Design, Site preparation, Supply, Installation, Testing, Commissioning, and AMC services of Basic Infrastructure for the establishment of a Data center etc. at IIT-Madras

Ref No. GEM/2023/B/4132621: CDACP/NSM-DC-IIT-MADRAS/23-24/393

AurinPro

Sl NO	Ref	Section	Description	Query	C-DAC Response
1	CDACP/NSM-DC-IIT-MADRAS/23-24/393	8. Comprehensive Warranty	All the equipment and components supplied must have onsite comprehensive warranty from date of successful installation, commissioning and signing of ISAT for 02 years + 03 years i.e. total 05 years.	We will provide CMC for all equipments but low side work will be consumable.	Tender document asks for 5 year comprehensive warranty which includes all parts, consumables(excluding Novec Gas), services etc as requried. Bidder to adhere to the same.
2	CDACP/NSM-DC-IIT-MADRAS/23-24/393	7.9- Work Description	Pressurised MS factory fabricated and tested thermal storage/ buffer tank for 10 minutes storage will be located in ground floor outside behind the electrical room area.	MS structure platform or Foundation will be under CDAC scope for Thermal storage. Kindly confirm	The scope of IIT-M is clearly mentioned in the tender scope demarcation. Rest all items/ works whatever may be required to completed the work and achieve the tender intent shall be in bidders scope including the foundation for the thermal storage buffer tank.
3	CDACP/NSM-DC-IIT-MADRAS/23-24/393	7.12 Page 21 of 82	Space availability as shown in the drawing to be reviewed and confirmed by the bidders	Need a site visit for same. CDAC to confirm date & time.	Site visit conducted during prebid meeting. If bidder needs to visit site kindly contact neelu@iitm.ac.in
4	CDACP/NSM-DC-IIT-MADRAS/23-24/393	9.22 Page 40 of 82	Server Rack 45U having dimensions of 800 X 1460 mm are not in the scope of bidder. However,the bidder to ensure that the RDHx should meet this size of the racks with proper framing and blank off panels.	Need Rack GA drawing.	Rack dimensions are provided. The actual details shall be shared during detailed engineering post order.
5	CDACP/NSM-DC-IIT-MADRAS/23-24/393	10.3 BMS System:	Architecture of BMS system shall be of:	Request you to clerify on redundancy part of BMS	No redundancy is evisaged. However the BMS should be designed such that its failure should not stop/ change the operations of the entire system. Ensure smooth function of the deployed system in the event of failure of any component.
6	CDACP/NSM-DC-IIT-MADRAS/23-24/393	10.5 Page 42 of 82	Supply and Implement Video Surveillance systems (if required):	Request you to clerify whether we need to consider the CCTV system or not	The cabling for power and data shall be in scope of the bidder. The camera shall be in provided by IIT-M to vendor at the time of execution.
7	CDACP/NSM-DC-IIT-MADRAS/23-24/393	10.9 Page 44 of 82	Supply and implementing NOVEC 1230:	In place of Novec 1230 can we consider FK gas as Novec production & service support will be stop after 2025.	Acceptable.
8	CDACP/NSM-DC-IIT-MADRAS/23-24/393	ANNEXURE D - LIST OF RECOMMENDED MAKES	Water Leak Detection System	We recommend to have Synopsys make water leak detection	Ensure tender specifications as a minimum are followed. Makes which meet or exceed the tender specifications and standards can be considered.
9	CDACP/NSM-DC-IIT-MADRAS/23-24/393	ANNEXURE D - LIST OF RECOMMENDED MAKES	PAC	We recommend to have Stulz make water leak detection	Ensure tender specifications as a minimum are followed. Makes which meet or exceed the tender specifications and standards can be considered.
10	CDACP/NSM-DC-IIT-MADRAS/23-24/393	General	Building section for Chilled water pipe length	Request you to provide Building section drawing.	Site visit conducted during prebid meeting. If bidder needs to visit site kindly contact neelu@iitm.ac.in
11	CDACP/NSM-DC-IIT-MADRAS/23-24/393	General	Floor Loading & structural layout	Request you to provide Floor Loading & structural layout.	The DC is planned to be at the ground floor level. Hence this query should not arise.
12	CDACP/NSM-DC-IIT-MADRAS/23-24/393	7.9	Air cooled chiller with pumps shall be installed on the terrace at 3rd floor level	1) Please share the layout of third floor level where the chillers & pumps are to be installed. 2) Please clarify the scope of Structure required for Buffer tank installation.	1) Terrace chiller plant layout is part of tender documents. Refer the same. 2) Refer corrigendum.
13	CDACP/NSM-DC-IIT-MADRAS/23-24/393	7.9 & 9.1	Section 7.9 specify chilled water pipe insulation as PUF and Aluminium cladding, however section 9.1 asks for cross linked polyethylene pipe section.	Please clarify which material to be considered.	Refer corrigendum.
14	CDACP/NSM-DC-IIT-MADRAS/23-24/393	9.1	"The pumps shall be vertical multistage, in-line design"	Please confirm do we need to consider Multi-stage pumps?	Pumps can be single stage or multistage. The flow and head requirements should be maintained as a minimum. However the final supply shall be done as per approved calculations and head calculations during detailed engineering.
15	CDACP/NSM-DC-IIT-MADRAS/23-24/393	9.12	Gate and globe or Ball valves: Gate and globe valves up to 50 mm size shall be gun metal construction.Valves above 50 mm diameter shall have cast iron body and bronze/gun metal spindle valve seat. The valves shall have non rising spindle.	Please confirm for 50mm dia size, we shall consider ball valve or butterfly valve.	In tender documents the ball valve is clearly mentioned in section 9.12.
16	CDACP/NSM-DC-IIT-MADRAS/23-24/393	9.19	Thermal Storage Buffer Tank-	Capacity of Thermal storage Buffer tank is 15m3, please confirm.	As per tender documents, 10 minute storage (15 m3) is required as a minimum. Bidder to submit calculation of the capacity along with the bids.
17	CDACP/NSM-DC-IIT-MADRAS/23-24/393	10.2.b	Water Flow Meters	Please confirm the type of water flow meters - Inline type or clamp On type	section 10.2 mentions clearly.
18	CDACP/NSM-DC-IIT-MADRAS/23-24/393		General	1) Specifications of PAC & smoke extraction fan are missing from the RFP 2) Please confirm the Material of construction for drain pipes. 3) Scope of ODU structure to be confirmed.	All ODU structure is in scope of bidder. Proposed location as per tender drawings. Drain pipes are of UPVC material. Specifications of all equipment shall be as per tender documents as a minimum criteria. Bidders can quote for meeting the specs and better solution as per the requirement of the tender For point number 1 , refer corrigendum.
19	CDACP/NSM-DC-IIT-MADRAS/23-24/393	ANNEXURE D - LIST OF RECOMMENDED MAKES	Make list	Make of following items are missing - Closed expansion tank, Chiller, Thermal insulation XLPE insulation, smoke extraction fan	Refer corrigendum.

20	CDACP/NSM-DC-IIT-MADRAS/23-24/393	2 Scope Demarcation	Scope of work Carried out by IIT Madras, Chennai to be excluded by the bidder. Insulation for false floor, false ceiling for all the area	Please clerify whether floor & ceiling insulation is under IIT madras scope or not?	The scope of IIT-M is clearly mentioned in the tender scope demarcation. Rest all items/ works whatever may be required to completed the works and achieve the tender intent shall be in bidders scope.
21	CDACP/NSM-DC-IIT-MADRAS/23-24/393	8.6 Earthing and Earthing Pits:	All earthing pits are in IIT-M scope.	Please clerify whether earth pits is under IIT madras scope or not?	The scope of IIT-M is clearly mentioned in the tender scope demarcation. Rest all items/ works whatever may be required to completed the works and achieve the tender intent shall be in bidders scope.
22	CDACP/NSM-DC-IIT-MADRAS/23-24/393	8.8	Stainless steel (SS) cable tray to be considered above each row of the Rack	Kindly confirm whether instead of SS cable tray we can proposed MS power coated Cable tray.	Quote as per tender documents and Specifications.

Schneider Electric IT Business (I) Pvt. Ltd.

Sl NO	Ref	Section	Description	Query	C-DAC Response
1		Sec IV/Page 2	The access control and CCTV shall be carried out by IIT-M, But the entire cabling work shall be done by the bidder	Since ACS and CCTV design is being carried out by CDAC, requesting to share the Cable Qty. and specification required for the same Make & Model of ACS System Make & Model of CCTV system	As per tender drawings and specifications, the make and model shall be shared at the time of detailed engineering. The cable quantity has to be derived by the bidder from the tender drawings and BMS room location
2		Sec IV/Page 16	This data center should be energy efficient in which almost 90% of heat extraction from server racks is by Rear door Heat Exchanger and rest by In Row Coolers. UPS rooms cooling loads are taken by the PACs and other smaller rooms by split ACs.	10% of total IT Load is 46.5 kW. Inrow selected as per Techical Specs is of 10 kW each x 2 no's. Which is less than the 10% requirement of 26.5 kW. Kindly clarify	Read the "90% as 99%". Quote as per tender documents. Refer corrigendum.
3			7.2 Metal Grid Celing	Kindly confirm the clear height of the False Ceiling	The bidder shall do the detailed engineering and get the false ceiling height as per the equipment and services requriements.
4		Sec IV/Page 20/Page 89	7.4.4 Bidder to consider to providing 2 nos. 2-point panel remover, lead, lift, steps for 600mm raised floor etc. Vesda Layout	AS per 7.4.3 Raised floor Height is 300 mm & as per Vesda Layout it is 450 mm. Requesting to kindly confirm the actual height of rasied Floor. **With Chiller water piping routed below raised floor inside DC, 300 mm clearance will not be sufficient. Request to kindly consider 600 mm height**	Refer corrigendum.
5		Sec IV/ Page 38	9.13 Butterfly valves	We request you to accept Valves with PN10 rating.	Quote as per tender specifications to meet the design intent. Minimium criteria is given in the tender specifications. PN 16
6		Sec IV/Page 20	7.5 Fire Rated Doors	Kindly confirm which fire door Bidder to provide	Doors wherever in the fire rated wall in scope of bidder shall be fire rated. Check for battery room and electrical room as per the tender documents & drawings.
7		8.1 / 21 of 82	IIT-M shall provide synchronised incoming power from their existing/ upgraded transformer and DG sets and their LV substation of 2x1000 KVA ONAN 11KV/433 V. The LT incomer panel shall be placed in the electrical room. TWO incomers shall be provided by IIT-M from two sources for redundancy. Termination of these incoming cables into the incomer panel shall be in the bidder's scope. Details of cabling and electrical scheme from there on are indicated in the SLD. All parts and products shall be new.	Kindly confirm two nos of incoming cable will be provided by CDAC upto incomer panel.	Tender document clearly states the scope. Quote as per the same. Your understanding is correct.
8		8.6 / 29 of 82	Earthing and Earthing Pits: All earthing pits are in IIT-M scope. All Electrical Equipment must be efficiently double earthed in accordance with the requirement of IS-3043/IEEE 80 and relevant regulations of Electrical. The earth pits shall be as per IS with proper arrangement for testing. Maintenance free earth pits to be used. All Earthing conductors shall be hot dip galvanized / electrolytic grade base copper conductor.	As per clause 8.6 Earthing pit is part of IIT-M scope, kindly confirm Earthstrip between server / electrical room to Earth pit is whose scope.	Tender specifications about the scope of earthing for the bidder is clear. Quote as per tender documents and specifications.
9		Sec 1/Page 3	2.1.2. e The self-certified copies of audited balance sheets or the certificate/s from a Chartered Accountant for last three financial years indicating the annual sales turnover.	We have CA audited Turn over certificate till FY 21-22. FY 22-23 is under audit. Request to kindly accept Turn over certifcate from FY 19-22.	Accepted
10		General		RDHx make is not mentioned in the make list	Refer the corrigendum.
11		General		Location of Chiller	The chiller location is clearly mentioned in tender documents and drawings.
12		General		Requesting to kindly share the CAD format for the Layouts, SLD and P&ID Scheme	Kindly contact mmg@cdac.in
13		General	IBMS	Please provide the location of BMS room and also clarify whether new BMS room to be created or existing BMS Room to be used	Exisiting BMS room to be used. Space will be provided by IIT-M. Location is at the entrance side of the building. Clarified at the time of the site visit. Bidder may do the site visit once again if required.

14		General	IBMS	BMS Integration - Please clarify to integrate existing equipment into new BMS system. ex. Transformer , DG set, energy meter, Panel breaker status,UPS, cooling units(AHU) or any other specific equipment	Only material and equipment supplied by bidder for this tender will need to be integrated / Installed in the BMS room. The existing BMS system will work seperatily as it is.
15		General	IBMS	Please clarify BMS system should be integrated with existing system or it should be an independent system.if it has integrated with the existing system, please share the existing BMS system details.	It will be an Inependent System.Only material and equipment supplied by bidder for this tender will need to be integrated in the BMS and will be totally separate from existing BMS, The existing BMS system will work seperatily as it is.
16		Point No. 9 - Page No. 31	Chiller Rating	Screw type Air cooled chiller with VFD based minimum rating is 130TR, so can we consider 140TR*2 Nos, instead of 70TR*3 Nos	Bidder can propose as an alternative, however, all engineering should be in loop for the proposed system. The minimum capacity and reducndancy requirement shall be met with as per tender and design and project intent Refer corrigendum
17		General Terms and Conditions on GeM 4.0 (Version 1.12) dt 16th August 2023 Page 33	18:- Limitation of Liability ii) In the event of any gross negligence or willful misconduct on part of either party, as finally judicially determined by a court of competent jurisdiction.	Reqest to kindly delete " **as finally judicially determined by a court of competent jurisdiction**."	No change
18			General-Suspension Clause	Request to add below:- 1. If the Buyer/C-DAC fails to comply with the provisions of this Contract, the Contractor/Seller may, after giving not less than 14 days' notice to the Buyer, suspend work or reduce the rate of work. If the Buyer subsequently cures the failure as specified in the notice, the Seller shall resume normal working as soon as is reasonably practicable. 2. If the Contractor/Seller suffers delay and/or incurs Cost as a result of suspending work (or reducing the rate of work) in accordance with this Sub-Clause, the Seller shall give notice to the Buyer and shall be entitled to an extension of time for any such delay, if completion is or will be delayed and payment of any such Cost, which shall be included in the Contract Price to Buyer/C-DAC. 3. If the suspension under this Sub-Clause continues for a continues period of 60 days then the Contractor/Seller may, upon giving 14 days' notice to the Buyer/C-DAC, terminate the Contract. Upon such termination, Seller shall be entitled to payment of amounts for the works already carried out and all other incidental costs incurred including costs of material already ordered or under production, cost of demobilizing and liabilities due to vendors and sub-contractors of the Contractor/Seller	No change

19			General-Termination Clause	Request to kindly include the below:- Either Party can terminate the Contract with prior written notice of 30 days to the other Party for any of the following reasons: a) Insolvency, receivership or bankruptcy proceedings are commenced by or against the Party; b) Party makes a general arrangement for the benefits of its creditors; c) Party abnormally delays or fails to fulfill its contractual obligations including, but not limited to, approval and timely payments etc. d) Any material breach or representations or warranties made was false or intentionally misleading when made. e) The occurrence of Force Majeure event continues for 3 months or above. f) Buyer fails to take delivery of material due to whatever reasons for more than 3 months. g) Repetitive suspension of work or equipment deliveries are withheld beyond 3 months	No change
				A change in Law of any Government Authority where performance of contractual obligations are not feasible or possible. Termination by EIL/Buyer for default- If the Contractor/ Seller is in default, this clause for termination can only be accepted for Notice of termination to be in writing Termination only in case of material breach and that to if it is not remedied within a predefined period of time. If possible, termination will be limited to only in respect of the part of the scope of work affected by the non-performance. scope of work. Termination by Contractor/ Seller- The Seller can terminate/ cancel the Contract with prior written notice of 30 days to the Buyer for any of the following reasons:-	
				a) Insolvency, receivership or bankruptcy proceedings are commenced by or against the Buyer; b) Contractor/Seller's payment are withheld /suspended beyond reasonable time limit c) C-DAC/Buyer fails to fulfill its contractual obligations d) Any material breach or representations or warranties made was false or intentionally misleading when made. e) Buyer assigns or transfers the Contract or any right or interest herein other than in accordance with the Contract. f) Persistently fails to timely comply its obligations including approval/ certifications of drawings, documents, measurements or other inputs. g) The occurrence of Force Majeure event continues for 3 months or above. h) Buyer fails to take delivery of material due to whatever reasons for more than 3 months. i) Repetitive suspension of work due to reasons attributable to Buyer. j) A change in Law of any Government Authority, where performance of contractual obligations are not feasible or possible. k) Buyer fails to provide encumbrances free land for Project work or access or approach is restricted.	

				In any case of termination and/or project being scraped/ purged for whatever reasons, the Seller shall receive from Buyer the full payment towards all the work performed, including but not limited to, certified or not; all payments due towards confirmed commitments with respect to costs of materials, goods and services ordered by the Seller with its Sub-contractor or Sub-suppliers for performance of this Contract, including the once delivered at site and/or are under transit/ or under manufacturing at Sellers' manufacturing plant. The Seller shall also be entitled for payment with reasonable profit by the Buyer on the part of the terminated works; Payment of a sum representing 10% of the contract price as a termination fee. In addition, the Seller shall have all other rights and remedies to which he is entitled under this Contract and/or at law	
20			General-Export	We understood C-DAC will directly procure this materials as per Tender BOQ & these equipments will be installed in Chennai & Hyderabad Data center for C-DAC own use and C-DAC will not export these equipments to any other Countries in future.	Installation at IIT Madras
21			General-Export	Request to kindly add below:- Export Compliance- The deliverables provided by Seller under this Contract contain or may contain components and/or technologies from the United States of America ("US"), the European Union ("EU") and/or other nations. Buyer acknowledges and agrees that the supply, assignment and/or usage of the products, software, services, information, other deliverables and/or the embedded technologies (hereinafter referred to as "Deliverables") under this Contract shall fully comply with related applicable US, EU and other national and international export control laws and/or regulations. Unless applicable export license/s has been obtained from the relevant authority and the Seller has approved, the Deliverables shall not (i) be exported and/or re -exported to any destination and party (may include but not limited to an individual, group and/or legal entity) restricted by the applicable export control laws and/or regulations; or	
				(ii) be used for those purposes and fields restricted by the applicable export control laws and/or regulations. Buyer also agrees that the Deliverables will not be used either directly or indirectly in any rocket systems or unmanned air vehicles; nor be used in any nuclear weapons delivery systems; and will not be used in any design, development, production or use for any weapons which may include but not limited to chemical, biological or nuclear weapons. If any necessary or advisable licenses, authorizations or approvals are not obtained, whether arising from inaction by any relevant government authority or otherwise, or if any such licenses, authorizations or approvals are denied or revoked, or if the applicable export control laws and/or regulations would prohibit Seller from fulfilling any order, or would in Seller's judgment otherwise expose Seller to a risk of liability under the applicable export control laws and/or regulations if it fulfilled the order Seller shall be excused from all obligations under such order and/or this Contract.	

22			General-Cyber Security	Request to add below:- Cybersecurity Obligations: Purchaser's Obligations for Its Systems: Purchaser is solely responsible for the implementation and maintenance of a comprehensive security program ("Security Program") that contains reasonable and appropriate security measures and safeguards to protect its computer network, systems, machines, and data (collectively, "Systems"), including those Systems on which it runs the Products or which it uses with the Services, against Cyber Threats. "Cyber Threat" means any circumstance or event with the potential to adversely impact, compromise, damage, or disrupt Purchaser's Systems or that may result in any unauthorized access, acquisition, loss, misuse, destruction, disclosure, and/or modification of Purchaser's Systems, including any data, including through malware, hacking, or similar attacks. Without limiting the foregoing, Purchaser shall at a minimum:	No change
				(a) have qualified and experienced personnel with appropriate expertise in cybersecurity maintain Purchaser's Security Program, and have such personnel regularly monitor cyber intelligence feeds and security advisories applicable to Purchaser's Systems or Purchaser's industry; (b) promptly update or patch its Systems or implement other appropriate measures based on any reported Cyber Threats and in compliance with any security notifications or bulletins, whether publicly disclosed on SE's security notification webpage at https://www.se.com/ww/en/work/support/cybersecurity/security-notifications.jsp or otherwise provided to Purchaser; (c) regularly monitor its Systems for possible Cyber Threats; (d) regularly conduct vulnerability scanning, penetration testing, intrusion scanning, and other cybersecurity testing on its Systems; and (e) meet the recommendations of SE's Recommended Cybersecurity Best Practices, available at https://www.se.com/us/en/download/document/7EN52-0390/, as may be updated by SE from time to time, and then-current industry standards.	
				Purchaser's Use of the Products, Software, and Services: SE may release Updates and Patches for its Products, Software, and Services from time to time. Purchaser shall promptly install any Updates and Patches for such Products, Software, or Services as soon as they are available in accordance with SE's installation instructions and using the latest version of the Products or Software, where applicable. An "Update" means any software that contains a correction of errors in a Product, Software, or Service and/or minor enhancements or improvements for a Product, Software, or Service, but does not contain significant new features. A "Patch" is an Update that fixes a vulnerability in a Product, Software, or Service. Purchaser understands that failing to promptly and properly install Updates or Patches for the Products, Software, or Services may result in the Products, Software, or Services or Purchaser's Systems becoming vulnerable to certain Cyber Threats or result in impaired functionality, and SE shall not be liable or responsible for any losses or damages that may result.	

				Identification of Cyber Threats: If Purchaser identifies or otherwise becomes aware of any vulnerabilities or other Cyber Threats relating to the Products, Software, or Services for which SE has not released a Patch, Purchaser shall promptly notify SE of such vulnerability or other Cyber Threat(s) via the SE Report a Vulnerability page (https://www.se.com/ww/en/work/support/cybersecurity/report-a-vulnerability.jsp#Customers) and further provide SE with any reasonably requested information relating to such vulnerability (collectively, "Feedback"). SE shall have a non-exclusive, perpetual and irrevocable right to use, display, reproduce, modify, and distribute the Feedback (including any confidential information or intellectual property contained therein) in whole or part, including to analyze and fix the vulnerability, to create Patches or Updates for its customers, and to otherwise modify its Products, Software, or Services, in any manner without restrictions, and without any obligation of attribution or compensation to Purchaser; provided, however, SE shall not publicly disclose Purchaser's name in connection with such use or the Feedback (unless Purchaser consents otherwise).	
				By submitting Feedback, Purchaser represents and warrants to SE that Purchaser has all necessary rights in and to such Feedback and all information it contains, including to grant the rights to SE described herein, and that such Feedback does not infringe any proprietary or other rights of third parties or contain any unlawful information.	
23			Payment terms	Request you to accept these Below Payment terms: a. Mobilization advance - 20% of PO Value b. 70% on delivery of all materials c. 90% on Installation c. 10% on installation and commissioning with PBG	No change
24		Page - 22	Greater than equal to i.e. ≥ 96 % in Online Double Conversion at 50% load to 75% Loading condition and ≥ 99% in OEM Specific Economy mode at at 50% load to 75% Loading condition.	For better saving from Electricity Bill higher efficiency plays a crucial role requesting to amend the efficiency to 96.8% in online double conversion at 50% load to 75% Load to lower the total cost of owernership.	Minimum criteria is given. Bidder can propose same of better
25		Page - 22	Cable termination will be from bottom.	Request to amend the cable termination either from bottom or top as per OEM design	Acceptable. However, the site constaints should be taken into consideration before proposing.
26		Page - 25	The UPS battery shall be sized for 10 minutes backup	Request your confirmation on Battery backup of 10 mins as Start of life of End of life.	The battery backup should be 10min for the entire period of 5 years for the rated capacity of the UPS. Refer Corrigendum
27			Warranty on UPS	Request you to kindly confirm the warranty on UPS	All equipment, material and workmanship has to have a warranty of 5 years as per tender documents. The bidder is responsible, irrespective of OEM/ Manufacturer's agreement/ arrangement with the bidder.

Legrand

Sl NO	Ref	Section	Description	Query	C-DAC Response
			Product Safety: IEC 62368-1, IEC 60335-2-40, UL 1995, UL 60335-2-40, CSA C22.2 #236	1. Standards IEC 62368-1 is for AV equipment, IEC 60335-2-40 is for household equipments and UL 1995 is for Refigerant based and are not applicable for RDHx application. Hence request you to remove these standards. 2. However, request you to add " RDHx should have been tested & approved by ETL, in accordance with EN 60950-1:2006 +A1:2010 +A11:2009 +A12:2011 safety standards ", as these are are relevant to RHDx product	Every manufacturer will have their relevant standard manufacturing practise and certification based on their respective manufacturing locations. Hence, all equivalent standards and testing qualification meeting the tender criteria will be acceptable. Bidder to specify the relevant standards proposed by the OEM and submitt along with the bid.

			EMC : 61000-6-4, 61000-3-2, 61000-3-3	61000-6-4 is not applicable as it is already certified under 61000-3-2 & 3-3. Hence request you to remove 61000-6-4	Every manufacturer will have their relevant standard manufacturing practise and certification based on their respective manufacturing locations. Hence, all equivalent standards and testing qualification meeting the tender criteria will be acceptable. Bidder to specify the relevant standards proposed by the OEM and submitt along with the bid.
			Shock & Vibe: Siesmic : 60068-2-27, 60068-2-64	Siesmic certification is applicable for the Rack as the Rear door is attached to the rack. Hence kindly remove this clause.	Every manufacturer will have their relevant standard manufacturing practise and certification based on their respective manufacturing locations. Hence, all equivalent standards and testing qualification meeting the tender criteria will be acceptable. Bidder to specify the relevant standards proposed by the OEM and submitt along with the bid.
			Transportation: Thermal Shock according to Telcordia GR-63, Section 5.1.1.1	This clause is not relevant to the RDHx. Hence please remove this clause	Every manufacturer will have their relevant standard manufacturing practise and certification based on their respective manufacturing locations. Hence, all equivalent standards and testing qualification meeting the tender criteria will be acceptable. Bidder to specify the relevant standards proposed by the OEM and submitt along with the bid.
			Redundant Power Supply Units, require hot swappable without opening of door	1. Redundant Power Supply is available with inbuilt ATS and replacing the power supply units requires no downtime. It is a rare incident and it takes only couple of minutes to replace. RDHx is capable to maintain the room ambiance with the redundancy planned during the power supply unit replacement. Hence request you to mention " Replacement of power supply units without opening the door / without any downtime. 2. RDHx offered has fans to generate enough CFM Airflow (8217 m3/h) to remove the heat from the rack as per our design, with a better technology & efficiency. 10000 m3/h is not required for this project conditions. Hence request you to amend to "RDHx should have enough fans to generate Airflow to remove the heat from rack as per OEM design"	1. Every manufacturer will have their relevant standard manufacturing practise and certification based on their respective manufacturing locations. Hence, all equivalent standards and testing qualification meeting the tender criteria will be acceptable. Bidder to specify the relevant standards proposed by the OEM and submitt along with the bid. 2. Any change suggested or requested should be followed with proper selection and calculation justification. The intention is not to compromise on the air temperature even in the unforseen circumstance of any one fan/ part failing Remeber it is not just the time required to change, but also the time when it is found that a part has failed and subsequently time requried to get the parts and then change.
			Easy handling of RDHx - Total depth of shall not be exceed more than 250mm with Fan module.	Request you to amend the depth of the door to 250mm to 280mm for more participation, as each OEM has different form factor doors	Can be accepted, as long as vendor is able to justify the space available and the equipment fits within the space without compromising on the performance requried as per tender documents.
			7” touch panel display with new User Interface	We provide 4.3” LCD screen (non touch display) with Button panel available. Touch screen not recommended for High critical areas like Data Center due to security reasons & accidental changes in settings etc..Hence request you to amend as : "LCD Screen display should be provided as per OEM design"	Bidder can quote as per OEM standards
			RDHx should have the following features:	Kindly add Usystems / Legrand make in the RDHx makelist.	Ref Corrigendum

Netcon Technologies India Private Limited

Sl NO	Ref	Section	Description	Query	C-DAC Response
1		SECTION II, Page No: 6, Clause 3	The bidder must have successfully executed at end client sites at least 1 numbers of data centres in India in last five years. Each of the data centres should be with minimum of UPS feeding power of **400 KVA**(excluding redundancy) and minimum feeding cooling load of **120 Tons**(excluding redundancy) (UPS and cooling to be considered only for server area) along with Fire- fighting and suppression systems with high end integration of building management system and all the allied works required for successful installation & completion of the Data Centre. This order should be on the name of bidder issued by the end client.	We request you to kindly modify this clause as under for fair and healthy competition, "The bidder must have successfully executed at end client sites at least 1 numbers of data centres in India in last five years. Each of the data centres should be with minimum of UPS feeding power of **100 KVA**(excluding redundancy) and minimum feeding cooling load of **20 Tons**(excluding redundancy) (UPS and cooling to be considered only for server area) along with Fire- fighting and suppression systems with high end integration of building management system and all the allied works required for successful installation & completion of the Data Centre. This order should be on the name of bidder issued by the end client"	No change

2		SECTION II, Page No: 6, Clause 3	3.4 The bidder should have undertaken/ completed the activities of providing on-site support and facility management / O & M services to at least one data centre. The scope of the activity should cover operation and maintenance of Electrical Systems, Cooling systems (Chillers, PAC/PAHU /In ROW/RDHX etc.) UPS and Battery, IBMS etc. Bidder to provide the documentary evidence that minimum three technical manpower had deployed at site and maintaining electrical system and cooling system. Such Data centre having minimum cooling capacity of 100 Tons.	We request you to kindly accept PO from Large Enterprise where the end client is Government Organisation. Also Change this clause as "Such Data centre having minimum cooling capacity of **100 Tons (Including Standby Units)**."	No change
3			Past Performance Value - 19Cr	We request you to kindly accept PO from Large Enterprise where the end client is Government Organisation. PO Value consisting entire SOW of project with various components of Data center / ICCC	No change
4			Bid Submission date : 23-11-2023 15:00:00	Request to extend Bid submission for another 4 weeks from the current bid submission date	Refer Corrigendum.

Nikom InfraSolutions Pvt. Ltd.

Sl NO	Ref	Section	Description	Query	C-DAC Response
1		Sec IV/Page 2	The access control and CCTV shall be carried out by IIT-M, But the entire cabling work shall be done by the bidder	Since ACS and CCTV design is being carried out by CDAC, requesting to share the Cable Qty. and specification required for the same	As per tender drawings and specifications, the make and model shall be shared at the time of detailed engineering. The cable qunatity has to be derived by the bidder from the tender drawings and BMS room location
				Make & Model of ACS System	
				Make & Model of CCTV system	
2		Sec IV/Page 16	This data center should be energy efficient in which almost 90% of heat extraction from server racks is by Rear door Heat Exchanger and rest by In Row Coolers. UPS rooms cooling loads are taken by the PACs and other smaller rooms by split ACs.	10% of total IT Load is 46.5 kW. Inrow selected as per Techical Specs is of 10 kW each x 2 no's. Which is less than the 10% requirement of 26.5 kW. Kindly clarify	Read the "90% as 99%". Quote as per tender documents. Refer corrigendum.
3			7.2 Metal Grid Celing	Kindly confirm the clear height of the False Ceiling	The bidder shall do the detailed engineering and get the false ceiling height as per the equipment and services requriements.
4		Sec IV/Page 20/Page 89	7.4.4 Bidder to consider to providing 2 nos. 2- point panel remover, lead, lift, steps for 600mm raised floor etc. Vesda Layout	AS per 7.4.3 Raised floor Height is 300 mm & as per Vesda Layout it is 450 mm. Requesting to kindly confirm the actual height of rasied Floor. **With Chiller water piping routed below raised floor inside DC, 300 mm clearance will not be sufficient. Request to kindly consider 600 mm height**	Refer corrigendum.
5		Sec IV/ Page 38	9.13 Butterfly valves	We request you to accept Valves with PN10 rating.	Quote as per tender specifications to meet the design intent. Minimium criteria is given in the tender specifications. PN 16
6		Sec IV/Page 20	7.5 Fire Rated Doors	Kindly confirm which fire door Bidder to provide	Refer corrigendum.
7		8.1 / 21 of 82	IIT-M shall provide synchronised incoming power from their existing/ upgraded transformer and DG sets and their LV substation of 2x1000 KVA ONAN 11KV/433 V. The LT incomer panel shall be placed in the electrical room. TWO incomers shall be provided by IIT-M from two sources for redundancy. Termination of these incoming cables into the incomer panel shall be in the bidder's scope. Details of cabling and electrical scheme from there on are indicated in the SLD. All parts and products shall be new.	Kindly confirm two nos of incoming cable will be provided by CDAC upto incomer panel.	Tender document clearly states the scope. Quote as per the same. Your understanding is correct.

8		8.6 / 29 of 82	Earthing and Earthing Pits: All earthing pits are in IIT-M scope. All Electrical Equipment must be efficiently double earthed in accordance with the requirement of IS- 3043/IEEE 80 and relevant regulations of Electrical. The earth pits shall be as per IS with proper arrangement for testing. Maintenance free earth pits to be used. All Earthing conductors shall be hot dip galvanized / electrolytic grade base copper conductor.	As per clause 8.6 Earthing pit is part of IIT-M scope, kindly confirm Earthstrip between server / electrical room to Earth pit is whose scope.	Tender specifications about the scope of earthing for the bidder is clear. Quote as per tender documents and specifications.
9		Sec 1/Page 3	2.1.2. e The self- certified copies of audited balance sheets or the certificate/s from a Chartered Accountant for last three financial years indicating the annual sales turnover.	We have CA audited Turn over certificate till FY 21-22. FY 22- 23 is under audit. Request to kindly accept Turn over certifcate from FY 19-22.	Accepted
10		General		RDHx make is not mentioned in the make list	Refer the corrigendum.
11		General		Location of Chiller	The chiller location is clearly mentioned in tender documents and drawings.
12		General		Requesting to kindly share the CAD format for the Layouts, SLD and P&ID Scheme	Kindly contact mmg@cdac.in
13		General	IBMS	Please provide the location of BMS room and also clarify whether ne	Exisiting BMS room to be used. Space will be provided by IIT-M. Location is at the entrance side of the building. Clarified at the time of the site visit. Bidder may do the site visit once again if required.
14		General	IBMS	BMS Integration - Please clarify to integrate existing equipment into new BMS system. ex. Transformer , DG set, energy meter, Panel breaker status,UPS, cooling units(AHU) or any other specific equipment	Only material and equipment supplied by bidder for this tender will need to be integrated / Installed in the BMS room. The existing BMS system will work seperatily as it is.
15		General	IBMS	Please clarify BMS system should be integrated with existing system or it should be an independent system.if it has integrated with the existing system, please share the existing BMS system details.	It will be an Inependent System.Only material and equipment supplied by bidder for this tender will need to be integrated in the BMS and will be totally separate from existing BMS, The existing BMS system will work seperatily as it is.
16		Point No. 9 - Page No. 31	Chiller Rating	Screw type Air cooled chiller with VFD based minimum rating is 130TR, so can we consider 140TR*2 Nos, instead of 70TR*3 Nos	Bidder can propose as an alternative, however, all engineering should be in loop for the proposed system. The minimum capacity and reducndancy requirement shall be met with as per tender and design and project intent. Refer Corrigendum.
17		General Terms and Conditio ns on GeM 4.0 (Version 1.12) dt 16th August 2023 Page 33	18:- Limitation of Liability ii) In the event of any gross negligence or willful misconduct on part of either party, as finally judicially determined by a court of competent jurisdiction.	Reqest to kindly delete " **as finally judicially determined by a court of competent jurisdiction."**	No change
18		General-Suspension Clause		Request to add below:- 1. If the Buyer/C-DAC fails to comply with the provisions of this Contract, the Contractor/Seller may, after giving not less than 14 days' notice to the Buyer, suspend work or reduce the rate of work. If the Buyer subsequently cures the failure as specified in the notice, the Seller shall resume normal working as soon as is reasonably practicable. 2. If the Contractor/Seller suffers delay and/or incurs Cost as a result of suspending work (or reducing the rate of work) in accordance with this Sub-Clause, the Seller shall give notice to the Buyer and shall be entitled to an extension of time for any such delay, if completion is or will be delayed and payment of any such Cost, which shall be included in the Contract Price to Buyer/C-DAC. 3. If the suspension under this Sub-Clause continues for a continues period of 60 days then the Contractor/Seller may, upon giving 14 days' notice to the Buyer/C-DAC, terminate the Contract. Upon such termination, Seller shall be entitled to payment of amounts for the works already carried out and all other incidental costs incurred including costs of material already ordered or under production, cost of demobilizing and liabilities due to vendors and sub-contractors of the Contractor/Seller	No change

19		General-Termination Clause		Request to kindly include the below:- Either Party can terminate the Contract with prior written notice of 30 days to the other Party for any of the following reasons: a) Insolvency, receivership or bankruptcy proceedings are commenced by or against the Party; b) Party makes a general arrangement for the benefits of its creditors; c) Party abnormally delays or fails to fulfill its contractual obligations including, but not limited to, approval and timely payments etc. d) Any material breach or representations or warranties made was false or intentionally misleading when made. e) The occurrence of Force Majeure event continues for 3 months or above. f) Buyer fails to take delivery of material due to whatever reasons for more than 3 months. g) Repetitive suspension of work or equipment deliveries are withheld beyond 3 months	No change
				A change in Law of any Government Authority where performance of contractual obligations are not feasible or possible. Termination by EIL/Buyer for default- If the Contractor/ Seller is in default, this clause for termination can only be accepted for Notice of termination to be in writing Termination only in case of material breach and that to if it is not remedied within a predefined period of time. If possible, termination will be limited to only in respect of the part of the scope of work affected by the non-performance. scope of work.	
				Termination by Contractor/ Seller- The Seller can terminate/ cancel the Contract with prior written notice of 30 days to the Buyer for any of the following reasons:- a) Insolvency, receivership or bankruptcy proceedings are commenced by or against the Buyer; b) Contractor/Seller's payment are withheld /suspended beyond reasonable time limit. c) C-DAC/Buyer fails to fulfill its contractual obligations. d) Any material breach or representations or warranties made was false or intentionally misleading when made. e)Buyer assigns or transfers the Contract or any right or interest H29herein other than in accordance with the Contract. f)Persistently fails to timely comply its obligations including approval/ certifications of drawings, documents, measurements or other inputs. g) The occurrence of Force Majeure event continues for 3 months or above. h) Buyer fails to take delivery of material due to whatever reasons for more than 3 months. i) Repetitive suspension of work due to reasons attributable to Buyer. j) A change in Law of any Government Authority, where performance of contractual obligations are not feasible or possible. k) Buyer fails to provide encumbrances free land for Project work or access or approach is restricted. In any case of termination and/or project being scraped/purged	No change

				for whatever reasons, the Seller shall receive from Buyer the full payment towards all the work performed, including but not limited to, certified or not; all payments due towards confirmed commitments with respect to costs of materials, goods and services ordered by the Seller with its Sub-contractor or Sub-suppliers for performance of this Contract, including the once delivered at site and/or are under transit/ or under manufacturing at Sellers' manufacturing plant. The Seller shall also be entitled for payment with reasonable profit by the Buyer on the part of the terminated works; Payment of a sum representing 10% of the contract price as a termination fee. In addition, the Seller shall have all other rights and remedies to which he is entitled under this Contract and/or at law	
20		General-Export		We understood C-DAC will directly procure this materials as per Tender BOQ & these equipments will be installed in Chennai & Hyderabad Data center for C-DAC own use and C- DAC will not export these equipments to any other Countries in future.	Installtion at IIT Madras
21		General-Export		Request to kindly add below:- Export Compliance- The deliverables provided by Seller under this Contract contain or may contain components and/or technologies from the United States of America ("US"), the European Union ("EU") and/or other nations. Buyer acknowledges and agrees that the supply, assignment and/or usage of the products, software, services, information, other deliverables and/or the embedded technologies (hereinafter referred to as "Deliverables") under this Contract shall fully comply with related applicable US, EU and other national and international export control laws and/or regulations. Unless applicable export license/s has been obtained from the relevant authority and the Seller has approved, the Deliverables shall not (i) be exported and/or re -exported to any destination and party (may include but not limited to an individual, group and/or legal entity) restricted by the applicable export control laws and/or regulations; or (ii) be used for those purposes and fields restricted by the applicable export control laws and/or regulations.	No change
				Buyer also agrees that the Deliverables will not be used either directly or indirectly in any rocket systems or unmanned air vehicles; nor be used in any nuclear weapons delivery systems; and will not be used in any design, development, production or use for any weapons which may include but not limited to chemical, biological or nuclear weapons. If any necessary or advisable licenses, authorizations or approvals are not obtained, whether arising from inaction by any relevant government authority or otherwise, or if any such licenses, authorizations or approvals are denied or revoked, or if the applicable export control laws and/or regulations would prohibit Seller from fulfilling any order, or would in Seller's judgment otherwise expose Seller to a risk of liability under the applicable export control laws and/or regulations if it fulfilled the order Seller shall be excused from all obligations under such order and/or this Contract.	

