



General Bid Bulletin No. 19
30 July 2021

**THE MALOLOS-CLARK RAILWAY PROJECT AND THE NORTH-SOUTH RAILWAY
PROJECT SOUTH LINE COMMUTER PACKAGE CP NS-01: PROCUREMENT OF
ELECTRICAL AND MECHANICAL SYSTEMS AND TRACK WORKS (IFB No: 21-040-3)**

TO ALL PROSPECTIVE BIDDERS:

This General Bid Bulletin is issued to amend/clarify certain provisions in the Bidding Documents for the above-mentioned Project. Please refer to the attached Annexes of this General Bid Bulletin for details:

1. **Annex "A"** – Clarification to the Bidding Documents
2. **Annex "B"** – Addendum to the Bidding Documents with **"Attachment 1"**
3. **Annex "C"** – Not Applicable

All other portions of the Bidding Documents not affected by these revisions, amendments and/or clarifications shall remain unchanged.

Revisions/amendments/clarifications made herein shall be conserved as an integral part of the Bidding Documents of this Project.

For your guidance and information.

For the Bids and Awards Committee

SIGNATURE REDACTED

ENGR. JAIME M. NAVARRETE, JR
Chairperson

Annex A

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Item No.	Volume Section No. Page No. Clause No. / Title Reference Text	Clarification Request	Proposed Revised Text (if any)	Response
1	<p>Part I Section III, EQC - 11, 4.2 (b) Specific Experience</p> <p>S.N:10, "10) Minimum of two (2) contracts for Computerized Maintenance Management Systems (CMMS) for railway system maintenance."</p>	<p>Computerized Maintenance Management Systems (CMMS) and Enterprise Asset Management (EAM) are two similar type of systems that offer maintenance-oriented solutions.</p> <p>For Railway System applications, most of the System providers are generally providing Enterprise Asset Management (EAM) solution which typically overs the general requirements of a CMMS system also.</p> <p>Therefore we understand that credentials of providing Enterprise Asset Management (EAM) solution for Railway project shall meet the requirement EQC criteria mentioned in CI 4.2 (b) SN 10.</p> <p>Kindly Confirm.</p>		<p>System proposed shall comply with CMMS specification requirements.</p>
2	<p>General Bid Bulletin No. -6, PC - 11, 4) The Interface Contractor for the following Contract Packages with which the Works will be required to</p>	<p>As per the referred clause there are Tunnel works with approximately 4.7 km of underground Railway in the CP S-03b section. Whereas there was no Underground Section</p>		<p>In the S-03b contract area the tunnel is provided for MMSP and not for NSCR which is running above ground in this area. ITB 6.5</p>

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	<p>interface are as shown as below:</p> <p>- Package CP S-03b Civil Engineer, Tunnel and Building Works for approximately 6.1 km of Railway with 4.7km of Underground Railway and 1.4 km of at-Grade Railway, including FTI Station and Tunnelling Works to connect to MMSP Senate section.</p>	<p>shown in the alignment Drawings provided in the Tender drawings.</p> <p>Hence, we request you to provide the details of Underground sections in the CP S-03 b and the alignment drawings for the same.</p>		<p>provides details of where the civil drawing for this area can be obtained.</p>
3	<p>Part 3 Section VIII, PC - 08</p>	<p>Phase 1 (CP04) commissioning, whether it will be linked to PSD? or will it be independent of PSD works of Section 1</p> <p>Section 1 (Malolos - Solis), since the civil works is already under construction and E&M Systems are being executed under another contract, we want to know if it will ONLY be in commercial operation after Completion of PSD works for Section 1, i.e NTP + 37 months?</p>		<p>Commissioning of Section 1 under CP04 shall include PSD. The substantial completion of PSD in Section 1 shall be at NTP+37 months</p>
4	<p>Part I Section IV, BF 301</p> <p>GBB-6, Page No. - 13</p>	<p>We would like to reiterate ITEM No. 22 of GBB 6, to confirm the list of spares and the quantity.</p> <p>Please confirm if the list of spare parts to be</p>		<p>The spare parts proposed by the bidder in the Form SPA shall be included in the bid amount. The bidder shall comply with the</p>

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	<p>SI. NO. 22, FORM SPA 1, Part 1 - Form SPA - Contractor list of proposed spare parts.</p> <p>The spare parts shall be the Contractor's scope. Please refer to the Section IV Bidding Forms Appendix 7.8 and Employer's Requirements for detail.</p>	<p>proposed in the form SPA are the spare parts already included in the contractor's bid amount?</p> <p>Or this is an additional list?</p>		<p>requirements shown in the Section VI Employer's Requirements.</p>
5	<p>Part 2 Section VI, ERT - 32, 1.14.1 & MCRP-DWG GEN-TK-0200, 4) The elastic material shall be adhered on the bottom surface of the sleeper beneath the rail position. The coefficient of elasticity shall be 25-30MN/m.</p> <p>6) Elastic material is attached to avoid adhesion between sleeper and the track bed on the end surface and side surface of the sleeper. The</p>	<p>From the referred Clauses and Drawings, we understand that the Elastic Material shall be attached to the Sleeper bottom, end surface and side surfaced at the factory itself.</p> <p>We also understand that the bidder need not to provide separate Boot or Anti Vibration Sleeper Box.</p> <p>Kindly Confirm.</p>		<p>The elastic materials at the sleeper bottom, end and side surface is one set and can be considered as Boot or Anti Vibration Sleeper box following the requirement stated in ERT 1.14.1. The contractor shall submit the detailed design subject to Engineers review and approval.</p>

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	coefficient of elasticity of the material shall be about 250-300MN/m.			
6	Part 2 Section VI, ERT - 22, 1 . 12. 1, 4) All rails shall be produced by one manufacturer.	We understand that all the rails required for the Mainline shall be procured from the same manufacturer. However, this shall not include on the rails required for the depot. The contractor can supply Rails required for the Main line from one supplier and the Rails required from the Depot from another supplier, if required. Kindly confirm.		Two manufacturers will be acceptable. One manufacturer for mainline rails only and one manufacturer for Depot rails only.
7	Part 2 Section VI, ERT - 29, 1.13.5, 1.13.5 Anchorage System 4) Baseplates shall be anchored by a minimum of two (2) high tensile bolts at straight sections of the mainline. If necessary due to lateral loadings, four (4) high tensile bolts at curve sections radius less than 500 m may be used	We request the employer to specify the limit of Lateral loadings to be considered to assess whether 4 Nos. of high tensile bolts are required or not in curves with Radius less than 500 m.		It is the Contractor's responsibility as part of the contract to specify the limit of the lateral loadings to be considered subject to the Engineer's review and approval.

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8	<p>Part 2 Section VI, ERT - 29, 1.13.5, 1.13.5 Anchorage System</p> <p>4) Baseplates shall be anchored by a minimum of two (2) high tensile bolts at straight sections of the mainline. If necessary due to lateral loadings, four (4) high tensile bolts at curve sections radius less than 500 m may be used</p>	<p>We understand that due to lateral loadings in curve sections with radius less than 500m, if required, the bidder may use 4 high tensile bolts to anchor the Fastening system.</p> <p>We request the employer to provide reference drawings for the 4-hole baseplate and Fastening System with 4 bolt assembly.</p>		The contractor shall provide the detailed drawings as part of the detailed design contract subject to Engineers review and approval.
9	<p>Part 2 Drawings,</p> <p>MCRP-DWG-ALT04-PL-0007 MCRP-DWG-ALT04-PL-0008 MCRP-DWG-ALT04-PL-0009 MCRP-DWG-ALT04-PL-0010 MCRP-DWG-ALT04-PL-0011 MCRP-DWG-ALT04-PL-0012</p> <p>Track Alignment Drawings</p>	<p>From the referred Track alignment Drawings, we understand that the Bidder shall install Track Works in Underground section for a length of 6 TKM approximately.</p> <p>However, Typical Cross section Drawings for Underground section are not provided in the Tender documents. Hence, we request the employer to provide the same and specify if any different type of Track Structure shall be installed in the Underground section.</p>		Mainline track structure shall be adopted for the underground section.
10	<p>Part 2 Section VI, ERT - 23, 1.12.5, End</p>	<p>We understand from the referred clause that, end hardened rails shall be used only in</p>		It is the contractor's responsibility to determine the use of End Hardened Rails

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	hardened rail shall be used for jointed section in the mainline with a radius larger than or equal to 800 meters.	mainline jointed section. Whereas the entire section is connected by Continuous Welded Rails. Hence, we understand that, End Hardened Rails are not required to be used for the mainline. Kindly confirm,		during detailed design stage subject to Engineers review and approval.
11	Part 2 Section VI, ERT - 51, 1.27, Track maintenance vehicles shall be provided for the ongoing maintenance of the line. Main track maintenance being considered are replacement of materials, rail grinding, realignment, etc.	We request the Employer to kindly provide the expected Delivery Schedule of the Track Maintenance Vehicles and Equipment		The delivery schedule for Track Maintenance Vehicles and Equipment shall follow Key Date KD 2-5.
12	Part 2 Section VI, ERT - 39, 1.17.10, 1. The turnouts shall be designed for the following operational speed	We understand that the speeds specified in the referred clause are Operational speeds. We request the employer to provide the Design speeds for all the turnouts in mainline and Depots		The contractor shall provide the design speed of the turnouts based on the operational speed requirement stated in ERT 1.17.10 subject to Engineers Review and Approval.
13	Part 2 Section VI, ERT - 19 & ERT - 25, 1.10.2	As per the clause 1.10.2 (1) the Safety guard device is not required in the depot area, whereas as per the clause 1.12.12 (1) Safety		ERT 1.10.2 (1) shall prevail

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	<p>& 1.12.12, 1.10.2 Depot</p> <p>1) The safety guard device is not required in the depot area. It is required only for the depot access track and test track, only if the radius of the curve is less than 200.....</p> <p>&</p> <p>1.12.12 Safety Guard Device</p> <p>1) Guard rails shall be installed in main line on all curves with a center line radius of less than 250m, and in depot on 200m or less radius curves except turnouts.</p>	<p>Guard Device shall be installed in Depot in curves with Radius less than or equal to 200m.</p> <p>The two referred clauses seem to be contradictory to each other.</p> <p>Kindly confirm whether the bidder shall provide Safety Guard Device in depots or not.</p>		
14	<p>Part 2 Section VI, ERT - 19, ERT - 20, 1.10.3, 1) Fastening assemblies shall be at nominal 667 mm or less centers for</p>	<p>Kindly specify radius of curve, below which the fastening system shall be provided with a normal spacing of 625mm or less.</p>		<p>It is the contractor's responsibility as part of the Design and Build contract to identify the radius of curve where 625mm spacing shall be used subject to Engineers review and approval.</p>

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	straight tracks, and 625 mm or less centers for curved tracks.			
15	Part 2 Section VI, ERT - 23, 1.12.4, 2) Head hardened rail shall be used on area where there will be a high frequency of starting or stopping (station areas)	We request the employer to provide the limits in the Station areas where Head hardened rails shall be used.		It is the scope of the contractor to provide the limits in the detailed design stage as part of the Design and Build Project subject to Engineers review and approval.
16	Part 2 Section VI, ERT - 36, 1.17.2, 2) The rail fastening system for the track work	The sentence from the referred clause seems incomplete. Please clarify		The clause refers to the requirements for the depot turnouts that rail fastening shall be provided.
17	Part 2 Section VI, ERT - 37, 1.17.2, 13) Test track turnouts shall be compatible with the maximum attainable speed at the test track	We request the Employer to specify the Design & Operational speeds of the Test track		The contractor shall propose based on the detailed design subject to the Engineer's review and approval.
18	Part 2 Drawings, 132/315, MCRP-DWG-ALT04-PL-011	We request the Employer to specify the distance between Northbound and South bound at scissor crossover at chainage 85+600		The distance between the northbound and southbound scissor crossovers is 5400mm between Track centers.
19	Part 2 Drawings, 167/315, MCRP-DWG-ALT04-PL-0001	We request the Employer to clarify whether the design, supply and installation of diamond crossing ST-03 at chainage 0+978 is included in the scope of works of CP NS-01 contractor or not.		Please refer to GBB16 Annex B Item 23 for the SBT (Solis, Blumentritt, Tutuban) propose layout. The design, supply and installation of SBT area is the scope of the contractor.

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		Kindly also specify the Geometry of the Diamond crossing.		As the civil contract for this section is not yet finalized, the bidder can use the SBT layout for bidding purposes. Future interface shall be done at appropriate time.
20	Part 2 Drawings, 168/315, MCRP-DWG-ALTO4-PL-0002	We understand that the design, supply and installation of following are not included in the scope of works of CP NS-01 contractor. - Turnout BLUE-09 - Connecting track from turnout BLU-09 to turnout BLU-10 - Connecting track from turnout BLU-09 to turnout BLU-11 Kindly confirm		It is the scope of NS-01 contractor.
21	Part 2 Drawings, 176/315, NSRP-SW-ALT-PL-D-0001	We understand that the design, supply and installation of following are not included in the scope of works of CP NS-01 contractor. - Turnout BLUE-09 - Connecting track from turnout BLU-09 to turnout BLU-10 - Connecting track from turnout BLU-09 to turnout BLU-11 Kindly confirm		It is the scope of NS-01 contractor.

