

**“Contract for Design, Manufacture, Supply, Installation, Testing And Commissioning of (A). Electrical and Mechanical (E&M) Including Hydraulics, Fire Safety Systems, UPS & DG Sets (B). Environmental Control System (ECS) and Building Management System (BMS) (C). Tunnel Ventilation System (TVS) and TVS - SCADA Works For Underground Stations, Intermediate Vent Shaft And Associated Tunnels Of East – West Corridor Of Ahmedabad Metro Rail Project – Phase I”**

**Clarification to Queries (Set-8, dated 03-08-2018) received subsequent to the Prebid Conference**

**IFB No: MEGA/UG/E&M-01 Dt: 18-04-2018**

S.No	Document Reference Clause / Section	Page No	Description as per Bid Document / Drawing	Tenderer's Query	GEC Response
1	Tender Drawings	24 of 106	Station Air-conditioning Airflow schematic	<p>1) This schematic showed the return air to Platform AHU being connected from TES. However in Clarification (Set-01) S.N. 15 , it was clarified that extract air from the OTE and UPE will not act as return air for AHU. Hence our understanding now is that a separate return air duct is required to come from the platform level and connect to the platform AHU. Also there will be no separate return air fan(s) for platform level and the static pressure of the AHU supply fan itself will be such as to draw the return air from platform level. Separate smoke exhaust fans for Platform level will still remain. Kindly confirm.</p> <p>2) This schematic shows a separate smoke exhaust duct for the concourse level . Kindly confirm if the Concourse supply air duct itself can be used as smoke exhaust duct (similar to platform level arrangement shown in the schematic) , in which case a separate return air duct is not required to connect to the Concourse AHU. There will be no separate return air fan(s) for concourse level and the static pressure of the AHU supply fan itself will be such as to draw the return air from concourse level. Separate smoke exhaust fans for Concourse level will still remain. Kindly confirm.</p>	(1) & (2): Tender Drawings are for illustrative purpose only. Contractor to design the system in line with the requirements stipulated in Employer's Requirements and applicable international standards, and submit the same to Engineer for his acceptance. No deviation from the Technical Specification will be allowed, without Engineer's approval. Tender condition prevails.
2	Executive Summary Report	10 of 14	Indoor Design Conditions : According to §5.1.3 of DBR	In DBR clause 5.1.3 , RH for platform level is mentioned as $\leq 55\%$ in which case we would normally calculate for a resultant RH of 50% in HAP software. However Clause 1.1 (page ECS Scope-2) of Part B : ECS & BMS system mentions design reference point of 55% RH for platform level also. Kindly confirm the design reference RH for Platform level whether it is to be 55% or 50%. Page 10 of 14 of Executive Summary Report also mentions Indoor Design conditions to be according to §5.1.3 of DBR.	DBR and executive summary of SES & CFD are for reference only. Design reference RH for platform public area may be taken as 55%. During detailed design, Contractor to interface and furnish his proposal with valid justification to the Engineer for his approval. Tender condition prevails.
3	Clarifications (Set-02) S.N.56	9 of 19	-	Your clarification mentions fresh air supply fan. Kindly clarify if this fresh air fan is intended only for supplying the fresh air to the Concourse & Platform AHU's. DBR clause 6.1.6 mentions the BOH areas to be provided with FCU's with treated outdoor air from dedicated fresh air handling units. Kindly clarify if we can use a dedicated fresh air fan for the BOH areas also in lieu of the treated fresh air handling unit.	Kindly refer to clarification of Pre-bid Query Set-6, Sl. No. 155.

**“Contract for Design, Manufacture, Supply, Installation, Testing And Commissioning of (A). Electrical and Mechanical (E&M) Including Hydraulics, Fire Safety Systems, UPS & DG Sets (B). Environmental Control System (ECS) and Building Management System (BMS) (C). Tunnel Ventilation System (TVS) and TVS - SCADA Works For Underground Stations, Intermediate Vent Shaft And Associated Tunnels Of East – West Corridor Of Ahmedabad Metro Rail Project – Phase I”**

**Clarification to Queries (Set-8, dated 03-08-2018) received subsequent to the Prebid Conference**

**IFB No: MEGA/UG/E&M-01 Dt: 18-04-2018**

S.No	Document Reference Clause / Section	Page No	Description as per Bid Document / Drawing	Tenderer's Query	GEC Response
4	Executive Summary Report Table 4	5 of 14	No. of smoke exhaust fans per station : 4	Station smoke exhaust fans require to be at least 2x50% standby. In which case kindly clarify how the quantity of only 4 fans per station. On each side of a typical station , minimum 4 fans (i.e. 2 for Concourse level and 2 for Platform level) are required and then the total number of fans for typical station would be 8 nos. Kindly confirm.	Executive summary of SES & CFD are for reference only. During detailed design, Contractor to interface and furnish his proposal with valid justification to the Engineer for his approval. Tender condition prevails.
5	Executive Summary Report Table 12	10 of 14	Chiller Qty./Capacity , Chiller Dimensions/Model	a) We understand all the three number chillers are working and there is no standby. Kindly confirm.  B) The dimensions mentioned seem to be of a particular make "Carrier". Kindly note that contractors shall be free to consider & install any make of chiller which meets the tender specifications , since they cannot be restricted to any one single particular make. Kindly confirm.	a) Kindly refer to clarification of Pre-bid Query Set-6, Sl. No. 153. b) Input parameters provided are for reference only. Contractor may propose the equipment conforming to the technical specifications requirements to the Engineer for his approval. No change, Tender conditions prevails.
6	Executive Summary Report Tables 13 to 17	11 of 14 to 13 of 14	AHU Airflow rates	a) The AHU airflow rates mentioned in the Executive Summary report are grossly undersized. As per our HAP calculations , the AHU airflow rates required are much higher than those mentioned. Kindly confirm if contractors are to consider and provide the required AHU airflow rates capable of meeting the inside design conditions and not to simply consider the AHU flowrates mentioned in the Executive Summary report.  b) The dimensions of the AHU's mentioned seem to be for a double tier AHU with heat recovery wheel etc.. Since the heat recovery wheels are deleted now , these dimensions no longer are relevant. Kindly confirm that the dimensions of the AHU's can be as per the selected manufacturer's standard to meet the tender specifications .	(a) Executive summary is for reference only. During detailed design, Contractor to interface and furnish his proposal with valid justification to the Engineer for his approval. Tender condition prevails. (b) Contractor may propose the equipment conforming to the technical specifications requirements to the Engineer for his approval. No change, Tender conditions prevails.