22		General-Cyber Security		Request to add below:- Cybersecurity Obligations: Purchaser's Obligations for Its Systems: Purchaser is solely responsible for the implementation and maintenance of a comprehensive security program ("Security Program") that contains reasonable and appropriate security measures and safeguards to protect its computer network, systems, machines, and data (collectively, "Systems"), including those Systems on which it runs the Products or which it uses with the Services, against Cyber Threats. "Cyber Threat" means any circumstance or event with the potential to adversely impact, compromise, damage, or disrupt Purchaser's Systems or that may result in any unauthorized access, acquisition, loss, misuse, destruction, disclosure, and/or modification of Purchaser's Systems, including any data, including through malware, hacking, or similar attacks. Without limiting the foregoing, Purchaser shall at a minimum: (a) have qualified and experienced personnel with appropriate expertise in cybersecurity maintain Purchaser's Security Program, and have such personnel regularly monitor cyber intelligence feeds and security advisories applicable to Purchaser's Systems or Purchaser's industry; (b) promptly update or patch its Systems or implement other appropriate measures based on any reported Cyber Threats and in compliance with any security notifications or bulletins, whether publicly disclosed on SE's security notification webpage at https://www.se.com/ww/en/work/support/cybersecurity/se curity-	No change
23		Payment terms		Request you to accept these Below Payment terms: a. Mobilization advance - 20% of PO Value b. 70% on delivery of all materials c. 90% on Installation c. 10% on installation and commissioning with PBG	No change
24	Page No. 15 of 82	Scope Demarcation		Please confirm cctv and ACS high side item in whom scope ,please clarify	As per tender
25		General		Please provide the autocad file of drawings	Kindly contact mmg@cdac.in

Prasa Infocom and Power Solutions Private Limited

Sl NO	Ref	Section	Description	Query	Revised C-DAC Response
1	Pg. No. 15 Point No. 2		Scope Demarcation Scope of work Carried out by IIT Madras, Chennai to be excluded by the bidder - Insulation for false floor, false ceiling for all the area Scope of work Carried out by Bidder but not limited to - All works of interior civil, Raised flooring, false Ceiling, lighting, partition wall between the DC and electrical rooms and battery room shall be in scope of the bidder.	Request you to please clarify False Ceiling works under who's scope. Requesting CDAC to clarify the scope Demarcation	The entire False Ceiling work including but not limited to DC area, Battery room, Electrical room , passage area etc. is in bidders scope as per the tender. Refer Corrigendum.
2	Point No. 8.2.2 Page No. 21 & 22		Each UPS shall be of modular architecture with Power Unit & removable sub power modules rating 25kW to 50 kW. Achieve highest system protection.while it is UPS Modules must be of 30-50 KW Rating in each 500 kVA/kW power cabinet.	Requesting CDAC to approve 50 to 67KW or 25kW to 67kW module for UPS System	Tender specifications are a minimum requirement, bidders should quote systems which meet or exceed the standards and Specifications meeting or exceeding the design and project intent with due justifications. 25kW - 67kW can be accepted. Refer Corrigendum.
3	Pg. No. 65		Make List Li-Ion Battery	Requesting CDAC to Approve additional make of Delta & Exicom for Li-Ion batteries with compliance to necessary specifications	As per tender
4	LiB Data Sheet		Certifications - IBC International Building Code), CBC (California Building Code) & OSHPD (Office of State-wide Health Planning and Development for California Healthcare)	Request you to please elaborate the clause as we believe this is in case of building and not the data center work. Correct us if our assumption is wrong please.	Relevant NBC 2016 to be followed. Data center is also housed in a building and respective applicable clauses needs to be followed.
5	PA		PA specification required	Please confirm PA system needs to be standalone system integrated or Fully integrated with voice evacuation system along Fire alarm system.	PA system is not in the bidders scope.
6	General		System Specification for PA	Please share System specification and application area guidelines for design.	PA system is not in the bidders scope.
7	General		System Specification for PA	Please share System specifications and application area guidelines for design., Typical drawings shared in specification is noted for reference.	PA system is not in the bidders scope.
8	8.7		LT panels-ACBs and MCCBs	Specifications is very general. Requesting to please clarify the Parameters to be considered in the display of releases in ACB and MCCBs.	No specific display requirement. Tender specifications are given as a minimum requirement.
9	Page No. 34 Point 9.5.9		Minimum 8 FAN assemblies per unit are required	Requesting CDAC to accept Number of fans for In-row as per OEM design while complying to all the CFM requirements	Can be accepted. Refer corrigendum
10	Point No. 2.1 Page No. 23		UL RP 2986 - "Incident Arc Energy in front of product with top cover bolted and power module inserted or removed is <1.2 cal/cm^2"	Request you to accept as per individual OEM standards on this clause as the mentioned feature may be available with only one of the OEMs;	Can be accepted. Refer corrigendum

Technovous

Sl NO	Ref	Section	Description	Query	C-DAC Response
1	Page 17 / 5		Design of Data Centre	The testing and commissioning methodology with detailed set up shall be part of the technical submittal for approval- Need clarification	The bidders should submit the testing procedure with relevant instruments, loads, time schedule, formats for approval, before conducting the acceptance test
2	Page 18 / 5		Design of Data Centre(point. f)	Access Control System layout with technical data sheet of each item, Installation and O&M manuals of all important components.- Scope need to clarify.	Access control system will be given by IIT-M to bidder at site and the bidder will install (along with cabling) and commission as per the Installation and O&M manual of all important components.
3	Page 18 / 5		Design of Data Centre(point. g)	Surveillance camera placement plan and wiring , Installation and O&M manuals of all important components.- Scope need to clarify.	Cameras will be given by IIT Madras to the bidder at site and the bidder will install (along with cabling) and commission as per the Installation and O&M manual of all important components.
4	Page 21 / 8.1		Requirement towards electrical	(Cable Laying from existing transformer and DG set to Electrical room LT panel) scope need to clarify.	Scope is clearly given in tender documents. It will be done by IIT-M till LT Panel room
5	Page 40 / 10.1		Requirements towards IBMS	Supply and implementation of physical security (access controls including biometric), Motion sensors etc.	Scope is clearly given in tender documents. It will be done by IIT-M.
6	Page 42 / 10.4		Supply and implementation of fire alarm system	supply of Fire alarm system needs to include with agent release circuit or not clarification needed.	Required

7	Page 42 / 10.5		Supply and implementation of Video Surveillance	Supply of the CCTV surveillance need clarification	Scope is clearly given in tender documents. Supply will be done by IIT-M. Installation, commissioning and cabling will be done by bidder.
8	Page 5 / 7		Requirements towards Civil/Interior work	Kindly share the detailed specifications and construction guidelines for the superstructure along with the codal compliances need to follow on mandatory basis (if any)	As per tender loading conditions and specifications. Bidders can give their calculations for meeting the above conditions.
9	Page 5 / 7		Requirements towards Civil/Interior work	Kindly share the detailed specifications and construction guidelines for the sub structure along with the codal compliances need to follow on mandatory basis (if any)	As per tender loading conditions and specifications. Bidders can give their calculations for meeting the above conditions.
10	Page 44 / 11		Indicative Design Schematic (Sr.No. 2)	Instead of INRow (10kW is <3Ton) cooling, it is recommended to have PAC for the room cooling. PAC will have higher CFM and easy to maintain, it also can be connected with chilled water	Any alternative solution/ suggestions should be given with calculation and complete engineering suitable for this site including dehumidification system. We suggest to quote as per tender Specifications.
11	Page 16 / 3		Background	90% & 10% (RDHx & INRow) is mentioned in the tender, which needs clarity.	Read 99% and 1%, instead of 90% and 10%. Refer corrigendum.
12	Page 86 / Dwg Sheet No:- E1.0.0		Power Distribution Scheme drawing	Each Rack 32A 4P Tap off mentioned, need clarification	Refer revised SLD and quote accordingly.
13	Page 44 / 11		Indicative Design Schematic (Sr. No. 5)	Since RDHx doesn't have redundancy on product level or water inlet, it is highly recommended to have the capacity of the door 30% to 40% more than the actual. In case of door failure due to various reasons, RDHx door near to this rack should take the burden and work efficiently until the door is replaced.	Quote as per tender. Vendor is free to quote any value added solution with proper inputs and justifications.
14	Page 35 / 9.5.18		Requirements towards HVAC work	RDHx door should have intelligence to communicate the water flow, temperature, humidity, pressure, dew point, EC Fans etc... parameters instantly.	Quote as per tender. Vendor is free to quote any value added solution with proper inputs and justifications.
15	Page 43 / 10.8		Supply and implementation of Water Leak Detection system	RDHx piping should be under the floor with proper water leakage detection system in place.	Quote as per tender. Vendor is free to quote any value added solution with proper inputs and justifications.
16			General	Monitoring of the entire system through DCIM should be in place	Quote as per tender. Vendor is free to quote any value added solution with proper inputs and justifications.
17			General	As discussed in Pre-Bid Query, CDAC need to share Base structure drawing on the terrace to mount the Mechanical components.	Drawing is already provided in tender documents.
18			General	As discussed in Pre-Bid Query, Project timeline is estimated for 120 days from the date PO. We might require extension on the timeline based on the long lead items.	No Change

Valuepoint Systems Pvt. Ltd.

Sl NO	Ref	Section	Description	Query	C-DAC Response
1		**2.1.2 Section-II / Page# 3** c. Copies of at least one purchase orders or contracts completed and successful installation and completion reports in the name of bidder from the end client / end user, during last Five years for Data Centre work. Self-declarations will not be entertained.		As the requirement is very high end and a combination of UPS & AC, there may not be many qualified bidders. In view of larger participation from bidders, we sincerely request to modify this and the subsequent causes mentioned in this sheet as follows. *Copies of at least one purchase orders or contracts and installation reports in the name of bidder / OEM from the end client / end user, during last Five years for Data Centre work.* *In case of the PO copy is from OEM, where it is not directly released by the end client, an OEM declaration mentioning the delivery & execution of the project, on their letterhead is mandatory.*	No change
2		**2.1.2 Section-II / Page# 3** d. Copy of at least one purchase order from the end client/ end user for data centre facility management / O & M activities completed / ongoing as per eligibility para.		Request to modify the clause as follows: *Copy of at least one purchase order on bidder / OEM from the end client/ end user for data centre facility management / O & M activities completed / ongoing as per eligibility para.* *In case of the PO copy is from OEM, where it is not directly released by the end client, an OEM declaration mentioning the delivery & execution of the project, on their letterhead is mandatory.*	No change

3		**3 Eligibility Criteria** **3.3** The bidder / OEM must have successfully executed at end client sites at least 1 numbers of data centres in India in last five years. Each of the data centres should be with minimum of UPS feeding power of 400 KVA(excluding redundancy) and minimum feeding cooling load of 120 Tons(excluding redundancy) (UPS and cooling to be considered only for server area) along with Fire- fighting and suppression systems with high end integration of building management system and all the allied works required for successful installation & completion of the Data Centre. This order should be on the name of bidder issued by the end client.		Request to modify the clause as follows: *The bidder / OEM must have successfully executed at end client sites at least 1 numbers of data centres in India in last five years. Each of the data centres should be with minimum of UPS feeding power of 400 KVA(excluding redundancy) and minimum feeding cooling load of 120 Tons(excluding redundancy) (UPS and cooling to be considered only for server area) along with Fire- fighting and suppression systems with high end integration of building management system and all the allied works required for successful installation & completion of the Data Centre. This order should be on the name of bidder issued by the end client.* *In case of the PO copy is from OEM, where it is not directly released by the end client, an OEM declaration mentioning the delivery & execution of the project, on their letterhead is mandatory.*	No change
4		**3 Eligibility Criteria** 3.4 The bidder / OEM should have undertaken/ completed the activities of providing on-site support and facility management / O & M services to at least one data centre. The scope of the activity should cover operation and maintenance of Electrical Systems, Cooling systems (Chillers, PAC/PAHU /In ROW/RDHX etc.) UPS and Battery, IBMS etc. Bidder to provide the documentary evidence that minimum three technical manpower had deployed at site and maintaining electrical system and cooling system. Such Data centre having minimum cooling capacity of 100 Tons		Request to modify the clause as follows: *The bidder / OEM should have undertaken/ completed the activities of providing on-site support and facility management / O & M services to at least one data centre. The scope of the activity should cover operation and maintenance of Electrical Systems, Cooling systems (Chillers, PAC/PAHU /In ROW/RDHX etc.) UPS and Battery, IBMS etc. Bidder to provide the documentary evidence that minimum three technical manpower had deployed at site and maintaining electrical system and cooling system. Such Data centre having minimum cooling capacity of 100 Tons.* *In case of the PO copy is from OEM, where it is not directly released by the end client, an OEM declaration mentioning the delivery & execution of the project, on their letterhead is mandatory.*	No change
5		**3 Eligibility Criteria** 3.5 A summary of the projects implemented covering all the details must be enclosed with the Technical Bid.		Request to modify the clause as follows: *A summary of the projects implemented by the bidder / OEM covering all the details must be enclosed with the Technical Bid.*	No change

M/s. Vertiv Energy Private Limited

Sl NO	Ref	Section	Description	Query	C-DAC Response
1	Eligibility Criteria: 3.3		The bidder must have successfully executed at end client sites at least 1 numbers of data centres in India in last five years.	We requesting you to please consider Successful DC Completion in last 8 Years instead of 5 Years , As you aware FY 2020, FY 2021 went on Covid .	As per Tender

2	Eligibility Criteria:		The bidder must have successfully executed at end client sites at least 1 numbers of data centres in India in last five years.	We requesting you to please consider Bidder should have successfully completed implementation of similar projects (including the scope of supply and installation of Civil, electrical, HVAC, IBMS) of Data Centres in India, during the last 8 years. i. Two completed projects costing not less than Rs. 10 Crores each or ii. One completed project costing not less than Rs. 19 Crores	As per Tender
3	Eligibility Criteria: 3.11		The bidder must comply with the provisions of Office Memorandum: F/No/6/18/2019-PPD dated 23rd July, 2020, issued by Public Procurement Division, Department of Expenditure, Ministry of Finance, GoI or latest Notifications	Please confim, shall we submit Self Declaration stating duly adherence to F/No/6/18/2019-PPD dated 23rd July, 2020	Self-declaration to be submitted in the `format as published in the ATC'
4	Eligibility Criteria: 3.11		The copy of registration certificate or a declaration in compliance with the provisions stipulated in office memorandum F/No/6/18/2019-PPD dated 23 July 2020 issued by public procurement Division, Dept. of Expenditure, Ministry of Finance, GoI or Latest	Shall we submit GST Registration copy , please confirm	Self-declaration to be submitted in the `format as published in the ATC'
5	Eligibility Criteria:			We requesting you to please consider Bidder should have office presence in Chennai as a part of Eligibility Criteria.	As per Tender
6	Eligibility Criteria:			We requesting you to please consider TIER III Data Centre project Experience in India as Eligibility Criteria.	As per Tender
7	Eligibility Criteria:			We requesting you to please consider average annual financial turnover of the bidder during the last Five years ending 31.03.2022 should be at least Rs. 100 Crores in the Eligibilty criteria.	As per Tender
8	Eligibility Criteria:			We requesting you to please consider the bidder shall have experience in providing Facility Management Services for the physical infrastructure part of at least one Data Centres of Tier-III standard, for atleast 2 years during the last five years as part of Eligibilty criteria.	As per Tender
9	Eligibility Criteria:			We requesting you to please consider the Bidder must have on its roll at least 100 technically qualified professionals in the Non IT who have prior experience in providing the Data Centre Infrastructure maintenance services as on bid submission date. Bidder Must have at least following technical manpower on its role. i) 30 resources should be B.E/B. Tech/MCA ii) 10 resources should be B.E/B. Tech (Electrical & Mechanical) iii) At least (5) Five Project management professional with PMP or Prince-2 certified. iv) At least (3) Three CDCS/ CDCE/CDCP certified in the Eligibility Criteria.	As per Tender
10	Schedule of Requirement:		2. Scope Demarcation : CCTV, Access Control excluded by the bidder.	We presume all the Equipments like Camera, NVR, PuE Switch, Reader, Biometric, Access software, PC shall be excluded from our scope. Our part will be supply of Required cables for the above system, please confirm	Quote as per tender document requirement. Confirmed. But the PC for IBMS is in the scope of bidder.
11	Schedule of Requirement:		2. Scope Demarcation : CCTV, Access Control.	We requesting you to please share the Layout of Access control & CCTV system, same will help us to take the Cable Measurments.	Provided in tender documents
12	Schedule of Requirement:		2. Scope Demarcation : CCTV, Access Control.	We request you to please confirm the location where we are placing the BMS PC & CCTV NVR.	Location is within the exisitng BMS room
13	Schedule of Requirement:		2. Scope Demarcation : Partion between UPS Room & Server Room excluded by the bidder.	As per Scope of work by Bidder S.No. 1 : Mentioning Partition wall between the DC & Electrical Room & Battery room , Please confirm our scope in this .	Refer corrigendum
14	Schedule of Requirement:		2. Scope Demarcation : Civil	Our Scope shall be limited to SITC of Raised Floor & False Ceiling civil works inside the Server Hall. Please confirm.	Refer corrigendum
15	Schedule of Requirement:		2. Scope Demarcation : Civil	We request you to please confirm, the existing Toilet Area, UPS room we need to demolish the entire wall as well as Tiles after that we will use normal sand to level the Existing areas then we will use new Vetrified Tiles of 40X40MM , please confrim.	The work is in IIT Madras Scope

16	Schedule of Requirement:		7 Requirements towards Civil/Interior work: 7.2 METAL GRID CEILING:	We request you to please confirm shall we consider Metal Ceiling only in Server Hall & Balance area like Corridor, Panel & UPS Room shall we use Gypsum Ceiling or do we need to consider Metal Ceiling for all the Rooms, please confirm.	Quote as per tender specifications.
17	Schedule of Requirement:		2. Scope Demarcation : Fire-rated vision glass partition; Fire-rated steel doors for the server room, UPS room, and emergency doors	As per the Demarcation, Steel door, Partition's are not part of our scope, but in SOR pg No. 6 of 58, 7.5 & 7.6 stating detailed specification. Please confirm do we need to consider the Supply of Steel door & Partition in our scope.	Refer corrigendum
18	Schedule of Requirement:		Carpet Flooring	For Material Movement on the Corridor Existing carpet may get damage, please confirm shall we consider 600mm x 600mm Nylon Carpet Tiles only in front of DC Hall area , please confirm.	As per tender documents
19	Schedule of Requirement:		Steel Door	Emergency Exit door shall we consider Double Steel Fire Door, please confirm.	As per tender documents emergency exit door is in the scope of IIT-M
20	Schedule of Requirement:		Civil : Foundation for Storage Tank	Please confirm whether Foundtation of Storage Tank is part of our scope or not.	Refer corrigendum
21	Schedule of Requirement:		SOR: Page No.16 of 58, S.No. 8.4: AC wiring circuit:	RFP showing conduits shall be galvanized and shall conform to IS-2667, Please confirm shall we consider PVC conduit instead of GI.	No. please adhere to tender specifications.
22	Schedule of Requirement:		SOR: Page No.17 of 58, S.No. 8.8: Stainless Steel (SS)	As per RFP, we need to consider Cable Tray as Stainless Steel wiremesh only inside the Data Hall. Other area shall we Hot Dip Galvanised Perforated tray . Please confirm.	Confirmed. As per tender documents.
23	Schedule of Requirement:		Copper Cable	In SLD, from UPS Input panel to UPS showing 1CX185 Sqmm Copper Unarmored Flexible cable. Please note that Unarmored is as per IS 7098 & Copper Flexible as per IS 694 & hence both are not same . Please confirm shall we consider Flexible or Unarmored .	Consider Unarmored Copper cable as per IS 7098. Refer corrigendum
24	Schedule of Requirement:		SLD: UPS Input Panel	We presume Incoming cable for UPS Input Panel i.e 4R 3.5CX 400 Sqmm AL. Cable is not part of our scope. Only Outgoing Cables from UPS Input panel shall be in our Scope, Please confirm.	Yes, however termination is in the scope of bidder.
25	Schedule of Requirement:		SOR: Page No.17 of 58, S.No. 8.10: Sandwich Bus Duct	SOR, S.No.8.10 Shows Copper & S.No.2.4 shows Aluminium, Please confirm.	Refer corrigendum
26	Schedule of Requirement:		SOR: Page No.17 of 58, S.No. 8.10: Sandwich Bus Duct	We request you to please confirm Busbars designed based on the temperature rise only not as per current density. Ambient 40 Deg C (55 Deg C over the ambient)	Please quote as per tender documents.
27	Schedule of Requirement:		SOR: Page No.17 of 58, S.No. 8.10: Sandwich Bus Duct	We request you to please confirm Enclosure : 1.6mm thickness of GI with RAL 7032	Meeting the tender specifications. RAL 7032 & 7035 are both acceptable as per manufacturer's standards.
28	Schedule of Requirement:		SOR: Page No.17 of 58, S.No. 8.10: Sandwich Bus Duct	We request you to please confirmInsulation : Class F (155 Deg C) Mu	Can be accepted, except where do we get mica these days.... After 5 years when the warranty is over, only after that the insulation wears off..... then what will be the replacement?
29	Schedule of Requirement:		SOR: Page No. 34 of 58, S.No.2.1: SITC of ATS Panels, Isolator panels etc.	Those panels are not captured in the SLD, Please confirm.	These are for panels at local levels and will have to be designed and implemented as per Specification s. Hence include.
30	Schedule of Requirement:			Inside the Server Hall, please confirm the requirement of Cold Aisle or Hot Aisle Containment .	Not requried as per tender documents.
31	Schedule of Requirement:		RPDB & UPS DB	SLD shows 3CX1.5 Sqmm & 3CX4 Sqmm & 3CX2.5 Sqmm Cable as Outgoing connected to Direct Light power, Raw power & UPS . Please confirm do we follow this or do we need to consider Wires with conduit.	These cables are between the main panel and subdistribution DBs. Wires and conduits will be requried for the loop wiring.
32	Schedule of Requirement:		Power & Ligthing DB	SLD showing 6 WAY DB whereas Each Outgoing showing 4 Nos, please suggest.	spares are considerd. Please follow tender documents.
33	Schedule of Requirement:		7” touch panel display with new User Interface	Control display will be touch screen as per OEM design. The touchscreen display is used to show the operating parameters, such as fan speed, temperatures, and fan status.	As per OEM standerds
34	Schedule of requirement, Clause no. 9.5.18		Body shall be preferably GI powder coated with copper cooling coils and aluminium fins.	Cooling Coil will be of copper tube & aluminium fins, whereas sheet body will aluminum + GI powder coated based on machine construction design.	Acceptable.

35	Schedule of requirement, Clause no. 9.5.18		Performance at inlet 20°C water supply., 24°C air supply should give up to 45Kw. keeping the room at 22+/- 2 degC.	As per tender clause 9.1 , chiller has been designed CHW In/Out 20/15 deg C. As information is contradictory. Please clarify following for selection of RDHX . 1. Chilled water inlet/outlet temp to be considered for RDHX design. 2. Supply air temp/rack inlet temp required. 3. Cooling capacity required as specs mention in BOQ in equipment schedule list (serial no. 5) 40 KW & 45 kW both.	Refer corrigendum
36	Schedule of requirement, Clause no. 9.5.18		Product SafetyIEC 62368-1, IEC 60335-2-40, UL 1995, UL 60335-2-40, CSA C22.2 EMC : 61000-6-4, 61000-3-2, 61000-3-3 Shock & Vibe: Siesmic : 60068-2-27, 60068-2-64 Environmental: REACH, RoHS, CA PROP65	liebert DCD active fan module, CE Confirmation : As per European standard CE declaration for liebert DCD active fan module, conformity established through compliance with following standard. - IEC/EN 62040-1+A1: 2013. - IEC/EN 62040-2:2006. North American Confirmation : UL 62368-1:2014 DCD (Passive) coil is just mechnaical device without electonics & control.	Specification and standards or equivalent standards should be met with the tender specifications and intent. Regional standards due to location of the manufacturer's factory will not be considered a deviation.
37	Schedule of requirement,9.5		DX Based In Row Unit with CE+UL certification with inbuilt dual power supply:- Supply, installation, testing and commissioning of self-contained direct expansion type In Row units suitable for operation on R32 /R410a/R407C refrigerant & should have advanced microprocessor based. The unit shall be suitable for operation on on 230V, 50 Hz, AC supply.	All major components used are CE certified (Compressor, Fan etc). This complies safety requirements. ISO certification shall be provided. External dual contactor power logic option is available, mounted externally. Unit shall operate on 400V- 3Ph - 50Hz.	Specification and standards or equivalent standards should be met with the tender specifications and intent. Regional standards due to location of the manufacturer's factory will not be considered a deviation.
38	Schedule of requirement,9.5.2		The frame of the units is constructed of 16-gauge formed steel for maximum strength. The cabinet is serviceable from the front and rear. The front and rear exterior panels are constructed of 18 gauge perforated steel with 80% open free area. All panels, which include a key latch for safety and security, allow easy access and removal.	Unit shall be 1-1.5mm thick CRCA The perforated inlet and outlet panels will have 75% open area.	Cannot be 1- 1.5mm thickness. 1.5 to 1.6mm thickness can be accepted. 75% to 80% open area can be accepted but bidder should try to adhere to specs instead of small deviations.
39	Schedule of requirement,9.5.3		The machine should be inbuilt with the liquid receiver & pressure relief valve, Liquid line solenoid Valve, NRV for better performance of the machine.-	External liquid receiver can be provided as per the site requirement of indoor to outdoor distance. Kindly specify indoor to outdoor distance.	Quote as per tender documents. Layouts already available in tender documents. Receiver cannot be external. Can be either in indoor unit or in outdoor unit.
40	Schedule of requirement,9.5.4		Condensate Pump - : A condensate pump is factory wired and piped internally to the condensate drain pan. Within the condensate pump, there should be dual position float. The first position is used for condensate pump control and the other float generates a condensate pump failure alarm to prevent condensate pan overflow.	The Machine is inbuilt with Condensate drain pump internally wired & piped & will be with single float system. Also we are providing water leak detector sensor with each unit for water overflow detection.	Meeting the specifications and design intent. So acceptable.
41	Schedule of requirement,9.5.6		Electric heaters-Each packaged In Row unit shall be provided with multi stage heating elements constructed from aluminum. Electric heaters shall be of the low temperature totally enclosed strip type fitted with radiation fins . If overheating occurs, a safety thermostat should cuts off the voltage supply to the heaters and triggers an alarm. These elements are low watt density, wired for single-phase and loaded equally on all three phases, and electrically and thermally protected by both automatic and manual reset thermal cut outs.	Ceramic single stage PTC heater with overheat protection with automatic cut outs controlled by micro processor as per control logic.	If meeting specifications and intent, then acceptable.
42	Schedule of requirement,9.5.7		Filters-Filtration of conditioned air is very important to maintaining the clean, particle-free environment required inside Data Center. Filters should be easily replaceable from the unit. Filter efficiency should be greater-than 20% as ASHRAE 52.1. Filters are washable type and needs to meet HF-1 standards (as per ASHRAE 52.2).	We are providing higher class MERV8 (G4) class filter.	All equivalent standards or better than specifications, is acceptable.
43	Schedule of requirement,9.5.9		The unit should be equipped with variable speed, electrically commutated (EC), to allow for varying heat load. Variable Speed Fans shall be variable speed capable of modulating from minimum 20% to 100%. Each fan assembly shall consist of integral fan finger guards. Minimum 8 FAN assemblies per unit are required.	Unit shall have 4 nos of EC fan as per OEM design meeting the requirement.	The air flow and reducndancy has to be met with. Refer corrigendum.

44	Schedule of requirement,9.5.12		Humidifier-. The humidifier shall be capable of providing continuous auto modulation in steam generation as per the steam requirement per hour. The humidifier shall be fully serviceable with replaceable electrodes. This needs to be factory piped and wired, with cylinder and an automatic solid state control circuit. The humidification system shall automatically condition the passing air to a user-specified humidity setpoint. The reheat system, shall automatically work in conjunction with the condensate management system to temper the air to match the user-specified temperature and humidity setpoint.	The INROW machines being placed close to rack and being 100% sensible cooling machines so humidifier cannot be required. Also if the humidifier are operational there is chance of water droplet to deposit on the server. We request you to pl remove the same	Scope documents does not require humidifcation. Refer corrigendum
45	Schedule of requirement,11		As per clause no. 11, 2 x 35kW DX PAC with return air plenum and motorised dampers is mentioned, however there is no details provided in technical specification.	Kindly confirm if 35 kW PAC in scope, or provide specifications & design data for same.	Scope docuements are clear as 2x35KW DX PAC is in bidders scope. Refer corrigendum
46	Schedule of requirement, Clause no. 9.1		Air cooled chiller, variable speed screw type, suitable to deliver 70 TR at design conditions	For this capacity range we offer Multi scroll compressor with Dual circuit & IDV technology for high efficiency in part load conditions. We request to approve scroll compressor.	Refer corrigendum
47	Schedule of requirement, Clause no. 9.1		Quick restart feature and shall be able to reach to it’s maximum capacity within 120 Seconds.	Chiller will reach to 100% capacity within 150 secs from the time of power resumption.	Can be accepted. Refer corrigendum
48	Schedule of requirement, Clause no. 9.4		The finned coil heat exchangers shall consist of copper phosphorus deoxidised (Cu-DHP) tubes, having copper content 99.9%, made to EN 12735 parts 1 & 2, ASTM B280/b68/b743	Cu-DHP tubes is for Evaporator only.	Meeting tender specifications, hence OK.
49	Makes			We request you to please include the List of makes 1. Chiller - Vertiv 2. LT Cable - Avocab 3. GSS- Cryptzo 4. BMS- Vertiv	Refer corrigendum

Frontier

Sl NO	Ref	Section	Description	Query	C-DAC Response
1		3 Eligibility Criteria :	3.2 The bidder should be an entity registered in India under appropriate Indian Laws. Certificate for the same should be submitted along with the bid. 3.3 The bidder must have successfully executed at end client sites at least 1 numbers of data centres in India in last five years. Each of the data centres should be with minimum of UPS feeding power of 400 KVA(excluding redundancy) and minimum feeding cooling load of 120 Tons(excluding redundancy) (UPS and cooling to be considered only for server area) along with Fire- fighting and suppression systems with high end integration of building management system and all the allied works required for successful installation & completion of the Data Centre. This order should be on the name of bidder issued by the end client.	Request you to kindly include the below point, since VERTIV ENERGY will work through Vertiv authorized channel partners. Bidder/OEM, The order should in the name of Bidder, OEM, OEM authorised Partner.	No change
				Bidder/OEM, The order should in the name of Bidder, OEM, OEM authorised Partner.	No change

M/s Netweb Technologies India Ltd.

Sl NO	Ref	Section	Description	Query	C-DAC Response
1		Section 6	Eligibility Criteria - The bidder must have successfully executed at end client sites at least 1 numbers of data centres in India in last five years. Each of the data centres should be with minimum of UPS feeding power of 400 KVA (excluding redundancy) and minimum feeding cooling load of 120 Tons(excluding redundancy) (UPS and cooling to be considered only for server area) along with Fire- fighting and suppression systems with high end integration of building management system and all the allied works required for successful installation & completion of the Data Centre. This order should be on the name of bidder issued by the end client.	We request you to kindly consider the below: UPS feeding of 400KVA either by the client directly or by the bidder. Kindly allow for 80 Tons in lieu of 120 Tons of the Feeding cooling load.	No change
2		Section 6	Eligibility Criteria - The bidder should have undertaken/ completed the activities of providing on-site support and facility management / O & M services to at least one data centre. The scope of the activity should cover operation and maintenance of Electrical Systems, Cooling systems (Chillers, PAC/PAHU /In ROW/RDHX etc.) UPS and Battery, IBMS etc. Bidder to provide the documentary evidence that minimum three technical manpower had deployed at site and maintaining electrical system and cooling system. Such Data centre having minimum cooling capacity of 100 Tons	Kindly allow for Data centre cooling capacity of 80 Tons	No change

Annexure B – Corrigendum

Tender No: Tender No: GEM/2023/B/4132621 dated 26.10.2023

Sr. No	Reference	Tender Description	Corrigendum
		Section IV – Schedule of Requirement	
1	**4.6**	Electrical power and water during construction will be provided at one location. Client i.e. IIT-Madras shall not provide any accommodation for the contractor and his staff including labour.	Bidder to note the following standard operating procedure for projects to be executed within the IIT-M Campus No Labour camp or labour staying facility shall be within the campus. All labour and staff should submit their name, photographs, adhaar card copy and police verification certificate from the police station in related to the address in the adhaar card. Material movement in the road near IIT-M is not allowed before 10PM and after 6AM. Hence bidders to take note of this and plan accordingly. IIT-M will not allow material to come inside and be unloaded without the vendors supervisor present at site at the time of material arrival. Material movement within the campus is allowed 24hrs. Water shall be provided free at one point at site and at the time of water supply (continuous flow of water is not available). Hence, bidder will have to organise their water tanks/ drums to store and use as per their convenience. Quality of water shall be as it is, no special / treatment will be done by IIT-M. Bidder to follow all norms of safety and quality of panel board etc. as per IIT-M

Sr. No	Reference	Tender Description	Corrigendum
			standards for availing the power and water supply. Power for construction shall be provided free but will be metered and shall be given at one point only.
2	**Section IV, Clause 3**	Background, 3rd sentence: This data center should be energy efficient in which almost 90% of heat extraction from server racks is by Rear door Heat Exchanger and rest by In Row Coolers.	Change to: This data center should be energy efficient in which almost 99% of heat extraction from server racks is by Rear door Heat Exchanger and rest by In Row Coolers.
3.	**Clause 2**	Scope Demarcation	The partition wall between the electrical room and the server room will be in scope of IIT-M. Please read the scope of works in bidders scope 1st line as under: All works of interior civil, raised flooring, false Ceiling, lighting, partition wall between the DC and battery room shall be in scope of the bidder. Other than this - The scope of IIT-M is clearly mentioned in the tender scope demarcation. As per clause 4 of tender documents, - Rest all items/ works whatever may be required to complete the works and achieve the tender intent shall be in bidders scope including the foundation for the thermal storage buffer tank or any such scope not specifically mentioned in IIT-M scope. The respective heights of false floor, ceiling etc can be as per bidders final working

Sr. No	Reference	Tender Description	Corrigendum
			drawing which has to be submitted for approval with all services in place, before physically taking up the works at site.
4.	**Tender drawings**	Drawings – Electrical SLD - Chilled water schematic	Updated version is enclosed.
5.	**Bus Duct**	Sandwich Bus duct	Sandwich bus duct can be of Aluminium while the bus bars in the panels have to be of copper.
6	**Panel/ UPS**	Cable termination from bottom	Bidder can propose either top or bottom, however, the entire engineering has to be done for the solution provided.
7.	**UPS**	Module size – 25-50kW	25-67kW modules are acceptable.
7.1	**UPS**	UL RP 2986 - "Incident Arc Energy in front of product with top cover bolted and power module inserted or removed is <1.2 cal/cm^2"	The ratings can be as per respective OEM/ manufacturer's standards. However the NFPA standards should be followed as a minimum.
7.2	**UPS**	Battery backup	Battery backup to be provided for 10 minute throughout the life of 5 years for the rated capacity of UPS (both Non-IT and IT UPS)
8.	**Chiller**	120Sec to full load	Upto 150sec to full load can be considered.
9.	**Condensate pump**	2 point level controller	Though single point with additional safety provision can be accepted, 2 point is preferred.
10.	**DX-PAC**	Specifications	Attached.

Sr. No	Reference	Tender Description	Corrigendum
11.	**In Row Cooler**	Number of fans & Humidifier	Any number of fans are acceptable where the unit shall have at least 1 additional fan from the rated capacity ((N+1) redundancy). e.g. if 4 fans meet the requirement, then unit shall have 5, if 5 fans meet the capacity, then 6 will be required. Humidifier is not required. Only dehumidification & re-heater circuit. The system should be complete in all respects, the bidder can use external T&RH sensors and connect to BMS to send command to start and stop the unit to maintain the T&RH of the room as per the specified conditions. In case any bidder wishes to propose PAC/ Dehumidifier they can propose the same with complete drawing and operating logic to be fit within the available space and detailed specifications and operating logic.
12.	**Smoke Extraction Fan**	Specifications	Attached
13.	**10.9 Pg 44**	Novec 1230	Bidder can alternatively propose FK-5-12 System. Either of them are acceptable.
14.	**9.1**	Pumps – multiple stage	Pumps can be single stage or multiple stage. However the pump flow and head should be met with.
15.		Material of drain pipes	uPVC pipes and fittings shall be used for any plumbing works.
16.		Raise floor height	Raised floor height shall be 600mm or higher and should be able to accommodate all services below floor as planned. It should also be in level with outside level, else step up or step down provisions will also need to be considered by bidder.
17.		Chillers	Bidders can propose VFD screw /scroll compressor chillers. The alternate capacity chillers can be proposed. For each chiller

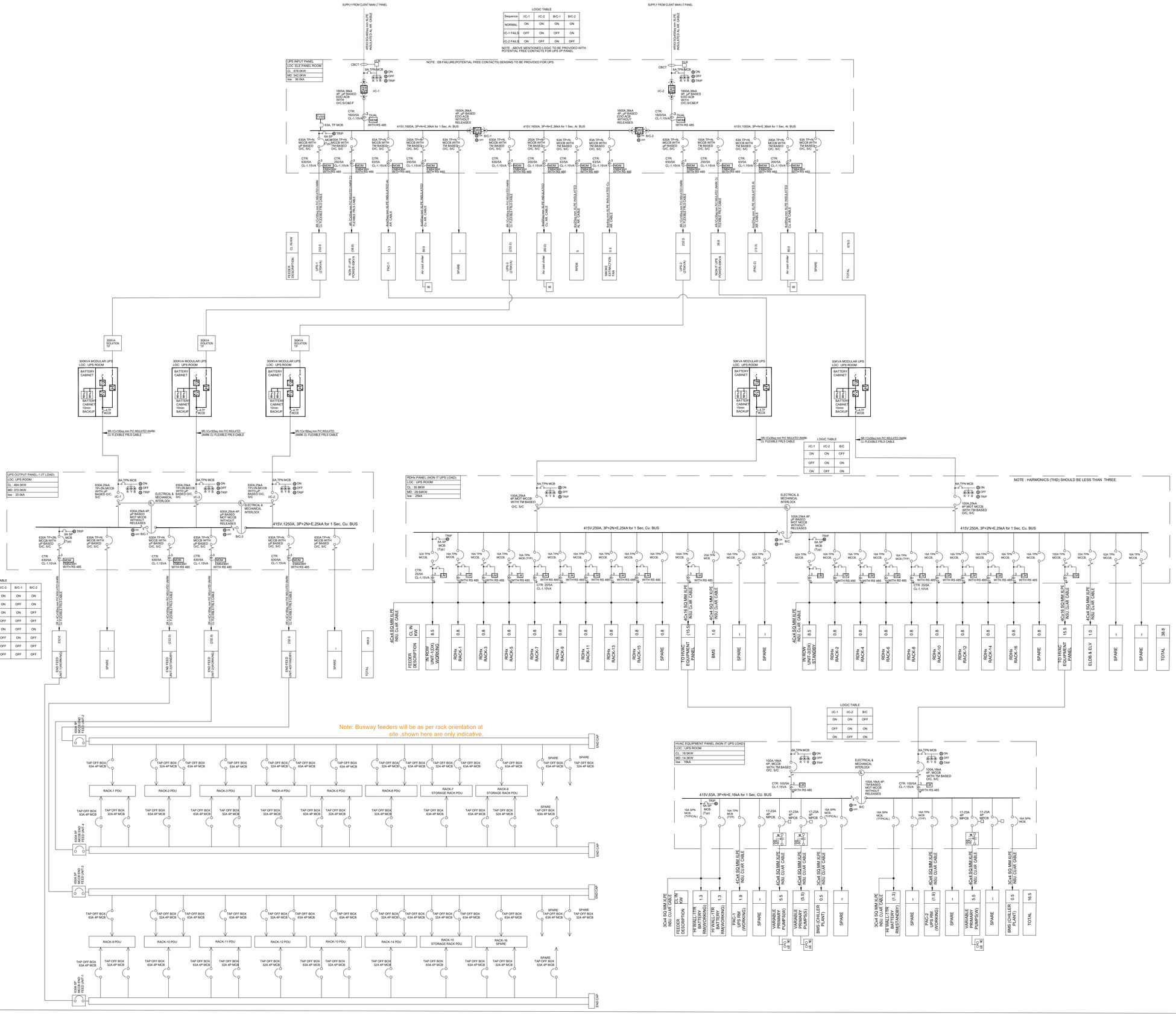
Sr. No	Reference	Tender Description	Corrigendum
			minimum 50% capacity should be variable , remaining should be fixed .The specification for variable speed etc should match tender requirement. Operating load of 140TR should be met with and have at least one same capacity chiller redundant i.e. (N+1) redundancy. All pumps, feeders piping valves etc should meet the above option. Solution should include complete engineering and close all loops. No additional claim is possible.
18.		Chilled Water Pipe Insulation	The external chilled water piping shall be insulated with EITHER PUF wrapped in polythene sheet and cladded with aluminium sheet of 26G OR with UV Protected cross linked polyethene sheet. For internal piping cross linked polythene pipe insulation is preferred.
19.		By-pass connection	The communicable BTU meter will need to be installed with isolation valves before and after the BTU meter and a bypass line with manual isolation valve of the same size of the header. Hence the online BTU meter if needs isolation for removal will need 3 valve isolation and bypass arrangement.
20.		Codes and Standards to be followed	Every manufacturer will have their relevant standard manufacturing practise and certification based on their respective factory locations. Hence, all equivalent standards and testing qualification meeting the tender criteria will be acceptable. Bidder to specify the relevant standards that their proposed manufacturer will be following at the time of bid for all items.
21		Fire Rated Doors	The bidders scope shall include the fire rated wall between the server room and battery room. The door connecting the battery room and the electrical room shall be fire rated and

Sr. No	Reference	Tender Description	Corrigendum
			is in bidders scope. All external doors are in scope of IIT-M.
22		False Ceiling Height	The bidder has to plan for the internal services and servers in the server room. Based on the services below the false floor, and the above the false ceiling + the racks and services within the server room, the bidder has to arrive at the server room false ceiling. Based on this calculations and drawings, the approval shall be given for the false floor and ceiling heights. Being an existing facility the existing constraints will play a major role in this decision.
23		Copper Cables	Copper power cables installed in the UPS room shall be Copper Unarmored as per IS 7098.
24		RDHx capacity in BOQ	Consider 42kW cooling capacity under the specified conditions instead of 40kW mentioned.
24.	**RDHx**	General specifications to be adhered	The RDHX should ensure optimum thermal and energy performance by removing the heat generated by the active IT/compute equipment directly at source, preventing hot exhaust air entering the data center/server room. It should work independent of IT equipment fan speed to route the warm air flow to the cold-water heat exchanger utilizing chilled water temperature. The heat from the warm exhaust air flow from the IT components need to be dissipated by way of the water heat exchanger with active EC fans mounted on the cooling door ad shall have one additional fan of same rating as inbuilt redundancy. RDHX be fitted to the back of rack , Should be compatible with Rack of 800mm width and height of 45 U. RDHX should not occupy space in the rack, the full server rack is thus available for the IT equipment. The solution for active EC fan

Sr. No	Reference	Tender Description	Corrigendum
			should be self-sufficient with inbuilt controller and sensors to control the flow of water and fan speed depending on temperature data monitored through various sensors mounted in front and rear of the RDHx doors. The Cooling capacity (for sizing purpose) should be 42KW as a minimum but preferred upto 45kW of IT load with 20oC water inlet temperature to the heat exchanger coil in terms of kW with exit air temperature not higher than 24oC. RDHx must work accordingly to the IT load variations in the rack to optimize energy consumption. There should not be any over cooling or undercooling irrespective of rack IT load. It should be possible to replace the defective fan without stopping the entire system. Controller should ensure adequate cooling to be delivered. Intelligent RDHx must have in built controller inbuilt within the chassis of the RDHx and receive the feedback from temperature sensors installed at various points (front, rear, and exhaust) and displayed on a graphic screen and based on the feedback, controller automatically adjust the fan speed, water flow rate. Fans must be driven by EC motor and be IP44 rated,. Unit Noise should not cross more than 60 dBA @ 1 metre at full load condition and Unit Noise should not cross more than 48 dBA @ 1 metre at normal load condition (30% to 50 % fan speed). RDHX should comply with min IP21 rating and compliance with standards like CE, UL. The RDHx control system should be able to mix and match the water flow and the fan speeds to always maintain the required outlet temperature and RH within tolerance limits from the door and display the same in the graphic display board. Vendor to submit the Certificates for the claimed standards and compliances at the time of submission. System should ensure free from condensation

Sr. No	Reference	Tender Description	Corrigendum
			which operates above dew point temperature of water inside the environment. Supply and return hose to be made from either SS flexible pipe or a mix of galvanized wire, fabric and rubber silicone offering ultra-pliable hoses with a smaller bend radius than most other hoses available, which help prevent twisting while offering the benefit of additional flexibility. Hose testing certificate with pressure of minimum of 7 bar & theoretical burst minimum at 10 bar or more to be submitted. RDHX should have communications protocols in built to suit the BMS requirement preferably BACNET. Connection of hose pipe should be from bottom and at connection point at most care to be taken to protect IT hardware incase water leakage inside rack. Air inlet temperature to be considered at full load as 38 Deg C +-2 and from RDHX in the room will be 22 Deg C +- 2 Deg C. Rack size of 45 U to be considered. Adapter plates need to be considered in case the RDHX is of 42U size. Provide the selection sheet and data sheet to meet the specifications.
25.	**General**	Additional Makes of Equipment	RDHx – nVent, Vertiv, Usystems, Swegon Blue Box, CoolIT PAC – Vertiv, Schnieder, Blue Box, nVent, Rittal, Legrand (USystems). Pressurised Expansion Tank – Anergy, Grundfos. Chiller – Vertiv, Schnieder, Swegon Blue Box. XLPE Thermal Insulation – Thermobreak Smoke extraction fan – Systemaire, Greenheck. LT cables – Polycab, Universal, KEI or equivalent.

Sr. No	Reference	Tender Description	Corrigendum
			GSS – Honeywell, HD Fire, Earthlink, Siemens BMS – Siemens, Honeywell, Schnieder,Vertiv equivalent. NOTE: The above makes above and in the tender recommended make list are given as a guidance and recommendation, the bidder should meet all the tender requirement and specification as a minimum even if they are offering from the mentioned recommended make list of tender documents.
26.	**General**	Bidder Instructions	Bidders to note and submit the following along with the tender documents – Heat load estimation of the DC and UPS room. Including dehumidification load for DC room. Chiller data sheets, chilled water pump data sheets, PAC Data sheets, InRow Cooler Data sheets, RDHx Data sheets selected and proposed. Load calculation and UPS selection sheet for both IT and Non-IT UPS. Load calculation and battery selection sheet. Buffer tank sizing calculation sheet. NOTE: all selection and calculation should be based on ASHARE n=20 basis. Data centre PUE estimate Bidders to note that post the award of tender they have to submit the final selection along with all detailed calculations, data sheets and drawings for approval without which they cannot deliver the material/ equipment.



