**Response to Bidder Queries (3)**
**Tender No. CMRL / PHASE 1 / SYS / ARE05 / 2025**
**Design, Manufacture, Supply, Testing, Commissioning of Standard Guage Metro Rolling Stock (Electrical Multiple Units) and Depot Machinery & Plant and Training of Personnel**

| Sl. No. | As per the Submission of Bidder(s) | | | | CMRL Response |
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| | Part/ Section No | Clause No. | Original Bid Condition | Bidder's queries | |
| 1 | Part 2 / Section VI A | 9.2.1 | Auxiliary power requirements are described for One Unit of 3 cars (DMC + TC + MC) considering 6 car rake consists of two identical 3 car units for the purpose of auxiliary power supply distribution scheme. The auxiliary power supply shall consist of two static converter & inverters, two back-up batteries & two battery chargers. The Auxiliary Converter shall be suitable for operation at 25 KV AC input supply at pantograph level with the input supply frequency variation from 47~52 Hz and voltage variation from 19~31kV. The failure of auxiliary power supply equipment shall be communicated to TCMS / OCC / BCC. Failure / isolation of main converter shall not cause any reduction in performance of auxiliary converter-inverter. The auxiliary power supply system shall be configured such that it performs reliably for all operating train consists. | **Justification:**<br>Two auxiliary batteries (one per 3-car unit) can be provided for the 6-car trainset, connected in parallel and sized for total train-level auxiliary loads to ensure balanced sharing, redundancy, and stable operation. This configuration offers higher efficiency with reduced weight and maintenance, as adding more batteries provides no performance benefit while increasing complexity. Weight increase at train level will be more than 1 tonnes.<br><br>**Amendment Request :-**<br>Auxiliary power requirements are described for One Unit of 3 cars (DMC + TC + MC) considering 6 car rake consists of two identical 3 car units for the purpose of auxiliary power supply distribution scheme. The auxiliary power supply shall consist of two static converter & inverters, ~~two~~ **one** back-up ~~batteries~~ **battery** & two battery chargers. The Auxiliary Converter shall be suitable for operation at 25 KV AC input supply at pantograph level with the input supply frequency variation from 47~52 Hz and voltage variation from 19~31kV. The failure of auxiliary power supply equipment shall be communicated to TCMS / OCC / BCC. Failure / isolation of main converter shall not cause any reduction in performance of auxiliary converter-inverter. The auxiliary power supply system shall be configured such that it performs reliably for all operating train consists. | Tender conditions prevail. |
| 2 | Part 2 / Section VI A | 3.6.5.1 | Longitudinal banks of **flat** type anti slip finish stainless steel seats shall be provided along the body-side between the doorway draught screens. The Contractor shall provide as much seating space as possible between the side doors. The seat layout should be such that it will not obstruct the flow of passengers during rush hours while boarding or detraining. Draught screen shall be provided at each door and shall be an integral part of the stanchions at the doorways. Bump support / Lumber support arrangement shall be at suitable locations as decided by CMRL. | **Justification:-** Bidder requests to keep the option of seat type open<br><br>**Amendment Requested::-**<br>Longitudinal banks of flat / **bucket** type anti slip finish stainless steel seats shall be provided along the body-side between the doorway draught screens. The Contractor shall provide as much seating space as possible between the side doors. The seat layout should be such that it will not obstruct the flow of passengers during rush hours while boarding or detraining. Draught screen shall be provided at each door and shall be an integral part of the stanchions at the doorways. Bump support / Lumber support arrangement shall be at suitable locations as decided by CMRL. | Tender conditions prevail. |
| 3 | Part 2 / Section VI A | 11.4.18.3, 11.4.23, 17.5.2.10.9 | 11.4.18.3 : c. ΔQ / Q for track twist (Testing method & test condition with track twist values shall be in accordance with EN14363 Method 3).<br><br>11.4.23 : b) Test method & test condition requirements assessment for Safety against derailment on twisted track, with track twist values of bogie and vehicle body test twist shall be in accordance with EN14363 Method 3 (Railway applications - Testing for the acceptance of running characteristics of railway vehicles) with above acceptance criteria.<br><br>17.5.2.10.9 : A load equalization test shall be performed on one motor bogie and one trailer bogie installed on the first completed married pair at AW0 and AW4 load conditions. For this test, one wheel of the bogie shall be raised and then lowered 63.5 mm with respect to the plane formed by the other three wheels of the same bogie as they rest on level track, and additionally wheel unloading testing method & test condition with track twist values of bogie and vehicle body test twist shall conform to method 3 of EN 14363. An alternative design and service proven load equalization test may be presented to CMRL for approval during design review. During the test, the other three-wheel treads shall maintain contact with the rails. Additionally, with one wheel raised and lowered 51mm with respect to the plane formed by the other three wheels, the neutral wheel load of the other three wheels shall not change by more than 50%. | **Justification:**<br>Track twist values for the ΔQ / Q test shall be adopted from the real track conditions since the track twist values provided in EN 14363 is relevant for the track conditions of European Rail network. Please refer white paper for more details.<br><br>**Amendment Requested:**<br>11.4.18.3 "c. ΔQ / Q for track twist (Testing method & test condition, with track twist values **as per maximum specified track twist**, shall be in accordance with EN14363 Method 3)"<br><br>11.4.23 "b) Test method shall be in accordance with EN14363 Method 3 & test condition requirements assessment for Safety against derailment on twisted track, with track twist values of bogie and vehicle body test twist **as per maximum specified track twist**, shall be in accordance with EN14363 Method 3 (Railway applications - Testing for the acceptance of running characteristics of railway vehicles) with above acceptance criteria."<br><br>17.5.2.10.9 "A load equalization test shall be performed on one motor bogie and one trailer bogie installed on the first completed married pair at AW0 and AW4 load conditions. For this test, one wheel of the bogie shall be raised and then lowered 63.5 mm with respect to the plane formed by the other three wheels of the same bogie as they rest on level track, and additionally wheel unloading testing method & test condition, with track twist values of bogie and vehicle body test twist **as per maximum specified track twist**, shall conform to method 3 of EN 14363. An alternative design and service proven load equalization test may be presented to CMRL for approval during design review. During the test, the other three-wheel treads shall maintain contact with the rails. Additionally, with one wheel raised and lowered 51mm with respect to the plane formed by the other three wheels, the neutral wheel load of the other three wheels shall not change by more than ~~50%~~.**67%**" | Refer Addendum No.3, S.No. 25, 27 and 36 |
| 4 | Part 2 / Section VI A | 2.13.3, 11.4.18.1 | 2.13.3 : e) The Sperling ride index of the rake at 80 kmph shall not exceed 2.5 in both vertical and horizontal directions in inflated condition of secondary suspension and 3.0 in deflated condition for both vertical and horizontal directions.<br><br>11.4.18.1 : The Sperling ride index of the rake at 80 kmph shall not exceed 2.50 in both vertical and horizontal directions in inflated condition of secondary suspension and 3.0 in deflated condition. | **Justification:**<br>Please refer white paper for more details.<br><br>**Amendment Requested:**<br>2.13.3 "e) The Sperling ride index of the rake at 80 kmph shall not exceed 2.5 in both vertical and horizontal directions in inflated condition of secondary suspension and **at 55kmph shall not exceed** 3.0 in deflated condition for both vertical and horizontal directions. "<br><br>11.4.18.1 "The Sperling ride index of the rake at 80 kmph shall not exceed 2.50 in both vertical and horizontal directions in inflated condition of secondary suspension and **at 55kmph shall not exceed** 3.0 in deflated condition. " | Refer Addendum No.3, S.No. 9 and 24 |

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| 5 | Part 2 / Section VI A | 12.5.2 | Main reservoir with a capacity adequate for the 6 car rake consist shall be provided on each car, which shall be supplied from the main reservoir pipeline. | **Justification:**<br>Reservoirs are provided in only two cars for the 6 car train set, not in each car. The AGTU and its main reservoir is added adjacently and sized to cater the entire train air consumption requirement. Additionally, we have provided brake reservoir in every car to meet braking requirement. Adding Main reservoir in each car will increase the fill up time and has no advantage in operation. The total compressed air capacity of the complete train will be adequate to meet all operational air consumption requirements under various service conditions. The sizing of air reservoirs will be determined based on detailed Air Consumption Calculations for the CMRL Phase-1 route profile, duly considering compressor fill-up time.<br><br>**Amendment Requested:**<br>Main reservoir with a capacity adequate for the 6 car rake consist shall be provided ~~on each car~~, which shall be supplied from the main reservoir pipeline. | Refer Addendum No.3, S.No. 32 |
| 6 | Part 2 / Section VI A | 1.2.4. | When assessing acceptability of the Contractor proposed equivalent standard, CMRL will review on a case-by-case basis and will not unreasonably withhold acceptance of any alternative standard that is in general use in the transit agencies or railroads for similar applications that have a successful history of operation. | **Amendment Request :**<br>When assessing acceptability of the Contractor proposed equivalent standard, CMRL will review on a case-by-case basis and will not ~~unreasonably~~ withhold acceptance of any alternative standard **(including parameter/values therein)** that is in general use in the transit agencies or railroads for similar applications that have a successful history of operation. **The contractor shall only submit reference of any such previous project to establish its usage.** | Tender conditions prevail. |
| 7 | Part 2 / Section VI A | 3.6.1.27 | Gaps in vehicle interior shall be minimized. Gaps that are visible to passengers shall be maintained in the range of 1mm (min) to 2mm (max) to ensure they are flush and uniform with the panel edges. Concealed gaps shall be 1.5 mm - 3 mm. | Justification: Considering the parts and assembly manufacturing variations it is requested to allow the bidder to present the gap and flush variations during detail phase and concur or mutually agree with CMRL. Hence it is requested to adjust he clause as below :-<br><br>**Amendment Requested:**:- Gaps in vehicle interior shall be minimized. Gaps that are visible to passengers shall be maintained in the range of 1mm (min) to 2mm (max) to ensure they are flush and uniform with the panel edges. Concealed gaps shall be 1.5 mm - 3 mm. **The gap and flush details shall be presented to CMRL during detail design phase and the design philosohy has to be agreed by CMRL.** | Tender conditions prevail.<br><br>(The contractor shall submit the design for review and approval by the Engineer during design phase) |
| 8 | Part 2 / Section VI A | 3.14.5.1 | The cab framework, together with panels although not windscreens shall prevent penetration of a sharp cornered hollow steel cube sides 70 mm - 75 mm and of uniform thickness with a mass of 0.9 kg, projected corner-first at a speed of 160 kmph. | Justification:- A dedicated intrusion analysis need not have to be performed, as the structure is designed in such a way that it will not encroach into the driver or passenger occupied areas<br><br>**Amendment Requested:**:-<br>The cab framework, together with panels although not windscreens shall ~~prevent penetration of a sharp cornered hollow steel cube sides 70 mm - 75 mm and of uniform thickness with a mass of 0.9 kg, projected corner-first at a speed of 160 kmph.~~be designed to ensure that no intrusion occurs into areas occupied by the driver or passengers. | Tender conditions prevail. |
| 9 | Part 2 / Section VI A | 11.4.10 e) | The Helical springs shall have a fatigue life of not less than 10,00,000 kms and shall be designed and tested as per EN 13298 and EN 13906. The service life of rubber bonded metal components / rubber of spring type primary suspension shall be OEM rated for not less than 8 years. The Contractor shall ensure that the chosen supplier provides a warranty for the same. | Justification:<br>OEM provides warranty only for stipulated duration of time and cannot provide warranty for the entire design life.<br><br>**Amendment Request:**<br>The Helical springs shall have a fatigue life of not less than 10,00,000kms and shall be designed and tested as per EN 13298 and EN 13906. The service life of rubber bonded metal components / rubber of spring type primary suspension shall be OEM rated for not less than 8 years. ~~**The Contractor shall ensure that the chosen supplier provides a warranty for the same.**~~ | Refer Addendum No.3, S.No. 22 |
| 10 | Part 2 / Section VI A | 11.4.11 d) | Hydraulic dampers of suitable capacity shall be provided symmetrically to control and limit the vertical and lateral oscillation of the car body. The damping factors are to satisfy this provision. The damping factor in vertical mode, by wedge test, when tested using a wedge of 18 mm thickness should be between 0.20 and 0.25. Suspension will not be considered acceptable if maximum acceleration and spring displacements do not decay within 2-3 cycles. No leakages of any kind shall be permitted. The design life of the dampers shall be minimum 10 years. | **Justification:**<br>The dampers are tuned to meet the required acceleration and ride comfort performance. There is no specific requirement in EN 14363 to validate the damping factor, and RDSO also does not specify any acceptance criteria for the damping factor.<br>The effects of damping are inherently covered through the acceleration and ride comfort tests. Therefore, the bidder proposes the removal of the damping factor acceptance criteria.<br><br>**Amendment Requested:**<br>Hydraulic dampers of suitable capacity shall be provided symmetrically to control and limit the vertical and lateral oscillation of the car body. The damping factors are to satisfy this provision. The damping factor **shall be measured** in vertical mode, by wedge test when tested using a wedge of 18 mm thickness. ~~**should be between 0.20 and 0.25.**~~ Suspension will not be considered acceptable if maximum acceleration and spring displacements do not decay within 2-3 cycles. No leakages of any kind shall be permitted. The design life of the dampers shall be minimum 10 years. | Tender conditions prevail. |