**“Contract for Design, Manufacture, Supply, Installation, Testing And Commissioning of (A). Electrical and Mechanical (E&M) Including Hydraulics, Fire Safety Systems, UPS & DG Sets (B). Environmental Control System (ECS) and Building Management System (BMS) (C). Tunnel Ventilation System (TVS) and TVS - SCADA Works For Underground Stations, Intermediate Vent Shaft And Associated Tunnels Of East – West Corridor Of Ahmedabad Metro Rail Project – Phase I”**

**Clarification to Queries (Set-8, dated 03-08-2018) received subsequent to the Prebid Conference**

**IFB No: MEGA/UG/E&M-01 Dt: 18-04-2018**

S.No	Document Reference Clause / Section	Page No	Description as per Bid Document / Drawing	Tenderer's Query	GEC Response
7	Executive Summary Report Tables 13 to 17	11 of 14 to 13 of 14	AHU Quantities	<p>E&amp;M rooms of each side of the station are shown to be catered to by a common AHU. Kindly note that the internal loads of each room would vary differently at different points of time , in which case it is not feasible to maintain constant inside temperature condition in each room if all of them are supplied from a common AHU.</p> <p>The DBR clause 6.1.6 aptly mentioned FCU's for BOH rooms which will allow individual room temperature control in a room depending on its changing load pattern. Part-B - ECS &amp; BMS Particular specifications Clause A00.8.1.5 (pages ECS-10 &amp; 11) also mention ancillary rooms shall be air conditioned with fan coil units. Kindly confirm that FCU's shall be provided for the E&amp;M rooms as per the DBR &amp; Part-B - ECS &amp; BMS Particular specifications stipulations.</p>	Executive summary is for reference only. During detailed design, Contractor to interface and furnish his proposal with valid justification to the Engineer for his approval. Tender condition prevails.
8	Executive Summary Report Tables 13 to 17	11 of 14 to 13 of 14	AHU Quantities	<p>Offices &amp; BOH rooms of a station are shown to be catered to by a common AHU. Kindly note that the internal loads of each room would vary differently at different points of time , in which case it may not be feasible to maintain constant inside temperature condition in each room if all of them are supplied from a common AHU. Also some of the offices &amp; BOH rooms are located on the north side of the station &amp; the rest on the south side in which case it is not practically feasible to connect all of them to a common AHU. Also , a few of these rooms may require aircon during non-revenue hours when the remaining rooms do not and hence it may not be feasible to connect them to a common AHU.</p> <p>The DBR clause 6.1.6 aptly mentioned FCU's for BOH rooms which will allow individual room temperature control in a room depending on its changing load pattern &amp; also individual room aircon on/off control depending on its usage . Part-B - ECS &amp; BMS Particular specifications Clause A00.8.1.5 (pages ECS-10 &amp; 11) also mention ancillary rooms shall be air conditioned with fan coil units. Kindly confirm that for the offices &amp; BOH rooms requiring aircon , FCU's shall be provided as per the DBR &amp; Part-B ECS &amp; BMS Particular specifications stipulations and also the practice being followed by most metros in India.</p>	Executive summary is for reference only. During detailed design, Contractor to interface and furnish his proposal with valid justification to the Engineer for his approval. Tender condition prevails.

**“Contract for Design, Manufacture, Supply, Installation, Testing And Commissioning of (A). Electrical and Mechanical (E&M) Including Hydraulics, Fire Safety Systems, UPS & DG Sets (B). Environmental Control System (ECS) and Building Management System (BMS) (C). Tunnel Ventilation System (TVS) and TVS - SCADA Works For Underground Stations, Intermediate Vent Shaft And Associated Tunnels Of East – West Corridor Of Ahmedabad Metro Rail Project – Phase I”**

