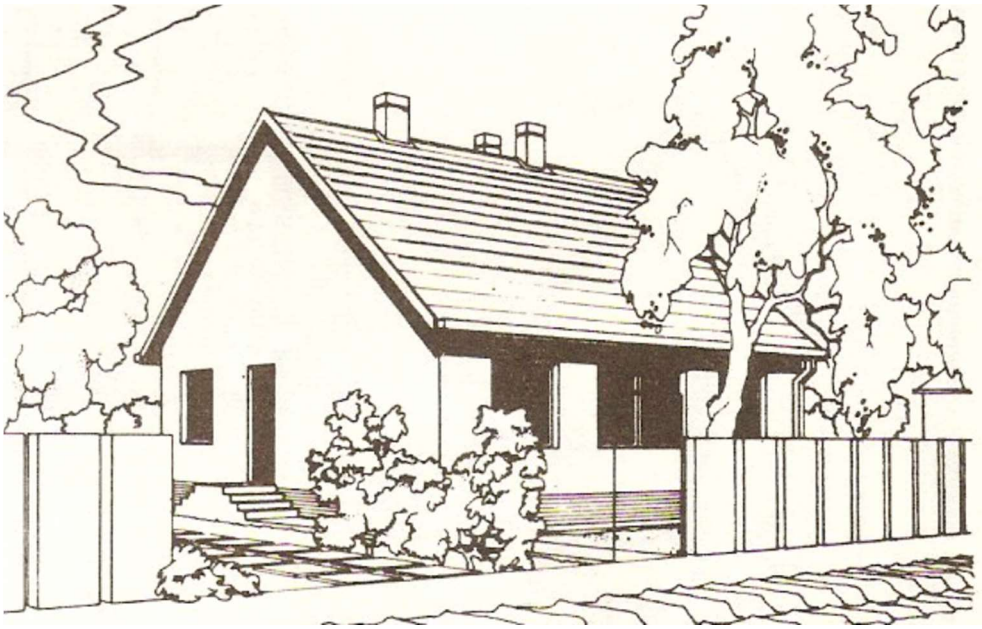
MŰEGYETEM 1782

Geotechnical report

of Small family house



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2022/23 autumn

semester

Budapest, Hungary

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1. *Introduction*

Purpose:

The task which was given is to design family house on the non-utilizing area. The building is 9.9*9.9sized one story family house.

The selected area that is chosen for the especially for this project is located in the 1st district, Tigris street61, 1016, Budapest. The ground is non-utilized recently by any structural projects. The small family housebuilding will stand by on its own because no neighboring building is standing beside it which means no additional foundation instruction is needed to take care existing building's foundation.

The Duna is located approximately 780m from the area and the neighboring building is located approximately 20m.

From the website (https://map.mbfsz.gov.hu/fdt100/) the lithology is marl, lime marl, clay marl, tuffite, tuffite sandstone cords, allodapic limestone settlements, lower part Bryozoa. Also according the official geological index: bE3-Ol1e. (Figure 2)

The altitude – 176.26mBSI.

Figure 1. The chosen area

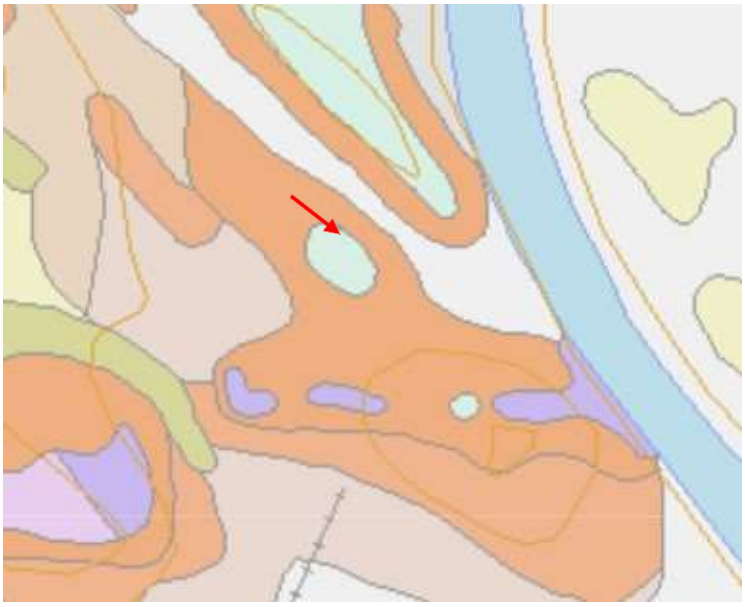

Figure 2. Soil view (website above mentioned)

- For the preparation of the design foundation following are done:

1. Visit to the sites for ground investigation
2. Two boreholes drilling with 12m depth
3. Soil test samples to investigate soil properties, water content and groundwater level
4. Preparation of the data for the soil report

This building will go in to geotechnical category 1 because of its simple structure, design, risk issues.

