

# MAHARASHTRA ENERGY DEVELOPMENT AGENCY KOLHAPUR

2023/DOK/Technical/Desk -1/Quotation/409

Date: 19/05/2023

## Quotation Call

To,  
(Supplier/Developer/Contractor/Integrator )

### **Sub: Supply, Installation, testing & commissioning of 300 wp Capacity 09 meter height (02 nos.) Solar High Mast at Aitawade Khurd, Tal. Walwa, Dist. Sangli – Invitation to Quote**

With reference to subject matter, we would like to invite your quotes in sealed condition for undertaking the work with MEDA technical specifications and technical standards with following terms and conditions –

- Details and Dates: -

1	System details	<b>09 Meter Solar High Mast</b>
2	Estimated Cost	8,39,553/-(Inclusive of all taxes and charges)
3	Date and time for submission of quotations.	From 22/05/2023; 10:00 Hrs to 30/05/2023 18:00 Hrs
4	Date and time for opening of quotations.	31/05/2023; 10:00 Hrs
5	Security Deposit	25,500/- ( to be deposited by online mode in favor of Maharashtra Energy Development Agency, Kolhapur)
6	Address for communication and for quotation opening.	Maharashtra Energy Development Agency, Divisional Office Kolhapur SR.No. 249/A-1/55, E Ward, MHADA complex, Nagala Park, Near Zilla Parishad, Kolhapur-416003
7	Site location	<b>1) Bajirao Patil Society(Chikurde Road) 2) Lingayat Smashanbhumi of Grampachayat Aitawade Khurd, Tal. Walwa, Dist. Sangli</b>

### ➤ ELIGIBILITY CRITERIA –

The manufacturer/supplier shall be eligible to quote for this work provided fulfilment of following.

1. Shall have a registered firm/company with GST registration.
2. Shall provide brief information in prescribed format (enclosed).
3. Shall not be black listed in any govt and/or other organizations.

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4. Shall provide documentary proof about having experience of supply, installation and commissioning of minimum 02 Nos of Solar High Mast System or minimum 10 Nos. of Solar Street Lights. (Work experience must be of government work).
5. Shall have an annual average turnover of Rs. 20 lakh per year for FY 2020-21 and 2021-22 duly certified by chartered accountant.
6. Shall provide self-attested copy of IT returns for FY 2020-21 and 2021-22. (Assessment year 2021-22 and 2022-23 )
7. Shall have arrangement of providing after sales service in area of installation of systems.

### ➤ **TERMS AND CONDITIONS –**

- 1) Location for installation of Solar High Mast shall be assigned immediately by the user agency to the selected manufacturer/supplier to get the work done in stipulated time.
- 2) The installation of solar High Mast should be done in excellent manner and meet technical standards prescribed by the MEDA.
- 3) As per the technical criteria set by the Ministry of New and Renewable Energy, Govt. of India the solar modules should fulfill the IEC standards and shall be procured from manufacturer providing module with RFID tag.
- 4) The manufacturer/supplier shall provide modules approved by MNRE else have to submit valid test certificate of systems being supplied from MNRE or govt. approved test centers.
- 5) The solar module should be engraved with name of company supplying the same along with installation date etc.
- 6) If the solar High Mast doesn't function as per given standards then the loss incurred shall be borne by the supplier and paid to Aitawade Khurd, Tal. Walwa, Dist. Sangli. Supplier shall give training of System operation to a person duly nominated by user agency and same shall be informed to divisional office Kolhapur.
- 7) The manufacturer/supplier shall provide the user manual, warranty card to the user agency with copy to MEDA.
- 8) The manufacturer/supplier shall visit the site and ensure scope of work before submission of quote against the enquiry.
- 9) **The manufacturer/supplier should enclosed the Site Visit Report in given prescribed format.**
- 10) The work being of limited nature the manufacturer/supplier within Kolhapur/Sangli District will be given preference while assigning the work against the invited quotes.
- 11) Shall have to provide detail information about Company/firm in attached Format (Bidder's Information sheet)
- 12) **The manufacturer/supplier shall submit their quotations in two different sealed envelopes i.e. First envelop shall contains documents a per the technical eligibility criteria and Second envelop shall contain Financial details (quoted rate).**
- 13) **The manufacturer/supplier should mention the subject on each sealed envelope i.e Technical Envelop and Financial Envelop.**
- 14) **The financial envelop of technically qualified bidders will only be opened.**

