

Annexure-1**SECTION – 5****I. GENERAL SCOPE OF WORK AND INSTRUCTIONS**

1. The Contractor shall post a dedicated Project & Deputy Project Manager for this Contract who will be the single point of contact for all contractual obligations.
2. The Contractor shall conduct interview of staff to assess their suitability prior to their deployment in the appropriate field. Only those staff found fit should be deployed. The list of CVs along with documents relating to educational qualification and technical experience of personnel to be deployed shall be made available to MAHA-METRO in advance for approval and if any change is required on part of MAHA-METRO, fresh list of CVs of personnel shall be made available by the contractor for approval after each and every change.
3. The Contractor shall prepare detailed date-wise, shift-wise, location-wise, and name wise list/roster of personnel who are deputed to perform each function as stated above as per the requirement of MAHA-Metro.
4. **Shift Timings:**
 - (i) All staff will work in the following shift timings of minimum 8hrs/shift per day
 - a. Morning Shift: 06.00 to 14.00 hours
 - b. Evening Shift: 14.00 to 22.00 hours
 - c. Night Shift: 22.00 to 06.00 hours
 - d. General shift 10:00 to 18:00 hour

Note: staff shall come well in advance so as to get ready to perform the services as per shift timings indicated above.
 - (ii) The Employer may make changes to the shift timings locally for locations or universally for all locations. The attendance shall be based on Biometric system installed by Maha-Metro.
 - (iii) **MAHA-Metro may at its own discretion deploy the staff across various groups any time. The Contractor shall plan for deployment of staff accordingly.**
 - (iv) The Project & Deputy Project Manager will be available round the clock on call, and shall not leave the city without informing the Employer and putting up a suitable replacement.
5. The staff should be fluent in speaking Marathi, Hindi and English.
6. The staff shall always maintain high decorum to keep up the standards of MAHA METRO. Their level of integrity shall be beyond suspicion.
7. The contractor will provide uniform and Personal Protective Equipment (like Safety Shoe, High Visibility vest & Safety Helmet) for all his staff after due approval from MAHA-Metro.
8. I-card as prescribed in contract document shall be provided to all the staff while on duty.
9. **Safety Measures & Instructions:** The Employer's premises have High Voltage OHE, High Voltage equipment, movement of Trains in the depot and stations, and other industrial equipment, which can cause major injury, electrocution, and even death to the personnel. Hence, requirements for observing safety are very high. The Contractor's Team leaders/supervisors will be provided familiarization on the safety aspects and shall be required to train all the personnel deployed. The Contractor shall ensure that the following rules and guidelines are made known

to its entire staff and must be followed to ensure safety. An assurance in this regard will be taken in writing by the contractor from the staff deployed.

a. Things to do:

- (i) In case of fire/anything unusual on OHE equipment or wires, inform the Employer's nominated staff/executives/control.
- (ii) Extinguish fire by available fire extinguishers.
- (iii) Ensure no water jet is directed at the fire under any circumstances.
- (iv) Before taking up the work 2 meters near to OHE, the OHE should be switched off and earthed on both sides.
- (v) Keep clear of the track.
- (vi) Special care should be taken while carrying long pipes, poles or ladders through tracks so that it should not come within 2 meters of OHE.
- (vii) Cases of electric shock arising out of contact traction should be reported to the Employer's staff/executives/control.
- (viii) The staff should wear proper PPE when and as required.
- (ix) Staff shall adopt the necessary safety procedures made by the Employer to avoid any type of accidents/incident to staff and material.
- (x) Cleaning work other than that of surface (i.e. of beam, pillars etc.) should be done during block period availing shadow block only.
- (xi) Whenever washing or cleaning using water jets is done, take appropriate power block.
- (xii) Staff shall adopt the necessary safety procedures made by MAHA METRO to avoid any type of accidents/incident to staff and material.
- (xiii) The service provider shall display necessary signage approved by MAHA METRO.
- (xiv) The staff should not allow any person to enter unauthorized area without proper authorization from the Employer.
- (xv) Report any unusual occurrence in their vicinity to the MAHA METRO staff.
- (xvi) To stop/start escalator/lifts in emergency & to help/evacuate commuters stuck up in escalators/lifts & during need.
- (xvii) Any other work assigned by Maha Metro

b. Things NOT to be done:

- (i) Do not approach within 2 meters of any OHE or live equipment.
- (ii) Do not work on or near OHE or any live equipment unless they are made dead, earthed and shut down notices/ permit to work obtained.
- (iii) Do not enter switching station or remote control center unless specially permitted.
- (iv) Do not touch a person in contact with live OHE Remove/touch only after power supply is switched off and earthed.
- (v) Do not touch any OHE fallen on the ground and do not allow anyone else to touch it.
- (vi) Do not forget to give artificial respiration to the victim as per the prescribed procedure laid down in shock treatment charts.
- (vii) Do not cross in front of energized train.
- (viii) Cleaning work with conducting materials like Aluminum/ Steel rods should be avoided at all times when power block is not availed.
- (ix) Do not lift or raise your tools towards OHE.
- (x) Do not damage the plinth continuity, connection to BEC, OPC and handrail continuity.
- (xi) Do not use steel tape or metallic tape or tape with woven metal reinforcement in electrified area.

10. Preservation of Peace and orderly conduct: The Contractor shall be fully responsible to ensure the discipline, and orderly conduct among the staff deployed for work. Smoking & Consumption of Tobacco in any form is not allowed. The carrying and consumption of

intoxicating liquor, drugs or other substances that may affect the proper performance is strictly prohibited in the depots/Stations.

11. RESOURCES REPORT: The Contractor shall submit to the in charge each month a detailed list of manpower employed during the report period and list of all scheduled & Breakdown maintenance carried out.

12. Accidents:

- a. It shall be the sole responsibility of the Contractor to adopt all the safety measures & deploy Maintenance personnel who are adequately trained in safety.
- b. If any accident occurs within the station area due to maintenance lapse or due to negligence on the part of the Contractor's personnel, it shall be the full responsibility of the Contractor.
- c. If any damage occurs to the structures/ material & equipment due to maintenance activities, the cost of damage will be recovered from the Contractor's bill.
- d. If an injury/death occurs to any person due to negligence of the contractor's staff/maintenance activity, the cost of damage will be recovered from the Contractor's bill.

13. Medical Examination: Contractor shall submit the medical fitness certificate of the proposed staff from recognized medical doctor as per MAHA-Metro Standards. Refer http://www.metrotrainagpur.com/pdf/NMRC_Indicative_Medical_Standards.pdf (A-3 for Team Leader, Deputy Team Leader & Supervisor and B-1 for Technician)

14. Communication facility: All the staff including Team leader & Deputy Team Leader shall be given a mobile phone by the contractor.

15. Standard operating Procedures (SOP):

- a. Contractor shall prepare the SOP based on maintenance manuals/MRGR, OEM manual, SOPs & SWOs etc & submit the same to Maha Metro for approval.
- b. Contractor shall ensure that the SOPs of Operation & Maintenance are safely followed and should plan and educate their staff accordingly.

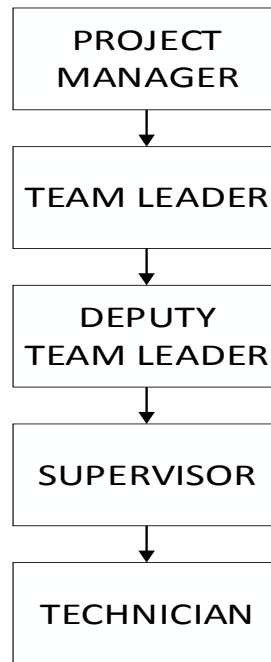
16. Maintenance Groups:

SN	Group Name	Group Number	Maintenance Activity Being Monitored
1	Signal & Telecom (S&T)	Group-1	Signalling, Telecom, IT
2	Electrical	Group-2	Over Head Equipment (OHE), Power Supply Installations (PSI), Electrical & Mechanical (E&M), pumps, Air-Conditioning (AC), Plumbing, Fire Alarm, Fire Fighting, BMS
3	Engineering	Group-3	Track, Station, Viaduct & all other Civil Structure, miscellaneous Engg. Works
4	Rolling Stock/Depot	Group-4	Rolling stock (RS), Depot Machinery & Plant (M&P), Rail cum Road Vehicle (RRV) & Breakdown Equipment

