OmikronKappa Consulting

PTOLEMAIDA

GREECE

Ground improvement methods in challenging geotechnical environment:

Case study of the MBT Plant in Ptolemaida, Western Macedonia

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WASTE TREATMENT FACILITY GROUND IMPROVEMENT

The Mechanical and Biological Treatment (MBT) Plant in Ptolemaida was constructed within a highly challenging geotechnical environment shaped by historical open-cast lignite mining activities.

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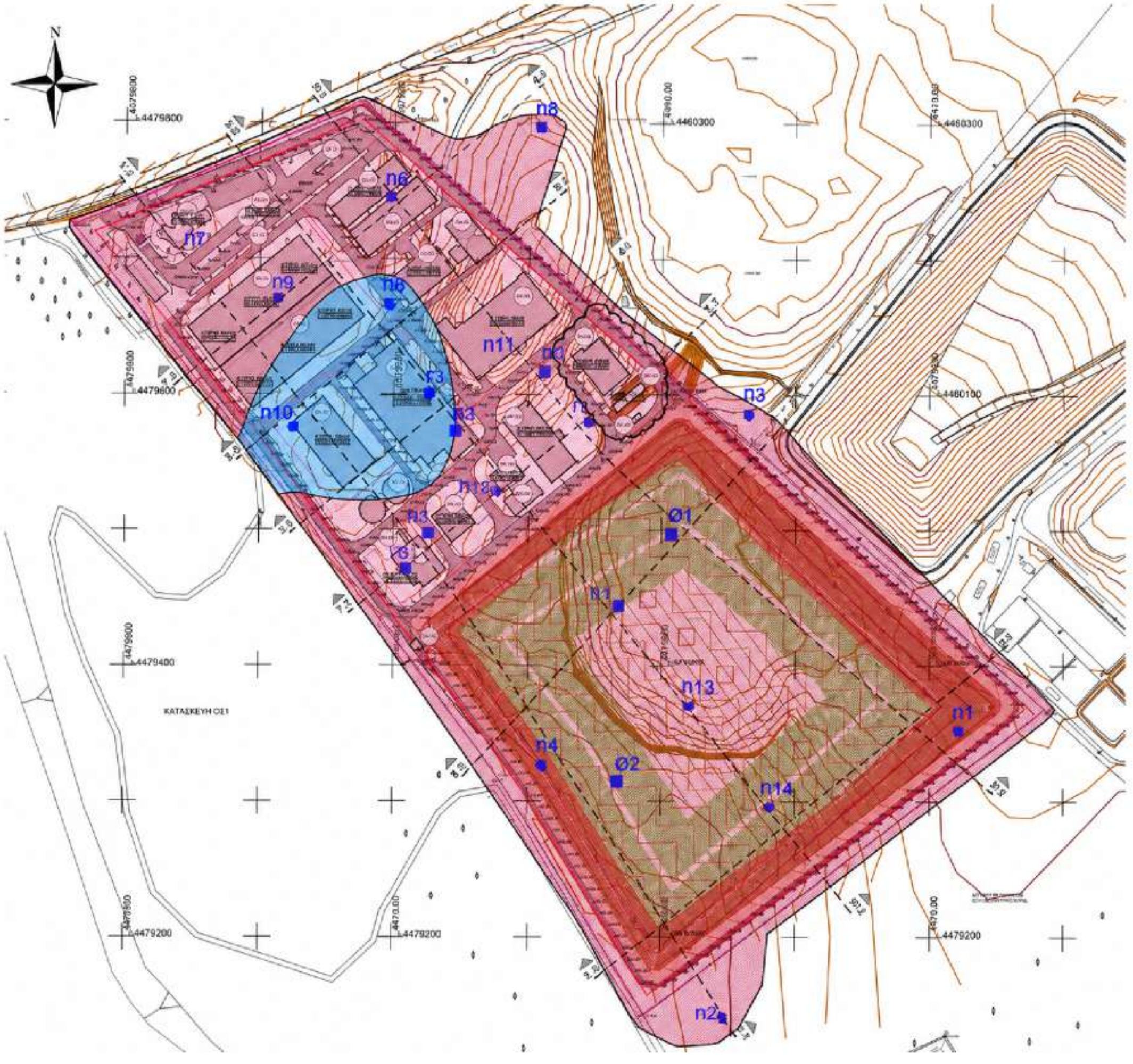
The site is underlain by approximately 60–80 meters of recent, heterogeneous and randomly stratified mine excavation deposits.



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These artificial fills contain marls, silty marls, clays, sands and gravels, resulting in highly variable ground conditions across the facility footprint.

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Ground improvement was essential to enhance soil stiffness, accelerate consolidation and mitigate long-term creep settlements of the buildings and infrastructure within strict allowable tolerances.

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The adopted ground improvement method combined surcharge preloading via temporary earth embankments with deep prefabricated vertical drains (PVDs) to accelerate the dissipation of excess pore-water pressures.

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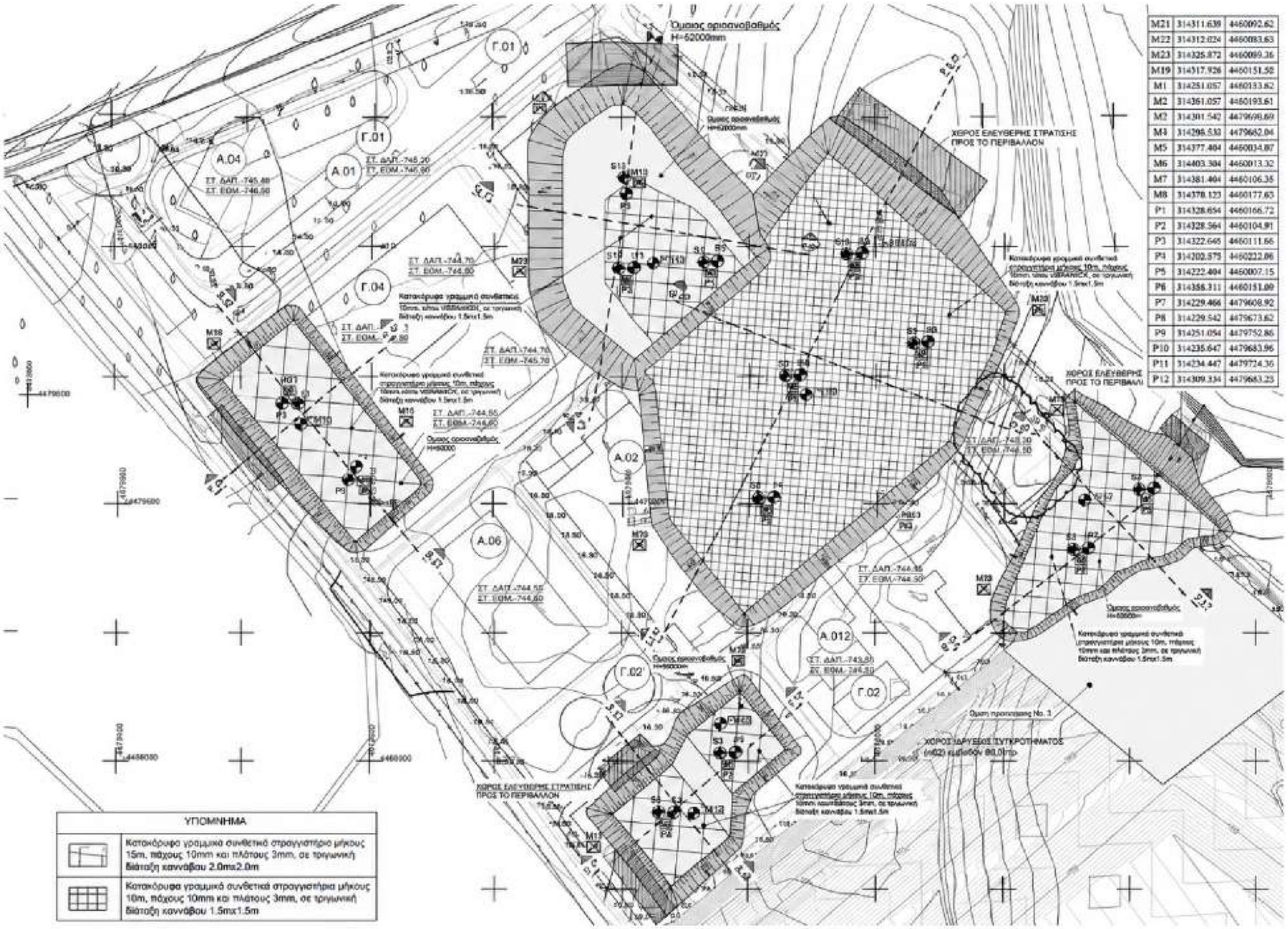
The preload embankments reached heights of up to 9 metres, covering a total surface area of approximately 14,000 square metres across five district zones.



