



**TITLE OF THE TENDER: "TECHNICAL CONSULTANT SERVICES
FOR ATTIKO METRO S.A. PROJECTS IN
THESSALONIKI REGION"**

RFP-434/23 A.Σ. 189830

**TECHNICAL INFORMATION ABOUT THE CONSULTANT
PERSONNEL AND SERVICES**

**TECHNICAL INFORMATION ABOUT THE
CONSULTANT PERSONNEL AND SERVICES**

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1. GENERAL DESCRIPTION OF THE COMPANY ATTIKO METRO S.A.

ATTIKO METRO S.A. a SINGLE-MEMBER S.A. Company, trading as ATTIKO METRO S.A., was established via Article First of Law 1955/91 (Government's Gazette 112/18.07.91, volume A'). The purpose of ATTIKO METRO S.A., which is determined via Article 2 of Law 1955/91, as this is amended through article 35 of L. 3202/03 (and articles 121 and 145 of Law 4070/12 is the design, construction, organization, management, running, operation and development of the Urban Railway Network of Attica and Thessaloniki Regions and, in general, of the Electric Railway of Attica and Thessaloniki Regions with the exception of OSE Railway Network (electrification or non-electrification network) as well as of the TRAMWAY network in whole Greece.

The projects that ATTIKO METRO S.A. implements require high technical expertise, their scopes call for a broad spectrum of specialties, and are co-financed by the European Union.

ATTIKO METRO S.A. is currently constructing the Base Project of Thessaloniki Metro, which is at the completion and testing phase and its extension to Kalamaria, which is at an advanced stage having the Civil Works being completed. At the same time, at the design stage are the extensions of Thessaloniki Metro to the Airport and to the Western Suburbs. ATTIKO METRO S.A. is also investigating additional projects for the further extension of the Metro network in Thessaloniki Region. These projects are described in detail in the following article.

In view of its increased commitments in order to implement and put to tender the aforementioned projects, ATTIKO METRO S.A. needs to be supported by a specialized Technical Consultant.

2. ATTIKO METRO S.A. PROJECTS IN THE REGION OF THESSALONIKI

2.1 PROJECTS OVERVIEW

This article provides information on **all ATTIKO METRO S.A. projects in Thessaloniki**. The scope of the services to be provided by the Technical Consultant of this contract is described in article 3 of this document. The purpose is to provide:

- an overview of the Metro projects under construction, under procurement and under design, as well as of the future projects
- an overview about each project's phase of the works, as well about the individual activities and actions by ATTIKO METRO S.A. in the framework of these projects
- an overview about the technical issues involved
- the framework of the contracts based on which the projects are executed
- ATTIKO METRO S.A. responsibilities, actions, activities and obligations for each of the above

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in order to give a clear picture of the framework within which the prospective Consultant to be appointed by this procedure is called upon to respond to.

2.1.1 Base Project

The Thessaloniki Metro Base project comprises of one underground main line approximately 9.6 Km in length with two tracks, running –at its greatest part– underneath main road axes and central points of the city, and with 13 stations. It also includes a Depot in the area of Pylea for train stabling, as well as for the maintenance and repairs of rolling stock and the entire electrical and mechanical equipment. Within the Depot is the Operation Control Center (OCC), as well as the Thessaloniki Metro Administration Building, which are also part of the Project’s scope of works.

Moreover, the Project scope includes the rolling stock required for the operation of the line. The system shall be a fully automated driverless system, but provisions for an Automatic Train Operation system with train attendants shall also be made, as described in detail in the relevant technical specifications.

The Line begins on the north-west side of the city with the “New Railway Station” located in front of the OSE Station as its first station, and goes on to reach “Nea Elvetia” Terminal Station on the south-east side of the city. The line follows mainly the Monastiriou, Egnatia, N. Egnatia, Delfon, and Solonos Streets before on its way to “Nea Elvetia ” Terminal Station.

The foreseen stations are the following:

1. New Railway Station
2. Demokratias
3. Venizelou
4. Aghias Sofias
5. Sintrivani
6. Panepistimio
7. Papafi
8. Efkliidi
9. Fleming
10. Analipseos
11. 25 Martiou
12. Voulgari

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13. Nea Elvetia

2.1.2 Extension to Kalamaria

The Project encompasses the underground main Line (2 tracks) spanning over a length of approximately 4.7km from 25 Martiou crossover up to the end of the forestation of MICRA Station. The Project includes the construction of three (3) shafts, as well as the construction of five (5) stations:

Nomarchia
Kalamaria
Aretsou
Nea Krini
Micra

2.1.3 Ridership requirements

The Base Project system is sized for at least 18,000 passengers per hour per direction with headway of 90 sec. Furthermore, the overall Project planning shall also take into consideration the projected ridership figures at every station, as detailed in the Planning Manual of each individual Project. It is noted that, as far as the projected ridership figures are concerned, all future extensions of the system have been taken into consideration. Especially, as regards the addition of the Extension to Kalamaria, the two branches of the line shall be connected at Patrikiou crossover; the first branch shall be directed towards Nea Elvetia and the second branch towards Kalamaria. Given the length of the Line with two stations in the branch towards Nea Elvetia and the length of the Line with five stations in the branch towards Kalamaria, the initial concept is that the circulation of the trains in the main part of the Line shall be distributed based on the ratio 2:1 in both branches. In other words, out of three consecutive trains with a 90 sec headway, the first two trains shall be directed to the branch towards Kalamaria and the third train shall be directed to the branch towards Nea Elvetia.

2.1.4 Extension to the Airport

The project includes the Metro extension to the east of Kalamaria, approximately 5.5km long, with 3 stations that will connect the city with the Airport; while alternative alignments and technical solutions have been prepared for the subject project.

2.1.5 Extension to the Northern Western Suburbs

Based on transportation studies prepared in the past and those in progress carried out in order to proceed with the final selection of the metro alignment, it arises that the **northern western** extension of the Base Line to Stavroupoli (5 km, 5 stations) and to Evosmos (4.4 km, 4 stations) is necessary.

These alignments are under investigation and final selection for the optimal service of the western suburbs of Thessaloniki region.

