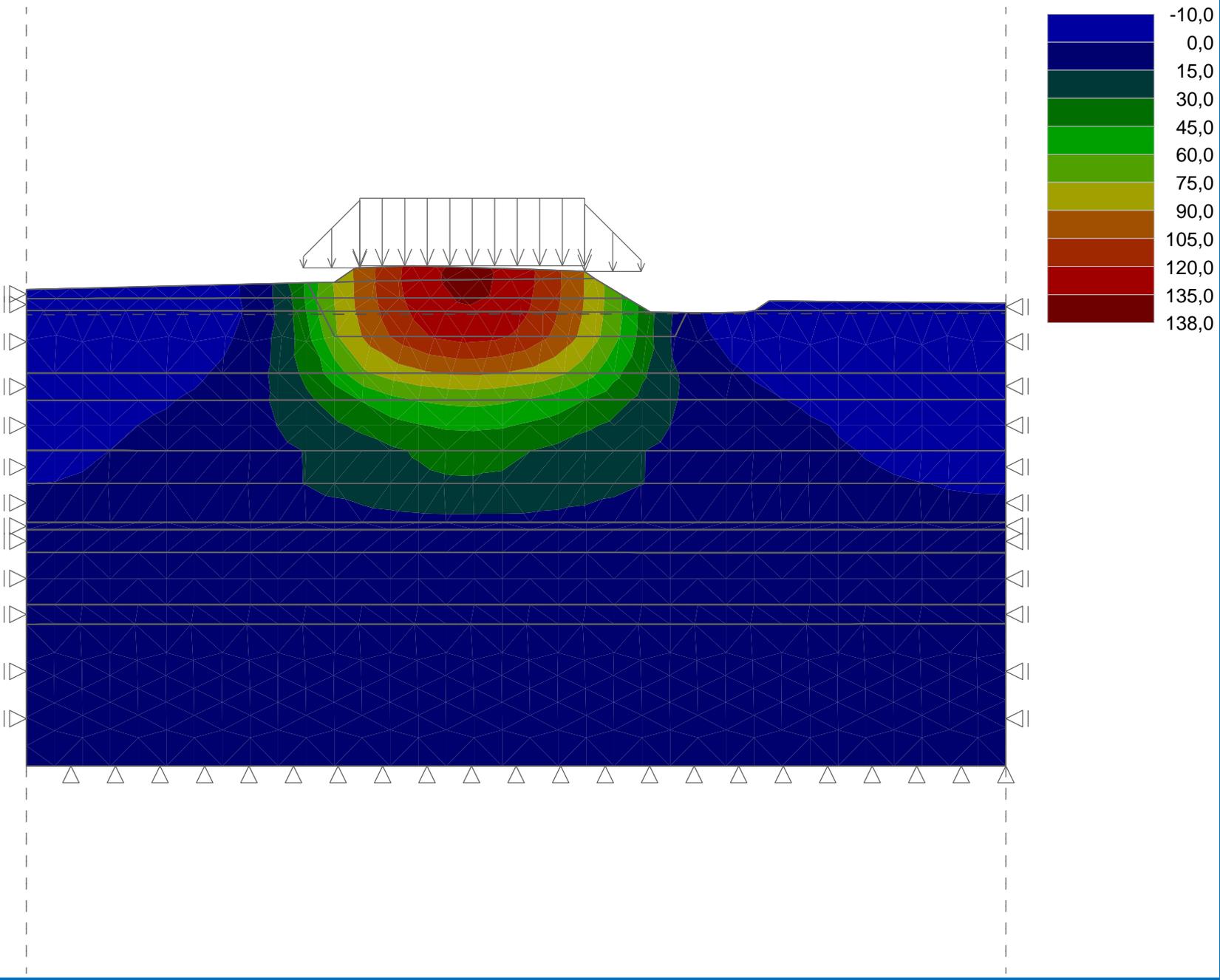


Nazwa :

Faza : 4



Analiza konsolidacji została przeprowadzona prawidłowo.

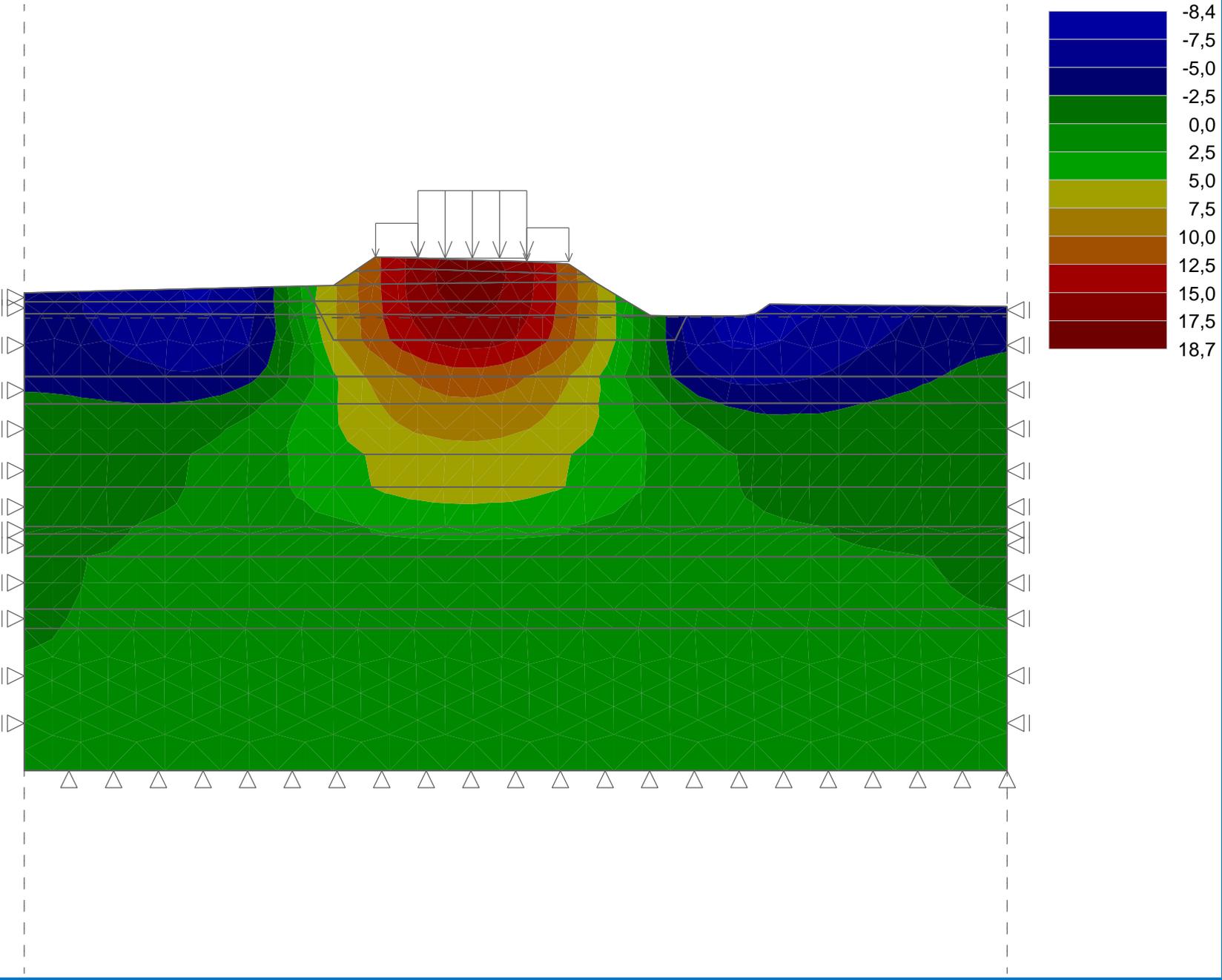
Ustawienia obliczeń : **użytkownika**

Osiągnięty czas w fazie = 90,00000 dzień

Całkowity osiągnięty czas = 100,00000 dzień

Nazwa :

