

# भारत सरकार
# GOVERNMENT OF INDIA
# केंद्रीय लोक निर्माण विभाग
# CENTRAL PUBLIC WORKS DEPARTMENT

**Name of Work:** Construction of Office cum Residential and Hostel Complex for the Department of NIPER at Panihati, B.T. Road, Kolkata, West Bengal. Balance works of Administrative Building (G+4) storied, Animal House (G+1) storied, Girls Hostel (G+2), Boys Hostel (G+2) storied, Substation building, Pump House and Main Entrance Gate Structure with Security Cabin including bulk services and development works (Civil, Electrical and Mechanical)

# NIT

## NIT NO. 53/EE (E)-BCED/05/SE/Barasat/CPWD/2026-27-Recal1

**O/o THE SUPERINTENDING ENGINEER, BARASAT**
**CPWD, BARASAT, NIZAM PALACE, KOLKATA – 700020**

# INDEX

Name of Work: Construction of Office cum Residential and Hostel Complex for the Department of NIPER at Panihati, B.T. Road, Kolkata, West Bengal. Balance works of Administrative Building (G+4) storied, Animal House (G+1) storied, Girls Hostel (G+2), Boys Hostel (G+2) storied, Substation building, Pump House and Main Entrance Gate Structure with Security Cabin including bulk services and development works (Civil, Electrical and Mechanical)

NIT No: **53/EE (E)-BCED/05/SE/Barasat/CPWD/2026-27-Recal1**


| Sl. No. | Description | Page No. |
|---|---|---|
| 1 | Index | 3-4 |
| 2 | Approval of NIT | 5 |
| 3 | PART – A: General Information | 7 |
| 4 | Information & Instruction for Bidders for e-tendering | 9-11 |
| 5 | CPWD - 6 for e-tendering | 12-18 |
| 6 | Percentage rate tender & contract for works (Form CPWD - 7) | 19-20 |
| 7 | Proforma of Schedule (A to F) | 21-32 |
| 8 | Form of Bank Guarantee for Performance Guarantee / Security Deposit / Mobilization Advance | 33-34 |
| 9 | Undertaking on structural stability and soundness of already completed buildings and infrastructure projects (Form F) | 35 |
| 10 | Proforma for receipt of deposition of EMD | 36 |
| 11 | Form of application by the contractor for seeking extension of time | 37 |
| 12 | Form of application of the contractor for seeking rescheduling of the milestones | 38 |
| 13 | Part – B: Electrical Works | 39 |
| 14 | Additional Conditions of Contract and Specifications for E&M Works | 41-47 |
| 15 | Special Conditions of Contract for Electrical works as per CPWD Specification | 47-54 |
| 16 | Additional Conditions for Internal Electrical Installations | 54-60 |
| 17 | Additional Conditions for Cable and Cable Laying Work | 60-62 |
| 18 | Additional Conditions for Earthing System | 62-63 |
| 19 | Additional Conditions and Specifications for Wet riser and Sprinkler Installation | 63-69 |
| 20 | Additional Conditions for Fire Alarm System | 69-72 |
| 21 | Particular Specifications for VRV / VRF / Split AC | 72-83 |
| 22 | Solar Photovoltaic Panel | 83-88 |
| 23 | CCTV System | 88-89 |
| 24 | Specifications for 13 Passengers Lift | 89-92 |

| | | |
|---|---|---|
| 25 | Quality Assurance, Quality Audit and Inspection | 93 |
| 26 | Handover, Compatibility and Utilization of existing site materials | 94-95 |
| 27 | List of Preferred Makes (Electrical) | 96-103 |
| 28 | Memorandum of Understanding (MOU) | 104 |
| 29 | Willingness Certificate | 105 |
| 30 | PART – C: Civil Works | 107 |
| 31 | Section 1 Special Conditions | 109-130 |
| 32 | Section 2 Special Condition for Green Building | 131-142 |
| 33 | Section 3 Particular Specifications and Special Conditions for Cement | 143-144 |
| 34 | Section 4 Special Conditions for Steel Reinforcing Bar | 145-151 |
| 35 | Section 5 Additional Conditions and Particular Specifications for RCC Works | 152-157 |
| 36 | Section 6 Particular Specifications and Additional Conditions for Water Proofing Work | 158-159 |
| 37 | Section 7 | 160-166 |
| 38 | Section 8 Particular Specifications for Aluminium Work | 167-169 |
| 39 | Section 9 Fire Check / Rated Door | 170-172 |
| 40 | Guarantee To Be Executed by Contractor for Removal of Defects After Completion in Respect of Water Proofing Works (Annexure A1) | 173 |
| 41 | Guarantee To Be Executed by The Contractor for Removal of Defects After Completion in Respect of Sanitary Installations / Water Supply / Drainage Work / Aluminium Work / Structural Glazing Works (Annexure A2) | 174 |
| 42 | Guarantee To Be Executed by Contractor for Removal of Defects After Completion in Respect of Painting Work (Annexure A3) | 175 |
| 43 | List of Preferred Makes (Civil) | 176-193 |
| 44 | Part D: Schedule of Quantity | 195 |
| 45 | Schedule of Quantities (E&M) | 197-291 |
| 46 | Schedule of Quantities (Civil) | 292-318 |
| 47 | General Abstract | 319 |
| 48 | Proforma for quoting Rates | 320 |


**Certified that this NIT contains Page No. 01 to 320 (One to Three Hundred and Twenty) pages only including the cover page)**

Executive Engineer
Barasat-II, CPWD
Nizam Palace, Kolkata

Executive Engineer (E&M)
Barasat, CPWD
Salt Lake, Kolkata

Assistant Engineer (Admin)
O/o SE-Barasat, CPWD,
Nizam Palace, Kolkata

Assistant Engineer (P)
O/o SE-Barasat, CPWD,
Nizam Palace, Kolkata

# COMPOSITE NIT

| | |
|---|---|
| NIT No. | **53/EE (E)-BCED/05/SE/Barasat/CPWD/2026-27-Recal1** |
| Name of Work | Construction of Office cum Residential and Hostel Complex for the Department of NIPER at Panihati, B.T. Road, Kolkata, West Bengal. Balance works of Administrative Building (G+4) storied, Animal House (G+1) storied, Girls Hostel (G+2), Boys Hostel (G+2) storied, Substation building, Pump House and Main Entrance Gate Structure with Security Cabin including bulk services and development works (Civil, Electrical and Mechanical) |
| Estimated Cost | **₹ 25,03,70,795.00**<br>(Electrical: ₹ 12,74,10,464.00 + Civil: ₹ 12,29,60,331.00) |
| Earnest Money | **₹ 35,03,708.00** |
| Performance Guarantee | **(a) 5 % of the Tendered Value or Estimated Cost Put to Tender (ECPT) (whichever is higher)**<br>**(b) Where the tendered amount is less than eighty percent (80%) of the estimated cost put to tender (ECPT), the Performance Guarantee, in addition to the requirement as under (a) above, shall be increased by an amount equal to the difference between eighty percent (80%) of the ECPT and the tendered amount** |
| Security Deposit | **2.5% of tendered amount** |
| Time Allowed | **6 (Six) Months** |

Draft NIT amounting to **₹ 25,03,70,795.00 (Rupees Twenty-Five Crore Three Lakh Seventy Thousand Seven Hundred and Ninety-Five only)** is hereby approved

Executive Engineer
Barasat-II, CPWD
Nizam Palace, Kolkata

Executive Engineer (E&M)
Barasat, CPWD
Salt Lake, Kolkata

Assistant Engineer (Admin)
O/o SE-Barasat, CPWD,
Nizam Palace, Kolkata

Assistant Engineer (P)
O/o SE-Barasat, CPWD,
Nizam Palace, Kolkata

Superintending Engineer - Barasat
CPWD, Nizam Palace, Kolkata

BLANK

# PART – A
# General Information

BLANK

**INFORMATION AND INSTRUCTIONS FOR BIDDERS FOR e-TENDERING**
(FORMING PART OF TENDER DOCUMENT AND TO BE POSTED ON WEBSITE)

The Executive Engineer (E&M), Barasat, CPWD, 3rd Floor, CGO Complex, DF Block, Salt Lake – 700064 (Mobile No. – 8076300816; email: eeebed884@gmail.com) on behalf of President of India invites online percentage rate bids from the approved and eligible contractors of CPWD enlisted in appropriate class in composite category for the following work(s):

| Sl. No. | NIT No. | Name of Work & Location | Estimated cost put to tender | Earnest Money | Period of Completion | Last date & time of submission of Bid, EMD, copy of receipt for deposition of original EMD and other documents as specified in the NIT | Time and date of opening of Bid |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 | **53/EE (E)-BCED/05/SE/Barasat/CPWD/2026-27-Recal1** | Construction of Office cum Residential and Hostel Complex for the Department of NIPER at Panihati, B.T. Road, Kolkata, West Bengal. S.H: Balance works of Administrative Building (G+4) storied, Animal House (G+1) storied, Girls Hostel (G+2), Boys Hostel (G+2) storied, Substation building, Pump House, Main Entrance Gate Structure with Security Cabin including bulk services and development works (Civil, Electrical and Mechanical) | **₹ 25,03,70,795.00** (Electrical: ₹ 12,74,10,464.00 + Civil: ₹ 12,29,60,331.00) | **₹ 35,03,708.00** | **6 (Six) Months** | **10/12/2026 up to 05:00 PM** | **10/12/2026 up to 05:30 PM** |

1 The intending bidder must read the terms and conditions of CPWD-6 carefully. He should only submit his bid if he considers himself eligible and he is in possession of all the documents required.

2 Information and Instructions for bidders posted on website shall form part of bid document.

3 The bid document consisting of plans, specifications, the schedule of quantities of various types of work to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents can be seen and downloaded from website https://etender.cpwd.gov.in or www.cpwd.gov.in free of cost.

4 But the bid can only be submitted after deposition of original EMD either in the office of Executive Engineer inviting bids or division office of any Executive Engineer, CPWD within the period of bid submission and uploading the mandatory scanned documents such as Insurance Surety Bonds, Account Payee Demand Draft or Banker's Cheque or Fixed Deposit Receipts or / and Bank Guarantee including e-Bank Guarantee (for balance amount as prescribed) from any of Commercial Banks towards EMD in favour of Executive Engineer as mentioned in NIT**,** receipt for deposition of original EMD to division office of any Executive Engineer (including NIT issuing EE / AE), CPWD and other documents as specified. EMD shall be made / issued only from the account of the bidder / tenderer submitting the bid / tender. EMD made / issued from the account other than that of the bidder/ tenderer submitting the bid, shall not be accepted.

5 Those contractors who are not registered or have not updated their profile on the website mentioned above, are required to get registered / update their profile beforehand. The necessary training materials including the videos with step-to-step process available on download section of If needed they can be imparted training on online bidding process as per details available on the website https://etender.cpwd.gov.in.

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

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

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

9 Contractor must ensure to quote rate in the prescribed column(s) meant for quoting rate in figures appears in yellow colour and the moment rate is entered; it turns sky blue.

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

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

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

I Insurance Surety Bonds / Demand Draft / Account Payee Banker's Cheque / FDR / Bank Guarantee of any Commercial Bank against EMD. The EMD is to be drawn in favour of **Executive Engineer, Barasat Central Division-I, CPWD**. EMD shall be made / issued only from the account of the bidder / tenderer submitting the bid / tender. EMD made / issued from the account other than that of the bidder / tenderer submitting the bid, shall not be accepted

II Enlistment Order of the Contractor

III GST Registration Certificate if already obtained by the bidder.

If the bidder has not obtained GST registration as applicable, then in such case the bidder shall scan and upload following undertaking along with bid documents,

"If work is awarded to me, I / we shall obtain GST registration certificate, as applicable, within one month from the date of receipt of award letter of before release of any payment by CPWD, whichever is earlier, failing which I / we shall be responsible for any delay in payments which will be due towards me/us on account of the work executed and / or for any action taken by CPWD or GST department in this regard."

IV Copy of receipt for deposition of original EMD issued from division office of any Executive Engineer, CPWD

V Undertaking on structural stability and soundness as per prescribed format Form "F"

VI Training Certificate of ERP training in the name of himself or his authorized representative issued by any of the CPWD regional Training Institute (RTIs) at Delhi, Mumbai, Chennai, and Kolkata or by the National CPWD Academy (NCA), Ghaziabad or by any other special training arranged by ERP unit at CPWD Headquarter

Executive Engineer (E&M)
Barasat, CPWD
Salt Lake, Kolkata

**CPWD – 6**

**GOVERNMENT OF INDIA**

**CENTRAL PUBLIC WORKS DEPARTMENT**

**NOTICE INVITING BID FOR e-TENDERING**

1 Percentage Rate Bids are invited on behalf of President of India from approved and eligible contractors of CPWD for the work of "Construction of Office cum Residential and Hostel Complex for the Department of NIPER at Panihati, B.T. Road, Kolkata, West Bengal. S.H: Balance works of Administrative Building (G+4) storied, Animal House (G+1) storied, Girls Hostel (G+2), Boys Hostel (G+2) storied, Substation building, Pump House, Main Entrance Gate Structure with Security Cabin including bulk services and development works (Civil, Electrical and Mechanical)".

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

1.1 The work is estimated to cost **₹ 25,03,70,795/-.** This estimate, however, is given merely as a rough guide.

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

3 The time allowed for carrying out the work will be **6 (Six) Months** from the date of start as defined in Schedule 'F' or from the first date of handing over of the site, whichever is later, in accordance with the phasing, if any, indicated in the bid documents.

4 (i) The site for the work is available

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

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

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 CPWD for two years by the concerned enlistment authority (in case of CPWD enlisted contractor) and by the concerned SE / CE (in case of non-enlisted contractor).

7 While submitting the revised bid, contractor can revise the rate of one or more item(s) any number of times (he need not re-enter rate of all the items) but before last time and date of submission of bid as notified.

8 Earnest Money in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt, Banker's Cheque or Bank Guarantee including e-Bank Guarantee (for balance amount as prescribed) from any of the Commercial Banks (Drawn in favour of **Executive**

**Engineer, Barasat Central Division-I, CPWD**) shall be scanned and uploaded on the e-tendering website within the period of bid submission. The original EMD should be deposited either in the office of Executive Engineer inviting bids or division office of any Executive Engineer, CPWD within the period of bid submission. The EMD receiving Executive Engineer (including NIT issuing EE / AE) shall issue a receipt of deposition of earnest money deposit to the bidder in a prescribed format (enclosed) uploaded by tender inviting EE in the NIT. EMD shall be made / issued only from the account of the bidder / tenderer submitting the bid / tender. EMD made / issued from the account other than that of the bidder / tenderer submitting the bid, shall not be accepted.

This receipt shall also be uploaded to the e-tendering website by the intending bidder upto the specified bid submission date and time.

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

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

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

The bid submitted shall be opened **at 5:30 PM on 10/12/2026.**

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

(i) The bidder is found ineligible.

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

(iii) If any discrepancy is noticed between the documents as uploaded at the time of submission of bid and hard copies as submitted physically by the lowest bidders 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.

(v) The bidder does not upload the scanned copy of the Training Certificate of ERP training in the name of himself or his authorized representative issued by any of the CPWD regional Training

Institute (RTIs) at Delhi, Mumbai, Chennai, and Kolkata or by the National CPWD Academy (NCA), Ghaziabad or by any other special training arranged by ERP unit at CPWD Headquarter.

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

11 **The description of the work is as follows:**

Construction of Office cum Residential and Hostel Complex for the Department of NIPER at Panihati, B.T. Road, Kolkata, West Bengal. S.H: Balance works of Administrative Building (G+4) storied, Animal House (G+1) storied, Girls Hostel (G+2), Boys Hostel (G+2) storied, Substation building, Pump House, Main Entrance Gate Structure with Security Cabin including bulk services and development works (Civil, Electrical and Mechanical).

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

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

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

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

15 The contractor shall not be permitted to bid for works in the CPWD Circle (Division in case of contractors of Horticulture / Nursery category) responsible for award and execution of contracts, in which his near relative is posted as Divisional Accountant or as an officer in any capacity between the grades of Superintending Engineer and Junior Engineer (both inclusive). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any Gazetted officer in the Central Public Works Department or in the Ministry of Housing and Urban Affairs. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of this Department.

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

17 The bids for the work shall remain open for acceptance for a period of 30 (Thirty) days from the date of opening of bids in case of single bid system and 75 (Seventy-Five) days from the date of opening of technical bids in case bids are invited in 3 or 3 bid system. Further,

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

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

(iii) Withdrawal of the tender, by the tenderer, shall only be made through e-tender portal. Any other method i.e. through letter or email 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.

18 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:

18.1 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.

18.2 Standard C.P.W.D. Form 7 or other Standard C.P.W.D. Form as applicable

19 For Composite Bids:

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

19.2 The bid document will include following 4 (four) components:

**Part A**: CPWD-6, CPWD-7 including Schedule A to F for major and minor components of the work, Standard General Conditions of Contract for CPWD 2023 (Construction) as amended / modified up to last date of submission of bid, Form of Bank Guarantee for Earnest Money Deposit / Performance Guarantee / Security Deposit / Mobilisation Advance, Form F, Proforma for Receipt of Deposit of Earnest Money Deposit, Form of Application by the Contractor for seeking Extension of Time, Form of Application of the Contractor for seeking Rescheduling of Milestones.

**Part B (E & M Works)**: Additional Conditions of Contract and Specifications for E&M Works, Special conditions of contract for IEI & Firefighting system, Substation system, UPS system, Water pump system, VRF air conditioning system, CCTV, LAN system, Solar voltaic power generation system, DG set, Lift, Additional Conditions for Internal Electrical Installations, Cable and cable laying work, earthing scope, Wet riser and sprinkler system, VRV / VRF or split AC, Solar voltaic power generation system, CCTV system, Lift, Quality Assurance, Quality Audit and Inspection, Hand over, compatibility and utilization of existing site materials, List of Preferred Makes, Proforma for MoU and Proforma for Willingness Certificate

**Part C (Civil Works)**: Special Conditions, Special Conditions for Green Building, Particular Specifications and Special Conditions for Cement, Special Conditions for Steel Reinforcing Bars, Additional Conditions and Particular Specifications for RCC Works, Particular Specifications and Additional Conditions for Water Proofing Work, Conditions for Water, Particular Specifications for Aluminium Work, Guarantee for Aluminium Work, Fire Check / Rated Door, Annexure A1, A2 & A3 and List of Approved Material (Civil).

**Part D (Schedule of Quantity)**: Schedule of Quantity (E&M Works), Schedule of Quantity (Civil), General Abstract and Proforma for Quoting Rates.

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

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

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

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

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

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

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

19.9 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 specialised component(s).

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

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

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

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

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

20 The intending bidders are required to update their profile in CPWD e-tender portal and to upload their bids well in advance of last date of submission of tender. Any issue related to updating profile / uploading tender can be resolved through the concerned Executive Engineer (Mobile No. – 8076300816; email: eeebed884@gmail.com) or ERP Helpline No. 18001803286 or email id cpwd.support@techmahindra.com. The e-tendering bidders are also advised not to wait to raise any issues till the last date of submission of bid in their own interest.

21 In case of reduction in scope of work no claim on account of reduction in value of work, loss of expected profit, consequential overheads etc. shall be entertained.

22 Goods & Service Tax (GST), construction Worker's Welfare Cess, Education Cess, etc. shall be payable by the contractor and CPWD will not entertain any claim whatsoever in respect of same.

23 GST or any other tax applicable in respect of inputs procured by the contractor for this contract shall be payable by the Contractor and Government will not entertain any claim whatsoever in respect of the same. However, component of GST at time of supply of service (as provided in CGST Act 2017) provided by the contract shall be varied if different from that applicable on the last date of receipt of tender including extension if any.

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

Executive Engineer (E&M)
Barasat, CPWD
Salt Lake, Kolkata

**CPWD – 7**

**GOVERNMENT OF INDIA**
**CENTRAL PUBLIC WORKS DEPARTMENT**
**PERCENTAGE RATE TENDER & CONTRACT FOR WORKS**

(A) Tender for the work of: Construction of Office cum Residential and Hostel Complex for the Department of NIPER at Panihati, B.T. Road, Kolkata, West Bengal. S.H: Balance works of Administrative Building (G+4) storied, Animal House (G+1) storied, Girls Hostel (G+2), Boys Hostel (G+2) storied, Substation building, Pump House, Main Entrance Gate Structure with Security Cabin including bulk services and development works (Civil, Electrical and Mechanical)

(i) To be uploaded by **17.00 hours on 10/12/2026** to / upload at https://etender.cpwd.gov.in.
(ii) To be opened in presence of tenderers who may be present **at 5:30 P.M. on 10/12/2026** in the office of the Executive Engineer (E&M), Barasat, CPWD, 3rd Floor, CGO Complex, Salt Lake, Kolkata

TENDER

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

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

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

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

A copy of earnest money deposit receipt of prescribed amount deposited in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt, Banker's Cheque or Bank Guarantee (as prescribed) issued by a Commercial Bank, is scanned and uploaded (strike out as the case may be).

If I / We, fail to furnish the prescribed performance guarantee within prescribed period, I / We agree that the said President of India or his successors, in office shall without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely. Further, if I / We fail to commence work as specified, I / We agree that President of India or the successors in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said performance guarantee absolutely. The said Performance Guarantee shall be a guarantee to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to those in excess of that limit at the rates to be determined in accordance with the provision contained in Clause 12.2 and 12.3 of the tender form.

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

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

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

Dated:

Witness: (Signature of Contractor)

Address:

Occupation: (Postal Address)

**ACCEPTANCE**

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

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

(a) _____

(b) _____

(c) _____

For & on behalf of the President of India

Signature: ___ _____

Dated: ____ / _____ / 20 _____

Designation: _____

## PROFORMA OF SCHEDULES (A to F)

**SCHEDULE 'A'**

Schedule of quantities for E&M and Civil works are enclosed **Page - 197 to 318**

**SCHEDULE 'D'**

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

**SCHEDULE 'E'**

| | |
|---|---|
| Reference to General Conditions of Contract | GCC for CPWD 2023 Construction Works as amended / modified upto last date of submission of tender |
| Name of Work: | Construction of Office cum Residential and Hostel Complex for the Department of NIPER at Panihati, B.T. Road, Kolkata, West Bengal. S.H: Balance works of Administrative Building (G+4) storied, Animal House (G+1) storied, Girls Hostel (G+2), Boys Hostel (G+2) storied, Substation building, Pump House, Main Entrance Gate Structure with Security Cabin including bulk services and development works (Civil, Electrical and Mechanical) |
| Estimated cost of work | **₹ 25,03,70,795.00**<br>**(Electrical: ₹ 12,74,10,464.00 + Civil: ₹ 12,29,60,331.00)** |
| Earnest money | **₹ 35,03,708.00** |
| Performance Guarantee | (a) 5 % of the Tendered Value or Estimated Cost Put to Tender (ECPT) (whichever is higher)<br>(b) Where the tendered amount is less than eighty percent (80%) of the estimated cost put to tender (ECPT), the Performance Guarantee, in addition to the requirement as under (a) above, shall be increased by an amount equal to the difference between eighty percent (80%) of the ECPT and the tendered amount |
| Security Deposit | 2.5 % of tender value |

**SCHEDULE 'F'**

General Rules & Directions:

| | | | |
|---|---|---|---|
| 1 | Officer inviting tender | : | Executive Engineer (E&M), Barasat, CPWD, Salt Lake, Kolkata |
| 2 | Maximum percentage for quantity of items of work to be executed beyond which rates are to be determined in accordance with Clauses 12.2 & 12.3 | : | As per Clauses 12.2 & 12.3 |

| | | | |
|---|---|---|---|
| 3 | Definitions | : | |
| (i) | Engineer-in-Charge (Civil) | : | Executive Engineer (Civil), Barasat Central Division - II, CPWD, Barasat or successors thereof |
| (ii) | Engineer-in-Charge (Electrical) | : | Executive Engineer (E&M), Barasat, CPWD, Salt Lake, Kolkata or successors thereof |
| (iii) | Accepting Authority | : | Superintending Engineer, CPWD, Barasat or successor thereof |
| (iv) | Percentage on cost of materials and labour to cover all overheads and profits | : | 15% |
| (v) | Standard Schedule of Rates | | DSR 2023, DSR (E&M) 2025 & Market Rates |
| (vi) | Department | | Central Public Works Department |
| (vii) | Standard CPWD contract Form GCC 2020, CPWD Form 7/ 8 as modified & corrected upto last date of submission of bids | | CPWD Form 7 and GCC CPWD 2023 Construction Works as modified & corrected up to last date of submission of tender (whether correction vide latest circulars are incorporated or not in this document) |

**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 | 7 Days |
| (ii) | Maximum allowable extension with late fee @ 0.1% per day of Performance Guarantee amount beyond the period provided in (i) above | 7 Days |

**Clause 2**

| | |
|---|---|
| Authority for fixing compensation under Clause 2 | Superintending Engineer, CPWD, Barasat or successor thereof |

**Clause 5**

| | |
|---|---|
| Number of days from the date of issue of letter of acceptance for reckoning date of start | 10 Days or date of handing over of site whichever is later |

Milestone(s) as per table given below

| Sl. No. | Description of Milestone (Physical) | Time allowed (from date of start) | Amount to be with-held in case of non-achievement of milestone |
|---|---|---|---|
| (A) | (B) | (C) | (D) |
| 1 | a) Submission of Completion Program including critical path analysis, mobilization and setting up of site infrastructure like Site Office, Site Lab, access road, etc., obtaining labour licence and quarry permits, mobilisation of manpower and tools and plants, collection of centering and shuttering materials of minimum 1000 sqm, completion of barricading as per requirement b) Finalization of the road layout at site c) Finalization of all mix designs d) Procurement and laying of external water-supply pipelines e) Completion of cross-drainage works f) Completion of all works up to plinth level for the main entrance gate and security cabin g) Completion of all works upto plinth level including plinth level slab of substation building h) Completion of brickwork up to lintel level of the substation building i) Completion of toilet partitions in the Administrative Block j) Completion of plumbing work in the wet laboratories of Administrative Block k) Submission of shop drawings of structural glazing l) Finalization of specialized agencies / associate agencies for specialized civil and E&M works m) Preparation and approval of drawings and makes for all electrical and mechanical (E&M) works, including substation and transformer-related drawings n) Approval of brands and models of all civil and E&M materials and o) Placement of orders for all E&M equipment required for the work | 2 Months | 1% of composite tendered cost |
| 2 | a) Completion of 50% of the road work in all respects b) Completion of flooring works (granite & wall tiles) and stainless-steel railings in the Administrative Block c) Completion of treatment of expansion joints works of Administrative Block d) Procurement of structural-glazing materials e) Completion of 50% wall putty work in Administrative Building f) Completion of the superstructure of the electrical substation (ESS), including plastering and waterproofing treatment at | 3 Months | 1% of composite tendered cost |

| | | | |
|---|---|---|---|
| | terrace g) Completion of the RCC structure of the main entrance gate and security cabin h) Completion of all works of the pump house and underground sump i) Completion of cable laying from the substation to the different feeder pillars and j) Supply of feeder pillars, Supply of all types of electrical fittings including external-lighting equipment, Supply of all variable refrigerant flow (VRF) air-conditioning system equipment and solar photovoltaic (PV) power-plant equipment | | |
| 3 | a) Completion of 75% of the road work b) completion of fire-door works including fittings of Administrative Block c) Completion of civil works of the substation building in all respects d) Completion of all wall-putty work of buildings e) Completion of 80% of false-ceiling work in the Administrative Block f) Installation of feeder pillars and electrical fittings including external-lighting equipment g) Supply and installation of firefighting, fire-alarm and CCTV systems h) Installation of VRF air-conditioning and solar PV power-plant equipment and i) Supply of all substation equipment, including the DG set, lifts with all allied equipment | 4 Months | 1% of composite tendered cost |
| 4 | a) Completion of all road works including surface drainage and gully chambers b) Completion of 50% of structural glazing works of the Administrative Block c) Completion of false-ceiling work and frameless glass doors in the Administrative Block d) Completion of the main entrance structure in all respect e) Completion of installation of all substation equipment, including the DG set and UPS and f) installation of lifts with all associated machinery | 5 Months | 1% of composite tendered cost |
| 5 | a) Completion of all Civil and E&M works in all respects as per full scope of the agreement b) Testing and commissioning of the VRF system, substation, DG set, lifts, solar PV power plant and all other E&M equipment and systems c) Submission of warranty documents, inventory lists and as-built drawings d) Cleaning of work site, removal of scraps & waste materials in all respect and e) Handing Over in full functional condition | 6 Months | 1% of composite tendered cost |

Withheld amount shall be released if and when subsequent milestone is achieved within respective time specified. The main contractor will ensure that electrical components of the work are executed in time without giving any chance for slippage of milestone an account of delay in execution of associated electrical

works by him. However, in case milestones are not achieved by the contractor for the work, the amount shown against milestone shall be withheld by the Engineer-In-Charge of the respective components.

**Note**: Intending bidder may submit phasing of activities / milestones on the basis of their resources and methodology at the time of tendering corresponding to physical milestones / stages indicated in the above table. These shall be formed part of the agreement after approval of the accepting authority.

| | |
|---|---|
| Time allowed for execution of work | **6 (Six) Months**;<br>Time shall be Essence of the Contract and the work is to be completed on Time |

**Authority to Decide:**

| | |
|---|---|
| Extension of time | Executive Engineer (E&M), Barasat, CPWD, Salt Lake, Kolkata or successors thereof |
| Rescheduling of milestones | Superintending Engineer, CPWD, Barasat or successor thereof |
| Shifting of date of start in case of delay in handing over of site | Superintending Engineer, CPWD, Barasat or successor thereof |

**PROFORMA OF SCHEDULES (CLAUSE 5)**

**Clause 5.1** The Contractor shall submit a Time and Progress chart for each mile stone as soon as possible but within 7 days of issue of letter of award of work. Such chart shall be made in due consideration of the Schedule of Handing over of site as specified in the Schedule F (**Annexure-A)**. The Engineer-in-Charge may within 7 (seven) days of receipt of such chart, make modifications thereafter, if any, and communicate the approved chart to the contractor, failing which the chart submitted by the contractor shall be deemed to be approved by the Engineer-in-Charge.

Schedule of Handing over of Site (Annexure A)

| 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 | 100% | 10 Days or date of handing over of site whichever is later |
| Part B | Portion with encumbrances | 0% | -- |

Schedule of issue of Designs and Drawings (Annexure-B)

| Part | Portion of Design | Description | Time period for issue of design reckoned from date of receipt of tenders |
|---|---|---|---|
| Part A | Architectural Drawings | Architectural drawings | 10 (Ten) days or date of handing over of site whichever is later |
| Part B | Structural Drawings | Foundation Drawings | Date of start of individual activity for which contractor has to intimate at least 15 days before taking up the respective activity |

| | | | |
|---|---|---|---|
| | | Superstructure Drawings | Date of start of individual activity for which contractor has to intimate at least 15 days before taking up the respective activity |
| Part C | Service Drawings | MEP Drawings | Date of start of individual activity for which contractor has to intimate at least 15 days before taking up the respective activity |

**Clause 5.1**

| | |
|---|---|
| Schedule of rate of recovery for delay in submission of monthly progress report | **₹ 1,500 per week or part thereof** |

**Clause 5.2**

| | |
|---|---|
| Mode of giving notices for hindrance | Hindrance reporting to be done online through ERP Portal |

**Clause 5.4**

| | |
|---|---|
| Schedule of rate of recovery for delay in submission of revised programme | **₹ 1,000 per day** |

| | |
|---|---|
| **Clause 6** | Applicable –EMB through ERP Portal |

**Clause 7**

| | |
|---|---|
| Gross work to be done together with net payment / adjustment of advances for material collected, if any, since the last such payment for being eligible to interim payment | For Civil Component – ₹ 160 lakhs or mutually agreed upon<br>For E&M Component – ₹ 160 lakhs or mutually agreed upon |

**Clause 7A**

| | |
|---|---|
| Whether Clause 7A shall be applicable | Yes<br>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, are submitted by the contractor to the Engineer-in-Charge |

**Clause 8A**

| | |
|---|---|
| Authority to decided compensation on account if contractor fails to submit completion plans | Executive Engineer (E&M), Barasat, CPWD, Salt Lake, Kolkata or successors thereof |
| Compensation | 0.1% of accepted tendered value |

**Clause 10A for Civil Component**

List of equipment for field testing laboratory

| Sl. No. | Equipment | Number (Min.) |
|---|---|---|
| 1 | Balances | |
| | (i) 7 Kg to 10 Kg capacity, Semi self-indicating type-accuracy 10 gm | 1 No. |
| | (ii) 500 gm capacity, semi self-indicating type-accuracy 1 gm | 1 No. |
| | (iii) Pan Balance – 5 Kg capacity accuracy 1 gm | 1 No. |
| 2 | Sieve as per IS460-1962 | |
| 2.1 | 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 | 2 Set |
| 2.2 | I.S. sieves – 200mm internal dia. (brass frame) consisting of 2.36mm, 1.18mm, 600 microns, 425 microns, 300 microns, 212 microns, 150 microns, 90 microns, 75 microns, with lid and pan | 2 Set |
| 3 | Sieve Shaker capable to handle 200 mm dia. - 300 mm dia. sieves, manually operated with timing switch assembly | 1 No. |
| 4 | Graduated Measuring Cylinders 200 ml capacity | 2 Nos. |
| 5 | Enamel Trays (for efflorescence test for bricks) | |
| 5.1 | (i) 300 mm x 250 mm x 40 mm | 2 Nos. |
| 5.2 | (ii) Circular plates of 250 mm dia. | 2 Nos. |
| 6 | Universal Testing Machine | 1 No. |
| 7 | Steel tapes – 5 m | 4 Nos. |
| 8 | Vernier Callipers | 2 Nos. |
| 9 | Micrometer screw 25 mm guage | 1 No. |
| 10 | A good quality plumb bob | 3 Nos. |
| 11 | Spirit level, minimum 30 cm long with 3 bubbles for horizontal vertical | 3 Nos. |
| 12 | Wire Guage (circular type) disc | 1 No. |
| 13 | Foot rule | 1 No. |
| 14 | Long nylon thread | 3 Nos. |
| 15 | Magnifying glass | 1 No. |
| 16 | Screw driver 30 cm long | 2 Nos. |
| 17 | Ball pin hammer, 100 gm | 1 Nos. |
| 18 | Plastic bags for taking samples | 4 Nos. |

| | | |
|---|---|---|
| 19 | Moisture meter for timber | 1 No. |
| 20 | Ovens-electrically operated, thermostatically controlled upto 110°C - sensitivity 1°C | 1 No. |
| 21 | Equipment for slump test- Slump cone, steel plate, tamping rod, steel scale, scoop | 1 Set |
| 22 | 100 tonnes compression testing machine, electrical-cum manually operated | 1 No. |

**For Electrical Component:**

| Sl. No. | Equipment | Number (Min.) |
|---|---|---|
| 1 | Insulation resistance Tester (1000 V) | 1 No. |
| 2 | Earth Resistance Tester | 1 No. |
| 3 | Multi-metre | 1 No. |
| 4 | Tong Tester | 1 No. |
| 5 | Any other equipment required for proper testing and commissioning of the work | 1 No. |

**Clause 10B (i)**

Whether Clause 10B (i) shall be applicable **Applicable**

**Clause 10B (ii)**

Whether Clause 10B (ii) shall be applicable **Applicable**

**Clause 10C** **Not Applicable**

**Clause 10CA** **Not Applicable**

**Clause 10CC** **Not Applicable**

**Clause 11**

Specifications to be followed for execution of works:

Civil Work — CPWD Specifications 2019 (Reprint) Volume – I & II with corrections slips up to last date of submission of bid

Electrical Work —
a) CPWD General Specifications for Electrical Works – Part-I (Internal), 2023 amended up to date
b) CPWD General Specifications for Electrical Works – Part-II (External), 2023 amended up to date
c) CPWD General Specifications for Electrical Works, Part – III, Lifts and Escalators 2003 amended up to date
d) CPWD General Specifications for Electrical Works – Part-IV (Sub Station)

e) CPWD General Specifications for Electrical Works – Part-V (Wet Riser & Sprinkler System), 2018 amended up to date

f) CPWD General Specifications for Electrical Works – Part-VI (Fire Detection and Fire Alarm System), 2018 amended up to date

g) CPWD General Specifications for Electrical Works – Part-VII (D.G. Sets)

h) Heating Ventilation & Air-conditioning (HVAC) Works 2017 amended up to date

Note:

1) The above Specifications shall be applicable with correction slips up to the last date of submission / uploading of bid and amendments thereof

2) Wherever CPWD Specifications are not available, works shall be executed as per Special Conditions, Particular Specifications, Relevant BIS Codes and terms and conditions mentioned in the NIT. Where no specifications or BIS Code is available, Manufacturer's Specifications shall be followed

3) The direction of the Engineer-in-Charge shall be followed in absence of the above two

**Clause 12**:

| Type of work | | **Original work** |
|---|---|---|
| 12.2 & 12.3 | Deviation Limit beyond which Clauses 12.2 & 12.3 shall apply for building work | 100% |
| | (i) Deviation Limit beyond which clauses 12.2 & 12.3 shall apply for foundation work (except items mentioned in earth work subhead in DSR and related items) | |
| | (ii) Deviation Limit for items mentioned in earth work subhead of DSR and related items | |

**Clause 16**

| | |
|---|---|
| Competent Authority for deciding reduced rates | Superintending Engineer, CPWD, Barasat or successor thereof |

**Clause 18**

List of Mandatory Machinery, Tools & Plants to be deployed by the Contractor at Site

| Sl. No. | Machinery, Tools & Plants | Quantity |
|---|---|---|
| **1** | Excavator (various capacity) | 1 No. |
| 2 | Concrete Batching Plant (10 cum / hour) | 1 No. |
| 3 | Builders Hoist | 1 No. |
| 4 | Needle Vibrator (40/60 mm) | 4 Nos. |
| 5 | Concrete Pump | 1 No. |
| 6 | Drilling Machine | 2 Nos. |
| 7 | D.G Set of required capacity | As per requirement |

| | | |
|---|---|---|
| 8 | RO Plant and Iron Removal Plant | As per requirement |
| 9 | Total Station | 1 No. |
| 10 | Vibratory Roller / Pneumatic Roller / Sheep foot Roller | 1 No. each as per requirement |
| 11 | Minimum Steel shuttering to be provided by the agency | 1000 sqm |
| 12 | Water Pump set for curing | 2 Nos. |
| 13 | Mortar Mixture machine hopper type– 1 bag capacity | 1 No. |
| 14 | Floor grinding / polishing machine | 2 Nos. |
| 15 | Screeners for sand | 5 Nos. |
| 16 | Any other machinery as required for completion of the work as per decision of Engineer-in-Charge | As per requirement |

Note: (1) The above list is only indicative and not exhaustive and is for general guidance. The bidder may be required to deploy more T&P as per requirement of work at any stage at this own cost & nothing extra whatsoever on this amount shall be paid. This includes equipment for arrangement of concrete from RMC producing plants also.

(2) The equipment, T&P and machinery shall be kept in good working condition.

(3) Equipment like concrete mini batching plant, concrete pump, excavators, roller, polishing machine, etc. shall be allowed to be moved away from the site when the same are no longer required at site of work in the opinion of Engineer-in-Charge.

(4) In addition to above list, contractor is bound to bring at site any test equipment for any item of work at his own cost, which Engineer-in-Charge may direct him. Nothing extra shall be paid in this regard. Decision of Engineer-in-Charge in this regard shall be final and binding.

(5) If the contractor fails to comply such directions within time specified by the Engineer-in-Charge, the same shall be brought to site by Department at risk and cost of contractor. The expenditure thus incurred shall be deducted from the dues of the contractor.

**Clause 19 – Labour laws to be complied by the Contractor**

| | |
|---|---|
| Competent authority for deciding penalty | Executive Engineer (E&M), Barasat, CPWD, CGO Complex, Salt Lake, Kolkata or successors thereof |
| **Clause 19C** | ₹ 1,000/- for each default |
| **Clause 19D** | ₹ 1,000/- for each default |
| **Clause 19G** | ₹ 1,000/- per day for each default (subjected to maximum of 5% of the contract value) |
| **Clause 19K** | ₹ 1,000/- per tradesman per day |

**Clause 25**

| | |
|---|---|
| Conciliator for settlement of disputes | Special Director General, CPWD, Kolkata or his successor thereof |
| Arbitrator Appointing Authority | Superintending Engineer, CPWD, Barasat or successor thereof |

| | |
|---|---|
| Place of Conciliation | Kolkata |
| Place of Arbitration | Kolkata |

**Clause 32**

**Requirement of Technical Representative(s) and Recovery Rate**

| Sl. No. | Minimum Qualification of Technical Representative | Designation of Technical Staff | Minimum experience in years | Number (of major + minor component) | Rate at which recovery shall be made from the contractor in the event of not fulfilling provision of Clause 32 (i) | |
|---|---|---|---|---|---|---|
| | | | | | Figures | Words |
| 1 | Graduate Engineer | Project Manager | 20 (and having experience of one similar nature of work) | 1 | ₹ 60,000/- Per Month | Rupees Sixty thousand per Month |
| 2 | Graduate Engineer | Deputy Project Manager | 12 (and having experience of one similar nature of work) | 1 | ₹ 40,000/- Per Month | Rupees Forty thousand per Month |
| 3 | Graduate Engineer or Diploma Engineer | Project / Site Engineer | 5 or 10 respectively | 1+1 | ₹ 25,000/- Per Month | Rupees Twenty-Five thousand per Month |
| 4 | Graduate Engineer or Diploma Engineer | Project Planning / Quality / Billing Engineer | 2 or 5 respectively | 1+1 | ₹ 15,000/- Per Month | Rupees Fifteen thousand per Month |

**Note:**

1. In addition to above, the Main Contractor / Specialized Firms engaged by the Main Contractor shall deploy sufficient number of experienced engineers / technicians and work force along with tools and plants required for safe execution of various operations / activities. For slow progress and any untoward incident, the main Contractor shall be held responsible.

2. Specialized technical staffs for execution of components such as plumbing, water proofing, fire-fighting, etc. shall be deployed as per requirement of work.

3. Assistant Engineers retired from Government services who 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.

4. The contractor shall submit a certificate of employment of the technical representative(s) (in the form of copy of Form -16 or CPF deduction issued to the Engineers employed by him) along with every account bill / final bill and shall produce evidence if at any times so required by the Engineer-in-charge.

**Clause 38**

(i) (a) Schedule / Statement for determining theoretical quantity of cement & bitumen on the basis of Delhi Schedule of Rates 2023 with corrections slips up to last date of submission of bid

(ii) Variations permissible on theoretical quantities

| | | |
|---|---|---|
| (a) | Cement | |
| | For works with estimated cost put to tender more than ₹ 25 lakh | 2 % plus / minus |
| (b) | Bitumen All Works | 2.5% plus & only & nil on minus side |
| (c) | Steel Reinforcement and structural steel sections for each diameter, section and category | 2% plus / minus |
| (d) | All other materials | Nil |

On non-judicial stamp paper of minimum ₹100

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

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

1 Whereas the Executive Engineer (E&M), Barasat, CPWD, 3rd Floor, CGO Complex, Salt Lake, Kolkata on behalf of the President of India (hereinafter called "The Government") has invited bids under NIT No. **53/EE (E)-BCED/05/SE/Barasat/CPWD/2026-27-Recal1** for "Construction of Office cum Residential and Hostel Complex for the Department of NIPER at Panihati, B.T. Road, Kolkata, West Bengal. S.H: Balance works of Administrative Building (G+4) storied, Animal House (G+1) storied, Girls Hostel (G+2), Boys Hostel (G+2) storied, Substation building, Pump House, Main Entrance Gate Structure with Security Cabin including bulk services and development works (Civil, Electrical and Mechanical)". The Government has further agreed to accept irrevocable Bank Guarantee for ₹…….. (Rupees…….Only) valid upto…… (date)* as Earnest Money Deposit from……(name and address of contractor) ……(hereinafter called "the contractor") for compliance of his obligations in accordance with the terms and conditions of the said NIT

OR**

Whereas the Executive Engineer (E&M), Barasat, CPWD, 3rd Floor, CGO Complex, Salt Lake, Kolkata on behalf of the President of India (hereinafter called "The Government") has entered into an agreement bearing No ..... with .....(name and address of contractor) …… (hereinafter called "the contractor") for execution of work of "Construction of Office cum Residential and Hostel Complex for the Department of NIPER at Panihati, B.T. Road, Kolkata, West Bengal. S.H: Balance works of Administrative Building (G+4) storied, Animal House (G+1) storied, Girls Hostel (G+2), Boys Hostel (G+2) storied, Substation building, Pump House, Main Entrance Gate Structure with Security Cabin including bulk services and development works (Civil, Electrical and Mechanical)". The Government has further agreed to accept an irrevocable Bank Guarantee for ₹…… (Rupees……. Only) valid upto….. (date)* as Performance Guarantee / Security Deposit / Mobilization Advance from the said contractor for compliance of his obligations in accordance with the terms and conditions of the agreement.

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

3 We, ……(indicate the name of the Bank) ..... do 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 as required to meet the recoveries due or likely to be due from the said Contractor. Any such demand made on the bank shall be conclusive as regards the amount due and payable by the Bank under this Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding ₹ …….. (Rupees …….only).

4 We, …….. (indicate the name of the bank) ……., further undertake to pay the Government any money so demanded notwithstanding any dispute or disputes raised by the contractor(s) in any suit or proceeding pending before any court or Tribunal, our liability under this Bank Guarantee

being absolute and unequivocal. The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the Contractor shall have no claim against us for making such payment.

5 We, ……. (indicate the name of the Bank)…….., further agree that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligation hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Contractor from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said contractor and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor or for any forbearance, act of omission on the part of the Government or any indulgence by the Government to the said Contractor or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

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

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

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

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

Date …..……..

Witnesses:

1. Signature ……..
Name and address

2. Signature……
Name and address

Authorized Signatory
Name
Designation
Staff Code No.
Bank Seal

**FORM "F"**

**UNDERTAKING ON STRUCTURAL STABILITY AND SOUNDNESS OF ALREADY COMPLETED BUILDINGS AND INFRASTRUCTURE PROJECTS**

| | |
|---|---|
| Name of Work | Construction of Office cum Residential and Hostel Complex for the Department of NIPER at Panihati, B.T. Road, Kolkata, West Bengal. S.H: Balance works of Administrative Building (G+4) storied, Animal House (G+1) storied, Girls Hostel (G+2), Boys Hostel (G+2) storied, Substation building, Pump House, Main Entrance Gate Structure with Security Cabin including bulk services and development works (Civil, Electrical and Mechanical) |
| NIT No. | **53/EE (E)-BCED/05/SE/Barasat/CPWD/2026-27-Recal1** |

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

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

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

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

| | |
|---|---|
| Signature of notary with seal | Signature of bidder or an authorized person of the firm with stamp |

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

# PROFORMA FOR RECEIPT OF DEPOSITION OF EMD

Receipt of deposition of original EMD

(Receipt No……*……../ date……* ….....  )

Name of work: Construction of Office cum Residential and Hostel Complex for the Department of NIPER at Panihati, B.T. Road, Kolkata, West Bengal. S.H: Balance works of Administrative Building (G+4) storied, Animal House (G+1) storied, Girls Hostel (G+2), Boys Hostel (G+2) storied, Substation building, Pump House, Main Entrance Gate Structure with Security Cabin including bulk services and development works (Civil, Electrical and Mechanical)

1 NIT No: 53/EE (E)-BCED/05/SE/Barasat/CPWD/2026-27-Recal1

2 Estimated Cost: **₹ 25,03,70,795/-**

3 Amount of Earnest Money Deposit: **₹ 35,03,708/-**

4 Last date of submission of bid: upto **05:00 P.M. on 10.12.2026**

1 Name of contractor …..... #

2 Form of EMD …..... #

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

4 Date of submission of EMD …..... #

(**To be filled by EMD receiving EE)

(EMD should be drawn in favour of **Executive Engineer, Barasat Central Division- I, CPWD)**

Signature, Name & Designation of
EMD receiving officer (EE / AE (P) / AE / AAO)
Along with officer stamp

Notes:

1. 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 EE / AE(P) / AE / AAO.
2. The original EMD receiving Executive Engineer shall release the EMD after verification from the e-tendering portal https://etender.cpwd.gov.in that the particular contractor is not L-1 tenderer and work is awarded.
3. The tender inviting Executive Engineer will call for original EMD of the L1 tenderer from EMD receiving Executive Engineer immediately.

**FORM OF APPLICATION BY THE CONTRACTOR FOR SEEKING EXTENSION OF TIME**
**PART - I**

1. Name of Contractor
2. Name of work as given in the agreement
3. Agreement No.
4. Estimated amount put tender
5. Date of commencement of work as per agreement
6. Period allowed for completion of work as per agreement
7. Date of completion stipulated in agreement
8. Period for which extension of time has been given previously:

| | EE's letter No. and Date | Extension granted | |
|---|---|---|---|
| | | Months | Days |
| (a) 1st extension …….. | | | |
| (b) 2nd extension …….. | | | |
| (c) 3rd extension …….. | | | |
| (d) 4th extension …….. | | | |
| (e) Total extension previously given….. | | | |

9. Reasons for which extension have been previously given (copies of the previous applications should be attached)
10. Period for which extension if applied for
11. Hindrances on account of which extension is applied for with dates on which hindrances occurred and the period for which these are likely to last.
(a) Serial no.
(b) Nature of hindrance
(c) Date of occurrence
(d) Period for which it is likely to last
(e) Period for which extension required for this particular hindrance
(f) Overlapping period if any, with reference to item
(g) Net extension applied for
(h) Remarks, if any
Total period on account of hindrances mentioned above…… Months ……. Days
12. Extension of time required for extra work
13. Details of extra work and the amount involved:
(a) Total value of extra work
(b) Proportionate period of extension of time based on estimated amount put to tender on account of extra work.
14. Total extension of time required for 11 & 12

Submitted to the Sub Divisional Officer ……

Signature of contractor Date:

**FORM OF APPLICATION OF THE CONTRACTOR FOR SEEKING RESCHEDULING OF THE MILESTONES**

1. Name of contractor
2. Name of work as given in the agreement
3. Agreement no.
4. Estimated amount put tender
5. Date of commencement of work as per agreement
6. Period allowed for completion of work as per agreement
7. Date of completion stipulated in agreement
8. Rescheduling of milestones done previously

| Milestone No. Already Rescheduled | EE's Letter No. and Date | Rescheduling Of Milestones Done | |
|---|---|---|---|
| | | Original Date | Rescheduled Date |
| (A) 1st Milestone | | | |
| (B) 2nd Milestone | | | |
| ..... | | | |

Rescheduling of milestone applied for

| Milestone No. for Which Rescheduling is Applied | Original / Rescheduled Date | Details and Period of Hindrances | Comments of Executive Engineer | Proposed Rescheduled Date of |
|---|---|---|---|---|
| (A) 1st Milestone | | | | |
| (B) 2nd Milestone | | | | |
| ..... | | | | |

Submitted to the Sub Divisional Officer  Signature of Contractor

Date

# Part – B
# (E&M Works)

BLANK

## ADDITIONAL CONDITIONS OF CONTRACT & SPECIFICATIONS FOR E & M WORKS

### 1.0 GENERAL AND COMMERCIAL CONDITIONS

1.1 This section covers the various commercial conditions applicable and to be read in connection with the conditions of contract of the standard form (CPWD-7) of the department (CPWD) forming part of the tender papers. In the event of any discrepancy between these two, the requirements of the former will be followed.

1.2 These additional conditions and additional specifications are applicable to all E&M works in general. For specific tenders some of the E&M services may not be a part of the particular tender. In such cases the conditions and specifications which are not related to the works or components thereof mentioned in the schedule of work shall not apply for that particular tender.

1.3 All the E & M works shall be carried out as per direction and to the entire satisfaction of the Engineer-in-charge.

1.4 The contractor has to submit all the drawings to the Engineer–in–charge of the works for approval i.e. HT panel, MV panel, AMF panel, Pole & Pole Bracket for Street light, all other panels &layout drawing of all works before execution or procurement of materials.

Unless otherwise specified in the following conditions, the work shall, in general, be carried out as per following specifications:

a) CPWD General Specifications for Electrical Works–Part-I(Internal) 2023 amended upto date

b) CPWD General Specifications for Electrical Works–Part-II(External)2023 amended upto date

c) CPWD General Specifications for Electrical Works, Part – IV, Substation 2013 amended up to date

d) CPWD General Specifications for Electrical Works – Part-V (Wet Riser & Sprinkler System) 2020 amended up to date

e) Relevant BIS specifications amended up to date

f) Indian Electricity Act 2003 and Indian Electricity Rules 1956 amended up to date

g) Local Fire Regulations applicable at the place of installation

h) Relevant and applicable foreign standards and specifications amended up to date.

i) Any other relevant act or rules and local byelaws

j) Commercial and additional conditions and specifications for E & M work for this tender

1.5 If the specifications for any item or its component are not available in the CPWD specifications cited above, relevant BIS specification as amended up to date shall be followed, whether or not the specific reference of a particular BIS specification has been made in this specification / tender document.

1.6 Wherever any reference to any Indian Standard specification occurs in the document relating to this contract the same shall be inclusive of all amendments issued thereto or revisions thereof, if any, up to the date of opening of tenders.

1.7 All materials should conform to relevant BIS specifications wherever the same exists in absence of stipulation in this tender document.

1.8 Where manufacturers furnish specific instructions / recommendations relating to the materials used in this job and / or their installation, covering points not specifically mentioned in these documents, these instructions shall be followed in all cases and shall be deemed to be included in the schedule of work whether they have been specifically mentioned or not.

1.9 Manufacturer's catalogue / literature on installation, testing, maintenance and troubleshooting of major equipment shall be submitted to the department while handing over the installation.

1.10 **Materials to be used in the Work**:

1.10.1 All materials used in the work shall be new and of good quality, conforming to the relevant specifications as per good Engineering practice.

1.10.2 All the materials proposed to be used in the work should be got approved from Engineer in Charge before use in work.

1.10.3 The materials to be supplied / provided by the contractor in execution of the work should be ISI marked, wherever applicable and of make as specified in the agreement. Where the make of any particular material is not specified in the contract document, the material shall be supplied as per makes desired by the Engineer-in-charge.

1.10.4 It will be the responsibility of the contractor / bidder to ensure use of genuine materials in the work. The department reserves the right to get (any / all materials / components) inspected by the manufacturer or their authorized representatives at any stage of the execution of work. If any of the materials, equipment supplied and used in work is found spurious at any stage, then the department reserves the right to ask the contractor to replace it by genuine one and make suitable recovery and / or withheld suitable amount till it is done, even if any payment against that material is already made.

1.10.5 The department may ask for any valid document like manufacturer's test certificate, document for purchase of the material, document for import / shipment of imported materials, etc. as deemed fit by the Engineer-in-Charge to ascertain genuineness of material supplied by / used in the work by the contractor. The contractor shall remain bound to submit all such documents to the department failing which payment may not be made or if already paid may be recovered / withheld from subsequent running account payment.

1.10.6 Copies of all purchase documents for all equipment, accessories, fittings, fixtures, etc. which carry guarantee / warrantee shall be handed over to the department in suitable form so that proper guarantee of materials are available to the department.

1.10.7 All the equipment and their components and all the materials to be used in the work shall be suitable for the environmental conditions at the location of the work.

1.10.8 The materials to be supplied in this work shall be scheduled in such a way that milestones are achieved and no shortfall is there. At the same time materials should be brought at sight in phases in such a manner so that they are not brought much in advance at site and dumped in work site for long period before installation and guarantee / warrantee of the materials are available for full period i.e. from the date of beneficial use of the material / equipment as per tender conditions. If the materials / equipment is supplied at site much before actual use in work, the department shall not remain bound to accept and make payment for such items of work involving the said materials / equipment. None of the equipment/ machines/materials

supplied shall be more than six months old from date of supply at site. The decision of the Engineer-in-Charge will be final and binding on all.

1.10.9 Dismantled materials, if any, should be returned to the department unless otherwise anything in contrary has been specifically stated in the tender document / BOQ.

1.11 **Rates**

1.11.1 Unless otherwise provided in the schedule of quantities of the work the rates tendered by the contractor shall be all inclusive and shall apply to all heights, lifts, leads and depths of the building and nothing extra shall be payable to him on this account.

1.11.2 The rates for all items of work shall, unless clearly specified otherwise, include cost of all labours, materials and other inputs involved in the execution of the item irrespective of whether they have been specifically mentioned in the tender document or not.

1.11.3 This, being an indivisible works contract, Sales Tax, GST, Excise Duty, etc. are not payable separately. The rates tendered shall be firm and inclusive of all taxes, duties, cess and levies as applicable (except service tax), and all charges for packing, forwarding, insurance, freight and delivery, installation, testing and commissioning at site, watch and ward, etc. including temporary constructional storage, risks, overhead charges, general liabilities / obligations and clearance from local bodies and State Fire Services, as applicable. Nothing extra shall be paid. However, fees payable to the local bodies / authorities for such clearance, etc. shall be borne by the department.

1.11.4 Octroi exemption certificate may be issued by the department if required by the contractor. However, the department is not liable to reimburse the octroi duty in case exemption certificates are not honoured by the concerned authorities.

1.11.5 The rates quoted by the tenderer, shall be firm and inclusive of all taxes (including works contract tax but excluding service tax), octroi, duties and levies and all charges for packing forwarding, insurance, freight and delivery, installation, testing, commissioning, etc. at site including temporary constructional storage, risks, overhead charges, general liabilities / obligations and clearance from local authorities.

1.11.6 **If any Extra items / Deviation items (beyond permissible limit) executed by the agency before approval from the competent authority, the executing agency shall submit the tax invoice, vouchers etc. along with the rate analysis as per the provision of Clause 12.2 & 12.3 of GCC-2023 for Original Construction work as modified & corrected up to last date of submission of tender.**

1.12 **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.

1.13 **Storage and Custody of Materials**: The agency has to make his own arrangement for watch and ward of the stores. Their safe custody shall be the responsibility of the contractor till the final taking over of the installation by the department.

1.14 **Accident:** The department (CPWD) shall not have any responsibility or liability in case of any accident, injury to the personnel to the contractor at work site or to the general public at the

work site due to mishandling of equipment by the personnel of the contractor or any other similar reason. The responsibilities and liabilities for such accidents and incidents shall be borne in full by the contractor.

1.15 **After Sales Service:** The contractor shall ensure adequate and prompt after sales service in the form of maintenance personnel and spares as and when required with a view to minimize the break down period. Particular attention shall be given to ensure that all spares are easily available during the normal life of the installation.

1.16 **Removal of Surplus Materials and Tools:** After completion of work the agency shall remove his men, materials, debris, etc. from site.

1.17 **Quality of Work and Workmanship**

1.17.1 The contractor shall be entirely responsible and answerable for all the works done by him regarding quality, adherence to the laid down specifications, terms and conditions, warranty / guarantee, etc. and he shall be liable to bear any compensation that may be levied by the department under any of the clauses of the agreement.

1.17.2 Clause 1.15 of CPWD General Specifications for Electrical Works, Part – IV, Substation 2013 shall be applicable.

1.17.3 The materials having ISI mark shall have precedence over the one conforming to IS Specifications.

1.17.4 The contractor is advised to visit the site before quoting for his tender to apprise himself about the site environments and other conditions. Drawings and inventories can be seen in the office of the Engineer–in–Charge.

1.18 **Site Order Book**: The contractor or his authorized representative shall sign the site order book and comply with the remarks entered therein by the representative of the department.

1.19 **Watch and Ward**

1.19.1 The contractor will make his own storage for his own materials. The watch and ward of the materials and of the installations would be responsibility of contractor till the work is completed / handed over to the department. Nothing extra shall be paid to the contractor on this account.

1.19.2 Making payment to the contractor in any form against supply of materials / equipment / components or execution thereof shall not absolve the contractor of his responsibility of watch and ward of the equipment, materials, etc. and their satisfactory functioning until the same is taken over by the department after successful installation, testing, commissioning and running in period.

1.19.3 No separate storage space will be provided to the contractor for storage of his materials and equipment to be brought at site and used in execution. The available open site space may however be used by the contractor for storage purposes in which case he may build up temporary store at available site space at his own cost.

1.20 **Variation in Quantity**

1.20.1 Quantities shown against each item of work or supply are tentative which may vary on either side (plus or minus). This variation shall, in general, be governed by Clause No. 12 of the clauses of contract of CPWD form 7. The contractor should ensure from the Engineer-in-charge and from the site condition the actual quantity required / to be used / to be supplied before bringing the materials at site. In case the actual quantity of material required at the site

is less than the stipulated quantity, the contractor cannot claim to supply entire quantity stipulated in the schedule of quantities of work (Schedule – A) as well as cannot demand for payment thereof. The contractor shall therefore, be very careful about the quantity of materials to be supplied / brought at site. The decision of the Engineer-in-charge in this regard shall be final and binding on the part of the contractor. Even if initial payment for supply of materials is made in any form for bringing material at site and if it is found at later stage that the actual requirement is less as per site requirement or as per decision of the Engineer-in-charge, the contractor shall have to take back the additional quantity brought / supplied at site and necessary adjustment shall be made from his next bill on this account. No claim in this regard shall be entertained.

1.21 **Natural Calamity**

1.21.1 No payment will be made to the contractor for any damage caused by rain, snow fall, floods, dampness, fire, sun or any other natural cause whatsoever during the execution of work. The damage to the work due to above reason, if any, shall have to be made good by the contractor at his own cost and no claim on this account shall be entertained.

1.22 **Inspection & Testing**

1.22.1 The Engineer-in-Charge or his authorized representative may inspect any material at manufacturers' works and may witness routine tests as per relevant Indian Standard Specifications or other relevant specifications at manufacturers' works.

1.22.2 The contractor shall give in writing advance notice to the Engineer-in-charge and arrange for such inspection / presence for testing at manufacturers work. The Travelling Allowance, Dearness Allowance, etc. of the departmental personnel who will be deputed to witness the tests, etc. shall be borne by the Department.

1.22.3 The Engineer-in-Charge or his authorized representatives shall have, at all the reasonable times, access to the contractor's premises or works or other works where manufacturing / fabrication shall be done and shall have the power, at all reasonable times, to inspect and examine the materials and workmanship during its manufacture or fabrication.

1.22.4 Inspection of imported materials at foreign works shall however not be carried out by the department. These materials shall be inspected and tested at site. Manufacturers' original test certificates and document of import / shipment should be provided to the department along with the materials without which no payment should be made to the contractor.

1.22.5 The contractor shall arrange for all the materials and labour required in connection with inspection of equipment or for any testing to be carried out at his works / manufacturers' works or at site of installation. Notice of such inspection / presence for testing shall be given by the contractor to the Engineer-in-charge at least fifteen days in advance.

1.22.6 Notwithstanding approval for such tests / inspection of equipment / components by the Engineer-in-Charge or his authorized representative, the contractor shall be required to perform site tests as desired by the Engineer-in-Charge and prove the correctness of ratings and performance of equipment / components and materials supplied and / or installed by him as per contract specifications and conditions at his own cost.

1.22.7 The Engineer-in-Charge reserves the right to reject any equipment / machinery / material should it, on tests after installation, be found not to comply with contract specifications or its performance is not satisfactory.

1.22.8 Final inspection and testing will be done by the Engineer-in-Charge or his authorized representative as per details to be indicated by the Engineer-in-Charge.

1.22.9 It shall be the responsibility of the contractor to get the installation inspected and passed by the local authorities concerned, as may be required by local bye laws. The contractor will extend all help including testing facilities to the representatives of local bodies. In case the contractor fails to make desired facilities available during inspection, the department reserves the right to provide the same at the risk and cost of contractor. The observation of the local authorities will be promptly attended by the contractor. The installation will be accepted by the department only after receiving clearance from the local bodies / fire authorities. The inspection charges levied by local / statutory authorities for the inspection shall however, be borne by the department.

1.23 **Completion Drawing and Manual**

1.23.1 In addition to the mode and form of submission of completion drawings and manuals as stipulated in the relevant CPWD Specifications for various sub-heads of E&M works, the contractor shall also submit soft copy of the completion drawings.

1.24 **Power Supply and Water Supply**

1.24.1 No Power & Water Supply shall be provided by the department for the purpose of execution of the E&M work, except for testing and commissioning of installations. The contractor shall make his own arrangement in this regard. The power supply for testing and commissioning will be given at one point inside the premises and the contractor shall have to make arrangement for required cabling work and switch gears for extension of the power to the required location for testing. This will be applicable to all sub-heads of E&M works.

1.25 **Works to be done by the Contractor:** Unless otherwise mentioned in the tender documents, the following works shall be done by the contractor and therefore, their cost shall be deemed to be included in their tendered cost – whether specifically indicated in the schedule of quantity / work or not:

1.25.1 Preparation of all layout, working drawings for execution of the work (E&M) components and submission to the Engineer-in-Charge for approval to be done by the agency within 15 days from the scheduled date of commencement of the work.

1.25.2 Foundations for equipment / structures / pumps including vibration isolation spring / pads.

1.25.3 All minor building works necessary for installation of equipment such as making of openings in walls / floors, either of RCC or brick masonry, foundation trench for fuel line and cable, making of opening in walls or in floors and restoring them to their original condition / finish and necessary grouting, etc. as required.

1.25.4 Dismantling of brick wall, if any, for inserting / positioning / placement of equipment, Control panel / Diesel Tanks or for taking ducting / cable tray / pipes and rebuilding / making good the same to its original position / finish for the same. Nothing extra shall be paid by the department.

1.25.5 Making good all damages caused to the structure during installation and restoring the same to their original finish.

1.25.6 Supply and installation of all necessary angle / channel / flat iron supports and brackets, etc. for installation of the cabling / electric panels / pumps / accessories on floor / wall / shaft / terrace and at other places, as may be necessary including their installations in position.

1.25.7 Responsibility to ensure safety of all materials against pilferage and damage till the installation is handed over to the department.

1.25.8 All scaffolding as may be necessary for installation of exhaust piping / cabling / electric panels / lightning arrestor/ exhaust pipe / wet riser and sprinkler pipes / ducts and all other equipment and their sub-assemblies / accessories on floor / wall / shaft / terrace and at other places during erection work and subsequent removal.

1.25.9 Painting of all exposed metal surfaces of equipment's and components with appropriate / approved colour as required and as desired by the Engineer–in–Charge.

1.25.10 All electrical work including cable, wire, earthing to be done as specified in Schedule of Work.

1.25.11 Small wiring, inter-connection, etc. inclusive of all materials and accessories necessary to comply with the regulations as well as proper and trouble-free operation of the equipment.

1.25.12 Closing of the cable entry points in sub-station against seepage of water rodents, etc.

1.25.13 Approval / clearance of the complete installation shall be obtained by the contractor from CPCB / State Pollution Control Board / Local Bodies / Central Electricity Authority (CEA) / other licensing authorities wherever required. However, application shall be made by the Department and any statutory fee, as applicable, shall be paid by the department directly to the government authorities concerned.

1.26 **Date of taking over of the installation and date of acceptance**

1.26.1 The date of taking over of the installations under any sub-head of E&M works shall be the date of taking over the complete building (s) after due completion of the entire composite work and after complete test and trial run of all the major equipment under all sub-heads of E&M works to the entire satisfaction of the Engineer-in-Charge.

1.26.2 Subject to the guarantee clause, date of taking over the installation after stipulated period of trouble-free operation of all the E&M works shall be the date of acceptance.

1.27 The appointment of Arbitrator shall be governed by the relevant clause of CPWD General Condition of Contract. The condition of contracts shall be governed by GCC, CPWD.

1.28 **SPECIAL CONDITIONS OF CONTRACT FOR ELECTRICAL WORKS AS PER CPWD SPECIFICATION**

Agency for execution of electrical components of works to be engaged by the main contractor shall have to fulfil the following criteria

I **IEI & FIRE FIGHTING SYSTEM**

(a) In case the main contractor himself is registered in CPWD in appropriate class of composite work and possessing valid Electrical license, he shall be allowed to execute internal electrical installation.

(b) In case the main contractor does not fulfill the above eligibility, he shall associate a contractor who fulfill the following criteria:

A. Registered contractor of CPWD in appropriate class & category with electrical license for internal electrical installations and having requisite experience as given under B.

OR

B. (i) **Eligibility Criteria for Non Registered Contractor in CPWD for Internal Electrical Installation Work**:

Firms possess valid electrical license and Experience of having successfully completed works during the last 7 years ending last day of the month pervious to the one in which applications / tenders are invited. The works completed up to previous day of last date of submission of tenders shall also be considered:

Three similar completed works costing not less ₹ 96 Lakhs

OR

Two similar completed works costing not less ₹ 144 Lakhs

OR

One similar completed work costing not less ₹192 Lakhs

Similar Work means "***Supplying, Installation, Testing and Commissioning of Internal Electrical Installation in India***"

B. (ii) **Eligibility Criteria for Non Registered Contractor in CPWD for Fire Fighting Work**:

Firms possess valid electrical license and Experience of having successfully completed works during the last 7 years ending last day of the month pervious to the one in which applications / tenders are invited. The works completed up to previous day of last date of submission of tenders shall also be considered:

Three similar completed works costing not less ₹ 84 Lakhs

OR

Two similar completed works costing not less ₹ 126 Lakhs

OR

One similar completed work costing not less ₹ 168 Lakhs

Similar Work means "***Supplying, Installation, Testing and Commissioning of Fire fighting works in India***".

B. iii) **Eligibility Criteria for Non Registered Contractor in CPWD for Automatic Fire Alarm Work**:

Firms possess valid electrical license and Experience of having successfully completed works during the last 7 years ending last day of the month pervious to the one in which applications / tenders are invited. The works completed up to previous day of last date of submission of tenders shall also be considered:

Three similar completed works costing not less ₹ 21 Lakhs

OR

Two similar completed works costing not less ₹ 33 Lakhs

OR

One similar completed work costing not less ₹ 42 Lakhs

Similar Work means "***Supplying, Installation, Testing and Commissioning of Automatic Fire Alarm works in India***"

**II SUBSTATION SYSTEM**

(a) In case the main contractor himself has the requisite experience as given under B for Substation System or the main contractor directly procures the equipment of approved make from OEM and gets it installed from authorized Agency / service provider of the manufacturer having the requisite experience as given under B for Substation System, they shall be allowed to execute Substation Works

(b) In case the main contractor does not fulfill the above eligibility, he shall associate a contractor who fulfill the following criteria:

A. Registered contractor of CPWD in appropriate class & category having requisite experience as given under B for Substation System.

OR

B. **Eligibility Criteria for Non Registered Contractor in CPWD for Substation System Work:**

Firms having experience of having successfully completed works during the last 7 years ending last day of the month pervious to the one in which applications / tenders are invited. The works completed up to previous day of last date of submission of tenders shall also be considered:

Three similar completed works costing not less ₹ 96 Lakhs

OR

Two similar completed works costing not less ₹ 144 Lakhs

OR

One similar completed work costing not less ₹ 192 Lakhs

Similar Work means "***Supplying, Installation, Testing and Commissioning of Substation System Works in India***".

**III. UPS SYSTEM**

In case the main contractor himself has the requisite experience as given under B for UPS System or the main contractor directly procures the equipment of approved make from OEM and gets it installed from authorized Agency / service provider of the manufacturer having the requisite experience as given under B for UPS System, they shall be allowed to execute UPS Works

In case the main contractor does not fulfill the above eligibility, he shall associate a contractor who fulfill the following criteria:

C. Registered contractor of CPWD in appropriate class & category having requisite experience as given under B for UPS System.

OR

D. **Eligibility Criteria for Non Registered Contractor in CPWD for UPS System Work:**

Firms having experience of having successfully completed works during the last 7 years ending last day of the month pervious to the one in which applications / tenders are invited. The works completed up to previous day of last date of submission of tenders shall also be considered:

Three similar completed works costing not less ₹ 0.24 Lakhs

OR

Two similar completed works costing not less ₹ 0.36 Lakhs

OR

One similar completed work costing not less ₹ 0.48 Lakhs

Similar Work means "***Supplying, Installation, Testing and Commissioning of UPS Works in India***".

**IV. Water Pump SYSTEM**

In case the main contractor himself has the requisite experience as given under B for Water Pump System or the main contractor directly procures the equipment of approved make from OEM and gets it installed from authorized Agency / service provider of the manufacturer having the requisite experience as given under B for Water Pump System, they shall be allowed to execute Water Pump Works

In case the main contractor does not fulfill the above eligibility, he shall associate a contractor who fulfill the following criteria:

E. Registered contractor of CPWD in appropriate class & category having requisite experience as given under B for Water Pump System.

OR

F. **Eligibility Criteria for Non Registered Contractor in CPWD for Water Pump System Work:**

Firms having experience of having successfully completed works during the last 7 years ending last day of the month pervious to the one in which applications / tenders are invited. The works completed up to previous day of last date of submission of tenders shall also be considered:

Three similar completed works costing not less ₹ 3.2 Lakhs

OR

Two similar completed works costing not less ₹ 4.8 Lakhs

OR

One similar completed work costing not less ₹ 6.4 Lakhs

Similar Work means "***Supplying, Installation, Testing and Commissioning of Water Pump System Works in India***".

**V. VRF AIR CONDITIONING SYSTEM**

In case the main contractor himself has the requisite experience as given under B for Air Conditioning System or the main contractor directly procures the equipment of approved make from OEM and gets it installed from authorized Agency / service provider of the manufacturer having the requisite experience as given under B for VRF Air Conditioning System, they shall be allowed to execute VRF Air Conditioning Works

In case the main contractor does not fulfill the above eligibility, he shall associate a contractor who fulfill the following criteria:

G. Registered contractor of CPWD in appropriate class & category having requisite experience as given under B for VRF Air Conditioning System.

OR

H. **Eligibility Criteria for Non Registered Contractor in CPWD for VRF Air Conditioning System Work:**

Firms having experience of having successfully completed works during the last 7 years ending last day of the month pervious to the one in which applications / tenders are invited. The works completed up to previous day of last date of submission of tenders shall also be considered:

Three similar completed works costing not less ₹ 102 Lakhs

OR

Two similar completed works costing not less ₹ 153 Lakhs

OR

One similar completed work costing not less ₹ 204 Lakhs

Similar Work means "***Supplying, Installation, Testing and Commissioning of VRF Air Conditioning System Works in India***".

**VI CCTV**

(a) In case the main contractor himself has the requisite experience as given under B for CCTVor the main contractor directly procures the equipment of approved make from OEM and gets it installed from authorized Agency / service provider of the manufacturer having the requisite experience as given under B for CCTV Works, they shall be allowed to execute CCTV Works.

(b) In case the main contractor does not fulfill the above eligibility, he shall associate a contractor who fulfill the following criteria:

A. Registered contractor of CPWD in appropriate class & category having requisite experience as given under B for CCTV Works.

OR

B. **Eligibility Criteria for Non Registered Contractor in CPWD for CCTV Work:**

Firms having experience of having successfully completed works during the last 7 years ending last day of the month pervious to the one in which applications / tenders are invited. The works completed up to previous day of last date of submission of tenders shall also be considered:

Three similar completed works costing not less ₹ 18 Lakhs

OR

Two similar completed works costing not less ₹ 27 Lakhs

OR

One similar completed work costing not less ₹ 36 Lakhs

Similar Work means "***Supplying, Installation, Testing and Commissioning of CCTV Works in India***".

**VII LAN SYSTEM**

(a) In case the main contractor himself has the requisite experience as given under B for LAN System or the main contractor directly procures the equipment of approved make from OEM and gets it installed from authorized Agency / service provider of the manufacturer having the requisite experience as given under B for LAN System Works, they shall be allowed to execute LAN System Works.

(b) In case the main contractor does not fulfill the above eligibility, he shall associate a contractor who fulfill the following criteria:

A. Registered contractor of CPWD in appropriate class & category having requisite experience as given under B for LAN System Works.

OR

B. **Eligibility Criteria for Non Registered Contractor in CPWD for LAN System Work:**

Firms having experience of having successfully completed works during the last 7 years ending last day of the month pervious to the one in which applications / tenders are invited. The works completed up to previous day of last date of submission of tenders shall also be considered:

Three similar completed works costing not less ₹ 27 Lakhs

OR

Two similar completed works costing not less ₹ 40 Lakhs

OR

One similar completed work costing not less ₹ 54 Lakhs

Similar Work means "***Supplying, Installation, Testing and Commissioning of LAN System Works in India***".

**VIII SOLAR PHOTO VOLTAIC POWER GENERATION SYSTEM**

(a) In case the main contractor himself has the requisite experience as given under B for Solar Photo Voltaic Power Generation System or the main contractor directly procures the equipment of approved make from OEM and gets it installed from authorized Agency / service provider of the manufacturer having the requisite experience as given under B for Solar Photo Voltaic Power Generation System Works, they shall be allowed to execute Solar Photo Voltaic Power Generation System Works.

(b) In case the main contractor does not fulfill the above eligibility, he shall associate a contractor who fulfill the following criteria:

A. Registered contractor of CPWD in appropriate class & category having requisite experience as given under B for Solar Photo Voltaic Power Generation System Works.

OR

B. **Eligibility Criteria for Non Registered Contractor in CPWD for Solar Photo Voltaic Power Generation System Work:**

Firms having experience of having successfully completed works during the last 7 years ending last day of the month pervious to the one in which applications / tenders are invited. The works completed up to previous day of last date of submission of tenders shall also be considered:

Three similar completed works costing not less ₹ 12 Lakhs

OR

Two similar completed works costing not less ₹ 18 Lakhs

OR

One similar completed work costing not less ₹ 24 Lakhs

Similar Work means "***Supplying, Installation, Testing and Commissioning of Solar Photo Voltaic Power Generation System Works in India"***.

**IX DG SET**

(a) In case the main contractor himself has the requisite experience as given under B for DG Set or the main contractor directly procures the equipment of approved make from OEM and gets it installed from authorized Agency / service provider of the

manufacturer having the requisite experience as given under B for DG Set Works, they shall be allowed to execute DG Set Works.

(b) In case the main contractor does not fulfill the above eligibility, he shall associate a contractor who fulfill the following criteria:

A. Registered contractor of CPWD in appropriate class & category having requisite experience as given under B for DG Set Works.

OR

B. **Eligibility Criteria for Non Registered Contractor in CPWD for DG Set Work:**

Firms having experience of having successfully completed works during the last 7 years ending last day of the month pervious to the one in which applications / tenders are invited. The works completed up to previous day of last date of submission of tenders shall also be considered:

Three similar completed works costing not less ₹ **9** Lakhs

OR

Two similar completed works costing not less ₹ 13 Lakhs

OR

One similar completed work costing not less ₹ 18 Lakhs

Similar Work means "***Supplying, Installation, Testing and Commissioning of DG Set Works in India***".

**X ELIGIBILITY CRITERIA OF LIFT**

(a) The lift manufacturer shall comply with BIS standards, duly certified by th manufacturer itself.

