ТОВАРИСТВО З ОБМЕЖЕНОЮ ВІДПОВІДАЛЬНІСТЮ

«ДНІПРОВСЬКИЙ ПРОЕКТНО-ВИШУКУВАЛЬНИЙ ІНСТИТУТ «ДПВІ»

Limited Liability Company "Dniprovskyi proektno-vyshukuvalnyi institut "DPVI"

Customer: Regional Office of Water Resources in Mykolaiv Region

«Reconstruction of the Kazankiv group water supply system to provide water to settlements of the Sofiivska hromada of Mykolaiv region». Adjustment

Report on Engineering-Geological Surveys

Code 922-07 /25-Г

Dnipro 2026

Content

Introduction

In March 2026, a complex of engineering and geological works was carried out оп the object "Reconstruction of the Kazankiv group water supply system to provide water to populated areas of the Sofiivka territorial community of the Bashtansky district of the Mykolaiv region."

The work was performed according to the customer's technical specifications.

The purpose of engineering and geological works:

1. Study of engineering-geological and hydrogeological conditions of the site based оп the performed engineering-geological works;

2. Determination of indicators of physical and mechanical characteristics of soils;

3. Forecast of changes in engineering-geological and hydrogeological conditions of the territory over time.

To solve the tasks set in the technical specifications, the following engineering and geological work was performed:

- collection, systematization and analysis of materials from regional and IocaI studies that highlight the geological, structural-tectonic, hydrogeological, geomorphological and seismic features of the research area;

- reconnaissance survey of the exploration site and the surrounding area;

- drilling of engineering and geological wells;

- soil sampling;

- laboratory soil research;

- office processing of materials, preparation of a technical report.

The reconnaissance survey of the territory included an inspection of the project site, establishment of the features of the geomorphological and geological structure of the work area. No signs of negative processes were detected.

The scope of work consisted of drilling 1 O wells, located every 300 m along the axis of the route, with a depth of 1 m below the designed depth of the pipeline: 4 technical wells with a diameter of up to 168 mm and 6 exploratory wells with a diameter of up to 127 mm.

Samples of soils with disturbed structure were taken from the wells to determine their physical and mechanical characteristics. Geological wells are tied in plan and elevation relation and plotted оп the topographic plan of the site. The elevation system is Baltic.

Laboratory soil tests were conducted in accordance with current regulatory documents in the geotechnical laboratory. Laboratory tests included determination of soil moisture, plasticity, density, and tests of soil deformation parameters.

Program of works on engineering and geological surveys

1. Full name of the object

"Reconstruction ofthe Kazankiv group water supply system to provide water to settlements of the Sofiivka territorial community of the Bashtansky district of the Mykolaiv region."

2. Location of the facility (by administrative division)

The territory of the studied site is located on the territory of the Sofiivska territorial community ofthe Bashtansky district ofthe Mykolaiv region.

3. Customer

Regional office of water resources in Mykolaiv region.

4. Design stage

Design is carried out in one stage - detailed design (DDS).

5. Information on the availability of materials from engineering and geological surveys of previous years

The materials of the Technical Report on engineering and geological surveys for the project "Reconstruction of the Kazankivskyi group water supply system to provide settlements in the Yelanetskyi district ofthe Mykolaiv region with centralized drinking water supply" are available, completed in November-December 2021.

6. Special requirements for search results

According to the requirements of DBN A.2.1-1-2008 (Appendix L), 10 mining operations shall be carried out, located every 300 m along the axis of the route, with a depth of 1 m below the designed depth of the pipeline: 4 technical wells with a diameter of up to 168 mm and 6 exploratory wells with a diameter of up to 127 mm (Table 3.3, item 3.2.5.17 of DBN A.2.1-1-2008).

Perform laboratory work and tests in accordance with DSTU B V.2.1-5, while ensuring that for each selected engineering and geological element at least ten separate values of physical characteristics and at least six values of strength and deformation characteristics of soil properties are obtained.

There are no special requirements due to the industry specifics of the designed facility.

7. Applications

1. Basic information about the structural features of the designed buildings and structures, communication routes (according to Form No. 1, attached).

2. Situation diagram with the design of the structures and routes.

3. Technical conclusion on engineering and geological surveys for the project "Reconstruction of the Kazankivskyi group water supply system to provide settlements of the Yelanetskyi district of Mykolaiv region with centralized drinking water supply".

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Basic information about the design features of the designed construction objects along the routes of linear structures

№	Purpose of the route name	Pipeline specifications (diameter, material, installation method, etc.)	Depth of installation, m	Length, m	Presence and characteristics of transition sections
1	Pre-filter building (renovation of 1 tank)	-	-	-	-
2	Existing water pipeline	steel, DN400 mm	1.5 m	3000 m	Existing aerial crossing over the Ingul River
3	Site for the installation of underground clean water tanks	-	-	-	

The length of the sections is indicated as an estimate and is specified in the process of creating project documentation.

Situational diagram with a diagram showing the designed structures and routes.

Laboratory soil research

Conducted in accordance with current regulatory documents in the geotechnical laboratory. Laboratory studies included determination of soil moisture, plasticity, density, and tests of soil deformation parameters.

The surveys were carried out in accordance with the requirements of regulatory documents: DBN A.2.1-1-2014 and DBN V.1.2-2-2006. The breakdown and binding of wells were performed instrumentally, with a Magellan Triton 2000 GPS receiver, and were drawn onto a working topographic base of a scale of 1 :500. The volume and composition of this report comply with the requirements of Appendix H of DBN A.2.1-1-2014.

Knowledge of engineering and geological conditions

When writing the report, по archival materials were used, по searches were conducted in adjacent territories, and по archival materials were provided Ьу the customer. Bibliographic materials are listed in the "List of used literature".

Physical, geographical and technogenic conditions

"The reconstruction of Kazankivske will take pIace оп the territory of the Sofiivska territorial community of the Bashtansky district of the Mykolaiv region."

Absolute marks of the earth's surface at the wellheads in the Baltic height system vary in the range of +27m - +65m.

The territory of the district is located in the Steppe zone with a temperate continental climate, which is characterized Ьу hot and dry summers and relatively warm winters. The climate is determined Ьу the influence of air masses coming from the Atlantic, the Arctic basin, or formed in the areas of Eurasia. Cyclonic activity is very developed in winter, with cyclones of Atlantic origin prevailing. A feature of winters are frequent thaws, which are associated with the movement of air masses from the Antarctic, the Mediterranean and the Black Seas.