LEGEND :

SYMBOL	DESCRIPTION
	ELECTRICALLY OPERATED AIR CIRCUIT BREAKER (ACB) O/C & S/C WITH MICROPROCESSOR RELEASE
	MANUALLY OPERATED MCCB WITH O/C & S/C, THERMAL&MAGNETIC RELEASE
R Y B	PHASE INDICATOR LAMPS
ON OFF TRIP	PUSH BUTTON SWITCHES WITH FEEDER STATUS INDICATOR LAMP
3	CURRENT TRANSFORMER
MDM EM-6400	MULTI DATA METER
MDM EM-6436H	MULTI DATA METER
	MINIATURE CIRCUIT BREAKER
IL	INTERLOCK
3M	STARTER WITH AUTO MANUAL CHANGER OVER FACILITY
	REMOTE PUSH BUTTON STATION
63	ISOLATOR

NOTE:-

1. UPTO 160AMPS MCCB ARE WITH THERMAL MAGNETIC & ABOVE ARE WITH MICROPROCESSOR.
2. THE INTERLOCKING AND SEQUENCE OF OPERATION SHALL BE APPROVED DURING THE SHOP DRAWING APPROVALS.
3. CTR IS INDICATIVE, DETAILED CALCULATION SHALL BE PROVIDED BEFORE PROCUREMENT.
4. CONTROL AND PROTECTION FOR INDICATING LAMPS AND INSTRUMENTATION SHALL BE THROUGH 4P (3ø) & SP MCB UPTO PANELS FOR 35KA AND 4P (3ø) MPCB ABOVE 35KA.
5. BUSWAY TO RACK TERMINATION CABLE WILL BE SUPPLIED AS PER BUSWAY MANUFACTURER STANDARD LENGTH.

REV	DESCRIPTION	DATE
R5	BUS COUPLER ADDED IN MAIN LT PANEL	09.11.23
R4	BUS WAY FEEDER DISTRIBUTION UPDATED AS PER REQUIREMENT	12.09.23
R3	REVISED AS PER THE LATEST HVAC LOAD LIST	01.09.23
R2	B/C ADDED FOR UPS O/P PANELS	20.06.23
R1	UPDATED AS PER RDHx OPTION	15.06.23
R0	PRELIMINARY DRAWING	26.05.23

CLIENT:

CDAC
Centre for Development of Advance Computing

PROJECT:

IIT MADRAS, CHENNAI

MEP CONSULTANTS:

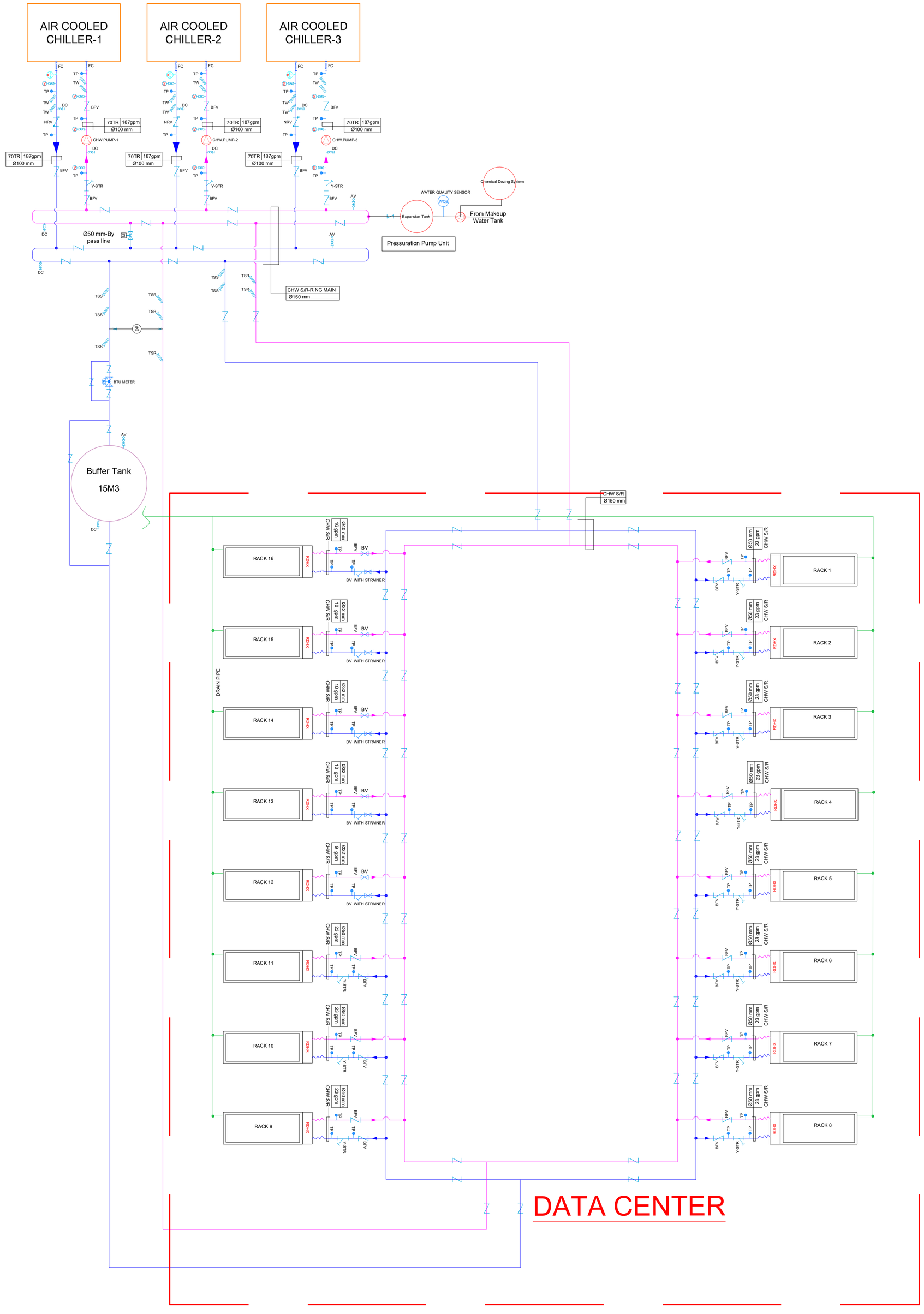
DRAWING DESCRIPTION :

POWER DISTRUBUTION SCHEME

SHEET NO :

E1.0.0

PURPOSE : PRELIMINARY DRAWING	DATE :12.09.2023
DETAILED : PS	REV : R4
CHECKED : GP	PLOT SIZE : A1
SCALE : NTS	
JOB No :	



ACCESSORIES LEGENDS

BFV	BUTTERFLY VALVE (ABOVE 40NB)
BV	BALL VALVE (20-40NB)
MV	MODULATING VALVE
	STRAINER WITH BALL VALVE
NRV	NON RETURN VALVE
Y-ST	Y STRAINER
FS	FLOW SWITCH
TP	TEST POINT
PG	PRESSURE GAUGE
TW	THERMOWELL
AV	AIR VENT
DC	DRAIN VALVE
IV	ISOLATION VALVE
FC	FLEXIBLE CONNECTION
FC	FLOW METER
TSS	TEMPERATURE SENSOR -CHWS
TSR	TEMPERATURE SENSOR -CHWR
DP	DIFFERENTIAL PRESSURE SENSOR
	FLEXIBLE CONNECTION

PIPE LEGENDS

CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
DRAIN	DRAIN PIPE

REV	DESCRIPTION	DATE
R2	PRELIMINARY DRAWING	11.12.23
R1	PRELIMINARY DRAWING	10.11.23
R0	PRELIMINARY DRAWING	31.08.23

CLIENT:

CDAC
Centre for Development of Advance Computing

PROJECT:

IIT MADRAS, CHENNAI

MEP CONSULTANTS:

DRAWING DESCRIPTION :

CHILLED WATER SCHEMATIC

SHEET NO :

M0.0.0

PURPOSE : PRELIMINARY DRAWING	DATE :11.12.2023
DETAILED : AD	REV : R2
CHECKED : RS	PLOT SIZE :
SCALE : NTS	A1
JOB No :	

A. Specifications for Precision air System (PAC)

Supply, installation, testing and commissioning of self-contained direct expansion type Precision air conditioning units suitable for operation on R410a refrigerant & should have advanced microprocessor and electronically communicated. Modular construction Precision air conditioning unit suitable for operation on R-410a refrigerant with top discharge arrangement consisting of inlet filter, draw through direct drive Electronically commutated Motors and Backward curved Plug fans, fan motor assembly to deliver desired air quantity, Inverter / Variable Flow Scroll , Direct Expansion Cooling Coil, Heater banks to maintain humidity inside the space, condensate drain pan of stainless steel construction, Microprocessor panel, programmable control complete with display. The unit shall be suitable for operation on 415 V, 50 Hz, AC supply. The controller unit should also be capable of starting the standby other DX base unit in case the temperature is not able to achieve with the working units. For Basis of Design Bidder to consider site ambient data along with following parameters.

Equipment Parameters

- Equipment air inlet: (Outlet from unit): 22 DegC +/- 2 Deg & 50% RH
- Machine configuration: Top discharge
- Actual Capacity: As provided
- Flow Direction: Top discharge
- Machine Capacity control: Return Air
- Compressor type: Scroll compressor and will be inverter/ digital.
- Evaporator Fan: Blades with Electronically commutated (EC) motor
- Humidification & De-humidification: In built feature of humidification & dehumidification
- Filters: Filter to be provided on the Package unit, having 95% efficiency down to 5 Microns.

The refrigerant controller shall ensure that if RH is high, the refrigerant flow or dew point reduction is managed to dehumidify the air and get the desired RH conditions. Write in this regard should be submitted.

Base panel shall be constructed out of galvanized steel and painted with epoxy powder coated. Unit shall be complete with space for refrigeration equipment, fans, cooling coils, liquid receiver, Liquid line solenoid Valve, NRV and multistage strip heaters and modulating Humidifiers with air cooled condenser unit. Unit shall be provided with welded tubular steel floor stand with adjustable legs and requisite vibration isolation pads.

The units should be equipped with direct driven backward curved EC radial fans with electronically commutated brushless motors. The technology employed by these motors allows straightforward control of fan speed by means of the electronic controller in order to obtain adjustment of air flow rate and static pressure to ensure correct distribution of the treated air. The filter chamber shall be an integral part of the system and withdraw able from the front of the unit. Low airflow and clogged filter alarm sensors consisting of two pressure switches for controlling the operating conditions of the fans and the build-up of dirt on the air filters inside the unit. The motor's high efficiency should make for less energy absorption, especially at partial loads and during starting (lowering of peak current), which means a reduction in power consumption of approximately 30% compared to AC motor. The motor shall have minimum IP54 Protection. Evaporator Coil Precision packaged unit shall

comprise of cooling coil of copper tubes expanded into aluminium fins with corrugated profile and hydrophilic treatment. Face and surface areas shall be such as to assure rated capacity

and the air velocity across the coil. Complete Coil should be fully accessible from front. Drain pan shall be made of stainless steel with nitrile rubber insulation.

Scroll Compressor

The compressor shall be of the high efficiency scroll design operating with R410A refrigerant and 415V/3~/50 Hz supply. The compressors are provided with integrated thermal overload protection. The compressor motor control driver is provided with integral electronic protection against over temperature, over current, over or under-voltage with absence of one or more phases. The compressor shall be charged with mineral oil and designed for operation on environment friendly refrigerantR410a.The machine should be inbuilt with the liquid receiver & pressure relief valve, Liquid line solenoid Valve, NRV for better performance of the machine. The refrigeration system shall be of the Single/ Multiple circuit direct expansion type and incorporate hermetic scroll compressors, complete with crankcase heaters. Scroll compressors should be variable flow.

The refrigerant circuit comprises:

- Liquid receiver inbuilt in the indoor/ outdoor unit
- Electronically- controlled expansion valve (EEV)
- Solenoid valve for shutting off the refrigerant liquid
- Refrigerant liquid flow indicator
- Solid cartridge freon filter
- Safety valve
- High pressure safety pressure switch with manual reset
- Low pressure switch with automatic reset
- Copper refrigerant pipes with anti-condensation insulation on the suction line
- Pipe taps on suction and delivery side and charging valve on liquid side.
- Each Compressor / refrigerant circuit to have its own independent Evaporator coil and Condenser coil.

Electronic Expansion Valve (EEV)

The unit should have Electronic Expansion Valve and should be capable of responding to the varying load conditions. It should be able to provide following advantages:

- Fast, high precision adjustment of refrigerant flow;
- Fast arrival of the unit at steady-state conditions;
- Superheating value remains constant in variable thermal load conditions;
- Efficient operating conditions of the compressor, especially in the presence of low room temperatures;
- Wide working range with consequent extension of the unit's operating limits. These properties result in enhanced performance of the unit and make it possible to obtain very significant energy savings.

Condenser shall be air cooled type, suitable for outdoor installation and shall be suitable for operating at high ambient of 45 C DBT (db) and at low ambient of up to 0^{o}C DBT. The condenser shall be complete with provisions for refrigerant piping connections, shut off valves fan controls, electrical connections, receiver, and any other standard accessories necessary with the equipment supplied.

Each Circuit to have its independent set of condenser coil. Location of condenser unit will be next to Data Centre external wall. Condenser shall be designed for the required refrigeration capacity plus the heat of compression and at least 10^{o}C sub cooling, considering designed summer ambient conditions.

Electric heaters-Each packaged unit shall be provided with multi stage heating elements constructed from aluminium. Electric heaters shall be of the low temperature totally enclosed strip type fitted with radiation fins. If overheating occurs, a safety thermostat should cut off the voltage supply to the heaters and triggers an alarm. In case the RH is still high, the refrigeration circuit should be capable of going into dehumidification cycle as described below.

Humidifier, if specified, shall be with boiling water in a polypropylene steam generator to provide humidification. The humidifier shall be capable of providing continuous auto modulation in steam generation from 30-100% as per the steam requirement per hour. The humidifier shall be fully serviceable with replaceable electrodes.

Waste water shall be flushed from the humidifier by initiation of water supply valve via U-trap. The microprocessor should be able to display the current drawn and actual steam output in the microprocessor.

De-humidification cycle shall operate by keeping the airflow constant but with the help of EEV to reduce the ADP of the coil. The system shall be provided with relevant water detection kit which shall have sensors with wire of minimum 1.5mtrs and each of the sensor must be capable to detect individually any water below the false floor near the unit, the sensor must be connected to the unit microprocessor thus enabling the controller to give an alarm in case of wet floor. -A microprocessor shall continuously monitor operation of each room air-conditioning unit continuously digitally display room temperature and room relative humidity, alarm on system malfunction and simultaneously display problem. When more than one malfunction occurs, flash fault in sequence with room temperature, remember alarm even when malfunction cleared, and continue to flash fault until reset.

Each of the unit shall be inter communicable to auto change over from working to standby mode as per the set operating logic/ cycle hours.

The unit shall be complete with motorised ON/ OFF damper to prevent the short circuiting of the air from the working unit to the standby unit and back. This damper shall be interlocked to keep the position in OPEN/ CLOSED position based on unit operating or in standby mode.

The unit shall be connected to supply air plenum with grilles for direct discharge in the direction of the room and plenum with grilles and vibration isolator shall be part of the scope of supply.

Microprocessor to control the following functions:

- Room Temp temperature
- Humidity (HH versions)
- Speed of the delivery fans
- Timing of compressors with automatic rotation
- Alarm signal on two levels
- Controlled automatic reset of high- and low-pressure alarms.
- Damper OPEN/ CLOSED position.
- The machine should be programmable to set the rotation time between the working & standby units as per client requirement.

B. Specifications for Smoke extraction fan

System completes with Double inlet and Double Width (DIDW) backward curved blower or Tube Axial Fan. Fan should be manufactured in line with Air Movement and Control Association International, Inc (AMCA) certification requirements. The fan should be fire rated for 250^{o}C operation for 1 hour at least. Totally enclosed, fan cooled, provided with Class H insulation. Fans shall be provided with TEFC Sq. cage direct driven, Class H insulation motor, suitable for 415 V+/-10 %, 50 Hz, 3 phase supply. Fan must be selected for minimum consumption and maximum efficiency.

Fire Damper, wherever specified should be with minimum 2 hours fire rating. The damper shall be constructed out of 16 G galvanized sheet steel. Damper control and monitoring operations shall be through BMS.

The fan shall be suitable for working in -ve pressure for suction of smoke from remote corner of the room.

NATIONAL SUPERCOMPUTING MISSION

INFRASTRUCTURE | APPLICATIONS | R&D | HRD

Centre for Development of Advanced Computing

A Scientific Society of Ministry of Electronics & Information Technology,

Government of India

Innovation Park, Panchavati, Pashan Road, Pune - 411008

Tel: +91-20-25868086 / 25503673-675

www.cdac.in

Additional Terms Conditions & detailed scope etc. to be read with GeM bidding Document & will be binding on the prospective bidders.

GeM Bid No & CDACP/NSM-DC-IIT-MADRAS/23-24/393

CDAC, Pune invites `ONLINE' bids for Design, Site Preparation, Supply, Installation, Testing, Commissioning, and AMC services of Basic Infrastructure for the establishment of a Data Center at Indian Institute of Technology (IIT) Madras, Chennai

Name of the Institute:	Centre for Development of Advanced Computing, Pune 411007.
Place of Supply, Installation & Commissioning, Support etc.	Indian Institute of Technology, IIT Madras, Chennai Name:- R. Thiruneelagandan Email:- neelu@iitm.ac.in Location: Computer Centre Mobile-9444396142
Date & Time of site visit & Pre-bid meeting.	8 November, 2023 – 1100hrs. Onwards. **(At Site, IIT, Madras).**

Instruction for Online Bid Submission:

The bidders are required to submit soft copies of their bids electronically on the GeM Portal. More information useful for submitting online bids on the GeM Portal may be obtained at: https:// Government e Marketplace (GeM) | National Public Procurement Portal, Government of India (gem.gov.in). For any queries at: helpdesk-gem[at]gov[dot]in Toll Free Numbers (Inbound): Call 1800-419-3436 / 1800-102-3436(9:00 am - 10:00 pm Mon to Sat)Helpdesk Outbound No's :0755-6681401, 0755-6685120, 011-69095625, 011-69095640 Railway Helpline: 011-44022666 Defence Helpline: 0755-6681450 Helpdesk Walk-In Address: 2nd Floor, Jeevan Tara Building, 5-Sansad Marg, Near Patel Chowk, New Delhi-110001. (9:00am-06:00pm Mon to Fri) For Seller related tutorials visit https://gem.gov.in/training/videos/sellers.

SECTION I – INVITATION OF BIDS

1 Introduction

This RFP is being floated to select the most appropriate vendor to build & operate the Data Center for a period of two years. The model of the proposed Data Center (DC) should be capable of enhancing capacities by incrementally augmenting the infrastructure. The monitoring of the proposed DC is planned through an Integrated Building Management System (IBMS) and therefore, the equipment's to be installed in the proposed Data Centre should be BMS compliant. As a part of this project, C-DAC invites on-line bids from eligible bidders for supply, installation, commissioning and CAMC Services of Data Centre Solutions etc. on turnkey basis, as per the requirements stipulated in this document, at the Locations given below:

Indian Institute of Technology Madras
IIT P.O., Chennai 600 036, INDIA

2 Two Bid (e-Packet) System:

The bids must be uploaded on-line through GeM portal, as per GeM portal / policy

2.1 e-Packet No. 1: TECHNICAL BID

2.1.1 Section-I

a. **Annexure G**: The contents must be organized & submitted as per the Annexure G with proper page nos containing the required information/data etc.

b. Covering Letter, as per **Annexure – A.**

c. Authorization letter (on bidder's letterhead) issued by the competent authority of bidder, authorizing the signatory to sign on behalf of the bidder, as per **Annexure – B.**

d. The Undertaking on bidder's letterhead, towards EMD as per format given in **ANNEXURE-F**

2.1.2 Section-II:

a. A copy of Certificate of Incorporation, Partnership Deed / Memorandum and Articles of Association / any other equivalent document showing date and place of incorporation, in India as applicable.

b. A copy of GST registration certificate.

c. Copies of at least one purchase orders or contracts completed and successful installation and completion reports in the name of bidder from the end client / end user, during last Five years for Data Centre work. Self-declarations will not be entertained.

d. Copy of at least one purchase order from the end client/ end user for data centre facility management / O & M activities completed / ongoing as per eligibility para.

e. The self-certified copies of audited balance sheets or the certificate/s from a Chartered Accountant for last three financial years indicating the annual sales turnover.

f. A photo copy of the commercial bid actually submitted **without prices** (prices masked) and copy of commercial terms and conditions (in detail) as included in the commercial bid. C-DAC reserves

the right to reject the bid in case of any discrepancy observed in the un-priced commercial bid and the actual commercial bid.

g. Manufacturer authorization certificate as per **Annexure-C** for UPS and batteries, LT panels and associated component, Chiller, In Row , BMS Software, Pumps, Gas Suppression System, etc., issued by respective OEMs.

h. The copy of registration certificate or a declaration in compliance with the provisions stipulated in office memorandum F/No/6/18/2019-PPD dated 23 July 2020 issued by public procurement Division, Dept. of Expenditure, Ministry of Finance, GoI or Latest.

i. Certificates from respective OEMs, as per format given in **Annexure –I,** declaring the country of OEM, country of manufacture and percentage of local contents for UPS and batteries, LT panels and associated components, Chillers, In Row Units BMS Software, Pumps, VFD Drives, Gas Suppression System etc.

j. Self- certificate form the bidder towards compliance with the provisions of order No. P-45021/2/2017-PP (BE-II). Dated 4th June, 2020 issued by Public Procurement Division, Department of Investment and Internal Trade, Ministry of Commerce, GoI or latest.

k. All the necessary documents in support of eligibility criteria

2.1.3 **Section-III:**

a. The executive summary of the bid submitted.

b. Duly filled Technical Bid (covering the details of solution, detailed bill of material, bill of quantities, technical specifications, makes and models of items, diagrams, layouts, all drawings etc.)

c. The details of electrical power consumption, foot-print, ambient temp, temperature range targeted, cable schedule along with voltage drop calculations, battery sizing and back up calculations etc.

d. Design Basic Report along with annual average Power Usage Effectiveness (PUE) calculations for 25%, 50%, 75% and 100 % of IT load.

e. Design basis and analysis of cooling solution at full and partial load conditions including complete details, assumptions made and the specific references/standards used for the same. Applicable derations while selecting the chillers and bidder to submit selection of the product considering site ambient conditions as per ASHRAE.

f. Technical Compliance matrix against all details requested.

g. The printed catalogue / leaflet/brochures published by the principal manufacturer of the items quoted to be submitted along with the Technical Bid.

h. Legal / statutory permissions required, if any.

2.2 **e-Packet 2: FINANCIAL BID**

The Financial Bid complete in all respects with all details filled as per BOQ.xls format given in GeM Portal.

Note:

All the documents listed in e-packet-1 (Section-I, II & III) must be arranged in the flow / in sequence as mentioned as per **Annexure-G** strictly.

C-DAC reserves the right to reject the bid, if any of the above listed documents are not submitted.

3 Pre-Bid Meeting – Date/ Time/ Venue / Online:

The pre-bid meeting will be held **at Site** as given in schedule to sort out/resolve queries raised by the prospective bidders regarding the GeM Bid scope, conditions, terms & conditions etc. The prospective bidders requiring any clarification of the bidding document may send their queries in writing through e-mail in the format given below. C-DAC, Pune will respond to these queries during the pre-bid meeting. The queries/doubt/clarifications etc. must be sent at least one days prior to the date of pre-bid meeting.

Name of the bidder:			
Sr.	**Section / Page/ Clause Reference**	**Query from bidder**	**C-DAC Response**
1			
2			

4 Last Date of submission of bids:

Last date for submission of e-bids through GeM portal shall be as per given in GeM Bid Schedule.

5 Opening of on-line e-bids

The technical e-bids will be opened through GeM portal**.**

6 Opening of commercial e-bids:

Commercial e-bids of the qualified bidders only will be opened. The decision of C-DAC's bid evaluation committee in this regard will be final and binding on bidders. C-DAC's bid evaluation committee will be authorised to take appropriate decision on minor deviations, if any.
The date, time of opening of commercial bids will be declared on GeM portal/policy to the qualified bidder. The financial bids will be opened `on-line' through GeM portal/GeM portal/app.

(END OF SECTION I)

SECTION II – INSTRUCTIONS TO BIDDERS (ITB)

1 Locations for Supply, Installation, Commissioning, Warranty Services & AMC Services

The entire data center solutions as described in Schedule of Requirements must be supplied, installed, commissioned & supported at

Indian Institute of Technology Madras, Chennai - details as per the Bid Schedule.

2 Order Placements & Payment by

The orders will be placed and payments shall be released by
Centre for Development of Advanced Computing (C-DAC),
Innovation Park, Panchavati, Pashan
Pune 411008, Maharashtra, INDIA

3 Eligibility Criteria

Only the bidders complying with following eligibility criteria will qualify for opening of commercial bids and for further processing.

3.1 The bidder must submit all the documents listed at para 3 Section – I above, along with the technical bid.

3.2 The bidder should be an entity registered in India under appropriate Indian Laws. Certificate for the same should be submitted along with the bid.

3.3 The bidder must have successfully executed at end client sites at least 1 numbers of data centres in India in last five years. Each of the data centres should be with minimum of UPS feeding power of 400 KVA(excluding redundancy) and minimum feeding cooling load of 120 Tons(excluding redundancy) (UPS and cooling to be considered only for server area) along with Fire- fighting and suppression systems with high end integration of building management system and all the allied works required for successful installation & completion of the Data Centre. This order should be on the name of bidder issued by the end client.

3.4 The bidder should have undertaken/ completed the activities of providing on-site support and facility management / O & M services to at least one data centre. The scope of the activity should cover operation and maintenance of Electrical Systems, Cooling systems (Chillers, PAC/PAHU /In ROW/RDHX etc.) UPS and Battery, IBMS etc. Bidder to provide the documentary evidence that minimum three technical manpower had deployed at site and maintaining electrical system and cooling system. Such Data centre having minimum cooling capacity of 100 Tons.

3.5 A summary of the projects implemented covering all the details must be enclosed with the Technical Bid.

3.6 Bidder should have minimum turnover of Rs. 19.0 Crores for each of the last three financial years.

3.7 If the bidder is not a principal manufacturer of Data Centre components, the undertaking/s (in original) from the respective OEMs/principal manufacturers (on the letterhead), as per format given in **Annexure** must be submitted for the components such as UPS and battery, LT panels and associated component, Chillers, In Row , BMS Software and Pumps ,Gas suppression system etc. (in e-packet – 1- Section-II).

3.8 The principal manufacturers/ original equipment manufacturer (OEM) of Data Centre components viz. UPS, In Rows, DG Sets, Chillers , RDHx etc. should have service centre in the respective state of site location. Documentary evidence for the same to be provided.

3.9 The bidder must submit all the documents as per Document Checklist – **Annexure-G**, with appropriate page nos for the same. The flow of the submitted documents must be in the same order.

3.10 The bidder must not be blacklisted by any Central / State Govt. Organizations of India as on date of submission of the bids. A certificate or undertaking to this effect must be submitted **(Annexure – A)**.

3.11 The bidder must comply with the provisions of Office Memorandum: F/No/6/18/2019-PPD dated 23rd July, 2020, issued by Public Procurement Division, Department of Expenditure, Ministry of Finance, GoI or latest Notifications

3.12 The solution offered must comply with the provisions of Order No P-45021/2/2017-PP (BE-II). Dated 4th June, 2020 issued by Public Procurement Division, Department of Investment and Internal Trade, Ministry of Commerce, GoI, read with order number W-43/4/2019-IPHW- MeitY, dated 7th September, 2020 issued by IPWH division of MeitY, GoI or latest Notifications

Note: The bidder should provide sufficient documentary evidence to support of the eligibility criteria and exemptions mentioned. C-DAC reserves the right to reject any bid not fulfilling the eligibility criteria.

4 Exemptions

If in the view of bidder, any exemption / relaxation is applicable to them from any of the eligibility requirements, under any Rules / process/ Guidelines/ Directives of Government of India, bidder may submit their claim for the applicable exemption /relaxation, quoting the valid Rule/ process/ Guidelines/ Directives. In this case the bidder must submit necessary and sufficient documents along with the technical bid, in support of his claim. The decision about granting the exemption/ relaxation will be taken by the bid evaluation committee which is empowered to grant exemption/relaxation.

5 Local Conditions

It will be incumbent upon each bidder to fully acquaint himself with the local conditions and other relevant factors at the proposed Data Centre site which would have any effect on the performance of the contract and / or the cost. The Bidder is expected to make a site visit to the proposed Data Centre facility to apprise them self and obtain all information that may be necessary for preparing the bid and entering into contract.

Failure to obtain the information necessary for preparing the bid and/or failure to perform activities that may be necessary for the providing services before entering into contract, will in no way relieve the successful bidder from the responsibility of performing any work in accordance with the GeM Bid documents. It will be imperative for each bidder to diligently be informed of all legal conditions and factors which may have any effect on the execution of the contract as described in the bidding documents. C-DAC Pune shall not entertain any request for clarifications from the bidder regarding such conditions. It is the responsibility of the bidder that such factors have properly been investigated and considered while submitting the bid proposals and that no claim whatsoever including those for financial adjustment to the contract awarded under the bidding documents will be entertained by C-DAC Pune and that neither any change in the time schedule of the contract nor any financial adjustments arising thereof shall be permitted by the C-DAC Pune on account of failure of the bidder to appraise himself of local laws and site conditions or otherwise.

6 C-DAC Right to amend / cancel

6.1 At any time prior to the deadline for submission of bids, C-DAC may, for any reason, whether on its own initiative or in response to the clarification request by a prospective bidder, modify the bid document.

6.2 The amendments to the GeM Bid documents, if any, will be notified by release of Corrigendum Notice on GeM portal (as ATC) / www.cdac.in against this GeM Bid. The amendments/ modifications will be binding on the bidders.

6.3 C-DAC at its discretion may extend the deadline for the submission of bids if it thinks necessary to do so or if the bid document undergoes changes during the bidding period, in order to give prospective bidders time to take into consideration the amendments while preparing their bids.

6.4 C-DAC reserves the right to cancel the entire RFP/GEM Bid without assigning any reasons thereof

7 Precautions while preparing the Bids

Bidder should avoid, as far as possible, corrections, overwriting, erasures or postscripts in the bid documents. In case however, any corrections, overwriting, erasures or postscripts have to be made in the bids, they should be supported by dated signatures of the same authorized person signing the bid documents. In case of discrepancies and/ or calculation errors, if any, the lower of the unit prices and/or amounts shall only be considered for comparison of bids. Only Single technical solution to be submitted.

8 Earnest Money Deposit (EMD) – Exemption format attached.

The bidder must submit the undertaking towards Earnest Money Deposit (EMD / bid security), as per format given in **Annexure subject** to the conditions stipulated therein

9 Period of validity of bids

9.1 Bids shall be valid for minimum 180 days from the date of submission. A bid valid for a shorter period shall stand rejected.

9.2 C-DAC may ask for the bidder's consent to extend the period of validity. Such request and the response shall be made in writing only. The bidder is free not to accept such request. A bidder agreeing to the request for extension will not be permitted to modify their bid.

10 Submission of Bids- Online

The Bid documents shall be neatly arranged and all pages should be numbered. They should not contain any terms and conditions, printed or otherwise, which are not applicable to the Bid. The conditional bid will be summarily rejected. Insertions, postscripts, additions and alterations shall not be recognized, unless confirmed by bidder's signature.

11 Late Bids

C-DAC shall not be responsible and liable for the delay in receiving the bid for whatsoever reason. C-DAC will not be responsible for any issues arising/pertaining with GeM portal for non-submission, failure in submission of bids, responses to queries etc. on-line. Bidders are advised to submit e-bids,

responses to queries (if any) etc. well in advance of the last date and time of submission so the bids. C-DAC will not be responsible for failure in submission/upload of bids for non-working of the on line portal at last day/hours of submissions of bids.

12 Evaluation of Bids

The bids will be evaluated in two steps.

12.1 The bids will be examined based on eligibility criteria stipulated at para 3, Section – II of this document, to check the eligibility of the bidders. The technical bids of only the eligible bidders will be evaluated based on technical requirements stipulated in the RFP.

12.2 Only the bidders, whose technical bid is found to meet the requirements as specified above will qualify for opening of the commercial bid and will be informed about the date and time of the opening of the commercial bid.

12.3 The decision of the TEC with respect to complete technical evaluation is final and binding on all the bidders.

12.4 During evaluation of the bids C-DAC at its discretion may ask the Bidder for clarification of its Bid. The request for clarification and the response shall be in writing, and no change in the prices is permitted. If required C-DAC may invite the Bidders for technical presentation on the solution offered. During the process of evaluation of bids, if any discrepancies are observed in the bid submitted, the bidders may be given an opportunity to clarify on same. If in the view of bidder, any change in quantity, make or model is required or any additional items are required, for clearing the said discrepancy, the bidder has to arrange for said change and/or addition of material without any increase in the prices quoted.

12.5 If the information provided by the bidder is found to be incorrect/misleading at any stage/time during the GeM Bidding Process, C-DAC reserves the right to reject all such incomplete bids.

13 Comparison of Bids (as per GeM portal policies)

13.1 Only the technically qualified bids as per terms and conditions stipulated in this document shall be considered for opening and evaluation of price bid.

13.2 The total price including the GST amounts, (@rates quoted by the bidder or tariff rates, whichever are less) along with the comprehensive warranty support and Operation & maintenance charges for first two years as per price bid format and Additional items for another 3 years of CAMC and O&M will be considered for the purpose of comparison of bids and for calculating the L1 bidder. (@rates quoted by the bidder or tariff rates, whichever are less). (Please refer para 1, Section- III), as appeared and calculated on GEM portal.

13.3 PO of additional items i.e. CAMC of 3rd, 4th, 5th year alongwith O&M thereto, will be placed by IIT Madras / C-DAC after completion of 02 years based on the availability of funds at the IIT Madras.

13.4 The date and venue for opening of price bids will be communicated to bidders through GEM portal as per GeM policy.

14 Award of Contract

C-DAC reserves the right to award the contract to the qualified bidder whose technical bid has been accepted and determined as the lowest evaluated price bid (As declared by GeM portal after Reverse Auction, if any).

14.1 However, C-DAC reserves the right and has sole discretion to reject the lowest evaluated bid.

14.2 If more than one bidder happens to quote the same lowest price, C-DAC reserves the right to place the order with the bidder who has installed a Data Centre with more IT load at single site. The decision of C-DAC shall be final for awarding the contract OR as declared on the GEM.

15 Purchaser's Right to amend / cancel

15.1 C-DAC reserves the right to amend the eligibility criteria, commercial terms & conditions, Scope of Supply, quantities, technical specifications etc. The same shall be published on the Portals.

15.2 C-DAC reserves the right to cancel the entire or partially GeM Bid without assigning any reasons thereof.

15.3 C-DAC reserves the right to reject the bid submitted by the lowest evaluated bidder.

(End of Section - II)

SECTION III – SPECIAL CONDITIONS OF CONTRACT

1 Prices

a. The prices quoted shall remain firm and no price escalation will be permitted till completion of order.

b. The prices quoted must be inclusive of comprehensive warranty charges, packing & forwarding, freight, insurance, loading, unloading charges /entry tax/road permit charges and allied charges till destination at site.

c. The group-wise prices must be quoted for all the items as per format given in **Section – V**.

d. The order placement of additional items i.e. CAMC and O&M for 3rd, 4th and 5th Years may be placed by IIT Madras, Chennai or By C-DAC, Pune based on the availability of funds at IIT Madras, Chennai.

e. Before the placement of order, the successful bidder must submit the detailed Bill of Material, giving price for each individual line item, keeping the total price quoted un-changed. The order will be placed on the basis of this BoM. The supplier must ensure that their invoice exactly matches this BoM, so as to avoid any payment complications

2 Taxes and Duties:

2.1 The bidder should exercise utmost care to quote the correct amounts of GST on each item. Any revision in statutory tax /duty structure as on date of supply/invoice, shall be considered, as applicable.

2.2 In case of any error/ oversight in GST amount quoted by the bidder, the bidder will not be permitted to rectify the error/oversight. The orders/ contract will be placed with the GST amounts quoted/calculated by the bidder or actual applicable amount (as on placement of order), whichever is **LOWER.** The difference amount payable, if any, between the quoted GST amount and applicable amount shall be borne by the bidder.

2.3 Notwithstanding the para above, if the GST is not quoted separately and the bid is silent whether GST is included or excluded in price, for the purpose of evaluation of bids, the prices shall be taken as quoted with GST. In this case, the order will be placed with the quoted price. The GST applicable, if any will be borne by the bidder/contractor

2.4 The prices are compared as per the GeM portal policies which are on the basis of GST rates quoted/calculated by the bidder. Bidder to note that there is not control of C-DAC/buyer in comparing the offered prices. In case of errors, the bidders will not be permitted to change the GST percentage, nor any amounts towards the same.

3 Project Timeline

All the items covered in the Schedule of Requirements (**Section – IV**) must be supplied, installed and commissioned within 4 months (Sixteen weeks) from the date of award of Contract / placement of order.

4 Payments (In INR only)

a. 70% amount of the cost of UPS and batteries, LT Panels, Chillers and Pumps, InRow, RDHx, will be released within 30 days of receipt of these components at site along with tax invoice and against physical verification and acknowledgement by C-DAC and/ or end user.

b. 20% amount of the cost of UPS and batteries, LT Panels, Chillers and Pumps, In Rows, RDHx and 90% cost of the remaining supplied items and 90% charges towards installation and commissioning of the system will be released on successful installation, commissioning of the solution. This portion of payment shall be subject to acceptance and submission of Integrated System Acceptance Test (ISAT) report to C-DAC. In case of delay in integration and commissioning of the DC with HPC system for the reasons attributed to C-DAC beyond 60 days, this portion of payment will be released against submission of bank guarantee of equivalent amount. This Bank Guarantee will be released on successful completion of installation, commissioning and ISAT of the solution.

c. Balance 10% payment will be released on successful installation & commissioning of solution against submission of PBG. The PBG must be submitted within 30 days from the date of successful installation(s) and ISAT. The penalties- if any, for delay in deliveries, will be deducted from this portion of payment.

d. The proportionate payments towards CAMC of 3rd, 4th, 5th year & Operation and Maintenance charges will be released on 'post quarterly' basis within 15 days, after accepting the supporting documents by C-DAC/Client.

e. The penalties - if any, towards non/short performance will be deducted from the quarterly payments payable.

f. The applicable TDS will be deducted.

g. The payments shall be remitted through NEFT/RTGS only.

h. Successful bidder to upload the invoices according to the time lines/supplies as above, on GEM portal/to HPC-Tech Group, C-DAC, Pune.

i. The post quarterly invoices towards CAMC & O&M charges to be submitted to HPT-Tech Group, C-DAC, Pune for releasing the payments.

Note: All the payments are subject to submission of the valid and complete tax invoices.

5 Security Deposit (SD)

The successful bidder will be required to furnish the Security Deposit in INR equivalent to 5% of the Contract/Order value (excluding taxes) within 15 days of award of Contract / receipt of Order(s). The Security Deposit should be submitted in the form of Demand Draft drawn in favor of C-DAC payable at Pune or in the form of Bank Guarantee in the name of C-DAC, Pune. The Bank Guarantee submitted towards Security Deposit should be issued by a Scheduled Commercial Bank and must be valid for a period of 6 months. The Security Deposit will be returned within 30 days upon completion of installation, commissioning and ISAT, and on submission of Performance Security.

6 Performance Security

The successful bidder will be required to furnish the Performance Security towards the Data Centre Solutions supplied, in the form of a Bank Guarantee in INR equivalent to 3% of the invoice amount(except for O & M charges and excluding taxes), as per the format attached to this document. This bank guarantee should be submitted along with the invoice after successful installation and

commissioning of the Data Centre solution. The Bank Guarantee should be from a Scheduled Commercial bank and shall remain valid for the period of 26 months from the date of installation and ISAT. The PBG must be negotiable at a branch of issuing bank in Pune. The successful bidder may be required to submit / renew PBG for the 3rd, 4th, 5th year CAMC charges, if the order is placed by C-DAC/IIT-Madras.

C-DAC reserves the right to invoke the Performance Bank Guarantee(s) submitted by bidder, in case of the following:

a. The Item/Components fail to achieve the performance as stipulated in this document or
b. The bidder fails to provide the comprehensive warranty and other services in scheduled time frame, as stipulated in this document or
c. The bidder delays to provide the warranty services as stipulated in this document.

7 Completeness Responsibility

The bidders may please note that this is a contract on 'Turn-key' basis. Notwithstanding the scope of work, engineering, supply and services stated in bid document, any equipment or material, engineering or technical services which are not specifically mentioned under the scope of supply of the bidder and which are not expressly excluded there from but which – in view of the bidder - are necessary for the required performance of the datacenter solution in accordance with the RFP specifications are treated to be included in the bid and has to be implicitly performed by bidder. In no case, the bidder will be permitted to increase the prices quoted.

8 Comprehensive Warranty

The Supplier warrants that all the Goods are new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the Contract. The supplier further warrants that all Goods supplied under this contract shall have no defect arising from design, materials or workmanship (except when the design and/or material is required by the Purchaser's specifications) or from any act or omission of the supplier. The initial warranty of two years should be comprehensive on site, repair/replacement basis free of cost. Bidder has to enter into agreement / MoU with C-DAC Pune on award of contract which shall be in-line with this RFP document.

Note: - During the initial warranty period of 02 years + CAMC Period of 3rd, 4th and 5th Year, the supplier / Bidder will not get any charges towards consumables. All the required consumables charges has to be consider as part of warranty and CAMC services.

All the equipment and components supplied must have onsite comprehensive warranty from date of successful installation, commissioning and signing of ISAT for **02 years + 03 years** i.e. **total 05 years**.

SLA and managed service scope as per **Annexure - H.**

9 Post warranty CAMC

IIT Madras / C-DAC may release the order for the CAMC along with O&M. The work order may be released along with the initial order of first two years or after the completion of first two years based on the availability of funds at IIT Madras.

C-DAC/IIT Madras reserves the right to enter or not into the CAMC after the end of warranty period of first two years. (C-DAC/IIT-Madras reserves the right to cancel the order for 3rd, 4th, 5th years CAMC+O&M based on the availability of funds).

10 Penalties

CDAC reserves the right to levy penalties for each site, as given below.

Sr. No	Parameters	Penalty
A	Penalty for Delayed Deliveries and installation	0.5% of order value per week for delay in installation and commissioning beyond schedule. If the delay is more than 10 weeks, C-DAC reserves the right to cancel the Contract/ Order. In case of in ordinate delay on the part of bidder in completing the work and cancellation of Purchase order, C-DAC will arrange to complete unfinished work through suitable contactor and expenses incurred by C-DAC in doing of such work shall be recovered from the bidder. Any delay because of CDAC, conditions arising out of Force Majeure will not be considered while calculating the delay period for penalties. i.e. total 5% of maximum penalty shall be levied against Delayed Deliveries and installation
B	Penalty if uptime of Data Centre components. Measured on quarterly basis is (as per calendar year)	Penalty for downtime shall be levied as given below in B.1, B.2, B.3 which will be over and above the penalty mention above in para A.
1	Less than 98.5% but more than 97.5% in a quarter	Penalty @0.2% of the order value per quarter.
2	Less than 97.5%	Penalty @1% of the order value per quarter.
3	Less than 95%	C-DAC reserves the right to terminate the contract and invoke the performance bank guarantee.
	Capping	The maximum penalty as stipulated in Para A and B above put together will be capped to 10% of the order value.

The detailed mechanism / method for arriving at the measurable parameters mentioned in table above is covered in the **Service Level Agreement (SLA) as per Annexure –H,** to be signed before award of contract/ release of Order.

(End of Section- III)

SECTION IV – SCHEDULE OF REQUIREMENT

This Section covers the general and technical requirements of Data Centre components.