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Regarding the extension to Stavroupoli and in the framework of the implementation of the Base Project, all the required provisions in relation to Civil Works adjacent to Dimokratias Station have been implemented along with the provisions pertaining to the E/M and railways systems, that will allow for the future construction of the connection of the extensions with the Base Line without causing the slightest interruption to or without having the slightest impact on it. It is pointed out that, on the basis of the initial planning, the base line has been designed in full compliance with the operation of the extensions, since the branches in the eastern and western section of the line shall operate with the trains circulating with the normal headway, while in the common central part the trains from all branches shall be combined, circulating with half the headway up to 90sec. The transportation study, which is under compilation, shall finalize the alignment of every section of the extensions.

It is stressed that, as already stated, the extensions, after the extension to Kalamaria, shall require the construction of an additional depot – train stabling area, which shall be located according to the relevant planning, in a free area in the north/east side of Pylea Depot, while an investigation has been conducted for other alternative areas.

2.1.6 Other projects in maturing process

ATTIKO METRO S.A. also investigates additional projects, apart from the aforementioned ones, for the further extension of the Metro network in the Region of Thessaloniki.

2.2 TECHNICAL SCOPE OF ATTIKO METRO S.A. PROJECTS

In summary, the scope of the Projects includes the following works, indicatively and not limited to them:

2.2.1 Surveys and Designs

In the framework of implementing the works of ATTIKO METRO S.A. by Contractors, further surveys and designs are required in order to confirm the results of the available surveys and designs, to supplement those surveys/designs that need to be completed and to prepare the Final Design and/or the Detailed Final Design of the Projects. The surveys and designs include indicatively, but not limited to, the following:

- Survey works - cadastral diagrams / tables
- Geological – Hydrogeological & geotechnical surveys and designs
- Layout and longitudinal profile of the alignment of the line
- Surveys and checking for the positioning and design of Public Utility Organization Network Diversions

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- Traffic and Transport Studies
- Traffic Diversion Studies
- Designs for excavation works, temporary retaining works and permanent structures
- Designs concerning the Special Vulnerability and Relative Risk Assessment of Buildings and Structures
- Designs for the implementation of protection measures for buildings and structures and special studies for sensitive buildings and structures, monuments, buildings for public use etc.
- Design – Construction of shafts and/or tunnels for the structural monitoring and support, as required, of KAA during the EPB - TBM passage underneath it and reinstatement of these shafts – tunnels upon completion of works to their prior condition
- Geomechanical and Structural Monitoring studies
- Flood Protection design during the Construction and Operation of the Projects
- Noise and Vibration study during the Construction and Operation of the Projects
- Passive Fire Protection study
- Architectural designs (station layouts and architectural finishes)
- Station acoustic studies
- Design of E/M and railway systems (mechanical, electrical, power, low voltage, signaling)
- Trackwork designs
- E/M designs for the simulation of Traction Power, Tunnel Ventilation, Station Acoustics, line operation – signaling, etc.)
- Design coordinating Civil Works, Electrical and Mechanical and railway systems
- Compiling – Checking the Project log for every contract involved
- Network Operating Analysis and its maintenance requirements
- Design and organization of the Operation Control Center, the Depot and the Administration Building

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- Reliability, Availability, Maintainability and Safety (RAMS) study, including a Risk Analysis for the rolling stock and for all electro/mechanical and railway systems
- Compilation of Health and Safety Plan and File
- A study for the rational use and energy saving during the project operation.

The designs/surveys/studies for the projects, shall be subject to ATTIKO METRO S.A.'s approval And, in some cases, to the relevant services and organizations concerned (e.g. PPC, OTE, EYDATH, Municipalities, YPEHODE, Ministry of Culture etc.) approval before their implementation. The DFDs shall be prepared by the construction contractors further to the approval of the General Final Design and shall be approved by ATTIKO METRO S.A..

2.2.2 Preliminary Works

The above include the following:

- Review, verification and completion of the existing data (establishment of topographical network of the Project, topographic surveys, geological, hydrogeological, geotechnical, hydrological, urban and environmental studies, PUO network surveys, investigation of the condition of the buildings etc.).
- Prior to the main construction works, relocation of PUO networks will be executed at the stations and other CW locations.
- Issuance of any type of permits.
- Occupations and expropriations.
- Worksite installations.

2.2.3 Archaeological - Traffic Works

Prior to the construction of the stations and the execution of other Civil Works, archaeological excavations will be executed.

2.2.4 Civil Works

In the framework of projects implementation, all Civil Works concerning the scope of each Project shall be constructed. These works include, *inter alia*, the following:

1. Tunnels

The existing tunnels have been constructed and the future ones shall be constructed in the following ways:

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- a) Underground mechanical boring using EPB-TBM. The use of EPB-TBM equipped with proper systems shall be applied in order to ensure that buildings and structures located within the Project influence zone will not be affected within the framework of the adherence to the Project time schedule.
- b) Underground excavation using conventional mechanical means.
- c) Cut and cover method.

2. Stations, Shafts and Crossovers

The construction methods of stations, crossovers and shafts shall include the following techniques:

- a) Cut and Cover method.
- b) Underground boring using conventional mechanical means.
- c) Cover and Cut method.

The design and construction method for each station /Shaft / crossover shall be based on the Description of each project and the relevant Specifications. The location of the stations, the accesses and other openings shall be as shown on the architectural drawings.

3. Depot

The existing Depot site is located at the end of the Base Project Line at Pylea.

The design and construction method of the Depot shall be based on the Description of the Base Project and the respective Specifications.

The Depot has already been constructed but its eventual expansion to the east, in the framework of the new extensions of the network, shall require the compilation of designs and preparation for its implementation. At the same time, alternative locations have been also recorded for an additional Depot to be required in any case in the framework of the next extension of the network; these alternative locations, if selected, shall call for the compilation of designs as well as preparation for their implementation.

4. Connection of the Line with the Depot

After NEA ELVETIA Station, the forestation tunnel shall lead to Pylea Depot. This section is to be both underground and surface. Where the profile of the tunnel ascends above ground level, it shall be completely enclosed with a reinforced concrete box providing the same cross-section as the cut and cover tunnel.