**Clarification to Queries (Set-8, dated 03-08-2018) received subsequent to the Prebid Conference**

**IFB No: MEGA/UG/E&M-01 Dt: 18-04-2018**

S.No	Document Reference Clause / Section	Page No	Description as per Bid Document / Drawing	Tenderer's Query	GEC Response
9	Executive Summary Report Tables 13 to 17	11 of 14 to 13 of 14	AHU Quantities	<p>SCR + IT/Signal rooms of a station are shown to be catered to by a common AHU. Kindly note that the internal loads of each room would vary differently at different points of time , in which case it may not be feasible to maintain constant inside temperature condition in each room if all of them are supplied from a common AHU. Also some of the rooms are located on the north side of the station &amp; the rest on the south side in which case it is not practically feasible to connect all of them to a common AHU.</p> <p>The DBR clause 6.1.6 aptly mentioned FCU's for BOH rooms which will allow individual room temperature control in a room depending on its changing load pattern &amp; usage requirement. Part-B - ECS &amp; BMS Particular specifications Clause A00.8.1.5 (pages ECS-10 &amp; 11) also mention ancillary rooms shall be air conditioned with fan coil units. Kindly confirm that FCU's shall be provided as per the DBR &amp; Part-B ECS &amp; BMS Particular Specifications stipulations and also as per the practice being followed by most metros in India.</p>	Executive summary is for reference only. During detailed design, Contractor to interface and furnish his proposal with valid justification to the Engineer for his approval. Tender condition prevails.
10	Tender Drawings		Architectural Drawings	Some of the rooms are named as "Spare" rooms and "UNA" rooms. Kindly confirm what ECS provisions are to be made for such rooms and the design inputs (occupancy / fresh air / equipment heat gain / lighting) for the same.	During Detailed Design, Contractor to interface with designated Contractors and furnish his proposal with valid justification to the Engineer for approval. Tender Conditions prevails.
11	Executive Summary Report Tables 12	10 of 14	Chiller Capacities	As per our HAP load calculations the chiller capacity requirements are coming out to be higher than those mentioned in table 12 for some stations and lower for some . Kindly confirm if we can consider and provide chiller capacities as required as per our calculations so as to be able to meet the inside design conditions.	It is lump sum designed and build Contract. Executive summary requirements are provided for reference only. Contractor to interface and provide necessary equipments sizing conforming to Technical Specifications, for Engineer's approval. No deviation from Employer's Requirements shall be permitted, unless approved in writing by the Engineer. Contractor shall be responsible for the functionality of the system. Tender conditions prevails.

**“Contract for Design, Manufacture, Supply, Installation, Testing And Commissioning of (A). Electrical and Mechanical (E&M) Including Hydraulics, Fire Safety Systems, UPS & DG Sets (B). Environmental Control System (ECS) and Building Management System (BMS) (C). Tunnel Ventilation System (TVS) and TVS - SCADA Works For Underground Stations, Intermediate Vent Shaft And Associated Tunnels Of East – West Corridor Of Ahmedabad Metro Rail Project – Phase I”**

**Clarification to Queries (Set-8, dated 03-08-2018) received subsequent to the Prebid Conference**

**IFB No: MEGA/UG/E&M-01 Dt: 18-04-2018**

S.No	Document Reference Clause / Section	Page No	Description as per Bid Document / Drawing	Tenderer's Query	GEC Response
12	Clarifications (Set-01) S.N.59	9 of 11	-	Kindly understand that depending upon whether Air-conditioning (or) Mechanical ventilation is required for below rooms , it will have a major impact on the design and costing of the bid. Hence it cannot be left vague and a clear answer is required. Kindly clarify clearly whether Air-conditioning is required (or) Mechanical ventilation is required for the following rooms :- Subway/Corridor (i.e. long station entrances ) - one each in Shahpur & Kalupur stations , short station entrances , ECS plant rooms , TV Fan rooms , TVF panel rooms , ASS/TSS rooms , Electrical LV/MV rooms , DB rooms , sewage ejector rooms , sump pump rooms , seepage pump rooms & seepage panel rooms .	Kindly refer to clarification of Pre-bid Query Set-6, Sl. No. 128, 130, 131. Full Subway/Corridor (i.e long station entrances) area to be air-conditioned as well ventilated. Provision of smoke extraction in the subway / corridor envisaged. This shall be interfaced during detailed design stage, and decided during detail design. Tender condition prevails.
13	Sample HAP calculation report		Cash storage , storage & cleaners rooms are shown to be airconditioned.	Rooms like cash storage , storage rooms & cleaners room shall be mechanically ventilated. Kindly clarify.	During Detailed Design, Contractor to interface with designated Contractors and furnish his proposal with valid justification to the Engineer for approval. Tender Conditions prevails.
14	Sample HAP calculation report		Emergency stairs / Service stairs are shown to be airconditioned.	Staircases shall be ventilated / pressurised. Kindly confirm.	Emergency staircases shall be ventilated and pressurized conforming to NFPA requirements. Tender Conditions prevails.
15	Executive Summary Report	10 of 14	Ventilation : according to § 5.1.5 of DBR	With the deletion of the heat recovery wheel in the AHU vide Addendum No.-1 , kindly confirm that the platform public area will also be a recirculation type airconditioned design (similar to concourse) and the outdoor air consideration for platform public area also will be 3.8 LPS/person + 0.3 LPS/Sq.m as is the case for Concourse public area.	No change, Tender conditions prevails.
16	Design basis Report - Table 5.1.3 & Table 5.1.5	13 & 14	UPS/Battery Rooms	Table 5.1.3 mentions UPS/Battery rooms under list of Airconditioned rooms whereas Table 5.1.5 mentions Minimum 12 total air changes per hour. Kindly confirm what ECS provision is required for UPS/Battery rooms.	ASS/TSS, UPS Battery room air-conditioning and ventilation requirements to be decided during detailed design & interfacing activities of E&M Contractor subject to its acceptance by Engineer. Tender condition prevails.
17	Design basis Report - Table 5.1.3 & Table 5.1.5	13 & 14	ASS/TSS room , LV room , gas cylinder room (FM 200)	Table 5.1.5 mentions Minimum total air changes per hour of 15 , 15 & 6 respectively for these rooms whereas Table 5.1.3 mentions indoor design conditions of 28±2°C for such rooms. Kindly confirm if these rooms are to be ventilated or airconditioned.	Refer item number 16 above.

