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Unit Name : VASANTDADA SUGAR INSTITUTE
Kindly go through the details, In case of any problems/ issues related to the reported data email to <a href="mailto:purchase@vsisugar.org.in">purchase@vsisugar.org.in</a>

TENDER DETAILS	
Tender Code	2053
Mode	Quantity Contract
Is Over All	No
Tender Type	Open
Tender Category Type	JOBWORK
Section	VSI
Type Of Bid	Two Bid
Material Description	Supply, erection, testing & commissioning of OFF-Grid solar Photovoltaic system with Hybrid Controller (VFD),DCDB,MMS,DC Wiring,LA & Earthing & Termination & Civil work complete for 3 ph 415 v 50Hz open well submersible at Naigaon Farm- Tal.Haveli, Dist Pune - 412110,B- Division 5 HP X 2 nos (SPV capacity : 9 kwp x 2NO) Qty: 1 Job
Estimated Cost [In Rupees]	NA
Submission Date	Wednesday, March 4, 2026 11:55:00 PM
Tender Validity	120 Days
Delivery Period	60 Days
Tender Document Fees [In INR]	1180.0
Tender Document Fees In Words	one thousand one hundred eighty Rupees
Sugarmart Fees [In INR]	590.0
Sugarmart Fees In Words	five hundred ninety Rupees
Contact Email Id	<a href="mailto:purchase@vsisugar.org.in">purchase@vsisugar.org.in</a>
Commencement Period	60 days from 'First order'
Basis Of Prices	Firm Price
Sample Required	Not Required
Deviation	No
EMD [In Rupees]	15000
EMD In Words	fifteen thousand Rupees
BID OPENING DETAILS	
TECHNICAL BID	Will be declared later
PRICE BID	Will be declared later

TENDER DOCUMENTS	
Total Number of documents : 1	



## Vasantdada Sugar Institute

Manjari (Bk), Tal:-Haveli, Dist: Pune: 412307 Maharashtra

Phone: (020)26902100, Fax: (020)26902244

e- Tender -1

Design, Supply, Installation, Testing and Commissioning of Off Grid Solar Photovoltaic Power System with hybrid controller (VFD), DCDB, MMS, String wiring, LA & Earthing, cable & termination & civil work complete for 3 Phase, 415V 50 Hz, Open well Submersible Pump At VSI Naigaon Farm-Pune

Part	Motor No	Location at Naigaon Farm	Division	For Motor Capacity	Solar PV power Capacity
Part-1	1	Green House no.1	B	5 HP	9 kwp
Part-2	2	Green House no.2	B	5HP	9 kwp

Tender Submission  
At

Vasantdada Sugar Institute  
Manjari (Bk) Pune

Date:-

Time:-

Issue to

**INDEX**

SR.NO	SECTION	PARTICULARS	PAGE NO
1	SECTION-K	GENERAL DSCRIPTION OF WORK	3
2	SECTION-L	FORM OF TENDER & GENERAL CONDITION OF TENDER	4-5
3	SECTION-M	ARTICLES OF AGREEMENT	7-8
4	SECTION-N	BRIEF PROJECT INFORMATION & GENERAL SCOPE OF WORK & TERM AND CONDITION	9-12
5	SECTION-P	TENDER NOTICE	13-16
6	SECTION-Q	INSTRUCTIONS TO TENDERERS	17
7	SECTION-R1	TERM & CONDITION OF CONTRACT	18-27
8	SECTION-S	TECHNICAL SPECIFICATIONS	28-41
9	SECTION-T	TEST TO BE CARRIED OUT	42-43
10	SECTION-U	COMMENTS BY TENDERER	44
11	SECTION-SM	SPECIFIED MAKES OF MATERIAL	45
12	SECTION-TD	List of information drawing issued with tender	46
13		Basic information of Location of VSI Naigaon Farm	
		Layout of Naigaon with of marking of motor locations	
		Drawing-1	
		Drawing-2	
		Drawing-3	
		Drawing-4	

SECTION: K  
GENERAL DSCRIPTION OF WORK

Vasantdada Sugar institute is propose to installation of off grid connected solar P.V. power system to following irrigation pumps

Part	Motor No	Location at Naigaon Farm	Division	For Motor Capacity	Solar PV power Capacity
Part-1	1	Green House no.1	B	5 HP	9 kwp
Part-2	2	Green House no.2	B	5HP	9 kwp

The existing open well submersible motor pumps set are run on MSEDCL AG supply. This AG Feeder has load shedding. The supply from MSEDCL is only 8 hours & due to this VSI is facing Problem for irrigation to sugar cane farming. And seed processing So VSI has decided to install off grid solar power system to generate the power from solar PV panels and run the irrigation pumps through hybrid VFD controller on day time.

The main aims of installation of solar system for irrigation pump is given below

To run the pump set on solar power as well as on MSEDCL power

➤ To increase the irrigation period in day time to fulfillment of our irrigation need

Scope of work shall include, Design, engineering, Supply, Installation, Trails, Testing and Commissioning of off grid solar photovoltaic power system with Hybrid controller (VFD) for existing and new 3 Ph, 415V, 50 Hz, Open well Submersible Pump) at Vasantdada Sugar Institute Naigaon Farm Pune

**The scope of work shall include following**

\* Inspection of materials (all) with authority of VSI

Completion work of Design, Engineering, Civil, Fabrication, Manufacture, Supply, Installation, Testing, Performance testing and Trials and Commissioning off grid connected solar photovoltaic power system with other necessary works will be in scope of contractor

Contractor shall submit its all necessary technical & corrective design, string design details, fix angle of MMS, Configuration of controller, makes of equipments, Guaranteed run period of pump, electrical lay out and block diagrams and etc in technical envelope while submitting the tender

Contacto must visit work site before design & filling tender to inspect all site condition and collect data for design of solar PV system, shadow analysis, electrical cable lay out Earthing points, Location of site, its latitude and longitude, temperature, wind speed etc

Contractor shall execute the work as per IS/IEC/MSEDCL/MERC/MEDA specification and as per instruction of Electrical section. (VSI)Contractor shall submit work completion project report with all test certificates, drawings, warranty, guaranty certificates etc.

SECTION: L

FROM OF TENDER  
(TO BE COMPLETED BY TENDERER)

Date:

To,

The Director General,  
Vasantdada Sugar Institute  
Manjari (BK),  
Pune

**Sub.: Tender-**

**1** \_\_\_\_\_  
-----  
-----

Dear Sir,

We have pleasure in submitting herewith our Tender for the above mentioned work duly completed in all respects.

1. We have read and studied the conditions, specifications, drawings (schedule of Quantities and rate), special conditions. We hereby agree to abide by them.
  2. We also agree to complete the proposed work within 3month (work to be carried out as per tender specification and when necessary in co-operation with other contractors) from the date of issue of work order.
  3. We agree to execute and complete the said work at quoted item rate at Rupees
- 

Thanking you,  
Yours truly,

(Signature of the Contractor)

From:  
\_\_\_\_\_

**GENERAL CONDITION OF TENDER**

**Name of work, Tender-1:** Design, Supply, Installation, testing and Commissioning of Off Grid Solar Photovoltaic Power System with hybrid controller (VFD), DCDB, MMS, String wiring, LA& Earting, cable & termination & civil work complete for 3 Phase, 415V, 50 Hz, Open well Submersible Pump At VSI Naigaon Farm-Pune

Part	Motor No	Location at Naigaon Farm	Division	For Motor Capacity	Solar PV power Capacity
Part-1	1	Green House no.1	B	5 HP	9 kwp
Part-2	2	Green House no.2	B	5HP	9 kwp

Sealed **Item rate** tenders are invited from reputed, experienced, Project developers/ Firms/EPC contractors/registered channel partners of MEDA/MNRE/MSEDCL/Electrical contractors of MSEDCL/PWD with following eligibility for the above work at Vasantdada Sugar Institute Naigaon Farm, Tal-Haveli, Dist -Pune

## Eligibility

- 1) Copy of firm registration/Company registration
- 2) Copy of GST registration certificate
- 3) Copies of income tax return filed for last three years
- 4) Copy of Pan Card
- 5) The list of similar works executed during in last three years, documentary evidence is necessary (Open well motor pump set; three phase AC, 415 V, 50 HZ, 5 to 25 Hp &above
- 6) Electrical license contractor/Supervisor

1	Type of Tender	<b>B-2 Item Rate</b>
2	Earnest Money Deposit (EMD)	<b>Rs 15000/-</b> in form of Demand Draft in favors of Vasantdada Sugar Institute from RTGS/ON LINE /NEFT
3	Security Deposit	5% of accepted tender amount. (2% EMD +3% Deducted from Running/final bill)
4	Retention of Security deposit	Total 5% security deposit to be retained for one year defect liability period without any interest
5	Defect liability period	One year defect liability period for electrical item For Solar PV Panels < 10 year after handover of work and linear warranty up to 25 years for Controller(VFD) 1 Year after handover of project
6	Tender Document Cost	Rs .1000/- (Non Refundable) +GST Extra
7	Running Bill	Tender items which is supply and erected
8	Time limit	Two months.
9	Minimum Value of Interim Bills (RA bill)	20% of tendered costs

10	Liquidated damages for delay	Rs. 0.1% per day up to maximum of 10% of accepted tender amount.
11	Tender document availability ON LINE	From <b>16/02/2026 to 4/03/2026</b>
12	Prebid meeting on	<b>26/02/2026 on 2 PM</b>
13	Last date of submission of	<b>Date 04/03/2026/ time: 11.55 PM</b>
14	Submission of Tender	ON-LINE
15	Validity of offer	120 day (from the date of opening)
16	Payment Terms	Given in Section R-1, Clause-R-14
17	Insurance against: Accident, fire etc. to workmen	Given in Section R-26
18	Insurance against: Accident, fire etc. to workmen	Given in Section R-26

We are pleased to quote our best item rate for work of Tender-1, Design, Supply, Installation, Testing and Commissioning of Off Grid Solar Photovoltaic Power System with hybrid controller (VFD), DCDB, MMS, String wiring, LA & Earthing, cable & termination & civil work complete for 3 Phase, 415V, 50 Hz, Open well Submersible Pump At VSI Naigaon Farm-Pune

Part	Motor No	Location at Naigaon Farm	Division	For Motor Capacity	Solar PV power Capacity
Part-1	1	Green House no.1	B	5 HP	9 kwp
Part-2	2	Green House no.2	B	5HP	9 kwp

My offer for this work is Rs. \_

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Accepted tender cost : Rs. \_\_\_\_\_

Thanking you,

signature of Contractor

## SECTION-M

## General Format of agreement

Note: Agreement will do on separate stamp paper. The appropriate cost of stamp paper will be as per rule. The bidder will purchase the stamp papers for agreement

## ARTICLES OF AGREEMENT

Made at \_\_\_\_\_ this \_\_\_\_\_ day of \_\_\_\_\_, 2024

BETWEEN \_\_\_\_\_ o

f (hereinafter referred to as the Employer which expression shall include his heirs, Executors, Administrators and Assigns) of the one part.

AND \_\_\_\_\_

Trading in the name and style of \_\_\_\_\_ (hereinafter referred to as the Contractor which WHEREAS the Employer is desirous of **Design, Supply, Installation, Testing and Commissioning of Off Grid Solar Photovoltaic Power System with hybrid controller (VFD), DCDB, MMS, String wiring, LA & Earthing, cable & termination & civil work complete for 3 Phase, 415V, 50 Hz, Open well Submersible Pump At VSI Naigaon Farm-Pune**

Part	Motor No	Location at Naigaon Farm	Division	For Motor Capacity	Solar PV power Capacity
Part-1	1	Green House no.1	B	5 HP	9 kwp
Part-2	2	Green House no.2	B	5HP	9 kwp

\_\_\_\_\_ and has caused Drawings and specifications describing the work to be done to be prepared by Messrs \_\_\_\_\_ (hereinafter referred to as the Technical Advisor/ Elect Engr-Electrical) and WHEREAS the Contractor has agreed to execute upon and subject to the conditions set forth herein (hereinafter referred to as 'The Said Conditions') the work shown upon the said Drawings and described in The Specification' and they said Priced Scheduled of Quantities.

1) At the respective rates mentioned in the Priced Schedule of Quantities

2) At \_\_\_\_\_ above/below the respective rates mentioned in the Priced Scheduled of Qualities.

3) For the lump sum amount of Rs. \_\_\_\_\_ (hereinafter referred to as the Amount) and WHEREAS the Contractor has deposited Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_) with Technical Advisor/ Engr-Electrical for the due performance of the Agreement.