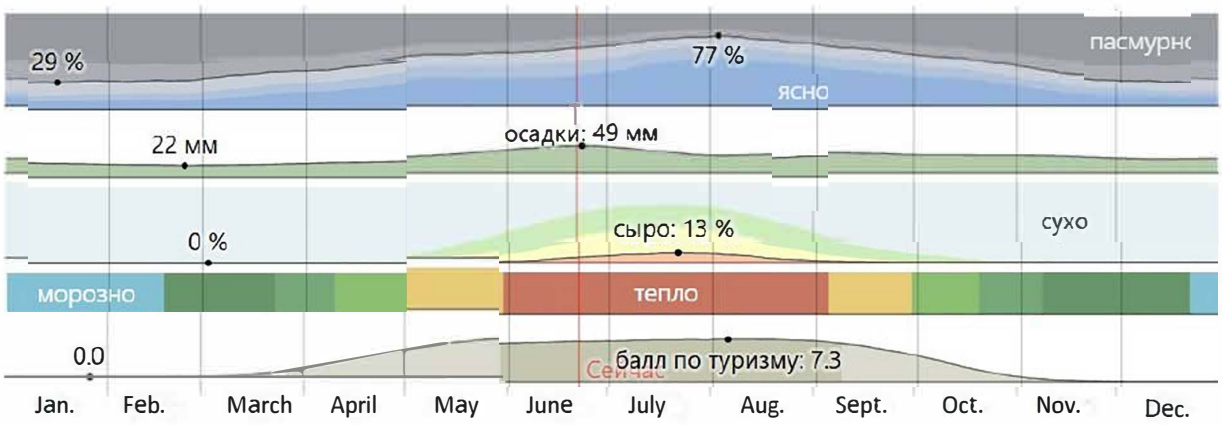
In summer, the weather is dominated Ьу the Azores anticyclone, with a large number of clear and sunny days, as well as the occurrence of dust storms and dry winds. In October-November, the influence of the Azores anticyclone ends and the Siberian one develops instead. In this regard, the frequency of fogs increases, cloudy weather with foggy precipitation is often observed. In the second half of autumn. the effect of southern and western cyclones increases, which determine a large number of cloudy days, frequent precipitation and fog.

2.1 Climate

The climate of the territory is temperate continental. The average annual temperature is about +11.6 °C. The amount of precipitation is 630 mm per year. The wettest months are May-June, the driest are January-February. The winter period lasts from November to March. Wind regime: northern and eastern winds prevail, the average speed is 5.0 m/s.

The climate of the area of the survey site, according to DSTU-N B V.1.1-27:201 **О,** is located in the 11 (Southeastern) architectural and construction climatic region (Fig. 1), characterized by a temperate continental climate and the following climatic indicators.

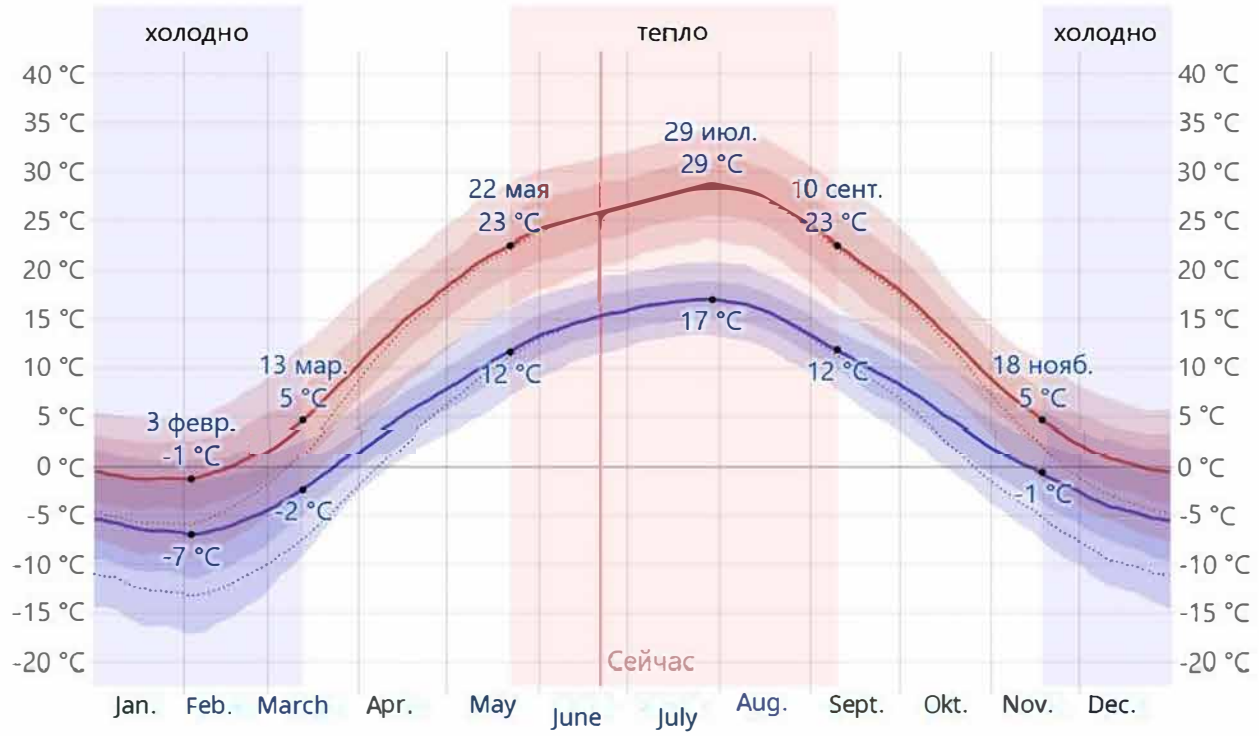
In the territory of the Sofiivska territorial community of Bashtansky district of Mykolaiv region, summer is warm and sometimes cloudy, and winter is long, frosty, snowy, windy and cloudy. Throughout the year, the temperature usually ranges from -7 °C to 29 °C and rarely falls below -17 °C or above 34 °C.



Climate indicators for 2025 Ьy month

In the territory of the Sofiivska territorial community of the Bashtansky district of the Mykolaiv region, the warm season lasts 3.6 months, from May 22 to September 1 O, with a maximum average daily temperature above 23 °C. The hottest month of the year iп Verkhnyodniprovsk is July, with aп average maximum temperature of 28 °C and a minimum of 17 °C.

The cold season lasts 3.8 months, from November 18 to March 1 3, with a minimum average daily temperature below 5 °C. The coldest month of the year iп Verkhnyodneprovsk is January, with aп average temperature maximum of -6 °C and a minimum of -1 °C.



2.2 Snowfall

Snowfall accumulated over a rolling 31-day period centered оп each day of the year. The area experiences significant seasonal variations in monthly snowfall.

The snowy part of the year lasts 4.5 months, from November 8 to March 25, with a sliding 31-day period of at least 25 millimeters of snow. The month with the most snowfall is January, with an average snowfall of 113 millimeters.

The snow-free period of the year lasts 7.5 months, from March 25 to November 8. The least amount of snow falls around July 21, with an average total accumulation of 0 millimeters.

Average snowfall (solid line) accumulated over a rolling 31-day period centered оп the day in question, with ranges of 25-75 and 10-90 percentiles. Thin dashed line is the corresponding average rainfall