17. Qualification & Experience: -

SN	Post	Groups	Qualification	Stream	Minimum Experience
1	Project/Deputy Project Manager	General	B.E/ B. Tech		10 years' experience in Construction and/or maintenance/ of metro/Railway systems or its sub-systems
1	Team Leader/ Deputy Team Leader	S&T	B.E/ B. Tech	Electronics	7 years' experience in Construction and/or maintenance/ of metro/Railway systems or its sub-systems
		Electrical		Electrical	
		Engineering		Civil	
		Rolling Stock/ Depot		Electrical/ Electronics	
2	Supervisor	S&T	3 Year Diploma	Electronics	5 years relevant experience
		Electrical		Electrical	
		Engineering		Civil	
		Rolling Stock/ Depot		Electrical/ Electronics	
		IT	MCA	Computer Science	5 years relevant experience
3	Technician	S&T	2 Year ITI	Electronics	3 years relevant experience for 30% of the total.
		Electrical		Electrical	
		Engineering		Civil	
		Rolling Stock/ Depot		Electrical/ Electronics	
		Electrical		Electrical	
		Engineering		Civil	
		Rolling Stock/ Depot		Electrical/ Electronics	

18. Organization Structure /hierarchy



19. Facilities to be provided :-

- a) **Office space:** The contractor shall have his own office space in the vicinity of Metro Alignment. The office space for the on-duty staff will be provided in the Station/Depot as available.
- b) **Furniture:** Furniture for the Contractor's office shall be procured by the contractor himself.
- c) **Consumables:** MAHA-METRO will supply the necessary spares and consumables required for maintenance activities.
- d) **Tools:** All Tools and tackles, required for Maintenance activity will be provided by MAHA-METRO.
- e) **Electricity:** Electricity at station/Depot premises will be provided by MAHA-Metro.
- f) **Conveyance:** MAHA-Metro will not provide transportation facilities to the contractor staff to come to workplace and movement from one workplace to another.

20. Training: - Initially, specialized training for individual group will be imparted to the contractor's staff by MAHA-Metro, as a minimum requirement for carrying out the maintenance activities at the expenses of contractor. Theory/Practical/on job training shall be given to all staff before deploying them to work.

Note: During training period of 1 month, employer will pay salary of the staff deployed for training

21. Competency: - After successfully completion of training program, competency test/interview will be first carried out by the contractor based on past experience and training given in MAHA-Metro. After issue of competency by contractor, competency test/interview will be carried out by MAHA-Metro and competency/permission to work shall be awarded accordingly.

If any contractor's staff leaves the company, for contractor's new staff, the entire cost of training (Rs. 50,000) and salary during training period shall be borne by contractor.

22. Time line: - Total requirement of staff given is indicative. MAHA-Metro will advise the contractor to deploy the required no. of staff in phased manner. The contractor shall mobilize the required staff progressively **within 2 months** of notice issued by MAHA-Metro

23. Safety, Quality Environment:-

- a) All systems of MAHA-Metro are sophisticated with adequate safety provisions inbuilt for maintainers. Various safety measures need to be observed while performing preventive/corrective maintenance. Hence, usage of relevant Personal Protective Equipment (PPE) is mandatory during maintenance. Safety belt for working at height, Helmet, Safety Shoe, cotton gloves, nose mask, face mask and ear plug form a set of PPE. Provisioning and renewal of PPE to maintainers shall be the responsibility of the contractor, at his own cost.
- b) Keeping the healthiness of all systems in fettle for a long period is solely dependent upon the quality of maintenance. It is expected from the contractor to establish a good quality culture and adopt best practices. The contractor shall strive for continual improvement in quality of maintenance services.

- c) The working environment needs to be maintained with utmost cleanliness. Better maintenance practices need to be followed to avoid spillage of oil, grease and other consumables. Removed packaging materials of spares to be disposed in bins provided in the maintenance shed. All removed spares shall be handed back to stores.

25. Rights of Manuals/ training Materials: The maintenance contractor will be handling maintenance data, maintenance manuals, training material and maintenance records of MAHA-Metro systems. These are proprietary to MAHA-Metro and should not be shared with any one.

26. Audit: -

- a) MAHA-Metro or its nominated firm will perform random, periodic or continuous audits to ascertain the quality of maintenance to the expected levels. The contractor will be penalized for the non-conformances observed during the audit.
- b) The contractor should strive to exceed the expectations of MAHA-Metro through continual improvement of methods, sequences, motion economy and practices.
- c) If any individual staff of the contractor is not performing upto the satisfactory level, MAHA Metro has the right to ask for the replacement. In such case also, cost of training and salary during training period shall be borne by contractor and will not reimbursed by MAHA-Metro.
- d) If the contractor is not in a position to perform maintenance service to the satisfaction of MAHA-Metro, the contract will be terminated after giving three months prior notice, in such case the contractors' performance bank guarantee will be forfeited.