### ➤ **COMPREHENSIVE MAINTENANCE CONTRACT (CMC)**

- i. The complete Solar High Mast must have warrantee against any manufacturing/ design/ installation defects for a minimum period of 5 years.
- ii. During the CMC period, timely cleaning of SPV panels (once in fortnight) of system shall bound to Beneficiary.
- iii. During the CMC period, successful contractor should visit the site quarterly (after each 03 months) and ensure the successful working of Solar High Mast. Also successful contractor shall maintain the visit log book at the Grampachayat Aitawade Khurd. If any problem occurs in

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working of Solar High Mast; Successful contractor shall attend the system within 48 hours and rectify the problem immediately.

- iv. In case if Contractor fail to provide service during the CMC period, the Performance Bank Guarantee should be forfeited and Contractor/ Supplier shall be blacklisted.

### ➤ **TERMS OF PAYMENT –**

- 50% of the project cost will be released after installation and commissioning of the Solar High Mast which should be duly certified by contractor, Officer of MEDA & authorized person of User Agency along with submission of undertaking of Comprehensive Maintenance contract from the date of commissioning and Insurance policy documents (Covering Natural Calamity, Damage, Fire, and Burglary) effective from date of commissioning up to CMC period (5 years).
- 50% of the total cost shall be released after receipt of two month successful performance report of Solar High Mast which should be duly certified by Officer of MEDA, authorized person of User Agency and submission of performance bank guarantee of 10% cost of project amount from any Nationalized Bank valid for period of 5 years from date of commissioning of the project.

### ➤ **DEDUCTION:-**

- i. The TDS at the source will be deducted as per the Govt. rule and regulations.
- ii. MEDA will issue necessary certificates of TDS deduction.
- iii. C' / 'D' form will not be issued by MEDA.

### ➤ **SECURITY DEPOSIT –**

- 1) A sum of Rs. 25,500/- (Rupees Twenty Five Thousand Five Hundred Only) shall be deposited by the selected manufacturer/supplier as security deposit by online mode in favor of 'Maharashtra Energy Development Agency, Kolhapur on or before issuing of Work Order.
- 2) If the contractor fails to execute the system in given time or terminates the order prematurely then the security deposit will be forfeited and no excuses will be entertained.
- 3) The security deposit will be returned to the contractor without interest after successful commissioning of system and receipt of commissioning report duly signed by user agency, MEDA official and representative of the contractor.

### ➤ **PENALTY –**

- A penalty of 1/2% of the total project cost shall be imposed on the contractor against a delay of one week in project completion subject to a maximum of up to 10% of the total project cost. In case the penalty exceeds 10% of the total project cost, the given order will be canceled & the security deposit will be forfeited and the Contractor/ Supplier shall be blacklisted.

### **DELIVERABLES –**

- The supply, installation, testing and commissioning of subjected project shall be done within 30 days from the date of acceptance of order.

### ➤ **CHECK LIST OF DOCUMENTS –**

- PAN and GST Details.
- Copy of IT Returns.
- Declaration on company letter head.
- Bidders Information Sheet.
- Annual Turnover Certificate.

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- Work Experience Details.
- Site Visit Report.

We look ahead to seek your sealed quotation on or before 30/05/2023 till 18 Hrs.

Thanking you,

SD/-

Divisional General Manager  
MEDA, Divisional Office, Kolhapur

Encl. :-

1. Technical Specifications of Solar High Mast.
2. Site Survey Form.
3. Bidder Information Sheet.
4. Declaration Format.

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**BIDDER'S INFORMATION**

<b>Sr.No</b>	<b>Particulars</b>	
1	Name of Firm	
2	Details of Mailing Address	
3	Firm Status (PSU/Incorporate/Ltd/Pvt.Ltd/LLP/Partnership/Proprietary)	
4	Name & Designation Of Contact Person	
5	Contact No.	
6	E-mail Address for correspondence	
7	Firm website Address	
8	Firm registration No/ROC Establish Year of firm	
9	PAN No.	
10	GST No.	
11	Turnover (in Rs.) for FY 2020-21 and 2021-22	
12	Skilled manpower	
13	*Experience in Solar High Mast Nos	
14	*Experience in Solar Street Lights Nos	

Authorised Sign and Stamp

\* Enclose documentary evidence accordingly.

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## DECLARATION

(On company's letter head)

To,

**Divisional General Manager,**

Divisional Office Kolhapur

Maharashtra Energy Development Agency

(A Government of Maharashtra Institution)

Address: C. S. No. 249/A – 1/55, E Ward, Mhada Complex, Nagala Park, Near Zilla Parishad,  
Kolhapur - 416003

Respected Sir/Madam,

1. We have carefully read and understood all the terms and conditions of the invitation to quote and hereby convey our acceptance to the same.
2. The information / documents furnished along with our offer are true and authentic to the best of my knowledge and belief, We are well aware of the fact that furnishing of any false information/ fabricated document would lead to rejection of our quotation at any stage besides liabilities towards prosecution under appropriate law.
3. We have apprised our self fully about the job to be done within the comfortable amount and during the currency of the period of agreement and also acknowledge bearing consequences to of non-performance or deficiencies in the services on our part.
4. We have no objection, if enquiries are made about the work listed by us.
5. We have not been barred or blacklisted by any Government Agency / Department/ PSU or any such competent Government authority, organization where we have worked. Further, if any of the partners/directors of the organization /firm is blacklisted or having any criminal case against them, our bid shall not be considered. At any later point of time, if this information is found to be false, Divisional General Manager, Divisional Office Kolhapur, Maharashtra Energy Development Agency, may terminate the assigned contract immediately.
6. We have not been found guilty by a court of law in India for fraud, dishonesty or moral turpitude.
7. We agree that the decision of Divisional General Manager, Divisional Office Kolhapur, and Maharashtra Energy Development Agency in selection of Developers/Supplier/Contractor shall be final and binding to us.

For

(Company Name)

Name of signing authority / Designation / Place / Date

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**Annual Turnover**

Each Bidder must fill in this form including private/public limited company.

Name of Company:-

<b>Annual Turnover Data for the FY 2020-21,2021-22</b>	
<b>Year</b>	<b>Rs in Lacs</b>
2020-21	
2021-22	

The information supplied should be the Annual Turnover of the Bidder in terms of the amounts billed to clients for each year for work in progress or completed.

Signature of Applicant

Certified by Applicant's Auditor

(Affix Stamp)

**MAHARASHTRA ENERGY DEVELOPMENT AGENCY KOLHAPUR**

**SITE VISIT REPORT**

(To be submitted on letterhead of bidder)

Date: \_\_\_\_\_

To,  
The Divisional General Manager,  
Divisional Office Kolhapur,  
Maharashtra Energy Development Agency  
(A Government of Maharashtra Institution)  
Address: C. S. No. 249/A – 1/55, E Ward, Mhada Complex, Nagala Park, Near Zilla  
Parishad, Kolhapur – 416003.

**Sub. :** Site Visit Report for Installation and Commissioning of Solar High Mast at Grampanchayat  
Aitawade Khurd, Tal. Walwa, Dist. Sangli

Ref.: Quotation Call No. -----Date:

Sir,

This has reference to above referred quotation call for Installation and Commissioning of 09  
Meter Solar High Mast at ----- Grampanchayat Aitawade  
Khurd, Tal. Walwa, Dist. Sangli in state of Maharashtra.

I / We hereby declare that we have visited the site.

I / We made myself/ourselves acquainted with site conditions, approach to site, requirement  
of  
area, availability of water, requirement of quotation conditions etc.

I / We verified all details required to execute the project successfully.

I / We have no problems in undertaking the project and complete them in the given time period.

Thanking you

Yours faithfully,  
(Signature of Bidder)

Name of Bidder -----

Designation -----

Seal:

**Signature of User Agency authorities.**

Seal:.....



## MAHARASHTRA ENERGY DEVELOPMENT AGENCY KOLHAPUR

- **DEFINITION:**

A standalone Solar High Mast Lighting system (SHMLS) is an outdoor lighting unit used for illuminating a street or an open area. The Solar High Mast Lighting System consists of solar photovoltaic (SPV) module, a luminaire, storage battery, control electronics, inter- connecting wires/cables, module mounting steal tower/ pole including hardware and battery box. The luminaire is based on White Light Emitting Diode (W-LED), a solid state device which emits light when electric current passes through it. The luminaire is mounted on the steal tower/ pole at a suitable angle to maximize illumination on the ground. The PV module must be place on separate structure placed at the top of the steal tower/ pole at an angle facing south so that it receives solar radiation throughout the day, without any shadow falling on it. A battery is placed in a box attached to the steal tower/ pole. Electricity generated by the PV module charges the battery during the day time which powers the luminaire from dusk to dawn. The system lights at dusk and switches off at dawn automatically.

<b>PV Module</b>	Only indigenous modules shall be used in the project. For each High mast SPV module aggregate capacity 1980Wp (min 330Wp X 6Nos Module.
<b>Battery</b>	Li Ferro Phosphate (LiFePo4) batteries of capacity 12.8 Volt, 600Ah @, (12.8V, 100 Ah x 6 nos.) for each High Mast. With cells in a suitable weather resistant enclosures and sophisticated designed battery management system (appropriate over charging, over heating deep discharge protection) without paralleling battery bank. Battery should be in IP-65 enclosure
<b>Light Source</b>	White Light Emitting Diode (W-LED) flood light 6*50Watt (LED +Driver) DC operated conforming to IP65 or above with proper dimmer arrangement Using LEDs which emits ultraviolet light will not be Permitted
<b>Light Output</b>	White color (color temperature 5500-6500 K). Lumen efficiency of LED- min 140 lumens/Watt. The illumination should be uniform without dark bands or abrupt variations, and soothing to the eye. Higher light output will be preferred.

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<b>Pole (Minimum 80 Microns)</b>	9M Long, polygonal Raising lowering mast shaft in Single section Suitable for basic wind speed 50 m/sec (180 Km/Hr) complete with head frame, Luminaries carriage suitable to install 6 nos. Luminaries, Solar Panels & battery on the top of the mast .There should be provision to install the type tested Winch inside the mast for raising & lowering of complete solar lighting system along with compact unit of modules through a mounting structure around the pole including hardware. The mast must be hot dip galvanized 20 sided polygonal structure having Bottom A/F minimum Dia 330 mm and top A/ F Dia 150 mm of 3 mm thick. The high mast should have a designed life of 25 years.
<b>Stainless Steel Wire Rope</b>	Wire rope of Grade AISI 316 grade, 7/19 construction, with two ropes continuous min.6 mm diameter and breaking load capacity min. 2000 kg x 2. The breaking load test report obtained from govt. laboratory of the wire rope should justify the desired breaking load capacity.
<b>Raising and Lowering lighting mast</b>	Manual pulley system
<b>Electronics Efficiency</b>	Minimum 85% total

- **MINIMUM TECHNICAL REQUIREMENTS / STANDARDS:**

### 1. DUTY CYCLE

The Solar PV White- LED High Mast Light system should be designed to operate from dusk to dawn.

### 2. MODULES

- Only indigenous modules (Make in India) of reputed brand IEC Tested shall be used in the project. Crystalline high power/efficiency cells shall be used in the Solar Photovoltaic module.
- The open circuit voltage of the PV modules under STC should be at least 21.0 Volts.
- Crystalline high power/efficiency cell shall be used in the Solar Photovoltaic

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- module. The cell efficiency should not be less than 16%.
- d. PV module must be warranted for output wattage, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years.
  - e. The terminal box on the module shall be IP 65 and designed for long life outdoor operation in harsh environment should have a provision of opening for replacing the cable, if required.
  - f. The offered module shall be in accordance with the requirements of MNRE.
  - g. Latest edition of IEC 61215 edition II / IS 14286 for Crystalline and shall be certified by MNRE authorized test centre. The bidder shall submit appropriate certificates.
  - h. PV modules must qualify to IEC 61730 Part 1- requirements for construction & Part 2 – requirements for testing, for safety qualification.
  - i. Protective devices against surges at the PV module shall be provided. Low voltage drop bypass diodes shall be provided and if required, blocking diode(s) may also be provided.
  - j. Identification and traceability
  - k. Each PV module must use a RF identification tag (RFID), which must contain the following information:
    - a) Name of the manufacturer of PV Module
    - b) Name of the Manufacturer of Solar cells
    - c) Month and year of the manufacture (separately for solar cells and module)
    - d) Country of origin (separately for solar cells and module)
    - e) I-V curve for the module
    - f) Peak Wattage,  $I_m$ ,  $V_m$  and FF for the module
    - g) Unique Serial No and Model No of the module
    - h) Date and year of obtaining IEC PV module qualification certificate
    - i) Name of the test lab issuing IEC certificate
    - j) Other relevant information on traceability of solar cells and module as per ISO 9000 series.
    - k) The RFID should be inside the module laminate

### 5. BATTERY:

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Battery shall be Lithium Ferro phosphate (LiFePo<sub>4</sub>) with maximum Depth of Discharge 90%, the batteries should conform to the latest BIS /International standards. The battery shall be of LiFePo<sub>4</sub> storage batteries as per MNRE/BIS/IEC standards with control electronics, BMS, interconnecting wire/cables properly sealed. Should have designed battery management system (appropriate over charging, over heating deep discharge protection).

- a) Capacity of each battery shall not be less than 12 .8V, 100Ah and 75 Ah as per above table.
- b) DOD shall be 90% i.e., at least 90% of the rated capacity of the battery should be between fully charged & load cut off conditions.
- c) Battery terminal shall be provided with covers.
- d) Suitable carrying handle shall be provided.
- e) Bidder shall mention the design cycle life of batteries at 75%, 50% and 25% depth of discharge at ambient temperature up to 45 degree C.
- f) The batteries shall be designed for operating in ambient temperature of site upto 55 degree C.
- g) The self-discharge of batteries shall be less than 2 % per month of rated capacity at 27 degree C.

### 6. LIGHT SOURCE:

- The light source will be of white LED type The color temperature of white LEDs used in the system should be in the range of 5500 degree K – 6500 degree K. Use of LEDs which emits ultraviolet light will not be permitted.
- The illumination should be uniform without dark bands or abrupt variations, and soothing to the eye. Higher light output will be preferred. The light output from the white LED light source should be almost constant.
- The lamps should be housed in an assembly suitable for outdoor use and shall comply with IP65. The LED housing should be made of pressure die cast aluminium having sufficient area for heat dissipation and heat resistant toughened clear glass/ high quality poly carbonate fitted with pressurized die cast aluminium frame with SS screws. The temperature of heat sink should not increase more than 30 degree C above ambient temperature even after 48 hrs of continuous operation. This condition should be complied for the dusk to dawn operation of the lamps while battery operating at any voltage between the loads disconnect and charge regulation set point.
- High power LED of minimum capacity 1 watt each capable to withstand maximum

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1 amp driving current having lens angle greater than 120 degree shall be used. The LED LM 80 test report shall only be used.

- The LED efficiency should be more than 140 lumen / watt.
- All LED in circuit must be connected in series only. It must incorporate failshort mechanism in all LEDs
- The LEDs used in the luminary should have life time more than 50,000 hrs.
- The lumen depreciation of LED shall not be more than 30% even after 50,000 burning hours.
- Power consumption of the each LED Luminary / Lighting unit shall not be more than 30 W (including LED Driver power loss).
- The LED efficacy should be more than 140 lumen / watt.
- Other Parameters :
  5. LED DC current regulation – better than 3 %
  6. Input – 12 V DC
  7. Driver Type- DC-DC ( as per IEC 62384)
  8. CRI - 70 % Typical
  9. Lighting quality- Free from glare and flickering and UV
  10. Ambient temp– up to 50 deg
  11. DC to DC converter efficiency > =90 %
- The connecting wires used inside the luminaries, shall be low smoke halogen free, fire retardant e-beam cable and fuse protection shall be provided at input side.
- Auto reset table reverse polarity protection shall be provided
- LED lighting unit shall comply with LM -79-08 and LM -80-08 Standards and copy of test certificate (LM 80-08) should be submitted.
- The make, model number, country of origin and technical characteristics of white LEDs used in the lighting system must be furnished.
- The luminaries must have light distribution polar curve as per LM 79 test specifications.

### 5. **ELECTRONICS:**

MPPT charge controller to maximize energy drawn from the Solar PV array. The MPPT charger shall be microcontroller based. The MPPT should have four stage charging facilities i.e Bulk, Absorption, Float and Equalization. The auto equalization facilities for every (30+<sub>3</sub> days) and provision to verify it during testing. The PV charging efficiency shall not be less

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than 90% and shall be suitably designed to meet array capacity. The charge controller shall confirm to IEC 62093,

IEC 60068 as per specifications

- a. Protection against polarity reversal of PV array and battery, Over Current, Short Circuit, Deep Discharge, Input Surge Voltage, Blocking diode protection against battery night time leakage through PV Module
- b. Electronics should operate from 10 volt to 21 volt and its Euro efficiency should be at least 90%.
- c. The system should have protection against battery overcharge and deep discharge conditions. The numerical values of the cut off limits of lower voltages should not be less than 12 Volt
- d. The system should have protection against Microwave radar sensor auto Dimming system.
- e. Full protection against open circuit, accidental short circuit and reverse polarity should be provided.
- f. Charge controller shall have automatic dusk-dawn circuit based on SPV module as sensor for switching on/off the high mast light without manual intervention. The sensor must not get triggered by impulse lighting like lightning flashes and firecrackers.
- g. The self-consumption of the charge controller shall not be more than 20 mA at rated voltage and rated current. Adequate protection shall also be incorporated under no-load conditions (i.e. when the system is ON & the load(LED Lamp is removed)
- h. The system should be provided with 2 LED indicators: a green light to indicate charging in progress and a red LED to indicate deep discharge condition of the battery. The green LED should glow only when the battery is actually being charged.
- i. All capacitors shall be rated for max. temp. of 105° C.
- j. Resistances shall preferably be made of metal film of adequate rating.
- k. Device shall have adequate thermal margin should be at least 25 degree below the allowable junction temperature while operating at an ambient temperature of 55 degree C and full load.
- l. Fibre glass epoxy of grade FR 4 or superior shall be used for PCB boards.

**6. MECHANICAL HARDWARE**

- I. A galvanized metallic frame structure to be fixed on the pole to hold the SPV module(s). The frame structure should be fixed at 30 degree from horizontal facing true south.
- II. The pole should be hot dip Galvanized Iron Octagonal pole of 12.5.0 mtr. Height as per specification as under:
- III. The Octagonal poles shall be Hot dip galvanized to min 80 microns. The material of pole shall be as per specification of BS EN 10025, ISO1461.
- IV. The size of the pole shall be min 150 mm (A/F) at Top side, 330 mm (A/F) at bottom side with thickness of 3 mm minimum.
- V. Diameter of base plate min. (mm)= 540mm; Thickness of base plate (mm)=min 16 mm.
- VI. Separate Pole should have the arrangement for module and battery at top for mounting of Solar panel of design capacity with mounting structure at an angle of latitude  $\pm 2^{\circ}$  degree.
- VII. The batteries shall also be mounted on this pole at suitable height hence provision should be made accordingly
- VIII. The pole shall be mounted on suitable RCC foundation at least 1.5 meter deep and 600mm above ground with 6 bolt of min 24 mm size
- IX. The Nut -Bolts in battery box and panel structures should be properly riveted to ensure the theft proof.
- X. The design and foundation details of the pole shall be got approved before execution of work.
- XI. Battery box:  
Two vented metallic box of 20 SWG thick made of pre coated galvanized ms sheet with 60 microns thickness for housing the storage battery outdoors should be provided with proper lock and key.. The size of box should be as per battery size (including vent plug/level indicator) providing minimum clearance of 25 mm on all sides. The battery box is to be properly rest/mounted on pole at least 04 meters of height from ground level. Louvers for proper ventilation should be provided on one side and back of the battery box. No vents shall be provided on top of battery box. Box should be provided with proper locking arrangement. The edges of box should be turned properly to give smooth edge and good strength. Two wooden battens should be fixed inside the battery box to avoid the electrical contact between battery

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and box. Components and hardware shall be vandal and theft resistant. All parts shall be corrosion-resistant

Electric cable:

The electric cable used shall be twin core PVC insulated water and UV resistance copper cable of minimum size 1.5sq mm. Cable shall meet IS 1554 / 694 Part 1:1988 & shall be of 650 V/ 1.1 kV.

