TENDER DOCUMENT

NAME OF WORK: Electrical Work for Development of Tourism Facilitation Centre Cum Multi Level Parking at Puri, Odisha (Prasad Scheme)

ESTIMATED COST: Rs.84,71,327.00

EMD: Rs.1,69,426.00

CLIENT:
India Tourism Development Corporation,
Engg. Project Division
Scope Complex, 6th Floor,
Core 8, Lodi Road
New Delhi-110003
www.theashokgroup.com
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# Check List for Tender Submission

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<td>Digitally signed Tender Documents</td>
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<td>2.</td>
<td>Proof of average annual financial turnover of firm during last 3 years ending 31st March of the previous financial year of 30% of the estimated cost.</td>
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<td>3.</td>
<td>Proof of having successfully completed similar works during last 7 years ending last days of the month previous to one in which tenders are invited as per following.</td>
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<td></td>
<td>a. Three similar completed works costing to less than the amount equal to 40% of the estimated cost.</td>
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<td>Or</td>
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<td>b. Two similar completed works costing to less than the amount equal to 50% of the estimated cost.</td>
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<td>Or</td>
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<td>c. One similar completed work costing to less than the amount equal to 80% the estimated cost.</td>
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<td>4.</td>
<td>Copy of PAN Card</td>
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<td>5.</td>
<td>Proof of Registration with ESI</td>
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<td>9.</td>
<td>Copies of Similar work executed in last 3 years along with performance certificate</td>
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<td>10.</td>
<td>History &amp; Structure of Firm, Name of Directors/Proprietary/Partners with technical staff</td>
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<td>11.</td>
<td>List of Machineries, Tools Plant &amp; Equipment’s</td>
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<td>12.</td>
<td>Audited Balance Sheets of Last 3 Years For the year 2016-17 For the year 2017-18 For the year 2018-19</td>
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<td>13.</td>
<td>An Affidavit duly notarized on stamp paper of Rs. 100/- (non judicial) stated that:- <strong>In case any ambiguity notice in the documents submitted at any stage, we shall be entirely responsible and liable for any action as deemed fit under the law.</strong></td>
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<td>14.</td>
<td>Integrity Pact as per guidelines / instructions given in tender documents</td>
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<td>15.</td>
<td>EMD refund form</td>
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<td>16.</td>
<td>All the above certificate / documents shall be digitally signed by the firm and original shall be produced for verification as required.</td>
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India Tourism Development Corporation Limited  
Scope Complex, Core-8, 7th Lodi Road, New Delhi

PRE-QUALIFICATION CUM E-TENDER NOTICE

NAME OF WORK: Electrical Work for Development of Tourism Facilitation Centre Cum Multi Level Parking at Puri, Odisha (Prasad Scheme)

1. E-Tenders are invited on behalf of India Tourism Development Corporation Ltd. New Delhi for **Electrical Work for Development of Tourism Facilitation Centre Cum Multi Level Parking at Puri, Odisha (Prasad Scheme)**. Manual tender shall not be accepted.

2. Estimated Cost (TS) : **Rs. 8471327.00**
   
   (This estimate however, is given merely as a rough guide).

3. EMD : **Rs. 169426.00**

4. Cost of Tender Document : **Nil**

5. The work is to be completed within **27 Months** days from 7th day after the day on which Project Engineer issues the written order to commence the work or from the date of handing over the site, which is later.

6. Tender document can be downloaded from the ITDC website, [www.theashokgroup.com](http://www.theashokgroup.com) (for reference only) and Central Public Procurement Portal i.e. CPPP Site [http://etenders.gov.in/eprocure/app](http://etenders.gov.in/eprocure/app) up from **17.12.2019** to **02.01.2020**. The online bids will be received upto **02.01.2020** till 16.00 Hrs. and the Technical Bids will be opened on **03.01.2020** at 16:00 Hrs electronically.

7. Pre-bid Meeting: A pre-bid meet is scheduled on **23.12.2019 at 11:00 Hrs** at the ITDC conference Hall, 6th floor, Scope Complex, Core-8, 7 Lodhi Road, New Delhi-110003. Interested parties are requested to be present during the above pre-bid meeting for the brief and any clarification to be addressed. **No Clarification after the pre-bid meeting will be entertained.** Parties are excepted to send their queries in advance by email before the date of pre bid meeting. In case any of the suggestion of those present in pre-bid meeting are accepted, same would be uploaded on site and intimated to all those who attended the pre-bid meeting.

8. Bid submission: The tender shall be submitted online only at Central Public Procurement Portal i.e. CPPP website: [tender.nic.gov.in](http://tender.nic.gov.in) or [http://etenders.gov.in/eprocure/app](http://etenders.gov.in/eprocure/app). The applicant is expected to examine all instructions, forms, terms and conditions in the documents. Failure to furnish all information/document as desired in the NIT or submission of a Bid not substantially responsive to the NIT in every respect will be at bidder's risk and may result in rejection of its Bid.
9. The applicant’s are advised to follow the instructions “Instructions/Guidelines for NIC e-tendering portal provided in Annexure-1 for online submission of Bids

10. Bid documents may be scanned with 100 dpi with black and white option which helps in reducing size of scanned documents.

11. The bidders who are desirous of participating in e-tender shall upload their bids in the format prescribed in tender document. The bidders should upload the relevant digitally signed documents, certificates etc. and tender documents. The bidder shall digitally sign all the documents, certificates etc. owning the responsibility for their correctness / authenticity. Bids shall be submitted online only at website: https://etenders.gov.in/eprocure/app.

12. The bids are required to be uploaded as per guidelines indicated for e-procurement as given in website: http://etenders.gov.in.

13. Minimum system requirement for e-tendering are also contained in Annexure – A

14. For any clarification with regard to tender enquiry, you may contact e-tendering helpdesk nos. 0120-4200462, 0120-4001002, 0120-4001005, and 0120-6277787. Intending bidders in their own interest may approach the e-tendering helpdesk well in advance to ascertain the requirements to participate in the tender.

15. The EMD (Refundable) of Rs. 169426.00 need to be deposited through RTGS/NEFT or DD as per instructions given in website: - http://itdc.eproc.in. The cost of money transfer (including Payment Gateways Commission and taxes etc) has to be borne by the bidder. It is therefore, advised that the bidder should consider the time to process the payment electronically (i.e. NEFT/RTGS, Net banking, credit/debit cards) to ITDC or DD in favour of ITDC payable at New Delhi into consideration before submitting the bid. The ITDC will not be liable for delay/non-payment. Bank details of ITDC for EMD payment through NEFT/RTGS:-
   i) Name of Bank : State Bank of India
   ii) Branch Name : Scope Complex Lodi Road, New Delhi
   iii) IFSC Code : SBIN0020511
   iv) Bank A/c No. : 52091765999

No interest will be payable on EMD. In the case of successful bidder, earnest money deposit will be adjusted towards the security deposit or it may be forfeited in case the successful bidder refuses to accept the award of supply or fails to complete the required formalities within the specified and permitted time. The earnest money is refundable to the unsuccessful bidders only after the finalization of the tender. Tenders without EMD will be summarily rejected.

16. Exemption from submission of EMD for MSME Units: The MSME Units shall be exempted from submission of EMD on production of requisite proof in respect of valid registration certificate from the MSME. Firms in the process of obtaining of MSME registration will not be considered for the EMD exemption.
17. The prices are to be quoted / documents to be uploaded as per Part-II (Price Bid).

18. The process as defined by the ASP for e-tendering is to be followed (details would be provided to the registered tenderer by ASP at the time of registration. The applicant’s are advised to follow the Instructions/guidelines for NIC E-Tendering portal provided in Annexure-1 for online submission of bids.

19. Bidders are required to have Class 3 Digital Certificate (if they do not have) from authorized digital certificate issuance authority. Details regarding DSC are contained in Annexure-1 under head “Frequently Asked Questions on Digital Signature Certificate”.

20. Proof of having Successfully Completed “Similar works” (Similar Works means “Electrical works”) during last seven years.

   a. Three similar completed works costing not less than the amount equal to 40% of the estimated cost.

   OR

   b. Two similar completed works costing not less than the amount equal to 50% of the estimated cost.

   OR

   c. One similar completed work costing not less than the amount equal to 80% of the estimated cost.

**Note:** The contractors participating in tenders are required to submit completion certificate and copy of work order. Similar work means – “Electrical works”

21. Copies of similar works executed in last three years along with work order and performance certificate issued by the previous clients showing the nature of work and their value.

22. Copy of PAN Card.

23. Copy of Registration under GST Law.

24. Copy of Registration with PF, ESIC Authority.

25. Audited Balance Sheet for the last three Financial Years and i.e.
   a) For the F.Y 2018-19
   b) For the F.Y 2017-18
   c) For the F.Y 2016-17

26. Proof of average annual financial turn over during last three years ending 31st March of previous financial year should be at least 30% the estimated cost. Format of annual turnover given in tender as per the Audited Accounts should be enclosed in this regard.
27. History and Structure of firm, Name of Director(s)/ Partner(s)/ Proprietor with technical staff.

28. List of Machinery, Tools, Plants & Equipment.

29. Bank detail of Bidder as per following format on letterhead of firm:
   - Name of Bank : 
   - Beneficiary : 
   - IFSC Code : 
   - Account No. : 

30. An affidavit on stamp paper of Rs. 100.00 (non-judicial) be submitted along with the technical bid stating that “In case any ambiguity is noticed in the documents (listed out documents) submitted at any stage, we shall be entirely responsible and liable for any action as deemed fit under the law”. This should be notarized. Since the mode of submission of document is through e-tendering the affidavit as specified above shall be considered valid legally for tender evaluation and the same original affidavit will be submitted by the bidders on or before opening of the technical bid in the office of HOD (PPMC), India Tourism Development Corporation, Engg. Project Division, Room no. 508, 5th Floor, Core-8, Scope Complex, Lodhi Road, New Delhi.

31. E-tenders are invited for the subject work Normally contractors whose names are borne on the approved list of contractors of PWD/ CPWD/ MES/ Railways/ PSUs of (Either with State or with Central govt.) may be permitted to E-tendering according to their financial category. However in the present case eligibility criteria are given in the Para 15 to 26. The details of items are indicated in the Schedule of work/quantity upload herewith. The tenderer should carefully pursue the clauses mentioned as here under before submitting their tender, require clarification if any, may be sought prior to submission of tender. No request for clarification will be entertained once the tender is submitted.

32. Original documents if required may be asked from the tenderers after opening of Technical bid for cross verification.

33. All the above certificates/documents shall be submitted by the firm should be digitally signed.

34. The tender has to be submitted through tender.nic.gov.in or http://etenders.gov.in/eprocure/app on or before the Last Date & Time for Submission.

35. Tenderers 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, 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 the risks, contingencies and other circumstances which
may influence or effect their tender. A tendered shall be deemed to have full knowledge of the site, whether he inspects it or not and no extra charges consequent on any misunderstandings or otherwise shall be allowed.

36. Submission of a tender by a tendered 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 the conditions and rates at which stores, tools, plant, etc. will be issued to him by the Corporation and local conditions and other factors bearing on the execution of the works.

37. A tendered shall quote in figures as well as in word(s) for rate(s) tendered. The amount for each item should be worked out and the requisite totals give. Special care shall be taken to write rates in figures as we as in words and the amounts in figure only in such way that interpolation is not possible. The total amount shall be written both in figures and in words, in case of figures, the words Rs. Should be written before the figure of rupee and the work “Paisa” after the decimal figure, e.g. Rs. 2.15 P and in case of words “Rupees” should precede and the word “Paisa” should be written at the end. Unless the rate is in whole rupees followed by the word “only” it should invariably be up to two placed of decimal.

38. a) All rates shall be quoted on the tender form and shall include all material, labour, transportation, all taxes, duties, testing, commissioning, supervision, tool, plants, wastage, sundries, scaffoldings as required mobilization, demobilization, transportation etc. and nothing extra shall be payable on any account. However, shall not include the GST & GST Cess (if applicable) herein after termed as GST and shall not include ESI/EPF which is reimbursed separately.

b) GST or any other tax paid/payable by vendor on materials if procured by the vendor in respect of this contract shall be payable by the contractor and the corporation will not paid/payable by vendor entertain any claim whatsoever in the said regard.

39. a) The rates quoted by the tenderer shall be exclusive of GST and employer’s ESI/EPF contribution. Supplier shall submit to ITDC the GST compliant tax invoice/debit note/revised tax invoice. GST charged in the tax invoice/debit note/revised tax invoice by the supplier shall be released separately to the supplier only after supplier files the outward supply details in GSTR-1 on GSTN portal and Reconciliation of Inward supply is done by ITDC with corresponding details of outward supply of supplier and supplier accept the changes made by ITDC and has paid the GST at the time of filling the monthly return. ESI/EPF shall be reimbursed separately (Wherever applicable) after receiving claim of the contractor duly supported with ESI/EPF deposit challans in respect of associated manpower.

b) The contractor shall be solely responsible for complying with all the provisions of EPF, miscellaneous provisions Act 1952 and ESI act relating to manpower engaged for this contract and in the event of any liability on ITDC by virtue of its being the
principle employer. Due to failure of the contractor to comply with the said acts, the contractor shall indemnify and reimburse the amount payable by ITDC on this account.

40. As per law of land, statutory deduction like income tax/TDS under GST (as & when applicable) etc shall be made from the contractor’s bill as applicable.

41. In case of item rate tenders, only rates quoted shall be considered. Any tender containing percentage below/above the rates quoted is liable to be rejected.

42. The tender for the works shall not be witnessed by a contractor or contractors who himself/themselves has/have tendered or who may and has/have tendered for the same works. Failure to observe this condition shall render the tender of the contractor tendering as well as of those witnessing the tender liable to rejection.

43. On acceptance of tender, the earnest money will be treated as part of the Security Deposit.

44. The General Terms & Conditions of Contract or any special condition of the contracts attached with tender will form integral part of the contract. The tenderers are required to sign each and every document with digital signed as token of acceptance.

45. The India Tourism Development Corporation Limited will return the earnest money, where applicable, to every unsuccessful tenderer. Tenderer has to duly fill up the EMD return form enclosed at Annexure-III for EMD return.

46. The Tenderer is requested to ensure the EMD refund form (Annexure III) is filled accurately and all details have been correctly mentioned. The EMD will be refunded through online mode as per the bank details furnished by the service provider / vendor / bidder in the EMD refund form (Annexure III). We will not be responsible for any non / wrong payment made on account of any incorrect / wrong information provided in the EMD refund form.

47. A tenderer shall submit the tender that satisfies each and every condition laid down in this notice, failing which, the tender will be liable to be rejected. The tenderer shall upload all the pages of tender document digitally signed as acceptance of tender.

48. India Tourism Development Corporation does not bind themselves to accept the lowest or any tender or to give any reason for the decision.

49. India Tourism Development Corporation Ltd., reserves to itself the right of accepting the whole or any part of the tender and tenderer shall be bound to perform the same at his quoted rates.

50. This notice of tender shall form part of the Contract Documents.

51. The validity of the tender(s) shall be up to 90(Ninety) days from the date of opening of tender(s).
52. In case it is found during evaluation or at any time before signing of contract or after its execution and during the period of subsistence there of that one or more of the eligibility conditions have not been met by the applicant, or the applicant has made deliberate misrepresentation or has given any deliberately incorrect or false information, the applicant shall be disqualified forthwith, if not, yet appointed as the contractor/supplier and if the applicant has already been issued the LOA or has entered into the contract, as the case may be, the same shall, notwithstanding anything to the contrary contained therein be liable to be terminated along with forfeiture of earnest money deposit (EMD)/performance security by a communication in writing by the corporation being liable in any matter whatsoever to the applicant and without prejudice to any other right or remedy with the corporation may have under the bidding documents the contract or under applicable law. Besides the corporation reserves the right to blacklist the applicant for any future dealing along with the initiation of any appropriate penal action as per the applicable law.

53. The rates of the contractor shall be inclusive of labour cess @ 1% or as applicable and necessary recovery of labour cess shall be made from each RA bill by the ITDC to be deposited with the labour board of the concerned state. In case the labour board is not established in the state, recovery made by ITDC on account of labour cess shall be retained under suspense and will be deposited with the labour board at the later date as and when the labour board is established in the state.

54. The tenderers whose tender is accepted shall permit the Corporation at the time of making any payment to him for work done under the Contract to deduct such sums as will along with the amount of the EMD deposited amount to 5 per cent of the gross amount of the bill 50.00 Lakh. The security Deposit deducted will be released to the contractor on expiry of defect liability period on the demand of the contractor provided the project engineer is satisfied that there is no demand outstanding against the contractor.

55. All the corrigendum/extension regarding this tender will be published on the mentioned website only.

56. The vendors shall pass the benefits accrued due to the GST to the ITDC. In contingency of any legal proceedings/action taken by the tax authorities for non-compliance of anti-profiteering clause by the vendor. The vendor shall indemnifies on stamp paper or on letter head the ITDC from any losses monetary or otherwise suffered on account of non-compliance of anti-profiteering clause by the vendor.

57. The vendor shall indemnify the ITDC from any direct or indirect losses suffered by the ITDC due to non-compliance on part of vendor under GST Act, which may affects the GSTN rating of ITDC.

58. In case of any non-compliance by the vendor which results into losses of input tax credit under GST Law to ITDC, the vendor shall pay ITDC an amount equal to lost input tax credit along with interest/penalties or any other monetary loss suffered because of such non-compliance under GST Act.
59. Vendor shall indemnifies the ITDC against any loss monetary or otherwise arising due to legal proceedings initiated by the tax authorities as a result of non-compliance/default in paying tax by ITDC in respect of the recourse action in case of “BLACK LISTING” under the “Compliance Rating Score” mechanism due to non-compliance/default by vendor.

60. In case of any new tax/levy/duty etc becomes applicable after the date of Bidder’s offer but before opening of the price bid, the Bidder/contractor must convey separately its impact on his price duly substantiated by documentary evidence in support of the same before opening of price bid. Claim for any such impact after opening the Price Bid will not considered by ITDC for reimbursement of tax or reassessment of offer.

61. Low rated and high rated items would be identified while awarding the contract with immediate effect further. For abnormally high rated items, the running account payments in respect of such items would be restricted to estimated rates/justified rates plus or minus the percentage quoted above or below the overall estimate/justified cost. The rates so restricted would only be released after 90% work in respect of abnormally low rate items are executed by the vendor.

62. The Intending tenderers are advised to visit the I.T.D.C. website:- www.theashokgroup.com,https://etenders.gov.in/eprocure/app regularly till closing date of submission of tender for any corrigendum / addendum /amendment. The quoted item should strictly comply with our requirement given in the tender document. Incomplete/conditional offer or tender without EMD will be rejected out rightly. The tender completed in all respect must be applied online before the last date and time of tender submission. The Techno Commercial Bid will be opened on the scheduled date and time of opening online bids. Financial Bids of only technically qualified tenders shall be opened at a later date which will be intimated to only technically qualified bidders. The Management reserves the right to accept/reject any of all bids in part or all without assigning any reason thereof.

63. Drawings enclosed with this tender are indicative only. The bidder who desires to see larger size drawings, the same can be seen with our project Engineer at his office at Hotel Kalinga Ashok, Bhubneshwar.

For & on behalf of the
India Tourism Development Corporation Ltd.
Signature:

Signature: _____________________________
HOD (PPMC),
ITDC
Room No. 508, 5th Floor,
Scope Complex, Core – 8,
Lodhi Road, New Delhi – 110003
Annexure-A

Instructions / Guidelines for NICE-Tendering Portal

URL - [https://etenders.gov.in](https://etenders.gov.in)

For Registration of Bidders - Click “Online Bidder Enrolment” link + Bidders registration manual

For Bidders – Class 3DSCs are required

**System Requirement – Windows 7 or onward plus internet connection + Java 8 Version 151 (Available at Sl.No. 5, “Download” Tab of NICE-Tendering Portal)**

Gap of 24 hours is advised between tender closing date & time and tender opening date & time. Every bidder can participate from their own location.

**Tab “Help For Contractors”**

*Special Instructions to the Contractors / Bidders for the e-submission of the bids online through these Procurement Portal*

1. Bidder should do Online Enrolment in this Portal using the option Click Here to Enroll available in the Home Page. Then the Digital Signature enrollment has to be done with the e-token, after logging into the portal. The e-token may be obtained from one of the authorized Certifying Authorities such as eMudhra CA / GNFC / IDRTB / MTNL/ Trust line / Safe Scrpt / TCS.

2. Bidder then logs into the portal giving user id / pass word chosen during enrollment.

3. The e-token that is registered should be used by the bidder and should not be misused by others.

4. DSC once mapped to an account cannot be remapped to any other account. It can only be inactivated.

5. The Bidder scan update well in advance, the documents such as certificates, purchase order details etc., under My Documents option and these can be selected as per tender requirements and then attached along with bid documents during bid submission. This will ensure lesser upload of bid documents.

6. After downloading / getting the tender schedules, the Bidder should go
through them carefully and then submit the documents as per the tender documents; otherwise, the bid will be rejected.

7. The BOQ template must not be modified / replaced by the bidder and the same should be uploaded after filling the relevant columns, else the bidder is liable to be rejected for that tender. Bidders are allowed to enter the Bidder Name and Values only.

8. If there are any clarifications, this may be obtained on line through the e Procurement Portal, or through the contact details given in the tender document. Bidder should take into account of the corrigendum published before submitting the bids online.

9. Bidder, in advance, should prepare the bid documents to be submitted as indicated in the tender schedule and they should be in PDF / XLS / RAR / DWF formats. If there is more than one document, they can be clubbed together.

10. Bidder should arrange for the EMDs as specified in the tender. The original should be posted / couriered / given in person to the Tender Inviting Authority, within the bid submission date and time for the tender.

11. The bidder reads the terms and conditions and accepts the same to proceed further to submit the bids.

12. The bidder has to submit the tender document(s) online well in advance before the prescribed time to avoid any delay or problem during the bid submission process.

13. There is no limit on the size of the file uploaded at the server end. However, the upload is decided on the Memory available at the Client System as well as the Network bandwidth available at the client side at that point of time. In order to reduce the file size, bidders are suggested to scan the documents in 75-100DPI so that the clarity is maintained and also the size of file also gets reduced. This will help in quick uploading even at very low bandwidth speeds.

14. It is important to note that, the bidder has to click on the Freeze Bid Button, to ensure that he / she completes the Bid Submission Process. Bids which are not frozen are considered as Incomplete / Invalid bids and are not considered for evaluation purposes.

15. In case of Offline payments, the details of the Earnest Money Deposit (EMD) document submitted physically to the Department and the scanned copies furnished at the time of bid submission online should be the same
otherwise the Tender will be summarily rejected.

16. The Tender Inviting Authority (TIA) will not be held responsible for any sort of delay or the difficulties faced during the submission of bids online by the bidders due to local issues.

17. The bidder may submit the bid documents on line mode only, through this portal. Offline documents will not be handled through this system.

18. At the time of freezing the bid, the e Procurement system will give a successful bid updation message after uploading all the bid documents submitted and then a bid summary will be shown with the bid no, date & time of submission of the bid with all other relevant details. The documents submitted by the bidders will be digitally signed using the e-token of the bidder and then submitted.

19. After the bid submission, the bid summary has to be printed and kept as an acknowledgement as a token of the submission of the bid. The bid summary will act as a proof of bid submission for a tender floated and will also act as an entry point to participate in the bid opening event.

20. Successful bid submission from the system means, the bids as uploaded by the bidder is received and stored in the system. System does not certify for its correctness.

21. The bidder should see that the bid documents submitted should be free from virus and if the documents could not be opened, due to virus, during tender opening, the bid is liable to be rejected.

22. The time that is displayed from the server clock at the top of the tender Portal, will be valid for all actions of requesting bid submission, bid opening etc, in the e-Procurement portal. The Time followed in this portal is as per Indian Standard Time (IST) which is GMT+5:30. The bidders should adhere to this time during bid submission.

23. All the data being entered by the bidders would be encrypted at the client end, and the software uses PKI encryption techniques to ensure the secrecy of the data. The data entered will not be viewable by unauthorized persons during bid submission and not viewable by any one until the time of bid opening. Overall, the submitted bid documents become readable only after the tender opening by the authorized individual.

24. During transmission of bid document, the confidentiality of the bids is maintained since the data is transferred over secured Socket Layer (SSL) with 256 bit encryption technology. Data encryption of sensitive fields is
The bidders are requested to submit the bids through online e Procurement system to the TIA well before the bid submission end date and time (as per Server System Clock).

Frequently Asked Questions on Digital Signature Certificate

1. What is a Digital Signature Certificate?

Digital Signature Certificates (DSC) are the digital equivalent (that is electronic format) of physical or paper certificates. Examples of physical certificates are drivers' licenses, passports or membership cards. Certificates serve as a proof of identity of an individual for a certain purpose; for example, a driver's license identifies someone who can legally drive in a particular country. Likewise, a digital certificate can be presented electronically to prove your identity, to access information or services on the Internet or to sign certain documents digitally.

2. Why is Digital Signature Certificate (DSC) required?

Like physical documents are signed manually, electronic documents, for example e-forms are required to be signed digitally using a Digital Signature Certificate. Transactions that are done using Internet if signed using a Digital Signature Certificate becomes legally valid.

3. Who issues the Digital Signature Certificate?

A licensed Certifying Authority (CA) issues the digital signature. Certifying Authority (CA) means a person who has been granted a license to issue a digital signature certificate under Section 24 of the Indian IT-Act 2000.

4. What are the different types of Digital Signature Certificates valid for e-Tendering program?

The different types of Digital Signature Certificates are:

- Class2: Here, the identity of a person is verified against a trusted, pre-verified database.
- Class3: This is the highest level where the person needs to present himself or herself in front of a Registration Authority (RA) and prove his / her identity.

5. What type of Digital Signature Certificate (DSC) is to be obtained for e Filing on the e Tendering Portal?
DSC of Class 2 and Class 3 category issued by a licensed Certifying Authority (CA) needs to be obtained for e-filing on the e-Tendering Portal.

6. What is the cost of obtaining a Digital Signature Certificate?

The cost of obtaining a digital signature certificate may vary as there are many entities issuing DSCs and their charges may differ. The approximate cost could vary between Rs. 2000 to Rs. 3000 depending on the number of years for which it is issued.

7. How to obtain DSC for dept users?

The Department Officers shall get the DSC sore-Tokens from any of the authorized vendors of CA, India. For convenience, the vendor addresses are given here: To View [click here]
The Vendor list is not exhaustive. The Department users may ensure that they get two pairs of Keys (One for Signing and One for Encryption).

8. How to obtain DSC for contractors / bidders

Bidder scan obtain the e Tokens from the following address To View [click here]

9. How much time do CAs take to issue a DSC?

The time taken by Certifying Authorities to issue a DSC may vary from three to seven days.

10. What is the validity period of a Digital Signature Certificate?

The Certifying Authorities are authorized to issue a Digital Signature Certificate with a validity of one or two years. The maximum period for which the DSC is issued is only two years. On the expiry of the term, the Digital Signature Certificate can be revalidated by paying the fees again.

11. What is the legal status of a Digital Signature?

Digital Signatures are legally admissible in a Court of Law, as provided under the provisions of IT.

12. Is a company required to obtain a Digital Signature Certificate in its own name for e Tendering
Digital Signature Certificate (DSC) is not required by Companies but by individuals. For example the Director or the Authorized signatory signing on behalf of the Company requires a DSC.

13. Can I do e-filing of documents if I do not possess a DSC?

No. It is mandatory to have a valid digital signature certificate for e-filing the forms on e-Tendering portal.

For further guidance please refer "Bidders Manual Kit" on the NICE-Tendering Website https://etenders.gov.in/eprocure/app
24 Hour Support details

For any technical related queries please call at 24x7 Help Desk Number 0120-4200462, 0120-4001002, 0120-4001005, 0120-6277787.

International Bidders are requested to prefix 91 as country code

Note-Bidders are requested to kindly mention the URL of the Portal and Tender Id in the subject While e-mailing any issue alongwith the Contact details. For any issues/clarification to the tender(s) published kindly contact the respective Tender Inviting Authority.

Tele 0120-4200462, 0120-4001002, 0120-4001005, 0120-6277787.

E-Mail:  support@eproc.nic.in

For any Policy related matter/Clarifications Please contact Dept. of Expenditure, Ministry of Finance.

E-Mail: cppp- doe@nic.in
Guidelines/ Instructions regarding submission of Integrity Pact

The bidders are required to adhere the following guidelines in respect of submission of Integrity Pact:-

(1) The Integrity Pact is to be prepared on a non-judicial stamp paper of Rs. 100.00 or the amount as may be applicable in the respective state- whichever is higher, by the bidder. Cost of the stamp paper is to be borne by the bidder.

(2) The bidder will mention the date and other relevant details as per the tender document.

(3) A scanned copy of the Integrity Pact signed by the authorized signatory/ partners / consortium members is to be uploaded along with the Techno- Commercial Bid and the original document is to be submitted to in the office of Dy. GM (Civil), India Tourism Development Corporation, Engg. Project Division, Room No. 613, 6th Floor, Core – 8, Scope Complex, Lodhi Road, New Delhi on or before the due date/ extended due date of submission of the bids.

(4) In case the bidder wants an original copy of the Integrity Pact for his reference/ record, they will have to submit two sets of the Integrity Pact on non-judicial stamp paper of Rs. 100.00 or the amount as may be applicable in respective state- whichever is higher, by the bidder. Cost of the stamp paper is to be borne by the bidder.

(5) Integrity Pact will be part of terms & conditions of the contract and bidder is bound by the provisions contained therein.

(6) Particulars of two Independent External Monitors (IEM’s) appointed by ITDC is as under :-

<table>
<thead>
<tr>
<th>Names and contact details of the two Independent External monitors (IEM’s) appointed by ITDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Bhushan Chander Gupta IAS (Retd.) 3297, Sector 19D, Chandigarh – 160019 Mobile No. 9971199729 E-mail : <a href="mailto:bcgupta2000@yahoo.com">bcgupta2000@yahoo.com</a></td>
</tr>
<tr>
<td>Sh. Jagmohan Garg (Ex- Vigilance Commissioner CVC) Flat No. 604, ASPIRE – 2, Emerald Court, Supertech, Sector – 93A, NOIDA Expressway, NOIDA – 201301 (UP) Mobile No. : 8800889956 E-mail : <a href="mailto:jagmohan.garg@gmail.com">jagmohan.garg@gmail.com</a></td>
</tr>
</tbody>
</table>
# Format of Annual Turnover as per the Audited Accounts

<table>
<thead>
<tr>
<th>S. No</th>
<th>Financial Year</th>
<th>Turnover (INR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2016 – 17</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2017 – 18</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2018 – 19</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Average Turnover of above three years</td>
<td></td>
</tr>
</tbody>
</table>

(Signature of Bidder with Seal, CA)

This is to certify that the above information has been examined by us on the basis of relevant documents, books of accounts & other relevant information and the information submitted above is as per our record.

(Signature of Authorized Signatory, CA) with membership No.

Seal of CA Firm
Interpretation and Definitions

1. Singular and Plural
Where the context so requires, words importing the singular only also include the plural and vice versa.

2. Headings and Marginal Notes to Conditions
Headings and marginal notes to these General Conditions shall not be deemed to form part thereof or be taken into consideration in the interpretation or construction thereof or of the Contract.

3. Definitions
   a) "Corporation” shall mean the India Tourism Development Corporation having its registered office at Scope Complex 6th floor Core 8 Lodi Road New Delhi-110003, in the State of Delhi and includes a duly authorized representative of the Corporation or any other person empowered in this behalf by the Corporation to discharge all or any of its functions.
   b) The “Accepting Authority” shall mean the Chief Engineer or his nominee on behalf of the India Tourism Development Corporation.
   c) The “Contract” shall mean the notice inviting the tender, the tender and acceptance thereof and the formal agreement, if any, executed between the India Tourism Development Corporation Unit: Engineering Project Division and the Contractor together with the documents referred to therein including these conditions with appendices and any special conditions, the specifications, designs, drawings, schedule of quantities with rates and amounts and schedule of rates. All these documents taken together shall be deemed to form one Contract and shall be complementary to one another.
   d) The “Contractor” shall mean the individual or firm or company whether incorporated or not, undertaking the works and shall include legal representatives of such individuals or persons composing such firm or unincorporated company, or successors of such firm or company as the case may be and permitted assigns of such individual or firm or company.
   e) The “Contract Sum” shall mean: in the case of Item Rate Contracts the cost of the work arrived at after extension of the quantities shown in Schedule of
Quantities by the item rates quoted by the tenderer for the various items.

f) A “Day” shall mean a day of 24 hours from midnight to midnight irrespective of the number of hours worked in that day.

g) I “Project Engineer” / “Assistant Engineer” shall mean the Engineering Officer appointed by the India Tourism Development Corporation, who shall direct supervise and be in charge of the works for purposes of this contract, and maintain liaison with the architect(s).

II "Architect(s)/ Consultant(s)" shall mean the person/persons practicing as such and duly appointed by the Accepting Authority for the Works under a separate Agreement getting out the Architect(s)/Consultant(s) responsibilities and terms.

III "Clerk of Works" shall mean the engineer appointed at the Works by the Accepting Authority to represent the Architect(s).

h) “Excepted Risks” are risks due to riots (otherwise than among Contractor's employees) and civil commotion (in so far as both these are uninsurable), war (whether declared or not), invasion, act of foreign enemies, hostilities, civil war, rebellion, revolution, insurrection, military or usurped power, any acts of Government, damage from aircraft, acts of God, such as earthquake, lightning and unprecedented floods and other causes over which the Contractor has no control and accepted as such by the Accepting Authority or causes solely due to use or occupation by the Corporations of the part of Works in respect of which a certificate of completion has been issued or cause solely due to Corporation's faulty design of Works.

i) "Market Rate" shall be the rate as decided by the Project Engineer on the basis of the cost of materials inclusive of any taxes, octroi or such statutory imposition, at the time of work, and cost of Labour at the site where the work is to be executed plus the percentage mentioned in Schedule “F” to cover all overheads, supervision and profit.

j) Schedule(s) referred to in these conditions shall mean the standard schedule of rates prescribed by the India Tourism Development Corporation and the amendments thereto issued from time to time.

k) The "Site" shall mean the lands and/or other places on, under, in or through which the work is to be executed under the Contract including any other lands or places which may be allotted by the Corporation or used for the purposes of the Contract.

l) "Temporary Works" shall mean all temporary works of every kind required in or about execution, completion or maintenance of the works.
m) "Urgent Works" shall mean any urgent measures which in the opinion of the Project Engineer, become necessary during the progress of the works to obviate any risk of accident or which become necessary for security.

n) A “Week” shall mean seven days without regard to the number of hours worked in any day in that week.

o) The "Works" shall mean the works to be executed in accordance with the Contract or part(s) thereof as the case may be and shall include all extra or additional, altered or substituted works or temporary and urgent works as required for performance of the Contract.

Scope and Performance

Contract Documents
4. The Contractor shall be furnished, free of charge; one certified true copy of the contract Document and of all further drawings, which may be issued during the progress of the works.

4.1 None of these documents shall be used by the Contractor for any purposes other than that of this Contract.

Works to be Carried Out
5. The work to be carried out under the contract shall, except as otherwise provided in these conditions, include all labour, materials, tools, plant, equipment, and transport which may be required in preparation of and for and in the full and entire execution and completion of the works. The descriptions given in the Schedule of Quantities shall, unless otherwise stated, be held to include wastage on materials, carriage and cartage and return of empties, hoisting, setting, fitting and fixing in position and all other labour necessary in and for the full and entire execution and completion as aforesaid in accordance with good practice and recognized principles.

Inspection of Site
6. The Contractor shall inspect and examine the Site and its surroundings and shall satisfy himself before submitting his tender as to the nature of the ground and subsoil (so far as is practicable), the form and nature of the Site, the quantities and nature of work and materials necessary for the (completion of the works and means of access to the site, the accommodation he
may require and in general shall himself obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect his tender. No extra charges consequent on any misunderstanding or otherwise shall be allowed.

**Sufficiency of Tender**

7. The Contractor shall be deemed to have satisfied himself before tendering as to correctness and sufficiency of his tender for the Works and of the rates and prices quoted in the Schedule of Quantities, which rates and prices shall, except as otherwise provided, cover all his obligations under the Contract and all matters things necessary for the proper completion and maintenance of the works.

**Discrepancies and Adjustment of Errors**

8. The several documents forming the Contract are to be taken as mutually explanatory of one another, detailed drawings being followed in preference to small-scale drawings and figured dimensions in preference to scale and Special Conditions in preference to General Conditions.

8.1 In the case of discrepancy between Schedule of Quantities, the Specifications and/or the Drawings, the following order of preference shall be observed:

a) Description in Schedule of Quantities
b) Particular Specification and Special Conditions, If any
c) Drawings
d) General Specifications

8.2 If there are varying or conflicting provisions made in anyone document forming part of the Contract, the Accepting Authority shall be the deciding authority with regard to the intention of the document.

8.3 Any error in description, quantity or rate in Schedule of Quantities or any omission there from shall not vitiate the Contract or release the Contractor from the execution of the whole or any part of the Works Comprised therein according to drawings specifications or from any of his obligations under the Contract.

8.4 If on check there are found to be differences between the rates given by the Contractor in Words and figures or in the amount
worked out by him in the Schedule of Quantities and General Summary, the same shall be adjusted in accordance with the following rules:

a) In the event of a discrepancy between description in words and figures quoted by a tenderer, the rate which corresponds to the amount worked out by the Contractor shall be taken as correct. When the amount of an item is not worked out by the Contractor or it does not correspond to the rate written either in figures or in words, the rate quoted by the contractor in WORDS shall be taken as correct.

b) In the event of an error occurring in the amount column of Schedule of Quantities as a result of wrong extension of the unit rate and quantity the UNIT RATE shall be regarded as firm and extension shall be amended on the basis of the rate.

c) All errors in totalling in the amount column and carrying forward totals shall be corrected.

d) The totals of various sections of Schedule of Quantities as amended shall be carried over to the General Summary and the tendered sum amended accordingly. The tendered sum so altered shall, for the purpose of the tender, be substituted for the sum originally tendered and considered for acceptance instead of the original sum quoted by the tenderer. Any rounding off of totals in various sections of Schedule of Quantities or in General Summary by the tenderer shall be ignored.

Security Deposit / Performance Guarantee (GCC)

9. (a) The successful tenderer shall deposit an amount equal to the 5% the tender and accepting value of the work (without limit) as performance guarantee in the form of banker cheque / demand draft / pay order / an irrevocable bank guarantee bound of any scheduled bank or the State Bank of India in the prescribed form. The time allowed for submission of the performance guarantee by the contractor shall be decided by the NIT.
approving authority for a period ranging from 4 to 15 days of
issue of the letter of acceptance, depending upon the magnitude
and / or urgency of the work. The Performance Guarantee will
be valid till the completion of the work.

9. (b) The Contractor shall permit the Corporation at the time of
making any payment to him for work done under the contract to
deduct such sums as will along with the amount of the EMD
deposited amount to 5 percent of the gross amount of the bill.
The Security Deposit deducted will be released to the contractor
on expiry defect liability on the demand of the contractor
provided the project engineer is satisfied that there is no
demand outstanding against the contractor.

9. (c) When the Security Deposit reaches a limit of Rs. 5,00,000/- the
Contractor if so desires may convert the amount into Bank
Guarantee from any scheduled bank. The validity of this Bank
Guarantee shall extend upto the expiry of the Defects Liability
Period. This shall further be subject to the condition that at least
one fourth of the total Security Deposit shall remain in cash until
the expiry of Defects Liability Period.

Deviations/Variations Extent and Pricing

10. The Architects and/or Project Engineer shall have power (i) to
make alterations in, omissions from, additions to, or
substitutions for, the original specifications, drawings, designs
and instructions that may appear to him to be necessary or
advisable during the progress of the work, and (ii) to omit part
of the Works in case of non-availability of a portion of the Site or
for any other reason, and the Contractor shall be bound to carry
out the Works in accordance with any instructions given to him
in writing signed by the Project Engineer and such alterations,
omissions, additions or substitutions shall form part of the
Contract as if originally provided therein and any altered,
additional or substituted work which the Contractor may be
directed to do in the manner above specified as part of the
Works, shall be carried out by the Contractor on the same
conditions in all respects including price on which he agreed to
do the main work except as hereinafter provided. No work which
radically changes the original nature of the Contract shall be
ordered by the Architect'/ Project Engineer as a deviation and in
the event of any deviation being ordered which in the opinion of
the Contractor changes the original nature of the Contract, he
shall nevertheless carry it out and the disagreement as to the
nature of the work and the rate to be paid there for shall be
resolved in accordance with Condition 49.

10.1 The time for completion of the Works shall, in the event
of any deviations resulting in additional Cost over the
Contract Sum being ordered, be extended as follows if
requested by the Contractor:
a) In the proportion which the additional cost of the
altered, additional or substituted work, bears to
the original Contract Sum; plus
b) 25% of the time calculated in (a) above or such
further additional time as may be considered
reasonable by the Project Engineer.

Extra Items
11.(a) The rates of all authorized extra items or additional,
altered or substituted work, shall be worked out as
follows:-

i) If the rate for additional, altered or Substituted
item of work is specified in the Schedule of
Quantities, the Contractor shall carry out the
additional, altered or substituted item at the same
rate. In the case of composite tenders, where two
or more schedules of Quantities may form part of
the Contract the applicable rate shall be taken
from the schedule of Quantities of that particular
part in which the deviation is involved, failing that
at the lowest applicable rate for the same item of
work in the other schedule of quantities.

ii) If the rate for any altered, additional or
substituted item of work is not specified in the
Schedule of Quantities, the rate for that item shall
be derived form the rate for the nearest similar
item specified therein. In case of composite
tenders where two or more schedule of quantities
form part of the contract, the rate shall be derived
from the nearest similar item in the Bills of
Quantities of the particular part of Works in which the deviation is involved, failing that from the lowest of the nearest similar items in other schedule of quantities.

**iii)** If the rate for any additional, altered or substituted item of work cannot be determined in the manner specified in sub-paras (i) and (ii) above, then such item of Work shall be carried out at the rate entered in the Latest CPWD Schedule of Rates PLUS OR MINUS the percentage by which the tendered amount of the Works actually awarded is higher or lower than the estimated amount of the Works actually awarded.

**iv)** Where the rates cannot be derived in the manner of (i) to (iii) above, the same shall be worked out on the basis of Market Rates or actual expenditure incurred in the execution of the item inclusive of any taxes, octroi. etc., plus 15% Contractor's profit, overheads and supervision charges.

**b)** The Contractor shall, within 14 days of the date of receipt of an order to carry out the above work, or within 14 days after having carried out the above work. Submit the rates, which he proposes to claim for such items of work, supported by rate analysis and vouchers. The Architect / Project Engineer shall communicate to the Contractor the rates admissible for these items.