27. Interfacing with other departments/ contractors: The contractor is required to interface with Housekeeping contractor, Security Contractor, and all system contractors on a day to day basis, during the course of maintenance service. It is expected that contractor should co-ordinate with the above fellow contractors for smooth execution of maintenance activities. Any disputes that arise between the above contractors during interface, MAHA-Metro's decision will be final.

28. Penalties: -

- a. In the event of any loss incurred/occurred to Maha-Metro, as a result of any lapse on the part of the contractor, such loss will be recovered from the amount payable to the contractor. The decision of Maha-Metro shall be final and binding on the contractor.
- b. In case any public complaint is received attributable to misconduct/misbehavior of the contractor's personnel, & is assessed as true by Maha-Metro's administration, a penalty of Rs. 1,000/- for each such incident shall be levied and the same shall be deducted from the contractor's bill and on repetition of the same Maha-Metro may terminate the contract.
- c. Any breach of Conditions stipulated in the contract detected by Maha-Metro officials shall attract a spot fine upto Rs. 1,000/- per event.
- d. Rs.1000/- per day per person will be deducted if any staff of Contractor is not in proper or without uniform or without ID card.
- e. If any repetitive lapses are found in the performance of the duty by the Contractor or on any particular incident negatively affecting the working of Maha-Metro, a suitable amount of penalty as decided by Maha-Metro will be deducted from the Contractor's monthly bill/performance guarantee.
- f. If the contractor fails to perform its duties/functions satisfactory as prescribed by Maha-Metro then Maha-Metro reserves the right to terminate the contract with the contractor at any point of time. In no event shall the contractor be entitled to any prospective profits or consequential losses because of such termination.
- g. In addition to any of the provisions listed above, Maha-Metro can terminate the contract without providing any reason to the contractor by giving notice in three months in advance. No compensation shall be paid to the contractor for the residual period after the cancellation of contract.

- h. In the event, contractor is not following Labour laws, he will be directed to rectify the irregularity/non-compliance. In case of failure to rectify or repeated non-compliance, contractor may be fined INR 1000/- per each occurrence per day.
- i. If any of the technician/supervisor is absent from duty a penalty of Rs 500/person/day will be imposed, moreover payment towards days of absence will not be paid.
- j. If Contractor fails to complete any one of required schedule of maintenance timely indicated in scope of work (chapter 5), the following penalties shall be levied;

1	Scheduled maintenance	Penalty	Remarks
1	Daily	200/day	
2	Weekly	500/day	
3	Monthly	1000/day	
4	3 Monthly	2000/day	
5	6 Monthly	3000/day	
6	Yearly	5000/day	

Note: If delay in scheduled maintenance is on account of Maha-Metro or for attending breakdown maintenance not attributable to the Contractor, no penalty shall be levied

- k. If the monthly total level of staff provided goes below 90% of the total level of staff to be provided in that billing cycle, a penalty of 5% of the billing amount will be imposed.

29. Manpower required: Bidder shall assess the manpower requirement to manage the services as per scope, however they need to deploy minimum manpower as indicated below

SN	POST	Groups	Requirement
1	Team Leader	S&T	1
		Electrical	1
		Engineering	1
		Rolling Stock/Depot	1
2	Deputy Team Leader	S&T	1
		Electrical	1
		Engineering	1
		Rolling Stock/Depot	1
3	Supervisor	S&T	4
		IT	5
		Electrical	2
		Engineering	4
		Rolling Stock/Depot	2
4	Technician	S&T	32
		Electrical	65
		Engineering	34
		Rolling Stock/Depot	24
Grand Total			180

- 1. The staff should be well versed with Marathi, Hindi, and English.**
- 2. MAHA-Metro at its discretion may increase/decrease the total/discipline wise staff.**
- 3. The Contractor shall deploy the additional manpower as per the requirement of MAHA-Metro and will be paid on pro-rata basis of Annexure(s) of Section-9 Financial Bid.**

- 30.** Details of Stations & Depot for which maintenance services to be provided under Contract is as under