1 Data Centre on Turn-key Basis

The Data Centre is required to be built on 'Turn-key' basis. The successful bidder should build the entire data center infrastructure which includes civil works, interiors, environmental controls like humidity, temperature etc., security (including access/ monitoring equipment), electrical systems, uninterrupted power systems with battery banks, Chillers, pumps, In Row coolers, RDHx, Piping , Valves, Fire suppression, BMS etc. as specified. The responsibility towards required material/items/equipment's, work, man power etc. rests with the successful bidder. The overall requirements and available information/ data/documents are included in this Section. The bidders are advised to go through same and visit the sites before working out the details in this perspective and submit the solution document complete in all respects.

2 Scope Demarcation

Scope of work Carried out by IIT Madras, Chennai to be excluded by the bidder.

- Insulation for false floor, false ceiling for all the area
- CCTV
- Access control
- Chiller platform on the Terrace (Load with water to be provided by the Bidder)
- Two incomers (Generator +transformer) of 2*4*400 sq mm
- Partition between UPS room and Server room
- Fire-rated vision glass partition
- Fire-rated steel doors for the server room, UPS room, and emergency doors

Scope of work Carried out by Bidder but not limited to:

- All works of interior civil, Raised flooring, false Ceiling, lighting, partition wall between the DC and electrical rooms and battery room shall be in scope of the bidder.
- The access control and CCTV shall be carried out by IIT-M, But the entire cabling work shall be done by the bidder
- The fire alarm, suppression, Rodent repellent, water leak detection, BMS shall be in bidders scope.
- The synchronised electrical power supply cables from 2 sources upto the panel shall be given by the IIT-M. The same shall be terminated by the bidder in their incoming panel. All downward distribution including for chiller plant and other related work shall be in bidders scope.
- The treated water required for the primary and secondary circuit along with makeup water tank and thermal expansion tank shall be provided by the bidder.

3 Background

Computer Science Department IIT Madras, wished to set up a 3 PF DC at IIT Madras, under National Supercomputing Mission program. The implementing agency C-DAC is going to build data center of 3.0 PF capacity which includes server racks as well as storage rack. This data center should be energy efficient in which almost 90% of heat extraction from server racks is by Rear door Heat Exchanger and rest by In Row Coolers. UPS rooms cooling loads are taken by the PACs and other smaller rooms by split ACs.

Air cooled Chilled water system shall be used to remove the sensible heat from the DC, while DX systems shall be used for the UPS room and for dehumidification requirements in the Server room. The PACs shall be with Heaters.

4 General Requirements:

The general requirements applicable to the data centres are given below. Other than these requirements, depending on the site conditions, the bidder may propose appropriate changes in other requirements. However, the responsibility towards successful installation and commissioning and smooth running of data center rests with bidder only.

4.1 The solution shall comprise of supply, installation, testing, commissioning training and handing over of all materials, equipment, hardware, software, appliances and necessary labour to commission said system complete with all the required components strictly as per the latest IS, IEC, IEEE, ASHRAE, ASHRAE TC9.9 2017,NBC etc. codes.

4.2 Also, the scope includes the supply, installation & commissioning of any material or equipment including civil works that are not specifically mentioned in the specifications and design details but are required for successful commissioning of the project.

4.3 The vendor shall provide detailed design, documentation, make, and model, efficiency including user, system and operation manuals along with the necessary diagrams, design drawings and details bifurcation of Bill of Quantity (BOQ) along with details description. Design drawing should include but not limited to Single Line Diagram, Discrimination curves, Lighting drawing, P & ID (Process and Instrumentation Diagram), , equipment sizing and selection along product selection calculations etc. with clear sectional drawings for server and utility room, interior, raised flooring, false ceiling, fire rated glass partitions, complete BMS system required for data centre etc.

4.4 The vendor shall take the necessary clearance / approval of the drawings, design, quality of material, make and model of the quoted material etc. prior to the execution of the project

4.5 The Data Centre should be complete in all respects.

4.6 Electrical power and water during construction will be provided at one location. Client i.e. IIT-Madras shall not provide any accommodation for the contractor and his staff including labour.

4.7 The scope of installation, configuration, integration and commissioning shall mean to install and configure all components and subsystems as well as providing all data to the existing Building Management System with the required components, integrating the entire facility and make the system operational as per scope of work.

4.8 To assess the efficiency of the data centres the power usage effectiveness (PUE) will be computed as

$$PUE = \frac{\text{Total Power } (A=B+C)}{\text{IT power } (B)}$$

A = Total Power

B = IT Power

C = Utility Power (Chillers+ Pumps + InRow Unit + RDHx + PAC + UPS + Isolation Transformers)

4.9 The acceptance test shall cover the following scope:

4.9.1 Factory Test Reports

Bidder shall provide factory test report for all products after testing each parameter of products as per their standard test procedure.

- Electrical panels including isolation transformer.
- In Row Units & RDHx
- PACs
- Pumps
- Air Cooled chillers
- UPS and Li Ion battery
- Thermal Storage Tank

Further – At site after installation, the performance test of the individual equipment and the overall system as a whole, will need to be carried out. A brief of the testing procedure to be adopted shall be submitted along with bids.

5 Design of Data Centre

The proposed designs and indicative drawings enclosed in the RFP document are for reference and for the purpose of bidding. The vendor so finalized would be required to make the necessary shop drawings, provide layouts and GA drawings, Technical Data sheets etc so as to arrive at a final scheme in line with the requirements and in accordance with the requirements of Indian standards, IEC, IS,IEEE,NBC etc. The testing and commissioning methodology with detailed set up shall be part of the technical submittal for approval. The above shall be subject to approval by C-DAC, whose decision will be final and project will have to be executed as per that. However, no change whatsoever in the price schedules would be allowed after the award of the work and the price shall remain firm throughout the project and the entire works is to be executed within the quoted price schedules.

The shop drawings and technical data during execution should include the following, but is not limited to,

a) Floor plan with equipment layout and detailed drawings, showing necessary sections etc.

b) Layout of raised floor and false ceiling layout with data sheet of each item.

c) Electrical diagrams (including UPS, SLD, Lighting, Earthing, Equipment Layout, Power Distribution etc.) with load estimate, technical data sheet of each item, Installation and O&M manuals of all important components.

d) Cooling system layout with P & ID, Piping layout, Equipment Layout, Schematic etc.. with load calculations, technical data sheet of each item, Installation and O&M manuals of all components.

e) Fire detection and suppression system capacity calculations, plan/ layout with technical data sheet of each item along with Installation and O&M manuals of all important components.

f) Access Control System layout with technical data sheet of each item, Installation and O&M manuals of all important components.

g) Surveillance camera placement plan and wiring , Installation and O&M manuals of all important components.

h) Environment monitoring system placement plan with technical data sheet of each item, Installation and O&M manuals of all important components.

6 Design Inputs

Tables given below are the details of exact load parameters. These values are given to the bidders to come out with appropriate configuration and sizing. The major sub systems of the DC infrastructure are:

a) UPS along with Li Ion Batteries

b) Air Cooled Chilled water plant, Piping, Pumps, Electrical Panel, Instrumentation etc.

c) Raised Flooring and False Ceiling

d) DX based PAC, Rear door heat exchangers and In Row units with air cooled condenser and related work.

e) Access Control, CCTV and I-BMS System

f) Electrical Panels and cables

g) Thermal Storage Tank

h) 45 U Racks with 800 mm W x 1460 mm D (**C-DAC will Provide**)

i) Illumination system

j) Earthing System

The specifications and requirement of the entire solution is stipulated in the RFP with respect to the design and solution, certain indicative inputs like layout, SLD,P&ID etc. are provided. Bidder may follow the indicative inputs provided in this RFP or come out with innovative design which is optimal and cost effective without violating any of the specifications given.

6.1 The envisaged IT load for data center: 465 KW max.

Sr. No	Description	Power in Kw/Rack	Qty.
1	Server Rack -CPU	36.4	9
2	Server Rack -CPU+GPU	35	2
3	Service Node rack	11	1
4	Storage rack	12	3
5	Spare rack	20	1

7 Requirements towards Civil/Interior work

7.1 Civil architecture and preparation of data center: Interiors of the data centre (including, civil works, foundation work, raised floor, false ceiling, fire rated partitions, fire rated glass partition, fire rated glass doors, fire rated glass sliding door etc.)

7.2 METAL GRID CEILING: The drop ceiling shall be provided with Armstrong Lay in (Hot dipped galvanized steel) metal ceiling system 600 x 600 x 5 mm with standard 2.5 mm dia (16% open space) and fleece with NRC (Non Directional Visual) of 70 & CAC 36 (CAC is a measure for rating the performance of a ceiling system as a barrier to airborne sound transmission through a common plenum between adjacent closed spaces) to be laid on Armstrong grid system. The modular ceiling sheets with necessary fittings should be done up aesthetically to integrate with the lighting.

7.3 Raised flooring: Suitable raised false flooring as per prevailing standards should be provided as per site requirements. The entire Access floor system shall be made from high density cementatious board and provide Class O as per BS 476 PART 6 for Fire propagation index and Class 1 as per BS 476 Part 7. Fire Ratings tested as per CIRC 91/61 or BS 476 Part 6 & 7 fire resistance up to 60 min as per NFPA. System should have antistatic property and air leakage resistance. The system shall be able to withstand a minimum UDL of 2500 kg per sq meter and a point load of minimum 600 kg. and rolling load of minimum of 300 Kg.

7.4 Panel should meet the below requirements:

7.4.1 The panel shall be coated with epoxy coating on the exposed surface. Have an infill of light weight cementitious material. Insulated against heat and noise transfer. Panels shall be finished with High Performance Anti-Static Laminate. Panels will remain flat through and stable unaffected by humidity or fluctuation in temperature throughout its normal working life. Panels will provide for impact resistance top surfaces minimal deflection, corrosion resistance properties and shall not be combustible or aid surface spread of flame. Panels will be insulated against heat and noise transfer. Panels will be 600 x 600mm and fully interchangeable with each other within the range of a specified layout. Panels shall rest on the grid formed by the stringers which are bolted on to the pedestals. Panels shall be finished with anti-static 0.9 mm Laminate and thick plastic edge material that is self-extinguishing and will be PVC free. Panel should withstand a Concentrated Load of minimum 500 Kg applied on area 25mm x 25mm in the centre of the panel which is placed on four steel blocks without deflecting more than 2.5mm and without setting permanently more than 0.20mm

7.4.2 Pedestal installed to support the panel will be suitable to achieve a finished floor height of 300mm. Pedestal design will confirm speedy assembly and removal for relocation and maintenance. Pedestal base to be permanently secured to position on the sub-floor. Pedestal assembly will provide for easy adjustment of levelling and accurately align panels to ensure lateral restrain. Pedestals will support an axial load of minimum 1500 Kgs, without permanent deflection and an ultimate load of 2500 Kgs. Pedestal head will be designed to avoid any rattle or squeaks. Pedestal should have GI Base plate of suitable dimensions, GI Pipe, check nut for level adjustment, threaded stud with GI pedestal head, all screws etc.

7.4.3 Under structure (US) system consists of stringers to form a grid of 600 x 600mm. These stringers are locked into the pedestal head and run both ways. The US system will provide adequate solid, rigid and quiet support for access floor panels. The US system will provide a minimum clear, uninterrupted height of 300 mm between the bottom of the floor and bottom of the access floor for electrical conducting and wiring The stringer shall be hot dipped galvanized steel cold roll construction specially designed to stabilize lateral stability and to support the panels on all sides

for alignment. The channels shall have counter sunk holes at both ends to accommodate bolting of the same to the pedestal head assembly. Earthing point connections are to be part of standard design. The longitudinal ribs and flaps in the lower part should be designed to increase flexion resistance. The grid formed by the pedestal and stringer assembly will receive the floor panel.

7.4.4 Bidder to consider to providing 2 nos. 2-point panel remover, lead, lift, steps for 600mm raised floor etc.

7.5 Fire Rated Steel Door-two hours- Two hours fire rated double skin steel door constructed from 1.25mm thick galvanized steel sheet formed to provide a 46mm thick fully flush door shell with lock seam joints at stile edges and the internal construction of the door should be specially designed Honey Comb structure with reinforcements at top, bottom and stile surround. The door frames and door shutters should be primed with Zinc-Phosphate Staving Primer and finished with Polyurethane Aliphatic grade or epoxy paint as per approved manufacturer specifications. Door if used for Emergency purpose is required to be with Panic bar. The Fire Doors are to be fully insulated and shall be tested as per IS: 3809-1979, ISO: 834-1975, IS: 3614 (PART-II)- 1992 and BS 476 (PART- 20 & 22)- 1987 under live fire conditions, The wired glass is to comply with both BS 476: PART 22 and BS 6206 relating to fire resistant and impact performance.

7.6 Fire rated Partition/ Walls: Partition walls within the data center should have 2-hour fire rated. Suitable smoke seals should be used. Fire line boards should conform to IS:2095 – 1996-Part-I. Providing and fixing minimum 132MM thick FIRE RATED gypsum board partitions with 2 Nos. x 15mm thick fire line board on both sides of 72mm GI floor channel and 70mm Square MS Pipe stud as per specifications, including cost of chasing for electrical conduits,. This item includes all tools, tackles, material, labor, fixture adhesives sealants etc. for the complete work.

7.7 Opening for the Cables or other utility services which are coming inside the building needs to be sealed by Fire resistance board system, water soluble fire retardant solutions, fire expanding foam etc. having minimum of 2 hours' fire rating when tested in accordance with BS 476 part 20 and UL 1479 for horizontal and vertical openings in RCC slabs, Beams, walls, Brick masonry or Gypsum partitions for passing service shafts. The service lines could be of various types like electrical cables, cable trays or metal pipes etc. The foam shall have Acoustic property as per DIN 4109 and Smoke and Air Seal. The Foam should have the feature of Re penetrability for future maintenance or repair activities. Fire soluble cable coating Should be suitable for protecting against spread of flame on timber panels and tested as per IEC 332 part 3 standard for reduced spread of flame & tested as per FM Class 3971. It should have no derating effect on cables, free from fiber, asbestos, odorless and solvent free, flexible when dry after application.

7.8 Room Signage and fire evacuation map. Providing & fixing Aluminium Modular Signage using Aluminium Alloy 6063 extrusion with Anodising (The thickness of the anodization is typically 30 microns. The integrity of the anodize coating is tested to meet the international specifications ISO 2143-1981.) With lifetime Warranty in normal working condition.

7.9 Air cooled chiller with pumps shall be installed on the terrace at 3rd floor level. The same shall be mounted on the MS structural platform installed by IIT-M, over load bearing columns (Load details to be provided by the bidder). Bidder to give the final point load details marking the chillers, pumps, isolation boxes and pipe lines to meet the operational and service spaces around. The chilled water pipe line duly insulated with specified grade and thickness PUF and cladded with Aluminium sheet as per specifications upto the unconditioned space in the ground floor shall be laid as per specification on terrace and upto the ground level. Pressurised MS factory fabricated and tested thermal storage/ buffer tank for 10 minutes storage will be located in ground floor outside behind the electrical room area. Outdoor type isolation panel for

each chiller shall also be located at terrace and copper conductors of suitable ratings to be laid between the isolator box and chiller panel terminals by bidder.

7.10 INSULATION ON CEILING AND FLOOR SLAB: Supply and installation of external thermal insulation class-"O" closed cell elastomeric nitrile rubber insulation with adhesives recommended as per the approved shop drawings/ specifications. Minimum 13 mm thick for floor and ceiling insulation is required wherever not in scope of IIT-M.

7.11 Providing and fixing of tested 120 minutes fire rated - integrity and radiation control and partial insulation (EW120) - fully glazed non-load bearing fixed glass partition system with symmetrical (Bi-Directional) fire protection. The glass should be Contraflam Lite or equivalent 14 mm clear 120 min fire rated and partially insulated (EW120), Non Wired Toughened Interlayered glass having a sound reduction of minimum 30 dB and compliant to class 1(B)1 category of Impact Resistance as per EN 12600.The glass shall be able to withstand fire attack from both sides. The glass should be manufactured in UL & TUV audited Facility and including UL Certification. The profiles are manufactured from 1.6 mm galvanized steel sheet pressed and formed to a required profile of the dimension. These specifications are applicable for fire rated glass door, fire rated glass partition, wherever not in scope of IIT-M.

7.12 GI Modular support frameworks to be considered for piping installation for outside part of building. Chillers, Pumps and associated accessories needs to be installed at outdoor space between the 2 buildings. Space availability as shown in the drawing to be reviewed and confirmed by the bidders. Refer attached drawing for reference only.

7.13 HOUSE KEEPING: The vendor is responsible for keeping the site clean and deep cleaning by removing all the debris etc. every day, using adequate covering/tarpuline sheets etc to cover the any areas required (client property etc.). All cleaning equipment's like heavy duty vacuum cleaners etc to be according to the approval.

7.14 Power Cable entry in each rack will be from Top, Bidder need to consider boxing arrangement or cable manager or cable trunking system so that entire data centre installation should look aesthetically good.

8 Requirements towards Electrical Work

8.1 IIT-M shall provide synchronised incoming power from their existing/ upgraded transformer and DG sets and their LV substation of 2x1000 KVA ONAN 11KV/433 V. The LT incomer panel shall be placed in the electrical room. TWO incomers shall be provided by IIT-M from two sources for redundancy. Termination of these incoming cables into the incomer panel shall be in the bidder's scope. Details of cabling and electrical scheme from there on are indicated in the SLD. All parts and products shall be new.

8.2 Modular UPS for IT as well as NON IT Load:-

8.2.1 The UPS and associated equipment shall operate in conjunction with a primary power supply and an output distribution system to provide quality uninterrupted power for mission critical, electronic equipment load.

8.2.2 Each UPS Frame shall be sized for kW =kVA @40 Deg C . load i.e. Unity Output power Factor with no derating at 40 Deg C. Design of UPS should be Insulated-gate bipolar transistor (IGBT) rectifier and 3 level IGBT inverter switching with double conversion as per IEC 62040-3 operating modes. Inverter Switching Frequency shall be ≥18 kHz to keep the noise minimum. Inverter shall be PWM controlled using DSP logic. Analog control shall not be acceptable. Each UPS shall be of

modular architecture with Power Unit & removable sub power modules rating 25kW to 50 kW achieve highest system protection. Failure of any sub power module in individual UPS Frame shall not lead to entire Frame Capacity down but only the failed sub power module capacity shall go down. i.e. In case of Failure of any one Sub Power module, rest of the available power module in the frame shall continue to operate in normal double conversion mode of operation with reduced capacity. **Each rack shall have a spare module space for adding the replacement module before removal of the failed module.** 300kVA UPS should be minimum scalable upto 500kVA/kW UPS frame size & 50kVA UPS should be minimum scalable upto 150kVA UPS frame size This shall also be applicable to all UPS's operating in parallel configuration. The UPS shall be housed in a freestanding cabinet with casters and shall contain Static Bypass and maintenance Bypass isolator. Each UPS should have phase sequence correction at Input i.e. In case of Phase reversal at Input, UPS shall continue to operate in Double Conversion Mode of operation without going to battery mode. Steady state voltage regulations will be within 1% of nominal output voltage, linear load harmonics distortion should be less than 3% and non-liner load harmonics distortion should be less than 5%. UPS should be capable of 100% unbalanced load. Greater than equal to i.e. ≥ 96 % in Online Double Conversion at 50% load to 75% Loading condition and ≥ 99% in OEM Specific Economy mode at at 50% load to 75% Loading condition. Noise generated by UPS under normal steady state condition should not be more than 70 DB as per ISO 7779. UPS should be ROHS / Energy Star complied product. Cable termination will be from bottom. All serviceable components to be from front. , Rear space upto 200mm can be provided only for ventilation purpose. UPS display should show the battery status monitoring, UPS mode, Alarm (Audio and visible), Events etc. The UPS communication capability should be able to integrate into any industry standard Building Management System (BMS). Adequate protections for UPS, for rectifier, bypass, battery, battery against overload, short circuit, battery over charging, battery over discharging, transients, surges (as per IEEE 587) etc. needs to be considered as per IEC 62040-1. Built in SNMP card, MODBUS TCP IP/ BacNet over IP, Dry contacts card to be standard feature in UPS. Should comply with UL 1973/ CE/IEC 62619 /UN 38.3 for LITHIUM ION BATTERIES.

8.2.3 The UPS shall be have self-regulating and self-protection against following conditions

- Over voltage
- Powerline surges
- Undervoltage and overcurrent induced by the mains
- Sudden changes in the output load and short circuits at the output
- Transient ,surges, voltage spikes shall be suppressed and shall be removed from the output of UPS

8.2.4 Critical Cards within UPS which are directly exposed to air should be conformally coated to protect the UPS from Moisture and Conductive dust. AC/DC capacitor having service life of Min 10 years. No replacement for 10 years. IP rating of Min IP 20.

8.2.5 Parallel operation: it must be possible the connection of minimum 4 units of same size to set up a distributed parallel system, in order to increase system capacity or achieve system redundancy. Parallel control logic must ensure a high load sharing accuracy (less than 5% of nominal power) and no single points of failure. That is a distributed control design must be implemented (no master/slave architecture), so that any failure in one equipment won't impact operation of the whole parallel system. Parallel control connections must provide high noise rejection /

8.2.6 UPS to Battery Inter connecting cables; Links; Racks and standard accessories Connections to the Incoming terminals will be provided and take the load from Outgoing terminals of the UPS. All other equipment necessary to operate the UPS is in the scope of the Vendor.

8.2.7 The UPS shall be housed in freestanding cabinets. The mechanical structure of the UPS shall be sufficiently strong and rigid to withstand handling and installation operations. The sheet metal

elements in the structure shall be protected against corrosion by a suitable treatment, such as zinc electroplating, bi-chromating, epoxy paint, or an equivalent.

8.2.8 The UPS shall be designed for forced air cooling. Air inlets shall be provided from the front. Air exhaust shall be from the top portion of the unit or from back side with maximum space available up to 200mm.

8.2.9 STANDARDS - Product should confirm to below minimum applicable standards

IEC 62040-3 UPS PERFORMANCE,
IEC 60950, CE, VDE,
UL 1778 for UPS,
UL 9540A, UL 1973/UL 1642 FOR LITHIUM ION BATTERIES

8.2.10 UPS Input / Output :

UPS for IT requirement - 3 x 300 KVA with isolation transformer

UPS for non IT requirement – 2 x 50KVA

	Minimum Functional and Technical Specifications – 300kVA/kW	**Compliance (Yes / No)**
1	**General Requirement**	
1.1	The vendor shall provide 3**x300 kVA/kW (N+1)** modular live/Hot Swappable Scalable UPS, The power cabinet must be of 500 kVA/kW each. **Also, each power cabinet shall be consisting of multiple numbers of live/hot-swappable power modules.**	
1.2	The vendor shall provide 2**x50 kVA/kW** modular live/Hot Swappable UPS. The power cabinet must be of 150 kVA/kW each. **Also, each power cabinet shall be consisting of multiple numbers of live/hot-swappable power modules.**	
2	**Standard**	
2.1	The UPS shall be designed in accordance with the applicable sections of the current revision of the following documents. Where a conflict arises between these documents and statements made herein, the statements in this specification shall govern the following: • General and safety requirements for UPS used in operator access area: IEC/EN 62040- 1-1 • Electromagnetic compatibility (EMC) requirements for UPS: IEC/EN 62040-2 C2 • **UL RP 2986 - "Incident Arc Energy in front of product with top cover bolted and power module inserted or removed is <1.2 cal/cm²"** OEM Standards: ISO 9001, ISO 14001, ISO 45001, ISO 50001	
3	**DESIGN REQUIREMENTS: -**	
3.1	Transformer less, IGBT Rectifier & IGBT Inverter Modular Scalable Hot Swappable UPS System UPS Modules must be of 30-50 KW Rating in each 500 kVA/kW power cabinet.	

	Minimum Functional and Technical Specifications – 300kVA/kW	Compliance (Yes / No)
3.2	Input Voltage 380/400/415(Minimum) VAC, three-phase	
3.3	Input Voltage Range 331 to 477 V	
3.4	Input Frequency and tolerance 50HZ +/- 10Hz (40 to 60Hz)	
3.5	Input Total Harmonics Distortion <5% at 100% load	
3.6	Input Power factor ≥0.99 at full load	
3.7	**Overload capability**: 150% for 1 minute (normal operation). 125% for 10 minutes (normal operation)	
3.8	Overall UPS efficiency: Greater than 97 % i.e. > 97 % at 50% load	
3.9	Output Voltage 380/400/415 (Minimum) VAC, 3 Phase.	
3.10	Voltage Regulation /Stability ±1%	
3.11	Output Power Factor: Unity	
3.12	Rated Frequency: 50 Hz +-0.1%	
3.13	Acoustic Noise (At 1 meter from UPS) at 100% load: Less than 68 dB	
3.14	Output Voltage distortion (THDv)(100% Load):Linear load: <1(%) Non-Linear load: <5(%)	
3.15	Maximum input short circuit protection – 65kA	
3.16	Networking Protocol – SNMP, Modbus TCP/IP	
3.17	Operating Temperature: 0 to 40 Deg C	
3.18	Humidity 0 to <95%	
3.19	The UPS shall be provided with Phase Sequence Correction at Input i.e., Incase of Phase reversal at Input, UPS shall continue to operate in Double Conversion Mode of operation without going to battery mode.	
3.20	The UPS shall be provided with oscilloscope for measuring and recording input/output voltage & current waveforms in the event of any abnormal or alarming situation arises. In-case it is not available within the UPS, then two numbers of 3 Phase Power Meters (one at Input & one at Output) shall be	

	Minimum Functional and Technical Specifications – 300kVA/kW	Compliance (Yes / No)
	provided along with the UPS system which can capture the Waveforms Triggered during the failure event.	
3.21	AC/DC capacitor service life shall be minimum 10 years. If less than 10 years capacitors replacement cost must be considered in the final commercial offer	
3.22	UPS shall have built-in feature to test UPS at 100% Load without the need of any external Load Bank. In case this feature is not available within the UPS, Vendor shall provide an External Load Bank equal to UPS Capacity which will be kept at the site till the end of Warranty period.	
4	**Mechanical**	
4.1	Dust filter & Rodent Mesh shall be provided with each UPS Frame	
4.2	Built In / External Energy Meter shall be provided to display kWh consumption at input & output.	
4.3	Conformal Coating: Critical components like PCBs in UPS shall be conformal coated for protection against dust and other environmental harsh conditions.	
4.4	Ingress Protection – IP 20	
4.5	Cable Entry: Top Cable Entry Provision shall be provided.	
5.	**Battery**	
5.1	The UPS battery shall be sized for 10 minutes backup	
5.2	Battery Chemistry: LMO-NMC / NMC	
5.3	Cell Type: Prismatic only	
5.4	Cycle life(@25℃,1C/1C,100%DOD) shall be ≥ 2500 Cycles	
5.5	Each battery cabinet shall feature a DC rated circuit breaker for control and protection. The circuit breaker within the battery cabinet shall only provide protection to the battery string within that battery cabinet.	
5.6	Battery Monitoring System: Monitor + Control along with balance charging. Individual Module Level, Rack Level & System Level shall be provided with each UPS with LIB system. The BMS shall provide SOC (State of Charge), SOH (State	

	Minimum Functional and Technical Specifications – 300kVA/kW	Compliance (Yes / No)
	of Health), Voltage and Temperature for each Cell and Module within the LIB rack	
5.7	Li-ion Battery cabinet Certificate / Compliance: UL9540 A (mandatory)	
5.8	Cable Entry: Top/ bottom cable entry please mention	

8.2.11 ENVIRONMENTAL

2 x 35KW (DX Type) PAC top discharge with plenum

3 x 1.5TR High Wall split AC for battery room.

Operating Ambient Temperature	+ 20 to +30°C
Relative Humidity	0 to 95% non-condensing
Operating altitude	0m < IIT-C < 100m MSL
Audible noise	<70 dbA
Conformal coating PCBs	Required
Phase sequence correction	Required.
Emergency Shutdown Switch	Required.

8.3 Choices of lithium chemistries and cell designs : Based on long calendar life, high safety and high power density Bidder to choose either any one maintained below chemistry of Lithium.

LMO((LiMn2O4 - Lithium Manganese Oxide)
NMC (LiNiMnCoO2 - Lithium Nickel Manganese Cobalt Oxide)

8.3.1 Selection of a particular chemistry should be made with safety in mind as well as the other system requirements, namely float service life, footprint or volume of the solution, power capability, temperature of operation and discharge time etc.. Bidder need to consider above aspects while selecting chemistry of Lithium. Battery to be sized considering minimum aging factor as 1.25 and minimum design margin as 1.1.

8.3.2 A Battery system shall be furnished for the UPS with backup time of 10 Mins at Unity PF, capacity to maintain UPS output at the specified load for the duration. Battery protection shall be provided by thermal-magnetic moulded-case circuit breakers in each battery rack. UPS battery should be Lithium Ion based(LMO or NMC) battery as per recommended makes with back up time of 10 Mins at Unity PF with Built in DC Breaker , Battery Cabinet and Battery Monitoring system. These Batteries are to be in the RACK. The battery system shall be designed with highest level of protection built into the battery system against potential safety risk – over voltage and short circuit. Vendor to submit the compatibility certificate with Offered Model of Battery and UPS. Vendor to submit Battery Sizing calculation for back up.

8.3.3 The Complete battery system should be comprised of multiple such module in series / parallel combination to arrive at the required backup and DC voltage requirement of UPS.

8.3.4 Batteries should be compliant to

Safety Cell	UL1642

Module	UL 1973
Transportation	UN38.3
Seismic	GR63
EMC	IEC61000-6-2, and 61000-6-4
Rack Level	UL 1998,991
Battery Module & Switchgear	UL 1973 with each component level
battery Aging factor	IEEE 495
Battery manufacturer should have Quality Certificate	(i) ISO 14001:2004 (Environment) & OHSAS 18001:2007 (Health & Safety) and (ii) ISO 9001-2008

8.3.5 The Battery System should be equipped with Battery Management system to indicate the availability and health of entire battery system and cell balancing activity. Battery cabinet should be free standing housing Battery modules with Battery breaker, Battery management system, and Communication protocol for BMS etc.

8.3.6 The lithium ion battery solution shall communicate with the UPS .

8.3.7 Battery monitoring shall be provided at the module, rack, and system level. A switched-mode power supply shall be included and shall provide power for the battery monitoring system from UPS Input and Output. BMS parameters should able to monitor on Building management system with MODBUS TCP IP. In case MODBUS TCP IP support is unavailable, Vendor to provide dedicated PC.

8.3.8 The battery system shall consist of a 3 level of protection namely, cell, module and rack level.

1st Level Protection – Battery Management System (BMS) & Switch Gear: Each battery rack shall be installed with main switch gear to isolate the affected battery rack in the event of a fault. BMS shall also be included in each rack to provide continuous monitoring of the voltage and temperature of each cell within the rack. BMS gathers and analyses the rack current. In the event of over voltage or short circuit, the BMS will trip the MCCB at rack level.

2nd Level Protection – Fuse: Fuses are built into the main switch gear at rack level. In the event of a fault current (caused by short circuit) which the MCCB cannot be activated in the shortest time, fuses will be activated to clear the fault current without damaging the cells.

3rd Level Protection – Cell: Several protection features shall be incorporated into the cell namely, safety function layer (SFL), Multi-layers Separator, Safety Vent, Safety Fuse and Overcharged Safety Device. These safety features are to protect the cell from overcharging and thermal runaway.

The UPS vendor shall able to program the battery parameter such as AH, Charging current, DC bus in display settings.

8.3.9 Warranty – **Manufacturer's warranty of 5 years (End of Life (EOL) requirement) from date of commissioning.**

ANNEXURE
Technical Compliance for Lithium Ion Batteries

DATA SHEET FOR BATTERIES - Lithium-Ion Battery - UL 9540A Complies Module and Cabinet

Sr. No.	Parameters	Requirement as per specification	Confirmation by Bidder
1	Battery Type	Lithium-Ion type (LMO/NMC) Battery	

		With AF as per battery OEM	
2	Battery Capacity & Autonomy Time (at end of life)	Ah bidder to specify. (AH) >=10 minutes @ EOL Battery sizing sheet to be given by vendor	
3	Number of Strings of battery		
4	Nominal Battery Bank Voltage	To be given by bidder	
5	Nominal Cell Voltage	To be given by bidder	
6	Minimum cell end voltage	As per OEM for EOL design	
7	Battery Enclosure	UL 9540A compliant fire propagation safety modules and cabinet	
8	Battery rack construction	Closed cabinet with Inbuilt DC breaker	
9	Battery Monitoring System	Required inbuilt for Cell level, Module level, Rack level and system level for complete offered solution per UPS	
10	Permanent connection for portable load banks	Provided for full load testing for each UPS module at Site only	
11	Make	As per approved list	
12	Operating Temperature	To be given by bidder	
13	PF considered for battery calculation	To be given by bidder	
14	Overall dimensions of battery rack / panel	To be given by bidder	
15	Cable Entry	Top IN/TOP out	
16	Total weight	To be given by bidder	
18	Battery autonomy	To be considered at the end of life	
19	Battery End of Life (in years)	Bidder to specify	
20	Battery Warranty	5 Years + 5 Years extended warranty support as per requirement for complete module and associate accessories including breaker and BMS cards	
21	Battery Module cooling	Shall be Naturally Air cooled without any additional fan support.	

22	BMS/TMS communication protocol	TCP / IP on customer BMS /TMS	
23	Seismic Compliance	Required with Seismic Bolts	
24	Certifications	1. Fire Safety: Must demonstrate that the UL9540A large scale fire test criteria are met at unit level. The report shall be available upon request.	
		2.Safety: UL 1998, UL 991, UL 1973, UL 1642	
		3.EMC/EMI: EN 61000-6-2, EN61000-6-44. Seismic codes and standards:	
		a. IBC International Building Code)	
		b. CBC (California Building Code)	
		c. OSHPD (Office of Statewide Health Planning and Development for California Healthcare)	

8.4 AC wiring circuit: Main circuit Point wiring should be surface or concealed conduit system. Conduit wiring shall be as per IS-732. Conduits and conduit accessories shall be galvanized and shall conform to IS-2667, 1988. Conduit ends shall be free from sharp edges or burrs. The ends of all conduits shall be reamed and neatly bushed with Bakelite bushings. In order to minimize condensation or sweating inside the conduit system, all outlets shall be properly drained and ventilated in such manner so as to prevent entry of insects. Conduit pipes shall be fixed by 22 gauge ribbed G.I. saddles on 25 x 3 mm G.I. (Galvanized Iron) saddle bars in an approved manner at intervals of not more than 50 cms. Saddle shall be fixed on either side of couplers, bends or similar fittings, at a distance of 30 mm from the centre of such fittings. Existing point wiring before using needs to be checked and if technically found ok can be considered for use.

8.5 Lighting fixtures:- Lighting wiring between JB (Junction Box) and lighting fixtures shall be done by PVC insulated 3-core (phase neutral and earth) unarmoured cable. All joints of conductors in Switch boards / JB's / Fittings shall be made only by means of approved Mechanical connectors (nylon / PVC connectors). Bare or twist joints are not permitted anywhere in the wiring system. Fixtures shall be firmly supported from the structures, support clamps etc. They may be bolted or welded to the steel work or metal inserts. In case of concrete structures, where metal inserts are not available, fixtures will be fixed to or supported from concrete surfaces with the help of anchor fastener, in such cases special care shall be taken to see that anchoring is firm. All LED fixtures shall be with high power factor, low harmonic (THD< 10%) (THD= Total Harmonics Distortion) and minimum 100 lumens/watt.

8.6 Earthing and Earthing Pits: All earthing pits are in IIT-M scope. All Electrical Equipment must be efficiently double earthed in accordance with the requirement of IS-3043/IEEE 80 and relevant regulations of Electrical. The earth pits shall be as per IS with proper arrangement for testing. Maintenance free earth pits to be used. All Earthing conductors shall be hot dip galvanized / electrolytic grade base copper conductor. The main earthing rings shall be done as per practice laid in Indian Standard. All electrical equipment shall be connected to the earth bus at two points except the lighting fittings and junction boxes. All hardware for bolted joints shall be galvanized and the size of the bolt shall not be more than quarter of the size of earth conductor. Tinned copper lugs shall be provided

where round earthing conductors are used. The 415V neutral shall be solidly earthed by means of two separate and distinct connections to earth. The earth pits shall be interconnected between themselves and the main earthing grid to form an earthing ring. All joints in the main earthing conductors shall be welded. Terminal joints on the equipment shall be bolted. Removable test links shall be provided near the earth pits to facilitate testing of earth pits. Where the earthing terminal diameter provided on equipment is larger than quarter of the size of the earth conductor, connection shall be made using a wider flag welded to the conductor. The equipment to be earthed shall be connected to a common earth grid of power system. The number of earth pits will depend upon soil resistivity and the voltage of the system. The earth pit together with the electrode shall be constructed as per IS-3043-1987. The potential difference between neutral and earth should be less than 3 V. A bolted assembly link shall be provided in the connection between earth electrode and the main earth conductor. Existing Earth pits cannot be used all should be new one. Equipotential earthing inside the data center needs to be considered with grid below raised flooring of 2 X 2 meter of 25 X 3 mm Cu strip and all end corners after covering complete room needs to be grounded. Pedstal /stringers, Rack body to be grounded to this grid so that flooring and equipment's are at equal potential.

8.7 LT Panels (Low Tension/voltage Panels): Design, Supply, installation, testing and commissioning of all LT panels. Panels will be as per IEC 61439. Panels feeders should have rated capacity of Load manager with RS 485 communication port. This should compactable for BMS system to know the energy consumption. Bidder to submit License certificate of LT panels as per IEC 61439. Selection of switchgear should be as per IEC 60947 and bidder to submit the Discrimination chart for all the feeders. All the panels should be with Transient Voltage Surge Suppressor (TVSS) with response time as per short circuit calculation,Let-through Voltage 600V-800V. For selecting the source fault level bidder to consider value of transient reactance (Xd') as per IS -1180 for transformer of rating 11/.433 KV 1000 KVA

8.8 Stainless steel (SS) cable tray to be considered above each row of the Rack along with required Cable tray Grid above the rack to be considered and provided. (Minimum four crossing of SS cable tray - two at end and two at center are required. Bidder to consider 2 X 150 mm and height of 65 mm SS cable tray. (2 nos. in parallel two each other)

8.9 Cables- All Low tension cables should be of 1.1 KV grade, All power cables from 25 Sq.mm to 400 Sq.mm should be with stranded, compact aluminum conductor, with XLPE insulated, PVC inner sheathed, galvanized steel strip armored and overall PVC sheathed conforming to IS:7098 /88. As stated in Electrical single line diagram for Cu flexible cables should be of Solid/Stranded Copper conductor, XLPE Insulated, cores laid up, PVC tape/PVC Extruded Inner sheathed for Multicore Cables, Unarmoured, extruded PVC Type ST2 Sheathed as per IS 7098 (Part 1) 1988.

8.10 Bus Duct Sandwich Type -- **Copper Sandwich Type** Construction 3P4W 100% N with body Enclosure as Integral Earth. Operating Voltage 1000V Suitable for 50 / 60 Hz with impulse withstand voltage of minimum 6 kV, Insulation Voltage 690V Rated Short time Current 20 kA for 1 Sec. Cu conductor with Tin coating on entire surface, Neutral conductor shall have same cross section area that of phase conductor. The Earthing shall be Aluminum and it shall be one continuous piece, integral earth rated at min 50% of phase. Earthing shall be factory fitted factory tested and Icw rating for the earthing shall also be declared on Type Test Certificate produced by manufacturer. Bus Bar Should be insulated with red class F thermosetting plastic material and factory fitted in one side of the each trunking components. The enclosure shall provide a protection not less than IP- 55 as per IEC-60529 for indoor application. . The busbar Trunking shall comply with standard IEC 61439-6 and the rated current of the busbar trunking systems shall be referred to the average ambient temperature of 40 °C .The Bus duct enclosure consists of four C-ribbed section bars, bordered and riveted, with excellent mechanical, electric and heat loss efficiency. The sheet metal is made of 1.5 mm thick hot-galvanizes steel treated according to UNI EN 10327 and painted with RAL7035 resins with high resistance to chemical agents.

Tap-off Box with Mechanical Interlocking Feature for MCB Power Isolation is required. Entire system should include but not limited to Straight Length, Flange End, Elbow 90 Deg. End cover, Horizontal hanger, adaptor box, Copper braded flexible, tap off boxes rating as per SLD and Layout Drawing. All these fitting shall be in accordance with IEC 61439-6 and from the same manufacturer. There should not by any risk of exposure to electromagnetic fields. The busbar trunking housing shall be constructed of electro galvanized steel and aluminum to reduce hysteresis and eddy current loses and shall be provided with 7 tank cleaning & powder coating process with a suitable protective finish of ANSI 49 grey epoxy paint. The busbar trunking housing shall be totally enclosed non-ventilated for protection against mechanical damage and dust accumulation.

8.11 C-DAC will provide the essential cables for establishing connections between the rack's DC power source and the Bus Bar Tap Off Boxes

9 Requirements towards Heating, ventilation, and air conditioning work

9.1 Air cooled chiller, variable speed screw type, suitable to deliver 70 TR at design conditions. 3 sets of chillers inbuilt variable speed inverter driven pumps within chiller frame are to be installed and inline pumps are to be installed. Chiller should have Quick restart feature and shall be able to reach to it's maximum capacity within 120 Seconds. Inbuilt ATS switch within Chiller electrical panel is mandatory. Condenser coil shall have anti-corrosive coating. Condenser fan shall be with EC type only. Civil pedestals, pipe racks, supports from walls/ slabs etc shall be considered as part of the scope of works by bidder. The chiller water pipes shall be insulated with UV protected cross linked polyethylene pipe sections suitable for outdoor applications. The thickness selection shall be submitted for approval prior to procurement and installation. The electrical panel for the chiller plant shall be outdoor type and shall house the chiller pump feeders also. The pump incoming power shall be separate and shall be taken from NON IT UPS. Harmonic suppression equipment to limit current harmonics to less than 5% THD shall be part of this panel. Details of chiller are as below.

Sr. No.	Description	Rating	Quantity
1	Air cooled variable speed inverter screw type (minimum two inverter independent circuit compressors) chiller with entering/leaving temperature 20°C/15°C at an ambient not less than (ASHRAE n=20) conditions. (2 Working + 1 Standby). Fouling factor for selection: 0.018 m2°C/Kw, with inbuilt variable speed inverter driven pumps within chiller frame.	70 TR	3

9.2 All cooling equipment selection to be done based on American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE n=20) standard. The cooling systems should perform efficiently at variable load conditions. The overall cooling solution should be designed to achieve better cooling and low operating cost. The room supply air temperature should be maintained at 22 +/- 2 Deg. C and humidity as per ASHRAE TC 9.9 2017 guidelines. The cooling system in the server rack area should be designed as per layout design provided in Layout Drawings. Heating and humidifier to maintain correct operating environment throughout the data centre needs to be considered. Relative humidity to be maintained in the cold aisle in data center will be from 40% to 65%.

9.3 Logic of operation of cooling system will be as follows: The dedicated temperature & RH sensor will sense the room Temperature and RH in the cold aisle. When the RH increases beyond a set point, the 10KW In Row Cooler unit will start and dry and cooled air will be circulated inside the DC. As long

as the Room temperature and RH is above or equal to the "set point", the control system will facilitate the In Row Cooling Unit to run.

