General Bid Bulletin No. 21
06 August 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

PACKAGE CP NS-01: E&M SYSTEMS AND TRACK WORKS
General Bid Bulletin No. 21
Annex A

Item No.	Volume Section No. Page No. Clause No. / Title Reference Text	Clarification Request	Proposed Revised Text (if any)	Response
1	Part 2 Section VI, ERT-5, 1.4.2 (4) Track works Design Principles, "…….To this end, the contractor shall understand the type, standards and manufacturers of track work materials and components of the existing PNR system. It is essential that there is compatibility between components already installed in PNR and components provided under this contract..."	Please specify what exactly is being expected by "Compatibility between components already installed in PNR ", as we are not aware of this reference.		Please refer to Annex B of this GBB for the updated ERT 1.4.2. The clause referring to PNR components compatibility has been deleted.
2	Vol. II Part 2, Section VI (c) Technical Requirements (ERT), ERT-5, 1.4.2 Track works Design Principles, (4) It is essential that there is compatibility between components already installed in PNR and components provided under this contract; (7) To ensure compatibility and suitability of the incorporated materials and components	Please provide details of the trackwork components installed in PNR in order for Contractor to ensure compatibility between components provided in this contract and components already installed in PNR.		Please refer to Annex B of this GBB for the updated ERT 1.4.2. The clause referring to PNR components compatibility has been deleted.

PACKAGE CP NS-01: E&M SYSTEMS AND TRACK WORKS
General Bid Bulletin No. 21
Annex A

Item No.	Volume Section No. Page No. Clause No. / Title Reference Text	Clarification Request	Proposed Revised Text (if any)	Response
	to match with the existing track works and other systems which have already been installed in the existing system;			

Annex B

PACKAGE CP NS-01: E&M SYSTEMS AND TRACK WORKS
General Bid Bulletin No. 21
Annex B

ITEM NO.	REFERENCE/CLAUSE/ SECTION	REVISIONS / AMENDMENTS
Volume II Part 2 – Employer's Requirements		
1	Volume II Part 2 – Employers Requirements ERT-5	Trackwork ERT 1.4.2 4) clause deleted.
2	Section VI-SOW-3	34.5kV removed from NSRP substation incoming supply from Meralco.
3	ERG page 81: ERG 20.2	External parties added to interfacing parties.
4	ERT-704 clause 8.9.2.1 (c)	'under-cleaning track (N40)' replaced with 'underfloor-cleaning track (N11)'
5	ERT-746 N02.06 Welding Machine	'N01.10' replaced with 'N01.09'
6	ERT-747 N02.07 Oxygen Acetylene Gas Welder	'N01.11' replaced with 'N01.10'
7	ERT-748 N02.08 Worktable	'N01.14' replaced with 'N01.13'
8	ERT-749 N02.09 Tool Cabinet	'N01.15' replaced with 'N01.14'
9	ERT-755 N03.03 Worktable	'N01.14' replaced with 'N01.13'

10	ERT-756 N03.04 Tool Cabinet	‘N01.15’ replaced with ‘N01.14’
11	ERT-763 Section 2	’50Hz’ replaced with ‘60Hz’
12	ERT-767 N12.05 Welding Machine	‘N01.10’ replaced with ‘N01.09’
13	ERT-768 N12.06 Oxygen Acetylene Gas Welder	‘N01.11’ replaced with ‘N01.10’
14	ERT-769 N12.07 Worktable	‘N01.14’ replaced with ‘N01.13’
15	ERT-770 N12.08 Tool Cabinet	‘N01.15’ replaced with ‘N01.14’
16	ERT-779 N13.07 Double Head Grinder	‘N01.07’ replaced with ‘N01.06’
17	ERT-780 N13.08 Upright Drilling Machine	‘N01.08’ replaced with ‘N01.07’
18	ERT-781 N13.09 Disc Cutter	‘N01.09’ replaced with ‘N01.08’
19	ERT-782 N13.10 Welding Machine	‘N01.10’ replaced with ‘N01.09’
20	ERT-783 N13.11 Oxygen Acetylene Gas Welder	‘N01.11’ replaced with ‘N01.10’
21	ERT-784 N13.12 Worktable	‘N01.14’ replaced with ‘N01.13’
22	ERT-785 N13.13 Tool Cabinet	‘N01.15’ replaced with ‘N01.14’
23	ERT-787 N14.02 High Pressure Water Cleaner	‘N01.17’ replaced with ‘N01.16’
24	ERT-788 N14.03 Worktable	‘N01.14’ replaced with ‘N01.13’

25	ERT-789 N14.04 Tool Cabinet	‘N01.15’ replaced with ‘N01.14’
26	ERT-806 N16.08 Worktable	‘N01.14’ replaced with ‘N01.13’
27	ERT-807 N16.09 Tool Cabinet	‘N01.15’ replaced with ‘N01.14’
28	ERT-820 N17.10 Double Head Grinder	‘N01.07’ replaced with ‘N01.06’
29	ERT-821 N17.11 Upright Drilling Machine	‘N01.08’ replaced with ‘N01.07’
30	ERT-822 N17.12 Welding Machine	‘N01.10’ replaced with ‘N01.09’
31	ERT-823 N17.13 Oxygen Acetylene Gas Welder	‘N01.11’ replaced with ‘N01.10’
32	ERT-824 N17.14 Worktable	‘N01.14’ replaced with ‘N01.13’
33	ERT-825 N17.15 Tool Cabinet	‘N01.15’ replaced with ‘N01.14’
34	ERT-829 N18.02 High Pressure Water Cleaner	‘N01.17’ replaced with ‘N01.16’
35	ERT-834 N18.07 Worktable	‘N01.14’ replaced with ‘N01.13’
36	ERT-835 N18.08 Tool Cabinet	‘N01.15’ replaced with ‘N01.14’
37	ERT-848 N19.10 Double Head Grinder	‘N01.07’ replaced with ‘N01.06’
38	ERT-849 N19.11 Upright Drilling Machine	‘N01.08’ replaced with ‘N01.07’
39	ERT-850 N19.12 Worktable	‘N01.14’ replaced with ‘N01.13’