M21	314311.639	4480092.62
M22	314312.024	4480083.63
M23	314325.872	4480089.36
M19	314317.926	4480151.58
M1	314251.057	4480133.82
M2	314361.057	4480193.61
M2	314381.542	4479698.69
M3	314296.532	4479682.04
M5	314377.484	4480034.87
M6	314403.384	4480013.32
M7	314381.484	4480106.35
M8	314378.123	4480177.63
P1	314328.654	4480166.72
P2	314328.564	4480104.91
P3	314322.645	4480111.66
P4	314202.575	4480222.86
P5	314222.484	4480007.15
P6	314358.311	4480151.09
P7	314229.466	4479608.92
P8	314229.542	4479673.62
P9	314251.054	4479752.86
P10	314235.647	4479683.96
P11	314234.447	4479724.36
P12	314309.334	4479683.23

ΥΠΟΜΝΗΜΑ	
	Κατακόρυφα γραμμικά συνθετικά στραγγιστήρια μήκους 15m, πάχους 10mm και πλάτους 3mm, σε τριγωνική **διάταξη καννάβου 2.0mx2.0m**
	Κατακόρυφα γραμμικά συνθετικά στραγγιστήρια μήκους 10m, πάχους 10mm και πλάτους 3mm, σε τριγωνική διάταξη καννάβου 1.5mx1.5m