**“Contract for Design, Manufacture, Supply, Installation, Testing And Commissioning of (A). Electrical and Mechanical (E&M) Including Hydraulics, Fire Safety Systems, UPS & DG Sets (B). Environmental Control System (ECS) and Building Management System (BMS) (C). Tunnel Ventilation System (TVS) and TVS - SCADA Works For Underground Stations, Intermediate Vent Shaft And Associated Tunnels Of East – West Corridor Of Ahmedabad Metro Rail Project – Phase I”**

**Clarification to Queries (Set-8, dated 03-08-2018) received subsequent to the Prebid Conference**

**IFB No: MEGA/UG/E&M-01 Dt: 18-04-2018**

S.No	Document Reference Clause / Section	Page No	Description as per Bid Document / Drawing	Tenderer's Query	GEC Response
18	Sample HAP Calculation Report Kankaria station			The equipment heat gain consideration value of 500 W/m <sup>2</sup> for Station control room , UPS , Signalling & Telecom rooms seem much on the higher side and consideration of such high values may result in unnecessarily oversized equipment capacities & sizes . Hence to allow for reasonably sized equipment & related cost , kindly clarify if we can consider suitable equipment heat gain values for these areas in line with our similar Metro experiences which will also be subject to validation during interface with system wide contractors during detailed design.	Bidder may consider suitable equipment heat gain values in line with similar metro as suggested. During Detailed Design, Contractor to interface with designated Contractors and furnish his proposal with valid justification to the Engineer for approval. Tender Conditions prevails.
19	Design basis Report - Clause 5.1.8	15	Equipment W/m <sup>2</sup> for Electro mechanical areas	The assumed equipment heat gain value 100 W/m <sup>2</sup> for the Electro mechanical areas is very much on the higher side for some of the E&M rooms (e.g. ECS plantrooms & TV fan rooms) and consideration of such high values may result in unnecessarily high equipment capacities & sizes . In the sample HAP calculation report of Kankaria station , only 25 W/m <sup>2</sup> has been considered for ECS plantrooms . Hence to allow for reasonably sized equipment & related cost , kindly clarify if we can consider suitable equipment heat gain values for these areas in line with our similar Metro experiences which will also be subject to validation during interface with system wide contractors during detailed design.	Bidder may consider suitable equipment heat gain values in line with similar metro as suggested. During Detailed Design, Contractor to interface with designated Contractors and furnish his proposal with valid justification to the Engineer for approval. Tender Conditions prevails.
20	Kankaria station Preliminary HVAC diagram			The Kankaria station preliminary HVAC diagram does not show separate set of smoke exhaust fans for concourse level & platform level . Kindly clarify.	Diagram shared is for reference purpose only. This is Contractor's scope of works. Contractor to furnish his proposal with valid justification to the Engineer for approval. Tender Conditions prevails.
21	Kankaria station Preliminary HVAC diagram			Kindly clarify what is the fan shown connected to room WC in offices/BOH	Diagram shared is for reference purpose only. This is Contractor's scope of works. Contractor to furnish his proposal with valid justification to the Engineer for approval. Tender Conditions prevails.



**“Contract for Design, Manufacture, Supply, Installation, Testing And Commissioning of (A). Electrical and Mechanical (E&M) Including Hydraulics, Fire Safety Systems, UPS & DG Sets (B). Environmental Control System (ECS) and Building Management System (BMS) (C). Tunnel Ventilation System (TVS) and TVS - SCADA Works For Underground Stations, Intermediate Vent Shaft And Associated Tunnels Of East – West Corridor Of Ahmedabad Metro Rail Project – Phase I”**

**Clarification to Queries (Set-8, dated 03-08-2018) received subsequent to the Prebid Conference**

**IFB No: MEGA/UG/E&M-01 Dt: 18-04-2018**

S.No	Document Reference Clause / Section	Page No	Description as per Bid Document / Drawing	Tenderer's Query	GEC Response
22	Architectural Drawings Shahpur & Kalupur stations			Kindly clarify if the long entrances (i.e. subways/corridor) one each in Kalupur and Shahpur station are to be provided with mechanical ventilation (or) air conditioning. If they are to be air conditioned then the basis of design inputs like occupancy, lighting load & outdoor air criteria may be furnished and also clarify if air conditioned, what type of equipment to be provided, i.e. AHU or multiple FCU's. Also confirm if any ECS provisions to be provided for "corridor in lieu of CP" at concourse RHS of Kankaria east station	Entrances shall be air-conditioned with the provision of smoke extraction as safe passageway during emergency scenario, conforming to NFPA and Employer's requirements. Tender Conditions prevails.
23	Design Basis Report Table 5.1.4	14	E&M rooms : Occupancy 3 m <sup>2</sup> /person	The occupancy criteria of 3 m <sup>2</sup> /person given for E&M rooms in table 5.1.4 in DBR is very high. For example an ECS plant room of 557 sqm will show an occupancy of 185 persons if this criteria is considered, whereas the sample HAP calculation report of Kankaria station considered "nil" occupancy for ECS plant rooms. Hence kindly confirm that we may consider the occupancy for such areas as per similar metro experiences which shall also be validated during interface with system wide contractors during detailed design stage.	Bidder may consider suitable equipment heat gain values in line with similar metro as suggested. During Detailed Design, Contractor to interface with designated Contractors and furnish his proposal with valid justification to the Engineer for approval. Tender Conditions prevails.
24	Design basis Report - Clause 5.1		for mission critical rooms and areas that require 24*7 operation standby chilled water AC units/VRV units/FCU's are to be provided.	You have clarified that air-cooled chiller is to be provided for non-revenue hours operation. One number air-cooled chiller (with multiple scroll compressors) sized to handle the non-revenue hours load shall be provided. As regards to standby provision, N+1 configuration shall be considered for the FCU's serving these 24*7 rooms. Kindly clarify.	Kindly refer to clarification of Pre-bid Query Set-6, Sl. No. 157. Number of Air-cooled Chillers required for the systems rooms shall be based on the cooling load requirements of the system rooms. Contractor to interface with other Contractors and furnish the detailed design based on the agreement with them, to the Engineer with valid justification for acceptance. Air cooled chillers required for system rooms during non-revenue hours operation, shall be based on duty - standby operation. Tender Conditions prevails.
25	Design basis Report- Clause 6.1.4			Clause 6.1.4 mentions EC-DC FCU's whereas clause 5.1 mentions CAV FCU's. Kindly clarify that CAV FCU's with 3 speed switch are adequate.	EC-DC FCU's are envisaged for MEGA project. Tender Conditions prevails.
26	Design basis Report -Clause 6.1.4			Clause 6.1.4 mentions about passive cooling systems like radiant cooling which are not feasible for Metro applications and hence not being considered by us. Kindly confirm.	Radiant cooling system provision is not binding to the Contractor. May be proposed at no extra cost to Employer. Tender condition prevails.

