



**NASLOVNA STRAN Z OSNOVNIMI PODATKI O
ELABORATU**

NAČRT IN ŠTEVILČNA OZNAKA ELABORATA

Geološko geotehnično poročilo za parc. št. 4131/5, 4131/7, 4131/8 k.o. 144 Kobilje

NAROČIK

Stanovanjski sklad republike Slovenije, Poljanska cesta 31, 1000 Ljubljana

OBJEKT

Večstanovanjski objekt

VRSTA PROJEKTNE DOKUMENTACIJE:

elaborat

ZA GRADNJO

Novogradnja

ŠTEVILKA PARCELE in KATASTRSKA OBČINA:

Parc. št. 4131/5, 4131/7, 4131/8 k.o. 144 Kobilje

PROJEKTANT:

PNV inženiring d.o.o., Špičnik 47, 2201 Zgornja Kungota

POOBlašČENI INŽENIR:

mag Janez MAYER univ. dipl. inž. rud. in geotehnol, - RG-0038

ŠTEVILKA, KRAJ IN DATUM IZDELAVE ELABORATA:

GG 25/11/1180, Maribor 5.2.2026

S. SPLOŠNI DEL

S.1 KAZALO VSEBINE POROČILA

S. SPLOŠNI DEL	2
S.1 KAZALO VSEBINE POROČILA	3
S.2 KAZALO SLIK.....	4
S.3 KAZALO GRAFIK	4
T. TEHNIČNI DEL	5
T.1. SPLOŠNO.....	6
T.1.1. Lokacija in opis	6
T.2. STANDARDI IN PRAVILNIKI	7
T.3. OSNOVE ZA PROJEKTIRANJE.....	7
T.3.1. Geološke osnove	7
T.3.2. Hidrogeološki podatki.....	8
T.3.3. Podzemna in meteorna voda	9
T.3.4. Vodoprepustnost in ponikanje.....	9
T.3.5. Seizmičnost terena	9
T.4. OGROŽENOST OBMOČJA.....	10
T.4.1. Poplavna ogroženost.....	10
T.4.2. Erozijska ogroženost.....	10
T.4.3. Možnost plazenja	11
T.5. TERENSKÉ PREISKAVE	12
T.5.1. SPLOŠNO.....	12
T.5.2. Izvleček rezultatov meritev s dinamičnim penetrometrom	12
T.5.3. Laboratorijske preiskave	12
T.5.4. Strukturno vrtanje	13
T.5.5. Popis in fotografije sondažnih izkopov.....	14
T.1.1.1. Sondažni izkop 1	14
T.1.1.2. Dinamični deformacijski modul - Rezultati.....	15
T.1.1.3. Sondažni izkop 2	16
R.1.1. Dinamični deformacijski modul - Rezultati.....	17
T.2. ANALIZA STABILNOSTI	19
T.6. ANALIZA POSEDKOV	19
T.3. POGOJI ZA VGRADNJO.....	20
T.3.1. Prisotni materiali	20
T.3.2. Pogoji za izvajanje zemeljskih del.....	20
T.6.1. Smernice za temeljenje	20
T.4. OPOZORILA.....	21
R. LABORATORIJSKE PREISKAVE	22
R. RAČUNSKI DEL	23
R.2. REZULTATI MERITEV S TEŽKIM DINAMIČNIM PENETROMETROM RSG135	24
R.3. MERILNA OPREMA IN INTERPRETACIJA MERITEV.....	25
R.3.1. DINAMIČNI PENETROMETER RSG 135.....	25
R.3.2. INTERPRETACIJA MERITEV.....	26
R.4. REZULTATI ANALIZE POSEDKOV	28
R.5. VRTINE	29
G. GRAFIKE	30

S.2 KAZALO SLIK

Slika 1 – Makrolokacija obravnavane parcele	6
Slika 2 - Mikrolokacija obravnavane parcele.....	6
Slika 3 - izsek iz geološke karte.....	7
Slika 4 - izsek iz hidrogeološke karte	8
Slika 5 - karta projektnege pospeška tal s povratno dobo 475 let	9
Slika 6: Izrez iz atlasa voda - Integralna karta poplavne ogroženosti.....	10
Slika 7: Izrez iz atlasa voda - karta erozijske ogroženosti	10
Slika 8: Izsek iz atlasa voda - plazljiva območja	11
Slika 9 - vrtina 1	13
Slika 10 - vrtina 2	13
Slika 11 - Fotografije razkopa 1	14
Slika 12 - Fotografije razkopa 2	16
Slika 13 - geološko geotehnični prerez PR.1.....	19
Slika 14 - rezultat analize posedkov	19
Slika 15 - dinamični penetrometer RSG 135.....	25

S.3 KAZALO GRAFIK

- G.1 Situacija z lokacijo meritev
- G.2 Geološko geotehnični profil PR.1

T. TEHNIČNI DEL

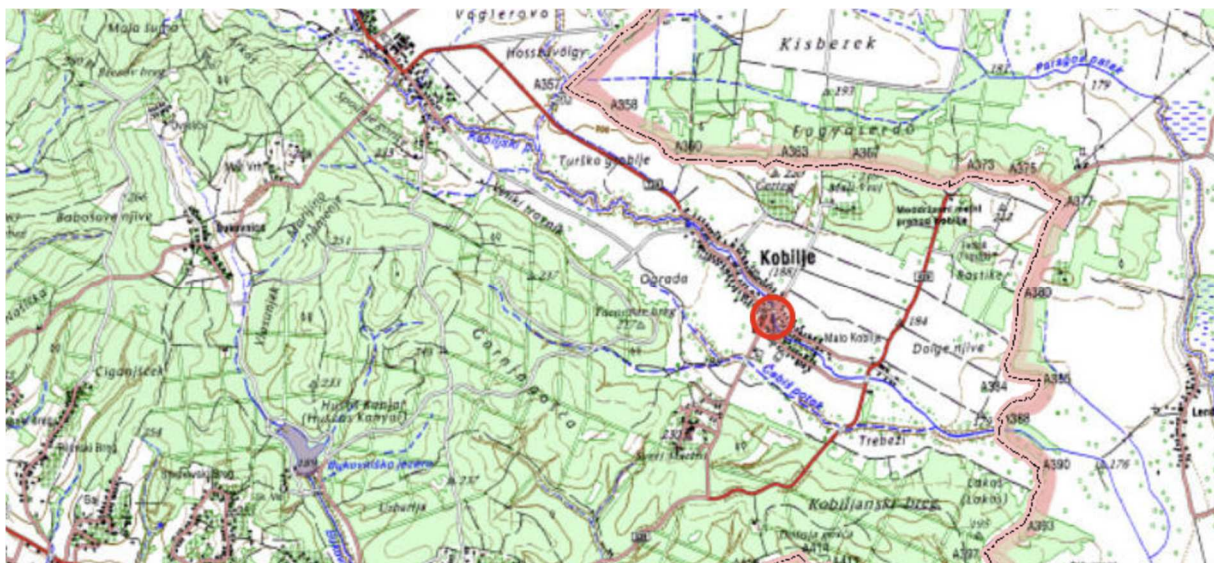
T.1. SPLOŠNO

Naročnik geološko geotehničnega poročila želi na parcelah s parcelno št. 4131/5, 4131/7, 4131/8 k.o. 144 Kobilje, pridobiti informacije o pogojih za temeljenje.

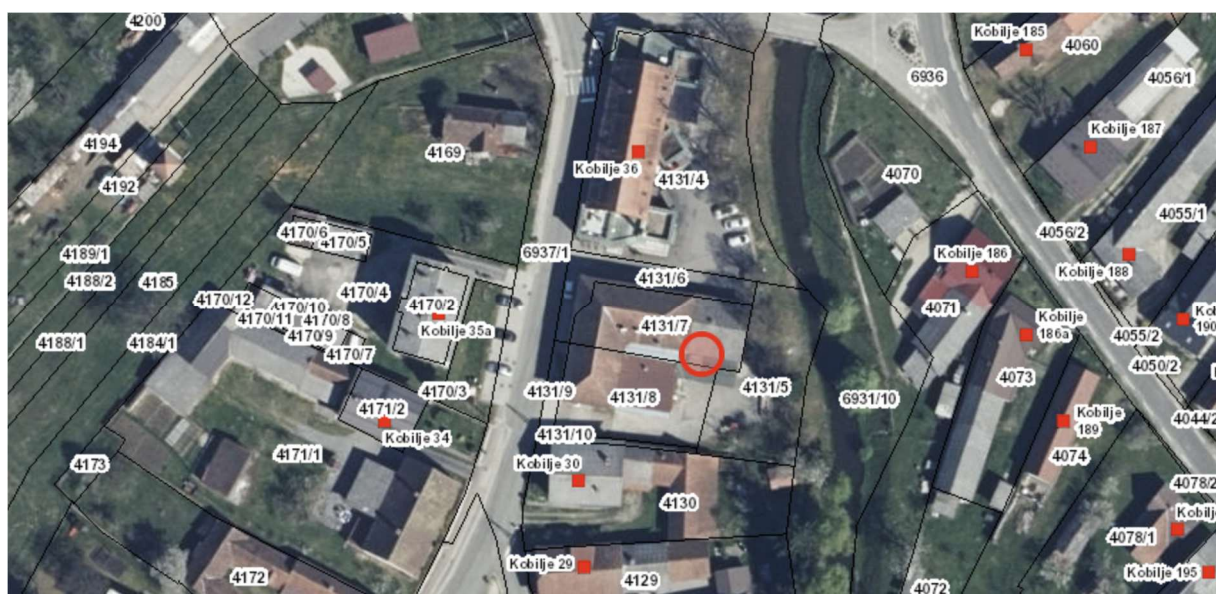
Osnova za izdelavo tega poročila je terenska prospekcija območja, predhodne raziskave na obravnavanem območju, geodetski posnetek in izvedene terenske meritve ter interpretacija pridobljenih podatkov.

T.1.1. Lokacija in opis

Parcele se nahajajo ob glavni cesti v centru Kobilja blizu osnovne šole Kobilje. Na lokaciji se je nahajal stanovanjski objekt, ki je pred kratkim bil porušen. Parcele mejijo na parcelo 4131/4 na severni in 4130 na južni strani. Vzhodno od obravnavane lokacije teče Kobiljanski potok, na zahodni strani pa poteka glavna cesta preko katere je možen dostop do obravnavanih parcel.



Slika 1 – Makrolokacija obravnavane parcele



Slika 2 - Mikrolokacija obravnavane parcele

T.2. STANDARDI IN PRAVILNIKI

Geološko geotehnično poročilo ter analize sledijo načelom naslednjih pravilnikov, standardov in smernic:

SIST EN 1997-2:2007

EN 22476-2 Geotechnical investigation and testin – field testing: Dynamic probing

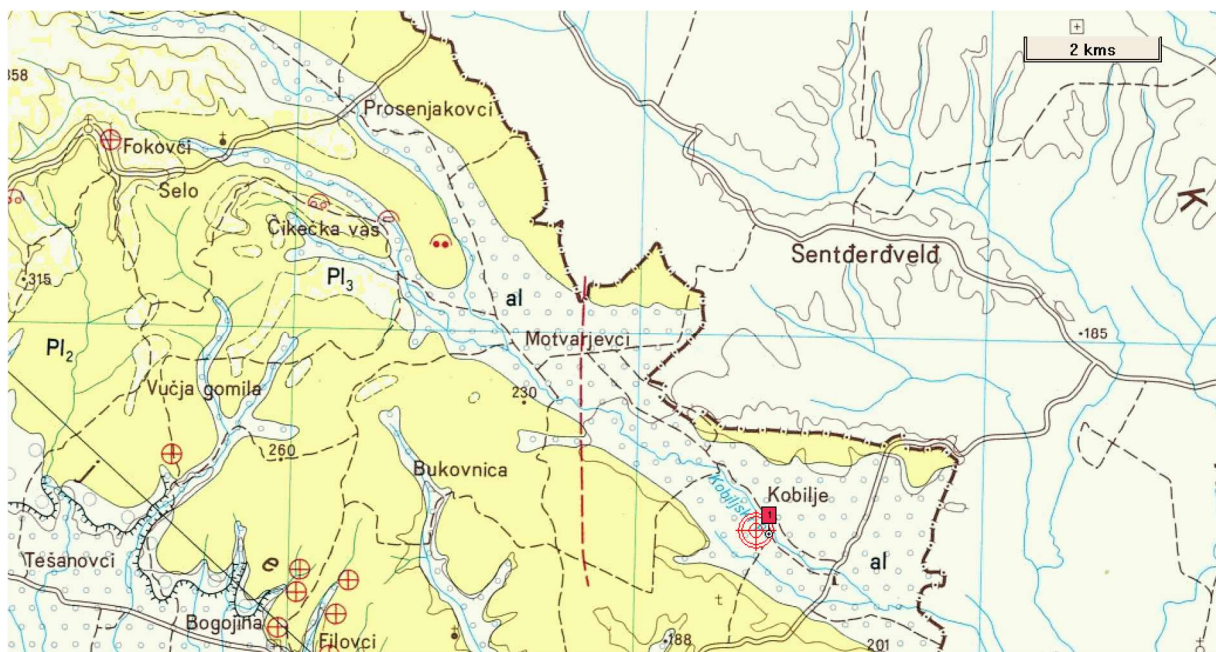
Tehnična specifikacija TSPI-PGV.05.100:2023

T.3. OSNOVE ZA PROJEKTIRANJE

T.3.1. Geološke osnove

Obravnavana lokacija je prikazana na geološki karti Slovenije – list Goričko in označena s številko 1. Glede na tektonsko opredelitev terena spada k geotektonski enoti imenovani »Centralne Alpe v podlagi terciarja«. Nekateri geologi prištevajo ta del ozemlja tudi v Graški zaliv Panonskega morja. Sicer pa Goričko pripada udornemu terciarnemu bazenu panonskega obrobja. Podlaga tega dela terciarnega zaliva, ki obsega današnje Goričko, pripada podaljšku Centralnih Alp, katerih vzhodni del se je pogreznil ob prelomu, ki poteka v smeri sever-jug ob vzhodnem robu Pohorja in Kozjaka.