5. Provisions for future Metro branch connections

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The Works also include the necessary structures / provisions for the connection of the base line with the future branches of the Metro extensions. These provisions have been constructed near DIMOKRATIAS and 25 MARTIOU Stations in such a way that future line extensions are possible without any interruption of the revenue service of the Base Project to be constructed in the framework of this contracting work.

6. Geomechanical and Structural Monitoring
7. Measures related to ground treatment, as required.
8. Measures related to the protection, propping and strengthening of the buildings located adjacent to excavations, monuments, antiquities, main sewer, etc.
9. Flood Protection.

2.2.5 Architectural works

In all buildings, stations and other structures of the Projects, the architectural works include the following:

- Functional layout of the stations, entrances, concourse areas, personnel rooms and other necessary technical rooms and auxiliary rooms.
- Horizontal and vertical connections (corridors, escalators / staircases, lifts, emergency exits) ensuring, on the one hand, the unobstructed circulation of the users and, on the other hand, the evacuation of the station in an emergency case.
- Architectural finishes on floors, (including provisions for PSNs), walls, ceilings, false floors, suspended ceilings (made of materials with sound attenuating properties), balustrades, handrails and any external surfaces of stations, entrances, shafts and Depot buildings.
- Reinstatement and final configuration of street level surfaces at the locations of the worksites, once they are abolished.
- Signage at stations, shafts, crossovers and tunnels.
- All the above shall also be applicable to the buildings of the existing Depot and of the future Depots.
- Operation equipment for the station master rooms, OCC and the personnel areas at the Stations and at the Depot.

2.2.6 Electromechanical and Railway Systems

The design, supply, installation, testing and commissioning of the following Electromechanical and Railway Systems are required in the framework of the Works:

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1. Ventilation
2. Heating/ Ventilation/ Air Conditioning (HVAC)
3. Traction Power Supply - Medium Voltage - 20KV
4. 230/400V Power Distribution
5. Lighting
6. Fire fighting/ Fire detection
7. Escalators/ Travelators
8. Lifts
9. Earthing, bonding and protection against stray current
10. Lightning Protection
11. Water Supply, irrigation
12. Drainage, sewage
13. Pumping Station
14. 3rd Rail Traction Power System
15. Signaling (Systems: CBTC, Automatic Train Control (ATC), Automatic Train Supervision (ATS), Automatic Train Protection (ATP), Automatic Train Operation (ATO), Signaling Data Transmission System (DCS))
16. Point Machines
17. Road / Railway Traffic Lights
18. Passenger Information System (PIS)
19. Telecommunications (TETRA)
20. Automatic and Direct Phones
21. Closed Circuit TV (CCTV)
22. Public Announcements (PA)
23. Clocks and Time Distribution System
24. Information Technology (IT) Infrastructure System

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25. Broadband WiFi for the passengers
26. Safety and Protection System
27. Intercommunication System
28. Fare Collection System
29. Uninterrupted Power Supply Systems (UPS) - Batteries
30. Building Automation Control System (BACS)
31. Power Remote Control System (PRCS) / SCADA, Cables and Fiber Optics Networks
32. Cable and Fiber Optics Networks
33. Data Central Storage System
34. Data Transmission Systems
35. Trackwork
36. Depot Equipment
37. Rolling Stock
38. Operations Control Center (OCC)
39. Spare Parts and Maintenance Systems
40. Trackwork including the 3rd rail
41. Train traction power supply including the 750V DC traction power release system
42. Control and surveillance system in the Station Master Room (SMR) of the traction equipment of the Rectifier Substation
43. PABX
44. Direct Line Telephone System (DLT)
45. Access control and intrusion detection system
46. Equipment of the Station Master Room (SMR)
47. 110V DC supply system

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48. Platform Screen Doors (PSD) System.

Rolling Stock

The rolling stock constitutes a fundamental reference point of all the projects and, therefore, the parameters, the issues and the information referring to the rolling stock affect most of the other scopes of works.

Eighteen (18) trains have been delivered until now, while the supply of 15 more trains is at the final phase of the relevant tender.

Testing and Commissioning

All the electromechanical and railway systems, including the rolling stock, require testing and commissioning.

The tests are, generally, of many levels, as follows:

- Factory Acceptance Tests (FAT)
- Stand Alone Tests (SAT)
- System Integration Tests (SIT)
- System Performance Tests (SPT)
- Trial Running (on all installations, new and old)
- Operation of the Depot
- Operation of the OCC
- Operation of the entire Line

Other (related to preliminary works)

- Traffic diversions
- Relocations of PUOs
- Archaeological Surveys
- Temporary occupations and expropriations of areas.

2.2.7 Depot equipment

The Contractor of the Base Project shall supply all equipment, the necessary installations and the tools required for maintenance and repair reasons of:

- The rolling stock
- The fixed installations including all electromechanical and railway systems.

2.2.8 Operation Control Center (OCC)

The Pylea Depot Operation Control Center (OCC) shall include:

- Facilities for the Supervision and Control of the Network Operation and Train Supervision.

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- Network safety control, management and protection.
- Building Automation Control System of the line and the Depot (BACS).
- Power Remote Control System (PRCS)
- Integrated Communications Control System (ICCS).

The room of the OCC operators shall, also, include the Depot control installations. The movement and the operations of the trains within the Depot shall be checked by the Depot operation controller, who is found in the OCC operators' room.

2.2.9 Administration Building

The Contractor shall construct the Administration Building to accommodate all Departments of Thessaloniki Metro Operation Company. The building shall be within the Depot area and shall include structures that serve the functional needs of the Metro network administration and operation personnel. The said building includes all necessary electrical and mechanical systems of the building (heating, air conditioning, lighting, drainage etc.), as well as the architectural finishes

2.3 ATTIKO METRO S.A. ACTIVITIES WITHIN THE FRAMEWORK OF THE ABOVE WORKS

With regard to works stated in paragraph 2.1 above, ATTIKO METRO S.A. has undertaken the following activities:

2.3.1 Projects to be commissioned

The main activities of ATTIKO METRO S.A. for the Metro Projects to be commissioned (Base Project and Extension to Kalamaria) are as follows:

- It is organizing the temporary and final acceptances of the works, is preparing the relevant lists of pending issues, recapitulative tables, etc. and is implementing all necessary administrative actions for the Contractual and Financial closure of the contracts related to the construction of the works in operation.
- It has put to tender the Thessaloniki Metro operation and maintenance and, in this framework, it shall provide the required technical support and organization on issues pertaining to the Operation and Maintenance, when required, in order to resolve problems and settle issues related to the systems and rolling stock testing activities, with eventual failures during the 3-year warranty period, the eventual non-compliance with the contractual specifications, the cooperation with the city's agencies or other Public Services etc. In the same framework, it shall monitor the operation of the E/M and railway systems and rolling stock, it shall monitor the documentation of RAMS objectives, it shall prepare the

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relevant statistic analyses and shall draw conclusions to be implemented in the new projects.