### **7. INSTALLATION OF SYSTEM:**

The system should be properly installed at site. The SPV module mounting structure along with telescopic octagonal pole should be properly grouted depending upon the location and requirement of the site. The grouting should be such that it should withstand the maximum wind speed /storm of 180 kmph. The pole should rest on a suitable RCC foundation. Of (RCC Foundation minimum size of 900 mm x 900 mm x 1500 mm deep and 600 mm above the ground level. must have min 6 nos. foundation bolts of min 1000 mm & 24mm dia.) Adequate space should be provided behind the PV module/array for allowing un-obstructed air flow for passive cooling. Cables of appropriate size should be used to keep electrical losses to a bare minimum. Care should be taken to ensure that the battery is placed with appropriate levelling on a structurally sound surface. The control electronics should not be installed directly above the battery. All wiring should be in a proper conduit or capping case. Wire should not be hanging loose. Any minor items which are not specifically included in the scope of supply but required for proper installation and efficient operation of the SPV systems is to be provided by the manufacturer as per standards.

### **8. WARRANTIES:**

The mechanical structures, electrical works including power conditioners /charge controllers/ maximum power point tracker units/distribution boards/digital meters/ switchgear/ storage batteries, etc. and overall workmanship of the Solar LED High Mast / systems must be warranted against any manufacturing/ design/ installation defects for a minimum period of 5 years

### **9. PROTECTIONS:**

#### **LIGHTING PROTECTION:**

The SPV module shall be provided with lightning & over voltage 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



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NFC 17- 102:2011 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.

### **Earthing**

1. Equipment grounding (Earthing) shall connect all non-current carrying metal receptacles, electrical boxes, appliance frames, chassis and PV panel mounting structures in one long run. The grounding wire should not be switched, fused or interrupted.
2. The complete earthing system shall be electrically connected to provide return to earth from all equipment independent of mechanical connection.
3. The equipment grounding wire shall be connected to solar PV module.
4. Earthing system design should be as per the standard practices.

### **CABLES & WIRES**

Cabling shall be carried out as per IE Rules

- Wires: Only FRLS copper wires of appropriate size and of reputed make shall have to be used.
- Cables Ends: All connections are to be made through suitable cable / lug / terminals; crimped properly & with use of Cable Glands.
- Cable Marking: All cable/wires are to be marked in proper manner by good quality ferule or by other means so that the cable can be easily identified. Any change in cabling schedule/sizes if desired by the bidder/supplier be got approved after citing appropriate reasons, All cable schedules/layout drawings have to be got approved from the purchaser prior to installation. All cable tests and measurement methods should confirm to IEC 60189.

### **Electrical Safety, Earthing Protection Electrical Safety**

- Internal Faults: In built protection for internal faults including excess temperature, commutation failure, overload and cooling fan failure (if fitted) is obligatory.
- Over Voltage Protection: Over Voltage Protection against atmospheric lightning discharge to the PV array is required
- Cabling practice: Cable connections must be made using PVC Cu cables, as per BIS standards. All cable connections must be made using suitable terminations for effective contact. The PVC Cu cables must be run in GL trays with covers for protection.