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| 11 | Part 2 / Section VI A | 11.11.6 | The fine-tuning of WFL custom profiles using TCMS shall be achievable using regular diagnostic laptops that are already provided to CMRL under the scope of this Contract. No additional proprietary software shall be required for this purpose. | Justification: Diagnostic laptops are meant for troubleshooting and regular maintenance. Fine-tuning of WFL custom profiles will be done via TCMS before revenue service.Hence its not recommended to use regular diagnostic laptops. This changing of software with daignostic laptop will lead to severe safety & security level impacts, as the provided software is SIL2 and also its not accepted to change the parameter.<br><br>**Amendment Requested:** Bidder requested to remove this clause of using regular diagnostic laptops for Fine-tuning of WFL custom profiles. This fine tuning will be done in the scope of TCMS software before revenue service and any fine tuning of profiles will be updated in the TCMS software parameters. Bidder will support for this activities untill the final tuning. Also this changing of softwrae under daignostic laptop will lead to safety & security level impacts . As we are providing SIL2 software its not accepted to change the parameter. | Refer Addendum No.3, S.No. 29 |
| 12 | Part 2 / Section VI A | 12.4.6 | The air supply and distribution systems shall be designed such that any type of failure can be isolated remotely TCMS & RSC consoles in OCC, DCC & BCC such that the impact on performance capabilities is minimized. In case of any failure, an alarm shall be sent to TCMS and also to OCC. | Justification:<br>Whenever there is an fault raised by air compressor unit , TCMS automatically switches over to other compressor. Therefore, with the help of smart management of air compressor unit by TCMS there is no requirement of additional Magnet valve.<br><br>**Amendment Requested:**:-<br>~~The air supply and distribution systems shall be designed such that any type of failure can be isolated remotely TCMS & RSC consoles in OCC, DCC & BCC such that the impact on performance capabilities is minimized.~~ In case of any failure, an alarm shall be sent to TCMS and also to OCC. | Tender conditions prevail. |
| 13 | Part 2 / Section VI A | 12.7.4 | A high integrity fast response closed loop digital brake control system shall be provided with the brake regulation rate at ±5% of the deceleration demand. The closed loop is formed by the dynamic brake and the pneumatic brake: use of dynamic brake is maximized, achieved dynamic brake information is provided to pneumatic brake control, and this control applies to the remaining need of brake in order to reach the total demand. | Justification:<br>As per EN 13452-2, section 4.2.2. Dynamic type tests, the performance obtained from different tests, done under nominally identical conditions, shall not diverge by more than a defined value from the average performance for those test conditions (e.g. same speed, load, location,..), The Transport Authority shall define this figure (tolerance or repeatability band). *It is recommended that this figure does not exceed* ***±10 %*** *for dry rail condition*. Brake regulation rate of ±5% is stringent to achieve and bidder would like to follow the standard'd requirement<br><br>**Amendment Requested:**:-<br>A high integrity fast response closed loop digital brake control system shall be provided with the brake regulation rate at ~~**±5%**~~ **±10%**of the deceleration demand. The closed loop is formed by the dynamic brake and the pneumatic brake: use of dynamic brake is maximized, achieved dynamic brake information is provided to pneumatic brake control, and this control applies to the remaining need of brake in order to reach the total demand. | Tender conditions prevail. |
| 14 | Part 2 / Section VI A | 12.7.6 | The Brake control unit shall have provision for logging All parameters / signals and faults with related data. Provision shall be available for continuous logging or logging triggered by a particular event of user selectable parameters (up to 20 at a time) for a period of up to 24 hrs. The memory shall be adequate to store the above data including an additional minimum 20,000 incidents. Provision shall be available to download the stored data for analysis and troubleshooting. The diagnostic tools for brake system shall include complete graphical & analytical tools, recording of events, data of the brake system and interface signals etc. It shall also have a provision to add on the necessary signals as required during fault investigations. | Justification:<br>Bidder wants to clarify for the last statement of the requirement. The necessary signals to be monitored will be defined during the project phase and once software is freezed no more signals can be added.<br><br>**Amendment Requested:**:-<br>The Brake control unit shall have provision for logging All parameters / signals and faults with related data. Provision shall be available for continuous logging or logging triggered by a particular event of user selectable parameters (up to 20 at a time) for a period of up to 24 hrs. The memory shall be adequate to store the above data including an additional minimum 20,000 incidents. Provision shall be available to download the stored data for analysis and troubleshooting. The diagnostic tools for brake system shall include complete graphical & analytical tools, recording of events, data of the brake system and interface signals etc. ~~It shall also have a provision to add on the necessary signals as required during fault investigations.~~ Contractor shall define the necessary signals required during fault investigations in the project phase. | Tender conditions prevail. |
| 15 | Part 2 / Section VI A | 14.11.2 | a) Download Triggers<br>The triggers for remote downloading to central server shall be time interval actuated, fault actuated, manual triggered from train and also forced downloaded remotely by authorized CMRL personnel. | Justification: The system supports only full data download to ensure data integrity, consistency, and compliance with safety and cybersecurity requirements. Trigger-based or partial downloads (time, fault, or manual) are not permitted as they may lead to incomplete datasets, unpredictable system load, and potential interference with safety-critical operations. Full download under controlled conditions guarantees reliable, validated, and complete data retrieval for diagnostics and analysis.<br><br>**Amendment Requested:**:- Bidder requested to ammend this clause of " time interval actuated, fault actuated, manual triggered" triggers for remote downloading.<br>~~**a) Download Triggers**~~<br>~~**The triggers for remote downloading to central server shall be time interval actuated, fault actuated, manual triggered from train and also forced downloaded remotely by authorized CMRL personnel.**~~ | Tender conditions prevail. |
| 16 | Part 2 / Section VI A | 19.54.3 i) | Dry heat test: The dry heat test shall be conducted for class T3 and temperature shall be considered 80°C against 70°C specified in IEC/EN. An extra performance check at 95°C shall also be carried out for 10 minutes over temperature value. LCD / LED display units may be tested at 70°C and an extra performance check at 85°C shall also be carried out for 10 minutes over temperature value | Justification: It is not recommended to perform an extra performance test at 85°C for 10 minutes for LCD/LED displays because LCD liquid crystals become unstable at temperature >70°C and permanently damage the display also LED backlights age rapidly at high temperature. It will have permanent impact on occurrence of image quality degradation & contrast drops. Therefore, such test will have major risks destroying the module.<br><br>**Amendment Requested:**:-<br>Dry heat test: The dry heat test shall be conducted for class T3 and temperature shall be considered 80°C against 70°C specified in IEC/EN. An extra performance check at ~~**95°C**~~ **80°C** shall also be carried out for 10 minutes over temperature value. LCD/LED display units may be tested into 70oC ~~**and an extra performance check at 85oC shall also be carried out for 10 minutes over temperature value**~~. | Tender conditions prevail. |

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| 17 | Part 2 / Section VI A | 14.13.1 | Key Alarms<br>The Contractor shall propose a list of critical / key alarms to be communicated to the OCC in realtime through the signalling network. This list shall include all alarms that are required for maintaining safe train operation. Any repetitive, hierarchical or cascading type faults shall be suitably masked or combined together to ensure brevity of the information being presented to OCC operator. | Justification: Repetitive, hierarchical, and cascading faults shall not be masked to ensure full visibility of system behavior, maintain fault traceability, and enable accurate root cause analysis. Masking such faults may obscure failure origins, hide system dependencies, and compromise safety and maintenance effectiveness. Hence all the faults to be attended by the OCC operator.<br><br>**Amendment Requested:**:- Bidder request to ammend the clasue as below;<br>Key Alarms<br>The Contractor shall propose a list of critical / key alarms to be communicated to the OCC in realtime through the signalling network. This list shall include all alarms that are required for maintaining safe train operation. Any repetitive, hierarchical or cascading type faults shall be ~~suitably masked or combined together to ensure brevity of the information being~~ **presented to OCC operator.** | Tender conditions prevail. |
| 18 | Part 2 / Section VI A | 14.13.2 | RSC Display<br>The Rolling Stock Controller (RSC) in OCC, BCC and in DCCs shall have facility of full TCMS functionality of any train on his workstation on demand through signalling network. Supply of RSC hardware and Development of the DDU application in RSC workstation shall be responsibility of Rolling Stock Contractor. RS Contractor shall interface with the Signalling Contractor for this purpose. The workstation shall be provided by RS Contractor. | Justification:Only train monitoring functions is allowed from OCC and not train control functions. Train control functions implemented in TCMS shall not be available in OCC to ensure that all safety-critical operations remain local, deterministic, and independent of communication networks. This avoids risks associated with network latency, loss of communication, cybersecurity threats, and conflicting operational authority, thereby maintaining system safety, integrity, and compliance with railway standards.<br>**Bidder requested to ammend this clause as below.**<br>**Amendment Requested:**:-<br>RSC Display<br>The Rolling Stock Controller (RSC) in OCC, BCC and in DCCs shall have facility of ~~**full only**~~ TCMS **monitoring** functionality of any train on his workstation on demand through signalling network. Supply of RSC hardware and Development of the DDU application in RSC workstation shall be responsibility of Rolling Stock Contractor. RS Contractor shall interface with the Signalling Contractor for this purpose. The workstation shall be provided by RS Contractor. | Tender conditions prevail. |
| 19 | Part 2 / Section VI A | 14.13.3 | OCC GUI<br>Rolling Stock Contractor shall propose a user-friendly graphical user interface in the form of a conceptual schematic / wireframe that shall include page layouts, arrangement of the GUI's content, interface and navigational elements, and a description of how they work together. This proposal shall be submitted to CMRL for his approval well in advance and shall be jointly agreed with Signalling Contractor for implementation. The Rolling Stock Contractor shall provide detailed information of the TCMS-OCC interface as implemented in at least two recently executed UTO Projects for reference during design stage. The name of such projects shall be indicated by the Contractor during Preliminary stage. | Justification:OCC/GUI/RSC-HMI having same control features and same screens of TCMS or replicate TCMS screens will have impact on ensuring strict segregation between safety-critical onboard control and supervisory systems. Remote systems are limited to monitoring functions to avoid risks arising from communication delays, cybersecurity vulnerabilities, and operational conflicts. This separation ensures deterministic train control, maintains system safety integrity, and complies with railway safety and cybersecurity standards.<br><br>**Amendment Requested:**:-<br>~~**OCC GUI**~~<br>~~**Rolling Stock Contractor shall propose a user-friendly graphical user interface in the form of a conceptual schematic / wireframe that shall include page layouts, arrangement of the GUI's content, interface and navigational elements, and a description of how they work together. This proposal shall be submitted to CMRL for his approval well in advance and shall be jointly agreed with Signalling Contractor for implementation. The Rolling Stock Contractor shall provide detailed information of the TCMS-OCC interface as implemented in at least two recently executed UTO Projects for reference during design stage. The name of such projects shall be indicated by the Contractor during Preliminary stage.**~~ | Tender conditions prevail. |
| 20 | Part 2 / Section VI A | 14.13.4 | UTO OPERATIONS:<br>The design of TCMS and its relevant components in train shall support for UTO / GoA4 in the CMRL Phase 1 & Phase 1 extension network defined in Chapter 1. Trains shall be operated in GoA2 / ATO mode during the initial stage of commissioning and revenue operations and in GoA4 /UTO subsequently. Hence all the feedbacks, information and train controls which are available on TCMS screen shall also be available in OCC and DCC for smooth operation of passenger service | Justification: Only train monitoring functions is allowed from OCC and not train control functions. Train control functions implemented in TCMS shall not be available in OCC to ensure that all safety-critical operations remain local, deterministic, and independent of communication networks. This avoids risks associated with network latency, loss of communication, cybersecurity threats, and conflicting operational authority, thereby maintaining system safety, integrity, and compliance with railway standards.<br><br>**Amendment Requested:**:-<br>UTO OPERATIONS:<br>The design of TCMS and its relevant components in train shall support for UTO / GoA4 in the CMRL Phase 1 & Phase 1 extension network defined in Chapter 1. Trains shall be operated in GoA2 / ATO mode during the initial stage of commissioning and revenue operations and in GoA4 /UTO subsequently. ~~**Hence all the feedbacks, information and train controls which are available on TCMS screen shall also be available in OCC and DCC for smooth operation of passenger service.**~~ | Tender conditions prevail. |
| 21 | Part 2 / Section VI A | 11.5.4 | The car shall be equipped with a quick disconnects for all power and control leads from the bogie to the car body. The quick disconnects shall be keyed as to prevent accidental miss wiring. | **Justification:**<br>Motor power cables cannot be quick disconnect based, as these cables are required to be terminated inside the motor junction box. Additionally, motor power cables cannot be equipped with quick disconnect connectors because traction circuits carry very high currents and require mechanically secure, vibration proof terminations.<br><br>**Amendment requested:**<br>The car shall be equipped with a quick disconnects for ~~**all**~~ **possible** power and control leads from the bogie to the car body. The quick disconnects shall be keyed as to prevent accidental miss wiring. | Tender conditions prevail.<br><br>(The contractor shall submit the design for review and approval by the Engineer during design phase) |

