

MUMBAI METRO RAIL CORPORATION LIMITED
Mumbai Metro Line-3 Project

Response to Bidders Queries (Set-2) for IFB No. MM3-CBS-TVE (Phase2) (P2L1 & P2L2)

Design, Manufacture, Supply, Installation, Testing and Commissioning of Tunnel Ventilation System & Environmental Control System - Package: 15 (Phase-2)

S. No.	PART & SECTION REFERENCE	CLAUSE REFERENCE	PAGE NO	CLAUSE DESCRIPTION	BIDDERS QUERY	MMRC RESPONSE/CLARIFICATION	ADDENDUM (Y/N)
P2L1							
1	Part 2 - Employers Requirement Section VI-B1 & B2 - Technical Specifications - ECS & TVS	General	General	Technical & Installation Requirements	The proposed manufacturers/vendors fulfilling all the functional and performance requirement of the specifications shall be acceptable to the employer, kindly confirm.	Bid Conditions Prevail.	N
2	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.2.2 Quality control -AHU	Page 42 of 145	The AHU manufacturer shall show at least five years of continuous and current experience in the design, assembly, and testing of AHU's.	As per Bid Form - 23 E, the manufacturer shall have provided 20 units with a minimum of 3 years of revenue services. Accordingly Bidder's proposal in line with Bid Form- 23 E shall be acceptable to the employer, kindly confirm.	Bid Conditions Prevail.	N
3	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.2.3 Technical and General Requirement Clause (a) - AHU	Page 43 of 145	Drain pan of heavy gauge Stainless steel (SS-316).	As per the manufacturing standard of major manufacturers, Drain Pan shall be of SS - 304 Grade. Kindly Confirm.	Bid Conditions Prevail.	N
4	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.2.3 Technical and General Requirement Clause (a) - AHU	Page 43 of 145	The units shall be of a panelized construction fabricated with heavy gauge steel suitably welded and reinforced to provide a rigid assembly.	As per the manufacturing standard of major manufacturers, the units shall be of bolted Panelized Construction instead of Welded Construction, for the ease of dismantling AHU if required for future maintenance works.	Bid Conditions Prevail. (Shall be subject to approval of material submittal)	N
5	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.2.3 Technical and General Requirement Clause (b) - AHU	Page 43 of 145	The fan shall be direct drive Plug fan with EC motors, with integral variable speed drive and rated in accordance with ISO 14694.	As per the manufacturing standard of major manufacturers the fans shall be, Belt Driven Centrifugal type with IE-2 Class three phase induction motors. Kindly Confirm.	Bid Conditions Prevail.	N
6	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.2.3 Technical and General Requirement Clause (b) - AHU	Page 43 of 145	AHU shall have two types of filters: 1) High Efficiency washable Pre filters of 90% efficiency down to 10 micron particle size with aluminum frame. 2) Washable Bag filters shall be provided with 85% efficiency down to 3 micron particle size.	As per the manufacturing standard of major manufacturers, either of the two types of filters shall be provided along with the AHU(s). As incorporating both type of Filters shall have following benefits: 1) Increase Pressure Drop 2) Increase A-U Size. Kindly confirm.	Bid Conditions Prevail.	N
7	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.2.3 Technical and installation requirements. Clause (e) - AHU	Page 43 of 145	All filter frame shall of SS-304 and be epoxy painted.	Epoxy paint is provided for Corrosion resistance. Since Filter Frame is of SS-304, which is already corrosion resistant, epoxy paint is not required. Kindly confirm.	Bid Conditions Prevail.	N
8	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.2.3 Technical and installation requirements. Clause (h) - AHU	Page 45 of 145	Motor shall comply with NEMA MG-1.	The motors shall comply with equivalent IEC standards. Kindly Confirm.	Bid Conditions Prevail. (To be finally decided during detailed design stage.)	N
9	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.2.3 Technical and installation requirements. Clause (h) - AHU	Page 45 of 145	Fan characteristic curves shall be related to measurements on a fan test rig with Inlet silencing chamber in accordance with DIN 24163 Part 2 OR ISO 5801.	Fan characteristic curves shall be compliant to equivalent AMCA standards. Kindly Confirm.	Bid Conditions Prevail. AMCA standards are also listed in specification.	N
10	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.2.3 Technical and installation requirements. Clause (i) - AHU	Page 45 of 145	Units supplied with casing exterior factory painted shall able to withstand a salt water spray test in accordance with ASTM B117 for a minimum of 500 consecutive hours.	Testing shall not applicable if the supplied units have Pre-Coated sheets, for casing material. Kindly Confirm.	Bid Conditions Prevail.	N
11	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	Annexure- A Air Filters	Page 144 of 145	All filters shall be UL-approved, and shall be washable.	Only Filter Media shall be UL approved. Kindly Confirm.	Bid Conditions Prevail.	N
12	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	Annexure- A Air Filters	Page 144 of 145	All gaskets shall have the same fire property requirements as the air filter.	Gaskets shall be Fire Retardant Type.	Bid Conditions Prevail.	N



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13	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.3.2 Quality control Clause (b) - FCU	Page 48 of 145	The fan coil units Manufacturer shall show at least Five years of continuous and current experience in the design, assembly and testing of fan coil units.	As per Bid Form - 23 E, the manufacturer shall have provided 20 units with a minimum of 3 years in revenue services. Accordingly Bidder's proposal in line with Bid Form- 23 E shall be acceptable to the employer, kindly confirm.	Bid Conditions Prevail	N
14	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.3.1 General - FCU	Page 49 of 145	Inner skin & Outer skin thickness should be 1.2 mm & 1 mm of Powder coated sheet.	Inner skin & Outer skin thickness should be 1.2 mm & 1 mm of Pre-Coated Sheets. Kindly Confirm.	Bid Conditions Prevail.	N
15	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.3.2 Quality control Clause (b) - FCU	Page 49 of 145	The coil shall be 4 or 6 rows deep, of seamless copper tubes not less than 10mm O.D. and 0.5 mm thick encased in SS-304 frame and having copper headers.	As per the manufacturing standard of the major manufacturers, IGT copper tubes are available in 9.54mm OD. Please confirm.	Bid Conditions Prevail.	N
16	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.3.2 Quality control Clause (b)	Page 49 of 145	The coil shall have continuous aluminum fins having minimum thickness of 0.15 mm.	We propose aluminum fins having minimum thickness of 0.14 mm.	Bid Conditions Prevail.	N
17	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.3.3 Fan and motor - FCU	Page 49 of 145	Maximum noise level acceptable shall be 50 dB at a distance of 1.5 m from fan.	Owing to the Background Noise, at site it is not possible to comply to this clause. We propose minimum sound level shall be 65 dB at a distance of 1.5 m from FCU, the same is acceptable in other metro projects, as well. Kindly Confirm.	Bid Conditions Prevail	N
18	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.3.4 Drain Pan Clause (d) - FCU	Page 50 of 145	Drain pans shall have copper male connectors for connection to the condensate drainpipes. The frame and drain pipe should be of SS-316.	Drain pans shall have SS-304 male connectors and further the Frame and Drain pipe should be Galvanized Iron as per relevant IS standard. The same is acceptable in other metro projects as well. Kindly Confirm.	Bid Conditions Prevail.	N
