



MUMBAI METRO RAIL CORPORATION (MMRC)

(A JV company of Govt. of India and Govt. of Maharashtra)

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Invitation for Prequalification of bidders for *Design, manufacture, supply, installation, testing and commissioning of Tunnel Ventilation System & Environmental Control Systems*

Date: 25th May 2016

Loan Agreement Number: [ID-P 233]

IFP Number: [MM3-CBS-TVE]

Addendum No: 1

Sr No	Description and Clause No	Amendment
1	Deadline for Submission of Application Submissions PDS ITA 16.1	Replace “The deadline for Application submission is: Date: 27 th May, 2016, Time: 3:00 p.m.” With “The deadline for Application submission is: Date: 29 th June, 2016, Time: 3:00 p.m.”
2	Opening of Applications: PDS ITA 18.1	Replace “The opening of the Applications shall be at 4:00 p.m. on 27 th May, 2016” With “The opening of the Applications shall be at 4:00 p.m. on 29 th June, 2016.”

Sr No	Description and Clause No	Amendment
3	Section III Qualification Criteria and Requirements 3.2 Average Annual Turnover Page QCR-6	<p>Replace</p> <p><u>For one (1) contract package</u></p> <p>The average annual turnover as a prime contractor (defined as billing for TVS/ECS contracts in progress or completed) over the last 5 financial years (i.e. financial years whose ending dates are between April 1, 2010 to March 31, 2015 for the countries where the financial year ending on 31st March or January'1, 2010 to December'31, 2014 for the countries where the financial year ending on 31st December) must be at least USD 19 million or the equivalent thereof.</p> <p><u>For two (2) contract packages</u></p> <p>The value of turnover above shall be replaced with USD 38 million</p> <p>With</p> <p><u>For one (1) contract package</u></p> <p><i>Minimum average annual construction turnover of USD 19 million, calculated as total certified payments received for contracts in progress and/ or completed, within the last 5 years, divided by 5 years (i.e financial years between April 1, 2010 to March 31, 2015 for the countries where the financial year ending on 31st March or January'1, 2010 to December'31, 2014 for the countries where the financial year ending on 31st December).</i></p> <p><u>For two (2) contract packages</u></p> <p>The value of turnover above shall be replaced with USD 38 million</p>
4	Section III Qualification Criteria and Requirements 3. Financial Situation Page QCR-6	<p>Add in end of 3. Financial Situation:</p> <p><i>Notes for Applicant:</i></p> <p>(i) <i>To bring at par, Turnover values will be escalated by assuming 5% inflation per annum for Indian Rupees and 2% inflation per annum for foreign currency for first 4 years of Turnover values.</i></p> <p>(ii) <i>Wherever audited Financial Statement of financial year ending 31st March 2016 or 31st December 2015 is available, the same will be considered.</i></p>

Sr No	Description and Clause No	Amendment
5	Section III Qualification Criteria and Requirements 4.2 (a) Specific Construction Experience Page QCR-7	<p>Replace</p> <p>A minimum number of two (2) similar contracts that have been satisfactorily and substantially⁽ⁱⁱⁱ⁾ completed as a prime contractor (single entity or JV member)⁽ⁱⁱⁱ⁾ for 10 years between 1st January 2006 and 31st December 2015.</p> <p>The similarity shall be based on the physical size, complexity, methods /technology or other characteristics as described in Section VI, Scope of Works.</p> <p>With</p> <p>A minimum number of two (2) similar contracts that have been satisfactorily and substantially⁽ⁱⁱⁱ⁾ completed as a prime contractor (single entity or JV member)⁽ⁱⁱⁱ⁾ for 10 years between 1st January 2006 and 31st December 2015.</p> <p><i>The similarity shall be defined as “A single contract with Air conditioning system of minimum capacity 2000TR for project MRT/ Railways/ Airports/ Ports/ Big Hospitals etc and/or Tunnel ventilation system of 2.5km tunnel for MRT/ Railways/ Highways”.</i></p>
6	Section III Qualification Criteria and Requirements 4.2 (b) Specific Experience Page QCR-8, 9, 10	<p>Replace</p> <p>For the above or other contracts executed during the period stipulated in 4.2 (a) above, a minimum construction experience, as prime contractor, management contractor, or subcontractor, in the following key activities:</p> <p><u>For one (1) contract package</u></p> <p>(a) Detail Engineering, Manufacture, Supply, Installation, Testing and commissioning of large Environmental Control System of large infrastructure projects/ U/G works completed in last 10 years of any of the following value:-</p> <p>(i) One work of more than USD 19 million and above or</p> <p>(ii) Average value of 2 works - USD 12 million and above or</p> <p>(iii) Average value of 3 works - USD 9 million and above</p> <p>(b) Detail Engineering, Manufacture, Supply, Installation, Testing and commissioning of Tunnel Ventilation System of large infrastructure projects/ U/G works completed in last 10 years of any of the following value:-</p> <p>(i) One work of more than - USD 23 million and above or</p> <p>(ii) Average value of 2 works - USD 14 million and above or</p> <p>(iii) Average value of 3 works - USD 11 million and above</p> <p>(c) Electrical Systems for MRTS/ Railway/ Airports/ large infrastructure projects</p> <p><u>For two (2) contract package</u></p>