**“Contract for Design, Manufacture, Supply, Installation, Testing And Commissioning of (A). Electrical and Mechanical (E&M) Including Hydraulics, Fire Safety Systems, UPS & DG Sets (B). Environmental Control System (ECS) and Building Management System (BMS) (C). Tunnel Ventilation System (TVS) and TVS - SCADA Works For Underground Stations, Intermediate Vent Shaft And Associated Tunnels Of East – West Corridor Of Ahmedabad Metro Rail Project – Phase I”**

**Clarification to Queries (Set-8, dated 03-08-2018) received subsequent to the Prebid Conference**

**IFB No: MEGA/UG/E&M-01 Dt: 18-04-2018**

S.No	Document Reference Clause / Section	Page No	Description as per Bid Document / Drawing	Tenderer's Query	GEC Response
27	Design basis Report -Clause 6.1.6			Clause 6.1.6 mentions about VAV AHU's with pressure independent VAV terminals for large public areas like concourse/transfer areas. Kindly note that these areas are generally treated as single zone ( concourse LHA as one zone & concourse RHS as another zone) and hence there is no need of providing any terminal VAV boxes. Kindly confirm.	No change, Tender conditions prevails.
28	Design basis Report -Clause 5.1.3	13	During winter , system will run under open air system which is already cool will be used to maintain the indoor comfort conditions within public area.	Kindly note that free cooling concept is generally not feasible for metro ECS applications and hence this requirement may kindly be deleted. Kindly confirm.	This may be decided during detailed design phase subject to valid justification and its acceptance by the Engineer. Tender Conditions prevails.
29	Design Basis Report -Clause 5.1.7	14	Outdoor air will be filtered properly using fresh air sand intake louvers.	Kindly confirm if regular intake air louvers with bird screen will do (considering Indian conditions) . Also kindly clarify if the scope of providing the intake air louvers is in the scope of this contract or is it in the scope of the civil contractor.	Kindly refer to clarification of Pre-bid Query Set-1, Sl. No. 56. Contractor to interface with Civil Contractors for the provision of sand trap louvers.
30	Executive Summary Report	10 of 14	Indoor Design Conditions : According to § 5.1.3 of DBR	Kindly confirm that the indoor design conditions for air conditioned areas shall be as per Clause 5.1.3 of DBR and not as mentioned in Clause 6.1.3 of DBR (i.e. 25°C (+2) Dry bulb and 50% (+10) RH).	Kindly refer to clarification of Pre-bid Query Set-6, Sl. No. 127.
31	Design Basis Report -Clause 6.1.4	31	Design header & main distribution piping will be sized 10-15% extra for future expansion.	Design header & main distribution piping will be sized for the chiller capacities selected and no spare provision for future expansion is being considered. Kindly confirm.	No change. Tender Conditions prevails.
32	Design Basis Report -Clause 6.1.5	32	The Coefficient of performance (COP) for the chillers is expected to be not less than 3.2 (1.089 KW/Ton) for full load efficiency. For an IPLV rated efficiency (at AHRI 550/590 condition) , the COP is expected not to be less than 5.5 (0.640 KW/Ton)	These COP values pertain to air-cooled chiller. We understand that the COP values mentioned are applicable at AHRI Standard rating conditions.  Kindly provide the minimum COP values for water-cooled chillers.	Kindly refer to clarification of Pre-bid Query Set-7, Sl. No. 8



**“Contract for Design, Manufacture, Supply, Installation, Testing And Commissioning of (A). Electrical and Mechanical (E&M) Including Hydraulics, Fire Safety Systems, UPS & DG Sets (B). Environmental Control System (ECS) and Building Management System (BMS) (C). Tunnel Ventilation System (TVS) and TVS - SCADA Works For Underground Stations, Intermediate Vent Shaft And Associated Tunnels Of East – West Corridor Of Ahmedabad Metro Rail Project – Phase I”**