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22	Part 2 Drawings, NSRP-SW-ALT-PL-D-0002	Two turnouts are indicated on Southbound and Northbound track at approximately chainage 20+630. Kindly confirm the Scope of Works of the CP NS-01 Contractor for these turnouts and also specify the geometry of these two turnouts.		The two (2) turnouts on Southbound and Northbound line of NSCR, south of Bicutan station that connects NSCR and MMSP are the scope of NS-01. The turnout is identified as #12 simple turnout. The updated track alignment will be issued at appropriate time.
23	Part 2 Section VI, ERT - 22, 1.12.2, 1.12.2 Rail Section and Material 1) Rail EN60E1 for mainline, EN60E1 or JIS60 for mainline turnout and JIS50N for depot areas compliant to JIS E1101 or equivalent shall be utilized.	We understand that JIS50 N rails or equivalent rail sections like 90 UTS or 52 kg rails can be used for the Depot sections. Kindly confirm		Depot section rails and turnouts are limited to JIS 50N. Other rail types are not allowed.
24	Part 2 Section VI, ERT - 315, clause no. 2.2.2 (d), d) At least two (2) meeting rooms in the OCC, shall be equipped with video conference facilities.	We understand that there are 3 meeting rooms and 3 conference rooms in the floor plan of OCC. Kindly confirm which of the 6 rooms or 3 meeting rooms should be installed VC end points?		This is a Design and Build Contract. The exact rooms shall be decided during contract execution together with the O&M Concessionaire.

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		This input is required as we need to consider the size of the room for the model of the Endpoint to be used.		
25	Part 2 Section VI, ERT - 239, 3.9 Testing, Commissioning and Verification 3.9.4 Special Tool and Test Equipment, 6) The Contractor will be required to maintain the equipment software throughout the guarantee period and hand over the same at the end of the guarantee period. As part of the diagnostic test equipment, the Contractor shall provide the following: - Sets of replacement cable and connector assemblies and a suitable number of interface hardware for each piece of test equipment; and	Kindly confirm the purpose of replacement cable and connector assemblies? We understand that they are solely for testing purposes.		It is a standard for a test equipment to have a spares, or replacement cables and connector assemblies in cases that it malfunctions.
26	Part 2 Section VI, General	Kindly share the floor plan indicating the end points. The information is required for accurate		This is a Design and Build Contract. The contractor should design the end points

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		calculation for the number of ports for switches.		and calculate the number of ports for the switches.
27	Part 2 Section VI, ERT - 315, 3) Intercom System, a) Master Device b) Slave Device	Quantity of slaves and location to place both the master and slave are not specified. We need at least the location on where Master and Slave devices should be placed.		This is a Design and Build Contract. The contractor should calculate the quantity and define the locations based on his design.
28	Part 2 Section VI, ERT - 312, Appendix 3: Voice and Data, Voice Recording in IP-PBX	Kindly share the following information which is required for our estimation purpose: 1. Average number of calls per day 2. Average minute per call 3. Life Span of Recording stored.		This is a Design and Build Contract. Required capacity of recording to be analyzed by the contractor. Recording shall be stored for at least 4 weeks. Please refer to ERT-278- Section 5- Call Logging.
29	Part 2 Section VI, ERT - 343, Appendix 7: Time Server and Master Clock System, The time information shall be obtained from GPS and delivered through an IP network by intelligent protocols. The time information shall be displayed on the slave clocks via the Master clock and sub-master clocks. The slave clocks shall be powered via sub-master clocks. Other equipment except	Kindly confirm if slave clocks must be powered only by sub-master clocks. Can slave clocks be connected through a POE Switch instead of sub-master clocks? Kindly confirm.		The slave clock is powered from POE conforming to IEEE 802.3af. Please refer to ERT 348 Section 6) Slave Clock.

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	slave clocks shall be powered via the L2 switch (PoE) on the upper streamside			
30	Part 2	On the voice recording system of Pa and Radio, Kindly confirm if the voice logs have to be stored on the same server.		This is a Design and Build Contract. Both the PA and Radio Systems have Voice logs. A separate recorder is preferred.
31	Part 2 Section VI, General	Kindly clarify the years of license required for Radio Frequency Kind confirm if any coordination is required with Smart or other relevant third parties regarding frequency related structures, activities or licensing requirements.		The required number of years for the license is dependent on how many years the Contractor will utilize the license in the implementation works before it will be handover to the O&M Concessionaire. We believe that the Radio Frequency Operating License is an annual renewal. Please inquire with the NTC Licensing on the specific for the Radio System Operating License application and other required permits. Coordination with Smart is necessary and required as the Radio Frequency band that was assigned by NTC for this project will Co-share with Smart Communications. Please Refer to ERT 263 on this item.
32	Part 2 Section VI, ERT - 106, 2.11.8, A failure of the ATP system shall	It is our understanding that lineside signals are not needed for degraded operations modes in		Please refer to GBB 4 Annex A item 64

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	<p>prevent the train to be driven in ATP Manual mode, reverting to SR Mode. In this mode, the speed of the train shall be limited to 25 km/h.</p> <p>A complete malfunction of the on-board ATP system will require that the system is overridden. To override the ATP system, a sealed switch shall be provided by the rolling stock contractors. Operation of this switch shall be logged within the TMS and the speed restricted to 25 km/h by the Rolling Stock system.</p>	<p>case of a complete malfunction of the ATP (ERTMS N2). Please confirm our understanding.</p>		
33	<p>Volume II of IV - Part 2 Employer's Requirements, ERT - 151, 2.19.3, The contractor shall supply, install and integrate a level crossing system at the Depots comprising of sliding gate barrier, visual and audible warning devices.</p>	<p>There are some level crossing in Banlic depot wihch is located in non-signaled area (without track detection and operated manually) Is it needed to operate and equip those level crossings automatically?</p>		<p>Please refer to GBB 4 Annex A item 62</p>
34	<p>Volume II of IV - Part 2 Employer's Requirements, ERT - 114, 2.13, These shall be located on each slide of each</p>	<p>We understand that this system is based in some pushbuttons located along platforms and in SCr in order to stop the trains in case of</p>		<p>The Bidder's understanding is correct. The push buttons will interface with Signaling system. It is to be installed at all stations.</p>

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	platform. On each platform, there shall be 3 Emergency stop switches provided and in the Station Control Room.	emergency. Shall this system interface with the trackside signalling system (CBI, RBC . . .) or it should be interface directly with the train for emergency brake? It should be installed in all stations even where no interlocking exists?		
35	Volume II of IV - Part 2 Employer's Requirements, ERT - 1070, 12.2.1, An Integrated ATS and OCC to unify the operational control and monitoring of the three lines N1, N2 and SC	The ATS to be provided in this contract must integrate all the trackside equipment of the NSCR-N1 contract? In that case the number of stations and its topology is need for bidding. Another solution is proposed by keeping the ATS system from the NSCR-N1 contract, migrating it to the IOCC and providing different workstations or control areas for each section (N1, N2 and SC) in the same control room. This would make easier the migration plan.		NS01 shall interface with CP04 and propose solution at design stage for the approval of Engineer. Bid condition shall prevail.
36	Volume II of IV - Part 2 Employer's Requirements, ERT - 166, 2.26.10.4, The Contractor will make all such arrangements within the contract price and no separate payment shall be made for the above-mentioned works; all associated costs shall be included in the CP NS-01 Contractor's bid.	It is our understanding that the works related to adapt the systems of other contracts (NSCR-N1 and MMSP) for interface purposes shall not be included in the contractor's bid. Those works would be carried on by other contractors. This contract should include only the works for interface contractor's systems with the other systems.		This is interface with other contractors. NS01 shall carry out work in NS01 scope with interfacing contractors in order to deliver the solution.

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37	Volume II of IV - Part 2 Employer's Requirements, ERT - 164, 2.26.9.2, For shunting purposes of various routes along the SBT area, that are critical to the operation of Clark to Calamba, a number of turnouts shall be provided between Solis, Tutuban and Blumentritt. These turnouts shall be controlled from interlocking/s.	Clarify if the signaling scope must start in the KP 0+495 or in the KP 1+329 so the point machines for the turnouts near Solis station must be provided.		Signaling work shall follow demarcation boundary as stipulated in NS01 Track works and carry out all works upto the Trackwork boundary. Please refer ERT 84, clause 2.4.1
38	Volume II of IV - Part 2 Employer's Requirements, ERT - 164, 2.26.9.2, For shunting purposes of various routes along the SBT area, that are critical to the operation of Clark to Calamba, a number of turnouts shall be provided between Solis, Tutuban and Blumentritt. These turnouts shall be controlled from interlocking/s.	It is our understanding that the CBI and ETCS equipment for Solis station is out of scope of this contract.		The Bidder's understanding is correct.
39	Volume II of IV - Part 2 Employer's Requirements, ERT - 163, 2.26.8, Train Control/Tunnel Ventilation System (TVS) Interface:	What is the purpose of this interface? We request to define the functions of this interface and if it should be safety related.		Please refer to GBB 15 annex A item 5. The contractor shall perform Hazard analysis and Risk assessment of this interface function for the review of the Engineer.

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	The physical interface between the two systems will be done at OCC/IOCC level. All required cables and cabling infrastructure from Signalling equipment room to TVS room will be provided by the Contractor.			
40	Volume II of IV - Part 2 Employer's Requirements, ERT - 163, 2.26.10.1, 4. The contractor shall ensure that the MMSP train is protected by the trackside equipment at all times, including in the event of switchover failure from CBTC to ERTMS L2 or vice-versa.	Does it mean that in case of a failure switching between systems, the OBI ETCS shall be capable of interfacing with the CBTC trackside equipment (Zone controller) for safe train operation? Same case with OBU CBTC interfacing with RBC ETCS N2. According to the question 3 in the GBB No. 3 we understand that no additional equipment will be needed in case of failure, due to this interface will be performed at Bicutan station at the stop, it means that in the event of switchover failure, the train could not pass from MMSP to NSCR line and vice-versa. Please, consider to eliminate or rewrite the text referred before (point 4).		No change in this clause. The Bidder shall perform the hazard analysis and risk assessment for the switchover function of signaling system at Bicutan station for Engineer's review and approval.
41	Volume II of IV - Part 2 Employer's Requirements, ERG - 11	Kindly clarify that Contractor shall include On board ERTMS and ATO equipment only for:		The Bidder's understanding is correct. This will be interface with other contractors.

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	ERG - 12, 4.3.2, Interfacing Contractors shall include but not be limited to the following: Package CP NS-03: Rolling Stock - Limited Express Trainsets Package CP NS-02: Rolling Stock - Commuter Trainsets Package CP03: Rolling Stock Package CP107: Rolling Stock for MMSP	Package CP NS-03: 7 trains Package CP NS-02: 38 trains Package CP 107: 30 trains Kindly clarify manufacturer and model of trains.		
42	GBB 5, , IT 3, There shall be interoperability requirement of Trackside equipment of NS01 with On board equipment of CP04 and Onboard equipment of NS01 with track side equipment of CP04. Please refer clause 2.4.1. The two contractors shall have to interface for interoperability.	Kindly clarify CP04 trackside Equipment.		Trains with NS01 OBU will travel on NSCR line including N1 section where Trackside signaling is provided by CP04.
43	Volume II of IV - Part 2 Employer's Requirements, ERT - 163, 2.26.9, For the track sideworks, the Contractor shall follow demarcation of the trackwork. However, the contractor	Please confirm if the contractor shall extend and terminate cables to the SER (Station Equipment Room) in Caloocan and Guiguinto.		The contractor shall extend and terminate cables to SER nearest stations i.e. in Solis and Malolos

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	shall extend and terminate all data and control cables up to the nearest equipment rooms of North side and South side of CP04 contract.			
44	<p>Volume II of IV - Part 2 Employer's Requirements Appendix A1, ERT - 189, 2.38.4, The Rolling Stock, ERTMS/ETCS Level 2 and Communications system shall perform Sytem Integration Test and the tests shall include but not limited to traction and braking control, precision stopping, jog function, door operation, and PA/PIS functioning test, remote commange and control for Rolling Stock monitoring and troubleshooting from OCC to train and safety related test, etc.</p> <p>A Train Event Recorder shall be provided by the ROLLing Stock Contractors, it shall be designed to resist tampering,and shall monitor</p>	<p>Bidders understands that the Rolling Stock's Contractors shall perform the testing and commissioning of ERTMS system. Bidder is responsible of the delivering of the protocol of test to ensure that the ETCS onboard system works satisfactorily.</p> <p>Confirm our understanding is correct.</p> <p>Which event recorder will be installed in each Package of Rolling Stock?</p>		<p>The Bidder's understanding is incorrect. NS01 Signaling shall conduct Integrated testing and commissioning of ETCS system along with Rolling stock contractor and Communication system.</p> <p>This is an interface with other contractors.</p>

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	and record data on train speed, direction of motion, time, distance, propulsion position, brake applications and operations (including service brake, emergency brake) equipped, cab signal indications, etc. The Contractor shall provide the requisite interface signal to RS for this purpose.			
45	Volume II of IV & Section VI - Employer's Requirements, ERT - 52, 3 (a), Track works - Transport and replacement of rails, sleepers, and ballast;	Please confirm length, number and size of rails to be transported at a time.		NS-01 contractor shall interface with O&M Concessionaire at appropriate time.
46	Volume II of IV & Section VI - Employer's Requirements, ERT - 52, 4 (g), Bi-directional cab operation	It will be bi-directional cab operation, operating cab at middle of the vehicle. Operating cab will not be at both end of the vehicle. Kindly confirm.		The Bidder's understanding is correct. One (1) operating cab that can be operated bi-directional.
47	Volume II of IV & Section VI - Employer's Requirements, ERT - 53, 5 (i), Connector for pneumatic andaelectrical control of hauling	Kindly clarify what kind of connecting interface is needed.		The contractor shall interface with Open Wagon which to be supplied together with Motor Car with Crane. Pneumatic and electrical interface controls are for loop integrity during hauling.

