



**General Bid Bulletin No. 4**  
**20 April 2021**

**IFB No. 21-031-4**

**THE MALOLOS-CLARK RAILWAY PROJECT AND  
THE NORTH SOUTH RAILWAY PROJECT-SOUTH LINE (COMMUTER)  
PACKAGE CP NS-03: ROLLING STOCK-LIMITED EXPRESS TRAINSETS**

This General Bid Bulletin is issued to amend/clarify certain provisions in the Bidding Documents for the abovementioned project. Please refer to the attached Annexes of this General Bid Bulletin duly approved by the end-user and co-implementer for details:

1. **Annex "A"** –Answers to Queries from Prospective Bidders including clarifications to the Bidding Documents;
2. **Annex "B"**– Revisions to the Bidding Documents; and
3. **Annex "B – 1"** – Revised pages/amendments and final form as revised/amended.

All other portions of the Bidding Documents affected by these revisions, amendments and/or clarifications shall be made to conform to the same.

Revisions/amendments/clarifications made herein shall be considered an integral part of the Bidding Documents for this project.

For your information and guidance.

For the Bids and Awards Committee IV:

**SIGNATURE REDACTED**

**JOSEPH ZONRAD D. DUEÑAS**

*Chairperson*

# Annex A

**PACKAGE CP NS-03: ROLLING STOCK - LIMITED EXPRESS TRAINSETS**  
**General Bid Bulletin No. 4**  
**Annex A**

Item No.	Volume Section No. Page No. Clause No. / Title Reference Text	Clarification Request	Proposed Revised Text (if any)	Response
1	<p style="text-align: center;">Volume II Part 2 -Employer's Requirements Section V1. Technical Requirements ERT-6, ERT-7 1.6.1.1 Basic Train Formation, 1.6.1.8</p>	<p><i>The limited express train is consisting of 6 motor mounted cars and 2 trailer (not motor mounted) cars with operator cab. However, the Contractor can propose alternative to the motor configuration during the design stage.</i></p> <p><i>The Contractor shall able to propose the alternative to the Power and Auxiliary Electric System Configuration for the Engineer review. The simplified block diagram for reference is shown in Appendix A.</i></p> <p>Clause 1.6.1.1 indicates that an alternative motor configuration can be</p>	-NA-	<p>Different architecture to Appendix A can be proposed without incurring into a material deviation of the Technical Bid.</p> <p>Please refer to Annex B on the updated employer requirements on motor configuration and Power and Auxiliary Electric System Configuration.</p>

		<p>proposed during the design stage.</p> <p>Clause 1.6.1.8 indicates that an alternative Power and Auxiliary Electric System Configuration can be proposed and Appendix A architecture is a reference.</p> <p>Please confirm a different architecture to that shown in Appendix A can be proposed without incurring into a material deviation of the Technical Bid.</p>		
2	<p>Volume II Part 2 - Employer's Requirements Technical Requirements ERT-7, ERT-170 1.6.2.1 Basic Train Formation Appendix B-1: Door Position and Door Pitches</p>	<p>1. <i>Carbody Length (excluding coupler, overhang of leading car) 19,500 mm</i></p> <p>2. <i>Overall length (excluding overhang of leading car) 20,000 mm?</i></p> <p>Clause 1.6.2.1 defines the main dimensions for the carbody.</p>	-NA-	<p>Bidder understanding is correct. Please refer to Vol 1 Part 1-Bidding Procedure;</p> <p>APPENDIX 6.7: COMPLIANCE MATRIX</p> <p>The Bidder is required to show its responsiveness to the Employer's Requirements - General and Technical Requirements by indicating with a check mark (tick) in the 'Conformance' column or, <u>alternatively, in the 'Partial Conformance' column using Form Compliance Matrix (as provided in the Bidding Forms).</u></p>

		<p>In addition, as PSD doors are included in the platforms, the Tenderer understands that the specific passenger door position indicated in Appendix B-1 is a mandatory requirement, and thus in case of non-compliance or partial compliance, it will be considered as a material deviation.</p> <p>Please confirm that the Tenderer's understanding is correct.</p>		<p><u>If the Bidder inserts a check mark in the 'Partial Conformance' column, then it is required to give specific details of the area of non-conformance and explain the reasons for such non-conformance and why the Employer should favorably consider accepting such non-conformance without the Employer determining that the Bidder's Technical Bid is not substantially responsive to the Employer's Requirements.</u></p> <p>The Bidder is advised to note that, should the Employer determine that the Bidder's Technical Bid is not substantially responsive to the Employer's Requirements, then its Bid will be rejected by the Employer.</p>
3	<p>Volume II Part 2 - Employer's Requirements Technical Requirements ERT-7, ERT-170 1.6.2.1 Basic Train Formation</p> <p>Appendix B-1: Door Position and Door Pitches</p>	<p>1. Carbody Length (excluding coupler, overhang of leading car) 19,500 mm</p> <p>2. Overall length (excluding overhang of leading car) 20,000 mm?</p> <p>Clause 1.6.2.1 defines the main dimensions for the carbody.</p>	-NA-	<p>Bidder understanding is not correct. Alternative to the SOW, ERG and ERT in the bidder submission, in particular to clause 1.6.2.1 shall follow the instruction in Vol 1 Part 1-Bidding Procedure;</p> <p>APPENDIX 6.7: COMPLIANCE MATRIX</p> <p>The Bidder is required to show its responsiveness to the Employer's Requirements - General and Technical Requirements by indicating with a check</p>

		<p>As long as passenger access door position is maintained, the Tenderer understands that the carbody's main dimensions can slightly vary without being considered a material deviation.</p> <p>Could you confirm that the Tenderer's understanding is correct?</p>		<p>mark (tick) in the 'Conformance' column or, <u>alternatively, in the 'Partial Conformance' column using Form Compliance Matrix (as provided in the Bidding Forms).</u></p> <p><u>If the Bidder inserts a check mark in the 'Partial Conformance' column, then it is required to give specific details of the area of non-conformance and explain the reasons for such non-conformance and why the Employer should favorably consider accepting such non-conformance without the Employer determining that the Bidder's Technical Bid is not substantially responsive to the Employer's Requirements.</u></p> <p>The Bidder is advised to note that, should the Employer determine that the Bidder's Technical Bid is not substantially responsive to the Employer's Requirements, then its Bid will be rejected by the Employer.</p>
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# Annex B

**PACKAGE CP NS-03: ROLLING STOCK - LIMITED EXPRESS TRAINSETS**  
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ITEM NO.	REFERENCE/CLAUSE/ SECTION	REVISIONS / AMENDMENTS
<b>Volume II Part 2 – Employer’s Requirements</b>		
1	SOW-3 1.10	<p><u>Updated clause 1.10, third paragraph:</u></p> <p>The Contractor shall also provide all special tools, diagnostic test equipment, test benches, jigs, etc. that shall be necessary for the operations and maintenance of the Rolling Stock and associated equipment which support the heavy maintenance of the rolling stock. The Contractor shall provide all special tools, diagnostic test equipment, test benches, jigs etc. during design stage for the given statement of No Objection. The Contractor shall responsible for the delivery, installation, testing &amp; commissioning of the approved special tools, diagnostic test equipment, test benches, jigs etc. The Contractor shall deliver the training of the special tools, diagnosis test equipment, test benches, jigs, etc.to the Employer’s personnel as per clause 1.12.</p>
2	ERG-48 8.2.1	<p><u>Updated clause 8.2.1:</u></p> <p>Within the SAMP, the Contractor shall submit a Performance Assurance Plan (PAP) or RAM Assurance Plan as per EN 50126 or IEC 62278 or any other equivalent international standard for the Rolling Stock to comply with the Employers Requirement (functional, performance and safety Requirements) and submitted for review by the Employer/Engineer. The PAP shall describe the activities that the Contractor proposes to carry out during the life cycle of the design, implementation and operation of the Rolling Stock, and shall demonstrate compliance with the Employer’s Requirements, achievement of a TOC for each trainset, and a Performance Certificate for the total fleet (7 trainsets).</p>



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3	ERG-48 8.4	<u>Updated clause 8.4:</u>  (Not Used)
4	ERG-49 8.5.6	<u>Updated clause 8.5.6:</u>  (Not Used)
5	ERT-6 1.5.1.3	<u>Updated clause 1.5.1.3:</u>  The Mockup shall be displayed to public at the location determined by the Employer. The Contractor shall bear all of the associated cost of the Mock-up from Manufacture's Factory to the location of display in Metro Manila, Philippines.
6	ERT-6 1.6.1.1	<u>Revised clause 1.6.1.1:</u>  The limited express train formation shall consist of eight (8) car sets comprises of motor mounted cars and trailer cars (not motor mounted) with operator cab. The design flexibility shall be provided for the limited express train formation of 10 car sets per consist for future expansion.
7	ERT-6/7 1.6.1.2	<u>Revised clause 1.6.1.2:</u>  Typical vehicle configuration consisting of 6 motor mounted cars and 2 trailer (not motor mounted) cars with operator cab is shown in Appendix A. The bidder shall propose the