19	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.3.7 Noise contro - FCU	Page 50 of 145	Maximum noise level acceptable shall be 50dB in the room.	Owing to the Background noise and noise produce by other equipments in operational rooms, it is not possible to achieve the referred Noise Criteria. We propose an acceptable noise level of 65 dB, the same is acceptable in other metro projects as well. Kindly confirm.	Bid Conditions Prevail.	N
20	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.3.10 Field Tests - FCU	Page 51 of 145	After each FCU is installed and ready for pipe connection, the coil shall be tested against leaks at a hydraulic pressure of 10kg/m ² .	We recommend that the FCU(s) shall be checked randomly for Hydraulic testing. It is neither feasible, nor is safe to conduct hydro testing on each FCU. Kindly confirm.	Bid Conditions Prevail.	N
21	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.4.2 Quality Control Reference Standards - Chillers	Page 52 of 145	The water chilling units Manufacturer shall show at least ten years of continuous and current experience in the design, assembly and testing of such units.	As per Bid Form - 23 A, the manufacturer shall have provided 20 units with a minimum of 3 years in revenue services. Accordingly Bidder's proposal in line with Bid Form- 23 A shall be acceptable to the employer, Kindly confirm.	Bid Conditions Prevail.	N
22	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.4.3.1 Water cooled variable speed drive screw chillers	Page 53 of 145	General	We understand that for the subject project VFD driven screw chillers are required however as per Clause (a) General, Soft Starter for motor is also envisaged. It is not possible to integrate soft starter along with VFD. Accordingly either VFD or Soft Starter can be provided. Please Clarify.	Bid Conditions Prevail. This is to be finalised during detailed design stage being DB contract.	N
23	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.4.3.1 Water cooled variable speed drive screw chillers	Page 54 of 145	Condenser - Pt. (v): The condenser shall be tested against leaks with a pressure of 24.5 Kg/Cm ² on both the shell side and the waterside.	As per industry practice the Pressure Testing takes place at 1.5 times rated pressure, accordingly the condenser shall be tested against leaks with pressure of 21 Kg/cm ² on both shell side and water side.	Bid Conditions Prevail	N
24	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.4.3.1 Water cooled variable speed drive screw chillers	Page 55 of 145	Chiller Control Panel should have Indicating lights.	The Chiller control Panel shall be a touchscreen LCD display without any Indicating lights, please confirm.	Bid Conditions Prevail	N
25	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.4.3.1 Water cooled variable speed drive screw chillers - Clause (h)	Page 56 of 145	The chilling units shall be delivered with pre-charged refrigerant from the manufacturing premises. The refrigerant shall not be charged at site.	Their remains a risk of refrigerant leakage during transit and transportation. Further special clearances from authorities have to be taken which is time consuming and may lead to delay in equipment delivery. Accordingly we request to allow refrigerant charging at site before chiller commissioning. The same is acceptable in other metro projects as well. Please confirm.	Bid Conditions Prevail.	N



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26	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.4.3.1 Water cooled variable speed drive screw chillers - Clause (i)	Page 56 of 145	Spring type vibration isolators to eliminate transmission of vibrations upto 90% are required.	Vibration Isolation Pads of similar efficiency shall be provided. Kindly Confirm.	Bid Conditions Prevail.	N
27	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.4.3.1 Water cooled variable speed drive screw chillers - Clause (j)	Page 57 of 145	Automatic air vent at the Inlet and outlet of chiller.	We understand that the Automatic Air vents shall be provided at the Inlet Water Pipeline and outlet water Pipeline. Kindly confirm.	Bid Conditions Prevail. Being D&B contract, to be decided during detail design.	N
28	Part 2 - Employers Requirement Sect on VI-B1 - Technical Specifications ECS	6.2.4.3.2 Magnetic Levitation Chillers	Page 58 of 145	COP at ARI Conditions > 6.3, IPLV > 10.0	In accordance with the product range of all major manufacturers, COP at ARI Conditions shall be > 6.0, IPLV shall be > 8.0. Kindly Confirm.	Bid Conditions Prevail.	N
29	Part 2 - Employers Requirement Sect on VI-B1 - Technical Specifications ECS	6.2.4.3.5 Execution	Page 61 of 145	The complete water-chilling unit shall be mounted on a R.C.C foundation.	All structural-steel/Masonry/RCC foundations for Chiller Installation shall be provided by Civil Contractor. Please confirm.	Bid Conditions Prevail. (Please refer Appendix 19 of Part-2, Section VI-A).	N
30	Part 2 - Employers Requirement Sect on VI-B1 - Technical Specifications ECS	6.2.4.3.5 Execution	Page 61 of 145	Pt. (ii), Chillers shall be installed on an equipment pad with vibration isolators.	As per installation standard of major manufacturers, chillers shall be mounted upon Vibration Isolation Pads. Kindly confirm.	Bid Conditions Prevail.	N
31	Part 2 - Employers Requirement Sect on VI-B1 - Technical Specifications ECS	6.2.4.3.5 Execution	Page 61 of 145	Pt. (iii) Factory-applied, anti-sweat thermal insulation shall be attached to the cooler shell.	Owing to the risk of insulation damage during transportation and Installation, it is a standard practice to apply Insulation at site before handover to the Client. Accordingly we recommend insulation shall be installed at site. Please confirm.	Bid Conditions Prevail.	N
32	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.5.3 Manufacturers qualifications and experience - Air Cooled Chillers	Page 62 of 145	The Air cooled chilling units manufacturer shall show at least ten years of continuous and current experience in the design, assembly and testing of such units.	As per Bid Form - 23 A, the manufacturer shall have provided 20 units with a minimum of 3 years in revenue services. Accordingly Bidder's proposal in line with Bid Form- 23 A shall be acceptable to the employer, kindly confirm.	Bid Conditions Prevail.	N
33	Part 2 - Employers Requirement Sect on VI-B1 - Technical Specifications ECS	6.2.5.4 Technical and Installation requirements	Page 63 of 145	The air cooled water chilling machine shall have squirrel cage Induction motor.	The Air Cooled Chiller shall have Totally enclosed Refrigerant Cooled motor. Please confirm.	Bid Conditions Prevail.	N
34	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.5.4.4 Installation of Air-Cooled Chillers	Page 65 of 145	The air-cooled chiller package housing compressor, chiller and condensers shall be mounted on structural foundation.	All structural-steel/Masonry/RCC foundations for Chiller Installation shall be provided by Civil Contractor. Please confirm.	Refer response of Query at S.No 29	N
35	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.6.2 Quality control - Water Circulating Pumps	Page 66 of 145	Codes & Standards for Pumps	Pumps shall comply to equivalent or superior IS/B5/ISO/EN Standards. Kindly confirm.	Bid Conditions Prevail. Please refer clause 1.4.1 of Part 2 Section VI- B1 regarding proposal for alternative or additional codes and standards.	N
