

Name of work:	Providing various LED fixtures at Paschim Vihar Group Housing Societies. (SUB HEAD - 1 : - 1.Shiva Enclave 2.Ritu Apartment 3.Anandvan 4.Balvinder Apartment 5. Nivedita Enclave 6.Supriya Apartment 7. Sahridaya Apartment 8. Priydarshani Apartment 9. Trivni Apartment 10. Sakshar Apartment 11. Maitri Apartment 12. Shubniketan) (SUB HEAD - 2 : -1.Navbharat Apartment 2. Manav Apartment 3. J.K. Apartment 4. Anuradha Apartment 5. Ashoka Apartment 6. Adarsh Apartment 7. Gasta Housing Complex 8. Raksha Kunj 9. Pink Apartment 10. Milap Apartment 11. Shubam Apartment 12. CA Apartment)	
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CORRECTION (C)	NIL-----
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A. E. (P)

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NOTICE INVITING E-TENDER

- Name of Work: : Providing various LED fixtures at Paschim Vihar Group Housing Societies. (SUB HEAD - 1 : - 1.Shiva Enclave 2.Ritu Apartment 3.Anandvan 4.Balvinder Apartment 5. Nivedita Enclave 6.Supriya Apartment 7. Sahridaya Apartment 8. Priyadarshani Apartment 9. Trivni Apartment 10. Sakshar Apartment 11. Maitri Apartment 12. Shubniketan) (SUB HEAD - 2 : -1.Navbharat Apartment 2. Manav Apartment 3. J.K. Apartment 4. Anuradha Apartment 5. Ashoka Apartment 6. Adarsh Apartment 7. Gasta Housing Complex 8. Raksha Kunj 9. Pink Apartment 10. Milap Apartment 11. Shubam Apartment 12. CA Apartment)
- NIT No : **37/SE/West/PWD/NCTD/2019-20**
- ESTIMATED COST : **Rs. 2,16,56,278/-**
- EARNEST MONEY : **Rs. 4,33,126/-**
- SECURITY DEPOSIT : 2.5% of Tendered Cost
- PERFORMANCE GUARANTEE : 5% of Tendered Cost
- TIME PERIOD : **02 (Two) Months**

Certified that the NIT contains 01 to 64 Pages

This NIT is approved for Rs. 2,16,56,278/- (Rs. Two Crore Sixteen Lac Fifty Six Thousand Two Hundred Seventy Eight only)

**Assistant Engineer (P)
West Maint. Circle, PWD,
New Delhi**

**Executive Engineer (P)
West Maint. Circle, PWD,
New Delhi**

**Superintending Engineer
West Maint. Circle, PWD,
New Delhi**

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INVITATION OF BID FOR e-TENDERING

The Executive Engineer(E), PWD, West Electrical Division M-131 (N), PWD, 41 Rama Road, Delhi-15, invites on behalf of President of India, Online Percentage Rate composite tender from approved and eligible contractors of CPWD, MES, BSNL, MTNL & other State Government Department dealing with Building and Roads and other experienced contractors for the following work through e-procurement solution:-

S.N o	NIT No.	Name of Work	Estimated Cost	Earnest Money	Stipulated period of completion of work	Last date and time for online submission of bid, copy of receipt of deposition of original EMD and other documents as specified in the bid document	Date & time of opening of bid
1	37/SE/West/NCTD/PWD/2019-20	Providing various LED fixtures at Paschim Vihar Group Housing Societies. (SUB HEAD - 1 : - 1.Shiva Enclave 2.Ritu Apartment 3.Anandvan 4.Balvinder Apartment 5. Nivedita Enclave 6.Supriya Apartment 7. Sahridaya Apartment 8. Priyadarshani Apartment 9. Trivni Apartment 10. Sakshar Apartment 11. Maitri Apartment 12. Shubniketan) (SUB HEAD - 2 : -1.Navbharat Apartment 2. Manav Apartment 3. J.K. Apartment 4. Anuradha Apartment 5. Ashoka Apartment 6. Adarsh Apartment 7. Gasta Housing Complex 8. Raksha Kunj 9. Pink Apartment 10. Milap Apartment 11. Shubam Apartment 12. CA Apartment)	Rs. 2,16,56,278/-	Rs. 4,33,126/-	02 Months	Up to 3.00 PM on 25.11.2019	Up to 3.00 PM on 25.11.2019
							At 3.30 PM on 25.11.2019

1. The intending bidder must read the terms and conditions of CPWD-6 carefully. He should only submit his bid if he considers himself eligible and he is in possession of all the documents required.
2. Information and instructions for bidders posted on website shall form part of bid document.
3. The bid document consisting of plans, specifications, schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be compiled with

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and other necessary documents can be seen and downloaded from <https://govtprocurement.delhi.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, DD(H), PWD within the period of bid submission and uploading the mandatory scanned documents such as Demand draft or Pay order or Bankers Cheque or Deposit at call Receipt or Fixed Deposit Receipts and Bank Guarantee of any scheduled Bank 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), PWD and other documents as specified.
5. Those contractors not registered on the website mentioned above, are required to get registered beforehand. If needed they can be imparted training on online bidding process as per details available on the website.
6. The intending bidder must have valid class-III digital signature to submit the bid.
7. On opening date, the contractor can login and see the bid opening process. After opening of bids he can 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 pink colour and the moment rate is entered, it turns sky blue.
In addition to this, while selecting any of the cells a warning appears that if any cell is left blank the same shall be treated as "0 (ZERO)". Therefore, if any cell is left blank and no rate is quoted by the bidder, rate of such item shall be treated as "0 (ZERO)".
However, If a tenderer quotes nil rates against each item in item rate tender or does not quote any percentage above/below on the total amount of the tender or any section / sub head in percentage rate tender, the tender shall be treated as invalid and will not be considered as lowest tenderer.
10. SC/ST contractors enlisted under class V category are exempted from processing fee payable to ITI.

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

(ONLY SCANNED DOCUMENTS ARE TO BE UPLOADED. PHOTOGRAPHS OF RELEVANT DOCUMENTS, IF UPLOADED, ARE LIABLE TO BE REJECTED IN CASE OF LACK OF CLARITY)

- (i) Treasury Challan / Demand Draft / Pay order or Banker's Cheque / Deposit at Call Receipt / FDR / Bank Guarantee of any Scheduled Bank against EMD
- (ii) Receipt of earnest money as per para-I above in the prescribed format.
- (iii) Enlistment Order of the CPWD Contractor in appropriate Category
- (iv) For contractors registered with MES, BSNL, MTNL etc. & other experienced contractors, their relevant registration certificates along with certificates of experience of similar work as mentioned in NIT.

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(v) GST Registration issued by GNCTD, if already obtained by the bidders

If the bidder has not obtained Delhi State GST registration certificate, **or**

as required by GST Authorities, then in such a case the bidder shall scan and upload following undertaking along with other bid documents,

“ If work is awarded to me/us, I/we shall obtained GST Registration Certificate, within 1 month from the date of receipt of award letter or before release of any payment by PWD, 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 PWD or GST Department in this regard.”

(vi) Affidavit as per clause 1.2.3 of CPWD 6 (from non CPWD contractors).

(vii) Copy of PAN card

(viii) Copy of Valid Electrical License.

**Executive Engineer (E),
West Electrical Division M-131 (N),
PWD, 41 Rama Road, Delhi-15**

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CPWD-6

CPWD-6 FOR e-TENDERING

1. **PercentageRate Composite** bids are invited on behalf of the President of India from approved and eligible contractors of CPWD, **MES, BSNL, MTNL & other State Government Department dealing with Building and Roads and other experienced contractors** through e-Tendering for the work:- **Providing various LED fixtures at Paschim Vihar Group Housing Societies. (SUB HEAD - 1 : - 1.Shiva Enclave 2.Ritu Apartment 3.Anandvan 4.Balvinder Apartment 5. Nivedita Enclave 6.Supriya Apartment 7. Sahridaya Apartment 8. Priyadarshani Apartment 9. Trivni Apartment 10. Sakshar Apartment 11. Maitri Apartment 12. Shubniketan) (SUB HEAD - 2 : -1.Navbharat Apartment 2. Manav Apartment 3. J.K. Apartment 4. Anuradha Apartment 5. Ashoka Apartment 6. Adarsh Apartment 7. Gasta Housing Complex 8. Raksha Kunj 9. Pink Apartment 10. Milap Apartment 11. Shubam Apartment 12. CA Apartment)**

The enlistment of the contractors should be valid on the last date of submission of tenders.

In case only the last date of submission of tender is extended, the enlistment of contractor should be valid on the original date of submission of bids.

1.1 The work is estimated to cost : **Rs. 2,16,56,278/-**

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

1.1.1 The eligibility of bidders will correspond to the combined estimated cost of different components put to bid.

1.2 Intending bidder is eligible to submit the bid provided he has definite proof from the appropriate authority, which shall be to the satisfaction of the competent authority, of having satisfactorily completed similar works of magnitude specified below:

Criteria of eligibility for submission of bid documents

1.2.1 Conditions for Non-CPWD registered contractors (**MES, BSNL & other State Government Department**) dealing with Building and Roads and other experienced contractors who full fill the following criteria shall be eligible to apply:

- (a) Should have satisfactorily completed three similar works each value not less than **Rs. 86.63 Lakh** or two similar works each of value not less than Rs. **129.94 Lakh** one similar work value not less than Rs. **173.25 Lakh**.

Similar work shall mean “**Electrical Work**”

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The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum; calculated from the date of completion to last date of receipt of applications for bids.

(b) Joint ventures/ Consortium and Special Purpose Vehicles are not accepted.

- (i) If the bidder is an individual, the application shall be signed by him above his full type written name and current address.
- (ii) If the bidder is a proprietary firm, the application shall be signed by the proprietor above his full typewritten name and the full name of his firm with its current address.
- (iii) If the bidder is a firm in partnership, the application shall be signed by all the partners of the firm above their full typewritten names and current address, or, alternatively, by a partner holding power of attorney for the firm. In the later case a certified copy of the power of attorney should accompany the application. In both cases a certified copy of the partnership deed and current address of all the partners of the firm should accompany the application.
- (iv) If the bidder is a limited company or a corporation, the application shall be signed by a duly authorized person holding power of attorney for signing the application accompanied by a copy of the power of attorney. The bidder should also furnish a copy of the Memorandum of Articles of Association duly attested by a Public Notary.

1.2.2 To become eligible for issue of bid, the bidders shall have to furnish an affidavit as under:

I/We undertake and confirm that eligible similar works(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 bidding in PWD 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. (Scanned copy to be uploaded at the time of submission of bid).

1.2.3 It will be mandatory for non CPWD contractors to upload the work experience certificate(s) and the affidavit as per the provisions of clause 1.2.1 & 1.2.2.

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 <https://govtprocurement.delhi.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 12(Twelve) 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 the work.**

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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 & conditions of contract to be complied with and other necessary documents except **Standard General Conditions of Contract Form 2019 for Maintenance Works** can be seen from website <https://govtprocurement.delhi.gov.in> free of cost. The standard publications like General Conditions of Contract, Delhi Schedule of Rates 2016 (for Civil & Electrical) specifications for Civil & Electrical works and **Delhi Analysis of Rates 2016 (for Civil & Electrical)** with amendments / correction slips up to the last date of submission of bid can be seen free of cost from website <https://govtprocurement.delhi.gov.in> or cpwd.gov.in.
6. After submission of the bid, the contractor can re-submit revised bid any number of times but before last time and date of submission of tender as notified.
7. While submitting the revised bid, contractor can revise the rate of one or more item(s) any number of times (he need not re-enter rate of all the items) but before last time and date of submission of tender as notified.
8. When bids are invited in three stage system and if it is desired to submit revised financial bid, then it shall be mandatory to submit revised financial bid. If not submitted then the bid submitted earlier shall become invalid.
9. Earnest Money in the form of Treasury Challan or Demand Draft or Pay order or Banker's Cheque or Deposit at Call Receipt or Fixed Deposit Receipt **(drawn in favour of "Executive Engineer, CBMD M-131(N), PWD")**. shall be scanned and uploaded to the e-Tendering website within the period of bid submission.

The Original EMD should be deposited either in the office of Executive Engineer inviting bids or division office of any Executive Engineer, PWD within the period of bid submission. The EMD document receiving Executive Engineer (including NIT issuing EE) shall issue a receipt of deposition of earnest money deposit to the bidder in a prescribed format (prescribed in **GCC-2019 (For Maintenance Works)** with up to date amendments up to last date of submission of bid) uploaded by tender inviting EE in the NIT. The receipt shall also be uploaded to the e-tendering website by the intending bidder up to 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 Rs. 20 lakh, whichever is less, shall have to be deposited in shape prescribed above, and balance may be deposited in shape of Bank Guarantee of any scheduled bank having validity for 6 months or more, from the last date of receipt of tenders which is to be scanned and uploaded by the intending bidders.

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

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- 9A. The contractors registered prior to 01.04.2015 on e-tendering portal of CPWD shall have to deposit tender processing fee at existing rates, or they have option to switch over to the new registration system without tender processing fee any time.