Širša okolica obravnavane lokacije je zastopana z materiali kot so prod in aluvijalne naplavine Kobiljskega potoka na karti označenem z oznako al.



Slika 3 - izsek iz geološke karte

Rec	OPIS_SIF	STAROST
1	Aluvij	Al

T.3.2. Hidrogeološki podatki

Območje naselja Kobilje hidrogeološko sodi v Panonski sedimentni bazen, za katerega je značilna plastnata zgradba iz kvartarnih in terciarnih klastičnih sedimentov. V hidrogeološkem smislu se območje uvršča med lokalne vodonosnike oziroma vodonosnike s spremenljivo izdatnostjo ter prostorsko obsežne, vendar največ srednje izdatne vodonosnike, skladno z razvrstitvijo, uporabljeno v okviru hidrogeoloških kart Slovenije.

V zgornjih plasteh prevladujejo kvartarni sedimenti, sestavljeni pretežno iz glin, meljev in lokalno drobnozrnatih peskov, ki izkazujejo majhno do srednjo prepustnost. Zaradi izrazite litološke heterogenosti in izmenjevanja bolj ter manj prepustnih plasti so vodonosni horizonti prostorsko omejeni in neenakomerno razviti. V takšnih razmerah se pojavljajo plitvi lokalni vodonosniki, ki so neposredno napajani s padavinami in za katere so značilna izrazita sezonska nihanja gladine podzemne vode ter spremenljiva izdatnost.

V globljih delih sedimentnega zaporedja, predvsem v terciarnih peščenih in peščenjakih plasteh, se pojavljajo regionalno razširjeni vodonosniki, ki so lateralno obsežnejši, vendar po izdatnosti praviloma ne presegajo srednjih vrednosti. Ti vodonosniki so pogosto delno zaprti ali polzaprti, z omejeno neposredno povezavo s površinskimi vodami, njihova hidrogeološka vloga pa je izrazitejša v regionalnem merilu kot pri plitvih gradbenih posegih.

Podzemna voda se na obravnavanem območju pojavlja predvsem kot plitva podtalnica v kvartarnih sedimentih, lokalno pa tudi kot zaledna voda, ki se zadržuje nad manj prepustnimi glinastimi plastmi. Nivo podzemne vode je časovno in prostorsko spremenljiv ter je močno odvisen od padavinskih razmer in lokalnega reliefa. V obdobjih dolgotrajnih ali intenzivnih padavin je mogoč začasen dvig gladine podzemne vode ter pojav vode v izkopih, zlasti pri globljih gradbenih jamah.

Hidrogeološke razmere na območju Kobilja ne ustrezajo značilnostim visoko izdatnih prodnih vodonosnikov, temveč so izrazito lokalnega značaja in praviloma obvladljive z ustreznimi tehničnimi ukrepi. Kljub temu je pri zahtevnejših posegih v prostor, zlasti pri globljih izkopih ali podkletenih objektih, potrebno upoštevati možnost vpliva podzemne in zaledne vode ter temu prilagoditi način gradnje in zaščito konstrukcije. Za natančno opredelitev dejanskih hidrogeoloških razmer na posamezni lokaciji so v takšnih primerih priporočene dodatne terenske raziskave.



Slika 4 - izsek iz hidrogeološke karte

T.3.3. Podzemna in meteorna voda

Konkretni podatki o gibanju nivoja podzemnih vod na tem območju nam niso na voljo, ker ni na voljo opazovalnih objektov. Med izvajanjem meritev smo zaznali podtalno vodo na lokaciji meritve DPH 1 na globini 4m. Prav tako smo pri izvajanju sondažnih izkopov zaznali precejno podtalno vodo na globini 0,5m. Nivo podtalne vode ocenjujemo, da je na koti cca +184 m. Ob daljšem in bolj intenzivnem deževju se lahko pričakuje dvig podtalne vode.

T.3.4. Vodoprepustnost in ponikanje

V obeh vrtinah smo ugotovili nivo podtalne vode na globini cca. -2,5 m, kar je praktično nivo potoka. V zgornjih slojih prevladujejo glineni in zaglinjeni materiali v katerih ocenjujemo faktor vodoprepustnosti na $k=1 \times 10^{-8}$ m/s. V globljih slojih materiali preidejo v zaglinjene prode, kjer ocenjujemo faktor vodoprepustnosti, na podlagi laboratorijskih preiskav na $k=3 \times 10^{-2}$ m/s.

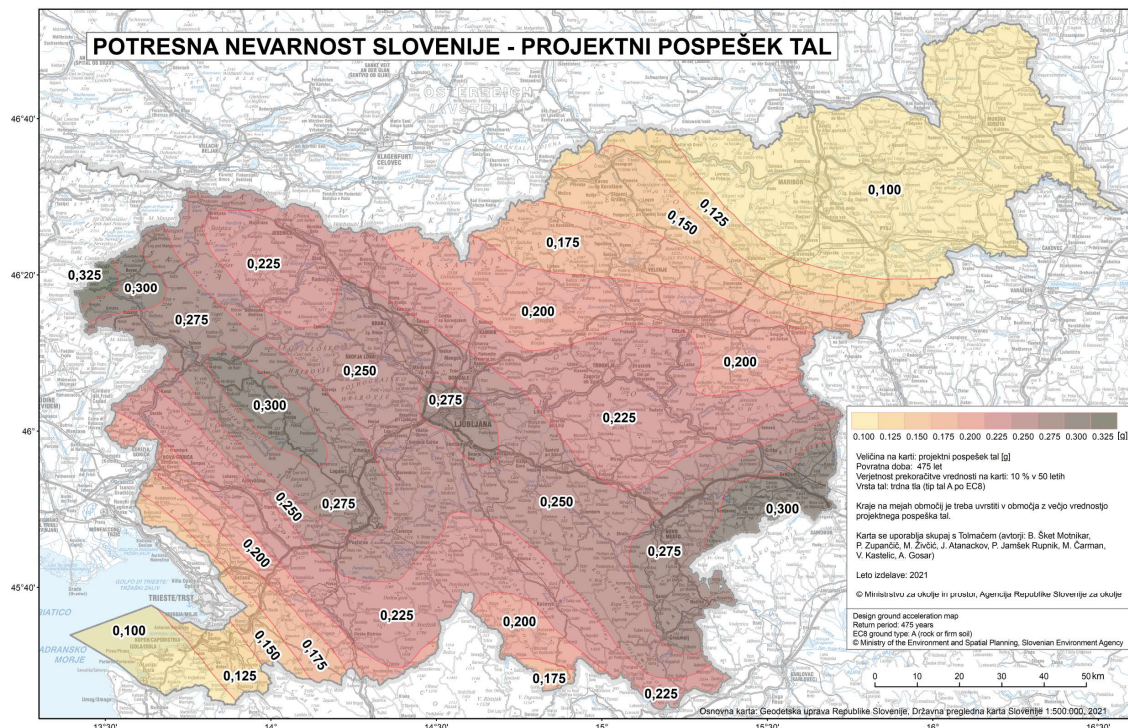
Faktor vodoprepustnosti omogoča ponikanje, na globini večji od 3,0m v prodnatih materialih.

T.3.5. Seizmičnost terena

Podatke o seizmičnosti terena smo povzeli po karti »POTRESNA NEVARNOST SLOVENIJE – PROJEKTI POSPEŠEK TAL« za povratno dobo 475 let, ki je od leta 2008 obvezna za uporabo pri projektiranju skladno s predpisi EUROCODE.

Projektni pospešek tal: 0,100 g

Tip tal: D – Sedimenti rahlih do srednje gostih nevezljivih zemljin (z nekaj mehкими vezljivimi plastmi ali brez njih) ali pretežno mehkih do trdnih vezljivih zemljin.



Slika 5 - karta projektnega pospeška tal s povratno dobo 475 let

T.4. OGROŽENOST OBMOČJA

T.4.1. Poplavna ogroženost

Iz integralne karte poplavne ogroženosti lahko razberemo, da se obravnavana lokacija nahaja v območju poplav s 500 letno povratno dobo.



Slika 6: Izrez iz atlasa voda - Integralna karta poplavne ogroženosti

T.4.2. Erozijska ogroženost

Iz karte erozijske ogroženosti je razvidno, da obravnavana lokacija ni erozijsko ogrožena.



Slika 7: Izrez iz atlasa voda - karta erozijske ogroženosti

T.4.3. Možnost plazjenja

Iz priložene slike, na kateri so prikazana plazovita območja je razvidno, da se obravnavana lokacija ne nahaja na območju z možnostjo plazjenja.



Slika 8: Izsek iz atlasa voda - plazljiva območja

T.5.4. Strukturno vrtanje

V sklopu preiskav smo izvedli tudi dve vrtini. Obe vrtini sta bili globine 10 m. Vrtine je izvedlo podjetje Geologist s strojem GEO 305 dne 29.12.2025.

Popis vrtine je prikazan med prilogami.