36	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.6.3 Technical and installation requirements	Page 67 of 145	Pt. a: The casing and exterior (color) finish should be same as that of the chillers.	The casing and exterior (color) finish should be as per the Manufacturing Standards of the Vendor. Kindly confirm.	Bid Conditions Prevail.	N
37	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.6.3 Technical and installation requirements	Page 67 of 145	Pt. b: The pump efficiency shall be 80% minimum.	The minimum efficiency of the pump shall be between 63% to 80% depending upon their capacity. Kindly confirm.	Bid Conditions Prevail.	N
38	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.6.3 Technical and installation requirements	Page 67 of 145	Pt. f: The impeller shall be of Bronze and should be properly balanced.	As per the manufacturing standards of Major manufacturers, the impeller shall be of SS / Or of material with equivalent properties.	Bid Conditions Prevail.	N
39	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.6.3 Technical and installation requirements	Page 67 of 145	Pt. h: A suitable flexible coupling shall be provided to connect the pump and the motor.	Owing to a higher failure rates of Pumps with Flexible Coupling due to mis-alignment during operations & maintenance, we propose Direct driven pumps, wherein the Pumps are connected directly to Motor using a stub shaft. The same shall have no effect on Pump's performance. Kindly confirm.	Bid Conditions Prevail.	N



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40	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.6.3.4 Quality assurance	Page 67 of 145	Pt. c: All functions of the variable speed pump control system shall be tested at the factory prior to shipment. This test shall be conducted with motors connected to VSD output and it shall test all inputs and program execution specific to this application.	As per industry practice all the functions of the Variable Speed Pump shall be tested at site post integration with field DPT. It is not possible to test all functions of the pumping system at factory.	Bid Conditions Prevail.	N
41	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	General	General	Pump Installation	All structural-steel/Masonry/RCC foundations/Floating Foundations for Pump Installation shall be provided by Civil Contractor. Please confirm.	Refer response of Query at S.No 29	N
42	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.7.3 Technical and installation requirements	Page 71 of 145	The cooling towers shall be induced draft Cross flow type.	We propose Counter Flow type Induced draft cooling towers as the same have significantly less footprints in comparison to Cross Flow type cooling towers of the same capacity. Kindly confirm.	Bid Conditions Prevail.	N
43	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.7.3 Technical and installation requirements - Pt. (a) - General	Page 71 of 145	The Cooling tower shall be constructed with a sturdy structural Hot dipped Galvanized frame.	As per the manufacturing standard of the major manufacturers the Cooling Tower frame shall be of FRP. Kindly confirm.	Bid Conditions Prevail.	N
44	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.7.3 Technical and installation requirements - Pt. (a) - General	Page 71 of 145	The fan deck shall form an integral part of the body	As per the manufacturing standard of the major manufacturers the Fan Deck & Panel shall be installed on the frame of Cooling Tower. Kindly Confirm.	Bid Conditions Prevail.	N
45	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.7.3 Technical and installation requirements- Pt. (b)-Water Distribution System	Page 71 of 145	The hot water distribution basin shall be open gravity type for easy cleaning, constructed with FRP, and shall be distributed through a sprinkler system consisting of PVC sprinkler pipes, which shall be mounted on top of the main supply standpipe.	As per the manufacturing standard of major manufacturer(s), the hot water distribution shall be through header-branch pipe arrangement consisting of spray nozzles. Kindly Confirm.	Bid Conditions Prevail.	N
46	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.7.3 Technical and installation requirements- Pt. (c)- Fan assembly	Page 72 of 145	The fan assembly shall be statically and dynamically balanced.	As per the manufacturing standard of major manufacturer(s) the fan assembly shall be statically balanced only. Kindly confirm.	Bid Conditions Prevail.	N
47	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.7.3 Technical and installation requirements- Pt. (c)- Fan assembly	Page 72 of 145	The fan motor shall be shall be of high efficiency class EFF-1 totally enclosed fan cooled squirrel, cage type conforming to IP 55 motor protection.	The Fan motor shall be of IE-2, Class efficiency. Kindly confirm.	Bid Conditions Prevail. Please refer clause 1.4.1 of Part 2 Section VI- B1 regarding proposal for alternative or additional codes and standards.	N
48	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.9.3.7 Butterfly Valves	Page 85 of 145	Valves of DN40 and larger shall be of cast Iron body.	As per the manufacturing standard of the major manufacturers Valves of DN 50 and above shall be of cast Iron body. Kindly Confirm.	Bid Conditions Prevail.	N
49	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.9.3.10 Strainers	Page 86 of 145	Pt I. Strainers DN250 and above shall be cast steel flanged pot-type with scantlings as for DN200.	As per the manufacturing standard of all the major manufacturers, Cast-Steel type Y-Strainer is available upto DN 150 mm only. Accordingly we propose Cast Iron type Y-Strainer for DN 200 mm and above sizes. Kindly Confirm.	Bid Conditions Prevail.	N
50	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.10.3.5 Motor Operated Dampers (MOD)	Page 91 of 145	Pt o. Motor operated damper frames shall be a channel cross-section with not less than a 100 mm web and 50 mm flanges,	The damper construction shall be as per manufacturer's standard, however all performance requirement of the the Contract Specifications shall be fulfilled. Kindly Confirm	Bid Conditions Prevail.	N
51	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.13.3 Technical and installation requirements (ECS Fans)	Page 103 of 145	The fan characteristic shall also be such that for a 15 % increase in static pressure over the specified value, the fan shall deliver not less than 85 % of the specified air volume flow rate.	As per the manufacturing practices of major fan manufacturers, the fans can either be best efficient or shall comply to the subject clause. Kindly confirm.	Bid Conditions Prevail.	N
52	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.13.3 Technical and installation requirements (ECS Fans)	Page 103 of 145	Pt b. All fans with nominal rating above 7.5 kW shall have a minimum efficiency of 70%.	As per the available range of products of all major fan manufacturers, fans with nominal rating above 7.5 kW shall have a minimum efficiency of 65%. Kindly Confirm.	Bid Conditions Prevail.	N



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53	Part 2, Employer's Requirements Section VI-B2 - Technical Specification TVS	6.2.2.1 Reference Standards	Page 43 of 104	Codes & Standards for TVF	The Fans shall be supplied in accordance to the equivalent IS/BS/ISO/EN/IEC Standards, please confirm.	Bid Conditions Prevail. Please refer clause 1.3.9 of Part 2 Section VI- B2 regarding proposal for alternative or additional codes and standards	N