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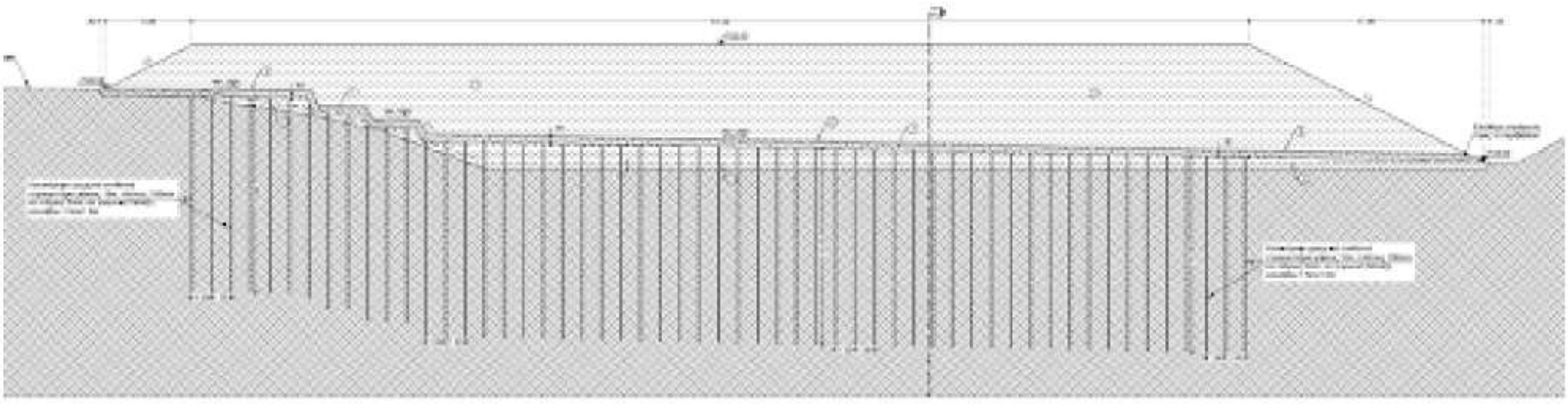
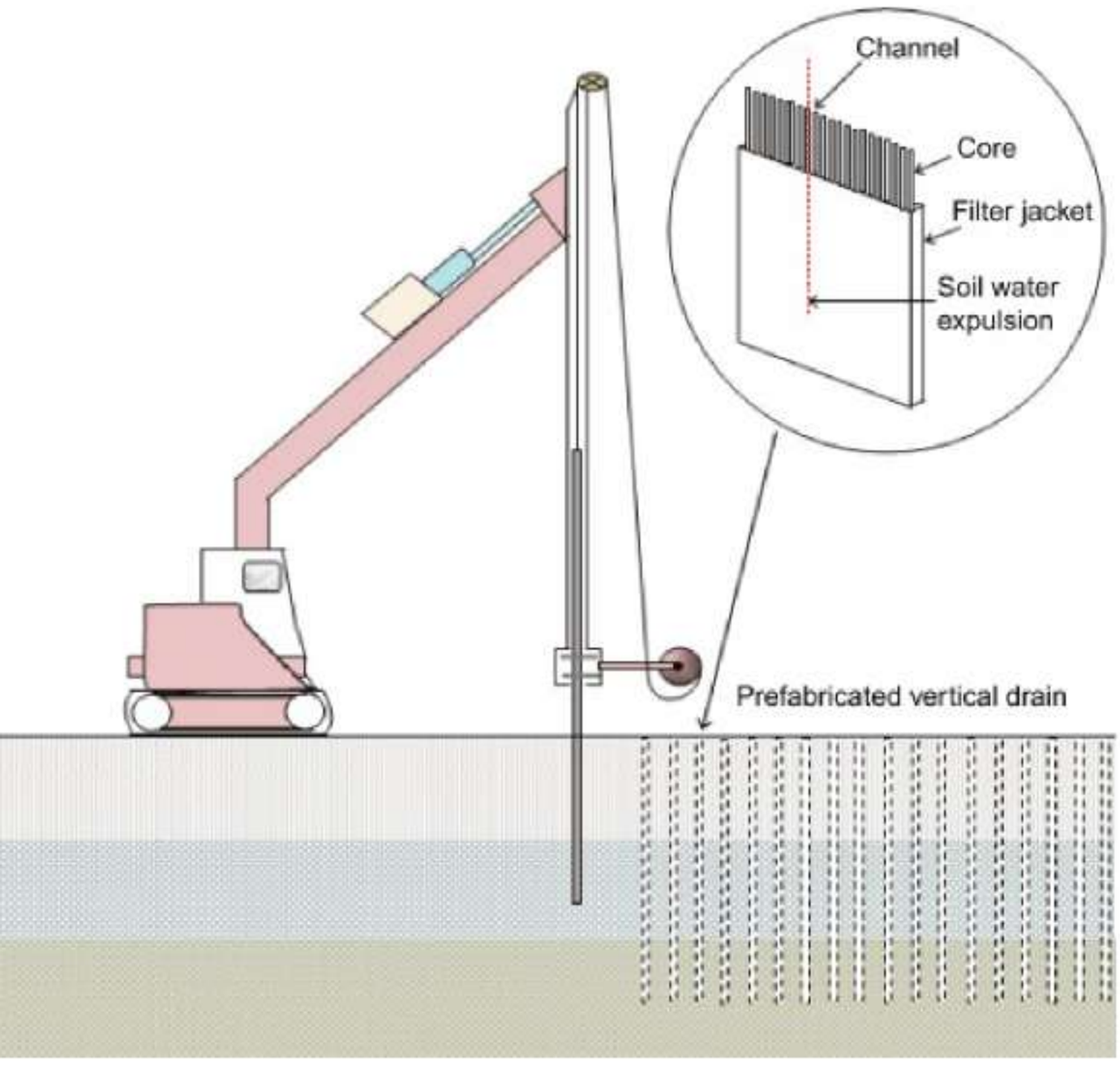
PVDs were installed to depths of 15 metres using equilateral triangular grids ranging from 1.3 × 1.3 metres to 2.0 × 2.0 metres.





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High-precision settlement markers and vibrating-wire piezometers provided continuous monitoring data.