NOW IT IS HEREBY AGREED AS FOLLOWS:

- 1) In consideration of the payments to be made to the Contractor as hereinafter provided he \_\_\_\_\_ shall \_\_\_\_\_ upon and subject to the said Conditions execute and complete the works shown upon the said Drawings and such further detailed drawings as may be furnished to him by the said Technical Advisor-Electrical and described in the said Specifications and the said Priced Schedule of Quantities.
- 2) The Employer shall pay the Contractor such sum as shall become payable hereunder at the times and in the manner specified in the said conditions.
- 3) The within plans, Agreement and documents above mentioned shall form the basis of this Contract and the decision of the said Technical Advisor/ Engineer -Electrical on other the Technical Advisor-Electrical for the time being as mentioned in the Conditions of Contract to reference to all matters of dispute as to the material, workmanship or account and as to the intended interpretation of the clauses of this Agreement or any other document attached hereto shall be final and binding on both parties and may be made a Rule of Court.
- 4) The said Contract comprises **Design, Supply, Installation, Testing and Commissioning of Off Grid Solar Photovoltaic Power System with hybrid controller (VFD), DCDB, MMS, String wiring, LA & Earthing, cable & termination & civil work complete for 3 Phase, 415V, 50 Hz, Open well Submersible Pump At VSI Naigaon Farm-Pune**

Part	Motor No	Location at Naigaon Farm	Division	For Motor Capacity	Solar PV power Capacity
Part-1	1	Green House no.1	B	5 HP	9 kwp
Part-2	2	Green House no.2	B	5HP	9 kwp

and all subsidiary works connected therewith the same site as may be ordered to be done from time to time by the said Technical Advisor/ Engineer -Electrical or other. The Technical Advisor-Electrical for the time being even though such works may not be shown on the Drawings or described in the said Specifications or the priced Schedule of Quantities.

- 5) The Employer though the Technical Advisor/ Engineer -Electrical reserves to himself the right of altering the drawings and nature of the work and of adding to or omitting any items of work or of having portions of the same carried out and departmentally or otherwise and such alterations or variations shall be carried out without prejudice to this Contracts.
- 6) The said Conditions shall be read and construed as forming part of this Agreement and the parties hereto will respectively abide by and submit themselves to the conditions and stipulations and perform the agreements on their parts respectively in such conditions contained.
- 7) All disputes arising out of or in any way connected with this Agreement shall be deemed and only the Courts in to have arisen in Pune \_\_\_\_\_ shall have jurisdiction to determine the same.
- 8) The several parts of this Contract have been read to us and fully understood by us. As witness out hands this day of 2026

Signed by the said  
In the presence of  
In the presence of  
Contractor

Employer Signed by the said

**SECTION-N****BRIEF PROJECT INFORMATION AND GENERAL SCOPE OF WORK & TERM AND CONDITION**

The Contractor should examine carefully the General conditions of the Contract including ANNEXTURE if any, the specifications & the Drawings supplied herewith. He should visit & inspect the site at his own responsibility & expenses and obtain all the information which may be necessary for the purpose of preparation, design and submitting the tender

Vasantdada Sugar institute proposes to installation of off grid connected solar P.V. power system with VFD Controller for to run existing/new 3 Ph, 415V, 50 Hz. Open well Submersible Pump s of 25 Hpx2 Nos at B division for to utilize the natural source of light energy covert into electrical energy by SPV for aiming to increase the time duration of irrigation at day time.

1.0 Proposed location of installation of solar PV system: B division at Naigaon Farm near B Bandhara and wells

2.0 The existing details of MSEDCL connection as below

Sr.no	Consumer No	Category	Sub division	Circle	Remark
1	170349033840	HT-AG	Uruli kanchan	PRC	B-DIVISION

3

Part	Motor No	Location at Naigaon Farm	Division	For Motor Capacity	Solar PV power Capacity
Part-1	1	Green House no.1	B	5 HP	9 kwp
Part-2	2	Green House no.2	B	5HP	9 kwp

.0 Detail of existing motor pump set and irrigation

4.0 Contractor shall be responsible to complete the project work and achieve the project performance

5.0 Contractor shall submit the all design in technical documents

a) DC String design

b) Specification of Controller, VFD, Protection of systems (DC / A /C) and motors, relation with MSEDCL

c) Available solar power generation and operation of pumping

d) Design of maximum efficiency of generated power

e) Technical effect while working on motor pump on solar power and on MSEDCL Power

6.0 Contractor shall take all safety precautions for DC and AC Supply in system

7.0 Cable rooting and Distribution location will be decided as per site condition

8.0 VSI will pay only legal fees against production of payment proof of receipts if any paid for this net metering work of MSEDCL/Electrical inspector

9.0 VSI shall not pay any consultancy charges related to this work paid to any government department such as MEDA/MNRE/ SECI /MSEDCL/etc

10.0 Contractor shall draw/carryout all corresponding necessary AutoCAD drawings for the approval of electrical inspector/, MSEDCL, MNRE/MEDA

11.0 Contractor shall be giving the action plan of total work within 4 days from date of issue of work order

12.0 Contractor shall submit all bills of materials, Invoices and make entry of material received date wise.

13.0 Installation, supply of material, quality of work & all scope of work made as per the direction of VSI Electrical section

14.0 The work should be strictly carried out as per standard method of contract and as per the approved drawings and in accordance with the IS / I EC / Indian electricity act,, Electrical Inspector and Government authorities and VSI electrical section

15.0 Contractor shall be responsible for in case of any physical and electrical accidents, mishap occurs on work site during completion of total work. The VSI is no way responsible to such accident/injury, and no claim for any kind of compensation will be entertained.

16.0 Provide of all material as per approved make only and after inspection of VSI

17.0 It is to be noted that work is to be carried out under the supervision VSI Electrical section

18.0 Contractor shall be responsible for any damage during transportation, erection, testing. Commissioning and charging the work done

19.0 The cost of the work should be inclusive of cost of material, freight, all duties Safe Grad Duty (SGD)+ Basic Custom Duty (BCD) for solar panels, insurance, overhead and profit , packing forwarding and handling by crane, loading, unloading, transport, liaisioning work if any etc and not subject to any change

20.0 Client reserve the right to add or delete, reduce or increase quantities of any item from the scope of work in this event, quoted tender item- rates shall remain unchanged and no claim of any on this account is payable.

21.0 In general Scope of work shall include (not limited to) following activities: Supply, Erection, Testing and Commissioning, Handling over & maintain during defect liability period.

.SPV Panels

VFD controller unit

AC and DC Cables

Protection equipments, SPDs AC DC, MCB, DC Fuse, UV, OV etc

Earthing materials & Testing.

Structure material and hardware

Electrical meters and panel accessories

22.0 Clients reserve their right to supply some materials from their stocks at prevailing stock issue rate or market rate whichever is higher

23.0 Contractor shall arrange electrical and water supply from provided points of supply by VSI.

24.0 Quantities mentioned in the scope of work schedule are tentative. Payments will be made as per actual measurement

25.0 Contractor has to provide necessary tools and tackles to complete the work

26.0 The work is to be carried out in close coordination with and other agencies and Tender to take into account unavoidable delay due to non availability of fronts and no compensation shall be paid on this account.

27.0 The item rate include for unloading of Equipment at site (irrespective of the fact, whether included in Tenderer's scope of supply or not) Unloading shall be by crane if Insisted by client/consultant. Item rate shall also include for shifty erection, testing, commissioning and maintaining during "Defects Liability Period" of one year

28.0 Over "time frame" for the project is as under:

Issue of Tender	<b>16/02/2026 to 04/03/2026</b>
Submission of Tender	<b>04/03/2026 up to 11.55 pm</b>
Prebid meeting on	<b>26/02/2026 at 2.00 PM</b>
Period of Overall Completion	<b>2 Months</b>

Above schedule is tentative and it is to be expressly agreed that off grid connected solar photovoltaic power system installation will have to be properly co-ordinate with others agencies. No compensation shall be paid to the contractor for delay in starting / completing solar system installation, due to corresponding delay in completion of civil work/labor and delay in material OR due to any other unforeseen reasons.

29.0 Time is the "ESSENCE OF THE CONTRACT" and above completion schedule (as revised from time to time to suit client's priorities) shall be strictly adhered to.

30.0 VSI do not bind ourselves to accept the lowest or any tender and reserves the right to accept or reject any or all tenders, either in whole or in part without assigning any reasons for doing so.

31.0 Partly offer, inadequate /unclear information or any omission/deviation in the scope of work, specification terms and condition laid down in the tender documents; make the tender liable for rejection.

32.0 The Contractor who's Tender is accepted will be required to enter into an Agreement in the Approved form by the Client/Financing Authority.

SECTION-P  
e-Tender Notice  
VASANTDADA SUGAR INSTITUTE, MANJARI (BK), PUNE

ON LINE offers in B-2 form (item rate) for the following work are invited from reputed, experienced, Project developers / Firms/EPC contractors/registered channel partners of MEDA/MNRE/MSEDCL/Electrical contractors of MSEDCL/PWD and will be received in sealed covers, addressed to the Director General, Vasantdada Sugar Institute, in his Office up to 5.30 PM. Hrs. on 14/05/2024.

Eligibility

- 1) Copy of firm registration/Company registration
- 2) Copy of GST registration certificate
- 3) Copies of income tax return filed for last three years
- 4) Copy of Pan Card
- 5) The list of similar works executed during in last three years, documentary evidence is necessary (Open well motor pump set; three phase AC, 415 V, 50 HZ, **5 to 25 Hp & above**)
- 6) Electrical license contractor/Supervisor

**Name of work: Tender-1:**Design, Supply, Installation, Testing and Commissioning of Off Grid Solar Photovoltaic Power System with hybrid controller (VFD), DCDB, MMS, String wiring, LA & Earthing, cable & termination & civil work complete for 3 Phase, 415V, 50 Hz, Open well Submersible Pump At VSI Naigaon Farm-Pune

Part	Motor No	Location at Naigaon Farm	Division	For Motor Capacity	Solar PV power Capacity
Part-1	1	Green House no.1	B	5 HP	9 kwp
Part-2	2	Green House no.2	B	5HP	9 kwp

- 1) Cost of each blank Tender form : Rs. **1000/- (Non Refundable)+ GST**
- 2) Period of work competition : 2 months
- 3) Earnest Money : Rs **15000/- (Rs. Fifteen thousand only)**
- 4) Security Deposit : 5% of accepted tender amount. (Converted 2% EMD as SD + 3% Deducted from Running & final bill)
- 5) Date and time upto  
Which Blank tender forms  
Will be issued. : **16/02/2026 to 04/03/2026** during Office Hours
- 6) Date and time of  
Submission of tender : **04/03/2026 up to 11.55 PM** Hours.

7) Pre-tender Conference will be held **on 26/02/2026 at 2.00 PM**. Hrs. at Manjari in the office of the Director General, Vasantdada Sugar Institute, Manjari, Pune.

8) Validity period : 120 days (from the date of opening)

The offer of the Contractor shall remain valid for acceptance for a minimum period of 120 days from the date fixed for opening of Envelope No.2 (Main Tender) and thereafter until it is withdrawn by the Contractor by notice in writing duly addressed to the authority opening the tender and sent by Registered Post Acknowledgement Due.

10) The tender notice shall form a part of the contract agreement.

11) The Vasantdada Sugar Institute does not bind themselves to accept lowest or any of the tender.

12) The blank tender forms will be sold only to the reputed contractors and registered Contractors on production of original or attested copy of valid registration and income tax papers, experience certificate and maintained in eligibility

13) The tenderer if firm or company shall in their forwarding letter mention the names of all the partners of the firm or the company (as the case may be) and the name of the partner who holds the power attorney if any, authorizing him to conduct transaction on behalf of the Firm or Company.

14) Right is reserved to revise or amend the contract documents fully or part thereof prior to the date notified of amended for the receipt of tender. Such deviations/ amendments if any shall be communicated in the form of corrigendum or by a letter as may be considered suitable.

15) The tenderer shall enter his item rates in words and figures in the blank space of the B-2 Form under para "Tender for the work" the item rates in figures and words and score out one of the words 'below / above' as necessary under his attestation. In case there is difference between rates written in figures and words, the lower rates will be taken as final.

16) No pages should be removed from, added in or replaced in the Tender.

17) Tenders which do not fulfill all or any conditions or are incomplete in any respect are liable to summarily rejection.