Faza : 7

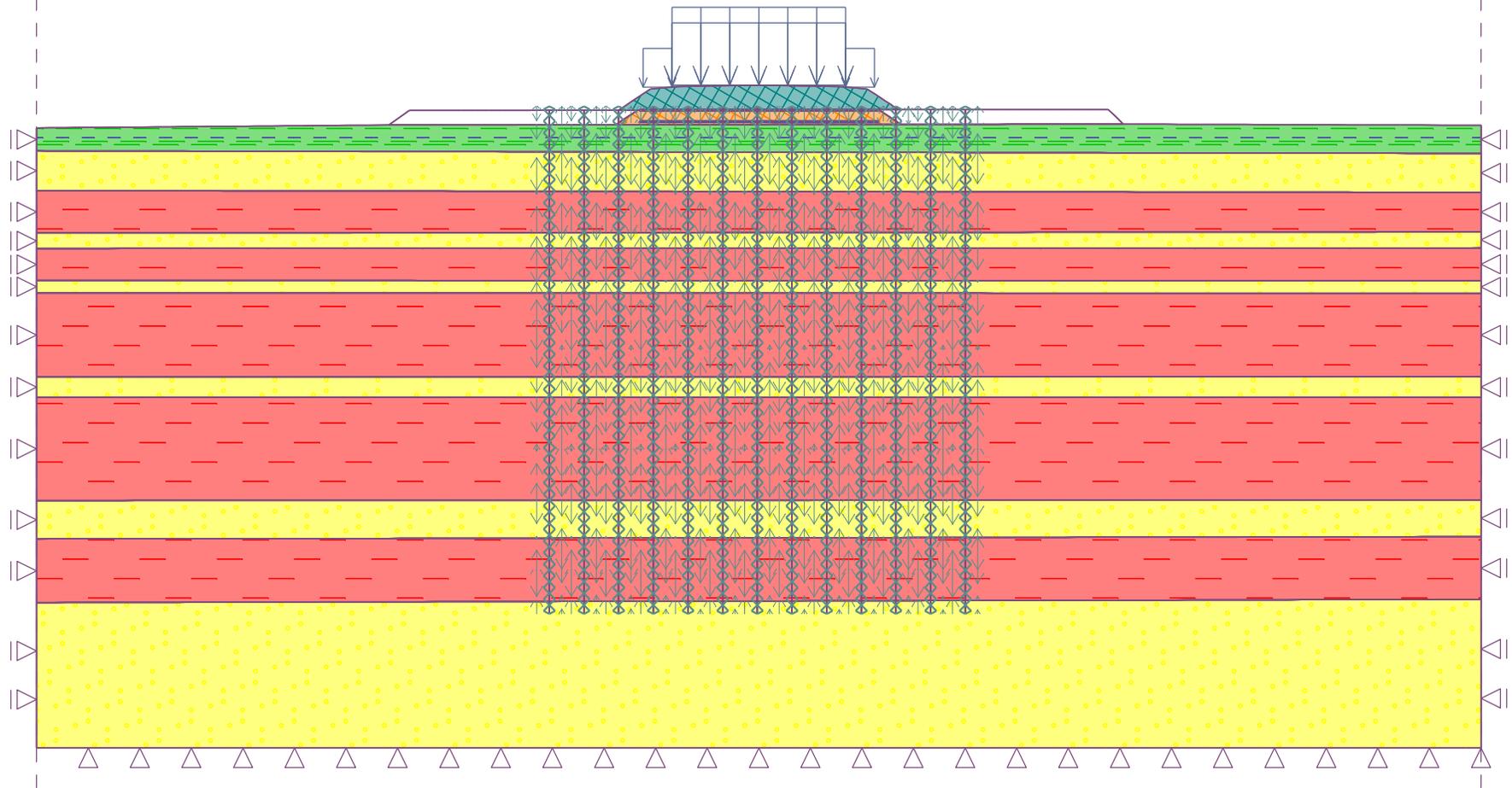


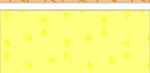
Analiza konsolidacji została przeprowadzona prawidłowo.