**Suspension of Works**

**12.(a)** The Contractor shall, on receipt of the order in writing of the Project Engineer, suspend the progress of the Works or any part thereof for such time in such a manner as the Project Engineer may consider necessary for any of the following reasons: -

**i)** on account of any default on part of the
ii) for proper execution of the Works or part thereof for reasons other than the default of the Contractor; or

iii) For safety of the Works or part thereof.

The Contractor shall during such suspension, properly protect and secure the Works to the extent necessary and carry out the instructions given in that behalf by the Project Engineer.

12.(b) If the suspension is ordered for reasons (ii) and (iii) in sub-para a) above:

i) The Contractor shall be entitled to an extension of time equal to the period of every such suspension PLUS 25%.

**Time and Extension for Delay**

13. The time allowed for execution of the works or the extended time in accordance with these conditions shall be the essence of the Contract. The work shall commence from the 7th day after the date of work order issued by the Architect/Project Engineer, or from the date of handing over of the site whichever is later. If the Contractor commits default in commencing the work as aforesaid, the corporation shall without prejudice to any other right or remedy be at liberty to forfeit the earnest money absolutely.

13.1 The Contractor shall agree upon a time and progress charts or PERT/CPM Chart ensuring good progress accordingly.

13.2 If the works be delayed by:

a) Force majored, or

b) abnormally bad weather or

c) serious loss or damage by fire or

d) civil commotion, local combination of workmen, strike or lockout, affecting any of the trades employed on the work or

e) delay on the part of other contractors or tradesmen engaged by the Corporation in executing work not forming part of the
Contract or
f) non-availability of stores which are the responsibility of the Corporation to supply or

g) non-availability or breakdown of Tools and Plant to be supplied or supplied by the Corporation or

h) Any other cause which in the absolute discretion of the authority is beyond the Contractor’s control.

Then upon the happening of any such event causing delay, the contractor shall immediately give notice thereof in writing to the Project Engineer but shall nevertheless use constantly his best endeavours to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Project Engineer to proceed with the works.

13.3 Request for extension of time to be eligible for consideration shall be made by the Contractor in writing as per 28.3 within fourteen days of happening of the event causing delay. The Contractor may also, if practicable, indicate in such a request the period for which extension is desired.

13.4 In any such case the authority mentioned in Schedule “F” may give a fair and reasonable extension of time for completion of the work. Such extension shall be communicated to the Contractor by the Architect/Project Engineer in writing, within 3 months of the date of receipt of such request by the Project Engineer/Architect.

Plant and Equipment
14. The Contractor shall arrange at his own expense all tools, plants and equipment’s required for the execution of the work, in such numbers or quantity as to meet the time of completion specified.

Materials to be provided by the Contractor

15. (a) The Contractor shall, at his own expense, provide all materials required for the Works other than those, which are to be supplied by the Corporation.

15. (a)1. All materials to be provided by the Contractor shall be in conformity with the specifications laid down in the Contract and the Contractor shall, if requested by the Project Engineer furnish proof to
the satisfaction of the Project Engineer that the materials so comply.

15.(a)2. The Contractor shall, at his own expense and without delay, supply to the Project Engineer samples of materials proposed to be used in the Works. If samples are not approved, the Contractor shall forthwith arrange to supply to the Project Engineer for his approval fresh samples complying with the specifications laid in the Contract.

15.(a)3. The Project Engineer shall have full powers to require removal of any or all of the materials brought to Site by the Contractor which are not in accordance with the Contract specifications or do not conform in character or quality to samples approved by him. In case of default on the part of the Contractor in removing rejected materials the Project Engineer shall be at liberty to have them removed by other means. The Project Engineer shall have full powers to procure other proper materials to be substituted for rejected materials and in the event of the Contractor refusing to comply, he may cause the same to be supplied by other means. All costs, which may attend upon such removal and/or substitution, shall be borne by the Contractor.

15.(a)4. Subject as hereinafter provided in Condition 47 all charges on account of octroi, terminal or sales tax and other duties on materials obtained for the Works from any source (excluding materials supplied by the Corporation) shall be borne by the Contractor.

15.(a)5. The Project Engineer shall be entitled to have tests carried out as specified in the Contract for any materials supplied by the Contractor other than those for which, as stated above, satisfactory proof has already been furnished at the cost of the Contractor and the Contractor shall provide at his expense all facilities which the Project Engineer may require for the purpose. If no tests are
specified in the Contract, and such tests are required by the Project Engineer, the Contractor shall provide all facilities required for the purpose and the charges for these tests shall be borne by the Contractor only, if the tests disclose that the said materials are not in accordance with the provision of the Contract. The cost of materials consumed in tests shall be borne by the Contractor in all cases except when otherwise provided.

**Materials to be supplied by the Corporation**

15.(b) Materials to be supplied by the Corporation are shown in Schedule “B” which also stipulates quantum, place of issue and rate(s) to be charged in respect thereof.

15.(b) 1. If after acceptance of the tender the Contractor desires the Corporation to supply any other materials, such materials may be supplied by the Corporation, if available, at rates to be fixed by the Accepting Authority.

15.(b) 2. The Contractor shall bear the cost of loading, transporting to Site, unloading, storing under cover as required, assembling and joining the several parts together as necessary and incorporating or fixing materials in the Works including all preparatory work of whatever description as may be required.

15.(b) 3. All materials issued to the contractor by the Corporation for incorporation or fixing in the Works (including preparatory work) shall, on completion or on foreclosure of the works. Be returned by the Contractor at his expense, at the place of issue, after making due allowance for actual consumption, reasonable wear and tear and/or waste. The decision of the Engineer in this regard is final and binding. If the Contractor is required to deliver such materials at a place other than the place of issue, he shall do so and the transportation charges which would have been incurred by the Contractor had such materials been
deliver at the place of issue, shall be borne by the Corporation.

**15.(b)4.** Surplus materials returned by the Contractor shall be credited to him by the Project Engineer rates not exceeding those at which these were originally issued to him after taking into consideration any deterioration or damage which may have been caused, to the said materials whilst in the custody of the Contractor.

**15.(b)5.** If on completion of Works the Contractor fails, to return surplus materials out of those supplied by the Corporation, then in addition to any other liability which the Contractor would incur, the Project Engineer may, by a written notice to the Contractor, require him to pay within a fortnight of receipt of the notice, for such unreturned surplus materials at double the issue rates.

**15.(b)6.** If cement is to be supplied by the Corporation, every cement go down shall be provided with two locks on each door. The key of one lock at each door shall remain with the Project Engineer or his representative and that of the other lock with the Contractor's authorized agent at Site of Works so that cement is removed from the go down only according to daily requirements with the knowledge of both the parties.

**General**

**15.(c)** Materials required for the Works, whether brought by the Contractor or supplied by the Corporation, shall be stored by the Contractor only at places approved by the Project Engineer, storage and safe custody of materials shall be the responsibility of the Contractor.

**15.(c)1.** Corporation's officials concerned with the Contract shall be entitled at any time to inspect and examine any materials intended to be used in or on the works, either on the Site or at factory or workshop or other place(s) where such materials are assembled/fabricated/ manufactured or at any
place(s) where these are lying or from which these are being obtained and the Contractor shall give such facilities as may be required for such inspection and examination.

15.(c)2. All materials brought to the Site shall become and remains the property of the Corporation and shall not be removed off the Site without the prior written approval of the Project Engineer. But, whenever the works are finally completed and advance, if any, in respect of any such material is fully recovered. The contractor, shall at his own expense, forthwith remove from the Site all surplus materials originally supplied by him and upon such removal, the same shall reset in and become the property of the Contractor.

Labour
64. The Contractor shall employ labour in sufficient numbers either directly or through sub-contractors, where such subletting is permitted, to maintain the required rate of progress and of quality to ensure workmanship of the degree specified in the Contract and to the satisfaction of the Project Engineer. The Contractor shall not employ in connection with the Works any person who has not completed his fifteenth year of age.


16.2 The Contractor shall indemnify the Corporation against any payments to be made under and for observance of the Regulations aforesaid without prejudice to his right to claim indemnity from his sub-contractors.

Setting out the Works

17. The Contractor shall provide all labour and setting out apparatus required and set out the
works and be responsible for the accuracy of the same. He shall amend at his own cost any error found at any stage, which may arise through inaccurate setting out.

Site Drainage
18. (a) All water which may accumulate on the Site during the progress of the Works, or in trenches and excavations, from other than the Excepted Risks shall be removed from the Site to the satisfaction of the Project Engineer and at the Contractor's expense.

18. b) Nuisance: The Contractor shall not at any time do, cause or permit any nuisance on the Site or do anything which shall cause unnecessary disturbance or inconvenience to owners, tenants or occupiers of other properties near the Site and to the public generally.

Materials Obtained from Excavation
19. Materials of any kind obtained from excavation on the Site shall remain the property of the Corporation and shall be disposed of as the Project Engineer may direct.

Treasure Trove, Fossil, etc
20. All fossils, coins, articles of value or antiquity and structures and other remains or things of geological or archaeological interest discovered on the Site shall be the absolute property of the Corporation and the Contractor shall take reasonable precautions to prevent his workman or any other person from removing or damaging any such article or thing and shall immediately upon discovery thereof and before removal acquaint the Project Engineer with such discovery and carry out the Project Engineer’s directions as to the disposal of the same at the expense of the Corporation.

Protection of Trees
21. Trees designated by the Project Engineer shall be protected from damage during the Course of the Works and earth level within 1 meter of each such tree shall not be changed. Where necessary, such trees shall be protected by providing temporary fencing.
Watching and lighting

22. The Contractor shall provide and maintain at his own expense all lights, guards, fencing and watching when and where necessary or required by the Project Engineer for the protection of the Works or for the safety and convenience of those employed on the works or the public.

Contractor's Supervision

23. The Contractor shall either himself supervise the execution of the Works or shall appoint qualified Engineer approved by the Architect and/or Project Engineer to act in his stead. If the Contractor fails to appoint a suitable agent as directed by the Engineer-in-Charge, the Engineer-in-Charge shall have full powers to suspend the execution of the Works until such date as a suitable agent is appointed and the Contractor shall be held responsible for the delay so caused to the works.

Inspection and Approval

24. All works embracing more than one process shall be subject to examination and approval at each stage thereof and the Contractor shall give due notice to the Architect and/or Project Engineer shall or his authorized representative when each stage is ready. In default of such notice, the Project Engineer shall be entitled to appraise the quality and extent thereof.

24.1 No work shall be covered up or put out of view without the approval of the Architect/Project Engineer or his authorized representative and the Contractor shall afford full Opportunity for examination and measurement of any work which is about to be Covered up or put out of view and for examination of foundations before permanent Work is placed thereon. The Contractor shall give due notice to the Project Engineer or his authorized representative whenever any such work or foundation is ready for examination and the Architect/Project Engineer or his representative shall, without unreasonable delay, unless he considers it unnecessary and advises the
Contractor accordingly, attend for the purpose of examining and measuring such work or of examining such foundations. In the event of the failure of the Contractor to give such notice he shall, if required by the Architect/Project Engineer, uncover such work at the Contractor's expense.

24.2 Departmental officers concerned with the Contract shall have powers at any time to inspect and examine any part of the Works and the Contractor shall give such facilities as may be required for such inspection and examination.

Removal of Workmen

The Contractor shall employ in and about the execution of the works only such persons as are skilled and experienced in their several trades and the Architect/Project Engineer shall be at liberty to object to and require the Contractor to remove from the Works any person employed by the Contractor in or about the execution of the Works who in the opinion of the Project Engineer misconduct himself or is incompetent or negligent in the proper performance of his duties and such person shall not be again employed upon the Works without permission of the Architect/Project Engineer.

Uncovering and Making Good

The Contractor shall uncover any part of the Works and/or make openings in or through the same as the Project Engineer may from time to time direct for his verification and shall reinstate and make good such part to the satisfaction of the Architect/Project Engineer. If any such part has been Covered up or put out of view after being approved by the Project Engineer and is subsequently found on uncovering to be executed in accordance with the Contract, the expenses of uncovering and/or making openings in or through reinstating and making good the same shall be borne by the Corporation. In any other case all such expenses shall be borne by the Contractor.

Work during Night or on Sundays and Holidays

Subject to any provisions to the contrary is contained in
the Contract, if works have to be carried out during night or on Sundays or on authorized holidays, permission in writing of the Project Engineer shall be obtained except when the work is unavoidable or absolutely necessary for the safety of life, property or works in which case the Contractor shall immediately advise the Project Engineer accordingly.

**Completion Certificate**

**28.1** As soon as the work is completed, the Contractor shall give notice of such completion to the Project Engineer and within 45 days of receipt of such notice the Project Engineer shall inspect the work and shall furnish the Contractor with a certificate of completion indicating (a) the date of completion, (b) defects to be rectified by the Contractor, and/or (c) items for which payment shall be made at reduced rates, When separate periods of completion have been specified for items or groups of items, the Project Engineer shall issue separate completion certificates for such items or groups of items, No certificate of completion shall be issued, nor shall the work be considered to be completed till the Contractor shall have removed from the premises on which the work has been executed all scaffoldings, sheds and surplus materials, except such as are required for rectification of defects, rubbish and all huts and sanitary arrangements required for his workman on the Site in connection with the execution of the work, and cleaned floor, gutters and drains, eased doors and sashes, oiled locks and fastenings labeled keys clearly and handed them over to the Project Engineer or his representative and made the whole premises fit for immediate occupation or use to the satisfaction of the Project Engineer.

**28.2** If at any time before completion of the entire work, items or groups or items for which separate periods of completion have been specified, have been completed, the Architect/Project Engineer, with the consent of the Contractor, takes possession of any part or parts of the same (any such part(s) being hereinafter in this condition referred to as the relevant part) then notwithstanding anything expressed or implied elsewhere in this Contract:
a) Within thirty days of the date of completion of such items or groups of items or of possession of the relevant part, the Project Engineer shall issue completion certificate for the relevant part as in Condition 30 provided the contractor fulfils his obligations under that condition for the relevant part.

b) The Defects Liability Period in respect of such items and the relevant part shall be deemed to have commenced from the certified date of completion of such items or the relevant part as the case may be.

c) For the purposes of ascertaining compensation for delay under condition 31 in respect of any period during which the works are not complete, the relevant part will be deemed to form a separate item or group, with date of completion as given in the contract or as extended under condition 13 and actual date of completion as certified by the Project Engineer under this condition.

**Hindrance Register**

28.3 A Hindrance Register shall be maintained at the site of work showing the items affected, the date on which the delay occurred and the date on which the delay was cleared. These entries shall be initiated by the Project Engineer as well as the Contractors authorized representative. The Hindrance register shall also be inspected by the Architects during their inspection of works and initiated in token thereof. Request for extension shall be made as per Performa enclosed in the Contract.

**Compensation for Delay**

29. If the Contractor fails to maintain the required progress in terms of Condition 13 or to complete the work and clear the site on or before the Contract or extended date-period of completion, he shall, without prejudice to any other right or remedy of the Corporation on account of such breach, pave as agreed compensation amount calculated as stipulated below or such smaller amount as may be fixed by the authority mentioned in Schedule "F" on the Contract value of the work for every week that the progress remains below that specified in Conditions 13 and 14 or that the work remains incomplete. This will also apply to items or groups of items for which
separate period of completion has been specified. 1% (one per cent ) of the contract amount subject to a maximum or Rs. 10,000 PER WEEK or a part thereof for first four weeks of delay and subsequent delay for every week or part thereof amount shall be 2% of the contract amount subject to maximum of Rs. One lakh per week. The total compensation for delay shall further be subject to an overall maximum of 15% (fifteen per cent) of the Contract as awarded. The decision of the competent officer shall be final and binding.

29.1 The amount of compensation may be adjusted or set off against any sum payable to the Contractor under this or any other contract with the Corporation.

Defects Liability Period

30. The Contractor shall be responsible to make good and remedy at his own expense within such period as may be stipulated by the Project Engineer any defect which may develop or may be noticed before the expiry of the period mentioned in Schedule 'F' hereto from the certified date of completion and intimation of which has been sent to the Contractor within seven days of the expiry of the said period by a letter sent by hand delivery or by registered post.

30.1 Buildings. Sanitary works, water supply works, electrical works, plant and machinery, furniture, roads and drainage, etc., ONE YEAR from the date of completion.

Contractor's Liability and Insurance

31. From commencement to completion of the Works, the Contractor shall take full responsibility for the care thereof and for taking precautions to prevent loss or damage and to minimize loss or damage to the greatest extent possible and shall be liable for any damage or loss that may happen to the Works or any part thereof and all Corporation’s T&P from any cause whatsoever (save and except the Excepted Risks) and shall at his own cost repair and make good the same so that at completion, the Works and all Corporation’s T&P shall be in good order and condition and in conformity in every respect with the requirements of the Contract and instructions of the Project Engineer.

31.1 The Contractor shall indemnify and keep indemnified the Corporation against all losses and claims for injuries or damage to any persons or any property whatsoever which may arise
out of or in consequence of the construction and maintain of the Works and against all claims demands, proceedings. Damages, costs, charges and expenses whatsoever in respect of or in relation thereto PROVIDED always that nothing herein contained shall be deemed to render the Contractor liable for or in respect of or to indemnify the Corporation against any compensation or damage caused by the Excepted Risks.

31.2 Before commencing execution of the work the Contractor shall without in any way limiting his obligations and responsibilities under this Condition insure against any damage loss or injury which may occur to any property (excluding that of the Corporation but including the Corporation’s building rented by the Contractor wholly or in a part and any part of which is used by him for storing combustible materials), or to any person (including any employee of the Corporation) by or arising out of carrying out of the Contract.

31.3 The Contractor shall at all times indemnify the Corporation against all claims, damages or compensation under the provisions of Payment of Wages Act, 1936, Minimum Wages Act, 1948, Employers Liability Act, 1938, Workmen’s Compensation Act, 1923, Industrial Disputes Act, 1947 and the Maternity Benefit Act, 1961, or any modifications thereof or any other law relating thereto and rules made hereunder from time to time or as a consequence or any accident or injury to any workman or other persons in or about the Works, whether in the employment of the Contractor or not, save and except where such accident or injury has resulted from any act of Corporation, his agents or servants, and also against all costs, charges and expenses of any suit, action or proceedings arising out of such accident or injury and against all sum or sums which may, with the consent of the Contractor, be paid to compromise or compound and claim, Without limiting his obligations and liabilities as above provided, the Contractor shall insure against all claims, damages or compensation payable under the Workman’s Compensation Act, 1923 or any modification thereof or any other law relating thereto.

31.4 The aforesaid insurance policy / policies shall provide that they shall not be cancelled till the Architect/Project Engineer has agreed to their cancellation.

31.5 The Contractor shall prove to the Architect/ Project Engineer from time to time that he has taken out all the insurance policies reference to above and has paid the necessary
premiums for keeping the policies alive till expiry of the Defect Liability Period.

31.6 The Contractor shall ensure that similar insurance policies are taken out by the sub-contractors (if any) and shall be responsible for any claims or losses to the Corporation resulting from their failure to obtain adequate insurance protection in connection thereof. The Contractor shall produce or cause to be produced, by his sub-contractors (if any) as the case may be the relevant policy or policies and premium receipts as and when required by the Architect/Project Engineer.

31.7 If the contractor and or his sub-contractors (if any) shall fail to effect and keep in force the insurance referred to above or any other insurance which he they may be required to effect under the terms of the Contract then and in any such case the Corporation may, without being bound to effect and keep in force any such insurance and pay such premium or premiums as may be necessary for that purpose and from time to time deduct the amount so paid by the Corporation from any moneys due or which may become due to the Contractor or recover the same as a debt due from the Contractor.

Facilities to Other Contractors

32. The Contractor shall in accordance with the requirements of the Architect /Project Engineer, afford all reasonable facilities to other contractors engaged contemporaneously on separate contracts in connection with the works and for departmental labour and labour of any other properly authorized authority or statutory body which may be employed at the Site on execution of any work not included in the Contract or of any contract which the Corporation may enter into in connection with or ancillary to the Works.

Notices to local Bodies

33. The Contractor shall comply with and give all notices required under any Governmental authority, instrument, rule or order made under any Act of Parliament, State laws or any regulation or bye-Yaws of any regulation or bye-laws of any local authority relating to the works. He shall before making any variation from the Contract drawings necessitated by such compliance give to the Architect/Project Engineer a written
notice giving reasons for the proposed variation and obtain the Project Engineer’s instructions thereon.

33.1 The Contractor shall pay and indemnify the Corporation against any liability in respect of any fees or charges payable under any Act of Parliament, State laws or any Government instrument rule or order and any regulation or byelaws of any local authority in respect of the works.

Sub-Contracts

34. The Contractor shall not sublet any portion of the Contract without the prior written approval of the Accepting Authority.

Instructions and Notices

35. Subject as otherwise provided in this Contract, all notices to be given on behalf of the Corporation and all other actions to be taken on its behalf may be given or taken by the Architect Project Engineer or any officer for the time being entrusted with the functions, duties and powers of the Architect/Project Engineer.

35.1 All instructions, notices and communications, etc. under the Contract shall be given in writing and if sent by registered post to the last known place of abode or business of the Contractor shall be deemed to have been served on the date when in the ordinary course of post these would have been delivered to him.

35.2 The Contractor or his agent shall be in attendance at the Site(s) during all working hours and shall superintend the execution of the Works with such additional assistance in each trade as the Architect/Project Engineer may consider necessary. Orders given to the Contractor’s Agent shall be considered to have the same force as if they had been given to the Contractor himself.

35.3 The Project Engineer shall communicate or confirm his instructions to the Contractor in respect of the execution of work in a “Work Site Order Book” maintained in the office of the Architect/Project Engineer and the Contractor or his authorized representative shall confirm receipt of such instructions by signing the relevant entries in this book. If required by the Contractor, he shall be furnished a certified true copy of such instruction(s).
Foreclosure of Contract in Full or in Part due to Abandonment or Reduction in Scope of work

36. If at any time after acceptance of the tender the Corporation shall decide to abandon or reduce the scope of the Works for any reason whatsoever and hence not require the whole or any part of the works to be carried out, the Architect/Project Engineer shall give notice in writing to that effect to the Contractor and the Contractor shall have no claim to any payment of compensation or otherwise whatsoever, on account of any profit or advantage which he might have derived from the execution of the Works in full but which he did not derive in consequence of the foreclosure of the whole or part of the Works.

36.1 The Contractor shall be paid at Contract rates full amount for works executed at Site and, in addition, a reasonable amount as certified by the Project Engineer for the items hereunder mentioned which could not be utilized on the work to the full extent because of the foreclosure:

a) Any expenditure incurred on preliminary Site work. e.g., temporary access roads, temporary labour huts, staff quarters and Site office; storage accommodation and water storage tanks.

b) i) The Corporation shall have the option to take over Contractor's materials or any part thereof either brought to Site or of which the Contractor is legally bound to accept delivery from suppliers (for incorporation in or incidental to the work) provided, however, the Corporation shall be bound to take over the materials or such portions thereof as the Contractor does not desire to retain. For materials taken over or to be taken over by the Corporation, cost of such materials. The cost shall, however, take into account purchase price, cost of transportation and deterioration or damage which may have been caused to materials whilst in the custody of the Contractor.

b) ii) For Contractors materials not retained by the Corporation, reasonable cost of transporting such materials from Site to Contractor's permanent stores or to his other Works, whichever is less. If materials are not transported to either of the said places, no cost of transportation shall be payable.

c) If any material supplied by the Corporation is required surplus, the same except normal wastage shall be returned by the Contractor to the Corporation at rates not exceeding those at which these were originally issued less allowance.
for any deterioration or damage which may have been caused whilst the materials were in the custody of the Contractors. In addition, cost of transporting such materials from Site to the Corporation stores, if so required by the Corporation.

d) Reasonable compensation for transfer of T&P from Site to Contractors permanent stores or to his other Works, whichever is less, If T&P are not transported to either of the said places, no cost of transportation shall be payable.

36.2 The contractor shall, if required by the Architect/ Project Engineer, furnish to him books of account, wage books, time sheets and other relevant documents as may be necessary to enable him to certify the reasonable amount payable under this Condition.

Termination of contract for Death

37. If the Contractor is an individual or a proprietary concern and the individual or the proprietor dies and if the Contractor is a partnership concern and one of the partners dies then unless the Accepting Authority is Satisfied that the legal representatives of the individual Contractor or of the proprietor of the proprietary concern and in the case of partnership, the surviving partners are capable of carrying out and completing the Contract the Accepting Authority shall be entitled to cancel the Contract as to its incomplete part without the Corporation being in any way liable to payment of any compensation to the estate or the deceased Contractor and/or to the surviving partners of the Contractor’s firm on account of the cancellation of the Contract. The decision of the Accepting Authority that the legal representatives of the deceased Contractor or the surviving partners of the Contractor’s firm cannot carry out and complete the Contract shall be final and binding on the parties. In the event of such cancellation the Corporation shall not hold the estate of the deceased Contractor and/or surviving partners of the Contractor’s firm liable in damages for not completing the Contract.

Cancellation of Contract in Full or in Part.

38. If the Contractor:

a) At any time makes default in proceeding with the Works with due diligence and continues to do so after a notice in writing of 7 days from the Architect/Project Engineer or

b) Commits default in complying with any of the terms and conditions of the contract and does not remedy
it or take effective steps to remedy it within 7 days, after it notice in writing is given to him in that behalf by the Architect/Project Engineer or

c) Fails to complete the Works or items of work with individual dates or completion, on or before the date(s) or completion, and does not complete them within the period specified in a notice given in writing in that behalf by the Architect/Project Engineer or

d) Shall offer or give or agree to give to any person in Corporation's service or to any other person on his behalf any gift or consideration or any kind as an inducement or reward for doing or forbearing to do or for having done or forborne to do any act in relation to the obtaining or execution or this or any other Contract for the Corporation or

e) Shall enter into a contract with the Corporation in connection with which commission has been paid or agreed to be paid by him or to his knowledge, unless the particulars of any such commission and the terms of payment thereof have previously been disclosed in writing to the Accepting Authority/Project Engineer; or

f) Shall obtain a Contract with the Corporation as a result of ring tendering or other non-benefited methods of competitive tendering, or

g) Being an individual, or if a firm, any partner thereof, shall at a time be adjudged insolvent or have a receiving order or order for administration of his estate made against him or shall take any proceedings for liquidation/composition (other than a voluntary liquidation for the purpose of (amalgamation or reconstruction) under any Insolvency Act for the time being in force or make any conveyance or assignment of his effects or composition or arrangement for the benefit of his creditors or purport so to do, or if any application be made under any Insolvency Act for the time
being in force for the sequestration of his estate or if a trust deed be executed by him for the benefit of his creditors; or

h) Being a company shall pass a resolution or the Court shall make an order for the liquidation of its affairs, or a receiver or manager of behalf of the debenture holders shall be appointed or circumstances shall arise which entitle the court on debenture holders to appoint a receiver or Manager or

i) Shall suffer an execution being levied on his goods and allow it to be continued for a period of 21 days; or

j) Assigns, transfers, sublets (engagement of labour on a piecework basis or of labour with materials not to be incorporated in the work, shall not be deemed to be subletting) or attempts to assign, transfer or sublet the entire Works or any portion thereof without the prior written approval of the Accepting Authority, Accepting Authority may, without prejudice to any other right to remedy which shall have accrued or shall accrue thereafter to the Corporation by written notice, cancel the Contract as a whole or only such items of work in default from the Contract.

38.1 The Accepting Authority shall on such cancellation have powers to:

a) Take possession of the Site and any materials, constructional plant, implements, stores, etc. thereon and/or

b) Carry out the incomplete work by any means AT THE RISK AND COST OF THE CONTRACTOR.

38.2 On cancellation of the Contract in full or in part the Architect/Project Engineer shall determine what amount, if any, is recoverable from the Contractor for completion of the Works or part of the Works or in case the Works or part of the Works is not to be completed, the loss or damage suffered by
the Corporation. In determining the amount, credit shall be given to the Contractor for the value of the work executed by him up to the time of Cancellation, the value of Contractor's materials taken over and incorporated in the work, and use of tackle and machinery belonging to the Contractor.

38.3 Any excess expenditure incurred or to be incurred by the Corporation in completing the works or part of the Works or the excess loss or damages suffered or may be suffered by the Corporation as aforesaid after allowing such credit shall be recovered from any moneys due to the contractor on any account and if such moneys are not sufficient, the Contractor shall be called upon in writing to pay the same within 30 days.

38.4 If the Contractor shall fail to pay the required sum within the aforesaid period of 30 days, the Architect/Project Engineer shall have the right to any or all of the Contractor's temporary buildings, etc. and apply the proceeds of sale thereof towards the satisfaction of any sums due from the contractor under the Contract and if thereafter there be any balance outstanding from the Contractor, it shall be recovered in accordance with the provisions of the contract.

38.5 Any sums in excess of the amounts due to the corporation and unsold materials, constructional plant, etc. shall be returned to the contractor, provided always that if cost or anticipated cost of completion by the Corporation of the works or part of the works is less than the amount which the contractor would have been paid had he completed the works or part of the works, such benefit shall not accrue to the contractor.

 LIABILITY FOR DAMAGES, DEFECTS OR IMPERFECTIONS AND RECTIFICATIONS THEREOF

39. If the Contractor or his workmen or employees shall injure or destroy any part of the building in which they may be working or any building, road, fence, etc. contiguous to the premises on which the work or any part of it is being executed, or if any damage shall happen to the work while in progress the Contractor shall, upon receipt of a notice in writing in that behalf, make the same good at his own expense. If it shall appear to the Architect/Project Engineer or his representative at any time during construction or re-construction or prior to the expiration of the DEFECTS LIABILITY PERIOD, that
any work has been executed with unsound, imperfect or unskilled workmanship or that any materials or articles provided by the Contractor for execution of the work are unsound or of a quality inferior to that contracted for, or otherwise not in accordance with the contract, or that any defect, shrinkage or other faults have appeared in the work arising out of defective or improper materials or workmanship, the contractor shall upon receipt of a notice in writing in that behalf from the Architect/Project Engineer, forthwith rectify or remove and re-construct the work so specified in whole or in part, and/or remove the materials or articles so specified and provide other proper and suitable materials or articles at his own expense, notwithstanding that the same may have been inadvertently passed, certified and paid for and in the event of his failing to do so within the PERIOD TO BE SPECIFIED BY THE Architect/Project Engineer in his notice aforesaid, the Project engineer in his notice aforesaid, the Project engineer may rectify or remove and replace with others the materials or articles complained of, as the case may be, by other means AT THE RISK AND EXPENSE OF THE CONTRACTOR.

39.1 In case of repairs and maintenance works, splashes and droppings from white-washing, painting, etc., shall be removed and surfaces cleaned simultaneously with completion of these items of work in individual rooms, quarters or premises, etc. where the work is done, without waiting for completion of all other items of work in the Contract. In case the Contractor fails to comply with the requirements of this condition, the Project Engineer shall have the right to get the work done by other means at the cost of the Contractor. Before taking such action, however, the Project Engineer shall give three days notice in writing to the Contractor.

Urgent Works

40. If any Urgent Work (in respect whereof the decision of the Architect/Project Engineer shall be final and binding) becomes necessary and the Contractor is unable or unwilling at once to carry it out, the Architect/Project Engineer may, by his own or other working people carry it out, as he may consider necessary. If the Urgent Work shall be such as the Contractor is liable under the Contract to carry out at his expense, all expenses incurred on it by the Corporation shall be recoverable from the Contractor and be adjusted or set off against any sum payable to
him.

Changes in Constitution
41. Where the Contractor is a partnership firm, prior approval in writing of the Accepting Authority shall be obtained before any change is made in the constitution of the firm. Where the Contractor is an individual or a Hindu Undivided Family business concern such approval as aforesaid shall like-wise be obtained before the Contractor enters into any partnership agreement where under the partnership firm would have the right to carry out the work hereby undertaken by the Contractor. If prior approval as aforesaid is not obtained the Contract shall be deemed to have been assigned in contravention of Condition 38(j) hereof and the same action may be taken and the same consequences shall ensue as provided for in the said Condition 38.

Valuation and Payment

Records and Measurement
42. The Architect/Project Engineer shall, except as otherwise stated, ascertain and determine by measurement the value in accordance with the Contract of work done in accordance therewith.
42.1 All items having a financial value shall be entered in Measurement Book, Level Book, etc. prescribed by the Corporation so that a complete record is obtained of all work performed under the Contract.
42.2 Measurements shall be taken jointly by the Clerk-of-Works/Project Engineer and by the Contractor or his authorized representative.
42.3 Before taking measurements of any work the Project Engineer or the person deputed by him for the purpose shall give a reasonable notice to the Contractor. If the Contractor fails to attend or send an authorized representative for measurements after such a notice or fails to countersign or to record the objection within a week from the date of measurements, then in any such event measurements taken by the Clerk-of-Works/Project Engineer or by the person deputed by him shall be taken to be correct measurements of the work.

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42.4 The Contractor shall, without extra charge, provide assistance with every appliance, labour and other things necessary for measurements.

42.5 Measurements shall be signed and dated by both the parties each day on the Site on completion of measurements. If the Contractor objects to any of the measurements recorded on behalf of the Corporation, a note to that effect shall be made in the Measurement Book against the item objected to and such note shall be signed and dated by both parties engaged in taking the measurements.

Methods of Measurement
43. Except where any general or detailed description of the work in quantities expressly shows to the contrary, Schedule of Quantities shall be deemed to have been prepared and measurements shall be taken in accordance with the procedure set forth in the Schedule of Rates/Specification notwithstanding any provision in the relevant Standard Method of Measurement or any general or local custom. In the case of items, which are not covered by the Schedule of Rates/Specification, measurements shall be taken in accordance with the relevant Standard Method of Measurement issued by the Indian Standards Institution.

Payment on Account
44. Interim bills shall be submitted by the Contractor at intervals mentioned in Schedule “F” on or before the date fixed by the Project Engineer for the work executed. The Architect/Project Engineer shall then arrange to have the bill verified by taking or causing to be taken, where necessary the requisite measurements of the work.

44.1 Payment on account for amount admissible shall be made on the Architect/Project Engineer certifying the sum to which the Contractor is considered entitled by way of interim payment for the following:

a) All work executed, after deducting there from the amounts already paid the security deposit and such other amount as may be deductible or recoverable in terms of the contract.

b) 75% of the cost (as assessed by the Architect/
Project Engineer of any materials which are in the opinion of the Project Engineer reasonably required in accord as act and have been brought to Site for incorporation in the Works and are safeguarded against loss due to any cause whatsoever to the satisfaction of the Architect/Project Engineer, but have not been so incorporated provided the Contractor provides an insurance cover for the full cost of PERISHABLE MATERIALS.

44.2 The advance payments under (b) above shall be adjusted as and when materials are utilized in the Works.

44.3 Any interim certificate given relating to work done or materials delivered, may be modified or corrected by any subsequent interim certificate or by the final certificate. No certificate of the Architect/Project Engineer supporting an interim Payment shall of itself be conclusive evidence that any work or materials to which it relates is /are in accordance with the Contract.

44.4 Pending consideration of extension of date of completion, interim payments shall continue to be made as herein provided.

**Time Limit for Payment of Final Bill**

45. The final bill shall be submitted by the Contractor WITHIN THREE MONTHS of physical completion of the Works, No further claims shall be made by the Contractor after submission of the final bill and these shall be deemed to have been waived and extinguished. Payment of those items of the bill in respect of which there is no dispute and of items in dispute, for quantities and at rates approved by the Architect/Project Engineer shall be made within the period specified hereunder, the period being reckoned from the data of receipt of the bill by Architect/Project Engineer:

a) **Contract amount not exceeding Rs.5.00 lakhs** ... Four months

b) **Contract amount exceeding Rs. 5.00 lakhs .... Six months**

45.1 After payment of the amount of the final bill payable as aforesaid has been made, the contractor may, if he so desires, reconsider his position in respect of the disputed portion of the final bill and if he fails to do so within 90 days, has disputed.
Reimbursement on Variation in Price

46. (a) Materials if after submission of the tender and or during the progress of the works, the price of any material (not being a material supplied by the Accepting Authority in accordance with the Conditions of the contract) is increased by an Act of Legislature (Central or States) and/or any notification there under or on account of new duties or levies such as octroi or on account of increase in such duties affecting the price of materials required for incorporation in the works or the price of any item to be incorporated in the works and made from materials of which the price has increased as aforesaid and the contractor has thereupon to pay in respect and of such materials or item a price which is higher than the price of that material or item as prevailing immediately before the passing of such Act or levying, increasing of such duty, the corporation shall in case of increase in price or the duty reimburse to the contractor the increase in price or the additional or increased duty paid by the contractor.

Overpayments and Underpayments

47. 1 Whenever any claim for the payment of a sum of money to the corporation arises out of or under this contract against the contractor the same may be deducted by the corporation from any sum then due or which at any time thereafter may become due to the contractor under this contract and failing that under any other contract with the corporation or from any other sum due to the contractor from the corporation (which may be available with the corporation) or from his security deposit, or he shall pay the claim on demand.

47.2 The corporation reserves the right to carry out post payment, audit, and technical examination of the final bill including all supporting vouchers, abstracts, etc. The corporation further reserves the right to enforce recovery of any overpayment when detected, notwithstanding the fact that the amount of
the final bill may be included by one of the parties as an item of dispute before an arbitrator appointed under Condition 48 of this Contract and notwithstanding the fact that the amount of the final bill figures in the arbitration award.

47.3 If as a result of such audit and technical examination any overpayment is discovered in respect of any work done by the Contractor or alleged to have been done by him under the Contract. It shall be recovered by the Corporation from the contractor by any or all of the methods prescribed above or if any under payment is discovered, the amount shall be duly paid to the Contractor by the Corporation.

47.4 Provided that the aforesaid right of the Corporation to adjust overpayments against amounts due to the Contractor under any other contract with the Corporation shall not extend beyond the period of two years from the date of payment of the final bill or in case the final bill is a MINUS bill, from the date the amount payable by the Contractor under the MINUS final bill is communicated to the Contractor.

47.5 Any amount due to the Contractor under this Contract for underpayment may be adjusted against any amount then due or which may at any time thereafter become due before payment is made to the Contractor, from him to the corporation on any other contract or account whatsoever.

Arbitration and Laws
Arbitration
48. Except where otherwise provided for in the contract all questions and disputes relating to the meaning of the specifications, designs, drawings and instructions herein before mentioned and as to the quality of workmanship or materials used on the work or as to any other question, claim right, matter or thing whatsoever in any way arising out or relating to the contract, designs, specifications, estimates, instructions, order or these conditions or otherwise concerning the works, or execution or failure to execute the same whether arising during the progress of the work or after the completion or abandonment thereof shall be referred to the chairman & managing Director of the India Tourism Development Corporation for appointment of an Arbitrator under the Arbitration & Conciliation Act, 1996 as amended time to time. The sole Arbitrator so appointed shall not have any direct or indirect or any past or
present relationship or interest in any of the parties. In case of deposit work, the client will also be a party in the arbitration proceedings.

The arbitral proceedings shall be held in Delhi.

Jurisdiction: The contract shall be governed by the Laws of India and Jurisdiction of Courts for legal issue will be Delhi.

49. This Contract shall be governed by the Indian laws for the time being in force. The Authority appointing the Arbitrator should not be lower in rank than the Authority accepting the agreement.

50. The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple interest rate of 7% per annum, calculated from the actual date of completion to previous day of last date of submission of tender. The multiplication factor of 7% per annum Simple interest is not applicable on the annual Financial Turnover figures.

51. Joint Venture and Consortium are not accepted. However, LLP shall be accepted in addition to existing practice.

52. Tax Registration: GST / or as applicable from time to time.

53. (a) In case of deposit work, the client should be made a party in the proceedings before the court of Law / Arbitration.

53. (b) In case of deductions from the bills of the parties, except statutory deductions, a speaking letter be issued within seven days of such deductions, to the party recording the reasons in support of deductions to ensure that decision of such deductions is not a result of whim or fancy but arrived at after considering the relevant clauses of the NIT, breach, laps on the part of the party whereby ITDC is entitled for deductions.

54. (a) If the proprietor / any of the partners of the bidder firm / any of the directors of the bidder company have been at any time, convicted by a Court for an offence, such bidder will be ineligible.

54. (b) In case of any clear indication of cartelization of express or implied
anticompetitive agreements between the Bidder’s at the time of finalization of Tender or thereafter, which at any time i.e. before or after award of the contract comes to the notice of the ITDC, the Tendering Authority may reject the relevant Bids, forfeit their EMD / Security Deposit

54. (c) The selected bidder shall indemnify the ITDC against prosecutions, claims of damages, all third party claims of infringement of patent, trademark / copyright rights arising from the use of the supplied software / hardware etc. And related services or any part thereof or any violation / non observance of applicable Laws / Rules & Regulation by the bidder or his personnel. ITDC stand indemnified from any claims that the hired manpower may opt to have by virtue of working on the project for whatever period. ITDC also stand indemnified from any compensation arising out of accidental loss of life or injury sustained by the personnel while working on the project.

54. (d) Any information pertaining to the Govt. or any other client involved in the project that comes to the knowledge of the bidder in connection with this contract will be deemed to be confidential and the bidder will be fully responsible for the same being kept confidential and held in trust, as also for all consequences of its concerned personnel failing to do so. The bidder shall ensure due secrecy of information and data not intended for public distribution.

54. (e) No failure or omission by the parties in the performance of any obligation of this contract will be deemed a breach or create any liability if the same will arise from any cause or cause beyond the control of the Parties, including, but not limited to, the following, acts of God, acts or omissions of any government, any rules, regulations or orders issued by any governmental authority or by any officer, department, agency or instrumentality thereof, fire, flood, storm, earthquake, accident, war, rebellion, insurrection, riot and invasion. The affected party shall notify the other party of such force majeure circumstances as soon as reasonably practical, and shall promptly undertake all reasonable efforts necessary to cure such force majeure circumstances.

54. (f) The Bidder (s) will not, directly or through any other person or firm indulge in fraudulent practice means a will full misrepresentation or omission of facts or submission of fake / forged documents in order to induce public official to act in reliance thereof, with the purpose of obtaining unjust advantage by or causing damage to justified interest of other and / or to influence the procurement process to the detriment of the Corporation interests.
TENDER

To,

INDIA TOURISM DEVELOPMENT CORPORATION
Unit: Engineering Project Division

(Hereinafter referred to as the Corporation)
I / We have read and examined the following documents relating to the Construction of ___________________________

(a) Notice Inviting Tender
(b) Schedules A, B, C, & F
(c) ___________________________ Specifications
(d) Drawings
(e) Special Conditions

I / We hereby tender for the execution of the works referred to in the aforesaid documents upon the terms and conditions contained or referred to therein and in accordance in all respects with the specifications, designs, drawings and other relevant details at the rates contained in Schedule 'A' and within the period(s) of completion as stipulated in Schedule 'F'.