18) The Tenderer may, in the forwarding letter mention any points he may wish to make clear but right is reserved to reject the same of the whole of the tenders if the same become conditional tender thereby.

19) All relevant documents with of tender form should be kept in technical envelop No-1 and tender form should be kept in envelope no-2 marked as commercial offer, Both the envelopes should be kept in bigger envelop duly addressed to the VSI super scribing as tender for

## GENERAL

**a) Time limit:** The work is to be completed within time limit as specified in the Notice inviting tender which shall be reckoned from the date of written order of commencing the work and shall be inclusive of monsoon period.

**b) Tender Rate:** No alteration in the form of tender and the schedule of tender and no additions in the scope of special stipulation will be permitted. Rates quoted for the tender shall be taken as including to all leads and lifts, all taxes, & Duties handling charges

**c) Tender Units:** The tenders should particularly note the unit mentioned in the Schedule "B" on which the rates are based. No change in the units shall be allowed. In the case of difference between rates written in figures and words, the correct rate will be the one, which is lower of the two.

**d) Correction:** No corrections shall be made in the tender documents. Any corrections that are to be made by crossing the incorrect portion and writing the correct portions above with the initials of the tenderer.

**e)** All pages of tender documents, conditions, specifications, correction slips, etc shall be initiated by the tenderer. The tender should bear full signature of the tenderer, or his authorized power of attorney holder in case of Firm.

**f)** The Income Tax and work contract tax in force from time to time or at the rate as intimated by the competent Income Tax authority shall be deducted from bill amount whether measured bill, advance payment or secured advance.

## 2.0 EARNEST MONEY

2.1 Earnest money of **Rs.15000/- (Rs. Fifteen thousand only)** along with the tender should be in the shape of RTGS /NEFT On-Line (RTGS details are given on website)

2.2 Tender of those who do not deposit earnest money in one of the above acceptable forms shall be summarily rejected. Earnest money in any other form of cheque will not be accepted.

2.3 The amount of earnest money will be refunded to the unsuccessful tenderer on deciding about the acceptance or otherwise of the tender or on expiry of the validity period whichever is earlier.

The case of the successful tenderer, it will be transferred towards a part of security deposit to be paid after completion defect liability period. If successful tendered does not pay the security deposit in the prescribed time limit and complete the agreement bond, his earnest money deposit will be forfeited to the VSI.

### 3.0 TENDERING PROCEDURES

#### 3.1 Pre-tender Conference:

**3.1.1** A Pre-tender Conference open to all prospective tenders will be held 2.00 PM Hrs. on **26/02/2026** in the office of the Director General, Vasantdada Sugar Institute, Manjari, Pune, wherein the prospective tenderers will have an opportunity to obtain clarifications regarding the work and the tender conditions.

**3.1.2** The prospective tenderers are free to ask for any additional information or clarifications either in writing or orally and the reply to the same will be given by the Director General, Vasantdada Sugar Institute, Manjari (BK), Pune in writing and this clarification referred to as Common Set of Conditions, deviations (CSD), shall form part of the tender documents and which will also be common and applicable to all tenderers. The point/ points if any, raised in writing and/or verbally by the contractor in Pre-tender Conference not finding place in C.S.D. issued after the Prebid Conference is / are deemed rejected. In such case the provision in NIT shall prevail. No individual correspondence shall be made thereafter with the contractor.

**3.1.3** The tender submitted by the tender shall be based on the clarification, additional facility issued (if any) by the Department and this tender shall be un-conditional. Conditional tenders will be summarily rejected.

**3.1.4** All tendere are cautioned that the tenders containing any deviation from the contractual terms and conditions, specifications or other requirements and conditional tenders will be rejected as non responsive.

#### 3.1.5 Manner of submission

##### **Envelope No. 1 Contains (Technical Envelope)**

- 1) Copy of firm registration/Company registration
- 2) Copy of GST registration certificate
- 3) Copies of income tax return filed for last three years
- 4) Copy of Pan Card
- 5) The list of similar works executed during in last three years, documentary evidence is necessary (Open well motor pump set; three phase AC, 415 V, 50 HZ, **5 to 25 Hp & above**)
- 6) Electrical license contractor/Supervisor
- 7) The particulars of technical staff available
- 8) Tools and tackles/Machinery etc available
- 9) Contractor shall submit its complete technical offer details of project

**SECTION Q****INSTRUCTIONS TO TENDERERS**

- Q.1** The Tenders must be submitted in e tender only. (Section 'B' of this Tender document to be filled up) Complete Tender Document along with Drawings to be returned.
- Q.2** It is imperative that Tenderer fills in all columns in the SUMMARY SHEET and Price Schedules Sections "B" and shows total supply and erection price for the Project in the SUMMARY SHEET.
- Q.3** Overall completion period shall not exceed client's requirements from time to time.
- Q.4** Each page under price schedule Sections "B" should be totaled and the total carried forward to the next summary sheet. Each page of the Tender Document and drawings should be signed or initiated and stamped in token of acceptance of contents of tender.
- Q.5** Deviations to specifications/drawings/ any of the other terms and conditions should be clearly specified in Section U. The comments must be given quoting respective Clause No./Section No. Deviations stated elsewhere (covering letter etc) shall not be considered.
- Q.6** The prices quoted should be firm, without any price variation clause and inclusive of all Cost of material, freight, duties insurance, overhead and profit, packing forwarding and handling by crane, loading, unloading, transport, liaisoning work and include for transportation of equipments duly insured against transit risks and packed properly upto the place of erection and shall include for unloading at site. Shifting and unloading of materials at site (supplied by contractor or client) is to be quoted under "Erection"head + GST Extra
- Q.7** Storage space shall be provided at site, if available.
- Q.8** No accommodation shall be provided for Contractors' Staff/ Workers at site. The Contractor to arrange the same
- Q.9** It may be specifically noted that the owners reserve their right to split "Supply" and "Erection" orders on two or more parties and procure certain items directly from suppliers and in such case, for split or part orders tender's quoted rates shall remain unchanged.

## SECTION R-1

## INSTRUCTIONS TO TENDERERS

## 1.0 Definitions:

In construing this contract following words shall have the meaning herein assigned to them, except where the subject or contract otherwise requires.

## OWNERS/EMPLOYERS

CLIENTS : The Director General,  
Vasantdada Sugar Institute,  
Manjari (BK), Pune  
and shall include his / their legal representatives, assign/s or  
successor/s.

a) CONTRACTOR : Shall mean successful Tenderer:  
(To be filled up after award of contract)

b) ELECTRICAL CONSULTANT Shall mean : Electrical Section  
Vasantdada Sugar Institute,  
Manjari (BK), Pune - 412 307  
and shall include his / their legal representatives, assign/s or successor/s.

c) SITE : Shall mean place of work under this contract.

d) CONTRACT : Shall mean invitation to tender, other  
Sections,  
Under this tender document including (not  
limited to) Terms/ Conditions, Drawings, Specifications,  
Price Schedules attached hereto and duly signed by  
deviations to 'Owners' and 'Contractor' including such  
'Owners' Tender Terms signed and accepted by both  
agreement. and 'Contractors' as per the contract

e) SPECIFICATION : Shall mean specifications, drawings, General  
conditions of Contract, special conditions of contract, any other  
terms Specifying Owners requirements pertaining to the  
Contract, Technical/ Commercial/ Others annexed to  
the Contract

'PLANT" and "'EQUIPMENT'  
STORES WORK OR "  
WORKS

be  
  
be

: Shall mean and include plant, equipment material to  
  
'supplied and erected' or 'erected only' and work to  
  
Done by the Contractor under the Contract.

TESTS  
  
this

: Shall mean all pre-commissioning ests, Tests on  
completion, tests at Manufacturers work as per  
  
contract and as per relevant IS

SPECIFICATIONS.

g) CONTRACT VALUE  
contract

: Total value of the scope of work under the

## R.2. SCOPE OF WORK:

Owners intend to installation of **Design, Supply, Installation, Testing and Commissioning of Off Grid Solar Photovoltaic Power System with hybrid controller (VFD), DCDB, MMS, String wiring, LA & Earthing, cable & termination & civil work complete for 3 Phase, 415V, 50 Hz, Open well Submersible Pump At VSI Naigaon Farm-Pune**

Part	Motor No	Location at Naigaon Farm	Division	For Motor Capacity	Solar PV power Capacity
Part-1	1	Green House no.1	B	5 HP	9 kwp
Part-2	2	Green House no.2	B	5HP	9 kwp

Scope shall include work as per Tender documents along with implied minor works mentioned specifically or not. This scope shall be generally as per contract Agreement and shall include such additional jobs as may be required to be carried out for the completion of the 'Electrical facilities in the opinion of the Owners/Consultant. Any additional major jobs. / items required to be carried out shall be evaluated on the basis of similar item-rates under the contract or where such similar items do not exist the contractor shall submit-cost analysis to arrive at the Item-rates for the approval of institute and payment shall made at the mutually agree rat

## R.3. ADDITIONAL WORK:

Any additional work if required/ ordered by the Owners/ Consultant shall be taken up and completed within the agreed time schedule. The item-rates for such work shall be submitted for the approval of Owners/Consultants, but the work shall start immediately upon receiving instructions by the Contractor from the Owners/ Consultant.

**R.4. PRE-QUALIFICATIONS:**

Every tenderer shall submit along with his tender a list of similar works carried out by him, giving value, during last 3(three) years. Similar work executed during in last three years documentary evidence necessary and as eligibility given above

**R.5 .EQUIPMENT/WORKMANSHIP:**

The equipment to be supplied under this contract shall be strictly as per specifications of the contract and relevant IS specifications. In the event of any ambiguity/ dispute, the Owners/Consultants verdict shall be final and binding on the "Contractor.

**R.6. ERECTION, TESTING, COMMISSIONING AND MAINTAINING THE EQUIPMENT DURING THE MAINTENANCE PERIOD (Defects Liability period)**

Item rate for "ERECTION" shall include unloading at site stores (by crane if required by Owners/Consultant, shifting to place of work, erection, testing, commissioning, handing over to Owners and attending the equipment during Defects Liability period (If the equipment falls under Contractor's scope of "Supply and Erection" (or only erection). The erection shall be as per contract specifications and relevant IS specifications. The contractor shall obtain, before, during and after completion of erection, approval from MSEDCL and Electrical Inspector, Factory Inspector, other Statutory Authorities as and where required.

**7. DEFECTS/MODIFICATIONS:**

If in the opinion of Owners/ Consultant/ Statutory authorities the work carried out by the Contractor is defective, the Contractor shall without any additional cost of Owners, rectify such defects or carry out such modifications to make the work "complete" in all respects and acceptable to the Owners/ Consultant/ statutory authorities. If any test readings are not satisfactory, the Contractor shall carry out required modifications (which may include even replacement of certain item/s) without any additional cost of whatsoever nature to Owners. The work shall be guaranteed to yield the specified ratings design conditions within tolerance as per relevant IS Specs. Any equipment, which in the requirements for which it is installed, may be rejected and Contractor shall replace it free of cost and within such time as may be reasonably allowed to him.

**R.8 COMPLETION CERTIFICATE:**

On completion of Erection the Contractor shall inform the Consultant for witnessing the site tests. Required tools/ instruments for such tests shall be arranged by the Contractor. The equipment shall be commissioned only after obtaining written acceptance of pre-commissioning tests (which shall be carried out as per requirement of Owners/ Consultant). At this stage the Consultant shall issue "Completion Certificate" to the Contractor. The Owners/ Consultant reserve the right to issue the completion certificate in parts. If due to Contractor's inefficiency the Contractor's completion certificate is delayed, the Owners reserve their right to put the equipment to use. The "Maintenance Period" OR defects liability period shall start from the date of completion to the satisfaction of the Owners/ Consultant's as mentioned in the completion certificate. Before issue of completion certificate, contractor shall supply " AS BUILT DRAWINGS" and "OPERATION" & "MAINTENANCE MANUALS" as per relevant clause.