2. Borehole data analysis

- From the borehole inspection:

There are two bore hole logs provided on the site-Borehole 2 and 9. Boreholes have the BH diametersof 180 mm with both having the drill depth of 12 meters. The altitude of borehole 2 is 176.26 mBSI and borehole 9 is 176.22 mBSI. Samples were taken 14 meters from each other. There are only one type of cohesive soils (Cl) which was examined according to plasticity index, water content, consistency index, solid, water, and air phase content, degree of saturation, void ratio, moist density, dry density, angleof internal friction and cohesion. At borehole 1 (2B) until 0.15m brown, sandy silt with organic matters was found brown then from here to 6.8 meters browney gray, gray, grayey-yellow, high plasticity clay was found. From 6.8-8.1m grayey-yellow, brown, silty sand (siSa), then until 9.8m yellowey-gray sand (Sa), from this to the end, gray high plasticity clay (Cl) was encountered. In borehole2 (9B), until 0.15m brown, sandy silt with organic matters was found and from there until 6.6 meters grayey-yellow, high plasticity clay (Cl) was detected, then to the 8.2m grayey-yellow,silty sand with some gravel content (siSa), after this until

9,8m gray sand (Sa), from this to the end of the borehole log 12m grayey-brown, gray clay was collected. During all borehole investigation water is observed.During the drilling GWL 10 meters below the level.

The local explorations were realized on October 5th of year 2012. During the exploration we did not encounter any gases in the soil, and we did not find any irregular formations such as lentils or hollows nor any traces relating to them, can be found on the examined plot. The data accumulated from the completed explorations are adequate for elaborating the construction plans and no further examination will be necessary. In the laboratory, using the disturbed soil samples we defined the characteristics necessary for compiling the soil examination report.

2.1 Ground water conditions

Groundwater is observed in within the two borehole investigation. Sulphate ion content- 100mg/l, Chloride ion content 150mg/l. Since the sulphate ion content is within 200, there will be no environmental class for the chemical corrosion. Also the chloride ion content is within 500, there is no environmental class for non-seawater corrosion. Hence the minimum concrete strength can be C25/30.
During the drilling ground water was -10.00m.

Observed groundwater levels are summarized in the following table:

Borehole	Date	Elevation of boreholes [mBSI]	Encountered depth of GWL [m]	Encountered GWL [mBSI]	Depth of at rest GWL [m]	At rest GWL [mBSI]	Charateristic ground water level [m]	Design ground water level [m]
2B	05.10.2012	176.26	-8	168.26	-7.55	168.71	-7	-6.5
9B	08.10.2012	176.22	-8.5	167.72	-7.25	168.97	-7	-6.5

2.2 Geotechnical parameters

The characteristics of the 3 soil layers are listed in the table below:

Soil type	Unit weight [kN/m^3]	Saturated unit weight [kn/m^3]	Friction angle [deg]	Cohesion [kPa]	Oedometric modulus [mPa]
Browney-gray,grayey-yellow clay (Cl)	21	22.0	12	35	8
Grayey-yellow,brown,silty sand (siSa)	19	20	27	8	10
Yellowey-gray sand (Sa)	18	21.7	32	0	12

- Soil condition

I_p- soil plasticity index is in most of the soils is above 30%. High plasticity browney gray clays which is hard to scratch.

3. Summary

The shallow strip foundation is recommended because of its economical perspective. From the frost limit point of view since the clay is subsurface soil, the limit is 1m.

Because the soil is high plasticity condition the minimum range is 1.5m-2m below the surface so the recommended depth is 2m.

The 1st district is famous by the beautiful small houses so I hope the building will be one which stands out.