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		limited express eight (8) cars train formation comprises of motor mounted cars, trailer cars and cars with operator cab. The proposed formation and the equipment architecture shall meet the system requirements in this tender not limited to weights limits, train performance, noise and vibration etc. The proposed train formation and equipment architecture data/documents shall be provided in the bid submission.
8	ERT-7 1.6.1.3	<p><u>Added clause 1.6.1.3:</u></p> <p>The limited express train formation and equipment arrangement architecture shall be finalised during design stage. Any time and cost implication to the changes of train formation and equipment arrangement architecture from the bid submission to the given notice of no objection at final design, shall be borne by the Contractor and no contract variation shall be provided by the Employer.</p>
9	ERT-7 1.6.1.3, 1.6.1.4, 1.6.1.5, 1.6.1.6, 1.6.1.7, 1.6.1.8, 1.6.1.9	<p><u>Clause 1.6.1.3 renumbered to 1.6.1.4;</u></p> <p><u>Clause 1.6.1.4 renumbered to 1.6.1.5;</u></p> <p><u>Clause 1.6.1.5 renumbered to 1.6.1.6;</u></p> <p><u>Clause 1.6.1.6 renumbered to 1.6.1.7;</u></p> <p><u>Clause 1.6.1.7 renumbered to 1.6.1.8 and updated as follow:</u></p> <p>Provision for 10 car trainsets shall be provided for future upgrade. The evidence of data/document shall be provided in the bid submission.</p>

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		<p><u>Clause 1.6.1.8 renumbered to 1.6.1.9 and updated as follow:</u></p> <p>Typical Power and Auxiliary Electric System Configuration is as follow:</p> <p>1) Six (6) power conversion systems which can drive four (4) AC motors shall be equipped in suitable three (3) intermediate cars of trainsets. Two (2) auxiliary power supply systems with a primary inverter to serve the auxiliary loads shall be equipped in the proper place of trainsets. The simplified block diagram for reference is shown in Appendix A</p> <p><u>Added new Clause 1.6.1.10:</u></p> <p>The bidder shall propose the power and auxiliary electric system configuration and this proposal shall be submitted in the bid submission. The positions where these devices shall be reviewed by the Engineers. Both leading cars shall be trailer car (not motor mounted) considering EMC and the mounted space for on-board ETCS, Running and Stopping Assistant system and PSD controller.</p> <p><u>Clause 1.6.1.9 renumbered to 1.6.1.11;</u></p> <p><u>Added new Clause 1.6.1.12:</u></p> <p>The major electrical equipment table shall be provided by bidder in the bid submission. The major electrical equipment table shall be finalized during design stage.</p>

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10	ERT-13 1.11.2.3 1.11.3.2	<p><u>Updated clause 1.11.2.3:</u></p> <p>Coefficients of adhesion for the train speed between 120km/h and 160km/h should be lower than the train speed under 120km/h. During the design stage, adhesion should be considered during deceleration of speed over 120km/h is lower compare to the speed under 120km/h, and for the average deceleration the adhesion must satisfied the demanded braking effort for emergency braking.</p> <p><u>Updated clause 1.11.3.2:</u></p> <p>The corresponding traction motor characteristics, and the train mass, shall be considered in the Design Performance Curve as defined in JIS E 6102 or equivalent standard.</p>
11	ERT-14 1.11.4.1 1.11.4.2	<p><u>Updated clause 1.11.4.1:</u></p> <p>The Contractor shall confirm by calculation and test that 8 cars trainset at the 7t/car loading condition, with the isolation of 25% motorised bogies the limited express train is capable of completing continuous trip within the stipulated running time.</p> <p><u>Updated clause 1.11.4.2:</u></p> <p>The Contractor shall confirm by calculation and test that 8 cars trainset at 7t/car loading condition, with the isolation of 50% motorised bogies the limited express train is capable of completing one round trip including traversing the maximum gradient of the main line.</p>

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		However, reduction of acceleration and restriction of regenerative braking force may be accompanied.
12	ERT-16 1.13.2	<p><u>Updated clause 1.13.2:</u></p> <p>The ride quality shall be evaluated according to JIS E 4023 or other international standards. The Contractor shall provide a vibration analysis for the Engineer's review and acceptance, which shall demonstrate compliance to these ride quality requirements.</p>
13	ERT-49 5.8.1	<p><u>Updated clause 5.8.1:</u></p> <p>The Contractor shall provide space on the leading vehicles to cater for people on wheelchairs, and people with prams. The prospective wheelchair space shall be prominently labeled on the floor with the appropriate standard sign. Additionally, a non-obstructive, self-aid and a railway transportation proven wheelchair securement device with instruction decal shall be made available for ready installation for each wheelchair space.</p>
14	ERT-80  11.1.1	<p><u>Updated clause 11.1.1:</u></p> <p>A modern and well service-proven three-phase alternating current propulsion system shall be provided to the motor mounted cars and shall have the following features but not limited to:</p> <ol style="list-style-type: none"> <li>1) One DC to AC inverter packages (Self cooling/force cooling Power Conversion Equipment), each powering the grouped traction motors in a vehicle;</li> </ol>

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		2) For the purpose of the energy conservation improvement and low center of gravity the material of filter inductor shall be copper or aluminum; 3) The design of filter inductor shall be considered the energy-saving type; 4) The magnetic flux caused by filter inductor shall be less than 1mT at 1.0 m of the just above of filter inductor from the floor level; 5) A car level microprocessor-based control system (power electronics control equipment), which shall perform all propulsion of acceleration and regenerative braking; 6) Each AC squirrel cage traction motor shall drive a gear unit. Traction motor insulation shall be tropicalized and shall be Class 200 insulation or better; and 7) In the event of propulsion failure occurs on any car, that propulsion unit shall be automatically disabled (or by manual disable from the driver's cab) to allow the trainset to be operated by the rest of the healthy propulsion units; 8) About the blending between friction brake and regenerative brake when brake starts, the dummy signal of regenerative brake shall be short as possible considering ride effort. In case catenary voltage is higher than the voltage which regenerative brake is effective, the dummy signal of regenerative brake shall not be used; 9) Lowered regenerative performance applied except for ATO normal mode may be acceptable in case it is difficult to achieve reasonable design in consideration with capacity and size, weight and so on. It shall be necessary to be reviewed by the Engineer when above performance will be adopted; 10) Wheel diameter correcting shall be made to this device;
15	ERT 11.1.2	<u>Updated clause 11.1.2:</u>

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		The propulsion equipment arrangement architecture and features shall be finalised during design stage. Any time and cost implication to the changes of propulsion architecture and equipment arrangement from the bid submission to the given notice of no objection at final design, shall be borne by the Contractor and no contract variation shall be provided by the Employer. The propulsion system shall have sufficient capacity for normal and recovery operation.
16	ERT-90 13.2.3	<u>Deleted clause 13.2.3:</u>
17	ERT-90 14.1.1	<u>Updated clause 14.1.1:</u>  The limited express train shall be provided with auxiliary power supply equipment (APSE). The AC output of the APSE shall be sinusoidal under all conditions of load. The types of loads connected to the auxiliary electrical system shall include, not but limited to: <ol style="list-style-type: none"> <li>1) Emergency Lighting;</li> <li>2) All Exterior Lights;</li> <li>3) Communication Systems, AP system and CCTV system;</li> <li>4) Propulsion, TMS, Brake Controls, and Air Compressor system;</li> <li>5) Door Controls;</li> <li>6) On Board Signaling equipment;</li> <li>7) Cab console indicators;</li> <li>8) Horn;</li> <li>9) Wiper control/system;</li> <li>10) Active Ventilation System of VAC.</li> </ol>

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		<p><u>Added new clause 14.1.2:</u></p> <p>The typical arrangement of APSE is as per Appendix A. The bidder shall propose the APSE equipment arrangement in the bid submission. The arrangement of APSE shall consider the system requirements (Clause 1 of ERT) of this tender and the EMI to the signaling equipment.</p> <p><u>Added new clause 14.1.3:</u></p> <p>The architecture and equipment arrangement of APSE shall be finalised during design stage. Any time and cost implication to the changes of APSE architecture and equipment arrangement from the bid submission to the given notice of no objection at final design, shall be borne by the Contractor and no contract variation shall be provided by the Employer.</p> <p><u>Clause no 14.1.2 renumbered to 14.1.4;</u></p> <p><u>Clause no. 14.1.3 renumbered to 14.1.5;</u></p> <p><u>Clause no. 14.1.4 renumbered to 14.1.6;</u></p> <p><u>Clause no. 14.1.5 renumbered to 14.1.7;</u></p> <p><u>Clause no. 14.1.6 renumbered to 14.1.8;</u></p> <p><u>Clause no. 14.1.7 renumbered to 14.1.9;</u></p>



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ITEM NO.	REFERENCE/CLAUSE/ SECTION	REVISIONS / AMENDMENTS
		<u>Clause no. 14.1.8 renumbered to 14.1.10;</u>
18	ERT-91 14.2.1 14.2.2	<p><u>Updated clause 14.2.1:</u></p> <p>The Auxiliary Power Supply Equipment (APSE) shall capable of supplying all loads continuously. The failure of an APSE shall be enunciated in the Driver's cab and shall be recorded in the TMS and APSE. At least one dead battery start device shall be incorporate in one train-set, which shall be located in the Driver's cab.</p> <p><u>Updated clause 14.2.2:</u></p> <p>The APSE shall consist of but not limited to auxiliary power inverter (Si-IGBT or Hybrid-SiC Technology, force ventilated), to supply all AC power, and a Low Voltage Power Supply (LVPS) to provide low voltage DC power, HSCB and Fuse to protect from over current.</p>
19	ERT-92 14.3.1	<p><u>Updated clause 14.3.1:</u></p> <p>APSEs mounted on limited express train shall have a parallel synchronous operation. If one of two performing parallel synchronous stops by trouble, the other APSE shall perform normally. Then, the signal of VAC degraded mode of operation shall be transmitted to VAC of the affected area through TMS.</p>