**R.9. COMPLETION CERTIFICATE WITH SNAG LIST:**

If in the opinion of Owners/ Consultant the defects in the work are minor, the Consultant may consider issuing "Completion Certificate" for the Contract along with the Snag list for which the Contractor shall give an undertaking that the Snags shall be attended and rectified within three (1) months from the date of completion certificate. The right of issuing such a certificate lies exclusively with the "Owner"

**R.10 DEFECTS LIABILITY PERIOD AND THE FINAL ACCEPTANCE CERTIFICATE:**

Defects Liability Period shall commence on the date of completion mentioned in the completion certificate (with or without Snag list) and shall last for one year for tender items in addition 5 Years for controller and 10 Year for solar panels. On completion of the "Defects Liability Period" the Owners/Consultant shall carry out final inspection of work and issue/ list of defects/ snags. The Contractor shall attend to and rectify these snags/defects immediately. During the Defects Liability Period, if there is any defect in the work carried out by the Contractor the Owners / Consultant shall inform the Contractor who would attend to and rectify such defects immediately. At the end of the Defects Liability Period and after rectification of all snags, the Consultant shall issue "Final Acceptance Certificate". If after defect rectification, the item is not acceptable to Owners/Consultant, the Contractor shall replace the item by right quality item, free of cost. The nature and quantum of defect, its reporting to the Contractor, contractor's response thereof shall be recorded in writing by the "Owner" and acknowledged by the Contractor/Consultant as the case may be.

**R.11. DELIVERY/COMPLETION SCHEDULE:**

The Contractor shall strictly adhere to agreed Delivery/Completion Schedule (or revised schedule agreed to by Owners).

**R.12. PENALTY:**

The penalty shall be 0.1% (point one percent) per day subject to a maximum of 10% of the total contract value for the delay beyond the agreed completion dates for various stages/ phases. If during the course of the Contract it is clear to the Owners/Consultant that the Project is delayed by more than 2 weeks due to reasons totally attributable to the Contractor, the Owner shall have right to terminate the Contract or get part or whole of the remaining work executed by some other agency at the Contractor's risk and cost, besides applying the Penalty for delay caused to the Project.

(For Completion dates refer to Clause "Q" 4 under Sec. Q.)

**R.14 TERMS OF PAYMENT:****SUPPLY WITH ERECTION**

- a) **70%** amount within 10 days of Supply and of erection of each item after verification and approval by the VSI.  
Such payments of supply of material can be billed maximum two times/installation.
- b) **30%** amount would be paid after successful commissioning & satisfactory performance of work (It is a final bill).

**Note: 3% security deposit amount will be deducted from running and final bill**

**NOTE:**

- 1) 5% Security deposit of total contract value will be kept for period of one year

- 2) Interest on any type of deposit i.e. Earnest money deposit, security deposit etc.  
Will not be paid.
- 3) Payment will be as per actual quantities measured.
- 4) Billing method shall be cumulative type.

**R.15 EXPECTED RISKS (FORCE MAJEURE CLAUSE)**

A) The "Accepted Risk" are not (in so far as it is uninsurable) war, invasion, act of foreign enemies, hostilities (whether war be declared or not), civil commotion, rebellion, insurrection or military or unsurpassed power, sabotage, fire, floods, explosions, epidemics, quarantine restrictions, earthquakes, damage by aircraft, and ACTS of GOD or any cause for which owners are responsible for the delay in execution / completion of work by Contractor.

B) The above mentioned FORCE MAJEURE EVENTS shall not include constraints which could prudently be foreseen like shortage of power, non-availability of raw materials, difficulties in making transport arrangements etc.

R.16 MSEDCL SUPPLY VOLTAGE: H V side 22000 Volts 3 Phase 3 Wire 50 Hz U  $\pm$  10%  
Variation as received from Supply Company. L.V.: 415 Volts/240 Volts 3 Phase 4 Wire 50 HZ.  
Earthed natural system.

**R.17 AMBIENT TEMPERATURE/WEATHER CONDITIONS:**

The contractor shall take into account prevailing Ambient Temperature / Weather conditions at site while designing the equipment. (Ambient Temperature shall be as per relevant IS Specs.

**R. 18 MAKES OF THE EQUIPMENTS: VSI APPROVED**

The Contractor shall specify Makes of the equipment offered. These shall be approved list of makes in tender only and shall be subject to the approval of VSI.

**R. 19 MANUFACTURER'S DRAWINGS/COTALOGUES:**

These shall be submitted in 3 sets, within 2 weeks of date of award of the order OR letter of Intent.

**R.20 POWER AND WATER:**

(Contractor shall arrange water himself and power will given at one point and further distribution shall be carried by himself for the work specified in schedule).

**R. 21 AS BUILT DRAWINGS & 'OPERATION AND MAINTENANCE MANUALS':**

3 (Three) Sets Hard copies along with 1 set of CD shall be supplied. These shall include (this is not exclusive list).

- a) Detailed layouts of street light equipment/cables/earthing/lighting system etc. as installed.
- b) Manufacturer's Operation and Maintenance instructions. (As Applicable)

- c) Test Results of light lux level (after Consultant's acceptance)
  - d) Contractor's instructions for routine maintenance of the contract items.
  - e) Any other drawings/detailed deemed necessary by the Owners/Consultant for satisfactory maintenance of the work.
- 1) List of recommended spares for 2 years operation. (As Applicable)

**R.22 CARE OF WORKS:**

From commencement to the completion of works the Contractor shall take full responsibility of all works related to this contract and those of other agencies, including temporary works. In case of any damage, loss or injury to the works (either of Contractor's or other agencies) except for causes defined under Accepted Risks Clause, the Contractor shall repair/make goods or replace such damaged items at his own cost and make the same good and acceptable. The Contractor is also liable for any damages to the works (his or other's) occasioned by him in the course of any operations carried out by him for the purpose of carrying out his obligations. Any delay occurring on account of any of the above shall be to the account of Contractor. Contractor may employ watchman for the safe custody of materials. Security and Safety of all works related to this contract is Contractor's sole responsibility. This is subject to Accepted Risks under clause R-16 above.

**R. 23 COMPREHENSIVE INSURANCE OF WORKS/LABOURS:**

The contractor must take comprehensive insurance all risk policy to cover his works/ labours against all risks and include the cost of his policy in the tender price.

**R. 24 DAMAGES TO PERSONS/PROPERTY AND THIRD PARTY INSURANCE:**

The Contractor shall take every practical care and precaution not to damage or injure any adjoining or other properties (including the property of the owners) or any persons. He shall indemnify and keep indemnified the owners against all claims for injuries or damages to any person or any such property whatsoever which may arise out of or in consequence of construction and maintenance of the works and against all claims, demands, proceedings, damages costs, charges and expenses whatsoever in respect of or in relation thereto. The contractor should also cover above by means of third party Insurance in the joint name of the Contractor and Owners. Third party insurance shall be for minimum amount of Rs. 1,00,000/- per occurrence. All the charges / costs for the same would be borne by the Contractor

**R. 25 ACCIDENT OR INJURY TO STAFF/ WORKMEN:**

The Owners shall not be liable for or in respect or in consequence of any accident or injury to any workmen or other person in the employment of the Contractor or his Sub- Contractor and the Contractor shall indemnify and keep indemnified the Owners against all such damages, compensation and against all such claims, demands, proceedings, cost charges and expenses whatsoever in respect thereof or in relation thereto.

**R.26 INSURANCE AGAINST ACCIDENT, FIRE ETC. TO WORKMEN:**

The Contractor shall insure against such liability with an insurer (approved by the Owners) and shall continue such insurance during whole of the time such persons are employed by him or his sub-

contractor for the contract. The Insurance Policy with up- to-date asked by the Owners. After the Contract is awarded contractor shall take out "Workmen's compensation" and "Contractor's All Risk Insurance Policies and indemnify the client for the same.

**R.27 COMPLIANCE OF ABOVE CLAUSES:**

It is obligatory on the part of the Contractor to comply with all the clauses mentioned above and the tender price is supposed to include costs of implementation of the above clauses. If any of the liabilities such as Insurance Policies are not discharged satisfactorily by the Contractor, the Owners will arrange to implement the clauses and costs, if any, shall be recovered by the Owners from the Contractor's bills.

**R.28 RISK PURCHASE CLAUSE:**

If in the opinion of the Owners/ Consultant, the Contractor fails to perform and discharge his obligations at any time during tenure of the contract including maintenance period, the Owners shall give 7 days notice in writing to the Contractor to improve his performance. If the Contractor fails, the Owners reserve the right to cancel the whole or part of the order and get the same carried out by other agencies at the Contractor's risk cost and responsibilities and recover the costs from the Contractor's outstanding bills or Security Deposit or Retention amount.

**R.29 LABOUR LAWS ETC.:**

The Contractor shall abide by the provisions of State / Central Govt./Local Labour Laws and discharge his obligations towards any liability arising out of such Laws in respect of his workers/Sub-Contractor's Workers. In case, the Contractor fails to comply with the Law requirements, the Owners will have to intervene and settle the demands / disputes of the Contractor or his Sub-Contractor's Labour and debit the cost to the Contractors account. The Contractor shall maintain all such records for the presence of his labour / other people as may be required. In no case, the same would be mixed up with records of the Owner/his other Contractors.

**R. 30 WORKMANSHIP:**

Good Workmanship and neat appearance are pre-requisites of the Contract. Work shall be carried out in accordance with statutory rules and regulations in force and confirm to M.S.E.D.CL. standards, Electrical Inspector's requirements I.E. Rules and relevant 15. MNRE/MEDA/SEC

**R. 31 TOOLS & SPARE PARTS:**

All special Tools and Tackles required for the proper erection and assembly of equipments covered by the contract shall be obtained by the Contractor himself. All sundry materials such as foundation bolts, nuts etc., required for the erection of equipments/Switch-boards including base channels required to raise the level of the Switch-boards shall be included in the erection costs of respective items. Necessary scaffolding shall be provided by the Contractor. Scaffolding shall be so fastened that Swaying/Swinging from structure or Building shall be prevented.

**R. 32 QUANTITIES:**

Quantities mentioned in the tender documents are approximate and tenderer is advised to check these with his working drawings and arrive at actual required quantities as per site conditions, before

placing order. In any case, the payment will be made on the basis of finally supplied and erected quantities on completion of work. Owners keep option to pay for any additional quantities left balance and not erected, but do not bind themselves to do so. If the orders are split for supply and erection, it is the responsibility of Erection Contractor to prepare working drawings and inform Consultants so that "Supply" Contractor can be informed to supply quantities required for satisfactory completion of project.

**R. 33 ACCEPTANCE OF TENDER:**

The Owners reserve right to accept or reject any or all tenders without giving any reasons thereof. The Owners reserve right not to accept lowest tender and Owners may split the order whereby they may place one or more orders for part of work for supply and or erection and in such case Tenderer's item-rates shall remain unchanged.

**1.34 DISPUTE / AMBIGUITIES:** In case of Disputes / Ambiguities while interpreting any of Tender/Contract conditions Owner's decision in the matter shall be final and binding

**R.35 BENEFICIERY FOR INSURANCE POLICIES:**

Insurance policies mentioned in the respective clauses shall be taken within 30 days of award of the order, Owners shall be the sole beneficiaries for these policies. Copies of these policies shall be produced when asked. If Contractor fails to take out these policies within the stipulated period, owners reserve their right to take out these policies on Contractors behalf and debit the cost to Contractor's Account.

**R. 36 OBSERVANCE OF RULES/REGULATIONS/ACTS:**

The Contractor will have to observe all the rules and regulations prescribed under the Factories Act, Provident Fund Act., ESI Act., Shops and Establishment Act, Workmen's Compensation Act and such other Acts and Labour Laws as may be applicable and any liability arising out of non-observance of the regulations and Acts in respect of his employees or his Sub-Contractor employees, in respect of this Contract work, will have to be fully assumed and met by the Contractor. The Contractor should ensure that he satisfies all the above regulations acts, etc., the Contractor or his Sub-Contractor in the Owner's premises/ site of work, shall be the liability of the Contractor and the Owner shall not assume any responsibility legal or otherwise in this respect.

**R. 38 QUANTITIES:**

This clause is to be read in conjunction with Clause-32 "QUANTITIES" Tenderer to note that No Claims for loss / compensation / escalation on the grounds of increase / decrease in the quantities indicated in the tender schedule of quantities, shall be entertained under any circumstances, nor will the Contractor shall be entitled to prefer any claims whatsoever on these grounds.

**R. 39 REGULATIONS:**

The Contractor and his employees shall observe all rules and regulations of working in a running institute

**R.40 SITE SUPERVISIONS & SITE INSTRUCTION BOOK:**

The Contractor shall deploy qualified and responsible Engineer at site for site supervision and these Engineers shall be available at site during working hours to take instructions and answer queries.

**R. 41 WEEKLY SITE MEETINGS:**

SENIOR REPRESENTATIVE of the Contractor along with the site Engineer shall attend weekly site meetings and himself available for any other meetings with the Consultants/ Owners as and when required at site/Pune.