40	ERT-851 N19.13 Tool Cabinet	‘N01.15’ replaced with ‘N01.14’
41	ERT 873 N20.13 Worktable	‘N01.14’ replaced with ‘N01.13’
42	ERT-874 N20.14 Tool Cabinet	‘N01.15’ replaced with ‘N01.14’
43	ERT-879 N21.04 Worktable	‘N01.14’ replaced with ‘N01.13’
44	ERT-880 N21.05 Tool Cabinet	‘N01.15’ replaced with ‘N01.14’
45	ERT-890 N22.08 Double Head Grinder	‘N01.07’ replaced with ‘N01.06’
46	ERT-891 N22.09 Upright Drilling Machine	‘N01.08’ replaced with ‘N01.07’
47	ERT-892 N22.10 Welding Machine	‘N01.10’ replaced with ‘N01.09’
48	ERT-893 N22.11 Oxygen Acetylene Gas Welder	‘N01.11’ replaced with ‘N01.10’
49	ERT-894 N22.12 Worktable	‘N01.14’ replaced with ‘N01.13’
50	ERT-895 N22.13 Tool Cabinet	‘N01.15’ replaced with ‘N01.14’
51	ERT-899 Section 2.7 (i)	‘50Hz’ replaced with ‘60Hz’
52	ERT-902 N23.06 Double Head Grinder	‘N01.07’ replaced with ‘N01.06’
53	ERT-903 N23.07 Upright Drilling Machine	‘N01.08’ replaced with ‘N01.07’
54	ERT-904 N23.08 Welding Machine	‘N01.10’ replaced with ‘N01.09’

55	ERT-905 N23.09 Oxygen Acetylene Gas Welder	‘N01.11’ replaced with ‘N01.10’
56	ERT-906 N23.10 Worktable	‘N01.14’ replaced with ‘N01.13’
57	ERT-907 N23.11 Tool Cabinet	‘N01.15’ replaced with ‘N01.14’
58	ERT-909 N24.02 Seat Cleaning Machine	‘MCRP-DWG-DEF-DEP-0005’ replaced with ‘MCRP-DWG-DEF-DEP-0006’
59	ERT-911 N24.04 Worktable	‘N01.14’ replaced with ‘N01.13’
60	ERT-912 N24.05 Tool Cabinet	‘N01.15’ replaced with ‘N01.14’
61	ERT-918 N25.06 Worktable	‘N01.14’ replaced with ‘N01.13’
62	ERT-919 N25.07 Tool Cabinet	‘N01.15’ replaced with ‘N01.14’
63	ERT-924 N26.05 Double Head Grinder	‘N01.07’ replaced with ‘N01.06’
64	ERT-925 N26.06 Upright Drilling Machine	‘N01.08’ replaced with ‘N01.07’
65	ERT-928 N26.09 Worktable	‘N01.14’ replaced with ‘N01.13’
66	ERT-929 N26.10 Tool Cabinet	‘N01.15’ replaced with ‘N01.14’
67	ERT-930 N27.01 Rack System	‘N01.16’ replaced with ‘N01.15’
68	ERT-939 N31.04 Tool Cabinet	‘N01.15’ replaced with ‘N01.14’
69	ERT-978 S02.06 Welding Machine	‘S01.10’ replaced with ‘S01.09’

70	ERT-979 S02.07 Oxygen Acetylene Gas Welder	‘S01.11’ replaced with ‘S01.10’
71	ERT-980 S02.08 Worktable	‘S01.14’ replaced with ‘S01.13’
72	ERT-981 S02.09 Tool Cabinet	‘S01.15’ replaced with ‘S01.14’
73	ERT-989 S03.03 Worktable	‘S01.14’ replaced with ‘S01.13’
74	ERT-990 S03.04 Tool Cabinet	‘S01.15’ replaced with ‘S01.14’

Annex B – Attachment 1

1.4 Design Requirement

1.4.1 General

The track work designs shall be based on established metro railway practices and to the current state-of-the-art track work technology. Track gauge shall be "standard gauge" 1435 mm.

Maximum operational speed shall be 160 km/h.

Track work designs shall incorporate engineering solutions, standards, materials and components that have been tested and well proven in service under similar coastal environment, traffic and operational conditions in other modern railway/metro rail systems for a period of not less than seven (7) years unless otherwise stated.

The Contractor shall provide certificates, attestations and statements from metro rail or railway organizations, industries, and manufacturers, as applicable, to support the Contractor's compliance with this requirement.

The track work shall be designed to accommodate all the forces and displacements generated at the wheel and rail contact point.

Loading conditions for design purposes shall be based on a gross axle load of 16.3 tons for normal operation.

The calculation of forces used for design shall be based on either Japanese regulations or equivalent national or international standards.

1.4.2 Track works Design Principles

1) To produce track works can be easily maintained during non-traffic hours;
2) To minimize the requirements and costs for carrying out maintenance to both the track works and rolling stock;
3) To ensure the long-term availability of the materials and components for future replacements;
4) To provide adequate track-to-earth electrical insulation, to reduce leakage of traction return currents in order to meet limitations specified in the contract specifications;
5) To ensure compatibility of track work with works and designs of all other systems and disciplines;
6) To ensure compatibility and suitability of the incorporated materials and components to match with the existing track works and other systems which have already been installed in the existing system;
7) To ensure the long-term durability and structural integrity of the track works;
8) To ensure that the designs of the track works and its components shall be to Japanese standards, AREMA, AAHSTO, EN Codes, ISO Standards, and IEC Standards and to other recognized international standard specifications, subjected to Approval by the Engineer;
9) To ensure that the Contractor shall always select the option that provides a higher degree of quality for the concerned material/component;
10) When codes and standards are quoted in this document, equivalent standards may be proposed by the Contractor which offer an equivalent and/or higher degree of quality

1.4 Design Requirement

1.4.1 General

The track work designs shall be based on established metro railway practices and to the current state-of-the-art track work technology. Track gauge shall be "standard gauge" 1435 mm.

Maximum operational speed shall be 160 km/h.

Track work designs shall incorporate engineering solutions, standards, materials and components that have been tested and well proven in service under similar coastal environment, traffic and operational conditions in other modern railway/metro rail systems for a period of not less than seven (7) years unless otherwise stated.

The Contractor shall provide certificates, attestations and statements from metro rail or railway organizations, industries, and manufacturers, as applicable, to support the Contractor's compliance with this requirement.

The track work shall be designed to accommodate all the forces and displacements generated at the wheel and rail contact point.

Loading conditions for design purposes shall be based on a gross axle load of 16.3 tons for normal operation.

The calculation of forces used for design shall be based on either Japanese regulations or equivalent national or international standards.

1.4.2 Track works Design Principles

1) To produce track works can be easily maintained during non-traffic hours;
2) To minimize the requirements and costs for carrying out maintenance to both the track works and rolling stock;
3) To ensure the long-term availability of the materials and components for future replacements;
~~4) To maintain different materials and components to be held by the Employer as spare stock to the minimum possible number. To this end, the contractor shall understand the type, standards and manufacturers of track work materials and components of the existing PNR system. It is essential that there is compatibility between components already installed in PNR and components provided under this contract;~~
4~~5~~) To provide adequate track-to-earth electrical insulation, to reduce leakage of traction return currents in order to meet limitations specified in the contract specifications;
5~~6~~) To ensure compatibility of track work with works and designs of all other systems and disciplines;
6~~7~~) To ensure compatibility and suitability of the incorporated materials and components to match with the existing track works and other systems which have already been installed in the existing system;
7~~8~~) To ensure the long-term durability and structural integrity of the track works;
8~~9~~) To ensure that the designs of the track works and its components shall be to Japanese standards, AREMA, AAHSTO, EN Codes, ISO Standards, and IEC Standards and to other recognized international standard specifications, subjected to Approval by the

5. Outline of Telecommunications

The outline of the Telecommunications is as follows;

a) Backbone System

b) Radio System

c) Dispatcher Telecommunications

d) Voice and Data Radio System

e) CCTV System

f) Passenger Information and Flight Information Display Systems

g) Public Address

h) Time Server and Master Clock System

i) Meteorological and Seismic Monitoring System

j) All Cables, Cable Containment and supports for the system.