A sum of Rs.___________________ is hereby forwarded in crossed bank draft No _____________________________ date _________________ drawn on _____________________________ Bank favouring India Tourism Development Corporation, New Delhi, as Earnest Money. If I/We fail to keep the tender open for a period of 90(ninety) days validity after opening the tender(s), or make any modifications in the terms and conditions of the tender which are not acceptable to the Corporation, I/We agree that the Corporation shall, without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely. Should this tender be accepted, I/We hereby agree to abide by and fulfil all the terms, conditions and provisions of the aforesaid documents.

If, after the tender accepted, I/We fail to commence the execution of the works as provided in the conditions, I/We agree that the Corporation shall without prejudice to any of their right or remedy, be at liberty to forfeit the said earnest money absolutely.

Witness ________________ Signature _____________________________
Date ____________________ in the capacity of _____________________________
Address ____________________ Duly authorized to sign the tender
__________________________________________________________ On behalf of
__________________________________________________________ (In block capitals)
__________________________________________________________ Date: ____________________
Postal Address ____________________
__________________________________________________________
Telegraphic Address ____________________

Duly authorized to sign the tender
On behalf of
(In block capitals)

Schedule 'F'

Reference to General Conditions of Contract
(To be signed by the Contractor(s) at the time of signing the agreement)

Condition No:
3(b) Accepting Authority: India Tourism Development Corporation

3(i) Market Rate - percentage addition To cover profit, overheads and supervision 15%

9. (a) Estimated cost of the Works put to tender
(b) Earnest money (2% of the estimated cost of the Works)
(c) Security deposit (5% of gross value of work done Subject to a maximum of Rs.5.00 lakhs

11(ii) Schedule of rates applicable: Analysis of rate Odisha, CPWD DSR 2018 & Market Rate without GST

Percentage adjustment to the rates in the Schedule of Rates, for pricing deviations Plus/minus ______________________

13. Time allowed for execution of work (To be reckoned from the SEVENTH Day after the date of work order): As per NIT

29. Compensation for delay: As per PQ cum NIT

30. Defects liability Period of completion. ONE YEAR from the date of completion

31. Interim Bills Monthly or as certified by the Architect / Project Engineer

32. Final Bill

a) Contract amount not Exceeding Rs. 5.00 Lakhs Four months.

b) Contract amount Exceeding Rs. 5.00 Lakhs Six months.
### Schedule 'B'

**Materials for Issue to the Contractor.**
*(See Condition 15)*

<table>
<thead>
<tr>
<th>SI. No.</th>
<th>Particulars</th>
<th>Rate at which Material will Be issued</th>
<th>Quantity</th>
<th>Place of Issue</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

**NIL**

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**Signature of Issuing Officer**

**Date**

**Signature of Contractor**

**Date**
**Schedule "C"**

**Performa Recommending Extension of Time**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Name of work</td>
</tr>
<tr>
<td>(2)</td>
<td>Name of Contractor</td>
</tr>
<tr>
<td>(3)</td>
<td>Name of Architect</td>
</tr>
<tr>
<td>(4)</td>
<td>Contract Amount</td>
</tr>
<tr>
<td>(5)</td>
<td>Final Gross Value of Work</td>
</tr>
<tr>
<td></td>
<td>Including cost of extra items</td>
</tr>
<tr>
<td>(6)</td>
<td>Date of award of the work</td>
</tr>
<tr>
<td>(7)</td>
<td>Date of commencement of work</td>
</tr>
<tr>
<td>(8)</td>
<td>Completion date as per the Contract</td>
</tr>
<tr>
<td>(9)</td>
<td>Actual date of completion</td>
</tr>
<tr>
<td>(10)</td>
<td>Period requiring extension</td>
</tr>
<tr>
<td>(11)</td>
<td>Amount of compensation for Delay as per the Contract</td>
</tr>
<tr>
<td>(12)</td>
<td>Reference to Contractor's letter(s) Of application seeking extension of Time within due date as per contract.</td>
</tr>
<tr>
<td>(13)</td>
<td>Reasons for delay and justifications:</td>
</tr>
<tr>
<td></td>
<td>(a)</td>
</tr>
<tr>
<td></td>
<td>(b)</td>
</tr>
<tr>
<td></td>
<td>(c)</td>
</tr>
<tr>
<td></td>
<td>(d)</td>
</tr>
<tr>
<td>(14)</td>
<td>Conclusion:</td>
</tr>
<tr>
<td>(a)</td>
<td>Full extension is recommended Without levy of compensation amount OR</td>
</tr>
<tr>
<td>(b)</td>
<td>Full extension is recommended With levy of compensation amount Of Rs_________ for period days.</td>
</tr>
</tbody>
</table>

(Strike out Words which are not applicable)

SIGNATURES:

**Assistant Engineer**  **Executive Engineer**  **Architect**  **Project Engineer**

NOTE: Duplicate typed copies of extracts from the Hindrance Register should be enclosed with this Performa.
Form of Bank Guarantee in Security Deposit in Individual Contract

(General Condition No, 9)

To,

India Tourism Development Corporation

1. In consideration of the I.T.D.C.,_______of_________ (hereinafter called the "Corporation" which expression shall unless repugnant to the subject or context include his successors and assigns) having agreed under the terms and conditions of Contract No._______ Date_______ made between _______________ and the Corporation in connection with (hereinafter called the said Contract) to accept a Deed of Guarantee as herein provided for Rs._________ from a Scheduled Bank in lieu of the security deposit to be made by the Contractor or in lieu of the deduction to be made from the Contractor's bills, for the due fulfilment by the said Contractor of the terms and conditions contained in the said Contract we,________ the _________ Bank Ltd. (hereinafter referred to as "the said Bank") a company under the Companies Act 1956 and having our registered Office at _________________ do hereby undertake and agree to Indemnify and keep indemnified the Corporation from time to time to the extent of Rs. __________(Rupees ______________only) against any loss or damage, costs, charges and expenses caused to or suffered by or that may be caused to or suffered by the Corporation by reason of any breach or breaches by the said Contractor of any of the terms and conditions contained in the said Contract and to unconditionally pay the amount claimed by the Corporation on demand and without demur to the extent aforesaid.

2. We ____________ Bank Ltd. further agree that the Corporation shall be the sole judge of and as to whether the said Contractor has committed any breach or breaches of any of the terms and conditions of the said Contract and the extent of loss, damage, costs, charges and expenses caused to or suffered by or that may be caused to or suffered by the Corporation by reason of any breach or breaches by the said Contractor of any of the terms and conditions contained in the said Contract and to unconditionally pay the amount claimed by the Corporation from time to time shall be final and binding on us.

3. We, the said Bank, further agree that the Guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and till all the dues of the Corporation under the said Contract or by virtue of any of the terms and conditions governing the said Contract have been fully paid and its claims satisfied or discharged and till _________ certifies that the terms and conditions of the said Contract have been fully and properly carried out by the said Contractor and accordingly discharges this Guarantee subject, however, that the Corporation shall have no claim under this Guarantee after years
from the date of expiry of the Defects Liability Period as provided in the said Contract or from the date of cancellation of the said Contract, and the Case may be, unless a notice of the claim under this Guarantee has been served on the Bank before the expiry of the said period of years in which case the same shall be enforceable against the Bank notwithstanding the fact, that the same is enforced after the expiry of the said period of years.

4. The Corporation shall have the fullest liberty without affecting in any way the liability of the Bank under this Guarantee or Indemnity from time to time to vary any of the terms and conditions of the said contract or to extend time of performance by the said Contractor or to postpone for any time and from time to time any of the powers exercisable by it against the said contractor and either to enforce to forebear from enforcing any of the terms and conditions governing the said Contract or securities available to the Corporation and the said Bank shall not be released from its liability under these present by any exercise by the Corporation of the liberty with reference to the matters aforesaid or by reason of time being given to the said Contractor or any other forbearance, act or omission on the part of the Corporation or any indulgence by the Corporation to the said Contractor or any other matter or thing whatsoever which under the law relating to sureties would but for this provision have the effect of so releasing the Bank from its such liability.

5. It shall not be necessary for the Corporation to proceed against the Contractor before proceeding against the Bank and the Guarantee herein contained shall be enforceable against the Bank. Notwithstanding any security which the Corporation may have obtained or obtain from the Contractor shall at the time when proceedings are taken against the Bank hereunder be outstanding or unrealized.

6. We, the said Bank, lastly undertake not to revoke this Guarantee during its currency except with the previous consent of the Corporation in writing and agree that any change in the Constitution of the said Contractor or the said Bank shall not discharge our liability hereunder.

Date this ___day of ____ 19

For and on behalf of the Bank

The above Guarantee is accepted by the ITDC/

For and on behalf of the I.T.D.C. _______________of__________________SD

_____________

Dated_________________

(Name and designation)
NOTE:

*For proprietary concerns

Shri_________ son of _______________resident of ______________ carrying on business under the name and style of________ at_________ (hereinafter called “the said Contractor” which expression shall unless the context requires otherwise include his heirs, executors, administrators and legal representatives).

For Partnership concerns

(a) Shri __________son of ______________resident __________of ______________

(b) Shri __________son of_________ resident of ________ carrying on business in co-partnership under the name and style of________ at_________ (hereinafter collectively called “the said Contractor” which expression shall unless the context requires otherwise include each of them and their respective heirs, executors administrators and legal representatives.

For Companies

S/ Shri__________ a company under the Companies Act 1956 and having its registered office at __________in the State of ___________ hereinafter called:” the said Contractor” which expression shall enter the context requires otherwise include its successors and assigns).
Bank Guarantee for Advance to Contractors

To,

The India Tourism Development Corporation Ltd.
Scope Complex, Core 8 Lodi Road
New Delhi-110003

THIS BANK GUARANTEE made this______ between ___________ (hereinafter referred to as guarantor) In favour of India Tourism Development Corporation Limited a company registered under the Companies Act having its registered office at Scope Complex, Core 8 Lodhi Road New Delhi-110003 (hereinafter referred to as employer).

WHEREAS M/s______________ (hereinafter called contractor) has entered into a contract with the employer to carry out the work and have agreed to complete the above mentioned work in accordance with the time bound programme agreed to separately between the employer and the contractor, namely by.

1. NOW THIS GUARANTEE WITNESS that in consideration of the employer having agreed to contractor's request for the release of Rs ________(Rupees_________ only) as advance against order on furnishing Bank Guarantee for Rs __________(Rupees_________ only).

2. We do hereby unconditionally and irrevocably agree and undertake to pay to India Tourism Development Corporation Limited, New Delhi on demand and without demur and amount not exceeding Rs__________ (Rupees__________ only).

3. Any such demand on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to any amount not exceeding Rs_______ (Rupees_______ only).

4. We further agree and confirm that this guarantee also covers all risks regarding security for the due and faithful fulfillment of the contract by M/s ____________ and also any loss or damage caused to or suffered by, or would be caused to or suffered by the employer by reason of any breach by the said contractor of any of the terms and conditions contained in the said agreement or by reason of the contract's failure to complete the work strictly in accordance with the time schedule agree to. We further agree that the employer shall be the sole judge of and as to whether the said contractor has committed any breach of any of the terms and conditions of the contract and as to the extent of the loss or damage caused to or suffered by the employer on account thereof. We further agree that the guarantee herein contained shall remain in force and effect during the period that would be taken for the performance of the said contract and it shall continue to be enforceable till all the dues of the employer under or by virtue of the said order.
have been fully paid and its claim satisfied or discharged or till the India Tourism Development Corporation Limited. New Delhi. Certify that terms and conditions of the said order have been fully and properly carried out by the said contractor and accordingly discharge the Guarantee provided, however, that unless a demand or claim under the guarantee is made on us in writing on or before have shall be discharged from all liabilities under this guarantee thereafter.

5. We further agree that the India Tourism Development Corporation Limited. New Delhi, shall have the fullest liberty with or without our consent and without effecting in any manner our obligation hereunder, to vary any of the terms and conditions of the said contract or extend time of performance by the said contractor from time to time, postpone for any time or from time to time any of the powers exercisable by India Tourism Development Corporation Limited, New Delhi, against the said contractor and to forbear or enforce any of the terms and conditions relating to the said order and we shall not be retrieved from our liability by reasons of any such variation, or extension being granted to the said contractor or for any forbearance act or omission on the part of the India Tourism Development Corporation Limited, New Delhi, or any indulgence by it to the said contractor or by any such matter or thing whatsoever which under the law relating to surety would but for this provision have the effect of so relieving us from its such liability.

6. We lastly undertake not to revoke this guarantee during its currency except with the previous consent of the India Tourism Development Corporation Limited, New Delhi.

7. Notwithstanding anything contained hereinbefore, our liability under this bond is restricted to as Rs.________(Rupees _________only) and It will remain in force till the __________Unless a claim or demand in writing is made against us under this guarantee before that date all your rights under the said guarantee shall be forfeited and we shall be relieved and discharged from all liability there under.
### Annexure 2

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Constitution</td>
<td></td>
</tr>
<tr>
<td>“Bill to” Address</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td></td>
</tr>
<tr>
<td>State</td>
<td></td>
</tr>
<tr>
<td>Postal Code</td>
<td></td>
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<tr>
<td>Country</td>
<td></td>
</tr>
<tr>
<td>Sr. No.</td>
<td>State</td>
</tr>
<tr>
<td>1</td>
<td>Haryana</td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

City
State
Postal Code
Country
Contact person for communicating any kind of mismatch in inputs-output. Please provide the name, designation, email id and contact no of the relevant person

Tax Details
Permanent Account Number (PAN)

**Documents to be attached:**

1. GST registration certificate/acknowledgement.
2. Copy of PAN
<table>
<thead>
<tr>
<th>Supplier Name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CIN (Corporate Identity Number)</td>
<td></td>
</tr>
<tr>
<td>Whether Registered under GST Y or N</td>
<td></td>
</tr>
<tr>
<td><strong>Business Constitution</strong></td>
<td></td>
</tr>
<tr>
<td>Whether Availing the benefit of Composite Scheme Y or N</td>
<td></td>
</tr>
<tr>
<td>“Bill from” address of the vendor and State Code</td>
<td></td>
</tr>
<tr>
<td>State wise GSTIN of Vendor (of ‘Bill from’ location)</td>
<td></td>
</tr>
<tr>
<td>“Ship from” address of the vendor and State Code</td>
<td></td>
</tr>
<tr>
<td>Name of authorised signatory</td>
<td></td>
</tr>
<tr>
<td>Contact person for communicating any kind of mismatch in inputs-output. Please provide the name, designation, email id and contact no of the relevant person</td>
<td></td>
</tr>
<tr>
<td>Provision GSTIN No. in each supplying state (from where material/Service is supplied to the Company) along with one of the following documents:</td>
<td>Closest to the image boundary</td>
</tr>
<tr>
<td>(a) Registration Certificate provided by the Government (including GSTIN)</td>
<td></td>
</tr>
<tr>
<td>(b) Screen shot of the GST website displaying your GSTIN Number(c) PDF of the email received from the Government providing provisional GSTIN No</td>
<td></td>
</tr>
<tr>
<td><strong>Details of items supplied to the Company</strong></td>
<td></td>
</tr>
<tr>
<td>Details of Goods supplied by the Vendor &amp; HSN Code/Excise classification of all goods supplied to the company</td>
<td></td>
</tr>
<tr>
<td>Details of Services supplied by the Vendor and Service Accounting Code of each such service</td>
<td></td>
</tr>
</tbody>
</table>

Seal/Signature of Vendor
INTEGRITY PACT

This Integrity Pact (hereinafter referred to as the Agreement) is made on ____ day of the month of ______ 20____

Between

India Tourism Development Corporation Ltd (ITDC) - a Government of India Undertaking, is a company duly incorporated and existing under the provisions of the Companies Act, 1956, having its registered office at SCOPE Complex, Core 8, 7 Lodi Road, New Delhi-110003 (hereinafter referred to as the Principal, which expression shall unless repugnant to the meaning of context hereof include its successors and permitted assigns).

And

M/s. ____________________________ (name and address of the Individual/firm/company/consortium members) through ____________ [mention details of the duly authorized signatory] (hereinafter referred to as the Bidder/Contractor which expression shall unless repugnant to the meaning of context hereof include its successors and permitted assigns).

Preamble

Whereas, the Principal has floated a Tender _________ [Tender No.] (hereinafter referred to as Tender) and intends to award under laid down procedures, contract(s)/purchase order/work order/ for ______________[name of the contract/order] or items covered under the tender (hereinafter referred to as the Contract).

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

Whereas, in order to achieve these goals, the Principal has appointed competent and credible Independent External Monitor (IEM) for this Pact after approval of Central Vigilance Commission.

Whereas to meet the aforesaid purpose both parties have agreed to enter into this Integrity Pact (hereinafter referred to as the Agreement), the terms and conditions of which, shall be read as an integral part of the tender document and contract between the parties.

Now, Therefore, in consideration of the mutual covenants contained in this Pact, both parties hereby agree as follows:-

Section 1- Commitments of the Principal
1. The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:

   a. No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

   b. The Principal will during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/additional information through which the Bidder(s) could obtain an advantage in relation to the process or the contract execution.

   c. The Principal will exclude from the process all known prejudiced persons.

2. If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the IPC/PC Act, or if there is a substantive suspicion in this regard, the Principal will inform the Chief Vigilance Officer and in addition can initiate disciplinary actions.

Section 2 - Commitments of the Bidder(s)/ Contractor(s)  The Bidder(s)/Contractor(s) commit them self to take all measures necessary to prevent corruption. The bidder(s)/Contractors(s) commit them self to observe the following principles during participation in the tender process and during the contract execution.

   a. The Bidder(s) / contractor(s) will not, directly or through any other persons or firm, offer promise or give to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

   b. The Bidder(s)/Contractor(s) will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

   c. The Bidder(s)/Contractor(s) will not commit any offence under the relevant IPC/PC Act; further the Bidder(s)/Contractors will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
d. The Bidder(s)/Contractor(s) of foreign origin shall disclose the name and address of the Agents/representatives in India, if any. Similarly, the bidder(s)/contractor(s) of Indian Nationality shall furnish the name and address of the foreign principals, if any. And the details as mentioned in the ‘Guidelines on Indian Agents of Foreign suppliers’ shall be disclosed by the Bidder(s)/Contractor(s). Further, as mentioned in the Guidelines all the payments made to the Indian agent/representative have to be in Indian Rupee only.

In a tender, either the Indian Agent on behalf of the Principal/OEM or the Principal/OEM itself can bid but both cannot bid simultaneously for the same item/product in the same tender. If an agent submits bid on behalf of the Principal/OEM, the same agent shall not submit a bid on behalf of another Principal/OEM in the same tender for the same item/product.

e. The Bidder(s)/Contractor(s) will, when presenting their bid, disclose any and all payments made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

f. Bidder(s)/Contractors who have signed the integrity pact shall not approach the courts while representing the matter to IEM s and shall wait for their decision in the matter.

2. The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

Section 3: Disqualification from tender process and exclusion from future contracts

If the Bidder(s)/Contractor(s), before award or during execution has committed a transgression through a violation of Section 2, above or in any other form such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/Contractor(s) from the tender process or terminate the Contract, if already executed or exclude the Bidder/Contractor from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of the transgression and action will be taken as per the procedure prescribed in the “Guidelines on banning of business dealings” of the Principal.

Section 4: Compensation for Damages

Without prejudice to any rights that may be available to the Principal under law or Contract or its established policies and laid down procedures, the Principal shall have the following rights in case of breach of this Agreement by the Bidder(s)/Contractor(s).

1. If the Principal has disqualified the Bidder(s) from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent to the Earnest Money Deposit / Bid Security Amount of the Bidder/Contractor.
2. If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to Section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages of the Contract value or the amount equivalent to Performance Bank Guarantee.

**Section 5: Previous Transgression**

1. The Bidder declares that no previous transgressions occurred in the last three years with any other company in any country conforming to the anti-corruption approach or with any other public sector enterprise in India that could justify his exclusion from the tender process.

2. If the bidder makes incorrect statement on this subject, he can be disqualified from the tender process or action can be taken as per the procedure mentioned in the "Guidelines on Banning of business dealings" of the Principal.

**Section 6: Equal treatment of all Bidders/Contractors.**

1. In case of sub-contracting, the principal contractor shall take the responsibility of the adoption of Integrity Pact by the sub-contractor(s).

2. The Principal will enter into Agreements with identical conditions as this one with all bidders, contractors.

3. The Principal will disqualify from the tender process all bidders who do not sign and submit this Integrity Pact along with their Technical Bid for this Tender or violate its provisions at any stage of the tender process.

**Section 7: Violations of the Integrity Pact**

If the Principal obtains knowledge of conduct of a Bidder, Contractor, or of an employee or a representative or an associate of a Bidder, Contractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the same to the Chief Vigilance Officer.

**Section 8: Independent External Monitor/Monitors (IEM)**

1. The Principal will appoint competent and credible Independent External Monitor for this Pact after approval of Central Vigilance Commission.

The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

2. The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. The monitor would have access to all
contract documents whenever required. It will be obligatory for him/her to treat the information and documents of the bidders/contractors as confidential. He/she reports to the C&MD, ITDC.

3. The Bidder/Contractor accepts that the Monitor has the right to access without restriction to all project documentation of the principal including that provided by the contractor. The contractor will also grant the monitor, upon his/her request and demonstration of a valid interest, unrestricted and unconditional access to their project documentation. The same is applicable to sub-contractors (if any).

4. The Monitor is under contractual obligation to treat the information and documents of the Bidders(s)/ contractor(s)/ sub-contractors(s) with confidentiality. The monitor has also signed declarations on 'Non- Disclosure of Confidential Information’ and of 'Absence of conflict of interest’. In case of any conflict of interest arising at a later date, the IEM shall inform C&MD (ITDC) and recuse himself/herself from that case.

5. The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

6. As soon as the Monitor notices, or believes to notice, a violation of this agreement, he/she will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or to take other relevant action. The monitor can in this regard submit nonbinding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

7. The Monitor will submit a written report to the C&MD, ITDC within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.

8. If the Monitor has reported to the C&MD, ITDC, a substantiated suspicion of an offence under relevant IPC/PC Act, and the C&MD, ITDC has not, within the reasonable time taken visible action to proceed against such offence or reported it to the Chief Vigilance Officer, the Monitor may also transmit this information directly to the Central Vigilance Commissioner.

9. The word 'Monitor' would include both singular and plural.

**Section 9 - Pact Duration**

1. This pact begins when both parties have signed this Agreement. It expires for the Contractor 12 months after the last payment under the contract and for all other bidders 6 months after the contract has been awarded.
2. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings.

3. If any claim is made / lodged during this time, the same shall be binding and continue to be valid despite the lapse of this Agreement as specified above, unless it is discharged / determined by C&MD of ITDC.

**Section 10 - Other provisions**

1. This Agreement is subject to Indian Law, the place of performance and jurisdiction is the Registered Office of the Principal i.e. New Delhi.

2. Changes and supplements, as well as termination notices need to be made in writing. Side agreements have not been made.

3. This agreement must be signed by the duly authorized signatory only. If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members. In case of any change in partnership/consortium the new partner or member will have to sign this document.

4. Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

5. Issues like Warranty / Guarantee etc. shall be outside the purview of IEMs.

6. In the event of any contradiction between this Agreement and its annexure, the clause of the Agreement will prevail.

For the sake of brevity, both the parties agree that this Agreement will have precedence over the Tender/Contract documents with regard to any of the provisions covered in this Agreement.

________________________________________
(For & on behalf of the Principal) (For & on behalf of the Bidder)
(Office Seal) (Office Seal)

Place: ___________
Date: ___________
Witness-1: ___________(Sign)
Name: _________________________
Address: ________________________
Witness-2: ___________(Signature)
Name: _________________________
FRAUD PREVENTION POLICY - ITDC

INTRODUCTION

ITDC has placed adequate systems and procedures commensurate to its nature of business such as Licensing Procedure, Purchase Procedure, Engineering & Works Manual, Delegation of Power etc. For ensuring the orderly and efficient conduct of business in an honest, ethical and transparent manner without any bias or malafide.

Further as per schedule V to SEBI (LODR) Regulations, 2015 relating to Corporate Governance provisions requirement, ITDC has placed a whistle blower policy. This policy envisages the Corporation to put in place a mechanism for employees to report to the Management about unethical behaviour, actual or suspected fraud or violation of conduct rules.

Clause 34 (2) (f) of the SEBI (LODR) Regulations, 2015 requires top 500 companies (based on market Capitalization) to give in its Annual Report the Business Responsibility Report describing the initiative taken by the Company from an environmental, social and governance perspective. Principal 1 of the policy requires that businesses should not engage in practices that are abusive, corrupt, or anti-competition. Pursuant to this, it is considered appropriate to formulate and implement a FRAUD PREVENTION policy in the Company.

OBJECTIVES

The objective of the “Fraud Prevention Policy” is to provide a system for detection, reporting and prevention of fraud, whether committed or suspected. The policy will provide a framework and lay down a procedure for detection, reporting and prevention of fraud or suspected fraud. The policy will ensure that management is aware of its responsibilities for detection and prevention of fraud and for establishing procedures for preventing fraud and / or detecting fraud when it occurs.

SCOPE OF THE POLICY

The policy applies to all frauds committed or suspected linked to the business of the Company involving any employees as well as representatives of vendors, suppliers, contractors, consultants, service providers or any outside agency doing business with the company.
DEFINITION OF FRAUD

“Fraud is a wilful act intentionally committed by an individual (s) – by deception, suppression, cheating or any other fraudulent or any other illegal means, thereby, causing unlawful gain (s) to self or any other individual (s) and wrongful loss to other (s), whether in cash or kind.

ACTIONS CONSTITUTING FRAUD

While fraudulent activity could have a very wide range of coverage, the following are some of the act(s) which constitute fraud. The list given below is only illustrative and not exhaustive:

i. Forgery or alteration of any document or account belonging to the Company.

ii. Forgery or alteration of Cheque, Bank Draft or any other Financial Instrument etc.

iii. Misappropriation of funds, securities, supplies or others assets by fraudulent means etc.

iv. Falsifying records such as pay-rolls, removing the documents from files and / or replacing it by a fraudulent note etc.

v. Willful suppression of facts / deception in matters of appointment, placements, submission of reports, tender committee recommendations etc. as a result of which a wrongful gain (s) is made to one and wrongful loss (s) is caused to the others.

vi. Utilizing Company funds for personal purposes.

vii. Authorizing or receiving payments for goods not supplied or services not rendered. Destruction, disposition, removal of records or any other assets of the Company with an ulterior motive to manipulate and misrepresent the facts so as to create suspicion / suppression / cheating as a result of which objective assessment / decision would not be arrived at.

Any other act that falls under the gamut of fraudulent activity. Suspected improprieties concerning an employee’s moral, ethical, or behavioural conduct, should be resolved by departmental management and Employee Relations of Human Resources rather than under Fraud Policy.
REPORTING OF FRAUD

Any employee, representatives of vendors, suppliers, contractors, consultants, service providers or any outside agency doing business with the company as soon as he / she comes to know of any fraud or suspected fraud or any other fraudulent activity must report such incident (s). Such reporting shall be made to the designated Nodal Officer (s) nominated by the Company for this purpose from time to time. If, however, there is shortage of time such report should be made to the immediate HOD whose duty shall be to ensure that input received is immediately communicated to the Nodal Officer. The reporting of the fraud normally should be in writing. In case the reporter is not willing to furnish a written statement of fraud but is in a position to give sequential and specific transaction of fraud / suspected fraud, then the officer receiving the information / Nodal Officer should record such details in writing as narrated by the reporter and also maintain the details about the identity of the official / employee / other person reporting such incident. Reports can be made in confidence and the person to whom the fraud or suspected fraud has been reported must maintain the confidentiality with respect to the reporter and such matter should under no circumstances be discussed with any unauthorized person.

All reports of fraud or suspected fraud shall be handled with utmost speed and shall be coordinated by Nodal Officer (s) to be nominated.

On receiving input about any suspected fraud / nodal officer (s) shall ensure that all relevant records documents and other evidence is being immediately taken into custody and being protected from being tampered with, destroyed or removed by suspected perpetrators of fraud or by any other official under his influence.

DUTY OF NODAL OFFICER

The “Nodal Officer” shall, refer the details of the Fraud / suspected fraud to the Vigilance Department of ITDC, immediately for further appropriate investigation and needful action.

During receipt of information of Fraud / Suspected Fraud, it would be the duty of Nodal Officer to verify the identity of the Complainant. Anonymous Complaint should not be acted upon. After verification of the identity of the Complainant, the Nodal Officer should keep the identity of the Complaints secret.

After completion of the investigation, due & appropriate action, which could include administrative action, disciplinary action, civil or criminal action or closure of the matter if it
is proved that fraud is not committed etc. Depending upon the outcome of the investigation shall be undertaken.

Vigilance Department shall apprise “Nodal Officer” of the result of the investigation undertaken by them. There shall be constant coordination maintained between the two.

**RESPONSIBILITY FOR FRAUD PREVENTION / CREATING AWARENESS / CIRCULATION OF POLICY**

It is the responsibility of every employee, representatives of vendors, suppliers, contractors, consultants, service providers or any outside agency doing business with the company to ensure that there is no fraudulent action being indulged in, in their own area of activity / responsibility. As soon as they learn of any fraud or have suspicion regarding it, they should immediately report the matter as per the procedure laid down in the policy.

All vendors, suppliers, contractors, service providers, consultants and other agencies having business relations with the company are required to affirm to the Fraud Prevention Policy of the company. As such this policy document shall form a part of the tender / RFP document and shall have to be concurred to by all bidders.

All Departmental Heads shall be responsible for proper implementation of the Fraud prevention policy of the company. The Nodal Officers have powers to take corrective actions as per this policy. Name and contact number of nodal officers shall be available on Website and all prominent locations. Efforts will be made to keep the name of the informer secret.

The company recognises that employee / stakeholder’s awareness is essential for effective detection / prevention of fraud / suspected fraud. As such the company shall put in place adequate communication mechanisms for dissemination of information about the policy and its importance to the corruption free governance of the company.

**AMENDMENTS / REVIEW OF POLICY**

The Chairperson and Managing Director shall be the Competent Authority for the interpretation and revision of this policy. The policy will be reviewed and revised as and when needed.

**Nodal Officer:** HOD of Engineering Division of ITDC will be the Nodal Officer
### Business Responsibility Policy

<table>
<thead>
<tr>
<th>S.No</th>
<th>BRR principles approved by ITDC Board</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principle 1.</td>
<td><strong>Businesses should conduct and govern themselves with Ethics, Transparency and Accountability</strong>&lt;br&gt;1. Businesses should develop governance structure, procedures and practices that ensure ethical conduct at all levels; and promote the adoption of this principle across its value chain. Businesses should communicate transparently and assure access to information about their decisions that impact relevant stakeholders.&lt;br&gt;2. Businesses should not engage in practices that are abusive, corrupt, or anti-competition.&lt;br&gt;3. Businesses should truthfully discharge their responsibility on financial and other mandatory disclosures.&lt;br&gt;4. Businesses should report on the status of their adoption of these Guidelines as suggested in the reporting framework in this document.&lt;br&gt;5. Businesses should avoid complicity with the actions of any third party that violates any of the principles contained in these Guidelines.</td>
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<tr>
<td>Principle 5.</td>
<td><strong>Businesses should respect and promote human rights</strong>&lt;br&gt;1. Businesses should understand the human rights content of the Constitution of India, national laws and policies and the content of International Bill of Human Rights. Businesses should appreciate that human rights are inherent, universal, and interdependent in nature.&lt;br&gt;2. Businesses should integrate respect for human rights in management systems, in particular through assessing and managing human rights impacts of operations, and ensuring all individuals impacted by the business have access to grievance mechanisms.&lt;br&gt;3. Businesses should recognize and respect the human rights of all relevant stakeholders and groups within and beyond the workplace, including that of communities, consumers and vulnerable and marginalized groups.&lt;br&gt;4. Businesses should, within theirs sphere of influence, promote the awareness and realization of human rights across their value chain.&lt;br&gt;5. Businesses should not be complicit with human rights abuses by a third party.</td>
</tr>
<tr>
<td>Principle 6.</td>
<td><strong>Businesses should respect, protect, and make efforts to restore the environment</strong>&lt;br&gt;1. Businesses should utilize natural and manmade resources in an optimal and responsible manner and ensure the sustainability of resources by reducing, reusing, recycling and managing waste.&lt;br&gt;2. Businesses should take measures to check and prevent pollution. They should assess the environmental damage and bear the cost of pollution abatement with due regard to public interest.&lt;br&gt;3. Businesses should ensure that benefits arising out of access and commercialization of biological and other natural resources and associated traditional knowledge are shared equitably.&lt;br&gt;4. Businesses should continuously seek to improve their environmental performance by adopting cleaner production methods, promoting use of energy efficient and environmental friendly technologies and use of renewable energy.</td>
</tr>
</tbody>
</table>
5. Businesses should develop Environment Management System (EMS) and contingency plans and processes that help them in preventing, mitigating and contingency environmental damages and disasters, which may be caused due to their operations or that of a member of its value chain.

6. Businesses should report their environmental performance, including the assessment of potential environmental risks associated with their operations to the stakeholders in a fair and transparent manner.

7. Businesses should proactively persuade and support its value chain to adopt this principle.
1. Protection of work/workers: The safety of the work in all respect is contractor’s responsibility till the site is handed over back to ITDC after completion of project.

2. Measurement: The quantities given in the tender are approximate which may be increased / decreased during execution of work however the payment shall be made on the basis of actual measurement taken on site and in conformity with BIS codes.

3. Lighting arrangement: The contractors shall provide adequate lighting arrangements as approved by the Project Engineer for carrying out the works during night time and also provide all other facilities for the labour employed to carry out the works.

4. Site constraints: The quoted rate shall, among others, include mobilization of various type of materials and labour, tools, plants, lighting etc. working at all heights, depths, widths etc. and also the constraints at site like accesses, simultaneous working of other agencies engaged by the corporation, lead, lift, light shortage of storage space and such other situations as exist at site of work.

5. Water & Electricity: The contractor shall make his own arrangement for water & electricity required for construction as well as for drinking water at his own cost. The contractor shall make necessary arrangement for the above at his own cost and remove the same on completion /termination of the work. If water and electricity be arranged by ITDC, 1% of work done shall be deducted from contractor’s bill, i.e. half percent each for water & electricity.

6. The rates of the contractor shall be inclusive of Labour Cess @1% or as applicable and necessary recovery of labour cess shall be made from each RA bill by the ITDC to be deposited with the labour board of the concerned state. In case the labour board is not established in the state, recovery made by ITDC on account of labour cess shall be retained under suspense and will be deposited with the labour board at the later date as and when the labour board is established in the state.

7. Safe Custody: The safe custody and up-keep, till handing over, is the sole responsibility of the contractor. The contractor shall employ sufficient supervisory personal and watchman to ensure that the different items fabricated, supplied by him are kept in fine condition till they are hand over satisfactorily.

8. Handing over: On completion of the work, the site of work shall be thoroughly cleaned and all debris removed before the work is handed over satisfactorily as per the agreed phases.

9. Specification: All work their execution, workmanship; measurements shall be carried out as per the CPWD specification or latest BIS codes unless otherwise specified.

10. Quantity: The contractors deemed to have studied the site carefully and arrived at quantities or material so as to complete each items of schedule of quantity in its entirely.
11. Additional Work: During the course of execution, if any related additional works are specified, notified, the same shall be executed by the contractor.

12. The Contractor shall submit a phased work programme for execution of the work immediately after award of work.

13. Contractor shall provide “All risk insurance policies” beneficiary to ITDC equivalent to the contract sum which shall be validated till the defect liability period is over and workman compensation policy which shall be validated for running period of work.

14. The contractor should strictly comply with the provision of EPF&ESI Acts and keep indemnified the corporation against all actions claims demands, liabilities whatsoever under and in respect of breach of any provision of clause of the said Act.

15. On completion of work a post comparative statement will be prepared and total work done amount of the lowest firm will be restricted at the lowest amount of post comparative statement of the other tenderers in case of reversal of tender for payment purpose.

16. Any discrepancies found in the documents/drawings must be brought to the notice of the Project Engineer and clarification sought well in advance and his decision shall be final and binding on the contractor.

17. All mandatory tests as per CPWD specifications and as desired by Engineer-in-Charge shall be carried out. The testing charges of material including cost of materials shall be borne by the contractor.

18. The original/copy of purchase bills of items supplied by the contractor those having Guarantee/warrantee provided by the manufacturer (like sanitary ware/ CP fittings etc) is to be provided by the Contractor to ITDC for dealing further maintenance of the items through the manufacturer. However, during defect liability period, the contractor will be sole responsible to rectify defects.

19. The basic rate / price mentioned in the item is subjective. If Architect / ITDC Engineer-in-Charge select an item having more / less price as mentioned in the tender (basic price), then rate will re-worked out w.r.t. actual price of the item for cost adjustment.

20. The form work used shall be made of steel or unless specifically permitted by the Engineer in which case the form work shall be with seasoned salwood planks bullahs with lining of steel sheet inside & made watertight & shall be made sufficiently rigid by the use of ties & bracings to prevent displacement or sagging between supports & to withstand all pressure, ramming & vibration, without deflection from the prescribed lines occurring during & after placing of the concrete. The contractor has to submit to the Deptt. full working plan of the centering & shuttering to the bridge prior to execution. It is to be further noted that in the event of collapse of false work & staging, the contractor is liable to be blacklisted apart from other penalties according to the terms of contract & law.

21. The contractor shall be responsible for the true & proper setting out of the work & for the correctness of the position, levels, dimensions & alignment of all part of the work & for the provision of all necessary instruments, appliances & labour in connection there with. If any time during the progress of the works, any error shall appear or arise in the position, levels, dimensions or alignment of any part of the works the contractor on being required to do so by the concerned Executive Engineer-in-Charge or his representative shall at his own expenses rectify such error to the satisfaction of concerned Executive Engineer-in-Charge. The checking of any setting out or of any line or level by the concerned Executive Engineer of his representative shall not in any way relieve the contractor of his responsibility for the
22. Explosives shall not be used on the work by the contractor without the permission in writing of the concerned Executive Engineer & then only in the manner & to the extend prescribed. Where explosives are used the same shall be stored in a special magazine to be provided by & at the cost of the contractor who shall be liable of all damages, loss or injury to any person or property & shall be responsible for complying with all the statutory rules & regulations prescribed by the Chief Inspector of Explosives. It is responsibility of the contractor to procure explosive required for the work. However, the deptt. may tender necessary possible help for procuring explosive License. No claim will however be entertained for delay or failure in rendering such help by the deptt.

23. Sub-standard work

(i) The contractors are required to execute all works according to the specifications laid down, and in a proper workmanlike manner. The motto of the Department shall remain quality, speed and economy in cost in the execution of any work. There shall be no compromise on the quality of work. The field staff, namely, the Junior Engineer/Assistant Manager/Sr. Manager (Engg.), shall remain vigilant to see that the contractor does not execute any defective/poor quality work. If, despite their vigilance and issue of directions certain items of work are done below specifications, and/or if they have not been done in a proper workmanlike manner, the contractor should be immediately asked to rectify or re-do them according to the specifications and according to sound engineering practice. All such defects/deficiencies in the items of works are to be noted in time and recorded in the Site Order Book. It will be the duty of the field staff to point out such defects in the work in time during the progress of the work.

(ii) These defects should also be brought to the notice of the Sr. Manager (Engg.) immediately on their occurrence by the Junior Engineer/Assistant Manager (Engg.), so that he may take timely action to issue notices to the contractor either to rectify the defects or even to get the work dismantled and re-done if necessary. The Sr. Manager (Engg.), shall also on his own inspect the work as frequently as possible and take timely action to issue such notices to the contractor.

(iii) Every attempt should be made to issue such notices regarding the defective/deficient items immediately on their occurrence during the progress of the work. Timely action alone can prevent occurrence of defects/deficiencies that will be difficult or impossible to rectify later on. Where such defects/deficiencies crop up during the maintenance period, notices for re-doing/rectifying the same should be issued within the prescribed maintenance period.

(iv) If the contractor does not rectify the defect or make good the deficiency, the work should be got redone or rectified through another agency, or departmentally by employing skilled labourers, at the contractor’s cost.

24. Acceptance of sub-standard work

(i) In general, sub-standard works should not be allowed to occur, as they reflect poorly on the professional competence of the field staff and adversely affect the image of the Department.

(ii) Acceptance of work below specifications and/or below acceptable levels of workmanship, and the resulting payment at reduced rates for such defective/deficient works should be resorted to only for those items where materials conforming to the required
specifications are not available, or where it is structurally impossible to get the work re-done or where in opinion of Dy. General Manager/Sr. Manager/Engineer-in-charge, it is expedient to do so.

(iii) Acceptance of sub-standard work at reduced rates should be done only under exceptional circumstances General Manager/Dy. General Manager/Sr. Manager is the competent authority to accept sub-standard work.

(iv) The total value of quantities of items at agreement rate for which the General Manager/Dy. General Manager/Sr. Manager accepts sub-standard work in a contract shall not exceed 5% of the contract value. In case total value of such items exceeds 5% prior approval of General Manager/Dy. General Manager/Sr. Manager would be necessary. Before a sub-standard work is accepted by the Department, the Engineer-in-Charge, after getting prior approval of Competent Authority, should write a letter to the contractor, for and on behalf of the ITDC, regarding acceptance of the same and the provisional rates pending the decision of the Competent Authority with regard to final rates. In reply to this letter, the contractor should send his consent for acceptance of the terms specified by the Department.

(v) The decision of the General Manager/Dy. General Manager/Sr. Manager regarding the quantum of reduction as well as justification thereof in respect of rates for sub-standard work that may be decided will be final, and would not be open to arbitration.

(vi) The amount of compensation once levied by the Project Engineer cannot also be waived or reduced by higher officers.

25. PERMITS AND LICENCES

Permit and licences for release of materials which are under government control will be arranged by the contractor. The Corporation will render necessary assistance, sign any forms or application that may be necessary as per status. The Project Engineer and Architect shall be indemnified against all government or legal actions arising out of theft or misuse of government controlled materials in the custody of the contractor.

26. GOVT. AND LOCAL RULES

A The contractor shall conform to the provisions of all local bye-laws and Acts relating to the work and to the Regulation etc. of the Government and Local authorities and of any company with whose system the work under contract is required by the said Act, rules, regulations and bye-laws for execution of the work involved.

B The Contractor shall be responsible for getting the electrical installation inspected and approved by the local authorities wherever required and getting electrical load sanctioned from the concerned authorities if required along with the installation of a metering panel and shall have to get the same approved from the statuary authority. The cost if any shall be deemed to have been included in his quoted rates taking into account all liabilities for licences, fees for footpath encroachment restoration etc. and shall indemnity the Employer against such liabilities and shall defend all actions arising from such claims or liabilities.
27. (i) **Requirement of Technical Staff for work:**

<table>
<thead>
<tr>
<th>Requirement of technical staff</th>
<th>Minimum experience (Years)</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Project Manager with degree in Electrical Engineering</td>
<td>10</td>
<td>Principal Technical Representative</td>
</tr>
<tr>
<td>(ii) Graduate Engineer</td>
<td>5</td>
<td>Technical Representative</td>
</tr>
<tr>
<td>(iii) Graduate Engineer</td>
<td>2</td>
<td>Project/Site Engineer and Project Planning/billing Engineer</td>
</tr>
<tr>
<td>Or</td>
<td></td>
<td></td>
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<tr>
<td>Diploma Engineer</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

(ii) **Rate recovery in case of noncompliance of above clause will be made at following rates:**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Qualification</th>
<th>Experience (Years)</th>
<th>Rate of recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Project Manager with Degree</td>
<td>10</td>
<td>Rs.30000/- p.m.</td>
</tr>
<tr>
<td>2</td>
<td>Graduate Engineer</td>
<td>5</td>
<td>Rs.25000/- p.m.</td>
</tr>
<tr>
<td>3</td>
<td>Graduate Engineer</td>
<td>2</td>
<td>Rs.15000/- p.m.</td>
</tr>
<tr>
<td>4</td>
<td>Diploma Engineer</td>
<td>5</td>
<td>Rs.15000/- p.m.</td>
</tr>
</tbody>
</table>

28. The contractor shall maintain records of Technical staff deputed/provided at site of work as per clause 27 above and shall submit their monthly attendance sheet to Project Engineer of ITDC for verification and needful action.

29. **Hindrance clarification:**

(i) Rain shall not be counted as hindrance.

(ii) Similarly, it is also clarified that no hindrance shall be recorded in case of festival as the same are known hindrance and taken into account in stipulated period of time for completion of work at the time of floating of the tender.

In addition to special condition as mentioned above, the following will be additional special terms & conditions for E&M works:-

30. **General**

These Special Conditions shall be read in conjunction with the General Terms and conditions and shall take precedence over the General Conditions in case of any difference between the two.
31. **Site Supervision**
The contractor shall issue identity cards to the staff deputed on the work. The staff deputed on the work shall be in proper uniform as decided by the Engineer-in-charge. The contractor shall indemnify the department against all losses or damages or liability arising in respect of staff deployed by him on the work. The contractor shall have to adopt all the safety precautions while executing the work and no claim shall be entertained by the department in case of any accident while carrying out the work.

32. **Service Engineers/Mechanics/Labor**
The service engineers/mechanics deployed must have requisite expertise. In addition to Technical manpower specified in special conditions of civil works, the contractor may employ such number of employees as he may think fit for due discharge of the contract and the person so employed by him shall be the employee of the contractor for all purpose whatsoever, and shall not be deemed to be in the employment of the company. However, ITDC shall make arrangement of issuance of gate entry passes to all such personnel after receiving request in writing from the contractor. The contractor shall be solely responsible for any cost/risk/loss/accident due to transportation or movement of the System at the site. All costs for loading, unloading, transport, shifting complying Government Regulations, Maintenance and Servicing of the system including the cost of spare parts, periodical replacement shall be borne by the contractor.

33. **Accidents/Injury**
ITDC will not be responsible for any kind of accident, injury or casualty occurred to the contractor or his representative, worker or workmen or persons, animals or things and for all damages to the project works, materials, equipment, structural and / or decorative part of property which may arise from the operations or neglect of Contractor or any of his employees whether such injury or damage arise from carelessness, accident or any other cause whatsoever in any way connected with the carrying out of this contract.

All warning signs shall be in Hindi, English and Oriya and shall remain prominently displayed at potential accident hazard locations. These signs shall be maintained to remain in a clean and legible conditions at all time's to the satisfaction of the Project Engineer.

34. **Electrical License**
The Contractor shall be liable to comply and adhere with the Rule-45 Of The Indian Electricity Rules, 1956 and shall possess a valid contractor’s license of appropriate class in the state or shall have works supervised by licensed Supervisors or foreman having valid license as per Indian Electricity Rules, 1956. The site engineer shall have liberty to suspend work, till the time contractor complies with the said Rule.

35. **Discrepancies in Drawing/Documents**
Any discrepancies found in the documents/drawings must be brought to the notice of the project engineer and clarification sought well in advance and his decision shall be final and binding on the contractor.

36. **Regards for Religious Sentiments**
Being located in close proximity to a highly sacred Hindu shrine, the contractor shall ensure that in no way the religious sentiments of the devotees visiting the place round
the year are hurt in any way by any of his employee/staff/labor. Any such incidence if noticed shall be sole responsibility of contractor and appropriate authorities shall be informed for taking appropriate action as per prevalent law.

37. Fire Protection
The Contractor shall provide and maintain adequate fire protection in the forms of barrels of water with bucket tanks, fire extinguishers, or other effective means of extinguishing fire, ready for instant use. The Contractor shall follow the instructions and specifications of the concerned local authorities.

38. Telephone
The Contractors shall make his own arrangements to obtain a telephone connection at site till the project is completed.

39. Setting Out
Setting out shall be in accordance with General Conditions of Contract. The contractor will establish benchmarks and/or reference lines as shown on the drawings. All other work shall be laid out from these marks and/or lines. Temporary poles and other marks used in setting out shall be removed on completion of the required work, after taking necessary approvals from the Project Engineer.

40. Initial and Final Levels
The Contractor shall acquaint himself with the nature of the ground, existing structures, foundations and subsoil, which might be encountered during excavation of earthworks. The Corporation does not guarantee or warrant in any way that the materials to be found in the excavation will be similar in nature to that of any samples which may have been exhibited or indicated in the report, drawings or any other contract documents or to materials obtained from boring or trail holes. The contractor shall be deemed to have made local and independent inquiries and shall take the whole risk of the nature of the ground subsoil or materials to be excavated or penetrated and the Contractor shall not be entitled to receive any extra or additional payment not to be relieved from any of his obligations by reasons of the nature of such ground subsoil or material. All excavations, cutting, and fills shall be constructed to the lines, levels and gradients specified with any necessary allowance for consolidation, settlement and drainage so that at the end of the period of maintenance the ground shall be at the required lines, levels and gradients. During the course of the Contract and during the period of maintenance any damage or defects in cuttings and fills, structures and other works, caused by slips, falls or basins or any other ground movement due to the Contractor's negligence shall be made good by the Contractor at his own cost.

41. CPRI Approval for Panels
All Panels should be got tested at site/Lab by CPRI and certificate to be submitted before finalization of bill by the contractor. The cost of testing including transportation shall be borne by the contractor and no extra payment shall be made.

42. Electrical and fire work should be executed as per latest IS-safety codes of CPWD specifications.

43. List of Approved Make
A list of approved makes in respect of important items is enclosed which shall form part of this contract. Only makes approved as per this list shall be used in the work.

44. The contractor shall be responsible for the conduct and behavior of the workers deployed by him. Workers will bear proper uniform and name badges and photo Identity Card will be issued to them by the contractor. No foreign national shall be deployed by the contractor without proper police verification and the contractor shall also ensure that no arms/ammunition explosion brought to the site by any of the workers engage by him.

45. The Architectural, structural and other services drawings for the work shall at all time be properly correlated before executing any work and no claim whatsoever shall be entertained in this respect.

46. The contractor, through his engineers, shall ensure quality construction in a planned and time bound manner. Any sub-standard Material / work beyond set out tolerance limits shall be summarily rejected by the Engineer-In-Charge.

47. The contractor shall have to make approaches, to the site, if so required and keep them in good condition for transportation of labor and materials as well as inspection of works by the Engineer-In-Charge. Nothing extra shall be paid on this account.

48. The work shall be carried out in the manner complying in all respects with the requirement of relevant byelaws of the local body under the jurisdiction of which the work is to be executed.

49. The work shall be carried out in such manner so as not to interfere or affect or disturb other works, being executed by other agencies, if any. The contractor shall arrange his work with that of the other in an acceptable and coordinated manner and shall perform it, in proper sequence to the complete satisfaction of the Engineer-In-Charge. Any damage done by contractor to any existing work shall be made good by him at his own cost or the same shall be got done at their risk and cost.

50. The contractor shall make his own arrangements for obtaining electric connections and make necessary payments directly to the departments concerned. The department will however, make all reasonable recommendations to the authority concerned in this regard. Till such time contractor is unable to obtain connection from the concerned department the contractor will make alternative arrangements to do the work and no hindrance shall be recorded on this account.

51. The contractor shall be responsible to arrange at his own cost all necessary tools and plants required for execution of this work. Tools, plants and machinery required shall be brought to the site to maintain the progress as per schedule of work and also as and when required by the Engineer-In-Charge and same shall not be removed without the consent of the Engineer-In-Charge. A list of minimum plant and equipment to be mobilized for the work shall be given to Engineer-in-Charge. Contractor may be required to mobilize any further equipment as per the requirement of work.
52. No foreign exchange shall be made available by the department for the purpose of procurement of equipment, plants, machinery, materials of any kind or any other items required to be carried out in execution of work.

53. The contractor or his authorized representative should always be available at the site of work to take instructions from Engineer-In-Charge, and ensure proper execution of work. No work shall commence in the absence of contractor’s engineers.

54. The contractor shall take all necessary precautions to prevent any nuisance or inconvenience to the owners, tenants of adjacent properties and to the public in general and to prevent any damage to such properties and any pollution of environment. He shall make good at his own cost and to the satisfaction of the Engineer-In-Charge, any damage to roads, paths, cross-drainage works or public or private property whatsoever caused by the execution of the work or by the traffic brought thereon by the contractor. Utmost care shall be taken to keep the noise level to the barest minimum so that no disturbance as far as possible is caused to the occupants/users of adjoining buildings.

55. No payment will be made to the contractor for damage caused by rains, or other natural calamity or other unforeseen reasons during the execution of the works and no such claim on this account shall be entertained by ITDC. The entry of material and workers of the contractor shall be from given restricted route. Necessary external barricading, ramp, hoist etc. if required, shall be done by the contractor at its own cost.

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

57. The Malba/unserviceable materials shall be disposed of as per directions of Engineer-In-Charge at locations indicated by him.

58. Factory made materials shall be procured only from reputed manufacturers or their authorized dealers. Engineer-In-Charge reserves his right to get the materials tested in laboratories of his choice before final acceptance. Samples of all materials proposed to be employed in the execution of the works may be called for at any time by the Project Engineer and the cost of supplying such samples will be borne by the contractor. All samples submitted to the Project Engineer will have to be preserved by the contractor at site till the final completion of the work and at the contractor cost. All materials brought on to site shall be stored so that they remain in perfect condition until such time as they are incorporated in the work. Method of storage, protection and handling of material shall be to the Project Engineer approval. All rejected material should be removed from site within 24 hrs. ITDC reserve the right to reject any item which in their assessment is second hand.

59. A detailed program in the form of precedence network diagram is to be submitted to the Engineer-In-Charge within 15 days of commencement of work. The program chart will have to be updated fortnightly and submitted to the Engineer-In-Charge on fortnightly basis. The program chart should include the following
a) Descriptive note explaining sequence of various activities
b) Network (PERT / CPM)
c) Programs of mobilization of machinery / equipments
d) Labor deployment schedule
e) Cash flow statement

60. The submission for approval by the Engineer-In-Charge of detailed program or the furnishing of such particulars shall not relieve the contractor of any of his duties or responsibility under the contract. This is without prejudice to the right of the Engineer-In-Charge to take action against contractor as per terms and conditions of the agreement. In order to adhere to the program, the work may have to be carried out in more than one shift and no claim on this account shall be entertained. Contractor will give advance notice in writing to Engineer-In-Charge for doing any work in odd hour.

61. If the performance of the work done is found unsatisfactory and any defects noticed during the guarantee period, they shall be rectified by the contractor within seven days of receipt of intimation of defects in the work. If the defects pointed out are not attended to within the specified period, the same will be got done from another agency at the risk and cost of the contractor Bank guarantee shall be submitted on completion of specialized item.

62. Some restrictions may be imposed by the security agencies/local police on the working and for movement of labor, materials etc. The movement of trucks and vehicles shall be regulated in accordance with rules and regulations of the area surrounding the site. The contractor shall be bound to follow all such restrictions/instructions and nothing extra shall be payable on this account. No claim whatsoever will be entertained by the department on account of any restrictions imposed by the security agencies or local police in execution of work.

63. All safety factor such as providing and fixing barricading, masking, partitioning, safety nets etc which are required for workers and hotel property to be provided by contractor during execution of complete work.

64. All sign boards and partitions which are required during the execution of work as per the site condition to be provided by the contractor. No extra payment to be made in this account.

65. The materials to be used for this work shall be of approved make of highest quality and/or BIS marked. Those material for which BIS Certification Mark is not issued shall conform to relevant manufacturer's specifications and/or latest CPWD specifications.

66. There are different Sub-Heads in the work. Certain items may be same in various subheads. The quoted rates for similar items in different sub-heads shall be the same. In the event of any variation in the quoted rates, the lower of the two or more shall be applicable and acceptable to the contractor.

67. All charges on account of royalty, tollage, rent, octroi, terminal or sales tax and / or other duties or any increase or decrease in any levy on materials obtained for the work or
temporary work or part thereof (excluding materials provided by the Corporation) shall be borne by the Contractor.

68. Day to day issue & receipt of material and consumption registers shall be maintained in the standard format at the site of work with the Project Engineer, and it will be responsibility of the Contractor to get these updated, regularly.

69. In the case of conflict amongst the various drawings, the decision of the Project Engineer shall be final and binding.

70. Neither the omission by the Project Engineer to test the materials nor the production of manufacturer(s) certificate etc. as aforesaid, shall affect the right of the Project Engineer to reject, after delivery the materials found unsuitable or not in accordance with the specifications.

71. The contractor may engage a sub contractor with prior approval from Project Engineer, who will seek approvals from Competent Authority and till such time said approval is communicated to the contractor, no hindrance shall be recorded.

**SPECIAL CONDITIONS APPLICABLE FOR ELECTRICAL WORKS**

72. **Power Supply System**

   Entire work shall be suitable for use on 415 volt 3 phase 4 wire supply system with transformer neutral grounded. The rated frequency of the supply system shall be 50 cycles per second.

73. **Name Plates & Caution Boards**

   The Contractor shall affix pointing caution boards/ danger plates as statutorily required for electrical safety. The contractor shall also providing engraved anodized aluminum or approved equivalent name plates of suitable sizes on switchboards/panels/equipments etc.

74. **Circuit Identification**

   All incoming and outgoing cables and wires shall be properly labeled as per the layout /schematic drawings for easy identification. Details of circuits being fed from DBs shall be affixed at the back of the door of each DB.

75. **Civil Works, Cleaning and Painting**

   Minor civil work items required for the work like cutting chases in walls/ceilings, making holes and openings, providing inserts, grouting etc including making good the same and painting the civil works. Providing final paint coat to all exposed fabricated steel work and providing matching paint in approved manner over portions of factory painted equipment if damaged during transportation/storage/installation before handing over.

76. **Statutory Approval**

   The Contractor shall deposit applications as prescribed with the appropriate Authorities on behalf of Owners for obtaining sanctions/approvals/permissions/clearances as detailed below, and shall arrange for timely obtaining of all sanctions / permission /approvals / clearance as required. All expenses required to be incurred for obtaining the statutory...
approvals including liaison charge shall be borne by the Contractor. Statutory fees shall however be reimbursed by the Owners against valid official receipt.

77. **Clearances for Electrical Works**
The Contractor shall at its own expense obtain clearance from Electrical Inspector after completion of work if required and issue of NOC.

78. **Compliance of Statutory Observation**
Complying with observation, if any, of Electrical Inspector and / or any other Statutory Authority after completion of work in order to obtain a categorical clearance to start beneficial use and in the event of the work being inspected by Chief Technical Examiner of CVC, Government of India, complying with CTEs observations, if any shall be responsibility of contractor.

79. **Shop Drawings on Award of Work before Commencement**
The Contractor shall furnish manufacturer's test certificates in respect of materials/equipments/components used on work as required and shall submit shop drawings as below to Architects/Owners for approval before commencements of work at site/fabrication/manufacture.

80. **Drawings on Work Completion.**
After completion of works the contractor shall submit completion drawings in the form of one completion set of originals on sepiya cloth with two sets of blue prints as also in the form of computers CD's and CD ROM and three sets of documents as listed below.

a) As built details of equipments, cable routing drawings showing size, type and number of medium voltage cables and made of installation, earthing etc.

b) As built GA and schematic drawings of switch boards, DB's etc. showing material and size of sheet steel/busbar/inter connections and make and rating of switch gear including details and protections, metering, indication and interlocks etc, as built details of earth-pits and earthing electrodes.

81. **Samples**
All materials and equipment used on work shall be got approved by Owners/Architects prior to use on work Samples / literature of items, as directed, shall be got approved from Owners/Architects prior to use on work.

82. **Inspection at Manufacturer’s Works**
Prior to shipment of equipment, the ITDC reserves the right to inspect the equipment at Manufacturer's Works. Contractor shall provide and secure every reasonable access and facility at Manufacturer's Works for this inspection.

83. **Safety Regulations**
The Contractor shall, at their own expense, arrange for safety provisions as per safety codes of Indian Standards Institution, Indian Electricity Act and such other Rules. Regulations and Laws as may be applicable, in respect of all labor, directly or indirectly employed in the work for performance of the Contractors shall be deemed to be a part of this agreement.
a) No inflammable material shall be stored in places other than the rooms specially constructed for this purpose in accordance with the provisions of Indian Explosives Act. If such storage is unavoidable, it should be allowed only for a short period and in addition, special precautions, such as cutting off the supply to such places at normal items, storing materials away from wiring and switch boards, giving electric supply for a temporary period with due permission of Engineer-in-charge shall be taken.

b) Protective and safety equipment such as rubber gauntlets or gloves, earthing rods, line men's belt, portable artificial respiration apparatus etc. should be provided in easily identifiable locations. Where electric welding or such other nature of work is undertaken, goggles shall also be provided.

c) Necessary number of caution board such as —Man on Line, Don't switch on should be readily available in easily identifiable locations. Standard first aid boxes containing materials as prescribed by the St. John Ambulance, Brigade or Indian Red Cross should be provided in easily identifiable locations and should be readily available. Periodical examination of the first aid facilities and protective and safety equipment provided shall be undertaken and proper records shall be maintained for their adequacy and effectiveness.

d) Charts (one in English and one in regional language) displaying methods of living artificial respiration to a recipient of electrical shock shall be prominently displayed at appropriate places. A chart containing the names, addresses and telephone numbers of nearest authorized medical practitioners, hospitals, Fire Brigade and also of the officers in charge shall be displayed prominently alongwith the First Aid Box.

e) No work shall be undertaken on live installations, or on installations which could be energized unless one another person is present to immediately isolate the electric supply in case of any accident and to render first aid, if necessary. No work on live L.T. busbar or pedestal switchboards should be handled by a person below the rank of a Wireman and such a work should preferably be done in the presence of the Engineer-in-charge of the work. When working on or near live installations, suitably insulated tools should be used, and special care should be taken to see that those tools accidentally do not drop on live terminals causing shock or dead short.

f) Before starting any work on the existing installation, it should be ensured that the electric supply to that portion in which the work is undertaken is preferably cut off. Precautions like displaying —Men at Work, cautions boards on the controlling switches, removing fuse carrier from these switches and these fuse carriers being kept with the person working on the installation, etc. should be taken against accidental energization. —Permit to Work, should be obtained from the Engineer-in-charge. No work on H.T. main should be undertaken unless it is made dead and discharge to earth with an earthing lead of appropriate size. The discharge operation shall be repeated several times and the installation connected to earth positively before any work is started.

g) Before energizing on an installation after the work is completed, it should be ensured that all tools have been removed and accounted, not person is present inside any enclosure of the switch board etc. any earthing connection made for doing the work has been removed, —Permit to Work, is received back duly signed by the person to whom it was
issued in token of having completed the work and the installation being ready for re-
energizing and —Men at Work, caution boards removed.

84. **Completion Certificate**
On completion of the electrical installation a certificate shall be furnished by the Contractor
countersigned by the Licensed Supervisor, under whose direct supervision the installation
was carried out. This certificate shall be in the prescribed form as required by the local
supply authority.

**TECHNICAL SPECIFICATIONS FOR CABLE / FEEDER PANELS**

85. **Arrangement for Incoming/Outgoing Cable Termination**
Cable entries shall be provided either from the rear or from the front through cable alleys
of suitable size. Removable gland plate to be provided for each cable entry. Cable support
arrangement to be provided inside cable alley so that cables are neatly arranged and
fixed. From each outgoing switch, insulated strip/conductor of suitable size to be provided
unto suitable terminal block, which will receive incoming / outgoing cable termination.
Cables shall not be terminated directly to switchgear, but terminated through proper
terminal blocks.

86. **Specification of Cable Terminal Block**
Terminal block of reputed make shall be used. The housing material shall be polyamide
having unbreakable and fire-retardant characteristic. All the metal parts shall be made up
of copper alloy including the screws. Mounting shall be —Din or —G-ail‖ type. Screws shall
be self captive type. No protection cover is required, and the block should be touch proof.

87. **Bus Bars / Supports / Clearances**
The bus bar system may comprise of a system of main / auxiliary bus bars run in bus bar
alleys. For bus bar material, shall be aluminum current density 0.8 A per sq mm.

88. **Storing, Erection and Commissioning of Lt Panels**
The panels shall be stored in well ventilated, dry places. Suitable polythene covers shall
be provided for necessary protection against moisture.

89. **FEEDER PILLARS**
The Feeder Pillars shall be of cold rolled sheet steel, totally enclosed with front and
rear opening floor mounting type dust damp and vermin proof. The door swing shall not
be less than 160 deg. All covers and doors of enclosures shall have gaskets of oil resistant
synthetic materials, firmly held in place by continuous metal retainer in addition to the
adhesive. The thickness of the sheet shall not be less than 3mm. Sheet steel shall be
ground smooth. All sheet surfaces shall be free from dents and hammer marks. Sheet
steel shall be of high quality.

All openings and cut-outs shall be made by machine and shall be free from burrs. Weld-
runs shall be ground smooth. The maximum operating height shall not exceed 1500mm.
Adequate lifting facilities shall be provided for the complete unit. The layout and general
arrangement of the panel and feeder pillar shall be approved by Project Manager. The bus
bars provided in the feeder pillars shall be of aluminium. Bus bars and their
interconnections shall be air insulated PVC sleeved and colour coded and shall have minimum clearance to earth and between phases in line with IS:375.

The size of the neutral bus bar shall be half of that of phase bus bar for sizes above 200 A and neutral shall be 100% rated for bus bar upto 200 A.

The earth bus bar shall be located at the bottom and shall be continuous throughout the length of the panel. It shall be of GI strip of 50mm x 6mm size.
The connections between vertical and horizontal bus bars shall be bolted type.

The feeder pillars shall be provided with removable sheet steel gland plate of minimum 6mm thickness for cable termination at the bottom.
The feeder pillar shall be painted as below:

a. The pre-treatment process shall involve de-greasing, rinsing de-scaling rinsing derusting rinsing phosphating, rinsing & passivation.
b. Two coats of red oxide primer and air drying.
c. A coat of filler to remove imperfections and dry block rubbing.
d. Panel surface shall be rubbed down wet to obtain a fine smooth finish and prepare it for coat of paint of required shade.
e. Stoving of paint with infrared rays heating process.
f. After carrying out the wiring work, the final touch up of the panel shall be done.
g. After the above the feeder pillar required for outdoor duty shall be given a coat of clear epoxy paint.

90. BUS BAR SUPPORTS AND ATTACHMENTS SUPPORTS

Bus bars shall be firmly fixed on supports constructed from a suitable insulated material such as DMC or SMC Bus Bar supports. Alternatively bus bars shall be supported on insulators of suitable lengths conforming to relevant Indian Standards. The supports shall be sufficiently robust to effectively withstand electro-mechanical stresses produced in the event of short circuit.

Further for tapping off connections from bus bars, PVC insulated wire shall be used for current capacities upto 100 amp and for higher current capacities solid conductors/strips suitably insulated with PVC sleeve/tape shall be used.

91. CLEARANCES

The minimum clearances to be maintained for open and enclosed indoor air insulated bus burs / electrically non exposed and working at system voltages upto 600 volts shall be as follows:
Between Min clearances
Phase to Earth 26 mm
Phase to Phase 32 mm

92. ARRANGEMENT OF BUS BARS & MAIN CONNECTIONS
Bus bars and main connections which are substantially in one plane shall be arranged in order given as follows:

a. The order of phase connections shall be Red, Yellow & Blue.
b. When the run of the conductors is horizontal the red shall be on the top or on the left or farthest away as viewed from the front.
c. When the run of the conductor is vertical the red shall be on the left or farthest away as viewed from the front.

93. ERECTION TESTING AND COMMISSIONING OF FEEDER PILLARS STORING

The Feeder Pillar shall be stored in a well ventilated dry place, suitable polythene covers shall be provided for necessary protection against moisture.

ERECTION

Feeder Pillar shall be installed on suitable foundation. Foundation shall be as per the dimensions supplied by the manufacturer. The foundation shall be flat and level. Suitable grouting holes shall be provided in the foundation. Feeder Pillar shall be properly aligned and bolted to the foundation. Provision shall be made in the feeder pillar for entry & exit of cables from bottom.
Cables shall be terminated on the bottom plate by using brass compression, glands. The individual cables shall then be led through to the panel to the required compartments for necessary terminations. The cables shall clamped to the supporting arrangement. The strip earth bus bar shall be connected to the local earth grid.

94. PRE COMMISSION TESTS

Feeder Pillar shall be commissioned only after the successful completion of the following tests. The tests shall be carried in the presence of Project Manager. All main and auxiliary bus bar connections shall be checked and tightened. All wiring terminations and bus bar joints shall be checked and tightened. Wiring shall be checked to ensure that it is according to the drawing. All wiring shall be tested for insulation resistance by a 1000 volt meager.

95. MEDIUM VOLTAGE CABLES

Medium voltage cables shall be aluminum conductor. XLPE steel wire armoured or steel tape armoured construction. Aluminum conductors up to 10 sq. mm may be solid circular in cross section and sizes above 10 sqmm shall be stranded. Sector shaped stranded conductors shall be used for sizes above 25 sqmm. The cables shall conform to IS 1554 (Part 1)

96. CORE IDENTIFICATION

Core shall be provided with the following colour scheme of PVC insulation.
1 core : Red / Black / Yellow / Blue
2 core : Red and Black
3 core : Red, Yellow and Blue
3.5 /4 core : Red, Yellow, Blue & Black

Short circuit ratings for the cables shall be specified in IS:1554 part-I

97. **LAYING OF CABLES**

Before the cable laying work is undertaken the route of the cable shall be decided with the Project Manager.

a. While shortest practicable route will be preferred cable runs shall follow fixed development such as roads footpaths etc. with proper off-sets so that future maintenance and identification are rendered easy.

b. Whenever cables are laid along well demarcated or established roads, the LV/MV cables shall be laid in existing cable trenches shown in site plan / directed by Project Manager.

c. Cables of different voltages and also power and control cables shall be kept in different trenches with adequate separation. Where available space is restricted LV/MV cables shall be laid above HV cables.

d. Where cables cross one another the cables of higher voltage shall be laid at a lower level than the cables of lower voltage.

e. Power and communication cables shall as far as possible cross at right angle.

Where power cables are laid in proximity to communication cables the horizontal and vertical clearances shall not normally be less than 60 cm.

98. **Width of trench** (in case of cables laid other than in existing trenches)

The width of trench shall be determined on the following basis:

a. The minimum width of trench for laying single cables shall be 350mm.

b. Where more than one cable is to be laid in the same trench in horizontal formation with width of trench shall be increased such that the inter-axial spacing between the cables except where otherwise specified shall be at least 200mm. This spacing may be reduced wherever necessary with approval of Project Manager.

c. There shall be a clearance of at least 150mm between axis of the end cables and the sides of the trench. However suitable adjustment in space may be made to suit site conditions.

99. **Depth of trench**

a. The depth of trench shall be determined on the following basis:

b. Where cables are laid in single tier formation, the total depth of the trench shall not be less than 750mm. When more than one tier of cables is unavoidable and vertical formation of laying is adopted, the depth of trench shall be increased by 300mm for each additional tier to be formed.
100. **Excavation of trenches (Trenches other than existing trenches)**

   a. The trenches shall be excavated in reasonably straight lines. Wherever there is a change in direction. Suitable curvature of 12 times the overall diameter of the largest cable shall be provided complying with the requirements.

   b. Where gradients and changes in depths are unavoidable these shall be gradual.

   c. Excavation shall be done by any suitable means manual or mechanical. The excavated soil shall be stacked firmly by the side of the trench such that it may not fall back into the trench.

   d. Adequate precautions shall be taken not to damage any existing cables, pipes or other such installations during excavation. Wherever bricks, tiles or protected covers or bare cables are encountered, further excavation shall not be carried out without the approval of the Engineer in charge.

   e. Existing property exposed during trenching shall be temporarily supported or propped adequately as directed by the Engineer in charge. The trenching in such cases shall be done in short lengths, necessary pipes laid for passing cables therein and the trench refilled as required.

   f. If there is any danger of a trench collapsing or endangering adjacent structures the sides shall be well shored up with timbering and / or sheathing as the excavation proceeds. Where necessary these may even be left in place when back filling the trench.

   Note: Excavation through lawns shall be done in consultation with the owner.

101. **Laying of cable in trench**

   a. The cable drum shall be properly mounted on jacks or on a cable wheel at a suitable location. It should be ensured that the spindle, jack etc are strong enough to carry the weight of the drum without failure and that the spindle is horizontal in the bearings so as to prevent the drum creeping to one side while rotating.

   b. The cable shall be pulled over rollers in the trench steadily and uniformly without jerks or strains. The entire cable length shall as far as possible be laid in one stretch. However when this is not possible the remainder of the cable shall be removed by flaking i.e. making one long loop in the reverse direction.

   c. After the cable is uncoiled and laid over the rollers, the cable shall be lifted slightly over the rollers beginning from one end by helpers standing about 10 metre apart and drawn straight.

   d. The cable shall then be taken off the rollers by additional helpers lifting the cables and then laid in the trench in a reasonably straight line.

   e. For short runs and cable sizes upto 50 sq mm 1.1 KV grade the alternative method of direct handling can be adopted with the prior approval of the Engineer in charge.
f. If two or more cables are laid in the same trench, care shall be taken to preserve relative position. All the cables following the same routes shall be laid in the same trench. Cables shall not cross each other as far as possible.

g. When the cable has been properly straightened the cores shall be tested for continuity and insulation resistance. The cable shall be measured thereafter.

h. Suitable moisture sealing compound / tape shall be used for sealing of the ends.

i. Cable laid in trenches in a single tier formation shall have a covering of clean dry sand of not less than 80mm above the base cushion and 150 mm sand before the protective cover with Sub Class 'B' bricks is laid.

j. In the case of vertical multi-tier formation after the first cable has been laid a sand cushion of 300mm shall be provided over the initial bed before the second tier is laid. If additional tiers are formed each of the subsequent tiers also shall have a sand cushion of 300mm. The top most cable shall have a final sand covering not less than 170mm before the protective cover is laid.

k. A final protection to cables shall be laid to provide warning to future excavators of the presence of the cable and also to protect the cables against accident mechanical damage. Such protection shall be with second class bricks of not less than 200mm x 100mm x 100mm (nominal size) laid breadth wise for the full length of the cable to the satisfaction of the Project Manager. Where more than one cable is to be laid in the same trench this protective covering shall cover all the cables and project at least 50mm over the sides of the end cables.

l. The trenches shall then be back filled with excavated earth free from stones or other sharp edged debris and shall be rammed and watered in successive layers not exceeding 300mm. Unless otherwise specified a crown of earth not less than 50 mm in the centre and tapering towards the side of the trench shall be left to allow for subsidence. The crown of earth shall however not 100mm exceed so as not to be a hazard to vehicular traffic.

m. Where road berms or lawns have been cut or kerb stones displaced the same shall be repaired and made good to the satisfaction of the Engineer in charge and all surplus earth and rocks removed to placed as specified.

102) **ROUTE MARKER**

a. Route markers shall be provided along straight runs of the cables at locations approved and generally at intervals not exceeding 50 metres.

b. Markers shall also be provided to identify change in the direction of the cable route and also for location of every underground joint.
LAYING OF CABLES IN EXISTING TRENCHES

a. Cables shall be arranged in tier formation inside the trench. Suitable clamps, hooks and saddles shall be used for securing the cables in position and dressing properly so that the clear spacing between the cables shall not be less than the diameter of the cable.

b. Laying in pipes/closed ducts.

c. In locations such as road crossings, entry to buildings / poles in paved areas etc. cables shall be laid in pipes or closed ducts.

d. These pipes shall be laid directly in ground and encased with 50 mm CC.

e. Unless otherwise specified the top surface of pipes shall be at a minimum depth of 500mm from the ground level when laid under roads, pavements etc.

f. Pipes shall be continuous and clear of debris or concrete before cable in drawn. Sharp edges at ends shall be smoothened to prevent injury to cable insulation or sheathing.

LAYING OF CABLES IN FLOORS

Laying of cables directly in floors is to be avoided and pipes of adequate size shall be used wherever necessary.

MEASUREMENT OF CABLE RUNS

The cable runs shall be measured upto the outer end of the boxes without any allowances for overlap in joints. The actual run of the cables shall be measured and the rate shall include all the above mentioned material, labour etc for laying as required.

Note: The cables shall be left in the form of a loop. Wherever long runs of cable length are installed cable loops shall be left at suitable intervals as specified by the Project Manager.

TERMINATION OF CABLES CABLE BOXES AND GLANDS

All Cable joints / terminations shall include tinned brass compression glands, tinned brass check nuts and washers, armour clamps to provide effective earthing as required and neoprene gaskets.

CRIMPED CABLE TERMINATION

Soldered Termination shall be avoided. Solder less termination by using crimping tools shall be provided for cables. All such terminations shall be made by using crimping tools and suitable lugs for solder less termination.

In the case of aluminium conductors, it is to be ensured that the conductor oxidation is cleaned by means of emery paper and then a thin coat of tin is applied before pinching into any equipment.
108) TESTING OF CABLES

Test shall be conducted for insulation between phases and between phase and earth for each length of cable, before and after jointing. On completion of cable laying work, the following tests shall be conducted in the presence of the Project Manager.

a. Insulation Resistance Test (Sectional and Overall)
b. Continuity resistance test
c. Sheathing resistance test
d. Earth test

Note: All tests shall be carried out in accordance with relevant standards, codes of practice and electricity rules. The contractor shall provide necessary instruments, equipment and labour for conducting the above tests and shall bear all expenses in connection with such tests. All tests shall be carried out in the presence of the Project Manager.

109) EARTH ELECTRODES

PLATE EARTH ELECTRODE

The plate electrodes shall be of Copper or G.I. as called for in the Schedule of Quantities. The minimum dimensions of the electrode shall be G.I. 600mm x 600mm x 6m thick and for Copper 600mm x 600mm x 3mm.

The electrode shall be buried in ground with its face vertical and top not less than 3M below ground level.

110) EARTH ELECTRODE PIT

METHOD OF INSTALLING WATERING ARRANGEMENT

In the case of plate earth electrode, a watering pipe of 20mm dia of medium class G.I. pipe shall be provided and attached to the electrode. A funnel with mesh shall be provided at the top of this pipe for watering the earth. The watering funnel attachment shall be housed in masonry enclosure of not less than 300x300x300mm. A cast iron/MS frame with cover having locking arrangement shall be suitably embedded in the masonry enclosure.

111) LOCATION OF EARTH ELECTRODE

The following guidelines shall be followed for locating the earth electrodes. An earth electrode shall not be situated less than 2 metre from any building. The excavations for electrode shall not affect the column footings or foundations of the buildings. In such cases electrode may be further away from the building.

The location of the earth electrode shall be such where the soil has reasonable chance to remain moist, as far as possible.

Entrances, pavements and road ways shall not be used for locating the earth electrode.

112) EARTHING LEADS

The strip earthing leads shall be connected to the earth electrode at one end and to the metallic body of the main equipment at the other end. The earthing shall connect to the earthing network in the installation.
113) **EARTHING LEAD SIZES**

Strip earthing leads shall be of GI or copper as per specifications.

114) **EARTHING LEADS INSTALLATION**

The length of buried strip earthing lead shall be buried in trench ground not less than 0.5 M deep. If conditions necessitates use of more than one earthing lead they shall be laid as widely distributed as possible preferably in a single straight trench or in a number of trenches radiating from one point.

115) **METHOD OF CONNECTING EARTHING LEAD TO EARTH ELECTRODE**

In the case of plate earth electrode the earthing lead shall be securely bolted to the plate with two bolts, nuts, check nuts and washers as required by IS 3043:1987. In the case of pipe earth electrode it shall be connected by means of a through bolt, nuts and washers and cable socket.

All materials used for connecting the earth lead with electrode shall be GI case of GI pipe and GI plate earth electrode or tinned brass in case of copper plate electrode.

116) **PROTECTION OF EARTHING LEAD**

The earthing lead from electrode onwards shall be suitably protected from mechanical injury and corrosion by a pipe 15mm dia GI pipe in case of wire and 100/40 mm dia medium class GI pipe. The portion of the GI pipe within ground shall be buried at least 30cm deep (to be increased to 60 cm in case of road crossing or pavements). The portion within the building shall be recessed in walls and floors to adequate depth.

117) **G.I. PIPE EARTH ELECTRODE**

GI pipe shall be of medium class, 40mm dia and 4.5M in length. Galvanising of the pipe shall conform to relevant Indian Standard. GI pipe electrode shall be cut tapered at the bottom and provided with holes of 12mm dia, drilled not less than 7.5cm from each other upto 2m of length from bottom. The electrode shall be buried in the ground vertically with its top not less than 20cm below ground level. The pipe shall be surrounded with alternative layers of common salt and charcoal (150mm all round the pipe) as per I.S. code 3045.

A manhole of brick mansory of 300mm x 300mm size to surround pipe shall be provided over the pit for inspection. A bolted removable link connection shall be accommodated in this manhole for testing.

Earthing conductors shall form the earthing network throughout the installation for earthing of all non-current carrying metal parts.

118) **EARTHING CONDUCTOR INSTALLATION**

The earthing conductors inside the building wherever exposed shall be properly protected from mechanical injury by running the same in GI pipe of adequate size. Joints shall be revetted and brazed in approved manner.
Lugs of adequate capacity and size shall be used for termination. Lugs shall be bolted to the equipments body to be earthed after the metal body is cleaned of paint and other only substances and properly tinned.

119) SIZING OF EARTHING CONDUCTORS

Sizing of earthing conductors shall be as per schedule of quantities.

120) PROHIBITED CONNECTIONS

Neutral conductor, sprinkler pipes, or pipes conveying gas, water or inflammable liquid, structural steel work, metallic enclosures and lighting protection system conductors shall not be used as a means of earthing an installation or even as a link in an earthing system.

121) RESISTANCE OF EARTH

No earth electrode shall have a greater ohmic resistance than 3 ohms as measured by an approved earth testing apparatus. In rocky soil the resistance may be upto 5 ohms. The electrical resistance measured between earth connection at the main switchboard and any other point on the completed installation shall be low enough to permit the passage of current necessary to operate fuses or circuit breakers, and shall not exceed 1 ohm.

122) STANDARDS

The relevant Indian Standard Specifications and Codes of practice will apply to the equipment and the work covered by the scope of this contract. In addition the relevant clauses of the Indian Electricity Act 1910 and electricity rules 1956 as amended upto date shall also apply.

123) GENERAL

All the non-current carrying metal parts of electrical installation shall be earthed properly. All metal conduits, trienking, cable sheathes, switchgear, distribution fuse boards light fittings and all other parts made of metal shall be bonded together and connected by means of specified earthing conductors to an efficient earthing system. All earthing shall be in conformity with Indian Electricity Rules.

The Earthing System shall in comprise the following :-

a. Earth Electrodes
b. Earthing Leads
c. Earth Conductors

All earthing shall be as per the relevant I.S. Specifications IS 3043 : 1987 and other Statutory Regulations as required.
All three phase equipment shall have two separate and distinct body earths and single phase equipment shall have a single body earth.
124) **TWO POLE STRUCTURE**

Two pole structures to be provided as described in Schedule and HT overhead line coming from Supply Company. The poles shall be steel swaged poles conforming to IS 2713. Each pole shall be provided with base plate and pole cap. The poles shall be fixed in ground with concrete foundation as shown on the drawing / schedule. MS cross arms shall be provided for installation of insulators, lightning arrestors, air break gang operated switch and drop out fuses. MS bracings shall also be provided. Poles and all steel items shall be painted with two coats of approved aluminium paint over a coat of steel primer. One danger plate and anti-climbing device shall be fixed on each pole. Rate quoted against pole items shall be deemed to include provisioning of base plate, pole cap, cross arms, bracings, anti-climbing devices, danger board, painting excavation back filling and concrete for the foundation.

125) **ELECTRIC POWER DISTRIBUTION AND WIRING**

**Introduction**

The electric power will be received and distributed in a building, through following means:

(i) Cabling and switchgear to receive power. The building is divided into convenient number of parts, each part served by a rising main system to distribute power vertically/horizontally.

(ii) Power flows from rising main through tap-off box to floor main board to final DBs and then to wiring.

(iii) Dedicated circuit for different loads such as lighting, HVAC, power plug loads shall be provided, wherever possible.

(iv) Rising main, which takes care of general lighting and power outlet load of the building, should have independent cables for lighting as well as power, wherever possible. Other loads like lifts, water pump sets, other motor loads are fed by independent cables of suitable capacity fed from properly designed essential/nonessential LT power panels with suitably designed switchgear having necessary control and safety features.

(v) Therefore the distribution/wiring system essentially consists of provision of cables, switchgear, rising main, bus-ducting, earthing, laying of pipes/conduits etc. (in surface or recess) based on proper detailed designing to decide on various sizes/capacities of these components and various controls and safety features involved, to provide an efficient, reliable, safe and adequate electrical distribution and wiring system.

(vi) A typical schematic diagram of power distribution of a building is enclosed. (See Fig. 3)

126) **System of Distribution and Wiring**

(i) The wiring shall be done from a distribution system through main and/or branch distribution boards. The system design and location of boards will be properly worked out.

(ii) Each main distribution board and branch distribution board shall be controlled by an incoming circuit breaker/linked switch with fuse. Each outgoing circuit shall be controlled by a circuit breaker/switch with fuse.
(iii) For non-residential and residential buildings as far as possible DBs shall be separate for light and power.
(iv) Only MCCB/MCB/HRC fuse type DBs shall be used. Rewirable type fuses shall not be used.
(v) Three phase DBs shall not be used for final circuit distribution as far as possible.
(vi) ‘Power’ wiring shall be kept separate and distinct from light wiring, from the level of circuits, i.e., beyond the branch distribution boards. Conduits for light/power wiring shall be separate.
(vii) Essential/non-essential/UPS distribution each will have a completely independent and separate distribution system starting from the main, switchboard upto final wiring for each system. As for example, conduit carrying non-essential wiring shall not have essential or UPS wiring. Wiring for essential and UPS supply will have their own conduit system. No mixing of wiring is allowed.
(viii) Generally, no switchboard will have more than one source of incoming supply. More than one incoming supply will be allowed only at main board with proper safety and interlocking so that only one source can be switched on at a time.
(ix) Each MDB/DB/Switch Board will have reasonable spare outgoing ways for future expansion.

127) **Sub main Wiring**

(a) **Submain Wiring**
Submain wiring shall mean the wiring from one main/distribution switchboard to another.

(b) **Circuit Wiring**
Circuit wiring shall mean the wiring from the distribution board to the 1st tapping point inside the switch box, from where point wiring starts.

128) **Measurement of Submain and Circuit Wiring**

(i) Circuit and submain 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 or channel as the case may be, exclusive of interconnections inside the switchboard etc. The increase on account of diversion or slackness shall not be included in the measurement.

(ii) The length of circuit wiring with two wires shall be measured from the distribution board to the nearest switch box from which the point wiring starts. Looping of switch boxes also will be counted towards circuit wiring, measured along the length of conduit/channel.

(iii) When wires of different circuits are grouped in a single conduit/ channel, the same shall be measured on linear basis depending on the actual number and sizes of wires run.

(iv) Protective (loop earthing) conductors, which are run along the circuit wiring and the submain wiring, shall be measured on linear basis and paid for separately. Note: Conduit carrying submain will not carry circuit/point wiring. Similarly conduit carrying circuit wiring will not carry submain/point wiring. Conduit carrying point wiring will not carry submain/circuit wiring.
129) **Measurement of Other Wiring Work**

Except as specified above for point wiring, circuit wiring and submain 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.

130) **Point Wiring**

**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.

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

(b) Ceiling rose (in case of pendants except stiff pendants).

(c) Back plate (in the case of stiff pendants).

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

131) **Scope**

Following shall be deemed to be included in point wiring:

(a) Conduit/channel as the case may be, accessories for the same and wiring cables between the switch box and the point outlet, loop protective earthling of each fan/light fixture.

(b) All fixing accessories such as clips, screws, Phil plug, rawl plug etc. as required.

(c) Metal or PVC switch boxes for control switches, regulators, sockets etc, recessed or surface type, and phenolic laminated sheet covers over the same.

(d) Outlet boxes, junction boxes, pull-through boxes etc. but excluding metal boxes if any, provided with switchboards for loose wires/conduit terminations.

(e) Control switch or MCB, as specified.

(f) 3 pin or 6 pin socket, ceiling rose or connector as required. (2 pin and 5 pin socket outlet shall not be permitted.)

(g) Connections to ceiling rose, connector, socket outlet, lamp holder, switch etc.

(h) Bushed conduit or porcelain tubing where wiring cables pass through wall etc.

(Note: In areas where false ceiling are provided, termination of wires should be at the fittings. Flexible conduits from ceiling junction box to the fittings shall be provided duly coupled at both ends. This shall be included within the scope of point wiring.)

(i) Interconnecting wiring between switches within the switch box on the same circuit.

132) **Measurement**

(a) Point Wiring (other than socket outlet points)

(i) Unless 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, and classified as laid down in 3.4.4.

133) **Classification**

Points measured under 3.4.3 On unit basis shall be classified as under according to the type of building:
(a) Residential Buildings
(i) Group ‘A’, for point wiring for type I, type II and type III residential quarters and hostels.
(ii) Group ‘B’, for point wiring for type IV and above type of residential quarters and barracks.
(b) Non-residential Buildings
Group ‘C’ for all types of non-residential buildings such as offices, hospitals, laboratories, educational institutions, libraries etc.
(c) For any Other Type of Building
The group under which the points are to be classified shall be decided by the concerned Chief Engineer (Elect.).

134) Point Wiring for Socket Outlet Points

(i) The light plug (6 A) point and power (16 A) point wiring shall be measured on linear basis, from the respective tapping point of live cable, namely, switch box, another socket outlet point, or the sub-distribution board as the case may be, up to the socket outlet.
(ii) The metal/PVC box with cover, switch/MCB, socket outlet and other accessories shall be measured and paid as a separate item.

Note: There shall normally be no “on the board” light plug point.
(iii) The power point outlet may be 16 A/6 A six pin socket outlet, where so specified in the tender documents.

135) Group Control Point Wiring

(i) 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 one point and classified according to 3.4.4, and (b) for the subsequent points, the distance from that outlet to the next one and so on, shall be treated as separate point(s) and classified according to 3.4.4.
(ii) No recovery shall be made for non-provision of more than one switch in such cases.

136) Twin Control Light Point Wiring

(i) 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 and classified according to 3.4.4.
(ii) No recovery shall be made for non-provision of more than one ceiling rose or connector in such cases.

137) Multiple Controlled Call Bell Point Wiring

(i) In the case of call bell points with a single call bell outlet, controlled from more than one place, the points shall be measured in parts i.e.
(a) from the call bell outlet to one of the nearest ceiling roses meant for connection to bell push, treated as one point and classified according to 3.4.4, and
(b) from that ceiling rose to the next one and so on, shall be treated as separate point(s) and classified according to 3.4.4.
(ii) No recovery shall be made for non-provision of more than one ceiling rose or connector for connection to call bell in such cases.
138) **Wiring System**

(i) Wiring shall be done only by the looping system. Phase/live conductors shall be looped at the switch box. For point wiring, neutral wire/earth wire looping for the 1st point shall be done in the switch box; and neutral/earth looping of subsequent points will be made from point outlets.

(ii) In wiring, no joints in wiring will be permitted anywhere, except in switch box or point outlets, where jointing of wires will be allowed with use of suitable connector.

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

(iv) Light, fans and call bells shall be wired in the ‘lighting’ circuits. 15A/16A socket outlets and other power outlets shall be wired in the ‘power’ circuits. 5A/6A socket outlets shall also be wired in the ‘power’ circuit both in residential as well as nonresidential buildings.

(v) **Colour Coding**

Following colour coding shall be followed in wiring:
- Phase : Red/Yellow/Blue (Three phase wiring)
- Live : Red (Single phase wiring)
- Neutral : Black
- Earth : Yellow/Green.

(vi) **Termination of Circuit into Switchboard**

Circuit will consist of phase/neutral/earth wire. Circuit will terminate in a switch board (first tapping point, where from point wiring starts) in following manner:
- Phase wire terminated in phase connector. Neutral wire terminated in neutral connector. Earth wire terminated in earth connector. The switchboard will have phase, neutral and earth terminal connector blocks to receive phase/neutral/earth wire. See Fig 4.

139) **Run of Wiring**

(i) The type of wiring shall be as specified in the tender documents namely, surface conduit/recessed conduit, steel/PVC, channel.

(ii) Surface wiring shall run as far as possible along the walls and ceiling, so as to be easily accessible for inspection.

(iii) Above false ceiling, in no case, open wiring shall be allowed. Wiring will be done in recessed conduit or surface steel conduit.

(iv) In recessed conduit system, routes of conduit will be planned, so that various inspection boxes provided don't present a shabby look. Such boxes can be provided 5 mm above plaster level, and they can be covered with plaster of paris with marking of junction boxes.

(v) Where number of electrical services like electrical wiring, telephone wiring, computer cabling, pass through corridors, it may be proper to plan such service with properly designed aluminum/PVC channels duly covered by a false ceiling, so that subsequently such service can be maintained and additional cables can be provided.
Generally conduits for wiring will not be taken in floor slabs. When it is unavoidable special precaution to be taken to provide floor channels with provision for safety and maintenance. Alternatively false flooring can be provided.

140) Passing through Walls or Floors

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

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

141) Joints in Wiring

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

(ii) There shall be no joints in the through-runs of cables. If the length of final circuit or submain 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.

(iii) Termination of multistranded conductors shall be done using suitable crimping type thimbles.

142) Ratings of Outlets (to be adopted for design).

(i) Incandescent lamps in residential and non-residential buildings shall be rated at 60W and 100W respectively.

(ii) Ceiling fans shall be rated at 60W. Exhaust fans, fluorescent tubes, compact fluorescent tubes, HPMV lamps, HPSV lamps etc. shall be rated according to their capacity. Control gear loses shall be also considered as applicable.

(iii) 6A and 16A socket outlet points shall be rated at 100W and 1000W respectively, unless the actual values of loads are specified.

143) Capacity of Circuits

(i) Lighting circuit shall feed light/fan/ call bell points. Each circuit shall not have more than 800 Watt connected load or more than 10 points whichever is less. However, in case of CFL points where load per point may be less, number of points may be suitably increased.

(ii) Power circuit in non-residential building will have only one outlet per circuit.

(iii) Each power circuit in residential building can feed following outlets: (a) Not more than 2 Nos. 16A outlets. (b) Not more than 3 Nos. 6A outlets. (c) Not more than 1 No.16A and 2 Nos. 6A outlets.

(iv) Load more than 1 KW shall be controlled by suitably rated MCB and cable size shall be decided as per calculations.

(v) Power Wiring with Bus Trunking

It is permitted to meet large-scale power requirement in a hall, or floor, with use of single phase or 3 phase bus bars running inside a metal enclosure. This will be provided with careful design and use of factory fabricated bus-trunking of reputed make, conforming to relevant BIS standards and with standard accessories like End feed unit, tap off with necessary safety features like over current, short-circuit and earth fault protection. Such trunking will be of specified breaking KA rating.
**Socket Outlets**

(i) Socket outlets modular type shall be 6A 3 pin, 16 Amp 3 pin or 16/6 Amp 6 pin. 5 pin socket outlets will not be permitted. The third pin shall be connected to earth through protective (loop earthing) conductor. 2 pin or 5 pin sockets shall not be permitted to be used.

(ii) Conductors connecting electrical appliances with socket outlets shall be of flexible type with an earthing conductor for connection to the earth terminal of plug and the metallic body of the electrical appliance.

(iii) Sockets for the power outlets of rating above 1KW shall be of industrial type with associated plug top and controlling MCB.

(iv) Where specified, shutter type (interlocking type) of sockets shall be used.

(vi) Every socket outlet shall be controlled by a switch or MCB, as specified. The control switch/MCB shall be connected on the 'live' side of the line.

(vi) 5A/6A and 15A/16A socket outlets shall be installed at the following positions, unless otherwise specified. (a) Non-residential buildings – 23 cm above floor level. (b) Kitchen – 23 cm above working platform and away from the likely positions of stove and sink. (c) Bathroom – No socket outlet is permitted for connecting a portable appliance thereto. MCB/IC switch may be provided above 2 m for fixed appliances, and at least 1 m away from shower. (d) Rooms in residences – 23 cm above floor level, or any other level in special cases as desired by the Engineer-in-charge.

(vii) Unless and otherwise specified, the control switches for the 6A and 16A socket outlets shall be kept along with the socket outlets.

**Cables**

(i) Copper conductor cable only will be used for submain/ circuit/ point wiring.

(ii) Minimum size of wiring:
- Light Wiring: 1.5 sq.mm.
- Power Wiring: 4.0 sq.mm.
- Power circuit rated: More than 1 KW, Size as per calculation.

(iii) Insulation: Copper conductor cable shall be PVC insulated conforming to BIS Specification.

(iv) Multi stranded: Cables are permitted to be used.

**Flexible Cable**

(i) Conductor of flexible cables shall be of copper. The cross sectional area of conductor for flexible cable shall be as per design.

(ii) Only 3 core flexible cables shall be used for connecting single-phase appliances.

(iii) Unless the flexible cables are mechanically protected by armour, or tough rubber, or PVC sheath, these shall not be used in workshops and other places where they are liable to mechanical damage.

(iv) Flexible cable connection to bell push from ceiling rose shall be taken through steel conduit/metallc casing and capping.

**Wiring Accessories**

(a) **Control Switches for Point**

(i) Control switches (single pole switch) carrying not more than 16A shall be modular type. The switch shall be ‘On’ when the knob is down.
(ii) (a) In type I, II & III quarters, Barracks & school buildings (except principal’s & staff rooms) etc. Piano type switches shall be provided (unless specifically asked for by the user department / Architect.)

(b) Modular type switches to be provided for remaining types of buildings i.e. in all types of remaining non-residential buildings & residential buildings of type IV & above & Transit hostel or as may be decided by the Architect/ user department. (Note: Provision is meant for new constructions and in existing buildings during rewiring if the building work renovation is also in progress in the area. Otherwise existing type of piano switches will be continued.)

(iii) It is recommended to provide double pole MCB in proper enclosure as power outlet for window type AC units, geysers etc.

(b) Switch Box

(i) Switch box shall be hot dip galvanized, factory fabricated, suitable in size for surface/ recess mounting and suitable in size for accommodating the required number of switches and accessories (where required to be used for applications other then modular switches/ sockets).

(ii) Switch box also can be of non-metallic material. The technical sanctioning authority will approve specified makes of reputed quality and specifications.

(c) Switch Box Covers (for application other than modular type)

Phenolic laminated sheets of approved shade shall be used for switch box covers. These shall be of 3 mm thick synthetic phenolic resin bonded laminated sheet as base material and conforming to grade P-I of IS 2036 : 1974.

Note: Specification for switch boxes is covered in the chapters on the various types of wiring.

(d) Ceiling Rose

(i) A ceiling rose shall not be used on a circuit, the voltage of which normally exceeds 250V. 32

(ii) Only one flexible cord shall be connected to a ceiling rose. Specially designed ceiling roses shall be used for multiple pendants.

(iii) A ceiling rose shall not embody fuse terminal as an integral part of it.

(e) Lamp Holders

(i) Lamp holders may be batten, angle, pendant or bracket holder type as required. 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.

(ii) 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.

(iii) All lamp holders shall be provided with shade carriers.

(iv) Where center contact Edison Screw lamp holders are used, the outer or screw contact shall be connected to the ‘middle wire’, or the neutral conductor of the circuit.

(f) Fittings:

Types : The type of fittings shall be as specified in tender documents.

Indoor Type Fittings

(i) Where conductors are required to be drawn through tube or channel leading to the fitting, 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.

(i) Wires used within prewired fittings shall be flexible with PVC insulation and 14/0.193 mm (minimum) copper conductors. The leads shall be terminated on built-in-terminal block, ceiling rose or connector, as required.

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

(iii) Fittings shall be installed such that the lamp is at a height of 2.4m above floor level, unless otherwise directed by the Engineer-in-charge.

(v) Fittings made of CRCA shall be phosphatized and powder/epoxy painted. For coastal areas and humid area like toilets, kitchen, for prolonging the life of such fittings, corrosion free materials like engineering plastic, aluminium, stainless steel etc. should be used.

Outdoor Fittings
Outdoor fittings shall have suitable IP protection. It is preferable that street light 33 fittings are of cast aluminium body of IP 65, for reducing recurring maintenance cost and improved performance. Where required IP 66 fittings also can be provided for reducing maintenance frequency and cost. Other fittings, which are not available with tested IP 65/54 protection, can be properly fabricated with weatherproof features, proper gasketing etc. As far as possible corrosion free material like cast aluminium, stainless steel, engineering plastics may be used for fabrication of such fittings, to prolong life of such fittings. There should not be any exposed wiring in such outdoor fittings.

148) Attachment of Fittings and Accessories

(a) Conduit Wiring System
(i) 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 outlet boxes. The fan regulators may also be fixed on outlet boxes, if so directed by the Engineer-in-charge.
(ii) Aluminium alloy or cadmium plated iron screws shall be used to fix the accessories to their bases.
(iii) The switch box/regulator box shall normally be mounted with their bottom 1.25 m from floor level, unless otherwise directed by the Engineer-in-charge.

(b) Fixing to Walls and Ceiling
(i) Wooden plugs for fixing to wall/ceiling will not be allowed. Fixing will be done with the help of PVC sleeves/Rowel plugs/ dash fasteners as required.
(ii) Drilling of holes shall be done by drilling machines only. No manual drilling of hole will be allowed.
Fans, Regulators and Clamps

(a) Ceiling Fans
(i) Ceiling fans including their suspension shall conform to relevant Indian Standards.
(ii) The capacity of a ceiling fan to meet the requirement of a room with the longer dimension D meters should be about 55 D m³/min.
(iii) The height of fan blades above the floor should be \((3H + W)/4\), where \(H\) is the height of the room, and \(W\) is the height of the work plane.
(iv) The minimum distance between fan blades and the ceiling should be about 0.3 meters.
(v) When actual ventilated zone does not cover the entire room area, then optimum size of ceiling fan should be chosen based on the actual usable area of the room, rather than the total floor area of the room.
(vi) The number of fans and the optimum sizes for rooms of different dimensions are given in the following table:
(vii) Energy Efficient fans with BEE 3-5 star rating or complying with IS 374: 1979, shall be used. The minimum service value of fans shall be 3.5 m³/min/W and air delivery 200 m³/min.
   The values of service factor and air delivery for ceiling fans with 1200 mm sweep are given in the table below:
(viii) Step Type Electronic regulators should be used instead of resistance type regulators for controlling speed of fans.
(ix) 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.
(x) For wooden or steel joists and beams, the suspension shall consist of GI flat of size not less than 40 mm x 6 mm, secured on the sides of the joists or beams by means of two coach screws of size not less than 5 cm for each flat. Where there is space above the beam, a through-bolt of size not less than 1.5 cm dia, shall be placed above the beam from which the flats are suspended. In the latter case, the flats shall be secured from movements by means of another bolt and nut at the bottom of the beam. A hook consisting of MS rod of size not less than 1.5 cm dia shall be inserted between the MS flat through oval holes on their sides. Alternatively, the flats may be bent inwards to hold tightly between them by means of a bolt and nut, a hook of ‘S’ form.
(xi) In the case of ‘I’ beams, flats shall be shaped suitably to catch the flanges and shall be held together by means of a long bolt and nut.
(xii) For concrete roofs, a 12 mm dia. MS rod in the shape of ‘U’ with their vertical legs bent horizontally at the top at least 19 cm on either side, and bound to the top reinforcement of the roof shall be used, as shown in Fig. 5.
(xiii) In buildings with concrete roofs having a low ceiling height, where the fan clamp mentioned under sub-clause (v) above cannot be used, or wherever specified, recessed type fan clamp inside metallic box, as shown in Fig. 6 shall be used.
(xiv) Canopies on top of suspension rod shall effectively hide the suspension.
(xv) The leading in wire shall be of nominal cross sectional area not less than 1.5 sq. mm. and shall be protected from abrasion.
(xvi) Unless otherwise specified, all ceiling fans shall be hung 2.75 m above the floor.
(xvii) In the case of measurement of extra down rod for ceiling fan including wiring, the same shall be measured in units of 10 cm. Any length less than 5 cm shall be ignored.
(xviii) The wiring of extra down rod shall be paid as supplying and drawing cable in existing conduit.
(b) **Exhaust Fans**

(i) Exhaust fans shall conform to relevant Indian Standards.

(ii) Exhaust fans shall be erected at the places indicated by the Engineer-in-charge. For fixing an exhaust fan, a circular opening 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 opening as possible, by means of a flexible cord, care being taken to see that the blades rotate in the proper direction.

(iii) Exhaust fans for installation in corrosive atmosphere, shall be painted with special PVC paint or chlorinated rubber paint.

(iv) Installation of exhaust fans in kitchens, dark rooms and such other special locations need careful consideration; any special provisions needed shall be specified.

(c) **Regulators**

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

150) **Marking of Switch Boards**

(i) **Schematic Diagram**

First a comprehensive schematic diagram for each building is to be prepared, starting from Main LT Panel, rising main, submain boards, DBs, etc. and the 37 manner in which they are connected. This will include essential, non-essential and UPS systems. Sizes of interconnecting main/submain cables shall be indicated.

(ii) **Marking of each Main Board**

Each main board/submain board shall be marked indicating rating of each incoming/outgoing switch and the details of load/area it feeds. Detail/size of incoming and outgoing cable also shall be marked indicating from where the incoming cable has originated.

(iii) **Marking of Distribution Board**

Each Distribution Board shall be marked indicating detail of incoming switch (Size of cable and from where it is fed) and marking of each outgoing MCB indicating the area it feeds. Suitable marking sticker will be suitably fixed to indicate such details.

(iv) **Marking of Power/Light DBs**

Power/light DBs shall be marked ‘P’ and ‘L’ respectively.

(v) **Marking for Non-essential/Essential/UPS/Switch Boards**

Each switchboard shall be marked essential/non-essential/UPS to indicate the nature of such switchboards.

(vi) **Marking of Main Earthing Terminal**

Main earthing terminals in main/submain switchboard shall be permanently marked, as “Safety Earth – Don’t Remove”.

151. **LT Distribution Switchgear**

Only following type switchboards will be used:

(a) Main/Submain switchboard of cubicle type.

(b) DBs – Conventional DBs of reputed makes can also be used with the approval of technical sanctioning authority in addition to prewired DB.

(c) Specially designed switchboards. Also specially designed switchboards can be used with detailed specification and fabrication drawings approved by the technical sanctioning authority.

(d) Specifications of cubicle panel and pre-wired DB are given in Clause 7.1.2 of Chapter 7.
3.19 Location of Switchboards

(i) Switchboards are to be located in common areas like corridors, lobby etc. and not to be located in locked room.

(ii) Switchboard shall be located only in dry situation and in well-ventilated space. They shall not be placed in the vicinity of storage battery or exposed to chemical fume.

(iii) Switchboards shall not be erected above gas stove, or sinks or within 2.5 meter of any washing unit in washing rooms of launderings or in the bath rooms, toilets, or kitchen.

(iv) As far as possible main boards shall not be located in basement. Such main boards can be located in ground floor.

(v) It is preferable to locate floor main boards in rising main shafts of adequate size, with steel doors (having ventilation) or in suitable room.

(vi) Similarly DBs can be in suitable nitches in corridor walls having doors.

(vii) Locating main boards under staircase or standing open in corridor is not a desirable practice, besides being highly unaesthetic.

(viii) The main switchboard, which receives power to the building, should be invariably located in a switch room, having round the clock access, for emergency attendance to the switchboard.

152. Guidelines for Planning Residential Areas

(i) U.G. System of Power Distribution, Street Lighting, Telephone Cabling and TV Cabling

For long-term economical maintenance, better reliability of service, safety, protection against heavy rains, storm, wind etc. and aesthetics, under ground cable system will be generally followed. Also considering the high cost of land, under ground system results in better economic utilization of land area, otherwise substantial land route has to be earmarked for overhead lines.

(ii) Efficient working of street lights and staircase lighting is required for security of the colony and safety and convenience of the residents. Therefore adequate street lighting, staircase lighting is to be provided. Generally back lanes of residential blocks remain dark. Such areas are also to be covered by basic street lighting for security.

(iii) Meter Board

(For a Block of Quarters)

Generally for a block of quarters of 2/3/4 storied, electric supply for each block is received in a meter board, where a cubicle meter panel is provided with system of power distribution to each quarter. (See Fig. 7)

At present such meter boards are invariably located under staircase. This is not a desirable practice from technical/aesthetic viewpoint.

It is technically desirable to coordinate with Architect to provide separate meter room for each block of quarters or a number of blocks.

(iv) Stair Case Lighting

Stair case lighting is to be treated as an extension of street lighting, for security and convenience of the residents. CFL (1 x 11 Watt) type stair case lighting may be provided to reduce load. As for example, need of 200 quarters can be met with 100 CFL fitting (each of 11 watt), with connected load of 1.5 KW only. Incandescent stair case lighting and bulk head fittings should not be provided, in view of excessive energy consumption and low burning hours.

(v) Emergency Electric Supply
For ensuring essential water supply and security lighting, a D.G. set to be provided for each colony to take care of water supply pump set, street lighting and essential load requirement of buildings like CGHS Dispensary, Community Center etc.

(vi) **Fittings**
Subject to limit of yardstick of fittings for various types of quarters following guidelines to be provided:
(i) Every room to be provided with one fluorescent fitting for energy saving.
(ii) Kitchen to be provided with a fluorescent fitting, tapped from a batten holder (through an adopter), so that in case of need batten holder can be used with bulbs.
(iii) Incandescent bulkhead fittings not to be used.
(iv) Quality fittings of reputed make to be used.

(vii) **Main Board of Each Quarter**
It shall be MCB type with provision of ELCB with the incoming MCB. It shall be located in a niche with ventilated door cover, in the room connecting to the entry of the quarter. MCB DB shall be pre-wired type, for trouble free service.

(viii) **Corrosion Free Fittings**
Coastal areas and humid areas like kitchen, toilet are subject to corrosion, which substantially reduces the useful life of such fittings, besides giving an ugly look on account of rusting. Therefore for coastal areas, and other humid areas corrosion free type of fittings (like aluminium, stainless steel, engineering plastic) should be used, for ensuring long life of such fittings and to achieve life cycle economy, after taking into account recurring expenditure on account of painting of fittings.

(ix) **Telephone Wiring**
Telephone wiring is to be provided for each quarter. One outlet up to type III quarters, 40 two outlets up to type IV quarters and three outlets above type IV quarters. Such telephone wiring to be brought to a tag-block at a suitable point in ground floor. Provisions shall be kept for suitable entry-pipe for laying incoming telephone cable.

(x) **TV Cabling**
Internal TV cabling shall be provided, with two outlets up to type III quarters and three outlets for type IV quarters and above. Similarly, from suitable point at ground floor, TV cabling shall be provided. With use of suitable splitters, such TV cabling to be connected to each quarter.

(xi) **Lighting for Parks**
Colonies are provided with parks. Such parks should be provided with adequate lights to include area lights, pathway lights etc. so that the parks can be effectively used by the residents and they remain secure during night time.

(xii) **External Pipe Network for Laying Telephone and TV Cabling for the Colony**
Starting from a suitable room, pipe network may be provided to lay telephones/TV cables for the colony. Suitable road cross pipe and manholes to be provided for drawing such cables and their maintenance.

(xiii) **Preliminary Estimate to Take Care of Telephone/TV Cabling in a Colony**
At present, such services are provided in a very crude manner making use of existing poles and hanging cables. Apart from making colonies shabby, such services are subject to
damages and unsatisfactory service. Therefore preliminary estimate should provide for such TV/Telephone cabling for the colony.

(xiv) **Other Allied Services**
Modern residential colonies require support services like CCTV (for Gate and house security), intercom system, basic security system etc. for the safety and convenience of the residents. Therefore, preliminary estimate should provide for basic provisions for such safety/security systems. Most of these services pay for themselves within 3 / 4 years of installation, besides providing security, which sometimes amount to life saving instances.

153. **Guidelines for Planning Office Buildings**

(i) The main objective is to avoid possible fire hazards, which calls for sound detailed designing and use of quality equipments and materials executed with sound workmanship and supervision.

(ii) All control LT Panels, controlling power supply to the entire building will be located in a centralized room, from where centralized control and monitoring of the entire power supply system can be made.

(iii) Earth fault protection shall be provided for each individual building at the LT receiving point i.e. Main LT Panel. ELCB shall not be provided as a matter of routine in distribution boards. These can be provided, if required, by the Chief Engineer (E), in charge. 41

(iv) Office buildings are prone to fire hazard during night hours. Therefore, after office hours, all the LT Panels should be switched off. Based on need of the building, only the specified LT panel to be kept ‘ON’ which feed the loads during night hours. Such panel, called common service panel, may feed following loads, which are normally used after office hours:-

(a) Some specified lifts.
(b) Staircase/ Corridor/ Compound light.
(c) Fire protection loads.
(d) Pump Sets.
(e) Other loads which are kept ‘ON’ after office hours.

(v) **Reliability of Power Supply**

Minimum two transformers to be provided to provide certain redundancy. Also a smaller size transformer may be provided to take care of reduced load during ‘after office’ hours to have energy saving of transformer, after proper technical evaluation.

(vi) It is preferable to plan for a separate service building, to combine all electrical and mechanical services of the building, so that the services can be maintained comprehensively at a lower cost and also reducing the overall area requirement. Such service building can combine electric sub-station, DG Sets, UPS, Air-conditioning Plant, water supply pump sets, etc.
(vii) While planning, maintainability of various services to be ensured, like providing facilities like access, approachability of various equipments, maintenance space etc.

154. METALLIC CONDUIT WIRING SYSTEM

Application
(i) Recessed conduit is suitable generally for all applications. Surface conduit work may be adopted in places like workshops, plant rooms, pump rooms, wiring above false ceiling/below false flooring, and at locations where recessed work may not be possible to be done. The type of work, viz. surface or recessed, shall be as specified in the respective works.
(ii) Flexible conduits may only be permitted for interconnections between switchgear, DBs and conduit terminations in wall.

Material
Conduits
(i) 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 galvanized or stove enameled surface.
(ii) 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.
(iii) No steel conduit less than 20 mm in diameter shall be used.

Conduit Accessories
(i) The conduit wiring system shall be complete in all respects, including their accessories.
(ii) All conduit accessories shall be of threaded type, and under no circumstances pin grip type or clamp grip type accessories shall be used.
(iii) Bends, couplers etc. shall be solid type in recessed type of works and may be solid or inspection type as required, in surface type of works.
(iv) (a) Saddles for surface conduit work on wall shall not be less than 0.55 mm (24 gauges) for conduits upto 25 mm dia and not less than 0.9 mm (20 gauges) for larger diameter. The corresponding widths shall be 19 mm & 25 mm.
(b) The minimum width and the thickness of girder clips used for fixing conduits to steel joists, and clamps shall be as per Table II.

Outlets
(i) The switch box or regulator box shall be made of metal on all sides, except on the front. In the case of cast boxes, the wall thickness shall be at least 3 mm and in case of welded mild steel sheet boxes, the wall thickness shall not be less than 1.2 mm (18 gauge) for boxes upto a size of 20 cm x 30 cm, and above this size 1.6 mm (16 gauge) thick MS boxes shall be used. The metallic boxes shall be duly painted with anticorrosive paint before erection as per chapter 15 of these Specifcations.
(ii) (a) Outlet boxes shall be of one of the size, covered in the Schedule of Rates (Elect.), 2012
(b) 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.
(iii) An earth terminal with stud and 2 metal washers and terminal block shall be provided in each MS box for termination of protective conductors and for connection to socket outlet/metallic body of fan regulator etc.

(iv) A metal strip shall be welded/screwed, to the metal box as support if tumbler type of control switches, sockets and/or fan regulators in flush pattern.

(v) 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.

(vi) The fan regulators can also be mounted on the switch box covers, if so stipulated in the tender specifications, or if so directed by the Engineer-in-charge.

(vii) Except where otherwise stated, 3 mm thick phenolic laminated sheets as per clause 3.14(c) shall be fixed on the front with brass screws, or aluminium alloy/cadmium plated iron screws as approved by the Engineer-in-charge.

**Installation**

**Common Aspects for Recessed and Surface Conduit Works**

(i) **Conduit Joints**

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

(b) Conduit pipes shall be joined by means of screwed couplers and screwed accessories only. Threads on conduit pipes in all cases shall be between 44 13 mm to 19 mm long, sufficient to accommodate pipes to full threaded portion of couplers or accessories.

(c) 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.

(d) The Engineer-in-charge, 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.

(e) 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.

(ii) **Bends in Conduit**

(a) 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 or inspection type normal bends, elbows or similar fittings, or by fixing cast iron inspection boxes, whichever is most suitable.

(b) No length of conduit shall have more than the equivalent of four quarter bends from outlet to outlet. (c) Conduit fittings shall be avoided as far as possible on conduit system exposed to weather. Where necessary, solid type fittings shall be used.

(iii) **Outlets**

(a) All outlets such as switches, wall sockets etc. may be either flush mounting type, or of surface mounting type, as specified in the Additional Specifications.

(b) All switches (except piano type switches), socket outlets and fan regulators shall be fixed on metal strips which shall be screwed/welded to the box. Piano type switches and accessories shall be fixed on the phenolic laminated sheet covers in flush pattern.

(iv) **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 Chapter 15 “Painting”.

**Additional Requirements for Surface Conduit Work**

(i) Painting before Erection
The outer surface of conduit including all bends, unions, tees, junction boxes etc. forming part of the conduit system, shall be adequately protected against rust when such system is exposed to weather, by being painted with 2 coats of red oxide paint applied before they are fixed.

(ii) Fixing Conduit on Surface
(a) Conduit pipes shall be fixed by saddles, secured to suitable approved plugs with screws in an approved manner at an interval of not more than one meter, but on either side of the couplers or bends or similar fittings, saddles shall be fixed at a distance of 30 cm from the center of such fittings.

(b) Where conduit pipes are to be laid along the trusses, steel joists etc. the same shall be secured by means of saddles or girder clips or clamps as required by the Engineer-in-charge.

(c) In long distance straight run of conduit, inspection type couplers at reasonable intervals shall be provided, or running threads with couplers and jam nuts shall be provided.

(iii) Fixing Outlet Boxes
Only portion of the switch box shall be sunk in the wall, the other portion being projected out for suitable entry of conduit pipes into the box.

Additional Requirements for Recessed Conduit Work

(i) Making Chase
(a) The chase in the wall shall be neatly made and of ample dimensions to permit the conduit to be fixed in the manner desired.

(b) In the case of buildings under construction, the conduits shall be buried in the wall before plastering, and shall be finished neatly after erection of conduit.

(c) In case of exposed brick / rubble masonry work, special care shall be taken to fix the conduit and accessories in position along with the building work.

(ii) Fixing Conduits in Chase
(a) The conduit pipe shall be fixed by means of staples, J-hooks, or by means of saddles, not more than 60 cm apart or by any other approved means of fixing.

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

(iii) Fixing Conduits in RCC Work
(a) 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.

(b) 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.

(c) 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.

(iv) Fixing Inspection Boxes
(a) Suitable inspection boxes to the minimum requirement shall be provided to permit inspection and to facilitate replacement of wires, if necessary.

(b) 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 : 1988.

(c) Suitable ventilating holes shall be provided in the inspection box covers.
(v) **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, unless otherwise specified in the Additional Specifications.

(vi) **Fish Wire**
To facilitate subsequent drawing of wires in the conduit, GI fish wire of 1.6 mm/1.2 mm (16/18 SWG) shall be provided along with the laying of the recessed conduit.

(vii) **Bunching of Cables**
(a) Cables carrying Direct Current may, if desired, be bunched whatever their polarity, but cables carrying alternating current, if installed in metal conduit shall always be bunched so that the outgoing and return cables are drawn into the same conduit.
(b) Where the distribution is for single phase loads only, conductors for these phases shall be drawn in one conduit.
(c) In case of three phase loads, separate conduits shall be run from the distribution boards to the load points, or outlets as the case may be.

**Earthing Requirements**
(i) 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.
(ii) A protective (loop earthing) conductor(s) shall be laid inside the conduit between the metallic switch boxes and distribution switch boards and terminated with proper earth lugs/terminals. Only PVC insulated copper conductor cable of specified size green in colour shall be allowed.
(iii) The protective conductors shall be terminated properly using earth studs, earth terminal block etc. as the case may be.
(iv) Gas or water pipe shall not be used as protective conductor (earth medium).

### TABLE I

Maximum Number of PVC Insulated 650/1100 V grade Aluminum / Copper Conductor Cable conforming to IS 694 : 1990

<table>
<thead>
<tr>
<th>Nominal cross sectional area of conductor in sq.mm</th>
<th>20m m</th>
<th>25m m</th>
<th>32mm</th>
<th>38m m</th>
<th>51m m</th>
<th>64m m</th>
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<tbody>
<tr>
<td>S</td>
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<td>S</td>
<td>B</td>
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</tr>
<tr>
<td>1.50</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>2.50</td>
<td>5</td>
<td>3</td>
<td>8</td>
<td>6</td>
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<td>0</td>
</tr>
<tr>
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<td>3</td>
<td>2</td>
<td>6</td>
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</tr>
<tr>
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<td>-</td>
<td>5</td>
<td>4</td>
<td>8</td>
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<td>25</td>
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<td>-</td>
<td>-</td>
<td>-</td>
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<td>2</td>
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<td>-</td>
<td>-</td>
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<td>-</td>
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<td>70</td>
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</tr>
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</table>

Note:
(1) The above table shows the maximum capacity of conduits for a simultaneous drawing in of cables.

(2) 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.

(3) Conduit sizes are the nominal external diameters.

155. EARTHING

Scope
This chapter covers the essential requirements of earthing system components and their installation. This shall be read with Appendix F, which lays down criteria for their design. For details not covered in these specifications IS code of Practice on Earthing (IS 3043 : 1987) shall be referred to.

156. Application

(i) The electrical distribution system in the Department is with earthed neutral (i.e. neutral earthed at the transformer / generator end). In addition to the neutral earthing, provision is made for earthing the metallic body of equipments and noncurrent carrying metallic components in the sub-station, as well as in the internal/ external electrical installations.

(ii) Earthing system is also required for lightning protection, computer installations and hospital operation theaters, etc. for functional reasons.

(iii) Earthing requirements are laid down in Indian Electricity Rules, 1956, as amended from time to time, and in the Regulations of the Electricity Supply Authority concerned. These shall be complied with.

(iv) Application for Internal E.I.

(a) Every sub-main will have earth continuity conductor to run along with sub-main wiring. In case of 3-phase sub-main wiring two earth continuity conductors shall be provided.

(b) Every circuit will have its earth continuity conductor to run along with circuit wiring. In case of 3-phase circuit two earth continuity conductors shall be provided.

(c) Looping of earth is allowed only in case of point wiring. (d) When 2/3 power outlets are looped to one circuit, earth looping of these outlets is permissible.

157. Types of Electrodes & Material

Earth Electrodes

Types
The type of earth electrode shall be any of the following, as specified. (For selection criteria in designs, Appendix F may be referred to).

(a) Pipe earth electrode.

(b) Plate earth electrode.

(c) Strip or conductor earth electrode.

158. Electrode Materials and Dimensions

(i) The materials and minimum sizes of earth electrodes shall be as per Table IX (revised).

(ii) GI pipe electrodes shall be cut tapered at the bottom, and provided with holes of 12 mm dia, drilled not less than 7.5 cm from each other upto 2 m of length from the bottom.

(iii) The length of the buried strip or conductor earth electrode shall be not less than 15 m. This length shall suitably be increased if necessary, on the basis of the information
available about soil resistance, so that the required earth resistance is obtained. Prior approval of the Engineer-in-charge shall be taken for any such increase in length.

(iv) All hardware items used for connecting the earthing conductor with the electrode shall be of GI in the case of GI pipe and GI plate earth electrodes, and forged tinned brass in case of copper plate electrodes.

159. Earthing Conductor & Sizes

(i) The earthing conductor (protective conductor from earth electrode up to the main earthing terminal/earth bus, as the case may be) shall be of the same material as the electrode, viz. GI or copper, and in the form of wire or strip as specified.

(ii) The size of earthing conductor shall be specified, but this shall not be less than the following (For calculating the size of the earthing conductor in design, Appendix F para 3.5.1).

(a) 4 mm dia. (8 SWG) copper wire,
(b) 25 mm x 4 mm in the case of GI strip, or
(c) 20 mm x 3 mm in the case of copper strip.

(iii) Earthing conductor larger than the following sectional areas need not be used, unless otherwise specified.

(a) 150 sq.mm.in case of GI, or
(b) 100 sq.mm.in case of copper.

160. Earth Continuity / Loop Earthing Conductor & Sizes

(i) The material and size of protective conductors shall be as specified below (for criteria in design of these Appendix F may be referred to): Size of phase Size of protective conductor of the same conductor material as phase conductor

Upto 4 sq.mm. Same size as that of phase conductor

Above 4 sq.mm. up to 16 sq.mm. Same size as that of phase conductor

Above 16 sq.mm. up to 35 sq.mm. 16 sq.mm.

Above 35 sq.mm. Half of the phase conductor

8.3 Location for Earth Electrodes

(i) Normally an earth electrode shall not be located closer than 1.5 m from any building. Care shall be taken to see that the excavation for earth electrode does not affect the foundation of the building; in such cases, electrodes may be located further away from the building, with the prior approval of the Engineer-in-charge.

(ii) The location of the earth electrode will be such that the soil has a reasonable chance of remaining moist as far as possible. Entrances, pavements and roadways, should be avoided for locating earth electrodes.

161. Installation

Electrodes

Various Types of Electrodes

(i) (a) Pipe electrode shall be buried in the ground vertically with its top at not less than 20 cm below the ground level. The installation shall be carried out as shown in Fig. 11 (revised).

(b) In locations where the full length of pipe electrode is not possible to be installed due to meeting a water table, hard soil or rock, the electrode may be of reduced length, provided the required earth resistance result is achieved with or without additional electrodes, or any alternative method of earthing may be adopted, with the prior approval of the Engineer-in-charge. Pipe electrodes may also be installed in horizontal formation in such exceptional cases.
(ii) Plate electrode shall be buried in ground with its faces vertical, and its top not less than 3.0 m below the ground level. The installation shall be carried out as shown in Fig. 12 (revised).

(iii) When more than one electrode (plate/pipe) is to be installed, a separation of not less than 2 m shall be maintained between two adjacent electrodes.

(iv) (a) The strip or conductor electrode shall be buried in trench not less than 0.5 m deep.
(b) If conditions necessitate the use of more than one strip or conductor electrode, they shall be laid as widely distributed as possible, in a single straight trench where feasible, or preferably in a number of trenches radiating from one point.
(c) If the electrode cannot be laid in a straight length, it may be laid in a zigzag manner with a deviation up to 45 degrees from the axis of the strip. It can also be laid in the form of an arc with curvature more than 1 m or a polygon.

Artificial Treatment of Soil
When artificial treatment of soil is to be resorted to, the same shall be specified in the schedule of work. The electrode shall be surrounded by charcoal / coke and salt as indicated in Fig. 11 and 12. In such cases, excavation for earth electrode shall be increased as per the dimensions indicated in these figures.

Watering Arrangement
(i) In the case of plate earth electrodes, a watering pipe 20 mm dia. Medium class pipe shall be provided and attached to the electrodes as shown in Fig. 11 and 12. A funnel with mesh shall be provided on the top of this pipe for watering the earth.
(ii) In the case of pipe electrodes, a 40 mm x 20 mm reducer shall be used for fixing the funnel with mesh.
(iii) The watering funnel attachment shall be housed in a masonry enclosure of size not less than 30 cm x 30 cm x 30 cm.
(iv) A cast iron / MS frame with MS cover, 6 mm thick, and having locking arrangement shall be suitably embedded in the masonry enclosure.

Earthing Conductor (Main Earthing Lead)
(i) In the case of plate earth electrode, the earthing conductor shall be securely terminated on to the plate with two bolts, nuts, check nuts and washers.
(ii) In the case of pipe earth electrode, wire type earthing conductor shall be secured as indicated in Fig. 11 using a through bolt, nuts and washers and terminating socket.
(iii) A double C-clamp arrangement shall be provided for terminating tape type earthing conductor with GI watering pipe coupled to the pipe earth electrode. Galvanized “C” shaped strips, bolts, washers, nuts and check nuts of adequate size shall be used for the purpose.
(iv) The earthing conductor from the electrode up to the building shall be protected from mechanical injury by a medium class, 15 mm dia. GI pipe in the case of wire, and by 40 mm dia, medium class GI pipe in the case of strip. The protection pipe in ground shall be buried at least 30 cm deep (to be increased to 60 cm in case of road crossing and pavements). The portion within the building shall be recessed in walls and floors to adequate depth in due co-ordination with the building work.
(v) The earthing conductor shall be securely connected at the other end to the earth stud/earth bar provided on the switch board by:
(a) Soldered or preferably crimped lug, bolt, nut and washer in the case of wire, and
(b) Bolt, nut and washer in case of strip conductor. In the case of sub-stations or alternators, the termination shall be made on the earthing terminal of the neutral point on the equipment and/or the earth bus, as the case may be.

Loop Earthing/ Earth Continuity Conductor
(i) Earth terminal of every switchboard in the distribution system shall be bonded to the earth bar/ terminal of the upstream switch board by protective conductor(s).

(ii) Two protective conductors shall be provided for a switchboard carrying a 3-phase switchgear thereon. (iii) Loop earthing of individual units will not be however necessary in the case of cubicle type switchboards.

(iv) The earth connector in every distribution board (DB) shall be securely connected to the earth stud/ earth bar of the corresponding switch board by a protective conductor.

(v) The earth pin of socket outlets as well as metallic body of fan regulators shall be connected to the earth stud in switch boxes by protective conductor. Where the switch boxes are of non-metallic type, these shall be looped at the socket earth terminals, or at an independent screwed connector inside the switch box. Twisted earth connections shall not be accepted in any case.

**Earth Resistance**

(i) The earth resistance at each electrode shall be measured. No earth electrode shall have a greater ohmic resistance than 5 ohms as measured by an approved earth testing apparatus. In rocky soil the resistance may be up to 8 ohms.

(ii) Where the above stated earth resistance is not achieved, necessary improvement shall be made by additional provisions, such as additional electrode(s), different type of electrode, or artificial chemical treatment of soil etc., as may be directed by the Engineer-in-charge.

**Marking**

(i) Earth bars/terminals at all switch boards shall be marked permanently, either as “E” or as (ii) Main earthing terminal shall be marked “SAFETY EARTH – DO NOT DISCONNECT”.

**Use of Residual Current Devices (RCDs)**

An extract on selection and application of RCDs (also known as RCCBs) from IS 12640: 1988 is given at Appendix G. Provision of RCD shall be specified in individual cases keeping in view the type, use, importance, system of earthing and nature of electrical installations to be protected by the RCCBs, requirements of the local electric supply company, etc. The sensitivity shall be 30 mA, 100 mA, 300 mA, or 500 mA, as specified.

**TABLE IX (Revised)**

<table>
<thead>
<tr>
<th>Type of Electrodes</th>
<th>Material</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe</td>
<td>GI medium class</td>
<td>40 mm dia 4.50 m long (without any joint)</td>
</tr>
<tr>
<td>Plate</td>
<td>(i) GI Copper</td>
<td>60 cm x 60 cm x 6 mm thick</td>
</tr>
<tr>
<td></td>
<td>(ii) Copper</td>
<td>60 cm x 60 cm x 3 mm thick</td>
</tr>
<tr>
<td>Strip</td>
<td>(i) GI Copper</td>
<td>100 sq. mm section</td>
</tr>
<tr>
<td></td>
<td>(ii) Copper</td>
<td>40 sq. mm section</td>
</tr>
<tr>
<td>Conductor</td>
<td>(i) Copper</td>
<td>4 mm dia (8 SWG)</td>
</tr>
</tbody>
</table>

( Note : Galvanisation of GI items shall conform to Class IV of IS 4736 : 1986.

162. PROTECTION OF BUILDING AGAINST LIGHTNING

Scope
This chapter covers the detailed requirements of installation of lightning conductor system for protection of buildings against lightning. The principles of this type of protection are outlined in Appendix H to these specifications. For details not covered in these specifications, reference may be made to IS 2309 : 1989.

Application This system shall be provided where specified. The decision whether or not to provide this system should be taken by the competent authority considering all relevant factors as per Appendix H.

Principal Components The principal components of a lightning protective system are :-
(a) Air terminations,
(b) Down conductors,
(c) Joint and bonds,
(d) Testing joints,
(e) Earth terminations and
(f) Earth electrodes.

Materials
The materials of air terminations, down conductors, earth termination etc. of the protective system shall be reliably resistant to corrosion, or be adequately protected against corrosion. The material shall be one of the following, as specified.
(a) Copper: Solid or flat copper strip of at least 98% conductivity conforming to relevant I.S. Specifications shall be used.
(b) Copper Clad Steel: Copper clad steel with copper covering permanently and effectively welded to the steel core shall be used. The proportion of copper and steel shall be such that the conductance of the material is not less than 30% of conductance of the solid copper of the same total cross-sectional area.
(c) Galvanized Steel: Steel thoroughly protected against corrosion by a zinc coating shall be used.
(d) Aluminium: Aluminium, 99% pure, and with sufficient mechanical strength, and protected against corrosion shall be used.

Aluminium should not be used underground, or in direct contact with walls.

All air terminations shall be of GI and all down conductors shall be of GI or aluminium, except where the atmospheric conditions necessitate the use of copper or copper clad steel for air terminations and down conductors.

The recommended shape and minimum sizes of conductors for use above and below ground are given in Tables X and XI respectively.

Layout
The system design and layout shall be done in accordance with IS 2309 : 1989 and specified in the tender documents. The work shall be carried out accordingly satisfying at the same time, the requirements of clauses 8.4.2 to 8.4.3.

Air Terminations
(i) Air termination networks may consist of vertical or horizontal conductors, or combinations of both. For the purpose of lightning protection, the vertical and horizontal conductors are
considered equivalent and the use of pointed air terminations, or vertical finial is, therefore, not regarded as essential.

(ii) A vertical air termination, where provided, need not have more than one point, and shall project at least 30 cm, above the object, salient point or network on which it is fixed.

(iii) For a flat roof, horizontal air termination along the outer perimeter of the roof shall be used. For a roof of larger area a network of parallel horizontal conductors shall be installed. No part of the roof should be more than 9 m from the nearest horizontal protective conductor.

(iii) Horizontal air terminations should be carried along the contours such as ridges, parapets and edges of flat roofs, and, where necessary, over flat at surfaces, in such a way as to join each air termination to the rest, and should themselves form a closed network. (v) All metallic projections including reinforcement, on or above the main surface of the roof which are connected to the general mass of the earth, should be bonded and form a part of the air termination network. (vi) If portions of a structure vary considerably in height, any necessary air terminations or air termination network for the lower portions should be bonded to the down conductors of the taller portions, in addition to their own down conductors.

9.4.3 Down Conductors

(i) The number and spacing of down conductors shall be as specified, or as directed by the Engineer-in-charge. 79 (ii) Routing (a) A down conductor should follow the most direct path possible between the air terminal network and the earth termination network. Where more than one down conductor is used, the conductors should be arranged as evenly as practicable around the outside walls of the structures. (b) The walls of light wells may be used for fixing down conductors, but lift shafts should not be used for this purpose. (c) Metal pipes leading rainwater from the roof to the ground may be connected to the down conductors, but cannot replace them, such connections should have disconnecting joints. (d) In deciding on the routing of the down conductor, its accessibility for inspection, testing and maintenance should be taken into consideration.

9.4.4. The lightning protective system should be so installed that it does not spoil the architectural or aesthetic beauty of the building.

9.5 Installation

General (i) The entire lightning protective system should be mechanically strong to withstand the mechanical forces produced in the event of a lightning strike. (ii) Conductors shall be securely attached to the building, or other object to be protected by fasteners, which shall be substantial in construction, not subject to breakage, and shall be of galvanized steel or other suitable materials, with suitable precautions to avoid corrosion. (iii) The lightning conductors shall be secured not more than 1.2 m apart for horizontal run, and 1 m for vertical run.

9.5.2 Air Terminations All air terminals shall be effectively secured against
overturning either by attachment to the object to be protected, or by means of substantial bracings and fixings which shall be permanently and rigidly attached to the building. The method and nature of the fixings should be simple, solid and permanent, due attention being given to the climatic conditions and possible corrosion. 9.5.3 Down Conductors (i) The down conductor system must, where practicable, be directly routed from the air termination to the earth termination network, and as far as possible, be symmetrically placed around the outside walls of the structure starting from the corners. In all cases consideration to side flashing must always be given. (ii) Practical reasons may not sometimes allow the most direct route to be followed. While sharp bends, such as arise at the end of roof are inescapable (and hence permissible), re-entrant loops in a conductor can produce high inductive voltage drops so that the lightning discharge may jump across the open side of a loop. As a rough guide, this risk may arise when the length of the conductor forming the loop exceeds 8 times the width of the open side of the loop. (b) When large re-entrant loops as defined above cannot be avoided, such as in the case of some cornices or parapets, the conductors should be arranged in such a way that the distance across the open side of a loop complies with the requirement indicated above. Alternatively, such cornices or parapets should be provided with holes through which the conductor can pass freely. (iii) Bonding to Prevent Side Flashing Any metal in, or forming a part of the structure, or any building services having metallic parts which are in contact with the general mass of the earth, should be either isolated from, or bonded to the down conductor. This also applies to all exposed large metal items having any dimension greater than 2 m whether connected to the earth or not. 9.5.4 Joints and Bonds 9.5.4.1 Joints (i) A lightning protective system should have as few joints as possible. (ii) Joints should be mechanically and electrically effective, for example, clamped, screwed, bolted, crimped, riveted or welded. (iii) With overlapping joints, the length of the overlap should not be less than 20 mm for all types of conductors. (iv) Contact surfaces should first be cleaned, and then inhibited from oxidation with a suitable non-corrosive compound. (v) Joints of dissimilar metals should be protected against corrosion or erosion from the elements, or the environment and should present an adequate contact area. 81 9.5.4.2 Bonds (i) Bonds have to join a variety of metallic parts of different shapes and composition, and cannot therefore be of a standard form. (ii) There is the constant problem of corrosion and careful attention must be given to the metals involved, i.e. the metal from which the bond is made, and those of the items being bonded. (iii) The bond must be mechanically and electrically effective, and protected from corrosion in, and erosion by the operating environment. (iv) External metal on, or forming part of a structure, may have to discharge the full lightning current, and its bond to the lightning protective system should have a cross-sectional area not less than that employed for the main conductors. (v) Structures supporting overhead electric supply, telephone and other lines must not be bonded to a lightning protective system without the permission of the appropriate authority. (vi) Gas pipe in no case shall be bonded to the lightning protective earth termination system. 9.5.5 Test Joints Each down conductor should be provided with a test joint in such a position that, while not inviting unauthorized interference, it is convenient for use when testing. 9.5.6 Earth Termination Network (i) An earth station comprising one or more earth electrodes as required, should be connected to each down conductor. This shall be specified. (ii) Each of the earth stations should have a resistance not exceeding the product given by 10 ohms
multiplied by the number of earth electrodes to be provided therein. The whole of the lightning protective system, including any ring earth, should have a combined resistance to earth not exceeding 10 ohms without taking account of any bonding [as per 9.5.3 (iii)]. (iii) If the value obtained for the whole of the lightning protection system exceeds 10 ohms, a reduction can be achieved by extending or adding to the electrodes, or by interconnecting the individual earth terminations of the down conductors by a conductor installed below ground, sometimes referred to as a ring conductor. Buried ring conductors laid in this manner are considered to be an integral part of the earth termination network, and should be taken into account when assessing the overall value of resistance to earth of the installation. (iv) A reduction of the resistance to the earth to a value below 10 ohms has the advantage of further reducing the potential gradient around the earth electrode when discharging lightning current. It also further reduces the risk of side flash to metal in, or of structure. (v) Earth electrodes should be capable of being isolated and a reference earth point should be provided for testing purposes.

163. PAYMENT TERMS

The following payment shall be applicable for the works to be carried out under this contract:

a) 75% of cost of material supplied at site as secured advance on production of actual bills along with challans of materials clearly indicating reference of work order, quantity and BOQ item number.

b) 85% of schedule item rate shall be payable on completion of installation/execution of work at site.

c) 95% of schedule item rate shall be payable on completion of testing.

d) 100% of schedule item rate shall be payable on final commissioning and handing over of works.

e) 10% Security deposit shall be deducted from gross amount of Running/Final bills and shall be governed in accordance with Clause No. 9 of the General Conditions of Contract.
3.1 SCOPE
This section covers the detailed requirements regarding supply, installation, testing, commissioning and handing over of transformers required for the sub-station.

Conventionally oil cooled transformers were being used for electrical sub-station. However due to presence of oil for cooling of transformers, an inherent fire risk is involved in the use of oil cooled transformers.

After repeated fire accidents due to burning of oil in oil cooled transformers, I.E. Rules have been amended to provide for use of only dry type transformers where a sub-station is planned inside the main building while oil cooled transformers can continue to be used if the sub-station is located in an independent building.

There are two types of dry type transformers viz. vacuum pressure impregnated (VPI) dry type transformers and cast resin dry type transformers. This section provide for use of both the type of dry type transformers where individual capacity of transformer does not exceed 400 KVA. Only cast resin dry type transformers shall be used for higher capacity.

3.2 OIL COOLED TRASFORMERS
Oil filled transformers may be used only in sub-stations located in separate single or two storied service buildings outside the main building structure and there shall at least be 6 meter clear distance between the adjoining buildings and sub-station such that fire tender is able to pass between the two structures. (NBC-2005 Part-8, Section 2 clause 4.2.1 j).

3.2.1 General Construction
The oil filled transformers shall comply with the following Indian Standards as amended up to date:

(i) IS 2026 - Part I to V - power transformers.
(ii) IS 335 - Transformer oil.
(iii) IS 10028 (Part II & III) - Installation and Maintenance of Transformers.
(iv) IS 2099 - Bushings.IS 2705 - Current Transformers.
(v) IS 6600 - Guide for loading of oil immersed transformers.

3.2.2 Insulation Oil
Insulation oil shall conform to IS 335. Transformer oil to be supplied with initial fill of filtered oil.
3.2.3 General Requirements
The transformer shall be indoor or outdoor type as specified. Unless otherwise specified the transformer in addition shall have thermal and dynamic ability to withstand external short-circuit as per clause 9 of IS 2026 (Part I) : 1977.

3.2.4 Capacity and Rating
The KVA ratings for three phase transformers are given below:

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<tbody>
<tr>
<td>100</td>
<td>250</td>
<td>630</td>
<td>1600</td>
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<td>125</td>
<td>315</td>
<td>800</td>
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<tr>
<td>160</td>
<td>400</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>500</td>
<td>1250</td>
<td></td>
</tr>
</tbody>
</table>

Continuous rating specified shall be irrespective of tapping position.

TEMPERATURE RISE

The reference ambient temperatures assumed for the purpose of this specification are as follows:

(a) Maximum ambient air temperature 50°C.
(b) Maximum daily average ambient air temperature 40°C.
(c) Maximum yearly weighted average ambient temperature 32°C.
(d) Minimum yearly weighted average ambient temperature (-)5°C.

The temperature rise at the above conditions and at the altitude not exceeding 1000 meters shall be as follows:

By resistance method 55°C (maximum temperature being 95°C). By thermometer 50°C.

If the site conditions indicated for a particular job is more severe than the refereed ambient temperature mentioned above, the temperature rise shall be suitably scaled down such that the hot spot temperature shall not exceed the values for the reference conditions.

3.2.5 Tap Changing Device
Tap changing device shall be provided on H.V side, circuit type, externally hand operated with necessary indications for tap position and locking arrangement at any of the tapping positions. It shall be designed for bi-directional operation and shall be of self-positioning type and shall have the following steps:

\[\pm 2.5\% \quad \pm 5\% \quad -7.5\% \quad -10\% \quad (\text{if required})\]

Note: Tap changing device shall normally be off load type. However NIT approving authority may use on load type Tap Changing Devices judiciously.
3.2.6 Voltage Ratio
Unless otherwise specified, the transformer shall be suitable for a voltage ratio of 11 KV/433 V.

VECTOR GROUP
In case of step down transformers, the winding connections shall conform to vector group dy. 11 unless otherwise specified.

In case of step up transformer the vector group unless otherwise specified shall be star/ delta.

3.2.7 Cooling
Unless otherwise specified, the transformer shall be oil immersed natural air-cooled type (ONAN).

3.2.8 Accessories
The transformer shall be a single tank type with termination on bushings or cable end box as specified both on HV and MV side. The MV side shall be suitable to receive bus bar trunking or MV cable inter-connection suitable for full load current of the transformer.

FITTINGS
The transformer shall be complete with the following fittings: -

(a) Oil conservator with oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above.

(b) Off circuit type tap changer with position indicator and locking arrangement for all transformers.

(c) Thermometer pocket with plug for all transformers of capacity 100 KVA and above.

(d) 100 mm dial type /stem type thermometer with metal guard. Dial type thermometer may have max. temperature indicator and resetting device for all transformers of capacity 250 KVA and above.

(e) Lifting lugs for all transformers.

(f) Bi-directional /Unidirectional Rollers to be specified.

(g) Rating diagram and terminal marking plate for all transformers.

(h) Explosion vent for all transformers of capacity 400 KVA and above.

(i) Additional Neutral separately brought out on a bushing for earthing for all transformers.

(j) Earth terminals (2 Nos.) for body earthing for all transformers.

(k) Valves for filtration, drainage and filling etc. with necessary plugs for all transformers.

(l) Radiator assembly for all transformers.

(m) Silica gel breather for all transformers.
(n) Air release plug for all transformers.
(o) First filling of oil to IS 335:1993 including make-up fill during installation for all transformers.
(p) Facility to connect up Buchholtz relay for all transformers of capacity 800 KVA and above.
(q) Inspection covers on tank cover for access to terminal connections for all transformers.
(r) Bushing terminations or cable box terminations as specified.
(s) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

3.2.9 Explosion Vent
Explosion vent or pressure relief device shall be provided of sufficient size for rapid release of any pressure that may be generated within the tank and which might result in damage to the equipment. The device shall operate at a static pressure less than the hydraulic test pressure for transformer tank. Means shall be provided to prevent the ingress of moisture and of such a design to prevent gas accumulation.

3.2.10 Accommodation for Auxiliary Apparatus
Where specified, such as, for restricted earth fault protection, facilities shall be provided for the mounting of a neutral current transformer.

RATING AND DIAGRAM PLATES
The following plates shall be fixed to Transformer in a visible position.

(a) A rating plate of weather proof material bearing the data specified in the appropriate clauses of IS 2026:1977.
(b) A diagram plate showing the internal connection and also the voltage vector relationship of the several windings in accordance with IS 2026:1977 and a plan view of the transformer giving the correct physical relationship of the terminals.

3.2.11 Joints and Gaskets
All gaskets used for making oil tight joints shall be of proven material such as granulated cork bonded with synthetic rubber gaskets or synthetic rubber or such other good material.

GAS AND OIL ACTUATED (BUCHHOLTZ) RELAYS
Buchholtz Relay shall be provided for transformers of capacity 800 KVA and above. The design of the relay mounting arrangements, the associated pipe work shall be such that mal-operation of the relays shall not take place under normal service. The pipe work shall be so arranged that all gas arising from the transformer shall pass through the gas and oil-actuated relay. The oil circuit through the relay shall not form a delivery path in parallel with any circulating oil pipe, nor shall it be tied into or connected through the pressure relief vent. Sharp bends in the pipe work shall be avoided.
All wiring connections, terminal boards, fuses and links etc. connected with gas actuated relays shall be suitable for tropical atmosphere. Any wiring liable to be in contact with oil shall have oil resistant insulation and the bared ends of stranded wire shall be sealed together to prevent seepage of oil entering connection boxes used for cables or wiring.

3.2.12 Cable Box
Cable box shall not be mounted on the tank covers. It shall be feasible to remove the tank covers for inspection during maintenance etc. without recourse to breaking the joints or disturbing the cables already terminated. Necessary removable links in oil approachable through inspection cover in tank cover etc. after lowering oil shall be provided for test purpose.

3.2.13 Parallel Operation
For parallel operation of transformers, the transformers shall have the same percentage impedance, same voltage ratio, same vector group, phase sequence etc.

3.2.14 Tests
3.2.14.1 Tests at Works:
All routine and other tests prescribed by IS 2026 shall be carried out at the manufacturer’s works before dispatch of the transformer in the presence of inspecting officer if required. Copies of the test certificates shall be furnished to the department. In addition to the prescribed routine tests, temperature rise test shall be invariably done on one transformer of each design. A copy of the impulse test certificate done on the same type/design of the transformer shall be furnished in accordance with IS for purpose of record. If no impulse test was done in an earlier unit of the same design and capacity, one transformer will be subjected to impulse test in consultation with the Inspector at the firm’s cost.

Copies of the certificates for pressure test, test for bushings, and type test for short circuit shall be supplied to the Department.

3.2.14.2 Tests at Site:
In addition to tests at manufacturer’s premises, all relevant pre-commissioning checks and tests conforming to IS code of practice No. 10028 (Part II & III) shall be done before energization. The following tests are to be particularly done before cable jointing or connecting up the bus bar trunking:

(a) Insulation test between HV to earth and HV to MV with 5000 volts Megger.
(b) Insulation test between MV to earth with 500 volts Megger.
(c) Dielectric strength Test on oil.
(d) Buchholtz relay operation by simulation test when fitted.

All test results are to be recorded and reports should be submitted to the department.

3.2.15 Installation and Commissioning
3.2.15.1 The transformer shall be installed in accordance with IS 10028 (Part II & III)-Code of
practice for Installation and maintenance of transformer. Necessary support channels shall be grouted in the flooring.

3.2.15.2 The transformer shall be moved to its location and shall be correctly positioned. Transformer wheels shall be either locked or provided with wheel stoppers. All parts of the transformers which are supplied loose, such as conservator, radiator banks, Buchholtz relay, dial thermometer, bushing etc. shall be fitted on the transformer. Transformer oil supplied in drums shall be topped up into the transformer after duly testing/filtering upto the correct level required.

3.2.15.3 Wiring of devices such as Buchholtz relay, dial thermometer etc. shall be carried out as per drawings. Earthing of neutral and body of the transformer shall be done in accordance with section (7) of these specifications.

3.2.15.4 Drying out of transformer winding will be necessary when the di-electric strength of the oil is lower than the minimum value as per IS10028 or the transformer has not been energized within 6 months of leaving the works or where the radiator assembly is done at site. The transformer shall be dried out by one of the methods specified in IS 10028. Drying out with centrifugal or vacuum type filters will, however, be preferred. The contractor shall carry out the process of drying without interruption and shall maintain a log sheet indicating time, oil temperature and insulation resistance.

3.2.15.5 After complete drying out of the transformer, oil sample shall be collected by the contractor and shall be tested for di-electric strength as specified in IS 335:1993 with approved test kit.

3.2.15.6 All devices such as dial type thermometers, Buchholtz relays and main alarm and trip contacts shall be checked for satisfactory operation.

3.2.15.7 All tests specified in 3.2.14 of these specifications shall be carried out by the contractor in the presence of inspecting officer/consignee free of cost.

3.2.16 Maximum Allowable Power Transformer Losses

Power transformers of the proper ratings and design must be selected to satisfy the minimum acceptable efficiency at 50% and full load rating. In addition, the transformer must be selected such that it minimizes the total of its initial cost in addition to the present value of the cost of its total lost energy while serving its estimated loads during its respective life span.

Total losses for oil filled transformers should conform as per the following table:

<table>
<thead>
<tr>
<th>Transformer Capacity (kVA)</th>
<th>Maximum Allowable losses at 50% kVA or load</th>
<th>Maximum Allowable losses at full load/Rated kVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>1.04%</td>
<td>1.80%</td>
</tr>
<tr>
<td>160</td>
<td>0.96%</td>
<td>1.38%</td>
</tr>
<tr>
<td>200</td>
<td>0.93%</td>
<td>1.35%</td>
</tr>
<tr>
<td>250</td>
<td>0.89%</td>
<td>1.27%</td>
</tr>
</tbody>
</table>
### Guaranteed Technical Data

Guaranteed technical particulars shall be supplied vide Schedule ‘C’ of Appendix III.

### DRY TYPE DISTRIBUTION TRANSFORMERS

#### General Construction

3.3.1.1 The Transformers shall comply with the following Indian Standards as amended upto date:

(i) IS 11171 : 1985 - Dry type power transformers.
(ii) IS 10028 (Part II & III) - Installation and Maintenance of Transformers.
(iii) IS 2099 - Bushing
(iv) IS 2705 - Current Transformers.

3.3.1.2 **Constructional Features:** *All the MS parts shall be either Hot dipped galvanized or cold galvanized to make them corrosion free. The core shall be made up of high grade low loss cold rolled grain oriented silicon steel. Both low & high voltage windings shall be made of copper conductor. The class of winding insulation shall correspond to class ‘F’. The construction of the windings of the transformer shall be such that no creepage path is found even in dusty & corrosive ambient conditions. The core coil assembly shall be housed in a prefabricated enclosure. The enclosure shall be fabricated with mild steel CRCA sheets with adequate provision for ventilation. The enclosures shall under go the seven tank process. Finally the external and internal surfaces of the enclosure shall be powder coated with the required paint shade.*

#### General Requirements

The transformer shall be indoor or outdoor type as specified. Unless otherwise specified the transformer in addition shall have thermal and dynamic ability to withstand external short-circuit as per clause 9 of IS 2026 (Part I): 1977 and clause 5 of IS 11171: 1985.

#### Capacity and Rating

The KVA ratings for three phase transformers are given below:

<table>
<thead>
<tr>
<th>KVA</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>630</td>
<td>1600</td>
</tr>
<tr>
<td>315</td>
<td>800</td>
<td>&amp; higher</td>
</tr>
<tr>
<td>400</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>1250</td>
<td></td>
</tr>
</tbody>
</table>

Continuous rating specified shall be irrespective of tapping position.
3.3.4 Indoor transformers shall be suitable for IP-23 protection; out door transformers shall confirm to IP-33 protection.

3.3.5 Temperature Rise

The reference ambient temperatures assumed for the purpose of this specification are as follows:

(a) Maximum ambient air temperature 50°C.
(b) Maximum daily average ambient air temperature 40°C.
(c) Maximum yearly weighted average ambient temperature 32°C.
(d) Minimum yearly weighted average ambient temperature (-) 5°C.
(e) Class of insulation F

The temperature rise limit at the above conditions and at the altitude not exceeding 1000 meters shall be as specified.

If the site conditions indicated for a particular job is more severe than the referred ambient temperature mentioned above, the temperature rise above ambient shall be suitably scaled down such that the hot spot temperature shall not exceed the values for the reference conditions 90°C (F class insulation).

3.3.6 (A) Tap Changing Device

Preferred tapping range is +5% to -7.5% in 2.5 percent steps by means of off load tap changing links or tap switch. The device shall be provided on HV for HV Voltage to keep LV Voltage constant.

(B) Terminal Markings Connections

Relevant provisions of IS 2026 (Part-IV): 1977 shall be applicable.

3.3.7 Voltage Ratio

Unless otherwise specified, the transformer shall be suitable for a voltage ratio of 11 KV/ 433 V.

Vector Group

In case of step down transformers, the winding connections shall conform to vector group Dy 11 unless otherwise specified.

In case of step up transformer the vector group unless otherwise specified shall be star / delta.

3.3.8 Cooling

Unless otherwise specified the transformer cooling shall be air and naturally cooled (AN).
3.3.9 **Accessories**

The transformer shall be with enclosure or without enclosure with HV and MV terminations as specified both on HV and MV side. The MV side shall be suitable to receive bus bar trunking or MV cable inter-connection suitable for full load current of the transformer.

3.3.10 **Fittings**

The transformer shall be complete with the following fittings: -

(a) Off load type tap changing link or tap switch.
(b) RTD temperature controller.
(c) Lifting lugs for all transformers.
(d) Bi-directional / Unidirectional Rollers to be specified.
(e) Rating diagram and terminal marking plate for all transformers.
(f) Additional Neutral separately brought out on a bushing for earthing for all transformers.
(g) Earth terminals (2 Nos.) for body earthing for all transformers.
(h) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

3.3.11 **Rating Plates**

- A rating plate of weather proof material bearing the data specified in clause-8 of IS 11171: 1985.

3.3.12 **Joints and Gaskets**

- All gaskets used for making gas tight joints shall be of proven material.

3.3.13 **Parallel Operation**

- For parallel operation of transformers, the transformers shall have the same percentage impedance, same voltage ratio, same vector group, phase sequence etc.

Where ever more than one Transformer is to be installed in the same Sub-Station, capacity of each Transformer shall preferably be same.

**Tests**

3.3.15.1 **Tests at Works**

All routine and other tests prescribed in IS 11171 : 1985 shall be carried out at the manufacturer's works before the dispatch of the transformer in the presence of inspecting officer. Copies of the test certificates shall be furnished to the department. In addition to the prescribed routine tests, temperature rise test shall be invariably done on one transformer of each design. A copy of the impulse test certificate done on the same type/design of the transformer shall be furnished in accordance with IS 11171 : 1985 for purpose of record. If no impulse test was done in an earlier unit of the same design and type, one transformer will be subjected to impulse test in consultation with the Inspector at the firm's cost. Copies of the certificates of type test for short circuit shall be supplied to the Department.
3.3.15.2 **Tests at Site**

In addition to tests at manufacturer’s premises, all relevant pre-commissioning checks and tests conforming to IS code of practice No. 10028 shall be done before energization. The following tests are to be particularly done before cable jointing or connecting up the bus bar trunking.

(a) Insulation test between HV to earth and HV to MV with a 5000 volts Megger.
(b) Insulation test between MV to earth with 500 volts Megger.
(c) All test results are to be recorded and reports should be submitted to the department.

3.3.14 **Installation and Commissioning**

3.3.14.1 The transformer shall be installed in accordance with IS 10028-Code of practice for Installation and maintenance of transformer. Necessary support channels shall be grouted in the flooring.

3.3.14.2 The transformer shall be moved to its location and shall be correctly positioned. Transformer wheels shall be either locked or provided with wheel stoppers.

3.3.14.3 Wiring of devices shall be carried out as per drawings; Earthing of neutral and body of the transformer shall be done in accordance with section (7) of these specifications.

3.3.14.4 All devices shall be checked for satisfactory operation.

3.3.14.5 All tests specified in 3.2.14 of these specifications shall be carried out by the contractor in the presence of inspecting officer/ consignee free of cost.

3.3.15 **Maximum Allowable Power Transformer Losses** Power transformers of the proper ratings and design must be selected to satisfy the minimum acceptable efficiency at 50% and full load rating. In addition, the transformer must be selected such that it minimizes the total of its initial cost in addition to the present value of the cost of its total lost energy while serving its estimated loads during its respective life span.

**Total losses for dry type distribution transformers should conform as per the following table:**

<table>
<thead>
<tr>
<th>Transformer Capacity (kVA)</th>
<th>Maximum Allowable losses at 50% kVA or load</th>
<th>Maximum Allowable losses at full load/Rated kVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>1.88%</td>
<td>2.44%</td>
</tr>
<tr>
<td>160</td>
<td>1.61%</td>
<td>2.07%</td>
</tr>
<tr>
<td>200</td>
<td>1.50%</td>
<td>1.90%</td>
</tr>
<tr>
<td>250</td>
<td>1.36%</td>
<td>1.73%</td>
</tr>
<tr>
<td>400</td>
<td>1.19%</td>
<td>1.51%</td>
</tr>
<tr>
<td>500</td>
<td>1.12%</td>
<td>1.45%</td>
</tr>
</tbody>
</table>
### SECTION-VII

**LIST OF RELEVANT INDIAN STANDARDS**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>I.S. No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>IS-8757</td>
<td>Glossary of terms associated with Fire safety</td>
</tr>
<tr>
<td>2.</td>
<td>IS-884.</td>
<td>Specification for first aid hose reel for fire fighting</td>
</tr>
<tr>
<td>3.</td>
<td>IS-901.</td>
<td>Specification for couplings, double male and double female instantaneous pattern for fire fighting.</td>
</tr>
<tr>
<td>4.</td>
<td>IS-902.</td>
<td>Specification for suction hose couplings for fire fighting purposes</td>
</tr>
<tr>
<td>10.</td>
<td>IS-636.</td>
<td>Non percolating flexible fire fighting delivery hose.</td>
</tr>
<tr>
<td>19.</td>
<td>IS-2930.</td>
<td>Functional requirements for hose laying tender for fire brigade use.</td>
</tr>
<tr>
<td>21.</td>
<td>IS-8090.</td>
<td>Specification for couplings, branch pipe, nozzle, used in hose reel tubing for fire fighting.</td>
</tr>
<tr>
<td>S.No.</td>
<td>I.S. No.</td>
<td>Title</td>
</tr>
<tr>
<td>-------</td>
<td>----------</td>
<td>-------</td>
</tr>
<tr>
<td>22.</td>
<td>IS-8442.</td>
<td>Specification for stand post type water monitor for fire fighting</td>
</tr>
<tr>
<td>24.</td>
<td>IS-11101.</td>
<td>Specification for extended branch pipe for fire brigade use</td>
</tr>
<tr>
<td>26.</td>
<td>IS-12407.</td>
<td>Graphic symbols for fire protection plan.</td>
</tr>
<tr>
<td>27.</td>
<td>IS-9668.</td>
<td>Code of practice for provision and maintenance of water supplies and fire fighting</td>
</tr>
<tr>
<td>28.</td>
<td>IS-3844.</td>
<td>Code of practice for installation and maintenance of internal fire hydrants and hose reel on premises.</td>
</tr>
<tr>
<td>31.</td>
<td>IS-15105.</td>
<td>Design and installation of fixed automatic sprinkler fire extinguisher system-Code of Practice.</td>
</tr>
<tr>
<td>32.</td>
<td>IS-325</td>
<td>Three phase induction motors.</td>
</tr>
<tr>
<td>33.</td>
<td>IS-1822</td>
<td>Motor starter for voltage not exceeding 1000 volts.</td>
</tr>
<tr>
<td>34.</td>
<td>IS-3624</td>
<td>Burden tube pressure and vacuum gauges.</td>
</tr>
<tr>
<td>35.</td>
<td>IS-1520</td>
<td>Horizontal centrifugal pumps for clear, cold, fresh water.</td>
</tr>
<tr>
<td>36.</td>
<td>IS-1239</td>
<td>Mild steel tubes, tubulars and other wrought steel fittings.</td>
</tr>
<tr>
<td>37.</td>
<td>IS-3589</td>
<td>Electrically welded steel pipes for water, gas and sewage.</td>
</tr>
<tr>
<td>38.</td>
<td>IS-6392</td>
<td>Steel pipe flanges.</td>
</tr>
<tr>
<td>39.</td>
<td>IS-778</td>
<td>Gun metal gate, globe and check valves for general purpose.</td>
</tr>
<tr>
<td>40.</td>
<td>IS-2592</td>
<td>Recommendation for methods of measurement or fluid flow be means of orific plates and nozzles.</td>
</tr>
<tr>
<td>41.</td>
<td>IS-732</td>
<td>Code practice for electrical wiring and fittings of building.</td>
</tr>
<tr>
<td>42.</td>
<td>IS-900</td>
<td>Code of practice for installation and maintenance of induction motor.</td>
</tr>
<tr>
<td>43.</td>
<td>IS-1248</td>
<td>Direct acting electrical indicating instruments.</td>
</tr>
<tr>
<td>44.</td>
<td>IS-2516</td>
<td>A.C. circuit breakers for voltages not exceeding 1000 volts.</td>
</tr>
<tr>
<td>45.</td>
<td>IS-4047</td>
<td>Heavy duty air break switches and composite units of air break switches and fuses for voltage not exceeding 1000 volts.</td>
</tr>
<tr>
<td>46.</td>
<td>IS-2208</td>
<td>HRC cartridge fuse links upto 650 volts.</td>
</tr>
<tr>
<td>47.</td>
<td>IS: 1554 (Part-I)</td>
<td>PVC insulated (heavy duty) electric cables for working voltage upto and including 1100 volts.</td>
</tr>
<tr>
<td>48.</td>
<td>IS:1536</td>
<td>Centrifugally Cast Iron Pipe</td>
</tr>
<tr>
<td>49.</td>
<td>IS:1537</td>
<td>Vertically Cast Iron Pipe</td>
</tr>
<tr>
<td>50.</td>
<td>IS1538</td>
<td>Cast Iron Pipe Fitting</td>
</tr>
<tr>
<td>51.</td>
<td>IS:780</td>
<td>Sluice valve for water works purposes (50 to 300 mm.size)</td>
</tr>
<tr>
<td>52.</td>
<td>IS:13095</td>
<td>Butterfly valves.</td>
</tr>
</tbody>
</table>
## List of approved make (E&M)

<table>
<thead>
<tr>
<th>Item</th>
<th>Approved Make</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.T. Cable, 1.1 KV grade Cable &amp; wires</td>
<td>Havells/Finolex/Polycab or equivalent</td>
</tr>
<tr>
<td>Switch Disconnector Fuses Unit</td>
<td>Legrand/L &amp; T/Siemens or equivalent</td>
</tr>
<tr>
<td>Pipes</td>
<td>Jindal/Tata or equivalent or equivalent</td>
</tr>
<tr>
<td>Switch/ Switch Boxes</td>
<td>Anchor/Havells(Crabtree)/Legrand or equivalent</td>
</tr>
<tr>
<td>PVC Conduit</td>
<td>AKG/Setia/ Kalinga/BEC or equivalent</td>
</tr>
<tr>
<td>Light fixtures</td>
<td>Philips/CG/Havels/Panasonic/Lustre or equivalent</td>
</tr>
<tr>
<td>equivalent</td>
<td></td>
</tr>
<tr>
<td>MCB/MCCB &amp; DB</td>
<td>L&amp;T/ Havells /Legrand/Schneider or equivalent</td>
</tr>
<tr>
<td>Timer switch</td>
<td>Crabtree/L&amp;T/Schneider or equivalent</td>
</tr>
<tr>
<td>Power Contactors</td>
<td>L&amp;T/Havells/ Schneider or equivalent</td>
</tr>
<tr>
<td>Exhaust Fans</td>
<td>Havells/Usha/Crompton or equivalent</td>
</tr>
<tr>
<td>Transformer</td>
<td>Kirloskar/Alstom/Power linc or equivalent</td>
</tr>
<tr>
<td>Contactors, Timers, HRC Fuses Fuse Fitting &amp; Indicating Lamps</td>
<td>Legrand/L &amp; T/Siemens or equivalent</td>
</tr>
<tr>
<td>Fabrication of Main L.T. Panel &amp; Sub Distribution Board/ Panel/ Feeder pillars</td>
<td>CPRI Tested or equivalent</td>
</tr>
<tr>
<td>Voltmeter &amp; Ammeter, Selector Switch, Current Transformer &amp; Indicating Lights</td>
<td>AE/Neptune/Ducati/MECO/L&amp;T or equivalent</td>
</tr>
<tr>
<td>Cable Gland &amp; Lugs</td>
<td>Dowells/Multit/Jainsons or equivalent</td>
</tr>
<tr>
<td>Modular Type Light and Power Accessories (Switches, Sockets)</td>
<td>Havells Crabtree/Legrand/Northwest or</td>
</tr>
<tr>
<td>equivalent</td>
<td>Havells/Usha/Crompton Greaves or equivalent</td>
</tr>
<tr>
<td>Ceiling Fan</td>
<td>Kirloskar/kSB/Siemens or equivalent</td>
</tr>
<tr>
<td>Pump</td>
<td>Minimax/ G.tech/ Guard or equivalent</td>
</tr>
<tr>
<td>ABC Type</td>
<td></td>
</tr>
</tbody>
</table>
EMD REFUND FORM
(To be filled by bidder)

Name of the tender applied for: ____________________________________ Date: _______________________

Details of the Bidder

Name of the firm: ________________________________________________
Address: ______________________________________________________________________________
Name of the Authorized Signatory: ________________________________________________
Contact No. _______________________________________
Email ID: ____________________________________________________________

Details of EMD Submitted:

Cash Deposited: Rs. _______________________ With: _________________________________________
Receipt No.: ___________________________ Date: ____________________________
Pay Order / DD No. ___________________ Date: __________________ Drawn on: ___________________
In case of payment through RTGS please provide the Bank Transaction Reference Number: _________________
In case of Payment through NEFT please provide the UTR Number: _________________________________
In case of bidding through E-Proc website please provide the OPGR No.: __________________________

Particulars for online refund (Please attach scanned copy of Cheque)

Name of Bank: __________________________________________________________________________
Branch Name and Address: ____________________________________________________________
IFSC Code: _____________________________________________________________________________
Account No.: ____________________________________________ Account Type: _________________

I hereby declare that the particulars given above are correct and complete and accord our consent receiving EMD without claiming any interest.

Signature of the Authorized Signatory
Name: ____________________________
Designation: ______________________

Official Seal
INDIA TOURISM DEVELOPMENT CORPORATION LIMITED  
Unit: Engineering Project Division  

NAME OF WORK: Electrical Work for Development of Tourism Facilitation Centre cum Multi Level Parking at Puri, Odisha (Prasad Scheme)

Technical Bid  
Schedule of Quantity  
(Rate not to be quoted here)

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>DESCRIPTION</th>
<th>QTY</th>
<th>UNIT</th>
<th>RATE</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td></td>
<td></td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>INTERNAL ILLUMINATION Wiring:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Recessed wiring to light point / fan point / exhaust fan point / call bell point with 1.5 sq.mm FR PVC insulated single core multistrand copper conductor of ISI marked with 20 mm dia non-metallic PVC flexible conduit with 5/10 Amp, 250 V modular type switch ISI marked and ceiling rose ISI marked mounted on MS box having front bakelite cover and MS box of suitable size as required, with 1.5 sq.mm FR PVC insulated single core multistrand copper conductor as earth wire including all accessories and connection as per direction of Engineer in Charge.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Primary light points.</td>
<td>540.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td>Secondary light points looped from the above point</td>
<td>470.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.3</td>
<td>Twin control point</td>
<td>16.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.4</td>
<td>Ceiling fan point consisting of fan hook, modular switch &amp; regulator and ceiling rose as per requirement.</td>
<td>72.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>Wall bracket / Exhaust fan point consisting of 5/10A modular switch and 6A socket/ceiling rose near fan.</td>
<td>52.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.6</td>
<td>Call bell point</td>
<td>5.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Supplying and fixing of 3 pin, 5 amp ceiling rose ISI marked on the existing junction box / wooden block including connection etc. as required.</td>
<td>122.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Supplying and fixing of batten holder / BK angle holder ISI marked on the existing junction box / wooden block including connection etc. as required.</td>
<td>102.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Supply and fixing of 6Amp plug with 6amp switch on existing board (Modular type)</td>
<td>38.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Point wiring for 5 / 6 amp socket outlet with 2 x 1.5 sq.mm FR PVC insulated single core multistrand copper conductor of ISI marked in recess 20 mm dia non-metallic PVC flexible conduit with modular type switch,</td>
<td>54.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Quantity</td>
<td>Unit</td>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------</td>
<td>------</td>
<td>----------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>phenolic laminated sheet suitable size ISI marked MS box and earthing point with 1 x 1.5 sq.mm FR PVC insulated single core multistrand copper conductor for loop earthing etc. as required.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Supply and fixing of multipurpose board Modular type of 6Amp 2nos. Switch and 2nos. Socket with all connection.</td>
<td>18.0</td>
<td>NOS</td>
<td>Not to be quoted here</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Supplying and fixing of metal box (nominal size) on surface or in recess with suitable size of modular base and cover plate in front including providing and fixing 5 pin 15 / 16 amps socket outlet and 15 / 16 amps modular type switch, connection, etc as required.</td>
<td>14.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Supplying and fixing of Modular type 25 Amp one way switch and socket outlet for AC point with metal box and modular cover.</td>
<td>11.0</td>
<td>NOS</td>
<td>Not to be quoted here</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Supply, delivery, installation, testing and commissioning of TV Antenna/Telephone Outlet Boards containing a Modular TV Antenna/Telephone Socket fixed on Modular Concealed Box including connections and making good the damages caused complete as required and as per Direction of Engineer-In-Charge.</td>
<td>5.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Supply, installation and &amp; commissioning of dual occupancy sensor based on lighting control system so that lighting is turned off automatically if the daylight set point level is reached, or after reasonable time delay when a room or area is vacated by the last person to occupy said room or area. Products shall be manufactured by an ISO 9002 certified manufacturing facility. IEC 60669-2-1 / CE / Rohs compliant Y. Sensors shall have an operating temperature range of -5°C - +45°C. The work is included of all necessary wiring with 2x1.5 sq mm copper wire inside 20mm dia PVC condute from near ByDB.</td>
<td>1.0</td>
<td>SET</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Submains:</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>8</td>
<td>Recessed/surface extra lead submain wiring alongwith earth wire with the following size of PVC insulated single core multistrand copper conductor of ISI marked conforming to IS 694/1990 in 20mm dia non metallic heavy duty flexible condute 1.6mm in surface/recessed PVC condute as required exceeding to Long point in 2x1.5sqmm + 1x1.5sqmm.</td>
<td>280.0</td>
<td>MTR</td>
<td>Not to be quoted here</td>
<td></td>
</tr>
<tr>
<td>11.2</td>
<td>Recessed wiring to submain in 2 x 2.5 sq.mm FR PVC insulated single core multistrand copper conductor of ISI marked confirming to IS-694/1990 in required dia non-metallic heavy duty flexible conduit 1.6 mm thick alongwith 1 x 1.5sq.mm FR PVC insulated single core multistrand copper conductor as earth wire. exceeding to Long point in 2x1.5sqmm + 1x1.5sqmm.</td>
<td>3880.0</td>
<td>MTR</td>
<td>Not to be Quoted Here</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>11.3</td>
<td>Recessed wiring to submain in 2 x 4.0sq.mm FR PVC insulated single core multistrand copper conductor of ISI marked confirming to IS-694/1990 in required dia non-metallic heavy duty flexible conduit 1.6 mm thick alongwith 1 x 1.5sq.mm FR PVC insulated single core multistrand copper conductor as earth wire.</td>
<td>1000.0</td>
<td>MTR</td>
<td>Not to be Quoted Here</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>11.4</td>
<td>Recessed wiring to submain in 2 x 6.0sq.mm FR PVC insulated single core multistrand copper conductor of ISI marked confirming to IS-694/1990 in required dia non-metallic heavy duty flexible conduit 1.6 mm thick alongwith 1 x 2.5sq.mm FR PVC insulated single core multistrand copper conductor as earth wire.</td>
<td>200.0</td>
<td>MTR</td>
<td>Not to be Quoted Here</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>11.5</td>
<td>Recessed wiring to submain in 2 x 10.0sq.mm FR PVC insulated single core multistrand copper conductor of ISI marked confirming to IS-694/1990 in required dia non-metallic heavy duty flexible conduit 1.6 mm thick alongwith 1 x 4.0sq.mm FR PVC insulated single core multistrand copper conductor as earth wire.</td>
<td>50.0</td>
<td>MTR</td>
<td>Not to be Quoted Here</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>11.6</td>
<td>Recessed wiring to submain in 4 x 4 sq.mm FR PVC insulated single core multistrand copper conductor of ISImarked confirming to IS-694/1990 in required dia non-metallic heavy duty flexible conduit 1.6 mm thick alongwith 2 x 2.5 sq.mm FR PVC insulated single core multistrand copper conductor as earth wire as equired</td>
<td>100.0</td>
<td>MTR</td>
<td>Not to be Quoted Here</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>11.7</td>
<td>Recessed wiring to submain in 4 x 6 sq.mm FR PVC insulated single core multistrand copper conductor of ISImarked confirming to IS-694/1990 in required dia non-metallic heavy duty flexible conduit 1.6 mm thick alongwith 2 x 2.5 sq.mm FR PVC insulated single core multistrand copper conductor as earth wire as equired.</td>
<td>600.0</td>
<td>MTR</td>
<td>Not to be Quoted Here</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>11.8</td>
<td>Recessed wiring to submain in 4 x 10 sq.mm FR PVC insulated single core</td>
<td>260.0</td>
<td>MTR</td>
<td>Not to be Quoted Here</td>
<td>Not to be Quoted Here</td>
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</tbody>
</table>
multistrand copper conductor of ISI marked confirming to IS-694/1990 in 32mm dia non-metallic heavy duty flexible conduit 1.6 mm thick alongwith 2 x 4 sq.mm FR PVC insulated single core multistrand copper conductor as earth wire as equired.

| 12 | Supplying and drawing TV cable RG-6 grade, 0.7 mm solid copper conductor PE insulated shielded with fine tined copper braid and protected with FR PVC sheath in existing surface / recessed steel / PVC conduit as required. | 200.0 | MTR |

| 13 | Supplying and drawing two pair 0.5 mm dia FRLS PVC insulated annealed copper conductor, unarmored telephone cable in the existing surface/ recessed steel/ PVC conduit as required. | 300.0 | MTR | Not to be Quoted Here | Not to be Quoted Here |

| 14 | **Control Panel**
Supply, delivery, installation, testing and commissioning of indoor floor mounted type distribution boards made out of 1.6mm thick powder coated CR sheet steel duly acid treated for derusting, primed and painted with epoxy paint, dust, damp & vermin proved having hinged door with provision for cable entry, earthing studs as per specification mentioned below duly factory wired conforming to the relevant ISS and as per special conditions of contract making good the damages caused complete including necessary civil / fabrication work as required as per the direction of Engineer-in-charge. | Not to be Quoted Here | Not to be Quoted Here |

| All MCCB shall confirm to IEC- 60947 and IS-13947. MCB shall comply with the isolation function requirement of IEC-60947-2 section 7.1.2 to be marked as suitable for isolation / disconnection to facilitate safety of person in use. All MCCB have ics=100% icu and the overload setting should be from 0.7 to 1 times of Ir for thermal magenetic release and for microprocessor release the overload Settings: 0.4 to 1 times of Ir. Manually closing mechanism should be accommodated in a Moulded housing of robust and vermin-proof construction. MCB shall be provided with double insulation (insulation between front cover and internal power circuits to avoid any accidental contact with live current carrying path with the front cover open) . The tripping devices shall be ambient temperature compensated | | | |
### 14.1 **Main Distribution Board for Building**

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<thead>
<tr>
<th></th>
<th>1.0</th>
<th>SET</th>
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<tbody>
<tr>
<td><strong>Incoming:</strong></td>
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<td></td>
</tr>
<tr>
<td>1 No 400A 4P Electronic Earth Leakage Module (EELM) MCCB (50kA) with ROM &amp; spreader links</td>
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<td></td>
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<tr>
<td>Busbar : 2 SET, 4 Nos 500 Amp Copper Strips. (CD=1A/sqmm)</td>
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</tr>
<tr>
<td>Instruments: 1 Set of (0-400 A, 0-500 V) Digital ammeter/ voltmeter with inbuilt selector switch, 1 set of LED type phase indicating lamps with control fuses &amp; 1 set of required CT.</td>
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<tr>
<td>Change over switch:</td>
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<td></td>
</tr>
<tr>
<td>1 no On Load 4P 400Amp</td>
<td></td>
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</tr>
<tr>
<td><strong>Outgoing:</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2 Nos 160A (36kA) 4P Thermal Magnetic MCCB with ROM &amp; spreader links for APFC Panel &amp; Spare.</td>
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<tr>
<td>5 Nos 125A (36kA) 4P Thermal Magnetic MCCB with ROM &amp; spreader links for FDB Basement, FDB 1st Floor, Fire fighting DB, Car lift DB &amp; Spare.</td>
<td></td>
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</tr>
<tr>
<td>2 Nos 80A (36kA) 4P Thermal Magnetic MCCB with ROM &amp; spreader links for Lift DB &amp; spare.</td>
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</tr>
<tr>
<td>4 Nos 40A (36kA) 4P Thermal Magnetic MCCB with ROM &amp; spreader links for Pump House DB, STP DB, External Illumination DB &amp; spare.</td>
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<tr>
<td>Complete duly factory wired as per SLD</td>
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</tbody>
</table>

### 14.2 **APFC PANEL (50 KVAR)**

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<tr>
<th></th>
<th>1.0</th>
<th>SET</th>
<th>Not to be Quoted Here</th>
<th>Not to be Quoted Here</th>
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</thead>
<tbody>
<tr>
<td><strong>Incoming:</strong></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>1 no. 160A, TPN MCCB (25kA) with Thermal Magnetic based release for Over Current, Short circuit protection + Earth Fault module.</td>
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</tr>
<tr>
<td><strong>Busbar:</strong></td>
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</tr>
<tr>
<td>One set of 200 A TPN Alu. Bus Bar, 25kA with PVC Sleeve in sealed Powder Coated Bus Chamber.</td>
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<tr>
<td><strong>Metering, Indication &amp; Relay:</strong></td>
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</tr>
<tr>
<td>1 nos. (0 -160A) digital ammeter with built in selector switch with CT's</td>
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</tr>
<tr>
<td>1 set Automatic Power Factor Correction Relay (8 Steps) with digital Power Factor Meter</td>
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</tr>
</tbody>
</table>
One set of R/Y/B phase indication Lamp with control MCBs.

1 Sets of "ON/OFF"

1 No. Auto / Manual Selector Switch

1 set of Aux. Contactors

1 No. timer for manual mode switching

1 set Control MCB

outgoing:

1 Sets of 15 KVAR Capacitor bank with 7% Harmonic Block Reactor, 40A TP contactor and 40A TP MCCB (25kA) Capacitor rating to be designed for required output KVAR at 415V.

2 Sets of 10 KVAR Capacitor bank with 7% Harmonic Block Reactor, 32A TP contactor and 32A TP MCCB (25kA) Capacitor rating to be designed for required output KVAR at 415V.

2 Set of 5 KVAR Capacitor bank with 7% Harmonic Block Reactor, 16A TP contactor and 16A TP MCB "D curve" (10kA) Capacitor rating to be designed for required output KVAR at 415V.

2 Set of 2.5 KVAR Capacitor bank with 7% Harmonic Block Reactor, 10A TP contactor and 10A TP MCB "D curve" (10kA) Capacitor rating to be designed for required output KVAR at 415V.

7 Sets "ON/OFF" LED Indicating lamps.

7 Sets "ON/OFF" Push Buttons.

7 Sets Control MCBs & Neutral links.

7 Sets of Digital Ammeter with built-in selector switch & 3CT's.

Panel space heaters with control MCB & thermostat, covered LED lamp controlled by door switch for each panel.

Suitable Size of Exhaust fans with Air filter for each Panel of Capacitor & Reactor compartment.

50 x 6 mm AL. earth bus across the width of panel

14.3 **Floor Distribution Board I (Basement floor & ground floor)**

<p>| | | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Incoming:</td>
<td></td>
<td>Not to be quoted here</td>
</tr>
<tr>
<td>1 No 100A 4P Thermal Magnetic (TM) MCCB (25kA) with ROM &amp; spreader links</td>
<td></td>
<td>Not to be quoted here</td>
</tr>
<tr>
<td>Busbar: 1 SET, 4 Nos 160 Amp Copper Strips. (CD=1A/sqmm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instruments: 1 Set of (0-100 A, 0-500 V) Digital ammeter/ voltmeter with inbuilt</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Selector Switch, 1 set of LED type phase indicating lamps with control fuses & 1 set of required CT.**

**Outgoing:**

- 4 Nos 63A (10kA) 4P MCB 'C' for Power BDB & Spare.
- 6 Nos 40A (10kA) 4P MCB 'C' for Light BDB & Spare.
- 4 Nos 40A (10kA) 2P MCB 'C' for Power ckt & Spare.

Complete duly factory wired as per SLD

<table>
<thead>
<tr>
<th>14.4</th>
<th><strong>Floor Distribution Board II (1st floor, 2nd Floor &amp; 3rd floor)</strong></th>
<th>1.0</th>
<th>SET</th>
<th>Not to be Quoted Here</th>
<th>Not to be Quoted Here</th>
</tr>
</thead>
</table>

**Incoming:**

- 1 No 125A 4P Thermal Magnetic (TM) MCCB (25kA) with ROM & spreader links
- Busbar: 1 SET, 4 Nos 160 Amp Copper Strips (CD=1A/sqmm)
- Instruments: 1 Set of (0-150 A, 0-500 V) Digital ammeter/ voltmeter with inbuilt selector switch, 1 set of LED type phase indicating lamps with control fuses & 1 set of required CT.

**Outgoing:**

- 4 Nos 63A (10kA) 4P MCB 'C' for Power BDB & Spare.
- 6 Nos 40A (10kA) 4P MCB 'C' for Light BDB & Spare.
- 4 Nos 40A (10kA) 2P MCB 'C' for Power ckt & Spare.

Complete duly factory wired as per SLD

<table>
<thead>
<tr>
<th>14.5</th>
<th><strong>Lift D.B. (Vehicle Lift)</strong></th>
<th>1.0</th>
<th>SET</th>
<th>Not to be Quoted Here</th>
<th>Not to be Quoted Here</th>
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</thead>
</table>

**Incoming:**

- 1 No 100A (25kA) 4P thermal magnetic release MCCB with ROM & Spreader links.
- Busbar: 4 Nos 160 Amp Copper Strips (CD=1A/sqmm)
- Instruments: 1 set of LED type phase indicating lamps with control fuses

**Outgoing:**

- 2 Nos 80A 4P RCCB (300mA) for Lift motor & spare.
- 2 Nos 25A 2P RCCB (30mA) for lift car control panel.
- 4 Nos 6A/10A SP MCB 'C' (10kA) for lift car light.

Complete duly factory wired as per SLD

<table>
<thead>
<tr>
<th>14.6</th>
<th><strong>Lift D.B. (Passenger Lift)</strong></th>
<th>1.0</th>
<th>SET</th>
<th>Not to be Quoted Here</th>
<th>Not to be Quoted Here</th>
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</thead>
<tbody>
<tr>
<td>1 No 63A (25kA) 4P thermal magnetic release MCCB with ROM &amp; Spreader links.</td>
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<tr>
<td>Busbar : 4 Nos 100 Amp Copper Strips (CD=1A/sqmm)</td>
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<tr>
<td>Instruments: 1 set of LED type phase indicating lamps with control fuses</td>
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</tr>
<tr>
<td>Outgoing :</td>
<td></td>
<td></td>
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<tr>
<td>2 Nos 40A 4P RCCB (300mA) for Lift motor &amp; spare.</td>
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<tr>
<td>2 Nos 25A 2P RCCB (30mA) for lift car contral panel &amp; spare.</td>
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<tr>
<td>4 Nos 6A/10A SP MCB 'C' (10kA) for lift car light &amp; spare.</td>
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<tr>
<td>Complete duly factory wired as per SLD</td>
<td>1.0</td>
<td>SET</td>
<td>Not to be Quoted Here</td>
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</tbody>
</table>

14.7 **Pump House D.B.**

**Incoming :**

1 No 40A 4P TM MCCB (25kA) with ROM & spreader links

**Busbar :**

One set 63 Amp Copper Strips (CD=1A/sqmm)

**Instruments:**

1 set of LED type phase indicating lamps with control fuses

**Outgoing :**

2 no 25A 4P 30mA RCCB for motor & spare.

12 nos of 6-32A SP MCB as per SLD

Complete duly factory wired as per SLD

15 **Supply, delivery, installation, testing & commissioning of L.T. indoor floor/ wall mounted type distribution boards made out of reputed company having provision for cable/ conduit entry, earthing studs as per specification mentioned below duly factory wired conforming to the relevant ISS and as per special conditions of contract making good the damages caused complete as per the direction of Engineer-in-charge.**

15.1 **Power BDB (4way Double Door TPN DB)**

**Incoming**

1 no of 63A 4P MCCB

**Outgoing**

12 nos of 6-32A SP MCB as per SLD

15.2 **Light DB (4way Double Door TPN DB)**

**Incoming**

1 no of 25A 4P RCBO (100mA)

**Outgoing**

12 nos of 6-32A SP MCB as per SLD
<table>
<thead>
<tr>
<th></th>
<th><strong>Light BDB (6 way Double Door TPN DB)</strong></th>
<th>1.0</th>
<th>SET</th>
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<th>Not to be Quoted Here</th>
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<tbody>
<tr>
<td></td>
<td>incoming</td>
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<tr>
<td></td>
<td>1 no of 63A TPN RCBO</td>
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<td></td>
<td>outgoing</td>
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<tr>
<td></td>
<td>18nos of 10-32A SP MCB as per SLD</td>
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<tr>
<td></td>
<td><strong>Light BDB (12 way Double Door SPN DB)</strong></td>
<td>1.0</td>
<td>SET</td>
<td></td>
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<td></td>
<td>incoming</td>
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<tr>
<td></td>
<td>1 no of 40A 2P RCBO (100mA)</td>
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<tr>
<td></td>
<td>outgoing</td>
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<tr>
<td></td>
<td>10nos of 10-32A SP MCB as per SLD</td>
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<td></td>
<td><strong>Cabling</strong></td>
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<td></td>
<td>Supply, laying &amp; testing of following size of PVC insulated, PVC sheathed, round armoured aluminium conductor power cable of 1100 volt grade laid on surface of wall / column / existing RCC / stone ware / masonry cable trench / cable trey / through G.I. pipe / hume pipe as the case may be, including cost of saddles / clamps / markers etc but excluding the cost of G. I. pipe / hume pipe complete with making good the damages caused and returning the balance unused cables to stores as required and as per direction of Engineer-in-charge.</td>
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<tr>
<td></td>
<td><strong>16.1</strong> 3 &amp;1/2c x 400 Sq. mm Aluminum armoured cable.</td>
<td>60.0</td>
<td>RM</td>
<td></td>
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<tr>
<td></td>
<td><strong>16.2</strong> 3 &amp;1/2c x 70 Sq. mm Aluminum armoured cable.</td>
<td>20.0</td>
<td>RM</td>
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<td></td>
<td><strong>16.3</strong> 3 &amp;1/2c x 50 Sq. mm Aluminum armoured cable.</td>
<td>30.0</td>
<td>RM</td>
<td>Not to be Quoted Here</td>
<td>Not to be Quoted Here</td>
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<tr>
<td></td>
<td><strong>16.4</strong> 3 &amp;1/2c x 35 Sq. mm Aluminum armoured cable.</td>
<td>60.0</td>
<td>RM</td>
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<tr>
<td></td>
<td><strong>16.5</strong> 3 &amp;1/2c x 25 Sq. mm Aluminum armoured cable.</td>
<td>60.0</td>
<td>RM</td>
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<tr>
<td></td>
<td><strong>16.6</strong> 4c x 16 Sq. mm Aluminum armoured cable.</td>
<td>40.0</td>
<td>RM</td>
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<td></td>
<td><strong>17 Cable termination:</strong></td>
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<tr>
<td></td>
<td>Supplying and making end termination with brass compression gland and aluminum lugs for following size of PVC insulated and PVC sheathed / XLPE aluminum cable of 1.1 KV as required.</td>
<td></td>
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<tr>
<td></td>
<td><strong>17.1</strong> 3 &amp;1/2c x 400 Sq. mm Aluminum armoured cable.</td>
<td>2.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>17.2</strong> 3 &amp;1/2c x 70 Sq. mm Aluminum armoured cable.</td>
<td>2.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>17.3</strong> 3 &amp;1/2c x 50 Sq. mm Aluminum armoured cable.</td>
<td>2.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>17.4</strong> 3 &amp;1/2c x 35 Sq. mm Aluminum armoured cable.</td>
<td>2.0</td>
<td>NOS</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Description</td>
<td>Quantity</td>
<td>Unit</td>
<td>Rate</td>
<td>Amount</td>
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<td>------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>17.5</td>
<td>3 &amp;1/2c x 25 Sq. mm Aluminum armoured cable.</td>
<td>4.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.6</td>
<td>4c x 16 Sq. mm Aluminum armoured cable.</td>
<td>2.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td><strong>Earthing:</strong> Earthing with G.I earth pipe 4.5 meter long 40 mm dia ISI marked including accessories and providing masonry enclosure with cover plate having locking arrangement and watering pipe etc with charcoal and salt as required</td>
<td>6.0</td>
<td>SET</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Supply of materials and installation of <strong>chemical earthing</strong> size of chemical earth bar 2 mtr, size of earth pit 3’ X 2’ X 9’ chemical compound to be used 50 kg. There is an arrangements for termination of copper strip of earth continuity conductor including cost of water pouring arrangements, brick masonry enclosure on top with removable cast iron cover complete with labour for excavation of pit in all kinds of soil &amp; rock as required and as per direction of Engineer-in-charge. (For Lift earthing)</td>
<td>4.0</td>
<td>SET</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Supplying and laying 25 mm x 5 mm G.I earth strip ISI marked at 0.5 meter below ground level as strip earth electrode including soldering etc. as required</td>
<td>30.0</td>
<td>RM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Providing and fixing 25 mm X 5 mm copper strip on surface or in recess for connections etc. as required.</td>
<td>20.0</td>
<td>RM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Supply of material &amp; laying under ground/floor/wall including making end termination and testing of following size of Cu/G.I. wire for loop earthing of equipments, switch boards &amp; panels as required complete as per direction of Engineer-in-charge.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.1</td>
<td>6 swg G.I wire</td>
<td>300.0</td>
<td>RM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.2</td>
<td>8SWG HDBC Wire in non metallic conduit</td>
<td>200.0</td>
<td>RM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td><strong>Fittings &amp; Fixtures</strong> Installation and testing of following types of fluorescent tube fixtures directly on wall/ceiling of building with all accessories such as electronics ballast, fluorescent tube lights, stove enamelled box, perpex sheet cover etc complete assembly including supply &amp; fixing of teak wood round block and making connection from the suitable point outlet as per the direction of Engineer-in-charge.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.1</td>
<td>Supply, delivery, installation, testing &amp; commissioning of extruded aluminium</td>
<td>100.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
<td>Price</td>
<td>Notes</td>
<td></td>
<td></td>
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<tr>
<td>------</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>23.2</td>
<td>Supply, delivery, installation, testing &amp; commissioning of extruded aluminium batern 2ft long 10w LED fitting.</td>
<td>4.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.3</td>
<td>Supply, delivery, installation, testing &amp; commissioning of 65w surface mounted LED Green Bay on roof.</td>
<td>1.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.4</td>
<td>Supply, delivery, installation, testing &amp; commissioning of surface mounted 15w LED fitting.</td>
<td>582.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.5</td>
<td>Supply, delivery, installation, testing &amp; commissioning of 7w LED Bulb on existin holder</td>
<td>102.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.6</td>
<td>Supply, delivery, installation and testing of 12w LED recessed mounted step light of cast aluminium lighting fixtures, stainless steel screws, glass diffuser, corrosion and UV ray resistant coating and rubber gasket</td>
<td>151.0</td>
<td>NOS</td>
<td>Not to be Quoted Here</td>
<td></td>
</tr>
<tr>
<td>23.7</td>
<td>Supply, delivery, installation, testing &amp; commissioning of robust and reliable 7w LED bulkhead IP65 protection and IK09 resistance suitable for surface and wall mounting application.</td>
<td>4.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.8</td>
<td>Supply, delivery, installation, testing &amp; commissioning of fully difused recessed mounted 2'x2' LED luminaire 36W</td>
<td>16.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.9</td>
<td>Supply, delivery, installation, testing &amp; commissioning of ultra sleek recessed downlight 10w LED fitting.</td>
<td>31.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.10</td>
<td>Supply, delivery, installation, testing &amp; commissioning of ultra sleek recessed downlight 6w LED fitting.</td>
<td>24.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.11</td>
<td>Supply, delivery, installation, testing &amp; commissioning of recess mounted COB-based, tiltable downlight with multible beam angle 6w LED fitting.</td>
<td>2.0</td>
<td>NOS</td>
<td>Not to be Quoted Here</td>
<td></td>
</tr>
<tr>
<td>23.12</td>
<td>Supply, delivery, installation, testing &amp; commissioning of 5 meter long indoor LED strip light.</td>
<td>6.0</td>
<td>NOS</td>
<td>Not to be Quoted Here</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Supply, delivery, installation, testing &amp; commissioning of BEE Star rated 1200mm sweep ceiling fan</td>
<td>72.0</td>
<td>NOS</td>
<td>Not to be Quoted Here</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Supply, delivery, installation, testing &amp; commissioning of wall mounting fan 400mm sweep</td>
<td>2.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Supply, delivery, installation, testing &amp; commissioning of single phase 600mm sweep 900 RPM heavy duty Exhaust fan</td>
<td>30.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Supply, delivery, installation, testing &amp; commissioning of metal Exhaust fan 12&quot; sweep</td>
<td>18.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Item Description</td>
<td>Unit</td>
<td>Quantity</td>
<td>Rate (($)</td>
<td>Remarks</td>
</tr>
<tr>
<td>-----</td>
<td>------------------------------------------------------------------------------------------------------</td>
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<td>---------</td>
</tr>
<tr>
<td>28</td>
<td>Supply, delivery, installation, testing &amp; commissioning of plastic Ventilation fan 200mm sweep</td>
<td></td>
<td>4.0</td>
<td>NOS</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Supply &amp; Fixing of electronic call bell ding two modular on entrance door way and as per the direction of Engineer-in-charge or Consultant.</td>
<td></td>
<td>5.0</td>
<td>NOS</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>30</td>
<td><strong>SUBSTATION 11 KV LINE:</strong> Supply of all Materials, Labour and Stringing of 11 KV Overhead Line with, 55 mm² Insulated Aluminum Conductor, on 100 X 116 mm RS Joist 10 Mtrs. long complete with required Insulators, Cross Arms, Stays Set complete as per site requirement and Direction of Engineer-In-Charge.</td>
<td>KM</td>
<td>0.2</td>
<td></td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>31</td>
<td><strong>DP STRUCTURE</strong> Supply Installation Testing and Commissioning of DP structure for 1x250 KVA Substation, 11 KV underground HT Line &amp; metering unit complete with required size of channels and angles for mounting of AB switch and HG fuse with required size of nuts &amp; bolts. 11KV 3 pole on load isolated air brake switch complete with knife blade switches both Male/Female, operating GI pipe with handle &amp; rotating mechanism. Pad locking arrangement with pad lock. Interconnecting AB switch OH line with 30sqmm AAC conductor &amp; interconnection to pin insulator/HG fuse set by suitable Cu flexible strip. Spring earth of the handle, earthing of switch etc along with 11KV 3 pole horn gap fuse set on the double pole structure. 11KV HG fuse set should be complete with 11KV insulators Cu horn gaps etc. Interconnection of HG fuse with transformer with &quot;0&quot; SWG HDB Cu conductor and 12KV lighting arrester including interconnection by 30sqmm AAC conductor &amp; clamp complete as required with binding using all types of binding wires and painting with red oxide/aluminium/black paint complete as required and direction of Engineer-in-Charge along with following items:</td>
<td>SET</td>
<td>1.0</td>
<td></td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td></td>
<td>i Supplying and erection of 05 Nos. 100X 116X RS joist pole of 11m long each weighing 257.4 kg. (23.4 kg/mtr)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ii Erection of 05 Nos. metallic pole of following length in cement concrete 1:3:6 (1 cement: 3 coarse sand: 6 graded stone aggregate 40 mm nominal size) foundation including excavation and refilling etc. as required.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>iii 11 KV GI pin and pin insulator</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>iv 11KV Disc Insulator with necessary hardwire fitting. 90 KN (B &amp; S type)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>32</td>
<td><strong>Transformer</strong></td>
<td>Supply installation testing and commissioning of 250 KVA, 11KV/433V Copper wounded Transformer (three stars rated) with manual tap changing regulator (-2.5% to +7.5%) and E&amp;MR Testing with necessary hardware as required.</td>
<td>EA</td>
<td>1.0</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>33</td>
<td><strong>LT Panel</strong></td>
<td>Supply installation testing and commissioning of duly tested by CPRI outdoor floor mounted type kiosk Panel Board with 8 Nos Kitkat and 400 Amp 50KA 4 Pole thermal magnetic MCCB, voltmeter, Ammeter, selector switch, busbar etc. with rotary handle and spreader links made out of 2mm thick CR sheet steel duly acid treated for derusting, primered and painted with epoxy paint dust resistant and vermin proved having hinged door with provision for cable entry earthing studs as per specification conforming to relevant ISS and making good complete including necessary civil works and fabrication as required.</td>
<td>SET</td>
<td>1.0</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>34</td>
<td><strong>CABLES</strong></td>
<td>Supply &amp; laying of 3.5 core 400sqmm aluminium armoured 1.1 kV grade PVC insulated Armoured cable</td>
<td>MTR</td>
<td>20.0</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>35</td>
<td><strong>Earthing</strong></td>
<td>Earthing with G.I earth pipe 4.5 meter long 40 mm dia ISI marked including accessories and providing masonry enclosure with cover plate having locking arrangement and watering pipe etc with charcoal and salt as required (For Body, Lightning Arrestor &amp; DP of Transformer)</td>
<td>SET</td>
<td>4.0</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>36</td>
<td><strong>Supply and Installation of Safe Earth Electrodes (Chemical Earthing)</strong></td>
<td>Supply and Installation of Safe Earth Electrodes (Chemical Earthing) including cost of Electrode, Earthing Compound, Excavation of Earthing Pit, Refilling, etc. as required (For Neutral) complete with all materials and accessories as required.</td>
<td>SET</td>
<td>2.0</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>37</td>
<td><strong>Earthing Accessories</strong></td>
<td>Supplying and laying of 25x6mm &amp; 50x6 GI Flat for earth conductors including fixing accessories, stainless steel bolts, nuts and washers complete as required.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>37.01</td>
<td>25 X 6 mm GI Flat</td>
<td>MTR</td>
<td>40.0</td>
<td>Not to be Quoted Here</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>38</td>
<td><strong>Supply of Materials and laying Underground / Floor/ Wall including making End Termination and Testing of 8 SWG HDBC WIRE in non-metallic conduit for loop earthing of equipment’s, switch boards &amp; panel with providing and fixing of Copper strip Flat (25x5) on surface or in recess as required complete with all accessories as per direction of Engineer-in-charge.</strong></td>
<td>MTR</td>
<td>20.0</td>
<td>Not to be Quoted Here</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>39</td>
<td><strong>Safety Equipment</strong></td>
<td>Supply and hanging of Shock Treatment Chart duly Laminated.</td>
<td>EA</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>39.02</td>
<td>Supply &amp; Laying of 8 mm Thick Rubber Mat, ISI mark of 1100 V Grade.</td>
<td>EA</td>
<td>4.0</td>
<td></td>
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<tr>
<td>39.03</td>
<td>Supply and Installation of 3 Nos. Fire Buckets on a Mild Steel Stand complete as per specification and requirement of Fire Safety Provisions.</td>
<td>SET</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39.04</td>
<td>Supply and Installation of 5 Kgs. Capacity CO2 type Fire Extinguisher complete as required.</td>
<td>EA</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39.05</td>
<td>Providing and fixing bi-lingual Danger HT notice board of 250mmx200mm as specified below, made of mild steel at least 2mm thick &amp; vitreous enamelled signal red colour on both sides as background &amp; with inscriptions in enamelled vitreous white colour on front side for lettering as required.</td>
<td>EA</td>
<td>8.0</td>
<td>Not to be Quoted Here</td>
<td></td>
</tr>
<tr>
<td>39.06</td>
<td>Supply and fixing of 100 mm dia GI Pipe.</td>
<td>MTR</td>
<td>5.0</td>
<td></td>
<td></td>
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<tr>
<td>40</td>
<td><strong>EXTERNAL ILLUMINATION</strong>&lt;br&gt;<strong>DB-External Light</strong>&lt;br&gt;Supply, delivery, installation, testing and commissioning of indoor floor mounted type distribution boards made out of 2mm thick CR sheet steel duly acid treated for derusting, primered and painted with epoxy paint, dust, damp &amp; vermin proved having hinged door with provision for cable entry, earthing studs as per specification mentioned below duly factory wired conforming to the relevant ISS and as per special conditions of contract making good the damages caused complete including necessary civil / fabrication work as required as per the direction of Engineer-in-charge.</td>
<td>1.0</td>
<td>NOS</td>
<td>Not to be Quoted Here</td>
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<td></td>
<td><strong>Incoming:</strong> 1 40A 3P+N+NL MCCB (25 KA) type isolator followed by 1 No 70-A 3P AC3 duty power contactor with Bypass Toggle switch.</td>
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<tr>
<td></td>
<td><strong>Bus bars:</strong> 4 Nos.20x3mm E C Strips</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td><strong>Outgoing:</strong> 4 Nos 40-A, 3PN MCB 'C'of 6 nos 6-32 Amp 2P MCB 'C' (10 KA)</td>
<td></td>
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<td></td>
<td>Complete duly factory wired as per SLD</td>
<td></td>
<td></td>
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<tr>
<td>41</td>
<td><strong>Junction Box</strong>&lt;br&gt;Supply, installation and testing of Hensel make IP65 (dust &amp; water proof) (in accordance to 60 529) junction box, made of high <strong>Hensel make IP65</strong> (dust &amp; water proof) (in accordance to 60 529) junction box, made of high quality Thermoplastic (shock proof, rust free, corrosion free, acid and chemical resistant, fire retardant, having high impact, made of halogen and silica free recyclable material), UV resistant, having high grade gasket made of Polyurethane, should withstand glow wire test at 9600c, should be flame retardant, 1. 139X119X70 mm fitted with 6sq.mm Stud type terminal with 4nos IP65 Polyamide Glands 1500.00</td>
<td>12.0</td>
<td>SET</td>
<td>Not to be Quoted Here</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Description</td>
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<td></td>
</tr>
<tr>
<td>42</td>
<td><strong>Earthing</strong></td>
<td>2.0</td>
<td>SET</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Earthing with G.I earth pipe 4.5 meter long 40 mm dia ISI marked including accessories and providing masonry enclosure with cover plate having locking arrangement and watering pipe etc with charcoal and salt as required</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43</td>
<td></td>
<td>10.0</td>
<td>MTR</td>
<td>Not to be Quoted Here</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td></td>
<td>Supplying and laying 25 mm x 5 mm G.I earth strip ISI marked at 0.5 meter below ground level as strip earth electrode including soldering etc. as required</td>
<td></td>
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<td>44</td>
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<tr>
<td></td>
<td>Supply of material &amp; laying under ground/ floor/ wall including making end termination and testing of following size of Cu/G.I. wire for loop earthing of equipments, switch boards &amp; panels as required complete as per direction of Engineer-in-charge.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44.01</td>
<td>6 swg G.I wire</td>
<td>60.0</td>
<td>MTR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td><strong>CABLES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supply, laying &amp; testing of following size of solid Aluminium conductor upto 16 SQ mm /XLPE insulated PVC Tape innersheathed Armour, 650/1100 V grade as per IS 7098 (PART 1) 1988, PVC insulated, PVC sheathed, round armoured aluminium conductor power cable of 1100 volt grade laid on surface of wall / column / existing RCC / stone ware / masonry cable trench / cable trey / through G.I. pipe / hume pipe as the case may be, including cost of saddles / clamps / markers etc but excluding the cost of G. I. pipe / hume pipe complete with making good the damages caused and returning the balance unused cables to stores as required and as per direction of Engineer-in-charge.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45.01</td>
<td>4c x 16 Sq. mm</td>
<td>60.0</td>
<td>MTR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45.02</td>
<td>4c x 10 Sq. mm</td>
<td>250.0</td>
<td>MTR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45.03</td>
<td>4c x 6 Sq. mm</td>
<td>100.0</td>
<td>MTR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45.04</td>
<td>2c x 10 Sq. mm</td>
<td>80.0</td>
<td>MTR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45.05</td>
<td>2c x 6 Sq. mm</td>
<td>200.0</td>
<td>MTR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>46</td>
<td><strong>Cable termination:</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Supplying and making of all materials for terminations of 1.1 KV grade copper/aluminium multicore cables of the following sizes. The work includes cable glanding using brass plated single compression glands, sizing the core leads, removing insulation, fixing suitable crimping type copper lugs/thimbles by using hydraulic crimping tools with correct size of the dies, shaping the leads and neatly connecting the same to the equipment terminals.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46.01</td>
<td>4c x 16 Sq. mm Aluminium armoured cable</td>
<td>2.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>46.02</td>
<td>4c x 10 Sq. mm Aluminium armoured cable</td>
<td>20.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>47</td>
<td><strong>Accessories</strong></td>
<td>20.0</td>
<td>MTR</td>
<td>Not to be Quoted Here</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td></td>
<td>Supply &amp; installation of 40mm dia 2mm thick PVC Conduit with fittings such as bends, elbows, reducers, chase nipples, split couplings, plugs etc. as per site</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>GI pipe 2&quot; dia for Road Cross</td>
<td>20.0</td>
<td>MTR</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 49 | **Fittings & Fixtures**  
Supply, delivery, installation and testing of 3.6 metre high LED 30 watt post top light of cast iron base, mild steel column, cast aluminium lighting fixture, acrylic diffuser, stainless steel screws, corrosion and UV ray resistant coating with foundation and all fixing accessories. | 20.0 | NOS | Not to be Quoted Here | Not to be Quoted Here |
| 50 | Supply, delivery, installation and testing of 170mm dia 780mm high 9w LED Bollard of alluminium lighting fixtures, acrylic diffuser, stainless steel screws and Pole, corrosion and UV ray resistant coating with with foundation and all fixing accessories. | 30.0 | NOS | Not to be Quoted Here | Not to be Quoted Here |
| 51 | Supply, delivery, installation and testing of out door type of cast aluminium housing, stainless steel screws, corrosion and UV ray resistant coating with 18 watt LED bulb and with all fixing accessories for bathing complex. | 16.0 | NOS |
| 52 | Supply, delivery, installation and testing of LED 40 watt post top light of cast aluminium housing, stainless steel screws, corrosion and UV ray resistant coating with all fixing accessories for entrance gate. | 6.0 | NOS | Not to be Quoted Here | Not to be Quoted Here |
| 53 | Supply, delivery, installation and testing of LED 5 watt step lights of cast aluminium housing, stainless steel screws, acrylic diffuser, rubber gascate, corrosion and UV ray resistant coating and with all fixing accessories. | 40.0 | NOS | Not to be Quoted Here | Not to be Quoted Here |
| 54 | Supply, delivery, installation and testing of bulkhead lights of cast aluminium housing, stainless steel screws, acrylic diffuser, CRC back plate, corrosion and UV ray resistant coating with 12 watt LED bulb and with all fixing accessories. | 40.0 | NOS | Not to be Quoted Here | Not to be Quoted Here |
| 55 | **LIGHTENING ARRESTER**  
Supply of Active Lightening arrestor of Class A for building protection .It shall work on early streamer Emission principle & shall be made of stain less steel with a ΔT of 60 micro sec (ABB OPR 60 or equivalent) A non-reset table type counter (FLASH COUNTER) shall also be supplied to count the number of lighting occurrences. | 1.00 | SET | Not to be Quoted Here | Not to be Quoted Here |
<p>| 56 | Supply of mounting plate for mast of 3 mtr with guy wire &amp; base plate | 1.00 | SET |
| 57 | Supply of flash counter for the above device | 1.00 | SET |
| 58 | Supply of all materials, installation &amp; testing of <strong>Copper safe earth electrode</strong> (chemical earthing) with earthing electrode of 3 metre long 50mm diameter hot dip galvanised pipe confirming IS:3043 including cost of 50kg chemical filling compound, masonry enclosure, C I cover, | 1.00 | SET | Not to be Quoted Here | Not to be Quoted Here |</p>
<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Rate</th>
<th>Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>59</td>
<td>Supply of materials and laying under ground / floor through prelaid GI pipe and fixing to the wall supported on porcelain base insulators at an interval not exceeding 500mm including making connection to plate earthing and required brazing at joints with 25mm x 6mm size of copper flats for earthing of Lightening Arrestor as required complete as per direction of Engineer-in-charge.</td>
<td>50.0</td>
<td>MTR</td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>Installation of Class A device on the top of building. The device shall be installed at a height of about 3 mtrs from the roof top of the building using a GI mast. The device shall be connected to the earth pit using copper tape of 25 mm x 3 mm or better. This copper tape shall be run firmly along the side of the mast with the help of spacers. It shall also be ensured that this down conductor shall not touch the building throughout. The down conductor shall be connected to the earth electrode using Exothermic welding. A counter shall be installed at an appropriate place to count the number of occurrences. All the accessories like spacers, welding materials etc. required for the installation shall be arranged by the ABB or equivalent only.</td>
<td>1.00</td>
<td>SET</td>
<td>Not to be quoted here</td>
</tr>
</tbody>
</table>

Not to be quoted here
**NAME OF WORK:** Electrical Work for Development of Tourism Facilitation Centre Cum Multi Level Parking at Puri, Odisha (Prasad Scheme)

**Financial Bid**

**Schedule of Quantity**

*Not to be Quoted here*

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>DESCRIPTION</th>
<th>QTY</th>
<th>UNIT</th>
<th>RATE</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>INTERNAL ILLUMINATION Wiring:</strong>&lt;br&gt;Recessed wiring to light point / fan point / exhaust fan point / call bell point with 1.5 sq.mm FR PVC insulated single core multistrand copper conductor of ISI marked with 20 mm dia non-metallic PVC flexible conduit with 5/10 Amp, 250 V modular type switch ISI marked and ceiling rose ISI marked mounted on MS box having front bakelite cover and MS box of suitable size as required, with 1.5 sq.mm FR PVC insulated single core multistrand copper conductor as earth wire including all accessories and connection as per direction of Engineer in Charge.</td>
<td>Not to be Quoted Here</td>
<td>Not to be Quoted Here</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Primary light points.</td>
<td>540.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td>Secondary light points looped from the above point</td>
<td>470.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.3</td>
<td>Twin control point</td>
<td>16.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.4</td>
<td>Ceiling fan point consisting of fan hook, modular switch &amp; regulator and ceiling rose as per requirement.</td>
<td>72.0</td>
<td>NOS</td>
<td>Not to be Quoted Here</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>1.5</td>
<td>Wall bracket / Exhaust fan point consisting of 5/10A modular switch and 6A socket/ceiling rose near fan.</td>
<td>52.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.6</td>
<td>Call bell point</td>
<td>5.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Supplying and fixing of 3 pin, 5 amp ceiling rose ISI marked on the existing junction box / wooden block including connection etc. as required.</td>
<td>122.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Supplying and fixing of batten holder / BK angle holder ISI marked on the existing junction box / wooden block including connection etc. as required.</td>
<td>102.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Supply and fixing of 6Amp plug with 6amp switch on existing board (Modular type)</td>
<td>38.0</td>
<td>NOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Point wiring for 5 / 6 amp socket outlet with 2 x 1.5 sq.mm FR PVC insulated single core multistrand copper conductor of ISI marked in recess 20 mm dia non-metallic PVC</td>
<td>54.0</td>
<td>NOS</td>
<td>Not to be Quoted Here</td>
<td>Not to be Quoted Here</td>
</tr>
</tbody>
</table>
flexible conduit with modular type switch, phenolic laminated sheet suitable size ISI marked MS box and earthing point with 1 x 1.5 sq.mm FR PVC insulated single core multistrand copper conductor for loop earthing etc. as required.

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<tbody>
<tr>
<td>6</td>
<td>Supply and fixing of multipurpose board Modular type of 6Amp 2nos. Switch and 2nos. Socket with all connection.</td>
<td>18.0</td>
<td>NOS</td>
</tr>
<tr>
<td>7</td>
<td>Supplying and fixing of metal box (nominal size) on surface or in recess with suitable size of modular base and cover plate in front including providing and fixing 5 pin 15 / 16 amps socket outlet and 15 / 16 amps modular type switch, connection, etc as required.</td>
<td>14.0</td>
<td>NOS</td>
</tr>
<tr>
<td>8</td>
<td>Supply &amp; fixing of Modular type 25 Amp one way switch and socket outlet for AC point with metal box and modular cover.</td>
<td>11.0</td>
<td>NOS</td>
</tr>
<tr>
<td>9</td>
<td>Supply, delivery, installation, testing and commissioning of TV Antenna/Telephone Outlet Boards containing a Modular TV Antenna/Telephone Socket fixed on Modular Concealed Box including connections and making good the damages caused complete as required and as per Direction of Engineer-In-Charge.</td>
<td>5.0</td>
<td>NOS</td>
</tr>
<tr>
<td>10</td>
<td>Supply, installation and &amp; commissioning of dual occupancy sensor based on lighting control system so that lighting is turned off automatically if the daylight set point level is reached, or after reasonable time delay when a room or area is vacated by the last person to occupy said room or area. Products shall be manufactured by an ISO 9002 certified manufacturing facility. IEC 60669-2-1 / CE / Rohs compliant Y. Sensors shall have an operating temperature range of -5°C - +45°C. The work is included of all necessary wiring with 2x1.5 sq mm copper wire inside 20mm dia PVC condute from near ByDB.</td>
<td>1.0</td>
<td>SET</td>
</tr>
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11 Submains:

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<thead>
<tr>
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<tbody>
<tr>
<td>11.1</td>
<td>Recessed/surface extra lead submain wiring alongwith earth wire with the following size of PVC insulated single core multistrand copper conductor of ISI marked conforming to IS 694/1990 in 20mm dia non metallic heavy duty flexible condute 1.6mm in surface/recessed PVC condute as required exceeding to Long point in 2x1.5sqmm + 1x1.5sqmm.</td>
<td>280.0</td>
<td>MTR</td>
</tr>
<tr>
<td>11.2</td>
<td>Recessed wiring to submain in 2 x 2.5 sq.mm FR PVC insulated single core multistrand copper conductor of ISI marked confirming to IS-694/1990 in required dia non-metallic heavy duty flexible conduit 1.6 mm thick alongwith 1 x 1.5sq.mm FR PVC insulated single core multistrand copper conductor as earth wire. exceeding to Long point in 2x1.5sqmm + 1x1.5sqmm.</td>
<td>3880.0</td>
<td>MTR</td>
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<td>-------------------------------------------------------------------------------------------------</td>
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<tr>
<td>11.3</td>
<td>Recessed wiring to submain in 2 x 4.0sq.mm FR PVC insulated single core multistrand copper conductor of ISI marked confirming to IS-694/1990 in required dia non-metallic heavy duty flexible conduit 1.6 mm thick alongwith 1 x 1.5sq.mm FR PVC insulated single core multistrand copper conductor as earth wire.</td>
<td>1000.0</td>
<td>MTR</td>
</tr>
<tr>
<td>11.4</td>
<td>Recessed wiring to submain in 2 x 6.0sq.mm FR PVC insulated single core multistrand copper conductor of ISI marked confirming to IS-694/1990 in required dia non-metallic heavy duty flexible conduit 1.6 mm thick alongwith 1 x 2.5sq.mm FR PVC insulated single core multistrand copper conductor as earth wire.</td>
<td>200.0</td>
<td>MTR</td>
</tr>
<tr>
<td>11.5</td>
<td>Recessed wiring to submain in 2 x 10.0sq.mm FR PVC insulated single core multistrand copper conductor of ISI marked confirming to IS-694/1990 in required dia non-metallic heavy duty flexible conduit 1.6 mm thick alongwith 1 x 4.0sq.mm FR PVC insulated single core multistrand copper conductor as earth wire.</td>
<td>50.0</td>
<td>MTR</td>
</tr>
<tr>
<td>11.6</td>
<td>Recessed wiring to submain in 4 x 4 sq.mm FR PVC insulated single core multistrand copper conductor of ISI marked confirming to IS-694/1990 in required dia non-metallic heavy duty flexible conduit 1.6 mm thick alongwith 2 x 2.5 sq.mm FR PVC insulated single core multistrand copper conductor as earth wire as equired.</td>
<td>100.0</td>
<td>MTR</td>
</tr>
<tr>
<td>11.7</td>
<td>Recessed wiring to submain in 4 x 6 sq.mm FR PVC insulated single core multistrand copper conductor of ISI marked confirming to IS-694/1990 in required dia non-metallic heavy duty flexible conduit 1.6 mm thick alongwith 2 x 2.5 sq.mm FR PVC insulated single core multistrand copper conductor as earth wire as equired.</td>
<td>600.0</td>
<td>MTR</td>
</tr>
<tr>
<td>11.8</td>
<td>Recessed wiring to submain in 4 x 10 sq.mm FR PVC insulated single core</td>
<td>260.0</td>
<td>MTR</td>
</tr>
</tbody>
</table>
multistrand copper conductor of ISI marked confirming to IS-694/1990 in 32mm dia non-metalic heavy duty flexible conduit 1.6 mm thick alongwith 2 x 4 sq.mm FR PVC insulated single core multistrand copper conductor as earth wire as required.

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<tbody>
<tr>
<td>12</td>
<td>Supplying and drawing TV cable RG-6 grade, 0.7 mm solid copper conductor PE insulated shielded with fine tined copper braid and protected with FR PVC sheath in existing surface / recessed steel / PVC conduit as required.</td>
<td>200.0 MTR</td>
</tr>
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<tr>
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<tbody>
<tr>
<td>13</td>
<td>Supplying and drawing two pair 0.5 mm dia FRLS PVC insulated annealed copper conductor, unarmored telephone cable in the existing surface/ recessed steel/ PVC conduit as required.</td>
<td>300.0 MTR Not to be Quoted Here</td>
</tr>
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</table>
| 14 | **Control Panel**  
Supply, delivery, installation, testing and commissioning of indoor floor mounted type distribution boards made out of 1.6mm thick powder coated CR sheet steel duly acid treated for derusting, primered and painted with epoxy paint, dust, damp & vermin proved having hinged door with provision for cable entry, earthing studs as per specification mentioned below duly factory wired conforming to the relevant ISS and as per special conditions of contract making good the damages caused complete including necessary civil / fabrication work as required as per the direction of Engineer-in-charge. | Not to be Quoted Here |

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<tbody>
<tr>
<td></td>
<td>All <strong>MCCB</strong> shall confirm to IEC- 60947 and IS-13947. MCCB shall comply with the isolation function requirement of IEC-60947-2 section 7.1.2 to be marked as suitable for isolation / disconnection to facilitate safety of person in use. All MCCB have ics=100% icu and the overload setting should be from 0.7 to 1 times of Ir for thermal magenetic release and for microprocessor release the overload Settings: 0.4 to 1 times of Ir. Manually closing mechanism should be accommodated in a Moulded housing of robust and vermin-proof construction. MCCB shall be provided with double insulation (insulation between front cover and internal power circuits to avoid any accidental contact with live current carrying path with the front cover open). The tripping devices shall be ambient temperature compensated.</td>
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</tbody>
</table>
type. The insulating case shall be made of high strength heat resistant and flame retardant thermosetting insulating material.

### 14.1 Main Distribution Board for Building

<table>
<thead>
<tr>
<th>1.0</th>
<th>SET</th>
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</table>

**Incoming:**

1 No 400A 4P Electronic Earth Leakage Module (EELM) MCCB (50kA) with ROM & spreader links

Busbar : 2 SET, 4 Nos 500 Amp Copper Strips. (CD=1A/sqmm)

**Instruments:** 1 Set of (0-400 A, 0-500 V) Digital ammeter/ voltmeter with inbuilt selector switch, 1 set of LED type phase indicating lamps with control fuses & 1 set of required CT.

**Change over switch:**

1 no On Load 4P 400Amp

**Outgoing:**

2 Nos 160A (36kA) 4P Thermal Magnetic MCCB with ROM & spreader links for APFC Panel & Spare.

5 Nos 125A (36kA) 4P Thermal Magnetic MCCB with ROM & spreader links for FDB Basement, FDB 1st Floor, Fire fighting DB, Car lift DB & Spare.

2 Nos 80A (36kA) 4P Thermal Magnetic MCCB with ROM & spreader links for Lift DB & spare.

4 Nos 40A (36kA) 4P Thermal Magnetic MCCB with ROM & spreader links for Pump House DB, STP DB, External Illumination DB & spare.

**Complete duly factory wired as per SLD**

### 14.2 APFC PANEL (50 KVAR)

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<tr>
<th>1.0</th>
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</table>

**Incoming:**

1 no. 160A, TPN MCCB (25kA) with Thermal Magnetic based release for Over Current, Short circuit protection + Earth Fault module.

**Busbar:**

One set of 200 A TPN Alu. Bus Bar, 25kA with PVC Sleeve in sealed Powder Coated Bus Chamber.

**Metering, Indication & Relay:**

1 nos. (0-160A) digital ammeter with built in selector switch with CT’s

1 set Automatic Power Factor Correction Relay (8 Steps) with digital Power Factor Meter
<table>
<thead>
<tr>
<th>Component Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>One set of R/Y/B phase indication Lamp with control MCBs.</td>
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</tr>
<tr>
<td>1 Sets of &quot;ON/OFF</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1 No. Auto / Manual Selector Switch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 set of Aux. Contactors</td>
<td></td>
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</tr>
<tr>
<td>1 No. timer for manual mode switching</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 set Control MCB</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>outgoing:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Sets of 15 KVAR Capacitor bank with 7% Harmonic Block Reactor, 40A TP contactor and 40A TP MCCB (25kA) Capacitor rating to be designed for required output KVAR at 415V.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2 Sets of 10 KVAR Capacitor bank with 7% Harmonic Block Reactor, 32A TP contactor and 32 TP MCCB (25kA) Capacitor rating to be designed for required output KVAR at 415V.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Set of 5 KVAR Capacitor bank with 7% Harmonic Block Reactor, 16A TP contactor and 16 A TP MCB &quot;D curve&quot; (10kA) Capacitor rating to be designed for required output KVAR at 415V.</td>
<td></td>
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</tr>
<tr>
<td>2 Set of 2.5 KVAR Capacitor bank with 7% Harmonic Block Reactor, 10A TP contactor and 10 A TP MCB &quot;D curve&quot; (10kA) Capacitor rating to be designed for required output KVAR at 415V.</td>
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</tr>
<tr>
<td>7 Sets &quot;ON/ OFF&quot; LED Indicating lamps.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>7 Sets &quot;ON/ OFF&quot; Push Buttons.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>7 Sets Control MCBs &amp; Neutral links.</td>
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<td></td>
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<tr>
<td>7 Sets of Digital Ammeter with built-in selector switch &amp; 3CT's.</td>
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<tr>
<td>Panel space heaters with control MCB &amp; Thermostat, covered LED lamp controlled by door switch for each panel.</td>
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<tr>
<td>Suitable Size of Exhaust fans with Air filter for each Panel of Capacitor &amp; Reactor compartment.</td>
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<tr>
<td>50 x 6 mm AL. earth bus across the width of panel</td>
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</tr>
<tr>
<td><strong>14.3 Floor Distribution Board I (Basement floor &amp; ground floor)</strong></td>
<td>1.0</td>
<td>SET</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td><strong>Incoming:</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1 No 100A 4P Thermal Magnetic (TM) MCCB (25kA) with ROM &amp; spreader links</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Busbar : 1 SET, 4 Nos 160 Amp Copper Strips. (CD=1A/sqmm)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Instruments: 1 Set of (0-100 A, 0-500 V) Digital ammeter/ voltmeter with inbuilt</td>
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</table>
selector switch, 1 set of LED type phase indicating lamps with control fuses & 1 set of required CT.

**Outgoing:**

- 4 Nos 63A (10kA) 4P MCB 'C' for Power BDB & Spare.
- 6 Nos 40A (10kA) 4P MCB 'C' for Light BDB & Spare.
- 4 Nos 40A (10kA) 2P MCB 'C' for Power ckt & Spare.

Complete duly factory wired as per SLD

**14.4 Floor Distribution Board II (1st floor, 2nd Floor & 3rd floor)**

| 1.0 | SET | Not to be Quoted Here | Not to be Quoted Here |

**Incoming:**

- 1 No 125A 4P Thermal Magnetic (TM) MCCB (25kA) with ROM & spreader links
- Busbar : 1 SET, 4 Nos 160 Amp Copper Strips. (CD=1A/sqmm)
- Instruments: 1 Set of (0-150 A, 0-500 V) Digital ammeter/ voltmeter with inbuilt selector switch, 1 set of LED type phase indicating lamps with control fuses & 1 set of required CT.

**Outgoing:**

- 4 Nos 63A (10kA) 4P MCB 'C' for Power BDB & Spare.
- 6 Nos 40A (10kA) 4P MCB 'C' for Light BDB & Spare.
- 4 Nos 40A (10kA) 2P MCB 'C' for Power ckt & Spare.

Complete duly factory wired as per SLD

**14.5 Lift D.B. (Vehicle Lift)**

| 1.0 | SET | Not to be Quoted Here | Not to be Quoted Here |

**Incoming:**

- 1 No 100A (25kA) 4P thermal magnetic release MCCB with ROM & Spreader links.
- Busbar : 4 Nos 160 Amp Copper Strips (CD=1A/sqmm)
- Instruments: 1 set of LED type phase indicating lamps with control fuses

**Outgoing:**

- 2 Nos 80A 4P RCCB (300mA) for Lift motor & spare.
- 2 Nos 25A 2P RCCB (30mA) for lift car control panel.
- 4 Nos 6A/10A SP MCB 'C' (10kA) for lift car light.

Complete duly factory wired as per SLD

**14.6 Lift D.B. (Passenger Lift)**

| 1.0 | SET | Not to be Quoted Here | Not to be Quoted Here |

**Incoming:**
<table>
<thead>
<tr>
<th>No</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 No 63A (25kA) 4P thermal magnetic release MCCB with ROM &amp; Spreader links.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Busbar : 4 Nos 100 Amp Copper Strips (CD=1A/sqmm)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Instruments: 1 set of LED type phase indicating lamps with control fuses</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Outgoing :</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 Nos 40A 4P RCCB (300mA) for Lift motor &amp; spare.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 Nos 25A 2P RCCB (30mA) for lift car control panel &amp; spare.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 Nos 6A/10A SP MCB 'C' (10kA) for lift car light &amp; spare.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Complete duly factory wired as per SLD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.7</td>
<td><strong>Pump House D.B.</strong> 1 No 40A 4P TM MCCB (25kA) with ROM &amp; spreader links</td>
<td>1.0</td>
<td>SET</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td></td>
<td>Busbar :</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>One set 63 Amp Copper Strips (CD=1A/sqmm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Instruments: 1 set of LED type phase indicating lamps with control fuses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>outgoing :</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 no 25A 4P 30mA RCCB for motor &amp; spare.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>2 no 10A-32A SP MCB 'C' (10kA) for light ckt.</td>
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<tr>
<td></td>
<td>Complete duly factory wired as per SLD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Supply, delivery, installation, testing &amp; commissioning of L.T. indoor floor/ wall mounted type distribution boards made out of reputed company having provision for cable/ conduit entry, earthing studs as per specification mentioned below duly factory wired conforming to the relevant ISS and as per special conditions of contract making good the damages caused complete as per the direction of Engineer-in-charge.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.1</td>
<td><strong>Power BDB (4way Double Door TPN DB)</strong></td>
<td>4.0</td>
<td>SET</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td></td>
<td>incoming</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 no of 63A 4P MCCB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>outgoing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12 nos of 6-32A SP MCB as per SLD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.2</td>
<td><strong>Light DB (4way Double Door TPN DB)</strong></td>
<td>10.0</td>
<td>SET</td>
<td></td>
</tr>
<tr>
<td></td>
<td>incoming</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 no of 25A 4P RCBO (100mA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>outgoing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12 nos of 6-32A SP MCB as per SLD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Light BDB (6 way Double Door TPN DB)</td>
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</tr>
<tr>
<td></td>
<td>incoming</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 no of 63A TPN RCBO</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>outgoing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>18nos of 10-32A SP MCB as per SLD</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Light BDB (12 way Double Door SPN DB)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>incoming</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 no of 40A 2P RCBO (100mA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>outgoing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10nos of 10-32A SP MCB as per SLD</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## 16 Cabling
Supply, laying & testing of following size of PVC insulated, PVC sheathed, round armoured aluminium conductor power cable of 1100 volt grade laid on surface of wall / column / existing RCC / stone ware / masonry cable trench / cable trey / through G.I. pipe / hume pipe as the case may be, including cost of saddles / clamps / markers etc but excluding the cost of G. I. pipe / hume pipe complete with making good the damages caused and returning the balance unused cables to stores as required and as per direction of Engineer-in-charge.

### 16.1 3 &1/2c x 400 Sq. mm Aluminum armoured cable.

<table>
<thead>
<tr>
<th></th>
<th>60.0</th>
<th>RM</th>
</tr>
</thead>
</table>

### 16.2 3 &1/2c x 70 Sq. mm Aluminum armoured cable.

<table>
<thead>
<tr>
<th></th>
<th>20.0</th>
<th>RM</th>
</tr>
</thead>
</table>

### 16.3 3 &1/2c x 50 Sq. mm Aluminum armoured cable.

<table>
<thead>
<tr>
<th></th>
<th>30.0</th>
<th>RM</th>
</tr>
</thead>
</table>

### 16.4 3 &1/2c x 35 Sq. mm Aluminum armoured cable.

<table>
<thead>
<tr>
<th></th>
<th>60.0</th>
<th>RM</th>
</tr>
</thead>
</table>

### 16.5 3 &1/2c x 25 Sq. mm Aluminum armoured cable.

<table>
<thead>
<tr>
<th></th>
<th>60.0</th>
<th>RM</th>
</tr>
</thead>
</table>

### 16.6 4c x 16 Sq. mm Aluminum armoured cable.

<table>
<thead>
<tr>
<th></th>
<th>40.0</th>
<th>RM</th>
</tr>
</thead>
</table>

## 17 Cable termination:
Supplying and making end termination with brass compression gland and aluminum lugs for following size of PVC insulated and PVC sheathed / XLPE aluminum cable of 1.1 KV as required.

### 17.1 3 &1/2c x 400 Sq. mm Aluminum armoured cable.

<table>
<thead>
<tr>
<th></th>
<th>2.0</th>
<th>NOS</th>
</tr>
</thead>
</table>

### 17.2 3 &1/2c x 70 Sq. mm Aluminum armoured cable.

<table>
<thead>
<tr>
<th></th>
<th>2.0</th>
<th>NOS</th>
</tr>
</thead>
</table>

### 17.3 3 &1/2c x 50 Sq. mm Aluminum armoured cable.

<table>
<thead>
<tr>
<th></th>
<th>2.0</th>
<th>NOS</th>
</tr>
</thead>
</table>

### 17.4 3 &1/2c x 35 Sq. mm Aluminum armoured cable.

<table>
<thead>
<tr>
<th></th>
<th>2.0</th>
<th>NOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.5</td>
<td>3 &amp; 1/2c x 25 Sq. mm Aluminum armoured cable.</td>
<td>4.0</td>
</tr>
<tr>
<td>------</td>
<td>------------------------------------------------</td>
<td>-----</td>
</tr>
<tr>
<td>17.6</td>
<td>4c x 16 Sq. mm Aluminum armoured cable.</td>
<td>2.0</td>
</tr>
</tbody>
</table>
| 18   | **Earthing:**  
Earthing with G.I earth pipe 4.5 meter long  
40 mm dia ISI marked including accessories and providing masonry enclosure with  
cover plate having locking arrangement and watering pipe etc with charcoal and salt as required | 6.0 | SET |                      |                      |
| 19   | **Supply of materials and installation of chemical earthing** size of chemical earth bar 2 mtr, size of earth pit 3' X 2' X 9' chemical compound to be used 50 kg. There is an arrangements for termination of copper strip of earth continuity conductor including cost of water pouring arrangements, brick masonry enclosure on top with removable cast iron cover complete with labour for excavation of pit in all kinds of soil & rock as required and as per direction of Engineer-in-charge. (For Lift earthing) | 4.0 | SET | Not to be Quoted Here | Not to be Quoted Here |
| 20   | Supplying and laying 25 mm x 5 mm G.I earth strip ISI marked at 0.5 meter below ground level as strip earth electrode including soldering etc. as required | 30.0 | RM |                      |                      |
| 21   | Providing and fixing 25 mm X 5 mm copper strip on surface or in recess for connections etc. as required | 20.0 | RM |                      |                      |
| 22   | Supply of material & laying under ground/ floor/ wall including making end termination and testing of following size of Cu/G.I. wire for loop earthing of equipments, switch boards & panels as required complete as per direction of Engineer-in-charge. |                      |       |                      |                      |
| 22.1 | 6 swg G.I wire | 300.0 | RM | Not to be Quoted Here | Not to be Quoted Here |
| 22.2 | 8SWG HDBC Wire in non metallic conduit | 200.0 | RM |                      |                      |
| 23   | **Fittings & Fixtures**  
Installation and testing of following types of fluorescent tube fixtures directly on wall / ceiling of building with all accessories such as electronics ballast, fluorescent tube lights, stove enamelled box, perpex sheet cover etc complete assembly including supply & fixing of teak wood round block and making connection from the suitable point outlet as per the direction of Engineer-in-charge. |                      |       |                      |                      |
<p>| 23.1 | Supply, delivery, installation, testing &amp; commissioning of extruded aluminium | 100.0 | NOS | Not to be Quoted Here | Not to be Quoted Here |</p>
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>23.2</td>
<td>Supply, delivery, installation, testing &amp; commissioning of extruded aluminum batern 2ft long 10w LED fitting.</td>
<td>4.0</td>
<td>NOS</td>
</tr>
<tr>
<td>23.3</td>
<td>Supply, delivery, installation, testing &amp; commissioning of 65w surface mounted LED Green Bay on roof.</td>
<td>1.0</td>
<td>NOS</td>
</tr>
<tr>
<td>23.4</td>
<td>Supply, delivery, installation, testing &amp; commissioning of surface mounted 15w LED fitting.</td>
<td>582.0</td>
<td>NOS</td>
</tr>
<tr>
<td>23.5</td>
<td>Supply, delivery, installation, testing &amp; commissioning of 7w LED Bulb on existin holder.</td>
<td>102.0</td>
<td>NOS</td>
</tr>
<tr>
<td>23.6</td>
<td>Supply, delivery, installation and testing of 12w LED recessed mounted step light of cast aluminum lighting fixtures, stainless steel screws, glass diffuser, corrosion and UV ray resistant coating and rubber gasket</td>
<td>151.0</td>
<td>NOS</td>
</tr>
<tr>
<td>23.7</td>
<td>Supply, delivery, installation, testing &amp; commissioning of robust and reliable 7w LED bulkhead IP65 protection and IK09 resistance suitable for surface and wall mounting application.</td>
<td>4.0</td>
<td>NOS</td>
</tr>
<tr>
<td>23.8</td>
<td>Supply, delivery, installation, testing &amp; commissioning of fully difused recessed mounted 2'x2' LED luminaire 36W</td>
<td>16.0</td>
<td>NOS</td>
</tr>
<tr>
<td>23.9</td>
<td>Supply, delivery, installation, testing &amp; commissioning of ultra sleek recessed downlight 10w LED fitting.</td>
<td>31.0</td>
<td>NOS</td>
</tr>
<tr>
<td>23.10</td>
<td>Supply, delivery, installation, testing &amp; commissioning of ultra sleek recessed downlight 6w LED fitting.</td>
<td>24.0</td>
<td>NOS</td>
</tr>
<tr>
<td>23.11</td>
<td>Supply, delivery, installation, testing &amp; commissioning of recess mounted COB-based, tiltable downlight with multible beam angle 6w LED fitting.</td>
<td>2.0</td>
<td>NOS</td>
</tr>
<tr>
<td>23.12</td>
<td>Supply, delivery, installation, testing &amp; commissioning of 5 meter long indoor LED strip light.</td>
<td>6.0</td>
<td>NOS</td>
</tr>
<tr>
<td>24</td>
<td>Supply, delivery, installation, testing &amp; commissioning of BEE Star rated 1200mm sweep ceiling fan.</td>
<td>72.0</td>
<td>NOS</td>
</tr>
<tr>
<td>25</td>
<td>Supply, delivery, installation, testing &amp; commissioning of wall mounting fan 400mm sweep.</td>
<td>2.0</td>
<td>NOS</td>
</tr>
<tr>
<td>26</td>
<td>Supply, delivery, installation, testing &amp; commissioning of single phase 600mm sweep 900 RPM heavy duty Exhaust fan.</td>
<td>30.0</td>
<td>NOS</td>
</tr>
<tr>
<td>27</td>
<td>Supply, delivery, installation, testing &amp; commissioning of metal Exhaust fan 12&quot; sweep.</td>
<td>18.0</td>
<td>NOS</td>
</tr>
<tr>
<td>No.</td>
<td>Description</td>
<td>Unit</td>
<td>Quantity</td>
</tr>
<tr>
<td>-----</td>
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<td>------</td>
<td>----------</td>
</tr>
<tr>
<td>28</td>
<td>Supply, delivery, installation, testing &amp; commissioning of plastic Ventilation fan 200mm sweep</td>
<td></td>
<td>4.0</td>
</tr>
<tr>
<td>29</td>
<td>Supply &amp; Fixing of electronic call bell ding dong two modular on entrance door way and as per the direction of Engineer-in-charge or Consultant.</td>
<td></td>
<td>5.0</td>
</tr>
<tr>
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<tr>
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<td></td>
<td></td>
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</tr>
<tr>
<td>30</td>
<td>SUBSTATION 11 KV LINE: Supply of all Materials, Labour and Stringing of 11 KV Overhead Line with, 55 mm² Insulated Aluminum Conductor, on 100 X 116 mm RS Joist 10 Mtrs. long complete with required Insulators, Cross Arms, Stays Set complete as per site requirement and Direction of Engineer-In-Charge.</td>
<td>KM</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>DP STRUCTURE Supply Installation Testing and Commissioning of DP structure for 1x250 KVA Substation, 11 KV underground HT Line &amp; metering unit complete with required size of channels and angles for mounting of AB switch and HG fuse with required size of nuts &amp; bolts. 11KV 3 pole on load isolated air brake switch complete with knife blade switches both Male/Female, operating GI pipe with handle &amp; rotating mechanism. Pad locking arrangement with pad lock. Interconnecting AB switch OH line with 30sqmm AAC conductor &amp; interconnection to pin insulator/HG fuse set by suitable Cu flexible strip. Spring earth of the handle, earthing of switch etc along with 11KV 3 pole horn gap fuse set on the double pole structure. 11KV HG fuse set should be complete with 11KV insulators Cu horn gaps etc. Interconnection of HG fuse with transformer with &quot;0&quot; SWG HDB Cu conductor and 12KV lighting arrester including interconnection by 30sqmm AAC conductor &amp; clamp complete as required with binding using all types of binding wires and painting with red oxide/aluminium/black paint complete as required and direction of Engineer-in-Charge along with following items:</td>
<td>SET</td>
<td>1.0</td>
</tr>
<tr>
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<tr>
<td>i</td>
<td>Supplying and erection of 05 Nos. 100X116X RS joist pole of 11m long each weighing 257.4 kg. (23.4 kg/mtr)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii</td>
<td>Erection of 05 Nos. metallic pole of following length in cement concrete 1:3:6 (1 cement: 3 coarse sand: 6 graded stone aggregate 40 mm nominal size) foundation including excavation and refilling etc. as required.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii</td>
<td>11 KV GI pin and pin insulator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv</td>
<td>11KV Disc Insulator with necessary hardwire fitting. 90 KN (B &amp; S type)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>EA</td>
<td>SET</td>
</tr>
<tr>
<td>---</td>
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<td>-----</td>
<td>------</td>
</tr>
<tr>
<td>32</td>
<td><strong>Transformer</strong> Supply installation testing and commissioning of 250 KVA, 11KV/433V Copper winded Transformer (three stars rated) with manual tap changing regulator (-2.5% to +7.5%) and E&amp;MR Testing with necessary hardware as required.</td>
<td>EA 1.0</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>33</td>
<td><strong>LT Panel</strong> Supply installation testing and commissioning of duly tested by CPRI outdoor floor mounted type kiosk Panel Board with 8 Nos Kitkat and 400 Amp 50KA 4 Pole thermal magnetic MCCB, voltmeter, Ammeter, selector switch, busbar etc. with rotary handle and spreader links made out of 2mm thick CR sheet steel duly acid treated for derusting, primered and painted with epoxy paint dust resistant and vermin proved having hinged door with provision for cable entry earthing studs as per specification conforming to relevant ISS and making good complete including necessary civil works and fabrication as required.</td>
<td>SET 1.0</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>34</td>
<td><strong>CABLES</strong> Supply &amp; laying of 3.5 core 400sqmm aluminium armoured 1.1 kV grade PVC insulated Armoured cable</td>
<td>MTR 20.0</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>35</td>
<td><strong>Earthing</strong> Earthing with G.I earth pipe 4.5 meter long 40 mm dia ISI marked including accessories and providing masonry enclosure with cover plate having locking arrangement and watering pipe etc with charcoal and salt as required (For Body, Lightning Arrestor &amp; DP of Transformer)</td>
<td>SET 4.0</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>36</td>
<td>Supply and Installation of Safe Earth Electrodes (Chemical Earthing) including cost of Electrode, Earthing Compound, Excavation of Earthing Pit, Refilling, etc. as required (For Neutral) complete with all materials and accessories as required.</td>
<td>SET 2.0</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>37</td>
<td><strong>Earthing Accessories</strong> Supplying and laying of 25x6mm &amp; 50x6 GI Flat for earth conductors including fixing accessories, stainless steel bolts, nuts and washers complete as required.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37.01</td>
<td>25 X 6 mm GI Flat</td>
<td>MTR 40.0</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>38</td>
<td>Supply of Materials and laying Underground / Floor/ Wall including making End Termination and Testing of 8 SWG HDBC WIRE in non-metallic conduit for loop earthing of equipment’s, switch boards &amp; panel with providing and fixing of Copper strip Flat (25x5) on surface or in recess as required complete with all accessories as per direction of Engineer-in-charge.</td>
<td>MTR 20.0</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>39</td>
<td><strong>Safety Equipment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39.01</td>
<td>Supply and hanging of Shock Treatment</td>
<td>EA 1.0</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>39.02</td>
<td>Supply &amp; Laying of 8 mm Thick Rubber Mat, ISI mark of 1100 V Grade.</td>
<td>EA</td>
<td>4.0</td>
</tr>
<tr>
<td>39.03</td>
<td>Supply and Installation of 3 Nos. Fire Buckets on a Mild Steel Stand complete as per specification and requirement of Fire Safety Provisions.</td>
<td>SET</td>
<td>1.0</td>
</tr>
<tr>
<td>39.04</td>
<td>Supply and Installation of 5 Kgs. Capacity CO2 type Fire Extinguisher complete as required.</td>
<td>EA</td>
<td>1.0</td>
</tr>
<tr>
<td>39.05</td>
<td>Providing and fixing bi-lingual Danger HT notice board of 250mmx200mm as specified below, made of mild steel at least 2mm thick &amp; vitreous enamelled signal red colour on both sides as background &amp; with inscriptions in enamelled vitreous white colour on front side for lettering as required.</td>
<td>EA</td>
<td>8.0</td>
</tr>
<tr>
<td>39.06</td>
<td>Supply and fixing of 100 mm dia GI Pipe.</td>
<td>MTR</td>
<td>5.0</td>
</tr>
</tbody>
</table>

**40** **EXTERNAL ILLUMINATION**  
**DB-External Light**  
Supply, delivery, installation, testing and commissioning of indoor floor mounted type distribution boards made out of 2mm thick CR sheet steel duly acid treated for derusting, primed and painted with epoxy paint, dust, damp & vermin proved having hinged door with provision for cable entry, earthing studs as per specification mentioned below duly factory wired conforming to the relevant ISS and as per special conditions of contract making good the damages caused complete including necessary civil / fabrication work as required as per the direction of Engineer-in-charge.  

**Incoming:** 1 40A 3P+NL MCCB (25 KA) type isolator followed by 1 No 70-A 3P AC3 duty power contactor with Bypass Toggle switch.  
**Bus bars:** 4 Nos. 20x3mm E C Strips  
**Outgoing:** 4 Nos 40-A, 3PN MCB 'C'of 6 nos 6-32 Amp 2P MCB 'C' (10 KA)  
Complete duly factory wired as per SLD

**41** **Junction Box**  
Supply, installation and testing of Hensel make IP65 (dust & water proof) (in accordance to 60 529) junction box, made of high Hensel make IP65 (dust & water proof) (in accordance to 60 529) junction box, made of high quality Thermoplastic (shock proof, rust free, corrosion free, acid and chemical resistant, fire retardant, having high impact, made of halogen and silica free recyclable material), UV resistant, having high grade gasket made of Polyurethane, should withstand glow wire test at 9600c, should be flame retardant, 1. 139X119X70 mm fitted with 6sq.mm Stud type terminal with 4nos IP65 Polyamide  

<p>| 41 | Junction Box | 12.0 | SET | Not to be Quoted Here | Not to be Quoted Here |</p>
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>42</td>
<td><strong>Earthing</strong>&lt;br&gt;Earthing with G.I earth pipe 4.5 meter long 40 mm dia ISI marked including accessories and providing masonry enclosure with cover plate having locking arrangement and watering pipe etc with charcoal and salt as required</td>
<td>2.0</td>
<td>SET</td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>Supplying and laying 25 mm x 5 mm G.I earth strip ISI marked at 0.5 meter below ground level as strip earth electrode including soldering etc. as required</td>
<td>10.0</td>
<td>MTR</td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>44</td>
<td>Supply of material &amp; laying under ground/ floor/ wall including making end termination and testing of following size of Cu/G.I. wire for loop earthing of equipments, switch boards &amp; panels as required complete as per direction of Engineer-in-charge.</td>
<td></td>
<td></td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>44.01</td>
<td>6 swg G.I wire</td>
<td>60.0</td>
<td>MTR</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td><strong>CABLES</strong>&lt;br&gt;Supply, laying &amp; testing of following size of solid Aluminum conductor upto 16 SQ mm /XLPE insulated PVC Tape innersheathed Armour, 650/1100 V grade as per IS 7098 (PART 1) 1988, PVC insulated, PVC sheathed, round armoured aluminium conductor power cable of 1100 volt grade laid on surface of wall / column / existing RCC / stone ware / masonry cable trench / cable trey / through G.I. pipe / hume pipe as the case may be, including cost of saddles / clamps / markers etc but excluding the cost of G. I. pipe / hume pipe complete with making good the damages caused and returning the balance unused cables to stores as required and as per direction of Engineer-in-charge.</td>
<td></td>
<td></td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>45.01</td>
<td>4c x 16 Sq. mm</td>
<td>60.0</td>
<td>MTR</td>
<td></td>
</tr>
<tr>
<td>45.02</td>
<td>4c x 10 Sq. mm</td>
<td>250.0</td>
<td>MTR</td>
<td></td>
</tr>
<tr>
<td>45.03</td>
<td>4c x 6 Sq. mm</td>
<td>100.0</td>
<td>MTR</td>
<td></td>
</tr>
<tr>
<td>45.04</td>
<td>2c x 10 Sq. mm</td>
<td>80.0</td>
<td>MTR</td>
<td></td>
</tr>
<tr>
<td>45.05</td>
<td>2c x 6 Sq. mm</td>
<td>200.0</td>
<td>MTR</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td><strong>Cable termination:</strong>&lt;br&gt;Supplying and making of all materials for terminations of 1.1 KV grade copper/aluminium multicore cables of the following sizes. The work includes cable glancing using brass plated single compression glands, sizing the core leads, removing insulation, fixing suitable crimping type copper lugs/thimbles by using hydraulic crimping tools with correct size of the dies, shaping the leads and neatly connecting the same to the equipment terminals.</td>
<td></td>
<td></td>
<td>Not to be Quoted Here</td>
</tr>
<tr>
<td>46.01</td>
<td>4c x 16 Sq. mm Aluminium armoured cable</td>
<td>2.0</td>
<td>NOS</td>
<td></td>
</tr>
<tr>
<td>46.02</td>
<td>4c x 10 Sq. mm Aluminium armoured cable</td>
<td>20.0</td>
<td>NOS</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td><strong>Accessories</strong>&lt;br&gt;Supply &amp; installation of 40mm dia 2mm thick PVC Conduit with fittings such as</td>
<td>20.0</td>
<td>MTR</td>
<td>Not to be Quoted Here</td>
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</tbody>
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174
<p>| | | | |</p>
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</tr>
</thead>
<tbody>
<tr>
<td>48</td>
<td>GI pipe 2” dia for Road Cross</td>
<td>20.0</td>
<td>MTR</td>
</tr>
</tbody>
</table>
| 49 | **Fittings & Fixtures**  
Supply, delivery, installation and testing of 3.6 metre high LED 30 watt post top light of cast iron base, mild steel column, cast aluminium lighting fixture, acrylic diffuser, stainless steel screws, corrosion and UV ray resistant coating with foundation and all fixing accessories. | 20.0 | NOS | Not to be Quoted Here | Not to be Quoted Here |
| 50 | Supply, delivery, installation and testing of 170mm dia 780mm high 9w LED Bollard of alluminium lighting fixtures, acrilic diffuser, stainless steel screws and Pole, corrosion and UV ray resistant coating with with foundation and all fixing accessories. | 30.0 | NOS | Not to be Quoted Here | Not to be Quoted Here |
| 51 | Supply, delivery, installation and testing of out door type of cast aluminium housing, stainless steel screws, corrosion and UV ray resistant coating with 18 watt LED bulb and with all fixing accessories for bathing complex. | 16.0 | NOS |   |   |
| 52 | Supply, delivery, installation and testing of LED 40 watt post top light of cast aluminium housing, stainless steel screws, corrosion and UV ray resistant coating with all fixing accessories for entrance gate. | 6.0 | NOS | Not to be Quoted Here | Not to be Quoted Here |
| 53 | Supply, delivery, installation and testing of LED 5 watt step lights of cast aluminium housing, stainless steel screws, acrylic diffuser, rubber gascate, corrosion and UV ray resistant coating and with 12 watt LED bulb and with all fixing accessories. | 40.0 | NOS | Not to be Quoted Here | Not to be Quoted Here |
| 54 | Supply, delivery, installation and testing of bulkhead lights of cast aluminium housing, stainless steel screws, acrylic diffuser, CRC back plate, corrosion and UV ray resistant coating with 12 watt LED bulb and with all fixing accessories. | 40.0 | NOS | Not to be Quoted Here | Not to be Quoted Here |
| 55 | **LIGHTENING ARRESTER**  
Supply of Active Lightening arrestor of Class A for building protection .It shall work on early streamer Emission principle & shall be made of stain less steel with a $\Delta T$ of 60 micro sec (ABB OPR 60 or equivalent) A non-reset table type counter (FLASH COUNTER) shall also be supplied to count the number of lighting occurrences. | 1.00 | SET | Not to be Quoted Here | Not to be Quoted Here |
| 56 | Supply of mounting plate for mast of 3 mtr with guy wire & base plate | 1.00 | SET |   |   |
| 57 | Supply of flash counter for the above device | 1.00 | SET |   |   |
| 58 | Supply of all materials, installation & testing of Copper **safe earth electrode** (chemical earthing) with earthing electrode of 3 metre long 50mm diameter hot dip galvanised pipe confirming IS: 3043 including cost of 50kg chemical filling compound, masonary | 1.00 | SET | Not to be Quoted Here | Not to be Quoted Here |

bends, elbows, reducers, chase nipples, split couplings, plugs etc. as per site requirement.
<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Unit</th>
<th>Rate</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>59</td>
<td>Supply of materials and laying underground / floor through prelaid GI pipe and fixing to the wall supported on porcelain base insulators at an interval not exceeding 500mm including making connection to plate earthing and required brazing at joints with 25mm x 6mm size of copper flats for earthing of Lightening Arrestor as required complete as per direction of Engineer-in-charge.</td>
<td>MTR</td>
<td>50.0</td>
<td>1.00</td>
</tr>
<tr>
<td>60</td>
<td>Installation of Class A device on the top of building. The device shall be installed at a height of about 3 mtrs from the roof top of the building using a GI mast. The device shall be connected to the earth pit using copper tape of 25 mm x 3 mm or better. This copper tape shall be run firmly along the side of the mast with the help of spacers. It shall also be ensured that this down conductor shall not touch the building throughout. The down conductor shall be connected to the earth electrode using Exothermic welding. A counter shall be installed at an appropriate place to count the number of occurrences. All the accessories like spacers, welding material etc required for the installation shall be arranged by the ABB or equivalent only.</td>
<td>SET</td>
<td>1.00</td>
<td>Not to be Quoted Here</td>
</tr>
</tbody>
</table>

Not to be Quoted Here