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<b>Volume III Part 3 – Conditions of Contract and Contract Forms</b>																										
20	Section VIII Particular Conditions Attachment 1 Summary of Key Dates	<p>The table in the Summary of Key Dates is updated:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="3" style="text-align: center;">TABLE 1 – KEY DATES</th> </tr> <tr> <th style="text-align: center;">Key Date</th> <th style="text-align: center;">Element of Work</th> <th style="text-align: center;">No. of Months</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">KD 1</td> <td>Achievement: Completing Final Design Review.</td> <td style="text-align: center;">18 months</td> </tr> <tr> <td style="text-align: center;">KD 2</td> <td>Achievement: Deliver the Mock Up to the site</td> <td style="text-align: center;">14 months</td> </tr> <tr> <td style="text-align: center;">KD 3</td> <td>Achievement: Completing FAI and FAT.</td> <td style="text-align: center;">36 months</td> </tr> <tr> <td style="text-align: center;">KD 4</td> <td>                     Achievement: Supply and delivery of the following Rolling Stock equipment for training purposes to the CP NS-01 Contractor at the North Depot (for Training Center Facility):                     <ul style="list-style-type: none"> <li>- Equipment for driving simulator,</li> <li>- Pantograph, and</li> <li>- Bogie assembly for motor car including traction motor, gearbox and coupling.</li> </ul> </td> <td style="text-align: center;">40 months</td> </tr> <tr> <td style="text-align: center;">KD 5</td> <td>Achievement: Completion of training and delivery of Operation and Maintenance Manual.</td> <td style="text-align: center;">48 months</td> </tr> <tr> <td style="text-align: center;">KD 6</td> <td>Achievement: Delivery of 7 trainsets (1-7) and completion of testing and commissioning thereof plus handing over.</td> <td style="text-align: center;">46 months</td> </tr> </tbody> </table>	TABLE 1 – KEY DATES			Key Date	Element of Work	No. of Months	KD 1	Achievement: Completing Final Design Review.	18 months	KD 2	Achievement: Deliver the Mock Up to the site	14 months	KD 3	Achievement: Completing FAI and FAT.	36 months	KD 4	Achievement: Supply and delivery of the following Rolling Stock equipment for training purposes to the CP NS-01 Contractor at the North Depot (for Training Center Facility): <ul style="list-style-type: none"> <li>- Equipment for driving simulator,</li> <li>- Pantograph, and</li> <li>- Bogie assembly for motor car including traction motor, gearbox and coupling.</li> </ul>	40 months	KD 5	Achievement: Completion of training and delivery of Operation and Maintenance Manual.	48 months	KD 6	Achievement: Delivery of 7 trainsets (1-7) and completion of testing and commissioning thereof plus handing over.	46 months
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		KD 7	Achievement: Delivery of all spare parts, consumables, special tools and jigs, plus as-built drawings.	49 months															
		KD 8	Achievement: Completion of Trial Operation support and the whole of the Works.	53 months															
21	Section VIII Particular Conditions Attachment 2 Time for Access to the Site	<p><u>The table in the Time for Access to the Site is updated:</u></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Access Date</th> <th style="text-align: center;">Site (Works Area)</th> <th style="text-align: center;">Month no.</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">AD 1</td> <td>                     On-board Signalling System and other equipment to be mounted on the Rolling Stock supplied by CP NS-01 Contractor from E&amp;M Systems and Track Works.                       The E&amp;M System and Track Works Contractor will supply this equipment in Japan at the Rolling Stock Contractor's premises or at alternative agreed location(s)                 </td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">AD-1: for trainsets one to seven (1-7) supplied under this contract</td> <td style="text-align: center;">25 months</td> </tr> <tr> <td style="text-align: center;">AD 2</td> <td>Access to allocated areas within the North Depot for receiving trainsets, assembling, testing, commissioning and test running within the depot.</td> <td style="text-align: center;">27 months</td> </tr> <tr> <td style="text-align: center;">AD 3</td> <td>Access to the mainline from CIA to Clark (as available) for Test running and Performance Proving</td> <td style="text-align: center;">28 months</td> </tr> </tbody> </table>			Access Date	Site (Works Area)	Month no.	AD 1	On-board Signalling System and other equipment to be mounted on the Rolling Stock supplied by CP NS-01 Contractor from E&M Systems and Track Works.  The E&M System and Track Works Contractor will supply this equipment in Japan at the Rolling Stock Contractor's premises or at alternative agreed location(s)			AD-1: for trainsets one to seven (1-7) supplied under this contract	25 months	AD 2	Access to allocated areas within the North Depot for receiving trainsets, assembling, testing, commissioning and test running within the depot.	27 months	AD 3	Access to the mainline from CIA to Clark (as available) for Test running and Performance Proving	28 months
Access Date	Site (Works Area)	Month no.																	
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			AD 4	Access to the whole mainline from Calamba to CIA	77 months	
			NB	<ol style="list-style-type: none"> <li>1. <i>Access will be given progressively to the whole of the North South Commuter Railway for the use of this Rolling Stock.</i></li> <li>2. <i>Obtaining permission from the Railway Safety Inspector to use the Rolling Stock for commercial operations will be the responsibility of the Employer with the support of the Rolling Stock manufacturer.</i></li> </ol>		

# Annex B – Attachment 1

Spare parts, consumables, special tools and diagnostic test equipment shall be provided by the Contractor for the maintenance of the Rolling Stock in accordance with the approved maintenance plan by the Employer/Engineer and the O&M manuals.

The Contractor shall submit a comprehensive list of recommended spare parts and consumables in accordance with the requirements specified in the ERG and ERT for the period of at least 2 years.

The Contractor shall also provide all special tools, diagnostic test equipment, test benches, jigs, etc. that shall be necessary for the operations and maintenance of the Rolling Stock and associated equipment which support the heavy maintenance of the rolling stock. The Contractor shall provide all special tools, diagnostic test equipment, test benches, jigs etc. during design stage for the ~~given statement~~ given statement of No ~~Objection~~ Objection. The Contractor shall be responsible for the delivery, installation, testing & commissioning of the approved special tools, diagnostic test equipment, test benches, jigs etc. The Contractor shall deliver the training of the special tools, diagnostic test equipment, test benches, jigs, etc. to the Employer’s personnel as per clause 1.12.

#### **1.11 Provision of Rolling Stock Operation and Maintenance (O&M) Manuals**

The Contractor shall provide fully illustrated Operation and Maintenance (O&M) Manuals complete with the following:

- 1) Drawings;
- 2) Diagrams;
- 3) Schematics; and
- 4) Spare parts catalogues.

The maintenance manual shall be categorized as follows:

- 1) Running maintenance requirements;
- 2) Scheduled maintenance requirements; and
- 3) Overhaul maintenance requirements.

The Manuals shall be in the form of high-quality printed ‘hard’ copy for at least 20 copies and in the form of ‘soft’ copy which is to be proposed by the Contractor during the design phase.

#### **1.12 Training for Employer’s Personnel**

The Contractor shall provide operational and maintenance training to the operation and maintenance staff.

Training shall be categorized as follows:

- 1) Operation staff training;
- 2) Maintenance staff training; and
- 3) Engineering staff training

Training shall include provision of all required training materials and appropriate training venues.

#### **1.13 Providing “As-Built” Drawings and Schematic**

The Contractor shall submit as-built documentation for the Rolling Stock and its associated equipment.

The Contractor shall submit an as-built specification which has been updated and modified from the original ERT, taking account of any changes.

Spare parts, consumables, special tools and diagnostic test equipment shall be provided by the Contractor for the maintenance of the Rolling Stock in accordance with the approved maintenance plan by the Employer/Engineer and the O&M manuals.

The Contractor shall submit a comprehensive list of recommended spare parts and consumables in accordance with the requirements specified in the ERG and ERT for the period of at least 2 years.

The Contractor shall also provide all special tools, diagnostic test equipment, test benches, jigs, etc. that shall be necessary for the operations and maintenance of the Rolling Stock and associated equipment which support the heavy maintenance of the rolling stock. The Contractor shall provide all special tools, diagnostic test equipment, test benches, jigs etc. during design stage for the given statement of No Objection. The Contractor shall be responsible for the delivery, installation, testing & commissioning of the approved special tools, diagnostic test equipment, test benches, jigs etc. The Contractor shall deliver the training of the special tools, diagnostic test equipment, test benches, jigs, etc. to the Employer’s personnel as per clause 1.12.

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The Contractor shall submit as-built documentation for the Rolling Stock and its associated equipment.

The Contractor shall submit an as-built specification which has been updated and modified from the original ERT, taking account of any changes.

and commissioning phases to ensure that the Contractor has met all relevant System Assurance requirements. The Engineer shall give 7 days’ notice to the Contractor about the audit arrangement. The Contractor shall provide all necessary assistance to enable the Employer or his representative complete the audit.

**8.2 Performance Assurance Plan (PAP)**

- 8.2.1 Within the SAMP, the Contractor shall submit a Performance Assurance Plan (PAP) or RAM Assurance Plan as per EN 50126 or IEC 62278 or any other equivalent international standard for the Rolling Stock to comply with the Employers Requirement (functional, performance and safety Requirements) and submitted for review by the Employer/Engineer. The PAP shall describe the activities that the Contractor proposes to carry out during the life cycle of the design, implementation and operation of the Rolling Stock, and shall demonstrate compliance with the Employer’s Requirements, achievement of a TOC ~~for each~~for each train-set, and a Performance Certificate for the total fleet (7 trainsets).
- 8.2.2 The Contractor shall implement a formal Maintainability Plan for Rolling stock any other applicable system to comply with the Technical Requirements (ERT).