**Clarification to Queries (Set-8, dated 03-08-2018) received subsequent to the Prebid Conference**

**IFB No: MEGA/UG/E&M-01 Dt: 18-04-2018**

S.No	Document Reference Clause / Section	Page No	Description as per Bid Document / Drawing	Tenderer's Query	GEC Response
33	Drawing No. UG1-D-KLP-AD-12201 dated 29.06.2018		Kalapur Station Ancillary Building Drawing	<p>This Drawing shows two nos. air-cooled chillers. Kindly confirm that one number air-cooled chiller (with multiple scroll compressors) along with one number matching capacity chilled water pump sized to be able to handle the non-revenue hours operation will be adequate. The Executive Summary report also did not mention anything on the quantity/capacity of the air-cooled chillers.</p> <p>Also this drawing shows 3 no's secondary chilled water pumps in addition to the 4 no's primary chilled water pumps . As already clarified by you vide S.N.33 of Clarifications (Set-01) , there will be only one set of chilled water pumps which are 4 no's (3w+1s) variable speed primary pumps. Kindly confirm.</p>	<p>Kindly refer to clarification of Pre-bid Query Sl. No. 24 above.</p> <p>Clarification given in Sl. No. 33 (Set-1) is confirmed.</p>
34	Design Basis Report Clause 6.1.5	32	...refrigerant recovery .....& leakage detection systems	Refrigerant recovery & leakage detection systems are generally not provided in Metro ECS applications and hence requirement of these may be deleted. Kindly confirm.	No change. Tender conditions prevails.
35	Design Basis Report Clause 6.1.5 Design Basis Report Clause 6.1.16 Particular specifications	32 36 ECS-205	.... chiller management system.. .... chiller plant management software.... Chiller plant manager	We do not envisage a separate chiller plant manager since BMS is being provided in this project and the BMS can do the function of the chiller plant manager. Kindly confirm.	No change. Tender conditions prevails.
36	Design Basis Report Clause 6.1.6	33	A branch duct connection to the general extract with a fire damper and a volume control damper will be provided for these areas.	Kindly elaborate which general extract are you referring to here.	This may be decided during detailed design phase subject to valid justification and its acceptance by the Engineer. Tender Conditions prevails.
37	Design Basis Report Clause 6.1.6	33	All ventilation and A/c units will be sized for 10-15% extra capacity to meet future needs. Main ducts & pipes will be sized to include this future capacity.	All ventilation and A/c units including the main ducts & pipes will be sized for the chiller/AHU/fan capacities required for present needs. Kindly confirm.	No change. Tender conditions prevails.

**“Contract for Design, Manufacture, Supply, Installation, Testing And Commissioning of (A). Electrical and Mechanical (E&M) Including Hydraulics, Fire Safety Systems, UPS & DG Sets (B). Environmental Control System (ECS) and Building Management System (BMS) (C). Tunnel Ventilation System (TVS) and TVS - SCADA Works For Underground Stations, Intermediate Vent Shaft And Associated Tunnels Of East – West Corridor Of Ahmedabad Metro Rail Project – Phase I”**

**Clarification to Queries (Set-8, dated 03-08-2018) received subsequent to the Prebid Conference**

**IFB No: MEGA/UG/E&M-01 Dt: 18-04-2018**

S.No	Document Reference Clause / Section	Page No	Description as per Bid Document / Drawing	Tenderer's Query	GEC Response
38	Design Basis Report Clause 6.1.6	33	For station specific rooms like telecom & signalling , server rooms etc. a dedicated refrigerant unit will be used as a standby source at the time of off time/emergency or maintenance. The computer rooms units used in these spaces will have an option for dual connection for chilled water & DX refrigerant connections. UPS & battery rooms will have dedicated FCU with 100% backup of DX cooling units for emergency.	No DX units are envisaged anywhere in the station. Also no computer room units are envisaged for Metro ECS application. The telecom & signalling rooms are provided with N+1 configuration of chilled water fan coil units which will be supplied with chilled water from water cooled chillers during revenue hours & from air-cooled chiller during non-revenue hours. Kindly confirm.	No change. Tender conditions prevails.
39	Design Basis Report Clause 6.1.6	33	For areas with little or ne clearance, a standalone supply displacement diffuser .... Where suitable ceiling permits , jet diffusers .....	Displacement diffusers / Jet diffusers are not feasible for Metro ECS application. The type of supply air outlets will be square diffusers / linear grilles . Kindly confirm.	No change. Tender conditions prevails.
40	Design Basis Report Clause 6.1.11	35	Standby A/c will be provided to signalling , telecom and other specific equipment rooms . VRV/DX units ....	No DX/VRV units are envisaged anywhere in the station. The signalling , telecom & other critical equipment rooms are provided with N+1 configuration of chilled water fan coil units which will be supplied with chilled water from water cooled chillers during revenue hours & from air-cooled chiller during non-revenue hours. Kindly confirm.  <a href="#">Kindly refer to the clarification given in Sl. No. 38 above.</a>	No change. Tender conditions prevails.
41	Design Basis Report Clause 6.1.12	35	Makeup air will be introduced through doors or louvers with automatic opening devices .	In case of smoke exhaust from the public areas , the makeup air will be induced from the station entrances. Kindly confirm.	No change. Tender conditions prevails.
42	Design Basis Report Clause 6.1.12	35	Two sets of smoke extract fans will be provided on minimum with duty-standby approach.	2x50% capacity smoke extract fans is generally provided for station smoke extract. Kindly clarify.	No change. Tender conditions prevails.

**“Contract for Design, Manufacture, Supply, Installation, Testing And Commissioning of (A). Electrical and Mechanical (E&M) Including Hydraulics, Fire Safety Systems, UPS & DG Sets (B). Environmental Control System (ECS) and Building Management System (BMS) (C). Tunnel Ventilation System (TVS) and TVS - SCADA Works For Underground Stations, Intermediate Vent Shaft And Associated Tunnels Of East – West Corridor Of Ahmedabad Metro Rail Project – Phase I”**