SN	Reach1	SN	Reach 3
1	Khapri	1	Lokmanya Nagar
2	New Airport	2	Bansi nagar
3	Airport South	3	Vasudev Nagar
4	Airport	4	Rachana Ring Road Jn.
5	Ujjwal Nagar	5	Subhash Nagar
6	Jaiprakash Nagar	6	Dharampeth Science College
7	Chattrapati Square	7	LAD Chowk
8	Ajni Square	8	Shankar Nagar Square
9	Rahate Colony	9	Institute of Engineers
10	Congress Nagar	10	Jhansi Rani Square
11	Sitabuldi Interchange	11	Hingna Depot
12	Mihan Depot		

Contractor shall have to maintain the entire section of reach-1 from Mihan depot to Sitabuldi & reach 3 from Hingna depot to Sitabuldi complying the details given in specific scope of work

- 31.** The Maintenance Staff shall wear uniform which shall be provided by the Contractor. The uniform should also facilitate identification of the rank of the personnel. Necessary personal protective equipment including winter clothing, raincoat etc. shall be provided by the Contractor at its cost. Design of Uniform shall be submitted to Maha Metro for approval

SECTION – 5**II. SPECIFIC SCOPE OF WORK**

Specific scope of work basically includes maintenance (Schedule/ Preventive and breakdown/ corrective) of various systems under supervision and control of supervisors from Maha-Metro in 4 major groups i.e. Group 1: S&T (Signalling & Train Control System, Telecommunication & IT), Group 2: Electrical (Traction OHE, PSI & E&M), Group 3: Engineering (Track, Civil Stations and Viaduct,) Group 4: Rolling Stock & Depot.

A. MAINTENANCE SERVICES FOR SIGNALLING, TELECOMMUNICATION, AND IT SYSTEMS

1. The scope of Maintenance of Signalling, Telecom, IT, UPS and Battery equipment's falls under this group. Preventive Maintenance includes Periodical regular maintenance performed in order to prevent the occurrence of equipment faults in the future.
2. Periodicity of maintenance of the System gears is defined in table – 1. The periodical maintenance shall include cleaning and upkeep of equipment rooms and equipment's installed inside station & depots and along the track, visual inspection, cleaning, lubrication (oiling & greasing) of mechanical gears/parts, measurement of voltages/currents/resistance, joint inspections, adjustment of setting, corrections (as per original). The floor cleaning, mopping will be done by Housekeeping staff.
3. Corrective Maintenance includes Maintenance that covers the overhaul of equipment and also includes the replacement of modules, major parts and assemblies, with the used one being returned to a running maintenance shed or the supplier for repair and / or overhaul.

Table-1

SN	Gears	Weekly	Monthly	Three Monthly	Six monthly	Yearly
1	Point Machine S700K and associated accessories	✓	✓		✓	✓
2	Signal and associated accessories		✓			✓
3	Buffer Signal and associated accessories		✓			✓
4	Axle Counter and associated accessories		✓			✓
5	ESP(Platform + SCR) and EMP panel				✓	
6	ATS Cubicle	✓		✓		✓
7	Transformer Cubicle					✓
8	Power Distribution Cubicle				✓	✓
9	UPS system	✓	✓			✓
10	Battery Bank	✓	✓			✓
11	ATS/VDU Work Station	✓	✓	✓		
12	Westrace				✓	✓
13	Crank Handle					✓
14	Point Machine BSG-9	✓	✓	✓	✓	✓
15	TGMT On-board equipment and associated accessories		✓	✓	✓	✓
16	TGMT Trackside equipment and associated accessories		✓	✓	✓	✓

SN	Gears	Weekly	Monthly	Three Monthly	Six monthly	Yearly
17	Station Computer System)	✓	✓	✓	✓	✓
18	PIDS	✓	✓	✓	✓	✓
19	PAS	✓	✓	✓	✓	✓
20	CCTV	✓	✓	✓	✓	✓
21	Master Clock	✓	✓	✓	✓	✓
22	Radio	✓	✓	✓	✓	✓
23	FOTS	✓	✓	✓	✓	✓
24	OAIT	✓	✓	✓	✓	✓
25	EPABX/Telephone	✓	✓	✓	✓	✓
26	ACIDS	✓	✓	✓	✓	✓
27	SCADA	✓	✓	✓	✓	✓
28	CDRS	✓	✓	✓	✓	✓

Note:

1. Computers and its accessories like CPU, UPS, Printer, Keyboard, and Monitor etc. are to be cleaned daily.
2. The different types of equipment available in UPS room are to be cleaned by suitable methods & equipment.