54	Part 2, Employer's Requirements Section VI-B2 - Technical Specification TVS	6.2.3.3 Fan-Motor Unit Design Requirements	Page 49 of 104	Pt c. Emergency fan-motor units shall have a total efficiency of not less than 75 percent in forward flow and not less than 65 percent in reverse flow, when operating at the specified nominal flow rate.	As per the available range of products of all major fan manufacturers, Emergency fan-motor units shall have a total efficiency of not less than 65 percent in forward flow and not less than 55 percent in reverse flow, when operating at the specified nominal flow rate. Please confirm.	Bid Conditions Prevail.	N
55	Part 2, Employer's Requirements Section VI-B2 - Technical Specification TVS	6.2.3.11 Motor Tests	Page 54 of 104	Motors shall be tested in accordance with the procedures specified in IEEE Publication 112 and NEMA MG-1.	Motor shall be tested in accordance with equivalent IEC Standards. Kindly Confirm.	Bid Conditions Prevail. Please refer clause 1.3.9 of Part 2 Section VI- B2 regarding proposal for alternative or additional codes and standards	N
56	Part 2, Employer's Requirements Section VI-B2 - Technical Specification TVS	6.2.3.17 Noise Test	Page 57 of 104	Inspections specified shall be tested in accordance with the induct test procedure of ANSI 12.34.	Sound testing shall be performed in accordance with equivalent ISO/BS/AMCA/EN standards. Kindly Confirm.	Bid Conditions Prevail. Please refer clause 1.3.9 of Part 2 Section VI- B2 regarding proposal for alternative or additional codes and standards	N
57	Part 2 - Employers requirement Section VI-B1 - Technical Specifications - ECS	6.2.1.6	Page 40 of 145	Control and Monitoring of Smoke Control System	We understand separate smoke panel is not required as IBP is already available in SCR. Please confirm.	Bid Conditions Prevail. (Smoke control panel shall be provided if required by local code).	N
58	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	3.2.2 d	Page 16 of 145	Scope of work	We understand only Modes operation is to be done from IBP and equipment monitoring & control is through TVE SCADA from SCR. Please confirm.	Bid Conditions Prevail.	N
59	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	5.3.3	Page 23 of 145	Function of AC System for Station Public and Ancillary/Office Rooms	We understand that FCU operation shall be through thermostat as stand alone unit. Further, individual FCU monitoring & controlled is not required from TVE SCADA. Please confirm.	Bid Conditions Prevail. (All TVE equipment shall be controlled and monitored through TVE SCADA).	N
60	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	5.8.e	Page 27 of 145	Functions of Control and Monitoring System forUG Station ECS	We understand Local Control Panel (LCP) / ECS Control Panel shall be VCP and the same shall be installed on respective RHS & LHS PLC's in SCADA room, i.e. total 2 Nos VCP. Please confirm.	Bid Conditions Prevail. Please refer SCADA drawing for knowing the location of VCP.	N
61	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	5.8.e	Page 27 of 145	Functions of Control and Monitoring System forUG Station ECS	We understand Local Control Panel (LCP) / ECS control panel shall operate ECS modes only and individual control/monitoring of equipment is not provided. Please confirm.	Bid Conditions Prevail.	N
62	Part 2, Employer's Requirements Section VI-B2 - Technical Specification TVS	3.5.3 n	Page 21 of 104	RAMS analysis including safety certification of SIL Level of SCADA systems	We understand that SIL certification shall be applicable forBMS PLC's, IBP & VCP's only. Please Confirm.	Bid Conditions Prevail. Confirmed.	N
63	Part 2, Employer's Requirements Section VI-B3 - Technical Specification SCADA	1.1.3	Page 1 of 54	Phase 1 Contractor shall responsible for Integration, coordination and interface of Phase 2 TVE control and monitoring functions in the OCC/BCC.	We have assume OCC/BCC is in the scope of Phase-01 Contractor, Phase-02 Contractor will not provide any hardware and software in OCC/BCC. For Phase-2 contract the Works is limited to station level. However Phase 2 TVE Contractor shall make data available on Modbus TCP/IP (Open Protocol) at station level Communication Switch provided by another system wide contractors for OCC Data Communication. Please Confirm.	Bid Conditions Prevail. Refer the SCADA drawings and Appendix 19 for the scope and interface.	N
64	Part 2, Employer's Requirements Section VI-B3 - Technical Specification SCADA	2.3	Page 7 of 54	Scada for OCC/BCC is not part of this scope. However providing support to phase 1 contractor necessary for integration of Phase - 2 Scada system is in Phase 2 Contractor Scope	All the hardware and software at OCC/BCC are in scope of Phase 1 contractor scope. Please Confirm.	Bid Conditions Prevail. Confirmed	N



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65	Part-2, Employer's Requirements Section VI-B3 - Technical Specification SCADA	5.7	Page 16 of 54	The equipment shall derive its required power from the source provided by the contractor at stations and OCC/BCC.	UPS Power Supply for all BMS equipment to provide by other system wide contractor. Please Confirm	Bid Conditions Preval. Please refer Appendix 19 of Part 2, Section VI-A	N
66	Part-2, Employer's Requirements Section VI-B3 - Technical Specification SCADA	5.23.1	Page 34 of 54	For maintenance purpose, 2 notebook computers shall be provided.	Please Confirm if 2 Notebook is required for whole lot.	Bid Conditions Preval. Confirmed, 2 (two) notebooks are required for this contract.	N
67	Part-2, Employer's Requirements Section VI-B3 - Technical Specification SCADA	6.3.2	Page 49 of 54	The Contractor shall determine the necessary Inter processor links and data transfer protocols	Please confirm data Interface with other contractors shall be over Modbus TCP/IP.	Bid Conditions Preval. It is part of interface coordination with other contractors	N
68	Part-2, Employer's Requirements Section VI-B3 - Technical Specification SCADA	7.1	Page 43 of 54	Civil Works	Sealing of wall opening shall be in the scope of Civil contractor. Please confirm.	Bid Conditions Preval.	N
69	Part-2, Employer's Requirements Section VI-B4 - Technical Specification Electrical	3.3.2.19 iv	Page 32 of 65	Screened Signal and Control Cables	For SCADA system 2.5 sqmm conductor cable for termination & maintenance shall be difficult. Please confirm if 1.5sqmm conductor size cable for SCADA can be considered.	Bid Conditions Preval.	N
70	Part-2, Employer's Requirements Section VI-B4 - Technical Specification Electrical	5.3.2 e	Page 44 of 65	Local Motor Control Panel (LMCP)	For motors with VFD, any control of open/close from panel shall not be required since the function shall be available in VFD. Please confirm.	Bid Conditions Preval.	N
71	Part-2, Employer's Requirements Section VI-B4 - Technical Specification Electrical	7	Page 54 of 65	Variable Speed Drives	We understand THD calculation will be in scope of contractor. Any other filter/equipments are not consider for THD monitoring, control & improvement. Please clarify.	Bid Conditions Preval. Please refer to clause 7.2 of Part 2 Section VI-B4.	N
P2L2							
72	Part-2 Employers Requirement Section VI-B1 & B2 - Technical Specifications - ECS & TVS	General	General	Technical & Installation Requirements	The proposed manufacturers/vendors fulfilling all the functional and performance requirement of the specifications shall be acceptable to the employer, kindly confirm.	Bid Conditions Preval.	N
73	Part-2 Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.2.1 Quality control -AHU	Page 42 of 145	The AHU manufacturer shall show at least five years of continuous and current experience in the design, assembly, and testing of AHU's.	As per Bid Form - 23 E, the manufacturer shall have provided 20 units with a minimum of 3 years in revenue services. Accordingly Bidder's proposal in line with Bid Form- 23 E shall be acceptable to the employer, kindly confirm.	Bid Conditions Preval.	N
74	Part-2 Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.2.3 Technical and General Requirement Clause (a) - AHU	Page 43 of 145	Drain pan of heavy gauge Stainless steel (SS-316)	As per the manufacturing standard of major manufacturers, Drain Pan shall be of SS - 304 Grade. Kindly Confirm.	Bid Conditions Preval.	N
75	Part-2 Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.2.3 Technical and General Requirement Clause (a) - AHU	Page 43 of 145	The units shall be of a panelized construction fabricated with heavy gauge steel suitably welded and reinforced to provide a rigid assembly.	As per the manufacturing standard of major manufacturers, the units shall be of bolted Panelized Construction instead of Welded Construction, for the ease of dismantling AHU if required for future maintenance works.	Bid Conditions Preval. (Shall be subject to approval of material submittal)	N
76	Part-2 Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.2.3 Technical and General Requirement Clause (b) - AHU	Page 43 of 145	The fan shall be direct drive Plug fan with EC motors, with integral variable speed drive and rated in accordance with ISO 34694.	As per the manufacturing standard of major manufacturers the fans shall be, Belt Driven Centrifugal type with IE-2 Class three phase induction motors. Kindly Confirm.	Bid Conditions Preval.	N
77	Part-2 Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.2.3 Technical and General Requirement Clause (b) - AHU	Page 43 of 145	AHU shall have two types of filters: 1) High Efficiency washable Pre filters of 90% efficiency down to 10 micron particle size with aluminum frame. 2) Washable Bag filters shall be provided with 85% efficiency down to 3 micron particle size.	As per the manufacturing standard of major manufacturers, either of the two types of filters shall be provided along with the AHU(s). As incorporating both type of Filters shall have following demerits: 1) Increased Pressure Drop 2) Increased AHU Size. Kindly confirm.	Bid Conditions Preval.	N



S. No.	PART & SECTION REFERENCE	CLAUSE REFERENCE	PAGE NO	CLAUSE DESCRIPTION	BIDDERS QUERY	MMRC RESPONSE/CLARIFICATION	ADDENDUM (Y/N)
78	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.2.3 Technical and Installation requirements. Clause (e) - AHU	Page 43 of 145	All filter frame shall of SS-304 and be epoxy painted.	Epoxy paint is provided for Corrosion resistance. Since Filter Frame is of SS-304, which is already corrosion resistant, epoxy paint is not required. Kindly confirm.	Bid Conditions Prevail.	N
79	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.2.3 Technical and Installation requirements. Clause (h) - AHU	Page 45 of 145	Motor shall comply with NEMA MG-1.	The motors shall comply with equivalent IEC standards. Kindly Confirm.	Bid Conditions Prevail. (To be finally decided during detailed design stage)	N
80	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.2.3 Technical and Installation requirements. Clause (h) - AHU	Page 45 of 145	Fan characteristic curves shall be related to measurements on a fan test rig with inlet silencing chamber in accordance with DIN 24163 Part 2 OR ISO 5801.	Fan characteristic curves shall be compliant to equivalent AMCA standards. Kindly Confirm.	Bid Conditions Prevail AMCA standards are also listed in specification.	N
81	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.2.3 Technical and Installation requirements. Clause (i) - AHU	Page 45 of 145	Units supplied with casing exterior factory painted shall able to withstand a salt water spray test in accordance with ASTM B117 for a minimum of 500 consecutive hours.	Testing shall not applicable if the supplied units have Pre-Coated sheets, for casing material. Kindly Confirm.	Bid Conditions Prevail.	N
82	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	Annexure- A Air Filters	Page 144 of 145	All filters shall be UL-approved, and shall be washable.	Only Filter Media shall be UL approved. Kindly Confirm.	Bid Conditions Prevail.	N
83	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	Annexure- A Air Filters	Page 144 of 145	All gaskets shall have the same fire property requirements as the air filter.	Gaskets shall be Fire Retardant Type.	Bid Conditions Prevail.	N
84	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.3.2 Quality control Clause (b) - FCU	Page 48 of 145	The fan coil units Manufacturer shall show at least five years of continuous and current experience in the design, assembly and testing of fan coil units.	As per Bid Form - 23 E, the manufacturer shall have provided 20 units with a minimum of 3 years in revenue services. Accordingly Bidder's proposal in line with Bid Form- 23 E shall be acceptable to the employer, kindly confirm.	Bid Conditions Prevail	N
85	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.3.1 General - FCU	Page 49 of 145	Inner skin & Outer skin thickness should be 1.2 mm & 1 mm of Powder coated sheet.	Inner skin & Outer skin thickness should be 1.2 mm & 1 mm of Pre-Coated Sheets. Kindly Confirm.	Bid Conditions Prevail.	N
86	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.3.2 Quality control Clause (b) - FCU	Page 49 of 145	The coil shall be 4 or 6 rows deep, of seamless copper tubes not less than 10mm O.D. and 0.5 mm thick encased in SS-304 frame and having copper headers.	As per the manufacturing standard of the major manufacturers, IGT copper tubes are available in 9.54mm OD. Please confirm.	Bid Conditions Prevail.	N
87	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.3.2 Quality control Clause (b)	Page 49 of 145	The coil shall have continuous aluminum fins having minimum thickness of 0.15 mm.	We propose aluminum fins having minimum thickness of 0.14 mm.	Bid Conditions Prevail.	N
88	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.3.3.3 Fan and motor - FCU	Page 49 of 145	Maximum noise level acceptable shall be 50 dB at a distance of 1.5 m from fan.	Owing to the Background Noise, at site it is not possible to comply to this clause. We propose minimum sound level shall be 65 dB at a distance of 1.5 m from FCU, the same is acceptable in other metro projects, as well. Kindly Confirm.	Bid Conditions Prevail.	N
89	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.3.3.4 Drain Pan Clause (d) - FCU	Page 50 of 145	Drain pans shall have copper male connectors for connection to the condensate drainpipes. The frame and drain pipe should be of SS-316.	Drain pans shall have SS-304 male connectors and further the Frame and Drain pipe should be Galvanized Iron as per relevant IS standard. The same is acceptable in other metro projects as well. Kindly Confirm.	Bid Conditions Prevail.	N
90	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.3.3.7 Noise control - FCU	Page 50 of 145	Maximum noise level acceptable shall be 50dB in the room.	Owing to the Background noise and noise produce by other equipments in operational rooms, it is not possible to achieve the referred Noise Criteria. We propose an acceptable noise level of 65 dB, the same is acceptable in other metro projects as well. Kindly confirm.	Bid Conditions Prevail.	N



S. No.	PART & SECTION REFERENCE	CLAUSE REFERENCE	PAGE NO	CLAUSE DESCRIPTION	BIDDERS QUERY	MMRC RESPONSE/CLARIFICATION	ADDENDUM (Y/N)
91	Part 7 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.3.3.10 Field Tests - FCU	Page 51 of 145	After each FCU is installed and ready for pipe connection, the coil shall be tested against leaks at a hydraulic pressure of 10kg/m ² .	We recommend that the FCU(s) shall be checked randomly for Hydraulic testing. It is neither feasible, nor is safe to conduct hydro testing on each FCU. Kindly confirm.	Bid Conditions Prevail.	N
92	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.4.2 Quality Control Reference Standards - Chillers	Page 52 of 145	The water chilling units Manufacturer shall show at least ten years of continuous and current experience in the design, assembly and testing of such units.	As per Bid Form - 23 A, the manufacturer shall have provided 20 units with a minimum of 3 years in revenue services. Accordingly Bidder's proposal in line with Bid Form- 23 A shall be acceptable to the employer, Kindly confirm.	Bid Conditions Prevail.	N
93	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.4.3.1 Water cooled variable speed drive screw chillers	Page 53 of 145	General	We understand that for the subject project VFD driven screw chillers are required however as per Clause (a) General, Soft Starter for motor is also envisaged. It is not possible to integrate soft starter along with VFD. Accordingly either VFD or Soft Starter can be provided. Please Clarify.	Bid Conditions Prevail. This is to be finalised during detailed design stage being DB contract.	N
94	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.4.3.1 Water cooled variable speed drive screw chillers	Page 54 of 145	Condenser - Pt. (v): The condenser shall be tested against leaks with a pressure of 24.5 Kg/Cm2 on both the shell side and the waterside.	As per industry practice the Pressure Testing takes place at 1.5 times rated pressure, accordingly the condenser shall be tested against leaks with pressure of 21 Kg/cm2 on both shell side and water side.	Bid Conditions Prevail.	N
95	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.4.3.1 Water cooled variable speed drive screw chillers	Page 55 of 145	Chiller Control Panel should have Indicating lights	The Chiller control Panel shall be a touchscreen LCD display without any Indicating lights, please confirm.	Bid Conditions Prevail.	N
96	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.4.3.1 Water cooled variable speed drive screw chillers - Clause (h)	Page 56 of 145	The chilling units shall be delivered with pre-charged refrigerant from the manufacturing premises. The refrigerant shall not be charged at site.	Their remains a risk of refrigerant leakage during transit and transportation. Further special clearances from authorities have to be taken which is time consuming and may lead to delay in equipment delivery. Accordingly we request to allow refrigerant charging at site before chiller commissioning. The same is acceptable in other metro projects as well. Please confirm.	Bid Conditions Prevail.	N
97	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.4.3.1 Water cooled variable speed drive screw chillers - Clause (j)	Page 56 of 145	Spring type vibration isolators to eliminate transmission of vibrations upto 90% are required.	Vibration Isolation Pads of similar efficiency shall be provided. Kindly Confirm.	Bid Conditions Prevail.	N
98	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.4.3.1 Water cooled variable speed drive screw chillers - Clause (j)	Page 57 of 145	Automatic air vent at the Inlet and outlet of chiller.	We understand that the Automatic Air vents shall be provided at the Inlet Water Pipeline and outlet water Pipeline. Kindly confirm.	Bid Conditions Prevail. Being D&B contract, to be decided during detail design.	N
99	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.4.3.2 Magnetic Levitation Chillers	Page 58 of 145	COP at ARI Conditions > 6.3, IPLV > 10.0	In accordance with the product range of all major manufacturers, COP at ARI Conditions shall be > 5.0, IPLV shall be > 8.0. Kindly Confirm.	Bid Conditions Prevail.	N
100	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.4.3.5 Execution	Page 61 of 145	The complete water-chilling unit shall be mounted on a R.C.C. foundation.	All structural-steel/Masonry/RCC foundations for Chiller Installation shall be provided by Civil Contractor. Please confirm.	Bid Conditions Prevail. (Please refer Appendix 19 of Part-2, Section VI-A)	N
101	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.4.3.5 Execution	Page 61 of 145	Pt. (ii), Chillers shall be installed on an equipment pad with vibration isolators.	As per Installation standard of major manufacturers, chillers shall be mounted upon Vibration Isolation Pads. Kindly confirm.	Bid Conditions Prevail.	N
102	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.4.3.5 Execution	Page 61 of 145	Pt. (iii) Factory-applied, anti-sweat thermal insulation shall be attached to the cooler shell.	Due to the risk of insulation damage during transportation and installation, it is a standard practice to apply insulation at site before handover to the Client. Accordingly we recommend insulation shall be installed at site. Please confirm.	Bid Conditions Prevail.	N
103	Part 7 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.5.3 Manufacturer's qualifications and experience - Air Cooled Chillers	Page 62 of 145	The Air cooled chilling units manufacturer shall show at least ten years of continuous and current experience in the design, assembly and testing of such units.	As per Bid Form - 23 A, the manufacturer shall have provided 20 units with a minimum of 3 years in revenue services. Accordingly Bidder's proposal in line with Bid Form- 23 A shall be acceptable to the employer, kindly confirm.	Bid Conditions Prevail.	N
104	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	6.2.5.4 Technical and Installation requirements	Page 63 of 145	The air cooled water chilling machine shall have squirrel cage induction motor.	The Air Cooled Chiller shall have Totally enclosed Refrigerant Cooled motor. Please confirm.	Bid Conditions Prevail.	N



S. No.	PART & SECTION REFERENCE	CLAUSE REFERENCE	PAGE NO	CLAUSE DESCRIPTION	BIDDERS QUERY	MMRC RESPONSE/CLARIFICATION	ADDENDUM (Y/N)
105	Part 7 - Employers Requirement Section VI-B1 – Technical Specifications - ECS	6.2.5.4.4 Installation of Air Cooled Chillers	Page 65 of 145	The air-cooled chiller package housing compressor, chiller and condensers shall be mounted on structural foundation.	All structural-steel/Masonry/RCC foundations for Chiller Installation shall be provided by Civil Contractor. Please confirm.	Refer response of Query at S.No.29	N
106	Part 2 - Employers Requirement Section VI-B1 – Technical Specifications - ECS	6.2.6.2 Quality control - Water Circulating Pumps	Page 66 of 145	Codes & Standards for Pumps	Pumps shall comply to equivalent or superior IS/BS/ISO/EN Standards. Kindly confirm.	Bid Conditions Prevail. Please refer clause 1.4.1 of Part 2 Section VI- B1 regarding proposal for alternative or additional codes and standards.	N
107	Part 2 - Employers Requirement Section VI-B1 – Technical Specifications - ECS	6.2.6.3 Technical and installation requirements	Page 67 of 145	Pt. a: The casing and exterior (color) finish should be same as that of the chillers.	The casing and exterior (color) finish should be as per the Manufacturing Standards of the Vendor. Kindly confirm.	Bid Conditions Prevail.	N
108	Part 2 - Employers Requirement Section VI-B1 – Technical Specifications - ECS	6.2.6.3 Technical and installation requirements	Page 67 of 145	Pt. b: The pump efficiency shall be 80% minimum.	The minimum efficiency of the pump shall be between 63% to 80% depending upon their capacity. Kindly confirm.	Bid Conditions Prevail.	N
109	Part 7 - Employers Requirement Section VI-B1 – Technical Specifications - ECS	6.2.6.3 Technical and installation requirements	Page 67 of 145	Pt. f: The Impeller shall be of Bronze and should be properly balanced.	As per the manufacturing standards of Major manufacturers, the impeller shall be of SS / Or of material with equivalent properties.	Bid Conditions Prevail.	N
110	Part 2 - Employers Requirement Section VI-B1 – Technical Specifications - ECS	6.2.6.3 Technical and installation requirements	Page 67 of 145	Pt. h: A suitable flexible coupling shall be provided to connect the pump and the motor.	Owing to a higher failure rates of Pumps with Flexible Coupling due to mis-alignment during operations & maintenance, we propose Direct driven pumps, wherein the Pumps are connected directly to Motor using a stub shaft. The same shall have no effect on Pump's performance. Kindly confirm.	Bid Conditions Prevail.	N
111	Part 2 - Employers Requirement Section VI-B1 – Technical Specifications - ECS	6.2.6.3.4 Quality assurance	Page 67 of 145	Pt. c: All functions of the variable speed pump control system shall be tested at the factory prior to shipment. This test shall be conducted with motors connected to VSD output and it shall test all inputs and program execution specific to this application.	As per industry practice all the functions of the Variable Speed Pump shall be tested at site post integration with field DPT. It is not possible to test all functions of the pumping system at factory.	Bid Conditions Prevail.	N
112	Part 2 - Employers Requirement Section VI-B1 – Technical Specifications - ECS	General	General	Pump Installation	All structural-steel/Masonry/RCC foundations/Floating Foundations for Pump Installation shall be provided by Civil Contractor. Please confirm.	Refer response of Query at S.No.29	N
113	Part 2 - Employers Requirement Section VI-B1 – Technical Specifications - ECS	6.2.7.3 Technical and installation requirements	Page 71 of 145	The cooling towers shall be induced draft Cross flow type.	We propose Counter Flow type Induced draft cooling towers as the same have significantly less footprints in comparison to Cross Flow type cooling towers of the same capacity. Kindly confirm.	Bid Conditions Prevail.	N
114	Part 2 - Employers Requirement Section VI-B1 – Technical Specifications - ECS	6.2.7.3 Technical and installation requirements - Pt. (a) - General	Page 71 of 145	The Cooling tower shall be constructed with a sturdy structural Hot dipped Galvanized frame.	As per the manufacturing standard of the major manufacturers the Cooling Tower frame shall be of FRP. Kindly confirm.	Bid Conditions Prevail.	N
115	Part 2 - Employers Requirement Section VI-B1 – Technical Specifications - ECS	6.2.7.3 Technical and installation requirements - Pt. (a) - General	Page 71 of 145	The fan deck shall form an integral part of the body	As per the manufacturing standard of the major manufacturers the Fan Deck & Panel shall be installed on the frame of Cooling Tower. Kindly Confirm.	Bid Conditions Prevail.	N
116	Part 2 - Employers Requirement Section VI-B1 – Technical Specifications - ECS	6.2.7.3 Technical and installation requirements- Pt. (b)- Water Distribution System	Page 71 of 145	The hot water distribution basin shall be open gravity type for easy cleaning, constructed with FRP, and shall be distributed through a sprinkler system consisting of PVC sprinkler pipes, which shall be mounted on top of the main supply standpipe.	As per the manufacturing standard of major manufacturer(s), the hot water distribution shall be through header-branch pipe arrangement consisting of spray nozzles. Kindly Confirm.	Bid Conditions Prevail.	N
117	Part 2 - Employers Requirement Section VI-B1 – Technical Specifications - ECS	6.2.7.3 Technical and installation requirements- Pt. (c)- Fan assembly	Page 72 of 145	The fan assembly shall be statically and dynamically balanced.	As per the manufacturing standard of major manufacturer(s) the fan assembly shall be statically balanced only. Kindly confirm.	Bid Conditions Prevail.	N
118	Part 2 - Employers Requirement Section VI-B1 – Technical Specifications - ECS	6.2.7.3 Technical and installation requirements- Pt. (c)- Fan assembly	Page 72 of 145	The fan motor shall be of high efficiency class EFF-1 totally enclosed fan cooled squirrel, cage type conforming to IP 55 motor protection.	The Fan motor shall be of IE-2, Class efficiency. Kindly confirm.	Bid Conditions Prevail. Please refer clause 1.4.1 of Part 2 Section VI- B1 regarding proposal for alternative or additional codes and standards.	N
119	Part 2 - Employers Requirement Section VI-B1 – Technical Specifications - ECS	6.2.9.3.7 Butterfly Valves	Page 85 of 145	Valves of DN40 and larger shall be of cast iron body.	As per the manufacturing standard of the major manufacturers Valves of DN 50 and above shall be of cast iron body. Kindly Confirm.	Bid Conditions Prevail.	N



S. No.	PART & SECTION REFERENCE	CLAUSE REFERENCE	PAGE NO	CLAUSE DESCRIPTION	BIDDERS QUERY	MMRC RESPONSE/CLARIFICATION	ADDENDUM (Y/N)
120	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.9.3 10 Strainers	Page 86 of 145	Pt i. Strainers DN250 and above shall be cast steel flanged pot-type with scantlings as for DN200.	As per the manufacturing standard of all the major manufacturers, Cast-Steel type Y-Strainer is available upto DN 150 mm only. Accordingly we propose Cast Iron type Y-Strainer for DN 200 mm and above sizes. Kindly Confirm.	Bid Conditions Prevail.	N
121	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.10.3.5 Motor Operated Dampers (MOD)	Page 91 of 145	Pt a. Motor operated damper frames shall be a channel cross-section with not less than a 100 mm web and 50 mm flanges.	The damper construction shall be as per manufacturer's standard, however all performance requirement of the the Contract Specifications shall be fulfilled. Kindly Confirm	Bid Conditions Prevail.	N
122	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.13.3 Technical and installation requirements (ECS Fans)	Page 103 of 145	The fan characteristic shall also be such that for a 15 % increase in static pressure over the specified value, the fan shall deliver not less than 85 % of the specified air volume flow rate.	As per the manufacturing practices of major fan manufacturers, the fans can either be best efficient or shall comply to the subject clause. Kindly confirm.	Bid Conditions Prevail	N
123	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.13.3 Technical and installation requirements (ECS Fans)	Page 103 of 145	Pt b. All fans with nominal rating above 7.5 kW shall have a minimum efficiency of 70%.	As per the available range of products of all major fan manufacturers, fans with nominal rating above 7.5 kW shall have a minimum efficiency of 65%. Kindly Confirm.	Bid Conditions Prevail.	N
124	Part 2, Employer's Requirements Section VI-B2 - Technical Specification TVS	6.2.2.1 Reference Standards	Page 43 of 104	Codes & Standards for TVF	The Fans shall be supplied in accordance to the equivalent IS/BS/ISO/EN/IEC Standards, please confirm.	Bid Conditions Prevail. Please refer clause 1.3.9 of Part 2 Section VI- B2 regarding proposal for alternative or additional codes and standards	N
125	Part 2, Employer's Requirements Section VI-B2 - Technical Specification TVS	6.2.3.3 Fan-Motor Unit Design Requirements	Page 49 of 104	Pt c. Emergency fan-motor units shall have a total efficiency of not less than 75 percent in forward flow and not less than 65 percent in reverse flow, when operating at the specified nominal flow rate.	As per the available range of products of all major fan manufacturers, Emergency fan-motor units shall have a total efficiency of not less than 65 percent in forward flow and not less than 55 percent in reverse flow, when operating at the specified nominal flow rate. Please confirm.	Bid Conditions Prevail.	N
