

 <p><b>ATTIKO METRO S.A.</b></p>	<p><b>“DESIGN, PROCUREMENT, INSTALLATION AND COMMISSIONING OF TELECOMMUNICATIONS, LOW VOLTAGE AND CONTROL SYSTEMS IN THE THESSALONIKI METRO EXTENSION TO KALAMARIA”</b></p> <p><b>TECHNICAL DESCRIPTION</b></p>	<p><b>RFP-380/20</b></p>
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## 1. INTRODUCTION

The present document provides the Bidders with the Technical Description pertaining to the design, procurement, installation, testing and commissioning of eight (8) systems for Telecommunications, Low Voltage and Control of Thessaloniki Metro extension to Kalamaria, as well as with information relating to the project’s design, characteristics and implementation.

## 2. PROJECT OVERVIEW

### 2.1 General

The Project of Thessaloniki Metro extension to Kalamaria consists in one underground Line approximately 4.77km long. The CW start at KP 0+091 (Track 1 – all KPs in this document refer to track 1, unless otherwise noted) and end at KP 4+738 at the end of the forestation of Micra station. The trackwork starts at KP 0+00 within the trumpet shaft of “25<sup>th</sup> Martiou” Station of Thessaloniki Metro Base Project, at the end of the existing crossover, ending at the end of the forestation, at KP 4+738.

The project of the extension to Kalamaria consists in two (2) single-track tunnels, five (5) stations, three (3) shafts, two (2) pumping stations, three (3) crossovers, two of which are incorporated in Micra station and one (1) forestation.

Attached hereto is a general drawing with the layout of the Line.

The names of the stations are:

- Nomarchia
- Kalamaria
- Aretsou
- Nea Krini
- Micra

The names of the shafts are:

- Kritis Shaft
- Pontou Shaft
- Terminal Shaft

The names of the pumping stations are:

- Pumping station 1
- Pumping station 2

The crossovers are:

- Nomarchia (past Nomarchia Station)
- 1<sup>st</sup> Micra crossover (incorporated to the west of Micra station)



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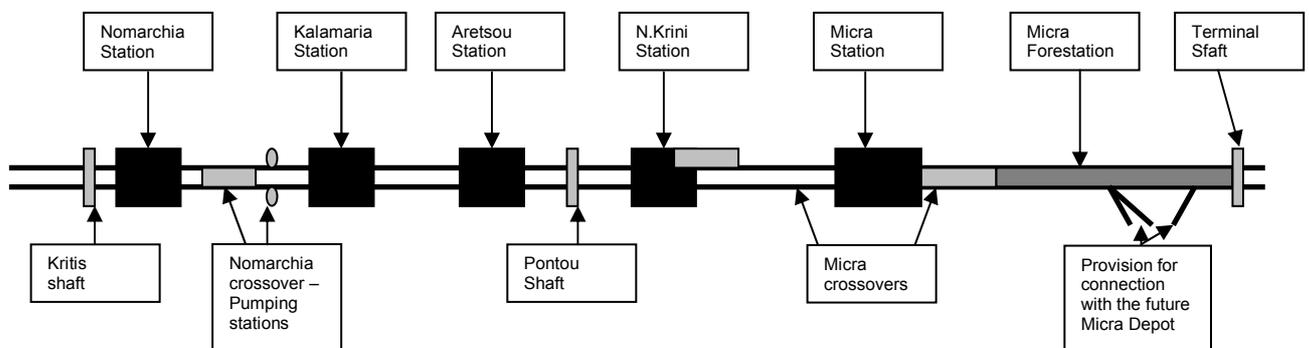
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- 2<sup>nd</sup> Micra crossover (incorporated to the east of Micra station)

In the framework of a future Contract, the construction of a Depot (Micra Depot) is foreseen near Micra station. The future connection of the Line with Micra Depot is foreseen to be implemented at Micra forestation, as shown in the respective drawings.