Slika 9 - vrtina 1



Slika 10 - vrtina 2

T.5.5. Popis in fotografije sondažnih izkopov

T.1.1.1. Sondažni izkop 1

GLOBINA	KLASIFIKACIJA		STAROST	LITOLOŠKI OPIS	VZOREC	VODA	OPOMBE
	GEOLOŠKI PROFIL (ASTM D 2487)	AC (SIST EN ISO 14688-2:2018)					
1.0				Glineno umetno nasutje z drobcu opeke in gramoza	/	0,5m	0.3m (Evd=20,5MPa) 0.6m (Evd=2,1MPa) 0.9m (Evd=4,6 MPa)
1.2	CL	CIM		Rjava glina trde konsistence	/		1.2m (Evd=12,7MPa)



Slika 11 - Fotografije razkopa 1

T.1.1.2. Dinamični deformacijski modul - Rezultati

Mesto meritve:	Razkop 1
Globina meritve:	30

Posedek u [mm]	
Poizkus	1
u 1	1,16
u 2	1,08
u 3	1,06
u povp.	1,10

Dinamični deformacijski modul Evd [MPa]	
Poizkus	1
E vd	20,5
CBR	10,0

Mesto meritve:	Razkop 1
Globina meritve:	60

Posedek u [mm]	
Poizkus	1
u 1	2,09
u 2	2,04
u 3	2,03
u povp.	2,05

Dinamični deformacijski modul Evd [MPa]	
Poizkus	1
E vd	2,1
CBR	1,0

Mesto meritve:	Razkop 1
Globina meritve:	90

Posedek u [mm]	
Poizkus	1
u 1	4,83
u 2	4,85
u 3	4,93
u povp.	4,87

Dinamični deformacijski modul Evd [MPa]	
Poizkus	1
E vd	4,6
CBR	2,1

Mesto meritve:	Razkop 1
Globina meritve:	120

Posedek u [mm]	
Poizkus	1
u 1	1,75
u 2	1,76
u 3	1,79
u povp.	1,77

Dinamični deformacijski modul Evd [MPa]	
Poizkus	1
E vd	12,7
CBR	5,9

T.1.1.3. Sondažni izkop 2

GLOBINA	KLASIFIKACIJA		STAROST	LITOLOŠKI OPIS	VZOREC	VODA	OPOMBE
	GEOLOŠKI PROFIL (ASTM D 2487)	AC (SIST EN ISO 14688-2:2018)					
0.9				Glineno umetno nasutje z drobci opeke in gramoza			0.3m (Evd=18.4MPa) 0.6m (Evd=6.6MPa)
2.0	CL	CIM		Rjava glina trde konsistence			0.9m (Evd=5.6MPa) 1.2m (Evd=5.8MPa) 1.5m (Evd=9.0MPa)
2.2	GW-GM	GrW-siGr		Prod s primesmi peska in melja			2.1m (Evd=29,5 MPa)



Slika 12 - Fotografije razkopa 2

R.1.1. Dinamični deformacijski modul - Rezultati

Mesto meritve:	Razkop 2
Globina meritve:	30

Posedek u [mm]	
Poizkus	1
u 1	1,28
u 2	1,21
u 3	1,19
u povp.	1,23

Dinamični deformacijski modul E _{vd} [MPa]	
Poizkus	1
E _{vd}	18,4
CBR	8,8

Mesto meritve:	Razkop 2
Globina meritve:	60

Posedek u [mm]	
Poizkus	1
u 1	3,61
u 2	3,37
u 3	3,30
u povp.	3,43

Dinamični deformacijski modul E _{vd} [MPa]	
Poizkus	1
E _{vd}	6,6
CBR	3,0

Mesto meritve:	Razkop 2
Globina meritve:	90

Posedek u [mm]	
Poizkus	1
u 1	3,99
u 2	4,10
u 3	4,07
u povp.	4,05

Dinamični deformacijski modul E _{vd} [MPa]	
Poizkus	1
E _{vd}	5,6
CBR	2,5

Mesto meritve:	Razkop 2
Globina meritve:	120

Posedek u [mm]	
Poizkus	1
u 1	3,75
u 2	3,93
u 3	3,95
u povp.	3,88

Dinamični deformacijski modul E _{vd} [MPa]	
Poizkus	1
E _{vd}	5,8
CBR	2,6

Mesto meritve:	Razkop 2
Globina meritve:	150

Posedek u [mm]	
Poizkus	1
u 1	2,54
u 2	2,48
u 3	2,48
u povp.	2,50

Dinamični deformacijski modul E _{vd} [MPa]	
Poizkus	1
E _{vd}	9,0
CBR	4,1

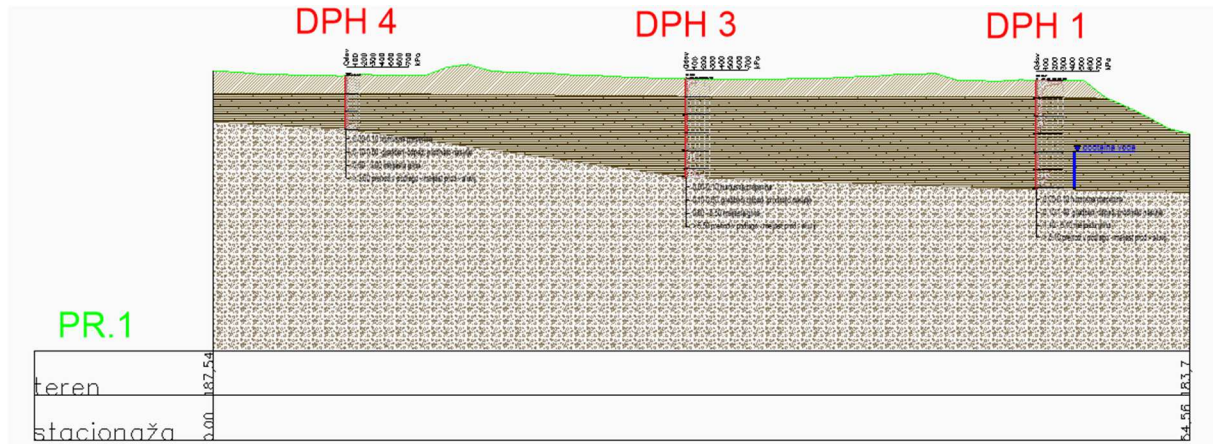
Mesto meritve:	Razkop 2
Globina meritve:	210

Posedek u [mm]	
Poizkus	1
u 1	0,80
u 2	0,75
u 3	0,74
u povp.	0,76

Dinamični deformacijski modul E _{vd} [MPa]	
Poizkus	1
E _{vd}	29,5
CBR	15,2

T.2. ANALIZA STABILNOSTI

Zaradi praktično ravnega terena analiza stabilnosti ni potrebna in relevantna. Teren je stabilen.



Slika 13 - geološko geotehnični prerez PR.1

T.6. ANALIZA POSEDKOV

Predviden objekt je zasnovan kot plitvo temeljen objekt na plošči z robnimi ojačitvenimi rebri. Pri analizi posedkov smo predpostavili debelino talne plošče 30 cm.

Preračun smo izvedli s programom GEO5 FEM, ki omogoča modeliranje in preračun zemeljskega polprostorja. Izvedli smo več različnih preračunov.

V preračunu smo uporabili karakteristike zemljin, katere smo izmerili na terenu, medtem ko smo ostale povzeli iz predhodno izvedenega geotehničnega poročila.

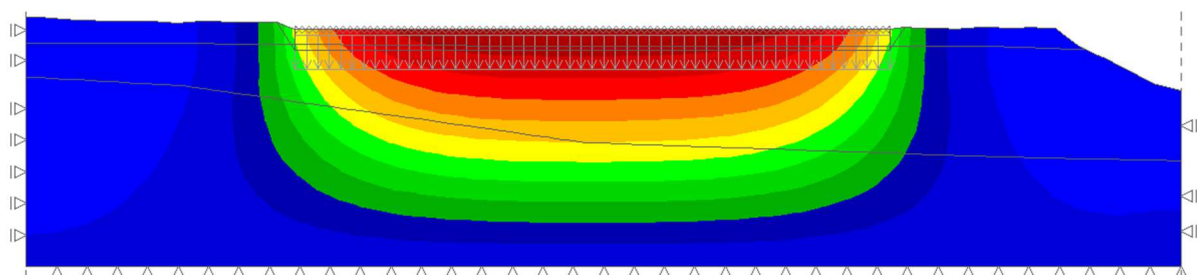
V izračunu smo modelirali zemeljski polprostor, kjer smo simulirali zamenjavo rahlega in neutrnjenega umetnega nasutja s tamponskim nasutjem ter njegovo komprimacijo.

Na podlagi izkušenj smo ocenili predvideno obremenitev na temeljna tla, ki znaša 60 kPa.

Preračunani elastični posedki pod ploščo znašajo do 5 mm. Konsolidacija objekta se lahko pričakuje v rangu 2 – 5 cm.

Glede na videne in vgrajene materiale smatramo, da se bo večina posedkov zgodila v relativno kratkem času.

Na podlagi videnih materialov ter rezultatov preračuna ocenjujemo modul reakcije tal k_s 13 – 30 MN/m³.



Slika 14 - rezultat analize posedkov

T.3. POGOJI ZA VGRADNJO

T.3.1. Prisotni materiali

Nasutje:

Ocenjene geotehnične karakteristike:

- prostorninska teža: $\gamma = 19 - 21 \text{ kN/m}^3$
- strižna trdnost: $\varphi = 20 - 27^\circ$, $c = 0 - 5 \text{ kN/m}^2$
- modul stisljivosti: $Mv = 5 - 15 \text{ MN/m}^2$
- kategorija izkopa: III. (lahka zemljina)

Peščen prod (Gr, saGr, sisaGr):

Geotehnične karakteristike:

- prostorninska teža: $\gamma = 21 - 22 \text{ kN/m}^3$
- strižna trdnost: $\varphi = 33 - 35^\circ$, $c = 0 - 2 \text{ kN/m}^2$
- modul stisljivosti: $Mv = 15 - 20 \text{ MN/m}^2$
- kategorija izkopa: III. (lahka zemljina)

Melj in glina (Si, Cl, SiCl):

Ocenjene geotehnične karakteristike:

- prostorninska teža: $\gamma = 19 - 20 \text{ kN/m}^3$
- strižna trdnost: $\varphi = 18 - 20^\circ$, $c = 15 - 20 \text{ kN/m}^2$
- modul stisljivosti: $Mv = 2 - 8 \text{ MN/m}^2$
- kategorija izkopa: III. (lahka zemljina)

T.3.2. Pogoji za izvajanje zemeljskih del

Zahtevnih opravil pri izvajanju zemeljskih del ni pričakovati. Vse izkope bo mogoče opraviti strojno. Pri izkopih je potrebno izkope izvesti pod naklonom 1:1,5, v nasprotnem primeru je potrebno izkope varovati s trajnim ali začasnim podpornim ukrepom, ki ga potrdi geomehanik.

T.6.1. Smernice za temeljenje

Temeljenje objekta naj se izvaja na temeljni plošči. Temeljenje naj se izvaja na sanacijski tamponski blazini debeline minimalno 100 cm. S to sanacijsko blazino je potrebno zamenjati obstoječo nenosilnost umetno nasutje, ki je na območju objekta do globine cca 50-120 cm.

Na planumu izkopa potrebno doseči $E_{vd} \geq 10 \text{ MPa}$ in enoosno tlačno trdnost 100 kPa. Pod temelje naj se vgradi vsaj 1,0 m tamponskega nasutja TD64, ki ga je potrebno statično utrjevati po plasteh debeline maksimalno 0,15 m. Na planumu nasutja je potrebno doseči zbitost $E_{vd} \geq 45 \text{ MPa}$ in $E_{v2} \geq 90 \text{ MPa}$. Izvedba temeljev naj bo takšna, da ne bo obstajala možnost izpiranja tampona z meteorno ali zaledno vodo. Na planum izkopa se naj vgradi 300 g geotekstil. Planum izkopa je potrebno drenirati z drenažnimi cevmi, da se preprči zastajanje precejne ujete vode.

Dopustna obremenitev osnovnega materiala – peščenega proda je cca 120-150

Geomehanik mora pred pričetkom vgrajevanja tamponskega nasutja preveriti in potrditi geotehnične razmere. V kolikor na planumu niso dosežene zahtevane vrednosti je potrebno prilagoditi debelino tamponskega nasutja.

T.4. OPOZORILA

Drugačne razmere pri izvedbi izkopov, ki opisu v tem poročilu ne bi bile ustrezne, je potrebno ponovno pregledati, ugotoviti stanje in nosilnost temeljnih tal v delu, kjer jih predstavlja drugačen material od prognoziranega. Obtežni primer v izračunih je informativne narave. Za preračun dejanskega temeljenja je potrebno izdelati preračun temeljenja na podlagi dejanskih obtežb in reakcij objekta na temeljna tla. Vsa zemeljska dela se morajo izvajati v suhem vremenu. V primeru globljih in nenosilnih con pa je potreben ponoven ogled in odločitev o pripravi temeljnih tal, oziroma preračunu temeljenja.

