

TECHNICAL DATA





**GEOLOGICAL AND GEOTECHNICAL SURVEYS AND
DESIGNS FOR THE EXTENSION OF THESSALONIKI
METRO TO "MACEDONIA" AIRPORT
TECHNICAL DATA**

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A Technical Description

A.1 Technical description of the Projects under design

The projects under design concern the extension of the Thessaloniki Metro to MACEDONIA Airport, which constitutes the south-eastern extension of the Metro Extension project to Kalamaria, currently under construction, and the extension of Pylea Depot.

- Extension to MACEDONIA Airport

This extension shall begin as an underground section past "Mikra" station - the last station on the Extension to Kalamaria – shall then be headed to Georgikis Scholis Avenue, meeting the said Avenue at the location of the Supreme Joint War College. The first station of the subject extension shall be constructed at this location – below Georgikis Scholis Avenue – and shall be called "Anotera Scholi Polemou" station (Supreme War College).

Past this Station, the line emerges to the surface, at the middle of the center island along Gergikis Scholis Av., which has been widened exactly for this reason. From the point where the line emerges and all the way to "Macedonia" airport, it shall be elevated.

Three more stations shall be constructed along this elevated alignment: one at the IKEA department store next to OASTH bus station ("Diavalkaniko" Station), one at Prassina Phanaria area ("Georgiki Scholi" Station), and finally the terminal station, in front of the existing building of "Macedonia" airport ("Airport" Station).

All stations (one underground and two elevated), with the exception of "Airport" Station, shall be side platform stations. "Airport" Terminal Station shall be a center platform station.

- Extension of Pylea Depot

The operation and maintenance of all trains, as well as of the facilities of the Base Project and the Thessaloniki Metro extensions, requires the construction of additional Depot facilities at Pylea. The new supplementary installations are also deemed necessary, because the initial existing installations at Pylea have been designed in a restricted available area of approximately 50,000m², which led to acceptable and safe yet not optimised solutions in technical and operational terms.

The area of the subject additional space of the new Depot is approximately 51,000m² and 350m long, WE oriented, where the Metro network is planned to be developed.

The natural surface level of the landplot starts from the absolute level of 70,00m (Above Sea Level – ASL) along its western side (terminating point: Possidonos Street) and very quickly reaches the level of 73,00m (ASL), which is kept almost intact above the two thirds of the landplot, while at the last third of the landplot the level is lowered to 63,00m ASL up to its eastern terminating point.

In the drawing presented in the Appendix, utilized exclusively for information only, the locations of the Metro Extension to MACEDONIA Airport and of Pylea Depot are shown indicatively.

A.2 Description of the scope of this tender

The scope of this Contract covers the conduct of geological and geotechnical investigations and designs, in order to investigate the ground in the area of the Thessaloniki Metro Extension to MACEDONIA Airport and in the area of the extension of Pylea Depot, based on the following provisions:

- Extension to MACEDONIA Airport

The following works shall be carried out: (a) geological investigation and geological design, (b) geotechnical investigation, including drilling of boreholes with the associated geological and geotechnical field works and laboratory tests, presentation of their results and evaluation of the geotechnical investigation.

More specifically, the following sample boreholes shall be executed, distributed accordingly: boreholes shall be drilled along the alignment, approximately 100 meters apart. In the area of the underground station "Anotera Scholi Polemou", at least four boreholes shall be drilled near the four corners of the station building and outside its outline. At least two boreholes are expected to be drilled in the vicinity of the elevated stations, at locations near their future abutments. The final borehole depth shall vary according to the nature and the characteristics of the project to be constructed at each borehole location (underground tunnel, elevated section, underground station, elevated station, enlarged area, etc.) and is expected to be in the order of 40 meters from the ground surface. These boreholes shall be accompanied by in-situ tests; the pertinent samples shall be subject to laboratory tests. Piezometers shall be installed in most of these boreholes, in order to conduct water level measurements and to obtain water samples for analyses.

In addition, it is foreseen that 1 borehole shall be drilled in the area of "Anotera Scholi Polemou" underground station for the execution of pressuremeter tests and approximately 5 Cone Penetration Tests (static – CPT) at various locations along the alignment.

Borehole drilling without sampling is also foreseen for the installation of piezometers at a certain distance from the alignment to measure the water level. The depth of these boreholes shall be in the order of 20 meters, they shall be drilled at distances of 50 meters from the alignment - on both sides - and they shall be approximately 500 meters apart.

Finally, one pumping well may be executed, in order to perform a pumping test and take measurements from the monitoring piezometers in the vicinity.

- Extension of Pylea Depot

The following works shall be carried out: (a) geological investigation and geological design, (b) geotechnical investigation, including drilling of boreholes (approximately 25m depth) with the associated geological and geotechnical field works and laboratory tests, presentation of their results and evaluation of the geotechnical investigation.

A.3 Available data from earlier studies related to the tendered study

The available data and studies related to the scope of this tender are the following:

- Extension to MACEDONIA Airport Ground Investigation Report, Locations: Extension to Kalamaria – Kalamaria Depot (Phase 1) (1GE0CW180R901B), Exhibit 1a: Technical Report, Exhibit 1b: Technical Report - Appendices, Exhibit 2: Detailed

- Results of Site Tests, Exhibits 3a, 3b, 3c, 3d and 3e: Detailed Results of Laboratory Tests, Exhibit 4: Laboratory and Field Test Forms, Joint Venture OTM SA, SOTIROPOULOS & ASSOCIATES SA, GEOTECHNOLOGIKI SA, February 2009.
- Ground Investigation Report, Locations: Extension to Kalamaria (Phase 2) (1GE0CW180R903B), Exhibit 1a: Technical Report, Exhibit 1b, 1c & 1d: Technical Report - Appendices, Exhibits 2a & 2b: Detailed Results of Site Tests, Exhibits 3a, 3b, 3c, 3d, 3f, 3g & 3h: Detailed Results of Laboratory Tests, Exhibit 4: Laboratory and Field Test Forms, Joint Venture OTM SA, SOTIROPOULOS & ASSOCIATES SA, GEOTECHNOLOGIKI SA, July 2009.
 - Ground Investigation Report, Locations: Kalamaria Depot (Phases 1&2) (1GE0CW180R904B), Exhibit 1a: Technical Report, Exhibit 1b: Technical Report - Appendices, Exhibits 2: Detailed Results of Site Tests, Exhibits 3a & 3b: Detailed Results of Laboratory Tests, Exhibit 4: Laboratory and Field Test Forms, Joint Venture OTM SA, SOTIROPOULOS & ASSOCIATES SA, GEOTECHNOLOGIKI SA, July 2009.
 - Supplementary Geotechnical Investigation Factual Report, Section: Extension to Kalamaria KP 0+000 ÷ KP 4+737 (MICRA Station not included, KP 4+059 ÷ KP 4+379), Technical Report (1GE0PW180S901B), Detailed Results of Site Tests (1GE0PW180S903A), Detailed Results of Laboratory Tests (1GE0PW180S904A), Field Test Forms (1GE0PW180S905B), Digital File in AGS format, OMA ATE, February 2014.
 - Extension of Pylea Depot CGI Factual Report. Section: Depot (1D00CW180R901B and C). GEOGNOSI S.A.. May-July 2007.

B Justification of the Project’s feasibility

B.1 Justification of the project’s feasibility

- Extension to MACEDONIA Airport

The feasibility of a fixed-route mode leading to “Macedonia” Airport has been initially documented in the General Traffic Study for Thessaloniki (2000), Organization of the Regulatory Plan and Environmental Protection of Thessaloniki (ORTHE). Moreover, the figures in the said study were confirmed 10 years ago via the single Strategic Transport Infrastructure Plan for Thessaloniki (August 2010).

Today, given the development of the area (new commercial and recreational uses) and the development of the airport, passenger loads are estimated to be higher. This extension is expected to serve:

- The passengers of “Macedonia” airport. The airport acquires a new Runway and its terminal is expanded. Based on these facts and in line with the Development Master Plan, prepared by Fraport in September 2017, passenger traffic is expected to be increased by 30.67% between 2016 and 2026 and by 21.57% in the period from 2027 to 2036. This translates to a total increase of passenger numbers by 62.58% for the period 2016-2036 (from 6,078,118 to 9,881,634 passengers).
- The residents of Perea, Epanomi, Vassilika, Thermi areas and the South and East areas of the Municipality of Thessaloniki, who shall be given the option to transfer to the Metro network from their vehicles at “Georgiki Scholi” Station” station - where a car parking facility is foreseen to be constructed - or from buses at “Diavalkaniko” Station.

- The students and employees of the Supreme Joint War College.
- The employees / visitors to the Interbalkan Medical Center.
- The employees and visitors of commercial centers and recreation facilities developed along the axis of Georgiki Scholi Ave., as well as in the wider area (e.g. at “Mediterranean Cosmos”).

For this reason, the currently planned project envisages that the extension of the Metro line to the Airport shall initially be underground and then elevated, as described in the technical data chapter. The advantage of this option is that it does not require the passengers to make transfers between the Metro and another fixed route mode (Tramway or Monorail), which greatly facilitates passengers to the Airport who usually carry luggage.

It is anticipated that the feasibility of this Metro extension is expected to be confirmed by the General Transport Study for Thessaloniki, a project to be tendered in March 2019.

- Extension of Pylea Depot

The initial maintenance installations have been designed at the southern end of the Thessaloniki Metro Base Project, after NEA ELVETIA Station, at Pylea Depot, and fully cover the needs of the Base Project as regards train stabling, light maintenance, overhaul and repairs, while they cover part of the needs of the extensions in light maintenance, overhaul and repairs.

The operation and maintenance of all trains and fixed installations of Thessaloniki Metro Base Project and the extensions require the construction of additional installations of the Depot at Pylea, designed to support the reliable operation of all trains and the optimisation of the effectiveness of all transportation services to the residents of Thessaloniki.

B.2 Justification of the studies’ feasibility

It is imperative that the geological and geotechnical investigations and designs commence immediately, since they are prerequisites for finalizing the extension’s alignment, as well for commencing all other project maturing works.

C Schedule of required designs

The scope of this tender is the preparation of geological and geotechnical investigations and designs to investigate the ground in the area of the extension of Thessaloniki Metro to MACEDONIA Airport and in the area of the extension of Pylea Depot as described in detail in the above Section A.2.



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Appendix