**GENERAL LAYOUT PLAN**



**2.2 Ridership requirements**

The system shall be dimensioned to accommodate at least 18,000 passengers/hour/direction at a train headway of 90 sec. Moreover, the Project’s design shall take into account the foreseen ridership data at each station, as these figures are provided in detail in the Planning Manual of the Main Contractor of the Kalamaria extension, which is made available for information purposes to the bidders. It is pointed out that the future system extensions have also been taken into account in the calculation of the forecast ridership figures.

**2.3 General Operational Characteristics**

The operation of Thessaloniki Metro Base Project, as well as the operation of the extension to Kalamaria, is entirely based on a fully automated driverless train system under normal operating conditions. However, an attendant can be on-board the train with the passengers during train service in order to guide and assist the passengers in cases of emergencies or train evacuations. The question whether the attendant shall permanently remain on the train or not, shall be answered at a later stage by the Metro Operation Company or Department, but all systems involved shall be designed on the basis of the assumption that it is a fully automated, driverless train system.

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#### **2.4 Provisions for Future Extensions**

The Project scope also includes expandability provisions for the future extension of the line to the Airport and connection with the future Micra Depot.

#### **2.5 Operation Control and Surveillance (OCC) and Emergency Control Room (ECR)**

The operation of the entire Thessaloniki Metro System and, therefore, the operation of the entire extension to Kalamaria, shall be controlled and surveyed from the Operation Control Centre (OCC) located at Pylea Depot. Stand-by systems for decentralized control and surveillance systems shall be made available for emergency cases. The OCC shall be capable to remotely control and operate the trains and all E/M and railway systems. Under normal operating conditions, the train control system shall be fully automated. However, the train attendant shall have the option to override the automatic operation and operate the train manually in case of the system’s failure, or in case of emergency.

In case of failure of the OCC, operation control and surveillance shall be shifted to the Emergency Control Room (ECR).

#### **2.6 Headways**

The system shall be designed and constructed so as to achieve an operational headway of 90 sec under ATC/ATO operation at its central part. The trains shall be split at a ratio of 2 to 1 at “25<sup>th</sup> Martiou” crossover, heading to Kalamaria and Nea Elvetia, respectively.

#### **2.7 Contractors involved in the project of the extension to Kalamaria**

The following Contractors are involved in the subject project:

1. The Main Contractor assigned with the Civil Works, trackwork, E/M works and systems for all building installations and certain railway systems of the Project
2. The Contractor responsible for the Signalling system and the Automatic Train Control (ATC) system
3. The Contractor responsible for the Building Automation and Control System (BACS)
4. The Contractor of this contract, responsible for the Telecommunications, Low Voltage and Control systems
5. The Contractor of this contract, responsible for the Power Remote Control System (PRCS)

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6. The Contractor responsible for the Automatic Fare Collection (AFC) System
7. The contractor of the new Rolling Stock (15 trains)
8. The Base Project Contractor (indirectly, on account of the existing Base Project systems that will need to be amended / upgraded / expanded, so as to function as an integrated whole).

### **3. TELECOMMUNICATIONS AND LOW VOLTAGE SYSTEMS – SCOPE OF WORKS**

#### **3.1 Scopes of works for Telecommunications, Low Voltage and Control Systems**

The following Telecommunications, Low Voltage and Control systems are included in the scope of this Contract. Namely:

1. Closed Circuit TV System (CCTV)
2. Public Announcement System (PA)
3. Digital Data Transmission System (DTS)
4. Safety Management System (SMS)
5. Intrusion Detection System (IDS)
6. Access Control System (ACC)
7. Radio Communications System (TETRA)
8. Passenger Information System (PIS)
9. Integrated Central Control System for Telecommunications (ICCS)
10. Power Remote Control System (PRCS)

The above systems shall be implemented by the Contractor in cooperation with the other Contractors involved in the Kalamaria extension project, as described in the following paragraphs of this document.