Maribor, 5.2.2026

Sestavil:

Tomaž Mayer, dipl. inž. grad. (UN)

R. LABORATORIJSKE PREISKAVE

Naročnik: **PNV inženiring d.o.o.**

Lokacija: **Kobilje**

Objekt:

Program preiskav: **007-26**

Delovni nalog: **83549**

PREGLEDNICA REZULTATOV PREISKAV GEOTEHNIČNIH PARAMETROV ZEMLJIN																																		
Vzorec			Klasifikacija		Gostota				Lezne meje				Zrnavost						Trdnost zemljine				Defornabilnost zemljine				VDP							
ID vzorca	Oznaka sonde	Datum odvzema	Globina		opis zemljine / hribine	Vlačnost w	Naravna γ	Suha γ _d	Gostota zrnja γ _s	Plast w _p	Žlebk w _L	Indeks plast. I _p	Indeks kons. I _c	koef. enakom. C _c	koef. ukiv. C _c	gramoz > 2	pesek < 2, > 0,063	mejl. glina < 0,063	VDP Hazen k	VDP USBR	Enoosna		Nedren. stična Fall cone c _{uk}	Direktni sting		Obremenilne stopnje σ				ind. stisljivosti Cc	ind. razbreme. Cs	sprem. h.p. (povpr.) k ₁₀	konst.h.p. k ₁₀	
			žepni. q _{u,2}	lab. q _u																	j'	c'		50	100	200	400							
			od	do					(%)	(Mg/m ³)	(Mg/m ³)	(Mg/m ³)	(%)	(%)	(%)	(%)	(%)	(m/s)	(m/s)	(kPa)	(kPa)	(kPa)	(*)	(kPa)	(kPa)	(kPa)	(kPa)	(kPa)	(kPa)	(kPa)	(m/s)	(m/s)		
GI-26-037	V-1	29.12.2025	1,10	- 1,50	CIM, srednje plastična glina, trde kons.	22,1	1,88	1,54		24	48	24	1,08								336			28,8	4,1	2.700	4.000	5.000	6.900		2,81E-02			
GI-26-038	V-1	29.12.2026	7,40	- 7,70	GrW-siGr, dobro zrnat prod z meljem in peskom (GW-GM)	7,5	2,22	2,06						28,96	0,97	66,79	28,04	5,17	9,4E-04	1,4E-03														1,0E-05
GI-26-039	V-2	29.12.2026	2,00	- 2,50	CIM, srednje plastična glina, trde kons.	16,8	1,99	1,70		21	37	16	1,26								478			26,6	10,6	nabr.	nabr.	nedef.	9.800		1,97E-02			
standard:		privzeto TSPI PG.05.200:2021/USCS za zemljine, sicer navedeno			SIST EN ISO 17892-1:2015	SIST EN ISO 17892-2:2015	SIST EN ISO 17892-3:2016	SIST EN ISO 17892-12:2018				SIST EN ISO 17892-4:2017						SIST EN ISO 17892-7:2018	SIST EN ISO 17892-6:2017	SIST EN ISO 17892-10:2019		SIST EN ISO 17892-5:2017				SIST EN ISO 17892-11:2019								
		količina:			3	3	0	2				1						2	0	0	2		1				0	1						

Datum: **19.01.2026**

Pregledal: **A. Kovačič**



DOLOČITEV NARAVNE VLAŽNOSTI

po standardu: SIST EN ISO 17892-1:2015

ID vzorca: **GI-26-037**

ID programa p.: **007-26**

Naročnik: **PNV inženiring d.o.o.**

Lokacija: **Kobilje**

Objekt:

Sonda: **V-1**

Globina: **1,10-1,50 m**

Opis vzorca: **CIM, srednje plastična glina, trde kons.**

oznaka posode:	169	133	318
masa posode [g]:	18,980	18,764	24,431
masa vzorca in posode [g]:	162,980	164,120	147,540
masa suhega vzorca in posode [g]:	136,930	137,840	125,340
masa vode [g]:	26,050	26,280	22,200
masa suhega vzorca [g]:	117,950	119,076	100,909
vlažnost [%]:	22,09	22,07	22,00
povprečna vlažnost [%]:	22,05		

žepni penetrometer $q_{u,z}$ [kPa]				
340	350	320	340	330
336				

Preiskal: M. Sambolič

Obdelal: M. Sambolič

Datum: 19.01.2026

Pregledal: A. Kovačič





DOLOČITEV GOSTOTE ZEMLJIN - LINEARNA METODA

po standardu: SIST EN ISO 17892-2:2015

ID vzorca: **GI-26-037**

ID programa p.: **007-26**

Naročnik: **PNV inženiring d.o.o.**

Lokacija: **Kobilje**

Objekt:

Sonda: **V-1**

Globina: **1,10-1,50 m**

Opis vzorca: **CIM, srednje plastična glina, trde kons.**

oznaka kalupa:	ed3
masa kalupa [g]:	64,008
masa vzorca in kalupa [g]:	207,680
masa vzorca [g]:	143,672
premer kalupa [mm]:	70,16
višina vzorca v kalupu [mm]:	19,78
vlačnost vzorca [%]:	22,05
gostota vzorca [Mg/m^3]:	1,88
suha gostota vzorca [Mg/m^3]:	1,54

Preiskal: M. Sambolič

Obdelal: M. Sambolič

Datum: 19.01.2026

Pregledal: A. Kovačič

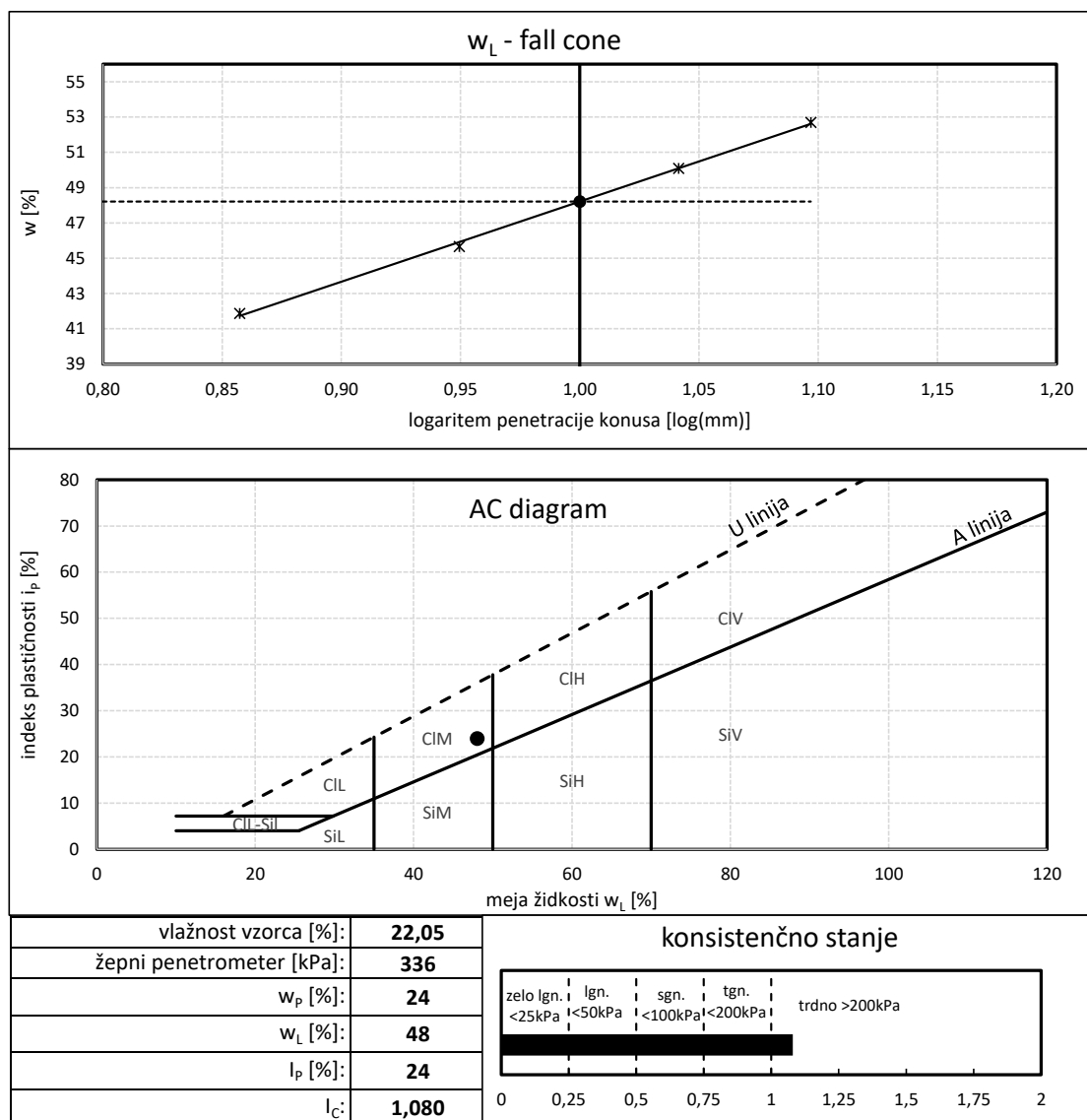




DOLOČITEV KONSISTENČNIH MEJ

po standardu: SIST EN ISO 17892-12:2018

ID vzorca: **GI-26-037**
 ID programa p.: **007-26**
 Naročnik: **PNV inženiring d.o.o.**
 Lokacija: **Kobilje**
 Objekt:
 Sonda: **V-1**
 Globina: **1,10-1,50 m**
 Opis vzorca: **CIM, srednje plastična glina, trde kons.**
 Opomba:



Preiskal: M. Sambolič
 Obdelal: M. Sambolič
 Datum: 19.01.2026
 Pregledal: A. Kovačič



DRENIRANA STRIŽNA PREISKAVA V DIREKTNEM STRIŽNEM APARATU

po standardu: SIST EN ISO 17892-10:2019

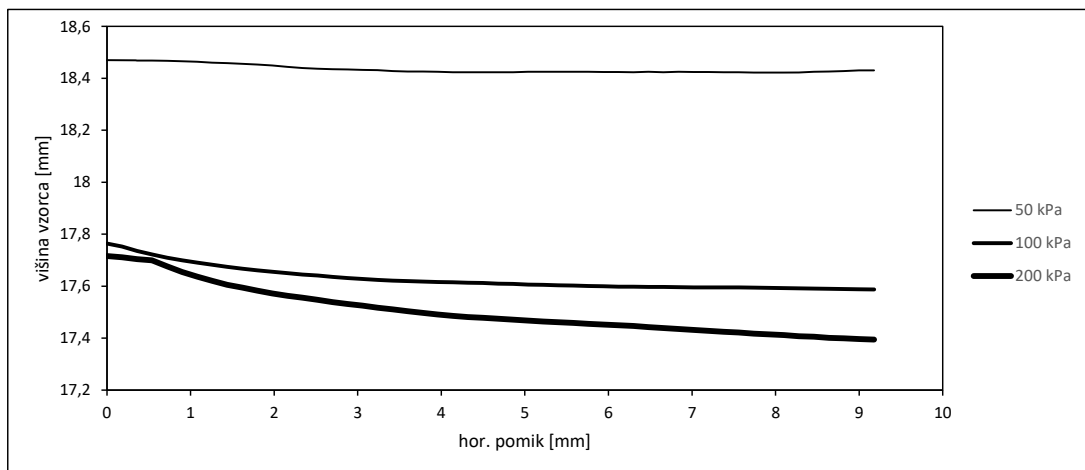
stran 1/2

ID vzorca: **GI-26-037**
 ID programa p.: **007-26**
 Naročnik: **PNV inženiring d.o.o.**
 Lokacija: **Kobilje**
 Objekt:
 Sonda: **V-1**
 Globina: **1,10-1,50 m**
 Opis vzorca: **CIM, srednje plastična glina, trde kons.**
 Opomba: **vzorec vgrajen intaktno, preplavljen in konsolidiran**

vlažnost vzorca [%]:	22,05
žepni penetrometer [kPa]:	336
gostota [Mg/m ³]:	1,82
suha gostota [Mg/m ³]:	1,49
gostota zrnja [Mg/m ³]:	2,70 (ocenjena)
zasičenost [%]:	73,5

širina celice [mm]:	60
dolžina celice [mm]:	60
višina celice [mm]:	19

σ [kPa]:	50	100	200
$\tau_{POR.}$ [kPa]:	36,7	51,6	116,7
$\tau_{KONČNI}$ [kPa]:	34,3	48,8	101,6
višina vzorca po konsolidaciji [mm]:	18,470	17,764	17,716
povpr. čas konca prim. kons. [s]:			
max. hitrost striženja [mm/min]:			
hitrost striženja [mm/min]:	0,007	0,007	0,007
h. pomik pri porušitvi [mm]:	3,958	5,220	3,959
višina vzorca pri porušitvi [mm]:	18,425	17,605	17,491
končni h. pomik [mm]:	9,178	9,180	9,179
končna višina vzorca [mm]:	18,430	17,587	17,395
vlažnost po striženju [%]:	29,85	28,67	28,67



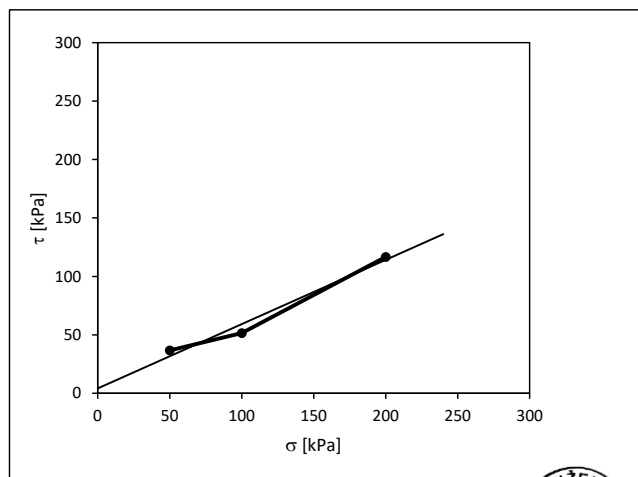
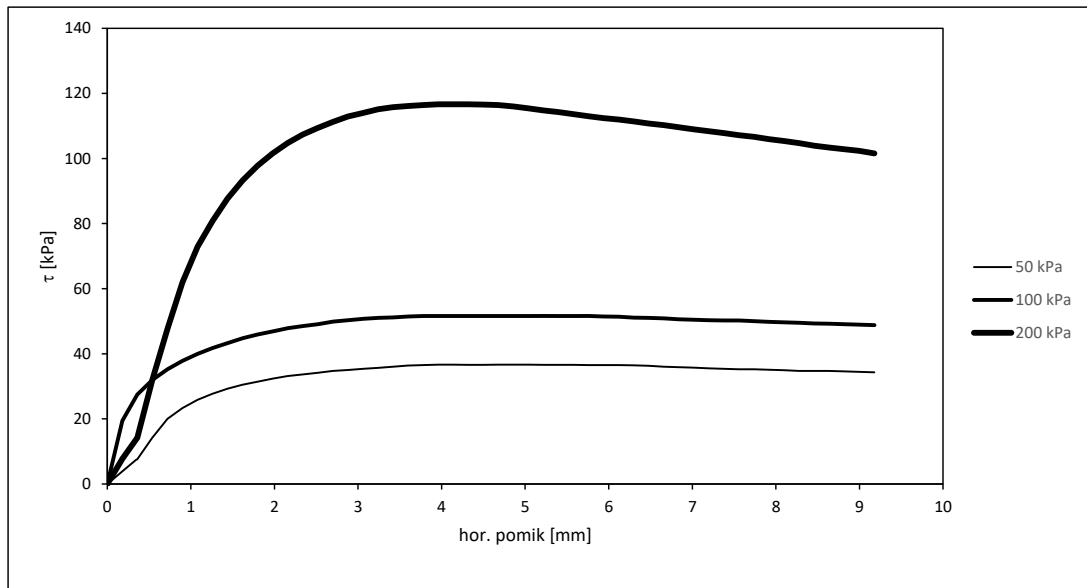


DRENIRANA STRIŽNA PREISKAVA V DIREKTNEM STRIŽNEM APARATU

po standardu: SIST EN ISO 17892-10:2019

stran 2/2

ID vzorca: **GI-26-037**
 ID programa p.: **007-26**
 Naročnik: **PNV inženiring d.o.o.**
 Lokacija: **Kobilje**
 Objekt:
 Sonda: **V-1**
 Globina: **1,10-1,50 m**
 Opis vzorca: **CIM, srednje plastična glina, trde kons.**
 Opomba: **vzorec vgrajen intaktno, preplavljen in konsolidiran**



REZULTATI - PORUŠITEV	
strižni kot ϕ' [°]:	28,8
kohezija c' [kPa]:	4,1
korelacija:	0,988



Preiskal: M. Sambolić
 Obdelal: M. Sambolić
 Datum: 19.01.2026
 Pregledal: A. Kovačič

št. vzorca: **GI-26-037**
NAROČNIK: PNV Inženiring d.o.o.

LOKACIJA: Kobilje

D.N.: 83549

VRTINA: V-1

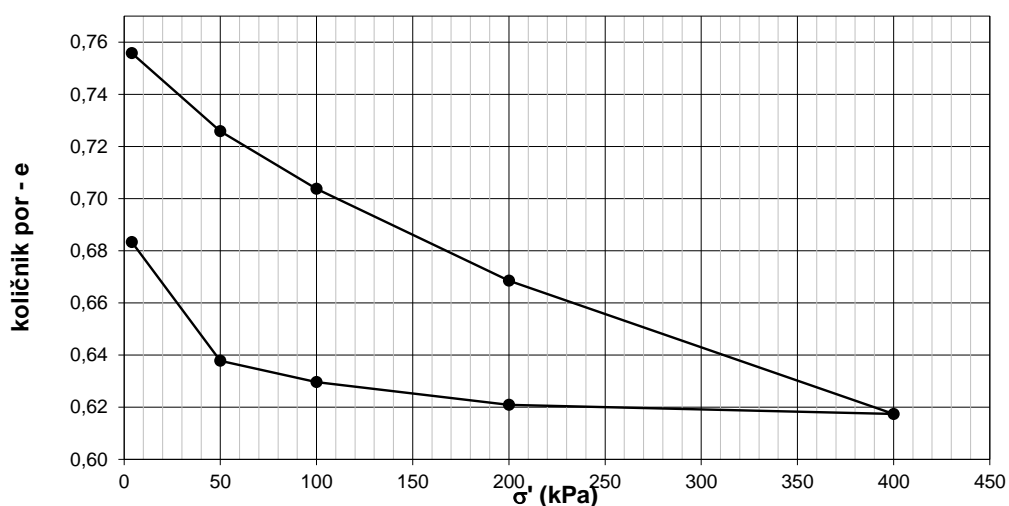
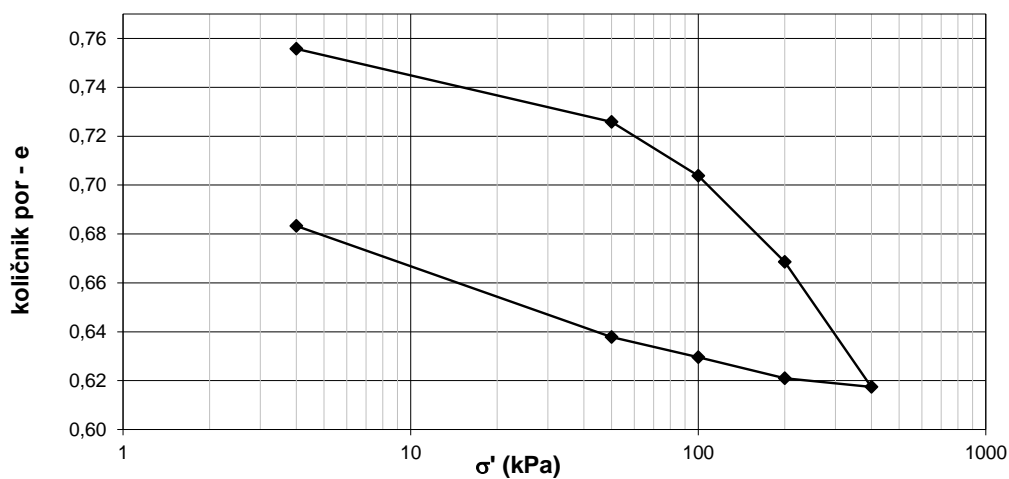
GLOBINA: 1,1-1,5m

OPOMBA: preplavljeno pri 50 kPa

OPIS ZEMLJINE: CIM, srednje plastična glina, trde kons.

aparatus:	3	gostota zrn ρ_s :	2,70	Mg/m ³ (ocenjena)
višina vzorca:	19,78 mm	vлага vzorca pred preiskavo:	22,2	%
premer vzorca:	70,16 mm	vлага vzorca po preiskavi:	25,1	%
S_r pred:	79,3 %	gostota ρ :	1,88	Mg/m ³
S_r po:	99,1 %	suha gostota ρ_d :	1,54	Mg/m ³

KRIVULJA STISLJIVOSTI





DOLOČITEV NARAVNE VLAŽNOSTI

po standardu: SIST EN ISO 17892-1:2015

ID vzorca: **GI-26-038**

ID programa p.: **007-26**

Naročnik: **PNV inženiring d.o.o.**

Lokacija: **Kobilje**

Objekt:

Sonda: **V-1**

Globina: **7,40-7,70 m**

Opis vzorca: **GrW-siGr, dobro zrnat prod z meljem in peskom (GW-GM)**

oznaka posode:	NP23		
masa posode [g]:	567,600		
masa vzorca in posode [g]:	1032,400		
masa suhega vzorca in posode [g]:	999,800		
masa vode [g]:	32,600		
masa suhega vzorca [g]:	432,200		
vlažnost [%]:	7,54		
povprečna vlažnost [%]:	7,54		

Preiskal: A.Kovačič

Obdelal: A.Kovačič

Datum: 9.01.2026

Pregledal: A. Kovačič





DOLOČITEV GOSTOTE ZEMLJIN - LINEARNA METODA

po standardu: SIST EN ISO 17892-2:2015

ID vzorca: **GI-26-038**

ID programa p.: **007-26**

Naročnik: **PNV inženiring d.o.o.**

Lokacija: **Kobilje**

Objekt:

Sonda: **V-1**

Globina: **7,40-7,70 m**

Opis vzorca: **GrW-siGr, dobro zrnat prod z meljem in peskom (GW-GM)**

oznaka kalupa:	perm
masa kalupa [g]:	3039,600
masa vzorca in kalupa [g]:	5768,000
masa vzorca [g]:	2728,400
premer kalupa [mm]:	80,00
višina vzorca v kalupu [mm]:	245,00
vlačnost vzorca [%]:	7,54
gostota vzorca [Mg/m^3]:	2,22
suha gostota vzorca [Mg/m^3]:	2,06

Preiskal: A.Kovačič

Obdelal: A.Kovačič

Datum: 9.01.2026

Pregledal: A. Kovačič

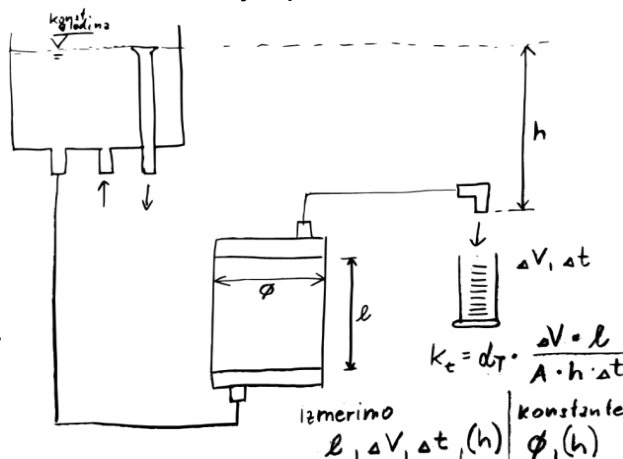




**DOLOČITEV VODOPREPUSTNOSTI V PERMEAMETRU
PRESKUS S KONSTANTNIM HIDRAVLIČNIM PADCEM**
(PO STANDARDU ISO/TS 17892-11:2019), kakovostni razred III.

ID vzorca: **GI-26-038**
 ID programa p.: **007-26**
 Naročnik: **PNV inženiring d.o.o.**
 Lokacija: **Kobilje**
 Objekt:
 Sonda: **V-1**
 Globina: **7,40-7,70 m**
 Opis vzorca: **GrW-siGr, dobro zrnat prod z meljem in peskom (GW-GM)**
 Opomba: **blago dreniranje vode iz vzorca (delež vode nad zasičenjem)**

premer vzorca ϕ [mm]: **80,0**
 višina vzorca l [mm]: **245**
 masa vzorca [g]: **2728,4**
 vlažnost vzorca [%]: **7,5**
 gostota [Mg/m³]: **2,22**
 suha gostota [Mg/m³]: **2,06**
 vodni stolpec h [mm]: **1170**
 korekcija permeametra₁₀ [s/m²]: **8,85E+04**



št. meritve	Δt [s]	ΔV [mL]	T [°C]	k_{10} [m/s]
1	2360	815	23	1,05E-05
2	2758	915	23	1,01E-05
3	2775	920	23	1,01E-05
4	2868	950	23	1,01E-05
5	2402	860	23	1,09E-05
6				
7				
8				
9				
10				
povprečje:				1,03E-05



Preiskal: A.Kovačič
 Obdelal: A.Kovačič
 Datum: 9.01.2026
 Pregledal: A. Kovačič



DOLOČITEV NARAVNE VLAŽNOSTI

po standardu: SIST EN ISO 17892-1:2015

ID vzorca: **GI-26-039**

ID programa p.: **007-26**

Naročnik: **PNV inženiring d.o.o.**

Lokacija: **Kobilje**

Objekt:

Sonda: **V-2**

Globina: **2,00-2,50 m**

Opis vzorca: **CIM, srednje plastična glina, trde kons.**

oznaka posode:	300	134	349
masa posode [g]:	22,385	19,955	24,086
masa vzorca in posode [g]:	151,830	156,700	173,200
masa suhega vzorca in posode [g]:	133,220	137,320	151,420
masa vode [g]:	18,610	19,380	21,780
masa suhega vzorca [g]:	110,835	117,365	127,334
vlažnost [%]:	16,79	16,51	17,10
povprečna vlažnost [%]:	16,80		

žepni penetrometer $q_{u,z}$ [kPa]				
480	500	480	460	470
478				

Preiskal: M. Sambolič

Obdelal: M. Sambolič

Datum: 19.01.2026

Pregledal: A. Kovačič





DOLOČITEV GOSTOTE ZEMLJIN - LINEARNA METODA

po standardu: SIST EN ISO 17892-2:2015

ID vzorca: **GI-26-039**

ID programa p.: **007-26**

Naročnik: **PNV inženiring d.o.o.**

Lokacija: **Kobilje**

Objekt:

Sonda: **V-2**

Globina: **2,00-2,50 m**

Opis vzorca: **CIM, srednje plastična glina, trde kons.**

oznaka kalupa:	ed4
masa kalupa [g]:	58,864
masa vzorca in kalupa [g]:	209,425
masa vzorca [g]:	150,561
premer kalupa [mm]:	70,25
višina vzorca v kalupu [mm]:	19,51
vlačnost vzorca [%]:	16,80
gostota vzorca [Mg/m^3]:	1,99
suha gostota vzorca [Mg/m^3]:	1,70

Preiskal: M. Sambolič

Obdelal: M. Sambolič

Datum: 19.01.2026

Pregledal: A. Kovačič

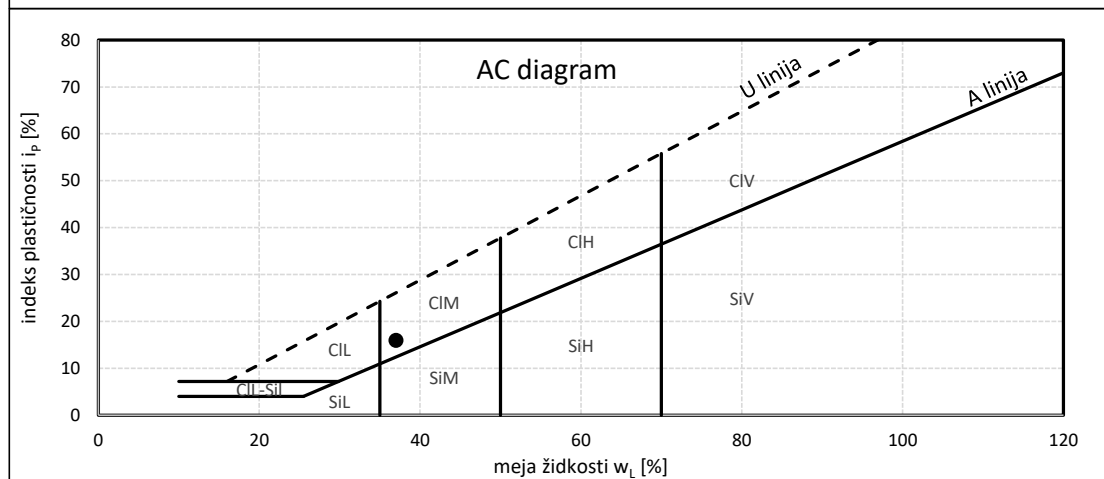
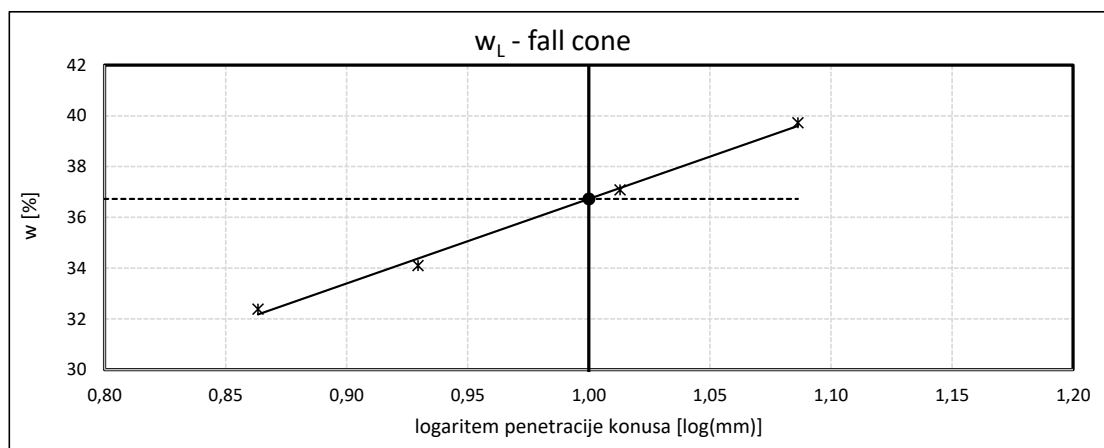




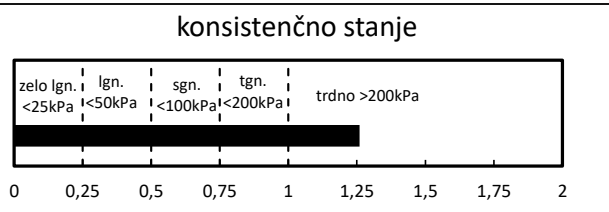
DOLOČITEV KONSISTENČNIH MEJ

po standardu: SIST EN ISO 17892-12:2018

ID vzorca: **GI-26-039**
 ID programa p.: **007-26**
 Naročnik: **PNV inženiring d.o.o.**
 Lokacija: **Kobilje**
 Objekt:
 Sonda: **V-2**
 Globina: **2,00-2,50 m**
 Opis vzorca: **CIM, srednje plastična glina, trde kons.**
 Opomba:



vlažnost vzorca [%]:	16,80
žepni penetrometer [kPa]:	478
w _p [%]:	21
w _L [%]:	37
I _p [%]:	16
I _c :	1,260



Preiskal: M. Sambolič
 Obdelal: M. Sambolič
 Datum: 19.01.2026
 Pregledal: A. Kovačič



DRENIRANA STRIŽNA PREISKAVA V DIREKTNEM STRIŽNEM APARATU

po standardu: SIST EN ISO 17892-10:2019

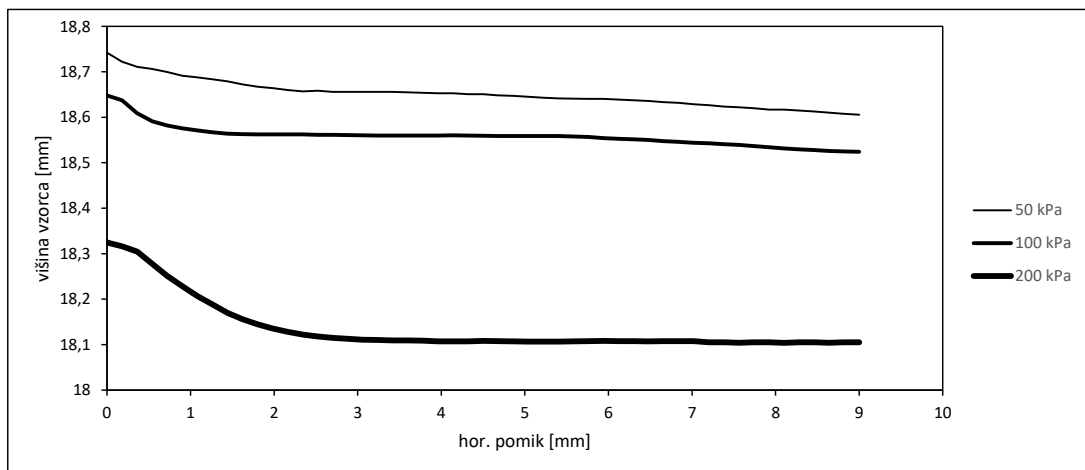
stran 1/2

ID vzorca: **GI-26-039**
 ID programa p.: **007-26**
 Naročnik: **PNV inženiring d.o.o.**
 Lokacija: **Kobilje**
 Objekt:
 Sonda: **V-2**
 Globina: **2,00-2,50 m**
 Opis vzorca: **CIM, srednje plastična glina, trde kons.**
 Opomba: **vzorec vgrajen intaktno, preplavljen in konsolidiran**

vlažnost vzorca [%]:	16,80
žepni penetrometer [kPa]:	478
gostota [Mg/m ³]:	1,97
suha gostota [Mg/m ³]:	1,68
gostota zrnja [Mg/m ³]:	2,70 (ocenjena)
zasičenost [%]:	75,0

širina celice [mm]:	60
dolžina celice [mm]:	60
višina celice [mm]:	19

σ [kPa]:	50	100	200
τ_{POR} [kPa]:	34,8	62,1	110,4
$\tau_{KONČNI}$ [kPa]:	32,8	60,3	108,2
višina vzorca po konsolidaciji [mm]:	18,742	18,648	18,325
povpr. čas konca prim. kons. [s]:			
max. hitrost striženja [mm/min]:			
hitrost striženja [mm/min]:	0,006	0,007	0,007
h. pomik pri porušitvi [mm]:	3,061	2,700	6,481
višina vzorca pri porušitvi [mm]:	18,656	18,561	18,107
končni h. pomik [mm]:	9,001	9,000	9,001
končna višina vzorca [mm]:	18,606	18,524	18,105
vlažnost po striženju [%]:	20,52	20,01	19,37



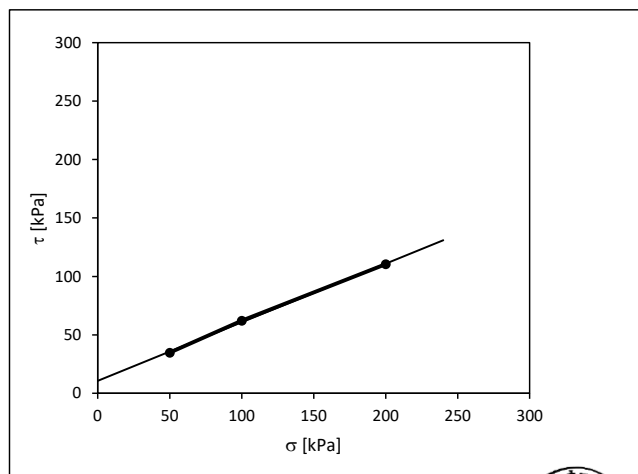
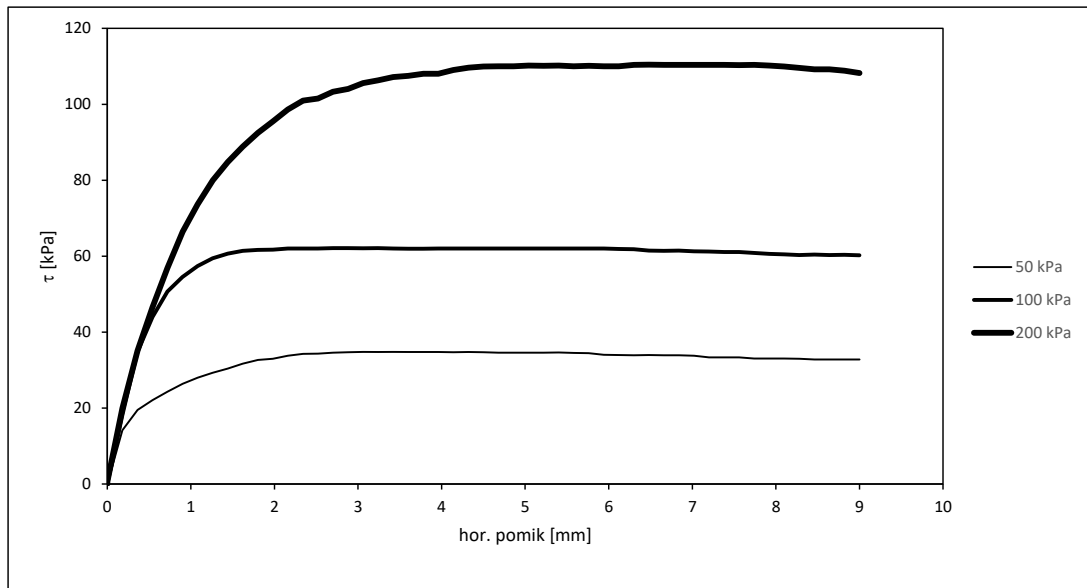


DRENIRANA STRIŽNA PREISKAVA V DIREKTNEM STRIŽNEM APARATU

po standardu: SIST EN ISO 17892-10:2019

stran 2/2

ID vzorca: **GI-26-039**
 ID programa p.: **007-26**
 Naročnik: **PNV inženiring d.o.o.**
 Lokacija: **Kobilje**
 Objekt:
 Sonda: **V-2**
 Globina: **2,00-2,50 m**
 Opis vzorca: **CIM, srednje plastična glina, trde kons.**
 Opomba: **vzorec vgrajen intaktno, preplavljen in konsolidiran**



REZULTATI - PORUŠITEV	
strižni kot ϕ' [°]:	26,6
kohezija c' [kPa]:	10,6
korelacija:	1,000



Preiskal: M. Sambolič
 Obdelal: M. Sambolič
 Datum: 19.01.2026
 Pregledal: A. Kovačič

št. vzorca: **GI-26-039**
NAROČNIK: PNV Inženiring d.o.o.

LOKACIJA: Kobilje

D.N.: 83549

VRTINA: V-2

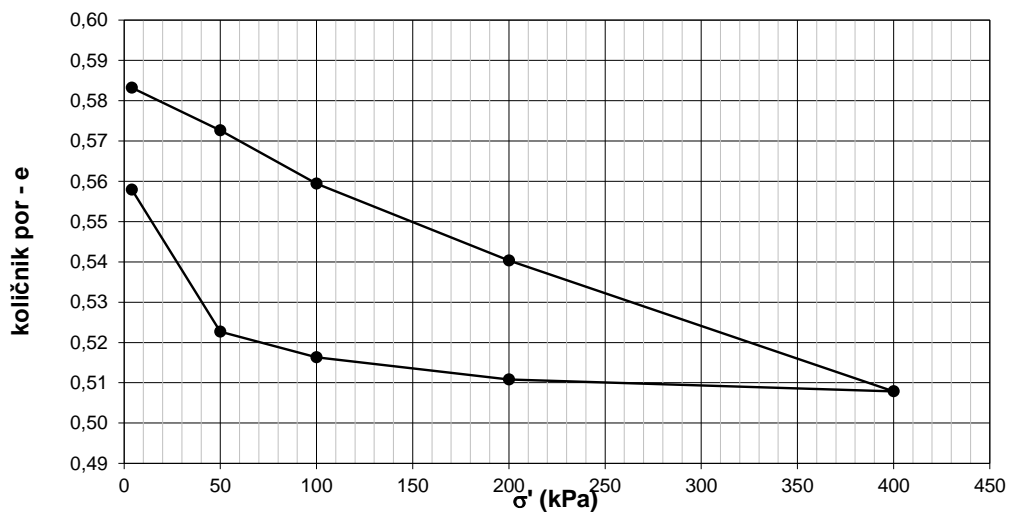
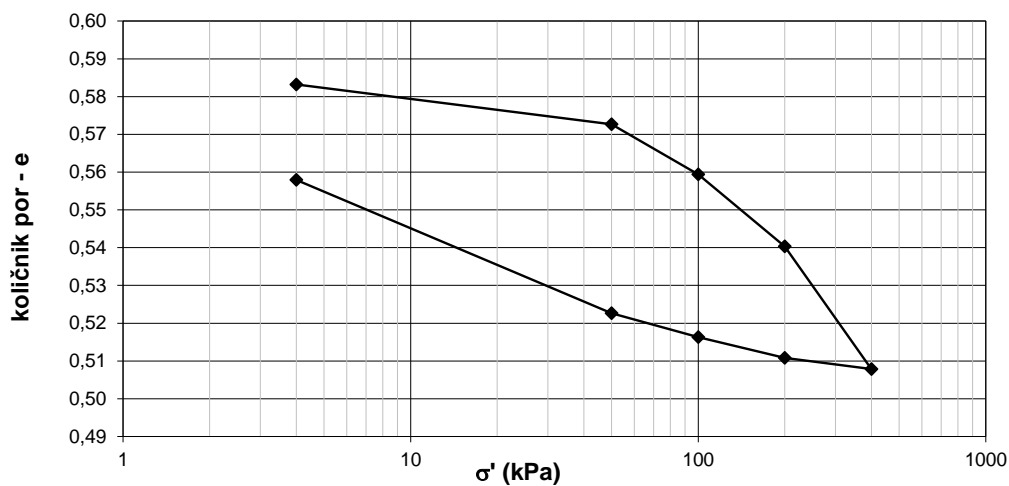
GLOBINA: 2-2,5m

OPOMBA: preplavljeno pri 50 kPa

OPIS ZEMLJINE: CIM, srednje plastična glina, trde kons.

aparatus:	4	gostota zrn ρ_s :	2,70	Mg/m ³ (ocenjena)
višina vzorca:	19,51 mm	vлага vzorca pred preiskavo:	16,8	%
premer vzorca:	70,25 mm	vлага vzorca po preiskavi:	20,9	%
S_r pred:	77,7 %	gostota ρ :	1,99	Mg/m ³
S_r po:	101,2 %	suha gostota ρ_d :	1,70	Mg/m ³

KRIVULJA STISLJIVOSTI



EDOMETERSKI PRESKUS S POSTOPNIM OBREMENJEVANJEM

SIST EN ISO 17892-5:2017

Geoinženiring d.o.o.
**GEOLOGIJA -
 GEOTEHNIKA -
 GEOFIZIKA**
 Dimičeva 14
 1000 LJUBLJANA

št. vzorca: **GI-26-039**

NAROČNIK: PNV Inženiring d.o.o.

LOKACIJA: Kobilje

VRTINA: V-2

GLOBINA: 2-2,5m

D.N.: 83549

OPOMBA: preplavljeno pri 50 kPa

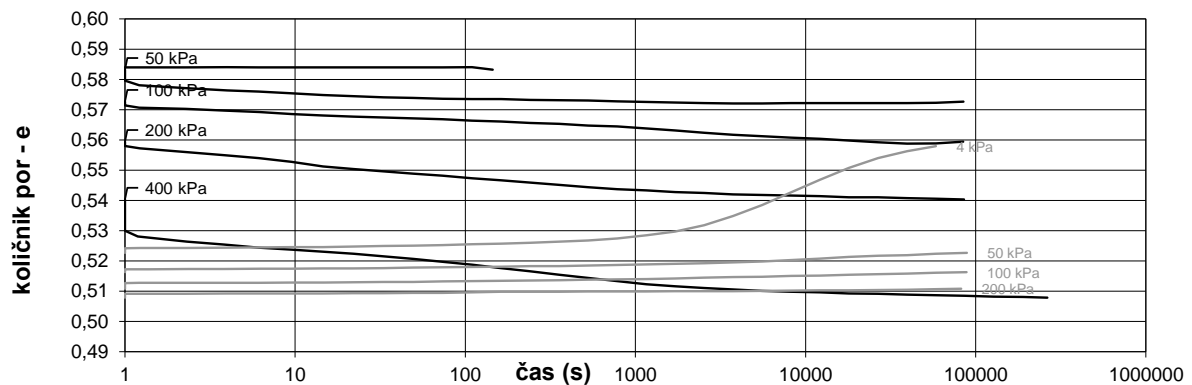
OPIS ZEMLJINE: CIM, srednje plastična glina, trde kons.

stopnja (kPa)	e_k	E_{oed} (kPa)	k_{10} (m/s) (Square root time)	C_α
0-4	0,583	-		
4-50		nabr.		
50-100		nabr.		
100-200		ndef.		
200-400	0,508	9800	8,64E-11	8,05E-04
400-200	0,511	110000		
200-100	0,516	29000		
100-50	0,523	12000		
50-4	0,558	2100		

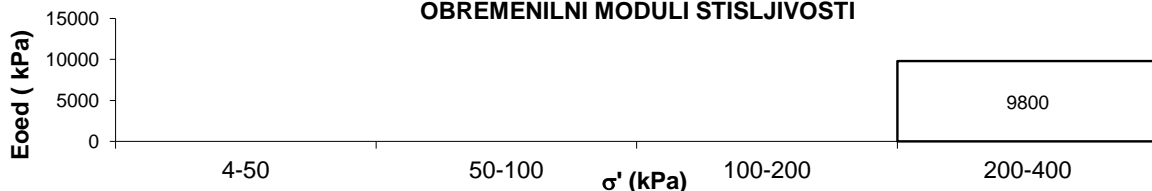
σ'_p (kPa) (Casagrande)	
C_c	
C_s	0,020

e_0
0,584

ČASOVNI POTEK KONSOLIDACIJE



OBREMENILNI MODULI STISLJIVOSTI



VODOPREPUSTNOST (SIST ISO EN 17892-11:2019) , kakovostni razred III.

σ	$\Delta t[s]$	$T [^{\circ}C]$	$H_1[mm]$	$H_2[mm]$	$h_s[mm]$	k_{10} [m/s]

PREISKAL: M. Sambolić

ZAČ. PREISKAVE: 06.01.26

KON. PREISKAVE: 16.01.26

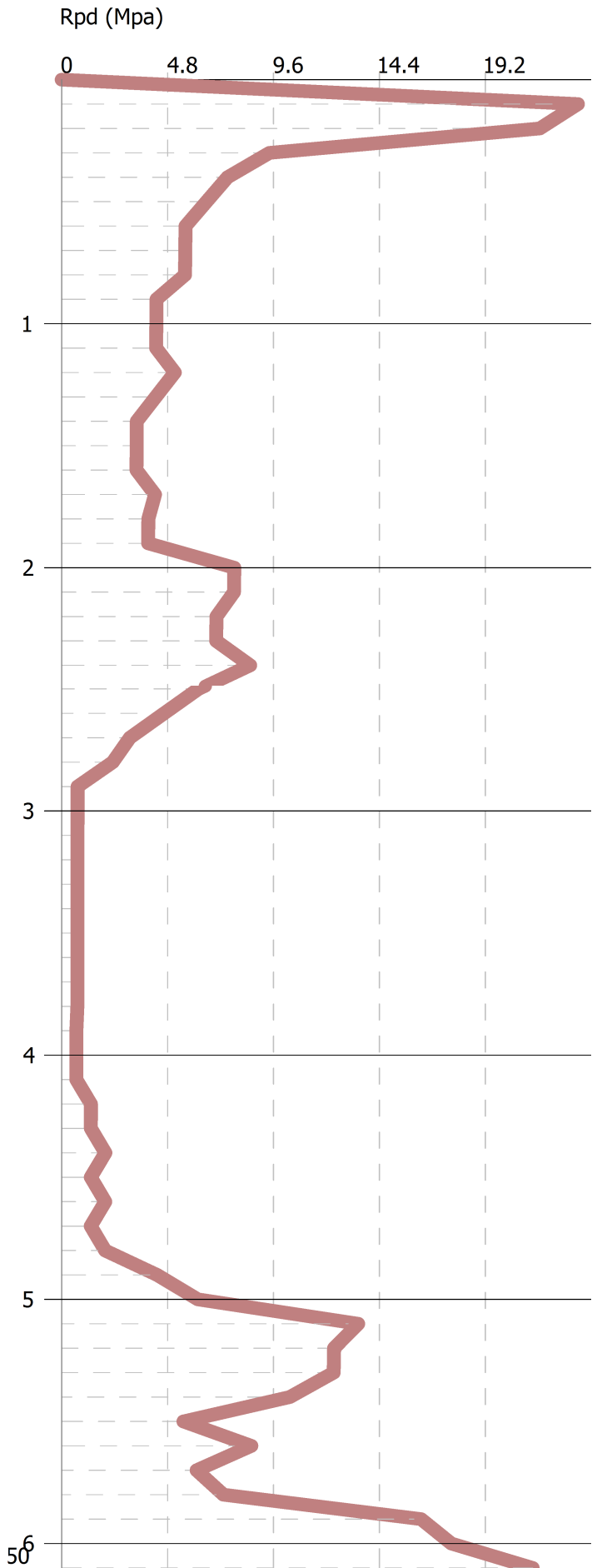
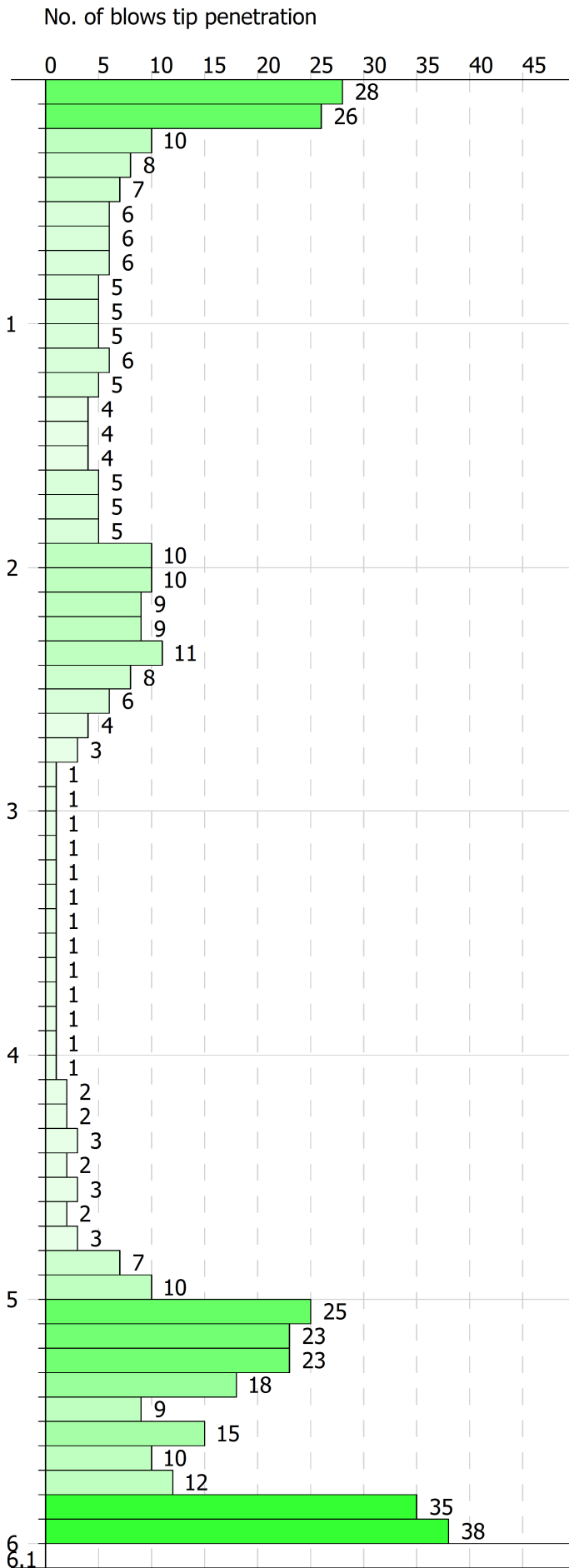
Stran 2/2



