

TENDER DOCUMENT
(Scope of Work and Technical Specification)

Supply Installation and Commissioning
Of
Operational Area Visual Monitoring and
Supervision System
At
CPP, HWP(M)

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1. PREAMBLE

Heavy Water Board is a constituent unit of Department of Atomic Energy, Govt. of India. The Board has set up Heavy Water Plants at various locations throughout India. The tender is for Heavy Water Plant Manuguru (HWP Manuguru), located at Post - Aswapuram, District- Bhadradi Kothagudem, Telangana – 507 116

This contract is for supply, installation, testing and commissioning of Operational Area Visual Monitoring and Supervision System at Captive Power Plant of HWP, Manuguru and the bidder is required to quote and furnish all the guaranteed technical particulars in the tender. It is a contract for the complete scope of work and the price is going to be evaluated based on the total cost.

The Tenderer should have adequate experience in execution of such jobs on comprehensive basis and all the relevant documents in support of proof of ability of the contractor should be furnished along with the tender.

The schedule of quantity mentioned in the tender document is indicative. The tenderer has to quote a complete workable system as per the indicative schedule of quantity. The tenderer must include in its quotation all such panels, communication hardware, electronic cards, mounting bases, power supplies/adapters, all interconnecting cables/wires, software, interfacing hardware, converters, erection materials, commissioning materials etc as required to make the system completely workable as per our tender specification.

The information/drawings provided in this tender document are strictly confidential and should not be copied without explicit approval from HWP Manuguru.

Incomplete offers are liable to be rejected

2. GENERAL SCOPE OF WORK

2.1 INTRODUCTION

Heavy Water Plant, Manuguru, invites Tenders for SUPPLY, ERECTION, INSTALLATION, TESTING, COMMISSIONING AND DOCUMENTATION OF OPERATIONAL AREA VISUAL MONITORING AND SUPERVISION SYSTEM FIRE DETECTION AND ALARMING SYSTEM at CAPTIVE POWER PLANT of HWP MANUGURU.

2.2 SCOPE

The Scope covers complete engineering, supply, erection, configuration, loading of programs/software (if any), activation of licence for the supplied software (if any), configuration of the system, testing, installation, commissioning, operation & maintenance training of operators & technicians and complete documentation of the package. Refer details scope of work at page no 13.

2.2.1 Intent of the scope

The intent is not to specify completely herein all the details of design of the Fire Detection and Alarming System. However, the system shall conform in all respect to high standard of engineering design and workmanship and capable of performing continuous operation in a manner acceptable to the purchaser. All specifications at any stage of the procurement must conform to this tender document in letter and spirit. Detailed final specifications of all the Cameras, Network Video Recorders, Monitors, Networking systems & accessories, layout & installation drawings shall have to be duly approved by the purchaser adhering to this tender specification. All the subsequent site jobs should be executed as per these approved detailed final specification and drawings.

2.2.2 Deviation from Tender Specifications

In case of conflict between any clause of this tender specification or any clause in the offer submitted by the bidder, same shall be specifically brought out by the bidder as deviations in their offer by grouping all such details in a separate "Deviation Sheet".

2.2.3 Bids, Specifications and Drawings

2.2.3.1 Tender quotations, together with all Supporting Information, Details System Architecture, General Arrangement (GA) Drawings, Layout Drawings, Details Schedule of Quantities, Bill of Material, Cabling Schedule, Wiring Drawings and Technical Data etc. as required shall be submitted along with the bid. Tenderer shall also submit a preliminary supply and erection time schedule at the time of submission of the Tender quotation.

2.2.3.2 Any item not covered in the subject tender schedule of quantity or bill of material, but required for completion of intended scope of the tendered job shall be specifically brought out by the bidder and should be included in their offer, failing which it will be treated as expressively agreed by the bidder that those items are included in various rates quoted for the supply, erection and commissioning of the system and no extra payment shall be made.

2.2.3.3 Bidders are advised to visit the site and familiarize themselves with site conditions before submitting their tender (if required). Non-familiarity with site conditions will not be considered a reason either for extra claims or for not carrying out the work in strict conformity with the tender specification and subsequent approved drawings and specifications.

For any information on site visit, the tenderers may contact

Engineer In Charge (I-U),

Heavy Water Plant Manuguru,

Aswapuram, District -Bhadradi Kothagudem, Telangana – 507 116

Email: dymm_iu@man.hwb.gov.in Tel No. – 08746-233209, 233409

2.2.4 Completion Schedule

The bidder's attention is drawn to the fact that no tender will be considered unless the bidder can satisfy the purchaser that he can meet the delivery dates specified in the tender document. Contractor shall be prepared to carry out the work in the time prescribed in the project schedule with major dates as follows: -

- Submission of detailed final system specifications of all the Cameras, Network Video Recorders, Monitors, Networking systems & accessories,

layout & installation drawings for approval: - Within One month from the date of issue of work order.

- Pre-Dispatch Inspection of all the items: - Within Four Months from date of issue of work order.
- Completion of Installation, Testing and Commissioning along with Training: - Within Ten Months from date of issue of work order.

Bidders should note that above mentioned Delivery Schedule is to be strictly adhered to. Any delay beyond the indicated period will attract appropriate Liquidation Damage (LD) clauses as per standard terms and conditions of purchase.

2.2.5 Packaging and Transport

Bidders shall note that packaging for shipment shall be in accordance with the following instructions. Each package shall be limited to size and weight that are permissible under the existing rail and road transport limitations. Instruments & accessories etc. shall be packed and protected so as not to suffer deterioration, damage or breakage during shipment, transshipments, and storage in the tropical climate. All lifting points shall be clearly marked and direction indicated. All electronic items must be packed with protection from static electricity hazard.

2.2.6 Foreign Exchange

BIDDERS ARE INFORMED THAT NO FOREIGN EXCHANGE WILL BE PROVIDED BY THE PURCHASER FOR ANY PART OF WORK TO BE EXECUTED BY THE CONTRACTOR.

2.2.7 Installation, Site Testing and Commissioning

Vendor shall depute suitable authorized Supervisors/Engineers and technicians at site for erection, installation, testing and commissioning of total system. Adequate Supervision for Safe working by bidder's personnel is to be ensured. All Safety & Main rules in vogue at HWP-Manuguru site shall be complied and adhered during the execution of work at Site. It should be the responsibility of the Tenderer, after award of work, to ensure that none of their personnel or sub-contractor's personnel loiter in the Plant Site and tamper with any of the existing installations. The personnel engaged at site, should restrict themselves within the work area and should always take prior permission for moving away from the work spot. This is all the more necessary as Heavy Water Plant-Manuguru handles Toxic and Poisonous Gases.