**R. 42 MAINTENANCE OF SITE RECORDS:** The Contractor shall maintain at site proper record of Contract Agreement, Drawings, site instructions or any other records as requested by consultants/ Owners and shall make these available to Consultants/Owners as and when required during site visits.

**R. 43 CO-ORDINATION OF WORK:**

The Contractor shall co-ordinate his work with those of other agencies and the Consultants/Owners shall decide the priorities.

**R.44 SAFETY MEASURES:**

The Contractor shall provide all "Safety Measures" such as Safety Belts, Helmets etc.. and shall provide proper temporary lighting for his scope of work.

**R45 HOUSE KEEPING:**

The Contractor shall provide proper Housekeeping, Keep working place neat and clean store materials neatly and properly.

**R. 46 MSEDCL/MSETCL Co-ordination/Approval/MNRE/MEDA registration approval for project and subsidy approvals/Electrical inspectors approval etc.:** If required The Contractor is responsible to obtain above all in time and ensure completion and commissioning within the scheduled completion date.

**R. 47 ARBITRATION:** If at any time, any question, dispute or difference whatever shall arise between the Owner and the Contractor upon, or in relation to or in connection with correct, either party may forthwith give to the other, notice in writing of the existence of such question, dispute or difference and shall be referred to the adjudication of an arbitrator to be nominated by the Owner. The award of the arbitrator shall be final and binding on both the parties and the provisions of the Indian Arbitration Act 1940 and the rules there under and any statutory modification thereof shall be deemed to apply to and be incorporated in the Contract.

**R. 48** The contractor shall make good all civil works damaged/ disturbed by him while carrying out Electrical Installation, immediately after installation work or in any case before end of the contract.

## SECTION-S

## TECHNICAL SPECIFICATIONS

**Name of work:**

Design, Supply, Installation, Testing and Commissioning of Off Grid Solar Photovoltaic Power System with hybrid controller (VFD), DCDB, MMS, String wiring, LA & Earthing, cable & termination & civil work complete for 3 Phase, 415V, 50 Hz. Open well Submersible Pump At VSI Naigaon Farm-Pune

Part	Motor No	Location at Naigaon Farm	Division	For Motor Capacity	Solar PV power Capacity
Part-1	1	Green House no.1	B	5 HP	9 kwp
Part-2	2	Green House no.2	B	5HP	9 kwp

**The proposed projects shall be commissioned as per the technical specifications given below**  
**DEFINITION**

A OFF Grid Solar Photo Voltaic (SPV) power System consists of SPV array, Module Mounting Structure, hybrid motor controller with VFD consisting of Maximum Power Point Tracker (MPPT), Inverter, and Controls & Protections, interconnect cables and switches. PV Array/string is mounted on a suitable structure. Off Grid tied SPV system is without battery and should be designed with necessary features to supplement 3 phase 415 V AC power to motor pump set of 5HP considering the actual full load current of motor during day time. Components and parts used in the SPV power plants including the PV modules, metallic GI structures, cables, junction box, switches,, electrical switchgears etc., should conform to the BIS or IEC or international specifications, wherever such specifications are available and applicable.

Solar PV system shall consist of following equipments/components.

Solar PV modules consisting of high efficiency MONOFECIAL PV Modules.

Mounting structures in GI Junction Boxes. AC/DC

Earthing and lightening protections.

IR/UV protected PVC Cables, pipes and accessories

**SOLAR PHOTOVOLTAIC MODULES:****1. Specification of Solar PV Modules (144 SOLAR CELLS MONO PERC & HYPERSOL VSMDH)**

Solar PV modules shall be of the crystalline silicon type. Detailed specifications of the solar PV modules are given below: The PV modules used must qualify to the latest edition of IEC PV module qualification test or equivalent BIS standards

Type	Crystalline silicon (Higher than 600(72 TOPCON Mono perc (144 half-cells)n-Type solar cells)
	High Efficiency Bifacial PV Modules

Electrical Data	Peak Power Pmax (wp)	580	585	590	595	<b>600</b>	605
	Maximum Voltage Vmpp (V)	43.6	43.8	44	44.2	<b>44.4</b>	44.6
	Maximum Current Impp (A)	13.31	13.37	13.43	13.48	<b>13.54</b>	13.6
	Open Circuit Voltage V <sub>DC</sub> (V)	52	52.2	52.4	52.6	<b>52.8</b>	53
	Short Circuit Current I <sub>sc</sub> (A)	14.2	14.26	14.32	14.38	<b>14.44</b>	14.5
	Module Efficiency (%)	22.45	22.65	22.84	23.03	<b>23.23</b>	23.42
	Temperature Coefficients (Tc)	Tc of Open Circuit Voltage ( $\beta$ )	-0.26%/°C				
Tc of short Circuit Current ( $\alpha$ )		0.046%/°C					
Tc of power (Y)		-0.30%/°C					
Maximum System Voltage		1500v					
NOCT		45°C±2°C					
Temperature Range		-40°C to + 85 °C					

Mechanical Data	Length x Width x Height	2278 x 1134 x 30mm (89.68 x 44.65 x 1.18 inches)
	Weight	31.6±5% kg (69.67Ibs)
	Cable & connectors	400 mm(+ve terminal and 400 mm (-ve terminal) length cables ,MC4 compatible /MC4 connector
	Application Class	Class A (Safety class II)
	Class A (Safety class II)	2.00mm (0.098inches ) high transmission low iron tempered glass AR coated
	Cells	72 (144half-cells )N-TYPE bifacial solar cells
	Back sheet	Composite film
	Frame	Anodized aluminum /Alloy steel frame
	Mechanical Load Test	5400Pa (Snow)load ,2400 Pa (Wind load )
	Cell encapsulant	EPE/EVA
	Maximum Series Fuse Rating	30A
Approvals and Certificates ^	IEC 61215:2016,IEC 61730:2016,IEC 61701, IEC 62716,IEC 600682-68,IEC 62804,CE, CEC (California),UL 61215,UL61730,CAN-CSA	
Performance warranty	Linear power warranty for 30 years with 1% for 1 <sup>st</sup> year degradation and 0.4% from 2 to year 30	

Other general requirement for the PV modules and subsystems shall be the following:

- 1) The total solar PV array capacity should not be less than allocated capacity (kWp) and should comprise of solar crystalline modules of minimum **600 Wp** and above wattage. Module capacity less than minimum **595** watts peak should not be accepted.
- 2) PV modules must be tested and approved by one of the IEC authorized test centers.
- 3) Protective devices against surges at the PV module shall be provided. Low voltage drop bypass diodes shall be provided.
- 4) The bidder shall carefully design & accommodate requisite numbers of the modules to achieve the rated power generation in his bid.
- 5) The rated output power of any supplied module shall have tolerance of +/-3%. And cable ( AC/DC) voltage drop should be less than 2%
- 6) The peak-power point voltage and the peak-power point current of any supplied module and/or any module string (series connected modules) shall not vary by more than 2 (two) per cent from the respective arithmetic means for all modules and/or for all module strings, as the case may be.
- 7) The module shall be provided with a junction box with either provision of external screw terminal connection or sealed type and with arrangement for provision of by-pass diode. The box shall have hinged, weather proof lid with captive screws and cable gland entry points or may be of sealed type and IP-65 rated.
- 8) Material Warranty is defined as: The manufacturer should warrant the Solar Module(s) to be free from the defects and/or failures specified below for a period not less than twelve (12) years from the date of sale to the original customer ("Customer")
  - I) Defects and/or failures due to manufacturing
  - II) Defects and/or failures due to quality of materials
  - III) Non conformity to specifications due to faulty manufacturing and/or inspection processes if the solar Module(s) fails to conform to this warranty, the manufacturer will repair or replace the solar modules, at the Owners sale option

## **2) SOLAR PV MODULES MOUNTING STRUCTURE/ARRAY STRUCTURE**

2.1 The PV modules shall be mounted on hot dip galvanized steel structures having adequate strength and appropriate design, which can withstand the load of the modules and high wind velocities 180 km/hr. The support structure shall be hot dip galvanized steel

2.2 Detailed Specifications for the mounting structure are given below:

Wind velocity, withstanding capacity	As per IS875
Structure material	<b>1)PURLIN/RAFTER/SUPPORT:</b> In C LIP Section <b>100 x 50x x20x 3 mm IS2062.2011)</b> Base plates Gi Plate 250 x 250 x8 mm with GI Foundation bolt \$12 mm x 300 mm with Hot dip galvanized steel. Surface protection HDG <b>120</b> micron
	<b>2) Uni strut :</b> In size 42 mm x 42 mm x10mm thickness 2.5 mm to 3 mm
	<b>3) Z Bracket Size:</b> thickness of Gi sheet 3 mm Size of 2 bracket 40 mm x 100 x 40 mm Width 240 mm (Suitable to sheet crest pitch)
	With necessary following brackets and hardware's fitting Clit/Bracket/Clamps / Mid Clamp/End clamps / anti thief clamps/all necessary ancillary hardware's clamp etc Self tapping screw: HILTI Make is to be used for fitting on sheet roof top suitable to crest height and purlin
Bolts, nuts, fasteners, panel mounting clamps	Stainless steel SS 304
Installation mounting on ground (Shawn in drawing)	The structures shall be designed for simple mechanical on-site Installation. There shall be no requirement of complex machinery at the installation site. The structure shall be install as per site condition with considering all shadows of site water tank/parapet/ side walls etc The appropriate access platform/walk-ways shall be provided for cleaning and maintenance of the system
Access for panel cleaning and maintenance	All solar panels must be accessible from the top for cleaning and from the bottom for access to the module junction box
Orientation and Panel tilt angle	Modules alignment and tilt angle shall have to calculate to provide the maximum annual energy output. (15° to 19)
Standards	The mounting structure steel shall be as per latest 15 2062: 1992 and galvanization of the mounting structure shall be in compliance of latest IS 4759. IS 800-2007, IS 801-1975, IS875-1993,1S811-1987.part-3,1S2629-1985,IS 4759-1996

a) Hot dip galvanized MS mounting structures may be used for mounting the modules/ panels/arrays. Each structure should have angle of inclination as per the site conditions to take maximum isolation. However to accommodate more capacity the angle inclination may be reduced until the plant meets the specified performance ratio requirements

b) The Mounting structure shall be so designed to withstand the speed for the wind zone of the location where a PV system is proposed to be installed (like Delhi-wind speed of 150 km/ hour). It may be ensured that the design has been certified by a recognized Lab/Institution in this regard and submit wind loading calculation sheet to VASANTDADA SUGAR INSTITUTE PUNE. Suitable fastening arrangement such as grouting and calming should be provided to secure the installation against the specific wind speed.

c) The mounting structure steel shall be as per latest IS 2062: 1992 and galvanization of the mounting structure shall be in compliance of latest 15 4759.

d) Structural material shall be corrosion resistant and electrolytic ally compatible with the materials used in the module frame, its fasteners, and nuts and bolts. Structures also can be used which can withstand the wind speed of respective wind zone. Necessary protection towards rusting need to be provided either by coating or anodization.

e) Aluminum frames should be avoided for installation in coastal area

F) The fasteners used should be made up of stainless steel. The structures shall be designed to allow easy replacement of any module. The array structure shall be so designed that it will occupy minimum space without sacrificing the output from the SPV panels

Design requirement on sheet mounting structure shall in frame

Frame structure shall be in fix and with proper angle as per site requirement

Gap between percolated sheet and modules shall be minimum 6 inch le suitable to do maintenance work

Design the frame as per site requirement by using existing support channels of shed with proper welding and necessary fitting accessories and hardware in GI and SS (nut bolts) materials

Design frame by considering the path way for maintenance and cleaning works

Design frame as per south facing to get maximum output with proper angle ( 16 deg to 19° Jof mounting for solar radiation & Panels fitting with structure by 55 nut bolts Bidder shall submit structure certificate from approved designer to suitable for wind velocity 180kcm / h \* r before installation

### **3. JUNCTION BOXES (JBS)**

a) The junction boxes are to be provided in the PV array for termination of connecting cables. The 1 Boxes (JBS) shall be made of GRP / F \* RP / Powder Coated Aluminum/cast aluminum alloy with full dust, water & vermin proof arrangement. A ||wires/cables must be terminated through cable lugs. The JBS shall be such that input & output termination can be made through suitable cable glands.

b) Copper bus bars/terminal blocks housed in the junction box with suitable termination threads Conforming to IP65 standard and IEC 62208. Hinged door with EPDM rubber gasket to prevent water entry. Single/double compression cable glands. Provision of earthings. It should be placed at 5 feet height or above for ease of accessibility

c) Each Junction Box shall have High quality Suitable capacity Metal Oxide Varistors (MOVS)/ SPDs, suitable Reverse Blocking Diodes. The Junction Boxes shall have suitable arrangement monitoring and disconnection for each of the groups.

d) Suitable markings shall be provided on the bus bar for easy identification and the cable ferrules must be fitted at the cable termination points for identification

e) All fuses shall have DIN rail mountable fuse holders and shall be housed in thermoplastic IP 65 enclosures with transparent covers.