9.4 Air Cooled Chiller: Supply, installation, testing and commissioning of air cooled chiller with variable speed screw compressors. The finned coil heat exchangers shall consist of copper phosphorus deoxidised (Cu-DHP) tubes, having copper content 99.9%, made to EN 12735 parts 1 & 2, ASTM B280/b68/b743 specifications. Aluminium fins shall be with advanced rippled-corrugated fin design to create a state of continuous turbulence, with full drawn collars to maintain fin spacing and provide a continuous surface cover over the entire tube. The tubes shall be mechanically expanded into the fin collars to provide a continuous primary to secondary compression bond over the entire finned length for maximum heat transfer rates. Headers shall be made of copper tubes having steel-flanged connections as standard. Micro channel is not acceptable

9.5 DX Based In Row Unit with CE+UL certification with inbuilt dual power supply:- Supply, installation, testing and commissioning of self-contained direct expansion type In Row units suitable for operation on R32 /R410a/R407C refrigerant & should have advanced microprocessor based. In row units should consists of cabinet,inlet filter, EC fans, Inverter Compressor, Direct Expansion Cooling Coil, Heater banks to maintain humidity inside the space, condensate drain pan of stainless steel construction, Condensate pump, humidifier,Microprocessor panel, programmable control complete with LCD display. The unit shall be suitable for operation on on 230V, 50 Hz, AC supply. The controller unit should also be capable of starting the standby unit in case the temperature is not able to achieve with the working units. For Basis of Design Bidder to consider site ambient data along with below maintained parameters. The Row based cooling unit should get coupled with IT racks and supply cold air very close to IT load and remove hot air closely from IT load. Unit's airflow should be horizontal and should provide uniform air distribution over the entire face of the coil. The In row-based solution improves energy efficiency and cooling ability in a number of ways. Direct Expansion (DX) InRow unit draws air directly from the hot aisle (if any as per design), allowing the unit to take advantage of higher heat transfer efficiency due to higher temperature differences. It can then discharge room-temperature air directly in front of the servers it is cooling. Placing the unit in the row enables the unit to operate at higher return and supply air temperatures, yielding 100% sensible capacity. This significantly need to reduce higher humidification. The modular design of the InRow unit allows it to be easily added in the row as the demand for cooling increases. The additional benefit of the row-based architecture is the ability to add hot-aisle containment. Containing the hot aisle further reduces any chance of hot and cold air streams mixing. The unit shall be configured to provide air flow/pattern to provide uniform airflow over the entire height of the rack. A variable capacity compressor with inverter which permits staples adaptation of the output in partial-load operation. EC fan /variable speed should be used for maximum efficiency and minimum power cost. The system should remain in operation in case fan replacement is required. Cooling system should come with monitoring and control panel. Total CFM (cubic feet per minute) of each unit should be adequate to maintain the rack temperature. Supply cooling temperature to be maintained at 22°C or lower with an accuracy of ±2°C. at site ambient conditions.

9.5.1 Equipment Parameters

Equipment air outlet	22 DegC +/- 2 Deg & 50% RH
Machine configuration	Front discharge
Ambient temperature	As per Ashrae n=20
Return air temperature	33 Deg C
Actual Capacity	10 kW
Flow Direction	Front discharge
Machine Capacity control	Return Air
Compressor type	Inverter Compressor

Evaporator Fan	Backward curve blades with Electronically commutated (EC) motor
Humidification & De-humidification: In built feature of humidification & dehumidification	In built feature of humidification & dehumidification
Filters	Filter to be provided on the Package unit, having 90% efficiency down to 10 Microns
Outdoor unit	1 per dedicated circuit / In Row, with copper tubes & aluminum fins with fan speed controller & anti-corrosive coating.

9.5.2 The frame of the units is constructed of 16-gauge formed steel for maximum strength. The cabinet is serviceable from the front and rear. All exterior panels and corner posts on the frame are powder coated for durability and an attractive finish. The front and rear exterior panels are constructed of 18 gauge perforated steel with 80% open free area. All panels, which include a key latch for safety and security, allow easy access and removal. The footprint of 300 mm is required. Units shall include casters and levelling feet to allow ease of installation in the row and provide a means to level the equipment with adjacent IT racks.

9.5.3 Inverter Compressor The compressor shall be of the high efficiency design operating with R32/ R410A / R407C refrigerant and 415V/3~/50 Hz supply. The compressors should be operating with R32/R410A /R407C and power supply of 400-460V/3ph/50 Hz /230V/1~/50 Hz. . The compressors are provided with integrated thermal overload protection. The compressor motor control driver is provided with integral electronic protection against over temperature, over current, over or under-voltage with absence of one or more phases. Compressors, the humidifier shall be isolated from the air flow in the version with downward flow machines. The compressor shall be charged with mineral oil and designed for operation on environment friendly refrigerant R32/R410a /R407C.The machine should be inbuilt with the liquid receiver & pressure relief valve, Liquid line solenoid Valve, NRV for better performance of the machine.- The refrigeration system shall be of the Single/ Multiple circuit direct expansion type. The refrigerant circuit comprises of Liquid receiver inbuilt in the indoor unit ,Electronically- controlled expansion valve (EEV),Solenoid valve for shutting off the refrigerant liquid, Refrigerant liquid flow indicator, Solid cartridge Freon filter, Safety valve, High pressure safety pressure switch with manual reset, Low pressure switch with automatic reset, Copper refrigerant pipes with anti-condensation insulation on the suction line, Pipe taps on suction and delivery side and charging valve on liquid side, Each Compressor / refrigerant circuit to have its own independent Evaporator coil and Condenser coil.

9.5.4 Condensate Pump - : A condensate pump is factory wired and piped internally to the condensate drain pan. Within the condensate pump, there should be dual position float. The first position is used for condensate pump control and the other float generates a condensate pump failure alarm to prevent condensate pan overflow.

9.5.5 Cooling Coil- Cooling coil needs to be designed for high-sensible heat ratios, the coil is constructed with copper tubes, raised-lance-type aluminum fins, and 18-gauge galvanized steel end plates. Coil headers are equipped with anti-drip shields in the event of condensation. The condensate pan is thermal formed non-ferrous material, and is sloped for positive drainage to provide higher indoor air quality.

9.5.6 Electric heaters-Each packaged In Row unit shall be provided with multi stage heating elements constructed from aluminum. Electric heaters shall be of the low temperature totally enclosed strip type fitted with radiation fins . If overheating occurs, a safety thermostat should cuts off the voltage supply to the heaters and triggers an alarm. These elements are low watt density, wired for single-

phase and loaded equally on all three phases, and electrically and thermally protected by both automatic and manual reset thermal cut outs.

9.5.7 Filters-Filtration of conditioned air is very important to maintaining the clean, particle-free environment required inside Data Center. Filters should be easily replaceable from the unit. Filter efficiency should be greater-than 20% as ASHRAE 52.1. Filters are washable type and needs to meet HF-1 standards (as per ASHRAE 52.2).

9.5.8 In row unit should have both bottom as well as top entry of refrigerant pipes.

9.5.9 The unit should be equipped with variable speed, electrically commutated (EC), to allow for varying heat load. Variable Speed Fans shall be variable speed capable of modulating from minimum 20% to 100%. Each fan assembly shall consist of integral fan finger guards. Minimum 8 FAN assemblies per unit are required.

9.5.10 Condenser shall be air-cooled type, suitable for outdoor installation and shall be suitable for operating at high ambient and at low ambient as per site ambient temperatures. Condenser shall be in copper tube & aluminum fins construction. The condenser fan/s shall be of axial type with variable voltage electric motor complete with IP-54 or greater protection. Motor shall be speed controlled to ensure a stable operation for varying ambient.. The condenser shall be complete with provisions for refrigerant piping connections, shut off valves and any other standard accessories necessary with the equipment supplied. Each In Row Circuit to have its independent set of condenser coil. The condenser should be equipped with fan speed controller for the speed variation based on the condensing temperature & the speed variation should be steeples. Condenser unit should be with small foot print unit and top discharge condenser will be recommended. Condenser with compressor inside is also recommended requirement as keeping compressor in the OCU unit (i.e.away from data center) will ease during routine maintenance as well as shut down maintenance activity and it lowers the sound level in Data Center. Copper piping with insulation tube of elastomeric, nitrile foam between each sets of outdoor & indoor unit. Piping to be properly supported by MS clamp. All transmission wiring between indoor to outdoor units should be kept in GI conduit/Plica Flexible Metal Conduit / Cable Tray. Maximum distance between indoor and outdoor unit to be considered as per site conditions and provided drawings.

9.5.11 Electronic Expansion Valve (EEV) The unit should have Electronic Expansion Valve and should be capable of responding to the varying load conditions.. It should be able to provide advantages as Fast, high precision adjustment of refrigerant flow, Fast arrival of the unit at steady-state conditions, Superheating value remains constant in variable thermal load conditions, Efficient operating conditions of the compressor, especially in the presence of low room temperatures etc.

9.5.12 Humidifier-. The humidifier shall be capable of providing continuous auto modulation in steam generation as per the steam requirement per hour. The humidifier shall be fully serviceable with replaceable electrodes. This needs to be factory piped and wired, with cylinder and an automatic solid state control circuit. The humidification system shall automatically condition the passing air to a user-specified humidity setpoint. The reheat system, shall automatically work in conjunction with the condensate management system to temper the air to match the user-specified temperature and humidity setpoint.

9.5.13 De-humidification cycle shall operate by keeping the airflow constant but with the help of EEV to reduce the ADP of the coil. The De-humidification system should be designed to ensure RH does not exceed 65% .

9.5.14 The system shall be provided with relevant water detection kit which shall have sensors with wire of minimum 1.5mtrs and each of the sensor must be capable to detect individually any water below the false floor near the unit, the sensor must be connected to the unit microprocessor thus enabling the controller to give an alarm incase of wet floor.

9.5.15 A microprocessor shall continuously monitor operation of In ROW unit continuously digitally display temperature and room relative humidity, alarm on system malfunction and simultaneously display problem. When more than one malfunction occurs, flash fault in sequence with room temperature, remember alarm even when malfunction cleared, and continue to flash fault until reset. Microprocessor to control and display the functions as Room Temp temperature, Humidity ,Speed of the delivery fans, Timing of compressors with automatic rotation, Alarm signals , Cool fail, Air filter clogged, Return air sensor fault, Supply air sensor fault, Rack temperature sensor fault, High discharge pressure, Low suction pressure, Fan fault etc.

9.5.16 All In Row Unit should monitor on BMS system to collect critical information of connected devices, temperature, humidity etc.

9.5.17 Chilled water Active Rear Door Heat Exchanger (RDHx) is to be used for all the computing power heat removal and keeping the room at 22+/- 2°C. The RDHx should be matching to the rack frame size which is 800mm width and 45U for the computing server racks and network and spare racks shall be confirmed during detailed engineering. No site modifications will be allowed.

9.5.18 RDHx should have the following features:

Easily adaptable to third party cabinets.

Heat exchanger connections external thread BSPP 1-1/4" thread flat sealing, integrated venting valve with hose.

Water Connection to the unit shall be with insulated stainless steel corrugated hose of required length and matching to the pipe lines/ units for easy and quick connections.

Factory fitted and tested control Valve with actuator as per load requirement.

Motorised control valve , Control valve with electric actuator for modulation of the coolant flow. Set consists of:

- 1 x 2-way valve orifice diameter 25mm and Kvs value of 16, pressure rating PN16, zinc-pleated brass, BSPT 1" female thread00
- 1 x electric actuator 24VDC, supplied with power through the controller, 3 point control

Water flow, pressure and temperature sensors included with the water control package allow for water monitoring and regulation according to actual heat load

Frame solution separates coil and condensate management from the rack-mounted equipment

Product Safety: IEC 62368-1, IEC 60335-2-40, UL 1995, UL 60335-2-40, CSA C22.2 #236

EMC : 61000-6-4, 61000-3-2, 61000-3-3

Shock & Vibe: Siesmic : 60068-2-27, 60068-2-64

Environmental: REACH, RoHS, CA PROP65

Transportation: Thermal Shock according to Telcordia GR-63, Section 5.1.1.1

Rear space inside the cabinet should be completely available for power distribution and cable management.

Fans should be hot swappable without door opening.

Redundant Power Supply Units, require hot swappable without opening of door. RDHX should have enough fans to generate Air flow of 10000 m³/h to remove the heat from rack.

Should have High performance heat exchanger with vertical fins and hydrophilic coating.

Main controller toolless hot-swappable, no opening of door required.

Easy handling of RDHx - Total depth of shall not be exceed more than 250mm with Fan module.

Should be Integrate with Air temp, Air humidity, water temp, water flow, water pressure sensors, leak detection sensor etc.

7" touch panel display with new User Interface

Performance at inlet 20°C water supply., 24°C air supply should give up to 45Kw. keeping the room at 22+/- 2°C.

OEM should be present in India with good service network through direct and indirect authorised partners.

The RDHx should be aesthetically good and matching to the Rack colour/ shade. Bidder to co-ordinate and ensure that the same is matched prior to delivery.

Body shall be preferably GI powder coated with copper cooling coils and aluminium fins. Variable speed fan to automatically operate at optimal speed as per the rack discharge temperature. Under normal operating periods, the load of the RDHx shall be taken on the floor using levelling studs and not on the hinge of the door.

The chilled water connections should be from bottom.

9.5.19 Thermal Containment, if specified, should be provided for best in class. Containment of both front and back should be done. In row Cooling unit, where used for Rack cooling, should supply cold air in front of rack and suck hot from rear end of it from hot aisle.

9.6 Water Piping and accessories: Water pipe should be heavy duty Mild steel (MS) (Black steel) with all necessary fittings like bends, elbows, tees, flanges, reducers, vibration isolators, hanger, supports, PUF Gatti and fitting like flanges, bellows, union, etc. MS 'C' class water piping, cut to required length and installed with welded joints, including all necessary fittings such as elbows, tees etc. Piping shall be insulated with physically cross linked polyethylene pipe sections. External finish of insulation shall be Al. foil finish for internal application and with manufacturer recommended treatment for external application. Minimum thickness of insulation shall be 19 mm indoors and 25 mm in outdoors and internal unconditioned spaces. Thickness of insulation shall be selected from software and submitted for prior approval. All pipe joints shall be welded or provided with necessary fittings. Pipe flanges shall conform to IS:1536 whereas the threads shall conform to IS:554. All piping shall be tested to hydrostatic test pressure of at least 1 ½ times the maximum operating pressure but not less than 7 Kg/Sqm for a period of not less than 24 hours. Entire system shall then be retested. After completion of the installation, the pipe lines are to be flushed thoroughly to blow out the entire dirt and muck. The system then shall be balanced to deliver the water quantities. Direction of flow shall be marked on aluminum cladding above pipelines in bold markings. All pipe supports shall be galvanized, modular supports.

9.7 BTU meter: Online BTU meter which is pipe mounted and weather protected (if installed exposed to atmospheric conditions), shall be communicable type and shall provide data of instantaneous BTU/Hr (i.e. plant loading), BTU (cumulative thermal energy), instantaneous Flow, instantaneous supply chilled water temperature and return water temperature. All these data shall be stored in the BMS with an time interval of not exceeding 10 minutes. The BTU meter shall be such than it can be field calibrated with reference to any master calibrated instrument, should require minimum or no maintenance and should preferably be Ultrasonic type using dropper principle.

9.8 Water flow meter and water quality meter shall also be installed online in the make up water system. This shall also be communicable type and BMS should have records of the water quality and quantity being added to the system.

9.9 Differential Pressure Transmitters: Differential pressure transmitters shall be field mounted and shall transmit an isolated 4-20mA DC signal indicative of process variable to the pump logic controller via standard three wire 24 DC system with Emission/Immunity confirming to EN61000-6-2/3. Unit shall have stainless steel wetted parts with two 7/16" process connections. It shall be protected against radio frequency interference and shall have water tight, IP 55 electrical enclosure. Sensor should be capable of withstanding a burst pressure of 25 bar. Accuracy shall be within 2.5% BFSL (Best Fit Straight Line).

9.10 Supply, installation, testing & commissioning of Centrifugal Pumps. The pumps shall be vertical multistage, in-line design which enables installation in a horizontal one pipe system where the suction and discharge ports are in the same horizontal level and have the same pipe dimensions. The pump, electric motor, coupling and coupling guard shall be factory assembled at the pump manufacturer's facility. Pump shall be fitted with a 3-phase, fan-cooled induction motor. Motor shall Include a frequency converter VFD (PI or PID controller)i either in the motor terminal box or in separate Pump panel. The combined motor and frequency converter efficiency shall be higher than the IE4 level defined for fixed-speed motors in IEC 60034-30-2. Pump and motor shall be of integrated and user-friendly compact design. Sound pressure level of pumps shall be according to EN ISO 3743.The design total head capacity curve shall preferably be continuously rising towards the shut off. In case of unstable (drooping) characteristic the duty point shall be well away from the unstable region. The shut off head shall be at least 110% of the total head. Pumps shall run smooth without undue noise and vibration. Vibration shall limited to class II C of BS 4675 Part –I. Pumps of a particular category shall be identical and shall be suitable for parallel operation with equal load division. Components of identical pumps shall be interchangeable. . Flexible bellows at pump inlet and pump outlet as per suction and delivery sizes to be considered. Pump Base shall be a robust construction with integrally-cast support in order to transmit pipe load to the foundation. Liquid passages in the casing shall be smooth finish to ensure high Efficiency. Pump Flange dimensions shall be in accordance with EN 1092-2. Pump base shall have tapped hole provision for draining. The impeller shall be AISI 316 stainless steel enclosed type with smooth surface finishes for minimum frictional loss. This ensures high Efficiency. Impeller shall be fixed to the shaft by means of a split cone and a split cone nut/union nut. Shaft shall be AISI 316 or AISI 431 stainless steel with splined design, and shall be adequately sized to with stand all stresses, hydraulic loads, vibrations and torques coming in during operation. Shaft shall be provided with Mechanical seal as default fitment to provide leak free operation. The liquid cavity shall be sealed off at the pump shaft by an internally flushed mechanical seal with Silicon carbide seat and Silicon carbide seal ring, suitable for continuous operation at 50o C. The mechanical shaft seal shall be cartridge type for maintenance free operation and balanced. Pump base shall be EN-GJL-200 or EN-GJS-500-7 grade Cast Iron according to ASTM 25B or ASTM A536-84 70-50-05 or equivalent standard. Motor shall be suitable for operation on a 3 X 380-500V (± 10% variation), 50-60Hz ± 5%, 3phase AC supply. Motor with thermal protection against steady overload and stalled condition (IEC 34-11). Bidder may consider an integrated frequency convertor and a PI controller incorporated within the motor terminal box and also inbuild DP sensor and flow mater.

9.11 Variable Frequency Drive(VFD): The variable frequency drive(s) shall be pulse width modulation (PWM) type, microprocessor controlled design. VFD, including all factory-installed options, is tested to conform to UL standard 508. VFD shall also meet UL and be CE marked and built to ISO 9001:2000 standards. VFD shall comply EMC directives as per IEC 61800-3:2004, category C1 with 50-meter motor cable (for power less than or equal to 90 Kw) & category C2 with 50 meter motor cable (for power more than 90 Kw). VFD shall be housed in enclosures for indoor applications. Wall mounted/VFDs with plastic enclosures shall not be acceptable. For outdoor applications, VFDs shall be housed in IP 54 enclosure or if inbuild pump with frequency inverter the enclosure shall be IP55. VFD shall employ an advanced sine wave approximation and voltage vector control to allow operation at rated motor shaft output speed with no deration. This voltage vector control shall minimize harmonics to the motor to increase motor efficiency and life. Power factor shall be near unity regardless of speed or load. VFD shall have balanced DC link chokes to minimize power line harmonics. VFDs without a DC link choke shall provide a 3% impedance line reactor. VFD shall be compatible for ModBUS/any open standard protocol.

9.12 Gate and globe or Ball valves: Gate and globe valves up to 50 mm size shall be gun metal construction. Valves above 50 mm diameter shall have cast iron body and bronze/gun metal spindle valve seat. The valves shall have non rising spindle.

9.13 Butterfly valves: The butterfly valve shall be supplied along with flow control lever. The valves shall be compact in size and shall conform to BS 5155, MSS SP 67 and API 609. The valves shall be light in weight and easy to install. The body shall of close grain cast iron conforming to IS:210 and the seating shall be of Resilient black, Nitrile rubber / EPDM moulded on to the body. The disk shall be of SG iron nylon coated, whereas the shaft shall be of stainless steel A ISI 431 treated permanently for lubrication. The shaft seals shall be of Nitrile 'O' rings and rubber seals. Valves shall be rated PN 16. Care should be taken during installation to see that the disk is not damaged during installation due to the flanges being incorrectly spaced. Provide gear operated valves for sizes having 300 mm and above. For smaller sizes such as 40 mm and below diaphragm type or Ball valves are acceptable. The butterfly valve shall be supplied along with flow control lever.

9.14 Ball valves: Ball Valves shall have body of carbon steel. The ball and the shaft shall be of stainless steel. The seat shall be of PTFE. The valve shall be complete with socket weld ends.

9.15 Check Valves: Check valves for smaller sizes shall be of swing type of gun metal construction. Spring loaded double flap check valves shall be used for horizontal lines. Wafer type plate check valves shall be used for bigger sizes. The check valves shall be suitable for PN16.

9.16 Auto Balancing Valve: Balancing valve if specified or shown in drawings shall be installed in branch pipe. These valves shall be factory calibrated. Each valve shall limit flow rates within ±5% accuracy, regardless of system pressure fluctuations. Sufficient number of flanges and unions shall be provided as required to facilities maintenance work once the piping is installed. Piping shall be properly supported on or suspended from stands, clamps, roller hangers, etc. as required. The contractor shall adequately design all brackets, saddles, clamps and hangers and shall be responsible for their structural integrity. Each support shall be isolated from the support by means of anti-vibration springs or durable liner of neoprene rubber. Pipe supports shall be of steel and shall be painted with rust preventive paint and finish coated with synthetic enamel paint of approved colour. Only factory made supports with Galvanized fully threaded rods with bands are acceptable. The chilled water pipes shall be isolated from the bands by a rubber sheet.

9.17 Expansion Tank: Closed Expansion Tank with Expansion Vessel and pressurizing Pumps with one working and one standby. Expansion tank to be of MS with Nitrile Rubber Insulation minimum 32 mm thick & minimum 26 Gage Aluminum Cladding with diamond finish with related piping, isolating valves, safety valves, drains, overflow. Alternatively UV Protected pre cladded cross linked polyethylene insulation material (no clad) with thickness as per approved technical data sheets can be used. Tank shall have Anticorrosive Coating. Close expansion tank should be provided with water capacity to suffice the capacity of volume of water contraction & expansion during operation & rest state of the system while maintaining proper system pressurization under varying operating conditions. Tank should be a closed vessel with rubber bladder/diaphragm to maintain the operating pressure inside the pipelines. System should include PRV and Air Vent also. Standby and working booster pump should be provided with selector switch for pump starting, pressure differential transmitter, pressure gauge & non return valve at discharge outlet of the pump, suction and discharge manifold.

9.18 Pressurization unit consisting of inline vertical multistage, centrifugal water pump with SS 304 casing, SS304 impeller and SS316 shaft, CI base TEFC motor, with mechanical seal, control panel and with duty cycling and dry run protection.

9.19 Thermal Storage Buffer Tank- MS tank with capacity as per P & ID to be used as thermal storage for back up supply. The tank to be of M S Construction and with anti-corrosive coating from inside with Nitrile rubber Insulation 32 mm thick & 26 Gage Aluminum Cladding with diamond finish OR UV protected No Clad cross linked polyethylene (XLPE) material of required thickness, and with related piping, Isolating valves , Safety valves , Drains, Overflow and Guages. 6 mm Shell thickness and 8 mm Dish thickness. The tank shall have necessary ports with flange. Bidder to consider temperature sensor of as well as level sensor in both the tank and same to be integrated in BMS for control as well as monitoring. Bidder to ensure insulation and cladding. Location of thermal storage tank will be as per approved drawing. Storage capacity calculations shall be submitted for approval for 10 minutes back up.

Bidder can choose to use ICE thermal storage in lieu of water storage with proper calculations and approval to reduce the size of the storage.

9.20 STRAINERS -Strainers shall be preferably of approved 'Y' type or pot type as specified in the GeM Bid schedule with GI or fabricated steel bodies. Strainers up to 50 mm shall be of gun metal type. Strainers shall have a removable bronze screen with 3 mm perforations and permanent magnet. Strainers shall be provided with flanges. They shall be designed so as to enable blowing out accumulated dirt and facilitate removal and replacement of all screen without disconnection from the main pipe. Strainers shall be provided with isolating valves so that they may be cleaned without draining the entire system.

9.21 Chemical dosing plant with dosing pumps suitable for the requirement for flushing and treating the water. This should include make up water storage tank, first charge of Dosing chemicals for the commissioning of the system, chemicals for the operation during warranty period. Treated water tank should be of adequate capacity. Entire system should include interconnecting piping, accessories, float and valves complete in all respect. This system is used to remove mill scale, dirt etc. and provide a protective corrosion resistant layer on the inside surface of piping. Chemical dosing system shall be provided to minimize corrosion, biofilm prevention, preventing scale deposition and to control the water quality. Chemical dosing system shall maintain the water PH value 8.0 to 9.5, total dissolved solid less than 1500 ppm and sulphite concentration between 50 to 100 ppm.

9.22 Server Rack 45U having dimensions of 800 X 1460 mm **are not in the scope** of bidder. **However, the bidder to ensure that the RDHx should meet this size of the racks with proper framing and blank off panels. No area should be left free for air bypass from the racks.** The Rack unit supported by Plinth/ Casters/ Leveller should support a static load not less than 1000 kg, total installed equipment weight. Flame Retardant blanking panels for empty 35% blank space to be provided., All enclosure components i.e. frame and door should be bonded together and to rack ground point. Rack should be constructed with extruded aluminum frame to provide stability and load bearing capacity. The Rack should be provided hexagonal perforated single front door with high security electronics locks. Rack should have all built-in accessories to manage cables and other devices. All the mounting hardware should be provided with rack. Rack is powder coated with Nano ceramic pre-treatment process. The Powder coating process is ROHS compliant. Powder coating thickness shall be 80 to 100 microns .Bidders not to consider supply of 45 U server racks.

The bidder is required to do NSM Branding on the front door and side panel of the solution as per the specification (Specifications / drawings will be provided by C-DAC).

10 Requirements towards IBMS work

10.1 Supply and implement physical security (access controls including biometric), Motion sensors etc.

The basic function of access door control is as below.

a) Access control system (ACS) is to be deployed to allow entry for the authorized personnel only and restrict unauthorized people from entering nominated areas of premises. Access privileges to be configured as per the access data stored in Access Door Controllers (ADC). These privileges define the right of access card holder to enter the predefined area upon presenting the card at readers.

b) It shall support distributed architecture with central monitoring and control. If communication to the central control fails, the ACS shall continue providing access based on the predefined security configuration. Until communication is restored, all event logs and alarms shall be stored locally for minimum six months (based on ADC capacity). These events shall be sent to the central control when the communication is regained.

c) It shall have multiple supervised inputs. The dynamic status of each input shall be continuously monitored and each change should be reported immediately.

d) It shall provide programmable inputs, i.e. the ability to apply a variety of conditions to the way in which these inputs are monitored. These conditions shall be expressed in definite terms. It shall be able to produce and communicate various types of outputs (Audible sirens, relay switching etc.) based on the above definition. These outputs shall be standard in terms and shall be interfaced as inputs to other Building Management System. ACS communications should support RS232/ RS485/ TCP/IP. All data over the network between the ADC and the Server end shall be encrypted. All ACS software/firmware upgrades shall be downloadable through the network to the ADC.

10.2 Supply and implement environmental Controls and other sensors(Air conditioners, humidity controls, etc.)

a) Humidity Sensor: The humidity sensor shall be in an independent housing or be combined with the room /duct type temperature sensor in the common housing as per application requirement. The sensor should be electronic type with capacitive sensing element. Relative Humidity (RH) sensors shall be of standard 0-10 VDC or 4-20 mA type, well protected against solid and liquid contaminants with a permeable coating. Range of 0-100% RH. Accuracy: +/- 3% Operating temperature range of 0 to 50 °C. Stainless steel sheath construction complete with integral shroud to enable specified operation in air streams of up to 10 m/sec. Maintenance of Sensor to be by a

simple field method such as solvent or mild detergent solution washing, to remove anticipated airborne contaminants. Maximum sensor non-linearity of ±3% RH with defined curve.

b) Water Flow Meters - Water flow meter should work on Faraday's law of induction or Doppler principle or any equivalent velocity sensing principal. As soon as the electrically charged particles of a fluid cross the artificial magnetic field generated by two field coils, an electric voltage is induced. This voltage, tapped by two measuring electrodes, is directly proportional to the velocity of flow and thus to the flow volume. The magnetic field is generated by a pulsed direct current with alternating polarity. This ensures a stable zero point and makes the flow measurement insensitive to multiphase or inhomogeneous liquids, as well as low conductivity. The measuring principle is virtually independent of pressure, density, temperature and viscosity. Flow meter should be communicable type and integrated with preset flow alarm. Accuracy shall be + 2% of actual reading from 0.4 to 20 feet per second flow velocities.

c) Monitoring of Water Quality –This is used for real-time measurement of water quality. This is used to optimize treatment processes, detect water contamination incidents etc.

   a. pH Sensor and monitoring - The pH of a solution indicates how acidic or basic (alkaline) .pH sensor should have measurement range from 0-14.

   b. Turbidity sensor: Turbidity has indicated the degree at which the water loses its transparency.

   c. Temperature sensor:

10.3 BMS System: - Architecture of BMS system shall be of:

- Management Level (BMS Servers/Software)
- Control Level (DDC Controllers)
- Field Level (Field Sensors)
- Operational Layer
- BMS should have capability to show real time PUE, trends and record historical data of PUE.
- BMS should generate event notifications over emails, data for events based on which uptime and downtime will be calculated.
- BMS should generate alarm signal and tripping signal at abnormal situations. This should be software generated and any one can be utilized for giving tripping command for shutting down the some servers or all.

There should be real-time reporting of

- Component wise and aggregate power consumption
- Temperature and relative humidity in the data centre and UPS room.
- Instantaneous PUE, hourly PUE, daily PUE, monthly PUE and annual PUE.
- Alarm indicators for component failures.

There should be real-time monitoring and logging of all parameters of the data centre as per ASHRAE/TGG 2009 Real time energy consumption measurements in data centres guidelines (best practical). There should be facilities for periodic reports (including uptime reports) of all aspects of the data Centre. All the required hardware and software eco-system which store at least two months of historical data (High end PC, 32" LCD HD Monitor, Key Board, Mouse etc.) has to be supplied by the bidder. The Integrated Control Platform shall support encrypted password authentication for all web services whether serving or consuming. Bidder to consider the integration of CDU unit along

with integration of DC modules of all the racks in the scope. A Graphical User Interface (GUI) shall be provided indicating SLD ,P &ID, Equipment's visuals etc.

Specification of all in one PC with 23 inch monitor : Intel Core i-7 latest generation processor, OS - Genuine Windows 11 Prof, RAM - 32 GB DDR3/DDR4 SDRAM Memory - 1TB GB HDD Graphic Card - 2GB NVIDIA Quadro 600 Graphics capability: VGA, with at least 32k colors Network: 100/1000 Mb Ethernet network card with wireless keyboard and Mouse. Make: Dell / HP

BTU Meters at outlet of each chiller should be considered to ensure a Real-time measurement of the BTU being consumed. To monitor Component wise and aggregate power consumption suitable energy meters shall be provided.

10.4 Supply and Implement fire alarm system –

The system and its components shall be Underwriters Laboratories, Inc. listed, and FM APPROVED under the appropriate testing standard, for fire alarm systems and the installation shall be in compliance with the UL 10th Edition listing. The fire alarm system shall comply with requirements of NFPA 72 (National Fire Alarm and Signaling Code). The system shall be electrically supervised and monitor the integrity of all conductors.

When a fire alarm condition is detected and reported by one of the system indicating the affected devices, the following functions shall immediately occur:

- The System Alarm LED to be flashed.
- Built in Agent release circuit with release / Abort module of same make.
- System output programs assigned via control-by-event interlock programming to be activated by the particular point in alarm should be executed, and the associated system outputs (notification appliances and/or relays) to be activated.
- The audio portion of the system should sound the proper audio signal (consisting of tone, voice, or tone and voice) to the appropriate zones.
- Zone identification should be available on BMS system.

The publications listed below are part of this specification.

National Fire Protection Association (NFPA) - USA:

No. 70	National Electric Code (NEC)
No. 72-1996	National Fire Alarm Code
No. 90A	Air Conditioning Systems
No. 92A	Smoke Control Systems
No. 92B	Smoke Management Systems in Large Areas
No. 101	Life Safety Code

Bidder to consider fire alarm system in Data center area, Porta Cabin i.e. UPS, Panel and Battery area.

10.5 Supply and Implement Video Surveillance systems (if required):

The surveillance system shall be designed and developed to the following standards: ISO 9001 (2000), ISO/IEC 15504 Level 3 or higher

The NVR based system shall include Data storage of 4 months and any other required software,

hardware etc. CCTV should cover all internal area in the server room, Porta Cabin area, entrance of server room and external utility area including chillers area and Thermal storage tank area etc.

10.6 Supply and implement Very Early Smoke detection system (VESDA):

Provide an air sampling smoke detection system (Very Early Smoke Detection Apparatus) for each server area. Provide a Laser Focus air sampling smoke detection system for areas as per site condition including but not limited to utility area, server area etc. in accordance with manufacturer's recommendations.

The air sampling smoke detection system shall consist of highly sensitive smoke detectors with aspirating fans, air sampling pipe network, filters, networked controllers and a high-level interface to the building Fire Alarm System, as required.

The air sampling detectors shall provide a nominal obscuration level range from .0015 to 6% /ft., adjustable through the system operator control interface.

Smoke Detector Assembly: The smoke detector, filter, and aspirating fan shall be housed in a Detector Control Assembly Enclosure and arranged in such a way that air is drawn from the protected area through the filter and detector by the aspirating fan.

The Detector Control Assembly shall house the programmable intelligent controller, which will support air flow/detector supervision, automatic and manual sensitivity adjustment, time delay and remote reset functions. Laser COMPACT detector shall communicate with the fire alarm control panel.

The system shall provide 3 field-selectable levels of alarm status: Alert Level 1 (.04% obscuration/ft.), pre-Alarm Level 2 (1.06 % obscuration/ft.) and Alarm Level 3 (2.6% obscuration/ft.). Actual sensitivity levels will be determined in the field and programmed during system commissioning. Alarm Levels 1 and 2 will initiate a Supervisory Condition on the Fire Alarm System, and Alarm Level 3 will initiate the building-wide evacuation sequence.

- Approval – UL & FM
- 18000 Event logs required.
- Output signal – 5 Relay contact for Fault / Alarm & one analogue output for smoke density
- Large flow rate fan (Max. shutoff pressure: at least 350Pa and max. flow rate: at least 170L.min

VESDA to be considered in the Data Center Area as well as in Electrical /UPS Room.

10.7 Supply and implement Rodent Repellent System:

The objective is to protect the entire premises viz. server area, utility area etc., all the voids against rodents. The purpose is to keep the rodents away from the floor by generating very variable high frequency sound waves which are not audible to human ear but irritate rodents. The objective is to protect all the cables below floor, above ceiling & room void from damage caused by rodents. The system proposed is to protect all the equipment's, areas with relevant type of high frequency sound producing device called satellites or transducers. Once powered up these transducers produce very high frequency variable sound waves continuously which irritate the rodents and are forced to evacuate the place. The devices can be tested periodically by means of a test switch provided on Main console. Rode dent repellant system to be considered in all DC as well as in Porta Cabin.

10.8 Supply and implementing Water Leak Detection system:

It should include electronic alarm modules, water sensing cable, graphic display map, and auxiliary equipment. The system has to be capable of automatically detecting the presence of water at any point across the length of sensing cable. The system should alarm and locate the point of liquid contact on the digital display. This system should capable of communicating to BMS. Water Leak detection system to be considered in all DC as well as in Porta Cabin.

10.9 Supply and implementing NOVEC 1230:

Supply, install, test and commission NOVEC 1230 (Fluro Ketone FK-5-1-12) based fire suppression system. The fire suppression system shall include and not be limited to gas release control panel, CCOE approved seamless cylinders, discharge valve (with solenoid or pneumatic actuator) as the case may be, discharge pipe, check valve and all other accessories required to make a complete operation system meeting applicable requirements of NFPA 2011 standards and installed in compliance with all applicable requirements of the local codes and standards.

Bidder to consider NOVEC suppression system in Data center area, and for Electrical/ UPS room. Bidder to submit the calculation for the sizing of the gas quantity/ cylinders.

11 Indicative Design Schematic

Minimum rating of components at site ambient conditions (considering deration factors, taking in to account utilization of 90% under peak load) along with rating is as shown in below table.

Sr. No.	Name of Components	Rating for each unit	Qty.	Redundancy
1	3 x 70TR Chiller system along with Pump, Tank, Piping ,Control Panel, VFD,PID controller, Instrumentation as per P & ID etc.	281 kW	3	N+1
2	2 x 10 kW DX based Inrow with Air cooler condenser unit for Data Center Area	10 kW	2	N+1
3	3 X 500 KVA UPS Rack with 300KVA UPS with 10 minutes Li Ion battery back for IT load	300 KVA	3	N+1
4	2 X 50 KVA UPS in 150KVA UPS Rack frame with 10 minutes Li Ion battery back for NON IT load	50 KVA	1	N+N
5.	11 X 40 kW chilled water RDHx mounted on racks with frame suitable for 800mm width and no bypass.	40kW	11	N
5a.	5 X 20 kW chilled water RDHx mounted on racks with frame suitable for 800/600mm width and no bypass.	20kW	5	N
6	2 x 35kW DX PAC with return air plenum and motorised dampers	35kW	2	N+N

Sr. No.	Name of Components	Rating for each unit	Qty.	Redundancy
7	Buffer tank for 10 min storage back up	10 min	1	N
8	I BMS System, VESDA, Rodent, WLD		1	
9	Electrical LT Panels, PDU Cables etc.		1	
10	NOVEC gas bank system		1	
11	Fire Alarm		1	

Below is the list of minimum capacity and components/systems (BOQ) bidder should consider in the offering. Bidder to submit a rough estimate of each of the system sizing in their solution document along with the bid and successful bidder to provide detailed calculations with OEM data backups and certifications for each of the items for approval prior to delivery of the items.

Sr. No.	Description
1	Civil
1.1	Supply, Installation, Testing and Commissioning of Raised Flooring System as per specification and drawings give in this document. Bidder to refer the layout for calculating the quantity.
1.2	Supply, Installation, Testing and Commissioning of False Ceiling System as per specification and drawings given in this document. Bidder to refer the layout for calculating the quantity.
1.3	Supply, Installation, Testing and Commissioning of two hour fire rated glass Doors.
1.4	Supply, Installation, Testing and Commissioning of fire rated expandable foam, water soluble cable coating etc.
1.5	Supply, Installation, Testing and Commissioning of 2 hour fire rated Glass Partition
1.6	Supply, Installation, Testing and Commissioning of 2 hour fire rated MS door along with all accessories.
1.7	Any other missing civil components that's includes but not limited to opening , cut out and re closure, steel structure for Equipment's foundations and base frame, , thermal storage tank etc., At terrace floor column bracing along with structural platform is not in this GeM Bid scope for heavy components as Dry cooler and adiabatic water tanks. Bidder needs to submit the dry weight, wet weight, dimensions etc. details during bid submission to prepare the structural drawing.
1.8	Supply, Installation, Testing and Commissioning of INSULATION ON ROOF AND FLOOR SLAB, where ever required.
1.9	Supply and Installation of Room Signage and fire evacuation map.
2.0	Supply and Installation of fire resistance solutions etc.
2.1	In BMS room bidder to consider chair and computer table for BMS person and IT engineers (4 computer tables and 4 revolving chairs with handles). As shown in layout drawing

Sr. No.	Description
2.2	Supply , fabrication , installation of Steel for equipment platform, equipment base stand , maintenance stand , pipe railing , maintenance platform , etc.
2.3	Equipment's Foundation, chain link fencing for equipment at ground floor
2.4	Steel structure for the equipment's which are going to get installed at Terrace floor.(Excluding column bracing and column connections)
2	**Electrical System**
2.1	Supply , Installation, Testing and Commissioning of LT panels, lighting DBs, Raw Power DBs, Chiller plants Panels, Pump Starter Panel, UPS out Put Panel, In row Panels, ATS panels, PAC panels, isolator panels etc.
2.2	Supply, Installation, Testing and Commissioning of internal illumination system and external illumination. Internal Lux level to be 400-500 lux.
2.3	Supply, Installation, Testing and Commissioning cables and End terminations.
2.4	Supply, Installation, Testing and Commissioning Al sandwich bus duct of rating 500 Amps along with end feed units, tap off boxes, supporting hangers etc. as per SLD and layout.
2.5	Supply, Installation, Testing and Commissioning of perforated type Cable Trays, SS mesh cable trays etc along with Cover and supporting hangers as per Standard Engineering Practices.
2.6	Supply, Installation, Testing and Commissioning EARTH ELECTRODES AND EARTH STRIPS (as required and within battery limits)
2.7	Supply, Installation of First Aid Box, Shock treatment Chart, Emergency Fire evacuation Map, Shock Treatment Chart, Rubber Mat etc.
2.8	Supply, Installation, Testing and Commissioning of Rack PDUs as per rating provided in SLD with C13 and C19 sockets.
2.9	Supply, Installation, Testing and Commissioning of 3 X 300 KVA UPS with rack frame size of 500KVA UPS along with DC and AC Cabling and individual battery bank for back up time of 10 minutes. The type of battery shall be Li Ion type. Each UPS should have separate battery bank. Battery protection shall be provided by thermal-magnetic molded-case circuit breakers in each battery rack.
2.10	Supply, Installation, Testing and Commissioning of 2 X 50 KVA UPS with racks frame size of 150KVA UPS along with DC and AC Cabling and individual battery bank for back up time of 10 minutes. The type of battery shall be Li Ion type. Each UPS should have separate battery bank. Battery protection shall be provided by thermal-magnetic molded-case circuit breakers in each battery rack.
3	**Cooling System**

Sr. No.	Description
3.1	Supply, Installation, Testing and Commissioning of complete Air cooled 3 x 70TR Chiller System as per P & ID and Specifications including VFD –Pumps, Piping, Valves, Instrumentations, Electrical Panel, PLC, Fans etc. Location will be at terrace floor.
3.2	Supply, Installation, Testing and Commissioning of 2 x 10 kW In Row system along with air cooled condenser unit and associated piping and valves and as per specifications given. As per Layout drawing.
3.3	Supply Installation and testing and commissioning of 11 x 40kW & 5 x 20kW chilled water RDHx units with frames matching to 800mm wide rack doors.
3.4	Supply Installation and testing and commissioning of 2 x 35kW DX PAC units with mounting frames for electrical and UPS room.
3.5	Supply Installation and testing and commissioning of inverter based 5star AC units -3 nos. in the Battery room of rating 1.5TR each.
3.6	Supply, Installation, Testing and Commissioning of complete buffer storage / ice thermal system along with piping, valves Instrumentations, for 10 minutes back up at ground floor level.
3.7	Supply, Installation, Testing and Commissioning of Chemical dozing system along with tank.
3.8	Supply, Installation, Testing and Commissioning of pressurization system along with expansion tank and skid working + standby pressurization pumps, valves, sensors and switches.
3.9	Any other items missing as per drawing and GeM Bid specifications to make the system complete and meet the intent of the project, including BTU meters, energy meters, system controllers, plant managers etc.
4	IBMS-
4.1	IBMS – Integrated building management system should cover but not limited to, NOVEC Gas base fire suppression system, Fire alarm, Access control, Water leak Detector, Rodent Repellent, CCTV, VESDA System etc., Water quality, BTU metering, water Pressure etc. various types of sensors etc., software, communication protocol, field Devices along with Direct digital control (DDC) , etc.
4.2	Supply, Installation, Testing and Commissioning of Intelligent Addressable Fire Alarm System (FM Approved/ UL Listed) which includes Intelligent Addressable Fire Alarm Panel, FM approved Analogue Addressable Heat Type Smoke Detector, Analogue Addressable Multi Criteria Type Smoke Detector with In-buit Isolator Base, Addressable Manual Call Point, Sounder (85 Db), Response Indicator (For False Floor Areas), Addressable Control module for activating sounder , Gas release Panel , Access Control De-Activation, Short Circuit Isolator Module, Addressable Monitor Modules, 2 core x 1.5 sq.mm twisted pair shielded multi strand Armored FRLS cable etc.
4.3	Supply, Installation, Testing and Commissioning of VESDA system with aspiration detectors, nozzles, capillary tubes etc.