**Clarification to Queries (Set-8, dated 03-08-2018) received subsequent to the Prebid Conference**

**IFB No: MEGA/UG/E&M-01 Dt: 18-04-2018**

S.No	Document Reference Clause / Section	Page No	Description as per Bid Document / Drawing	Tenderer's Query	GEC Response
43	Design Basis Report Clause 6.1.13	36	Two sets of fans will be provided on minimum with a duty-standby approach.	One fan per each pressurised staircase is provided. Kindly confirm.	No change. Tender conditions prevails.
44	Clarifications (Set-01) S.N. 17	3 of 11	VFD will be used on AHU motors , pumps & fans.	Kindly note that VFD's are not used on all fans (except for the fresh air fans supplying to the public area AHU's since they are to modulate the quantity of fresh/outdoor air intake based on CO2 sensor feedback) . All other fans including the ventilation supply & exhaust fans catering to ventilated areas , staircase pressurisation fans , smoke exhaust fans are of constant speed. Kindly clarify.	TVF, TEF, AHU, Chillers, all E&M pumps for ECS as well as E&M system, etc. are envisaged with VFD in line with the EMC requirements and applicable International Standards. Some fans may be considered as operating at constant speed subject to the Engineer's acceptance based on the proposed design and valid justification. Tender Conditions prevails.
45	Part B - ECS & BMS System 1.1	ECS Scope-2	...provide a minimum of 0.005 cum/s fresh air per person.	As per Executive Summary Report page 10 of 14, the ventilation criteria is to be according to § 5.1.5 of DBR which specifies minimum outdoor air of 3.8 Lps/person + 0.3 Lps/sq.m for public areas and 8.5 Lps/person for BOH areas. Kindly confirm if the ventilation criteria should be considered in line with clause 5.1.5 of DBR as mentioned in the Executive summary report.	Executive summary is for reference only. During detailed design, Contractor to interface and furnish his proposal with valid justification to the Engineer for his approval. Tender condition prevails.
46	Part B - ECS & BMS System 1.3	ECS Scope-3	... Split A/c.....	We do not envisage the provision of Split A/c units anywhere in the station. Kindly confirm.	This may be required for technical rooms system air-conditioning, at no extra cost to the Employer, in case of delay in commissioning of station ECS system or any other suitable location wherever required. Tender conditions prevails.
47	Part B - ECS & BMS System 4.0	ECS Scope-6	Interfaces	We request you to provide the interface scope matrix sheet between us & the civil contractor to be able to know the scope & responsibility demarcation clearly.	Refer General Specifications. Tender conditions prevails.
48	Part B - ECS & BMS System A00.8.1.5	ECS-10	The ancillary rooms shall be airconditioned with fan coil units as detailed elsewhere. Fresh air for these areas shall be provided through centrifugal fan air units.	Kindly confirm that fresh air fans are adequate to supply fresh air to the FCU rooms as per this clause , in lieu of treated fresh air handling unit mentioned elsewhere in DBR.	This is part of contractor's detailed design, and submission of the same to the Engineer with valid justification for approval. Tender conditions prevail.

**“Contract for Design, Manufacture, Supply, Installation, Testing And Commissioning of (A). Electrical and Mechanical (E&M) Including Hydraulics, Fire Safety Systems, UPS & DG Sets (B). Environmental Control System (ECS) and Building Management System (BMS) (C). Tunnel Ventilation System (TVS) and TVS - SCADA Works For Underground Stations, Intermediate Vent Shaft And Associated Tunnels Of East – West Corridor Of Ahmedabad Metro Rail Project – Phase I”**

**Clarification to Queries (Set-8, dated 03-08-2018) received subsequent to the Prebid Conference**

**IFB No: MEGA/UG/E&M-01 Dt: 18-04-2018**

S.No	Document Reference Clause / Section	Page No	Description as per Bid Document / Drawing	Tenderer's Query	GEC Response
49	Part B - ECS & BMS System A01.3.2.1 & A01.3.10	ECS-26 ECS-29	The fan outlet velocity shall not exceed 12.7 m/sec. The fan outlet velocity shall not exceed 10 m/sec	Kindly clarify which value of maximum fan outlet velocity is to be followed.	This shall be based on Contractor's detailed design and subject to its acceptance by the Engineer. 12.7m/s specified as the max. allowable fan outlet velocity. Tender Conditions prevail.
50	Part B - ECS & BMS System A03.3.4.2	ECS-43	The water boxes/end covers shall be marine type of steel....	If 2-pass condensers are selected , the requirement of marine water boxes can be ignored. Kindly confirm.	No change, Tender conditions prevails.
51	Part B - ECS & BMS System A05.3.5	ECS-71	The pump set shall be with horizontal/vertical split case type....	Long coupled end suction backpullout type pump are regularly used in Metro ECS applications. Kindly confirm that these are acceptable.	No change, Tender conditions prevails.
52	Part B - ECS & BMS System A05.4.3	ECS-72	Pump logic controller	Since BMS is being provided in this project , separate pump logic controller can be avoided since the BMS can be made to do the function of this controller. Kindly confirm.	No change, Tender Conditions prevails.
53	Part B - ECS & BMS System A06.3.2	ECS-81	Flexible Ducts	We do not envisage the need/feasibility of flexible ducts in this project. Kindly clarify .	Refer to clause no. A06.3.2.3 for it's limited application, if required and approved by Engineer. No Change. Tender condition prevails.
54	Part B - ECS & BMS System A07.3.1 Section A.26.0	ECS-95 ECS-204	Semi-rigid fibreglass ..... ....EPDM	Kindly clarify that either of the two materials can be used as insulation material for air-conditioning ducts.	No change, Tender Conditions prevails.
55	Part B - ECS & BMS System Section A11	ECS-128	Packaged split air-conditioning units / VRV units	We do not envisage the need or requirement of split Ac units or VRV units anywhere in the station, since the critical rooms requiring air-conditioning are provided with N+1 configuration of chilled water fan coil units which will be supplied with chilled water from water cooled chillers during revenue hours & from air-cooled chiller during non-revenue hours. Kindly confirm.	This may be required for technical rooms system air-conditioning, at no extra cost to the Employer, in case of delay in commissioning of station ECS system or any other suitable location wherever required. Tender conditions prevails.
56	Part B - ECS & BMS System A12.3.3	ECS-139	Axial Flow Fans	Kindly clarify if the axial flow fans are to be of tube axial type or vane axial type.	Refer Technical Specifications. No change, Tender conditions prevails.
57	Part B - ECS & BMS System A21.3.1 b)	ECS-178	Chemical treatment to prevent corrosion , Scaling and Sludge formation.....	Kindly clarify if this chemical dosing system for condenser water can be avoided since Electronic Anti fouling system has been asked for in Section A23.	No change, Tender Conditions prevails.