**8.3 Performance (RAM) Requirements**

- 8.3.1 The Contractor shall submit the Performance or RAM (Reliability, Availability and Maintainability) Target Apportionment Report in the preliminary design stage.
- 8.3.2 The Contractor shall conduct a Preliminary RAM Analysis which shall give an initial indication of any RAM problems which may arise which might affect the performance of the rolling stock.
- 8.3.3 The Contractor shall provide RAM Demonstration Plan and RAM Demonstration report as necessary in the relevant stages of the project.
- 8.3.4 The Contractor shall establish a Data Reporting and Corrective Action System (DRACAS) to monitor the safety and RAM performance of the equipment, from the design, through testing and commissioning and into operation. The system shall be used to monitor the performance of components and to identify patterns of failures so that corrective action can be taken to improve both current and future systems.
- 8.3.5 The reliability of the trains shall be measured based on the number of train service disruption incidents, hereafter referred to as incidents, which are caused by train failures during operation. An incident is defined as any one of the following events which are caused by a train failure:
  - 1) Train removed from Service;
  - 2) Delay to Train Service (more than 5 minutes);
  - 3) Failure to be Dispatched.

**8.4 (Not Used)**

**8.5 Performance Acceptance Criteria (PAC)**

- 8.5.1 All RAM calculations shall use an annual operation of 19 hours a day, 7 days a week, with engineering downtime of 5 hours a day.
- 8.5.2 Each trainset shall achieve:
  - 1) Trail Operation (selected trainset) – No major faults.



and commissioning phases to ensure that the Contractor has met all relevant System Assurance requirements. The Engineer shall give 7 days’ notice to the Contractor about the audit arrangement. The Contractor shall provide all necessary assistance to enable the Employer or his representative complete the audit.

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- 1) Train removed from Service;
  - 2) Delay to Train Service (more than 5 minutes);
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## **8.4 (Not Used)**

## **8.5 Performance Acceptance Criteria (PAC)**

- 8.5.1 All RAM calculations shall use an annual operation of 19 hours a day, 7 days a week, with engineering downtime of 5 hours a day.
- 8.5.2 Each trainset shall achieve:
- 1) Trail Operation (selected trainset) – No major faults.

- 2) **In-service Operations** - 10,000 km or two (2) months of continuous in-service operational FFR.

8.5.3 The train fleet (7 trainsets) as a whole shall achieve:

- 1) **MDBF** – In service operational faults, MDBF no less than 50,000 km causing a delay greater than 5 minutes.
- 2) **OMTTR** – Operational Mean Time To Restore (OMTTR) capital components; the trainsets shall be restored to operational order in an OMTTR of 15 minutes.
- 3) **CMTTR** – Corrective Mean Time To Repair (CMTTR) capital components shall not be greater than 4 hours.

8.5.4 Where appropriate, the Contractor shall also specify RAM (Reliability, Availability and Maintainability) requirements for the design, operation and maintenance of subsystems where the failure mode, effects and criticality analysis (FMECA) identify failure modes that have a maintenance, operations or safety impact, using the risk assessment methodology.

8.5.5 The Contractor shall commence the use of the Data reporting analysis and corrective action system (DRACAS) prior to any factory or site acceptance tests and report to the Employer/Engineer on a regular basis.

8.5.6 [\(Not Used\)](#)

**8.6 Performance Reports**

8.6.1 The Contractor shall provide Performance Reports to support the applications for Rolling Stock TOC for each trainset and the Performance Certificate for the fleet (7 trainsets).

8.6.2 The Rolling Stock TOC Performance report shall be issued for each trainset prior to operational acceptance and shall provide:

- 1) Technical design justification of performance;
- 2) Cross reference to Rolling Stock performance in a similar application;
- 3) The design prediction at LRU (Line replaceable unit) level (MDBF, OMTTR and CMTTR) of all capital components;
- 4) Failure mode, effect, & criticality analysis (FMECA) and Fault Tree Analysis (FTA)
- 5) Reliability Critical item list which might impact the operations of the train or train service,
- 6) Manufacturing Completion Certificate for each train,
- 7) Design Qualification Testing Completion Certificate,
- 8) Factory Acceptance Tests Completion Certificate,
- 9) Train Delivery to site completion Certificate,
- 10) As-built Drawing,
- 11) Completion of Training program,
- 12) On-site Testing and Commissioning Completion Certificate for each train, and
- 13) Train Operation Completion Certificate for each train 1500 km (FFR)

8.6.3 The Rolling Stock Performance report shall be issued progressively on a monthly basis, shall be finalized at the end of DNP, and shall provide:

- 1) In-service FFR operational performance of individual trainsets as per clause 8.3.3;

- 2) **In-service Operations** - 10,000 km or two (2) months of continuous in-service operational FFR.

8.5.3 The train fleet (7 trainsets) as a whole shall achieve:

- 1) **MDBF** – In service operational faults, MDBF no less than 50,000 km causing a delay greater than 5 minutes.
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8.5.5 The Contractor shall commence the use of the Data reporting analysis and corrective action system (DRACAS) prior to any factory or site acceptance tests and report to the Employer/Engineer on a regular basis.

8.5.6 (Not Used)

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- 1) In-service FFR operational performance of individual trainsets as per clause 8.3.3;

5) Modification 'strike box' with a minimum of 10 positions.

### 1.3.3 Software Configuration

1.3.3.1 Configuration of software shall comply with the requirements of EN 50128 or any equivalent standard approved by the Engineer.

## 1.4 Special Responsibility of the Contractor

1.4.1.1 No examination, review and given statement of No Objection by the Engineer of the design, drawings, and documents submitted by the Contractor, with or without amendment, or any given statement of No Objection or consent given by the Engineer for any equipment or part of the Works, shall absolve the Contractor from any of his obligations under the contract or any liability arising out of the designs, drawings and documents or equipment or part of Works.

## 1.5 Mockup

1.5.1.1 In order to evaluate the effectiveness of the vehicle interior and its layout, the Contractor shall develop the interior design using a full-scale half- vehicle (with driver’s cab) mockup. The drivers cab mockup shall be fully equipped to show completely built condition. The entire design of the vehicle interior including the drivers cab shall be reviewed by the Engineer/Employer.

1.5.1.2 The exterior of the mockup shall accurately represent that of the vehicle, and shall be painted to simulate actual materials or equivalent used. The mock-up shall be strong enough to accommodate persons inside without the damage or deformation. It shall be constructed on a substantial platform, to facilitate transportation and to prevent damage (cracking) and distortion of the hardware.

1.5.1.3 The Mockup shall be displayed to public at the location determined by the Employer. The Contractor shall bear all of the associated cost of the Mock-up from Manufacture’s Factory to the location of display in Metro Manila, Philippines.

1.5.1.4 The Contractor shall prepare the provision of at least twelve (12) display sites which shall be determined by the Employer over a period of 18 months of mockup display. The Contractor shall bear all of the associated cost of the Mockup logistics and others i.e., security, authority approval etc.

## 1.6 Basic Train Formation

### 1.6.1 General Vehicle Configuration

1.6.1.1 ~~The limited express train is consisting of 6 motor mounted cars and 2 trailer (not motor mounted) cars with operator cab. However, the Contractor can propose alternative to the motor configuration during the design stage. The limited express train formation shall consist of eight (8) car sets comprises of motor mounted cars and trailer cars (not motor mounted) with operator cab. The design flexibility shall be provided for the limited express train formation of 10 car sets per consist for future expansion.~~

1.6.1.2 Typical vehicle configuration consisting of 6 motor mounted cars and 2 trailer (not motor mounted) cars with operator cab is shown in Appendix AB. The bidder shall propose the limited express eight (8) cars train formation comprises of motor mounted cars, trailer cars and cars with operator cab. The proposed formation and the equipment architecture

5) Modification 'strike box' with a minimum of 10 positions.

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1.3.3.1 Configuration of software shall comply with the requirements of EN 50128 or any equivalent standard approved by the Engineer.

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1.6.1.2 Typical vehicle configuration consisting of 6 motor mounted cars and 2 trailer (not motor mounted) cars with operator cab is shown in Appendix A. The bidder shall propose the limited express eight (8) cars train formation comprises of motor mounted cars, trailer cars and cars with operator cab. The proposed formation and the equipment architecture

shall meet the system requirements in this tender not limited to weights limits, train performance, noise and vibration etc. The proposed train formation and equipment architecture data/documents shall be provided in the bid submission.

1.6.1.3 The limited express train formation and equipment arrangement architecture shall be finalised during design stage. Any time and cost implication to the changes of train formation and equipment arrangement architecture from the bid submission to the given notice of no objection at final design, shall be borne by the Contractor and no contract variation shall be provided by the Employer.

~~1.6.1.3~~ 1.6.1.4 Auxiliary Power System Equipment (APSE) shall not be mounted on both leading cars for avoiding EMI to the signaling equipment, but Battery and Battery charger may be mounted on both leading cars.

~~1.6.1.4~~ 1.6.1.5 The mass (tare weight) of the 8-cars trainset shall be 315 tons or less.

~~1.6.1.5~~ 1.6.1.6 Weight balance, lower center of gravity, etc., shall be taken into consideration. The weight distribution shall be as defined in IEC 61133 or any equivalent standard approved the Engineer.

~~1.6.1.6~~ 1.6.1.7 Total gross axle load of leading car and middle car shall not exceed 16 Tonnes for loads as in section 8.5 of IEC61133

~~1.6.1.7~~ 1.6.1.8 Provision for 10 car trainsets shall be provided for future upgrade. The evidence of data/document shall be provided in the bid submission.