Sr No	Description and Clause No	Amendment
		<p>(a) Detail Engineering, Manufacture, Supply, Installation, Testing and commissioning of large Environmental Control System of large infrastructure projects/ U/G works completed in last 10 years of any of the following value:-</p> <p>(i) One work of more than USD 38 million and above or</p> <p>(ii) Average value of 2 works - USD 24 million and above or</p> <p>(iii) Average value of 3 works - USD 18 million and above</p> <p>(b) Detail Engineering, Manufacture, Supply, Installation, Testing and commissioning of Tunnel Ventilation System of large infrastructure projects/ U/G works completed in last 10 years of any of the following value:-</p> <p>(i) One work of more than USD 46 million and above or</p> <p>(ii) Average value of 2 works - USD 28 million and above or</p> <p>(iii) Average value of 3 works - USD 22 million and above</p> <p>(c) The above items (a) and (b) shall include Electrical Systems for MRTS/ Railway/ Airports/ large infrastructure projects</p> <p>With</p> <p>For the above or other contracts executed during the period stipulated in 4.2 (a) above, a minimum construction experience, as prime contractor, management contractor, or subcontractor, in the following key activities:</p> <p><u>For one (1) contract package</u></p> <p>(a) Detail Engineering, Manufacture, Supply, Installation, Testing and commissioning of large Environmental Control System of large infrastructure projects/ U/G works completed in last 10 years of any of the following value:-</p> <p>(i) One work of USD 19 million and above or</p> <p>(ii) Two(2) works of USD 12 million <i>each</i> and above or</p> <p>(iii) Three(3) works of USD 9 million <i>each</i> and above</p> <p>(b) Detail Engineering, Manufacture, Supply, Installation, Testing and commissioning of Tunnel Ventilation System of large infrastructure projects/ U/G works completed in last 10 years of any of the following value:-</p> <p>(i) One work of <i>4.0 km tunnel for MRT/ Railways/ Highways</i> and above or</p> <p>(ii) Two(2) works of <i>2.5 km tunnel for MRT/ Railways/ Highways each</i> and above or</p> <p>(iii) Three(3) works of <i>1.5km tunnel for MRT/ Railways/ Highways each</i> and above</p> <p>(c) <i>The above items (a) and (b) shall include</i> Electrical Systems for MRTS/ Railway/ Airports/ large infrastructure projects</p> <p><u>For two (2) contract package</u></p> <p>(a) Detail Engineering, Manufacture, Supply, Installation, Testing and commissioning of large Environmental Control System of large infrastructure projects/ U/G works completed in last 10 years of any of the following value:-</p> <p>(i) One work of USD 38 million and above or</p>

Sr No	Description and Clause No	Amendment
		(ii) Two(2) works of USD 24 million <i>each</i> and above or (iii) Three(3) works of USD 18 million <i>each</i> and above (b) Detail Engineering, Manufacture, Supply, Installation, Testing and commissioning of Tunnel Ventilation System of large infrastructure projects/ U/G works completed in last 10 years of any of the following value:- (i) One work of 8.0 km tunnel for MRT/ Railways/ Highways and above or (ii) Two(2) works of 5.0 km tunnel for MRT/ Railways/ Highways <i>each</i> and above or (iii) Three(3) works of 3.0 km tunnel for MRT/ Railways/ Highways <i>each</i> and above (c) The above items (a) and (b) shall include Electrical Systems for MRTS/ Railway/ Airports/ large infrastructure projects.
7	Section III Qualification Criteria and Requirements 4. Experience Page QCR-10, 11	<u>Notes for the Applicant</u> Delete Note (vi) (vi) The Applicant shall have simulation and testing equipment and facilities for full design checking and validation (through load simulation) and for testing of the subsystem once installed on site. Add Note (vii) (vii) <i>To bring at par, Contract work values will be escalated by assuming 5% inflation per annum for Indian Rupees and 2% inflation per annum for foreign currency for first 9 years of contract works values.</i>
8	Section IV – Application Forms Page AF-20	Delete Important Notes (1 to 6) on Page AF-20
9	Section VI. Scope of Works 1. Description of Works Page SOW-3,4,5	Replace 1. Description of Works Page SOW-3,4,5 With 1. <i>Description of Works as per Attachment No. 1 to this Addendum No. 1</i>
10	Section VI. Scope of Works 3. Site and Other Data	Replace in paragraph The high temperature in Mumbai is approximately 30-33 degrees Celsius.....

Sr No	Description and Clause No	Amendment
	1.Mumbai City Profile Page SOW-7	With The high temperature in Mumbai is approximately 30-37 degrees Celsius.....
11	Section VI. Scope of Works 3.Site and Other Data 2. Project Description 2.2 Salient features Sr. 10.TVS/ECS Page SOW-9	<p>Replace TVS/ECS Tunnel Ventilation (a) Tunnel ventilation and track way exhaust systems utilizing the Tunnel Ventilation Fans (TVF). (b) Tunnel ventilation system with Saccardo nozzle to push smoke to the TVF exhaust point for fire emergency scenarios. (c) Under-Platform Supply Systems (UPSS) consist of Air Handling Units which can provide cool air into the track way for hot days. Environmental Control System (a) Chilled water cooling system for public areas, offices and plant rooms. (b) Station smoke exhaust system to use TVF plants.</p> <p>With TVS/ECS Tunnel Ventilation (a) Tunnel ventilation and track way exhaust systems. (b) Tunnel ventilation system with/ <i>without</i> Saccardo nozzle to push smoke to the TVF exhaust point for <i>tunnel</i> fire emergency scenarios. (c) Under-Platform <i>Air</i> Supply Systems (UPASS) consists of <i>Ventilation fans</i> which can provide <i>ambient</i> air into the track way. Environmental Control System (a) Chilled water cooling system for public areas, offices and plant rooms. (b) Station smoke exhaust system to use <i>OTE</i> plants.</p>
12	PDS ITA 23.3 Page PDS-4	Replace “As stipulated in ITA 1.1, this prequalification exercise shall be for multiple contracts packages. The whole of the works will be divided into three (3) contract packages as under:-

Sr No	Description and Clause No	Amendment
		<p>MM3-CBS-TVE-01 Lot 1 Aarey (incl) to BKC (incl)</p> <p>MM3-CBS-TVE-02 Lot 2 BKC (excl) to Science Museum (incl)</p> <p>MM3-CBS-TVE-03 Lot 3 Science Museum (excl) to Cuffe Parade (incl).</p> <p>The Employer will prequalify each Applicant for a maximum contract value (bidding capacity). An Applicant shall be allowed to bid for any contract within his bidding capacity. However, he may only be awarded a maximum number of any <u>2 contracts</u>, provided he meets the aggregated requirements of such contract combination (award capacity).</p> <p>A bidder's award capacity will be determined during bid evaluation when additional information will be assessed such as (i) current contract commitments, (ii) cash flow capacity, (iii) equipment to be allocated, and (iv) personnel to be submitted will be assessed.</p> <p>It is to be noted that Aarey Station will be at grade & air-conditioning provision for certain areas to be included.”</p> <p>With</p> <p>As stipulated in ITA 1.1, this prequalification exercise shall be for multiple contracts packages. The whole of the works will be divided into three (3) contract packages as under:-</p> <p>MM3-CBS-TVE-01 Lot 1 Aarey (incl) to BKC (incl)</p> <p>MM3-CBS-TVE-02 Lot 2 BKC (excl) to Science Museum (incl)</p> <p>MM3-CBS-TVE-03 Lot 3 Science Museum (excl) to Cuffe Parade (incl).</p> <p><i>As a result of this pre-qualification process, a list of pre-qualified applicants will be drawn (separately for one contract package and two contract packages) and pre-qualified applicants will be free to bid for any number of packages. An applicant shall be allowed to bid for any contract within his bidding Capacity. However at the time of award of contract, no bidder will be awarded more than 2 contracts. This decision would be made on the basis of the lowest responsive price-bid combination for all three (3) Contract packages.</i></p> <p>A bidder's award capacity will be determined during bid evaluation when additional information will be assessed such as (i) current contract commitments, (ii) cash flow capacity, (iii) equipment to be allocated, and (iv) personnel to be submitted will be assessed.</p> <p>It is to be noted that Aarey Station will be at grade & air-conditioning provision for certain areas to be included.</p>

1. Description of the Works

A. Project Description

The Mumbai Metro Line 3 (MML3) consists of 26 underground stations and one station at grade with the total length of approximately 32.5 km. There will be 9 interchange stations with 6 crossovers. The tunnel diameter will be 5.8m. The train will be an eight (8) car train with the overall length of approximately 178 m.

B. General

The Bid document to be issued by the MMRC will include outline of design/ construction guidelines as a part of Employer's Requirements. This will cover performance and provide technical requirements to deliver desirable features.

The scope of work comprises design, manufacture, supply, installation, testing and successful commissioning of equipment forming Tunnel Ventilation and Environmental Control System for the Mumbai Metro Line 3 (MML3) project along with training staff on the system operation and maintenance, and, with maintenance of the Tunnel Ventilation System (TVS) and Environment Control Systems (ECS) till the end of the testing and commissioning of the whole MML3 metro rail system. The scope of the works may be divided into three lots, viz, MM3-CBS-TVE-01(Lot 1), MM3-CBS-TVE-02 (Lot 2) and MM3-CBS-TVE-03 (Lot3). It also includes the supply of spares and special maintenance tools and the supply of operation & maintenance manuals. The equipment required for the project shall feature all equipment and systems required to form part of TVS and ECS. Employer may enter into maintenance contract with the contractors for a period of 3 to 5 years post DLP.

The successful Bidder will be responsible for coordinating all interfaces between the systems offered by him and other packages awarded to other Contractors which impinge upon his design e.g. Electrical & Mechanical (E&M), Rolling Stock, Tunnel fixed structure, Station buildings and platforms, Signalling and Telecommunication, maintenance management information system, Platform Screen Doors System, if any etc. MMRC will supervise/facilitate the coordination between the Contractor and other designated contractors. However, the Contractor will allow for liaison with, and modifications to his design to cater for the work of such other Contractors for common design approaches and standardisation on system implementation practices.

The contractors shall understand the complexity of the metro systems on the large industrial grade fire rated ventilation fan systems, no single point of failure systems, redundancies of equipment and control systems, congested services coordination in limited available space, planning for the life cycle replacements without stopping revenue service.

The successful Bidder will also be required to provide sufficient technical data, (dimensions, weight and mounting details) including maintenance schedules, inspection/repair procedure for any machinery/plant required for equipment/ sub-systems. In addition other technical interface details will be provided to enable other project contractors to proceed in parallel with their design and development.

Safety worthiness of the system will be evaluated by Commissioner of Metro Rail Safety under Ministry of Civil Aviation Govt. of India.