Ustawienia obliczeń : **użytkownika**

Osiągnięty czas w fazie = 179,00000 dzień

Całkowity osiągnięty czas = 283,00000 dzień

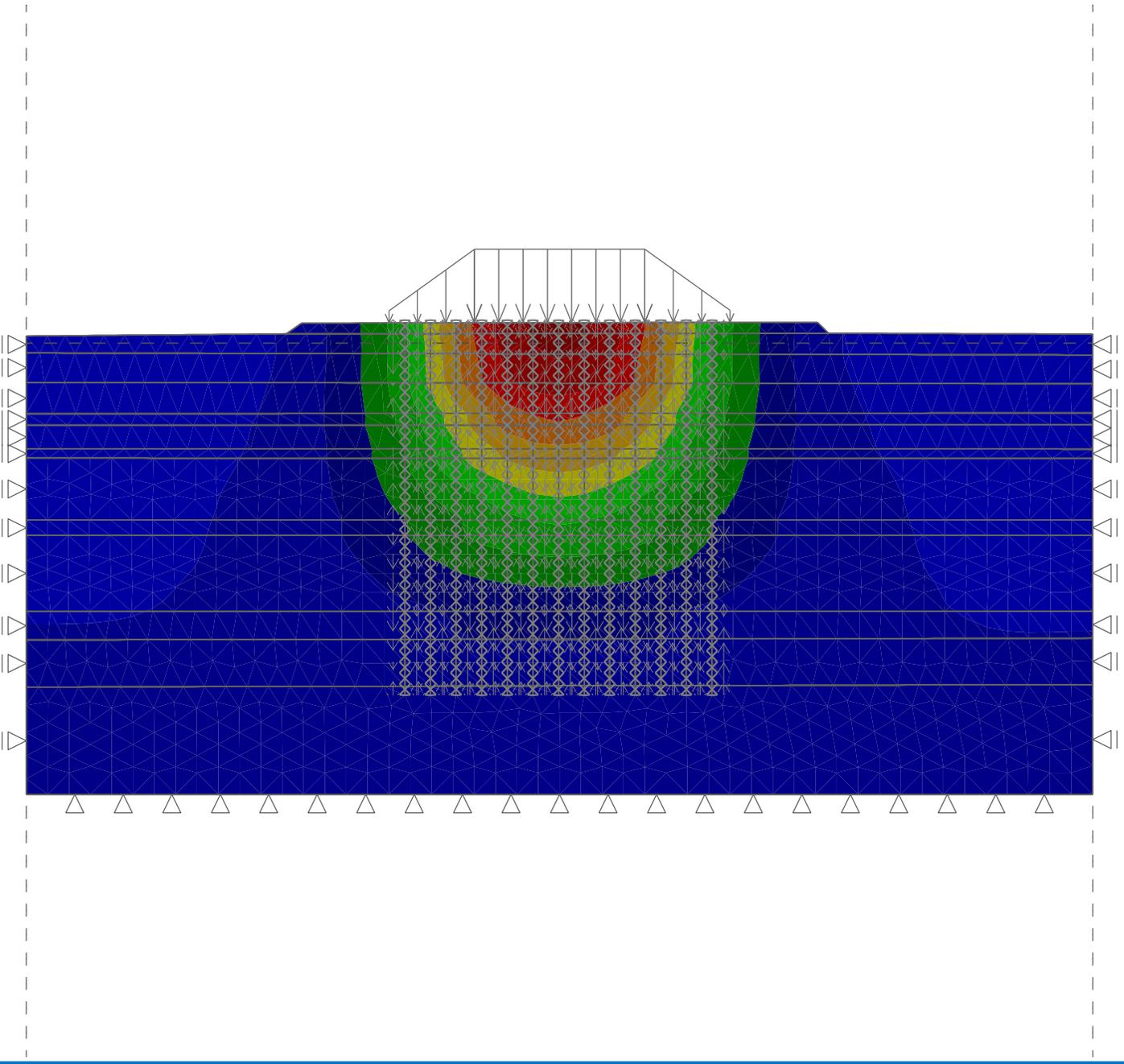
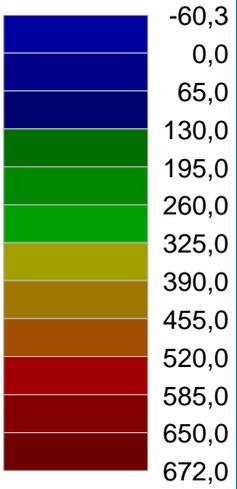


	Nasyp		Platforma robocza_dreny
	Kruszywo materaca		IVb (GH, GpH, PgH)
	Va (Pd, Ppi)		IIIb (Nm, Nm//Pd)
	Va2 (Pd, Ppi)		Vb (Pd, Ppi)
	Vc (Pd, Ppi)		



Nazwa :

Faza : 5



Analiza konsolidacji została przeprowadzona prawidłowo.

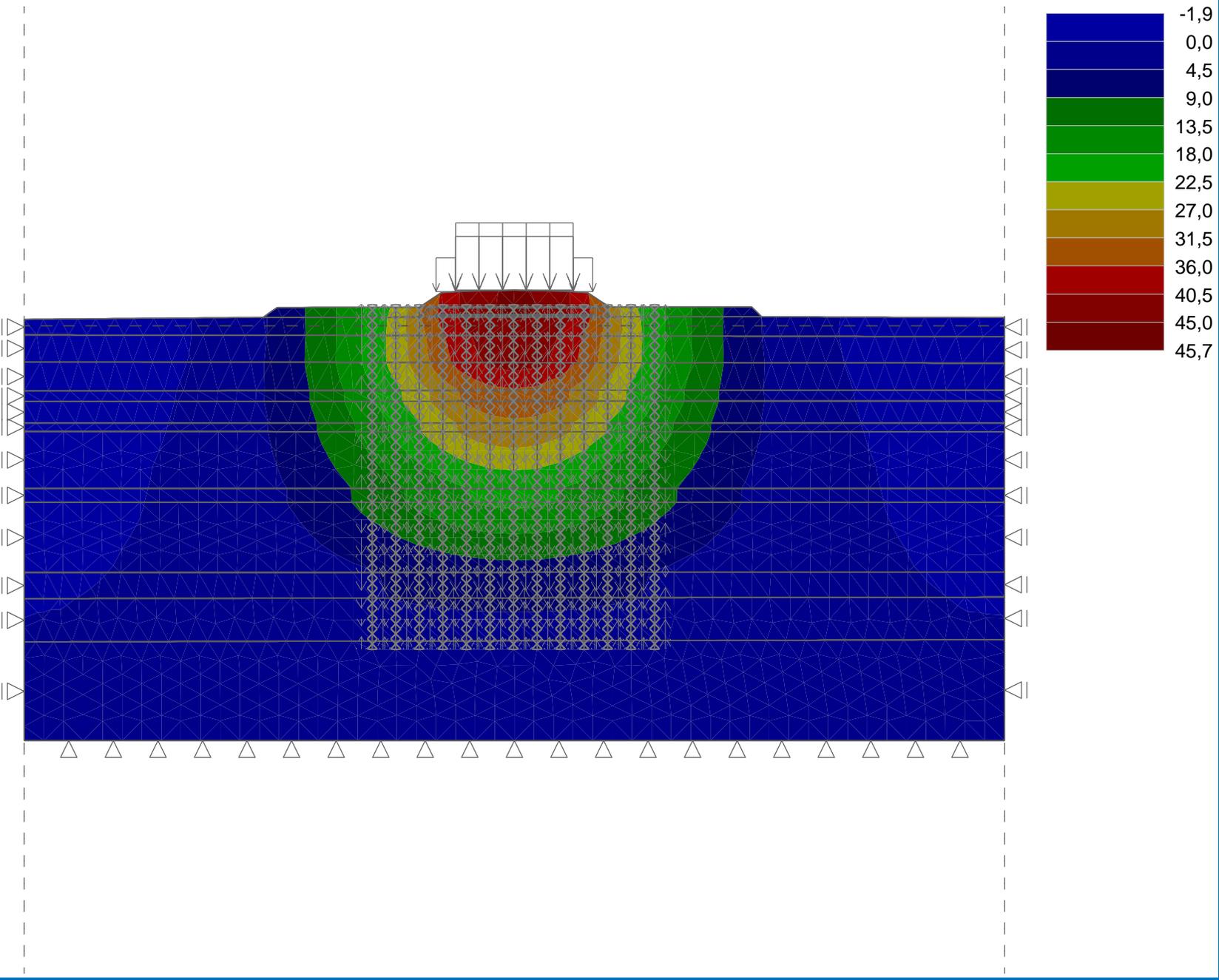
Ustawienia obliczeń : **użytkownika**

Osiągnięty czas w fazie = 145,00000 dzień

Całkowity osiągnięty czas = 160,00000 dzień

Nazwa :

Faza : 9



Analiza konsolidacji została przeprowadzona prawidłowo.