~~1.6.1.8~~ 1.6.1.9 Typical Power and Auxiliary Electric System Configuration is as follow:

1) Six (6) power conversion systems which can drive four (4) AC motors shall be equipped in suitable three (3) intermediate cars of trainsets. Two (2) auxiliary power supply systems with a primary inverter to serve the auxiliary loads shall be equipped in the proper place of trainsets. The simplified block diagram for reference is shown in Appendix A

~~6)~~ 1.6.1.10 The bidder shall propose the power and auxiliary electric system configuration and this proposal shall be submitted in the bid submission. The positions where these ~~devices shall~~ devices shall be reviewed by the Engineers. Both leading cars shall be trailer car (not motor mounted) considering EMC and the mounted space for on-board ETCS, Running and Stopping Assistant system and PSD controller.

~~7) The Contractor shall able to propose the alternative to the Power and Auxiliary Electric System Configuration for the Engineer review.  
The simplified block diagram for reference is shown in Appendix A.~~

1.6.1.11 Under emergency conditions, one train in W2 (Clause 1.1) loading must be capable of operating with another train in W2 loading coupled to it for hauling or pushing.

~~1.6.1.9~~ 1.6.1.12 The major electrical equipment table shall be provided by bidder in the bid submission. The major electrical equipment table shall be finalized during design stage.

1.6.2 Vehicle Physical Characteristics

1.6.2.1 The following physical characteristics indicate fundamental vehicle dimensions that should be given careful attention.

1.	Carbody Length (excluding coupler, overhang of leading car)	19,500 mm
2.	Overall length (excluding overhang of leading car)?	20,000 mm
3.	Train length	160,000 mm

shall meet the system requirements in this tender not limited to weights limits, train performance, noise and vibration etc. The proposed train formation and equipment architecture data/documents shall be provided in the bid submission.

- 1.6.1.3 The limited express train formation and equipment arrangement architecture shall be finalised during design stage. Any time and cost implication to the changes of train formation and equipment arrangement architecture from the bid submission to the given notice of no objection at final design, shall be borne by the Contractor and no contract variation shall be provided by the Employer.
- 1.6.1.4 Auxiliary Power System Equipment (APSE) shall not be mounted on both leading cars for avoiding EMI to the signaling equipment, but Battery and Battery charger may be mounted on both leading cars.
- 1.6.1.5 The mass (tare weight) of the 8-cars trainset shall be 315 tons or less.
- 1.6.1.6 Weight balance, lower center of gravity, etc., shall be taken into consideration. The weight distribution shall be as defined in IEC 61133 or any equivalent standard approved the Engineer.
- 1.6.1.7 Total gross axle load of leading car and middle car shall not exceed 16 Tonnes for loads as in section 8.5 of IEC61133
- 1.6.1.8 Provision for 10 car trainsets shall be provided for future upgrade. The evidence of data/document shall be provided in the bid submission.
- 1.6.1.9 Typical Power and Auxiliary Electric System Configuration is as follow:
  - 1) Six (6) power conversion systems which can drive four (4) AC motors shall be equipped in suitable three (3) intermediate cars of trainsets. Two (2) auxiliary power supply systems with a primary inverter to serve the auxiliary loads shall be equipped in the proper place of trainsets. The simplified block diagram for reference is shown in Appendix A
- 1.6.1.10 The bidder shall propose the power and auxiliary electric system configuration and this proposal shall be submitted in the bid submission. The positions where these devices shall be reviewed by the Engineers. Both leading cars shall be trailer car (not motor mounted) considering EMC and the mounted space for on-board ETCS, Running and Stopping Assistant system and PSD controller.
- 1.6.1.11 Under emergency conditions, one train in W2 (Clause 1.1) loading must be capable of operating with another train in W2 loading coupled to it for hauling or pushing.
- 1.6.1.12 The major electrical equipment table shall be provided by bidder in the bid submission. The major electrical equipment table shall be finalized during design stage.
- 1.6.2 Vehicle Physical Characteristics
  - 1.6.2.1 The following physical characteristics indicate fundamental vehicle dimensions that should be given careful attention.

1.	Carbody Length (excluding coupler, overhang of leading car)	19,500 mm
2.	Overall length (excluding overhang of leading car)?	20,000 mm
3.	Train length (In case of 8 cars, excluding overhang of both leading cars)	160,000 mm
4.	Overall Width (excluding light on both sides of the vehicle)	2,950 mm

3.	Acceleration (at W2 loading)	: Minimum 0.83 m/s <sup>2</sup> (0-40 kmph, thereafter, the Bidder shall make their own calculation of traction force in order to comply with the basic requirements)
4.	Starting Tractive effort	:400 kN or higher
5.	Maximum Power output at wheel	:5200 kW
6.	Jerk limit under all acceleration and service braking conditions (Max.)	: 1.1 m/s <sup>3</sup>
7.	Service deceleration	: 4.2km/h/s
8.	Wheel diameter	: 860mm (New) / : 820mm (Half worn) : 780mm (Fully worn) : (792 minimum reprofiling diameter)
9.	Emergency deceleration	: 4.7km/h/s
10.	Axial Thrust	:1500kN
11.	Severity of Service	: Shall meet conditions of continuous 1 round trip of peak operation at loads of 7t/car or higher without adverse effect to any system (7t/car is passenger load but see comments about EN 15663 clause 6 Table 3)

1.11.2.2 Acceleration and deceleration values shall be maintained under all loading conditions. All braking requirements shall be maintained under all loading conditions.

1.11.2.3 Coefficients of adhesion for the train speed between 120km/h and 160km/h should be lower ~~than~~ ~~the~~ ~~than~~ ~~the~~ train speed under 120km/h. During the design stage, adhesion should be considered during deceleration of speed over 120km/h is lower compare to the speed under 120km/h, and for the average deceleration the adhesion must satisfied the demanded braking effort for emergency braking.

1.11.2.4 Jerk during acceleration and deceleration shall not be more than 1.1 m/s<sup>3</sup> (except under emergency braking condition) and in any direction. Failure of jerk limiting system shall not limit braking effort.

1.11.2.5 Indicated speed shall be within ±2km/h of actual speed at any speed.

1.11.2.6 In addition, the pneumatic system shall meet the following brake reaction time or to follow EN 13452:

- a) Full service application : 1.5 seconds
- b) Emergency application : 1.2 seconds
- c) Full service release : 2.0 seconds
- d) Emergency release : 3.0 seconds

1.11.2.7 The brake reaction times of a and b are defined from the order of braking to 90% of BC pressure, and these of c and d are defined from full pressure to 10% of BC pressure.

1.11.2.8 Brake slip/slide protection shall apply to all braking modes.

1.11.3 Performance Characteristics

1.11.3.1 Performance curves for traction and braking shall be established based on kN / metric ton versus speed for the W2 loading condition.

1.11.3.2 The corresponding traction motor characteristics, and the train mass, shall be considered in the Design Performance Curve as defined in JIS E ~~6102~~ ~~or~~ 6102 ~~or~~ equivalent standard.

1.11.4 Degraded/Emergency Performance



3.	Acceleration (at W2 loading)	: Minimum 0.83 m/s <sup>2</sup> (0-40 kmph, thereafter, the Bidder shall make their own calculation of traction force in order to comply with the basic requirements)
4.	Starting Tractive effort	:400 kN or higher
5.	Maximum Power output at wheel	:5200 kW
6.	Jerk limit under all acceleration and service braking conditions (Max.)	: 1.1 m/s <sup>3</sup>
7.	Service deceleration	: 4.2km/h/s
8.	Wheel diameter	: 860mm (New) / : 820mm (Half worn) : 780mm (Fully worn) : (792 minimum reprofiling diameter)
9.	Emergency deceleration	: 4.7km/h/s
10.	Axial Thrust	:1500kN
11.	Severity of Service	: Shall meet conditions of continuous 1 round trip of peak operation at loads of 7t/car or higher without adverse effect to any system (7t/car is passenger load but see comments about EN 15663 clause 6 Table 3)

1.11.2.2 Acceleration and deceleration values shall be maintained under all loading conditions. All braking requirements shall be maintained under all loading conditions.

1.11.2.3 Coefficients of adhesion for the train speed between 120km/h and 160km/h should be lower than the train speed under 120km/h. During the design stage, adhesion should be considered during deceleration of speed over 120km/h is lower compare to the speed under 120km/h, and for the average deceleration the adhesion must satisfied the demanded braking effort for emergency braking.

1.11.2.4 Jerk during acceleration and deceleration shall not be more than 1.1 m/s<sup>3</sup> (except under emergency braking condition) and in any direction. Failure of jerk limiting system shall not limit braking effort.

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1.11.2.6 In addition, the pneumatic system shall meet the following brake reaction time or to follow EN 13452:

- a) Full service application : 1.5 seconds
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- c) Full service release : 2.0 seconds
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1.11.2.7 The brake reaction times of a and b are defined from the order of braking to 90% of BC pressure, and these of c and d are defined from full pressure to 10% of BC pressure.

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1.11.3 Performance Characteristics

1.11.3.1 Performance curves for traction and braking shall be established based on kN / metric ton versus speed for the W2 loading condition.

1.11.3.2 The corresponding traction motor characteristics, and the train mass, shall be considered in the Design Performance Curve as defined in JIS E 6102 or equivalent standard.