2.2.8 Guarantee

Guarantee should be given by the vendor that the system along with all accessories shall perform as per the design intent of accuracies, reliability, performances as specified, as per the codes and practices indicated for this tender. In absence of the relevant codes in the area if any, the manufacturer's specification and relevant Indian Standards (IS) shall be complied with to the satisfaction of the purchaser. If any deviation is noticed, the vendor shall rectify the same in a period not exceeding 30 days and if he is not able to rectify then he should substitute the entire system with a new one.

2.3 GENERAL SERVICES

2.3.1 Requirements

- a) Transport of all material received at site to storage area until required for erection. An area will be earmarked for this purpose. Unloading of material at site, transport of material from stores to work site shall also be in Contractor's scope.
- b) Carryout minor modification at no extra cost as suggested by the Purchaser for completion of entire project.
- c) Vendor should provide all facilities for Purchaser to check and approve all erection procedure. All erection and testing jobs shall be offered for inspection of purchaser. This shall however in no way relieve the Contractor of his responsibility for providing adequate and competent supervision.
- d) The Contractor shall fully comply with the relevant statutory rules and regulations as applicable from time to time.

2.3.2 Electricity for site erection, installation testing and commissioning work

Temporary single phase 230 Volt or 3 phase 415 Volt AC connection will be provided to the contractor depending upon the requirement free of cost. The contractor should also see that all his electrical equipments and power tools are maintained in an excellent condition and no sparking/burning etc. should occur as the plant is having ignitable materials.

2.4 PLANT LOCATION, SITE INFRASTRUCTURE:

The proposed system will be located in Heavy Water Plant, Manuguru, (Telengana).

The plant is located on 600 Acres of land and the proposed system envisages Installation and Commissioning Of Operational Area Visual Monitoring and Supervision System at the Captive Power Plant of HWP Manuguru.

SOME OF THE PARTICULARS OF THE SITE AREA:

- a) Nearest town/location : Manuguru (approximately 10KM from Plant Site);
Kothagudem District Head Quarter (approximately 40KM from Plant Site)
- b) Nearest railway station : Bhadrachalam Road Station (approximately 40 KM from plant site)
Khamam Station (approximately 120 Kms from plant site)
- c) Nearest airport : Hyderabad (approximately 350 KM from plant site)
-

3. DETAIL SCOPE OF WORK

3.1 Overview

3.1.1 The scope of work is to supply, install, test and commission a complete workable OPERATIONAL AREA VISUAL MONITORING AND SUPERVISION SYSTEM as a whole along with documentation and training of operators and maintenance technicians.

3.1.2 The OPERATIONAL AREA VISUAL MONITORING AND SUPERVISION SYSTEM will have 30 nos motorized dome colour IP cameras (Pan, Tilt, Zoom type) and must be designed for installation at both indoor and outdoor use. The contractor has to fabricate supports/fixtures for the indoor installation as well as fabricate & install structures/poles/fixtures for outdoor installations. The outdoor cameras have to be installed on 06 meters high poles/structures which will be fabricated and installed by the contractor as per relevant IS codes.

3.1.3 The monitoring system will be installed in the main control room existing at TG Building. All the interconnecting cables from the cameras to the main control room have to be laid by the contractor.

3.1.4 All the cameras have to be connected to a NVR. The NVR should have 16 camera input ports and 01 monitor output ports.

3.1.5 CAT-6 Cable, Fiber Optics Cable, Cable Tray as required in the item no 03, 04, 05, 06 of the schedule of work is NOT included in the scope of supply of this contract. The same will be provided as required from HWPM to the contractor for carrying out the work.

3.1.6 NVR shall be with minimum 2TB Hardisk Drive for viewing, controlling and recording of cameras views.

3.1.7 The principle underlying in this overview (section 3.1) will govern the complete system design as a whole. The contractor has to carry out all supplies and works related

to this overview explicitly. (This point may be read with clause no – 2.2.3.2 of this tender document.)

3.1.8 The climate condition of the site, where the system has to be installed can be described as wet tropical climate with monsoon rain.

Temperature range is 5°C to 50°C

Relative max. humidity is 98% (non-condensing)

Annual average humidity is 80%

Altitude: 97.87 mts above mean sea level.

All equipment has to be suitable for mounting, functioning and storage in tropical climate

3.2 Electrical Supply, Classification and Wiring

3.2.1 The electrical supply will be as follows –

(1) A 230V A.C. supply will be given for the complete system which will be terminated at a single point inside the main control room. This supply will be from an uninterrupted power supply of 230VAC±10%, 50 Hz (±3%).

(2) The tendered system must include design and distribution of the power supply from this terminated point to all its cameras, monitoring system, other equipments and accessories of the package system.

(3) Where ever any other voltages A.C./D.C. is needed for this system, it shall be generated by the contractor through redundant power packs, which will be part of this supply & work.

(4) Double pole MCB of proper rating has to be provided at the main input as well as for each distribution circuits.

3.3 Schedule of Quantity

3.3.1 Table

Sl No.	Item description	Qty
01	Fabrication and Erection of poles including civil work as per scope of work	08 nos

02	Fabrication and installation of MS Mounting fixtures as per scope of work	22 nos
03	Laying of cable tray as per scope of work	200 mtrs.
04	Laying of Underground cable as per scope of work	50 mtrs.
05	Laying of CAT6 cable as per scope of work	612 mtrs
06	Laying of Fiber optics cable as per scope of work	500 mtrs
07	Supply and Installation of Media Converter as per scope of work	50 nos
08	Splicing of Fiber Optics Cable as per scope of work	120 nos
09	Supply, installation configuration and commissioning of IP Based monitoring cameras as per the scope of work.	30 nos
10	Supply, installation configuration and commissioning of 16 channel NVR as per scope of work	03 nos
11	Supply and Installation of 19" Rack as per scope of work	06 nos
12	Supply and installation of fiber patch box as per scope of work	50 nos
13	Supply and Installation of PoE Switch as per scope of work	30 nos.
14	Supply, installation configuration and commissioning of Display/Monitoring System as per scope of work	03 nos
15	Supply and Installation of Junction box as per scope of work	30 nos
16	Supply, installation configuration and commissioning of Networking Routing Device as per scope of work	02 nos

3.3.2 The above table broadly covers the major works/items for the system and must be read with clause no. 2.2.3.2 of this tender document.

3.3.3 The price break-up for this lumpsum contract is to be provided as per the above Schedule of Quantity along with all taxes, duties, levies, packing & forwarding charges, transport charges etc.