2.3 Wind

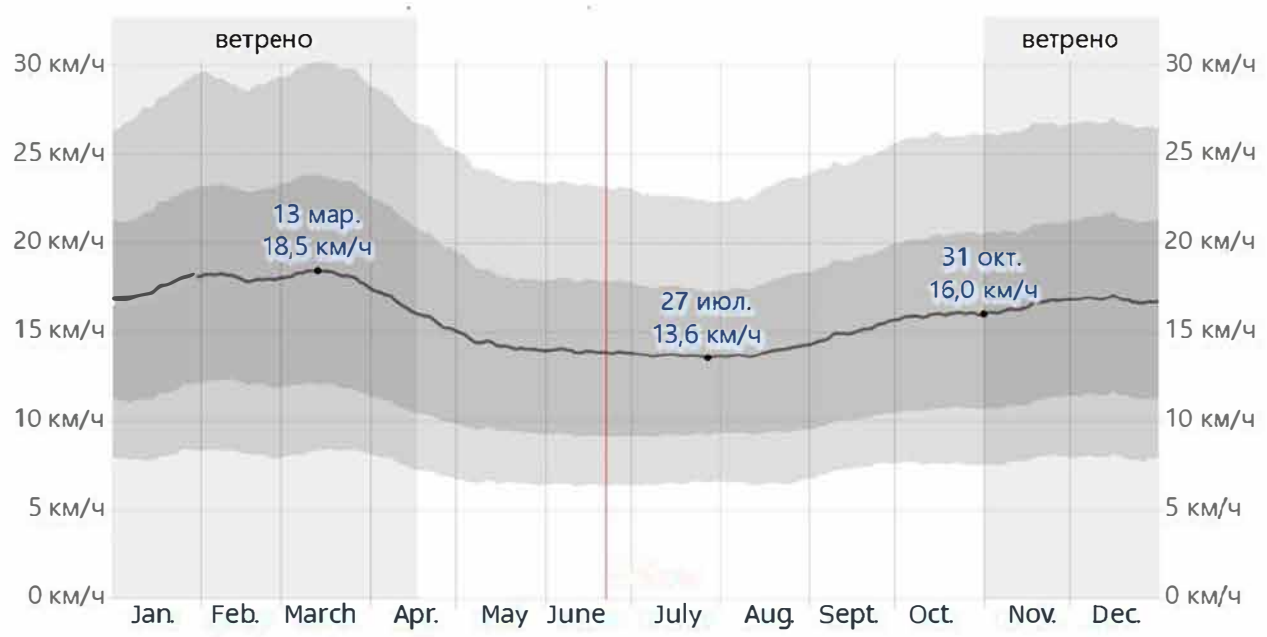
This section describes the average hourly wind vector (speed and direction) over a large area at a height of 1 O meters above the ground. The wind experienced at any particular location depends largely оп IocaI topography and other factors, and instantaneous wind speed and direction vary over wider ranges than the hourly average values.

In the territory of the Sofiivka territorial community of the Bashtansky district of the Mykolaiv region, the average hourly wind speed undergoes significant seasonal ftuctuations throughout the year.

The windiest part of the year lasts 5.6 months, from October 31 to April 17, with an average wind speed of over 1 6.O kilometers per hour. The windiest month of the year in Verkhnyodneprovsk is March, with an average hourly wind speed of 18.2 kilometers per hour.

The calmer season lasts 6.5 months, from April 17 to October 31. The calmest month of the year is July, with an average hourly wind speed of 13.7 kilometers per hour.

Average wind speed graph



Average hourly wind speed (dark gray line) with ranges of 25-75 and 10-90 percentiles..

Month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Speed wind (kph)	17.3	18.1	18.2	16.2	14.3	13.9	13.7	13.9	15.1	16.0	16.5	16.8

Characteristics of load and impact values, according to Annex E (DBN V.1.2-2: 2006) [14], are:

Parameter	Marking	Value	Unit
Standard wind load	W_0		Pas
Standard snow load	S_0		Pas
Ice wall thickness			mm
Wind load during ice	Wv		Pas

Wind load W_0 = 440 Pa

This is the standard value of the pressure on vertical surfaces from the action of the wind. The design takes into account the exposure coefficient (for open plains - about 0.65-0.8).

Snow load S_0 = 1110 Pa Converted to kg/m^2 using the formula:

1 Pa=0.10197 kg/m2⇒50=1110·0.10197===113.2 kg/m2

This is the average mass of snow on a horizontal plane.

The thickness of the ice wall Ь = 20 mm

It is used when calculating the load оп wires, pipes and elements of open structures. Ice adds additional weight and increases air resistance.

Wind load ice floe Wv = 260 Pas

It is taken into account as a separate situation in case of strong wind + presence of ice.

The standard depth of seasonal soil freezing, calculated according to formula (7.2) DBN V.2.1-10-2009 [19]

dfn•do√мt,

where d0- a quantity equal to, m,

for: loams and clays d0= 0.23;

sandy loam and silty and fine sands d0= 0.28;

Mt- dimensionless coefficient, numerically equal to the sum of absolute values of average monthly negative temperatures for the winter iп a given area, determined according to DSTU-N B V.1.1-27: 201 o **[12].,**

V.1.1-27: 201 O [12].

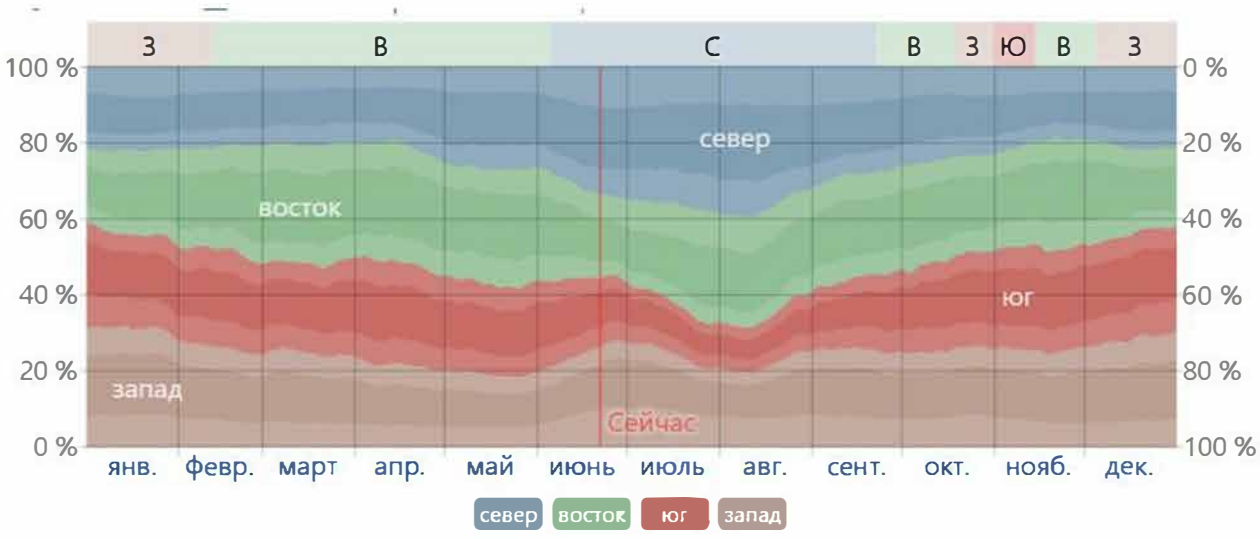
dfn = 2.82 x 0.23 = 0.65 m - for loamy deposits;

dfn = 2.82 x 0.28 = 0.78 m - for sandy soils.

2.4 Wind direction

The wind most often blows from the east for 3.8 months, from February 12 to June 5; for 3.7 weeks, from September 22 to October 18; and for 2.9 weeks, from November 14 to December 4, with a peak percentage of 33% оп March 23. The wind most often blows from the north for 3.6 months, from June 5 to September 22, with a peak percentage of 39% оп August 11. The wind most often blows from the west for 1.9 weeks, from October 18 to October 31, and for 2.3 months, from December 4 to February 12, with a peak percentage of 27% оп October 24.

Percentage of hours during which the average wind direction corresponds to each of the four main wind directions, excluding hours during which the average wind speed is less than 1.6 km/h. The slightly shaded areas оп the borders are the percentage of hours iп the predicted intermediate directions (northeast, southeast, southwest, and northwest).



2.5 Architectural and construction climatic zoning of Ukraine

According to the climatic zoning scheme of B. P. Alisov (1969).The work site is located in the Atlantic-continental European, insufficiently humid, warm region of the temperate climate zone.