(b) The manufacturer shall be compliant to the Public Procurement (Preference to Mak In India), Order 2017 (as amended from time to time) issued by the Department o Industrial Policy and Promotion (DIPP), Ministry of Commerce and Industry.

(c) The main contractor shall have to associate with agency fulfilling the following eligibilit criteria having satisfactorily completed the works as mentioned below during the las seven years ending last day of month previous to the one in which tenders are invite with completion certificate issued by an officer not below the rank of Executive Enginee / Project Manager or equivalent:

Three similar works each costing not less than ₹ **32 Lakhs**

Or

Two similar works each costing not less than ₹ **48 Lakhs**

Or

One similar work costing not less than ₹ **64 Lakhs**

Similar work shall mean "***Supplying, Installation, Testing and Commissioning o Lifts in India***".

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

(a) He fulfills the prescribed eligibility criteria respectively for this work

Or

(b) He directly procures the equipment of approved make from manufacturer and gets it installed from authorized Agency / service provider of the manufacturer / specialized agency, all as per the eligibility criteria mentioned above.

(d) The manufacturer shall furnish an undertaking regarding availability of spares for the entire expected life of the lift i.e. 15 to 20 years.

(e) The complete lift installation including its components, safety devices, various types of controls etc., testing, inspection, operation & maintenance shall conform to relevant Codes, Standards, code of practices, guidelines, safety rules, inspection manual(s), rules issued by Bureau of Indian Standards, as amended up to the last date of receipt of tenders.

(f) Quality standards shall conform to latest IS/ISO-9001:2015.

(g) The down time of installed lifts being maintained by the manufacturer shall not be more than 8 hours (average) in case of minor faults and 7 days (average) in case of major faults during the last one financial year.

Note: During scrutiny of cases, the value of executed work by a firm shall be brought to current costing level by enhancing the value of work done @ 7% per annum (simple interest basis) calculated from date of actual completion to the last date of receipt of applications for tender (without compounding) for eligibility criteria for above mentioned works. The experience certificates duly attested shall be furnished to engineer-in-charge and only after approval of agency, the firm shall be deployed by main contractor for execution of work. The contractor has to arrange facilities for inspection of equipment's/ materials including conducting the required tests in the manufacturing unit. However, no condition is incorporated in the NIT regarding inspection of equipment's / materials in the manufacturing unit located outside India without prior permission of Ministry of HUA.

**2.0 ADDITIONAL CONDITIONS FOR INTERNAL ELECTRICAL INSTALLATION**

2.1 The Department shall not issue any T & P and nothing extra shall be paid on account of this.

2.2 The main contractor should engage an eligible agency having valid registration in CPWD in appropriate class under category internal & external electrical installations / appropriate class under composite category for execution of electrification work. The firm should possess valid electrical contractor license. In case the main contractor himself meets the above criteria, he shall be allowed to execute this sub-head of work after due verification by Engineer-in-Charge.

2.3 The firm shall be issued tender on production of valid electrical license from competent authority in the name of the contractor. However, the contractors shall be allowed to participate in tender with an undertaking that they will either obtain valid electrical license at the time of execution of electrical work or associate contractors having valid electrical license of eligible class. In case of association of electrical contractor, the main contractor has to enter in agreement with the contractor associated and copy of such agreement shall be submitted to Executive Engineer in charge of E&M component. In case the main contractor intends to change the associated contractor during operation of the contract, he shall obtain prior approval of respective Engineer in charge. The new agency shall have to satisfy the laid down

eligibility criteria. In case Engineer in charge of respective disciple is not satisfied with the performance of the agency, he can direct the main contractor to change the agency associated for execution of minor component and this shall be binding on the main contractor.

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

2.5 The tenderer shall guarantee among other things, the following vis-à-vis specifications:

(a) Quality, strength and performance of the materials used

(b) Satisfactory operation during the maintenance period

2.6 **Defects Liability Period**

(a) The entire installation in general shall be guaranteed for a period of 12 months from the date of completion. Any defective materials and equipment shall be replaced free of cost at the direction of the Engineer-in-Charge.

(b) All the LED bulbs / LED Fittings shall be guaranteed for a period of 5 years from the date of completion of work and handing over. A letter from the manufacturer of the LED luminaries regarding the back-to-back arrangement for performance of this guarantee clause shall be submitted at the time of supply of LED fittings.

(b)(i) 50% of the performance guarantee shall be refunded to the contractor soon after the completion of the work and recording of the completion certificate.

(b)(ii) 50% of the Performance Guarantee shall be retained as Security Deposit

(b((iii) 50% of the Performance Guarantee retained as Security Deposit plus 2.5% Security Deposit already deducted from each running bill (Total 2.5 + 2.5 =5%) shall be refunded year wise proportionately.

**3.0 Extent of Work**

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

3.2 Minor building works necessary like making of opening in walls or in floors and restoring to their original condition, finish and necessary grouting, etc. as required to be undertaken.

3.3 Maintenance (Routine & preventive) for one year from date of completion and handing over.

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

3.5 Verification of correctness of material at destination: All materials and equipment supplied by the contractor shall be new. They shall be of such design, size and materials as to satisfactorily function under the rated conditions of operation and to withstand the environmental conditions at site. The contractor shall have to produce all the relevant records to certify that the genuine material from the manufacturers has been supplied and erected.

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

(a) Inspection of materials / equipment to be witnessed at the Manufacturer's premises in accordance with relevant BIS / Agreement Inspection Procedure

(b) To receive materials at site with Manufacturer's Test Certificate(s)

(c) To inspect materials at the Authorized Dealer's Godowns to ensure delivery of genuine materials at site

(d) To receive materials after physical inspection at site

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

**4.0 Interpreting Specifications / Order of Precedence**

4.1 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), IS Codes, etc., the following order of preference shall be followed:

a) Schedule of quantities
b) Commercial and Additional conditions, technical specifications for this work
c) General Conditions of Contract for CPWD Works
d) Drawings (if any approved by the Engineer-in-charge)
e) CPWD General Specifications for electrical works
f) Relevant IS or any other International code in case IS code is not available

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

4.3 The main agency shall be responsible for all acts of commissions and non-commissions of the electrical contractor or sub-contractor engaged by him, even with approval of department.

4.4 Approval of the Engineer-in-charge shall be taken well in advance for all the materials to be used in the work by the contractor.

4.5 Running/final bill for Electrical / Mechanical components shall be made/passed by the EE (E) directly to the main Contractor. The main contractor shall make the payment to associated Contractor within 15 days of receipt of each running account payment.

4.6 Payments terms: On account payments for part work (after stipulated and statutory deductions) as assessed by the Engineer–in-Charge for the applicable items in the Contract shall be payable at part rates. The part rates will be decided by the Engineer-in-Charge of the work and shall be binding on the contractor.

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

4.8 The Associated Electrical Contractor or his representative is bound to sign the site order book as and when required by the Engineer-in-charge and will comply with the remarks therein.

4.9 The contractor shall make his own arrangement at his own cost for electrical / general tools and plants required for the work.

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

4.11 The contractor must be able to work on concrete slabs / walls as and when required and in complete co-ordination with the civil works. Cutting of chases in the plastered wall shall in no case be allowed. The contractor shall fix conduits and boxes in the walls soon after the brick work is completed and finish the chase to rough surface with proper cement sand mixture. Only in exceptional cases e.g. where cutting of plastered surface cannot be avoided it will be contractor's responsibility to ensure that plastering is done to match the original finish at no extra cost.

4.12 The contractor shall remove all the debris due to the electrical works from the site as soon as the work is completed.

4.13 The rupturing capacity of the MCB's shall be 10 KA. The MCB's shall have ISI mark.

4.14 All the MCCBs shall be rated for Ics =100% Icu.

4.15 The copper wire to be used on this work shall be FRLS / HFFR type.

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

4.17 The Electrical works shall be carried out by the contractor, side by side with the progress of the civil works.

4.18 The Contractor shall on demand by the Engineer-in-Charge, furnish the proof to the satisfaction of Engineer-in-Charge regarding purchase of wires, MCBs, MCBDB, fittings, accessories and other items, from the manufacturers authorized outlets.

4.19 Cutting of brick walls shall be with chase cutting machine only. All repairs and patch works shall be neatly carried out to match the original finish and to entire satisfaction of Engineer in Charge.

4.20 All the sub main and circuit wiring includes loose wire for connections inside switch boxes and MCB DBs. No extra payment for these loose wires shall be made. However, wires within the cubicle panel will be measured and paid under relevant item of work.

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

4.22 Copper conductor of insulated cables of size 1.5 sqmm and above shall be stranded and terminals shall be provided with crimped lugs at no extra cost.

4.23 All MS pulling box cover should be of phenolic laminated sheet of thickness not less than 3 mm and nothing extra shall be paid on the account.

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

4.25 All hardware items such as screws, thimbles, GI wires, etc. which are essentially required for completing an item as per specifications will be deemed to be included in the item even when the same have not been specifically mentioned.

4.26 All hardware items such as nuts, bolts, screws, washers, etc. to be used in work shall be zinc/ cadmium plated iron and nothing extra will be paid on this account.

4.27 Any conduit which has not been 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.

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

4.29 Materials to be used in work are to be ISI marked wherever applicable. The make of the materials has been indicated in the list of acceptable makes. No other make will be acceptable. For items for which acceptable makes are not mentioned in the tender document, Engineer-In-Charge shall decide the make before bringing the material to the site by the contractor. The materials to be used in the work shall be got approved by the Engineer in Charge / his representative before its use at site. The E-in-C shall reserve the right to instruct the contractor to remove the material which, in his opinion, is not acceptable.

4.30 Quantity of various items as specified in tender document may change during construction stage as per site condition / client's requirement, the successful bidder is advised to verify the actual requirement of items including fittings, fixtures before bringing the material to the site.

4.31 In case the same item(s) appear more than once in the schedule of work / BOQ under the same sub head or among the different subhead of works, the lowest rate quoted for that item (s) shall be considered for the particular item(s) wherever appeared in any part of BOQ/ Schedule of works for the purpose of tender evaluation although web generated e-price bid may incorporate different quoted rate for same item(s) as per the quoting pattern of the tenderer. The tendered amount thus worked out shall be final & shall be binding on the contractor.

4.32 All statutory deductions like WCT, Labour welfare cess, etc. shall be made from the bills.

4.33 Testing: All tests, prescribed in these General Specifications, to be done before, during and after installation, shall be carried out, and the test results shall be submitted to the Engineer-in-Charge in prescribed Performa, forming part of the Completion Certificate.

4.34 Commissioning on Completion: After Completion of the work, it shall be ensured that the installation is tested and commissioned.

**5.0 Completion Plan and Completion Certificate**

(i) For all works completion certificate after completion of work shall be submitted to the Engineer-in-Charge.

(ii) Completion plan drawn to a suitable scale in tracing cloth with ink indicating the following, along with three blue print copies of the same shall also be submitted:

(a) General layout of the building

(b) Locations of main switchboard and distribution boards, indicating the circuit numbers controlled by them

(c) Position of all points and their controls

(d) Types of fittings, viz. fluorescent, T5, LED based, pendants, brackets, bulk head, fans exhaust fans, etc.

(e) Name of work, job number, accepted tender reference, actual date of completion, names of Division / Sub-Division, and name of the firm who executed the work with their signature.

(iii) The contractor shall submit the completion plan separately in triplicate on blue print with one set on tracing "Cloth" as per the contract within 30 days of the completion of work. In case, the contractor fails to submit the plan, he shall be liable to pay a sum equivalent to 2.5% of the value of the work subject to a ceiling of ₹ 25,000.00.

**6.0 ADDITIONAL SPECIFICATION FOR MV PANEL**

6.1 These shall in general be as per Section – 4 of CPWD General Specifications for Electrical Works, Part IV, and Substations – 2013. MV Panel Boards: All switch gears / MCCBs / ACBs in any panel board shall be of same make. This will be applicable for all other sub heads of work also. The connection from the switch gears up to the terminal block in cable alley shall be made by aluminium bars of appropriate rating or by PVC insulated single core copper cable of appropriate rating. For connection by cable, duration of cable due to temperature, grouping etc. shall be duly taken into consideration while selecting the size of cable. Proper colour coding shall be maintained.

6.1.1 There shall be separate gland plate for each cable entry.

6.1.2 The cubicle panels with more than 1000 Amps bus shall be made of tested structural modular sections.

6.1.3 All the ACBs and MCCBs in one panel shall be of one make only from amongst the list of preferred makes of materials.

6.1.4 All the MCCBs having microprocessor release shall have inbuilt over load, short circuit and earth fault protection. For the MCCBs, Ics shall be equal to 100 % Icu.

6.1.5 All the MCCBs having thermal magnetic release shall have inbuilt short circuit and over load protection. There shall also be external earth fault protection if the schedule of work so stipulates.

6.1.6 All three pole MCCBs shall have neutral link as required.

6.1.7 Individual door earthing of all the compartments shall be done by suitable size FRLS / HFFR grade PVC insulated single core copper conductor cable of size not less than 4 sqmm.

6.1.8 All the panels are to be manufactured / fabricated as per approved drawings, inspections and observations. Non-compliance shall lead to summary rejection of such item and action shall be taken under relevant terms and condition of the agreement.

6.1.9 Successful bidder will be required to provide such facilities as will be necessary for inspection of the panels before dispatch at his or his associated works. There may be stage inspection also. Bidder shall furnish all necessary information for the purpose and will also give sufficient notice regarding the dates proposed for routine and all such tests to the department to facilitate their presence.

6.1.10 Inspection of the items of supply shall be done by the Engineer-in-Charge or his authorized representative before they are dispatched to site of work. Copies of inspection certificates issued by CPWD officers shall be attached with dispatch documents to consignee. All arrangements for inspection of the materials at factory shall be made by the bidder and nothing

extra shall be paid for the same. However, the cost of to and fro journey of the inspection team of the department shall be borne by the department.

6.1.11 Contractor shall arrange, before dispatch of the LT panels, an inspection and certification from the authorized engineer of the manufacturer of the switchgears i.e. ACBs, MCCBs, SDFUs about the genuineness and the same shall be submitted to the Engineer-in-Charge along with inspection / test report prepared by the inspecting officer authorized by the Engineer-in-Charge. This will be applicable for all other electrical panels also.

6.1.12 The MV panels shall be properly packed before dispatch so as to avoid any damage during transport. If the panels are found to be damaged after they reach at site, the same will be summarily rejected by the department.

6.1.13 All the MCCBs shall be provided with front operating kit (lockable rotary handle) irrespective of whether they have been specifically mentioned in the schedule of work or not.

6.1.14 All small wiring for controls and indication, etc. in the panels shall be of minimum size 1.5 sq. mm size FRLS / HFFR grade PVC insulated single core copper conductor cables conforming to IS 634. Identification ferrules shall be at both ends of the wires. All control wirings meant for external connection are to be brought out on a terminal board.

**7.0 Foundation of Poles**

The foundation of the poles shall be as per manufacturer's recommendation.

**8.0 Street Light Luminaries**

The street light luminaries shall be provided with surge protector of 5 KV or more.

**9.0 Terms of Payment**

9.1 The following percentage of contract rates for the various items included in this sub-head of work shall be payable against the stage of work shown herein:

| Sl. No. | Stage of work | Percentage of Contract Rate |
|---|---|---|
| 1 | After initial inspection (wherever specified) and delivery at site in good condition on pro-rata basis | 70% |
| 2 | On completion of pro-rata installation | 20% |
| 3 | On commissioning completion of successful running in period and taking over of the installation by the department | 10% |

**10.0 ADDITIONAL CONDITIONS AND SPECIFICATIONS FOR CABLE AND CABLE LAYING WORK**

10.1 The work shall in general be carried out as per CPWD General Specifications for Electrical Works, Part – II 2023 amended up to date.

10.2 When more than one cable is laid in the same trench, the smallest size of the cable shall be considered as main cable and the higher size cables shall be considered as additional cable laid in the same trench. Measurement of cable laying work shall be taken accordingly.

10.3 The make of UG cable supplied shall be one from the preferred makes of materials. The MV cables shall have ISI certification mark having valid ISI certification license.

10.4 All the UG cables used in this work shall be of any one make from the list of preferred makes of materials. Cables of different makes, though from list of preferred makes of materials, shall not be used.

10.5 **Packing**: Strictly in accordance with the provisions as per Clause 18.1, 18.2 and 18.2.1 in IS-7098 (Part-I) – 1988 as amended up to date.

10.6 **Delivery Period**: Shortest possible time schedule in delivery is required to be framed / observed, but not later than the specified. The date of actual receipt of materials at site will be considered as the relevant date for this purpose. The delivery schedule shall be as per Table of Milestone.

10.7 **Payment Terms**: The following percentage of contract rates for the various items included in this sub-head of work shall be payable against the stage of work shown herein:

| Sl. No. | Stage of work | Percentage of Contract Rate |
|---|---|---|
| 1 | After initial inspection (wherever specified) and delivery at site in good condition on pro-rata basis | 70% |
| 2 | On completion of pro-rata installation | 20% |
| 3 | On commissioning completion of successful running in period and taking over of the installation by the department | 10% |

10.8 **Placing Order of UG Cables**: Before placing orders on the manufacturer for supply of the cables, the contractor is required to carefully assess the exact requirement of each size of the cable at the site of work and get the same approved form the Engineer-in-Charge. Department shall not take back any spare quantity of cable whether in pieces or in sealed drums if procured more than that actually required at site / approved by the Engineer-in-Charge. Even if advance payment is made for the cable & after erection surplus cables are found, the payment towards surplus cables made if any, shall be adjusted from the next on account bill of the contractor.

10.9 However, it may be noted that the contractor shall have to arrange extra quantity of the cable, over and above that assessed by the contractor, before start of the work and approved by the Engineer-in-Charge, if such additional quantity of the cable is required at site, in order to make the installation as covered in the Reach and Scope of this work, operational. Such extra quantity shall be paid as per terms and conditions of the Agreement.

10.10 **Inspection & Testing**: All the cable used at work should be tested before measurement of cables at work site as well as before use at work. The manufacturer test certificate should be produced at site at the time of delivery of cables at work site.

**11.0 WORKS TO BE DONE BY THE CONTRACTOR**

11.1 Unless otherwise mention in the tender document, the following works shall be done by the contractor and therefore their cost shall be deemed to be included in their tendered cost, whether specifically indicated in the schedule of work or not:

(i) Foundation for equipment including foundation bolts and vibration isolation spring and pads

(ii) Suspenders, brackets and floor / wall support for suspending / supporting pipes / cable trays

(iii) Excavation and refilling of trenches in soil wherever the pipes are to be laid directly in ground, including base treatment and supports

(iv) Sealing of all floors / slabs / wall opening provided by the department or made by the contractor for pipes and cables from fire safety point of view, after laying of the same

(v) Painting of all exposed metal surfaces of equipment's and components with appropriate colour

(vi) Making openings in the walls / floors / slabs or modifications in the existing openings wherever provided for carrying pipeline, cables, etc.

(vii) All electrical works including cables / wires, earthing, etc. beyond power supply made available by the department

(viii) Making good all damages caused to the structure during installation and restoring the same to their original finish

(ix) Approval from local bodies / fire authorities as may be required as per local by-laws (The contractor's responsibility shall be limited to the work executed by him). The inspection fee of local bodies / fire authorities shall be borne by the department.

12.0 **Care of the building**: Care shall be taken by the contractor while handling and installing the various equipment's 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.

**13.0 ADDITIONAL CONDITIONS FOR EARTHING SYSTEM SCOPE**

13.1 This section covers the general requirements of the earthing system for sub-station installation & protection of building against lightning.

13.1.1 **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. For a two-transformer substation total number of earth electrodes shall be 6 (4 for neutral earthing, 2 each for two transformers & 2 for connection to a common earth bus for body earthing).

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

13.1.3 **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 further 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.

13.1.4 **Watering Arrangement**: Method of watering arrangement shall comply with CPWD General Specifications.

13.1.5 **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 earth lead shall be 25 mm x 5 mm copper of equivalent GI strip.

13.1.6 **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 60 cm 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.

Earthing system shall comprise earth electrodes in accordance with clause 8.2. of General Specifications for electrical works (Part I internal) 2023. Normally an earth electrode shall not be situated less than 1.5 m from any building. GI Pipe electrode shall be used for earthing of internal electrical installations like DB, Meter Board, Feeder Pillars & Poles, etc. GI plate electrode shall be used for fire-fighting pumps, water supply pumps, lightning conductors. Separate earth electrodes shall be provided for lightning arrestor / lightning conductors.

13.1.7 **Testing**: After installation, the tests as specified in CPWD General Specifications for Electrical work (Part I Internal) 2023 shall be carried out and results recorded.

Selection of Type of Electrodes: Following are general guidelines for the selection of the type of electrodes.

Number of Earth Electrodes

(i) In all cases, relevant provisions of Rules 33, 61 and 67 of the Indian Electricity Rules, 1956 as amended, shall be complied with.

(ii) Non-current carrying metal parts of all apparatus utilizing power supply at voltage exceeding 250 volts shall be earthed by two separate and distinct connections to the earth bus, or to two separate and distinct earthing sets.

## 14.0 ADDITIONAL CONDITIONS AND SPECIFICATIONS FOR WET RISER AND SPRINKLER INSTALLATION

14.1 Specification: The work of wet riser and sprinkler system shall be executed as per CPWD General Specification for Electrical works Part V (Wet Riser and Sprinkler System) 2020 amended upto date.

14.2 The pumps, motors, starters for pump motors in panel shall be as per actual requirement at site depending on the bhp of pump offered / required and in accordance with the NIT requirement and shall be provided accordingly, irrespective of what has been indicated, if any, in the tender schedule / NIT.

14.3 Measurement: Measurements of plumbing work shall be on following basis:

(a) Piping shall be measured along the centre line of installed pipes including all pipe fittings and accessories but excluding valves and other items for which quantities are specifically indicated in the schedule of work. No separate payment shall be made for fittings and accessories.

(b) The rates for piping work shall include all wastage allowances, flanges pipe supports, hangers, excavation, refilling, testing, nuts and check nuts, vibration isolators, suspension where specified or required, and any other item required to complete the piping installation. None of these items will be separately measured and paid.

14.4 **Inspection by Local Fire Officer:** After completion of the work and testing to the entire satisfactory of Engineer-in Charge, the installation shall be offered for inspection by Chief Fire Officer or his representative. Testing as desired by the Fire Officer shall be carried out. The contractor will extend all help including man power during testing. The observation of Chief Fire Officer which are a part of agreement. These shall be attended by the contractor. Nothing extra is to be paid for testing as above.

14.5 **Completion Drawings and Manuals**: Three sets of following laminated drawings shall be submitted by the contractor while handing over the installation to the Department. Out of this one of the sets shall be laminated on a hard base for display in fire control room.

(a) Installation drawings giving complete details of all the equipment, including their foundations

(b) Plumbing layout drawings giving sizes and lengths of all the pipes and the sizes and locations of all types of valves and including isometric drawings for the entire piping including the pipe connections to the various equipment.

(c) Line diagram and layout of all electrical control panels giving switchgear ratings and their disposition cable feeder sizes and their layout

(d) Control wiring, drawings with all control components and sequence of operations to explain the operation of control circuits. Apart from drawings, three sets of manufacturer's technical catalogues of all major equipment and accessories as well as operation and maintenance manual of all major equipment, detailing all adjustments, operation and maintenance procedure shall be submitted to the department after completion of the work before final bill is released.

14.6 The valves and instruments shall normally be flanged type so that they can be easily dismantled and refixed during maintenance. In case of screwed type (where flange type is not manufactured) arrangement of flanges shall be done by the contractor for which nothing extra shall be paid.

14.7 **Terms of payments**: The following percentage of contract rates for the various items included in the contract shall be payable against the stage of work shown herein:

| Sl. No. | Stage of work | Machinery and Equipment (Pumps and Elect. Panels) | All other items |
|---|---|---|---|
| 1 | After initial inspection (wherever specified) and delivery at site in good condition on prorata basis | 75% | 70% |
| 2 | On completion of pro-rata installation | 15% | 20% |

| | | | |
|---|---|---|---|
| 3 | On testing, commissioning and handing over | 10% | 10% |

14.8 **Site Information**: The tenderer, should, in his own interest, visit the site and familiarizes himself with the site conditions before tendering. For any clarification, tenderer may discuss with the Engineer- in-Charge.

14.9 **Rates**

14.9.1 The rates quoted by the tenderer, shall be firm and inclusive of all taxes, duties levies, octroi etc. and all charges for packing forwarding, insurance, freight and loading, unloading, delivery, installation, testing, commissioning etc. at site including temporary construction of storage, risks, overhead charges, general liabilities/ obligations and clearance from Chief Fire Officer. However, the fee for the Fire Department for inspections shall be borne by the department.

14.9.2 The department will not issue Octroi exemption certificate.

14.9.3 The contractor has to carry out maintenance as per manufacturer's standards for a period of 12 months from the date of handing over. Nothing extra shall be paid on this account.

14.10 **Completeness of tender, Submission of Execution Programme, Approval of Drawings, and Commencement of Work**

14.10.1 *Completeness of the tender*: All sundry equipment, fittings, assemblies, accessories, hardware items, bolts, supports, termination lugs for electrical connection, cable glands, junction box and all other sundry items for proper assembly and efficient working of the various equipment and components of the work shall be deemed to have been included in the tender, irrespective of the fact whether such items are specifically mentioned in the tender or not.

14.10.2 **Submission of programme**: The successful tenderer shall submit his programme for submission of drawings, supply of equipment, installation, testing, commissioning and handing over of the installation to the Engineer-in- Charge. This programme shall be framed keeping in view the building progress.

14.10.3 **Submission of Drawings**: The contractor shall submit the design calculations and drawings to the Engineer-in-Charge for approval before start of work.

14.10.4 **Commencement of Work**: The contractor shall commence work as soon as the drawings submitted by him are approved.

14.11 **Dispatch of Materials to Site and Safe Custody thereof**

14.11.1 The contractor shall dispatch materials to site in consultation with the Engineer-in-Charge.

14.11.2 Suitable lockable storage accommodation shall be made available free of charge temporarily if available otherwise contractor has to arrange storage accommodation on his own. Watch & ward however, shall be the responsibility of contractor.

14.11.3 Programme of dispatch of material shall be framed keeping in view the building progress.

14.11.4 Safe custody of all machinery and equipment supplied by the contractor shall be the responsibility of the contractor till final taking over by the department.

14.12 **Co-ordination with Other Agencies**

14.12.1 The contractor shall co-ordinate with all other agencies involved in the work so that the work of other agencies is not hampered due to delay in his work.

14.12.2 Piping, cabling or any other work, which directly affect the progress of building work, shall be given priority.

14.13 **Quality of Materials and Workmanship**

14.13.1 The components of the installation shall be of such design so as to satisfactorily function under all conditions of operation.

14.13.2 The entire work of manufacture / fabrication, assembly and installation shall conform to sound engineering practice.

14.13.3 All equipment and materials to be used in work shall be manufactured in factories of good repute having excellent track record of quality manufacturing, performance and proper after sales service.

14.14 **Care of the Building**

14.14.1 The Contractor shall also be responsible for repairing all such damages and restoring the same to the original finish at their cost.

14.14.2 The Contractor shall also remove all unwanted and waste materials arising out of the installation from the site of work from time to time.

14.15 **Storage & Custody of Materials**: The agency has to make his own arrangements. 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.

14.16 **Guarantee**

14.16.1 All equipment shall be guaranteed for a period of 12 months from the date of acceptance and taking over of the installation by the Department against unsatisfactory performance and/or breakdown due to defective design, material, manufacture, workmanship or installation. The equipment or component or any part thereof so found defective during the guarantee period shall be repaired or replaced free of cost to the satisfaction of the Engineer-in-charge. In case it is felt by the department that undue delay is being caused by the contractor in doing this, the same will be got done by the department at the risk & cost of the contractor. The decision of Engineer-in-charge in this regard shall be final & binding on the contractor.

14.16.2 The tender shall guarantee among other things, the following: a) Quality, strength and performance of the materials used as per manufacturers standards b) Safe mechanical & electrical stress on all parts under all specified conditions of operation.

14.17 **Tender Drawings, Drawings for Approval and Completion Drawings**

14.17.1 **Tender Drawings**: The drawings appended with the tender documents are intended to show the Protected Areas, space allotted for various equipment, tentative routes. The equipment offered shall be suitable for installation in the spaces shown in these drawings.

14.17.2 **Drawings for approval on award of the work**: The contractor shall prepare & submit three sets of following drawings 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. The decision of the Engineer-in-Charge shall be final & binding on the contractor.

(a) Lay out drawings of the equipment to be installed in pump from and terrace

(b) Drawings showing the details of erection of entire equipment including their foundations

(c) Plumbing drawings showing the layout of entire piping, dia. and length of pipes, hydrant, air vessel and isometric drawings showing connections to various equipment

(d) Sprinkler drawing indicating layout and size of pipe, location of valves, sprinklers, etc.

(e) Lay out and isometric drawings of the equipment and pipe work, valves, nozzles to be installed in various rooms

(f) Drawings including section, showing the details of erection of entire equipment including their supports, mountings, etc.

(g) Electrical wiring diagrams for all electrical equipment and controls including the sizes and capacities of the various cables and equipment

(h) Any other drawings relevant to the work

14.17.3 The successful tenderer would be required to submit the following drawings after award of work for approval before commencement of installation:

(a) General arrangement drawings of the equipment like detectors, panels etc. in the building with complete dimensions as per interior and structural layouts

(b) The contractor shall submit four copies of catalogues, manufacturer's drawings, equipment characteristics data or performance charts as required by Engineer-in-Charge

(c) Any other drawings relevant to the work

14.17.4 **Completion Drawings**: Three sets of the following laminated drawings shall be submitted by the contractor while handing over the installation to the Department. Out of this one of the sets shall be laminated on a hard base for display in the Control room. In addition, one soft copy will be given on pen drive.

(a) Installation drawings giving complete details of all the equipment, including their mountings/ supports

(b) Plumbing layout drawings giving sizes and lengths of all the pipes and the sizes and locations of valves, nozzles and including isometric drawings for the entire piping including the pipes connections to the various equipment

(c) Electrical wiring diagrams for all electrical equipment and controls including the sizes and capacities of the various cables and equipment

14.18 **Inspection & Testing**

14.18.1 Initial inspection of materials & equipment at manufacturer’s works will be done by the Engineer-in-Charge or his representative. For item/equipment requiring initial inspection at manufacturer’s works, the contractor will intimate the date of testing of equipment at the manufacturer’s works before dispatch. The contractor shall give sufficient advance notice regarding the dates proposed for such tests to the department’s representative(s) to facilitate his presence during testing. The Engineer-in-charge at his discretion may witness such testing. Equipment will be inspected at the manufacturer/authorized dealer’s premises, before dispatch to the site by the contractor.

(a) The department also reserves the right to inspect the fabrication job at factory and the successful tenderer has to make arrangements for the same

(b) The materials duly inspected by Engineer-in-Charge or his authorized representative shall be dispatched to site by the contractor

(c) No additional payment shall be made to the contractor for initial inspection/ testing at the manufacturer's works by the representative of the Engineer-in-Charge. However, the department will bear the expenses of its representative deputed for carrying out initial inspection / testing

14.18.2 **Final Inspection and Testing**

Final Inspection and testing will be done by the Engineer-in-Charge of his representative. The installation will be offered for inspection by local bodies (Chief Fire Officer). The contractor or his representative shall attend such inspection of the Chief Fire Officer, extend all test facilities as are considered necessary, and comply with all observations of the Chief Fire Officer which are part of the agreement and arrange for obtaining necessary clearance certificate in favour of the department. In case the contractor fails to attend the inspection and made desired facilities available during inspection, the department reserves the right to provide the same at the risk and cost of the contractor and impose penalty for the same. The installation will be accepted by the department only after receiving clearance from Chief Fire Officer for the work executed by the contractor under the agreement which is the responsibility of the contractor.

14.19 **Extent of Work**

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

14.19.2 In addition to supply, installation, testing and commissioning of wet riser equipment, following works shall be deemed to be included within the scope of work to be executed by the tenderer as this is a turnkey job:

(a) Minor building works necessary for installation of equipment, foundation, making of opening in walls or in floors and restoring them to their original condition/ finish and necessary grouting etc. as required

(b) All supports for overhead pipes, cables, valves, sprinkler and channels etc. as required

14.20 **Works to be done by the Contractor**

Unless otherwise mention in the tender document, the following works shall be done by the contractor and therefore their cost shall be deemed to be included in their tendered cost, whether specifically indicated in the schedule of work or not:

(i) Foundation for equipment including foundation bolts and vibration isolation spring and pads

(ii) Suspenders, brackets and floor / wall support for suspending / supporting pipes / cable trays

(iii) Excavation and refilling of trenches in soil wherever the pipes are to be laid directly in ground, including base treatment and supports

(iv) Sealing of all floors / slabs / wall opening provided by the department or made by the contractor for pipes and cables from fire safety point of view, after laying of the same

(v) Painting of all exposed metal surfaces of equipment's and components with appropriate colour

(vi) Making openings in the walls / floors / slabs or modifications in the existing openings wherever

provided for carrying pipeline, cables, etc.

(vii) All electrical works including cables / wires, earthing, etc. beyond power supply made available by the department

(viii) Making good all damages caused to the structure during installation and restoring the same to their original finish

(ix) Approval from local bodies / fire authorities as may be required as per local by-laws (The contractor's responsibility shall be limited to the work executed by him). The inspection fee of local bodies / fire authorities shall be borne by the department.

14.21 **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.

14.22 Verification of Correctness of Equipment at Destination: The contractor shall have to produce all relevant records to certify the genuineness of equipment from the manufacturers.

14.23 Machinery for Installation: All tools and tackles required for unloading/ handling of equipment and materials at site, their assembly, erection, testing and commissioning shall be the responsibility of the contractor.

14.24 **Safety Measures**: All equipment shall incorporate suitable safety provisions to ensure safety of the operating personnel at all times. The initial and final inspection reports shall bring out explicitly the safety provisions incorporated for all equipment.

14.25 **After Sales Service**: The contractor shall ensure adequate and prompt after sales service in the form of maintenance, spares and personnel as and when required and shall minimize the breakdown period. In case of equipment supplied by other manufacturers the firm shall furnish a guarantee from the manufacturer for the same before the installation is taken over.

14.26 **Documents to be provided on Completion of Work**: Three sets of following documents shall be furnished to the department by the contractor on completion of work:

(a) Completion drawings

(b) 3 Sets of manufacturer's technical catalogues of all equipment and accessories

(c) Operation and maintenance manual of all major equipment, detailing all adjustments, operation and maintenance procedure has been supplied and erected

15.0 **ADDITIONAL CONDITIONS AND SPECIFICATIONS FOR FIRE ALARM SYSTEM**

15.1 Scope of work: The work in general shall cover design, engineering, supply, storage, transportation, handling, installation, testing and commissioning of the entire automatic fire detection and alarm system and shall be treated as included in the scope of work of the successful tenderer whether or not they are specifically mentioned in the schedule of work or elsewhere in this tender document. This shall also include planning, programming, demonstration, training of personnel for maintenance and operation, submission of completion drawing, providing guarantee and after sales service.

15.2 All the components of fire alarm system shall be provided in manufacturer's original new and unopened sealed packing bearing manufacturer's name and label, otherwise they will not be accepted.

15.3 Drawings and Manual to be furnished by the Contractor:

(a) The contractor shall submit in duplicate the following drawings within a fortnight of the award of work for approval by the department:

(i) Layout of detectors, manual call boxes and all other accessories

(ii) Wiring diagram including connection topology for the complete system

(iii) Circuit diagram of individual panels, P.A. system and detectors

(iv) Constructional details of the various control and indicating panels and mimic diagram(s)

(b) Before commencement of the installation: The above drawings, with observations of the Department duly incorporated, shall be submitted to the Engineer-in-Charge in triplicate along with any special instructions, with regard to handling, storage and installation.

(c) Documents to be furnished on completion of installation: Three sets of the following documents shall be furnished to the department by the contractor on completion of work:

(i) Completion drawings as per 1.16. CPWD General Specifications for Electrical Works – Part-VI

(ii) Manufacturer's technical catalogues of all equipment and accessories

(iii) Operation and maintenance manual of all major equipment, detailing all adjustments, operation and maintenance procedures

15.4 The following tests after installation shall be conducted in the presence of engineer-in-charge and the test certificate shall be furnished with the record of tests:

(a) Continuity test

(b) Test for insulation resistance of the wiring work and the fire alarm panel

(c) Earth resistance test

(d) Earth continuity test

(e) Test for system operation. This test shall be conducted using a test fire at normal floor level. The number of locations for such a test shall be 1 % of the total number of detectors in an installation subject to a minimum of two and maximum of five. The system operation for fault conditions shall be conducted by introducing faults such as open circuit, short circuit, removal of detector, open/ short circuit in a sounder circuit, etc.

15.5 Test Certificate: Copies of all documents of routine and type test certificates of the equipment’s and materials carried out at the manufacturer’s premises and guarantee certificate shall be furnished to the department along with the supply of the materials. Payment of major equipment / materials shall not be released without receipt of such certificate and inspection / witnessing testing at manufacturers’ works even if the materials are reached at site.

15.6 The department reserves the right to send any material / component to any laboratory of its choice for testing of the material / component. All the charges for such testing shall be borne by the contractor. Nothing extra shall be paid on that account. Proper test certificates of such tests carried out, if any, shall have to be submitted in original to the department without which payment may not be released by the department.

15.7 The decision of the Engineer–in–Charge regarding requirement of test and guarantee certificate in respect of particular material / equipment will be final.

15.8 Detectors, control and indicting panels, sounders, PA system equipment, battery unit, manual call points, control modules shall be tested at the manufacturer’s works to indicate satisfaction to the contract specifications and test certificate be furnished with the supply.

15.9 In case of imported fire alarm components such as main fire alarm panel, repeater panel, detectors, manual call points, sounders, control modules etc.; individual certificate with individual number confirming to the relevant international standard shall be provided.

15.10 Running in period: After satisfactory commissioning and final inspection, the contractor shall demonstrate the trouble-free working / running of the entire automatic fire alarm system and accessories.

15.11 After the installation has operated satisfactorily without any major break down, mal-functioning or trouble, it shall be taken over by the department.

15.12 Date of acceptance: Subject to the guarantee clause, date of taking over the installation after trouble free operation shall be the date of acceptance.

15.13 Guarantee: The contractor shall guarantee the entire FAS / AFAS installation as per specifications both for components and for system as a whole. All equipment shall be guaranteed for 1 year from the date of acceptance against unsatisfactory performance or break down due to defective design, manufacture and / or installation. The installation shall be covered by conditions that the whole installation / any part thereof found defective within 1 year from the date of taking over shall be replaced / repaired by contractor free of charge as decided by Department. The warranty shall cover following:

(a) Quality, strength and performance of materials used

(b) Safe mechanical and electrical stress on all parts under all specified conditions of operation

(c) Satisfactory operation during the maintenance period

15.14 After sales service: The contractor shall ensure adequate and prompt after sales service in the form of maintenance personnel and spares as and when required with a view to minimise the break down period. Particular attention shall be given to ensure that all spares are easily available during the normal life of the installation.

15.15 Training: The contractor should provide necessary onsite training to operators of the system and engineers of the department which shall include log in the system, system operation, system initialisation, getting displays and reports, trouble shooting, password modification, etc.

15.16 Final Inspection & Testing -Final inspection & testing will be done by the Engineer-in-Charge or his representative. The installation will be offered for inspection to local body (Chief Fire Officer), The contractor will extend all help including test facilities to the representative of Chief Fire Officer. In case contractor fails to make desired facilities available during inspection, the department reserves the right to provide the same at the risk & cost of the contractor. The observations of Chief Fire Officer which are a part of agreement shall be promptly attended by the contractor. The installation will be accepted by the department only after receiving clearance from Chief Fire Officer.

15.17 Payment terms for automatic fire alarm works: The following percentages of contract rates for the various items of work included in the contract shall be payable against the stages of work shown therein:

| Sl. No. | Stage of work | Machinery and Equipment (Panel Detector, Hooter, etc.) |
|---|---|---|
| 1 | After initial inspection and delivery at site of materials in good condition supported with proper | 75% |

| | | |
|---|---|---|
| | documents to the satisfaction of the engineer-in-charge on pro-rata basis | |
| 2 | After completion of installation in all respect | 15% |
| 3 | After testing, commissioning trial run and handing over to the department for beneficial use | 10% |

**16.0 Particular Specification for VRV / VRF or SPLIT AC Works**

16.1 These General Specifications cover the equipment and materials for the system, their testing and/ or inspection as may be necessary before their dispatch from their respective factory, their delivery at site, all preparatory works, assembling, installation and adjustments, commissioning, final Testing, Adjusting & Balancing putting into operation, equipment capacity computation and handing over of the complete system.

16.2 These General Specifications is supplemented with OEMs specifications for executing the work. The OEMs specifications wherever differ from these General Specifications shall have over- riding value and shall be followed for this work.

16.3 Related Documents: These General Specifications shall be read in conjunction with the National Building Code of India (NBC) 2016 as amended up to date and Energy Conservation Building Code of India 2017 as amended up to date, BEE Star labelling.

16.4 Site Information: The tenderer should, in his own interest, visit the site and familiarize himself with the site conditions before tendering. For any clarification, tenderer may discuss with the Engineer-in-Charge.

16.5 Heat Load Calculations &Equipment Selection

(i) The successful bidder / contractor should give detailed heat load calculations as per Appendix 'D' of CPWD General Specification of HVAC Works 2024 separately for all the seasons in which, the specified conditions are to be maintained along with various coefficients considered and the calculation of U values, R values of Roof assemblies, Walls, Windows, Doors, Fenestration etc. and other required detail immediately after award of work.

(ii) The successful Bidder / Contractor should also give the above heat load calculations wherever required separately for the areas served by each AHU in a central air conditioning / heating system / Spilt Unit / Cassette AC system.

(iii) The equipment selection and duct design shall be made on the basis of the above heat load calculations.

(iv) The Contractor can refer and utilize the design done by the department/ consultants for the department; however, there shall be no commitment to provide the same to the contractor, nor the contractor shall be absolved of the responsibility of correct design and performance of the air-conditioning system provided by him / her, citing the design proposed by the department / consultant for the department.

16.6 Conformity With Statutory Acts, Rules, Standards and Codes

(i) All components shall conform to relevant Bureau of Indian Standard Specifications, wherever existing, amended up to date and Energy Conservation Act 2001 as amended up to date, Energy Conservation Rule 2018 as amended up to date & Energy Conservation Building code 2017 of India as amended up to date, BEE star labelling. A non-comprehensive list of such standards is appended in Appendix 'B' CPWD General Specification of HVAC Works 2024.

(ii) All works shall conform to relevant Bureau of Indian Standard Specifications, National Building code 2016 as amended up to date, Energy Conservation Act 2001 as amended upto date, Energy Conservation Rule 2018 as amended up to date and Energy Conservation Building code 2017 of India as amended up to date, National Electric Code 2023 as amended up to date, as well as relevant BIS codes, BEE star Labelling. All codes and Standards shall mean upto date updated the latest edition as on last date of submission or last extended date of submission of tender.

(iii) All electrical works shall be carried out in accordance with the provisions of Indian Electricity Act, 2003 and Indian Electricity Rules, 1956 amended to date, National Electrical Code of India 2023 as amended upto date. They shall also conform to CPWD General Specifications for Electrical works, Part-I: Internal, 2023 as amended/revised upto date and Part-II: External, 2023 as amended/revised upto date and Part IV (Sub Station – 2013) as revised / amended upto date.

(iv) In the case of discrepancy between the schedule of Quantities, the Specifications and/or the Drawings, the following order of preference shall be observed:

(a) Description of Schedule of Quantities, if any

(b) Particular Specification and Special Condition, if any

(c) Drawings

(d) CPWD Specifications

(e) Bureau of Indian Standard Specifications

(f) ECBC 2017

(g) National building code 2016

All above mentioned documents amended up to date are applicable.

16.7 Safety Codes and Labour Regulations:

(i) All the safety procedures outlined in the safety codes listed in Appendix ‘C’ CPWD General Specification of HVAC Works 2024shall be complied with

(ii) In respect of all labour employed directly or indirectly on the work for the performance of the air conditioning contractor’s part of work, the contractor at his own expense, will arrange for the safety provisions as per the statutory provisions, B.I.S recommendations, factory act, workman’s compensation act, CPWD code and instructions issued from time to time. Failure to provide such safety requirements would make the tenderer liable for penalty as provided in the labour laws / GCC for each violation. In addition, the Engineer-in-charge shall be at liberty to make arrangements and provide facilities as aforesaid and recover the cost from the contractor.

(iii) The contractor shall provide necessary barriers, warning signals and other safety measures while laying pipelines, ducts cables etc. or wherever necessary so as to avoid accident. He shall also indemnify CPWD against claims for compensation arising out of negligence in this respect. Contractor shall be liable, in accordance with the Indian Law and Regulations for any accident occurring due to any cause. The department shall not be responsible for any accident occurred or damage incurred or claims arising therefrom during the execution of work. The contractor shall also provide all insurance including third party insurance as may be necessary

to cover the risk. No extra payment would be made to the contractor due to the above provisions thereof.

16.8 Works to be done by the contractor: Unless otherwise mentioned in the tender documents, the following works shall be done by the contractor and therefore, their cost shall be deemed to be included in their tendered cost whether specifically indicated in the schedule of work/ tender or not:

(i) Foundations for equipment including foundation bolts and vibration isolation spring / pads

(ii) Support columns and beams for cooling towers

(iii) Suspenders, brackets and floor / wall / Ceiling support for suspending/ supporting ducts and pipes

(iv) Suspenders and / or cable trays for laying the cables

(v) Excavation and refilling of trenches in soil wherever the pipes are to be laid directly inground, including necessary base treatment and supports

(vi) Sealing of all floor slab / wall openings provided by the Department or contractor for pipes and cables, from fire safety point of view, after laying of the same

(vii) Painting of all exposed metal surfaces of equipment and components with appropriate Making openings in the walls / floors / slabs or modification in the existing openings wherever provided for carrying pipe line, ducts, cables, etc.

(viii) In case of new construction work the opening shall be made in slab casting / wall construction

(ix) Providing wooden/ metallic frames for fixing grills / diffusers

(x) Making good all damages caused to the structure during installation and restoring the same to their original finish

(xi) Balancing of all VRV / VRF AC system in accordance with generally accepted engineering standards. A written balance report shall be provided (wherever asked for) to the Engineer-in-Charge or his representative for VRV / VRF AC system as per requirement of CPWD Specification

(xii) A set of three copies of operations manual shall be provided to the Engineer in Charge or his representative containing following information at a minimum:

(a) VRV / VRF / Split AC system equipment capacity

(b) Equipment operation and maintenance manuals

(c) VRV / VRF / Split AC system control maintenance and calibration information, including wiring diagrams, schedules, and control sequence descriptions

(d) A complete written narrative of how each system is intended to operate

(xiii) In case of new construction work (EPC as well as Non-EPC) involving civil work, HVAC work and other E&M services having working plant tonnage 200 & above, the Contractor shall associate the Energy modeller and carried out the energy modelling of complete building & Energy Performance Index modelling including all services and other active/passive factors including core & shell as involved in the complete design. The cost of this energy modelling deemed to include in the tendered cost and nothing extra will be paid on this account.

16.9 Power Supply, Water Supply and Drainage

(i) In case of Standalone work of VRV / VRF AC system in the existing building, Electricity and drainage shall be provided by the Contractor for successful and satisfactory completion of work.

(ii) In case of EPC contract the Contractor has to arrange Power, Water i/c water Softening plant, Drainage, Tube cleaner system etc. by own resources at free of Cost, until otherwise specified in the tender.

16.10 Machinery For Erection: All tools and tackles, heavy machinery handling equipment, etc. required for unloading/ handling of equipment and materials at site, their assembly, erection, testing and commissioning shall be the responsibility of the contractor.

16.11 Completeness of the tender: All sundry equipment, fittings, assemblies, accessories, hardware items, gaskets, masonry platforms / foundation for Chilling Units, pumps, Cooling Towers etc., supports for pipes foundation bolts, supports, termination lugs for electrical connections, cable glands, junction boxes and all other items which are useful and necessary for proper assembly and efficient working of the various equipment and components of the work shall be deemed to have been included in the tender.

16.12 Submission of Programme: As per milestone stipulated in Schedule F of NIT, the successful tenderer shall submit his programme for submission of Design Calculation, drawings, Heat Load Calculation, Documents to be submit to Local Bodies, Air and water distribution layout and drawings, Selection of Equipment, supply of equipment, installation, testing, commissioning, getting approval from Local body, if any, any other activities as required in NIT and handing over of the installation to the Engineer-in-Charge. This execution of work to be planned keeping in view of building's interior renovation work / other related works which shall be given priority.

16.13 Submission of Drawings: The contractor shall submit the drawings to the Engineer-in-Charge as per milestone stipulated in schedule F of NIT for approval before start of work.

16.14 Commencement of Work: The contractor shall commence work as soon as the drawings submitted by him are approved.

16.15 Dispatch of materials to site and their safe custody: The contractor shall dispatch materials to site in consultation with the Engineer-in-Charge. Programme of dispatch of material shall be framed keeping in view the building interior renovation work / other related works. Safe custody of all machinery and equipment supplied by the contractor shall be the responsibility of the contractor till final taking over by the department.

16.16 Co-ordination with other agencies: The contractor shall co-ordinate with all other agencies involved in the work so that the work of other agencies is not hampered due to delay in his work. Ducting, piping, cabling or any other work, which directly affect the progress of building work, shall be given priority.

16.17 Quality of Materials and Workmanship

(i) The components of the installation shall be of such design so as to satisfactorily function under all conditions of operation.

(ii) The entire work of manufacture / fabrication, assembly and installation shall conform to sound engineering practice. The entire installation shall be such as to cause minimum transmission of noise and vibration to the building structure.

(iii) All equipment's and materials to be used in work shall be manufactured in factories of good repute having excellent track record of quality manufacturing, performance and proper after sales service.

(iv) None of the equipment / machines supplied shall be more than six months old from date of supply at site, Copy of Excise Gate Pass / Invoice / Shipment / Custom Clearance certificate/ details (in case of Imported equipment) / GST Bills shall be submitted to prove the date of manufacture & genuineness of the equipment / machines supplied. In case of whereas per NIT condition specialized agency is associated by main contractor as per agreement terms & conditions, all materials to be procured by associate specialized agency and all bills shall be in the name of associate agency in such cases.

(v) The material dispatch shall also accompany with the acceptance test / quality tests / performance test certificate as carried out by the Manufacture and by third party.

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

16.19 Inspection and Testing

A Initial Inspection &Testing

(i) Initial inspection of materials & equipment e.g. chiller, AHU, FCU, Cooling tower, Pumps, VRF units& its associated equipment shall be carried out by Engineer-in-charge or his authorized representative in factory. For items requiring assembly at site, the inspection shall be for the components to be assembled. The Engineer-in-charge can ask for factory inspection of other items also and the same shall also be deemed to be included in tender cost. All main material equipment etc. as required in inspection & testing is deemed to be included in tender cost. For item/ equipment requiring initial inspection at manufacturer's works, the contractor will intimate the date of testing of equipment at the manufacturer's works before dispatch. The contractor shall give sufficient advance notice regarding the dates proposed for such tests to the department's representative(s) to facilitate his presence during testing. The Engineer-in-charge at his discretion may witness such testing. Equipment will be inspected at the manufacturer/ authorized dealer's premises, before dispatch to the site by the contractor. For equipment sourced from abroad, the contractor shall include in his bid the costs of journey & stay, other costs if any, for sending his technically competent representative to witness the performance and pre-dispatch tests at the manufacturer's works. Evidence to this effect by way of travel documents etc. shall be produced before the payment against delivery is released. The Engineer-in-charge, at his discretion, may also witness such testing subject to Government Orders at that time.

(ii) The department also reserves the right to inspect the fabrication job at factory and the successful tenderer has to make arrangements for the same.

(iii) The materials duly inspected by Engineer-in-Charge or his authorized representative shall be dispatched to site by the contractor.

(iv) No additional payment shall be made to the contractor for initial inspection / testing at the manufacturer's works by the representative of the Engineer-in-Charge. However, the

department will bear the expenses of its representative deputed for carrying out initial inspection / testing.

(v) Factory testing of VRF having aggregate capacity more than 100 HP at NABL Certified Test Bed in India. Factory testing of Chillers shall be as per BIS / BEE/ ARI

B Final Inspection & Testing: Final Inspection & testing will be done by Engineer-in-Charge or his representative as per details indicated in CPWD General Specification for HVAC Works-2024.

C Safety measures: All equipment shall incorporate suitable safety provisions to ensure safety of the operating personnel at all times. The initial and final inspection reports shall bring out explicitly the safety provisions incorporated in each equipment.

16.20 Running in Period & Date of Acceptance

(i) After the installation work has been completed by the contractor, he will conduct tests and make adjustments as per chapter 17, CPWD General Specification for HVAC Works-2024 and further as may be necessary to satisfy himself that the entire AC System is capable of continuous running. Thereafter, he will offer to the department a running-in period of 7 days subject to a minimum aggregate of 120 hrs at his cost. The duty cycle of the plant during this running in period shall be same as that specified in the tender documents. In case of multiple compressor installations, all the compressors should be run by rotation. The plant will be operated and a log of all parameters will be maintained during this period. The contractor will be free to carry out necessary adjustments etc. during this period without stopping the plant. Record of inside conditions will be made during this period to check that the same are as per NIT requirements. The plant will be said to have successfully completed the running-in-period, if no break down or abnormal / unsatisfactory operation of any machinery occurs during this period. After this the plant will be made available for beneficial use. After the plant has operated without any major break down / trouble and inside conditions are maintained as per NIT requirements for the above specified running in period, it shall be taken over by the department subject to guarantee clause mentioned below. This date of taking over of plant after trouble free operation during the running in period shall be the date of acceptance.

(ii) Any loss of refrigerant or oil during the running in period shall be made good by the contractor free of charge.

(iii) Capacity test of the chilling unit & other major equipment shall be carried out as and when conditions become stabilized as per details given under Appendix 'G' CPWD General Specification for HVAC Works 2024.

(iv) Seasonal testing may be carried out as & when outside conditions become suitable for the Major Season Test. When the major seasonal test cannot be carried out on commissioning of the installation due to any reason not attributable to the contractor, the installation will he handed over to the Department for beneficial use after completion of successful running in test of 7 days subject to a minimum aggregate of 120 hours. The balance payment shall be released to the contractor on his furnishing a bank guarantee in the specified format from a scheduled bank for an equivalent amount. The bank guarantee shall be valid for a period of 6 months. However, it will be extended till the successful completion of the major seasonal test.

This bank guarantee shall be independent of the one furnished for performance guarantee. The Summer or monsoon season will be the major seasonal test for the purpose of the above.

16.21 Guarantee

(i) The contractor shall guarantee the complete system to maintain the specified conditions under all conditions of ambience and internal loads subject to the condition that designed outside conditions & designed internal loads are not exceeded.

(ii) All equipment shall be guaranteed for a period of 12 months from the date of acceptance and taking over of the installation by the Department or period offered by OEM; whichever is greater, against unsatisfactory performance and / or breakdown due to defective design, material, manufacture, workmanship or installation. The equipment or component or any part thereof, so found defective during the guarantee period shall be repaired or replaced free of cost to the satisfaction of the Engineer-in-Charge. In case, it is felt by the department that undue delay is being caused by the contractor in doing this, the same will be got done by the department at the risk & cost of the contractor. The decision of Engineer-in-Charge in this regard shall be final.

(iii) Any leakage of refrigerant and / or oil due to defective design, manufacture, workmanship or installation during the guarantee period shall be made good by the contractor free of charge.

16.22 Tender Drawings, Drawings for Approval & Completion Drawings for approval on award of the work: The contractor shall prepare & submit three sets of hard copy & one digital / soft copy in AutoCAD format of following drawings (2D / 3D) and get them approved from the Engineer-in-Charge before the start of the work. The approval of drawings however does not absolve the responsibility of contractor to supply the equipment / materials as per agreement, if there is any contradiction between the approved drawings and agreement. In case of applicability of BIM modelling as per NIT, then all drawings and data shall be developed and extracted from BIM platform.

(i) Layout drawings of the equipment to be installed in various spaces stated below

(ii) Drawings including section, showing the details of erection of entire equipment including their foundations, water basin for the cooling towers / air washers, etc.

(iii) Plumbing drawings showing the layout of entire piping, dia. & length of pipes, valves and isometric drawings showing connections to various equipment.

(iv) Ducting drawings showing sizes, locations of dampers, grilles & diffusers

(v) Electrical wiring diagrams for all electrical equipment and controls including the sizes and capacities of the various cables and equipment

(vi) Dimensioned drawings of all electrical and control panels

(vii) Drawings showing the details of all insulations and vapour barrier works

(viii) Drawings showing details of supports for pipes, cable trays, ducts, etc.

(ix) Any other drawings relevant to the work. The department shall, at its discretion, use the soft copy of such drawings to prepare and examine the integrated services layout, resolve conflicts, and advise the contractor to modify the execution drawings suiting & adjusting to all the services requirements. The contractor shall be bound to modify & execute accordingly.

16.23 Completion Drawings: One set of digital / soft copy and three sets of the following laminated drawings shall be submitted by the contractor while handing over the installation to the

Department. Out of this, one of the sets shall be laminated on a hard base for display in the A.C. plant room. In addition, one set will be given on pen drive:

(i) Plant installation drawings giving complete details of all the equipment, including their foundations

(ii) Refrigerant tube layout drawings including insulation giving sizes and lengths of all the pipes and the sizes and locations of all types of valves, and including isometric drawings for the entire piping including the pipe connections to the various equipment and insulation details wherever required

(iii) Duct layout drawings with their sizes and locations, and sizes and locations of all dampers, grills & diffusers

(iv) Line diagram and layout of all electrical control panels giving switchgear ratings and their disposition, cable feeder sizes and their layout

(v) Control wiring drawings with all control components and sequence of operations to explain the operation of control circuits

(vi) BIMS drawings (wherever applicable)

(vii) Electrical cabling layout

16.24 After Sales Services: The contractor shall ensure adequate and prompt after sales service in the form of maintenance, spares and personnel as and when required and shall minimize the breakdown period. In case of equipment supplied by manufacturer other than the contractor, the firm shall also furnish a guarantee from the manufacturer for the same before the plant is taken over.

16.25 Documents To Be Furnished on Completion of Installation: Three sets of the following documents shall be furnished to the department by the contractor on completion of work:

(a) Completion drawings

(b) 03 sets in digital form and 03 sets in printed form of manufacturer's technical catalogues of all equipment and accessories

(c) 02 sets of digital and 02 sets of hard copy of Operation and maintenance manual of all major equipment detailing all adjustments, operation and maintenance procedures

(d) Licenses for all software and technologies as applicable

(e) In case of applicability of BIM modelling as per NIT, all drawings and data shall be developed and extracted from BIM platform

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

| Sl. No. | Stage of work | Machinery and Equipment (Outdoor & Indoor units) | All other items |
|---|---|---|---|
| 1 | After initial inspection (wherever specified) and delivery at site in good condition on prorata basis | 75% | 70% |
| 2 | On completion of pro-rata installation | 15% | 20% |

| | | | |
|---|---|---|---|
| 3 | On testing, commissioning and handing over | 10% | 10% |

16.27 Design Parameters

(i) Outdoor Design Conditions Outdoor design conditions (where the air conditioning is to be installed) shall be accordance with Table 2.1 (CPWD General Specification for HVAC Works 2024). Values of ambient dry-bulb temperatures and wet-bulb temperatures, against the various annual percentiles, represent the value that is exceeded on average by the indicated percentage of the total number of hours. The 0.4 percent, 1.0 percent, 2.0 percent values are exceeded on average 35 h, 88 h and 175 h, respectively in a year. The 99.0 percent and 99.6 percent values are defined in the same way but are usually reckoned as the values for which the corresponding weather elements are less than the design conditions of 88 h and 35 h, respectively. The design values of 0.4 percent, 1.0 percent and 2.0 percent annual cumulative frequency of occurrence may be selected depending upon application of air conditioning system. For normal comfort conditions, values under 1.0 percent column should be used for cooling loads and 99 percent column for heating loads. For critical applications, values under 0.4 percent column should be used for cooling loads and 99.6 percent column for heating loads. Maximum dry bulb temperature and co-incident wet bulb temperature shall be considered for design.

(ii) Indoor design conditions: The general design criteria for Air-Conditioning of proposed Hostel Building shall be as per Indian Society of Heating Refrigeration & Air-conditioning Engineers (ISHRAE) Data Book 2017 which is reproduced as below: General Category Specific Category Inside Design Condition (Winter & Summer) Relative Humidity (RH) Air Movement Circulation Air Changes Per Hr. Noise Filtration Efficiency Average 68 to 72°F (20-22°C) 40% - 55% Below 25 FPM 8 - 12 Nc 35-40 35% - 60% or better.

16.28 The tentative scope of work in G+7 floor Hostel building. The necessary approval of drawing / designs / layouts of entire AC system from various authorities shall be the responsibility of agency.

16.29 Variable Refrigerant Volume / Flow System: The system selected is a modular system, with number of indoors connected to centrally located outdoor units. The outdoor units for all the system shall be air cooled type.

(a) General Description: All the VRF air conditioners shall be fully factory assembled, wired, internally piped & tested. The outdoor unit shall be pre-charged with first charge of refrigerant. Additional charge shall be added as per refrigerant piping at site. All the units shall be suitable for operation with 415 V +/- 10%, 50 Hz + 3%, 3 Phase supply for outdoor units; & 220 V +/- 10%, 50 Hz +/- 3%, 1 Phase supply for indoor units.

(b) Specifications of Outdoor Units

(i) Outdoors units of the VRV system shall be compact air-cooled type.

(ii) The outdoor unit should comprise of Inverter controlled Rotary Compressor / Scroll Compressor, minimum two compressors for above 14HP modules.

(iii) Each module of outdoor unit must have at least 100 % of variable compressor which can work on Part load suitable to operate at heat load proportional to indoor requirement.

(iv) The outdoor units must be suitable for up to 180 m refrigerant piping between outdoor unit & the farthest indoor units or as per OEM design. Allowable level difference between outdoor unit & indoor units shall be 50 m in case of outdoor unit on top & 40 m in case of outdoor unit at bottom or as per OEM design.

(v) Allowable level difference between various indoor units connected to one out door unit shall be up to 15 m or as per OEM design.

(vi) The outdoor units shall be suitable to operate within an ambient temperature range of 5 Deg C to 51 Deg C in cooling mode; & -20 Deg C to 15 Deg C in heating mode or as per OEM design.

(vii) The entire operation of outdoor units shall be through independent remotes of indoor units. No separate Start / Stop function shall be required.

(viii) Starter for the Outdoor Unit compressor shall be "Direct on Line" type. Inverter compressor of the unit shall start first & at the minimum frequency to reduce the in-rush current during starting.

(ix) Complete refrigerant circuit, oil balancing/ equalizing circuit shall be factory assembled & tested.

(c) Specifications of Indoor Units: The units include pre-filter, fan section and DX coil section. The housing of units shall be light weight powder coated galvanized steel. Units shall have external casing of ABS Plastic for supply and return air.

High wall type indoor units Wall Mounted Units

(i) Wall mounted units must be compact & stylish design that does not detract from the decor of the room.

(ii) Each indoor unit must have electronic expansion valve operated by microprocessor thermostat-based temperature control to deliver cooling / heating as per the heat load of the room.

(iii) The unit must have provision of adding drain pump kit if required & specified. The drain pump must be suitable to lift drain up to 1000 mm from the bottom of the unit.

(iv) The sound pressure level of unit at the highest operating level shall not exceed 46 dB(A).

(v) Refrigerant control in the indoor unit shall be through Electronic Expansion Valve.

(d) Installation

(i) The units shall be mounted on ribbed rubber pads for vibration isolation. The contractor shall supply the required charge of refrigerant, lubricant and other consumables, for commissioning and testing of the equipment.

(ii) All the equipment shall be thoroughly tested and checked for leaks. All safety controls shall be suitably set and a record of all setting shall be furnished to the project supervisor.

(iii) Providing and fixing M.S. structural support for condensing unit with vibration isolator pad in-between support and structure and vibration isolation suspender and pads for evaporating units shall be in scope of contractor.

(iv) OEM of VRF units or authorized vendor of the OEM shall verify, validate and certify the installation and testing / commissioning of copper piping system.

(e) Painting: Shop coats of paint that have become marred during transportation or erection shall be cleaned off with mineral spirits, wire brushed and spot primed over the affected areas, then coated with enamel paint to match the finish over the adjoining shop- painted surfaces.

(f) Condensate Drain Piping: All pipes to be used for condensate drain shall be PVC pipe conforming to IS: 4985 -Class I& all joints should be Gluing or solvent cementing as per manufacturer recommendation

(g) Refrigerant Piping: All refrigerant pipes and fittings shall be soft drawn / half hard / hard drawn copper tubes and wrought copper fitting suitable for connection with silver solder. The Copper Piping & Piping Circuit should be with Minimum Number of joints to avoid the leakage probability, which shall be attained by.

(i) Using preferably less joint piping system e.g. One End Expanded Tubes

(ii) Bending the tubes instead of using elbow joints wherever 90-degree bending is required.

(1) Piping should be routed at site in such a manner, that brazed joints in the refrigeration piping are kept to a minimum.

(2) The makes of tube fittings shall be same as that of tubes.

(3) The thickness of fittings used shall be same as that of the pipe.

(iii) All joints in copper piping shall be swaged joints using low temperature brazing and/ or silver solder. Before jointing any copper pipe or fittings, its interior shall be thoroughly cleaned be passing a clean cloth via wire or cable through its entire length. The piping shall be continuously kept clean of dirt, etc. The nitrogen gas must be purged for protecting copper pipe during brazing operation. After brazing allow it for natural cooling.

(iv) Refrigerant lines shall be sized to limit pressure drop between evaporator and condensing unit to less than 0.2 kg per sq cm.

(v) After the refrigerant piping installation has been completed the refrigerant piping system shall be pressure tested using, Freon mixed with nitrogen at a pressure of 20 Kg per Sq. cm. (High side) and 10 Kg per Sq. cm (Low side). Pressure shall be maintained on the system for 24 hours.

(vi) The system shall then be evacuated to a minimum vacuum of 70 cm. of mercury and held for 24 hours, during which time; change in vacuum shall not exceed 12 cm of mercury.

(vii) All refrigerant piping shall be installed strictly as per the instructions and recommendations of air conditioning equipment manufacturers.

(viii) The refrigerant copper tubes shall comply with ASTM B280 (Standard specification for seem less copper tube for air conditioning and refrigeration).

(ix) The refrigerant copper tube fittings shall conform to ASME B16.18/B16.22/ B 16.26/ B 16.50. However, copper tube fitting used for brazed connections in air conditioning and refrigeration system shall comply with ASME standard B 16.22. The refrigerant copper tube fitting shall be of same manufacturers as of copper tubes. The thickness of all copper tubes fitting shall be equal to or greater than thickness of copper tubes.

(x) All pipes must be tested for defects using Eddy Current Testing and other test as per ASTM B280 (Standard Specification for Seamless copper tube for air-conditioning and refrigeration)

(xi) Joints in refrigerant piping should be kept as minimum as possible. The use of elbows, sockets, bends etc. shall be avoided and as per requirement the copper tubes shall be suitably bend with automatic bending machine.

(xii) Each copper tube shall be marked (embossed) with manufacturer name, OD in mm, wall thickness in mm, lot number, month & year of manufacturer and conforming standard (as applicable).

(xiii) The copper tube fitting shall be marked (embossed) with manufacturer name, OD in mm and wall thickness in mm.

(h) Insulation work: The insulation work shall be as per CPWD General Specification for HVAC Works 2024.

(j) Inspection, testing, adjusting, balancing and commissioning Final inspection

(i) After completion of the entire installation as per specification in all respects, the AC contractor shall demonstrate trouble free running of the AC equipment's and installation for a period of minimum 120 hours of running as detailed in CPWD General Specification for HVAC Works 2024.

(ii) After the trial run, the AC contractor shall offer the plant for the seasonal test, namely test for summer or monsoon season whichever occurs earlier. The test results as per Appendix G, CPWD General Specification for HVAC Works 2024 shall be furnished.

(iii) The equipment capacity computations as per notes of the Annexure 'G' shall be carried out.

(iv) The Input KW of the unit / TR at full load shall also be checked against contract requirements, if any.

(v) All instruments for testing shall be provided by the AC contractor. These shall be as per Note 'A' of Appendix G. The accuracy of the instruments shall be as follows:

(1) Temperature: Liquid in glass thermometer having accuracy ± 1 deg. C as per IS: 4825.

(2) Wet bulb Temperature: Sling psychrometer conforming to IS: 6017. Scale Error: For less than 0 deg. C: 0.3 deg C + 0.2 deg. C. For over 0 deg. C: 0.2 deg. C + 0.1 deg. C

(vi) The Testing, Adjusting and Balancing (TAB) shall be carried out during execution of work as well as at the stage of final inspection and commissioning for aggregate system capacity 100 TR and above.

(vii) Testing, adjusting, and balancing (TAB) is the process of checking and adjusting all HVAC systems in a building to produce the design objectives. This process includes:

(1) Adjusting the total system and equipment

(2) Measuring electrical performance of VRV / VRF AC System equipment

(3) Establishing quantitative performance of all equipment

(4) Verifying automatic control system operation and sequences of operation

(5) Sound and vibration measurement

(6) Measurement of duct leakages, etc. Report Forms: Test data sheets arranged in logical order for submission and review. They should also form the permanent record to be used as the basis for any future TAB work. All tests, Adjusting and balancing shall be carried out in the presence of Engineer-in-Charge or his representative

## 17.0 SOLAR PHOTOVOLTAIC PANEL

17.1 SPECIFICATIONS OF SPV PANEL

| Sl. No. | Description | As per NIT |
|---|---|---|
| 1 | Minimum Output (Pmax) as per STC | As decided by Engineer-in-Charge |
| 2 | Voc / Isc | 44.64 / 8.75A |
| 3 | MPP Voltage (Vmpp) V | 35.93 |
| 4 | MPP current (imp) A | 8.33 |
| 5 | Open circuit voltage (Voc)V | 45.10 |
| 6 | Normal operating cell temperature | 45 ± 2 °C |
| 7 | Module dimensions (LxWxH) | Approx. 1960 mm x 990 mm x 40 mm |
| 8 | PV Module type | Mono Crystalline |
| 9 | No. of PV cells per Module Standard | 72/As per Manufacturer |
| 10 | Min. efficiency of solar cell | 15.50% |
| 11 | Solar module frame material | Aluminium |
| 12 | Weather resistant junction | IP65 / IP67 |
| 13 | Glass | Toughened / Tempered |
| 14 | Glass iron content | Low Iron |
| 15 | Glass Transmissivity | High transmissivity |
| 16 | Frame | Anodized aluminium |
| 17 | Encapsulation | Ethyl Vinyl Acetate (EVA) |
| 18 | Trilaminate back surface | Tedlar / Polyester |
| 19 | By-pass diode | To be provided |
| 20 | Standard | IEC 61215 / IS 14286 & IEC61730 Part 1 & Part 2 |
| 21 | Performance Guarantee | 10 years of 90% power output 25 years of 80% power output |

17.2 SPECIFICATION OF SOLAR INVERTER (GRID TIED)

| Sl. No. | Description | As per NIT |
|---|---|---|
| 1 | Type | Grid tied |
| 2 | Max. DC Array Input Voltage & Power | 1000 V & Not less than 25,000 W |
| 3 | DC Voltage Tolerance | -20% to +15% of the Carrey input voltage in Sl. No. 1 above |
| 4 | Type of solar charge controller | MPPT based solar charge controller |
| 5 | Switching Device | MOSFET / IGBTBASED |

| | | |
|---|---|---|
| 6 | Continuous inverter output rating 40 kWp | 11kWp |
| 7 | Output wave form | Pure Sine wave output |
| 8 | total harmonic distortion | <3% with resistive load |
| 9 | Nominal AC output voltage and frequency | 415V, 3 phase, 50Hz |
| 10 | Output frequency | 50 Hz +0.5Hz |
| 11 | Grid frequency tolerance | +5% |
| 12 | Grid frequency synchronization range | 3Hz |
| 13 | No-Load losses | <1% |
| 14 | Power factor | >0.9 Lagging |
| 15 | Inverter efficiency | > 98% at nominal voltage & power |
| 16 | Noise level | < 57 db |
| 17 | Certifications | IEC 61727, CE, IEC62109-1, IEC 62109-2, IEC 61683/IS 61683, IEC 60068-2(1,2,14,30) |
| 18 | Idle current | <4 % of rated capacity |
| 19 | Regulation Line regulation and load regulation | -2% |
| 20 | Over load features | 150%for one minute |
| 21 | Cooling | Forced air cooling with temperature-controlled cooling / Regulated air cooling |
| 22 | Operating Temperature | (-)10°C to 55°C |
| 23 | Relative Humidity | 95% |
| 24 | LED/LCD display | Indications display shall indicate system functional parameters and protection functional indicators |
| 25 | Data Monitor and display controls | RS 485, Ethernet or RS232 connectivity |
| 26 | Protections | 1. Input over Voltage<br>2. Low / High frequency<br>3. Short Circuit<br>4. Under / over output voltage<br>5. Over Temperature<br>6. Grid input under voltage / over voltage with auto recovery<br>7. DC disconnect device<br>8. DC reverse polarity<br>9. Anti-Islanding protection as per the standard |

| | | |
|---|---|---|
| 27 | Enclosure | Protection Safety IP 65 / IP 66 (for outdoor) Galvanic isolation at input & output through transformer |

17.3 SPECIFICATIONS FOR ARRAY JUNCTION BOX (DCDB)

| Sl. No. | Description | As per NIT |
|---|---|---|
| 1 | No. of module in series | As per manufacturer standard |
| 2 | No. of module in parallel | As per manufacturer standard |
| 3 | Minimum Capacity of each SPV panel | 300 Wp |
| 4 | Switch gears | MCB / MCCB |
| 5 | Connectors | 1.1 KV grade 100 Amps capacity |
| 6 | Wiring | FRLS copper conductor single core cable 1.1 KV grade of required size |
| 7 | Enclosure Protection | IP 65 (outdoor) dust & vermin proof weather resistance |
| 8 | Enclosure | Thermoplastic / Polycarbonate material |
| 9 | Size | As per manufacturer standard / Site requirement |

17.4 SPECIFICATIONS FOR PV PANEL SUPPORT STRUCTURE

| Sl. No. | Description | As per NIT |
|---|---|---|
| 1 | Material | Hot dip galvanized steel (85 Microns) |
| 2 | Thickness of member | 2 mm |
| 3 | Over all dimensions | As per manufacturer standard |
| 4 | Wind rating | 150 Km / hour |
| 5 | Tilt angle and adjustment | Adjustable as per site requirement |
| 6 | Peach of structure d | Max. 7 Mtr or as per manufacturer standard |
| 7 | Hard wears & fastener | SS 304 |
| 8 | Foundation | CC (1 Cement: 2 Coarse Sand: 4 graded 20 mm stone aggregate) |

17.5 SPECIFICATIONS FOR AC DB (AC PANEL)

| Sl. No. | Description | As per NIT |
|---|---|---|
| 1 | Make | As per acceptable make list attached. |
| 2 | Thickness of sheet metal | 2 mm thick |
| 3 | Size of bus bar | 25mm x 5mm |
| 4 | Material of bus bar | Copper |
| 5 | Bus bar Insulation | PVC Sleeve |
| 6 | Over all dimension | 1.2 sqm (Front Area) |
| 7 | Degree of protection | IP 42 as per IS 13947 (Part-I) |

17.6 SPECIFICATIONS FOR CABLE

| Sl. No. | Description | As per NIT |
|---|---|---|
| 1 | Type | XLPE2 |

| | | |
|---|---|---|
| 2 | Grade | 1.1 KV |
| 3 | Size & material | As per NIT |
| 4 | SPV module to AJB | 4 sqmm copper unarmoured (DC cable) |
| 5 | AJB to inverter | 6 sqmm copper unarmoured (DC cable) |
| 6 | Inverter to ACDB | 4x35 sqmm copper armoured |
| 7 | ACDB to Grid | 4x35 sqmm copper armoured |
| 8 | Confirmation | IS 7908 / 7098 (Part-I)1988 amended upto date |

17.7 TECHNICAL PARAMETERS FOR ENERGY METER

| Sl. No. | Description | As per NIT |
|---|---|---|
| 1 | Applicable IS | IS 13779 or IS 14679 depending upon accuracy of meters |
| 2 | Accuracy Class Index | 0.5 or better up to 650 V |
| 3 | Display | LCD |
| 4 | Power factor range | Zero lag –unity – zero lead |
| 5 | Display parameters Power Consumption | Display parameters: LCD test, KWH import, KWH export, MD in KW export, MD in KW import, Date &Time, AC current and voltages and power factor (Cumulative KWH will be indicated continuously by default &other parameters Through push button) Less than 1 Watt & 4 VA in Voltage circuit and 2 VA for Current circuit |
| 6 | Frequency | 50 Hz with + / - 5%variation |
| 7 | MD Registration | a) Meter shall store MD in every 30 min. period along with date & time. At the end of every 30 min, new MD shall be compared with previous MD and store whichever is higher and the same shall be displayed.<br>b) It should be possible to reset MD automatically at the defined date (or period) or through MRI.<br>c) Manual MD resetting using sealable push |
| 8 | Climatic conditions | a) As per IS 13779 or IS 14697 for climatic conditions.<br>b) The meter should function satisfactorily in India with high end temperature as 50°C and humidity up to 95%. A meter shall withstand an insulation test of 4 KV |
| 9 | Insulation | Surge and impulse test at 8 KV |

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

| Sl. No. | Stage of work | Machinery and Equipment's (Solar Photo Voltaic Module, Power Conditioning Unit) | All other items |
|---|---|---|---|
| 1 | After initial inspection (wherever specified) and delivery at site in good condition on prorata basis | 75% | 70% |
| 2 | On completion of pro-rata installation | 15% | 20% |
| 3 | On testing, commissioning and handing over | 10% | 10% |

**18.0 CCTV SYSTEM**

18.1 This specification covers installation, testing as may be necessary before dispatch, delivery at site, all preparatory work, assembly and installation, commissioning putting into operation of CCTV Surveillance system.

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

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

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

18.5 Item must be complete with all equipment's and required accessories along with necessary power systems, connectors, plugs, sockets and hardware / software as required for complete installation of the system under this contract and present scope of work and nothing extra shall be payable on this account.

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

18.7 All software & hardware should be in upgraded version.

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

18.9 For storage 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.

18.10 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).