2.3.2 Projects under construction

The main ATTIKO METRO S.A. activities related to the Metro Projects under construction are as follows:

- Review and approval of the Contractors' designs (usually Final and Detailed Finals Designs).
- Supervision of all phases related to the construction of Civil Works, installation of E/M and railway equipment, construction of architectural finishes in the stations, tests of integrated systems, system performance tests and trial running.
- Enactment of decisions related to the interface points between Contractors on a technical, temporary and contractual level. AM shall have the overall responsibility on the general coordination of the works on a design level as well as on a construction, equipment installation, testing and commissioning level.
- Monitoring and administration of the progress of the works and the relevant contracts in terms of contract, finances and time schedule and organization of the necessary corrective actions where required.
- Ensuring quality control of the Projects.
- Supervision as to the adherence to the health and safety regulations in the worksites.

2.3.3 Projects to be tendered

The main ATTIKO METRO S.A. activities as to the Metro Projects to be tendered are the following:

- Organization of the necessary expropriations and temporary occupations
- Ensuring funding of the projects
- Preparation of Preliminary or General Final Designs (GFD) level
- Preparation of the tender documents of the projects and ensuring of the coordination between contractual documents and designs
- Preparation of cost lists and project budgets, as well as their time schedules
- Tendering of the projects for the selection of Contractors.

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2.3.4 Extension Projects under Design

The main ATTIKO METRO S.A. activities for the Metro works under design are as follows:

- Preparation of the conceptual designs, preliminary designs and/or final designs of the works required for their tendering. This preparation is carried out either in-house or with the assistance of designers/consultants.
- Ensuring the optimal designs in terms of operation, cost and environment.
- Preparation of the required environmental designs of the Projects either in-house or with the assistance of designers/consultants, which are submitted to the YPEKA for approval.

2.3.5 Scheduled Extension projects:

The main ATTIKO METRO S.A. activities related to the scheduled Metro and Tramway projects are the following:

- Prepares the strategic planning designs on the basis of the transport needs and selects the optimum solution for the expansion of the Metro networks, in conjunction with the forecasts on the expansion of the city, the evolution of land uses, the employment, the transport networks and infrastructures, etc.
- Prepares the feasibility studies for the projects in order to secure their funding. Up to now, the above projects have been funded by the EU, the European Investment Bank and the Greek State.
- Prepares the conceptual and/or final designs of the projects and, in general, sees to everything required as per the above paragraph 2.3.4.

3. SCOPE OF THE CONSULTANT’S SERVICES

The scope of the Contract includes the provision of services by an experienced Technical Consultant who will possess the necessary know-how to support ATTIKO METRO S.A. in the implementation of the following projects under execution and future projects

- Thessaloniki Metro Base Project
- Metro Extension to Kalamaria
- Metro Extension to the Airport
- Metro Extension to the Western Suburbs
- Other works under the maturing process in the Region of Thessaloniki

as well as in the implementation of all the activities forming the technical scope of ATTIKO METRO S.A. and falling within its responsibilities.

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**3.1 GENERAL OBLIGATIONS OF THE CONSULTANT RELATED TO
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The obligations of the Consultant are summarized as follows:

1. Participation in every activity (designs, surveys, tendering activities, constructions, testing and commissioning) required in the framework of the technical scope of ATTIKO METRO S.A. projects under construction and the new ones, so as to ensure their successful completion.
2. Provision of specialized technical solutions, information and optimization recommendations, based on the evolution of technology, as necessary.
3. Participation in / provision of support to issues related to the design, management and supervision of the projects.

It is stressed that the Consultant shall have an advisory role. He shall not have managerial duties.

His general duties shall be as follows:

- To monitor the progress of the works, to evaluate the technical choices and solutions proposed during their development, to estimate their effectiveness and to propose improvements, where required.
- To participate in the daily activities of ATTIKO METRO S.A., as regards the advancement of the works, review of designs, supervision of the Project, monitoring of the progress of works, tests, commissioning, etc.) within the existing organizational structure of ATTIKO METRO S.A..
- To support ATTIKO METRO S.A. engineering scope in cooperation with ATTIKO METRO S.A. personnel, as required, in the framework of the various projects related to the Metro, the car parking facilities or other similar projects. In this framework, to prepare designs awarded to the Consultant by ATTIKO METRO S.A. on specialized scopes, as required by the projects.
- To recommend changes/modifications through the “Technical Deviation” procedure implemented by ATTIKO METRO S.A..
- To provide special technical information, technical solutions and advice, utilizing all the potential of the companies forming the Consultant’s entity (acquired from previous projects, data bases, specifications etc.), as well as their experience gained from monitoring and executing similar projects.
- To develop, through his direct participation in the daily activities of AM, the know-how transfer to ATTIKO METRO S.A...

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- To train ATTIKO METRO S.A. personnel in the implementation of the simulation plans for the proper operation of E/M systems in case of allocation of the right of use.
- To propose solutions and technical choices based on the progress of the technology, the international practice in modern Metro and Tramway systems, possible techniques contributing to the reduction in the cost relating to their construction, installation, maintenance and operation, in general.
- To support ATTIKO METRO S.A. on costing related issues for new contracts, compilation of specifications and compilation of tender documents for new contracts.
- To support ATTIKO METRO S.A. on issues related to the preparation and processing of the payment certificates of the construction contractors.