The Contractor should be in position to provide necessary support (have experts with adequate knowledge and experience, qualification, and to submit such documentation as required) to assist MMRC for effective interaction with Indian authorities viz. Ministry of Railways, RDSO, Commissioner of Metro Railway Safety, EIG and Mumbai Fire Service (MFS).

The contractor shall be responsible for obtaining relevant certificates or clearance from local

civic authorities, completion certificates, fire clearance etc. MMRC shall extend necessary assistance wherever possible. However, it will be the ultimate responsibility of the contractor to obtain all the required relevant certificates or clearances as per the time schedule prescribed by MMRC.

The successful Bidder will have to ensure transfer of technology for detail design, indigenous, system assembly, installation, maintenance and software customization/modification within a defined time frame. For that purpose, the Applicants may set up suitable facilities in India.

The contractor shall be responsible for the preliminary design stage, detail design stage, working / shop drawing stage to the stage of execution and preparation of As Built Drawings.

The work is likely to cover Detail Engineering, Supply, Installation, Preparation of Operation and Maintenance Manual, Training of Maintenance/Operation Personnel, Testing and Commissioning of the Environment Control System (ECS) and Tunnel Ventilation System (TVS) of Mumbai MRTS Line-3 for 26 underground stations and Air Conditioning at one at grade station in 3 construction lots and associated tunnel and ramp sections.

For all the underground stations, the TVS and ECS shall broadly adopt the following system configuration concept subject to outcome of SES/CFD study:

- i. Tunnel ventilation fans shall be used for tunnel ventilation purpose *and also for trackway fire exhaust (in case of fire on platform track)*.
- ii. The Over Track Exhaust system *shall normally function for OTE purpose. However it shall also be used for Station smoke exhaust in emergencies*. The supply air ducts will be utilised for smoke exhaust in case of fire in the station.

C. Tunnel Ventilation System (TVS)

The scope of TVS comprises detailed design, coordination with all relevant parties, procurement, installation, testing and successful commissioning for the underground part of the corridors. The Tunnel Ventilation System shall consist of:

- i. TVS simulation by utilising the Subway Environmental Simulation (SES) computer program or the equivalent software. Simulation software, approach and the modelling results synchronisations shall be agreed and coordinated among the construction contracts. The SES simulation for the whole line shall be the scope of work for Contract Lot-1(MM3-CBS-TVE-01). Contract Lots 2 and 3 shall coordinate with Contract Lot -1 for the implementation of the tunnel ventilation system performance as per the simulation results.
- ii. Computational fluid dynamics (CFD) modelling for the station, trackway, siding tracks, etc. fire simulations.
- iii. Ventilation Systems for Trackway Exhaust system including fans, dampers and steel ductworks,
- iv. TVS including fans, dampers, steel ductworks and velocity sensors,
- v. Tunnel ventilation control system including the SCADA for the stations, the OCC and BCC,

Associated electrical power supply and distribution system between the low voltage main panel and Tunnel Ventilation equipment

D. Environment Control Systems (ECS)

The scope of ECS comprises detailed design, coordination with all relevant parties, manufacture, procurement, installation, testing and successful commissioning for the corridor. The ECS shall consist of:

- i. Air conditioning system to the stations, utility rooms, plantrooms, OCC and BCC buildings, mid vent shaft etc. The system shall include chillers, pumps, cooling towers, AHUs, FCUs, ductwork, pipework, etc. to form a complete system,
- ii. Ventilation systems to plantrooms include fans dampers, ductwork, etc. to form a complete system,
- iii. ECS control system including the SCADA,
- iv. Associated electrical power supply and distribution system between the low voltage main panel and ECS equipment.
- v. VRV system to be provided for Aarey Station, which is at grade.

E. General

The following scopes apply to both TVS and ECS.

- i. Testing and commissioning (including system acceptance testing, integrated testing & commissioning and operational acceptance),
- ii. Supply of operation and maintenance manuals,
- iii. Training of operation and maintenance personnel,
- iv. Supply of spares, special tools and maintenance tools,