18.11 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 work:

(a) Completion drawings

(b) Manufacturer's technical catalogues of all equipment's and accessories

(c) Operation and maintenance manual of all major equipment detailing all adjustment, operation and maintenance procedure

18.12 Contractor shall get approval of Scheme for CCTV work before commencement of work. Following details shall be included in scheme:

a. Location of cameras

b. Location of Racks, switches, etc

c. Cabling layout from camera till control room.

d. Technical specifications / catalogue of each component

18.13 CCTV system to be supplied and installed with all software, hardware like sealing joint, connectors (all type LC / SC / GBIC, RJ45, etc), patch cords etc. are deemed to be included in scope of work and nothing extra shall be paid on this account. Contractor is required to work out his costing accordingly.

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

| Sl. No. | Stage of work | Machinery and Equipment's (Camera, NVR, HDD, Work Station, LED Monitor, PoE Switch, UPS) | All other items |
|---|---|---|---|
| 1 | After initial inspection (wherever specified) and delivery at site in good condition on prorata basis | 75% | 70% |
| 2 | On completion of pro-rata installation | 15% | 20% |
| 3 | On testing, commissioning and handing over | 10% | 10% |

**19.0 SPECIFICATIONS FOR 13 PASSENGERS/ 2000Kg goods lift LIFT**

19.1 Type of Lift: Passenger lift (Gear less with permanent magnet synchronous motor)

19.2 No. of Lift: 2 Nos 13 passenger lift & 1 no 2000 kg good lifts

19.3 Load / No. of persons: 884 Kg / 13 persons for passenger lift & 2000 kg for goods lift

19.4 Rated speed: 1.0 Mtr / Sec for passenger lift & 0.5 Mtr / Sec for goods lift

19.5 Travel in meters: 17 meters (Approx)

19.6 Number of Floors Served: 5 Floors (G+4)

19.7 For 13 Passenger Lift & 2000 kg for goods lift

(a) Inside size of Lift well: 2500 mm Wide x 1900 mm Deep for 13 Passenger Lift & 2600 mm Wide x 2800 mm Deep for 2000 goods Lift

(b) Pit Depth: the pit depth and overhead shall be such as to conform to the requirements of bottom clearance and top clearance of IS 14665 (Part 2/ Sec. 1)

19.8 Clear inside size of the lift car: 2000 mm Wide x 1100 mm Deep or 2.2 Sqm area for 13 Passenger Lift & 1700 mm Wide x 2500 mm Deep or 4.25 Sqm area for 2000 kg goods Lift

19.9 Dimension of lift machine room: Machine room less

19.10 Position of the counter weight: as per Manufacture specification.

19.11 Position of machine: At the top of lift shaft

19.12 a) Type of Control: Microprocessor based A.C. variable voltage variable (V3F) frequency control

b) Type of operation: Micro-processor based Simplex Collective selective with or without attendant

c) Potential free contacts: Required for each floor position and up & down movement of the lift for building automation & Central Indicating Panel

19.13 Car Entrance door

(a) Number: 1 No. centre opening, door and door frame both of stainless steel

(b) Size: as per cpwd specification

(c) Type of door: Horizontal Sliding - Centre opening

(d) Car open in front only or open through: Open in front only

(e) Power or manual operation: as per cpwd specification

19.14 Construction Design & finish of Car body work: Stainless steel moon rock finish body work stainless steel drop ceiling and CFL / LED lamps for lighting inside the car and fan. PVC 3 mm thick (minimum) flooring. All other items as per CPWD General Specifications for Lifts 2003. Etched finish Stainless Steel car & landing door is also acceptable.

19.15 Type of signal system

(a) Digital floor position indicator in the car and at all landings (to be provided above the car/ landing doors). Travel direction indicator in the car and at all landings

(b) Gongs & visual indication through directional arrows on all landings for pre arrival of the car at all floors

(c) Overload warning Audio & Visual indicator, inside the car (lift should not start on overload)

(d) Battery operated alarm bell and emergency light duly fed by a suitable inverter with SMF batteries for 30 minutes backup. Non rechargeable battery is also acceptable.

(e) Car operating panel with fade proof luminous buttons in car and with intercom

(f) Luminous hall buttons at all landings. Landing call registered indicator at all floors

(g) Voice annunciation system. This will announce the position of the car landing in Hindi and / or English besides facilities for any other announcement to be made from the central control room / reception of the building

(h) Intercom system with Two phones (One at Ground floor, one inside car)

(i) Protection against overvoltage, under-voltage and single phasing should be provided

19.16 Landing Entrance

(a) Location of Landing entrance on different floors: All doors on the same side

(b) Number: 2 pairs

(c) Size: as per cpwd specification

(d) Type of Doors: Horizontal Sliding - Centre Opening

(e) Lift in Use / Lift out of Order Sign: A suitable box above the landings with LED illuminated bilingual (in English & Hindi) sign of “LIFT OUT OF ORDER” coming up simultaneously on all

floors. Provision of Lift out of order sign in LPB is also accepted in lieu of provision of separate box as per manufacturing practice.

19.17 Electric supply

(a) Power: 415 V, A.C., 50 Hz, 3 phase, 4 wire system

(b) Lighting: 230 V, A.C., 50Hz, 1 phase

19.18 Is neutral wire available for control circuits: Yes

19.19 Storage space provided: Yes, in complex only

19.20 Additional items

(a) Ventilation opening in the Car Body: Required with fans. The fan should be auto switch off when there is no passenger inside the lift car

(b) Operating panel inside Car: Automatic cum manual flush mounted with luminous switches suitable for barrier free environment for physically challenged at ground floor

(c) Fireman's Switch: Required at ground floor

(d) The firm's offer should include beam and all structural steel required for the work

(d) Automatic Rescue Device (ARD): Provisions of Automatic Rescue Device for the purpose of bringing the lift car to the nearest floor should be provided, one for each individual lift i.e. two nos. ARDs are to be provided for a bank. This shall consist of:

(1) Control panel with necessary interface / integration of device with the main controller

(2) Inverter of required capacity

(3) Maintenance free batteries (Non rechargeable / rechargeable) of required Ampere-hours capacity

(4) Battery charging unit

(5) "Rescue Operation on" indicator in the lift car

(6) Free maintenance for a period of one year from the date of commissioning and taking over by the Department. The maintenance period of 12 months for different lifts shall be reckoned from the date of handing over of each lift separately

(7) Braille System including all facility for physically challenged persons

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

| Sl. No. | Stage of work | Machinery and Equipment's (Lift) | All other items |
|---|---|---|---|
| 1 | After initial inspection (wherever specified) and delivery at site in good condition on prorata basis | 75% | 70% |
| 2 | On completion of pro-rata installation | 15% | 20% |
| 3 | On testing, commissioning and handing over | 10% | 10% |

19.22 **WORK TO BE DONE BY LIFT CONTRACTOR**

(i) These Passenger lifts shall have additional special features for use by physically challenged persons.

(ii) Both the lifts cars and machine rooms shall be equipped with a suitable intercom system along with facility of intercom with necessary instruments and exchange. This shall be provided by the Lift contractor.

(iii) The tender document also included in its scope a provision of suitable capacity Inverter with Maintenance Free batteries (Non rechargeable / rechargeable) backup suitable for 30 minutes duration, so as to supply power to emergency Alarm System and one of the lights in each lift.

(iv) All temporary scaffoldings & minor building works

(v) One-year free maintenance from the date of taking over by the department. The maintenance period of 12 months for different lifts shall be reckoned from the date of handing over of each lift separately

(vi) Additional supporting Channels if required for safety reasons are to be fixed inside the existing lift shafts for installation of new lifts, the cost shall be included in the quoted price & no extra payment shall be made on this account

(vii) The gap between the car & the lift shaft shall be filled as per norms and relevant standards. No extra payment shall be made on this account

(viii) The cost of minor building works necessary for installation of equipment's etc. shall be included in the quoted price. No extra payment shall be made on this account

(ix) Potential free contacts shall be provided for each floor position and up & down movement of the lifts as specified in specifications for connection to BMS system whenever required

(x) Suitable audiovisual indication of rescue operation shall be provided with automatic rescue device

(xi) The cost of preparatory works, if any shall be included in the quoted price. No extra payment shall be made on this account.

## QUALITY ASSURANCE, QUALITY AUDIT AND INSPECTION

20.1 Sole responsibility for Quality of work rests with the contractor through routine inspection and testing by the technical staff employed by the contractor. The quality of the work shall be assured through routine and random testing of materials and items of work in the field laboratory and outside laboratory.

20.2 **Quality Audit & Inspection**: The Engineer-in-Charge and / or his representative including the Third-Party Inspecting Agency (TPIA) duly deputed by the Government may also assure proper quality being achieved by the Contractor.

20.3 **Outside Laboratory**: The tests required to be conducted in outside laboratory shall be conducted in the laboratory as may be approved by the Engineer-in charge such as National Test House, Regional Research Laboratory, Regional Engineering College, Laboratory of other Engineering Colleges or any other laboratory.

20.4 Non-association during Sampling and / or Testing: In case the contractor or his authorized representative is not present or does not associate himself in collection of test samples, the test results / reports such tests and consequences thereon shall be binding on the contractor.

20.5 **Costs**

(a) Samples of materials / items of work required for testing in field or outside laboratory shall be provided free of cost by the contractor. The contractor shall also assist inspection and collection of samples for testing by Engineer-in-Charge or his authorized representative.

(b) Sampling: All costs incurred in collection of samples, packing & transportation to the approved outside lab / field laboratory shall be borne by the contractor.

(c) Testing: The cost of tests conducted in outside approved laboratory, shall be borne by the contractor in the manner described below:

(i) By the contractor, if the test results show that the material / items of work do not conform to the relevant specifications

(ii) By the contractor, if the test results show that the material / items of conform to the relevant specifications

(d) Contractor to facilitate all necessary help at no extra cost for carrying out:

(i) Inspection of works

(ii) Inspection at factories and collection of test samples there from

(iii) Collection of samples of all materials brought at site

(iv) Testing of all materials at field laboratory / outside laboratory approved by Engineer-in-Charge

(v) The contractor shall submit fortnightly work program to the Engineer-in-Charge in order to enable him / TPIA to supervise inspection of work and testing of materials

21.1 **Handover, Compatibility and Utilization of Existing Site Materials**

1. **Handover of Inventory:** A specified quantity of construction materials currently available at the project site will be handed over in "as-is" condition to the selected Agency for the execution of the balance work. A joint inventory and condition report shall be signed prior to commencement.
2. **Material Compatibility Verification:** The Agency shall thoroughly inspect and ensure the technical compatibility and quality of these existing materials with the requirements of the balance work specifications.
3. **Risk and Cost Responsibility:** Any technical incompatibilities, logistical hurdles, or site hindrances arising from the use or integration of these existing materials must be resolved proactively by the Agency. All such measures shall be executed **entirely at the Agency's own cost**, and no claims for extra financial compensation, rate revisions, or time extensions will be entertained by the Department.

21.2 The Following materials remain at site. This will be handed over to the Agency for execution of balance work. The Agency should be worked according to the compatibility of existing material with the balance work materials

| Sl. No. | Description of Material | Quantity |
|---|---|---|
| 01 | BLDC Fan (1200MM Sweep), Make- USHA, Model- Technix BLDC | 01 Nos. |
| 02 | Wall Fan (400 MM), Make- Crompton, Model- High Flo Neo | 84 Nos. |
| 03 | 20W Batten Tube Light (1200mm), Make- Bajaj, Model- BCLAB 20W CW LED XT | 40 Nos. |
| 04 | 10W Bulk Head Light, Make- Bajaj, Model- BIBWP 10W LED | 16 Nos. |
| 05 | 12W recessed Light, Make- Bajaj, Model-BZSLO.nxt 12L LED WH RD/ BGSLO Pro Recess 12W LED RD CW SD | 86 Nos. |
| 06 | 15W recessed Light, Make- Bajaj, Model-BZSLO.nxt 15 L LED WH RD/BGSLO Pro Recess 15W LED RD CW SD | 251 Nos. |
| 07 | 4Ft X 1ft (36W) Surface Light, Make- Bajaj, Model- BZSSLL36L LED WH1 | 26 Nos. |
| 08 | 36W 2ftX2ft LED Light (Recessed), Make- Bajaj, Model- BZRSQL 43 L LED GX PRO | 426 Nos. |
| 09 | 102W High Bay light, Make- Philips, Model- BY515P 105. | 14 Nos. |
| 10 | Street Light LED Fitting, Make -Bajaj, Model- VISTA 78L WH PO PC SD) | 65 Nos. |
| | Fire Alarm system | |
| 11 | Addressable Photo Thermal Detector (Make- SIEMENS, Model- OH921,) (Detector Base Model- DB-11E) | 300 Nos. |
| 12 | MCP, Make- Siemens, Model- XMS-S | 19 nos. |
| | UPS | |
| 13 | 30 KVA UPS system with 75 AH SMS Battery, Make- Vertiv, Model- LIEBERT-ITA 2 | 01 No. |
| | Armoured Cable | |
| 14 | 4C X 16 sq.mm (Al. armoured Cable, Make- KEI) | 163.50 Meter |
| 15 | 3.5C X 50 Sq.m (Al. armoured Cable, Make- KEI) | 500 Meter |
| 16 | 3.5C X 150 Sq.m(Al. armoured Cable, Make- KEI) | 250 Meter |
| 17 | 3.5 C X 185 Sq.m (Al. armoured Cable, Make- KEI) | 351 Meter |
| 18 | 3.5C X 240 Sq.m (Al. armoured Cable, Make- KEI) | 120 Meter |
| 19 | 3.5C X 300Sq.m (Al. armoured Cable, Make- KEI) | 6803 Meter |
| 20 | 3C X 10Sq.m (Al. armoured Cable, Make- KEI) | 1704.80 Meter |
| 21 | 4C X 10 Sq.Mm (Cu. armoured Cable, Make- KEI | 357.50 Meter |
| 22 | 6 Core Fiber optic cable single Mode (make- R & M) | 1300 Meter |

## LIST OF PREFERRED MAKES (ELECTRICAL)

| | | |
|---|---|---|
| **A** | **I.E.I., MCBDB & MCB, Cable & Wires** | |
| 1 | MCB DB (Sheet thickness 1.6 mm) | Legrand / L&T / Siemens Electric / Schneider / ABB / Hager |
| 2 | MCB / MCCB / Isolator / Industrial Plug Socket/ RCCB/ RCBO`s | Legrand (DX3) / Siemens (Betaguard) / Schneider Electric / ABB(SB) / Hager (Novelo) / L&T (d sine) |
| 3 | Change Over Switch | Schneider Electric / Siemens / Hager / ABB / L&T / Legrand |
| 4 | FRLS PVC insulated Copper conductor Single core cable for wiring (ISI marked) | Finolex / Havells / RR Kable / KEI / Polycab / Jivah |
| 5 | Armoured / Unarmoured telephone cable, coaxial cable | Finolex / Havells / RR Kable / KEI / Polycab |
| 6 | MS Conduit (ISI marked) with heavy duty MS Conduit pipe accessories | AKG / BEC / RMCON |
| 7 | PVC Conduit (ISI marked) with heavy duty PVC Conduit pipe accessories | AKG / Finolex / BEC |
| 8 | Modular Switch, Socket / Telephone socket/ cable TV Socket / Data outlet socket/ Fan Regulator / G I Boxes etc. (Wiring Accessories) | MK (Blenz Prus) / ABB (Ivie) / Havells (Murano) / Legrand (Myrius) / Schneider electric (ZENcelo) |
| 9 | Selector Switch & Toggle switch | Salzer (L&T) / Siemens / Kaycee / ABB |
| 10 | DLP / PVC Trunking | MK / Schneider Electric / Legrand |
| 11 | GI pipe | Jindal HISSAR / TATA / SAIL |
| 12 | Paints | ICI / Asian / Berger / Nerolac |
| 13 | Terminal Block & Connectors | Elmex / Wago / Hensel / Connectwell |
| 14 | Phenolic laminated sheet/ Bakelite sheet | Hylem / Formica (P-I grade) / Mylam / Greenlam |
| 15 | Cat-6 Cable, Wires & Fiber optic cable | Beldon / Legrand / Molex / Schneider / Polycab |
| **B** | **Fans & Fittings** | |
| 1 | LED Light Fittings | Phillips / Wipro / Trilux / Osram / LT / Bajaj / Crompton / Havells |
| 2 | Ceiling fan / Exhaust fan / Wall fan | USHA / Havells / Crompton / Orient / Atomberg / Bajaj |
| 3 | Wall Bracket fitting | Havells / Phillips / Wipro / Trilux / Osram / Bajaj |
| 4 | Geysers | Racold / Havells |
| **C** | **Street Lighting** | |
| 1 | LED Post Top fitting | Phillips / Wipro / Trilux / Osram / LT / Bajaj / Crompton / Havells/ Ligman |
| 2 | LED Street Light fitting | Phillips / Wipro / Trilux / Osram / LT / Bajaj / Crompton / Havells/ Ligman |

| | | |
|---|---|---|
| 3 | LED Street light with in-built solar panel & controller | Phillips / Wipro / Osram / Trilux / Bajaj / Crompton / Havells |
| 4 | Ornamental MS & CI Pole (Factory Finish) | Bajaj / BPP / RR ISPAT / Trans Rail / Havells |
| 5 | Hot Dipped Galvanized Octagonal Pole (Factory Finish) | Bajaj / RR ISPAT / Trans Rail / Havells / Calcutta Poles / Subham Poles |
| 6 | Polycarbonate Junction Box / Enclosure | Hensel / Spelsberg / Neptune-bals / Sintax |
| 7 | XLPE insulated PVC Sheathed Aluminium / Copper conductor Armored cable of 1.1 KV grade | Finolex / RR Kabel / KEI / Havells / Polycab |
| **D** | **Sub -Station Equipment** | |
| 1 | Feeder Pillar / LT Panels (Approval of CPRI shall not be older than 5 years) | Amit Projects Pvt. Ltd. / Green Galaxy Electrotech / Associated Switchgears and Project Ltd. / C&S / EAP Electro Allied Product Pvt. Ltd. |
| 2 | Air Insulated Rising Main | C&S / L&T / Schneider / Legrand / Balaji Electro Controls Pvt. Ltd. |
| 3 | Sandwich type Bus Trunking | C&S / L&T / Schneider / Legrand |
| 4 | Moulded Case Circuit Breaker (MCCB) Thermal release/ Microprocessor based (Ics=Icu=100%) | Same as Sl. No. 2 of Subhead A **(**I.E.I., MCBDB & MCB, Cable & Wires) |
| 5 | Power / Aux. contactor 3/4 pole | Schneider Electric / Legrand / Hager / L&T / ABB / Siemens |
| 6 | Potential transformer / Current Transformer | Automatic Electric / Gilbert & Maxwell / L&T / Kappa |
| 7 | LED type indicating lamp/ Push Button | Schneider Electric / L&T / Siemens / C&S / Vaishno |
| 8 | Over load Relays | Schneider Electric / L&T / Siemens / C&S / ABB |
| 9 | Conventional/ Electronic Digital Meters (A/V/PF/Hz/KW/KWH) | Conzerv / L&T / Secure / AE / C&S / HPL |
| 10 | Timer | Schneider Electric / Legrand / Hager / L&T / ABB / Siemens / C&S |
| 11 | Fasteners / GI Clamp | Hilti / Fisher |
| 12 | D.W. Corrugated HDPE pipe (ISI marked) | Rex / Duroplast / Triputi / Duraline / ASTRAL |
| 13 | Transformer (Oil / Dry type) | Crompton / ABB / Schneider / Kirloskar / Voltamp |
| 14 | HT Panel / Ring Main Unit | Crompton / Seimens / ABB / L&T / Schneider / Kirloskar / Balaji Electro Controls Pvt. Ltd. |
| 15 | HT Cable (ISI marked) | Finolex / Havells / RR Kable / KEI / Polycab |
| 16 | HT End Termination/ Cable jointing Kit | Reychem / Denson / 3M |

| | | |
|---|---|---|
| 17 | ACBs with Display | Schneider Electric (Master pact NW6.0A) / Legrand (DMX3MP4) / L&T (U-Power-OMEGA) / ABB(Emax) PR122 / Siemens (3WL-ETU45B) |
| 18 | Rubber Mat (ISI marked) | Jyoti/ Padmini / Premier / Raychem |
| 19 | Ammeter | Kaycee / L&T / AE / C&S / HPL / Schneider |
| 20 | Voltmeter | Kaycee / L&T / AE / C&S / HPL / Schneider |
| 21 | Fire Extinguishers (ISI marked) | Minimax/ Safex / Lifeguard / Kalpex / Ceasefire / Padmini |
| 22 | Capacitor & Reactors / APFC Relay | Epcos / L&T / ABB / Siemens / Schneider / Havells |
| 23 | XPLE insulated PVC sheathed Aluminium / Copper conductor Armored / Unarmored cable of 1.1 KV grade | Same as Sl. No. 7 of Subhead C **(**Street Lighting) |
| 24 | Cable Glands double compression with Earthing links | Comet / Jainsons / Dowells / Gripwell |
| 25 | Bimetallic Cable Lugs | Comet / Dowells / Hax Brass (Copper Alloy India) / Jainsons / Gripwell |
| 26 | MS / GI Cable tray | MEM /BEC / Legrand / OBO Betterman / Steeelways / Ricoh |
| 27 | Programmable Logic Controller (PLC) | Siemens / Honeywell / L&T / ABB |
| **E** | **DG Set** | |
| 1 | Engine | Cummins / Caterpillar / VOLVO / Mitsubishi / Kirloskar / Ashok Leyland / Perkins |
| 2 | Alternator | Kirloskar / Crompton / Siemens / GEC / Stamford / Leroy Somer |
| 3 | Manufacturer of AMF panel & Acoustic enclosure | Same as the OEM for DG Set |
| 4 | AMF Relays | C&S Electric Ltd / Deep Sea Electronic / Bernini / Woodward |
| 5 | M.S. pipes | Jindal / Tata / Birla Zenith |
| 6 | Anti-Vibrations Mountings | As per recommendation of manufacturer |
| 7 | Batteries | Exide / Amaron / Southern Batteries / Panasonic / HBL |
| 8 | Control Cables and other cables | Same as Internal Electrical Installations |
| 9 | Power Cable | Same as Internal Electrical Installations |
| 10 | Air Circuit Breakers (All the ACB,s in one panel shall be of the same make) | Same as Internal Electrical Installations |
| 11 | Ammeter / Voltmeter / Combined Meters | Same as Internal Electrical Installations |
| **F** | **Fire Fighting Equipment** | |
| 1 | MS/ GI Pipe | Jindal HISSAR / TATA / SAIL |

| | | |
|---|---|---|
| 2 | Forged steel fittings/ Flanges | Johnson Industries / VS Forge / JK Forging / Trueforge |
| 3 | Pipe Hangers | Hilti / Fischer |
| 4 | Butterfly Valve/ Sluice valve/ NRV/ Foot valve/ Air Release valve (ISI marked) | Leader / Advance / Kirloskar / Zoloto / L&T Valves Limited |
| 5 | Y Type Strainer | Leader / Zoloto / Kirloskar / Audco / Honeywell |
| 6 | Fire / Sprinkler pump / Terrace Fire pump | Kirloskar / KSB / Grundfos / Wilo / Mather+Platt |
| 7 | Electric Motor | ABB / Siemens / Kirloskar / Grundfos / Crompton |
| 8 | Diesel Engine for Fire Pump | Cummins India / Ashok Leyland / Greaves / KOEL |
| 9 | Couplings | Lovejoy / Fenner / Dunlop |
| 10 | Anti Vibration Mountings | Kanwal Industries Corporation / Dunlop / GERB / Resistoflex |
| 11 | Pressure Switch (ISI marked) | System Sensor / Switzer / Honeywell / Siemens |
| 12 | Pressure Gauge (ISI Marked) / Thermometer | H Guru/ Fiebig |
| 13 | Double / Single Headed Landing Valve / FBC / Branch pipe / Hose Box / RRL Hose Reel / First Aid Hose Reel (ISI marked) | Minimax / New Age / Lifeguard / Padmini / Safex / Omex / Fire Shield / Ceasefire |
| 14 | Fireman Axe | Minimax / New Age / Padmini |
| 15 | Water Flow Switch (FM/UL Listed) | System Sensor / Rapid Control / Potter / Switzer |
| 16 | Pipe protection pipe coat (AW4) Wrapping (ISI Marked) | Pypcoat / Marphalt / Rustech / Safex / IWL / Shalimar / Taxa / Mac poly coat |
| 17 | Level Controller & Indicator (water) (ISI Marked) | Auto pump / Cirrus Engineering / Techtrol |
| 18 | Fire Sealant | Promat / Birla 3 M / Hilti |
| 19 | Over load Relays | Schneider Electric / L&T / Siemens / C&S / ABB / Havells |
| 20 | Power/ Aux. contactor 3/4 pole | Same as Sl. No. 5 of Subhead D **(**Sub -Station Equipment) |
| 21 | LED type indicating lamp/ Push Button | Same as Sl. No. 7 of Subhead D **(**Sub -Station Equipment) |
| 22 | LT jointing kit / Termination | Reychem / Denson / Cap Seal / Safekei / 3M |
| 23 | Battery | Exide / Amron / Stamford |
| 24 | Battery Charger | Statcon / CDC / AE / Expofyn / Thycon India |
| 25 | Epoxy Paint | ICI / Asian / Berger / Nerolac |
| 26 | Analogue/ Digital Measuring Instruments (Voltmeter/ Ammeter/ Energy meter/ KW/ PE/ Multi-Function meter) | Same as Sl. No. 19 of Subhead D **(**Sub - Station Equipment) |

| | | |
|---|---|---|
| 27 | Aluminium / Copper power cable / Control cable (Armoured / Unarmoured) | Same as Sl. No. 7 of Subhead C **(**Street Light) |
| 28 | Cable Glands & Lugs | Same as Sl. No. 24 of Subhead D **(**Sub - Station Equipment) |
| 29 | Solenoid Valve / Spray Nozzle | Perker / HD / Tyco / Emersion |
| 30 | Sprinkler | HD / Tyco / Wormald / Viking / Omex / Victaulic / Siex AG / Newage / Safex |
| 31 | Steel Flexible Extension | Omex / Newage / Tyco / Lifeguard |
| 32 | Vibration Eliminator | Resistoflex / D Waren / Kanwal |
| 33 | Welding Electrodes | Advani / ESAB / L&T |
| 34 | Cast Iron Valve | Kirloskar / Kartar / Kalpana / Zoloto / Advance |
| 35 | PUF Pipe Support | Malanpur / Lloyd / Best Puf |
| 36 | Pressurized Expansion Tank & Air Separator | Grundfos / ITT / Anergy |
| 37 | Balancing Valve | Advance / Audco / AIP |
| 38 | Pot Strainer | Sant / AIP / Rapidcool / Emerald |
| **G** | **LAN System** | |
| 1 | Networking Rack | Valrack / NetRack / Panduit / APC |
| 2 | Patch Panel | Belden / Systimax / Panduit / Molex / HP |
| 3 | Network Switch | Cisco / HP / Allied Tellies / Digisol |
| **H** | **Air Conditioning** | |
| 1 | Air Conditioning | Daikin / Mitsubishi / O-General / Blue Star / Carrier / Hitachi / Voltas / LG |
| 2 | Nitrile Rubber | Armaflex / Owens Corning / K-Flex / Lloyd Insulation |
| 3 | Cross Linked Polyethylene | Torcellene / Thermo break |
| 4 | Factory Fabricated Duct | Zeco / Rolastar / Ductofab / Voltas |
| 5 | Grill / Diffuser / VCD | Air master / Airflow / Ruskin Titus / Carryaire / Tristar |
| 6 | VCD / Gravity Louvers / Exhaust & Fresh Air Louvers | Air master / Airflow / Ruskin Titus / Carryaire / Tristar |
| 7 | Propeller Fan | Alstom / Khaitan / Crompton / Marathon |
| 8 | Axial Fan | Systemair / Kanalflakt / Kruger / Otsberg / Nicotra |
| 9 | GI Sheet Metal Duct | SAIL / TATA / Jindal |
| 10 | Duct Flange | Zeco / Rolastar / Ductofab / Voltas |
| 11 | Self-Adhesive Sealing Gasket for Ducts | PRIMA SEAL/AIR FLOW/TOCELLEN |
| 12 | UPVC Drain Pipes | Supreme / Astral Pipes / Precision / Prince / Finolex / Ashirvad |
| 13 | Copper Refrigerant Pipe | Mandev / Rajco / Nippon / Totaline / Godrej |
| **I** | **Occupancy Sensor** | |
| 1 | Occupancy Sensor | ABB / Lutron / Schneider / Legrand / Honeywell |
| **J** | **Solar Photo Voltaic Power Generation** | |
| 1 | SPV Modules | Vikram Solar Pvt Ltd. /TATA Power solar / Adani Solar/ Moserbaer / Waree Engineers Ltd/ Manufacturers Approved by Ministry of New & Renewable Energy |

| | | |
|---|---|---|
| 2 | Data logging system | As per OEM of PCU |
| 3 | Power Control Unit (PCU) string PCU | MNRE approved models of Delta / ABB / Mitshubishi / Schneider / Ingeteam / Frontius / Havells / Polycab / Luminious / Hitachi |
| 4 | Array Structure | KOHL / OFSL / Tata |
| **K** | **CCTV** | |
| 1 | Dome/PTZ /Bullet Camera | Honeywell / Bosch / Axis / Siemens / Sony |
| 2 | Network Video Recorder | Honeywell / Bosch / Axis / Siemens / Sony |
| 3 | Workstation | DELL / HP/ Lenovo |
| 4 | HDD | WD / Seagate / Hitachi |
| 5 | LED Monitor | Sony / Samsung / LG |
| 6 | Managed Switch | HP / Cisco |
| 7 | Online/Offline UPS | APC / Numeric / Eaton |
| 8 | HDMI Cable | Belden / Honeywell / MX / Krammer |
| **L** | **Lift** | |
| 1 | Lift | Toshiba / Jhonson / Otis / Kone / Schindler / Mitsubishi |
| **M** | **Access Control System** | |
| 1 | Access Control and accessories | Honeywell / Tyco-Johnson controls / Bosch / HID / Godrej |
| **N** | **Audio Video System** | |
| 1 | FOH Speakers | Bose / Martin Audio / JBL / Electro Voice / Renkus Heinz / Bosch / Sony |
| 2 | Sub-Woofer | Bose / Martin Audio / JBL / Electro Voice / Renkus Heinz / Bosch / Sony |
| 3 | SPL Fill Loud Speakers | Bose / Martin Audio / JBL / Electro Voice / Renkus Heinz / Bosch / Sony |
| 4 | Floor Monitor Speakers | Bose / Martin Audio / JBL / Electro Voice / Renkus Heinz / Bosch / Sony |
| 5 | Networkable Power Amplifier | Bose / Powersoft / Lab Gruppen/ Ashly Audio |
| 6 | Digital Signal Processor | Bose / Biamp / Ashly Audio |
| 7 | Audio Mixer | Yamaha / Soundcraft / Studio Master |
| 8 | Wireless Hand-Held Microphone | AKG / Audio-Technica / Electro Voice / Sennheiser / Shure / JBL |
| 9 | Wireless Lapel microphone with receiver | AKG / Audio-Technica / Electro Voice / Sennheiser / Shure / JBL |
| 10 | Wired Cardiord hand held Microphone | AKG / Audio-Technica / Electro Voice / Sennheiser / Shure / JBL |
| 11 | Cardiord Instrument microphone | AKG / Audio-Technica / Electro Voice / Sennheiser / Shure / JBL |
| 12 | Gooseneck Microphone | AKG / Audio-Technica / Electro Voice / Sennheiser / Shure / JBL |

| | | |
|---|---|---|
| 13 | Smart Metallic Podium | EAPL / ELCO / Liberty |
| 14 | Wireless Presentation System | Crestron / Barco / Extron / Cramer / AMX |
| 15 | Microphone Cables | Beldon / Sommer / Klotz |
| 16 | Loud Speaker cable | Beldon / Sommer / Klotz |
| 17 | Quad Core IP Control System | Aurora / Crestron / Extron |
| 18 | Streaming Transceiver | Aurora / Crestron / Extron |
| 19 | Streaming Transceiver wall plate | Aurora / Crestron / Extron |
| 20 | DLP Laser Projector | Barco / Christie / Panasonic / Sony / NEC |
| 21 | Projector Screen | Liberty / Logic / Dalite / Chief / Draper / Visio Teck / Focus |
| 22 | Rack | Same as Sl. No. 1 of Subhead F **(**LAN System) |
| 23 | Interactive Panel | LG / Samsung / Sony |
| 24 | All other items not covered above | As per approval of the Engineer-in-charge |
| **O** | **Fire Alarm System** | **Note: Siemens / or any other UL and FM approved OEM which can be integrate with existing Siemens system as already installed or supplied material at site.** |
| 1 | Addressable Manual call box | Siemens / Notifier / Bosch / Tyco-simplex / Radionic / Edward and UL / ULC / FM / VDS / LPCB / EN 54 Certified / Listed / Approved |
| 2 | Addressable Type fault isolator | Siemens/ Notifier / Bosch / Tyco-simplex / Radionic / Edward and UL / ULC / FM / VDS / LPCB / EN 54 Certified / Listed / Approved |
| 3 | Strobe lights cum hooter | Notifier/ Johnson Control/Honeywell/ Siemens/ Bosch /EST/NOTOFIRE Pvt. Ltd. |
| 4 | Addressable control modules for hooter | Siemens / Notifier / Bosch / Tyco-simplex / Radionic / Edward and UL / ULC / FM / VDS / LPCB / EN 54 Certified / Listed / Approved |
| 5 | Addressable monitor module for flow switch | Siemens/ Notifier / Bosch / Tyco-simplex / Radionic / Edward and UL / ULC / FM / VDS / LPCB / EN 54 Certified / Listed / Approved |
| 6 | Addressable type fire alarm control panel | Siemens/ Notifier / Bosch / Tyco-simplex / Radionic / Edward and UL / ULC / FM / VDS / LPCB / EN 54 Certified / Listed / Approved |
| 7 | Network repeater panel | Siemens/ Notifier / Bosch / Tyco-simplex / Radionic /Edward and UL / ULC / FM / VDS / LPCB / EN 54 Certified / Listed / Approved |
| 8 | Addressable multi sensing fire detector (combination of optical type smoke detector & ROR type heat Detector) | Siemens/ Notifier / Bosch / Tyco-simplex / Radionic /Edward and UL / ULC / FM / VDS / LPCB / EN 54 Certified / Listed / Approved |
| 9 | Cat-6 cable, wires & Fiber optic cable | MAX / Avaya / Beldon / Legrand / Molex / |

| | | |
|---|---|---|
| | | Schneider |
| 10 | Response Indicator | Notifier / Johnson Control / Honeywell / Siemens /Bosch / EST / Trisim |

**PROFORMA FOR MEMORANDUM OF UNDERSTANDING**

**MEMORANDUM OF UNDERSTANDING [MOU] BETWEEN**

1] M/s [Name of the firm with full address]
Enlistment Status
Valid Upto:
[Henceforth called the Main Contractor]

And

2] M/s [Name of the firm with full address]
Enlistment Status
Valid Upto:
[Henceforth, called Associated Contractor]

Name of Work: Construction of Office cum Residential and Hostel Complex for the Department of NIPER at Panihati, B.T. Road, Kolkata, West Bengal. S.H: Balance works of Administrative Building (G+4) storied, Animal House (G+1) storied, Girls Hostel (G+2), Boys Hostel (G+2) storied, Substation building, Pump House, Main Entrance Gate Structure with Security Cabin including bulk services and development works (Civil, Electrical and Mechanical)

[Electrical Component only] as per schedule, specifications, terms and conditions of tender
We state that MoU between us will be treated as an agreement and has legality as per Indian Contract Act (amended up to date) and the department (CPWD) can enforce all the terms and conditions of the agreement for execution of the above work. Both of us shall be responsible for the execution of work as per the agreement to the extent of this MoU allows. Both the parties shall be paid consequent to the execution as per agreement to the extent this MoU permits.

We have agreed as under:

1 The associated contractor shall be liable for disciplinary action if he failed to discharge the action(s) and other legal action as per agreement besides forfeiture of the security deposit.

2 All the material, machinery and equipment, tools and tackles required for execution of the electrical works as per agreement shall be the responsibility of the associated contractor.

3 The site staff required for the electrical work shall be arranged by the associated contractor as per terms and conditions of the agreement.

| | |
|---|---|
| SIGNATURE OF MAIN CONTRACTOR | SIGNATURE OF ASSOCIATED CONTRACTOR |
| Date | Date |
| Place | Place |
| COUNTERSIGNED | |
| EXECUTIVE ENGINEER (E) | |

**PROFORMA FOR WILLINGNESS CERTIFICATE**

**WILLINGNESS CERTIFICATE**

Name of Work: Construction of Office cum Residential and Hostel Complex for the Department of NIPER at Panihati, B.T. Road, Kolkata, West Bengal. S.H: Balance works of Administrative Building (G+4) storied, Animal House (G+1) storied, Girls Hostel (G+2), Boys Hostel (G+2) storied, Substation building, Pump House, Main Entrance Gate Structure with Security Cabin including bulk services and development works (Civil, Electrical and Mechanical)

I hereby give my willingness to work as associated contractor for the above-mentioned work.
I will execute the work as per specifications and conditions for the agreement and as per direction of the Engineer-in-charge. Also, I will employee full time technically qualified supervisor for the works. I will attend inspection of officers of the department as and when required.

Date: Signature of Contractor

BLANK

# PART-C

# SPECIAL CONDITIONS

# &

# PARTICULAR SPECIFICATIONS

# FOR

# CIVIL WORKS

BLANK

## SECTION 1
## SPECIAL CONDITIONS

1.0 **GENERAL**

1.1 The Contractors are advised to inspect and examine the site and its surroundings and satisfy themselves with the nature of site, the means of access to the site, the constraints of space for stacking material / machinery, etc., constraints put by local regulations, if any, weather conditions at site (rainfall, winter / summer temperatures, etc.), general ground / subsoil conditions, etc. or any other circumstances which may affect or influence their bids. The contractors are encouraged to clarify any data or any query that he thinks will affect his rate from the department before opening of the financial bid. No claim, whatsoever, shall be entertained at a later date for any errors found, on plea that the information supplied by the Department in the tender is insufficient or on plea that the assumption of the bidder at the time of the bidding varied from the facts.

1.2 The Contractor shall, if required by him, before submission of the tender, inspect the drawings and tender documents carefully**.** The department shall not bear any responsibility for the lack of knowledge and also the consequences, thereof to the Contractor. The information and data shown in the drawings and mentioned in the bid documents have been furnished, in good faith, for general information and guidance only. The Engineer-in-Charge, in no case, shall be held responsible for the accuracy thereof and / or interpretations or conclusions drawn there from by the Contractor and all consequences shall be borne by the Contractor. The Engineer in charge shall have right to change part or full drawings or specifications in the tender document and resulting variations will be dealt with as per the condition for the same in the agreement. It is presumed that the Contractor shall satisfy himself for all possible contingencies, incidental charges, wastage, bottlenecks, etc. likely during execution of work and acts of coordination, which may be required between different agencies.

1.3 The contractor is to work in the best industry practice and no incidental expense which forms part of execution of any item but are not explicitly mentioned in the item will be considered to be a part of the item and nothing extra will be payable in this regard.

1.4 The work shall be carried out in accordance with the approved architectural drawings, structural drawings & service drawings. Before commencement of any item of work, the contractor shall correlate all the relevant architectural, structural drawings, service drawings, Specifications, etc. issued for the work and approved by the Department and satisfy himself that the information available from there is complete and unambiguous. Only written dimensions shall be followed and the drawing is not expected to be scaled. The discrepancy, if any, shall be brought to the notice of the Engineer-in-Charge before execution of the work. The contractor alone shall be responsible for any loss or damage occurring by commencement of work on basis of a non-coordinated drawing.

The contractor is expected to study the drawing and bring to the notice of the Engineer-in-charge any discrepancy at least one month in advance so that the discrepancy can be resolved without affecting the work. The delay in work due to the failure of the contractor to do so will be considered as a failure on the part of the contractor.

1.5 The contractor(s) shall give to the local body, police and other authorities all necessary notices, etc. that may be required by law and obtain all requisite licenses for temporary obstructions, enclosures, etc. and pay all fees, taxes and charges which may be leviable on account of these operations in executing the contract.

1.6 The contractor shall ensure that there is no damage to adjoining property. If any such untoward incident happens, he shall be entirely responsible for any consequences besides making good any damages to the adjoining property, whether public or private. He shall supply and maintain lights either for illumination or for cautioning the public at night.

1.7 Proper temporary barricading by fencing with G.I. sheets, shall be carried out by the contractor at the start of work in order to physically define the boundaries of the plot for restricted entry to only those involved in the work and also to prevent any accidents, at the same time without causing any inconvenience to the traffic and the users of the handed over buildings in the adjacent plots. The contractor shall ensure zero disturbances to the adjacent area due to sound or air pollution caused by the site activities.

1.8 Wherever any reference to any Indian Standards occurs in the documents relating to this contract, the same shall be the latest version in force on last date of submission of the bid.

1.9 Any legal or financial implications resulting out of disposal of earth shall be sole responsibility of the contractor.

1.10 Wherever required for the execution of work, all the scaffolding shall be provided and suitably fixed, by the contractor. It shall be provided strictly with steel double scaffolding system, suitably braced for stability, with all the accessories, gangways, etc. with adjustable suitable working platforms to access the areas with ease for working and inspection. Single scaffolding system is strictly prohibited and shall invite necessary action. Double scaffolding shall be designed to take all incidental loads. It should cater to the safety features for workmen. It shall be ensured that no damage is caused to any structure due to the scaffolding.

1.11 The contractor shall be responsible for making arrangement of all temporary structures, stock piles or stores. However, if the contractor intends to use the area inside the campus, then the same has to be got approved in the layout plan. In case of availability of the land, the same will be allotted to the contractor for use till the stipulated date of completion so extended without any levy of compensation as per clause 2. The area used for such temporary structures shall be cleared of within 2 weeks of provisional completion and the area should be restored without a trace of any such structure failing which the same will be done at the risk and cost of the contractor. The decision of the Engineer-in-charge shall be final and binding in this regard.

1.12 The Contractor shall take all precautions to abide by the environmental related restrictions imposed by any statutory body having jurisdiction in Panihati as well as prevent any pollution of streams, ravines, river bed and waterways. All waste or superfluous materials shall be transported by the Contractor, entirely to the satisfaction of the Engineer-in-Charge and disposed at designated places only. 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.

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

(a) The contractor shall at his own cost prepare necessary shop drawing showing details of as constructed shape of the item where ever necessary and get it approved by the Engineer-In-Charge. For aluminium work the contractor shall also give details of sections proposed in his shop drawing.

(b) Obtaining of Statutory permissions (for carrying out constructions) wherever applicable and required.

(c) Contractor shall prepare all the shop drawings or layout drawings for all the coordinated services and provide them to the Department before starting any work or placing any order of 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.

(d) The contractor shall submit material's submittals along with material' sample for approval of Engineer-in-Charge prior to delivery of material at site at least one month or the time required for testing which ever whichever is earlier in advance.

1.14 Any cement slurry added over base surface (or) for continuation of concreting for better bond is deemed to have been built in the items and nothing extra shall be payable for extra cement considered in consumption on this account.

1.15 The quoted rate shall be inclusive of all taxes which include royalty, octroi or any other tax under any head or name. However statutory payments that need to be paid to statutory bodies for obtaining statutory approvals would be refunded by the department on production of proper bill and proof of payment. Any tax claims coming from any department of any nature due to the operation of the contract would have to be borne by the contractor failing which it will be settled at the risk and cost of the contractor and the department would not have any responsibility for any interest of late fees that is payable due to delay in any such tax payment. The cost that the department needs to spend in facilitating such payment also would be at the risk and cost of the contractor.

1.16 The contractor is expected to be acquainted with all laws and regulation in force with regard to the work and has to quote his rates accordingly. Ignorance of any provision in law will not be considered an excuse. Further no compensation in time or cost will be done by the department on account of any new law or restriction imposed by statutory bodies not under the control of CPWD other than the ones explicitly mentioned in the General Conditions of Contract.

1.17 The electricity and water required for the work would have to be arranged by the contractor and he will have to bear all the cost for the same. The water used for the work will have to satisfy the relevant IS standards and CPWD will have the liberty to ask for supply from different source or direct to install suitable treatment facility to ensure the water quality meets the standard and nothing extra will be paid by the department. In case, water is sourced from bore wells installed in the Campus, necessary permission shall be obtained from the concerned department in charge of ground water resources. Copy of such permission shall be shared with the department. In case, during course of execution, it is found that the contractor did not obtain the necessary permission and did not pay the necessary fee, department will take necessary action in this regard.

1.18 The contractor is expected to know the natural normal weather pattern of the site and is expected to plan his activities taking into account of the same. No hindrance will be considered in the work for normal weather patterns. However, hindrance will be considered only if extra ordinary bad weather persists.

1.19 The contractor shall submit a proper PERT / CPM chart at the start of the work and identify critical activities and take actions as may be needed to avoid any hindrance to the critical activities. The contractor shall submit an updated PERT / CPM chart on the 5th of every calendar month explaining reasons for delay if any correlating with hindrances beyond the control of the contractor if any that has happened during the month and get the same approved by the Engineer In Charge. Extension of time will be granted only for hindrances which actually affect the program that is submitted every month and only to that extent the hindrance affects the program. However, if the program is failed due to unexplained hindrances the department might choose to grant extension of time in which case it will be with levy of compensation as per Clause 2 of the agreement. **No RA bill will be processed till such program as mentioned in this condition is submitted by the contractor.**

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

1.21 The contractor shall ensure proper drainage at site at all times so that water stagnation is avoidable in the best way possible.

1.22 The contractor will be responsible for any theft committed by any of his employees or his labours. The theft will be dealt legally as per procedure however the contractor will be held responsible for losses if any due to such event and care shall be taken to avoid such an event.

1.23 Special thrust should be laid on respecting women working at site or visiting site for any reason. The contractor shall ensure that the labour and employees give utmost respect to women and prevent any untoward action of any sort. The contractor shall note that the office of SE has in place an internal complaints committee to prevent sexual abuse against women at works place as per the relevant act and shall ensure necessary awareness among their employees that the said committee can be contacted if found necessary.

1.24 No tree shall be damaged / removed without obtaining written approval from Engineer in Charge.

1.25 The department owns the site and shall have the right to visit or pass to any location of the site at any time. The department also will have the right to permit free movement of any agency through the site if it is found necessary and the contractor will have no right to prevent the same. The contractor shall extend full corporation in this regard. If so desired by the Engineer in Charge, any temporary structure, stock pile or any facility made by the contractor needs to be relocated, the contractor shall do the same without any extra cost and shall ensure the same is done within 7 days of issue of such order in writing by the Engineer-in-Charge.

1.26 The contractor shall make any temporary construction road as may be needed at his own cost with the approval of the Engineer in Charge. The site might be slushy or muddy at times. The contractor may have to make the same motorable if needed to proceed with the work. Neither any hindrance will be entertained in this regard nor will any extra cost be paid for the same.

1.27 CPWD would be employing other agencies for other works not in the scope of this tender. The contractor shall ensure complete cooperation and coordination with those agencies for which nothing extra shall be paid. The contractor shall incorporate the drawings and details supplied by those agencies and ensure that necessary holes, sleeves or openings are left in the walls or other members as may be necessary during construction so that demolishing is avoided at a later stage. Any hole or sleeve which found necessary after completion of the work due to the absence of advance drawing will be paid for. However, if sleeves, holes or openings are missed out even after submission of advance drawings, it will be executed at the risk and cost of the contractor.

2 **PREVENTION OF NUISANCE AND POLUTION CONTROL**

2.1 The contractor shall take all necessary precautions to prevent any nuisance or inconvenience to the owners, tenants or occupiers of adjacent properties and to the public in general and to prevent any damage to such properties from pollutants like smoke, dust, noise.

2.2 All site machinery and equipment used at site or outside site by the contractor including vehicles used for transportation shall be compliant with the latest pollution control norms of the relevant stipulating / enforcing authority.

2.3 All the loose material like sand, earth shall be supplied at the site in covered condition to avoid spillage of the materials and to prevent air pollution. Arrangements should be there to ensure all the wheels of all vehicles exiting the site are properly cleaned and no dust or debris of any sort or definitions is spilled over to the campus road or to the public road by any means due to activities at the site. Damage rectification or cleaning of any adjacent property or road that may be required due to the actions of the contractor will be done at the risk and cost of the contractor.

2.4 Waste disposal of all kinds may be done as per the pollution control boards norm and for the purpose of pollution control and sanitation, the stock pile, labour camp or any other temporary space directly linked to the work would be coming under the definition of site even if the same is procured or hired at the contractor own cost.

2.5 Suitable arrangements for treatment or sound insulation shall be made at the cost of the contractor to ensure that no pollution occurs in water, air or via noise due to the activities at site.

3 **SETTING OUT**

3.1 The contractor shall carry out survey of the work area, at his own cost, setting out the layout and fixing of alignment of the building and other bulk service infrastructure in consultation with the Engineer–in-charge & proceed further ensuring full structural continuity. Any discrepancy between architectural drawings and actual layout at site shall be immediately brought to the notice of the Engineer–in-charge. It shall be responsibility of the contractor to ensure correct setting out of alignment. Total station survey instruments only shall be used for layout, fixing boundaries, centre lines, etc.

3.2 The contractor shall submit the initial levels of any area before any earthwork and shall ensure 100% test checking before execution of the work. No earthwork will be measured in the absence of a 100% test checked initial level

3.3 The contractor shall establish, maintain and assume responsibility for grades, lines, levels and benchmarks. He shall report any errors or inconsistencies regarding grades, lines, levels, dimensions, etc. to the Engineer–in-charge before commencing work. Commencement of work

shall be regarded as the contractor's acceptance of such grades, lines, levels and dimensions and no claim shall be entertained at a later date for any errors found.

3.4 If at any time, any error appears due to grades, lines, levels and benchmarks during the progress of the work, the contractor shall, at his own expense rectify such error, if so required, to the satisfaction of the Engineer–in-charge.

3.5 The contractor shall protect and maintain temporary / permanent benchmarks at the site of work throughout the execution of work. These benchmarks shall be got checked by the Engineer-in-Charge or his authorized representatives. The work at different stages shall be checked with reference to bench marks maintained for the said purpose.

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

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

3.8 The rate quoted by the contractor is deemed to be inclusive of site clearance, setting out work (including marking of reference points, centre lines of buildings), construction and maintenance of reference bench mark(s), taking spot levels, construction of all safety and protection devices, barriers, barricading, signage, labour safety, labour welfare and labour training measures, preparatory works, working during monsoon, working at all depths, height and location, etc, any extra excavation of earth wherever required and any other incidental works required to complete this work.

3.9 **INTEGRATED SERVICE DRAWINGS:** Before taking up the work, the contractor shall do integration and coordination of various civil, electrical, mechanical and other services involved in the construction of building so that no conflict occurs while execution of works of various services at site and also provide 2-D drawings of integrated drawings for various civil and electrical services showing details of lay out plan including sectional elevations. Contractor shall plan and mobilize his resources as per the integrated drawings and as per the site conditions to facilitate convenient execution, installation as well as maintenance of these services. Nothing extra shall be payable on this account.

4 **PRESERVATION AND CONSERVATION MEASURES**

4.1 Existing drains, pipes, cables, over-head wires, sewer lines, water lines and similar services, if any, encountered in the course of the execution of work shall be protected against the damage by the contractor at his own expense. Even in case of accidental damage, the responsibility of repair / replacement including removal of leaked / spilled water, sewage etc. will be on the contractor and shall be repaired / replaced at his own cost.

4.2 Existing services shall not be diverted permanently until they are interfering directly with the layout. Notwithstanding anything to the contrary contained herein, the Contractor shall ensure that the respective entities owning the existing roads, right of way, level crossings, structures, or utilities on, under or above the site are enabled by it to keep them in continuous satisfactory use, if necessary, by providing suitable temporary diversions with the Authority of the controlling body

of that road, right of way or utility. All temporary supports and other measures required to protect and maintain the services during construction period as per direction of Employer, shall be deemed to be included in the quoted rate / amount of the contractor and nothing extra shall be paid on this account. In case the same are to be removed and diverted, expenditure incurred in doing so shall be payable to the contractor. The contractor shall work out the cost, get the same approved by Engineer-in-Charge before taking up actual execution. 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.

4.3 A site laboratory with the minimum equipment as specified in Schedule F / in this bid document shall be established, made functional and maintained within one month from the award of work as per attached list without any extra cost to the department. In case any equipment is not available in the site laboratory during the inspection of the work by the department, the same shall be procured by the department and set up at the site laboratory at the risk and cost of the contractor. The laboratory shall be properly lit and maintained in a clean and hygienic condition at all times.

5 **SPECIALISED AGENCIES**

5.1 The contractor shall engage specialized agency for carrying out specialized item of work as per condition of contract. The contractor is encouraged to finalize and engage the specialized agency with the requisite eligibility before tendering for the work. The contractor shall submit the name of the agency along with their working experience, presentation on method statement and materials being used for execution of such items, etc. to Engineer-in-Charge for approval within 1 month of award of work except for the piling agency whose details may be submitted along with the performance guarantee. Contractor shall submit the proposal (along with work experience certificate issued by competent authority) of only those specialised agencies who have work experience of satisfactorily completion of similar works as per criteria mentioned in the contract. The contractor will have the liberty to change the specialized agency if found necessary but only with the explicit written consent of the respective Engineer-in-Charge in which case the engineer in charges decision regarding eligibility criteria required for the agency based on balance work and practicality of changing the agency based on balance work will be final and binding.

5.2 It shall be the responsibility of main contractor to sort out any dispute / litigation with the Specialized Agencies without any time & cost overrun to the Department. The main contractor shall be solely responsible for settling any dispute / litigation arising out of his agreement with the Specialized Agencies. The contractor shall ensure that the work shall not suffer on account of litigation/ dispute between him and the specialized agencies / sub-contractor(s). No claim of hindrance in the work shall be entertained from the Contractor on this account. No extension of time shall be granted and no claim whatsoever, of any kind, shall be entertained from the Contractor on account of delay attributable to the selection / rejection of the Specialized Agencies or any dispute among them. An undertaking shall be submitted from specialized agency duly signed by the main agency that CPWD will not be party to any dispute that might occur between specialized agency and main agency.

5.3 Engineer-in-Charge will have power to remove any specialized agency due to bad behaviour, bad workmanship or any other conditions arising out of the work. The decision of the Engineer-in-Charge shall be final and binding. The contractor after receiving of such order from Engineer-in-Charge shall associate other specialized agency within 1 week. The contractor shall make payment to the specialized agencies / sub-contractor(s) within 1 week of receiving payment from the department.

5.4 Each specialized agency shall be mandated to deploy a single point of contact representative empowered to take decisions and make commitments on behalf of the specialized agency.

6 **RATES**

6.1 The rates quoted by the Contractor are deemed to be inclusive of site clearance, setting out work, profiling, establishment of reference bench mark(s), installing various signage, taking spot levels, survey with total station, construction of all safety and protection devices, compulsory use of helmet, safety shoes and other appropriate safety gadgets by workers, imparting continuous skill enhancement training and other training for all the workers, barriers, preparatory works, construction of clean, hygienic and well-ventilated workers housings in sufficient numbers, working during monsoon or odd season, working in multiple shifts, working at all depths, height, lead, lift, levels and location, making of mock ups as per tender documents, implementation of green building norms to achieve desired Green Plus Rating, etc. and any other unforeseen but essential incidental works required to complete this work. No extension of time for completion of work shall be granted on these accounts.

6.2 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.

6.3 Ancillary and incidental facilities required for execution of work like labour accommodations, stores, fabrication yard, offices for Contractor, watch and ward, temporary ramp required to be made for working at the basement level, temporary access / approaches to locations within site during rain / other inclement weather conditions, temporary structure for plants and machinery, 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, testing facilities / laboratory at site of work, facilities for all field tests, 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 Engineer-in-Charge, a site / construction yard layout, specifying areas for construction, site office, machinery, material yard, cement & other storage, steel fabrication yard, site laboratory, water tank, concrete batching plant, etc.

6.4 For completing the work in time, the Contractor is expected to work in two or more shifts (including night shifts). No claim whatsoever shall be entertained on this account, not with-standing the fact that the Contractor may have to pay extra amounts for any reason, to the labourer 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.

7 **SUPERVISION OF WORK**

7.1 The Contractor shall depute Site Engineer & skilled workers as required for the work. He shall submit organization chart along with details of Engineers and supervisory staff. It shall be ensured that all decision-making powers shall be available to the representatives of the Contractor at Panihati itself to avoid any likely delays on this account. All the minimum staff mandated in the agreement shall be stationed at Panihati and shall not take leave from station more than 1 week without the approval of the Engineer-in-Charge. The Contractor shall also furnish list of persons for specialized works to be executed for various items of work.

8 **SAFETY PRACTICES**

8.1 **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 daytime 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. **If the contractor fails to provide the warning / caution boards within 7 days of written direction of Engineer-in-Charge or his authorized representative, the same shall be fixed by the department at the risk and cost of the contractor**.

8.2 **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, Engineer-in-charges, Structural Consultants, Department, etc. besides providing space for names of other Contractors, Sub-Contractors and specialized agencies within 15 days from issue of award letter. Nothing extra shall be payable on this account. **In case of non-compliance / delay in compliance in this, the same shall be fixed by the department at the risk and cost of the contractor**.

8.3 Necessary protective and safety equipment such as helmet, safety shoes, gloves etc. shall be provided to the site engineer(s), supervisory staff(s), labour(s) and technical staff(s) of the contractor and also to the departmental / client officials inspecting the works by the Contractor at his own cost and to be used at site.

8.4 Nylon net (50 x 50 mm aperture and 4mm dia.) at site shall be fixed to hooks, etc., along periphery of building at various levels required and as directed by Engineer-in-charge for safety of the working staff for which nothing extra will be paid on this account.

9 **QUALITY ASSURANCE**

9.1 The proposed building is a prestigious project and quality of work is of paramount importance. Contractor shall have to engage well-experienced skilled labour and deploy modern T&P and other equipment to execute the work. Many items like exposed finish form work, specialized flooring work, polysulphide sealant in expansion joints, silicon sealant with backer rod in

structural glazing works, factory made door-window shutters, proper slope maintaining in toilet units, sanitary & water supply installation, water proofing treatment works will specially require engagement of skilled workers having experience particularly in execution of such items.

9.2 Materials used on work without prior inspection and testing (where testing is necessary) and without approval of the Engineer-in-Charge are liable to be considered unauthorized, defective and not acceptable. The Engineer-in-Charge shall have full powers to require the removal of any or all of the materials brought to site by contractor which are not in accordance with the contract specifications or do not conform, in character or quality to the samples approved by the Engineer-in-Charge. In case of default on part of contractor in removing rejected materials, Engineer-in-Charge shall be at liberty to have them removed at the risk and cost of contractor.

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

9.4 The contractor / associate agency shall extend full cooperation to Third Party Quality Assurance Agencies engaged by the Department for the project during their field visits for arranging the necessary quality assurance tests for materials and the construction works.

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

9.6 The Contractor shall submit 15 days prior to execution of any item submit a Minimum Quality Assurance Plan (A detailed and complete method statement for the execution, testing and Quality Assurance Plan / procedures for basic materials and such items, to be followed during execution of work) for approval of the Engineer-in-Charge. All the materials to be used in the work, to give the finished work complete in all respects, shall comply with the requirements of the specifications and shall pass all the tests required as per specifications as applicable or such specifications / standards as directed by the Engineer-in-Charge. Any lapse in quality noticed will be got removed and re-built without any notice at the risk and cost of the contractor in the absence of such plan or due to the non-compliance of such plan. All test results for materials used in the work should form part of the said plan.

9.7 All materials and fittings brought by the contractor to the site for use shall conform to the samples approved by the Engineer-in-charge which shall be preserved till the completion of the work. Wherever brand / quality of material is not specified in the particular specifications, the contractor shall submit the samples as per list of preferred makes given in the tender documents. For all other items, materials and fittings of ISI Marked shall be used with the approval of Engineer-in-Charge. Wherever ISI Marked material / fittings are not available, the contractor shall submit samples of materials / fittings manufactured by firms of repute conforming to relevant specifications or IS codes and use the same only after getting the approval of Engineer-in-Charge.

9.8 The Contractor shall procure and provide all the materials from the manufacturers / suppliers as per the list attached with the tender documents, as per the item description and particular specifications for the work. The equivalent brand for any item other than brand / make mentioned in particular specifications for any item, shall be permitted to be used in the work, only when either the specified make is not available or when the make proposed is matching exactly or exceeds the technical specification of the specified item and the market price of the proposed brand is not lesser than 95% of the market price of the brand specified.

9.9 Bulk delivery of all the materials shall only be made at site after the sample approval of the respective material. All the samples shall be kept in the safe custody of the contractor and shall be produced at demand during the construction period. All the materials shall be brought well in advance as per program finalized with the Engineer-in- Charge so that the sample testing of the same can be done before the execution of the work without delaying the work.

9.10 The contractor shall also provide adequate supporting staff at his cost for carrying out field tests, packaging and forwarding of samples for outside laboratory tests and for maintaining test records.

9.11 The tests, as necessary and where no field laboratory facilities are available, shall be conducted in the laboratory approved by the Engineer–in-Charge. Where field testing is available random samples as desired by the Engineer in Charge shall be send to the laboratory. Whenever a sample is sent to the lab the contractor shall ensure that the sample is sealed and signed by the Engineer-in-Charge or his authorized representative. The sample should be delivered to the respective lab and receipt in this regard should reach the Engineer-in-Charge within 5 days of issue of the letter for testing failing which the test shall be considered null and void and retesting will have to be done. No test result shall be delayed more than 1 month from the date of submission at the lab. If any test result is reported to be missing after the material has reached the lab the sample will be considered to have failed the test result and action will be taken accordingly. The contractor shall arrange for testing in the lab in presence of the representative of the Engineer-in-Charge or Representatives of client or Senior officers of CPWD or representatives of third-party quality assurance team. All testing shall be done in labs of India alone. All the equipment in the field laboratory shall be calibrated as per manufacture specification and an upto date calibration should be displayed alongside the machine in legible and readable format at all times.

9.12 The Contractor shall at his own risk and cost make all arrangements and shall provide all such facilities including material and labour, which the Engineer-in-Charge may require for collecting,

preparing, forwarding the required number of samples for testing as per the frequency of test stipulated in the contract specifications or as considered necessary by the Engineer-in-Charge, at such time and to such places, as directed by the Engineer-in-Charge. The contractor shall keep a close watch on the sampling frequency in CPWD specifications and ensure samples are collected and tested as per the sampling frequency.

9.13 The Contractor or his authorized representative shall associate in collection, preparation, forwarding and testing of such samples. In case he or his authorized representative is not present or does not associate him, the result of such tests and consequences there on shall be binding on the Contractor. The Contractor or his authorized representative shall remain in contact with the Engineer-in–Charge or his authorized representative associated for all such operations.

9.14 The testing charges of all materials shall be borne by the contractor including all incidental charges like cost of materials, packing and transportation, etc.

9.15 All the hidden items such as water supply lines, drainage pipes, conduits, sewers etc. are to be properly tested as per the design conditions before covering and their measurements to be duly test checked by the Engineer-in-Charge or his authorized representative, prior to hiding these items.

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

9.17 Before painting works the contractor shall inspect the whole building for any possible point dampness or wetness and ensure that no possibility of dampness exist in the building and after painting shall give a warranty bond for painting in the prescribed proforma for a period of 5 years.

9.18 The Contractor shall arrange electricity at his own cost for testing of the various electrical installations as directed by Engineer-in-Charge and for the consumption by the contractor for executing the work. Also, all the water required for testing various electrical installations, fire pumps, wet riser / fire-fighting equipment, fire sprinklers, etc. and also testing water supply, sanitary and drainage lines, water proofing of underground sump, overhead tanks, water proofing treatment, etc. shall be arranged by the contractor at his own cost.

9.19 The contractor shall make available, on request from the Department, the copies of challan, cash memos, receipts and other certificates, if any, vouchers towards the quantity and quality of various materials procured for the work. The contractor shall also provide information and necessary documentation on the name of the Manufacturer, Manufacturer’s product identification, Manufacturer’s instructions, Warning, Date of Manufacturing and Test Certificates (from Manufacturers for the products of each consignment delivered at site), shelf life, if any, etc., for the Department to ensure that the material have been procured from the approved source and is of approved quality, as directed by the Engineer-in-Charge. Wherever specified, day to day account of receipt of such material shall be maintained at site of work.

9.20 There may be exposed brick work to be executed in the contract. The contractor shall ensure the bricks used in the said works are without any damage to edges and are regular in size and of best quality. The brick work shall be done with the exposed side as the smooth side nothing extra shall be paid for the said additional scaffolding. Flemish bond has to be used in the exposed brick work. The mortar joints have to be uniform and should not have a size variation of more

than 3 mm average. Specialized tools as required may be used for this purpose. Closures or bats that are required in the masonry has to be machine cut and should not be cut in crude fashion. The bricks used should have uniform colour. This exposed brick masonry and its pointing shall invariably be done in Portland Pozzolana Cement.

9.21 In case there is any discrepancy in frequency of testing as given in list of mandatory tests and that in individual subheads 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.

9.22 The contractor shall provide documents for 5 years of manufactures warranty from the date of completion for LED light fitting, FANS, and sanitary installations and facilitate smooth coordination between the OEM.

9.23 For the items which will be delivered in Numbers, quantity of the testing samples shall be brought at site along with the bulk load of the material and no testing samples shall be brought separately.

9.24 Testing shall be done for each load of the material brought at site irrespective of the frequency of testing.

## 10 SUBMISSION AND DOCUMENTATION

10.1 The Contractor shall render all help and assistance in documenting the total sequences of this project by way of photography, slides, audio / video recording using drone videos, etc. The original films shall be the property of the Department. No copy shall be prepared without the prior approval of the Engineer-in-Charge.

10.2 The Contractor shall display all permissions, licenses, registration certificates, bar charts, other statements, etc. under various labour laws and other regulations applicable to the works, at his site office. He should also keep at site at least one set of BIS Codes and other relevant codes at site and produce the same if asked for by Engineer-in-Charge. In case of non-compliance, these codes will be purchased from the market and actual cost of purchase will be recovered from the next RA Bill of the Contractor.

10.3 The Contractor shall make available five (05) sets of completed Building Drawings (including soft copy of the same), i.e. “As Built Drawings” along with literatures, maintenance manuals, warranty certificates, etc. of various installed fittings, fixtures and equipment for the completed projects. This shall be the prerequisite for payment of final bill.

10.4 The Contractor shall make available five (05) sets of all drawings (including soft copy of the same) of internal & external services i.e. water supply, sanitary line and drainage lines. This shall be prerequisite for payment of final bill. The drawings shall have following information:

(a) Run off for all piping and their diameters including soil, waste pipes and vertical stacks.

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

(c) Run off for all water supply lines with diameters, location of control valves, access panels, etc.

(iv) The contractor shall make available four (04) sets of computerized Standard Measurement Books (SMBs) having measurements of the buildings.

(v) The Performance Guarantee shall not be released to the contractor until the aforesaid drawings are submitted to the Engineer-in-Charge.

(vi) Electronic measurement book is introduced. The contractor shall comply with the same as per the direction of Engineer-in-charge. All hidden items shall be got test checked by the representative of the Engineer-in-Charge before hiding the item failing which that item can be considered to have been executed free of cost.

## 11 PROJECT PROGRAM CHART

11.1 The Contractor shall prepare an integrated program chart including civil, E & M and other services for the execution of work showing clearly all activities from the start of work to completion, with details of manpower, equipment and machinery required for the fulfilment of the program as per Clause-5 of the GCC within 15 days from the date of award of work. The Engineer-in-charge may within 30 days thereafter, if required modify, and communicate the program approved to the contractor failing which the program submitted by the contractor shall be deemed to be approved by the Engineer-in-charge. These shall be submitted by the contractor through electronic media besides forwarding hard copies of the same. The integrated program chart so submitted should not have any discrepancy with the physical milestones specified in the tender documents. The program chart should include the following:

(i) Descriptive note explaining sequence of various activities.

(ii) Construction Program prepared on PRIMAVERA / M. S. Projects only, which will indicate resources in financial terms, manpower and specialized equipment for every important stage.

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

(iv) Program for arranging and deployment of manpower both skilled and unskilled so as to achieve targeted progress.

(v) Program of procurement of machinery / equipment having adequate capacity, commensurate with quantum of work to be done within stipulated period, by contractor.

(vi) Program for achieving fortnightly micro milestones and periodic milestones.

(vii) The program chart shall be updated every month accounting for all the hindrance in the work and no new program chart shall be submitted. In the updation the contractor should show the items of work which he failed to execute on time during that month and update the completion program by additional inputs for those items within the same overall completion time. In case the progress of the work is hindered due to the hindrance at site, he shall submit the application of Extension of time within stipulated period (as mentioned in Clause 5 of General Conditions of Contract) of encountering such delay. Please read this along with condition in Sl. No. 1.19 of Special Conditions.

(viii) The submission for 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 & conditions of agreement.

### 11.2 Submission of Progress Reports

Apart from the above integrated program chart, the contractor shall be required to submit fortnightly progress report of the work in a computerized form on 1st and 16th of every month. The progress report shall contain the following:

(a) Construction schedule of the various components of the work through a bar chart for the next two fortnights (or as may be specified), showing the micro-milestone / milestones, targeted tasks (including material and labour requirement) and up to date progress. At least 20 digital photographs showing all the parts of construction site along with at least 10 minutes drone video of executions of different items in soft copy has to be submitted in every fortnightly progress report

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

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

(d) Man-power statement indicating

(i) Individually names of all staff deployed on work along with their designations.

(ii) No. of skilled workers (trade wise) and total no. of unskilled workers deployed on the work and their location of deployment i.e. blocks.

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

11.3 **PROJECT REVIEW MEETINGS**

The contractor, immediately on award of work, shall submit details of his key personnel to be engaged for the work at site. In addition, he shall furnish the Engineer-in-charge detailed program involved with the work. The contractor shall present the programme and status at various review meetings as required. Weekly Review Meetings: Shall be attended by Local Team headed by Project-in-charge along with PMC team and client representative and representative of consultants / associate agencies / specialised agencies for every alternative week.

| | | |
|---|---|---|
| Agenda | (a) | Weekly programme v/s actual achieved in the past week and programme for next week |
| | (b) | Remedial actions and hold up analysis |
| | (c) | Any decision on quarries raised either by contractor / PMC |

Monthly Review Meetings: Shall be attended by Project–in–charge and the Management Representative who can take independent decisions along with PMC team and client's representatives and representative of consultants / associate agencies / specialised agencies.

| | | |
|---|---|---|
| Agenda | (a) | Progress Status / Statistics |
| | (b) | Completion Outlook |
| | (c) | Major hold ups / slippages |
| | (d) | Assistance required |
| | (e) | Critical issues |
| | (f) | Any decision on queries raised either by Contractor / PMC |
| | (g) | Anticipated cash flow requirement for next two months |

12 **CLEANLINESS OF SITE**

12.1 The Contractor shall not stack building material / malba / muck on the land or road of the local development authority or on the land owned by the others, as the case may be. So, the muck, rubbish, etc. shall be removed periodically as directed by the Engineer-in-Charge from the site of work to the approved dumping grounds as per the local byelaws and regulations of the concerned authorities and all necessary permissions in this regard from the local bodies shall be obtained by the Contractor. In case, the Contractor is found stacking the building material / malba as stated above, the Contractor shall be liable to pay the stacking charges / penalty as may be levied by the local body or any other authority and also to face penal action as per the rules, regulations and bye-laws of such body or authority. The Engineer–in-Charge shall be at liberty to recover, such sums due but not paid to the concerned authorities on the above counts, from any sums due to the Contractor including amount of the Security Deposit and performance guarantee in respect of this contract agreement.

12.2 The contractor shall take instructions from the Engineer-in-Charge regarding collection and stacking of materials at any place. No excavated earth or building rubbish shall be stacked on areas where other buildings, roads, services and compound walls are to be constructed.

12.3 The site of work shall be always kept clean due to constraints of space and to avoid any nuisance to the users of buildings in the adjacent plots. The Contractor shall take all care to prevent any water-logging at site. The waste water, slush, etc. shall not be allowed to be collected at site. It may be directly pumped into the creek with prior approval of the concerned authorities. For discharge into public drainage system, necessary permission shall be obtained from relevant authorities after paying the necessary charges, if any, directly to the authorities. The work shall be carried out in such a way that the area is kept clean and tidy. All the fees / charges in this regard shall be borne by the Contractor.

12.4 It is the responsibility of contractor to keep building neat and clean. The contractor shall spray the chemicals, fumigate site area to check the mosquitoes at frequent interval or as directed by the Engineer-in-Charge. The contractor shall also make lighting and temporary ventilation arrangement in basement. The contractor shall provide submersible pumps with automatic on / off system in each sump in basement to bail out the accumulated water. The contractor shall quote rates after considering the above stated conditions.

12.5 The contractor shall not wash the drum of TM (transit mixer) at site and shall avoid the spread of leachate / cement slurry at the site of work and all care shall be taken to keep the site neat and clean at his own cost.

12.6 The contractor shall keep a record of the rejected material at the site and these materials shall not be removed from the site without any intimation to the Engineer-in-charge.

13 **INSPECTION OF WORK**

13.1 In addition to the provisions of relevant clauses of the contract, the work shall also be open to inspection by Senior Officers of CPWD / CTE / TPQA and the representatives of the Consultants. The contractor shall at times during the usual working hours and at all times at which reasonable notices of the intention of the Engineer-in-Charge or other officers as stated above to visit the works shall have been given to the contractor, either himself be present to receive the orders

and instructions or have a responsible representative duly accredited in writing, to be present for that purpose.

(a) The Committee / Consultant / Third Party Quality Assurance Agency appointed by CPWD, shall be inspecting the works including workshops and fabrication factory to ensure that the works, in general, are being executed according to the design, drawings and specifications laid down in the contract. Their observations shall be communicated by CPWD engineering staff and compliance is to be reported to CPWD.

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

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

(ii) Keep entrance and surrounding area clean

(iii) Display layout plan, key plan, building drawings including plans, elevations and sections.

(iv) Upto date displays of Bar chart, CPM, PERT, etc.

(v) Keep details of quantities executed, balance quantities, deviations, possible extra item, substituted item, etc.

(vi) Keep plastic / cloth mounted one set of building drawings.

(vii) Set of Helmets and safety shoes for exclusive use for officers / dignitaries visiting at site.

(c) The work may be inspected by Chief Technical Examiners Organization of Central Vigilance Commission. In such case, the contractor shall make all arrangements for providing required details / documents.

14 **FINAL TESTING OF THE INSTALLATION**

The Contractor shall demonstrate trouble free functioning of all the Civil and E & M installations and other external bulk services. The Engineer-in-Charge or his authorized representatives shall carry out final inspection of the various Civil, E & M and other services and installations. The contractor shall demonstrate all the features of the building to the client representative and should train 2 client employees regarding the maintenance operation dos and don'ts of each of the specialized items and obtain a certificate from Client regarding the same without which 10% of the bill amount of the said specialized item will be withheld from the contractor.

15 **SUBMISSION OF AS-BUILT DRAWINGS AND OBTAINING OCCUPATION CERTIFICATE**

The contractor shall be responsible for obtaining occupation certificate / completion certificate from local bodies including getting the required site visits conducted by such authorities with a view to obtain the same.

16 **DEWATERING**

16.1 De-watering required, if any, shall be done conforming to BIS Code IS: 9759 (guide lines for de-watering during construction) and / or as per the specifications approved by the Engineer-in-Charge. Design of an appropriate and suitable dewatering system shall be the Contractor's responsibility. Such scheme shall be modified / augmented as the work proceeds based on fresh information discovered during the progress of work, at no extra cost. At all times during

construction work, efficient drainage of the site shall be carried out by Contractor and especially during the laying of plain cement concrete, taking levels, etc. The Contractor shall also ensure that there is no danger to the nearby properties and installations on account of such lowering of water table. If needed, suitable precautionary measures shall be taken by the Contractor. Also, the scheme of dewatering adopted shall have adequate built in arrangement to serve as stand-by to attend to repair of pumps, etc. and disruption of power / fuel supply.

16.2 In trenches where surface water is likely to get into cut / trench during monsoons, a ring bund of puddle clay or by any other means shall be formed outside, to the required height, and maintained by the Contractor. Also, suitable steps shall be taken by the Contractor to prevent back flow of pumped water into the trench.

16.3 The Agency shall be responsible for taking necessary approval for the discharge of water.

17 **INSURANCE POLICIES**

17.1 Before commencing the execution of work, the Contractor shall, without in any way limiting his obligations and liabilities, insure at his own cost and expense against any damage or loss or injury, which may be caused to any person or property, at site of work. The Contractor shall obtain and submit to the Engineer-in-Charge proper Contractor All Risk Insurance Policy for an amount 1.25 times the contract amount for this work, with Engineer-in-Charge as the first beneficiary. The insurance shall be obtained in joint names of Engineer-in-Charge and the Contractor (who shall be second beneficiary). Also, he shall indemnify the Department from any liability during the execution of the work. Further, he shall obtain and submit to the Engineer-in-Charge, a third-party insurance policy for maximum amount of ₹ 10 lakh for each accident, with the Engineer-in-Charge as the first beneficiary. The insurance shall be obtained in joint names of Engineer-in-Charge and the Contractor (who shall be second beneficiary). The Contractor shall, from time to time, provide documentary evidence as regards payment of premium for all the Insurance Policies for keeping them valid till the completion of the work. The Contractor shall ensure that Insurance Policies are taken for the workers of his Sub-Contractors / specialized agencies also. Without prejudice to any of its obligations and responsibilities specified above, the Contractor shall within 30 days from the date of letter of acceptance of the tender and thereafter at the end of each quarter submit a report to the Department giving details of the Insurance Policies along with Certificate of these insurance policies being valid, along with documentary evidences as required by the Engineer-in-Charge. No work shall be commenced by the Contractor unless he obtains the Insurance Policies as mentioned above. Also, no payment shall be made to the Contractor on expiry of insurance policies unless renewed by the Contractor. No claim of hindrance (or any other claim) shall be entertained from the contractor on these accounts.

18 **Training of the Personnel**

The contractor shall arrange at no extra cost to the Department to train Client persons on how to operate and how to carryout preventive maintenance of the systems, minimum one number each for various civil, electrical, mechanical and other services / systems. The contractor shall arrange this training from well qualified and experienced personnel for at least seven days. After completion of the training, certificate of training shall be provided by the contractor to the Client

persons and these certificates shall be submitted to the Department till which time 10 % amount of the respective specialized items will be withheld by the department.

19 **Applicable Permits**

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

19.2 The contractor shall ensure that applicable permits mandated by the local bodies and in case warranted for this work are obtained as required under the Applicable Laws. An indicative but not exhaustive list of some of applicable permits is mentioned below for guidance of Contractor.