### **4. DC DISTRIBUTION BOARD:**

a) DC Distribution panel to receive the DC output from the array field.

b) DC DPBs shall have sheet from enclosure of dust & vermin proof conform to IP 65 protection. The bus bars are made of copper of desired size. Suitable capacity MCB/MCCB shall be provided for controlling the DC power output to the PCU/inverter along with necessary surge arrestors.

**5. AC DISTRIBUTION PANEL BOARD:**

a) AC Distribution Panel Board (DPB) shall control the AC power from PCU/ inverter, and should have necessary surge arrestors. Interconnection from ACDB to mains at LT Bus bar while in grid tied mode.

b) All switches and the circuit breakers, connectors should conform to IEC 60947, part I, II and III/1560947 part I, II and III.

c) The changeover switches, cabling work should be undertaken by the bidder as part of the project.

d) All the Panel's shall be metal clad, totally enclosed, rigid, floor mounted, air insulated, cubical type suitable for operation on three phase/single phase, 415 or 230 volts, 50 Hz

e) The panels shall be designed for minimum expected ambient temperature of 45 degree Celsius, 80 percent humidity and dusty weather

f) All indoor panels will have protection of IP54 or better. All outdoor panels will have protection of IP65 or better.

g) Should conform to Indian Electricity Act and rules (till last amendment).

h) All the 415 AC or 230 volts devices/equipment like bus support insulators, circuit breakers, SPDs, VTs etc., mounted inside the switchgear shall be suitable for continuous operation and satisfactory performance under the following supply conditions

Variation in supply voltage	±10%
Variation in supply Frequency	±3%

**6. PCU/ARRAY SIZE RATIO:**

a) The combined wattage of all inverters should not be less than rated capacity of power plant under STC

b) Maximum power point tracker shall be integrated in the PCU/inverter/controller to maximize energy drawn from the array.

**7. Motor Controller VFD/ Inverter**

a) As SPV array produce direct current electricity, it is necessary to convert this direct current into alternating current and adjust the voltage levels and frequency (VFD) to run the motor pump set. Conversion shall be achieved using an electronic Inverter and the associated control and protection devices. All these components of the system are termed the "Power Conditioning Unit (PCU)". In addition, the PCU shall also house MPPT (Maximum Power Point Tracker), an interface between Solar PV array & the Inverter and VFD, to the power conditioning unit to archive maximum output of motor pump set.

Typical technical features of the Controller shall be as follows:

	Solar Controller of Motor Pump	
--	--------------------------------	--

	Drive input Voltage for VFD800-10AC	1. 300V to 800V DC from Solar Panel 2. 415V-10%-15% 50Hz three phase supply
	Modes of Operation	1. MOTOR mode: Variable Frequency Variable Voltage three-phase output for motor control. Programming mode
	Frequency of Operation	1. MPPT Mode: Minimum operating frequency-20Hz Base frequency is programmable. 2. Keypad Operation: 1Hz to Base frequency variable from keypad. Default frequency set-50Hz Maximum Operating Frequency is equal to Base Frequency, Base voltage for base frequency is programmable
	V/F Curve Pattern	Linear with Base Voltage at Base Frequency
	Start-up Sequence	Variable Frequency using Keypad for testing purposes. 2. Based on the Input DC Voltage for Solar interface: Inverter will wait until the input DC Voltage reaches Open circuit voltage. There is a Start-up Delay time of 5 seconds after which PWM Pulses are released and motor starts running.
	Stop sequence	For both modes of Start-up, inverter will stop if the input voltage is less than Minimum Input Voltage. For Keypad operation, inverter will stop by pressing BACK key
	Restarting sequence	1. With Mode 1 of Start-up sequence, frequency is reset to minimum operating frequency of 1Hz. User can Increase or decrease the output frequency using display keypad interface. 2. With Mode 2 of Start-up sequence, the VFD800-10AC will start when the input voltage is more than the Open Circuit Voltage and the Start-up delay is elapsed. 3. Restart time after two low intensity trips is 2 minutes
	Protection Features	1. DC Under voltage 2. DC Overvoltage 3. Over Temperature 4. NTC Open 5. Pressure In 6 Surge AC 7 Phase Fall & System Error 9. Door Open 10. Surge PV 11. Dry Run 12. Unbalance 13. Inverse OL 14. Over current in Acceleration 15 Over current in Deceleration 16. Over current while running 17. Output Short Circuit
	Communication	RS-485 MODBUS serial communication with 8 bits, Even Parity, 15stop bit and 9600 Baud rate
	Display	2 Line 16 Character LCD display with 4 function Key pad

## 9. PROTECTIONS

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

### **10 LIGHTNING PROTECTION**

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

### **11 SURGE PROTECTIONS**

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

### **12 EARTHING PROTECTION**

i) Each array structure of the PV yard should be grounded/ earthed properly as per IS:3043- 1987. In addition the lightning arrester/masts should also be earthed inside the array field. Earth Resistance shall be tested in presence of the representative of Department/[NAME OF THE ORGANISATION] as and when required after earthing by calibrated earth tester. PCU, ACDB and DCDB should also be earthed properly.

Earth resistance shall not be more than 5 ohms. It shall be ensured that all the earthing points are bonded together to make them at the same potential.

### **13. CABLES**

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

i) Shall meet IEC 60227/15 694, IEC 60502/151554 standards

ii) Temp. Range: -10°C to +80°C.

iii) Voltage rating 660/1000V

iv) Excellent resistance to heat, cold, water, oil, abrasion, UV radiation

v) Flexible

vi) Sizes of cables between array interconnections, array to junction boxes, junction boxes to Inverter etc. shall be so selected to keep the voltage drop (power loss) of the entire solar system to the minimum (2%)

vii) For DC cabling XLPE or XLPO insulated and sheathed, UV stabilized single core, multi-stranded flexible copper cables shall be used. Multi core cable shall not be used

viii) For AC cabling XLPE insulated and PVC sheathed single or multi core multistrand flexible copper cables shall be used. Outdoor AC cables shall have a UV-Stabilized outer sheath

ix) The cables (as per IS) should be insulated with a special grade PVC compound formulated for outdoor use. Outer sheath of cable shall be electron beam cross linked XLPO and black in color

x) The DC cable from the SPV module array shall run through a UV-Stabilized PVC conduit pipe of adequate diameter with minimum wall thickness of 1.5 mm

- xi) Cables and wire used to interconnection of solar PV modules shall be provide with solar PV connectors (MC4) and couplers
- xii) All cables and conduit pipe shall be clamped to the roof top walls and ceiling with thermo plastic clamps at intervals not exceeding 50 Cm. The minimum DC cable size shall be 6.00 Sq mm copper. In three phase system size of the neutral wire shall be equal to the size of phase wire
- xiii) Cable Routing/ Marking: All cable/wires are to be routed in a GI cable tray and suitably tagged and marked with proper manner by good quality ferule or by other means so that the cable easily identified. In addition cable drum no/Batch No to be embossed/printed at every one meter
- xiv) Cable jacket should also be electron beam cross linked XLPE flame retardant and black. in color
- xv) All cables and connectors for use of installation of solar field must be of solar grade which can withstand harsh environment conditions, including high temperatures UV radiation, high rain, humidity, dirt, salt, Burial and attack by moss and microbes for 25 year and voltages as per latest IEC standard. DC cable used for solar modules to array junction box shall be solar grade copper (Cu) with XLPO insulation and rated for 1.1 KV as per relevant standard only

**XVI)** The rating given approximate bidder to indicate size and length as per the system design requirement. All cable required to the plant shall be provided by bidder. Any change in cable size if desired by the bidder shall be approved after citing appropriate reason. All cable schedules/lay out drawings shall be approved prior to installation

**Xvii)** Multistand annealed high conductivity copper conductor PVC 'A' pressure extruded insulation or XLPE insulation overall PVC/XLPE insulation for UV protection armored cable for underground laying, all cable trays including covers to be provided. All cables confirm to latest edition of IEC/equivalent BIS standard as specified below

Bos items/component standard description standard cable numbers general test and measuring method PVC/XLPE insulated cables for working voltage up to and including 1100 V, UV resistant for outdoor Installation IS/IEC 699

The Cable should be so selected that it should be compatible up to the life of the solar PV panels i.e. 25 years.

**xviii)** The total voltage drop on cable segment from solar PV modules to solar grid inverter shall not exceed 2% The size of each type of DC cable selected shall be based on minimum voltage drop however; the maximum drop shall be limited to 2%.

**xix)** The total voltage drop on cable segments from the solar grid inverter to the building LT panel (distribution Board ) shall not exceed 2%

The size of each type of AC cable selected shall be based on minimum voltage drop however; the maximum drop shall be limited to 2%

#### **14. DANGER BOARDS AND SIGNAGES:**

Danger boards should be provided as and where necessary as per IE Act, /IE rules as amended up to date. Three signage shall be provided one each at battery-cum-control room, solar array area and main entry from administrative block. Text of the signage may be finalized in consultation with [NAME OF THE ORGANISATION]/owner.

#### **15. FIRE EXTINGUISHERS:**

The firefighting system for the proposed power plant for fire protection shall be consisting of:

- a) Portable fire extinguishers in the control room for fire caused by electrical short circuits
- b) Sand buckets in the control room
- c) The installation of Fire Extinguishers should confirm to TAC regulations and BIS standards.

The fire extinguishers shall be provided in the control room housing PCUs as well as on the Roof or site where the PV arrays have been installed.

**16. SAFETY MEASURES:** The bidder shall take entire responsibility for electrical safety of the installation(s) including connectivity with the grid and follow all the safety rules & regulations applicable as per Electricity Act, 2003 and CEA guidelines etc.

**17. Display Board:**

The bidder has to display a board at project site mentioning the following Plant Name, capacity, Location, Type of renewable energy plant, date of commissioning. details of tie with transmission and distribution co. power generation and export FY wise

**18 NOTES**

The entire system should be appropriately tested and certified by the authorized Test Centers of the MNRE to meet the performance as specified.

**19 AUTHORISED TESTING LABORATORIES/CENTERS**

1 The PV modules must be tested and approved by one of the IEC authorized test centre"s. Test certificates can be issued by any of the NABL/BIS Accredited Testing/Calibration Laboratories. 2 Test certificates for the system/components/ items from any of the NABL/BIS Accredited Testing Calibration Laboratories/MNRE approved test centers to be submitted.

**A) OPERATING TRAINING**

- i) System description including electrical, electronic and mechanical sub-system and their functions.
- ii) System operating procedures.
- iii) System operating characteristics. iv) System limitations.
- v) On-site system operation.

**B) MAINTENANCE TRAINING**

- 1) System description including electrical, electronic and mechanical sub-systems and their functions.
- ) System and component trouble-shooting
- iii) On-site inspection and operation and maintenance
- iv) Schedule of maintenance, safety checks and procedures.

**20) CABLES & CABLE LYING:**

**L.T. CABLES:**

LT Aluminum Conductor cable, LT-XLPE Insulated, Armored cable, 650/1100 Volts grade.

Confirming to 15 7098 part-1/1988 ISI Mark

All power and distribution cables shall be 1100V grade, XLPE Insulated and sheathed, armoured, multistrand aluminum conductor cables unless otherwise specified.

All control cables shall be 1100V grade XLPE insulated and sheathed, armoured, multistrand aluminum, copper conductor cables unless otherwise specified. The cables shall confirm to IS 7098 part-1/1988 ISI Mark with up-to-date amendments. Type test certificates of the cables from manufacturers for the particular drums shall be provided.

**LYING:**

The cables shall be thoroughly inspected for transit damage and irregularity in sheath etc.

1. Sufficient manpower with necessary equipment like jacks, rollers shall be provided for unwinding and laying the cables and dragging and twisting shall be avoided. Proper unwinding methods shall be used to avoid twists.

2. Cables shall be laid at a depth of at least 600mm from ground level with 50mm sand bedding, brick box with cushion for protection. Bending radius provision of at least 8D shall be kept while laying.

The trenches shall be filled and reinstated layer by layer leaving a crown on top.