**“Contract for Design, Manufacture, Supply, Installation, Testing And Commissioning of (A). Electrical and Mechanical (E&M) Including Hydraulics, Fire Safety Systems, UPS & DG Sets (B). Environmental Control System (ECS) and Building Management System (BMS) (C). Tunnel Ventilation System (TVS) and TVS - SCADA Works For Underground Stations, Intermediate Vent Shaft And Associated Tunnels Of East – West Corridor Of Ahmedabad Metro Rail Project – Phase I”**

**Clarification to Queries (Set-8, dated 03-08-2018) received subsequent to the Prebid Conference**

**IFB No: MEGA/UG/E&M-01 Dt: 18-04-2018**

S.No	Document Reference Clause / Section	Page No	Description as per Bid Document / Drawing	Tenderer's Query	GEC Response
58	Part B - ECS & BMS System Section A22	ECS-181	FRP louvers	We do not envisage the provision of any FRP louvers . Intake & Exhaust louvers shall be of GSS as per Clause A 22.1. Kindly clarify.	FRP types Louvers are also envisaged for MEGA UG section. Intake & Exhaust Louvers may be permitted of GSS type. Contractor to interface with other contractors and submit the suitable design conforming to standards for Engineer's approval. Engineer's decision shall be final & binding to the Contractor. Tender Conditions prevails.
59	Part B - ECS & BMS System Section A24	ECS-184	Magnetic levitation chillers	We do not envisage the provision of any magnetic levitation chillers . Chillers shall be of screw compressor type as per Clause A03.3.1 . The magnetic levitation chillers are more expensive as compared to the screw chillers and are also not viable for the chiller capacities involved. Kindly confirm.	Kindly refer to clarification of Pre-bid Query Set-1, Sl. No. 40
60	3. Combined file Part B & C		Louvre specifications	Bidder requests to provide below details of the louvre for tunnel ventilation shaft, which is in the scope of civil contractor, louvre performance in terms of pressure drop characteristics, and self-generated noise characteristics.	Refer Tender drawings for details. Latest drawings to be collected by successful bidder while interfacing with Civil Contractor. Tender conditions prevails.
61	Part C – TVS and NP-SCADA System	Clause 3.3 (3)	Rolling stock details	It is our past project experience similar weather condition that Trains' A/C can allow 55deg C as the maximum air temperature at inlet of the condenser before it begins unloading. Considering the summer peak ambient temperature in Ahmedabad reaches 40degC and above, and the same train also will run above ground with solar heat flux, it is expected the Train A/C should be able to allow a higher air temperature at condenser inlets. Please clarify with rolling stock contractor and advise if a higher temperature of 55deg C can be allowed.	Contractor is required to interface to rolling stock contractor for the details of the AC condenser performance data and adopt in the detailed design and submit for Engineer's approval. Tender conditions prevails.
62	Schematic drawings for TVS		TBM tunnel cross section	Bidder requests MEGA to provide TBM tunnel cross section with all service provisions.	Tunnel Crosssection prepared by Civil Contractor shall be shared with successful bidder. E&M Contractor to develop the detail design of all services while interfacing with designated contractor and furnish the same to Engineer for approval. Tender Conditions prevails.
63	Part C – TVS and NP-SCADA System			Kindly confirm if tunnel section between KKE and portal has ~800m long section, is there any provisions to allow jet fan in these sections? The tunnel section for TBM launching shaft which probably can be used for installing the jet fans.	Kindly refer to clarification of Pre-bid Query Set-6, Sl. No. 145

**“Contract for Design, Manufacture, Supply, Installation, Testing And Commissioning of (A). Electrical and Mechanical (E&M) Including Hydraulics, Fire Safety Systems, UPS & DG Sets (B). Environmental Control System (ECS) and Building Management System (BMS) (C). Tunnel Ventilation System (TVS) and TVS - SCADA Works For Underground Stations, Intermediate Vent Shaft And Associated Tunnels Of East – West Corridor Of Ahmedabad Metro Rail Project – Phase I”**

**Clarification to Queries (Set-8, dated 03-08-2018) received subsequent to the Prebid Conference**

**IFB No: MEGA/UG/E&M-01 Dt: 18-04-2018**

S.No	Document Reference Clause / Section	Page No	Description as per Bid Document / Drawing	Tenderer's Query	GEC Response
64	Schematic drawings for TVS		Cross Passage dimensions	The alignment drawings indicate there are cross passages for evacuation. Bidder requests a typical drawing to be made available which indicates the cross section of the cross passage.	Cross passage drawings prepared by Civil Contractor shall be shared with successful bidder. E&M Contractor to develop the detail design of all services while interfacing with designated contractor and furnish the same to Engineer for approval. Tender Conditions prevails.
65	Part-1 Section II Bid Data Sheet	Clause ITB 24.1	The deadline for Bid submission	We request you to extend the bid submission date by two months from the date of last clarification from your end.	Please refer to Addendum 3 issued dated 27.07.2018 for Bid submission extension.