System details are described in ERT.

6. Outline of Power Supply System

The outline of the Power Supply Systems is as follows;

a) Substations, battery posts, and sectioning posts for the mainline and in the depots.

b) Power will be supplied from traction substation (TSS) to the train through an Overhead Contact line System (OCS) and to other facilities through a 6.6kV loop Distribution system (PDS).

c) 69kV power shall be provided by electric utility companies (MCRP).

115kV power shall be provided by MERALCO (NSRP-South)

d) SCADA System for TSS's, overhead contact line system, and electrical equipment.

e) Solar Panel power generation for selected stations and depots.

f) All Cables, Cable Containment and supports for the system.

System details are described in ERT.

7. Outline of the Power Distribution System

The outline of the Power Distribution Systems is as follows;

a) Distribution cable network installation on the mainline and in depots

b) Works at station electrical rooms and high voltage electrical room in the depots

c) Distribution of power to equipment for train operation, station equipment, etc.

d) All Cables, Cable Containment and supports for the system.

System details are described in ERT.

5. Outline of Telecommunications

The outline of the Telecommunications is as follows;

a) Backbone System

b) Radio System

c) Dispatcher Telecommunications

d) Voice and Data Radio System

e) CCTV System

f) Passenger Information and Flight Information Display Systems

g) Public Address

h) Time Server and Master Clock System

i) Meteorological and Seismic Monitoring System

j) All Cables, Cable Containment and supports for the system.

System details are described in ERT.

6. Outline of Power Supply System

The outline of the Power Supply Systems is as follows;

a) Substations, battery posts, and sectioning posts for the mainline and in the depots.

b) Power will be supplied from traction substation (TSS) to the train through an Overhead Contact line System (OCS) and to other facilities through a 6.6kV loop Distribution system (PDS).

c) 69kV power shall be provided by electric utility companies (MCRP).

115kV power shall be provided by MERALCO (NSRP-South) ~~except for TSS1 which is supplied at 34.5kV.~~

d) SCADA System for TSS's, overhead contact line system, and electrical equipment.

e) Solar Panel power generation for selected stations and depots.

f) All Cables, Cable Containment and supports for the system.

System details are described in ERT.

7. Outline of the Power Distribution System

The outline of the Power Distribution Systems is as follows;

a) Distribution cable network installation on the mainline and in depots

b) Works at station electrical rooms and high voltage electrical room in the depots

c) Distribution of power to equipment for train operation, station equipment, etc.

d) All Cables, Cable Containment and supports for the system.

System details are described in ERT.

The Contractor shall develop and submit for approval by the Engineer an Interface Control Document for each sub-system and Other Works Contractor and External Parties. The Interface Control Document shall be a "live" common document between each sub-system and other Contractors and external parties, which will be revised and re-submitted by the Contractor to ensure that it remains current, and at other times as directed by the Engineer. It shall be signed off by the Contractor, his sub-contractors, and the interfacing Contractors, prior to submission. The submission date of each Interface Control Document shall be coordinated with that of the respective other parties. The Interface Control Document shall cover the contents of the following as minimum:

a) Clearly identify the demarcation between the sub-system, his subcontractors, and Other Works Contractors;
b) Describe detailed physical, electrical/ mechanical, and functional interfaces (such as protocols, software, and data structures) between the sub-system, his sub-contractors, and Other Works Contractors;
c) Identify the information to be exchanged between the sub-system, his sub-contractors, and Other Works Contractors with a timeline that complies with the overall Project program as well as the contracts of the respective parties;
d) Define Design, Manufacture, Supply, Installation, Testing, and Commissioning responsibilities;
e) Address the Design, Manufacture, Supply, Installation, Testing and Commissioning program of the interfaces to meet the key dates of each contract, and highlight any program risks requiring the Engineer's attention;
f) Specify the proposed method and schedule for verifying interface integrity along with any requirements, whether temporary or permanent, relating to the physical installation of each party's equipment or materials used for the Works; and
g) Include test procedures and a program to demonstrate the performance and integrity of the integrated systems.
h) Interface Matrix that defines the interface and its requirements, responsibilities of each interfacing parties and due dates.
i) Interface Solution Register (ISR) reference that records the agreed solution to each interface. The ISR shall describe in detail how the interface is solved and what methods are agreed to verify the requirement of the interface. Template of the ISR will be provided by Engineer.
j) Demarcation Drawings to define the responsibilities of each interfacing party.
k) Information Exchange Log (IEL)

l) Coordinated Installation Programme (CIP)The Contractor shall communicate and co-operate with the Interface Contractors and/or External Parties to identify and resolve potential interface problems.

The Contractor shall allow for the fact that many of the design activities of the Interface Contractors may proceed concurrently to the construction of this Contract. Specific dates for the delivery of this and other required information shall be confirmed between the Contractor and the Interface Contractors.

The Contractor's program shall allow for the timing of availability of necessary interface information from the interfacing parties.

20.3. Request for Information

All requests for information (RFI), acknowledgment of receipt of information, and any

The Contractor shall develop and submit for approval by the Engineer an Interface Control Document for each sub-system and Other Works Contractor and External Parties. The Interface Control Document shall be a "live" common document between each sub-system and other Contractors and external parties, which will be revised and re-submitted by the Contractor to ensure that it remains current, and at other times as directed by the Engineer. It shall be signed off by the Contractor, his sub-contractors, and the interfacing Contractors, prior to submission. The submission date of each Interface Control Document shall be coordinated with that of the respective other parties. The Interface Control Document shall cover the contents of the following as minimum:

a) Clearly identify the demarcation between the sub-system, his subcontractors, and Other Works Contractors;
b) Describe detailed physical, electrical/ mechanical, and functional interfaces (such as protocols, software, and data structures) between the sub-system, his sub-contractors, and Other Works Contractors;
c) Identify the information to be exchanged between the sub-system, his sub-contractors, and Other Works Contractors with a timeline that complies with the overall Project program as well as the contracts of the respective parties;
d) Define Design, Manufacture, Supply, Installation, Testing, and Commissioning responsibilities;
e) Address the Design, Manufacture, Supply, Installation, Testing and Commissioning program of the interfaces to meet the key dates of each contract, and highlight any program risks requiring the Engineer's attention;
f) Specify the proposed method and schedule for verifying interface integrity along with any requirements, whether temporary or permanent, relating to the physical installation of each party's equipment or materials used for the Works; and
g) Include test procedures and a program to demonstrate the performance and integrity of the integrated systems.
h) Interface Matrix that defines the interface and its requirements, responsibilities of each interfacing parties and due dates.
i) Interface Solution Register (ISR) reference that records the agreed solution to each interface. The ISR shall describe in detail how the interface is solved and what methods are agreed to verify the requirement of the interface. Template of the ISR will be provided by Engineer.
j) Demarcation Drawings to define the responsibilities of each interfacing party.
k) Information Exchange Log (IEL)
l) Coordinated Installation Programme (CIP)

The Contractor shall communicate and co-operate with the Interface Contractors and/or External Parties to identify and resolve potential interface problems.

The Contractor shall allow for the fact that many of the design activities of the Interface Contractors may proceed concurrently to the construction of this Contract. Specific dates for the delivery of this and other required information shall be confirmed between the Contractor and the Interface Contractors.

The Contractor's program shall allow for the timing of availability of necessary interface information from the interfacing parties.

20.3. Request for Information

All requests for information (RFI), acknowledgment of receipt of information, and any

removal/installation shop (N12) and the outside of the Workshop building, and between the underfloor-cleaning track (N11~~40~~) and the lead track.

d. The rolling stock is moved by temporary bogies (N12-04) in the Workshop building.

e. The train can move itself on the track from the lead track to the final adjustment shop (N31).

f. The heavy repair method is that there are not spare parts for heavy repair (bogies and parts/equipment) basically but spare parts for failures/accidents on the train.

i. The parts for heavy repair are dismantled from the car body.

ii. The parts are inspected and repaired in the Workshop building basically.

iii. The parts after inspection and repair are reassembled to the same car body as before dismantling.

8.9.2.2. Under above methods, the basic concept of workshop facilities is as follows.

a. Shop-in Check Facilities (N11 and N31)

i. There are the shop-in check facilities at the underfloor cleaning track (N11) and the final adjustment shop (N31).

ii. The underfloor cleaning track is to clean the underfloor equipment/parts of rolling stock.

iii. The underfloor cleaning track is to clean the underfloor equipment on the train before maintenance works in the workshop building.

iv. The final adjustment shop is to conduct shop-in check before maintenance works in the Workshop building.

v. The final adjustment shop is to uncouple the train to one car.

vi. The final adjustment shop has three tracks for shop-in check and final adjustment to conduct works at the same time.

b. Bogie Removal/Installation Facilities (N12)

i. There are the bogie removal/installation facilities at the bogie removal/installation shop.

ii. The bogie removal/installation shop is to divide the rolling stock into the bogies and the car body and to re-install the bogies to the car body after inspections and repairs of the bogies.

iii. The bogies are installed to/removed from the car body by the car body lifting jack.

iv. The temporary bogies (N12-04) are installed to/removed from the car body by the car body lifting jack (N12-02).

removal/installation shop (N12) and the outside of the Workshop building, and between the underfloor-cleaning track (N11) and the lead track.

d. The rolling stock is moved by temporary bogies (N12-04) in the Workshop building.

e. The train can move itself on the track from the lead track to the final adjustment shop (N31).

f. The heavy repair method is that there are not spare parts for heavy repair (bogies and parts/equipment) basically but spare parts for failures/accidents on the train.

i. The parts for heavy repair are dismantled from the car body.

ii. The parts are inspected and repaired in the Workshop building basically.

iii. The parts after inspection and repair are reassembled to the same car body as before dismantling.

8.9.2.2. Under above methods, the basic concept of workshop facilities is as follows.

a. Shop-in Check Facilities (N11 and N31)

i. There are the shop-in check facilities at the underfloor cleaning track (N11) and the final adjustment shop (N31).

ii. The underfloor cleaning track is to clean the underfloor equipment/parts of rolling stock.

iii. The underfloor cleaning track is to clean the underfloor equipment on the train before maintenance works in the workshop building.

iv. The final adjustment shop is to conduct shop-in check before maintenance works in the Workshop building.

v. The final adjustment shop is to uncouple the train to one car.

vi. The final adjustment shop has three tracks for shop-in check and final adjustment to conduct works at the same time.

b. Bogie Removal/Installation Facilities (N12)

i. There are the bogie removal/installation facilities at the bogie removal/installation shop.

ii. The bogie removal/installation shop is to divide the rolling stock into the bogies and the car body and to re-install the bogies to the car body after inspections and repairs of the bogies.

iii. The bogies are installed to/removed from the car body by the car body lifting jack.

iv. The temporary bogies (N12-04) are installed to/removed from the car body by the car body lifting jack (N12-02).

N02.06 Welding Machine

The same requirements as of N01.0910 shall be applied except follows:

1. Quantity: One (1) set

N02.06 Welding Machine

The same requirements as of N01.09 shall be applied except follows:

1. Quantity: One (1) set

N02.07 Oxygen Acetylene Gas Welder

The same requirements as of N01.101 shall be applied except follows:

1. Quantity: One (1) set

N02.07 Oxygen Acetylene Gas Welder

The same requirements as of N01.10 shall be applied except follows:

1. Quantity: One (1) set

N02.08 Worktable

The same requirements as of N01.134 shall be applied except follows:

1. Quantity: One (1) pc

N02.08 Worktable

The same requirements as of N01.13 shall be applied except follows:

1. Quantity: One (1) pc

N02.09 Tool Cabinet

The same requirements as of N01.145 shall be applied except follows:

1. Quantity: One (1) pc

N02.09 Tool Cabinet

The same requirements as of N01.14 shall be applied except follows:

1. Quantity: One (1) pc

N03.03 Worktable

The same requirements as of N01.134 shall be applied except follows:

Quantity: One (1) pc

N03.03 Worktable

The same requirements as of N01.13 shall be applied except follows:

Quantity: One (1) pc

N03.04 Tool Cabinet

The same requirements as of N01.145 shall be applied except follows:

Quantity: One (1) pc

N03.04 Tool Cabinet

The same requirements as of N01.14 shall be applied except follows:

Quantity: One (1) pc

N12.02 Car Body Lifting Jack

1. Quantity: Twenty-Five (25) sets

2. Functional Requirements

Quantity of Lifting Jacks:	4 Nos per Set
Lifting capacity per Jack	10t Min.
Lifting capacity per set	04 x 10t =40t Min.
Lowest position of cantilever (claw) above T.O.R.	400mm
Highest position of cantilever (claw) above T.O.R.	2.500mm
Vertical stroke	2.115mm
Regulating range of the cantilever	475mm in horizontal direction
Lifting/lowering speed	approx. 300mm/min
Operating voltage	400V±10% / ~~65~~0Hz±5%/ 3 phases
Control voltage	230V±10%/ ~~65~~0Hz±5%/ 24V DC
Protection of electrical equipment	IP55
Isolation class	F
Synchronization tolerance	±5mm
Noise level	Max 75 dB(A) in a distance of 1m
Floor flatness	Max ±5mm in a distance of 2m

2.1. One car body lifting jack set shall consist of four (4) on-floor type mobile jacks of electric motor driven screw type having self-locking features when the power fails, and a control system for lifting of single car provided in the N12 Bogie Removal/Installation Shop.

2.2. Four jacks shall be synchronized during the lifting process after confirming enough contact with jacking pads on the car within a tolerance of +/- 5 mm..

2.3. Each Lifting Jack will be overload tested Dynamically with 115% of the SWL and Statically with 150% of the SWL.

2.4. The equipment will be executed in metric system.

2.5. All the basic components in the system will be interchangeable

3. Design:

3.1. Major particulars of car will be as follows; the Contractor shall confirm to the Rolling Stock Contractor:

i. Track: 1,435 mm gauge,

ii. Cary weight: less than 40 tons except bogies,

iii. Car width: 2,950 mm (1,435 mm gauge).

3.2. Arrangement of lifting positions shall be referred to the Workshop Layout drawings.

3.3. The jacking operation shall be carried out and controlled on the central control panel, and remote-control box shall be provided for single jack operation.

3.4. In-floor socket boxes including plugs shall be provided.

3.5. Safety measure shall be provided for the train opposite side where the staff cannot watch from the central control panel.

3.6. Flashing lights and audible warning device shall be provided for operation safety.

N12.02 Car Body Lifting Jack

1. Quantity: Twenty-Five (25) sets

2. Functional Requirements

Quantity of Lifting Jacks:	4 Nos per Set
Lifting capacity per Jack	10t Min.
Lifting capacity per set	04 x 10t =40t Min.
Lowest position of cantilever (claw) above T.O.R.	400mm
Highest position of cantilever (claw) above T.O.R.	2.500mm
Vertical stroke	2.115mm
Regulating range of the cantilever	475mm in horizontal direction
Lifting/lowering speed	approx. 300mm/min
Operating voltage	400V±10% / 60Hz±5%/ 3 phases
Control voltage	230V±10%/ 60Hz±5%/ 24V DC
Protection of electrical equipment	IP55
Isolation class	F
Synchronization tolerance	±5mm
Noise level	Max 75 dB(A) in a distance of 1m
Floor flatness	Max ±5mm in a distance of 2m

2.1. One car body lifting jack set shall consist of four (4) on-floor type mobile jacks of electric motor driven screw type having self-locking features when the power fails, and a control system for lifting of single car provided in the N12 Bogie Removal/Installation Shop.

2.2. Four jacks shall be synchronized during the lifting process after confirming enough contact with jacking pads on the car within a tolerance of +/- 5 mm..

2.3. Each Lifting Jack will be overload tested Dynamically with 115% of the SWL and Statically with 150% of the SWL.

2.4. The equipment will be executed in metric system.

2.5. All the basic components in the system will be interchangeable

3. Design:

3.1. Major particulars of car will be as follows; the Contractor shall confirm to the Rolling Stock Contractor:

i. Track: 1,435 mm gauge,

ii. Cary weight: less than 40 tons except bogies,

iii. Car width: 2,950 mm (1,435 mm gauge).

3.2. Arrangement of lifting positions shall be referred to the Workshop Layout drawings.

3.3. The jacking operation shall be carried out and controlled on the central control panel, and remote-control box shall be provided for single jack operation.

3.4. In-floor socket boxes including plugs shall be provided.

3.5. Safety measure shall be provided for the train opposite side where the staff cannot watch from the central control panel.

3.6. Flashing lights and audible warning device shall be provided for operation safety.

N12.05 Welding Machine

The same requirements as of N01.0910 shall be applied except follows:

Quantity: One (1) set

N12.05 Welding Machine

The same requirements as of N01.09 shall be applied except follows:

Quantity: One (1) set

N12.06 Oxygen Acetylene Gas Welder

The same requirements as of N01.101 shall be applied except follows:

Particle Quantity: One (1) set

N12.06 Oxygen Acetylene Gas Welder

The same requirements as of N01.10 shall be applied except follows:

Particle Quantity: One (1) set

N12.07 Worktable

The same requirements as of N01.134 shall be applied except follows:

Quantity: Two (2) pcs

N12.07 Worktable

The same requirements as of N01.13 shall be applied except follows:

Quantity: Two (2) pcs

N12.08 Tool Cabinet

The same requirements as of N01.145 shall be applied except follows:

Quantity: two (2) pcs

N12.08 Tool Cabinet

The same requirements as of N01.14 shall be applied except follows:

Quantity: two (2) pcs

N13.07 Double Head Grinder

The same requirements as those of N01.067 shall be applied except follows:

Quantity: Four (4) sets

N13.07 Double Head Grinder

The same requirements as those of N01.06 shall be applied except follows:

Quantity: Four (4) sets

N13.08 Upright Drilling Machine

The same requirements as those of N01.078 shall be applied except follows:

Quantity: Two (2) sets

N13.08 Upright Drilling Machine

The same requirements as those of N01.07 shall be applied except follows:

Quantity: Two (2) sets

N13.09 Disc Cutter

The same requirements as those of N01.089 shall be applied except follows:

Quantity: Two (2) sets

N13.09 Disc Cutter

The same requirements as those of N01.08 shall be applied except follows:

Quantity: Two (2) sets

N13.10 Welding Machine

The same requirements as those of N01.0910 shall be applied except follows:

Quantity: Four (4) sets

N13.10 Welding Machine

The same requirements as those of N01.09 shall be applied except follows:

Quantity: Four (4) sets

N13.11 Oxygen Acetylene Gas Welder

The same requirements as those of N01.101 shall be applied except follows:

Particle Quantity: Four (4) sets

N13.11 Oxygen Acetylene Gas Welder

The same requirements as those of N01.10 shall be applied except follows:

Particle Quantity: Four (4) sets

N13.12 Worktable

The same requirements as those of N01.134 shall be applied except follows:

Quantity: Eight (8) pcs

N13.12 Worktable

The same requirements as those of N01.13 shall be applied except follows:

Quantity: Eight (8) pcs

N13.13 Tool Cabinet

The same requirements as those of N01.145 shall be applied except follows:

Quantity: Eight (8) pcs

N13.13 Tool Cabinet

The same requirements as those of N01.14 shall be applied except follows:

Quantity: Eight (8) pcs

N14.02 High Pressure Water Cleaner

The same requirements as those of N01.167 shall be applied except follows:

Quantity: One (1) set

N14.02 High Pressure Water Cleaner

The same requirements as those of N01.16 shall be applied except follows:

Quantity: One (1) set

N14.03 Worktable

The same requirements as those of N01.134 shall be applied except follows:

Quantity: One (1) pc

N14.03 Worktable

The same requirements as those of N01.13 shall be applied except follows:

Quantity: One (1) pc

N14.04 Tool Cabinet

The same requirements as those of N01.145 shall be applied except follows:

Quantity: One (1) pc

N14.04 Tool Cabinet

The same requirements as those of N01.14 shall be applied except follows:

Quantity: One (1) pc

N16.08 Worktable

The same requirements as those of N01.134 shall be applied except follows:

Quantity: Five (5) pcs

N16.08 Worktable

The same requirements as those of N01.13 shall be applied except follows:

Quantity: Five (5) pcs

N16.09 Tool Cabinet

The same requirements as those of N01.145 shall be applied except follows:

Quantity: Two (2) pcs

N16.09 Tool Cabinet

The same requirements as those of N01.14 shall be applied except follows:

Quantity: Two (2) pcs

N17.10 Double Head Grinder

The same requirements as those of N01.067 shall be applied except follows:

Quantity: One (1) set

N17.10 Double Head Grinder

The same requirements as those of N01.06 shall be applied except follows:

Quantity: One (1) set

N17.11 Upright Drilling Machine

The same requirements as those of N01.078 shall be applied except follows:

Quantity: One (1) set

N17.11 Upright Drilling Machine

The same requirements as those of N01.07 shall be applied except follows:

Quantity: One (1) set

N17.12 Welding Machine

The same requirements as those of N01.0910 shall be applied except follows:

Quantity: One (1) set

N17.12 Welding Machine

The same requirements as those of N01.09 shall be applied except follows:

Quantity: One (1) set

N17.13 Oxygen Acetylene Gas Welder

The same requirements as those of N01.101 shall be applied except follows:

Particle Quantity: One (1) set

N17.13 Oxygen Acetylene Gas Welder

The same requirements as those of N01.10 shall be applied except follows:

Particle Quantity: One (1) set

N17.14 Worktable

The same requirements as those of N01.134 shall be applied except follows:

Quantity: Two (2) pcs

N17.14 Worktable

The same requirements as those of N01.13 shall be applied except follows:

Quantity: Two (2) pcs

N17.15 Tool Cabinet

The same requirements as those of N01.145 shall be applied except follows:

Quantity: Eight (8) pcs

N17.15 Tool Cabinet

The same requirements as those of N01.14 shall be applied except follows:

Quantity: Eight (8) pcs

N18.02 High Pressure Water Cleaner

The same requirements as those of N01.167 shall be applied except follows:

Quantity: One (1) set

N18.02 High Pressure Water Cleaner

The same requirements as those of N01.16 shall be applied except follows:

Quantity: One (1) set

N18.07 Worktable

The same requirements as those of N01.134 shall be applied except follows:

Quantity: One (1) pc

N18.07 Worktable

The same requirements as those of N01.13 shall be applied except follows:

Quantity: One (1) pc

N18.08 Tool Cabinet

The same requirements as those of N01.145 shall be applied except follows:

Quantity: One (1) pc

N18.08 Tool Cabinet

The same requirements as those of N01.14 shall be applied except follows:

Quantity: One (1) pc

N19.10 Double Head Grinder

The same requirements as those of N01.067 shall be applied except follows:

Quantity: One (1) set

N19.10 Double Head Grinder

The same requirements as those of N01.06 shall be applied except follows:

Quantity: One (1) set

N19.11 Upright Drilling Machine

The same requirements as those of N01.078 shall be applied except follows:

Quantity: One (1) set

N19.11 Upright Drilling Machine

The same requirements as those of N01.07 shall be applied except follows:

Quantity: One (1) set

N19.12 Work Table

The same requirements as those of N01.134 shall be applied except follows:

Quantity: Nine (9) pcs

N19.12 Work Table

The same requirements as those of N01.13 shall be applied except follows:

Quantity: Nine (9) pcs

N19.13 Tool Cabinet

The same requirements as those of N01.145 shall be applied except follows:

Quantity: Two (2) pcs

N19.13 Tool Cabinet

The same requirements as those of N01.14 shall be applied except follows:

Quantity: Two (2) pcs

N20.13 Worktable

The same requirements as those of N01.134 shall be applied except follows:

Quantity: Two (2) pc

N20.13 Worktable

The same requirements as those of N01.13 shall be applied except follows:

Quantity: Two (2) pc

N20.14 Tool Cabinet

The same requirements as those of N01.145 shall be applied except follows:

Quantity: Two (2) pcs

N20.14 Tool Cabinet

The same requirements as those of N01.14 shall be applied except follows:

Quantity: Two (2) pcs

N21.04 Worktable

The same requirements as those of N01.134 shall be applied except follows:

Quantity: One (1) pc

N21.04 Worktable

The same requirements as those of N01.13 shall be applied except follows:

Quantity: One (1) pc

N21.05 Tool Cabinet

The same requirements as those of N01.145 shall be applied except follows:

Quantity: One (1) pc

N21.05 Tool Cabinet

The same requirements as those of N01.14 shall be applied except follows:

Quantity: One (1) pc

N22.08 Double Head Grinder

The same requirements as those of N01.067 shall be applied except follows:

Quantity: One (1) set

N22.08 Double Head Grinder

The same requirements as those of N01.06 shall be applied except follows:

Quantity: One (1) set

N22.09 Upright Drilling Machine

The same requirements as those of N01.078 shall be applied except follows:

Quantity: One (1) set

N22.09 Upright Drilling Machine

The same requirements as those of N01.07 shall be applied except follows:

Quantity: One (1) set

N22.10 Welding Machine

The same requirements as those of N01.0910 shall be applied except follows:

Quantity: One (1) sets

N22.10 Welding Machine

The same requirements as those of N01.09 shall be applied except follows:

Quantity: One (1) sets

N22.11 Oxygen Acetylene Gas Welder

The same requirements as those of N01.101 shall be applied except follows:

Quantity: One (1) set

N22.11 Oxygen Acetylene Gas Welder

The same requirements as those of N01.10 shall be applied except follows:

Quantity: One (1) set

N22.12 Worktable

The same requirements as those of N01.134 shall be applied except follows:

Quantity: One (1) pcs

N22.12 Worktable

The same requirements as those of N01.13 shall be applied except follows:

Quantity: One (1) pcs

N22.13 Tool Cabinet

The same requirements as those of N01.145 shall be applied except follows:

Quantity: One (1) pcs

N22.13 Tool Cabinet

The same requirements as those of N01.14 shall be applied except follows:

Quantity: One (1) pcs

N23.03 Magnetic Flaw Detector

1. Quantity: One (1) set

2. Functional Requirements

2.1. The magnetic flaw detector (MPI) shall be used for the flaw detecting of the tight lock coupler & draft gear parts by the magnetic particle flaw detecting technology.

2.2. The MPI equipment shall be of fixed on-floor type in the N23 Tight Lock Coupler and Draft Gear Shop, and composed of work conveyors, a magnetizing device, particle spraying device, a darkroom for inspection with a black light, demagnetizing (degaussing) device.

2.3. MPI process shall be performed automatically except the inspection with a black light by the operator.

2.4. The feature for minimizing dead zone in the work shall be provided in the AC magnetizing technology.

2.5. Major particulars of the coupler are as follows; the Contractor shall confirm to the Rolling Stock Contractor:

i. Type of coupler : auto tight lock couplers and bar couplers of steel,
ii. Major dimensions : approx. 1,000 mm x 350 mm x 400 mm,
iii. Weight : max. 450 kg.

2.6. Flaw detected by the Magnetic flaw detector shall be follows:

i. Type: Metal fatigue cracks,
ii. Direction: All directions,
iii. Parts: Whole surface,
iv. Detection method: Visual inspection with Black light.

2.7. Major functions of the magnetic flaw detector shall be as follows

i. Power input: 400V AC 3 phase, ~~65~~0Hz, approx. 200A
ii. Output of electric current: AC 1,000～1,200A
iii. Demagnetize capacity: under 1.0 mT (10 gauss)
iv. Dimension: approx. L 5,700 x W 1,300 x H 2,200mm
v. Size of dark room: approx. L 2,000 x W 2,200 x H 2,200 mm

3. Design

3.1. The tight lock coupler or works to be inspected will be put on the entrance conveyor of the MPI equipment by using the crane or by hand.

3.2. Arrangement of the MPI equipment shall be referred to the workshop layout drawings.

3.3. The MPI equipment shall be equipped with automatic operation and individual operation.

3.4. The following accessories shall be included, but not limited to:

i. Portable gauss meter,
ii. Tool kit,
iii. Anchor bolt (no anchor hole preferable).

4. Interface Requirement

4.1. Interface shall be taken with Rolling Stock Contractor and the Building Contractor at the appropriate timing,

5. Eligible Supplier

There is no preference.

N23.03 Magnetic Flaw Detector

1. Quantity: One (1) set

2. Functional Requirements

2.1. The magnetic flaw detector (MPI) shall be used for the flaw detecting of the tight lock coupler & draft gear parts by the magnetic particle flaw detecting technology.

2.2. The MPI equipment shall be of fixed on-floor type in the N23 Tight Lock Coupler and Draft Gear Shop, and composed of work conveyors, a magnetizing device, particle spraying device, a darkroom for inspection with a black light, demagnetizing (degaussing) device.

2.3. MPI process shall be performed automatically except the inspection with a black light by the operator.

2.4. The feature for minimizing dead zone in the work shall be provided in the AC magnetizing technology.

2.5. Major particulars of the coupler are as follows; the Contractor shall confirm to the Rolling Stock Contractor:

i. Type of coupler : auto tight lock couplers and bar couplers of steel,
ii. Major dimensions : approx. 1,000 mm x 350 mm x 400 mm,
iii. Weight : max. 450 kg.

2.6. Flaw detected by the Magnetic flaw detector shall be follows:

i. Type: Metal fatigue cracks,
ii. Direction: All directions,
iii. Parts: Whole surface,
iv. Detection method: Visual inspection with Black light.

2.7. Major functions of the magnetic flaw detector shall be as follows

i. Power input: 400V AC 3 phase, 60Hz, approx. 200A
ii. Output of electric current: AC 1,000～1,200A
iii. Demagnetize capacity: under 1.0 mT (10 gauss)
iv. Dimension: approx. L 5,700 x W 1,300 x H 2,200mm
v. Size of dark room: approx. L 2,000 x W 2,200 x H 2,200 mm

3. Design

3.1. The tight lock coupler or works to be inspected will be put on the entrance conveyor of the MPI equipment by using the crane or by hand.

3.2. Arrangement of the MPI equipment shall be referred to the workshop layout drawings.

3.3. The MPI equipment shall be equipped with automatic operation and individual operation.

3.4. The following accessories shall be included, but not limited to:

i. Portable gauss meter,
ii. Tool kit,
iii. Anchor bolt (no anchor hole preferable).

4. Interface Requirement

4.1. Interface shall be taken with Rolling Stock Contractor and the Building Contractor at the appropriate timing,

5. Eligible Supplier

There is no preference.

N23.06 Double Head Grinder

The same requirements as those of N01.067 shall be applied except follows:

Quantity: One (1) set

N23.06 Double Head Grinder

The same requirements as those of N01.06 shall be applied except follows:

Quantity: One (1) set

N23.07 Upright Drilling Machine

The same requirements as those of N01.078 shall be applied except follows:

Quantity: One (1) set

N23.07 Upright Drilling Machine

The same requirements as those of N01.07 shall be applied except follows:

Quantity: One (1) set

N23.08 Welding Machine

The same requirements as those of N01.0910 shall be applied except follows:

Quantity: One (1) set

N23.08 Welding Machine

The same requirements as those of N01.09 shall be applied except follows:

Quantity: One (1) set

N23.09 Oxygen Acetylene Gas Welder

The same requirements as those of N01.101 shall be applied except follows:

Quantity: One (1) set

N23.09 Oxygen Acetylene Gas Welder

The same requirements as those of N01.10 shall be applied except follows:

Quantity: One (1) set

N23.10 Worktable

The same requirements as those of N01.134 shall be applied except follows:

Quantity: Two (2) pc

N23.10 Worktable

The same requirements as those of N01.13 shall be applied except follows:

Quantity: Two (2) pc

N23.11 Tool Cabinet

The same requirements as those of N01.145 shall be applied except follows:

Quantity: Two (2) pc

N23.11 Tool Cabinet

The same requirements as those of N01.14 shall be applied except follows:

Quantity: Two (2) pc

N24.02 Seat Cleaning Machine

1. Quantity: One (1) set

2. Functional Requirements

2.1. The seat cleaning machine shall be provided for the air blow cleaning of the seat cushion and back removed from rolling stock in the N24 Seat Shop.

2.2. The seat cleaning machine shall be composed of, but not limited to:

i. Automatic air blow device,

ii. Seat transfer conveyor,

iii. Dust collector, exhaust duct,

iv. Air compressor, air tank, filter, drain separator.

2.3. Seat to be cleaned: W 390 – 530 x L 3,000 x H 80 – 160 mm,

2.4. Major performance of seat cleaning machine shall be as follows:

i. Type: automatic flow line cleaning system,

ii. Air blow: rotating impulse blast air,

iii. Conveyor speed: max. 5 m/min,

iv. Number of air nozzle: approx. 30 pcs,

v. Outlet pressure: max. 0.69 MPa,

vi. Air-compressor: 6 m3/min,

vii. Air tank: 600 litres.

3. Design

3.1. The seat cleaning machine shall be installed on the flat floor without pit.

3.2. The seat cleaning machine shall have two operation modes; automatic and individual operation.

3.3. Conveyor speed shall be adjustable.

3.4. Dust collector shall be of cartridge type.

3.5. Arrangement of the seat cleaning machine shall be referred to the drawing MCRP-DWG-DEF-DEP-00065, Workshop Layout.

4. Interface Requirement

4.1. Interface shall be taken with Rolling Stock Contractor.

4.2. Interface shall be taken at the appropriate timing with the Building Contractor regarding, but not limited to:

i. Floor anchor bolts, installation work,

ii. Electric power source, distribution box, cabling, etc.,

iii. Duct support and route, wall penetration, opening finishing, etc.

5. Eligible Supplier

There is no preference.

N24.02 Seat Cleaning Machine

1. Quantity: One (1) set

2. Functional Requirements

2.1. The seat cleaning machine shall be provided for the air blow cleaning of the seat cushion and back removed from rolling stock in the N24 Seat Shop.

2.2. The seat cleaning machine shall be composed of, but not limited to:

i. Automatic air blow device,

ii. Seat transfer conveyor,

iii. Dust collector, exhaust duct,

iv. Air compressor, air tank, filter, drain separator.

2.3. Seat to be cleaned: W 390 – 530 x L 3,000 x H 80 – 160 mm,

2.4. Major performance of seat cleaning machine shall be as follows:

i. Type: automatic flow line cleaning system,

ii. Air blow: rotating impulse blast air,

iii. Conveyor speed: max. 5 m/min,

iv. Number of air nozzle: approx. 30 pcs,

v. Outlet pressure: max. 0.69 MPa,

vi. Air-compressor: 6 m3/min,

vii. Air tank: 600 litres.

3. Design

3.1. The seat cleaning machine shall be installed on the flat floor without pit.

3.2. The seat cleaning machine shall have two operation modes; automatic and individual operation.

3.3. Conveyor speed shall be adjustable.

3.4. Dust collector shall be of cartridge type.

3.5. Arrangement of the seat cleaning machine shall be referred to the drawing MCRP-DWG-DEF-DEP-0006, Workshop Layout.

4. Interface Requirement

4.1. Interface shall be taken with Rolling Stock Contractor.

4.2. Interface shall be taken at the appropriate timing with the Building Contractor regarding, but not limited to:

i. Floor anchor bolts, installation work,

ii. Electric power source, distribution box, cabling, etc.,

iii. Duct support and route, wall penetration, opening finishing, etc.

5. Eligible Supplier

There is no preference.

N24.04 Worktable

The same requirements as those of N01.134 shall be applied except follows:

Quantity: One (1) pc

N24.04 Worktable

The same requirements as those of N01.13 shall be applied except follows:

Quantity: One (1) pc

N24.05 Tool Cabinet

The same requirements as those of N01.14 shall be applied except follows:

Quantity: One (1) pc

N24.05 Tool Cabinet

The same requirements as those of N01.145 shall be applied except follows:

Quantity: One (1) pc

N25.06 Worktable

The same requirements as those of N01.134 shall be applied except follows:

Quantity: Nine (9) pcs

N25.06 Worktable

The same requirements as those of N01.13 shall be applied except follows:

Quantity: Nine (9) pcs

N25.07 Tool Cabinet

The same requirements as those of N01.145 shall be applied except follows:

Quantity: One (1) pc

N25.07 Tool Cabinet

The same requirements as those of N01.14 shall be applied except follows:

Quantity: One (1) pc

N26.05 Double Head Grinder

The same requirements as those of N01.067 shall be applied except follows:

Quantity: One (1) set

N26.05 Double Head Grinder

The same requirements as those of N01.06 shall be applied except follows:

Quantity: One (1) set

N26.06 Upright Drilling Machine

The same requirements as those of N01.078 shall be applied except follows:

Quantity: One (1) set

N26.06 Upright Drilling Machine

The same requirements as those of N01.07 shall be applied except follows:

Quantity: One (1) set

N26.09 Worktable

The same requirements as those of N01.134 shall be applied except follows:

Quantity: One (1) pc

N26.09 Worktable

The same requirements as those of N01.13 shall be applied except follows:

Quantity: One (1) pc

N26.10 Tool Cabinet

The same requirements as those of N01.145 shall be applied except follows:

Quantity: One (1) pc

N26.10 Tool Cabinet

The same requirements as those of N01.14 shall be applied except follows:

Quantity: One (1) pc

N27 WAREHOUSE

N27.01 Rack System

The same requirements as those of N01.15~~6~~ shall be applied except follows:

Quantity: One hundred eighty-six (186) sets

N27 WAREHOUSE

N27.01 Rack System

The same requirements as those of N01.15 shall be applied except follows:

Quantity: One hundred eighty-six (186) sets

N31.04 Tool Cabinet

The same requirements as those of N01.145 shall be applied except follows:

Quantity: One (1) pc

N31.04 Tool Cabinet

The same requirements as those of N01.14 shall be applied except follows:

Quantity: One (1) pc

S02.06 Welding Machine

The same requirements as of S01.09~~10~~ shall be applied except follows:

Quantity: One (1) set

.

S02.06 Welding Machine

The same requirements as of S01.09 shall be applied except follows:

Quantity: One (1) set

.

S02.07 Oxygen Acetylene Gas Welder

The same requirements as of S01.101 shall be applied except follows:

Quantity: One (1) set

S02.07 Oxygen Acetylene Gas Welder

The same requirements as of S01.10 shall be applied except follows:

Quantity: One (1) set

S02.08 Worktable

The same requirements as of S01.134 shall be applied except follows:

Quantity: One (1) pc

S02.08 Worktable

The same requirements as of S01.13 shall be applied except follows:

Quantity: One (1) pc

S02.09 Tool Cabinet

The same requirements as of S01.145 shall be applied except follows:

Quantity: One (1) pc

S02.09 Tool Cabinet

The same requirements as of S01.14 shall be applied except follows:

Quantity: One (1) pc

S03.03 Worktable

The same requirements as of S01.134 shall be applied except follows:

Quantity: One (1) pc

S03.03 Worktable

The same requirements as of S01.13 shall be applied except follows:

Quantity: One (1) pc

S03.04 Tool Cabinet

The same requirements as of S01.145 shall be applied except follows:

Quantity: One (1) pc

S03.04 Tool Cabinet

The same requirements as of S01.14 shall be applied except follows:

Quantity: One (1) pc