#### **3.2 General requirements and responsibilities of the Contractor**

In the framework of the scopes included in this Contract, the Contractor shall be responsible for the following:

- Preparation of the Final and the Detailed Final Designs for the Project, including, also, all additional investigation work, simulations and designs that may possibly be required for it, ensuring the required coordination between the static, architectural, electromechanical and railway requirements.
- Coordination of designs in cooperation with the Main Contractor of the Kalamaria extension and with the other Contractors, as required, as well



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as coordination of the modifications to the Operation Control Center (OCC) and the Emergency Control Room (ECR) at Pylea Depot, in matters relating to both designs and implementation.

- Preparation of the necessary designs so that the fully compatible integration of this Project in the currently constructed Metro network and the OCC / ECR, without causing any problem whatsoever or without reducing the performance of the Base Project, or disrupting its revenue service.
- Compilation of the Safety and Health Plan and File (SAY/FAY), as described in detail in the General Specifications – Volume I (GS0200 Design Requirements and GS0750 Health and Safety Specifications).
- Ensuring the unobstructed and safe access of the equipment during its installation phase, as well as during the operation and maintenance of the Project.
- Supply of the equipment.
- Factory acceptance testing of the equipment (FAT).
- Delivery of the equipment.
- Installation of the equipment.
- The coordination and cooperation with other Contractors involved for the sound and timely completion of the installations as a whole.
- Equipment installation tests (IT), stand-alone tests of the systems (SAT), system integrated tests (SIT) and tests on the equipment performance (SPT) for the scopes of his contract and his participation in the tests regarding the trial run of the new extension to Kalamaria, using the rolling stock foreseen in the Base Project or the new required rolling stock, in cooperation with other involved Contractors.
- The modifications and upgrading of equipment, systems, documentation, drawings and software to be commissioned in the Base Project as required for the functional integration of the Project in the existing Metro network and in the OCC and ECR.
- Commissioning of all Telecommunications, Low Voltage and Control systems of his contract, in combination with the electromechanical and railway equipment of the extension project, in full compatibility with the equipment of the Metro network – Base Project currently under construction.
- Cooperation with other Project Contractors during tests, trial operation and RAMS (reliability, availability, maintainability, safety) evaluation to be performed both by them and by the Contractor of this Contract.
- The cooperation with Thessaloniki Metro Operations Company or Department and in adherence to its rules and regulations for the duration of the Project execution regarding access and performing work in areas

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under the jurisdiction of this Operations Company/ Department, as well as during the testing and trial run periods.

- The guarantee of his Project’s installed systems shall be for three (3) years as of the completion certificate, under the condition that the Contractor shall have submitted the final measurement of the works within a period of two (2) months from the completion certificate.
- The training of the operation and maintenance personnel, enabling them to operate and maintain any system in an effective and safe manner and to repair any potential failures.
- Periodic inspection and “corrective” maintenance of his Project’s systems as included in this Contract, i.e. rectification/restoration of bad workmanship, failures, faults etc. throughout the guarantee period.

Moreover, the Contractor:

- Shall provide samples of the utilized materials/electromechanical equipment, if required, and more specifically all that is needed for the training of the technical personnel in maintenance and fault repair.
- Shall provide ATTIKO METRO S.A. with access to the equipment, during the installation works, testing and commissioning.
- Shall ensure that every equipment item in operation is reliable, adequate and safe for the operation and maintenance personnel, as well as for the remaining equipment.
- Shall participate in the coordination of the designs and the implementation of any amendments to the OCC / ECR and the respective technical rooms, as well as in the tests and commissioning of the Central Equipment to be installed by him and by other Contractors, in the framework of the extension to Kalamaria.
- Shall coordinate the interfaces between the systems falling under his scope of work and shall participate in their coordination with the other E/M and railway systems of the Project, including the existing Base Project trains and the new trains required to serve the needs of the extension to Kalamaria, as required.
- Shall provide, in an intelligible form, every necessary justification, drawing, flow diagrams and software lists for every programmable equipment item (depending on each individual case), design information and information of electromechanical nature, as well as support manuals, in order to facilitate the Project Owner in operating, maintaining, troubleshooting relevant problems, and modifying and further developing the Metro system.
- Shall provide the necessary spare parts for the guarantee period and the spare parts to be used after the expiry of this guarantee period, the special tools (e.g. programming devices), testing tools and equipment, application software and software official licenses for the systems to be

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installed by the Contractor. The lists with the above spare parts shall be submitted by the Contractor for approval based on the specifications.