The bid submitted shall be opened at 03:30 PM on

10. The bid submitted shall become invalid and e-Tender processing fee shall not be refunded if :
- The bidder is found ineligible.
 - The bidder does not upload scanned copies of all the documents including Goods and Service Tax (GST) registration) as stipulated in the bid document.
 - If any discrepancy is noticed between the documents as uploaded at the time of submission of bid and hard copies as submitted physically by the lowest tenderer in the office of tender opening authority.
 - If a tenderer does not quote any percentage above / below on the total amount of the tender or any section / sub head in percentage rate tender, the tender shall be treated as invalid and will not be considered as lowest tenderer.
11. The contractor whose bid is accepted will be required to furnish **performance guarantee of 5% (Five Percent)** of the tendered amount within the period specified in Schedule "F". **In this regard GCC-2019 for Maintenance Works with up to date corrections shall be followed.** This guarantee shall be in the form of cash (in case guarantee amount is less than Rs. 10,000/-) or deposit at call receipt of any scheduled bank/banker's cheque of any scheduled bank/Demand Draft of any scheduled bank/Pay order of any scheduled bank (in case guarantee amount is less than Rs. 1,00,000/-) or Government Securities or Fixed Deposit Receipt or Guarantee Bonds of any Scheduled bank or the State Bank of India in accordance with the prescribed form. Form of Performance Security (Guarantee) Bank Guarantee Bond shall be as per Proforma given in **GCC for CPWD Works – 2019 for Maintenance Works** and amendment there in up to last date of submission of bid.
- 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 Programme Chart (Time and Progress) within the period specified in Schedule-F.
12. The work of **Providing various LED fixtures at Paschim Vihar Group Housing Societies. (SUB HEAD - 1 : - 1.Shiva Enclave 2.Ritu Apartment 3.Anandvan 4.Balvinder Apartment 5. Nivedita Enclave 6.Supriya Apartment 7. Sahridaya Apartment 8.**

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Intending Bidders are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their tenders 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 tender. A tenderer shall be deemed to have full knowledge of the site whether he inspects it or not and no extra claims / payments 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 mentioned if any, in this tender document and local conditions and other factors having a bearing on the execution of the work.

13. The competent authority on behalf of the President of India does not bind itself to accept the lowest or any other tender and reserves to itself the authority to reject any or all the tenders received without assignment of any reason. All tenders in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the tenderer, shall be summarily rejected.
14. Canvassing whether directly or indirectly, in connection with tenderers is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be liable to rejection.
15. The competent authority on behalf of President of India reserves to himself the right of accepting the whole or any part of the tender and the tenderer shall be bound to perform the same at the rate quoted.
16. The contractor shall not be permitted to tender for works in the PWD Circle (Division in case of contractors of Horticulture/Nursery category) responsible for award and execution of contracts, in which his near relative is posted a Divisional Accountant or as an officer in any capacity between the grades of Superintending Engineer and Junior Engineer (both inclusive). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any gazetted officer in the Central Public Works Department or in the Ministry of Urban Development.

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Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of this Department.

17. No Engineer of gazetted rank or other gazetted officer employed in engineering or administrative duties in an engineering department of the Government of India is allowed to work as a contractor for a period of one year after his retirement from Government service, without the 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 tender or engagement in the contractor's service.
18. **The bid for the works shall remain open for acceptance for a period of thirty (30) Days from the date of opening of tenders.** If any bidder withdraws his bid before the said period or issue of letter of acceptance, whichever is earlier, or makes any modifications in the terms and conditions of the bid which are not acceptable to the department, then the Government shall, without prejudice to any other right or remedy, be at liberty to forfeit 50% of the said earnest money as aforesaid. Further the bidder shall not be allowed to participate in the retendering process of the work.
19. This notice inviting Tender shall form a part of the contract document. The successful tenderer/contractor, on acceptance of his tender by the Accepting Authority shall within **15 days** from the stipulated date of start of the work, sign the contract consisting of:-
- The Notice Inviting bid, all the documents including additional conditions, specifications and drawings, if any, forming part of the tender as uploaded at the time of invitation of tender and the rates quoted online at the time of submission of bid and acceptance thereof together with any correspondence leading thereto.
 - General conditions of contract 2019 **for Maintenance Works** as amended/modified up to **last date of submission of bid.**
20. For Composite Tenders
- 20.1.1 The Executive Engineer in charge of the major component i.e. **Executive Engineer(E), PWD, West Electrical Division M-131 (N), PWD, 41 Rama Road, Delhi-15** will call bids for the composite work. The cost of tender document and Earnest Money will be fixed with respect to the combined estimated cost put to tender for the composite tender.
- 20.1.2 The bid document will include following **Three** components:
- Part A:- CPWD-6, CPWD-7 including schedule A, D, E & F for **electrical** component of the work, Standard General Conditions of Contract for Form-7 for **CPWD works-2019 for Maintenance Works** as amended up to last date of submission of bid.
- Part B:- Schedule A,D, E & F for civil component of the work , (SE/EE in charge of major component shall also be competent authority under clause 2 and clause 5 as mentioned in the schedule A,D, E & F for major components) General/specific

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conditions, specifications and schedule of quantities applicable to Civil component of the work.

Part C:- General/ Specific conditions, specifications and schedule of quantities applicable to electrical components (s) of the work.

- 20.1.3 The bidder shall associate himself with agencies as per NIT conditions.
- 20.1.4 The eligible bidders shall quote rates for all items of major component as well as for all items of minor components of work.
- 20.1.5 After acceptance of the bid by competent authority, the EE in charge of major (Electrical) 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 competent and has also to sign one or two more copy of agreement for EE in charge of minor components. One such signed set of agreement shall be handed over to EE in charge of minor components. EE of major component will operate Part -A and Part -C of the agreement EE in-charge of electrical component (s) shall operate Part B and Part-A of the agreement.
- 20.1.6 Entire work under the scope of composite tender including major and all minor components shall be executed under one agreement.
- 20.1.7 Security Deposit will be worked out corresponding to the estimated cost of the composite work including Civil & Electrical works.
- 20.1.8 The main contractor has to associate agency (s) for minor components(s) conforming to eligibility criteria as defined in the bid document and has to submit details of such agency (s) to Engineer-in-charge of minor component (s) within prescribed time. Name of agency (s) to be associated shall be approved by Engineer-in-charge of minor component (s).
- 20.1.9 In case the main contractor intends to change any of the agency/agencies for minor component or specialized component of work, during the operation of the contract, he shall obtain prior approval of Engineer-in-charge of the respective component. The new agency/agencies shall also have to satisfy the laid down eligibility criteria. In case Engineer-in-charge is not satisfied with the performance of any agency, he can direct the contractor to change the agency executing such items of work and this shall be binding on the contractor.
- 20.1.10 The main contractor has to enter into agreement with contractor(s) associated by him for execution of minor component(s). Copy of such agreement shall be submitted to EE in charge of each minor component as well as to EE in charge of major component. In case of change of associate contractor, the main contractor has to enter into agreement with the new contractor associated by him.
- 20.1.11 Running payment for the major component shall be made by EE of major discipline to the main contractor. Running payment for minor components shall be made by the Engineer-in-charge of the discipline of minor component directly to the main contractor.

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- 20.1.12A The composite work shall be treated as complete when all the components of the work are complete. The completion certificate of the composite work shall be recorded by Engineer-in-charge of major component after recording of completion certificate of all other components.
- 20.1.12B Final bill of whole work shall be finalized and paid by the EE of major component. Engineer- in -charge of minor component will prepare and pass the final bill for their component of work and pass on the same to the EE of major component for including in the final bill for composite contract.
21. Performa for various securities/ guarantee bonds etc. are given in tender document. In case performa for any work/ Item/ security/ guarantee bond etc. is not prescribed in NIT , contractor shall get it approved from Engineer-in-Charge before submitting to Engineer –in – charge.
22. Engineer-in-Charge shall deduct TDS, Income tax, Labour cess and **GST(Goods & Service Tax 2017)** etc. as per prevailing Government instructions / orders from the total payment made to contractor in pursuance of this contract. This TDS shall also be deducted on advance payment to be adjusted in future bills and on the amount of cost escalation. The TDS certificate shall be issued by the Engineer-in-Charge to the contractor in form GST form as applicable within 28 days from the end of the month in which tax has been deducted.
23. In the tender document, the word “CPWD” shall include “PWD (GNCT Delhi)” wherever exists.

**Executive Engineer (E),
West Electrical Division M-131 (N),
PWD, 41 Rama Road, Delhi-15**

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PUBLIC WORKS DEPARTMENT

GOVERNMENT OF NCT DELHI

STATE: -DELHI

ZONE: - NORTH (M)

CIRCLE: - West (M)

BRANCH: -B&R

DIVISION:- E.E. West Electrical Division

PERCENTAGE RATE TENDER & CONTRACT FOR WORKS

1. Tender for the work of: - Providing various LED fixtures at Paschim Vihar Group Housing Societies. (SUB HEAD - 1 : - 1.Shiva Enclave 2.Ritu Apartment 3.Anandvan 4.Balvinder Apartment 5. Nivedita Enclave 6.Supriya Apartment 7. Sahridaya Apartment 8. Priyadarshani Apartment 9. Trivni Apartment 10. Sakshar Apartment 11. Maitri Apartment 12. Shubniketan) (SUB HEAD - 2 : -1.Navbharat Apartment 2. Manav Apartment 3. J.K. Apartment 4. Anuradha Apartment 5. Ashoka Apartment 6. Adarsh Apartment 7. Gasta Housing Complex 8. Raksha Kunj 9. Pink Apartment 10. Milap Apartment 11. Shubam Apartment 12. CA Apartment).
- (i) To be uploaded by 15:00 hours on **----- to Executive Engineer(E), PWD, West Electrical Division M-131 (N), PWD, 41 Rama Road, Delhi-15 , at web site:<https://govtprocurement.delhi.gov.in>
- (ii) To be opened in presence of bidders who may be present *either at the place of opening of tenders (electronically) or can visualize to process online* at **..... P.M. on **----- in the office of Executive Engineer(E), PWD, West Electrical Division M-131 (N), 41 Rama Road, Delhi-15.

Released to website:<https://govtprocurement.delhi.gov.in> at Tender I.D. No.**

Signature of officer releasing the documents**

Designation : **Executive Engineer**

Date of Release:**

*** To be filled in by the Executive Engineer***TENDER**

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)**E. E. (P)**

I/We have read and examined the notice inviting tender, schedule A, D, E & F applicable specifications, 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 condition of contract and all other contents in the tender document for the work.

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

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

A sum of*..... is hereby forwarded in the form of Treasury Challan or Demand Draft or Pay order or Banker's Cheque or Deposit at Call Receipt or Fixed Deposit Receipt of any Scheduled Bank **(drawn in favour of "Executive Engineer, CBMD M-131(N), PWD")** and Rs.*/- in the shape of Bank Guarantee issued by a Scheduled Bank as earnest money. 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 the work as specified, I/We agree that President of India or his successors in office shall, without prejudice to any other right or remedy available in law, be at liberty to forfeit the said earnest money and the performance guarantee absolutely, otherwise the said earnest money shall be retained by him towards security deposit to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to therein and to carry out such deviations as may be ordered, upto maximum of the percentage mentioned in Schedule "F" and 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 both Earnest Money and 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 PWD in future forever. Also, if such a violation comes to the notice of Department before date of start of work, the Engineer-in-Charge shall be free to forfeit the entire amount of Earnest Money Deposit/Performance Guarantee.

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

*

Dated*

Signature of Contractor
Postal Address....*

Witness:

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)

E. E. (P)

Address: *


Occupation:

.....* to be filled in by contractor

ACCEPTANCE

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

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

- i) 
- ii)**
- iii)

For & on behalf of the President of India

Signature.....**

Dated**

Designation:

**Executive Engineer (E),
West Electrical Division M-131 (N),
PWD, 41 Rama Road, Delhi-15**

(** to be filled by EE)

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)

E. E. (P)

PERFORMA OF SCHEDULES

FOR ELECTRICAL WORK (MAJOR COMPONENT OF WORK)

SCHEDULE 'A'

Schedule of quantities

- (a) For Electrical component of work attached at pages 151 to 181

SCHEDULE 'D'

Extra schedule for specific requirement/documents for the work, if any

----- NIL -----

SCHEDULE 'E'

1. *Reference to General Conditions of contract :* **General Conditions of contract for Central PWD: GCC 2019 for Maintenance Works, Form-7** for CPWD works as amended upto last date of submission of bid

2. **Name of :** Providing various LED fixtures at Paschim Vihar Group Housing Societies. (SUB HEAD - 1 : - 1.Shiva Enclave 2.Ritu Apartment 3.Anandvan 4.Balvinder Apartment 5. Nivedita Enclave 6.Supriya Apartment 7. Sahridaya Apartment 8. Priyadarshani Apartment 9. Trivni Apartment 10. Sakshar Apartment 11. Maitri Apartment 12. Shubniketan) (SUB HEAD - 2 : -1.Navbharat Apartment 2. Manav Apartment 3. J.K. Apartment 4. Anuradha Apartment 5. Ashoka Apartment 6. Adarsh Apartment 7. Gasta Housing Complex 8. Raksha Kunj 9. Pink Apartment 10. Milap Apartment 11. Shubam Apartment 12. CA Apartment).

- i. **Estimated cost of work:** Rs. 2,16,56,278/-
- ii. **Earnest Money** Rs. **4,33,126/-** (To be returned after receiving performance guarantee)
- iii. **Performance Guarantee** 5% of tendered value

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)

E. E. (P)

iv. Security Deposit

2.50% of tendered value

SCHEDULE 'F' (FOR ELECTRICAL COMPONENT OF WORK)**General Rules & Directions :**

Officer inviting tender

Executive Engineer (E), PWD, West Electrical
Division M-131 (N), 41 Rama Road, Delhi-15

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

See Below

Definitions

2(v) Engineer-in-charge

Executive Engineer (E), PWD, West Electrical
Division M-131 (N), 41 Rama Road, Delhi-15

2(viii) Accepting Authority

Superintending Engineer, West Maint. Circle,
PWD (GNCTD)

2(x) Percentage on cost of materials and labour to cover all profits & overheads.

15%

2(xi) Standard schedule of Rates

DSR 2016 with correction slips upto last date of submission of bid.