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	procedure shall be equipped with needs.			
48	Volume II of IV & Section VI - Employer's Requirements, ERT - 53, 6, Drive Power: All vehicle engines and machines must follow the requirements of the DENR order 2015-04	Kindly provide DENR order 2015-04 document and also provide the engine emission requirement.		Please refer on the link below. https://air.emb.gov.ph/
49	Volume II of IV & Section VI - Employer's Requirements, ERT - 53, 8 (a), Couplers shall be provided for hauling flat open wagon and covered wagon	Please provide coupler details.		This is an interface between NS-01 and NS-02 contractor.
50	Volume II of IV & Section VI - Employer's Requirements, ERT - 52 ERT - 53 ERT - 55 ERT - 56 Diesel Engine	Emission norms of the engine is not mentioned in the specification. Please confirm.		Local government laws and policies for emission norms and limits shall be complied. Please refer to DENR 2015-4 Administrative Order which is available on GOVPH website https://air.emb.gov.ph/
51	Volume II of IV & Section VI - Employer's Requirements, ERT - 52 ERT - 53	It is not mentioned in the specification, Please confirm that any international standard such as AWS, EN or equivalent is acceptable.		The Bidder's understanding is correct.

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	ERT - 55 ERT – 56 Welding standards			
52	Volume II of IV & Section VI - Employer's Requirements, ERT - 56, 5 (a), Measure speed 80km/h	For the requirement and speed of the network this measure speed seems very high. We request you to revise the Maximum Measure speed as 60km/h.		The contractor shall propose during project implementation and subject to the Engineer's review and approval.
53	Volume II of IV & Section VI - Employer's Requirements, ERT - 57, 5 c), Rail grinding velocity approximately 0.7 - 0.8 km/hr approx. 500m/track	This is a very low speed and can affect the rail surface. Kindly check and confirm.		The contractor shall propose during project implementation and subject to the Engineer's review and approval.
54	Volume II of IV & Section VI - Employer's Requirements, ERT - 57, 5 (d), Grinding depth 0.05mm/pass; and the centerline-average roughness of a worn rail is typically 0.5 to 2 microns. However, a ground surface is relatively rough because the grits in a grinding stone (like sand on a sanding disc) cut small grooves in the rail (the value of for a freshly ground rail is typically less than 12 microns)	Considering this is a MRT network for passenger carriage. This surface roughness requirement is not adequate. Leading passenger and metro network worldwide require a much better surface finish post grinding. Kindly check and clarify		The contractor shall propose the grinded rail surface requirement based on experience and subject to the Engineer's review and approval.

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55	Volume II of IV & Section VI - Employer's Requirements, ERT - 52 ERT - 53 ERT - 55 ERT - 56 Bogie-bogie configuration	It is not mentioned in the specification that vehicle should be Bogie-Bogie or Axie-Axie. Bogie-Bogie system are the standard configuration in all leading metros keeping in mind safety, speed, curve negotiability.		The contractor shall propose during project implementation and subject to the Engineer's review and approval.
56	Volume II of IV & Section VI - Employer's Requirements, ERT - 56 ERT - 57 Cabin	Cabin details is not mentioned in the specification. All leading metros require climate controlled cabins at each end of the machine. Keeping in mind safety and reliability.		The contractor shall propose during project implementation and subject to the Engineer's review and approval.
57	Volume II of IV & Section VI - Employer's Requirements, ERT - 56 ERT - 57 Machine frame compression strength	Machine frame compression strength details is not mentioned in the specification. Keeping safety in mind and considering the travel speed of the network, all leading metros require robust machine frame for safety of critical machine components specially grinding carriage.		The contractor shall propose during project implementation and subject to the Engineer's review and approval.
58	Volume II of IV & Section VI - Employer's Requirements, ERT - 56 ERT - 57 Diesel Engine	Emission norms of the engine is not mentioned in the specification. Please confirm.		Local government laws and policies for emission norms and limits shall be complied. Please refer to DENR 2015-4 Administrative Order which is available on GOVPH website https://air.emb.gov.ph//

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59	Volume II of IV & Section VI - Employer's Requirements, ERT - 60, 3, The track tramping machine shall be equipped with a minimum 4 tools of tamping heads with positioning and diagonal tamping configuration for maintenance of the plain track and turnouts in the depot. It combines the proven strengths of continuous action plane line tamping machines and the flexibility of turnout tamping machines: continuous forward motion and cyclic tamping for plain track and large parts of the turnout, 1-sleeper tamping unit for absolutely flexibility and, if necessary, cyclic working action for complex turn outs. The machine shall be capable of tamping 50m of track per hour and enable the operator to achieve the track geometry through turnouts to the required standards.	Could you please clarify the meaning of diagonal tamping configuration and cyclic working action for complex turnouts.		Diagonal tamping configuration is the normal position of the tamping heads/tool. Cyclic working action means that any tamping heads is flexible for tamping complex areas of the turnouts. Any Tamping heads/tool can be disabled and lifted/rotate.

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60	Volume II of IV & Section VI - Employer's Requirements, ERT - 60, 5 (b), Minimum curve radius 92m in depot area	Is it in work mode or travel mode?		Work mode and travel mode
61	Volume II of IV & Section VI - Employer's Requirements, ERT - 60, Diesel Engine	Emission norms of the engine is not mentioned in the specification. Please confirm.		Local government laws and policies for emission norms and limits shall be complied. Please refer to DENR 2015-4 Administrative Order which is available on GOVPH website https://air.emb.gov.ph/
62	Volume II of IV & Section VI - Employer's Requirements, ERT - 51 to ERT – 63, Need clearance envelope.	Please provide the details		All the Rail mounted maintenance vehicles shall follow the envelope as per rolling stock and structure gauge drawing MCRP-DWG-GEN-TK- 0020 Rev 6 or latest.
63	Volume II of IV & Section VI - Employer's Requirements, ERT - 51 to ERT - 63, EMC/test typing/brake line testing	Please provide details of any EMC/type testing/brake line testing or any other machine specific testing required on site upon commissioning		This is design and build contract. The contractor shall design and propose at design stage for Engineer's review and approval.
64	Volume II of IV & Section VI - Employer's Requirements, ERT - 51 to ERT - 63, Additional/special training	Please provide details of any additional/special training		Any additional trainings other than specified in the requirement shall be informed to the contractor in the appropriate time.
65	Volume III of IV PART 2 - Employer's Requirements Drawing No. MCRP-	We observe that the 110V DC battery & charger panel, 6.6 kV/400-230V operation transformer required for AC & DC auxiliary power supply and		Please consider using suitable size of Battery Charger and RTU Panel for the building dimension shall remain. Operation

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	DWG C/C-PSS-2115, 32 of 40, Sectioning Layout,	<p>the RTU Panel is not indicated in the Sectioning Post layout drawing. To accomodate these equipment we observe that the Sectioning post building dimension (15x17 mtrs.) as indicated in the drawing may not be adequate.</p> <p>Please clarify if the Building dimension can be increased as per the actual Equipment Layout arrangement requirements.</p>		transformer maybe indoor or outdoor depending on the space available.
66	Volume II of IV PART 2 - Employer's Requirements, 5. POWER DISTRIBUTION SYSTEM, ERT - 460, 5.1.2 Scope of Supply, The Contractor shall consider the effect of the induction voltage of the external transmission line (MERALCO, PELCO III, FELAPCO, AEC AND CEDC) on the distribution line of this Project and shall coordinate with the relevant Contractors regarding the provision of study and measures	<p>Kindly elaborate in the detail the requirement of the referred clause.</p> <p>As per our understanding, the 6.6 kV Distribution system cables will be routed separately in the Viaducts and cable embankments which may not have interference with the 69kV Transmission lines which is external and terminated only at TSS. Kindly confirm our understanding.</p>		The Bidder understanding is correct. Notwithstanding, the contractor is required to conduct EMC study including the impact of HV transmission line to the 6.6kV cable as part of the design deliverables.
67	Volume II of IV PART 2 - Employer's Requirements, 5. POWER	Kindly clarify if the outdoor lighting is to be provided for the entire main line i.e. for entire		Bid condition on the specified location shall prevail. The quantity of the outdoor lighting

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	DISTRIBUTION SYSTEM, ERT - 480, 5.6.8 Outdoor lighting, (1) Outdoor lighting in main line, Outdoor lighting for the main line shall be provided near the point machines, access stairs, in tunnels and covered areas and other dark areas where there is no or limited ambient lighting and at stabling sidings.	Viaduct and Cable embankment or only to the specific areas in the Viaduct like the point machines and access stairs. Also please provide in detail the lighting requirement at the stabling sidings.		for the mainline must be obtained by the contractor based on the outdoor lighting calculation design. Please refer to clause 5.6.8 ERT 481
68	Volume II of IV PART 2 - Employer's Requirements, 5. POWER DISTRIBUTION SYSTEM, ERT - 500, 5.1.2 Scope of Supply, (6) Scope of Works for low voltage distribution in the main line, 4) Protection devices for cable installation	Kindly elaborate the requirements of 'protection devices' for the cable installation.		A Protection relay device for cable.
69	Volume II of IV PART 2 - Employer's Requirements, 4. POWER SUPPLY SYSTEM, ERT - 361 ERT - 399, 4.1 Scope of Works, 4.1.1, (3)	We observe there is discrepancy in the requirement of Cable size selection of 69kV Cable from Distribution Utility up to the Substation is not Contractor scope of works, and it shall be by Electric Companies.		The Bidder understanding is correct. The contractor is required to provide technical information if requested as part of interface work

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	4.6.3 Interface Control Sheet, "The complete cable network and cable support system up to the connection in substations shall be carried out by others. However, the cable size and types shall be decided by the Contractor."			
70	Volume II of IV PART 2 - Employer's Requirements, 4. POWER SUPPLY SYSTEM, ERT - 400, 4.6.3 Interface Control Sheet,	<p>Kindly clarify the Metering device interface requirement.</p> <p>We presume that the Tariff meters shall be supplied and installed at VCT by other (Electric Companies)</p> <p>It is not clear what is the Metering device interface that needs to be considered by the Contractor.</p>		The contractor is required to provide technical information if requested as part of interface work
71	Volume II of IV PART 2 - Employer's Requirements, 4. POWER SUPPLY SYSTEM, ERT - 363 , 4.1.2 System Requirement,s 1), viii, The Contractor shall provide the	Kindly elaborate the requirement that is mentioned in the referred clause.		The power required to be used for all the equipment in the substation.

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	electric power if required, using in the substation electric power equipment etc.			
72	Volume II of IV PART 2 - Employer's Requirements, 4. POWER SUPPLY SYSTEM, ERT - 461, 5.1.2 Scope of Supply, (2) Scope of works for HRR and RER in the stations (3) Scope of works for HER in the Mabalacat Depot.	Kindly confirm that for HRR, RER and HER in Deport the LV cables from the Main Switchgear (400-230V) outgoing feeders to LV panel and other loads are not in Contractor scope of works. Only the LV cable between the 6.6kV/400V transformer to the Main Switchgear (400V) shall be considered in scope of supply. Please confirm our understanding		The Bidders understanding is correct however LV panel and cable for system equipment shall be in Contractor's scope. Please refer to GBB16 Annex B Item 8 and 14.
73	Volume III of IV PART 2 - Employer's Requirements Drawing No. MCRP-DWG C/C-PSS-2115, Sh. 30 of 40, SUBSTATION LAYOUT (SS No. S22), Control CCP Panel	We observe that the Control/CCP Panel has been indicated only in Substation layout drawing for SS no. S22 and not indicated in other Substation layout drawings. Kindly clarify the requirement of Control/CCP Panel. Also please clarify if the Building dimension can be increased as per the actual Equipment Layout arrangement requirements.		The Control Panel will be the main distribution board that will supply voltage on all substation equipment's control circuit. Building dimension shall remain. Please propose a suitable size of CCP/control panel.

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74	<p>Part 2 - Employer's Requirements Section V1. Employer's Requirements Technical Requirements, ERT - 389, Power Supply</p> <p>4.4.7 Photo Voltaic Power Generation Systems, (x) All necessary earthing system for solar power generation system.</p>	<p>Bidder presume that provision for earthing of Solart Roof-Top system equipment is available in the electrical room where interconnection panel for Solar is available. No additional below ground earthing grid/earth pit is considered in the Solar scope of work. Kindly confirm.</p>		<p>The Bidder's understanding is incorrect. Please refer to clause 4.4.7 (1) 2) ix ERT 391.</p>
75	<p>Part 2 - Employer's Requirements Section V1. Employer's Requirements Technical Requirements, ERT - 391, Power Supply</p> <p>(2) System Design and Performance Requirments, iv. The Power Conditioners and Remote Monitoring System shall be installed in the PV System Control System located at the station building ground floor.</p>	<p>Kindly provide the control system room location in the station building, bidder understand sufficient space is available for Inverter, ACDB & remote monitoring system, kindly provide equipment layout of proposed location.</p>		<p>The equipment layout is to be discussed by the contractor to the concerned interfacing parties.</p>

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76	<p>Volume II of IV PART 2 - Employer's Requirements, 4. POWER SUPPLY SYSTEM, ERT - 391, , vi. Proposed approximate peak solar power output shall be as following:</p> <p>Calumpit station: 100kWp</p> <p>Apalit station: 100 kWp</p> <p>San Fernando station: 100kWp</p> <p>Angeles station: 100 kWp</p> <p>Workshop in Depot: 1000kWp</p> <p>Light Repair Shop in Depot: 310kWp</p> <p>OCC building in Depot: 100kWp</p> <p>Paco station: 100kWp</p> <p>Nichols station: 100kWp</p>	<p>We presume that the rooftop solar power shall be connected to the Main Switchgear (400V) located in the High Voltage Receiving room of the Station building. Kindly confirm our understanding.</p>		<p>The Bidder's understanding is correct.</p>

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	FTI station: 39kWp EDSA : 100kWp Light Repair Shop in Depot: 310 kWp OCC building in Depot: 100kWp			
77	Part 2 - Employer's Requirements Section V1. Employer's Requirements Technical Requirements, ERT - 392, Power Supply (3) Particular Reaquirements, 3) PV Combiner i. Panel Type : IP 65 for outdoor, IP 21 for indoor, floor-mounted ii. Maximum voltage : 1000V DC iii. SPD protection: Type2 pluggable	Bidder understand that string inverter is required as per Sepcification requirement, hence PV combiner box not required, Kindly confirm.		The Bid condition shall prevail.
78	Part 2 - Employer's Requirements Section V1. Employer's	Kindly clarify the max. DC system voltage allowed - 1000V of 1500v.		Please refer to Annex B.