- Shall provide the necessary installation, operation and maintenance manuals, as required.
- Shall prepare the design for and shall organize each system’s operation and maintenance as regards the scope of works included in the Contract.
- Shall provide appropriate rooms to conduct practical training (as required). In view of conducting the training and at the Contractor’s request, it is possible that ATTIKO METRO S.A. may provide existing rooms or spaces in Pylea Depot, in coordination with the Operation Department or Company.
- Shall be responsible for conducting the tests to measure the system’s RAMS during the guarantee period (as required).
- Shall secure the safety certificates, as required, and shall dispose all equipment and documentation needed to conduct the above tests.

### **3.3 Works in the Operations Control Centre (OCC) and the Emergency Control Room (ECR) at Pylea Depot**

Special reference must be made to the design, organization and implementation of the required modifications, upgrades and additions to the foreseen equipment in the Operations Control Centre (OCC) and Emergency Control Room (ECR) at Pylea Depot in order to cover the operation of the systems falling under this Contract within the new extension.

The Contractor’s scope of works comprises the completion, modification, upgrading and/or, if needed, replacement of the relevant systems and devices in the Pylea Depot OCC and ECR, which are included in this Contract, as well as anything else required for the completion of their designs, supply, installation, testing and commissioning. The Contractor shall always assume that ATTIKO METRO’s reference to any “system” includes both software and the respective hardware.

The Contractor shall be responsible to organize the above additions, modifications and upgrading to the systems forming part of his scope and shall describe the relevant requirements associated with additional equipment to be required in OCC both in the main room, as well as in the technical rooms, as well as in the ECR, in cooperation with the Main Contractor of the extension to Kalamaria and the other Contractors responsible to upgrade the systems not included in this contract (Signalling, BACS, AFC) and with the Contractor of the Base Project with whom he will cooperate.

All modifications, expansions and additions to the OCC systems included in the Contractor’s scope shall be implemented, so that:

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- The new or upgraded central systems are incorporated in the man-machine interfaces (MMI) existing in the Base Project, as regards control consoles, keyboards, mice, display units etc.
- All modifications are implemented with the least disturbance to the operators of the Base Project Metro system.
- The Contractor shall execute his works in the OCC/ECR in a manner not causing any problem to or not reducing the performance of the equipment or the ability to monitor/control the Base Project, or disrupting its revenue service to the least.
- No additional UPSs are required to be installed, since these are to be supplied by the Main Contractor of the extension to Kalamaria.
- With regard to the systems included in the Contractor’s scope, the addition of five (5) new stations and the completion of the respective central systems in the OCC and the ECR would be desirable not to result in additional operator consoles or screens, other than the existing ones for the Base Project. If this is not feasible, the Contractor shall submit his properly justified proposal for amendments / additions, which must be approved by AM.

### **3.4 Description of the scope of works for Telecommunications, Low Voltage and Control systems**

The scope of works for each of the Telecommunications, Low Voltage and Control systems of the Project is described in the following paragraphs:

#### **3.4.1 Close Circuit TV system (CCTV)**

The Contractor shall design, supply, install, test and commission a modern Closed Circuit TV System (CCTV), which will be used for real-time visual surveillance and control in all public and other special areas of the five (5) new stations of the expansion to Kalamaria. At the same time, image from specific locations in these areas shall be recorded. The new CCTV system shall be integrated into the existing central equipment in the OCC and the ECR at Pylea Depot, by implementing all necessary modifications or additions in terms of hardware or software.

The trainborne Closed Circuit TV System is not included in the scope of this tender; it shall be provided by the train suppliers.

#### **3.4.2 Public Address System (PA)**

The Contractor shall design, supply, install, test and commission a modern Public Address System (PA), which includes hardware and software and shall be used to announce all types of information to the public in all areas of the five (5) new stations of the extension to Kalamaria, in a clear and intelligible manner. The Contractor shall also be responsible for the design, planning, modification, upgrading of systems, equipment and software required in the

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OCC and ECR, as well as elsewhere in the Base Project if required, in order to ensure the smooth and reliable operation of the Public Address System as a whole. This system shall cover all the operating requirements under normal and emergency operation. It shall also be fully capable of transmitting "live" messages from the SMRs and from the OCC and ECR, as well as of scheduled messages and background music. The system shall be fully programmable and customizable to meet the above requirements.

The trainborne PS system is not included in the scope of this contract and shall be provided by the train suppliers.

#### 3.4.3 Digital Data Transmission System (DTS)

The Contractor shall design, supply, install, test and commission a modern Digital Data Transmission System, which includes hardware and software and shall be used in the bidirectional transmission of any types of data, i.e., Video, Audio, Data across other telecommunications or E/M-railway systems, as well as control systems of the new stations, the depot, the tunnels, the shafts, the OCC and ECR and the administration building, in real time in all areas of the new Metro extension project to Kalamaria. The Contractor shall also be responsible for the design, planning, modification, upgrade of systems, equipment and software required in the OCC and ECR, as well as in other parts of the Base Project if required to ensure the smooth and reliable operation of the Data Transmission System as a whole.

It should be noted that as the Data Transmission System (DTS) in the extension project shall be implemented by the present Contractor, he shall have to be coordinated with all involved contractors, as well as with the Main Contractor of the Kalamaria extension to serve the data transmission needs of all involved systems of these contractors as a whole.

#### 3.4.4 Safety Management System (SMS) that incorporates the subsystems related to Intrusion Detection (IDS) and Access Control (ACC)

The Contractor shall design, supply, install, test and commission a security and protection system (SMS) in all areas of the stations, in the shafts and in the tunnels of the Kalamaria extension. The SMS system shall consist of a platform, functionally integrated with the corresponding central systems in OCC and shall include an Access Control System (ACC) with "smart" cards, an Intrusion Detection System (IDS) with sensors at station accesses, doors and openings of shafts at street level, central equipment for the management of the above systems in each station with equipment to be installed in the telecommunications equipment room (3.4 t) and in the station master room (SMR), for local control purposes.

#### 3.4.5 Radio Communication System (TETRA)

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The Contractor shall design, supply, install, test and commission a Digital Wireless Communication System in the extension to Kalamaria, to cover all areas of the stations, tunnels and shaft of the extension. This communication network shall be based on TETRA standards, and shall provide the necessary wireless communication between the Metro operation personnel located in stations, on trains or elsewhere along the Line of both the Base Project and the extension to Kalamaria, the maintenance personnel at the depot or wherever else it is located within the Metro network, the Operating Control Center (OCC), the Emergency Control Room (ECR) and their respective control rooms. The equipment shall include the base stations and relays / antennas in each station, a leaky coaxial (LCX) cable as a continuous antenna mounted on the tunnel ceiling, while it shall also cover the shafts of the extension with independent antennas. The scope also includes portable units with manual switching to selected channels, as required by users. The Wireless communication equipment in each station shall be installed in the telecommunications equipment room and in the station master room (SMR). This system shall be fully compatible in all its functions and features with the system implemented in the Basic Project

#### 3.4.6 Passenger Information System (PIS)

The Contractor shall design, supply, install, test and commission a modern Passenger Information System (PIS), which shall be used for real time visual information and early warning of the public located on the platforms of the five (5) new stations of the extension to Kalamaria. This system shall inform mainly the passengers about the arrival time of the trains and therefore it must be functionally interfaced with the Train Signaling and Control System and more specifically with the Automatic Train Supervision Subsystem (ATS). It shall also be able to display emergency messages such as in the event of a station evacuation, or other messages if required. The Contractor shall also be responsible for the design, planning, modification, upgrade of systems, equipment and software of the above system in OCC and the ECR, so that the system works smoothly and reliably as a whole.