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| 22 | Part 2 / Section VI A | 11.6.1 (c) & (d) | c) Appropriate heat treatment or stress relief shall be done after fabrication to ensure strength requirements are met, unless otherwise approved by CMRL.<br><br>(d) All welding on the bogie including application of brackets, pads and other attachments shall be entirely completed prior to stress relieving. Drilling, tapping and machining of finished surfaces shall be accomplished only after stress relief. | **Justification:**<br>The proposed bogie frames shall be designed per DVS 1612 methodology which is equivalent to the bogie frames designed as per ERRI B12 RP60.<br>DVS 1612 does not require stress relieving and thus limits the induced stresses to a much lower value than that allowed by ERRI B12 RP60 for frames with heat treatment. Hence, stress relieving is not necessary in all designs and will be applicable only if ERRI B12 RP60 is applied.<br>Bidder requests to delete/modify the clause accordingly.<br><br>**Amendment Requested:**<br>(c) Appropriate heat treatment or stress relief ~~**shall**~~ **may** be done after fabrication to ensure strength requirements are met, unless otherwise approved by CMRL.<br><br>(d) All welding on the bogie including application of brackets, pads and other attachments shall be entirely completed prior to stress relieving, **if performed**. Drilling, tapping and machining of finished surfaces shall be accomplished only after stress relief, **if performed.** | Tender conditions prevail. |
| 23 | Part 2 / Section VI A | 17.5.2.10.9 | A load equalization test shall be performed on one motor bogie and one trailer bogie installed on the first completed married pair at AW0 and AW4 load conditions. For this test, one wheel of the bogie shall be raised and then lowered 63.5 mm with respect to the plane formed by the other three wheels of the same bogie as they rest on level track, and additionally wheel unloading testing method & test condition with track twist values of bogie and vehicle body test twist shall conform to method 3 of EN 14363. An alternative design and service proven load equalization test may be presented to CMRL for approval during design review. During the test, the other three-wheel treads shall maintain contact with the rails. Additionally, with one wheel raised and lowered 51mm with respect to the plane formed by the other three wheels, the neutral wheel load of the other three wheels shall not change by more than 50%. | **Justification:**<br>As agreed for ARE03A, bidder requests that the criteria be based on the APTA standard. Please refer white paper for more details.<br><br>**Amendment Requested:**<br>Additionally, with one wheel raised and lowered 51mm with respect to the plane formed by the other three wheels, the neutral wheel load of the other three wheels shall not change by more than ~~**50%**~~ **67%.** | Refer Addendum No.3, S.No. 36 |
| 24 | Part 2 / Section VI A | 11.12.4 | The Contractor shall submit the methodology of detection, detailed calculation of design proof load, installation arrangement, safety against derailment, energy absorbing capabilities etc. conforming to Table 3 — Obstacle deflector performance requirements of EN 15227 and EN 13749 during detailed design for CMRL review and approval. Provisions shall be made to avoid false detection. The Contractor shall submit the detailed calculation of design proof load, installation arrangement, safety against derailment, energy absorbing capabilities etc. during PFDR stage. | **Justification:**<br>For metro applications, obstacle detectors are electro-mechanical devices designed to identify obstacles on the track and signal the TCMS to apply an emergency brake in real time, preventing derailment.<br>In contrast, the purpose of an obstacle deflector is to be large and strong enough to clear obstacles from the path of the train's running gear at its leading end. Such a requirement pertains to mainline applications where livestock, large debris, etc are prevalent.<br>Additionally, as per Table 3 of EN 15227, for C-II class vehicles such as metro trains, obstacle deflectors are marked as 'N/A'. Considering this, bidder kindly requests the removal of the clause pertaining to EN 15227 requirements. Please refer white paper for more details.<br><br>**Amendment Requested:**<br>The Contractor shall submit the methodology of detection, detailed calculation of design proof load, installation arrangement, safety against derailment, energy absorbing capabilities etc. conforming to ~~**Table 3 — Obstacle deflector performance requirements of EN 15227**~~ and EN 13749 during detailed design for CMRL review and approval. Provisions shall be made to avoid false detection. The Contractor shall submit the detailed calculation of design proof load, installation arrangement, safety against derailment, energy absorbing capabilities etc. during PFDR stage. | Refer Addendum No.3, S.No. 30 |
| 25 | Part 2 / Section VI A | 9.2.6 | The design life of the auxiliary converters shall be a minimum of 35 years and be capable of operation for a period of 18 years without major maintenance (excluding consumables). | Amendment Requested::- The design life of the auxiliary converters shall be a minimum of 35 years and be capable of operation for a period of 18 years ~~without major maintenance (excluding consumables).~~**subject to routine maintenance, overhaul, or replacement** | Tender conditions prevail. |
| 26 | Part 2 / Section VI A | 3.4.1.4.3 | The carbody and attached equipment shall be designed to provide necessary clearances for the bogie and bogie profiles. Under normal conditions, the design must allow for 40 mm minimum clearance between carbody mounted parts and all bogie mounted parts, including wiring, hoses, cable, wheels and chains, under the worst combination of wear, except for any stops attached to the carbody for limiting bogie movement or for bogie lifting during maintenance. Worst case conditions may result from horizontal and vertical curves, track super elevation, worn wheels, maximum passenger load, roll, yaw, lateral motion, and suspension system failures. | Justification:**As per standard practices 40mm is not an optimized clearance between carbody mounted parts and bogie mounted parts and it affects rolling stock sizing hence bidder requests to amend the clause as below. Amendment Requested:**:- The carbody and attached equipment shall be designed to provide necessary clearances for the bogie and bogie profiles. Under normal conditions, the design must allow for **>20mm** minimum clearance between carbody mounted parts and all bogie mounted parts, including wiring, hoses, cable, wheels and chains. **And clearance should be >10mm** under the worst combination of wear, except for any stops attached to the carbody for limiting bogie movement or for bogie lifting during maintenance **where** worst case conditions may result from horizontal and vertical curves, track super elevation, worn wheels, maximum passenger load, roll, yaw, lateral motion, and suspension system failures. | Tender conditions prevail. |
| 27 | Part 2 / Section VI A | 4.4.2.2 & 4.2.9 | The Contractor shall prove CMRL that automatic coupling between two rakes (mechanical, pneumatic and electrical) shall be possible without any manual intervention in the ruling curve (sharpest curve), ruling gradient (sharpest gradient) in mainline as well in depot (for all GoA2 operation network) based on the alignment drawing provided by CMRL. | Justification:Automatic coupling on all curve will not be feasible, manual intervention may be required when unidirectional coupling is considered. Hence bidder request to amend the clause as below:-<br><br>**Amendment Requested:** The Contractor shall prove CMRL that automatic coupling between two rakes (mechanical, pneumatic and electrical) shall be possible **from either one side of the train** without any manual intervention in the ruling curve (sharpest curve), ruling gradient (sharpest gradient) in mainline as well in depot (for all GoA2 operation network) based on the alignment drawing provided by CMRL. | Refer Addendum No.3, S.No. 14 |
| 28 | Part 2 / Section VI A | 9.4.5 d) | The auxiliary converter shall use a control scheme that contains extensive self- diagnostics logic, which shall be fully integrated with DMS. At a minimum, the diagnostics system shall identify a range of credible faults, identify whether a Least Responsible Unit (LRU) is responsible for the fault, and whether the LRUs (or non-LRUs) must be replaced or the system merely reset. The diagnostics system memory shall be retained for at least 1000 events and shall be controlled in FIFO methodology. The Contractor shall submit for CMRL's review a list of faults and functional description of fault logging. (CDRL 9-10) The Contractor shall also submit for CMRL's review a list of faults and functional description of trace recording system. (CDRL 9-11) | Bidder request to rephrase the clause as follows:The auxiliary converter shall use a control scheme that contains extensive self-diagnostics logic, which shall be fully integrated with DMS**(TCMS).** At a minimum, the diagnostics **Logic** shall identify a range of credible faults, identify whether a Least Responsible Unit (LRU) is responsible for the fault, and whether the LRUs (or non-LRUs) must be replaced or the system merely reset. The diagnostics system memory shall be retained for **500 events** and shall be controlled in FIFO methodology. The Contractor shall submit for CMRL's review a list of faults and functional description of fault logging. (CDRL 9-10) The Contractor shall also submit for CMRL's review a list of faults and functional description of trace recording system. (CDRL 9-11) | Tender conditions prevail. |

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| 29 | Part 2 / Section VI A | 3.4.6.2 | The gangway shall have a minimum throughway height of 1900 mm and a width of 1400 mm. Carbody end wall flatness shall be less than 1.5 mm per each 500 mm conform to the requirements of EN 16286-1 for gangway mounting surface and including outside mounting surface. | Justification :- As per industry experience end wall flatness 3mm per each 500mm is achieved over stainless steel carbody.<br><br>**Amendment Requested:**The gangway shall have a minimum throughway height of 1900 mm and a width of 1400 mm. Carbody end wall be less than ~~1.5 mm~~ **3 mm** per each 500 mm conform to the requirements of EN 16286-1 for gangway mounting surface ~~and including outside mounting surface.~~ | Tender conditions prevail. |
| 30 | Part 2 / Section VI A | 3.2.7 | Design of carbody shall be such that sealants are not used as a primary protection for ingress of rainwater. The cars shall be completely watertight, without using any sealing compound If considered unavoidable, only weld-through sealants shall be provided. The external sealants shall not be exposed to direct sunlight. The life of the sealant shall be at least 12 years. Detailed literature / catalogues shall be submitted to the CMRL and approval obtained prior to undertaking manufacture of car body. Water tightness shall comply with clause 17.6.13. Metallic conduit, tubing, piping, and fittings shall not require replacement for the design life of the car. Additionally, the car body shall be designed with safety margins commonly used in the railroad industry or as detailed in this Specification. | Justification :- The typical sealant life expectancy is 8 years **Accordingly bidder requests to amend the clause as below** Design of carbody shall be such that sealants are not used as a primary protection for ingress of rainwater. The cars shall be completely watertight, without using any sealing compound If considered unavoidable, only weld-through sealants shall be provided. The external sealants shall not be exposed to direct sunlight. The life of the sealant shall be at least ~~12 years~~ 8 years. Detailed literature / catalogues shall be submitted to the CMRL and approval obtained prior to undertaking manufacture of car body. Water tightness shall comply with clause 17.6.13. Metallic conduit, tubing, piping, and fittings shall not require replacement for the design life of the car. Additionally, the car body shall be designed with safety margins commonly used in the railroad industry or as detailed in this Specification. | Tender conditions prevail. |
| 31 | Part 2 / Section VI A | 3.13.9 | The lower and upper connections of the collision posts, corner posts, and any shear reinforcements shall be built into the structure by connecting to the top and bottom plates or flanges of the end structure and roof structure. Welding used for these connections shall be full penetration in accordance with AWS/EN. | Justification :- Collision design and performance will be according to EN15227.<br><br>**Amendment Requested:**–The lower and upper connections of the front end structure/collision posts/corner posts and any shear reinforcements shall be built into the carbody ~~structure~~ by connecting to the top and bottom plates or flanges of the end structure and roof structure. Welding/Bolting used for these connections shall be full penetration in accordance with AWS/EN. | Tender conditions prevail. |
| 32 | Part 2 / Section VI A | 3.4.6.23 | Vertical gaps between the hinged moving tread-plates of the inter-car gangway and the general floor level of the car shall not exceed 5mm. A means shall be provided to minimise wear of the floor by the sliding action of each moving tread plate. The wear pads provided for this purpose shall have a robust design which prevents risk of detachment from the assembly and it shall be possible to replace the wear pad during scheduled maintenance. | Justification: The maximum vertical gap has been considered as 15mm only during the curve negotiation at 100m. The vertical gaps of 15mm is seen in many service proven gangways and does not pose any problem. However, actual gaps and the location will be obtained after performing a detailed simulation during detailed design stage. The bidder also confirms that Vertical gaps between the hinged moving tread-plates of the gangway and the general floor level of the car will be covered by the tapering / slope on the threshold plate to avoid any trip hazard.<br><br>**Amendment Requested:** Vertical gaps between the hinged moving tread-plates of the inter-car gangway and the general floor level of the car shall not exceed ~~5mm~~ 15mm. A means shall be provided to minimize wear of the floor by the sliding action of each moving tread plate. The wear pads provided for this purpose shall have a robust design which prevents risk of detachment from the assembly and it shall be possible to replace the wear pad during scheduled maintenance. | Tender conditions prevail. |
| 33 | Part 2 / Section VI A | 11.9.29 | Wheels, axles, gears, etc., shall be mounted using cold pressure and fits specified in the standard. Axle roller bearing may be mounted in the journal by induction heating. A wheel and axle mounting procedure, complying with standards shall be submitted for CMRL approval. | Justification: Wheel and axle mounting procedures comply with EN 13260:2020. Axle roller bearings are mounted on the journal using cold pressing rather than induction heating. Induction heating is avoided due to potential risks to bearing integrity, lubrication quality, and increased process complexity. Cold pressing offers a more reliable, effective, and standard-compliant solution.Gear wheels, however, shall be installed using controlled heating, as permitted by EN standards, and not by cold pressing.<br><br>**Amendment Request:** Wheels, axles, gears, etc., ~~**shall**~~ **may** be mounted using cold pressure and fits specified in the standard. Axle roller bearing may be mounted in the journal by induction heating. A wheel and axle mounting procedure, complying with standards shall be submitted for CMRL approval. | Tender conditions prevail. |
| 34 | Part 2 / Section VI A | 11.4.18.3 | c. ΔQ / Q for track twist (Testing method & test condition with track twist values shall be in accordance with EN14363 Method 3) | Justification:Track twist values for the ΔQ / Q test shall be adopted from the real track conditions since the track twist values provided in EN 14363 is relevant for the track conditions of European Rail network for regional trains.<br><br>**Amendment Requested:c.** ΔQ / Q for track twist (Testing method ~~**& test condition with track twist values**~~ shall be in accordance with EN14363 Method 3 **with CMRL track twist values)** | Refer Addendum No.3, S.No. 25 |
| 35 | Part 2 / Section VI A | 12.2.10 (h) | Under conditions of a dragging parking brake (occurring on no more than one bogie) for a minimum distance of 3 kilometres at a speed of 10 kmph, no damage shall be caused to the braking system or any bogie component, with the exception of abnormal shoe wear. Detailed figures to be providedduring PFDR design stage. | Justification:To restrict the temperature from exceeding acceptable limits, bidder proposes allow for intermittent cooling periods at least 30 mins.<br><br>**Amendment Requested:** Under conditions of a dragging parking brake (occurring on no more than one bogie) for a minimum distance of 3 kilometres at a speed of 10 kmph **with intermittent cooling periods**, no damage shall be caused to the braking system or any bogie component, with the exception of abnormal shoe wear. Detailed figures to be provided during PFDR design stage. | Tender conditions prevail. |
| 36 | Part 2 / Section VI A | 2.14.3.3 | For an emergency brake application in good adhesion conditions (i.e. dry uncontaminated wheel rail interface) on level track from maximum speed, the rake shall brake to a standstill from 80kmph within a distance of 223 m under any Loading Conditions up to AW4. The minimum average emergency brake rate following any single point failure shall not be less than 1.3 m/s2. | Justification: Minimum average emergency brake rate is same in both without failure as per Table 2-7 and with single point failure as per this clause, which is not practical. Linked to clause 12.6.9.8 as well.<br><br>**Amendment Requested:** For an emergency brake application in good adhesion conditions (i.e. dry uncontaminated wheel rail interface) on level track from maximum speed, the rake shall brake to a standstill from 80kmmh within a distance of 223 m under any Loading Conditions up to AW4. The minimum average emergency brake rate following any single point failure shall not be ~~**less**~~ **more** than 1.3 m/s2.- | Tender conditions prevail. |
| 37 | Part 2 / Section VI A | 17.5.2.10.5 | All bogie frames, and other primary structural members, shall be qualified by **radiographic** inspection of all critical welds. | Justification:The bidder proposes to perform ultrasonic inspection instead of radiographic inspection as defined in table:4 of EN 15085-3 for Volumetric Test, based on the weld performance class during serial production.<br><br>**Amendment Requested:** ~~**All**~~ Bogie frames, and other primary structural members, shall be qualified by ~~**radiographic**~~ **ultrasonic** inspection of all critical welds. **Frequency of test as per EN15085-3.** | Tender conditions prevail. |

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| 38 | Part 2 / Section VI A | 17.5.3.4 | Dynamometer test runs shall be made for simulated car weight AW0, AW2, and AW3 & AW4 from each of the entry speeds of 16, 24, 48, 80, 90 km/h). For each entry speed, input signals calling for 25, 50, 75, and 100 percent of full service braking effort and for emergency braking effort shall be used. | Justification: The bidder recommends performing tests only for the worst-case scenarios:-AW4 with 100% SB effort (all ED out) under speed restriction-AW4 nominal mode (100% ED + EP available) at 80 km/h.However, the linearity test will be conducted at different speeds (40, 60, 80, and 90 km/h) with loadings AW0, AW3, and AW4. The bidder requests confirmation from the customer if this approach is acceptable, in line with other CMRL projects. | Tender conditions prevail. |
| 39 | Part 2 / Section VI A | 17.5.3.4 (d) | Each test shall be run starting with both cold and hot initial tread and (disc, if used) conditions. | Justification: The bidder proposes that applicability be limited to linearity and parking brake tests. All other tests will be conducted in accordance with the dynamometer test specifications .<br>**Amendment Requested:** ~~Each~~ **Linearity and parking brake** tests test shall be run starting with both cold and hot initial tread and (disc, if used) conditions. | Tender conditions prevail. |
| 40 | Part 2 / Section VI A | 17.6.16.1 | All production bogie welds including the frame and any other primary structural members shall be subjected to magnetic particle or dye penetrant inspection, except critical welds, which shall be inspected by radiography, Magnetic particle inspection shall be in accordance with ASTM E 709. Dye penetrant inspection shall be in accordance with ASTM E165. Cast bogie frames shall be 100% magnetic particle inspected. Radiographic inspection shall be continued at a rate of one bogie frame for each ten bogies produced. If defects are found during sampling inspection, the Contractor shall positively locate the beginning of such defects in previous bogie frames and apply appropriate corrective action. | Justification:All Frames shall be visually inspected.Magnetic particle inspection shall be performed as per the NDT work instruction prepared with guidelines of EN15085-3 considering the weld performance class<br><br>**Amendment Request:** ~~**All**~~ production bogie welds including the frame and any other primary structural members shall be subjected to magnetic particle or dye penetrant inspection, except critical welds, which shall be inspected by ~~**radiography**~~ **ultrasonic testing**, Magnetic particle inspection shall be in accordance with ASTM E 709 / **EN ISO 17638** . Dye penetrant inspection shall be in accordance with ASTM E165 / **EN571-1 (ISO 3452-1).** Cast bogie frames shall be 100% magnetic particle inspected. ~~**Radiographic**~~ **Ultrasonic** inspection shall be continued at a rate of one bogie frame for each ten bogies produced. If defects are found during sampling inspection, the Contractor shall positively locate the beginning of such defects in previous bogie frames and apply appropriate corrective action. | Tender conditions prevail. |
| 41 | Part 2 / Section VI A | 10.13.27 | Each traction motor shall be provided with redundant thermistor for determination of temperature of stator winding. It should be possible to replace the thermistors in the depot without lifting the car. Traction motor terminal boxes shall be provided with heat-detectors / LHD linked to TCMS / fire detection & control unit (refer clause 2.26) so that their status is monitored. | Justification:Bidder proposes a redundant PT 100 temperature sensor mounted on stator frame not in stator winding.<br><br>**Amendment requested:**Each traction motor shall be provided with redundant thermistor for determination of temperature of stator ~~winding~~ frame. It should be possible to replace the thermistors in the depot without lifting the car. Traction motor terminal boxes shall be provided with heat-detectors / LHD linked to TCMS / fire detection & control unit (refer clause 2.26) so that their status is monitored. | Tender conditions prevail. |
| 42 | Part 2 / Section VI A | 12.13.2 | Provision shall be available to activate all the above isolating valves and switches to isolate the defective equipment from TCMS, and remotely isolate from OCC. | Justification: Isolation cocks are considered for all the parts of pneumatic system to isolate in case of any problem. Isolation valve is considered for Service Brake.Not all the isolation valves are possible to isolate remotely; only the service brake isolation is considered remotely.<br><br>**Amendment requested:** Provision shall be available to activate some isolating valves / cocks and switches to isolate the defective equipment from TCMS and remotely isolate from OCC. | Tender conditions prevail. |
| 43 | Part 2 / Section VI A | 12.3.12 | The drive motor shall conform to the requirement of IEC 60349-2 and the temperature rise of thewindings of the motor shall be limited to temperature index of the insulation minus 70 ºC. Themotor shall have at least IP65 protection. | **Bidder request to amend the clause as CMRL Phase 2 drive motor performs fairly with IP 55 protection** | Refer Addendum No.3, S.No. 31 |
| 44 | Part 2 / Section VI A | 12.8.4 | The SAPB shall be an integral part of the friction brake actuation system. Parking brake application indication should be available on the brake actuators and on the driving motor car. | Justification: No indication of parking brake application available in brake actuators<br><br>**Amendment requested:** The SAPB shall be an integral part of the friction brake actuation system. ~~Parking brake application indication should be available on the brake actuators and on the driving motor car~~. | Tender conditions prevail. |
| 45 | Part 2 / Section VI A | 19.35.12 | All cable shall be run in enclosed waterproof and dust-proof ducting. | Justification: Cables running in Under Frame will be in Waterproof and Dust proof closed cable trays and Flexible conduits. But cables inside saloon will be placed in closed and controlled environment without closed ducting.<br><br>**Amendment requested:** All cable running in Underframe/ external zone shall be enclosed in waterproof and dust-proof ducting. | Tender conditions prevail. |
| 46 | Part 2 / Section VI A | 19.36.6 | Minimum 4 mm2 Cross sectional area of conductor shall be used for wire pulled through conduits. Any changes in minimum wire size will be considered during design review. | Justification: Wire sizing will be followed as per EN 50343: Railway applications - Rolling stock - Rules for installation of cabling.<br><br>**Amendment requested:** ~~Minimum 4 mm2~~ Cross sectional area of conductor ~~shall be~~ used for wire pulled through conduits shall be based on wire sizing followed as per EN 50343. Any changes in minimum wire size will be considered during design review. | Tender conditions prevail. |
| 47 | Part 2 / Section VI A | 19.36.7 | Wire for control and auxiliary circuits shall not be smaller than 4 mm2 Cross sectional area of conductor 4 mm2 Cross sectional area of conductor except for high temperature, public address, and intercom applications. . Any changes in minimum wire size will be considered during design review. | Justification: Wire sizing will be followed as per EN 50343: Railway applications - Rolling stock - Rules for installation of cabling.<br><br>**Amendment requested:** ~~Wire for control and auxiliary circuits shall not be smaller than 4 mm2~~ Cross sectional area of Wire for control and auxiliary circuits shall be sized based on wire sizing followed as per EN 50343. ~~conductor 4 mm2 Cross sectional area of conductor except for high temperature, public address, and intercom applications.~~ . Any changes in minimum wire size will be considered during design review. | Tender conditions prevail. |

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| 48 | Part 2 / Section VI A | 19.36.9 | When bundled, 1.5 mm2 Cross sectional area of conductor wire may be used in circuits where the current is low and physical strength is not required, or when laid in wire troughs or its equivalent. | Justification: Wire sizing will be followed as per EN 50343: Railway applications - Rolling stock - Rules for installation of cabling.<br><br>**Amendment requested:** ~~When bundled, 1.5 mm2~~ Cross sectional area of conductor wire when bundled ~~may be~~ shall be based on wire sizing followed as per EN 50343, used in circuits where the current is low and physical strength is not required, or when laid in wire troughs or its equivalent. | Tender conditions prevail.<br><br>(The contractor shall submit the design for review and approval by the Engineer during design phase) |
| 49 | Part 2 / Section VI A | 19.38.12 | General Car body wiring insulation shall be flame-retardant, halogen-free, extra- flexible, cross-linked polyolefin material, phosphorus, sulfur, and nitrogen combined to less than 1% by weights. | Justification: Bidder requests to add international standard specification viz EN45545 and EN50382,EN50306,EN50264<br><br>Amendment requested: General Car body wiring insulation shall be flame-retardant, halogen-free, extra- flexible, cross-linked polyolefin material phosphorus, sulfur, and nitrogen combined to less than 1% by weights and shall comply with EN50264, EN50382,EN50306 and EN45545 | Refer Addendum No.3, S.No. 40 |
| 50 | Part 2 / Section VI A | 19.41.3 | The cable jacket shall extend within the body, shall be held by a clamp, and shall have a gasket seal at the entrance. | Justification: As, per Industry best standards and Bidder's Return of Experience Gasket is not used for all connectors. Gaskets are used only if necessary<br><br>**Amendment requested:** The cable jacket shall extend within the body, shall be held by a clamp, and shall have a gasket seal at the entrance, only if necessary | Tender conditions prevail. |
| 51 | Part 2 / Section VI A | 19.42.1 | Terminations and connections throughout the car shall be with insulated ring tongue connectors of the compression (crimp) type. | Justification: As per Bidder's Return of Experience and industry standard, all terminations up to 4 Sqmm are Insulated<br><br>**Amendment requested:** Terminations and connections upto 4sq.mm throughout the car shall be with insulated ring tongue connectors of the compression (crimp) type. | Tender conditions prevail. |
| 52 | Part 2 / Section VI A | 19.44.1 | Communications wire and cable shall consist of twisted pairs of not less than 0.75 mm2 Cross sectional area of conductor soft annealed, tinned copper. | Justification: For Communication cables, wire gauges will be followed as per Equipment data sheet/ suppliers recommendation.<br><br>**Amendment requested:** Communications wire and cable shall consist of twisted pairs of Cross sectional area selected based on equipment data sheet/ supplier's recommendation. The conductor shall be soft annealed, tinned copper. | Tender conditions prevail. |
| 53 | Part 2 / Section VI A | 19.38.11 | Di-electric test for all Control & Power cables shall comply with IEC 61133 & IEC 60077. | Justification: Bidder proposes only IEC 61133 instead of IEC 60077 for Dielectric Testing in Rolling stock application, as IEC 60077 is applicable only for electrical equipment<br><br>**Amendment requested:** Di-electric test for all Control & Power cables shall comply with IEC 61133 ~~& IEC 60077~~ | Tender conditions prevail. |
| 54 | Part 2 / Section VI A | 2.1.13 | ATO train borne unit: One ATO train borne unit is provided for each cab. | Clarification Requested::As per RFP clause Signalling cabinet is to be located in Cab zone. However is there is acceptance on proposal of keeping the Signalling cabinet is T car | Tender conditions prevail. |
| 55 | | 19.28.11.1 | Any exposed wireways, conduits, or piping made of material subject to corrosion shall receive a minimum of two coats of primer and two coats of an approved paint. | Justification:It may be noted that the conduits are non-metallic material, hence there is no requirement of painting. Further there is no usage of pipes for routing the cables. For metallic wireways or cable ducts bidder suggests to amend the clause to allow better materials to be used for construction which may not need painting.<br><br>**Amendment requested:**Any exposed wireways or cable ducts, conduits, or piping made of material subject to corrosion shall receive a minimum of two coats of primer and two coats of an approved paint / local passivated based on type of material. | Tender conditions prevail. |
| 56 | Part 2 / Section VI A | 9.6.11 | Battery electrolyte capacity shall be such that the batteries will not require topping up more than once in a year. Battery re-conditioning shall not be required before four years. Complete calculation of loss of water and float / boost charging shall be submitted. Batteries shall be designed with integrated topping up provisions. Suitable interconnection shall be provided so that topping up of all the cells can be carried out using from a single point on battery box. The design shall be submitted for review of CMRL. | Justification: 1. For the first year of service water topping is to be done at 6 months and after that it can be after 1 year2. Battery system will have 2 circuit for water filling (single point entry for each tray)<br><br>**Amendment request:** We request the customer's agreement to the battery supplier's proposal: water topping to be performed every 6 months during the first year, and subsequently once per year thereafter. | Tender conditions prevail. |
| 57 | Part 2 / Section VI A | 7.3.10 | Air filter elements shall be replaceable from outside the car. | Justification: Air filters will be replaceable from inside the car to avoid climbing on roof.<br><br>**Amendment Requested:**Air filter elements shall be replaceable from ~~outside~~ inside the car. | Refer Addendum No.3, S.No. 21 |
| 58 | Part 2 / Section VI A | 2.15.10.9 | The fault indications shall be electrically latched when the faults are detected and shall illuminate whenever the supply to the electronics is switched on. The information contained within the fault log shall be stored on non-volatile memory. | Justification: All the faults pertaining to BCE will be displayed on Driver Desk/ OCC with help of TCMS but there are no illuminations present on BCU.<br><br>**Amendment Requested:**The fault indications shall be electrically latched when the faults are ~~detected and shall illuminate whenever the supply to the electronics is switched on~~ . The information contained within the fault log shall be stored on non-volatile memory | Tender conditions prevail. |
| 59 | Part 2 / Section VI A | 3.6.1.22 | All internal panels (side panels, ceiling panels, end-ceiling panels, inspection cover panels, doorcoving panels, ceiling coving panels, etc) shall be of aluminium material with proven record inMetro / EMU application. Coating system shall be proposed by the Contractor shall be provenand conform to the requirements in clause 3.6.1.21, subjected to CMRL approval.Flatness of Aluminium side panels shall be controlled within 0.5 mm per 1m length.The Contractor shall ensure adequate measure have been taken to prevent and mitigate the riskof bi-metallic corrosion and rattling. Suitable damping and Insulation shall also be provided toreduce noise and thermal conductivity especially at metal-to-metal contact points. | Amendment request: :Modification of 1mm/meter inplace of 0.5mm/meter flatness in line with other CMRL projects | Tender conditions prevail. Also, Refer Addendum No.3, S.No. 13 |

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| 60 | Part 2 / Section VI A | 3.6.1.23 | The number of joints on all interior panels shall be minimised. The location of joints shall becarefully selected such that they are minimally visible throughout the entire vehicle includingsaloon interior. Where side panel joints cannot be eliminated, only one joint behind the saloonseat shall be permitted. No later than pre-final design stage, proposals for all internal panels shallbe submitted to CMRL for approval. CMRL's decision on the design selection shall be final andbinding on the Contractor. | Justification: Bidder proposes to have 2 joint behind the saloon seat and for aluminum recommend to have 2 joints at least for manufacturing feasibility.<br><br>**Amendment request: :** Modification to 2 joint behind sal0on seat . | Refer Addendum No.1, S.No. 109 |
| 61 | Part 2 / Section VI A | 13.13.8 | In case of activation of PEI in any of the car by passenger, the camera recording focusing the PEI shall be displayed on the CCTV DDU. The cameras shall have inbuild zoom function. It shall be possible to filter, zoom and select images in offline mode for investigation purpose. The images shall be with time stamping and it shall be possible to link them with respective location of train. | Justification: Offline zooming shall be possible with PACIS-CCTV software application, so inbuilt Zoom function maynot be required within Camera.<br><br>**Amendment requested**:<br>Bidder requests to remove inbuilt Zoom function in camera from requirement. | Refer Addendum No.1, S.No. 316 |
| 62 | Part 2 / Section VI A | 13.2.10 | Each main communication system shall be operated and inhibited independently in case of failure. This inhibition shall be possible from TCMS, OCC, BCC and DCCs. | Justification: Inhibition of displays (DRM, PID, IEDD, FDI-TNI) and PEI are provided from PACIS CCH and since it is provided from PACIS HMI, the functionality from TCMS DDU is not replicated.<br><br>**Amendment requested**:<br>Bidder request to replace "TCMS, OCC, BCC and DCCs." by "PACIS HMI"_in the mentioned requirement. | Refer Addendum No.1, S.No. 292<br><br>(The contractor may propose, the alternate scheme for review and approval by the Engineer during the design phase). |
| 63 | Part 2 / Section VI A | 14.9.5 | The overall time required for uploading the software for all subsystems shall not be more than 10 minutes for each complete sub-system of train and the same shall be demonstrated. (Ex. In case of doors sub-system, the time requirement is collectively for all doors of one train) | Justification: The duratopn for software uploading for subsystems will be around 10 minutes.<br>**Amendment requested:**<br>Bidder request to keep the requirement open for review and approval during detail design. | Tender conditions prevail.<br><br>(The contractor may propose, the alternate scheme for review and approval by the Engineer during the design phase). |
| 64 | Part 2 / Section VI A | 4.8.2.1 | Electrical connections between the cars of a rake shall use highly flexible multi-conductor cables conforming to relevant international standards with quick-disconnect connectors on both ends. | Justification:.<br>Bidder proposes to use flexible multiconductor cable for Communication (class C) and flexible single core cables for Power and control cables (class A and B)_ | Tender conditions prevail. |
| 65 | Part 2 / Section VI A | 10.9.1 | High voltage Copper cable of adequate voltage rating and diameter shall connect the vacuum circuit breaker to the main transformer. The cable shall be laid in stainless steel pipe from end-to-end terminations from roof to under-frame. The cable insulation and sheathing shall be halogen free, flame retardant and having smoke emission in compliance with IEC 60502, BS 6853 and EN 45545 Part 1 to 7(Category 4-A, Hazard level HL3). The Bushing & Connector shall comply with EN 50180 and EN 50181. The details for roof-end and transformer-end terminations of 25 KV cable shall be provided for the CMRL's review. The cable shall not have any straight through joint / connector between HT bushing on the roof and transformer bushing in the transformer. | Justification:.<br>Bidder proposes to lay High voltage cables through stainless steel ducts to have a better accessibility and maintenance of cable. Further BS 6853 is withdrawn and its equivalent standard is EN45545.<br>**Amendment requested:**<br>High voltage Copper cable of adequate voltage rating and diameter shall connect the vacuum circuit breaker to the main transformer. The cable shall be laid in stainless steel pipe or duct from end-to-end terminations from roof to under-frame. The cable insulation and sheathing shall be halogen free, flame retardant and having smoke emission in compliance with IEC 60502, ~~BS 6853~~ and EN 45545 Part 1 to 7(Category 4-A, Hazard level HL3). The Bushing & Connector shall comply with EN 50180 and EN 50181. The details for roof-end and transformer-end terminations of 25 KV cable shall be provided for the CMRL's review. The cable shall not have any straight through joint / connector between HT bushing on the roof and transformer bushing in the transformer. | Tender conditions prevail. |
| 66 | Part 2 / Section VI A | 19.46.13 | There shall be at-least 10% spare wires with connected terminals for each category of type of purpose inside each electrical conduit and 20% of spare wires for Trainlines. These categories of wires could be audio, Ethernet, trainlines, various train networks, other serial & parallel communications and all types of car lines or trainlines which are passing through the jumper conduits. It shall be possible for CMRL to utilize these free cables which are within the train conduits without impacting other functionalities of the train at a later stage. | **Justification:.**<br>Overall 10% of spare control cables shall be considered as per EN 50343. Based on Industry best standards and Return of Experience on similar projects 10% of spare control cables are sufficient for future usage.<br>**Amendment requested:**<br>There shall be at-least 10% spare wires with connected terminals for control cables ~~each category of type of purpose~~ inside ~~each~~ electrical conduit and ~~20%~~ 10% of spare wires for Trainlines. ~~These categories of wires could be audio, Ethernet, trainlines, various train networks, other serial & parallel communications and all types of car lines or trainlines~~ which are passing through the jumper conduits. It shall be possible for CMRL to utilize these free cables which are within the train conduits without impacting other functionalities of the train at a later stage. | Tender conditions prevail. |
| 67 | Part 2 / Section VI A | 19.44.3 | Stranding shall be at least 26 strands. | **Justification:.**<br>Communication cables stranding shall be 19 strands cables selected as per standard IEC 61156 -3,EN50343. Bidder requests to amend the requirement as per standard. | Refer Addendum No.3, S.No.7 |
| 68 | Part 2 / Section VI A | 19.46.5 | Conduits that contain three or more conductors shall be sized such that the sum of the cross-sectional area of the wires and cables does not exceed 40% of the cross sectional area of the conduit. For two conductors, a limit of 30% shall be used. For a single conductor, a limit of 53% shall be permitted. | **Amendment requested:**<br>Conduits that contain three or more conductors shall be sized such that the sum of the cross-sectional area of the wires and cables does not exceed 40% of the cross sectional area of the conduit. For two conductors, a limit of 30% shall be used. For a single conductor, a limit of 53% shall be permitted. Alternatively the conduits shall be sized as per EN 50343, Sec 4.12 | Tender conditions prevail. |
| 69 | Part 2 / Section VI A | 3.4.1.3.1 | The cab ends of the car shall have a collision structure that may include, but is not limited to, full- height corner posts, collision posts, structural shelf, and sheeting. The stress analysis for the collision posts and corner posts shall be submitted for approval. An analysis demonstrating that all joints comply with fatigue load requirements shall also be submitted for approval. | Jstification:<br>In lieu of corner posts and collision posts, a service proven collision buffer system will be installed that meets the requirements of EN 15227-2020. Buffer system also provide same impact as of Corner / Collision post.<br><br>**Amendment requested:**<br>The cab ends of the car shall have a collision structure that may include, but is not limited to, full- height corner posts, collision posts, structural shelf, sheeting or Collision Buffer system. The stress analysis for the collision posts, corner posts or buffer system shall be submitted for approval. An analysis demonstrating that all joints comply with fatigue load requirements shall also be submitted for approval. | Tender conditions prevail. |

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| 70 | Part 2 / Section VI A | 18.6.5.6 | It is clarified that even if trainsets are not deployed to the network to the extent that is required to earn the design mileage (defined in Clause 1.4.5) the same MDBF targets and respective calculations taken for Reliability demonstration shall prevail. | Bidder seeks this requirement can be modified in the RFP.<br><br>Bidder understands that the above Targets are based mileage earning. For every 10% change in actual average annual kilometre earning with respect to specified values, the above Reliability Target shall be adjusted by 5%.<br>As an illustration, in case actual average annual kilometre earning is 1,34,999 KM then MDBF Target shall be 76,000 KM after 12 months of start of revenue service of first Train.<br><br>This approach for reliability target adjustment as per mileage accumulation was accepted in multiple Indian projects | Refer Addendum No.3, S.No. 38 |
| 71 | Part 2 / Section VI A | 4.4.4.2 | The supporting device shall provide a suitable means for vertical height adjustment of the coupler head to compensate for wheel wear, operating levels of the primary suspension, failure of air suspension and coupler assembly wear. | Justification:<br>Primary suspension compresion, secondary deflation etc are operational variation during the run . A preadjustment may not be needed for these variations. Coupler supporting device is designed for slight adjustment to keep coupler horizontal.<br><br>**Amendment requested:**<br>The supporting device shall provide a suitable means for **angular** ~~**vertical height**~~ adjustment of the coupler head ~~**to compensate for wheel wear, operating levels of the primary suspension, failure of air suspension and coupler assembly wear.**~~ | Refer Addendum No.3, S.No. 15 |
| 72 | Part 2 / Section VI A | 3.4.3.3 | If a "plug-in" cab enclosure is used, the watertight seal between the main carbody and cab shell shall last for a minimum of 12 years under the loading and environmental conditions identified in these Technical Provisions. Joints formed primarily with caulking or sealant shall not be used. | Justification:<br>Typical life expectancy of selant is 8 years.<br><br>**Amendment requested:**<br>If a "plug-in" cab enclosure is used, the watertight seal between the main carbody and cab shell shall last for a minimum of ~~12 years~~ **8 years** under the loading and environmental conditions identified in these Technical Provisions. Joints formed primarily with caulking or sealant shall not be used. | Tender conditions prevail. |
| 73 | Part 2 / Section VI A | 17.5.2.5(b) | One of the jacks supporting the car section being tested shall be lowered until the load on that jack is 10% of its original load. | Justification:<br>EN 12663 specifies using a 10 mm offset for lifting and rerailing load cases, making the 10 mm displacement the more realistic and standard approach.<br><br>**Amendment requested:**<br>One of the jacks supporting the car section being tested **shall be lowered by 10mm**. | Refer Addendum No.3, S.No. 6 |
| 74 | Part 2 / Section VI A | 19.14.6 | Gelcoat additives, fillers, monomers, catalysts, activators, inhibitors, pigments, or flameproofing materials shall be added to resin mixes to obtain finished products with required characteristics. No FRP panels shall be painted. | Justification:<br>Although the resin mixture is created with the substances mentioned in the requirment, the HL3 gel coated panels have risk of water impregnation into panels, hence painting the parts gives protection against mositure. Due to painting asethetics of parts, life of the parts , UV resistance is improved<br>**Amendment requested:**<br>FRP shall be painted for additional part protection. | Tender conditions prevail. |
| 75 | Part 2 / Section VI A | 19.25.1 (viii) | All exposed bolts and nuts shall be stainless steel, unless otherwise specified. | Justification:<br>Stainless steel fasteners will be used wherever possible. But based on the FEA calculation where there is a high stresses, High Tensile Fasteners will used.<br>**Amendment Requested:**<br>All exposed bolts and nuts shall be stainless steel, unless otherwise specified. But in the case where High strength is required other material sfasteners can be used. | Tender conditions prevail.<br><br>(The contractor shall submit the details of fasteners for review and approval by the Engineer during design phase) |
| 76 | Part 2 / Section VI A | 19.25.4 (iv) | Stainless steel nuts and bolts shall be used for stainless-to-stainless joints. | Justification:<br>Stainless steel fasteners will be used up to ≤ M8, beyond that for structural assembly, High strength fasteners with adequate corrosion protection will be used.<br>**Amendment Requested:**<br>Stainless steel nuts and bolts shall be used for stainless-to-stainless joints. But in the case where High strength is required High strength fasteners with adequate corrosion protection can be used. | Tender conditions prevail.<br><br>(The contractor shall submit the details of fasteners for review and approval by the Engineer during design phase) |
| 77 | Part 2 / Section VI A | 19.55.5 | To the greatest extent practicable, component labelling shall be provided on PCBs. PCB's shall be connected to the case or rack wiring using multi-pin connectors, which shall have a successful service history in rail applications. Details shall be provided in any electronic rack system, the failure of any one module or individual circuit board shall neither cause loss of the electronics power supply within the rack, nor cause subsequent failure of circuits on other PCB's or modules. PCB's shall have mechanical polarisation to prevent insertion into a wrong socket. The use of PCB edge connectors in not permitted unless reviewed by CMRL, on a case by case basis. PCB's and modules shall be positively retained in the rack or case by a fastener or spring loaded locking pin. All PCBs shall be adequately lacquered to isolate from environment pollution | **Justification:.**<br>Bidder's TCMS electronics are part of product's Reasearch and Development which is not separately developed for each project. . Since the same products are provided in similar metros globally, Bidder requests to retain the standrad products which has followed industrial practices<br>**Amendment requested:**<br>Bidder requests to delete this clause | Tender conditions prevail. |

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| 78 | Part 2 / Section VI A | 3.3.6 | All welds on car exterior and interior (including spots weld marks) shall be passivated with an acceptable procedure to protect against any visible rusting/chemical deposits / blackening etc Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems shall be done as per ASTM A380 or equivalent. Procedure shall be submitted for CMRL's approval before ninety (90) days start of car manufacturing. | **Justification:** Considering that interfaces and discontinuous welding zones within interior areas present a significant risk of chemical ingress and spillage during chemical passivation—potentially resulting in corrosion—the bidder recommends that chemical passivation shall not be applied to interior welds. Alternatevely a surface protection can be employed for those areas. Accordingly, the bidder requests that the clause be amended to reflect this requirement<br><br>**Amendment requested:**<br>All welds on Car exterior ~~and interior~~ (including spots weld marks) shall be passivated with an acceptable procedure to protect against any visible rusting/chemical deposits / blackening etc Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems shall be done as per ASTM A380 or equivalent. For interior welds a suitable surface protection shall be employed and procedure shall be submitted for CMRL's approval before ninety (90) days start of car manufacturing. | Tender conditions prevail. |
| 79 | Part 2 / Section VI A | 9.2.6 | The design life of the auxiliary converters shall be a minimum of 35 years and be capable of operation for a period of 18 years without major maintenance (excluding consumables). | **Justification:**<br>Windings and gaskets has to be overhauled every 10 years<br><br>**Amendment Requested:**<br>The design life of the auxiliary converters shall be a minimum of 35 years and be capable of operation for a period of ~~18~~ 10 years without major maintenance (excluding consumables). | Tender conditions prevail. |
| 80 | Part 2 / Section VI A | 17.5.4.8.6 | c) WSP Tests will be done on Randomly selected 3 trains in Tare Load in speed range 60- 30kmph for Braking Modes as EB (Emergency Brake), FSB (Full-Service Brake with ED Dynamic Brake), FSB (Full-Service Brake without ED Dynamic Brake) for evaluation by CMRL. | **Justification:**<br>Following UIC 541-05 standards, the WSP test being a type test will be performed on a single train, as the system configuration will remain consistent.<br><br>**Amendment requested:**<br>c) WSP Tests will be done ~~on Randomly selected 3 trains~~ in Tare Load in speed range 60- 30kmphfor Braking Modes as EB (Emergency Brake), FSB (Full-Service Brake with ED Dynamic Brake), FSB (Full-Service Brake without ED Dynamic Brake) for evaluation by CMRL. | Tender conditions prevail. |
| 81 | Part 2 / Section VI A | 11.9.2 | The wheel tread shall be of the wear adapted wheel profile V135 as defined in NF F03 402. The Contractor shall undertake a wheel-rail interaction / simulation study to optimally derive all other wheel parameters within the range permitted by the SOD. Track parameters are specified in the Interface Requirements (Appendix-C) and the alignment drawings. | Bidder requests to retain the clause allowing to suggest an alternate wheel profile during project phase.<br>**Amendment request :-**<br>The wheel tread shall be of the wear adapted wheel profile V135 as defined in NF F03 402. The Contractor shall undertake a wheel-rail interaction / simulation study to optimally derive all other wheel parameters within the range permitted by the SOD. Track parameters are specified in the Interface Requirements (Appendix-C) and the alignment drawings.<br>**[The Contractor may propose an alternative SOD compliant wheel profile for CMRL's consideration if there are strong justifications to demonstrate improvements over the above-mentioned profile].** | Tender conditions prevail. |
| 82 | Part-1, Section – IV | Price Centre 4.4.6 | Milestone Number RS-C1<br>NTP+630 days | Please note that carbody, interiors and associated systems for Phase-1 will require major adaptation due to change in passenger door pitch between Phase-1 & Phase-2 trainsets. Also, Phase-2 (96 cars) was 3-car configuration against 6-car configuration in this tender. Time required to deliver proto trainset will be more than what was asked in Phase-2 (96 Cars) project.<br>Therefore, bidder requests to increase timeline for Milestone Number RS-C1 from NTP+630days to NTP+730 days from Commencement Date.<br><br>Once the proto delivery is increased to NTP+730 days, all subsequent intermediate Milestones will have cascading effect and need to be readjusted. However, bidder confirms to complete the project within overall timeline stipulated in the RFP i.e. Completion of Milestone RS-F1.10 by NTP+1410 days and Milestone RS-F2.10 by NTP+2140 days.<br>In view of the above, Employer is requested to provide flexibility to bidder to adjust intermediate Milestones meeting the Final Completion of Milestone RS-F1.10 and RS-F2.10 as per RFP. | Refer Addendum No.3, S.No. 4 |
| 83 | Part 3 : Section VIII | PC (Part B: Specific Provisions) Clause 10.2 | Replace last paragraph of Sub-clause 10.2 with the following:<br>If the activities / Works related to a Key Date achievement is completed and certified by the Engineer for only certain number of trains under the relevant milestone, the delay damages thereafter for completion of the remainder number of trains shall be reduced. For any period of delay after the actual Key Dates stated in this Contract, the proportional reduction in these delay damages shall be calculated as the proportion which the value of the trains so certified bears to the value of that milestone activity as a whole. The Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these proportions. The provisions of this paragraph shall only apply to the daily rate of delay damages under Sub-Clause 8.7 [Delay Damages] and shall not affect the maximum amount of these damages.<br>The Employer can use any part of the works for VIP visits, inauguration functions, mock passenger trials, etc. If so, Contractor shall not claim for Taking- Over Certificate under this sub clause. | In view of the sr. no. 59 query above, Bidder requests to add following in the referred clause:<br><br>Any imposition of LD on account of delay in accomplishing Key Date will be waived and LD amount if deducted will be returned (without interest) provided Contractor is able to accomplish Key Date RS-F1.10 (as per Part-1, Section-IV, Clause 4.4 - 4.4 Schedule of Payments). | Refer Addendum No.3, S.No. 5 |
| 84 | Addendum-1 | Sr. No. 432 | Add the following at the end of Sub-clause 11.1:<br>11.1.1 DLP/DNP- Rolling Stock:<br>DLP / DNP for Rolling Stock shall start from the date of issuance of Taking-over Certificate (TOC) for the 1st trainset and the fleet DNP / DLP ends two years after the TOC date of the 28th Trainset. In the case of DLP / DNP for Option Quantity (If exercised) of Rolling Stock shall start from the date of issuance of Taking over Certificate (TOC) for the 1st trainset of Option Quantity and the fleet DNP / DLP ends two years after the TOC date of the last<br>Trainset of Option Quantity. | Ending fleet DNP / DLP two years after the TOC date of the 28th Trainset will significantly increase DNP of previous 27 train sets which is not the standard practice in other metro projects.<br>Bidder requests to consider DLP / DNP for Rolling Stock train wise. The DNP / DLP applicable to each Trainset shall commence on the date of issuance of the Taking-Over Certificate (TOC) for that Trainset and shall expire twenty-four (24) months thereafter. The DNP / DLP for any Trainset shall be independent of and not linked to the Taking-Over Certificate dates of other Trainsets, including the final Trainset delivered under the Contract.<br>Kindly confirm acceptance and amend the clause accordingly. | Tender conditions prevail. |

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| 85 | Addendum-1<br><br>Addendum-1 | Sr. No. 52<br><br>Sr. No. 385 | Integerated test related to GoA4 mode of operation: Within a period of two years from the date of introduction of 1st Trainset into the **revenue operation in GoA2 mode / TOC**, the contractor shall complete the integerated tests and trials under the above clause applicable to GoA4 mode of operation under interface with the signaling and PSD contractors to the satisfaction of the Employer.<br><br>17.10 BURN-IN TRIALS / SERVICE TRIALS IN ATO (GoA2) **& UTO (GoA4):** | Section VII, General Conditions, Clause no. 10 (Employer's Taking Over) is linked with Clause No. 8.2 (Completion) which is linked with "Tests on Completion" for which "Burn-in trials / Service trials" is a pre-requisite which now includes UTO (GoA4) also as per Addendum-1.<br><br>Please reconfirm that, for Revenue Operation/Employer's Taking Over, Burn-in trials / Service trials in **ATO (GoA2) only** will be considered. Burn-in trials / Service trials in UTO (GoA4) is only for the purpose of demonstration and payment for Price Centre RS-F2 and NOT a pre-requisite for Revenue Operation/Employer's Taking Over. | Refer Addendum No.3, S.No. 37 |
| 86 | Part 3, Section - VIII Particular Conditions (Part B: Specific Provisions) | 14.9 | Release of Retention Money Against BG (Project Period)<br>Retention money shall be deducted at the rate of 5% on each Interim payment certificate (IPC), excluding taxes & duties, in respective currencies and up to the cumulative value equal to 5% of the Accepted Contract Amount (excluding Provisional sum), excluding taxes & duties.<br><br>Upon the request of the Contractor, the Employer after issuance of Taking-Over certificate of each trainset / each Depot Machinery & Plant may release the withheld retention money specific to that trainset / Depot Machinery & Plant, on submission of Bank Guarantee for an equivalent amount in respective currencies from a Public sector bank (PSB) of India or Scheduled Commercial Banks in India as listed under Schedule of Commercial Banks by The Reserve Bank of India (RBI), in the format annexed to the Particular Conditions.<br><br>Upon completion of DNP of Rolling Stock and Depot Machinery & Plant, the Retention money amount or the Retention money Bank Guarantees (less the value of claims made by the Employer for uncompleted warranty work) for Rolling Stock and Depot Machinery & Plant shall be certified by the Engineer / Employer for releasing to the Contractor.<br><br>**The Employer may, at its sole discretion, release the accumulated retention money on yearly basis against the Contractor's request. In such cases, the Contractor shall submit an irrevocable and unconditional e-BG for 100% of the requested amount, valid up to the end of the Defects Liability Period (DLP).** | Bidder requests Employer to amend the original clause as follows:<br><br>Release of Retention Money Against BG (Project Period)<br>Retention money shall be deducted at the rate of 5% on each Interim payment certificate (IPC), excluding taxes & duties, in respective currencies and up to the cumulative value equal to 5% of the Accepted Contract Amount (excluding Provisional sum), excluding taxes & duties.<br><br>Alternatively, prior to submission of Interim Payment Certificate (IPC) the Contractor may submit Bank Guarantee in lieu of Retention Money for 5% of the Accepted Contract Amount (excluding Provisional sum), in respective currencies from a Public sector bank (PSB) of India or Scheduled Commercial Banks in India as listed under Schedule of Commercial Banks by The Reserve Bank of India (RBI), in the format annexed to the Particular Conditions, valid up to the end of the Defects Liability Period (DLP).<br><br>~~Upon the request of the Contractor, the Employer after issuance of Taking-Over certificate of each trainset / each Depot Machinery & Plant may release the withheld retention money specific to that trainset / Depot Machinery & Plant, on submission of Bank Guarantee for an equivalent amount in respective currencies from a Public sector bank (PSB) of India or Scheduled Commercial Banks in India as listed under Schedule of Commercial Banks by The Reserve Bank of India (RBI), in the format annexed to the Particular Conditions.~~<br>Upon completion of DNP of Rolling Stock and Depot Machinery & Plant, the Retention money amount or the Retention money Bank Guarantees (less the value of claims made by the Employer for uncompleted warranty work) for Rolling Stock and Depot Machinery & Plant shall be certified by the Engineer / Employer for releasing to the Contractor.<br>~~The Employer may, at its sole discretion, release the accumulated retention money on yearly basis against the Contractor's request. In such cases, the Contractor shall submit an irrevocable and unconditional e-BG for 100% of the requested amount, valid up to the end of the Defects Liability Period (DLP).~~ | Tender conditions prevail. |
| 87 | Part-1, Section – IV, Bidding Forms | 4.2 Pricing Summary (BID TOTAL) | Allowable Apportionment:<br>Price Centre A – 8%<br>Price Centre CST – 2%<br>Price Centre FAI – 3%<br>Price Centre CPT – 2%<br>Price Centre C – 70%<br>Price Centre E – 8%<br>Price Centre F1 – 5%<br>Price Centre F2– 2% | As the Contractor will incur the majority of its costs upon delivery of the train sets, the actual expenditure related to Testing & Commissioning (Price Centre E) and Integrated Testing & Commissioning (Price Centre F1 & F2) is substantially lower than the apportioned percentages specified in the bid documents. Maintaining the current apportionment would therefore significantly impact cash flow for the Contractor.<br><br>In comparable metro projects, the allocation for these stages is typically around 10%. Based on the actual effort and cost structure for this project, we respectfully request a more practical and equitable apportionment of maximum 10% for Testing & Commissioning with the split as indicated below, which supports a more sustainable cash-flow profile without affecting project delivery or obligations. Further, in case of delay by Employer in implementation of wayside CBTC beyond timeline given in Price Centre RS-F2, payment for RS-F2 milestones will be help up for which there is no remedy in the Contract.<br><br>In view of the above, bidder proposes changes to allowable apportionment to following price centres as below (Reference : Exerpts of DMRC RS 21, BMRCL contracts submitted with the query):<br><br>Price Centre A – 8%<br>Price Centre CST – 2%<br>Price Centre FAI – 3%<br>Price Centre CPT – 2%<br>**Price Centre C – 75%**<br>Price Centre E – 8%<br>**Price Centre F1 – 2%**<br>**Price Centre F2– 0%** | Tender conditions prevail. |
| 88 | Part 3, Section - VIII Part A Contract Data | S.No. 17, Clause 14.2 | The interest free mobilization advance at the rate of 10% of the Accepted Contract Amount (Excluding Provisional Sum, Taxes & Duties) in the currencies and proportions is payable against production of Bank guarantee from a public sector bank. And the guarantee shall be in the form of a BG for 100% of the advance amount requested plus GST. (in parlance with CVC guidelines).<br>GST on the mobilization advance is not reimbursable.<br>Mobilization advance shall be paid in two equal instalments | In most of the Metro tenders, advance payment is generally 15% in two installments (10% + 5%). Hence Bidder requests for Advance payment of 15% (interest free) payable in two parts : 10% & 5% for the total contract amount (as in RFP) payable in respective currencies.(Reference : Exerpts of DMRC RS 21, BMRCL contracts submitted with the query). | Tender conditions prevail. |
| 89 | Part 3 : Section VIII | GCC 14.7 | **Payment:** The Employer shall pay to the Contractor:<br>**.....**<br>(b) the amount certified in each Interim Payment Certificate within 56 days after the Engineer receives the Statement and supporting documents; and | We request CMRL to modify the clause as follows:<br><br>Payment: The Employer shall pay to the Contractor:<br>.....<br>(b) the amount certified in each Interim Payment Certificate within **28 days** after the Engineer receives the Statement and supporting documents; and | Refer Addendum No.3, S.No. 46 |

**Response to Bidder Queries (3)**
**Tender No. CMRL / PHASE 1 / SYS / ARE05 / 2025**
**Design, Manufacture, Supply, Testing, Commissioning of Standard Guage Metro Rolling Stock (Electrical Multiple Units) and Depot Machinery & Plant and Training of Personnel**

| Sl. No. | As per the Submission of Bidder(s) | | | | CMRL Response |
|---|---|---|---|---|---|
| | Part/ Section No | Clause No. | Original Bid Condition | Bidder's queries | |
| 90 | Part-1, Section-IV | Clause 4.4.6 - Price Centre 'RS-C', | Note-1 to 5 | In order to improve cash flow of bidder, please **include additional Note-6** as follows:<br><br>The Employer shall make an interest free payment for each milestone number RS-C2 to RS-C10 against start of carbody manufacturing of the respective trainsets against submission the following documents:<br>1) Equivalent amount of BG<br>2) Documentary evidence of start of manufacturing<br>For sr. no. 1, Contractor shall submit an irrevocable and unconditional e-BG for 100% of the requested amount, valid up to the completion of respective delivery milestone against which the payment is requested. Such amount paid by Employer will be adjusted from the payment against completion of delivery milestone (as per PRICE CENTRE 'RS-C'). | Tender conditions prevail. |
| 91 | 2. SCHEDULE OF ADJUSTMENT DATA | | #VALUE! | Please note that the existing Price Variation Clause does not truly represent the actual cost structure of a Metro Rolling Stock.<br><br>The current Price Variation Clause includes indices only for Stainless Steel, Carbon Steel, and Copper, which are inherently highly volatile commodities and represent only a partial component of the overall cost structure of Metro rolling stock. Several important cost elements, which are integral to the design, manufacture, and integration of any Metro car, are not adequately covered under the existing clause.<br><br>As a result, the current structure of the Price Variation Clause exposes the Contractor to a substantial and disproportionate financial risk.<br><br>Bidder submits that adoption of the revised formulation(as proposed below) would ensure a more accurate, comprehensive, and transparent reflection of the actual project cost structure, enable a fair and balanced allocation of price fluctuation risks, and thereby support effective project execution as well as long term financial sustainability over the duration of the contract.<br><br>Non Adjustable : 15%<br>CPI All India Industrial Workers : 20%- 25%<br>Stainless Steel, CRU : 15% - 25%<br>WPI Manufacture of Electrical Equipment : 10%-20%<br>WPI Manufacture of Computer, Electronics and Optical products : 10%-20%<br>WPI All Commodities : 10%-20%<br><br>Kindly refer the white paper submitted for further details. | Refer Addendum No.3, S.No. 1 to 3 |
| 92 | - | - | - | Ref: Letter dated 12 May 2026<br>Sub: Request for Consideration of Technical Amendment in Tender No. CMRL / PHASE 1 / SYS / ARE05 / 2025 – Traction Converter/Inverter Configuration<br><br>... The current tender provisions, including Clause 2.15.4.2 and Clause 10.11.1, require Bogie Control based Traction Converter/Inverter configuration for the 67% motorization arrangement.<br><br>....<br><br>... we respectfully submit that Car Control based configuration is also a technically mature, operationally proven, and suitable solution for the present 6-car, 67% motorized train configuration, and is capable of meeting the required performance and reliability criteria. This is supported by successful implementation and operation in comparable Indian metro projects.<br>...<br>..... | Refer Addendum No.3, S.No. 47 to 54 |
| 93 | Part 3<br>Section VIII | GCC 14.7 | Payment: The Employer shall pay to the Contractor:<br>.....<br>(b) the amount certified in each Interim Payment Certificate within 56 days after the Engineer receives the Statement and supporting documents or, at a time when the Bank's loan or credit (from which part of the payments to the Contractor is being made) is suspended, the amount shown on any statment submitted by the Contractor, within 14 days after such statement is submitted, any discrepancy being rectified in the next payment to the Contractor including any amounts due in accordance with a decision by the DB which have been included in the Inteerim Payment Certificatge; | Option 1 : We request CMRL to modify the clause similar to payment clause of DMRC RS 21 (clauses annexed) as under;<br>Payment: The Employer shall pay to the Contractor:<br>.....<br>(b) After preminary scutiny and certification by the project Manager, payment of 80% of the certified interim amount shall be made by the Employer within 14 days. The amount certified shall account for all deductions, including statutory deductgions, recoveries for Advances and any amounts due from the Contractor. The balance 20% shall be paid within 28 days, from the date of the preliminary certification of the bill by thje Projectg Manager.<br><br>Option 2 : If Option 1 is not feasible we request CMRL to atleast modify the clause as below<br>Payment: The Employer shall pay to the Contractor:<br>.....<br>(b) After preminary scutiny and certification by the project Manager, payment of 80% of the certified interim amount shall be made by the Employer within 28 days. The amount certified shall account for all deductions, including statutory deductgions, recoveries for Advances and any amounts due from the Contractor. The balance 20% shall be paid within 56 days, from the date of the preliminary certification of the bill by thje Projectg Manager. | Refer Addendum No.3, S.No. 46 |

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**Tender No. CMRL / PHASE 1 / SYS / ARE05 / 2025**
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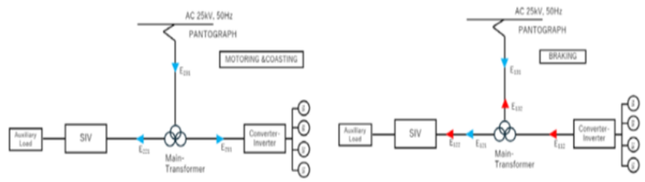
| Sl. No. | As per the Submission of Bidder(s) | | | | CMRL Response |
|---|---|---|---|---|---|
| | Part/ Section No | Clause No. | Original Bid Condition | Bidder's queries | |
| 94 | Part 2 – Section VI A: ERTS – RS | 2.14.2 TractionPerformance(2.14.2.4) | Means shall be provided to isolate locally each set of traction equipment in therake. In case of failure of One Motor car, only that Motor coach bogie shall beisolated and still the rake shall be capable of continuing to work until the peakperiod is over. | We request amendment of the existing condition as below:<br>Proposed Amendment:<br>Means shall be provided to isolate locally each set of traction equipment in therake. In case of failure of One Motor car, only that Motor coach bogie or MotorCar shall be isolated and still the rake shall be capable of continuing to workuntil the peak period is over. | Refer Addendum No.3, S.No. 47 |
| 95 | Part 2 – Section VI A: ERTS – RS | 2.15.4 TractionEquipment (2.15.4.2) | The main traction equipment of motor cars for 67% powering arrangement shallinclude two (2) independent power circuits for bogie control. | We request amendment of the existing condition as below:<br>Proposed Amendment:<br>The trainset shall have a 67% motor car ratio and shall be equipped withtwo (2) main transformers, each feeding an independent traction powercircuit | Refer Addendum No.3, S.No. 48 |
| 96 | Part 2 – Section VI A: ERTS – RS | 2.15.9 Wheel Slip andSlide ProtectionSystem (WSP) (2.15.9.2) | A system shall be provided to detect and control wheel slip / slide on all axlesand detect slip at axle level with control at bogie level, to ensure that anyreduction in requested tractive effort or brake retardation during wheel spin/slideis kept to a minimum | We request amendment of the existing condition as below:<br>Proposed Amendment:<br>A system shall be provided to detect and control wheel slip / slide on all axlesand detect slip at axle level with control at bogie level or car level, to ensurethat any reduction in requested tractive effort or brake retardation during wheelspin/slide is kept to a minimum. | Refer Addendum No.3, S.No. 49 |
| 97 | Part 2 – Section VI A: ERTS – RS | 2.15.9 Wheel Slip andSlide ProtectionSystem (WSP) (2.15.9.7) | The correction of slide by the pneumatic brakes system shall act independently on a per axle basis. Whereas, dynamic braking shall correct slide a per bogiebasis. The overall blended brakes system shall be fully adaptive to optimisebraking in varying adhesion conditions. | We request amendment of the existing condition as below:<br>Proposed Amendment:<br>The correction of slide by the pneumatic brakes system shall act independentlyon a per axle basis. Whereas, dynamic braking shall correct slide a per bogiebasis or car basis. The overall blended brakes system shall be fully adaptive tooptimise braking in varying adhesion conditio | Refer Addendum No.3, S.No. 50 |
| 98 | Part 2 – Section VI A: ERTS – RS | 2.15.9 Wheel Slip andSlide ProtectionSystem (WSP) (2.15.9.8) | Wheel spin on any individual axle must always be detected. However,correction of wheel spin need only be applied at a whole bogie level. Whenwheel spin is corrected, traction power shall be gradually increased to meetperformance requirements. | We request amendment of the existing condition as below:<br>Proposed Amendment:<br>Wheel spin on any individual axle must always be detected. However,correction of wheel spin need only be applied at a whole bogie level or carlevel. When wheel spin is corrected, traction power shall be gradually increasedto meet performance requirements. | Refer Addendum No.3, S.No. 51 |
| 99 | Part 2 – Section VI A: ERTS – RS | 2.15.11 Validation ofSpecific EnergyConsumptionc) | #VALUE! | We request amendment of the existing condition as below:<br>Proposed Amendment:<br>  | Refer Addendum No.3, S.No. 52 |
| 100 | Part 2 – Section VI A: ERTS – RS | 10.11 POWERCONVERTER-INVERTER (10.11.1) | There shall be one Converter-Inverter per bogie in each motor car. The Converter-Inverter shall be of proven design, four quadrant IGBT or any otherlatest metro rail proven technology-based unit, with VVVF control. Theequipment shall conform to IEC 61287-1. Natural or forced (air / water) coolingshall be adopted. However, if forced (air / water) cooling is offered, completedetails of the arrangement including the method of dust filtration (if applicable)shall be furnished. The Contractor shall provide the details of variation of powerfactor with power and variation of power with catenary voltage. | We request amendment of the existing condition as below:<br>Proposed Amendment:<br>There shall be one Converter-Inverter per bogie or per car in each motor car.The Converter-Inverter shall be of proven design, four quadrant IGBT or anyother latest metro rail proven technology-based unit, with VVVF control. Theequipment shall conform to IEC 61287-1. Natural or forced (air / water) coolingshall be adopted. However, if forced (air / water) cooling is offered, completedetails of the arrangement including the method of dust filtration (if applicable)shall be furnished. The Contractor shall provide the details of variation of powerfactor with power and variation of power with catenary voltage. | Refer Addendum No.3, S.No. 53 |

**Response to Bidder Queries (3)**
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**Design, Manufacture, Supply, Testing, Commissioning of Standard Guage Metro Rolling Stock (Electrical Multiple Units) and Depot Machinery & Plant and Training of Personnel**

| Sl. No. | As per the Submission of Bidder(s) | | | | CMRL Response |
|---|---|---|---|---|---|
| | Part/ Section No | Clause No. | Original Bid Condition | Bidder's queries | |
| 101 | Part 2 – Section VI A: ERTS – RS | 10.11 POWERCONVERTER-INVERTER (10.11.10) | Wheel Slip / Slide control during powering and electrical regenerative brakingshall be provided using speed sensor less vector control subject to its provendesign in Metro Transits System. Uncontrolled slip / slide should be clearlyrecorded in TCMS, OCC, BCC & DCC as critical fault. | The application of sensorless speed control is possible, but applying sensorlessspeed control results in disadvantages such as the inability to detect slip/slideon each axis.(generally, we don't detect axle level speed when we use thespeed sensor-less control because the purpose of this control is to reduce thenumber of sensors )<br><br>This occurs in both bogie control and car control.<br>~~In order to achieve higher performance slip/slide control,we request amendmentof the existing condition as below:~~<br><br>In addition if speed sensors are not used, a certain amount of time is requiredfor speed estimation before acceleration and deceleration.This speed estimation time directly affects stopping accuracy (300 mm) adnacceleration time.<br><br>Proposed Amendment:<br><br>Wheel Slip / Slide control during powering and electrical regenerative brakingshall be provided using ~~speed sensor less~~ vector control subject to its provendesign in Metro Transits System. Uncontrolled slip / slide should be clearlyrecorded in TCMS, OCC, BCC & DCC as critical fault. | Tender conditions prevail. |
| 102 | Part 2 – Section VI A: ERTS – RS | 10.11 POWERCONVERTER-INVERTER (10.11.19 | The propulsion equipment shall ensure the guaranteed performance for wheeldiameter differences for minimum 4 mm within any bogie without any adverseeffect on any equipment. If the wheel diameter tolerances exceed the abovelimit, there shall be no damage to any equipment. | We request amendment of the existing condition as below:<br><br>Proposed Amendment:<br><br>The propulsion equipment shall ensure the guaranteed performance for wheeldiameter differences for minimum 4 mm within any bogie and minimum 4 mm within any car without any adverse effect on any equipment. If the wheeldiameter tolerances exceed the above limit, there shall be no damage to anyequipment. | Tender conditions prevail. |
| 103 | Part 2 – Section VI A: ERTS – RS | 10.13 TRACTIONMOTORS(10.13.7) | The temperature rise limit for the stator winding shall be the maximumtemperature index of the insulation minus 70°C when the traction motorundergoes the temperatures rise test, which is specified by IEC 60349-2. Thetemperature rise shall be verified in system type test bed and the lines (asavailable) with 25% ventilation blocked. The Contractor shall consider the temperature rise on account of different factors including proximity impact (notless than 10 °C) in the under frame and specified wheel diameter difference inthe bogie(s) as indicated in clause 10.11.19 above. The type test procedure andvalidation of temperature rise is described in Chapter 17. | We request amendment of the existing condition as below:<br><br>Proposed Amendment:<br><br>The temperature rise limit for the stator winding shall be the maximumtemperature index of the insulation minus 70°C when the traction motorundergoes the temperatures rise test, which is specified by IEC 60349-2. Thetemperature rise shall be verified in system type test bed and the lines (asavailable) with 25% ventilation blocked. The Contractor shall consider thetemperature rise on account of different factors including proximity impact (notless than 10 °C) in the under frame and specified wheel diameter difference inthe bogie(s) and car(s) as indicated in clause 10.11.19 above. The type testprocedure and validation of temperature rise is described in Chapter 17. | Tender conditions prevail. |
| 104 | Part 2 – Section VI A: ERTS – RS | 12.12 WHEEL SLIDEPROTECTION(12.12.3) | The wheel slide system shall detect the onset of slip / slide by either an axledeceleration exceeding a pre-set parameter, or detection of a differencebetween the relative speeds of the axles of any one axle of any bogie | We request amendment of the existing condition as below:<br><br>Proposed Amendment:<br><br>The wheel slide system shall detect the onset of slip / slide by either an axledeceleration exceeding a pre-set parameter, or detection of a differencebetween the relative speeds of the axles of any one axle of any bogie or car. | Tender conditions prevail. |
| 105 | Part 2 – Section VI A: ERTS – Rolling Stock | APPENDIX – I: TRAINWITHDRAWAL SCENARIOS FOR 6CAR TRAINTable | 11 Traction converters Isolation of more than Two traction inverter. | We request amendment of the existing condition as below:<br><br>Proposed Amendment:<br><br>11 Traction converters Isolation of more than One traction inverter. | Refer Addendum No.3, S.No. 54 |