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	Requirements Technical Requirements, ERT - 441, , 3) PV Combiner ii. Maximum voltage : 1000V DC i. DC Power Cables - Rating: 1500V			
79	Part 2 - Employer's Requirements Section V1. Employer's Requirements Technical Requirements, ERT - 439, Power Supply 4.4.7 Photo Voltaic Power Generation Systems, 2) The scope of works for the Photovoltaic Power Generation System shall be as follows ii) Workstation (including software)	Bidder understand that 1 no. Workstation is required at each station location. Bidder understand that all workstations are independent and no interfacing is required between workstation of one station and workstation of other stations. Please confirm that bidder's understanding is correct.		The Bidder's understanding is correct.
80	Part 2 - Employer's Requirements Section V1. Employer's	Bidder understand that 1 no. Thermometer is required to be connected at back of PV module		This is a design and build project. The number of system components will depend

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	<p>Requirements Technical Requirements, ERT - 439, Power Supply</p> <p>4.4.7 Photo Voltaic Power Generation Systems, 2) The scope of works for the Photovoltaic Power Generation System shall be as follos:</p> <p>iv) Thermometer</p>	<p>at each station location. Please confirm that bidder's understanding is correct.</p>		<p>on the design considerations relevant to the general requirements stated on Clause 4.4.6 ERT 441.</p>
81	<p>Part 2 - Employer's Requirements Section V1. Employer's Requirements Technical Requirements, ERT - 439, Power Supply</p> <p>4.4.7 Photo Voltaic Power Generation Systems, The scope of works for the Photovoltaic Power Generation System shall be as follows</p> <p>v)Pyranometer</p>	<p>Bidder undesrand that 1 no. Pyranometer is required at each station location. Please confirm that bidder's understanding is correct.</p>		<p>This is a design and build project. The number of system components will depend on the design considerations relevant to the general requirements stated on Clause 4.4.6 ERT 441.</p>

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82	<p>Part 2 - Employer's Requirements Section V1. Employer's Requirements Technical Requirements, ERT - 439, Power Supply</p> <p>4.4.7 Photo Voltaic Power Generation Systems, xiii) All weather type display monitor installed in the station concourse for public awareness</p>	Bidder requests client to clarify the distance between the workstation of Photo Voltaic Power Generation Systems and LED 4K 50 inch display monitor in the each station location.		This is a design and build project. The design study, supply, installation, and commissioning will be under the scope of the contractor as stated in clause 4.4.6 (1) of ERT 441
83	<p>Part 2 - Employer's Requirements Section V1. Employer's Requirements Technical Requirements, ERT - 439, Power Supply</p> <p>4.4.7 Photo Voltaic Power Generation Systems, 8) Photovoltaic Power Generation System shall be interfaced with Power SCADA</p>	Bidder requests client to specify the communication protocol and interfacing point for communication with power SCADA		Please refer to clause 4.4.5 (10) & (13) of ERT 439 & 440.
84	ERT - 417, 58, (9) (2), AC Bus duct between Rectifier Transformer and Rectifier DC 1500V outdoor type	Can we propose an outdoor container solution with 2 rectifiers per container?		The bid condition shall prevail.

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	metal enclosed air insulated switchgear with high-speed circuit breaker and disconnecting switches, and			
85	Part II Section 6, ERT - 589, Table 6.4.7 Example of Specifications of F Type Foundation for the Stay, Sl. No. 5: Ready Mixed Concrete Nominal strength = 18 N/cm2	For OCS Foundation at depot, the nominal strength of concrete was mentioned as 18N/cm2. We understand that it is a type error. The nominal strength of concrete for OC depot foundation shall be 18N/mm2.		Typo. Units corrected to N/mm2. Please refer to Annex B.
86	Part II Section 6, ERT - 360 & ERT - 410, 4 POWER SUPPLY SYSTEM I. The Malolos- Clark Railway Project (MCRP) 4.1 Scope of Works, The work shall include the following: 1) Main Line with thirteen (13) Traction Substations (TSS), four (4) Battery Posts (SP) and at North Depot, one (1) Depot Traction station (Depot	We understand that the number & location of TSS mentioned in the tender documents is for indication only. However, the location & numbers of TSS can be finalized based on Traction Power simulation. Kindly Confirm.		The Bidder's understanding is correct.

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	SS), one (1) Depot sectioning Post (Depot SP) are planned to construct, and the locations and site conditions are described as follows:			
87	Part II Section 6, ERT - 360 & ERT - 410, 4 POWER SUPPLY SYSTEM I. The Malolos- Clark Railway Project (MCRP) 4.1 Scope of Works, The work shall include the following: 1) Main Line with thirteen (13) Traction Substations (TSS), four (4) Battery Posts (SP) and at North Depot, one (1) Depot Traction station (Depot SS), one (1) Depot sectioning Post (Depot SP) are planned to construct, and the locations and site conditions are described as follows:	We understand that the Ratings/Sizing of TSS mentioned in the tender documents is for indication only. However, the Ratings/Sizing of TSS whether higher or lower than the reference ratings/sizing shall be finalized based on Traction Power simulation. Kindly Confirm.		The Bidder's understanding is correct.
88	Part II Section 6, ERT - 398, 4.5.6 Installation of Cables, (1) Cable risers	We understand that the Cable troughs/trays on viaduct are in the scope of Civil Contractor and not in the scope of Current Contract CP NS-01.		The Bidder's understanding is incorrect. This will be under the scope of the NS-01

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	shall be protected with cable trays/steel conduit pipes	Kindly confirm.		contractor in coordination with interfacing parties.
89	<p>Volume II Section VI, ERT - 367, 4 PSS I. MCRP, 4.1.3 System Overview</p> <p>7) Battery Post v. The BP system shall be utilized to safely bring passengers to the nearest station during adjacent TSS power failure. The BP's shall be sized to allow for multiple trains within the electrical sections to move out of the affected section</p>	<p>As per the reference drawings provided in the tender, there are two types of Battery posts.</p> <p>Type 1: BAattery posts inside the Traction Sub-station</p> <p>Type 2: Battery posts independent of TSS on the line at the border of electric company - 4 Nos</p> <p>The tender specification is common and does not differentatte between the two types. The purpose and application of these two different typers of Battery posts are not clearly defined.</p> <p>Our understanding of the purpose of these battery posts is as below:</p> <p>Type 1 - Only for regeneration and Voltage stabilisation</p> <p>Type 2 - Voltage stabilization, regeneration & Rescue operation during power outage</p>		<p>Type 1 & Type 2 battery post serve the same purpose. Please refer to clause 4.1.3 7) ERT 367. The exact number, the location and the required capacity of the battery post shall be determined during the traction power simulation study.</p>

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		<p>The above is based on the below references from teh Employers requirement</p> <p>1. The size of civil buildings for TSS can accommodate only Type 1 BPs (smaller size) 2. The Type 2 BPs are strategically positioned at electric company boundaries enabling them to take of power outage.</p> <p>Kindly confirm our understanding on the purpose and application of the two types of battery posts.</p>		
90	Part 3 Vol. 4 Section VIII PC, KD 2-6,	Please confirm this date applies for PSD		The integrated system testing shall include PSD
91	Part 3 Vol. 4 Section VIII PC, KD 3-2,	Please confirm this date applies for PSD		The integrated system testing shall include PSD
92	Part 3 Vol. 4 Section VIII PC, KD-4-8,	Please confirm this date applies for PSD		The integrated system testing shall include PSD
93	4 CP NS-01 BD Draft Part 2 Vol.2 EM Version 11 FINAL REV A, 10.1.4 (2),	Are information on the train kinematic envelope available in order to assess the passenger entrapment risk between the PSD facade and the train and determine the necessary mitigations measures?		Please refer to GBB 12 Annex A item 56.

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94	4 CP NS-01 BD Draft Part 2 Vol.2 EM Version 11 FINAL REV A, 10.5.1 (7),	Please specify the fatigue loading case to be considered, X N/m2, Y times per year.		The contractor shall propose appropriate values based on the previous similar project, at design stage for approval of the Engineer
95	CP 107 TS, Appendix-C,	Train pitch is different between the train layout and configuration, which one shall be followed?		This contract is not part of NS01 scope of works.
96	4 CP NS-01 BD Draft Part 2 Vol.2 EM Version 11 FINAL REV A, 10.3.1(17),	Shall PSD numbering change according the train direction?		The contractor shall propose numbering scheme at design stage for approval of the Engineer
97	4 CP NS-01 BD Draft Part 2 Vol.2 EM Version 11 FINAL REV A, 10.4.2(4)(b),	Could we use the Screen to display the alarm, or required an individual lamp?		The contractor shall propose arrangement at design stage for approval of the Engineer
98	4 CP NS-01 BD Draft Part 2 Vol.2 EM Version 11 FINAL REV A, 9.2.10,	Does any prototype for FHPSD is needed in the depot for training?		No. Only Half height PSD shall be installed.
99	4 CP NS-01 BD Draft Part 2 Vol.2 EM Version 11 FINAL REV A, 10.4.2.2,	The DOI should be visible from platform extremity, please define power, and brightness as base on external condition visibility can be affected (as per the horizontal lighy along the platform) Kindly clarify.		The contractor shall propose appropriate design for approval of the Engineer. Bid condition shall prevail.
100	4 CP NS-01 BD Draft Part 2 Vol.2 EM Version 11 FINAL REV A, 10.4.2.4,	The status indicator shall not be confused with the door indicator does it mean it shall be separated or can it be integrated on the same support but in specific zoning.		The contractor shall propose appropriate design for approval of the Engineer. Bid condition shall prevail.

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		Kindly clarify		
101	4 CP NS-01 BD Draft Part 2 Vol.2 EM Version 11 FINAL REV A, 10.4.3,	Door isolation, it is proposed to use a 4 position key switch (Auto, insulated, open, close) instead of a 3 position one _ 2 push button		Bid condition shall prevail.
102	4 CP NS-01 BD Draft Part 2 Vol.2 EM Version 11 FINAL REV A, P1310 10.3.2(3),	SIL should be considered for safety function not just the system and it is only for electronic system. A THR for safety function to be allocated to subsystem to define the SIL level according to EN standard(EN 50126). SIL4 is equivalent to 1e-9/h. Kindly confirm our understanding.		The Bidder's understanding is correct. The SIL is allocated to safety function controlled by electrical/electronic/programmable electronic safety related systems and/or softwares as per relevant standards like EN 50126, EN50128, EN50128 or IEC 61508.
103	4 CP NS-01 BD Draft Part 2 Vol.2 EM Version 11 FINAL REV A, P1312 10.3.2(15),	For combination of two component failure, it is allowed but it will be limited to an acceptable level and failure should be detected.		Bidder's query is unclear. This clause refers to fault being detected, authorized person can isolate if needed and allow rectifying the fault without interfering the train operations. Bidder shall perform hazard analysis and risk assessment for Engineer to review and approve.
104	4 CP NS-01 BD Draft Part 2 Vol.2 EM Version 11 FINAL REV A, P1312 10.3.2(18),	Passenger detection is the GHD(Gap Hazard Detector) or it is just obstacle detection by the PSD system?		Please refer to ERT 1028 clause 10.3.2 (2) and 10.3.2 (18), The PSD shall have both: (i) Gap Hazard detector between train and

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				PSD and (ii) Obstacle detector between the sliding doors.
105	4 CP NS-01 BD Draft Part 2 Vol.2 EM Version 11 FINAL REV A, P1315 10.4.3,	The door isolation is mechanical isolation or only electrical? FT suggest key is not removeable at Main or Isolate position to avoid staff forget to reset the door into normal position.		The contractor shall propose appropriate design for approval of the Engineer. Bid condition shall prevail.
106	4 CP NS-01 BD Draft Part 2 Vol.2 EM Version 11 FINAL REV A, Clause 12.2.1: Centralized CMMS system.,	Is both the depots connected with in the same LAN or both operates individually?		Initially, both depots operate individually with local network then the networks will be connected on WAN at final stage.
107	4 CP NS-01 BD Draft Part 2 Vol.2 EM Version 11 FINAL REV A, Clause 12.2.1: Centralized CMMS system.,	Does both depots have their own business process, or both the depots follow the same business process		Both depots operated by same O&M Concessionaire. However, the activities on each depot will depend on the facilities provided in those depot and final operation shall be coordinated and agreed with the O&M Concessionaire.
108	4 CP NS-01 BD Draft Part 2 Vol.2 EM Version 11 FINAL REV A, Clause 12.2.1: Centralized CMMS system.,	Whether the AMS system to be implemented in two different systems (Two Separate implementations in south depot and north depot)		The CMMS system will be implemented in both Mabalacat Depot and Banlic Depot separately. The equipment at Banlic Depot will be decommissioned and migrated to Mabalacat Depot once it is operational.