The trainborne PIS system is not included in the scope of this contract but shall be provided by the train suppliers.

#### 3.4.7 Integrated Central Control System for Telecommunications (ICCS)

The Contractor shall design, supply, install and commission an Integrated Central Control System for Telecommunications (ICCS) for the operation and control of the Telecommunications and Low Voltage systems from the workstations in the OCC / ECR and the SMRs of the five (5) new station of the extension to Kalamaria. Essentially, the Contractor shall expand the existing system to the five (5) new stations, supplementing and upgrading the central system in the OCC and ECR, respectively. This system shall ensure the necessary synchronization and coordination of the various telecommunications and low voltage subsystems that shall be installed by the Contractor in the extension to Kalamaria where required.

The ICCS System for Telecommunications shall have commercially available software with the appropriate technical specifications and the necessary

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hardware and interfaces to provide uninterrupted supervision and management of the following Telecommunications and Low systems installed by both the Contractor if this contract, as well as by the Main Contractor of the extension. The systems to be served shall be the following:

- Closed Circuit TV - (CCTV).
- Public Address - (PA).
- Digital Data Transmission - (DTS).
- Radio Communication - (TETRA).
- Passenger Information - (PIS).
- Automatic Telephones - (PABX) to be installed by the Main Contractor of Kalamaria extension.
- Direct Line Telephones (DLT), which includes the Traction Removal system (TCR) to be installed by the Main Contractor of Kalamaria extension.
- Safety Management System - (SMS), which includes the Access Control - (ACC) and Intrusion Control - (IDS) Subsystems.

The ICCS System shall be of high reliability and availability, suitable for use in Metro systems with the appropriate redundancy and flexibility.

It should be noted that as the ICCS in the extension project shall be implemented by the present Contractor, it shall have to be coordinated with all involved contractors, and mainly with the Main Contractor of the extension to Kalamaria to centrally (from the OCC / ECR) serve all other involved Telecommunications and Low Voltage Systems of these contractors as a whole.

#### 3.4.8 Power Remote Control System (PRCS)

The Contractor shall design, supply, install, test and commission the Power Remote Control System (PRCS) on the extension to Kalamaria (from the “25<sup>th</sup> Martiou” Station to Micra Forestation) of the Thessaloniki Metro. This system shall have local-peripheral equipment which shall be installed mainly on the Kalamaria extension and shall be connected to the existing central PRCS system located in the OCC and ECR at Pylea Depot, while additions / modifications will be required at special points of the Base Project near the connection with the extension. The scope includes the necessary hardware and software to provide a fully functional remote control and surveillance system of the power supply systems’ equipment installed by the Main Contractor in the Base Project and the extension.

## 4 POINTS OF SPECIAL ATTENTION

### 4.1 Station Master Room (SMR)

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The Station Master Room (SMR) is a focal point of the works of this contract and in this context the Contractor shall install in each of the five (5) stations of the extension at least the following equipment:

1. Integrated Central Control Workstation for the Telecommunication System (ICCS) that shall integrate the systems of this contract as well as other telecommunication systems of the Main Contractor of the Project
2. TETRA communications base console

Moreover:

- The required hardware to be provided shall be fully integrated and harmonized with the rest of the furniture of the room in terms of design / colors.
- All cable routing of the new systems within the room shall run underneath the false floor or above the false ceiling and in no case will cables be visible to the public.
- The Contractor shall provide the information regarding his systems to the Main contractor of the Kalamaria extension, who is also responsible for the overall coordination at the level of design, layout and installation of the equipment within each SMR.

#### **4.2 Furniture for personnel rooms**

The Contractor shall utilize all the furniture in the Station Master’s room, the ticket issuing offices, as well in all technical rooms, as required this has been designed and shall be installed by the Main Contractor of the extension to Kalamaria. The same applies for the OCC and ECR, where the furniture is foreseen to be provided by the Base Project Contractor.