3.3.4 The details technical specification of the major items is given at section 4 of this tender document.

3.4 Schedule of Works

3.4.1 The intent is to specify broadly the works to be carried out for erection installation and commissioning of a workable-as-a-whole “OPERATIONAL AREA VISUAL MONITORING AND SUPERVISION SYSTEM” as per this tender specification. Scope of execution of work shall cover but not be limited to the following:-

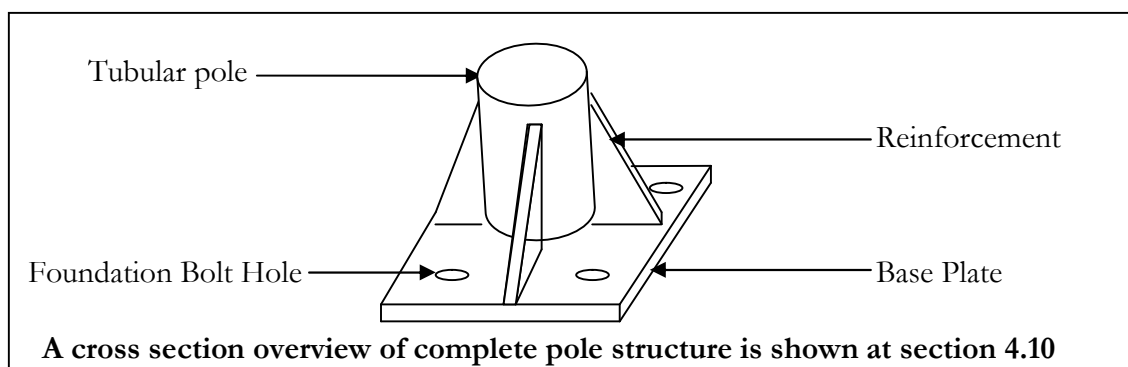
- (a) Unpacking, assorting, physical checking, cleaning and drawl of all supplied materials (viz. cameras, monitoring/control accessories and erection materials) from CPP site stores to contractor’s site stores and/or places of storage, return of left over materials if any to the owners store.
- (b) To make arrangements for services such as transport, medical, lighting, canteen etc. for working round the clock for own staff. To arrange/store in tanks and supply drinking water to the contractor’s own staff so as to avoid personnel inconvenience.
- (c) To make arrangement and supply of consumables like welding electrodes, industrial gases, cleaning fluids (Such as CTC, Kerosene etc.), primer & paints for structural, Teflon tape, insulation tapes, sealing compound, all clamping materials for cables, tubes, trays, racks, impulse tubes like aluminum strips, screws, washers, clamps GI nuts and bolts of different sizes, cable lugs, all identification ferrules for cables/wires, structural materials of MS/CS.
- (d) Supply of MS or GI Structural Steel and Fabrication of mounting structures(for outdoor cameras), frames, supports, mounting stands, clamps and brackets for the cameras and its accessories.
- (e) Fabrication and fixing of cable racks, cable trays and corners, tees and crossings etc. for the cable racks and cable trays.
- (f) Fixing of cable racks and cable trays as per approved route and drawings.

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- (g) Making trench for cable laying in all kind of soil, hard morrum etc. (600mm depth and 300mm width), sand cushioning, laying of cable, providing and spreading one layer brick covering and refilling the trench.
- (h) Cutting of RCC/Tar road to a depth of 200mm, laying of class-A 2"GI pipe back filling and resurfacing for cable route where ever it crosses the road.
- (i) Laying and supporting of multi core and single core electric cables, multi core and single core signal cables, fiber optics cable, cat 6 cable and any other special cables on racks / trays.
- (j) Any civil job involved in the installation of mounting structures(for outdoor cameras), conduits for cables, cable trays supports, mounting stands, racks, junction boxes etc, is in the scope of the contractor. This may involve cutting holes in walls / floors /ground, digging earth, chipping the foundations / reinforced concrete floors and grouting and / or furnishing after the job is over.
- (k) Cleaning and painting of all fabrications done by the contractor such as frames, supports, clamps, mounting stands and racks etc., and retouching of painted surface of racks/cabinets wherever required at no extra cost of HWPM.
- (l) For the cable racks in Trenches, earth strips and conduits buried under ground shall be painted with two or more coats of bituminous paints.
- (m) All base steel structures shall be painted with one coat of red oxide zinc chromate's primer to IS:2074 (25 Microns) and two or more coats of synthetic enamel paint to IS:2932 (50Microns). Before painting, the surface should be thoroughly scraped and cleaned to remove rust, grease, plaster and any other foreign matter. The quality of the paint shall conform to relevant Indian Standards and shall be approved by the purchaser. To touch up with paint all instruments mounted in the field and in the control room with its accessories, which are damaged/, scratched during handling, erection or repair without any extra cost. The paint shade shall exactly match the painted surface of the Instruments or its accessories on which touch up is done.
- (n) Installation of cameras along with junction boxes at field locations and its control & monitoring accessories at main control room. Interconnection Cabling, glanding, feruling, fixing lugs, and termination of the wires.

- (o) Testing of electrical cable, signal cables and any other special cables for proper connections, continuity and insulation.
- (p) Testing, functional checking of camera monitoring, recording, accessories control and sequence control to the satisfaction of the purchaser. Sealing of cable entries to control room / racks.
- (q) Submission of as built drawings of all installations, fabrications, cablings, wirings etc. done at site.
- (r) Training of operators and technicians for efficient and proper operation and maintenance of the OPERATIONAL AREA VISUAL MONITORING AND SUPERVISION SYSTEM.

3.4.2 Guidelines for fabrication and erection of structures for mounting cameras:

- (a) Supply and erection of steel tubular poles (swaged type) conforming to IS:2713 (Part – II) – 1980 for mounting of cameras.
- (b) The pole must be of suitable length so as to mount the camera at six meters height from the ground elevation.
- (c) The steel tubular pole is to be welded to a flat MS plate(15mm thick) base with proper reinforcement at four sides as shown below:-



- (d) The work also involves digging of earth pit 1.5mtr (Length) X 1.5mtr (Breadth) X 1.5mtr (Depth) at each location for installation of camera poles.
- (e) Making of PCC base of 1500mm (Length) X 1500mm (Breadth) X 150mm (Depth) at the bottom of the dug pit.
- (f) Making of RCC foundation of 800mm (Length) X 800mm (Breadth) X 1500mm (Depth) over the PCC base inside the dug pit.
- (g) Each RCC foundation must have four numbers of 800mm long foundation bolts (700mm embedded in the RCC structure with 100mm protruding outside) for bolting each pole structure.
- (h) Each RCC foundation must have one metal conduit (or GI Pipe) embedded at the centre of the foundation for camera cable laying.
- (i) The RCC, PCC and all structural welding works must conform to relevant IS codes.
- (j) At 4 meter ground elevation an anti climb hood/umbrella of one meter diameter, made out of barbed wires and ISA25 or ISA40, to be constructed on each pole.