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Item No.	Volume Section No. Page No. Clause No. / Title Reference Text	Clarification Request	Proposed Revised Text (if any)	Response
109	4 CP NS-01 BD Draft Part 2 Vol.2 EM Version 11 FINAL REV A, Clause 12.2.1: Centralized CMMS system.,	If we need to Implement AMS separately in both the depots, does these to be migrated into single AMS system in IOCC.		Bidder's understanding is correct. Both application and data server for CMMS provided in the Mabalacat Depot and Banlic Depot shall be in dual redundant configuration. However, the equipment at Banlic Depot will be decommissioned and migrated to Mabalacat Depot once it is operational. Details may refer to Clause 12.1.1.
110	4 CP NS-01 BD Draft Part 2 Vol.2 EM Version 11 FINAL REV A, Clause 12.2.1: Centralized CMMS system.,	Is Rolling Stock considered under scope of work of the current contract.		The Contractor shall perform the necessary interface works with NS02 and NS03 to comply with the functionality and performance of CMMS under the scope of NS01.
111	4 CP NS-01 BD Draft Part 2 Vol.2 EM Version 11 FINAL REV A, Clause 12.2.1: Centralized CMMS system.,	TCMS/TIMS to be integrated with AMS system.		For CMMS scope of work, Bidder may refer to section 11 and Clause11.4.1.2.
112	Part 2 - Employer's Requirements Section VI, , GBB 4, Page No. 65, SL. NO. 94& 95, No change. Each OCC shall have redundancy requirements as defined in chapters of	We understand that after commissioning of the IOCC at Mabalacat, the OCC at Banlic shall be decommissioned and all the Equipment of Banlic OCC shall be handed over to the employer.		The Bidder's understanding is correct.

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	ERT and ERG. Once the control is migrated to IOCC, any equipment released from individual OCCs shall be returned to the Employer.	Kindly confirm.		
113	Part 2 – Employer’s Requirements Section V1. Employer’s Requirements Technical Requirements – Signaling, ERT 137, 2.17.31 Train Dispatch, The ETCS System shall provide a train- ready signal, initiated by the train operator (only in train operator/driven mode) which shall place a train	Train Ready signal is not an ERTMS feature as it is not one of the variables between EVC and RBC. Please clarify how do you envisage the realization for this functionality.		Bid conditions shall prevail.
114	Part 2 – Employer’s Requirements Section V1. Employer’s Requirements Technical Requirements – Signaling, ERT 144, 2.17.38.1 General, ...This simulator maybe integrated with the Troubleshooting and Maintenance Workstation and response Item No. 11 response within GBB No. 5	Please confirm that based on response to GBB No. 5, the Troubleshooting and Maintenance Workstation is not required to be integrated with the ATS Training Simulator as the Troubleshooting and Maintenance Workstation is part of the CMMS module within the Training Facility (section 9.2.8).		The Bidder’s understanding is incorrect. ATS Training Simulator is independent of the Train Operation Simulators. The Troubleshooting and Maintenance workstation for training facility proposed in ERT 144 clause 2.17.38.1 is not related to CMMS work station of ERT 1016 clause 9.2.8.

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	confirming ATS Training simulator independent of the Training Facility			
115	Part 2 – Employer’s Requirements Section V1. Employer’s Requirements Technical Requirements – Signaling, ERT 1013, 9.2.3 Signal System, ...This simulator maybe integrated with the Troubleshooting and Maintenance Workstation and response Item No 11 response within GBB No. 5 confirming ATS Training simulator independent of the Training Facility	The RBC or LEU are not included in section 9.2.3, please could you confirm that these subsystems are not required as part of the Signal System module within the Training Facility at Training Centre?		Bid condition shall prevail.
116	Part 2 – Employer’s Requirements Section V1. Employer’s Requirements Technical Requirements – Signaling, ERT 144, ERT 1007, 2.17.38 ATS Training Simulator, GBB No.5 item No. 11 9 TRAINING FACILITY TRAINING CENTRE, Reference to all the training facilities requirements	From all previous documents, please confirm that our following understanding is correct. The different training modules are as follows: 1. ATS Training Simulator à Focused only in Traffic Operators training 2. Train Operation Simulator for Drivers à Focused only in the training of Train drivers. 3. Training Equipment for Operation & Maintenance Staff à Focused in Track Work, PS, Signal System, Telecom ..., and including the Troubleshooting and Maintenance training as		The ATS simulator, Train Simulators and equipment shall be used for training of Operation & Maintenance staff. Bid condition shall prevail.

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		<p>part of the CMMS.</p> <p>4. Train Arcade Simulator in some of the stations</p> <p>5. Test Track à This area and its facilities area completely independent of the Training Facility at Training Center.</p>		
117	<p>Part 2 – Employer’s Requirements Section V1. Employer’s Requirements</p> <p>Technical Requirements – Signaling, ERT-156, 2.22.2 Output, The operational status of the UPS shall be capable of being exhibited using a Liquid Crystal Display (LCD) or similar device. The differing features of the UPS shall be selectable using a keypad; these would include but not be limited to the following:</p> <ol style="list-style-type: none"> 1) Input voltage; 2) Input current; 3) Power factor; 4) Frequency; 5) Battery voltage; 6) Battery and rectifier current; 	<p>Please clarify if the information sent to the ATS by the UPS system about the mentioned variables consists into a continuous range of value or a Boolean value meaning alarm triggered or not.</p>		<p>The information sent to ATS will be alarms for failure or malfunction</p>

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	7) Output voltage and current; 8) Inverter kW; and 9) Temperature. The UPS shall be capable of providing information to the ATS system. An alarm shall be generated for failure or malfunction of items indicated above.			
118	Part 2 – Employer’s Requirements Section V1. Employer’s Requirements Technical Requirements – Signaling, ERT-107, 2.12.1 General Requirements, All main sub-systems shall be configured with redundant constituents to achieve hot-standby mode such that a failure will have no impact on operations.	Please note that the signalling system of each Signalling provider approved to supply TSI compliant ETCS solutions are different in terms of architecture and features to fulfill the availability targets according TSI For ETCS, the EVC as “brain” of the SIG solution is designed as highly reliable 2oo2 solution. We propose to change the requirement to the global standard as specified in TSI. Long term experience has shown that our Supplier’s solution fulfills global customers’ targets for operational performance while keeping costs and maintenance/obsolescence efforts low. Kindly note that our systems are in operation in several countries without the application of the hot-standby feature.		Bid condition shall prevail.

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		<p>Since our product provides fail-safe design by using two independent CPU boards (2oo2 architecture). All safety-relevant calculations are performed independently by both processor boards and data consistency is continuously checked by comparison of the calculation results. As the hardware design of the CPU boards itself enforces continuous data comparison, no software synchronisation is required. By using hardware based synchronisation, complexity of software can be kept at a minimum and possible errors, e.g. due to missing software synchronisation points, can be avoided. That makes the software leaner, more readable and finally less error-prone. Usual customer requirements for reliability according TSI UNISIG specs are being met by both, redundant and non-redundant solutions</p> <p>We therefore kindly request you to adapt this requirement to allow all Signalling supplier to bid with their most cost efficient solution while fulfilling customer operational targets and international standards.</p>		

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119	<p>Part 2 – Employer’s Requirements Section V1. Employer’s Requirements Technical Requirements – Signaling, ERT-109, 2.12.7 Transmission of ATC Information</p> <p>2) On board ATP Equipment, b) Two out of two hardware with identical or diverse hardware and common or diverse software or Single Electronic Structure based on reactive fail safety with diverse software. Redundancy shall be provided so that failure of one onboard ATP equipment does not prevent the train from being operated in ATP mode. The changeover in the event of failure of one unit shall be automatic, without train operator’s intervention, with an indication in the cab.</p>	<p>Please note that the signalling system of each Signalling provider approved to supply TSI compliant ETCS solutions are different in terms of architecture and features fulfill the availability targets according TSI. For ETCS, the EVC as “brain” of the SIG solution is designed as highly reliable 2oo2 solution. We propose to change the requirement to the global standard as specified in TSI. Long term experience has shown that Supplier’s solution fulfills global customers’ targets for operational performance while keeping costs and maintenance/obsolescence efforts low. Kindly note that our systems are in operation in several countries without the application of the hot-standby feature. Since our product provides fail-safe design by using two independent CPU boards (2oo2 architecture). All safety-relevant calculations are performed independently by both processor boards and data consistency is continuously checked by comparison of the calculation results. As the hardware design of the CPU boards itself enforces continuous data</p>		Bid condition shall prevail

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		<p>comparison, no software synchronisation is required. By using hardware based synchronisation, complexity of software can be kept at a minimum and possible errors, e.g. due to missing software synchronisation points, can be avoided. That makes the software leaner, more readable and finally less error-prone.</p> <p>Usual customer requirements for reliability according TSI UNISIG specs are being met by both, redundant and non-redundant solutions.</p> <p>We therefore kindly request you to adapt this requirement to allow all Signalling supplier to bid with their most cost efficient solution while fulfilling customer operational targets and international standards by removing "Redundancy shall be provided so that failure of one onboard ATP equipment does not prevent the train from being operated in ATP mode. The changeover in the event of failure of one unit shall be automatic, without train operator's intervention, with an indication in the cab".</p>		

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Item No.	Volume Section No. Page No. Clause No. / Title Reference Text	Clarification Request	Proposed Revised Text (if any)	Response
120	4 CP NS-01 BD Draft Part 2 Vol.2 EM Version 11 FINAL REV A, ERG-90, Table 21.2, Table 21.2: E&M systems and Track works RAM Targets	Please explain what activities are included and expected within MTTR = 30 min for OCS.		The MTTR is the time taken to repair/replace and failure and restore the system back to operation. This time excludes logistics time. Please refer to ERG Clause 21.3.22.
121	Vol 2, ERT 361, 4.1.1 (2), Payment of Guarantee Cost and Connection Cost, which is required by electric companies upon entering into a contract to receive an electrical supply.	<p>Please note that bidder has sent enquiries to various Electric Companies mentioned in the tender. While MERALCO requires endorsement from DOTr, reply other Electric Companies are also not encouraging.</p> <p>From the discussion with Electric Companies, bidder understands the following: Guarantee Cost means Bill Deposit amount equivalent to estimated one month billing. The said deposit will be refunded upon termination of services.</p> <p>Since the deposit amount will be refunded from Electric Companies to DOTr at the time of termination of services, the initial deposit paid by bidder, on behalf of DOTr, shall be reimbursed to bidder by DOTr before taking over.</p> <p>If the above understanding is not correct,</p>		Bidder shall refer to the Distribution Services Open Access Rules (DSOAR) for the definition of bill deposit. There are parameters used by the distribution utility (DU) in computing the bill deposit such as load factor (LF), demand factor (DF), etc. and these are based on their industry classification in the 2009 Philippine Standard Industrial Classification (PSIC) wherein rail transport is under Class 491 – Transport via Railways. The Price Schedules do not give a full description of the works to be performed nor of the plant, equipment and services to be supplied or provided under each item. The Bidder shall therefore be deemed to have read and fully understood the Employer’s Requirements and all other sections of the Bidding Documents (including reviewing the

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		bidder requests to clearly mention definition of Guarantee Cost.		Drawings), in order to ascertain the full scope of the requirements included in each item prior to filling out the rates and prices.
122	Vol 2, ERT 361, 4.1.1 (2), Payment of Guarantee Cost and Connection Cost, which is required by electric companies upon entering into a contract to receive an electrical supply.	Connection cost means the cost of supply and installation of first private pole located within project premises and associated costs for Certification from Engineer. Please confirm. If the above understanding is not correct, bidder requests to clearly mention definition of Connection Cost.		Please refer to the Distribution Services Open Access Rules (DSOAR) Section 2.4 for the definition of Connection Cost.

Annex B

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ITEM NO.	REFERENCE/CLAUSE/ SECTION	REVISIONS / AMENDMENTS
Volume II Part 2 – Employer’s Requirements		
1	ERT 393: Clause 4.4.7 (3) (3) (ii)	‘1000V’ replaced with ‘1500V’
2	ERT 444: Clause 4.4.7 (3) (3) (ii)	‘1000V’ replaced with ‘1500V’
3	GBB-9 Annex B Item no.5	<u>Interface Control Sheet</u> Item No.1. Incoming 69kV Line, Design & size location Added: ‘CP NS-01/’
4	GBB-9 Annex B Item no.6	<u>Interface Control Sheet</u> Item No.1. Incoming 115kV Line, Design & size location Added: “CP NS-01”
5	ERT 463-464: Clause 5.1.2 (11) (2)	Text ‘REM’ replaced with ‘HRR’ Added: ‘except for system’s equipment’
6	ERT 463-464: Clause 5.1.2 (11) (3)	Added: ‘except for system’s equipment’
7	ERT 501: Clause 5.1.2 (11) (2)	Text ‘REM’ replaced with ‘HRR’ Added: ‘except for system’s equipment’
8	ERT 501: Clause 5.1.2 (11) (3)	Added: ‘except for system’s equipment’
9	ERG 41: Clause 6.3.4	The contractor shall provide to the Employer 6 no. high specification laptops equipment with Autodesk Revit version 2020. These laptops shall be provided before the

		commencement of the design and shall remain the property of the Employer on completion of the contract
10	ERT 590: Table 6.4.7	Update Nominal Strength= 18N/mm ²
11	ERT 646: Part 2 Section VI Technical Requirements – AFC Table 7-6	Table 7-6 Peak Hour Passenger Demand updated.
12	ERT 50: 1.23 26) :	New clause added: On the viaduct sections drilling into the deck shall not be permitted and the contractor shall design and install a plinth into which walkway fixings can be attached. The exception to this is the CP05 area where drilling to the deck is permitted subject to the precautions regarding damage to the civil works are approved and implemented.
13	ERG 186: Appendix 8	ERG 186 Appendix 8- Outline of demarcation updates.
Volume III Part 2 – Employer’s Requirements d) Employer’s Drawings		
14	NSRP-DWG-PSS-0000 REV.08 GBB 12, page 166	Revised the drawing issued in GBB12 with drawing “NSRP-DWG-PSS-0000 REV.10”