19.3 Consequences on account of failure to obtain the mandatory permits shall be the sole responsibility of the contractor and no claim whatsoever shall be entertained by the Engineer In Charge. Any liability incurred by Engineer in Charge on account of such failure shall be recovered from the amounts / payments due to the contractor.

Permission of the State Government for extraction / quarrying of boulders, sand, earth etc. from quarry / river

Permission of Pollution Control Board for installation of crushers

License for use of explosives

Permission of the State Government for drawing water from river/ reservoir

License from Inspector of factories or other competent authority for setting up Batching Plant

Clearance of Pollution Control Board for setting up Batching Plant

Clearance of Pollution Control Board for Asphalt Plant

Clearance of Pollution Control Board for installation of diesel generator sets

Fire safety clearance from fire authorities

Permission of State Government for cutting of trees, if any

Permit for employing unskilled / semi-skilled labour during day / night

Permit for disposal of solid waste / excess material or soil

Permissions from the public utilities for diversion of utilities including reinstatement / reconstruction to original specifications

Approvals for electric supply / distributions

Any other permits or clearance required under the Applicable laws

The above list of permits is not exhaustive but only indicative. The contractor is expected to ensure that all rules of the land are followed and all permits are taken by him before any activity and no burden of permits / licence is passed on to department at any point of time.

19.4 The recoveries to be made towards non fulfilment of conditions of submission of 'SMP' (Site Management Plan) as part of the compliance with Green Plus guidelines, technical staff, field laboratory, labour laws, safety measures, etc. as mentioned under Special Conditions are non-refundable. It is over and above the compensation levied (if any) under Clause 2.

20 **PRESERVE AND PROTECT LANDSCAPE DURING CONSTRUCTION**

20.1 The contractor shall ensure that no tree, existing or otherwise, shall be harmed and damage to

roots should be prevented during trenching, placing backfill, driving or parking heavy equipment, dumping of trash, oil, paint, and other materials detrimental to plant health. These 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.

20.2 The contractor shall take steps to protect trees or saplings identified for preservation within the construction site using tree guards of approved specification.

20.3 Contractor should limit all construction activity within the specified area as per the Construction Management Plan (CMP) approved by Engineer-in-Charge.

20.4 The contractor shall avoid cut and fill in the root zones, through delineating and fencing the drip line (the spread limit of a canopy projected on the ground) of all the trees or group of trees. The contractor shall separate the zones of movement of heavy equipment, parking, or excessive foot traffic from the fenced plant protection zones.

20.5 The contractor shall ensure that maintenance activities during construction period shall be performed as needed to ensure that the vegetation remains healthy.

21 **PREPARATION OF SAMPLE (MOCK-UP)**

21.1 The contractor shall prepare one sample / Mock-Up for typical units (e.g. Room / Lobby / quarter). Samples of representative units shall be prepared by the contractor well in advance before taking up the mass execution at the appropriate time as per mile stones. The contractor shall invariably prepare the samples units of finishing items i.e. flooring of different types, external & internal finishing including colour scheme of paint, tiles in dado, flooring in platforms & staircase, water supply & sanitary fittings, structural glazing and any other item as per direction of Engineer-in-Charge. The contractor shall proceed with further finishing items only after getting the samples of these items approved in writing from Engineer-in-charge.

22 **STRUCTURAL SAFETY**

22.1 Following guidelines to be followed where height of casting of concrete is higher than 3.5 m or where higher loading are coming during casting of concrete or large span structure more than 5 meter long or some special structure like domes, vaults, steel structure, glass canopy, etc.

a) Centering / scaffolding / staging / support works for casting of these structures should be properly designed by a qualified and experienced person / agency having past experience in design of false work (centering) for concrete structures and should be proof checked by similar experienced person / agency and it should be approved by Engineer-in-Charge. The provisions of Clause 7 of IS: 14687 may be referred for design of false work (centering).

b) A method statement for erection and dismantling of the centering / scaffolding / staging and process of concreting & process of anchor of steel structure shall be prepared by contractor and submitted to Engineer-in-Charge for approval and the work shall be commenced only after approval of method statement by Engineer-in-Charge. The provisions of Clause 9 of IS:14687 may be referred for erection, safety precautions & other site operations pertaining to false work (centering).

c) Engineering form watcher shall be engaged during erection, concreting and dismantling for early detection of any movement or instability in the system.

d) A detailed programmed of field safety inspection of centering / scaffolding / formwork of such structures during different stages should be chalked out and strictly followed.

e) The prime responsibility of safety of false work shall be with contractor for concrete and structural steel work.

f) Provision of safety net, fall arresting system including other safety gears, for workers, working over these structures shall be followed strictly.

23 **OTHER CONDITIONS W.R.T. EXECUTION OF WORKS**

23.1 The work shall be carried out in accordance with the contract specification / terms, tendered drawings and detailed drawings including revised drawings, if any, issued during execution of work by the Engineer-in-Charge.

23.2 Wherever any reference to any Indian Standards occurs in the documents relating to this contract, the same shall be inclusive of all amendments issued thereto or revisions thereof, if any, up to the last date of receipt of tenders including extensions if any.

23.3 Unless otherwise specified in the schedule of quantities, the rates for all items of work shall be considered, as inclusive of adhering to all special conditions of the contract.

23.4 All stone aggregate and stone ballast shall be of hard stone variety to be obtained from approved quarries. The quarry and gradation of aggregate should be maintained after the mix design is approved and if a change is required for un avoidable reasons a revised mix design is to be done. Contractor is encouraged to get multiple mix designs approved so that an issue with one RMC plant or Quarry does not hamper the progress. Water proofing chemical has to be added while doing concrete of water retaining structure and roofing. The contractor shall get approved separate mix deign with the selected water proofing compound as the additive before such works are taken up.

23.5 Coarse sand should be obtained from approved sources. The same shall be clean and sharp angular grit type. The coarse sand shall be screened before using, if required. If the sand brought to site is dirty, it must be washed in clean water to bring the sand to the required specifications.

23.6 The contractor is required to deploy resources as per availability of site. However, no claim will be entertained for idle labour, idle machinery, idle technical / non-technical staff, idle T&P, etc.

23.7 The work of services will be executed simultaneously. The Contractor shall minimize the scope of making recesses, holes, opening, etc. as the same shall be planned in advance and necessary grooves / niches shall be provided in shuttering of RCC.

23.8 Laminates on flush doors shall be machine pressed, preferably in factory. The design and pattern of laminates shall be as per the approval of Engineer-in-Charge.

23.9 The Aluminium door-windows-framework, lamination and lipping on flush doors shall be factory-made. Internal lipping shall be provided on flush doors.

23.10 Unless otherwise specified, wherever mild steel / galvanized iron sections and pipes are provided in the work, priming coat of approved steel primer shall be done after removing rust from section, if any, and finally finished with low VOC synthetic enamel paint or as mentioned specifically in specification.

23.11 For avoiding of scratch marks or damage to the vitrified / ceramic floor tile, the necessary arrangement of hessian cloth with a coat of plaster of Paris over it shall be provided.

23.12 Fall nets and scaffolding nets for protection from debris / dusts and noise, etc. are to be provided during the construction period.

23.13 Wherever M.S. grill provided in window, horizontal and vertical spacing of members should normally be 10 cm centre to centre or closer as per requirement.

23.14 Wherever the doors are required to be fixed to AAC block masonry, the frame shall be fixed in RCC band or concrete block masonry.

23.15 In case of reduction in scope of work, no claim on account of reduction in value of work, loss of expected profit, consequential overheads etc. shall be entertained.

**24 DISPUTE RESOLUTION**

24.1 The department expect a cordial coordination on the part of the contractor. In case of any difference of opinion the contractors is advised to intimate difference of opinion regarding any decision or actions of the Engineer-in-Charge in writing within a maximum of 1 month from the date such a difference of opinion arose so that the issue can be resolved. The said intimation in writing shall be well quantified with proof if any for verification at the time. Any dispute or difference of opinion raised after one month of occurrence of the said dispute or any un / ill quantified claims made would be considered as an afterthought and will not be entertained. All disputes would be resolved as per the conditions of the contract and contractor shall strictly follow the same.

**Note: Nothing extra shall be payable on the account of the special conditions mentioned under Section-1 to 9.**

## SECTION 2

## SPECIAL CONDITIONS FOR GREEN BUILDING

2.0 The building shall confirm to Green Building CPWD 2021 Green Plus Rating. The points that are aimed for to achieve the Green Plus Rating will be mentioned in the drawing. The contractor shall ensure such actions and documentation so that the points aimed for from the construction planning and execution activities are not lost.

2.1 **Construction Stage**

(a) All vehicles, equipment and machinery to be procured for construction shall conform to the relevant Bureau of India Standard (BIS) norms.

(b) Emission from the vehicles must conform to environmental norms

(c) Dust produced from the vehicular movement and other site activities is to be mitigated by sprinkling of water.

(d) Noise limits for construction equipment shall not exceed 75 dB(A), measured at one meter from the edge of the equipment in free area, as specified in the Environment Protection Act 1986, Schedule VI-Part E, as amended on 9th May 1993. The maximum noise levels near the construction site should be limited to 65 dB (A) Leq (5 min) in project area.

(e) **Construction Waste Disposal**

(i) The pre-identified dump locations will be a part of solid waste management plan to be prepared by the Contractor in consultation with Engineer-in-charge.

(ii) Contractor shall get approved the location of disposal site prior to commencement of the excavation on any section of the project location.

(iii) Contractor shall ensure that any spoils of material / construction waste will not be disposed off in any municipality solid waste collection bins.

2.2 **Procurement of Construction Materials**

(i) All vehicles delivering construction materials to the site shall be covered to avoid spillage of materials and maintain cleanliness of the roads.

(ii) Wheel Tyres of all vehicles used by of the contractor, or any of his subcontractor or materials suppliers shall be cleaned and washed clear of all dust / mud before leaving the project premises. This shall be done by routing the vehicles through tyre washing tracks.

(iii) Contractor shall arrange for regular water sprinkling at least twice a day (i.e. morning and evening) for dust suppression of the construction sites and unpaved roads used by his construction vehicles.

2.3 **Water Pollution**

(i) The Contractor shall take all precautionary measures to prevent the wastewater during construction to accumulate anywhere.

(ii) The wastewater arising from the project is to be disposed off in the manner that is acceptable to the Engineer–in-charge.

2.4 **Air and Noise Pollution**

(i) Contractor shall use dust screens and sprinkle water around the construction site to arrest spreading of dust in the air and surrounding areas.

(ii) Contractor shall ensure that all vehicles, equipment and machinery used for construction are regularly maintained and confirm that emission levels comply with environmental emission standards / norms.

(iii) For controlling the noise from vehicles, all vehicles and equipment used in construction will be fitted with exhaust silencers.

(iv) Servicing of all construction vehicles and machinery will be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaced.

(v) Noise emission from compactors (rollers), front loaders, concrete mixers, cranes (movable), vibrators and saws should be less than 75 dB(A).

(vi) As per the standards / guidelines for control of Noise Pollution from Stationary Diesel Generator (DG) sets, noise emission in dB(A) from DG Set (15-500 KVA) should be less than 94+10 log 10 (KVA). The standards also suggest construction of acoustic enclosure around the DG Set and provision of proper exhaust muffler with insertion loss of minimum 25 dB(A) as mandatory.

2.5 **Personal Safety, Hygiene Measures for Labour**

i) Contractor shall provide the following items for safety of workers employed by contractor and associate agencies:

a) Protective footwear, helmet and gloves to all workers employed for the work on mixing, cement, lime mortars, concrete, etc. and openings in water pipeline / sewer line.

b) Welder's protective eye-shields to workers who are engaged in welding works.

c) Safety helmet and Safety harness / belt

d) Provide adequate sanitation / safety facilities for construction workers to ensure the health and safety of workers during construction, with effective provisions for the basic facilities such as sanitation, drinking water and safety equipment or machinery.

(ii) All the workers should be wearing helmet and shoes all the time on site.

(iii) Masks and gloves should be worn whenever and wherever required.

(iv) Adequate drinking water facility should be provided at site, adequate number of decentralized latrines and urinals to be provided for construction workers.

(v) Full-time workers (if any with the approval of Engineer-in-Charge) residing on site should be provided with clean and adequate temporary hutment.

(vi) First aid facility should also be provided.

(vii) Overhead lifting of heavy materials should be avoided. Barrow wheel and hand-lift boxes should be used to transport materials onsite.

(viii) Tobacco and cigarette smoking should be prohibited onsite.

(ix) All dangerous parts of machinery shall be well guarded and all precautions for working on machinery shall be taken.

(x) Maintain hoists and lifts, lifting machines, chains, ropes and other lifting tackles in good condition. Provide safety net of adequate strength to arrest falling material down below.

(xi) Use of durable and reusable formwork systems to replace timber formwork and ensure that formwork where used is properly maintained.

(xii) Ensure that walking surfaces or boards at height are of sound construction and are provided with safety rails and belts. Provide protective equipment such as helmets.

(xiv) Provide measure to prevent fire. Fire extinguisher and buckets of sand to be provided in fire-prone area and elsewhere.

(xv) Provide sufficient and suitable light for working during night.

(xvi) Ensure that measures to protect workers from materials of construction, transportation, storage and other dangers and health hazards are taken.

(xvii) Ensure that the construction firm / division / company have sound safety policies.

(xviii) Comply with the safety procedure, norms and guidelines (as applicable) as outlined in NBC 2016.

(xix) Adopt additional best practices and prescribed norms as in NBC 2016.

2.6 Identify roads on-site that would be used for vehicular traffic. Upgrade vehicular roads (if these are unpaved) by increasing the surface strength by improving particle size, shape and mineral type that make up the surface base. Add surface gravel to reduce source of dust emission. Limit amount of fine particles (smaller than 0.075 mm) to 10-20%. Limit vehicular speed on site to 10 km/h. Nothing extra will be payable for this.

2.7 All material storages should be adequately covered and contained so that they are not exposed to situations where winds on site could lead to dust / particulate emissions.

2.8 Spills of dirt or dusty materials shall be cleaned up promptly so the spilled material does not become a source of fugitive dust and also to prevent seepage of pollutant laden water into the ground aquifers. When cleaning up the spill, ensure that the clean – up process does not generate additional dust. Similarly, spilled concrete slurries or liquid wastes should be contained / cleaned up immediately before they can infiltrate into the soil/ground or runoff in nearby areas.

2.9 Contractor shall ensure that water spraying is carried out by wetting the surface by spraying water on:

(i) Any dusty material

(ii) Areas where demolition work is carried out

(iii) Any unpaved main-haul road and

(iv) Areas where excavation or earth moving activities are to be carried out

2.10 The contractor shall ensure the following:

(i) Cover and enclose the site by providing dust screen, sheeting or netting to scaffold along the perimeter of a building

(ii) Covering stock piles of dusty material with impervious sheeting

(iii) Covering dusty load on vehicles by impervious sheeting before they leave the site

(iv) Transferring, handling / storing dry loose materials like bulk cement and dry pulverized fly ash inside a totally enclosed system

(v) Clear vegetation only from areas where work will start right away

(vi) Vegetate / mulch areas where vehicles do not ply

(vii) Apply gravel / landscaping rock to the areas where mulching / paving is impractical

2.11 **Special conditions for Green Plus compliance for works:**

(i) The contractor shall ensure that the following provisions are complied with during the construction besides GCC provisions related to a) CPWD safety code b) Model rules and c) CPWD contractors labour regulations.

(a) Reduction in air pollution during construction by taking necessary measures. For example, Covering stock piles, covering bricks and loads of dusty materials, carry out wheel washing of vehicles entering/exiting the site, sprinkle water on roads with loose dust, cordoning of material stocking area and construction work area, etc.

(b) Efficient water use during construction

(c) Efficient reduction in waste during construction by segregating hazardous and inert waste and such segregated waste shall be safely disposed off

(d) Smoking is strictly prohibited on site

(e) All construction materials are properly stacked without only spillage and wastage.

(ii) No extra payment shall be made for all the operations described above such as covering stock piles, covering bricks and loads of dusty materials, carrying-out wheel washing of vehicles entering/exiting the site, sprinkling water on roads with loose dust, cordoning of materials stacking area and construction work area, etc. It may be noted that the quoted amount covers the cost of these operations. In case the special conditions for Green Plus compliance is not strictly followed during the execution of the work the fine **(non-refundable)** for non-performance of each corresponding activity specified as below shall be levied per day of failure.

| **Sl. No.** | **Operations** | **Fine per day** |
|---|---|---|
| 1. | Covering stock piles | ₹100 / day |
| 2. | Covering bricks and loads of dusty materials. | ₹ 100 / day |
| 3. | Carry out wheel washing of vehicles entering/exiting the site. | ₹ 350 / day |
| 4 | Sprinkler water on roads having loose dust. | ₹ 270/ day |
| 5. | Cordoning of material stocking area and construction work area | ₹ 100 / day |

(iii) If the non-compliance of Green Plus norms are observed for more than a week it shall be construed that the agreement conditions are not performed by the Agency and action shall be taken as deemed fit by the Engineer-in-Charge.

2.12 Adopt measures to prevent air pollution in the vicinity of the site due to construction activities. There is no standard reference for this. The best practices should be followed (as adopted from international best practice documents and codes).

2.13 The contractor shall provide experienced personnel with suitable training to ensure that these methods are implemented. Prior to the commencement of any work, the method of working, plant equipment and air pollution control system to be used on–site should be made available for the

inspection and approval of the Engineer–in-Charge to ensure that these are suitable for the project.

2.14 Employ measures to segregate the waste on-site into inert, chemical or hazardous wastes. Recycle the unused chemical / hazardous wastes such as oil, paint, batteries and asbestos. The inert waste is to be disposed off to Municipal Corporation / local bodies dump yard & landfill sites.

2.15 To preserve the existing landscape and protect it from degradation during the process of construction, proper timing for construction activity shall be selected to minimize the disturbance such as soil pollution due to spilling of the construction material and it's mixing with rainwater. The construction management plan including soil erosion control management plan shall be prepared accordingly for each month. The application of erosion control measures includes construction of gravel pits and tyre washing bays of approved size and specification for all vehicular site entry / exits, protection of slopes greater than 10%. Sedimentation Collection System and run-off diversion systems shall be in place before the commencement of construction activity. Existing vegetation shall be preserved and protected by not-disturbing or damaging specified site areas during construction.

2.16 The Contractor should follow the construction plan as proposed by the Engineer-in-Charge / landscape consultant to minimize the site disturbance such as soil pollution due to spilling. Use staging and spill prevention and control plan to restrict the spilling of the contaminating material on site.

2.17 Spill prevention and control plans should clearly state measures to stop the source of the spill. Measures to contain the spill and measures to dispose the contaminated material and hazardous wastes shall be taken by the bidder. Agency should also state the designation of personnel trained to prevent and control spills. Hazardous wastes include pesticides, paints, cleaners and petroleum products.

2.18 A soil Erosion and Sedimentation Control Plan (ESCP) should be prepared prior to construction and should be applied effectively.

2.19 The contractor shall prepare and submit 'Spill prevention and control plans' before the start of construction, clearly stating measures to stop the source of the spill, to contain the spill, to dispose the contaminated material and hazardous wastes, and stating designation of personnel trained to prevent and control spills. Hazardous wastes include pesticides, paints, cleaners, and petroleum products.

2.20 The contractor shall ensure that no construction leaches (e.g. cement slurry) is allowed to percolate into the ground. Adequate precautions are to be taken to safeguard against this including reduction of wasteful curing processes, collection, basic filtering and reuse. The contractor shall follow requisite measures for collecting drainage water run-off from construction areas and material storage sites and diverting water flow away from such polluted areas. Temporary drainage channels, perimeter dyke / swale, etc. shall be constructed to carry the pollutant–laden water directly to the treatment device or facility (municipal sewer line).

2.21 All lighting installed by the contractor around the site and at the labour quarters during construction shall be CFL / LED bulbs of the appropriate illumination levels. This condition is a must, unless specifically prescribed otherwise.

2.22 All the building materials and systems used on site must be as per the specifications and approved makes by the Engineer-in-Charge.

2.23 All required certificates explaining the properties of the building material / system needs to be obtained from the manufacturer / vendor as required by the green building rating authority. The purchase orders of all the materials made with the manufacturers / authorized vendors should be maintained and shall be provided for the process with due diligence upon request.

2.24 All paints, adhesives and sealants should comply with the VOC limits prescribed by Green Plus, as follows:

**Table 1- VOC limits for Paints, Adhesives and Sealants**

| Description | VOC Limit (g/l) | Description | VOC Limit (g/l) |
|---|---|---|---|
| **PAINTS** | | **Adhesive** | |
| Non-flat paints | 150 | Wood flooring | 100 |
| Flat (Mat) paints | 50 | Tile | 65 |
| Anti-corrosive / anti-rust | 250 | Indoor Carpet | 50 |
| **COATINGS** | | | |
| Varnish | 350 | Structural Glazing | 100 |
| Lacquer | 550 | Multipurpose Construction | 70 |
| Floor Coatings | 100 | | |
| Stains | 250 | | |

2.25 Water saving measures as suggested by the consultants need to be followed on site. If bore well water is used for construction, it must be metered. For waste water use in construction, record must be maintained of all tankers used at site. All sources of water use during construction must be regularly monitored.

2.26 The contractor / subcontractor shall prepare and submit a Site Management Plan (SMP) within 15 days of start, for approval by the Engineer–in-charge. This SMP shall indicate the locations of godown, stockpiles, barricading, waste storage, offices, vehicular movement routes, etc. In short, this SMP would comprehensively represent how the site activities shall be managed conforming to Green Plus guidelines.

2.27 Any other site management measures suggested by the Engineer-in-charge / green building consultant shall be followed on site.

2.28 The contractor & his team shall put adequate efforts to minimize construction waste generation at site. This shall include collection and segregation of all construction waste at site like broken bricks, tiles, glass, pavers, steel scrap, concrete debris, plastic bags, drums, packaging cardboard, timber scrap, cement bags, etc.

2.29 The contractor must keep record of all the construction waste being recycled or reused at site and also maintain receipts / records of waste sold from site. The contractor must ensure that no waste from the site is sent to landfill sites, either all waste is reused within the site or sent for recycling. Track the waste sent off the site to its final destination. Contractor must keep record as gate passes / challans for all the waste material sent out for selling.

2.30 The contractor shall submit to the Engineer–in-Charge after construction of the buildings, a detailed as-built quantification of the following within 10 days of recording of completion.

Contractor will be penalized @ ₹ 500 per day of delay in submission of "detailed as built quantification".

(i) Total materials used
(ii) Total waste generated
(iii) Total waste reused
(iv) Total water used
(v) Total electricity consumed and
(vi) Total diesel consumed

2.31 Evidence for the implementation of all the above required measures shall be provided to the Engineer-in-Charge in the form of photographs and templates as required which is required for the submission to the green building rating authority.

2.32 The contractor shall provide potable water for all workers. 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. The total number to be provided shall not be less than 1 per 30 employees in any one shift. 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.

2.33 In compliance to the Hon'ble National Green Tribunal (NGT) and Office Memorandum No. DG/SE/CM/CON/Misc./02 dated 16.03.2016, following preventive / corrective measures to be taken at site in order to control air pollution from construction and demolition activity:

(i) The contractor shall not store / dump construction material or debris on metalled road.
(ii) The contractor shall get prior approval from Engineer-in-Charge for the area where construction material or debris can be stored beyond metalled road. This area shall not cause any obstruction to free flow of traffic / inconvenience to the pedestrians. It should be ensured by contractor that no accident occurs on account of such permissible storage.
(iii) The contractor shall take appropriate protection measures like raising wind breakers of appropriate height on all sides of the plot / area using CGI sheets or plastic and / or other similar material to ensure that no construction material dust fly outside plot area.
(iv) The contractor shall ensure that all the trucks or vehicles of any kind which are used for construction purposes / or are carrying construction material like cement, sand and other allied material are fully covered. The contractor shall take every necessary precaution that the vehicles are properly cleaned and dust free to ensure that enroute their destination, the dust, sand or any other particles are not released in air / contaminate air.

(v) The contractor shall provide mask to every worker working on the construction site and involved in loading, unloading and carriage of construction material and construction debris to prevent inhalation of dust particles.

(vi) The contractor shall provide all medical help, investigation and treatment to the workers involved in the construction of building and carry of construction material and debris relatable to dust emission.

(vii) The contractor shall ensure that C&D waste is transported to the C&D waste site only and due record shall be maintained by the contractor.

(viii) The contractor shall ensure compulsory use of wet jet in grinding and stone cutting.

(ix) The contractor shall comply with all the preventive and protective environmental steps as stated in the MoEF Guidelines 2010.

(x) The contractor shall carry out on-road-inspection for black smoke generating machinery. The contractor shall use cleaner fuel.

(xi) The contractor shall ensure that all DG sets comply with emission norms notified by MoEF.

(xii) The contractor shall use vehicles having pollution under control certificate. The emissions can be reduced by a large extent by reducing the speed of a vehicle to 20 kmph. Speed bumps shall be used to ensure speed reduction. In cases where speed reduction cannot effectively reduce fugitive dust, the contractor shall divert traffic to nearby paved areas.

(xiii) The contractor shall ensure that the construction material is covered by tarpaulin. The contractor shall take all other precaution to ensure that no dust particles are permitted to pollute air quality as a result of such storage.

(xiv) The paving of the path for plying of vehicles carrying construction material is more permanent solution to dust control and suitable for longer duration projects.

2.34 In case of non-availability of the C&D Waste Material / Product, the contractor shall make arrangement of substitute materials / products without any cost adjustment.

2.35 Any penalty imposed by Civic bodies / NGT for Non-Compliance of their guidelines issued by them from time to time shall be borne by the contractor.

2.36 The contractor shall comply with the safety procedures, norms and guidelines (as applicable) as outlined in the Part 7 of National Building code 2016 of India, Bureau of Indian Standards. A copy of all pertinent regulations and notices concerning accidents, injury and first-aid shall be prominently exhibited at the work site. Depending upon the scope & nature of work, a person qualified in first-aid shall be available at work site to render and direct first-aid to causalities. A telephone may be provided to first-aid assistant with telephone numbers of the hospitals displayed. Complete reports of all accidents and action taken thereon shall be forwarded to the competent authorities.

2.37 The contractor shall ensure the following for construction workers safety among other measures:

- Guarding all parts of dangerous machinery.
- Precautionary signs for working on machinery
- Maintaining hoists, lifting machines, chains, ropes & other lifting tackles in good condition

- Durable and reusable formwork systems to replace timber formwork and ensure that formwork where used is properly maintained
- Ensuring that walking surfaces or boards at height are of sound construction and are provided with safety rails or belts
- Provide protective equipment; helmets, etc.
- Provide measures to prevent fires
- Fire extinguishers and buckets of sand to be provided in the fire-prone area and elsewhere
- Provide sufficient and suitable light for working during night time

2.38 Evidence for the implementation of all the above required measures shall be provided to the Engineer-in-Charge in the form of photographs and templates as required which is required for the submission to the green building rating authority.

2.39 Where possible, the contractor shall select materials / vendors, harvested and manufactured regionally, within close proximity of the project site. Contractor shall collect & submit the relevant material certificates for materials with high recycled (both post-industrial and post- consumer) content, including materials like RMC mix with fly-ash, glass with recycled content, calcium silicate boards etc. Contractor shall collect the relevant material certificates for rapidly renewable materials such as bamboo, wool, cotton insulation, agri-fiber, linoleum, wheat board, strawboard, cork, etc.

2.40 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.

2.41 Wherever required, Contractor shall meet and carry out of all activities on site, supplementation of information, and submitting in accordance with IGBC LEED India New Construction v1.0 &Green Plus program standards and guidelines. Towards meeting the aforementioned building environmental rating standard(s) expert assistance shall be provided to him upon request.

2.42 **CONSTRUCTION WASTE**

The contractor shall make himself conversant with the Site Waste Management Program Manual and actively contribute to its compilation by estimating the nature and volume of waste generated by the process / installation in question. The Contractor's ingenuity is especially called towards meeting this prerequisite / credit (as per IGBC LEED India, New Construction v1.0 &Green Plus, MNRE) for recycling cardboard, metal, brick, acoustical tile, concrete, plastic, clean wood, glass, gypsum wallboard, carpet and insulation.

a) Contractor shall ensure that wastage of construction material is within 3%. Subject to the suitability, all construction debris shall be used for road preparation, back filling, etc, as per the instructions of the Engineer in Charge, with necessary activities of sorting, crushing, etc. No construction debris shall be taken away from the site, without the prior approval of the Engineer in Charge. If and when construction debris is taken out of the site, after prior permissions from the Engineer in Charge, then the contractor shall ensure the safe disposal of all wastes and will only dispose of any such construction waste in approved dumping sites.

b) Contractor shall collect all construction waste generated on site. Segregate these wastes based on their utility and examine means of sending such waste to manufacturing units which use them

as raw material or other site which require it for specific purpose. All construction debris generated during construction shall be carefully segregated and stored in a demarcated waste yard. Clear, identifiable areas shall be provided for each waste type. Employ measures to segregate the waste on site into inert, chemical, or hazardous wastes. Typical construction debris could be broken bricks, steel bars, broken tiles, spilled concrete and mortar, etc.

c) Water spray, through a simple hose for small projects, to keep dust under control. Fine mists should be used to control fine particulate. However, this should be done with care so as not to waste water. Heavy watering can also create mud, which when tracked onto paved public roadways, must be promptly removed. Also, there must be an adequate supply of clean water nearby to ensure that spray nozzles don't get plugged.

d) Contractor shall be required to provide an easily accessible area that serves the entire building and is dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, corrugated cardboard, glass, plastics, and metals. He shall coordinate the size and functionality of the recycling areas with the anticipated collections services for glass, plastic, office paper, newspaper, cardboard, and organic wastes to maximize the effectiveness of the dedicated areas. Consider employing cardboard balers, aluminium can crushers, recycling chutes, and collection bins at individual workstations to further enhance the recycling program.

e) 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.

f) The storage of material shall be as per standard good practices as specified in Part 7, Section 2 in Storage, Stacking and Handling practices, NBC 2016 and shall be to the satisfaction of the Engineer in Charge to ensure minimum wastage and to prevent any misuse, damage, inconvenience or accident. There should be a proper planning of the layout for stacking and storage of different materials, components and equipment's with proper access and proper manoeuvrability of the vehicles carrying the materials. While planning the layout, the requirements of various materials, components and equipment's at different stages of construction shall be considered.

g) 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. The contractor shall ensure that the site and the workers facilities are kept litter free. Separate bins should be provided for plastic, glass, metal, biological and paper waste and labelled in both Hindi and English with suitable symbols.

h) The Contractor shall remove from site all rubbish and debris generated by the Works and keep the Work Site clean and tidy throughout the Contract Period. All the serviceable and non-serviceable (malba) material shall be segregated and stored separately. The malba obtained during construction shall be collected in well-formed heaps at properly selected places, keeping in a view safe condition for workmen in the area. Materials which are likely to cause dust nuisance or undue environmental pollution in any other way, shall be removed from the site at the earliest and till then they shall be suitable covered. Glass & steel should be dumped or buried separately to prevent injury. The removal of debris should be carried out during day. In case of poor visibility artificial light may be provided.

2.43 **DOCUMENTATION**

(a) The contractor shall submit a document after construction of the buildings, a brief description along with photographic records to show that other areas have not been disturbed during construction. The document should also include brief explanation and photographic records to show erosion and sedimentation control measures adopted (Document CAD drawing showing site plan details of existing vegetation, existing buildings, existing slopes and site drainage pattern, staging and spill prevention measures, erosion and sedimentation control measures and measures adopted for top soil preservation during construction).

(b) The contractor shall submit to the Engineer in Charge, before the start of construction, a site plan along with a narrative to demarcate areas on site from which top soil has to be gathered, designate area where it will be stored, measures adopted for top soil preservation and indicate areas where it will be reapplied after construction is complete.

(c) The contractor shall submit to the Engineer in Charge, a detailed narrative (not more than 250 words) on provision for safe drinking water and sanitation facility for construction workers and site personnel.

(d) Provide supporting document from the manufacturer of the pre-cast building blocks specifying the fly ash content of the blocks used in an infill wall system.

(e) The contractor shall, during the entire tenure of the construction phase, maintain the following records and submit to the Engineer in Charge on demand:

(i) Water consumption in litres

(ii) Electricity consumption in 'kwh' units

(iii) Diesel consumption in litres

(iv) Quantum of waste (volumetric / weight basis) generated at site and the segregated waste types divided into inert, chemical and hazardous wastes

(v) Digital photo documentation to demonstrate compliance of safety guidelines as specified herein

(vi) Quantities of material brought into the site, including the material issued to the contractor by the Engineer-in-Charge

(vii) Quantities of construction debris (if at all) taken out of the site

(viii) Digital photographs of the works at site, the workers facilities, the waste and other material storage yards, pre-fabrication and block making works, etc. as guided by the Engineer-in-Charge

f) The contractor shall submit to the Engineer-in-Charge, following information, for all material brought to site for construction purposes, including manufacturer's certifications, verifying information, and test data, where specifications sections require data relating to environmental issues including but not limited to:

i) Source of products: Supplier details and location of the supplier

ii) Project Recyclability: Submit information to assist Owner and Contractor in recycling materials involved in shipping, handling, and delivery, and for temporary materials necessary for installation of products

iii) Recycled Content: Submit information regarding product post-industrial recycled and post-consumer recycled content

iv) Product Recyclability: Submit information regarding product and product's component's

recyclability including potential sources accepting recyclable materials wherever applicable

(g) Provide total support to Engineer in Charge and Green Building Consultants appointed by the Engineer in charge in completing all Green Building Rating related formalities, including signing of forms, providing signed letters in the contractor's letterhead whenever required.

(h) The contractor is expected to go through all other conditions of the LEED &Green Plus rating stipulations. Failure to adhere to any of the above-mentioned items, without approval of the Engineer in Charge, shall be deemed as a violation of contract and the contractor shall be held liable for penalty as per terms of the agreement.

## SECTION 3

### 3.0 PARTICULAR SPECIFICATION AND SPECIAL CONDITIONS FOR CEMENT BROUGHT BY THE CONTRACTOR

3.1 **CEMENT**

The agency shall procure OPC conforming to IS: 8112 / PPC conforming to IS: 1489 (Part 1) as required in the work from reputed cement manufacturers mentioned in the list of Preferred makes for civil works or from any other reputed cement manufacturer having a production capacity not less than 1 million tons per annum as approved by competent authority of CPWD. The bidders may also submit a list of names of cement manufacturers which they propose to use in the work. The tender accepting authority reserves right to accept or reject name(s) of cement manufacturer(s) which the bidder proposes to use in the work. No change in the tendered rates will be accepted if the tender accepting authority does not accept the list of cement manufacturers, given by the bidder, fully or partially.

3.2 Supply of cement shall be taken in 50 kg bags bearing manufacturer's name and ISI marking OR in bulk in bunkers in which case the contractor may purchase directly from the manufacturer. Samples of cement arranged by the contractor shall be taken by the Engineer-in-Charge and got tested in accordance with provisions of relevant BIS codes. In case 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. Every fresh cement batch should be brought to site at least 30 days before they are to be used / consumed in the work.

3.3 The cement shall be brought at site in bulk supply of approximately 50 tonnes or as decided by the Engineer-in-Charge. The cement godown of the capacity enough to ensure progress of work without delay may be constructed at site as per CPWD specification.

3.4 The cement shall be got tested by the Engineer-in-Charge and shall be used on the work only after satisfactory test results have been received. The contractor shall supply free of charge the cement required for testing including its transportation cost to testing laboratories. The frequency and details of the tests shall be decided by the Engineer-in-Charge depending on the quantum of supply in each batch. The cost of tests shall be borne by the contractor.

3.6 The actual issue and consumption of cement on work shall be regulated and proper accounts be maintained by the contractor. The theoretical consumption of cement shall be worked out as per procedure prescribed in Clause 38 of the contract and shall be governed by the conditions laid therein. Cement consumption less than theoretical consumption including permissible variation, is not permitted. In case of excess consumption, no adjustment shall be made and no extra payment shall be made. 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.

3.7 Damaged cement shall be removed from the site immediately by the contractor on receipt of a notice in writing from the Engineer-in-charge. Till the time it is removed the damaged cement shall be clearly marked quantified and kept separately so that the same is not used by mistake in the work. If he does not do so within 3 days of receipt of such notice, the Engineer-in-charge shall get it removed at the cost of the contractor.

3.8 ADGs / SDGs may change the brand of cement depending upon availability in local market but conforming to grade mentioned in the NIT and only with ISI mark, if warranted. The name of the manufacturers should be finalized after taking into consideration the availability and the cost factor.

## SECTION 4

4.0 **SPECIAL CONDITION FOR STEEL REINFORCING BARS**

4.1 Only ISI marked **Corrosion Resistant Steel (CRS)** Bars (Bars Set I) of various grades conforming to IS: 1786 and additional requirements (e.g. Chemical composition requirement for manganese and copper, Tempered Marten site (TM) Ring Requirement, Marking Requirement and compliance of provisions of ISO 9001: 2015 and ISO 14001: 2004 (Refer Annexure -1 (c)) shall be procured from the list of approved manufactures or from the manufactures who are approved by the SDG of CPWD in any region of CPWD based on set guidelines for use in the work.

4.2 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 Samples shall also be taken and got tested by the Engineer-in-charge as per the provisions in this regard in relevant BIS code and additional requirements as mentioned above. In case the test results indicate that the steel arranged by the contractor does not conform to the specifications as defined under Para 4.1 above, the same shall stand rejected, and it shall be removed from the site of work by the contractor at his cost within a week's time of written orders from the Engineer-in-charge to do so.

4.4 The steel reinforcement bars shall be brought to the site preferably in bulk supply of 25 tonnes or more or as decided by the Engineer-in-Charge. Each lot of supplies steel will be tested irrespective of the lot size.

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

4.7 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.

4.8 The actual issue and consumption of steel on work shall be regulated and proper accounts shall be maintained as provided in Clause 10 of the contract. The theoretical consumption of steel shall be worked out as per procedure prescribed in Clause 38 of the contract and shall be governed by conditions laid therein. Steel consumption less than theoretical consumption including permissible variations is not permitted. In case of excess consumption, no adjustment shall be made and no extra payment shall be made.

4.9 The steel brought to site and steel remaining unused shall not be removed from site without the written permission of the Engineer-in-Charge. For the purpose of payment, the actual weight of reinforcement steel shall be worked out as below:

4.10 To arrive at unit weight for the purpose of payment three random samples each of 1 meter length shall be collected for each diameter of re-bar from every consignment received at site. Actual weight of three specimens for each diameter shall be taken and average weight calculated and recorded. The average weight so arrived at shall be compared with theoretical weight of that particular diameter of rebar. Actual or theoretical weight whichever is less shall be considered for making payment for that consignment. However final payment shall be made on the basis of weighted average of all the consignment. The decision of the Engineer-in-charge as regards the

random samples and average weight shall be final and binding on the contractor and no claim of any kind shall be entertained in this regard.

4.11 The contractor shall submit original vouchers from the manufacturer for the total quantity of steel supplied under each consignment to be used in the work. All consignment received at the work site shall be inspected by the Site staff along with the relevant documents before acceptance. The contractor shall obtain Original Vouchers and copy of Test Certificates and furnish the same to the Engineer-in-Charge in respect of all the lots of steel brought by him from approved supplier to the site of work. The original vouchers and copy of test certificates shall not be defaced by the Site staff and kept on record in the site office. The reinforcing steel brought to site of work shall be stored on brick / timber platform of 30 / 40-cm height. Nothing extra shall be paid on this account.

**Annexure-I (c)**

**Testing requirement for Individual reinforcement bar diameter of Particular Grade of Steel**

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

A **BAR SET-1**

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

1.1 Chemical Properties

a) Carbon (C)

b) Sulphur (S)

c) Phosphorous (P)

d) Nitrogen and Carbon Equivalent

1.2 Physical Properties

(i) 0.2 percent proof stress / yield stress, minimum, N/mm2

(ii) Ratio of Tensile Strength (Ts) to Actual Yield Strength (or 0.2% of yield stress (Ys)) of the test piece N/mm2

(iii) Elongation, percent, Minimum, on gauge length 5.65VA, where A is the cross- sectional area of the test piece

(iv) Total elongation at maximum force, percentage, minimum on gauge length 5.65VA, where A is the cross-sectional area of the test piece

(v) Bend test and re-bend test

(vi) The mean area of ribs (in mm2) per unit length (in mm) above the core of the bar, projected on a plane normal to the axis of the bar

(vii) Pull-out testing in accordance with IS 2770 (Part 1)

2 **Additional requirement**

2.1 Permissible limit for Manganese and Copper as follows (**Table 1**):

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

**Notes:**

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

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

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

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

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

**Annexure-I (d)**

## 1 CRITERIA FOR CLASSIFICATION OF BARS

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

### 1.1 Process of Classification

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

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

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

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

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

### 1.2 Classification of Steel Bars

The bar shall be classified as:

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

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

## 2 ADDITIONAL REQUIREMENTS

Four additional requirements as specified hereunder:

### 2.1 Chemical Composition Requirement

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

### 2.2 TM Ring Requirement

The following two requirements shall be met with

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

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

### (a) Test Procedure

The following is the procedure:

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

(ii) Steel bars may be cut using handsaw or an abrasive cutter with continuous supply of coolant to limit the temperature of steel, and thereby avoid any transition or changes in Tempered Martensite (TM) and Ferrite-Pearlite (FP) phases **(Figure 2).** The sharp edges of cut bars should

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

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

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

(b) **Measurements**

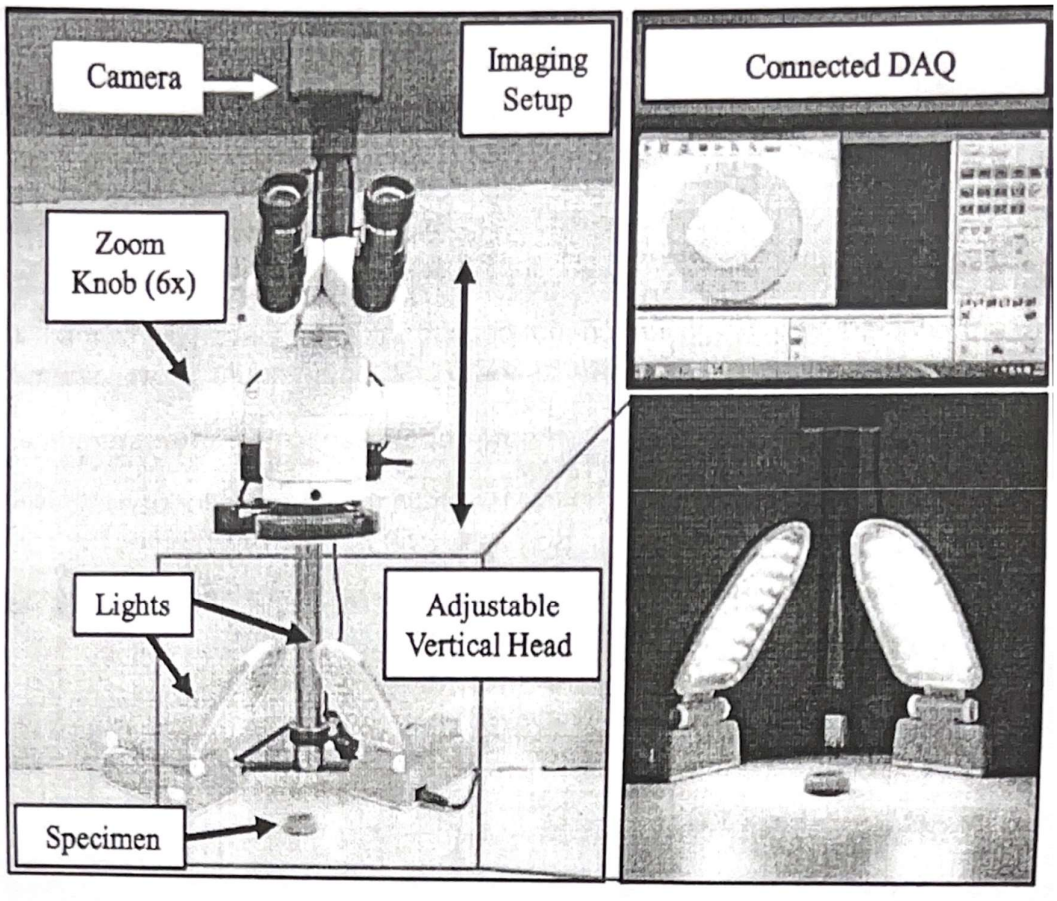
The procedure for obtaining the CSPD of the TM Ring along the perimeter shall be as per Table 2.

2.3 **Marking Requirement**

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

2.4 **Manufacturing Process Requirement**

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



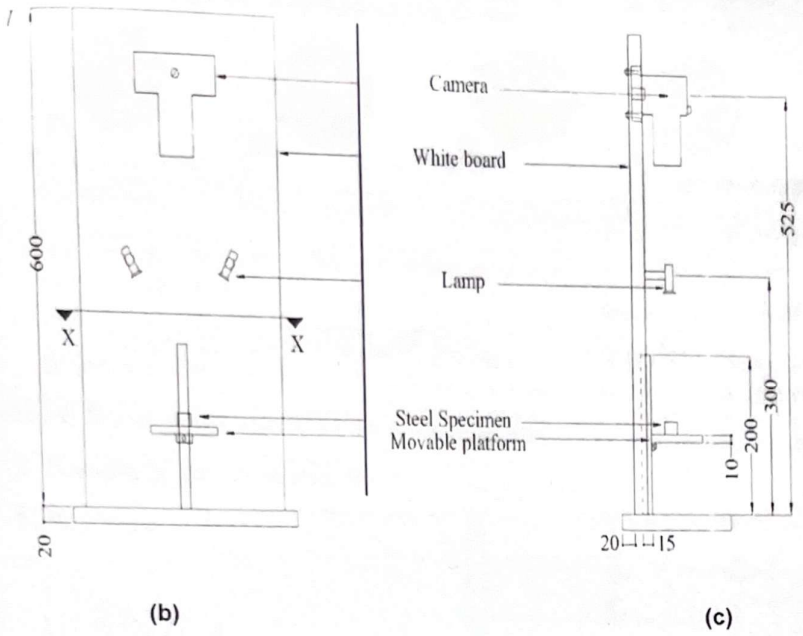



**Figure 1**: Test setup for CSPD of the TMT bars: (a) Imaging Setup, (b) Schematic Front View (c) Schematic Side View

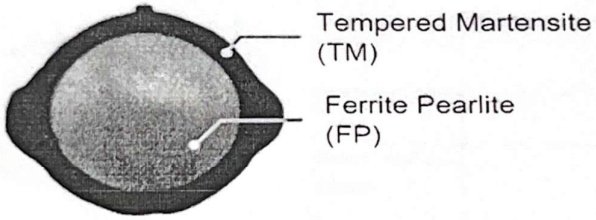
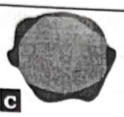
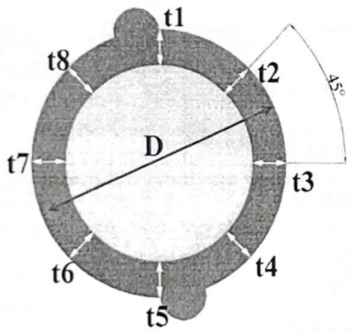



**Figure 2**: Cross-section of the steel bar showing the TM and FP areas

**Table 2:** Method of obtaining CSPD of TM Ring

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

## SECTION 5

**5.0 ADDITIONAL CONDITIONS AND PARTICULAR SPECIFICATION FOR R.C.C. WORK (DESIGN MIX CONCRETE)**

Before start of RCC work concrete Mix Design shall be got done by the contractor from a NABL accredited laboratory / IIT / NIT laboratory with the approval of Engineer-in-Charge. The RCC Work shall be carried out as per the Mix Design approved by the Engineer-in-charge. The source of materials cannot be changed once the mix design is approved by the Engineer in Charge.

The contractor is encouraged to get multiple mix designs approved to ensure that the delay or problem with any source does not affect the progress of the work.

Contractor shall use water proofing material in the concrete as additive when concreting of water retaining structure or roof is done. The contractor shall ensure a separate mix design is done using the additive of water proofing compound separately for this concrete. The contractor while submitting mix design for approval shall also declare source of components.

5.1 **GENERAL**

The RCC work shall be done with RMC or Design Mix Concrete, unless otherwise specified in the nomenclature of items, wherever letter M has been indicated, the same shall imply for the Design Mix Concrete. The Ready-Mix Concrete shall be as per IS: 4926 and as per CPWD Specification and guide lines. For the nominal mix in RCC, CPWD specification shall be followed. The Design Mix Concrete will be designed based on the principles given in IS: 456, 10262 and SP 23. The contractor shall carry out design mixes for each class of concrete indicating that the concrete ingredients and proportions will result in concrete mix meeting requirements specified. The cement shall be actually weighed as presumption of each bag having 50 kg shall not be allowed. In case of use of admixture, the mix shall be designed with these ingredients as well. The specification mentioned herein below shall be followed for Design Mix Concrete.

**INGREDIENTS**

i) Coarse Aggregate: As per CPWD Specifications with upto date correction slips upto last date of submission of tender including extensions, if any.

i) Fine Aggregate: As per CPWD Specifications with upto date correction slips upto last date of submission of tender including extensions, if any

ii) Water: As per requirements laid down in IS 456-2000 and CPWD specifications with upto date correction slips upto last date of submission of tender including extensions, if any

iii) Cement: OPC / PPC arranged by the contractor conforming to relevant IS Code

5.2 Admixture: Type of Admixture shall be got approved from Engineer-in-Charge. Admixtures of approved quality shall be mixed with concrete to achieve the desired workability within specified water cement ratio. The admixture shall conform to IS: 9103. The chloride content in the admixture shall satisfy the requirement of BS: 5075. The total amount of chlorides in the admixture mixed concrete shall also satisfy the requirements of IS: 456.

5.3 The contractor shall not be paid anything extra for admixture required for achieving desired workability without any change in specified water cement ratio for RCC / CC work.

5.4 Whenever concrete is done the sampling for testing will be done from the last pouring point of concrete and not from the plant or the source.

5.5 The shape of inferior cube moulds for sampling is known to give erroneous results. The contractor shall ensure good quality cube moulds of adequate number are available at site and any failure of test sample due to bad sampling or mould will be considered as failed concrete as the latter is contractor's responsibility.

5.6 The directions shall be given to the mix designing lab to ensure least permeability in concrete and the criteria of selecting the mix design to be used in work from the trial mix shall be governed both by permeability as well as strength. The mix designing lab shall also report the permeability of concrete in various trial mixes along with their respective strengths.

5.7 For such approval various ingredients for mix design as submitted by contractor shall be sent to the lab / test houses through the Engineer-In-Charge of the project and got it tested in approved laboratories as may be decided by the Engineer-in-charge. Sample of aggregate sent shall be preserved at site by the department. For each different set of Coarse aggregates & Fine aggregates, fresh design shall be done and got approved by Department. The admixture if used by contractor shall be at his own cost without any extra payment.

5.8 When OPC is used it shall be in combination with GGBS as follows: Part of OPC 43 grade cement (conforming to IS8112) can be substituted with Ground Granulated Blast furnace slag (GGBS) to nearly 30%. The physical and chemical properties of GGBS shall conform to IS: 12089. Uniform blending with OPC 43 grade cement to be ensured in accordance with clauses 5.2 and 5.2.1 of IS: 456-2000.

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

5.10 **APPROVAL OF DESIGN MIX**

(i) The mix design for a specified grade of concrete shall be done for a target mean compressive strength fck = fck + 1.65s
where fck = Characteristic Compressive Strength at 28 days and
s = Standard deviation which depends on degree of quality control

(ii) The degree of quality control for this work is "good" for which the standard deviation (s) obtained for different grades of concrete shall be as per IS relevant IS Standards / Codes.

(iii) 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.

5.11 **CHARGES FOR DESIGN MIX**

All cost of mix designing and testing connected therewith including charges payable to the laboratory shall be borne by the contractor.

5.12 **DESIGN MIX CONCRETE FROM FULLY AUTOMATIC COMPUTERISED CONCRETE BATCHING AND MIXING PLANT**

(i) **Proportioning Concrete**

In proportioning cement concrete, the quantity of both cement and aggregates shall be determined by weight. The cement shall be weighed separately from the aggregates. Water shall either be measured by volume in calibrated tanks or weighed. All measuring equipment shall be maintained in a clean and serviceable condition. The amount of mixing

water shall be adjusted to compensate for moisture content in both coarse and fine aggregates. The moisture content of aggregates shall be determined in accordance with IS: 2386 (Part III). Suitable adjustments shall also be made in weights of aggregates to allow for variation in weight of aggregates due to variation in moisture content.

(ii) **Production of Concrete**

The concrete shall be RMC produced in a central batching and mixing plant with, computerized printing for contents and admixture dosage. The batching plant shall be fully automatic. Automatic batcher shall be charged by devices which, when actuated by a Single starter switch will automatically start the weighing operation of each material and stop automatically, when the designated weight of each material has been reached. The batching plant shall have automatic arrangement for dispensing the admixture and shall also be capable of discharging water in more than one stage. A print out from the batching plant for every lot shall be submitted. A batching plant essentially shall consist of the following components: Separate storage bins for different sizes of aggregates, silo for cement; and water storage tank.

(a) Batching equipment

(b) Mixers

(c) Control panels

(d) Mechanical material feeding and elevating arrangements

(e) The Contractor shall arrange for inspection of automatic batching plant within seven days of issue of letter of award to facilitate inspection and approval of same by Engineer-In-Charge. Nothing extra will be paid for this.

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

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

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

5.13 **Mixing Concrete**

The mixer in the batching plant shall be so arranged that mixing action in the mixers can be observed from the operator's station. The mixer shall be equipped with a mechanically or electrically operated timing, signalling and metering device which will indicate and assure

completion of the required mixing period. The mixer shall have all other components as specified in IS: 4925.

5.14 **Transportation, Placing and Compaction of Concrete**

(i) Mixed concrete from the batching plant shall be transported to the point of placement by transit mixers or through concrete pumps or steel closed bottom buckets capable of carrying 6 cum concrete. In case the concrete is proposed to be transported by transit mixer, the mixer speed shall not be less than 4 rev/ min. of the drum nor greater than a speed resulting in a peripheral velocity of the drum as 70 m / minute at its largest diameter. The agitating speed of the agitator shall be not less than 2 rev / min. nor more than 6 rev / min. of the drum. The number of revolutions of mixing drum / blades at mixing speed shall be between 70-100 revolutions for a uniform mix, after all ingredients have been charged into drum. Unless tempering water is added, all rotation after 100 revolutions shall be at agitating speed of 2 to 6 rev / min and number of such rotations shall not exceed 250. The general construction of transit mixer & other requirements shall conform to IS5892

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

(iii) Materials for pumped concrete shall be batched consistently and uniformly. Maximum size of aggregate shall not exceed one-third of the internal diameter of the pipe. Grading of aggregate shall be continuous and shall have sufficient ultra fine materials (materials finer than 0.25mm). Proportion of fine aggregates passing through 0.25 mm shall be between15 & 30% and that passing through 0.125 mm sieve shall not be less than 5% of the total volume of aggregate. When pumping long distances and through hot weather, set- retarding admixtures may be used. Admixtures to improve workability can be added. Suitability of concrete through pumping shall be verified by trial mixes and by performing pumping tests.

5.15 **PREPARATION OF MIXES AS PER APPROVED DESIGN MIX AND CONDUCTING CONFIRMATORY TEST AT FIELD LAB**

The contractor shall make the cubes of trial mixes as per approved Mix design at site laboratory for all grades, in presence of Engineer in charge using sample of approved materials proposed to be used in the work prior to commencement of concreting and get them tested in his presence to his entire satisfaction for 7 days and 28 days. Test cubes shall be taken from trial mixes as follows: For each mix, a set of six cubes shall be made from each of the three consecutive batches. Three cubes from each set of six shall be tested at age of 7 days and remaining three cubes at age of 28 days. The cubes shall be made, cured, transported and tested strictly in accordance with specifications. The average strength of nine cubes at age of 28 days shall exceed the specified target mean strength for which design mix has been approved. The evaluation of test results will be done as per IS: 456.

5.16 **WORK STRENGTH TEST**

(i) **TEST SPECIMEN**

Work strength test shall be conducted in accordance with IS: 516 on random sampling. Each test shall be co0nducted on six specimens, three of which shall be tested at 7 days and remaining three at 28 days. Additional samples shall be prepared, if required, as per direction of Engineer in charge for testing samples cured by accelerated method as described in IS 9103.

(ii) **TEST RESULTS OF SAMPLE**

The test results of the sample shall be the average of the strength of three specimens. The individual variation shall not be more than ±15 percent of the average. If more, the test results of the sample are invalid. 90% of the total tests shall be done at the laboratory established at site by the contractor and remaining 10% in the laboratory of Government Engineering colleges, or in any other approved laboratory as directed by the Engineer-in-charge.

5.17 **STANDARD FOR ACCEPTANCE**

Acceptance criteria of concrete shall be as per CPWD specifications and IS Code. Standard deviations values given for guidance therein will be used in such calculations.

5.18 **NON-DESTRUCTIVE TESTING (NDT) OF CONCRETE**

(i) NDT will be carried out at site for the concrete as may be needed at the frequency the same is thought to be reasonable by the Engineer in Charge. Ultrasound pulse velocity, Rebound Hammer, core extraction and testing, etc will be the usual methods. The calibrated equipment's for this should be always available in the field lab.

(iii) Pulse velocity method of test of concrete is to be conducted for CPWD works as a routine test. The acceptance criteria which will be applicable are as per IS 13311. “Good” and “Excellent” grading are acceptable and below these grading the concrete will not be acceptable. Acceptance criteria of other NDT will be as per the relevant IS code.

(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, locations, where continuous seepage is observed, construction joints and visibly 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 have to be made at the cost of the contractor. Honeycombed areas and loose pockets will be repaired by grouting using expansive concrete grout having minimum strength of M 60 by pressure injection method after chipping loose concrete in appropriate manner. 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 at the cost of contractor.

(vi) After conducting the non-destructive testing, the area if required the area shall be repaired/ refilled with the Non shrinkage Grout of M60 grade.

5.19 **MEASUREMENT:** As per CPWD specifications

5.20 **COVER / SPACER BLOCK**

The contractor shall provide approved type of support for maintaining the bars in position and ensuring required spacing and correct cover of concrete to reinforcement as called for in the drawings, spacer blocks of required shape and size. Chairs and spacer bars shall be used in order to ensure accurate positioning of reinforcement. Spacer blocks shall be cast well in advance with approved proprietary pre-packed free flowing mortars (Conbextra as manufactured by M/s Fosroc Chemicals India Ltd. or equivalent as approved by the Engineer-in-charge at his discretion) of high early strength and same colour as surrounding concrete, pre-cast cement mortar / concrete blocks / blocks of polymer shall not be used as spacer blocks unless specially approved by the Engineer-in-charge.

## SECTION 6

### 6.0 PARTICULAR SPECIFICATION AND ADDITIONAL CONDITIONS FOR WATER PROOFING WORK

6.1 The work shall be got executed as per CPWD Specifications and as per the manufacturer's specification through specialized agency as approved by the Engineer-in-charge.

The contractor shall furnish the following particulars

(a) The name of the specialized firm

(b) The trade names of the product, which would be used

(c) List of similar works where the treatment has been used

(d) Quantity of chlorides and sulphides used in the product

6.2 The specialised firm engaged by the contractor should have successfully completed Water Proofing Treatment Works as mentioned below during the last 7 (seven) years ending last day of month previous to the one in which tenders are invited:

Three similar completed works each costing not less than ₹ 3.10 Lakhs

Or

Two similar completed works each costing not less than ₹ 4.65 Lakhs

Or

One similar completed work costing not less than ₹ 6.20 Lakhs

Similar Work means "Water Proofing Treatment Works in India".

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

6.4 **GUARANTEE FOR WATER PROOFING TREATMENT**

The contractor shall be fully responsible for and shall guarantee proper performance of the entire waterproofing system for a period of 10 (Ten) years to be reckoned from the date after the maintenance period prescribed in the contract, which shall be furnished in a non-judicial stamp paper of value not less than ₹ 100/- in approved proforma before final payment and shall not in any way limit any other rights of the Employer may have under the contract. Guarantee for water proofing shall comprise of all the items described above in particular specification.

All water-proofing work shall be carried out through approved specialist agency as per method of working approved by the Engineer-in-charge. However, the contractor shall be solely responsible for waterproofing treatment until the expiry of the above guarantee period.

Ten years guarantee in prescribed proforma attached shall be given by the contractor for the water proofing treatment. Towards that 10% (ten percent) of the cost of these items worked out on market rates of water proofing under this sub head shall be retained as guarantee to watch the performance of the work executed. However, half of this amount (withheld) would be released after five years from the date of completion of the work, if the performance of the waterproofing works is satisfactory. The remaining withheld amount shall be released after completion of Ten years from the date of completion of work, if the performance of the waterproofing work is satisfactory. If any defect is noticed during the guarantee period, it should be rectified by the contractor within seven days of issuing of notice by the Engineer-in-Charge and, if not attended to, the same shall be got done through other agency at the risk and cost of the contractor and recovery shall be affected from the amount retained towards guarantee. In

any case, the contractor and the specialist agency, during the guarantee period, shall inspect and examine the treatment once in every year and make good any defect observed and confirm the same in writing. The security deposit can be released in full, if bank guarantee of equivalent amount, valid for the duration of guarantee period, is produced and deposited with the Department.

## SECTION 7

### 7.1 CONDITIONS FOR WATER

The contractor shall make his own arrangement for providing water for construction and drinking purpose. Water charges shall not be recovered on account of it. Contractor shall get the water tested from any laboratory approved by the Engineer-in-charge at regular interval as per the CPWD Specifications. All expenses towards collection of samples, packing, transportation, testing charges, etc. shall be borne by the contractor. The contractor shall arrange for silver nitrate solution at site for testing for chlorides which should be readily available at all times. The contractor shall ensure the water used should not have chloride detectable by the random field test. If required the contractor shall arrange water purifying unit to ensure water quality.

### 7.2 FORM WORK

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

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

7.2.3 Double steel scaffolding having two sets of vertical supports shall be provided for external wall finish, cladding, etc. The supports shall be sound and strong, tied together with horizontal pieces over which scaffolding platform shall be fixed. Scaffolding shall have steel staircase for inspection of works at upper levels.

7.2.4 Nothing extra shall be paid for the centring and shuttering, circular in shape for the form work of any mean radius on the plan /elevation.

7.2.5 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 RCC shall be accordingly adjusted at the time of its centering, shuttering and casting for which nothing extra shall be paid to the Contractor.

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

Steel shuttering as approved by the Engineer-in-charge only shall be used by the contractor. Minimum size of shuttering plates shall be 600 mm x 900 mm 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.

7.2.7 For the execution of centring and shuttering, the contractor shall use ‘Reebol E” chemical mould release agent of FOSROC or equivalent as shuttering oil as approved by Engineer-in-charge and nothing extra shall be paid on this account.

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

7.3 **STAINLESS STEEL CRAMPS & SILICON COATING**

7.3.1 The size & shape of the cramps shall be as per drawing and as per directions of Engineer-in-charge. The samples of steel cramps should be got approved in advance before starting the stone cladding work.

7.3.2 The sample of silicone water base repellent should be got approved from Engineer-in-charge before starting the execution. The silicone-based water repellents to be used for application shall confirm to the Manufacture's Specification as approved by Engineer-in-charge. Silicone coating shall preferably be applied in two coats working from top to bottom area by low pressure spray equipment (3-10 kg / sqm). An interval of 2 to 3 hours between the coats shall be given. In case of coatings to be applied by brush, a wide fine hair brush shall be used. The percentage rate of the item shall include cost of material, labour and all operations as above.

7.4 **REINFORCEMENT:**

7.4.1 Bar Bending Schedule: The agency shall prepare bar bending schedule drawings as per approved structural drawings and submit to Engineer-in-charge in advance for approval. The bar bending schedule shall conform to Indian Standard IS 2502-Code of Practice for Bending and Fixing of bars for Concrete Reinforcement. Before execution of work, five copies of these drawings each including for revision will be submitted to Engineer-in-charge for approval. Keeping in view the quantum of the work, the BBS shall preferably be prepared with software and one person acquainted with preparing BBS with software shall be deputed at site to speed up the work. One software shall also be installed in a computer to be kept at the disposal of CPWD.

7.5 **Expansion Joint**

**General**

Seismic / separation joints shall be provided where shown on the drawings. They shall be constructed within gap between the adjoining parts for the works of the width specified in the drawings.

The contractor shall ensure that no debris is allowed to enter and be lodged in seismic and separation joints.

Seismic or separation joints shall be provided with approved 100 mm thickness of compressible filler board, backer rod and polysulphide sealant compound, etc.

Board to be used in expansion joint shall be of best approved quality and shall be got approved before use. It shall have minimum density of 95 kg/cum, non-staining with less than 1% water absorption and compression recovery of 93% minimum as per the specifications.

**Method of Application**

100 mm thick expansion board having sufficient width as directed by Engineer-in-charge shall be provided in expansion joint before filling and finishing the expansion joint with sealant.

The expansion joint shall be cleaned and made dry completely. All loose materials shall also be removed. The joints gap shall be made uniform in width and depth after cleaning the joints. The backup materials of best quality shall be provided in position in order to produce the size of joint

i.e. width and depth. The primer part of I and II shall be mixed thoroughly together in required proportion as prescribed by manufacture specification, so that a uniform mixture obtained. The mixed solution shall be applied to two sides of the joint that it covers the sides complete.

Disturbed edges of RCC members near expansion joints shall be finished with rich mortar without any extra work includes providing required width of expansion board in the joints and measurement of expansion board only shall be taken.

Sampling criteria

Following test carried out at every 100 sqm:

(i) Density

(ii) Water absorption

(iii) Compression recovery

7.6 **STAINLESS STEEL WORK**

Stainless steel generally shall be Grade 1.4301 (SS 304) or 1.4401 (SS 316). Lower grades shall not be used. Surface finish of all the stainless-steel materials will be in 240 grit satin finish / matt finish. All stainless-steel material will have to be coated by a solution of Inox to avoid finger in prints and avoidance of settlement of environment / atmospheric dust. Before taking up any procurement / construction activity, shop drawings shall be prepared and submitted for obtaining approval from Engineer-in-Charge.

Stainless steel railing shall be provided with SS 304 grade stainless steel of 50 mm dia. of 18-gauge handrail with adequate rods parallel to handrail, balusters, flanges, end caps, newel posts with caps, etc. complete as per approved drawings and direction of Engineer–in–charge.

Stainless steel railing, both sides in staircase and external ramp with double handrail shall be used for barrier free accessibility requirements with adequate SS balusters, runners, etc. as per approved architectural drawing. Fixing shall be done by stainless steel expansion bolts of approved size and make as per Engineer-in-Charge and welding to be done by using organ welding rods and the surface being duly finished and cleaned by K2 passivation, which is nitric acid plus fluoric acid solution treatment by which the chances of corrosion will be eliminated and any burn out makes on the metal will also be eliminated.

7.6.1 **STRUCTURAL STEEL WORK**

1. Scope of work for the contractor in respect of structural steel work shall cover, but shall not be limited to the following:

(i) Structural steel work shall cover all composite structural works consisting of structural steel and RCC in combination. It shall also cover steel trusses and miscellaneous structural steel frameworks.

(ii) Preparation and submission of complete detailed shop fabrication drawings based on the architectural and structural design and drawings including revisions in them as per directions of Engineer-in-charge.

(iii) Submission of revised structural design, with calculations and detailed fabrication drawings, in case any substitution is required in the designed sections with prior approval of Engineer-in-charge.

(iv) Submission of detailed erection plan/methodology for all structural members of structural steel structure, compatible with the details of fabrication. Also, complete drawings & phase wise

instructions for all the activities required to erect steel structure in final position, shall be submitted.

(v) Submission of shuttering, staging and scaffolding details for casting of deck slab over the erected “Steel Plate Girders”.

(vi) Submission of details of specialized agency for steel fabrication in workshop and erection at site of structural steel work, which the contractor proposed to associate for structural steel work. The agency for fabrication of steel members in workshop and agency for erection of these steel members at site should preferably be same. The specialized agency should satisfy the experience requirements as stipulated in bid document elsewhere. Details should include experience of specialized agency in similar structural steel works, financial capabilities, location of workshop, fabrication facilities available in fabrication workshop, etc.

(vii) Procurement and testing of all raw structural steel materials in lots for fabrication taking into account wastage, margin, etc. including storage and upkeep of the materials.

(viii) Providing all materials, labour, tools & plant and equipment and all types of consumables required for fabrication using Gas Metal Arc welding (MIG welding) or Submerged arc welding including all necessary bolts, nuts, washers with wastage margin.

(ix) Fabrication of the steel works in accordance with the approved fabrication drawings, including all shop assembling, matching and marking. Design, manufacture / fabrication and provision of all jigs, fixings, manipulators, etc. required for the fabrication.

(x) Suitably marking, bundling and packing for transport of all fabricated materials.

(xi) Preparing and furnishing detailed bill of materials, drawing office dispatch lists &bolts.

(xii) Lists and any other lists of bought out items required in connection with the fabrication of the structural steelwork.

(xiii) Loading and transporting all fabricated steelwork and field connection materials including site unloading and erection of structure in final position with all bolts, nuts, insert plate, etc.

(xiv) The contractor shall provide general assistance during complete erection for solving any problem related to fabrication or site assembling of the structural steelwork. The contractor shall ensure the presence of the qualified and experienced Erection Engineer during complete erection work at site.

(xv) All major/ minor modifications of the fabricated steel structures, as directed by the Engineer-in-charge, including but not limited to the following:

a) Removal of bends, kinks, twists, etc. for parts damaged during transportation and handling.

b) Cutting, chipping, filling, grinding, etc. if required for preparation and finishing of site connections.

c) Reaming of holes for use of higher size bolt if required.

d) Re-fabrication of parts damaged beyond repair during transport and handling or re-fabrication of parts which are incorrectly fabricated.

e) Fabrication of parts omitted during fabrications by error, or subsequently found necessary.

f) Drilling of hole, with prior approval of Engineer-in-charge, which are either not drilled at all or are drilled in incorrect location during fabrication. Drilling of holes for connections of all structural members shall otherwise be done in fabrication workshop only.

(xvi) Carry out tests in accordance with the related Specification which will be inspected by Engineer-in-charge

(xvii) Details of erection equipment machinery including capacity & specifications, tools, tackle, etc. to be used for erection purpose.

(xviii) Necessary formwork & staging required for erection of structural members including design of formwork for all the anticipated loads.

(xix) All procedures and tests on welds as per specifications and welded parts to ensure the strength requirements of joints.

2 **Submittals:** On commencement of the work pertaining to steel structure, the Contractor shall submit the following in two sets:

a. Detailed baseline program, material procurement schedule, shop/working drawings, submission of samples, process / methodology of fabrication & delivery to site storage yard and erection at site for the approval of the Engineer-in-charge.

b. Complete fabrication drawings, schedule of quantity, cutting lists, bolt lists, welding schedules.

c. Results of any tests, as and when conducted and as required by the Engineer-in-charge.

d. Manufacturer's mill test reports / certificates in respect of steel materials, bolts, nuts and electrodes, etc. as may be applicable.

e. A detailed list of all Plant & Equipment such as cranes, derricks, winches, welding sets, all consumables, grinding and hole drilling machine, etc. their make, model, present condition and location, availability to the contractor and the ones he will employ on the job to maintain the progress of work in accordance with the contract.

f. The total number of experienced personnel of each category like fitters, welders, riggers, etc. which he intends to deploy on the project.

7.7 **STRUCTURAL STEEL WORK - QUALITY CONTROL & TESTING REQUIREMENTS**

a. The scope of work of these specifications is to establish the norms for ensuring the required Quality Control through established testing norms of the welded structural steelwork by Engineer-in-charge.

b. The contractor shall himself inspect all materials and shop work to satisfy the specified tolerance limits and Quality norms before the same are inspected by Engineer-in-charge or his authorized representative.

c. All materials, equipment and work of erection shall be subject to the inspection of the Engineer in charge who shall be provided with all facilities including labour and tools required at all reasonable times. Any work found defective is liable to be rejected.

d. No protective treatment shall be applied to the work until the appropriate inspection and testing has been carried out. The stage inspection shall be carried out for all operations so as to ensure the correctness of fabrication and good quality. Plate Girder dimensions and camber, if any, shall not be finally checked until all welding and heating operations are completed and the member has cooled to a uniform temperature.

e. Testing of material: All the materials shall be tested for mechanical and chemical properties as per various IS codes as may be applicable and shall conform to requirements specified. The cost of these tests shall be borne by the contractor.

f. Rivets, bolts, nuts, washers, welding consumables, steel forging, casting and stainless steel shall be tested for mechanical and chemical properties as per the appropriate IS Code.

g. Rolling and cutting tolerance shall be as per relevant CPWD specifications or Indian Standards. The thickness check measurements for the plate and rolled sections shall be taken at not less than 15 mm from edge. For plates thicker than 25mm, check for laminations in plates shall be carried out by ultra-sonic testing or any other specified methods.

h. Steelwork shall be inspected for surface defects and exposed edge laminations during fabrication and blast cleaning. Significant edge laminations found shall be reported to the Engineer in charge for his decision. Chipping, grinding, machining or ultrasonic testing shall be used to determine depth of imperfection.

i. Bolted connections: Bolts and bolted connection joints with high strength bolts shall be inspected and tested according to IS: 4000. The alignment of plates at all bolted splice joints and welded butt joints shall be checked for compliance with codal requirements.

j. Welding and welding consumables: Welding procedure, welded connection and testing shall be in compliance with codal requirements. All facilities necessary for stage inspection during welding and on completion shall be provided to the Engineer in Charge or his authorized representatives. Adequate means of identification either by identification mark or other record shall be provided to enable each weld to be traced to the welder(s) by whom it was carried out.

k. The contractor shall through appropriate planning and continuous measurements in the workshop and the erection at site, ensure that the tolerance specified below are strictly adhered to. Tolerances in dimensions of components of fabricated structural steel work shall be specified on the drawings and shall be subject to the approval of the Engineer before fabrication.

l. Dimensional & Weight Tolerance: The dimensional and weight tolerance for rolled shapes shall be in accordance with IS: 1852, 808 etc. The acceptable limits of straightness for rolled or fabricated members as per IS: 7215.

m. The structural steel shall comply in all respects with the requirements of approved drawings and relevant codes and specifications and shall be procured from approved manufacturers only. It may be noted that quality of raw steel used for fabrication shall be essence of the contract & shall be strictly conforming to specified standard. Steel sections to be supplied by the manufacturers shall be tested as per codal provisions at the manufacturer's premises before dispatch. The contractor on receipt of supply in his fabrication shop shall carry out necessary control tests including ultrasonic testing as per codal requirements and verify them with the list received from manufacturers. The rejected lot shall not be used and rejected lot shall be immediately removed from fabrication shop. Only steel passed in all tests shall be used for fabrication.

n. The contractor shall supply information in the technical package regarding source / manufacturers from where procurement of steel is proposed.

o. Fabricator agency shall have in house facilities for all testing of weld, as detailed in this tender document. A Minimum of 30% of welds will be tested at random if any weld fails 30% of welds random will be re tested after the failed welds are rectified and tested till such time no weld fails the test. Liquid penetration test will be used for 90% of the test and 10% will be tested with ultrasound.

7.8 **ROAD WORK**

Road work will be governed by CPWD specification as well as MORTH Specifications and in case of discrepancy MORTH Specification will supersede.

7.9 **CONSTRUCTION JOINTS**

Construction joints shall be located and treated as per the relevant IS codes and the locations shall be intimated to the Engineer-in-Charge well in advance so that approval for the same can be obtained from the structural designer. The decision regarding the construction joint treatment and location by the structural designer of the project shall be final and binding as shall be communicated by the Engineer-in-Charge.

## SECTION 8

### 8.0 PARTICULAR SPECIFICATIONS – ALUMINIUM WORK

8.1 Before taking up any procurement / construction activity, shop drawings (for fixing of all kind of aluminium Works showing all hardware) shall be prepared and submitted for obtaining approval from Engineer-in-Charge.

8.2 Minimum weight of aluminium section for doors, windows and ventilators shall be as per relevant standards. The section to be used shall be selected by the contractor while preparation of the shop drawing that will have to be submitted for approval of the Engineer in Charge. Only Joinery detail will be provided by the department for this purpose.

8.3 Samples of un-anodized as well as powder coated aluminium sections, microwave cured EPDM gaskets, glass, stainless steel screws, anchor fasteners, hardware and any other material or components requiring approval of samples, in opinion of Engineer-in-Charge, shall be submitted for the approval as mentioned above. The above samples shall be retained as standards of materials and workmanship.

8.4 Aluminium sections to be used for various works shall be appropriate to meet technical, structural, functional and aesthetic considerations. Aluminium work for doors, windows, ventilators, partitions, etc. shall be 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 diameter 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. Powder coated aluminium (minimum thickness of polyester powder coating 50 micron) section shall be used. Hinges/ pivots, provision for fixing of fittings, EPDM rubber / neoprene gasket shall be provided wherever required. The polyester powder coating shall be carried out in a factory / workshop approved by engineer-in-charge.

8.5 All joints shall be accurately fabricated and be hairline in appearance. The finished surface shall be free from visible defects. All the aluminium windows/ventilators/doors shall be factory made and shall be brought to site for assembly and fixing.

8.6 All hardware used shall conform to the relevant specifications mentioned in Schedule of Quantity and as per samples approved by the Engineer-in-Charge. Design, quality, type, number and fixing of hardware shall be generally in accordance with shop drawings and as approved by the Engineer-in-Charge before use.

8.7 All doors, windows, ventilators, glazing, etc. shall be made water tight with microwave cured EPDM gaskets and weather silicone sealants to the satisfaction of the Engineer-in-Charge.

8.8 The frames shall be strictly as per architectural drawings; the corners of the frame being fabricated to the true right angles. Both the fixed frames and openable shutter frames shall be fabricated out of sections cut to required length, mitred and mechanically jointed for satisfactory performance. All members shall be accurately machine milled and fitted to form hairline joints. The jointing accessories such as aluminium cleats, stainless steel screws. etc. shall not cause any bi-metallic

reaction by providing separators, wherever required. Vertical members of the aluminium frame work shall be embedded in the floors, wherever required, by cutting and making good of the floor.