3.2 CONSULTANT'S TECHNICAL SCOPE OF WORKS

A. Civil Work Designs

- Participation in the review of the designs produced by the Contractors of Civil Works of projects under construction and new projects, especially as regards specific issues of underground structures, as well as the control of constructability, settlements, vulnerability and protection of buildings and structures.
- Designs mean also Technical Specifications, Material Submittal Sheets (MSSs), drawings, dimensioning, calculations, etc.
- Preparation of technical reports containing proposals for addressing special issues of structural and geotechnical character, inclusive of the examination of buildings in cases of extensive damage due to Metro works and increased hazards to buildings, thus, providing support to ATTIKO METRO S.A. in its decision making process.
- Preparation of design related data for permanent and temporary civil works, in cooperation with the pertinent engineering sections of ATTIKO METRO S.A..
- Assistance in the evaluation process regarding results of investigations and geotechnical interpretation reports, which give the parameters necessary for the preparation of the structural and geotechnical designs of the structures.
- Assistance in the preparation of the necessary traffic Transportation Studies and Traffic Management Studies in the framework of the planning for new projects.

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- Assistance in the review of the designs and other documents submitted to ATTIKO METRO S.A.. Review and validation of design parameters during construction stage.
- Assistance in the management and insurance against general risks in the framework of the projects and in all other aspects to be deemed necessary by ATTIKO METRO S.A..
- Submission of technical reports on issues related to the Metro projects concerning, as an example without however being limited to it, environmental issues, issues related to the mechanical boring of tunnels using TBM machines etc., in line with the requirements of the Service.

B. Electromechanical and railway system designs

The scope of works includes:

- Participation in the review of designs of the E/M and railway systems/rolling stock for ATTIKO METRO S.A. projects. The term “designs” covers the technical specifications, the Material Submittal Sheets, the drawings, the dimensioning, the calculations, the testing procedures, the simulations, etc.
- Preparation of designs for the various E/M and railway systems and cooperation with the pertinent ATTIKO METRO S.A. Departments.
- Preparation of various simulations and special studies/designs which are required for certain scopes of works and projects.
- The consultant shall specifically assist in the technical, spatial and operational cooperation of the designs with an emphasis on:
 - a) the interfaces with Civil Works
 - b) the interfaces of the systems of the already existing Metro network with the systems that are going to be installed.
 - c) the interfaces with systems belonging to third parties (suburban railway, PUO networks, technical projects etc.)
 - d) issues of new technologies related to the existing systems.

C. Organization, Coordination and Supervision of Civil Works

Participation in the organization, coordination and supervision of the Civil works (stations, tunnels, shafts, depots, transfer stations), with emphasis on special subjects related to underground works, such as the use of the NATM method, the use of diaphragm walls, Tunnel Boring Machines (TBM, EPB) and opining on the methods, the cost and the time schedule for the construction of the projects.

D. Organization of Works relating to the Installation of Electromechanical and Railway Systems

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- Organization and management of parallel and successive works for equipment installation, taking into consideration the actual conditions, the progress of the works, their safe performance and functional sequence that is necessary for the various systems.
- Participation in the organization, coordination and supervision of works related to the construction and installation of E/M equipment, the railway systems and rolling stock, signaling systems and BACS in the AM extensions under construction.

E. Testing and Commissioning of the E/M and Railway Equipment

- Participation in the tests at all their stages described (FAT, SAT, SIT, SPT, TR) placing special emphasis on the attendance during tests, the processing of the results of each stage, the determination of the prerequisites for each following stage, the management of the test reports for each stage etc.
- Organization and management of the Trial Operation of the system, as follows:
 - Preparation of the testing procedures of the system’s trial operation, in cooperation with all the E/M contractors and rolling stock supply contractors ensuring adherence to AM’s performance specifications.
 - Ensuring the suitable and necessary conditions that will allow the system’s Trial Operation.
 - Management and monitoring of the system’s Trial Operation.
 - Preparation of procedures related to the system behavior testing during emergency passenger safety related issues and monitoring of their proper execution.
 - Compilation of the respective test protocol where it shall be clearly stated that each individual system as well as the entire system can be operated in accordance with the requirements of the operation plan that has already been issued by ATTIKO METRO S.A. with any remarks fully substantiated, so that ATTIKO METRO S.A. may be in a position to proceed with the necessary corrective measures.
- Organization and management of the SPT tests:
 - Preparation of testing procedures for the system “performance” in a manner covering the performance specifications, as they are described in the contractual documents of the Contractor.
 - Preparation of the time schedule for the performance testing, taking into account the actual conditions and the progress of the works.

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- Ensuring the suitable and necessary conditions that will allow the execution of these tests with special emphasis on safety.
- Organization of these tests in cooperation with the Contractor and AM.
- Management and witnessing of these tests.
- Compilation of the respective performance test protocols where it shall be clearly stated that the system has been constructed in accordance with the performance specifications; the protocols shall be accompanied by a Punch List Items fully commented upon and structured in the order of priority, so that ATTIKO METRO S.A. can implement the necessary corrective measures.

F. Quality Assurance and Quality Control

- Review and improvement of the procedures intended for the quality assurance and quality control of the works.
- Assistance in the review of the Contractors' quality assurance and quality control systems.
- Providing support to the personnel on the quality assurance and quality control procedures.
- Assistance in the process related to the ISO certification.

G. Preparation of Designs and Tender Documents related to Future Projects of AM

The Consultant shall participate in the preparation and the review of the preliminary and final designs, as well as in the compilation of the tender documents for the future extensions.

H. Consultancy services, control and monitoring of reliability, availability, maintainability and safety (RAMS) of the E/M and railway systems, as well as of the Rolling Stock.

I. Consultancy services on matters pertaining to costing (new prices etc.), contracts (RTW, etc.) and time scheduling

It is finally stressed that the Consultant shall give his opinion on all matters related to designs, supervision, quality, safety, contracts, quantities, cost, time schedule, testing and commissioning of works and systems.

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**4. DESCRIPTION OF JOB POSITIONS, EXPERIENCE AND DUTIES OF THE
REQUIRED CONSULTANT’S TECHNICAL PERSONNEL**

4.1 General

The Contractor shall be under the obligation to make available two groups of personnel.

Group K1 shall remain unchanged, as regards the number and man-months of the executives throughout the execution of the contract.