4. Annex

Boreholes:

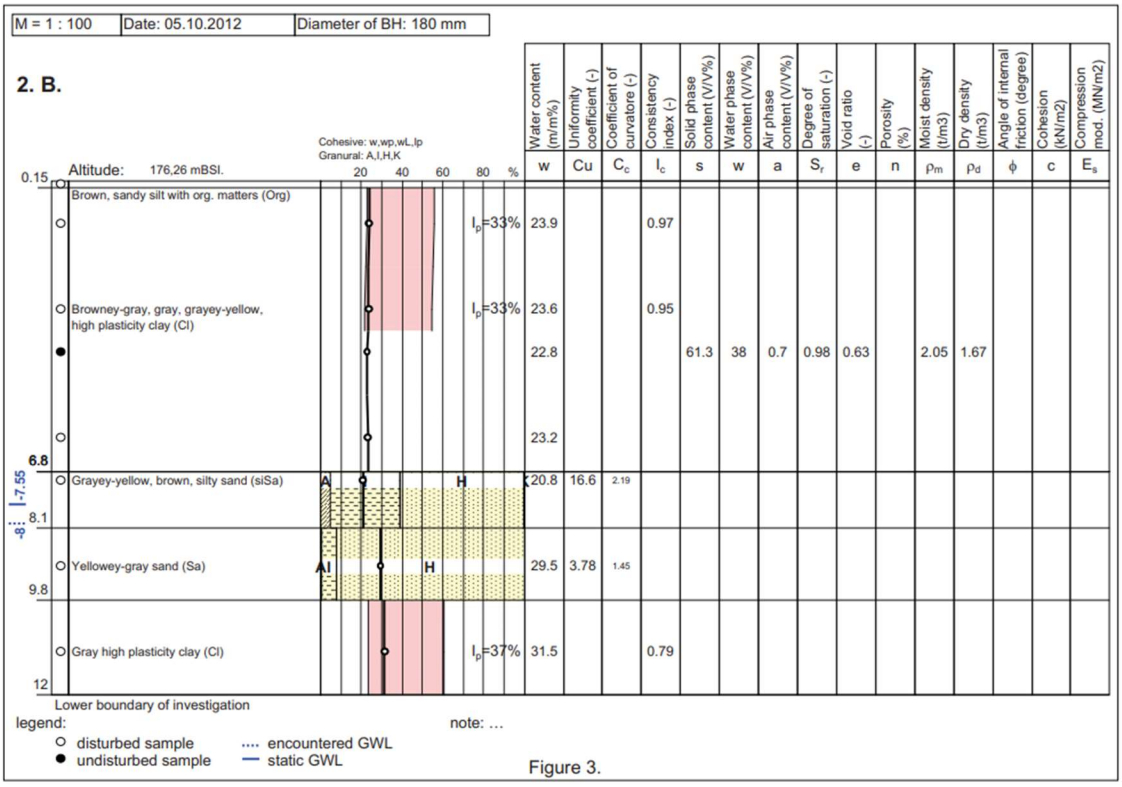

Figure 3.