Annex B – Attachment 1

-
- ii. Panel Type: Outdoor IP65 (per IEC 60529), closure type, wall mount or free-standing
 - iii. Operating Temperature: $-25^{\circ}\text{C} \sim +60^{\circ}\text{C}$
 - iv. Rated Input Voltage: not less than DC 360V
 - v. Rated Output Voltage: not less than AC 400V
 - vi. Output frequency: 60 Hz
 - vii. Output Waveform: Pure Sine Wave
 - viii. Phase: 3-phase
 - ix. Range of Operating Input Voltage: according to manufacturer’s specification
 - x. Power Factor: 0.90 minimum
 - xi. Total Harmonic Distortion of Output Current: not more than 5% in total, not more than 3% each (at rated output)
 - xii. Power Conversion Efficiency: not less than 97%
 - xiii. PV Power Control: Maximum power point tracking (MPPT)
 - xiv. Protection Function: Over voltage relay, under voltage relay, over frequency relay, under frequency relay, over voltage ground relay, Island operation detecting function.
- 3) PV Combiner
- i. Panel Type : IP 65 for outdoor, IP 21 for indoor, floor-mounted
 - ii. Maximum voltage : 1500V DC
 - iii. SPD protection: Type2 pluggable
- 4) Circuit Breaker
- i. Compliance: Per IEC 60947 Part I-III; IS 60947 Part I-III; EN 50521
 - ii. Main Breaker ampacity rating for AC Combiner
- 5) Cables
- i. DC Power Cables:
 - Sizing by Contractor, to comply with the Philippine Electrical Code (PEC) and other applicable regulatory requirements
 - Per EN 50618
 - Rating: 1500 V
 - Temperature Range: $-40 \text{ deg C} \sim +120^{\circ}\text{C}$
 - ii. AC Power Cables
-

- vii. Frame Material: Anodized aluminium
 - viii. Power output warranty: not less than 25 years, linear
 - ix. Warranty on Materials and Workmanship: not less than 12 years
- 2) Power Conditioner
- i. Compliance: IEC61727
 - ii. Panel Type: Outdoor IP65 (per IEC 60529), closure type, wall mount or free-standing
 - iii. Operating Temperature: $-25^{\circ}\text{C} \sim +60^{\circ}\text{C}$
 - iv. Rated Input Voltage: not less than DC 360V
 - v. Rated Output Voltage: not less than AC 400V
 - vi. Output frequency: 60 Hz
 - vii. Output Waveform: Pure Sine Wave
 - viii. Phase: 3-phase
 - ix. Range of Operating Input Voltage: according to manufacturer’s specification
 - x. Power Factor: 0.90 minimum
 - xi. Total Harmonic Distortion of Output Current: not more than 5% in total, not more than 3% each (at rated output)
 - xii. Power Conversion Efficiency: not less than 97%
 - xiii. PV Power Control: Maximum power point tracking (MPPT)
 - xiv. Protection Function: Over voltage relay, under voltage relay, over frequency relay, under frequency relay, over voltage ground relay, Island operation detecting function.
- 3) PV Combiner
- i. Panel Type : IP 65 for outdoor, IP 21 for indoor, floor-mounted
 - ii. Maximum voltage : ~~1500V~~1000V DC
 - iii. SPD protection: Type2 pluggable
- 4) Circuit Breaker
- i. Compliance: Per IEC 60947 Part I-III; IS 60947 Part I-III; EN 50521
 - ii. Main Breaker ampacity rating for AC Combiner
- 5) Cables
- i. DC Power Cables:
 - Sizing by Contractor, to comply with the Philippine Electrical Code (PEC) and other applicable regulatory requirements

- ix. Range of Operating Input Voltage: according to manufacturer’s specification
- x. Power Factor: 0.90 minimum
- xi. Total Harmonic Distortion of Output Current: not more than 5% in total, not more than 3% each (at rated output)
- xii. Power Conversion Efficiency: not less than 97%
- xiii. PV Power Control: Maximum power point tracking (MPPT)
- xiv. Protection Function: Over voltage relay, under voltage relay, over frequency relay, under frequency relay, over voltage ground relay, Island operation detecting function.

3) PV Combiner

- i. Panel Type : IP 65 for outdoor, IP 21 for indoor, floor-mounted
- ii. Maximum voltage : ~~1500V~~1000V DC
- iii. SPD protection: Type2 pluggable

4) Circuit Breaker

- i. Compliance: Per IEC 60947 Part I-III; IS 60947 Part I-III; EN 50521
- ii. Main Breaker ampacity rating for AC Combiner

5) Cables

- i. DC Power Cables:
 - Sizing by Contractor, to comply with the Philippine Electrical Code (PEC) and other applicable regulatory requirements
 - Per EN 50618
 - Rating: 1500 V
 - Temperature Range: -40 deg C ~ +120 °C
- ii. AC Power Cables
 - Sizing by Contractor, to comply with the Philippine Electrical Code (PEC) and other applicable regulatory requirements
 - Per IEC 60227
 - Rating @ 90 deg C: 600 Volts

6) Display Monitor for publicity

- i. Ingress Protection: IP20 (indoor)
- ii. Display Type: LED 4K 50 inch with hanging bracket
- iii. Digit Height: not less than 100mm, reading distance up to 40m

- ii. Maximum voltage : 1500V DC
- iii. SPD protection: Type2 pluggable

4) Circuit Breaker

- i. Compliance: Per IEC 60947 Part I-III; IS 60947 Part I-III; EN 50521
- ii. Main Breaker ampacity rating for AC Combiner

5) Cables

- i. DC Power Cables:
 - Sizing by Contractor, to comply with the Philippine Electrical Code (PEC) and other applicable regulatory requirements
 - Per EN 50618
 - Rating: 1500 V
 - Temperature Range: -40 deg C ~ +120 °C
- ii. AC Power Cables
 - Sizing by Contractor, to comply with the Philippine Electrical Code (PEC) and other applicable regulatory requirements
 - Per IEC 60227
 - Rating @ 90 deg C: 600 Volts

6) Display Monitor for publicity

- i. Ingress Protection: IP20 (indoor)
- ii. Display Type: LED 4K 50 inch with hanging bracket
- iii. Digit Height: not less than 100mm, reading distance up to 40m
- iv. Representable values shall be following but not limited to:
 - Today’s total AC output power (kWh)
 - Total AC output energy since installation (kWh)
 - Current generated energy (kW)
 - CO₂ reduction value since installation (kg-CO₂)
 - Solar radiation intensity (kW/ m²)
 - Ambient Temperature (deg °C)
 - Real pictures of various components of PV system installed
 - Other various images for the passengers for public awareness.

7) Thermometer

No	Interface Description	Design Requirement	Design Size& location	Supply	Fix	Remarks
	<ELECTRIC COMPANIES>					
1	Incomming 69kV line	CP NS-01/ Electric Companies	CP NS-01/ Electric Companies	Electric Companies	Electric Companies	
2	Metering device interface	Electric Companies	CP NS-01/ Electric Companies	Electric Companies	Electric Companies	
3	Specification of receiving equipment	CP NS-01/ Electric Companies	CP NS-01	CP NS-01	CP NS-01	
	<Telecommunications Equipment>					
1	SCADA I/F	CP NS-01	CP NS-01	CP NS-01	CP NS-01	
2	CATV I/F	CP NS-01	CP NS-01 (TLC)	CP NS-01	CP NS-01	
3	Telephone I/F	CP NS-01	CP NS-01	CP NS-01 (TLC)	CP NS-01 (TLC)	
	<OCS >					
1	Leading out of feeder line and return circuit	CP NS-01 (OCS)	CP NS-01	CP NS-01 (OCS)	CP NS-01	
	<Distrubution >					
1	Leading out of distribution line	CP NS-01 (PDS)	CP NS-01	CP NS-01 (PDS)	CP NS-01	
	<Distrubution station equipment>					

The Contractor shall review the design and coordinate with relevant Contractors and electric utility companies as detailed below:

No	Interface Description	Design Requirement	Design Size& location	Supply	Fix	Remarks
	<ELECTRIC COMPANIES>					
1	Incomming 69kV line	CP NS-01/ Electric Companies	<u>CP NS-01/</u> Electric Companies	Electric Companies	Electric Companies	
2	Metering device interface	Electric Companies	CP NS-01/ Electric Companies	Electric Companies	Electric Companies	
3	Specification of receiving equipment	CP NS-01/ Electric Companies	CP NS-01	CP NS-01	CP NS-01	
	<Telecommunications Equipment>					
1	SCADA I/F	CP NS-01	CP NS-01	CP NS-01	CP NS-01	
2	CATV I/F	CP NS-01	CP NS-01 (TLC)	CP NS-01	CP NS-01	
3	Telephone I/F	CP NS-01	CP NS-01	CP NS-01 (TLC)	CP NS-01 (TLC)	
	<OCS >					
1	Leading out of feeder line and return circuit	CP NS-01 (OCS)	CP NS-01	CP NS-01 (OCS)	CP NS-01	
	<Distrubution >					

8. The Contractor shall coordinate with Interfacing Contractors (CP05 and CP S-01 to CP S-07) regarding the provision of cable routes and installation, including methods of mounting the cable containment systems to the civil infrastructure.

4.6 Interfacing Requirements

4.6.1 General

The Contractor shall liaise and coordinate with Interfacing Parties to ensure the effective and compatible coordination of all aspects of design, installation, testing and commissioning of work.

4.6.2 Contractor’s Responsibility

- (1) The Contractor shall ensure that all the interface items as listed in Clause 4.6.3 of this specification shall be included in the interface management plan.
- (2) Other items not mentioned in the interface items but are relevant to the design, installation, testing and commissioning of permanent works, shall also be included in the interface management plan.

4.6.3 Interface Control Sheet

The Contractor shall review the design and coordinate with relevant Contractors and the electric utility company as detailed below:

No	Interface Description	Design Requirement	Design Size & location	Supply	Fix	Remarks
	<MERALCO>					
1	Incomming 115kV line	CP NS-01/ MERALCO	CP NS-01/ MERALCO	MERALCO	MERALCO	
2	Metering device interface	MERALCO	CP NS-01/ MERALCO	MERALCO	MERALCO	
3	Specification of receiving equipment	CP NS-01/ MERALCO	CP NS-01	CP NS-01	CP NS-01	
	< Telecommunications equipment>					
1	SCADA I/F	CP NS-01	CP NS-01 (TLC)	CP NS-01 (TLC)	CP NS-01 (TLC)	
2	CATV I/F	CP NS-01	CP NS-01 (TLC)	CP NS-01 (TLC)	CP NS-01 (TLC)	

Laying of Cables

1. Cable risers shall be protected with cable trays/ steel conduit pipes.
2. Bending radius of low voltage cables shall be not less than 8 times for single core type and 6 times for multi core type the outside diameter of the cable respectively.
3. Cable trays shall be fixed to the wall or the ceilings, fixing intervals shall be less than 1.5 m.
4. Cables laying with cable trays on the vertical direction shall be bound tightly at the 1.5 m intervals.
5. No tension is permitted for splicing of the cables.
6. Openings for cables drawn into cubicles shall be protected properly so that no pest or moisture can enter.
7. Occupancy of cables in the trough shall be not more than 60 %
8. The Contractor shall coordinate with Interfacing Contractors (CP05 and CP S-01 to CP S-07) regarding the provision of cable routes and installation, including methods of mounting the cable containment systems to the civil infrastructure.

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	<MERALCO>					
1	Incomming 115kV line	CP NS-01/ MERALCO	<u>CP NS-01/</u> MERALCO	MERALCO	MERALCO	

(7) Scope of works for low voltage distribution in the Mabalacat Depot

- 1) Low voltage cables in the Mabalacat Depot shall be installed in buried ducts, concrete troughs, and manholes respectively.
- 2) Low voltage cables work for outdoor lighting equipment, outdoor mechanical equipment and all buildings which require electric power
- 3) The Contractor shall provide outdoor lighting (including control panels) for emergency stairs etc.,
- 4) Outdoor lighting fixtures shall be mounted on poles.
- 5) Low Voltage distribution board with single or three phase LV power required.

(8) Scope of works for outdoor lighting in the Mabalacat Depot

- 1) The Contractor shall provide outdoor lighting (including control panels) in the Mabalacat Depot yard for maintenance works.
- 2) Outdoor lighting fixtures in the Mabalacat Depot yard shall be mounted on the poles and beams of the OCS.
- 3) Outdoor lighting on the road in the Mabalacat Depot shall be mounted on poles.
- 4) Low Voltage distribution board with single or three phase LV power required.

(9) Scope of works for outlets for maintenance

- 1) The Contractor shall provide outlets for maintenance on the main line, the locations and quantity of which shall be proposed by the contractor and approved by the Engineer.
- 2) Outlets for maintenance shall be mounted on the wall in the main line.

(10) Scope of works for earthing system

- 1) The main earthing system shall be provided by Civil Contractors.
- 2) The Contractor shall provide the earthing terminals in the RER and HER.
- 3) Contractor shall provide earthing cables between the main earthing system and earthing terminals.

(11) Out of Scope of works

- 1) Building works for RER, HRR and EGR including internal lighting, outlets, air conditioners and other building services.
- 2) In the main line, Station electrical room equipment including cabling between the

main LV Switchgear installed by the Contractor in RER, HRR and the LV panels in RER, HRR except for system’s equipment.

- 3) In the Mabalacat Depot, Low voltage electrical room equipment including cabling between the main LV Switchgear installed by the Contractor in HER and the LV panel in the low voltage electrical room except for system’s equipment.
- 4) The exhaust equipment in the exhaust stack shaft installed between the emergency generator room and the vent on the roof. (The Contractor shall install an exhaust pipe for the emergency generator between generator equipment and the exhaust stack shaft in the emergency generator room.)