126	Part 2, Employer's Requirements Section VI-B2 - Technical Specification TVS	6.2.3.11 Motor Tests	Page 54 of 104	Motors shall be tested in accordance with the procedures specified in IEEE Publication 112 and NEMA MG-1.	Motor shall be tested in accordance with equivalent IEC Standards. Kindly Confirm.	Bid Conditions Prevail. Please refer clause 1.3.9 of Part 2 Section VI- B2 regarding proposal for alternative or additional codes and standards	N
127	Part 2, Employer's Requirements Section VI-B2 - Technical Specification TVS	6.2.3.17 Noise Test	Page 57 of 104	Inspections specified shall be tested in accordance with the induct test procedure of ANSI 12.34.	Sound testing shall be performed in accordance with equivalent ISO/BS/AMCA/EN standards. Kindly Confirm.	Bid Conditions Prevail. Please refer clause 1.3.9 of Part 2 Section VI- B2 regarding proposal for alternative or additional codes and standards	N
128	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications ECS	6.2.1.6	Page 40 of 145	Control and Monitoring of Smoke Control System	We understand separate smoke panel is not required as IBP is already available in SCR. Please confirm	Bid Conditions Prevail. (Smoke control) panel shall be provided if required by local code).	N



S. No.	PART & SECTION REFERENCE	CLAUSE REFERENCE	PAGE NO	CLAUSE DESCRIPTION	BIDDERS QUERY	MMRC RESPONSE/CLARIFICATION	ADDENDUM (Y/N)
129	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	3.2.2.d	Page 16 of 145	Scope of work	We understand only Modes operation is to be done from IBP and equipment monitoring & control is through TVE SCADA from SCR. Please confirm.	Bid Conditions Preval.	N
130	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	5.3.3	Page 23 of 145	Function of AC System for Station Public and Ancillary/Office Rooms	We understand that FCU operation shall be through thermostat as stand alone unit. Further, Individual FCU monitoring & controlled is not required from TVE SCADA. Please confirm.	Bid Conditions Preval. (All TVE equipment shall be controlled and monitored through TVE SCADA).	N
131	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	5.8.e	Page 27 of 145	Functions of Control and Monitoring System forUG Station ECS	We understand Local Control Panel (LCP) / ECS Control Panel shall be VCP and the same shall be installed on respective RHS & LHS PLC's in SCADA room, i.e. total 2 Nos VCP. Please confirm.	Bid Conditions Preval. Please refer SCADA drawing for knowing the location of VCP.	N
132	Part 2 - Employers Requirement Section VI-B1 - Technical Specifications - ECS	5.8.e	Page 27 of 145	Functions of Control and Monitoring System forUG Station ECS	We understand Local Control Panel (LCP) / ECS control panel shall operate ECS modes only and individual control/monitoring of equipment is not provided. Please confirm.	Bid Conditions Preval.	N
133	Part 2, Employer's Requirements Section VI-B2 - Technical Specification TVS	3.5.3.n	Page 21 of 104	RAMS analysis including safety certification of SIL Level of SCADA systems	We understand that SIL certification shall be applicable forBMS PLC's, IBP & VCP's only. Please Confirm	Bid Conditions Preval. Confirmed.	N
134	Part 2, Employer's Requirements Section VI-B3 - Technical Specification SCADA	1.1.3	Page 1 of 54	Phase 1 Contractor shall responsible for integration, coordination and interface of Phase 2 TVE control and monitoring functions in the OCC/BCC.	We have assume OCC/BCC is in the scope of Phase-01 Contractor, Phase-02 Contractor will not provide any hardware and software in OCC/BCC. For Phase-2 contract the Works is limited to station level. However Phase 2 TVE Contractor shall make data available on Modbus TCP/IP (Open Protocol) at station level Communication Switch provided by another system wide contractors for OCC Data Communication. Please Confirm.	Bid Conditions Preval. Refer the SCADA drawings and Appendix 19 for the scope and interface.	N
135	Part 2, Employer's Requirements Section VI-B3 - Technical Specification SCADA	2.3	Page 7 of 54	Scada for OCC/BCC is not part of this scope, However providing support to phase 1 contractor necessary for integration of Phase - 2 Scada system is in Phase 2 Contractor Scope	All the hardware and software at OCC/BCC are in scope of Phase 1 contractor scope. Please Confirm.	Bid Conditions Preval. Confirmed	N
136	Part 2, Employer's Requirements Section VI-B3 - Technical Specification SCADA	5.7	Page 16 of 54	The equipment shall derive its required power from the source provided by the contractor at stations and OCC/BCC.	UPS Power Supply for all BMS equipment to provide by other system wide contractor. Please Confirm	Bid Conditions Preval. Please refer Appendix 19 of Part 2, Section VI-A	N
137	Part 2, Employer's Requirements Section VI-B3 - Technical Specification SCADA	5.23.1	Page 34 of 54	For maintenance purpose, 2 notebook computers shall be provided.	Please Confirm if 2 Notebook is required for whole lot.	Bid Conditions Preval. Confirmed, 2 (two) notebooks are required for this contract.	N
138	Part 2, Employer's Requirements Section VI-B3 - Technical Specification SCADA	6.3.2	Page 49 of 54	The Contractor shall determine the necessary inter processor links and data transfer protocols.	Please confirm data Interface with other contractors shall be over Modbus TCP/IP.	Bid Conditions Preval. It is part of interface coordination with other contractors	N
139	Part 2, Employer's Requirements Section VI-B3 - Technical Specification SCADA	7.1	Page 43 of 54	Civil Works	Sealing of wall opening shall be in the scope of Civil contractor. Please confirm.	Bid Conditions Preval.	N
140	Part 2, Employer's Requirements Section VI-B4 - Technical Specification Electrical	3.3.2.19.iv	Page 32 of 65	Screened Signal and Control Cables	For SCADA system 2.5 sqmm conductor cable for termination & maintenance shall be difficult. Please confirm if 1.5sqmm conductor size cable for SCADA can be considered.	Bid Conditions Preval.	N
141	Part 2, Employer's Requirements Section VI-B4 - Technical Specification Electrical	5.3.2.e	Page 44 of 65	Local Motor Control Panel (LMCP)	For motors with VFD, any control of open/close from panel shall not be required since the function shall be available in VFD. Please confirm.	Bid Conditions Preval.	N
142	Part 2, Employer's Requirements Section VI-B4 - Technical Specification Electrical	7	Page 54 of 65	Variable Speed Drives	We understand THD calculation will be in scope of contractor. Any other filter/equipments are not consider for THD monitoring, control & improvement. Please clarify.	Bid Conditions Preval. Please refer to clause 7.2 of Part 2 Section VI-B4.	N
P2L1 & P2L2							
143	As per specification no voltage drop has been specified, therefore for cable calculations as per standard practice, we have considered 5% voltage drop till the end Equipment. In 5% we suppose voltage drop is of Cable only and the VFD voltage drop is not supposed to be considered in this 5%. Kindly clarify.			Bid Condition Preval. As per Bid Documents the allowable voltage drop from TVE switch gear till the end equipment shall be maximum 2%	It is worth to mentioned here that Generally Voltage Drop of VFD is more than 2%. In this condition, the Fundamental Voltage Drop from TVE switch gear to end equipment desired 2% (maximum) is not possible without applying any voltage regulation equipment. Pl. clarify.	Bid Conditions Preval. "The Contractor should select drives having minimum or no voltage drop across it... Accordingly, if required, voltage control measure should be integral part of the design to meet overall voltage drop limitation."	