3. H.T. and L.T. cables shall not be laid in same trench. When more than one cable is laid in same trench a gap of at least 150mm shall be kept between the cables.

4. Cables laid on walls, trenches shall be supported at every 600mm for vertical run and every 450mm for horizontal run. Suitable clamps shall be provided for fixing and support. Vertical runs near ground level shall be protected by GI Pipes of suitable size up to the height of at least 1200mm.

**JOINTING:**

Jointing or end termination of cables shall be done by skilled person only. Straight through joints shall be avoided as far as possible. The length of the cables in schedule will be approximate and actual site measurements shall be taken by contractor prior to cutting any cable. Heavy duty compression type brass glands shall be used for all connections. Crimping type lugs with suitable brass/ Chrome Plated hardware shall be provided for connections.

**TESTING:**

Cables shall be meggered as soon as they are brought to site. Insulation resistance shall also be tested.

1. After cutting.
2. After laying and preparing the joint.

Following test shall be taken after completing the installation;

- a) Cable continuity.
- b) Earth continuity.
- c) Insulation resistance.

1000V megger shall be used for testing 3 phase 415V system.

All HT cables shall be pressure tested after making the end joints at site. Insulation resistance tests shall be done by 5000V megger for all H.T. cables.

**21) EARTHING**

**GENERAL:**

All non live metal parts of the electrical system and equipment shall be earthed with suitable size of earth conductors. 2 distinct earthings shall be provided for all 3 phase equipment.

Earthing shall be in conforming with IS 3043 and Lightning protection shall be with IS 2309. The earth resistance shall not exceed 2 ohms at any time. Earth resistance shall be taken with earth meggers for all earth points. All earth points shall be located 2.0 mtrs away from the building and there will be a minimum distance of 3.0 mtrs between 2 earth points.

**EARTH STATION:**

Pipe Electrode Earthing: 40mm dia GI Pipe 3.0 mtrs long tapered at bottom and 12mm dia holes at 75mm c/c on all sides for bottom 2.0 mtrs with top watering arrangement shall form earth electrode. The electrode has to be buried vertical in ground. As per instruction

Plate Earthing: 600 x 600 x 6mm GI or 600 x 600 x 3mm Copper Plate with 25mm dia GI watering pipe with funnel at top. The construction shall be as per details given in the latest edition of IS 3043. As per instruction In case of rocky strata, Bore earthing stations with 150mm bore and 100mm class B GI pipe shall be done. Depth of bore earthing shall be 6.5 mtr minimum. Soil resistivity test shall be done for deciding depth if necessary as per instruction

Bentonite or earth powder slurry shall be put along with pipe in the bore.

**MASONRY CHAMBER:**

Brick masonry chamber of size 300 \* 300 x 300mm min. (internal clear dimensions) with cast iron cover and frame with top finished at ground level shall be provided for watering and test link access.

As per the instruction of Engineer

**ARTIFICIAL TREATMENT:**

In case of rocky soil, hard murum soil resistance is very high. For getting proper earthing alternate layers of charcoal and salt are to be provided, for entire height of earth electrode with 300mm over all cover. Black cotton soil can be used for refilling the earth points in rocky strata.

**EARTHING CONDUCTORS:**

a) Main H.T. Transformer and D.G. set neutral switch-yard	50 x 6mm GI strip.
b) Grid earth conductors	40*6mm GI strip.
c) Main switch boards/ distribution boards upto 800A power	40 x 6mm GI strip
d) Other switch board and motor including and above 50 HP	32 x 6mm GI strip.
e) Motors from 20 HP to 50 HP	25 x 6mm GI strip.
Motors above 10 HP upto 20 HP and lighting distribution boards	25 x 3mm GI strip.
Power points 63A	8 SWG GI Wire/10 SGG Cu. Wire.
g) Lightening conductors	20 x 3 mm Cu/GI strip.
h) Motors below 10 HP and power point upto 32 Amps.	10 SWG GI Wire/12 SWG Cu. Wire.

The earthing conductors shall be connected with welding or a bolted joint with at least 2 reverts/bolts.

The joints shall be painted with bitumen paint.

Earthing conductors for lightening protection shall be run on parapet walls of outer periphery of building and outer periphery of height point for horizontal runs and on unapproachable vertical walls upto disconnecting box fixed at 1.0 mtr. Height above ground level. Lightening conductor shall be connected to earth station directly and separate 32 x 6mm strip from earth station is to be connected to grid earthing.

**22) CONCRETING RATION 1:4:8 AS per MSEDCL**

Providing and laying in position plain cement concrete using granite or black trap graded metal including mixing in a mechanically operated mixer, compacting, curing as required etc complete for all lifts above or below the ground level where concrete is proposed, including

It is mandatory on the Contractor to get structural drawings approved from the registered structural designer prior to the commencing the work. Also if it is required to get the structural and foundation drawing to be approved from the electrical inspector, the contractor has to obtain the approval of the same. Also the design & drawing of the cement concrete foundation for these items shall got approved from the certified structural / Civil Engineer for its strength and suitability. The cement concrete shall be the RCC if required and as per the directives of the civil engineer.

## SECTION-T

## TEST TO BE CARRIED OUT

Contractors have to carried out all necessary test of solar roof top equipment and project work test as per the MNRE /MSEDCL etc as per the rule and Standard Method and requirement of Electrical Inspector and submit all Test certificate

- 1) All DC and AC testing certificate All Earthing certificates is to be submitted
- 2) Test report of motor Controller
- 3) Test Reports of Solar PV Panels
- 4) Cables and DC wires
- 5) Test certificate of SPD and protection units

**TESTS AT MANUFACTURER'S WORKS:**

These shall be carried out at Manufacturer's works as per relevant IS specifications. Copies of these certificates shall be submitted in the O & M manual.

Copies of TYPE TEST CERTIFICATES shall be submitted.

**SITE TESTS:**

Following Tests shall be carried out in the presence of the Owner's represent at /Consultant.

Equipments/Transformer/Switch-boards:

## a) Transformers:

- a .J. Visual inspection for apparent damage, broken parts, cracks, leaks, level, etc.
- a.2. For transformer, 3 samples of the transformer oil shall be taken from the bottom of tank and shall be tested to withstand 40 KV for 60 seconds against 2.5 mm gap as described in the appendix of IS: 33 (Latest Edition)
- 8.3. Insulation Resistance Tests by Minimum 1000 V D.C. Meager. T values shall correspond to factory test results.
- a.4. Wherever the oil sample tests and IR values are not satisfactory ( opinion of Consultants) transformer shall be dried out using stream line filter. The drying Process shall be continued till the Insulation Resistance Curve shows a steady and definite increasing trend and the meager Value shall be not less than 20 Mega Ohms per KV. (Drying out/Filtration shall be at extra cost).
- 8.5. All transformer accessories such as Buchholz Relay, breather, gauges thermometer etc. shall be thoroughly checked and adjusted.

## A.6. Ratio Test (By using AVOMETER)

- a.7. On energisation the new transformers shall be kept on NO LOAD for minimum 24 hours.

## 2. b) M.V. Switch-boards/equipments:

b.1. Insulation Resistance tests with 1000 V meager with switches in closed position Minimum acceptable results.

Phase to Phase 50 Mega ohms.

Phase to Earth 50 Mega Ohms.

b.2. Switch-boards including secondary wiring to be subjected to 2 KV test for 1 minute.

b.3. Meters and Relays to be calibrated through secondary injunction tests (Optional and at extra cost)

c) Insulation Resistance Tests by 1000 V Meager between phases and between wil Phases and earth.

d) Conduit point wiring/switches/sockets:

d.1. Insulation Resistance Test

d.2. Earth continuity Test

4.3. Polarity test for single switches.

Earth meager tests shall be carried out on following:

a. Each Earthing station.

b. Eanking System as a whole

c. Earth continuity conductors.

SECTION – U  
COMMENTS BY TENDERER

Tenderers comments on Tender Terms/condition and specification should necessarily come under this section only

Comments made elsewhere (covering letter etc) shall be ignored .If Tenderes have no comments even then they should write “NO COMMENTS” and Sign

## SECTION:-SM

## APPROVED MAKES OF MATERIAL/EQUIPMENTS

Note: Clients reserves rights to ask and demand specific make for any of the following approved Makes to be used

Sr.no	Description	APPROVED MAKE
1	Solar Photo Voltaic Panels	<b>Vikram Solar</b> /WAAREE /Kirloskar Solar
2	Motor Controller with VFD (Hybrid)	<b>Kirloskar brothers LTD (KBL)</b> /ABB
3	DC Cable/Wire	<b>Polycab</b> /Lapp/Havells/KEI
4	DC Fuse/DC MCB	<b>Cooper Busman</b> / ABB/Schneider /Siemens /Elecom
5	Surge Protection Devices DC/AC	<b>Phoenix</b> /ABB/Schneider/LEGRAND
6	GI Cable tray/Trunk	PWD/MSEDCL approved
7	Lighting arrester	MSEDCL approved / Yash Earting/JEF/ABB
8	MCB/MCCB/ELCB/RCBO	Legrand/ABB/Siemens / Schneider
9	AC Junction Box/combiner box	Nordic/Trinity/HENSEL/Adler/MSEDCL approved
10	DC junction Box	Nordic/Trinity/HENSEL/Adler/MSEDCL approved
11	Energy Meter	L&T/Secure/MSEDCL approved
12	LT-XLPE AC Cables & AC Control Cable and wires	Polycab/Finolex/KEI
13	Lugs and Glands	Dowell/Jainson/Comet/HMI
14	Indicating Lamps	L&T/Teknic/Siemens
15	Connectors/MC4 Connectors for DC	ABB/Phoenix/Elecom/Teknic/Connect
16	PVC Casing-n-Capping conduit pipes and accessories, PVA cable tray	Modi / Diamond/Precision
17	Screws/Fastenerbolt	Nettale fold/kingfold/power/shakti
18	LT Cable Joint Kit	Raychem/Mahindra/3M
19	Double Wall corrugated(DWC) Pipe, Color:	Rex, Brand - Telerex,/ ALOM/Gemini (ISI Mark)
20	GI/MS sheet Material	Jindal/Tata/MEDA Approved
21	Digital Meter/multifunction meter	L&T/HPL/Siemens
22	Earthing Material	MSEDCL Approved / YESH earting/U-PROTECH
23	Cement pipe/half round	Everest/PWD approved
24	U PVC Pipe	Finolex/Ashirwad/Paras/Kothari

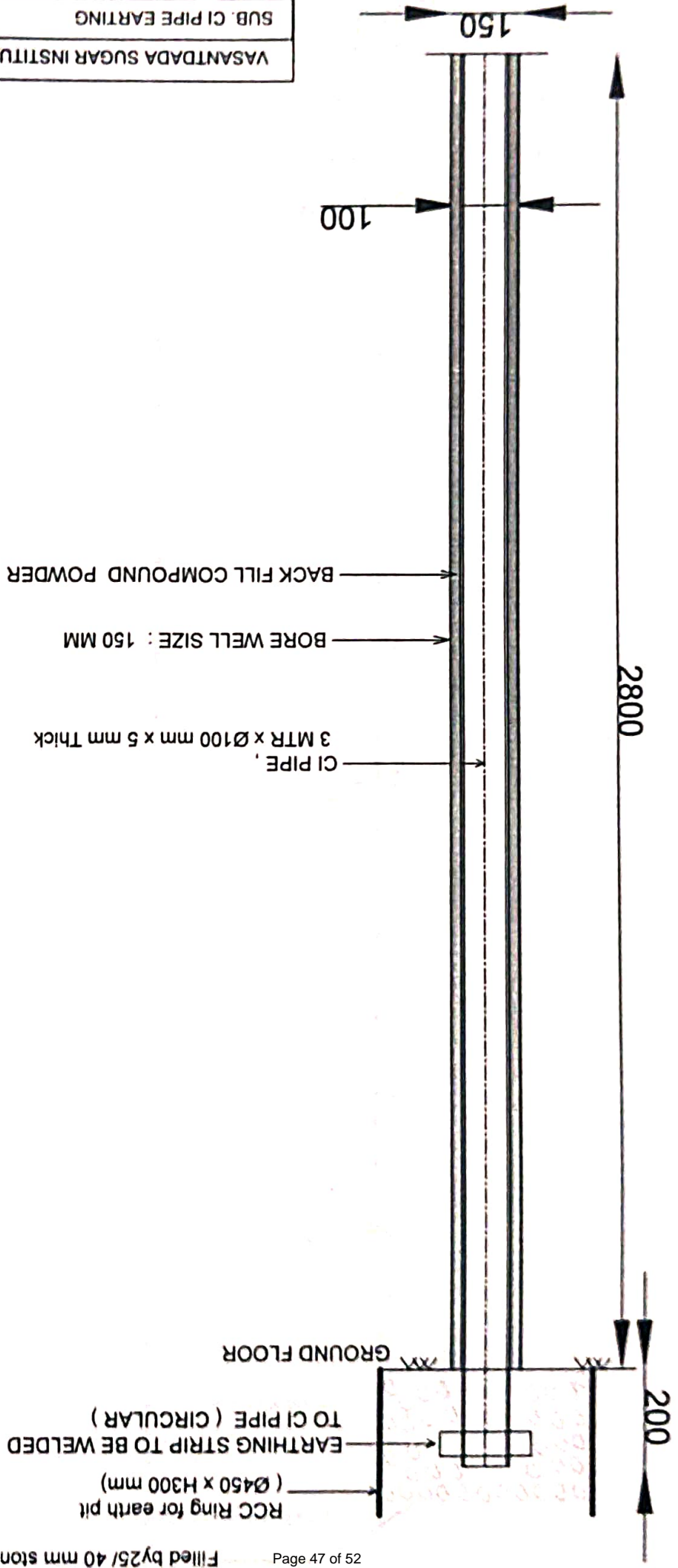
**SECTION TD****Drawing Issued with the Tender**