#### **4.3 Interface of the new extension with the Base Project and with a future extension**

The Contractor shall ensure the interface of the new Telecommunications, Low Voltage and Control systems with the Base Project line under construction at “25<sup>th</sup> Martiou” station and crossover, and anywhere else it is required at functional interface level between the extension to Kalamaria and the existing line.

In addition, the Contractor shall examine, study and plan the necessary modifications and adjustments in the existing systems, equipment and software, as well as the manner and time that the respective works should be carried out, in relation, moreover, with the requirements of the operating network and the available time period for the performance of these works during the night engineering hours, or whenever required.

All works required to be executed at the area where the extension interfaces with the operating network, such as all connections, temporary or permanent relocation of equipment, new cabling, protection of equipment, modifications required for the proper interfacing between the Project’s systems and sub-

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systems etc., all form part of the Project’s scope. Any and all eventual modifications and interventions to the existing part of the Extension to Kalamaria project shall be properly designed and clearly shown on the relevant drawings and designs to be prepared by the Contractor.

In addition, the Contractor shall also provide all necessary information concerning his contract to the main Contractor of the extension, as well as to other involved contractors (of other systems of the extension or the rolling stock), to the extent this is required in order to fully ensure the interface between the existing networks and the new extension.

Finally, the Contractor shall provide all information concerning the systems he shall install to a potential future Contractor(s) awarded with further extensions of the Line, e.g., to the airport, so as to ensure proper integration of additional systems into the systems of this contract.

## **5 PROVISIONS – OBLIGATIONS OF THE MAIN CONTRACTOR OF THE EXTENSION TO KALAMARIA TO THE CONTRACTOR OF THIS CONTRACT AND THE SYSTEMS HE SHALL INSTALL**

This chapter includes the provisions of the Main Contractor of the Kalamaria extension in order to support the works and installations of this Contractor and of any other Contractors involved in the extensions Project.

More specifically, the main Contractor shall be responsible for the following:

- The design, coordination and spatial / functional interfaces with any other contractors, including the Contractor of this contract, who shall supply and install systems not included in the main Contractor’s scope of works. In additions, the main contractor is responsible for coordinating the project construction works, testing and commissioning of the project as a whole.
- The provision of drawings and designs for the extension to Kalamaria at a DFD level, including the architectural drawings of the stations to serve as a background for the design of the systems by the present Contractor (and other involved contractors).
- The coordinated design, installation and spatial coordination of all cable routings, cable trays, exposed or embedded ducts network cables that may be of common used by involved contractors.
- Ensuring the suitability and adequate dimensioning of all openings and holes required for the routing of trays, cables, ducts, and other networks of any other contractors.
- Sealing with materials and based on fire resistance requirements of all relevant openings / holes for trays, cables and ducts in the new stations and shafts, after the installation of all these networks by all involved contractors, including the Contractor of this contract.

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- The coordinated design, dimensioning and implementation of the power supply for the equipment of all other contractors, including the Contractor of this contract, up to the switchboard or power distribution sub-panels of the equipment of each contractor. As regards the systems installed by the Contractor of this contract, the Main Contractor of the extension shall provide the required pair of UPS units in each station / telecommunication room (3.4.t), which shall provide power to the Telecommunications, Low Voltage and Control systems of this Contractor.
- Providing the Fiber Optics Distribution Framework and the distributors within the telecommunication rooms (3,4t), to which all users of fiber optic cables (i.e. contractor of other system) shall connect their systems via fiber optic cables to be installed by the aforementioned users. The Main Contractor shall coordinate with the Contractor of this Contract (as well as with involved Contractor / user of fiber optic cables) as regards the fiber optics cables' routings and the requirements for cores connections to be required per each system installed either by the Contractor of this contract, the Main Contractor or other potentially involved Contractors.
- The coordination concerning the false ceilings in the five (5) stations and the installation of the false ceilings after the wiring of each system has been completed (on the trays and in the ducts located above the false ceilings) and the various systems of other contractors including this Contractor, i.e. for speakers, cameras, TETRA relays, etc. and their foundation / mounting bases have been coordinated.
- The functional coordination of the correct and reliable bidirectional data transmission of the systems installed by other contractors, including the Contractor of this contract from / to the OCC and the ECR, through the optical fiber networks of the Main Contractor of the extension to Kalamaria and the Data Transmission System (DTS) of the present Contractor. At this point, it is also necessary to note the responsibility of this Contractor who will install the data transmission system (DTS) in the extension project and who shall have to coordinate with all the involved Contractors as well as with the Main Contractor of the extension, in order to cover the data transmission needs of all involved systems via the DTS.
- All the required infrastructure for the installation of the scopes included in this contract, such as the required space / equipment rooms, cable and other networks passing openings in slabs, masonry and concrete walls etc. of the Civil Works, false floors, embedded duct, trays for power and control cables, equipment access routes, central power supply and related wiring up to pertinent switchboards of the systems of this contract, earthing provisions in the required rooms and provision of air conditioning in telecommunications equipment rooms.
- Ensuring the overall electromagnetic compatibility in the extension to Kalamaria.