3.5 Progress of Work

3.5.1 If at any time in the observation of Engineer-in-Charge, the contractor has fallen behind the construction schedule, the Engineer-in-Charge may, without any extra cost to OWNER may instruct the contractor to take such steps as may be necessary to improve his progress, such as but not limited to

- i) Comply overtime operations/ extra hours of work.
- ii) Increase the number of shifts
- iii) Work on Sundays and Holidays and
- iv) Increase his resource of deployment.

3.5.2 The contractor in such case shall demonstrate the manner as to how he proposes to maintain the construction schedule and make up the loss time period to be specified by HWPM.

3.5.3 Failure of the contractor to comply with the above shall be considered a failure to execute the contract with due diligence and then owner shall without prejudice to any other right or remedy which shall have accrued or shall accrue thereafter, may sublet the balance job in part or in full to other agencies and get it done at contractor's risk and cost.

3.6 Guidelines for Erection Installation and Commissioning

The following are the general guidelines for the execution and testing of works related to the installation of cameras, monitoring accessories and to their initial maintenance during and after installation until final checking, testing and handing over to the client are completed.

3.6.1 The works shall be performed with perfect workmanship according to the National and International Codes and Standards mentioned elsewhere in the tender.

3.6.2 The supply of all types of materials required and necessary for the construction / fabrication and installation of supports camera, junction boxes, cable conduits, monitoring/control panel and its accessories etc. shall be included in the scope of supply of the Contractor.

3.6.3 All cable tray supports shall be grinded to remove rough edges and deformities (after fabrication), sand blasted and painted as per the painting specifications prescribed and attached elsewhere in this enquiry, before securely fastening in their respective positions.

3.6.4 Cable Trays shall be supported at a minimum interval of every 2000 mm (for 300mm wide) at every 1000 mm (for 200mm wide) and at every 500 mm (for 50 mm wide) trays.

3.6.5 All cable trays shall be fastened at a minimum of two places on each support throughout the length of the trays by means of galvanized / plated corrosion resistant bolts and nuts. The bolt head shall be round type so that they do not damage the cable sheath while pulling the cables in the trays. All cables shall be of single run / length only and no intermediate joints shall be permitted. Cable markers at both ends shall identify all cables.

3.6.6 Individual cores / wires shall be identified using grafo-plast method or suitable colour coded ferrules. Wire connection shall be made using cable lugs of proper size employing Crimping Tool.

3.6.7 Electrical connections/wiring within panel/cabinet shall be carried out using the following type of cables of different colours.

- Flexible 0.5 Sq.mm multi stranded copper conductor of 1500 V insulation grade for signal (both analogue as well as discrete/digital).
- Flexible 1.5 Sq.mm multi stranded copper conductor for power supply of individual instruments.
- Flexible multi stranded copper conductor of suitable size and other specifications similar to signal cables except for screening are to be used for grounding/earthing of monitoring/control panel, junction boxes etc.
- Copper conductor multi strand suitable size and other specifications similar to signal cables except for screening are to be used for distributing UPS Power supply as required.

3.6.8 All instruments (camera and its accessories) shall be protected from corrosive atmospheric agents like salt, dust etc. and from any damages caused by other contractors working in the area by suitable cardboard boxes and / polythene bags of sufficient thickness and size properly fastened by the Instrument contractor after installation of the instruments.

3.7 Consumables

The contractor shall include in the scope of supply the following consumables in required quantities for proper execution of work. The list shall not be treated as a complete list. It is the responsibility of the instrumentation contractor to include all materials required for proper installation of all systems without any extra charges to the purchaser.

S. No.	Item Description	Size etc.
1.	Malogrip type and interlocking type identification ferrules made from high grade PVC of yellow colour with black engraving, marked with alphabets from	Suitable for core size 0.5 Sq.mm, 1.0 Sq. mm, 2.5, 4.0 and 6.0 Sq. mm

	A to Z, numerals from 0 to 9, + ve,-Ve etc.	
2.	Malogrip type flexible identification ferrules made from high grade PVC of yellow colour engraved in black with alphabets from A to Z and numerals from 0 to9.	Suitable for cable diameters of 12 mm to 27 mm (if required)
3.	PTFE Sealing tapes	10 mm to 25 mm width
4.	Rag bolts, washers and nuts (M.S. Galvanised)	M 10 x 100 M 10 x 150 M 12 x 100
5.	Cable lugs with Sleeves (tinned copper)	Suitable for 0.5 ,1.5, 2.5, 4 and 6 mm 2 cables.
6.	'O' 'J' bolts, washers & nuts (M.S. Galvanised)	M8, suitable for ½ // NB M10, 1 // NB Pipe M12, 2 // NB Pipe and others as required
7.	Sleeves of suitable material	For Brazing 6 mm OD & ½ " OD tube, (if required ¾ ", 18 mm OD tube)
8.	'O' 'J' bolts, washers & nuts (M.S.Galvanised)	M8 x 75 Thread length 40 mm suitable for ½" NB pipe
9.	Nuts, bolts and washers (Cold forged galvanised)	M6 x 20 M6 x 40 M6 x 65 & above M15 x 30 Nuts suitable for M12 bolts
10.	Machine screws (M.S. Galvanised) with mushroom heads complete with washers & nuts according to British Association Standard thread or British whitworth standard thread.	0BA x ½ " 2BA x 1 " 4BA x ½ " 4BA x 1 " ½ " BSW x ½ " ½ " BSW x 1 " x ½ "
11.	Aluminium strips in coiled form made of HE 9 M alloy conforming to IS-733 .. 1967.	20 (0.3 mm) x 1.6 (0.2 mm) as required

3.8 Inspection, Test and Acceptance of Installation

3.8.1 The work being executed by the contractor will be subject to phase wise and periodical inspection and testing by the consultant, owner or their representative. The contractor shall bear all expenses for such tests and inspection. Tests /inspection shall include all those procedures and operations necessary to ensure that the instruments have been perfectly installed and interconnections made correctly. These tests / inspection shall be taken up as and when a work or a portion of work is completed by the contractor and offered for inspection in writing by the contractor. If the works do not correspond to the technical requirements as spelt out in the specifications, standards, approved drawings, documents, OEM manuals or not executed with perfect workmanship (in the view of or in the opinions of the purchaser), the inspecting officer/ consultant will give oral / written instruction for elimination of the defects. The contractor will rectify / redo the work at no extra cost to the purchaser.

3.8.2 Alignment of cable trays with adjacent structures, alignment and dressing of cables in the cable trays, clamping of cables etc. shall be inspected and checked.

3.8.3 Integrity of terminations as per the terminal inter-connection diagrams, identification and marking of cores, cables, etc. shall be checked for the conformity with the drawings, documents and specification.

4 Technical Specification of Major Items

4.1 Instruction to the bidder

The technical specification has blank spaces earmarked for filling up information by the bidder regarding the offered system. The bidder must fill up the blank space and sign with seal on each page of the specification sheet. All blank space (to be filled by the bidder) must be filled or must be crossed across.

4.2 Specification for cameras

Sl.No.	Specification	Tender Requirement	Bidders Affirmation for the quoted model
1	Image Sensor	1/3" Progressive Scan CMOS	
2	Shutter Speed	1/3 to 1/10000 s	

3	Slow Shutter	Yes	
4	Minimum Illumination	0.005 Lux; 0 Lux with IR/White Light	
5	Day/Night Mechanism	IR Cut Filter	
6	Day/Night Switch	Unified/ Scheduled/ Auto	
7	Lens Type	Fixed Focal Lens	
8	Focal Length	4 mm	
9	Aperture	F1.6	
10	FOV	4mm: Horizontal FOV: 79°, Vertical FOV: 43°, Diagonal FOV: 93°	
11	Lens Mount	M12	
12	DORI Distance	4 mm: Detect: 80 m (262 ft) Observe: 33 m (109 ft) Recognize: 16 m (52 ft) Identify: 8 m (26 ft)	
13	Pan/tilt Range	Pan: 0° to 350°, Tilt: 0° to 120°	
14	Pan/tilt Speed	Pan Speed: Configurable from 8° to 44°/s; Preset Speed: 44°/s Tilt Speed: Configurable from 8° to 44°/s, Preset Speed 44°/s	
15	Manual Control Speed	Configurable from 8° to 35°/s	
16	Presets	300	
17	Patrol Scan	8 patrols, up to 8 presets for each patrol	
18	Power-off Memory	Yes; Auto restore to previous PT and lens status after power failure	
19	Park Action	Yes; Preset; Patrol Scan	

20	3D Positioning	Yes	
21	Manual adjustment range	Pan: 0° to 348° Tilt: 0° to 120°	
22	IR LED	Quantity: 2 Range: 30m Wavelength: 850nm	
23	White LED	Quantity: 2 Range: 30m	
24	Illuminator On/Off Control	Auto/Scheduled/Always on/Always off	
25	Max. Resolution	2560 X 1440	
26	Main Stream	Frame Rate: 50Hz: 1fps, 5fps, 10fps, 15fps, 20fps, 25fps 60Hz: 1fps, 5fps, 10fps, 15fps, 20fps, 25fps, 30fps Resolution: 2560x1440, 2304x1296, 2048x1280, 1920x1080, 1280x720 Note: If the image rotation is set to 90° or 270°, the frame rate only supports up to 20fps.	
27	Sub-Stream	Frame Rate: 50Hz: 1fps, 5fps, 10fps, 15fps, 20fps, 25fps 60Hz: 1fps, 5fps, 10fps, 15fps, 20fps, 25fps, 30fps Resolution: 640x480, 352x288, 320x240 Note: If the image rotation is set to 90° or 270°, the frame rate only supports up to 20fps.	
28	Bit Rate Control	CBR, VBR	
29	Video Compression	Main Stream: H.265+/H.265/H.264+/H.264	

		Sub-Stream: H.265/H.264	
30	H.264 Type	High Profile	
31	H.264+	Main Stream Supported	
32	H.265 Type	Main Profile	
33	H.265+	Main Stream Supported	
34	Video Bit Rate	Main Stream: 256 Kbps to 4 Mbps Sub-Stream: 64 Kbps to 512 Kbps	
35	Image Settings	Mirror, Brightness, Contrast, Saturation, Sharpness, Exposure, WDR, White Balance, Prevent Overexposure to Infrared Light, HLC Adjustable by Client Software, Rotation(90°/270°)	
36	Image Enhancement	BLC/3D DNR/HLC/SmartIR	
37	Wide Dynamic Range	DWDR	
38	SNR	≥ 52 dB	
39	Image Parameters Switch	Yes	
40	Privacy Mask	Up to 4 Masks	
41	ROI	1 Region	
42	OSD Setting	Yes	
43	Audio Communication	Two-Way Audio	
44	Audio Input	Yes	
45	Audio Output	Yes	
46	Audio Compression	Yes	
47	Audio Sampling Rate	8KHz	
48	Environment Noise Filtering	Yes	
49	Audio Bit Rate	64 Kbps(G.711 alaw)	
50	Protocol	TCP/IP, UDP, ICMP, HTTP,	

		HTTPS, DHCP, DNS, RTSP, NTP, UPnP UDP, SSL/TLS, FTP/SFTP, RTP, IPv4, IPv6, ARP	
51	ONVIF	Yes	
52	API	Open Network Video Interface (Profile S)	
53	Simultaneous Live View	3 Main Streams & 3 Sub-Streams	
54	Client	Web UI	
55	Web Browser	Google Chrome® 57 and above Firefox® 52 and above Safari® 11 and above Microsoft® Edge 91 and above	
56	Cloud	Yes	
57	Security	Password Protection, HTTPS Encryption, IP Address Filter, Digest Authentication	
58	Smart Event	<ul style="list-style-type: none"> • Area Intrusion Detection • Line-Crossing Detection • People Detection • Vehicle Detection • Region Entering Detection • Region Exiting Detection • Object Abandoned Detection • Object Removal Detection • Abnormal Sound Detection 	
59	Basic Event	<ul style="list-style-type: none"> • Motion Detection (Enhanced with Human & Vehicle Classification for more accurate alerts) • Video Tampering Detection • Exception (Illegal Login) 	
60	Alarm Linkage	Memory Card Video Recording, Message Push, Audible Warning, White Light Flashing	
61	Linkage Method	N/A	
62	Output	Message Push	

	Notification		
63	Network Interface	1 RJ45 10/100M Self-Adaptive Ethernet Port, PoE	
64	Alarm	N/A	
65	Reset Button	Yes	
66	Power	DC Power Port	
67	On-board Storage	Built-In Memory Card Slot, Support MicroSD Card, Up to 512 GB	
68	Built-in Microphone	Yes; Records Anything Going on within a 15-ft Radius of the Camera	
69	Built-in Speaker	Yes	
70	Audio	N/A	
71	Operating Temperature	-30–60 °C	
72	Storage Temperature	-40–60 °C	
73	Operating Humidity	95% or Less (Non-Condensing)	
74	Storage Humidity	95% or Less (Non-Condensing)	
75	Material	Plastic	
76	Power Supply	12V DC \pm 5%, Max. 14 W, 5.5mm Coaxial Power Plug PoE: 802.3at, class 4, Max. 16 W	
77	Protection	IP66	
78	Product Dimensions (L x W x H)	120 \times 172 \times 198 mm	
79	Certifications	CE, EAC, UKCA, RCM, Triman, BSMI, VCCI, FCC, IC	

4.2 Specification of Network Video Recorders:

Sl. No.	Specification	Tender Requirement	Bidders Affirmation for the quoted model
1	IP Video Input	16-Channel	

2	Incoming Bandwidth	80 Mbps	
3	Outgoing Bandwidth	60 Mbps	
4	HDMI Output Resolution	1 Channel, Resolution: 3840x2160/30Hz, 1920x1080/60Hz, 1680x1050/60Hz, 1440x900/60Hz, 1280x1024/60Hz, 1280x720/60Hz	
5	VGA Output Resolution	1 Channel, Resolution: 1920x1080/60Hz, 1680x1050/60Hz, 1440x900/60Hz, 1280x1024/60Hz, 1280x720/60Hz	
6	Video Output Mode	HDMI/VGA Simultaneous Output	
7	Multi-View Display	1/4/6/8/9/16	
8	Audio Compression	G.711A/G.711U/G.726	
9	Video Compression	H.265+/H.265/ H.264+/H.264	
10	Record Resolution	8MP/5MP/4MP/3MP/1080p/UXGA/720p/VGA/4CIF/DCIF/2CIF/CIF/QCIF	
11	Synchronous Playback	16-Channel	
12	Capability	25fps: 2-ch @ 8MP, 4-ch @ 4MP, 8-ch @ 2MP 30fps: 4-ch @ 3MP, 2-ch @ 5MP	
13	Record Mode	Manual Recording, Scheduling Recording, Motion Detection Recording	

14	Playback Mode	Instant Playback, Regular Playback, Tag Playback, Event Playback	
15	Backup Mode	Regular Backup, Video Clip Backup	
16	Playback Function	Play, Pause, Stop, Fast Forward, Fast Backward, Play By Frame, Full Screen, Video Clip, Export Clip, Digital Zoom, Lock Recording, Audio On/Off	
17	Protocol	UPnP (Plug and Play), NTP (Network Timing)	
18	Mobile Phone Access	Android, iOS	
19	Web Browser	Chrome (57+), Firefox (52+), Edge (91+)	
20	Interoperability	ONVIF, CGI	
21	Network Interface	1, RJ-45 10/100 Mbps Self-Adaptive Ethernet Interface	
22	USB Interface	1 Front USB 2.0 Port, 1 Rear USB 2.0 Port	
23	Audio Interface	1, Audio In; 1, Audio Out	
24	Alarm In/Out	N/A	
25	Serial Interface	N/A	
26	Power	1× DC Jack	
27	Reset Button	1	
28	Speaker	N/A	
29	eSATA	1	
30	HDMI	1	
31	VGA	1	
32	SATA	2 SATA Interfaces	
33	Capacity	Up to 10 TB Capacity for Each HDD	
34	Hard disk	Yes, 01 no. required of 2TB capacity	
35	General Alarm	Motion Detection, Video Tampering, Line-Crossing Detection, Intrusion Detection,	

		Region Entering Detection, Region Exiting Detection, Object Abandoned/Removal Detection, Vehicle Detection, Human Detection, Smart Frame	
36	Anomaly Alarm	Video Loss, Offline and IP Conflict, Disk Exception, Login Exception, Fan Exception	
37	Alarm Linkage	Recording, White Light Alarm, Buzzer, Log, Audible Alarm	
38	Storage Temperature	-40-70 °C	
39	Storage Humidity	10%~90% RH Non-Condensing	
40	Working Temperature	NVR: -10-55 °C Power Adapter: 0-40 °C	
41	Working Humidity	10%~90% RH Non-Condensing	
42	Dimensions(W X D X H)	330 × 285 × 45 mm	
43	Net Weight	1.9 Kg	
44	Gross Weight	3.2 Kg	
45	Power Supply	12V DC/3.3A	
46	Max. Power Consumption	4.78 W (Without Disk) 24.16 W (With Disk)	
47	Certifications	CE, EAC, UKCA, RCM, Triman, BSMI, VCCI, FCC, IC, HDMI	

4.3 Technical Specification of wall mounted racks:

Sl. No.	Specification	Tender Requirement	Bidders Affirmation for the quoted model
1	Type	6U 19 inch Wall Mount Server Rack Cabinet with Acrylic Door	
2	Features	Removable Door, Vented, Lockable Door, Key Lock	
3	Form Factor	Wall Mountable	

4	Product Color	Black	
5	Product Material	Steel	
6	Maximum Weight Capacity	110.50 lb	
7	Height	13.1	
8	Width	22.1	
9	Depth	15.8	
10	Weight (Approximate)	22.90 lb	
11	Rack Height	6U	
12	Rack Width	19	
13	Package Contents	<ul style="list-style-type: none"> • 6U 19 Wall Mount Server Rack Cabinet Acrylic Door • 1 x Set of keys • 20 x Cabinet Screw • 20 x Cage Nut 	
14	Additional Information	<ul style="list-style-type: none"> • Compact wall mount design and rugged steel construction • Vented panels with a 120mm cooling fan • Large side and bottom cable routing holes with grommets 	
15	Compatibility	EIA RS-310D	

4.4 Technical Specification of Network switch

Sl.No.	Specification	Tender Requirement	Bidders Affirmation for the quoted model
1	Interface	• 6× 10/100 Mbps RJ45 Ports	

		(4× 10/100 Mbps 802.3af PoE Ports) <ul style="list-style-type: none"> • AUTO Negotiation • AUTO MDI/MDIX 	
2	Network Media	<ul style="list-style-type: none"> • 10BASE-T: UTP category 3, 4, 5 cable (maximum 100m); EIA/TIA-568 100Ω STP (maximum 100m) • 100BASE-TX: UTP category 5, 5e cable (maximum 100m); EIA/TIA-568 100Ω STP (maximum 100m) 	
3	Fan Quantity	Fanless	
4	Installation	<ul style="list-style-type: none"> • Desktop • Wall Mounting 	
5	Power Supply	External Power Adapter (Output: 53.5VDC / 0.81A)	
6	PoE Ports (RJ45)	<ul style="list-style-type: none"> • Standard: 802.3 af compliant • PoE Ports: Ports 1–4, up to 15.4 W PoE output per port • Power Supply: 41 W 	
7	LED Indicator	<ul style="list-style-type: none"> • Power • Link/Act • PoE Status • PoE MAX 	
8	Dimensions (W x D x H)	6.2×4.0×1.0 in (158×101×25 mm)	
9	Max Power Consumption	<ul style="list-style-type: none"> • 2.53 W (220 V/50 Hz no PD connected) • 47.76 W (220 V/50 Hz with 41 W PD connected) 	
10	Max Heat Dissipation	<ul style="list-style-type: none"> • 8.61 BTU/h (220 V/50 Hz no PD connected) • 162.38 BTU/h (220 V/50 Hz with 41 W PD connected) 	
11	Switching Capacity	1.2 Gbps	
12	Packet Forwarding Rate	0.8928 Mpps	

13	MAC Address Table	2K	
14	Jumbo Frame	2 KB	
15	Advanced Features	<ul style="list-style-type: none"> • Extend Mode Button (Ports 1–4, Up to 250 m PoE power supply and data transmission) • PoE Auto Recovery Button (Ports 1-4) • Compatible With IEEE 802.3af Compliant PDs • Mac Address Auto-Learning and Auto-Aging • IEEE 802.3x Flow Control • Green Technology 	
16	Transfer Method	Store and Forward	
17	Certification	CE, FCC, RoHS	

4.5 Technical Specification of Media Converter

Sl.No.	Specification	Tender Requirement	Bidders Affirmation for the quoted model
1	Standards and Protocols	IEEE 802.3i, IEEE 802.3u, IEEE 802.3ab, IEEE 802.3z	
2	Basic Function	Auto-negotiation of Half-Duplex / Full-Duplex transfer mode Extends fiber distance up to 20km	
3	Interface	<ul style="list-style-type: none"> • 1× 1000M SC/UPC port • 1× 10/100/1000M RJ45 port (Auto MDI/MDIX) 	
4	Wave Length	1310nm	
5	Network Media 1000BASE-LX	Single-mode Fiber	
6	Network Media 1000BASE-T	UTP category 5, 5e cable (maximum 100m) EIA/TIA-568 100Ω STP	

		(maximum 100m)	
7	Dimensions (W x D x H)	3.7*2.9*1.1 in. (94.5*73.0*27.0 mm)	
8	Power Supply	External Power Adapter	
9	Max. Power Consumption	1.8W	
10	LED	PWR, Link/Act	
11	Safety & Emission	FCC, CE, RoHS	
12	Environment	<ul style="list-style-type: none"> • Operating Temperature: 0°C~50°C (32°F~122°F) • Storage Temperature: -40°C~70°C (-40°F~158°F) • Operating Humidity: 10%~90% non-condensing • Storage Humidity: 5%~90% non-condensing 	

4.6 Technical Specification of Router

Sl.No.	Specification	Tender Requirement	Bidders Affirmation for the quoted model
1	WiFi Speeds	BE3600 <ul style="list-style-type: none"> • 5 GHz: 2882 Mbps (802.11be) • 2.4 GHz: 688 Mbps (802.11be) 	
2	WiFi Capacity	<p>High</p> <hr/> <p>Dual-Band Allocate devices to different bands for optimal performance</p> <p>2x2 MU-MIMO Simultaneously communicates with multiple MU-MIMO clients</p> <p>OFDMA Simultaneously communicates</p>	

		<p>with multiple clients</p> <p>Airtime Fairness Improves network efficiency by limiting excessive occupation</p> <p>DFS Access an extra band to reduce congestion</p> <p>4 Streams Connect your devices to more bandwidth</p>	
3	Advanced Features	<ul style="list-style-type: none"> • Multi-Link Operation (MLO) • 4K-QAM • Multi-RUs • EasyMesh-Compatible • Works with Alexa and Google Assistant • IoT Network 	
4	Wireless Mode	<ul style="list-style-type: none"> • Router Mode • Access Point Mode 	
5	Network Security	<ul style="list-style-type: none"> • SPI Firewall • Access Control • IP & MAC Binding • Application Layer Gateway • Real-Time IoT Protection • Malicious Site Blocker • Intrusion Prevention System • DDoS Attack Prevention • Home Network Scanner 	
6	Guest Network	<ul style="list-style-type: none"> • 1× 5 GHz Guest Network • 1× 2.4 GHz Guest Network 	
7	VPN Server	<ul style="list-style-type: none"> • OpenVPN Server • PPTP VPN Server • L2TP VPN Server • WireGuard VPN Server 	
8	VPN Client	<ul style="list-style-type: none"> • Open VPN Client 	

		<ul style="list-style-type: none"> • PPTP VPN Client • L2TP VPN Client • WireGuard VPN Client 	
9	WiFi Encryption	<ul style="list-style-type: none"> • WPA • WPA2 • WPA3 • WPA/WPA2-Enterprise (802.1x) 	
10	LED	PWR, Link/Act	
11	Safety & Emission	FCC, CE, RoHS	
12	Environment	<ul style="list-style-type: none"> • Operating Temperature: 0°C~50°C (32°F~122°F) • Storage Temperature: -40°C~70°C (-40°F~158°F) • Operating Humidity: 10%~90% non-condensing • Storage Humidity: 5%~90% non-condensing 	
13	Ethernet Ports	<ul style="list-style-type: none"> • 1× 2.5 Gbps WAN • 1× 2.5 Gbps LAN • 3× 1 Gbps LAN 	
14	USB Support	<p>1× USB 3.0</p> <ul style="list-style-type: none"> • Supported Partition Formats: NTFS, exFAT, HFS+, FAT32 • Supported Functions: FTP Server Media Server Samba Server 	
15	Buttons	<ul style="list-style-type: none"> • Power On/Off Button • Wi-Fi On/Off Button • LED Button • WPS Button • Reset Button 	
16	Power	<p>12 V = 2 A (US) 12 V = 1.5 A (EU)</p>	
17	Protocol	<ul style="list-style-type: none"> • IPv4 • IPv6 	

18	WAN Type	<ul style="list-style-type: none"> • Dynamic IP • Static IP • PPPoE • PPTP • L2TP 	
19	Quality of Service	QoS by Device	
20	Cloud Service	<ul style="list-style-type: none"> • Auto Firmware Upgrade • DDNS 	
21	NAT Forwarding	<ul style="list-style-type: none"> • Port Forwarding • Port Triggering • DMZ • UPnP 	
22	IPTV	<ul style="list-style-type: none"> • IGMP Proxy • IGMP Snooping • Bridge • Tag VLAN 	
23	DHCP	<ul style="list-style-type: none"> • Address Reservation • DHCP Client List • Server 	
24	DDNS	<ul style="list-style-type: none"> • NO-IP • DynDNS 	
25	System Requirements	<p>Internet Explorer 11+, Firefox 12.0+, Chrome 20.0+, Safari 4.0+, or other JavaScript-enabled browser</p> <p>Cable or DSL Modem (if needed)</p> <p>Subscription with an internet service provider (for internet access)</p>	
26	Certifications	CE, FCC, RoHS	
27	Environment	<ul style="list-style-type: none"> • Operating Temperature: 0°C~40°C (32°F ~104°F) • Operating Humidity: 10%~90% non-condensing 	

4.7 Technical Specification of LED Monitor

Sl.No.	Specification	Tender Requirement	Bidders Affirmation for the quoted model
1	Resolution	1,920 x 1,080	
2	Type	LED	
3	Screen size	43"	
4	PQI (Picture Quality Index)	1000	
5	HDR (High Dynamic Range)	Yes	
6	Contrast Enhancer	Yes	
7	Dolby Digital Plus	Yes	
8	Sound Output (RMS)	20W(L:10W, R:10W)	
9	Speaker Type	2 Channel	
10	HDMI	2 ports	
11	USB	1 port	
12	Digital Audio Out (Optical)	1	
13	HDMI Quick Switch	Yes	
14	Design	Mold	
15	Bezel Type	VNB	
16	Front Colour	Glossy black	
17	Power Supply	AC100-240V 50/60Hz	
18	Energy Efficiency Class	2 or better	
19	Accessories	Remote Control, Batteries, Mounting accessories, User Manual, Power cable, HDMI Cable,	

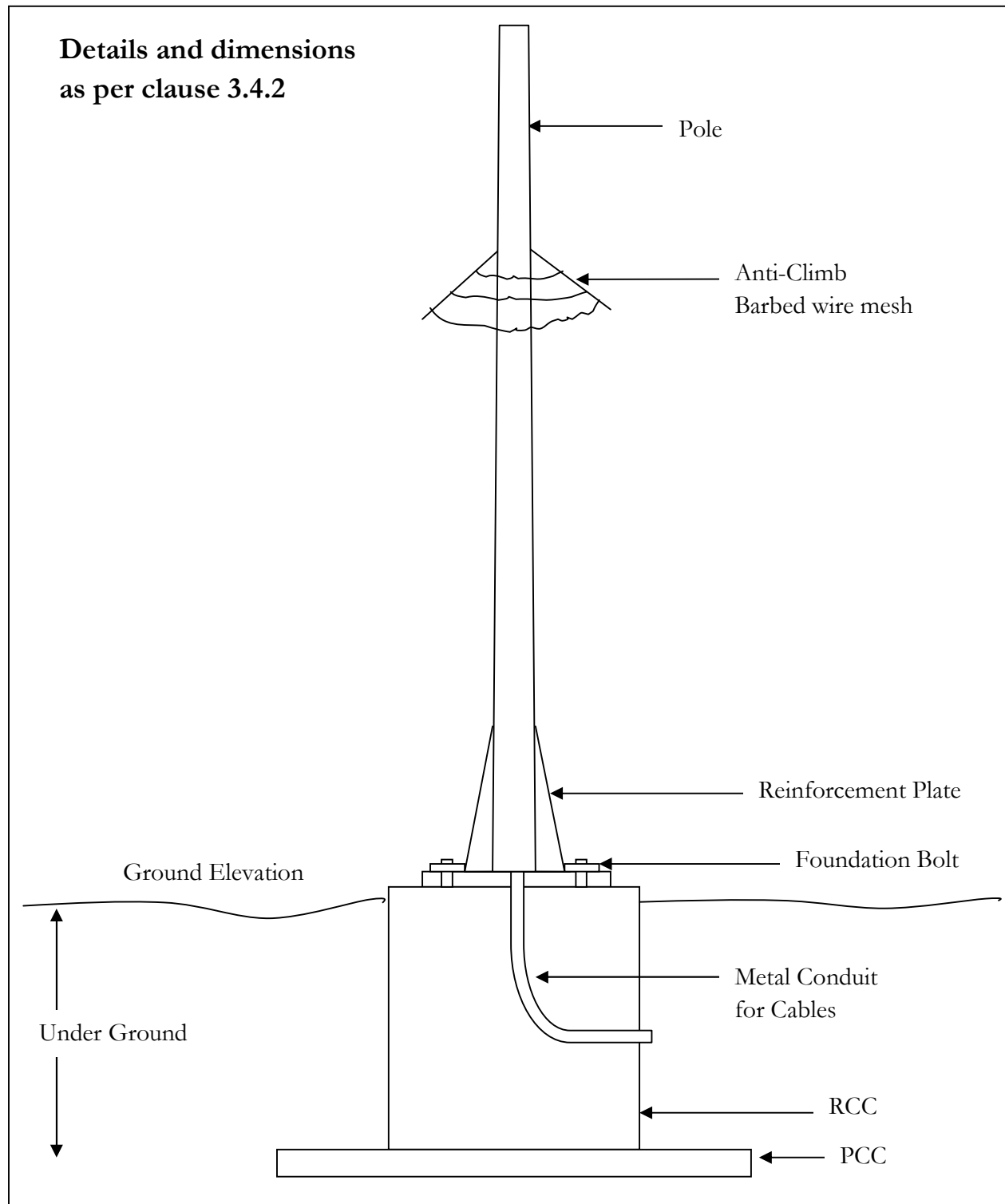
4.8 Technical Specification of Fiber patch box

Sl.No.	Specification	Tender Requirement	Bidders Affirmation for the quoted model
1	Dimensions	8"X3"X2" (approx.)	
2	Protection	IP 66	
3	Material of construction	PTFE	

4.9 Technical Specification of Junction box

Sl.No.	Specification	Tender Requirement	Bidders Affirmation for the quoted model
1	Dimensions	12"X14"X6"	
2	Protection	IP 66	
3	Material of construction	Powder coated Mild Steel	

4.10 Vertical Cross Section Overview of mounting structures for camera at outdoor location.



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