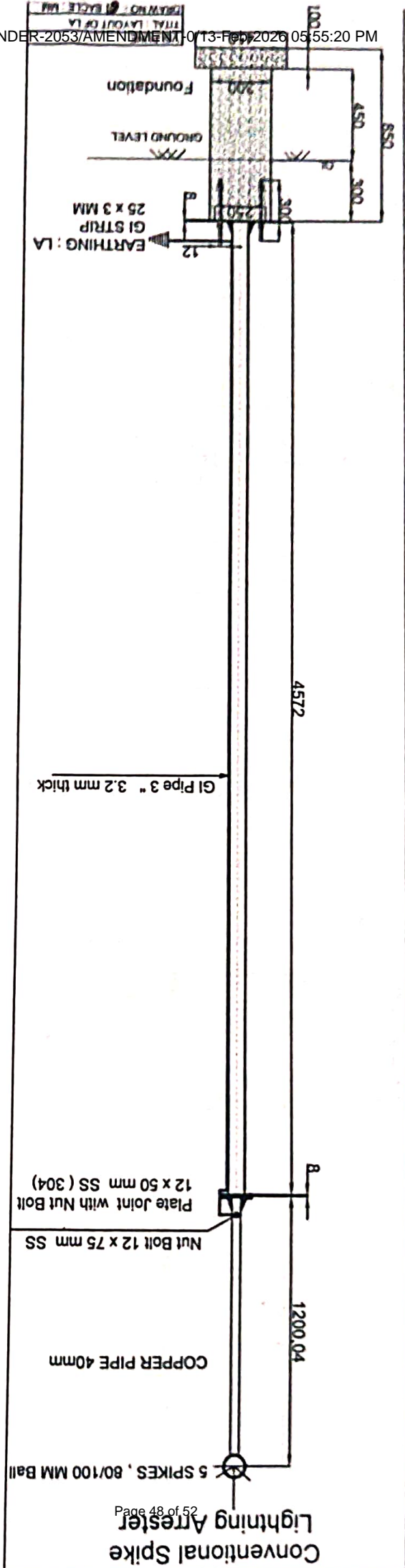
<b>Sr.no</b>	<b>Drawing</b>	<b>Drawing No</b>	<b>Page No.</b>
1	Basic information of Location of VSI Naigaon Farm		
2	Lay out Naigaon with marking of motor locations	Lay out	
3	CI pipe earthing	Drawing No .1	
4	Layout of LA	Drawing No .2	
5	GA of civil Foundation and MMS	Drawing No .3	
6	Layout of foundation and MMS	Drawing No .4	
7	Elevation of MMS with fix angle	Drawing No .5	

**Basic information of Location of VSI Naigaon Farm**

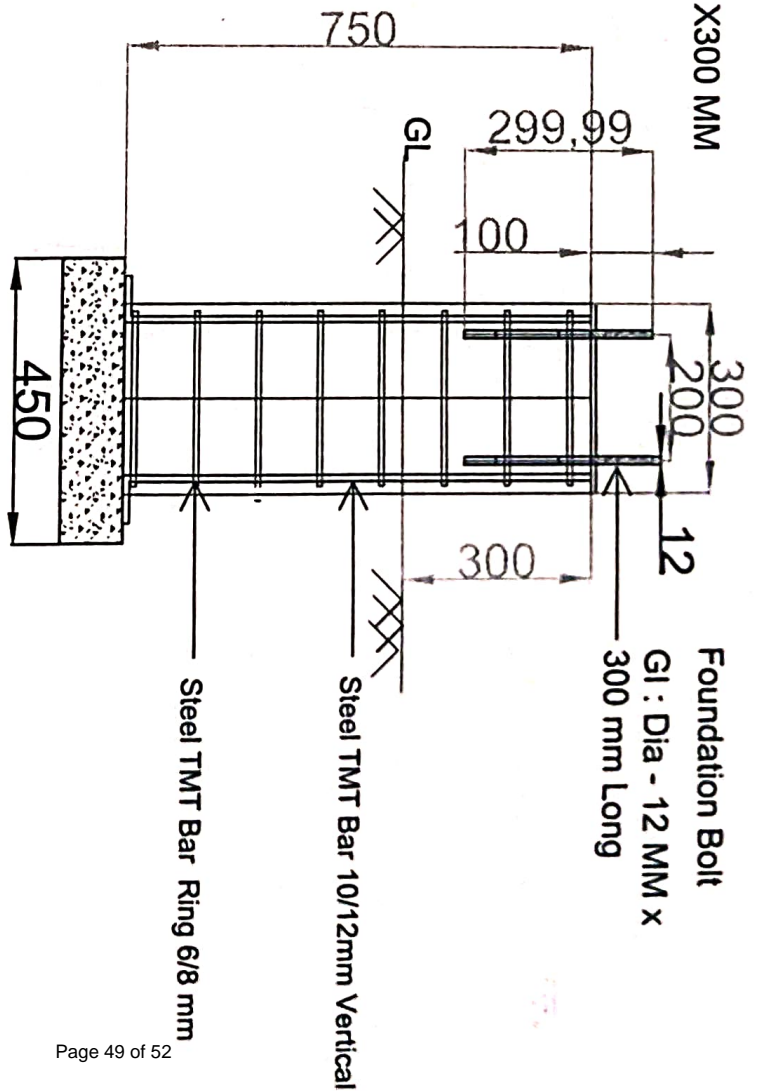
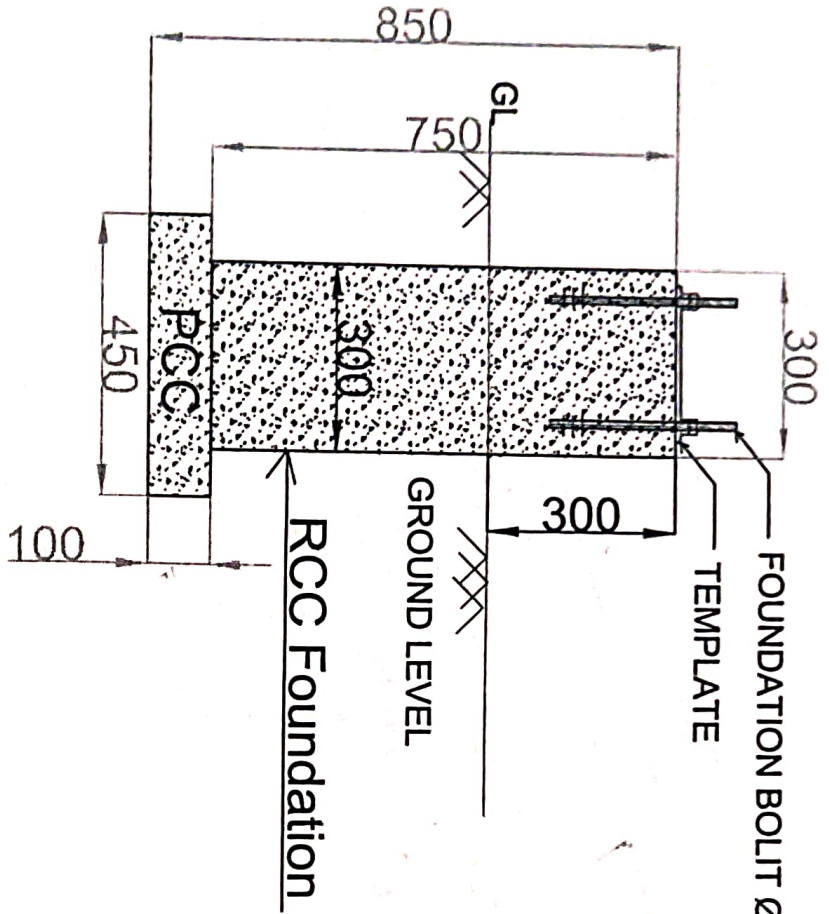
Sr.no	Point	Information
1	VSI Naigaon Farm	VASANTDADA SUGAR INSTITUTE ,Naigaon Farm
2	Farm Address	Village –Naigaon ,Tal-Haveli,Dist-PUNE- 412110
A	Land Mark	Near Theur
A-1	Latitude	18°31'27"N
A-2	Longitude	74°05'04"E
03	Main road towards Naigaon Farm	By NH Pune-sholapur road Turn at Naigaon phata Near Kunjeer wadi ,Tal.Haveli Pune.
04	Distance from Pune city	38 KM







Conventional Spike Lightning Arrester



<b>VASANTDADA SUGAR INSTITUTE</b>	
<b>SUB.: LAY OUT OF CIVIL FOUNDATION</b>	
<b>DRAWING NO.- 7</b>	<b>SCALE : MM</b>

## TECHNO-COMMERCIAL BID

### BID DOCUMENTS

S No.	Document Name	Document Details
1	Copy of Registration Certificate of Trader /Firm/Organization/Industry *	
2	GST Registration *	
3	PAN CARD *	
4	Income Tax return certificate for last three years *	
5	Past Experience last 3 years *	The List of similar work executed during last three year Documents evidence necessary (open well motor pump set three phase AC, 415V, 50 Hz, 5 HP to 25 HP and above)
6	Terms and conditions for deputing engineers and technicians. *	Electrical License Contractor/ Supervisor

\* - Indicates Mandatory Document to Fill (to participate in tender)

### ITEM DETAILS

S. No.	Item Code	Item Name	Category	Qty. Req.	Unit	Version	Specification	Drawing	Documents Req. from Vendors	Comments
1	01-03-049 *	JOB WORK ITEMS<->GENERAL JOB WORK<->SUPPLY, ERECTION, TESTING & COMMISSIONING OF OFF-GRID SOLAR PHOTOVOLTAIC SYSTEM WITH HYBRID CONTROLLER (VFD), DCDB, MMS, DC WIRING, LA & EARTHING & TERMINATION & CIVIL WORK COMPLETE FOR 3 PH 415 V 50HZ OPEN WELL SUBMERSIBLE AT NAIGAON FARM- TAL.HAVELI, DIST PUNE	JOBWORK	01.00	JOB	0	No	No	No Documents Selected	N.A.

\* - Indicates Mandatory Item to Quote (or to participate in tender)

**PRICE BID****BID DOCUMENTS**

S.No.	Documents Name	Document Details
1	Required Bid Document(BOQ) *	

**FORMULA DETAILS**

Category Name	Formula
JOBWORK	DEFITEMQTY*RATEPERUNIT

## Price Schedule : JOBWORK

S No.	Item Code	Quantity (in Number)	RATE PER UNIT (in Rupees)	Total
1	[JOB WORK ITEMS<>GENERAL JOB WORK<>SUPPLY, ERECTION, TESTING & COMMISSIONING OF OFF-GRID SOLAR PHOTOVOLTAIC SYSTEM WITH HYBRID CONTROLLER (VFD), DCDB, MMS, DC WIRING, LA & EARTHING & TERMINATION & CIVIL WORK COMPLETE FOR 3 PH 415 V 50HZ OPEN WELL SUBMERSIBLE AT NAIGAON FARM- TAL.HAVELI, DIST PUNE]			
	01-03-049 *			

\* - Indicate Price required for this item.