Group K2 shall vary as regards the number and man-months of executives, in line with the actual needs and the time schedules of the projects.

The following Table includes the specialized personnel that the Contractor must possess during the execution of the Contract along with the minimum required years of experience.

Code	Position	Proposed position	Experience - Specialization	Foreseen Seat for the Provision of Services - Technical Consultant Offer	NUMBER OF PERSONS	Initial Man-months
GROUP K1						
1.1	1.1	Head of the Consultant – Coordinator	Civil Engineer or Electrical Engineer or Mechanical Engineer. Coordinator of the Consultant’s Group possessing an experience of 15 years in the management/administration/coordination of major Civil Works projects, out of which 5 years in the management/administration/coordination of Metro projects.	Athens	1	60
1.2	1.2	Civil Engineer - Construction	Civil Engineer – Structural Engineer possessing an experience of 15 years in the organization and construction of Civil Works, out of which 5 years in Metro projects or in underground railway or road projects.	Thessaloniki	1	60
1.3	1.3	Electrical Engineer – Installation, Testing and Commissioning	Electrical Engineer possessing 15 years of experience in E/M works, out of which 5 years in Metro projects or in underground railway projects.	Thessaloniki	1	60
1.4	1.4	Contracts Engineer -	Civil Engineer possessing an experience of 15 years in the management of major public works contracts.	Thessaloniki	1	60
1.5	1.5	Costing Engineer	Civil Engineer or Mechanical Engineer or Electrical Engineer possessing an experience of 15 years in the costing of major public works.	Thessaloniki	1	60

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1.6	1.6	Trackwork Engineer	Civil Engineer or Mechanical Engineer or Topographer Engineer possessing an experience of 15 years in design or construction, out of which 5 years in trackwork projects	Athens	1	60
1.7	1.7	Engineer – Power Supply	Electrical Engineer possessing an experience of 15 years in E/M works, out of which 5 years in electrical power supply or power distribution systems in railway, industrial or major building projects.	Athens	1	60
1.8	1.8	Engineer - Ventilation	Mechanical Engineer possessing an experience of 15 years in mechanical designs, out of which 5 years in tunnel ventilation, station ventilation and air conditioning, including relevant Automated Supervision and Control Systems of E/M Installations (BACS).	Athens	1	60
1.9	1.9	Engineer – Signaling	Electrical Engineer possessing an experience of 15 years in E/M systems, out of which 5 years in underground railway projects, such as Metro signaling systems, EIXL, ATS, ATO, ATP, driverless systems, as well as in Platform Screen Doors for the supervision of the corresponding installation, testing and commissioning works.	Athens or Thessaloniki	1	60
1.10	1.10	Engineer – Telecommunication and Low Voltage	Electrical Engineer possessing an experience of 15 years in E/M works, out of which 5 years in Metro systems or in underground railway projects, specializing in telecommunication systems, to support the designs in the field of telecommunications and low voltage systems.	Athens	1	60
1.11	1.11	Engineer – Rolling Stock	Rolling Stock Mechanical Engineer or Electrical Engineer possessing an experience of 15 years in E/M systems, out of which 10 years in rolling stock and E/M systems related to rolling stock.	Thessaloniki	1	60
GROUP K2						
2.1	2.1.1 2.1.2	Construction Civil Engineer	Civil Engineer possessing an experience of 12 years in organization and construction of major CW	Thessaloniki Thessaloniki	1 1	50 50
2.2	2.2.1 2.2.2	Architect Engineer	Architect Engineer possessing an experience of 12 years in major building works	Thessaloniki Thessaloniki	1 1	50 50
2.3	2.3	Topographer Engineer	Topographer Engineer possessing an experience of 12 years in organization and supervision of survey works	Thessaloniki	1	50
2.4	2.4	Structural Design Civil Engineer	Civil Engineer possessing an experience of 12 years in structural designs	Athens	1	50

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2.5	2.5	Civil Engineer, Geotechnical Designs	Geotechnical Engineer, possessing an experience of 12 years in geotechnical designs	Thessaloniki	1	50
2.6	2.6.1 2.6.2 2.6.3	E/M Construction Engineer	Electrical Engineer or Mechanical Engineer, possessing an experience of 12 years in E/M works, such as ventilation, escalators, lifts, pumping stations, power supply and distribution, earthing, lighting	T		
				Thessaloniki	1	50
				Thessaloniki	1	50
Thessaloniki	1	50				
2.7	2.7.1 2.7.2	Contracts Engineer	Civil or Mechanical or Electrical Engineer possessing an experience of 12 years in the management of contracts of major public works	Athens Thessaloniki	1 1	50 50
2.8	2.8	Cost Engineer – Civil Works	Civil Engineer possessing an experience of 12 years in costing of major public works	Thessaloniki	1	50
2.9	2.9	Cost Engineer – E/M Works	Mechanical or Electrical Engineer possessing an experience of 12 years in costing of E/M systems in major public works	Thessaloniki	1	50
2.10	2.10	Quality Engineer	Civil or Mechanical or Electrical Engineer possessing an experience of 12 years in Quality Control, Quality Management in ISO certification procedures, etc.	Thessaloniki	1	50
2.11	2.11	Transport Engineer	Civil Engineer or Topographer Transport Engineer, possessing an experience of at least 12 years in the preparation of general transit and transport studies, using strategic planning transportation models and traffic management models	Thessaloniki	1	50
2.12	2.12	SCADA Engineer	Electrical Engineer possessing an experience of 15 years in E/M works, out of which 5 years in SCADA systems in Metro projects or railway projects or industrial or major building projects	Athens	1	50
2.13	2.13	Telecommunications and Low Voltage Engineer	Electrical Engineer possessing an experience of 15 years in E/M works, out of which 5 years in Telecommunications and Low Voltage systems in Metro projects or railway projects or industrial or major building projects	Athens	1	50
2.14	2.14	Organization and Commissioning Engineer	Electrical Engineer or Mechanical Engineer possessing an experience of 15 years, out of which 10 years in the organization and commissioning of Metro lines/networks	Athens or Thessaloniki	1	50
2.15	2.15	Power Supply Engineer	Electrical Engineer possessing an experience of 15 years in E/M works, out of which 5 years in electrical systems of power supply or distribution in Metro projects or railway projects or industrial or major building projects	Athens	1	50
2.16	2.16	Mechanical Engineer - Facilities	Mechanical Engineer possessing an experience of 15 years in Mechanical works, out of which 5 years in mechanical works and	Athens	1	50

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			building mechanical facilities in railway projects			
2.17	2.17	Rolling Stock Engineer	Rolling stock Mechanical Engineer or Electrical Engineer possessing an experience of 15 years in E/M systems, out of which 10 years in rolling stock and E/M systems related to rolling stock	Athens	1	50

4.2 Description of job positions and duties

Group K1 shall consist of the following executives:

K1.1 Civil Engineer, or Electrical Engineer or Mechanical Engineer Head of Consultant and Coordinator

He shall be the head and coordinator of the consultant’s executives. His scope of works shall include the review and coordination of designs, ensuring of the Specifications, preparation of designs, reports, etc.. In addition, he will have an advisory role on technical issues and shall participate in the preparation of the designs and the technical tender documents for the new extensions.

K1.2 Civil Engineer – Construction

His scope of works includes the organization and coordination of the construction, as well as the in situ supervision of the civil works execution, ensuring adherence to the approved designs and specifications about the works under construction. Regarding future extensions, he shall have an advisory role on technical issues regarding the designs under preparation for these works, depending on the needs of ATTIKO METRO S.A..

K1.3 Electrical Engineer – Installation, Testing and Commissioning

Technical Consultant for the organization and supervision of the installation, testing and commissioning of the E/M and Railways Systems. The scope includes the organization of the supervision of the works related to the installation of the Electromechanical equipment, the on-site coordination among the various Contractors, the testing of individual and consolidated systems, performance testing and trial run.

K1.4 Civil Engineer - Contracts

His scope includes the provision of consultancy services on contractual issues in the framework of the projects under construction as well as the assistance to ATTIKO METRO S.A. in the preparation of the future tendering documents (compilation of documents, etc.).

K1.5 Civil Engineer or Mechanical Engineer or Electrical Engineer - Costing

His scope includes the provision of consultancy services on costing issues (contractual compliance of Contractors, Contractor’s requests, RTWs, new prices etc.) in the projects under construction both for CW works and E/M systems, as well as assistance provided to ATTIKO METRO S.A in the

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preparation of the tender documents for the future extensions (compilation of the documents, quantity estimates, costing etc).

K1.6 Civil Engineer or Mechanical Engineer or Topographer Engineer - Trackwork

Technical consultant in the field of trackwork (track systems, 3rd rail systems, walkways/cable ducts, tunnel invert filling concrete, cable conduits, stray current collection grid etc. in tunnels and Depots). In relation to the above, he shall provide technical advice on issues related to design review and compliance with the specifications, he shall participate in the preparation of designs for new extensions, compilation of new specifications and tender documents. Moreover, he shall have a consultancy role on issues related to interfaces with other systems, ground-borne noise and vibration, and the corresponding performance audits & tests.

K1.7 Electrical Engineer - Power Supply

Technical Support Consultant for designs and construction in the fields of traction power, medium and low voltage. The scope of works includes the assistance on issues related to train traction power systems based on a 750V DC third rail, the evaluation and conducting of relevant simulations on systems pertaining to MV power supply, low voltage power distribution, coordination of electrical systems with other systems in stations, tunnels and Depots, as well as earthing and stray current protection systems. He shall have an advisory role on technical issues related to design review and compliance with the specifications, preparation of designs for the new extensions, compilation of new specifications and tender documents.

K1.8 Mechanical Engineer - Ventilation

Technical support consultant on issues related to tunnel ventilation, station ventilation and air conditioning and testing and commissioning related procedures of the respective E/M equipment. He shall have an advisory role on technical issues related to design review and compliance with the specifications, shall participate in the preparation of designs for new extensions, compilation of new specifications and tender documents.

K1.9 Electrical Engineer - Signaling

Technical support consultant for designs in the fields of signaling and control systems of train with or without train-attendant. He shall have an advisory role on technical issues related to design review and compliance with the specifications, shall participate in the preparation of designs for new extensions, compilation of new specifications and tender documents. The scope shall also include the coordination of interfaces and operation among signaling systems, rolling stock, trackwork, traction and other Railway Systems for the main lines and the Depots.

K1.10 Electrical Engineer - Telecommunications and Low Voltage

Technical support consultant for designs and supervision of works in the fields of telecommunications and low voltage systems, and testing and commissioning related procedures of the respective E/M equipment in underground railway projects. He shall have an advisory role on technical

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issues related to design review and compliance with the specifications, and shall participate in the preparation of designs for new extensions and compilation of new specifications and tender documents.

K1.11 Mechanical Engineer or Electrical Engineer - Rolling Stock

Technical Support Consultant in the field of designs and monitoring of Metro and Tramway Rolling Stock construction and tests. The scope of works includes car-body structure, loads and, mainly, train E/M systems, such as the traction power system and the motors, the auxiliary power supply system, the doors system, the braking system, the HVAC system, the control systems, etc.

Group K2 shall consist of the following personnel:

K2.1 Civil Engineer, Construction

The scope of his services includes the organization and coordination of the construction and the *in situ* supervision of the civil works execution, as well as ensuring that the subject supervision will be executed according to the approved designs and the specifications for the works under construction. With regard to the future extensions, he shall have an advisory role on technical issues related to designs under preparation for these works, depending on ATTIKO METRO S.A.'s needs.

K2.2 Architect Engineer

The scope of works includes the organization, coordination of the supervision and in-situ supervision of the architectural works execution, ensuring adherence to the approved designs and specifications for the works under construction. Regarding future extensions, he shall have an advisory role on technical issues regarding the architectural designs under preparation for these works, depending on the needs of ATTIKO METRO S.A..

K2.3 Topographer Engineer

The scope of works includes the design review, ensuring adherence to the specifications, the preparation of topographic designs, etc. He shall have an advisory role on technical issues related to design review and compliance with the specifications, preparation of designs for the extensions, compilation of new specifications and technical tender documents, depending on the needs of ATTIKO METRO S.A..

K2.4 Civil Engineer – Structural Designs

The scope of works includes the design review, ensuring adherence to the specifications for CWs, the preparation of designs and reports, etc. Moreover, he shall have an advisory role on technical issues related to design review and compliance with the specifications, preparation of designs for the extensions, compilation of new specifications and technical tender documents, depending on the needs of ATTIKO METRO S.A..

K2.5 Civil Engineer – Geotechnical Designs

The scope of works includes the design review, ensuring adherence to the specifications for CWs, the preparation of geotechnical designs and reports,

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etc. He shall have an advisory role on technical issues related to design review and compliance with the specifications, preparation of designs for the extensions, compilation of new specifications and technical tender documents, depending on the needs of ATTIKO METRO S.A..

K2.6 Mechanical or Electrical Engineer – Construction

Technical Consultant for the organization and supervision of the installation, testing and commissioning of E/M and Railway Systems.

The scope of works includes the contribution of the Consultant to the installation of systems concerning power supply and distribution, train traction power, signaling, ATP, ATO and ATS, telecommunications, weak current systems, control and remote control systems etc. Moreover, it includes the organization of the supervision of the works for the installation of trackwork and E/M equipment, the in-situ coordination of different Contractors, the independent and integrated systems' tests, the performance tests and the trial run, depending on the needs of ATTIKO METRO S.A..

K2.7 Civil Engineer or Mechanical Engineer or Electrical Engineer - Contracts

The scope of works includes the provision of consultancy services on contractual issues in the framework of the projects to be constructed, as well as assistance to ATTIKO METRO S.A. in the preparation of the tender documents for the future extensions (compilation of documents, etc.), depending on the needs of ATTIKO METRO S.A..

K2.8 Civil Engineer – CW Cost

The scope of works includes the provision of consultancy services on CW cost related issues (Contractors' compliance with the contract, requests of Contractors, RTWs, new prices etc.) for the projects under construction, as well as assistance to ATTIKO METRO S.A. in the preparation of the tender documents for the future extensions (compilation of documents, quantity estimates, costing etc.), depending on the needs of ATTIKO METRO S.A..

K2.9 Mechanical Engineer or Electrical Engineer – E/M Cost

The scope of works includes the provision of consultancy services on E/M cost related issues (Contractors' compliance with the contract, requests of Contractors, RTWs, new prices etc.) for the projects under construction, as well as assistance to ATTIKO METRO S.A. in the preparation of the tender documents for the future extensions (compilation of documents, quantity estimates, costing etc.), depending on the needs of ATTIKO METRO S.A..

K2.10 Civil Engineer or Mechanical Engineer or Electrical Engineer - Quality

He shall provide consulting services with regard to all individual scopes described below:

- Checking and improvement of the procedures, as regards quality control and quality assurance of the works;
- Providing assistance to the quality control and quality assurance of the Contractor;
- Providing support to ATTIKO METRO S.A. personnel as regards quality control and quality assurance;
- Providing assistance as regards the ISO certification procedures

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- Review of the implementation and proposals for the improvement of operating procedures of the company.

K2.11 Civil Engineer or Topographer Transportation Engineer

Their scope of works shall include the review and preparation of general transit and transport studies, using strategic planning transportation models and traffic management models. In addition, he shall participate in the preparation of Cost – Benefit Studies for new projects, through the provision of the necessary information about ridership and travels, in general, depending on the needs of ATTIKO METRO S.A..

K2.12 SCADA Electrical Engineer

Technical Consultant responsible for the review of designs, installation, testing and commissioning of Automatic Control Systems (SCADA) for the supervision and control of the Mechanical and Electrical Systems of the Project, depending on the needs of ATTIKO METRO S.A..

K2.13 Electrical Engineer - Telecommunications and Low Voltage

Technical Support Consultant for designs and supervision of works in the fields of telecommunications and low voltage systems, and testing and commissioning related procedures of the respective E/M equipment in underground railway projects. He shall have an advisory role on technical issues related to design review and construction, compliance with the specifications, and shall participate in the preparation of designs for the new extensions, compilation of new specifications and preparation of tender documents, depending on the needs of ATTIKO METRO S.A..

K2.14 Electrical Engineer or Mechanical Engineer – Organization and Commissioning

Technical Consultant for the design support and organization of the Project operation, including the operation of stations, trains and systems and the respective organization of the Operations Company, on issues related to its operational structure, needs and description of work positions, procedures for personnel selection, personnel distribution on a geographical and/or per scope basis, training of personnel, supporting systems and software, organization and distribution of works and duties to the Operation Control Centre (OCC), ensuring safety and quality in operation, operation related environmental compliance, preparation of procedures and of rule books etc., depending on the needs of ATTIKO METRO S.A.

K2.15 Electrical Engineer - Power Supply

Technical Support Consultant for designs and construction in the fields of traction power, medium and low voltage. The scope of works includes the assistance on issues related to train traction power systems based on a 750V DC third rail, the evaluation and conducting of relevant simulations on systems pertaining to MV power supply, low voltage power distribution, coordination of electrical systems with other systems in stations, tunnels and Depots, as well as earthing and stray current protection systems. He shall have an advisory role on technical issues related to design review and compliance with the specifications and shall participate in the preparation of

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designs for the new extensions, compilation of new specifications and tender documents, depending on the needs of ATTIKO METRO S.A..

K2.16 Mechanical Engineer – Facilities

Technical Consultant for the designs and the supervision of the installation, testing and commissioning of the Mechanical Systems and facilities, such as ventilation, air-conditioning, fire protection, drainage – sewage, pumping stations, escalators, lifts, etc.. The scope includes the organization of the supervision of the works related to the installation of the Electromechanical equipment, the on-site coordination among the various Contractors, the testing of individual and consolidated systems, performance testing and trial run, depending on the needs of ATTIKO METRO S.A..

K2.17 Mechanical Engineer or Electrical Engineer - Rolling Stock

Technical Support Consultant in the field of designs and monitoring of Metro Rolling Stock construction and tests. The scope of works includes car-body structure and train E/M systems, such as the traction power system and the motors, the auxiliary power supply system, the doors system, the braking system, the HVAC system, the control systems, etc., depending on the needs of ATTIKO METRO S.A.