5.1.3 Scope of Works

The Works to be performed by the Contractor shall include at least the following:

- 1) Design, supply, system quality management, installation, testing including integrated testing, and commissioning to complete the power distribution system;
- 2) Presentations, reviews and audit support as described in the Employer’s Requirements;
- 3) Interface management with relevant Contractors;
- 4) Design, identification of locations for concrete foundations for supporting structures if necessary, floor cinder concrete, earthing terminals for RER, REH, HER and DB, concrete troughs along the track, buried pipe and manhole in the Mabalacat Depot and coordination and interfacing with relevant Contractors;
- 5) Decommissioning, removal and/or disposal of temporary works; and
- 6) Defects liability of Permanent Works after commissioning as stipulated in the Contract.

5.1.4 System Overview

(1) System Studies

The Contractor shall carry out and provide results including the following power related studies to the Engineer for Approval:

- 1) AC 6.6kV power demands study;
- 2) Short circuit current, voltage drop and permissible current study;
- 3) Protection relay setting and system protection coordination study;
- 4) Power supply design, including the whole system, each station, each building and DB the Mabalacat Depot;
- 5) Earthing study;

(7) Scope of works for low voltage distribution in the Mabalacat Depot

- 1) Low voltage cables in the Mabalacat Depot shall be installed in buried ducts, concrete troughs, and manholes respectively.
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- 1) The Contractor shall provide outdoor lighting (including control panels) in the Mabalacat Depot yard for maintenance works.
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- 1) The Contractor shall provide outlets for maintenance on the main line, the locations and quantity of which shall be proposed by the contractor and approved by the Engineer.
- 2) Outlets for maintenance shall be mounted on the wall in the main line.

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- 1) The main earthing system shall be provided by Civil Contractors.
- 2) The Contractor shall provide the earthing terminals in the RER and HER.
- 3) Contractor shall provide earthing cables between the main earthing system and earthing terminals.

(11) Out of Scope of works

- 1) Building works for RER, HRR and EGR including internal lighting, outlets, air conditioners and other building services.
- 2) In the main line, Station electrical room equipment including cabling between the

main LV Switchgear installed by the Contractor in RER, ~~HRRREM~~ and the LV panels in RER, ~~HRRREM~~ except for system’s equipment.

- 3) In the Mabalacat Depot, Low voltage electrical room equipment including cabling between the main LV Switchgear installed by the Contractor in HER and the LV panel in the low voltage electrical room except for system’s equipment.
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- 2) Low voltage cables work for outdoor lighting equipment, outdoor mechanical equipment and all buildings which require electric power
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- 4) Outdoor lighting fixtures shall be mounted on poles.
- 5) Low Voltage distribution board with single or three phase LV power required.

(8) Scope of works for outdoor lighting in the Banlic Depot

- 1) The Contractor shall provide outdoor lighting (including control panels) in the Banlic Depot yard for maintenance works.
- 2) Outdoor lighting fixtures in the Banlic Depot yard shall be mounted on the poles and beams of the OCS.
- 3) Outdoor lighting on the road in the Banlic Depot shall be mounted on poles.
- 4) Low Voltage distribution board with single or three phase LV power required.

(9) Scope of works for outlets for maintenance

- 1) The Contractor shall provide outlets for maintenance on the main line, the locations and quantity of which shall be proposed by the contractor and approved by the Engineer.
- 2) Outlets for maintenance shall be mounted on the wall in the main line.

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- 2) The Contractor shall provide the earthing terminals in the RER and HER.
- 3) Contractor shall provide earthing cables between the main earthing system and earthing terminals.

(11) Out of Scope of works

- 1) Building works for RER, HRR and EGR including internal lighting, outlets, air conditioners and other building services.
- 2) In the main line, Station electrical room equipment including cabling between the main LV Switchgear installed by the Contractor in RER, HRR and the LV panels in RER, HRR except for system’s equipment.
- 3) In the Banlic Depot, Low voltage electrical room equipment including cabling between the main LV Switchgear installed by the Contractor in HER and the LV panel in the low voltage electrical room except for system’s equipment.

trenches, and manholes respectively.

- 2) Low voltage cables work for outdoor lighting equipment, outdoor mechanical equipment and all buildings which require electric power
- 3) The Contractor shall provide outdoor lighting (including control panels) for emergency stairs etc.,
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- 1) The Contractor shall provide outdoor lighting (including control panels) in the Banlic Depot yard for maintenance works.
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- 1) Building works for RER, HRR and EGR including internal lighting, outlets, air conditioners and other building services.
- 2) In the main line, Station electrical room equipment including cabling between the main LV Switchgear installed by the Contractor in RER, ~~HRRREM~~ and the LV panels in RER, ~~HRRREM~~ except for system’s equipment.
- 3) In the Banlic Depot, Low voltage electrical room equipment including cabling between the main LV Switchgear installed by the Contractor in HER and the LV panel in the low voltage electrical room except for system’s equipment.

CMMS.

The contractor shall provide to the Employer 6 no. high specification laptops equipment with Autodesk Revit version 2020. These laptops shall be provided before the commencement of the design and shall remain the property of the Employer on completion of the contract

6.4. Number of Copies

6.4.1. The following quantities of drawings and other documents shall be submitted to the Engineer, including preliminary, pre-final, and final design submissions, the final contract document, and all other submissions. These drawings and documents are in addition to those required for the exchange of information between the Interface Contractors and other submissions to statutory, governmental, and local authorities if required.

- (1) 4 full-size sets of paper drawings (folded and collated)
- (2) 4 sets of Design Reports including design documents and calculations, structural analysis, simulation and calculation, and all other design-related information.
- (3) 4 sets of all other submissions.
- (4) 2 sets of each of the above in electronic format

6.5. Design Submission Program

6.5.1. The Contractor shall prepare the Design Submission Program which sets out fully the Contractor's anticipated program for the preparation, submission, and review of the Design Packages, the Final Design Submission, and the Installation and Manufacturing Drawing Submissions and for the Issue of Notices in relation thereto.

6.5.2. The Design Submission Program shall:

- (1) be consistent with and its principal features integrated into the Works Program, and show all relevant major activities;
- (2) identify dates and subjects by which the Engineer’s decisions should be made;
- (3) make adequate allowance for periods of time for review by the Engineer;
- (4) indicate the Design Interface and Coordination requirement and periods for each Interface Contractor;
- (5) include lists of requisite design details for each and every component or equipment of all systems.

The Contractor shall update the Design Submission Program suitably if the Engineer observes any deviation.

6.5.3. For the system and components of the Works or the Plant, the Contractor shall submit documents and drawings describing function description, product description, interface requirement description, RAM requirement description, life cycle calculations, type and routine test specifications, list, and details of spares, related calculations, etc. The Design Submission Program shall also include a listing of various plans, processes, and other submissions.

6.6. Design Process

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6.6. Design Process

Table 6.4.7 Example of Specifications of F Type Foundation for the Stay

No.	Name	detailed	Unit	Min.	Max.	Notes
1	Foundation	Type		1	5	Type 5: bore hole with
	Frame number		Nos	4	5	
2	H type steel	SS400	mm	6	6	Width:175, hieght:175, vertical thickness:7.5 Upper and lower thickness: 10
3	Equal angle steel	SS400	mm	6	6	Width:65, hieght:65, thickness:8
4	Hexagon head bolt					M16 ×14mm by JIS B 1180 : 2014 Hexagon head bolts and hexagon
5	Ready Mixed Concrete	18-8-25	m ²	0.98	2.7	Nominal strength=18 N/mm ² , concrete Slump size=8 cm, max. diameter in coarse aggregate=25 mm, prescribed by JIS A 5308 : 2014 Ready-mixed concrete. Circular decorative concrete
6	Steel plate	Welded	Nos	2	2	Thickness: 4.5 mm, 140 mm×60 mm

6.4.19 Bolts and nuts

Example of bolts and nuts shows below.

Table 6.4.8 Example of Methods of Bolts and Nuts Locking under Multimodal Vibrations

Locking Item	Locking tools				Stop loosening		Locking method	
	Single nut	Double nut	High strength Bolt	self-locking nuts	Painted lock nut	Thin sheet metal nut	Spring lock washer	Cotter pin
Beam	○	●	—	○●	—	○	—	—
Flange connected with a part of pole	—	—	○		—	○	—	—

No.	Name	detailed	Unit	Min.	Max.	Notes
5	Ready Mixed Concrete	18-8-25	m ²	0.98	2.7	Nominal strength = 18 N/mm ² , concrete Slump size = 8 cm, max. diameter in coarse aggregate = 25 mm, prescribed by JIS A 5308 : 2014 Ready-mixed concrete. Circular decorative concrete
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Beam	○	●	—	○●	—	○	—	—
Flange connected with a part of pole	—	—	○		—	○	—	—
Flange connected with beams	—	○	○	○	—	○	—	—
Bracket · dropper · paralleled frame	○	●	—	○●	—	○	—	—
Cantilever	—	○	—	○	—	○	—	○
Band for pole	○	—	—	—	—	—	○	—
Fitting for insulator	○	—	—	—	—	—	○	○

7.8.4 Passenger Demand Forecast

7.8.4.1 MCRP and NSRP-South Commuter

- a) The Contractor shall propose the equipment quantity for each station, taking into consideration the passenger demand forecast, station space capacity and the equipment requirements stated in Section 7.9. The AFC system proposed shall be able to process passengers on weekday peak hour at each station smoothly.
- b) The passenger demand forecast data for peak 1(one) hour until 2045 are shown in Table 7-6

Table 7-6 Peak Hour Passenger Demand

Station	2045	
	Boarding	Alighting
CIA	490	490
Clark	5,846	5,846
Angeles	1,778	1,778
San Fernando	4,247	4,247
Apalit	1,646	1,646
Calumpit	1,800	1,800
Tutuban	1,133	1,133
Blumentritt	2,911	2,911
Espana	4,134	4,134
Santa Mesa	4,996	4,996
Paco	1,202	1,202
Buendia	5,200	5,200
EDSA	2,006	2,006
Nichols	1,862	1,862
Bicutan	7,538	7,691
Sucacat	2,992	3,048
Alabang	5,817	5,932
Muntinlupa	3,454	3,506

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Santa Mesa	4,996	4,996
Paco	1,202	1,202
Buendia	5,200	5,200
EDSA	2,006	2,006
Nichols	1,862	1,862
FTI	6,445	6,622
Bicutan	7,538	7,691
Sucacat	2,992	3,048
Alabang	5,817	5,932

- 16) Provision shall be made for maintenance ladders with retractable handles that shall not infringe the structure gauge. The Contractor shall provide these at both ends of the stations, at turnout locations and at 200m intervals. The positions shall be subject to the Engineers Approval.
- 17) Pedestrian crossings shall be clear of switch and crossing, switch machine, rodding, drive, and other moving parts. The pedestrian crossings shall be at least 5m away from a switch toe.
- 18) Walkways shall not block any drainage inlets or cable openings.
- 19) The cable containment shall ensure suitable separation between the different types of cables. Cable tray hanger/support shall be made of hot dipped galvanized steel to avoid corrosion.
- 20) The separation of the different types of cables shall conform with Philippine and International Standards.
- 21) Power cables supported by the cable containment shall be cleated or fixed by a method given a Notice of No Objection by the Engineer. Fiberoptic cables shall be continuously supported by the means of cable tray or trunking.
- 22) Cable tray design shall consider the minimum bending radius of all cables especially power cables of large diameters.
- 23) There shall be no sharp edges in the entire cable tray system so as not to damage any cables during pulling and installation.
- 24) The walkway shall support any commercial telecommunication cables and leaky coaxial cables to be installed at a later date. In addition, the cable containment shall be designed to have 25% spare capacity for future cables. Any additional cables shall be capable of being installed directly from works trains without the need to winch or pull the cables and without the need to dismantle any part of the walkway to enable cables to be laid.
- 25) For the at grade areas concrete footings shall be provided for the walkway.
- 26) On the viaduct sections drilling into the deck shall not be permitted and the contractor shall design and install a plinth into which walkway fixings can be attached. The exception to this is the CP05 area where drilling to the deck is permitted subject to the precautions regarding damage to the civil works are approved and implemented.
- 27) The contractor shall design and assemble a mock-up of the proposed walkway system for the worst case of horizontal curvature and applied cant. This mockup shall be prepared during the design phase and before the commencement of manufacture.
- 28) Emergency lighting shall be provided in accordance with NFPA 130 in tunnel and covered areas and other dark areas where there is no or limited ambient lighting. The lighting shall be controlled from switches located at portals, access locations, at the nearest station, and via the BMS system. In the case of the emergency lighting in the CIA approach tunnels, this shall be supplied from the generator as back up.
- 29) The Contractor shall provide a suitable earthing system for the walkway taking into consideration safety and stray currents.
- 30) In the CP-S-03a and CP-S-03b contract areas between Chainages 13+566 to 13+870, 15+589 to 16+046 and 16+564 to 18+347 due to clearance restrictions it

with a slope of 1:12 between the emergency walkway and Track crossing. The proposed ramp shall have an anti-slip surface. Walkways shall interface with the stations at platform ends.

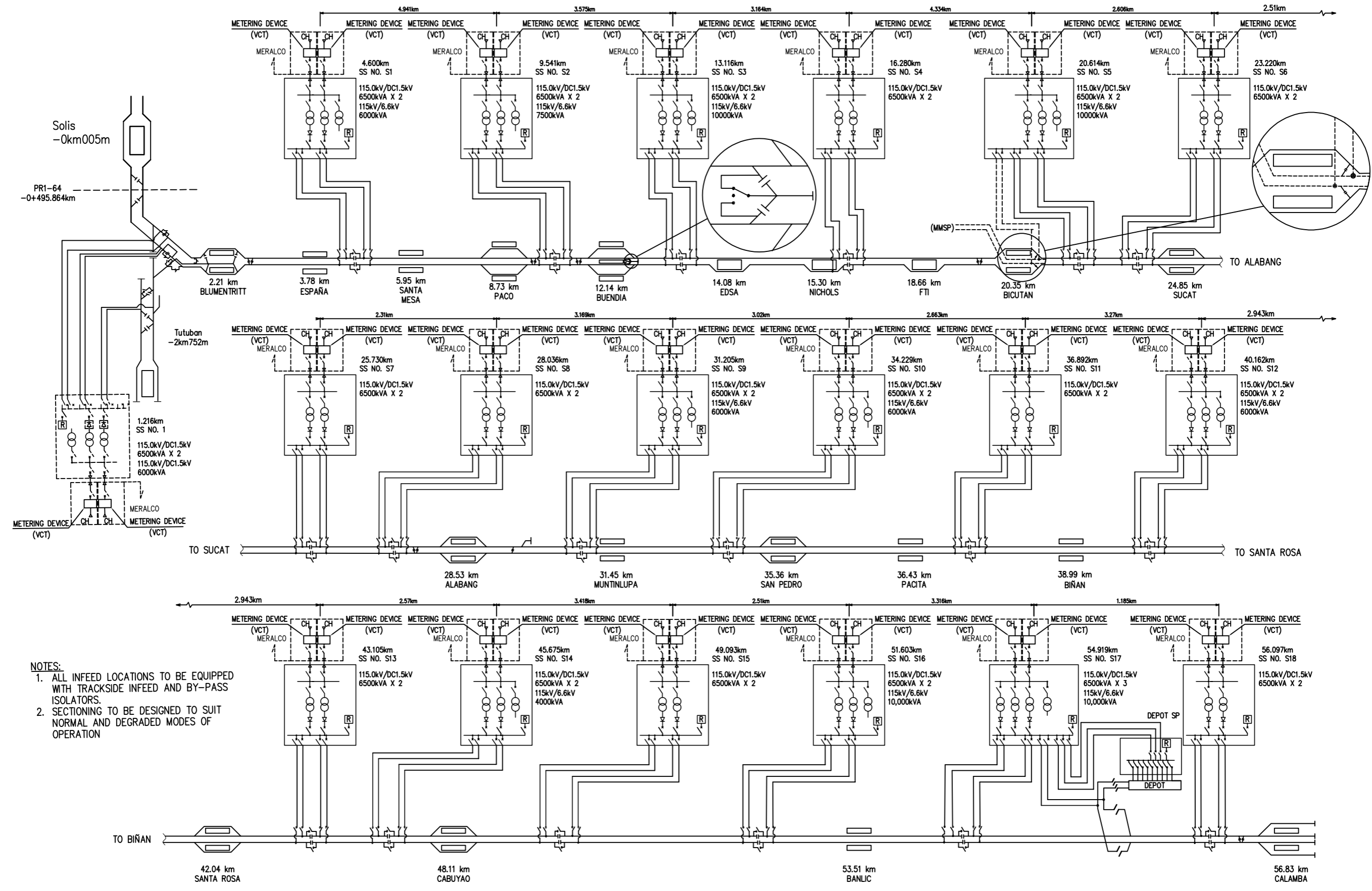
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- 25)26) On the viaduct sections drilling into the deck shall not be permitted and the contractor shall design and install a plinth into which walkway fixings can be attached. The exception to this is the CP05 area where drilling to the deck is permitted subject to the precautions regarding damage to the civil works are approved and implemented.
- 26)27) The contractor shall design and assemble a mock-up of the proposed walkway system for the worst case of horizontal curvature and applied cant. This mockup shall be prepared during the design phase and before the commencement of manufacture.
- 27)28) Emergency lighting shall be provided in accordance with NFPA 130 in tunnel and covered areas and other dark areas where there is no or limited ambient lighting. The lighting shall be controlled from switches located at portals, access locations, at the nearest station, and via the BMS system. In the case of the emergency lighting in the CIA approach tunnels, this shall be supplied from the generator as back up.
- 28)29) The Contractor shall provide a suitable earthing system for the walkway taking

**APPENDIX 8- OUTLINE INTERFACE DEMARCATION
 WITH MMSP**

Discipline	MMSP INTERFACE			
	NS-01	CP106	NS-01	CP107
Trackwork	<p>Bicutan Station (Southside)</p> <p>The block joint in between the double-ended points of Northbound and Southbound lines with NSCR lines will act as a boundary limits for the respective projects.</p> <p>NS-01 shall interface with CP106 for the chainages of the boundary limits at Southbound line and Northbound line</p> <p>IRJ will be supplied by NS-01.</p>	<p>Bicutan Station (Southside)</p> <p>The block joint in between the double-ended points of Northbound and Southbound lines with NSCR lines will act as a boundary limits for the respective projects.</p> <p>NS-01 shall interface with CP106 for the chainages of the boundary limits at Southbound line and Northbound line</p>	Rail-wheel interface study	Provision of wheel interface information to be used in rail-wheel interface study
Signaling	In addition to the track demarcation, NS-01 shall supply, install, test and commission signaling way side at MMSP line in coordination with CP106 for interoperability.	CP106 shall install way side equipment on MMSP track in coordination with NS-01 for normal train operation as well as for interoperability. There shall be interface at CBI level for availability of route,	NS-01 shall supply, install, test and commission GSM-R radio on CP107 Rolling stock and CP107 Simulator. For this purpose, NS-01 shall develop interface matrix for all related aspects with CP107 matrix and interface at all stages of	CP107 shall interface for development of interface matrix and interface at all stages of the project with NS-01.

**APPENDIX 8- OUTLINE INTERFACE DEMARCATION
 WITH MMSP**

Discipline	MMSP INTERFACE			
	NS-01	CP106	NS-01	CP107
Trackwork	<p>Bicutan Station (Southside)</p> <p>The block joint in between the double-ended points of Northbound and Southbound lines with NSCR lines will act as a boundary limits for the respective projects.</p> <p><u>NS-01 shall interface with CP106 for the chainages of the boundary limits at Southbound line and Northbound line</u></p> <p>IRJ will be supplied by NS-01.</p>	<p>Bicutan Station (Southside)</p> <p>The block joint in between the double-ended points of Northbound and Southbound lines with NSCR lines will act as a boundary limits for the respective projects.</p> <p><u>NS-01 shall interface with CP106 for the chainages of the boundary limits at Southbound line and Northbound line</u></p>	Rail-wheel interface study	Provision of wheel interface information to be used in rail-wheel interface study
Signaling	In addition to the track demarcation, NS-01 shall supply, install, test and commission signaling way side at MMSP line in coordination with <u>CP106</u> CP04 for interoperability.	CP106 shall install way side equipment on MMSP track in coordination with NS-01 for normal train operation as well as for interoperability. There shall be interface at CBI level for availability of route,	NS-01 shall supply, install, test and commission GSM-R radio on CP107 Rolling stock <u>and CP107 Simulator</u> . For this purpose, NS-01 shall develop interface matrix for all related aspects with CP107 matrix and interface at all stages of	CP107 shall interface for development of interface matrix and interface at all stages of the project with NS-01.



- NOTES:**
1. ALL INFEEED LOCATIONS TO BE EQUIPPED WITH TRACKSIDE INFEEED AND BY-PASS ISOLATORS.
 2. SECTIONING TO BE DESIGNED TO SUIT NORMAL AND DEGRADED MODES OF OPERATION

VERSIONS	DATE	DESCRIPTION
05	25 MAY 2021	SS NO.1 REVISED
06	15 JUN 2021	DISTRIBUTION TRANSFORMER CAPACITY CHANGED
07	17 JUN 2021	BUENDIA,SUCAT & SANTA ROSA STATIONS MODIFIED
08	24 JUN 2021	RECTIFIER TRANSFORMER CAPACITY CHANGED & SS NO.8,SS NO.9 & SS NO. 18 CHAINAGE REVISED
10	13 JUL 2021	ISOLATORS ADDED AT SBT

DEPARTMENT OF TRANSPORTATION (DOTr)

 PHILIPPINE NATIONAL RAILWAYS

CONSULTANT
 JICA DESIGN TEAM (JDT)

 ORIENTAL CONSULTANTS GLOBAL CO.,LTD.

 JAPAN INTERNATIONAL CONSULTANTS FOR TRANSPORTATION CO.,LTD.

 KATAHIRA & ENGINEER INTERNATIONAL

 PACIFIC CONSULTANTS CO.,LTD.

 TONICHI ENGINEERING CONSULTANTS, INC.

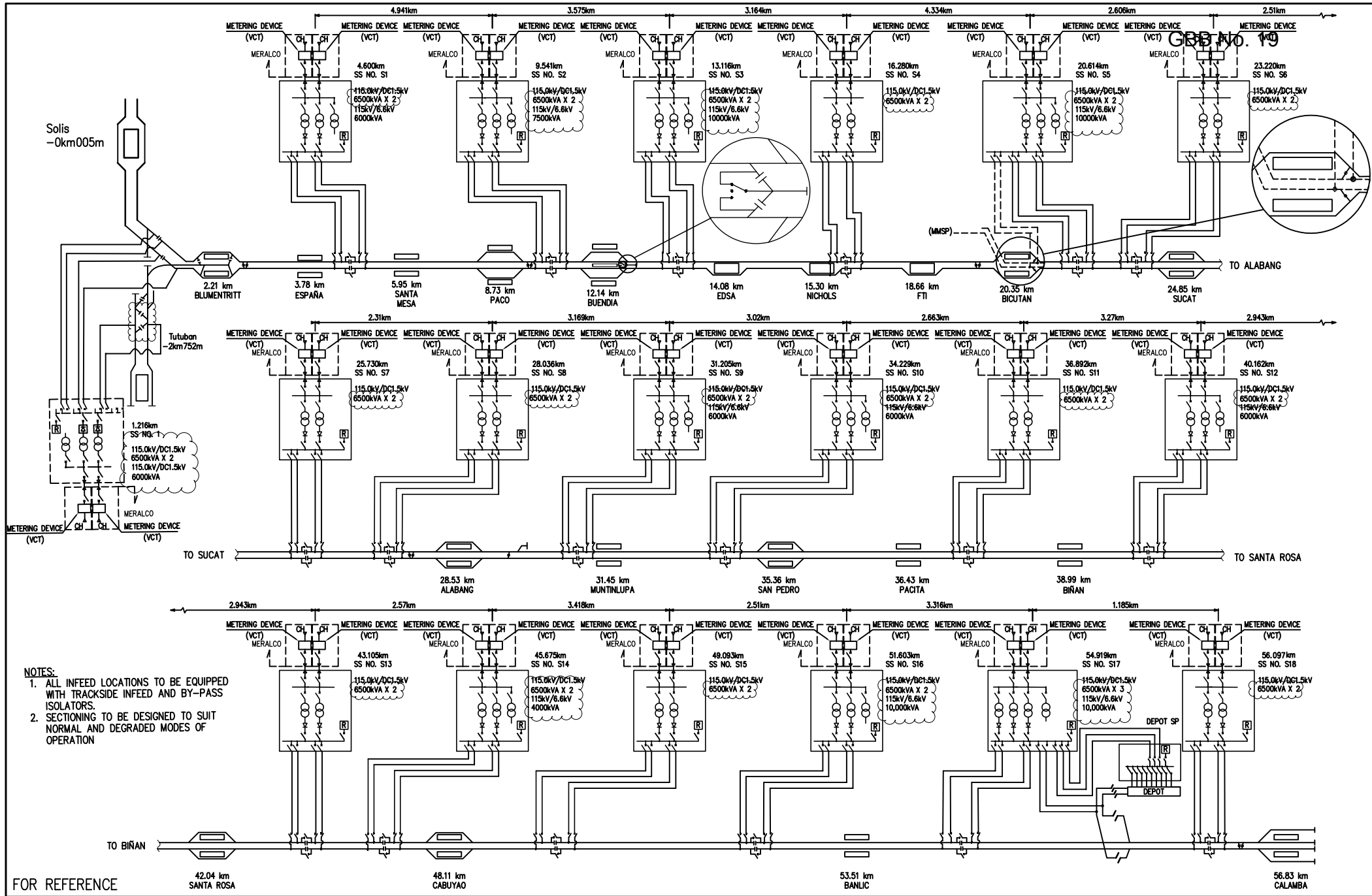
 Tokyo Metro Co.,Ltd.

TITLE	JDT	SMEC
DESIGNER	I.SHIMIZU	-
CHECK	T.MATSUMOTO	-
TEAM LEADER	T.SHIZUKA	-
P. MANAGER	N.KAWAI	-

MALOLOS - CLARK RAILWAY PROJECT (MCRP)
 NORTH SOUTH RAILWAY PROJECT-SOUTH (NSRP-SOUTH)
 Package CP NS-01 : Bidding Documents
 TRACTION POWER FEEDING SYSTEM

DATE	REV
06 MAY 2021	
	10

SHEET No. 3 OF 45
 DRG No. NSRP-DWG-PSS-0000
 DRG S. -

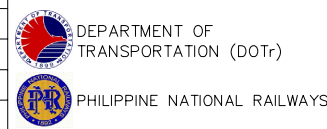


GBB No. 19

- NOTES:**
1. ALL INFEED LOCATIONS TO BE EQUIPPED WITH TRACKSIDE INFEED AND BY-PASS ISOLATORS.
 2. SECTIONING TO BE DESIGNED TO SUIT NORMAL AND DEGRADED MODES OF OPERATION

FOR REFERENCE

VERSIONS	DATE	DESCRIPTION
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CONSULTANT

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MALOLOS - CLARK RAILWAY PROJECT (MCRP)
NORTH SOUTH RAILWAY PROJECT-SOUTH (NSRP-SOUTH)

Package CP NS-01 : Bidding Documents

TRACTION POWER FEEDING SYSTEM

DATE	06 MAY 2021
SCALE	NONE
SHEET No.	3 OF 45
DRG No.	NSRP-DWG-PSS-000
DRG S.	
REV	09