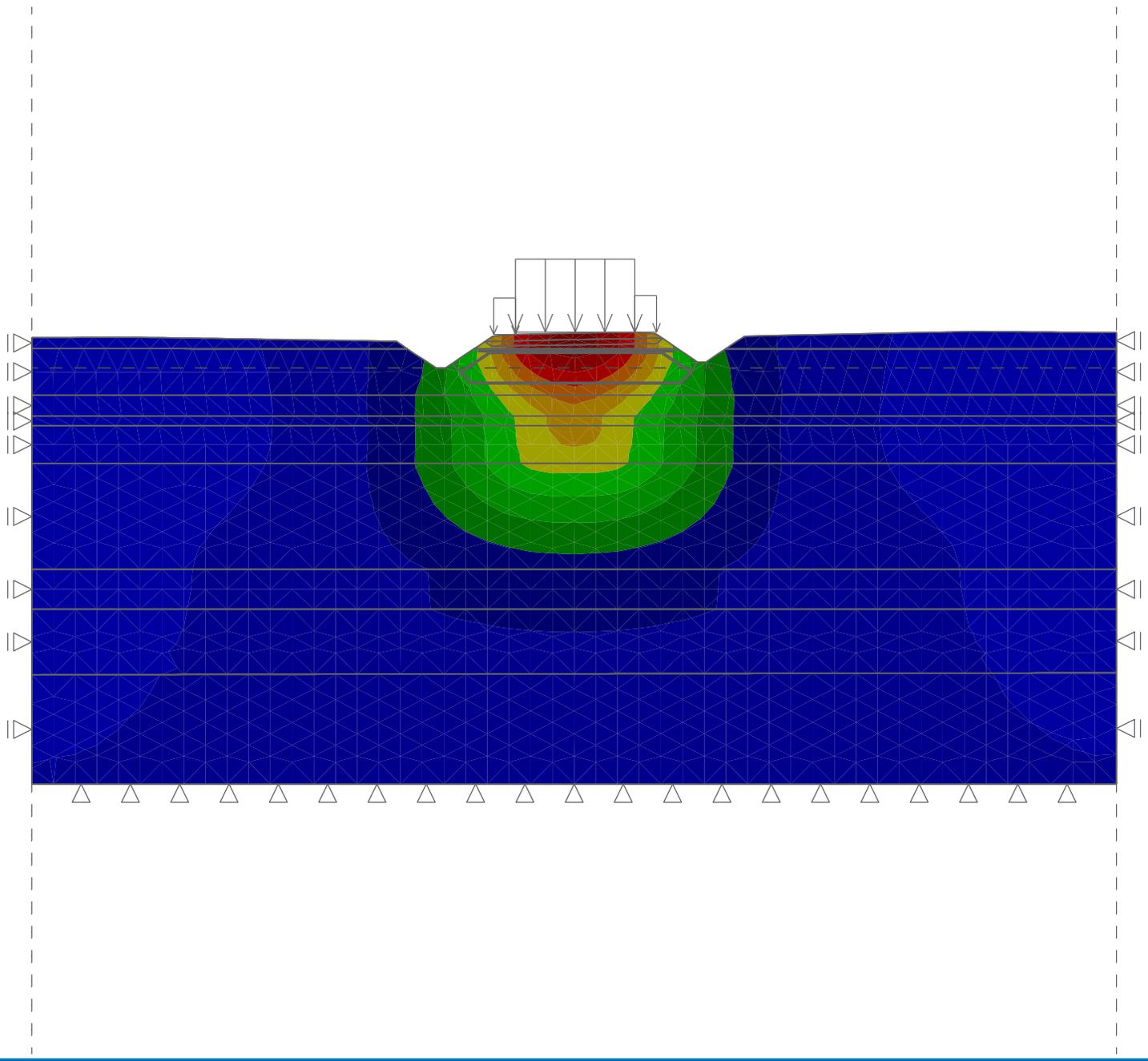
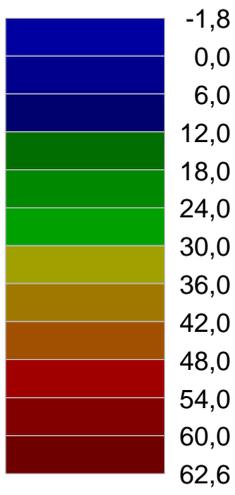
Ustawienia obliczeń : **użytkownika**

Osiągnięty czas w fazie = 7,00000 dzień

Całkowity osiągnięty czas = 186,00000 dzień

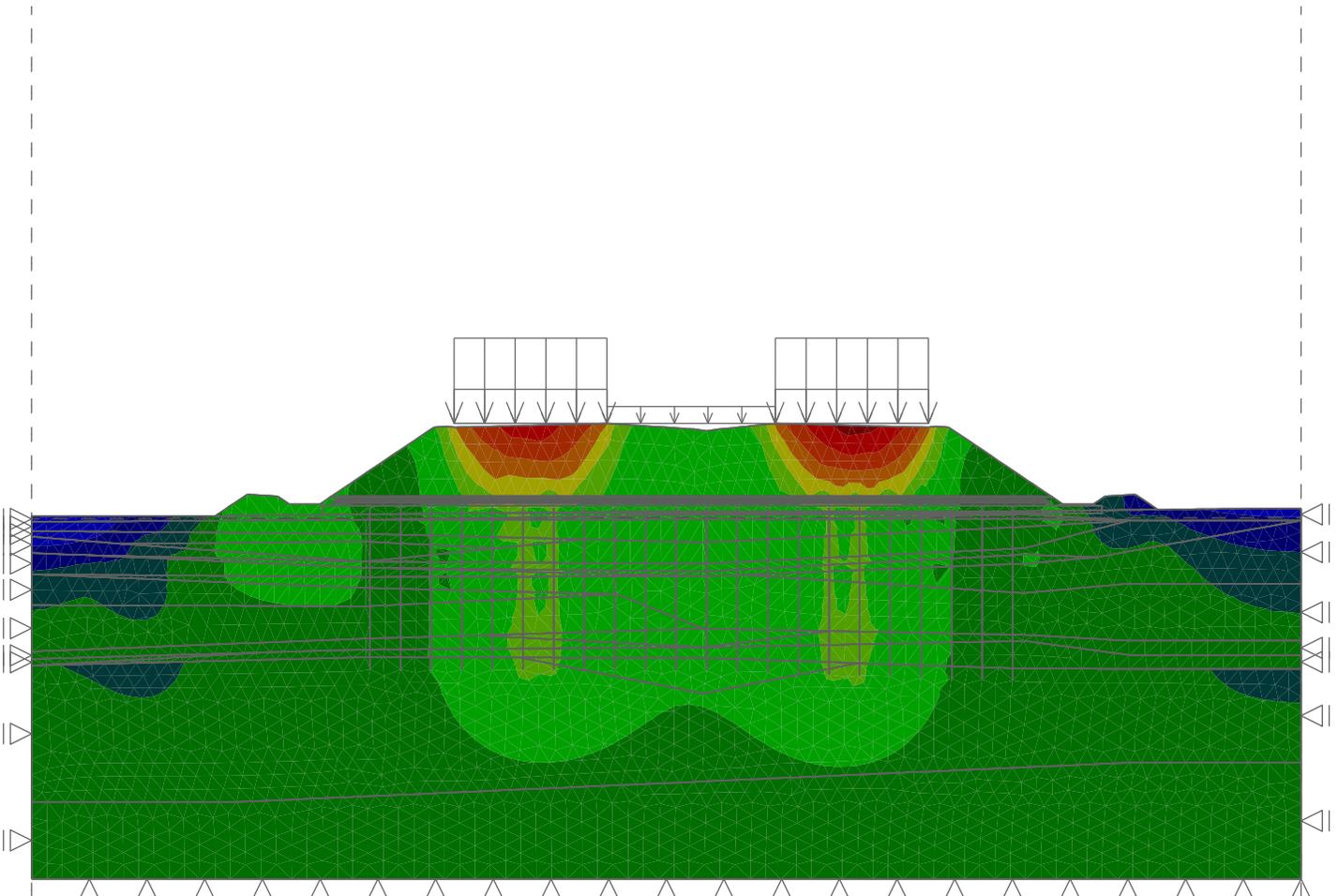
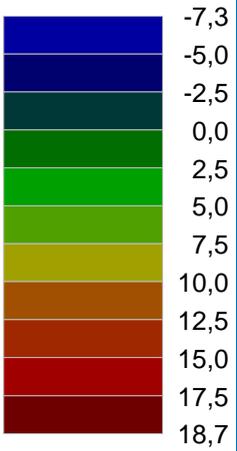
Nazwa :