2(xii) Department

Public Works Department (GNCTD)

9 (ii) Standard CPWD contract Form

GCC 2019 for Maintenance Works, Form-7 for CPWD works as amended up to last date of submission of bid.**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 including Provident Fund Code No. or proof of applying thereof from date of issue of letter of acceptance. 7 Days
- (ii) Maximum allowable extension with late fee @ 0.1% of performance guarantee amount per day beyond the period provided in (i) above 7 Days

Clause -2

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)**E. E. (P)**

Authority for fixing compensation under clause -2	Superintending Engineer, West Maint. Circle, PWD(GNCTD)
Clause 5	
Number of days from the date of issue of letter of acceptance for reckoning date of start mile stone (s) as per table given below	14 Days

<u>Mile Stones of the Contract</u>			
S. No.	Description of mile stone (Financial)	Time allowed from date of start of work	Amount to be withheld in case of non achievement of mile stone
1	Financial progress of the work 10% of tendered value	10 Days	1.25% of accepted tendered amount
2	Financial progress of the work 25% of tendered value.	20 Days	1.25% of accepted tendered amount
3	Financial progress of the work 65% of tendered value	40 Days	1.25% of accepted tendered amount
4	Financial progress of the work 100% of tendered value	60 Days	1.25% of accepted tendered amount

The withheld amount due to non-achievement of mile stone may be released if the subsequent mile stone is achieved in the specific time.

Note : intending tenderer may submit physical activities/mile stones on the basis of their resources and methodology at the time of tendering corresponding to physical mile stones /stages as indicated in the above table. These shall be formed part of agreement after approval of the accepting authority, otherwise it would be assumed that agency agrees with the above mentioned physical mile stones.

Time allowed for execution of work	02 Months
------------------------------------	------------------

	Authority to decide		
(i)	Extension of time	:	Executive Engineer (E), PWD, West Electrical Division M-131 (N), 41 Rama Road, Delhi-15
(ii)	Rescheduling of mile stones	:	Superintending Engineer, West Maint. Circle, PWD(GNCTD)
(iii)	Shifting of date of start in case of delay in handing over of site	:	Superintending Engineer, West Maint. Circle, PWD(GNCTD)

Clause 5.1 (i)

(a) Schedule of Handing over of site.

Part	Portion of site	Description	Time period for handing over reckoned from date of issue of letter of intent
1	2	3	

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)

E. E. (P)

Site is available			
(b) Schedule of issue of Designs.			
Part	Portion of site	Description	Time period for handing over reckoned from date of issue of letter of intent
1	2	3	
Not Applicable			
5.1(iii)	Recovery in case of delay in submission of monthly progress report	:	Rs. 7000/- per week

CLAUSE 7

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

Rs. 54.15 Lakhs (For Electrical Works)

CLAUSE 7A

Whether clause 7A is applicable

:

Yes

CLAUSE 10A

Electrical work	
As per site requirement and direction of Engineer-in-Charge.	
CLAUSE 10B (ii)	Not Applicable
CLAUSE 10C	Not Applicable
Component of labour expressed as % of value of work	-

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)

E. E. (P)

CLAUSE 10CA		Not Applicable	
Material covered	Nearest Material (other than cement, reinforcement bars & structural steel) for which all India wholesale price index to be followed	Base Price (excluding GST) and its corresponding period of all the materials covered under clause 10CA	
-----	-----	-----	-----
CLAUSE 10CC	Not applicable		
CLAUSE 11			
Specification to be followed for execution of work	<div>(i) General Specifications for Electrical Works (Part-III-LIFTS & Escalators) - 2003</div> <div>(ii) General Specifications for Heating, Ventilation & Air-Conditioning(HVAC) - 2004</div> <div>(iii) General Specifications for Electrical Works - Internal - 2005</div> <div>(iv) Amendment in CPWD General Specifications for Electrical Works Part I Internal - 2013.</div> <div>(v) CPWD General Specifications for Electrical Works Part I Internal - 2013.</div> <div>(vi) CPWD General Specifications for Electrical Works Part IV Sub Station – 2013.</div> <div>(vii) CPWD General Specifications for Electrical Works Part VII D.G. Sets - 2013.</div> <div>(viii) CPWD General Specifications for Electrical Works Part VIII Gas Based Fire Extinguishing System - 2013</div> <div>(ix) Amendment in General specifications for Heating, Ventilation & Air-Conditioning(HVAC) - 2017</div> <div>(x) General Specifications for Heating, Ventilation & Air-Conditioning(HVAC) - 2017</div> <div>(xi) CPWD General Specifications for Electrical Works Part VI Fire Detection and Alarm System – 2018.</div> <div>with correction slips issued up to last date of submission of bid along with all relevant codes, manufacturers/suppliers specification and as per direction of Engineer-in-charge</div>		
CLAUSE 12			
Authority to decide deviation upto 1.5 times of tendered amount.....		Chief Engineer	
12.2. & 12.3 :-	Deviation Limit beyond which clauses 12.2 & 12.3 shall apply for Building works	50% (Fifty Percent)	
12.5	(i) Deviation limit beyond which clauses 12.2. & 12.3 shall apply for Foundation work (except items mentioned in earth work subhead in DSR related items)	50% (Fifty Percent)	
	(ii) Deviation limit for items mentioned in earth work subhead of DSR and related items	50% (Fifty Percent)	

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)**E. E. (P)**

CLAUSE 16		
Competent Authority for deciding reduced rates.		Superintending Engineer, West Maint. Circle, PWD, Delhi
CLAUSE 18		
List of machinery, tools & plants which may be required to be deployed by the contractor at site.		
Note: Requirement of T&P mentioned else where in the document is tentative which may be changed by Engineer-in-charge as per requirement of work & site.		
Clause 19 C	Authority to decide penalty for each default	SE, West, PWD, NCTD
Clause 19 D	Authority to decide penalty for each default	SE, West, PWD, NCTD
Clause 19 G	Authority to decide penalty for each default	SE, West, PWD, NCTD
Clause 19 K	Authority to decide penalty for each default	SE, West, PWD, NCTD

Clause 25: The constitution of the Dispute Redressal Committee (DRC) is as follows:-

Constitution of Dispute Redressal Committee (DRC)	Competent Authority to appoint DRC.
<p>DRC for total claims more than Rs. 25 Lacs: Chairman - Chief Engineer (Health), PWD, GNCTD Member Secretary - Director , office of Pr. CE(M) PWD,GNCTD Member- Superintending Engineer (North), PWD (GNCTD) Superintending Engineer (West) shall present the case before DRC but shall not have any part in decision making.</p>	<p>Chief Engineer (North), PWD, GNCTD</p>
<p>DRC for total claims uptoRs. 25 Lacs: Chairman - Director, office of Pr. CE(M) PWD, GNCTD. Member Secretary - Executive Engineer (P), West Circle, PWD (GNCTD). Member- Executive Engineer, Electrical (North) Building, PWD (GNCTD) Executive Engineer (E), PWD, West Electrical Division M-131 (N), 41 Rama Road, Delhi-15 shall present the case before DRC but shall not have any part in decision making.</p>	<p>Chief Engineer (North), PWD, GNCTD</p>

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)

E. E. (P)

CLAUSE 32 (i)					
"Requirement of Technical Representative (s) and Recovery Rate" for the work					
S. No.	Requirement of Technical Staff		Minimum Experience (Years)	Designation of Technical Staff	Rate at which recovery shall be made from the contractor in the event of not fulfilling provision of clause 32(i)
	Qualification	Number of Major + Minor Component)			
1	Graduate Engineer	1	2	Project Planning/ Quality/ Site/ Billing Engineer	Rs. 15,000/- per month
	or				
	Diploma Engineer	1	5		
-----N/A-----					
"Assistant Engineer retired from Government Services those are holding Diploma will be treated at par with Graduate Engineer".					
Diploma holder with minimum 10 year relevant experience with a reputed construction co. can be treated at par with graduate Engineers for the purpose of such deployment subject to the condition that such diploma holders should not exceed 50% of requirement of degree engineers.					

	CLAUSE 38	
(i) (a)	Schedule/statement for determining theoretical quantity of cement & bitumen on the basis of Delhi Schedule of Rates	DSR 2016 with correction slips issued upto last date of submission of bid
(ii)	Variations permissible on theoretical quantities	
	(a) Cement	
	(i) for works estimated cost put to tender not more than Rs. 25 Lakhs	3 % plus/minus
	(ii) For works with estimated cost put to tender more than Rs. 25 Lakhs	2 % plus/minus
	(b) Bitumen for all works	2.5% plus only & nil on minus side
	(c) Steel reinforcement and structural steel section for each diameter, section and category	2% plus/minus

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)

E. E. (P)

	(d) All other materials	Nil
	RECOVERY RATES FOR QUANTITY BEYOND PERMISSIBLE VARIATION For All Elements	
	Excess beyond permissible limits	NIL
	Less use beyond the permissible limit	Sub standard work shall not be accepted

**Executive Engineer (E),
West Electrical Division M-131 (N),
PWD, 41 Rama Road, Delhi-15**

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)

E. E. (P)

Prescribed Format for EMD Deposition

Receipt of deposition of original EMD		
Receipt No.		date:-
1.	Name of work:-	Providing various LED fixtures at Paschim Vihar Group Housing Societies. (SUB HEAD - 1 : - 1.Shiva Enclave 2.Ritu Apartment 3.Anandvan 4.Balvinder Apartment 5. Nivedita Enclave 6.Supriya Apartment 7. Sahridaya Apartment 8. Priyadarshani Apartment 9. Trivni Apartment 10. Sakshar Apartment 11. Maitri Apartment 12. Shubniketan) (SUB HEAD - 2 : -1.Navbharat Apartment 2. Manav Apartment 3. J.K. Apartment 4. Anuradha Apartment 5. Ashoka Apartment 6. Adarsh Apartment 7. Gasta Housing Complex 8. Raksha Kunj 9. Pink Apartment 10. Milap Apartment 11. Shubam Apartment 12. CA Apartment)
2.	NIT No. :-	37/SE/West/PWD/NCTD/ 2019-20
3.	Estimated Cost:-	Rs. 2,16,56,278/-
4.	Amount of Earnest Money Deposit:-	Rs. 4,33,126/-
5.	Last date of submission of bid:-	25.11.2019 3.00 PM
6.	Name of Contractor:-	
7.	Form of EMD:-	
8.	Amount of earnest Money Deposit:-	
9.	Date of submission of EMD:-	

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

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)

E. E. (P)

TECHNICAL SPECIFICATIONS

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)**E. E. (P)**

General and Commercial

1. SCOPE:

- (i) These General Specifications indicate the requirements and precautions to be taken during the execution of Internal Electrical, LV Installation works to ensure efficient, safe, economical and practical use of materials and equipments including prevention of risks and fire hazards.
- (ii) This section covers the general & commercial requirements applicable to this works contract for Electrical Installation works.

2. RELATED DOCUMENTS:

- (i) These General Specifications shall be read in conjunction with the standard conditions of contract contained in other parts of the document and their correction slips, the tender specifications, schedule of quantities, drawings and other documents in the tender papers connected with this work.

3. WORKS INCLUDED IN THIS SECTION:

- (i) 240V. Single phase, 2 wire and 415V 3phase 4 wire Power distribution system complete.
- (ii) An adequate equipment grounding system.
- (iii) Providing, fixing, testing & commissioning of distribution boards.
- (iv) Providing, fixing, testing & commissioning of luminaries and fans.
- (v) Providing, fixing, testing & commissioning Conduit / Ducts for Communication System.
- (vi) Providing installation testing and commissioning of Split AC System

4. INTERPRETATION OF AGREEMENT:

In the interpretation of the agreement, the order of descending importance for any ambiguity or discrepancy shall be as follows:-

- (i) Schedule of Quantities read with Technical Specifications.
- (ii) Special Conditions
- (iii) Drawings.
- (iv) I.S. Codes/National Electrical Code/ latest CPWD Specifications/ B.S.S. or any other International Standard.
- (v) Clauses of Contract.
- (vi) General Directions.
- (vii) Sound Engineering practice.

Note: In case of difference between (i), (ii) & (iii) above, the stringent amongst all shall be followed.

5. DRAWINGS:

5.1 CONTRACT DRAWINGS:

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)

E. E. (P)

Contract drawings are basic but shall be closely followed as actual construction permits. Any deviations made shall be in conformity with the Architectural and other services drawings. Shop drawings shall be submitted by the contractor and got approved from the Architects / Consultant. Architectural drawings shall take precedence over contract or other services drawings as to all dimensions. Any deviations in drawings will be brought to Architects / Consultant's Notice before work is executed as directed by Architects / Consultant. Contractor shall verify all dimensions at site and bring to the notice of the Architect / Consultant any or all discrepancy or deviations noticed.

5.2 DETAILED WORKING DRAWINGS:

Detailed working drawings and detail drawings on the basis of which actual work is to be proceeded/executed will be furnished to the contractor by the Architect/Consultant from time to time. Variation of any nature from those indicated in the drawings made available to him at the tender stage which areas 'Advance Drawings' as a guide to generally describe the scheme will not entitle the contractor for claiming any additional payment, payments will be made on the actual measurement of the work done, as admissible, as per drawings, at the accepted rates entered in the Schedule of Quantities forming part of this tender document.

5.3 PREPARATION OF SHOP AND FABRICATION DRAWINGS:

All shop and fabrication drawings shall be prepared by Contractor based on the Consultant's drawing and got approved from the Architect/ Consultant. No extra payment shall be admissible to the contractor on this account.

5.4 SHOP DRAWING, MAINTENANCE MANUALS ETC.:

On the award of the work, the contractor shall immediately proceed with the preparation of detailed shop drawings, detailing the equipment that are to be installed and the ancillary works that are to be carried out. Six sets of all such working drawings shall be submitted to the Architect/Consultant for their approval to ensure that the works will be carried out in accordance with the specifications and drawings, including such changes as may have been mutually agreed upon. The basic drawings shall be received by the **Engineer-in-Charge / Architect/Consultant** for his approval within three weeks of the award of work, and complete shop/detail drawings within 6 weeks of award of work.

5.5 Any drawing issued by the **Engineer-in-Charge / Architect/Consultant** for the works are the property of the **Engineer-in-Charge / Architect/Consultant** and shall not be lent, reproduced or used on any works other than intended without the written permission of the **Engineer-in-Charge / Architect/ Consultant**.

5.6 The contractor shall provide the following drawings for approval to Architect/Consultant before commencement of supply/fabrication.

5.7 The contractor shall provide the following drawings for approval to Architect/Consultant before commencement of supply/fabrication.