B. MAINTENANCE SERVICES FOR ELECTRICAL SYSTEMS (TRACTION, E&M AND POWER SUPPLY)

1. The scope of Maintenance of Traction 25 KV OHE, PSI (in RSS, TSS and ASS), E&M, pumps, Air Conditioning, Plumbing, Fire Alarm, Fire Fighting and BMS equipment's falls under this group. Preventive Maintenance includes Periodical regular maintenance performed in order to prevent the occurrence of equipment faults in the future. Periodicity of maintenance of the System gears is defined in table – 2A, 2B, 2C.
2. The periodical maintenance shall include visual inspection, cleaning, lubrication (oiling & greasing) of mechanical gears/parts, measurement of voltages/currents/resistance, joint inspections, adjustment of setting, corrections (as per original).
3. Preventive maintenance is applied when equipment is still operative. In all such cases proactive treatment is given consisting of checks, examination and supervisory inspection. The frequency of maintenance given in following para is indicative. It may be increased on the basis of factors such as site condition/pollution levels and other system specific requirements.
4. Corrective Maintenance includes Maintenance that covers the overhaul of equipment and also includes the replacement of modules, major parts and assemblies, with the used one being returned to a running maintenance shed or the supplier for repair and / or overhaul.

Table -2A**PSI**

S N	Gears	Monthly	Three Monthly	Six monthly	Yearly
1	Bonding and Earthing	✓			✓
2	Oil Level in Transformers, CTs	✓			
3	Insulator	✓	✓		
4	Traction Transformer		✓	✓	✓
5	Circuit Breakers and Interrupters		✓	✓	✓
6	Isolator		✓	✓	✓
7	Bus-bars, Clamps and Connectors		✓	✓	✓

S N	Gears	Monthly	Three Monthly	Six monthly	Yearly
8	Control and Relay Panels.	✓	✓	✓	✓
9	Batteries and Battery Chargers		✓		✓
10	PTs and CTs		✓		✓
11	Booster Transformers		✓		✓
12	Lightning Arrestors		✓	✓	✓
13	132 kV and 33 kV Current Transformer		✓	✓	✓
14	Cast Resin Dry Type Transformers (at RSS and ASS)		✓	✓	✓
15	Maintenance of ASS	✓	✓	✓	✓
16	415V Three Phase LT Panels			✓	✓
17	415V Panels/DBs		✓		✓
18	110V DC DB		✓		✓
19	Battery Charger	✓	✓		✓
20	Ni-CD battery	✓		✓	✓
21	Earthing Station/MAT			✓	✓
22	Surge Arrester			✓	✓
23	Feeder Pillar		✓		✓
24	Protection Relay		✓		✓

SCADA**Maintenance Schedule of RTU Panel**

SN	Check list	Schedule
1	Visual Inspection of LED status of CPU card, Power supply card, DI card, DO card, AI Card.	Quarterly
3	Cleaning of RTU panel using vacuum cleaner	Quarterly
4	Check the voltage at every DI-TB and DO-TB. Replace fuse if blown off after checking	Quarterly
5	Check the working and performance of power supply units and communication convertors	Quarterly
6	Tight all the cable connections of DI, DO and AI circuit Tight the cable connectors and connections of communication cable	Quarterly
7	Check the updating of analog values and tight the transducer connections	Quarterly
8	Ensure marking on cables, transducers, relays etc	Quarterly
9	Check the earthing connections and seal the holes if any.	Quarterly
10	Check the functioning of Local SCADA permissive switch and execution of SCADA permissive from OCC	Quarterly
11	Check the door locking arrangement for proper alignment. Lubricate if necessary	Quarterly
12	Check the foundation bolts for proper tightness.	Quarterly
Maintenance Schedule of Operation Control Centre		
1	Check updating of events, alarms (audible and visual), trends, energy reports analog values.	Quarterly