8.9 **FIXING OF ALUMINIUM FRAMEWORK**

i) The screws used for fixing fixed aluminium frames of the aluminium windows to masonry walls / RCC members and aluminium members to other aluminium members shall be of stainless steel of approved make and quality and of stainless-steel grade 304. Threads of machine screws used shall conform to requirement of I.S.4218.

ii) For the aluminium windows, the gap between the aluminium frames and the R.C.C / Masonry and also any gaps in the various sections shall be filled with weather silicone sealant DC 795 of Dow Corning or equivalent in the required bite size, to ensure water tightness including providing and fixing backer rod, wherever required. The weather silicone sealant shall be of such approved colour and composition that it would not stain or streak the masonry / R.C.C. work. It should not sag or flow and shall not set hard or dry out under any conditions of weather and shall be tooled properly. The weather silicone sealant shall be used as per the manufacturer's specifications and shall be of approved colour and shade. Any excess sealant shall be removed /cleared.

iii) Fixing of glass panes shall be designed in such a way that replacing damaged / broken glass panes is easily possible without having to remove or damage any members or interior finishing materials.

8.10 **PROTECTION AND CLEANING**

1) All glass panes shall be retained within aluminium framing by use of exterior grade microwave cured EPDM gaskets. Use of glazing or caulking compounds around the perimeter of glass will not be permitted. There shall be no whistling or rattling. Before installation of glass, Contractor shall ensure the following:

i) All glazing rebates shall be square, true to plumb, true to plane, dry and free from dust.

ii) Glass edge shall be clean and cut to exact size and grounded.

2) Glass of specified thickness in doors, windows, ventilators, fixed glazing, etc. shall be of approved make and standard quality conforming to C.P.W.D. Specifications.

8.11 GUARANTEE FOR ALUMINIUM WORK

a) The contractor shall be fully responsible for and shall guarantee proper design and performance of his installed system for a period of 10 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, thermal stresses, building movements and the like.

In addition, 10-year guarantee (to be furnished in non-judicial stamp paper of value ₹ 100/-) in prescribed Performa shall be given for performance of glazed units, anodizing, 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 correct which the Employer may have under the Contract.

b) In addition, 10% (ten percent) of the cost of all the items under sub-head ALUMINIUM WORK, as mentioned in schedule of quantities, shall be withheld from the bills towards guarantee as specified above. This amount to be withheld towards guarantee shall be in addition to the other amounts to be withheld as mentioned elsewhere in the contract agreement. However, half of this amount (withheld) would be released after five years from the date of completion of the work, if the performance, as required, is satisfactory. The remaining withheld amount shall be released

after 10 years from the date of completion of work, if the performance, as required, is satisfactory. If any defects is noticed during the guarantee period, it shall be rectified by the contractor within seven days of issue of notice to the contractor, temporarily, to the satisfaction of the CPWD / Client or any other authorized representative of client and within a period of one month the permanent rectification of the defects / replacement of defective materials should be carried out by the contractor. If not attended to, the same shall be got done through other agency at the risk and cost of the contractor and the cost, which shall be final and binding on the contractor, shall be recovered from the amount withheld towards the guarantee as mentioned above or any other amount due to the contractor. However, the amount withheld as guarantee can be released in full if irrevocable bank guarantee, from a Schedule / Nationalized Banks, of the same amount, for the guarantee period is submitted by the contractor in favour of Engineer -In-Charge of major discipline**.** The defects, if any, shall be rectified in a workmanlike manner, retaining the same aesthetics and other functional parameters of the original work.

## SECTION 9

**9.0 FIRE CHECK / RATED DOOR**

CPWD Specification 2019 Vol. I & II with revisions/ amendments / correction slips upto last date of bid submission (including extensions, if any), National Building Code (NBC) 2016 and manufacturer's specification will be followed. Fire Check doors shall be provided in buildings wherever necessary and required as per National Building Code 2016 and as per architectural drawing provided with tender document. Unless otherwise specified elsewhere in tender document, all fire doors should be fire rated for 120 minute and doors of fire exit corridor should meet the requirement of fire exit corridor specified in NBC 2016. In general, all the services / electrical rooms/shafts shall be provided with Metal Fire Check / rated doors whereas all the lobbies, entry/exit to corridors shall be provided with the Glazed fire check/rated doors. Rooms opening in fire exit corridors may be provided with wooden fire check/rated doors. In case of any deviation is found between general principle mentioned herein and Fire check doors shown in architectural drawings (or mentioned in door & window schedule), the former i.e. general principle (mentioned herein) will be followed. If any door type or tag is not mentioned in drawings or door & window schedule, decision shall be given by Engineer in charge based on principles mentioned herein. Before taking up any procurement/construction activity, shop drawings (for fixing of all kind of doors, showing all hardware) shall be prepared and submitted for obtaining approval from Engineer-in-Charge.

9.1 The Fire check/rated Door should not collapse during the rated period of the fire under specified fire conditions. The fire door should not allow the passage of hot gases or the flames through the rebate or the gap between the door frame and shutter. The integrity or smoke sealing function is achieved in Fire Door by incorporating an "Intumescent Seal". This Intumescent Seal in the form of a strip, which under fire conditions expands many times its original size and forms a hard char which has high insulation properties and does not permit the smoke or flames to escape through the gap between the shutter and frame.

9.2 Observation, if any, made by the fire officer on the fire check / rated doors, shall be incorporated suitably. Nothing extra shall be paid on this account.

9.3 Execution of Fire Check Doors shall be carried out through the Specialized Agencies having sufficient work experience in the same field and shall be got approved from the Engineer-in-Charge well in advance. Specialized firm shall furnish all materials, labour, accessories, equipment, tool and plant and incidentals required for providing and installing the fire check/rated doors. Contractor has to select one specialized agency from list of preferred makes/brands and specialized agencies.

9.4 Fire resistance and smoke check doors shall be made of proper sizes and section as per the available opening at the site. The details shown on the drawings indicate generally the sizes of components parts and general standards. These may be varied slightly to suit the standard adopted by the manufactures. Before proceeding with manufacturing, the contractor shall prepare and submit complete manufacture and installation drawing for approval of the Engineer-in-Charge and no work shall be performed until the approval of these drawings is obtained.

9.5 The term "Fire Rating" referred in tender documents means fire rating of complete assembly of fire check door e.g. frames, shutter, vision panel, glass, hinges and other hardwares. Doors will

be approved only after door passes the required tests from fire testing lab approved by the Engineer-in-Charge. Cost of sample door and testing shall be borne by contractor.

9.6 Doors shall be fabricated to size in factory. Fabricated material shall be protected against any damage during transportation. 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 units/members. Arrangements shall be made for expeditious replacement of damage units or members. Materials found acceptable on inspection shall be repacked in crates and stored safely.

9.7 Just prior to installation, the doors shall be uncarted and stacked on edge on level bars and supported evenly. The frame shall be fixed into position true to line and level using adequate number of fasteners of approved size and manufacture and in an approved manner. The holes in concrete/masonry member for housing anchor bolts shall be drilled with an electric drilling machine only.

9.8 Stainless steel ball bearing hinges, panic bars, door trims, fire rated hydraulic door closers, handles, tower bolts, lock and other fittings shall be as per specifications given in tender document and shall be got approved from Engineer-in-Charge. All Hardware's should have a minimum 02 Years of manufacturer warrantee from the date of supply. Hardwares should pass European certificate "CE" of conformity / UL certified with required fire ratings and relevant documents to this effect shall be produced at the time of approval of samples.

9.9 The design of fire check/rated doors and material to be used in their construction has to be such that the doors shall be capable of providing an effective barrier of desired rating.

9.10 **FIRE RATED HARDWARE FOR FIRE CHECK DOORS:** All hardware for fire check/rated doors shall also be fire rated and shall have certification from UL / CE. All fittings and fixtures shall be as mentioned in tender document and got approved from the Engineer-in-Charge before procurement well in advance and the approved samples shall be kept at site till completion of the work.

9.11 **Guarantee Bond**

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 thermal stresses, air tightness, proper closing and opening without any gaps between shutter and frames and the like In addition 5 years guarantee (to be furnished in non-judicial stamp paper of value ₹100/-) in prescribed proforma shall be given for material and hardware. All the Guarantees shall be submitted before final payment and shall not in any way limit any other rights to correct which the Employer may have under the Contract.

In addition, 10% (ten percent) of the cost of all the items of Fire Rated Door, as mentioned in schedule of quantities, shall be withheld from the bills towards guarantee as specified above. This amount to be withheld towards guarantee shall be in addition to the other amounts to be withheld as mentioned elsewhere in the contract agreement. However, this amount (withheld) would be released after five years from the date of completion of the work, if the performance, as required, is satisfactory. If any defect is noticed during the guarantee period, it shall be rectified by the contractor within seven days of issue of notice to the contractor, temporarily, to the satisfaction of the CPWD/ client or any other authorized representative of CPWD/ client and

within a period of one month the permanent rectification of the defects/replacement of defective materials should be carried out by the contractor. If not attended to, the same shall be got done through other agency at the risk and cost of the contractor and the cost, which shall be final and binding on the contractor, shall be recovered from the amount withheld towards the guarantee as mentioned above or any other amount due to the contractor**. However, the amount withheld as guarantee can be released in full against irrevocable bank guarantee, from a Schedule / Nationalized Banks, of the same amount, for the guarantee period is submitted by the contractor in favour of Government.** The defects, if any, shall be rectified in a workmanlike manner, retaining the same aesthetics and other functional parameters of the original work.

**ANNEXURE-A1**

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

The Agreement made this ..... day of ..... two Thousand..... between ..... S/o ..... (hereinafter called the Guarantor of the one part) and the PRESIDENT OF INDIA (hereinafter called Government of the other part)

WHEREAS this agreement is supplementary to a contract (hereinafter called the contract) dated ..... and made between the GUARANTOR of the one part and the Government of the other part, whereby the contractor, inter alia, undertook to render the buildings and structures in the said contract recited completely water and leak-proof.

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

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 years to be reckoned from the date after the maintenance period prescribed in the contract.

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

(a) Misuse of roof shall mean any operation which will damage proofing treatment like chopping of firewood and things of the same nature which might cause damage to the roof;

(b) Alteration shall mean construction of an additional storey or a part of the roof or construction adjoining to existing roof whereby proofing treatment is removed in parts;

(c) The decision of the Engineer-in-Charge with regard to cause of leakage shall be final.

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

That if 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 Charge will be final and binding on the parties.

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

Signed, sealed and delivered by OBLIGOR in the presence of:
1.....
2.....
Signed for and behalf of THE PRESIDENT OF INDIA by ..... in the presence of:
1.....

**ANNEXURE-A2**

**GUARANTEE TO BE EXECUTED BY THE CONTRACTOR FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF SANITARY INSTALLATIONS / WATER SUPPLY / DRAINAGE WORK / ALUMINIUM WORK / STRUCTURAL GLAZING WORKS**

The Agreement made this ..... day of ..... two Thousand..... between ..... S/o ..... (hereinafter called the Guarantor of the one part) and the PRESIDENT OF INDIA (hereinafter called Government of the other part)

WHEREAS this agreement is supplementary to a contract (hereinafter called the contract) dated ..... and made between the GUARANTOR of the one part and the Government of the other part, whereby the contractor, inter alia, undertook to render the work in the said contract structurally stable, leak proof, made of sound material, workmanship, anodizing, colouring, sealing etc.

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, defective anodizing / Powder coat colouring 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, defective galvanizing for five years to be reckoned from the date after the maintenance period prescribed in the contract.

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

That if 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 Charge will be final and binding on the parties.

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

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

1.....

2.....

Signed for and behalf of THE PRESIDENT OF INDIA by ..... in the presence of:

1.....

**ANNEXURE-A3**

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

The Agreement made this ..... day of ..... Two Thousand..... between ..... S/o ..... (hereinafter called the Guarantor of the one part) and the PRESIDENT OF INDIA (hereinafter called Government of the other part)

WHEREAS this agreement is supplementary to a contract (hereinafter called the contract) dated ..... and made between the GUARANTOR of the one part and the Government of the other part, whereby the contractor, inter alia, undertook to render the buildings and structures in the said contract recited completely water and leak-proof.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said structure will remain water & dust replant and fade proof for five years from the date of completion and handing over.

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 years to be reckoned from the date after the maintenance period prescribed in the contract.

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

(a) Misuse of painting shall mean any operation which will damage painting like cleaning with harsh chemicals, Inflicted dust, or man-made moisture percolation.

(b) Alteration shall mean construction of an additional storey or a part of the roof or construction adjoining to existing roof whereby proofing treatment is removed in parts;

(c) The decision of the Engineer-in-Charge with regard to cause of leakage shall be final.

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

That if GUARANTOR fails to execute the painting 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 Charge will be final and binding on the parties.

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

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

1.....

2.....

Signed for and behalf of THE PRESIDENT OF INDIA by ..... in the presence of:

1.....

| | LIST OF APPROVED MAKES (CIVIL) | | |
|---|---|---|---|
| Sl. No. | Material Description | Brand | Make |
| 1 | Chloropyriphos | Piramid | Amvac Agri Rasayan Pvt. Ltd. |
| | | Noban | Chemtts Wets & Flows Pvt Ltd. |
| | | Dursbantct | De-Nocil Ltd. |
| | | Premise Agenda | Bayer Ltd. |
| | | Hilban | Hindustan Insecticides Ltd. |
| | | Sarups Pest Control | Sarups Pest Control Ltd. |
| 2 | Ordinary Portland Cement (43 Grade) / Portland Pozzolana Cement | ACC | ACC Cements Ltd. |
| | | Ultra Tech | Ultra Tech Cement Ltd. |
| | | Birla | Birla Corporation Ltd. |
| | | Dalmia | Dalmia Cement Bharat Ltd. |
| | | Zuari | Zuari Cement Ltd. |
| | | Jaypaee Cement | Jaypee Cement Ltd. |
| | | J.K. Cement | J.K. Cement Pvt. Ltd |
| | | Ambuja Cement | Ambuja Cements Ltd |
| | | Century Cement | Birla Gold Cement |
| | | Shree Cement | Shree Cement |
| 3 | Damp Proof Material | MAPEI | MAPEI Construction Products India P Ltd. |
| | | Ferrous Crete | Ferrous Crete (India) Pvt. Ltd. |
| | | Impermo | Snowcem Paints |
| | | Duraseal | Apurva India Pvt. Ltd. |
| | | Acco Proof | Acc Cements Ltd. |
| | | Dr. Fixit | Pidilite Industries |
| | | Fosroc | Fosroc Chemicals India Pvt. Ltd. |
| | | Cico | Cico Industries |
| | | Sika | Sika India Pvt Ltd. |
| | | Pidilite | Pidilite Industries Ltd. |
| | | Basf | Basf India Ltd. |
| | | Myk | Myk Laticrete India Pvt Ltd. |
| 4 | CRS TMT Bars Fe-500 D or more | SAIL | Steel Authority Of India Ltd. |
| | | TISCO | Tata Steel Ltd. |
| | | VIZAG | Rastriya Ispat Nigam Ltd. |
| | | JSW | Jsw Steel Ltd. |
| | | JINDAL | Jindal Steel & Power Limited |
| 5 | Plasticiser & Super Plasticiser | Contrament, Power Flow | Mc Bauchemie (India) Pvt Ltd. |
| | | Myk Schomburg | MykArments Range of Products |
| | | Plastiment, Sikament | Sika India Pvt Ltd. |
| | | Conplast Sp430 | Fosroc India |
| | | Chryso - Hp / Delta / Optima | Chryso India Pvt Ltd |
| | | Basf | Basf India Ltd. |
| | | Cico | Cico Industries |
| 6 | Expansion Joint Bitumen Board | Dura Board Hd 100 | Supreme Industries |
| | | STP | Shalimar Tar Products |
| | | Durafill | Supreme Industries |
| 7 | Post Tensioning System | Crux | Crux Processing Systems Pvt Ltd |
| | | Vsl | Vsl India Pvt Ltd. |
| | | Ultracon | Ultracon Structural Systems Pvt Ltd. |

| | | | |
|---|---|---|---|
| | | Bbr | Bbr (India) Pvt Ltd. |
| 8 | PT Strands | Dp Wires | Dp Wires Ltd. |
| | | Tata Wiron | Tata Steel Ltd. |
| | | Usha Martin | Usha Martin Ltd |
| 9 | Adhesive | Dunlop | India Tyres & Rubber Co (India) Ltd. |
| | | Vamorganic | Vamorganic Ltd. |
| | | Sika | Sika India Pvt Ltd. |
| | | Fevicol | Pidilite Industries |
| | | Cico | Cico Industries |
| | | Proofex Of Adhesive | Fosroc India Ltd. |
| | | Kerabond Plus | Mapei Construction Products India P Ltd. |
| 10 | Grout | Ardex | Ardex Endura Adhesive India Pvt Ltd. |
| | | Ferrous Crete | Ferrous Crete (India) Pvt. Ltd |
| | | Lata Poxy | Myk Laticrete India Pvt. Ltd |
| | | Basf | Basf India Ltd. |
| | | Fosroc Gp2 | Fosroc India Ltd. |
| | | Myk Schomburg | Myk Arments Range of Products |
| | | Fugabella, Porcelana | Kerokoll India Pvt Ltd. |
| | | Dr. Fixit | Pidilite Industries |
| | | Kerapoxy | Mapei Construction Products India P Ltd. |
| | | Weber | Saint Gobin India Pvt Ltd. |
| 11 | Ready Mix Concrete | Ultratech | Ultratech Concrete |
| | | ACC | ACC Ltd. |
| | | Lafarge | Lafarge India Pvt. Ltd. |
| 12 | AAC Blocks | Xtralite | Ultra Tech Concrete Ltd. |
| | | Areocon | Hil |
| | | Siporex | Siporex |
| | | Nucon | Green Way Building Materials India Pvt. Ltd |
| | | Renacon | Renaatus Procon Pvt Ltd. |
| 13 | Wooden Flush Door Shutters | Jayna Flush Doors | Jain Wood Industries |
| | | Raavella Door | Raavella Industrials (P) Ltd |
| | | Kailash | Kailash Hitech Timber Industries Pvt. Ltd |
| | | Indian Timber Products | Indian Timber Products |
| | | Shakthi | Shree Shakthi Modern Flush Doors |
| | | Greenlam | Greenlam Ply Industries Ltd. |
| | | Mayur | Mayur Ply Industries |
| | | MP Plywood Products | Mp Wood Products |
| | | Kitply | Kitply Industries Ltd. |
| | | Duro Flush doors | Duro Ply Industries Ltd. |
| | | Kenwood | Kenwood Ply & Board |
| | | Century | Century Flush Doors |
| | | Sylvan Ply | Sylvan Ply Board (India) Limited |
| 14 | Water Proof Ply wood Commercial Ply, Fire | Jayna Ply | Jain Wood Industries |
| | | Greenply | Greenply Industries Ltd. |

| | | | |
|---|---|---|---|
| | Retardant Ply and Block board | Kitply | Kitply Industries Ltd. |
| | | Duroply | Duro Ply Industries Ltd. |
| | | Archidply | Archid Ply Industries Ltd. |
| | | Century Ply | Century Flush Doors |
| | | Wuudply | M/s Prime Veneers Ltd. |
| | | Sylvan Ply | Sylvan Ply Board (India) Limited |
| 15 | Laminate | Green Lam | Green Lam Industries Ltd |
| | | Century | Century Laminates |
| | | Merino | Merino Laminates |
| | | Archidply | Archid Ply Industries Ltd. |
| | | Royal Touche | Royal Touche Laminates |
| | | Kitmica | Kitply Industries Ltd. |
| | | Sunmica | Sunmica Industries |
| | | Formica | Formica Laminates (India) Pvt Ltd. |
| 16 | Prelaminated Particle board Exterior Grade | Merino | Marino Laminates |
| | | Kitlam | Kit Ply Industries Ltd. |
| | | Tesa Action Co. | Tesa Action Co. |
| | | Ecoboard | Ecoboard Industries Ltd |
| | | Associate | Associate Décor Limited |
| | | Archid Ply | Archid Ply Industries Ltd. |
| | | Century | Century MDF |
| | | Green Lam | Greenlam Industries Ltd |
| 17 | High Density (HDF) Prelaminated Board | Pergo | Red Floor India |
| | | Green Ply | Green Ply Industries Ltd. |
| 18 | Gypsum Board | Gyproc Saint Gobain | Saint Gobain Gyprock India Ltd. |
| | | Lafarge | Lafarge India Pvt. Ltd |
| | | USG Boral Board | USG Board India Pvt. Ltd |
| | | Armstrong | Armstrong World Industries |
| 19 | Glass Door Hardware | Dorma | Dormakaba India Pvt Ltd. |
| | | Kich | Kich Architectural Products Ltd. |
| | | Classic | Classic Hardware |
| | | Squash | Squash Glass Doors |
| | | Hafele | Hafele India Pvt Ltd. |
| | | Ozone | Ozone Hardware |
| | | Geze | Geze Gmbh |
| | | Dorset | Dorset Industries Pvt Ltd |
| 20 | Hydraulic door closers / Floor springs | Godrej | Godrej Locking Solution & Systems |
| | | Hardwyn | Hardwyn Hardware |
| | | Magnum Kit | Mukund Overseas |
| | | Dorma | Dormakaba India Pvt Ltd. |
| | | Everite | Everite Agencies |
| | | Dorset | Dorset Industries Pvt Ltd |
| | | Geze | Geze Gmbh |
| 21 | Locks & Latches | Dorset | Dorset Industries Pvt Ltd |
| | | Godrej | Godrej Locking Solution & Systems |
| | | Hitech | Globe Locks India |
| | | Hafele | Hafele India Pvt Ltd. |

| | | | |
|---|---|---|---|
| | | Harrison | Harrison Locks |
| | | Plaza | Bharat Lock House |
| | | Yale | Assa Abloy India (Pvt) Ltd. |
| | | Link | Link Locks |
| | | Geze | Geze Gmbh |
| 22 | Metalic / Steel Fire Door | Shakthi Hormann | Shakthi Hormann Pvt Ltd. |
| | | Promot | Promot Fire & Insulation (P) Ltd. |
| | | MPP Schodders | MPP Technology Pvt Ltd. |
| | | Navair | Navair International Pvt Ltd. |
| | | Signumfire Protection | Signumfire Protection Pvt Ltd. |
| | | Godrej | Godrej Security Solution |
| 23 | Fire Smoke Seal | Hilti | Hilti India Pvt Ltd |
| | | Promat | Promat Fire & Insulation (P) Ltd |
| | | Atroflame | Atroflame Ltd. |
| | | Raven | Raven Global |
| 24 | Fire Rated Hardware | Dorma | Dormakaba India Pvt Ltd. |
| | | Ingersolrand | Ingersolrand (India) Ltd |
| | | Dorset | Dorset Industries Pvt Ltd |
| | | Backers FS | Backers FS |
| | | Geze | Geze Gmbh |
| 25 | Non-Metallic Fire door | Navair | Navair International Pvt Ltd. |
| | | Promat | Promat Fire & Insulation (P) Ltd |
| | | Godrej | Godrej Security Solutions |
| | | Kenwood | Kenwood Ply & Board |
| 26 | Stainless Steel Screws | Kundan | Kundan Industries Ltd |
| | | Alloy | Alloy Ltd |
| | | GKW | GKW Limited |
| | | Nettlefold | Nettlefold Screws |
| | | Pooja | Pooja Steel Corporation |
| | | Atul | Atul Fasteners Ltd |
| 27 | Butt Hinges Openable Window Shutters | Hafela | Hafele India Pvt Ltd. |
| | | Earlt Bihari | Earlt Bihari India Pvt Ltd |
| | | Dorma | Dormakaba India Pvt Ltd. |
| | | Dorset | Dorset Industries Pvt Ltd |
| | | Alu Alpha | Alu Alpha India |
| 28 | Mild Steel Butt Hinges / Piano Hinges | Jolly | Jolly Engineering Works |
| | | Supreme | Supreme |
| | | Saswat | Saswat |
| | | Deepak | Deepak |
| | | Swift | Swift Screws |
| | | Garg | D.P. Garg & Company |
| | | Amit | Lovely Metal Industries Pvt Ltd. |
| | | Jyoti | Jyoti Architectural Pvt Ltd. |
| 29 | Stainless Steel Butt Hinges | Ozone | Ozone Hardware |
| | | Dorma | Dormakaba India Pvt Ltd. |
| | | Geze | Geze Gmbh |
| | | Garg | D.P. Garg & Co. |
| 30 | Concealed Tower Bolt | Dorma | Dormakaba India Pvt Ltd. |
| | | Ingersolrand | Ingersolrand (India) Ltd |

| | | | |
|---|---|---|---|
| | | Dorset | Dorset Industries Pvt Ltd |
| | | Alu Alpha | Alu Alpha India |
| 31 | UPVC Doors, Door Frames and Windows | Fenesta | Fenasta Dcm Shriman |
| | | Encraft | Encraft India Pvt Ltd. |
| | | LG | LG India Pvt Ltd. |
| | | Aluplast | Alu Alpha India |
| | | Komarling | Profile India Window Technology Pvt Ltd. |
| | | Duroplast | Duro Plast Extrusion Pvt Ltd. |
| | | Qute | Qute Extrusions Pvt Ltd. |
| 32 | PVC Doors and Frames | Accucel | Accura Polytech Pvt Ltd. |
| | | Duroplast | Duroplast Extrusion Pvt Ltd. |
| | | Polyline | Polyline Extrusion Pvt Ltd. |
| | | Rajshri | Rajshri Productions Pvt Ltd. |
| | | Qute | Qute Extrusions Pvt Ltd. |
| 33 | Stainless Friction Hinges | Hetich | Hetich India Pvt.Ltd |
| | | Haffle | Hafele India Pvt Ltd. |
| | | Securistyle | Securistyle India Pvt Ltd. |
| | | Earl Bihari | Earlt Bihari India Pvt Ltd |
| | | Ebco | Ebco |
| | | Roto | Roto Frank Asia |
| 34 | Float Glass / Toughened Glass | Saint Gobain | Saint Gobin India Pvt Ltd. |
| | | Asahi | Asahi India Glass Ltd |
| | | Pilkinton | Pilkinton India Pvt Ltd. |
| | | Modiguard | Gujarat Guardian Ltd |
| 35 | Reflective Glass | Saint Gobain | Saint Gobin India Pvt Ltd. |
| | | Asahi | Asahi India Glass Ltd |
| | | Pilkinton | Pilkinton India |
| | | Modifloat | Gujarat Guardian Ltd |
| | | Glaverbel | Glaverbel India |
| 36 | Tempered Reflective / Clear Glass | Saint Gobain | Saint Gobin India Pvt Ltd. |
| | | Fuso | Fuso Glass India Pvt Ltd. |
| | | Gurind | Gurind India |
| | | Asahi | Asahi India Glass Ltd |
| | | Modiguard | Gujarat Guardian Ltd |
| | | Impact Safety | Impact Safety Glass Works Pvt Ltd. |
| 37 | Fire rated glass | Contra Flam / Pyroswiss of Saint Gobain | Saint Gobin India Pvt Ltd. |
| | | Promat | Promat Fire & Insulation (P) Ltd |
| | | Pyran Of Schott | Schott Glass India Pvt Ltd. |
| | | Pilkinton | Pilkinton India |
| 38 | Anchor / SS Stone Cladding Clamps / Dash Fasteners | Hilti | Hilti India Pvt Ltd |
| | | Fischer | Fischer India |
| | | Anchor | Anchor Ltd |
| | | Nutech | Nutech Construction Chemicals |
| | | Canon | Cannon |
| | | Wurth | Wuerth India Pvt Ltd. |
| | | Trixel | Axel India Pvt Ltd. |
| | | Helfen | Helfen Anchoring System |

| | | | |
|---|---|---|---|
| | | Bosch | Bosch Ltd |
| 39 | Structural Steel | SAIL | SAIL |
| | | TISCO | Tata Steel |
| | | Vizag | RINL |
| | | JSW | JSW |
| 40 | M.S Pipe Tubes | SAIL | SAIL |
| | | TISCO | Tata Steel |
| | | Jindal | JSW |
| 41 | Stainless steel | Salem | Sail |
| | | Connect | Connect Ltd. |
| | | Ark Product Pvt.Ltd | Ark Product Pvt Ltd. |
| | | Jindal | JSW |
| | | SAIL | SAIL |
| 42 | Stainless Steel bolts, washers, nults | Kundan | Kundan Industries Ltd. |
| | | Pooja | Pooja Steel Corporation |
| | | Atul | Atul Fastners Ltd. |
| | | Hilti | Hilti India Pvt Ltd. |
| 43 | Stainless steel pressure plate screws | Kundan | Kundan Industries Ltd. |
| | | Pooja | Pooja Steel Corporation |
| | | Atul | Atul Fastners Ltd. |
| 44 | Welding Rods | Advani | Advani Oerlikon Ltd. |
| | | Esab | Esab India Pvt Ltd. |
| 45 | Metal Deck Sheet | Tata | Tata Steel |
| | | SAIL | SAIL |
| 46 | Shear Stud / Connector | Koco | Koster & Co. |
| 47 | Vitrified Tiles | AGL | Asian Granite India Limited |
| | | Marbito | Marbito Tiles |
| | | NITCO | NITCO Ltd. |
| | | RAK | RAK Ceramic India Pvt Ltd. |
| | | Kajaria | Kajaria Ceramic Ltd. |
| | | Somany | Somany Ceramic Ltd. |
| | | Jhonson | Prism Johnson Ltd. |
| | | Varmora Granito | Varmora Granito Granite Pvt. Ltd. |
| | | Vitero | Aparna Enterprises Limited |
| 48 | Glazed Ceramic Tiles (also wall tiles) | AGL | Asian Granite India Limited |
| | | NITCO | NITCO Ltd. |
| | | RAK | RAK Ceramic India Pvt Ltd |
| | | Kajaria | Kajaria Ceramic Ltd |
| | | Somany | Somany Ceramic Ltd |
| | | Jhonson | Prism Johnson Ltd |
| | | Varmora Granito | Varmora Granito Granite Pvt Ltd |
| 49 | Synthetic Sports Flooring | Armstrong | Armstrong Flooring |
| | | LG | LG Hausys India |
| | | Wondorfloor | Rmg Polyvinyl India Ltd |
| 50 | Linoleum Sports Flooring | Armstrong | Armstrong Flooring India Ltd |
| | | Forbo | Forbo Flooring India Pvt Ltd |
| | | Gerflor | Gerflor Flooring |
| 51 | False Floor | Hewetson | Hewetson India |
| | | Access Floor System | Access Floor System |

| | | | |
|---|---|---|---|
| | | Unifloor | Unifloor India Ltd |
| | | Unitile | Unitile Office Systems Pvt Ltd. |
| | | Pinnacle | Pinnacle |
| | | Kebao | Inner Space (Distributors) |
| 52 | Engineered Wood Floor | Armstrong | Armstrong Flooring |
| | | Mikasa Real Wood Floors | Green Lam Industries |
| | | New Wood | New Wood India Ltd |
| | | Werner | Werner Floors |
| | | Pergo | Redfloor India |
| 53 | Floor Spring (For non DSR Items) | Dorma | Dormakaba India Pvt Ltd. |
| | | Ingersolrand | Ingersolrand India Pvt Ltd. |
| | | Ozone | Ozone Hardware |
| | | Geze | Geze Gmbh |
| 54 | Cement Concrete parking tiles | NITCO | NITCO Ltd. |
| | | Poddar | Poddar Udyog |
| | | EUROCON | EUROCON Tiles India |
| | | Dazzle | Dazzle Designer Tiles Pvt Ltd. |
| | | NTC | NTC Parking Tiles |
| | | Hindustan Tiles | Hindustan Tiles, Ranchi, Pune |
| | | Ultra | Ultra Tile Private Ltd |
| 55 | Synthetic Carpet Tiles | Toli | Toli Corporation |
| | | Hollitex | Hollitex Carpet Tiles |
| | | Standard Carpets | Standard Carpets |
| 56 | Vitrified Paving Tiles | Pavit | Pavit Ceramics Pvt Ltd. |
| 57 | Glass Mosaic Tiles | Italia | Tile Italia Mosaics Pvt. Ltd |
| | | Coral | Coral Tiles |
| | | Mridul | Mridul Tiles |
| | | Palladio | Palladio Mosaics |
| | | Bisazza | Bisazza Italy |
| | | Birla White | Birla Corporation Ltd. |
| | | JK White | JK Cement Ltd |
| | | Pavit (Eco Tile) | Pavit Ceramics Pvt Ltd. |
| 58 | Thermal Insulation Treatment | Pidilite | Pidilite Industries |
| | | Elastospray | Basf |
| | | Rock India Pvt Ltd. | Rock India Pvt Ltd |
| | | Weather Kool & Seal | Berger Paints |
| 59 | Acoustic Insulation | Twingerinsul | U.P. Twiga Fiber Glass Ltd. |
| | | Lloyd Insulation | Lloyd Insulation (India) Ltd. |
| | | Saint Gobain Gyproc | Saint Gobin Gyproc India |
| | | Himalayan Acoustics | Himalayan Acoustics |
| | | Knauf | Knauf Gypsum India Pvt. Ltd |
| | | Anutone | Anutone Acoustics Ltd. |
| 60 | UPVC Pipes and Fittings (Rain Water Pipes) | Supreme | Supreme Industries Ltd |
| | | Prince | Prince Pipes and Fittings Ltd |
| | | Finolex | Finolex Industries Ltd |
| | | Astral | Astral Polytechnik Ltd |
| | | Ashirwad | Ashirwad PVC Pipes |
| | | Flowguard | Flowguard |
| 61 | | Lloyd Insulation | Lloyd Insulation (India) Ltd. |

| | | | |
|---|---|---|---|
| | Sandwich PUF panelled roofing sheets | Jindal Mectec / Jindal | Mectec Pvt Ltd |
| | | Danpalon | Danapal Light Architecture |
| | | GE Plastic | GESilicons |
| | | Lexan | Lexan Ltd |
| 62 | Polycorbonate Sheet | MGPolyplast | MG Polypas |
| | | GE Lexon | GE Silicons |
| | | Danpalon | Danapal Light Architecture |
| | | Alcox | Hindeggan Alcox Ltd. |
| | | Polygal | Polygal India Pvt Ltd. |
| 63 | False Ceilings | Aerolite | Andhra Polymers Pvt Ltd. / Aerolite Industries Pvt Ltd. |
| | | Armstrong | Armstrong World Industries |
| | | Gridsquare | Gridsquare Ceilings |
| | | Knauf | Knauf Gypsum India Pvt.Ltd |
| | | USG Boral | USG Boral |
| | | Hunter Douglas | Hunter Douglas |
| | | Saint Gobain Gyproc | Saint Gobain Gyproc India |
| 64 | False Ceiling Members (perimeter, Ceiling Section, Intermediates, angles etc) | Armstrong | Armstrong World Industries |
| | | Aerolite | Andhra Polymers Pvt Ltd. / Aerolite Industries Pvt Ltd. |
| | | Gridsquare | Gridsquare Ceilings |
| | | Gypframe Steel | British Gypsum |
| | | Knauf | Knauf Gypsum India Pvt. Ltd |
| | | Lloyd | Lloyd Insulation (India) Ltd. |
| | | Saint Gobain | Saint Gobain Gyproc |
| 65 | Synthetic Enamel Paint | Premium Gloss Enamel | Asian Paint Ltd |
| | | Dulex | ICI Dulex Ltd |
| | | Nerolac | Nerolac Paints Ltd |
| | | Berger | Berger Paints |
| | | Nippon | Nippon Paint India Ltd. |
| 66 | Pink Primer | Wood Primer | Asian Paint |
| | | Dulex | IciDulex |
| | | Nerolac | Nerolac Kansia Nerolac Paints Ltd |
| | | Berger | Berger Paints |
| | | Nippon | Nippon |
| 67 | Red Oxide Zinc Chromate Primer | High-Performance Yellow Metal Primer | Asian Paint |
| | | Dulex | ICI Dulex |
| | | Nerolac | Nerolac |
| | | Berger | Berger Paints |
| | | Nippon | Nippon |
| 68 | Oil Bound Distemper | Tractor Aqalock | Asian Paint |
| | | Dulux (Maxilite) | Dulux |
| | | MGPolyplast | NEROLAC |
| | | Berger (BISM) | Berger Paints |
| 69 | Acrylic Emulsion | Premium Emulsion | Asian Paint |
| | | Dulux (Super Cover) | ICI Dulux |
| | | Neroloc (Beauty Gold) | Nerolac |
| | | Berger (Bism) | Berger Paints |

| | | | |
|---|---|---|---|
| 70 | Water Proof Cement Paint | Asian Exterial Wall Primer | Asian Paint |
| | | Berger | Berger Paints |
| | | Surfa | Surfacoats (India) Pvt. Ltd |
| | | ICI Dulux | ICI Dulux |
| | | Cem Colour | Snowcem Paints |
| 71 | Acrylic Smooth Exterior paint | Dulux | ICI Dulux |
| | | Apex | Asian Paints |
| | | Nerolac | Nerolac |
| | | Berger | Berger |
| | | Nippon | Nippon |
| 72 | Premium Acrylic smooth exterior paint with silicon additives | Ultima | Asian Paint |
| | | Dulux | Ici Dulux |
| | | Nerolac | Nerolac |
| | | Berger | Berger |
| 73 | Cement Based Wall Putty | J.K. Wall Putty | J.K. Cements Ltd. |
| | | Birla Wall Care | Birla Cements Ltd. |
| | | Asian Paints | Asian Paints Ltd. |
| | | Berger | Berger |
| | | Ardex Endura | Ardex Endura India Pvt Ltd. |
| | | Ferrous Crete | Ferrous Crete (India) Pvt. Ltd |
| 74 | Acrylic Textured Plaster | Apex Duracast | Asian Paints |
| | | Spectrum Paints | Spectrum Paints Ltd. |
| | | Heritage | Heritage Rajkamal Group |
| | | Asian Paints | Asian Paints |
| | | Neroloc | Neroloc |
| 75 | Ready Mix Cement Plaster | Readi Plast | Ultratech Cements Ltd |
| | | Gyproc Plasters | Saint Gobain Gyproc India |
| | | Ultra Tech | Ultra Tech Cement Ltd. |
| | | Ferrous Crete | Ferrous Crete (India) Pvt. Ltd |
| 76 | Melamine Polish | Asian Paints | Asian Paints |
| | | Melamine Gold Wudfin | Pidilite Industries |
| | | Polycure | Polycure Malaysia |
| 77 | Fire Retardant Paint | Jotun | Jotun Paints |
| | | Hilti | Hilti India |
| | | Akzonobel | Dulex Akzonobel Paints |
| | | Asian Paints | Asian Paints |
| | | STPL Ltd | STPL Ltd |
| 78 | Anticorrosive bitumastic paint | Berger | Berger Paints India Ltd. |
| | | Shalimar | Shalimar Paints India Ltd. |
| | | IS 158 Bituminous Black | Asian Paints |
| 79 | Cement Primer | Asian Paints | Asian Paints |
| | | JKPrimaxx | JK Cement Ltd |
| | | Berger | Berger Paints India Ltd. |
| 80 | Epoxy Paint | Asian Epoxy | Asian Paints |
| | | Berger | Berger Paints India Ltd. |
| | | Shalimar | Shalimar Paints |
| | | STPL Ltd. | Shalimar Tar Products |
| | | Ardex Endura | Ardex Endura India Pvt Ltd. |
| | | Mapecoat L24 | Mapei Construction Products India P Ltd. |

| | | | |
|---|---|---|---|
| | | Nerolac | Nerolac |
| | | Sun Epoxy Paint | Sunanda Speciality Coatings Pvt Ltd. |
| 81 | Epoxy Coating | Basf | Basf India Ltd. |
| | | Fosroc | Fosroc Ltd |
| | | Laticrete | Myk Laticrete India |
| | | Ardex Endura | Ardex Endura India Pvt Ltd. |
| | | Mapecoat Dw25 | Mapei Construction Products India P Ltd. |
| | | Ferrous Crete | Ferrous Crete (India) Pvt. Ltd. |
| | | Sun Epoxy Paint | Sunanda Speciality Coatings Pvt. Ltd. |
| 82 | Silicon Coating | Dow Corning | Dow Corning India |
| | | Basf | Basf India Ltd. |
| | | GE | GE Silicones |
| | | Wacker | Wacker Silicones |
| 83 | Interlocking concrete paver blocks | Dazzle | Dazzle Designer Tiles Pvt Ltd. |
| | | Ultra | Ultra Tiles Private Ltd. |
| | | Shree | Shree Bharat Paver Blocks |
| | | Hindustan Tiles | Hindustan Tiles, Ranchi, Pune |
| | | NITCO (Rockard) | NITCO |
| | | Bharat (Nilsan) | Bharat |
| | | Regency | Regency |
| | | Basant Betons | Basant Betons |
| 84 | Solar Studs / Median markers | 3M | 3M Science |
| | | Avery Dennison | Avery Dennison India Pvt. Ltd. |
| | | Nikkalite | Nippon Carbide Industries (Usa) |
| 85 | Polycorbonate convex mirrors, rubberised road hump | Unique Safety Solutions | Unique Safety Solutions |
| 86 | Mirror | Modi Guard | Gujarat Guardian Ltd |
| | | Saint Gobain | Saint Gobain Glass India Ltd. |
| | | AIS Mirror | Asahi India Glass Ltd |
| 87 | Vitreous Commodes / Washbasin | Hindware | Hsil Ltd |
| | | Roca | Roca Bath Room Products |
| | | Parryware | Roca Bath Pvt Ltd. |
| | | Kohler | Kohler World Wide |
| | | Cera | Cera Sanitary Ware Ltd |
| | | Jaquar | Jaquar Group |
| 88 | Flushing Cistern | Parryware | Roca Bath Pvt Ltd. |
| | | Kohler | Kohler World Wide |
| | | Hindware | HSIL Ltd |
| | | Cera | Cera Sanitary Ware Ltd |
| | | Jaquar | Jaquar Group |
| 89 | SWR PVC Pipes and Fittings | Supreme | Supreme Industries Ltd |
| | | Astral | Astral Polytechnik Ltd |
| | | Finolex | Finolex Industries Ltd |
| | | Flowguard | Ashirwad Pvc Pipes |
| | | Prince | Prince Pipes and Fittings Ltd |
| 90 | | Jhonson | Prison Jhonson Ltd. |

| | | | |
|---|---|---|---|
| | Stainless Steel Kitchen Sink | Diamond | Pheonix Appliances Pvt Ltd. |
| | | Jindal | Centuary Polytech |
| | | Nilkanth | Nilkant |
| | | Nirali | Jyoti (India) Metal Industries Pvt Ltd. |
| | | Hindware | Hsil Ltd. |
| | | Silver Shine | Blue Stone Sanitary Industries Pvt Ltd. |
| | | Joyna | Joyna |
| | | Navkar | Shri Navkar Metals Ltd. |
| | | Franke | Franke India Ltd. |
| | | Futura | Futura Kitchen Sinks India Pvt Ltd. |
| 91 | Centrifugally Cast (Spun) Iron Soil Pipes | NECO | Jayaswal NECO Ltd. |
| | | SKF Brand | SKF Industries |
| | | HEPCO | HEPCO |
| | | Bengal Iron Corporation | Bengal Iron Corporation |
| | | RPMF | Raj Pattern Makers and Founders Pvt. Ltd. |
| 92 | PE-AL-PE Composite pipes | KITEC | KITEC Industries (India) Pvt. Ltd. |
| 93 | GI Pipes | Tata | Tata Steel Ltd. |
| | | Zenith | Zenith Birla (India) Ltd. |
| | | Hissar | Hissar |
| | | Jindal | Jindal Pipes Ltd. |
| | | Apollo | Apl Apollo |
| 94 | GI Pipes Fittings | Zoloto | Zoloto Industries |
| | | Unik | Unik Malleables |
| | | HB | HB Industries |
| | | ICS | Sgree Samarth Engineers |
| 95 | Water Supply Valves | Zoloto | Zoloto Industries |
| | | Leader | Leader Valves Ltd. |
| | | Arco | Arco Valves Pvt Ltd |
| | | Nanda | Nanda Miller Company |
| 96 | CPVC Pipes and Fittings | Supreme | Supreme Industries Ltd |
| | | Finolex | Finolex Industries Ltd |
| | | Astral | Astral Polytechnik Ltd |
| | | Prince | Prince Pipes and Fittings Ltd |
| | | Ashirwad | Ashirwad PVC Pipes |
| | | Flowguard | Flowguard |
| 97 | PVC / HDPE Water Storage Tanks | Vectus | Vectus Industries Ltd |
| | | Supreme | Supreme Industries Ltd |
| 98 | DI Pipes | Electrosteel | Electrosteel |
| | | Jindal | Jindal |
| | | Tata Ductura | Tata Ductura |
| | | Kapilansh | Kapilansh |
| | | Keshoram | Keshoram |
| 99 | DI fittings | Electrosteel | Electrosteel |
| | | Jindal | Jindal |
| | | Tata Ductura | Tata Ductura |

| | | | |
|---|---|---|---|
| | | Kapilansh | Kapilansh |
| | | Keshoram | Keshoram |
| 100 | Water Supply fixtures like bibcock, shower panels | Jaquar | Jaquar Group |
| | | Parryware | Roca Bathroom Products Pvt. Ltd. |
| | | Metro | Metro Sanitations Pvt. Ltd. |
| | | Waterman | Kewal Brothers |
| | | Seiko | Seiko Sanitations |
| | | Prayag | Prayag Polymers Pvt. Ltd. |
| | | Kingston | Kingston Brass India |
| | | Marc | Mark Showers |
| 101 | Air Release Valve | Kirloskar | Kirloskar Brothers Ltd. |
| | | Rbm | Afs Ltd. |
| | | Kartar | Kartar Valves Private Ltd. |
| 102 | Centrifugally Cast (Spun) Iron | Lanco / Sripipes | Electrosteel Castings Ltd. |
| | | Jindal | Jindal Saw Ltd |
| | | Keshoram | Kesoram Industries Ltd |
| | | Electrosteel | Electrosteel Castings Ltd. |
| 103 | Spun Cast Iron Fittings | Neco | Jayaswal Neco Ltd. |
| | | Kartar | Kartar Valves Private Ltd. |
| | | Electrosteel | Electrosteel Castings Ltd. |
| | | Kapilansh Centrifugal | Kapilansh Dhatu Udyog (P) Ltd. |
| | | SKF Brand | Singhaliron Foundary Pvt Ltd |
| 104 | CI double flange sluice valve | Kirloskar | Kirloskar Brothers Ltd. |
| | | Rbm | Afs Ltd. |
| | | Kartar | Kartar Valves Private Ltd. |
| | | IVS | Indian Valves Private Ltd. |
| | | Zoloto | Zoloto Industries |
| | | Burn | Burn |
| | | Leader | Leader Valves Ltd. |
| 105 | CI double flanged non return valve | Kirloskar | Kirloskar Brothers Ltd. |
| | | Fluidtech | Fluidtech |
| | | Zolto | Zolota Industries |
| 106 | Gun metal Valves | Zolto | Zolota Industries |
| | | Leader | Leader Valves Ltd. |
| | | Sant | Sant Valves Pvt Ltd |
| | | Audco | L&T Valves |
| 107 | PTMT/PVC water supply, sanitary fittings, bib cocks, pillar cock, Angle valve, etc. | PEARL | Precision Products |
| | | Prayag | Prayag Polymers (P) Ltd |
| | | Supreme | Supreme Industries |
| 108 | RCC Pipes | Indian Hume Pipe | Indian Hume Pipe Ltd., |
| | | Madurai spun pipe | Madurai spun pipe company |
| | | Lakshmi Sood & Sood | Lakshmi Sood & Sood Pipe Co. |
| | | Jain & Co | Jain spun pipes Co., |
| 109 | CI Manhole cover | NECO | Jayaswal Neco Ltd. |
| | | HEPCO | Binay Udyog Pvt. Ltd. |
| | | BIC | Bengal Iron corporation |
| 110 | SFRC Cover and grating | KK | KK Manhole and gratings Co Pvt Ltd. |
| | | Advent | Advent concrete vision |

| | | | |
|---|---|---|---|
| | | Kutty | Kutty Industries |
| | | Nu-TEC | Nu-Tech concrete products (P) Ltd. |
| 111 | Plastic Encapsulated Foot Rest | KK India | KK Manhole and gratings Co Pvt Ltd. |
| | | KGM | KGM Exports |
| | | Accurate Buildcon | Accurate Buildcon company |
| 112 | Spun cast iron covers & gratings | NECO | Jayaswal NECO Ltd |
| | | Jagannath | Sri Jagannath Iron Foundry Pvt. Ltd. |
| | | Kapilansh Centrifugal | Kapilansh Dhatu Udyog(P)Ltd. |
| | | SKF brand | SINGHALIRON FOUNDARY Pvt. Ltd. |
| 113 | Aluminium doors / windows sections | Hindalco | Hindalco Industries Ltd. |
| | | Jindal | Jindal Aluminium Ltd. |
| | | NALCO | NALCO |
| | | Omalco Extrusion | Omalco Extrusion Pvt. Ltd. |
| | | Bhoruka | Bhoruka Aluminium Ltd., |
| | | Indal | Indian Aluminium Ltd., |
| 114 | Aluminium systems / Anodised aluminium fittings for doors / windows | Define | Define Overseas Pvt. Ltd. |
| | | Schueco | Schueco India Pvt. Ltd., |
| | | Bhoruka | Bhoruka Aluminium Ltd., |
| | | Kawneer | Kawneer India |
| | | Hardima | Hardima sales corporation |
| | | Everite | Everite Agencies |
| 115 | Friction stay hinges | Earl Bihari | Earl Bihari Pvt. Ltd. |
| | | KINLONG | Kinlong Industries |
| 116 | EPDM Gaskets | Anand | Anand NVH products (P) Ltd., |
| | | Roop | Roop Polymers Ltd., |
| | | Bohra | Bohra rubber Pvt Ltd., |
| | | Hanu | Hanu Industries |
| | | Amee Rubber | Amee Rubber Industries Pvt Ltd. |
| 117 | Silicon Gaskets | Sree Gaurav | Sree Gaurav Rubber products |
| 118 | Masking Tapes | 3M | 3M |
| | | Sun | Sun |
| | | Wonder polymer | Wonder Tape Industries |
| | | Roop | Roop Polymers Ltd. |
| 119 | Water proofing compound | Fosroc | Fosroc India |
| | | Ferrous Crete | Ferrous Crete (India) Pvt. Ltd. |
| | | Sika | Sika India |
| | | MYK Schomburg | MYK Arments range of products |
| | | Penetron | Penetron India Pvt. Ltd. |
| | | Dr. Fixit | Pidilite Industries |
| | | Accoproof | ACC Cements Ltd. |
| | | Ardex Endura | Ardex Endura (India) Ltd |
| | | Alchemica | Alchemica Ltd. |
| | | Smart Care | Asian Paints |
| | | Cementmix Plus / Advanced Latex Plus | Berger Paints |
| | | Shaliplast LW+ | STP Ltd |

| | | | |
|---|---|---|---|
| | | Mapecure AS / Mapecure E 30 / Mapecure ASE | M/s MAPEI Constructions Product India Pvt. Ltd. |
| 120 | Membrane Water proofing system | BASF | BASF India Ltd., |
| | | Ferrous Crete | Ferrous Crete (India) Pvt. Ltd. |
| | | STP Ltd | Shalimar Tar Products |
| | | MYK Schomburg | MYK Arments range of products |
| | | Asian paints | Smart Care Water Proofing products |
| | | Dr. Fixit | Pidilite Industries |
| | | Alchemica | Alchemica Ltd. |
| | | Ardex Endura | Ardex Endura ltd |
| | | Hydro tech | Hydro tech Ltd |
| | | Mapeplan TU S20 / Planiseal 88/ Planiseak 288 | M/s MAPEI Constructions Product India Pvt. Ltd. |
| | | Elastoroof PU / Sunroof PU / Sunkote | Sunanda Speciality Coatings Pvt. Ltd |
| 121 | Chemical water proofing system | BASF | BASF India Ltd., |
| | | Ferrous Crete | Ferrous Crete (India) Pvt. Ltd. |
| | | MC-Bauchemie | MS-Bauchemie India Ltd., |
| | | Sika | Sika India |
| | | Sunanda speciality coating | Sunanda speciality coating Pvt Ltd. |
| | | Perma construction Aid | Perma Construction Aid Pvt Ltd |
| | | Fosroc | Fosroc India |
| | | Dr. Fixit | Pidilite Industires |
| | | Smart Care | Asian Paints |
| | | Latexshield 2K / Tankshield PW | Berger Paints |
| 122 | Water stops | Hydrotite | Sika India |
| | | BASF | BASF India Ltd., |
| | | Dr. Fixit | Pidilite Industries |
| | | Ardex Endura | Ardex Endura ltd |
| | | Ferrous Crete | Ferrous Crete (India) Pvt. Ltd. |
| | | Hydroswell | Sika India |
| | | Smart Care | Asian Paints |
| 123 | Aluminium composite panels | Alucobond | 3A Composites India Pvt. Ltd. |
| | | Eurobond | M/S Euro panel products Pvt. Ltd. |
| | | Aludecor | M/S Aludecor Lamination Pvt. Ltd. |
| | | Reynobond | Reynobond |
| | | Alpolic | Alpolic |
| | | Alstrong | Alstrong |
| 124 | PVC Perforated Pipes | Rex Polyextrusion | Rex Polyextrusion Ltd |
| | | Akash Enterprises | Akash Enterprises |
| | | Zenplas Pipes | Zenplas Pipes Pvt. Ltd. |
| | | Supreme | Supreme Industries |
| 125 | Play Equipment | Koochie Play | Koochie Play Systems Pvt. Ltd. |
| | | Playworld Systems | Playworld Systems India |
| 126 | Structural Sealant | Dow corning | Dow corning India |
| | | Wacker | Wacker Silicones. |
| | | GE | GE Silicones |

| | | | |
|---|---|---|---|
| | | STP Ltd. | Shalimar Tar Products |
| | | Asian paints | Smart Care Sealant |
| | | Fosroc | Fosroc India |
| | | BASF | BASF India Ltd. |
| 127 | Poly-sulphide sealant | Dr. Fixit | Pidilite Industries Ltd |
| | | Ferrous Crete | Ferrous Crete (India) Pvt. Ltd. |
| | | MYK Schomburg | MYK Arments range of products |
| | | Pidilite | Pidilite Industeries |
| | | STP Ltd. | Shalimar Tar Products |
| | | Fosroc | Fosroc India |
| | | Techseal | Choksey Chemical Pvt. Ltd, |
| 128 | Bitumen Impregnated Board | Shalitex | Shalimar Tar Products |
| 129 | Polyethylene backer rod | Supreme | Supreme Industries |
| 130 | Epoxy | Fosroc | Fosroc India |
| | | Ferrous Crete | Ferrous Crete (India) Pvt. Ltd. |
| | | Shalibons | Shalimar Tar Products |
| | | Asian paints | Asian Paints |
| | | Ardex | Ardex Endura (India) Pvt. Ltd. |
| 131 | Weather Silicon make and grade | Dow corning | Dow corning India |
| | | Momentive (GE) | GE Silicones |
| 132 | GRC Jali | Terrafirma | Terrafirma GRC Industries |
| | | Ecovision | Ecovision Industries Pvt. Ltd. |
| 133 | Air transfer grills | Cool grills | Cool grills, Pune |
| | | Systemair India | Systemair India Pvt. Ltd., |
| 134 | Ready-made/ Gypsum Plaster | Ferrous Crete | Ferrous Crete (India) Pvt. Ltd. |
| | | Gyproc Cute 100 | Gyproc India |
| | | Ultratech | Ultratech cements Ltd. |
| 135 | Steel Windows / Pressed Steel Frames | Madhu Industries | Madhu Industries, San Harvic, NCL |
| | | San Harvic | San Harvic |
| | | NCL | NCL Industries |
| 136 | PVC Flooring | LG Hausys | LG Hausys |
| | | Ger flor | Gerflor flooring |
| | | Armstrong | Armstrong World Industries |
| 137 | Grass Paver | Unistone | Unistone |
| | | Ultra | Ultra Ltd. |
| 138 | FRP Door Frames & Shutter | Meena Fibre Glass, | Meena Fibre Glass |
| | | Duroplast | Duroplast extrusion Pvt Ltd |
| | | Cactus | Cactus |
| | | Polyline. | Poluline |
| | | JAYNA | Jain Wood Industries |
| | | JAIN | Jain Doors Pvt Ltd |
| 139 | Non-Metallic Floor Surface Hardeners | Ironite | Ironite |
| | | Hardonite, | Hardonite |
| | | FOSROC | Fosroc India |
| | | SIKA | SIKa India |
| | | BASF | BASF India Ltd., |
| | | CICO | CICO Technologies Ltd., |
| | | Pidilite | Pidilite Industries Ltd, |

| | | | |
|---|---|---|---|
| 140 | PU Enamel Metallic Paints on MS Structure & Epoxy Paints (Premium Quality) | SKK | SKK Ltd. |
| | | Akzonobel | Akzonobel |
| | | Asian | Asian Paints |
| | | Berger, | Berger paints India Ltd. |
| | | MRF | MRF Paints |
| 141 | Rockwool / Glasswool insulation | Twigafiber | Twigaifiber glass Ltd. |
| | | Llyod Insulation | Llyod Insulation Ltd. |
| | | Supreme | Supreme Industries ltd |
| 142 | Actactic Polypropylene (APP) Modified Water proof Membrane | STP | Shalimar Tar Products |
| | | Ferrous Crete | Ferrous Crete (India) Pvt. Ltd. |
| | | Bitumat Co. Ltd, | Bitumat Co. Ltd |
| | | Pidilite | Pidilite Industries Ltd, |
| | | Ardex Endura | Ardex Endura |
| | | Hydrotech Ltd. | Hydro tech Ltd |
| | | Smart Care | Asian Paints |
| | | Proshield | Berger Paints |
| | | IWL India Limited | IWL India Limited |
| 143 | Structural Glazing | Modi | Modi Guard |
| | | Saint Gobain | Saint Gobain Glass India Ltd. |
| | | Asahi | Asahi India glass Ltd |
| | | Glaverbel | Glaverbel India |
| 144 | Sensor Based Auto Flush Systems | AOS Systems„ | AOS Systems |
| | | TOTO | TOTO Ltd |
| | | Parryware, | Parryware |
| | | Hindware, | HSIL Ltd |
| | | Grohe | Grohe |
| | | Jaquar | Jaquar Group |
| | | KOHLER | KOHLER WORLD WIDE |
| 145 | Float Valve (Ball Valve) | Prayag, | Prayag Polymers (P) Ltd |
| | | Leader, | Leader valves Ltd. |
| | | Zoloto, | Zolota Industries |
| | | IBP | IBP Industries |
| | | Arco | Arco valves Pvt. Ltd., |
| 146 | Spider Patch Fittings for Structural Glazing | Dorma | Dormakaba India Pvt. Ltd |
| | | Sevax | Saint Gobain Glass India Ltd. |
| | | Kich | Kich India |
| | | Ozone | Ozone Ltd |
| | | Hafele | Hafele Ltd |
| 147 | Multi Walled Polycarbonate Roofing Sheets | Danpalon | Danapal Light architecture |
| | | Lexan GE | GELexan |
| 148 | Adhesive for AAC Block / Tiles | Ultratech | Ultratech cements Ltd. |
| | | Ardex Endura / Gold Star | Ardex Endura |
| | | Ferrous Crete | Ferrous Crete (India) Pvt. Ltd. |
| 149 | Aluminium Formwork | MFE(MIVAN) | MIVAN |
| | | S-Form | S-Form |
| | | MFS | MFS |
| 150 | EPDM Water Proofing Membrane | Smart Care | Asian Paints |
| | | Ferrous Crete | Ferrous Crete (India) Pvt. Ltd. |
| | | Pidilite | Pidilite Industries |

| | | | |
|---|---|---|---|
| | | STP | Shalimar Tar Products |
| | | Fosroc | Fosroc India |
| 151 | PU Coating (UV Resistant Liquid Applied Coating) | Smart Care | Asian Paints |
| | | Pidilite | Pidilite Industries |
| | | BASF | BASF |
| | | Fosroc | Fosroc India |
| | | SIKA | SIKA India |
| | | PURoofkoat | Berger Paints |
| 152 | Polyurea Ultroh | Smart Care/Ferrous Crete | Asian Paints |
| | | Ferrous Crete | Ferrous Crete (India) Pvt. Ltd. |
| | | BASF | BASF |
| | | SIKA | SIKA India |
| | | Pidilite | Pidilite Industries |
| 153 | Modular Kitchen /Wardrobes/Hardware and Accessories | Sleek | Asian Paints |
| | | Godrej | Godrej & Boyce Co. |
| | | Spacewood | Spacewood |
| | | Evoke | Evoke |
| 154 | High end Exterior Textures | Allura/Graniza Range | Asian Paints |
| | | SKK Brand | SKK Ltd. |
| | | Berger | Berger paints India Ltd. |
| 155 | Acrylic Exterior Textures | Asian paints | Asian Paints |
| | | Berger | Berger paints India Ltd. |
| | | Akzonobel | Akzonobel |
| | | Ebco | Ebco |
| | | Neroloc | Nerolac Paints Ltd. |
| 156 | Puff Insulations | Smart Care | Asian Paints |
| | | Llyod Insulation | Llyod Insulation (India) Ltd. |
| | | Fosroc | Fosroc India |
| | | BASF | BASF |
| | | Pidilite | Pidilite Industries Ltd. |
| | | Supreme | Supreme ltd. |
| 157 | GP Grout | Ferrous Crete | Ferrous Crete (India) Pvt. Ltd. |
| | | Asian paints | Smart Care SC GP Grout Grey |
| | | BASF | BASF |
| | | Pidilite | Pidilite Industries Ltd. |
| | | Care | Care |
| | | Mapefill GPIN | MAPEI Construction Products India P Ltd. |
| | | SIKA | SIKA India |
| | | Smart Care SC GP Grout Grey | Asian Paints |
| | | Homeshield Supergrout | Berger Paints |
| | | TEEMAX GROUT TP-1 | M/s Teemage Builders (P) Ltd |
| 158 | Galvalume sheet for roofing, cladding, Sandwich panel | Llyod Metal Craft | Llyod Insulations. |
| | | Tata Blue Scope | Tata Blue Scope |
| | | Bhushan | Bhushan steel |
| | | JSW | JSW |
| | | Essar | Essar group |
| 159 | Mechanical coupler for Reinforcement | Dextra | |
| | | Sanfield | Sanfield India Ltd |

| | | | |
|---|---|---|---|
| 160 | WPC Frames and Shutters | DUROPLAST | Duroplast Extrusion Pvt Ltd. |
| | | RAJSHRI | Rajshri Productions Pvt Ltd. |
| | | QUTE | Qute Extrusions Pvt Ltd. |
| 161 | Water Treatment Plant | Ion exchange | Ion exchange (India) Ltd |
| | | Thermax | Thermax Ltd |
| | | Pentair | Pentair water India private limited |

BLANK

# PART – D
# (SCHEDULE OF QUANTITY)

BLANK

**SCHEDULE OF QUANTITY A (E&M)**

Name of work: Construction of Office cum Residential and Hostel Complex for the Department of NIPER at Panihati, B.T. Road, Kolkata, West Bengal. S.H: Balance works of Administrative Building (G+4) storied, Animal House (G+1) storied, Girls Hostel (G+2), Boys Hostel (G+2) storied, Substation building, Pump House, Main Entrance Gate Structure with Security Cabin including bulk services and development works (Civil, Electrical and Mechanical)

| Sl. No. | Description of Item | Quantity | Unit | Rate (₹) i/c C.I. | Amount (₹) |
|---|---|---|---|---|---|
| 1 | Sub-Head - I (I.E.I) | | | | |
| 1.1 | Wiring for light point / fan point / exhaust fan point / call bell point with 1.5 sq.mm FRLS / HFFR PVC insulated copper conductor single core cable in surface / recessed steel conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS / HFFR PVC insulated copper conductor single core cable etc. as required | | | | |
| 1.1.1 | Group C | 86.00 | Point | 2,416.15 | 2,07,788.90 |
| 1.2 | Wiring for group controlled (looped) light point / fan point / exhaust fan point / call bell point (without independent switch etc.) with 1.5 sq. mm FRLS / HFFR PVC insulated copper conductor single core cable in surface / recessed steel conduit, and earthing the point with 1.5 sq. mm FRLS / HFFR PVC insulated copper conductor single core cable etc. as required | | | | |
| 1.2.1 | Group C | 10.00 | Point | 1,432.90 | 14,329.00 |
| 1.3 | Wiring for circuit / submain wiring along with earth wire with the following sizes of FRLS / HFFR PVC insulated recessed steel conduit as required | | | | |
| 1.3.1 | 4 X 6 sq. mm + 2 X 6 sq. mm earth wire | 490.00 | Meter | 1,151.15 | 5,64,064.00 |
| 1.3.2 | 4 X 10 sq. mm + 2 X 6 sq. mm earth wire | 300.00 | Meter | 1,440.95 | 4,32,285.00 |
| 1.4 | 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 | | | | |
| 1.4.1 | 3 x 1.5 sq. mm | 150.00 | Meter | 119.60 | 17,940.00 |
| 1.4.2 | 6 x 1.5 sq. mm | 50.00 | Meter | 224.25 | 11,213.00 |
| 1.4.3 | 3 x 2.5 sq. mm | 250.00 | Meter | 170.20 | 42,550.00 |
| 1.4.4 | 3 x 4 sq. mm | 170.00 | Meter | 255.30 | 43,401.00 |
| 1.4.5 | 6 x 4 sq. mm | 100.00 | Meter | 487.60 | 48,760.00 |
| 1.5 | Supplying and fixing of following sizes of steel conduit along with accessories in surface / recess including painting in case of surface conduit, or cutting the wall and making good the same in case of recessed conduit as required | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 1.5.1 | 20 mm | 750.00 | Meter | 292.10 | 2,19,075.00 |
| 1.5.2 | 25 mm | 470.00 | Meter | 332.35 | 1,56,205.00 |
| 1.5.3 | 32 mm | 100.00 | Meter | 414.00 | 41,400.00 |
| 1.6 | 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 | 43.00 | Each | 757.85 | 32,588.00 |
| 1.7 | Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 2 nos. 3 pin 5/6 A modular socket outlet and 2 nos. 5/6 A modular switch, connections etc. as required. (For light plugs to be used in non-residential buildings) | 2.00 | Each | 870.55 | 1,741.00 |
| 1.8 | Supplying and fixing 20 A, 240 V, SPN Industrial type socket outlet, with 2 pole and earth, metal enclosed plug top along with 20 A "C" curve, SP, MCB, in sheet steel enclosure, on surface or in recess, with chained metal cover for the socket out let and complete with connections, testing and commissioning etc. as required. | 5.00 | Each | 2,076.90 | 10,385.00 |
| 1.9 | Supplying and fixing 20 A, 415 V, TPN Industrial type socket outlet, with 4 pole and earth, metal enclosed plug top along with 20 A "C" curve, TPMCB, in sheet steel enclosure, on surface or in recess, with chained metal cover for the socket out let and complete with connections, testing and commissioning etc. as required. | 20.00 | Each | 3,188.95 | 63,779.00 |
| 1.10 | Supplying and fixing two module stepped type electronic fan regulator on the existing modular plate switch box including connections but excluding modular plate etc. as required | 20.00 | Each | 462.30 | 9,246.00 |
| 1.11 | Supplying and fixing following modular switch/ socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required | | | | |
| 1.11.1 | 6 pin 15/16 A socket outlet | 1.00 | Each | 251.85 | 252.00 |
| 1.11.2 | 25A Motor Starter (for AC-2 Module) | 1.00 | Each | 728.00 | 728.00 |
| 1.12 | Supplying and drawing co-axial TV cable RG-6 grade, 0.7 mm solid copper conductor PE insulated, shielded with fine tinned copper braid and protected with PVC sheath in the existing surface / recessed steel / PVC conduit as required | 80.00 | Meter | 62.10 | 4,968.00 |

| | | | | | |
|---|---|---|---|---|---|
| 1.13 | Supplying and fixing following size / modules, GI box along with modular base & cover plate for modular switches in recess etc. as required | | | | |
| 1.13.1 | 1 or 2 Module (75mmX75mm) | 13.00 | Each | 407.10 | 5,292.00 |
| 1.13.2 | 3 Module (100mmX75mm) | 2.00 | Each | 441.60 | 883.00 |
| 1.14 | Supplying and fixing following way, single pole and neutral, sheet steel, MCB distribution board, 240 V, on surface / recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB / RCCB / Isolator) | | | | |
| 1.14.1 | 12-way, Double door | 1.00 | Each | 3,301.65 | 3,302.00 |
| 1.15 | Supplying and fixing following way, horizontal type three pole and neutral, sheet steel, MCB distribution board, 415 V, on surface / recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB / RCCB / Isolator) | | | | |
| 1.15.1 | 4 way (4 + 12), Double door | 1.00 | Each | 5,033.55 | 5,034.00 |
| 1.15.2 | 8 way (4 + 24), Double door | 1.00 | Each | 7,287.55 | 7,288.00 |
| 1.16 | Supplying and fixing of following ways surface / recess mounting, vertical type, 415 V, TPN MCB distribution board of sheet steel, dust protected, duly powder painted, inclusive of 200 A tinned copper bus bar, common neutral link, earth bar, din bar for mounting MCBs (but without MCBs and incomer) as required. (Note: Vertical type MCB TPDB is normally used where 3 phase outlets are required.) | | | | |
| 1.16.1 | 4 way (4 + 12), Double door | 4.00 | Each | 9,143.65 | 36,575.00 |
| 1.16.2 | 8 way (4 + 24), Double door (MCCB incomer) | 4.00 | Each | 12,332.60 | 49,330.00 |
| 1.17 | Supplying and fixing 5 A to 32 A rating, 240 / 415 V, 10 kA, "C" curve, miniature circuit breaker suitable for inductive load of following poles in the existing MCB DB complete with connections, testing and commissioning etc. as required | | | | |
| 1.17.1 | Single pole | 62.00 | Each | 327.75 | 20,321.00 |
| 1.17.2 | Double pole | 1.00 | Each | 800.40 | 800.00 |
| 1.17.3 | Triple pole | 24.00 | Each | 1,230.50 | 29,532.00 |
| 1.18 | Supplying and fixing following rating, 240 / 415 V, 10 kA, "C" curve, miniature circuit breaker suitable for inductive load of following poles in the existing MCB | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | DB complete with connections, testing andcommissioning etc. as required | | | | |
| 1.18.1 | 63 A FP | 8.00 | Each | 3,078.00 | 24,624.00 |
| 1.18.2 | 63 A TP | 10.00 | Each | 2438.00 | 24,380.00 |
| 1.19 | Supplying and fixing following rating, four pole, 415 V, isolator in the existing MCB DB complete with connections, testing and commissioning etc. as required | | | | |
| 1.19.1 | 40 A | 1.00 | Each | 1,206.35 | 1,206.00 |
| 1.19.2 | 63 A | 7.00 | Each | 1,282.25 | 8,976.00 |
| 1.20 | Providing and fixing M.V. danger notice plate of 200 mm X 150 mm, made of mild steel, at least 2 mm thick, and vitreous enamelled white on both sides, and with inscription in single red colour on front side as required | 10.00 | Each | 362.25 | 3,623.00 |
| 1.21 | Supplying, installation by suspension on ceiling, testing and commissioning of following capacity Sandwich Type Rising Mains for use on 3 phase 4 wire 415 volts, 50Hz A.C. supply with metal clad enclosure having IP-54 rating after fixing the tap off boxes and all accessories, made of 1.6mm thick steel sheet duly powder coated in convenient sections complete with 4 Nos aluminium bus bars having current density of 130 A/sq cm at nominal current rating, necessary joints, elbow joints & expansion joints and bends, fire barrier at each floor, provision of tapping at every metre, adopter box and copper flexible for joints, continuous earthing with 2 Nos aluminium strip of suitable size (one on each side) including, G.I. clamping brackets, suspenders, angle iron bracket, steel fasteners, connecting to earthing system etc. as required | | | | |
| 1.21.1 | 400 A, Isc= 25kA for 1 sec | 46.00 | Meter | 18,625.40 | 8,56,768.00 |
| 1.21.2 | 800 A, Isc= 50kA for 1 sec | 18.00 | Meter | 26,267.15 | 4,72,809.00 |
| 1.22 | Supplying, installation, testing & commissioning of following capacity End Feed Unit for the existing Air Insulated Compact Type bus trunking/ rising mains for use on 3 phase 4 wire 415 volts, 50Hz A.C. supply made with 1.6mm thick steel sheet enclosure (IP54) duly powder coated with provision of MCCB / ACB (but without MCCB / ACB) complete with necessary joints including clamping brackets, angle iron bracket, steel fasteners, connecting to earthing system etc. as required | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 1.22.1 | 400 A, Isc= 30kA for 1 sec | 2.00 | Each | 13,671.20 | 27,342.00 |
| 1.22.2 | 800 A, Isc= 50kA for 1 sec | 1.00 | Each | 21,587.80 | 21,588.00 |
| 1.23 | Supplying, installation, testing & commissioning of following capacity Plug In / tap off box on the existing Air Insulated Compact Type bus trunking / rising mains for use on 3 phase 4 wire 415 volts, 50Hz A.C. supply made with 1.6mm thick sheet steel enclosure (IP54) duly powder coated with provision of MCCB / ACB (but without MCCB / ACB) complete etc. as required | | | | |
| 1.23.1 | 125 A, Isc= 15kA for 1 sec | 22.00 | Each | 10,469.60 | 2,30,331.00 |
| 1.23.2 | 200 A, Isc= 25kA for 1 sec | 2.00 | Each | 10,469.60 | 20,939.00 |
| 1.23.3 | 250 A, Isc= 30kA for 1 sec | 2.00 | Each | 12,846.65 | 25,693.00 |
| 1.23.4 | 400 A, Isc= 35kA for 1 sec | 1.00 | Each | 12,846.65 | 12,847.00 |
| 1.24 | Providing and fixing following rating and breaking capacity and pole MCCB with thermomagnetic release and terminal spreaders in existing cubicle panel board including drilling holes in cubicle panel, making connections, Ics=100% Icu and Operational Voltage 690V etc. as required | | | | |
| 1.24.1 | 125 A,36KA, FPMCCB | 26.00 | Each | 9,940.60 | 258,456.00 |
| 1.24.2 | 200 A,36KA, FPMCCB | 2.00 | Each | 18,349.40 | 36,699.00 |
| 1.24.3 | 250 A,36KA, FPMCCB | 2.00 | Each | 21,127.80 | 42,256.00 |
| 1.24.4 | 400 A,50KA, FPMCCB | 1.00 | Each | 51,362.45 | 51,362.00 |
| 1.24.5 | 800 A, 50 KA, FPMCCB | 1.00 | Each | 81,344.00 | 81,344.00 |
| 1.25 | LED Down lighter (SMD Type) (System lumen efficacy ≥ 105 < 120lm/Watt) Supplying, installation, Testing & Commissioning of LED Recessed / surface Down lighter (Round / square / Rectangular) SMD type of following body material with PMMA and prismatic diffuser and construction as per IS : 10322 with driver as per the requirement with Driver efficiency >85%, Operating voltage AC 140-270 Volt, frequency 50 / 60 hz, Operating temp range -5 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 , UGR (Unified Glare Rating) < 19, Flicker free (flicker should be below 5%), life time (LED, Driver & electrical circuitry), of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends , CCT 3000°K / 4000°K / 5700°K / 6500°K (As per ANSI Bin), SDCM (Standard Deviation Colour Matching) <3, Maximum power consumption should | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | not more than the specified rating and Fixture shall be confirming to relevant BIS standards 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 and <120 lm/Watt output. LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C) Powder coated die cast / Extruded aluminium Body including trim | | | | |
| 1.25.1 | 12-15 Watt | 129.00 | Each | 822.25 | 1,06,070.00 |
| 1.26 | LED Batten light (System lumen efficacy ≥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 -5 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 circuitry), of minimum 50000 Burning Hours with , 70% of initial Lumen maintained till life ends, CCT 3000°K / 4000°K / 5700°K / 6500°K (As per ANSI Bin), SDCM (Standard Deviation Colour Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard 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 and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C). Powder coated die cast / Extruded aluminium Body (Thickness > 1.20 mm) | | | | |
| 1.26.1 | 18- 22 Watt | 23.00 | Each | 783.15 | 18,012.00 |
| 1.27 | Supply, Installation, Testing and Commissioning of ceiling fan with Brush Less Direct Current (BLDC) Motor, class of insulation: B, 3 nos. metal (Aluminium alloy) blades, 30 cm long down rod, 2 nos. canopies, shackle kit, safety rope, copper winding, steel / Al body Power Factor not less than 0.9, Service Value (CM/M/W) minimum as below, 350 RPM (tolerance as per IS : 374-2019), THD (Total Harmonic Distortion)less than 10%, suitable for operation with regulator for speed control and all remaining accessories including safety pin, nut bolts, washers, temperature rise=75 0C (max.), insulation resistance more than 2 mega ohm, suitable for 230 V, 50 Hz, single phase AC supply, Ceiling Fan compliant to IS 374:2019 fan i/c external connections with 1.5 sq.mm FRLS / HFFR, PVC insulated copper conductor single core cable and earthing etc. as required. | | | | |
| 1.27.1 | 1200mm, service value ≥ 6.0 CM/Min/Watt, air delivery 210 CM/Min (Minimum) | 19.00 | Each | 3,099.25 | 58,886.00 |
| 1.28 | Supplying, Installation, Testing and commissioning of Passive Infrared (PIR) technology-based occupancy sensor having high performance, non-regulating programmable type, suitable for connected load upto 10Amp, for mounting height up to 3 meter and for 5 m diameter coverage area along with necessary fixing arrangements i/c programming at site etc. complete as required | 34.00 | Each | 5,630.40 | 1,91,434.00 |
| 1.29 | Supplying, Installation, Testing and commissioning of Microwave technology-based occupancy sensor having high performance, non-regulating programmable type, suitable | 24.00 | Each | 14,392.25 | 3,45,414.00 |

| | | | | | |
|---|---|---|---|---|---|
| | for connected load upto 10 Amp, for mounting height up to 3 meter and for 5m x 20m coverage area along with necessary fixing arrangements i/c programming at site etc. complete as required | | | | |
| 1.30 | Installation, Testing and Commissioning of pre-wired, fluorescent fitting / compact fluorescent / LED fitting of all types, complete with all accessories and tube / lamp etc. directly on ceiling / wall, including connections with 1.5 sq. mm FRLS / HFFR PVC insulated, copper conductor, single core cable and earthing etc. as required | 833.00 | Each | 297.85 | 2,48,109.00 |
| 1.31 | Installation, Testing and Commissioning of pre-wired, fluorescent fitting / compact fluorescent / LED fitting of all types, complete with all accessories and tube / lamp etc., including supplying and fixing ball and socket arrangement, 2 Nos. down rods of 20 mm dia. X 1.6 mm thick steel conduit upto 30 cm length, painting and wiring the down rods and connections with 1.5 sq. mm FRLS / HFFR PVC insulated, copper conductor, single core cable and earthing etc. as required | 26.00 | Each | 639.40 | 16,624.00 |
| 1.32 | Supplying, installation Testing and commissioning of 400 mm sweep wall fan having double ball bearing, 1500 rpm, air delivery not less than 76 cmm, including fixing, connection etc. complete as required | 112.00 | Each | 2,590.00 | 2,90,080.00 |
| 1.33 | Supplying, installation Testing and commissioning of 300 mm sweep exhaust fan in the existing opening suitable for 230 V AC, 1400 RPM i/c providing & fixing louver and shutter etc. and connection with 3 x 1.5 sq. mm PVC insulated PVC sheathed copper conductor round cable etc.as required | 50.00 | Each | 4,683.00 | 2,34,150.00 |
| 1.34 | Supplying, installation Testing and commissioning of 200 mm sweep exhaust fan in the existing opening suitable for 230 V AC, minimum 900RPM i/c providing & fixing louver and shutter etc. and connection with 3 x 1.5 sq. mm PVC insulated PVC sheathed copper conductor round cable etc.as required | 16.00 | Each | 1,897.00 | 30,352.00 |
| 1.35 | Supplying, installation Testing and commissioning of 2 Ft, Metal housing LED Batten Light, not more than 12W, minimum Lumen efficacy 100 lm/watt | 2.00 | Each | 606.00 | 1,212.00 |

| | | | | | |
|---|---|---|---|---|---|
| | suitable for 230 V AC, 50HZ Ac supply, connection etc. as required | | | | |
| 1.36 | Supplying, installation Testing and commissioning of instant water heater Geyser 5 Ltr., for 230V, 50 Hz AC supply, minimum 2000 Watt, with Thermostat, thermal cut out, LED indicator, minimum tank warranty 5 Years and other parts 2 Years. connection etc. as required | 8.00 | Each | 5,078.00 | 40,624.00 |
| 1.37 | Supplying, installation Testing and commissioning of instant water heater Geyser 20 Ltr., for 230V, 50 Hz AC supply, minimum 2000 Watt, with Thermostat, thermal cut out, LED indicator, minimum tank warranty 7 Years and other parts 2 Years. connection etc.as required | 12.00 | Each | 12,562.00 | 1,50,744.00 |
| | LED Illuminated Signage | | | | |
| 1.38 | Supply installation testing commissioning of ceiling / pendent mounted single / double sided LED signage light, Minimum size 350mm X 160mm, green / red colour laser engraved signage matter with inbuilt Li-Ion rechargeable battery min 2200 mAh or 1 hrs. backup, suitable for 160-240V supply complete with Mounting chain etc as required | | | | |
| 1.38.1 | Single sided Led Signage | 30.00 | Each | 8,979.00 | 2,69,370.00 |
| 1.39 | Supply Laying and termination of PVC Insulated and PVC Round Sheathed Multi Core Bright Annealed Bare Copper Conductor Cables for Voltage Grade 1100 Volts as per IS: 694:2010 | | | | |
| 1.39.1 | 2C X 1.5 sq. CU cable | 600.00 | Meter | 118.00 | 70,800.00 |
| 1.40 | Supplying, installation Testing and commissioning of Bulkhead not less than 10W, suitable for 240V, 50HZ Ac Supply polycarbonate housing which is known for its high impact resistance of IK08 and ability to withstand harsh environmental conditions with IP65 protection. With 120 Lm/W efficacy & 4kV inbuilt surge protection, it is used in commercial, industrial, and residential settings, providing reliable lighting solutions for various applications connection etc. as required | 16.00 | Each | 1,090.00 | 17,440.00 |
| 1.41 | Providing and laying of MS checkered plate 8 mm thick (With checkered) duly cut and drilled in required sizes, 10 mm dia. lifting MS handles and painting with | 100.00 | Sq. Mtr. | 7,324.00 | 7,32,400.00 |

| | | | | | |
|---|---|---|---|---|---|
| | black synthetic paint over red oxide primer complete as required | | | | |
| 1.42 | Providing and fixing of MS Angles of size 40mm X 40mm X 5mm thick duly cut and drilled in required sizes, for supporting MS checkered plates, and painting with black synthetic paint over red oxide primer complete as required | 300.00 | Mtr. | 461.00 | 1,38,300.00 |
| 1.43 | Installation Testing and commissioning of 400 mm sweep wall fan having double ball bearing, 1500 rpm, air delivery not less than 76 cmm, including fixing, connection etc. complete as required | 85.00 | Each | 279.00 | 23,715.00 |
| 1.44 | Supplying and fixing following rating, four pole, (three phase and neutral), 415 volts, ISI marked, as per IS 12640-1 residual current circuit breaker (RCCB), having a sensitivity current 300 mA in the existing MCB DB complete with connections, testing and commissioning etc. as required | | | | |
| 1.44.1 | 63 A FP | 8.00 | Each | 6,494.00 | 51,952.00 |
| 1.45 | Supplying, Installation, Testing and commissioning of High Bay Light suitable for 230 V. 50 HZ AC supply including driver, Fastner, etc. as required, efficacy 160 Lumen/watt, colour temperature 5700K, not less than 100Watt, IP 65 protection and 5 Year minimum warranty complete as required | 8.00 | Each | 10,810.00 | 86,480.00 |
| 1.46 | Supply & laying of XLPE insulated PVC sheathed Copper conductor 1.1 KV grade steel unarmoured cable confirming to IS 7908 (Part-I) as amended up to date of following sizes in Pipe / Open Duct / Cable Tray etc as required | | | | |
| 1.46.1 | 3.5 X 35 sq. mm | 50.00 | mtr. | 4,739.00 | 2,36,950.00 |
| | Sub-Total | | | | ₹ 76,41,416.00 |
| 2 | Sub-Head- II (Earthing & Lightning arrester) | | | | |
| 2.1 | Earthing with G.I. earth pipe 4.5 Meter long, 40 mm dia. including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe etc. with charcoal/ coke and salt as required. | 6.00 | Each | 8,806.70 | 52,840.00 |
| 2.2 | 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 Meter long etc. with charcoal / coke and salt as required | 28.00 | Each | 9,603.65 | 2,68,902.00 |

| | | | | | |
|---|---|---|---|---|---|
| 2.3 | Earthing with copper earth plate 600 mm X 600 mm X 3 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 Meter long etc. with charcoal / coke and salt as required | 12.00 | Each | 17,254.60 | 2,07,055.00 |
| 2.4 | 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 | 200.00 | Meter | 868.25 | 1,73,650.00 |
| 2.5 | Providing and fixing 25 mm X 5 mm copper strip in 40 mm dia. G.I. pipe from earth electrode including connection with brass nut, bolt, spring, washer excavation and re-filling etc. as required | 90.00 | Meter | 1,883.70 | 1,69,533.00 |
| 2.6 | Providing and fixing 25 mm X 5 mm copper strip on surface or in recess for connections etc. as required | 75.00 | Meter | 1,432.90 | 1,07,468.00 |
| 2.7 | Providing and fixing 25 mm X 5 mm G.I. strip on surface or in recess for connections etc. as required | 175.00 | Meter | 330.05 | 57,759.00 |
| 2.8 | Providing and fixing 6 SWG dia. G.I. wire on surface or in recess for loop earthing as required | 100.00 | Meter | 96.60 | 9,660.00 |
| 2.9 | Providing and fixing 4.00 mm dia. copper wire on surface or in recess for loop earthing as required | 100.00 | Meter | 198.95 | 19,895.00 |
| 2.10 | Providing and fixing of lightning conductor finial, made of 25 mm dia. 300 mm long, G.I. tube, having single prong at top, with 85 mm dia. 6 mm thick G.I. base plate including holes etc. complete as required | 30.00 | Each | 700.35 | 21,011.00 |
| 2.11 | Jointing copper / G.I. tape (with another copper / G I tape, base of the finial or any other metallic object) by riveting / nut bolting / sweating and soldering etc. as required | 195.00 | Each | 159.85 | 31,171.00 |
| 2.12 | Providing and fixing G.I. tape 20 mm X 3 mm thick on parapet or surface of wall for lightning conductor complete as required. (For horizontal run) | 420.00 | Meter | 170.20 | 71,484.00 |
| 2.13 | Providing and fixing G.I. tape 20 mm X 3 mm thick on parapet or surface of wall for lightning conductor complete as required. (For vertical run) | 175.00 | Meter | 273.70 | 47,898.00 |
| 2.14 | Providing and laying G.I. tape 32 mm X 6 mm from earth electrode directly in ground as required | 50.00 | Meter | 254.15 | 12,708.00 |
| 2.15 | Providing and fixing testing joint, made of 20 mm X 3 mm thick G.I. strip, 125 mm long, with 4 nos. of G.I. bolts, nuts, | 26.00 | Each | 161.00 | 41,86.00 |

| | | | | | |
|---|---|---|---|---|---|
| | chuck nuts and spring washers etc. complete as required | | | | |
| | Sub-Total | | | | ₹ 12,55,220.00 |
| 3 | Sub Head- III (Feeder Pillar, Cable, Street Light) | | | | |
| | LED Flood Light, powder coated pressure die cast aluminium (System lumen efficacy 105 <120 lm/Watt) | | | | |
| 3.1 | Supplying, Installation, Testing & Commissioning of Flood Light, powder coated pressure die cast aluminium body with built in or separate driver as per the requirement with Driver efficiency >85%, Input voltage: Input voltage: 140-270 Volt AC, frequency 50/60 hz, Operating temp range -5 0C to 50 0C, internal surge protection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency >85%,THD < 10% as per IEC 61000-3-2, P. F.≥0.95, IP-66,IK-10, CRI >70, under voltage and over voltage protection, EMI-EMC as per CISPR -15, lenses for beam angle 30 deg- 120 deg as per the application and the project requirement, suitable tilt able fitting, life time (LED, Driver & electrical circuitry) of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report, CCT 3000°K / 4000°K / 5700°K / 6500°K (As per ANSI Bin), SDCM (Standard Deviation Colour Matching) <5, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard complete in all respect i/c external connections with 1.5 sq mm FRLS / HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy ≥105 <120 lm/Watt output. LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C) | | | | |
| 3.2.1 | 70 watt | 6 | each | 2,431.10 | 14,587.00 |
| 3.2 | LED Street light fixture, powder coated pressure die cast aluminium body | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | (System lumen efficacy ≥105 <120 lm/Watt) | | | | |
| | Supplying, installation, Testing & Commissioning of Street light LED fixture powder coated pressure die cast aluminium body with driver as per the requirement with Driver efficiency >85%, Input voltage: 140-270 Volt AC, frequency 50/60 hz, Operating temp range -5 $^0$C to 50 $^0$C, internal surge protection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency >85%,THD < 10% as per IEC 61000-3-2, P. F.≥0.95, IP-66,IK-10, CRI >70, under voltage and over voltage protection, EMI EMC As per CISPR -15, lenses for beam angle as per IESNA type I/II/III as per the width of the road and the project requirement., suitable to fit in up to 65mm dia. pipe, life time (LED, Driver & electrical circuitry) of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report, CCT 3000°K / 4000°K / 5700°K / 6500°K (As per ANSI Bin), SDCM (Standard Deviation Colour Matching) <5, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard complete in all respect i/c external connections with 1.5 sq.mm FRLS / HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy ≥105 <120 lm/Watt output. LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C) | | | | |
| 3.2.1 | 72 watt | 25.00 | each | 2,208.00 | 55,200.00 |
| 3.3 | Supply, Installation, Testing and Commissioning of LED Post top Lantern fittings on existing Street Light Pole having lumen output not less than 4000 lumens, lumen efficacy 100 LPW, having glass cover, CRI > 70, THD < 10%, in built surge protection 4 KV, IP65 made of high-pressure aluminum metallic housing, integral driver suitable | 40.00 | each | 7,381.00 | 2,95,240.00 |

| | | | | | |
|---|---|---|---|---|---|
| | for 220-240 V,50 Hz AC supply including necessary nuts and bolts for fixing on the existing Street light pole complete etc. as reqd. | | | | |
| 3.4 | Supply and installation of hot dip Galvanized Octagonal pole of 6.0-meter heights made of 3 mm thick sheet steel single section having bottom dia. of 130 mm and top dia. of 70 mm i/c built in control gear box, with base plate of 220 mm X 220 mm X 12 mm suitable for wind speed as per IS: 875 complete with existing RCC foundation and grouting 4 nos. M20 x 600 mm "J" type foundation bolts etc. (Foundation Bolt to be supplied with pole) suitable for mounting existing single / double arm bracket. Pole should be finished with flush door of min 400 mm length at a height of 500 mm from the base plate with proper strengthening to the cut-out of the door opening. Each pole shall be complete with 6 mm thick Bakelite sheet complete with DIN rail, 6 Amps, 10 KA SP MCB, heavy duty connector suitable upto 25 sq.mm. terminations, connection with 1.5 sqmm FRLS / HFFR Cable upto fittings & Earth Stud etc. complete as required | 75.00 | Each | 20,327.00 | 15,24,525.00 |
| 3.5 | Supply & installation of pole mounted hot deep galvanised steel street light bracket suitable for 70mm pole top of following length made of 40 mm dia. (nominal bore) medium class hot deep galvanised steel pipe with suitable tilt angle welded with GI pole cap of suitable diameter medium class hot dip galvanised steel pipe 30 c.m. long and covered with 3 mm thick GI plate at the pole cap | | | | |
| 3.5.1 | Single over hung suitable for mounting one No. street light fitting 1.5 mtr long | 60.00 | each | 1,598.00 | 95,880.00 |
| 3.5.2 | Double over hung suitable for mounting two Nos. street light fitting 1.5 mtr long | 15.00 | each | 2,678.00 | 40,170.00 |
| 3.6 | Providing and laying suitable R.C.C foundation of Galvanized Octagonal Pole (as per OEM manufacturer's design and specification ) with 1:2:4 (1 cement : 2 Corse sand : 4 graded stone aggregate of 20 mm dia. nominal size) with steel reinforcement, over the base of 75 mm thick PCC (1:5:10) on brick soling at base including excavation of earth including dressing of sides and ramming of bottoms, required | 25.00 | cum | 21,510.00 | 5,37,750.00 |

| | | | | | |
|---|---|---|---|---|---|
| | shuttering, 15mm thick cement plaster of mix 1:4 (1 cement : 4 fine sand) of exposed RCC collar & double coat primer, painting complete as required | | | | |
| 3.7 | Installation, Testing and Commissioning of existing LED street light fittings of 60 - 90 Watt on existing 6-meter height octagonal pole bracket etc.as required. (Fittings will be supplied Departmentally) | 65.00 | each | 251.00 | 16,315.00 |
| 3.8 | STREET LIGHT FEEDER PILLER | | | | |
| | Supply installation testing commissioning of floor mounted dust vermin proof duly powder coated of approved shade compartmentalised double door cubical type feeder pillar with ingress protection of IP 55 having front openable doors with neoprene rubber gasket with locking arrangement and hinged door for switchgear compartment, | | | | |
| | Fabricated from 2mm thick CRCA sheet steel (Tapered top fabricated from 3mm thick CRCA sheet) including 50mm X 50mm X 6 mm angle iron frame at base, including providing and fixing the following mounting and accessories there in complete with detachable gland plates made of 3mm thick CRCA sheet. Suitable for 415V 50Hz 3 phase AC supply | | | | |
| | Incomer:<br>1 No. 63 Amps. Four pole MCCB of fault breaking capacity 25 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt extended rotary Operating Handle | | | | |
| | LED indication lamps (R/Y/B) | | | | |
| | Busbar: 100A 415V 4W Aluinium Bus | | | | |
| | Out Going: | | | | |
| | Street Light Control | | | | |
| | 32A 10 KA 'C' curve DP MCB -3 No. | | | | |
| | 1 no astronomical timer switch with 4 pole contractor - 1 set | | | | |
| | Auto Manual switch - 1 No. | | | | |
| | 7 Nos. 20 KA 'C' curve SP MCB as outgoing | | | | |
| | 1 No. 32 Amps. Four pole MCCB of fault breaking capacity 25 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt extended rotary Operating Handle | | | | |
| | Indication LED lamp for phase as required | | | | |
| 3.8.1 | Street Light feeder Panel complete as required | 2.00 | Set | 1,22,550.00 | 2,45,100.00 |

| | | | | | |
|---|---|---|---|---|---|
| 3.9 | Supply, Installation, Testing and Commissioning Outdoor type IP 66 rated Polycarbonate Cable Junction Box of suitable size for 10-16 sqmm cable termination with heavy duty connector & connections with 3 X 1.5 sqmm. FRLS / HFFR PVC insulated Copper cable complete as required | 20.00 | each | 1,650.00 | 33,000.00 |
| | DWC Pipe | | | | |
| 3.10 | Supplying and laying of following size DWC HDPE pipe ISI marked along with all accessories like socket, bend, couplers etc. conforming to IS 14930, Part II complete with fitting and cutting, jointing etc. direct in ground (75 cm below ground level) including excavation and refilling the trench but excluding sand cushioning and protective covering etc., complete as required | | | | |
| 3.10.1 | 63 mm dia. (OD-63 mm & ID-51 mm nominal) | 4,000.00 | Meter | 332.35 | 13,29,400.00 |
| 3.10.2 | 120 mm dia. (OD-120 mm & ID-103 mm nominal) | 2,220.00 | Meter | 479.55 | 10,64,601.00 |
| 3.10.3 | 200 mm dia. (OD-200 mm & ID-175 mm nominal) | 3,300.00 | Meter | 842.95 | 27,81,735.00 |
| | GI Pipe | | | | |
| 3.11 | 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 | | | | |
| 3.11.1 | 100 mm dia. | 120.00 | mtr. | 2,205.70 | 2,64,684.00 |
| 3.11.2 | 150 mm dia. | 100.00 | mtr. | 3,328.10 | 3,32,810.00 |
| | Cable Laying | | | | |
| 3.13 | Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size in the existing RCC / HUME / METAL pipe as required | | | | |
| 3.13.1 | Upto 35 sq. mm | 2,555.00 | mtr. | 54.05 | 1,38,098.00 |
| 3.13.2 | Above 35 sq. mm and upto 95 sq. mm | 550.00 | mtr. | 82.80 | 45,540.00 |
| 3.13.3 | Above 95 sq. mm and upto 185 sq. mm | 510.00 | mtr. | 111.55 | 56,891.00 |
| 3.13.4 | Above 185 sq. mm and upto 400 sq. mm | 6,885.00 | mtr. | 195.50 | 13,46,018.00 |
| 3.14 | Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size in the existing masonry open duct as required | | | | |
| 3.14.1 | Upto 35 sq. mm | 310.00 | mtr. | 41.40 | 12,834.00 |
| 3.14.2 | Above 35 sq. mm and upto 95 sq. mm | 60.00 | mtr. | 66.70 | 4,002.00 |
| 3.14.3 | Above 95 sq. mm and upto 185 sq. mm | 70.00 | mtr. | 92.00 | 6,440.00 |
| 3.14.4 | Above 185 sq. mm and upto 400 sq. mm | 295.00 | mtr. | 167.90 | 49,531.00 |

| | | | | | |
|---|---|---|---|---|---|
| 3.15 | Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size on wall surface as required | | | | |
| 3.15.1 | Upto 35 sq. mm (clamped with 1mm thick saddle) | 95.00 | mtr. | 73.60 | 6,992.00 |
| 3.15.2 | Above 35 sq. mm and upto 95 sq. mm (clamped with 25x3mm MS flat clamp) | 40.00 | mtr. | 173.65 | 6,946.00 |
| 3.15.3 | Above 95 sq. mm and upto 185 sq. mm (clamped with 25/40x3mm MS flat clamp) | 40.00 | mtr. | 207.00 | 8,280.00 |
| 3.15.4 | Above 185 sq. mm and upto 400 sq. mm (clamped with 40x3mm MS flat clamp) | 30.00 | mtr. | 311.65 | 9,350.00 |
| 3.16 | Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size on cable tray as required | | | | |
| 3.16.1 | Upto 35 sq. mm (clamped with 1mm thick saddle) | 580.00 | mtr. | 60.95 | 35,351.00 |
| 3.16.2 | Above 35 sq. mm and upto 95 sq. mm (clamped with 25x3mm MS flat clamp) | 50.00 | mtr. | 125.35 | 6,268.00 |
| 3.16.3 | Above 95 sq. mm and upto 185 sq. mm (clamped with 25/40x3mm MS flat clamp) | 50.00 | mtr. | 158.70 | 7,935.00 |
| 3.16.4 | Above 185 sq. mm and upto 400 sq. mm (clamped with 40x3mm MS flat clamp) | 30.00 | mtr. | 259.90 | 7,797.00 |
| 3.17 | Supplying and making end termination with brass compression gland and aluminium / Cu lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required | | | | |
| 3.17.1 | 3 X 10 sq. mm (22mm) | 140.00 | Each | 358.80 | 50,232.00 |
| 3.17.2 | 3½ X 25 sq. mm (28mm) | 20.00 | Each | 426.65 | 8,533.00 |
| 3.17.3 | 3 X 35 sq. mm (28mm) | 26.00 | Each | 481.85 | 12,528.00 |
| 3.17.4 | 4 X 10 sq. mm (25mm Cu cable) | 40.00 | Each | 413.00 | 16,520.00 |
| 3.17.5 | 3½ X 35 sq. mm (32mm Cu cable) | 10.00 | Each | 666.00 | 6,660.00 |
| 3.17.6 | 4 X 16 sq. mm (28mm) | 16.00 | Each | 420.90 | 6,734.00 |
| 3.17.7 | 3½ X 50 sq. mm (35mm) | 14.00 | Each | 556.60 | 7,792.00 |
| 3.17.8 | 3½ X 70 sq. mm (35mm) | 10.00 | Each | 623.30 | 6,233.00 |
| 3.17.9 | 3½ X 150 sq. mm (50mm) | 10.00 | Each | 917.70 | 9,177.00 |
| 3.17.10 | 3½ X 185 sq. mm (57mm) | 6.00 | Each | 1,151.15 | 6,907.00 |
| 3.17.11 | 3½ X 240 sq. mm (62mm) | 6.00 | Each | 1,334.00 | 8,004.00 |
| 3.17.12 | 3½ X 300 sq. mm (70mm) | 38.00 | Each | 1,536.40 | 58,383.00 |
| 3.17.13 | 3½ X 400 sq. mm (82mm) | 4.00 | Each | 1,969.95 | 7,880.00 |
| 3.18 | Supply of XLPE insulated PVC sheathed aluminium conductor 1.1 KV grade steel armoured UG cable confirming to IS 7908 (Part-I) as amended up to date of following sizes | | | | |
| 3.18.1 | 3 X 10 sq. mm | 480.00 | mtr. | 289.00 | 1,38,720.00 |
| 3.18.2 | 3½ X 25 sq. mm | 150.00 | mtr. | 452.00 | 67,800.00 |
| 3.18.3 | 3 X 35 sq. mm | 120.00 | mtr. | 527.00 | 63,240.00 |

| | | | | | |
|---|---|---|---|---|---|
| 3.18.4 | 4 X 16 sq. mm | 160.00 | mtr. | 410.00 | 65,600.00 |
| 3.18.5 | 3½ X 70 sq. mm | 200.00 | mtr. | 1060.00 | 2,12,000.00 |
| 3.18.6 | 3½ X 240 sq. mm | 340.00 | mtr. | 3167.00 | 10,76,780.00 |
| 3.18.7 | 3½ X 400 sq. mm | 40.00 | mtr. | 4983.00 | 1,99,320.00 |
| 3.19 | Supplying and fixing cable route marker with 10 cm X 10 cm X 5 mm thick G.I. plate with inscription there on, bolted / welded to 35 mm X 35 mm X 6 mm angle iron, 60 cm long and fixing the same in ground as required | 30.00 | Each | 687.70 | 20,631.00 |
| | Feeder Pillar | | | | |
| 3.20 | Supply installation testing commissioning of floor mounted, dust & vermin proof, outdoor type feeder pillar shall be suitable for 415 V, 50 Hz, 3-phase, 4-wire AC supply fabricated from 2mm thick CRCA sheet steel (Tapered top fabricated from 3mm thick CRCA sheet with drip edge) duly powder coated of approved shade after seven-tank pre-treatment process, including 50mm X 50mm X 6 mm or higher angle iron base frame, compartmentalised, double door cubical type feeder pillar with ingress protection of IP 55 having front, back openable doors with neoprene rubber gasket (3 mm) with locking arrangement and hinged door for switchgear compartment, 25 × 6 mm copper earth bar running throughout the panel, with 02 ( Two ) external earth studs, 2.5 sqmm internal wiring with FRLS / HFFR Copper Conductor (Class 2), Engraved labels for all feeders, Lifting Hooks, Separate cable chamber, "415 V Danger" plate | | | | |
| | including providing and fixing the following mounting and accessories there in complete with detachable gland plates made of 3mm thick CRCA sheet suitable for 415V 50Hz 3 phase AC supply | | | | |
| 3.20.1 | Non-Essential Feeder Pillar-I (Min depth 800 mm) | | | | |
| | 1 Nos. 800 Amps, Uimp= 12KVp. each four pole horizontal draw out type air circuit breaker of fault breaking capacity 50 KA (Ics = 100 % Icu = Icw for one second up to 433 V) Electrically (EDO) operated, microprocessor controlled Modular ACB with LSIGN release (zone: O/L with time delay, S/C instantaneous, adjustable earth fault & neutral protection with min 4-time settings in | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | LSG conforming to relevant IS / IEC standard. | | | | |
| | i) Prewired Metering Module with Digital Type Voltmeter-1 no | | | | |
| | ii) Digital multi-function meter with LED Display for V, A, PF, KW, KVA, KVAR, THD-V & I, Frequency. With resin cast CT of 800 A / 5 A - 1 set | | | | |
| b) | 800A 4 pole manual Changeover -1 no | | | | |
| | Incoming terminals should be suitable for termination of Cable termination upto 4 run of size 3.5 X 300 sqmm. Al armoured cable | | | | |
| | BUS BAR | | | | |
| c) | Busbar shall be made of high conductivity 99% purity, electrical-grade aluminium TPN (having 100% Neutral) of minimum of 1000 Amps. Capacity, 415 V, 4 Way with heat shrinkable coloured sleeves etc. for withstanding fault level of 50 KA for 1 Sec. | | | | |
| | Out Going: | | | | |
| d) | 1 No. 630 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with microprocessor based built in O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| | Digital multi-function meter with LED Display for V, A, PF, KW, KVA, KVAR, THD-V & I, Frequency. With resin cast CT of 630 A / 5 A - 1 set | | | | |
| e) | 1 No.- 400 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with microprocessor based built in O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| | Digital multi-function meter with LED Display for V, A, PF, KW, KVA, KVAR, THD-V & I, Frequency. With resin cast CT of 400 A / 5 A - 1 set | | | | |
| f) | 2 No. 250 Amps. each four pole MCCB (MCCB Shall have double break | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| g) | 1 No. 100 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 25 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| h) | One no Light point with 10W LED bulb & 6A switch socket | 1.00 | job | 9,76,620.00 | 9,76,620.00 |
| 3.20.2 | Non-Essential Feeder Pillar-II (minimum depth 600 mm) | | | | |
| a) | Incomer -1 No.- 630 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with microprocessor based built in O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| | Prewired Metering Module with Digital Type Voltmeter-1 no | | | | |
| | Digital multi-function meter with LED Display for V, A, PF, KW, KVA, KVAR, THD-V & I, Frequency. With resin cast CT of 630 A / 5 A - 1 set | | | | |
| b) | 630A 4 pole manual Changeover -1 no | | | | |
| | Incoming terminals should be suitable for termination of Cable termination upto 2 run of size 3.5 X 300 sqmm. Al. armoured cable | | | | |
| | BUS BAR | | | | |
| c) | Busbar shall be made of high conductivity 99% purity, electrical-grade aluminium TPN (having 100% Neutral) of minimum of 800 Amps. Capacity ,415 V, 4 Way with heat shrinkable coloured | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | sleeves etc. for withstanding fault level of 36 KA for 1 Sec | | | | |
| | Out Going: | | | | |
| c) | 1 No.- 400 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with microprocessor based built in O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| | Digital multi-function meter with LED Display for V, A, PF, KW, KVA, KVAR, THD-V & I, Frequency. With resin cast CT of 400 A / 5 A - 1 set | | | | |
| d) | 2 Nos.63 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 25 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| e) | 1 No.250 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| f) | 1 No. 160 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 25 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| g) | One no Light point with 10W LED bulb & 6A switch socket. | 1.00 | job | 5,70,640.00 | 5,70,640.00 |

| | | | | | |
|---|---|---|---|---|---|
| 3.20.3 | Essential Feeder Pillar-I (minimum depth 500 mm) | | | | |
| a) | Incomer -1 No.400 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB. | | | | |
| | Prewired Metering Module with Digital Type Voltmeter-1 no | | | | |
| | Digital multi-function meter with LED Display for V, A, PF, KW, KVA, KVAR, THD-V & I, Frequency. With resin cast CT of 400 A / 5 A - 1 set | | | | |
| b) | 400A 4 pole manual Changeover -1 no | | | | |
| | Incoming terminals should be suitable for termination of Cable termination upto 2 run of size 3.5 X 300 sqmm. Al armoured cable. | | | | |
| | BUS BAR | | | | |
| c) | Busbar shall be made of high conductivity 99% purity, electrical-grade aluminium TPN (having 100% Neutral) of minimum of 500 Amps. Capacity ,415 V, 4 Way with heat shrinkable coloured sleeves etc. for withstanding fault level of 36 KA for 1 Sec. | | | | |
| | Out Going: | | | | |
| d) | 1 No.- 320 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with microprocessor based built in O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| | Digital multi-function meter with LED Display for V, A, PF, KW, KVA, KVAR, THD-V & I, Frequency. With resin cast CT of 320 A / 5 A - 1 set | | | | |
| e) | 1 Nos. 160 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 25 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB. | | | | |
| e) | 3 Nos. 63 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 25 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| | Street Light Control | | | | |
| f) | Incoming -32A 10 KA 'C' curve FP MCB -1 | | | | |
| | 1 no astronomical timer switch with contactor - 1 set | | | | |
| | Auto Manual switch - 1 no | | | | |
| | 3 nos 20A 10KA 'C' curve SP MCB as outgoing | | | | |
| g) | One no Light point with 10W LED bulb & 6A switch socket | 1.00 | job | 5,25,291.00 | 5,25,291.00 |
| 3.20.4 | Essential Feeder Pillar-II (minimum depth 600 mm) | | | | |
| a) | Incomer -1 No. 500 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB. | | | | |
| | Prewired Metering Module with Digital Type Voltmeter-1 no | | | | |
| | Digital multi-function meter with LED Display for V, A, PF, KW, KVA, KVAR, THD-V & I, Frequency. With resin cast CT of 500 A / 5 A - 1 set | | | | |
| b) | 500A 4 pole manual Changeover -1 no | | | | |
| | Incoming terminals should be suitable for termination of Cable termination upto 2 run of size 3.5 X 300 sqmm. Al armoured cable | | | | |
| | BUS BAR | | | | |
| c) | Busbar shall be made of high conductivity 99% purity, electrical-grade aluminium TPN (having 100% Neutral) | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | of minimum of 630 Amps. Capacity ,415 V, 4 Way with heat shrinkable coloured sleeves etc. for withstanding fault level of 36 KA for 1 Sec. | | | | |
| | Out Going: | | | | |
| d) | 1 No.- 400 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with microprocessor based built in O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| | Digital multi-function meter with LED Display for V, A, PF, KW, KVA, KVAR, THD-V & I, Frequency. With resin cast CT of 400 A / 5 A - 1 set | | | | |
| e) | 1 Nos. 250 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| e) | 1 No. 100 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| f) | 2 Nos.63 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 25 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| g) | Street Light Control | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | Incoming -32A 10 KA 'C' curve FP MCB -1 | | | | |
| | 1 no astronomical timer switch with contactor - 1 set | | | | |
| | Auto Manual switch - 1 no | | | | |
| | 3 Nos 20A 10KA 'C' curve SP MCB as outgoing. | | | | |
| h) | One no Light point with 10W LED bulb & 6A switch socket | 1.00 | job | 6,37,584.00 | 6,37,584.00 |
| 3.20.5 | Essential Feeder Pillar-III (minimum depth 500 mm) | | | | |
| | Incomer: | | | | |
| a) | 1 No.- 320 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with microprocessor based built in O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| | Prewired Metering Module with Digital Type Voltmeter-1 No. | | | | |
| | Digital multi-function meter with LED Display for V, A, PF, KW, KVA, KVAR, THD-V & I, Frequency. With resin cast CT of 320 A / 5 A - 1 set | | | | |
| b) | 320 A 4 pole manual Changeover -1 no | | | | |
| | Incoming terminals should be suitable for termination of Cable termination upto 2 run of size 3.5 X 300 sqmm. Al armoured cable | | | | |
| | BUS BAR | | | | |
| c) | Busbar shall be made of high conductivity 99% purity, electrical-grade aluminium TPN (having 100% Neutral) of minimum of 400 Amps. Capacity ,415 V, 4 Way with heat shrinkable coloured sleeves etc. for withstanding fault level of 36 KA for 1 Sec. | | | | |
| c) | Busbar: 400A 415V 4W Aluinium Bus | | | | |
| | Out Going: | | | | |
| d) | 1 Nos. 250 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | spreader links with all accessories for each MCCB. | | | | |
| | Digital multi-function meter with LED Display for V, A, PF, KW, KVA, KVAR, THD-V & I, Frequency. With resin cast CT of 250 A / 5 A - 1 set | | | | |
| e) | 2 Nos.63 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 25 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| f) | 1 Nos.160 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 25 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| g) | 1 Nos.100 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| | Street Light Control | | | | |
| h) | Incoming -32A 10 KA 'C' curve FP MCB -1 | | | | |
| | 1 no astronomical timer switch with contactor - 1 set | | | | |
| | Auto Manual switch - 1 no | | | | |
| | 3 nos 20A 10KA 'C' curve SP MCB as outgoing | | | | |
| i) | One no Light point with 10W LED bulb & 6A switch socket | 1.00 | job | 4,58,348.00 | 4,58,348.00 |
| | HT Cable & Earthing | | | | |
| 3.21 | Supplying of following sizes HT Power cable of Aluminium conductor XLPE insulated galvanised flat steel strip armoured and overall PVC sheathed | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | cable conforming to IS 7098 (Part-II)/1985 etc suitable for 6.6 KV (UE) as required. | | | | |
| 3.21.1 | 3C X 240 sqmm | 50.00 | mtr. | 4,924.00 | 2,46,200.00 |
| 3.22 | Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 11 KV grade of following size in the existing masonry open duct as required. | | | | |
| 3.22.1 | Above 120 sq. mm and upto 400 sq. mm | 50.00 | mtr. | 167.90 | 8,395.00 |
| 3.23 | Supplying and making indoor cable end termination with heat shrinkable jointing kit complete with all accessories including lugs suitable for following size of 3 core, XLPE aluminium conductor cable of 11 KV grade as required: | | | | |
| 3.23.1 | 240 sq. mm | 6.00 | each | 20,026.10 | 1,20,157.00 |
| | Sub-Total | | | | ₹ 1,59,72,179.00 |
| 4 | Sub-Head- IV (Substation) | | | | |
| 4.1 | Supply, installation, testing and commissioning of following capacity (continuous loading) 6 / 0.433 KV Delta / Star ,step down, 3 Phase, 50 Hz, Dyn 11 vector group, Cast Resin Dry Type, copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better) AN (air natural) cooled transformer suitable for indoor applications with Off Load Tap Changer on HV side, manual operation of Off load tap changer HV side in range of +7.5% to -7.5% in steps of 2.5%, insulation class F (or better), suitable for environment conditions class E2 / E3, suitable for fire behaviour class F1 ,climate class-C1/C2 , having cable end boxes on HV side suitable for 3x300 sq.mm XLPE HT cable with necessary hardware, clamps, lugs etc. for termination , 1250 Amps bus trunking arrangement on LV side complete with all accessories and safety provisions as per relevant IS Code, The transformer shall be provided with standard fittings / accessories as per relevant IS and mentioned below, protection alarm / trip protection, 3 nos. of Polymeric Zinc Oxide surge Arrestors on HV Side. Winding Temperature scanner (Digital) with alarm / Trip contacts with RTD Sensors per LV winding and space for mounting differential protection CT's in LV chamber with neutral brought out separately including supplying and | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | laying of copper conductor multicore control cable from transformer to HT breaker / HT Panel for safety tripping, complete as confirming to IS 11171 & IS-2026 Part-11, i/c supplying and grouting of suitable M.S. Channel with all accessories ,complete in all respects as required at site as per CPWD specifications. Design ambient condition: | | | | |
| | a) ambient temperature 50 degree C,<br>b) Relative Humidity 90 % Max,<br>c) Percentage Impedance as per IS.<br>d) The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location, rating plate as per relevant IS Code etc. All testing shall as per relevant IS Code. Noise level Shall not exceed limits as per NEMA TR-1<br><br>The enclosure shall also have Welded Door handle, Danger plate on HV and LV side doors, caution plate for tap links for HT doors, Door limit switch on both HV and LV side doors to be wired up to WTI box terminal for tripping the transformer in case door is opened with the enclosure transformer energized, Phase marking plates on HV and LV doors | | | | |
| | Fitting and Accessories: The following fittings shall be provided:<br>a) Two earthing terminals with the earthing symbol<br>b) Rating and terminal marking plates<br>c) Thermometer pocket with cap<br>d) Lifting lugs for the complete transformer as well as for core and winding assembly<br>e) Bi-directional flat rollers<br>f) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth)<br>g) Bird guard<br>h) Name Rating & Diagram Plate<br>i) Monogram Plate<br>j) Additional neutral separately brought out on bushing for earthing | | | | |
| 4.1.1 | 630 KVA (losses as per ECBC i.e. at 50% loading < 3340 watt, losses at 100% loading < 8820 watt) | 2.00 | Each | 34,72,569.00 | 69,45,138.00 |
| | VCB Panel | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 4.2 | Supplying, Installation, testing & commissioning of Indoor type , floor mounted, metal clad VCB panel rated at 6 kV, 3 phase, 50 Hz with complete with 4 No. ( 1 no. incoming & 3 nos. outgoing) draw-out cassette type / ROF Vacuum Circuit Breaker (VCB) with horizontal / vertical isolation, single break, trip free mechanism, manually charged and auto / manually closing breaker having short circuit fault level of 25 kA & rated current 630 Amp and short time current withstand capacity of 25 kA for 3 seconds , as per IS:13118 / IEC 62271 -100 / 200 as amended up to date and additional specifications. The panel shall be modular, extensible, totally enclosed, fully interlocked & rack-in, rack - out mechanism, fabricated from 2 mm CRCA / Aluzinc sheet steel with powder coating. It shall include Air insulated HT sleeved Copper Busbar, motor operated with anti-pumping device for auto operation, mechanical ON / OFF indicator with hand trip device, manual spring charge mechanism, closing & tripping coils, auxiliary switch / contactor of 6 NO+6NC etc. The panel shall be provided with a continuous copper earth bus bar with 2 no. external earth stud etc. of suitable size. Switchgear should be Internal Arc Compliant as per standard. Cable compartment suitable for 2R X 3C x 240 sq. mm XLPE HT cable end termination (Cable entry from bottom), complete as required. The basic insulation level of entire panel shall be 20KV(RMS) / 60 KV(Peak). (Panel should be designed & manufactured at OEM in-house & Supervision during installation and complete testing & commissioning to be done by OEM. VCB, IDMT Relay must be of same make.) | | | | |
| | Busbars: | | | | |
| | Air insulated HT sleeved self-supported copper bus bars of 800 amps capacity, fault level as per OEM design | | | | |
| | (a) Incoming: | | | | |
| | (i) 1 No. 630 A, 6 KV VCB, 25 KA short circuit fault level | | | | |
| | (ii) 1 No. three phase 6 KV / root 3 / 110 V / root 3 Resin Cast PT suitable for three wire system, Class 0.5 accuracy and 100 VA burden with 1 No. Voltmeter | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | (0-15KV), Analogue type, selector switch for Voltmeter and protection fuses / MCB for HT Metering up to 12 KV on incomer & protection backed by HT & LT fuses. PT must be placed rear side of panel or on the CB trolley | | | | |
| | (iii) 1 no. 0 - 300 A Digital Ammeter with selector switches for ammeters | | | | |
| | (iv) 1 Nos. Digital multifunctional meter of class 0.50 for measurement of A, V, F, pF, KW, KVA, KVAr, KWh, Freq, odd harmonics upto 31th and having real time clock and RS 485 port | | | | |
| | (v) 1 No. Microprocessor based numerical relay with overload, short circuit, IDMT earth fault communicable on modbus protocol, for protection and Status monitoring. Master trip and Trip Ckt Supervision relay, transformer auxiliary as required for OTI, WTI & Trip functions, phase over-current protection | | | | |
| | (vi) 1 Set of 3 CT's dual core dual ratio 300 / 150 / 5 / 5 A of 15 VA burden with STC-25 KA / 1 sec and accuracy class 0.5 for metering and Class 5 P10 for protection. | | | | |
| | vii) Annunciator -8 Window with Hooter - 1Set | | | | |
| | viii) R, Y, B ON, OFF, Trip Indication with MCB - 1 Set | | | | |
| | ix) 250 W Space heater should have RH based sensor for operation of moisture control. | | | | |
| | (b) Outgoing (3 Set): | | | | |
| | (i) 3 No. 630 A, 6 KV VCB, 25 KA short circuit fault level | | | | |
| | (ii) 3 nos. 0-100 A Digital Ammeter with selector switches for ammeters. | | | | |
| | (iii) 3 Nos. Digital multifunctional meter of class 0.50 for measurement of A, V, F, pF, KW, KVA, KVAr, KWh, Freq, odd harmonics upto 31th and having real time clock and RS 485 port. | | | | |
| | (iv) 3 no. each 1 set of Microprocessor based numerical relay with overload, short circuit, IDMT earth fault communicable on modbus protocol, for protection and Status monitoring. Master trip and Trip Ckt Supervision relay, transformer auxiliary as required for OTI, WTI & Trip functions, phase over-current protection | | | | |
| | (v) 3 Set of each 3 CT's 100 / 5 A of 15 VA burden with STC-25 KA / 1 sec and | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | accuracy class 0.5 for metering and Class 5 P10 for protection. | | | | |
| | vi) Annunciator -8 Window with Hooter - 3Set | | | | |
| | vii) R, Y, B ON, OFF, Trip Indication with MCB - 1\3 Set | | | | |
| | viii) 250 W Space heater should have RH based sensor for operation of moisture control. | | | | |
| | (c) Power pack for each panel suitable for closing / tripping / indication of 1 Nos. HT panel boards with maintenance free batteries of suitable AH (but not less than 30 AH), charging unit complete with suitable capacity of Ammeter & Voltmeter including connections with 2.5 sq. mm. FRLS / FRLSH / HFFR grade PVC insulated copper conductor cable etc. as required | | | | |
| | Complete 6 KV VCB PANEL as described above | 1.00 | Job | 37,17,333.00 | 37,17,333.00 |
| 4.3 | MAIN LT PANEL | | | | |
| | Supplying, installation, testing & commissioning of cubical type, floor mounted, extensible , LT Panel suitable for 415 V, 3 Phase, 4 wire 50 Hz AC supply system conforming to IEC 61439 - Part 1 & 2 (Design Verified Panel) of suitable size fabricated in compartmentalized design from CRCA sheet steel as per OEM standard design having impact resistance IK 10 and shall have double door design, front door shall be of tempered glass having mechanical impact of IK 09 including cleaning & finishing complete with minimum 7 tank process for powder coating in approved shade, having IP 42 protection, with short circuit withstand capacity of 50 KA for 1 Sec., Internal Arc 50 KA for 0.3 Sec conforming to IEC 61641 standards. The main switchboard shall be of Form 3b construction and bottom base channel of MS section of suitable size | | | | |
| | fabrication shall be done in transportable sections if required, entire panel shall have one common Copper earth bar of suitable size at the rear with 2 Nos. earth studs / terminals, solid connections from main bus bar to switch gears with required size of aluminium bars and control wiring with 2.5 Sq.mm. FRLS / HFFR grade PVC insulated | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | copper conductor single core cable, cable alleys, cable gland plates in two or more haves, including providing following switch gears: | | | | |
| a) | Incomer: | | | | |
| i) | 2 Nos. 1000 Amps, Uimp= 12KVp. (From Transformer Supply) each four pole horizontal draw out type air circuit breaker of fault breaking capacity 50 KA (Ics = 100 % Icu = Icw for one second up to 433 V) Electrically (EDO) operated, microprocessor controlled Modular ACB with LSIGN release (zone: O/L with time delay, S/C instantaneous ,adjustable earth fault & neutral protection with min 4 time settings in LSG and ACB shall be capable of providing data of measurement of following parameters Current, Voltage, PF, Power, Energy, Maximum demand , ZSI with date and time stamping with last 10 trip history and protection settings on display & communicable through modbus protocol RS-485 port . LED indication for fault differentiation & Ready to close contact. fitted with interlocked door, automatic safety shutters, mechanical ON / OFF and service / test / isolated position indicators and frame earthing contact, conforming to IS / IEC 60947-2 as amended up to date complete with following accessories for each ACB | | | | |
| ii) | Incoming terminals should be suitable for termination upto 1250 Amps bus trunking system / Cable termination. | | | | |
| iii) | Independent Electrical Spring closing mechanism - 2 No. | | | | |
| iv) | Digital multifunction meter to read V, A, KVA, KWH, PF, Hz, THD etc. having RS 485 port and compatible to PC with modbus / back net protocol with 3 Nos. resin cast CTs of 1000 / 5 A class 1.0 accuracy and 15 VA burden. 2 Set. | | | | |
| v) | 2 no voltmeter (Digital Type) with inbuilt selector Switch & necessary protection. | | | | |
| | 2 no Ammeter (Digital Type) with inbuilt selector Switch & necessary protection. | | | | |
| vi) | 2 Set of R, Y, B, On, OFF, TRIP & Spring charge indication with 2 Amps. back up MCB, breaker ON indicating light with MCB, test terminal block set, fuses / MCBs, circuits as per standard practice, auxiliary contacts for positive interlocking of the breakers as required. | | | | |

| | | | | | |
|---|---|---|---|---|---|
| viii) | Shunt trip coil 220 V A.C. | | | | |
| ix) | 2 No. over voltage & under voltage relay | | | | |
| x) | CTs for APFC Relay | | | | |
| | BUS BAR | | | | |
| b) | Busbar shall be made of high conductivity min 99% purity, high - conductivity electrical-grade aluminium TPN (having 100% Neutral) of minimum of 1250 Amps. capacity etc. for withstanding fault level of 50 KA for 1 Sec. | | | | |
| | BUS COUPLER | | | | |
| c) | 1 No. 1000 Amps, Uimp= 12KVp. each four pole horizontal draw out type air circuit breaker, fault breaking capacity 50 KA (Ics = 100 % Icu = Icw for one second up to 433 V) Electrically operated. (Technical complying incomer) | | | | |
| | INTERLOCKING | | | | |
| d) | Electrical through advance contacts in ACB's (Incomers & Bus couplers) and mechanical interlocking (so that only two breakers will operate at a time) should be provided to ensure that only one supply is available at a time on each section of bus and to eliminate any possibility of accidentally approaching two supplies at one bus section | | | | |
| e) | OUTGOING | | | | |
| | Section-1 | | | | |
| i) | 1 No.- 500 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with microprocessor based built in O/L, S/C protection, Earth Fault, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| | (Outgoing terminals should be suitable for connection of bus trunking system) | | | | |
| ii) | 2 Nos. 630 Amps, Uimp= 12KVp. each four pole horizontal draw out type air circuit breaker, fault breaking capacity 50 KA (Ics = 100 % Icu = Icw for one second up to 433 V) Electrically operated. (Technical Specification complying incomer ACB) | | | | |
| | 1 no CT operated Digital multifunction meter to read V, A, KVA, KWH, PF, Hz, | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | THD etc. having RS 485 port and compatible to PC with modbus / back net protocol with 3 Nos. resin cast CTs of 630 / 5 A class 1.0 accuracy and 15 VA burden. -2 Set | | | | |
| iii) | 2 Nos.- 250 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with microprocessor release with inbuilt O/C, S/C protection, Earth Fault & neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| | 1 no CT operated Intelligent multifunction digital meter to read V, A, KVA, KWH, PF, Hz etc. having RS 485 port and compatible to PC with modbus / back net protocol with 3 Nos. resin cast CTs of 250 / 5 A class 1.0 accuracy and 15 VA burden. -2 Set | | | | |
| iv) | 1 No.- 100 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with microprocessor release with inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| | 1 no CT operated Intelligent multifunction digital meter to read V, A, KVA, KWH, PF, Hz etc. having RS 485 port and compatible to PC with modbus / back net protocol with 3 Nos. resin cast CTs of 100 / 5 A class 1.0 accuracy and 15 VA burden. -1 Set | | | | |
| vi) | One no 50 KA 3P+1N SPD Class I + II | | | | |
| g) | Section-2 | | | | |
| i) | 1 No.- 500 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with microprocessor based built in O/L, S/C protection, Earth Fault, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | spreader links with all accessories for each MCCB | | | | |
| | (Outgoing terminals should be suitable for connection of bus trunking system) | | | | |
| ii) | 1 Nos. 630 Amps, Uimp= 12KVp. each four pole horizontal draw out type air circuit breaker, fault breaking capacity 50 KA (Ics = 100 % Icu = Icw for one second up to 433 V) Electrically operated. (Technical Specification complying incomer ACB) | | | | |
| | 1 no CT operated Digital multifunction meter to read V, A, KVA, KWH, PF, Hz, THD etc. having RS 485 port and compatible to PC with modbus / back net protocol with 3 Nos. resin cast CTs of 800 / 5 A class 1.0 accuracy and 15 VA burden. -1 Set | | | | |
| | (Outgoing terminals should be suitable for connection of bus trunking system) | | | | |
| iii) | 2 No.- 400 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with microprocessor based built in O/C, S/C protection, Earth Fault & neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| | 1 no CT operated Digital multifunction meter to read V, A, KVA, KWH, PF, Hz etc. having RS 485 port and compatible to PC with modbus / back net protocol with 3 Nos. resin cast CTs of 400 / 5 A class 1.0 accuracy and 15 VA burden. - 2 Set | | | | |
| iv) | 2 Nos.- 250 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) microprocessor release with inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| | 1 no CT operated Intelligent multifunction digital meter to read V, A, KVA, KWH, PF, Hz etc. having RS 485 port and compatible to PC with modbus / back net protocol with 3 Nos. resin cast | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | CTs of 250 / 5 A class 1.0 accuracy and 15 VA burden. - 2 Set | | | | |
| v) | One no 50 KA 3P+1N SPD Class I + II | | | | |
| | (Complete the panel as stated above) | 1.00 | Set | 56,64,397.00 | 56,64,397.00 |
| 4.4 | ESSENTIAL Panel | | | | |
| | Supplying, installation, testing & commissioning of cubical type, floor mounted, extensible, LT Panel suitable for 415 V, 3 Phase, 4 wire 50 Hz AC supply system conforming to IEC 61439 - Part 1 & 2 ( Design Verified Panel) of suitable size fabricated in compartmentalized design from CRCA sheet steel as per OEM standard design having impact resistance IK 10 and shall have double door design, front door shall be of tempered glass having mechanical impact of IK 09 including cleaning & finishing complete with minimum 7 tank process for powder coating in approved shade, having IP 42 protection, with short circuit withstand capacity of 50 KA for 1 Sec., Internal Arc 50 KA for 0.3 Sec conforming to IEC 61641 standards. The main switchboard shall be of Form 3b construction and bottom base channel of MS section of suitable size. | | | | |
| | fabrication shall be done in transportable sections if required, entire panel shall have one common Copper earth bar of suitable size at the rear with 2 Nos. earth studs / terminals, solid connections from main bus bar to switch gears with required size of aluminium bars and control wiring with 2.5 Sq.mm. FRLS / HFFR grade PVC insulated copper conductor single core cable, cable alleys, cable gland plates in two or more haves, including providing following switch gears: | | | | |
| a) | Incomer: | | | | |
| i) | 2 Nos. 630 Amps, Uimp= 12KVp. each four pole horizontal draw out type air circuit breaker of fault breaking capacity 50 KA (Ics = 100 % Icu = Icw for one second up to 433 V) Electrically (EDO) operated, microprocessor controlled Modular ACB with LSIGN release (zone: O/L with time delay , S/C instantaneous ,adjustable earth fault & neutral protection with min 4 time settings in LSG and ACB shall be capable of providing data of measurement of | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | following parameters Current, Voltage, PF, Power, Energy, ZSI, Maximum demand with date and time stamping with last 10 trip history and protection settings on display & communicable through modbus protocol RS-485 port . LED indication for fault differentiation & Ready to close contact. fitted with interlocked door, automatic safety shutters, mechanical ON / OFF and service / test / isolated position indicators and frame earthing contact, conforming to IS/IEC 60947-2 as amended up to date complete with following accessories for each ACB. | | | | |
| ii) | Incoming terminals should be suitable for termination of bus trunking system / Cable termination. | | | | |
| iii) | Independent Electrical Spring closing mechanism - 2 No. | | | | |
| iv) | Digital multifunction meter to read V, A, KVA, KWH, PF, Hz, THD etc. having RS 485 port and compatible to PC with modbus / back net protocol with 3 Nos. resin cast CTs of 630 / 5 A class 1.0 accuracy and 15 VA burden - 2 Set | | | | |
| v) | 2 no voltmeter (Digital Type) with inbuilt selector Switch & necessary protection | | | | |
| vi) | 2 no Ammeter (Digital Type) with inbuilt selector Switch & necessary protection | | | | |
| vii) | 2 Set of R, Y, B, On, OFF, TRIP & Spring charge indication with 2 Amps. back up MCB, breaker ON indicating light with MCB, test terminal block set, fuses / MCBs, circuits as per standard practice, auxiliary contacts for positive interlocking of the breakers as required | | | | |
| viii) | Shunt trip coil 220 V A.C. | | | | |
| ix) | 2 No. over voltage & under voltage relay | | | | |
| | BUS BAR | | | | |
| b) | Busbar shall be made of high conductivity min 99% purity, high - conductivity electrical-grade aluminium TPN (having 100% Neutral) of minimum of 800 Amps. capacity etc. for withstanding fault level of 50 KA for 1 Sec. | | | | |
| | BUS COUPLER | | | | |
| c) | 1 Nos. 630 Amps, Uimp= 12KVp. each four pole horizontal draw out type air circuit breaker, fault breaking capacity 50 KA (Ics = 100 % Icu = Icw for one second up to 433 V) Electrically | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | operated. (Technical complying incomer) | | | | |
| | INTERLOCKING | | | | |
| d) | Electrical through advance contacts in ACB's (Incomers & Bus couplers) and mechanical interlocking (so that only two breakers will operate at a time) should be provided to ensure that only one supply is available at a time on each section of bus and to eliminate any possibility of accidentally approaching two supplies at one bus section | | | | |
| e) | OUTGOINGS | | | | |
| | Section - I | | | | |
| i) | 1 No.- 500 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with microprocessor based built in O/C, S/C protection, Earth Fault & neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB. | | | | |
| | 1 No. CT operated Digital multifunction meter to read V, A, KVA, KWH, PF, Hz etc. having RS 485 port and compatible to PC with modbus / back net protocol with 3 Nos. resin cast CTs of 500 / 5 A class 1.0 accuracy and 15 VA burden. - 1 Sets. | | | | |
| ii) | 1 Nos.- 320 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB. | | | | |
| | 1 No. CT operated Intelligent multifunction digital meter to read V, A, KVA, KWH, PF, Hz etc. having RS 485 port and compatible to PC with modbus / back net protocol with 3 Nos. resin cast CTs of 320 / 5 A class 1.0 accuracy and 15 VA burden. - 1 sets | | | | |
| iii) | 1 Nos.- 250 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | 36 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB. | | | | |
| | 1 no CT operated Intelligent multifunction digital meter to read V, A, KVA, KWH, PF, Hz etc. having RS 485 port and compatible to PC with modbus / back net protocol with 3 Nos. resin cast CTs of 250 / 5 A class 1.0 accuracy and 15 VA burden. - 1 sets | | | | |
| iv) | 1 Nos.- 63 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 25 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB. | | | | |
| v) | 1 Nos.- 100 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 25 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| v) | One no 50 KA 3P+1N SPD of Class I + II | | | | |
| | Section - II | | | | |
| i) | 2 No. 400 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with microprocessor based built in O/C, S/C protection, Earth Fault & neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| | 1 no CT operated Digital multifunction meter to read V, A, KVA, KWH, PF, Hz | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | etc. having RS 485 port and compatible to PC with modbus / back net protocol with 3 Nos. resin cast CTs of 400 / 5 A class 1.0 accuracy and 15 VA burden. - 2 Sets. | | | | |
| ii) | 1 Nos.- 250 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 36 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB. | | | | |
| | 1 No. CT operated Intelligent multifunction digital meter to read V, A, KVA, KWH, PF, Hz etc. having RS 485 port and compatible to PC with modbus / back net protocol with 3 Nos. resin cast CTs of 250 / 5 A class 1.0 accuracy and 15 VA burden. - 1 sets | | | | |
| iii) | 2 Nos.- 63 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 25 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| iv) | 1 Nos.- 100 Amps. each four pole MCCB (MCCB Shall have double break mechanism) of fault breaking capacity 25 KA (Icu = 100 % Ics up to 433V) with TM based inbuilt O/C, S/C protection, neutral protection & Aux Contacts for On/Off/trip LED Indication, extended rotary Operating Handle' and MCCB Shall have all for proper termination & spreader links with all accessories for each MCCB | | | | |
| v) | One no 50 KA 3P+1N SPD of Class I + II | | | | |
| | Essential Panel as described above | 1.00 | Set | 37,90,610.00 | 37,90,610.00 |
| 4.5 | AMF PANEL | | | | |
| | Supply installation testing commissioning of Free standing floor mounted , dust & vermin proof , IP 42, Fabricated from 2mm thick CRCA sheet steel duly powder coated of approved | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | shade after seven-tank pre-treatment process, including base of ISMC 100 MS channel, compartmentalised, double door cubical type having front, back openable doors automatic mains failure control panel including auto by-pass, suitable 250 KVA silent type DG set complete with relays, timers, set of CTs for metering & protection and energy analyser to indicate currents, phase and line voltages, frequency, power factor, KWH, Kilo Volt, Ampere Relative Hour (KVARH), KVA (Phase & Total), KW & provision for overload, short circuit, restricted earth fault, under frequency, power (aluminium) and control (copper ) cabling of suitable size upto 15 meter between AMF panel, LT Panel and DG Set including connection inter-connection etc. as required, all complete and inter locking and communication / Ethernet / RS485 / SNMP port open protocol for BMS integration including suitable software , 25 × 6 mm copper earth bar running throughout the panel, with 02 ( Two ) external earth studs , internal wiring with FRLS / HFFR Copper Conductor (Class 2), Engraved labels for all feeders, Lifting Hooks, Separate cable chamber, "415 V Danger" plate. etc. as per approved by Engineering in charge, Providing and fixing the following mounting and accessories there in complete with detachable gland plates made of 3mm thick CRCA sheet. Suitable for 415V 50Hz 3 phase AC supply. | | | | |
| | The bus bars insulation shall be with heat shrinkable sleeves. SMC / DMC busbar supports shall be used, Busbars shall be of rectangular section hard drawn high conductivity Aluminum busbar connections shall be constructed in accordance with the requirements of latest code of IS / IEC standards, Busbar capacity is 1.25 times of switchgear capacity, All the switchgear connection should be of solid connections. | | | | |
| | 1. 02 numbers 630 Amps, Uimp= 12KVp. each four pole horizontal draw out type air circuit breaker of fault breaking capacity 50 KA (Ics = 100 % Icu = Icw for one second up to 433 V) Electrically (EDO) operated, microprocessor controlled Modular ACB | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | with LSIGN release (zone: O/L with time delay, S/C instantaneous, adjustable earth fault & neutral protection conforming to IS / IEC 60947-2 as amended up to date complete with following accessories for each ACB.<br>2. Auto / Manual / Test / Off selector switch<br>3. Protection for under voltage with time delay and over voltage phase reversal (2 nos Over voltage relay, 2 Nos. reverse power relay and 2 Nos. under voltage relay).<br>4. 3 Sets of current transformers 15 P 10 accuracy for protection and 15 VA class-I for metering<br>5. Energy analyser unit to indicate current, Voltage (LN & L_L), kW, kVA (Phase & Total), Frequency, KWH, PF.<br>6. LED Indicating lamps for load on mains and load onset<br>7. Fuse / MCB for instruments<br>8. Battery charger, complete with transformer / rectifier, | | | | |
| | D.C. voltmeter and ammeter, selector switch for trickle, off and boost and current adjustment.<br>9. Main supply failure monitor<br>10.Supply failure timer<br>11.Restoration timer<br>12.Control unit with three impulse automatic engine start / stop and failure to start lockout.<br>13. Impulse counter with locking and reset facility.<br>14. ON / OFF / Control circuit switch with indicator<br>15.Audio / Video annunciation for<br>(i) High water temperature<br>(ii) Low lubricating oil pressure<br>(iii) Engine over speed<br>(iv) Engine fails to start<br>(v) Full load / maximum load warning<br>16.Protection for over / under Frequency, Loss of AC sensing, Over Current, Unbalancing load with suitable number of relays and accessories<br>17. Maintenance notification based on Engine Run Hour & due date.<br>18. Load Management through PLC to achieve auto opening and closing of incomer breakers, bus coupler switching of essential panel, interlocking providing signal to AMF Panel for load status and AMF shall give command to DG Set to | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | auto start / auto stop depending upon load status and requirement etc. and necessary hardware and software required to perform the operation shall be provided by the contractor including all control wiring | | | | |
| | AMF Panel as described above | 1.00 | Set | 10,87,154.00 | 10,87,154.00 |
| 4.7 | HPFC Panel | | | | |
| | Supply, Installation, testing and commissioning of HYBRID APFC Panel, 3 phase 4 wire, 415 V, 50 Hz AC System for Ambient temperature -5°C to +40°C of following capacity with passive solution of 60% capacity and active solution of 40% capacity,3Phase 4 wire Hybrid Power Factor Correction Solution (with arrangement for neutral current balance) to achieve >0.99 lag and TDDI / THDV values within IEEE recommended limits' should be designed as per IS 16636 Or IEC 61921. The active section and passive section shall work in sync to give optimized output. The degree of protection of passive section should be IP 42, and of active section should be minimum IP 21. The switching device for APFC passive section should be through capacitor duty contactor and for the active compensation system shall be IGBT based with 3 level topologies having 12 IGBT in inverter circuit. The active compensation system should filter harmonics from 2nd to 50th individual harmonic order and shall be selectable for the entire range. The active compensation system should have feature to improve PF correction and harmonic filtration having response time < 100 Microsecond. The hybrid panel shall be indoor type floor mounted free standing totally enclosed, extensible, fabricated in compartmentalised designed made of CRCA sheet steel of 2.0mm thick for framework & | | | | |
| | covers, 3 mm thick for gland plate i/c cleaning & finishing complete with 9 tank process for powder coated of approved shade (RAL 7032-Siemens Gray or as approved by Engineer-in-Charge), having front section (switch gear and control accessories) and rear section (capacitor and reactor), front and rear access, having suitable current carrying capacity, extensible TPN Aluminium | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | alloy bus bar of high conductivity, DMC / SMC bus bar supports, bottom base channel of MS Section, fabrication shall be done in transportable section, entire panel shall have common copper earth bar of minimum size of 25mm x 5mm with 2 nos. earth studs, the earth terminals provided on the body of capacitor bank shall also be bonded to the main capacitor panel earth bus with 2 nos. 8 SWG or 6 SWG GI earth wires / equivalent size of copper conductor cable, forced ventilation for maintaining temperature rise not more than 5°C from ambient, interconnections, connections with 14% detuned reactor and heavy duty 525 V ISI marked Impregnated MPP (Metalized Polypropylene) Capacitor (IS 13340 Part -1 & 2) APFC Panel shall be in compliance with IS :16636 & CPWD Specifications etc. as per below details | | | | |
| | (A) Incomers | | | | |
| | Suitable capacity MCCB / ACB (Upto 300 KVAR, MCCB and above 300 KVAR, ACB ) Microprocessor base with O/C, S/C, E/L release of TPN 50KA breaking capacity (Ics=Icu), ON, OFF, Trip, R, Y, B - LED Indicating Lamp set along with required Instruments and accessories with extended rotary handle and door interlocking arrangement. Current rating of the Incomer in ampere shall be HPFC Panel rating in KVAR x 1.4 x 1.5 or Nearest higher standards rating | | | | |
| | (B) Instruments & Indications | | | | |
| | a) For Passive Section: | | | | |
| | i) 3-Phase current sensing APFC microprocessor relay / controller, advance 12/16 stages (12 stages for overall capacity of panel (active + passive) below 500 KVAR and 16 stages 500 KVAR & above) and having display of Phase wise V, A, PF, Cos-Phi, KW, KVA, KVAR, THD-V , THD-I, harmonics up to 31 level.<br>ii) Auto Manual Selector switch, auxiliary contactors with timer for delay in manual mode.<br>iii) Digital Multi-function meter with LED Display for V, A, PF, KW, KVA, KVAR, THD-V & I, Frequency. | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | iv) Suitable rating control transformer shall be provided for control and indication circuit. | | | | |
| | v) All components like control transformer, meter, relay and indicating lamp shall be protected by using suitable rating individual MCB's. | | | | |
| | vi)Wiring of the control circuit shall be done by using 2.5 sq mm, FRLS / HFFR 1100 V grade, PVC insulated multi stranded copper control wire. | | | | |
| | vii) Communication Ethernet / RS485 / SNMP port open protocol for BMS integration as per approved by Engineering in charge. | | | | |
| | b) For Active Section: Dedicated HMI (Human Machine Interface) (Minimum 7-inch display) for controlling and communication and having display of Phase wise V, A, PF, Cos-Phi, KW, KVA, KVAR, THD-V, THD-I, harmonics up to $50^{th}$ level. Communication Ethernet / RS485 / SNMP port open protocol for BMS integration as per approved by Engineering in charge. | | | | |
| | 250 KVAR | 2.00 | Job | 15,70,082.35 | 31,40,165.00 |
| 4.8 | Bus-bar Trunking | | | | |
| | Supplying, installation, testing and commissioning of Following capacity sandwich type busbar trunking system in accordance with IEC 61439-6, suitable for 3-phase, 4-wire, 415 V, 50 Hz AC supply, with metal-clad enclosure having minimum IP54 degree of protection, comprising aluminium busbars (3L+N+PE) with 100% rated neutral and integral aluminium protective earth conductor of minimum 50% capacity of phase conductor, with current density not exceeding 130 A/sq.cm at nominal rated current and Class F or better insulation. The enclosure shall be of minimum 1.6 mm thick GI sheet, duly powder coated, in suitable sections, complete with all necessary joints, elbow joints, expansion joints, bends, fire barriers, adaptor boxes and flexible copper bonding braid across joints / expansion joints and suitable flexible copper connections at terminations wherever required. The system shall be provided with continuous external earthing using 2 Nos. aluminium strips of suitable size, | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | one on each side, including GI clamping brackets, suspenders, angle iron brackets, steel fasteners and all other accessories required for complete installation and commissioning. The busbar trunking system shall be design verified in accordance with IEC 61439-6. Complete in all respects | | | | |
| 4.8.1 | 800 A, short-time withstand current (Icw) of minimum 50 kA for 1 second. | 35.00 | mtr. | 25,920.00 | 9,07,200.00 |
| 4.8.2 | 1250 A, short-time withstand current (Icw) of minimum 50 kA for 1 second. | 20.00 | mtr. | 34,527.00 | 6,90,540.00 |
| 4.9 | Providing and fixing H.T. danger notice plate of 250 mm X 200 mm, made of mild steel, at least 2 mm thick, and vitreous enamelled white on both sides, and with inscription in single red colour on front side as required. | 6.00 | Each | 391.00 | 2,346.00 |
| 4.10 | Providing and fixing M.V. danger notice plate of 200 mm X 150 mm, made of mild steel, at least 2 mm thick, and vitreous enamelled white on both sides, and with inscription in single red colour on front side as required | 8.00 | Each | 362.25 | 2,898.00 |
| 4.11 | Providing First Aid Box as approved by St. John Ambulance Brigade / Indian Red Cross conforming to IS 2217: 1963 | 5.00 | Each | 1407.00 | 7,035.00 |
| 4.12 | Supply & fixing shock treatment chart duly mounted on a wooden frame with glass as reqd. (approximate minimum front area 0.60 sq. meter) | 4.00 | Each | 1461.00 | 5,844.00 |
| 4.13 | Supply, laying of electrical insulating mat conforming to IS 15652:2006 with latest amendments, Class C, 3 mm thick, with non-slip surface, complete with BIS / ISI marking and manufacturer's test certificate, complete as required | 25.00 | sq.mtr. | 2,267.00 | 56,675.00 |
| 4.14 | Supply, laying of electrical insulating elastomeric mat conforming to IS 15652:2006 with latest amendments, Class B, 2.5 mm thickness, with non-slip surface, BIS / ISI marked, complete with manufacturer's test certificate as required | 40.00 | sq.mtr. | 1,423.00 | 56,920.00 |
| 4.15 | Supply of electrical insulating hand gloves conforming to IS 13774:2021, Class 2, suitable for electrical work up to 11 kV AC, Category R (acid, oil and ozone resistant), elastomeric insulating material, standard length as per manufacturer, BIS / ISI marked, complete with manufacturer's test certificate as required | 2.00 | Each Set | 1,407.00 | 2,814.00 |

| | | | | | |
|---|---|---|---|---|---|
| 4.16 | Providing and fixing earth bus of 50 mm X 5 mm copper strip on surface for connections etc. as required | 5.00 | mtr | 2,581.75 | 12,909.00 |
| | Sub-Total | | | | ₹ 2,60,89,978.00 |
| 5 | Sub-Head- V (DG Set) | | | | |
| 5.1 | DG Set | | | | |
| | Supplying, Installation, Testing & Commissioning of Unit Rate 'Silent Type Diesel Generating set as per CPCB IV + or better norms along with having Prime Power Rating of KVA as below, 415 volts at 1500 RPM, 0.8 lagging power factor at 415 V suitable for 50 Hz, 3 phase system & for 0.85 Load Factor, including testing at factory and site with fuel, load for test and other necessary arrangements Complete as per CPWD specifications, should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location, rating plate as per relevant IS Code etc. and consisting of the followings: | | | | |
| | (A) Diesel Engine: Turbocharged Diesel engine 4 stroke water cooled, Ulti cylinder, dynamically balanced fly wheel, electric start of suitable BHP at 1500 RPM suitable for above output of alternator at 40 0C, 50% RH & at 1000 Meter MSL, capable of taking 10% over loading for one hour after 12 hours of continuous operation. The engine will be with electronic governor, Dry type Air filter with service indicator, first filling of engine fuel (after commissioning) lubricating Oil, Coolant and other consumables complete with all the required accessories, the electronic governor shall be as per ISO 8528.The engine shall comply to the latest CPCB norms (CPCB IV + or better) and conforming to BS5514, BS 649, IS 10000, IS 10002, IS 13018 and asper CPWD specifications | | | | |
| | (B) Engine mounted Instrument Panel fitted with and having digital dis Plate for following:<br>(i) Start-stop switch with key<br>(ii) Water temperature indication<br>(iii) Lubrication oil pressure indication<br>(iv) Lubrication oil temperature indication<br>(v) Battery charging indication and Voltage indication | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | (vi) RPM indication<br>(vii) Over speed indication<br>(viii) Low lubrication Oil trip indication<br>(ix) Engine Running Hours indication<br>(x) Fuel Level | | | | |
| | (C) Alternator: Synchronous alternator rated of appropriate KVA, 415volts at 1500 RPM, 3 phase 50 Hz, AC supply with 0.8 lagging power factor at 40 0C, 50% RH & at 1000Meter MSL. The alternator shall be having Screen Protected Drip Proof (SPDP) enclosure IP23, brushless, continuous duty, dynamically balanced rotor, capable of taking 10% over loading for one hour after 12 hours of continuous operation, self-cooled, self-excited and self-regulated through AVR conforming to IS13364 (Part 2) / IS: 4722 / BS 2613 suitable for tropical conditions and with class- H insulation | | | | |
| | (D) Base Frame & Foundation: Both the engine and alternator shall be mounted on suitable base frame made of MS channel with necessary reinforcement which shall be installed on suitable cement concrete foundation and vibration isolation arrangement as per recommendations of manufacturer. | | | | |
| | (E) FUEL TANK: Daily service fuel tank of suitable litres capacity as per CPWD Specifications, fabricated out of 3 mm thick M.S. sheet complete with all standard accessories and fuel piping between fuel tank and diesel engine with MS class 'C' pipes of suitable dia. Complete with valves, level indications & accessories as required as per specifications. | | | | |
| | (F) Exhaust System: Dry exhaust manifold with hospital type exhaust silencer and catalytic convertor | | | | |
| | (G) Starting System: 12V / 24V DC starting system comprising of starter motors: voltage regulator and arrangement for initial excitation complete with suitable numbers of batteries (180 AH capacity lead acid SMF type) as required as per specifications. The battery shall be housed inside the acoustic enclosure of DG Set | | | | |
| | (H) Acoustic and weather proof enclosure with arrangement for fresh air intake for cooling of the engine & | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | alternator, extraction, discharging hot air in to the atmosphere and the temperature rise inside the enclosure, noise level outside enclosure. The acoustic enclosure should be suitable for cable connection / connection through bus-trunking. Such arrangements on acoustic enclosure should be water proof & dust-proof conforming to IP-65 protection. The enclosure shall be as per CPCB IV + or better norms etc. and as per CPWD specifications | | | | |
| | (I) AMF Panel: Free standing floor mounted IP 42 automatic mains failure control panel including auto by-pass, suitable for KVA as below for silent type DG set complete with relays, timers, set of CTs for metering & protection and energy analyser to indicate currents, phase and line voltages, frequency, power factor, KWH, Kilo Volt Ampere Relative Hour (KVARH), KVA (Phase & Total), KW & provision for overload, short circuit, restricted earth fault, under frequency, power (aluminium) and control (copper) cabling of suitable size upto 15 meter between AMF panel, LT Panel and DG Set including connection interconnection etc. as required, all complete and inter locking and communication / Ethernet / RS485 / SNMP port open protocol for BMS integration including suitable software, the panel shall be of DG Set OEM make etc. as per approved by Engineering in charge and including the following:<br>1. Suitable numbers and appropriate capacity 4 pole motorised electrically operated draw out with cradle type 3 position ACB with electronic release for O/C & E/F and shunt trip.<br>2. Auto / Manual / Test / Off selector switch<br>3. Protection for under and over voltage phase reversal (2 Nos. Over voltage relay, 2 Nos. reverse power relay and 2 Nos. under voltage relay).<br>4. 3 Sets of current transformers 15 P 10 accuracy for protection and 15 VA class-I for metering<br>5. Energy analyser unit to indicate current, Voltage (LN & L_L), kW, kVA (Phase & Total), Frequency, KWH, PF.<br>6. LED Indicating lamps for load on | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | mains and load onset<br>7. Fuse / MCB for instruments<br>8. Battery charger, complete with transformer / rectifier, | | | | |
| | D.C. voltmeter and ammeter, selector switch for trickle, off and boost and current adjustment.<br>9. Main supply failure monitor<br>10. Supply failure timer<br>11. Restoration timer<br>12. Control unit with three impulse automatic engine start / stop and failure to start lockout.<br>13. Impulse counter with locking and reset facility.<br>14. ON / OFF / Control circuit switch with indicator<br>15. Audio / Video annunciation for<br>(i) High water temperature<br>(ii) Low lubricating oil pressure<br>(iii) Engine over speed<br>(iv) Engine fails to start<br>(v) Full load / maximum load warning<br>16. Protection for over / under Frequency, Loss of AC sensing, Over Current, Unbalancing load with suitable number of relays and accessories<br>17. Maintenance notification based on Engine Run Hour & due date.<br>18. Load Management through PLC to achieve auto opening and closing of incomer breakers, bus coupler switching of essential panel, interlocking providing signal to AMF Panel for load status and AMF shall give command to DG Set to auto start / auto stop depending upon load status and requirement etc. and necessary hardware and software required to perform the operation shall be provided by the contractor including all control wiring | | | | |
| 5.1.1 | 250 KVA | 1.00 | Each | 21,52,272.15 | 21,52,272.00 |
| 5.2 | Shifting, Installation, testing and commissioning of Existing 250 KVA DG set (Make- Ashok Leyland) from existing location near secondary gate of NIPER to Substation Panel in existing foundation including accessories complete as required | 1.00 | Job | 32,595.00 | 32,595.00 |
| | Sub-Total | | | | ₹ 21,84,867.00 |
| 6 | Sub-Head- VI (Lift) | | | | |
| 6.1 | Passenger Lifts (13 passenger (1360 kg)) | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | Supplying, Installation, Testing & Commissioning of following capacity passenger Machine room less (MRL) lift with regenerative drive as per CPWD General Specification for Electrical Works (Part-III Lift & Escalator) 2003, BIS Codes, NBC 2016 as amended upto date having provision for barrier free access as per Harmonised Guidelines & Standards for Universal Accessibility in India - 2021 of MoHUA, serving different floors in the lift shaft as per detailed specifications enclosed and as under including all other equipment and accessories complete as required: | | | | |
| | (i) Speed-1.0 MPS | | | | |
| | (ii) Floors-5(G+4) | | | | |
| | (iii) Travel-17 metres (approx.) | | | | |
| | (iv) Stops & opening: 5 stops and 5 openings | | | | |
| | (v) Controller: A.C. variable voltage & variable frequency | | | | |
| | (vi) Automatic rescue device (ARD) complete with dry maintenance free batteries as required. | | | | |
| | vii) Operation: Microprocessor based single automatic push button / simplex selective collective / duplex collective selective with / without attendant | | | | |
| | (viii) Power-415 Volts+10%, 3 phase, 50 Hz, 4 wires system | | | | |
| | (ix) Car Enclosure: Stainless steel scratch proof (Moon Rock / Honeycomb / Hairline Finish) on all sides and stainless-steel decorative ceiling with fans (indirect throw) and LED fitting. | | | | |
| | x)The car flooring should be smooth and antiskid as approved by engineer-in-charge. | | | | |
| | (xi) Type of doors:<br>(a) Car: Power operated, centre opening horizontal sliding stainless steel scratch proof (Moon Rock / Honeycomb / Hairline Finish).<br>(b) Landing doors: stainless steel scratch proof. | | | | |
| | (xii) A hand rail not less that 600mm long at 900mm above floor level to be fixed adjacent to control panel in the lift car. | | | | |
| | (xiii) Voice announcement system in the car to announce the position of the elevator in the hoist way as the car passes or stops at floor served by the elevator. | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | (xiv) Closed loop Control System, protection against power fluctuation, self-diagnostic control, Landing doors 2 hours Fire rated, Overload detection and protection, Overspeed Governor, Dot Matrix LED D & P Indicators In Car &Landings, BMS Compatibility, tamper proof infrared curtain covering almost the entire height of the lift car door, Alarm horn, Anti Nuisance Operation, CCTV camera system with 4 MP IP camera, suitable NVR and HDD for 30 days storage backup , Firemen switch, 2/3 way intercom, Emergency Stop Switch with battery backup for fan and light fitting for 1 hour, pit ladder | | | | |
| | xv) The lift doors shall have a vision panel to enable persons with hearing impairment to signal for help or assistance in the event of an emergency | | | | |
| | (xvi) An appropriate technological support be provided (Through emergency messaging \|services or alarms etc.) to respond to the emergency requirements of person with hearing impairment or deafness | | | | |
| | (xvii) In case of failure of ARD or other electronic devices, a provision of manual rescue be provided | | | | |
| 6.1.1 | 13 passenger (884 kg) | 2.00 | Each | 19,36,859.58 | 38,73,719.00 |
| 6.2 | Goods Lifts (20 passenger (1360 kg)) | | | | |
| | Supplying, Installation, Testing & Commissioning of 2000kg Machine room less (MRL) goods lift with regenerative drive as per CPWD General Specification for Electrical Works (Part-III Lift & Escalator) 2003, BIS Codes, NBC 2016 as amended upto date, serving different floors in the lift shaft as per detailed specifications enclosed and as under including all other equipment and accessories complete as required: | | | | |
| | (i) Speed-0.5 MPS | | | | |
| | (ii) Floors-5(G+4) | | | | |
| | (iii) Travel-17 metres (approx.) | | | | |
| | (iv) Stops & opening: 5 stops and 5 openings | | | | |
| | (v) Controller: A.C. variable voltage & variable frequency | | | | |
| | (vi) Automatic rescue device (ARD) complete with dry maintenance free batteries as required. | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | vii) Operation: Microprocessor based single automatic push button / simplex selective collective / duplex collective selective with / without attendant | | | | |
| | (viii) Power-415 Volts+10%, 3 phase, 50 Hz, 4 wires system | | | | |
| | (ix) Car Enclosure: Stainless steel scratch proof (Moon Rock / Honeycomb / Hairline Finish) on all sides and stainless-steel decorative ceiling with fans (indirect throw) and LED fitting. | | | | |
| | x)The car flooring should be strong to take the rated load without any deformation or damage and antiskid as approved by engineer-in-charge. | | | | |
| | (xi) Type of doors:<br>(a) Car: Power operated, centre opening horizontal sliding stainless steel scratch proof (Moon Rock / Honeycomb / Hairline Finish).<br>(b) Landing doors: stainless steel scratch proof | | | | |
| | (xii) A hand rail not less than 600 mm long at 900mm above floor level to be fixed adjacent to control panel in the lift car | | | | |
| | (xiii) Voice announcement system in the car to announce the position of the elevator in the hoist way as the car passes or stops at floor served by the elevator | | | | |
| | (xiv) Closed loop Control System, protection against power fluctuation, self-diagnostic control, Landing doors 2 hours Fire rated, Overload detection and protection, Overspeed Governor, Dot Matrix LED D & P Indicators In Car &Landings, BMS Compatibility, tamper proof infrared curtain covering almost the entire height of the lift car door, Alarm horn, Anti Nuisance Operation, CCTV camera system with 4 MP IP camera, suitable NVR and HDD for 30 days storage backup, Firemen switch, 2/3 way intercom, Emergency Stop Switch with battery backup for fan and light fitting for 1 hour, pit ladder | | | | |
| | xv) In case of failure of ARD or other electronic devices, a provision of manual rescue be provided | | | | |
| 6.2.1 | 2000 Kg | 1.00 | Each | 39,00,736.75 | 39,00,7367.00 |
| 6.3 | Supplying and fixing of Four Pole MCB Enclosure as per IEC 61439-3, IK 08 including accessories as required | 3.00 | Each | 1,023.00 | 3,069.00 |

| | | | | | |
|---|---|---|---|---|---|
| | Sub-Total | | | | ₹ 77,77,525.00 |
| 7 | Sub-Head- VII (Solar Photovoltaic Power Plant) | | | | |
| 7.1 | Solar Photovoltaic Power Plant | | | | |
| | Supplying Installation, Testing and Commissioning of on-grid Solar Photovoltaic Power Plant conforming to various applicable standards BIS, IEC, MNRE guidelines, the Central Electricity Authority Regulations and CPWD Specifications as amended up to date, consisting of Mono / Poly Crystalline silicon solar cells module, net metering facility, necessary control, protections, earthing, cabling, mounting structure, junction boxes, power conditioning units, Real time online web interfaced Data Monitoring System, Distribution panels, grid connecting arrangement, conduits, pipes, cable trays and other accessories etc. as required | | | | |
| | a) High Energy Efficiency Solar Photovoltaic Module of capacity 330 Wp or above, manufactured in India, conforming to IS 14286 / IEC 61215, IS / IEC 61730- Part-1, IS / IEC 61730- Part-2. Solar Photovoltaic Module conversion efficiency shall not be less than 23% at STC with temperature coefficient of Pmax better than -0.30% per 0C. PV modules used in solar power plants/ systems must be warranted for their output peak watt capacity, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years. Solar Modules shall be designed to operate in relative humidity upto 100% with temperature between -10 $^0$C and +85 $^0$C. Further, each PV module used in any solar power project must have Radio frequency identification tag with information such as name of manufacturer, month and year of manufacturing, country of origin (separately for Solar cell and module), I-V curve, Unique Serial No and Model No of the module, Wattage, Im, Vm and FF, name of test lab issuing IEC certificate | | | | |
| | b) Power Conditioning Unit (PCU) of 350-800 V DC Input voltage range and 415 V AC, three phase, 4 wire, 50Hz +/- 2.5 Hz, output voltage suitable to generate AC with a variation of 10% at nominal voltage. Power with efficiency not less than 97%, total harmonic | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | distortion less than 3% and suitable for ambient temperature from 0 to 50 $^0$C, Minimum IP-65 for outdoor and Minimum IP 21 for indoor, Built-in meter and data logger, MPPT, switching devices | | | | |
| | IGBT / MOSFETs and controller Microprocessor / DSP. PCU / inverter shall be capable of complete automatic operation including wake-up, synchronization & shutdown. The PCU shall be able to withstand unbalanced load conforming to IEC standard with shutdown / standby mode. It must be provided with grid islanding along with manual disconnect pole isolation switch besides automatic disconnection. Minimum protections: Mains Under / Over Voltage, over current, Over / Under grid frequency, over temperature, Surge voltage induced at output due to external source, Short-circuit, Lightening, Anti Islanding (for grid synch. Mode) and other protections as per applicable standards. LCD / LED display of minimum parameters: DC input voltage, DC current, AC Voltage and current (all 3 phases, in case of 3 phase), Instantaneous & cumulative AC output power, Daily DC energy produced and other parameters applicable standard. Communication interface RS 485 / RS 232 | | | | |
| | c) Module mounting structure: The roof top solar plant generation units shall be installed by using supporting Aluminium / Galvanized MS structure (mass of zinc coating shall be as per IS4759) having minimum head room clearance of 2.4 meter above the terrace level / ground level. The mounting structure would be designed to sustain wind load and seismic parameter of the site of installation. All the structure shall be design as per applicable BIS code and the material shall also confirm the applicable BIS Code. Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame, its fasteners, nuts and bolts. The suitable arrangements for maintenance and cleaning shall be provided | | | | |
| | d) Real time online web interfaced Data Monitoring System complete with | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | accessories for various parameters such as Solar Irradiance, temperature, AC Output Voltage and current, Output Power, Power factor, DC Input Voltage and Current, Time Active, Time disabled, Time Idle, Power produced and other parameters as per standard practices | | | | |
| | e) Array junction box & Main junction box with IP 65 protection and termination arrangement for incoming and outgoing cable along with glands, lugs and other | | | | |
| | accessories etc. as required. Each junction box shall be made of GRP / FRP / Powder Coated Aluminium /cast aluminium alloy with full dust, water & vermin proof arrangement with High-quality Suitable capacity Metal Oxide Varistors (MOVs) (semiconductor diode with resistant applied voltage) / surge arrestors and suitable Reverse Blocking Diodes, isolation switches isolate the DC input to Inverter, copper bus bar etc. | | | | |
| | f) Lightning, surge voltage protection, earthing protection and grid islanding | | | | |
| | g) Cables: Connections & Interconnections by required size IR / UV protected XLPE insulated copper conductor 1.1 kV grade armored power and control cables (ISI Marked) along with supplying & fixing of necessary channel / conduit, GI cable trays, supports, lugs, thimble and other accessories etc. as required | | | | |
| | h) DC Distribution Board and AC Distribution Panel Board: IP65, free standing, metal cladded, having copper bus bar, having required protection and control gears, connection-interconnection, etc. as required | | | | |
| 7.1.1 | Complete as mentioned above | 50.00 | KWp | 62,422.00 | 31,21,100.00 |
| | Sub-Total | | | | ₹ 31,21,100.00 |
| 8 | Sub-Head- VIII (Fire alarm) | | | | |
| | INTELLIGENT FIRE ALARM SYSTEM | | | | |
| 8.1 | Supplying, installation, testing and commissioning of microprocessor based intelligent addressable main fire alarm panel, central processing unit with the following loop modules and capable of supporting not less than 240 devices (including detectors) and minimum 120 detectors per loop and loop length up to 2 km, network communication card, | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | minimum 320 character graphics / LCD display with touch screen or other keypad and minimum 4000 events history log in the non-volatile memory (EPROM), power supply unit (230 ± 5 % V, 50 hz), 48 hrs back-up with 24 volt sealed maintenance free batteries with automatic charger | | | | |
| | The panel shall have facility to connect printer to printout log and facility to have seamless integration with analog / digital voice evacuation system (which is part of the schedule of work under SH: PA System) and shall be complete with all accessories. The panel shall be compatible for IBMS system with open protocol BACnet / Modbus over IP complete as per specifications | | | | |
| | Note: The Panel must be integrated and operate with existing detector and system) | | | | |
| 8.1.1 | Ten Loop Panel | 1.00 | Each | 5,48,426.95 | 5,48,427.00 |
| 8.2 | Supplying, installation, testing & commissioning of repeater panel with 320 character / Touch screen LCD display with inbuilt reset, acknowledge and silence switches complete as required | 4.00 | Each | 1,30,794.10 | 5,23,176.00 |
| 8.3 | Supplying, installation, testing & commissioning of central graphical fire alarm management system to centrally monitor and operate the fire alarm system complete as required | 1.00 | Each | 2,41,803.60 | 2,41,804.00 |
| 8.4 | Supplying, installation, testing & commissioning of intelligent analog addressable photothermal detector complete with mounting base complete as required | 305.00 | Each | 3,454.60 | 10,53,653.00 |
| 8.5 | Installation, testing & commissioning of intelligent analog addressable photothermal detector complete with mounting base complete as required | 299.00 | Each | 101.00 | 30,199.00 |
| 8.6 | Supplying, installation, testing & commissioning of response indicator on surface / recessed MS Box having two LED metallic cover complete with all connections etc as required | 305.00 | Each | 351.90 | 1,07,330.00 |
| 8.7 | Supplying, installation, testing & commissioning of intelligent addressable thermal detector with rate of rise cum fixed temperature thermistor complete with base as required | 8.00 | Each | 3,295.90 | 26,367.00 |

| | | | | | |
|---|---|---|---|---|---|
| 8.8 | Supplying, installation, testing & commissioning of addressable fire control module complete as required | 2.00 | Each | 3,629.40 | 7,259.00 |
| 8.9 | Supplying, installation, testing & commissioning of addressable manual call point complete as required | 9.00 | Each | 4,672.45 | 42,052.00 |
| 8.10 | Installation, testing & commissioning of addressable manual call point complete as required | 18.00 | Each | 101.00 | 1,818.00 |
| 8.11 | Supplying, installation, testing & commissioning of addressable horn cum strobe complete as required | 27.00 | Each | 4,234.30 | 1,14,326.00 |
| 8.12 | Supplying, installation, testing & commissioning of fire fighter telephone handset complete as required | 5.00 | Each | 6,918.40 | 34,592.00 |
| 8.13 | Supplying, installation, testing & commissioning of fire fighter phone jack complete as required | 25.00 | Each | 1,942.35 | 48,559.00 |
| | PUBLIC ADDRESS SYSTEM | | | | |
| 8.14 | Supplying, installation, testing & commissioning of 6 zone, voice alarm controller with USB, MP4 player (including 6 zone button paging station) with seamless integration facility with main fire alarm panel for voice evacuation complete as required | 1.00 | Each | 1,51,932.25 | 1,51,932.00 |
| 8.15 | Supplying, installation, testing & commissioning of 1.5/3/6W ceiling speaker complete as required | 65.00 | Each | 1,178.75 | 76,619.00 |
| 8.16 | Supplying, installation, testing & commissioning of digital audio amplifier 75 Watt, 25V rms operating at 240 Volt AC Supply complete as required | 4.00 | Each | 1,75,223.20 | 7,00,893.00 |
| 8.17 | Supplying, installation, testing & commissioning of Voice command keypad 6 zone, with microphone assembly complete as required | 1.00 | Each | 98,267.50 | 98,268.00 |
| | CONDUITING AND WIRING | | | | |
| 8.18 | Supplying and fixing 25 mm dia. MS flexible pipe with PVC coating along with all ancillaries and accessories like coupler etc. as required | 420.00 | Meter | 69.00 | 28,980.00 |
| 8.19 | 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 | | | | |
| 8.19.1 | 2 x 1.5 sq. mm | 4,000.00 | Meter | 88.55 | 3,54,200.00 |
| 8.2 | Supplying and drawing following sizes of XLPE insulated, core laid up, PVC tape inner sheathed multicore Armoured copper cable with galvanised steel strip, extruded PVC Type ST2 sheathed, 650/1100 V grade as per IS 7098 (Part- | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | I) 1988 complete as required in DWC pipe and surface as required for integration of Fire alarm system | | | | |
| 8.20.1 | 10 C x 1.5 sq. mm (Copper) | 1,100.00 | Meter | 774.00 | 8,51,400.00 |
| | Sub-Total | | | | ₹ 50,41,854.00 |
| 9 | Sub-Head- IX (Fire Fighting) | | | | |
| 9.1 | Providing laying, testing & commissioning of 'C' class heavy duty MS Pipe conforming to IS 1239 / Class - II of IS: 3589 i/c fittings like elbows, tees, flanges, tapers, nuts bolts, gaskets etc. in ground including welding, excavation & providing cement concrete blocks as supports, anticorrosive treatment with coal tar / asphalt tape as per IS 10221, refilling the trench etc. of following sizes complete as required | | | | |
| 9.1.1 | 200 mm. dia. (wall thickness = 6.3 mm) | 650.00 | mtr. | 8,338.65 | 54,20,123.00 |
| 9.1.2 | 150 mm. Dia | 100.00 | mtr. | 5,869.60 | 5,86,960.00 |
| 9.2 | Providing, laying, testing & commissioning of 'C' class heavy duty MS pipe conforming to IS 1239 / Class - II of IS: 3589 including Welding, fittings like elbows, tees, flanges, tapers, nuts bolts, gaskets etc. and fixing the pipe on the wall / ceiling with suitable clamp / support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required: | | | | |
| 9.2.1 | 25 mm dia. | 40.00 | mtr. | 1,058.00 | 42,320.00 |
| 9.2.2 | 40 mm dia. | 80.00 | mtr. | 1,447.85 | 1,15,828.00 |
| 9.2.3 | 65 mm dia. | 25.00 | mtr. | 2,248.25 | 56,206.00 |
| 9.2.4 | 80 mm dia. | 70.00 | mtr. | 2,618.55 | 1,83,229.00 |
| 9.2.5 | 100 mm dia. | 50.00 | mtr. | 3,538.55 | 1,76,928.00 |
| 9.2.6 | 150 mm dia. | 180.00 | mtr. | 4,943.85 | 8,89,893.00 |
| 9.2.7 | 200 mm dia. (wall thickness 6.3 mm) | 640.00 | mtr. | 7613.00 | 48,72,320.00 |
| 9.2.8 | 250 mm dia. (wall thickness 6.3 mm) | 20.00 | mtr. | 9,226.45 | 1,84,529.00 |
| 9.3 | Supplying and fixing single headed internal hydrant valve with instantaneous Gunmetal / Stainless Steel coupling of 63 mm dia. with cast iron wheel ISI marked conforming to IS 5290 (Type-A) with blank Gunmetal / Stainless Steel cap and chain as required | | | | |
| 9.3.1 | Single headed Stainless steel | 14.00 | Each | 7,626.80 | 1,06,775.00 |
| 9.4 | Supplying and fixing Single headed external yard hydrant valve with 1 No. 63 mm dia. instantaneous FM Gunmetal / Stainless Steel coupling and cast-iron wheel, ISI marked, conforming to IS 5290 (type A) with blank Gunmetal / | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | Stainless Steel cap and chain as required: | | | | |
| 9.4.1 | Single headed Stainless steel | 13.00 | Each | 7,626.80 | 99,148.00 |
| 9.5 | Providing, installation, testing and commissioning of non-return valve of following sizes confirming to IS: 5312 complete with rubber gasket, GI bolts, nuts, washers etc.as required: | | | | |
| 9.5.1 | 65 mm dia. | 2.00 | Each | 7,949.95 | 15,900.00 |
| 9.5.2 | 80 mm dia. | 2.00 | Each | 9,493.25 | 18,987.00 |
| 9.5.3 | 150 mm dia. | 15.00 | Each | 21,716.6 | 3,25,749.00 |
| 9.5.4 | 200mm dia. | 3.00 | Each | 35,530.4 | 1,06,591.00 |
| 9.5.5 | 250mm dia. | 2.00 | Each | 54,765.3 | 1,09,531.00 |
| 9.6 | Supplying, fixing, testing and commissioning of butterfly valve of PN 1.6 rating with bronze / gunmetal seat duly ISI marked complete with nuts, bolts, washers, gaskets conforming to IS 13095 of following sizes as required: | | | | |
| 9.6.1 | 80 mm dia. | 15.00 | Each | 6,216.9 | 93,254.00 |
| 9.6.2 | 100 mm dia. | 4.00 | Each | 8,361.65 | 33,447.00 |
| 9.6.3 | 150 mm dia. | 18.00 | Each | 11,197.55 | 2,01,556.00 |
| 9.7 | Supplying, fixing, testing & commissioning of double flanged sluice valve of rating PN 1.6 with non-rising spindle, bronze / gun metal seat, ISI marked complete with nuts, bolts, washers, gaskets and conforming to IS 780 of following sizes as required: | | | | |
| 9.7.1 | 65 mm dia. | 4.00 | Each | 11,349.35 | 45,397.00 |
| 9.7.2 | 80 mm dia. | 2.00 | Each | 13,093.90 | 26,188.00 |
| 9.7.3 | 150 mm dia. | 10.00 | Each | 27,701.20 | 2,77,012.00 |
| 9.7.4 | 200 mm dia. | 18.00 | Each | 47,593.90 | 8,56,690.00 |
| 9.7.5 | 250 mm dia. | 2.00 | Each | 56,228.10 | 1,12,456.00 |
| 9.8 | Providing, installation, testing and commissioning of stainless-steel Y-strainer fabricated out of 1.6 mm thick stainless steel, Grade 304, sheet with 3 mm dia. holes with stainless steel flange | | | | |
| 9.8.1 | 80 mm dia. | 1.00 | Each | 5,884.55 | 5,885.00 |
| 9.8.2 | 200mm dia. | 2.00 | Each | 27,106.65 | 54,213.00 |
| 9.9 | Supplying and fixing 63 mm dia. 15 m long RRL hose pipe with 63 mm dia. male and female couplings duly bound with GI wire, rivets etc. conforming to IS 636 (type-A) as required: | | | | |
| 9.9.1 | Stainless Steel (Grade 304 | 54.00 | Each | 5,367.05 | 2,89,821.00 |
| 9.10 | Supplying and fixing first-aid Hose Reel with MS construction spray painted in post office red, conforming to IS 884 complete with the following as required. (a) 20 mm nominal internal dia. water hose thermoplastic (Textile reinforced) | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | type -2 as per IS: 12585<br>(b) 20 mm nominal internal dia. gun metal globe valve & nozzle.<br>(c) Drum and brackets for fixing the equipments on wall.<br>(d) Connections from riser with 25 mm dia. stop gun metal valve & M.S. Pipe and socket | | | | |
| 9.10.1 | 30 m | 14.00 | Each | 10,856.00 | 1,51,984.00 |
| 9.11 | Supplying & fixing 63 mm dia. gun metal short branch pipe with 20 mm nominal internal diameter size nozzle conforming to IS 903 suitable for instantaneous connection to interconnect hose pipe coupling as required: | | | | |
| 9.11.1 | Stainless Steel (Grade 304) | 27.00 | Each | 2,019.40 | 54,524.00 |
| 9.12 | Supplying and fixing of double door hose cabinet of size 750 mm x 600 mm x 250 mm made of 16 swg MS sheet complete with glass doors including necessary locking arrangement suitable to accommodate 2 No 15-meter-long Hose pipe, 1 No. branch pipe, mounted on wall OR raised brick platform and fully painted with Post Office Red externally and internally with synthetic enamel paint complete in all respect, for internal / external hydrant as required | 27.00 | Each | 6,947.00 | 1,87,569.00 |
| 9.13 | Supplying and fixing of fire brigade connection of cast iron body with gun metal male instantaneous inlet couplings complete with cap and chain as reqd. for suitable dia. MS pipe connection conforming to IS 904 as required: | | | | |
| 9.13.1 | 3 way - 150 mm dia. M.S. Pipe | 10.00 | Each | 11,611.55 | 1,16,116.00 |
| 9.14 | Supplying and fixing air vessel made of 250 mm dia. 8 mm thick MS sheet, 1200 mm in height with air release valve on top and flanged connection to riser, drain arrangement with 25 mm dia. gun metal wheel valve with required accessories, pressure gauge and painting with synthetic enamel paint of approved shade as required | 5.00 | Each | 22,312.30 | 1,11,562.00 |
| 9.15 | Providing & fixing of pressure Gauge with suitable rating in M.S. pipe line including connection etc. as required | 30.00 | Each | 3013.00 | 90,390.00 |
| 9.16 | Providing, fixing, testing & commissioning of 15mm dia. quartzoid bulb type sprinklers of rating 68 degree C with required accessories: | | | | |
| 9.16.1 | Pendent Sprinkler | 572.00 | Each | 688.85 | 3,94,022.00 |
| 9.16.2 | Upright Sprinkler | 572.00 | Each | 688.85 | 3,94,022.00 |

| | | | | | |
|---|---|---|---|---|---|
| 9.16.3 | Horizontal side wall sprinkler | 10.00 | Each | 803.85 | 8,039.00 |
| 9.17 | Providing & fixing of pressure switch in M.S. pipeline including connection etc. as required | 4.00 | Each | 1,920.50 | 7,682.00 |
| 9.18 | Providing & fixing flow switch in following sizes M.S. pipe including connection etc as required | | | | |
| 9.18.1 | 100mm dia. | 4.00 | Each | 9,279.35 | 37,117.00 |
| 9.18.2 | 150 mm dia. | 5.00 | Each | 11,090.60 | 55,453.00 |
| 9.19 | Providing, fixing, testing & commissioning of installation control valve of cast iron body, brass / bronze working parts comprising of water motor alarm, bronze seat clapper, clapper arm and hydraulically driven mechanical gong bell to sound continuous alarm when the wet riser / sprinkler system activates, pressure gauges, emergency releases, strainer, pressure switch, cock valve complete with drain valve and bypass, test control box, ball valves, MS pipe of required size, flanges, orifice plate, gasket etc. of following sizes as required | | | | |
| 9.19.1 | 150mm dia. | 1.00 | Each | 58,425.75 | 58,426.00 |
| 9.20 | Supplying, installation, testing & commissioning of sprinkler flexible pipe (UL Listed) of stainless steel complete with 15 NPT on reducer thread with maximum working pressure of 175 PSI test pressure of 875 PSI (Burst) with branch line (Inlet) 25mmNPT male thread to sprinkler head (Outlet) 15 mm NPT female thread with reducer, nipple, 2 side brackets, centre bracket, stock bar of following sizes complete as required | | | | |
| 9.20.1 | 1200 mm | 547.00 | Each | 2,070.00 | 11,32,290.00 |
| 9.20.2 | 1500 mm | 25.00 | Each | 2,264.35 | 56,609.00 |
| 9.21 | Providing and fixing of CO2 type Fire Extinguisher of capacity 3 kg (4.5 Liter) confirms to IS 15683, bearing ISI marked, consisting of High-Pressure seamless steel cylinder (IS 7285) and duly approved by Chief controller of Explosive, fitted with wheel type valve, fully charged with CO2 gas (IS 15222), with non-conductor of electricity discharge PVC horn along with Bend Pipe, internally siphon tube, & mounting brackets having fire rating 34B | 45.00 | Each | 9,888.00 | 4,44,960.00 |
| 9.22 | Providing and Fixing of DCP (Dry Chemical Powder) type Fire Extinguisher of Capacity 4 kg Confirms | 45.00 | Each | 3,062.00 | 1,37,790.00 |

| | | | | | |
|---|---|---|---|---|---|
| | to ISI Mark IS 15683, bearing ISI marked complete with brass forged squeeze grip type valve fitted with pressure gauge, pressurize with dry Nitrogen gas filled, with discharge nozzle with wall mounting bracket, having fire rating of 2A & 21B | | | | |
| 9.23 | Supply and fixing MS stand duly painted over a coat of primer for 4 Nos. fire bucket with sand etc. as required | 6.00 | Set | 3,299.00 | 19,794.00 |
| 9.24 | Supplying & laying of 2x1.5 sqmm fire survival armoured cable, 600 / 1000V rated with annealed copper conductor having glass mica fire barrier tape covered by an extruded layer of Cross Linkable Ethylene Propylene Rubber (EPR) insulation and LSZH inner bedding, steel wire armouring & LSZH outer sheath complete as required | 500.00 | Meter | 443.90 | 2,21,950.00 |
| 9.25 | Supplying and fixing of following sizes of DLP PVC trunking in the surface i/c Suitable flexible cover, joints, end cap, angle, junction and other accessories etc. as reqd. | | | | |
| 9.25.1 | 80 mm X 50 mm | 100.00 | Meter | 1,409.00 | 1,40,900.00 |
| 9.26 | Supplying, fixing, testing & commissioning of Ball valve ISI marked bronze / gun metal seat, ISI marked complete with nuts, bolts, washers, gaskets following sizes as required for test valve: | | | | |
| 9.26.1 | 25 mm dia. | 10.00 | Each | 1,326.00 | 13,260.00 |
| 9.27 | Supplying, installation, testing and commissioning of dewatering pump set of 0.5 HP, suitable for 240 V, 50 HZ supply having ss impeller, CI casing, SS pump shaft, mechanical sealing, 40mm dia. for suction and delivery head complete as required | 1.00 | Set | 23,039.00 | 23,039.00 |
| 9.28 | CONTROL PANELS Fabrication, supplying, Installation testing & commissioning of Electrical control panel of cubical construction, floor mounted type, fabricated out of 2mm thick CRCA sheet, compartmentalised with hinged lockable doors, dust and vermin proof, powder coated of approved shade after 7 tank treatment process, cable alley, inter-connection with suitable size copper conductor cable / solid copper strip, having switchgears and accessories, mountings and internal wiring, earth | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | terminals, numbering etc. complete in all respect, suitable for main fire pump, pressurisation pump & diesel pump set complete as per CPWD specification with following in coming and Outgoings, suitable for operation on 415V, 3 phase, 50Hz Ac Supply with enclosure protection class IP 42 as required : | | | | |
| | Incomings<br>630A, 50kA 4 Pole MCCB, Ics=100% Icu Rating Digital Voltmeter 0-500V with selector switch Ammeter (0-630 A) with selector switch & CTs etc. LED type RYB phase indicating lamps, ON, OFF, trip indicating lamps 1 Set of Copper Bus Bar 800Amps, 4 Way<br>Outgoings<br>(Note : All outgoing feeders for pumps should have digital Ammeter with selector switches, and LED type ON, OFF, trip indicating lamps) Main Fire Pump 200 Amp, 50kA TPN MCCB, Ics=100% Icu, with fully automatic Star / Delta starter suitable for 75 hp pump with overload protection, current sensing type single phase preventor complete with all accessories and internal wiring required for automatic operation, selector switch for local / remote, auto / manual / OFF operation. - 2 sets Jockey Pump 100 Amp, 50kA TPN MCCB, Ics=100% Icu, with Suitable HP fully automatic Star / Delta starter with overload protection, current sensing type single | | | | |
| | phase preventor complete with all accessories and internal wiring required for automatic operation, selector switch for local / remote, auto / manual / OFF operation - 2 sets Diesel Engine Control for diesel engine comprising – Automatic / Manual selector switch & 3 attempts starting device, timers and relays as required, push buttons, start / stop in manual mode Indicating lamp for high / Low Lub. Oil pressure, High Water Temp and Engine on indication Battery charger suitable for 12V / 24 V DC with boost and trickle selector switch, 0-30 V DC volt meter, and 0-20 A DC Ammeter. All standard relays and accessories for automatic operation of diesel engine | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | System Controller: Designing, Supply, Installation, Testing and commissioning of system controller to control operation of main electric fire pump, diesel pump, Pressurization pump, Terrace pump in sequence as per specification consisting of relays, timers. Sensors, annunciation window for fault indication, complete as per specification | | | | |
| 9.28.1 | Control panels complete | 1.00 | Each | 5,39,977.90 | 5,39,978.00 |
| 9.29 | INDICATION PANEL | | | | |
| | Fabrication, supply, installation, testing and commissioning of wall mounted emote indication panel for firefighting system fabricated from not less than 1.6 mm thick CRCA sheet, powder coated of approved shade, complete internal wiring, indicating lamps, relays, accessories, numbering, lettering complete in all respect and consisting of the following as required: | | | | |
| | (i) ON / OFF indication of Main Electrical / Diesel Fire Pump, Sprinkler pump, Pressurisation Pump, Terrace Pump | | | | |
| | (ii) Audio / Visual indication of operation of Main Electric / Diesel Fire Pump and Terrace Pump | | | | |
| | (ii) Pressure indication in Fire Fighting System (pressure transducer to be installed under separate item) | | | | |
| 9.29.1 | Complete indication panel as above | 1.00 | Each | 58,954.00 | 58,954.00 |
| 9.30 | ANNUNCIATION PANEL | | | | |
| | Supplying, installation, testing and commissioning of annunciation panel made out of not less 1.6 mm thick CRCA sheet coated in approved colour with locking arrangement, audio and visual indication of fault and operation of automatic sprinkler, system monitoring including providing and fixing the following, connections interconnections etc. complete as required | | | | |
| | (i) Monitoring 6 Nos. of flow switches | | | | |
| | (ii) Monitoring the open circuit, short circuit & earth fault in control cable between panel and flow switches | | | | |
| | (iii) Audible alarm | | | | |
| 9.30.1 | Complete Annunciation panel as above | 1.00 | Each | 39,302.00 | 39,302.00 |
| | Gas Suppression System for Server Room & Electrical Room | | | | |
| 9.31 | SITC of 'Clean Agent, PESO Approved 80.0 Ltrs. Cylinder with Valve Assembly and arrangement for Supervisory Switch | 2.00 | Set | 1,89,578.00 | 3,79,156.00 |

| | | | | | |
|---|---|---|---|---|---|
| | connection for monitoring cylinder pressure, a pressure gauge with a safety burst disc and safety cap along with cylinder bracket and Discharge pipe with support and fittings, cs seamless to ASTM B-106 schedule minimum 40, etc. complete as required | | | | |
| 9.32 | SITC of Clean Agent FK-5-1-12 Extinguishing Agent shall be: The agent shall not contain any Hydro fluorocarbons (HFC). The ozone depletion potential should be zero. The Global warming potential should be equal to or less than 1 The Extinguishing Agent should be UL Listed / FM approved. The extinguishing agent should be filled in an UL Listed / PESO approved filling station | 125.00 | Kg | 2,078.00 | 2,59,750.00 |
| 9.33 | SITC of Master Cylinder Kit complete comprises of Electric Control Head operated electrically from the detection and control system | 2.00 | Nos. | 40,071.00 | 80,142.00 |
| 9.34 | SITC of Manual Actuator Assembly complete with liver to activate the system manually | 2.00 | Nos. | 14,305.00 | 28,610.00 |
| 9.35 | SITC of 'Wire Braided Flexible Rubber Hose with Elbow and connectors complete assembly to Connect Clean Agent Cylinder Assembly Discharge outlet with Discharge Pipe or Discharge Manifold | 2.00 | Nos. | 39,519.00 | 79,038.00 |
| 9.36 | SITC of Warning Signs and Plates for Inside Room and Outside Room application | 2.00 | Nos. | 4,500.00 | 9,000.00 |
| 9.37 | SITC of Discharge Nozzles to Discharge Clean Agent Gas in the Hazard Area as hydraulic calculation and flow rate required in 180 Deg. / 360 Deg. Discharge Pattern | 4.00 | Nos. | 15,355.00 | 61,420.00 |
| 9.38 | SITC of Discharge Pressure Switch for system as required | 2.00 | Nos. | 18,303.00 | 36,606.00 |
| 9.39 | SITC of Conventional 2 Zone Fire Detection Panel with 1 Zone Gas Release Module with Battery backup for system as requited | 2.00 | Nos. | 46,020.00 | 92,040.00 |
| 9.40 | Supplying, installation, testing & commissioning of manual call box of ABS type in surface / recess with stainless steel chain & hammer assembly complete with glass and push button etc. as required | 2.00 | Nos. | 510.60 | 1,021.00 |
| 9.41 | SITC of Abort Switch for system as required | 2.00 | Nos. | 8,245.00 | 16,490.00 |

| | | | | | |
|---|---|---|---|---|---|
| 9.42 | Supplying, installation, testing & commissioning fire alarm sounder with facility to make announcement, mounted in A.B.S. box with hinged cover plate & suitable for operation with amplifier i/c line matching transformer etc. complete as required | 2.00 | Nos. | 609.50 | 1,219.00 |
| 9.43 | Testing & commissioning of following fire pump installed at Fire Pump room including checking of pump, motor, coupling, valves, piping, electrical connections, starter / control panel, protections and interlocks; testing of automatic pump starting through pressure switch; performance testing at rated flow and head; functional testing of associated wet riser, hydrant and sprinkler systems including operation of test / drain arrangements; verification of pump running and fault indications and interface with automatic fire alarm system wherever provided; necessary flushing, servicing, adjustments and minor rectification for successful commissioning; and submission of test and commissioning report, complete as required etc. complete as required | | | | |
| 9.43.1 | Electric driven Main Fire Pump of rating 2850 lpm at 88 m Head | 2.00 | job | 44,297.00 | 88,594.00 |
| 9.43.2 | Diesel engine driven main fire pump of rating 2850 lpm at 88 m Head | 1.00 | job | 71,982.00 | 71,982.00 |
| 9.43.3 | Electric driven pressurization pump 300 lpm at 88 m Head | 1.00 | job | 16,611.00 | 16,611.00 |
| | Sub-Total | | | | ₹ 2,10,24,417.00 |
| 10 | Sub-Head- X (Networking and CCTV) | | | | |
| 10.1 | 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 | | | | |
| 10.1.2 | 25 mm | 450.00 | Meter | 193.20 | 86,940.00 |
| 10.1.3 | 32 mm | 150.00 | Meter | 240.35 | 36,053.00 |
| 10.2 | Supplying, drawing, Installation, Testing and commissioning of CAT6 UTP LSZH 23AWG Twisted Pair Cable in existing conduit / on surface, Category 6 Unshielded Twisted Pair, 4 pair should be complied as per UL/ETL verification program for compliance with ANSI / TIA-568.2-D standard. Outer diameter should be in the range of 6.1mm nominal with Operating Temperature Range: -5° to +60°C, Bending Radius: < 4 X Cable | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | Diameter at –5°C ± 1°C and Pulling Force: 11.5Kg etc. complete as required | | | | |
| 10.2.1 | 1 Run of cable | 200.00 | Meter | 69.00 | 13,800.00 |
| 10.2.2 | 2 Run of cable | 250.00 | Meter | 110.40 | 27,600.00 |
| 10.2.3 | 3 Run of cable | 150.00 | Meter | 150.65 | 22,598.00 |
| 10.3 | Supplying and drawing following core Fiber Optic Cable having corrugated steel armoring. The Fiber should be SM Fiber Central -loose tube filled with Thixotropic jelly, duly following Standards: ISO 11801, IEC 60793-1/60794-1-2, ITU-T-REC G.652D and Telcordia GR-20-core, High quality Electro Chromium Coated Corrugated Steel tape (ECCS) and HDPE- Sheath, Operating ambient Temperature should be – 5 0C to +50 0C and Storage Temperature shall be – 5 0C to +50 0C, Max Attenuation ± 0.36 (db / km) at Operational Wavelength 1310 nm and ± 0.22 db / km at Operational Wavelength 1550 nm. type of fiber should be 9/125 / G.652D & Refractive Index should be 1.4670/1.4675. The value for Mode-filed, Cladding Diameter 9.2 ± 0.4 µm and 125 ± 0.7 µm correspondingly. The Dispersion value < 3.5 < 18 ps/nm-km and PMD value < 0.2 ps/km and Cable Cutoff wavelength < 1260 nm i/c splicing & marking etc. complete as required | | | | |
| 10.3.1 | Single Mode 6 Core Optical fiber cable | 500.00 | Meter | 73.60 | 36,800.00 |
| 10.4 | Supply and fixing following port Rack Mount loaded LIU with pigtail, Front-mounted cable saddles for jumper management, suitable to manage both splices and terminations, Pre-assembled shelves in multiple configurations, Rubber fiber slotted bracket built-in, metal splice shelf to protect the fibers, 2 fiber spools built-in for 900µm tight buffered fiber storing, Capable of storing up to 3 meters of 900µm tight buffered fiber per adapter, Removable front and rear covers for better access to interior of LIU, Should be Single / Multi mode LC Type fully loaded. Accessory kit consists of cable ties, mounting ear screws, and spiral wrap tube etc. complete as required | | | | |
| 10.4.1 | 12 Port LIU | 12.00 | Each | 8,096.00 | 97,152.00 |
| 10.4.2 | 24 Port LIU | 2.00 | Each | 11,556.35 | 23,113.00 |
| 10.5 | Supplying and fixing Patch Cord of Optical Fiber Multi Mode or Single Mode LC to LC Fiber Duplex having high | 52.00 | Each | 810.75 | 42,159.00 |

| | | | | | |
|---|---|---|---|---|---|
| | precision ceramic ferrule with good concentricity, Fiber corning single mode G652D, Cable Type 2mm with Mechanical specification Apex Offset < 50 µm, Fiber Height + 100 nm, End-face radius of Curvature 7mm < R <25mm, Repeatability < 0.2 dB, Working ambient Temperature – 5 0C to +50 0C, Storage Temperature – 10 0C to +50 0C, Length – 2 meter, Type - LC-LC Duplex etc. complete as required | | | | |
| 10.6 | Supplying and fixing of following size Wall Mount Rack having Fixed Structure with 0.8mm CRCA Sheet, completely knocked-down condition (CKD) Shape, Vertical Mounting Rail 1.6 mm with 'U' Marking, Minimum 2 cable entry / exit provision at Top and bottom with rubber protection, Front 5mm Toughened Glass with lock, wall mounting kit, Powder coated Colour- RAL- 7035, complied with UL & RoHS, 2 x 6 sockets 16A power distribution units, 3 numbers closed cable organizer, Hardware mounting screws packet of 20 x 1 number, etc. complete as required | | | | |
| 10.6.1 | 9U Rack | 3.00 | Each | 10,304.00 | 30,912.00 |
| 10.6.1 | 15U Rack | 5.00 | Each | 15,329.50 | 76,648.00 |
| 10.7 | Supplying and fixing 24U Rack with 4 inch Castor wheels and front brake Floor Standing Rack with Main Frame Pillar of 1.25mm Powder Coated CRCA Sheet with removable side panels, L- Shape adjustable Vertical Mounting Rail of 2mm with 'U' Marking completely knocked-down condition (CKD) Shape, fitted with 4 number cooling fans, minimum 5nos two line cable entry / exit provision at top and bottom with rubber protection, Front door 5mm Toughened Glass with MS frame or MS perforated with lock, Rear MS vented or perforated door, Powder coated Colour- RAL- 7035 or black, complied with UL & RoHS, 2 x 6 sockets 16A power distribution units, 3 numbers closed cable organizer, Hardware mounting screws packet of 20 x 1 number, etc. complete as required | 1.00 | Each | 24,381.15 | 24,381.00 |
| 10.8 | Supplying, Installation, Testing and commissioning of RJ45 Connector for CAT 6 / 6A Cables. RJ45 modular plug supports 4 twisted pairs, 8 positions, 8 connectors. Housing: PC, UL94V-2, transparent colour, use for 24- 26 AWG | 78.00 | Each | 10.35 | 807.00 |

| | | | | | |
|---|---|---|---|---|---|
| | stranded wires etc. complete as required | | | | |
| 10.9 | Supplying, Installation, Testing and commissioning of following CAT6 Patch Cord should have ETL / UL verification program certificate for compliance with ANSI / TIA-568.2-D etc. complete as required | | | | |
| 10.9.1 | Copper Patch Cords of length 1m (3ft) | 366.00 | Each | 173.65 | 63,556.00 |
| 10.10 | Supplying Installation Testing and Commissioning of 24 port Cat6 Patch Panel loaded. Must be of 1U height with clear label holders and white label with the panel. 24 Ports Cat-6 Patch Panel should have ETL / UL verification program certificate for compliance with ANSI / TIA-568.2-D etc. complete as required | 20.00 | Each | 6,069.70 | 1,21,394.00 |
| 10.11 | Supplying, installation, Testing and commissioning of following capacity 8 port Layer 2 indoor Network Switch having features and specifications etc. as mentioned here under: Minimum 8 X RJ-45 Gigabit Ethernet Ports and additional 2 X 1G SFP Ports with non-blocking architecture by having Switching capacity of minimum 20 Gbps and packet forwarding rate of 14 Mpps or higher, 8K MAC table Internal dual AC Power supply with operating temperature of -5 0C to +50 0C. Jumbo frame: 9KB or higher, IGMP Snooping, IGMP snooping querier and support for IGMP Snooping Fast Leave, Should create 250 or more MLD groups, MLD Snooping, Per VLAN MLD Snooping C MLD Snooping Fast Leave, STP, RSTP,MSTP, Loopback detection, Multicast filtering, VLAN Tagging, QOS: 8 Queue per port, WRR, IPv4/IPv6 Interface : minimum 100 IPv4 static route entries and minimum 50 IPv6 static route entries, 700 Access Control entries, SSH CSSL for IPv4 and IPv6, 802.1x, ARP Spoofing, DHCP IP + MAC + Port Binding, Per Port Bandwidth Control, 802.1X Authentication (Supports local / RADIUS database, Port-based Access Control and EAP, OTP, TLS, TTLS, PEAP Support) Cable Diagnostic feature, LLDP, LLDP-MED, SNTP / NTP, RMON, SNMP v1,v2c, v3 and SNMP Traps. Certifications: FCC, CE marked UL / EN, RoHS and relevant MTCTE(TEC) / BIS compliance / | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | certification as applicable, etc. complete as required | | | | |
| 10.11.1 | 8 port PoE Layer 2 Network Switch with PoE Support of 130W or higher with each copper port supporting 802.3 at PoE+ | 8.00 | Each | 40,354.65 | 3,22,837.00 |
| 10.12 | Supplying, installation, Testing and commissioning of following capacity 24 port Layer 2 indoor Network Switch having features and specifications etc. as mentioned here under: At least 24 X RJ-45 Gigabit Ethernet Ports and additional 2 X 10G Base -T with 4 X SFP Ports with non-blocking architecture by having Switching capacity of min. 128Gbps and packet forwarding rate of 95Mpps or higher, 16K MAC table. Console Port, USB port, Stacking support of min. 4 units per stack. Internal dual AC Power supply, STP, RSTP, MSTP, BPDU Filter, BPDU Restriction, Min. 9K Jumbo Frame, LBD, IGMP Snooping V1/V2/V3, MLD Snopping V1/V2. IGMP / MLD Groups 1K or more, IPv4/IPv6 Loopback Interface, 16 L3 IP Interface, Ipv6 ND, VRRPv3, UDP Helper, ECMP. VLAN: 802.1Q, Port based, Q-in-Q, Multicast VLAN, Protocol VLAN, VLAN Trunking, DHCP Snopping, Server, server Screening. RADIUS, TACACS+ Authentication, QoS: 802.1P, 8 queues per port, QoS: WRR, Strict + WRR, WRED, 802.1p. ACL: MAC based, IPv4C IPv6, TCP/UDP Port number, time-based ACL, TFTP Client, SNMP V1, v2c, v3, SNMP traps, RMON, DHCP server, relay, client, LLDP, LLDP-MED, OAM, Dying Gasp, 802.3ah, sflow, RIP, OSPF v2/v3, policy-based route, SSL, SSH. 6 kV surge protection on all Gigabit Ethernet ports and on all GE RJ-45 access ports. certifications: FCC, CE marked, UL / EN, RoHS and relevant MTCTE(TEC) / BIS compliance / certification as | | | | |
| | applicable, etc. complete as required. | | | | |
| 10.12.1 | 24 port PoE Layer 2 Network Switch with PoE Support of 370W or higher with each copper port supporting 802.3at PoE+ min. | 21.00 | Each | 1,44,201.95 | 30,28,241.00 |
| 10.13 | Supplying, Installation, Testing and commissioning of small form-Pluggable (SFP) for Network Switches. Must be hot | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | Pluggable, RoHS Complaint, etc. complete as required | | | | |
| 10.13.1 | 10 G SFP + Single Mode / Multi Mode | 80.00 | Each | 17,217.80 | 13,77,424.00 |
| 10.14 | Supplying, installation, Testing and commissioning of following capacity 24 port Layer 3 Network Switch having features and specifications etc. as mentioned here under: At least 20 X RJ-45 Gigabit Ethernet Ports and additional 4 combo 10 / 100 / 1000 base-t / SFP Ports with additional 4 SFP+ ports non-blocking architecture by having Switching capacity of min. 128 Gbps and packet forwarding rate of 95 Mpps or higher, 16K MAC table. Console Port, USB port, Dual AC Power supply with operating temperature of 0 to +50 0C. Stacking port with stacking support of minimum 8 units per stack. 32K Mac address, 9K or more Jumbo frame, ERPS with enabling ring to converge in less than 50 ms from node or link failure, Static routing, Static, 6 to 4, ISATAP and GRE, IPv6 Neighbour Discovery (ND), BGP / ISIS / MPLS / VRRP v2, OSPFv2/v3, PBR, Route Redistribution, RIPv1/v2/ng, IP Helper all L3 Protocols should support from day 1 for both IPv6 and IPv4, 802.1x, Port security, Radius C TACACS+ authentication C accounting, DAD, DAI, DoS attack prevention, SSH, Guest VLAN, | | | | |
| | IP Access List, MAC Access List. Multicast: VLAN, PIM-SM, PIMDM, PIM-SDM, PIM-SMv6, DVMRP v3 and MSDP, IGMP C MLD Snooping, Flow mirroring, IGMP C MLD Snooping Querier, Per-VLAN IGMP C MLD Snooping. SNMP, Dual configurations, Multiple images, RMON, LLDP / LLDP-MED, sFlow, DHCP / BOOTP Client, IPv4 / IPv6, Syslog server, Debug command, 802.3ah Ethernet Link OAM, 802.1ag Connectivity Fault, Y.1731 OAM, 802.1Qbb Priority- based Flow Control (PFC), Dying Gasp, Cable Diagnostics, 6 kV surge protection on all Gigabit Ethernet ports and on all GE RJ-45 access ports. Certifications: FCC, CE marked, UL / EN, RoHS and relevant MTCTE (TEC) / BIS compliance / certification as applicable, etc. complete as required | 1.00 | Each | 2,22,859.65 | 2,22,856.00 |
| 10.15 | Supplying, Installation, Testing and commissioning of indoor Wireless | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | Access Point for High density use having features and specifications etc. as mentioned here under- WiFi6 802.11ax 574Mbps (2.4GHz) + 2402Mbps (5GHz), WIFI 6 Certified / Wi-Fi- alliance, MG 2.5G LAN POE Port having console management function, factory reset, WPA / WPA2 / WPA3™ Personal / Enterprise, WEP 64 / 128-bit, SSID broadcast disable, MAC address access control, Internal RADIUS server, SNMP, Customizable Captive Portal, Auto Channel, Works as Access Point, WDS, WDS with AP, Wireless Client ., Web (HTTP), Secure Socket Layer (SSL), Traffic control, Support ATF / Fast Roaming / Band Steering, Supports enhanced security – WPA-PSK / WPA2-PSK / WPA3-PSK and RADIUS client, and Cipher negotiation, and MAC / IP ACL for networks, Certifications: FCC, CE marked, UL / EN, RoHS and relevant MTCTE(TEC) / BIS compliance / certification as applicable. Works as Standalone, Compatible with S/W & H/W Controller with additional features like - Real-Time Monitoring and Alerts, Rich Advanced Features, Centralized Device Management, Role-Based Administration, Real-Time Monitoring, VLAN and Access Control, Auto RF Management and Bandwidth Optimization, Multi-SSID and Captive Portal Authentication / Product must be on Trusted Telecom Portal of Department of Telecommunication, Government of | | | | |
| | India etc. complete as required | 25.00 | Each | 40,892.85 | 10,22,321.00 |
| | CCTV | | | | |
| | 4MP IP IR Dome Camera | | | | |
| 10.16 | Supplying Installation Testing and Commissioning of 4MP IP IR Dome Camera having following specifications and features etc. | | | | |
| | 1) Signal System: PAL / NTSC, Signal to Noise Ratio: > 50 dB, Camera should display Camera title, Date & Time in live & recorded video | | | | |
| | 2) Image Sensor: 1 / 2.8" or better progressive Scan CMOS to get colour image even at night condition (Minimum Illumination: 0.006 Lux @ F1.4, AGC ON, 0 lux with IR or better) True Day & Night High Performance Mechanical IR cut filter with auto switch, Integrated IR | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | Source (Auto, Manual)- Inbuilt IR LED's with effective distance upto 50 meter or better and 30 meter for colour view in night, Imaging: 1/3s to 1/30000s electronic shutter support, Auto Gain Control, White Balance- Auto, Back Light Compensation, Multi zone Privacy Masking, HLC, Digital Watermarking | | | | |
| | 3) Compression (Minimum): Video: H.265 or better, Audio: G.711U/A, G.711Mu, G.726, AAC, G.723 | | | | |
| | 4) Wide Dynamic Range: WDR (120dB or more) | | | | |
| | 5) Digital Noise Reduction: DNR (3D) On/Off | | | | |
| | 6) Video Streaming & Frame Rates: Triple streaming, configurable Main stream: 4MP (2560×1440) 25 / 30fps, Sub streams minimum: 720P @ 25 / 30 fps | | | | |
| | 7) Image Setting: Rotate Mode, saturation, brightness, contrast, sharpness adjustable through client software or web browser, Edge Analytics: Tripwire, Intrusion, Motion Detection | | | | |
| | 8) Cyber Security: AES 256-bit Encryption, Configuration encryption, trusted execution, Digest, security logs, account lockout, video encryption, IP / MAC filtering, HTTPS, trusted upgrade | | | | |
| | 9) Onboard Storage: Camera should support built-in Micro SD / SDHC / SDXC Card slot upto 512 GB. It should be supplied with minimum 128GB memory Card | | | | |
| | 10) Recording Management: Format SD, overwrite, storage management, video to NAS device, | | | | |
| | 11) Alarm Trigger: Motion / tampering detection; network disconnection detection; IP conflict detection; memory card state detection; memory space detection | | | | |
| | 12) Network Protocol: SFTP, IPv6, IPv4, DNS, RTCP, NTP, RTP, HTTP, HTTPS, SNMP TCP / IP, PPPoE, NFS, UDP, ICMP, SSL, DHCP, SMTP, RTSPS, unicast, | | | | |
| | 13) System Capability: ONVIF, Camera shall support open-source VMS | | | | |
| | 14) Ethernet: 1 RJ 45 10 / 100 Ethernet port | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | 15) Audio: It should support 1 x Built-In Mic and 1/1 Alarm In / Out for External Mic. and Speakers as per site requirement. | | | | |
| | 16) Power Input: The camera should support simultaneous dual power input 12 VDC (via power adapter) and PoE (802.3af) to ensure continuous operation in the event of a failure in one power source. | | | | |
| | 17) Power Requirement: 12VDC/24 VDC / PoE (802.3af) / ePoE | | | | |
| | 18) Housing / Enclosure: IP67 weather proof, IK10, Metallic body | | | | |
| | 19) Operating Condition: Ambient Temperature: (-) 05°C to 50°C, humidity 95% (max) (non-condensing) | | | | |
| | 20) IR life: 40000 hours or higher | | | | |
| | 21) Video Bit rate: 32 KBPS - 8 MBPS or better | | | | |
| | 22) Standards: BIS with ER, STQC Certified, CE, FCC and RoHS | | | | |
| 10.16.1 | 4MP @ 25 / 30 fps @ 1440P (2560 x 1440) Dome Camera with 2.8 / 3.6 / 6 / 8 / 12 mm fixed lens (as per site requirement) | 20.00 | Each | 11,919.75 | 2,38,395.00 |
| 10.17 | 4MP IP IR Outdoor Bullet Camera | | | | |
| | Supplying Installation Testing and Commissioning of 4MP IP IR Outdoor Bullet Camera having following specifications and features etc. | | | | |
| | 1) Signal System: PAL / NTSC, Signal to Noise Ratio: > 50 dB, Camera should display Camera title, Date & Time in live & recorded video | | | | |
| | 2) Image Sensor: 1/2.8" or better progressive Scan CMOS get colour image even at night condition (Minimum Illumination: 0.006 Lux @ F1.4,AGC ON, 0 lux with IR or better) True Day & Night High Performance Mechanical IR cut filter with auto switch, Integrated IR Source (Auto, Manual)- Inbuilt IR LED's with effective distance upto 50 meter or better and 30 meter for colour view in night, Imaging: 1/3s to 1/30000s electronic shutter support, Auto Gain Control, White Balance- Auto, Back Light Compensation, Multi zone Privacy Masking, HLC, Digital Watermarking | | | | |
| | 3) Compression (Minimum): Video: H.265 or better, Audio: G.711U/A, G.711Mu, G.726, AAC, G.723 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | 4) Wide Dynamic Range: WDR (120dB or more) | | | | |
| | 5) Digital Noise Reduction: DNR (3D) On / Off | | | | |
| | 6) Video Streaming & Frame Rates: Triple streaming, configurable Main stream: 4MP (2560×1440) 25 / 30fps Sub streams minimum: 720P @ 25 / 30 fps | | | | |
| | 7) Image Setting: Rotate Mode, saturation, brightness, contrast, sharpness adjustable through client software or web browser, Edge Analytics: Tripwire, Intrusion, Motion Detection | | | | |
| | 8) Cyber Security: AES 256-bit Encryption, Configuration encryption, trusted execution, Digest, security logs, account lockout, video encryption, IP / MAC filtering, HTTPS, trusted upgrade | | | | |
| | 9) Onboard Storage: Camera should support built-in Micro SD / SDHC / SDXC Card slot upto 512 GB. It should be supplied with minimum 128GB memory Card | | | | |
| | 10) Recording Management: Format SD, overwrite, storage management, video to NAS device, | | | | |
| | 11) Alarm Trigger: Motion / tampering detection; network disconnection detection; IP conflict detection; memory card state detection; memory space detection | | | | |
| | 12)Network Protocol: SFTP, IPv6, IPv4, DNS, RTCP, NTP, RTP, HTTP, HTTPS, SNMP TCP / IP, PPPoE, NFS, UDP, ICMP, SSL, DHCP, SMTP, RTSPS, unicast, | | | | |
| | 13) System Capability: ONVIF, Camera shall support open-source VMS | | | | |
| | 14) Ethernet: 1 RJ 45 10 / 100 Ethernet port | | | | |
| | 15) Audio: It should support 1 x Built-In Mic and 1/1 Alarm In / Out for External Mic. and Speakers as per site requirement. | | | | |
| | 16) Power Input: The camera should support simultaneous dual power input—12 VDC (via power adapter) and PoE (802.3af) - to ensure continuous operation in the event of a failure in one power source | | | | |
| | 17) Power Requirement: 12VDC/24 VDC / PoE (802.3af) / ePoE | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | 18) Housing / Enclosure: IP67 weather proof, IK10, Metallic body | | | | |
| | 19) Operating Condition: Ambient Temperature: (-) 05°C to 50°C, humidity 95% (max) (non-condensing) | | | | |
| | 20) IR life: 40000 hours or higher | | | | |
| | 21) Video Bit rate: 32 KBPS - 8 MBPS or better | | | | |
| | 22) Standards: BIS with ER, STQC Certified, CE, FCC and RoHS | | | | |
| 10.17.1 | 4MP @ 25/30fps@1440P (2560 x 1440) Outdoor Bullet Camera with 2.8/ 3.6/6/8/12 mm fixed lens (asper site requirement) | 30.00 | Each | 11,572.45 | 3,47,174.00 |
| 10.18 | PTZ (Pan Tilt and zoom) IP IR Camera | | | | |
| | Supplying Installation Testing and Commissioning of PTZ (Pan, Tilt and Zoom) IP IR Camera having following specifications and features etc.: PTZ (Pan, Tilt and Zoom) IP IR Camera having following specifications and features etc. | | | | |
| | 1) IP IR PTZ Camera: Motorized PAN TILT ZOOM with IR | | | | |
| | 2) Image Sensor: 1/2.8" or better progressive Scan CMOS | | | | |
| | 3)Signal System: PAL/NTSC | | | | |
| | 4) Minimum Illumination: 0.008 Lux @ F1.6, AGC ON, 0 lux with IR, or better | | | | |
| | 5) Imaging: 1/1s to 1/30000s, Auto Gain Control, White Balance- Auto, Back Light Compensation, Image Rotation, Multi zone Privacy Masking (Upto 24 Area), HLC, Defog, Region of Interest and EIS features | | | | |
| | 6) On Screen Display: Camera should display Camera title, Date & Time in live & recorded video both | | | | |
| | 7) Signal to Noise Ratio: > 50 dB | | | | |
| | 8) Event Notification: Through Relays, E-Mails or FTP | | | | |
| | 9) Day & Night: True Day & Night High-Performance Mechanical IR cut filter with auto switch, IR Source- Inbuilt IR LEDs with effective distance. The camera should have IR LED's and cover distance up to 150 meter or above | | | | |
| | 10) Auto Tracking: The camera should be equipped with Deep-learning-based auto tracking function using simultaneously all of the panning, tilting and zooming should be available. When a motion is detected in a registered | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | monitoring area, the camera should track the motion (object) and capture it | | | | |
| | 11) Pre / Post Event Buffering: The camera should support at least of 5 seconds of pre & post event buffering. | | | | |
| | 12) Presets: 300 Presets | | | | |
| | 13) Video Compression (Minimum): H.265 or better, H.264, Audio: G.711U/A, G.711Mu, G.726, AAC, G.723 | | | | |
| | 14) Wide Dynamic Range: WDR (120dB or more), HLC & BLC | | | | |
| | 15) Digital Noise Reduction: DNR (2D+3D) On/Off | | | | |
| | 16) Image Setting: Rotate Mode, ROI, EIS, Defog, saturation, brightness, contrast, sharpness adjustable through client software or web browser | | | | |
| | 17) Profile Management: User configuration import, export | | | | |
| | 18) Cyber Security: Configuration encryption, AES 256-bit Encryption, Digest, account lockout, video encryption, IP / MAC filtering, trusted boot, trusted upgrade, trusted execution | | | | |
| | 19) Onboard Storage: Camera should support built in Micro SD / SDHC / SDXC Card slot upto 512 GB. It should be supplied with minimum 128GB Memory. | | | | |
| | 20) Recording Management: Format SD, overwrite, storage management, video to NAS device, remote archive access via FTP login | | | | |
| | 21) Edge based Video Analytics & Alarm Trigger: Motion / tampering detection; network disconnection detection; IP conflict detection; memory card state detection; memory space detection, Tripwire,Intrusion, Object Abandon / Missing, SMD, Face Detection | | | | |
| | 22) Network Protocol: SFTP, IPv6, IPv4, DNS, NTP, HTTP, HTTPS, SNMP, TCP / IP, PPPoE, NFS, ICMP, DHCP, SMTP, RTSPS | | | | |
| | 23) System Capability: ONVIF Profile S, G & T. CCTV Camera OEM should be fulltime member of ONVIF and quoted models should be listed on ONVIF official website (All the certifications & Credentials should be valid on the date of technical evaluation) | | | | |
| | 24) VMS: Camera shall support open-source VMS | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | 25) Connectivity: 1x LAN RJ-45 (10 / 100Base-T) | | | | |
| | 26) Audio Support: Audio Interface: The camera should have 1 / 1 Audio In / Out to connect External Mic and Speaker Audio Compression: PCM, G.711U/A, G.711MU, G.726, MPEG2-Layer2, G.722.1 | | | | |
| | 27) Alarm In / Out: Alarm In / out- 7 / 2 Ch In / Out | | | | |
| | 28) Power Input: The camera should support simultaneous dual power input—DC/ AC (via power adapter) and PoE (802.3af)—to ensure continuous operation in the event of a failure in one power source | | | | |
| | 29) Power Requirement: 24 VDC, 2.5 A (± 25%), PoE+ (802.3at) | | | | |
| | 30) Enclosure & Weather Proof Standard: IP67 weather proof and IK10, TVS 8000V lightning proof, surge protection, voltage transient protection | | | | |
| | 31) Operating Condition: Ambient Temperature: (-) 05°C to 50°C, humidity 95% (max) (non-condensing) | | | | |
| | 32) IR life: 40000 hours or higher | | | | |
| | 33) Video Bit rate: 32 KBPS - 8 MBPS or better | | | | |
| | 34) Standards: BIS with ER, STQC Certified, CE, FCC and RoHS | | | | |
| 10.18.1 | 4 MP IP IR motorized PTZ (4MP @ 25 / 30fps or better) camera, Triple streaming , configurable on resolution Main stream: 4MP @ 25 / 30 fps Sub streams :1080p @ 25 / 30 fps & D1 @ 25 / 30 fps or better, varifocal lens 4.5-135mm or better with Automatic & manual Focus Adjustment provisions, 30x Optical zoom and 12x Digital zoom with angle of view H : 57˚–2.4˚, m, PAN Travel: Pan: 0° ~ 360° endless; Manual Pan: 300°/s, Preset : 300° /s, Tilt Travel: Tilt: 0-90°, auto flip 180°, Manual Tilt: 200° /s, Preset : 300° /s | 3.00 | Each | 90,147.35 | 2,70,442.00 |
| 10.19 | Network Video Recorder (NVR) | | | | |
| | Supplying Installation Testing and Commissioning of following Channel Network Video Recorder (NVR) with camera licenses to record for all channels having specifications and features etc. as mentioned below: | | | | |
| | 1) Network Video Recorder Embedded / Installed OS (Linux) along with Camera Licenses to record per NVR and to | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | provide a live view, storage and simultaneously multi-channel playback of all IP camera or more and must be ONVIF with minimum support of 384 Mbps incoming Bandwidth. | | | | |
| | 2) NVR should support video compressions: H.265 or better, H.264, MJPEG | | | | |
| | 3) Must support 1 channel RCA Input, 2 channel RCA Output for Two-way Talk with G.711U / A, G.711u, PCM, G726 audio compressions | | | | |
| | 4) Intelligent auto power on when power resumes after power outage. | | | | |
| | 5) Storage: It should support minimum 8 SATA Slots with 20TB capacity / Slot and RAID support of RAID 0/1/5/6/10 | | | | |
| | 6) Connectivity Interface: 2 Nos. x 10/100/1000 Mbps Ethernet Ports, 1x RS485, 1x RS232, 1x eSATA Port | | | | |
| | 7) Backup Interface: It should have 4 Nosx USB port (2x USB3.0, 2xUSB2.0) | | | | |
| | 8) Video Output Ports: 2x HDMI and 2 VGA | | | | |
| | 9) Alarm Ports: It should have 16 / 8 Ch In / Out ports to connect various type of external sensors and output devices like hooter / Siren etc. | | | | |
| | 10) Email & SMS Alert options: Option for SMS / Email Alerts to minimum 5 designated mobile number for power failure, HDD failure, vandalism, tempering, network disconnection and panic | | | | |
| | 11) Web & Mobile Application: Web, Mobile app (For iPhone, iPad, Android Phone) for alerts and viewing | | | | |
| | 12) Protocols: HTTP, HTTPS, TCP / IP, IPv4 / IPv6, UDP, DHCP, DNS, SMTP, UPnP, IP Filter, PPPoE, FTP, DDNS, Alarm Server, IP Search, Multicast, Auto Registration, ONVIF (Profile T, Profile S, Profile G), CGI, SDK and OEM Cloud for remote monitoring without any public IP need | | | | |
| | 13) Standards: CE, FCC, RoHS, BIS Certified | | | | |
| | 14) Power Supply: Should support AC100-240V, 50 / 60Hz Power supply | | | | |
| | 15) Operating Condition: -5°C to 50°C, humidity 90% (max) (non-condensing) | | | | |
| | 16) The VMS application shall support all the features & functionalities of the offered cameras | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | 17) VMS should consist Licenses for all channels to record Cameras with General, motion detection, intelligent, alarm and POS recording modes VMS should be provided with Camera Licenses, with no dependency of VMS licenses by binding with the MAC address of the cameras to achieve the functionality | | | | |
| | 18) The NVR OEM shall be responsible for providing a mobile application compatible with both Android and iOS devices, enabling remote monitoring and playback of cameras / NVR footage | | | | |
| | 19) The OEM must provide its own DDNS server hosted in India, eliminating the need for a public IP address for remote monitoring over the Internet | | | | |
| | 20) Must support Continuous, Alarm, Motion, Instant, Panic Recording Mode | | | | |
| | 21) It should support Resolution: 32MP; 24MP; 16MP; 12MP; 8MP; 5MP; 4MP; 1080p; 720p; D1; CIF; QCIF | | | | |
| | 22) When alarm recording is enabled and an event occurs, you can click the alarm icon on monitoring page to view the alert details. The snapshot function is supported on monitoring and playback page | | | | |
| | 23) The Network Video Recorder (NVR) shall be configured to send email whenever a system message is created or an alarm event occurs. The email server shall be a valid SMTP server. Each recipient email address shall be configured to receive any combination of critical, warning, or informational messages or alarm notifications. When an alarm occurs, the email message includes the NVR name, time of alarm and a list of cameras that is configured to record upon alarm | | | | |
| | 24) It should have Web and GUI interface. | | | | |
| | 25) Built-In Artificial Intelligence: NVR should have built-in AI: 2 Channel face detection and recognition, - Minimum 4 Channel perimeter protection, - Minimum 8 Channel Smart Motion Detection | | | | |
| | 26) Face Recognition Database Capacity: It should support total Blacklist and Whitelist capacity of Minimum | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | 20,000 Faces or more with Face Detection speed of 12 face images / sec and facility to add Name, gender, birthday, address, credential type, credential No., countries & regions and state to each face image | | | | |
| | 27) Face & Human Attributes Search: Search Pictures / Video by Gender, age group, glasses, expressions, face mask, beard, Top colour, top type, hat, bag, age, gender and umbrella | | | | |
| | 28) ANPR Capability: It should support ANPR Camera with License plate, plate colour, vehicle body, vehicle model, vehicle logo, calling, seatbelt, vehicle registration location etc. vehicle attributes | | | | |
| | 29) Alarm Notifications based on: Motion detection, video tampering, video loss, scene changing, PIR alarm, Camera external alarm, Face detection, face recognition, perimeter protection (intrusion and tripwire), ANPR, people counting, stereo analysis, crowd distribution, heat map, Disk Full, Storage Error, IP Conflict and abnormal behaviour of fan, cyber security exception | | | | |
| | 30) Alarm Notification should be linked with Recording, snapshots, Camera external alarm output, buzzer, logs, presets and email | | | | |
| | 31) General AI Based Search: Search Pictures by channel, time, event type, target classification (Fall Detection, People Approach Detection, People No. Exception Detection, People Staying Detection, Violence Detection | | | | |
| | 32) Smart playback function: Should support smart search for the selected area in the video and smart playback to improve the playback efficiency | | | | |
| | 33) VCA (Video Content Analytic): Should support multiple video contented analytics based on camera analytics | | | | |
| | 34) Analytics by NVR: Perimeter protection and face recognition | | | | |
| 10.19.1 | 64 Channel Network Video Recorder (NVR) having display split: Main screen: 1/4/8/9/16/25/36/64, 2nd screen: 1/4/8/9/16 | 1.00 | Each | 94,990.00 | 94,990.00 |
| | Hard Disk Drive | | | | |
| 10.20 | Supplying, Installation, Testing and Commissioning following capacity | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | Surveillance grade Hard Disk with upto 256 MB/s Transfer Rate, 256 MB Cache, 7200 RPM Disk Speed, 3.5-inch form factor, SATA Interface, BSMI, ICES-003 / NNB-003, CE, FCC, KC, Maghreb, RCM, UKCA, VCCI, CB-Scheme, TUV, UL Certifications | | | | |
| 10.20.1 | 10TB (Terabytes) | 5.00 | Each | 28,517.70 | 1,42,589.00 |
| 10.21 | LED Display<br>Supplying, Installation, Testing and Commissioning of following size LED display (LED monitor) industrial grade with 3840x2160 resolution or better, USB playback, Bluetooth and Miracast connectivity, 4X HDMI 2.0, DP 1.2, HDR 10/10+, brightness: 500-nits or better, Video wall mode should be available, contrast ratio: 1200:1, OPS slot, viewing angle (H/V): 170°/ 170°, response time less than 12ms, Display control shall be on monitor screen and programmable with remote (remote shall be supplied with system),Key Board, Optical Mouse, etc. as required | | | | |
| 10.21.1 | 55 inch or larger | 3.00 | Each | 94,365.55 | 2,83,097.00 |
| | IPABX / EPABX System | | | | |
| 10.22 | Supplying, installation, testing and Commissioning of IP at its core with IP switching technology and 100% non-blocking communication system with 04 Port Voicemail, 04 Port FXS, 04 Port FXO, 1 PRI Trunk lines (30 Channels) Circuit with CLIP Facility, min 100 IP users License with provision for further additions, 100 analog users, 01 Number IP based Operator Console, 45 Party Conference, Speed Dial, Music on Hold, Internal / External ring difference, Call Barring, Call Pickup. The system should be redundant which offer 100% duplication of power supply and CPU card and to match the hybrid IP-PBX as per technical specification including supporting accessories etc. complete as required. The system should have valid TEC GR approval from DoT | 1.00 | Each | 14,33,991.35 | 14,33,991.00 |
| 10.23 | Supplying, Installation, Testing & Commissioning of Type 1 IP Phone having 2 VoIP account, 120 x 40 DOT matrix screen with backlight, Full HD duplex speaker phone, IPV6, Gigabit Ethernet, PoE etc. complete as required | 75.00 | Each | 13,452.70 | 10,08,953.00 |
| 10.24 | PC System Supplying Installation Testing Commissioning of Client | 1.00 | Each | 1,04,302.70 | 1,04,303.00 |

| | | | | | |
|---|---|---|---|---|---|
| | PC System comprising of PC Hardware with minimum11th Gen Intel® I7 processor CPU E5-2640 x64 (or better), compatible with dual and quad core processors minimum 3.1 Ghz and 8GB or higher RAM, Hard Drive Space of 256 GB SSD or better, Video card and monitor capable of 1920 x 1080 pixel resolution or better with Ethernet adapter (10/100/1000 Mbps with RJ-45 connector) with 2 GB or higher Graphics card suitable for BMS System complete etc. as required. | | | | |
| 10.25 | Supplying, Installation, Testing and commissioning of CAT6 Copper Information Outlet (IO) with face plate of colour as per site requirement, should have ETL/UL verification program certificate for compliance with ANSI / TIA-568.2-D. | 5.00 | Each | 173.65 | 868.00 |
| 10.26 | Supplying, Installation, Testing and commissioning of CAT 6, 4 Pair UTP, 23 AWG Double jacket Aluminum Armoured, Anti Rodent Cable suitable for Noisy Environment, High EMI surrounding, Frequency upto 250 MHz, FRLS PVC outer Jacket, suitable for -20 degree to 60 Degree Centigrade temperature, confirming to ISO / IEC 11801 as required | 400.00 | Meter | 152.00 | 60,800.00 |
| 10.27 | Supplying, Installation, Testing and commissioning of CAT 6, Tool Less Field Termination Plug for CCTV Camera End, confirming to IEC 60603-7 and ISO / IEC 11801 as applicable as required | 37.00 | Each | 1,040.00 | 38,480.00 |
| 10.28 | Supplying, Installation, Testing and Commissioning of following size LED display (LED monitor) industrial grade with 3840x2160 resolution or better, USB playback, Bluetooth and Miracast connectivity, 4X HDMI 2.0, DP 1.2, HDR 10 / 10+, brightness: 500-nits or better, Video wall mode should be available, contrast ratio: 1200:1, OPS slot, viewing angle (H/V): 170°/ 170°, response time less than 12ms, Display control shall be on monitor screen and programmable with remote (remote shall be supplied with system), Key Board, Optical Mouse, etc. as required | | | | |
| 10.28.1 | 55 inch or larger | 3.00 | each | 94,365.55 | 2,83,097.00 |
| 10.29 | Installation, Drawing, Testing and Commissioning of Single Mode 6 Core Optical fibre cable existing Fiber Optic | 1,300.00 | Meter | 14.00 | 18,200.00 |