### **EARTHING PROTECTION**

## **MAHARASHTRA ENERGY DEVELOPMENT AGENCY KOLHAPUR**

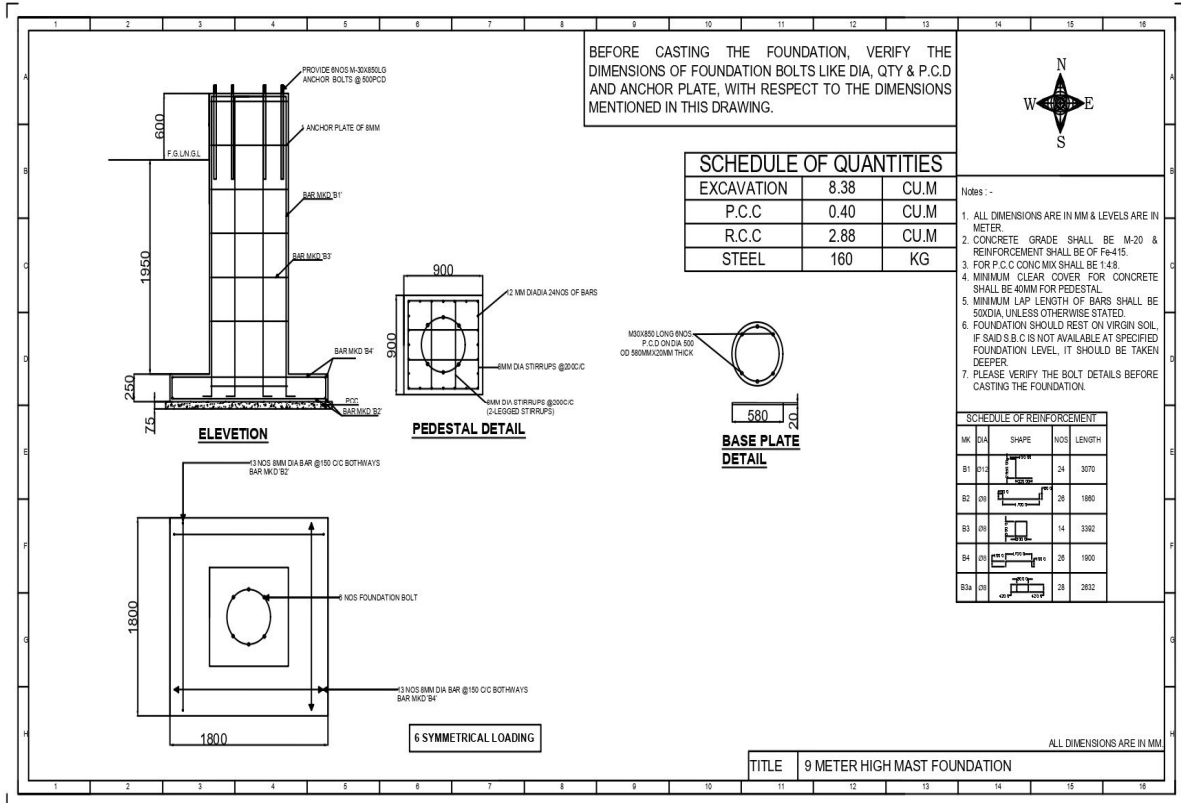
Each array structure of the PV yard should be grounded properly. In addition the lighting arrester/masts should also be provided inside the array field. Provision should be kept be provided inside the array field. Provision should be kept for shorting and grounding of the PV array at the time of maintenance work Warranties and Guarantees

1. Solar Modules: Workmanship/ product replacement for 10 years.
2. Solar Modules: 90% power output for 10 years & 80% power output for 25years.
3. BoS: Parts and Workmanship for 10 years, service for 25 years.
4. Power Plant Installation : Workmanship for 10 years, service for 25 years
5. PV Array Installation : Structural for 25 years

**Detailed specifications of Foundation are as per Annexure B.**

# MAHARASHTRA ENERGY DEVELOPMENT AGENCY KOLHAPUR

## ANNEXURE - B



MAHARASHTRA ENERGY DEVELOPMENT AGENCY KOLHAPUR

ANNEXURE - C

S. No.	Particulars
1	<p>Size Width 610mm(W) x Tall 915mm (T) Media : 3M - 40C-20R PRINT FILM SF Printing : ECO-UV Flatbed Piezoelectric Printing Coating : Matte Coated Cold type Base : Non Corrosive, Termite proof Polyethylene flat panels consisting of two thin coil-coated sheets bonded to a non-aluminium core 2.8 mm Mounting Elements : Hooks mounted with 3M Teflon<sup>Å</sup> 25 mm Strong Acrylic Clear Double Sided Adhesive + fabrication HSN Code : 8310 GST Rate 18%</p>

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**B**

Mounting Details Of Display Board