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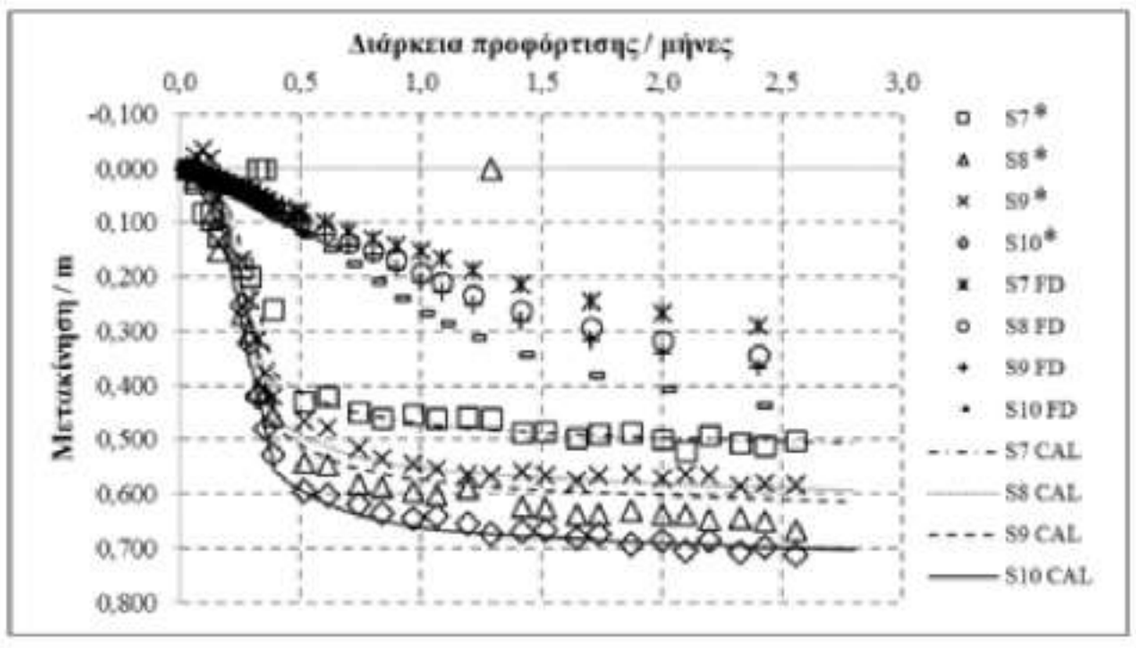
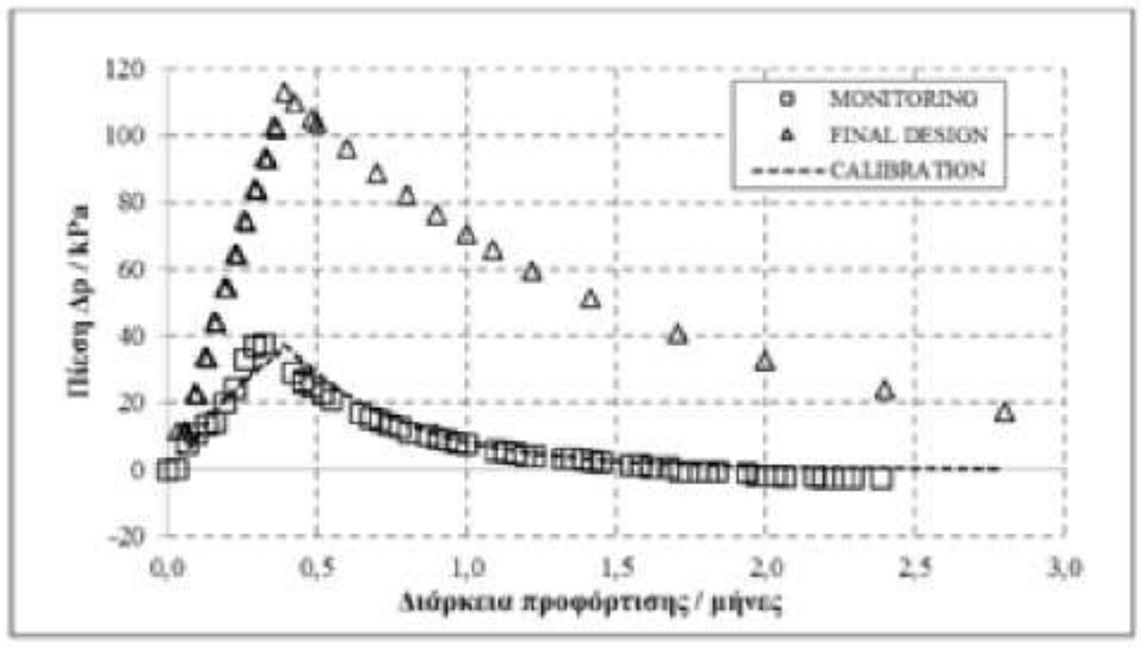
Monitoring data were utilized to back-analyze the geotechnical parameters, calibrate the numerical models and verify the ultimate efficacy of the ground improvement design.





The assessment of monitoring data enabled the optimization and verification of the preloading duration, ensuring the long-term resilience of the infrastructure.

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