5.7.1 Distribution Boards:

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)

E. E. (P)

- (i) General layout-Plan, section, elevations
- (ii) Foundation/ Fixing arrangement.
- (iii) Wiring-Power & Control

5.7.2 Internal Electrification System:

- (i) Conduit Lay-out including number and size of wire runs.
- (ii) Race way/ Bus Duct Layout
- (iii) Details of Switch Boxes

5.7.3 All drawings as indicated in various sub-heads.

6 After completion of the work the contractor shall submit one original on R.T.F & three prints of as built drawings along with 3Nos. Compact discs containing the same before the certificate of completion are issued to him. These drawing would include;

6.1 The location of all the equipment supplied & erected by the contractor.

Complete single line diagram for Normal and Emergency supplies.

6.2 Any other information the Architect/ Consultant may deem fit.

7. APPROVALS:

7.1 The contractor shall obtain all information relating to local regulations, Bye-Laws, sanction and release of electrical connection, application of any and all laws relating to his work or profession and his having to execute work as required. No additional claims shall be admissible on this account. All statutory certificates shall be provided by the contractor.

8. CODE REQUIREMENTS:

All work shall be done in accordance with the Institute of Electrical Engineers/ I S Code amended upto date/ Indian Electricity Rules.

9. MATERIALS:

All materials to be used in this work shall be new and bear the **Engineer-in-Charge / Architect/Consultant** label of approval.

9.1 **RATES:** The work shall be treated as on works contract basis and the rates tendered shall be for complete items of work inclusive of all taxes **(including works contract tax, service tax if any)**, duties, and levies etc. and all charges for items contingent to the work, such as, packing, forwarding, insurance, freight and delivery at site for the materials to be supplied by the contractor, watch and ward of all materials for the Internal E.I. work at site etc.

9.1.1 Prices quoted shall be firm.

10. TAXES AND DUTIES:

10.1 Being an indivisible works contract, GST etc. are not payable separately.

10.2 **Works contract tax**, if any, for the work shall be included within the quoted rates for the various items. The works contract tax shall be deducted from the bills of the contractor, as applicable.

10.3 **Octroi duty** shall not be paid separately for the materials supplied by the contractor.

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)

E. E. (P)

10.4 Loading and unloading at site, transportation etc. is not payable separately.

11. COMPLETENESS OF TENDER:

All sundry fittings, assemblies, accessories, hardware items, foundation bolts, termination lugs for electrical connections as required, and all other sundry items which are useful and necessary for proper assembly and efficient working of the various components of the work shall be deemed to have been included in the tender, whether such items are specifically mentioned in the tender documents or not.

12. WORKS TO BE DONE BY THE CONTRACTOR:

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

12.1.1 Cutting and making good all damages caused during installation and restoring the same to their original finish.

12.1.2 Painting at site of all exposed metal surfaces of the installation other than pre-painted items like fittings, fans, switch gear / distribution gear items, etc. Damages to finished surfaces of these items while handling and erection, shall however be rectified to the satisfaction of the Architect/Consultant.

12.1.3 Temporary shed if required over the storage space and locking arrangement thereof, and watch and ward of the materials and completed installation till completion of the work.

12.1.4 Testing and commissioning of completed installation.

13. TOOLS FOR HANDLING AND ERECTION:

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

List of tools and tackles to be confirmed by the contractor to the Site Engineer.

14. CARE OF THE BUILDING:

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

15. STRUCTURAL ALTERATIONS TO BUILDING

15.1 No structural member in the building shall be damaged/ altered, without prior approval from the **Engineer-in-Charge / Architect/Consultant**.

15.2 Structural provisions like openings, cut-outs, if any, provided for the work, shall be used. Where these require modifications, or where fresh provisions are required to be made, such contingent works shall be carried out by the contractor at his cost with prior approval of the **Engineer-in-Charge / Architect/Consultant**.

15.3 All chases required in connection with the electrical works shall be provided and filled by the contractor at his own cost to the original architectural finish of the buildings.

16. CONSTRUCTION

Temporary power distribution system at the time of construction shall be provided by the Contractor.

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)

E. E. (P)

TECHNICAL REQUIREMENTS & MEASUREMENT SYSTEM

1. SCOPE

This section covers the general technical requirements and measurement system of the various components in Internal Electrical Installation works.

1.1 TERMINOLOGY

The definition of terms shall be in accordance with **IS:732-1989** (Indian Standard Code of Practice for Electrical Wiring), except for the definitions of point, circuit, and sub-main wiring, which are defined in clauses here under.

2. POINT WIRING

2.1 Definition

A point (other than socket outlet point) shall include all work necessary in complete wiring to the following outlets from the controlling switch or MCB. The scope of wiring for a point shall, however, include the wiring work necessary in tapping from another point in the same distribution circuit and also circuit wiring from D.B. up to first tapping point. Nothing extra shall be paid for this.

Ceiling rose or connector (in the case of points for ceiling / exhaust fan points, pre-wired light fittings, and call bells).

Ceiling rose (in the case of pendants except stiff pendants). Back plate (in the case of stiff pendants).

Lamp holder (in the case of goose neck type wall brackets, batten holders and fittings which are not pre-wired) .

2.2 Scope

Following shall be deemed to be included in point wiring. Conduit, accessories for the same and wiring cables between the switch box and the point outlet. All fixing accessories such as screws, raw plug etc. as required. Metal switch boxes for control switches, regulators, and sockets etc, recessed in walls. Outlet boxes, junction boxes, pull-through boxes etc. including metal boxes if any, provided with switch boards for loose wires/ conduit terminations. Control switch or MCB, as specified. Ceiling rose or connector as required. (2 pin and 5 pin socket outlet shall not be used). Connections to ceiling rose, connector, socket outlet, lamp holder, switch etc. Inter connecting wiring between points on the same circuit, in the same switch box or from another. Protective (loop earthing) conductor from one metallic switch box to another in the distribution circuits, and for socket outlets. (The length of protective conductor run along with the circuits is included in the scope of points). Bushed conduit or porcelain tubing where wiring cables pass through wall etc.

2.3 Measurement:

2.3.1 Point Wiring (other than socket outlet points):

Unless and otherwise specified , there shall be no linear measurement for point wiring for light points, fan points, exhaust fan points and call bell points.

These shall be measured on unit basis by counting only. No separate measurement will be made for inter connections between points in the same distribution circuit and for the circuit wiring and protective (loop earthing) conductors between metallic switch boxes.

2.3.2 Point wiring for socket outlet points:

The light plug (6A) point and power (16/6A) point wiring shall be measured on unit basis. No separate measurement will be made for inter connections between points in the same distribution circuit and for the circuit wiring and protective (loop earthing) conductors between metallic switch boxes.

The power point outlet may be 16/6 A six pin socket outlet, where so specified in the

tender documents.

2.3.3 Group control points wiring:

In the case of points with more than one point controlled by the same switch, such points shall be measured in parts i.e.(a) from the switch to the first point outlet as primary point and for the subsequent points, as secondary point.

The switch for controlling four or more outlets shall be of 16 amp. Rating and no extra payment shall be made for the same.

2.3.4 Twin control light points wiring:

A light point controlled by two numbers of two way switches shall be measured as two points from the fitting to the switches on either side.

No recovery shall be made for non-provision of more than one ceiling rose or connector in such cases.

3. CIRCUIT AND SUB MAIN WIRING

3.1 Circuit wiring

Circuit wiring shall mean the wiring from the distribution board up to the tapping point for the nearest first point of that distribution circuit, viz. up to the nearest first switch box. The rate for circuit wiring is deemed to be included in the point wiring and nothing extra shall be paid for this.

3.2 Sub-main wiring

Sub-main wiring shall mean the wiring from one main/distribution switchboard to another.

3.3 Measurement of circuit and sub-main wiring

Sub-main wiring shall be measured on linear basis along the run of the wiring. The measurement shall include all lengths from end to end of conduit exclusive of inter connections inside the switch board etc. The increase on account of diversion or slackness shall not be included in the measurement.

Protective (loop earthing) conductors which are run along the sub main wiring shall be measured on linear basis and paid for separately.

4. OTHER WIRING WORKS:

Except as specified above for point wiring, circuit wiring and sub-main wiring, other types of wiring shall be measured separately on linear basis along the run of wiring depending on the actual number and sizes of wires run.

5. SYSTEM OF DISTRIBUTION AND WIRING:

5.1 Control at the point of entry of supply

There shall be a circuit breaker on each live conductor of the supply mains at the point of entry.

5.2 Distribution:

The wiring shall be done on a distribution system through main and/or branch distribution boards. The system design as well as the locations of boards shall be as indicated in BOQ/ drawings or as specified by the Architect/ Consultant.

Main distribution board shall be controlled by a circuit breaker. Each out going circuit shall also be controlled by a circuit breaker.

The branch distribution board shall be controlled by a circuit breaker. Each out going circuit shall be provided with a miniature circuit breaker (MCB) of specified rating on the phase or live conductor.

The loads of the circuits shall be divided, as far as possible, evenly between the number of ways of the distribution boards, leaving at least one spare circuit for future extension. The neutral conductors (incoming and outgoing) shall be connected to a common link (multi-way connector) in the distribution board and be capable of being disconnected

individually for testing purposes.

`Power' wiring shall be kept separate and distinct from `Lighting' wiring, from the level of circuits i.e., beyond the branch distribution boards.

Wiring shall be separate for essential loads (i.e., those fed through standby supply) and non essential loads throughout.

5.3 Balancing of Circuits:

The balancing of circuits in three wire or poly phase installations shall be arranged before hand to the satisfaction of the Architect/ Consultant.

5.4 Wiring System:

Wiring shall be done only by the "Looping system" .Phase or live conductors shall be looped at the switch boxes and neutral conductors at the point outlets.

Lights, fans and call bells shall be wired in the `lighting' circuits. 16A socket outlets and other power outlets shall be wired in the 'Power' and lighting circuits.

The wiring throughout the installation shall be such that there is no break in the neutral wire except in the form of a linked switchgear.

5.5 Run of Wiring:

The wiring shall be in recessed metallic conduit.

Due consideration shall be given for neatness, good appearance and safety.

5.6 Passing through walls or floors:

When wiring cables are to pass through a wall, these shall be taken through a protection (steel) pipe tube of suitable size such that they pass through in a straight line without twist or cross in them on either end of such holes. The ends of metallic pipe shall be neatly bushed with porcelain, PVC or other approved material.

All floor openings for carrying any wiring shall be suitably sealed after installation.

6. Joints in wiring:

No bare conductor in phase and/ or neutral or twisted joints in phase, neutral, and/or protective conductors in wiring shall be permitted.

There shall be no joints in the through-runs of cables. If the length of final circuit or sub main is more than the length of a standard coil, thus necessitating a through joint, such joints shall be made by means of approved mechanical connectors in suitable junction boxes.

Termination of multi stranded conductors shall be done using suitable crimping type thimbles.

7. RATINGS OF OUTLETS:

Incandescent lamps shall be rated at 100W.

Ceiling fans shall be rated at 60W. Exhaust fan, fluorescent tubes, compact fluorescent tubes, HPMV lamps, HPSV lamps, LED fixtures etc. shall be rated according to their capacity. Control gear losses shall also be considered as applicable.

16 A socket outlet points shall be rated at 1000W respectively, unless the actual values of loads are specified.

8. CAPACITY OF CIRCUITS:

`Lighting' circuit shall not have more than total connected load 800W and control by 6A switch or MCB for lighting & socket outlet etc.

`Power' circuit shall have only one outlet per circuit in non residential buildings.

9. CONFORMITY TO IE ACT, IE RULES, AND STANDARDS:

All electrical works shall be carried out in accordance with the provisions of Indian Electricity Act, 1910 and Indian Electricity Rules, 1956 amended up to date.

The works shall also conform to relevant Indian Standard Codes of Practice (COP) for the type of work involved.

In all electrical installation works, relevant safety codes of practice shall be followed. Guidelines on safety procedure outlined in Appendix 'C' should be adopted.

10. GENERAL REQUIREMENTS OF COMPONENTS:

10.1 Quality of materials:

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

10.2 Ratings of components

All components in a wiring installation shall be of appropriate ratings of voltage, current, and frequency, as indicated in BOQ.

All conductors, switches and accessories shall be of such size as indicated in BOQ.

10.3 Conformity to Standards

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

A broad list of relevant Indian Standards is given in Appendix 'A'. These Indian Standards, including amendments or revisions thereof upto the date of tender acceptance, shall be applicable in the respective contracts.

10.4 Interchangeability

Similar parts of all switches, lamp holders, distribution boards, switchgears, ceiling roses, brackets, pendants, fans and all other fittings of the same type shall be interchangeable in each installation.

11. CABLES:

11.1 Wiring cables

Conductors of wiring cables shall be of copper FRZHL PVC.

The smallest size of conductor for 'lighting' circuits shall have a nominal cross sectional area of not less than 1.5 sqmm. The minimum size of conductor for 'power' wiring shall be 2.5 sq mm. as per BOQ.

12. WIRING ACCESSORIES

12.1 Control switches for points

Control switches (single pole switches) carrying not more than 16A shall be of piano type / as specified, and the switch shall be "ON" when the knob is down.

For socket outlet, combined switch cum socket shall not be permitted.

The type and current rating of switch controlling a group of points, or discharge lamps, or a single large load, shall be specified in the tender documents.

Control switch shall be placed only in the live conductor of the circuit. No single pole switch or fuse shall be inserted in the protective (earth) conductor, or earthed neutral conductor of the circuit.

12.2 Socket outlets

Socket outlets shall be of, clamp on type. These shall be rated for 6A or 16A. Combined 16A six pin socket outlet shall be provided in 'power' circuits where ever specified and in kitchen area, water proof socket shall be used.

Socket outlets and plugs shall only be of 3 pin type; the third pin shall be connected to earth through protective (loop earthing) conductor.

Shutter type (interlocking type) of sockets shall be used.

The control switches for the 6A or 16A socket outlets shall be kept along with the socket outlets.

12.3 Switch box covers

These shall be of the same manufacturer as that of switches or sockets.