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- Organization and execution of tests with all involved contractors, including the Contractor of this contract. In this context, the Main Contractor shall organize to ensure the safety of all persons attending the tests.

In addition to the above and specifically for each individual scope, the Main Contractor shall be responsible for the following:

- The spatial coordination to ensure that the field of view of the CCTV cameras is not blocked by other signs and signage in the public areas of the five (5) new stations.
- The provision of information on architectural finishes (reflectivity / sound absorption and the related drawing wherefrom the reflection surfaces areas are drawn) in the public areas of the five (5) new stations for the most accurate 3D modeling in the context of the acoustic simulations in the stations.
- The provision of information about special linear lighting fixtures in public areas of the Main Contractor of the extension in case of integration of loudspeakers in the lighting fixtures.

## **6 OBLIGATIONS OF THE PRESENT CONTRACTOR TOWARDS OTHER CONTRACTORS OF THE EXTENSION TO KALAMARIA**

Given that the present Contractor:

- shall install systems which shall also serve systems installed by other Contractors,
- shall make use of systems installed by other Contractors,
- shall have to interface his systems with systems installed by other Contractors in the framework of the functional interfacing,

Shall be responsible for:

- The collection of all necessary technical and operational information, parameters, protocols, settings and configurations of all Telecommunications, Low Voltage and Control systems of all involved Contractors.
- The overall coordination of the Data Transmission System (DTS) requirements as well as of the Integrated Central Control System for Telecommunications (ICCS).
- The above apply at GFD and DFD design levels, at the level of installation, testing and commissioning and, in this context, the Contractor of this contract shall cooperate with all involved Contractors, as well as with the Main Contractor of the extension to Kalamaria at the extend required for each one of them.

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- The required coordination of designs and works in the Kalamaria extension project, up to the organization and planning of the required additions, modifications and upgrades of the systems as mentioned above, in the Station Master Rooms (SMR), in the technical rooms with telecommunication equipment (3.4t) in stations, crossovers, shafts and tunnels, in the main rooms and in the technical rooms of the OCC and ECR, at the points where the Base Project is connected with the extension to Kalamaria and everywhere else required according to the requirements of the respective chapters of the Specifications for each system.

## **7 ASSETS LOG – PROJECT LOG**

### **7.1 Assets Log**

Along with the Final Measurement, the Contractor shall submit the Assets Log, which shall include all the fixed assets to be incorporated in the Project within the framework of this contract, according to the Final Measurement, as well as their respective cost data, with a breakdown per scope and geographical area.

### **7.2 Project Log**

The obligations of the Contractor include the compilation of the Project Log and its submission to ATTIKO METRO S.A., according to the stipulations in Ministerial Decision ΔΝΣγ / οικ 38108 / ΦΝ 466 (Government Gazette 1956, VOLUME TWO, 07.07.2017, Content of the Project Log), as well as in the relevant article of the Conditions of the Contract.