Faza : 5



Obliczenia naprężeń zostały zakończone prawidłowo.

Ustawienia obliczeń : **użytkownika**
Osiągnięte obciążenie = 100,00 %



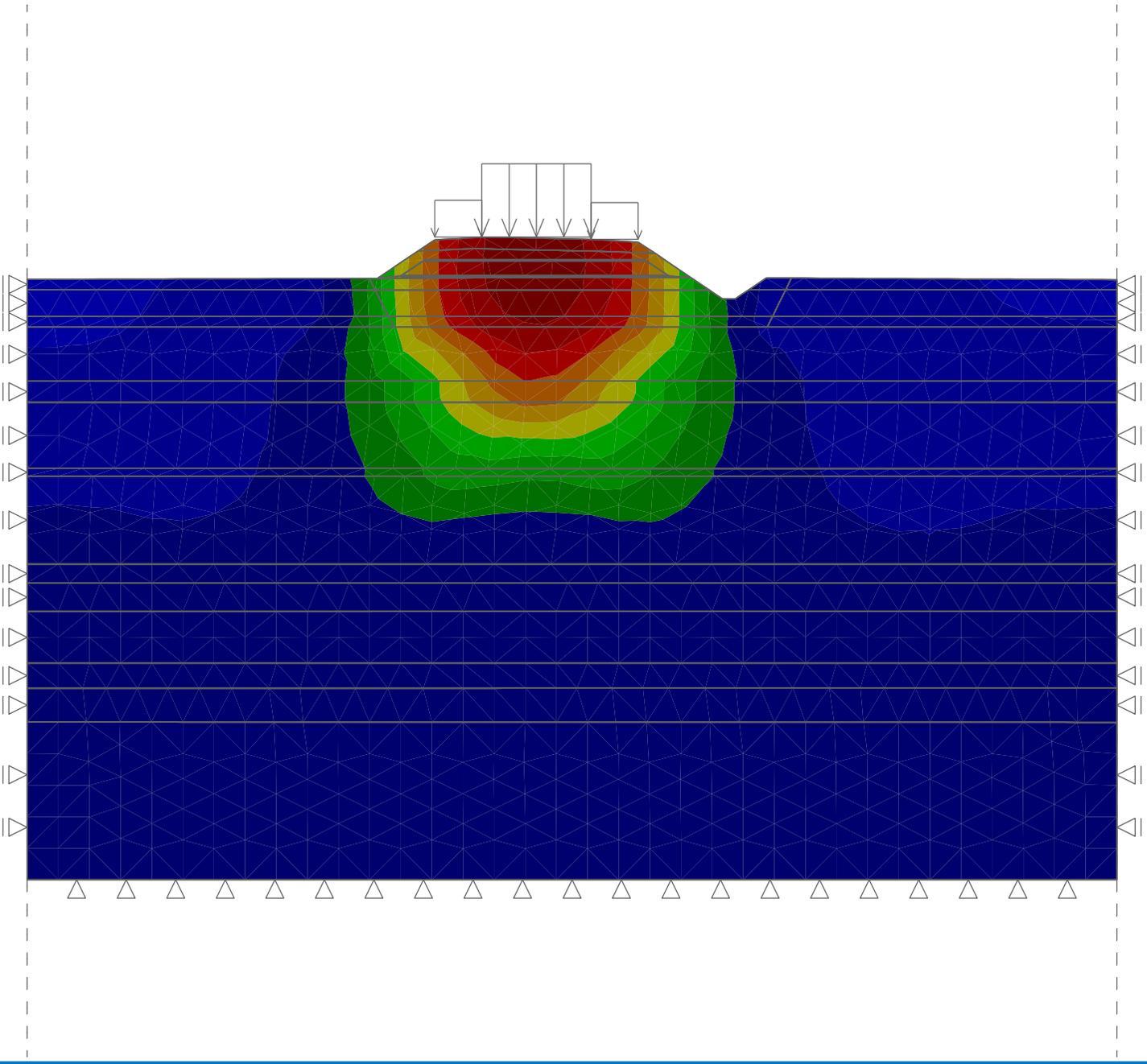
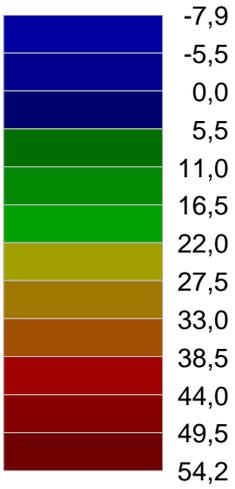
Obliczenia naprężeń zostały zakończone prawidłowo.

Ustawienia obliczeń : **użytkownika**

Osiągnięte obciążenie = 100,00 %

Nazwa :

Faza : 6



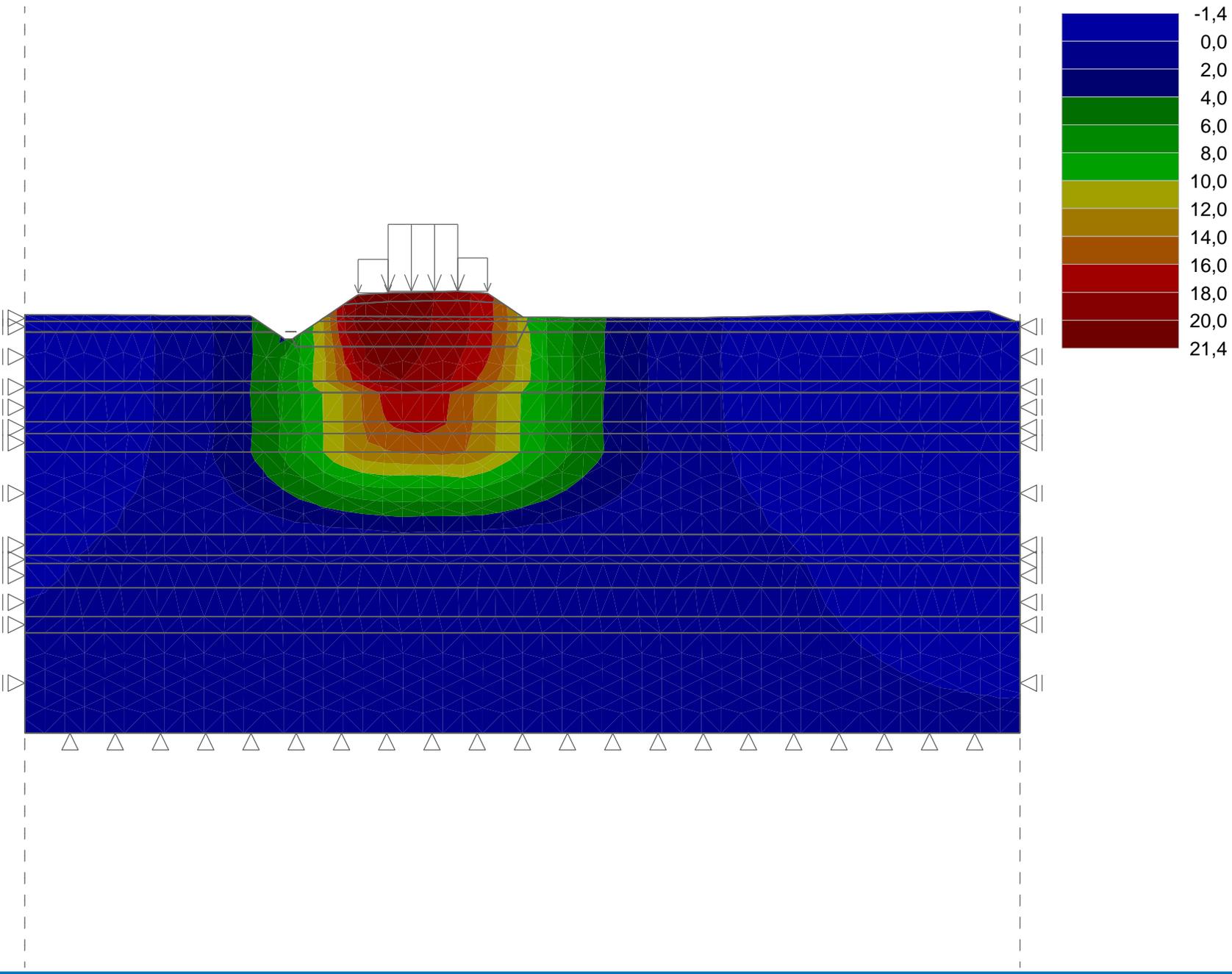
Obliczenia naprężeń zostały zakończone prawidłowo.

Ustawienia obliczeń : **użytkownika**

Osiągnięte obciążenie = 100,00 %

Nazwa :

Faza : 6



Obliczenia naprężeń zostały zakończone prawidłowo.

Ustawienia obliczeń : **użytkownika**

Osiągnięte obciążenie = 100,00 %



INGEO Sp. z o.o. 80-299 Gdańsk, Galaktyczna 15 st.
mobile: (58)622-11-00 fax: (58)622-11-07
www.ingeo.com.pl mail: biuro@ingeo.com.pl



SOILTECH Sp. z o.o. 80-299 Gdańsk, Galaktyczna 15 st.
mobile: (58) 622-11-00 fax: (58) 622-11-07
www.soiltech.pl mail: biuro@soiltech.pl

CONSTRUCTION OF EXPRESSWAY S7 KOSZWAŁY – NOWY DWÓR GDAŃSKI km 17+482,61 ÷ km 37+979,25 POLAND, EUROPE

Technical parameters of the designed road:

design speed V_p – 100 km/h
traffic category: KR6
maximum load on the road surface – 115kN/axis
minimum width of the road – 32,50 m

Engineering-geological conditions:

Within the investment area there are generally unfavourable and complicated, locally complex, engineering-geological conditions. The subsoil consists mainly of Quaternary deposits covering the investigated area with a continuous layer. The Quaternary base is mainly represented by Holocene deposits with a thickness of up to 20÷25 meters. The top layer of the subsoil consists of humus and locally engineering and non-engineering fills (within the existing road embankments). The subsoil is made of organic soils, delta river sands, fluvioglacial sands, boulder clays and clays. The dominant deposits are organic soils (muds and peats) of considerable thickness with underlying layer of river sands. In deeper boreholes there were also drilled boulder clays, silts and clays. Non-cohesive soils (sands, gravels) occur in various degree of compaction: from loose to very dense. State of cohesive soils differs from soft to stiff. Organic soils are characterized by very high variability of physical and mechanical parameters, they have very low load-bearing capacity and high deformation characteristics. In the area of research several quaternary groundwater levels have been investigated. The first groundwater level occurs at a depth from 0,00 to 2,00 meters below ground level. Groundwater level is subjected to considerable periodic fluctuations (from $\pm 0,75$ to $\pm 2,50$ meters).

The whole area designated for ground improvement is within the range of polder drainage systems – the ordinate of the first groundwater level is strictly dependent on periodic agrotechnical requirements which is natural in the analyzed area – completely subordinate to the agricultural economy.

Ground improvement:

Most of calculations of ground improvement were carried out with the use of GEO5 module FEM.

Due to the occurring engineering-geological conditions and the nature of the designed investment the following technologies of ground improvement have been applied:

T01a - soil replacement:

technology applied in the case of organic soils and non-engineering fills occurring to the depth of 5,0 m below ground level.
Total volume of soil replacement: 275 000 m³.



INGEO Sp. z o.o. 80-299 Gdańsk, Galaktyczna 15 st.
 mobile: (58)622-11-00 fax: (58)622-11-07
 www.ingeo.com.pl mail: biuro@ingeo.com.pl

SOILTECH Sp. z o.o. 80-299 Gdańsk, Galaktyczna 15 st.
 mobile: (58) 622-11-00 fax: (58) 622-11-07
 www.soiltech.pl mail: biuro@soiltech.pl

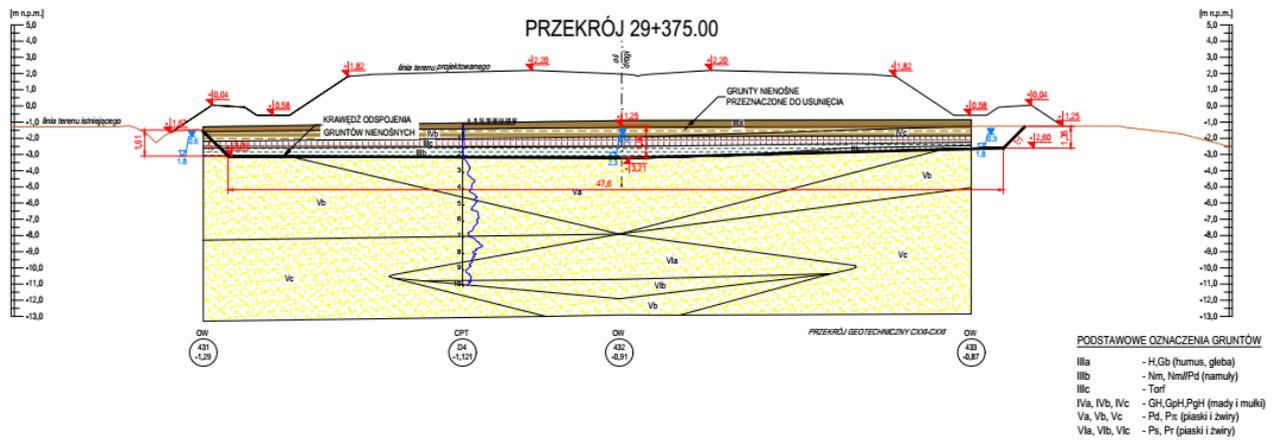


Fig. 1.0 Cross-section of soil replacement in km 29+375 S7



Fig. 1.1 Execution of soil replacement in km 29+375 S7



INGEO Sp. z o.o. 80-299 Gdańsk, Galaktyczna 15 st.
mobile: (58)622-11-00 fax: (58)622-11-07
www.ingeo.com.pl mail: biuro@ingeo.com.pl



SOILTECH Sp. z o.o. 80-299 Gdańsk, Galaktyczna 15 st.
mobile: (58) 622-11-00 fax: (58) 622-11-07
www.soiltech.pl mail: biuro@soiltech.pl

T08b - displacement columns with a diameter of 0,40 meters:

ground improvement consists of reinforced concrete columns with a diameter of 0,40 meters formed in the ground by the displacement method, reinforced concrete slabs based on the pile heads and 0,5 meters thick mattress made of aggregate reinforced with high-strength and low-deformation geotextiles. Total length of executed piles: 2375000 meters (186700 piles).

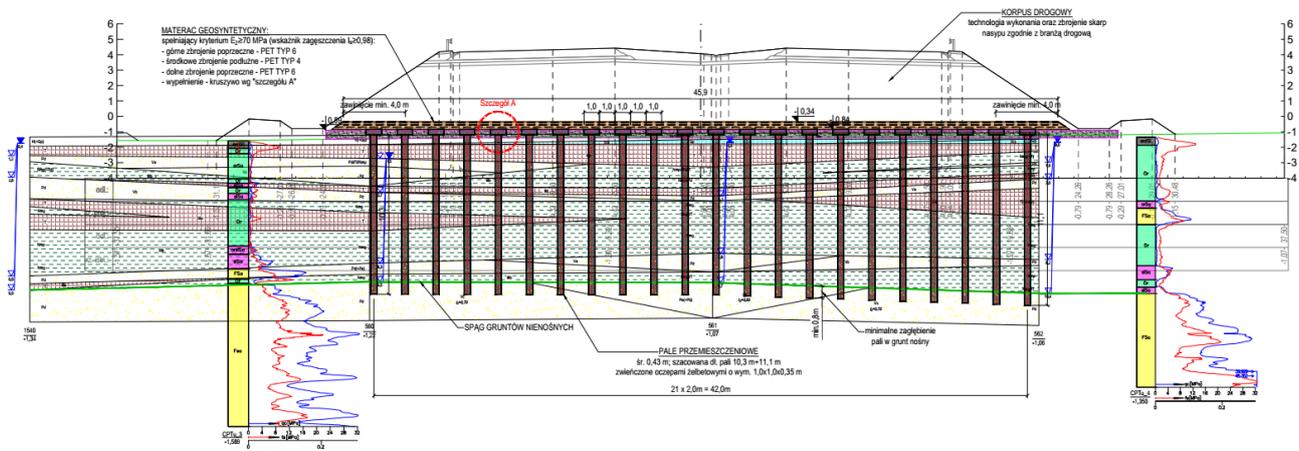


Fig. 5.0 Cross-section of displacement columns in km 32+950 S7



Fig. 5.1 Execution of displacement piles – rotary drilling rig BAUER BG 24 H



INGEO Sp. z o.o. 80-299 Gdańsk, Galaktyczna 15 st.
mobile: (58)622-11-00 fax: (58)622-11-07
www.ingeo.com.pl mail: biuro@ingeo.com.pl

SOILTECH Sp. z o.o. 80-299 Gdańsk, Galaktyczna 15 st.
mobile: (58) 622-11-00 fax: (58) 622-11-07
www.soiltech.pl mail: biuro@soiltech.pl

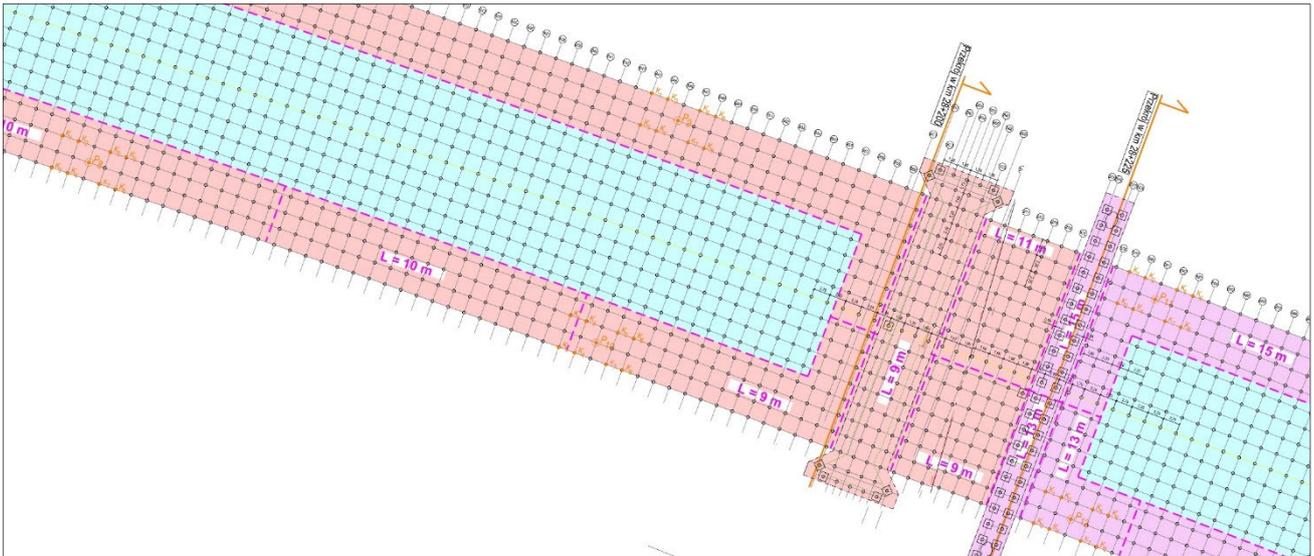


Fig. 5.2 Piling plan around km 28+200 S7



Fig. 5.3 Ground improvement around km 28+200 S7



INGEO Sp. z o.o. 80-299 Gdańsk, Galaktyczna 15 st.
mobile: (58)622-11-00 fax: (58)622-11-07
www.ingeo.com.pl mail: biuro@ingeo.com.pl

SOILTECH Sp. z o.o. 80-299 Gdańsk, Galaktyczna 15 st.
mobile: (58) 622-11-00 fax: (58) 622-11-07
www.soiltech.pl mail: biuro@soiltech.pl



Fig. 5.4 Pile caps – reinforced slabs located on pile heads



INGEO Sp. z o.o. 80-299 Gdańsk, Galaktyczna 15 st.
mobile: (58)622-11-00 fax: (58)622-11-07
www.ingeo.com.pl mail: biuro@ingeo.com.pl

SOILTECH Sp. z o.o. 80-299 Gdańsk, Galaktyczna 15 st.
mobile: (58) 622-11-00 fax: (58) 622-11-07
www.soiltech.pl mail: biuro@soiltech.pl



Fig. 5.5 Pile caps – reinforced slabs located on pile heads

T11 - granular layer with geogrid reinforcement at the base of the embankment:

technology used to obtain uniform settlements of the road embankment in the areas of diversified geological structure, heterogeneous strength parameters and compressibility, as well as to maintain stability during works execution and operation stage. Surface ground improvement is a 0,5 meters thick mattress with the use of natural aggregate 0/31,5 mm and polyester geogrid, built-in on the previously prepared subsoil (partial soil replacement to the depth of 0,5 meters).

Total volume of soil replacement: 99600 m³.

Total volume of geosynthetic mattress: 48000 m³.

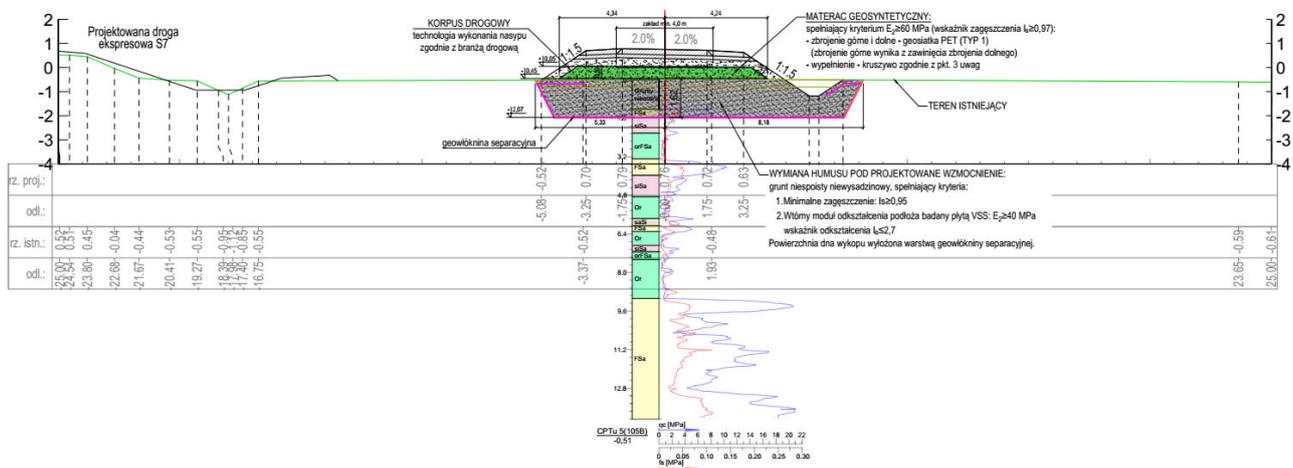


Fig. 6.0 Cross-section of geosynthetic mattress in km 0+400 of access road P-105b

T12 - surface compaction of the subsoil:

in areas where load-bearing soils occur in the subsurface layers and the designed loads are small, the subsoil was improved by surface compaction using vibrating and static rollers.

Total volume of built-in soil with surface compaction: 9150 m³.

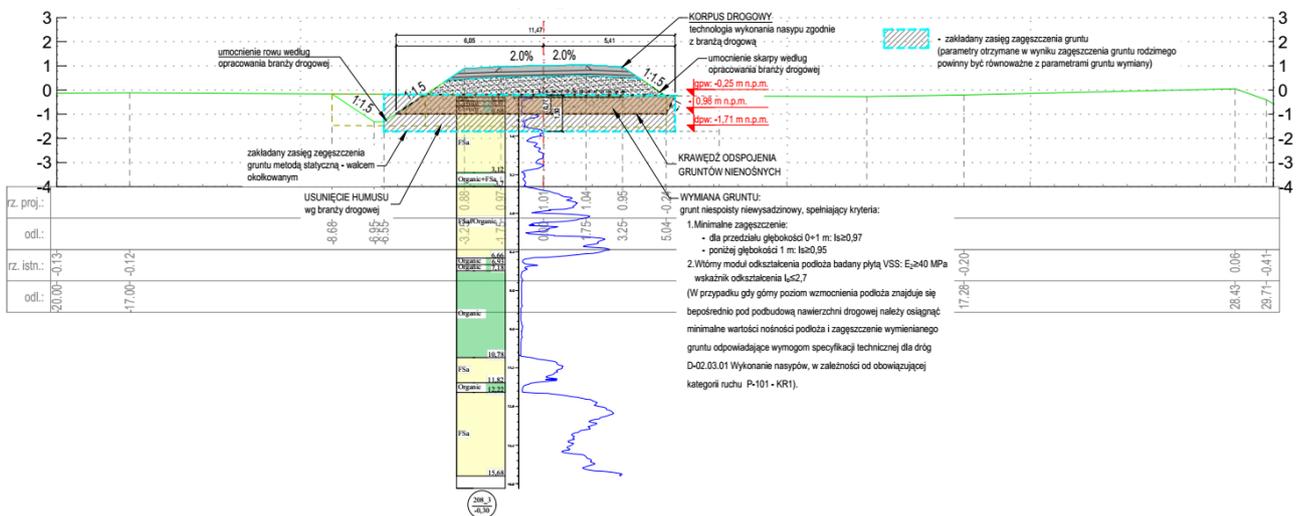


Fig. 7.0 Cross-section of surface ground improvement in km 0+340 of access road P-101