Sr. No.	Description
4.4	Supply, Installation, Testing and Commissioning of Rodent Repellant System
4.5	Supply, Installation, Testing and Commissioning of addressable Water Leak System
4.6	Supply, Installation, Testing and Commissioning of BMS System which includes Main Building Automation Graphic Software, BMS Machine, DDC Controllers with necessary Panels, Field Sensors, BTU meter, Level sensors, pressure transmitter, water quality, Third Party Integrations as In Row , Load Manager, Integration with fire alarm panel, Monitoring and control of cooling units , monitoring and controlling of pump and valve operations, CDU unit , DC modules in Racks etc.
4.7	Supply, Installation, Testing and Commissioning Fire Suppression System (Novec 1230 Based - For Server Room, Electrical Room and Battery Room) this should include Cylinder and valve assembly with solenoid actuator and Accessories, NOVEC Gas, manifold, valves, piping's, Nozzles, Abort switch, manual release switch etc. Bidders to submit the Gas concentration considered along with details calculation of volume calculation as ceiling void, floor void, room void etc. Modular Gas suppression systems are not accepted.
4.8	Water Quality Sensor and Monitoring
4.9	Supply, installation, testing and commissioning of water quality sensors as pH, Turbidity etc. along with monitoring system. This monitoring system needs to be integrated with BMS system.

12 Refer annexure for all drawings

- Data Centre with other support areas Layout.
- Terrace Chiller plant Layout
- Cooling P&ID
- Electrical SLD

13 Applicable Standards but Not Limited to

Installation and materials shall also confirm to latest amendments of

a. Indian Electricity Rules
b. Indian Factories Act
c. National Electric Code
d. Petroleum rules
e. Quality and Safety Standards

Sr. No.	Code Number	Description
1	IS 2309	Protection of buildings and allied structures against lightning.
2	IS 3043 /IEEE 80	Code of practice for earthing.
3	IS 5216	Safety procedure and practices in Electrical work.

Sr. No.	Code Number	Description
4	IS 3106	Code of practice for selection, installation and maintenance of fuses (Voltage not
5	IS 1646	Code of practice for fire safety of buildings (general) Electrical installation.
6	IS 9921	Alternating Current Dis connectors above 1000 V.
7	IS 2551	Danger notice plates.
8	IS 1248	Electrical indicating instruments.
9	IS 722	AC Electric meters.
10	IS 3156	Voltage transformers.
11	IS 10118	Installation and maintenance of switchgear.
12	IS 398 /IEC 1089-1991	ACSR conductors
13	IS 7098	Cross linked polyethylene insulated PVC sheathed cables up to 33 KV
14	IS 12943	Brass glands for PVC cables
15	IEC 99-4	Gapless Surge Arrestors
16	IS-900	Code of practice for Installation and Maintenance of Induction Motors
17	IS-1255 -1983	Codes of practice for Installation and Maintenance of Power Cables up to and including 33 KV Rating.
18	IS-732 1989	Code of practice for Electrical Wiring Installation. (System Voltage not exceeding660 Volt).
19	IS-1913	General and Safety Requirements for Luminaries.
20	IS-1646	Code of Practice for Fire Safety of Building (General) Electrical Installation.
21	IS 8130	Conductors for insulated electrical cables and flexible cords.
22	IS 3975	Specification for mild steel wires, strips and tapes for armouring of cables
23	IS-2667	Specification for Fittings for Rigid Steel Conduits for Electrical Wiring.
24	IS 3615	Glossary of terms used in Refrigeration and Air-conditioning.
25	IS 325	Three phase induction motor.
26	IS 1239	Mild steel tubes, tubular and other wrought steel fittings.
27	IS 639	Steel pipe flanges.

Sr. No.	Code Number	Description
28	IS 277	Galvanized sheet steel.
29	IS 5831	Specification for PVC insulation sheath for electric cables.
30	IS 655	Metal air ducts.
31	IS 732	Code of practice for electrical wiring and fittings for buildings.
32	IS 900	Code of practice for installation and maintenance of induction motors.
33	IS 1248	Direct acting electrical indicating instruments.
34	IS 6392	Steel pipe flanges.
35	IS 1367	Technical supply conditions for threaded steel fasteners.
36	IS:10462	Thickness of the PVC outer sheath
37	IS 4894	Centrifugal fan.
38	IS 1554	PVC insulated (heavy duty) electrical cables for working voltages up to and including 1100 V.
39	IS 659	Air-conditioning safety code.
40	IS 616	Mechanical refrigeration safety code.
41	IS: 1554 -	PVC insulated (heavy duty) electric (Part I) Cables - Part I for working voltages up to and including 1100V.
42	IS: 1753 -	Aluminum conductors for insulated cables.
43	IS: 3961 -	Recommended current ratings for (Part II) cables: Part-II PVC insulated and PVC sheathed heavy-duty cables.
44	IS: 3975 -	Mild steel wires, formed wires and tapes for armouring of cables
45	IS: 5831 -	PVC insulation and sheath of electrical cables.
46	IEEE 519:1992	Harmonics
47	IS 277	Galvanized Steel Sheet (Plain and corrugated).
48	IS 655	Metal Air Ducts.
49	IS 737	Wrought Aluminum and Aluminum Alloy sheet and strip for general engineering purposes.
50	UL 181	Factory – Made Air ducts and connectors.
51	UL 555	Fire Dampers.
52	ASHRAE 70	Method of testing for rating the performance of Air Outlets and inlets.
53	BS 649	Diesel Engines for general purpose.

Sr. No.	Code Number	Description
54	BS 2613	Rotating Electrical Machinery.
55	IS 4722	Electrical performance of rotating electrical machinery.
56	IS 4728	Terminal markings for rotating electrical machines.
57	IS 4729	Measurement of vibrations of rotating electrical machines.
58	IEC60034	Rotating Electrical Machines
59	IEC60034.1	Rotating Electrical Machines Part1: Rating and Performance
60	IEC60947	Low Voltage Switchgear and Control Gear
61	ISO 8528 Part 1 to 10:	Reciprocating Internal Combustion engine Driven Alternating current Generating Sets
62	IS-375	Marking and arrangement for switchgear bus bars, main connection and auxiliary wiring.
63	IS-722 Part – I	AC Electricity Meters
64		Part - I General requirements and tests
65	IS-1248	Direct acting indicating analogue electrical measuring instruments and their accessories.
66	IS-1822	AC Motor starters, of voltage not exceeding 1000 volts.
67	IS-2147 IS-2208	Degrees of protection provided by enclosures for low voltage switchgear and control gear.
68		HRC cartridge fuse links for voltage above 650V.
69	IS-2419 IS-2516	Dimensions for panel mounting indicating and recording electrical instruments.
70		Circuit Breakers - Requirements and Test voltages not exceeding 1000V AC or 1200V DC.
71	IS-2607	Air break isolators for voltages not exceeding 1000 volts.
72	IS-2959	Contactors for voltages not exceeding 1000V AC or 1200V DC
73	IS-3072	Code of practice for installation and maintenance of switchgear.
74	IS-3106	Code of practice for selection, installation, maintenance of fuses (voltage not exceeding 650V).
75	IS-3156, Part - I	Voltage Transformer - General Requirements.
76	Part – II	Voltage Transformer - Measuring Voltage Transformers.

Sr. No.	Code Number	Description
77	Part – III	Voltage Transformer - Protective Voltage Transformers.
78	IS-3231	Electrical Relays for Power System Protection.
79	IS-3914	Code of practice for selection of AC Induction Motor Starters (Voltage not exceeding 1000V)
80	IS-4047	Heavy-duty air-break switches and composite units of air-break switches and fuses for voltages not exceeding 1000 Volts.
81	IS-4064	Air break switches, air break disconnections, air break switch disconnections and fuse combination units for voltages not exceeding 1000V AC or 1200V DC.
82	Part – I	Part I - General Requirements.
83	IS-4146	Application guide for Voltage Transformers.
84	IS-4201	Application guide for Current Transformers.
85	IS-4237	General Requirements for Switchgear and Control Gear for Voltages not exceeding 1000V AC or 1200V DC.
86	IS-4483	Preferred panel cut-out dimensions for electrical relays - flush mounting IDMTL relays.
87	IS-4794, Part- I	Push Button Switches - General Requirement and Tests.
88	IS-5082	Wrought aluminum & aluminum alloy bars, rode, tubes and sections for electrical purposes.
89	IS-5987	Code of practice for selection of switches (Voltage not exceeding 1000V).
90	IS-6236	Direct recording electrical measuring instruments.
91	IS-6875	Control switches (switching devices for control and auxiliary circuits including contactor relays) for voltages up to and including 1000V AC and 1200V DC.
92	IS-8623	Factory built assemblies of switchgear and control gear for voltages up to and including 1000V AC and 1200V DC.
93	IEC 62040-3	(International Electro technical Commission) – Uninterruptible power systems (UPS) – Part 3: Method of specifying the performance and test requirements.
94	IEEE 587 (ANSI C62.41)	Category A & B (International Electrical and Electronics Engineers) – Recommended practices on surge voltages in low voltage power circuits.
95	ANSI B 31.5	Code for Refrigeration Piping

Sr. No.	Code Number	Description
96	ASHRAE 30	Methods of Testing Liquid Chilling Packages
97	ASHRAE 15	Safety Code for Mechanical Refrigeration

Bidder is required to submit compliance sheet in the tabular format for the selected products against above applicable code provision.

14 Recommended Makes:

List of Recommended Makes / Models of the major components/ equipment is given in **Annexure – D**. Bidders should use the makes and models having successful deployments in Data Centre applications in India. It is bidder's responsibility to comply with GeM Bid specifications and conditions, while selecting make and model of the product. However, bidder may offer equipment of any suitable make and model that complies with the GeM Bid specifications and conditions.

15 DC Acceptance Criteria:

Based on demonstration of following technical parameters, the DC implemented solution will be accepted.

15.1 Equipment's supplied and installed as per GeM Bid specifications defined in respective sections.

15.2 PUE

PUE (Chiller + RDHx + InRow Unit + PAC & UPS) should not be more than 1.4 during linpack testing.

15.3 Validating UPS redundancy operation by switching on and OFF some breakers.

15.4 Room Temperature – Measurement at various points inside data center to work out the hot pockets.

15.5 Demonstration of UPS system on balanced as well as unbalanced load conditions along with FFT analysis which include harmonics in voltage as well as Current, voltage regulations under No load to full load. Neutral to Earthing Voltage at UPS output should not be more than 3 volts.

15.6 FAT report of equipment.

15.7 Demonstration of UPS operation under EB failure condition and EB restoration condition.

15.8 Demonstration of Battery backup under full load condition.

15.9 Demonstration of operation of Dry cooler.

15.10 Demonstration of temperature profile at Buffer tank/ thermal storage tank , operation of valves. (Value of permissible limit should be programmable). Logic checking by changing the permissible limit parameters. Demonstration by creating false failure input of temperature sensors connected at chilled water header.

15.11 As built Drawing

15.12 Demonstration of creating false fire signal (Cross Zoning Input)and checking operation of magnetic coil on NOVEC cylinder manifold.

15.13 Demonstration of VESDA, Water Leak Detector system

15.14 Safety during Project Execution

15.15 Submission of Warranty Certificate from manufacturer of UPS , Battery , Pumps, In Row , Battery etc. as per RFP

15.16 Effective GUI in BMS screen, Effective implementation and utilization of BMS system. Monitoring of all field devices including Humidity, temperature sensors etc. on BMS screen, Control thro BMS in Automatic mode as well as Manual mode (Manual mode should be on BMS screen as well as Hard Wiring) of all actuators equipment's etc as per operating, failure and falesafe logic.

15.17 Data Center aesthetics and interiors

16 Safety Regulations

The contractor shall at his own expense, arrange for the safety provisions as per the codes of Indian Standard Institution, Indian Electricity Act / Rule and such other Rules, Regulations and Laws as may be applicable in respect of all labour, directly or indirectly employed in the work for performance of the Contractor's part of this agreement. While the Indian Electricity Rules 1956, as amended up to date, are to be followed in entirety, any installation or portion of the installation that does not comply with these Rules, should be rectified immediately.

The contractor shall be responsible for and indemnify the buyer against all injury to persons – both his own workmen and others and for all damage to structural and / or decorative part of the buyer's property during erection and commissioning of the equipment. The contractor shall repair / reinstate all such damage at his own cost.

It shall be ensured that the control switches and distribution boards are duly marked, the distribution diagrams of substations are prominently displayed, and the substation premises, main switch rooms and D.B. enclosures are kept clean. Particular care should be taken to prevent the substation being used as store for inflammable materials, broken furniture, waste materials etc.

No inflammable materials shall be stored in places other than the rooms specially constructed for this purpose in accordance with the provisions of the Indian Explosives Act. If such storage is unavoidable, it should be allowed only for short period and in addition, special precautions such as cutting off supply such places at normal times, storing materials away from wiring and switch boards, giving electric supply for a temporary period with due permission of engineer- in charge shall be taken.

Protective and safety equipment such as rubber gloves, earthing rods, line men's belt, portable respiration apparatus, necessary number of caution boards such as " Man on Line", "Don't switch on" etc. should be provided in easily identifiable locations. Where electric welding or such other nature of work is undertaken, goggles shall be provided.

Rubber or insulating mats should be available in front of the main switchboards or any other control equipment of medium voltage or above.

Standard first Aid boxes containing materials as prescribed by Indian red cross should be provided in easily identifiable locations and should be easily available.

Periodical examination of the first aid facilities and protective and safety equipment provided should be undertaken and proper records shall be maintained for their adequacy and effectiveness.

Charts (one in English and one in regional language) displaying methods of giving artificial respiration to a recipient of electrical shock shall be prominently displayed at appropriate places.

A chart containing the names, addresses and telephone numbers of nearest authorized medical practitioners, hospitals, fire brigade and also officers in charge shall be displayed prominently along with the first Aid box.

Steps to train supervisory staff and authorized persons of the engineering staff in the first Aid practices, including various methods of artificial respiration with the help of local authorities such as fire brigade, St. John's Ambulance Brigade, Indian Red Cross or other recognized institutions equipped to impart such training shall be taken, as prompt rendering of artificial respiration can save life at the time of electric shock.

Electrical wiring and control switches should be periodically inspected and any defective wiring switches which will expose live parts should be replaced immediately to make installation safe.

No work on live L.T. bus bars or pedestal switch boards should handle by a person below the rank of a wire man and such a work should preferably be done in the presence of the Engineer in charge of the work.

- When working on or near live installation, suitable insulated tools should be used, and special care should be taken to see that these tools accidentally do not drop on live terminals causing shock or dead short.

- The electrical switchgear and distribution boards should be clearly marked to indicate the area being controlled by them.

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

- Before energizing any installation after the work is completed, it should be ensured that all the tools have been removed and accounted and no person is present inside any enclosure of the switchboard. Any earthing connection made for carrying out the work should be removed. "Permit to work" should be received back duly signed by the person to whom it was issued in token of having completed the work and the installation being ready for energisation and "Men at Work" caution Boards removed.

- In case of electrical accidents and shock, the electrical installation on which the accident occurred should be switched off immediately and the affected person should be immediately removed from live installation by pulling him with the help of coat, shirt, and wooden material or with any other dry cloth. He should be removed from the place of accident to a nearby safe place and artificial respiration continuously given as contained in BIS code and standard prescribed by St John Ambulance Brigade or Fire Brigade.

- While artificial respiration on the affected person is started immediately, help of Fire Brigade and Medical Practitioner should be called for an artificial respiration should be continued uninterrupted until such help arrived.

- These instructions should be explained in Hindi / local language to those staff who does not understand English.

The contractor shall ensure that all portable power tools used by the workman are rated 230 volts, double insulated and have to taken through 100 mA Earth Leakage Circuit Breaker (ELCB). Also all temporary lighting shall be supplied through 30 mA ELCB. Inserting wire into the sockets without the plug tops is not allowed. The length of the extension cord for portable tools should not be more than 5 feet. Temporary cables and flexible wires of short length should be bunched up and supported at inaccessible height. Temporary lamps should be mounted at inaccessible height. If lamps are incandescent, they should be protected by wire-mesh.

All power supply / Distribution Boards shall have canopy for protection against weather if located outdoors.

While carrying out work in Vessels / AC ducts or any other confined place, hand lamps with metallic guard suitable for 24 Volts AC supply shall be used All non-current carrying metallic parts of electrical system and equipment shall be earthed with two separate earthing wires of adequate capacity.

a. GENERAL RESPONSIBILITY

The contractor shall obtain a "Work Permit" from the Site Engineer / Client before starting any work at site. The work permits are issued to prevent any one working in unauthorized areas and they are valid for specific period.

The contractor shall produce test certificates from Government approved certifying authorities for all the lifting gear & hoists (slings, chains, hooks, chain pulley blocks, winches, cranes etc.) before starting the work. The contractor's supervisor for subsequent spot checks shall retain the certificates.

The gas cylinders should be used in safe manner. They should not be dropped from heights. Acetylene cylinder should be kept upright position. Oxygen cylinders should not be kept near inflammable materials like oil etc.

The contractor is to remove all waste materials from and around the work site and leave the work spot spick and span.

Works like Gas cutting, welding etc.

Before carrying out any work like gas cutting, welding etc. the contractor shall contact the site-in - charge to ascertain about the safety of the area for welding work.

The contractor shall produce certificates for his welding sets checked by the site in charge before starting the work. The certificates shall have to be renewed every two months. A copy of the current certificate shall be displayed on the welding sets.

Only cables in good condition and insulated holders are to be used. The length of the supply cable shall not exceed 25 feet and the welding set body shall be properly earthed. Under no circumstance building structure pipeline should be used as a return path of the current.

A charged fire extinguisher of CO2 type is to be carried with each welding set.

The welder is to wear good quality insulated welding gloves, shoes & goggles while at work.

Tarpaulins are not be used in the vicinity of welding / gas cutting jobs.

b. EXCAVATION

In the event of an excavation being made, it is the responsibility of the contractor to see that any opening, sump or pit caused by them is securely fenced as required by the Factory Act.

c. WORKING AT HEIGHT

For carrying out work at heights exceeding 6 feet or over and near the opening in floors, roofs, etc the following precaution to be taken.

The written permission of the Departmental Manager is to be taken before carrying out any work. Adequate safety precautions like use of safety belts, crawling ladders etc are to be taken.

All personnel engaged on overhead work shall be men experienced in such work.

Whenever possible timber staging or platform shall be erected with planks of minimum thickness 2 inches and minimum width 12 inches when the nature of work demands staging of a greater width than plank provided then additional planks shall be added and lashed securely.

Staging shall be provided with simple safety rails or ropes throughout its length, at waist height and on each open side.

Staging supports shall be of standard steel scaffolding safely secured and supported on firm level footings or slung from overhead beams. The supports shall be situated at a maximum distance of 8 feet apart and staging shall be secured to each support.

In case the site or nature of work is unsuitable for erection of proper staging all workers shall wear safety belts around their waists and secure their lifelines to strong scaffolding or structural members.

Wherever it is not possible to put up staging and / or use safety belts, safety nets or sheets shall be slung beneath the place of work.

When working in open process vessels or tanks, safety belts or safety nets shall always be used whether or not staging and scaffolding is provided.

Safe access to all points of work should be provided in the form of suitable ladders, stairways etc.

Contractor's employee of at least status of a foreman shall examine all arrangements before starting such work is commenced and shall satisfy himself that all reasonable safety precautions have been taken.

d. FIRE INSTRUCTIONS

Before carrying out any gas cutting, welding etc, the contractor shall contact the site-in -charge to ascertain about the safety of the area for welding work.

Smoking is strictly prohibited in premises. Severe action will be taken if any of the contractor's workmen is found smoking at the work site area.

In case fire is discovered, dispatch additional force & site Engineer. Wherever possible switch off any electrical and gas apparatus near the fire.

Check the nature of fire, pick up appropriate fire extinguisher and try to put out fire. For Electrical fire use carbon dioxide fire extinguisher.

e. PERSONAL PROTECTIVE EQUIPMENT

The personal protective equipment should be worn wherever necessary.

f. REVIEW MEETINGS

Periodic safety review meeting shall be conducted to review safety and for better coordination with other agencies.

Periodically safety review will be held with Site Engineer and issues will be discussed and action points shall be monitored and recorded in a separate safety Register / File.

g. WORK AFTER NORMAL WORKING HOURS

Extra care need to be taken for jobs being carried out after normal working hours with due revalidated work permit.

h. ACCIDENTS

In case of injury or serious illness, the department should be informed immediately. All injuries are to be reported by filling in the "injury report" form, which will be available with the respective department / site engineer.

These safety conditions should not be regarded as exhaustive. These have been issued for the guidance of the contractor and will not in any way absolve the contractor from any obligations or liabilities that might incur or transfer such obligations on liabilities to the company.

(End of Section- IV)

SECTION V – PRICE SCHEDULE

Summary Format- Supply, Installation, Testing and Commissioning along with Loading, Unloading, Transport, Transit Insurance etc.

Sr. No.	Particulars	Unit	Quantity	Supply Price Rs.	Total Price Rs. (Including Applicable GST)
	Bidders to calculate the actual quantity as per the tentative Drawing Layout, SLD, P & ID and Site visit. If the any additional quantity required for the overall system functionality as per GeM Bid need to considered.				
1	Civil and allied works	Lot	1		
2	UPS frames for 3 X 500 KVA with 3 x 300KVA UPS & Isolation transformers	Set	1		
3	Li Ion Batteries for 3 X 300 KVA along with Battery Stand, Isolator, DC cabling etc.	Set	1		
4	UPS 2 X 50 KVA for NON IT Loads	Set	1		
5	Li Ion Batteries for 2 X 50 KVA along with Battery Stand, Isolator, DC cabling etc.	Set	1		
6	LV Electrical Components, All LT Panels, Isolation transformers, DBs, Bus bars, End feed units, Tap off boxes, PDU with K-4 rated Cu winding isolation dry type transformer panel, ATS panels, Isolator Panels, In Row Panels etc.	Lot	1		
7	All LT Cabling –Power and Control, Earthing, Lighting Arrestors, Cable Trays, SS Cable Tray, Supports, Cable terminations, Glands and other accessories etc.	Lot	1		
8	Internal and external Illumination System along with DBs	Lot	1		
9	2 x 10 KW In Row Unit (along with Air cooled Condenser, Cu piping and other accessories including containment, doors, dehumidification etc.	Lot	1		
10	3 x 70 TR Air Cooled chillers along with associated accessories including water tank, expansion tank, chemical dozing, etc.	Lot	1		
11	11 x 40KW chilled water RDHx meeting the 800mm width of the DC Racks.	Lot	1		
12	5 x 20KW chilled water RDHx meeting the 800mm width of the DC Racks.	Lot	1		

13	2 x 35KW DX PAC along with associated outdoor units, frames accessories, piping insulation and Panel.	Lot	1		
14	Thermal storage/ Buffer tank and associated accessories for 10min storage,	Lot	1		
15	Pipes of all sizes, Bends, valves, actuators, joints, end flanges and other hardware including insulation and accessories etc.	Lot	1		
16	Instrumentation and Control for entire Cooling System	Lot	1		
17	Fire Alarm system for Pota Cabin and Data Center area including Detectors, panels, cabling and associated accessories etc.	Lot	1		
18	Fire Suppression system for Data Center area including Gas release panel, cylinder, Manifold, piping and associated accessories etc.	Lot	1		
19	NOVEC Gas for Data center area	Lot	1		
20	Fire Suppression system for DC & Electrical area including Gas release panel, cylinder, NOVEC, Gas, Manifold, piping and associated accessories etc	Lot	1		
21	NOVEC Gas for above area	Lot	1		
22	Cabling for CCTV and access control system.	Lot	1		
23	IBMS software including system (Computer, Monitor) integration of third party devices, I/O modules, all control and communication cabling etc. **All In one PC** Intel Core i-7 latest generation processor, OS - Genuine Windows 11 Prof, RAM - 32 GB DDR3/DDR4 SDRAM Memory - 1TB GB HDD Graphic Card - 2GB NVIDIA Quadro 600 Graphics capability: VGA, with at least 32k colors Network: 100/1000 Mb Ethernet network card with wireless keyboard and Mouse.	Lot	1		
24	Other IBMS including Water leak detectors, Rodent Repellent, Vesda Water quality sensor system	Lot	1		
25	Any other item, material required to complete the solution on turnkey basis	Lot	1		
26	Any other charges required to complete the job on turnkey basis	Job	1		
26	Operation and Maintenance –Year-1	Set	1		
27	Operation and Maintenance –Year-2	Set	1		
28	Installation, commissioning, testing charges	Job	1		

Additional Items (These items will be considered for computing L1)

Sr. No.	Particulars	Quantity	Quoted Price Rs.	Total Price Rs.
1	Comprehensive Annual Maintenance Contract - Year-3	1		
2	Comprehensive Annual Maintenance Contract - Year-4	1		
3	Comprehensive Annual Maintenance Contract - Year-5	1		
4	Operation and Maintenance –Year-3	1		
5	Operation and Maintenance –Year-4	1		
6	Operation and Maintenance –Year-5	1		
	Grand Total Rs. (Including applicable GST, F.O.R. Site basis)			

Notes:

1. **Prices for individual line items of the BoQ should be mandatorily submitted. CDAC Pune reserves the right to reject the bid in case bidder fails to quote all the required items**.
2. Bidder must fill the supply and installation prices separately as per the above table.
3. The prices quoted should include the charges towards testing of equipments, installations and approvals from local electricity board/PWD, electrical/ civil engineering authority, pollution control board - as applicable. The official charges required for the required testing, certification, NOC etc. are to be paid by the bidder. The certifications, NOC etc. shall be in the name of C-DAC .
4. The invoice can be raised in compliance with GST requirements, giving full bill of material.

ANNEXURE A – COVERING LETTER

Date:

To:
Director General,
Centre for Development of Advanced Computing(C-DAC)
S.P. Pune University Campus,
Pune – 411007.

Subject: Submission of the Technical bid for Supply of Data Centre Solutions

Dear Sir,

We, the undersigned, offer to supply Data Centre Solutions and allied services in response to your **GeM Bid No & CDACP/NSM-DC-IIT-MADRAS/23-24/393** We are hereby submitting our proposal for same, which includes this Technical bid and the Financial Bid through GeM portal.

We hereby declare that all the information and statements made in this Technical bid are true and we accept that any misinterpretation contained in it, may lead to our disqualification.

We undertake, if our proposal is accepted, to submit a Security Deposit of 5 % of the contract / order value, as per terms stipulated in the GeM Bid.

We confirm that the deliveries, installation will be done within 4 months (16 weeks), if the order is placed..

We hereby certify that my/ our firm has not been disqualified and / or blacklisted by any Office/ Department/ Undertaking of the State Government / Central Govt. of India, PSU/ Autonomous Body of Government of India, as on the date/time of submission of this bid.

We undertake, if our proposal is accepted, to initiate the Implementation activities towards supply of material and services, as stipulated in the referred Gem Bid/ATC etc.

We hereby accept the applicable protocols while delivery, installation, implementation, commissioning of the entire `Turn-key' job with regards to `COVID-19' conditions at the Institution/site. (The same will be informed in the supply/work order(s) placed, if any).

We agree to abide by all the terms and conditions of the GeM bid document, including corrigenda. We would hold the terms of our bid valid for 180 days as stipulated in the Bid document.

We understand you are not bound to accept any Proposal you receive.

The undersigned is authorized to sign this bid document. The authority letter to this effect is enclosed.

Yours sincerely,
Authorized Signatory:
Name and Title of Signatory:
e-mail:
Mobile No:

ANNEXURE B – AUTHORITY LETTER

Date:

To:

Director General,
Centre for Development of Advanced Computing(C-DAC)
S.P. Pune University Campus,
Pune – 411007.

Subject: Authority Letter

Reference: **GeM Bid No & CDACP/NSM-DC-IIT-MADRAS/23-24/393**

Dear Sir,

We, M/s _____ (Name of the bidder) having registered office at _____ (address of the bidder) herewith submit our bid against the said bid document.

Mr./Ms. _____ (Name and designation of the signatory), whose signature is appended below, is authorized to sign and submit the bid documents on our behalf against said RFP

Specimen Signature:

The undersigned is authorised to issue such authorisation on behalf of us.

For M/s _____ (Name of the bidder)

Signature and company seal

Name

Designation

Email

Mobile No.

ANNEXURE C – UNDERTAKING BY PRINCIPAL MANUFACTURER

(To be submitted in Original on Letterhead- for all major equipment/devises/products – separately.)

Date:

Director General,
Centre for Development of Advanced Computing(C-DAC)
Innovation Park, Panchavati, Pashan,
Pune – 411008.

Subject: **Undertaking by Principal Manufacturer against GeM Bid No & CDACP/NSM-DC-IIT-MADRAS/23-24/393 for Supply, Installation & Commissioning of Data Centre Solutions.**

Dear Sir,

We, M/s _____ (Name of the manufacturer) having registered office at _____ (address of the manufacturer) by virtue of being manufacturer for _____ (Name of the product/s), hereby authorise M/s _____ (Name of the bidder) having their office at _____ (Address of bidder) to submit quote, supply, install and provide after sales support for our range of products quoted by them to meet the above mentioned GeM Bid requirements.

M/s _____ (Name of the manufacturer) within the scope of requirement as per the GeM Bid mentioned above undertake to provide technical & other support towards fulfilling the requirements of installation, commissioning, acceptance criteria and product warranty services for min. 05 years - of the Data Centre Items/Solutions to be supplied and installed at site(s) by our authorised representative M/s (Name of bidder) against said GeM Bid.

The undersigned is authorised to issue such authorisation on behalf of M/s _____ (Name of the manufacturer).

For M/s _____ (Name of the manufacturer)

Signature & company seal

Name

Designation

Email

Mobile No.

ANNEXURE D - LIST OF RECOMMENDED MAKES

THE FOLLOWING LIST IS INDICATIVE ONLY. THE ITEMS OFFERED MUST COMPLY WITH THE ORDER NO. P-45021/2/2017-PP (BE-II). DATED 4TH JUNE, 2020 ISSUED BY PUBLIC PROCUREMENT DIVISION, DEPARTMENT OF INVESTMENT AND INTERNAL TRADE, MINISTRY OF COMMERCE, GOI

Sr. No	Description List of Makes - Electrical	Recommended Makes
1	UPS System	Schneider/Vertiv/Eaton/Numeric/ FUJI /TMEIC/Delta/Socomec/ Riello Power India Pvt. Ltd
2	SMF Batteries for UPS	Rocket / Amar Raja / HBL /Quanta/Exide and for Li Ion - Samsung /LG
3	LT CABLES	RPG /KEI /FINOLEX/POLYCAB/Ravin/Lapp
4	Multifunction Meter (Digital Type)/Load Manager	Schneider/Socomec/Secure Meter/HPL/Siemens/L&T
5	MS/GI CONDUITS	BEC/BHARAT/AKG/UNIVERCELL
6	PVC CONDUITS	AVON PLAST//Precision/Dimond
7	MODULAR SWITCH SOCKET WITH SWITCH BOXES	ANCHOR/Legrand/Schneider
8	BRASS DOUBLE COPRESSION GLANDS	DOWELLS/COMMET/Siemens/Phoenix
9	MCCB/MCB/ACB	Schneider/L&T/ABB/Siemens/Eaton/Legrand
10	ELCB/MCB	Siemens/ Schneider / Legrand/Eaton
11	MCB DBS	Siemens/Schneider/Legrand/L&T /Eaton/ABB
12	METAL CLAD SOCKET OUTLETS	Legrand/SALZER/HAVELLS/L&T HAGER/Schneider
13	CABLE TRAYS	PROFAB/Indiana/OBO Bettermann
14	LUMINAIRIES	PHILLIPS/WIPRO/BAJAJ/HAVELLS/Syska
15	PROTECTIVE RELAYS	Siemens/ABB/L&T/Schneider/Eaton
16	CT's	VOLTAMP/AE/KAPPA
17	SURGE PROTECTION DEVICES	Schneider/Siemens/Legrand/Eaton
18	Auto Transfer Switch (ATS)	Siemens/Socomec/Schneider (ASCO)
19	LT Switchboards	License of IEC 61439 Panel Builder
20	Power Distribution Unit (PDU-Inside the Rack)	Vertiv/APC-Schneider -/Raritan/Eaton/Numeric/enlogic/Dhananjay Group

Sr. No	Description List of Makes - Electrical	Recommended Makes
21	FRLS PVC insulated stranded copper conductor wires and cables	Finolex | Lapp Kabel | Skyline | L&T | National | Echo | Havells |
22	Terminal blocks & cage clamps	Elmexx | Phoenix | Wago
23	Star Delta starter	L&T | ABB | Siemens | Schneider/Eaton
24	Soft starters/VFD Drives	ABB | Schneider | L&T/Siemens/Eaton/Danfoss/Grandfoss,Danfoss
25	Single phase preventor	L&T | Minilec | Syntron | Beluk
26	Electric Motors	Siemens | Crompton | ABB | Bharat Bijlee | Alstom
Sr. No.	**Details of Material- Civil and Interior**	
1	Cement	ACC, L&T, Ambuja
2	WALL PUTTY	GOLDSIZE PUTTY BY SHALIMAR PAINTS LTD., J K WALL PUTTY, Birla White
3	STRUCTURAL STEEL	TISCO, SAIL, RINL, JINDAL, ESSAR, Tata Steel
4	ANCHOR FASTNER	HILTI, FISHER
5	ALUMINIUM SECTIONS	INDAL, HINDALCO, JINDAL,
6	DISTEMPER & PAINTS	ICI-Dulux, ASIAN PAINTS, BERGER PAINTS, NEROLAC, British Paint
7	GYPSUM BOARD and Fire Rated partition	INDIA GYPSUM, LAFARGE BORAL, RAMCO LTD
8	Fire Sealants	3M,Hilti,Fischer
9	GLASS	SAINT GOBAIN, Schott, Pilkington
10	FALSE CEILING	INDIA GYPSUM, ARMSTRONG,AMF
11	Raised/False Flooring	Unitile/Uniflair/ USG/Access Floor Systems/AET Flexiable
12	Fire Door	Shakti Mat, Radiant, ProMat, Godrej,
13	Insulation	Armaflex/K-FLex
Sr. No.	**System / Description-IBMS**	
A	Intelligent Fire detection System	
1	Analogue Addressable Fire detection Panel	Tyco , Honeywell, Siemens , Schneider, Johnson Control

Sr. No	Description List of Makes - Electrical	Recommended Makes
2	Analogue Addressable Thermal /smoke Detector	Tyco , Honeywell, Siemens , Schneider
3	Analogue Addressable Manual Call Point	Tyco , Honeywell, Siemens , Schneider
4	Analogue Addressable Abort cum Gas Release Station	Tyco , Honeywell Siemens , Schneider
5	Analogue Addressable Control / Relay / Isolator Modules	Tyco , Honeywell Siemens , Schneider
6	Building Management Interface	Tyco , Honeywell, Siemens , Schneider
7	Fire Extingusher's	Cease Fire / Minimax
8	Aspiration Smoke Detection System	Xtralis, ICAN, Tyco,Siemens
9	Response Indicators	Daksh, Polixel, Agni
10	Gas Release Modules	Tyco , Honeywell, Siemens , Ravel
11	Fire Detection Cables	Polycab, Excel, LAPP kabel
B	**IP CCTV Surveillance System**	
1	IP Dome Cameras with Varifocal lense	BOSCH, Honeywell, Siemens ,Samsung
2	IP BOX Camera	BOSCH, Honeywell, Siemens
3	IP PTZ Camera	BOSCH, Honeywell, Siemens
4	Video Management, Recording Software	Pelco, BOSCH, Axis, Indigo Vision, Polixel, Milestone
5	32" Monitors	Samsung, LG, Sony
6	Network Switch	Comnet, RuggedCom, Moxa
7	CAT 6 Cable	AMP, Molex, ,Schneider
8	OFC Cables	Finolex, Sterlite, HFCL
9	Power Cables	Polycab, Excel, LAPP kabel
10	MS Conduit	BEC, AKG, Dimond
11	PVC Conduits	BEC, AKG, Precision
12	Storage Device	DELL, HP, IBM
13	Servers / Workstation	DELL, HP, IBM
C	**Access Control System**	

Sr. No	Description List of Makes - Electrical	Recommended Makes
1	Intelligent Access Controller	Siemens, Honeywell, Daccess
2	Time and Access Management Software	Nexwatch, Software House, Siemens, Honeywell, Daccess
3	Biometric Readers	Nexwatch, HID, DDS, Siemens, Honeywell, Daccess
4	Cards	Siemens, Honeywell, Daccess
5	Proximity Readers	Nexwatch, DDS, HID, Siemens, Honeywell, Daccess
6	Electromagnetic Locks	Dafikas,BELL, Trimec, Insyn
7	Network Switch	Comnet, RuggedCom, Moxa
8	Emergency Glass Break Station	KAC
9	CAT 6 Cable	AMP, Molex, Schneider
10	OFC Cables	Finolex, Sterlite, HFCL
11	Servers / Workstation	DELL, HP, IBM
D	**UL Listed Novec 1230 Clean Agent Fire Suppression System**	
1	UL Listed & PESO Approved Seamless Cylinders	Ansul, UTC, Siemens, Tyco
2	Novec 1230	Ansul, UTC, Siemens, Tyco,Siemens
3	Nozzles	Ansul, UTC, Siemens
4	Electronic/ Pneumatic Acutators	Ansul, UTC, Siemens
5	Discharge Valves	Ansul, UTC, Siemens
6	M.S Seamless Pipes	Jindal, Tata
7	Discharge Hose	Ansul, UTC, Siemens
8	Manifold Check Valve	Ansul, UTC, Siemens
9	Warning Sign Boards	Ansul, UTC, Siemens
10	Manual Abort & Release Station.	Daksh, Agni
E	**Building Management System**	
1	Main Control System/DDC Controllers	Honeywell, Schneider, Siemens,Rockwell
2	Temperature, Air humidity Sensors (Duct, Room)	Azbil (Yamatake), ALC, Sauter,Siemens,Endress-Hauser
3	Building Management Software	Honeywell, Siemens, Schneider ,

Sr. No	Description List of Makes - Electrical	Recommended Makes
4	Differential pressure switch Air flow / Water Flow switch/water Level switch	Azbil (Yamatake), ALC, Sauter, Honeywell,Emerson Process
5	Water Flow meter	Emerson -Process/Endress-Hauser/ Honeywell/ Sontay/Forbes Marshal
6	Water Pressure Transmetter/ Level Transmitter	Invensys/Kele/ Honeywell/ Sontay/Forbes/Marshal
7	Motorized Butterfly valves/ actuators	Rapid Cool/Audco/ Johnson/Siemens/Belimo
8	Current/Voltage/Power Factor/FrequencyKWH Transducers with digital display/Electronic Meter	Situ Electro Instuments Pvt.Ltd./ Secure metres Ltd./ Enercon/L&T
9	Printer	HP/Epson
10	Switching Relays	PLA/OMRON
11	Flame proof level switch	Veksler/Minilec
12	Electromagnetic Lock	Trimec/Dafickas
13	Current Relays	Sitn/Minilec/Sentry
14	Electric Actuators for 2-way ON/OFF valves	Danfoss/ Emtrack/ Johnson/ Honeywell/ Siemens/ Trane/ Cyclon Controls.
15	Transducer/Sensors/Water Quality system--pH,Conductivity,Dissolved Oxygen etc	Emerson – Process,Endress-Hauser,Siemens,ABB,Thermax
16	CAT 6 Cable	AMP, Molex,Schneider
17	OFC Cables	Finolex, Sterlite, HFCL
18	Servers / Workstation	DELL, HP, IBM
F	**Water Leak Detection System**	
1	Sensing Cables	Tracetek, Liebert, Sontay
2	WLDS Controller	Tracetek, Liebert, Sontay
3	Jumper Cables	Tracetek, Liebert, Sontay
G	**Rodent System**	-
1	Controller	MASER (Torrant Range), C Systems, Verma Craft
2	Sattelites	MASER (Torrant Range), C Systems, Verma Craft

Sr. No	Description List of Makes - Electrical	Recommended Makes
3	GUI Software	MASER (Torrant Range), C Systems, Verma Craft
	Mechanical Components	
1	Variable Speed Pumping system with Pump sets	Grundfos | Armstrong
2	In Row	Schneider,Vertiv, nVent,BlueBox,Clievameneta,
3	Variable Speed Pumping system with Pump sets	Grundfos | Armstrong
4	PAC	Schneider | Blue Box | Vertiev | Climaveneta
4.1	Fan section-Blower	Kruger | Flaktwood |Nutech |TCF Nadi |
4.2	Variable frequency drives	Danfoss |ABB/Eaton
4.3	Air Handling Unit (AHU)	Trane/Voltas/BlueStar/Blue Box
4.4	Variable Air Volume (VAV) Boxes	Caryaire-Titus | Trane | Johnson Control | Belimo
5	Racks (42 U IT and BMS)	Schneider, Valrack,,EFS,Rittal,Netrack,Dhananjay Group,Metafin Techanology
6	Adiabatic Dry Cooler	Thermax | Paharpur | Schneider | Lu Ve Exchangers | Thermofin | Kelvion
7	G.I.	Jindal (Hissar) |TATA |GST
8	M.S. upto 300 mm	Jindal (Hissar) | TATA |GST
9	M.S. Above 300 mm	Maharashtra Seamless | TATA |GST
10	**Valves**	
10.1	Butterfly Valves	Audco |Advance |C&R |Oventrop |TA Hydronics |Flowcon
10.2	Valve	Audco |Advance |Leader
10.3	Non Return Valve	Audco |Advance |C&R |Cim
10.4	Balancing Valves	Advance |Oventrop |Flowcon |T&A Hydronics |Honeywell |Danfoss
10.5	Ball ,Gate,Globe Valve	Audco | Emerald | Oventrop | Rapidcool |Cim |Zoloto
10.6	Ball Valves with Y Strainer	Rapidcool |Cim |Zoloto
11	**Accessories**	
11.1	Pressure Gauges	H.Guru |Fiebig |WAREE
11.2	Thermometers	Emerald | Fiebig |WAREE

Sr. No	Description List of Makes - Electrical	Recommended Makes
11.3	Flow Switch	Anergy | Honeywell | Siemens | Johnson | Schneider
11.4	Motorized butterfly valve	Siemens | Danfoss | Schneider | Advance | Audco
11.5	Dash Fastners	Hilti | Fischer
11.6	Vibration Isolators (Bellow Type)	Resistoflex | Cori | Easyflex
11.7	Spring Mounts	Emerald | Resistoflex
11.8	Rubber Groumat/ Clamps/ Hangers	Emerald/ Resistoflex/ Kanwal
12	**Air Filters**	
12.1	Filters	Airtech | Purolator | Puromatic | Thermodyne | Spectrum | Dynafilters
13	**Insulation**	
13.1	Glass Wool	Owens Corning | U.P. Twiga | Kimmco
13.2	Mineral Wool	Lloyd Insulation
13.3	Closed Cell Elastomeric Insulation	Armaflex | Aeroflex | Vidoflex | Kflex
13.4	Aluminium Sheets	TATA | Nippon | Hindalco | Indalco
14	Balancing Valve	TA Hydronics | Danfoss | Oventrop | Flowcon

ANNEXURE E – PERFORMANCE BANK GUARANTEE

(on non-judicial paper of appropriate value)

To,

Director General,
Centre for Development of Advanced Computing(C-DAC)
S.P. Pune University Campus,
Pune – 411007.

BANK GUARANTEE NO:

DATE:

Dear Sir(S)

This has reference to the Purchase Order No. _____ Dated _____ been placed by C-DAC on M/s_____ (Name & Address of vendor) for supply, installation, commissioning, warranty of _____ (description of items) at IIT Madras, Chennai.

The conditions of this order provide that the vendor shall,

1. Arrange to deliver the items listed in the said order to the consignee, as per details given in said order, and
2. Arrange to install and commission the items listed in said order at client's site, to the entire satisfaction of C-DAC and
3. Arrange for the comprehensive warranty service support towards the items specified in purchase order.