| | | | | | |
|---|---|---|---|---|---|
| | Cable including accessories etc. as required | | | | |
| | Sub-Total | | | | ₹ 1,10,02,975.00 |
| | Sub-Head- XI (VRV system) | | | | |
| 11.1 | OUTDOOR UNIT | | | | |
| 11.1 | Supplying, Installation, Testing & Commissioning of Modular type Variable Refrigerant Flow / Variable Refrigerant Volume air cooled Outdoor units suitable for cooling / heating having 100% hermetically sealed inverter type twin Rotary / Scroll Compressor(s), minimum two compressors (with individual separate PCB) for above 14HP modules, microprocessor based Controller, top discharge type condensing unit(s), with R-410-A Refrigerant or equivalent, vibration Isolators with suitable foundation etc. complete as required. To have better efficiency condenser fan shall be capable to operate at different speed with respect to load. The unit shall deliver the rated capacity and in confirmation as per IS 18728:2024 and CPWD Specifications and work even at 50°C ambient temperature without tripping. The system shall be able to deliver 100% of the rated capacity upto 390C. The unit shall be suitable to work on 400V +/- 10%, 3 Phase, 50Hz AC power supply and BMS compatible. The unit shall be filled with first charge of the refrigerant and ready for use as required. The condenser should be coated with a hydrophilic film to prevent water accumulation on the surface of the heat exchanger, enhance water dispersion, | | | | |
| | and reduce the risk of degradation, thereby improving overall performance and durability. The Indian Seasonal Energy Efficiency Ratio (ISEER) of the unit shall be as per Energy Conservation and Sustainable Building Code (ECSBC) 2024 as below and complete as per CPWD specification, connections, inter connections etc. as required. (For capacity <40 kWr ISEER 5.4, Capacity > 40 and <70 ISEER 5.5, Capacity > 70 ISEER 5.6 for ECSBC Building) | | | | |
| | For Cooling and Heating Both | | | | |
| 11.1.2 | 14 HP to 22 HP | 400 | Per HP | 21,977.65 | 87,91,060.00 |
| 11.2 | INDOOR UNIT | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 11.2 | Supplying, Installation, Testing and Commissioning of following minimum capacity 4 way Cassette Type Indoor ceiling mounted unit equipped with synthetic washable media pre-filter, fan section with low noise fan / dynamically balanced blower, multispeed motor, coil section with DX Copper coil, electronic expansion valve, outer cabinet, drain pump, grill, necessary supports, vibration Isolation, Corded remote control etc., suitable for operation on single phase 230 V ± 10%, 50Hz AC supply, complete, as required. The Indoor units must shut down upon receiving a signal from the BMS System / Fire Signals. The system shall be capable to adjust air flow as per room requirement in auto mode. The cooling capacity of indoor unit will be at air inlet conditions of 27 0C DB and 19 0C WB temperature. (Make will be same as of Outdoor) | | | | |
| 11.2.1 | 2.0 TR | 14.00 | Each | 45,694.10 | 6,39,717.00 |
| 11.2.2 | 2.6 TR | 20.00 | Each | 46,936.10 | 9,38,722.00 |
| 11.2.3 | 3.6 TR | 66.00 | Each | 50,909.35 | 33,60,017.00 |
| 11.3 | Supplying, Installation, Testing and Commissioning of following minimum capacity and external static preserver / VRV ceiling mounted high duct able type Indoor unit equipped with washable synthetic media pre-filter, fan section with low noise fan / dynamically balanced blower, multispeed motor, coil section with DX copper coil, electronic expansion valve, corded remote control, outer cabinet, vibration Isolators, drain pan, drain pump, other necessary supports etc., suitable for operation on single-phase AC supply 230 V ± 10%, 50 Hz complete as required. The Indoor units must shut down upon receiving signal from the BMS System / Fire Signals. The cooling capacity of indoor unit will be at air inlet conditions of 270 CDB and 190 CWB temperature. (Make will be same as of High Static Duct able units (minimum 78 pascal external static pressure) | | | | |
| 11.3.1 | 8.0 TR | 1.00 | Each | 97,969.65 | 97,970.00 |
| 11.4 | Supply, Installation, Testing and commissioning of factory built floor mounted / Ceiling Suspended double skin type horizontal / vertical top discharge air handling units made of | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | 25mm thick panels consisting of pre plasticized G.I. casing of thickness 0.8mm outside layer and 0.8 mm inside layer with polyurethane foam (PUF) insulation factory injected between them by injection moulding machine, complete with blower section with blower suitable for static pressure as required, cooling coil section with aluminium finned copper tubes (tube thickness not less than 0.5 mm) cooling coil of 6 row deep, filter section with 50 mm thick metal viscous / washable synthetic type air pre filters, belt drive package with TEFC drive muti speed motor suitable for 415 + 10% volts, 50Hz, 3 phase AC supply, drain connection stainless steel ( 18 G) drain pan with PUF insulation | | | | |
| 11.4.1 | 10TR- 2500 CFM | 2.00 | Each | 4,00,056.00 | 8,00,112.00 |
| 11.5 | Supply installing, testing and commissioning Central Controller with BACnet/IP & Modbus TCP BMS integration facility, centralized monitoring and control of minimum 256 indoor units, web server access, scheduling, alarm monitoring, energy management and all associated accessories complete as required." | | | | |
| 11.5.1 | complete as required | 1.00 | Each | 1,58,846.00 | 1,58,846.00 |
| 11.6 | Supplying, Installation, Testing and Commissioning of Y/T/Multi Joints. Joints shall be of same Original Equipment Manufacturer (OEM) make as of ODUs and IDUs | | | | |
| 11.6.1 | Indoor Units | 100.00 | Each | 5,215.25 | 5,21,525.00 |
| 11.6.2 | Outdoor Multi Joint | 25.00 | Each | 9312.70 | 2,32,818.00 |
| | COPPER REFRIGERANT PIPING | | | | |
| 11.7 | Supplying, Installation, testing and commissioning including vaccumiazation and Nitrogen testing of following nominal sizes of soft / hard drawn copper refrigerant piping for VRV/VRF system, complete with fittings, with suitable adjustable ring type hanger supports, jointing / brazing including accessories, insulated with XPLE Class-O tubular insulation / with Class-O closed cell elastomeric nitrile rubber tubular sleeves sections of 19 mm thick insulation as given below for Suction and Liquid lines, all accessories as per specifications etc. as required : (For Indoor only) | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 11.7.1 | 9.5 mm dia. (OD) (Soft drawn) with tube thickness 1.2 mm | 950.00 | Meter | 397.90 | 3,78,005.00 |
| 11.7.2 | 12.7 mm dia. (OD) (Soft drawn) with tube thickness 1.2 mm | 850.00 | Meter | 560.05 | 4,76,043.00 |
| 11.7.3 | 15.86 mm dia. (OD) (Soft drawn) with tube thickness 1.2 mm | 1250.00 | Meter | 707.25 | 8,84,063.00 |
| 11.7.4 | 19 mm dia. (OD) (Hard drawn) with tube thickness 1.2 mm | 350.00 | Meter | 849.85 | 2,97,448.00 |
| 11.7.5 | 22.2 mm dia. (OD) (Hard drawn) with tube thickness 1.2 mm | 450.00 | Meter | 1,039.60 | 4,67,820.00 |
| 11.7.6 | 25.4 mm dia. (OD) (Hard drawn) with tube thickness 1.2 mm | 15.00 | Meter | 1,228.20 | 18,423.00 |
| 11.7.7 | 28.58 mm dia. (OD) (Hard drawn) with tube thickness 1.2 mm | 280.00 | Meter | 1,330.55 | 3,72,554.00 |
| 11.7.8 | 31.8 mm dia. (OD) (Hard drawn) with tube thickness 1.62 mm | 80.00 | Meter | 1,405.30 | 1,12,424.00 |
| 11.7.9 | 34.9 mm dia. (OD) (Hard drawn) with tube thickness 1.62 mm | 240.00 | Meter | 1,478.90 | 3,54,936.00 |
| 11.7.10 | 38.1 mm dia. (OD) (Hard drawn) with tube thickness 1.62 mm | 250.00 | Meter | 1,520.30 | 3,80,075.00 |
| 11.7.11 | 41.27 mm dia. (OD) (Hard drawn) with tube thickness 1.62 mm | 380.00 | Meter | 1,573.20 | 5,97,816.00 |
| 11.8 | Supply & Filling of Refrigerant R-410A as required for piping between IDU & ODU. | 360.00 | KG | 1,941.00 | 6,98,760.00 |
| | HEPA Filter | | | | |
| 11.9 | Supply, installation, testing and commissioning of terminal supply unit with High Efficiency Particulate Air (HEPA) filter of minimum efficiency 99.995% at Most Penetrating Particle Size (MPPS) class H14 as per standard of approved size in Extruded Aluminum housing of 1.6 mm thick with AL volume control damper, canvas connection, gel seal arrangement, Dispersed Oil Particulate (DOP) port, protection screen of perforated type stainless steel protection screen to provide unidirectional air pattern, laminar flow diffuser arrays sized to introduce air into the room at low velocities of maximum face velocities of 260 fpm are to be used. The complete terminal HEPA filter assembly shall be factory tested as required | 6.00 | Sq. Mtr. | 30,970.00 | 1,85,820.00 |
| 11.1 | SITC of Equipment drain piping of UPVC / CPVC (Heavy Class), with valves, fittings, supports / clamps etc. up to the nearest drain point provided by the purchaser. Drain Piping shall be insulated with minimum 13 mm thick aluminium foil faced closed cell elastomeric Nitrile rubber / XLPE | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 11.10.1 | 65 NB | 290.00 | Meter | 882.00 | 2,55,780.00 |
| 11.10.2 | 50 NB | 260.00 | Meter | 647.00 | 1,68,220.00 |
| 11.10.3 | 40 NB | 150.00 | Meter | 553.00 | 82,950.00 |
| 11.11 | Supplying, installation, balancing and commissioning of fabricated at site GSS sheet metal rectangular / round ducting complete with neoprene rubber gaskets, elbows, splitter dampers, vanes, hangers, supports, bends, transitions, reducers, end caps, collars etc. as required complete in all respect in confirmation with IS: 655 and approved drawings and specifications of following sheet thickness complete as required. | | | | |
| 11.11.1 | Thickness 0.63 mm sheet | 510.00 | Sq. M | 1,394.95 | 7,11,425.00 |
| 11.11.2 | Thickness 0.80 mm sheet | 105.00 | Sq. M | 1627.25 | 1,70,861.00 |
| 11.12 | Supplying, installation, testing and commissioning of GI volume control duct damper complete with neoprene rubber gaskets, nuts, bolts, screws linkages, flanges etc. in confirmation to SMACNA / IS and as per specifications complete etc. as required. | 10.00 | Sq. M | 8,717.00 | 87,170.00 |
| 11.13 | Supplying, Fixing, installation, testing and commissioning of powder coated extruded aluminium Supply Air Grills with aluminium volume control dampers in confirmation to SMACNA / IS and as per specifications complete etc. as required | 6.00 | Sq. M | 11,066.45 | 66,399.00 |
| 11.14 | Supplying & fixing of powder coated extruded aluminium Return Air Grills with louvers but without volume control dampers complete in confirmation to SMACNA / IS and as per specifications complete etc. as required | 8.00 | Sq. M | 7,227.75 | 57,822.00 |
| 11.15 | Supplying, Fixing, installation, testing and commissioning of supply air diffusers of powder coated aluminium with aluminium volume control dampers with anti-smudge ring & removable core in confirmation to SMACNA / IS and as per specifications complete etc. as required | 5.00 | Sq. M | 14,767.15 | 73,836.00 |
| 11.16 | Supplying, Fixing, installation, testing and commissioning of Return air diffusers of powder coated aluminium without volume control dampers with anti-smudge ring & removable core in confirmation to SMACNA / IS and as per specifications complete etc. as required | 7.00 | Sq. M | 9,884.25 | 69,190.00 |
| 11.17 | Supplying, Fixing, testing and commissioning of fire dampers of minimum 90 minutes fire rated in supply | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | air duct/main branch and return air path as and where required of required sizes i/c control wiring, the damper shall be motorized and spring return so as to close the damper in the event of power failure automatically and open the same in case of power being restored. The spring return action shall be inbuilt mechanism and not externally mounted. The damper shall also be closed in the event of fire signal and, in confirmation to IS and as per specifications complete etc. as required | | | | |
| 11.17.1 | Fire damper | 10.00 | Sq. M | 13,058.25 | 1,30,583.00 |
| 11.17.2 | Actuator | 10.00 | Each | 12,241.75 | 1,22,418.00 |
| 11.18 | Supplying and fixing of acoustic lining of supply air duct and plenum with 25 mm thick resin bonded glass wool having density of 32 kg/m³, with 25 mm X 25 mm GI section of 1.25 mm thick, at 600 mm centre to centre covered with Reinforced Plastic tissue paper and 0.5 mm thick perforated aluminium sheet fixed to inside surface of ducts with cadmium plated nuts, bolts, stick pins, CPRX compound in confirmation to SMACNA / IS and as per specifications complete etc. as required | 105.00 | Sq. M | 1,023.50 | 1,07,468.00 |
| 11.19 | Supplying and fixing of following thickness duly laminated aluminium foil of mat finish closed cell Nitrile rubber (Class "O") insulation on existing duct after applying suitable adhesive for Nitrile rubber. The joints shall be sealed with 50 mm wide and 3 mm thick self-adhesive nitrile rubber tape insulation complete as per specifications and as required | | | | |
| 11.19.1 | 25mm | 510.00 | Sq. M | 1,187.95 | 6,05,855.00 |
| 11.20 | Supply, Laying and termination of PVC Insulated and PVC Round Sheathed Multi Core Bright Annealed Bare Copper Conductor Industrial Cables for Voltage Grade 1100 Volts as per IS: 694:2010 | | | | |
| 11.20.1 | 2C X 1.5 sq. CU cable | 3,675.00 | Meter | 118.00 | 4,33,650.00 |
| 11.21 | Supply, Installation, testing and commissioning of AHU KIT + COMMUNICATION KIT for existing AHU including starter panel for AHU, accessories etc. as required | 2.00 | Each | 1,00,014.00 | 2,00,028.00 |
| 11.22 | Supply & laying of XLPE insulated PVC sheathed Copper conductor 1.1 KV grade steel unarmoured cable confirming to IS 7908 (Part-I) as | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | amended up to date of following sizes in Pipe / Open Duct / Cable Tray | | | | |
| 11.22.1 | 4 X 10 sq. mm | 200.00 | mtr. | 1,828.00 | 3,65,600.00 |
| | Cable Tray | | | | |
| 11.23 | Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray (Galvanisation thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with two numbers GI Suspenders i/c base of suitable size GI angle, GI bolts & nuts, fastener etc. as required. | | | | |
| 11.23.1 | 100 mm width X 50 mm depth X 1.6 mm thickness | 250.00 | mtr. | 867.10 | 2,16,775.00 |
| 11.23.2 | 225 mm width X 50 mm depth X 1.6 mm thickness | 180.00 | mtr. | 1,139.65 | 2,05,137.00 |
| 11.23.3 | 300 mm width X 50 mm depth X 1.6 mm thickness | 40.00 | mtr. | 1,221.3 | 48,852.00 |
| | ODU PANEL | | | | |
| 11.24 | Supply installation testing commissioning of outdoor type floor mounted, dust & vermin proof, Fabricated from 2mm thick CRCA sheet steel (Tapered top fabricated from 3mm thick CRCA sheet with drip edge) duly powder coated of approved shade after seven-tank pre-treatment process, including 50mm X 50mm X 6 mm angle iron base frame, compartmentalised , double door cubical type feeder pillar with ingress protection of IP 55 having front, back openable doors with neoprene rubber gasket with locking arrangement and hinged door for switchgear compartment, 25 × 6 mm copper earth bar running throughout the panel, with 02 (Two) external earth studs, internal wiring with FRLS / HFFR Copper Conductor (Class 2), Engraved labels for all feeders, Lifting Hooks, Separate cable chamber, "415 V Danger" plate | | | | |
| | including providing and fixing the following mounting and accessories there in complete with detachable gland plates made of 3mm thick CRCA sheet. Suitable for 415V 50Hz 3 phase AC supply. (Min depth: 400 mm deep) | | | | |
| | Incomer: 1 No. 315 Amps 25 KA 4P MCCB (TM release, Icu=Ics) with adjustable O/L, S/C protection and 3 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | Nos. ON, OFF, TRIP indication lamp with protection MCB. | | | | |
| | Surge Protection: 1 no. Type-II Surge Protection Device (SPD) at incomer, complete with backup MCB. | | | | |
| | Prewired Metering Module with Digital Type Voltmeter, Ammeter (With RS 485 Port), Selector Switches, CT. | | | | |
| | R, Y, B Indicating Lamps for Three Phases - 1 Set | | | | |
| | Busbar: 400A 415V 4W Aluinium Busbar | | | | |
| | Outgoing: | | | | |
| A) | (i) 10 no 40 Amps 4-Pole 10KA curve as per OEM's electrical data sheet requirement MCB | | | | |
| | (ii) ON/OFF indication lamp | | | | |
| B) | (i) 3 no. 40 Amps MCB, "C" curve, 4-Pole, 10kA, rating for AHU. | | | | |
| | (ii) ON / OFF / TRIP indication lamps. | | | | |
| | One no Light point with 10W LED bulb & 6A switch socket | | | | |
| 11.24.1 | Complete The panel as stated above | 3.00 | Job | 1,63,268.00 | 4,89,804.00 |
| | Sub-Total | | | | ₹ 2,54,34,797.00 |
| 12 | Sub-Head- XII (Water Pump) | | | | |
| 12.1 | Supplying and lowering of submersible motor pump set capable of discharging clear sand free water of 150-400 LPM at a head of 19-60 Mtrs of 5 H.P capacity for 440V, 50Hz, AC 3 phase supply with cable length 3 Mtr suitable for DOL starter, speed 2900RPM in existing bore well with existing wire ropes and existing submersible cable with the help of chain pulley block, testing final run etc. complete as required. | 2.00 | Set | 51,174.00 | 1,02,348.00 |
| 12.2 | Supplying of submersible motor pump set (for standby) capable of discharging clear sand free water of 150-400 LPM at a head of 19-60 Mtrs of 5 H.P capacity for 440V, 50Hz, AC 3 phase supply with cable length 3 Mtr suitable for DOL starter, speed 2900RPM in existing bore well with existing wire ropes and existing submersible cable with the help of chain pulley block, testing final run etc. complete as required. | 1.00 | Set | 45,350.00 | 45,350.00 |
| 12.3 | Providing and fixing 65 mm dia. UPVC column pipe having pressure of 26 kgf/cm2 for the submersible pump upto the existing pipe line in existing borewell including connecting the pipe at required interval complete etc. as required. | 90.00 | Mtr | 602.00 | 54,180.00 |

| | | | | | |
|---|---|---|---|---|---|
| 12.4 | Supplying & Fixing Gun metal Non return valve ISI marked screwed type of 65 mm dia. in the existing pipe line including testing and commissioning complete etc. as reqd. | 2.00 | Each | 5,965.00 | 11,930.00 |
| 12.5 | Supplying & Fixing PVC coated 8mm dia. steel wire rope of superior quality along with U clamp for holding the pump motor set etc. complete as reqd. | 65.00 | Mtr | 157.00 | 10,205.00 |
| 12.6 | Supplying & Fixing of GI pipe of 32 mm dia. (Medium Class) along with its accessories like socket (32 mm dia.), Elbow (32 mm dia.), Union (32 mm dia.) suitable for laying flat cable for submersible motor pump set complete etc. as reqd. | 75.00 | Mtr | 486.00 | 36,450.00 |
| 12.7 | Supplying & fixing PVC insulated PVC sheathed copper conductor submersible flat cable ISI Marked in existing metal / HDPE / PVC/ pipe/ in bore well / in sump including fixing the cable to GI / HDPE pipe with suitable cable tags of following sizes etc. complete as required | | | | |
| 12.7.1 | 3 Core 4.0 Sq mm Flat Cable | 135.00 | Mtr | 213.90 | 28,877.00 |
| 12.8 | Supplying & Fixing bore well cover made of 6 mm thick MS plate suitable for 200mm dia. bore well i/c 40mm x 6mm iron clamp for holding the pump etc as reqd. | 2.00 | No. | 1,292.00 | 2,584.00 |
| 12.9 | Providing & fixing of pressure Gauge with suitable rating in M.S. pipe line including connection etc. as required. | 2.00 | Each | 4,197.00 | 8,394.00 |
| | Domestic Pump Starter Panel | | | | |
| 12.10 | Supplying, installation, testing & commissioning of cubical type Outdoor, motor starter Panel suitable for 415 V, 3 Phase, 4 wire 50 Hz AC supply system of suitable size fabricated in compartmentalized design from CRCA sheet steel of 1.6 mm thick for frame work / load bearing members / doors and covers, 2 mm thick for gland plates including cleaning & finishing complete with 7 tank process for powder coating in approved shade, IP - 54 with 2 Nos. earth studs / terminals and connections from switchgear to starter with required size of heavy duty copper cable, control wiring with 1.5 Sq.mm. FRLS grade PVC insulated copper conductor single core cable, suitable type cable terminals for termination of cable of size up to 4 C X 16 Sq. mm. | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | (A) Incomer - (i) 125 Amps 4 pole, 25 KA MCCB with Spreader, rotary handle etc. - 1 Nos. | | | | |
| | (ii) Digital multifunction meter- 1 sets. | | | | |
| | (iii) CT 100 / 5A, CL-1, VA-5 - 3 Set | | | | |
| | (iv) LED Indicating lamp RYB and ON/Off - 1 Sets | | | | |
| | (v) 6 Amps SP MCB, 10 KA - 3 Nos. | | | | |
| | (vii) 1 No. M.V danger notice. | | | | |
| | (B) BUS-BAR | | | | |
| | a) 250 Amp 4 strip Aluminium bus bar with heat shrinkable sleeve and mounting arrangement. | | | | |
| | (C) OUTGOINGS (All out going should be suitable for auto & manual operation) - | | | | |
| | 3 Nos. 15 HP Submersible Pump Starter Consisting of the following: 1 No. MPCB as per type-2 Co-ordination 2 Nos. 45A Power Contactor (Delta) AC3 Duty 1 no 18A Power Contactor (Star) AC3 Duty 1 No. O/L relay suitable for 15HP 3 Nos. 7.5 HP Submersible Pump Starter Consisting of the following: 1 No. MPCB as per type-2 Co-ordination 2 Nos. 32A Power Contactor (Delta) AC3 Duty 1 No. 18A Power Contactor (Star) AC3 Duty 1 no O/L relay suitable for 7.5 HP | | | | |
| | Protection & indication for each outgoing | | | | |
| | Overload and short circuit protection relay | | | | |
| | Indication lamp (ON / OFF) | | | | |
| | START / STOP push button | | | | |
| | Single phasing preventer | | | | |
| 12.10.1 | Complete set as required. | 1.00 | Job | 4,33,542.00 | 4,33,542.00 |
| 12.11 | Providing and fixing following sizes screwed type, ISI marked bronze metal Non return valve (Horizontal) not less than 1.0 Mpa Hyd in the existing GI / PVC Water pipe line i/c making the joint leak proof etc complete as required | | | | |
| 12.11.1 | (a) 65 mm dia. | 2.00 | Each | 7,435.00 | 14,870.00 |
| 12.12 | Providing and fixing following sizes screwed type, ISI marked bronze metal gate valve, seat T.P not less than 1.0 Mpa Hyd in the existing GI Water pipe line i/c making the joint leak proof etc complete as required. | | | | |
| 12.12.1 | (a) 65 mm dia. | 2.00 | Each | 11,686.00 | 23,372.00 |

| | | | | | |
|---|---|---|---|---|---|
| 12.13 | Providing and fixing of following sizes medium class GI Pipe ISI marked with all accessories like coupler / bend / elbow / union etc but excluding valve flanges etc i/c cutting, threading and making the joint leak proof etc. as required | | | | |
| 12.13.1 | (a) 65 mm dia. (For water line) | 25.00 | Mtrs | 1,235.00 | 30,875.00 |
| | Sub-Total | | | | ₹ 8,02,977.00 |
| 13 | Sub-Head- XIII (UPS System) | | | | |
| 13.1 | Installation, testing & commissioning of 30 KVA UPS system including supplying of Battery Rack for 40 Nos. 75 AH, 12 Volt Battery, Battery circuit Breaker for ITA2 UPS, Nyvin cable - interlink for 40 Nos. Battery, for Existing 30 KVA UPS system (Model-Vertiv ITA2) including connection complete as required for existing UPS system for fully functional but excluding UPS and Battery, complete as required | 1.00 | Job | 61,159.00 | 61,159.00 |
| | Sub-Total | | | | ₹ 61,159.00 |
| | TOTAL (E&M) | | | | ₹ 12,74,10,464.00 |

| SCHEDULE OF QUANTITY B (CIVIL) | | | | | |
|---|---|---|---|---|---|
| Name of work: Construction of Office cum Residential and Hostel Complex for the Department of NIPER at Panihati, B.T. Road, Kolkata, West Bengal. S.H: Balance works of Administrative Building (G+4) storied, Animal House (G+1) storied, Girls Hostel (G+2), Boys Hostel (G+2) storied, Substation building, Pump House, Main Entrance Gate Structure with Security Cabin including bulk services and development works (Civil, Electrical and Mechanical) | | | | | |
| Sl. No. | Description of Item | Quantity | Unit | Rate (₹) i/c C.I. & C.F. of 0.973 | Amount (₹) |
| 1 | EARTH WORK | | | | |
| 1.1 | Earth work in excavation by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead upto 50 m and for all lift, as directed by Engineer-in-charge | | | | |
| 1.1.1 | All kinds of soil | 2,774.00 | cum | 198.62 | 5,50,972.00 |
| 1.2 | Earth work in excavation by mechanical means (Hydraulic excavator) / manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, for all lift, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m | | | | |
| 1.2.1 | All kinds of soil | 260.00 | cum | 291.26 | 75,728.00 |
| 1.3 | Excavating trenches by mechanical / manual means of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, for all depth, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm in depth, including consolidating each deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m: | | | | |
| 1.3.1 | All kinds of soil | | | | |
| 1.3.1.1 | Pipes, cables etc. exceeding 300 mm dia. but not exceeding 600 mm | 700.00 | metre | 615.15 | 4,30,605.00 |
| 1.4 | Supplying and filling in plinth with sand under floors, including watering, ramming, consolidating and dressing complete | 1,717.00 | cum | 2,376.37 | 40,80,227.00 |
| 1.5 | Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared | 1,000.00 | sqm | 19.69 | 19,690.00 |
| | Sub-Total | | | | ₹ 51,57,222.00 |
| 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) | 878.00 | cum | 7,293.99 | 64,04,123.00 |
| 2.2 | Making plinth protection 50 mm thick of cement concrete 1:3:6 (1 cement: 3 coarse sand (zone-III) derived from natural sources: 6 graded stone aggregate 20 mm nominal size derived from natural sources) over 75 mm thick bed of dry brick ballast 40 mm nominal size, well rammed and consolidated and grouted with fine sand, including necessary excavation, levelling & dressing & finishing the top smooth | 20.00 | sqm | 838.43 | 16,769.00 |
| | Sub-Total | | | | ₹ 64,20,892.00 |
| 3 | REINFORCED CEMENT CONCRETE | | | | |
| 3.1 | Centering and shuttering including strutting, propping etc. and removal of form for | | | | |
| 3.1.1 | Foundations, footings, bases of columns, etc. for mass concrete | 493.00 | sqm | 438.79 | 2,16,323.00 |
| 3.1.2 | Walls (any thickness) including attached pilasters, buttresses, plinth and string courses etc. | 150.00 | sqm | 942.71 | 1,41,407.00 |
| 3.1.3 | Suspended floors, roofs, landings, balconies and access platform | 313.00 | sqm | 1,037.54 | 3,24,750.00 |
| 3.1.4 | Lintels, beams, plinth beams, girders, bressummers and cantilevers | 257.00 | sqm | 824.00 | 2,11,768.00 |
| 3.1.5 | Columns, Pillars, Piers, Abutments, Posts and Struts | 170.00 | sqm | 1,075.64 | 1,82,859.00 |
| 3.1.6 | Edges of slabs and breaks in floors and walls | | | | |
| 3.1.6.1 | Under 20 cm wide | 92.00 | metre | 233.36 | 21,469.00 |
| 3.2 | Extra for additional height in centering, shuttering where ever required with adequate bracing, propping etc., including cost of de-shuttering and decentering at all levels, over a height of 3.5 m, for every additional height of 1 metre or part thereof (Plan area to be measured) | | | | |
| 3.2.1 | Suspended floors, roofs, landings, beams and balconies (Plan area to be measured) | 1,185.00 | sqm | 430.01 | 5,09,562.00 |
| 3.3 | Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete upto plinth level | | | | |
| 3.3.1 | Thermo-Mechanically Treated CRS bars of grade Fe-500D or more | 69,778.00 | kg | 120.68 | 84,20,809.00 |
| 3.4 | Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | above plinth level | | | | |
| 3.4.1 | Thermo-Mechanically Treated CRS bars of grade Fe-500D or more | 10,317.00 | kg | 120.68 | 12,45,056.00 |
| 3.5 | Providing and laying in position ready mixed or site batched design mix cement concrete for reinforced cement concrete work; using coarse aggregate and fine aggregate derived from natural sources, Portland Pozzolana / Ordinary Portland / Portland Slag cement, admixtures in recommended proportions as per IS: 9103 to accelerate / retard setting of concrete, to improve durability and workability without impairing strength; including pumping of concrete to site of laying, curing, carriage for all leads; but excluding the cost of centering, shuttering, finishing and reinforcement as per direction of the engineer-in-charge, for the following grades of concrete.Note: Extra cement up to 10% of the minimum specified cement content in design mix shall be payable separately. In case the cement content in design mix is more than 110% of the specified minimum cement content, the contractor shall have discretion to either re-design the mix or bear the cost of extra cement | | | | |
| 3.5.1 | All works upto plinth level | | | | |
| 3.5.1.1 | Concrete of M25 grade with minimum cement content of 330 kg/cum | 291.00 | cum | 10,635.34 | 30,94,884.00 |
| 3.5.2 | All works above plinth level upto floor V level | | | | |
| 3.5.2.1 | Concrete of M25 grade with minimum cement content of 330 kg/cum | 98.00 | cum | 11,033.30 | 10,81,263.00 |
| 3.6 | Providing and fixing of expansion joint system related with floor location as per drawings and direction of Engineer-In-Charge. The joints system will be of extruded aluminum base members, self-aligning / self-centering arrangement and support plates etc. as per ASTM B221-02. The system shall be such that it provides floor to floor / floor to wall expansion control system for various vertical location in load application areas that accommodates multi directional seismic movement without stress to its components. System shall consist of metal profiles with a universal aluminum base member designed to accommodate various project conditions and finish floor treatments. The cover plate shall be designed of width and thickness required to satisfy projects movement and loading requirements and secured to base members by utilizing manufacturer's pre-engineered self-centering arrangement that freely | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | rotates / moves in all directions. | | | | |
| | The Self - centering arrangement shall exhibit circular sphere ends that lock and slide inside the corresponding aluminum extrusion cavity to allow freedom of movement and flexure in all directions including vertical displacement. Provision of Moisture Barrier Membrane in the Joint System to have watertight joint is mandatory requirement all as per the manufactures design and as approved by Engineer -in-Charge. (Material shall conform to ASTM 6063) | | | | |
| 3.6.1 | Floor Joint of 100 mm gap | 22.00 | metre | 7,152.94 | 1,57,365.00 |
| 3.7 | Providing and fixing of expansion joint system related with wall joint (internal / external) location as per drawings and direction of Engineer-In-Charge. The joints shall be of extruded aluminum base members, self-aligning / centering arrangement and support plates as per ASTM B221- 02. The material shall be such that it provides an Expansion Joints System suitable for vertical wall to wall / wall to corner application, both new and existing construction in office Buildings & complexes with no slipping down tendency amongst the components of the Joint System. The Joint System shall utilize lightweight aluminum profiles exhibiting minimal exposed aluminum surfaces mechanically snap locking the multicellular to facilitate movement. (Material shall conform to ASTM 6063) | | | | |
| 3.7.1 | Wall Joint of 100 mm gap | 162.00 | metre | 5,936.76 | 9,61,755.00 |
| | Sub-Total | | | | ₹ 1,65,69,270.00 |
| 4 | MASONRY WORK | | | | |
| 4.1 | Brick work with common burnt clay F.P.S. (non-modular) bricks of class designation 7.5 in foundation and plinth in: | | | | |
| 4.1.1 | Cement mortar 1:4(1 cement :4 coarse sand) | 435.00 | cum | 8,247.39 | 35,87,615.00 |
| 4.2 | Brick work with clay fly ash F.P.S. (non-modular) brick of class designation 7.5 in superstructure above plinth level up to floor five level in: | | | | |
| 4.2.1 | Cement mortar 1:6 (1 cement: 6 coarse sand) | 90.00 | cum | 10,176.90 | 9,15,921.00 |
| 4.3 | Half brick masonry with non-modular fly ash bricks of class designation 10, conforming to IS :12894, in super structure above plinth upto floor V level | | | | |
| 4.3.1 | Cement mortar 1: 4 (1 cement: 4 coarse sand) | 192.00 | sqm | 1,237.33 | 2,37,567.00 |

| | | | | | |
|---|---|---|---|---|---|
| | Sub-Total | | | | ₹ 47,41,103.00 |
| 5 | CLADDING WORK | | | | |
| 5.1 | Providing and fixing 18 mm thick gang saw cut, mirror polished, pre-moulded and pre-polished, 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 over 0.50 sqm | 29.00 | sqm | 5,747.26 | 1,66,671.00 |
| 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 | 918.00 | metre | 571.72 | 5,24,839.00 |
| 5.3 | Providing and fixing stone slab with table rubbed, edges rounded and polished, of size 75x50 cm deep and 1.8 cm thick, fixed in urinal partitions by cutting a chase of appropriate width with chase cutter and embedding the stone in the chase with epoxy grout or with cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 6 mm nominal size) as per direction of Engineer-in-charge and finished smooth | | | | |
| 5.3.1 | Granite Stone of approved shade | 13.00 | sqm | 4,533.82 | 58,940.00 |
| 5.4 | 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 | 412.00 | sqm | 1,418.78 | 5,84,537.00 |
| 5.5 | Polished Granite stone slabs 18 mm thick in risers of steps, skirting, dado and pillars laid on 12 mm (average) thick cement mortar 1: 3 (1 cement: 3 coarse sand) and jointed with grey cement slurry mixed with pigment to match the shade of the slabs complete | 455.00 | sqm | 4,736.68 | 21,55,189.00 |

| | | | | | |
|---|---|---|---|---|---|
| | Sub-Total | | | | ₹ 34,90,176.00 |
| 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) | 1.00 | sqm | 197.39 | 197.00 |
| 6.2 | Providing and fixing IS: 12817 marked stainless steel butt hinges (heavy weight) with stainless steel screws etc. complete: | | | | |
| 6.2.1 | 125x64x2.50 mm | 42.00 | each | 145.29 | 6,102.00 |
| 6.2.2 | 100x60x2.50 mm | 186.00 | each | 119.00 | 22,134.00 |
| 6.3 | Providing and fixing aluminium sliding door bolts, ISI marked anodized (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: | | | | |
| 6.3.1 | 250x16 mm | 2.00 | each | 291.59 | 583.00 |
| 6.4 | Providing and fixing aluminium tower bolts, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS: 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete: | | | | |
| 6.4.1 | 300x10 mm | 3.00 | each | 145.58 | 437.00 |
| 6.4.2 | 150x10 mm | 112.00 | each | 92.37 | 10,345.00 |
| 6.5 | Providing and fixing aluminium handles, ISI marked, anodized (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: | | | | |
| 6.5.1 | 125 mm | 28.00 | each | 74.13 | 2,076.00 |
| 6.5.2 | 100 mm | 112.00 | each | 66.63 | 7,463.00 |
| 6.6 | Providing and fixing aluminium hanging floor door stopper, ISI marked, anodized (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 | | | | |
| 6.6.1 | Twin rubber stopper | 1.00 | each | 80.96 | 81.00 |
| 6.7 | Providing and fixing factory made P.V.C. door frame of size 50x47 mm with a wall thickness of 5 mm, made out of extruded 5 mm rigid PVC foam sheet, mitred at corners and joined with 2 Nos. of 150 mm long brackets of 15x15 mm M.S. square tube, the vertical door frame profiles to be reinforced with 19x19 mm M.S. square tube of 19-gauge, EPDM rubber gasket weather seal to be provided throughout the frame. The door | 287.00 | metre | 551.31 | 1,58,226.00 |

| | | | | | |
|---|---|---|---|---|---|
| | frame to be fixed to the wall using M.S. screws of 65 / 100 mm size, complete as per manufacturer's specification and direction of Engineer- in-Charge | | | | |
| 6.8 | Providing and fixing factory made panel PVC door shutter consisting of frame made out of M.S. tubes of 19-gauge thickness and size of 19 mm x 19 mm for styles and 15x15 mm for top & bottom rails. M.S. frame shall have a coat of steel primers of approved make and manufacture. M.S. frame covered with 5 mm thick heat moulded PVC 'C' channel of size 30 mm thickness, 70 mm width out of which 50 mm shall be flat and 20 mm shall be tapered in 45 degree angle on both side forming styles and 5 mm thick, 95 mm wide PVC sheet out of which 75 mm shall be flat and 20 mm shall be tapered in 45 degree on the inner side to form top and bottom rail and 115 mm wide PVC sheet out of which 75 mm shall be flat and 20 mm shall be tapered on both sides to form lock rail. Top, bottom and lock rails shall be provided both side of the panel. 10 mm (5 mm x 2) thick, 20 mm wide cross PVC sheet be provided as gap insert for top rail & bottom rail, paneling of 5 mm thick both side PVC sheet to be fitted in the M.S. frame welded / sealed to the styles & rails with 7 mm (5 mm+2 mm) thick x 15 mm wide PVC sheet beading on inner side, and joined together with solvent cement adhesive. An additional 5 mm thick PVC strip of 20 mm width is to be stuck on the interior side of the 'C' Channel using PVC solvent adhesive etc. complete as per direction of Engineer-in-charge, manufacturer's specification & drawing | | | | |
| 6.8.1 | 30 mm thick pre laminated PVC door shutters | 89.00 | sqm | 4,099.61 | 3,64,865.00 |
| 6.9 | Providing and fixing panic bar / latch (Double point) fitted with a single body, Trim Latch & Lock on back side of the Panic Latch of reputed brand and manufacture to be approved by the Engineer- in- charge, all complete. | 45.00 | each | 9,361.30 | 4,21,259.00 |
| 6.10 | Providing and fixing zinc alloyed (white powder coated) touch lock for Aluminium / uPVC sliding window with necessary screws etc. complete | 6.00 | each | 228.26 | 1,370.00 |
| 6.11 | Providing and fixing steel roller for Aluminium / uPVC sliding door with necessary screws etc. complete | 12.00 | each | 207.56 | 2,491.00 |
| 6.12 | Providing and fixing fire resistant door frame of section 50 x 60 mm on horizontal side & 35 x 60 mm on vertical sides having built in | 256.00 | metre | 2,464.93 | 6,31,022.00 |

| | | | | | |
|---|---|---|---|---|---|
| | rebate made out of 1.6 mm thick GI sheet (Zinc coating not less than 120 gm/sqm) suitable for mounting 120 minutes Fire Rated Glazed Door Shutters. The frame shall be filled with mineral wool Insulation having density minimum 96 Kg/sqm. The frame will have a provision of G.I. anchor fasteners 14 Nos. (5 each on vertical style & 4 on horizontal style of size M10 x 80) suitable for fixing in the opening along with factory made template for SS ball bearing hinges of size 100x89x3 mm for fixing of fire rated glazed shutter. The frame shall be finished with an approved fire-resistant primer or powder coating of not less than 30 microns in desired shade as per the directions of Engineer - in- Charge. (Cost of SS ball bearing hinges is excluded) | | | | |
| 6.13 | Providing and fixing 60 mm thick glazed fire resistant door shutters of 120 minutes Fire rating conforming to IS:3614 (Part II) or EN1634-1:1999, tested and certified as per laboratory approved by Engineer-in-Charge, with suitable mounting on door frame, consisting of vertical styles, top rail & side rail 60 mm x 60 mm wide and bottom rail of 110 mm x 60 mm made out of 1.6 mm thick G.I. sheet (zinc coating not less than 120 gm/ sqm) duly filled mineral wool insulation having density minimum 96 kg/cum and fixing with necessary stainless steel ball bearing hinges of size 100x89x3 mm of approved make, including applying a coat of approved fire resistant primer or powder coating not less than 30 micron etc. all complete as per direction of Engineer-in-Charge (paneling to be paid for separately) | 131.00 | sqm | 13,447.43 | 17,61,613.00 |
| 6.14 | Providing and fixing glazing in fire resistant door shutters, fixed panels & partitions etc., with G.I. beading made out of 1.6 mm thick G.I. sheet (zinc coating not less than 120 gm/sqm) of size 20 x 33 mm screwed with M4 x 38 mm SS screws at distance 75 mm from the edges and 150 mm c/c, including applying a coat of approved fire resistant primer / powder coating of not less than 30 micron on G.I. beading, & special ceramic tape of 5 x 20 mm size etc. complete in all respect as per NBC 2016, IS 16231 (Part 3):2016 and as per direction of Engineer-in-Charge with glass of required thickness having 120 minutes of fire resistance both integrity & radiation control (EW120) and minimum 20 minutes of insulation (E120). The manufacturer has to give test report / | 105.00 | sqm | 48,873.10 | 51,31,676.00 |

| | | | | | |
|---|---|---|---|---|---|
| | certification of fire glass and the glass should have the stamp showing the value of E, EW & EI. The glass shall be tested in approved NABL accredited lab or by any other accreditation body which operates in accordance with ISO / IEC 17011 and accredited labs as per ISO / IEC 17025 for testing and calibration scopes shall be eligible. The maximum glazing size shall not be more than 1100x2200 mm (w x h) or 2.42 sqm | | | | |
| 6.15 | Providing and fixing hydraulic door closer having standard arm and with adjustable spring strength (EN 3-6) suitable for smoke and fire doors (Model No. TS 89F of Dormakaba make or equivalent make as approved by Engineer-in-Charge) with necessary accessories, screws, etc. all complete as per the directions of Engineer-in-Charge | 34.00 | each | 8,106.33 | 2,75,615.00 |
| | Sub-Total | | | | ₹ 87,97,555.00 |
| 7 | STEEL WORK | | | | |
| 7.1 | Providing and fixing 1 mm thick M.S. sheet door with frame of 40x40x6 mm angle iron and 3 mm M.S. gusset plates at the junctions and corners, all necessary fittings complete, including applying a priming coat of approved steel primer | | | | |
| 7.1.1 | Using M.S. angels 40x40x6 mm for diagonal braces | 3.00 | sqm | 6,494.77 | 19,484.00 |
| 7.2 | Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters | | | | |
| 7.2.1 | 80x1.25 mm M.S. laths with 1.25 mm thick top cover | 30.00 | sqm | 4,087.74 | 1,22,632.00 |
| 7.3 | Providing and fixing ball bearing for rolling shutters | 25.00 | each | 550.92 | 13,773.00 |
| 7.4 | Extra for providing grilled rolling shutters manufactured out of 8 mm dia. M.S. bar instead of laths as per design approved by Engineer-in-charge, (area of grill to be measured) | 7.00 | sqm | 859.64 | 6,017.00 |
| 7.5 | 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 | | | | |
| 7.5.1 | Hot finished welded type tubes | 17,821.00 | kg | 217.52 | 38,76,424.00 |
| 7.6 | Providing and fixing M.S. fan clamp type I or II of 16 mm dia. M.S. bar, bent to shape with hooked ends in R.C.C. slabs or beams during laying, including painting the exposed portion of loop, all as per standard design complete | 1.00 | each | 252.89 | 253.00 |
| 7.7 | 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 | | | | |
| 7.7.1 | In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works | 270.00 | kg | 193.13 | 52,145.00 |
| 7.8 | Providing and fixing stainless steel (Grade 304) railing made of Hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners, stainless steel bolts etc., of required size, on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.) | 8,902.00 | kg | 864.28 | 76,93,821.00 |
| | Sub-Total | | | | ₹ 1,17,84,549.00 |
| 8 | FLOORING | | | | |
| 8.1 | 52 mm thick cement concrete flooring with concrete hardener topping, under layer 40 mm thick cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm nominal size) and top layer 12 mm thick cement hardener consisting of mix 1:2 (1 cement hardener mix: 2 graded stone aggregate 6 mm nominal size) by volume, hardening compound mixed @ 2 litre per 50 kg of cement or as per manufacturer's specifications. This includes cost of cement slurry, but excluding the cost of nosing of steps etc. complete | 181.00 | sqm | 1,094.83 | 1,98,164.00 |
| 8.2 | Cement plaster skirting up to 30 cm height, with cement mortar 1:3 (1 cement: 3 coarse sand), finished with a floating coat of neat | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | cement | | | | |
| 8.2.1 | 18 mm thick | 40.00 | sqm | 740.80 | 29,632.00 |
| 8.3 | Extra for making chequers of approved pattern on cement concrete floors, steps, landings, pavements etc. | 181.00 | sqm | 93.83 | 16,983.00 |
| 8.4 | Providing and fixing glass strips in joints of terrazo / cement concrete floors | | | | |
| 8.4.1 | 40 mm wide and 4 mm thick | 181.00 | metre | 102.66 | 18,581.00 |
| 8.5 | Providing and laying rectified Glazed Ceramic floor tiles of size 300x300 mm or more (thickness to be specified by the manufacturer), of 1st quality conforming to IS: 15622, of approved make, in colours White, Ivory, Grey, Fume Red Brown, 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., complete | 13.00 | sqm | 1,488.20 | 19,347.00 |
| 8.6 | 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 | | | | |
| 8.6.1 | Glazed Vitrified tiles Matt / Antiskid finish of size | | | | |
| 8.6.1.1 | Size of Tile 600 x 600 mm | 205.00 | sqm | 1,639.10 | 3,36,016.00 |
| 8.7 | Providing and laying flamed finish Granite stone flooring in required design and patterns, in linear as well as curvilinear portions of the building all complete as per the architectural drawings with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4 coarse sand) laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade including rubbing, curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge : | | | | |
| 8.7.1 | Flamed finish granite stone slab Jet Black, Cherry Red, Elite Brown, Cat Eye or equivalent | 459.00 | sqm | 3,565.76 | 16,36,684.00 |

| | | | | | |
|---|---|---|---|---|---|
| 8.8 | Providing and laying Polished Granite stone flooring in required design and patterns, in linear as well as curvilinear portions of the building all complete as per the architectural drawings with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4 coarse sand) laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade including rubbing, curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge | | | | |
| 8.8.1 | Polished Granite stone slab of colour Black, Cherry / Ruby Red or equivalent | 791.00 | sqm | 5,014.35 | 39,66,351.00 |
| | Sub-Total | | | | ₹ 62,21,758.00 |
| 9 | ROOFING | | | | |
| 9.1 | Providing and fixing plain multipurpose cement board (Hight pressure steam cured) with suitable screws for cement particle board in ceiling etc. complete (frame work to be paid separately) | | | | |
| 9.1.1 | 6 mm thick Cement fiber board, Type-B, Category-III as per IS: 14862: 2000 | 515.00 | sqm | 1,031.62 | 5,31,284.00 |
| 9.2 | Providing and fixing on wall face unplasticized Rigid PVC rain water pipes conforming to IS: 13592 Type A, including jointing with seal ring conforming to IS: 5382, leaving 10 mm gap for thermal expansion, (i) Single socketed pipes | | | | |
| 9.2.1 | 110 mm diameter | 22.00 | metre | 422.29 | 9,290.00 |
| 9.3 | Providing and fixing on wall face unplasticized - PVC moulded fittings / accessories for unplasticized 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 | | | | |
| 9.3.1 | Bend 87.5° | | | | |
| 9.3.1.1 | 110 mm bend | 5.00 | each | 168.23 | 841.00 |
| 9.3.2 | Shoe (Plain) | | | | |
| 9.3.2.1 | 110 mm Shoe | 5.00 | each | 147.53 | 738.00 |
| 9.4 | Providing and fixing unplasticized - PVC pipe clips of approved design to unplasticized - PVC rain water pipes by means of 50x50x50 mm hard wood plugs, screwed with M.S. screws of required length, including cutting brick work and fixing in cement mortar 1:4 (1 cement: 4 coarse sand) and making good the wall etc. complete | | | | |
| 9.4.1 | 110 mm | 20.00 | each | 415.46 | 8,309.00 |
| | Sub-Total | | | | ₹ 5,50,462.00 |
| 10 | FINISHING | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 10.1 | 12 mm cement plaster of mix: | | | | |
| 10.1.1 | 1:6 (1 cement: 6 coarse sand) | 301.00 | sqm | 384.53 | 1,15,744.00 |
| 10.2 | 15 mm cement plaster on rough side of single or half brick wall of mix: | | | | |
| 10.2.1 | 1:6 (1 cement: 6 coarse sand) | 4,303.00 | sqm | 442.38 | 19,03,561.00 |
| 10.3 | 6 mm cement plaster of mix: | | | | |
| 10.3.1 | 1:3 (1 cement :3 fine sand) | 1,522.00 | sqm | 336.19 | 5,11,681.00 |
| 10.4 | Neat cement punning | 3,370.00 | sqm | 89.46 | 3,01,480.00 |
| 10.5 | Extra for plastering interior walls & ceilings of height more than 10 m from floor level for every additional height of 3 m or part thereof | 1,177.00 | sqm | 97.46 | 1,14,710.00 |
| 10.6 | Finishing walls with water proofing cement paint of required shade: | | | | |
| 10.6.1 | New work (Two or more coats applied @ 3.84 kg/10 sqm) | 9,849.00 | sqm | 130.80 | 12,88,249.00 |
| 10.7 | Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete | | | | |
| 10.7.1 | On steel work | 132.00 | sqm | 270.50 | 35,706.00 |
| 10.8 | French spirit polishing: | | | | |
| 10.8.1 | Two or more coats on new works including a coat of wood filler | 418.00 | sqm | 499.33 | 2,08,720.00 |
| 10.9 | 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 | 13,052.00 | sqm | 174.62 | 22,79,140.00 |
| 10.1 | Wall painting with acrylic emulsion paint, having VOC (Volatile Organic Compound) content less than 50 grams/litre, of approved brand and manufacture, including applying additional coats wherever required, to achieve even shade and colour | | | | |
| 10.10.1 | Two coats | 14,354.00 | sqm | 153.80 | 22,07,645.00 |
| 10.11 | Applying priming coats with primer of approved brand and manufacture, having low VOC (Volatile Organic Compound) content | | | | |
| 10.11.1 | With water thinnable cement primer on wall surface having VOC content less than 50 grams/litre | 24,203.00 | sqm | 82.74 | 20,02,556.00 |
| | Sub-Total | | | | ₹ 1,09,69,192.00 |
| 11 | ROAD WORK | | | | |
| 11.1 | Preparation and consolidation of sub grade with power road roller of 8 to 12 tonne capacity after excavating earth to an average of 22.5 cm depth, dressing to camber and consolidating with road roller including making good the undulations etc. and re-rolling the sub grade and disposal of surplus earth with lead upto 50 metres | 9,482.00 | sqm | 244.94 | 23,22,521.00 |
| 11.2 | Providing and laying design mix cement | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | concrete of M-30 grade, in roads / taxi tracks / runways, using cement content as per design mix, using coarse sand and graded stone aggregate of 40 mm nominal size in appropriate proportions as per approved & specified design criteria, providing dowel bars with sleeve / tie bars wherever required, laying at site, spreading and compacting mechanically by using needle and surface vibrators, levelling to required slope / camber, finishing with required texture, including steel form work with sturdy M.S. channel sections, curing, making provision for contraction / expansion, construction & longitudinal joints (10 mm wide x 50 mm deep) by groove cutting machine, providing and filling joints with approved joint filler and sealants, complete all as per direction of Engineer- in-charge (Item of joint fillers, sealants, dowel bars with sleeve / tie bars to be paid separately).<br>Note: Cement content considered in M-30 is @ 340 kg/cum. Excess / less cement used as per design mix is payable / recoverable separately | | | | |
| 11.2.1 | Cement concrete prepared with batch mixing machine | 1,130.00 | cum | 11,781.82 | 1,33,13,457.00 |
| 11.3 | Providing and fixing pre-moulded joint filler in expansion joints of RCC roads / CC pavements after making the joints dust free with high pressure air jet cleaners, all complete as per direction of the Engineer-in-Charge. (Pre-moulded joint fillers shall be made of bitumen hot sealing compound impregnated fibre board having impregnation more than 35%, conforming to IS:1838 for fibre board and IS: 1834 for hot sealing bitumen compound grade A) | 3,336.00 | per cm depth per cm width per metre length | 5.93 | 19,782.00 |
| 11.4 | Providing and filling in position rubberized bitumen hot sealing compound for sealing of expansion joints in roads / pavements all complete as per direction of the Engineer-in-Charge | | | | |
| 11.4.1 | Using grade 'A' sealing compound conforming to IS: 1834 | 11,676.00 | per cm depth per cm width per metre length | 9.68 | 1,13,024.00 |
| 11.5 | Providing and laying at or near ground level factory made kerb stone of M-25 grade cement concrete in position to the required line, level and curvature, jointed with cement | 168.00 | cum | 11,321.08 | 19,01,941.00 |

| | | | | | |
|---|---|---|---|---|---|
| | mortar 1:3 (1 cement: 3 coarse sand), including making joints with or without grooves (thickness of joints except at sharp curve shall not to more than 5 mm), including making drainage opening wherever required complete etc. as per direction of Engineer-in-charge (length of finished kerb edging shall be measured to calculate volume for payment). (Precast C.C. kerb stone shall be approved by Engineer-in-charge) | | | | |
| 11.6 | Providing and laying tactile tile (for vision impaired persons as per standards) of size 300x300x9.8 mm having with water absorption less than 0.5% and conforming to IS:15622 of approved make in all colours and shades in for outdoor floors such as footpath, court yard, multi modals location etc., laid on 20 mm thick base of cement mortar 1:4 (1 cement : 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as per direction of Engineer-in-Charge | 19.00 | sqm | 2,257.59 | 42,894.00 |
| | Sub-Total | | | | ₹ 1,77,13,619.00 |
| 12 | SANITARY INSTALLATIONS | | | | |
| 12.1 | 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: | | | | |
| 12.1.1 | White Vitreous china Orissa pattern W.C. pan of size 580x440 mm with integral type foot rests | 1.00 | each | 7,572.38 | 7,572.00 |
| 12.2 | 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: | | | | |
| 12.2.1 | White Vitreous China Wash basin size 630x450 mm with a single 15 mm C.P. brass pillar tap | 1.00 | each | 2,491.18 | 2,491.00 |
| 12.3 | Providing and fixing CP Brass 32 mm size Bottle Trap of approved quality & make and as per the direction of Engineer-in-charge | 114.00 | each | 1,157.89 | 1,31,999.00 |
| 12.4 | Providing and fixing P.V.C. waste pipe for sink or wash basin including P.V.C. waste fittings complete | | | | |
| 12.4.1 | Semi rigid pipe | | | | |
| 12.4.1.1 | 32 mm dia. | 1.00 | each | 116.25 | 116.00 |

| | | | | | |
|---|---|---|---|---|---|
| 12.5 | 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 | 77.00 | each | 1,799.22 | 1,38,540.00 |
| 12.6 | Providing and fixing 600x120x5 mm glass shelf with edges round off, supported on anodized aluminium angle frame with C.P. brass brackets and guard rail complete fixed with 40 mm long screws, rawl plugs etc., complete | 77.00 | each | 1,212.39 | 93,354.00 |
| 12.7 | Providing and fixing toilet paper holder: | | | | |
| 12.7.1 | C.P. brass | 55.00 | each | 899.30 | 49,462.00 |
| 12.8 | Providing and fixing soil, waste and vent pipes: | | | | |
| 12.8.1 | 100 mm dia. | | | | |
| 12.8.1.1 | Hubless centrifugally cast (spun) iron pipes epoxy coated inside & outside IS:15905 | 270.00 | metre | 1,308.39 | 3,53,265.00 |
| 12.9 | Providing and fixing bend of required degree with access door, insertion rubber washer 3 mm thick, bolts and nuts complete | | | | |
| 12.9.1 | 100 mm dia. | | | | |
| 12.9.1.1 | Hubless centrifugally cast (spun) iron epoxy coated inside & outside as per IS:15905 | 13.00 | each | 634.67 | 8,251.00 |
| 12.10 | Providing and fixing plain bend of required degree | | | | |
| 12.10.1 | 100 mm dia. | | | | |
| 12.10.1.1 | Hubless centrifugally cast (spun) iron pipes epoxy coated inside & outside IS:15905 | 52.00 | each | 411.77 | 21,412.00 |
| 12.11 | Providing and fixing single equal plain junction of required degree: | | | | |
| 12.11.1 | 100x100x100 mm | | | | |
| 12.11.1.1 | Hubless centrifugally cast (spun) iron epoxy coated inside & outside as per IS:15905 | 9.00 | each | 650.61 | 5,855.00 |
| 12.12 | Providing and fixing terminal guard: | | | | |
| 12.12.1 | 100 mm | | | | |
| 12.12.1.1 | Hubless centrifugally cast (spun) iron epoxy coated inside & outside as per IS:15905 | 5.00 | each | 478.69 | 2,393.00 |
| 12.13 | Providing and fixing shielded coupling for Hubless centrifugally cast-iron pipe | | | | |
| 12.13.1 | 100 mm dia | | | | |
| 12.13.1.1 | SS 304 grade coupling with EPDM rubber gasket | 213.00 | each | 483.44 | 1,02,973.00 |
| 12.14 | Providing and fixing trap of self-cleansing design with screwed down or hinged grating with or without vent arm complete, including cost of cutting and making good the walls and floors: | | | | |
| 12.14.1 | 100 mm inlet and 100 mm outlet | | | | |
| 12.14.1.1 | Hubless centrifugally cast (spun) iron epoxy coated inside & outside as per IS:15905 | 27.00 | each | 956.20 | 25,817.00 |
| 12.15 | Painting sand cast iron / centrifugally cast (spun) iron soil, waste vent pipes and fittings | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | with two coats of synthetic enamel paint of any colour such as chocolate grey, or buff etc. over a coat of primer (of approved quality) for new work: | | | | |
| 12.15.1 | 100 mm diameter pipe | 300.00 | metre | 92.64 | 27,792.00 |
| 12.16 | Providing and fixing PTMT liquid soap container 109 mm wide, 125 mm high and 112 mm distance from wall of standard shape with bracket of the same materials with snap fittings of approved quality and colour, weighing not less than 105 gms. | 77.00 | each | 188.37 | 14,504.00 |
| 12.17 | Providing and fixing PTMT towel ring trapezoidal shape 215 mm long, 200 mm wide with minimum distances of 37 mm from wall face with concealed fittings arrangement of approved quality and colour, weighing not less than 88 gms. | 19.00 | each | 259.54 | 4,931.00 |
| 12.18 | Providing and fixing G.I. flush pipe and C.P. brass urinal spreader all complete as per the directions of Engineer-in-charge | 36.00 | each | 765.68 | 27,564.00 |
| 12.19 | Providing and fixing M.S. holder bat clamp of approved design to sand cast iron / cast iron (spun) pipes comprising of M.S. flat brackets made of 50x5 mm flat of specified shape, projecting 75 mm outside the wall surface and fixed on wall with 4 Nos. 6 mm dia. expansion hold fasteners, including drilling necessary holes in brick wall / CC / RCC surface and the cost of bolts etc. The pipes shall be fixed to the already fixed brackets with the help of 30 mm x1.6 mm galvanized M.S. flats of specified shape and of total length 420 mm and shall be fixed with M.S. nuts, bolts, & washers of size 25x6 mm, one bolts on each side of the pipe | | | | |
| 12.19.1 | Total bracket length 580 mm of approved shape and design (for single 100 mm dia. pipe) | 24.00 | each | 340.22 | 8,165.00 |
| 12.20 | Providing and fixing 8 mm dia. M.S. (Galvanized) level adjusting hanger (up to 1000 mm length) along with 100mm M.S. (Galvanized) universal clamp for holding C.I. Pipes, fixing to roof slabs and stainless-steel expendable dash fastener of 8 mm dia. and 75mm long including nut bolt, washer etc. complete as per direction of Engineer-In-Charge | 214.00 | each | 388.21 | 83,077.00 |
| 12.21 | Providing and fixing chrome plated self-closing pressmatic urinal valve with auto closing system with wall flange and 200 mm connecting pipe with necessary screw and fittings for half stall urinal (Model No. F9020203CH of CERA make or equivalent make as approved by Engineer-in-charge) all complete as per the directions of | 36.00 | each | 2,594.94 | 93,418.00 |

| | | | | | |
|---|---|---|---|---|---|
| | Engineer-in-Charge | | | | |
| | Sub-Total | | | | ₹ 12,02,951.00 |
| 13 | WATER SUPPLY | | | | |
| 13.1 | Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold-water supply and all CPVC plain & brass threaded fittings, including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and testing of joints complete as per direction of Engineer in Charge Internal work - Exposed on wall | | | | |
| 13.1.1 | 25 mm nominal dia. Pipes | 10.00 | metre | 449.32 | 4,493.00 |
| 13.2 | Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold-water supply, including all CPVC plain & brass threaded fittings and fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and the cost of cutting chases and making good the same including testing of joints complete as per direction of Engineer in Charge<br>Concealed work, including cutting chases and making good the walls etc. | | | | |
| 13.2.1 | 15 mm nominal dia. Pipes | 1.00 | metre | 557.01 | 557.00 |
| 13.2.2 | 20 mm nominal dia. Pipes | 2.00 | metre | 601.54 | 1,203.00 |
| 13.3 | Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold-water supply including all CPVC plain & brass threaded fittings This includes jointing of pipes & fittings with one step CPVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. External work | | | | |
| 13.3.1 | 50 mm nominal dia. pipes | 215.00 | metre | 888.73 | 1,91,077.00 |
| 13.3.2 | 100 mm nominal dia. pipes | 940.00 | metre | 3,660.86 | 34,41,208.00 |
| 13.4 | Providing and fixing unplasticized PVC connection pipe with brass unions: | | | | |
| 13.4.1 | 45 cm length | | | | |
| 13.4.1.1 | 15 mm nominal bore | 134.00 | each | 109.38 | 14,657.00 |
| 13.5 | Constructing masonry Chamber 90x90x100 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for sluice valve, with C.I. surface box 100 mm top diameter, 160 mm bottom diameter and 180 mm deep (inside) with chained lid and RCC top slab 1:1.5:3 mix (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size), including necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | sand : 10 graded stone aggregate 40 mm nominal size ) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design : | | | | |
| 13.5.1 | With common burnt clay F.P.S. (non-modular) bricks of class designation 7.5 | 3.00 | each | 21,144.46 | 63,433.00 |
| 13.6 | Providing and placing on terrace (at all floor levels) polyethylene water storage tank, IS: 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank | 500.00 | per litre | 12.31 | 6,155.00 |
| 13.7 | Providing and fixing C.P. brass bib cock of approved quality conforming to IS:8931: | | | | |
| 13.7.1 | 15 mm nominal bore | 5.00 | each | 567.09 | 2,835.00 |
| 13.8 | Providing and fixing C.P. brass long nose bib cock of approved quality conforming to IS standards and weighing not less than 810 gms. | | | | |
| 13.8.1 | 15 mm nominal bore | 2.00 | each | 918.32 | 1,837.00 |
| 13.9 | Providing and fixing C.P. brass angle valve for basin mixer and geyser points of approved quality conforming to IS: 8931 | | | | |
| 13.9.1 | 15 mm nominal bore | 147.00 | each | 642.61 | 94,464.00 |
| 13.10 | Providing and fixing C.P. Brass extension nipple (size 15 mm x 50 mm) of approved make and quality as per direction of Engineer-in-charge | 147.00 | each | 83.70 | 12,304.00 |
| 13.11 | Providing and fixing chrome plated pillar cock with aerator and necessary fittings, nuts, washers and flange (Model No. F1015101CH of CERA make or equivalent make as approved by Engineer-in-charge) all complete as per the directions of Engineer-in-Charge | 76.00 | each | 422.52 | 32,112.00 |
| 13.12 | Providing and fixing PTMT grating of approved quality and colour | | | | |
| 13.12.1 | Rectangular type with openable circular lid | | | | |
| 13.12.1.1 | 150 mm nominal size square 100 mm diameter of the inner hinged round grating | 116.00 | each | 220.37 | 25,563.00 |
| 13.13 | Providing and fixing Chrome plated Two-way Bib Cock with single lever and wall flange, washers and necessary fixing arrangements (Model No. F1015163CH of CERA make or equivalent make as approved by Engineer-in-charge) all complete as per the directions of Engineer-in-Charge | 55.00 | each | 1,634.66 | 89,906.00 |
| | Sub-Total | | | | ₹ 39,81,804.00 |
| 14 | DRAINAGE | | | | |
| 14.1 | Constructing brick masonry manhole in cement mortar 1:4 (1 cement : 4 coarse | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | sand) with R.C.C. top slab with 1:1.5:3 mix (1 cement : 1.5 coarse sand (zone-III) : 3 graded stone aggregate 20 mm nominal size), foundation concrete 1:4:8 mix (1 cement : 4 coarse sand (zone-III) : 8 graded stone aggregate 40 mm nominal size), inside plastering 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with floating coat of neat cement and making channels in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement complete as per standard design : | | | | |
| 14.1.1 | Inside size 90x80 cm and 45 cm deep including C.I. cover with frame (light duty) 455x610 mm internal dimensions, total weight of cover and frame to be not less than 38 kg (weight of cover 23 kg and weight of frame 15 kg): | | | | |
| 14.1.1.1 | With common burnt clay F.P.S. (non-modular) bricks of class designation 7.5 | 2.00 | each | 14,289.61 | 28,579.00 |
| 14.2 | Constructing brick masonry road gully chamber 50x45x60 cm with bricks in cement mortar 1:4 (1 cement: 4 coarse sand) including 500x450 mm pre-cast R.C.C. horizontal grating with frame complete as per standard design: | | | | |
| 14.2.1 | With common burnt clay F.P.S. (non-modular) bricks of class designation 7.5 | 90.00 | each | 6,666.60 | 5,99,994.00 |
| 14.3 | Making soak pit 2.5 m diameter 3.0 metre deep with 45 x 45 cm dry brick honey comb shaft with bricks and S.W. drain pipe 100 mm diameter, 1.8 m long complete as per standard design | | | | |
| 14.3.1 | With common burnt clay F.P.S. (non-modular) bricks of class designation 7.5 | 1.00 | each | 30,057.12 | 30,057.00 |
| 14.4 | Providing and laying Non-Pressure NP-3 class (Medium duty) R.C.C. pipes including collars / spigot jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement: 2 fine sand) including testing of joints etc. complete | | | | |
| 14.4.1 | 450 mm dia. RCC pipes | 578.00 | metre | 2,994.92 | 17,31,064.00 |
| 14.4.2 | 600 mm dia. RCC pipes | 92.00 | metre | 3,805.83 | 3,50,136.00 |
| 14.4.3 | 900 mm dia. RCC pipes | 30.00 | metre | 6,016.87 | 1,80,506.00 |
| | Sub-Total | | | | ₹ 29,20,336.00 |
| 15 | ALUMINIUM WORK | | | | |
| 15.1 | Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections / appropriate Z sections and other sections of approved make conforming to IS: 733 and IS: 1285, fixing with dash fasteners | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | of required dia. and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminium snap beading for glazing / paneling, C.P. brass / stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge. (Glazing, paneling and dash fasteners to be paid for separately): | | | | |
| 15.1.1 | For fixed portion | | | | |
| 15.1.1.1 | Powder coated aluminium (minimum thickness of powder coating 50 micron) | 462.00 | kg | 594.06 | 2,74,456.00 |
| 15.1.2 | 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) | | | | |
| 15.1.2.1 | Powder coated aluminium (minimum thickness of powder coating 50 micron) | 240.00 | kg | 709.92 | 1,70,381.00 |
| 15.2 | 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): | | | | |
| 15.2.1 | With float glass panes of 4.0 mm thickness (weight not less than 10kg/sqm) | 23.00 | sqm | 1,316.78 | 30,286.00 |
| 15.2.2 | With float glass panes of 5 mm thickness (weight not less than 12.50 kg/sqm) | 2.00 | sqm | 1,684.30 | 3,369.00 |
| 15.3 | 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 | | | | |
| 15.3.1 | Upto 5 mm depth and 5 mm width | 84.00 | metre | 108.26 | 9,094.00 |
| 15.4 | Providing and fixing 12 mm thick frameless toughened glass door shutter of approved brand and manufacture, including providing and fixing top & bottom pivot & double acting hydraulic floor spring type fixing arrangement and making necessary holes etc. for fixing required door fittings, all complete as per direction of Engineer-in-charge (Door handle, lock and stopper etc. to be paid separately) | 23.00 | sqm | 5,959.42 | 1,37,067.00 |
| 15.5 | Providing and fixing stainless steel 304 grade H - type pull handle suitable for glass | 10.00 | set | 3,596.09 | 35,961.00 |

| | | | | | |
|---|---|---|---|---|---|
| | door (Model No. HPH-141 of Hardwyn make or equivalent make as approved by Engineer-in-Charge) (a back-to-back set for a single door) with necessary accessories etc. all complete as per the directions of Engineer-in-Charge | | | | |
| 15.6 | Providing and fixing stainless steel corner lock suitable for glass door shutters (Model No. XL-C 4011A of Dormakaba make or equivalent make as approved by Engineer-in-Charge) with necessary accessories, stainless steel screws, etc. all complete as per the directions of Engineer-in-Charge | 10.00 | each | 2,821.83 | 28,218.00 |
| 15.7 | Providing and fixing stainless steel top patch fitting suitable for glass door shutters (Model No. HE-20 of Hardwyn make or equivalent make as approved by Engineer-in-Charge) with necessary accessories, screws, etc. all complete as per the directions of Engineer-in-Charge | 10.00 | each | 2,000.65 | 20,007.00 |
| 15.8 | Providing and fixing stainless steel bottom patch fitting suitable for glass door shutters (Model No. HE-10 of Hardwyn make or equivalent make as approved by Engineer-in-Charge) with necessary accessories, screws, etc. all complete as per the directions of Engineer-in-Charge | 10.00 | each | 2,000.65 | 20,007.00 |
| | Sub-Total | | | | ₹ 7,28,846.00 |
| 16 | WATER PROOFING | | | | |
| 16.1 | Providing and laying integral cement-based water proofing treatment including preparation of surface as required for treatment of roofs, balconies, terraces etc. consisting of following operations: (a) Applying a slurry coat of neat cement using 2.75 kg/sqm of cement admixed with water proofing compound conforming to IS. 2645 and approved by Engineer-in-charge over the RCC slab including adjoining walls upto 300 mm height including cleaning the surface before treatment. (b) Laying brick bats with mortar using broken bricks / brick bats 25 mm to 115 mm size with 50% of cement mortar 1:5 (1 cement : 5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge over 20 mm thick layer of cement mortar of mix 1:5 (1 cement :5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge to required slope and treating similarly the adjoining walls upto 300 mm height including rounding of junctions of walls and slabs. (c) After two days of proper curing applying a | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | second coat of cement slurry using 2.75 kg/sqm of cement admixed with water proofing compound conforming to IS: 2645 and approved by Engineer-in-charge | | | | |
| | (d) Finishing the surface with 20 mm thick jointless cement mortar of mix 1:4 (1 cement :4 coarse sand) admixed with water proofing compound conforming to IS: 2645 and approved by Engineer-in-charge including laying glass fibre cloth of approved quality in top layer of plaster and finally finishing the surface with trowel with neat cement slurry and making pattern of 300x300 mm square 3 mm deep. (e) The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. "All above operations to be done in order and as directed and specified by the Engineer-in-Charge": | | | | |
| 16.1.1 | With average thickness of 120 mm and minimum thickness at khurra as 65 mm | 409.00 | sqm | 1,884.99 | 7,70,961.00 |
| | Sub-Total | | | | ₹ 7,70,961.00 |
| 17 | STRUCTURAL GLAZING ALUMMINIUM COMPOSITE PANEL | | | | |
| 17.1 | Providing and supplying aluminium extruded tubular and other aluminium sections as per the architectural drawings and approved shop drawings, the aluminium quality as per grade 6063 T5 or T6 as per BS 1474, including super durable powder coating of 60-80 microns conforming to AAMA 2604 of required colour and shade as approved by the Engineer-in-Charge. (The item includes cost of material such as cleats, sleeves, screws etc. necessary for fabrication of extruded aluminium frame work. Nothing extra shall be paid on this account). The weight of aluminium extruded section shall be taken for purpose of payment | 12,412.00 | kg | 463.58 | 57,53,955.00 |
| 17.2 | Designing, fabricating, testing, protection, installing and fixing in position semi (grid) unitized system of structural glazing (with open joints) for linear as well as curvilinear portions of the building for all heights and all levels, including: (a) Structural analysis & design and preparation of shop drawings for the specified design loads conforming to IS 875 part III (the system must passed the proof test at 1.5 times design wind pressure without any failure), including functional design of the aluminum sections for fixing glazing panels of various thicknesses, aluminium cleats, sleeves and splice plates etc. gaskets, screws, toggles, nuts, bolts, clamps etc., structural and weather silicone | 866.00 | sqm | 3,928.08 | 34,01,717.00 |

| | | | | | |
|---|---|---|---|---|---|
| | sealants, flashings, fire stop (barrier)- cum-smoke seals, microwave cured EPDM gaskets for water tightness, pressure equalization & drainage and protection against fire hazard including: | | | | |
| | (b) Fabricating and supplying serrated M.S. hot dip galvanized / Aluminium alloy of 6005 T5 brackets of required sizes, sections and profiles etc. to accommodate 3 Dimensional movement for achieving perfect verticality and fixing structural glazing system rigidly to the RCC / masonry / structural steel framework of building structure using stainless steel anchor fasteners / bolts, nylon separator to prevent bimetallic contacts with nuts and washers etc. of stainless steel grade 316, of the required capacity and in required numbers | | | | |
| | (c) Providing and filling, two-part pump filled, structural silicone sealant and one part weather silicone sealant compatible with the structural silicone sealant of required bite size in a clean and controlled factory / work shop environment, including double sided spacer tape, setting blocks and backer rod, all of approved grade, brand and manufacture, as per the approved sealant design, within and all around the perimeter for holding glass. (d) Providing and fixing in position flashings of solid aluminium sheet 1 mm thick and of sizes, shapes and profiles, as required as per the site conditions, to seal the gap between the building structure and all its interfaces with curtain glazing to make it watertight | | | | |
| | (e) Making provision for drainage of moisture / water that enters the curtain glazing system to make it watertight, by incorporating principles of pressure equalization, providing suitable gutter profiles at bottom (if required), making necessary holes of required sizes and of required numbers etc. complete. This item includes cost of all inputs of designing, labour for fabricating and installation of aluminium grid, installation of glazed units, T&P, scaffolding and other incidental charges including wastages etc., enabling temporary structures and services, cranes or cradles etc. as described above and as specified. The item includes the cost of getting all the structural and functional design including shop drawings checked by a structural designer, dully approved by Engineer-in-charge | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | The item also includes the cost of all mock ups at site, cost of all samples of the individual components for testing in an approved laboratory, field tests on the assembled working structural glazing as specified, cleaning and protection till the handing over of the building for occupation. In the end, the Contractor shall provide a water tight structural glazing having all the performance characteristics etc. all complete as required, as per the Architectural drawings, as per item description, as specified, as per the approved shop drawings and as directed by the Engineer- in-Charge.<br>Note: 1. The cost of providing extruded aluminium frames, shadow boxes, extruded aluminium section capping for fixing in the grooves of the curtain glazing and vermin proof stainless steel wire mesh shall be paid for separately under relevant items under this sub- head. However, for the purpose of payment, only the actual area of structural glazing (including width of grooves) on the external face shall be measured in sqm. up to two decimal places | | | | |
| | Note: 2. The following performance test are to be conducted on structural glazing system if area of structural glazing exceeds 2500 Sqm from the certified laboratories accredited by NABL (National Accreditation Board for Testing and Calibration Laboratories), Department of Science & Technologies, India. Cost of testing is payable separately. The NIT approving authority will decide the necessity of testing on the basis of cost of the work, cost of the test and importance of the work | | | | |
| | Performance Testing of Structural glazing system Tests to be conducted in the NABL accredited lab or any other accreditation body which operates in accordance with ISO / IEC 17011 and accredits labs as per ISO / IEC 17025 1. Performance Laboratory Test for Air Leakage Test (-50pa to - 300pa) & (+50pa to +300pa) as per ASTM E-283-04 testing method for a range of testing limit 1 to 200 mVhr 2. Static Water Penetration Test. (50pa to 1500pa) as per ASTME- 331-09 testing method for a range up to 2000 ml. 3. Dynamic Water Penetration (50pa to 1500pa) as per AAMA 501.01- 05 testing method for a range upto 2000 ml 4. Structural Performance Deflection and deformation by static air pressure test (1.5 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | times design wind pressure without any failure) as per ASTME-330-10 testing method for a range upto 50 mm 5. Seismic Movement Test (upto 30 mm) as per AAMA 501.4-09 testing method for Qualitative test, Tests to be conducted on site. 6. Onsite Test for Water Leakage for a pressure range 50 kpa to 240 kpa (35psi) upto 2000 ml | | | | |
| 17.3 | Providing, assembling and supplying vision glass panels (IGUs) comprising of hermetically-sealed 6-12- 6 mm insulated glass (double glazed) vision panel units of size and shape as required and specified, comprising of an outer heat strengthened float glass 6 mm thick, of approved colour and shade with reflective soft coating on surface # 2 of approved colour and shade, an inner Heat strengthened clear float glass 6 mm thick, spacer tube 12 mm wide, desiccants, including primary seal and secondary seal (structural silicone sealant) etc. all complete for the required performances, as per the Architectural drawings, as per the approved shop drawings, as specified and as directed by the Engineer- in-Charge. The IGUs shall be assembled in the factory / workshop of the glass processor | 779.00 | sqm | 4,161.05 | 32,41,458.00 |
| | (Payment for fixing of IGU Panels in the curtain glazing is included in cost of item No.25.2) For payment, only the actual area of glass on face # 1 of the glass panels (excluding the areas of the grooves and weather silicone sealant) provided and fixed in position, shall be measured in sqm. (i) Coloured tinted float glass 6 mm thick substrate with reflective soft coating on face # 2 + 12 mm Airgap + 6 mm Heat Strengthened clear Glass of approved make having properties as visible Light transmittance (VLT) of 25 to 35 %, Light reflection internal 10 to 15%, light reflection external 10 to 20 %, shading coefficient (0.25- 0.28) and U value of 3.0 to 3.3 W/m2 degree K etc. The properties of performance glass shall be decided by technical sanctioning authority as per the site requirement | | | | |
| 17.4 | Extra for openable side / top hung vision glass panels (IGUs) including providing and supplying at site all accessories and hardwares for the openable panels as specified and of the approved make such as heavy duty stainless steel friction hinges, min 4 -point cremone locking sets with | 106.00 | sqm | 4,108.23 | 4,35,472.00 |

| | | | | | |
|---|---|---|---|---|---|
| | stainless steel plates, handles, buffers etc. including necessary stainless steel screws / fasteners, nuts, bolts, washers etc. all complete as per the Architectural drawings, as per the approved shop drawings, as specified and as directed by the Engineer-in-Charge | | | | |
| | Sub-Total | | | | ₹ 1,28,32,602.00 |
| 18 | NEW TECHNOLOGIES AND MATERIALS | | | | |
| 18.1 | Providing & fixing false ceiling at all heights with GRG (Glass Fibre Reinforced Gypsum) false ceiling tiles of Size 595x595 mm of approved texture, design and patterns having moisture content less than 2%, humidity resistance of 99%, NRC 0.50 to 0.75 as per IS 8225:1987, Non-combustible as per BS 476 (part 4)-1970 and light reflectance of 85% (minimum) to be laid in true horizontal level suspended on inter-locking metal T-Grid of hot dipped galvanized iron section of 0.33 mm thick (galvanized @ 120 gram per sqm including both sides) comprising of main-T runners of size 15x32 mm of length 3000 mm, cross - T of size 15x32 mm of length 1200 mm and secondary intermediate cross-T of size 15x32 mm of length 600 mm to form grid module of size 600 x 600 mm, suspended from ceiling using galvanized mild steel items (galvanizing @ 80 grams per sqm) i.e. 50 mm long, 8 mm outer diameter M-6 dash fasteners, 6 mm dia. fully threaded hanger rod upto 1000 mm length and L-shape level adjuster of size 85x25x2 mm. Galvanized iron perimeter wall angle of size 24x24x0.40 mm of length 3000 mm to be fixed on periphery wall / partition with the help of plastic rawl plugs at 450 mm center to center and 40 mm long dry wall wood screws. The work shall be carried out as per specifications, drawing and as per directions of the Engineer-in-Charge | | | | |
| 18.1.1 | With semi perforated 12 mm thick micro tegular edged GRG false ceiling tiles | 3,912.00 | sqm | 2,072.35 | 81,07,033.00 |
| | Sub-Total | | | | ₹ 81,07,033.00 |
| | TOTAL (CIVIL) | | | | ₹ 12,29,60,331.00 |

## GENERAL ABSTRACT

**Name of Work:** Construction of Office cum Residential and Hostel Complex for the Department of NIPER at Panihati, B.T. Road, Kolkata, West Bengal. S.H: Balance works of Administrative Building (G+4) storied, Animal House (G+1) storied, Girls Hostel (G+2), Boys Hostel (G+2) storied, Substation building, Pump House, Main Entrance Gate Structure with Security Cabin including bulk services and development works (Civil, Electrical and Mechanical)

| Item No. | Sub-heads and items of work | Amount (₹) |
|---|---|---|
| 1 | Schedule "A" (E & M Portion) | ₹ 12,74,10,464.00 |
| 2 | Schedule "B" (Civil Portion) | ₹ 12,29,60,331.00 |
| **TOTAL** | | **₹ 25,03,70,795.00** |

# PROFORMA FOR QUOTING RATES

| CENTRAL PUBLIC WORKS DEPARTMENT | | | | | |
|---|---|---|---|---|---|
| NIT NO**: 53/EE (E)-BCED/05/SE/Barasat/CPWD/2026-27-Recal1** | | | | | |
| Name of Work: Construction of Office cum Residential and Hostel Complex for the Department of NIPER at Panihati, B.T. Road, Kolkata, West Bengal. S.H: Balance works of Administrative Building (G+4) storied, Animal House (G+1) storied, Girls Hostel (G+2), Boys Hostel (G+2) storied, Substation building, Pump House, Main Entrance Gate Structure with Security Cabin including bulk services and development works (Civil, Electrical and Mechanical) | | | | | |
| Estimated Cost put to Tender (₹) | | **₹ 25,03,70,795.00** | | | |
| Name of Contractor | | | | | |
| Sl. No. | Name of Component | Estimated Cost (₹) | Percentage above or below the estimated cost | % in Figures | Total Cost (₹) |
| 1 | E & M Work | ₹ 12,74,10,464.00 | | | |
| 2 | Civil Work | ₹ 12,29,60,331.00 | | | |
| | Total Cost | **₹ 25,03,70,795.00** | | | |

1. Rate filled in any form shall be considered only in %age
2. Rate filled at any other place in the document shall not be considered
3. No condition shall be accepted