1.11.4 Degraded/Emergency Performance

- 1.11.4.1 The Contractor shall confirm by calculation and test that 8 cars train-set at the 7t/car loading condition, with the ~~isolation of 25% motorised bogies propulsion system on one of the 6 motor car units totally inoperative is the limited express train is~~ capable of completing continuous trip within the stipulated running time.
- 1.11.4.2 The Contractor shall confirm by calculation and test that 8 cars train-set at 7t/car loading condition, with the ~~isolation of 50% motorised bogies propulsion system on two of the 6 motor car units totally inoperative is the limited express train is~~ capable of completing one round trip including traversing the maximum gradient of the main line. However, reduction of acceleration and restriction of regenerative braking force may be accompanied.
- 1.11.4.3 The Contractor shall confirm by calculation and test that 8 cars train-set at 7t loading condition is capable of pushing/towing the 10 cars train-set of commuter train (5M5T) at 20t/car loading condition (537 ton) to the nearest station, including traversing the maximum main line gradient. If the healthy train cannot pushing or towing on the maximum main line gradient, the high acceleration mode shall be applied.
- 1.11.4.4 Similarly, the Contractor shall confirm by calculation and test that 8 cars train-set at W0 loading condition is capable of pushing/towing the 10 cars train-set of commuter train (5M5T) and limited express train at tare condition (337 ton), with an inoperative propulsion system, from the farthest terminal station back to Depot, including starting on the gradient of 3.5% upgrade. If the healthy train cannot push or tow on the 3.5% upgrade, the high acceleration mode shall be applied. This requirement is under the non-slip condition under Philippines natural environment condition, and the adhesion at this requirement does not need to be considered. The test can be conducted under the non-slip condition. Provision for 10 car trainsets shall be provided for future upgrade.
- 1.11.4.5 For the test at 7t/car written above, it is also permitted to convert from the results of empty tests and certain loaded tests.
- 1.11.4.6 In case of coupling inoperable train and rescue train, emergency brake circuit shall be connected between these two trains by emergency electric coupler. These two trains emergency brake shall be controlled at the same demand synchronously from both train’s operator cabs. Intercom between these trains, buzzer and any other circuit required for rescue operation shall be connected by emergency electric coupler. The specifications for rescue operation and emergency electric coupler shall be considered coupling other project trains in interoperability section and shall be reviewed by the Engineer.
- 1.11.5 Brake Performance at Stopping
- 1.11.5.1 The Contractor shall confirm by calculation and test that the friction brakes are capable of holding 8 cars train-sets in the 7t/car loading condition on a 3.5% grade. Also, the Contractor shall confirm by calculation and test that the friction brakes are capable of holding 8 cars train-sets coupled to a disabled (without any brake) 8 cars train-sets both trains at W0 load condition on 3.5% grade. For the test at 7t/car written above, it is also permitted to convert from the results of empty tests and certain loaded tests.
- 1.11.5.2 In addition, brake performance tests shall be done as per ERT 1.11.1 and shall be submitted for Engineers review and comments.
- 1.11.5.3 The Contractor shall confirm that any train with 20% defective parking brake the units will hold a train at W2 loading on the greatest gradient.
- 1.11.6 Performance Calculation
- 1.11.6.1 The Contractor shall calculate train performance by simulation. Running curve with speed versus distance for both directions in powering and braking modes at W0 and W2 loading

- 1.11.4.1 The Contractor shall confirm by calculation and test that 8 cars trainset at the 7t/car loading condition, with the isolation of 25% motorised bogies the limited express train is capable of completing continuous trip within the stipulated running time.
- 1.11.4.2 The Contractor shall confirm by calculation and test that 8 cars trainset at 7t/car loading condition, with the isolation of 50% motorised bogies the limited express train is capable of completing one round trip including traversing the maximum gradient of the main line. However, reduction of acceleration and restriction of regenerative braking force may be accompanied.
- 1.11.4.3 The Contractor shall confirm by calculation and test that 8 cars train-set at 7t loading condition is capable of pushing/towing the 10 cars train-set of commuter train (5M5T) at 20t/car loading condition (537 ton) to the nearest station, including traversing the maximum main line gradient. If the healthy train cannot pushing or towing on the maximum main line gradient, the high acceleration mode shall be applied.
- 1.11.4.4 Similarly, the Contractor shall confirm by calculation and test that 8 cars train-set at W0 loading condition is capable of pushing/towing the 10 cars train-set of commuter train (5M5T) and limited express train at tare condition (337 ton), with an inoperative propulsion system, from the farthest terminal station back to Depot, including starting on the gradient of 3.5% upgrade. If the healthy train cannot push or tow on the 3.5% upgrade, the high acceleration mode shall be applied. This requirement is under the non-slip condition under Philippines natural environment condition, and the adhesion at this requirement does not need to be considered. The test can be conducted under the non-slip condition. Provision for 10 car trainsets shall be provided for future upgrade.
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and vibrations of the Rolling Stock satisfactorily such that they do not fail prematurely on this account earlier to the designed life. To establish this requirement, all of equipment, sub-assemblies and components shall be subjected to shock and vibration test to JIS E 4031 or other relevant standard. Various equipment on the vehicles complies with JIS E 4031 standard, which can withstand the vibration level with frequency 1 - 500Hz in longitudinal, lateral and vertical directions. If the trains run in full speed, each piece of equipment and the carbody of the vehicle does not resonate.

1.12.2.3 With the train at stationary and with all auxiliary equipment operating at rated capacity, no portion of the interior of the vehicles shall exceed the following levels of vibration:

- 1) 2.5 mm peak-to-peak amplitude for frequencies less than 1.4 Hz,
- 2) 0.01 g peak acceleration for the frequency range 1.4 Hz to 20 Hz, and
- 3) 0.75 mm/second peak velocity for the frequency range above 20 Hz.

1.12.3 Noise and Vibration Control

1.12.3.1 Rotating or reciprocating equipment and inductive electrical equipment (such as transformers, inductors, etc.) mounted to the rail carbody, which may become a source of vibration, and any equipment (bogie or carbody mounted) which may become a source of noise shall be adequately provided with resilient suspension and acoustically attenuated respectively.

1.12.3.2 The resonant frequency of the resilient suspension system shall be designed to avoid coupling with that of the vehicle structure. All suspensions are to be designed to provide maximum isolation for all modes of vibration. Also, resilient mounts must be arranged in a manner such that the equipment will be retained safely on the vehicle, and may continue operation, under all operating conditions stated in this ERT and any other applicable specification, in the event of a complete failure of the elastomeric material.

1.12.3.3 It shall be the responsibility of the Contractor to take all necessary precautions to minimize noise radiation and transmission by using up-to-date design techniques and proper acoustic attenuation materials, where required. The Contractor shall provide for review all pertinent details of the acoustic attenuation and any special noise reduction techniques used.

1.12.4 Aerodynamics and Pressure Effects

1.12.4.1 The Modular design and construction shall ensure that passengers and/or staff do not experience significant discomfort due to internal pressure changes when operating over the designated route induced by infrastructure and passing trains and effects on passengers on platforms and on trackside workers.

1.12.4.2 In the future, the new line between Clark station and New Clark City station will be open.

1.12.4.3 The new line plan has some tunnel and maximum operation speed is 160km/h. Airtight structure is required for rolling stock body.

1.13 **Ride Quality**

1.13.1 The vehicle shall be designed to be free from undue vibration and shock. All mounted equipment shall be free from resonance to avoid undue audible and visual distraction.

1.13.2 The ride quality shall be evaluated according to JIS E 4023 or other international ~~standards~~standards. ~~The~~ Contractor shall provide a vibration analysis for the Engineer’s review and acceptance, which shall demonstrate compliance to these ride quality requirements.

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- 5.7.5 The electrical sockets (220V 60Hz) / USB ports shall be provided adequate position on the seats one socket per person. The sockets shall be protected by a low amp breaker. As there are three (3) designs of socket sed in the Philippines, types A, B and C the most popular type shall be provided.
- 5.7.6 The seat design shall be ergonomically designed for passenger comfort, aesthetically pleasing, and eliminated gaps that will trap dirt or liquids.
- 5.7.7 The Contractor shall be required to supply documented evidence the proposed seats to have troubled-free service in a similar operating environment.
- 5.7.8 Specification of the seat shall be submitted by the Contractor for review by the Engineer.

**5.8 Accommodation for Disadvantaged Passengers**

5.8.1 The Contractor shall provide space on the leading vehicles to cater for people on wheelchairs, and people with prams. The prospective wheelchair space shall be prominently labeled on the floor with the appropriate standard sign. Additionally, ~~fully retractable and a~~ non-obstructive, ~~self-aid wheelchair tie-downs and a railway transportation proven wheelchair securement device with instruction decal~~ shall be made available ~~for ready installation~~ for each wheelchair space.

5.8.2 Each car shall be equipped with one (1) wheelchair space per car and 6 priority seats per car. The disabled and elderly passenger seat’s label shall be prominently displayed.

5.8.3 The wheelchair spaces shall be close to disabled type toilets.

~~5.8.3~~5.8.4 The priority seats location shall be nearest to the door as per Rule IV- Requirements for Public Transportation (BATAS PAMBANSA BILANG 344).

**5.9 Toilet**

- 5.9.1 The Contractor shall provide the two western type toilets per train. Both toilets must be designed for disabled Passengers and easy using with wheel chair.
- 5.9.2 The toilet system should have manure dirt tank and discharge it at depot and dispose. The capacity of waste tank shall be enough to store the toilet waste for three (3) days.
- 5.9.3 The fresh water tank at each toilet location, shall be sufficient for 3 days of usage.
- 5.9.4 Regarding the amount of waste per one person for the definition of tank-capacity, the Contractor shall be reviewed by the Engineer.
- 5.9.5 Regarding the direction of vent of waste tank, the Contractor shall discuss with CP N-05 Contractor and the Engineer.
- 5.9.6 The toilet system shall be vacuum flushing type.
- 5.9.7 In the toilet room shall be installed mirror, paper holder, hand wash corner and bidet shower (water hose with tap).
- 5.9.8 And shall be installed folding baby chair and folding baby bed on which the baby diaper can be changed.
- 5.9.9 There shall be waste bins in the toilet, one for common rubbish and one for diapers or sanitary products. They shall be clearly identified. The sanitary bin shall carry a Hazard Label.

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- 5.9.9 There shall be waste bins in the toilet, one for common rubbish and one for diapers or sanitary products. They shall be clearly identified. The sanitary bin shall carry a Hazard Label.
- 5.9.10 The toilet room shall be easy to clean, and shall be completely watertight.

**11 Propulsion System**

**11.1 General**

11.1.1 A modern and well service-proven three-phase alternating current propulsion system shall be provided ~~to the motor mounted cars for 6 cars of all 8 cars~~ and shall have the following features but not limited to:

- 1) One DC to AC inverter packages (Self cooling/force cooling Power Conversion Equipment), each powering the ~~four (4) traction grouped traction~~ motors in a vehicle;:-
- 2) For the purpose of the energy conservation improvement and low center of gravity the material of filter inductor shall be copper or aluminum;:-
- 3) The design of filter inductor shall be considered the energy-saving type;:-
- 4) The magnetic flux caused by filter inductor shall be less than 1mT at 1.0 m of the just above of filter inductor from the floor level;:-
- 5) A car level microprocessor-based control system (power electronics control equipment), which shall perform all propulsion of acceleration and regenerative braking;
- 6) Each AC squirrel cage traction motor shall drive a gear unit. Traction motor insulation shall be tropicalized and shall be Class 200 insulation or better; and
- 7) In the event of propulsion failure occurs on any car, that propulsion unit shall be automatically disabled (or by manual disable from the driver’s cab) to allow the trainset to be operated by the rest of the healthy propulsion units;:-
- 8) About the blending between friction brake and regenerative brake when brake starts, the dummy signal of regenerative brake shall be short as possible considering ride effort. In case catenary voltage is higher than the voltage which regenerative brake is effective, the dummy signal of regenerative brake shall not be used;:-
- 9) Lowered regenerative performance applied except for ATO normal mode may be acceptable in case it is difficult to achieve reasonable design in consideration with capacity and size, weight and so on. It shall be necessary to be reviewed by the Engineer when above performance will be adopted;:-
- 10) Wheel diameter correcting shall be made to this device;:-

~~The Contractor is allowed to propose alternative to the above requirement for Engineer review. The propulsion equipment arrangement architecture and features shall be finalised during design stage. Any time and cost implication to the changes of propulsion architecture and equipment arrangement from the bid submission to the given notice of no objection at final design, shall be borne by the Contractor and no contract variation shall be provided by the Employer.~~

11.1.2 The propulsion system shall have sufficient capacity for normal and recovery operation.

11.1.3 The Contractor shall validate and confirm the normal and recovery run (power consumption) curves submitted by CP NS-01 Contractor during design interfacing phase.

11.1.4 The Contractor shall simulate acceleration power consumption, generative power amount, RMS current, maximum drawn current during acceleration, maximum return current during regenerative braking to the Overhead Catenary System (OCS) and the temperature rise of each equipment etc. Total power consumption of around trip (Clark-Alabang) for the following minimum conditions shall be submitted for review by the Engineer:



## 11 Propulsion System

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- 9) Lowered regenerative performance applied except for ATO normal mode may be acceptable in case it is difficult to achieve reasonable design in consideration with capacity and size, weight and so on. It shall be necessary to be reviewed by the Engineer when above performance will be adopted;
- 10) Wheel diameter correcting shall be made to this device;

11.1.2 The propulsion equipment arrangement architecture and features shall be finalised during design stage. Any time and cost implication to the changes of propulsion architecture and equipment arrangement from the bid submission to the given notice of no objection at final design, shall be borne by the Contractor and no contract variation shall be provided by the Employer. The propulsion system shall have sufficient capacity for normal and recovery operation.

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running, etc.

~~13.2.3 (Not Used)~~

**14 Auxiliary Electrical Systems**

**14.1 General**

~~14.1.1~~ The limited express train shall be provided with auxiliary power supply equipment (APSE). Two (2) cars in the 8-cars train set shall have independent auxiliary power feeds at each voltage. The AC output of the APSE shall be sinusoidal under all conditions of load. The types of Emergency loads connected to the auxiliary electrical system shall include, not but limited to:

- 1) Emergency Lighting;
- 2) All Exterior Lights;
- 3) Communication Systems, AP system and CCTV system;
- 4) Propulsion, TMS, Brake Controls, and Air Compressor system;
- 5) Door Controls;
- 6) On Board Signaling equipment;
- 7) Cab console indicators;
- 8) Horn;
- 9) Wiper control/system;

10) Active Ventilation System of VAC.

~~14.1.2~~ The typical arrangement of APSE is as per Appendix A. The bidder shall propose the APSE equipment arrangement in the bid submission. The arrangement of APSE shall consider the system requirements (Clause 1 of ERT) of this tender and the EMI to the signaling equipment.

~~14.1.3~~ The architecture and equipment arrangement of APSE shall be finalised during design stage. Any time and cost implication to the changes of APSE architecture and equipment arrangement from the bid submission to the given notice of no objection at final design, shall be borne by the Contractor and no contract variation shall be provided by the Employer.

~~14.1.4~~ 14.1.4 All electrical equipment on the trains, other than the Power Conversion Equipment and the supply to the Auxiliary Power Supply Equipment (APSE), shall operate using the following nominal voltages, respectively:

- 1) 440 V<sub>AC</sub>, 3-phase, 60 Hz,
- 2) 220 V<sub>AC</sub>, 1-phase, 60 Hz,
- 3) 100 V<sub>DC</sub>
- 4) 12/24V<sub>DC</sub>

~~14.1.5~~ 14.1.5 The AC output shall be regulated within ±3% for all variations in input voltage and output load.

~~14.1.6~~ 14.1.6 The DC output shall be regulated within ±1% for all variations in input voltage and controlled not to damage the battery that has been floating charge.

~~14.1.7~~ 14.1.7 Sufficient capacitor shall be equipped when the pantograph leaves from overhead

running, etc.

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- 2) All Exterior Lights;
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- 3) 100 V<sub>DC</sub>
- 4) 12/24V<sub>DC</sub>

14.1.5 The AC output shall be regulated within  $\pm 3\%$  for all variations in input voltage and output load.

14.1.6 The DC output shall be regulated within  $\pm 1\%$  for all variations in input voltage and controlled not to damage the battery that has been floating charge.

14.1.7 Sufficient capacitor shall be equipped when the pantograph leaves from overhead catenary instantaneously, the power supply of APSE shall not stop. This guarantee time shall be reviewed by the Engineer.

catenary instantaneously, the power supply of APSE shall not stop. This guarantee time shall be reviewed by the Engineer.

~~14.1.6~~14.1.8 The Contractor shall submit the required capacity calculation considering 10 cars train-sets in the future extension and reviewed by the Engineer.

~~14.1.7~~14.1.9 The design of the auxiliary electrical system shall have sufficient capacity to provide backup power for normal operation of the emergency loads even in the event of lost overhead power. The design of the auxiliary electrical system and its capacity, including the backup power, shall be reviewed by the Engineer.

~~14.1.8~~14.1.10 This system shall have fuse and HSCB.

**14.2 Auxiliary Power Supply Equipment**

14.2.1 ~~Two (2) cars in the 8 cars train set shall be equipped with~~The Auxiliary Power Supply Equipment (APSE) shall capable of supplying all loads continuously. The failure of an APSE shall be enunciated in the Driver’s cab and shall be recorded in the TMS and APSE. At least one dead battery start device shall be incorporate in one train-set, which shall be located in the Driver’s cab.

14.2.2 The APSE shall consist of ~~but not limited to an~~ auxiliary power inverter (Si-IGBT or Hybrid-SiC Technology, force ventilated), to supply all AC power, and a Low Voltage Power Supply (LVPS) to provide low voltage DC power. ~~And APS shall have~~HSCB and Fuse to protect from over current.

14.2.3 When designing the auxiliary power inverter, particular care shall be taken to account for the simultaneous starting of large auxiliary loads, such that rapid cycling is avoided (particularly the VAC compressor). The inverter shall use a control scheme that contains extensive self-diagnostic logic, and receptacles shall be placed in the vehicle interior and exterior to allow the connections to any necessary test equipment.

14.2.4 The chassis of APSE shall be with the use of aluminum alloys.

14.2.5 The auxiliary power inverter output transformer shall be galvanically isolated, and the secondary windings shall incorporate a ground fault protection system. Upon detection of a ground fault, a fault message shall be transmitted to the TMS.

14.2.6 The LVPS shall provide the power to all system controls, including the Power Conversion Equipment, friction brakes (computer, brake control units, dump valves, etc.), VAC equipment, lighting, communication equipment, doors, radio, ATP, etc. The LVPS shall be solid-state and shall contain appropriate transient suppression and protective circuitry. The LVPS shall also incorporate appropriate fault and operation indicating lights and test switches. The failure of an LVPS shall be recorded in the TMS and APSE. Logged fault into the TMS and APSE shall be stored and remain until certain number of faults. APSE shall have ordinary-speed and high-speed trace function. In high-speed trace function, logged fault related to the switching of element and behavior of instantaneous current and voltage etc. shall be required to be available for fault diagnostic analysis.

14.2.7 The output of the LVPS shall be routed to the low voltage distribution panel/cabinet inside the car. The negative return current from each subsystem shall run individually to the Engineer’s reviewed insulated common point located in an enclosure under the car.

14.2.8 The entire Auxiliary Power Supply Equipment and controls shall be reviewed and commented by the Engineer.

14.2.9 If APS stops to operate by a serious failure, switch which can reset from the driver cab shall be installed.

- 14.1.8 The Contractor shall submit the required capacity calculation considering 10 cars train-sets in the future extension and reviewed by the Engineer.
- 14.1.9 The design of the auxiliary electrical system shall have sufficient capacity to provide backup power for normal operation of the emergency loads even in the event of lost overhead power. The design of the auxiliary electrical system and its capacity, including the backup power, shall be reviewed by the Engineer.
- 14.1.10 This system shall have fuse and HSCB.

## 14.2 Auxiliary Power Supply Equipment

- 14.2.1 The Auxiliary Power Supply Equipment (APSE) shall capable of supplying all loads continuously. The failure of an APSE shall be enunciated in the Driver’s cab and shall be recorded in the TMS and APSE. At least one dead battery start device shall be incorporate in one train-set, which shall be located in the Driver’s cab.
- 14.2.2 The APSE shall consist of but not limited to auxiliary power inverter (Si-IGBT or Hybrid-SiC Technology, force ventilated), to supply all AC power, and a Low Voltage Power Supply (LVPS) to provide low voltage DC power, HSCB and Fuse to protect from over current.
- 14.2.3 When designing the auxiliary power inverter, particular care shall be taken to account for the simultaneous starting of large auxiliary loads, such that rapid cycling is avoided (particularly the VAC compressor). The inverter shall use a control scheme that contains extensive self-diagnostic logic, and receptacles shall be placed in the vehicle interior and exterior to allow the connections to any necessary test equipment.
- 14.2.4 The chassis of APSE shall be with the use of aluminum alloys.
- 14.2.5 The auxiliary power inverter output transformer shall be galvanically isolated, and the secondary windings shall incorporate a ground fault protection system. Upon detection of a ground fault, a fault message shall be transmitted to the TMS.
- 14.2.6 The LVPS shall provide the power to all system controls, including the Power Conversion Equipment, friction brakes (computer, brake control units, dump valves, etc.), VAC equipment, lighting, communication equipment, doors, radio, ATP, etc. The LVPS shall be solid-state and shall contain appropriate transient suppression and protective circuitry. The LVPS shall also incorporate appropriate fault and operation indicating lights and test switches. The failure of an LVPS shall be recorded in the TMS and APSE. Logged fault into the TMS and APSE shall be stored and remain until certain number of faults. APSE shall have ordinary-speed and high-speed trace function. In high-speed trace function, logged fault related to the switching of element and behavior of instantaneous current and voltage etc. shall be required to be available for fault diagnostic analysis.
- 14.2.7 The output of the LVPS shall be routed to the low voltage distribution panel/cabinet inside the car. The negative return current from each subsystem shall run individually to the Engineer’s reviewed insulated common point located in an enclosure under the car.
- 14.2.8 The entire Auxiliary Power Supply Equipment and controls shall be reviewed and commented by the Engineer.
- 14.2.9 If APS stops to operate by a serious failure, switch which can reset from the driver cab shall be installed.

### 14.3 Redundant system

14.3.1 ~~Two (2)~~ APSEs mounted on ~~train-set~~ limited express train shall ~~perform~~ have a parallel synchronous operation. If one of two performing parallel synchronous stops by trouble, the other APSE shall perform normally. Then, the signal of VAC degraded mode of operation shall be transmitted to VAC of the affected area through TMS.

### 14.4 Maintenance Requirements

14.4.1 No component in the APSE and the ACU except for cover packing, power supply unit (AVR), gate IF, contacts of LB shall require removal or replacement for at least 12 years.

14.4.2 Any fault in the APSE or the ACU shall be logged and into the Fault Indication System of the TMS and ACU. What is needed of any fault shall be enunciated in the Driver’s Cab. Logged fault into the TMS and ACU shall be stored and remain until certain number of faults. ACU shall have ordinary-speed and high-speed trace function. In high-speed trace function, logged fault related to the switching of element and behavior of instantaneous current and voltage etc. shall be required to be available for fault diagnostic analysis.

14.4.3 Means shall be provided to automatically discharge capacitors whose voltage might present a hazard to a maintenance worker opening any enclosure. Discharge time shall not be more than 5 minutes.

### 14.5 Circuit Breaker Panels and Isolating Switches

14.5.1 The following distribution panels shall be provided:

- 1) Low (100 Vdc) Voltage Circuit Breaker Panel;
- 2) 220/440 V<sub>AC</sub> Circuit Breaker Panel;
- 3) All 220/440 V<sub>AC</sub> circuit breakers shall be located in a separate enclosure, and shall individually protect the circuits;
- 4) Panel for Auxiliary Power Supply Equipment;
- 5) Spare Circuit Breakers for all panels and
- 6) All isolating switches and Circuit breakers necessary for vehicle intervention shall be placed inside the driver’s cab for easy access and intervention.

14.5.2 All circuit breakers and switches necessary for vehicle revenue line fault intervention shall be located inside the drivers’ cab. The final list of circuit breakers and switches shall be subject to review by the Engineer. All circuit breaker panels shall be reviewed and commented by the Engineer. Attention shall be paid that arrangement of the panels are coordinated in consideration with operations in MCRP, NSCR and NSRP-S.

### 14.6 Emergency Power Supply

14.6.1 When battery capacity decreases, pantographs cannot be raised and APSE cannot operate because of lack of DC100V as control power voltage. Therefore, the Emergency Power Supply function, shown below, shall be equipped.

14.6.2 After pantograph raised by releasing the lock manually, it shall be able to take DC1500V power from overhead catenary and the power shall be converted to DC100V by Emergency Power Supply function. This is done at transformer level.

14.6.3 In this case, insufficient voltage supply to device which need DC100V shall not be permissible for appropriate initialize of device. Cutting off the DC100V circuit from

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**ATTACHMENT 1**

**SUMMARY OF KEY DATES**

- (1) The Employer requires the Contractor to complete certain elements of work by specific Key Dates (KD). Delay in achieving those Key Dates shall render the Contractor liable to pay Delay Damages (as set out in Part A, Contract Data, of the Particular Conditions).
- (2) Achieving a Key Date for an element of work means that, before the expiry of the number of months relevant to the element in question (as specified in “Table 1 – Key Dates” below), all works related to that element have been completed to the satisfaction of the Engineer. The number of months shown in Table 1 against a Key Date and its specific element of work signifies the maximum duration in months from the Commencement Date within which the identified element must be completed. The number of months shown in Table 1 will be converted into actual calendar dates after receipt by the Contractor of the Engineer’s notification of the Commencement Date for the Project.

<b>TABLE 1 – KEY DATES</b>		
<b>Key Date</b>	<b>Element of Work</b>	<b>No. of Months</b>
KD 1	Achievement: Completing Final Design Review.	18 months
KD 2	Achievement: Deliver the Mock Up to the site	<del>31</del> 14 months
KD 3	Achievement: Completing FAI and FAT.	36 months
KD 4	Achievement: Supply and delivery of the following Rolling Stock equipment for training purposes to the CP NS-01 Contractor at the North Depot (for Training Center Facility): <ul style="list-style-type: none"> <li>- Equipment for driving simulator,</li> <li>- Pantograph, and</li> <li>- Bogie assembly for motor car including traction motor, gearbox and coupling.</li> </ul>	40 months
KD 5	Achievement: Completion of training and delivery of Operation and Maintenance Manual.	48 months
KD 6	Achievement: Delivery of 7 trainsets (1-7) and completion of testing and commissioning thereof plus handing over.	46 months
KD 7	Achievement: Delivery of all spare parts, consumables, special tools and jigs, plus as-built drawings.	49 months
KD 8	Achievement: Completion of Trial Operation support and the whole of the Works.	53 months

- (3) The Contract Packages with which the Works will be required to interface are as shown below.
- The North South Commuter Railway Project (Malolos-Tutuban) (NSCR):



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**ATTACHMENT 2**

**TIME FOR ACCESS TO THE SITE**

- (1) The date on which the right to access to a part of the Site as the works area available to the Contractor are defined below and the extents of such areas are specified in the Employer’s Requirements.
- (2) Month numbers shown in the schedule signify the elapsed time in months from the Commencement Date. The month numbers shall be converted into actual calendar dates after receipt by the Contractor of the Engineer’s notification of the Commencement Date. Access Date means the first day of the month specified below

Access Date	Site (Works Area)	Month no.
AD 1	On-board Signalling System and other equipment to be mounted on the Rolling Stock supplied by CP NS-01 Contractor from E&M Systems and Track Works.  The E&M System and Track Works Contractor will supply this equipment in Japan at the Rolling Stock Contractor’s premises or at alternative agreed location(s)	
	AD-1: for trainsets one to seven (1-7) supplied under this contract	<del>37</del> <u>25</u> months
AD 2	Access to allocated areas within the North Depot for receiving trainsets, assembling, testing, commissioning and test running within the depot.	<del>35</del> <u>27</u> months
AD 3	Access to the mainline from CIA to Clark (as available) for Test running and Performance Proving	<del>36</del> <u>28</u> months
AD 4	Access to the whole mainline from Calamba to CIA	<del>68</del> <u>77</u> months
NB	<ol style="list-style-type: none"> <li>1. <i>Access will be given progressively to the whole of the North South Commuter Railway for the use of this Rolling Stock.</i></li> <li>2. <i>Obtaining permission from the Railway Safety Inspector to use the Rolling Stock for commercial operations will be the responsibility of the Employer with the support of the Rolling Stock manufacturer.</i></li> </ol>	

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	AD-1: for trainsets one to seven (1-7) supplied under this contract	25 months
AD 2	Access to allocated areas within the North Depot for receiving trainsets, assembling, testing, commissioning and test running within the depot.	27months
AD 3	Access to the mainline from CIA to Clark (as available) for Test running and Performance Proving	28 months
AD 4	Access to the whole mainline from Calamba to CIA	77months
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