The average dates of the first and last frosts in spring are April 24, in autumn - October 9. The average dates of the onset of persistent frosts are December 10-15, and their cessation - February 16-21. In winter, ordinary thaws - warming in the middle of winter, the number of such days - 45. Continentality of the climate
- 56%, which characterizes the climate of the region as temperate continental.

The average annual relative humidity is 72%. The maximum values are observed in winter - 82-88%, the lowest at the end of the calendar summer - 52-58%. The average number of days with fog is 61, most often in the cold season - 9-12 days per month. The amount of precipitation is 400-450 mm/year (with a maxim um at the beginning of summer). The area of work is classified as arid regions of Ukraine.

During the year, the total duration of precipitation is 730 hours. Over the past 60 years, droughts have occurred every 3-4 years for one decade. Severe droughts in Kryvyi Rih occur once every 5-1 O years, when only 100-150 mm of precipitation falls during the growing season. Average evaporation rates are 325 mm per year, and evapotranspiration (the amount of water that can evaporate in a given climate) is 800 mm/year.

The moisture coefficient according to **M. M.** Ivanov is 0.53, which characterizes the region as a territory with insufficient and unstable moisture. During aII summer months, the moisture balance is deficient. Rainfall in the warm period of the year falls mainly in the form of showers. The average number of days with showers during the growing season is 29. Torrential rains are accompanied Ьy thunderstorms and hail. Thunderstorms most often occur in the period from May to August (5-9 days per month), 27-29 days per year (maximum 84 days). During the warm period of the year, hail is observed on average for 2 days, maximum - 5. In winter, stable snow cover is established. The average multi-year decadal height of the snow cover is 10-15 cm, the average duration of the period with snow cover is 65 days. On average, there are 12-16 days with blizzards during the winter, the maximum number of days with blizzards during the cold period of the year is 27 days.

During the winter, ice is a frequent phenomenon, which is recorded on average for 15 days. 26 days per winter are with an air temperature below -1 O^0C. 52% of winters are snowless or with little snow, if dry eastern and northeastern winds prevail and anticyclonic frosty weather prevails.

Conclusion on climatic conditions

The average wind speed graph shows that the structure, direction and characteristics of winds are directly dependent on the characteristics of the general and IocaI atmospheric circulation. Winds from the northern directions (47% of recurrence) and eastern winds prevail. Southern winds are observed less frequently than others. In summer, northern and northwestern winds are most frequently repeated, in other seasons of the year - northeastern, northern and eastern winds.

Calms occur most often in early autumn and summer (approximately 3 days per month). The average wind speed per year is 4.9 m/s. Strong winds (with a speed of more than 14 m/s) are observed on average 29 days per year.

In the warm period, dry winds are often observed - winds from the eastern directions, which are characterized by a speed of more than 5.5 m/sec. at a very low relative humidity of air - 20-30%. They are formed in spring - early summer, in conditions of transformation of dry Arctic air masses over the expanses of Central Asia and the Volga region. The number of days with dry winds reaches 15-20 per year, their average duration is 4.4 days.

The climate of the region is moderately warm with mild winters. According to the climatic zoning of DSTU V.2.3-4:2015, the studied area belongs to the southern road-climatic zone III. The coldest month is January, the average daily air temperature is 2.5° C. The hottest month is July, the average monthly air temperature is +22.2° C, the average maximum is +26.9° C. The temperature of the coldest five-day period with a provision of 0.92 (calculated outdoor air temperature) is 22° C. The duration of the period with an average daily temperature of no more than 8° C is 165 days. The relative humidity of the air for 13 hours is 81 % in January, 55% in July. The amount of precipitation per year is 459 mm, liquid and mixed precipitation is 423 mm, and the daily maximum is 88 mm.

3. Engineering and geological conditions of the site

The project area has been explored with 1 O wells, to a depth of 4 m.

During office processing of field and laboratory data, the explored soil layer is divided into layers (engineering and geological elements, IGE) according to DSTU 2.1-2-96 and DSTU B V.2.1-5-96.

According to these documents, the stratification of the section was carried out according to lithological characteristics (mineral and granulometric composition) taking into account the conditions of formation, condition (density, structure, humidity, degree of weathering, consistency, layering, dispersion, degree of weathering and cracking) and physical and mechanical properties of the soils.

The nomenclature of foundation soils consists of enlarged stratigraphic-genetic complexes (SGC), divided by leading features into engineering-geological elements (IGE). Appendix 1

4. Hydrogeological conditions of the work area

According to the scheme of hydrogeological zoning of Ukraine, the territory of the works is located оп the watershed of two large hydrogeological basins (I-order) • the Cracked Waters of the Crystalline Massif and the Black Sea Artesian Basin. It is characterized Ьy the development of aquifers in fractured Precambrian rocks and their weathering crust, in depressions of the crystalline massif, composed of Paleogene, Neogene and Pleistocene deposits .

Гідрогеологічне районування території України

An aquifer in Quaternary alluvial deposits has been identified in the area. Water — slightly aggressive to concrete during alternating soaking. Depth of groundwater — 8-10 m. The horizon is non-pressure, the connection with the Dnipro River is filtration.

Water-bearing rocks are represented mainly Ьy medium-grained sands with layers of loam.

The predicted groundwater level is 8-10 m from the surface. The aquifer is non-pressure. The nature of the relationship with groundwater is filtration, zonal, direct, descending.

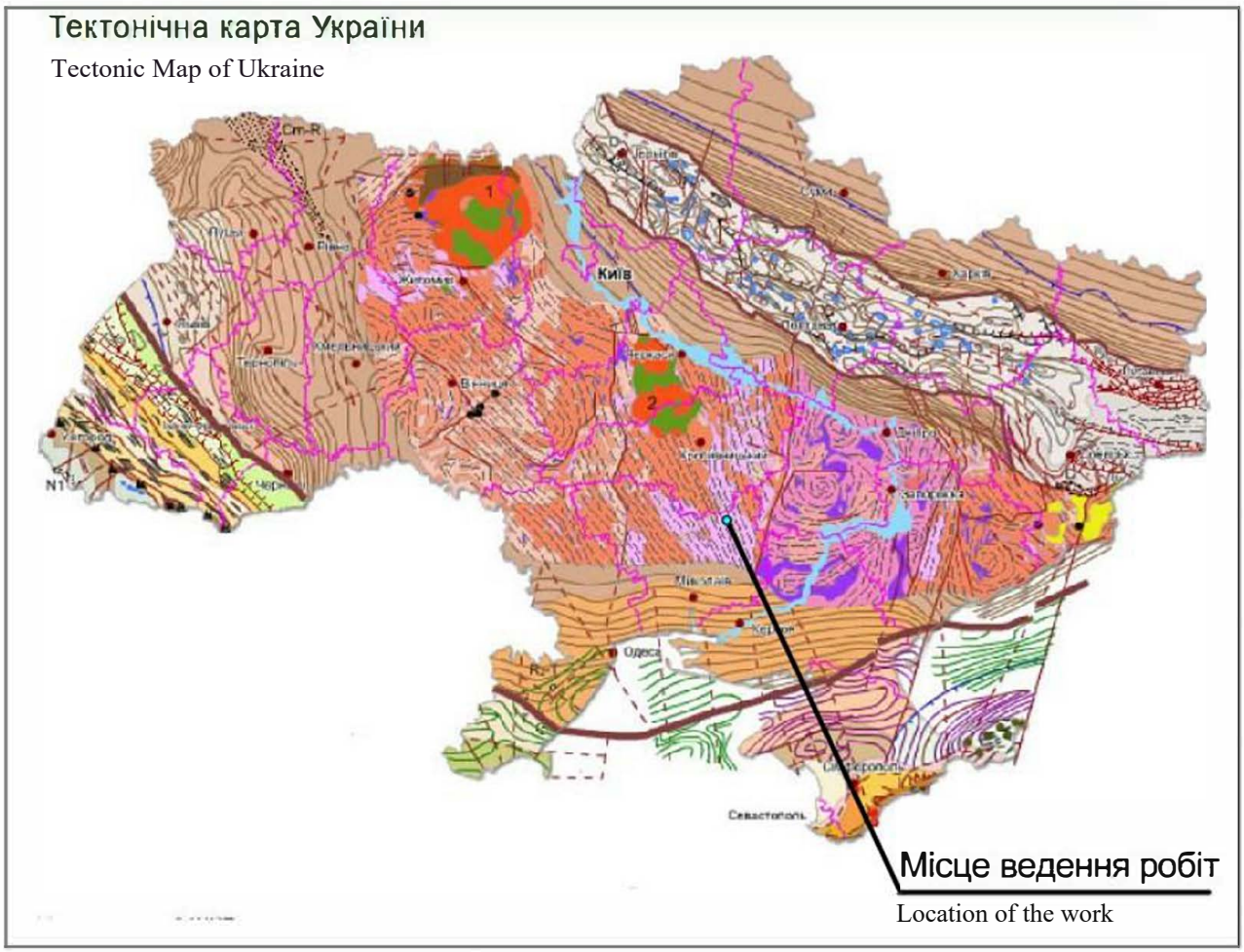
In terms of chloride content, water has a weak aggressiveness towards reinforced concrete structures during periodic immersion, and is non-aggressive when structures are constantly soaked.