12.4 Lamp holders

Lamp holders may be of batten/angle/pendant or bracket holder type as indicated in BOQ. The holder shall be made of brass and shall be rigid enough to maintain shape on application of a nominal external pressure. There should be sufficient threading for fixing the base to the lamp holder part so that they do not open out during attention to the lamp or shade.

Lamp holders for use on brackets and the like shall have not less than 1.3 cm nipple, and all those for use with flexible pendant shall be provided with cord grips.

All lamp holders shall be provided with shade carriers.

13. FITTINGS:**13.1 Types:**

The type of fittings shall be as specified in BOQ.

13.2 Indoor type fittings

The conductors are required to be drawn through tube popularly known as conduit. The tube or channel must be free from sharp angles or projecting edge, and of such size as will enable them to be wired with the conductors used for the final circuit without removing the braiding or sheathing. As far as possible all such tubes or channels should be of sufficient size to permit looping back.

Fittings using discharge lamps shall be complete with power factor correction capacitors, either internally or externally. An earth terminal with suitable marking shall be provided for each fitting for discharge lamps.

14. SWITCH GEAR AND CONTROL GEAR – General aspects:

All items of switchgear and distribution boards (DBs) shall be metal clad type.

The types, ratings and/ or categories of switchgear and protective gear shall be as specified in the BOQ.

RCCBs (ELCBs) where specified, shall conform to the requirements of current rating, fault rating, single phase or three phase configuration and sensitivity laid down in the BOQ.

While each outgoing way of distribution board (DB) shall be of miniature circuit breaker (MCB) as specified, and of suitable rating on the phase conductor, the corresponding earthed neutral conductor shall be connected to a common neutral

terminal block and shall be capable of being disconnected individually for testing purposes.

14.1 Independent earth terminal block:

Every distribution board (single phase as well as 3 phase) shall have an earth terminal block identical to, but independent from neutral terminal block, to enable termination of protective (loop earthing) conductors (incoming as well as outgoing) individually by screwed connection and without twisting.

Earthing terminal (1 for single phase and 2 for 3 phase) shall be provided on the metal cladding of switches and DBs for body earthing. These shall be suitably marked.

Knock out holes, with or without end plates as per standard design of manufacturers shall be provided in the metal cladding of switches and DBs for termination of conduits/cables.

15. PRE-WIRED MCB DISTRIBUTION BOARDS:

Prewired MCB DBs shall be provided only where specified.

The complete board shall be factory fabricated and shall be duly pre-wired in the

works, ready for installation at site.

The board shall be of wall mounted, cubical type construction, fabricated out of 1.6mm thick sheet steel, with stove enameled paint finish.

The board shall also be provided with a loose wire box as a compartment for the complete width and, depth of the board, and of minimum height of 125 mm in case of TPN DB's, and 100mm in case of SPN DB's.

The board shall be provided with a hinged cover of 1.6mm thick sheet steel in the front. Only the knobs of the MCBs shall protrude out of the front covers through openings neatly machine made for the purpose.

Knock out holes at the bottom, and detachable plate with knock out holes at the top of the board shall be provided.

Each distribution board shall be provided with a circuit list giving details of each circuit which it controls and the current rating of the circuit, and the size of the MCB.

The board shall be complete with the following accessories:-

- (a) 200 A copper bus bar(s).
- (b) Neutral link.
- (c) Common earth bar.
- (d) DIN bar for mounting MCBs.
- (e) **Elemex** type terminal connectors suitable for incoming and outgoing cables.
- (f) A set of indication lamps with HRC cartridge fuses for each phase of the incoming supply.
- (g) Earthing stud(s).

The board shall be fully prewired with single core PVC insulated copper conductors/insulated solid copper links, and terminated on to extended type terminal connectors, suitable for connections to the sizes of the respective conductors.

All incoming and outgoing wiring to the prewired MCB DB's shall be terminated only in the Elemex type extended terminal connectors to be provided within the DB. The terminal connectors shall, therefore, be so provided as to facilitate easy cable connections and subsequent maintenance.

A common copper earth bar shall be provided within the loose wire box. The common neutral bar as well as the terminal connectors shall, however, be provided within the main compartment just below the loose wire box.

16. MINIATURE CIRCUIT BREAKERS (MCB's):

'B' series MCB's shall be used only for normal 'lighting' circuits.

'C' series MCB's as per BOQ shall be invariably used for motor loads, halogen lamp fittings, sodium/mercury discharge lamps and all 'power' circuits.

Ratings (A), number of poles, type as MCB or isolator, etc. shall be as specified in the BOQ. The MCB's shall be of minimum 10KA rupturing capacity.

17. SWITCH BOARD LOCATIONS

17.1 General aspects

Switch boards shall be located as indicated on the drawings.

18. SWITCH BOARD INSTALLATION:

A switch board shall not be installed so that its bottom is within 1.10 m above the floor.

Where it is required to terminate a number of conduits on a board, it may be convenient to provide a suitable MS adopter box for the purpose. Such boxes shall be provided with the prior approval of the **Engineer-in-Charge/Architect/Consultant** and this will not be paid for separately.

All wires to the boards shall be bushed at the entries to avoid damage to insulation. No apparatus shall project beyond any edge of the panel.

All unused holes in the boards and in the mountings shall be plugged suitably to avoid entry of insects.

19. WIRING OF SWITCH BOARDS AND DISTRIBUTION BOARDS:

All connections between pieces of apparatus, or between apparatus and terminals on a board shall be neatly arranged in a definite sequence, following the arrangement of the apparatus mounted thereon, avoiding unnecessary crossings.

Cables shall be connected to terminals either by crimped or soldered lugs, unless the terminals are of such a form that they can be securely clamped without cutting away of cable strands.

All bare conductors shall be rigidly fixed in such a manner that a clearance of at least 2.5 cm is maintained between conductors of opposite polarity or phase, and between the conductors and any material other than insulating material.

The incoming and outgoing cables shall be neatly bunched and shall be fixed in such a way that the door shall be capable of swinging through an angle of not less than 90 degrees.

20. MARKING OF APPARATUS:

20.1 Marking of earthed neutral conductor

On the switchgear, the earthed conductor of a two wire system, or an earthed neutral conductor of a multi-wire system, an indication of a permanent nature shall be provided to identify the earthed neutral conductor. In this connection Rule 32(1) of Indian Electricity Rules 1956 (see Appendix C) shall be referred to. The neutral conductor shall be black in colour.

20.2 Main earthing terminal

The main earthing terminal in the main switch board shall be permanently marked as "SAFETY EARTH - DO NOT REMOVE".

All distribution boards shall be marked 'L' for lighting or 'P' for power and 'E' for essential as the case may be.

When a board is connected to a voltage higher than 250V, all the terminals or leads of the apparatus mounted on it shall be marked in the following colours to indicate the different poles or phases to which the apparatus or its different terminals may have been connected:

Three phases - Red, Yellow & Blue AND Neutral - Black only.

Where a four wire, three phase wiring is done, the neutral shall preferably be in one colour, and the other three wires in another colour.

All marking required under this rule shall be clear and permanent.

21. ATTACHMENT OF FITTINGS AND ACCESSORIES:

21.1 Conduit wiring system

All accessories like switches, socket outlets, call bell pushes and regulators shall be fixed in flush pattern inside the switch/regulator boxes. Accessories like ceiling roses, brackets, batten holders, etc. shall be fixed on metal outlet boxes. The fan regulators shall also be fixed in metal outlet boxes.

Cadmium plated brass screws shall be used to fix the accessories to their bases.

The switch box / regulator box shall be mounted with their bottom 1.25m from floor level, unless otherwise directed by the Architect/Consultant.

Dash fasteners shall be used for fixing to walls or ceiling.

22. FANS REGULATORS AND CLAMPS:

22.1 Ceiling fans

Ceiling fans including their suspension shall conform to relevant Indian Standards.

All ceiling fans shall be wired to ceiling roses or to special connector boxes, and suspended from hooks or shackles, with insulators between hooks and suspension rods. There shall be no joint in the suspension rod.

Recessed type fan clamp inside a metallic box as shown in tender drawings shall be used.

Canopies on top of suspension rod shall effectively hide the suspension. All ceiling fans shall be hung 2.75m above the floor.

In the case of measurement of extra down rod for ceiling fan including wiring, the same shall be measured in units of 10cm. Any length less than 5cm shall be ignored.

The wiring of extra down rod shall be paid as supplying and drawing cable in existing conduit.

22.2 Exhaust fans:

Exhaust fans shall conform to relevant Indian Standards.

Exhaust fans shall be erected at the places indicated on the drawings. For fixing an exhaust fan, a circular hole shall be provided in the wall to suit the size of the frame, which shall be fixed by means of rag bolts embedded in the wall. The hole shall be neatly plastered to the original finish of the wall. The exhaust fan shall be connected to the exhaust fan point, which shall be wired as near to the hole as possible, by means of a flexible cord, care being taken to see that the blades rotate in the proper direction.

22.3 Regulators:

The metallic body of regulators of ceiling fans/ exhaust fans shall be connected to earth by protective conductor.

23. WORKMANSHIP:

Good workmanship is an essential requirement to be complied with the entire work of manufacture/ fabrication, assembly and installation shall conform to sound engineering practice.

The work shall be carried out under the direct supervision of a first class licensed foreman, or of a person holding a certificate of competency issued by the State Govt. for the type of work involved, employed by the contractor, who shall rectify then and there the defects pointed out by the **Engineer-in-Charge/Architect/Consultant** during the progress of work.

24. COMMISSIONING ON COMPLETION:

Before the work man leaves the work finally, he must make sure that the installation is in commission, after due testing.

25. COMPLETION PLAN AND COMPLETION CERTIFICATE:

Completion certificate after completion of work as required by Engineer-in-Charge shall be submitted to the **Engineer-in-Charge/Architect/Consultant**.

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 distribution boards, indicating the circuit numbers controlled by them.
- (c) Position of all points and their controls.
- (d) Types of fittings, viz. fluorescent, pendants, brackets, bulk head, etc. fans and exhaust fans.

26. DRAWINGS

The work shall be carried out in accordance with the drawings enclosed with the tender documents and also in accordance with modification there to from time to time as approved by the **Engineer-in-Charge/Architect/Consultant**.

All circuits shall be indicated and numbered in the wiring diagram and all points shall be given the same number as the circuit to which they are electrically connected.

Metallic Conduit Wiring System

1. SCOPE:

This section covers the detailed requirements for wiring work in metallic conduits.

2. MATERIALS

2.1 Conduits

All rigid conduit pipes shall be of **steel** and be ISI marked. The wall thickness shall be not less than 1.6 mm (16 SWG) for conduits upto 32 mm dia. and not less than 2 mm (14 SWG) for conduits above 32 mm dia. These shall be solid drawn or reamed by welding, and finished with stove enameled surface or as per BOQ.

The maximum number of PVC insulated cables conforming to **IS:694-1990** that can be drawn in one conduit is given size wise in Table I, and the number of cables per conduit shall not be exceeded. Conduit sizes shall be selected accordingly in each run.

No steel/ G.I. conduit less than 20mm in diameter shall be used.

2.2 Conduit accessories

The conduit wiring system shall be complete in all respects, including their accessories. All conduit accessories shall be of threaded type, and under no circumstances ping rip type or clamp grip type accessories shall be used.

Bends, couplers etc. shall be solid type.

2.3 Outlets

The switch box or regulator box shall be made of sheet metal on all sides, except on the front. The wall thickness shall not be less than 1.2mm (18gauge) for boxes upto a size of 20 cm X 30 cm, and above this size 1.6 mm (16 gauge) thick wall thickness MS boxes shall be used. The metallic boxes shall be duly painted with anticorrosive paint before erection/fixing.

Where a large number of control switches and/or fan regulators are required to be installed at one place, these shall be installed in more than one outlet box adjacent to each other for ease of maintenance.

An earth terminal with stud and 2 metal washers shall be provided in each MS box for termination of protective conductors and for connection to socket outlet/metallic body of fan regulator etc.

Clear depth of the box shall not be less than 60 mm, and this shall be increased suitably to accommodate mounting of fan regulators in flush pattern.

3. INSTALLATION:

3.1 Conduit joints.

The conduit work of each circuit or section shall be completed before the cables are drawn in.

Conduit pipes shall be joined by means of screwed couplers and screwed accessories only. Threads on conduit pipes in all cases shall be between 13 mm to 19 mm long, sufficient to accommodate pipes to full threaded portion of couplers or accessories.

Cut ends of conduit pipes shall have no sharp edges, nor any burrs left to avoid damage to the insulation of the conductors while pulling them through such pipes.

The **Engineer-in-Charge/Architect/Consultant**, with a view to ensuring that the above provision has been carried out, may require that the separate lengths of conduit etc., after they have been prepared, shall be submitted for inspection before being fixed.

No bare threaded portion of conduit pipe shall be allowed, unless such bare threaded portion is treated with anticorrosive preservative or covered with approved plastic compound.

3.2 Bends in conduit

All necessary bends in the system, including diversion, shall be done either by neatly bending the pipes without cracking with a bending radius of not less than 7.5 cm, or alternatively, by inserting suitable solid type normal bends, elbows or similar fittings, or by fixing MS inspection boxes, whichever is most suitable for the particular situation.

No length of conduit shall have more than the equivalent of four quarter bends from outlet to outlet.

3.3 Outlets

All outlets such as switches, wall sockets etc. shall be flush mounting type.

All switches socket outlets and fan regulators shall be fixed on sheet cover of the same manufacturer as that of the accessories.

3.4 Painting after erection

After installation, all accessible surfaces of conduit pipes, fittings, switch and regulator boxes etc. shall be painted in compliance with the clauses under section - 'Painting'.

4. Additional requirements

4.1 Making chase

The chase in the wall shall be neatly made, and of ample dimensions to permit the conduit to be fixed in the desired manner.

The conduits shall be buried in the wall before plastering, and shall be finished neatly after erection of conduit.

4.2 Fixing conduits in chase

The conduit pipe shall be fixed by means of staples, J-hooks, or by means of saddles, not more than 60 cm apart.

All threaded joints of conduit pipes shall be treated with approved preservative compound to secure protection against rust.

4.3 Fixing conduits in RCC work

The conduit pipes shall be laid in position and fixed to the steel reinforcement bars by steel binding wires before the concreting is done. The conduit pipes shall be fixed firmly to the steel reinforcement bars to avoid their dislocation during pouring of cement concrete and subsequent tamping of the same.

Fixing of standard bends or elbows shall be avoided as far as practicable, and all curves shall be maintained by bending the conduit pipe itself with a long radius which will permit easy drawing in of conductors.

Location of inspection / junction boxes in RCC work should be identified by suitable means to avoid unnecessary chipping of the RCC slab subsequently to locate these boxes.

4.4 Fixing inspection boxes

Suitable inspection boxes to the minimum requirement shall be provided to permit inspection, and to facilitate replacement of wires, if necessary.

These shall be mounted flush with the wall or ceiling concrete. Minimum 65 mm depth junction boxes shall be used in roof slabs and the depth of the boxes in other places shall be as per **IS:2667-1977**.

Suitable ventilating holes shall be provided in the inspection box covers.

4.5 Fixing switch boxes and accessories

Switch boxes shall be mounted flush with the wall. All outlets such as switches, socket outlets etc. shall be flush mounting type.

4.6 Fish wire

To facilitate subsequent drawing of wires in the conduit, GI fish wire of 1.2 mm (18 SWG) shall be provided along with the laying of the recessed conduit.

4.7 Bunching of cables

Cables shall always be bunched so that the outgoing and return cables are drawn into the same conduit.

Where the distribution is for three phase loads only, conductors for all the three phases and neutral wire shall be drawn in one conduit.

All the floor conduit shall be GI fabricated & the rest shall be MS.

5. Earthing requirements

The entire system of metallic conduit work, including the outlet boxes and other metallic accessories, shall be mechanically and electrically continuous by proper screwed joints, or by double check nuts at terminations. The conduit shall be continuous when passing through walls or floors.

Protective (loop earthing) conductor(s) shall be laid along the runs of the conduit between the metallic switch boxes and the distribution boards/ switch boards, terminated thereto. These conductors shall be of such size and material as specified. Depending upon their size and material, the protective earth conductors shall be either drawn inside the conduits along with the cables, or shall be laid external to the conduits. When laid external to the conduits, this shall be properly clamped with the conduit at regular intervals.

The protective conductors shall be terminated properly using earth studs/ earth terminal block etc. as required.

Gas or water pipe shall not be used as protective conductor (earth medium).

TABLE - I

Maximum number of PVC insulated 650/1100 V grade copper conductor cable conforming to IS:694-1990 which can be drawn through a conduit

Nominal cross-sectional area of conductor in sq. mm.	20mm		25 mm		32 mm		38 mm		51 mm		64 mm	
	S B		S B		S B		S B		S B		SB	
1	2	3	4	5	6	7	8	9	10	11	12	13
1.50	5	4	8	6	15	10	-	-	-	-	-	-
2.50	4	2	6	4	10	8	-	-	-	-	-	-
4	2	-	4	4	8	6	-	-	-	-	-	-
6	2	-	4	3	6	5	-	-	-	-	-	-
10	-	-	3	2	5	4	6	5	-	-	-	-
16	-	-	2	2	3	3	5	4	9	6	11	7
25	-	-	-	-	3	2	5	3	8	6	9	7
35	-	-	-	-	-	-	3	2	6	5	8	6

Note :

The above table shows the maximum capacity of conduits for a simultaneous drawing in of cables.

The columns headed 'S' apply to runs of conduits which have distance not exceeding 4.25 m between draw in boxes and which do not deflect from the straight by an angle of more than 15 degrees. The columns headed 'B' apply to runs of conduit which deflect from the straight by an angle of more than 15 degrees at 4.25 m distance. Conduit sizes are the nominal external diameters.

PAINTING

1. SCOPE

This section covers the requirements of painting work in internal electrical installations, carried out manually by brush. This does not cover spray painting work of factory made items.

2. PAINTING WORK IN GENERAL

2.1 Paints

Paints, oils, varnishes etc. of approved make in original tin to the satisfaction of the Architect/Consultant shall only be used.

2.2 Preparation of the surface

The surface shall be thoroughly cleaned and made free from dust or foreign matter before painting is started. The proposed surface may be inspected by the Engineer-in-Charge/Architect/Consultant before the paint is applied.

2.3 Application

Paint shall be applied with brush. The paint shall be spread as smooth and even as possible. Particular care shall be paid to rivets, nuts, bolts and over-lapping. Before drawing out in smaller containers, it shall be continuously stirred with a smooth stick, while painting work is taken up.

Primer coat of anti-corrosive paint shall be given in the case of steel work, after the surface. In all cases of painting work, finishing shall be with 2 coats of paint in approved shade.

Each coat shall be allowed to dry out sufficiently before a subsequent coat is applied.

2.4 Precautions

All furniture, fixtures, glazing, floors etc. shall be protected by suitable covering. All stains, smears, splashing, dropping etc. shall be removed. While painting of conduits etc. it shall be ensured that the painting of wall and ceiling etc. is not spoiled in any way.

3. PAINTING OF CONDUITS AND ACCESSORIES

Requirement of painting of metallic conduits before installation on surface shall be met as per clause 3.3.(iv)

Cables: -

1. MEDIUM AND LOW PRESSURE:

Cables should be steel armored XLPE insulated PVC sheathed with fire retardant compound Aluminum conductor conforming to the quality as specified in the schedule of work. All cables, accessories and other materials should conform to I S Specification. The jointing work should be carried out by a competent authorized cable jointer.

2. LAYING OF CABLES:

All cables shall be laid as per C.P.W.D GENERAL SPECIFICATIONS FOR ELECTRICAL WORKS (PART-II EXTERNAL) - 2005 with amendments upto last date of submission of bids.

3. TESTING THE CABLES:

All cables shall be tested as per C.P.W.D GENERAL SPECIFICATIONS FOR ELECTRICAL WORKS (PART-II EXTERNAL) - 2005 with amendments upto last date of submission of bids.

GENERAL COMMERCIAL & TECHNICAL CONDITIONS

- 1.0 All the works shall be carried out as per CPWD General specification for Electrical Works, Part-I (Internal) 2013 & Part-II (External) 1995, Part-IV Sub Station (2013) amended up to last date of submission of bids and should also comply with relevant provisions of the Indian Electricity Rules and Acts as applicable, amended up to last date of submission of bids.
- 2.0 The contractor is advised to visit the site of work to have an idea of the execution of the work; failure to do so shall not absolve their responsibility to do the work as specified in agreement.

3.0 Rates:

- 3.1. The work shall be treated as on works contract basis and the rates tendered shall be for complete items of work (except the materials, if any, stipulated for supply by the department) inclusive of all taxes (including works contract tax, GST if any), duties, and levies etc. and all charges for items contingent to the work, such as packing, forwarding, insurance, freight and delivery at site for the materials to be supplied by the contractor, watch and ward of all materials (including those supplied by the department, if any) for the work at site etc
- 3.2. Prices quoted shall be firm.

4.0 Taxes and Duties:

- 4.1. Being an individual works contract, **GST, Sales Tax, Excise Duty etc.** are not payable separately.
- 4.2. The **work contract tax** shall be deducted from the bills of the contractor as applicable in the State in which the work is carried out, at the time of payments.

5.0 Mobilization Advance:

No mobilization advance shall be paid for the work, unless otherwise stipulated in tender papers for any individual works/ composite work.

6.0 Completeness of Tender:

All sundry fittings, assemblies, accessories, hardware items, foundation bolts, termination lugs for electrical connections as required, and all other sundry items which are useful and necessary for proper assembly and efficient working of the various components of the work shall be deemed to have been included in the tender, whether such items are specifically mentioned in the tender documents or not.

7.0 Works to be arranged by the department:

Unless and otherwise specified in the tender documents, the following works shall be arranged by the Department:

8.0 Works to be done by the contractor:

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

- (i) Foundations for equipments and components where required, including foundation bolts.
- (ii) Cutting and making good all damages caused during installation and restoring

the same to their original finish.

- (iii) Sealing of all floor openings provided by him for pipes and cables, from fire safety point of view, after laying of the same.
- (iv) Painting at site of all exposed metal surfaces of the installation other than pre-painted items like fittings, fans, switchgear/distribution gear items, cubicle switchboard etc. Damages to finished surfaces of these items while handling and erection, shall however be rectified to the satisfaction of the Engineer-in-Charge.
- (v) Testing and commissioning of completed installation.
- (vi) Storage space for all equipments, components and materials for the work

9.0 Storage and Custody of Materials:

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

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

10.0 Electric Power Supply and Water Supply:

Power and water supply will be arranged by the contractor at the site for installation purpose.

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

11.0 Tools for handling and Erecting:

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

12.0 Payment Terms:

Payment shall be made as per the relevant clauses of form **PWD 7/8** forming part of the tender documents.

13.0 Co-ordination with other agencies:

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

13.1. Care of buildings:

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

14.0 Structural Alterations to Buildings:

- (i) No structural member in the building shall be damaged / altered, without prior approval from the competent authority through the Engineer-in-charge.
- (ii) Structural provisions like openings, cutouts, if any, provided by the department for the work, shall be used. Where these required modifications or fresh provisions are required to be made, such contingent works shall be carried out by the contractor at his cost.
- (iii) All such openings in floors provided by the department shall be closed by the contractor after installing the cables/conduits/rising mains etc. as the case may be, by any suitable means as approved by the Engineer-in-charge without any extra payment.
- (iv) All chases required in connection with the electrical works shall be provided and filled by the contractor at his own cost to the original architectural finish of the buildings.

15.0 Addition to an installation:

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

16.0 Work in occupied buildings:

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

17.0 Drawings:

- (i) The work shall be carried out in accordance with the drawings and the tender documents and also in accordance with modification there to from time to time as approved by the Engineer-in-charge.
- (ii) All wiring diagrams shall be deemed to be 'Drawings' within the meaning of the term as used in Clause 11 of the **General conditions of contract 2019 (For Construction/Maintenance Works) with amendments upto last date of submission of bids.** (PWD 7 or PWD 8). They shall indicate the main switch board, the distribution boards (with circuit numbers controlled by them), the runs of various mains and sub mains and the position of all points with their controls.
- (iii) All circuits shall be indicated and numbered in the wiring diagram and the points shall be given the same number as the circuit to which they are electrically connected.
- (iv) After award of the work, the firm will be required to submit the drawings for the proposed work including layout plan, conduit routes etc. Work will be carried

out as per the approved drawings.

18.0 Conformity to IE act, IE Rules, and standards:

18.1. All electrical works shall be carried out in accordance with the provisions of Indian Electricity Act, 1910 and Indian Electricity Rules, 1956 amended upto last date of submission of bids. List of rules of particular importance to electrical installations under these General Specifications is given in Appendix C for reference.

19.0 General requirements of components:

19.1. **Quality of material:** All materials and equipments 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.

20.0 Inspection of materials and equipments:

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

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

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

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

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

workmanship and quality control.

21.0 Ratings of components:

- 21.1. All components in a wiring installation shall be of appropriate ratings of voltage, current and frequency, as required at the respective sections of the electrical installations in which they are used.
- 21.2. All conductors, switches and accessories shall be of such size as to be capable of carrying the maximum current, which will normally flow through them, without their respective ratings being exceeded.

22.0 Conformity to standards:

- 22.1. All components shall conform to relevant Indian Standard Specifications wherever existing. Materials with ISI certification mark shall be preferred.
- 22.2. Relevant Indian Standards including amendments or revisions thereof up to the date of tender acceptance shall be applicable in the respective contracts for respective items, firm to ensure its compliance.

23.0 Inter change ability:

Similar parts of all switches, lamp holders, distribution fuse boards, Switch gears, ceiling roses, brackets, pendants, fans and all other fittings of the same type shall be interchangeable in each installation.

24.0 Workmanship:

- 24.1. Good workmanship is an essential requirement to be complied with the entire work of manufacture/fabrication, assembly and installation shall conform to sound engineering practice.
- 24.2. **Proper supervision/skilled workmen:** The contractor shall be a licensed electrical contractor of appropriate class suitable for execution of the electrical work. He shall engage suitably skilled/licensed work men of various categories for execution of work supervised by supervisors / Engineer of appropriate qualification and experience to ensure proper execution of work. They will carry out instruction of Engineer-in- charge and other senior officers of the Department during the progress of work.
- 24.3. **Use of quality materials:** Only quality materials of reputed make as specified in the tender will be used in work.
- 24.4. **Fabrication in reputed workshop:** Switch boards and LT panels shall be fabricated in a factory/workshop having modern facilities like quality fabrication, seven tank process, powder/epoxy paint plant, proper testing facilities, manned by qualified technical personnel. These shall be as per make/item approved.

25.0 Testing:

All testes prescribed in this General Specification, to be done before, during and after installation, shall be carried out, and the test results shall be submitted to the Engineer-in-charge in prescribed Performa, forming part of the Completion Certificate.

26.0 Commissioning on completion:

After the work is completed, it shall be ensured that the installation is tested and

commissioned.

27.0 Completion plan and completion certificate:

- 27.1. For all works, completion certificate after completion of work as given in **Appendix– E of CPWD Specifications** shall be submitted to the Engineer-in-charge.
- 27.2. 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.
- (i) General layout of the building.
 - (ii) Locations of main switchboard and distribution boards, indicating the circuit numbers controlled by them.
 - (iii) Position of all points and their controls.
 - (iv) Types of fittings, viz. fluorescent, pendants, brackets, bulk head, fans, exhaust fans etc.
 - (v) Name of work, job number, tender reference, actual date of completion, names of Division/Sub-division and name of the firm who executed the work with their signature.
- 27.3 The contractor shall submit completion plan within thirty days of the completion of work. In case the contractor fails to submit the completion plan, he shall be liable to pay a sum equivalent to 2.5% of the value of the work subjected to a ceiling of Rs. 15,000/-

28.0 Guarantee

The installation will be handed over to the department after necessary testing and commissioning. The installation will be guaranteed against any defective design/workmanship. Similarly, the materials supplied by the contractor will be guaranteed against any manufacturing defect, inferior quality. The guarantee period will be for a period of 12 months from the date of handing over to the department. Installation/ equipments or components thereof shall be rectified/ repaired to the satisfaction of the Engineer-in-charge. The firm will be required to submit guarantee of material from the manufacturer to the department.

- 29.0 Material used on the work shall be got approved before installation at site by the Engineer-in-charge JE/AE shall record the material in Approval register.
- 30.0 The contractor shall submit the relevant document such as copy of bill invoice/ delivery challan/test certificate duly signed by the firm/contractor to the sub division officer at the time of preparation of bill failing which payment shall not be made to the contractor.
- 31.0 The lowest contractor/ OEM of the lift will have to submit the technical catalogue of the lift along with detailed working drawing for approval of consultant /Engineer-In-Charge. The Contractor / OEM of the lift shall have to take NOC from the Lift inspector of the Local bodies for beneficial use of the lift. If required.

32. Similarly technical catalogue of indoor and outdoor units of VRF system to be installed shall have to be submitted to consultant/Engineer-In-Charge for approval and decision of Engineer-In-Charge / Consultant shall be final and binding for the approved make as per BOQ.

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ADDITIONAL TERMS & CONDITIONS FOR ELCTRICAL WORK

Name of Work: - Providing various LED fixtures at Paschim Vihar Group Housing Societies. (SUB HEAD - 1 : - 1.Shiva Enclave 2.Ritu Apartment 3.Anandvan 4.Balvinder Apartment 5. Nivedita Enclave 6.Supriya Apartment 7. Sahridaya Apartment 8. Priydarshani Apartment 9. Trivni Apartment 10. Sakshar Apartment 11. Maitri Apartment 12. Shubniketan) (SUB HEAD - 2 : -1.Navbharat Apartment 2. Manav Apartment 3. J.K. Apartment 4. Anuradha Apartment 5. Ashoka Apartment 6. Adarsh Apartment 7. Gasta Housing Complex 8. Raksha Kunj 9. Pink Apartment 10. Milap Apartment 11. Shubam Apartment 12. CA Apartment)

The department shall deduct **GST and Income Tax** and other taxes on the value of work done from each bill of the contractor as per prevailing Government instructions/orders. Labour cess as per building and other construction worker's welfare cess act 1996 will be deducted from all the bills payable to the firm. Presently the cess is at the rate of 1% of the gross value of work done. In lieu, the department shall issue a certificate of deduction of tax at source to the contractor in relevant forms.

1. The contractor shall take all safety precautions to avoid accidents by exhibiting caution boards, red flags, red lights and by providing necessary barriers and all other measures required from time to time. The contractor shall be responsible for all damages and accidents due to negligence on his part.
2. The contractor shall give due notices to Municipality, Police and/or other authorities that may be required under the law/rules under force and obtain all requisite permissions/licenses for temporary obstructions/enclosures and pay all charges which may be leviable on account of his execution of the work under the agreement. Nothing extra shall be payable on this account.
3. The contractor shall leave such recesses, holes, openings, etc., as may be required for the electric, air-conditioning and other related works. (For this purpose any required inserts, sleeves, brackets, conduits, base plates, insert plates, clamps etc. shall be arranged by the contractor and fix the same at the time of casting of concrete, stone work & brick work, if required, and nothing extra shall be payable on this account.
4. The work will be carried out in close coordination with the building work and other agencies. Conduits will be laid in the slab within the specified time and it will have to be ensured that the casting of slabs is not delayed for want of laying of conduits. The conduits will also be laid in walls before the plaster work is undertaken so as to avoid breaking, cutting of plaster while making chase for laying of conduits subsequently. The contractor will have to employ adequate labour for carrying out the work. No claim regarding the idle labour for any reason will be entertained by the Department.
5. No tools and plants including special T&P etc. shall be supplied by the department and the contractor will have to make his own arrangements at his expenses.
6. All materials shall be got checked & approved by the Engineer-in-charge on receipt of the same at site before use and rejected material is to be removed from the site immediately.

7. The phenolic laminated sheet shall be Hylem/Formica make only.

8. All items which are not covered while carrying out electrical work shall be removed and shall be cleared by the contractors as soon as the work is completed.
9. The contractor shall give the Engineer-in-charge in every fortnight, a progress report of the work done during the previous fortnight. The progress of work will be reviewed periodically by the Engineer-in-charge with the contractor and shortfalls, if any, sorted out. The contractor shall thereupon take such action as may be necessary to bring back his work to schedule without any additional cost to the department.
10. The contractor shall quote his rates considering the specifications, terms & conditions and particular specifications and special conditions etc. and nothing extra shall be payable whatsoever unless otherwise specified.
11. The contractor shall be responsible for the watch and ward of the site/property/material provided by him and materials issued by the department against pilferage and breakage during the period of execution and thereafter till the work is completed and physically handed over to the department.
12. Samples of all materials, fittings and other materials/articles required for execution of the work shall be got approved from the Engineer-in-charge. Materials/articles manufactured by the firms of repute as indicated in tender documents and approved by the Engineer-in-charge shall only be used.
13. The contractor shall ensure quality **construction/installation** in a planned and time bound manner. Any sub-standard material or work beyond set out tolerance limits shall be summarily rejected by the Engineer-in-charge.
14. The contractor shall be required to make a sample flat for each type at the earliest opportunity using all approved materials for approval of Engineer in charge before mass scale finishing works are taken up.
15. Even ISI marked materials shall be subjected to quality test at the discretion of the Engineer-in-charge besides testing of other materials as per the specifications described for the item/material. Whenever ISI marked materials are brought to the site of work; the contractor shall, if required by the Engineer-in-charge, furnish manufacturers test certificates to establish that the materials procured by the contractor for incorporation in the work satisfy the provisions of IS codes relevant to the material and/or the work done.
16. The contractor shall have to engage well experienced skilled labour and deploy modern T&P and other equipments to execute the work.
17. The firm shall use only electrically operated chase cutting machine for cutting the chases in the wall for recessed conduit wiring.
18. The contractor will have to make his own arrangement for storage of materials. No storage space shall be provided by department.
19. The contractor will have to make his own arrangement for water and power supply for execution of works.
20. The contractor will have to ensure that the skilled labour i.e. wireman etc., engaged in the execution of the work must possess valid electrical license, otherwise he will not be permitted to execute the work.
21. The contractor shall be responsible for removal of all defects in the work during the

guarantee/warranty period. The department shall carry out routine maintenance only. However, if any failure is noticed during this period which is attributable to poor quality of material and bad workmanship, the contractor will be required to rectify the same at his own cost, failure of which the department will be at liberty to get the defects rectified at the risk & cost of the contractor. The contractor will also be required to carry out his own inspection/testing during the guarantee/warranty period and attend to any defect taking place during this period.

22. Priority to arrange the material shall be decided by the department. However material required for the work shall be brought at site only at the appropriate time keeping in view the progress of building works as well as Electrical & Mechanical works. Decision of Engineer-in-charge in this regard shall be final.
23. The contractor has to intimate his authorized representative, who will be receiving instructions in his absence. The contractor /his authorized representative is bound to sign the site order book as and when required by the Engineer-in-charge and to comply with the instructions therein.
24. Suitable back plates providing for fixing the wall brackets and ceiling flush fittings shall be supplied by the contractor free of cost.
25. It shall be responsibility of contractor to provide polythene/PVC plastic cover for all SDBs/meter boards/feeder pillars/panels etc. so as to protect them from wear & tear/damage during execution stage. Contractor shall provide the covers for the materials if any being supplied departmentally also. Nothing extra shall be paid on this account.
26. Contractor is fully responsible for any kind of damage to the LT/HT cable during execution of work. No joints shall be allowed if the cable is damaged. Contractor has to replace the full length at his own cost.
27. The MCB should be of same make as that of MCBDBs.
28. Colour coding shall have to be adopted in the wiring system as per specifications.
29. Tinned copper earthing lugs/thimbles/ferrules shall be provided for termination of earth wire to all metallic outlet boxes/fittings/fixtures/fan regulator/MCB DB/switch board / meter board etc., properly crimped/brazed/soldered for which nothing extra shall be paid.
30. Suitable crimping tools shall be used for crimping the lugs/thimbles/ferrules. Nothing extra shall be paid on this account. The lugs/thimbles/ferrules pressed by conventional/ordinary pliers shall not be accepted.
31. A suitable brass/tinned copper neutral link shall be fixed at suitable place in the metallic outlet boxes of all sizes to terminate neutral wire properly. Nothing extra shall be paid on this account.
32. An earth termination with earth stud of brass/ tinned copper/ 2 No. metallic washer so suitable earth bar of brass/tinned copper with tinned copper thimbles/ferrules/lugs should be suitably fixed at suitable place in the Metallic outlet box for termination of protective earth conductor. Nothing extra shall be paid on this account.
33. In the outlet boxes, phase from one switch to other switch shall be looped with suitable size of solid copper conductor. Nothing extra shall be paid on this account. Stranded conductor shall not be accepted.

34. Only required number of knockouts should be removed from metallic outlet boxes for entry of conduits. If more than required number of knock outs are removed, the metallic outlet box shall not be accepted.
35. Separate G.I. boxes shall be used for staircase light switches and bell push. Nothing extra shall be paid on this account.
36. Metal sheath of Co-axial T.V. cable shall be terminated using 'U' shape thimble/lugs/ferrules. Nothing extra shall be paid on this account.
37. To facilitate drawing of wires 16 / 18 SWG GI fish wire be provided along with laying of recessed conduit. Nothing extra shall be paid on this account.
38. Cable connection to switch gear is deemed to be included in the item of end termination. No extra payment shall be made for that.
39. The Work shall be carried out as per CPWD General Specifications for electrical works Part-I 2013 (INT), and Part-II 1995 (EXT.) and the Indian Electricity Rule – 1956 as amended upto date for such works.
40. All the materials, whatsoever, to be supplied and provided by the contractor should be of standard and approved quality. These should be got approved from the Engineer-in-Charge or his authorized representative before installation. No payment will be made for any unapproved or sub standard/ rejected materials used on the work. Rejected materials should be removed from the site of work within 48 hours failing which the same will be liable for removal by the department at the risk and cost of contractor without any liability.
41. Any damage done to the building while executing the electric work should be make good to the satisfaction of the department. The chases, holes etc. cut in the walls and roofs should be filled within two days. All malba should be removed on the same day. In case of failure to do so it will be got done by the Engineer-in-Charge or his authorized representative at contractor's risk and cost.
42. Electrician/ Wiremen employed for execution of electrical work should have electrical license as required under I.E. Act.
43. Department shall not be responsible for any injury partial or permanent or death of any worker at site due to accident or manufacturing of the equipment or by negligence of the staff.
44. No T&P shall be issued by the department for execution of work.
45. First aid box shall be kept by the contractor at site of work. No extra payment shall be made on this account.
46. Supply items to be got approved from Engineer-in-Charge in Advance, otherwise no payment shall be released.
47. The list of approved makes for the materials to be used at site for execution of work is attached.
48. All screws/ nuts bolts should be galvanized/ cadmium plated/ passivatee only as the case may be.
49. Entire Quantities of all materials shall invariably be deposited by the contractor before actual application on the surface. Original cash vouchers of materials purchased for the work shall be submitted to the Engineer-in-Charge.
50. Malba shall be removed from the site daily and site shall be kept neat and clean, failing which the same is liable to be go removed by the department at the risk and cost of contractor.
51. The rates quoted by agency shall be inclusive of all taxes/ levies/ GST etc. and nothing extra shall be paid on this account by Govt. . The quoted rates shall be firmed.
52. Contractor will inform the contact number to Deptt. so that in case of emergency the contractor can be informed for the work.
53. All dismantled materials returned to the department in J.E., Store, No extra payment will be made on this account.
54. Chase cutting for conduiting will be carried out only by chase cutting machine. Manual chase cutting strictly prohibited.

55. The agency has to provide inspection vehicle within 2.50 Hours of notice for site inspection during execution to J.E(E)/ AE(E) without asking any payment for that the rate in the tender has to be quoted considering. The frequency of visiting the site will not be restricted but will be according to site requirement. Failing of this penalty of Rs. 2500/- will be made to the contractor for each inspection.

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ADDITIONAL SPECIFICATION FOR LED FITTINGS

- 1) LM 79 & 80 certificate from manufacturer shall be submitted by the Contractor to the Engineer – in- Charge at the time at supply of fittings. In addition to LM certificate, the electrical fittings shall have following parameters.
CRI \geq 75, Power factor \geq 0.9, THD less than 10%
- 2) Light emitting diode luminaries shall confirm to IS: 16104/2012 complete with electronic control gear box conforming to IS: 16104/2012 and IS: 15885 (part – II/section 13)/2012. The accepted make shall have the same IS Specification, failing which the make shall not be accepted.
 - (a) Lumen efficacy of Light Emitting Diode used shall be more than 120 Lumen/Watt.
 - (b) Light Emitting Diode used shall be of Maximum 2 watt rating for indoor luminaire.
 - (c) The Life of Light Emitting Diode shall not be less than 50000 hour.
 - (d) Light Emitting Diode to be used in the Fittings shall be of same bin.
- 3) The Contractor shall furnish proof of purchase of light emitting diode fittings (with light emitting diode) from the OEM.
- 4) Light emitting diode driver shall withstand 440 volt AC, 50Hz at input for 2 hours and shall function properly after this, surge protection of the driver shall not be less than 2Kv.
- 5) The light emitting diode to be used in the fitting shall have same colour temperature and provide constant colour through their life, no variation shall be accepted. The firm shall submit proofs in this respect.
- 6) **The Firm shall stand a warranty of whole light emitting diode fitting i/c driver and light emitting diodes for a minimum period of five years from the company of LED fitting.**
- 7) **The amount of Security deposit of LED fittings to be released after 5 years.**
- 8) Current passing through light emitting diode shall be not be more than 700 mA and variation in illumination level shall be + 2% each allowed in input voltage range from 180 V AC to 250 V AC.
- 9) Light Emitting Diode rating mentioned in the schedule of work is the total power consumed by all the Light Emitting Diode's put together in a luminaire (excluding the power consumption of the driver circuit.)
- 10) The fittings shall be so designed that the illumination level shall evenly distributed and glare free.

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)

E. E. (P)

List of Approved Materials (Electrical Works)

1. All type Wire & Cable	:	HAVELLS/ R.R. KABEL/ GRANDLAY/ ELEKTRON
2. All type LED Fitting	:	HAVELLS/ HALONIX/ PHILIPS/ OSRAM/ TRILUX/ LT
3. Junction Box	:	NEPTUNE/ L&T/ SCHNEIDER/ SIEMENS
4. Octagonal Pole	:	BAJAJ/ PHILIPS/ PARUTHI/ VALMONT/ BPP
5. Decorative Pole	:	LUSTRE MODEL NO. LI8240 OR SIMILAR IN BAJAJ/ TWINKLE
6. Cement	:	AMBUJA/ ULTRATECH/ ACC
7. SMC Box	:	SINTEX/ HENSEL/ LEGRAND
8. G.I. Pipe, G.I. Earth Pipe	:	JINDAL HISSAR/ PRAKASH/TATA
9. DWC HDPE Pipe	:	REX/DURALINE/JAIN IRRIGATION
10. Cubical Feeder Pillar, Cubical Panel Board, Feeder Pillar	:	NEPTUNE/ TRICOLITE/ ADVANCE POWER
11. Angle & T	:	JINDAL/ TATA/ RANA

NOTE :- Prior approval of NIT Approving Authority is to be obtained in case of use of any other make if required by giving three make timely with justification. No delay if any on this account shall be entertained.

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)

E. E. (P)

Schedule of Quantity (Electrical Work)

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)**E. E. (P)**

SCHEDULE OF QUANTITIES

Name of work: - Providing various LED fixtures at Paschim Vihar Group Housing Societies. (SUB HEAD - 1 : - 1.Shiva Enclave 2.Ritu Apartment 3.Anandvan 4.Balvinder Apartment 5. Nivedita Enclave 6.Supriya Apartment 7. Sahridaya Apartment 8. Priyadarshani Apartment 9. Trivni Apartment 10. Sakshar Apartment 11. Maitri Apartment 12. Shubniketan) (SUB HEAD - 2 : -1.Navbharat Apartment 2. Manav Apartment 3. J.K. Apartment 4. Anuradha Apartment 5. Ashoka Apartment 6. Adarsh Apartment 7. Gasta Housing Complex 8. Raksha Kunj 9. Pink Apartment 10. Milap Apartment 11. Shubam Apartment 12. CA Apartment)

S.No.	Description of Item	Qty.		Rate	Unit	Amount
1	SITC of LED street light of 72-75 watt fitting with 120 lumens per watt, IP65 protection along with colour temperature rage 3000-6500 K as per direction of Engineer in Charge, PDC Aluminium frame and toughened glass complete with all accessories like electronic driver and surge protection device suitable to work on single phase 230 V AC supply, to be fixed on the existing tubular pole/GI pipe/wall mounted bracket i/c connection and dismantling of old system/fitting etc. complete as required at site.	490	Nos	7844.00	Each	3843560.00
2	SITC of LED street light of 40-45 watt fitting with 120 lumens per watt, IP65 protection along with colour temperature rage 3000-6500 K as per direction of Engineer in Charge, PDC Aluminium frame and toughened glass complete with all accessories like electronic driver and surge protection device suitable to work on single phase 230 V AC supply, to be fixed on the existing tubular pole/GI pipe/wall mounted bracket i/c connection and dismantling of old system/fitting etc. complete as required at site.	289	Nos	5314.00	Each	1535746.00
3	SITC of energy saving flood light luminaire with high power LED capacity of 200 watt with colour temperature rage 3000-6500 K as per direction of Engineer in Charge, powder coated PDC aluminium body with toughened glass, IP66 with electronic driver and all accessories i/c connection with suitable unarmoured copper cable as required.	19	Nos	18238.00	Each	346522.00
4	SITC of energy saving flood light luminaire with high power LED capacity of 120 watt with colour temperature rage 3000-6500 K as per direction of Engineer in Charge, powder coated PDC aluminium body with toughened glass, IP66 with electronic driver and all accessories i/c connection with suitable unarmoured copper cable as required.	14	Nos	9628.00	Each	134792.00
5	Supplying & fixing Hot press moulded SMC box of size 195 x 135 x 90 mm i/c S/F Aluminium Bus Bar of suitable size i/c Phase, Neutral and Earth link, 02 Numbers SP MCB 6 Amp, 10KA, C curve etc on street light pole/wall etc as reqd. at site.	800	Nos	1424.00	Each	1139200.00

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)

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6	SITC of 6 watt LED Bulk head light made of outer body of diae cast aluminium housing & frosted glass etc. Complete with connection as reqd..	48	Nos	1279.00	Each	61392.00
7	Fabrication, supply and erection of flange mounted hot dip Galvanized Octagonal Poles of 6 meters height made from 4 mm. thick HT Steel plate, having bottom dia of 130 mm. & top dia of 70 mm. complete with window with hinged cover at a height of 0.5 mtrs.from the base for cable termination block etc. and galvanized base plate of size 200mm X 200mm X 12mm thick on existing cement concrete pedestal as required. I/c supplying and fixing of the following in the window box provided for cable termination :- a) Supplying and fixing 4 Nos. 20 mm. dia X 600 mm. long GI foundation bolt (EN8grade) with nuts, washer including 2 Nos. template of 3 mm. thick size 200 X 200 mm. with 4 Nos. 28 mm. dia holes, to match with PCD of Pole base plate as reqd. b) Supplying and fixing 6 mm thick laminated mounted sheet inside the window mounted on and i/c providing and welding 3 nos. G.I strips 4mm thick of suitable length and having suitable size tapped holes - 10nos. as reqd. c) Supplying and fixing of 63 Amp terminal block suitable for 25sq.mm conductor -4nos. & shorting links – 5nos. on DIN channel i/c pdg. and fixing DIN channel of suitable length – 2 nos. on the existing laminated sheet. d) Supplying and fixing 6 Amp, SPMCB, 'C' Characteristics Curve - 1No. Earth stud-2Nos. welded at suitable height two nos. washers, springs washers & nuts. e) Cable support clamp suitable for 4 Nos of 4x25sqmm cable.	70	Nos.	9365.00	Each	655550.00
8	Providing and laying in position 1:2:4 reinforced cement concrete foundation of size 600 mm.(L) X 600 mm. wide and 1500 mm. deep i/c excavation of earth, providing cutting, bending and placing in position, reinforcement of cold twisted bars of 12 mm. dia-1660mm long (approx)- 8 Nos. and reinforcement ring of cold twisted bar of 8mm dia - 2200mm (approx) - 10nos. (with 150mm spacing) as required with positioning of foundation bolts (as per item below) and providing 90 mm. (O.D) DWVC, HDPE Pipe for cable entry & exit as required. (For 6 mtr. poles)	70	Nos.	4120.00	Each	288400.00
9	SITC of 35 Watt LED Post top outdoor integrated fitting with IP65 protection suitable for gate lights with high power LED as light source etc. Complete with connections i/c fixing DWVC HDPE pipe on the pillar of the gate, making good the damage etc. complete as required.	58	Nos.	8224.00	Each	476992.00

CORRECTION (C)	NIL-----
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A. E. (P)

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10	Supplying and fixing of 30 Watt LED Post Top Decorative Lantern fitting with IP65 protection, along with decorative pole of 3 mtr. long made out of galvanised mild steel with grey powder finish complete with junction box at bottom, comprising of four way 25Amp connector terminal with suitable MCB. The pole has mild steel base plate having four numbers mounting holes and with four numbers anchor bolts, nuts & foundations i/c connections etc. as required.	22	Nos.	35078.00	Each	771716.00
11	Supplying and fixing of 32 mm dia X 2.00 metres long G.I. pipe (medium class) bracket for mounting of fluorescent / HPMV/HPSV/LED street light fitting on pole including bending the pipe to the required shape, 2 nos 40 mm X 3 mm flat iron clamps with nuts, bolts and washer, painting the flat iron with primer and finish paint etc. as required.	700	Nos	663.37	Each	464359.00
12	Fabrication, Designing, Supplying & Fixing of Galvanized arm bracket 1000 mm long Single / double / triple over hang with tightening bolt etc. as per design approved by Engineer-In-Charge.	550	Kgs.	130.00	Kg.	71500.00
13	Supplying and drawing following sizes of PVC insulated PVC sheathed copper conductor multicore cable in the existing poles and bracket from cable termination connector to the fitting i/c providing suitable copper lugs connections etc. as reqd.a) 3 core 1.5 sq mm	3100	Mtrs.	68.00	Mtr.	210800.00
14	Supplying , 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.					
(a)	3x16 Sq.mm	6500	Mtrs.	146.00	Mtr.	949000.00
(b)	4 X 25 sq. mm	3600	Mtrs.	212.00	Mtr.	763200.00
15	Supplying and Laying of XLPE, Aluminium conductor armoured cable in the existing pipe as reqd.					
(a)	3x16 Sq.mm	2700	Mtrs.	139.00	Mtr.	375300.00
(b)	4 X 25 sq. mm	8400	Mtrs.	206.00	Mtr.	1730400.00
16	Supplying and making end termination with brass compression gland and aluminium lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 kV grade as required.					
(a)	3 X 16 sq. mm (25 mm)	1700	Nos.	182.81	Each	310777.00
(b)	4 X 25 sq. mm (28mm)	200	Nos.	233.49	Each	46698.00
17	Supplying and laying of following size DWC HDPE pipe ISI marked along with all accessories like socket, bend, couplers etc. conforming to IS 14930, Part II complete with fitting and cutting, jointing etc..direct in ground (75 cm below ground level) including excavation and refilling the trench but excluding sand cushioning and protective covering etc., complete as required.					
(a)	63 mm dia (OD-63 mm & ID-51 mm nominal)	12000	Mtrs.	122.18	Mtr.	1466160.00
18	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	500	Mtrs.	535.76	Mtr.	267880.00

CORRECTION (C)	NIL-----
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A. E. (P)

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	required a) 80 mm dia					
19	Fabrication, supplying & installation of M.S. outdoor double door type joint/junction box made out of 16 SWG M.S. sheet of size 600mm x750mm x 400mm with 4 Nos 100 A Aluminium bus bar fixed on wall with the help of nut bolts etc. The joint/junction box having LED type RYB indicators, double coating painting with approved enamel paint, locking arrangement complete etc as required)	71	Jobs	6103.00	Job	433313.00
20	Fabrication, supplying and installation of outdoor type cubical feeder pillar of suitable size not less than 40 cm and upto 45 cm deep made out of M.S. Sheet 2mm. Thick (14 SWG) duly compartmentalized having 4 strip busbar of 200amp capacity double door with locking arrangement for protection from rain, dust, duly fixed on M.S angle iron frame work of size 50 mm X 50 mm X 6 mm (NS) 90 cm long legs out of which 45 cm duly grouted in cement concrete 1:2:4 (1 cement 2 sand :4 stone aggregate 20 mm) and having following accessories mounted inside the cubical panel i/c connection, inter connection with aluminum thimbles, earthing with two nos. earth studs duly painted with one coat of red oxide & two coats of superior quality enamel paint complete etc. as reqd. Supplying & Fixing of following accessories in the existing cubical panel board/feeder pillar including connection testing etc. as reqd. a) 100 Amp. 16 KA MCCB - 3 pole- 1 No. b) 63 Amp. 1 6 KA MCCB 3 pole- 4 Nos. (With 100 Amp. frame size) c) Ammeter with CT and selector switch and Voltmeter with selector switch d) Three pole 80 Ampere AC - 3 rating Contactor - 1 No. e) Astro Mini Timer - 1 No. d) Phase indicating lamp - 1 Set e) Danger notic plate.	24	Nos.	60144.00	Each	1443456.00
21	Fabricating, Supplying & Fixing wire mesh protection frame work made out of 40 mm x 6 mm thick angle & "T" strengthened with intermediate members of MS flat iron of size 30 mm x 5 mm thick welded at a distance of 30 cm horizontally & vertically and duly welded with wire mesh of size 75 mm x 25 mm made with 6 SWG wire mash of size 75 mm x 25 mm made with 6 SWG wire on all sides and top i/c providing and fixing of double door gate with double locking arrangement (Two Nos. sliding bolts and One No go down lock) having 0.5 mtr. long legs of 40 mm x 40 mm x 6 mm thick angle iron, duly grouted in cement concrete foundation ration 1:2:4 (1 cement: 2 coarse sand : 4 graded stone aggregate), up to suitable depth painting with one coat of red oxide & Two coats of synthetic enamel paint of approval colour and shade etc.	1000	Sq.M.	2162.00	Sq.M	2162000.00

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A. E. (P)

E. E. (P)

	complete as reqd.					
22	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.	190	Sets	3323.16	Set	631400.40
23	Providing and lying earth connection from earth electrode with 6 SWG dia G.I wire in 15 mm dia G.I pipe from earth electrode i/c connection with G.I thimble excavation and re-filling as required.	2000	Mtrs.	121.27	Mtr	242540.00
24	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing as required.	24000	Mtrs.	33.49	Mtr	803760.00
25	Providing and fixing G.I. tape 20 mm X 3 mm thick on parapet or on surface of wall for lightning conductor complete as required.(For horizontal run).	500	Mtrs.	59.73	Mtr	29865.00
	Total					21656278.40
	Say Rs					21656278.00

Assistant Engineer (P)
Maintenance Circle (West),
(GNCTD), PWD, New Delhi

Executive Engineer (P)
Maintenance Circle (West),
(GNCTD), PWD, New Delhi

CORRECTION (C)	NIL-----
INSERTION (I)	NIL-----
DELETION (D)	NIL-----

A. E. (P)

E. E. (P)