M/s (Name of Vendor) has accepted the said purchase order with the terms and conditions stipulated therein and have agreed to issue the performance bank guarantee on their part, towards promises and assurance of their contractual obligations vide the Supply Order No. _____ M/s. _____ (name of vendor) holds an account with us and has approached us and at their request and in consideration of the promises, we hereby furnish such guarantees as mentioned hereinafter.

C-DAC shall be at liberty without reference to the Bank and without affecting the full liability of the Bank hereunder to take any other undertaking of security in respect of the suppliers obligations and / or liabilities under or in connection with the said contract or to vary the terms vis-a – vis the supplier or the said contract or to grant time and or indulgence to the supplier or to reduce or to increase or otherwise vary the prices or the total contract value or to forebear from enforcement of all or any of the obligations of the supplier under the said contract and/or the remedies of C-DAC under any security (ies) now, or hereafter held by C-DAC and no such dealing(s) with the supplier or release or forbearance whatsoever shall have the effect of releasing the bank from its full liability of C-DAC hereunder or of prejudicing right of C-DAC against the bank.

This undertaking guarantee shall be a continuing undertaking guarantee and shall remain valid and irrevocable for all claims of C-DAC and liabilities of the supplier arising up to and until _____ (date)

This undertaking guarantee shall be in addition to any other undertaking or guarantee or security whatsoever the that C-DAC may now or at any time have in relation to its claims or the supplier's obligations/liabilities under and / or in connection with the said contract and C-DAC shall have the full authority to take recourse to or enforce this undertaking guarantee in preference to the other undertaking or security (ies) at its sole

discretion and no failure on the part of C-DAC in enforcing or requiring enforcement of any other undertaking or security shall have the effect of releasing the bank from its full liability hereunder.

We _____ (Name of Bank) hereby agree and irrevocably undertake and promise that if in your (C-DAC's) opinion any default is made by M/s _____ (Name of Vendor) in performing any of the terms and /or conditions of the agreement or if in your opinion they commit any breach of the contract or there is any demand by you against M/s _____ (Name of Vendor), then on notice to us by you, we shall on demand and without demur and without reference to M/s _____ (Name of Vendor), pay you, in any manner in which you may direct, the amount of Rs. _____/- (Rupees _____ Only) or such portion thereof as may be demanded by you not exceeding the said sum and as you may from time to time require. Our liability to pay is not dependent or conditional on your proceeding against M/s _____ (Name of Vendor) and we shall be liable & obligated to pay the aforesaid amount as and when demanded by you merely on an intimation being given by you and even before any legal proceedings, if any, are taken against M/s _____ (Name of Vendor)

The Bank hereby waives all rights at any time inconsistent with the terms of this undertaking guarantee and the obligations of the bank in terms hereof shall not be anywise affected or suspended by reason of any dispute or disputes having been raised by the supplier (whether or not pending before any arbitrator, Tribunal or Court) or any denial of liability by the supplier or any order or any order or communication whatsoever by the supplier stopping or preventing or purporting to stop or prevent payment by the Bank to C-DAC hereunder.

The amount stated in any notice of demand addressed by C-DAC to the Bank as claimed by C-DAC from the supplier or as suffered or incurred by C-DAC on the account of any losses or damages or costs, charges and/or expenses shall as between the Bank and C-DAC be conclusive of the amount so claimed or liable to be paid to C-DAC or suffered or incurred by C-DAC, as the case may be and payable by the Bank to C-DAC in terms hereof.

You (C-DAC's) shall full liberty without reference to us and without affecting this guarantee, postpone for any time or from time to time the exercise of any of the powers and rights conferred on you under the contact with the said M/s _____ (Name of Vendor) and to enforce or to forbear from endorsing any power or rights or by reason of time being given to the said M/s _____ (name of Vendor) which under law relating to the sureties would but for the provisions have the effect of releasing us.

You will have full liberty without reference to us and without affecting this guarantee, postpone for any time or from time to time the exercise of any of the powers and rights conferred on you under the contract with the said M/s _____ (Name of Vendor) and to enforce or to forbear from endorsing any power or rights or by reason of time being given to the said M/s _____ (Name of Vendor) which under law relating to the sureties would but for the provisions have the effect of releasing us.
Your right to recover the said sum of Rs. _____/- (Rupees _____ only) from us in manner aforesaid will not be affected/ or suspended by reason of the fact that any dispute or disputes have been raised the said M/s _____ (Name of Vendor) and/ or that any dispute or disputes are pending before any officer, tribunal or court or Arbitrator.
The guarantee herein contained shall not be determined or affected by the liquidation or winding up, dissolution or change of constitution or insolvency of the said M/s _____ (Name of Vendor) but shall in all respects and for all purposes be binding and operative until payment of all dues to C-DAC in respect of such liability or liabilities.
Our liability under this guarantee is restricted to Rs._____/- (Rupees _____Only). Our guarantee shall remain in force until unless a suit action to enforce a claim under guarantee is filed against us within one month from the date of expiry of guarantee, all your

rights under the said guarantee shall be forfeited and we shall be relieved and discharged from all liabilities there under.

We have power to issue this guarantee in your favour under Memorandum and Articles of Association of our Bank and the undersigned has full power to do under the power of Attorney dated.

Notwithstanding anything contained herein:

A. Our liability under this guarantee shall not exceed Rs_____ (in words)
B. This bank guarantee shall be valid up to (26 months from date of installation) & unless a suit for action to enforce a claim under guarantee is filed against us within one month from the date of expiry of guarantee, all your rights under the said guarantee shall be forfeited and we shall be relieved and discharged from all liabilities there after i.e. after one month from the date of expiry of this Bank guarantee
C. We are liable to pay the guaranteed amount or any parts thereof under this bank guarantee only and only if you serve upon us a written claim or demand or before _____
D. The Bank guarantee will expire on _____

Granted by the Bank

Yours faithfully,

For (Name of Bank)
SEAL OF THE BANK
Authorised Signatory

ANNEXURE F – UNDERTAKING

Date:

To:

The Director General,
Centre for Development of Advanced Computing (C-DAC)
Innovation Park, Panchavati, Pashan Road,
Pune - 411008 Maharashtra, INDIA

Subject: Undertaking as per GFR – 2017, Rule 170(iii)

Dear Sir,

We, the undersigned, offer to carry out the 'Turn-key' project including **Products/items, components etc.** as per GeM Bid at C-DAC, Pune, in response to your **GeM Bid No & CDACP/NSM-DC-IIT-MADRAS/23-24/393**. We are hereby submitting our proposal for same, which includes Technical bid and the Financial Bid through GeM portal. As a part of eligibility requirement stipulated in said GeM Bid document, we hereby submit a declaration in lieu of Earnest Money Deposit (EMD), as given below:

1. Our bid shall remain valid for 180 days from the date of submission and that we will not withdraw or modify our bid during the validity period,
2. In case, we are declared as successful bidder and an order is placed on us, we will submit the acceptance in writing within 7 days of placement of order on us.
3. In case, we are declared as successful bidder and an order is placed on us, we undertake, to submit a Security Deposit of 5 % of the order value, as per terms stipulated in the GeM Bid.
4. In case of failure on our part to comply with any of the above said requirements, we are aware that we shall be declared as un-eligible for said GeM Bid and /or debarred from any **future bidding process of C-DAC or any Government entity & GeM portal for a period of minimum one year.**
5. The undersigned is authorized to sign this undertaking.

Yours sincerely,

Authorized Signatory:

Name and Title of Signatory:
e-mail:
Mobile No:

ANNEXURE –G: DOCUMENTS CHECK –LIST

Sr. No.	Documents to be Submitted (IN THE FOLLOWING SEQUENCE ONLY).	Submitted (Yes / No) with page nos.
	e-Packet-1 (Section-I)	
1	Annexure-G duly filled and neatly arranged in the following sequence only. The bidder must submit all the documents as per Document Checklist – Annexure G, with appropriate page nos for the same. The flow of the submitted documents must be in the same order/sequence.	
2	Covering Letter as per Annexure - A.	
3	Authority Letter as per Annexure – B	
4	Exemption documents or Annexure F towards EMD	
5	A copy of Certificate of Incorporation, Partnership Deed / Memorandum and Articles of Association / any other equivalent document showing date and place of incorporation, as applicable.	
6	A copy of GST registration certificate.	
7	Copies of at least one purchase orders or contracts and installation reports in the name of bidder from the end client / end user, during last Five years for Data Centre work.	
8	A photo copy of the commercial bid without prices (prices blocked) and copy of commercial terms & conditions (in detail) as included in the commercial bid. C-DAC reserves the right to reject the bid in case of any discrepancy observed in the un-priced commercial bid and the actual commercial bid.	
9	The undertaking(s) from the Principal Manufacturer(s) (OEMs) of products/ items offered as per Annexure – C.	
10	Undertaking to the effect that a Security Deposit of 5% of the order value will be submitted in case C- DAC decides to place the Purchase Order.	
11	Undertaking to the effect that the bidder is not black-listed or barred from participation in bidding process by any Central/ State Government, Government	

Sr. No.	Documents to be Submitted (IN THE FOLLOWING SEQUENCE ONLY).	Submitted (Yes / No) with page nos.
	Department, Government Undertaking, Public Sector Unit (PSU) or autonomous institution, as on date of submission of bids.	
12	All the necessary documents in support of eligibility criteria stipulated in Eligibility Criteria.	
	(Section-III)	
13	The executive summary of the bid submitted (As per Section-V)	
14	Duly filled Technical Bid (covering the details of solution, detailed bill of material, technical specifications, makes and models of items, diagrams, layouts, all drawings etc.)	
15	The details of electrical power consumption, foot-print, ambient temp, temperature range targeted, discrimination curves, short circuit calculations, cable schedule along with voltage drop calculations, battery sizing and back up calculations etc.	
16	Details of water consumption on various loading conditions.	
17	Design Basic Report along with annual average Power Usage Effectiveness (PUE) calculations for 25%, 50%, 75% and 100 % of IT load.	
18	Design basis and analysis of cooling solution at full and partial load conditions including complete details, assumptions made and the specific references/standards used for the same	
19	Legal / statutory permissions required, if any.	
19	e –packet 2 (FINANCIAL BID)	
	Price Bid as per format given in Section – V (as per GeM policy)	

ANNEXURE H – SERVICE LEVEL AGREEMENT (SLA)

The successful bidder will be required to sign a SLA, at the time of issuing the works order for supply, installation and commissioning of Data Centres. The basic service requirements /conditions that would be covered in the SLA are as given below.

1. Scope of Work for Operation and Maintenance

Scope of this SLA covers the satisfactory Operations of DC, Maintenance, warranty and support, as stipulated in the GeM Bid, Works Order, for a period of Five years from the date of successful installation and commissioning of the Data Centre. One minimum 8 years experienced technician with experience in the field of O & M for Electrical and cooling equipment's per shift and one Diploma Engineer with minimum 10 year of technical + administration experience needs to be deployed.

2. Definitions

"**Uptime**" shall mean the time period for which the specified services / components with specified technical and service standards are available to the state and user departments. Uptime, in percentage, of any component (Non-IT) can be calculated as:

Uptime = {1- [(Downtime) / (Total Time – Scheduled Maintenance Time)]} * 100

"**Downtime**" shall mean the time period for which the specified services / components with specified technical and service standards are not available to the state and user departments and excludes the scheduled outages planned in advance, the link failures and reasons beyond Vendor Control.

"**Incident**" refers to any event / abnormalities in the functioning of the Data Centre Equipment / specified services that may lead to disruption in normal operations of the Data Centre services.

"**Resolution Time**" shall mean the time taken (after the incident has been reported at the helpdesk), in resolving (diagnosing, troubleshooting and fixing)

The following shall be the responsibilities of the successful bidder.

3. Uptime Requirements:

The bidder shall ensure the uptime requirements for various systems, equipment, components as per details given in the following Table.

Sr No	List of Utilities	Criticality	Redundancy	Uptime	Resolution time
1	HVAC and Cooling (Including In ROw, Chillers/ Pumps,)	High	N+1	98.5%	6-8 hours for minor complaints and 24-48 hours for major complaints.
2	UPS	High	N+1	98.5%	6-8 hours for minor complaints and 24-48 hours for major complaints.
3	Electrical Infrastructure	High	N+1	98.5%	6-8 hours for minor complaints and 24-48

Sr No	List of Utilities	Criticality	Redundancy	Uptime	Resolution time
					hours for major complaints.
4	DG Sets	High		98.5%	6-8 hours for minor complaints and 24-48 hours for major complaints.
5	Fire detection and alarm systems, VESDA system, Fire suppression system,	High			Within 24 Hours
6	BMS and real-time measurements, CCTV system, Rodent control, Water leak detection system, Access control system	Medium			Within 48 Hours

4. Reporting Methodology

Understand & analyzing the products covered in the Supply, installation and commissioning scope and performance on periodic basis.

Submission of daily, weekly and monthly service performance reports in the agreed format specified as per the requirement of the infrastructure facilities.

Measurement and Monitoring with recording of readings and checking parameters of different facility equipment's.

Analyzing the readings and escalating suitably for abnormalities observed, if any. Supervise installation and maintenance work, whenever new equipment or systems are to be / being installed.

Adequate stock of onsite and offsite spare parts and spare component must be maintained by the successful bidder.

Successful bidder to ensure the commitment towards uptime requirement of the DC.

To provide this service it is important for the M/S ..... selected bidder to have back to back arrangement with the OEMs. The selected bidder would be required to provide a copy of the service level agreement signed with the respective OEMs.

Component that is reported to be down on a given date should be either fully repaired within the stipulated time frame. If breakdown is major, bidder to arrange for standby component/equipment on temporary basis (of equivalent configuration) within the time frame. In case the selected bidder fails to meet the above standards of maintenance, there will be a penalty as per clause 9 of section III.

5. DAILY CHECKS:

Access Control System:

- 24x 7 checking of Access System for alert and alarms.
- Monitoring of Status.
- Abnormality of System / errors
- Access Card Activity
- Report of Access to Data Center
- Report of Forceful Access (Invalid Access)
- Generation of Logs / reports and submission to Host Institute for review and necessary action.
- Testing & checking of all Doors, Magnetic locks and Sensors.

CCTV:

- Daily Checking of DVR System & Cameras
- Suspicious Action Report
- Abnormality of System
- Generation of Logs / reports and submission to Host Institute for review and necessary action/s Maintenance of reports

Fire Alarm System, Novec 1230 Gas, VESDA, Water Leak Detection (WLD), Rodent Repelled:

- Daily Checking of FAS Panel
- Immediate Action to Alarm Generated
- Monitoring of MCP
- Generation of Logs / reports and submission to Client for review and necessary action/s Maintenance of reports, Report Generation through IBMS.

Precision AC, PAHU and Comfort AC:

- Monitoring of PAC's Temperature and Humidity every half an hour physically.
- Monitoring of Alarms & Immediate Action to it Comparison of Software readings with Actual Reading.

6. Fire Drill Test

Maintenance Activities will be carried for the System/Devices in Coordination with Host Institute Engineer & Technician

7. Daily Reports

1. Hourly basis monitoring of UPS & PAC & concern System
2. Reports of Energy meter reading of all meters.
3. Readings of main LT panel.
4. Fuel in DG fuel tank.
5. Immediate response to electrical complaints by any Working staff.
6. Following of effective power consumption chart provided by Customer.
7. Maintaining Critical Electrical parts.

8. Generation of Logs / reports and submission to Host Institute for review and necessary action's Maintenance of reports

8. Weekly Reports

1. All Electrical Systems Health Check Report
2. Vendor call tracking until closure
3. UPS & DG: On load Report.
4. Fire Alarm System: Reports of False Alarm.
5. Access System: Data Backup.
6. CCTV: Backup of DVR Status.
7. WLD: Test of Water Leak Detection Sensor Cable.
8. All System Health Report.
9. PAC, Chiller and comfort AC

9. Monthly Reports

1. Follow up of schedule regarding preventive maintenance.
2. Presentation of consumption of meter units by Pie diagram.
3. Vendor Performance Reports.
4. Report of pending calls/problems.
5. MIS Report Presentation for Each Month

10. Call Logging Process with OEM/Vendors

The onsite team will get alerts on any issue in the data center. The onsite team will identify the area of problem and define problem severity into minor or major call. Call severity will be decided on basis of unit under suspect and impact on functions inside data center like - electrical power in DB, racks, cooling efficiency. Based upon this on site team will either manage to close the problem in case of minor alerts/alarms or In case of major alarms the team will raise an alarm over phone and email to OEM/Vendor with information to C-DAC /Host Institute designated team and O&M in-charge. O&M team will follow the Escalation matrix. The site team / OEM will identify problem area and will work towards resolution of problem.

11. Scheduled Maintenance

Bidder to submit the scheduled maintenance time along with frequency for the components.

12. Bidder has to submit and present the detailed plan of execution for Operation and maintenance activities including manpower deployment along with qualification details of manpower deployed at site.

Annexure – I: Mandatory Certificate/s from Respective OEMs

Name of Bidder:

Detail Address:

Contact Person:

Mobile No:

GeM Bid No & CDACP/NSM-DC-IIT-MADRAS/23-24/393

Pertaining to the provisions of order No. Order No P-45021/2/2017-PP (BE-II). Dated 4th June, 2020 issued by Public Procurement Division, Department of Investment and Internal Trade, Ministry of Commerce, GoI, read with order number W-43/4/2019-IPHW- MeitY, dated 7th September, 2020 issued by IPWH division of MeitY, GoI, we hereby certify the percentage of local contents for each item, as given below:(Bidder to add rows, as required & mention the *% of local contents against each item and consolidated % of local contents).

Sr. No	Item Description, with **Make, & Model**	Country of origin of OEM	Country of Manufacture of item	Country of Shipment	*Percentage of local contents as defined by order number W-43/4/2019-IPHW- MeitY, dated 7th September, 2020 issued by IPWH division of MeitY, GoI or Latest Notifications.	
					% per item	Consolidated % of Local contents.
1						
2						
3						

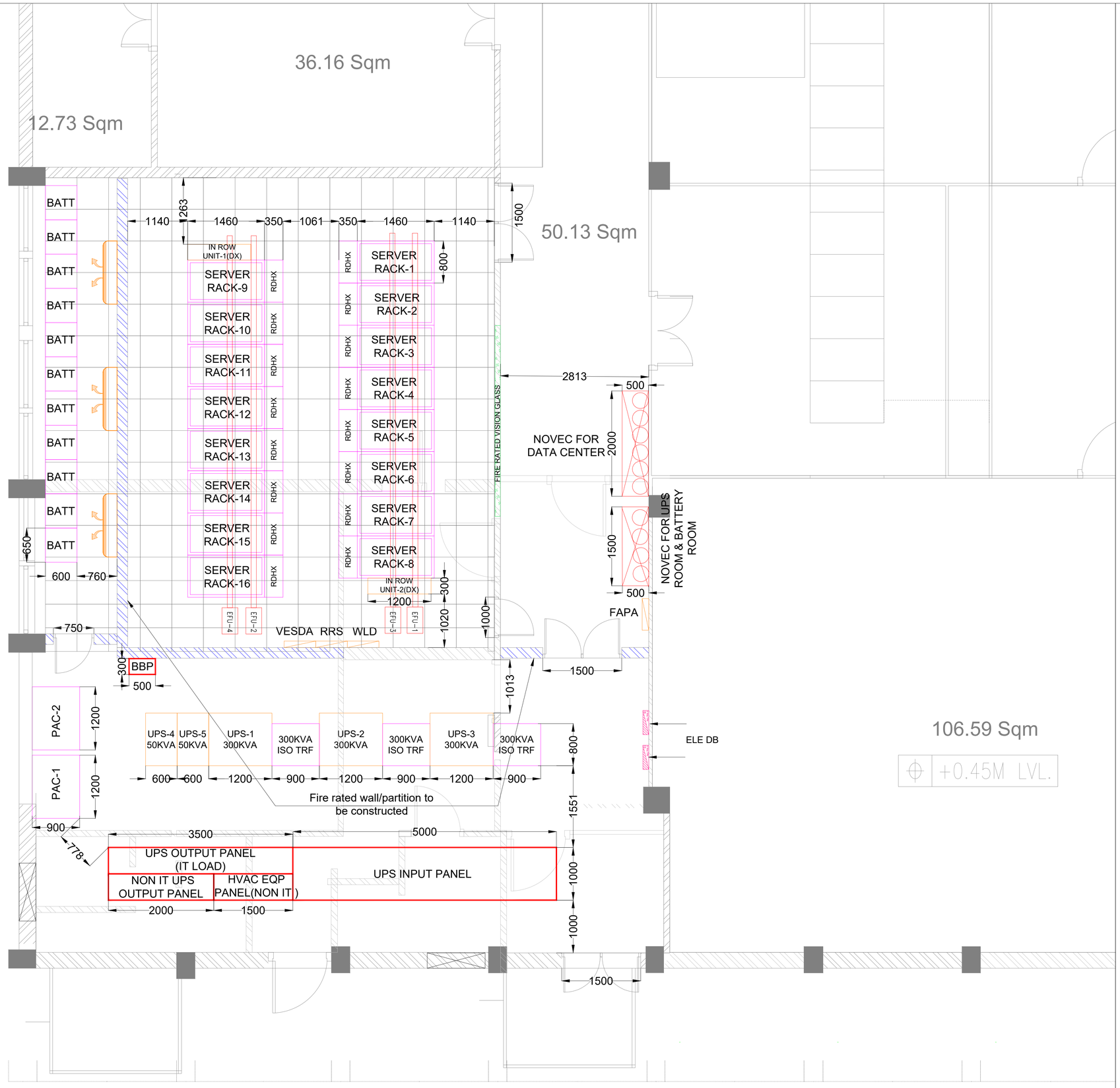
(*While declaring the Local content percentage, the (DPIIT-PP) OM No. P-45021/102/2019-BE-II-Part (1) (E-50310) Dt. 4 March 2021 – must be taken into consideration by the bidders/OEMs)

We also certify that, we are not from a country sharing land border with India as defined in order no. F/No/6/18/2019-PPD dated 23 July 2020 issued by public procurement Division, Dept. of Expenditure, Ministry of Finance, GoI and the goods offered by us comply with the provisions of said order. CDAC reserves the right to accept/Reject/Cancel the bid/inquiry, at its sole discretion, based on the responses received against the MII declaration submitted by the bidders / vendors, and may try to seek approvals from the respective competent authorities, to proceed.

For (Name of bidder)

Authorized Signatory
Contact Details:

(End of Document)



REV	DESCRIPTION	DATE
R5	RACK DIMENSIONS UPDATED	05.10.23
R4	AS PER REVISED ARICHITECTURE LAYOUT	30.08.23
R3	RDHx ORIENTATION REVISED	21.06.23
R2	BATTERY ROOM REVISED	19.06.23
R1	REVISED WITH RDHx OPTION	16.06.23
R0	PRELIMINARY DRAWING	06.06.23

CLIENT:

CDAC
Centre for Development of Advance Computing

PROJECT:

IIT MADRAS, CHENNAI

MEP CONSULTANTS:

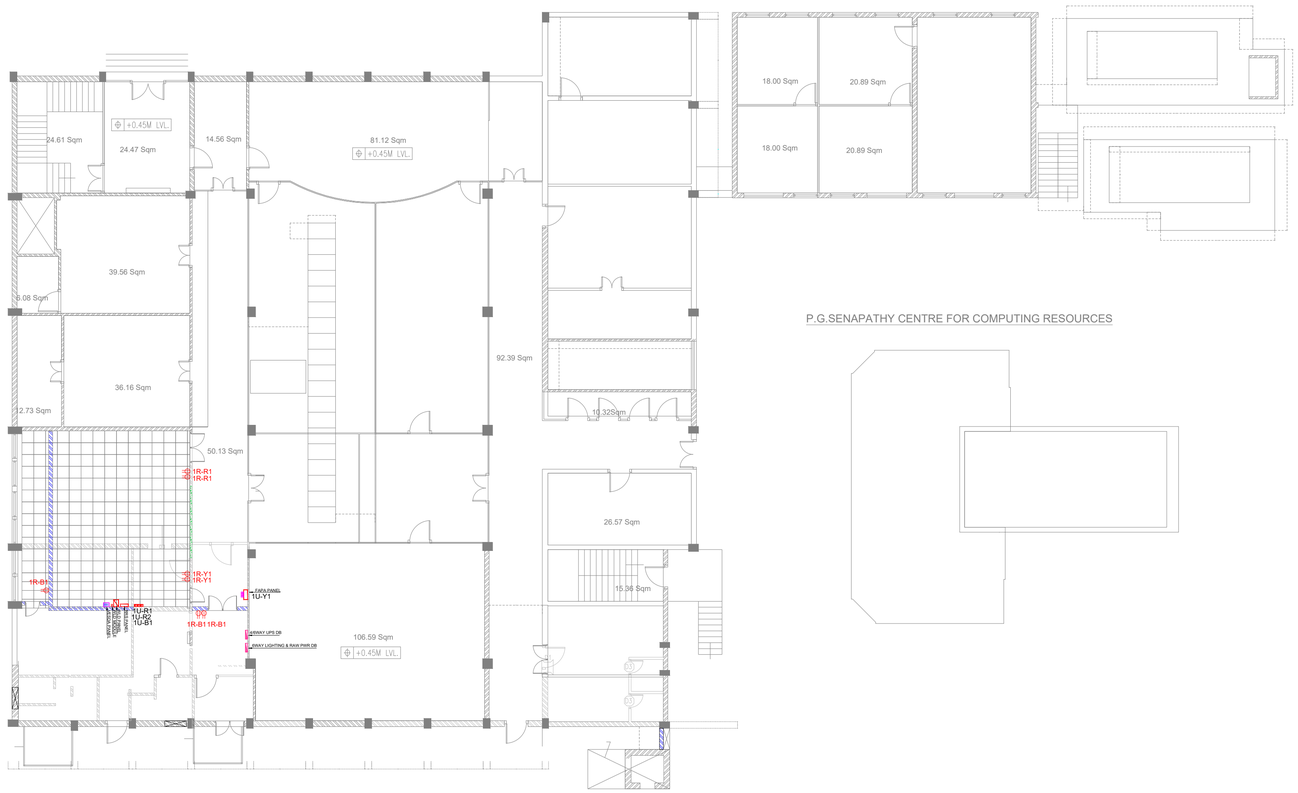
DRAWING DESCRIPTION :

ELECTRICAL EQUIPMENT LAYOUT

SHEET NO :

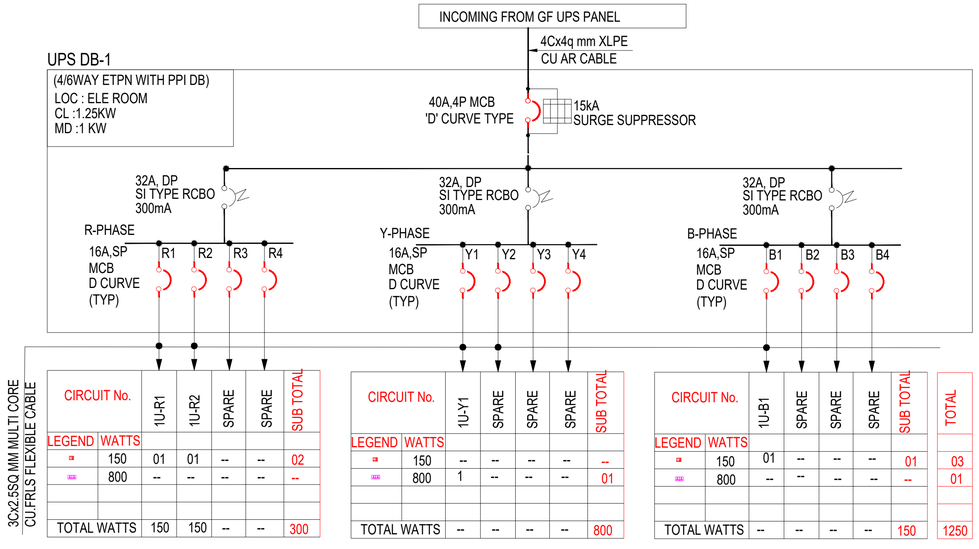
E0.0.2

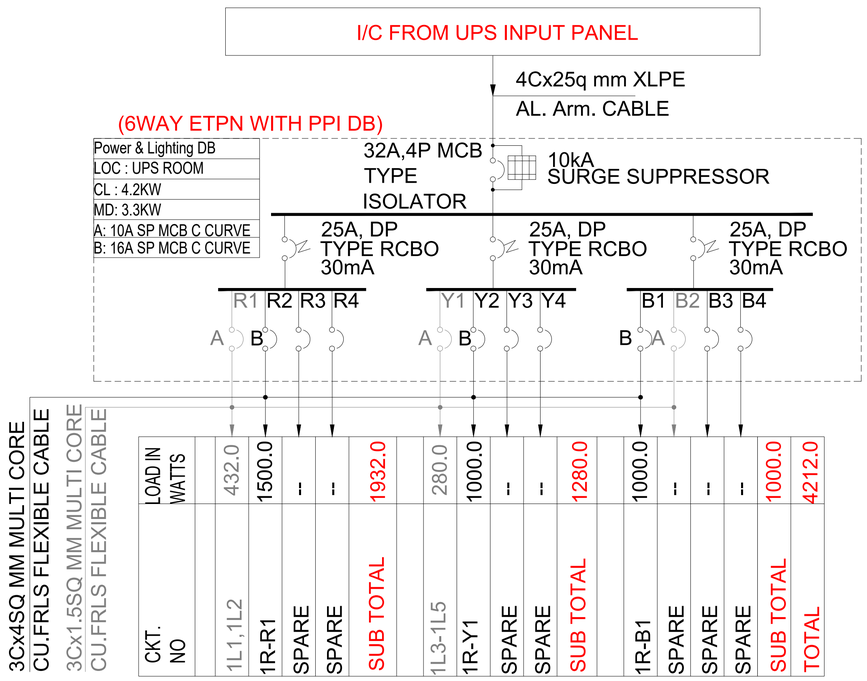
PURPOSE : PRELIMINARY DRAWING	DATE : 05.10.2023
DETAILED : GP	REV : R5
CHECKED : GP	PLOT SIZE :
SCALE : NTS	A1
JOB No :	



LEGEND FOR POWER & UPS DATA				
AREA	SYM	DESCRIPTION	MOUNTING	QTY
FAPA PANEL		2 No. of 6A, 3 pin socket with 16A SP switch & with GI box (UPS) 6M BOX	1200mm from FFL	01
RRS, WLD & VESDA PANEL		1No. of 6A, 3 pin socket without switch (2M) & with GI box (UPS)	1200mm from FFL	03
GENERAL AREA		1No. of 6/16A, 3/5 pin socket controlled by 1No. of 16A SP switch (3M) with GI box (Raw power)	300mm from FFL	07
		Distribution Board		02

NOTE : Exact mounting height of sockets for RRS,VESDA,ACCESS,WLD & FAPA Panels to be co coordinated at site





REV	DESCRIPTION	DATE
R2	AS PER REVISED ARICHITECTURE LAYOUT	30.08.23
R1	AS PER LATEST LAYOUT	27.06.23
R0	PRELIMINARY DRAWING	06.06.23

CLIENT:

CDAC
Centre for Development of Advance Computing

PROJECT:

IIT MADRAS, CHENNAI

MEP CONSULTANTS:

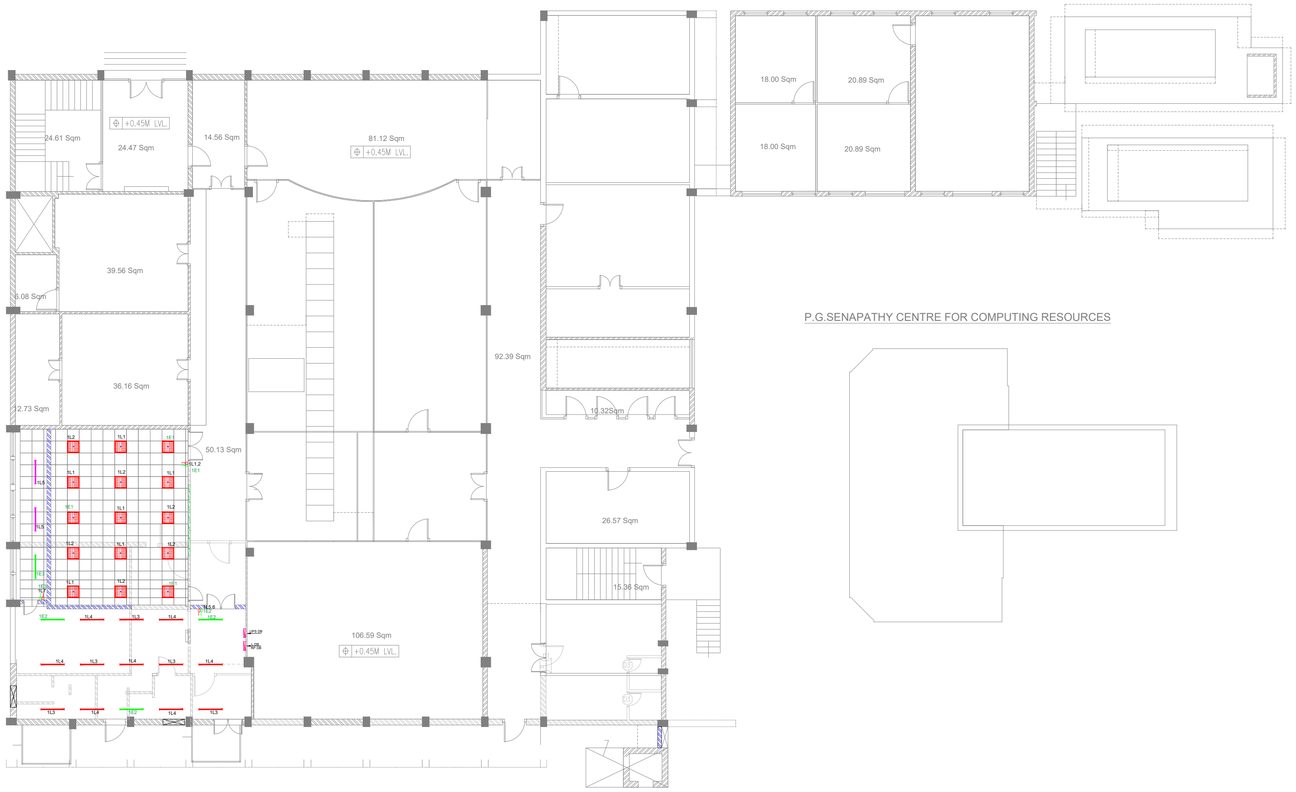
DRAWING DESCRIPTION :

POWER LAYOUT

SHEET NO :

E0.0.3

PURPOSE : TENDER	DATE : 30.08.2023
DETAILED : PS	REV : R2
CHECKED : GP	PLOT SIZE : A1
SCALE : NTS	
JOB No :	

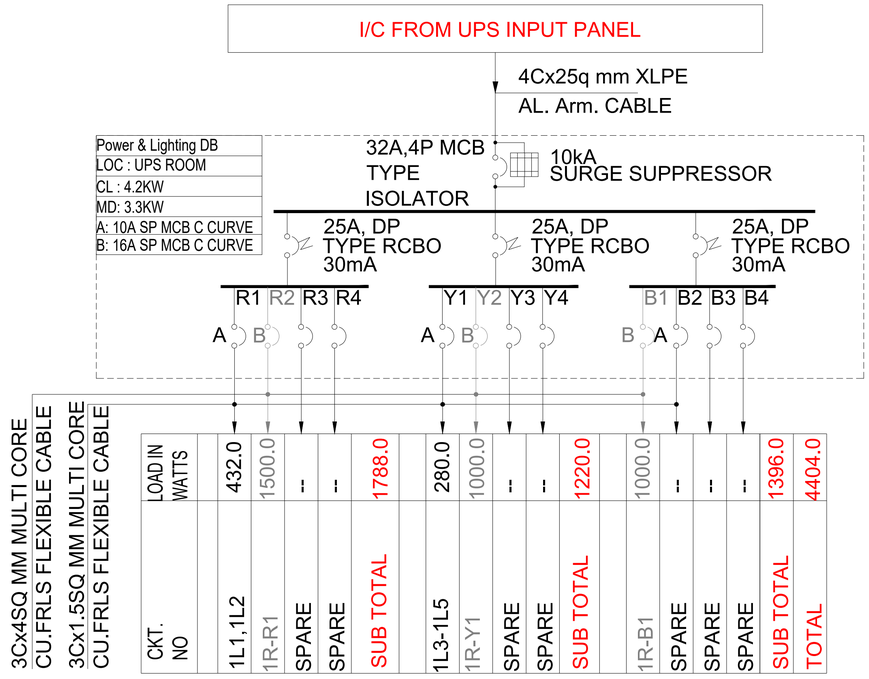


FUNCTIONAL LIGHTS

TAG	SYMBOL	DESCRIPTION	LOCATION	IMAGES	QUANTITY
F1		36W LED INBUILT SENSOR NON-DIMMABLE SURFACE MOUNTED SQUARE TYPE (2'X2') LIGHT FIXTURE CCT-5700K	HPC ROOM		15

SERVICE AREA LIGHTS

S1		20W IP65 CLEAN ROOM WALL MOUNTED LIGHT FIXTURE-1200MM CCT:5700K/6500K	AHU/ELEC/UPS/ BTT KITCHEN		16
S2		20W IP65 FLAME PROOF LED WALL MOUNTED LIGHT FIXTURE-1200MM CCT:5700K/6500K	BATTERY ROOM		02



REV	DESCRIPTION	DATE
R4	AS PER REVISED ARICHITECTURE LAYOUT	30.06.23
R3	RDHx ORIENTATION REVISED	21.06.23
R2	BATTERY ROOM REVISED	19.06.23
R1	REVISED WITH RDHx OPTION	16.06.23
R0	PRELIMINARY DRAWING	06.06.23

CLIENT:

CDAC
Centre for Development of Advance Computing

PROJECT:

IIT MADRAS, CHENNAI

MEP CONSULTANTS:

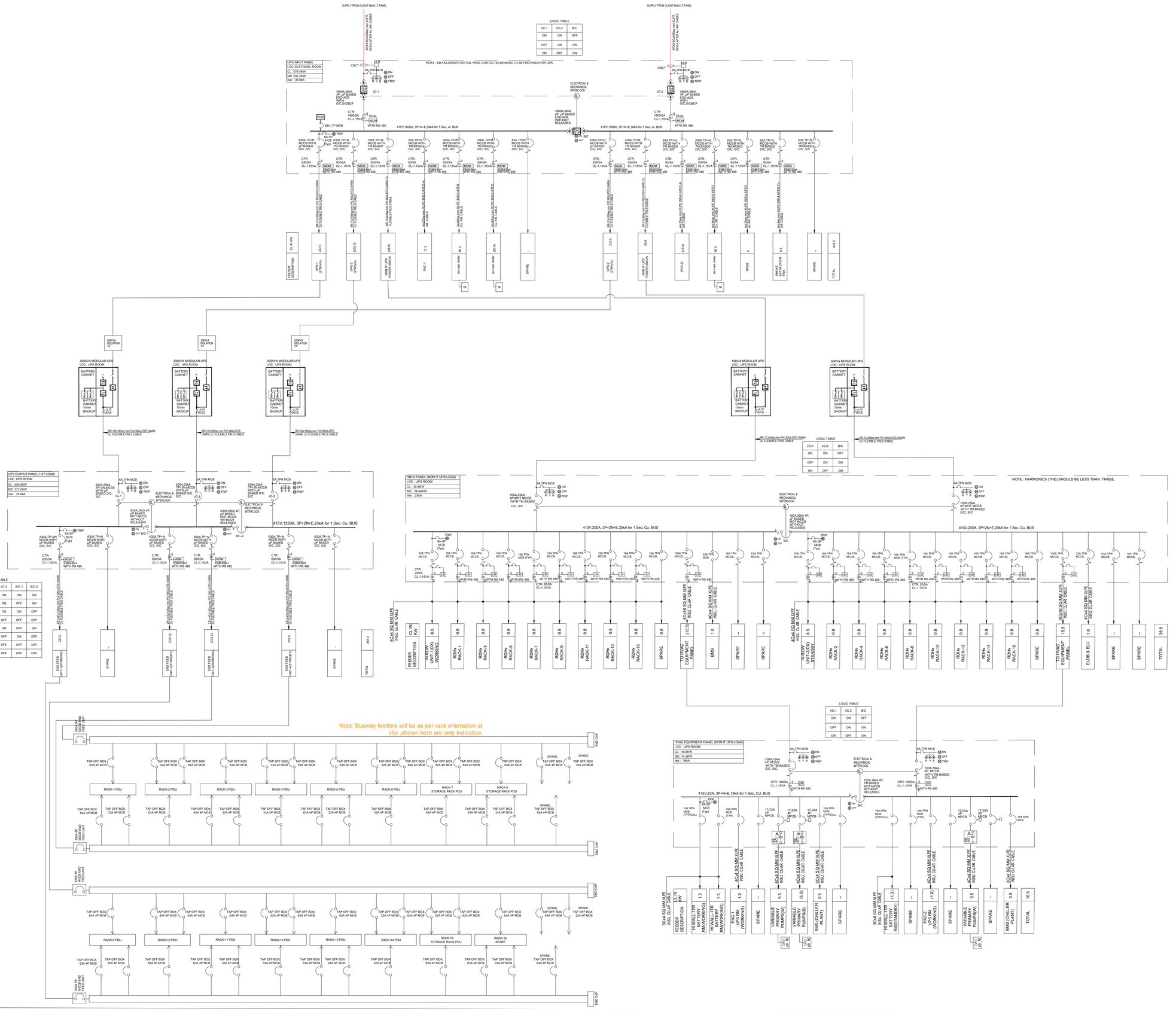
DRAWING DESCRIPTION :

LIGHTING LAYOUT

SHEET NO :

E0.0.4

PURPOSE : TENDER	DATE : 30.08.2023
DETAILED : PS	REV : R4
CHECKED : GP	PLOT SIZE : A1
SCALE : NTS	
JOB No :	



LEGEND :

SYMBOL	DESCRIPTION
ACB	ELECTRICALLY OPERATED AIR CIRCUIT BREAKER (ACB) O/C & S/C WITH MICROPROCESSOR RELEASE
	MANUALLY OPERATED MCCB WITH O/C & S/C, THERMAL&MAGNETIC RELEASE
R Y B	PHASE INDICATOR LAMPS
ON OFF TRIP	PUSH BUTTON SWITCHES WITH FEEDER STATUS INDICATOR LAMP
3	CURRENT TRANSFORMER
MDM EM-6400	MULTI DATA METER
MDM EM-6436H	MULTI DATA METER
	MINIATURE CIRCUIT BREAKER
IL	INTERLOCK
3K AUTO MANUAL CHANGE OVER	STARTER WITH AUTO MANUAL CHANGER OVER FACILITY
START STOP	REMOTE PUSH BUTTON STATION
63	ISOLATOR

NOTE:-

1. UPTO 160AMPS MCCB ARE WITH THERMAL MAGNETIC & ABOVE ARE WITH MICROPROCESSOR
2. THE INTERLOCKING AND SEQUENCE OF OPERATION SHALL BE APPROVED DURING THE SHOP DRAWING APPROVALS.
3. CTR IS INDICATIVE, DETAILED CALCULATION SHALL BE PROVIDED BEFORE PROCUREMENT.
4. CONTROL AND PROTECTION FOR INDICATING LAMPS AND INSTRUMENTATION SHALL BE THROUGH 4P (3ø) & SP MCB UPTO PANELS FOR 35KA AND 4P (3ø) MPCB ABOVE 35KA.
5. BUSWAY TO RACK TERMINATION CABLE WILL BE SUPPLIED AS PER BUSWAY MANUFACTURER STANDARD LENGTH.