Water has low aggressiveness to the lead sheath of the caЬIe, and high aggressiveness to the aluminum sheath.

5. Geological structure

In geostructural terms, according to the tectonic map of Ukraine, the territory of the work area belongs to the Dnieper megablock. The Ukrainian shield tectonic block

(Fig. 2.) The work site itself is located in the litho-tectonic zone, within the structure of a dome-shaped outcrop of granitoids.



According to the physical and geographical zoning of Ukraine, the territory is located within two natural physical and geographical zones: the northernmost part of the basin is located in the forest-steppe zone, the rest of the territory is in the steppe zone (Figure 1).

The infrastructure of the Prydniprovsk megablock is assumed to include two stratometamorphic complexes - the lower Slavgorod granulite-diafluorite (early Eogean) and the upper amphibolite-gneiss (late Eogean). Both of them are found as relics among the dominant granitoid formations that are part of the pluton-metamorphic and plutonic formations.

According to the conducted drilling of wells and existing geological maps, the most common rocks in the study area are the Poltava suite (southern part) and the Pontic stage of the Middle Miocene. Due to active erosion processes in the river valley, traces of rocks of the Precambrian, Paleogene, Neogene and Quaternary systems appear.

The Precambrian stratum is represented Ьy quartzites, shales, and sandstones of the Kryvyi Rih series. The rock surfaces are fractured. These rocks reach the surface not only in the valley of the Inhulets River, but also in the thalwegs of large gullies. The Paleogene sediments are represented Ьy Kyiv marly clays up to 1 O m thick.

Neogene deposits are represented by Sarmatian sands, limestones with clay layers with a total thickness of up to 20 cm and Pontic sands with a thickness of up to 1 O m. In watersheds they are everywhere covered by a layer of red-brown clays, loams with a total thickness of up to 9 m. Above lies loess-like loams, the thickness of which reaches 20 m. Alluvial deposits are represented by sandy loams, sands, loams, clays and are widespread in river valleys and in the lowlands of thalwegs of gullies. Their total thickness does not exceed 5 m.

Thus, the research area is confined to various tectonic structures.

Engineering and geological conditions of the site

The project area has been explored with 10 wells, to a depth of 4 m.

During office processing of field and laboratory data, the explored soil layer is divided into layers (engineering and geological elements, IGE) according to DSTU 2.1-2-96 and DSTU B V.2.1-5-96.

According to these documents, the stratification of the section was carried out according to lithological characteristics (mineral and granulometric composition) taking into account the conditions of formation, condition (density, structure, humidity, degree of weathering, consistency, layering, dispersion, degree of weathering and cracking) and physical and mechanical properties of the soils.

The nomenclature of foundation soils consists of enlarged stratigraphic-genetic complexes (SGC), divided by leading features into engineering-geological elements (IGE).

As a result of the engineering and geological taxonomy of the explored layers, they are summarized in the following nomenclature:

SGK-I. Soil-vegetation layer

IGE 1 - tQ Soil-vegetable layer - light loamy humus soil pass with construction debris. Genesis - technogenic, age - Quaternary (Holocene). Layer thickness 0.6-0.8 m.

IGE -2- tQ Bulk soil: heavy loamy humus soil pass. Genesis - technogenic, age - Quaternary (Holocene). Layer thickness 0.7-1.O m.

SGK-II. Quaternary diluvial deposits

IGE 3- dQ light, light brown, hard to rigid, greyish loam. Genesis - deluvial, age - Quaternary (Pleistocene). Layer thickness up to 3.0 m.

IGE 4 - dQ clay from brown to brown, with an admixture of carbonates, hard to semi-hard. Genesis - diluvial, age - Quaternary (Pleistocene). Layer thickness up to 3.0 m.

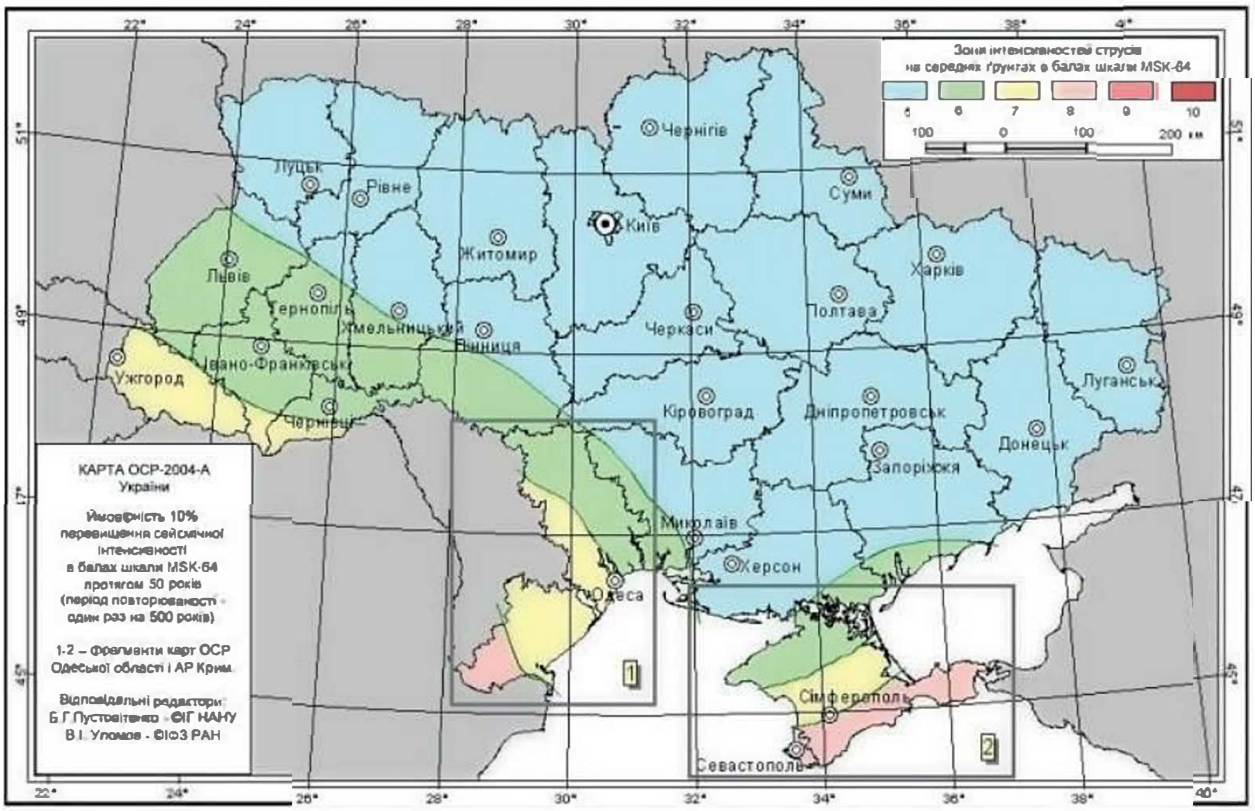
Geological sections are presented in the graphic part.

The construction site belongs to type I soil conditions in terms of subsidence.

Geological and engineering geological processes

No adverse physical and geological processes and phenomena were detected in the research area. Leno.

The intensity of the seismic impact of the area according to the ZSR-200A map **-5 points,** with a probability of 1 % exceeding the seismic intensity in MSK-64 scale points over 50 years (period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один раз на 500 років)
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Відповідальні редактори:
Б.Г.Пустовітенко - СІГ НАНУ
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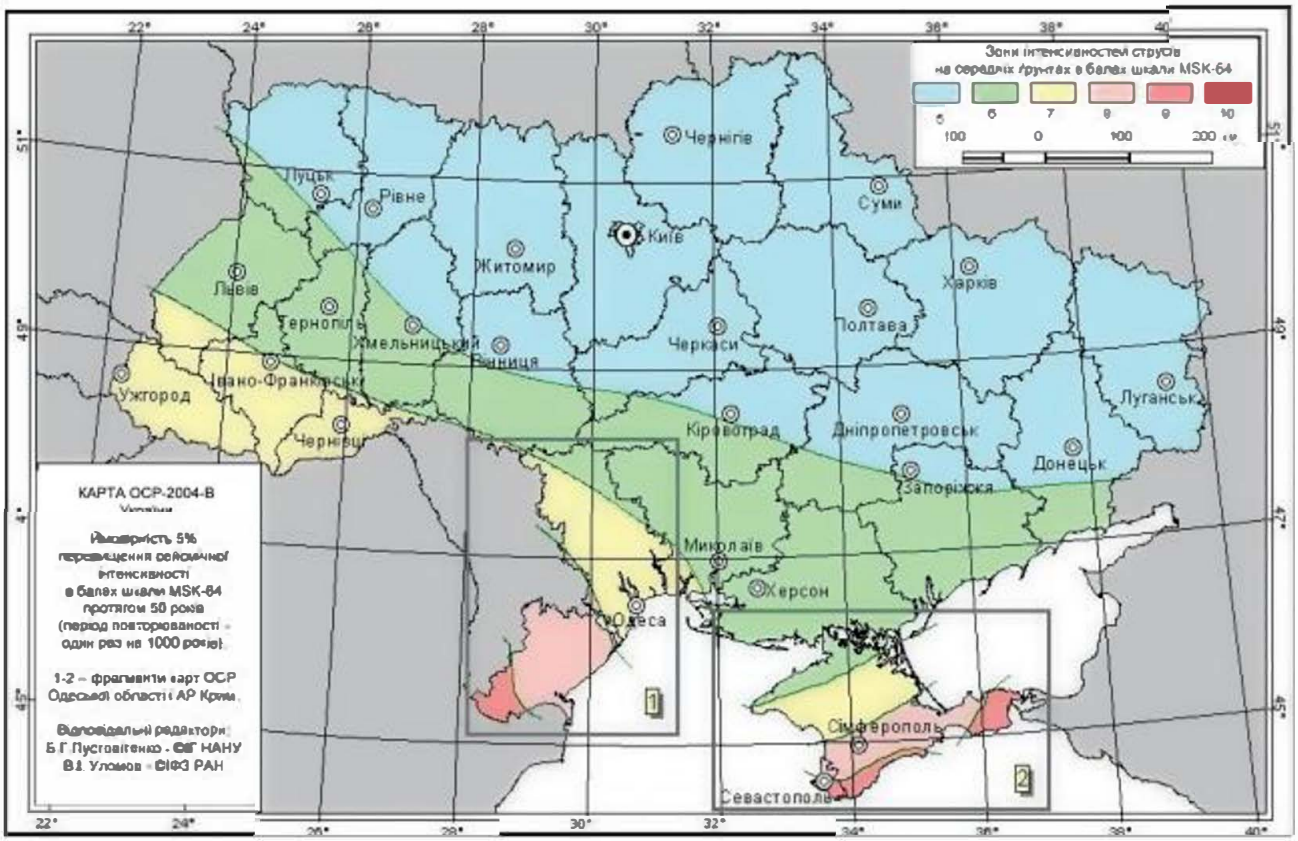
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1-2 – фрагменти карт ОСР
Одеської області і АР Крим
Відповідальні редактори:
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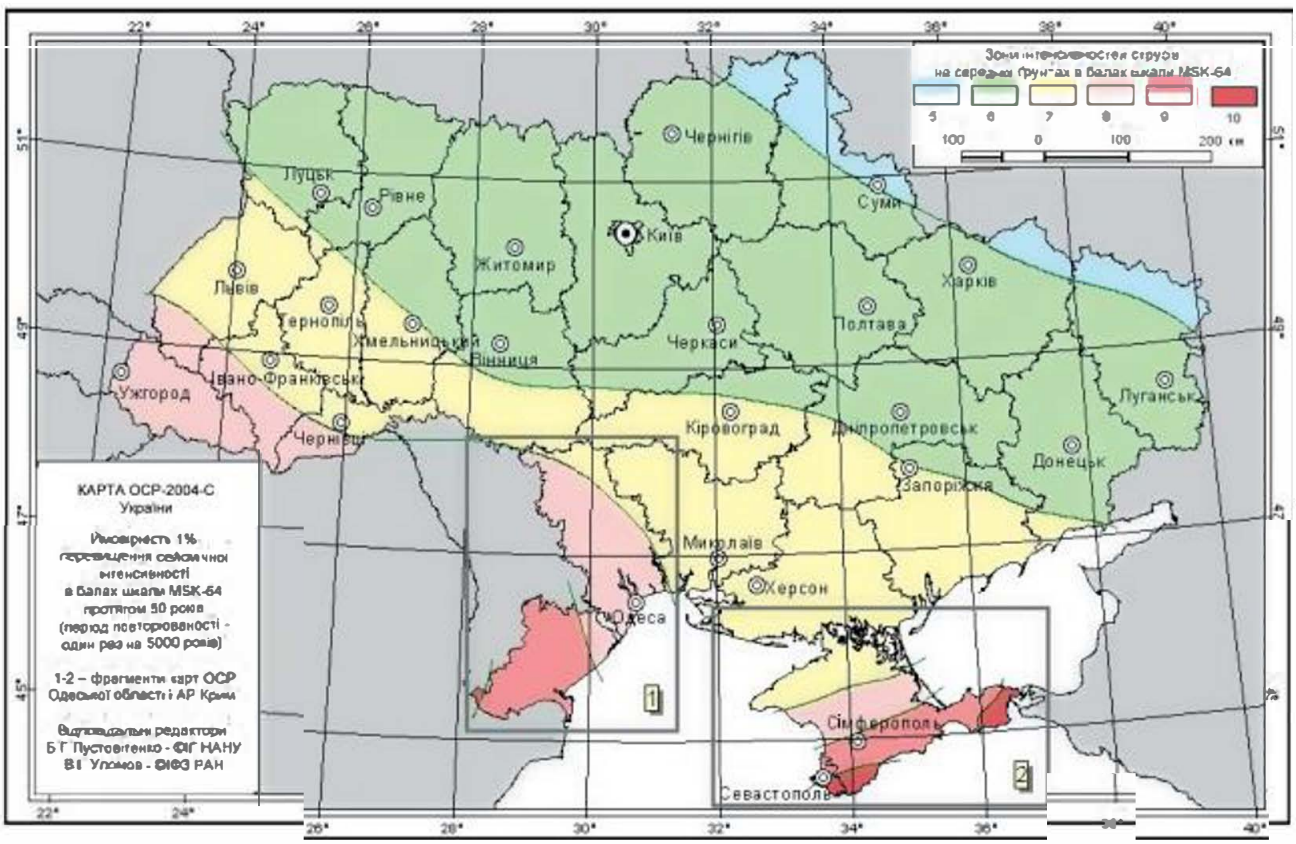

The exploration area according to the complexity of engineering and geological conditions (geomorphological - one geomorphological element; geological - 4 IGE soils; hydrogeological - 1 aquifer; geological and engineering and geological processes - none; belongs to the average category according to the complexity of engineering and geological conditions, according to Appendix Zh DBN A. 2.1-1-2014.

Conclusions and recommendations

Administratively, the territory of the studied area is located on the territory of the Sofiivka territorial community of the Bashtansky district of the Mykolaiv region.

Absolute marks of the earth's surface at the wellheads in the Baltic system of heights vary from +27 to +65. The depth of the wells is 4.0 m.

Characteristics of load and impact values, according to Annex E (DBN V.1.2-2: 2006)(14], are:

Parameter	Marking	Value	Unit
Standard wind load	W_0		Pas
Standard snow load	S_0		Pas
Ice wall thickness			mm
Wind load during ice	Wv		Pas

Wind load W_0 = 440 Pa
This is the standard value of the pressure on vertical surfaces from the action of the wind. The design takes into account the exposure coefficient (for open plains - about 0.65–0.8).

Snow load S_0 = 1110 Pa Converted to kg/m² using the formula:

1 Pa=0.10197 kg/m2⇒S0=1110·0.10197≈113.2 kg/m2

This is the average mass of snow on a horizontal plane.

The thickness of the ice wall Ь • 20 mm

It is used when calculating the load on wires, pipes and elements of open structures. Ice adds additional weight and increases air resistance.

Wind loadin case of iceWb = 260 Pa

It is taken into account as a separate situation in case of strong winds + presence of ice.

The standard depth of seasonal soil freezing, calculated according to formula (7.2) DBN V.2.1-10-2009 [19]

dfn•do√мt,

where d0- a quantity equal to, m,

for: loams and clays d0= 0.23;

sandy loam and silty and fine sands d0= 0.28;

Mt- dimensionless coefficient, numerically equal to the sum of absolute values of average monthly negative temperatures for the winter in a given area, determined according to DSTU-N B V.1.1-27: 201 o **[12].,**

V.1.1-27: 201 O [12].

dfn = 2.82 x 0.23 = 0.65 m - for loamy deposits;

dfn = 2.82 x 0.28 = 0.78 m - for sandy soils.

Recommendations:

To equip the facility under development, a number of conditions must Ье met:

- Remove the vegetation layer, eliminate voids, compact. A mistake at this stage can lead to deformation of the structure.
- Waterproofing is one of the most important stages of construction, with a level of groundwater, which is located at a level of 8-1 O meters from the ground surface.
- Maintain the technology of pouring concrete.

Ignoring this safety feature can lead to premature destruction of the structure.

List of used literature

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29. Hydroqeoloqy of the USSR Volume 5. Ukraine. Moscow. 1971

Physical and mechanical properties of rocks

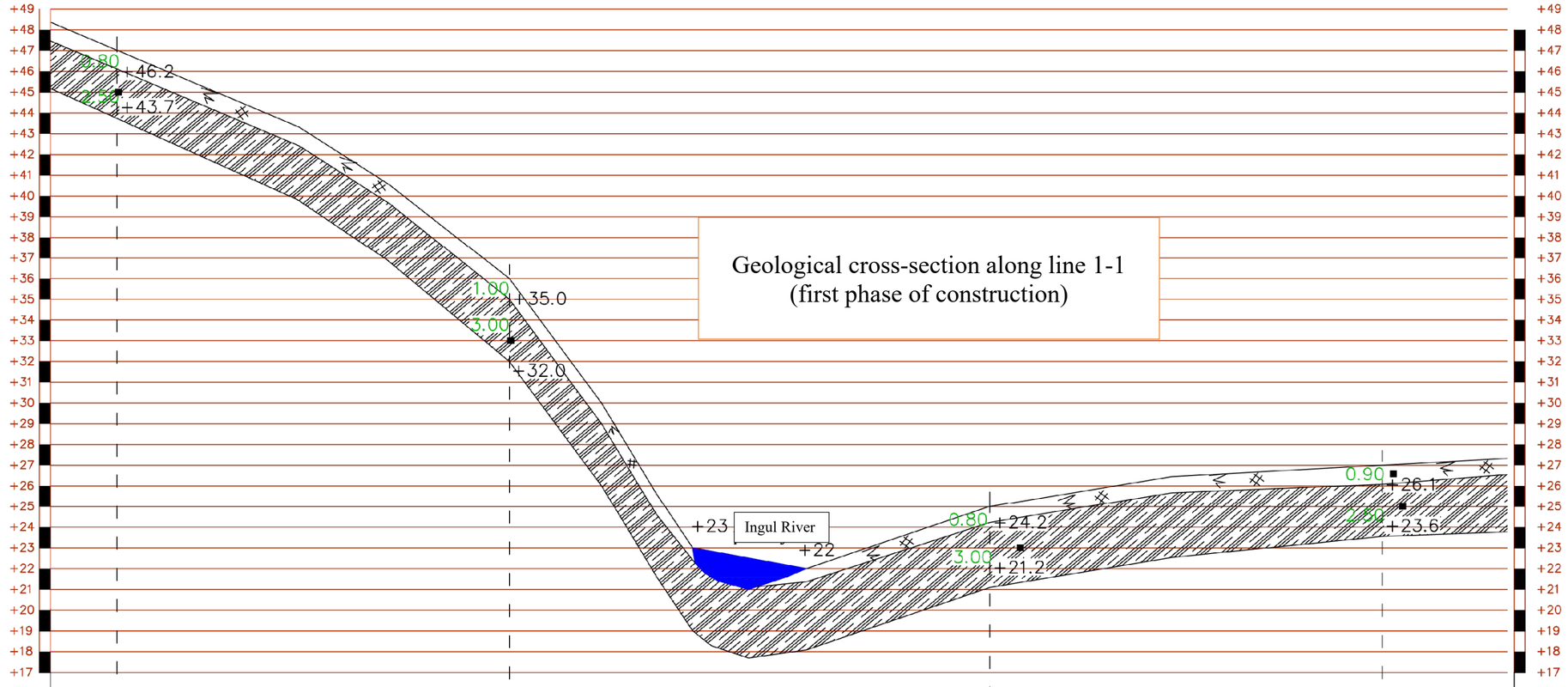
Soil Genesis Index and Age	№ №	Soil Name	Classification Parameters										Calculation Parameters												Soil group by workability
			Moisture Content			Plasticity Index	Liquidity Index	Density			Porosity Coefficient	Moisture Level	Soil specific gravity	Dry soil specific gravity	Specific gravity of soil particles	Total deformation modulus	Angle of internal friction	Specific adhesion	Soil specific gravity		Angle of internal friction		Specific adhesion		
																			γ=0,95	γ=0,85	γ=0,95	γ=0,85	γ=0,95	γ=0,85	
			W	W_1	W_p	I_p	I_l	r	r_d	r_s	e	S_r	g	g_d	g_s	E	φ	c	pI	pII	φI	φII	c I	C II	
			fractions of units					t/m3			fractions of units	fractions of units	kN/m3			MPa	degree	kPa	kN/m3		degree		kPa		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
tQ	1	Loose soil: light loamy, humus-rich topsoil mixed with construction debris	0,185	0,24	0,18	0,13	0,00-0,3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26а
tQ	2	Loose soil: heavy loamy, humus-rich soil	0,255	0,4	0,26	0,14	<0-0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26б
dQ	3	Light deluvial loam, light brown, firm to stiffly plastic, silt-rich	0,203	0,32	0,2	0,11	<0-0,33	1,68	1,3	2,7	0,921	0,6	16,5	13	26,8	12/5.	21/18	31/15	16,8	16,4	15	17	10	12	35б
dQ	4	Brown deluvial clay mixed with carbonates, hard to semi-hard	0,229	0,45	0,26	0,19	<0-0,08	1,84	1,4	2,75	0,84	0,77	18,7	16	27,5	19/12.	22/19	43/31	19,2	18,6	19	18	25	28	8б

№	Depth of extraction, m	Initial settlement pressure	Natural pressure, G zg, MPa	Magnitude of relative settlement under load, MPa							
				zg	0,05	0,1	0,15	0,2	0,3	Calculation formula	Interval
Borehole No. 1											
1	0,8	0,07	0,019	0,004	0,008	0,014	0,02	0,026	0,037		
2	2	0,08	0,038	0,005	0,006	0,012	0,019	0,026	0,032		
										1, 1sm	1
Borehole No. 4											
1	0,8	0,06	0,02	0,003	0,007	0,013	0,03	0,025	0,038		
2	2,3	0,07	0,039	0,006	0,008	0,011	0,018	0,025	0,033		
										1,1	1
Borehole No. 7											
1	0,5	0,07	0,019	0,004	0,008	0,014	0,02	0,026	0,037		
3	3,5	0,05	0,056	0,011	0,01	0,019	0.029	0,037	0.05		
										1,1	1
Borehole No.10											
1	0,5	0,06	0,02	0,005	0,005	0,016	0,032	0,025	0,036		
2	3	0,07	0,037	0,006	0,006	0,012	0,015	0,024	0,035		
										1,1	1

Note:

Soils No. 1–3, which make up the site, are prone to settlement due to their own weight and additional loads when saturated to a depth of approximately 3 m. Total settlement of 0.7–1.1 cm is possible.

Engineering-Geological Cross-Section 1-1



Geological cross-section along line 1-1
(first phase of construction)

Borehole number	Св т4		Св т3		Св т2		Св т1	Borehole number
Slope / Distance	300м i=0.036		170м i=0.036		50м i=0.06	300м i=0.006		Slope / Distance
Absolute elevation at the top of the borehole	+47		+36		+25		+27	Absolute elevation at the top of the borehole

Legend

Deluvial loam, light brown, firm to stiff

Sampling location

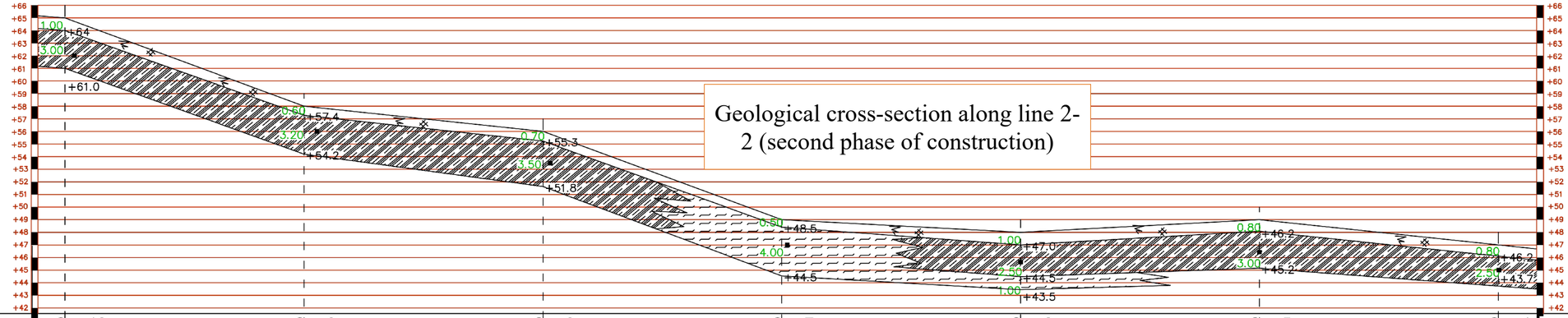
						922-07/25-Г
						«Реконструкція Казанківського групового водопроводу з метою забезпечення населених пунктів Софіївської територіальної громади Баштанського району Миколаївської області»
Зм.	Кіл.	Лист	№док	Підп.	Дата	
ГІП		Хижнякова			02.26	Інженерно-геологічні вишукування
Розробив		Самойлич			02.26	
Перевірив		Масик			02.26	
Н. контр.		Волобоєв			02.26	Інженерно-геологічні розрізи

Стадія	Аркуш	Аркушів
РП	1	2

ТОВ «ДНІПРОВСЬКИЙ ПРОЕКТНО-ВИШУКУВАЛЬНИЙ ІНСТИТУТ «ДПВІ»

формат А1

Engineering-Geological Cross-Section 2-2



Borehole number	Св т10		Св т9		Св т8		Св т7		Св т6		Св т5		Св т4	Borehole number
Distance, m		300м		300м		300м		300м		300м		300м		Distance, m
Absolute elevation at the top of the borehole	+65		+58		+56		+49		+48		+49		+47	Absolute elevation at the top of the borehole

Legend

Deluvial loam, light brown, firm to stiff

Brown clay. Brown deluvial clay, mixed with carbonates, hard to semi-hard

Sampling location

922-07/25-ІГ

«Реконструкція Комишівського групового водопроводу з метою забезпечення населених пунктів Софіївської територіальної громади Криворізького району Дніпропетровської області»

Інженерно-геологічні вишукування

Стадія: Р | Аркуш: 1 | Аркушів: 1

Інженерно-геологічні розрізи

ТОВ «ДНІПРОВСЬКИЙ ПРОЕКТНО-ВИШУКУВАЛЬНИЙ ІНСТИТУТ «ДІПРО»