2	Check the communication with all RTUs and back-up control centers	Quarterly
3	Check the power supply and LAN connectivity of each server, workstation and printer.	Quarterly
4	Check the time synchronization with Master clock and synchronization status of all RTUs	Quarterly
5	Take the system back up in CD/DVD and ensure the seal on CD-ROM, USB ports and floppy drives.	Quarterly
6	Check for any abnormality in the signal list, synoptic screen and rectify it.	Quarterly
7	Check the control transfer function.	Quarterly
9	Cleaning of server, work stations and communication cubicle by vacuum cleaner.	Half yearly

Table 2B**E&M**

SN	Gears	Daily	Weekly	Monthly	Three Monthly	Six monthly	Yearly
25	Panel	✓	✓	✓			✓
26	DB		✓				
27	Diesel Generator		✓	✓			✓
28	Lighting		✓		✓		
29	Earthing				✓		✓
30	AC Outdoor Units					✓	✓
31	AC Indoor Units					✓	✓
32	Fire Fighting/ PHI						
32a	Pumps	✓	✓			✓	✓
32b	Fire Hose Cabinet		✓			✓	✓
32c	Extinguishers			✓			
33	Fire Detection						
33a	Fire Alarm and Control Panel	✓	✓			✓	✓
33b	Detectors and Other Devices					✓	✓
34	BMS			✓	✓		
35	UPS	✓	✓	✓		✓	✓

Note:

1. The D.G. sets, connected panels, Battery Chargers, Fuel Tanks, and Oil Barrels etc. are to be cleaned weekly.
2. The different types of all fire and safety equipment available are to be cleaned and maintained by suitable methods & equipment. No operational services should be disrupted due to cleaning and maintenance operations. While cleaning, the safety has to be ensured by the personnel. Any accident, if occurs shall be the sole responsibility of the service provider. No equipment should be damaged due to cleaning.
3. The different types of equipment available in Pump room are to be cleaned weekly.
4. maintenance of all type of valves provided for firefighting pipe lines are to be carried out weekly by dry and wet cleaning methods.

Table 2C

Traction OHE

SN	Gears	Weekly	Monthly	Three Monthly	Six Monthly	Yearly	2 yearly	Remarks
01	Foot Patrolling	✓						
02	OHE checking by CMV		✓					
03	AOH Cantilever Assembly					✓		
04	Droppers and Jumpers					✓		
05	AOH Auto Tensioning Device					✓		
06	Spring Type ATD					✓		
07	Counter weight ATD					✓		
08	Checking of Overlaps		✓					
09	Turnouts		✓					
10	SWS Equipment			✓				
11	Section Insulators							Monthly for polluted zone and quarterly for non-polluted zone
12	a. Mainline		✓	✓				
	b. In Yard				✓			
	Current Collection				✓			
13	Isolator				✓			
14	Cantilevers					✓		
15	Insulator cleaning			✓				
16	Cleaning of ST and BT insulators of Polluted Zones				✓			
17	Contact Wire Diameter					✓		
18	Tree Trimming			Seasonal				
19	Kite, Thread, Bird nest Removal			Seasonal				
20	Periodical overhauling	4.5 years (the periodicity of POH shall be reduced with increased panto passage and pollution level)						
	a. Cantilever Assembly							
	b. Counter Weight type ATD							
	c. Catenary and Contact Wire							
	d. Jumpers							
21	Neutral Section	✓						
22	Bond and Earthing Connection					✓		
23	Mast for Graded Section					✓		

C. MAINTENANCE SERVICES FOR ROLLING STOCK AND DEPOT

- The various maintenance schedules, approximate person hours required, period of train availability and number of schedules are given in the following table.

Table 3

SN	Maintenance Schedule	Approximate person hours required	Availability of train in inspection line
1	72 hr inspection	4	90 min
2	15 Days Schedule (A check)	8	2 hrs
3	45 Days Schedule (B1 Check)	14	2 hrs
3	90 Days Schedule (B2 Check)	28	4 hrs
4	180 Days Schedule (B4 Check))	54	7 hrs
5	Annual Schedule (C1 Check)	160	20 hrs
6	Biannual Schedule (C2 Check)	160	20 hrs
7	RRU, Breakdown vehicle, Shunter, CMV & breakdown equipment	16	--

Note: The distribution of schedules slightly vary from month to month depending upon the availability of fit trains and operational requirements

Total No of Train set of 3 coach each is 12 sets for reach 1 & 3 to be maintained

- Based on the reliability of sub-systems, MAHA-Metro reserves its right to revise/modify/increase the inspection schedules, its periodicity, introduction of any special schedules or special checks. The contractor has to accordingly re-orient his resources for accomplishing the revised tasks.
- For any such revised tasks explained in point d. above, the rates will remain the same as initially quoted by the contractor for that particular maintenance schedule.

D. MAINTENANCE SERVICES FOR TRACK & CIVIL

- The scope of Maintenance of Track, Station, Viaduct & all other Civil Structure, miscellaneous Engg. Works, equipment's falls under this group.
- Preventive Maintenance includes Periodical regular maintenance performed in order to prevent the occurrence of defects/faults in the future. Periodicity of maintenance of the System of Track and civil as defined in Table No.4 & 5 respectively.
- The periodical maintenance shall include visual inspection by foot/cab, recording of Track parameter as per laid down schedule of track manual/OMS and rectification on need basis. The periodical inspection of viaduct, bearings, stations buildings, drainage arrangements etc, and replacement/rectification of defects on need basis as specified in works manual of Maha Metro.
- Corrective Maintenance of track includes replacement/rectification in case of failure and restore within permissible limit which includes renewal of Track components as defined in Track Manual. Corrective maintenance of civil includes replacement/rectification of bearings/structures/drainage etc, within permissible limit as specified in the works manual.

**Table 4
Track Maintenance Schedule**

SN	Title									
		Daily/ Value of counter	Weekly/ Value of counter	Fortnightly/ value of counter	Monthly/ value of counter	Quarterly/ value of counter	Half yearly/ value of counter	Yearly/ value of counter	Bi/yearly/ value of counter	4 yearly/ value of counter
1	Foot Inspection									
	a. Ballasted Track	✓								
	b. Ballastless Track		✓							
2	Curve measurement/ inspection at main line & depot									
	a. Ballasted Track					✓				
	b. Ballastless Track						✓			
3	Point and Crossing at main line									
	a. Ballasted track					✓				
	b. Ballastless track						✓			
	c. Scissor Crossover					✓				
4	Wear Measurement at curve location									
	a. For ballasted Track					✓				
	b. For ballastless track						✓			
5	OMS Operation				✓					
6	Tamping Machine Cycle									
	a. Ballasted Track / Mainline								✓	
	b. Points & Crossing and SCO							✓		
7	USFD Testing of Weld							✓		
8	Toe Load Measurement on every 100 th sleeper randomly when 4 years or GMT>200 whichever is earlier									✓
9	Creep Measurement					✓				
10	Inspection of Rail Expansion Joint for ballasted and Ballastless track (once in May, June, Dec & Jan)					✓				
11	Joint Inspection with S&T Department									
	a. Point & Crossing							✓		
	b. Insulated glued Joint							✓		
12	Greasing of outer rail for curves radius less than 500M		✓							
13	Track Patrolling by Key Man/ Maintenance Man									
	a. Ballasted Track Main Line	✓								
	b. Ballastless Track Main Line		✓							

Table No.5

CIVIL MAINTAINANCE SCHDULE

SN	Gears	Daily/ Weekly	15 Days	Mont hly	Three Monthly	Six monthly	Yearly
1	Viaduct Inspection					✓	✓
2	Grade Structure Inspection					✓	✓
3	Crash barrier Signs					✓	✓
4	Drainage System	✓ (*)				✓	✓
5	POT/PTFE/Spherical Bearing						✓
6	Inspection of Foundation					✓	✓
7	Sub Structure Inspection					✓	✓
8	Super Structure Inspection					✓	✓
9	Composite Girder Inspection					✓	✓
10	Building & Other Structure Inspection					✓	✓
11	Segmental Bridge Inspection					✓	✓

(*) During pre-monsoon and in rainy season

E. Breakdown Maintenance

- i. During breakdown, when asked for, contractor shall mobilize staff available at station/depot immediately. When staff deputed for scheduled maintenance is utilized for attending breakdown maintenance, any delay in scheduled maintenance (due to breakdown maintenance) will be condoned. However, the on duty available staff will not be paid for attending breakdown.
- ii. If required, contractor shall mobilize the off-duty staff for attending breakdown within 30 minutes. Contractor shall be paid at the accepted rate for attending breakdown only if breakdown is not attributed to the Contractor.

F. Details of population of gears & its location, detailed activities and checklist along with schedule of maintenance, DOs & DON'Ts will be provided for each department after award of Contract.