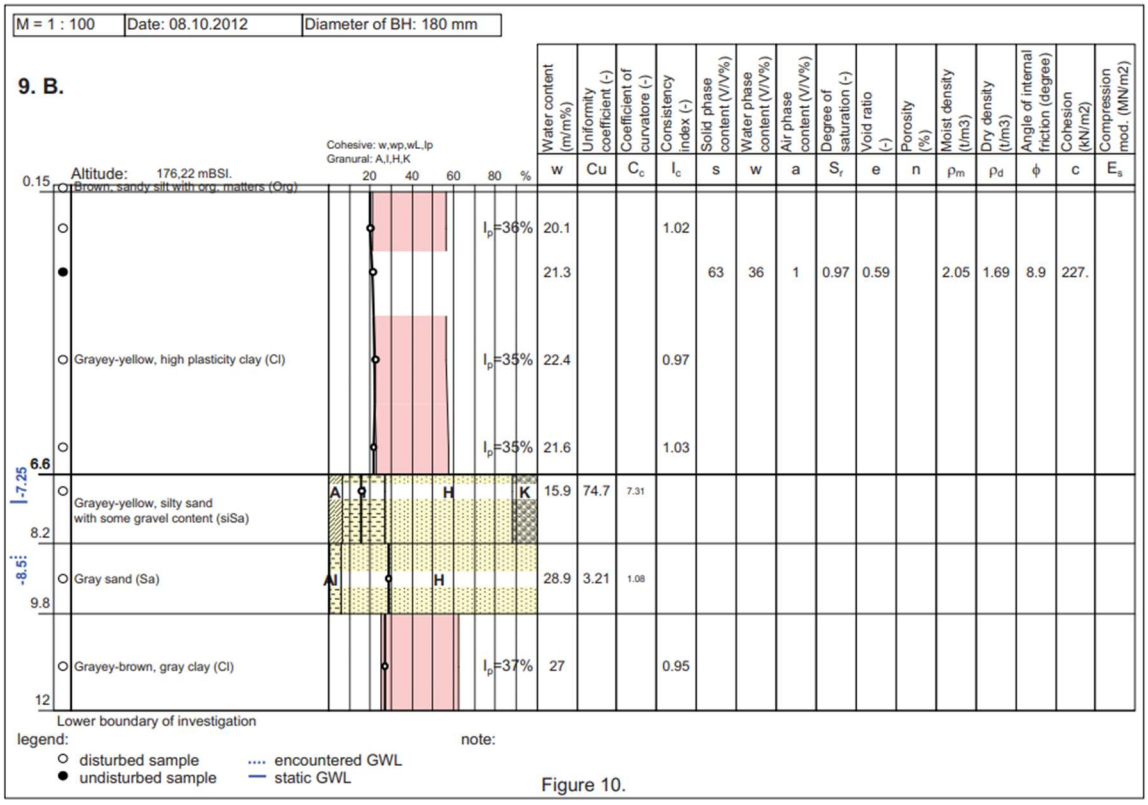

Figure 10.

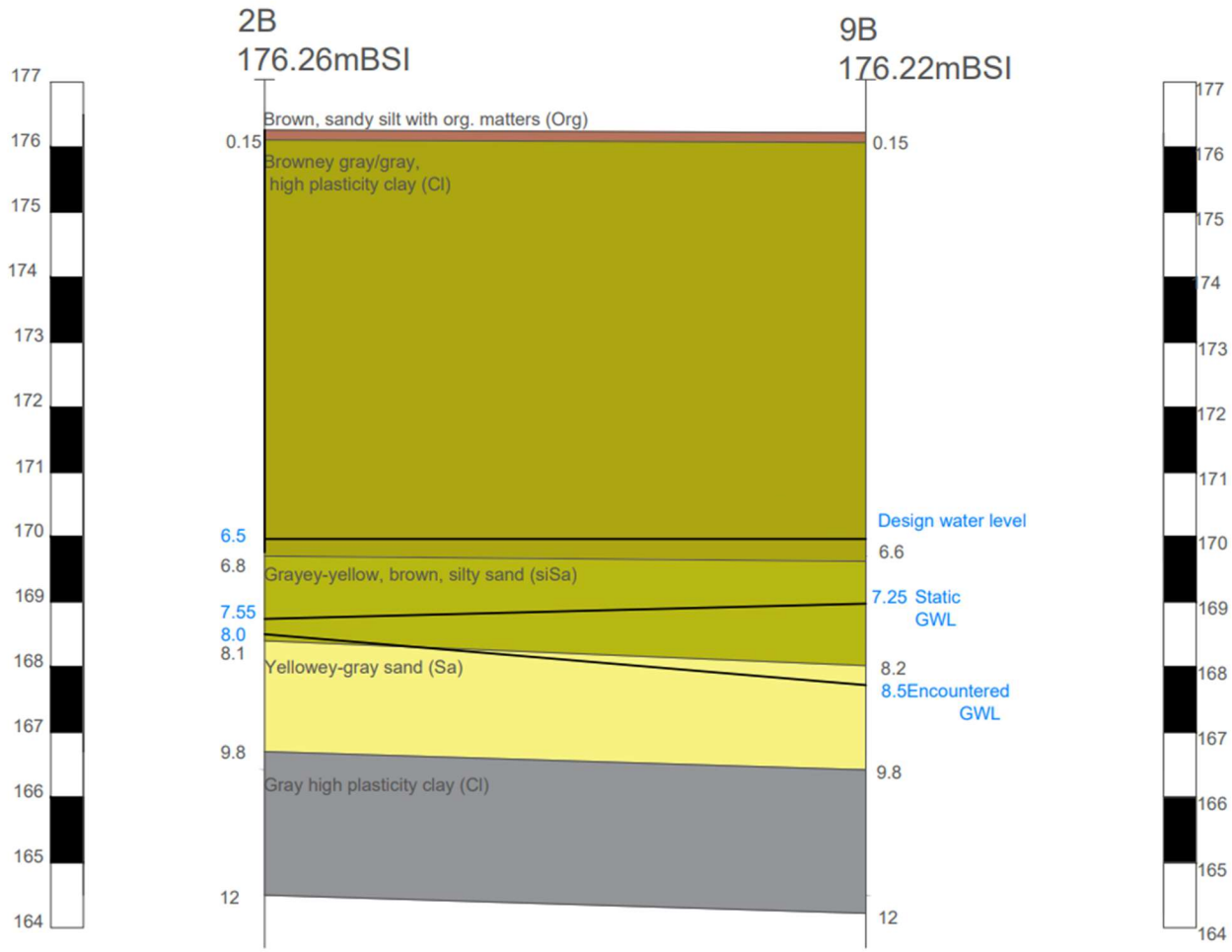

Figure. Cross section of soil layers

Site plan with borehole numbers: