



**Contract & Purchase Department  
(Rajasthan Field)**

2A, District Shopping Centre, Saraswati Nagar,  
Basni, Jodhpur-342005, Rajasthan, India.  
Phone-0291-2729472, Fax: 0291-2727050

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**Sub: IFB No.CJI-4232-P21 FOR CONSTRUCTION OF OIL EXECUTIVE  
RESIDENTIAL COMPLEX – JODHPUR UNDER QCBS (QUALITY &  
COST BASED SELECTION) TENDERING PROCESS.**

Dear Sirs,

1.0 OIL INDIA LIMITED (OIL), a “Navaratna” Category, Government of India Enterprise, is a premier OIL Company engaged in exploration, production and transportation of crude oil & natural gas with its Headquarters at Duliajan, Assam. Rajasthan Field of Oil India Limited (OIL) is engaged in exploration and production of Natural Gas from the Jaisalmer Basin and exploration of Heavy Oil in Bikaner-Nagaur basin of Western Rajasthan in India. OIL has also strategically diversified into Renewable Energy Business and O&M activities. The Field Office of OIL at Jodhpur is well connected by Road, Rail & Air.

2.0 In connection with its field office being located at Jodhpur, OIL invites Local Competitive Bids (LCB) from competent and experienced Contractors through OIL's e-procurement site for **construction of oil executive residential complex – Jodhpur** with the entire project expected to be completed within 24 months of award of contract. One complete set of Bid Document covering OIL's IFB for hiring of above services is uploaded in OIL's e-procurement portal. You are invited to submit your most competitive bid on or before the scheduled bid closing date and time through OIL's e-procurement portal. For your ready reference, few salient points of the IFB (covered in detail in the Bid Document) are highlighted below:

|   |   |
|---|---|
| <b>IFB No./ Tender No.</b>                      | <b>CJI-4232-P21</b>   |
| a. Type of IFB.                                 | Single Stage Two Bid System (QCBS).   |
| b. Bid Closing Date & Time.                     | <b>07.07.2020 at 11-00 hrs (IST).</b>   |
| c. Bid(Technical) Opening Date & Time           | <b>07.07.2020 at 15-00 hrs (IST).</b>   |
| d. Priced Bid Opening Date & Time.              | Will be intimated to the eligible Bidders nearer the time.  |
| e. Bid Submission Mode.                         | Bid to be uploaded on-line in OIL's E-Procurement portal.   |
| f. Bid Opening Place.                           | Office of the GM-C&P, Oil India Ltd., 2A, District Shopping Centre, Saraswati Nagar, Basni, Jodhpur-342005, Rajasthan, India. |
| g. Bid Validity.                                | 120 days from bid Closing date.   |
| <b>h. Bid Security Amount</b>                   | <b>INR 42,50,000/-</b>  |
| i. Bid Security Validity                        | 210 days from bid closing date.   |
| j. Amount and Validity of Performance Security. | Two Performance Security to be submitted:<br>i) PBG valuing 8% of total contract value valid                                  |

|   |  |
|---|--|
|   | upto 90 days beyond defect liability period<br>ii) PBG valuing 2% of total contract value valid for 75 (seventy-five) months from issuance of LOA. |
| k. Duration of the Contract.  | Twenty Four (24) months from the date of commencement of contract with early termination clause.   |
| l. Quantum of Liquidated Damage for Default in Timely Mobilisation. | Refer clause No. 17.0 of General Conditions of Contract (Part-3, Section-I)  |
| m. Bids to be addressed to.   | GM, C&P, Oil India Ltd., 2A, District Shopping Centre, Saraswati Nagar, Basni, Jodhpur-342005, Rajasthan, India                                    |
| <b>n. Pre-Bid Conference Date.</b>                                  | <b>16.06.2020 at 11:30 hrs (IST).</b>  |
| o. Last Date of receipt of Queries.                                 | 14.06.2020 up to 17:30 Hrs (IST)   |

**3.0 Pre-Bid Conference:** A pre-bid conference to explain Company's exact requirements and to reply queries of Bidders, if any, on the tender stipulations will be held on **16.06.2020 at 11:30 hrs (IST)** in OIL's Office at 2A, District Shopping Centre, Saraswati Nagar, Basni, Jodhpur-342005, Rajasthan, India. Maximum of two representatives of each bidder will be allowed to attend the pre-bid conference on producing authorization letter. Bidders interested to attend the Pre-Bid Conference should intimate General Manager (C&P), Oil India Limited, Jodhpur latest by 14.06.2020 up to 17:30 Hrs (IST).

**3.1** Owing to the current Covid-19 Pandemic and resultant lockdown throughout the country, the Pre-bid conference shall be held online through Video Conference. Interested bidders are therefore, advised to submit their queries latest by 14.06.2020 up to 17:30 Hrs (IST) and also provide their email id and contact details for the Video Conference. OIL shall provide the necessary Webex link to the interested bidders to join the video conference on the scheduled date and time. However, in case of lifting of lockdown, if any vendor wishes to attend the pre-bid conference at OIL House, Jodhpur, the bidder has to intimate OIL well in advance so as to enable OIL to make arrangements for the same.

**4.0 Integrity Pact:** The Integrity Pact must be uploaded in OIL's E-procurement portal along with the Technical Bid digitally signed by the same signatory who signed the Bid i.e. who is duly authorized to sign the Bid. If any Bidder refuses to sign Integrity Pact or declines to submit the Integrity Pact, their bid shall be rejected straightway. Uploading the Integrity Pact with digital signature will be construed that all pages of the Integrity Pact has been signed by the Bidder's authorized signatory who signs the Bid.

**5.0 GUIDELINES FOR PARTICIPATING IN OIL'S E-PROCUREMENT:**

**5.1** To participate in OIL's E-procurement tender, bidders should have a legally valid digital certificate **of Class 3 with Organizations Name** and **Encryption certificate** as per Indian IT Act from the licensed Certifying Authorities operating under the Root Certifying Authority of India (RCAI), Controller of Certifying Authorities (CCA) of India (<http://www.cca.gov.in>). **Digital Signature Certificates having "Organization Name" field as "Personal" are not acceptable.**

**5.2** Bidders without having E-tender Login ID and Password should complete their online registration at least seven (7) days prior to the scheduled bid closing date and time

of the tender. For online registration, Bidder may visit the OIL's E-tender site <https://etender.srm.oilindia.in/irj/portal>

5.3 Necessary Login ID & Password will be issued by OIL only after submitting the complete online registration by the Bidder. In the event of late registration/incomplete registration by Bidder, OIL INDIA LIMITED shall not be responsible for late allotment of User ID & Password and request for bid closing date extension on that plea shall not be entertained by Company.

5.4 MSE Units (manufacturers/Service Providers only and not their dealers/distributors) who are already registered with District Industry Centres or Khadi & Village Industries Commission or Khadi & Village Industries Board or Coir Board or National Small Industries Corporation or Directorate of Handicrafts & Handloom or any other body specified by Ministry of MSME are exempted from payment of Bid Security (EMD) irrespective of monetary limit mentioned in their registration, provided they are registered for the item they intend to quote/participate.

5.5 Bids without EMD shall be rejected, if the technical offer does not include a valid copy of relevant MSE Certificate issued by appropriate authority specifying the item as per tender. Therefore, it is in the interest of such MSE Vendors to furnish a copy of complete certificate to the concerned tender handling officer of OIL at least seven (7) days prior to the scheduled Bid Closing Date of the tender; seeking clarification/confirmation as to whether their registered item is eligible for EMD exemption or not. Late communication in this regards and request for bid closing date extension on that plea shall not be entertained by Company.

5.6 Parties shall be eligible for accessing the tender in E-portal after OIL enables them in the E-portal on receipt of request for the same.

5.7 Parties, who do not have a User ID, can click on **Guest login button** in the OIL's E-portal to view the available open tenders. The detailed guidelines are available in OIL's e-procurement site (Help Documentation). For any clarification in this regard, Bidders may contact Mr. P. Barman, Manager (ERP-MM) at [erp\\_mm@oilindia.in](mailto:erp_mm@oilindia.in), Ph.: 03742804903/7192/7171/7178.

#### 6.0 **QUERIES/CLARIFICATIONS ON THE TENDER:**

6.1 The prospective Bidders shall submit their queries/clarifications against the tender through E-mail addressed to General Manager (C&P), OIL INDIA LTD., Rajasthan Project, 2A, District Shopping Centre, Saraswati Nagar, Jodhpur-342005, Rajasthan, India and such queries must reach OIL's Rajasthan Project office at Jodhpur latest by 10.05.2020 up to 17:30 Hrs (IST). OIL shall provide clarifications on the date of pre-bid conference to only those queries received within this date. Replies will also be uploaded in OIL's e-tender portal. Queries / Clarifications against the tender received beyond 10.05.2020 will not be entertained and replied. OIL will not be responsible for non-receipt or late receipt of any Bidder's query in OIL's office.

#### 7.0 **IMPORTANT NOTES:**

7.1 Bidders shall take note of the following important points while participating in OIL's e-procurement tender:

- i) The bid along with all supporting documents must be submitted through OIL's E-procurement site only except the following documents which shall be submitted manually by the Bidder in two copies in a sealed envelope super-scribed with OIL's IFB No., Bid Closing date and marked as "Original Bid Security" and addressed to GM (C&P), OIL INDIA LTD., Rajasthan Field, 2A, Saraswati Nagar, Jodhpur-342005, Rajasthan (India):

- a) Original Bid Security
- b) Printed catalogue and Literature, if called for in the tender.
- c) Power of Attorney for signing the bid.
- d) Any other document required to be submitted in original as per tender requirement.

**The above documents including the Original bid security, must be received at OIL's GM- (C&P)'s office at Jodhpur on or before 11.00 Hrs (IST) on the Bid Closing date failing which the bid shall be rejected.** A scanned copy of the Bid Security shall also be uploaded by the Bidder along with their Technical Bid in OIL's E-procurement site.

ii) Bid should be submitted on-line in OIL's E-procurement site before 11.00 AM (IST) (Server Time) of the bid closing date as mentioned and will be opened on the same day at 3.00 PM (IST) at the office of the GM (C&P) in presence of the authorized representatives of the Bidders.

iii) If the digital signature used for signing is not of "Class -3" with Organizations name, the bid will be rejected.

iv) The tender is invited under SINGLE STAGE-TWO BID SYSTEM (QCBS). The Bidders shall submit both the "TECHNICAL" and "PRICED" bids through electronic form in the OIL's e-Procurement portal within the Bid Closing Date and Time stipulated in the e-Tender. The Technical Bid should be submitted as per Scope of Work & Technical Specifications along with all technical documents related to the tender and uploaded under **"Technical Attachment" Tab only. Bidders to note that no price details should be uploaded in "Technical Attachment" Tab Page. Details of prices as per Price Bid format/Priced bid can be uploaded as Attachment just below the "Tendering Text" in the attachment option under "Notes & Attachments" tab. A screen shot in this regard is given in the "Instruction to Bidder for Submission" file for guidance. Offer not complying with above submission procedure will be rejected as per Bid Evaluation Criteria mentioned in Part-2, (III)-Commercial Criteria.**

Regarding new bid submission procedure (effective from 12.04.2017 onwards), please refer **new vendor manual** available in OIL's E-tender Site:



**Oil India Limited e-Procurement**

User ID \*

Password \*

Login Problems? [Get Support](#)

[Supplier Enlistment for E-Tender](#)

[Important Note for New Portal Users:](#)

[Click here to View Compatibility Settings](#)

[General Guidelines to bidders](#)

[Click for User Manuals](#)

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Click here for the New Manual & Instruction

8.0 OIL now looks forward to your active participation in the IFB.

Thanking you,

Yours faithfully,

**OIL INDIA LIMITED**

**(Bhavik Mody)**

**Manager (C&P)**

**For GM (C&P)**

**For Executive Director (RF)**

## **PART - 1**

### **INSTRUCTIONS TO BIDDERS**

**1.0** Bidder shall bear all costs associated with the preparation and submission of bid. Oil India Limited, hereinafter referred to as Company, will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

#### **A. BID DOCUMENTS**

**2.0** The services required, bidding procedures and contract terms are prescribed in the Bid Document. This Bid Document includes the following:

- (a) A Forwarding Letter highlighting the following points:
  - (i) Company's IFB No. & Type and Tender Fee
  - (ii) Bid closing date and time
  - (iii) Bid opening date and time
  - (iv) Bid submission Mode
  - (v) Bid opening place
  - (vi) Bid validity, Mobilisation time & Duration of contract
  - (vii) The amount of Bid Security with validity
  - (viii) The amount of Performance Guarantee with validity
  - (ix) Quantum of liquidated damages for default in timely completion of contract
- (b) Instructions to Bidders, (Part-1)
- (c) Bid Evaluation Criteria, (Part-2)
- (d) General Conditions of Contract, (Part-3, Section-I)
- (e) Scope of Work/ Special Conditions of Contract for Civil works (Part-3, Section-II)
- (f) Scope of Work/ Special Conditions of Contract for Electrical works & BMS (Part-3, Section-III)
- (g) Price Bid Format, (Proforma-B)
- (h) Bid Form, (Proforma-C)
- (i) Statement of Compliance, (Proforma-D)
- (j) Bid Security Form, (Proforma-E)
- (k) Performance Security Form, (Proforma-F)
- (l) Agreement Form, (Proforma-G)
- (m) Proforma of Letter of Authority, (Proforma-H)
- (n) Authorisation for Attending Bid Opening, (Proforma-I)
- (o) Integrity Pact, (Annexure-A1)
- (p) Format for Certificate of Annual turnover & Net Worth (Annexure – VI)
- (q) General HSE Points (Appendix-A)
- (r) Procedure for obtaining labour license (Appendix-B)
- (s) Provisions for Purchase Preference Policy (linked with Local Content) (PP-LC) (Annexure-X)
- (t) Undertaking towards submission of authentic information/documents as per Format vide Annexure-XI.

**2.1** The Bidder is expected to examine all instructions, forms, terms and specifications in the Bid Documents. Failure to furnish all information required in the Bid Documents or submission of a bid not substantially responsive to the Bid Documents in every respect will be at the Bidder's risk & responsibility and may result in the rejection of its bid.

#### **3.0 TRANSFERABILITY OF BID DOCUMENTS:**

**3.1** Bid Documents are non-transferable. Bid can be submitted only in the name of the Bidder in whose name the Bid Document has been issued.

3.2 Unsolicited bids will not be considered and will be rejected straightway.

#### **4.0 AMENDMENT OF BID DOCUMENTS:**

4.1 At any time prior to the deadline for submission of bids, the Company may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bid Documents through issuance of an Addendum.

4.2 The Addendum will be uploaded in OIL's E-Tender Portal in the "Technical RFx Response" under the tab "Amendments to Tender Documents". The Company may, at its discretion, extend the deadline for bid submission, if the Bidders are expected to require additional time in which to take the Addendum into account in preparation of their bid or for any other reason. **Bidders are to check from time to time the E-Tender portal ["Technical RFx Response" under the tab "Amendments to Tender Documents"] for any amendments to the bid documents before submission of their bids. No separate intimation shall be sent to the Bidders.**

### **B. PREPARATION OF BIDS**

**5.0 LANGUAGE OF BIDS:** The bid as well as all correspondence and documents relating to the bid exchanged between the Bidder and the Company shall be in English language, except that any printed literature may be in another language provided it is accompanied by an official and notarised English translated version, which shall govern for the purpose of bid interpretation.

#### **5.1 BIDDER'S/AGENT'S NAME & ADDRESS:**

Bidders should indicate in their bids their detailed postal address including the Fax/Telephone /Cell Phone Nos. and E-mail address. Similar information should also be provided in respect of their authorised Agents in India, if any.

#### **6.0 DOCUMENTS COMPRISING THE BID:**

Bids are invited under Single Stage Two Bid System. The bid to be uploaded by the Bidder in OIL's E-Tender portal shall comprise of the following components:

##### **(A) TECHNICAL BID**

- (i) Complete technical details of the services & equipment specifications with catalogue, etc.
- (ii) Documentary evidence established in accordance with Clause 10.0 hereunder.
- (iii) Bid Security (scanned) in accordance with Clause 11.0 hereunder. Original Bid Security should be sent as per Clause No. 11.11 hereunder.
- (iv) Copy of Bid-Form **without** indicating prices in Proforma-C
- (v) Statement of Compliance as per Proforma-D
- (vi) Copy of Priced Bid **without** indicating prices (Proforma-B)
- (vii) Integrity Pact digitally signed by OIL's competent personnel as Annexure-A1, attached with the bid document to be digitally signed by the Bidder.
- (viii) Undertaking towards submission of authentic information/documents as per Format vide Annexure-XI.

##### **(B) PRICED BID**

- (i) Bidder shall quote their prices in the following Proforma available in OIL's E-procurement portal in the **"Notes & Attachments" Tab:**

- (1) Price-Bid Format as per Proforma-B
- (2) Bid Form as per Proforma-C

- (ii) The Priced Bid shall contain the prices and any other commercial information pertaining to the service offered. Currency of quote shall be INR only.
- (iii) For convenience of the qualified Bidders and to improve transparency, the rates/costs quoted by bidders against OIL's e-tenders shall be available for online viewing by such Bidders whose price bids are opened by Company. A Bidder can view item-wise rates/costs of all other such peer bidders against the tender immediately after price bid opening, if the e-tender is floated by Company with PRICE CONDITION. In case the Price-Bid is invited by Company through attachment form under "Notes & Attachment" (i.e. NO PRICE Condition), Bidder must upload their detailed Price-Bid as per the prescribed format under "Notes & Attachment", in addition to filling up the "Total Bid Value" Tab taking into account the cost of all individual line items and other applicable charges like freight, tax, duties, levies etc. Under NO PRICE condition(i.e. Price Bid in attachment form), the "Total Bid Value" as calculated & quoted by the Bidders shall only be shared amongst the eligible bidders and Company will not assume any responsibility whatsoever towards calculation errors/omissions therein, if any. Notwithstanding to sharing the "Total Bid Value" or the same is whether filled up by the Bidder or not, Company will evaluate the cost details to ascertain the inter-se-ranking of bidders strictly as per the uploaded attachment and Bid Evaluation Criteria only. Online view of prices as above shall be available to the Bidders only upto seven(07) days from the date of Price-Bid opening of the e-tender.

**7.0 BID FORM:** The Bidder shall complete the Bid Form and the appropriate Price Schedule furnished in their Bid.

**8.0 BID PRICE:**

8.1 Prices must be quoted by the Bidders online as per the price bid format available in OIL's E- Tender Portal in "Notes & Attachment" Tab. Unit prices must be quoted by the Bidders, both in words and in figures.

8.2 Prices quoted by the successful Bidder must remain firm during its performance of the Contract and is not subject to variation on any account.

8.3 All duties and taxes including Corporate Income Tax, Personal Tax, Octroi/Entry Tax, other Cess/levies etc. except Goods and Service Tax (GST) payable by the successful Bidder under the Contract for which this Bid Document is being issued, shall be included in the rates, prices and total Bid Price submitted by the Bidder, and the evaluation and comparison of bids shall be made accordingly. For example, personal taxes and/or any corporate taxes arising out of the profits on the contract as per rules of the country shall be borne by the Bidder.

**9.0 CURRENCY OF BID AND PAYMENT:** A Bidder is expected to submit their bid in Indian Rupees. Currency once quoted will not be allowed to be changed.

**10.0 DOCUMENTS ESTABLISHING BIDDER'S ELIGIBILITY AND QUALIFICATIONS:**

10.1 These are listed in **BID EVALUATION CRITERIA (BEC), PART-2** of the Bid document.

**11.0 BID SECURITY:**

11.1 The Bid Security is required to protect the Company against the risk of Bidder's conduct, which would warrant forfeiture of the Bid Security, pursuant to sub-clause 11.9 hereunder.

11.2 All the bids must be accompanied by Bid Security in Original for the amount as mentioned in the "Forwarding Letter" or an equivalent amount in other freely convertible



currency and shall be in the OIL's prescribed format as Bank Guarantee (BG) enclosed with the NIT vide **Proforma-E** in favour of OIL and payable at Jodhpur, Rajasthan from any schedule Indian Bank or Any Branch of an International bank situated in India and registered with Reserve Bank of India as scheduled foreign bank in case of domestic Bidder,

The Bank Guarantee shall be valid for the time as asked for in the Bid Document. Bank Guarantees issued by Banks in India should be on non-judicial stamp paper of requisite value, as per Indian Stamp Act, purchased in the name of the Banker.

**Note: Bid Security in the form of DD/Cheque/Cashier Cheque or any other mode will not be acceptable.**

11.2.1 The following is the Bank details of OIL, Rajasthan Project for obtaining Bank Guarantee:

| Bank Details of Beneficiary(OIL, Rajasthan Project) |  |
|---|--|
| a) Bank Name  | CORPORATION BANK   |
| b) Branch Name                                      | JODHPUR BRANCH (0492)  |
| c) Branch Address                                   | No. 76, LK TOWER, CHOPASANI ROAD,<br>JODHPUR-342003, RAJASTHAN |
| d) Banker Account No.                               | 049200201000626  |
| e) Type of Account                                  | CURRENT ACCOUNT  |
| f) IFSC Code  | CORP0000492  |
| g) MICR Code  | 342017002  |
| h) SWIFT Code                                       | N/A  |
| i) Contact No.                                      | 0291-2649128, 2625504  |
| j) Contact Person Name                              | MR. P. RAMNATH DIWAKAR   |
| k) Fax No.  | -  |
| l) Email Id   | cb492@corpbank.co.in   |

**11.3 Bidders can submit Bid Security on-line through OIL's electronic Payment Gateway.**

11.4 The Bank Guarantee shall be valid up to 90 days beyond the validity of the bids specified in the Bid Document.

11.5 Bank Guarantee with any condition other than those mentioned in OIL's prescribed format shall not be accepted and bids submitted by bidders with such Bank Guarantee will be liable for rejection.

11.6 The Bank Guarantee issued by a Bank amongst others shall contain the complete address of the Bank including Phone Nos., Fax Nos., E-mail address and Branch Code.

11.7 Bid Security shall not accrue any interest during its period of validity or extended validity. OIL shall not be liable to pay any bank charges, commission or interest on the amount of Bid Security.

11.8 The Bank Guarantee should be enforceable at all branches of the issuing Bank within India and preferably at Jodhpur, Rajasthan, the place of issuance of tender.

11.9 Any bid not secured in accordance with **sub-clause 11.2** above shall be rejected by the Company as non-responsive. Bank Guarantee issued by a Scheduled Bank in India at the request of some other Non-Scheduled Bank of India shall not be acceptable.

11.10 The Bidders shall extend the validity of the Bid Security suitably, if and when specifically advised by OIL, at the Bidder's cost.

11.11 Unsuccessful Bidder's Bid Security will be discharged and/or returned within 30 days after finalization of IFB.

11.12 Successful Bidder's Bid Security will be discharged and/or returned upon Bidder's furnishing the Performance Security and signing of the contract. Successful Bidder will however ensure validity of the Bid Security till such time the Performance Security in conformity with **Clause 29.0** below is furnished.

11.13 The Bid Security may be forfeited, if:

- i) The Bidder withdraws the bid within its original/extended validity.
- ii) The Bidder modifies/revise their bid suo-moto.
- iii) Bidder does not accept the order/contract.
- iv) Bidder does not furnish Performance Security Deposit within the stipulated time as per tender/order/contract.
- v) If it is established that the Bidder has submitted fraudulent documents or has indulged into corrupt and fraudulent practice, the bid security shall be forfeited after due process in addition to other action against the Bidder

11.14 In case any Bidder withdraws their bid during the period of bid validity, Bid Security will be forfeited and the party shall be put in the Holiday List for a period varying from six (06) months to two (02) years as the case may be as per Company's Banning Policy (available in OIL website).

**11.15 The scanned copy of the original Bid Security in the form of Bank Guarantee must be uploaded by Bidder along with the Technical bid in the "Technical Attachment" of OIL's E-portal.** The original Bid Security shall be submitted by Bidder to the office of DGM (C&P), Oil India Ltd., Rajasthan Project, 2A-District Shopping Centre, Saraswati Nagar, Basni, Jodhpur-342005, Rajasthan, India in a sealed envelope which must reach the office on or before 11.00 Hrs (IST) of the Bid Closing date. The envelope must be super-scribed with "Bid Security", IFB No., Description of Services & Bid Closing Date.

11.16 A bid shall be rejected straightway if Original Bid Security is not received within the stipulated date & time mentioned in the Tender and/or if the Bid Security validity is shorter than the validity indicated in Tender and/or if the Bid Security amount is lesser than the amount indicated in the Tender.

11.17 Bidders are requested to advise the Bank Guarantee issuing bank to comply with the following and ensure to submit the receipt of the copy of SFMS message as sent by the issuing bank branch, along with the original Bank Guarantee in OIL's tender issuing office / upload the same in OIL's e-tender portal along with the technical bid.

The bank guarantee issued by the bank must be routed through SFMS platform as per following details:

- (a) "MT 760 / MT 760 COV for issuance of bank guarantee
- (b) "MT 760 / MT 767 COV for amendment of bank guarantee

The above message/intimation shall be sent through SFMS by the BG issuing bank branch to Axis Bank, Jodhpur Branch, IFS Code - UTIB0000057; Swift Code: AXISINBB057. Branch Address - AXIS Bank Ltd, Prince Tower, Near Jaljog Circle, Residency Road, Jodhpur - 342003"

## **12.0 EXEMPTION FROM SUBMISSION OF BID SECURITY:**

12.1 Central Govt. offices and Central Public Sector undertakings are exempted from submitting Bid Security.

12.2 If the Bidder is a Micro or Small Enterprises (MSE) registered with District Industry Centres or Khadi and Village Industries Commission or Khadi and Village Industries Board or Coir Board or National Small Industries Corporation or Directorate of Handicrafts and Handloom or any other body specified by Ministry of MSME, then they are also exempted from submitting Bid Security. Bidding MSEs shall have to submit a Copy of valid Registration Certificate clearly indicating the monetary limit, if any and the items for which Bidder are registered with any of the aforesaid agencies.

In case bidding MSE is owned by Schedule Caste or Schedule Tribe entrepreneur, valid documentary evidence issued by the agency who has registered the Bidder as MSE owned by SC/ST entrepreneur should also be enclosed.

### **13.0 PERIOD OF VALIDITY OF BIDS:**

13.1 Bids shall remain **valid for 120** days from the date of closing of bid prescribed by the Company. **Bids of shorter validity will be rejected as being non-responsive.** If nothing is mentioned by the Bidder in their bid about the bid validity, it will be presumed that the bid is valid for 120 days from Bid Closing Date.

13.2 In exceptional circumstances, the Company may solicit the Bidder's consent to an extension of the period of validity. The request and the response thereto shall be made in writing through Fax or e-mail. The Bid Security provided under Para 11.0 above shall also be suitably extended. A Bidder may refuse the request without forfeiting its Bid Security. A Bidder granting the request will neither be required nor permitted to modify their Bid.

### **14.0 SIGNING OF BID:**

14.1 Bids are to be submitted online through OIL's E-procurement portal with digital signature. The bid and all attached documents should be digitally signed by the Bidder using "Class 3" digital certificates with Organizations Name [e-commerce application (Certificate with personal verification and Organisation Name)] as per Indian IT Act 2000 obtained from the licensed Certifying Authorities operating under the Root Certifying Authority of India (RCAI), Controller of Certifying Authorities (CCA) of India before bid is uploaded. Digital Signature Certificates having "Organization Name" field other than Bidder's Name are not acceptable. However, aforesaid Digital Signature Certificates having Bidder's Name in the "Organization Name" field are acceptable. Bidder must also have Encryption Certificate along with Digital Signature Certificate (DSC) of Class III [Organization].

The bid including all uploaded documents shall be digitally signed by duly authorized representative of the Bidder holding a Power of Attorney to bind the Bidder to the contract.

If any modifications are made to a document after attaching digital signature, the digital signature shall again be attached to such documents before uploading the same. The Power of Attorney shall be submitted by Bidder as mentioned in Para 15.1 below.

The authenticity of above digital signature shall be verified through authorized CA after bid opening and in case the digital signature is not of "Class-3" with organization name, the bid will be rejected.

Bidder is responsible for ensuring the validity of digital signature and its proper usage by their employees.

14.2 The original and all copies of the bid shall be typed or written in indelible inks. Since bids are to be submitted ONLINE with digital signature, manual signature is NOT relevant. The letter of authorisation (as per **Proforma-H**) shall be indicated by written Power of Attorney accompanying the Bid.

14.3 Any person signing the Bid or any other document in respect of this Bidding Document or other relevant documents on behalf of the Bidder without disclosing his authority to do so shall be deemed to have the authority to bind the Bidder. If it is discovered at any time that the person so signing has no authority to do so, the Company (OIL) may, without prejudice to any other right or remedy, cancel his Bid or Contract and hold the Bidder liable to the Company (OIL) for all costs and damages arising from the cancellation of the Bid or Contract including any loss which the Company (OIL) may sustain on account thereof.

14.4 Any physical documents submitted by Bidders shall contain no interlineations, white fluid erasures or overwriting except as necessary to correct errors made by the Bidder, in which case such correction shall be initialled by the person or persons who has/have digitally signed the Bid.

14.5 Any Bid, which is incomplete, ambiguous, or not in compliance with the Bidding process will be rejected.

## **15.0 SUBMISSION OF BIDS**

15.1 The tender is processed under Single Stage - Two Bid system (QCBS). Bidder shall submit the Technical bid and Priced bid along with all the Annexure and Proforma (wherever applicable) and copies of documents in electronic form through OIL's e-procurement portal within the Bid Closing Date & Time stipulated in the e-tender. For submission of Bids online at OIL's E-Tender Portal, detailed instructions are available in **"HELP DOCUMENTATION"** available in OIL's E-Tender Portal. Guidelines for bid submission are also provided in the "Forwarding Letter". The Technical Bid is to be submitted as per Terms of Reference/Technical Specifications of the bid document and Priced Bid as per the Price Schedule. The Technical Bid should be uploaded in the "Technical Attachment" under "Techno-Commercial Bid" Tab Page only. Prices to be quoted as per Proforma-B should be uploaded as Attachment just below the "Tendering Text" in the attachment link under "Techno-Commercial Bid" Tab under General Data in the e-portal. **No price should be given in the "Technical Attachment", otherwise bid shall be rejected.** The priced bid should not be submitted in physical form and which shall not be considered. For details please refer "INSTRUCTIONS" documents. However, the following documents in one set should necessarily be submitted in physical form in sealed envelope super-scribing the "IFB No., Brief Description of services and Bid Closing/Opening Date & Time along with the Bidder's name" and should be submitted to GM (C&P), Oil India Ltd., Rajasthan Project, 2A-District Shopping Centre, Saraswati Nagar, Basni, Jodhpur-342005, Rajasthan, India on or before 11.00 Hrs (IST) on the bid closing date indicated in the IFB:

- i) The Original Bid Security along with 1(one) copy
- ii) Power of Attorney for signing of the bid digitally
- iii) Any other document required to be submitted in original as per bid document requirement.
- iv) Printed catalogue and literature if called for in the bid document.

Documents sent through E-mail/Fax/Telephonic method will not be considered.

15.2 All the conditions of the contract to be made with the successful Bidder are given in various Sections of the Bid Document. Bidders are requested to state their compliance to each clause as per Proforma-D of the bid document and in case of non-compliance, if

any, the same to be highlighted in the Proforma – D and the same should be uploaded along with the Technical Bid.

15.3 Timely delivery of the documents in physical form as stated in Para 15.1 above is the responsibility of the Bidder. Bidders should send the same through Registered Post or by Courier Services or by hand delivery to the Officer in Charge of the particular tender before the Bid Closing Date and Time. Company shall not be responsible for any postal delay/transit loss.

15.4 Bids received through the e-procurement portal shall only be accepted. Bids received in any other form shall not be accepted.

**16.0 INDIAN AGENT/REPRESENTATIVE/RETAINER/ASSOCIATE:** Not Applicable.

**17.0 DEADLINE FOR SUBMISSION OF BIDS:**

17.1 Bids should be submitted online as per the online tender submission deadline. Bidders will not be permitted by System to make any changes in their bid/quote after the bid submission deadline is reached.

17.2 No bid can be submitted after the submission dead line is reached. The system time displayed on the e-procurement web page shall decide the submission dead line.

17.3 The documents in physical form as stated in Para 15.1 must be received by Company at the address mentioned above on or before 11.00 Hrs (IST) on the scheduled Bid Closing Date. Timely delivery of the same is the responsibility of the Bidders.

**18.0 LATE BIDS:** Bidders are advised in their own interest to ensure that their bids are uploaded in system before the closing date and time of the bid. The documents in physical form mainly the Original Bid Security if received by the Company after the deadline for submission prescribed by the Company shall be rejected and shall be returned to the Bidders in unopened condition immediately.

**19.0 MODIFICATION AND WITHDRAWAL OF BIDS:**

19.1 The Bidder after submission of Bid may modify or withdraw its Bid prior to Bid Closing Date & Time.

19.2 No Bid can be modified or withdrawn subsequent to the deadline for submission of Bids.

19.3 No Bid can be withdrawn in the interval between the deadline for submission of Bids and the expiry of the period of Bid Validity specified by the Bidder on the Bid Form. Withdrawal of a Bid during this interval shall result in the Bidder's forfeiture of its Bid Security and Bidder shall also be debarred from participation in future tenders of OIL and shall be put in the Holiday List for a period of six (06) months to two (02) years as the case may be as per Company's Banning Policy.

**20.0 EXTENSION OF BID SUBMISSION DATE:** Normally no request for extension of Bid Closing Date & Time will be entertained. However, OIL at its discretion, may extend the Bid Closing Date and/or Time due to any reasons.

**21.0 BID OPENING AND EVALUATION:**

21.1 Company will open the Technical Bids, including submission made pursuant to clause 19.0, in presence of Bidder's representatives who choose to attend at the date, time and place mentioned in the Forwarding Letter. However, an authorisation letter (as per **Proforma-I**) from the Bidder must be produced by the Bidder's representative at the time of Bid Opening. Unless this Letter is presented, the representative will not be

allowed to attend the Bid Opening. The Bidder's representatives who are allowed to attend the Bid Opening shall sign a register evidencing their attendance. Only one representative against each Bid will be allowed to attend. In technical bid opening, only "Technical Attachment" will be opened. Bidders therefore should ensure that technical bid is uploaded in the "Technical Attachment" Tab Page only in the E-portal.

21.2 In case of any unscheduled holiday or Bandh on the Bid Opening Date, the Bids will be opened on the next full working day. Accordingly, Bid Closing Date / time will get extended up to the next working day and time.

21.3 Bids which have been withdrawn pursuant to clause 19.0 shall not be opened. Company will examine bids to determine whether they are complete, whether requisite Bid Securities have been furnished, whether documents have been digitally signed and whether the bids are generally in order.

21.4 At bid opening, Company will announce the Bidder's names, written notifications of bid modifications or withdrawal, if any, the presence of requisite Bid Security and such other details as the Company may consider appropriate.

21.5 Normally no clarifications shall be sought from the Bidders. However, for assisting in the evaluation of the bids especially on the issues where the Bidder confirms compliance in the evaluation and contradiction exists on the same issues due to lack of required supporting documents in the Bid (i.e. document is deficient or missing), or due to some statement at other place of the Bid (i.e. reconfirmation of confirmation) or vice-versa, clarifications may be sought by OIL. In all the above situations, the Bidder will not be allowed to change the basic structure of the Bid already submitted by them and no change in the price or substance of the Bid shall be sought, offered or permitted.

21.6 Prior to the detailed evaluation, Company will determine the substantial responsiveness of each bid to the requirement of the Bid Documents. For purpose of these paragraphs, a substantially responsive bid is one, which conforms to all the terms and conditions of the Bid Document without material deviations or reservation. A material deviation or reservation is one which affects in any way substantial way the scope, quality, or performance of work, or which limits in any substantial way, inconsistent way with the Bid Documents, the Company's right or the Bidder's obligations under the contract, and the rectification of which deviation or reservation would affect unfairly the competitive position of other Bidders presenting substantial responsive bids. The Company's determination of Bid's responsiveness is to be based on the contents of the Bid itself without recourse to extrinsic evidence.

21.7 A Bid determined as not substantially responsive will be rejected by the Company and may not subsequently be made responsive by the Bidder by correction of the non-conformity.

21.8 The Company may waive minor informality or nonconformity or irregularity in a Bid, which does not constitute a material deviation, provided such waiver, does not prejudice or affect the relative ranking of any Bidder.

## **22.0 OPENING OF PRICED BIDS:**

22.1 Company will open the Priced Bids of the technically qualified Bidders on a specific date in presence of representatives of the qualified Bidders. The technically qualified Bidders will be intimated about the Priced Bid Opening Date & Time in advance. In case of any unscheduled holiday or Bandh on the Priced Bid Opening Date, the Bids will be opened on the next working day.

22.2 The Company will examine the Price quoted by Bidders to determine whether they are complete, any computational errors have been made, the documents have been properly signed, and the bids are generally in order.

22.3 Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price (that is obtained by multiplying the unit price and quantity) the unit price shall prevail and the total price shall be corrected accordingly. If there is a discrepancy between words, and figures, the amount in words will prevail. If any Bidder does not accept the correction of the errors, their Bid will be rejected.

**23.0 CONVERSION TO SINGLE CURRENCY:** Not Applicable.

**24.0 EVALUATION AND COMPARISON OF BIDS:** The Company will evaluate and compare the bids as per **BID EVALUATION CRITERIA (BEC), PART-2** of the Bid Document.

24.1 **DISCOUNTS / REBATES:** Unconditional discounts/rebates, if any, given in the bid will be considered for evaluation.

24.2 Post bid or conditional discounts/rebates offered by any Bidder shall not be considered for evaluation of bids. However, if the lowest Bidder happens to be the final acceptable Bidder for award of contract, and if they have offered any discounts/rebates, the contract shall be awarded after taking into account such discounts/rebates.

24.3 **LOADING OF FOREIGN EXCHANGE:** There would be no loading of foreign exchange for deciding the inter-se-ranking of domestic Bidders.

24.4 **EXCHANGE RATE RISK:** Since Indian Bidders are now permitted to quote in any currency and also receive payments in that currency, Company will not be compensating for any exchange rate fluctuations in respect of the services.

24.5 **REPATRIATION OF RUPEE COST:** Not Applicable.

**25.0 CONTACTING THE COMPANY:**

25.1 Except as otherwise provided in **Clause 21.0** above, no Bidder shall contact Company on any matter relating to its bid, from the time of the bid opening to the time the Contract is awarded except as required by Company vide **sub-clause 21.6**.

25.2 An effort by a Bidder to influence the Company in the Company's bid evaluation, bid comparison or Contract award decisions may result in the rejection of their bid.

## **D. AWARD OF CONTRACT**

**26.0 AWARD CRITERIA:**

26.1 The Company will award the Contract to the successful Bidder whose bid has been determined to be substantially responsive and has been determined as the lowest evaluated bid, provided further that the Bidder is determined to be qualified to perform the Contract satisfactorily.

**27.0 COMPANY'S RIGHT TO ACCEPT OR REJECT ANY BID:**

27.1 Company reserves the right to accept or reject any or all bids and to annul the bidding process and reject all bids, at any time prior to award of contract, without thereby incurring any liability to the affected Bidder, or Bidders or any obligation to inform the affected Bidder of the grounds for Company's action.

## **28.0 NOTIFICATION OF AWARD:**

28.1 Prior to the expiry of the period of bid validity or extended validity, Company will notify the successful Bidder in writing by registered letter or by fax or E-mail (to be confirmed in writing by registered / couriered letter) that its Bid has been accepted.

28.2 The notification of award will constitute the formation of the Contract.

28.3 Upon the successful Bidder's furnishing of Performance Security pursuant to Clause below, the Company will promptly notify each un-successful Bidder and will discharge their Bid Security, pursuant to Clause 11.0 hereinabove.

## **29.0 PERFORMANCE SECURITY:**

29.1 On receipt of notification of award from the Company, the successful Bidder shall furnish to Company the Performance Security for an amount specified in the Letter of Award (LOA) issued by Company to Contractor awarding the contract, as per **Proforma-F** or in any other format acceptable to the Company and must be in the form of a Bank Guarantee from any schedule Indian Bank or Any Branch of an International bank situated in India and registered with Reserve Bank of India as scheduled foreign bank in case of domestic Bidder.

Bank Guarantee issued by a Bank, amongst others, must contain the following particulars of such bank:

- a) Full address.
- b) Branch Code.
- c) Code Nos. of the authorized signatory with full name and designation.
- d) Phone Nos., Fax Nos., E-mail address.

The domestic Bidders will have to submit the Bank Guarantee from any of the scheduled banks and on non-judicial stamp paper of requisite value as per the Indian Stamp Act, purchased in the name of the issuing banker.

The Performance Security shall be denominated in the currency of the contract.

29.2 The Performance Security specified above must be valid as mentioned in the Forwarding letter. The Performance Security will be discharged by Company not later than 30 days following its expiry. In the event of any extension of the Contract period, Bank Guarantee should be extended by Contractor by the period equivalent to the extended period.

29.3 The Performance Security shall be payable to Company as compensation for any loss resulting from Contractor's failure to fulfil its obligations under the Contract.

29.4 The Performance Security will not accrue any interest during its period of validity or extended validity.

29.5 Failure of the successful Bidder to comply with the requirements of **clause 29.0 and/or 30.0** shall constitute sufficient grounds for annulment of the award and forfeiture of the Bid Security or Performance Security. In such an eventuality, the party shall be put in the Holiday List for a period from six (06) months to two (02) years as the case may be as per Company's Banning Policy.

29.6 Bidders are requested to advise the Bank Guarantee issuing bank to comply with the following and ensure to submit, the receipt of the copy of SFMS message as sent by the issuing bank branch, along with the original Bank Guarantee in OIL's office.

The bank guarantee issued by the bank must be routed through SFMS platform as per following details:

- (a) "MT 760 / MT 760 COV for issuance of bank guarantee



(b) "MT 760 / MT 767 COV for amendment of bank guarantee

The above message/intimation shall be sent through SFMS by the BG issuing bank branch to Axis Bank, Jodhpur Branch, IFS Code - UTIB0000057; Swift Code: AXISINBB057. Branch Address - AXIS Bank Ltd, Prince Tower, Near Jaljog Circle, Residency Road, Jodhpur - 342003"

### **30.0 SIGNING OF CONTRACT:**

30.1 At the same time as the Company notifies the successful Bidder that its Bid has been accepted, the Company will either call the successful Bidder for signing of the agreement or send the Contract Form provided in the Bid Documents, along with the General & Special Conditions of Contract, Technical Specifications, Schedule of Rates incorporating all agreements agreed between the two parties.

30.2 The successful Bidder shall sign and date the contract and return it to the Company after receipt of LOA. Till the contract is signed, the LOA issued to the successful Bidder shall remain binding amongst the two parties.

30.3 In the event of failure on the part of the successful Bidder to sign the contract, OIL reserves the right to terminate the LOA issued to the successful Bidder and invoke the Bid Security or the Performance Security if submitted by the successful Bidder. The party shall also be put in the Holiday List for a period from six (06) months to two (02) years as the case may be as per Company's Banning Policy.

### **31.0 FURNISHING FRAUDULENT INFORMATION/DOCUMENTS:**

31.1 If it is found that a Bidder/contractor has furnished fraudulent information / documents, the Bid Security/Performance Security shall be forfeited and the party shall be banned for a period of 3 (three) years from the date of detection of such fraudulent act besides the legal action as per Company's Banning Policy.

### **32.0 CREDIT FACILITY:**

32.1 Bidders should indicate clearly in the Bid about availability of any credit facility inclusive of Government to Government credits indicating the applicable terms and conditions of such credit.

### **33.0 MOBILISATION ADVANCE PAYMENT:** Not Applicable.

### **34.0 INTEGRITY PACT:**

34.1 OIL shall be entering into an Integrity Pact with the Bidders as per format enclosed vide **Annexure-A1** of the Bid Document. The Integrity Pact has been duly signed digitally by OIL's competent signatory and uploaded in the OIL's e-portal. The Integrity Pact shall be uploaded by the Bidder (along with the technical Bid) duly signed by the same signatory who signed the Bid i.e. who is duly authorized to sign the Bid. Uploading the Integrity Pact in the OIL's E-portal with digital signature will be construed that all pages of the Integrity Pact has been signed by the Bidder's authorized signatory who has signed the bid. **If any Bidder refuses to sign Integrity Pact or declines to submit the Integrity Pact, their bid shall be rejected straightway.**

34.2 OIL has appointed the following persons as Independent External Monitors (IEM) for a period of 3 (three) years to oversee implementation of Integrity Pact in OIL. Bidders may contact the Independent External Monitor for any matter relating to the IFB at the following addresses:

1. Shri Shri Sutanu Behuria, IAS(Retd.);  
E-mail: sutanu2911@gmail.com
2. Shri Rudhra Gangadharan, IAS (Retd.), Ex-Secretary, Ministry of Agriculture  
E-mail: rudhra.gangadharan@gmail.com

3. Shri Jagmohan Garg, Ex Vigilance Commissioner, CVC  
E-Mail ID: jagmohan.garg@gmail.com

**35.0 LOCAL CONDITIONS:**

35.1 It is imperative for each Bidder to be fully informed themselves of all Indian as well as local conditions, factors and legislation which may have any effect on the execution of the work covered under the Bidding Document. The Bidders shall be deemed, prior to submitting their bids to have satisfied themselves of all the aspects covering the nature of the work as stipulated in the Bidding Document and obtain for themselves all necessary information as to the risks, contingencies and all other circumstances, which may influence or affect the various obligations under the Contract.

No request will be considered for clarifications from the Company (OIL) regarding such conditions, factors and legislation. It is understood and agreed that such conditions, factors and legislation have been properly investigated and considered by the Bidders while submitting the Bids. Failure to do so shall not relieve the Bidders from responsibility to estimate properly the cost of performing the work within the provided timeframe. Company (OIL) will assume no responsibility for any understandings or representations concerning conditions made by any of their officers prior to award of the Contract. Company (OIL) shall not permit any Changes to the time schedule of the Contract or any financial adjustments arising from the Bidder's lack of knowledge and its effect on the cost of execution of the Contract.

**36.0 SPECIFICATIONS:** Before submission of Bids, Bidders are requested to make themselves fully conversant with all Conditions of the Bid Document and other relevant information related to the works/services to be executed under the contract.

37.0 **CUSTOMS DUTY:** Not Applicable.

**38.0 PURCHASE PREFERENCE:** Purchase Preference will be applicable as per latest Govt. Guidelines. Bidders to take note of the same and quote accordingly. It is Bidder's responsibility to submit necessary documents from the Competent Authority to establish that they are eligible for purchase preference against this tender.

**39.0 PRICE PREFERENCE:** Not Applicable.

**40.0 PURCHASE PREFERENCE ON LOCAL CONTENT:** Purchase preference policy-linked with Local Content (PP - LC) notified vide letter no. O-27011/44/2015-ONG-II/FP dated 25.04.2017 of MoP&NG shall be applicable in this tender. Bidders seeking benefits, under Purchase Preference Policy (linked with Local Content) (PP-LC) shall have to comply with all the provisions specified in **Annexure-X** and shall have to submit all undertakings / documents applicable for this policy.

**41.0** General Health, Safety and Environment (HSE) aspects shall be as per the terms set forth in Appendix-A of the tender document.

**42.0** Procedure for obtaining Labour License under Contract Labour (R&A) Act, 1970 & Central Rules-1971 shall be as per terms set forth in Appendix-B of tender document.

**43.0** The User Manual provided on the e-portal on the procedure How to create Response for submitting offer may be referred for guidance.

**44.0** Bidder must submit undertaking towards submission of authentic information/documents as per Format vide Annexure-XI.

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**END OF PART - 1**

## **PART – 2**

### **BID EVALUATION CRITERIA (BEC)**

#### **A. BID REJECTION CRITERIA (BRC):**

The bid shall conform generally to the specifications and terms and conditions given in this bid document. Bids shall be rejected in case the services offered do not conform to required parameters stipulated in the technical specifications. Notwithstanding the general conformity of the bids to the stipulated specifications, the following requirements will have to be particularly met by the Bidders without which the same will be considered as non-responsive and rejected. Bidders are advised not to take any exception/deviations to the bid document.

##### **1.0 Technical Criteria:**

- 1.1 Any offer which does not include all the jobs/services mentioned in the Scope of work will be considered as incomplete and rejected.
- 1.2 Bidder can be any proprietorship firms, partnership firms, private limited companies, Ltd companies including PSUs meeting the requisite criteria as mentioned below.
- 1.3 The Bidder must have Experience of having successfully executed atleast one (01) similar job valuing not less than **INR 20 Cr.** for any Govt. Organization /Public Limited/Private Limited Company, during last 7 (seven) years calculated up to the original bid closing date. The bidder shall furnish necessary documentary evidences in the form of experience certificate(s) issued by the organization to whom such service has been rendered or a copy of contract/work order and completion certificate/payment certificate issued by the client against the said contract, failing which the offer will be rejected.

Note: **‘Similar Works’** means **‘Comprehensive Construction project of Multi-Storied RCC Framed Structure Buildings for residential or institutional or commercial or assembly or hospitality or combination of one or more types’** in private sector limited company, Public sector, State Government or Central Government. The party should upload soft copy of the documentary evidences in the form of ‘Experience Certificate’ issued by the employer. In addition to construction works, the experience of electrical components in ‘internal / external electrification / distribution substation shall be explicitly mentioned, preferably in a separate certificate of the same project or of different project; in the name of individual bidder. The certificates should contain at least the following information:

- i. Tender/Contract/Work Order Number
- ii. Description of the job
- iii. Work Period / Completion date
- iv. Net Final Value of contract

- 1.4 The submission may also be accompanied by a concise firm/company profile of the bidder (within 2 pages) mentioning major current / recent past projects among others.
- 1.5 The Bidder shall have a valid Electrical Contractor's License issued by State Electrical Licensing board. However, in case the bidder does not have a valid Electrical Contractor's License, they provide an undertaking that in case of award of contract to the bidder, the bidder shall ensure that all electrical jobs shall be executed by a sub-contractor OR self with valid Electrical Contractor's License.
- 1.6 **Document check list:**  
(1) Electrical Contractor's License, if applicable  
(2) Completion Certificate supported by Work Order, LoA, etc.  
(3) Certificate of Electrical Works experience, supported by Work Order, LoA, executed quantity statement etc.
- 1.7 Soft copies (\*.pdf / \*.jpg / \*.png) should be directly scanned from the Original Documents in Colour, with at least 200dpi resolution. Documents scanned from photocopy/Xerox documents or poorly visible texts or inadequate data may lead to straight rejection of the bid. Notwithstanding above, the bidder may be asked to produce the original documents for verification.
- 1.8 If the bidder is executing similar works contract which is still running and the contract value/quantity executed prior to original date of bid submission is equal to or more than the amount as mentioned in para 1.2 above, such experience will also be taken in to consideration, provided that bidder has submitted satisfactory service execution certificate issued by the user.
- 2.0 **Financial Criteria:**
- 2.1 Annual Financial Turnover of the bidder during any of preceding three financial/accounting years from the original bid closing date should be at least **INR 20 Cr.**
- 2.2 Net worth of bidder must be positive for preceding financial/ accounting year.
- 2.3 Considering the time required for preparation of Financial Statements, if the last date of preceding financial / accounting year falls within the preceding six months reckoned from the original bid closing date and the Financial Statements of the preceding financial / accounting year are not available with the bidder, then the financial turnover of the previous three financial / accounting years excluding the preceding financial /accounting year will be considered. In such cases, the Net worth of the previous financial / accounting year excluding the preceding financial / accounting year will be considered. However, the bidder has to submit an affidavit/undertaking certifying that the balance sheet/Financial Statements for the preceding financial year (as the case may be) has actually not been audited so far.

Notes:

For proof of Annual Turnover & Net worth any one of the following document must be submitted along with the bid: -

- i) A certificate issued by a practicing Chartered/Cost Accountant (with Membership Number and Firm Registration Number), certifying the Annual turnover & Net worth as per format prescribed in ANNEXURE.

OR

ii) Audited Balance Sheet along with Profit & Loss account. In case of foreign bidders, self-attested/digitally signed printed published accounts are also acceptable.

- 2.4 In case the bidder is a Central Govt. Organization/PSU/State Govt. Organization/Semi-State Govt. Organization or any other Central/State Govt. Undertaking, where the auditor is appointed only after the approval of Comptroller and Auditor General of India and the Central Government, their certificates may be accepted even though FRN is not available. However, bidder to provide documentary evidence for the same.

### **3.0 Commercial Criteria:**

3.1 Bids shall be submitted under single stage two Bid systems i.e. Technical Bid and Priced Bid separately in the OIL's e-Tender portal. Please ensure that Technical Bid / all technical related documents related to the tender are uploaded in the "Technical Attachments" under Rfx Information only. The "TECHNO-COMMERCIAL UNPRICED BID" shall contain all techno-commercial details except the prices. Please note that no price details should be uploaded in Technical RFX Response otherwise bid will be rejected.

3.2 Prices/Rates should be quoted in Indian Rupees and must be as per PRICE BID FORMAT uploaded under Notes and Attachment Tab. The rates quoted and uploaded in the "PRICE BID FORMAT" under Notes and Attachment Tab will only be considered.

3.3 Price Bid Format in the form of MS-Excel sheet has been uploaded in e-Tender.

3.4 Prices and rates quoted by Bidders must be held firm during the term of the contract and not be subject to any variation. Bids with adjustable price terms will be rejected.

3.5 Bid Security (in case of BG) in original must reach the office of GM (C&P), Oil India Limited, Rajasthan Field, 2-A, Saraswati Nagar, District Shopping Centre, Basni, Jodhpur – 342 005, Rajasthan, India, before the bid opening date and time, otherwise, bid will be rejected. The amount of Bid Security shall be as specified in the "Forwarding Letter". Scanned copy of this Bid Security should also be submitted /uploaded online along with the un-priced (Technical) Bid. Public Sector Undertakings and Firms registered with NSIC/Directorate of Industries in India are exempted from submission of bid security against this tender.

3.6 Bids received in physical form, but not uploaded in OIL's e-Tender Portal will not be considered.

3.7 Bidders must quote rates in accordance with the price schedule outlined in PRICE BID FORMAT, otherwise the Bid will be rejected. The Bid in which the rates for any part of the service/work are not quoted in Section A shall be rejected. However, if no charge is involved for any of the service/item, 'NIL' should be mentioned against such part of service for Section A. If bidder has not quoted in Section B then it shall be considered as at par for Section B.

3.8 Bids received by Company after the bid closing date and time will be rejected.

3.9 User ID and Password are not transferable. Offers made by bidders who have not been issued/ permitted to download the bid document by the Company will be rejected.

3.10 Bids shall contain no interlineations, erasures or overwriting except as necessary to correct errors made by bidder, in which case such corrections shall be initiated by the person (s) signing the bid. However, white fluid should not be used for making corrections. Any bid not meeting this requirement shall be rejected.

3.11 The Bids and all uploaded documents must be digitally signed using "Class 3" digital certificate (encryption enabled) [e-commerce application (Certificate with personal verification and Organization name)] as per Indian IT Act obtained from the licensed Certifying Authorities operating under the Root Certifying Authority of India (RCAI), Controller of Certifying Authorities (CCA) of India.

3.12 Conditional offers will be rejected.

3.13 The following Clauses with all its sub-clauses should be agreed in to, failing which the bid will be rejected.

- Performance Security Clause
- Tax Liabilities Clause
- Insurance Clause
- Force Majeure Clause
- Termination Clause
- Arbitration Clause
- Applicable Law Clause
- Liquidated damages clause
- GST clause
- Integrity pact clause

3.12 Integrity pact: OIL shall be entering into an Integrity Pact with the bidder as per format enclosed annexure of the tender document. Each page of this Integrity Pact Proforma has been duly signed by OIL's competent signatory. The Proforma has to be returned by the bidder (along with the technical bid) duly signed by the same signatory who signed the bid i.e. who is duly authorized to sign the bid. Any bid not accompanied by Integrity Pact Proforma duly signed by the bidder shall be rejected straightway. All pages of the Integrity Pact to be signed by the bidder's authorized signatory who sign the bid.

#### **4.0 General:**

4.1 Proforma-I: The Compliance statement must be filled up by bidders and to be submitted along with their bids. In case bidder takes exception to any clause of the bidding document not covered under BRC/BEC, then the Company has the discretion to load or reject the offer on account of such exception if the bidder does not withdraw/modify the deviation when/as advised by Company. The loading so done by the company will be final and binding on the bidders. No deviation will, however, be accepted in the clauses covered under BRC.

4.2 To ascertain the substantial responsiveness of the bids, Company reserves the right to ask the bidder for clarification in respect of clauses covered under BRC also and such clarification fulfilling the BRC clauses in toto must be received on or before the deadline given by the company, failing which the offer will be summarily rejected.

4.3 If any of the clauses in the BRC contradicts with other clauses of bidding document elsewhere, then the clauses in the BRC shall prevail.

4.4 The original bid closing date shall be considered by OIL for evaluation of BRC Criteria even in case of any extension of the original bid closing date.

**B. BID EVALUATION CRITERIA (BEC):**

- 1.0 The bids conforming to the technical specifications, terms and conditions stipulated in the bidding document and considered to be responsive after subjecting to Bid Rejection Criteria will be considered for further evaluation as given below:
- 2.0 Bids shall be evaluated both in terms of Quality as well as Quoted Price i.e. Quality & Cost Based Selection (QCBS) methodology. The weightage for Quality is 50 marks and the weightage for the Quoted price is 50 marks.
- a) The marks allocated against various subsections under Quality Criteria of Bid shall be as in Table below:

**Table-1**

Table 1

| A - QUALITY CRITERIA (QCBS) – TECHNICAL AND FINANCIAL PARAMETERS   |   |       |          |
|--|---|-------|----------|
| Sl. No.  | Descriptions  | Marks |          |
| 1  | Total experience in Construction of Comprehensive Multi-Storied Real Estate buildings (HIG equivalent) including associated electrification reckoned from bid closing date  |       |          |
| 1.1  | More than 25 years of experience  | 5     | 5<br>Max |
| 1.2  | 15-25 years of experience   | 4     |          |
| 1.3  | 7 to 15 years of experience   | 3     |          |
| 1.4  | Minimum 7 years of experience   | 2     |          |
| Documentary Proofs: Certificate of incorporation, Documentary proof related to start and end of first and latest Multi-Storied real estate project executed by the bidder. Self-declaration by private firm/companies or certification by sister concern organization shall not be acceptable. |   |       |          |
|  |   |       |          |
| 2  | Works experience of at least 5,000 sqm floor area in a single project of Comprehensive Multi-Storied Real Estate buildings (HIG equivalent) including associated electrification, <b>during last 7 years</b> reckoned from bid closing date.                  |       |          |
| 2.1  | More than 3 projects completed  | 5     | 5<br>Max |
| 2.2  | 2 projects completed  | 4     |          |
| 2.3  | 1 project completed   | 3     |          |
| Documentary Proofs: Completion Certificate, supported by other tangible documentary evidences. Self-declaration by private firm/companies or certification by sister concern organization shall not be acceptable.   |   |       |          |
| 3  | Works experience of completing at least one (01) 5,000 sqm floor area in a single project of Comprehensive Multi-Storied Real Estate buildings (HIG equivalent) including associated electrification job, during last 7 years reckoned from bid closing date. |       |          |
| 3.1  | Project completion in less than 18 months   | 5     | 5<br>Max |
| 3.2  | Project completion in within 18 to 22 months  | 4     |          |
| 3.3  | Project completion in within 23-24 months   | 3     |          |
| Documentary Proofs: Completion Certificate, supported by other tangible documentary evidences. Self-declaration by private firm/companies or certification by sister concern organization shall not be acceptable.   |   |       |          |

| A - QUALITY CRITERIA (QCBS) – TECHNICAL AND FINANCIAL PARAMETERS  |   |   |          |       |
|---|---|---|----------|-------|
| Sl. No.   | Descriptions  |   |          | Marks |
|   |   |   |          |       |
| 4   | Having commissioned Building Management System (BMS) with at least 50nos different field devices in a single project with two way communication from a central control point, with industry standard Modbus protocol with publicly available register maps. Considerable Facility service parameters are: (1) HVAC including unitized ACs, (2) Lighting/Power management/smart metering, (3) Elevators, (4) Fire and Safety, (5) CCTV/Security, (6) Access Control, (7) Hazardous Gas detection, (8) Water/effluent quality monitoring, (9) Monitoring of roof top solar power plant. |   |          |       |
| 4.1   | More than 9 different facilities as mentioned above in a single project   | 5 | 5<br>Max |       |
| 4.2   | 4 to 9 different facilities as mentioned above in a single project  | 3 |          |       |
| 4.3   | At least 4 different facilities as mentioned above in a single project  | 2 |          |       |
| Documentary Proofs: Completion Certificate, supported by other tangible documentary evidences. Self-declaration by private firm/companies or certification by sister concern organization shall not be acceptable.                    |   |   |          |       |
| 5   | Completed at least on real estate project of size at least 5,000sqm floor area new construction which has Green Building Certification from IGBC or GRIHA   |   |          |       |
| 5.1   | IGBC-Platinum/GRIHA 5 star  | 5 | 5<br>Max |       |
| 5.2   | IGBC-Gold/GRIHA 4 star  | 4 |          |       |
| 5.3   | IGBC-Silver/GRIHA 3 star  | 3 |          |       |
| Documentary Proofs: Completion Certificate, supported other tangible documentary evidences.   |   |   |          |       |
| 6   | Installed Grid connected Rooftop SPV plant in a single project using polycrystalline/monocrystalline modules during last 5 years reckoned from bid closing date,  |   |          |       |
| 6.1   | At least 250KWp SPV plant in a single project with efficiency $\geq 16\%$   | 5 | 5<br>Max |       |
| 6.2   | At least 250KWp SPV plant in a single project with efficiency between 14 to 16%   | 4 |          |       |
| 6.3   | At least 125KWp SPV plant in a single project with efficiency $\geq 16\%$   | 3 |          |       |
| 6.4   | At least 125KWp SPV plant in a single project with efficiency between 14 to 16%   | 2 |          |       |
| Documentary Proofs: Completion Certificate and generation logs supported by other tangible documentary evidences. Self-declaration by private firm/companies or certification by sister concern organization shall not be acceptable. |   |   |          |       |
| 7   | Executed construction projects involving Labour licence & returns for 100 persons the Contract Labour (Regulation and Abolition) Act, 1970  |   |          |       |
| 7.1   | Obtained Labour Licence for 101 labourers or more   | 5 | 5<br>Max |       |
| 7.2   | Obtained Labour Licence for 51 labourers or more  | 3 |          |       |
| Documentary Proofs: Labour Licence, supported other tangible documentary evidences. Labour licence by sub-contractors may also be acceptable provided the bidder is principal employer to the sub-contractor.                         |   |   |          |       |



| A - QUALITY CRITERIA (QCBS) – TECHNICAL AND FINANCIAL PARAMETERS  |   |     |           |
|---|---|-----|-----------|
| Sl. No.   | Descriptions  |     | Marks     |
| 8   | Maximum Financial turnover of the Bidder in any of the last three financial years (in INR)  |     |           |
| 8.1   | More than 100 Crores  | 5   | 5<br>Max  |
| 8.2   | 80 to 100 Crores  | 4   |           |
| 8.3   | 40 to 80 Crores   | 3   |           |
| 8.4   | Up to 40 Crores   | 2   |           |
| Documentary Proofs: Balance Sheet & P/L statement of last three financial years.  |   |     |           |
| Total of Quality Criteria above ( 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8)  |   |     | 40 Max    |
| *Minimum marks for qualification on Technical and Financial parameters : 20 Marks   |   |     |           |
|   |   |     |           |
| B – QUALITY CRITERIA (QCBS) – BIDDER’S PRESENTATION   |   |     |           |
| Sl. No.   | Descriptions  |     | Marks     |
| 1   | Presentation by the technically and financially qualified bidders.<br><br>Bidders qualifying the BEC criteria and also scoring minimum 20 marks out of total 40 marks in Section A above, shall be invited for a presentation to OIL management. The presentation shall be scored based on the following content: |     | 10<br>Max |
|   | Company Profile   | 2.5 |           |
|   | Past Projects completed and special features in those projects  | 2.5 |           |
|   | Cost optimization and project optimization procedures and tools used during project execution and their positive impact on overall past projects  | 2.5 |           |
|   | Detailed Project Plan for execution of OIL’s residential complex for which the bid has been submitted and cost optimization and project optimization proposed for the same  | 2.5 |           |
|   | Total of Quality Criteria above ( Section A + Section B) = T  |     |           |
| *Minimum marks for qualification on Quality parameters based on Section A and Section B: 25 Marks.  |   |     |           |
| Price bids of only those Bidders scoring minimum 25 marks out of total 50 marks in Section A and Section B shall be opened on a pre-determined date and time. Eligible bidders whose price bids are to be opened shall be intimated by OIL nearer to the price bid opening date and time. |   |     |           |

**Note:**

- a) It shall be the bidder's responsibility to ensure submission of unambiguous /clear and sufficient documentary evidence in support of the evaluation criteria.
- b) OIL reserves the right to verify any or all data/document/information provided by the bidder. False statement by Bidder will make it liable for appropriate action.
- c) For the above purpose, supplementary reinforcing documents submitted by the bidder in response to specific query after bids are opened, may have later date after bid opening date provided that such the certification/letter contents are only historical/confirmatory in nature.

**3.0 Commercial Qualification:**

The points on commercial qualification will be as under:

- 3.1 The INR value of the commercially lowest offer (C-1) will be given 50points. The points of INR value of the commercially second lowest (C-2), third lowest (C-3), fourth lowest (C-4) and so on and will be calculated as under:
  - i) C-1 bidder point = 50 points **(C-1 = INR value of commercially lowest offer)**
  - ii) C-2 bidder point=  $50 * \text{INR value of commercially lowest offer C-1} / \text{C-2}$  **(C-2 = INR value of commercially second lowest offer)**
  - iii) C-3 bidder point=  $50 * \text{INR value of commercially lowest offer C-1} / \text{C-3}$  **(C-3 = INR value of commercially third lowest offer)**
  - iv) C-4 bidder point=  $50 * \text{INR value of commercially lowest offer C-1} / \text{C-4}$  **(C-4 = INR value of commercially fourth lowest offer)**
- 3.2 The total score (H1, H2, H3....) of the participating bidders under the QCBS system shall be evaluated by adding the technical score (T) and commercial score (C) arrived at after evaluation as mentioned above. The H1 bidder thus arrived shall be awarded the contract.
- 3.3 If there is any discrepancy between the unit price and total price, the unit price will prevail and total price shall be corrected. Similarly, if there is any discrepancy between words and figure, the amount in words shall prevail and will be adopted for evaluation.
- 3.4 In the event of two or more bids having the same highest Evaluated Bid Score (H1), the bid scoring the highest marks against *Quality* criteria (T) will be recommended for award of contract. In case of a subsequent tie, a draw of lot will be resorted to arrive at the recommended bidder.

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**END OF PART – 2**

## **PART-3**

### **SECTION-I**

#### **GENERAL CONDITIONS OF CONTRACT**

##### **1.0 DEFINITIONS:**

1.1 In the contract, the following terms shall be interpreted as indicated:

(a) "The Contract" means agreement entered into between Company and Contractor, as recorded in the contract Form signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein;

(b) "The Contract Price" means the price payable to Contractor under the contract for the full and proper performance of its contractual obligations;

(c) "Company" or "OIL" means Oil India Limited;

(d) "Contractor" means the Contractor performing the work under this Contract.

(e) "Contractor's Personnel" means the personnel to be provided by the Contractor to provide services as per the contract.

(f) "Company's Personnel" means the personnel to be provided by OIL or OIL's Contractor (other than the Contractor executing the Contract). The Company representatives of OIL are also included in the Company's personnel.

(g) "Contractor's items" means the equipment, materials and services, which are to be provided by Contractor or to be provided by Company at the expense of the Contractor, which are listed in Tender Document under Terms of Reference and Technical Specifications.

(h) "Company's items" means the equipment, materials and services, which are to be provided by Company at the expense of Company and listed in the Contract.

(i) "Company Representative" means the person or persons appointed and approved from time to time by the Company to act on its behalf for overall coordination and project management purpose.

(j) "The Work" means each and every activity required for the successful performance of the services described in Section II, the Terms of Reference.

(k) "Day" means a calendar day of twenty-four (24) consecutive hours beginning at 07:00 hrs. and ending at 07:00 hrs.

(l) "Party" means either the Company or Contractor as the context so permits and, as expressed in the plural, shall mean the Company and Contractor collectively.

(m) "Site" means the land and other places, on/under/ in or through which the works are to be executed by the Contractor and any other land and places provided by the Company for working space or any other purpose as designated hereinafter as forming part of the Site.

(n) "Gross Negligence" means any act or failure to act (whether sole, joint or concurrent) by a person or entity which was intended to cause, or which was in reckless disregard of or wanton indifference to, avoidable and harmful consequences such person or entity

knew, or should have known, would result from such act or failure to act. Notwithstanding the foregoing, Gross negligence shall not include any action taken in good faith for the safeguard of life or property.

(o) "Wilful Misconduct" means intentional disregard of good and prudent standards of performance or proper conduct under the Contract with knowledge that it is likely to result in any injury to any person or persons or loss or damage of property.

(p) "Affiliate" means any Person Which Controls, or is Controlled by, or under common Control with a Party; "Control" in this context means ownership of more than fifty percent (50%) of the shares of a Person and/or the right to appoint majority directors on Board by contract or otherwise.

(q) "Co-venturers" shall mean any co-venturers with the Company from time to time having an interest in either the PSC and/or a Joint and/or associated contracts for the purposes of exploration and production in Operating Contract the Operating Area and on whose behalf the Company would be deemed to have entered into this Contract.

## **2.0 EFFECTIVE DATE, MOBILISATION TIME/DE-MOBILIZATION TIME, DATE OF COMMENCEMENT OF THE CONTRACT AND DURATION OF CONTRACT:**

**2.1 EFFECTIVE DATE OF CONTRACT:** The contract shall become effective as of the date Company notifies the Contractor in writing that it has been awarded the contract. This date of issuance of Letter of Award (LOA) by the Company will be the Effective Date of Contract.

**2.2 MOBILISATION/De-MOBILISATION TIME OF THE CONTRACT:** Not Applicable.

**2.3 DATE OF COMMENCEMENT OF CONTRACT:** The contractor has to commence the work against the contract within 4 (four) days of intimation for commencement of work from OIL. The contractor has to ensure that all necessary equipment, machinery, tools and manpower are available at site within 14 days of the intimation for commencement of work from OIL. Date of commencement will be the date of issuance of commencement notice by OIL.

**2.4 DURATION OF CONTRACT:** The contract shall be valid for a period of Twenty Four (24) months from the Date of Commencement of the Contract.

**3.0 GENERAL OBLIGATIONS OF CONTRACTOR:** Contractor shall, in accordance with and subject to the terms and conditions of this Contract:

3.1 Perform the work described in the Terms of Reference (Part-3, Section-II) in most economic and cost effective way.

3.2 Except as otherwise provided in the Terms of Reference and the Special Conditions of the Contract, provide all labour as required to perform the work.

3.3 Perform all other obligations, work and services which are required by the terms of this contract or which reasonably can be implied from such terms as being necessary for the successful and timely completion of the work.

3.4 Contractor shall be deemed to have satisfied himself before submitting their bid as to the correctness and sufficiency of its bid for the services required and of the rates and prices quoted, which rates and prices shall, except insofar as otherwise provided, cover all its obligations under the contract.

3.5 Contractor shall give or provide all necessary supervision during the performance of the services and as long thereafter within the warranty period as Company may consider necessary for the proper fulfilling of contractor's obligations under the contract.

4.0 **GENERAL OBLIGATIONS OF THE COMPANY:** Company shall, in accordance with and subject to the terms and conditions of this contract:

4.1 Pay Contractor in accordance with terms and conditions of the contract. The period of time for which each rate shall be applicable shall be computed from and to the nearest an hour. The rates contained in the Contract shall be based on Contractor's operation being conducted on a seven (07) days week and a twenty-four (24) hours work day. Under the Contract, Contractor will be entitled to the applicable rate defined in Schedule of Rates. These rates are payable when the required condition has existed for a full 24 hours' period. If the required condition existed for less than 24 hours, then payments shall be made on pro-rata basis.

4.2 Allow Contractor access, subject to normal security and safety procedures, to all areas as required for orderly performance of the work.

4.3 Perform all other obligations required of Company by the terms of this contract.

#### 5.0 **PERSONNEL TO BE DEPLOYED BY CONTRACTOR**

5.1 Contractor warrants that it shall provide competent, qualified and sufficiently experienced personnel to perform the work correctly and efficiently.

5.2 The Contractor should ensure that their personnel observe applicable company and statutory safety requirement. Upon Company's written request, Contractor, entirely at his own expense, shall remove immediately any personnel of the Contractor determined by the Company to be unsuitable and shall promptly replace such personnel with personnel acceptable to the Company. Replacement personnel should be mobilized within ten (10) days from the date of issuance of notice without affecting the operation of the company.

5.3 The Contractor shall be solely responsible throughout the period of the contract for providing all requirements of their personnel including but not limited to, their transportation to & fro from field/drilling site, en-route/ local boarding, lodging & medical attention etc. Company shall have no responsibility or liability in this regard.

5.4 Contractor's key personnel shall be fluent in English language (both writing and speaking).

#### 6.0 **WARRANTY AND REMEDY OF DEFECTS**

6.1 Contractor warrants that it shall perform the work in a professional manner and in accordance with their highest degree of quality, efficiency, and with the state of the art technology/inspection services and in conformity with all specifications, standards and drawings set forth or referred to in the Technical Specifications. They should comply with the instructions and guidance; which Company may give to the Contractor from time to time.

6.2 Should Company discover at any time during the tenure of the Contract or till the Unit/equipment/tools are demobilised from site that the work does not conform to the foregoing warranty, Contractor shall after receipt of notice from Company, promptly perform any and all corrective work required to make the services conform to the Warranty. Such corrective Work shall be performed entirely at Contractor's own expenses. If such corrective Work is not performed within a reasonable time, the Company, at its option may have such remedial Work performed by others and

charge the cost thereof to Contractor subject to a maximum of the contract value payable for the defective work which needs corrective action which the Contractor must pay promptly. In case Contractor fails to perform remedial work, or pay promptly in respect thereof, the performance security shall be forfeited.

6.3 The Company's engineer shall have power to –

- (a) Reduce the rates at which payments shall be made if the quality of the work, although acceptable, is not upto the required standard, set forth in the Company's standard specifications which have been perused and fully understood by the Contractor.
- (b) Order the Contractor to remove any inferior materials from the work site and to demolish or rectify any work of inferior workmanship, failing which the Company's engineer may arrange for any such work to be demolished or rectified by any other means at the Contractor's expense.
- (c) Order the Contractor to remove or replace any workman whom he (the engineer) considers incompetent or unsuitable. The engineer's opinion as to the competence and suitability of any workmen engaged by the Contractor shall be final and binding on the Contractor.
- (d) Issue to the Contractor from time to time during the progress of the work such further drawings and instructions as shall be necessary for the purpose of proper and adequate executions and maintenance of the works and the Contractor shall carry out and be bound by the same.
- (e) Order deviations of this Agreement after obtaining approval from the Company's Management. All such deviation orders shall be in writing and shall show the financial effect, if any, and whether any extra time is to be allowed. The rates to be applied for such deviation order shall be as per DSR/DAR.

#### **7.0 CONFIDENTIALITY, USE OF CONTRACT DOCUMENTS AND INFORMATION:**

7.1 Contractor shall not, without Company's prior written consent, disclose the contract, or any provision thereof, or any specification, plan, drawing pattern, sample or information furnished by or on behalf of Company in connection therewith, to any person other than a person employed by Contractor in the performance of the contract. Disclosure to any such employed person shall be made in confidence and shall extend only so far, as may be necessary for purposes of such performance with prior permission from Company. However, nothing hereinabove contained shall deprive the Contractor of the right to use or disclose any information:

- (a) which is possessed by the Contractor, as evidenced by the Contractor's written records, before receipt thereof from the Company which however the Contractor shall immediately inform to Company; or
- (b) which is required to be disclosed by the Contractor pursuant to an order of a court of competent jurisdiction or other governmental agency having the power to order such disclosure, provided the Contractor uses its best efforts to provide timely notice to Company of such order to permit Company an opportunity to contest such order subject to prior permission from Company.

7.2 Contractor shall not, without Company's prior written consent, make use of any document or information except for purposes of performing the contract.

7.3 Any document supplied to the Contractor in relation to the contract other than the Contract itself remain the property of Company and shall be returned (in all copies) to Company on completion of Contractor's performance under the Contract if so required by Company.

7.4 During this Contract, Company and its employees, agents, other contractors, sub-contractors (of any tier) and their employees etc. may be exposed to certain confidential information and data of the Contractor. Such information and data shall have held by the Company, its employees, agents, other contractors, sub-contractors (of any tier) and their employees in the strictest Confidence and shall not be disclosed to any other party except on a need to know basis.

7.5 However, the above obligation shall not extend to information which:

i) is, at the time of disclosure, known to the public which Contractor shall immediately inform Company;

ii) is lawfully becomes at a later date known to the public through no fault of Contractor subject to Contractor's undertaking that no information has been divulged by them to the public;

iii) is lawfully possessed by Contractor before receipt thereof from Company which should be immediately informed to Company;

iv) is developed by Contractor independently of the information disclosed by Company which should be shared with the Company;

v) Contractor is required to produce before competent authorities or by court order subject to prior permission from Company;

#### **8.0 TAXES:**

8.1 Tax levied on Contractor as per the provisions of Indian Income Tax Act and any other enactment/rules on income derived/payments received under the contract will be on Contractor's account.

8.2 Contractor shall be responsible for payment of personal taxes, if any, for all the personnel deployed in India by Contractor.

8.3 The Contractor shall furnish to the Company, if and when called upon to do so, relevant statement of accounts or any other information pertaining to work done under the contract for submitting the same to the Tax authorities, on specific request from them in accordance with provisions under the law. Other than the information provided by the Contractor, the Contractor shall not be responsible for any inaccurate information provided by the Company to the Tax authorities and the Company shall indemnify the Contractor for all claims, expenses, costs or losses of any nature arising from such inaccuracy. Contractor shall be responsible for preparing and filing the return of income etc. within the prescribed time limit to the appropriate authority.

8.4 Prior to start of operations under the contract, the Contractor shall furnish the Company with the necessary documents, as asked for by the Company and/ or any other information pertaining to the contract, which may be required to be submitted to the Income Tax authorities at the time of obtaining "No Objection Certificate" for releasing payments to the Contractor.

8.5 Corporate income tax will be deducted at source from the invoice at the specified rate of income tax as per the provisions of Indian Income Tax Act as may be in force from

time to time and Company will issue TDS Certificate to the Contractor as per the provisions of Income Tax Act.

8.6 Corporate and personnel taxes on Contractor shall be the liability of the Contractor and the Company shall not assume any responsibility on this account.

8.7 All taxes and levies other than GST and customs duty on purchases and sales made by Contractor shall be borne by the Contractor.

8.8 **Goods and Services Tax (GST):** The quoted price should be exclusive of GST and the GST as applicable shall be to the Company account. The GST amount on the taxable part of the services provided by the Contractor shall be paid by the Company as per provisions of the GST Act. Bidder should take note of the following while submitting their offer in GST regime.

GOODS AND SERVICES TAX:

G1. "GST" shall mean Goods and Services Tax charged on the supply of material(s) and services. The term "GST" shall be construed to include the Integrated Goods and Services Tax (hereinafter referred to as "IGST") or Central Goods and Services Tax (hereinafter referred to as "CGST") or State Goods and Services Tax (hereinafter referred to as "SGST") or Union Territory Goods and Services Tax (hereinafter referred to as "UTGST") depending upon the import / interstate or intrastate supplies, as the case may be. It shall also mean GST compensation Cess, if applicable.

G2. The quoted price shall be deemed to be inclusive of all taxes and duties except "Goods and Services Tax" (hereinafter called GST) (i.e. IGST or CGST and SGST/UTGST applicable in case of interstate supply or intra state supply respectively and GST compensation Cess if applicable).

G3. Contractor/vendor shall be required to issue tax invoice in accordance with GST Act and/or Rules so that input credit can be availed by OIL (Oil India Limited)/Client. In the event that the contractor / vendor fails to provide the invoice in the form and manner prescribed under the GST Act read with GST Invoicing Rules thereunder, OIL / Client shall not be liable to make any payment on account of GST against such invoice.

G4. GST shall be paid against receipt of tax invoice and proof of payment of GST to government. In case of non-receipt of tax invoice or non-payment of GST by the contractor/vendor, OIL shall withhold the payment of GST.

G5. GST payable under reverse charge for specified services or goods under GST act or rules, if any, shall not be paid to the contractor/vendor but will be directly deposited to the government by OIL/Client.

G6. Where OIL/client has the obligation to discharge GST liability under reverse charge mechanism and OIL/client has paid or is /liable to pay GST to the Government on which interest or penalties becomes payable as per GST laws for any reason which is not attributable to OIL/client or ITC with respect to such payments is not available to OIL/client for any reason which is not attributable to OIL/client, then OIL/client shall be entitled to deduct/ setoff / recover such amounts against any amounts paid or payable by OIL/Client to Contractor / Supplier.

G7. The Supplier shall always comply with the requirements of applicable laws and provide necessary documents as prescribed under the Rules & Regulations, as applicable from time to time. In particular, if any tax credit, refund or other benefit is denied or delayed to OIL / Project Owner due to any non-compliance / delayed compliance by the Supplier under the Goods & Service Tax Act (such as failure to upload the details of the



sale on the GSTN portal, failure to pay GST to the Government) or due to non-furnishing or furnishing of incorrect or incomplete documents by the Supplier, the Supplier shall be liable to reimburse OIL / Project Owner for all such losses and other consequences including, but not limited to the tax loss, interest and penalty.

G8. Notwithstanding anything contained anywhere in the Agreement, in the event that the input tax credit of the GST charged by the Contractor / Vendor is denied by the tax authorities to OIL / Client for reasons attributable to Contractor / Vendor, OIL / client shall be entitled to recover such amount from the Contractor / Vendor by way of adjustment from the next invoice. In addition to the amount of GST, OIL / client shall also be entitled to recover interest at the rate prescribed under GST Act and penalty, in case any penalty is imposed by the tax authorities on OIL / Project Owner.

G9. TDS under GST, if applicable, shall be deducted from contractor's/vendor's bill at applicable rate and a certificate as per rules for tax so deducted shall be provided to the contractor/vendor.

G10. The Contractor will be under obligation for charging correct rate of tax as prescribed under the respective tax laws. Further the Contractor shall avail and pass on benefits of all exemptions/ concessions available under tax laws.

G11. The contractor will be liable to ensure to have registered with the respective tax authorities and to submit self-attested copy of such registration certificate(s) and the Contractor will be responsible for procurement of material in its own registration (GSTIN) and also to issue its own Road Permit/ E-way Bill, if applicable etc.

G12. In case the bidder is covered under Composition Scheme under GST laws, then bidder should quote the price inclusive of the GST (CGST & SGST/UTGST or IGST). Further, such bidder should mention "Cover under composition system" in column for GST (CGST & SGST/UTGST or IGST) of price schedule.

G13. OIL/client will prefer to deal with registered supplier of goods/ services under GST. Therefore, bidders are requested to get themselves registered under GST, if not registered yet. However, in case any unregistered bidder is submitting their bid, their prices will be loaded with applicable GST while evaluation of bid. Where OIL/client is entitled for input credit of GST, the same will be considered for evaluation of bid as per evaluation methodology of tender document.

G14. GST (GOODS & SERVICE TAX) (TRANSPORTATION CHARGES, SUPERVISION / TRAINING, SITE WORK):

The quoted Prices towards Transportation, Supervision, Training, Site Work, AMC shall be inclusive of all taxes & levies except Goods & Service Tax (GST).

Goods & Service Tax (GST) as billed by the Supplier shall be payable at actuals by Owner subject to Contractor furnishing proper tax invoice issued in accordance with Goods & Service Tax (GST) rules to enable Owner to take input tax credit as per Govt. Rules 2004 on Goods & Service Tax (GST) paid.

Goods & Service Tax (GST) shall not be payable, if the requirements as specified above are not fulfilled by the Supplier. In case of non-receipt of above, Owner shall withhold the payment of Goods & Service Tax (GST).

In case of Foreign Bidders, where foreign bidder does not have permanent establishment in India, for supervision/training services by foreign supervisor at Project Site, Goods & Service Tax (GST) shall be paid by Owner to tax authorities.

#### G15. Documentation requirement for GST

The vendor will be under the obligation for invoicing correct tax rate of tax/duties as prescribed under the GST law to Owner/OIL, and pass on the benefits, if any, after availing input tax credit.

Any invoice issued shall contain the following particulars-

- a) Name, address and GSTIN of the supplier;
- b) Serial number of the invoice;
- c) Date of issue;
- d) Name, address and GSTIN or UIN, if registered of the recipient;
- e) Name and address of the recipient and the address of the delivery, along with the State and its code,
- f) HSN code of goods or Accounting Code of services;
- g) Description of goods or services;
- h) Quantity in case of goods and unit or Unique Quantity Code thereof;
- i) Total value of supply of goods or services or both;
- j) Taxable value of supply of goods or services or both taking into discount or abatement if any;
- k) Rate of tax (IGST, CGST, SGST/ UTGST, cess);
- l) Amount of tax charged in respect of taxable goods or services (IGST, CGST, SGST/ UTGST, cess);
- m) Place of supply along with the name of State, in case of supply in the course of inter-state trade or commerce;
- n) Address of the delivery where the same is different from the place of supply and
- o) Signature or digital signature of the supplier or his authorised representative.

GST invoice shall be prepared in triplicate, in case of supply of goods, in the following manner-

- a) The original copy being marked as ORIGINAL FOR RECIPIENT;
- b) The duplicate copy being marked as DUPLICATE FOR TRANSPORTER and
- c) The triplicate copy being marked as TRIPLICATE FOR SUPPLIER.

In case of any advance given against any supplies contract, the supplier of the goods shall issue Receipt Voucher containing the details of details of advance taken along with particulars as mentioned in clause no. 15. (a), (b), (c), (d), (g), (k), (l), (m) & (o) above.

#### G16. GENERAL REMARKS ON TAXES & DUTIES:

In view of GST Implementation from 1st July 2017, all taxes and duties including Excise Duty, CST/VAT, Service tax, Entry Tax and other indirect taxes and duties have been submerged in GST. Accordingly reference of Excise Duty, Service Tax, VAT, Sales Tax, Entry Tax, E1/E2 Forms, and any other form of indirect tax except of GST mentioned in the bidding document shall be ignored.

8.9 Oil India Ltd., Rajasthan Project's GST provisional ID No. :08AAACO2352C1ZX

#### 9.0 **INSURANCE:**

9.1 The Contractor shall arrange insurance to cover all risks in respect of their personnel, materials and equipment belonging to the Contractor or its subcontractor (if applicable) during the currency of the contract including the third party items/consumables. For materials/equipment belong to the Contractor or its subcontractor, Contractor may self-insure the same.

9.2 Contractor shall at all time during the currency of the contract provide, pay for and maintain the following insurance amongst others:

- a) Workmen compensation insurance as required by the laws of the country of origin of the employee.
- b) Employer's Liability Insurance as required by law in the country of origin of employee.
- c) General Public Liability Insurance or Comprehensive General Liability insurance covering liabilities including contractual liability for bodily injury, including death of persons, and liabilities for damage of property. This insurance must cover all operations of Contractor required to fulfil the provisions under this contract.
- d) Contractor's equipment used for execution of the work hereunder shall have an insurance cover with a suitable limit.
- e) Automobile Public Liability Insurance covering owned and hired automobiles used in the performance of the work hereunder, with bodily injury limits and property damage limits as governed by Indian Insurance regulations.
- f) Public Liability Insurance as required under Public Liability Insurance Act 1991, "if applicable".

9.3 Any deductible set forth in any of the above insurance shall be borne by Contractor.

9.4 Contractor shall furnish to Company prior to commencement date, certificates of all its insurance policies covering the risks mentioned above.

9.5 If any of the above policies expire or are cancelled during the term of this contract and Contractor fails for any reason to renew such policies, then the Company will renew/replace same and charge the cost thereof to Contractor. Should there be a lapse in any insurance required to be carried out by the Contractor for any reason whatsoever, loss/damage claims resulting there from shall be to the sole account of Contractor.

9.6 Contractor shall require all of his sub-Contractor to provide such of the foregoing insurance coverage as Contractor is obliged to provide under this Contract and inform the Company about the coverage prior to the commencement of agreements with its sub-Contractors.

9.7 All insurance taken out by Contractor or their sub-contractor shall be endorsed to provide that the underwriters waive their rights of recourse on the Company and to the extent of the liabilities assumed by Contractor under this Contract.

9.8 Contractor shall obtain additional insurance or revise the limits of existing insurance as per Company's request in which case additional cost shall be to Contractor's account.

#### 10.0 **CHANGES:**

10.1 During the performance of the work, Company may make minor change to take care of any supplementary work within the general scope of this Contract including, but not limited to, changes in methodology, and minor additions to or deletions from the work to be performed. Contractor shall perform the work as changed. Changes of this nature will be affected by written order by the Company.

10.2 If any change result in an increase in compensation due to Contractor or in a credit due to Company, Contractor shall submit to Company an estimate of the amount of such compensation or credit in a form prescribed by Company. Such estimates shall be based on the rates shown in the Schedule of Rates. Upon review of Contractor's estimate, Contractor shall establish and set forth in the Change Order the amount of the compensation or credit for the change or a basis for determining a reasonable compensation or credit for the change. If Contractor disagrees with compensation or credit set forth in the Change Order, Contractor shall nevertheless perform the work as changed, and the parties will resolve the dispute in accordance with Clause 13 hereunder. Contractor's performance of the work as changed will not prejudice

Contractor's request for additional compensation for work performed under the Change Order.

**11.0 FORCE MAJEURE:**

11.1 In the event of either party being rendered unable by 'Force Majeure' to perform any obligation required to be performed by them under the contract, the relative obligation of the party affected by such 'Force Majeure' will stand suspended for the period during which such cause lasts. The word 'Force Majeure' as employed herein shall mean acts of God, war, revolt, agitation, strikes, riot, fire, flood, sabotage, civil commotion, road barricade (but not due to interference of employment problem of the Contractor), acts of government of the two parties, which makes performance impossible or impracticable and any other cause, whether of kind herein enumerated or otherwise which are not within the control of the party to the contract and which renders performance of the contract by the said party impossible.

11.2 Upon occurrence of such cause and upon its termination, the party alleging that it has been rendered unable as aforesaid thereby, shall notify the other party in writing within seventy-two (72) hours of the alleged beginning and ending thereof, giving full particulars and satisfactory evidence in support of its claim.

11.3 Should 'force majeure' condition as stated above occurs and should the same be notified within seventy-two (72) hours after its occurrence the 'force majeure' rate shall apply for the first fifteen (15) days. Parties will have the right to terminate the Contract if such 'force majeure' conditions continue beyond fifteen (15) days with prior written notice. Should either party decide not to terminate the Contract even under such condition, no payment would apply after expiry of fifteen (15) days force majeure period unless otherwise agreed to.

**12.0 TERMINATION:**

12.1 **TERMINATION ON EXPIRY OF THE TERMS (DURATION):** This contract shall be deemed to have been automatically terminated on the expiry of duration of the contract, thereof.

12.2 **TERMINATION ON ACCOUNT OF FORCE MAJEURE:** Either party shall have the right to terminate this Contract on account of Force Majeure as set forth in Article 11.0 above.

12.3 **TERMINATION ON ACCOUNT OF INSOLVENCY:** In the event that the Contractor or its collaborator at any time during the term of the Contract, becomes insolvent or makes a voluntary assignment of its assets for the benefit of creditors or is adjudged bankrupt, then the Company shall, by a notice in writing have the right to terminate the Contract and all the Contractor's rights and privileges hereunder, shall stand terminated forthwith.

12.4 **TERMINATION FOR UNSATISFACTORY PERFORMANCE:** If the Company considers that, the performance of the Contractor is unsatisfactory, or not upto the expected standard, the Company shall notify the Contractor in writing and specify in details the cause of the dissatisfaction. The Company shall have the option to terminate the Contract by giving 15 days' notice in writing to the Contractor, if Contractor fails to comply with the requisitions contained in the said written notice issued by the Company.

12.5 **TERMINATION DUE TO CHANGE OF OWNERSHIP & ASSIGNMENT:** In case the Contractor's rights and /or obligations under this Contract and/or the Contractor's rights, title and interest to the equipment/ material, are transferred or assigned without the Company's consent, the Company may at its absolute discretion, terminate this Contract.

**12.6 TERMINATION DUE TO NON-AVAILABILITY OF EQUIPMENT/PERSONNEL:** If at any time during the term of this Contract, breakdown of Contractor's equipment results in Contractors being unable to perform their obligations hereunder for a period of 15 successive days, Company at its option, may terminate this Contract in its entirety without any further right or obligation on the part of the Company, except for the payment of money then due. No notice shall be served by the Company under the condition stated above.

12.7 Notwithstanding any provisions herein to the contrary, the Contract may be terminated at any time by the company on giving 15 (fifteen) days written notice to the Contractor due to any other reason not covered under the above clause from 12.1 to 12.6 and in the event of such termination the Company shall not be liable to pay any cost or damage to the Contractor except for payment of services as per the Contract up to the date of termination including the Demob cost, if any.

**12.8 CONSEQUENCES OF TERMINATION:**

In all cases of termination herein set forth, the relative obligations of the parties to the Contract shall be limited to the period up to the date of termination. Notwithstanding the termination of this Contract, the parties shall continue to be bound by the provisions of this Contract that reasonably require some action or forbearance after such termination.

12.9 Upon termination of this Contract, Contractor shall return to Company all of Company's items, which are at the time in Contractor's possession.

12.10 In the event of termination of contract, Company will issue Notice of termination of the contract with date or event after which the contract will be terminated. The contract shall then stand terminated and the Contractor shall demobilize their personnel & materials.

**13.0 SETTLEMENT OF DISPUTES AND ARBITRATION:**

**13.1 Arbitration(Applicable for Suppliers/Contractors other than PSU) :**

Except as otherwise provided elsewhere in the contract, if any dispute, difference, question or disagreement arises between the parties hereto or their respective representatives or assignees, in connection with construction, meaning, operation, effect, interpretation of the contract or breach thereof which parties are unable to settle mutually, the same shall be referred to Arbitration as provided hereunder:

1. A party wishing to commence arbitration proceeding shall invoke Arbitration Clause by giving 30 days' notice to the other party. The notice invoking arbitration shall specify all the points of dispute with details of the amount claimed to be referred to arbitration at the time of invocation of arbitration and not thereafter. If the claim is in foreign currency, the claimant shall indicate its value in Indian Rupee for the purpose of constitution of the arbitral tribunal.

2. The number of arbitrators and the appointing authority will be as under:

| <b>Claim amount (excluding claim for interest and counter claim, if any)</b> | <b>Number of Arbitrator</b> | <b>Appointing Authority</b> |
|--|-----------------------------|-----------------------------|
| Up to INR 5 Crore  | Sole Arbitrator             | OIL                         |

|                   |               |   |
|-------------------|---------------|---|
| Above INR 5 Crore | 3 Arbitrators | One Arbitrator by each party and the 3rd Arbitrator, who shall be the presiding Arbitrator, by the two Arbitrators. |
|-------------------|---------------|---|

3. The parties agree that they shall appoint only those persons as arbitrators who accept the conditions of the arbitration clause. No person shall be appointed as Arbitrator or Presiding Arbitrator who does not accept the conditions of the arbitration clause.

4. Parties agree that there will be no objection if the Arbitrator appointed holds equity shares of OIL and/or is a retired officer of OIL/any PSU. However, neither party shall appoint its serving employees as arbitrator.

5. If any of the Arbitrators so appointed dies, resigns, becomes incapacitated or withdraws for any reason from the proceedings, it shall be lawful for the concerned party/arbitrators to appoint another person in his place in the same manner as aforesaid. Such person shall proceed with the reference from the stage where his predecessor had left if both parties consent for the same; otherwise, he shall proceed de novo.

6. Parties agree that neither shall be entitled for any pre-reference or pendente-lite interest on its claims. Parties agree that any claim for such interest made by any party shall be void.

7. The arbitral tribunal shall make and publish the award within time stipulated as under:

| Amount of Claims and counter claims(excluding interest) | Period for making and publishing of the award(counted from the date of first meeting of the Arbitrators) |
|---|--|
| Up to INR 5 Crore                                       | Within 8 months  |
| Above INR 5 Crore                                       | Within 12 months   |

The above time limit can be extended by Arbitrator, for reasons to be recorded in writing, with the consent of the other parties.

8. If after commencement of the arbitration proceedings, the parties agree to settle the dispute mutually or refer the dispute to conciliation, the arbitrators shall put the proceedings in abeyance until such period as requested by the parties.

9. Each party shall be responsible to make arrangements for the travel and stay etc. of the arbitrator pointed by it. Claimant shall also be responsible for making arrangements for travel/stay arrangements of the Presiding Arbitrator and the expenses incurred shall be shared equally by the parties.

In case of sole arbitrator, OIL shall make all necessary arrangements for his travel, stay and the expenses incurred shall be shared equally by the parties.

10. The Arbitration shall be held at the place from where the contract has been awarded. However, parties to the contract can agree for a different place for the convenience of all concerned.

11. The Arbitrator(s) shall give reasoned and speaking award and it shall be final and binding on the parties.

12. Subject to aforesaid, provisions of the Arbitration and Conciliation Act, 1996 and any statutory modifications or re-enactment thereof shall apply to the arbitration proceedings under this clause.

**13.0 Arbitration clause for Settlement of commercial disputes between Central Public Sector Enterprises (CPSEs) inter se and CPSE(s) and Government Department(s)/Organizations(s) - Administrative Mechanism for Resolution of CPSEs Disputes (AMRCD).**

In the event of any dispute or difference relating to the interpretation and application of the provisions of commercial contract(s) between Central Public Sector Enterprises (CPSEs)/ Port Trusts inter se and also between CPSEs and Government Departments/Organizations (excluding disputes concerning Railways, Income Tax, Customs & Excise Departments), such dispute or difference shall be taken up by either party for resolution through AMRCD as mentioned in OPE OM No. 4(1)/2013-DPE(GM)/FTS-1835 dated 22-05-2018.

**14.0 NOTICES:**

14.1 Any notice given by one party to other, pursuant to this Contract shall be sent in writing or by email and confirmed in writing to the applicable address specified below:

a) **Company**

OIL INDIA LIMITED  
2- A, DISTRICT SHOPPING CENTRE  
SARASWATI NAGAR, BASNI,  
JODHPUR-342005, RAJASTHAN  
Fax No. 0291- 2727050

b) **Contractor**

\_\_\_\_\_  
\_\_\_\_\_  
Fax No. :

14.2 A notice shall be effective when delivered or on the notice's effective date, whichever is later.

**15.0 SUBCONTRACTING/ASSIGNMENT:**

15.1 Contractor shall not subcontract, transfer or assign the contract, in full or any part under this contract, to any third party(s). Except for the main services under this contract, Contractor may sub-contract the petty support services subject to Company's prior approval. However, Contractor shall be fully responsible for complete execution and performance of the services under the Contract.

**16.0 MISCELLANEOUS PROVISIONS:**

16.1 Contractor shall give notices and pay all fees at their own cost required to be given or paid by any National or State Statute, Ordinance, or other Law or any regulation, or bye-law of any local or other duly constituted authority as may be in force from time to time in India, in relation to the performance of the services and by the rules & regulations of all public bodies and companies whose property or rights are affected or may be affected in any way by the services.

16.2 Contractor shall conform in all respects with the provisions of any Statute, Ordinance of Law as aforesaid and the regulations or bye-law of any local or other duly constituted authority which may be applicable to the services and with such rules and regulation public bodies and Companies as aforesaid and shall keep Company indemnified against all penalties and liability of every kind for breach of any such Statute, Ordinance or Law, regulation or bye-law.

16.3 During the tenure of the Contract, Contractor shall keep the site where the services are being performed reasonably free from all unnecessary obstruction and shall store or dispose of any equipment and surplus materials and clear away and remove from the site any wreckage, rubbish or temporary works no longer required. On the completion of the services, Contractor shall clear away and remove from the site any surplus materials, rubbish or temporary works of every kind and leave the whole of the site clean and in workmanlike condition to the satisfaction of the Company.

16.4 Key personnel cannot be changed during the tenure of the Contract except due to sickness/death/resignation of the personnel in which case the replaced person should have equal experience and qualification, which will be again subject to approval, by the Company.

**17.0 LIQUIDATED DAMAGES AND PENALTY FOR DEFAULT:**

17.1 Time is the essence of this Contract. In the event of the Contractor's default in timely completion of the project within the stipulated period, the Contractor shall be liable to pay liquidated damages @ 1/2% of contract value, per week or part thereof of delay subject to maximum of 7.5%. Liquidated Damages will be reckoned from the expiry date of the scheduled completion date. Liquidated Damages shall be applicable on the value of delayed item(s) provided the item(s) delayed are not critical for commissioning and final utilization of the work. If, however, the item(s) delayed in completion are critical for commissioning and final utilisation of the work then the contractor will be liable to pay liquidated damages by way of penalty at the rate of 1/2% (Half percent) per week of delay of the total contract cost subject to a maximum of 7.5% of total contract cost. Decision of Engineer-in-Charge shall be binding in this regard. The payment of liquidated damages/penalty may be reduced or waived at the sole discretion of the Company whose decision in this regard will be final. In the event of there being undue delay in execution of the Contract, the Company reserves the right to cancel the Contract and / or levy such additional damages as it deems fit based on the actual loss suffered by the company attributable to such delay. The company's decision in this regard shall be final.

17.2. Not applicable.

17.3 The parties agree that the sum specified above is not a penalty but a genuine pre-estimate of the loss/damage which will be suffered by OIL on account of delay/breach on the part of the Contractor and the said amount will be payable without proof of actual loss or damage caused by such delay/breach and without any demur and shall not be open for any dispute whatsoever.

17.4 Liquidated Damages are to be recovered from the final bill & not from the running bills. In case adequate amount may not be available in the final bill, necessary recovery can be made from previous bill(s) or Performance security submitted by the contractor.

**18.0 PERFORMANCE SECURITY:**

The Contractor has furnished to Company Two Bank Guarantees of value and validity as mentioned in the Letter of Award. The performance security shall be payable to Company as compensation for any loss resulting from Contractor's failure to fulfil their obligations under the Contract. In the event of extension of the Contract period, the validity of the bank guarantee shall be suitably extended by the Contractor. The bank guarantee will be discharged by Company not later than 30 days following its expiry.

**19.0 ASSOCIATION OF COMPANY'S PERSONNEL:** Company's engineer will be associated with the work throughout the operations. The Contractor shall execute the work with professional competence and in an efficient and workman like manner and provide Company with a standard of work customarily provided by reputed IP Survey Contractors to major international oil companies in the petroleum industry.



20.0 **LABOUR:** The recruitment of the labour shall be met from the areas of operation and wages will be according to the rates prevalent at the time which can be obtained from the District Authorities of the area. The facilities to be given to the labourers should conform to the provisions of labour laws as per contract Labour (Regulation and Abolition) Act, 1970.

21.0 **LIABILITY:**

21.1 Except as otherwise expressly provided, neither Company nor its servants, agents, nominees, Contractors, or sub-contractors shall have any liability or responsibility whatsoever to whomsoever for loss of or damage to the equipment and/or loss of or damage to the property of the Contractor and/or their Contractors or sub-contractors, irrespective of how such loss or damage is caused and even if caused by the negligence of Company and/or its servants, agent, nominees, assignees, contractors and sub-Contractors. The Contractor shall protect, defend, indemnify and hold harmless Company from and against such loss or damage and any suit, claim or expense resulting there from.

21.2 Neither Company nor its servants, agents, nominees, assignees, Contractors, sub-contractors or its Affiliates or Covertures shall have any liability or responsibility whatsoever for injury to, illness, or death of any employee of the Contractor and/or of its Contractors or sub-contractor irrespective of how such injury, illness or death is caused and even if caused by the negligence of Company and/or its servants, agents nominees, assignees, Contractors and sub-contractors. Contractor shall protect, defend, indemnify and hold harmless Company from and against such liabilities and any suit, claim or expense resulting there from.

21.3 The Contractor hereby agrees to waive its right of recourse and further agrees to cause its underwriters to waive their right of subrogation against Company and/or its underwriters, servants, agents, nominees, assignees, Contractors and sub-contractors for loss or damage to the equipment of the Contractor and/or its sub-contractors and/or their employees when such loss or damage or liabilities arises out of or in connection with the performance of the contract limited to the Contractor's liabilities agreed to under this Contract.

21.4 The Contractor hereby further agrees to waive its right of recourse and agrees to cause its underwriters to waive their right of subrogation against Company and/or its underwriters, servants, agents, nominees, assignees, Contractors and sub-contractors for injury to, illness or death of any employee of the Contractor and of its contractors, sub-contractors and/or their employees when such injury, illness or death arises out of or in connection with the performance of the contract limited to the Contractor's liabilities agreed to under this Contract.

21.5 Except as otherwise expressly provided, neither Contractor nor its servants, agents, nominees, Contractors or sub-contractors shall have any liability or responsibility whatsoever to whomsoever for loss of or damage to the equipment and/or loss or damage to the property of the Company and/or their Contractors or sub-contractors, irrespective of how such loss or damage is caused and even if caused by the negligence of Contractor and/or its servants, agents, nominees, assignees, Contractors and sub-contractors. The Company shall protect, defend, indemnify and hold harmless Contractor from and against such loss or damage and any suit, claim or expense resulting there from.

21.6 Neither Contractor nor its servants, agents, nominees, assignees, Contractors, sub-contractors shall have any liability or responsibility whatsoever to whomsoever for injury or illness, or death of any employee of the Company and/or of its Contractors or sub-contractors irrespective of how such injury, illness or death is caused and even if caused

by the negligence of Contractor and/or its servants, agents, nominees, assignees, Contractors and sub-contractors. Company shall protect, defend indemnify and hold harmless Contractor from and against such liabilities and any suit, claim or expense resulting there from.

21.7 The Company agrees to waive its right of recourse and further agrees to cause its underwriters to waive their right of subrogation against Contractor and/or its underwriters, servants, agents, nominees, assignees, Contractors and sub-contractors for loss or damage to the equipment of Company and/or its contractors or sub-contractors when such loss or damage or liabilities arises out of or in connection with the performance of the contract.

21.8 The Company hereby further agrees to waive its right of recourse and agrees to cause it underwriters to waive their right of subrogation against Contractor and/or its underwriters, servants, agents, nominees, assignees, Contractors and sub-contractors for injury to, illness or death of any employee of the Company and of its Contractors, sub-contractors and/or their employees when such injury, illness or death arises out of or in connection with the performance of the Contract.

22.0 **LIMITATION OF LIABILITY:** Notwithstanding any other provisions herein to the contrary, except only in cases of wilful misconduct and / or criminal acts,

(a) Neither the Contractor nor the Company (OIL) shall be liable to the other, whether in Contract, tort, or otherwise, for any consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs.

(b) Notwithstanding any other provisions incorporated elsewhere in the contract, the aggregate liability of the Contractor in respect of this contract, whether under Contract, in tort or otherwise, shall not exceed 50% of the Contract Price, provided however that this limitation shall not apply to the cost of repairing or replacing defective equipment by the Contractor, or to any obligation of the Contractor to indemnify the Company with respect to Intellectual Property Rights.

(c) Company shall indemnify and keep indemnified Contractor harmless from and against any and all claims, costs, losses and liabilities in excess of the aggregate liability amount in terms of clause (b) above.

**23.0 INDEMNITY AGREEMENT:**

23.1 Except as provided hereof Contractor agrees to protect, defend, indemnify and hold Company harmless from and against all claims, suits, demands and causes of action, liabilities, expenses, cost, liens and judgments of every kind and character, without limit, which may arise in favour of Contractor's employees, agents, contractors and sub-contractors or their employees on account of bodily injury or death, or damage to personnel/properly as a result of the operations contemplated hereby, regardless of whether or not said claims, demands or causes of action arise out of the negligence or otherwise, in whole or in part or other faults.

23.2 Except as provided hereof Company agrees to protect, defend, indemnify and hold Contractor harmless from and against all claims, suits, demands and causes of action, liabilities, expenses, cost, liens and judgments of every kind and character, without limit, which may arise in favour of Company's employees, agents, contractors and sub-contractors or their employees on account of bodily injury or death, or damage to personnel/properly as a result of the operations contemplated hereby, regardless of whether or not said claims, demands or causes of action arise out of the negligence or otherwise, in whole or in part or other faults.

**24.0 INDEMNITY APPLICATION:** The indemnities given herein above, whether given by Company or Contractor shall be without regard to fault or to the negligence of either party even though said loss, damage, liability, claim, demand, expense, cost or cause of action may be caused, occasioned by or contributed to by the negligence, either sole or concurrent of either party.

24.1 The Contractor shall not make Company liable to reimburse the Contractor to the statutory increase in the wage rates of the contract Labour appointed by the Contractor. Such statutory or any other increase in the wage rates of the contract Labour shall be borne by the Contractor.

24.2 The Contractor shall not engage Labour below 18 (eighteen) years of age under any circumstances. Persons above 60 (sixty) years age also shall not be deployed except Manager / Superintendent.

24.4 Moreover, the Contractor should obtain and produce in advance to commencement of Work all statutory certificates/licenses required for commencement of work against the contract. The Contractor employing 20 (twenty) or more workmen on any day of the preceding 12 (twelve) months shall be required to obtain requisite license at his cost from the appropriate Licensing Officer before undertaking any contract work. The Contractor shall also observe the rules and regulations framed under the Contract Labour (Regulations & Abolition) Act.

**25.0 ENTIRE CONTRACT:** This Contract contains the entire agreement between the Parties and supersedes any previous understandings, commitments, agreements or representations whatsoever, oral or written, pertaining to the subject matter hereof, provided that nothing in this Clause (Entire Contract) shall have effect to exclude or restrict the liability of either Party for fraud or fraudulent misrepresentation.

**26.0 RECORDS, REPORTS AND INSPECTION:** The Contractor shall, at all times, permit the Company and its authorized employees and representatives to inspect all the Work performed and to witness and check all the deliverables and tests made in connection with the said work. The Contractor shall keep an authentic, accurate history and logs reasonable times for inspection by the Company's designated representatives and its authorized employees and representatives. The Contractor shall provide the Company designated representatives with a weekly written report, on form prescribed by the Company showing details of work during the preceding week. The Contractor shall not, without Company's written consent allow any third person(s) access to the said records, or give out to any third person information in connection therewith.

#### **27.0 INSPECTION OF MATERIALS**

**27.1 INSPECTION BY COMPANY:** The Company shall have the right to inspect and reject for any valid cause any items, equipment, material furnished by Contractor for its use in the work related to contract and Contractor shall replace or repair at its sole expense such items so rejected with items free of defects, to the satisfaction of the Company.

**28.0 ROYALTY AND PATENTS:** Not Applicable.

**29.0 CUSTOMS DUTY:** Not Applicable.

**30.0 DEMOBILISATION:** The Contractor shall arrange for and execute demobilization of the Tools/Equipment/ Spare/ Accessories/Manpower etc. upon receipt of notice for demobilization from Company. Demobilization shall mean completion / termination of the contract and shall include equipment/tools/accessories, including the manpower,

unutilized spares and consumables at the cost of the contractor. Demobilization shall be completed by Contractor within 15 days of issue of demobilization notice by Company.

**31.0 PAYMENTS, MANNER OF PAYMENT, RATES OF PAYMENT:**

31.1 Company shall pay to the Contractor during the term of the Contract the amount due from time to time calculated according to the Schedule of Rates. No other payments shall be due from company unless specifically provided for in the Contract.

31.2 **MANNER OF PAYMENT:** All payments due by Company to Contractor hereunder shall be made at Contractor's designated bank. Bank charges, if any will be on account of the Contractor.

31.3 Payment of any invoices shall not prejudice the right of Company to question the validity of any charges therein, provided Company within one year after the date of payment shall make and deliver to Contractor written notice of objection to any item or items the validity of which Company questions.

31.4 Not Applicable.

31.5 Contractor shall send invoice to company on the day following the end of each month for all daily or monthly charges due to the contractor.

31.6 Contractor shall submit three (03) sets of all invoices duly super scribed 'Original' and 'Copy' as applicable to the Company for processing payment. Separate invoices for the charges payable under the contract shall be submitted by the Contractor for foreign currency and Indian currency.

31.7 Payment of monthly invoices, if undisputed, shall be made within 30 days following the date of receipt of invoice by Company.

31.8 Company shall within 30 days of receipt of the invoice notify the Contractor of any item under dispute, specifying the reasons thereof, in which event, payment of the disputed amount may be withheld until settlement of the dispute, but payment shall be made of any undisputed portion on or before the due date. This will not prejudice the company's right to question the validity of the payment at a later date as envisaged in Clause 31.3 above.

31.9 The acceptance by Contractor of part payment on any billing not paid on or before the due date shall not be deemed a waiver of Contractor's rights in any other billing, the payment of which may then or thereafter be due.

31.10 Payment of final demobilization charges shall be made if applicable within 45 days on receipt of invoice by Company accompanied by the following documents from the Contractor:

- a) Audited account up to completion of the contract.
- b) Tax audit report for the above period as required under the Indian Tax Laws.
- c) Documentary evidence regarding the submission of returns and payment to taxes for the personnel engaged by the Contractor or by its Sub-contractor.
- d) Any other documents as required by applicable Indian Laws.

In case, no demobilization charges are payable, the documents mentioned above will have to be submitted by the Contractor before release of the final payment by the Company. A certificate from Chartered Accountant on (a), (b) & (c) above will suffice

31.11 Contractor shall maintain complete and correct records of all information on which contractor's invoice are based upto 2 (two) years from the date of last invoice. Such

records shall be required for making appropriate adjustments or payments by either party in case of subsequent audit query / objection.

31.12 Provident Fund: The Contractor if covered under the P.F Act and if the contract cost is inclusive of P.F., must ensure strict compliance of provisions of Provident Fund and Miscellaneous Provisions Act, 1952 in addition to the various Acts mentioned elsewhere in this contract. Any Contractor found violating these provisions will render themselves disqualified from any future tendering. As per terms of the contract, if applicable, the Contractor must deposit Provident Fund Contribution (covering Employee's & Employer's share) with the competent authority monthly under their direct code. The Contractor shall be required to submit documentary evidence of deposit of P.F. Contribution to the Company. In case of failure to provide such documentary evidence, the Company reserves the right to withhold the amount equivalent to 13.36% P.F. Contribution on wage component.

### 32.0 **APPLICABLE LAW:**

32.1 The Contract shall be deemed to be a Contract made under, governed by and construed in accordance with the laws of India for the time being in force and shall be subject to the exclusive jurisdiction of Courts situated in Jodhpur, Rajasthan.

32.2 The Contractor shall ensure full compliance of various Indian Laws and Statutory Regulations, to the extent applicable, as stated below, but not limited to, in force from time to time and obtain necessary permits/ licenses etc. from appropriate authorities for conducting operations under the Contract:

- a) The Mines Act 1952-as applicable to safety and employment conditions .
- b) The Minimum Wages Act, 1948.
- c) The Oil Mines Regulations, 2017.
- d) The Workmen's Compensation Act, 1923.
- e) The Payment of Wages Act, 1963.
- f) The Payment of Bonus Act, 1965.
- g) The Contract Labour (Regulation & Abolition) Act, 1970 and the rules framed thereunder.
- h) The Employees Pension Scheme, 1995.
- i) The Interstate Migrant Workmen Act., 1979 (Regulation of employment and conditions of service).
- j) The Employees Provident Fund and Miscellaneous Provisions Act, 1952.
- k) The Rajasthan Tax Act
- l) The Goods and Service Tax Act, 2017.
- m) Customs Act & Rules
- n) Rajasthan Entry Tax Act
- o) Environment Protection Act
- p) Public Liability Act.
- q) Income tax Act.
- r) Insurance Act.

32.3 **EXPATRIATE PERSONNEL:** Not Applicable.

33.0 **SUBSEQUENTLY ENACTED LAWS:** Subsequent to the date of bid closing, if there is a change in or enactment of any law or change in application or enforcement or interpretation of existing law by any governmental authority or public body, which results in addition/ reduction in cost to Contractor on account of the operation contemplated under the Contract, the Company/Contractor shall reimburse the Contractor/pay Company for such additional/reduced costs actually incurred/saved by Contractor, subject to the submission of documentary evidence by Contractor/Company.

34.0 **SET-OFF:** Any sum of money due and payable to the Contractor (including Performance Security refundable to them) under this or any other Contract may be appropriated by OIL and set-off against any claim of OIL (or such other person or persons contracting through OIL) for payment of a sum of money arising out of this contract or under any other contract made by the Contractor with OIL (or such other person or persons contracting through OIL).

35.0 **WITHHOLDING:** Company may withhold or nullify the whole or any part of the amount due to Contractor, after informing the Contractor of the reasons in writing, on account of subsequently discovered evidence in order to protect Company from loss on account of :-

- a) For non-completion of jobs assigned as per Scope of Work and Special Conditions of Contract.
- b) Contractor's indebtedness arising out of execution of this Contract.
- c) Defective work not remedied by Contractor.
- d) Claims by sub-Contractor of Contractor or others filed or on the basis of reasonable evidence indicating probable filing of such claims against Contractor.
- e) Failure of Contractor to pay or provide for the payment of salaries/ wages, contributions, unemployment compensation, taxes or enforced savings with-held from wages etc.
- f) Failure of Contractor to pay the cost of removal of unnecessary debris, materials, tools, or machinery.
- g) Damage to another Contractor of Company.
- h) All claims against Contractor for damages and injuries, and/or for non-payment of bills etc.
- i) Any failure by Contractor to fully reimburse Company under any of the indemnification provisions of this Contract. If, during the progress of the work Contractor shall allow any indebtedness to accrue for which Company, under any circumstances in the opinion of Company may be primarily or contingently liable or ultimately responsible and Contractor shall, within five days after demand is made by Company, fail to pay and discharge such indebtedness, then Company may during the period for which such indebtedness shall remain unpaid, with-hold from the amounts due to Contractor, a sum equal to the amount of such unpaid indebtedness.

Withholding will also be effected on account of the following:-

- i) Order issued by a Court of Law in India.
- ii) Income-tax deductible at source according to law prevalent from time to time in the country.
- iii) Any obligation of Contractor which by any law prevalent from time to time to be discharged by Company in the event of Contractor's failure to adhere to such laws.
- iv) Any payment due from Contractor in respect of unauthorised imports.

When all the above grounds for withholding payments shall be removed, payment shall thereafter be made for amounts so with-hold.

Notwithstanding the foregoing, the right of Company to withhold shall be limited to damages, claims and failure on the part of Contractor, which is directly/indirectly related to some negligent act or omission on the part of Contractor.

36.0 **WAIVER:** Any delay in exercising and any omission to exercise any right, power or remedy exercisable by the Company under this contract shall not impair such right, power or remedy nor shall any waiver by the Company of any breach by the Contractor of any provision of this contract prevent the subsequent enforcement of that provision by

the Company or be deemed a waiver by the Company of any subsequent breach by the Contractor.

**37.0 INGRESS AND EGRESS AT LOCATION:**

37.1 The Company shall provide the Contractor, if required, requisite certificates for obtaining rights of ingress to, egress from locations where jobs are to be performed, including any certificates required for permits or licenses for the movement of the Contractor's personnel/equipment. Should such permits/licenses be delayed because of objections of concerned authorities in respect of specific Contractor's person(s), such person (s) should be promptly removed from the list by the Contractor and replaced with acceptable person (s).

**38.0 GENERAL HSE GUIDELINES:**

38.1 For General guidelines with respect to Health, Safety and Environmental aspects Appendix – A to be referred.

**39.0 POLLUTION:** Not Applicable.

**40.0 DEFECT LIABILITY PERIOD:** The defect liability for the property and all the items shall be 12 months from the date of actual completion or end of Work Order period whichever is later unless otherwise specifically mentioned and as certified by Engineer-In-Charge. During defect liability period, all corrective works shall be performed entirely at Contractor's own expenses. In case if such corrective works are not performed within a reasonable time after instructions, the Company at its discretion, may have such remedial works carried out through third party at the risk and cost of contractor. The costs so incurred shall be deducted from contractor's bill or Retention money/performance security.

**41.0 FISHING:** Not Applicable.

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**END OF SECTION – I, Part - 3**

### **Part – 3**

#### **SECTION – II**

##### **SCOPE OF WORK/SPECIAL CONDITIONS OF CONTRACT FOR CIVIL WORKS**

1. **SCOPE OF WORKS:** The primary scope of the work is construction of **OIL Executive Residential Complex – Jodhpur**. The works under this contract shall include project management but not limited to providing labour, tools and plants, machineries, transport and all other components viz. Civil, Electrical, BMS, Rooftop PV Plant, Plumbing, Sanitation, Landscaping, Fire safety and other related works up to the finishing so as to render it readily habitable except soft furnishing, including supply of all materials (unless otherwise mentioned specifically) so as to complete the project in all respect. The scope also includes following and maintaining project execution standards of guidelines as set by Green Building certification bodies such as GRIHA/IGBC.
2. **SITE LOCATION:** The site is located at Khasra No 677, near Judicial Academy, about 1.8 km from Jhalamand Circle, Jodhpur, Rajasthan.
3. **DURATION OF AGREEMENT AND WORK ORDERS:** Within the currency of the contract period, a gross period Work Order and multiple individual Sub - Work Orders may be issued against different individual set of jobs. The completion period of each Sub-Work Orders shall be different depending upon the approved Gantt chart (from Primavera) but within the gross contract period. The commencement and sequence of Sub-Work Orders shall be depending upon the criticality as per Critical Path Method (CPM) analysis. In case of non-performance or under performance by the contractor, provisional Retention Money shall be imposable for every individual Work Orders separately against respective Work Order values. However, the total value and method of evaluation shall be as per Liquidated Damages clause.
4. **EXECUTION ON ITEM RATE BASIS:** The works shall be carried out by contractor on item rate basis in conformity with the detailed drawing, scope of work, technical specifications, special conditions of the tender documents (including any addition/modification/ alteration/deletion made from time to time therein found essential for completion of works) for civil and all other works unless otherwise specifically mentioned in the line item.
5. **VARIATIONS/DEVIATIONS IN ITEMS, SPECS. & QUANTITIES:** There is no limit in variation of the quantum or values of the individual items. The rates shall remain firm in all the cases. The Engineer-In-Charge may increase or decrease the quantity of individual items to any extent based on costs and technical optimization or any other reason it shall in his opinion be desirable. The contractor shall be responsible for fair rates quoted against individual items irrespective of its quantity or its combination with other items. The rates are deemed to have sufficient profit margins, overhead, site conditions and other uncertainties factors in the project.

The Engineer-In-Charge may discard any of the items having unreasonably higher rates quoted than the prevailing market trend, and instruct for opting alternate deviated items from CPWD-DSR or partial substitution from the market or may go for separate third party independent procurements. The contractor shall not object to the decision in the pretext of gross loss or otherwise.

The Engineer-In-Charge may accept minor deviations in the item specifications provided the same is technically acceptable and financially not implicating significant changes in his/her opinion.

The Engineer-In-Charge may also discard any of the items without citing reasons to the contractor. The Engineer-In-Charge may also ask for the best quality materials amongst the approved list.



The contractor shall not contest to the above or ask for justification. The decision of the Engineer-In-Charge shall be final and binding on to the contractor.

6. Payment shall be at actuals based on the prices mentioned in the Schedule of Rates of the Contract.
7. **RATES FOR SUPPLEMENTARY ITEMS:** Item deviations shall not be permitted in general. However, in case of unavoidable circumstances Engineer-In-Charge may advise for supplementary / deviated items as per job requirements. The payment rates for such items shall be adopted flat from the CPWD-DSR 2018 after deduction of flat 18% GST component and then added with contractor's quoted percentage % adjustment (markup/discount), but without adjustment for applicable Cost Index or otherwise. The formula for calculation shall be  $[\text{Contract Rate} = (\text{DSR2018}/1.18) \times (100\% \pm \text{quoted \% markup/rebate})]$ . The items specification shall be of nearest possible descriptions with the CPWD-DSR. The interpretation of similarity and decision thereon by the Engineer-In-Charge shall be final and binding. In case customization of rates are necessitated, such items shall be analyzed as per CPWD's Delhi Analysis of Rates (DAR-2018) format where the input rates would be the actual cost incurred (without GST component) subject to furnishing of documentary evidences (genuine GST invoice wherever applicable). The basic rates and coefficient wherever applicable shall be as per DSR'2018 with quoted percentage markup/discount. No additional costs shall be added for royalty, octroi etc. which is deemed to have taken care by quoted percentage markup/discount.
8. **DISCLOSURE OF INPUT COSTS:** The contractor may be asked for procurement details of some major items (e.g. cement, reinforcement, aggregates, masonry blocks, electrical, sanitary) or entire items of the project such as individual invoices of material procurement, source of procurement, transportation, manufacturer's details, materials details, testing certificates, details of wage/salary payments to the site personnel etc. All original documents shall be maintained by the contractor, and a set of relevant copies self-certified by the contractor shall be submitted to the Engineer-In-Charge.
9. **PRICE VARIATION OVER TIME:** The rates quoted in the contract shall remain firm throughout the original contract period. However, if project is delayed inordinately for the reasons not attributable to the contractor directly or indirectly, other than Force majeure, Price Variation Clause (PVC) may be effected in order to protect both the parties from un anticipated sharp inflation changes over long period. The contractor shall initiate claim if such variation exceeds more than 10% rise in CPI indices between contract signing month and 30<sup>th</sup> months thereafter, at the time of actual execution  $\{ (\text{CPI}_{30\text{th month}} - \text{CPI}_{\text{agreement}}) / \text{CPI}_{\text{agreement}} \times 100 > 10\% \}$ .  
The contractor may be compensated with price difference flatly based on All India Consumer Price Index for Industrial Workers (CPI-IW) published by RBI / Labour Bureau, Govt. of India. The contractor shall not claim for any individual predominant materials price hikes, as the case may be.  
Such price variation shall be admissible only if the contractor did not delay directly or indirectly in any of the other activities or WBS (Work Breakdown Structure) elements during the gross period of execution. Also the Contractor shall establish the loss incurred by way of Rate Analyses as per DAR-2018 format for all individual items; so as to compare with the contract SoQ rates. The Rate Analyses shall be substantiated with actual invoices for major materials. A flat lump sum compensation will be calculated as per the formula:

$$[\text{Price Variation} = Q \times ((\text{CPI}_{\text{actual}} - \text{CPI}_{\text{agreement}}) / \text{CPI}_{\text{agreement}} - 10\% ),$$

Where,

Q = Value of items /quantities executed after 30<sup>th</sup> month of signing the contract agreement.

CPI<sub>actual</sub> = All India Consumer Price Index (IW) during the month of actual execution.

CPI<sub>agreement</sub> = Consumer Price Index during month of signing contract agreement;

If price variation clause is invoked by the contractor, and if subsequently the Price Variation value when calculated with the same formula comes negative, then the

same amount shall be deducted from the contractor's bills. Price variation if applicable shall be reconciled after completion of the project. This clause is not applicable for post commissioning operation and maintenance or rectification costs if any. Please note that Price variations due to change in statutory taxes/GST rates shall be dealt separately as per relevant clause in the contract.

- 10. CONTRACTOR'S RESPONSIBILITY IN UNDERSTANDING THE CONTRACT:** The contractor shall be deemed to have satisfied himself before tendering as to the sufficiency and correctness of his tender for the works and of the rates and prices quoted in the brief specifications, drawings, scope of work and payment (billing) schedule, which rates and prices shall, except as otherwise provided, cover all obligations under the contract and all matters and things found necessary for proper completion and maintenance of the works. It shall be the responsibility of the contractor to incorporate the changes that may be different from the scope of work envisaged at the time of tendering and as actually required to be executed. The contractor has quoted his rates after clearly studying the scope of work given in Tender Documents availed by him by downloading from the website or made available to him at the tendering stage itself and getting fully satisfied with the various items and technical intricacies involved in the work under his scope of work as envisaged in the tender. OIL shall not entertain any claim of the contractor on account of error or omission by him in this respect.
- 11. STATUTORY APPROVALS:** OIL shall be responsible for Building Drawing approval from Jodhpur Development Authority (JDA) and NOC from Indian Air Force (IAF) / Airport Authority of India for height clearance. For obtaining all other statutory approvals during construction and thereafter, the contractor shall be responsible on behalf OIL or on his behalf unless otherwise parameters are fully dependent on OIL. Necessary liaisoning to be undertaken wherever required with no extra claim. All the approvals shall be taken before the scheduled completion period and in any case before the work can be taken over.
- 12. ORDER OF PRECEDENCE OF DOCUMENTS:** The following Additional Conditions of Contract shall be read in conjunction with General Conditions of Contract (GCC) and other conditions of the tender documents. In case of difference, contradiction, discrepancy, with regard to conditions of contract, Specifications, Drawings, Bill of quantities etc. forming part of the contract, the following shall prevail in order of precedence.
- Work Order (for start and end dates)
  - Deviation Orders / Site Order Book
  - Schedule of Quantities / Descriptions in line items
  - Approved / Reviewed shop drawings/RFC Drawings
  - Field Test Reports
  - Statutory directives
  - Technical specifications in this contract
  - Special Condition of Contract.
  - Relevant B.I.S. Codes
  - Latest CPWD/Specifications

The scope also includes following and maintaining project execution standards of guidelines as set by Green Building certification bodies such as GRIHA/IGBC.

- 13. SUB-LETTING OF SPECIALIZED JOBS:** Sub-letting the certain specialized items may be permitted with permission from the Engineer-In-Charge. However, responsibility in entirety shall always rest with the primary contractor in all respect. The eligibility of nature of the specialized jobs and the nature of sub-contractor vendor (e.g., authorized service provider) shall be as decided by Engineer-In-Charge.
- 14. FREQUENCY OF BILL PAYMENT:** The mode of payment may not be oftener than monthly. Payment of works will be made only when the Engineer-in-charge is fully satisfied with the quality and service ability of the works. Running Bills may not be processed unless substantial tangible jobs are completed, the assessment of such quantum shall rest with the discretion of the Engineer- In-Charge. Contractor has to

submit their claimed measurement details (against completed payable items) in soft copy in spreadsheet (MS excel sheet) to the Engineer-In-Charge in the FORMAT of CMB (Computerized Measurement Book) as generally practised by CPWD or OIL Civil Engineering section. The measurement shall be verified jointly by the contractor and Engineer-In-Charge or his authorized representatives. Subsequently, contractor shall raise invoice against the undisputed measurements along with supporting documents if any for payments.

- 15. COMMUNICATION FOR SITE WORKS:** In addition to usual written communication, the other mode of retrievable communication such as e-mail, social media etc passed on to the contractor or his representatives shall be deemed to be valid instruction for the purpose of site related day-to-day activities. However, vital formal communications shall be by way of usual signed formal letters/documents only.
- 16. SAFETY CODE:** Contractor shall adhere to safe construction practice and guard against hazardous and unsafe working conditions and shall comply with BIS guidelines (published in relevant IS codes), CPWD Safety code and any other safety directives issued by Engineer-In-Charge from time to time. Tool box meeting / safety briefing shall be conducted with work force before commencement of every hazardous works including works in heights. Full time safety net shall be laid around the structure from all practicable sides from floor slab level 2 onward with proper props as approved by Engineer-In-Charge.
- 17. GREEN BUILDING COMPLIANCE:** Apart from design aspects (largely decided by OIL), Contractor shall maintain good house-keeping of the work site throughout the project period as instructed by the Engineer-In-Charge from time to time. Worksite arrangements and works methodology shall be fully compliant to the guidelines as prescribed by GREEN BUILDING certifying agencies such as IGBC/GRIHA with necessary documentations wherever necessary. No additional payments shall be compensated on account of meeting such compliances.  
Some of the indicative parameters (but not limited to) are stripping and stacking top soil for re-use in landscaping, use of optimum concrete curing procedure, selection of building materials along with its technical and commercial details including source, distances and sources of material supplies, re-use and recycling of waste materials, types of construction tools, equipment and accessories, water consumption rate with meters, effluent treatment and re-use of water, air pollution monitoring with devices, carrying of materials and wastes in covered vehicles, covering/sprinkling of water on to fine aggregates, loose earths and other source of dusts with non-potable STP water, limiting vehicular speed to 10km/h, noise level, worksite ambience, providing other applicable proper labour amenities etc. Contractor may refer to <https://igbc.in> and [www.grihaindia.org](http://www.grihaindia.org) for details. Requirements not meeting the compliances as deemed by the Engineer-In-Charge may not be permitted at the site.
- 18. WATER DURING CONSTRUCTION:** The contractor shall arrange water fit for the purpose of drinking and construction at their own cost. Boring underground water may be permitted at site subject to permission from the statutory body and suitability of the water for drinking/construction purpose. Contractor shall install PVC storage tank of adequate capacity for drinking purpose. For construction purpose, construction of ground tank may be permitted at the site as approved by the Engineer-In-Charge. Water meter shall be installed at all its sources (municipal/borewell/tanker). Uncontrolled usage of water for construction purpose or for labour camp and un-managed discharge of effluent shall not be permitted at the site.
- 19. ELECTRICITY DURING CONSTRUCTION:** The contractor will make his/their own arrangement for power supply. All the works of the contractor shall be done as per Indian Electricity Act and Rules framed there under and approved by the Engineer-in-Charge. The temporary lines will be removed forthwith after the completion of the work or if there is any hindrance caused to the other work due to the alignment of these lines, the contractor will re-route or remove the temporary lines at his own cost. The power connection shall have valid permission from the concerned authority.

Noiseless DG shall be arranged in case of non-availability of power supply at remote corners or otherwise.

**20. CONSTRUCTION PLAN TO BE SUBMITTED:** Contractor shall to submit construction activity plan, material storage, Tower Crane position, vehicular movement plan, labour camp, water and electricity plan etc to OIL approval before issuance of Work Order. The plan is to be prepared to ensure the following and is to be applied effectively during the whole construction phase:

- a) Demarcate area on the site plan to which the site activities would be limited during construction by the contractor. The demarcated area should be separated from the rest of the site through a physical barrier.
- b) Construction materials such as sand, aggregate etc. to be stored in demarcated areas within low height enclosures to limit spillage, waste and site contamination due to winds.
- c) Location should be identified on the construction site to store the used/scrap wastes. Both these wastes should be separately stored in Bins and handed over to authorized agencies for safe disposal.
- d) Location for other ancillary set ups.

**21. ENGAGEMENT OF SPECIALIZED AGENCY:** The Contractor shall engage competent and experienced specialized agency (as the case may be) approved by OIL for execution of items like Electrical works, elevator system, BMS, solar panel, STP etc as required. The Contractor will submit the credentials of the specialized agencies for approval by OIL. However, the entire responsibility towards quantity and quality of the entire project including services shall remain with the main Contractor. Nothing extra will be paid on this account.

**22. ENABLING WORKS:** Enabling works and other site arrangements shall not be payable. Enabling works shall be as directed by Engineer-In-Charge as per requirement of the project from time to time. The contractor shall comply without claiming for any compensation. Some of the enabling works are as tabulated below (Not exhaustive).

| Sl | Description (Minimum requirement)  |
|----|--|
| 1  | <b>SITE OFFICE:</b> <ol style="list-style-type: none"> <li>a) OIL personnel room (2 persons): 7.2sqm (carpet area), A/C, Table/Chair-2 set with other general office furnishing</li> <li>b) Contractor personnel (10 persons): 20sqm (carpet area), cooler, Table/Chair- 10 set with other general furnishing</li> <li>c) Toilet Block: 6sqm (carpet area) WC cum bath – 2 set (unisex) with tiles, basins, mirror, health faucet and other standard fitting.</li> <li>d) Kitchen/pantry: 5sqm (carpet area) having counter, sink-tap, LPG-burner set etc.</li> <li>e) Desktop with 21” monitor, core i7 processor, 8 GB RAM</li> <li>f) Multifunction printer: Laser jet</li> <li>g) Broadband connection</li> <li>h) Necessary signage with stiff framed flex prints.</li> </ol> |
| 2  | <b>SITE LAB:</b> <ol style="list-style-type: none"> <li>i) 20sqm, cooler, Table/Chair- 1 set with other general furnishing</li> </ol>  |
| 3  | <b>CEMENT GODOWN:</b> <ol style="list-style-type: none"> <li>a) As per CPWD specification with minimum capacity of 600 bags with first-in, first-out provision</li> </ol>  |
| 4  | <b>ENVIRONMENTAL CONSERVATIONS, AIR AND SOIL POLLUTION CONTROL:</b> <ol style="list-style-type: none"> <li>1) Continuous PPGI barricading sheet with height 3.0m, full height Scaffolding net- high density Polyethylene UV stabilized, shading coefficient minimum 75% (as per directives)</li> <li>2) Erosion channel with mesh/bunds and sedimentation tanks during monsoon to prevent site erosion or to reduce movement of soil outside during the project.</li> <li>3) Acoustic diesel generator sets (complying CPCB norms), stack height 3 m</li> </ol>  |

|    |  |
|----|--|
|    | from the top with a cap etc.   |
|    | 4) Vehicle wheel washing facility/gravel bed at all vehicular entrances/exits of the site.   |
|    | 5) Spill prevention plan/dyke walls for storage of hazardous items e.g, HSD, admixtures, bitumen etc.  |
|    | 6) Water meter and Waste Water treatment system (MBBR) for reuse   |
| 5  | <b>CCTV and Access control :</b><br>j) 7 Nos camera, 2 MP, IP 66 at different corners with varying pole heights up to 20m from ground.<br>k) Biometric attendance with finger print + face (iris) detection (for staff and labourers)<br>l) Connection to internet for remote monitoring and recording from the office (OIL HOUSE).<br>m) Monitor – 32” two nos; NVR/DVR backup – 8TB and Other related accessories  |
| 6  | <b>High Mast LED lights:</b> Erection of 2 Nos 20m height  |
| 7  | <b>ACCOMMODATION - TECHNICAL PERSONNEL:</b> 3 Nos of 2 bed rooms with furnishing befitting and officer (Similar to Hotel Room)   |
| 8  | <b>ACCOMMODATION LABOUR CAMP:</b> For 80 on-site resident labourers with amenities as per directives   |
| 9  | <b>OTHER LABOUR AMMENITIES:</b> Canteen, Crèche, rest room etc as per government directives / CPWD GCC.  |
| 10 | <b>AREA LIGHTING:</b> Adequate lightings with poles and LED lights sufficient lux required for construction during night.  |
| 11 | <b>WATER STORAGE TANK:</b> Adequate UG (masonry with impervious layer) tank and PVC storage tanks with proper pumps, plumbing and fittings.  |
| 12 | <b>MANNED SECURITY GATES (24 Hrs):</b> Proper Security hut security in shifts.   |
| 13 | <b>AIR MONITORING DEVICE:</b> Ambient Air Monitoring Device shall be installed as per requirement of GRIHA / IGBC / NAAQ   |
|    | <b>NB:</b><br>1. The size, arrangement, specifications, list of item etc may be variable with layout as approved by the Engineer-In-Charge.<br>2. In case of non-compliances on any of the above requirements by the contractor within 7 days of intimation, the Engineer-In-Charge may engage any available third parties on nomination basis (without going through public procurement method) at the cost and risk of the contractor, whose payment shall be made by the contractor or recovered from the contractor's payment/PBG. |

**23. WORK IN MONSOON AND SUMMER:** The Contractor must maintain minimum labour force as may be required for the job and plan and execute the construction and erection according to the prescribed schedule. No extra rate will be considered such work in monsoon. During monsoon and other period, it shall be the responsibility of the Contractor to keep the construction work site free from water logging at his own cost.

During summer heat, the contractor shall ensure necessary safety measures of the workers against scorching summer heat in the form of loo or otherwise.

In case of works stoppage on account of above, the cause and duration shall be recorded in the Hindrance Register duly countersigned by the Engineer-In-Charge for validation.

**24. WORKING PERIOD AND SHIFTS:** The working time at the time of work is 48 hours per week. Over timework is permitted in cases of need, however OIL shall not compensate the same in any manner. Shift working up to 2 shifts per day will be operated whenever necessary to commensurate the work progress. The contractor shall take this aspect in to consideration for formulating his rates in the bid. No extra

claims will be entertained on this account. The contractor must arrange for the placement of workers in such a way that delayed completion of the work or any part thereof for any reason whatsoever will not affect their proper employment. OIL shall not entertain any claim for idle time payment whatsoever. For carrying out critical work on Sundays and holidays, the Contractor shall approach the Engineer-in-Charge or his representative at least two days in advance and obtain permission in writing.

- 25. SETTING OUTWORKS:** The Engineer-in-Charge shall furnish the Contractor with only the corners of the work site land plots and a level bench mark. The Contractor shall set out the works and shall provide and efficient staff for the purpose and shall be solely responsible for the accuracy of such setting out.

The Contractor shall/provide, fix and be responsible for the maintenance of all stakes, templates, level marks, profiles and other similar things and shall take necessary precautions to prevent their removal or disturbance and shall be responsible for the consequence of such removal or disturbance should the same take place and for their efficient and timely reinstatement. The Contractor shall also be responsible for the maintenance of all existing survey marks, boundary marks, distance marks and centre line marks, either existing or supplied and fixed by the Contractor. The work shall be set out to the satisfaction of the Engineer-In-Charge. The approval thereof or presence of OIL personnel in setting out the work shall not relieve the Contractor or any of his responsibilities.

Before beginning the works, the Contractor shall at his own cost, provide all necessary reference and level posts, pegs, bamboo, flags, ranging rods, strings and other materials for proper layout of the work in accordance with the scheme for bearing marks acceptable to the Owner. The Centre, longitudinal or face lines and cross lines shall be marked by means of small masonry pillars. Each pillar shall have distinct marks at the centre to enable a theodolite to be set over it. No work shall be started until all these points are checked and approved by the Engineer-in-Charge in writing but such approval shall not relieve the Contractor of any of his responsibility. The Contractor shall also provide all labour, material and other facilities, as necessary, for the proper checking of layout and inspection of the points during construction. Pillars bearing identification marks located at the sites of units of works under construction should be protected and fenced by the Contractor.

- 26. RESPONSIBILITY FOR LEVEL AND ALIGNMENT:** The Contractor shall be entirely and exclusively responsible for the horizontal and vertical alignment, the levels and correctness of every part of the work and shall rectify effectually any errors or imperfections therein. Such rectifications shall be carried out by the Contractor, at his own cost, when instructions are issued to that effect by the Engineer-in-Charge.

- 27. COORDINATION AMONGST VARIOUS WORKS:** There will be instances where more than one agency is working at the same time at the site. The contractor shall at all times remain bound to co-ordinate with the agencies, deployed for the above works, including providing free access and making required provisions for them in execution of works pertaining to their portion of works. He shall also remain bound to ensure uninterrupted progress of work by these agencies in a peaceful and smooth manner. He shall also remain bound to make the required changes / additions / alterations in the works done by him to accommodate the items under the scope of work of such other agencies deployed by OIL. The contractor is deemed to have made the estimated allowances in this respect while quoting his rates at the tendering stage.

- 28. TECHNICAL SPECIFICATIONS:** All the materials, workmanship, methodology or any other parameters shall be Material specifications, workmanship and methodology of various items shall be as per latest IS Codes published by BIS or CPWD specifications or approved manufacturer's standard recommendations (in the order of preference) unless otherwise mentioned in this contract. Interpretation and direction of the Engineer In-Charge shall be final and binding on the contractor. The contractor or their representative shall not contest on technical requirements.

All materials to be used for the jobs shall be shown to the Engineer-In-Charge for quality checks/inspection followed by approval for utilization. Materials rejected by the Company must be removed by Contractor from work site within 48 Hrs. of rejection, failing which the Company reserves the right to get the rejected materials removed under risk and cost of the Contractor.

For the items where scope of design rests with the contractor, the overall allowed dimensions for the designs may be restricted within certain limits depending upon the site conditions. For example, STP may have to be custom designed so as to install underground and contained within restricted foot print. Rooftop Solar Panel installation may have to be installed in landscape pattern, at elevated frames (say 2.1m above terrace so as to allow free human passage below the panels, and also have minimum projection height for aesthetic and statutory reasons. Similarly, substation room size, the sizes of panels and other equipment shall be optimally sized, so as to cover minimum footprint.

**29. DEFECT LIABILITY:** The defect liability for the property and all the items shall be 12 months from the date of actual completion or end of Work Order period whichever is later unless otherwise specifically mentioned. However, in case of specialized items where such period mentioned/requirement is higher than 12 months, higher period will be applicable.

**30. OPERATION MAINTENANCE OF SPECIALISED ITEMS:** For items like Roof Top Solar Photo Voltaic Plant, Building Management System (BMS), Sewage Treatment Plant (STP) etc, the contractor shall perform free Operation and Maintenance including consumable and spares during the defect liability period including providing 16 hours skilled BMS operator in the control room, and it shall commence from formal date of full project completion. The contractor shall also agree to enter into sub-contracts for Annual Maintenance Contracts separately for additional minimum period of 5 years and extendable up to full machine/plant's useful life. These contracts may however be short closed by Oil India Ltd. at any point of time with minimum 6-month notice period.

**31. LIQUIDATED DAMAGE (LD):** Liquidated Damage on the gross project shall be as detailed in General Conditions of the Contract (GCC). Additionally, intermediate penalties shall be levied against delay in performance of individual set of activities which shall be considered as provisional Retention Money deductions and shall be reconciled at the end of the overall project with respect to gross Liquidated Damages if any. In case the overall project is completed despite intermediate delays in one or more activities, the provisional Retention Money/penalty amounts deducted shall be refunded to the contractor.

**32. PENALTIES AND RECOVERIES (IN ADDITION TO LD):** Apart from Liquidated Damages, penalties and recoveries may be levied on various ground as mentioned below:

| Sl | Description  | Recovery   |
|----|--|--|
| 1  | Recoveries for direct or indirect damages to OIL's property, assets or services etc if not corrected by the contractor or any works / material supply through third party due to non-compliance by the contractor. | Value assessed by OIL + 25% mark up (In case of disagreement, the contractor may appeal OIL for further review with his valuer representative) |
| 2  | Non deployment of requisite Technical Manpower   | As per relevant clause   |
| 3  | Non Deployment of Tools and Plants   | As per relevant clause   |
| 4  | Non Deployment of Lab and office equipments  | As per relevant clause   |
| 5  | Non adherence to the methodologies and compliances prescribed by Green Building certifying agencies, thereby leading to losing of scoring points for Green Building  | INR 1,00,000.00 (Rs One Lakh) per marks lost (fully attributable to the contractor's fault)  |

|   |   |   |
|---|---|---|
|   | Certification.  |   |
| 6 | Non compliance to the safety guidelines. Proper staging/scaffolding, safety net, non-conducting of Helmet, harness, lifeline, safety shoes, | Rs. 1,000 (One thousand) for each instance of lapse. Penalty to be levied with written warning by EIC with photographic evidence wherever applicable. This shall be at the discretion of the EIC. |
| 7 | Non adherence to Housekeeping after first instruction.  | Rs. 500 (Five hundred) for each instance of serious lapse as decided by EIC. Penalty to be levied with written warning by EIC with photographic evidence wherever applicable.                     |

- 33. MINIMUM TOOLS, PLANT AND MACHINERIES:** The list of minimum tools, plant and machinery to be provided by the contractor during the execution of the project. The deployment of such equipment shall be within 14 days of intimation to the contractor. Non-deployment of the equipment within stipulated time may invite penalty equivalent to daily/hourly rental for the delay period which shall deducted from the bill as deemed by Engineer-In-Charge. The rental for the purpose shall be as per CPWD basic rates or prevailing market rate (based on single quotation collected by Engineer-In-Charge with or without intimation to the contractor) whichever is higher.

**LIST OF MINIMUM TOOLS, PLANT AND MACHINERY**

| Sl | Description  | Quantity    | Period                  |
|----|--|-------------|-------------------------|
| 1  | Total station  | 1 No        | Whenever instructed     |
| 2  | Auto-level and accessories   | 1 No        | Full time               |
| 3  | Silent DG set up to 250 KVA  | As required | Whenever instructed     |
| 4  | Fully automatic Batching Plant for RMC, capacity 30 cum per Hr, Concrete pump, boom pump | 1 set       | For all building RCC    |
| 5  | Welding machine set  | As required | Whenever instructed     |
| 6  | Back Hoe loader (JCB)  | As required | Whenever instructed     |
| 7  | Diesel concrete mixer with hopper (Full bag capacity)                                    | 2 Nos       | Whenever instructed     |
| 8  | Pickup/Utility vehicle + Two wheeler   | 1 set       | Full time               |
| 9  | Water Tanker   | 1 No        | -do-                    |
| 10 | Steel cutting & bending machine  | 5 Nos       | Whenever instructed     |
| 11 | Tower Crane Min 20m ht and 20m cantilever  | 2 No        | Whenever instructed     |
| 12 | Transit concrete Mixers  | 2 nos.      | During concreting works |
| 13 | Formwork/shuttering (aluminium/steel/plywood)  | 3500 sqm    | During RCC works        |
| 14 | Steel treaded props / cup lock scaffolding/Net   | 3500 sqm    | During RCC works        |
| 15 | Stair Tower/ Access scaffold up to 20m   | 14 Sets     | Super structure works   |
| 16 | Needle vibrators   | 12 nos.     | During RCC works        |
| 18 | Plate vibrators  | 8 nos.      | During RCC works        |
| 19 | Tractors with trolley  | 2 nos.      | Whenever instructed     |

Note:

- (a) The quantities and list of equipment mentioned above are tentative and can be increased/ amended as per the requirement of work OR as per the direction of



- Engineer-in-Charge. The contractor has to deploy all the required equipment to complete all the works within stipulated specifications & time period as contract documents.
- (b) Use of Ballies, bamboos, dented forms or any other traditional forms, shuttering/props/ staging etc. shall not be allowed at the site.
  - (c) Contractor will not be allowed to take out equipment from the site without the written permission of Engineer-in-Charge.

**34. INSURANCE:** The contractor shall arrange at his own cost 'Contractor's All Risk' (CAR) Policy and any other policy pertaining to the project for value and coverage as deemed necessary by Engineer-In-Charge.

**35. TECHNICAL MANPOWER:** The contractor shall depute the minimum set of technical manpower within 10 days of issuance of formal Work Order (in case of full time personnel) or after instruction issued by Engineer-In-charge (in case of part time personnel). The contractor shall submit the resumes and credential certificates against all the personnel and shall maintain register, including entries in EPF and compliances. The contractor should ensure to the extent possible that same engaged personnel remain till end of the project. In exceptional case of repatriation, the contractor shall ensure replacement personnel immediately within next day. Penalty shall be levied on per day basis for non-deployment of the above manpower after cut-off date as instructed by the Engineer-In-Charge. One day weekly off shall be permitted in staggered manner with roster as approved by Engineer-In-charge. However, weekly one rest days and holidays maximum up to 10 days during the year against a designation may be exempted from penalty unless otherwise job exigency arises as deemed by Engineer-In-Charge. The personnel shall be available during all shifts of working time. The above shall not absolve the obligations of the contractor. All risks and liability shall remain with the contractor.

#### **LIST OF MINIMUM TECHNICAL MANPOWER**

| <b>Sl</b> | <b>Designation/Qualification</b>  | <b>Nos</b> | <b>Minimum monthly Remuneration</b> | <b>Penalty for non-deployment</b>                    |
|-----------|---|------------|-------------------------------------|--|
| 1         | Project Manager (Full time):<br>Graduate in Civil Engg. + 8 year experience   | 1          | 5 time the Min. wage                | 3 times the daily remuneration paid to the personnel |
| 2         | Civil Engineer – Planning & Supervision (Full time):<br>Graduate in Civil Engg + 5 year experience with Primavera   | 1          | 2.5 time the Min. wage              | 3 times the daily remuneration paid to the personnel |
| 3         | Civil Engineer – Supervision & Quality Control (Full time):<br>Graduate in Civil Engg + 5 year experience   | 1          | 2.5 time the Min. wage              | 3 times the daily remuneration paid to the personnel |
| 4         | Civil Engineer - Monitoring & Measurements (Full time):<br>Graduate in Civil Engg. + 3 year experience  | 1          | 2.5 time the Min. wage              | 3 times the daily remuneration paid to the personnel |
| 5         | Electrical Engineer (Full time):<br>Graduate in Elect Engg. + 3 year experience. He/she must have valid supervisor's certificate of competency issued by state licensing board. | 1          | 2.5 time the Min. wage              | 3 times the daily remuneration paid to the personnel |
| 6         | Labour cum Safety Officer (Full Time):<br>Graduate + 2 Year experience with   | 1          | 2.5 time the Min. wage              | 3 times the daily remuneration paid to the personnel |

|    |   |   |                        |  |
|----|---|---|------------------------|--|
|    | good comm. skill  |   |                        |  |
| 7  | BMS Engineer (during preliminary and execution):<br>Graduate in Instrumentation/IT/CSE/ECE + 2 year experience in BMS | 1 | 2.5 time the Min. wage | 3 times the daily remuneration paid to the personnel |
| 8  | Supervisor – Civil (Full time):<br>Diploma in Civil Engg+ 5 year experience   | 2 | 2 time the Min. wage   | 3 times the daily remuneration paid to the personnel |
| 9  | Supervisor cum Lab assistant (Full time):<br>Diploma in Civil Engg+ 5 year experience                                 | 2 | 2 time the Min. wage   | 3 times the daily remuneration paid to the personnel |
| 10 | Electrical-Supervisor (Full time):<br>Diploma in Electrical Engg+ 5 year experience                                   | 1 | 2 time the Min. wage   | 3 times the daily remuneration paid to the personnel |

Note:

- (a) Experience means post-qualification relevant experience as approved by Engineer-In-Charge.
- (b) The minimum monthly remuneration against the above personnel shall be equivalent multiple of unskilled labour daily wage as per prescribed Central Government Rates for Area B issued by the Government of India from time to time. The minimum monthly remuneration mentioned above is inclusive of PF & TA. The salary statement along with the PF statements are to be provided by the contractor with monthly bills.
- (c) Bidder has to take into account the expected revision of wages during the contract period while quoting against the tender.

- 36. QUALITY CONTROL / TESTS:** Quality control shall be monitored from time to time during the works execution. Various Lab / field tests as directed shall have to be performed by the contractor without any extra cost to the company. The necessity, types and frequency of such tests shall be at the discretion of the Engineer-In-Charge which he/she considered necessary based on the factors such as job nature of items, workmanship, quantum of the items etc.

#### **LIST OF MINIMUM MEASURING, MONITORING AND TESTING EQUIPMENT**

| Sl. | Description                                    | Qty    | Penalty for not providing   |
|-----|--|--------|---|
| 1   | Compressive Testing machine (100 Tons)         | 1 no   | 5% (five percent) of individual instrument cost on per day basis without ceiling. Cost of instrument shall be as decided by EIC based on standard instrument of any reputed make. |
| 2   | Digital Weighing Machine (0-5 kg)              | 1 no   |   |
| 3   | Slump test apparatus                           | 2 nos  |   |
| 4   | Set of sieves for grading of coarse aggregates | 1 set  |   |
| 5   | Set of sieves for grading fine aggregates      | 1 set  |   |
| 6   | Vicat Apparatus with accessories               | 1 set  |   |
| 7   | Electrically operated oven (300deg Centigrade) | 1 no   |   |
| 8   | Sampling Trays                                 | 1 no   |   |
| 9   | 150X150X150 IS marked Cube Moulds              | 18 nos |   |
| 10  | Measuring Cylinders - 1000ml,500 ml,100 ml     | 1 set  |   |
| 11  | Wash Bottles, Capacity 500 ml                  | 1 set  |   |
| 12  | Rebound hammer                                 | 1 set  |   |
| 13  | Industrial Thermometer                         | 5 Nos  |   |
| 14  | Vernier caliper                                | 2 set  |   |
| 15  | Screw gauge                                    | 3 set  |   |

|    |  |       |  |
|----|--|-------|--|
| 16 | Digital distance meter                               | 1 set |  |
| 17 | 3m, 5m 30m 50m tape and steel rules                  | 1 set |  |
| 18 | Cores Apparatus for conducting Proctor Density Tests | 1 set |  |

- (a) The quantities of equipment indicated are tentative and can be increased as per the requirement of work OR as per the direction of Engineer-in-Charge. The above equipment list is indicative and not complete. The contractor has to deploy all the required equipment to complete all the works within stipulated specifications & time period as contract documents.
- (b) The contractor will not be allowed to take out equipment from the site without the written permission of Engineer-in-Charge.
- 37. MANDATORY TESTS:** The contractor shall perform mandatory tests as per BIS / CPWD norms or as directed by the Engineer-In-Charge. These tests may be exempted for non-critical works irrespective of gross quantities and prescribed frequencies.
- 38. SECURED ADVANCE:** Secured advance maximum up to 70% may be paid to the contractor for reinforcement steel or any such major items as deemed substantial by the Engineer-In-Charge. Such payment may be by way of Running account bill on lump-sum basis, which may be superseded by detailed subsequent measurement in the Computerized Measurement Bill (CMB). The contractor shall not claim release of secured advance as a matter of contractual right. The material against which secured advance has been paid shall remain in the care and custody of the contractor till the utilization of the material and handing over of the facility to client whichever is later. The contractor shall arrange replacement of material at his own cost and without any time extension, in case of damage or loss due to any reason whatsoever. On completion of works as per requirement of specification, if any balance materials are available in the site after full adjustment of material secured advance, the contractor shall be allowed to take out the balance material from the site at his own cost.
- 39. PROJECT SCHEDULE AND TRACKING:** The bidder has to categorically conform to the master GANTT CHART provided by OIL in the tender document. The contractor shall execute the works so as to complete the works within the stipulated completion time for each and every individual activity as per the master GANTT CHART of OIL. **If the contractor fails to meet individual activity target completion as per master GANTT CHART (unless otherwise justified with sufficient acceptable ground), penalty shall be levied against each individual activity at the rate of 10% of the respective activity value, which shall be retained as provisional 'Retention money'.**
- 40. ACTIONS ON NON COMPLIANCE OF WORKS:** The contractor shall complete the work within the time specified by the Engineer-In-Charge failing which the company shall have the right to get the work done by any other means. Unless otherwise specified, such notice period shall be 7 days from the date of receipt of such instruction. In case the contractor exhibits:
- Underperformance with slow progress
  - Delivering poor workmanship/materials
  - Non-compliance of the instructions
  - Abandons the Agreement
  - Any other disobedience affecting the interest of the job,
- Then the Engineer-In-Charge shall have the right to get it executed through any other agency on behalf of the contractor on nomination basis at the risk and cost of the contractor. Such works through third party may be on higher than the contract rates, to which the contractor shall not have any claim whatsoever. The cost incurred by OIL for such works will be recovered from the outstanding bills of the contractor or from his security deposit with the Company.

**41. MEASUREMENT:** Engineer-in-charge shall, except as otherwise provided, ascertain and determine measurement and the value in accordance with the contract work done. All measurement of all items having financial value shall be entered in Computerized Measurement Book (CMB) and/or level field book so that a complete record is obtained of all works performed under the contract. All site measurements wherever applicable shall be taken jointly by OIL and the contractor. Certain measurements such as reinforcement quantity, earth work in excavation/back fill, concrete volume etc shall be derived from the drawings unless deviation recorded/observed at the site by the Engineer-In-Charge. Contractor signing on the CMB or SES pages is deemed to be acceptance of the payable quantities. If the contractor or his authorized representative does not remain present at the time of measurements after the contractor has been given a notice of 1 day in advance or fails to countersign or to record objection within a week from the date of the measurement then such measurements recorded in his absence by Engineer-In-Charge shall be deemed be accepted by the Contractor. The contractor shall, without extra charge, provide all assistance with every appliance labour and other things necessary for measurements and recording levels. All work to be measured as per latest IS standards with up to date corrections.

**42. DRAWINGS:** Proposed preliminary drawings such as Key Map, Plot Plan, Layout plans, Boundary Wall, Parking Plan, Terrace plan (for Roof top solar PV pant), Cable Trench routes, Foundation details, Beam Column frames with reinforcement details etc. The drawings in the tender documents are meant for broad initial visualization only by the contractor. The actual working drawings for site execution purpose shall be released from time to time with seal 'RELEASED FOR CONSTRUCTION' (RFC). There may be changes to any extent when compared with the initial drawings annexed in the tender document. The approved working drawings may also undergo multiple subsequent revisions.

**43. APPROVED MAKES/MODELS:**

The approved makes / models with sample picture for the project are as in ANNEXURE – I (Make). This list is not sacrosanct. The Engineer-In-Charge shall also have the discretion to adopt item from other makes not listed in 'Approved Makes' but within the same range as, on finding better technical specification retaliation /reliability /suitability factors in the un-listed items.

From approved item list, irrespective of the market prices, the Engineer-In-Charge may ask for best of the options from amongst the approved list. Contractor is deemed to have quoted rates considering higher range products. On not finding satisfactory in quality at the time of execution, the Engineer-In-Charge may also discard/reject any of the items even though the same listed in approved make. At the time of execution, when an item is not approved by the Engineer-In-Charge on quality/technical ground, the contractor shall not insist on to supply such less costing inferior material as a matter of their contractual rights, even though the same was of approved make mentioned in this contract document.

The contractor shall prepare a sample 'Flat' with at least 1m high wall portions (after slab casting) and seek approval from the Engineer-In-Charge/OIL Management.

**SPECIAL TECHNICAL CONDITIONS - CIVIL WORKS**

Unless otherwise specifically mentioned in SoQ or elsewhere in this contract, all the technical specifications shall be guided by:

**(1) CPWD SPECIFICATIONS 2019 (VOL. 1 & 2)**

Published DIRECTOR GENERAL, CPWD, New Delhi

For details visit:-<https://cpwd.gov.in/>

- (2) Relevant **INDIAN STANDARD (IS) CODES** Published by Bureau of Indian Standards, New Delhi  
For details visit:-<https://bis.gov.in/>

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**END OF SECTION – II, PART - 3**

## **Part – 3**

### **SECTION – III**

#### **SCOPE OF WORK/SPECIAL CONDITIONS OF CONTRACT FOR ELECTRICAL WORKS & BUILDING MANAGEMENT SYSTEM (BMS)**

The SCC for the Electrical Part of the Tender comprises two basic parts as follows:

- A. GENERAL
- B. TECHNICAL

#### **A. GENERAL**

1.1.0 Special conditions of contract shall be read in conjunction with the General Conditions of Contract, Bill of Quantities, specifications of work, drawings and any other document forming part of this contract wherever the context so requires.

1.1.1 Notwithstanding the sub-division of the documents into these separate sections and volumes, every part of each shall be deemed to be supplementary of every other part and shall be read with and into the contract so far as it may be practicable to do so.

1.1.2 Where any portion of the General Conditions of contract is repugnant to or at variance with any provisions of the Special conditions of Contract, then unless different intention appears, the provisions of the Special Conditions of Contract shall be deemed to override the provision(s) of General Conditions of Contract only to the extent that such repugnance or variance cannot be reconciled with the tender conditions of contract and shall be to the extent of such repugnance of variations, prevail; it being understood that the provisions of General Conditions of Contract shall otherwise prevail.

1.1.3 Wherever it is stated anywhere in this tender document that such and such a supply is to be effected or such and such a work is to be carried out, it shall be understood that the same shall be effected/carried out by the contractor at his own cost, unless a different intention is specifically and expressly stated herein or otherwise explicit from the context.

1.1.4 The materials, design and workmanship shall satisfy the relevant Indian Standards, the job specifications contained herein & codes referred to. Where the job specifications stipulate requirements in addition to those contained in the standard codes and specifications, these additional requirements shall also be satisfied. In the absence of any Standard/Specifications/Codes of practice for detailed specifications covering any part of the work covered in this tender, the instructions/directions of Company will be binding on the Contractor.

1.1.5 The items given under Bill of Quantity shall be read in conjunction with scope of work, scope of supply (by Contractor) and job specifications and in case of any irreconcilable conflict between them the provision in the item under "Bill of Quantity" will override the corresponding provision only if the scope of work, scope of supply and job specifications, which cannot be reconciled in such cases the decision of Company shall be final and binding on the contractor.

1.1.6 In case of contradiction between Indian Standards, General Conditions of Contract, Special Conditions of contract, Specifications Drawings, Bill of Quantity, the following shall prevail in order of precedence.

- (i) Letter of intent / Detailed Letter of intent along with statement of Agreed Variations and its enclosures.
- (ii) Bill of Quantity.
- (iii) Special Conditions of Contract
- (iv) Job specifications
- (v) Drawings
- (vi) General Condition of contract
- (vii) Indian Standard/Technical/Material Specifications.

### **1.2.0 LOCATION OF SITE AND SITE PARTICULARS**

1.2.1 Construction of OIL RF Housing Complex at Jodhpur, Rajasthan

1.2.2 The intending Bidder shall be deemed to have visited the site and familiarized himself thoroughly with the site conditions and job details before submitting the tender. Non familiarity with the site conditions will not be considered a reason either for extra claims or for not carrying out the work in strict conformity with the drawings and specifications.

### **1.3.0 STATUTORY REQUIREMENT FOR WORK**

1.3.1 The contractor should have valid Electrical Contractor's License issued or recognized/endorsed by State Licensing Board. In case license expires during contract period the same shall be renewed by the contractor. The contract may be terminated if the license is not renewed.

1.3.2 In case the contractor/firm does not possess Electrical Contractor License, he/the firm shall submit an undertaking that in case of award of contract, the contractor shall get all electrical works done from a sub-contractor having valid Electrical Contractor's License after obtaining approval from OIL. In such a case, the sub-contractor having the valid Electrical contractor license shall be responsible for executing the electrical portion of the contract as per stipulations detailed in the tender.

1.3.3 Contractor shall employ work persons with valid wireman permit (covering relevant portions), issued/recognised by State Licensing Board to carry out all electrical jobs and shall deploy one supervisor holding valid Electrical supervisor's competency certificate (covering relevant portions), issued/recognized/endorsed by State Licensing Board for supervision of electrical jobs.

1.3.4 All the certificates/permits/licenses mentioned above shall be valid during contract period.

1.3.5 Quality of jobs carried out by the Contractor shall be of high standard and should be as per the norms of BIS, NEC, CEA Regulations and other electrical standards recognized by the company.

### **1.4.0 POWER**

Electricity required for wiring purpose shall be arranged by the contractor at their own cost. The Contractor shall have to ensure use of proper safety device like RCBO/ELCB/RCCB while using their own Power supply.

### **1.5.0 SCOPE OF SUPPLY**

Company does not envisage supplying any material for this work & contractor shall arrange all materials, instruments, tools and tackles etc. required for execution of the work. Makes of items shall be as per attached Make List only ("Annexure 2"- for electrical items).

### **1.6.0 SCOPE OF WORK**

Brief details of work to be carried out by the contractor are as described below. This will include supply, storage, laying, installation, jointing and testing, obtaining approvals, testing and commissioning and completion of different electrical works. The contractor shall finally give a certificate of electrical work executed by him stating the job done as per the requirement of Central Electricity Authority Regulations, 2010. The work shall be carried out as described in Schedule of Quantities (SOQ), specifications, and drawings, BIS/NEC guidelines and as per the instructions by Engineer-in-charge (electrical), of the Company. The scope of work shall cover electrification works of any office building/Industrial house/ residential area or as specified by concerned Engineer in charge.

The broad items/activities covered under "electrical works" shall include the supply, installation, testing and commissioning of any or all of the following:

- i) Point wiring of light points, call bell points, Ceiling fan points, and exhaust fan points
- ii) Plug points, general power points, metal clad plug & socket outlet points etc. including light and power accessories etc., complete in all respects
- iii) All surface/concealed wiring through BIS marked medium/heavy duty PVC Casing capping/conduit, on or through wall, roof, roof beams, false ceiling, floors, cable trays etc.
- iv) LT panel at Electrical Control room
- v) Cables including Earthing cable from LT panel to VTPN DBs/TPN DBs
- vi) Cables from Main Distribution Boards (VTPN DB) to Distribution Boards (TPN/SPN DB), sub main wiring from main/sub distribution boards to various final distribution boards/switch boards
- vii) Main Distribution Boards (VTPN DB), Sub-Main Distribution Boards (TPN DB) and Sub Distribution Boards (SPN DB), as required
- viii) Light fixtures (including external light fittings) and ceiling & exhaust fans
- ix) Earthing of all Main VTPN DB, SPN DBs, switchboards etc. complete in all respects
- x) Erection of 9 M LT pole grouted with PCC collar with fixing of double brackets on pole where necessary
- xi) Fixing of Street lights on LT pole
- xii) Laying & connection of cable to the Street lights from Street light panel
- xiii) Rooftop Solar Power Plant

#### **1.7.0 SCHEDULE OF QUANTITIES/RATE**

1.7.1 The quantities shown against the various items are only approximate and may vary to any extent individually subject to relevant clause of General Conditions of Contract. Any increase or decrease in the quantities shall not form the basis for alteration of rates quoted and accepted including where low/high rates have been quoted by the successful bidder.

1.7.2 The Engineer in charge reserves the rights to interpolate or extrapolate the rate for any new item of work not finding a place in the Bill of Quantity, for similar items of lower and/or higher magnitude available in the Bill of Quantity.

1.7.3 In case any activity though specifically not covered in Bill of Quantity description but covered under scope of work/spec./drawing etc., contractor has to carry out the same without any extra claim.

1.7.4 The words "Bill of Quantity", "BOQ", "Schedule of Quantity" and "SOQ", appearing in this document, carry the same meaning.

#### **1.8.0 MEASUREMENTS, BILLING & PAYMENT**

1.8.1 All works shall be measured in metric system based on actual work done as per the terms and conditions of the Tender documents.

1.8.2 The final bill shall be submitted by the Contractor within three months of physical completion of the work or within one month of the date of the final certificate of completion furnished by the contractor (approved by OIL) whichever is earlier. 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.

1.8.3 Final bill based on Schedule of Quantity shall be prepared and submitted based on joint measurements (OIL and contractor). Contractor shall ensure that bills are submitted promptly and timely.

#### **1.9.0 DEDUCTIONS FOR INCORRECT WORK:**

If the Engineer-in-charge(Electrical) deems it expedient to correct work damaged or not done in accordance with the contract, an equitable deduction from the contract price shall be made thereof and the decision of the engineer shall be final.



### **1.10.0 CONTRACT DRAWINGS**

Contractor has to prepare all working drawings mentioned below and obtain approval from the engineer in charge (Electrical) before starting of the civil work.

- a) Layout diagram of complete wiring showing route for wiring from electrical panel to VTPN DB to TPN/SPN DB, TPN DB to SPN DB, SPN DB to Switch Board, Light and ceiling positions etc. showing all roof/floor/beam route layout
- b) Schematic diagram for complete electrical work including Rooftop Solar Power Plant
- c) Contractor shall keep at least one copy each of drawings, conditions of contract, specifications, instructions and schedule of quantities at the site of works available for reference by any authorized representative Engineer-in-charge(Electrical), at all times during the progress of the works.

### **1.11.0 COMPLETION DOCUMENTS**

The contractor shall submit 4 copies of **AS BUILT** layout drawings to OIL after completion of the work. These complete drawings shall give the following information:

- a) Layout of all equipment, switch boards, DB's etc.
- b) Location of DB's, Sub-mains, junction boxes & earthing (floor-wise)
- c) Schematic diagram for overall electrical distribution including Rooftop Solar Power Plant
- d) "As-Built") Layout of lighting & power wiring: Complete wiring showing route for wiring from electrical panel to VTPN DB to TPN/SPN DB, TPN DB to SPN DB, SPN DB to Switch Board, Light and ceiling positions etc. showing all roof/floor/beam route layout
- e) Cable schedule
- f) Operation & Maintenance Manuals for equipment if any
- g) Manufacturers' test reports & data sheets for equipment if any
- h) Electrical test certificate for the electrical work done as per CEAR, 2010

## **B. TECHNICAL**

### **2.0.1 SCOPE**

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

### **2.0.2 TERMINOLOGY**

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

### **2.0.3 POINT WIRING**

A point wiring (other than socket outlet point wiring)

- i. Shall extend from the controlling switch/MCB/controller to the corresponding point/device (lamps/luminaire/fan/exhaust fan/call bell etc.). Point/device refers to either single devices (like lamps, fans, etc.) or multiple devices controlled from one single switch/MCB/controller (like chandeliers, group of decorative lamps, etc.). Point wiring does not include switch which is covered under a separate item (supply and fixing of modular switch).
- ii. Includes supply & fixing of all items as specified in SOQ, like device holders, wires, conduit/casing-capping, accessories like screws, rawl plug, outlet boxes, junction boxes, pull-through boxes etc., including metal/PVC boxes if any,

provided with switch boards for loose wires/conduit terminations, bushed conduit or porcelain tubing where wiring cables pass through wall etc.

- iii. Shall be measured in terms of number of “points” only. There shall be no linear measurement for point wiring, or for the number and size of wires used.
- iv. Details of wire size, material, conduit/casing capping, colour of insulation as in SoQ.
- v. It is to be noted that point wiring is based on consideration of the length as per CPWD standard.

#### 2.0.4 Light plug point (socket outlet point) wiring:

##### A Socket (“*plug point*”) outlet point wiring

- i. Shall extend from the switchboard to the corresponding wall socket outlet. Sockets may include a single socket or multiple sockets (of same rating) in one module.
- ii. Includes plug points (6A), and other similar wall outlets.
- iii. Shall be reckoned as total length of wiring and shall be measured on linear basis along the run of wiring.
- iv. Details of wire size, material, conduit/casing capping, colour of insulation as in SoQ

### 2.1.0 CIRCUIT WIRING:

#### Circuit wiring

- i. Shall extend from the distribution board up to the switch board/box
- ii. Include all wiring accessories
- iii. Shall be reckoned as total length of wiring and measured on linear basis along the run of wiring
- iv. Details of wire size, material, conduit/casing capping, colour of insulation as in SoQ

#### 2.1.1 POWER PLUG POINT WIRING:

##### Power plug point wiring

- i. Shall extend from distribution board to 5/6 A and 15/16 A 6 pin socket outlet Include all wiring accessories
- ii. Shall be reckoned as total length of wiring and measured on linear basis along the run of wiring
- iii. Details of wire size, material, conduit/casing capping, colour of insulation as in SoQ

#### 2.1.2 SUB-MAIN WIRING

##### Sub-main wiring

- Shall extend from one main/distribution switchboard to another
- Shall be reckoned as total length of wiring and measured on linear basis along the run of wiring
- Includes all wiring accessories
- Details of wire size, material, conduit/casing capping, colour of insulation as in SoQ

#### 2.1.3 OTHER WIRING WORKS:

As per the details given in the SoQ.

#### 2.1.4 SYSTEM OF DISTRIBUTION AND WIRING:

- i. Control at the point of entry of supply:

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

- ii. Distribution:

The wiring shall be done on a distribution system through main and/or branch (sub-main) distribution boards. The system design as well as the locations of boards shall be as indicated in BOQ/drawings or as specified by the OIL Engineer-in-charge. Main distribution board (VTPN) shall be controlled by a circuit breaker. Each outgoing circuit

shall also be controlled by a circuit breaker. The branch distribution board shall be controlled by a circuit breaker. Each outgoing circuit shall be provided with a miniature circuit breaker (MCB) of specified rating on the phase or live conductor. The loads of the circuits shall be divided, as far as possible, evenly between the number of ways of the distribution boards, leaving at least one spare circuit for future extension.

The neutral conductors (incoming and outgoing) shall be connected to a common link (multilayer connector) in the distribution board and be capable of being disconnected individually for testing purposes.

'Power' wiring shall be kept separate and distinct from 'Lighting' wiring beyond the branch distribution boards.

#### iii. Balancing of Circuits:

The balancing of circuits in three wire or poly phase installations shall be arranged beforehand to the satisfaction of the OIL Engineer-in-charge.

#### 2.1.5 Wiring System:

- i. Wiring shall be measured only as per "point wiring" or "linear basis", as explained above.
- ii. Lights, fans and call bells shall be wired in the 'lighting' circuits.
- iii. 5A/6A Socket outlet shall be wired in the light plug point circuit.
- iv. 6/16A combined socket outlets and other power outlets shall be wired in the 'Power' circuits.
- v. The wiring throughout the system shall be such that there is no break in the neutral wire except in the form of linked MCCB's, MCB's, RCBO's etc.

#### 2.1.6 Run of Wiring:

The wiring shall be in concealed conduit/surface casing/capping as per SoQ. Due consideration shall be given for neatness, good appearance and safety.

#### 2.1.7 JOINTS IN WIRING:

No bare conductor in phase and / or neutral or twisted joints in phase, neutral, and / or protective conductors in wiring shall be permitted. There shall be no joints in the through-runs of wires. There shall be no looping of earth wires and neutral wires between points. All light points, plug points etc. shall have their individual neutral and earth wires laid up to the switchboard or distribution board as the case may be.

#### 2.1.8 RATINGS OF OUTLETS:

MCBs / switches / controllers for devices like light fittings, ceiling fans, exhaust fan etc. shall be rated according to the corresponding device capacity.

RCCBs for household circuits and similar installations should be rated for 100 mA tripping current.

Socket Outlets shall be rated according to their intended use only.

#### 2.1.9 CAPACITY OF CIRCUITS:

'Lighting' circuit shall not have more than a total of 10 points of light, fan and socket outlets, or a total connected load of 800W per circuit, whichever is less. 'Power' circuit shall have only one outlet per circuit.

#### 2.2.0 CONFORMITY TO CEA REGULATIONS, 2010 AND STANDARDS:

All electrical works shall be carried out in accordance with the provisions of CEA (Measures relating to safety and electric supply) Regulations 2010, National Electric code and National Building Code. The works shall also conform to relevant Indian Standards.

In all electrical installation works, relevant safety codes of practice shall be followed.

#### 2.2.1 TESTING OF WIRING / INSTALLATION:

Before/after and in stages, wherever required, OIL's engineer-in-charge shall inspect drawing of wires through conduits for correct size, quality, colour and continuity

(absence of loops) from points to switchboards and other wiring items. Inspection will be done in stages, as work progresses.

In case of casing/capping type wiring or as per SoQ, wherever required by OIL's engineer-in-charge, capping shall not be fixed on the casing till the work has been inspected with the wires in position and approved. Inspection will be done in stages, as work progresses.

On completion of an electrical installation (or extension thereof) OIL's engineer-in-charge may require a test certificate for the installation/wiring job before energising the circuits. In such instances, contractor shall issue a test certificate, countersigned by certified supervisor under whose supervision the job was carried out.

The following tests should be carried out:

- i) Insulation resistance test
- ii) Earth continuity test
- iii) Earth electrode resistance test

All necessary test instruments shall be arranged by the contractor.

### **2.3.0 GENERAL REQUIREMENTS OF COMPONENTS:**

#### **2.3.1 Quality of materials:**

All materials shall be of such design, size, material and make as to satisfactorily function under the rated conditions of operation and satisfy BoQ requirement.

#### **2.3.2 Ratings of components:**

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

#### **2.3.3 Conformity to Standards:**

All components shall conform to relevant Indian Standard Specification, including amendments or revisions thereof up to the date of tender acceptance.

#### **2.3.4 General Notes:**

- a) Items shall be procured from the manufacturer or their authorized dealers only.
- b) All the items shall be brand new and shall bear BIS monogram, wherever specified.
- c) Item shall be guaranteed for a period of one year from the date of installation of materials against any manufacturing defect or workmanship.

### **2.4.0 WIRES AND CABLES:**

#### **2.4.1 Wiring:**

a) Conductors of wiring cables shall be of copper. The smallest size of conductor for various circuits including earthing shall be not less than as follows:

- i. 'Lighting': 1.5 sq. mm,
- ii. 'Light Plug Point': 1.5 sq. mm,
- iii. 'Circuit Wiring': 2.5 sq. mm (from MCB DB to switchboard),
- iv. 'Power': 4 sq. mm,
- v. Circuit (Sub-Main): 10 sq. mm (from VTPN DB to SPN DB),

b) All wiring cables shall be FRLS, single core, multi-stranded, PVC insulated, unsheathed, 1100 V grade, BIS marked & FIA & TAC approved, with flexible conductor.

#### **2.4.2 Cables:**

Cables shall be armoured, PVC insulated and PVC sheathed power cables of 1100 V grade. They shall be fitted on wall surface/ Tray/False ceiling/False floor as required, clamping shall be with 1 mm thick saddle, wherever required.

### **2.5.0 PVC CONDUITS:**

2.5.1 All rigid conduit pipes shall be of medium (or heavy) duty PVC conduit of good quality and be BIS marked.

2.5.2 The conduit wiring system shall be complete in all respects, including their accessories. 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.

### 2.5.3 Bunching of cables:

Cables shall always be bunched so that the outgoing and return cables are drawn into the same conduit. Where the distribution is for three phase loads only, conductors for all the three phases and neutral wire shall be drawn in one conduit.

Wiring shall be so designed such that individual conduits are not filled beyond 40% of their capacity.

## **2.6.0 WIRING ACCESSORIES:**

### 2.6.1 Control switches for points:

Control switches (single pole switches) carrying not more than 16A shall be modular type complete with plate, as specified, and the switch shall be "ON" when the knob is down. Control switch shall be placed only in the live conductor of the circuit. No single pole switch or fuse shall be inserted in the protective (earth) conductor, or earthed neutral conductor of the circuit.

### 2.6.2 Socket outlets:

6/16 pin Socket outlets shall be of shutter type modular complete with plate. These shall be rated either for 6A, or 6/16A combined. Combined 6 pin (6A/16A) socket outlet shall be provided in 'power' circuits wherever specified. 6A Socket outlets shall only be of 5 pin type; the earth pin shall be connected to earth through protective (loop earthing) conductor. The control switches for 6A and 16A socket outlets shall be kept along with the socket outlets. Generally socket outlet shall be installed at a height of above 30 cm but below 130 cm from the floor level.

The layout of wiring shall be as approved by Engineer in Charge.

### 2.6.3 Switch box covers:

These shall be modular type of suitable size.

2.6.4 Ceiling rose – Only one flexible cord shall be connected per ceiling rose. For multiple pendants, each pendant shall have its own rose, or a specially designed rose shall be used.

## **2.7.0 FITTINGS:**

Indoor type fittings specification (as appearing in BoQ):

Suspension mount and batten mount LED luminaire with all accessories and lamps, ready for installation as per the following description.

i) Optical system should provide all round glare and beam control.

ii) Luminaire shall be as follows:

a) 4 feet long (1200 mm) LED batten luminaire for room/passage/corridor as detailed in SoQ

b) 2 feet long (600 mm) LED batten luminaire for toilet/bathroom as detailed in SoQ

c) 12 W LED downlighter for room/passage as detailed in the SoQ

d) 2W LED Night lamp as detailed in the SoQ

e) Flood light (50 W) LED luminaire for area light as detailed in the SoQ

f) 10W LED Bollard as detailed in the SoQ

g) 10W LED under water light as detailed in the SoQ

h) 40W LED Street light as detailed in the SOQ

iii) Luminaires shall be pre-wired up to the terminal block and fitted with High Performance driver (THD<10%) as standard, PF> 0.95; driver to conform to IS/IEC for safety/ performance.

iv) Luminaires shall be supplied with all standard accessories (including chains, brackets, mounting clamps etc.) for suspension and/or wall mounting.

v) Power supply: 230/240 V, 50 Hz, single phase

vi) The type of fittings shall be as specified in SOQ.

## **2.8.0 PRE-WIRED MCB DISTRIBUTION BOARDS:**

Pre wired MCB DB's shall be provided where specified.

The complete board shall be factory fabricated and shall be duly pre-wired, ready for installation at site.

The board shall be of wall mounted, cubicle type construction, fabricated out of 1.6mm thick sheet steel, with stove enamelled paint finish. The board shall be provided with a hinged cover of 1.6mm thick sheet steel on the front. Only the knob/dolly of the MCB's shall protrude out of the front covers through openings neatly machine made for the purpose. Knock out holes at the bottom, and detachable plate with knock out holes at the top of the board shall be provided.

VTPN and TPN DB shall also be provided with two nos. loose wire box and SPN DB shall be provided with one no. loose wire box as a compartment for the complete width and depth of the board, and of minimum height of 125mm in case of VTPN/TPN DB's, and 100 mm in case of SPN DB's.

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

- a) 100 A copper bus bar(s) for MCB DBs
- b) 250 A copper busbar for VTPN DB (fitted with 160A MCCB)
- c) Neutral link
- d) Common earth bar
- e) DIN bar for mounting MCB's
- f) Screw type terminal connectors suitable for incoming and outgoing cables.
- g) Earthing stud(s)

The board shall be fully pre-wired with single core PVC insulated copper conductors/insulated solid copper links, and terminated on to extended type terminal connectors, suitable for connections to the sizes of the respective conductors. All incoming and outgoing wiring to the pre wired MCB DB's shall be terminated only in extended terminal connectors to be provided within the DB. The terminal connectors shall therefore be so provided as to facilitate easy cable connections and subsequent maintenance. Connectors (Terminal blocks) are to be provided. A common copper earth bar shall be provided within the loose wire box. The common neutral bar as well as the terminal connectors shall, however, be provided within the main compartment just below the loose wire box.

#### **2.9.0 MINIATURE CIRCUIT BREAKERS (MCB's):**

'C' series MCB's shall be invariably used for all loads. Ratings (A), number of poles, type as MCB or isolator, etc. shall be as specified in the SOQ. The MCB's shall be of minimum 10KA rupturing capacity.

#### **2.10.0 SWITCH BOARD LOCATIONS:**

Switch boards shall be located as indicated on the drawings or as instructed by OIL's engineer. Switchboards should not be installed in places likely to be exposed to the weather. However exact location will be as per suitable available spaces.

Unless otherwise specified, a switch board shall be installed so that its bottom is 1.30 m from the floor level. Switchboards shall be well clear of door openings and with an open (unimpeded) space in front of the switchboard for easy access.

Where it is required to terminate a number of casing capping or conduits on a board, it may be convenient to provide a suitable PVC adapter box for the purpose. Such boxes shall be provided with the prior approval of the Engineer-in-charge (Electrical) and this will not be paid for separately. No apparatus shall project beyond any edge of the panel.

#### **2.11.0 FANS, REGULATORS AND CLAMPS:**

Fan Regulators:

Electronic modular type fan regulator shall be of approved makes. The fans, regulators etc., are to be procured from authorized dealer to ensure genuineness of the material.

#### **2.12.0 EARTHING:**

Whenever earth electrode is to be supplied and installed, only readymade, maintenance free, CPRI approved earthing electrodes with the proper dimensions (as per BOQ) shall be

used. This shall be complete with excavation of earth pit and construction of brick earth chamber to proper specifications as in BOQ.

GI Earth strap shall be supplied with the earth electrode for connecting the earth electrode to the equipment. Earth strap shall be terminated in the electrode/equipment with proper size of zinc coated nuts and bolts.

### **2.13.0 WORKMANSHIP:**

Good workmanship is an essential requirement to be complied with. The entire work of manufacture/fabrication, assembly and installation shall conform to sound Engineering practice. The work shall be carried out under the direct supervision of a person holding a valid supervisor's certificate of competency issued by the State Govt. for the type of work involved, employed by the contractor, who shall rectify then and there the defects pointed out by the Engineer-in-charge (Electrical) during the progress of work.

2.14.0 Approval for all Electrical items are required to be taken from the concerned Engineer in charge of OIL prior to supply.

### **2.15.0 COMMISSIONING ON COMPLETION:**

After the entire wiring is completed, a joint inspection shall be carried out. The contractor shall rectify the defects pointed out by OIL during inspection. The works shall be tested by the contractor and contractor shall submit the test certificates duly signed by the competent persons. The system shall be energised only after OIL approves the work done and submission of test certificate.

## **3.0 LT PANEL SPECIFICATIONS (LT panel-1 to 8, APFC panel, Substation main LT panel )**

### **3.0.1 Scope of work:**

This specification covers supply, installation and commissioning of 415 V AC, 50Hz indoor type panel with ACBs/MCCBs as incomer and MCCBs as outgoing feeders(as specified in the BoQ), ready for operation on being installed in a fixed position. The panel shall be placed on a suitable raised foundation to take the load of Panel.

### **3.0.2 Standards:**

All components used in the manufacture of the Panels shall confirm to the relevant IEC/BIS standard specification and especially to the followings:

- i. IS: 13947-1993/IEC: 60947- General arrangement for switchgear and control gear for voltage not exceeding 1000 V
- ii. IS: 12063-1987/IEC: 60529 Degrees of Protection provided by enclosures of electrical Equipment
- iii. IS: 5/2004 Colour for ready mixed paints and enamel
- iv. IS: 732/1989 Code of Practice for Electrical Wiring Installations
- v. IS: 5039/1983 Distribution pillars for voltage not exceeding 1000 V
- vi. IS/IEC: 127-1994 Miniature Fuses- Fuse Holders for Miniature Cartridge Fuse Links - Specification
- vii. IS: 2551-1982 Danger Notice Plates
- viii. IEC: 60664 Insulation co-ordination within low voltage system including clearance creepage distances for equipments

### **3.0.3 Technical Requirements:**

### **3.0.4 Details of components: Type of Panel: Indoor Type**

#### **3.1.0 Feeder Pillar (LT panel-1), Common Panel**

##### **3.1.1 Panel incomer shall have the following:**

a) 250 A, 4 Pole, MCCB, 36 KA with microprocessor base Trip Unit Ics=Icu =100% , adjustable over load settings -0.1-1.0 X In, adjustable short circuit settings 2-10XIr, with spreader links, rotary operating mechanism: 01 No.

b) The panel shall have:

(i) Digital Multifunction Meter, V+A+Hz,KW+PF+KWh+Maximum Demand with RS-485 : 1 No

(ii) Current Transformer 250/5 , 15VA, Class 1 to IS:2705, Cast resin type: 3 Nos.

(iii) LED Indication lights for indication of 'Supply On': 3Nos.

3.1.2 6A SP MCB 10 KA C CURVE-3 nos.

3.1.3 Busbar :

400A, 3 Phase, 4 wire, 50Hz ALUMINIUM with PVC sleeves indicated with four colours with current Density not more than 1 amp/mm<sup>2</sup>

3.1.4 Panel Outgoing shall have the followings:

a) Each Panel shall have

(i) 125 A, 4P MCCB, 25 KA with Thermal Magnetic Trip Unit, Ics=Icu=100%, Adjustable Thermal Settings-0.7-1.0XIn ,Fixed Short circuit Settings, With spreader Links, Rotary Operating Mechanism: 6 Nos.

(ii) 63A, 4P, 16kA, MCCB with Thermal Magnetic Trip Unit, Ics=Icu=100%, Adjustable Thermal Settings-0.7-1.0XIn ,Fixed Short circuit Settings, With spreader Links, Rotary Operating Mechanism : 3 Nos.

(ii) LED Indication lights(R,Y,B) for indication of 'Supply On': 27Nos.

3.2.0 Feeder Pillar (LT panel-2), Block Common Service Panel

3.2.1 Panel incomer shall have the following:

a) 125 A, 4P MCCB, 25 KA with Thermal Magnetic Trip Unit, Ics=Icu=100%, Adjustable Thermal Settings-0.7-1.0XIn ,Fixed Short circuit Settings, With spreader Links, Rotary Operating Mechanism: 1 No.

b) The panel shall have:

(i) Digital Multifunction Meter, V+A+Hz,KW+PF+KWh+Maximum Demand with RS-485 : 1 No

(ii) Current Transformer 150/5 , 15VA, Class 1 to IS:2705, Cast resin type: 3 Nos.

(iii) LED Indication lights for indication of 'Supply On': 3Nos.

3.2.2 Busbar

200A, 3 Phase, 4 wire, 50Hz ALUMINIUM with PVC sleeves indicated with four colors with current Density not more than 1.0 amp/mm<sup>2</sup>

3.2.3 Panel Outgoing shall have the followings:

a) Each Panel shall have

(i) 63 A, 3P MCCB, 16 KA with Thermal Magnetic Trip Unit, Ics=Icu=100%, Adjustable Thermal Settings-0.7-1.0XIn ,Fixed Short circuit Settings, With spreader Links, Rotary Operating Mechanism: 3Nos.

(ii) 40 A, 4P MCCB, 16 KA with Thermal Magnetic Trip Unit, Ics=Icu=100%, Adjustable Thermal Settings-0.7-1.0XIn ,Fixed Short circuit Settings, With spreader Links, Rotary Operating Mechanism: 3Nos.

(iii) 40A DP MCB 10 KA C CURVE. Qty= 4 Nos.

(iv) LED Indication lights(R,Y,B) for indication of 'Supply On': 30 Nos.

3.3.0 Feeder Pillar (LT panel-3), Block Utility Panel



3.3.1 Panel incomer shall have the following:

- a) 125 A, 4P MCCB, 25 KA with Thermal Magnetic Trip Unit, Ics=Icu=100%, Adjustable Thermal Settings-0.7-1.0XIn ,Fixed Short circuit Settings, With spreader Links, Rotary Operating Mechanism: 1 No.
- b) The panel shall have:
  - (i) Digital Multifunction Meter, V+A+Hz,KW+PF+KWh+Maximum Demand with RS-485 : 1 No
  - (ii) Current Transformer 150/5 , 15VA, Class 1 to IS:2705, Cast resin type: 3 Nos.
  - (iii) LED Indication lights for indication of 'Supply On': 3Nos.

3.3.2 Busbar

200A, 3 Phase, 4 wire, 50Hz ALUMINIUM with PVC sleeves indicated with four colors with current Density not more than 1.0 amp/mm<sup>2</sup>

3.3.3 Outgoing

- a) Each out going Panel shall have
  - (i) 40 A, 4P MCCB, 16 KA with Thermal Magnetic Trip Unit, Ics=Icu=100%, Adjustable Thermal Settings-0.7-1.0XIn ,Fixed Short circuit Settings, With spreader Links, Rotary Operating Mechanism: 4Nos.
  - (ii) 25A, 4P, MCB 10 KA C CURVE. Qty=2 Nos. 25A FP MCB 10 KA C CURVE. Qty=2 Nos.
  - (iii) LED Indication lights(R,Y,B) for indication of 'Supply On': 20 Nos.
  - (iv) Electronic Timer Operating voltage of 160V to 500V, Time delay range of 3-30 Sec.: 1 No
  - (v) 40A, 4P, AC operated Contactor with suitable 2 NO+2 NC with interlocking DG: 1 No
- b) Sub Outgoing feeder shall have
  - (i) 10A, SP, MCB, 10 KA, C CURVE: 15 Nos.

3.4.0 Feeder Pillar (LT panel-4), External Feeder

3.4.1. Panel Incomer shall have

- (i) 40 A, 4P, 10 KA, C curve MCB: 1 No.
- (ii) Electronic Timer Operating voltage of 160V to 500V, Time delay range of 3-30 Sec.: 1 No
- (iii) 40A 4P AC operated Contactor with suitable 2 NO+2 NC with interlocking DG: 1 No
- (iv) LED Indication lights(R,Y,B) for indication of 'Supply On': 5Nos.

3.4.2. Busbar

200A, 3 Phase, 4 wire, 50Hz ALUMINIUM with PVC sleeves indicated with four colours with current Density not more than 1.0 amp/mm<sup>2</sup>

3.4.3. Outgoing

- a) Outgoing panels shall have
  - (i) 10A SP MCB 10 KA C CURVE: 15 Nos.

3.5.0 Feeder Pillar (LT panel-5), Water Panel

3.5.1. Panel Incomer shall have

- (i) 125 A, 4P, MCCB, 25 kA with thermal magnetic trip unit Ics=Icu =100%, adjustable thermal settings -0.7-1.0 X In, fixed short circuit current settings, spreader links, rotary operating mechanism. Qty=1 No.
- (ii) LED Indication lights(R,Y,B) for indication of 'Supply On': 3 Nos.

(iii) Digital Multifunction Meter, V+A+Hz,KW+PF+KWh+Maximum Demand with RS-485 : 1 No

(iv) 150/5A Current Transformer, Bus Bar type, Class insulation (120°C) as per IEC/ EN 60044-1 accuracy class 1.0, rated secondary output-5A, Burden-5VA, Resin cast Ring type CT. Qty=3 Nos.

(v) Multifunction Meter With Accuracy class .5/1 with support of Modbus RTU on RS 485 shown accurate reading , favourite page can be selected reverse polarity indication manage active power, reactive power, apparent power ,power factor, voltage, current, frequency & power indication on display as well as unbalance phase angle power quality measurement with calibration led pulse output. Qty=1 No.

#### 3.5.2. Busbar

200A, 3 Phase, 4 wire, 50Hz ALUMINIUM with PVC sleeves indicated with four colours with current Density not more than 1.0 amp/mm<sup>2</sup>

#### 3.5.3. Outgoing

(i) 32A, 3P, MCB, 10 KA, D CURVE: 11 Nos.

(ii) LED Indication Lamp (R, Y, B): 33 Nos.

### 3.6.0 Feeder Pillar (LT panel-6, Block Energy Meter Panels)

3.6.1 Panel incomer shall have the following:

a) 250 A, 4 Pole, MCCB 36 KA with microprocessor base Trip Unit Ics=Icu =100% , adjustable over load settings -0.1-1.0 X In, adjustable short circuit settings 2-10XIr, with spreader links, rotary operating mechanism: 01 No.

b) The panel shall have:

(i) Digital Multifunction Meter, V+A+Hz,KW+PF+KWh+Maximum Demand with RS-485 : 1 No

(ii) 250/5A Current Transformer 400/5 , 15VA, Class 1 to IS:2705, Cast resin type: 3 Nos.

(iii) LED Indication lights for indication of 'Supply On'(R,Y,B): 3Nos.

#### 3.6.2 Busbar :

300A, 3 Phase, 4 wire, 50Hz ALUMINIUM with PVC sleeves indicated with four colours with current Density not more than 1 amp/mm<sup>2</sup>

3.6.3 Panel Outgoing shall have the followings:

a) Each Panel shall have

i) 63 A, 4P MCB, 10 KA, C Curve: 10 Nos.

ii) The panel shall be fitted with (Duel source) Energy meter, 3 phase, 4 wire, accuracy class-0.5, Direct reading 10-65 Amps with ACCL provision: 08 Nos.

### 3.7.0 Feeder Pillar (LT panel-7), Club House Main Panel

3.7.1 Panel incomer shall have the following:

a) 400 A, 4 Pole, MCCB 36 KA with microprocessor base Trip Unit Ics=Icu =100% , adjustable over load settings -0.1-1.0 X In, adjustable short circuit settings 2-10XIr, with spreader links, rotary operating mechanism: 01 No.

b) The panel shall have:

(i) Digital Multifunction Meter, V+A+Hz,KW+PF+KWh+Maximum Demand with RS-485 : 1 No

- (ii) Bus bar type Current Transformer, 400/5 , 15VA, Class 1 to IS:2705, Cast resin type: 3 Nos.
- (iii) LED Indication lights for indication of 'Supply On': 3Nos.

3.7.2 Incomer 6A, SP, MCB, 10 KA, C CURVE: 3 Nos.

3.7.3 Busbar :

480A, 3 Phase, 4 wire, 50Hz ALUMINIUM with PVC sleeves indicated with four colours with current Density not more than 1 amp/mm<sup>2</sup>

3.7.4 Panel Outgoing shall have the followings:

a) Each Panel shall have

- i) 100 A, 4 Pole, MCCB, 25 KA with Thermal Magnetic Trip Unit Ics=Icu =100% , adjustable thermal settings -0.7-1.0 X In, fixed short circuit settings, with spreader links, rotary operating mechanism: 01 No.
  - ii) 63 A, 3P MCCB, 16 KA with thermal magnetic trip unit, Ics=Icu =100% , Adjustable thermal settings-0.7-1.0XIn, fixed short circuit settings, with spreader links, rotary operating mechanism: 02 No.
  - iii) 63 A, 4P, MCCB, 16 KA with thermal magnetic trip unit, Ics=Icu =100%, Adjustable thermal settings-0.7-1.0XIn, fixed short circuit settings, with spreader links, rotary operating mechanism: 11 Nos.
  - iv) 63A, DP, MCB, 10 KA, C Curve: 2 Nos
- b) LED Indication Lamp, 230V, (R,Y,B): 42 Nos

3.8.0 Feeder Pillar (LT panel-8), Club House Utility Panel

3.8.1 Panel Incomer shall have

- (i) ) 63 A, 4P, MCCB, 16 KA with thermal magnetic trip unit, Ics=Icu =100% , Adjustable thermal settings-0.7-1.0XIn, fixed short circuit settings, with spreader links, rotary operating mechanism: 1 No
- b) The panel shall have:
  - (i) Digital Multifunction Meter, V+A+Hz,KW+PF+KWh+Maximum Demand with RS-485 : 1 No
  - (ii) 75/5A Current Transformer , Bus bar type, class E Insulation(120°C), as per IEC/EN 60044-1, accuracy class 5, Rated secondary output -5A Burden - 5 VA Circular Moided Current Transformer (CMCT):6 Nos.
  - (iii) LED Indication lights for indication of 'Supply On'(R,Y,B): 3Nos.

3.8.2 Busbar

75 A, 3 Phase, 4 wire, 50Hz ALUMINIUM with PVC sleeves indicated with four colours with current Density not more than 1.0 amp/mm<sup>2</sup>

3.8.3 Outgoing

a) Outgoing panels shall have

- (i) 40 A, 4P, MCCB, 16 KA with thermal magnetic unit Ics=Icu =100% , adjustable thermal settings -0.7-1.0 X In, Fixed short circuit settings, with spreader links, rotary operating mechanism: 3 Nos.
- (ii) 32A, TP, MCB, 10 KA, D Curve: 2 Nos
- (iii) 25A, TP, MCB, 10 KA, D Curve: 2 Nos.
- (iv) LED Indication lights(R,Y,B) for indication of 'Supply On' for each panel: 21 Nos.
- (v) Electronic Timer Operating voltage of 160V to 500V, Time delay range of 3-30 Sec.: 1 No

(vi) 40A, 4P, AC operated Contactor with suitable 2 NO+2 NC with interlocking DG: 1 No

#### 3.8.4 Busbar

**(i) 50A, 3 Phase, 4 wire, 50Hz ALUMINIUM with PVC sleeves indicated with four colours with current Density not more than 1 amp/mm<sup>2</sup>**

#### 3.8.5 Sub outgoing

(i) 10A SP MCB 10 KA C CURVE: 15 Nos.

#### 3.9.0 500 KVAR APFC Panel

3.9.1 The APFC panel shall have the followings:

i) 1250 A, TP, ACB, 50 KA with Microprocessor based trip unit, Ics=Icu =100% ,having overload settings, short circuit settings-Instantaneous & Earth fault protection, with spreader links, : 1 No.

ii) 6A SP MCB 10 KA C CURVE: 3 Nos.

#### 3.9.2. Busbar

The Busbar shall be 1300A, 3 Phase, 4 wire, 50Hz ALUMINIUM with PVC sleeves indicated with four colours with current Density not more than 1.0 amp/mm<sup>2</sup>: 1 Set

3.9.3 The panel shall have:

(i) Multifunction meter With Accuracy class 0.5/1 with support of Modbus RTU on RS 485 shown accurate reading , favourite page can be selected, reverse polarity indication manage active power, reactive power, apparent power ,power factor, voltage, current, frequency & power indication on display as well as unbalance phase angle power quality measurement with calibration led pulse output: 1 No.

(ii) 1000/5 A Current Transformer, Busbar type, class E insulation as per IEC/ EN 60044-1, accuracy class 1.0 Rated secondary output -5A Burden - 15 VA Resin cast rectangular type : 3 Nos.

(iii) LED Indication lights for indication of 'Supply On': 3Nos.

#### 3.9.4 Outgoing

a) The outgoing feeder shall have

i) 125 A, TP MCCB, 25 KA with thermal magnetic unit Ics=Icu=100%, Adjustable thermal settings -0.8-1.0 X In, Fixed short circuit current settings, with spreader links, rotary operating mechanism: 8 Nos.

ii) 63 A TP MCB 10 KA C Curve: 4 Nos.

iii) 14 stage low sensitivity APFC relay 3 CT sensing: 1 No.

iv) A/M Switch: 28 Nos.

v) LED Type Indicating Light ("ON SIGNAL") 230 V, GREEN WITH SMOOTH LENS: 28 nos.

vi) LED Type Indicating Light ("OFF SIGNAL")230 V RED WITH SMOOTH LENS: 28 Nos.

vii) Extended type Non-illuminated Push button to "ON"(GREEN): 28 Nos.

viii) Extended type Non-illuminated Push button to "OFF" (RED): 28 Nos.

ix) 50 KVAR Capacitor Duty contactor with damping Resistors and early make poles for 50 KVAR, 3Ø Capacitor, 440 V ,1NO+2NC AUX contacts: 8 Nos.

x) 25 KVAR TP Capacitor Duty contactor with damping Resistors and early make poles for 25 KVAR 3Ø Capacitor, 440 V ,1NO+1NC AUX Contacts: 4 Nos

xi) Capacitor Bank, 50 KVAR, Resin filled box type heavy duty Capacitor with operating losses, 0 .35W/KVAR: 8 Nos.

xii) Capacitor Bank, 25 KVAR Cylindrical type normal duty operating losses-0.45W/KVAR, 440V: 4 Nos.

#### 3.10.0 Substation Main LT panel

3.10.1 Panel Incomer-1 shall have

a) 2000A, 4 Pole, Icu 50 kA, up to 500V AC, 50Hz, draw-out type, Air Circuit Breaker with O/C, S/C, & E/F protection, electrically and manually operated, spring charging shall be motorized and manual. The feeder shall have brought out terminals for terminating 6 run 3.5core, 240sqmm XLPE Aluminium Cables: 1 No.

The panel shall have:

(i) Digital Multifunction Meter, V+A+Hz, KW+PF+KWh+Maximum Demand with RS-485 : 1 No.

(ii) Current transformer, 2000/5, 15VA, Class 1 to IS: 2705, Cast resin type. : 3 Nos.

(iii) LED Indication lights for indication of 'Supply On': 3Nos.

(iv) LED Indication lights for indication of OFF/ON/TRIP CB: 3Nos.

(v) Trip-neutral-Close selector Switch, 25 Amp: 1 Nos.

(vi) Moulded HRC Fuse Holders with HRC Fuses for control circuit protection: 6 Nos.

3.10.2 Panel Incomer-2 shall have:

a) 400 A, 4 Pole, MCCB 36 KA with microprocessor base Trip Unit Ics=Icu =100% , adjustable over load settings -0.1-1.0 X In, adjustable short circuit settings 2-10XIr, with spreader links, rotary operating mechanism: 01 No.

b) The panel shall have:

i) Digital Multifunction Meter, V+A+Hz, KW+PF+KWh+Maximum Demand with RS-485 : 1 No

(ii) 400/5A Current Transformer 400/5 , 15VA, Class 1 to IS:2705, Cast resin type: 3 Nos.

(iii) LED Indication lights for indication of 'Supply On': 3Nos.

3.10.3 Incomer 6A SP MCB 10 KA C CURVE: 6 Nos.

3.10.4 AMF panel complete with, M/F meter, CT 2000/5A, CI 1.0, CT 400/5A, CI 1.0 Indication lamp, Battery charger 24V, Relay card, DC Ammeter, SP MCB, 6A, 10kA- 6 nos., APFC relay card, 14 stage, AMF controller etc. Qty= 1 No.

3.10.5 Panel Outgoing ACB Feeder shall have the followings:

a) 1250 A, TP ACB, 50 KA with Microprocessor based Trip Unit Ics=Icu =100% , provide overload settings, , short circuit setting- instantaneous & earth fault protection with spreader links, rotary operating mechanism. The feeder shall have brought out terminals for terminating 4 run 3.5core, 240sqmm XLPE Aluminium Cables. Qty=1 No.

a) 1000A, 4 Pole, Icu 50 kA, up to 500V AC, 50Hz, draw-out type, Air Circuit Breaker with O/C, S/C, & E/F protection, electrically and manually operated, spring charging shall be motorized and manual. The feeder shall have brought out terminals for terminating 3 run 3.5core, 240sqmm XLPE Aluminium Cables. Qty= 2 Nos.

b) Each ACB Feeder shall have

CBCT in all the outgoing along with Digital Multi Function Meter.

(i) Digital multifunction meter with accuracy class 0.5 and with RS-485 port with MODBUS protocol for data logging/downloading. The meter shall preferably be of size 96mm x 96mm and shall measure the following electrical parameters: Voltage, Current, Frequency, KVA, KVar, PF, KWH, and KVarh. The multifunction meter shall have inbuilt memory to store data for minimum 75 days.

(iii) LED Indication lights for indication of 'Supply On': 3Nos.

(iv) LED Indication lights for indication of OFF/ON/TRIP CB: 3Nos

(v) Trip-neutral-Close selector Switch, 25 Amp: 1 Nos.

(vi) Moulded HRC Fuse Holders with HRC Fuses for control circuit protection: 6 Nos

3.10.6 Panel outgoing MCCB Feeder shall have the followings:

a) Rating of outgoing feeders:

- (i) 630A, 4 pole, Moulded case circuit Breaker, 36 kA, 415V AC, 50Hz : 2 Nos.
- (ii) 400A, 4 pole, Moulded case circuit Breaker, minimum 36kA, 50Hz, 415VAC: 1 no.
- (iii) 250A, 4 pole, Moulded case circuit Breaker, 36kA, 415V AC, 50Hz: 9 Nos.

b) Each outgoing MCCB shall have inbuilt microprocessor release mechanism and shall have following protection:

- 1) O/L protection
- 2) Short Circuit protection
- 3) E/F protection

Settings: i) Over Current:  $I_r = 0.8$  to  $1 \times I_n$ ; ii) Short Circuit:  $I_m = 5$  to  $10 \times I_r$ ; iii) Instantaneous protection against short Circuit with fixed threshold  $I_f = 5kA$

Earth leakage protection (CBCT & ELR): Current Settings: 30mA to 30A; Time Settings: 0.15Sec to 5 Sec:

c) Each outgoing feeder shall have CBCT with MFM with following details:

(i) Digital multifunction meter with accuracy class 0.5 and with RS-485 port with MODBUS protocol for data logging/downloading. The meter shall preferably be of size 96mm x 96mm and shall measure the following electrical parameters: Voltage, Current, Frequency, KVA, KVA<sub>r</sub>, PF, KWH, and KVA<sub>r</sub>h. The multifunction meter shall have inbuilt memory to store data for minimum 75 days.

ii) Core balance current transformer (CBCT) with earth leakage relay (ELR) for providing Earth leakage protection; current settings: 30mA to 30A; Time Settings: 0.15 Sec to 5 Sec: 1 set

iii) MCCBs shall be actuated by a handle that clearly indicates the three position ON/OFF/ TRIP.

iv) LED for R, Y, B phases shall be provided showing availability of power: 3 Nos.

v) Moulded HRC Fuse Holders with HRC Fuses for control circuit protection: 3 Nos.

vi) Pad locking arrangement in OFF position with pad lock: 1no.

vii) LED Indication lights for 'Feeder ON', 'Feeder OFF' & 'TRIP': 03 nos.

### 3.10.7 Bus-bar:

The bus chamber shall be sheet steel clad having front and rear bolted covers and shall consist of 1 set TP & N electrolytic grade, high conductivity aluminium bus-bars, conforming to BIS. Current rating of bus bar sections 2000 A, suitable for 415 V AC, 50 Hz system. The bus-bar shall be insulated with heat shrinkable PVC sleeves, make Raychem RPG, equivalent reputed make and shall be supported at required intervals with non- hygroscopic, non-deteriorating, and non-inflammable SMC / FRP supports having adequate mechanical strength and a high tracking resistance, to withstand short circuit fault levels up to 50 kA for 1 sec.

All risers and connections from bus bar shall be carried out with same material as the main bus bars of current rating as per rating of individual cubicle switch. To suit the stringent site conditions, the bus bar system shall be designed with generous clearance between phases than specified in the standards. Adequate non-hygroscopic insulating sheet barriers between the bus chambers and feeders shall be provided. The manufacturer's prototype panel must have type test certificate from CPRI/equivalent testing lab of national reputed for short circuit withstand capacity of 50kA for one second on minimum 2000 Amps Bus Bars and Temperature rise test. All necessary interconnection shall be duly tested as per IS: 8623.

3.10.8 The panel shall be fitted with (Duel source) Energy meter, 3 phase, 4 wire, accuracy class-0.5, Direct reading 10-65 Amps with ACCL provision.

### 3.11.0 Constructional Details of All panels:

#### 3.11.1 General Requirement:

- i. Panel shall be self-supporting, Indoor Type, dust, vermin/rodent proof, suitable for placing on a RCC foundation. Any left holes/cable entries shall be blocked by using detachable metallic sheets to prevent entry of rodent/reptiles.
- ii. The structure of Panel shall be made with 2mm thick CRCA sheet and (75x40x6) mm base channel as required.
- iii. Heavy duty Lifting hooks (4 No's heavy duty lifting hooks) shall be provided for lifting of Panel.
- iv. The door shall be in parts and shall have locking arrangement with special type Knob type key. Danger Plate fitted on both sides.
- v. For cooling of the component louver arrangement shall be made in the Panel
- vi. Panel shall have a heavy duty base framework. The frame design shall be such that the height between bottom cable entry plate and the connection hole of brought out link of incoming, outgoing MCCBs shall be minimum 450mm.
- vii. The entire sheet-work shall be given minimum ten tank anti-rust treatment as per IS and then powder coated (min 50 micron thick) in light grey shade no 631 as per IS:631.
- viii. The design should be as per IS-8623, 13947, 13703, 4237 and IEC-61439 and suitable for ambient-50°C (Max)/ 2°C (Min), humidity-60% (Max). All components used must be suitable for the environment as mentioned.
- ix. All hardware should be of high tensile steel & Zinc passivated. Size of spring washers & flat washers should be as per relevant IS for individual bolt.
- x. All the components shall be mounted on separate steel plate with necessary stiffeners or suitable channels so that all the components can be checked and replaced from front side after opening the door.
- xi. All items will be labelled using riveted engraved metallic or mica labels.
- xii. All incoming and outgoing cables shall enter the enclosure from bottom side. Bottom plate shall have individual detachable gland plates for all cables. These detachable plates shall be accessible and removable from inside. All cable entry plates shall have knockouts.

#### 3.11.2 General Technical Requirements:

- i. All connection links between bus-bar and MCCBs & brought out links shall be made with rectangular sections of Aluminium conforming to IS 5082. Current rating of links shall be minimum 1.5 times (rating for unassembled sections) the device rating. Spreader bars supplied by MCCB manufacturer shall be used for all incoming and outgoing terminations for all MCCBs.
- ii. All control wiring shall be done with single core 2.5sqmm, FRLS PVC insulated, 1100v grade, IS approved stranded copper cable.
- iii. All control cable ends shall have crimped copper lugs for proper termination and ferrules for identification of wiring. All the control circuit wiring shall be connected with terminals blocks, ferrules for easy identification
- iv. All panel doors shall be earthed.
- v. No bimetallic joints shall be permitted in the links of connections.
- vi. Special non-deteriorating Neoprene rubber gaskets shall be provided at panel doors.
- vii. Sufficient space should be provided for proper glanding, dressing, connecting up and maintenance of all cables. Sufficient nos. of cable entry holes shall be provided in the bottom plate.
- viii. All items shall be duly fixed with zinc passivated high tension hard-wares. DIN channel shall be used for components having facility to mount on DIN channel.

ix. All items of the Panel must be approved by ISI or IEC (with latest amendments) for performance and safety. 3 nos fuse carrier and base of 16 Amp of SM type with 4 Amp HRC fuses and fuse link shall be provided for power supply of multifunction meter. The auxiliary power supply of multifunction meter shall be 230 VAC.

x. Current transformer shall be cast resin type, with accuracy class 0.5 and suitable specification. 2 No's passivated heavy duty type nuts and bolts shall be provided for connection of earthing on two opposite side.

xi. For all incoming and outgoing cable connection, brought out terminals shall be provided. Suitable size of single compression M.S cable gland of size mentioned in the point no.

xii. For all incoming and outgoing cables along with Panel. Suitable size of holes shall be made into detachable gland plate for incoming and outgoing feeders. The cable gland is to be supplied and fitted in the Panel by bidder as per requirement of incoming and outgoing feeders.

xiii. The Panel shall have provision for,

a) Cable entries for 2000A ACB: suitable for terminating 6 run, 3.5×240 sqmm PVCA Al cable

b) Cable entries for 1000A ACB: suitable for terminating 3 run, 3.5×240 sqmm PVCA Al cable

c) Cable entries for 630 A MCCB:suitable for terminating 2 run, 3.5×240 sqmm PVCA Al cable

d) Cable entries for 400 A MCCB:suitable for terminating 1 run, 3.5×240 sqmm PVCA Al cable

e) Cable entries for 250 A MCCB:suitable for terminating 1run, 3.5×240 sqmm PVCA Al cable

f) Cable entries for 125 A MCCB:suitable for terminating 1 run, 3.5×120 sqmm PVCA Al cable

g) Cable entries for 63 A MCCB:suitable for terminating 1 no, 3.5×70 sqmm PVCA Al cable

xiv. Higher version of components with same feature as mentioned in make list of components having proven track records of components shall be acceptable to OIL with prior approval. All cable entries shall be done from bottom side. Separate detachable type gland plates shall be provided for all cables. One additional cable entry gland plate shall be provided

### 3.11.3 Plate and Marking:

3.11.4 Panel shall be provided with Aluminium /Stainless steel / Brass nameplate showing the following information indelibly marked in English:

- i) Manufacturer's Name
- ii) OIL's Purchase Order No. & date
- iii) Manufacturer's Serial Number
- iv) Year of Manufacture
- v) Rated Voltage Rating
- vi) No. of circuits (incoming & outgoing)
- vii) Rated Current of incoming circuit
- viii) Rated Current of outgoing circuit
- ix) Degree of protection

### 3.11.5 Danger Notice Plates:

Danger Notice plate shall be provided at the front of the Panel using M5 hot dipped galvanized /stainless steel / brass fasteners not removable type / accessible from the front i.e. without opening the door / front cover.

### 3.11.6 Tests:



The following routine tests shall be carried out in accordance with the relevant IS/IEC standards for all the LT panels:

A. Routine Tests:

The following routine tests shall be carried out at manufacturers' works during inspection:

- i) Overall Dimensions Checking.
- ii) Insulation Resistance Tests.
- iii) High Voltage Test at 2500 V, 50 Hz AC for one minute.
- iv) Functional Test and verification of continuity of protective circuits
- v) Verification of clearances & creepage distances

3.11.7 Test Certificates:

Copy of type test conducted on similar type panel by CPRI/NABL accredited laboratories for the following shall be submitted with the offer.

- a) Short time current withstand test
- b) Temperature rise test

3.11.8 Drawing & Documents:

A. The following drawings & documents shall be prepared based on NIT's specifications and statutory requirements with complete BOM and shall be submitted with the bid:

- i. Completely filled-in technical parameters
- ii. SLD of Panels
- iii. Bill of Materials (BOM)
- iv. GA drawing of the Panels showing dimensional details
- v. Type Test certificates for tests conducted earlier on similar equipment shall be furnished

B. Documents/drawings to be submitted for approval after the award of the order:

The following drawings & documents shall be submitted for approval: GA drawing, SLD, termination details, wiring diagram and complete bill of material of the Panel shall be submitted to OIL for approval within 45 days after placement of the order. The drawing shall be approved by OIL within 30 Days of submission of drawing. Delay in drawing approval due to error correction in drawings submitted will be parties account. Any delay in submission of drawing for approval shall be parties account.

C. Documents/drawings to be submitted along with the supply

Four sets of the following documents shall be submitted with the supply

- i. Approved GA drawing showing all details, including constructional detail and component layout for panels
- ii. Approved SLD & Schematic Diagram
- iii. Technical specification of all equipment including Manual/Catalogue/installation instructions etc
- iv. Installation, testing and commissioning & operation manual of the Panel and Air Circuit Breaker (ACB) and MCCB.
- v. Literature of main components like protection & auxiliary relays.
- vi. Bill Of Materials with technical details
- vii. Routine, Acceptance & Type test certificates.
- viii. Guarantee/warranty Certificate

**ix. List of recommended spares with pricing and part no. for two years operation**

**Note:** the drawing shall be approved by OIL within 30 Days of submission of drawing. Delay in drawing approval due to error correction in drawings submitted will be parties account.

3.11.9 Warranty:

The goods/equipment shall be of best quality and workmanship. Panel and all its components shall be guaranteed for twelve (12) months from the date of commissioning against defects arising due to material, workmanship or design. The party shall agree to replace/repair the defective components at site at their cost during guarantee period.

#### 23.1.4 INSPECTION of LT Panels

- (i) All the routine tests and special tests as per relevant IS are to be carried out in presence of OIL's Engineer at manufacturer's works. The supplier will give intimation to OIL 15 days advance prior to commencement of tests so that OIL can depute representative for witnessing tests in time.
- (ii) The LT Panels shall be cleared for dispatch only if the test results comply with the specifications and testing results are within the tolerance limits.
- (iii) Materials / equipment failed to conform to the specifications/during testing, OIL's representative shall have the right to reject the materials and in that case, the supplier will either replace the rejected materials or make alterations necessary to meet specifications requirements free of costs.

#### 4.0 Substation (HT Panel, Transformer, Cable, 2 pole structure, Metering panel)

##### 4.1.0 Description:

These general specifications cover the details of substation building and Substation Equipment (Transformers, HT Panels, HT and LT cables, Cable termination kits, 2 pole structure, Metering Panel, other related items, Chemical earth electrodes, Cable marking etc.) to be supplied, inspected as may be necessary before dispatch, delivery at site, installation, testing, commissioning, putting into operation and handing over in working condition all the equipment of the substation of working voltage 11000/415 volts.

##### 4.1.1 Related Documents:

This technical specification shall be read in conjunction with the standard conditions of the contract with correction slips, as are relevant for commercial aspects, as well as schedules and drawings and requirements under these specifications.

In the event of any discrepancy between these specifications and inter connected documents, the technical requirements as per the contract specifications shall be followed and deemed to be having over-riding value.

4.1.2 A sub-station installation work shall generally comprise of supply, installation, testing and commissioning of the following:

- a) D.P. Structure With AIR BREAK SWITCH
- b) HT metering cubicle panel
- c) HT Panels.
- d) Dry type Transformers complete with associated auxiliaries as specified.
- e) HT and LT cables.
- f) LT Panels.
- g) Earthing system.
- h) Safety Equipment.
- i) Miscellaneous items.

#### **4.1.3 CONFORMITY WITH STATUTORY ACTS, RULES, REGULATIONS, STANDARDS AND SAFETY CODES:**

- i) Indian Electricity Act
- ii) CEA (Measures relating to Safety & Electricity supply) Regulations, 2010
- iii) Relevant Indian Standards
- iv) Any other Act or Rules in force.

Safety Codes and Labour regulations

In respect of all labour employed directly or indirectly on the work, the bidder, hereinafter called the contractor, at his own expense will arrange for the safety provision outlined in safety requirement and specifications to comply with the statutory regulations, BIS recommendations and OIL's practices.

The contractor shall provide necessary barrier warning signals and other safety measures to avoid accidents. He shall also indemnify OIL against claims for compensation arising out of negligence in this respect.

Nothing in these specifications shall be construed to relieve the contractor of his responsibility for the design, manufacture and installation of the equipment with all accessories in accordance with applicable statutory regulations and safety codes in force from the safety angle.

#### **4.1.4 DRAWING AND DOCUMENTS:**

##### **A. SPECIFICATION**

The tender specifications shall indicate for a particular job the reference drawings to help the contractor to work out the tender. The drawings shall also indicate the schematic of main connections and shall form part of the specifications. Single line diagram of substation is attached for knowing the scheme of DP structure with Air break switch, HT metering cubicle, HT panel, Transformer and LT panel and Rooftop Solar PV Plant.

Drawings to be submitted with bid:

i) General arrangement drawing of DP structure with Air break switch, HT metering cubicle, HT panel, Transformer and LT panels and Rooftop Solar PV Plant.

ii) Drawings to be submitted for approval:

The contractor shall submit the following drawings within 60 days of award of work which shall be approved by OIL:

(a) Details of foundations for the equipment

(b) General arrangement drawing of HT Panel, Transformers, LT panels, Earthing system, Cable route etc. including details of grouting of channels / bolts of various equipment and Rooftop Solar PV Plant.

(c) All panels' schematics & wiring diagram including control wiring.

(d) Cable layout between HT panel boards, transformers & LT panel etc.

(e) Bar-chart indicating general programme for Electrical work plan for supply, installation, testing and commissioning and handing over.

(f) Any other drawing or data that may be necessary for the job along with complete bill of material must be submitted to OIL for approval.

The manufacture of panel should start after approval of the drawings by OIL.

B. Drawings to be submitted while handing over installation:

Three Sets of as built drawings comprising the following shall be submitted by the contractor while handing over the installation:

i) Equipment layout drawing(s) giving complete details of the entire equipment.

- (ii) Electrical drawings for the entire electrical equipment showing cable sizes, equipment capacities, switch-gear's ratings, control components, control wiring etc.
- (iii) Schematic diagram of the entire sub-station installation and Rooftop Solar PV Plant.

#### **4.1.5 DOCUMENTS TO BE SUBMITTED:**

The following documents are required to be submitted with the offer.

##### **4.1.6 HT(VCB) Panel:**

- i) Detail as per technical specification mentioned in SOQ.
- ii) Copy of Type test report done on similar panel & VCB at NABL/CPRI accredited laboratories or STL approved laboratories as per relevant IS.
- iii) An undertaking from the panel manufacturer stating that in the event of an order on the part of the panel manufacturer will supply the panel through the party as per specifications of the tender and order.

##### **4.1.7 LT Panel:**

- i) Detail as per technical specification mentioned in Point no.3.10.0 and in SoQ.
- ii) Copy of Type test report done on similar panel at NABL/CPRI accredited laboratories or STL approved laboratories as per relevant IS.
- iii) An undertaking from the panel manufacturer stating that in the event of an order on the part of the panel manufacturer will supply the panel through the party as per specifications of the tender and order.

##### **4.1.8 Transformer:**

- i) Detail as per technical specification mentioned in SOQ.
- ii) Copy of Type test report done on similar transformer at NABL/CPRI accredited laboratories or STL approved laboratories as per relevant IS.
- iii) An undertaking from the transformer manufacturer stating that in the event of an order on the part of the transformer manufacturer will supply the transformer through the party as per specifications of the tender and order.

4.1.9 Deviation of offer from tender specifications with justification and backup documents from principal wherever required shall be submitted with offer. All deviations shall be subjected to acceptance by OIL in writing.

The successful bidder shall obtain approval for the following drawings, documents. All electrical details shall be submitted within 60 days of award of work. OIL shall require minimum 60 days' time for approval of drawings. The approval time may increase depending upon clarifications required from the bidders.

Recommended list of spares with part no. & price for maintenance of panels shall be provided with the supply (not considered for evaluation).

#### **4.2.0 Documents to be submitted with supply:**

##### **A. HT Panel:**

- i) Four sets of installation, testing and commissioning & operation manual of the Panel and Vacuum Circuit Breaker (VCB).
- ii) Four sets of literature of main components like protection & auxiliary relays.
- iii) Four copies of as built general arrangement, schematic diagram and wiring diagrams.
- iv) Two copies of foundation drawings.
- v). Four sets of test report containing result of tests done at manufacture's work during inspection as per relevant IS.
- vi) Recommended list of spares with part no. & price for maintenance of panel (not considered for evaluation).

**C. Transformer:**

- i) Four sets of Manufacture's test certificates for all the components & assemblies as required by IS-11171 should be submitted to OIL along with dispatch of the materials.
- ii) Four sets of General arrangement drawing of all the components & assemblies and wiring drawing.
- iii) Four sets of Instruction manual for installation, operation, maintenance repairs and circuit diagram.
- iv) Recommended list of spares with part no. & price for maintenance of transformer (not for evaluation).

4.2.1 Type test certificate for dry type Voltage transformer & cast resin type current transformer from NABL/CPRI accredited laboratories or STL approved laboratories as per relevant IS shall be submitted with the supply.

**4.2.2 Documents to be submitted during handing over of Substations:**

After completion, while handing over the sub stations to OIL, the bidder shall hand over 3 sets of the operating and maintenance manual of all the equipment installed & used in the sub stations, their drawings, test certificates, copies of all documents for routine, acceptance and type test certificates of the equipment carried out at the manufacturers premise, type test certificate from NABL/CPRI accredited laboratories or STL approved laboratories for design and performance of Circuit breaker and cubicle as per standards, guarantee certificates, operating spares as specified in the tender, spare parts list and any other relevant documents regarding installation, adjustments operation and maintenance including preventive maintenance & trouble shooting together with all relevant data sheets.

**5.0 SCHEDULE OF WORK:**

OIL shall supply an indicative single line diagram and a schedule of work as per SOQ detailing the equipment, materials required, type and anticipated quantity/numbers in respect of each item. However, detailed drawings shall be prepared by the contractor & submitted to OIL for its approval.

**5.1.0 WORKS TO BE DONE:**

In addition to supply, installation, testing and commissioning of all equipment as per schedule of work, following work shall be deemed to be included within the scope of work, to be executed by the contractor.

- (i) All building works, such as equipment foundation if required cutting and making holes, grouting of channel belts as required.
- (ii) Provision of supports / clamps for equipment, cables etc. wherever required.
- (iii) Small wiring, inter-connection etc. inclusive of all materials and accessories, necessary to comply with the regulations as well as proper and trouble free operation of the equipment.
- (iv) Closing of the cable entry points in sub-station against seepage of water, rodents etc.
- (v) Tools and tackles required for handling and installation.
- (vi) All necessary testing equipment for commissioning of the panel.
- (vii) Watch and Ward of materials and/or installation and equipment till their handing over to OIL.

#### **5.1.1 INSPECTION OF SITE AND COLLECTION OF DATA:**

The HT and LT cable length given in the SOQ are approximate length. The contractor shall be deemed to have examined the tender documents, detailed specification, cable length, necessary data etc. and to have visited the site or ascertained all relevant details for offering suitable equipment/installation.

#### **5.1.2 EXTENT OF WORK:**

The scope of work shall consist of cost of all materials, labour transportation & Handling/supervision, installation, calibration, adjustments as required for commissioning of the sub-station. The term complete installation shall mean not only major item of the plant and the equipment covered by these specifications, but also incidental sundry components necessary for complete execution and satisfactory performance of installation with all labour charges, whether or not specifically mentioned in the tender documents, which shall be provided by the contractor at no extra cost.

#### **5.1.3 COMPLETENESS OF TENDER:**

All fittings, unit assemblies' accessories, hardware foundation bolts, terminal blocks for connections, cable glands and miscellaneous materials and accessories of items of work which are useful and necessary for efficient assembly and working of the equipment shall be deemed to have been included within the scope of the work in the tender and within the overall details for complete item whether they have been specifically mentioned or not.

#### **5.1.4 QUALITY OF MATERIALS AND WORKMANSHIP:**

All parts of equipment shall be of such design, size and material so as to function satisfactorily under all rated conditions of loading and operation. All components of the equipment shall have adequate factors of safety.

The entire work of fabrication, assembly and installation shall conform to sound engineering practice. The mechanical parts subject to wear and tear shall be of easily replaceable type.

The construction shall be such as to facilitate ease of operation, inspection, maintenance and repairs. All apparatus shall also be designed to ensure satisfactory operation under working conditions as specified.

#### **5.1.5 DISPATCH OF MATERIALS AND STORAGE:**

The contractor shall commence work as soon as the drawings submitted by him are approved. Safe custody of all machinery and equipment supplied by the contractor shall be his own responsibility till the final taking over by OIL.

#### **5.1.6 COORDINATION WITH OTHER AGENCIES:**

The contractor shall coordinate his work and cooperate with other agencies by exchange of all technical information like details of foundation if required, weight, overall dimensions, clearance and other technical data required for successful and proper completion of his portion of the work in relation to the work of others without any reservation. No remuneration should be claimed from the OIL for such technical cooperation. If any unreasonable hindrance is caused to other agencies and any completed portion of the works has to be dismantled and redone for want of cooperation and coordination by the contractor during the course of work, such expenditure incurred will be recovered from the contractor during the course of work, if the restoration work to the original condition of specification of the dismantled portion of the work was not under taken by the contractor.

#### **5.1.7 CARE OF BUILDINGS:**

Care shall be taken, while handling/installing the equipment to avoid damage to the building. On completion of the installation, the contractor shall arrange to repair all damages to the building caused during plant installation so as to bring to the original condition. He shall also arrange to remove all unwanted waste materials from substation room and other areas used by him.

#### **5.1.8 PAINTING AND PROTECTION:**

All damages to painting during transport and installation shall be set right to the satisfaction of OIL before handing over. All structural frame work for support of various items of equipment shall be given the final coat of paint of shade as per standard at site after erection is complete.

The major equipment like HT panel, transformers, LT panel, bus duct, cable trays etc. shall be factory final finish painted. The agency shall be required to do only touching to the damages caused to the painting during transportation, handling & installation at site. However, hangers, supports etc. of & cable tray etc. shall be painted with required shade including painting with two coats of anticorrosive primer paint at site. The following has to be incorporated during installation and commissioning:

- a) Neutral earth pit cover to be painted yellow.
- b) Body earth pit cover to be painted green.
- c) Surge arrestor earth pit cover to be painted black
- d) Available earth pit resistance values should be written on the earth pit cover (Both Individual and combined).

#### **5.1.9 TRAINING OF DEPARTMENTAL PERSONNEL:**

The operation and maintenance staff of OIL shall be associated with the contractor's personnel during the installation, testing and commissioning of the equipment.

#### **5.2.0 FINAL INSPECTION AND TESTING:**

When the installation is complete, the contractor shall arrange for inspection and testing of the installation. Test results obtained shall be recorded. The installation shall not be accepted unless it complies with the requirement of these Specifications. The Sub Station

installation shall be inspected by local licensee and/ CEA and their clearance taken before energizing the Sub Station. The responsibility of the contractor is to arrange inspection of substation by Central Electricity Authority (CEA) and their clearance will be taken before energizing of substation. All the observations/ deficiencies pointed out by the inspecting authorities shall be complied with by the contractor on priority.

OIL shall render necessary help and reimburse mandatory fees paid to CEA by the contractor if any, in this regard against submission of receipt and at the discretion of management.

#### **5.2.1 DATE OF ACCEPTANCE:**

The contractor shall monitor the operation of the substation for a period of one month after it is energized. The date of acceptance by OIL shall be after successful completion of continuous trouble free operation of the substation for a period of 01 month. In case of unsatisfactory performance or break down due to defective design, manufacture or installation during this one-month trial run, the substation shall be accepted only on completion of one-month trouble free operation.

#### **5.2.2 GUARANTEE:**

The contractor shall guarantee the entire sub-station installation as per specifications. All equipment shall be guaranteed for one year from the date of acceptance of the substation by OIL. The installation shall be covered by the conditions that whole installation or any part is found defective within one year from the date of acceptance shall be replaced or repaired by the contractor free of charge as decided by OIL. The warranty shall cover the following:

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

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

(c) Satisfactory operation during the maintenance period.

(d) Performance figures and other particulars as specified by the bidder under schedule of guaranteed technical particulars.

### **6.0. TECHNICAL SPECIFICATIONS OF ELECTRICAL EQUIPMENT:**

#### **6.1.0 Technical specifications of Earthing System:**

##### **6.1.1 Scope:**

This section covers the general requirements of the earthing system for Sub-station installation. G.I. Pipe earthing with G.I. Plate and G.I. strip and single core insulated cable shall be used for sub-station of 1X1250KVA capacity.

##### **6.1.2 Earthing Systems:**

Earthing system shall comprise of earth electrode of 40 mm diameter of G.I pipe of 3 mtrs length shall be used as an individual electrode and fixed with 600mmX600mmX6mm thick G.I. earth plate. For each transformer, 2 separate and distinct earth electrodes shall be provided for neutral earthing. The body earthing for transformers, HV & LT panels shall be done to a common earth bus connected to two separate and distinct earth electrodes.



Note: For one transformer sub- station total number of earth electrodes shall be 9 (2 for neutral earthing of transformer, 2 for body earthing of the transformer, 1 for surge suppressor, 2 for connection to VCB panel & 2no. for PCC panel of common earth bus for body earthing). The no. of earth electrodes shall be more depending upon soil resistivity and the value of earth resistance which shall be less than 1 ohm when connected together.

#### 6.1.3 Location of Earth Electrodes:

Preferably an earth electrode shall not be situated less than 1.5 m from the building (subjected to availability of space). Care shall be taken that the excavation of earth electrode may not affect the column footings or foundation of the building. In such cases electrodes may be farther away from the building. The location of the electrode earth will be a place where the soil has reasonable chance of remaining moist. As far as possible, entrances, pavements and road ways, are to be definitely avoided for locating the earth electrode. The distance 6.1.3 Electrodes:

Supply and burying Earth electrode with G.I. earth pipe 3 metre long, 40 mm dia including accessories, and providing masonry enclosure size 600mmx 600mm x600mm with RCC cover plate having 2nos. metallic hooks for lifting cover and funnel type arrangement for watering pipe etc. complete as required.

Distance between two earth electrodes shall be twice of minimum length of electrode or as per relevant IS.

#### 6.1.4 Size of Earth Lead:

The recommended sizes of G.I earth bus lead in case of sub-stations shall be 50mmx6mm. The minimum size of earth lead shall be PVC insulated 120sqmm of single core aluminium conductor cable. 2Nos. of 50x6mm GI strap shall be kept in each Pucca cable trench with no. of holes from there single core 120sqmm PVC insulated aluminium conductor cable can be connected to earth electrode and body of equipment

### 7.0 Installation, Testing and Commissioning

#### 7.1.0 HT Panel

##### 7.1.1 Installation of VCB panel:

- (i) The installation work shall comprise of placing and fixing of VCB panel
- (ii) All protection, indications & metering connections and wirings shall be completed.
- (iii) The trip supply battery installed shall be commissioned, completing initial charging of the batteries.
- (iv) All relay instruments and meters shall be mounted and connected with appropriate wiring. Calibration checks of units as necessary and required by the licensee like CTs, VTs Energy Meters etc. shall be completed before pre-commission checks are undertaken.

##### 7.1.2 Testing and Commissioning of VCB Panel

- (i) Procedure for testing and commissioning of relay shall be in general accordance with good practice.
- (ii) Commissioning checks and tests shall include in addition to checking of all small wiring connections, relays calibration and setting tests by secondary injection method and primary injection method. Primary injection test will be preferred for operation of relay through CTs. Before panel board is commissioned, provision of the safety namely fire extinguishers, rubber mats and danger board shall be ensured. In addition, all routine insulation tests shall be performed. Checks and test shall include following.

- (a) Operation checks and lubrication of all moving parts.
- (b) Interlock function checks.
- (c) Continuity checks of wiring, fuses etc. as required.
- (d) Insulation tests.
- (e) Trip test and protection gear tests.
- (f) The complete panel shall be tested with 5000V insulation tester for Insulation between poles and poles to earth. Insulation test of Secondary of CTs and VT to earth shall be conducted using 500V insulation tester.
- (g) Any other tests as may be required by the Licensee / Inspector shall be conducted.
- (h) Where specified, the entire switch board shall withstand high voltage test after installation.
- (i) Any other test required by the consignee/inspecting officer.

## 8.0 LT Panel:

### 8.1.0 Installation of LT Panel

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

#### 8.1.1 Testing and Commissioning of LT panel:

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

- (i) Operation checks and lubrication of all moving parts.
- (ii) Interlock function checks.
- (iii) Continuity checks of wiring, fuses etc. as required.
- (iv) Insulation test: When measured with 500V Insulation tester the insulation Resistance shall not be less than 100 mega ohms.
- (v) Trip tests and protection gear test

## 9.0 Transformer

### 9.1.0 Installation and Commissioning of Transformer:

- (i) The transformer shall be installed in accordance with IS 10028 (with latest amendment)-Code of practice for Installation and maintenance of transformer. Necessary support channels shall be grouted in the flooring.
- (ii) The Transformer shall be moved to its location and shall be correctly positioned. Transformer wheels shall be either locked or provided with wheel stoppers.
- (iii) Wiring of devices shall be carried out as per drawings; Earthing of neutral and body of the transformer shall be done in accordance with these specifications.
- (iv) All devices shall be checked for satisfactory operation.
- (v) All tests specified above of these specifications shall be carried out by the contractor in the presence of inspecting officer/consignee free of cost.

#### **9.1.1 Scope of work for HT cable:**

- (i) The scope of work includes supply, laying, jointing, end termination, testing and commissioning of 11 kV (UE,) 3x240 sq.mm., XLPE, Al cable and 3.5x240Sqmm XLPE AL Cable.
- (ii) The scope of work also includes laying of above cables in pre constructed pucca cable trench.
- (iii) The scope also covers straight through jointing and end termination of cables with standard practice with kits supplied by the bidder and approved by OIL.
- (iv) The quantities indicated in the schedule of items are tentative and payment shall be made to the actual quantities of work done only.

#### **9.1.2 Transportation, Storage and Handling:**

##### **9.1.3 Transportation:**

The cable drums shall be supplied directly to the site. Proper care shall be taken during transportation so that cable drums do not get damaged during transportation. If cable or drum gets damaged during transportation, it is sole responsibility of the bidder to take care of such damages. In case it requires replacement of damaged cable, the bidder has to replace the damaged cable with new cable at free of cost.

##### **9.1.4 Storage:**

- (i) The cable drums shall be stored on a well-drained, hard surface, so that the drums do not sink in the ground causing rot and damage to the cable drums. Paved surface is preferred, particularly for long term storage.
- (ii) The drums shall always be stored on their flanges, and not on their flat sides.
- (iii) Protection from rain and sun is preferable for long term storage of cables. There should also ventilation between cable drums.
- (iv) Damaged battens of drums etc. should be replaced as may be necessary.

##### **9.1.5 Handling:**

- (i) When the cable drums have to be moved over
- (ii) For manual transportation over a distance, the drum should be mounted on cable drum wheels, strong enough to carry the weight of the drum and pulled by means of ropes. Alternatively, they may be mounted on a trailer or on a suitable mechanical transport.
- (iii) For loading into and unloading from vehicles, a crane or a suitable lifting tackle should be used. Small sized cable drums can also be rolled down carefully on a suitable ramp or rails, for unloading, provided no damage is likely to be caused to the cable or to the drum.

##### **9.1.6 Installation:**

###### **A. General:**

- (i) Cables with kinks, straightened kinks or any other apparent defects like defective armouring etc. shall not be installed.
- (ii) Cables shall not be bent sharp to a small radius either while handling or in installation. The minimum safe bending radius shall be followed as per IS 1255. At joints and terminations, the bending radius of individual cores shall not be less than 15 times its overall diameter.

###### **B. Route:**

Cable shall be laid through Pucca trench, the route of which shall be decided by the Engineer-in-Charge considering the following:

(i) Laying in pucca cable trench:

While laying cables in pucca cable trench, cables shall be placed on cable trays. HT and LT cables shall be placed separately.

9.1.7 Cable type: Cross linked polyethylene (XLPE), armoured

i) Shelf life: Minimum 5 years.

**Note:** The package shall contain the following information/ documents:

- a. Make.
- b. Batch no.
- c. Date of manufacture.
- d. Date of expiry.
- e. Shelf life of the kit.
- f. Guarantee certificate.
- g. Installation manual.

9.1.8 Heat Shrinkable indoor and outdoor type end termination kit:

A. 11KV (UE) XLPE cable shall be terminated for indoor and outdoor use especially for indoor connection of 11KV VCB and outdoor connection of 11KV overhead lines. All the materials for indoor and outdoor termination shall be supplied by contractor along with cable jointer. The details of cable termination kit are given below:

i. Heat Shrinkable end termination kit for following cable and having the following features:

- a) Size of cable: 3 core, 240 sq.mm, Aluminium and 3.5 Core 240 Sq.mm. Al
- b) Voltage grade: 11,000 V, AC (UE)
- c) Cable type: Cross linked polyethylene (XLPE), armoured
- d) Type of kit: Indoor and outdoor type
- e) Shelf life: Minimum 5 years.

**B. Note:** The package shall contain the following information/ documents:

- a. Make.
- b. Batch no.
- c. Date of manufacture.
- d. Date of expiry.
- e. Shelf life of the kit.
- f. Guarantee certificate.
- g. Installation manual

C. Storing as well as jointing instructions of the manufacturer of such materials shall be strictly followed.

### 9.1.9 Testing

Testing before laying:

All cables, before laying, shall be tested with 2500/5000V Insulation tester. The cable cores shall be tested for continuity, absence of cross phasing, insulation resistance from conductors to earth / armour and between conductors.

### 9.2.0 Tools:

The party shall have one no. 2.5kV/ 5 kV Digital Insulation Resistance Tester of reputed make like Fluke, high voltage test set, multifunction meter and one set of hydraulic heavy duty crimping tool kit of reputed make of size 16 sq.mm.to 400Sq.mm. including complete set of suitable dies.

### 9.2.1 Technical specifications for 1.1KV grade LT Cable:

### 9.2.2 Scope of work:

The above cable shall be supplied, laid and commissioned from transformers to LT panel incomers & substation LT panel MCCBs to LT Feeder panels and other sub panels

(i) The scope of work includes supply, laying, termination, testing and commissioning of all 1.1 kV, XLPE/PVC insulated( as per specs in the SOQ), PVC sheathed, Al conductor and Cu conductor cables in a pucca cable trench.

(iii) The scope also covers termination and crimping of cables with sweating socket/ GI pipe/ clamp/ U Clip of standard practice with kits supplied by the bidder and approved by OIL. The cost of the items shall be included in the offer.

(iv) The cable shall be laid through 4-inch GI pipes at road crossings, across trenches, drainages and wherever necessary.

(vi) Any other items that are not included but are part of the execution shall be deemed to be included in the scope of and shall be included the cost of such items in their bid.

(vii) The quantities indicated in the schedule of items are tentative and payment shall be made to the actual quantities of work done only.

(viii) Earth continuity wire of single core, 120sqmm insulated wire for 240sqmm cable shall be laid throughout length of cables.

### 9.2.3 Installation, testing and commissioning of cable:

#### A. General:

(i) Cables with kinks, straightened kinks or any other apparent defects like defective armouring etc. shall not be installed.

(ii) Cables shall not be bent sharp to a small radius either while handling or in installation. The minimum safe bending radius for cables shall as per IS. The terminations, the bending radius of individual cores shall not be less than 15 times its overall diameter.

#### B. Route of cable:

(i) Cable shall run through pucca trench/pipes as shortest route possible.

### 9.2.4 Testing of cable before laying:

Before laying of the cables shall be tested for continuity and insulation resistance.

### 9.2.5 Termination & crimping of Cables:

The cable supplied by bidder is required to terminated and crimped. For termination and crimping of cable sweating Socket of required sizes are to be provided by the bidder

Clamp = as per requirement

U Clip- as per requirement

The cable supplied by bidder is required to be terminated at substation, overhead lines. Cable gland for cable will be supplied by party. For crimping of cables suitable size of heavy duty sweating socket of Al/ Copper shall be supplied by contractor. For crimping of cable, crimping tool is to be brought by the contractor. The cost of above items shall be included in the offer.

### 9.2.6 Testing:

#### A. Testing before laying:

All cables, before laying shall be tested with 1.0KV megger. The cable cores shall be tested for continuity, absence of cross phasing, and insulation resistance from conductors to earth / armour and between conductors.

**B. Marking on cable:**

- (i) Manufacturer's name, voltage grade, size of cable, year of manufacture shall be embossed on the outer sheath of the cable at one mtr. interval throughout the length of the cable.
- (ii) Cable drum shall be marked with manufacture's name, voltage grade, size of cable, year of manufacturing, length of cable, ISI mark & OIL#s purchase order number with suitable paint in permanent manner.
- (iii) Cable length shall be embossed in permanent manner with suitable paint at one-meter interval.
- (iv) Construction: Cable shall be so constructed that its outer side is completely round in shape.

**9.2.7 Technical Terms and conditions for supply, laying and commissioning of cable:**

- (i) The cable laying works shall be carried out as per terms and condition of the cable laying works.
- (ii) Crimping and end termination of the cable shall be carried out by experienced/skilled Technician with valid work permit.
- (iii) All the cable laying works shall be supervised by experienced supervisor having certificate of competency for carrying out 1.1KV works.
- (iv) Before laying of the cable, Insulation resistance and continuity test to be carried out.
- (v) The cable crimping and terminations shall be guaranteed for 12 months from the date of commissioning. If any failure of cable or terminations occurs during guarantee period, free of cost repair/ replacement will be carried out by bidder within short notice of 12 hours.

**9.2.8 General terms and conditions for supply, laying & commissioning of cable:**

- (ii) The bidder shall give 30 days' earlier intimation for routine test when cable will be ready at manufacturer's works. The cable shall be inspected and routine tested at manufacturer's works. After dispatch clearance from Oil's Engineer, cable will be dispatched to the site shall be carried out.
- (iii) The cable drum shall be kept in custody of bidder before laying, jointing and handing over the cable and it is sole responsibility of bidder to keep supervision of the cable. The storage and security of cable is in the scope of the bidder.
- (iv) All cable laying and termination works shall be carried out by persons having experienced and valid workman permit for cable jointing for LT cable.
- (v) The cable manufacturer shall have routine test facilities to carry out testing of 1.1 kV grade, 3.5Cx240Sq.mm. XLPE, Al cable as per IS 7098 (with latest amendments) at manufacturer's works.

**9.2.9 Tools:**

The party shall have one no.1.0kV digital Insulation resistance tester of reputed make like Fluke, high voltage test set, multifunction meter and one set of hydraulic heavy duty crimping tool kit of reputed make of size 10sqmm to 240Sqmm including complete set of suitable dies.

## 10.0 Technical specs of HT metering panel and DP structure

10.1.0 Supply, Installation, Testing & Commissioning of HT metering cubical panel as approved By DISCOMs fabricated out of 14 SWG CRCA sheet steel in two compartment & MS angle of size 60mmX6mm having provision for Following:

- (i) Provision for fixing Trivector Meter (To be supplied by DISCOMs)
- (ii) Provision for fixing of combined CT PT Set (To be supplied by DISCOMs),
- (iii) TT Block,
- (iv) 6mm Bakelite sheet on all sides,
- (V) 3/6 core copper cable for interconnections etc. as required.

10.1.1 DP :double pole structure on 2 no ISMB 125 x 70 mm, 10 mtr high using 7 no MS channel each of size 100 mm x 50 mm x 2500 mm complete in all respect with nuts, springs washers, clamps as required.

10.1.2 GO:Off load type gang operated 3-pole vertical flute type switch suitable for 11KV ; 400A ,3-ø, central post rotating double break isolator complete with MS hardware , copper moving & fixed contact ,assembly of 9 nos pin insulator ,GI pipe of suitable length for operation.

10.1.3 DO: 3nos Vertical / Horizontal mounted 11kv horn gap fuse set /drop out 11kv barrel fuses mounted on 6no pin insulators

10.1.4 LA: 3 piece non linear resistor type. lighting arrestor of approved make suitable for 3 wire, 11kv Overhead line with rated voltage of 9kv rms & nominal discharge current rating of 5 ka & complete with galvanized clamping arrangement GI bolts, nuts, washer etc as required.

10.1.5 JUMPERS: 3 no 11kv acsr conductors mounted on pin type insularors as required. 10.1.6 GENERAL:The GO shall be operated by hand operated liver properly earthed with provision for locking mounted at 3'

### 10.1.7 Scope of work

A. The scope of work consists of the followings:

- i) Supply and erection of DP structure as per the specs in SoQ.
- ii) Supply and fixing of GO and all accessories required as per SoQ
- iii) Supply and fixing of DO with all accessories as per SoQ
- iv) Supply and fixing of Lightning Arrestors with all accessories as per SoQ
- v) Supply and fixing of Jumpers as required
- vi) SITC of HT metering cubicle.
- vii) Connection of power supply from DISCOM power Line to DP Structure by taking necessary shut down.
- viii) SITC of HT cable(Supply, Laying, Connection and Testing) from HT Meter to VCB panel.

B. The contractor has to arrange for taking necessary permission from DISCOM (or Competent authority) for connection of HT metering panel to the HT line.

## 11.0 DG Set

11.1.0 Supply, Installation, Testing and Commissioning of Silent DG Set complete with 1500 RPM Diesel Engine of suitable BHP & AC Brush less SPDP Alternator mounted on a common base Frame & coupled through a flexible coupling or close coupled for feeding loads like Lights, ACs, Computers, Fans, Motors, Lifts etc. on continuous basis.

Alternator shall be self regulated with standard Alternator Protection( Over voltage , over speed & under voltage).

### 11.1.1 Technical specification of DG set

#### 11.1.2 ALTERNATOR:

- a) Type : Brushless
- b) Actual power 320 KVA at 50 degree celsius
- c) Frequency : 50 Cycles/sec, Frequency variation- $\pm 1\%$
- d) Supply system : 3 phases & neutral
- e) Connection: Star
- f) Rated voltage: 415 Volts, Variation of voltage from No load to full load- $\pm 2\%$  of rated voltage.
- g) Rated rpm. : 1500 rpm. max
- h) Enclosure : IP-23
- i) Insulation : Class 'H'
- j) Voltage Regulation: Automatic voltage regulation grade VG3
- k) Maximum permissible time Building up rated voltage From stand still-Less than 20 seconds.

#### 11.1.3 ENGINE:

Engine shall have residential silencer, up to 10 M exhaust piping , electronic / Mechanical governor, Manual & electric Start ,Batteries, Fuel tank ( with Stand) & piping , control panel (16 G) with MCCB (4P; 25 KA), Ammeter, Voltmeter, Frequency Meter, Energy Meter & Hour Meter, Engine instruments panel, AVM and with Weatherproof, powder coated Acoustic enclosure for DG set for sound attenuation fabricated from 2.0 mm CRCA sheet steel (structure) with side wall fabricated from 2.0 mm CRCA sheet & filled with 100mm thick glass wool(96Kg/m<sup>3</sup>) as per IS 8183 the doors of 100 mm thick and fabricated from 1.6mm CRCA sheet packed with acoustic material, floor of MS chequered plate 5.0mm thick, canopy fixed with axial flow fan of Alstom,/Almonard make including supplying and installing GI duct from exhaust of radiator of DG Set to outside the substation building.

#### 11.1.4 DIESEL ENGINE:

- a) Type: Multi-cylinder with direct radiator, Turbo charged with Heat Exchanger with oil cooler.
- b) No. of strokes:: 4
- c) No of Cylinder: 6
- c) Fuel injection :Direct
- d) Maximum speed : 1500 RPM
- e) Rated power: 380 BHP (minimum)
- f) Cooling of: Liquid cooled
- g) Cylinders with Oil cooled remote Radiator
- h) Type of Governor: Electronic, Mechanical or higher
- i) Class of Governor: A1 or higher
- j) Overload capacity for one hour for every 11hours continuous running at full load (%): 10
- k) Engine : Battery starting.
- l) Starting voltage: 24 V
- m) Efficiency at rated power factor and 75% of Full load: 90.25
- i) Starting : Universal. Auto/Manual position
- j) Engine shall be at least BS-VI or latest standard complied.
- k) Battery type: Low Maintenance free to IS: 14257 for high cranking performance

11.1.5 The Auto main failure (AMF) Panel shall be fabricated from CRCA sheet steel 2 mm Thick , Powder coated finish , Engine Start & Stop commands, control Relays , selector switches for Ammeter & Voltmeter, Ammeter & Voltmeter , Control & Power



Contactors, Timers, Electronic Hooter ,Visual & Alarm indication for faults, UPS, operator interface panel complete in all respect suitable for 320 KVA capacity DG sets:

#### 11.1.6 General requirement

All doors/ opening are sealed with neoprene/EPDM gaskets. The control panel shall be of IP 53. The enclosure has built in fuel tank, residential silencer (isolated from main DG chamber) with protection and tripping of DG set against temperature of more than 50 degree centigrade. All controls for operation of DG set are from outside the enclosure with DG control panel mounted inside enclosure , visible and accessible from outside. The enclosure should be suitable for following capacity DG sets and alternator. Noise level shall be less than 75 db(A) at a distance of 1 mtrs. duly certified by authorised agency etc. complete in all respect of following capacity :

#### 11.1.7 ACCESSORIES:

The Diesel Engine shall be equipped with minimum following/ as indicated in the specifications, devices/accessories built-in type including all standard fillings:

- a) Fuel supply pump with manual venting pump.
- b) Radiator
- c) Turbo charger with air filter (dry/oil bath type) and damper.
- d) Charge oil cooler
- e) Suction fuel filter
- f) Lube oil filter
- g) Electronic Isochronus Governor of suitable class
- h) Hour meter and RPM indicator
- i) Battery Starting Mechanism.
- j) AMF Panel having the complete with following:
  - 1)Starting Switch incorporated in touch panel/push button
  - 2)Lub. Oil Temp. gauge
  - 3)Lub. Oil pressure gauge
  - 4)Water Temp. gauge
  - 5)Control devices for safety and monitoring along with indicators.
- a) Common base/foundation frame
- b) Fly wheel and flexible coupling
- c) Automatic voltage regulator (A VR)
- d) Lube oil filter
- e) Fuel oil filter
- f) Fully insulated and suitably supported class '8' MS Exhaust pipe of required size minimum 3.25m above the highest point of the terrace
- g) Day storage tank for not less than 650 ltr capacity fabricated out of 3mm thick MS sheet, with M.S. fuel pipe line, high & low level indicator and alarm contacts.
- h) Residential type silencer
- i) Anti vibration pads
- j) Necessary batteries (minimum 2 of 180 AH capacity) with leads and mounting frame etc.
- k) The lubricants, coolant, to be filled to the fullest & fuel (day storage tank) sufficient for testing.
- l) All the above housed in a suitable Sound attenuated enclosure as per specifications and required Set.

#### 11.1.7 Other special features:

- i) Mode of operation-Auto Start
- ii) Capacity of largest rating Motor starting-To be furnished
- iii) Radiator cooled and Turbo charged
- iv) Alternator, 320 KVA at 50 degree celsius, at 0.8 pf (lag), 415V, 50Hz, 3-Ø

#### 11.1.8 Scope of work

A.

- i) Proper foundation to be made for installation of the DG Set
- ii) Laying and Connection of power and other control cables from DG set to LT panel and AMF panel
- iii) Two nos of Earth Electrode to be provided for Neutral earthing and two nos of electrode for Body earthing.
- iv. The neutral should be earthed with two separate insulated earth wire up to the Electrodes.
- v) The DG auto start to be tested during main supply failure.
- vi) The DG shall be tested up to optimum load
- vii) Exhaust to be extended to take the smokes outside of the building if necessary.
- viii) The DG shall be tested with AMF panel

B. General evacuation Plan for Diesel Generator(DG) Set Supply during DISCOM power failure:

The 320KVA DG set shall be used for the following purposes on a larger note:

1. Housing part all blocks common lighting to be made available from DG.
2. Housing part all houses supply to be restricted to 700/800W per flat (total 48 flats right now) in case of DG supply. For this if any necessary circuitry/device is to be put than, same shall be wired directly to the individual flat DBs for DG load restriction purpose in the flats. This shall be on bidder's part only.
3. All street lights (both housing & club house part) shall be also be supplied power from DG.
4. All essential supplies like all block lifts, CCTVs, all water pumps, SCADA control room, Electrical Substation etc.
5. All Club House Lighting (including auditorium) requirements, Fans, kitchen exhausts & ACs of some critical areas (on discretion of OIL) shall be made available through DG.
6. All guest house room loads restricted to max. 700/800W per room. For this if any necessary circuitry is to be put than, same shall be wired directly to the individual flat DBs for DG load restriction purpose in the flats. This shall be on bidder's part only.
7. All the above shall be in the scope of the bidder.

#### 11.1.9 Documents to be submitted along with the offer:

i) Detail technical literature and catalogue of:

- a) Diesel Engine
- b) Alternator

#### 11.2.0 Inspection of DG Set with AMF Panel

- (i) All the routine tests and special tests as per relevant IS are to be carried out in presence of OIL's Engineer at manufacturer's works. The supplier will give intimation to OIL 15 days advance prior to commencement of tests so that OIL can depute representative for witnessing tests in time.
- (ii) The DG set with AMF panel shall be cleared for dispatch only if the test results comply with the specifications and testing results are within the tolerance limits.
- (iii) Materials / equipment failed to conform to the specifications/during testing, OIL's representative shall have the right to reject the materials and in that case, the supplier will either replace the rejected materials or make alterations necessary to meet specifications requirements free of costs.

## 12.0 Earthing

All joints shall be riveted and sweated. Joints in the earth bar shall be bolted and the joints faces tinned. Where the diameter of the bolt for connecting earth bar to apparatus exceeds one quarter of the width of the earth bar, the connection to the bolt shall be made with a wider piece of flange of GI jointed to earth bar. These shall be tinned at the point of connection to equipment and special care taken to ensure a permanent low resistance contact to iron or steel. All steel bolts, nuts, washers etc. shall be cadmium plated, main earth bars shall be spaced sufficiently on the surface to which they are fixed such as walls or the side trenches to allow for ease of connections. The earthing shall suitably be protected from mechanical injury by galvanized pipe wherever it passes through wall and floor. The portion within ground shall be buried at least 75 cm deep. The earthing lead shall be securely bolted and soldered to plate or pipe as the case may be. In the case of plate earthing the lead shall be connected by means of a cable socket with two bolts and nuts. All washers shall be of the same materials as the plate or pipe. All iron bolts nuts and washers shall be used.

### 12.1.0 Testing:

After installation, the tests as specified in IS 3043 shall be carried out and results recorded.

Earth pit Enclosure: For all earth electrodes earth pit enclosures are required. The size of an earth pit shall be brick wall enclosure of size - (90x90x90) cm. The earth electrode shall be 30cm above the soil level. 50mmx6mm GI strap shall be welded on top of earth electrode to connect 2nos. of earth lead wires. The cover of Enclosure shall be RCC type with 2nos. lifting hooks suitable for brickwork enclosure.

## 13.0 TECHNICAL & OTHER DEVIATIONS:

The work shall be carried out as per technical Specifications for Electrical works relevant to CEA regulations 2010, Indian Standard, IEC, IE rules, and as per directions of Engineer-in-charge.

**Note:** Any deviations from Technical Specifications due to design considerations, for Electrical works as given in NIT shall be subject to express acceptance by OIL. In case there is no deviation, "NO DEVIATIONS" should be mentioned in the offer.

## 14.0. CONDITIONS:

1.1. This specification covers design, manufacture and testing as may be necessary before dispatch, delivery at site, all preparatory work, assembly and installation, commissioning, putting into operation of sub-station equipment consisting of HT panels, transformers, LT panels, HT and LT cabling etc. and final testing of sub-station equipment shall be carried out at OIL's substation site at Jodhpur.

1.2. The sub- station equipment shall be unloaded, stored & installed in the sub-station building as mentioned.

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

## 15.0 POWER SUPPLY:

The contractor has to arrange for power supply requirement of their own.

## 16.0. COMPLIANCE WITH REGULATIONS AND INDIAN STANDARDS:

(i) All works shall be carried out in accordance with relevant regulation, both statutory and those specified by the Indian Standards, CEA regulation 2010 & IEC & other standards related to the works covered by this specification.

(ii) The entire Electrical jobs shall be carried out under the supervision of an Electrical supervisor having a valid Electrical supervisor's certificate of competency issued by State Licensing Board.

**16.1.0** After completion of the installation (Substation), the same shall be offered for inspection by the representatives of the Central Electricity Authority. The contractor will extend all help including test facilities to the representatives of CEA. The observations/contraventions/non-compliance pointed out by CEA will be rectified /implemented by the contractor at his own cost. The final completion report will be given only after getting clearance from CEA.

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

**16.1.2** Successful bidder shall arrange for compliance with statutory provisions of safety regulations and OIL's requirements of safety codes in respect of labour employed on the work by the bidder. Failure to provide such safety requirement would make the tender liable for penalty applicable as per company policy for each default. In addition, OIL will be at liberty to make arrangement for the safety requirements at the cost of bidder and recover the cost thereof from him.

**17.0 ERECTION TOOLS:**

No tools and tackles required for testing, installation and commissioning purposes would be made available by OIL.

**18.0 INSURANCE AND STORAGE:**

All consignments are to be duly insured up to the destination from point of despatch at the cost of the contractor. The insurance covers shall be valid till the equipment is handed over duly installed, tested and commissioned. The equipment at site have to be stored securely by the contractor till handed over to OIL. The necessary arrangement to prevent theft/pilferage has to be made by the contractor.

**19.0 VERIFICATION OF CORRECTNESS OF EQUIPMENT AT DESTINATION:**

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

**20.0 INTERPRETING SPECIFICATIONS:**

In interpreting the specifications, the following order of decreasing importance shall be followed in case of contradictions:

- (a) Schedule of quantities
- (b) Technical specifications
- (c) Drawing (if any)
- (d) General specifications
- (e) Relevant BIS or other international code in case BIS code is not available.

**21.0 SAFETY REQUIREMENTS:**

This section covers the requirements of items to be provided in the sub-station for Compliance with statutory regulations and Safety and operational needs.

Safety provisions shall be generally in conformity with CEA regulations 2010. In particular following items shall be provided:

i) Insulation mats conforming to IS: 15652:2006 shall be provided in front of main HT and LT switch boards as per CEA (Measures Relating to Safety and Electric Supply) regulations 2010, chapter III, 19 (5).

ii) Trilingual First Aid Charts (English, Hindi & Regional language), displaying methods of giving artificial respiration to a recipient of electrical shock shall be prominently provided at appropriate place.

iv) Danger Plates shall be provided on all HV and LV equipment. LV danger plate shall be 200 mm x 150 mm and HV danger plate shall be size 250 mm x 200mm. The danger plate shall be made of mild steel of at least 2mm thick vitreous enamelled white on both sides and with the descriptions in signal red colour on front side as required. Notice plates of other suitable materials such as stainless steel, brass or such other permanent nature material shall also be accepted with the description engraved in signal red colour.

v) Sufficient number of caution boards such as "Man on Line" 'Don't Switch on' etc. shall be available in the sub-station. OIL's approval for the text, design & layout of all the above shall be taken before commencement of installation

## 22.0 11KV VCB panel

22.1.0 Supply, installation, testing and commissioning of 11 KV VCB Panels: 1 No.

22.1.1 Supply of 11KV 630/800A VCB Indoor type panel HT board, freestanding motor operated & withdrawal type fabricated from 2 mm thick CRCA sheet steel, With Ammeter, Voltmeter, PF Meter, KWH Meter, MDI Meter, Selector Switches as required, CRT-CT ( protection-200/ 5A 15VA ; CI-1.0 & Measuring 400/5A 15VA CI-1.0) , PT (11 KV /110V/ $\sqrt{3}$ ) , Fuses , IP42 Protection CI 4-window Annunciation Panel , AC/ DC Control voltage 24/48/ 110/230V , LED Indication lamps , S/C, O/C & E/F Protection (IDMT) Relays Alarm & trip contacts for Transformer protection (high winding temperature)etc. complete in all respect in order to ready to use.

22.1.2 This specification covers 3-pole, 50HZ, 11KV vacuum circuit breaker for indoor type:

### 22.1.3 APPLICABLE STANDARDS:

Unless otherwise modified in this specification, the vacuum circuit breakers shall comply with the following Indian standards as amended from time to time:

IS-2516: Circuit Breakers

IS-3156: Voltage Transformers

IS-2705: Current Transformers

### 22.1.4 RATED VOLTAGE:

The rated voltage for the circuit breaker shall be 12KV. This represents the highest system voltage corresponding to the nominal system voltage of 11 KV.

### 22.1.5 RATED CURRENT:

The standard rated normal current shall be 630A.

The bus-bar rating of the indoor type VCB shall be 800A.

### 22.1.6 RATED SHORT-CIRCUIT BREAKING CAPACITY:

The effective value of the rated short-circuit breaking current shall be 32KA.

The value of D.C component shall be calculated in accordance with the recommendations contained in IS 2516

#### 22.1.7 RATED SHORT-CIRCUIT MAKING CAPACITY:

The rated short-circuit making current of the circuit breakers shall be taken as 2.5 times the rms value of the AC component of the rated short-circuits breaking current.

#### 22.1.8 TECHNICAL SPECIFICATION OF 11 KV SINGLE PANEL VCB

##### i) CUBICLE AND CIRCUIT BREAKER DETAILS:

Cubicle & breaker and their accessories for 11KV, indoor VCB panel should be fully factory built and assembled for direct installation. Designed, manufactured and tested in accordance with Is-123118, 14658, 2071 3427 & IEC-60056/60298 and having following specifications. Circuit breaker & cubicle must have CPRI test certificate for design and performance as per above standards.

##### 22.1.9 CUBICLE:

The horizontal draw out and horizontal isolation type circuit breaker cubicles should be fabricated using high quality sheet steel of minimum thickness 2.5mm as per IS. The sheet metal should be given minimum seven tank anti corrosion treatment & then powder coated.

Colour- SIEMENS GREY.

The totally metal enclosed panel shall be compartmentalized with internal positioning of insulated material and epoxy reinforced fiber glass to provide the following:

- a) Bus bar compartment.
- b) Circuit Breaker Compartment.
- c) CT and Cable Compartment.
- d) Relay & Metering. compartment (L T Chamber).

22.2.0 The L.T chamber of suitable height shall be separated and suitably mounted on frame for ease of testing and maintenance. Auxiliary controls, protective relay and measuring equipment along with the switches and indications are to be accommodated in the L. T. chamber. Three nos. of bright steel hinges shall be used on front door with door opening limited to 135 Degree (approx). All devices in the L T box are to be marked with permanent labels. Panel rating plate shall be provided on the door.

22.2.1 Bus bar shall be rectangular in cross section and made from electrolytic grade electro tinned copper having 99.99% conductivity. Busbar current rating shall be 2000 Amp and Fault rating-32kA (Breaking). Heat shrinkable sleeve insulation of 11 KV voltage grade should be provided on busbar and its risers. Busbar arrangement should be such that in future similar cubicles can be connected sidewise with this cubicle.

22.2.2 Cast epoxy insulator supports for busbar & cable termination links designed to withstand full short circuit current at specified fault level for minimum 3 seconds shall be provided.

22.2.3 The circuit breakers shall be mounted on horizontal draw out truck. The circuit breaker truck should have horizontal isolating system.

22.2.4 The front door shall have view glass to facilitate observation of mechanical ON/OFF indication and operation counter.

22.2.5 The draw out truck shall have the following positions

- a) Isolated
- b) Test
- c) Service

22.2.6 The CT and the incoming cable compartment shall be in the rear. The outgoing cable compartment shall be provided on the back side. The L T control cable terminal arrangement shall be provided in the rear side and in a separate box so as to have isolation from high voltage terminals. All the cable entry plates shall have removable gland plates.

22.2.7 The CT required for metering and protection shall be as per IS-2705 & shall be sized adequately and its insulation will be epoxy cast type. Metering CT 15V A, Class-5P10, ratio 30-60/5. Protection CT, 15VA, Class-5P10, Ratio- 30-60/5. Short time rating -32KA for minimum 1 sec.

22.2.8 PT shall be epoxy cast resin type & as per IS-3156. PT should be horizontal draw out type Ratio 11 kv/ 110V (phase to phase), 100VA & protected with HRC fuse on both HT & L T side.

22.2.9 Panel shall have proper protective earthing terminals for connection to external earth straps.

22.3.0 Earthing connection between truck and cubicle shall be provided by means of sliding contact. The truck earthing should be arranged in such a way that the truck is earthed in isolated position when inserted. While the truck is being withdrawn, the earthing connection shall not be interrupted until the truck has moved past the isolated position.

22.3.1 The following minimum safety interlocks shall be provided.

a) The truck cannot be moved from test to service position or vice versa, when the CB is ON.

b) The CB cannot be switched ON when the truck is in any position between test and service.

22.3.2 The following minimum safety devices shall be provided to ensure the safety of operating personnel

a) Individual explosion vents for Bus bars/Breaker/Cable and CT chambers on the top of the panel to let out the gases under pressure generated during unlikely event of a fault inside the panel.

b) Front door/panel sides to be pressure tested to withstand arc faults.

c) CB and metal enclosure earthed in accordance with latest IS published by BIS(IS-2516, part- 1, section-I)

d) Self operating shutters, shielding live fixed contacts, shall be provided which closes automatically when truck is withdrawn to test position. Locking arrangement should be provided for the shutters.

22.3.3 Control wiring and CT wiring shall be done using single core, PVC insulated, stranded copper cable of 11 OOV grade and 2.5 sq. mm. size. All cables and wires shall be numbered with suitable ferrules. Suitable lugs shall be used for control wiring and ring type lugs shall be used for CT wiring. All wires shall terminate on suitable Terminal Blocks. All TBs shall have 10% spare terminals. TBs shall be marked . Reinforced flexible conduit shall be used for wiring and PVC spiral shall be provided on exposed wires near the door hinge in L T box. Colour coding of control cables shall be followed as required by ISI. Control cables shall be approved by IS-694.

22.3.4 Panel shall be provided with space heaters and adjustable thermostats of suitable rating along with protective HRC fuses and ON/OFF switch.

22.3.5 Lifting hooks shall be provided for the panel.

22.3.6 The switchgear panels shall have the following identification markings in a proper way in permanent manner:

a) Panel name in front and rear.

b) Caution and danger board in front & rear.

c) CT specification name plate on CT and at panel cover at rear.

d) Incoming & outgoing cable box.

22.3.7 Insulation system of the cubicles should withstand extreme humid condition and suitable for use under site condition mentioned in para 2.1.

#### 22.4.0 PANEL EQUIPMENT AND ACCESSORIES:

1. MC type Ammeter 144 x 144 mm size dual scale 0-30/60A for line current measurement.

Accuracy- 1%.

2. MC type Voltmeter 144 x 144 mm size., scale 0-15kV for line Voltage measurement.

Accuracy- 1%.

3. Digital type KWH Meter with additional facility for showing current, voltage, PF, MDL Meter approved by IS or IEC for performance and safety. Meter shall be suitable for operation in tropical environment with 40 deg C temp and 90o/o humidity. Make:

4. Ammeter and Voltmeter Selector switch : 1 no. each

5. Trip circuit check push button.

6. LED type Indication lamp for:

i) CB Close,

ii) CB open,

iii) Trip on fault,

iv) Trip circuit healthy.

v) Spring Charged. LEDs to be LVGP.

7. Breaker closing and tripping switch: For closing and tripping through 110V DC closing and 110V DC shunt trip coil.

8. Control supply shall be taken from the PT through suitably rated Power Pack having following specifications: .

a. 110V AC input supply to the power pack shall be taken from PT output.

b. 3 phase rectifier with 800 PIV shall be used in power pack.

c. Surge suppressor suitable for numeric relays shall be provided in the power pack.

d. Power pack shall be protected through suitable input HRC fuses.

e. Battery shall be provided in the power pack to provide DC power for 30 minutes after incoming power failure.

f. Suitable filters should be provided in the power pack to give ripple free DC output for reliable relay operation.

9. One no. combined Numeric relay for overload, short circuit and earth fault protection of transformer.

Type : Micom 122 of Schneider make.

10 . Auxiliary relays for sounding alarm and tripping of VCB panel in case of transformer fault. One buzzer type alarm shall be provided in the panel.

11 . Trip circuit supervisory relay- 1 No. Schneider make.

12. One set of operating handles for manual spring charging and breaker racking in/out.

13. The handle should have Auto, Manual, Off & Trip positions clearly indicated.

#### 22.5.0 SITE CONDITION:

1. a) Maximum Ambient air temperature - 50°C

b) Minimum Ambient air temperature - 2°C

2. Maximum humidity at site ( at 40 °C) - 60%

3. Surrounding atmospheric condition - Dry

4. Site altitude(above sea level) - 231Metre (approx)

5. Seismic design co-efficient - As per 1983

6. Rainfall: 360mm annually (approx)

#### 22.6.0 CIRCUIT BREAKER:

The breaker used shall be three pole VACUUM CIRCUIT BREAKER having the following features:

a. Draw out type with Horizontal Isolation mounted on truck with rollers.

b. Truck cover with two handles and fixed to truck frame with four screws.

c. Truck earthing with welded boss.

d. Insulation bushings shall be epoxy cast resin type and suitable for ambient conditions mentioned in para 2.1.

e. Bushings shall have suitable silver coated, flower contacts for firm connection.

f. Manual & motor operated spring charging system.

g. 11 kV, Three pole, 800A continuous rating, 32kA fault level.

h. Auxiliary contacts (6 NO + 6NC ).

i. Operation counter of 5 digits.



- j. Mechanical endurance of 50,000 (minimum) operations.
- k. Mechanical ON/OFF indication.
- l. Spring FREE/ CHARGED indication.
- m. Position indicator: SERVICE/ TEST/ ISOLATE.
- n. Low maintenance:
- o. Manual ON and TRIP button.
- p. Operating sequence: O: 0.3 min ; CO : 3 min ; CO.
- q. Shunt trip coil, closing coil: 110V DC rated.

#### 22.7.0 CABLE TERMINAL BOX:

HT cable boxes with termination links for termination of incoming and outgoing HT cables should be provided in the rear and side of the unit. Rear incoming cable box should be of suitable size for safe entry of one no. of incoming cable and should have suitable terminal links for safe termination of incoming cable. One no. outgoing cable will be terminated in the cable box mounted on side. Size for incoming and outgoing cables, 3 x 240sq. mm, 11kV grade, XLPE insulated, PVC sheathed, Aluminium Conductor, Armoured cable. Suitable nos of detachable gland plates with suitable size of heavy duty cable glands shall be provided in the bottom entry plates of both the cable boxes. Separate gland plates shall be provided for both the incoming cables in the incoming cable box.

Rear entry LT cable termination box with suitable single compression cable glands for heater supply cable and control cable from transformer marshalling box should be provided.

#### 22.8.0 Ratings:

- a) Rated voltage - 12kv
- b) Rated current - 1250A
- c) Withstand voltage - 75 kv
- d) Withstand current - 32 ka
- e) IP Rating - IP33

#### 22.9.0 CONTROL SUPPLY OF VCB PANEL

22.10.0 Control power supply shall be taken from 1 No battery bank for 24 V DC with battery charger.

22.10.1 The control power supply system shall consist of the following:

##### A. BATTERIES

- i) Type of battery: Sealed Maintenance Free (SMF) cells
- ii) Voltage of each battery: 2.0 V, 200 AH,
- iii) 12 Nos. batteries shall be connected in series to give 24 V DC output
- iii) The batteries shall be kept on insulated type rack and interconnected with silicon insulated Cable with terminal

##### B. BATTERY CHARGER

- i) Charging current: 20 A or as required
- ii) Float and boost charging facility shall be available.
- iii) Incomer to battery charger shall have single-phase supply with 20 Amps DP MCB with overload and short circuit protection.
- iv) Outgoing shall be double pole 20A MCBs-3 Nos
- v) Protection for control circuit shall be provided.
- vi) Float and Boost charging ammeters to be provided

The battery bank and charger shall be located in the same room as the VCB HT Panels. Interconnection to be done from LT panel to Battery charger / Battery. Make of battery and charger shall be as per acceptable make list of annexure -I

**22.10.2 Warranty:**

The goods/ equipment shall be of best quality and workmanship. The equipment shall be guaranteed for 12 (Twelve) months from the date of acceptance against defects arising due to material, workmanship or design. Relay will also be included in this guarantee.

**22.10.3 Inspection and Testing of VCB at Manufacturer's Works.**

- (i) All the routine tests and special tests as per relevant IS are to be carried out in presence of OIL's Engineer at manufacturer's works. The supplier will give intimation to OIL 15 days advance prior to commencement of tests so that OIL can depute representative for witnessing tests in time.
- (ii) The VCB shall be cleared for dispatch only if the test results comply with the specifications and testing results are within the tolerance limits.
- (iii) Materials / equipment failed to conform to the specifications/during testing, OIL's representative shall have the right to reject the materials and in that case, the supplier will either replace the rejected materials or make alterations necessary to meet specifications requirements free of costs.

**23.0 1215 KVA Transformer**

23.1.0 Supply of 1 no cast resin type dry type Transformer with confirming to IS 11171& Losses as per Discom's CTL ( CTL Test certificate to be attached ) of rating 11/0.433KV Delta-Star Connected, Vector Group Dyn 11, Off -LTC (+5% to -7.5% in steps of 2.5%) ambient air temperature for operation is 50°/55° C, ISI marked Epoxy based paint, including 1nos. set thermometer in winding for all 3-phases and core to maintain the winding temperature. carrying of pre-commission Testing & Charging of Transformer. specifications are given below:-

**A. GENERAL:**

- 1. Applicable Indian Standard: IS: 11171 with latest amendments.
- 2. Service duty : Continuous.
- 3. Installation : Indoor.
- 4. Auxiliary power supply : 240V AC  $\pm$  10 o/o
- 5. Control Voltage : 240V AC  $\pm$  10 %

**B. SITE CONDITION:**

- 1. a) Maximum Ambient air temperature - 50°C  
b) Minimum Ambient air temperature - 2°C
- 2. Maximum humidity at site ( at 40 °C) - 60%
- 3. Surrounding atmospheric condition - Dry
- 4. Site altitude(above sea level) - 231Metre (approx)
- 5. Seismic design co-efficient - As per 1983
- 6. Rainfall: 360mm annually (approx)

**C. RATING AND GENERAL DATA:**

- 1. Rating: 1250kVA, continuously rated.
- 2. No. of phases: 3
- 3. Frequency : 50  $\pm$  3 %
- 4. Type of Insulation : Cast Resin winding, Class-F. Temp. rise-90°C
- 5. Partial discharge: \_As per IS-11171, IS-6209.
- 6. Type of cooling: AN

7. Installation: Indoor .
8. Vector group : Dyn 11
9. Percentage impedance: 5% ( or as per IS-2026)
10. Nominal voltage ratio: 11kV/433V
11. Type of neutral earthing : Solidly grounded Neutral.
12. Symmetric short circuit withstand capacity : As per IS- 11171.
13. Rated short duration power frequency withstand voltage : As per IS 11171.
14. Rated lightning impulse withstand voltage: As per IS-11171.
15. TAP CHANGER:  
Type: OFF Circuit.  
Total tapping range:  $\pm 5.0\%$   
Tapping steps: In steps of 2.5 %
16. TERMINAL ARRANGEMENT: .  
HV winding line end : Cable box with bushings.  
LV winding line end : Cable box with bushings.  
One LV Neutral bushing inside the cable box and one (additional) outside the cable box.
17. BUSHING:  
Made from non hygroscopic epoxy resin cast material suitable for site condition mention in para- B & confirming to IS-2099.
18. CABLE BOX:
  - a) HV cable box should be suitable for termination of 1 no. 3 C, 240sq. mm XLPE, armoured, aluminium conductor cable with heat shrink type cable termination. Bottom plate should be detachable. Cable Box as per IP-54. Suitable non hygroscopic bushings are required for supporting the cable connection.
  - b) LV cable box should have brought out electro-tinned copper busbars of suitable rating & size for termination of 6 nos. of 3.5 core, 240 sq. mm PVCA/XLPE Aluminium cable. The busbar should have suitable holes (two nos. for each cable lug as lug with double hole will be used for termination) and provided with hardwares for termination of cables. The cable box should have detachable cable gland plate fitted with suitable heavy duty single compression cable glands for the cables mentioned above. Support for busbar in LV cable box should be made from FRP/SMC non hygroscopic material. Cable Box as per IP-54. Supports should be able to withstand the short circuit stress. All openings in enclosure should be guarded with suitable screen to guard against entry of rodents and reptiles.
  - c) Terminals should be marked as per IS: 2026.
19. TRANSFORMER CORE:
  - a) Material: High grade cold rolled grain oriented silicon steel for very low iron loss.
  - b) Structure : Grounded and sharp corners avoided.
  - c) Lamination: Treated and coated with suitable insulations. The core limbs & yokes are banded by means of resiglass tape to reduce vibration & noise.
20. TRANSFORMER WINDING:  
The winding material should be high conductivity electrolytic grade copper. The insulation should be Cast Resin type, Class-F. Conductor should have thermally upgraded paper (Nomex) insulation reinforced with fiberglass. The coil assembly is to be impregnated cast under vacuum with epoxy resin for achieving non-hygroscopic, acid & alkali resistant insulation. The complete winding should have smooth cylindrical finish after impregnation to ensure high. mechanical strength. The thickness of resin should be uniform. The insulation should be self- extinguishing type.  
Joints in the winding should be as under:
  - a) Permanent joints : Welded/ brazed.
  - b) Bolted connection : Provided with locking devices
21. ENCLOSURE:  
The core & winding assembly should be housed inside a sheet steel enclosure with removable inspection & tap changer covers. The enclosure should offer IP-23 protection as per IS-2147 & should have suitably designed louvers for circulation of cooling air. All the gaskets should be Of neoprene rubber. Enclosure should be powder coated with DA

Grey paint after surface treatment for corrosion protection. All openings in enclosure should be guarded with suitable screen to guard against entry of rodents and reptiles.

## 22. LIST OF FITTINGS AND ACCESSORIES:

a) HV bushings :

Inside HV cable box : 3 nos.

b) LV bushings -

Inside LV cable box : 4 nos.

Outside LV cable box : 1 no. for neutral earthing.

c) Winding temperature scanner connected with three nos. RTDs, one each for each LV winding, should be provided in a metallic enclosure that is mounted on the main enclosure. The scanner should provide indication, alarm & trip contacts. Winding temperature indicator should show maximum temperature attained. The RTDs should be properly wired upto the scanner terminals. Suitable hole with gland is required for control cable connecting scanner alarm/ trip contacts to HT Breaker.

d) Lifting lugs.

e) Earthing terminals # 2 nos.

f) Jacking lugs.

g) Inspection .cover

h) Base channels with bi-direction rollers.

i) Any other accessories which bidders think essential & required as per IS may also be included.

D. Winding Material - Copper

E. Off load tap changing on LT side - +5% to -5%

F. Maximum air temperature - 50°C

### 23.1.1 NAME PLATE

Transformer shall be furnished with a non-corrosive diagrammatic name plate permanently attached with non-corrosive hardware with following information:

- (i) KVA rating
- (ii) Primary and secondary voltage
- (iii) Primary and secondary current
- (iv) Frequency
- (v) Nos. of phases
- (vi) Percentage of impedance
- (vii) Types of cooling
- (viii) Connection & symbol
- (ix) Tap configuration
- (x) Insulation system and rated maximum temperature rise.
- (xi) Year of manufacture
- (xii) Design impedance.
- (xiii) Manufacturer's name
- (xiv) Net weight.
- (xv) IS standard.
- (xvi) OIL's P.O. no. and date.

### 23.1.2 LIFTING HOOK

Suitable Lifting hook shall be provided on the top of the transformer for transportation/installation of transformer.

### 23.1.3 INSPECTION

(i) All the routine tests and special tests as per IS: 11171 are to be carried out in presence of OIL's Engineer at manufacturer's works. The supplier will give intimation to OIL 15 days advance prior to commencement of tests so that OIL can depute representative for witnessing tests in time.

- (ii) The transformers shall be cleared for dispatch only if the test results comply with the specifications and testing results are within the tolerance limits.
- (iii) Materials / equipment failed to conform to the specifications/during testing, OIL's representative shall have the right to reject the materials and in that case, the supplier will either replace the rejected materials or make alterations necessary to meet specifications requirements free of costs.

#### 23.1.4 GENERAL TERMS AND CONDITIONS

- i. Transformer winding shall be specially braced to withstand to thermal and mechanical stresses of harmonic current and voltage.
- ii. Temperature rise test shall be carried out on transformer for full load current and up to 90 degree centigrade temperature. It takes nearly 8-12 hrs to complete test.
- viii. Partial discharge test is to be carried out on transformer.
- ix. Party should get the detail transformer drawings approved from OIL prior to manufacturing of the transformer.

#### 23.1.5 TEST

The following tests shall be carried out on the transformers

##### A. TYPE TEST

The transformer shall be type tested at CPRI/NABL or any government approved laboratory

Type test shall constitute the followings:

- (a) Measurement of winding resistance,
- (b) Measurement of voltage ratio and check of voltage vector relationship,
- (c) Measurement of impedance voltage, short circuit impedance and load loss,
- (d) Measurement of no load loss and current,
- (e) Separate-source voltage withstand test,
- (f) Induced overvoltage withstand test,
- (g) Lightning impulse test,
- (h) Temperature-rise test and
- (i) Short-circuit test.

##### B. SPECIAL TESTS

- (i) Partial discharge test as per IS: 6209-1982 and with Appendix A of IS: 2026 (Part 3)-1981.
- (ii) Measurement of acoustic sound

##### C. DOCUMENTS TO BE SUBMITTED BY THE PARTY

- i. Manufacture's test certificates for all the components & assemblies as required by IS-11171 with latest amendments should be submitted to us along with the materials.

##### D. TECHNICAL PARTICULARS

The following Technical Particulars with relevant test certificates to be furnished by the party along with the supply.

- i. Type of transformer:
- ii. Rating of transformer:
- iii. Primary Winding Details:
- iv. Secondary Winding Details:
- v. Reference standards:
- vi. No of Phases:
- vii. Rated Frequency:
- viii. Vector Group
- ix. Type of Cooling:
- x. Impedance Voltages:

- xi. Tapping on HV:
- xii. Enclosure type (IP):
- xiii. No Load losses at rated voltage:
- xiv. No load current at rated voltage:
- xv. Total losses (Cu+ Iron) at rated load:
- xvi. Insulation class:
- xvii. Insulation level:
- xviii. Average temp rise of windings over ambient temp (50 Degree):
- xix. Dimension (L X B X H):
- xx. Winding material:
- xxi. Efficiency at unity PF at full load:
- xxii. Efficiency at unity PF at half load:
- xxiii. Percentage Regulation at unity PF:
- xxiv. Percentage Regulations at 0.8 PF (Lag) 25: 25. Sound level:

#### 24.0 Installation and Commissioning of 1250 KVA Transformer

##### A. GENERAL NOTES ON COMMISSIONING:

1. The party shall confirm that the I&C jobs shall be carried out under the direct supervision of an Engineer/an electrical supervisor holding a valid Electrical Supervisor's Certificate of Competency. The copy of certificate of competency should be submitted prior to the commencement of the commissioning jobs.
2. The party shall obtain permit to work from OIL's Engr.-in-charge before taking up commissioning works.
3. All tools & instruments for commissioning shall be arranged / provided by the party.
4. The party shall depute their commissioning team and commission the transformer within 30 days after getting the Commissioning call from OIL.
5. Testing & Commissioning of transformers shall be carried out by specialist /engineer from manufacturer. All pre commissioning testing of transformer like magnetic balance test, vector group test, IR test etc. are required to be carried out by party at site before energisation of the transformer.
6. The commissioning of the transformer shall be considered as complete with the submission of the commissioning test records, operating & maintenance manuals, spares list of the transformer etc. to OIL.
7. Please note that whenever any reference to Indian Standard/International Standard is made in the above requirements / specifications, it shall be taken to mean the latest version, iteration or revision of the standard.

##### B. TECHNICAL NOTES ON COMMISSIONING:

###### 1. Commissioning

Any material / spare not specified in the NIT but required for commissioning, item shall be supplied by party.

###### 2. PRE-COMMISSIONING CHECKS:

After completion of installation of the transformer at the specified site, prior to energizing of the transformer, the following checks and tests shall be carried out on transformer:

- i) Assembly, check as per manufacturer's drawings and instructions.
- ii) Physical inspection for damages, external defects and remedial actions, if any.
- iii) Check for proper fixing on foundation, levelling and tightness of foundation bolts.
- iv) Check for proper tightness of transformer & its control devices, accessories, cables and earth connections.
- v) Check meters, if any.

### C. Earthing:

The Earthing shall be as described in the point nos. 6.1.0, 6.1.1, 6.1.2 and 6.1.3 of the Annexure-I

24.1.1 The commissioning of the Transformer shall be considered as complete only after the submission of the commissioning test records, operating & maintenance manuals, spares list of the Panel etc. to Oil India Limited.

24.1.2. It is to be noted that whenever any reference to Indian Standard/International Standard is made in the above requirements / specifications, it shall be taken to mean the latest version, iteration or revision of the standard.

### 25.0 Air Conditioner

#### 25.1.0 SITC of 1.5 TR, 5 Star AC

i. SITC of Air Cooled split type 1.5 TR, 5 star rating BEE Air conditioners complete with Indoor unit(IDU), Outdoor unit (ODU), surface / concealed copper Refrigerant piping with insulation (EP foam pipe section) upto 3 Mtr (IDU to ODU), copper power cable upto 4 Mtr (IDU to ODU), R-410 Refrigerant or latest, Remote, suitable for 400/230V +10% of 50 Hz ,1 /3 phase AC supply capable of performing cooling, dehumidification, air circulation of following capacity with Scroll /reciprocating / rotary compressor as specified. Qty: 01 No.

#### 25.1.1 SITC of 2.0 TR 5 Star AC:

i. SITC of Air Cooled split type 2 TR, 5 star rating BEE Air conditioners complete with Indoor unit(IDU), Outdoor unit (ODU), surface / concealed copper Refrigerant piping with insulation (EP foam pipe section) upto 3 Mtr (IDU to ODU), copper power cable upto 4 Mtr (IDU to ODU), R-410 Refrigerant or latest, Remote, suitable for 400/230V +10% of 50 Hz ,1 /3 phase AC supply capable of performing cooling, dehumidification, air circulation of following capacity with Scroll /reciprocating / rotary compressor as specified. Qty= 236 Nos.

#### 25.1.2 SITC of Air cooled split type 4.2 TR, 5 Star AC:

i. SITC of Air Cooled split type 4.2 TR 5 star rating BEE Air conditioners complete with Indoor unit(IDU), Outdoor unit (ODU), surface / concealed copper Refrigerant piping with insulation (EP foam pipe section) upto 5 Mtr (IDU to ODU), copper power cable upto 5 Mtr (IDU to ODU), R-410 or latest Eco-friendly Refrigerant, Remote, suitable for 400/230V +10% of 50 Hz ,1 /3 phase AC supply capable of performing cooling, dehumidification, air circulation of following capacity with Scroll / reciprocating / rotary compressor as specified. Qty: 16 No.

#### 25.1.3 Installation and Commissioning of Air conditioners.

All Air conditioners are to be installed as per the Standard installation and commissioning procedure. All required accessories and items are to be provided by the contractor.

#### 25.1.4 Warranty/ Guarantee

All the Air conditioners should have minimum 1 year standard Warranty/ Guarantee.

### **26.0 TECHNICAL SPECIFICATIONS FOR GRID INTERACTIVE ROOFTOP MOUNTED SOLAR PHOTO-VOLTAIC SYSTEM**

26.1.0 SITC of a 250 KWp grid interactive solar photovoltaic power plant (without battery back-up) at the Rooftop of OIL Township, Oil India Limited (OIL), Jodhpur, Rajasthan, India.

The Grid Interactive Rooftop Mounted Solar Photovoltaic (PV) plant shall consist mainly of the following components:

#### **A) Solar PV Modules-**

##### **Specification-**

SPV Poly crystalline modules to be supplied shall be of conforming to Tier -1. SPV modules shall contain high power poly crystalline silicon solar cells.

Stabilized output of the Solar Power Plant shall not be less than 250 KW under Standard Test Condition after one year of operation from date of Commissioning of solar plant.

**The plant should be put under stabilization period for 3 months from the date of commissioning.**

Stabilized output of the Solar Power Plant shall not be less than 250 KW under Standard Test Condition after one year of operation from date of Commissioning of solar plant.

Peak power point voltage and the peak power point current of any supplied module and / or any module string (series connected module) shall not be more than 3% from the respective arithmetic means for all modules and / or for all module strings, as the case may be.

The solar cell shall have surface anti-reflective coating to help in absorbing more light in all weather conditions.

Each module shall have low iron tempered glass front for strength & superior light transmission. It shall also have tough multi-layered polymer back sheet for environmental protection against moisture with high electrical insulation.

The module frame shall be made of aluminium or corrosion resistant material that shall be electrically & mechanically compatible with the structural material to be used for mounting the modules.

The solar modules shall have suitable encapsulation and sealing arrangements to protect the silicon cells from the environment. The arrangement and the material of encapsulation shall be compatible with the thermal expansion properties of the Silicon cells and the module framing arrangement / material. The encapsulation arrangement shall ensure complete moisture proofing during life of the solar modules.

Solar module shall be laminated using lamination technology using established polymer (EVA) and Pedlar / Polyester laminate.

The PV modules used must qualify to the latest edition of IEC 61215 & IEC 61730 (Edition I and II) for safety qualification testing, Salt Mist Corrosion Resistant (IEC 61701, IEC 62716), Sand Storm Test (IEC 60068-2), Fire Resistance (EN 13501-1 class E, IEC 61730 class C) & Ammonia Corrosion Resistant: IEC 62716. 2.1.16 Modules shall be PID-free

**Photo conversion efficiency of SPV Module shall not be less than 16%.** Module shall be made of high transmittance glass front surface giving high encapsulation gain.

The PV modules should have lowest temperature coefficient and positive power tolerance. Negative power tolerance shall not be accepted.

Module rating is considered under standard test conditions; however Solar Modules shall be designed to operate and perform under site conditions.

All materials to be used shall have a proven history of reliability, light weight and stable operation in external outdoor applications and shall have service life of more than 25 years



Solar PV Module design shall conform to following requirement:

- a. Weather proof DC rated MC connector and a lead cable coming out as a part of the module, making connections easier and secure, not allowing any loose connections.
- b. Resistant to water in grace, abrasion, hail impact, humidity & other harsh environmental factors for the worst situation at site.

PV modules used in solar power plants/ systems must be warranted for their output peak watt capacity, which should not be less than 90% at the end of 12 years and 80% at the end of 25 years.

The fill factor of module shall not be less than 0.70 (typical).

The V-I curve of each PV module with Sl. Nos. shall be submitted along with Modules meeting the required specifications.

Identification and Traceability:

Each PV module shall have RF identification tag. The following information must be mentioned in the RFID used on each module. This can be inside or outside the laminate, but must be able to withstand harsh environmental conditions.

- i) Name of the manufacturer of PV module
- ii) Name of the manufacturer of Solar cells
- iii) Month and year of the manufacturer (Separately for Solar cell and module)
- iv) Country of origin (Separately for Solar cell and module)
- v) I-V curve for the module
- vi) Wattage,  $I_m$ ,  $V_m$  and FF for the module
- vii) Unique Serial No and Model No of the module
- viii) Date and year of obtaining IEC PV module qualification certificate
- ix) Name of the test lab issuing IEC certificate
- x) Other relevant information on traceability of Solar cell and module as per ISO 9000 series.

Marking:

Each PV module used in any solar power project must use a RF identification tag. The following information must be mentioned in the RF ID used on each module

(This can be inside or outside the laminate, but must be able to withstand harsh environmental conditions.) and also in clear and indelible markings:

- Name, monogram or symbol of manufacturer of PV module;
- Name, monogram or symbol of manufacturer of Solar cells;
- Unique Serial number and model number of the module;
- Polarity of terminals or leads (colour coding is permissible)
- Maximum system voltage for which the module is suitable;
- Date & place (country of origin) of manufacture (separately for PV module and solar cell)
- I-V Curve for the module;
- Wattage,  $I_m$ ,  $V_m$  & FF for the module;
- Name of the test lab issuing IEC certificate;
- Other relevant information on traceability of solar cells and module as per ISO 9000;

The 250 KW Solar PV power plants shall continuously measure solar radiation, ambient temperature, wind speed and other weather parameters, generation of DC power as well as AC power generated from the plant.

PV modules used in solar power plants/ systems must be warranted for their output peak watt capacity, which should not be less than 90% at the end of 12 years and 80% at the end of 25 years.

## **B) Module Mounting Structures**

PV Array / String Configurations: The Solar array/string shall be configured in multiple numbers of sub-arrays / string, providing optimum DC power to auditable number of

sub arrays / string. The supplier shall submit their own design indicating configuration of Inverters respective sub arrays/string and bill of material.

The Module structure design shall be appropriate and innovative with a factor of safety of not less than 1.5. The supplier may choose to offer module mounting structure as per their design / economics.

The structure shall be designed to allow easy replacement of any module and shall be in line with site requirement

The mounting structure shall be designed for simple mechanical and electrical installation. It shall support SPV modules at a given orientation, absorb and transfer the mechanical loads to the base properly.

The mounting steel structure shall be as per latest BIS 2062 (amended up to date) and galvanisation of mounting structure shall be in compliance of BIS 4759 (amended up to date).

The array structure shall be so designed that it will occupy minimum space without sacrificing the output from SPV panels at the same time.

Nut & bolts, supporting structures including Module Mounting Structures shall have to be adequately protected from atmosphere and weather prevailing in the area.

All fasteners shall be of stainless steel of grade SS 304.

The Mounting structure shall be grounded properly using maintenance free earthing kit.

The support structure & foundation shall be so designed to withstand speed for wind zone of the location as given in relevant Indian wind load codes/ standards.

IS 800-2007 shall be followed for structural design. Contractor shall submit the DBR and STADD calculations along with the structural design within 10 days for approval of Oil India Ltd.

SPV module mounting structure

a. Type: Fixed

b. Azimuth: 0 degree True south

c. Tilt Angle: At altitude or as per site requirement.

Hot dipped Galvanized 80 Microns Steel Structure must be considered for all type of structural steel proposed for the power plant. Minimum thickness of galvanization should be at least 80 microns.

Design drawings with material selected shall be submitted for prior approval of OIL India within 10 days of detailed order. The manufacturer shall specify installation details of the PV modules and the support structures with appropriate diagram and drawings. The drawings along with detailed structure design and material selected and their standards shall be submitted in four sets to Oil India Ltd for approval before starting the execution work. The work will be carried out as per design approved by Oil India Ltd.

### **C) INVERTER(S): MAKE: DELTA/ABB/UTL/REPUTED MAKE**

Inverter, grid interactive in nature, shall consist of MPPT controller, inverter of aggregate rating 100 KW (3 X 100KW) in array design/suitable rating in case of string design, associated control and protection devices etc all integrated into inverter. It shall provide necessary protections for Grid Synchronization and Data Logging/Monitoring. The Inverters should convert DC power produced by SPV modules in to AC power and must synchronize automatically its AC output to the exact AC Voltage and frequency of Grid. The supplier may choose the inverter as string/Central as per their Design/ Project Philosophy.

The DC energy produced has to be utilized to maximum and supplied to the bus for inverting to AC voltage to extract maximum energy from solar array and provides 3-ph, 433V AC/ (+15% to - 10%), 50+/-1.5 Hz with total harmonic voltage distortion less than 3% to synchronize with local grid. DC voltage ripple content shall be not more than 3%.

Each inverter shall be compliant with IEEE standard 929-200 or equivalent and IEC 60068-2 standards for Environmental Testing.

The Inverters shall be of very high quality having efficiency not less than 98% and shall be capable of running in integrated mode.

Degree of protection of the indoor Inverters shall be at least IP-31 and that of outdoor at least IP-65.

Built in with data logging to remotely monitor plant performance through external PC.

The Inverters shall be designed for continuous, reliable power supply as per specification.

The Inverters should be designed to be completely compatible with the SPV array voltage and Grid supply voltage.

The dimension, weight, foundation details etc. of the Inverter shall be clearly indicated in the detailed technical specification.

The system should be capable of providing all the data including that of meter and Inverter to the central software on IEC-104 protocol. All the equipment's /hardware /software for complying to the same will be in the supplier's scope.

The Inverter shall be capable of complete automatic operation, including wake-up, synchronization & shut down independently& automatically.

Both AC & DC lines shall have suitable fuses, Metal Oxide Arrestors/surge arrestors and contactors to allow safe start up and shut down of the system. Fuses used in the DC circuit should be DC rated.

Inverters shall operate in sleeping mode when there will no power connected.

Protections:

- Over voltage both at input & output.
- Over current both at input & output.
- Over / under grid frequency.
- Heat sink over temperature.
- Short circuit.
- Protection against lightening.
- Surge arrestors to protect against Surge voltage induced at output due to external source.
- Any other protection.
- Anti- Islanding Protection

It should have user friendly 4X40 LED/LCD display for programming and view on line parameters such as:

- Inverter per phase Voltage, current, kW, kVA and frequency,
- Grid Voltage and frequency,
- Inverter (Grid) on Line status,
- PV panel voltage,
- Solar charge current and ambient temperature,
- Individual power stage heat sink and cabinet temperature,
- Solar Radiation (with external pyronometer with in scope)
- Inverter Import export kWh summation
- Solar kWh summation
- Inverter on
- Grid on
- Inverter under voltage/over voltage

-Inverter over load

- Inverter over temperature.

The Inverters shall have arrangement for adjusting DC input current and should trip against sustainable fault downstream and shall not start till the fault is rectified.

The 3 phase Inverters shall be from internationally reputed firms, which will incorporate latest Technological advance to provide highly reliable and efficient energy conversion from DC to AC.

Inverter shall be capable to synchronize independently & automatically with OIL's System grid power line frequency to attain synchronization and export power generated by solar plant to the internal electrical system.

The Inverter shall be capable of complete automatic operation, including wake-up, synchronization & shut down.

The Inverter shall be capable of operating in parallel with the grid utility service and shall be capable of interrupting line fault currents and line to ground fault currents.

The Inverter shall be able to withstand an unbalanced load conforming to IEC standard and relevant Indian electricity condition. The Inverter shall include appropriate self-protective and self-diagnostic features to protect itself and the PV array from damage in the event of Inverter component failure or from parameters – beyond the Inverter's safe operating range due to internal or external causes. The self-protective features shall not allow signals from the Inverter front panel to cause the inverter to be operated in a manner which may be unsafe or damaging. Faults due to malfunctioning within the Inverter, including commutation feature, shall be cleared by the Inverter protective devices and not by the existing site utility grid service circuit breaker.

The Inverter shall go to shut down/standby mode, with its contacts open, under the following conditions before attempting an automatic restart after an appropriate time delay.

- When the power available from the PV array is insufficient to supply the losses of the Inverter, the Inverter shall go to standby/shutdown mode.
- The Inverter control shall prevent excessive cycling of shut down during insufficient solar radiance.

Operation outside the limits of power quality as described in the technical data sheet should cause the power conditioner to disconnect the grid. Additional parameters requiring automatic disconnection are

- i. Neutral voltage displacement
- ii. Over current
- iii. Earth fault and
- iv. Reverse power

In each of the above cases, tripping time should be very less.

Following Technical documents of Inverter shall be supplied for approval after placement of order.

- Detailed technical description of the complete unit
- Instructions for installation and operation
- Electrical diagrams of all internal cabling, necessary for installation, maintenance and fault finding.
- Description of electrical and mechanical characteristics of units.
- Maintenance and fault-finding procedures.
- Safety precautions.
- Software for data monitoring with detailed description.
- Details of data acquisition
- Factory test reports in details on various parameters.
- Trouble shooting procedures.
- All maintenance requirements and their schedules, including detailed instructions on how to perform each task.
- Detailed schematics of all power instrumentation and control equipment and subsystems along with their interconnection diagrams. Schematics shall indicate wiring diagrams, their numbers and quantities, type and ratings of alt components and subsystems.
- A detailed bill of materials which shall list components model numbers, quantities and manufacturer of each supplied item.

- All documents and write ups shall be in English. They shall be clean and legible, and must be checked, signed, approved and dated by a competent representative of the contractor.

#### **D) PV Cable**

Specification: Single-pole, double insulated EBXL, XLPO (Strings) solar cable of adequate rating with fine-wire copper strand. The robust, flexible and space-saving design ensures constant electrical and mechanical properties during the whole life of the PV installation. TÜV certified according to the latest regulations. -40°C to +120°C (permanent) UV, ozone and hydrolysis resistant 1.1KV, Copper Armoured XLPE insulated.

#### **E) MC4 Connector (Pair Male-Female)**

Specification: With safety clip that requires a tool to unlock (NEC2008 compliant) Certified for applications with modules according to IEC61730, Safety class II, Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment -with Minimal voltage drop, High current-carrying capacity, Minimal power loss, Minimal contact resistance, High durability contacts withstand up to 1 million mating cycles, Operating temperatures up to 350°C.

#### **F) Junction Boxes**

Specification: Dust, vermin and water proof made from FRP

#### **G) AC Cable**

Specification: Adequate rating Power Cable shall be 1.1 kV, multi-core, stranded Copper conductor, XLPE insulated galvanized steel wire/strip armoured, flame retardant low smoke (FRLS) with PVC outer sheath made on PVC compound, conformity to IS:7098& other relevant standards.

#### **H) Distribution Boxes, cables and accessories**

Specification: An ACDB shall be provided in between PCU and Load/grid interface of suitable rating of connection and disconnection of PCU from load Class 0.5 Energy Meter for solar power monitoring.

All the cables shall be supplied conforming to IS standard as per requirement.

#### **I)LT Panel**

Specification: LT Panel with MCCBs at incomers and outgoing with proper rating Auto synchronization facility having reverse power and other protection relays. The Components shall be from the Make as specified. Having 2 Separate Compartments for Protective items and Power Distribution/ Collection. This LT panel shall be installed in OIL Housing main sub-station and shall be fed from an adequate capacity feeder (already designated under sub-station design consideration)

#### **J) Monitoring System**

Specification: This Monitoring System should be able to show and log all the major parameters from the Inverters and AC system and should be able to generate reports (generation, other operation parameters etc.) with errors and faults. This system should be accessible through web portal for remote monitoring. It can store historical data. It must be industrial grade only.

#### **K) Earthing System**

Specification: As per relevant IS

#### **L) Lightning Arrester**

Specification: As per relevant IS, ESE Type

## **M) MEASUREMENT OF ENERGY AND METERING**

Main Net meter (0.5 class minimum) along with suitable CT-PT (0.5 class minimum) to be installed at OIL Housing Main Substation (Metering Cubicle). A suitable outgoing feeder from OIL's substation shall provide power supply to the LT panel & the Solar/Check (Net) Metering Set with suitable CT- PT Set (if required) having accuracy of 0.5 class minimum shall installed in the LT panel. The incomer to the LT panel shall be termed as connection point. The necessary connections to the Solar Meter shall be made in such a way that is can monitor accurately the units generated or consumed by the roof top solar power plant.

This reading of the solar meter may be tallied from time to time with the data available with web-portal of Weather Monitoring System(shall record all data related to the roof top solar power plant).

Note: Connection point is the place where the DISCOM supply and the Solar Plant supply integrates.

## **MEASUREMENT OF ENERGY AND METERING**

Metering Systems:

The Operator shall maintain the Metering System (which shall include NET / TOD IEGC compliant meter, current and potential transformers and metering equipment). The Metering System will be designed and installed conforming to prudent practice so as to measure outgoing energy and power delivered by the Solar plant to the OIL's domestic sub-station at the delivery point, i.e. point of inter connection and also for the import of energy for any purpose. Metering equipment shall comply with the requirements of Grid Code but shall not be inferior to 0.5 accuracy Class minimum.

The Owner shall have the right to carry out inspections of the Metering Systems from time to time to check their accuracy.

### **Sealing and Maintenance of Meters**

The Metering System shall be sealed in the presence of both parties

When the Metering System and/or any component thereof is found to be outside the acceptable limits of accuracy or otherwise not functioning properly, it shall be repaired, re-calibrated or replaced by the Operator on priority.

Breaking of meter seals shall not be done except in case of any requirement by testing / calibration. Even in such case the Operator shall immediately inform the Owner of such requirement to enable Owner for deputing its representative. All testing / calibration of metering system shall be done by accredited agency.

All testing and metering equipment shall conform to the relevant IS

**Solar Meter** means meter for measurement power and energy as per **IEGC**

**Whereas Main(net) Meter with all necessary CT-PT shall be installed at the main sub-station/meter room only.**

**All the above shall be in scope of the supplier only.**

Approval from State DISCOM and payment of fees, if any, for integration of supply from the proposed Solar Power plant including testing/certification of NET/Solar meters/CT-PTs etc, if needed, shall be under the scope of the Supplier. No payment shall be paid by OIL in this regard.

## **N) Surge protection devices in both DC power side and AC power side**

O) Any other item not mentioned but required for proper installation and commissioning of the plant shall have to be provided by the supplier as per standard.

#### 26.1.1 LOCATION:

##### Location Details

Name of State: Rajasthan

District: Jodhpur

Location: OIL Township of Oil India Limited (rooftop)

Latitude: 26°14'12.39"N

Longitude: 73° 3'2.23"E

Roof top area of installation: 30,000 sq. feet (or usable area available at top of all buildings of OIL Housing)

#### 26.1.2 OPERATING CONDITIONS:

a. Operating Environment: 10 to 50 Deg. C

b. Operating Relative Humidity: 0 to 80%

c. Storage temp.: 15 to 45 Deg. C

d. Elevation: 221 m above MSL

#### 26.1.3 SCOPE OF SPECIFICATION:

a) The scope of these specifications shall cover design, engineering, manufacture, quality surveillance, testing at manufacturer's works, packing and supply, erection, testing and commissioning and performance testing of 250KWp (estimated) grid interactive Rooftop mounted solar photovoltaic system with associated components for installation at Oil India Limited Township, Jodhpur

b) The systems shall be complete with PV modules, inverter, metering, junction boxes, AC, DC distribution boards and cables, communication interface, and any other equipment necessary for safe and efficient operation of the system.

c) The work shall also include interconnection of PV system with the designed OIL grid supplying power to all the buildings.

d) The civil works for installation of complete system shall also be in scope of supplier.

e) The equipment offered shall conform in all respects to high standards of engineering, design and workmanship and be capable of performing in commercial operation up to Supplier's guarantee in a manner acceptable to OIL, who will interpret the meaning of drawings and specifications and shall have the power to reject any work or materials, which in his judgment are not in full accordance therewith.

f) It shall be the responsibility of the Supplier to ensure that all the works as per scope of the specification are completed for safe and efficient working of the system.

g) All the necessary co-ordination with regard to sub-contracted items shall be carried out by the Contractor. The customer (OIL) will communicate only with the Contractor for all matters pertaining to this contract.

h) Considering the reliability of the grid, no electrical storage batteries are envisaged as excess electricity generated by the solar panels which is not required by the equipment/devices in the building premises shall be exported to the grid.

#### 26.1.4 CODES AND STANDARDS

a) All Equipment and accessories shall comply with requirement of standards published by Bureau of Indian Standards (BIS). In-case no BIS codes exist the equipment shall meet the requirement of international standard including IEEE for design and installation of grid connected PV system.

b) The SPV Module must be provided with acceptable Test & Certified documents.

c) The quality of equipment supplied shall be generally controlled to meet the guidelines for engineering design included in the standards and codes listed in the relevant ISI and other standards, such as:

- IEEE 928: Recommended Criteria for terrestrial PV power systems.
- IEEE 929: Recommended practice for utility interface of residential and intermediate PV systems.
- IEEE519: Guide for harmonic control and reactive compensation of Static Power Controllers.
- National Electrical NFPA 70-1990 (USA) or Equipment National standard.
- National Electrical Safety Code ANSIC2 (USA) or equipment national standard.
- IEC: 61215 (2005) - Crystalline silicon terrestrial photovoltaic (PV)modules–Design qualification and type approval
- IEC 61683 / IS 61683 - Efficiency Measurements of Power Conditioners/Inverters including MPPT and Protections
- IEC: 61730 -1, -2 Photovoltaic (PV) module safety qualification Part 2: Requirements for testing
- IEC: 60904-1(2006) Photovoltaic Devices-Part-I: Measurement of Photovoltaic current-Voltage Characteristic
- IEC: 62446 (2009)- Grid-Connected Photovoltaic Systems— Minimum Requirements for System Documentation, Commissioning Tests and Inspection:
- IS 9000: Basic environmental testing procedure for Electronic and electrical items.

#### 26.1.5 SPECIFIC TECHNICAL REQUIREMENTS:

a) The Solar PV power system shall be rooftop mounted, grid connected without battery back-up.

b) The PV Array shall consist of a number of individual PV modules or panels that have been wired together in a series and/ or parallel combination and shall meet the generation power capacity of 250KWpeak (estimated).

c) The DC power generated from SPV array shall be converted to AC power with Power Conditioning Unit /Inverter, consisting of grid-tied Inverter and the associated control and protection devices. The voltage level shall match the grid voltage.

d) Output from Power Conditioning Unit shall be connected to an existing LT power distribution panel, wherein continuous synchronization with grid power shall be automatically active through static circuitry mechanism & devices.

e) Maximum available power of Solar PV Plant will be drawn during the daytime and during any shortfall in power generated by Solar PV Plant during time then extra power required shall be drawn from the Utility Source/without interruption to serve the load requirement. In case of any failure of grid power supply, PV Solar power supply will also automatically get disconnected immediately and the same will be restored automatically at restoration of grid power.

f) DUTY CYCLE: Average Hours of Operation/day: 8-11 hours per day, as per the solar insolation levels of the site.

#### 25.1.6 SUPPLY & INSTALLATION OF DC COMBINER BOX /ARRAY JUNCTION BOX:

a) Enclosure: The array junction boxes shall be made of PC-GFS Polycarbonate-Glass fibre substance) thermoplastic having minimum IP65/66 protection in accordance with IEC 60 529 with the help of internally embedded polyurethane gasket.



b) The enclosure should be double insulated with protection class II. In view of the same, IEC60439/IEC61439 (new revision) comes as an important standard as it fulfils this requirement of enclosure to be double insulated. (Test certification is required for IP65/ IP 66 degree of protection.) The lid shall be of transparent poly-carbonate.

c) Fuse Protection on Strings: DC fuses rated from 2A to 25A from leading manufacturers to be used in the combiner box to provide over-current protection.

d) Surge Protection Device: Surge Protection devices or SPD to be provided to protect the combiner/junction box from any power surge and voltage spike. SPD to be used should meet Type 2 regulations, and to be typically rated between 600 to 1000V.

e) Input Glands/Connectors: The combiner/array junction box offered is to be provided with IP67rated Cable Glands or MC 4 connectors at the input side to lead the array strings into the box. Suitable markings should be provided for easy identification and cable ferrules shall be fitted at the cable termination points for identification.

f) Degree of protection against mechanical load: IK 08 (5 Joule)

g) Toxic behaviour: Halogen/Silicon free, conform to RoHS directive 2002/95/EC

h) Temperature Tolerance range: -40 deg C to +120 deg C

i) Chemical Resistance: Acid, Lye, Petrol, Mineral Oil & partially resistant from Benzene.

j) UV behaviour: UV stabilized, even after many years there should be no sign of brittleness.

#### 26.1.7 METERING SCHEME

a) Metering is required to measure the Solar Gross Generation on continuous basis and register cumulative energy based on 15-minute interval basis, daily, monthly and yearly energy generation.

b) The average voltage and power factor based on 15-minute interval must also be recorded.

c) Meter must also display on demand, instantaneous, AC system voltages and currents, frequency, reactive power with sign, total harmonics current and voltage distortion etc.

d) Meters shall comply with the requirements of CEA Regulations on "Installation and Operation of Meters" and in conformity with IS 13779 or IS 14679.

e) An integrating pyranometer (class II or better) is to be provided with the sensor mounted in the plane of the array. Readout shall be integrated with data logging.

#### 26.1.8 POWER QUALITY REQUIREMENTS:

a) DC Injection in to the grid: The injection of DC power into the grid shall be avoided by proper technology at the output of the inverter. It is proposed to limit DC injection within 1% of the rated current of the inverter as per IEC 61727.

b) The limits for harmonics shall be as stipulated in the CEA Regulations on grid connectivity which are as follows:

- Total Voltage Harmonic Distortion= 5%
- Individual Voltage Harmonic Distortion=3%
- Total Current Harmonic Distortion=8%

c) Voltage Unbalance-The Voltage Unbalance in the grid shall not exceed 3.0%.

d) Voltage Fluctuations: The permissible limit of voltage fluctuation for step changes which may occur repetitively is 1.5%. For occasional fluctuations other than step changes the maximum permissible limits is 3%.

#### 26.1.9 COMMUNICATION INTERFACE:

a) The project envisages a communication interface which shall be able to support

- Real time data logging
- Event logging
- Supervisory control
- Operational modes
- Set point editing

b) The following parameters shall also be measured and displayed continuously.

- Solar system temperature
- Ambient temperature
- Solar irradiation/insolation
- DC current and Voltages
- DC injection into the grid (one-time measurement at
- Efficiency of the inverter
- Solar system efficiency
- Display of I-V curve of the solar system
- Any other parameter considered necessary by supplier of the solar PV system based on prudent practice.

c) Data logger/PC based monitoring system must record these parameters for study of effect of various environmental & grid parameters on energy generated by the solar system and various analysis would be required to be provided through bar charts, curves, tables, which shall be finalized during approval of drawings.

d) The communication interface shall be an integral part of inverter and shall be suitable to be connected to local computer/SCADA and also remotely via the Web using either a standard modem or a GSM/WIFI modem or using any communication interface.

#### 26.2.0 WEATHER MONITORING STATION:

a) An integrating PYRANOMETER for measuring the Solar Irradiance is to be provided, with the sensor mounted in the plane of the array. Readout is to be integrated with the data logging system.

b) In addition, wind vanes for wind speed data, temperature probes for recording the Solar panel temperature and ambient temperature are to be provided.

#### 26.2.1 LIGHTNING PROTECTION AND EARTHING:

a) Required numbers of suitable lightning arrestors should be installed in the array area. Lightning protection shall be provided by the use of suitable earthing conductors and electrodes so that any lightning strike may find an alternate route to earth.

Protection shall meet requirements of Central Electricity Regulations, 2010, and IS 2309:1969 (Protection of Buildings and allied structures from lighting).

b) Each array structure of the PV system should be grounded properly as per IS: 3043-1987. Provision should be kept for shorting and grounding of the PV array at the time of maintenance work. All metal casing/shielding of the plant should be thoroughly grounded in accordance with CEA Regulation-2010. Earth resistance should be tested in a dry weather in presence of the representative of customer, after earthing work is complete, with a calibrated earth tester and should have a value not more than the value specified in the relevant Code/Rules.

c) In case the SPV Array cannot be installed close to the equipment to be powered & a separate earth has been provided for SPV System, it shall be ensured that all the earth connections are bonded together to prevent the development of potential difference between any two earths.

#### 26.2.2 CIVIL WORKS:

a) Necessary approval shall be taken from concerned civil engineer of OIL before starting or executing civil works.

b) Embedment of structures suitable for mounting PV modules.

c) All the machinery such as hydra, JCBs, fork-lifts, for unloading of materials at site, movement of materials, foundation, erection of structures, module mounting, etc. shall be in the scope of Vendor.

#### 26.2.3 SYSTEM DOCUMENTATION:

Complete documentation on the system must be provided to OIL. System documentation should include an owner's manual and copies of relevant drawings for whatever system maintenance might be required in the future.

#### 26.2.4.1 TESTS AND TEST REPORTS:

Final acceptance tests for the PV plant shall include, but not limited to, the following:

- a) Visual inspection
- b) Verification that all required system and equipment labels, markings and placards are correct and in the proper locations. This includes ensuring that all equipment is properly listed, identified and labelled, suitable for the conditions of use, and installed according to the listed product instructions.
- c) Wiring & cabling
- d) Earthing connections
- e) Mounting and support structures
- f) Modules
- g) Lightning protection including surge protection
- h) Insulation Resistance Measurement
- i) Importance of PV system wire insulation for safety and performance
- j) Measurement methods for AC and DC circuits
- k) Interpretation of insulation test data and application of the results
- l) Test equipment selection
  - m) Array Performance Measurement
    - Electrical measurement, including calculating circuit voltages and currents to verify that the PV array and system operating parameters are within specifications.
    - I-V Curve Tracing and discrete voltage and current measurement

- PV system performance verification, correction and measurement using capacity test
- Interpreting I-V curves for performance troubleshooting
- Power performance Index and Energy performance index
- Calculations of energy yield
- Power rating, inverter efficiency, module temperature, array yield, system losses, etc.

#### 26.2.4.2 DOCUMENTS TO BE SUBMITTED ALONG WITH THE BID:

- Type test certificates for all the tests specified for the factory built Solar PV modules:
- Approved by MNRE Authorized test centre or equivalent International Labs (certificate to be submitted along with the offer).
- Module mounting structure- Certificate from MNRE approved test centre.
- Inverter: Certificate from MNRE approved test centre.
- DC Cable- TUV Certification
- Bill of materials.
- Documents as specified in BEC/BRC criteria.

#### 26.2.5 MAINTENANCE REQUIREMENT:

a) Easy access shall be provided for all components in the SPV plant and grid connecting equipment. Maintenance platform shall be provided for easy inspection of all the equipment.

b) If special tools are required for installation and maintenance, the supplier shall indicate the same and to be supplied free of cost.

c) The Supplier shall furnish operating and maintenance instruction manual to enable the purchaser to carry out maintenance of equipment effectively and safely.

d) Washing / cleaning of SPV panels would be carried out as per the prudent practice of the supplier.

#### 26.2.6 LAYOUT REQUIREMENT:

The overall dimensions of the SPV Plant shall suit the Rooftop space provided for the layout requirements. The arrangement to suit this space shall be intimated at the time of approving the general arrangement drawing of the equipment.

#### 26.2.7 INSTRUCTIONS, O&M MANUALS & DOCUMENTS TO BE SUBMITTED ALONG WITH SUPPLY:

a) Two copies of Instruction and Operation and Maintenance Manual in English should be provided with the system.

b) The manual shall be furnished at the time of dispatch of the equipment and shall include the following aspects:

- Erection drawings with written assembly instructions.
- Detailed instructions and procedures for the installation operation and maintenance.
- About solar PV system– its components and expected performance.
- Clear instructions about mounting of PV module (s)
- About the electronics
- DO's and DONT's
- Principle of Operation of various equipment

- Safety and reliability aspects
- Metering scheme
- About power conditioning unit's software and controls
- Clear instructions on regular maintenance and troubleshooting of solar power plant
- Name and address of the person or service centre to be contacted in case of failure or complaint.
- Rated voltages, current and all other technical information which may be necessary for correct operation of the SPV plant.
- Catalogue numbers of all the components which are liable to be replaced during life of the SV plant and all the component parts.
- Trouble shooting and diagnostic procedure

#### 26.2.8 AC DISTRIBUTION BOARD (ACDB)

Inverters installed in a control room converts DC energy produced by the solar array to AC energy. The AC power output of the inverters shall be fed to a local ACDB & then in a combined manner to be fed to the main ACDB (in LT panel) which also houses energy/solar meter. The 433V AC output from isolation (main) transformer shall be exported by cable of required capacity to OIL domestic sub-station.

All the power cables shall be taken through top / bottom of the panel or as per site requirement.

The ACDBs shall fitted with suitable rating & size copper bus, MCCB, HRC fuses/circuit breaker/isolator, indicators for all incomer and outgoing terminals, LED voltmeter & Ammeter with suitable selector switches to monitor & measure the power to be evacuated.

Nut & bolts including metallic shall have to be adequately protected against atmosphere and weather prevailing in the area.

The overall dimension, weight, sheet thickness, painting etc. should be indicated by the Contractor.

#### 26.2.9 MINIMUM TECHNICAL REQUIREMENT / STANDARD FOR SOLAR PHOTOVOLTAIC (PV) PLANT

##### PV MODULES:

The PV modules must conform to the latest edition of any of the following IEC/equivalent BIS Standards for PV module design qualification and type approval:

Crystalline Silicon Terrestrial PV Modules IEC 61215 / IS14286

Thin film PV modules IEC

Concentrator PV Modules & Assemblies IEC 62108

In addition, the modules must conform to IEC 61730 Part 1- requirements for construction & Part 2 - requirements for testing, for safety qualification.

PV modules to be used in a highly corrosive atmosphere (coastal areas, etc.) Must qualify Salt Mist Corrosion Testing as per IEC 61701.

BALANCE OF Plant (BoP) ITEMS/ COMPONENTS:

The BoP items / components of the SPV power plants/ systems deployed Under the Mission must conform to the latest edition of IEC/ equivalent BIS Standards as specified below:

| BoP item / component           |   | Applicable IEC / equivalent BIS Standard    |
|--------------------------------|---|---|
|                                | Standard Description                          | Standard Number                             |
| Inverter(s)*                   | Efficiency Measurements                       | IEC 61683                                   |
|                                | Environmental Testing                         | IEC 60068 2                                 |
| Charge controller/ MPPT units* | Design Qualification<br>Environmental Testing | IEC 62093 IEC 60068 2<br>(6,21,27,30,75,78) |

|   |  |   |
|---|--|---|
| <b>Storage Batteries</b>  | General Requirements & Methods of Test Tubular Lead Acid                       | IEC 61427 IS 1651/IS 133369                                     |
| <b>Cables</b>   | General Test and   | IEC 60189   |
| Measuring Methods PVC insulated cables for working Voltages up to and including 1100 V-Do-, UV resistant for outdoor installation |  | IS 694/ IS 1554 IS/IEC 69947                                    |
| <b>Junction Boxes / Enclosures</b>  | General  | Requirements IP 65 (for outdoor) / IP 21 (for indoor) IEC 62208 |
| <b>SPV System</b>   | Design PV Stand-alone System design verification                               | IEC 62124   |
| <b>Installation Practices</b>   | Electrical installation of buildings Requirements for SPV power supply systems | IEC 60364-7-712   |

\* Must additionally conform to the relevant national/international Electrical Safety Standards.

### 26.3.0 WARRANTY

The mechanical structures, electrical works including power conditioners / inverters / charge controllers/ maximum power point tracker units/Transformer, ACDB, LT DB, distribution boards / digital meters / switchgear / storage batteries, all equipment etc. and overall workmanship of the SPV power plants/ systems must be warranted against any manufacturing/ design/ installation defects for a minimum period of 5 years or as per OEM.

PV modules used in solar power plants/ systems must be warranted for their output peak watt capacity, which should not be less than 90% at the end of 12 years and 80% at the end of 25 years.

**System warranty certificate for the entire system is to be strictly issued by supplier of whole plant for 12 months from the date of commissioning.**

#### 26.3.1 NOTE:

a) General arrangement drawing of the plant to be approved by OIL prior to supply and installation.

### 27.0 INSTRUCTIONS FOR INSTALLATION AND COMMISSIONING:

- i. The supplier shall execute the jobs as per specifications and OEM guidelines
- ii. Supplier shall issue his/her work persons with all the safety gadgets.
- iii. Quality of jobs carried out by the Supplier shall be of high standard and should be as per the norms of Central Electricity Authority Regulations, 2010, NEC and other electrical standards recognized by the company.
- iv. Installation & commissioning shall be considered as complete only if it meets the requirement of OIL.
- vi. OIL shall reserve the right to ask the supplier to re-do poor quality job at no extra cost to OIL.

## 28.0 MANPOWER

- i. All personnel deputed by the Supplier shall be competent for the job.
- ii. All workers shall be medically fit and able to carry out the various jobs assigned to them.
- iii. Job shall have to be carried out in consultation with OIL.
- iv. The boarding/lodging, transportation to site, including transportation of materials at site and related costs shall be under the scope of the supplier.
- v. Loading and unloading of materials/ machines shall be the scope of the Supplier.

## 29.0 General HSE points to be adopted by the Supplier:

- a) It will be solely the Supplier's responsibility to fulfil all the legal formalities with respect to the Health, Safety and Environmental aspects of the entire job (namely, the persons employed by him, the equipment used, the environment etc.) under the jurisdiction of the district of that state where it is operating. The Supplier has to ensure that all sub-Suppliers hired by him/her comply with the same requirement as the Supplier himself/herself and shall be liable for ensuring compliance all HSE laws by the sub- Suppliers.
- b) The number of work persons hired/engaged by the Supplier shall depend on the quantum and/or exigency of jobs. Company engineer/ company supervisor may direct the Supplier/Supplier's supervisor to hire more persons if considered essential.
- c) It will be entirely the responsibility of the Supplier or his/her Supervisor/representative to ensure strict adherence to all HSE measures and statutory rules during operation in OIL's installation and safety of workers engaged by him/her. The crew members will not refuse to follow any instruction given by company's Safety Officer / Engineer / Official / Supervisor/Junior Engineer for safe working/ operation.
- d) Any issues regarding compensation arising out of the job carried out by the Supplier whether related to pollution, Safety or Health will be solely under the scope of the supplier and supplier cannot make OIL liable for the same.
- e) Any compensation arising due to accident of the Supplier's personnel while carrying out the job will be solely the responsibility of the Supplier and supplier cannot make OIL liable for the same.

## 30.0 TOOLS AND TACKLES:

- a) All tools and tackles shall be of standard make and must conform to IS or relevant standard.
- b) Whenever OIL wishes to inspect, Supplier shall produce the tools and tackles for inspection. Items must be replaced suitably whenever found defective.
- c) All tools & tackles required for carrying out the job shall have to be arranged by the supplier.

## 31.0 CUSTOMER'S ON SITE INSTRUCTION:

a) Supplier shall provide necessary onsite instruction and demonstration on the system related today to day operation & maintenance of the system including basic troubleshooting.

b) On-site instruction shall be considered by the Vendors and costs towards this, if any, shall be deemed to have been included in the overall quoted costs of the system. No additional costs towards to & fro travel, boarding & lodging shall be made on this account.

### **32.0 COMPREHENSIVE ANNUAL MAINTENANCE CONTRACT (CAMC)**

#### **32.1.0 Comprehensive Annual Maintenance Contract:**

32.1.1 Supplier of the solar PV plant has to take over the annual maintenance of the plant for 5 years once the plant is successfully handed over to OIL after installation & commissioning.

**32.1.2 Successful Handover: After successful completion of 3 months of stabilization period.**

**32.1.3 Date of Commissioning: The day whole plant is commissioned and successfully connected/synchronized to the Grid (DISCOM-JdVVNL).**

#### **32.1.4 . BRIEF POINTS REGARDING THE COMPREHENSIVE ANNUAL MAINTENANCE CONTRACT**

- a) The contractor shall ensure trouble free operation of the complete solar PV plant system.
- b) The contractor shall carry out maintenance of the installation as per the guidelines of the scope of work of CAMC given below during the entire contract period. During the inspection/maintenance schedule, the equipment in the solar PV plant will be thoroughly checked for proper operation, cleaned and serviced. However, contractor shall submit a detailed PM schedule once PO is placed. PM schedule shall be approved by OIL before signing of contract.
- c) The contractor shall also make any additional visits during the contract period, if required, in case of breakdown or if called by OIL's personnel. The same will be intimated by OIL. During any visit in the contract period, boarding/lodging, transportation of the contractor's personnel and materials required shall have to be arranged by the contractor.
- d) The contractor shall also undertake replacement/repair of any defective part of the solar PV plant system free of cost during the contract period.
- e) The contractor has to sign separate agreement with OIL for a period 5 years CAMC for 250kwp roof top Solar PV plant before the start of the CMC.
- f) The price mentioned in the Purchase Order shall be firm and binding, for entire 5 years. Contractor shall have to provide an undertaking to this effect along with supply of materials.
- g) At the end of the contractual period, the solar PV plant system shall be handed over to OIL in excellent working condition. If any equipment/part/component of the solar PV system is found to be defective due to improper maintenance, it shall be replaced by the contractor free of cost.



32.1.5 CONTRACT GUIDELINES: It is the responsibility of the contractor to ensure maximum output from the plant by cleaning/maintaining the equipment on a regular basis during the whole contract period (O&M) as per OEM recommendation. The contractor shall maintain the plant along with spares for 5 years.

The Comprehensive AMC, therefore, shall be of duration of 5 years as follows:

- Comprehensive annual maintenance contract for 5 years after handing over the plant to OIL.

The CAMC shall include overall supervision of maintenance activities that are required to ensure optimum performance of the Solar PV system as per the performance guarantee parameters submitted and established by the contractor at site and accepted by OIL.

The contractor shall submit a Detailed Annual Maintenance schedule to OIL within 15 days of the placement of the purchase order and award of contract for comprehensive AMC.

32.1.6 The scope of maintenance of the plant shall cover two parts:

- a) Scheduled/ Preventive/ predictive maintenance including cleaning/washing of solar panels
- b) Unscheduled/ Breakdown maintenance

a) Scheduled/ Preventive maintenance

The contractor shall have to carry out scheduled and preventive maintenance of the solar PV plant for 5 years (to be carried out after successful commissioning of the completed plant to satisfaction of OIL), which includes maintenance of the plant including regular maintenance.

The contractor shall also submit a detailed report every month to OIL about the maintenance carried out in the concerned period.

For ongoing cleaning and maintenance, the contractor shall provide sufficient manpower to carry out routine maintenance in line with OEM's recommendation. All tools/tackles and consumable materials shall be to contractor's account. However, water for cleaning can be provided from OIL's source.

b) Unscheduled/ Breakdown maintenance

In case of malfunction/breakdown in the plant, the contractor shall have to troubleshoot and rectify the failure/breakdown themselves. Any spares/replacement parts required to put the plant back into service shall have to be supplied by the contractor without any cost to OIL.

32.1.7 Spares required during AMC

The contractor shall supply all spares required during the AMC period. This includes spares/consumables for scheduled as well as unscheduled/breakdown maintenance.

32.1.8 Warranty

The Contractor shall be liable to replace any parts/components that have failed, may fail or show signs of defects during operation or due to poor workmanship of contractor's personnel or from any act or omission by the vendors/contractor for a period of 5 years from the date of handing over and acceptance by OIL of the complete Plant, free of cost during the currency of the contract period.

The contractor will have to hand over the plant to OIL in excellent working condition. After completion of AMC period, the final certificate shall be given by OIL's incharge. If there is any defect found in the component/equipment, the same shall have to be replaced by the contractor within one month, if contractor fails to do so, the same will be repaired/replaced by OIL and the cost shall have to be borne by the contractor.

The above includes, but not limited to, replacement/repair of any defective part (all components including PV modules, arrays, power supply unit, converter, inverter, all electronic cards, modules, fuses, fans, switches, wires and cables, lamps, transformers, cables etc.), civil structures for supporting the panels, metallic structures, cable mounting system etc. of the solar PV plant.

### **32.1.9 Compensation Calculation:**

Agreed Performance Ratio in Percentage (as per your quote): A

Achieved Performance Ratio in Percentage: B

$B = \text{Achieved Annual Energy Production} / \text{Nominal Annual Energy Production in kWh}^*$

\*Nominal Annual Energy Production in kWh = Annual Cumulative Solar Irradiation intensity (KWHr/m<sup>2</sup>) for the that year X Generator area of the PV plant (m<sup>2</sup>) X Efficiency of the PV modules

Difference = A-B

Compensation = \*Calculated AEP for the Year X (A-B) X Unit Rate X 25

\*Calculated AEP for the Year = Nominal AEP for the Year X Guaranteed PR

Unit rate = (Tariff @ LT Commercial rate of corresponding year)

Calculation:

First Year:

At the end of the first year, if the plant failed to achieve the PR (A above) than

a) The contractor shall compensate as follows:

Guaranteed PR: A

Achieved PR: B1

Difference: A-B1

Compensation: (Calculated AEP with the Guaranteed PR) X (A-B1) X 25 Years

Second Year onwards:

b) If the PR quoted in the Table-1 for the second year is equal or more than the achieved PR of first year then no compensation will be levied.

If the achieved PR for the second Year is less than the achieved PR of the first Year but equal to the Guaranteed PR for second year as quoted in Table-1, then no compensation will be levied.

If the achieved PR is less than the Guaranteed PR for the second year as quoted in Table-1 and less than the achieved PR of first Year then compensation will be calculated as follows:

Achieved PR of First Year: B1

Second Year Guaranteed PR (Table-1): A2

Second Year achieved PR: B2

Difference: (B1/A2 whichever is less)-B2

Compensation: (Calculated AEP with the Guaranteed PR for the second Year) X Difference X 24 Years.

This will continue for the remaining years of O&M.

**Note:** Compensation at the end of year, if arises, may be deducted from the last quarter against O & M charges and the balance, if applicable, can be deducted from the first quarter of the next year.

### **32.2.0 PERFORMANCE RATIO GUARANTEE TEST**

32.2.1 The test to prove the Performance Guarantee shall be conducted at site by the contractor in presence of Owner's/Consultant representative. The PG test procedure shall be submitted by successful vendor after the award of the contract for review and approval by OIL/Consultant. This test shall be binding on both the parties of the

Contract. Any special equipment, instrumentation tools and tackles required for successful completion of the Performance Guarantee Test shall be provided by the Contractor free of cost.

32.2.2 The procedure for PG demonstration test shall be as follows:

i) A calibrated pyranometer shall be installed by the contractor at the location mutually agreed by the Contractor and Owner/Consultant. The test report for the calibration shall be submitted by the contractor for approval by the Owner/Consultant. The output of this pyranometer for three months of the PG test shall be made available at SCADA.

ii) "Achieved energy production" exported from the plant shall be noted for three months. For this purpose, the energy recorded in the incoming feeder meter from the solar plant shall be taken into account.

iii) This recorded energy shall be compared with the "Nominal Energy Production" as mentioned in 32.1.9 above for 3 months.

32.2.3 Following factors shall be considered for computing the "Nominal Energy Production"

i) Generation loss due to grid outage: The measured global solar radiation of the period of the power evacuation system shall be excluded to calculate average global solar radiation for the period of the PG test

32.2.4 In case of non- achievement of the desired performance of the plant, the contractor, in its own interest, take adequate measures, such as providing additional modules etc., to improve the performance of the plant at no additional cost to OIL. Otherwise compensation as per clause no 32.1.9 will be applicable at the end of the year.

32.2.5 Payment against Comprehensive AMC

Against the AMC, the contractor shall raise the bills quarterly and shall be paid against the quarterly bills. If intimated by OIL, the contractor has to visit the site or visit themselves if they want, with their own cost.

Contractor shall submit a monthly certificate/health report/maintenance report to Electrical Engineering department stating the health/condition of the solar PV plant and/or any repair/maintenance job done during their periodic visits to the installation. Bills should be submitted along with the monthly reports. Bills without the accompanying health report/maintenance report will not be entertained.

### 33.0 SCOPE OF WORK OF COMPREHENSIVE ANNUAL MAINTENANCE CONTRACT

#### 33.1.0 Scheduled/ Preventive maintenance

33.1.1 The contractor shall ensure trouble free operation of the solar PV plant system by undertaking scheduled maintenance of the plant as per the recommendations of the respective OEMs/vendors of component items. The components of the solar PV plant shall be checked for loose connection/heating and the same shall be rectified. Troubleshooting and repair of the solar PV plant shall be done by the contractor.

The contractor shall submit a detailed PM schedule of the plant within 15 days of placement of PO. The schedule shall be approved by OIL before signing the contract.

33.1.2 During the inspection/maintenance schedule, the equipment in the solar PV plant will be thoroughly checked for proper operation, cleaned and serviced.

#### 33.1.3 Scope of regular maintenance work:

- a) Periodicity of maintenance: Every month
- b) Maintenance work to be carried out

i) Cleaning of solar PV modules/arrays monthly with water\*

ii) Checking and tightening all wiring connections in PV arrays and electrical cables in PCU, earthing and lightning protection system

- iii) Checking of proper functioning of PCU and recording all parameters, including any Fault/incipient fault
- iv) Measurement of solar irradiation
- v) Troubleshoot faults, if any, and rectify the same- if the fault cannot be rectified, the maintenance team will inform OIL and contractor. Contractor will arrange for rectification of the fault with the help of OEM/expert. Spares for regular/breakdown maintenance will be in contractor's scope.

**34.0 \* Note:**

A) If the weather is dusty, cleaning of PV arrays more than twice every month is to be carried out as per instruction of OIL. No extra charge can be claimed for this.

B) Water will be available free of cost from the installation. Any equipment viz. hose pipe, mops, pressure washer etc. will be in contractor's scope.

34.1.0 In case of any faults/ other problems not directly connected to the solar PV plant, (for example, non-functioning of a light fitting in a room supplied with solar power), the same shall be reported to concerned Engineer.

34.1.1 The contractor shall check the solar PV plant for any damage and ingress of water.

34.1.2 Following reports shall be submitted by the contractor in hard copy during the periodic visits:

- a) Healthiness/problems of solar PV plant (as per solar PV plant OEM(s)' guidelines)
- b) Operation checked status (of all components of the solar PV plant, changeover system etc.)
- c) Report attended and action taken (in details) for malfunctioning solar PV plant
- d) Any other relevant point

34.1.3 The starting date for annual maintenance service shall be the date on which the plant shall be handed over to OIL to their full satisfaction.

34.1.4 Any other points specifically not mentioned in the supply, installation and commissioning and annual maintenance services, but required for successful operation shall be in the scope of the contractor.

Any spares/serviceable parts/replacement parts required to put the defective plant back into service shall have to be supplied by the contractor without any cost to OIL.

**35.0 STATUTORY REQUIREMENT FOR WORK**

- i. The contractor shall execute the jobs as per specifications in the Annual Maintenance contract.
- ii. Contractor shall issue his/her work persons with all the safety gadgets.
- iii. Quality of jobs carried out by the Contractor shall be of high standard and should be as per the norms of Central Electricity Authority Regulations, 2010, NEC and other electrical standards recognized by the company.

**36.0 MANPOWER**

- i. All personnel deputed by the contractor shall be competent for the job.
- ii. All workers shall be medically fit and able to carry out the various jobs assigned to them.
- iii. Personnel deployed by the contractor shall be changed/replaced by the contractor if it is desired by OIL to do so. OIL shall not be required to give any reason for such request/instruction.

36.1.0 Job shall have to be carried out in consultation with OIL.

**37.0 General HSE points to be adopted by the Contractor:**

- a) It will be solely the Contractor's responsibility to fulfil all the legal formalities with respect to the Health, Safety and Environmental aspects of the entire job (namely, the

persons employed by him, the equipment used, the environment etc.) under the jurisdiction of the district of that state where it is operating. The contractor has to ensure that all sub-contractors hired by him/her comply with the same requirement as the contractor himself/herself and shall be liable for ensuring compliance all HSE laws by the sub- contractors.

b) The number of work persons hired/engaged by the contractor shall depend on the quantum and/or exigency of jobs. OIL may direct the contractor/contractor's supervisor to hire more persons if considered essential.

c) It will be entirely the responsibility of the Contractor or his/her Supervisor/representative to ensure strict adherence to all HSE measures and statutory rules during operation in OIL's installation and safety of workers engaged by him/her. The crew members will not refuse to follow any instruction given by company's Official / Supervisor for safe working/ operation.

h) Any issues regarding compensation arising out of the job carried out by the Contractor whether related to pollution, Safety or Health will be settled and payable by the contractor only.

i) Any compensation arising due to accident of the Contractor's personnel while carrying out the job, will be payable by the contractor only.

j) A contractor employee must, while at work, cooperate with his employer or other persons so far as is necessary to enable compliance with any requirement under the act or the regulations that is imposed in the interest of health, safety and welfare of the employee or any other person.

#### 38.0 FORCE MAJEURE:

a) In the event of either party being rendered unable by force majeure to perform any obligation under the contract, the relative obligation of the party affected by such force majeure shall stand suspended till such time that normal conditions are restored. The term force majeure shall mean act of God, strikes, lockouts or other industrial disturbances, wars (whether declared or not), riots, earth quake, storms, fire etc.

#### 39.0 MEASUREMENT OF ENERGY AND METERING: Refer to clause no 26.0 (M) above

#### IMPORTANT CLAUSE:

- a. Total EPC (X+Y) contract price quoted by bidder as per Price Bid format.
- b. Total O&M charges (Z) as per Price Bid format in for 5 years including statutory charges if any quoted by the bidder.
- c. The bidder shall furnish Annual Estimated Production (AEP) for 25 years based on the Performance Ratio (PR) offered by the bidder for the plant.
- d. Bidder shall submit AEP and the Performance Ratio (PR) in TABLE-1.
- e. AEP shall be calculated as follows  $AEP = \text{Nominal Annual Energy Production in kWh} \times \text{PR}$   
 $\text{Nominal Annual Energy Production in kWh} = \text{Annual Cumulative Solar Irradiation intensity (KWhr/m}^2\text{)} \times \text{Generator area of the PV plant (m}^2\text{)} \times \text{Efficiency factor of the PV modules}$

Note: To calculate Nominal Annual Energy Production (NAEP), Annual Solar Irradiation may be considered as 1500 KWh/m<sup>2</sup> (Jodhpur, Rajasthan). The AEP data provided in Table-1 will be used for evaluation purpose only.

f. If there is a discrepancy between the unit price and the total price, which is obtained by multiplying the unit price and quantity, or between sub totals and the total price, (even in case of carry forward of prices) the unit or subtotal price shall prevail and the total price shall be corrected accordingly. If there is a discrepancy between words and figures, the amount in words will prevail. This evaluation criterion is binding on the bidder.

3. Annual Energy Production (AEP) as given in TABLE1 for the first five years shall be considered for calculation cost per KWH. Although, bidder has to quote AEP and PR for 25 years. PR "Performance Ratio" (PR) means the ratio of actual plant output versus Calculated, nominal plant output in kWh annual.  $PR = \text{Annual Actual Energy output in kWh} / \text{Nominal Annual Energy Production in kWh}$ .

Nominal Annual Energy Production (in KWh) means Annual incident solar irradiation at the generator surface of the PV plant x relative efficiency of the PV plant modules. PGT means Performance Ratio Guarantee Test.

#### A. AEP and Performance ratio

1.0 Bidder are expected to make their own study of solar profile and other related parameters of the area & make sound commercial judgment about Performance Ratio (PR) to determine the Annual power output i.e. Annual Energy Production of the plant. It shall be the responsibility of the bidder to access the corresponding solar insolation values and related factors of solar plant.

2.0 The bidder shall be required to install energy meters to record the Net Annual Energy Production (AEP) from the Solar Plant (Energy generated and exported from solar plant – Energy Import from OIL system)

3.0 Necessary corrections may be carried out by OIL in the AEP furnished by bidders.

4.0 The corrected figure for AEP shall be considered for evaluation of bids. The same has to be ratified by the bidder.

5.0 The quoted PR for 25 years shall be adopted for entire O&M period.

6.0 The Successful bidder shall be responsible for achieving the Performance Ratio. For any shortfall in achieving the Performance Ratio (PR), the compensation shall be recovered from the successful bidder on annual basis. The successful bidder has to maintain the Solar Plant equipment(s) including its repair, replacement, overhauling, etc., so as to give the agreed Performance Ratio per year, for which OIL shall pay the agreed O&M charges only and no other charge / cost is payable by OIL.

7.0 The performance of 250 KW Solar Power Project shall be evaluated on annual basis. In case of shortfall in quoted Performance Ratio compensation shall be recovered as per compensation clause no 2.4 of COMPREHENSIVE ANNUAL MAINTENANCE CONTRACT (CAMC) part.

8.0 Compensation Calculation: Agreed Performance Ratio in Percentage (As per Table-1):  
A

Achieved Performance Ratio in Percentage: B

$B = \text{Achieved Annual Energy Production} / \text{Nominal Annual Energy Production in kWh}^*$

\*Nominal Annual Energy Production in kWh = Annual Cumulative Solar Irradiation intensity (KWhr/m<sup>2</sup>) for the that year X Generator

area of the PV plant (m<sup>2</sup>) X Efficiency of the PV modules Difference = A-B

Compensation = \*Calculated AEP for the Year X (A-B) X 8.35 X 25

\*Calculated AEP for the Year = Nominal AEP for the Year X Guaranteed PR

Unit rate = INR 8.35 (Tariff @ LT Commercial rate of corresponding year)

Calculation:

First Year:

At the end of the first year, if the plant failed to achieve the PR (A above) than

a) The bidder shall compensate as follows:

Guaranteed PR: A

Achieved PR: B1

Difference: A-B1

Compensation: (Calculated AEP with the Guaranteed PR) X (A-B1) X 25 Years

Second Year onwards:

b) If the PR quoted in the Table-1 for the second year is equal or more than the achieved PR of first year then no compensation will be levied.

If the achieved PR for the second Year is less than the achieved PR of the first Year but equal to the Guaranteed PR for second year as quoted in TABLE-1, then no compensation will be levied.

If the achieved PR is less than the Guaranteed PR for the second year as quoted in TABLE-1 and less than the achieved PR of first year, then compensation will be calculated as follows:

Achieved PR of First Year: B1

Second Year Guaranteed PR (TABLE-1): A2

Second Year achieved PR: B2

Difference: (B1/A2 whichever is less)-B2

Compensation: (Calculated AEP with the Guaranteed PR for the second Year) X Difference X 24 Years. This will continue for the remaining years of O&M.

Note: Compensation at the end of year, if arises, may be deducted from the last quarter against O & M charges and the balance, if applicable, can be deducted from the first quarter of the next year.

#### B. PERFORMANCE RATIO GUARANTEE TEST

1.0 The test to prove the Performance Guarantee shall be conducted at site by the contractor in presence of OIL's representative. The PG test procedure shall be submitted by successful vendor after the award of the contract for review and approval by OIL. This test shall be binding on both the parties of the Contract. Any special equipment, instrumentation tools and tackles required for successful completion of the Performance Guarantee Test shall be provided by the Contractor free of cost.

2.0 The procedure for PG demonstration test shall be as follows:

i) A calibrated pyranometer shall be installed by the contractor at the location mutually agreed by the Contractor and OIL. The test report for the calibration shall be submitted by the contractor for approval by the OIL. The output of this pyranometer for three months (stabilization period) of the PG test shall be made available at SCADA/Respective communication portal of the Weather Monitoring System.

ii) "Achieved energy production" exported from the plant shall be noted for three months. For this purpose, the energy recorded in the incoming feeder meter from the solar plant shall be taken into account.

iii) This recorded energy shall be compared with the "Nominal Energy Production" as mentioned in 8.0 above for 3 months (period of stabilization).

The bids conforming to the specifications, terms and conditions stipulated in the tender and considered to be responsive after subjecting to the Bid Rejection Criteria shall be considered for further evaluation as per General Terms and Conditions for Local Tender and the Bid

3.0 Price bids of techno-commercially acceptable bidders shall be evaluated as per following:

a. Total EPC (X+Y) contract price quoted by bidder as per Price Bid format.

b. Total O&M charges (Z) as per Price Bid format for 5 years including statutory charges if any quoted by the bidder.

c. The bidder shall furnish Annual Estimated Production (AEP) for 25 years based on the Performance Ratio (PR) offered by the bidder for the plant.

d. Bidder shall submit AEP and the Performance Ratio (PR) in TABLE-1.

e. AEP shall be calculated as follows

AEP = Nominal Annual Energy Production in kWh X PR

Nominal Annual Energy Production in kWh = Annual Cumulative Solar Irradiation intensity (KWhr/m<sup>2</sup>) X Generator area of the PV plant (m<sup>2</sup>) X Efficiency factor of the PV modules

#### **Note:**

To calculate Nominal Annual Energy Production (NAEP), Annual Solar Irradiation may be considered as **1500 KWh/m<sup>2</sup>** (Jodhpur, Rajasthan).

The AEP data provided in Table-1 will be used for evaluation purpose only.

f. If there is a discrepancy between the unit price and the total price, which is obtained by multiplying the unit price and quantity, or between sub totals and the total price, (even in case of carry forward of prices) the unit or subtotal price shall prevail and the total price shall be corrected accordingly. If there is a discrepancy between words and figures, the amount in words will prevail. This evaluation criterion is binding on the bidder.

3. Cost per KWH shall be calculated for the whole project i.e. 250KW. For this purpose, cost will be total of Capex and Opex for 5 Years as quoted in price bid format. Annual Energy Production (AEP) as given in **TABLE-1** for the first five years shall be considered for calculation cost per KWH.

Although, bidder has to quote AEP and PR for 25 years. **PR** "Performance Ratio" (PR) means the ratio of actual plant output versus Calculated, nominal plant output in kWh annual.  $PR = \text{Annual Actual Energy output in kWh} / \text{Nominal Annual Energy Production in kWh}$ .

**Nominal Annual Energy Production (in KWh)** means Annual incident solar irradiation at the generator surface of the PV plant x relative efficiency of the PV plant modules.

**PGT** means Performance Ratio Guarantee Test.

#### **A. AEP and Performance ratio**

1.0 Bidder are expected to make their own study of solar profile and other related parameters of the area & make sound commercial judgment about Performance Ratio (PR) to determine the Annual power output i.e. Annual Energy Production of the plant. It shall be the responsibility of the bidder to access the corresponding solar insolation values and related factors of solar plant.

2.0 The bidder shall be required to install energy meters to record the Net Annual Energy Production (AEP) from the Solar Plant (Energy generated and exported from solar plant – Energy Import from OIL system)

3.0 Necessary corrections may be carried out by OIL in the AEP furnished by bidders.

4.0 The corrected figure for AEP shall be considered for evaluation of bids. The same has to be ratified by the bidder.

5.0 The quoted PR for 25 years shall be adopted for entire O&M period.

6.0 The Successful bidder shall be responsible for achieving the Performance Ratio. For any shortfall in achieving the Performance Ratio (PR), the compensation shall be recovered from the successful bidder on annual basis. The successful bidder has to maintain the Solar Plant equipment(s) including its repair, replacement, overhauling, etc., so as to give the agreed Performance Ratio per year, for which OIL shall pay the agreed O&M charges only and no other charge / cost is payable by OIL.

7.0 The performance of 250 KW Solar Power Project shall be evaluated on annual basis. In case of shortfall in quoted Performance Ratio compensation shall be recovered as per compensation clause no 2.4 of COMPREHENSIVE ANNUAL MAINTENANCE CONTRACT (CAMC) part.

#### **8.0 Compensation Calculation:**

Agreed Performance Ratio in Percentage (As per Table-1): A

Achieved Performance Ratio in Percentage: B

$B = \text{Achieved Annual Energy Production} / \text{Nominal Annual Energy Production in kWh}^*$

\*Nominal Annual Energy Production in kWh = Annual Cumulative

Solar Irradiation intensity (KWHr/m<sup>2</sup>) for the that year X Generator area of the PV plant (m<sup>2</sup>) X Efficiency of the PV modules

Difference = A-B

Compensation = \*Calculated AEP for the Year X (A-B) X 8.35 X 25

\*Calculated AEP for the Year = Nominal AEP for the Year X

Guaranteed PR

Unit rate = INR 8.35 (Tariff @ LT Commercial rate of corresponding year)



**Calculation:****First Year:**

At the end of the first year, if the plant failed to achieve the PR (A above) than

a) The bidder shall compensate as follows:

Guaranteed PR: A

Achieved PR: B1

Difference: A-B1

Compensation: (Calculated AEP with the Guaranteed PR) X (A-B1)

X 25 Years

**Second Year onwards:**

b) If the PR quoted in the Table-1 for the second year is equal or more than the achieved PR of first year then no compensation will be levied.

If the achieved PR for the second Year is less than the achieved PR of the first Year but equal to the Guaranteed PR for second year as quoted in TABLE-1, then no compensation will be levied.

If the achieved PR is less than the Guaranteed PR for the second year as quoted in TABLE-1 and less than the achieved PR of first year, then compensation will be calculated as follows:

Achieved PR of First Year: B1

Second Year Guaranteed PR (TABLE-1): A2

Second Year achieved PR: B2

Difference: (B1/A2 whichever is less)-B2

Compensation: (Calculated AEP with the Guaranteed PR for the second Year) X Difference X 24 Years.

This will continue for the remaining years of O&M.

**Note:** Compensation at the end of year, if arises, may be deducted from the last quarter against O & M charges and the balance, if applicable, can be deducted from the first quarter of the next year.

**B. PERFORMANCE RATIO GUARANTEE TEST**

1.0 The test to prove the Performance Guarantee shall be conducted at site by the contractor in presence of OIL's representative. The PG test procedure shall be submitted by successful vendor after the award of the contract for review and approval by OIL. This test shall be binding on both the parties of the Contract. Any special equipment, instrumentation tools and tackles required for successful completion of the Performance Guarantee Test shall be provided by the Contractor free of cost.

2.0 The procedure for PG demonstration test shall be as follows:

i) A calibrated pyranometer shall be installed by the contractor at the location mutually agreed by the Contractor and OIL. The test report for the calibration shall be submitted by the contractor for approval by the OIL. The output of this pyranometer for three months of the PG test shall be made available at SCADA/Respective communication portal of the Weather Monitoring System..

ii) "Achieve d energy production" exported from the plant shall be noted for three months(period of stabilization). For this purpose, the energy recorded in the incoming feeder meter from the solar plant shall be taken into account.

iii) This recorded energy shall be compared with the "Nominal Energy Production" as mentioned in 8.0 above for 3 months.

3.0 Following factors shall be considered for computing the "Nominal Energy Production"

i) Generation loss due to grid outage: The measured global solar radiation of the period of the power evacuation system shall be excluded to calculate average global solar radiation for the period of the PG test

4.0 In case of non- achievement of the desired performance of the plant, the contractor, in its own interest, take adequate measures, such as providing additional modules etc., to improve the performance of the plant at no additional cost to OIL. Otherwise compensation as per clause no. 32.1.9 of COMPREHENSIVE ANNUAL MAINTENANCE CONTRACT (CAMC) part will be applicable at the end of the year.

**Annual Energy Production (AEP) for 25 Years Period**

1. The Bidder shall provide Performance Ratio (PR) considering offered design configuration and all local conditions, solar insolation, wind speed and direction, air temperature & relative humidity, barometric pressure, rainfall, sunshine duration, grid availability and grid related all other factors and losses due to near shading, incidence angle modifier, irradiance level, temperature loss array loss, Module quality loss, Module array mismatch loss, and various inverter losses, etc.

2. Bidder shall furnish detailed calculations for Nominal Annual Estimated Energy Production (NAEP) FOR 25 YEARS PERIOD of the 250KW solar power plant based on solar irradiation of 1500 KWHr/m<sup>2</sup>.

3. Generator Area: \_\_\_\_\_ m<sup>2</sup>

Table-1

| Year             | Nominal Annual Energy Production (KWh) | PR Ratio (%) | Annual Energy Production (KWh) | Module Efficiency |
|------------------|--|--------------|--------------------------------|-------------------|
|                  | (A)                                    | (B)          | (C=AxB)                        | (D)               |
| 1 <sup>st</sup>  |  |              |                                |                   |
| 2 <sup>nd</sup>  |  |              |                                |                   |
| 3 <sup>rd</sup>  |  |              |                                |                   |
| 4 <sup>th</sup>  |  |              |                                |                   |
| 5 <sup>th</sup>  |  |              |                                |                   |
| 6 <sup>th</sup>  |  |              |                                |                   |
| 7 <sup>th</sup>  |  |              |                                |                   |
| 8 <sup>th</sup>  |  |              |                                |                   |
| 9 <sup>th</sup>  |  |              |                                |                   |
| 10 <sup>th</sup> |  |              |                                |                   |
| 11 <sup>th</sup> |  |              |                                |                   |
| 12 <sup>th</sup> |  |              |                                |                   |
| 13 <sup>th</sup> |  |              |                                |                   |
| 14 <sup>th</sup> |  |              |                                |                   |
| 15 <sup>th</sup> |  |              |                                |                   |
| 16 <sup>th</sup> |  |              |                                |                   |
| 17 <sup>th</sup> |  |              |                                |                   |
| 18 <sup>th</sup> |  |              |                                |                   |
| 19 <sup>th</sup> |  |              |                                |                   |
| 20 <sup>th</sup> |  |              |                                |                   |
| 21 <sup>st</sup> |  |              |                                |                   |
| 22 <sup>nd</sup> |  |              |                                |                   |
| 23 <sup>rd</sup> |  |              |                                |                   |
| 24 <sup>th</sup> |  |              |                                |                   |
| 25 <sup>th</sup> |  |              |                                |                   |

Note: i) In case of non-availability of SITC of Rooftop Solar PV plant experience with the contractor, the contractor will have to sign an MOU with a competent firm having execution, maintenance experience of Solar Power plants, and submit the bid along with MoU and qualifying credentials of the MoU partner. In case the bidder is awarded the contract, the bidder has to ensure that the Solar Plant is sourced through the MoU partner only. In case of withdrawal of MoU partner or dilution of the MoU, the contractor may sub-contract the job to another Solar plant supplier with similar or higher credentials than the original partner, after obtaining due approval from OIL.

ii) The MOU/Agreement should be legally valid i.e. it should be on a non-judicial stamp paper and notarized.

**DATA SHEET of Vacuum Circuit Breaker :  
(To be filled by the bidder)**

A. 11KV VCB:

1. Name of manufacturer :
2. Manufacturer's

Type No. :

Model No. :

3. Panel type :

4. Degree of protection :

5. Fully Type tested : Yes/No.

6. Type Tested at : (Specify lab / Institution where test was carried out)

7. Conforms to (Standards):

- a) IEC :

- b) BIS :

- c) Others :

8. Rated Insulation:

- a) Min. withstands voltage :

- b) Impulse voltage withstand (dry) :

9. General details of Panels

- a) Extensible : Yes/No.

- b) Compartmentalized : Yes/No

- c) No. of compartments :

- d) Names of the compartments (To be indicated)

i)

ii)

iii)

iv)

10. Material of internal partitions :

11. Thickness of Panel Sheet metal :

12. Busbars

- a) Busbar material:

- b) Busbar shape :

- c) Busbar size :

- d) Busbar insulation :

- e) Busbar rating (Amps) :

- f) Busbar Spouts insulation material :

13. Busbar support insulation :

Type & materials

14. Guaranteed maintenance free life of

- a) Panels:

- b) Circuit breaker:

15. Operational safety interlocks provided (To be indicated)

- a)
- b)
- c)

16. Earthing facilities provided for

- a) Bus-bars: Yes/No
- b) Circuit/Cable: Yes/No.

17. Circuit breaker cubicle with front plate/door pressure tested for internal arc faults. :  
Yes/No

18. Panel Wiring:

- a) Voltage rating :
- b) Insulation type & material :
- c) Wire size :

19. ENVIRONMENTAL CONDITIONS

- a) Maximum Ambient air temperature :
- b) Minimum Ambient air temperature :

c) Maximum humidity at site (at 40 ° C) :

d) Surrounding atmospheric condition :

20. Confirmed insulation provided is suitable for above environmental conditions:  
Yes/No

## B. VACUUM CIRCUIT BREAKER

(Information to be given IS: 13118: 1991 Clause 9.102)

1) Rated Values and Characteristics

- a) Number of Poles :
- b) Class : Indoor/Outdoor
- Temperature :
- Ice coating :
- c) Rated voltage :
- d) Rated insulation level :
- e) Rated frequency :
- f) Rated normal current :
- g) Rated line charging :  
breaking current
- h) Rated cable charging :  
breaking current
- i) Rated small inductive :  
breaking current
- j) Rated Short Circuit :  
breaking current
- k) First pole to clear factor :
- l) Rated Transient Recovery voltage :
- m) Rated characteristics for short :  
line faults
- n) Rated Short Circuit making current:
- o) Rated Operating sequence :
- p) Rated duration of short circuit :
- q) Rated out of phase breaking current :

- r) Rated opening time :
- s) Rated break time. :
- t) Rated closing time :
- u) Frequency of operation :

2. Characteristics of the operating mechanism of CB and associated equipment in particular:

- a) Method of operation :
- b) Number and type of spares : auxiliary switches.
- c) Rated supply voltage power and rated supply frequency :
- d) Panel, Light space heater :
- e) Closing devices - Normal voltage :  
Min. voltage :  
Max. voltage:
- f) Shunt trip coil - Normal voltage : Min. voltage : Max. voltage :
- g) Series trip coil- Normal voltage : Min. voltage : Max. voltage :
- h) Indication supply :

3. Bushings - Material :

#### C. CURRENT TRANSFORMERS OF SWITCHGEAR PANEL:

1. Feeder panel DC/EF (Protection) CT's

- i) Make :
- ii) Type :
- iii) Class :

iv) Ratio :

v) Burden (VA) :

2. Panel Metering CT's

- i) Make :
- ii) Type
- iii) Class :
- iv) Ratio :

v) Burden (VA) :

3: Panel Protection CT's

- i) Make :
- ii) Type :

iii) Class :

iv) Ratio :

v) No. of cores (Secondary):

vi) Burden (VA) :

#### D. VOLTAGE TRANSFORMERS OF SWITCHGEAR PANEL:

1. Incoming Panel VT :

i) Make:

ii) Type:

iii) No. of phases :

iv) Ratio:

- v) Class :
- vi) Burden (VA) :
- vii) Location/Mounted on :
- viii) Fixed/Withdrawal:

- ix) Primary side protection:
- x) Secondary side protection:

#### E. CONTROL CABLES:

- a) Make :
- b) Voltage Grade :
- c) Insulation :
- d) Conductor Material :
- e) Size (Sq. mm. per core):
- f) Multifunction meter:
- a) Make:

- b) Class :
- c) Ratio :

#### H. SELECTOR SWITCHES:

- a) Make :
- b) Type :

#### I. CONTROL SWITCHES:

- a) Make :
- b) Type :

#### J. PROTECTIVE RELAY

- a) Type Relay :
- of
- b) Relay :
- Make
- of
- c) Model :

**Acceptable Make with Specification:**

A. For 1.1 KV/415V, AC equipment:

Digital Multifunction meter, Current Transformer, LED, HRC fuses, Trip- neutral-close selector switch, Air Circuit Breaker and MCCB are as follows:

**1. Digital Multifunction Meter:**

Make:

Schneider Power logic PM200 series, HPL -Socomec (Diris A41), Siemens PAC3200, Secure.

2. Digital Ammeter with inbuilt selector switch:

Make:

Schneider electric, HPL, LT, Siemens, IndoAsian.

**3. Current Transformer:**

Make:

Kappa, Precise Electrical, Pragati Electrical, Siemens, L&T, Schneider electric, IndoAsian, ECS.

**4. LED:**

Make:

Binay, Tecnic, L&T, Siemens.

**5. HRC Fuses:**

Make:

GE, Siemens, L&T, Schneider, Cooper Bussman, IndoAsian.

**6. Trip-Neutral-Close Selector Switch:**

Make:

Kaycee, Salzar, Schneider, L&T, Siemens, IndoAsian.

7. Digital Earth Leakage Relay with CBCT

Make: LEGRAND/SCHNEIDER/GE/PROKDV'S/NIC

8. **Air Circuit Breaker:** ACB with minimum LSIG Protection EDO type, fault level 50 kA or above at 500 V,AC. Draw-out type, electrical and manual operated having master-pact with O/C, S/C and Earth fault protection. Spring charging shall be motorized and manual also with 230V AC supply.

Make:

i) Schneider Electric (Merlin Gerin) of NW series with micro logic P/6.0H or above.

ii) Siemens India-WL Series with electronic trip unit ETU 76B release.

iii) GE India- EntelliGuard SL. ACB with electronic trip unit

iv) ABB India- Emax series with electronic trip unit

v) Legrand- model DMX3-N with electronic based protection unit MP4 LSIG.

vi) L&T Air Circuit Breaker, Type U- Power omega with matrix protection and control unit MTX4.

vii) IndoAsian Optibreak model, EDO with LSIG Protection.

9. **MCCB:** 415 volt, fault level 36kA and above with O/C, S/C and Earth fault protection (for distribution application with 4 sets of spreaders for cable connection)/ 25 kA for 250/100 Amps MCCB with LSIG protection

Make:

i) Schneider Electric (Merlin Gerin): model compact NSX with electronic trip unit with micro logic.

ii) ABB - Tmax Series, model-TP5 electronic Trip unit -LSIG.

iii) Siemens India Ltd: Sentron VL MCCB, model VL standard with electronic release and microprocessor based ETU-LSIG/LSING.

iv) Legrand: Model- DPX/DPX3 with LSIG release.

v) GE India: Record Plus, FG with electronic trip unit.

vi) Indoasian Optium Series with LSIG release

**10. Stainless steel single compression cable gland:**

Make:

Dowell/gland make/Jainson/Baliga/3D

11. Earthing cable

Make: NICCO/ASIAN/CRYSTAL/UNIVERSAL/ CCI/RPG/INCAB/POLYCAB/ANKUR/NECAB/HAVELLS/KEI

**12. 1.1 KV grade XLPE/PVC cable:**

Make:

Polycab/ Nicco/ Crystal/ RPG/NECAB/Prestige/Havells/Universal

**13. Sweating socket:**

Make: Dowell, 3M

**14. Auxiliary contactor:**

Make:

Siemens/ ABB/ Schneider electric/IndoAsian

**B. 11KV, AC HT equipment:**

**1. HT Current transformer-**

Make:

Kappa/Precise Electricals/ Intrans Electro Components Pvt Ltd/Pragati Electricals, ECS/Same as the maker of the VCB.

**2. Voltage transformer –**

Make:

Kappa/Precise Electricals/Intrans Electro Components Pvt Ltd/Pragati Electricals/Same as the maker of the VCB.

**3. Make of battery:**

Make:

Exide/Amco/Amararaja/Amron/Tata Green

**4. Make battery charger:**

Make:

Exide/Ruttonsha/ HBL/Emerson/Amararaja

**5. Directional type Numerical protection relay:**

Make:

ABB(Type REF615)/Siemens(Type Siprotec 7SJ80 & 7SD80)/ Siemens-Argus /SEL(Type SEL-751&SEL-311)/Schneider Group, type Micom-P14X series/Merlin-Gerin (Schneider Group, type Sepam Series S-84)

**6. Non directional type Numerical protection relay**

Make:

ABB(Type REF615)/Siemens (Type Siprotec 7SD80)/ Siemens-Argus /SEL(Type SEL-751)/Schneider Group, type Micom-p14x series/Merlin-Gerin (Schneider Group, type Sepam Series S-84)

**7. 11KV, Vacuum Circuit Breaker**

Make:

Siemens/ ABB/ Schneider

**8. 11KV Interrupter:**

Make:

Siemens/ ABB/ Schneider/ Crompton greaves/L&T

**9. 11KV XLPE cable:**

Make:

Havells/Nicco/Crystal/Polycab/Raychem RPG

**10. Cable termination kit:**

Make:



Raychem RPG/ Xicon/3M/ Multishrink

11. MC type Ammeter & Voltmeter:

Make: AE

12. Digital type KWH Meter:

Make: Conserve, L&T,GE.

**13. Dry type 1215 KVA Transformer:**

Make: Voltamp/ ABB/Raychem RPG/CG/Schneider/BHEL/Siemens

C. DG Set:

i. Engine:

Make: Cummins/VOLVO Penta/Caterpillar

ii. Alternator:

Make: Stamford/Cummins/Caterpillar/Volvo Penta

D. SPV Poly crystalline Module:

**Make: Adani/Vikram Solar/Warree Energies Ltd.**

**E. Air conditioner:**

**Make: Daikin, O-General, Mitsubishi**

E. Make of Items for wiring

1. All Single core BIS marked, copper FRLS PVC insulated stranded flexible 1100 v grade cable (as per IS 694 of size/rating as specified in SOQ)

Make: FINOLEX/HAVELLS /L&T/POLYCAB/RR KABEL

2. GI Pipe for earthing

Make: JINDAL/TATA

3. Copper lugs

Make: DOWELL/3D-BILLET/JAINEX/SCHNEIDER

4. PVC conduit

Make: RICHA/PLAZA/AKG/PRESTO PLAST/Anchor

5. Metal clad switch-socket unit, 20/25 Amps

Make: LEGRAND/SCHNEIDER/SIEMENS/HAVELLS/ INDO-ASIAN

6. Exhaust fan

Make: USHA/HAVELLS/CROMPTON/BAJAJ/PHILIPS

7. Enclosure for MCB

Make: LEGRAND/SCHNEIDER/SIEMENS INDOASIAN/L&T

8. Metal GI Box

Make: LEGRAND/SCHNEIDER/CRABTREE INDOASIAN ELVIRA/HAVELLS

9. Ceiling fan, 1400 mm Sweep, White in Colour

Make: HAVELLS(Pacer)/BAJAJ (Kassels)/ORIENT (PSPO)/USHA/CROMPTON GREAVES/PHILIPS

10. Modular Fan regulator 100W

Make: LEGRAND/SCHNEIDER/CRABTREE INDOASIAN ELVIRA/HAVELLS

11. Modular switches/Socket/Box/ Blank plate

Make: Legrand/ Crab tree/L&T/IndoAsian

12. VTPN DB/TPN DB/SPN DB

Note: DB and all components fitted therein have to be of same make.

Make: ABB/INDO-ASIAN/L&T/ SCHNEIDER/ SIEMENS/LEGRAND

14. All RCBO

Note: Make of RCBO, MCBs and box shall be of same make.

Make: ABB/INDO-ASIAN/L&T/ SCHNEIDER/ SIEMENS/LEGRAND

### **15. LED light fitting**

Make: Phillips/ GE/ Crompton greaves/ Bajaj/Havells/Jaquar

### **16. MCB:**

Make:

Siemens/ ABB/ Schneider electric/Legrand/L&T

**ANNEXURE-IV****TECHNICAL DATA SHEET FOR TRANSFORMER  
(To be filled in by the Bidder)**

| Sr. No | TECHNICAL PARTICULARS                              | SPECIFICATIONS      |
|--------|--|---------------------|
| 1      | Type of Transformer                                | Cast Resin Dry Type |
| 2      | KVA Rating (continuously rated)                    |                     |
| 3      | Duty   |                     |
| 4      | Rated Voltage                                      |                     |
| 5      | (a) HV (VOLTS)                                     |                     |
|        | (b) LV (Volts)                                     |                     |
| 6      | Rated Frequency                                    |                     |
| 7      | No. of Phases                                      |                     |
| 8      | Type of Cooling                                    |                     |
| 9      | Winding Connection                                 |                     |
| 10     | Tappings   |                     |
|        | (a) Range  |                     |
|        | (b) No. of steps                                   |                     |
|        | (c) In Steps of                                    |                     |
|        | (d) Tapping provided on HV side                    |                     |
| 11     | Tap changer type                                   |                     |
| 12     | Vector Group                                       |                     |
| 13     | Reference ambient temperature                      |                     |
| 14     | Temperature rise winding                           |                     |
| 15     | Class of Insulation                                |                     |
| 16     | % Impedance  |                     |
| 17     | Physical Dimensions                                |                     |
|        | (a) Length (in mm)                                 |                     |
|        | (b) Width (in mm)                                  |                     |
|        | (c) Height (in mm)                                 |                     |
| 18     | Approximate weight                                 |                     |
|        | (a) Core and Windings (Kgs)                        |                     |
|        | (b) Total Weight (Kgs)                             |                     |
| 19     | Iron losses at normal voltage ratio                |                     |
| 20     | Copper losses at normal voltage ratio at full load |                     |
| 21     | Efficiency at unity power factor                   |                     |
|        | (a) Full load                                      |                     |
|        | (b) 75% load                                       |                     |
|        | (c) 50% load                                       |                     |
| 22     | Regulation   |                     |
|        | (a) at unity power                                 |                     |
|        | (b) at 0.8 power factor                            |                     |
| 23     | Reference standards                                |                     |
| 24     | Method of Earthing                                 |                     |
| 25     | Fittings and Accessories                           |                     |
|        | (a) Off circuit tap links                          |                     |

|    |   |  |
|----|---|--|
|    | (b) Earthing terminals                    |  |
|    | (c) Rating and Diagram Plate              |  |
|    | (d) Lifting Lugs for Complete Transformer |  |
|    | (e) Cover Lifting Lugs                    |  |
|    | (f) Bidirectional Rollers                 |  |
|    | (g) Digital Temperature Scanner           |  |
| 26 | Transformer Type Tested                   |  |

**TECHNICAL EVALUATION SHEET FOR SCOPE OF WORK**

| SL No. | Clause no. of SCC of annexure I Tender Document | Description  | Bidders Remarks Complied/ Not complied / Deviation | Bidder to indicate relevant page no. of their bid to support the remarks/ compliance |
|--------|---|--|--|--|
| 1      | 3.11.7 (Test Certificates)                      | Copy of type test conducted on similar type panel by NABL/CPRI accredited laboratories for the following shall be submitted with the offer (For main LT Panels)  |  |  |
|        |   | a) Short time current withstand test   |  |  |
|        |   | b) Temperature rise test   |  |  |
| 2      | 3.11.8 (Drawing & Documents)                    | A. Drawings & documents to be submitted with the bid:  |  |  |
|        |   | i. Completely filled-in technical parameters   |  |  |
|        |   | ii. SLD of Panel   |  |  |
|        |   | iii. GA drawing of the Panel showing dimensional details   |  |  |
|        |   | iv. Type Test certificates for tests conducted earlier on similar equipment shall be furnished   |  |  |
| 3      | <b>4.1.1.</b><br>(DRAWING AND DOCUMENTS)        | Drawings to be submitted with bid:<br>i) General arrangement drawing of DP structure with Air break switch, HT metering cubicle, HT panel, Transformer and LT panel and Rooftop Solar PV Plant.                  |  |  |
| 4      | <b>4.1.3</b><br>HT(VCB) Panel)                  | i) Detail as per technical specification mentioned in SOQ.   |  |  |
|        |   | ii) Copy of Type test report done on similar panel & VCB at NABL/CPRI accredited laboratories or STL approved laboratories as per relevant IS.   |  |  |
|        |   | iii) An undertaking from the panel manufacturer stating that in the event of an order on the party the panel manufacturer will supply the panel through the party as per specifications of the tender and order. |  |  |

|   |                      |    |   |  |  |
|---|----------------------|----|---|--|--|
| 5 | 4.1.4<br>Panel       | LT | <p>i) Detail as per technical specification mentioned in Point no.3.10.0 and in SoQ.</p> <p>ii) An undertaking from the panel manufacturer stating that in the event of an order on the party the panel manufacturer will supply the panel through the party as per specifications of the tender and order.</p> |  |  |
|   |                      |    | <p>iii) An undertaking from the panel manufacturer stating that in the event of an order on the party the panel manufacturer will supply the panel through the party as per specifications of the tender and order.</p>   |  |  |
| 6 | 4.1.5<br>Transformer |    | <p>i) Detail as per technical specification mentioned in SOQ.</p>   |  |  |
|   |                      |    | <p>ii) Copy of Type test report done on similar transformer at CPRI/NABL accredited laboratories or STL approved laboratories as per relevant IS.</p>   |  |  |
|   |                      |    | <p>iii) An undertaking from the transformer manufacturer stating that in the event of an order on the party the transformer manufacturer will supply the transformer through the party as per specifications of the tender and order.</p>   |  |  |
| 7 | 11.1.9<br>DG Set     |    | <p>i) Detail technical literature and catalogue of:</p>   |  |  |
|   |                      |    | <p>a) Diesel Engine</p>   |  |  |
|   |                      |    | <p>b) Alternator</p>  |  |  |

## **Building Management System: Technical Terms and Condition**

- 1.0 The **OIL Executive Housing Project** referred in the NIT will have an integrated **Building Management System (BMS)**.
- 2.0 **Scope of Work:**
  - 2.1 **Definition of BMS:** BMS or Building Management System is same as the definition of Building automation and control systems (BACS) in ISO 16484.
  - 2.2 **Objective:** The BMS is aimed at providing a single-point computer based control and monitoring of facility services/field devices like HVAC, Gas Alarm System, Lighting and illumination, Power Supply, Metering and Management, CCTV, etc that will be part of the Housing Project.
  - 2.3 **Facility Services/Field Devices:**

The BMS will control and monitor the following Facility Services/Field Devices:

    - a) Gas Alarm System
    - b) AC
    - c) Solar Power Generation monitoring
    - d) Lighting and illumination sensors
    - e) Power Supply and metering
    - f) Water supply and metering
    - g) Public address system
    - h) EPBAX System
    - i) Security Surveillance System including intrusion detection
    - j) Access Control System
    - k) Public address system
    - l) Fire & Safety (FAS)
  - 2.4 **Phases of BMS project:** The phases and the method of the BMS project will be generally guided by the **ISO 16484 (all parts)** which summarily includes the following phases:
    - i. **Design** (determination of project requirements and production of design documents including technical specifications) and **Engineering** (detailed function and hardware design)
      - (a) The vendor's design and engineering has to be vetted and approved by OIL before going for execution of the Project.
      - (b) The vendor's design and engineering has to include a CAD visualization.
      - (c) Since OIL already would possess a preliminary design and engineering document, the vendor may base their design and engineering on the former.
      - (d) This project contains several, individual electrical and mechanical installations. The supplier must therefore be able to offer a comprehensive service concept covering all types of building installations. Possible service offerings must be incorporated into the design.
    - ii. Installation (installing and commissioning), and
    - iii. Completion (handover, acceptance and project finalization)
    - iv. In all the above phases of implementation of the project, the bidder should conform to the requirement of OIL.
  - 2.5 **System Architecture and General System Requirements:**
    - i. The BMS should be guided by the system architecture as per **ISO 16484-3**. There should be three system levels interconnected via standard communication as following:
      - a) Management level
      - b) Automation level (automation stations/individual room control)
      - c) Field level (field devices)

Note: The details of these three system levels is discussed in section named "System Architecture: System Levels" in **Details Section below**

- ii. **Interoperability:** The BMS system must be able to integrated third party devices via the following interoperability communication protocols:
  - a) BACnet (as per ISO-16484)
  - b) Modbus
  - c) OPC (Open Platform Communications): -The BMS must be OPC Foundation tested and certified and must be able to integrate and process, but also to provide real-time data as OPC data points. The System processing must include Alarming, Trending, Scheduling, and Reporting and allow cross communication with other integrated devices. The System must be support OPC Data Access.
- iii. **Communications network: -**
  - a) The required communications network is part of the BMS scope of delivery. All control, monitoring, and communications tasks must run on this network. The communications network comprises all three system levels:
    - Management level
    - Automation level
    - Field level
  - b) The approved network concept must be documented in full and handed over operational
  - c) Note: Details provided in the Details Section below
- iv. **Product Life Cycle:**
  - a. All equipment/software offered must be contained in the current product portfolio.
  - b. All the equipment/software offered shall be preferably have 10 year (from the year of installation and commissioning) support from OEM.
- v. **System Time:**
  - a. The building automation and control system must have a uniform system time i.e. UTC time (coordinated universal time)
  - b. To this end, a time master supporting BACnet BIBB DM-UTC-A as per the PICS document must be defined. The time master must receive the DCF77, GPS or Internet NTP signal and provide it synchronized to all remaining system devices.
  - c. The automation stations must autonomously run their own time if the time master fails. The building automation and control time must be resynchronized automatically after the time master becomes available again.
- vi. **Self-Monitoring and Self-Diagnosis:**
  - a. Watchdog: The BMS must monitor itself to always know its latest and current status. It should be enable with a watchdog function that helps detect and signal failed system devices and restarts them in a defined mode.
  - b. Self-diagnosis: -Self-diagnosis must be available to quickly detect errors. It must provide information on system function and load. E.g. CPU and memory load must be displayed.
- vii. **Power Failure Resilience:** The data must be saved for extended periods of time in case of power failure or extensions or removal of automation stations. The applications and all vital operating parameters (including set points, scheduler values, etc.) must not be lost due to a power outage. Other operating values such as alarms, trend data, etc. must be capable of being saved locally on the automation station.



- viii. **System Backup:** Configuration backup, Raid configuration, Ability to easily restore the system in case of hard disk failure or hardware failure of any device. A data backup concept must be presented that provides the current state of a project in a form that is useable and complete to the customer. It includes raw data from plants, applications, engineering data (e.g. DP, labeling, links, parameters), documentation.
- ix. **General Plant Operating Modes:** There will be generally five higher operating modes for all plants:
  - a) Local emergency manual operation without automation station functionality (direct via I/O module or directly on the control panel as agreed to with owner).
  - b) Local manual operation with automation station functionality (control panel in the control panel).
  - c) Local - manual operation via visualization on the management level (all functions on the local automation station are set to Auto).
  - d) Scheduler program under the condition that all plants are enabled for automatic operation.
  - e) Automatic detection/operation
- x. **Engineering Efficiency:**
  - a) System and tool platform:- Creating solutions must be as efficient as possible, i.e. programming on construction sites; use of pre-defined application blocks, fast exchange of standard functions, etc. The goal is to achieve the maximum required level of flexibility at as little expense as possible.
  - b) Preloaded application on devices: Applications portfolio must be prefabricated and tested must be loaded in a fix manner on the devices prior to commissioning. They can be used in the basic functions without the use of additional engineering tools.
  - c) Harmonized tools and workflows: Uniform data and functions must be used by the building automation and control system in a consistent manner throughout all tools to achieve a high level of data consistency. In other words, all data is only entered once in the system. Consistent tool processes avoid a manual exchange of data (Import/Export)
  - d) Search & Replace function must allow for Mass Changes in parameters can be done across the entire installed system (eg. Operating hours change, set point etc).
  - e) The possibility for free programming of individual system components should be available to individually modify customer-specific requests. The software shall be capable of doing Online engineering i.e. Zero Downtime of software during any modification of Graphics.
  - f) The technical operator at the customer be able independently make simple changes to the project. Potential training proposals must be appended to the bid.

2.6 **Offering on Installation and Commissioning:** The contractor shall provide all services to successfully commission the specified plants and systems. This includes:

- i. **System Activity:**
  - a. Create configuration and parameterization lists.
  - b. Review and ensure working communications across the entire building automation and control system including all devices on the network.
  - c. Check network load and resulting reaction times.
  - d. Test the modules and automation stations, all inputs and outputs including associated documentation (cold commissioning).

- e. Test the safety functions for control and processing algorithms (e.g. with regard to technical and mechanical installations interaction and simulated operating failure or faults).
  - f. Unambiguous labeling of all network components, user address, and/or operating materials.
  - g. Comprehensive data point test including review of all connected sensors and actuators.
  - h. Check all cabling in the building for adherence to installation guidelines.
  - i. Check all bus terminators and voltage supply.
  - j. Setting of required configuration parameters.
  - k. Commission the connected sensors and/or actuators together with the other mechanical and electrical installations.
  - l. Review of planned automation functions as per specifications.
  - m. Log set and measured values.
  - n. Log required function for energy efficiency
  - o. Simulation of Alarm and its response system including emergency response system
  - p. Simulation of all kinds of reporting that is enabled in the BM
  - q. Simulation of any other services as required and enabled in the BMS
  - r. Checking for any license violation
  - s. Any other activity deemed necessary at that time
- ii. **Submission of Design Documents:** A final, comprehensive documentation must be provided following building automation and control system acceptance. To create such documentation, the system must allow for complete and current data export. As a result, the complete data set must be able to be exported any time featuring up-to-date data. This document shall include:
- a) High Level and low level System Architecture Diagram
  - b) The approved communication network concept (with cabling diagrams) must be documented in full and handed over operational
  - c) Safety Guidelines
  - d) SOP on emergency response
  - e) Manual for cleaning of components and equipment
  - f) List of Components/Devices/Software installed
  - g) Any other document deemed necessary at that time
- iii. **Training:** The contractor provides all services to train maintenance staff. This includes the following topics.
- a. Structure, properties, and functions of the installed building automation and control system
  - b. Training on all operating options. (Room operation, emergency switch, control switch, operator units, management level, etc.).
  - c. Detailed operation of all management station functions. (Reports, analyses, trends, interpretation of alarms, alarm handling, data backup, etc.)
  - d. Troubleshooting and diagnosis on system and plants.
  - e. Adapt simple functions, implementation of updates, etc.

### 3.0 DETAILS SECTION:

#### A. System Architecture: System Levels:

##### I. Management Level:

- i. All information comes together at the management level. The management level is the graphical, interactive interface for the operator to the automation station and the integrated plants and plant parts. The operator can display, query, process, save, or print any plant information via the peripheral units at the management level. System operation must be simple, i.e. dialog-driven. The plants are displayed in synoptic images and the values and states are presented and displayed dynamically. Special

programs are used for higher control, optimization functions, maintenance and energy management.

- ii. The BMS must take care of recurring tasks to lower the operator's workload. This includes, for example, cyclical report generation triggering, plant release at various conditions, or automatic adjustment of set points or alarm limits.
- iii. Designed for use with fire life safety systems (UL certified): - The management station must have passed performance and environmental tests by the Underwriters Laboratories (UL). To combine the comfort and fire life safety system, the management station must provide all the relevant functions:
  - a) Visualize and treat events
  - b) Graphically monitor and control the life safety system
  - c) Know where to start as highest priority events are highlighted.
  - d) Directly navigate to the triggering element of an event.
  - e) Quickly navigate to custom operator instructions and graphical display of event locations.
  - f) Store and retrieve fire alarm system activity data.
  - g) Distribute fire monitoring and control capabilities across the network of the management stations.
  - h) Provide Operating Procedure checklists to guide the operator, under stress conditions, during the treatment of life safety events.
  - i) Send out automatic remote notification of responders through email
  - j) View and schedule automatic history reports.

**iv. Client Server Model:**

- a) The BMS will implement client server model at the management level in all possible platforms (SCADA, integration platform, CAD, etc). Necessary licenses for the servers and the clients will be provided by the vendor.
- b) Access protection: - Different persons maintain and operate the plant. For this reason, passwords must be assigned to authorized persons to guarantee transparency for tracking or authorization purposes. A minimum of four different rights must be assignable.
  - 1. Administrator.
  - 2. Program and graphics creation
  - 3. Operation to change or adjust set points.
  - 4. Guest
- c) Windows authentication: - The building automation and control system's password administration must be consistent with the customer's IT guidelines.
- d) Client Access should be enabled for remote access over internet

**v. SCADA platform:**

- a) The management station must be based on a SCADA platform, which must be fully compliant with the BACnet 8-AWS profile. It must enable the integration of any type of building equipment/facility service.
- b) Help functions: The software shall provide an online, context-sensitive help, including an index, glossary of terms, and the capability to search help via keyword or phrase.
- c) The SCADA platform will be based on client server model. Client installation as per requirement.
- d) Floating Client License concept: Easy configurable client as the same can be used as Desktop or Web client in Floating configuration. Range will be minimum 4 client access simultaneously.

**vi. User profiles:**

- a. **Individual view:** - Individual, specific, or own views must be able to be set up to broaden plant overview. These views must cover various electrical and mechanical installations or follow geographic or organizational criteria and must allow personalized hierarchical "tree" views that represent the workstation, control systems, geographical facility layouts, and mechanical equipment relationships.
- b. **User :** - The BMS must allow to create and manage users, its privilege, authentication and authorization in all the possible access platforms (OS level, SCADA platform, Integration Platform, etc)
- c. **Related Items:-** Information of any data point available in multiple pages, Access to trend, scheduler, reports, data sheets"
- d. **Activity log of Users:** The BMS system should maintain activity logs of all users including the administrators. For example, to enable pinpointing which user changed which configuration in a given platform in the BMS.

**vii. Graphics:**

- a) **Operator interface to CAD system:** - The operator interface shall allow users to access the various system schematics and floor plans via a graphical penetration scheme, menu selection, point alarm association. Graphics software shall permit the importing of CAD symbol, or scanned pictures for use in the system.
- b) **Operating messages:** - Operating messages must be able to be displayed and evaluated at the management level. Graphics shall be capable of displaying the status of points that have been overridden by a local priority switch, for points that have been designed to provide a field local priority override capability.
- c) **Full graphics mode:** - A fully graphic management level featuring ergonomic images must be available. The system must be designed for operation, monitoring, optimization, and logging of all connected automation stations in real-time.
- d) **Graphics creation:** - User shall be able to add/delete/modify system graphics and state text for digital points, from standard user interface without the need of any external or specialized tools.
- e) **Navigation:** - The navigation through various graphic screens shall be optionally achieved through a hierarchical "tree" structure. Graphics viewing shall also include dynamic pan zoom capabilities and include the ability to switch between multiple layers with different information on each layer.
- f) **Vector Graphics & Multi-layer with Depth support:** - The system must support for Autocad import of plan with Zoom In& Zoom Out facility through scroll mouse feature & must Enable simplified and uncluttered view of all utilities (FAS, ACS, CCTV etc) on any typical floor plan.
- g) **Dynamic 3D & HD Graphics:** - Must support for Dynamic 3D & HD Graphics symbols for better clarity, aesthetics, effective use of change in display technology
- h) **Pictures:** - Graphic symbols and standard: - The plant pictures must satisfy ergonomic needs of operators. The displayed graphic symbols must correspond to the generally valid standard for HVAC symbols (DIN 19227) and ASHRAE guidelines. Symbols must be supported as two or three dimensional graphics. Capability to create color graphic floor plan displays and system schematics for each piece of mechanical equipment, including, but not limited to, air handling units, chilled water systems, hot water boiler systems, and room level terminal units. Associated prints of standard plant pictures must thus be added to the bid.

i) **Object-oriented graphics:** - The building automation and control system must offer dynamic, high resolution graphics. The graphics must be object-oriented. Each symbol must be able to display several states in the same, consistent format. At the same time, several views must be able to be open concurrently, and all views must be updated dynamically.

j) **Continuous update and display:** - Measured values, set points, user settings, and alarms must be displayed immediately and continuously. State changes must be indicated via symbol, e.g. using animation or changing the color, in general, however, graphic presentation, or text.

#### **viii.Scheduler Program:**

a. At least eight switching times (On/Off) per day must be possible via operator units (local or management level) to achieve reasonable plant control. The following schedules must be supported

- i. Binary: e.g. on/off
- ii. Analog: e.g. set point profile.
- iii. Multistate: e.g. room operating modes Protection/Economy/Comfort.

b. Special days must be able to be edited at the management level via two different ways:

- i. Via calendar
- ii. Via direct special day entry in scheduler program

c. Navigation from plant picture to scheduler program: - Every currently used plant picture must offer user friendly scheduler program operation.

d. Management via central scheduler programs: - Operate all scheduler programs online from the management level to achieve consistent, transparent operation of all integrated systems and subsystems.

#### **ix.Alarm Handling:**

a. Alarm function: - The automation station contains an image of the physical data points. Each data point must be alarmable. Parameterization via operator units must be possible. The alarms either do not require acknowledgement, i.e. they come and go without acknowledgement, or must be acknowledged or reset and acknowledged.

b. Alarm message: - Alarms from the automation station must be displayed on the operator units within 1 second. Alarms must be acknowledged or acknowledged and reset dependent on access rights. Delay times (e.g. feedback supervision, triggering of differential pressure monitor, filter) must be changeable via operator units.

c. Alarm suppression: - Lower priority messages, undesired reactions from objects or entire plants must be capable of being suppressed during commissioning, plant servicing or automation station start up.

d. System safety

e. High availability: - High availability is required of the building automation and control system. Data availability must be increased and any fail times massively reduced.

f. Alarm generation

g. Message handling:- Both types of alarm management (Intrinsic Reporting/Algorithmic Reporting) are supported as recipients. Alarms from automation stations are received at the management level, but not generated based on a change to Present\_ Value or Status\_Flags in the automation station. All alarms are displayed when the management level is started.

h. Management Station Alarms must be possible to create Alarms for third party systems.

- i. **Alarm routing:**
  - i. Media, independence, formats: - Current alarms may need to be routed independent of media at certain times to a central service (Printer, email). To do this, various formats must be available (CSV, XLS, PDF). There shall be no limit to the number of points that can be configured for remote notification of alarm conditions (via email/over internet) and no limit on the number of remote devices which can receive messages from the system.
  - ii. Alarm message escalation list: - System must be configurable to send messages to an individual person or group of people and shall be configurable to send different messages to different remote devices based on alarm message priority level. It must be able to send also to an escalation list so that if the first device/people does not respond, the message is sent on to a second device/people after a configurable time has elapsed.
- j. Acknowledgment: After user rights are assigned, all alarms (alarms and faults, errors) must be acknowledgeable from all operator units. This helps to trace alarms. A time stamp and assignment (based on user account) is required. This includes:
  - i. Local acknowledgement (control panel, automation station).
  - ii. Management level.
  - iii. Remote operating equipment.
- k. Alarm management strategy: - The software shall allow the user to configure the alarm management strategy for each point. The editor shall provide the ability for editing the point database directly online with the Building Controllers. The operator interface software shall also provide the capability to perform bulk modification of point definition attributes to a single or multiple user-selected points.
- l. Assisted treatment of alarms: - The system should support for Guided operations for any event so as to reduce the human error while handling the alarms must be possible to configure Predefined & fast intervention steps for faster response.
- m. Alarm display
  - i. Color display: - Incoming alarms must be colored for quick and easy interpretation. Both order and state as well as alarm priority must be recognizable. The alarm window must be displayed as per operator needs. Alarm window displays must be added to the bid.
  - ii. Alarm message content: - The message texts must contain all information necessary to allocate and resolve the error. This includes at least the following attributes:
    - 1. Clear text.
    - 2. Control panel name
    - 3. Plant name
    - 4. Priority (min. 16 different priorities).
    - 5. Time.
    - 6. Status (acknowledged, unacknowledged).
    - 7. Instructions on how to resolve the problem must be available in the background.
- n. Filter alarms: - The building automation and control system must offer alarm filtering. Filtering must be possible by alarm lists or priorities. Alarms are displayed in popup windows. Step-by-step instructions on handling each alarm help the building automation and control system operator to find a solution.
- o. The BMS system should be able to provide log of alarms

- p. Alarm Sound: The BMS should have the ability to sound audible alarm (different sounds for different alarm) that can be broadcasted over PAS or local audio system based on the type of alarm.

**x.Event management:**

- a) **Event Routing and sorting:** - Event Routing shall allow the user to send event notification to selected printers or workstation location(s) based on event severity, or point type. The List must have the ability to list and sort the events based on event status, point name, ascending or descending activation time.
- b) **Event Notification:** - Event Notification shall be presented to each workstation in a tabular format application, and shall include the following information for each event: name, value, event time and date, event status, priority, acknowledgement information, and alarm count. Each event shall have the ability to sound an audible notification based on the category of the event.
- c) **Event acknowledge:** - Directly from the Event List, the user shall have the ability to acknowledge, silence the event sound, print, or erase each event. The interface shall also have the option to inhibit the erasing of active acknowledged events, until they have returned to normal status. The user shall also have the ability to navigate to all information related to a selected point in order to command, launch an associated graphic or trended graphical plot, or run a report on a selected point directly from the Event List.

**xi.Report generation:**

- a) The system must spontaneously (snapshot) generate predefined reports (real-time and historical data) to provide vital plant data at any time. These reports must be printable or exported to third-party spreadsheet software and as PDF file. The data must be editable in other programs (Microsoft Excel, or Microsoft Access) for further analysis.
- b) Standard report templates: - Templates help generate comprehensive reports without much effort. At least three different report templates must be available.
- c) Reports to record alarm and fault states.
- d) Reports to record logbook entries.
- e) Reports to record plant and building panels states
- f) List of all points currently in override status
- g) List of all disabled points
- h) List of alarm strategy definitions
- i) Point totalization report
- j) Point Trend data listings
- k) Initial Values report
- l) User activity report
- m) Event history reports
- n) Customized report templates: - The system must allow for creating specific report templates to meet individual report generation requirements, which also may include plant and trend graphics.

**xii.Remote operation:**

- a) Internet access: - The building automation and control system must offer an Internet solution via Microsoft IIS (Internet Information Server). The management level programs must be mapped to APS (Active Server Pages).
- b) Terminal server: - Users must be able to remotely operate and engineer plants regardless of location via a terminal server function. This openness, of course, may in no way impact plant safety.
- c) General requirement for operating: - The Web based interface shall provide the same functionalities as those available at any other

workstation, including operation and configuration capabilities. All operator interface functions must be available in clients running in a browser, installed client console, or Windows desktop app.

d) Via web browser: - Users must be able to remotely operate and engineer plants regardless of location with the same user interface. This openness, of course, may in no way impact plant safety. The client must run in a browser as a Full Trust client application

e) Dedicated Desktop Installed client: - Users must be able to remotely operate and engineer plants regardless of location. This openness, of course, may in no way impact plant safety. The client must run as a fully installed software installation that can lockdown desktop space and prevent the ability for the software to be minimized or covered by other applications.

f) Windows Desktop APP: - Users must be able to remotely operate and engineer plants regardless of location with the same user interface. This openness, of course, may in no way impact plant safety. An app must be downloaded to the client from the server PC that runs like an installed application, and must be automatically updated whenever new apps are available at the server.

### **xiii.Trend data:**

a) Simultaneous, multiple trends: - Multiple trend views must be possible simultaneously to provide a comprehensive plant overview. Standard plants from medium to higher complexity (as in this project) require a simultaneous display of up to 10 trend curves on the current page view to assess the plants. Multiple trend curves must thus be recorded at the same time.

b) Decentralized data storage: - None of the trend data may be lost during communications failure to achieve gap-free trend documentation. For this reason, all trend data must be created and saved to the automation station. After communications are restored, all values saved on the management station must be updated automatically.

c) Intermediate storage of history data: - Trend data are collected in the automation station and transferred to the management level after a specific time has expired or specific number of data has been recorded. Trend data may not be lost if the management station is unavailable temporarily.

d) Trend comparison: - To make analysis of changed conditions in different times, the system must provide a time shifted trend view.

## **II. Automation Level:**

**Automation station standard:** - Automation stations must be intelligent. They must be autonomous. They must be built to go from high decentralization into small units (DOC). Automation stations must be freely programmable and feature graphical programming optimized for building automation and control.

**The following functions must be available:** Control, measure, signal at various priorities and by event, monitor, alarm, count, calculate, schedule, save trend values, and log as per DIN EN ISO 16484-5. BACnetserver (automation stations) certificates must be added to the bid.

**System design:** - Manufacturer must prove that they have various scalable automation stations to ensure optimal automation station design. Associated system documentation must be added to the bid and included in system evaluation. Documentation must show that the hardware (DOC and I/O modules) is designed optimally for the number of the required data points. Delineation, Room automation to management level: - All management level functions must be fully engineered in the room automation station to increase plant availability. Delineation is defined to ensure that no additional engineering is required at the management level (BACnet client).



**Specifications:-** The DOC controller to be 32-bit controller with BTL certification. The decentralized small units (DOC) to have UIO concept for configuration of inputs & outputs to suite the project specific requirement and the last minute changes at site. The CPU frequency of 100 for controller upto 22 IO's & 133 MHz for 36 IO's and above with RTC & having Bacnet/ONOR Bacnet Ethernet IP having SDRAM of 16MB to 64MB & Flash Memory for 22 IO's & 36 IO's respectively. 8 MB to 16MB for 22 IO's & 36 IO's respectively. Maximum 10 for small units to support upto 36 IO's. The DOC to be capable of accepting inputs of 0-10 VDC; PT1000; NTC 10K; LG-Ni1000. The same to have agency compliances like EN 60730-1 ;EN 50491-x; EN 60730-5-2/-5-3; CE 2004/108/EC; CE2006/95/EC; UL916; FC PART15, CLASS B; ISO 14001 ; ISO 9001. Each decentralized small units(DOC ) should be capable of being operated through room units to a maximum of 5 nos via PPS2 interface for various operations apart from portable operating terminal(POT).

## **II.2 Operation concept at automation level**

### **Local operation**

General: - Local operation with access for the corresponding automation station, or network operation via BACnet to all or selected automation stations, or simple room operation must be available.

### **Operator and monitoring units**

Local operator and monitoring unit: - Local operation must be possible via a locally usable operator unit. All vital operating parameters of the automation station must be displayed in clear text. All current plant values, set points, and parameters must be displayed on the operator units. All operator units must be configured to allow for acknowledging maintenance and fault messages.

**Networkable operator and monitoring unit:** - Plant operation must be possible both locally and via management level. Local operation must be location-independent and allow for maintenance staff work from any automation station or be integrated in the control panel door. Operation must allow for access to all values (current values, set points, parameters, maintenance and fault messages) without special engineering as well as plant-specific composition of vital values. Operation must allow for graphic display of weekday and exception programs, heating curves and trends set up individually.

**Web operation independent of hardware:** - A web interface, independent of hardware, operates the building management system. The entire user interface must be optimized for finger operation. To ensure operation not tied to a location, web operation must also support, for example, off-the-shelf tables (Android, iOS App, Microsoft) or notebooks. It must be capable of operating multiple plants as well as display and acknowledge alarms. At the same time, functions to control the plant must be supported, so that plants must be able to be graphically operated and displayed using select data points, schedulers as well as trend views. User name and password is required to run functions that can change to plant settings in order to protect the plant.

**Operation via web browser or mobile clients:** - Vital functions must be viewable regardless of plant location. To this end, access is required via mobile clients (mobile phone, pocket PC, PDA, etc.) to all actual values and set points, plants and operating states.

**Online trends:-** Local operator units must support temporary recording of trend data to allow local operators to record a trend at the control panel for diagnostic purposes.

## **II.3 I/O modules**

Construction: - As highly flexible I/O modules are needed for complex and large technical equipment in buildings, they must be composed individually for each plant. To this end, modules must be configurable for various signal types, grouped, labeled per channel with

clear text, and distributed or set across several control panels/panels. The entire module electronics must be protected by a stable plastic housing.

Diagnostic function: - A status diagnosis for each channel is required to quickly locate installation or plant errors. The status is displayed by LED or on the module.

LED display: - The colour of the status LED must be configurable to correspond with message type to provide an easy overview in the control panel. Feedback: green, maintenance: yellow, warning: red.

Remote I/O modules: - Remote I/O modules must be able to be used for small plants or parts thereof to keep the size and number of control panels/panels as low as possible. The maximum number of data points edited this way may only be limited by the maximum capacity of the automation station.

Isolating terminal functionality: - The electronic modules must have isolating terminals to simplify hardware tests and commissioning. As a result, connected field devices can be measured at the test plug sockets without module electronics influence. At the same time, the connection terminals must act as cabinet panel terminal strips.

#### **Connection**

Short-circuit proof: - Field devices and motors must be connected directly without requiring coupling relays or other proprietary hardware. All terminals are protected against short circuit and incorrect wiring using AC/DC 24 V. Field device errors must be recognized and displayed reliably to retain high plant availability.

Broken wire interlock: - Interlocks (hardware) and fault messages must be designed for possible wire breaks or loose terminals under closed-loop rules, i.e. the automation station then has status "1" OK (closed monitoring loop) or no fault, and status "0" (interrupted monitoring loop) or fault.

#### **Connect field devices**

Field device standards: - The automation stations or I/O modules must support all common sensors (e.g. temperature, humidity) and actuators (valves, damper actuators) without requiring additional conversion hardware. The bidder must provide proof that the field devices used for the project were tested under the entire system and documented accordingly.

## **II.4 Updates and adaptations**

### **Updates**

Changes during operation: - Customer-specific plant programs must allow for minor adjustments without having to switch off unrelated plants and without changing set parameters and set points.

Changes to applications during operation: - Minor program changes must be able to be introduced without operational interruptions.

### **Adaptations**

Access via system network: - Operators must be able to enter adapted parameters, set points, times etc. in each automation station via the system network under their password.

## **III. Field Level:**

### **III.1 Requirements at the field level**

#### **Product range**

Field level contents: -

The field level comprises all measuring sensors, actuators, transmitters and energy measuring devices used to control, regulate, monitor, and optimize plants. The bidder is expected to provide all required field devices from own production to the installer to

provide a harmonized plant image. The associated field device product range overview must be added to the bid.

### **III.2 Actuators for ventilation and air conditioning plants**

Mechanical strength: - Robust and long-lived actuators are required for reliable operation of ventilating plants.

Connecting cable: - Actuators are required to have colour and number-coded connecting cables to prevent wiring mistakes.

Axis attachment: - The actuators must allow for fast mounting to maintain ventilation plants optimally at reasonable costs.

Damper positioning display: - Damper actuators must be equipped with an easily visible optical position indication for clear and visual check of the damper position.

Auxiliary functions: - Auxiliary functions such as auxiliary switches, position feedback, etc., are supplied mounted in the housing.

Disposal: - Actuators must be easily disposable.

Manual adjustment Actuators are equipped with manual adjuster or disengagement function.

### **III.3 Actuators for fire dampers**

#### **Security**

Demand: - Fire dampers are intended to provide protection against plant damage and/or personal injury. Periodic function checks guarantee highest safety. Motorization and position feedback is therefore a must. Fire dampers must guarantee secure closure in emergencies for the entire product life. All fire damper actuators as a rule must have a spring return actuator.

### **III.4 Field Devices/Sensors**

Bidder needs to install the following sensors/Field devices in housing complex/ buildings and same has to be communicate with BMS system for monitoring and controlling.

1. Beam Detector Receiver/ Transmitter.
2. RFID system for Vehicle control
3. Biometric face Scanner + Finger print reader system.
4. Energy meters.
5. Water meters.
6. Water Level Sensor.
7. LPG Gas Detector
8. CO2 Gas Detector.
9. PIR Sensor for lights.
10. RFID card Door Locks.
11. Multifunction Energy Meters.
12. Heat & Smoke detector.
13. Bullet Camera.
14. Dome Camera.
15. IP phones.
16. DDC controller (Use for remote On-Off of AC's from control room)

For location of the above field devices bidder may refer to building diagram attached in the tender document. Bidder needs to provide a suitable design/logic for install and communicate the above field devices with the bid document.

Any item/accessories required to install/ interface above sensors will be on bidder's scope. Bidder has to provide complete list of item/accessories with the bid documents.

### **B. Communication Network:**

#### **B.1 Standard BACnet/ AMEV**

#### **DIN EN ISO 16484-5 / AMEV**

BACnet conformance and BTL logo: - The BACnet servers (automation stations) used must support atleast BACnet standard Version 1, Revision 10 (1.10) or higher. In

addition, a test must be carried out successfully in a neutral testing laboratory (conformance testing) and the automation stations must have the BTL logo. B-AWS (management station): - Management stations must match the BACnet Profile B-AWS (Advanced workstation) as per the BTL Listing. B-BC (automation station): - Automation stations must match the BACnet Profile B-BC (Building Controller) as per the BTL Listing. AMEV AS-A and AS-B (automation station): - Automation stations must meet the AMEV profile AS-A and AS-B as per AMEV guidelines "Bacnet2011" B-AWS (management station): - Management stations must match the BACnet Profile B-AWS (Advanced workstation) as per the BTL Listing and also specified in ANSI / ASHRE 135 guideline. It must also support the BACnet Life Safety Points and BACnetLife Safety Zones functionality ONVIF video standard: - The system must be able to implement Video streams of IP cameras. The presentation in "video wall" modus must be supported.

#### **Conformance declaration**

Protocol implementation and conformance declaration (PICS): - Manufacturer self-declaration PICS is required prior to executing work to gain information on the type of communication for the building automation and control system.

#### **Communication via LonTalk**

BACnetover LonTalk: - The automation stations must allow for communication via LonTalk and work on simple two-wire cabling in a freely selectable bus topology with a total possible length of 900 m. EtherneUIP must serve as the backbone.

#### **Communication via BACnet/ IP**

BACneUIP: - The automation stations (room automation stations as well) must support BACneUIP communication (as per the standards described previously) for later system-independent plant extensions.

BACneUIP (v4-v6) to BACneUMS/TP: - The automation station must be able to integrate, using a router manufactured by the same vendor, the MS/TP protocol via BACnetIP.

BACnetIP (v4-v6) to BACnet/MS/TP or BACnet/LonTalk: - The automation station must be able to integrate, using a router manufactured by the same vendor, the BACnetMS/TP protocol via BACnet/IP as well as BACnet/LonTalk. BACnet/IPv4 to BACnet/IPv6: - The building management system must be able to connect the BACnet/IPv4 protocol with BACnet/IPv6 protocol using a router manufactured by the same vendor.

BACnetLonTalk to BACnet MS/TP: - The building management system must be able to connect the BACneULonTalk with BACneUMSffP protocol using a router manufactured by the same vendor.

## **B.2 Physical structure**

### **Network structure**

Structure: - The *offered* network must be flexible and allow for all types of networks (line, star, ring, tree, etc.) to satisfy all owner/operator needs.

Cable types: - The manufacturer must add to the bid any requirements for specific types of cable, cable installation, or diameters etc., if the manufacturer or *offered* bus topology require them.

## **B.3 Building automation and control system - Automation stations**

### **Openness**

Extendibility: - Integrating existing technical equipment without additional conversion hardware (existing, open system, or other standardized bus systems such as BACnet or third-party) in the new environment is a vital task. The same applies to LonTalk, DALI, or KNX integration.

Integration of third-party systems: - If possible, the same communication protocol must be used as for the existing technical equipment in the building to integrate third-party systems (refrigeration machines, lighting and building automation and control systems, etc.). Building automation and control systems not offering this integration as specified must include and clearly declare any additional conversion hardware (gateways) in their price.

Open and neutral communication via BACnet: - Automation stations are connected to the management level via communication bus. System structure must allow open, neutral and manufacturer-independent communication. Communications must take place in principle via BACnet even if proprietary communications would be possible based on the automation stations used. Intermediate OPC servers are not allowed.

Engineering interface via the network or remote: - Access over the network, VPN, or modem is required for maintenance and diagnostics purposes.

#### **B.4 Automation station - Automation station**

##### **Standard protocol**

Uniform protocol: - Communication must also be standardized even between individual modules and automation stations. All devices must communicate on the same protocol on the entire room level.

#### **B.5 Automation station - Field level**

##### **Field device connection.**

Connect field devices: - The automation stations or I/O modules must support all common sensors (e.g. temperature, humidity) and actuators (valves, damper actuators, lighting control, blinds drives) without requiring additional conversion hardware. The bidder must provide proof that the field devices used for the project was tested under the entire system and documented accordingly.

Use of communicative field devices: - Communicative field devices are required to achieve simple cabling and consistent communication structures.

Connect communicating field devices: - Common manufacturers must be integratable to connect third party devices and subsystems. (E.g. communicating pumps, Modbus subsystems, M-bus capable heat meters, etc.)

Third-party system connection: - A interface is required to connect various devices that supports communication protocols such as Modbus, M-Bus, Genibus and USS.

Support of Plug Play commissioning: - The communications protocol used on the field level must support "Plug & Play", i.e. commissioning must be able to be conducted by a person without tools other than a PC/notebook without expensive software tools.

Number of supported communicative field devices: - The communications protocol used on the field level must support at least 30 communicative field devices for each controller **with** the use of gateways.

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**END OF SECTION – III, PART - 3**

**PROFORMA-B****PRICE BID FORMAT**

**Project: Construction of OIL Executive Residential Complex - Jodhpur: including Civil, Electrical, BMS, Rooftop PV Plant, Plumbing, Sanitation, Landscaping, Fire safety and other related works up to the finishing.**

| <b>Sl. No.</b>                                     | <b>Description</b>   | <b>Qty</b> | <b>Unit</b> | <b>Unit Rate (INR)</b> | <b>Amount (INR)</b> |
|--|--|------------|-------------|------------------------|---------------------|
| <b>GROUP-A, SECTION-A: [ CIVIL GENERAL WORKS ]</b> |  |            |             |                        |                     |
| 1  | <b>Earth work in excavation</b> in All kinds of soil by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30cm in depth) including disposal of excavated earth, lead up to 150m and lift up to 1.5m, disposed earth to be levelled and neatly dressed.   | 6,745.913  | M3          |                        |                     |
| 2  | Earth work in excavation on <b>Ordinary Rocks upto 6m depth</b> from original ground. by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead upto 150 m, as directed by Engineer-incharge. Incase of difficult complex works at base, working space allowance up to 0.60 on each sides may be added on net concrete plan area. However, the measurement shall be taken vertically irrespective of slips/slopes. | 337.296    | M3          |                        |                     |
| 3  | <b>Filling available excavated earth</b> (excluding rock) in trenches, plinth, sides of foundations, landscape etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, lead up to 150 m and lift upto 1.5 m.   | 7,420.504  | M3          |                        |                     |
| 4  | Excavating, supplying and filling of local earth (including royalty)by mechanical transport upto a lead of 5km also including ramming and watering of the earth in layers not exceeding 20cm in trenches, plinth, sides of foundation etc. complete.   | 10,790.71  | M3          |                        |                     |
| 5  | <b>Antitermite treatment of soil</b> under floors using chemical emulsion @ 1 litre per hole, 300 mm apart including drilling 12 mm diameter holes and plugging with cement mortar 1 :2 to match in case of drilling on existing floor: With Chlorpyriphos/ Lindane E.C. 20% with 1% concentration   | 3,500.000  | M2          |                        |                     |
| 6  | <b>Tractor Services with levelling blades,</b> trolley or other attachments as per requirements for stripping of top fertile soil to stack-up at the designated area for re-use in   | 2,000.000  | HR          |                        |                     |

|    |  |          |    |  |  |
|----|--|----------|----|--|--|
|    | landscaping at the end. The service may also be used for various other activities not covered under the contractor's basic free enabling scope of works. The rate is inclusive of operator, fuel, oil, grease, maintenance etc. as required.   |          |    |  |  |
| 7  | Providing and laying in position cement <b>concrete of 1:4:8</b> nominal grade excluding the cost of centering and shuttering - All level 1:4:8 (1 Cement : 4 coarse sand (zone-III) : 8 graded stone aggregate 40 mm nominal size)  | 397.298  | M3 |  |  |
| 8  | Providing and laying in position <b>ready mixed (RMC)</b> plain cement concrete, with cement content as per approved design mix and manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for plain cement concrete work, including pumping of R.M.C. from transit mixer to site of laying and curing, excluding the cost of centering, shuttering and finishing, including cost of curing, admixtures in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and durability as per direction of the Engineer-in-charge. | 198.65   | M3 |  |  |
| 9  | Providing and laying in position specified grade of reinforced cement concrete <b>(1:1.5:3) up to plinth</b> , excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level : 1:1.5:3 (1 cement : 1.5 coarse sand (zone-III): 3 graded stone aggregate 20 mm nominal size)   | 2,410.27 | M3 |  |  |
| 10 | Reinforced reinforced cement concrete <b>(1:1.5:3) above plinth</b> , work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, beam, lintel, pillars, piers, abutments, cantilever, fins, stairs, posts and struts etc. above plinth level up to floor five level, excluding cost of centering, shuttering, finishing and reinforcement : 1:1.5:3 (1 cement : 1.5 coarse sand(zone-III) : 3 graded stone aggregate 20 mm nominal size)  | 1,630.66 | M3 |  |  |
| 11 | Providing, hoisting and fixing up to floor five level <b>precast reinforced cement concrete</b> in small lintels to floor five level, shelves, fins, trench cover, made on high precision, high quality forms, moulds, including the cost of required centering, shuttering but, excluding the cost of reinforcement, with 1:1.5:3 (1 cement : 1.5 coarse sand(zone-III) : 3 graded stone aggregate 20 mm nominal  | 100.00   | M3 |  |  |

|    |  |           |    |  |  |
|----|--|-----------|----|--|--|
|    | size).   |           |    |  |  |
| 12 | Providing precast cement concrete Jali 1:1.5:3 (1 cement : 1.5 coarse sand(zone-III) : 3 graded stone aggregate 6mm nominal size ) of approved pattern and sizes, reinforced with 1.6 mm dia mild steel wire, with high precision moulds/forms, including centering and shuttering, roughening cleaning, fixing and finishing in cement mortar 1:3 (1 cement: 3 fine sand) etc. complete, excluding plastering of the jambs, sills and soffits.  | 200.00    | M2 |  |  |
| 13 | Providing and laying in position ready mixed <b>(RMC) M-25 grade</b> concrete upto floor V level for reinforced cement concrete work, using cement content 350 kg/cum or higher as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work, including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering, shuttering finishing and reinforcement, including cost of admixtures in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and durability as per direction of the Engineer-in-charge. | 1,630.66  | M3 |  |  |
| 14 | Supplying and Adding Hyper plasticizer/super plasticizer admixture in cement as approved by Engineer-In-Charge.  | 7,500.00  | KG |  |  |
| 15 | Providing and applying concrete bonding agent of approved make/product on the spots as directed by Engineer-In-Charge.   | 100.00    | KG |  |  |
| 16 | Supplying and Adding non-metallic concrete hardener as approved by Engineer-In-Charge.   | 5,000.00  | KG |  |  |
| 17 | <b>Smooth finishing of the exposed surface</b> of RCC / PCC work with 6 mm thick cement mortar 1:3 (1 Cement : 3 fine sand).   | 3,500.00  | M2 |  |  |
| 18 | <b>Centering shuttering</b> including struttings, propping etc. and removal of form work for: Foundations, footings, bases for columns.  | 11,102.36 | M2 |  |  |
| 19 | <b>Centering shuttering</b> of form work for <b>Suspended floors</b> , roofs, landings, balconies and access platform including struttings, propping etc. and removal.   | 10,388.48 | M2 |  |  |
| 20 | Providing and fixing of customized <b>aluminium formwork</b> for monolithic construction RCC members using grade 5052 aluminium of panel sheets of minimum 4 mm thick and grade 6 (Type-6) aluminium   | 5,194.24  | M2 |  |  |



|    |   |             |    |  |  |
|----|---|-------------|----|--|--|
|    | for extruded sections. The form work includes of beam, column slab and similar components i.e. side panel, prop head for soffit, soffit panel, soffit bulk head and deck components i.e. deck panel, deck prop, prop length, deck mid, soffit length, deck beam bar, rocker, kiker and internal soffit corner, external soffit corner, external corner, internal corner etc. The panels are held in position by a simple pin and wedge system that passes through holes in the outside rib of each panel. The tolerance of finished panels to be (-1 mm), and shall conform to IS 14687-1999. Pins and wedges to be made of high grade mild steel, all complete as per direction of Engineer-in- charge. (Cost of RCC work shall be paid separately) in-charge. |             |    |  |  |
| 21 | <b>Centering shuttering (9m ht)</b> RCC slab including struttings, propping etc. and removal of form work for Suspended floors, roofs, landings, balconies, cantilever, fins, access platform etc at height up to 9m from nearest finish floor level. Ballies/bamboo/timber props and beams shall not be used for propping.   | 450.00      | M2 |  |  |
| 22 | Supplying and applying pre tested and approved water based <b>concrete curing compound</b> to concrete/ masonry surface, all as per manufacturer's specification and direction of Engineer-in-charge.   | 1,038.85    | M2 |  |  |
| 23 | <b>TMT Steel reinforcement</b> for R.C.C. work including straightening, cutting,bending, placing in position and binding all complete upto plinth level. Thermo-Mechanically Treated bars of grade Fe-500D or more.   | 1,70,147.43 | KG |  |  |
| 24 | Providing and fixing in position <b>Stainless steel expansion joints</b> made of Grade 304 up to 200mm wide plate-1.0 mm thick as per approved design.  | 50.00       | M  |  |  |
| 25 | Providing and fixing parallel <b>threaded Reinforcement couplers</b> conforming to IS code on "Reinforcement Couplers for Mechanical Splices of Bars for Concrete Reinforcement - Specification", to reinforcement bars including threading, enlargement at connection by forging, protecting the prepared reinforcement bars and related operations as required to complete the works per direction of Engineer-in-Charge. for reinforcement bar dia 16mm, 20mm and 25mm.  | 10,000.00   | NO |  |  |
| 26 | Providing and fixing in position 12mm thick bitumen impregnated fiber board conforming to IS: 1838, including cost of primer, sealing compound Grade-A in expansion joints.   | 50.00       | M2 |  |  |

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| 27 | Supplying and fixing <b>rough dressed stone sills</b> , dassa, coping, cornices sriwan, string courses etc. in cement mortar 1:4 including pointing with admixture of pigmnet matching with the stone shade: 75 mm thick.  | 519.03   | M2 |  |  |
| 28 | Supplying and fixing <b>Jodhpur machine cut white stone Kadau 290mm</b> hight in CM 1:4 with plain or rock facing with proper projection and machine cut edges of stone, two line dressing of building corners,jambbs etc. including uniform joints using aluminium square section of size 12mm to 15mm as per requirement of course, with requisite humber headers, length upto 3.6m  | 2,614.79 | M2 |  |  |
| 29 | Supplying and fixing <b>Jodhpur white sand stone machine cut</b> Dash, Coping, sill, lintel etc fixed in cement sand mortar 1:4 length upto 3.6m, and upto 150mm thick.  | 465.39   | M2 |  |  |
| 30 | Supplying and fixing <b>Jodhpur white sand stone machine cut</b> Dash, Coping, sill, lintel fixed in cement sand mortar 1:4, length upto 3.6m, and upto 90mm thick.  | 879.80   | M2 |  |  |
| 31 | <b>Stone work</b> (machine cut edges) <b>for wall lining</b> etc. (veneer work) upto 10 metre height, backing filled with a grout of average 12 mm thick cement mortar 1:3 (1 cement : 3 coarse sand) including pointing in white cement mortar 1:2 (1 white cement : 2 stone dust) with an admixture of pigment matching the stone shade : (To be secured to the backing and the sides by means of cramps and pins which shall be paid for separately) : White sand stone - <b>exposed face fine dressed</b> with rough backing .40 mm thick                | 2,105.10 | M2 |  |  |
| 32 | <b>Stone work</b> (machine cut edges) <b>for wall lining</b> etc. (veneer work) upto 10 metre height, backing filled with a grout of average 12 mm thick cement mortar 1:3 (1 cement : 3 coarse sand) including pointing in white cement mortar 1:2 (1 white cement : 2 stone dust) with an admixture of pigment matching the stone shade : (To be secured to the backing and the sides by means of cramps and pins which shall be paid for separately) : White sand stone - Exposed face <b>machine cut and table rubbed</b> with rough backing.40 mm thick | 153.60   | M2 |  |  |
| 33 | <b>Stone work</b> (machine cut edges) <b>for wall lining</b> etc. (veneer work) upto 10 metre height, backing filled with a grout of average 12 mm thick cement mortar 1:3 (1 cement : 3 coarse sand) including pointing in white cement mortar 1:2 (1 white cement : 2 stone dust) with an admixture of pigment matching the stone shade : (To be secured to the backing and the sides by means of cramps   | 172.80   | M2 |  |  |

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|    | and pins which shall be paid for separately)<br><b>:Gang saw cut stone 30mm thick White sand stone</b>   |          |    |  |  |
| 34 | <b>Jodhpur White Sand Stone tiles for exterior wall cladding with rock face design</b> , up to floor V level, backing filled with a grout of average 12 mm thick cement mortar 1:3 (1 cement : 3 coarse sand) including pointing in white cement mortar 1:2 (1 white cement : 2 stone dust) with an admixture of pigment matching the stone shade : (To be secured to the backing and the sides by means of cramps and pins which shall be paid for separately).   | 1,000.00 | M2 |  |  |
| 35 | <b>Providing and fixing cramps/pins</b> of required design, size & shape, with tread or plain, with nut etc adjustable or fixed type for stone/tile lining/cladding, in RCC/ CC / Brick masonry backing etc with cement mortar 1:2 ( 1 cement :2 coarse sand),including drilling necessary hole in stones, chase cutting and embedding the cramp in the hole (fastener to be paid separately). Stainless steel cramps.   | 128.70   | KG |  |  |
| 36 | <b>Random rubble masonry</b> with hard stone in foundation, plinth, wall including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size), including facing, pointing, all complete as directed by EIC.; Cement mortar 1:6 (1 cement : 6 coarse sand)  | 52.64    | M3 |  |  |
| 37 | Designing, fabricating, testing, installing and fixing in position Curtain Wall with Aluminium Composite Panel <b>(ACP) Cladding</b> , with open grooves for linear as well as curvilinear portions of the building , for all heights and all levels etc. including:<br>(a) Structural analysis & design and preparation of shop drawings for pressure equalisation or rain screen principle as required, proper drainage of water to make it watertight including checking of all the structural and functional design.<br>(b) Providing, fabricating and supplying and fixing panels of aluminium composite panel cladding in pan shape in metallic colour of approved shades made out of 4mm thick aluminium composite panel material consisting of 3mm thick FR grade mineral core sandwiched between two Aluminium sheets (each 0.5mm thick). The aluminium composite panel cladding sheet shall be coil coated, with Kynar 500 based PVDF / Lumiflon based fluoropolymer resin coating of approved colour and shade on face # 1 and polymer (Service) coating on face # 2 as | 500.00   | M2 |  |  |

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|    | <p>specified using stainless steel screws, nuts, bolts, washers, cleats, weather silicone sealant, backer rods etc.</p> <p>(c) The fastening brackets of Aluminium alloy 6005 T5 / MS with Hot Dip Galvanised with serrations and serrated washers to arrest the wind load movement, fasteners, SS 316 Pins and anchor bolts of approved make in SS 316, Nylon separators to prevent bi-metallic contacts all complete required to perform as per specification and drawing The item includes cost of all material &amp; labour component, the cost of all mock ups at site, cost of all samples of the individual components for testing in an approved laboratory, field tests on the assembled working curtain wall with aluminium composite panel cladding, cleaning and protection of the curtain wall with aluminium composite panel cladding till the handing over of the building for occupation. Base frame work for ACP cladding is payable under the relevant aluminium items. The Contractor shall provide curtain wall with aluminium composite panel cladding, having all the performance characteristics all complete , as per the Architectural drawings, as per item description, as specified, as per the approved shop drawings and as directed by the Engineer-in-Charge. However, for the purpose of payment, only the actual area on the external face of the curtain wall with Aluminium Composite Panel Cladding (including width of groove) shall be measured in sqm. up to two decimal places.</p> |          |    |  |  |
| 38 | Providing and laying autoclaved aerated cement <b>(AAC) blocks masonry</b> with all thicknesses in super structure above plinth level up to floor V level with RCC band at sill level and lintel level with approved block laying polymer modified adhesive mortar all complete as per direction of Engineer-in-Charge. (The payment of RCC band and reinforcement shall be made for separately).  | 2,314.90 | M3 |  |  |
| 39 | <b>Brick works</b> in foundation, walls etc at all level, in cement mortar 1:4 (1 cement : 4 coarse sand) with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 of any thickness.  | 7.56     | M3 |  |  |
| 40 | Providing and laying <b>cement plaster up to 15mm thick</b> , finished with a floating <b>coat of neat cement</b> of mix : 1:3 (1 cement: 3 fine sand)   | 4,000.00 | M2 |  |  |

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| 41 | Providing and laying <b>cement plaster up to 15mm thick</b> of mix : 1:4 (1 cement: 4 fine sand) all complete  | 32,933.33 | M2 |  |  |
| 42 | Providing and laying <b>Vitrified tiles</b> , gloss/matt/textured finish in 600x600 sizes (thickness to be specified by manufacturer), with water absorption less than 0.08 % and conforming to I.S. 15622, of approved make, in all colours & shade, in floor, wall, skirting, riser of steps, including scrapping/stripping old plaster/paints wherever required, laid with cement based high polymer modified quick set tile adhesive (water based) conforming to IS: 15477, in average 6 mm thickness, including grouting of joints with matching pigment. This work is inclusive of base levelling mortar bed cement mortar 1:3 (1 cement: 3 coarse sand) wherever required. Tiles relative surface warppage/distortion/lying error more than 300 micron shall not be accepted.                     | 12,477.46 | M2 |  |  |
| 43 | Providing and laying <b>Vitrified tiles</b> , gloss/matt/textured finish in large format sizes or slim planks (thickness to be specified by manufacturer), with water absorption less than 0.08 % and conforming to I.S. 15622, of approved make, in all colours & shade, in floor, wall, skirting, riser of steps, including scrapping/stripping old plaster/paints wherever required, laid with cement based high polymer modified quick set tile adhesive (water based) conforming to IS: 15477, in average 6 mm thickness, including grouting of joints with matching pigment. This work is inclusive of base levelling mortar bed cement mortar 1:3 (1 cement: 3 coarse sand) wherever required. Tiles relative surface warppage/distortion/lying error more than 300 micron shall not be accepted. | 100.00    | M2 |  |  |
| 44 | Providing and laying <b>rectified Glazed Ceramic tiles</b> on floor(size 300x300 mm) / Wall (size 300x450 mm) or higher (thickness to be specified by the manufacturer), of 1st quality conforming to IS : 15622, of approved make, in colours White, Ivory, Grey, Fume Red Brown, laid on 20 mm thick cement mortar 1:4 (1 Cement: 4 Coarse sand), jointing with grey cement slurry @ 3.3 kg/sqm including grouting the joints with white cement and matching pigments etc., complete.  | 17,076.31 | M2 |  |  |
| 45 | Providing and applying <b>white cement based putty</b> of average thickness 1 mm, of approved brand and manufacturer, over the plastered wall surface to prepare the surface even and smooth complete.   | 15,857.01 | M2 |  |  |

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| 46 | Wall painting with <b>acrylic emulsion paint</b> , having VOC (Volatile Organic Compound ) content less than 50 grams/ litre, of approved brand and manufacture, including applying additional coats wherever required, to achieve even shade and colour. Two or more coats from approved brand/model.   | 15,857.01 | M2 |  |  |
| 47 | Providing and fixing <b>powder coated aluminium work for doors</b> , windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS: 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminium snap beading for glazing / paneling, C.P. brass / stainless steel screws, stopper, buffer, sliding lock, stay hook, catch, hasp, tower bolt etc all complete as per architectural drawings and the directions of Engineer-in-charge: For partitions, doors, windows, ventilators etc including providing and fixing hinges, pivots, roller etc including the cost of EPDM rubber / neoprene gasket required. (Glazing, panelling, Door closers, Locks, special handles, floor spring or other major accessories shall be paid for separately) | 797.88    | KG |  |  |
| 48 | Providing and fixing <b>exterior grade ACP 4mm / Particle Board 12mm</b> both side prelaminate as per Grade I, Type II, IS:12823 panelling in doors, windows, ventilators and partition etc. as per specifications, drawings and direction of Engineer-in-charge complete.   | 79.79     | M2 |  |  |
| 49 | Providing <b>wood work in frames of doors, windows</b> , clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length. Second class teak wood.  | 2.05      | M3 |  |  |
| 50 | Providing and fixing ISI marked <b>flush door shutters</b> conforming to IS : 2202 (Part I) non-decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters, including providing lipping with teak wood battens 20 mm depth on all edges of flush door shutters: 35 mm thick including ISI  | 1,037.40  | M2 |  |  |

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|    | marked Stainless Steel butt hinges, with necessary screws  |        |    |  |  |
| 51 | Providing and fixing <b>bright finished brass 100 mm mortice latch</b> and lock, ISI marked, with six levers and a pair of anodised (anodic coating not less than grade AC 10 as per IS : 1868) aluminium lever handles of approved quality with necessary screws etc. complete. (Approved Brand: Doorma, Godrej or as approved by EIC)  | 560.00 | EA |  |  |
| 52 | Providing and fixing <b>aluminium die cast body Door closer</b> with slide channel EN 2 , with necessary accessories and screws etc. complete, from approved brand/model.  | 32.00  | EA |  |  |
| 53 | Providing and fixing double action <b>hydraulic floor spring</b> of approved brand and manufacture conforming to IS : 6315, having brand logo embossed on the body / plate with double spring mechanism and door weight upto 125 kg, for doors, including cost of cutting floors, embedding in floors as required and making good the same matching to the existing floor finishing and cover plates with brass pivot and single piece M.S. sheet outer box with slide plate etc. complete as per the direction of Engineer-in-charge. With stainless steel cover plate minimum 1.25 mm thickness , from approved brand/model.   | 10.00  | EA |  |  |
| 54 | Providing and fixing factory made <b>uPVC white colour sliding glazed window upto 1.50 m</b> in height dimension comprising of uPVC multi-chambered frame with in-built roller track and sash extruded profiles duly reinforced with 1.60 ± 0.2 mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), appropriate dimension of uPVC extruded glazing beads and uPVC extruded interlocks, EPDM gasket, wool pile, zinc alloy (white powder coated) touch locks with hook, zinc alloy body with single nylon rollers (weight bearing capacity to be 40 kg), G.I fasteners 100 x 8 mm size for fixing frame to finished wall and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealent over backer rod of required size and of approved quality, all complete as per approved drawing & direction of Engineer-in-Charge. (Single / | 477.18 | M2 |  |  |

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|    | double glass unit panes, wire mesh and silicon sealant shall be paid separately) Two track two panels sliding window made of (big series) frame 67 x 50 mm & sash 46 x 62 mm both having wall thickness of $2.3 \pm 0.2$ mm and single glazing bead / double glazing bead of appropriate dimension . (Area of window above 1.75 sqm upto 2.50 sqm).  |        |    |  |  |
| 55 | Providing and fixing factory made <b>uPVC white colour sliding glazed window</b> upto 1.50 m in height dimension comprising of uPVC multi-chambered frame with in-built roller track and sash extruded profiles duly reinforced with $1.60 \pm 0.2$ mm thick galvanized mild steel section made from roll forming process of required length (shape & size according to uPVC profile), appropriate dimension of uPVC extruded glazing beads and uPVC extruded interlocks, EPDM gasket, wool pile, zinc alloy (white powder coated) touch locks with hook, zinc alloy body with single nylon rollers (weight bearing capacity to be 40 kg), G.I fasteners 100 x 8 mm size for fixing frame to finished wall and necessary stainless steel screws etc. Profile of frame & sash shall be mitred cut and fusion welded at all corners, including drilling of holes for fixing hardware's and drainage of water etc. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of required size and of approved quality, all complete as per approved drawing & direction of Engineer-in-Charge. (Single / double glass unit panes, wire mesh and silicon sealant shall be paid separately)Three track three panels sliding window made of (big series) frame 116 x 45 mm & sash 46 x 62 mm both having wall thickness of $2.3 \pm 0.2$ mm and single glazing bead / double glazing bead of appropriate dimension. (Area of window above 1.75 sqm) | 271.08 | M2 |  |  |
| 56 | Providing and fixing <b>5mm thick glass pane</b> (clear/frosted/tinted as per requirement) glazing in door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of engineer-in-charge .  | 100.00 | M2 |  |  |
| 57 | Providing and fixing up to <b>6mm thick toughened glass</b> (clear / reflective / tinted / frosted direct or with film) in windows, ventilators and partition etc. as per specifications, drawings, values of SHGC, VLT and other parameters as required for Green Building or as per direction of   | 748.26 | M2 |  |  |



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|    | Engineer-in-charge complete. (Float glass may be permitted in exceptional cases such as small opening size, low vulnerable area etc)   |           |    |  |  |
| 58 | Providing and fixing up to <b>8mm thick toughened glass</b> /High performance glass (clear / reflective / tinted / frosted direct or with film) in windows, ventilators and partition etc. as per specifications, drawings, values of SHGC, VLT and other parameters as required for Green Building or as per direction of Engineer-in-charge complete.  | 200.00    | M2 |  |  |
| 59 | Providing and fixing up to <b>10mm thick toughened glass</b> /High performance glass (clear / reflective / tinted / frosted direct or with film) in windows, ventilators and partition etc. as per specifications, drawings, values of SHGC, VLT and other parameters as required for Green Building or as per direction of Engineer-in-charge complete.   | 200.00    | M2 |  |  |
| 60 | Providing and fixing up to <b>12mm thick toughened glass</b> /High performance glass (clear / reflective / tinted / frosted direct or with film) in windows, ventilators and partition etc. as per specifications, drawings, values of SHGC, VLT and other parameters as required for Green Building or as per direction of Engineer-in-charge complete.   | 1,606.18  | M2 |  |  |
| 61 | Providing and fixing up to <b>19mm thick toughened glass</b> /High performance glass (clear / reflective / tinted / frosted direct or with film) in windows, ventilators and partition etc. as per specifications, drawings, values of SHGC, VLT and other parameters as required for Green Building or as per direction of Engineer-in-charge complete. (Float glass may be permitted in exceptional cases such as small opening size, low vulnerable area etc) | 50.00     | M2 |  |  |
| 62 | Providing and fixing <b>double glazed hermetically sealed glazing</b> in windows, ventilators and partition etc. with 6mm /8mm thick toughened glass (clear / reflective / tinted of required SHGC/VLT/U value), having 10-12 mm air gap, including providing EPDM gasket, perforated aluminium spacers, desiccants, sealant (Both primary and secondary sealant) etc. as per specifications, drawings and direction of Engineer-in-charge complete.             | 466.56    | M2 |  |  |
| 63 | Providing and fixing <b>triple layered high density polyethylene water storage loft tank</b> with cover, conforming to ISI: 12701, colour of opaque white, from approved brand/model, as approved by Engineer-in-charge. The rate includes making necessary  | 46,000.00 | L  |  |  |

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|    | holes for inlet, outlet & over flow pipes. The base support i/c fittings & fixtures for tank shall be paid separately.   |        |   |  |  |
| 64 | Providing and fixing Chlorinated Polyvinyl Chloride ( <b>CPVC</b> ) pipes <b>15-25 mm OD Concealed/exposed</b> , having thermal stability for hot & cold water supply, including all CPVC plain & brass threaded fittings, i/c fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and the cost of cutting chases and making good the same including testing of joints complete as per direction of Engineer in Charge. Concealed work, including cutting chases and making good the walls. 15-25 mm nominal outer dia Pipes (price is inclusive of all accessories such as brass/plain socket, elbow, tee, union, etc but excluding valves) | 420.00 | M |  |  |
| 65 | Providing and fixing Chlorinated Polyvinyl Chloride ( <b>CPVC</b> ) pipes <b>32mm OD Exposed/concealed</b> , having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings This includes jointing of pipes & fittings with one step CPVC solvent cement, chase cutting/ trenching, making good & testing of joints complete as per direction of Engineer in Charge. (price is inclusive of all accessories such as brass/plain socket, elbow, tee, union, etc but excluding valves)  | 480.00 | M |  |  |
| 66 | Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes 32mm OD Exposed, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings This includes jointing of pipes & fittings with one step CPVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge.  | 350.00 | M |  |  |
| 67 | Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes <b>40mm OD, exposed/concealed</b> , having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings This includes jointing of pipes & fittings with one step CPVC solvent cement, chasing cutting/trenching, making good & testing of joints complete as per direction of Engineer in Charge. (price is inclusive of all accessories such as brass/plain socket, elbow, tee, union, etc but excluding valves)   | 420.00 | M |  |  |
| 68 | Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes <b>50mm OD, exposed/concealed</b> , having thermal stability  | 421.00 | M |  |  |

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|    | for hot & cold water supply including all CPVC plain & brass threaded fittings This includes jointing of pipes & fittings with one step CPVC solvent cement, chasing cutting/trenching, making good & testing of joints complete as per direction of Engineer in Charge. (price is inclusive of all accessories such as brass/plain socket, elbow, tee, union, etc but excluding valves)  |        |   |  |  |
| 69 | Providing and fixing Chlorinated Polyvinyl Chloride ( <b>CPVC</b> ) <b>pipes 62.5mm inner dia</b> , having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings This includes jointing of pipes & fittings with one step CPVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. (price is inclusive of all accessories such as brass/plain socket, elbow, tee, union, etc but excluding valves) | 422.00 | M |  |  |
| 70 | Providing and fixing <b>G.I. pipes 50 mm dia</b> nominal bore (for cable casing) complete with G.I. fittings including trenching and refilling etc.   |        | M |  |  |
| 71 | Providing and fixing <b>G.I. pipes 80 mm dia</b> nominal bore (for cable casing) complete with G.I. fittings including trenching and refilling etc.   |        | M |  |  |
| 72 | P&F <b>rigid PVC pipe 75mm dia</b> (IS : 4985 mark) class II (4 Kg/Cm), low noise/extra silent, approved quality/make including joining the pipe with solvent cement rubber ring and lubricant. 75mm dia including couplers, reducers, clamp, bracket, traps, tees, bend, etc with/without doors as per site requirements, including clamping on to wall or trenching on ordinary earth, refilling & testing of joints complete as per direction of Engineer in Charge.                             | 350.00 | M |  |  |
| 73 | P&F <b>rigid PVC pipe 110mm dia</b> (IS : 4985 mark) class II (4 Kg/Cm) , low noise/extra silent, approved quality/make including joining the pipe with solvent cement rubber ring and lubricant. 110mm dia including couplers, reducers, clamp, bracket, traps, tees, bend, etc with/without doors as per site requirements, including clamping on to wall or trenching on ordinary earth, refilling & testing of joints complete as per direction of Engineer in Charge.                          | 560.00 | M |  |  |
| 74 | P&F <b>rigid PVC pipe 160mm dia</b> (IS : 4985 mark) class II (6 Kg/Cm) , low noise/extra silent, approved quality/make including joining the pipe with solvent cement rubber ring and lubricant. 110mm dia including couplers, reducers, clamp, bracket, traps,  | 100.00 | M |  |  |

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|    | tees, bend, etc with/without doors as per site requirements, including clamping on to wall or trenching on ordinary earth, refilling & testing of joints complete as per direction of Engineer in Charge.  |        |    |  |  |
| 75 | P&F <b>rigid PVC pipe 200mm dia</b> (IS : 4985 mark) class II (6 Kg/Cm) , low noise/extra silent, approved quality/make including joining the pipe with solvent cement rubber ring and lubricant. 110mm dia including couplers, reducers, clamp, bracket, traps, tees, bend, etc with/without doors as per site requirements, including clamping on to wall or trenching on ordinary earth, refilling & testing of joints complete as per direction of Engineer in Charge.   | 100.00 | M  |  |  |
| 76 | P&F <b>uPVC ball valve 75mm dia</b> or equivalent <b>suitable valve</b> in rigid/uPVC pipe line including jointing all complete, from approved brand/model.  | 80.00  | NO |  |  |
| 77 | P&F <b>uPVC ball valve 110mm dia</b> or equivalent <b>suitable valve</b> in rigid/uPVC pipe line including jointing all complete, from approved brand/model.   | 80.00  | NO |  |  |
| 78 | Constructing <b>Small manhole Chamber</b> having inner size up to 0.27sqm area x 0.50m depth, in brick work in cement mortar 1:4 (1 cement :4 coarse sand) for manhole/inspection chamber, with hinged FRP/GRP solid cover with frame of size upto 600x600 including necessary excavation, foundation and inside slope grading concrete 1:5:10 ( 1 cement : 5 fine sand : 10 graded stone aggregate 40mm nominal size ) and plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12mm thick, finished with a floating coat of neat cement complete as per standard design : bricks of class designation 7.5                                    | 30.00  | NO |  |  |
| 79 | Constructing masonry <b>manhole Chamber</b> having inner size up to 1.0 sqm area x 1.0m depth, in brick work in cement mortar 1:4 (1 cement :4 coarse sand) for manhole/inspection chamber, with/without partition, made with 75mm thick RCC slab cover and hinged FRP/GRP solid cover with frame of size upto 600x600 including necessary excavation, foundation concrete 1:5:10 ( 1 cement : 5 fine sand : 10 graded stone aggregate 40mm nominal size ) and plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12mm thick, finished with a floating coat of neat cement complete as per standard design : bricks of class designation 7.5 | 30.00  | NO |  |  |

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| 80 | Providing and fixing white vitreous china <b>WALL HUNG water closet</b> (European type W.C. pan) with soft closing seat cover, concealed flushing cistern, including flush pipe, with all fittings and fixtures complete, including cutting and making good the walls and floors wherever required all complete: from approved make/model. | 170.00 | NO |  |  |
| 81 | Providing and fixing white vitreous <b>China Urinal with electronic sensor automatic flushing system</b> , with fittings, including painting of fittings and cutting and making good the walls and floors wherever required : from approved make/model.  | 5.00   | NO |  |  |
| 82 | Providing & fixing white vitreous china <b>water less urinal</b> of size 600 x 330 x 315 mm having antibacterial /germs free ceramic surface, fixed with cartridge having debris catcher and hygiene seal, from approved make/model.   | 5.00   | NO |  |  |
| 83 | Providing and fixing wash <b>basin on vanity / granite counter with wall mounted mixer taps, Bottle trap</b> etc with necessary accessories all complete, including painting and making good the walls wherever require, from approved make/model.   | 227.00 | M2 |  |  |
| 84 | Providing and fixing <b>bevelled edge mirror</b> finished mirror of superior glass complete fixed to walls with necessary accessories including SS glass-achhor/concealing knobs etc from approved make/model.   | 101.03 | M2 |  |  |
| 85 | Providing and fixing <b>Health faucet</b> all complete from approved make/model.   | 170.00 | NO |  |  |
| 86 | Providing and fixing <b>one/two way bib cock</b> all complete from approved make/model.  | 170.00 | NO |  |  |
| 87 | Providing and fixing <b>Angular Stop Cock</b> all complete from approved make/model.   | 397.00 | NO |  |  |
| 88 | Providing and fixing <b>Toilet Roll Holder</b> all complete from approved make/model.  | 170.00 | NO |  |  |
| 89 | Providing and fixing <b>Towel Ring</b> all complete from approved make/model, from approved make/model.  | 227.00 | NO |  |  |
| 90 | Providing and fixing <b>Towel Rack</b> all complete from approved make/model, from approved make/model.  | 227.00 | NO |  |  |
| 91 | Providing and fixing <b>Corner Glass Shelf</b> all complete from approved make/model.  | 454.00 | NO |  |  |
| 92 | Providing and fixing <b>Shower system with shower rose, concealed wall mixer/diverter, spout</b> with provision for hand shower etc all complete. from approved make/model.  | 90.00  | NO |  |  |

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| 93 | Providing and fixing <b>SS 304 grade cockroach trap square having size over 125x125 with removable cups</b> /trays/slits, including fixing suitable uPVC under floor trap, all complete   | 502.00   | NO |  |  |
| 94 | Providing and fixing <b>Stainless Steel kitchen sink</b> A ISI 304 (18/8) as per IS: 13983 with a shivel faucet including painting of fittings and brackets, cutting and making good the walls wherever required all complete: 510x1040 mm, bowl depth 250 mm: from approved make/model.  | 50.00    | NO |  |  |
| 95 | Supplying and Adding Integral crystalline admixture in cement as approved by Engineer-In-Charge.  | 1,000.00 | KG |  |  |
| 96 | Providing and laying factory made chamfered edge coloured Cement <b>Concrete paver blocks in footpath, parks, lawns</b> , drive ways or light traffic parking etc, of required strength, thickness & size/ shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50mm thick compacted bed of sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand. complete all as per direction of Engineer-in-Charge. 60mm thick cement concrete paver block of <b>M-35 grade</b> with approved colour, design & pattern. | 1,164.10 | M2 |  |  |
| 97 | Providing and laying <b>Parking Vitrified tiles</b> , gloss/matt/textured finish in different sizes 300mm x 300mm or higher (thickness to be specified by manufacturer), with water absorption less than 0.08 % and conforming to I.S. 15622, of approved make, in all colours & shade, in floor, wall, skirting, riser of steps, laid with cement based high polymer modified quick set tile adhesive (water based) conforming to IS: 15477, in average 6 mm thickness, including grouting of joints with matching pigment. This work is inclusive of base levelling mortar bed cement mortar 1:3 (1 cement: 3 coarse sand) wherever required. Tiles relative surface warpage/distortion/lying error more than 300 micron shall not be accepted.                                       | 3,754.76 | M2 |  |  |
| 98 | Providing and fixing <b>18 mm Granite slab</b> thick gang saw cut, mirror polished, pre-moulded and pre-polished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations of required size, approved shade, colour and texture laid  | 309.48   | M2 |  |  |

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|     | over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.  |           |    |  |  |
| 99  | <b>Cutting chases in masonry walls/concrete</b> for laying conduit pipes, plumbing pipes, sanitary lines etc up to 125mm wide and depth and making good the same with cement concrete 1:3:6 ( 1 cement : 3 coarse sand : 6 graded stone aggregate 12.5 mm nominal size) or with cement mortar 1:4 (1 cement : 4 coarse sand). This item shall be payable only where respective items are not inclusive of in its parent specifications.  | 300.00    | M  |  |  |
| 100 | Providing and fixing <b>stainless steel ( Grade 304) railing</b> made of Hollow tubes, channels, plates, standard connectors, flange cap, studs, newel post cap, and all other accessories etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners , stainless steel bolts etc., of required size, on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge,(for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.). | 25,221.13 | KG |  |  |
| 101 | Steel work welded in <b>built up sections/</b> framed work using MS angle, sheet, <b>Flats, RHS/SHS/ tubular, round</b> , square bar, chequered plates etc, including cutting, hoisting, fixing in position, including epoxy painting 2 or more coat (by spraying or as per manufacturer's instructions) over a priming coat of approved steel primer after chipping, grinding, buffing etc as required, for works in gratings, grills, frames, guard bar, ladder, railings, brackets, gates and similar works.  | 19,647.36 | KG |  |  |
| 102 | Steel work in built up tubular <b>RHS/SHS/ tubular</b> (round, square or rectangular hollow tubes etc.) trusses etc., including cutting, hoisting, fixing in position and applying epoxy painting 2 or more coat (by spraying or as per manufacturer's instructions) over a priming coat of approved steel primer, including welding and bolted with special shaped washers etc. complete.   | 23,738.75 | KG |  |  |

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| 103 | Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade: New work (Two or more coats applied @ 1.43 ltr/10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/10 sqm)   | 2,000.00 |    |  |  |
| 104 | Finishing walls with textured exterior paint of required shade and pattern as approved by EIC : New work (Two or more coats applied @ 3.28 ltr/10 sqm) over and including priming coat of exterior primer applied @ 2.20kg/10 sqm  | 4,000.00 | M2 |  |  |
| 105 | Providing and laying roof insulation with <b>50 mm thick</b> impervious sprayed, closed cell free Rigid <b>Polyurethane foam (PUF) over deck insulation</b> conforming to IS - 12432 Pt. III with fire resisting chemical additives(density of foam being 40-45 kg/cum), over a coat of polyurethane primer applied @ 6-8 sqm per litre, laying 400 G polythene sheet over PUF spray and providing a wearing course of average 40 mm thick cement screed 1:2:4 (1 cement : 2 coarse sand : 4 stone aggregate 20 mm nominal size) in chequered rough finish, in panels of 2.5 m x 2.5 m and embedding with 24 G wire netting and sealing the joints with polymerized mastic, all complete as per direction of Engineer-in-Charge. | 4,400.00 | M2 |  |  |
| 106 | Providing and fixing roofing consist of 0.8 mm thick galvanized steel deck sheet confirming to IS 277:1992 used as permanent shuttering over which MS wire mesh 3mm laid at 100x100 mm grid including edge trim covered with concrete. This metal deck will be supported on structural steel beam with shear studs. (Structural steel like Beam, column, joists etc. & concrete of different grade as per design will be paid separately).   | 126.00   | M2 |  |  |
| 107 | Providing and fixing Heat Resistant Terrace Tiles (300 mm x 300 mm x 20 mm) with SRI (solar refractive index) > 78, solar reflection > 0.70 and initial emittance > 0.75 on waterproof and sloped surface of terrace, laid on 20 mm thick cement sand mortar in the ratio of 1:4 (1 cement : 4 coarse sand) and grouting the joints with mix of white cement & marble powder in ratio of 1:1, including rubbing and polishing of the surface upto 3 cuts complete, including providing skirting upto 150 mm height along the parapet walls in the same manner.   | 4,400.00 | M2 |  |  |
| 108 | Providing and laying Precast concrete solid blocks/cast in situ concrete of grade M10 made of C&D waste from approved source. In   | 50.00    | M3 |  |  |



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|     | case of blocks, the laying shall be in proper alignment with Cement mortar 1:6 (1 cement : 6 coarse sand) in joints and pointing all complete.  |        |    |  |  |
| 109 | Providing and Placing in position suitable PVC water stops conforming to IS:12200 for construction/ expansion joints between two RCC members and fixed to the reinforcement with binding wire before pouring concrete etc. complete Serrated with central bulb (225 mm wide, 8-11 mm thick) or Kickers (320 mm wide, 5 mm thick)  | 100.00 | M  |  |  |
| 110 | Providing and laying <b>flamed finish Granite stone flooring</b> in required design and patterns, in linear as well as curvilinear portions of the building/stairs all complete as per the architectural drawings with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4coarse sand) laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade including rubbing, curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge :Flamed finish granite stone slab Jet Black, Cherry Red, Elite Brown, Cat Eye or equivalent. | 150.00 | M2 |  |  |
| 111 | Providing and fixing <b>PVC coated G.I. chain link fabric fencing</b> of required width in mesh size 50x50 mm including strengthening with 2 mm dia wire or nuts, bolts and washers as required complete as per the direction of Engineer-in-charge. Made of G.I. wire of dia. 4 mm, PVC coated to achieve outer dia not less than 5 mm in required colour and shade.   | 388.80 | M2 |  |  |
| 112 | Cutting holes in R.C.C beams / slabs / Stone with <b>core cutter machine</b> for hole dia up to 150 mm, on every 150mm thickness or part thereof.   | 50.00  | NO |  |  |
| 113 | Excavating trenches in all kinds of soil of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, depth upto 1.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm in depth, including consolidating each deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m : Pipes, cables etc, not exceeding 110 mm dia.   | 50.00  | M  |  |  |
| 114 | Excavating trenches in all kinds of soil of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, depth  | 50.00  | M  |  |  |

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|     | upto 1.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm in depth, including consolidating each deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m : Pipes, cables etc. exceeding 110 mm dia. but not exceeding 300 mm dia.  |       |    |  |  |
| 115 | Excavating trenches in all kinds of soil of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, depth upto 1.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm in depth, including consolidating each deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m : Pipes, cables etc. exceeding 300 mm dia but not exceeding 600 mm | 50.00 | M  |  |  |
| 116 | Extra for factory rolling of Mild Steel sections to desired curve as per design directed by Engineer-In-Charge. This item is payable over MS steel item rate for curved sections only.  | 50.00 | KG |  |  |

**GROUP-A, SECTION-B [ ROAD, LANDSCAPE, HORTICULTURE ]**

|   |  |          |    |  |  |
|---|--|----------|----|--|--|
| 1 | Supplying and construction of <b>granular sub-base using Moorum</b> for all leads and lifts, spreading in uniform layers of specified thickness with motor grader on prepared surface and compacting with 10-12 ton vibratory power roller including watering to achieve the desired density, complete as per directions of Engineer-in-charge. Payment shall be made for compacted volumes. | 1,344.06 | M3 |  |  |
| 2 | Preparation and consolidation of <b>sub grade with vibratory/power road roller</b> of 8 to 12 tonne capacity after excavating earth to an average of 22.5cm depth, dressing to camber and consolidating with road roller including making good the undulations etc. and re-rolling the sub grade and disposal of surplus earth with lead upto 50 metres.                                     | 4,677.79 | M2 |  |  |
| 3 | Providing and laying at or near ground level <b>kerb stone made of machine cut sandstone</b> (red/white) 125mm or thicker, with bevelled/rounded edge, laid in position to the required line, level and curvature, jointed with cement mortar 1:3 (1 cement: 3 coarse sand) with matching pigment, including making joints with or without grooves (thickness of joints except at sharp      | 31.39    | M3 |  |  |

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|   | curve shall not to more than 5mm), including making drainage opening wherever required complete etc. as per direction of Engineer-in-charge (Finished volume shall be measured for payment without deduction for bevel, joints etc). (Shape, size and pattern to be approved by Engineer-in-charge).  |          |    |  |  |
| 4 | Providing, laying, spreading and compacting <b>wet mix macadam (WMM)</b> with graded stone aggregate (size range 53 mm to 0.075 mm ) as per MoRTH specification including premixing the material with water at OMC in for all leads & lifts, laying in uniform layers with mechanical paver finisher in sub- base / base course on well prepared surface and compacting with vibratory roller of 8 to 10 tonne capacity to achieve the desired density, complete as per specifications and directions of Engineer-in-Charge. Job includes manually laid patch works wherever required. (In case of undulated surface, payment shall be as per actual usage volume corrected by compaction coefficient).   | 701.67   | M3 |  |  |
| 5 | Providing and applying <b>tack coat using bitumen emulsion</b> conforming to IS: 8887, using emulsion pressure distributor including preparing the surface & cleaning with mechanical broom, compressed air etc; With medium setting bitumen emulsion On WBM / WMM / bituminous surface @ 0.4kg/sqm   | 4,677.79 | M2 |  |  |
| 6 | Providing and laying <b>Bituminous concrete</b> using crushed stone aggregates of specified grading, premixed with bituminous binder and filler, transporting the hot mix to work site by tippers, laying with paver finisher equipped with electronic sensor to the required grade, level and alignment and rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction and density as per specification, complete and as per directions of Engineer-in-Charge. About 40mm compacted thickness with bitumen of grade VG-30 @ 5.5% (percentage by weight of total mix) and lime filler @ 3% (percentage by weight of Aggregate) and waste plastic additive @ 8% (percentage by weight of bitumen) prepared in Drum Type Hot Mix Plant of 60-90 TPH capacity. Use of Batch Type Hot Mix Plant of 100-120 TPH capacity is also permitted. Job includes manually laid patch works wherever required. (In case of undulated surface, payment shall be as per actual usage volume corrected by compaction coefficient) | 233.89   | M3 |  |  |

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| 7  | <b>Surface dressing</b> of the ground including removing vegetation and inequalities not exceeding 15 cm deep and disposal of rubbish, lead up to 50 m and lift up to 1.5m, All kinds of soil  | 2,092.83 | M2 |  |  |
| 8  | Providing and fixing <b>Glow studs</b> of size 100x20 mm made of heavy duty body shall be moulded ASA (Acrylic styrene Acryloretrite ) or HIP (High impact polystyrene) or ABS having electronically welded micro- prismatic lens with abrasion resistant coating as approved by Engineer in charge. The glow stud shall support a load of 13635 kg tested in accordance with ASTM D4280. The slope of retro- reflective surface shall be 35 (+/-5) degrees to base .The reflective panels on both sides with at least 12 cm of reflective area up each side. The luminance intensity should be as per the specification and shall be tested as described in ASTM I: 809 as recommended in BS: 873 part 4 : 1973. The studs shall be fixed to the Road surface using the adhesive conforming to IS, or as per procedure recommended by the manufacturer complete and as per direction of Engineer-in-charge. (Make 3m or as approved by EIC) | 320.00   | NO |  |  |
| 9  | Providing and applying 2.5 mm thick <b>road marking strips (retroreflective)</b> of specified shade/ colour using hot thermoplastic material by fully / semi-automatic thermoplastic paint applicator machine fitted with profile shoe, glass beads dispenser, propane tank heater and profile shoe heater, driven by experienced operator on road surface including cost of material, labour, T&P, cleaning the road surface of all dirt, seals, oil, grease and foreign material etc. complete as per direction of Engineer-in-charge and accordance with applicable specifications.   | 1,200.00 | M2 |  |  |
| 10 | <b>Painting road surface marking</b> with adequate nos of coats to give uniform finish with ready mixed road marking paint conforming to IS : 164, on bituminous surface in white/yellow shade, including cleaning the surface of all dirt, scales, oil, grease and foreign material etc. complete. New work -Two or more coats.(Make: Asian Paint apcotrak-WBR/IS or equivalent as approved by EIC)   | 202.50   | M2 |  |  |
| 11 | Collecting, supply and laying a layer of <b>brush wood/senia/khipra (senia type)</b> available as natural growth with all lead and lift, to be laid closely and uniformly over already dressed sub grade covering completely as per Engineer-in-charge.  | 800.00   | M2 |  |  |

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|----|--|-----------|----|--|--|
| 12 | Supplying and stacking at site dump <b>manure from approved source</b> , including carriage upto 5 km lead complete (manure measured in stacks will be reduced by 8% for payment) :Screened through sieve of I.S. designation 20 mm  | 1,212.30  | M3 |  |  |
| 13 | Lettering with <b>black Japan paint</b> of approved brand and manufacture.   | 20,000.00 | CM |  |  |
| 14 | Providing and stacking of <b>Plumeria alba</b> of height 165-180 cm. with 3-4 branches and thick stem in big size HDPE bags as per direction of the officer-in-charge.   | 65.00     | EA |  |  |
| 15 | Providing and stacking of <b>Azadirachta indica</b> ( Neem ) of height 120-130cm in big polybag of size 25 cm as per direction of the officer-in-charge.   | 30.00     | EA |  |  |
| 16 | Providing and stacking of <b>Polyalthia pendula</b> (Ashok Pendula) of height 180-195 cm. in gunny bag of size 30 cm as per direction of the officer-in-charge.  | 50.00     | EA |  |  |
| 17 | Providing and stacking of <b>Concocarpus tree</b> of ht. 20 cm to 30 cm multi branched in 15 cm size of Earthen Pot/Plastic Pot & as per direction of the officer-in-charge.   | 123.00    | EA |  |  |
| 18 | Providing and stacking of <b>Clerodendrum inerme</b> of ht. 20 cm to 30 cm multi branched in 15 cm size of Earthen Pot/Plastic Pot & as per direction of the officer-in-charge.  | 760.00    | EA |  |  |
| 19 | Providing and stacking of <b>Duranta Golden</b> , having ht.15 to 20 cm bushy shape with fresh and healthy leaves in 15 cm size of Earthen Pot/Plastic Pot & as per direction of the officer-in-charge..   | 560.00    | EA |  |  |
| 20 | Providing and Displaying <b>Acalypha red</b> well developed with fresh & healthy 30 to 45 cm ht. in 20 cm size Earthen Pot/ Plastic Pot as per direction of the officer-in-charge.   | 160.00    | EA |  |  |
| 21 | <b>Digging holes 1.2m dia x 1.2m deep</b> in ordinary soil and refilling the same with the excavated earth <b>mixed with manure or sludge</b> in the ratio of 2:1 by volume (2 parts of stacked volume of earth after reduction by 20% : 1 part of stacked volume of manure after reduction by 8%) flooding with water, dressing including removal of rubbish and surplus earth, if any, with all leads and lifts (cost of manure, sludge or extra good earth if needed to be paid for separately) Holes <b>1.2 cm dia, and 1.2 cm deep.</b> | 145.00    | EA |  |  |
| 22 | <b>Digging holes 0.9m dia x 0.9m</b> deep in ordinary soil and refilling the same with the excavated earth mixed with manure or sludge in the ratio of 2:1 by volume (2 parts of stacked volume of earth after reduction by  | 883.00    | EA |  |  |

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|    | 20% : 1 part of stacked volume of manure after reduction by 8%) flooding with water, dressing including removal of rubbish and surplus earth, if any, with all leads and lifts (cost of manure, sludge or extra good earth if needed to be paid for separately) Holes 90 cm dia, and 90 cm deep.  |          |    |  |  |
| 23 | <b>Digging holes 0.6m dia x 0.6m</b> in ordinary soil and refilling the same with the excavated earth mixed with manure or sludge in the ratio of 2:1 by volume (2 parts of stacked volume of earth after reduction by 20% : 1 part of stacked volume of manure after reduction by 8%) flooding with water, dressing including removal of rubbish and surplus earth, if any, with all leads and lifts (cost of manure, sludge or extra good earth if needed to be paid for separately) Holes 60 cm dia, and 60 cm deep. | 560.00   | EA |  |  |
| 24 | <b>Digging holes 45cm dia x 45cm</b> in ordinary soil and refilling the same with the excavated earth mixed with manure or sludge in the ratio of 2:1 by volume (2 parts of stacked volume of earth after reduction by 20% : 1 part of stacked volume of manure after reduction by 8%) flooding with water, dressing including removal of rubbish and surplus earth, if any, with all leads and lifts (cost of manure, sludge or extra good earth if needed to be paid for separately) Holes 45 cm dia, and 45 cm deep. | 160.00   | EA |  |  |
| 25 | Providing and laying <b>Neelgiri/Mexican grass</b> turf with earth 50mm to 60mm thickness of existing ground prepared with proper level and ramming with tools wooden (Dhurmos) and than rolling the surface with light roller make the surface smoothen and light watering with sprinkler and maintenance for 30 days or more till the grass establish properly, as per direction of officer-in-charge.  | 2,544.24 | M2 |  |  |
| 26 | Design, Supply, installation, testing and commissioning of <b>Drip/Micro Irrigation system</b> PVC Pipe Nominal outside diameter 40 mm 6 kg/cm <sup>2</sup> pressure each length of 6.10m as per IS:4985-2000 with latest amendments, excluding cost of branch pipe and dripper, but including necessary accessories such as elbow, gate valve, nipple, tee etc all complete as per direction of the Engineer In-Charge.  | 1,500.00 | M  |  |  |
| 27 | Design, supply, installation, testing and commissioning of <b>12 mm Lateral pipe</b> , with all accessories as per IS:12876:1989 with latest amendments all complete as per direction of the Engineer In-Charge.  | 500.00   | M  |  |  |

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| 28 | Supplying fixing <b>pressure compensating Drippers/Emitters</b> 2-4 litres/hr discharge IS:13487:1992 with latest amendment, including accessories such as rubber bush, connectors, poly end cap '8' shaped etc all completed as per direction of the Engineer In-Charge.  | 3,000.00 | NO |  |  |
| 29 | Design, Supply, installation, testing and commissioning of <b>63 mm Nominal outside diameter</b> pipe for lawn sprinkler system PVC Pipe 6 kg/cm <sup>2</sup> pressure each length of 6.10m as per IS:4985-2000 with latest Amendments, excluding cost of sprinkler but including necessary accessories such as elbow, gate valve, nipple, tee etc all complete as per direction of the Engineer In-Charge.  | 100.00   | M  |  |  |
| 30 | Supply, installation, testing and commissioning of <b>Pop-Up type sprinkler assembly</b> for residential lawn, 20m – 25 dia coverage, working pressure 2-4kg/cm <sup>2</sup> , anti-vandalism anchorage, finger tip adjustable for full or part circle mechanism, diffuser screw, integrated stream-straightening vane in nozzle, discharge @ 450-1180 lph, including necessary accessories such as Teflon washer, connectors etc all complete as per direction of the Engineer In-Charge. | 10.00    | NO |  |  |
| 31 | Providing and laying <b>NP2 class R.C.C. pipes 150 mm</b> dia. R.C.C. pipe with collars jointed with stiff mixture of cement mortar in the proportion of (1:2).  | 180.00   | M  |  |  |
| 32 | Providing and laying <b>NP2 class R.C.C. pipes 250 mm</b> dia. R.C.C. pipe with collars jointed with stiff mixture of cement mortar in the proportion of (1:2).  | 150.00   | M  |  |  |
| 33 | Providing and laying <b>NP2 class R.C.C. pipes 300 mm</b> dia. R.C.C. pipe with collars jointed with stiff mixture of cement mortar in the proportion of (1:2).  | 120.00   | M  |  |  |
| 34 | Providing and laying Non Pressure <b>NP-4 class 600 mm dia</b> RCC pipes (Heavy duty) R.C.C. pipes including collars/spigot jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement : 2 fine sand) including testing of joints etc all complete.  | 75.00    | M  |  |  |
| 35 | Providing and laying Non Pressure <b>NP-4 class 900 mm dia</b> RCC pipe (Heavy duty) R.C.C. pipes including collars/spigot jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement : 2 fine sand) including testing of joints etc all complete.   | 100.00   | M  |  |  |
| 36 | Providing and laying Non Pressure <b>NP-4 class 1200 mm</b> dia RCC pipes (Heavy duty) R.C.C. pipes including collars/spigot jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement : 2 fine sand)   | 100.00   | M  |  |  |

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|    | including testing of joints etc. all complete.   |       |     |  |  |
| 37 | Providing and fixing square-mouth <b>S.W. gully trap</b> class SP-1 complete with C.I. grating brick masonry chamber with water tight C.I. cover with frame of 300 x300 mm size (inside) the weight of cover to be not less than 4.50 kg and frame to be not less than 2.70 kg as per standard design: 100x100 mm size P type With common burnt clay F.P.S. (non modular) bricks of class designation 7.5 or 1:3:6 Concrete grout.   | 50.00 | NO  |  |  |
| 38 | Design, Supply and installation of <b>Rain-Water-Harvest modular mesh type plate system</b> for storm water tank construction in arrays (single, double, triple, quadruple, penta partitions), to be laid below garden, lawn, road side etc, made of recycled polypropylene, plate size about 450mm x 685mm or higher, porosity to contain water by at least 90% of gross volume, load bearing array, capable of taking load of earth refill and surcharge earth equivalent to about 3m high cohesion less soil or concentrated RCC foundation of 2 ton per sqm over the tank. The product shall have green certification by GRIHA/IGBC to be eligible for green points. Excluding cost of earthwork in excavation and back filling. | 5000  | M2  |  |  |
| 39 | Supply and installation of <b>roof rain water first flush filter system</b> assembly suitable for 110mm dia uPVC run down pipe inline for rain water harvest system, suitable to withstand heavy storm, made up of HDPE or metal body with SS304 filter, centrifugal/circular flow, self-cleansing, capable of handling minimum 200LPM discharge, product quality and mechanism as approved by Engineer-In-Charge.   | 25    | NO  |  |  |
| 40 | Supply and installation of underground <b>Dual step Pre-Filter Assembly</b> with Aluminium Lid Cover for rain water harvest system, Filter bucket at least 680 mm internal dia twin tank, capable of handling at least 75KL per hour, integrated with screen filter media to retain upto 180micron particles, durable and sturdy design, sample as approve by Engineer-In-Charge.  | 40    | SET |  |  |



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| 41   | Supply and installation of <b>Borewell Filter system</b> assembly for rain water harvest ground water recharge, size – about 250mm dia and 500mm height with connection arrangement for pipe upto 150mm dia, capable of handling at least 20KL per hour.  | 20    | NO  |  |  |
| 42   | Supply, installation, testing and commissioning of <b>Piezometer</b> for measuring water pressure to be used in Rain Water Harvest system, for upto 10m head, made of SS304 body with internal strain gauge sensor, internal high pressure diaphragm, cable up to 10m,  | 4     | NO  |  |  |
| 43   | Supply and installation of readymade <b>Risers/Filter Extension</b> units for underground rain water filter system made of recycled Polypropylene with steel reinforcement, sturdy and durable construction as approved by Engineer-In-Charge.  | 10    | M   |  |  |
| 44   | Supply, laying/wrapping <b>Geosynthetic Drainage composite</b> filtering non-woven Geotextile pervious membrane around modular mesh plate tank array system in rain water harvest system, tear resistant, made of non-woven 100% polyester, minimum 120 GSM all complete.   | 3000  | M2  |  |  |
| 45   | Supply, laying and wrapping Impervious Ethylene Propylene Diene Monomer ( <b>EPDM</b> ) Liner membrane/Liner around geotextile wrapped or naked modular mesh plate tank array system in rain water harvest system, made of minimum 250GSM, tear resistant, making, jointing rendering impervious tank, all complete.  | 1000  | M2  |  |  |
| <b>GROUP-A, SECTION-C: [ FIRE SAFETY AND OTHER SPECIALIZED ITEMS ]</b> |   |       |     |  |  |
| 1  | Supplying and fixing <b>first-aid Hose Reel</b> with MS construction spray painted in post office red, conforming to IS 884 complete with the following as required. 20 mm nominal internal dia water hose thermoplastic (Textile reinforced) type -2 as per IS: 12585 20 mm nominal internal dia SS 304 grade globe valve & nozzle. Drum and brackets for fixing the equipment on wall. Connections from riser with 25 mm dia stop | 14.00 | SET |  |  |

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|    | SS 304 grade valve & M.S. Pipe and socket.30 m   |       |     |  |  |
| 2  | Providing, fixing, testing & commissioning of installation <b>control valve</b> of cast iron body, brass/bronze working parts comprising of water motor alarm, bronze seat clapper, clapper arm and hydraulically driven mechanical gong bell to sound continuous alarm when the wet riser/sprinkler system activates, pressure gauges, emergency releases, strainer, pressure switch, cock valve complete with drain valve and bypass, test control box, ball valves, MS pipe of required size, flanges, orifice plate, gasket etc of following sizes as required :100 MM | 8.00  | EA  |  |  |
| 3  | Supply, fixing, testing and commissioning of <b>Electric Motor Driven Booster Pump</b> complete with Pump Set, Electric Motor, Base Frame and all accessories like pressure switch, pressure gauges, Butterfly valves, NRV etc. as per NBC. PCC foundation and foundation bolts as per specifications, the quoted rate inclusive of Starter, Panel and Cable from Panel to Pump and duty conditions as follows(i)working and 1 Stand By): i) Flow rate: 450 Ltrs/Min ii) Head: 40 Meter to create 3.5 kg/sq.cm.at the highest and farthest outlet iii)Type: Single Head    | 8.00  | SET |  |  |
| 4  | Supply & fixing of <b>Single headed Fire Hydrant Valve (S.S. body)</b> , oblique type complete with nuts, bolts, gaskets etc. – ISI marked.  | 16.00 | SET |  |  |
| 5  | Supply of <b>63 mm Fire Hose, RRL type of 15 M Long</b> duly bound with Male & Female Coupling (S.S. body). – ISI marked.  | 16.00 | SET |  |  |
| 6  | Supply of <b>Short Branch Pipe</b> (S.S. body). – ISI marked.  | 10.00 | NO  |  |  |
| 7  | Supply, handling cutting, laying, welding, testing of <b>100NB MS Pipe</b> Medium class pipeline, with necessary fittings, painting with two coats of primer & one coat signal red paint- ISI marked.  | 50.00 | M   |  |  |
| 8  | Supply, handling cutting, laying, welding, testing of <b>80NB MS Pipe</b> Medium class pipeline, with necessary fittings, painting with two coats of primer & one coat signal red paint- ISI marked.   | 20.00 | M   |  |  |
| 9  | Supply & fixing of M.S. body, glass fronted <b>double door hose box</b> . (18 S.W.G)   | 8.00  | NO  |  |  |
| 10 | Supply & fixing of Fiber body, glass fronted double door <b>hose box</b>   | 8.00  | NO  |  |  |
| 11 | Supply & fixing of 3 way Fire Brigade Inlet with <b>100 mm Butterfly Valve SS body</b> .   | 8.00  | SET |  |  |

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|----|---|----------|-----|--|--|
| 12 | Supply, installation, testing & commissioning of <b>Electrical Composite Control Panel</b> to enable maintaining of the Down Comer System in Auto Mode. Technical Specification of Electrical Control Panel for 10 H.P. Terrace type Booster Pump dedicated for Fire Hydrant Down Comer System : Electrical Starter Panel comprising of 1. No. Four pole 63A( DPX 125), MCCB with breaking capacity16KA, MDS-Legrand make ( as Incomer), 2. 1No. Fully automatic Star-Delta starter, with push button switch 3.Phase indication LEDs,4.Panel type Digital Voltmeter , 5.Panel type Digital Ammeter with CT, 6.Auto & Manual Switch with necessary interlocking arrangement, 7.Control wiring & earthing from Panel to Motor, 8.Single Phase Preventer (SPP), 9.Internal wiring,10. Panel should have provision for Both Floor and Wall mounting arrangement | 8.00     | SET |  |  |
| 13 | Supply & fixing of <b>Pressure Gauge</b> with necessary fittings.   | 8.00     | EA  |  |  |
| 14 | Supply & fixing of <b>Pressure Switch</b> with necessary fittings, INDFOSS make.  | 8.00     | EA  |  |  |
| 15 | Providing, installation, testing and commissioning of <b>stainless steel Y-strainer</b> fabricated out of 1.6 mm thick stainless steel, Grade 304, sheet with 3 mm dia holes with stainless steel flange.80 mm dia  | 8.00     | EA  |  |  |
| 16 | Providing and laying <b>damp-proof course 40mm thick</b> with cement concrete 1:2:4 (1 cement : 2 coarse sand (zone-III): 4 graded stone aggregate 12.5mm nominal size)   | 1,860.00 | M2  |  |  |
| 17 | Providing and applying Plaster of Paris punning 6-10mm thick average over the existing surface or wherever specified to prepare the surface even and smooth including all leads and lifts etc complete as directed by the Engineer. The surface punned to be kept ready to take on paint/wall paper.  | 480.00   | M2  |  |  |
| 18 | 25 mm wooden planking, tongued and grooved in flooring, including fixing with iron screws complete with :Second class teak wood   | 390.00   | M2  |  |  |
| 19 | Providing and fixing Gypsum Board 12.5mm false ceiling at all height including providing and fixing of frame work made of special sections, power pressed from M.S. sheets and galvanized with zinc coating of 120 gms/sqm (both side inclusive) as per IS : 277 and consisting of angle cleats of size 25 mm wide x 1.6 mm thick with flanges of 27 mm and 37mm, at 1200 mm centre to centre, one  | 260.00   | M2  |  |  |

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|----|--|--------|----|--|--|
|    | <p>flange fixed to the ceiling with dash fastener 12.5 mm dia x 50mm long with 6mm dia bolts, other flange of cleat fixed to the angle hangers of 25x10x0.50 mm of required length with nuts &amp; bolts of required size and other end of angle hanger fixed with intermediate G.I. channels 45x15x0.9 mm running at the spacing of 1200 mm centre to centre, to which the ceiling section 0.5 mm thick bottom wedge of 80 mm with tapered flanges of 26 mm each having lips of 10.5 mm, at 450 mm centre to centre, shall be fixed in a direction perpendicular to G.I. intermediate channel with connecting clips made out of 2.64 mm dia x 230 mm long G.I. wire at every junction, including fixing perimeter channels 0.5 mm thick 27 mm high having flanges of 20 mm and 30 mm long, the perimeter of ceiling fixed to wall/partition with the help of rawl plugs at 450 mm centre, with 25mm long dry wall screws @ 230 mm interval, including fixing of gypsum board to ceiling section and perimeter channel with the help of dry wall screws of size 3.5 x 25 mm at 230 mm c/c, including jointing and finishing to a flush finish of tapered and square edges of the board with recommended jointing compound , jointing tapes , finishing with jointing compound in 3 layers covering upto 150 mm on both sides of joint and two coats of primer suitable for board, all as per manufacturer's specification and also including the cost of making openings for light fittings, grills, diffusers, cut-outs made with frame of perimeter channels suitably fixed, all complete as per drawings, specification and direction of the Engineer in Charge but excluding the cost of painting with :12.5 mm thick tapered edge gypsum plain board conforming to IS: 2095- (Part I) : 2011 (Board with BIS certification marks)</p> |        |    |  |  |
| 20 | <p>Providing and fixing 600x600 Tegular Calcium Silicate false ceiling at all heights with integral densified calcium silicate reinforced with fibre and natural filler false ceiling tiles of Size 595x595mm of approved texture, design and patterns having NRC (Noise Reduction coefficient) of 0.50 (minimum) as per IS 8225:1987, Light reflectance of 85% (minimum). Non combustible as per BS:476 (part-4), fire performance as per BS:476 (part 6 &amp;7), humidity resistance of 100%, thermal conductivity &lt; 0.043 W/m K as per ASTM</p>  | 150.00 | M2 |  |  |

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|----|---|-------|----|--|--|
|    | <p>518:1991,in true horizontal level suspended on inter locking metal T-Grid of hot dipped galvanised iron section of 0.33mm thick (galvanized @ 120 grams per sqm including both sides) comprising of main-T runners of size 24x38 mm of length 3000 mm, cross - T of size 24x32 mm of length 1200 mm and secondary intermediate cross-T of size 24x32 mm of length 600mm to form grid module of size 600 x 600 mm, suspended from ceiling using galvanised mild steel items (galvanizing @ 80 grams per sqm) i.e. 50 mm long, 8 mm outer diameter M-6 dash fasteners, 6 mm dia fully threaded hanger rod upto 1000 mm length and L-shape level adjuster of size 85x25x25x2 mm. Galvanised iron perimeter wall angle of size 24x24x0.40 mm of length 3000 mm to be fixed on periphery wall / partition with the help of plastic rawl plugs at 450 mm centre to centre and 40 mm long dry wall S.S screws. The work shall be carried out as per specifications, drawing and as per directions of the Engineer-in-Charge. With 15 mm thick tegular edged light weight calcium silicate false ceiling tiles.</p>  |       |    |  |  |
| 21 | <p>Providing and fixing partition upto ceiling height consisting of G.I. frame and required board, including providing and fixing of frame work made of special section power pressed/ roll form G.I. sheet with zinc coating of 120 gms/sqm(both side inclusive), consisting of floor and ceiling channel 50mm wide having equal flanges of 32 mm and 0.50 mm thick, fixed to the floor and ceiling at the spacing of 610 mm centre to centre with dash fastener of 12.5 mm dia meter 50 mm length or suitable anchor fastener or metal screws with nylon plugs and the studs 48 mm wide having one flange of 34 mm and other flange 36 mm and 0.50 mm thick fixed vertically within flanges of floor and ceiling channel and placed at a spacing of 610 mm centre to centre by 6 mm dia bolts and nuts, including fixing of studs along both ends of partition fixed flush to wall with suitable anchor fastener or metal screws with nylon plugs at spacing of 450 mm centre to centre, and fixing of boards to both side of frame work by 25 mm long dry wall screws on studs, floor and ceiling channels at the spacing of 300 mm centre to centre. The boards are to be fixed to the frame work with joints staggered to avoid through cracks, Galvanised M.S. fixing channel of 99 mm width (0.9 mm thick having two flanges of 9.5 mm each with zinc coating of 120</p> | 45.00 | M2 |  |  |

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|    | gms/sqm(both side inclusive)) to be provided at the horizontal joints of two boards, fixed to the studs using metal to metal flat head screws, including jointing and finishing to a flush finish with recommended jointing compound, jointing tape, angle beads at corners (25 mm x 25 mm x 0.5 mm), joint finisher and two coats of primer suitable for board as per manufacture's specification and direction of engineer in charge all complete.75 mm overall thickness partition with 12.5 mm thick double skin fire rated Glass Reinforced Gypsum (GRG) plaster board conforming to IS: 2095: (part 3) : 1996 (Board with BIS certification marks)  |        |    |  |  |
| 22 | Providing and fixing fabric backing commercial grade wall paper of approved shade with recommended adhesive of approved make which will have 100% washable, scratch resistance, peel proof, and fire retardant properties. Cost to include preparation on the punned surface for receiving the wallpaper as per the manufacturer specification.   | 120.00 | M2 |  |  |
| 23 | Providing and fixing premium quality vertical fabric blinds of approved quality and shade, complete as required.  | 36.00  | M2 |  |  |
| 24 | Providing and laying High Impact Polypropylene synthetic interlocking modular flooring tile for Badminton court with following material specification and standards. size of the tile 250mmX 250mmx19mm (LxBxH), High Impact Polypropylene,. The Material should confirm to ASTM standards such as Flame spread Index( ASTM E 84):90 , B) Smoke Generation (ASTM E 84):90, C) Friction ( ASTM C 1028):Dry-0.65, wet -0.64, D) Compression Vs Crush ( ASTM D 3998) : No Break, E) Noise Reduction Coefficient ( ASTM C 423): 5-10% ,Rolling Load ( DIN 18032 -02):Pass, Standard Deformation ( DIN 18032-02):0.9mm, H) Ball Rebound ( DIN 18032-02):98%, I)Loading Bearing Capacity ( DIN 18032-02):180psi J) R Value : x<1 K) Flatness :0.0mm L) Lateral Movement : 0.0"-0.035". Lane marking painting with standard paints ( Asian or equivalent). Interlocking modular should be laid on concrete with proper tolerances, dryness and level etc., complete. | 78.00  | M2 |  |  |
| 25 | Providing and laying at or near ground level factory made kerb stone of M-25 grade cement concrete in position to the required line, level and curvature, jointed with cement mortar 1:3 (1 cement: 3 coarse sand),   | 5.00   | M3 |  |  |

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|    | including making joints with or without grooves (thickness of joints except at sharp curve shall not to more than 5mm), including making drainage opening wherever required complete etc. as per direction of Engineer-in-charge (length of finished kerb edging shall be measured for payment). (Precast C.C. kerb stone shall be approved by Engineer-in-charge).   |       |     |  |  |
| 26 | Chequered precast cement concrete tiles 22 mm thick in footpath & courtyard, jointed with neat cement slurry mixed with pigment to match the shade of tiles, including rubbing and cleaning etc. complete, on 20mm thick bed of cement mortar 1:4 (1 cement: 4  | 90.00 | M2  |  |  |
| 27 | Supply, installation, testing and commissioning of automatic boom barrier suitable for 4.0 m road width for intensive applications, high speed with 4.5 second opening time with Straight aluminium boom of minimum size 100mm x 70 mm, built-in LED blinker indicator, pair of photo cell, flashing light, push button, receiving card, 433.92 MHz bi-channel multi-user transmitter. 4,096 combinations with self learning function. (Remote), single channel loop detector etc. complete as required as per specifications & at site of work.  | 1.00  | SET |  |  |
| 28 | Supply installation testing and commissioning of 8" 2-way ceiling speaker, 100v/20watt 16ohm/100w, white For Break out area complete as required. Nos. 6, Supply installation testing and commissioning of 2-channel digital power amplifier 2 x 250Watts @ 4Ohms, bridgeable to 1 channel, convection cooled, Hypex inside, 1U 19" rackmount For Break out area complete as required. Nos. 1, Supply installation testing and commissioning of 8" wooden design cabinet loudspeaker, 8ohm/300watt full range, wall bracket and pole mount tube included, black/ White For Auditorium complete as required. Nos. 6, Supply installation testing and commissioning of 2-channel power amplifier 2 x 600Watts @ 4Ohms, convection cooled, 1U 19" rackmount For Auditorium complete as required. Nos. 1, Supply installation testing and commissioning of Wireless Handheld Microphone For Auditorium complete as required. Nos. 6 Supply installation testing and commissioning of Wireless Lavalier Microphone For Auditorium complete as required. Nos. 2, Supply installation testing and commissioning of | 1.00  | SET |  |  |

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|    | <p>Gooseneck Microphone for Podium For Auditorium complete as required. Nos. 1, Supply installation testing and commissioning of Active Local Input Panel For Auditorium complete as required. Nos. 6 Supply installation testing and commissioning of An Audio mixing console shall have 12 mono input channels, two stereo input channels, an FX master control and a stereo mix master output For Auditorium complete as required. Nos. 1, Supply installation testing and commissioning of HDMI Audio De-Embedder For Auditorium complete as required. Nos. 1, Switching control system Supply installation testing and commissioning Active Wall Plate – HDMI &amp; Computer Graphics with Bidirectional RS-232 and Stereo Audio DGKat Twisted Pair Transmitter - For Podium complete as required. Nos. 1, Supply installation testing and commissioning HDMI, Audio &amp; Data over DGKat Twisted Pair Receiver complete as required. Nos. 1 Supply installation testing and commissioning Wireless presentation device that allows a group of up to 64 users, to take turns in wirelessly presenting from their Win/Mac computer, Smartphone or Tablet complete as required. Nos. 1, Supply installation testing and commissioning A wireless presenter—with a brilliant green laser and intuitive slideshow controls - visible on LCD's/Plasma complete as required. Nos. 1, Installation Equipments Supply installation testing and commissioning AV Cable &amp; Connectors (HDMI/VGA/Audio/Patch Cords) complete as required.</p> |          |    |  |  |
| 29 | Providing and fixing of PVC speed brakers post on road Colour Yellow and Black, Size 350 mm x 1000 mm x 50 mm, Capacity 60 Ton.   | 53.90    | M  |  |  |
| 30 | Supplying & fixing of 6.0mm to 8.0mm thick BWR graded marine ply, including both sides covered with 0.8mm thick pre laminated sheets, to be fixed on back side of cabinet as specified in enclosed drawing & measurement sheets. The cost to include that for all accessories except soft closing SS hinge, handle. Payment will be made as per used ply for making cabinet.  | 1,250.00 | M2 |  |  |
| 31 | Supplying & fixing of 18.0mm thick BWR graded marine ply for front shutter to be used as door shutter, including front sides covered with 1.0mm thick laminated sheets to be fixed with hydraulic press at factory  | 2,440.00 | M2 |  |  |



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|    | including pressing of lippings & back sides covered with 0.8mm thick laminated sheets with 2.0mm thick PVC lipping (edge band) , to be fixed as specified in enclosed drawing & measurement sheets. The cost to include that for all accessories except soft closing SS hinge, handle. Payment will be made as per used ply for making cabinet  |        |    |  |  |
| 32 | Supplying & fixing of 18.0mm thick BWR graded marine ply for Top, Side & shelves including both sides covered with 0.8mm thick pre laminated sheets to be fixed with hydraulic press at factory including pressing of lippings with 1 mm thick PVC lipping (edge band), to be fixed as specified in enclosed drawing & measurement sheets. The cost to include that for all accessories except soft closing SS hinge, handle. Payment will be made as per used ply for making cabinet.  | 788.00 | M2 |  |  |
| 33 | Supplying & fixing of Cutlery Drawer, Length420mm, Depth-485mm, Height-100mm made of stainless steel of Grade IS:202  | 50.00  | NO |  |  |
| 34 | Supplying & fixing of Plain basket Drawer, Length 420mm, Depth-485mm, Height-100mm made of stainless steel of Grade IS:202.   | 50.00  | NO |  |  |
| 35 | Supplying & fixing of Thali basket Drawer, Length420mm, Depth-485mm, Height-150mm made of stainless steel of Grade IS:202.  | 50.00  | NO |  |  |
| 36 | Supply and installation of Kitchen Exhaust hood (Kitchen Chimney) of size 90cm, SS Body, glass front, wall mounted-ducted, low noise split type, energy efficient motor, variable speed, LED illuminated, three layer SS baffle filter, heat auto head cleaning facility, exhaust capacity 1000cum per hour, 1 year free maintenance.   | 50.00  | NO |  |  |
| 37 | Providing, fixing , testing and commissioning Digital Water Meter with all necessary fitting such as communication cable, threaded pieces, unions pressure gauge, isolation cock, flanges piece for future removal, flanges / unions complete with all necessary testing charges and obtaining test certificates from municipal authorities, on following size pipe lines (1 no. strainer shall be provided at inlet, 2 nos isolation valves at inlet & outlet, 1 no NRV on outlet including concrete meter chamber with frames & cover / aluminium 22 gauges housing with cover & lock for internal meters. The meter shall comply to ISO 4064 standard, feasible for class B or Class A installation. | 6.00   | NO |  |  |

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| 38 | Providing, fixing , testing and commissioning Digital Water Meter with all necessary fitting such as communication cable, threaded pieces, unions pressure gauge, isolation cock, flanges piece for future removal, flanges / unions complete with all necessary testing charges and obtaining test certificates from municipal authorities, on following size pipe lines (1 no. strainer shall be provided at inlet, 2 nos isolation valves at inlet & outlet, 1 no NRV on outlet including concrete meter chamber with frames & cover / aluminium 22 gauges housing with cover & lock for internal meters. The meter shall comply to ISO 4064 standard, feasible for class B or Class A installation. | 6.00   | NO |  |  |
| 39 | Providing, fixing , testing and commissioning Digital Water Meter with all necessary fitting such as communication cable, threaded pieces, unions pressure gauge, isolation cock, flanges piece for future removal, flanges / unions complete with all necessary testing charges and obtaining test certificates from municipal authorities, on following size pipe lines (1 no. strainer shall be provided at inlet, 2 nos isolation valves at inlet & outlet, 1 no NRV on outlet including concrete meter chamber with frames & cover / aluminium 22 gauges housing with cover & lock for internal meters. The meter shall comply to ISO 4064 standard, feasible for class B or Class A installation. | 2.00   | NO |  |  |
| 40 | Boring /drilling of bore well of required dia for casing /strainer pipes by suitable method prescribes in IS:2800 ( Part I) including hire and running charges of all equipments, tools, plants and machineries required for the job, all complete as per the direction of OIL, upto 30 mtr depth below ground level - All types of soil - 230 mm dia (Each bore hole 30 Mtr depth)   | 450.00 | M  |  |  |
| 41 | Supplying assembling , lowering and fixing in vertical position in bore well, unplasticised PVC medium well casing CM( pipe of 100 mm nominal dia conforming to IS:12818 including required hire and labour charges fitting and accessories etc. all complete, for all depths as per direction of OIL   | 225.00 | M  |  |  |
| 42 | Supplying assembling , lowering and fixing in vertical position in bore well ,unplasticised PVC medium well screen (RMS) ( pipe of 100 mm nominal dia with Rib conforming to IS:12818 including required hire and labour charges fitting and accessories etc. all complete as per direction of OIL  | 225.00 | M  |  |  |

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| 43 | Supplying, Installation, Testing and Commissioning of Electric Vehicle Charging unit at various points in the complex.   | 8.00     | NO |  |  |
| 44 | Design, Supply installation testing and commissioning of solar water heating system consisting of ISI marked required number of solar flat plate collectors each of area 2 sq. mtr with 9 nos. lasers welded cu-cu fin & tubes for high efficiency with necessary MS stands, structural supports for mounting on concrete Supports, rubber EPDM gaskets with nut and bolts, rubber gasket for flanges C-clamps etc with SS 304 fabricated floor supported Vertical/Horizontal of following storage capacity of Hot water Storage tank shall be suitable for a minimum working pressure .The tank shall be fabricated out of SS plate with suitable thickness as per tank capacities and inner ceramic lining of 2mm thickness. The tank shall be insulated with 50mm thick Rockwool/PUF covered with chicken wire mesh including 24 SWG aluminium cladding and Inlet and outlet pipe connections, drain pipe and level indicators , 1 nos. Pressure gauges, 1Nos.temperature gauge at inlet and outlet side, flow meter etc. including structural supports for mounting on concrete pedestal including the necessary accessories and safety fittings capable of delivering hot water at 55 - 60 Deg.C ,Varying minimum capacity of 500 ltr. capacity per day to 1000 ltr capacity per day etc. complete in all respect as per direction of Engineer-In-charge. | 7,000.00 | L  |  |  |
| 45 | Supply, installation, testing and commissioning of Submersible Open well pump to deliver the discharge of Min 6000 LPH @ 21m head; Max 2HP/1.1KW; Max delivery pipe dia 32NB/40mm OD.  | 8.00     | NO |  |  |
| 46 | Supply, installation, testing and commissioning of Centrifugal Pump to deliver the discharge of Min 6000 LPH @ 21m head; Max 1.5HP/1.1KW; Max delivery pipe dia 32NB/40mm OD.  | 2.00     | NO |  |  |
| 47 | Supply, installation, testing and commissioning of Centrifugal Pump to deliver the discharge of Min 3000 LPH @ 21m head; Max .75HP/0.55KW; Max delivery pipe dia 25NB.   | 8.00     | NO |  |  |
| 48 | Supply, installation, testing and commissioning of Regenerative/Centrifugal Pump to deliver the discharge of Min 2000 LPH @ 6m head; Max .5HP/0.37KW; Max delivery pipe dia 25NB.  | 3.00     | NO |  |  |

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| 49  | Supply, installation, testing and commissioning of <b>Submersible Sewage/Drainage pump</b> , upto 2HP, semi-open impeller, IP68, solid handling 25mm, minimum discharge of 250LPM at 3m head, Pipe dia 50mm, motor body stainless steel 304 grade.  | 8.00   | NO |  |  |
| 50  | <b>Mosaic Glass tiles</b> of approved make, colour and pattern, including making highlighting pattern, design, logo, caricature etc, laid with epoxy adhesive including grouts or as recommended by the manufacturer, including works around fittings, edges, corners etc all complete.   | 432.00 | M2 |  |  |
| 51  | Providing and fixing <b>CO2 type fire extinguishers</b> (Halon free) with steel cylinder with a discharge valve and conforming to IS:15683. Extinguishers shall be painted with red enamel paint and fixed to wall with brackets capacity 4.5 Kg.   | 10.00  | NO |  |  |
| 52  | Providing and fixing <b>ABC powder type fire extinguisher</b> (Halon free) suitable for inverted operation and fabricated from 1.6 mm M.S. sheet internally protected with anticorrosive treatment and hydraulically tested to a pressure of 25 Kg/Sqcm. Extinguishers externally painted with red enamel and fixed to wall with brackets complete with internal charge and spanner (Conforming to IS:15683 capacity 5 Kg).   | 30.00  | NO |  |  |
| <b>GROUP-B, SECTION-A: [ ELECTRICAL &amp; SOLAR ]</b> |   |        |    |  |  |
| 1   | <p>Supply, Installation, Testing and Commissioning of Common LT Panel.</p> <p>A. Panel incomer shall have the following:</p> <p>a) 250 A, 4 Pole, MCCB, 36 KA with microprocessor base Trip Unit Ics=Icu =100% , adjustable over load settings -0.1-1.0 X In, adjustable short circuit settings 2-10XIr, with spreader links, rotary operating mechanism: 01 No.</p> <p>b) The panel shall have:</p> <p>(i) Digital Multifunction Meter, V+A+Hz,KW+PF+KWh+Maximum Demand with RS-485 : 1 No</p> <p>(ii) Current Transformer 250/5 , 15VA, Class 1 to IS:2705, Cast resin type: 3 Nos.</p> <p>(iii) LED Indication lights for indication of 'Supply On': 3Nos.</p> <p>B. 6A SP MCB 10 KA C CURVE-3 nos.</p> <p>C. Busbar :</p> <p>400A, 3 Phase, 4 wire, 50Hz ALUMINIUM with PVC sleeves indicated with four colours</p> | 1.00   | NO |  |  |

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|   | <p>with current Density not more than 1 amp/mm<sup>2</sup></p> <p>D. Panel Outgoing shall have the followings:</p> <p>a) Each Panel shall have<br/> (i) 125 A, 4P MCCB, 25 KA with Thermal Magnetic Trip Unit, Ics=Icu=100%, Adjustable Thermal Settings-0.7-1.0XIn ,Fixed Short circuit Settings, With spreader Links, Rotary Operating Mechanism: 6 Nos.<br/> (ii) 63A, 4P, 16kA, MCCB with Thermal Magnetic Trip Unit, Ics=Icu=100%, Adjustable Thermal Settings-0.7-1.0XIn ,Fixed Short circuit Settings, With spreader Links, Rotary Operating Mechanism : 3 Nos.<br/> (ii) LED Indication lights(R,Y,B) for indication of 'Supply On': 27Nos.</p> <p>E. Main Distribution Panel Box made out of 16/14 SWG ms or better SWG as per standard IS, sheet polder coated, IP 42 Class Enclosure, as per approved design(CPRI approved Fabricator), Qty=1 No.</p>  |      |    |  |  |
| 2 | <p>Supply, Installation, Testing and Commissioning of Block Common Service Panel.</p> <p>A. Panel incomer shall have the following:<br/> a) 125 A, 4P MCCB, 25 KA with Thermal Magnetic Trip Unit, Ics=Icu=100%, Adjustable Thermal Settings-0.7-1.0XIn ,Fixed Short circuit Settings, With spreader Links, Rotary Operating Mechanism: 1 No.<br/> b) The panel shall have:<br/> (i) Digital Multifunction Meter, V+A+Hz,KW+PF+KWh+Maximum Demand with RS-485 : 1 No<br/> (ii) Current Transformer 150/5 , 15VA, Class 1 to IS:2705, Cast resin type: 3 Nos.<br/> (iii) LED Indication lights for indication of 'Supply On': 3Nos.</p> <p>B. Busbar<br/> 200A, 3 Phase, 4 wire, 50Hz ALUMINIUM with PVC sleeves indicated with four colours with current Density not more than 1.0 amp/mm<sup>2</sup></p> <p>C. Panel Outgoing shall have the followings:<br/> a) Each Panel shall have<br/> (i) 63 A, 3P MCCB, 16 KA with Thermal Magnetic Trip Unit, Ics=Icu=100%, Adjustable Thermal Settings-0.7-1.0XIn ,Fixed Short circuit Settings, With spreader Links, Rotary Operating Mechanism: 3Nos.</p> | 3.00 | NO |  |  |

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|   | <p>(ii) 40 A, 4P MCCB, 16 KA with Thermal Magnetic Trip Unit, Ics=Icu=100%, Adjustable Thermal Settings-0.7-1.0XIn ,Fixed Short circuit Settings, With spreader Links, Rotary Operating Mechanism: 3Nos.</p> <p>(iii) 40A DP MCB 10 KA C CURVE. Qty= 4 Nos.</p> <p>(iv) LED Indication lights(R,Y,B) for indication of 'Supply On': 30 Nos.</p> <p>D. Main Distribution Panel Box made out of 16/14 SWG ms or better SWG as per standard IS, sheet polder coated, IP 42 Class Enclosure, as per approved design(CPRI approved Fabricator), Qty=1 No.</p>   |      |    |  |  |
| 3 | <p>Supply, Installation, Testing and Commissioning of Block Utility Panel.</p> <p>A. Panel incomer shall have the following:</p> <p>a) 125 A, 4P MCCB, 25 KA with Thermal Magnetic Trip Unit, Ics=Icu=100%, Adjustable Thermal Settings-0.7-1.0XIn ,Fixed Short circuit Settings, With spreader Links, Rotary Operating Mechanism: 1 No.</p> <p>b) The panel shall have:</p> <p>(i) Digital Multifunction Meter, V+A+Hz,KW+PF+KWh+Maximum Demand with RS-485 : 1 No</p> <p>(ii) Current Transformer 150/5 , 15VA, Class 1 to IS:2705, Cast resin type: 3 Nos.</p> <p>(iii) LED Indication lights for indication of 'Supply On': 3Nos.</p> <p>B. Busbar<br/>200A, 3 Phase, 4 wire, 50Hz ALUMINIUM with PVC sleeves indicated with four colours with current Density not more than 1.0 amp/mm2</p> <p>C. Outgoing</p> <p>a) Each out going Panel shall have</p> <p>(i) 40 A, 4P MCCB, 16 KA with Thermal Magnetic Trip Unit, Ics=Icu=100%, Adjustable Thermal Settings-0.7-1.0XIn ,Fixed Short circuit Settings, With spreader Links, Rotary Operating Mechanism: 4Nos.</p> <p>(ii) 25A, 4P, MCB 10 KA C CURVE. Qty=2 Nos. 25A FP MCB 10 KA C CURVE. Qty=2 Nos.</p> <p>(iii) LED Indication lights(R,Y,B) for indication of 'Supply On': 20 Nos.</p> <p>(iv) Electronic Timer Operating voltage of 160V to 500V, Time delay range of 3-30 Sec.: 1 No</p> <p>(v) 40A, 4P, AC operated Contactor with suitable 2 NO+2 NC with interlocking DG: 1</p> | 1.00 | NO |  |  |

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|   | <p>No</p> <p>b) Sub Outgoing feeder shall have</p> <p>(i) 10A, SP, MCB, 10 KA, C CURVE: 15 Nos.</p> <p>D. Main Distribution Panel Box made out of 16/14 SWG ms or better SWG as per standard IS, sheet polder coated, IP 42 Class Enclosure, as per approved design(CPRI approved Fabricator), Qty=1 No.</p>   |      |    |  |  |
| 4 | <p>Supply, Installation, Testing and Commissioning of External Feeder Panel.</p> <p>A. Panel Incomer shall have</p> <p>(i) 40 A, 4P, 10 KA, C curve MCB: 1 No.</p> <p>(ii) Electronic Timer Operating voltage of 160V to 500V, Time delay range of 3-30 Sec.: 1 No</p> <p>(iii) 40A 4P AC operated Contactor with suitable 2 NO+2 NC with interlocking DG: 1 No</p> <p>(iv) LED Indication lights(R,Y,B) for indication of 'Supply On': 5Nos.</p> <p>B. Busbar</p> <p>200A, 3 Phase, 4 wire, 50Hz ALUMINIUM with PVC sleeves indicated with four colours with current Density not more than 1.0 amp/mm<sup>2</sup></p> <p>C. Outgoing</p> <p>a) Outgoing panels shall have</p> <p>(i) 10A SP MCB 10 KA C CURVE: 15 Nos.</p> <p>D. Main Distribution Panel Box made out of 16/14 SWG ms or better SWG as per standard IS, sheet polder coated, IP 42 Class Enclosure, as per approved design(CPRI approved Fabricator), Qty=1 No.</p> | 1.00 | NO |  |  |
| 5 | <p>Supply, Installation, Testing and Commissioning of Water Panel.</p> <p>A. Panel Incomer shall have</p> <p>(i) 125 A, 4P, MCCB, 25 kA with thermal magnetic trip unit Ics=Icu =100% , adjustable thermal settings -0.7-1.0 X In, fixed short circuit current settings, spreader links, rotary operating mechanism. Qty=1 No.</p> <p>(ii) LED Indication lights(R,Y,B) for indication of 'Supply On': 3 Nos.</p> <p>(iii) Digital Multifunction Meter, V+A+Hz,KW+PF+KWh+Maximum Demand with RS-485 : 1 No</p> <p>(iv) 150/5A Current Transformer, Bus Bar type, Class insulation ( 1200C) as per IEC/ EN 60044-1 accuracy class 1.0, rated</p>  | 1.00 | NO |  |  |

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|   | <p>secondary output-5A, Burden-5VA, Resin cast Ring type CT. Qty=3 Nos.</p> <p>(v) Multifunction Meter With Accuracy class .5/1 with support of Modbus RTU on RS 485 shown accurate reading , favourite page can be selected reverse polarity indication manage active power, reactive power, apparent power ,power factor, voltage, current, frequency &amp; power indication on display as well as unbalance phase angle power quality measurement with calibration led pulse output. Qty=1 No.</p> <p>B.. Busbar<br/>200A, 3 Phase, 4 wire, 50Hz ALUMINIUM with PVC sleeves indicated with four colours with current Density not more than 1.0 amp/mm<sup>2</sup></p> <p>C. Outgoing<br/>(i) 32A, 3P, MCB, 10 KA, D CURVE: 11 Nos.<br/>(ii) LED Indication Lamp (R, Y, B): 33 Nos.</p> <p>D. Main Distribution Panel Box made out of 16/14 SWG ms or better SWG as per standard IS, sheet powder coated, IP 42 Class Enclosure, as per approved design(CPRI approved Fabricator), Qty=1 No.</p> |      |    |  |  |
| 6 | <p>Supply, Installation, Testing and Commissioning of Block Energy Meter Panel.</p> <p>A. Panel incomer shall have the following:</p> <p>a) 250 A, 4 Pole, MCCB 36 KA with microprocessor base Trip Unit Ics=Icu =100% , adjustable over load settings -0.1- 1.0 X In, adjustable short circuit settings 2- 10XIr, with spreader links, rotary operating mechanism: 01 No.</p> <p>b) The panel shall have:</p> <p>(i) Digital Multifunction Meter, V+A+Hz,KW+PF+KWh+Maximum Demand with RS-485 : 1 No</p> <p>(ii) 250/5A Current Transformer 400/5 , 15VA, Class 1 to IS:2705, Cast resin type: 3 Nos.</p> <p>(iii) LED Indication lights for indication of 'Supply On'(R,Y,B): 3Nos.</p> <p>B. Busbar :</p> <p>300A, 3 Phase, 4 wires, 50Hz ALUMINIUM with PVC sleeves indicated with four colours with current Density not more than 1 amp/mm<sup>2</sup></p> <p>C. Panel Outgoing shall have the followings:</p>  | 6.00 | NO |  |  |



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|   | <p>a) Each Panel shall have</p> <p>i) 63 A, 4P MCB, 10 KA, C Curve: 10 Nos.</p> <p>ii) The panel shall be fitted with (Duel source) Energy meter, 3 phase, 4 wire, accuracy class-0.5, Direct reading 10-65 Amps with ACCL provision: 08 Nos.</p> <p>D. Main Distribution Panel Box made out of 16/14 SWG ms or better SWG as per standard IS, sheet poder coated, IP 42 Class Enclosure, as per approved design(CPRI approved Fabricator), Qty=1 No.</p>   |      |    |  |  |
| 7 | <p>Supply, Installation, Testing and Commissioning of Club House Main Panel.</p> <p>A. Panel incomer shall have the following:</p> <p>a) 400 A, 4 Pole, MCCB 36 KA with microprocessor base Trip Unit Ics=Icu =100% , adjustable over load settings -0.1-1.0 X In, adjustable short circuit settings 2-10XIr, with spreader links, rotary operating mechanism: 01 No.</p> <p>b) The panel shall have:</p> <p>(i) Digital Multifunction Meter, V+A+Hz,KW+PF+KWh+Maximum Demand with RS-485 : 1 No</p> <p>(ii) Bus bar type Current Transformer, 400/5 , 15VA, Class 1 to IS:2705, Cast resin type: 3 Nos.</p> <p>(iii) LED Indication lights for indication of 'Supply On': 3Nos.</p> <p>B. Incomer 6A, SP, MCB, 10 KA, C CURVE: 3 Nos.</p> <p>C. Busbar :</p> <p>480A, 3 Phase, 4 wire, 50Hz ALUMINIUM with PVC sleeves indicated with four colours with current Density not more than 1 amp/mm2</p> <p>D. Panel Outgoing shall have the followings:</p> <p>a) Each Panel shall have</p> <p>i) 100 A, 4 Pole, MCCB, 25 KA with Thermal Magnetic Trip Unit Ics=Icu =100% , adjustable thermal settings -0.7-1.0 X In, fixed short circuit settings, with spreader links, rotary operating mechanism: 01 No.</p> <p>ii) 63 A, 3P MCCB, 16 KA with thermal magnetic trip unit, Ics=Icu =100% , Adjustable thermal settings-0.7-1.0XIn, fixed short circuit settings, with spreader links, rotary operating mechanism: 02 No.</p> | 1.00 | NO |  |  |

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|   | <p>iii) 63 A, 4P, MCCB, 16 KA with thermal magnetic trip unit, Ics=Icu =10+C110% , Adjustable thermal settings-0.7-1.0XIn, fixed short circuit settings, with spreader links, rotary operating mechanism: 11 Nos.</p> <p>iv) 63A, DP, MCB, 10 KA, C Curve: 2 Nos</p> <p>b) LED Indication Lamp, 230V, (R,Y,B): 42 Nos</p> <p>E. Main Distribution Panel Box made out of 16/14 SWG ms or better SWG as per standard IS, sheet polder coated, IP 42 Class Enclosure, as per approved design(CPRI approved Fabricator), Qty=1 No.</p>  |      |    |  |  |
| 8 | <p>Supply, Installation, Testing and Commissioning of Club House Utility Panel.</p> <p>A. Panel Incomer shall have</p> <p>(i ) 63 A, 4P, MCCB, 16 KA with thermal magnetic trip unit, Ics=Icu =100% , Adjustable thermal settings-0.7-1.0XIn, fixed short circuit settings, with spreader links, rotary operating mechanism: 1 No</p> <p>b) The panel shall have:</p> <p>(i) Digital Multifunction Meter, V+A+Hz,KW+PF+KWh+Maximum Demand with RS-485 : 1 No</p> <p>(ii) 75/5A Current Transformer , Bus bar type, class E Insulation(1200C), as per IEC/EN 60044-1, accuracy class 5, Rated secondary output -5A Burden - 5 VA Circular Moiled Current Transformer (CMCT):6 Nos.</p> <p>(iii) LED Indication lights for indication of 'Supply On'(R,Y,B): 3Nos.</p> <p>3.8.2 Busbar</p> <p>75 A, 3 Phase, 4 wire, 50Hz ALUMINIUM with PVC sleeves indicated with four colours with current Density not more than 1.0 amp/mm<sup>2</sup></p> <p>C. Outgoing</p> <p>a) Outgoing panels shall have</p> <p>(i) 40 A, 4P, MCCB, 16 KA with thermal magnetic unit Ics=Icu =100% , adjustable thermal settings -0.7-1.0 X In, Fixed short circuit settings, with spreader links, rotary operating mechanism: 3 Nos.</p> <p>(ii) 32A, TP, MCB, 10 KA, D Curve: 2 Nos</p> <p>(iii) 25A, TP, MCB, 10 KA, D Curve: 2 Nos.</p> <p>(iv) LED Indication lights(R,Y,B) for indication of 'Supply On' for each panel: 21 Nos.</p> <p>(v) Electronic Timer Operating voltage of 160V to 500V, Time delay range of 3-30 Sec.: 1 No</p> | 1.00 | NO |  |  |

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|   | <p>(vi) 40A, 4P, AC operated Contactor with suitable 2 NO+2 NC with interlocking DG: 1 No</p> <p>D. Main Distribution Panel Box made out of 16/14 SWG ms or better SWG as per standard IS, sheet powder coated, IP 42 Class Enclosure, as per approved design(CPRI approved Fabricator), Qty=1 No.</p> <p>3.8.4 Busbar</p> <p>(i) 50A, 3 Phase, 4 wire, 50Hz ALUMINIUM with PVC sleeves indicated with four colours with current Density not more than 1 amp/mm<sup>2</sup></p> <p>3.8.5 Sub outgoing</p> <p>(i) 10A SP MCB 10 KA C CURVE: 15 Nos.</p>   |      |    |  |  |
| 9 | <p>Supply, Installation, Testing and Commissioning of 500KVAR APFC Panel.</p> <p>A. The APFC panel shall have the followings:</p> <p>i) 1250 A, TP, ACB, 50 KA with Microprocessor based trip unit, Ics=Icu =100% ,having overload settings, short circuit settings-Instantaneous &amp; Earth fault protection, with spreader links, : 1 No.</p> <p>ii) 6A SP MCB 10 KA C CURVE: 3 Nos.</p> <p>B. Busbar</p> <p>The Busbar shall be 1300A, 3 Phase, 4 wires, 50Hz ALUMINIUM with PVC sleeves indicated with four colours with current Density not more than 1.0 amp/mm<sup>2</sup>: 1 Set</p> <p>C. The panel shall have:</p> <p>(i) Multifunction meter With Accuracy class 0.5/1 with support of Modbus RTU on RS 485 shown accurate reading , favourite page can be selected, reverse polarity indication manage active power, reactive power, apparent power ,power factor, voltage, current, frequency &amp; power indication on display as well as unbalance phase angle power quality measurement with calibration led pulse output: 1 No.</p> <p>(ii) 1000/5 A Current Transformer, Busbar type, class E insulation as per IEC/ EN 60044-1, accuracy class 1.0 Rated secondary output -5A Burden - 15 VA Resin cast rectangular type : 3 Nos.</p> <p>(iii) LED Indication lights for indication of 'Supply On': 3Nos.</p> <p>D. Outgoing</p> <p>a) The outgoing feeder shall have</p> <p>i) 125 A, TP MCCB, 25 KA with thermal</p> | 1.00 | NO |  |  |

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|    | <p>magnetic unit Ics=Icu=100%, Adjustable thermal settings -0.8-1.0 X In, Fixed short circuit current settings, with spreader links, rotary operating mechanism: 8 Nos.</p> <p>ii) 63 A TP MCB 10 KA C Curve: 4 Nos.</p> <p>iii) 14 stage low sensitivity APFC relay 3 CT sensing: 1 No.</p> <p>iv) A/M Switch: 28 Nos.</p> <p>v) LED Type Indicating Light ("ON SIGNAL") 230 V, GREEN WITH SMOOTH LENS: 28 nos.</p> <p>vi) LED Type Indicating Light ("OFF SIGNAL") 230 V RED WITH SMOOTH LENS: 28 Nos.</p> <p>vii) Extended type Non-illuminated Push button to "ON"(GREEN): 28 Nos.</p> <p>viii) Extended type Non-illuminated Push button to "OFF" (RED): 28 Nos.</p> <p>ix) 50 KVAR Capacitor Duty contactor with damping Resistors and early make poles for 50 KVAR, 3Ø Capacitor, 440 V ,1NO+2NC AUX contacts: 8 Nos.</p> <p>x) 25 KVAR TP Capacitor Duty contactor with damping Resistors and early make poles for 25 KVAR 3Ø Capacitor, 440 V ,1NO+1NC AUX Contacts: 4 Nos</p> <p>xi) Capacitor Bank, 50 KVAR, Resin filled box type heavy duty Capacitor with operating losses, 0.35W/KVAR: 8 Nos.</p> <p>xii) Capacitor Bank, 25 KVAR Cylindrical type normal duty operating losses- 0.45W/KVAR, 440V: 4 Nos.</p> <p>E. Main Distribution Panel Box made out of 16/14 SWG ms or better SWG as per standard IS, sheet powder coated, IP 42 Class Enclosure, as per approved design(CPRI approved Fabricator), Qty=1 No.</p> |      |    |  |  |
| 10 | <p>Supply, Installation, Testing and Commissioning of Substation Main LT Panel.</p> <p>A. Panel Incomer-1 shall have</p> <p>a) 2000A, 4 Pole, Icu 50 kA, up to 500V AC, 50Hz, draw-out type, Air Circuit Breaker with O/C, S/C, &amp; E/F protection, electrically and manually operated, spring charging shall be motorized and manual. The feeder shall have brought out terminals for terminating 6 run 3.5core, 240sqmm XLPE Aluminium Cables: 1 No.</p> <p>The panel shall have:</p> <p>(i) Digital Multifunction Meter, V+A+Hz, KW+PF+KWh+Maximum Demand with RS-485 : 1 No.</p> <p>(ii) Current transformer, 2000/5, 15VA, Class 1 to IS: 2705, Cast resin type. : 3 Nos.</p> <p>(iii) LED Indication lights for indication of</p>   | 1.00 | NO |  |  |

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| <p>‘Supply On’: 3Nos.<br/> (iv) LED Indication lights for indication of OFF/ON/TRIP CB: 3Nos.<br/> (v) Trip-neutral-Close selector Switch, 25 Amp: 1 Nos.<br/> (vi) Moulded HRC Fuse Holders with HRC Fuses for control circuit protection: 6 Nos.</p> <p>B. Panel Incomer-2 shall have:</p> <p>a) 400 A, 4 Pole, MCCB 36 KA with microprocessor base Trip Unit <math>I_{cs}=I_{cu}=100\%</math> , adjustable over load settings <math>-0.1-1.0 \times I_n</math>, adjustable short circuit settings <math>2-10 \times I_r</math>, with spreader links, rotary operating mechanism: 01 No.<br/> b) The panel shall have:<br/> i) Digital Multifunction Meter, V+A+Hz,KW+PF+KWh+Maximum Demand with RS-485 : 1 No<br/> (ii) 400/5A Current Transformer 400/5 , 15VA, Class 1 to IS:2705, Cast resin type: 3 Nos.<br/> (iii) LED Indication lights for indication of ‘Supply On’: 3Nos.</p> <p>C. Incomer 6A SP MCB 10 KA C CURVE: 6 Nos.<br/> D. AMF panel complete with, M/F meter, CT 2000/5A, CI 1.0, CT 400/5A, CI 1.0 Indication lamp, Battery charger 24V, Relay card, DC Ammeter, SP MCB, 6A, 10kA- 6 nos., APFC relay card, 14 stage, AMF controller etc. Qty= 1 No.</p> <p>E. Panel Outgoing ACB Feeder shall have the followings:</p> <p>a) 1250 A, TP ACB, 50 KA with Microprocessor based Trip Unit <math>I_{cs}=I_{cu}=100\%</math> , provide overload settings, , short circuit setting- instantaneous &amp; earth fault protection with spreader links, rotary operating mechanism. The feeder shall have brought out terminals for terminating 4 run 3.5core, 240sqmm XLPE Aluminium Cables. Qty=1 No.</p> <p>a) 1000A, 4 Pole, Icu 50 kA, up to 500V AC, 50Hz,draw-out type, ,Air Circuit Breaker with O/C, S/C, &amp; E/F protection, electrically and manually operated , spring charging shall be motorized and manual. The feeder shall have brought out terminals for terminating 3 run 3.5core, 240sqmm XLPE Aluminium Cables. Qty= 2 Nos.</p> |  |  |  |  |
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| <p>b) Each ACB Feeder shall have CBCT in all the outgoing along with Digital Multi Function Meter.</p> <p>(i) Digital multifunction meter with accuracy class 0.5 and with RS-485 port with MODBUS protocol for data logging/downloading. The meter shall preferably be of size 96mm x 96mm and shall measure the following electrical parameters: Voltage, Current, Frequency, KVA, KVA<sub>r</sub>, PF, KWH, and KVA<sub>r</sub><sub>h</sub>. The multifunction meter shall have inbuilt memory to store data for minimum 75 days.</p> <p>(iii) LED Indication lights for indication of 'Supply On': 3Nos.</p> <p>(iv) LED Indication lights for indication of OFF/ON/TRIP CB: 3Nos</p> <p>(v) Trip-neutral-Close selector Switch, 25 Amp: 1 Nos.</p> <p>(vi) Moulded HRC Fuse Holders with HRC Fuses for control circuit protection: 6 Nos</p> <p>F. Panel outgoing MCCB Feeder shall have the followings:</p> <p>a) Rating of outgoing feeders:</p> <p>(i) 630A, 4 pole, Moulded case circuit Breaker, 36 kA, 415V AC, 50Hz : 2 Nos.</p> <p>(ii) 400A, 4 pole, Moulded case circuit Breaker, minimum 36kA, 50Hz, 415VAC: 1 no.</p> <p>(iii) 250A, 4 pole, Moulded case circuit Breaker, 36kA, 415V AC, 50Hz: 9 Nos.</p> <p>b) Each outgoing MCCB shall have inbuilt microprocessor release mechanism and shall have following protection:</p> <p>1) O/L protection<br/> 2) Short Circuit protection<br/> 3) E/F protection<br/> Settings: i) Over Current: <math>I_r=0.8</math> to <math>1 \times I_n</math>; ii) Short Circuit: <math>I_m= 5</math> to <math>10 \times I_r</math>; iii) Instantaneous protection against short Circuit with fixed threshold <math>I_f=5kA</math><br/> Earth leakage protection (CBCT &amp; ELR):<br/> Current Settings: 30mA to 30A; Time Settings: 0.15Sec to 5 Sec:</p> <p>c) Each outgoing feeder shall have CBCT with MFM with following details:</p> <p>(i) Digital multifunction meter with accuracy class 0.5 and with RS-485 port with</p> |  |  |  |  |
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| <p>MODBUS protocol for data logging/downloading. The meter shall preferably be of size 96mm x 96mm and shall measure the following electrical parameters: Voltage, Current, Frequency, KVA, KVA<sub>r</sub>, PF, KWH, and KVA<sub>r</sub>h. The multifunction meter shall have inbuilt memory to store data for minimum 75 days.</p> <p>ii) Core balance current transformer (CBCT) with earth leakage relay (ELR) for providing Earth leakage protection; current settings: 30mA to 30A; Time Settings: 0.15 Sec to 5 Sec: 1 set</p> <p>iii) MCCBs shall be actuated by a handle that clearly indicates the three position ON/ OFF/ TRIP.</p> <p>iv) LED for R, Y, B phases shall be provided showing availability of power: 3 Nos.</p> <p>v) Moulded HRC Fuse Holders with HRC Fuses for control circuit protection: 3 Nos.</p> <p>vi) Pad locking arrangement in OFF position with pad lock: 1no.</p> <p>vii) LED Indication lights for 'Feeder ON', 'Feeder OFF' &amp; 'TRIP': 03 nos.</p> <p>G. Bus-bar:</p> <p>The bus chamber shall be sheet steel clad having front and rear bolted covers and shall consist of 1 set TP &amp; N electrolytic grade, high conductivity aluminium bus-bars, conforming to BIS. Current rating of bus bar sections 2000 A, suitable for 415 V AC, 50 Hz system. The bus-bar shall be insulated with heat shrinkable PVC sleeves, make Raychem RPG, equivalent reputed make and shall be supported at required intervals with non- hygroscopic, non-deteriorating, and non-inflammable SMC / FRP supports having adequate mechanical strength and a high tracking resistance, to withstand short circuit fault levels up to 50 kA for 1 sec. All risers and connections from bus bar shall be carried out with same material as the main bus bars of current rating as per rating of individual cubicle switch. To suit the stringent site conditions, the bus bar system shall be designed with generous clearance between phases than specified in the standards. Adequate non-hygroscopic insulating sheet barriers between the bus chambers and feeders shall be provided. The manufacturer's prototype panel must have type test certificate from CPRI/equivalent testing lab of national reputed for short circuit withstand capacity of 50kA for one</p> |  |  |  |  |
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|    | <p>second on minimum 2000 Amps Bus Bars and Temperature rise test. All necessary interconnection shall be duly tested as per IS: 8623.</p> <p>H. The panel shall be fitted with (Duel source) Energy meter, 3 phase, 4 wire, accuracy class-0.5, Direct reading 10-65 Amps with ACCL provision.</p> <p>I. Main Distribution Panel Box made out of 16/14 SWG ms or better SWG as per standard IS, sheet polder coated, IP 42 Class Enclosure, as per approved design(CPRI approved Fabricator), Qty=1 No.</p> |       |   |  |  |
| 11 | <p>Wiring for light point/ fan point/ exhaust fan point/ call bell point with 2X1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface / recessed steel conduit, with piano type switch, phenolic laminated sheet, suitable size MS box and earthing the point with 1X1.5 sq.mm FRLS PVC insulated copper conductor single core cable etc. as required. GROUP A</p>  | 4.00  | P |  |  |
| 12 | <p>Wiring for light point/ fan point/ exhaust fan point/ call bellpoint with 2X1.5 sq.mm FRLS PVC insulated copper conductorsingle core cable in surface / recessed steel conduit, with pianotype switch, phenolic laminated sheet, suitable size MS box andearthing the point with 1X1.5 sq.mm FRLS PVC insulated copperconductor single core cable etc. as required. GROUP B</p>   | 6.00  | P |  |  |
| 13 | <p>Wiring for light point/ fan point/ exhaust fan point/ call bell point with 2X1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface / recessed steel conduit, with piano type switch, phenolic laminated sheet, suitable size MS box and earthing the point with 1X1.5 sq.mm FRLS PVC insulated copper conductor single core cable etc. as required. GROUP C</p>  | 10.00 | P |  |  |
| 14 | <p>Wiring for light/ power plug with 2X4 sq. mm FRLS PVC insulated multistranded copper conductor single core cable in surface/ recessed steel conduit alongwith 1 No. 4 sq. mm FRLS, PVC insulated copper conductor single core cable for loop earthing as required.</p>  | 50.00 | M |  |  |



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| 15 | Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS, PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm. FRLS, PVC insulated copper conductor single core cable etc as required.<br>Group A | 1,700.00  | P |  |  |
| 16 | Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS, PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm. FRLS, PVC insulated copper conductor single core cable etc as required.<br>Group B | 1,550.00  | P |  |  |
| 17 | Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS, PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm. FRLS, PVC insulated copper conductor single core cable etc as required.<br>Group C | 3,000.00  | P |  |  |
| 18 | Wiring for twin control light point with 1.5 sq.mm FRLS, PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, 2 way modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm. FRLS, PVC insulated copper conductor single core cable etc as required.   | 70.00     | P |  |  |
| 19 | Wiring for light/ power plug with 2X4 sq. mm FRLS, PVC insulated copper conductor single core cable in surface/ recessed medium class PVC conduit alongwith 1 No 4 sq. mm FRLS, PVC insulated copper conductor single core cable for loop earthing as required.   | 330.00    | M |  |  |
| 20 | Wiring for light/ power plug with 4X4 sq. mm FR PVC insulated copper conductor single core cable in surface/ recessed medium class PVC conduit alongwith 2 Nos 4 sq. mm FRLS, PVC insulated copper conductor single core cable for loop earthing as required.   | 736.00    | M |  |  |
| 21 | Wiring for circuit/ submain wiring with 2 X 1.5 sq. mm, FRLS, PVC insulated single core copper cable in surface/ recessed medium class PVC conduit along with 1 X 1.5 sq. mm, FRLS, PVC insulated copper conductor as earthing as required.   | 8,500.00  | M |  |  |
| 22 | Wiring for circuit/ submain wiring with 2 X 2.5 sq. mm, FRLS, PVC insulated single core copper cable in surface/ recessed medium  | 19,400.00 | M |  |  |

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|    | class PVC conduit along with 1 X 2.5 sq. mm, FRLS, PVC insulated copper conductor as earthing as required.  |           |    |  |  |
| 23 | Wiring for circuit/ submain wiring with 2 X 4 sq. mm, FRLS, PVC insulated single core copper cable in surface/ recessed medium class PVC conduit along with 1 X 4 sq. mm, FRLS, PVC insulated copper conductor as earthing as required.   | 17,500.00 | M  |  |  |
| 24 | Wiring for circuit/ submain wiring with 2 X 6 sq. mm, FRLS, PVC insulated single core copper cable in surface/ recessed medium class PVC conduit along with 1 X 6 sq. mm, FRLS, PVC insulated copper conductor as earthing as required.   | 800.00    | M  |  |  |
| 25 | Wiring for circuit/ submain wiring with 2 X 10 sq. mm, FRLS, PVC insulated single core copper cable in surface/ recessed medium class PVC conduit along with 1 X 10 sq. mm, FRLS, PVC insulated copper conductor as earthing as required.   | 500.00    | M  |  |  |
| 26 | Supplying and fixing of modular switch(Bell Push) on the existing modular plate & switch box including connections but excluding modular plate etc. as required.  | 64.00     | EA |  |  |
| 27 | Supplying and fixing stepped type electronic fan regulator on the existing modular plate switch box including connections but excluding modular plate etc. as required.   | 350.00    | EA |  |  |
| 28 | Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 3 pin 5/6 amps modular socket outlet and 5/6 amps modular switch, connection etc. as required. (For light plugs to be used in non residential buildings). | 1,850.00  | EA |  |  |
| 29 | Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 6 pin 5/6 & 15/16 amps modular socket outlet and 15/16 amps modular switch, connection etc. as required.  | 750.00    | EA |  |  |
| 30 | Supplying and fixing 3 pin, 5 amp ceiling rose on the existing junction box/ wooden block including connection etc as required.   | 284.00    | EA |  |  |
| 31 | Supplying and fixing call bell/ buzzer suitable for single phase, 230 volts, complete as required.  | 64.00     | EA |  |  |
| 32 | Installation, testing and commissioning of ceiling fan, including wiring the down rods of standard length (upto 30 cm) with 1.5 sq. mm FR PVC insulated, copper conductor, single core cable, including providing and fixing phenolic laminated sheet cover on the fan box etc. as required.      | 350.00    | EA |  |  |

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| 33 | Supplying and fixing extra down rod of 10 cm length G.I. pipe ,15 mm dia, heavy gauge including painting etc. as required. (Note : More than 5 cm length shall be rounded to the nearest 10 cm and 5 cm or less shall be ignored)  | 150.00   | EA |  |  |
| 34 | Supplying and fixing extra conduit down rod of 20 cm length G.I. pipe 15 mm dia, heavy gauge including painting etc. as required. (Note : More than 5 cm length shall be rounded to the nearest 10 cm and 5 cm or less shall be ignored)   | 150.00   | EA |  |  |
| 35 | Numbering of ceiling fan/ exhaust fan/ LED fittings as required.   | 350.00   | EA |  |  |
| 36 | Installation of exhaust fan in the existing opening, including making good the damage, connection, testing, commissioning etc. as required upto 450 mm sweep   | 220.00   | EA |  |  |
| 37 | Supplying and fixing of 8 Way, double door, single pole and neutral, sheet steel, MCB distribution board, 240 V, on surface/ recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB/RCCB/Isolator)                       | 10.00    | EA |  |  |
| 38 | Supplying and fixing of 8 Way (4+24), Double door, horizontal type three pole and neutral, sheet steel, MCB distribution board, 415 V, on surface/ recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB/RCCB/Isolator) | 54.00    | EA |  |  |
| 39 | Supplying and fixing of 8 way (4+24), double door, surface/ recess mounting, vertical type, 415 V, TPN MCB distribution board of sheet steel, dust protected, duly powder painted, inclusive of 200 A tinned copper bus bar, common neutral link, earth bar, din bar for mounting MCBs (but without MCBs and incomer ) as required.        | 2.00     | EA |  |  |
| 40 | Supplying and fixing of single pole, 5 amps to 32 amps rating, 240/415 volts, 10 kA "C" curve, miniature circuit breaker suitable for inductive load of following poles in the existing MCB DB complete with connections, testing and commissioning etc. as required.  | 1,380.00 | EA |  |  |
| 41 | Supplying and fixing single pole blanking plate in the existing MCB DB complete etc. as required.  | 75.00    | EA |  |  |
| 42 | Supplying and fixing 63 Amps, four pole, 415 volts, isolator in the existing MCB DB complete with connections, testing and commissioning etc. as required.   | 60.00    | EA |  |  |

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| 43 | Supplying and fixing of 40A, double pole, (single phase and neutral), 240 V, residual current circuit breaker (RCCB), having a sensitivity current 30 mA in the existing MCB DB complete with connections, testing and commissioning etc. as required.  | 180.00 | EA |  |  |
| 44 | Supplying and fixing 20 amps, 240 volts, SPN industrial type, socket outlet, with 2 pole and earth, metal enclosed plug top alongwith 20 amps "C" curve, SP, MCB, in sheet steel enclosure, on surface or in recess, with chained metal cover for the socket out let and complete with connections, testing and commissioning etc. as required.   | 300.00 | EA |  |  |
| 45 | Providing and fixing M.V. danger notice plate of 200 mm X 150 mm, made of mild steel, at least 2 mm thick, and vitreous enameled white on both sides, and with inscription in single red colour on front side as required.  | 20.00  | EA |  |  |
| 46 | Providing and fixing H.T. danger notice plate of 250 mm X 200 mm, made of mild steel, at least 2 mm thick, and vitreous enameled white on both sides, and with inscription in single red colour on front side as required.  | 10.00  | EA |  |  |
| 47 | Hot Dipped Galvanized Iron Cable Tray<br>Supplying and installing 150 mm width X 50 mm depth X 1.6 mm thickness, perforated Hot Dipped Galvanised Iron cable tray (Galvanisation thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with G.I. suspenders including G.I. bolts & nuts, etc as required | 150.00 | M  |  |  |
| 48 | Hot Dipped Galvanized Iron Cable Tray<br>Supplying and installing 200 mm width X 50 mm depth X 1.6 mm thickness, perforated Hot Dipped Galvanised Iron cable tray (Galvanisation thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with G.I. suspenders including G.I. bolts & nuts, etc as required | 100.00 | M  |  |  |
| 49 | Hot Dipped Galvanized Iron Cable Tray<br>Supplying and installing 300 mm width X 50 mm depth X 1.6 mm thickness, perforated Hot Dipped Galvanised Iron cable tray (Galvanisation thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with G.I. suspenders including G.I. bolts & nuts, etc as required | 100.00 | M  |  |  |

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| 50 | Earthing with G.I. earth pipe 3 metre long, 40 mm dia including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe etc. with charcoal/ coke and salt as required.  | 40.00    | EA  |  |  |
| 51 | Earthing with G.I. earth plate 600 mm X 600 mm X 6 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 metre long etc. with charcoal/ coke and salt as required.  | 40.00    | SET |  |  |
| 52 | Supplying and laying 6 SWG G.I. wire at 0.50 metre below ground level for conductor earth electrode, including connection/ termination with GI thimble etc. as required.   | 700.00   | M   |  |  |
| 53 | Supplying and laying 25 mm X 5 mm G.I strip at 0.50 metre below ground as strip earth electrode, including connection/ terminating with G.I. nut, bolt, spring, washer etc. as required. (Jointing shall be done by overlapping and with 2 sets of G.I. nut bolt & spring washer spaced at 50mm) | 700.00   | M   |  |  |
| 54 | Providing and fixing of lightning conductor finial, made of 25 mm dia 300 mm long, G.I. tube, having single prong at top, with 85 mm dia 6 mm thick G.I. base plate including holes etc. complete as required.   | 40.00    | EA  |  |  |
| 55 | Providing and fixing G.I. tape 20 mm X 3 mm thick on parapet or surface of wall for lightning conductor complete as required.(For horizontal run)  | 600.00   | M   |  |  |
| 56 | Providing and fixing G.I. tape 20 mm X 3 mm thick on parapet or surface of wall for lightning conductor complete as required.(For vertical run)  | 800.00   | M   |  |  |
| 57 | Providing and fixing testing joint, made of 20 mm X 3 mm thick G.I. strip, 125 mm long, with 4 nos. of G.I. bolts, nuts, chuck nuts and spring washers etc. complete as required.  | 120.00   | EA  |  |  |
| 58 | Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade Upto 35 sq. mm in the existing RCC/ HUME/ METAL pipe as required.   | 4,000.00 | M   |  |  |
| 59 | Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade above 35 sq. mm and upto 95 sq. mm in the existing RCC/ HUME/ METAL pipe as required.   | 300.00   | M   |  |  |
| 60 | Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade above 95 sq. mm and upto 185 sq. mm in the existing RCC/ HUME/ METAL pipe as required.  | 680.00   | M   |  |  |

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| 61 | Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade above 185 sq. mm and upto 400 sq. mm in the existing RCC/ HUME/ METAL pipe as required.   | 1,000.00 | M  |  |  |
| 62 | Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade upto 35 sqmm in the existing masonry open duct as required.   | 540.00   | M  |  |  |
| 63 | Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade above 35 sqmm and upto 95 sqmm in the existing masonry open duct as required.   | 400.00   | M  |  |  |
| 64 | Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade above 95 sqmm and upto 185 sqmm in the existing masonry open duct as required.  | 800.00   | M  |  |  |
| 65 | Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade above 185 sqmm and upto 400 sqmm in the existing masonry open duct as required.   | 1,000.00 | M  |  |  |
| 66 | Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade upto 35 sqmm on wall surface as required.  | 800.00   | M  |  |  |
| 67 | Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade above 35 sqmm and upto 95 sqmm on wall surface as required.  | 300.00   | M  |  |  |
| 68 | Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade upto 35 sqmm (clamped with 1mm thick saddle) on cable tray as required.  | 350.00   | M  |  |  |
| 69 | Supplying and fixing cable route marker with 10 cm X 10 cm X 5 mm thick G.I. plate with inscription there on, bolted /welded to 35 mm X 35 mm X 6 mm angle iron, 60 cm long and fixing the same in ground as required.                     | 30.00    | EA |  |  |
| 70 | Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 11 KV grade above 120sqmm and upto 400sqmm direct in ground including excavation, sand cushioning, protective covering and refilling the trench etc as required. | 120.00   | M  |  |  |
| 71 | Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 11 KV grade of following size in the existing RCC/HUME/ METAL pipe as required.  | 120.00   | M  |  |  |
| 72 | Supplying and making end termination with brass compression gland and aluminium lugs for 2 X 6 sq.mm (19mm) PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.                                   | 30.00    | EA |  |  |

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| 73 | Supplying and making end termination with brass compression gland and aluminium lugs for 2 X 10 sq.mm (22mm) PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.    | 20.00  | EA |  |  |
| 74 | Supplying and making end termination with brass compression gland and aluminium lugs for 3 X 6 sq.mm (22mm) PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.     | 30.00  | EA |  |  |
| 75 | Supplying and making end termination with brass compression gland and aluminium lugs for 3 X 25 sq.mm (25mm) PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.    | 20.00  | EA |  |  |
| 76 | Supplying and making end termination with brass compression gland and aluminium lugs for 3 X 300 sq.mm (45mm) PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.   | 10.00  | EA |  |  |
| 77 | Supplying and making end termination with brass compression gland and aluminium lugs for 3.5 X 95 sq.mm (45mm) PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.  | 20.00  | EA |  |  |
| 78 | Supplying and making end termination with brass compression gland and aluminium lugs for 3.5 X 185 sq.mm (57mm) PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required. | 30.00  | EA |  |  |
| 79 | Supplying and making end termination with brass compression gland and aluminium lugs for 3.5 X 240 sq.mm (45mm) PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required. | 10.00  | EA |  |  |
| 80 | Supplying and making end termination with brass compression gland and aluminium lugs for 3.5 X 300 sq.mm (70mm) PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required. | 20.00  | EA |  |  |
| 81 | Supplying and making end termination with brass compression gland and aluminium lugs for 4X 10 sq.mm (25mm) PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.     | 20.00  | EA |  |  |
| 82 | Supplying and making end termination with brass compression gland and aluminium lugs for 4X 16 sq.mm (28mm) PVC insulated and PVC sheathed / XLPE aluminium  | 200.00 | EA |  |  |

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|    | conductor cable of 1.1 KV grade as required.   |       |    |  |  |
| 83 | Supplying and making end termination with brass compression gland and aluminium lugs for 4X 25 sq.mm (28mm) PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.   | 10.00 | EA |  |  |
| 84 | supplying and making indoor cable end termination with heat shrinkable jointing kit complete with all accessories including lugs suitable for 3core X 240 sq. mm XLPE aluminium conductor cable of 11 KV grade as required :   | 12.00 | EA |  |  |
| 85 | Supplying and making outdoor cable end termination with heat shrinkable jointing kit complete with all accessories including lugs suitable for 3core X 240 sq. mm XLPE aluminium conductor cable of 11 KV grade as required :  | 4.00  | EA |  |  |
| 86 | Supplying and making straight through cable jointing with heat shrinkable jointing kit complete with all accessories including ferrules suitable for 3 core X 240 sq.mm, XLPE aluminium conductor cable of 11 KV grade as required :   | 1.00  | EA |  |  |
| 87 | <p>Supply, Installation, Testing and Commissioning of 1215 KVA, Cast resin Dry type Transformer with confirming to IS 11171&amp; Losses as per Discom's CTL ( CTL Test certificate to be attached ) of rating 11/0.433KV Delta-Star Connected, Vector Group Dyn 11, Off -LTC (+5% to -7.5% in steps of 2.5%) ambient air temperature for operation is 50°/55° C, ISI marked Epoxy based paint, including 1nos. set thermometer in winding for all 3-phases and core to maintain the winding temperature. carrying of pre-commission Testing &amp; Charging of Transformer. specifications are given below:-</p> <p>11/0.433kv ; 1250 KVA</p> <p>"A. GENERAL:</p> <ol style="list-style-type: none"> <li>1. Applicable Indian Standard: IS: 11171 with latest amendments.</li> <li>2. Service duty : Continuous.</li> <li>3. Installation : Indoor.</li> <li>4. Auxiliary power supply : 240V AC <math>\pm</math> 10 o/o</li> <li>5. Control Voltage : 240V AC <math>\pm</math> 10 %</li> <li>6. Make: NGEF, Crompton Greaves, Bharat Bijlee, Siemens" <p>"B. SITE CONDITION:</p> <ol style="list-style-type: none"> <li>1. a) Maximum Ambient air temperature - 50°C</li> <li>b) Minimum Ambient air temperature - 2°C</li> </ol> </li></ol> | 1.00  | EA |  |  |



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| <p>2. Maximum humidity at site ( at 40 °C) - 60%</p> <p>3. Surrounding atmospheric condition - Dry</p> <p>4. Site altitude(above sea level) - 231Metre (approx)</p> <p>5. Seismic design co-efficient - As per 1983</p> <p>6. Rainfall: 360mm annually (approx)"</p> <p>"C. RATING AND GENERAL DATA:</p> <p>1. Rating: 1250kVA, continuously rated.</p> <p>2. No. of phases: 3</p> <p>3. Frequency : 50 ± 3 %</p> <p>4. Type of Insulation : Cast Resin winding, Class-F. Temp. rise-90 o C</p> <p>5. Partial discharge: _As per IS-11171, IS-6209.</p> <p>6. Type of cooling: AN</p> <p>7. Installation: Indoor .</p> <p>8. Vector group : Dyn II</p> <p>9. Percentage impedance: 5% ( or as per IS-2026)</p> <p>10. Nominal voltage ratio: 11kV/433V</p> <p>11. Type of neutral earthing : Solidly grounded Neutral.</p> <p>12. Symmetric short circuit withstands capacity : As per IS- 11171.</p> <p>13. Rated short duration power frequency withstand voltage : As per IS 11171.</p> <p>14. Rated lightning impulse withstand voltage: As per IS-11171.</p> <p>15. TAP CHANGER:</p> <p>Type: OFF Circuit.</p> <p>Total tapping range: ± 5.0%</p> <p>Tapping steps: In steps of 2.5 %</p> <p>16. TERMINAL ARRANGEMENT: .</p> <p>HV winding line end : Cable box with bushings.</p> <p>LV winding line end : Cable box with bushings.</p> <p>One LV Neutral bushing inside the cable box and one (additional) outside the cable box.</p> <p>17. BUSHING:</p> <p>Made from non hygroscopic epoxy resin cast material suitable for site condition mention in para- B &amp; confirming to IS-2099.</p> <p>18. CABLE BOX:</p> <p>a) HV cable box should be suitable for termination of 1 no. 3 C, 240sq. mm XLPE, armoured, aluminium conductor cable with heat shrink type cable termination. Bottom plate should be detachable. Cable Box as per IP-54. Suitable non hygroscopic bushings are required for supporting the cable connection.</p> <p>b) LV cable box should have brought out electro-tinned copper busbars of suitable rating &amp; size for termination of 3 nos. of 3 and half C</p> |  |  |  |  |
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| <p>x 240 sq. mm PVCA Aluminium cable. The busbar should have suitable holes (two nos. for each cable lug as lug with double hole will be used for termination) and provided with hardwares for termination of cables. The cable box should have detachable cable gland plate fitted with suitable heavy duty single compression cable glands for the cables mentioned above. Support for busbar in LV cable box should be made from FRP/SMC non hygroscopic material. Cable Box as per IP-54. Supports should be able to withstand the short circuit stress. All openings in enclosure should be guarded with suitable screen to guard against entry of rodents and reptiles. c) Terminals should be marked as per IS: 2026.</p> <p>19. TRANSFORMER CORE:</p> <p>a) Material: High grade cold rolled grain oriented silicon steel for very low iron loss.</p> <p>b) Structure : Grounded and sharp corners avoided.</p> <p>c) Lamination: Treated and coated with suitable insulations. The core limbs &amp; yokes are banded by means of resiglass tape to reduce vibration &amp; noise.</p> <p>20. TRANSFORMER WINDING:</p> <p>The winding material should be high conductivity electrolytic grade copper. The insulation should be Cast Resin type, Class-F. Conductor should have thermally upgraded paper(Nomex) insulation reinforced with fiberglass. The coil assembly is to be impregnated cast under vacuum with epoxy resin for achieving non-hygroscopic, acid &amp; alkali resistant insulation. The complete winding should have smooth cylindrical finish after impregnation to ensure high. mechanical strength. The thickness of resin should be uniform. The insulation should be self- extinguishing type.</p> <p>Joints in the winding should be as under:</p> <p>a) Permanent joints : Welded/ brazed.</p> <p>b) Bolted connection : Provided with locking devices</p> <p>21.ENCLOSURE:</p> <p>The core &amp; winding assembly should be housed inside a sheet steel enclosure with removable inspection &amp; tap changer covers. The enclosure should offer IP-23 protection as per IS-2147 &amp; should have suitably designed louvers for circulation of cooling air. All the gaskets should be Of neoprene rubber. Enclosure should be powder coated with DA Grey paint after surface treatment</p> |  |  |  |  |
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|    | <p>for corrosion protection. All openings in enclosure should be guarded with suitable screen to guard against entry of rodents and reptiles.</p> <p>22. LIST OF FITTINGS AND ACCESSORIES:</p> <p>a) HV bushings :<br/>Inside HV cable box : 3 nos.</p> <p>b) LV bushings -<br/>Inside LV cable box : 4 nos.<br/>Outside LV cable box : 1 no. for neutral earthing.</p> <p>c) Winding temperature scanner connected with three nos. RTDs, one each for each LV winding, should be provided in a metallic enclosure that is mounted on the main enclosure.<br/>The scanner should provide indication, alarm &amp; trip contacts. Winding temperature indicator should show maximum temperature attained. The RTDs should be properly wired upto the scanner terminals. Suitable hole with gland is required for control cable connecting scanner alarm/ trip contacts to HT Breaker.</p> <p>d) Lifting lugs.</p> <p>e) Earthing terminals # 2 nos.</p> <p>f) Jacking lugs.</p> <p>g) Inspection .cover</p> <p>h) Base channels with bi-direction rollers.</p> <p>i) Any other accessories which bidders think essential &amp; required as per IS may also be included."</p> <p>Winding Material - Copper<br/>Off load tap changing on LT side - +5% to - 5%<br/>Maximum air temperature - 50°C</p> |      |    |  |  |
| 88 | <p>"Supply, Installation, Testing and Commissioning of 11KV 630/800A VCB Indoor type panel HT board, freestanding motor operated &amp; withdrawal type fabricated from 2 mm thick CRCA sheet steel , With Ammeter, Voltmeter, PF Meter, KWH Meter, MDI Meter, Selector Switches as required, CRT-CT ( protection-200/ 5A 15VA ; CI-1.0 &amp; Measuring 400/5A 15VA CI-1.0) , PT (11 KV / 110V/√3) , Fuses , IP42 Protection CI 4-window Annunciation Panel , AC/ DC Control voltage 24/48/ 110/230V , LED Indication lamps , S/C, O/C &amp; E/F Protection (IDMT) Relays Alarm &amp; trip contacts for Transformer protection (high winding temperature)etc. complete in all</p>  | 1.00 | EA |  |  |

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| <p>respect in order to ready to use.</p> <p>"</p> <p>This specification covers 3-pole, 50HZ, 11KV vacuum circuit breaker for indoor type:</p> <p>"1. APPLICABLE STANDARDS:</p> <p>Unless otherwise modified in this specification, the vacuum circuit breakers shall comply with the following Indian standards as amended from time to time:</p> <p>IS-2516 : Circuit Breakers</p> <p>IS-3156 :Voltage Transformers</p> <p>IS-2705: Current Transformers</p> <p>2. RATED VOLTAGE:</p> <p>The rated voltage for the circuit breaker shall be 12KV. This represents the highest system voltage corresponding to the nominal system voltage of 11 KV.</p> <p>3. RATED CURRENT:</p> <p>The standard rated normal current shall be 630A.</p> <p>The bus-bar rating of the indoor type VCB shall be 800A.</p> <p>4. RATED SHORT-CIRCUIT BREAKING CAPACITY:</p> <p>The effective value of the rated short-circuit breaking current shall be 32KA.</p> <p>The value of D.C component shall be calculated in accordance with the recommendations contained in IS 2516.</p> <p>5. RATED SHORT-CIRCUIT MAKING CAPACITY:</p> <p>The rated short-circuit making current of the circuit breakers shall be taken as 2.5 times the rms value of the a.c. component of the rated short-circuit breaking current.</p> <p>6. TECHNICAL SPECIFICATION OF 11 KV SINGLE PANEL VCB</p> <p>6.1CUBICLE AND CIRCUIT BREAKER DETAILS:</p> <p>Cubicle &amp; breaker and their accessories for 11KV, indoor VCB panel should be fully factory built and assembled for direct installation. Designed, manufactured and tested in accordance with Is-123118, 14658, 2071 3427 &amp; IEC-60056/60298 and having following specifications. Circuit breaker &amp; cubilce must have CPRI test certificate for design and performance as per above standards.</p> <p>6.2CUBICLE:</p> <p>The horizontal draw out and horizontal isolation type circuit breaker cubicles should be fabricated using high quality sheet steel of minimum thickness 2.5mm as per IS. The sheet metal should be given seven tank anti</p> |  |  |  |  |
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| <p>corrosion treatment &amp; then powder coated.<br/>Colour- SIEMENS GREY.</p> <p>The totally metal enclosed panel shall be compartmentalized with internal positioning of insulated material of epoxy reinforced fiber glass to provide the following:</p> <ul style="list-style-type: none"> <li>a) Bus bar compartment .</li> <li>b) Circuit Breaker Compartment.</li> <li>c) CT and Cable Compartment.</li> <li>d) Relay &amp; Metering. compartment (L T Chamber).</li> </ul> <p>6.3 The L.T chamber of suitable height shall be separated and suitably mounted on frame for ease of testing and maintenance. Auxiliary controls, protective relay and measuring equipment along with the switches and indications are to be accommodated in the L. T. chamber. Three nos. of bright steal hinges shall be used on front door with door opening limited tom 135 Degree (approx). All devices in the L T box are to be marked with permanent labels. Panel rating plate shall be provided on the door.</p> <p>6.4 Bus bar shall be rectangular in cross section and made from electrolytic grade electro tinned copper having 99.99% conductivity. Busbar current rating-2000 Amp. Fault rating-32kA (Breaking). Heat shrinkable sleeve insulation of 11 KV voltage grade should be provided on busbar and its risers. Busbar arrangement should be such that in future similar cubicles can be connected sidewise with this cubicle."</p> <p>"6.5 Cast epoxy insulator supports for busbar &amp; cable termination links designed to withstand full short circuit current at specified fault level for minimum 3 seconds shall be provided.</p> <p>6.6 The circuit breakers shall be mounted on horizontal draw out truck. The circuit breaker truck should have horizontal isolating system.</p> <p>6.7 The front door shall have view glass to facilitate observation of mechanical ON/OFF indication and operation counter.</p> <p>6.8 The draw out truck shall have the following positions</p> <ul style="list-style-type: none"> <li>a) Isolated</li> <li>b) Test</li> <li>c) Service</li> </ul> <p>6.9 The CT and the incoming cable compartment shall be in the rear. The outgoing cable compartment shall be</p> |  |  |  |  |
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provided on the back side. The L T control cable terminal arrangement shall be provided in the rear side and in a separate box so as to have isolation from high voltage terminals. All the cable entry plates shall have removable gland plates.

6.10 The CT required for metering and protection shall be as per IS-2705 & shall be sized adequately and its insulation will be epoxy cast type. Metering CT 15V A, Class-5P10, ratio 30-60/5. Protection CT, 15VA, Class-5P10, Ratio- 30-60/5. Short time rating -32KA for minimum 1 sec.

6.11 PT shall be epoxy cast resin type & as per IS-3156. PT should be horizontal draw out type Ratio 11 kv/ 110V (phase to phase), 100VA & protected with HRC fuse on both HT & L T side.

6.12 Panel shall have proper protective earthing terminals for connection to external earth straps.

6.13 Earthing connection between truck and cubicle shall be provided by means of sliding contact. The truck earthing should be arranged in such a way that the truck is earthed in isolated position when inserted. While the truck is being withdrawn, the earthing connection shall not be interrupted until the truck has moved past the isolated position.

6.14 The following minimum safety interlocks shall be provided.

a) The truck cannot be moved from test to service position or vice versa, when the CB is ON.

b) The CB cannot be switched ON when the truck is in any position between test and service."

"6.15 The following minimum safety devices shall be provided to ensure the safety of operating personnel

a) Individual explosion vents for Bus bars/Breaker/Cable and CT chambers on the top of the panel to let out the gases under pressure generated during unlikely event of a fault inside the panel.

b) Front door/panel sides to be pressure tested to withstand arc faults.

c) CB and metal enclosure earthed in accordance with latest IS published by BIS(IS-251 6, part- 1, section-I)

d) Self operating shutters, shielding live fixed contacts, shall be provided which closes automatically when truck is withdrawn to test position. Locking arrangement should be provided for the shutters.

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| <p>6.16 Control wiring and CT wiring shall be done using single core, PVC insulated, stranded copper cable of 11 OOV grade and 2.5 sq. mm. size. All cables and wires shall be numbered with suitable ferrules. Suitable lugs shall be used for control wiring and ring type lugs shall be used for CT wiring. All wires shall terminate on suitable Terminal Blocks. All TBs shall have 10% spare terminals. TBs shall be marked. Reinforced flexible conduit shall be used for wiring and PVC spiral shall be provided on exposed wires near the door hinge in L T box. Colour coding of control cables shall be followed as required by ISI. Control cables shall be approved by IS-694.</p> <p>6.17 Panel shall be provided with space heaters and adjustable thermostats of suitable rating along with protective HRC fuses and ON/OFF switch.</p> <p>6.18 Lifting hooks shall be provided for the panels.</p> <p>6.19 The switchgear panels shall have the following identification markings in a proper way in permanent manner:</p> <p>a) Panel name in front and rear.</p> <p>b) Caution and danger board in front &amp; rear.</p> <p>c) CT specification name plate on CT and at panel cover at rear.</p> <p>d) Incoming &amp; outgoing cable box.</p> <p>"</p> <p>"Insulation system of the cubicles should withstand extreme humid condition and suitable for use under site condition mentioned in para 2.1.</p> <p>2.0 PANEL EQUIPMENT AND ACCESSORIES:</p> <p>1. MC type Ammeter 144 x 144 mm size dual scale 0-30/60A for line current measurement.</p> <p>Accuracy- 1%. Make: AE.</p> <p>2. MC type Voltmeter 144 x 144 mm size., scale 0-15kV for line Voltage measurement.</p> <p>Accuracy- 1%. Make: AE.</p> <p>3. Digital type KWH Meter with additional facility for showing current, voltage, PF, MDL Meter approved by IS or IEC for performance and safety. Meter shall be suitable for operation in tropical environment with 40 deg C temp and 90o/o humidity. Make: Conserve, L&amp;T, GE.</p> <p>4. Ammeter and Voltmeter Selector switch : 1 no. each</p> <p>5. Trip circuit check push button.</p> <p>6. LED type Indication lamp for:</p> <p>i) CB Close,</p> |  |  |  |  |
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| <p> ii) CB open,<br/> iii) Trip on fault,<br/> iv) Trip circuit healthy.<br/> v) Spring Charged. LEDs to be LVGP.<br/> 7. Breaker closing and tripping switch: For closing and tripping through 110V DC closing and 110V DC shunt trip coil.<br/> 8. Control supply shall be taken from the PT through suitably rated Power Pack having following specifications: .<br/> a. 110V AC input supply to the power pack shall be taken from PT output.<br/> b. 3 phase rectifier with 800 PIV shall be used in power pack.<br/> c. Surge suppressor suitable for numeric relays shall be provided in the power pack.<br/> d. Power pack shall be protected through suitable input HRC fuses.<br/> e. Battery shall be provided in the power pack to provide DC power for 30 minutes after incoming power failure. This<br/> f. Suitable filters should be provided in the power pack to give ripple free DC output for reliable relay operation.<br/> 9. One no. combined Numeric relay for overload, short circuit and earth fault protection of transformer.<br/> Type : Micom 122 of Schneider make.<br/> 10 . Auxiliary relays for sounding alarm and tripping of VCB panel in case of transformer fault. One buzzer type alarm shall be provided in the panel.<br/> 11 . Trip circuit supervisory relay- 1 No. Schneider make.<br/> 12. One set of operating handles for manual spring charging and breaker racking in/out.<br/> 13. The handle should have Auto, Manual, Off &amp; Trip positions clearly indicated.<br/> "<br/> <br/> "2.1 SITE CONDITION:<br/> 1. a) Maximum Ambient air temperature - 50°C<br/> b) Minimum Ambient air temperature - 2°C<br/> 2. Maximum humidity at site ( at 40 °C) - 60%<br/> 3. Surrounding atmospheric condition - Dry<br/> 4. Site altitude(above sea level) - 231Metre (approx)<br/> 5. Seismic design co-efficient - As per 1983<br/> 6. Rainfall: 360mm annually (approx)<br/> 3.0 CIRCUIT BREAKER:<br/> The breaker used shall be three pole VACUUM CIRCUIT BREAKER having the following features: </p> |  |  |  |  |
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| <p>a. Draw out type with Horizontal Isolation mounted on truck with rollers.</p> <p>b. Truck cover with two handles and fixed to truck frame with four screws.</p> <p>c. Truck earthing with welded boss.</p> <p>d. Insulation bushings shall be epoxy cast resin type and suitable for ambient conditions mentioned in para 2.1.</p> <p>e. Bushings shall have suitable silver coated, flower contacts for firm connection.</p> <p>f. Manual &amp; motor operated spring charging system.</p> <p>g. 11 kV, Three pole, 800A continuous rating, 32kA fault level.</p> <p>h. Auxiliary contacts (6 NO + 6NC ).</p> <p>i. Operation counter of 5 digits.</p> <p>j. Mechanical endurance of 50,000 (minimum) operations.</p> <p>k. Mechanical ON/OFF indication.</p> <p>l. Spring FREE/ CHARGED indication.</p> <p>m. Position indicator : Service/ TEST/ ISOLATE.</p> <p>n. Low maintenance:</p> <p>o. Manual ON and TRIP button.</p> <p>p. Operating sequence: 0: 0.3 min ; CO : 3 min ; CO.</p> <p>q. Shunt trip coil, closing coil: 110V DC rated.</p> <p>4.0 CABLE TERMINAL BOX:</p> <p>HT cable boxes with termination links for termination of incoming and outgoing HT cables should be provided in the rear and side of the unit. Rear incoming cable box should be of suitable size for safe entry of one no. of incoming cable and should have suitable terminal links for safe termination of incoming cable. One no. outgoing cable will be terminated in the cable box mounted on side. Size for incoming and outgoing cables, 3 x 240sq. mm, 11kV grade, XLPE insulated, PVC sheathed, Aluminium Conductor, Armoured cable. Suitable nos of detachable gland plates with suitable size of heavy duty cable glands shall be provided in the bottom entry plates of both the cable boxes. Separate gland plates shall be provided for both the incoming cables in the incoming cable box. Rear entry LT cable termination box with suitable single compression cable glands for heater supply cable and control cable from transformer marshalling box should be provided.</p> <p>MAKE:<br/>Crompton Greaves, Siemens, ABB, Siemens</p> <p>"</p> |  |  |  |  |
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|    | Rated voltage - 12kv<br>Rated current - 1250A<br>Withstand voltage - 75 kv<br>Withstand current - 32 ka<br>IP Rating - IP33   |      |     |  |  |
| 89 | Supply, Installation, Testing & Commissioning of HT metering cubical panel as approved By DISCOMs fabricated out of 14 SWG CRCA sheet steel in two compartment & MS angle of size 60mmX6mm having provision for Following:<br>(i)Provision for fixing Trivector Meter (To be supplied by DISCOMs) (ii)Provision for fixing of combined CT PT Set (To be supplied by DISCOMs), (iii)TT Block, (iv) 6mm Bakelite sheet on all sides, (V) 3/6 core copper cable for interconnections etc. as required.   | 1.00 | EA  |  |  |
| 90 | Supply & Making of D.P. Structure With AIR BREAK SWITCH having following specifications:(BSR-2013)<br>DP :double pole structure on 2 no ISMB 125 x 70 mm, 10 mtr high using 7 no MS channel each of size 100 mm x 50 mm x 2500 mm complete in all respect with nuts, springs washers, clamps as required.<br>GO:Off load type gang operated 3-pole vertical flute type switch suitable for 11KV ; 400A ,3-ø, central post rotating double break isolator complete with MS hardware , copper moving & fixed contact ,assembly of 9 nos pin insulator ,GI pipe of suitable length for operation.<br>DO: 3nos Vertical / Horizontal mounted 11kv horn gap fuse set /drop out 11kv barrel fuses mounted on 6no pin insulators<br>LA: 3 piece non linear resistor type. lighting arrestor of approved make suitable for 3 wire, 11kv Overhead line with rated voltage of 9kv rms & nominal discharge current rating of 5 ka & complete with galvanized clamping arrangement GI bolts, nuts, washer etc as required.<br>JUMPERS: 3 no 11kv acsr conductors mounted on pin type insulators as required.<br>6.GENERAL:The go shall be operated by hand operated liver properly earthed with provision for locking mounted at 3' | 1.00 | EA  |  |  |
| 91 | "Supply, Installation, Testing and Commissioning of Silent 320 KVA DG Set complete with 1500 RPM Diesel Engine of suitable BHP & AC Brush less SPDP Alternator mounted on a common base Frame & coupled through a flexible coupling or close coupled for feeding loads like Lights, ACs, Computers, Fans, Motors, Lifts etc. on continuous basis.   | 1.00 | SET |  |  |

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| <p>Alternator shall be self regulated with standard Alternator Protection( Over voltage , over speed &amp; under voltage).</p> <p>"</p> <p>"A. ALTERNATOR:</p> <p>a) Type : Brushless</p> <p>b) Actual power 320 KVA at 50 degree celsius</p> <p>c) Frequency : 50 Cycles/sec, Frequency variation-± 1%</p> <p>d) Supply system :3 phases &amp; neutral</p> <p>e) Connection: Star</p> <p>f) Rated voltage: 415 Volts, Variation of voltage from No load to full load-± 2 % of rated voltage.</p> <p>g) Rated rpm. : 1500 rpm. max</p> <p>h) Enclosure : IP-23</p> <p>i) Insulation : Class 'H'</p> <p>j) Voltage: Automatic voltage</p> <p>k) Maximum permissible time Building up rated voltage From stand still-Less than 20 seconds.</p> <p>"</p> <p>"B. ENGINE:</p> <p>Engine shall have residential silencer, up to 10 M exhaust piping , electronic / Mechanical governor, Manual &amp; electric Start ,Batteries, Fuel tank ( with Stand) &amp; piping , control panel (16 G) with MCCB (4P; 25 KA), Ammeter, Voltmeter, Frequency Meter, Energy Meter &amp; Hour Meter, Engine instruments panel, AVM and with Weatherproof, powder coated Acoustic enclosure for DG set for sound attenuation fabricated from 2.0 mm CRCA sheet steel (structure) with side wall fabricated from 2.0 mm CRCA sheet &amp; filled with 100mm thick glass wool(96Kg/m3) as per IS 8183 the doors of 100 mm thick and fabricated from 1.6mm CRCA sheet packed with acoustic material, floor of MS chequered plate 5.0mm thick, canopy fixed with axial flow fan of Alstom, Almonard make.</p> <p>"</p> <p>"All doors/ opening are sealed with neoprene/EPDN gaskets. The enclosure has built in fuel tank, residential silencer (isolated from main DG chamber) with protection and tripping of DG set against temperature of more than 50 degree centigrade. All controls for operation of DG set are from outside the enclosure with DG control panel mounted inside enclosure , visible and accessible from outside. The enclosure should be suitable for following capacity DG sets and alternator. Noise level</p> |  |  |  |  |
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| <p>shall be less than 75 db(A) at a distance of 1 mtrs. duly certified by authorised agency etc. complete in all respect of following capacity :</p> <p>B. DIESEL ENGINE:</p> <p>a) Type: Multi-cylinder with direct radiator, Turbo charged with Heat Exchanger with oil cooler.</p> <p>b) No. of strokes:: 4</p> <p>c) Fuel injection :Direct</p> <p>d) Maximum speed : 1500 RPM</p> <p>e) Rated power: 380 BHP (minimum)</p> <p>f) Cooling of: Water cooled</p> <p>g) Cylinders with Oil cooled remote Radiator</p> <p>h) Engine : Battery starting.</p> <p>i) Starting : Universal. Auto/Manual position</p> <p>j) Engine shall be at least BS-VI complied."</p> <p>"ACCESSORIES:</p> <p>The Diesel Engine shall be equipped with minimum following/ as indicated in the specifications, devices/accessories built-in type including all standard fillings:</p> <p>a) Fuel supply pump with manual venting pump.</p> <p>b) Radiator</p> <p>c) Turbo charger with air filter (dry/oil bath type) and damper.</p> <p>d) Charge oil cooler</p> <p>e) Suction fuel filter</p> <p>f) Lube oil filter</p> <p>g) Electronic Isochronus Governor of suitable class</p> <p>h) Hourneter and RPM indicator</p> <p>i) Battery Starting Mechanism.</p> <p>j) AMF Panel having the complete with following:</p> <p>1)Starting Switch incorporated in touch panel/push button</p> <p>2)Lub. Oil Temp. gauge</p> <p>3)Lub. Oil pressure gauge</p> <p>4)Water Temp. gauge</p> <p>5)Control devices for safety and monitoring alongwith indicators.</p> <p>"</p> <p>"a) Common base/foundation frame</p> <p>b) Fly wheel and flexible coupling</p> <p>c) Automatic voltage regulator (A VR)</p> <p>d) Lube oil filter</p> <p>e) Fuel oil filter</p> <p>f) Fully insulated and suitably supported class '8' MS Exhaust pipe of required size minimum 3.25m above the highest point of the terrace</p> <p>g) Day storage tank for not less than 650 ltr</p> |  |  |  |  |
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|    | <p>capacity fabricated out of 3mm thick MS sheet, with M.S. fuel pipe line, high &amp; low level indicator and alarm contacts.</p> <p>h) Residential type silencer</p> <p>i) Anti vibration pads</p> <p>j) Necessary batteries (minimum 2 of 180 AH capacity) with leads and mounting frame etc.</p> <p>k) The lubricants, coolant, to be filled to the fullest &amp; fuel (day storage tank) sufficient for testing.</p> <p>l) All the above housed in a suitable Sound attenuated enclosure as per specifications and required Set."</p> <p>Mode of operation-Auto Start</p> <p>Capacity of largest rating Motor starting-To be furnished</p> <p>Radiator cooled and Turbo charged</p> <p>Alternator, 320 KVA at 50 degree celsius, at 0.8 pf (lag), 415V, 50Hz, 3-Ø</p>  |        |     |  |  |
| 92 | <p>SITC of Sealed Maintenance Free Lead Acid Battery with Charger required for supply of continuous 24 V DC output voltage for closing/tripping/indication circuit of the VCB panel board.</p> <p>ii) Voltage of each battery: 2.0 V, 200 AH,</p> <p>ii) 12 Nos. batteries shall be connected in series to give 24 V DC output</p> <p>iii)The batteries shall be kept on insulated type rack and interconnected with silicon insulated Cable with terminal</p> <p><b>B. BATTERY CHARGER</b></p> <p>i) Charging current: 20 A or as required</p> <p>ii) Float and boost charging facility shall be available.</p> <p>iii) Incomer to battery charger shall have single-phase supply with 20 Amps DP MCB with overload and short circuit protection.</p> <p>iv) Outgoing shall be double pole 20A MCBs- 3 Nos</p> <p>v) Protection for control circuit shall be provided.</p> <p>vi) Float and Boost charging ammeters to be provided</p> | 1.00   | SET |  |  |
| 93 | <p>SITC of 4 ft LED batten type light fixture made from PC suitable for mounting LED tube system (integral driver), Power Consumption of 20W, 100 lm/Watt output, life time of 50,000 burning hours with 70% initial lumen maintained. CCT 4000°K minimum.</p>  | 520.00 | EA  |  |  |
| 94 | <p>SITC of 2 ft LED batten type light fixture made from PC suitable for mounting LED tube system (integral driver), Power</p>   | 155.00 | EA  |  |  |

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|     | Consumption of 10W minimum 100 lm/Watt output, life time of 50,000 burning hours with 70% initial lumen maintained. CCT 4000°K minimum.   |          |    |  |  |
| 95  | SITC of Round surface mounted LED panel. PDC aluminium housing and high translucent frosted plastic diffuser makes it a robust Luminaire, 12W. Efficacy 100lm/w CCT 4000°K minimum  | 2,615.00 | EA |  |  |
| 96  | SITC of 2 module LED foot lamp , 2W (Max)   | 152.00   | EA |  |  |
| 97  | SITC of IP 65 / IP66 protected High Power LED Flood Light system with extruded aluminium housing, toughened glass diffuser with suitable lenses on LED to achieve various beam angles, 240V, 50Hz - High Power LED lamps supplied with pre-wired cable of 1 mtr. Integrated Driver shall be high efficiency having efficiency > 85% and in compliance to IEC standards. System life of 25,000 Burning Hours with 70% of initial Lumens maintained. Light output in Cool white or Warm White Colour as per engineers choice. Fixtures shall be CE and compliance. High Power LED Flood Light 50W | 82.00    | EA |  |  |
| 98  | SITC of IP65 IK10 protected LED Bollard fixture with extrusion aluminium housing, LED 10W, 220V-240V, 50Hz LEDs with available in quick connecting cable coupled with various mounting accessories. Driver shall be high efficiency having efficiency > 85% and in compliance to IEC standards (Integral with light fixture). system life of 25000 Burning Hours with 70% of initial Lumens maintained. Light output in Cool white or Warm White Colour as per engineers choice. Fixtures shall be CE compliance. 0.8 mtr high bollard  | 35.00    | EA |  |  |
| 99  | SITC of 10 W LED under water fixture, IP 67. Provide & Fixing of underwater Luminaire suitable for use with 230V reflector lamp in R30 shell with corrosion resistant housing made from Brass Connector box ,Heat Resistant toughened glass front Cover , Heat Resistant silicon rubber gasket to provide ingress protection of IP-67 .   | 12.00    | EA |  |  |
| 100 | Supply and erection of M S swaged tubular pole conforming to IS: 2713-1980 (part I to II) with galvanised base plate in position including excavation of the pit and filling the same with C.C. of M-20 grade (1:1.5:3) from  | 40.00    | EA |  |  |

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|     | base plate to 50 cm above ground level, with the help of steel frame not less than 40 cm dia up to 114.3mm outer dia and 50 cm beyond 114.3mm outer dia around the pole. Duly finished with cement plaster, earthing terminals , cable entry, GI cable sleeve complete as required. The pole shall be fabricated by using ISI mark tube for structural purpose of following height & designation.<br>Height: 8.5 Mtr.  |        |   |  |  |
| 101 | Supplying of 3X240 sqmm, XLPE insulated IS:7098/II/85 approved multistranded H.T. Aluminium armoured cable for working voltage 11 K.V. Earthed direct in ground  | 120.00 | M |  |  |
| 102 | Supplying of 4X6 sqmm, IS Approved PVC/XLPE insulated & sheathed multistranded armoured cable of 1.1 kV grade with Aluminium conductor   | 300.00 | M |  |  |
| 103 | Supplying of 4X10 sqmm, IS Approved PVC/XLPE insulated & sheathed multistranded armoured cable of 1.1 kV grade with Aluminium conductor  | 660.00 | M |  |  |
| 104 | Supplying of 4X16 sqmm, IS Approved PVC/XLPE insulated & sheathed multistranded Copper armoured cable of 1.1 kV grade.   | 800.00 | M |  |  |
| 105 | Supply of 4X25 sqmm, IS approved, 1.1 KV grade, PVC/XLPE insulated and sheathed, multistranded aluminium armoured cable  | 660.00 | M |  |  |
| 106 | Supply of 3.5x70 mmsq PVC 1100v grade, Heavy duty, PVC insulated, Black PVC sheathed cable with stranded, Aluminium conductor. The cable shall be approved by IS: 1554 with latest amendments. PVC insulation should be as per IS-5831. Manufacturer's name, cable size, voltage grade, ISI mark should be marked on the cable outer sheath in permanent manner at regular interval. Sequential marking should be provided on the cable outer sheath at every one meter length for measurement during use. | 250.00 | M |  |  |
| 107 | Supply of 3.5x185 mmsq PVC 1100v grade, Heavy duty, PVC insulated, Black PVC sheathed cable with stranded, Aluminium conductor. The cable shall be approved by IS: 1554 with latest amendments. PVC insulation should be as per IS-5831. Manufacturer's name, cable size, voltage grade, ISI mark should be marked on the cable outer sheath in permanent manner at regular interval. Sequential marking should be provided on the cable outer sheath at every one meter length for measurement            | 800.00 | M |  |  |

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|     | during use.   |        |    |  |  |
| 108 | Supply of 3.5x240 mmsq PVC 1100v grade, Heavy duty, PVC insulated, Black PVC sheathed cable with stranded, Aluminium conductor. The cable shall be approved by IS: 1554 with latest amendments. PVC insulation should be as per IS-5831. Manufacturer's name, cable size, voltage grade, ISI mark should be marked on the cable outer sheath in permanent manner at regular interval. Sequential marking should be provided on the cable outer sheath at every one meter length for measurement during use. | 800.00 | M  |  |  |
| 109 | Supply of 1X10 sqmm, IS approved, multistranded, Copper cable for earthing  | 800.00 | M  |  |  |
| 110 | Supply of 1x25 mmsq PVC 1100v grade, Heavy duty, PVC insulated, Black PVC sheathed cable with stranded, Aluminium conductor. The cable shall be approved by IS: 1554 with latest amendments. PVC insulation should be as per IS-5831. Manufacturer's name, cable size, voltage grade, ISI mark should be marked on the cable outer sheath in permanent manner at regular interval. Sequential marking should be provided on the cable outer sheath at every one meter length for measurement during use.    | 250.00 | M  |  |  |
| 111 | Supply of 1x120 mmsq PVC 1100v grade, Heavy duty, PVC insulated, Black PVC sheathed cable with stranded, Aluminium conductor. The cable shall be approved by IS: 1554 with latest amendments. PVC insulation should be as per IS-5831. Manufacturer's name, cable size, voltage grade, ISI mark should be marked on the cable outer sheath in permanent manner at regular interval. Sequential marking should be provided on the cable outer sheath at every one meter length for measurement during use.   | 800.00 | M  |  |  |
| 112 | SITC of 5 star rated vertical storage water heater with outer casing made of M.S. sheet finished with anti-corrosive powder coating, inner tank made of pure electrolytic copper/stainless steel / SPHP, Tubular copper sheathed and Nickel plated heating element/ twin ceramic cartridge heating element, stem type thermostat and thermal cut out, Dual indicating lamps for power supply and thermostat, PUF insulation,  | 170.00 | EA |  |  |



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|     | Pressure release valve, fusible plug etc. as required held in position with 4 no. rack bolts, duly wired with 3 core 2.5/4.0 Sqmm PVC insulated & sheathed copper conductor and 16 A/25A three pin plug top, including making inlet, outlet heavy gauge C.P./ Flexible alloy connection, testing etc. as required. Capcaity-15 Ltrs.  |      |     |  |  |
| 113 | <p>Complete Design, Manufacture and Supply of 250 KWp. Grid Connected Rooftop Solar PV System Complete with Solar Poly crystalline PV modules with mounting arrangement, necessary net meter etc. &amp; other Accessories and connecting cables etc. to be installed at OIL Township, Oil India Limited, Jodhpur, Rajasthan, India.</p> <p>The 250 KWp grid interactive solar photovoltaic power plant (without battery back-up) at the Rooftop of OIL Township, Oil India Limited (OIL), Jodhpur, Rajasthan, India shall consist mainly of the following components:</p> <ol style="list-style-type: none"> <li>1.Solar Poly crystalline PV Modules</li> <li>2.Module Mounting Structures</li> <li>3.Inverter(S)/ Power Condition Unit:</li> <li>4.PV Cable</li> <li>5.MC4 Connector (Pair Male-Female)</li> <li>6.Junction Boxes</li> <li>7.AC Cable</li> <li>8.Distribution Boxes, cables and accessories</li> <li>9.LT Panel</li> <li>10.Monitoring System</li> <li>11.Earthing System</li> <li>12.Lightening Arrester</li> <li>13.Measurement Of Energy and Metering</li> <li>14.Surge protection devices in both DC power side and AC power side.</li> </ol> <p>Any other items or components felt necessary or important for successful installation, testing and commissioning of the 250KWp Rooftop Solar PV Plant, over and above item listed above shall also be considered during bidding.<br/>(details as per SCC)</p> | 1.00 | SET |  |  |
| 114 | <p>1ST YEAR OF 5YEARS COMPREHENSIVE AMC FOR 250KWp ROOFTOP SOLAR PV SYSTEM.</p> <p>Supplier of the solar PV plant has to take over the annual maintenance of the plant for 5 years once the plant is successfully handed over to OIL after installation &amp; commissioning.</p> <p>Successful Handover: After completion of 3 months of stabilization period.</p> <p>Date of Commissioning: The day whole plant is commissioned and successfully connected</p>   | 1.00 | AU  |  |  |

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| <p>to the Grid (DISCOM-JdVVNL).</p> <p>CONTRACT GUIDELINES: It is the responsibility of the contractor to ensure maximum output from the plant by cleaning/maintaining the equipment on a regular basis during the whole contract period (O&amp;M) as per OEM recommendation. The contractor shall maintain the plant along with spares for 5 years</p> <p>Compensation Calculation:</p> <p>Agreed Performance Ratio in Percentage (as per your quote): A</p> <p>Achieved Performance Ratio in Percentage: B</p> <p><math>B = \frac{\text{Achieved Annual Energy Production}}{\text{Nominal Annual Energy Production in kWh} \times \text{Nominal Annual Energy Production in kWh} \times \text{Annual Cumulative Solar Irradiation intensity (KWHr/m}^2\text{) for the that year X Generator area of the PV plant (m}^2\text{) X Efficiency of the PV modules}}</math></p> <p>Difference = A-B</p> <p>Compensation = *Calculated AEP for the Year X (A-B) X Unit Rate X 25</p> <p>*Calculated AEP for the Year = Nominal AEP for the Year X Guaranteed PR</p> <p>Unit rate = (Tariff @ LT Commercial rate of corresponding year)</p> <p>Calculation:</p> <p>First Year:</p> <p>At the end of the first year, if the plant failed to achieve the PR (A above) than</p> <p>a) The contractor shall compensate as follows:</p> <p>Guaranteed PR: A</p> <p>Achieved PR: B1</p> <p>Difference: A-B1</p> <p>Compensation: (Calculated AEP with the Guaranteed PR) X (A-B1) X 25 Years</p> <p>Second Year onwards:</p> <p>b) If the PR quoted in the Table-1 for the second year is equal or more than the achieved PR of first year then no compensation will be levied.</p> <p>If the achieved PR for the second Year is less than the achieved PR of the first Year but equal to the Guaranteed PR for second year as quoted in Table-1, then no compensation will be levied.</p> <p>If the achieved PR is less than the Guaranteed PR for the second year as quoted in Table-1 and less than the achieved PR of first Year then compensation will be calculated as follows:</p> <p>Achieved PR of First Year: B1</p> <p>Second Year Guaranteed PR (Table-1): A2</p> <p>Second Year achieved PR: B2</p> |  |  |  |  |
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|     | <p>Difference: (B1/A2 whichever is less)-B2<br/> Compensation: (Calculated AEP with the Guaranteed PR for the second Year) X Difference X 24 Years.<br/> This will continue for the remaining years of O&amp;M.</p> <p>The bidders are requested to compulsorily quote Performance Ratio(PR) for 25 years in the table under Annual Energy Production (AEP) for 25 Years Period for evaluation purpose.<br/> (details as per SCC)</p>   |      |    |  |  |
| 115 | <p>2nd YEAR OF 5YEARS COMPREHENSIVE AMC FOR 250KWp ROOFTOP SOLAR PV SYSTEM.</p> <p>Supplier of the solar PV plant has to take over the annual maintenance of the plant for 5 years once the plant is successfully handed over to OIL after installation &amp; commissioning.</p> <p>Successful Handover: After completion of 3 months of stabilization period.</p> <p>Date of Commissioning: The day whole plant is commissioned and successfully connected to the Grid (DISCOM-JdVVNL).</p> <p>CONTRACT GUIDELINES: It is the responsibility of the contractor to ensure maximum output from the plant by cleaning/maintaining the equipment on a regular basis during the whole contract period (O&amp;M) as per OEM recommendation. The contractor shall maintain the plant along with spares for 5 years</p> <p>Compensation Calculation:<br/> Agreed Performance Ratio in Percentage (as per your quote): A<br/> Achieved Performance Ratio in Percentage: B<br/> <math>B = \frac{\text{Achieved Annual Energy Production}}{\text{Nominal Annual Energy Production in kWh} \times \text{Annual Cumulative Solar Irradiation intensity (KWHr/m}^2\text{) for the that year X Generator area of the PV plant (m}^2\text{) X Efficiency of the PV modules}}</math><br/> Difference = A-B<br/> Compensation = *Calculated AEP for the Year X (A-B) X Unit Rate X 25<br/> *Calculated AEP for the Year = Nominal AEP for the Year X Guaranteed PR<br/> Unit rate = (Tariff @ LT Commercial rate of corresponding year)<br/> Calculation:<br/> First Year:<br/> At the end of the first year, if the plant failed to achieve the PR (A above) than</p> | 1.00 | AU |  |  |

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|     | <p>a) The contractor shall compensate as follows:<br/> Guaranteed PR: A<br/> Achieved PR: B1<br/> Difference: A-B1<br/> Compensation: (Calculated AEP with the Guaranteed PR) X (A-B1) X 25 Years<br/> Second Year onwards:<br/> b) If the PR quoted in the Table-1 for the second year is equal or more than the achieved PR of first year then no compensation will be levied.<br/> If the achieved PR for the second Year is less than the achieved PR of the first Year but equal to the Guaranteed PR for second year as quoted in Table-1, then no compensation will be levied.<br/> If the achieved PR is less than the Guaranteed PR for the second year as quoted in Table-1 and less than the achieved PR of first Year then compensation will be calculated as follows:<br/> Achieved PR of First Year: B1<br/> Second Year Guaranteed PR (Table-1): A2<br/> Second Year achieved PR: B2<br/> Difference: (B1/A2 whichever is less)-B2<br/> Compensation: (Calculated AEP with the Guaranteed PR for the second Year) X Difference X 24 Years.<br/> This will continue for the remaining years of O&amp;M.</p> <p>The bidders are requested to compulsorily quote Performance Ratio(PR) for 25 years in the table under Annual Energy Production (AEP) for 25 Years Period for evaluation purpose.<br/> (details as per SCC)</p> |      |    |  |  |
| 116 | <p>3rd YEAR OF 5YEARS COMPREHENSIVE AMC FOR 250KWp ROOFTOP SOLAR PV SYSTEM.<br/> Supplier of the solar PV plant has to take over the annual maintenance of the plant for 5 years once the plant is successfully handed over to OIL after installation &amp; commissioning.<br/> Successful Handover: After completion of 3 months of stabilization period.<br/> Date of Commissioning: The day whole plant is commissioned and successfully connected to the Grid (DISCOM-JdVVNL).<br/> CONTRACT GUIDELINES: It is the responsibility of the contractor to ensure maximum output from the plant by cleaning/maintaining the equipment on a regular basis during the whole contract</p>  | 1.00 | AU |  |  |

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| <p>period (O&amp;M) as per OEM recommendation.<br/> The contractor shall maintain the plant along with spares for 5 years<br/> Compensation Calculation:<br/> Agreed Performance Ratio in Percentage (as per your quote): A<br/> Achieved Performance Ratio in Percentage: B<br/> <math>B = \frac{\text{Achieved Annual Energy Production}}{\text{Nominal Annual Energy Production in kWh} \times \text{Annual Cumulative Solar Irradiation intensity (KWHr/m}^2\text{) for the that year X Generator area of the PV plant (m}^2\text{) X Efficiency of the PV modules}}</math><br/> Difference = A-B<br/> Compensation = *Calculated AEP for the Year X (A-B) X Unit Rate X 25<br/> *Calculated AEP for the Year = Nominal AEP for the Year X Guaranteed PR<br/> Unit rate = (Tariff @ LT Commercial rate of corresponding year)<br/> Calculation:<br/> First Year:<br/> At the end of the first year, if the plant failed to achieve the PR (A above) than<br/> a) The contractor shall compensate as follows:<br/> Guaranteed PR: A<br/> Achieved PR: B1<br/> Difference: A-B1<br/> Compensation: (Calculated AEP with the Guaranteed PR) X (A-B1) X 25 Years<br/> Second Year onwards:<br/> b) If the PR quoted in the Table-1 for the second year is equal or more than the achieved PR of first year then no compensation will be levied.<br/> If the achieved PR for the second Year is less than the achieved PR of the first Year but equal to the Guaranteed PR for second year as quoted in Table-1, then no compensation will be levied.<br/> If the achieved PR is less than the Guaranteed PR for the second year as quoted in Table-1 and less than the achieved PR of first Year then compensation will be calculated as follows:<br/> Achieved PR of First Year: B1<br/> Second Year Guaranteed PR (Table-1): A2<br/> Second Year achieved PR: B2<br/> Difference: (B1/A2 whichever is less)-B2<br/> Compensation: (Calculated AEP with the Guaranteed PR for the second Year) X Difference X 24 Years.<br/> This will continue for the remaining years of O&amp;M.</p> |  |  |  |  |
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|     | <p>The bidders are requested to compulsorily quote Performance Ratio(PR) for 25 years in the table under Annual Energy Production (AEP) for 25 Years Period for evaluation purpose.<br/>(details as per SCC)</p>   |      |    |  |  |
| 117 | <p>4th YEAR OF 5YEARS COMPREHENSIVE AMC FOR 250KWp ROOFTOP SOLAR PV SYSTEM.</p> <p>Supplier of the solar PV plant has to take over the annual maintenance of the plant for 5 years once the plant is successfully handed over to OIL after installation &amp; commissioning.</p> <p>Successful Handover: After completion of 3 months of stabilization period.</p> <p>Date of Commissioning: The day whole plant is commissioned and successfully connected to the Grid (DISCOM-JdVVNL).</p> <p>CONTRACT GUIDELINES: It is the responsibility of the contractor to ensure maximum output from the plant by cleaning/maintaining the equipment on a regular basis during the whole contract period (O&amp;M) as per OEM recommendation. The contractor shall maintain the plant along with spares for 5 years</p> <p>Compensation Calculation:</p> <p>Agreed Performance Ratio in Percentage (as per your quote): A</p> <p>Achieved Performance Ratio in Percentage: B</p> <p><math>B = \frac{\text{Achieved Annual Energy Production}}{\text{Nominal Annual Energy Production in kWh} \times \text{Annual Cumulative Solar Irradiation intensity (KWHr/m}^2\text{) for the that year X Generator area of the PV plant (m}^2\text{) X Efficiency of the PV modules}}</math></p> <p>Difference = A-B</p> <p>Compensation = *Calculated AEP for the Year X (A-B) X Unit Rate X 25</p> <p>*Calculated AEP for the Year = Nominal AEP for the Year X Guaranteed PR</p> <p>Unit rate = (Tariff @ LT Commercial rate of corresponding year)</p> <p>Calculation:</p> <p>First Year:</p> <p>At the end of the first year, if the plant failed to achieve the PR (A above) than</p> <p>a) The contractor shall compensate as follows:</p> <p>Guaranteed PR: A</p> <p>Achieved PR: B1</p> <p>Difference: A-B1</p> <p>Compensation: (Calculated AEP with the</p> | 1.00 | AU |  |  |

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|     | <p>Guaranteed PR) X (A-B1) X 25 Years<br/>Second Year onwards:</p> <p>b) If the PR quoted in the Table-1 for the second year is equal or more than the achieved PR of first year then no compensation will be levied.</p> <p>If the achieved PR for the second Year is less than the achieved PR of the first Year but equal to the Guaranteed PR for second year as quoted in Table-1, then no compensation will be levied.</p> <p>If the achieved PR is less than the Guaranteed PR for the second year as quoted in Table-1 and less than the achieved PR of first Year then compensation will be calculated as follows:</p> <p>Achieved PR of First Year: B1<br/>Second Year Guaranteed PR (Table-1): A2<br/>Second Year achieved PR: B2<br/>Difference: (B1/A2 whichever is less)-B2<br/>Compensation: (Calculated AEP with the Guaranteed PR for the second Year) X Difference X 24 Years.<br/>This will continue for the remaining years of O&amp;M.</p> <p>The bidders are requested to compulsorily quote Performance Ratio(PR) for 25 years in the table under Annual Energy Production (AEP) for 25 Years Period for evaluation purpose.<br/>(details as per SCC)</p> |      |    |  |  |
| 118 | <p>5th YEAR OF 5YEARS COMPREHENSIVE AMC FOR 250KWp ROOFTOP SOLAR PV SYSTEM.</p> <p>Supplier of the solar PV plant has to take over the annual maintenance of the plant for 5 years once the plant is successfully handed over to OIL after installation &amp; commissioning.</p> <p>Successful Handover: After completion of 3 months of stabilization period.</p> <p>Date of Commissioning: The day whole plant is commissioned and successfully connected to the Grid (DISCOM-JdVVNL).</p> <p>CONTRACT GUIDELINES: It is the responsibility of the contractor to ensure maximum output from the plant by cleaning/maintaining the equipment on a regular basis during the whole contract period (O&amp;M) as per OEM recommendation. The contractor shall maintain the plant along with spares for 5 years</p> <p>Compensation Calculation:<br/>Agreed Performance Ratio in Percentage (as per your quote): A</p>  | 1.00 | AU |  |  |

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| <p>Achieved Performance Ratio in Percentage: B<br/> <math>B = \frac{\text{Achieved Annual Energy Production}}{\text{Nominal Annual Energy Production in kWh} \times \text{Annual Cumulative Solar Irradiation intensity (KWHr/m}^2\text{) for the that year X Generator area of the PV plant (m}^2\text{) X Efficiency of the PV modules}}</math><br/> Difference = A-B<br/> Compensation = *Calculated AEP for the Year X (A-B) X Unit Rate X 25<br/> *Calculated AEP for the Year = Nominal AEP for the Year X Guaranteed PR<br/> Unit rate = (Tariff @ LT Commercial rate of corresponding year)<br/> Calculation:<br/> First Year:<br/> At the end of the first year, if the plant failed to achieve the PR (A above) than<br/> a) The contractor shall compensate as follows:<br/> Guaranteed PR: A<br/> Achieved PR: B1<br/> Difference: A-B1<br/> Compensation: (Calculated AEP with the Guaranteed PR) X (A-B1) X 25 Years<br/> Second Year onwards:<br/> b) If the PR quoted in the Table-1 for the second year is equal or more than the achieved PR of first year then no compensation will be levied.<br/> If the achieved PR for the second Year is less than the achieved PR of the first Year but equal to the Guaranteed PR for second year as quoted in Table-1, then no compensation will be levied.<br/> If the achieved PR is less than the Guaranteed PR for the second year as quoted in Table-1 and less than the achieved PR of first Year then compensation will be calculated as follows:<br/> Achieved PR of First Year: B1<br/> Second Year Guaranteed PR (Table-1): A2<br/> Second Year achieved PR: B2<br/> Difference: (B1/A2 whichever is less)-B2<br/> Compensation: (Calculated AEP with the Guaranteed PR for the second Year) X Difference X 24 Years.<br/> This will continue for the remaining years of O&amp;M.</p> <p>The bidders are requested to compulsorily quote Performance Ratio(PR) for 25 years in the table under Annual Energy Production (AEP) for 25 Years Period for evaluation purpose.</p> |  |  |  |  |
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|  | (details as per SCC)  |      |    |  |  |
| 119  | <p>Complete Installation, Testing &amp; Commissioning of 250KWp Grid Connected Rooftop Solar PV System Complete with Solar Polycrystalline PV modules with mounting arrangement, necessary net meter etc. &amp; other Accessories and connecting cables etc. to be installed at OIL Township, Oil India Limited, Jodhpur, Rajasthan, India.</p> <p>All components as mentioned in Line Item 1169 i.e. Supply of 250KWp roof top solar PV plant, to be successfully installed, tested &amp; commissioned.</p> <p>All points/terms &amp; conditions as mentioned in line item 1169 i.e. Supply of 250KWp roof top solar PV plant, shall be strictly considered by OIL for accepting the completion of installation, testing &amp; commissioning of the 250KWp roof top solar PV plant.<br/>(details as per SCC)</p> | 1.00 | AU |  |  |
| 120  | <p>SITC of Auto main failure (AMF) Panel fabricated from CRCA sheet steel 2 mm Thick , Powder coated finish , Engine Start &amp; Stop commands, control Relays , selector switches for Ammeter &amp; Voltmeter, Ammeter &amp; Voltmeter , Control &amp; Power Contactors, Timers, Electronic Hooter ,Visual &amp; Alarm indication for faults, UPS, operator interface panel complete in all respect suitable for 320 KVA capacity DG sets:</p>   | 1.00 | NO |  |  |
| <b>GROUP-B, SECTION-B: [ LIFT SYSTEM AND SEWAGE TREATMENT PLANT]</b> |   |      |    |  |  |
| 1  | <p>Supplying, Installation, Testing and commissioning of <b>PASSENGER LIFT:</b><br/>CAPACITY: Minimum <b>884 KG (13 persons)</b>,<br/>CAR OPENING TYPE: Two-sided entrance / Through Type Car (180 degree or openable from front and back); SPEED: Minimum 1 mps; RISE / TRAVEL: 16 m (Inter-floor distance 3150mm approx); STOPS: 5 Stops With (Front opening at Bottom-most stop; Back opening at rest upper stops);<br/>CONTROLLER TYPE: AC V3F; DRIVE: VF Regenerative (Closed Loop); POWER SUPPLY: 400/415 Volts (3 Phase AC) / or as per manufacturers specification; OPERATION: Full collective operation; MACHINE ROOM: Machine rooms less; Gearless with PMS Motor located inside the shaft top.; MOTOR CONTROL: PMSM (Permanent Magnet Synchronous Motor) Drive; Microprocessor</p>                     | 6.00 | EA |  |  |

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| <p>based with digital closed loop feedback;<br/> <b>TRACTION MEDIA:</b> Suspension traction media /Flat Coated Steel Belt /steel cable or as per manufacturers specification as approved by EIC.; <b>CAR FINISH:</b> Highest grade scratch resistant Stainless steel 304 textured finish available with the manufacturer such as Vandal-proof, moonrock, leather etc. Skirting and other finishes as per manufacturers' general standard.; <b>Floor:</b> Quartz Granite slab, 18mm mirror polished, edge moulded, approved colour; <b>FALSE CEILING TYPE:</b> Metallic with spot/line LED light fixtures as approved by EIC.; <b>FLASE CEILING FINISH:</b> Stainless steel 304, mirror finish; <b>VENTILLATION:</b> Cross flow fan; <b>HAND RAILS:</b> Stainless Steel Mirror Finish flat/round Handrail; <b>FLOORING:</b> 18mm mirror polished Quartz Granite slab with edge finished; <b>CAR DOOR FINISH:</b> Stainless steel frame with toughened Glass as per standard.; <b>LANDING DOORS FINISH:</b> Stainless steel frame with toughened Glass as per standard.; <b>FIRE RATED DOORS:</b> Fire rating-60mins; <b>SHAFT inner DIMENSIONS:</b> Widht x Depth = 1600mm x 2600mm or as per manufacturer specs; <b>Pit Depth:</b> 1600mm or as per manufacturer specs; <b>Overhead room:</b> 4000mm or as per manufacturer specs; <b>CAR DIMENSIONS (W x D x H - mm):</b> 1100mm x 2100mm x 2200mm or as per manufacturer specs; <b>CAR &amp; HOISTWAY DOOR TYPE:</b> Central /Side opening doors; <b>DOOR OPENING (W x H - mm):</b> 900 mm W x 2100 mm H; <b>CAR OPERATING PANEL:</b> Buttons/Touch sensitive with Brail script in Stainless Steel (hairline)/glass having Door Open/Close and alarm button, position indicator, visual direction indicator etc.; <b>LANDING OPERATING PANEL:</b> Buttons/Touch sensitive with Brail script in Stainless Steel (hairline)/glass having position indicator, visual direction indicator etc.; <b>HALL FIXTURE FACE PLATE:</b> Stainless Steel #4(Hairline); <b>HALL BUTTON ARRANGEMENT:</b> Hall Button with HPI; <b>OTHER FEATURES:</b> Automatic car re-levelling, Low noise operation, Overload Device, Emergency Firemen control, Emergency Car Light Unit, Infrared Curtain Door Protection, Door Time Protection, Extra Door Time of Lobby &amp; Parking, Automatic/Manual Rescue Operation device, Belt Inspection Drive, Auto Fan Cut Off, Automatic Rescue operation, Voice Synthesizer, Building Management System</p> |  |  |  |  |
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|   | (BMS) interface etc all parameter as approved by Engineer-In-Charge.   |       |     |  |  |
| 2 | <p><b>Annual Operation and maintenance of installed Passenger Lift</b> after completion of free O&amp;M/Defect liability period. The scope of works shall be comprehensive maintenance and operation of the plant but excluding the cost of consumable and spares. The contractor shall ensure breakdown free maintenance all time. In case of any breakdown arise due to negligence of the contractor, penalty for the day(s) or part thereof shall be levied at the rate of two times daily pro-rata maintenance contract cost. Any other loss occurred due to such breakdown may also be recovered from the contractor. Rate to be quoted for 1st year only. Subsequent year's rate shall be varied (escalated/rebated) based on All India Consumer Price Index -Industrial Workers (CPI-IW) published by RBI/Labour Bureau, GoI. After first year, the average of CPI of following 12 month shall be compared with the CPI of first month of AMC contract (base month). Price shall be proportionately escalated/rebated as per percentage difference in the indices. The difference amount shall be adjusted after completion of the year as arrear. The proposed period is for 5 years. However, contract may be extendable up to full life of the installation.</p> | 60.00 | MO  |  |  |
| 3 | <p>Design, Engineering, Supply/Construction, Testing and Commissioning of underground type Sewage Treatment Plant <b>(STP) MBBR type</b>, customized as per site requirement for treating typical domestic sewage from residential complex, including tertiary treatment system with disinfection and ultra-filtration to give treated effluent quality fit for usable for domestic purpose. The treated effluent shall have limiting parameter as per relevant IS standards such as: pH at 25 deg.C = 6.5 - 8.5; Oil &amp; Grease = 0 ppm; Total suspended Solids &lt;5; B.O.D. PPM &lt; 5; C.O.D. PPM &lt; 15; Turbidity &lt; 1NTU; Odour = Nil; E-Coliform = not detectable in 100ml sample. The plant shall have online monitoring sensors for various parameter for its input/output qualities, which shall have provision to integrate with central Building Management System (BMS) with two way communication. The operation shall be PLC based remotely operable. The plant shall have minimum warrantee for 5 years. One year operation and maintenance with spare</p>   | 1.00  | SET |  |  |

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|   | shall be free of cost during its defect liability period. The party shall enter into annual operational and maintenance contract with minimum 5 years after expiry of free service, extendable up to full plant life.   |           |    |  |  |
| 4 | <p><b>Annual Operation and maintenance of installed MBBR type STP</b> after completion of free O&amp;M/Defect liability period. The scope of works shall be comprehensive maintenance and operation of the plant but excluding the cost of consumable and spares. The contractor shall ensure breakdown free maintenance all time. In case of any breakdown arise due to negligence of the contractor, penalty for the day(s) or part thereof shall be levied at the rate of two times daily prorata maintenance contract cost. Any other loss occurred due to such break-down may also be recovered from the contractor. Rate to be quoted for 1st year only. Subsequent year's rate shall be varied (escalated/rebated) based on All India Consumer Price Index -Industrial Workers (CPI-IW) published by RBI/Labour Bureau, GoI. After first year, the average of CPI of following 12 month shall be compared with the CPI of first month of AMC contract (base month). Price shall be proportionately escalated/rebated as per percentage difference in the indices. The difference amount shall be adjusted after completion of the year as arrear. The proposed period is for 5 years. However, contract may be extendable up to full life of the installation.</p> | 60.00     | MO |  |  |
| 5 | <p>Items adopted directly from CPWD-DSR-2019 or any other CPWD-DSR items published up to year 2019 for various works including Civil, Electrical, HVAC etc as per CPWD publications (available in the website <a href="http://www.cpwd.gov.in">www.cpwd.gov.in</a>). These shall be considered part of the regular SoQ items (i.e., non-supplementary) which may be necessary for the project but missed out in the main SoQ. The payment against respective items executed shall be made as per the rate of DSR-2019 after deducting flat included 18% GST component.</p> <p>The calculation formula shall be [ Contract Item Rate = (DSR/1.18) x (100% + quoted%) ]</p> <p>The bidders shall quote in the form of (+)% or (-)% or at par (0%) on the Schedule of Rates (SoR) accurately up to 2 decimal place, which shall be applied uniformly over all the items of CPWD SoR excluding GST as specified</p>   | 20,000.00 |    |  |  |

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|    | above for item10,Section B<br><br>Total Base Amount of DSR-2019 excluding GST (for evaluation purpose)<br>= INR 2,00,00,000.00 (Rupees Two Crore)<br>(The amount is split into 20,000 units x INR 1,000 for ERP compatibility)  |        |     |  |  |
| 6  | Design, Supply, installation, testing and commissioning of <b>Integrated Multi Satellite/DTH Digital Distribution System</b> capable of receiving multiple TV antenna/dish signals (of popular service providers such as TATA Sky, Airtel Digital, DishTV etc) to cater for 8 dwelling units (flats), having features such as multiple satellite TV services via single cable to the rooms, high quality loss less signal at each television point, plug and play, Supports all satellite pay and free-to-air DTH services in India, integration option for CCTV (Closed Circuit Television) Cameras signals, Integration option for High Speed Internet, Expandable for additional satellite receivers, including providing Single Line Diagram and Operation/Maintenance manual etc all complete as per direction of Engineer-In-Charge. This item does not include cost of laying cables and dish/antennae, which will be paid separately. | 8.00   | SET |  |  |
| 7  | Supplying and laying <b>co-axial TV cable</b> RG-6 grade, 0.7 mm solid copper conductor PE insulated, shielded with fine tinned copper braid and protected with PVC sheath in the existing surface/ recessed steel/ PVC conduit as required.  | 100.00 | M   |  |  |
| 8  | Supplying and drawing of <b>UTP 4 pair CAT 6 LAN Cable</b> in the existing surface/recessed steel/ PVC conduit as required.   | 100.00 | M   |  |  |
| 9  | Supplying and fixing upto <b>25mm PVC Conduit Medium class</b> along with accessories in surface/recess including cutting the wall and making good the same in case of recessed conduit as required all complete.   | 100.00 | M   |  |  |
| 10 | Supplying and fixing <b>32mm PVC Conduit Medium class</b> along with accessories in surface/recess including cutting the wall and making good the same in case of recessed conduit as required all complete.  | 100.00 | M   |  |  |
| 11 | Design, supply, fabrication and installation of FR grade PVDF PVC fabric <b>TENSILE ROOF</b> , made of 100% Polyester, 1100dtex, Panama weave, weighing 900-950 gsm, minimum 2.50m width, fine tune weldable PVDF lacquer, breaking strength (warp/weft) 4300/4200 N/5cm, Tear Strength   | 150.00 | M2  |  |  |

|   |   |   |    |  |  |
|---|---|---|----|--|--|
|   | (warp/weft) 600/500N, Adhesion 120N/5cm, Flame retardancy - M2/B1, Temperature resistance -30°C/+70°C, Light fastness 7-8, Manufacturer Warrant 10 Years, performing Wind-load analysis and steel structural design in StaadPro, Shop drawings for fabrication / erection, providing maintenance manual with spare catalogue, all complete with accessories but <b>Excluding cost of structural steel and foundations.</b><br>(Approved make: Serge Ferrari 702 S/ Mehler Type-1 700/ Sion (Belgium) / Sattler Protex (Austria) / FERARI/ HIRAOKA)  |   |    |  |  |
| <b>GROUP-B, SECTION-C: [ BUILDING MANAGEMENT SYSTEM ]</b> |   |   |    |  |  |
| 1   | Supply, Installation, testing and Commissioning of BMS Computer System: server grade Pentium i5/7 Core with 3GHz minimum CPU speed, minimum of 8 GB RAM, DVD/CD-RW Drive & 1 TB HDD, optical Mouse, 106 keys keyboard, 10/100 Mbps Ethernet card ,USB connection & internal modem<br>- Intel I-7 Processor (Latest Generation)<br>- 8 GB RAM, 1 TB hard disc<br>-3½” disc drive, DVD writer, compatible CDROM<br>28” flat screen, 1200 2 800, 256 colours (Full HD)<br>Windows 10 OS and shall have MS-Office & SQL Server 2016 installed   | 1 | NO |  |  |
| 2   | Supply, Installation, testing and Commissioning of BMS System Software : Web Based Graphical Software meeting the requirements in the Given I/O Summary & technical specifications including configuration and facility to create / provide the graphic mapping for all I/O Summary points, animate the Graphics, Navigation between pages, display of logs, changing the time zones, popup alarms, configurable password protection for Building Mgmt System as per Specifications. Software shall be able to communicate with Lon works, Bacnet, Modbus devices simultaneously, with unlimited user license capacity. Software shall be Smart device Compatible and shall have advanced features like Energy Dashboards, Energy Analytics, also proposed software shall be Forward and backward compatible with 10 years of Obsolation Support from OEM | 1 | NO |  |  |
| 3   | Supply, Installation, testing and Commissioning of UL listed, BTL certified, Hardware Interface/Soft integrators with inbuilt web browser for third party   | 1 | NO |  |  |

|    |  |      |     |  |  |
|----|--|------|-----|--|--|
|    | equipment, Open Protocol Software Integration. These integrators shall be of same make as DDCs and shall contain all necessary ports for software integration of below mentioned equipment                   |      |     |  |  |
| 4  | Supply, Installation, testing and Commissioning of FAS System Integration on Modbus RS485  | 1    | NO  |  |  |
| 5  | Supply, Installation, testing and Commissioning of Intrusion System Integration  | 1    | NO  |  |  |
| 6  | Supply, Installation, testing and Commissioning of Outside Temp & Humidity Sensor with radiation shield. Measuring Range: Temp:-30 to 50°C & RH 0-100%, Accuracy: ±1°C, ±3%                                  | 1    | NO  |  |  |
| 7  | Supply, Installation, testing and Commissioning of Lux Level Sensor  | 1    | NO  |  |  |
| 8  | Supply, Installation, testing and Commissioning of 2 Core 1.5mm <sup>2</sup> , armoured ATC conductor multi-stranded, twisted shielded cable for signals and communication                                   | 1    | M   |  |  |
| 9  | Supply, Installation, testing and Commissioning of 3 Core 2.5mm <sup>2</sup> , armoured ATC conductor multi-stranded, cable for Powering DDC , Actuators.  | 1    | M   |  |  |
| 10 | Supply, Installation, testing and Commissioning of CAT-6 cable   | 4000 | M   |  |  |
| 11 | Supply, Installation, testing and Commissioning of Supplying and laying of following sizes of MS conduit on surface/recess including cutting/filling chases along with conduit accessories etc. Size 25 mm ø | 1    | M   |  |  |
| 12 | Supply, Installation, testing and Commissioning of Supplying and laying of following sizes of MS conduit on surface/recess including cutting/filling chases along with conduit accessories etc. Size 20 mm ø | 1    | M   |  |  |
| 13 | Supply, Installation, testing and Commissioning of FAS Panel Addressable Single Loop Fire Alarm Control Panel<br>Part No.: GST200-2/1  | 1    | SET |  |  |
| 14 | Supply, Installation, testing and Commissioning of Network Card RS485 Network card for GST200 Panel<br>Part No.: P-9940A   | 1    | NO  |  |  |
| 15 | Supply, Installation, testing and Commissioning of 64 Channel NVR  | 2    | NO  |  |  |
| 16 | Supply, Installation, testing and Commissioning of 60" LED screen for the  | 2    | NO  |  |  |

|    |   |   |     |  |  |
|----|---|---|-----|--|--|
|    | display   |   |     |  |  |
| 17 | Supply, Installation, testing and Commissioning of PA Controller<br>Make: Bosch<br>Model: LBB 1990  | 1 | SET |  |  |
| 18 | Supply, Installation, testing and Commissioning of PA Amplifier<br>Capacity: 500 Watt<br>Make: Bosch<br>Model: LBB 1938   | 1 | NO  |  |  |
| 19 | Supply, Installation, testing and Commissioning of PA Call Station<br>Make: Bosch<br>Model: LBB 1956  | 1 | NO  |  |  |
| 20 | Supply, Installation, testing and Commissioning of MATRIX Make DIGITAL EPABX system<br>Model SARVAM GENX12SAC<br>Maximum Capacity up to 240 Ports <ul style="list-style-type: none"> <li>• 100% Non-Blocking</li> <li>• VOIP/E1 Connectivity (Optional)</li> <li>• GSM connectivity (Optional)</li> <li>• Conference up to 15 parties.</li> <li>• Flexible numbering</li> <li>• Auto Attendant</li> <li>• Caller ID Ready on all Extensions</li> <li>• PC connectivity</li> </ul>                                 | 1 | Set |  |  |
| 21 | Supply, Installation, testing and Commissioning of MATRIX UCS SME<br>License to Activate PBX Functionalities and 4 Slots  | 1 | NO  |  |  |
| 22 | Supply, Installation, testing and Commissioning of SARVAM VOCODER CHNL4 <ul style="list-style-type: none"> <li>•For SARVAM UCS and SARVAM UMG</li> <li>•To Support 4 Simultaneous Calls with Transcoding</li> <li>•Common for all Types of SME and ENT UCS Servers</li> </ul>   | 1 | NO  |  |  |
| 23 | Supply, Installation, testing and Commissioning of NX DBM VOCODER64 <ul style="list-style-type: none"> <li>•Support Maximum 64 Simultaneous VOCODING Channels</li> <li>•UCS and UMG Server Licenses are Supplied with 4 Built-in VOCODER Channels</li> </ul> Additional VOCODER Channel License is Required to Activate Desired Number of Channels <ul style="list-style-type: none"> <li>• Max. Number of Modules on CPU Card: ETERNITY GENX:2 (128 Channels)<br/>ETERNITY MENX/LENX:4 (248 Channels)</li> </ul> | 1 | NO  |  |  |
| 24 | Supply, Installation, testing and Commissioning of SARVAM IPSUB100  | 1 | NO  |  |  |



|    |   |     |     |  |  |
|----|---|-----|-----|--|--|
|    | License for IP Subscribers for SARVAM UCS<br>•No. of Users: 100<br>•License Required for Registering IP User Terminals  |     |     |  |  |
| 25 | Supply, Installation, testing and Commissioning of SARVAM IPSUB10 License for IP Subscribers for SARVAM UCS<br>•No. of Users: 10<br>•License Required for Registering IP User Terminals | 1   | NO  |  |  |
| 26 | Supply, Installation, testing and Commissioning of 10 Pair MDF Box with Krone Modules (For Incoming landlines)  | 1   | NO  |  |  |
| 27 | Supply, Installation, testing and Commissioning of Eternity GE CO8 support 8 trunk  | 1   | NO  |  |  |
| 28 | Supply, Installation, testing and Commissioning of Mounting Rack (Panel)  | 1   | NO  |  |  |
| 29 | Supply, Installation, testing and Commissioning of Beam Detector Receiver/ Transmitter  | 17  | SET |  |  |
| 30 | Supply, Installation, testing and Commissioning of Boom barrier - 6 Mtr.  | 2   | SET |  |  |
| 31 | Supply, Installation, testing and Commissioning of RFID system for Vehicle control  | 4   | SET |  |  |
| 32 | Supply, Installation, testing and Commissioning of UHF hard metal tag   | 500 | NO  |  |  |
| 33 | Supply, Installation, testing and Commissioning of Biometric face Scanner + Finger print reader system  | 4   | SET |  |  |
| 34 | Supply, Installation, testing and Commissioning of DDC controller   | 8   | NO  |  |  |
| 35 | Supply, Installation, testing and Commissioning of BMS panel suitable to incorporate DDC controller, Ethernet Switches (CCTV & EPABX system), SMPS & other accessories                  | 8   | NO  |  |  |
| 36 | Supply, Installation, testing and Commissioning of BMS panel suitable to incorporate DDC controller, Ethernet Switches (CCTV & EPABX system), SMPS & other accessories                  | 2   | NO  |  |  |
| 37 | Supply, Installation, testing and Commissioning of Energy meters  | 52  | NO  |  |  |
| 38 | Supply, Installation, testing and Commissioning of Water meters   | 51  | NO  |  |  |
| 39 | Supply, Installation, testing and Commissioning of Y-Strainer   | 51  | NO  |  |  |
| 40 | Supply, Installation, testing and Commissioning of Water Level Sensor   | 18  | NO  |  |  |

|    |  |      |     |  |  |
|----|--|------|-----|--|--|
| 41 | Supply, Installation, testing and Commissioning of LPG Gas Detector  | 1    | NO  |  |  |
| 42 | Supply, Installation, testing and Commissioning of CO2 Gas Detector  | 1    | NO  |  |  |
| 43 | Supply, Installation, testing and Commissioning of PIR Sensor  | 35   | NO  |  |  |
| 44 | Supply, Installation, testing and Commissioning of RFID card Door Locks  | 15   | NO  |  |  |
| 45 | Supply, Installation, testing and Commissioning of Split AC 1.5/2 Ton  | 40   | NO  |  |  |
| 46 | Supply, Installation, testing and Commissioning of Multifunction Energy Meters on Modbus RTU - (10 points / per Meter)   | 1    | NO  |  |  |
| 47 | Supply, Installation, testing and Commissioning of Water Meter integration   | 1    | NO  |  |  |
| 48 | Supply, Installation, testing and Commissioning of Lifts on Modbus RS485 - 12 No.(20 points/unit)  | 1    | NO  |  |  |
| 49 | Supply, Installation, testing and Commissioning of Heat & Smoke detector   | 64   | NO  |  |  |
| 50 | Supply, Installation, testing and Commissioning of MCP   | 5    | NO  |  |  |
| 51 | Supply, Installation, testing and Commissioning of Hooter Beacon + O/P Module  | 5    | NO  |  |  |
| 52 | Supply, Installation, testing and Commissioning of 2 Core 1.5mm <sup>2</sup> , armoured ATC conductor multistranded, twisted shielded cable for signals and communication                                    | 1500 | M   |  |  |
| 53 | Supply, Installation, testing and Commissioning of Supplying and laying of following sizes of MS conduit on surface/recess including cutting/filling chases along with conduit accessories etc. Size 20 mm ø | 300  | M   |  |  |
| 54 | Supply, Installation, testing and Commissioning of Bullet Camera   | 51   | NO  |  |  |
| 55 | Supply, Installation, testing and Commissioning of Dome Camera   | 40   | NO  |  |  |
| 56 | Supply, Installation, testing and Commissioning of 8 CH NVR  | 1    | NO  |  |  |
| 57 | Supply, Installation, testing and Commissioning of Industrial Camera Back box for Camera   | 4    | NO  |  |  |
| 58 | Supply, Installation, testing and Commissioning of LPR Bullet Camera   | 4    | NO  |  |  |
| 59 | Supply, Installation, testing and Commissioning of HikCentral License  | 1    | set |  |  |

|    |   |     |    |  |  |
|----|---|-----|----|--|--|
| 60 | Supply, Installation, testing and Commissioning of Surveillance HDD-08 TB   | 1   | NO |  |  |
| 61 | Supply, Installation, testing and Commissioning of 15 Watt speaker  | 18  | NO |  |  |
| 62 | Supply, Installation, testing and Commissioning of IP phones (Sparsh VP110) with 48 NO of Splitter  | 129 | NO |  |  |
| 63 | Supply, Installation, testing and Commissioning of Ethernet Switch - 16 port  | 35  | NO |  |  |
| 64 | Supply, Installation, testing and Commissioning of BMS Computer System: server grade Pentium i5/7 Core with 3GHz minimum CPU speed, minimum of 8 GB RAM, DVD/CD-RW Drive & 1 TB HDD, optical Mouse, 106 keys keyboard, 10/100 Mbps Ethernet card ,USB connection & internal modem<br>- Intel I-7 Processor (Latest Generation)<br>- 8 GB RAM, 1 TB hard disc<br>-3½” disc drive, DVD writer, compatible CDROM<br>28” flat screen, 1200 2 800, 256 colours (Full HD)<br>Windows 10 OS and shall have MS-Office & SQL Server 2016 installed   | 1   | NO |  |  |
| 65 | Supply, Installation, testing and Commissioning of BMS System Software : Web Based Graphical Software meeting the requirements in the Given I/O Summary & technical specifications including configuration and facility to create / provide the graphic mapping for all I/O Summary points, animate the Graphics, Navigation between pages, display of logs, changing the time zones, popup alarms, configurable password protection for Building Mgmt System as per Specifications. Software shall be able to communicate with Lon works, Bacnet, Modbus devices simultaneously, with unlimited user license capacity. Software shall be Smart device Compatible and shall have advanced features like Energy Dashboards, Energy Analytics, also proposed software shall be Forward and backward compatible with 10 years of Obsolation Support from OEM | 1   | NO |  |  |
| 66 | Supply, Installation, testing and Commissioning of UL listed, BTL certified, Hardware Interface/Soft integrators with inbuilt web browser for third party equipment, Open Protocol Software Integration. These integrators shall be of same make as DDCs and shall contain all necessary ports for software integration of below mentioned equipment  | 1   | NO |  |  |

|    |   |   |    |  |  |
|----|---|---|----|--|--|
| 67 | Supply, Installation, testing and Commissioning of FAS System Integration on Modbus RS485   | 1 | NO |  |  |
| 68 | Supply, Installation, testing and Commissioning of Intrusion System Integration   | 1 | NO |  |  |
| 69 | Supply, Installation, testing and Commissioning of Outside Temp & Humidity Sensor with radiation shield. Measuring Range: Temp:-30 to 50°C & RH 0-100%, Accuracy: ±1°C, ±3% | 1 | NO |  |  |
| 70 | Supply, Installation, testing and Commissioning of Lux Level Sensor   | 1 | NO |  |  |

**GROUP-B, SECTION-D: [ ITEMS ON REQUIREMENT BASIS ]**  
**OIL RESERVES THE RIGHT TO TAKE FINAL DECISION ON PROCUREMENT OF THESE ITEMS FROM THE CONTRACTOR. ALSO, THE QUANTITY IS INDICATIVE, ACTUAL PROCUREMENT BY OIL MAY VARY AT THE TIME OF REQUIREMENT**

|   |  |       |    |  |  |
|---|--|-------|----|--|--|
| 1 | Two Wheeled Waste/Garbage Bins of hard plastic, capacity : 120 Ltrs. Colour : Green for wet waste and Blue for Dry Waste, Volume Litres Can be mounted on poles, walls, stakes and trellises without any trouble. They are emptied by simply releasing them with a universal triangular lock and key. Available in the standard colours green and orange. Easy-to – clean smooth surface. The lid can be locked with a triangular key, which also provides added security to the bin against scavengers and animals. Provided with Metal strip at opening for extinguishing cigarettes. Lock and key are completely metallic without any plastic parts. Back plate is completely metallic without any plastic parts. Resistant to UV, cold, heat and chemicals.    | 6.00  | NO |  |  |
| 2 | Plastic Dustbin 10 litre Capacity, Specification - (a) Dimension - L X W X H - (282 X 212 X 365) mm, (b) Weight - 530 gm. (approx) Green for wet waste and Blue for Dry Waste, Volume Litres Can be mounted on poles, walls, stakes and trellises without any trouble. They are emptied by simply releasing them with a universal triangular lock and key. Available in the standard colours green and orange. Easy-to – clean smooth surface. The lid can be locked with a triangular key, which also provides added security to the bin against scavengers and animals. Provided with Metal strip at opening for extinguishing cigarettes. Lock and key are completely metallic without any plastic parts. Back plate is completely metallic without any plastic | 26.00 | NO |  |  |

|   |  |       |    |  |  |
|---|--|-------|----|--|--|
|   | parts. Resistant to UV, cold, heat and chemicals.  |       |    |  |  |
| 3 | SITC of Air Cooled split type 2 TR, 5 star rating BEE Air conditioners complete with Indoor unit(IDU), Outdoor unit (ODU), surface / concealed copper Refrigerant piping with insulation (EP foam pipe section) upto 3 Mtr (IDU to ODU), copper power cable upto 4 Mtr (IDU to ODU), R-410 Refrigerant or latest, Remote, suitable for 400/230V +10% of 50 Hz ,1 /3 phase AC supply capable of performing cooling, dehumidification, air circulation of following capacity with Scroll /reciprocating / rotary compressor as specified.                | 44.00 | EA |  |  |
| 4 | SITC of Air Cooled split type 4.2 TR 5 star rating BEE Air conditioners complete with Indoor unit(IDU), Outdoor unit (ODU), surface / concealed copper Refrigerant piping with insulation (EP foam pipe section) upto 5 Mtr (IDU to ODU), copper power cable upto 5 Mtr (IDU to ODU), R-410 or latest Eco-friendly Refrigerant, Remote, suitable for 400/230V +10% of 50 Hz ,1 /3 phase AC supply capable of performing cooling, dehumidification, air circulation of following capacity with Scroll / reciprocating / rotary compressor as specified. | 16.00 | EA |  |  |
| 5 | SITC of Air Cooled split type 1.5 TR, 5 star rating BEE Air conditioners complete with Indoor unit(IDU), Outdoor unit (ODU), surface / concealed copper Refrigerant piping with insulation (EP foam pipe section) upto 3 Mtr (IDU to ODU), copper power cable upto 4 Mtr (IDU to ODU), R-410 Refrigerant or latest, Remote, suitable for 400/230V +10% of 50 Hz ,1 /3 phase AC supply capable of performing cooling, dehumidification, air   | 1.00  | NO |  |  |

|  |  |           |     |  |  |
|--|--|-----------|-----|--|--|
|  | circulation of following capacity with Scroll /reciprocating / rotary compressor as specified.   |           |     |  |  |
| <b>GROUP-C, SECTION-A: [ OTHER CPWD UN-SPECIFIED ITEMS ]</b> |  |           |     |  |  |
| 1  | <p>Items adopted directly from CPWD-DSR-2019 or any other CPWD-DSR items published up to year 2019 for various works including Civil, Electrical, HVAC etc as per CPWD publications (available in the website www.cpwd.gov.in). These shall be considered part of the regular SoQ items (i.e., non-supplementary) which may be necessary for the project but missed out in the main SoQ. The payment against respective items executed shall be made as per the rate of DSR-2019 after deducting flat included 18% GST component.</p> <p>The calculation formula shall be [Contract Item Rate = (DSR/1.18) x (100% + quoted%) ]</p> <p>The bidders shall quote in the form of (+)% or (-)% or at par (0%) on the Schedule of Rates (SoR) accurately up to 2 decimal place, which shall be applied uniformly over all the items of CPWD SoR excluding GST as specified above for item10,Section B</p> <p>Total Base Amount of DSR-2019 excluding GST (for evaluation purpose)<br/>= INR 2,00,00,000.00 (Rupees Two Crore)<br/>(The amount is split into 20,000 units x INR 1,000 for ERP compatibility)</p> | 20,000.00 | UNI |  |  |
| <b>Total (Exclusive of GST)</b>                              |  |           |     |  |  |

**NOTES:**

1. Bidder shall note that no other charges apart from above shall be paid by COMPANY for providing the services mentioned under SCOPE OF WORK. Therefore, charges apart from above, if any, Bidder shall load in the above rates.
2. Assumptions made in respect of the number of days/parameters above for various operations are only for the purpose of evaluation of the bids. The Operator/Contractor will be paid on the basis of the actual number of days/parameters, as the case may be.
3. The Price should be written in both in words & figures. No correction in price should be done.
4. The prices mentioned in this price bid shall be taken into consideration for evaluation of bids. Any variation observed elsewhere in the bids shall be ignored while evaluation the bids.
5. The prices quoted should be inclusive of all taxes, duties and levies but excluding GST. However, the breakup of taxes and other statutory levies other than GST included above should be indicated separately. Bidder to also furnish the applicable

HSN/SAC code with reference to applicable GST rate for each item and service quoted by them.

6. Bidder shall offer firm prices. Price quoted by the successful bidder must remain firm during the execution of the contract and not subject to variation on any account.
7. The quantities mentioned above are tentative and for evaluation purpose and estimation of contract value only. However, payment shall be made based on actual consumption.

\*\*\*\*\*

**BID FORM**

To  
OIL INDIA LIMITED  
For GM-C&P  
RAJASTHAN FIELD  
JODHPUR-342005

**Sub: IFB No. CJI-4232-P21**

*Gentlemen,*

Having examined the General and Special Conditions of Contract and the Terms of Reference including all attachments thereto, the receipt of which is hereby duly acknowledged, we the undersigned offer to perform the services in conformity with the said conditions of Contract and Terms of Reference for the sum of \_\_\_\_\_ (Total Bid Amount in words and figures) or such other sums as may be ascertained in accordance with the Schedule of Prices attached herewith and made part of this Bid.

We undertake, if our Bid is accepted, to commence the work within (\_\_\_\_\_) days calculated from the date of issue of Letter of Award (LOA).

If our Bid is accepted, we will obtain the guarantee of a bank in a sum not exceeding 10% of estimated annual contract value for the due performance of the Contract.

We agree to abide by this Bid for a period of 120 days from the date fixed for Bid closing and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

Until a formal Contract is prepared and executed, this Bid, together with your written acceptance thereof in your notification of award shall constitute a binding Contract between us.

We understand that you are not bound to accept the lowest or any Bid you may receive.

Dated this \_\_\_\_\_ day of \_\_\_\_\_

**Authorised Person's Signature:** \_\_\_\_\_

**Name:** \_\_\_\_\_

**Designation:** \_\_\_\_\_

**Seal of the Bidder:**



**Tender No. : CJI-4232-P21**

**STATEMENT OF COMPLIANCE**  
**(Only exceptions/deviations to be rendered)**

| <b>SECTION NO.<br/>(PAGE NO.)</b> | <b>CLAUSE NO.<br/>SUB-CLAUSE NO.</b> | <b>COMPLIANCE/<br/>NON COMPLIANCE</b> | <b>REMARKS</b> |
|-----------------------------------|--------------------------------------|---------------------------------------|----------------|
|                                   |                                      |                                       |                |

**(Authorised Signatory).**

**Name of the Bidder\_\_\_\_\_**

**NOTE:** OIL INDIA LIMITED expects the Bidders to fully accept the terms and conditions of the bid document. However, should the Bidders still envisage some exceptions/deviations to the terms and conditions of the bid document, the same should be highlighted as per format provided above and to be submitted as part of their Technical Bid. If the Proforma is left blank, then it would be presumed that the Bidder has not taken any exception/deviation to the terms and conditions of the bid document.

**FORM OF BID SECURITY (BANK GUARANTEE)**

Ref. No.

Bank Guarantee No.

TO  
OIL INDIA LIMITED  
For GM-C&P  
RAJASTHAN FIELD  
JODHPUR-342005

WHEREAS, (Name of Bidder) ..... (hereinafter called "the Bidder") has submitted their Bid No. .... dated .....for the provision of certain OILFIELD services (hereinafter called "the Bid") against OIL INDIA LIMITED, RAJASTHAN FIELD, JODHPUR (hereinafter called the "Company")'s IFB No..... KNOW ALL MEN by these presents that we (Name of Bank) ..... of (Name of country) ..... having our registered office at ..... (hereinafter called "the Bank") are bound unto the Company in the sum of (.....)\* for which payment well and truly to be made to Company, the Bank binds itself, its successors and assignees by these presents.

SEALED with the common seal of the said Bank this ..... Day of ..... , 2020.

THE CONDITIONS of this obligation are:

1. If the Bidder withdraws their bid during the period of bid validity specified by the Bidder;

Or

2. If the Bidder, having been notified of the acceptance of their bid by the Company during the period of bid validity:

- fails or refuses to execute the Form of Contract in accordance with the Instructions to Bidders in the tender documents, or

- fails or refuses to furnish the Performance Security in accordance with the Instructions to Bidders in the tender documents;

Or

3. If the Bidder furnishes fraudulent document/information in their bid

We undertake to pay to Company up to the above amount upon receipt of its first written demand (by way of letter/fax/cable/email), without Company having to substantiate its demand, provided that in its demand Company will note that the amount claimed by it is due to it owing to the occurrence of one or two or all of the conditions, specifying the occurred condition or conditions.

This guarantee will remain in force up to and including the date (\*\*) and any demand in respect thereof should reach the bank not later than the above date.

SIGNATURE AND SEAL OF THE GUARANTOR.....

Name of Bank & Address.....

Witness .....

Address.....

-----  
(Signature, Name and Address)

Date.....

Place.....

- 
- The Bidder should insert the amount of the guarantee in words and figures denominated in the currency of the Company's country or an equivalent amount in a freely convertible currency.
  - The Date of Expiry of Bank Guarantee should be 210 days after the bid closing date as stated in the tender document

**The details of the issuing bank and controlling bank are as under:**

**A. Issuing Bank**

- 1. Full address of the bank:**
- 2. Email address of the bankers:**
- 3. Mobile nos. of the contact persons:**

**B. Controlling Office**

- 1. Address of the controlling office of the BG issuing banks:**
- 2. Name of the contact persons at the controlling office with their mobile nos. and email address:**

*Signature & Seal of the Bank*

**FORM OF PERFORMANCE BANK GUARANTEE (UNCONDITIONAL)\***

To:

(Name of Company .....)

(Address of Company .....)

WHEREAS (Name and address of Contractor) ..... (hereinafter called “Contractor”) had undertaken, in pursuance of Contract No..... Dated ..... to execute (Name of Contract and brief description of the work) ..... (hereinafter called “the Contract”), AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a bank guarantee by a recognised bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND

WHEREAS we have agreed to give the Contractor such a Bank Guarantee, now THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of (Amount of Guarantee)\*\* ..... (in words) ..... such sum being payable in the type and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of the guarantee sum as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modifications of the terms of the Contract or of the work to be performed there under or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee is valid until the date (.....)\*\*(calculated at **3 months** after Contract completion date).

SIGNATURE & SEAL OF THE GUARANTOR :.....

Name of Bank

.....

Address :.....

.....

Date :.....

---

\* Bidders are NOT required to complete this form while submitting the bid.

\*\*An amount is to be inserted by the guarantor, representing the percentage of the Contract price specified in the Contract, and denominated either in the currency of the

Contract or in a freely convertible currency acceptable to the Company as per para 29.0 of Part-1.

**The details of the issuing bank and controlling bank are as under:**

**A.Issuing Bank**

- 1. Full address of the bank:**
- 2. Email address of the bankers:**
- 3. Mobile nos. of the contact persons:**

**B.Controlling Office**

- 1. Address of the controlling office of the BG issuing banks:**
- 2. Name of the contact persons at the controlling office with their mobile nos. And email address:**

*Signature& Seal of the Bank*

**AGREEMENT FORM**

This Agreement is made on \_\_\_\_ day of \_\_\_\_\_ between Oil India Limited, a Government of India Enterprise, incorporated under the Companies Act 1956, having its registered office at Duliajan, Assam and Rajasthan Project Office at Jodhpur in the State of Rajasthan, hereinafter called the "Company" which expression unless repugnant to the context shall include executors, administrators and assignees on the one part, and M/s. \_\_\_\_\_ (Name and address of Contractor) hereinafter called the "Contractor" which expression unless repugnant to the context shall include executors, administrators and assignees on the other part,

WHEREAS the Company desires that Services \_\_\_\_\_ (brief description of services) should be provided by the Contractor as detailed hereinafter or as Company may requires;

WHEREAS, Contractor engaged themselves in the business of offering such services represents that they have adequate resources and equipment, material etc. in good working order and fully trained personnel capable of efficiently undertaking the operations and is ready, willing and able to carry out the said services for the Company as per Section-II attached herewith for this purpose and

WHEREAS, Company had issued a firm Letter of Award No. \_\_\_\_\_ dated \_\_\_\_\_ based on Offer No. \_\_\_\_\_ dated \_\_\_\_\_ submitted by the Contractor against Company's IFB No. \_\_\_\_\_. All these aforesaid documents shall be deemed to form and be read and construed as part of this agreement/contract. However, should there be any dispute arising out of interpretation of this contract in regard to the terms and conditions with those mentioned in Company's tender document and subsequent letters including the Letter of Award and Contractor's offer and their subsequent letters, the terms and conditions attached hereto shall prevail. Changes, additions or deletions to the terms of the contract shall be authorized solely by an amendment to the contract executed in the same manner as this contract.

NOW WHEREAS, in consideration of the mutual covenants and agreements hereinafter contained, it is hereby agreed as follows -

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract referred to.

2. In addition to documents herein above, the following Sections and Annexure attached herewith shall be deemed to form and be read and construed as part of this agreement viz.:

- a. General Conditions of Contract, (Part-3, Section-I)
- b. Scope of Work/ Special Conditions of Contract for Civil works (Part-3, Section-II)
- c. Scope of Work/ Special Conditions of Contract for Electrical works & BMS (Part-3, Section-III)
- d. Price Bid Format, (Proforma-B)
- e. Bid Form, (Proforma-C)
- f. Statement of Compliance, (Proforma-D)
- g. Bid Security Form, (Proforma-E)
- h. Performance Security Form, (Proforma-F)
- i. Agreement Form, (Proforma-G)

- j. Proforma of Letter of Authority, (Proforma-H)
- k. Integrity Pact, (Annexure-A1)
- l. General HSE Points (Appendix-A)
- m. Procedure for obtaining labour license (Appendix-B)
- n. Undertaking towards submission of authentic information/documents as per Format vide Annexure-XI.

3. In consideration of the payments to be made by the Company to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Company to provide the Services and to remedy defects therein in conformity in all respect with the provisions of this Contract.

4. The Company hereby covenants to pay the Contractor in consideration of the provision of the Services and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of this Contract at the times and in the manner prescribed by this Contract.

IN WITNESS thereof, each party has executed this contract at Jodhpur, Rajasthan as of the date shown above.

Signed, Sealed and Delivered,

For and on behalf of  
Company (Oil India Limited)

Name:

Status:

In presence of

1.

2.

For and on behalf of Contractor  
(M/s. \_\_\_\_\_)

Name:

Status:

In presence of

1.

2.

---

\* Bidders are NOT required to complete this form.

**PROFORMA LETTER OF AUTHORITY**

TO  
**GM (C&P)**  
Contracts & Purchase Department  
Oil India Ltd., Rajasthan Project  
Jodhpur-342005  
Rajasthan, India

Sir,

**Sub: OIL's IFB No. CJI-4232-P21**

We \_\_\_\_\_ confirm that Mr. \_\_\_\_\_ (Name and address) is authorised to represent us to Bid, negotiate and conclude the agreement on our behalf with you against Tender Invitation No. \_\_\_\_\_ for hiring of services for \_\_\_\_\_.

We confirm that we shall be bound by all and whatsoever our said representative shall commit.

Yours Faithfully,

**Authorised Person's Signature:** \_\_\_\_\_

**Name:** \_\_\_\_\_

**Designation:** \_\_\_\_\_

**Seal of the Bidder:**

**Note:** This letter of authority shall be on printed letter head of the Bidder and shall be signed by a person competent and having the power of attorney (power of attorney shall be annexed) to bind such Bidder. If signed by a consortium, it shall be signed by members of the consortium.



**AUTHORISATION FOR ATTENDING BID OPENING**

Date: \_\_\_\_\_

TO

**GM (C&P)**

Contracts & Purchase Department

Oil India Ltd., Rajasthan Project

Jodhpur-342005

Rajasthan, India

Sir,

**Sub: OIL's e-Tender No. CJI-4232-P21**

We hereby authorise Mr. /Ms. \_\_\_\_\_ (Name and address) to be present at the time of Pre-Bid Meeting / Un-priced Bid Opening / Price Bid Opening and for any subsequent correspondence / communication of the above Tender due on \_\_\_\_\_ on our behalf.

Yours Faithfully,

**Authorised Person's Signature:** \_\_\_\_\_

**Name:** \_\_\_\_\_

**Designation:** \_\_\_\_\_

**Seal of the Bidder:**

**Note:** This letter of authority shall be on printed letter head of the Bidder and shall be signed by a person who signs the bid.

\*\*\*

**INTEGRITY PACT**

Between

Oil India Limited (OIL) hereinafter referred to as "The Principal"

And

(Name of the Bidder).....hereinafter referred to as "The Bidder/Contractor"

**Preamble:**

The Principal intends to award, under laid down organizational procedures, contract/s for -----  
----- The Principal values full compliance with all relevant laws and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder/s and Contractor/s.

In order to achieve these goals, the Principal cooperates with the renowned international Non-Governmental Organization "Transparency International" (TI). Following TI's national and international experience, the Principal will appoint an external independent Monitor who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

**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:

1. 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 him/herself or third person, any material or immaterial benefit which he/she is not legally entitled to.
2. The Principal will, during the tender process treat all Bidders with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidders the same information and will not provide to any Bidder confidential/additional information through which the Bidder could obtain an advantage in relation to the tender process or the contract execution.
3. 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 relevant Anti-Corruption Laws of India, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

**Section: 2 - Commitments of the Bidder/Contractor**

(1) The Bidder/Contractor commits itself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.

1. The Bidder/Contractor will not, directly or through any other person or firm, offer, promise or give to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material or immaterial 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.
2. The Bidder/Contractor 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.

3. The Bidder/Contractor will not commit any offence under the relevant Anticorruption Laws of India; further the Bidder/Contractor 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.

4. The Bidder/Contractor will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

- (2) The Bidder/Contractor 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, before contract award has committed a transgression through a violation of Section 2 or in any other form such as to put his reliability or risibility as Bidder into question, the Principal is entitled to disqualify the Bidder from the tender process or to terminate the contract, if already signed, for such reason.

1. If the Bidder/Contractor has committed a transgression through a violation of Section 2 such as to put his reliability or credibility into question, the Principal is entitled also to 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. The severity will be determined by the circumstances of the case, in particular the number of transgressions, the position of the transgressions within the company hierarchy of the Bidder and the amount of the damage. The exclusion will be imposed for a minimum of 6 months and maximum of 3 years.

2. The Bidder accepts and undertakes to respect and uphold the Principal's Absolute right to resort to and impose such exclusion and further accepts and undertakes not to challenge or question such exclusion on any ground, including the lack of any hearing before the decision to resort to such exclusion is taken. This undertaking is given freely and after obtaining independent legal advice.

3. If the Bidder/Contractor can prove that he has restored/recouped the Damage caused by him and has installed a suitable corruption prevention system, the Principal may revoke the exclusion prematurely.

4. A transgression is considered to have occurred if in light of available evidence no reasonable doubt is possible.

### **Section 4 - Compensation for Damages**

1. If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover from the Bidder liquidated damages equivalent to 3 % of the value of the offer or the amount equivalent to Earnest Money Deposit/Bid Security, whichever is higher.
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 equivalent to 5% of the contract value or the amount equivalent to Security Deposit/Performance Bank Guarantee, whichever is higher.
3. The Bidder agrees and undertakes to pay the said amounts without protest or demur subject only to condition that if the Bidder/Contractor can prove and establish that the exclusion of the Bidder from the tender process or the termination of the contract after the contract award has caused no damage or less damage than the amount or the liquidated damages, the Bidder/Contractor shall compensate the Principal only to the extent of the damage in the amount proved.

## **Section 5 - Previous transgression**

1. The Bidder declares that no previous transgression occurred in the last 3 years with any other Company in any country conforming to the TI 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 the contract, if already awarded, can be terminated for such reason.

## **Section: 6- Equal treatment to all Bidders/Contractor/Subcontractors**

1. The Bidder/Contractor undertakes to demand from all subcontractors a commitment in conformity with this Integrity Pact, and to submit it to the Principal before contract signing.
2. The Principal will enter into agreements with identical conditions as this one with all Bidders, Contractors and Subcontractors.
3. The Principal will disqualify from the tender process all Bidders who do not sign this Pact or violate its provisions.

## **Section: 7- Criminal charges against violating Bidders/Contractors/ Subcontractors**

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

## **Section: 8 - External Independent Monitor/Monitors**

(Three in number depending on the size of the contract)

(To be decided by the Chairperson of the Principal)

1. The Principal appoints competent and credible external independent Monitor for this Pact. 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. He reports to the Chairperson of the Board of the Principal.
3. The 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 request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors. The Monitor is under contractual obligation to treat the information and documents of the Bidder/Contractor/Subcontractor with confidentiality.
4. 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.
5. As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or heal the violation, or to take other relevant action. The Monitor can in this regard submit non-binding 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.
6. The Monitor will submit a written report to the Chairperson of the Board of the Principal within 8 to 10 weeks from the date of reference or intimation to him by the 'Principal' and, should the occasion arise, submit proposals for correcting problematic situations.

7. If the Monitor has reported to the Chairperson of the Board a Substantiated suspicion of an offence under relevant Anti-Corruption Laws of India, and the Chairperson has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

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

#### **Section: 9 - Pact Duration**

This Pact begins when both parties have legally signed it. It expires for the Contractor 12 months after the last payment under the respective contract, and for all other Bidders 6 months after the contract has been awarded.

If any claim is made/ lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/determined by Chairperson of the Principal.

#### **Section:10 - Other provisions**

1. This agreement is subject to Indian Law. Place of performance and jurisdiction is the Registered Office of the Principal, i.e. Noida.

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

3. If the Contractor is a partnership or a consortium, this agreement must be, signed by all partners or consortium members.

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.

.....

.....

**For the Principal :**

**For the Bidder/Contractor:**

Witness 1: .....

Witness 2: .....

Place. JODHPUR.

Date .....

-----

\*\*\*\*\*

**ANNEXURE – VI**

**CERTIFICATE OF ANNUAL TURNOVER & NET WORTH**

[TO BE ISSUED BY PRACTISING CHARTERED ACCOUNTANTS' FIRM ON THEIR LETTER  
HEAD]

**TO WHOM IT MAY CONCERN**

This is to certify that the following financial positions extracted from the audited financial statements of M/s... .. (Name of the Bidder) for the last three (3) completed accounting years upto ..... (as the case may be) are correct.

| <b>YEAR</b> | <b>TURN OVER</b><br><b>In INR Crores / US\$ Million*</b> | <b>NET WORTH</b><br><b>In INR Crores / US \$ Million</b><br><b>*</b> |
|-------------|--|--|
|             |  |  |
|             |  |  |
|             |  |  |

\* Rate of Conversion (if used any): USD 1.00 = INR. .... .

Place :

Date:

Seal:

Membership No ..

Registration Code:

Signature :

[\* Applicable only for GLOBAL tenders.]

\*\*\*

## **APPENDIX-A**

### **GENERAL HSE POINTS**

1.0 It will be solely the Contractor's responsibility to fulfil all the legal formalities with respect in the Health, Safety & Environmental aspects of the entire job (namely, the persons employed by him, the equipment, the environment etc.) under the jurisdiction of the district of that state where it is operating. Ensure that all sub-Contractors hired by him comply with the same requirement as the Contractor himself and shall be liable for ensuring compliance all HSE laws by the sub or sub-Contractors.

2.0 Every person deployed by the Contractor in a mine must wear safety gadgets to be provided by the Contractor. The Contractor shall provide proper Personnel Protective Equipment as per the hazard identified and risk assessed for the job and conforming to statutory requirement and the Company PPE schedule. Safety appliances like protect footwear, safety helmet and full body harness has to be DGMS approved. Necessary supportive document shall have to be submitted as proof. If the Contractor fails to provide the safety items as mentioned above to the working personnel, the Contractor may apply to the Company (OIL) for providing the same. OIL will provide the safety items, if available, but in turn. OIL will recover the actual cost of the items by deducting from Contractor's bill. However, it will be the Contractor's sole responsibility to ensure that the persons engaged by him in the mines use the proper PPE while at work. All the safety gears mentioned above are to be provided to the working personnel before commencement of the work.

3.0 The Contractor shall prepare written Safe Operating Procedure (SOP) for the work to be carried out, including as assessment of risk, wherever possible and safe methods to deal with it/them. The SOP should clearly state the risk arising to men, machineries and materials from the mining operation/operations to be done by the Contractor and how it is to be managed.

4.0 The Contractor shall provide a copy of SOP to the person designated the Mine Owner who shall be supervising the Contractor's work.

5.0 Keep an up to date SOP and provide a copy to changes to a person designed by the Mine Owner/Agent/Manager

6.0 The Contractor has to ensure that all work is carried out in accordance with the Statute and SOP and for the purpose he may deploy adequate qualified and competent personnel for the purpose of carrying out the job in a safe manner. For work of a specified scope/nature, he should develop and provide to the Mine Owner a site

7.0 All persons deployed by the Contractor for working in mine must undergo Mines Vocational Training, initial medical examination, PME. They should be issued cards stating the name of the Contractor and the work and its validity period, indicating status of MVT, IME & PME.

8.0 The Contractor shall submit to DGMS indicating – name of his firm Registration Number, name & Address of person heading the firm, nature of work, type of deployment of work persons, No. of work persons deployed, how many work persons hold VT Certificate, how many work persons undergone IME and type of medical coverage given to the work persons.

9.0 The return shall be submitted quarterly (by 10<sup>th</sup> of April, July, October & January) for contracts of more than one year. However, for contracts of less than one year, returns shall be submitted monthly.

10.0 It will be entirely the responsibility of the Contractor/ his Supervisor/Representative to ensure strict adherence to all HSE measures and statutory rules during operation in Oil's installations and safety of workers engaged by him. The crew members will not refuse to follow any instruction given by the Company's Installation Manager/Safety Officer/Engineer/Official/Supervisor/Junior Engineer for safe operation.

11.0 Any compensation arising out of the job carried out by the Contractor whether related to pollution, Safety or Health will be paid by the Contractor only.

12.0 Any compensation arising due to accident of the Contractor's personnel while carrying out the job, will be payable by the Contractor.

13.0 The Contractor shall have to report all incidents including near miss to installation manager/Departmental Representative of concerned department of OIL.

14.0 The Contractor has to keep a register of the persons employed by him/her. The Contractor's supervisor shall take and main attendance of his men every day for the work, punctuality.

15.0 If the Company arranges any safety class/training for the working personnel at site (Company employees, Contractor worker etc.) the Contractor will not have any objection to any such training.

16.0 The health check-up of Contractor's personnel is to be done by the Contractor in authorized Health Centres as per Oil's requirement & proof of such test(s) is to be submitted to OIL. The frequency of periodic medical examinations should be every five years for the employees below 45 years of age and every three years for employees of 45 years of age and above.

17.0 To arrange daily tool box meeting and regular site safety meeting and maintain records.

18.0 Records of daily attendance, accident report etc. are to be maintained in Form B,E,J (as per Mines Rules 1955) by the Contractor



19.0 A Contractor employee must, while at work, take reasonable care for the health and safety of people who are all the employee's place of work and who may be affected by the employee's act or omissions at work.

20.0 A Contractor employee must, while at work, co-operate with his or her employer or other persons so far as is necessary to enable compliance with any requirement under the act or the regulations that is imposed in the interest of health, safety and welfare of the employee or any other person.

21.0 Contractor's arrangements for health for health and safety management shall be consistent with those for the mine owner.

22.0 In case Contractor is found non-compliant of HSE laws as required the Company will have the right for directing the Contractor to take action comply with the requirements, and for further non-compliance, the Contractor

23.0 When there is a significant risk to health, environment or safety of a persons or pace arising because of a non-compliance of HSE measure the Company will have the right to direct the Contractor to cease work until the non-compliance is corrected.

24.0 The Contractor should prevent the frequent change of his contractual employees as far as practicable.

25.0 The Contractor should frame a mutually agreed bridging document between OIL and the Contractor with roles and responsibilities clearly defined.

26.0 For any HSE matters not specified in the Contract document, the Contractor will abide the relevant and prevailing Acts/Rules/Regulations pertaining to Health, Safety and Environment.

\*\*\*\*\*

## **Appendix-B**

### **Procedure for obtaining Labour License under Contract Labour (R&A) Act, 1970 & Central Rules-1971**

Every Contractor to whom this Act applies shall execute any work through Contract Labour only after obtaining valid license from Licensing Officer. To obtain license contractor is required to submit:

- i) Application in Form IV in triplicate duly filled (Name of the Proprietor/Partner or the Directors/Responsible person in case of firm/company, complete postal address including Pin Code number, Telephone Number, Fax Number & E-mail address, if any), correct details of PE and work to be executed etc. correctly against all columns;
- ii) In case contractor is registered under the Companies Act and applicant is other than Director then he should be holding valid Power of Attorney.
- iii) Original Form-V issued by PE
- iv) Demand Draft for license fees and security deposit payable in favour of Regional Labour Commissioner (Central), Ajmer along with duly filled central challan (in TR-6) duly signed by applicant in quadruplicate for each demand draft;
- v) Copy of Work Order;
- vi) Copy of Partnership Deed and in case of Company, the application should be accompanied with Memorandum of Association/Article of Association;

Note: 1. Application form complete in all respect shall be either personally delivered to the Licensing Officer or can be sent by Registered A.D. Post.

2. Contractors, may intimate Dy. Chief Labour Commissioner (Central), Ajmer for expediting/suitable action if they do not receive license nor any communication within a week.

3. Contractors are not required to visit office of Licensing Officer unnecessarily for obtaining license until and unless they have been specifically advised to appear in person. Appearance of contractors in the office of licensing officer for obtaining license by persuasion will be viewed seriously.

\*\*\*\*\*

## **ANNEXURE – X**

### **Provisions for procurement of Services pertaining to Oil & Gas business activities covered under Purchase preference Policy (linked with Local Content) (PP-LC).**

This tender will be governed by the Purchase preference policy (linked with Local Content) (PP-LC) of Ministry of Petroleum & Natural Gas, Government of India. Indian Bidders are advised to refer notification no. O-27011/44/2016-ONG-II/FP dtd. 25.04.2017 and subsequent amendments, if any, and submit the necessary documents, declaration, undertaking etc. as per the policy guidelines along with their bid. As per the PP-LC policy, 50% of the tendered quantity would be awarded to the lowest techno-commercially qualified LC (Local Content) manufacturer / supplier which are within the price band of 10% of the L1, subject to matching the L1 price. Bidders seeking Purchase preference (linked with Local Content) (PP-LC) shall be required to meet / exceed the target of Local Content (LC) as per values furnished vide original notification of the policy and subsequent amendments applicable as on the bid closing date. The remaining quantity will be awarded to L1 (i.e. Non-Local Content (NLC) manufacturer / supplier not meeting prescribed LC criteria). In case a bidder is eligible to seek benefits under PP-LC policy as well as Public Procurement Policy for MSEs-Order 2012, then the bidders should categorically seek benefits against only one of the two policies i.e. either PP-LC or MSE policy. If a bidder seeks EMD exemption under the MSE policy, then it shall be considered that the bidder has sought benefit against the MSE policy and this option once exercised cannot be modified subsequently. Evaluation of bids with reference to PP-LC policy shall be done by OIL based on the documents submitted by the bidder. OIL shall not be responsible for any incorrect/incomplete submission of documents by bidder leading to non-compliance to PP-LC policy and denial of benefits under the policy.

\*\*\*

FORMAT OF UNDERTAKING BY BIDDERS TOWARDS SUBMISSION OF AUTHENTIC  
INFORMATION/DOCUMENTS

(To be typed on the letter head of the bidder)

Ref. No \_\_\_\_\_

**ANNEXURE-XI**

Date \_\_\_\_\_

**Sub: Undertaking of authenticity of information/documents submitted**

**Ref: Your tender No. CJI-4232-P21 Dated \_\_\_\_\_**

To,  
The CGM-Services(RP)  
Materials & Contracts Deptt,  
OIL, Rajasthan Project, Jodhpur

**Sir,**

With reference to our quotation against your above-referred tender, we hereby undertake that no fraudulent information/documents have been submitted by us.

We take full responsibility for the submission of authentic information/documents against the above cited bid.

We also agree that, during any stage of the tender/contract agreement, in case any of the information/documents submitted by us are found to be false/forged/fraudulent, OIL has right to reject our bid at any stage including forfeiture of our EMD and/or PBG and/or cancel the award of contract and/or carry out any other penal action on us, as deemed fit.

Yours faithfully,  
For (type name of the firm here)

Signature of Authorised Signatory

Name :

Designation :

Phone No.

Place :

Date :

(Affix Seal of the Organization here, if applicable)

\*\*\*\*\*

**--END OF TENDER DOCUMENT--**