REV	DESCRIPTION	DATE
R4	BUS WAY FEEDER DISTRIBUTION UPDATED AS PER REQUIREMENT	12.09.23
R3	REVISED AS PER THE LATEST HVAC LOAD LIST	01.09.23
R2	B/C ADDED FOR UPS O/P PANELS	20.06.23
R1	UPDATED AS PER RDHx OPTION	15.06.23
R0	PRELIMINARY DRAWING	26.05.23

CLIENT:

CDAC
Centre for Development of Advance Computing

PROJECT:

IIT MADRAS, CHENNAI

MEP CONSULTANTS:

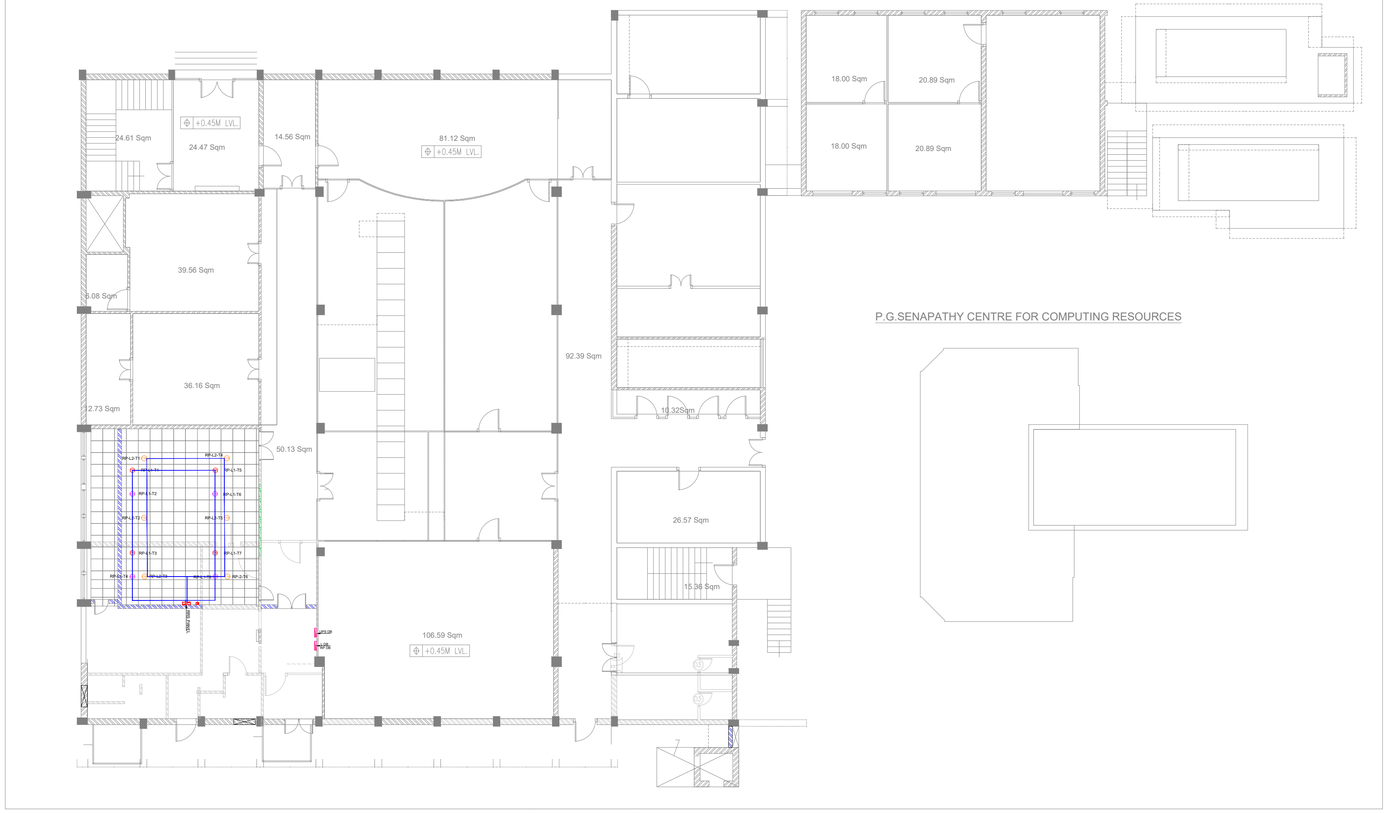
DRAWING DESCRIPTION :

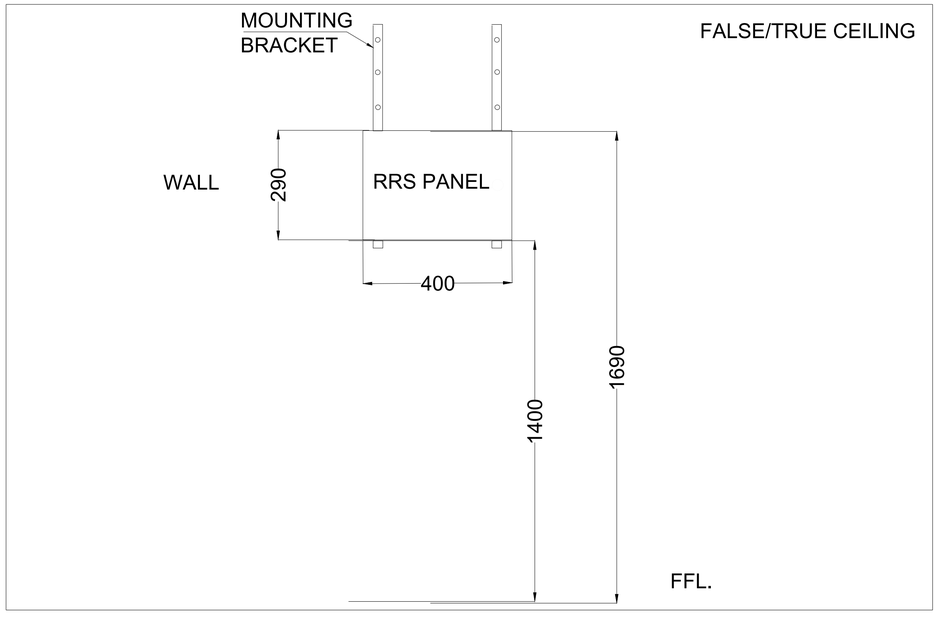
POWER DISTRUBUTION SCHEME

SHEET NO :

E1.0.0

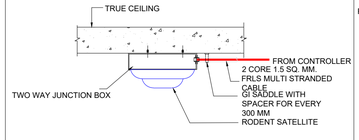
PURPOSE : PRELIMINARY DRAWING	DATE : 12.09.2023
DETAILED : PS	REV : R4
CHECKED : GP	PLOT SIZE : A1
SCALE : NTS	
JOB No :	



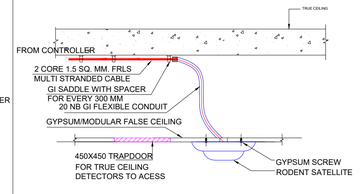


TYPICAL PANEL MOUNTING DETAILS OF RRS PANEL

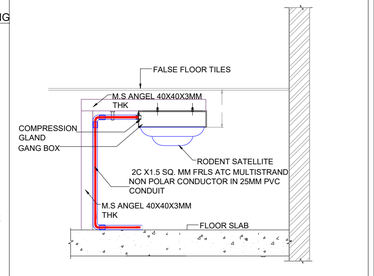
INSTALLATION DETAIL FOR RODENT SATELLITE ON TRUE CEILING



INSTALLATION DETAIL FOR RODENT SATELLITE ON FALSE CEILING



INSTALLATION DETAIL FOR RODENT TRANSDUCER (ON FALSE FLOOR)



LEGEND: RODENT REPELLENT SYSTEM

SYMBOL	DESCRIPTION
TR	RODENT REPELLENT TRANSDUCER (ABOVE FALSE CEILING/TRUE CEILING)
BTR	RODENT REPELLENT TRANSDUCER (BELOW FALSE CEILING)
FTR	RODENT REPELLENT TRANSDUCER (BELOW FALSE FLOOR)
	RODENT REPELLENT PANEL
	2 CORE FLEXIBLE 14/40 SWG, SPECIALLY COATED CT CABLE IN 25MM PVC CONDUIT
UPS	230V AC UPS POWER SUPPLY

REV	DESCRIPTION	DATE
R2	AS PER REVISED ARICHITECTURE LAYOUT	30.08.23
R1	AS PER LATEST LAYOUT	27.06.23
R0	PRELIMINARY DRAWING	06.06.23

CLIENT:

CDAC
Centre for Development of Advance Computing

PROJECT:

IIT MADRAS, CHENNAI

MEP CONSULTANTS:

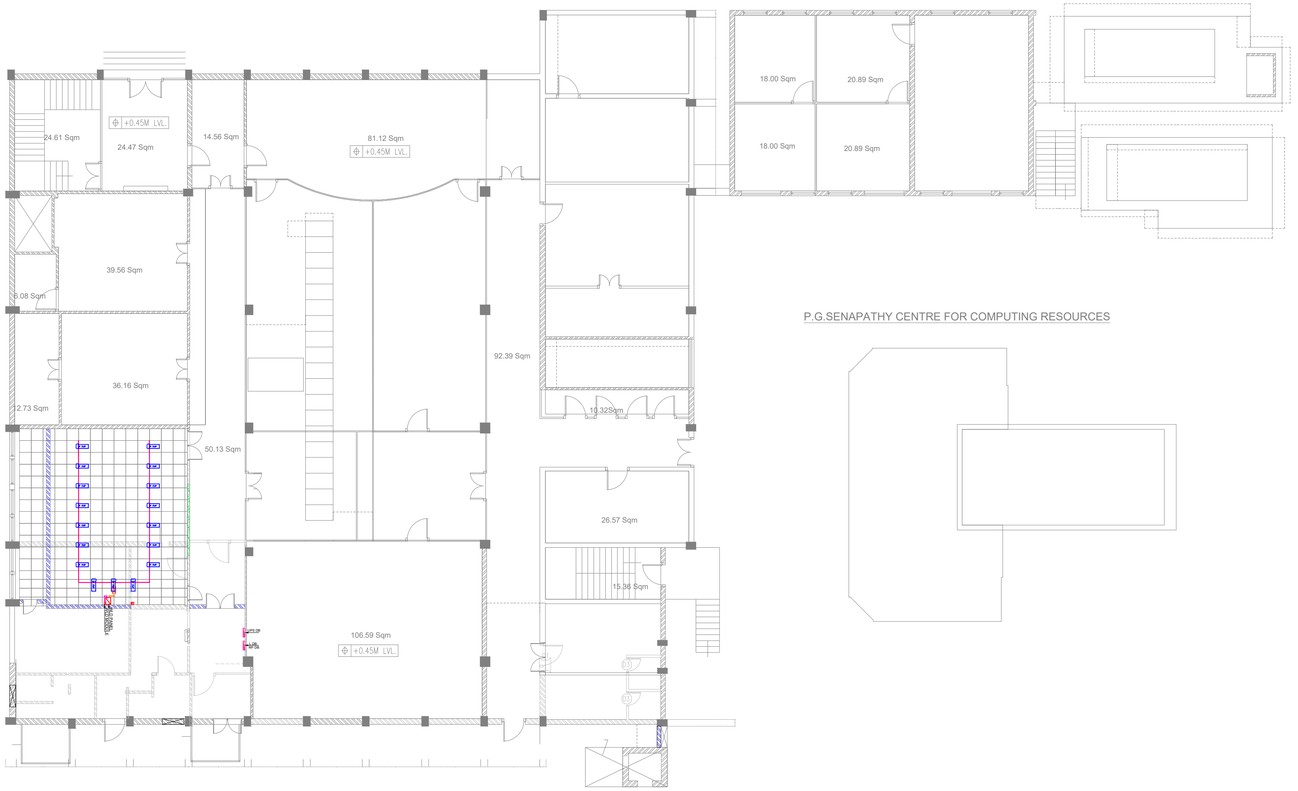
DRAWING DESCRIPTION :

RRS LAYOUT

SHEET NO :

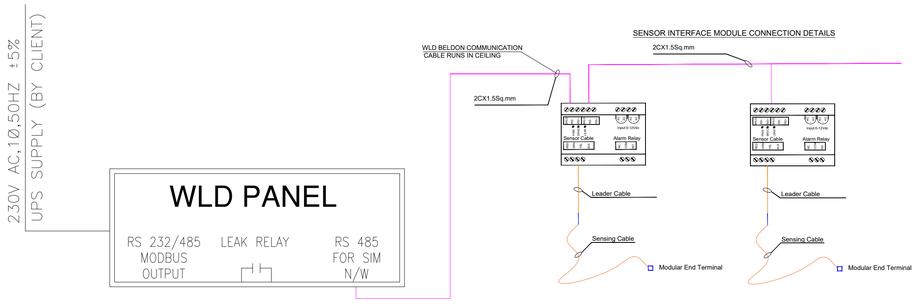
E4.0.1

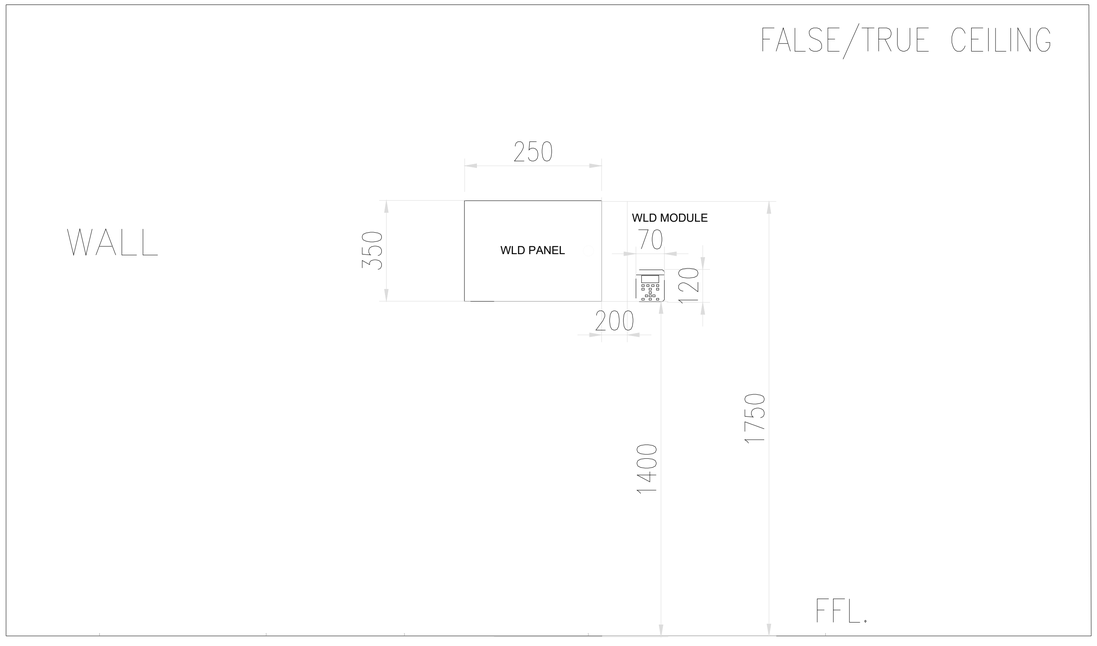
PURPOSE : TENDER	DATE : 30.08.2023
DETAILED : PS	REV : R2
CHECKED : GP	PLOT SIZE :
SCALE : NTS	A1
JOB No :	



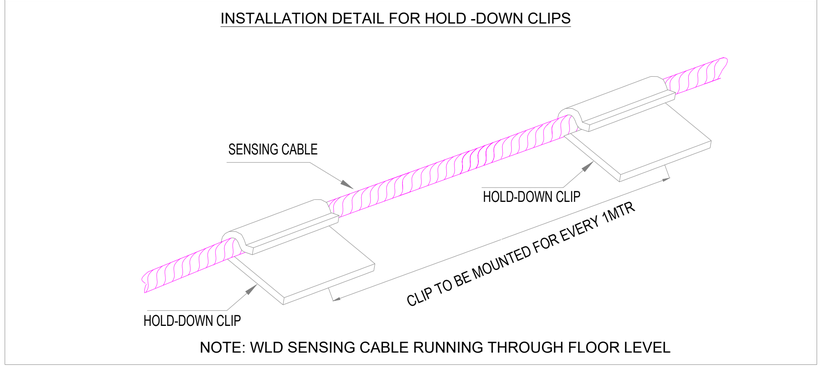
LEGENDS:

SYMBOL	DISCRIPTION
WLD PANEL	WATER LEAK DETECTION PANEL
	WATER LEAK DETECTION MODULE
	HOLDING CLIP
	CONNECTOR
	END OF LINE PLUG
	230 VAC, 5A UPS Socket by Electrical Vendor
	Power supply module
	LEADER CABLE
	2 CORE TWISTED PAIR 1.5 SQMM CABLE
	WATER LEAK DETECTION SENSING CABLES





TYPICAL PANEL AND DEVICES MOUNTING DETAILS OF WATER LEAK DETECTION



REV	DESCRIPTION	DATE
R2	AS PER REVISED ARICHITECTURE LAYOUT	30.08.23
R1	AS PER LATEST LAYOUT	27.06.23
R0	PRELIMINARY DRAWING	06.06.23

CLIENT:

CDAC
Centre for Development of Advance Computing

PROJECT:

IIT MADRAS, CHENNAI

MEP CONSULTANTS:

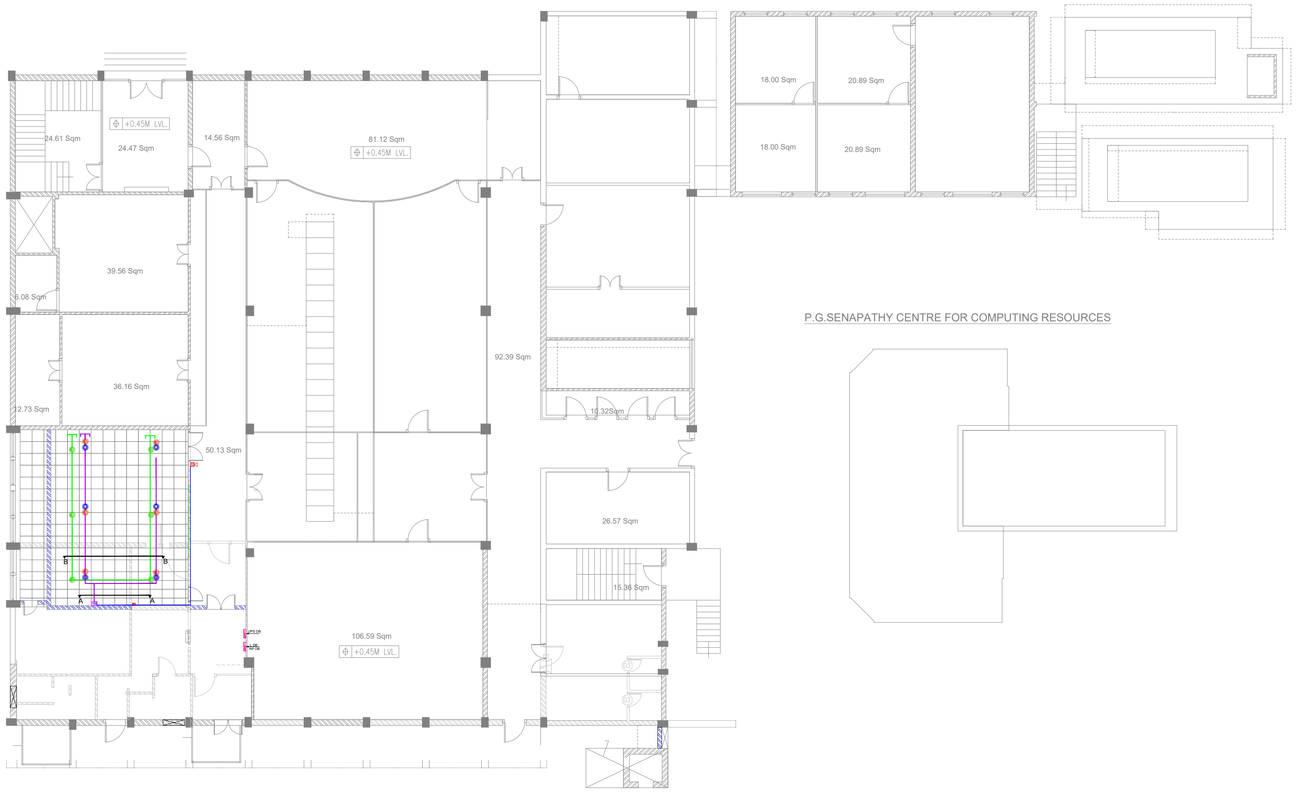
DRAWING DESCRIPTION :

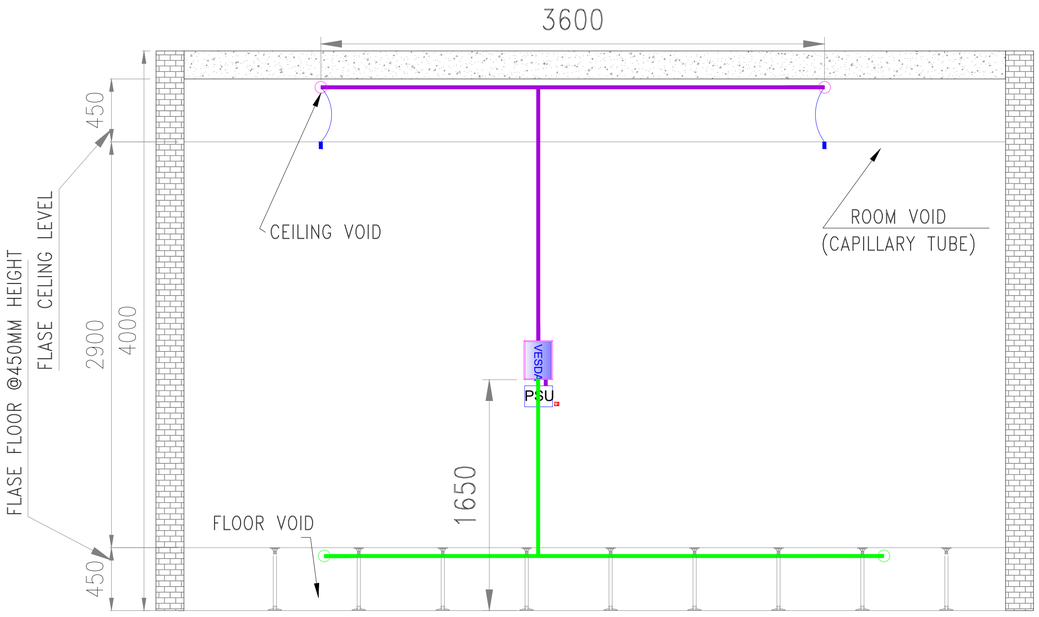
WLD LAYOUT

SHEET NO :

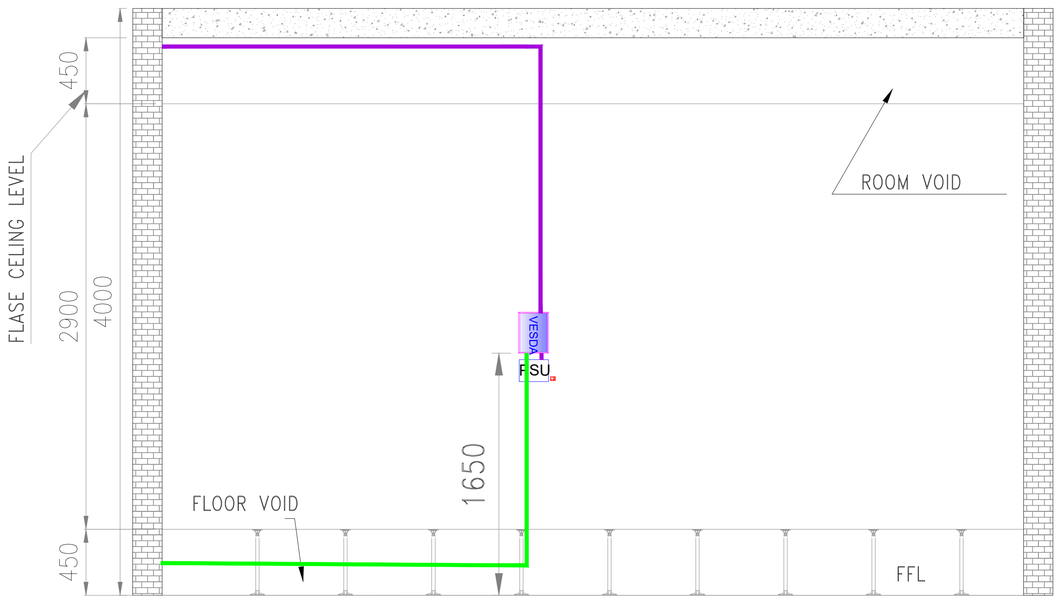
E5.0.1

PURPOSE : TENDER	DATE : 30.08.2023
DETAILED : PS	REV : R2
CHECKED : GP	PLOT SIZE : A1
SCALE : NTS	
JOB No :	





SECTION 'BB'



SECTION 'AA'

LEGEND:-

SYMBOL	DESCRIPTION
	SINGLE CHANNEL LASER ASPIRATION DETECTOR
	SAMPLING HOLE (CEILING VOID)
	SAMPLING HOLE (ROOM VOID)
	SAMPLING HOLE (SUBFLOOR)
	CAPILLARY TUBE
	1" DIA FRLS 2MM HEAVY DUTY PVC ASPIRATION TUBE(CEILING VOID)
	1" DIA FRLS 2MM HEAVY DUTY PVC ASPIRATION TUBE(SUB FLOOR VOID)
	2C X 1.5 SQMM ARMORED FRLS CABLE - POWER
	END CAP
	END CAP
	UPS POWER POINT 230 V 5A (CLIENT SCOPE)
	HOOTER

REV	DESCRIPTION	DATE
R2	AS PER REVISED ARICHITECTURE LAYOUT	30.08.23
R1	AS PER LATEST LAYOUT	27.06.23
R0	PRELIMINARY DRAWING	06.06.23

CLIENT:

CDAC
Centre for Development of Advance Computing

PROJECT:

IIT MADRAS, CHENNAI

MEP CONSULTANTS:

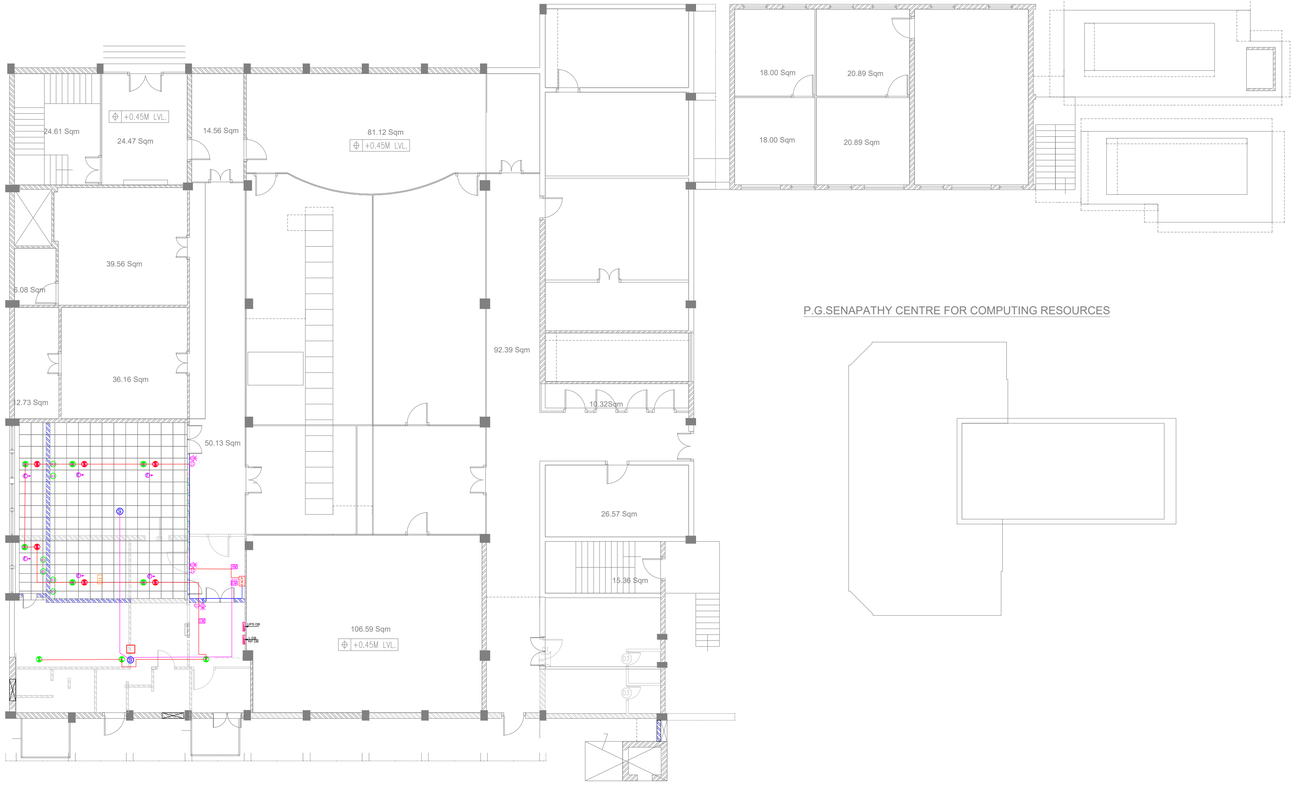
DRAWING DESCRIPTION :

VESDA LAYOUT

SHEET NO :

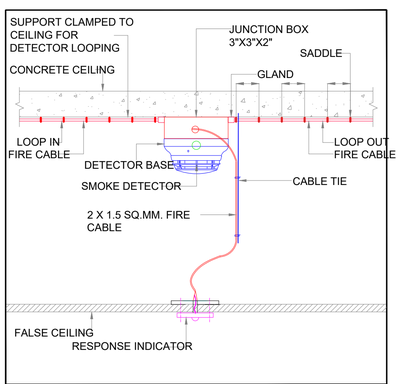
E6.0.1

PURPOSE : TENDER	DATE : 30.08.2023
DETAILED : PS	REV : R2
CHECKED : GP	PLOT SIZE : A1
SCALE : NTS	
JOB No :	

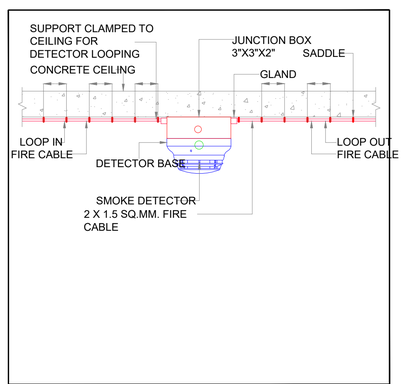


LEGEND FOR FIRE ALARM SYSTEM	
SYMBOL	DESCRIPTION
	ABOVE FALSE CEILING DETECTOR
	BELOW TRUE/FALSE CEILING DETECTOR
	RESPONSE INDICATOR
	BELOW FALSE FLOOR DETECTOR
	MANUAL CALL POINT
	HOOTER CUM STROBE
CM	CONTROL MODULE
FI	FAULT ISOLATOR BASE
MM	MONITOR MODULE
RM	RELAY MODULE
	2C x 1.5 SQMM FRLS Armoured TWISTED PAIR LOOP CABLE
	2C x 1.5 SQMM FRLS Armoured TWISTED PAIR NAC CABLE

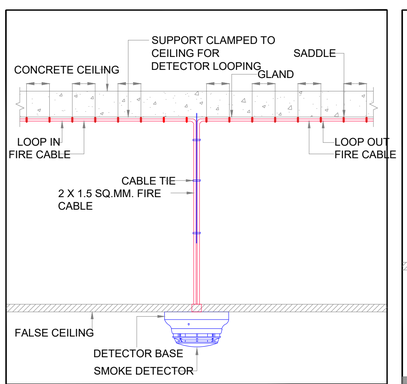
LEGEND FOR PUBLIC ADDRESS SYSTEM	
SYMBOL	DESCRIPTION
S	CEILING MOUNT SPEAKER
	BACK BOX FOR TRUE CEILING SPEAKER
	2C x 1.5 SQMM FRLS Armoured TWISTED PAIR CABLE



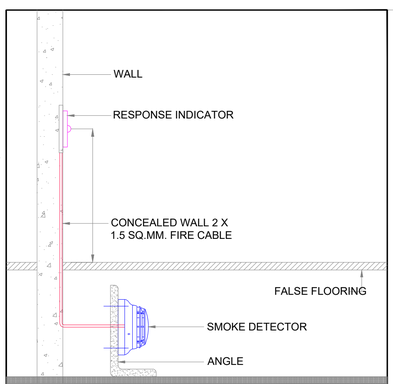
INSTALLATION DETAIL FOR ABOVE FALSE CEILING DETECTOR WITH RESPONSE INDICATOR



INSTALLATION DETAIL FOR TRUE CEILING DETECTOR

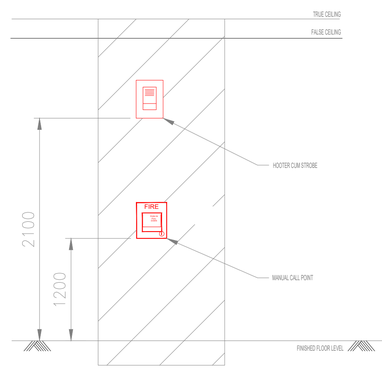


INSTALLATION DETAIL FOR BELOW FALSE CEILING DETECTOR



INSTALLATION DETAIL FOR FALSE FLOORING DETECTOR

MCP & HOOTER INSTALLATION DETAIL



REV	DESCRIPTION	DATE
R2	AS PER REVISED ARICHITECTURE LAYOUT	30.08.23
R1	AS PER LATEST LAYOUT	27.06.23
R0	PRELIMINARY DRAWING	06.06.23

CLIENT:

CDAC
Centre for Development of Advance Computing

PROJECT:

IIT MADRAS, CHENNAI

MEP CONSULTANTS:

DRAWING DESCRIPTION :

FAPA LAYOUT

SHEET NO :

E7.0.1

PURPOSE : TENDER	DATE : 30.08.2023
DETAILED : PS	REV : R2
CHECKED : GP	PLOT SIZE :
SCALE : NTS	A1
JOB No :	

OPERATING WEIGHT 180
KG/RMT FOR CHWS/CHWR PIPE

2 NOS CHW5/Ø150 MM

SUPPLY RING MAIN Ø150 MM

2 NOS CHWR/Ø150 MM

RETURN RING MAIN Ø150 MM

CHILLED WATER PIPE AT TERRACE

AIR COOLED CHILLER -70TR(2W+1S)
2300X2300X2450H
OPERATING WEIGHT 1450 KG

VARIABLE PRIMARY PUMP

RAISED PLATFORM FOR CHILLER MOUNTING

PUMPS AND RING MAIN BELOW THE RAISED PLATFORM

CHWS/R Ø100 MM

CHILLER PLANT AT TERRACE

G1	216 KGS
G2	332 KGS
G3	523 KGS
G4	340 KGS

FLOOR DRAIN

EXHAUST DUCT

EXHAUST LOUVERS

SMOKE EXTRACTION FAN 800 CFM

DX HIWALL UNIT 1TR (2W+1S)

CHWS/R Ø32 MM

CHWS/R RING MAIN
Ø150 MM

INROW OUTDOOR UNITS

CHWS/R Ø40 MM

HW-ODUS(2W+1S)
OUTDOOR UNITS STACKED

PAC OUTDOOR UNITS

CHWS/R Ø50 MM

NOVEC FOR DATA CENTER

NOVEC FOR ROOM & BATTERY ROOM

CHILLED WATER PIPES AT GROUND FLOOR DC
ROUTED BELOW RAISED FLOOR

CHILLED WATER PIPE DROP

DRAIN

STORAGE TANK
15m^3
OPERATING WEIGHT 18 TONS

FOUNDATION FOR STORAGE TANK

24.61 Sqm
24.47 Sqm
14.56 Sqm
81.12 Sqm
39.56 Sqm
6.08 Sqm
36.16 Sqm
12.73 Sqm
92.39 Sqm
50.13 Sqm
106.59 Sqm
10.32Sqm
26.57 Sqm
15.36 Sqm
18.00 Sqm
20.89 Sqm
18.00 Sqm
20.89 Sqm

+0.45M LVL.

P.G.SENAPATHY

LEGENDS	
	EGG CRATE GRILLE
	SMOKE EXTRACTION FAN
RDHX	REAR DOOR HEAT EXCHANGER
	DX TYPE HIWALL UNIT
IN ROW UNIT-1000	DX TYPE INROW UNIT
PAC 1	PRECISION AC
	VERTICAL INLINE PUMP
	FLEXIBLE CONNECTION

PIPE LEGENDS	
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
DRAIN	DRAIN LINE

REV	DESCRIPTION	DATE
R5	UPDATED AS PER THE REVISED RACK DIMENSION	05.10.23
R4	UPDATING CLIENT'S COMMENTS	01.09.23
R3	RDHx ORIENTATION REVISED	21.06.23
R2	BATTERY ROOM REVISED	19.06.23
R1	REVISED WITH RDHx OPTION	16.06.23
R0	PRELIMINARY DRAWING	06.06.23

CLIENT:

CDAC
Centre for Development of Advance Computing

PROJECT:

IIT MADRAS, CHENNAI

MEP CONSULTANTS:

DRAWING DESCRIPTION :

DC HVAC LAYOUT

SHEET NO :

M0.0.1

PURPOSE : TENDER DRAWING	DATE : 05.10.2023
DETAILED : SJ	REV : R5
CHECKED : RS	PLOT SIZE :
SCALE : NTS	A1
JOB No :	

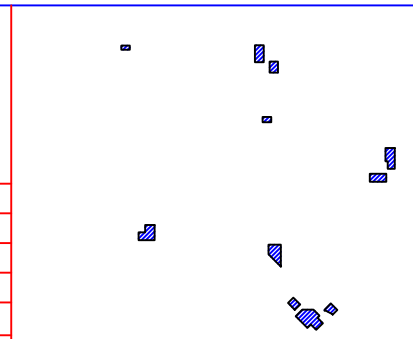
A-1

TERRACE FLOOR PLAN

JOINERY SCHEDULE

TYPE	DESCRIPTION	SIZE	TYPE	DESCRIPTION	SIZE
D	DOUBLE DOOR	1.50 X 2.21	W1	WINDOW	1.20 X 1.35
D1	DOOR	1.20 X 2.21	W2	WINDOW	2.55 X 1.50
D2	DOOR	1.00 X 2.21	W3	WINDOW	1.80 X 1.35
AD	DOOR	1.20 X 2.25	W4	WINDOW	1.75 X 1.35
ADD	ALUMINUM DOUBLE DOOR	1.20 X 2.25	W5	WINDOW	2.58 X 1.35
DD	DOUBLE DOOR	1.20 X 2.25	W6	WINDOW	0.75 X 1.35
AD	ALUMINUM DOUBLE	1.20 X 2.25	ASW	WINDOW	1.20 X 1.37
ADD1	DOOR	1.50 X 2.25	ASW1	WINDOW	2.00 X 1.37
TD	TOILET DOOR	1.00 X 2.10	V	VENTILATOR	1.20 X 0.70
TD1	TOILET DOOR	0.75 X 2.10	V1	VENTILATOR	0.90 X 0.90
			V3	VENTILATOR	0.75 X 0.90

KEY PLAN



AREA STATEMENT

DETAILS	SQM
GROUND FLOOR AREA	7593.00
FIRST FLOOR AREA	6555.00
SECOND FLOOR AREA	6281.00
TERRACE FLOOR AREA	236.00
TOTAL AREA	20665.00

This drawing has been prepared based on the actual survey and field measurements taken as per site conditions

LEGEND

PARTITION

BRICKWORK

NO	DATE	REVISION
1	04-02-20	Checked & Correction Noted by JE/JT
2	06-02-20	Correction Updated

S.VELMURUGAN, M.E.,M.B.A.

Contact - +91 9444 00 2859
+91 9444 70 2859
044 - 2247 2347

E-mail : info@svengineers.net
Web : www.svengineers.net

Plot No : 1,Sumangali complex,
Perumal Nagar 5th Main Road,
Old Pallavaram,
Chennai - 600 117

FILE NAME - D: sv/svengineers/iit/ten-15/bsb, pgsc & csb-final

FIELD SURVEY	DRAWN BY	CHECKED	APPROVED
Karthikeyan, Gawtham	siva	svm	

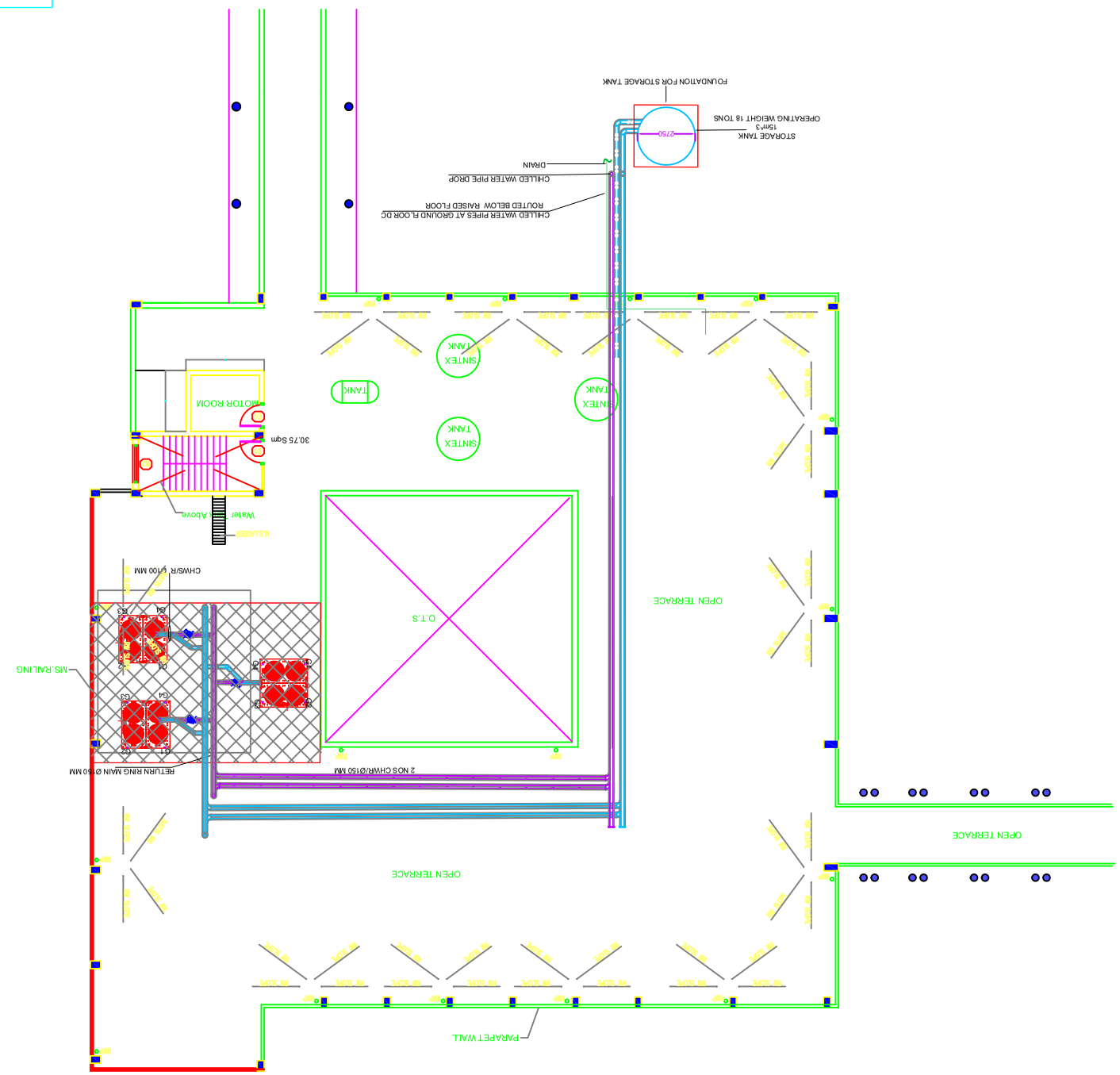
ALL DIMENSIONS ARE IN METRE

DWG NO	DATE	SCALE	DIRECTION
SV/AZ-05 4/4	13-09-2019	1:200	

TERRACE FLOOR PLAN

INDIAN INSTITUTE OF TECHNOLOGY
MADRAS, CHENNAI - 600 036

BSB, PG SENAPATHY CENTRE & CSB



P.G.SENAPATHY CENTRE FOR COMPUTING RESOURCES