

Geological Survey Regarding the Settlement of the Sewerage and Water Supply System in Rupea Agglomeration, Brașov County

Viorel Eugen Vasiliu

Universitatea Petrol-Gaze din Ploiești, B-dul București nr. 39, 100680, Ploiești
email: geologicdon@yahoo.com

Abstract

The paper presents the geotechnical properties for the lands in which water pipelines and outlets are situated. Following the rules of good practice, a good geotechnical study provides information to inform and support final design decisions and construction specification. The boreholes were made by means of Nordmayer Wacker RHF tool, RKS system.

Key words: *geotechnical investigation, outlet*

Introduction

The geotechnical investigations had been performed for the settlement of the drinkable water pipeline and sewerage on the following route: Rupea – Homorod – Hoghiz.

According to STAS 11100/93, the location is situated in the following area 7_1 and $a_g = 0,20g$ and according to Seismic projection code P100/1-2006, for the related area, and the peak value of land acceleration for projection, $a_g = 0,32g$, and the control period (corner) of the reply spectrum, $T_c=0,7$ s.

The freezing depth, according to STAS 6054-77, is of 1 m.

Taking into account the provisions of normative NP 074-2007, the geotechnical category was II.

To mention the fact that most of the locations have a hydrostatic level above the pipeline laying depth.

Geology and geomorphology

From geomorphologic point of view, the perimeter is situated in a relatively plane area, or with versants slowly inclined towards medium, which pertain to Brașov Depression. For each location, upon the lithological description, there has been a reference to the inclination of the land. From local point of view, the areas investigated are not affected by erosive processes or landslides. The deposits on which the investigated perimeter is situated belong to Tortonian, upper Pleistocene and upper Holocene eras.

Tortonian. Within the succession of Tortonian deposits we distinguish 4 subdivisions, the same that had been recognized into the outer areas of East Carpathian Curve, that are, from up to down:

- marls with globigerinae and dacite tuff (Dej tuff)
- saliferous clays
- schists with radiolars
- Spiratela marls

These stratigraphic entities are unequally developed; Dej tuff may reach thicknesses of 500 m. Sometimes the Tortonian deposits are accompanied by Triassic calcareous megabreccias with a matrix made of marls with globigerinae. Sometimes, the schist horizon with radiolars have interbedded sandstones, with less consistence, yellowish, limonitic, and black schist clays – marls (Ungra), followed by tuff bank.

The **Upper Pleistocene** is represented by the following deposit types:

- Alluvial deposits of the lower terrace of Olt river, with thicknesses of 8 – 12 m and that locally contain great blocks of andesites and andesitic pyroclastites
- Gravels, sands and sandy clays, under the actual alluviums of Olt river and that may reach thicknesses of 20 – 60 cm, with gastropod fauna
- Adobe deposits and adobe – proluvial deposits that cover lower or average Pleistocene formations, made of gravels and cobbles sourced from the erosion, transport and sedimentation of Cretaceous conglomerates, with a higher frequency in Hoghiz – Sercaia region

Upper Holocene has the following deposit categories:

- Alluviums into Olt meadow
- Sandy alluvial – proluvial deposits, which cover the large plain of Braşov Depression
- Palustrous deposits
- Deluvial – coluvial deposits
- Wind deposits represented by sand dunes.

Investigation of settlement of land

The research of settlement land had been made for each location, by the execution of 10 boreholes in 10 m depth. The drillings had been performed by means of Nordmayer Wacker RHF tool, RKS system, and there were only non – turbid samples collected and analyzed in authorized laboratory.

The hydrostatic had been encountered in all drillings, with depths between 0,60 and 5,90 m; the waters collected have a weak aggressiveness for cement concretes.

From lithological point of view, rocks were described from sands to clays and marls, of which the physical–mechanic characteristics and derived physical parameters are hereinafter identified:

- Humidity: 8,2 – 28,0 %
- Flow limit: 29 – 69%
- Agitation limit: 15 – 33 %

- Plasticity index: 14 – 47%
- Consistence index: 0,31 – 1,0
- Natural volume weight 16,45 – 21,99 kN/cubic meter
- Dry volume weight 11,64 – 18,84 kN/cubic meter
- Porosity 25 – 56%
- Pore index 0,33 – 0,99
- Saturation level 0,40 – 1,0
- Edometric module e_{2-3} 31,24 – 125,00 daN/ cm²
- Settlement coefficient 3,4 – 11,3 cm/ m
- Internal friction angle 13 – 43°
- Cohesion 5 – 20 kPa

Conclusions

The carrying capacity had been assessed by conventional pressure, according to STAS 3300/2-85.

The values of conventional pressures had been calculated for depths of 1 – 5 m and they varied from 75 to 450 kPa.

In order to position the pipelines, dewatering shall be necessary; in addition, measures must be taken for their protection against water aggressiveness.

According to TS, as regards the soil classification according to its cohesive properties and behaviors upon diggings, the lands are classified from medium to tough for manual works and II – III for mechanic works.

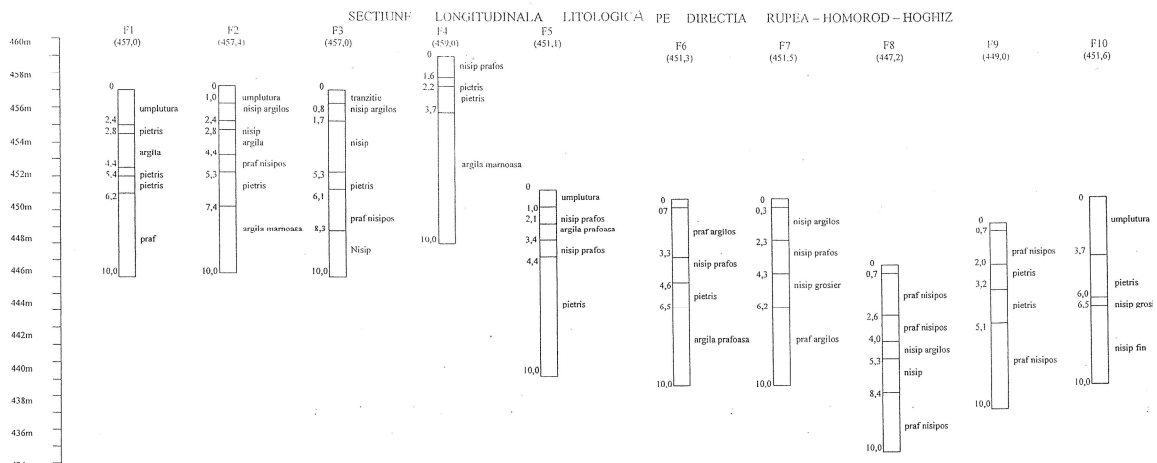


Fig. 1. Transversal section between Rupea and Hoghiz

References

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Studiul geotehnic privind amplasarea sistemului de canalizare și alimentare cu apă în aglomerarea Rupea, jud. Braşov

Rezumat

Sunt prezentate caracteristicile fizico-mecanice și parametrii fizici ai terenurilor de pozare a conductelor de apă și canalizare. Au fost calculate presiunile convenționale pentru adâncimi cuprinse între 1 și 5m; pentru poziționarea conductelor sunt necesare epuizamente.