PREGLEDAL: A. Kovačič

R. RAČUNSKI DEL

R.2. REZULTATI MERITEV S TEŽKIM DINAMIČNIM PENETROMETROM RSG135



ESTIMATE TEST GEOTECHNICAL PARAMETERS DPH 1

COHESIVE SOILS

Undrained cohesion

Description	NSPT	Layer depth (m)	Correlation	Cu (KPa)
Layer (1) Layer	52.88	0.00-0.20	Terzaghi-Peck	350.00
Layer (2) Layer	8.14	0.20-1.90	Terzaghi-Peck	53.84

Qc (CPT Cone resistance)

Description	NSPT	Layer depth (m)	Correlation	Qc (Mpa)
Layer (1) Layer	52.88	0.00-0.20	Robertson (1983)	10.37
Layer (2) Layer	8.14	0.20-1.90	Robertson (1983)	1.60

Oedometric module

Description	NSPT	Layer depth (m)	Correlation	Eed (Mpa)
Layer (1) Layer	52.88	0.00-0.20	Trofimenkov (1974), Mitchell e Gardner	53.07
Layer (2) Layer	8.14	0.20-1.90	Trofimenkov (1974), Mitchell e Gardner	8.32

Young's modulus

Description	NSPT	Layer depth (m)	Correlation	Ey (Mpa)
Layer (1) Layer	52.88	0.00-0.20	Apollonia	51.86
Layer (2) Layer	8.14	0.20-1.90	Apollonia	7.98

AGI Classification (Assoc. It. Geolog.)

Description	NSPT	Layer depth (m)	Correlation	Classification
Layer (1) Layer	52.88	0.00-0.20	A.G.I. (1977)	ESTREM. CONSISTENTE
Layer (2) Layer	8.14	0.20-1.90	A.G.I. (1977)	CONSISTENTE

Unit weight

Description	NSPT	Layer depth (m)	Correlation	Unit weight (KN/m ³)
Layer (1) Layer	52.88	0.00-0.20	Meyerhof	24.52
Layer (2) Layer	8.14	0.20-1.90	Meyerhof	18.73

Saturated unit weight

Description	NSPT	Layer depth (m)	Correlation	Saturated unit weight (KN/m ³)
Layer (1) Layer	52.88	0.00-0.20	Meyerhof	24.52
Layer (2) Layer	8.14	0.20-1.90	Meyerhof	20.59

Shear wave velocity

Description	NSPT	Layer depth (m)	Correlation	Shear wave velocity (m/s)
Layer (1) Layer	52.88	0.00-0.20	Ohta & Goto (1978) Low plasticity clays and silty clays	87.15
Layer (2) Layer	8.14	0.20-1.90	Ohta & Goto (1978) Low plasticity clays and silty clays	99.25

COHESIONLESS SOILS

Relative density

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Relative density (%)
Layer (3) Layer	8.14	1.90-2.70	8.14	Meyerhof 1957	71.61
Layer (4) Layer	2.03	2.70-4.80	2.03	Meyerhof 1957	35.76
Layer (5) Layer	14.24	4.80-6.00	14.24	Meyerhof 1957	94.72

Shear resistance angle

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Angle of friction (°)
Layer (3) Layer	8.14	1.90-2.70	8.14	Meyerhof (1956)	22.33

Layer (4) Layer	2.03	2.70-4.80	2.03	Meyerhof (1956)	20.58
Layer (5) Layer	14.24	4.80-6.00	14.24	Meyerhof (1956)	24.07

Young's modulus

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Young's modulus (Mpa)
Layer (3) Layer	8.14	1.90-2.70	8.14	Bowles (1982) Sabbia Media	---
Layer (4) Layer	2.03	2.70-4.80	2.03	Bowles (1982) Sabbia Media	---
Layer (5) Layer	14.24	4.80-6.00	14.24	Bowles (1982) Sabbia Media	14.34

Oedometric module

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Oedometric module (Mpa)
Layer (3) Layer	8.14	1.90-2.70	8.14	Begemann 1974 (Ghiaia con sabbia)	4.33
Layer (4) Layer	2.03	2.70-4.80	2.03	Begemann 1974 (Ghiaia con sabbia)	3.10
Layer (5) Layer	14.24	4.80-6.00	14.24	Begemann 1974 (Ghiaia con sabbia)	5.56

AGI Classification (Assoc. It. Geolog.)

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	AGI Classification (Assoc. It. Geolog.)
Layer (3) Layer	8.14	1.90-2.70	8.14	Classification A.G.I	SLIGHTLY THICKENED
Layer (4) Layer	2.03	2.70-4.80	2.03	Classification A.G.I	LOOSE
Layer (5) Layer	14.24	4.80-6.00	14.24	Classification A.G.I	MODERATELY THICKENED

Unit weight

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Unit Weight (KN/m ³)
Layer (3)	8.14	1.90-2.70	8.14	Terzaghi-Peck	14.26

Layer				1948	
Layer (4) Layer	2.03	2.70-4.80	2.03	Terzaghi-Peck 1948	13.45
Layer (5) Layer	14.24	4.80-6.00	14.24	Terzaghi-Peck 1948	15.00

Saturated unit weight

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Saturated weight (KN/m ³)
Layer (3) Layer	8.14	1.90-2.70	8.14	Terzaghi-Peck 1948	18.68
Layer (4) Layer	2.03	2.70-4.80	2.03	Terzaghi-Peck 1948	18.18
Layer (5) Layer	14.24	4.80-6.00	14.24	Terzaghi-Peck 1948	19.14

Poisson's modulus

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Poisson
Layer (3) Layer	8.14	1.90-2.70	8.14	(A.G.I.)	0.34
Layer (4) Layer	2.03	2.70-4.80	2.03	(A.G.I.)	0.35
Layer (5) Layer	14.24	4.80-6.00	14.24	(A.G.I.)	0.33

Dynamic shear modulus

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	G (Mpa)
Layer (3) Layer	8.14	1.90-2.70	8.14	Ohsaki (Sabbie pulite)	45.75
Layer (4) Layer	2.03	2.70-4.80	2.03	Ohsaki (Sabbie pulite)	12.40
Layer (5) Layer	14.24	4.80-6.00	14.24	Ohsaki (Sabbie pulite)	77.40

Shear wave velocity

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Shear wave velocity (m/s)
Layer (3) Layer	8.14	1.90-2.70	8.14	Ohta & Goto (1978) Silts	115.47
Layer (4) Layer	2.03	2.70-4.80	2.03	Ohta & Goto (1978) Silts	99.79
Layer (5) Layer	14.24	4.80-6.00	14.24	Ohta & Goto (1978) Silts	149.98

Liquefaction

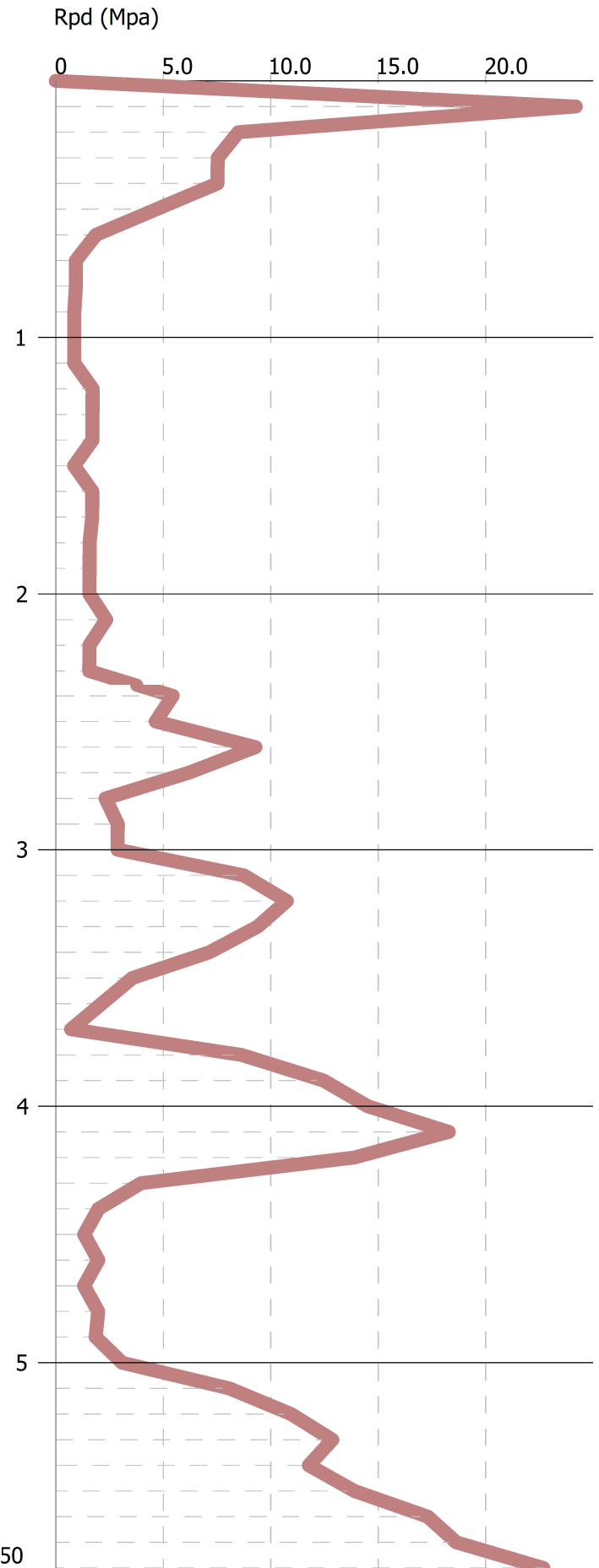
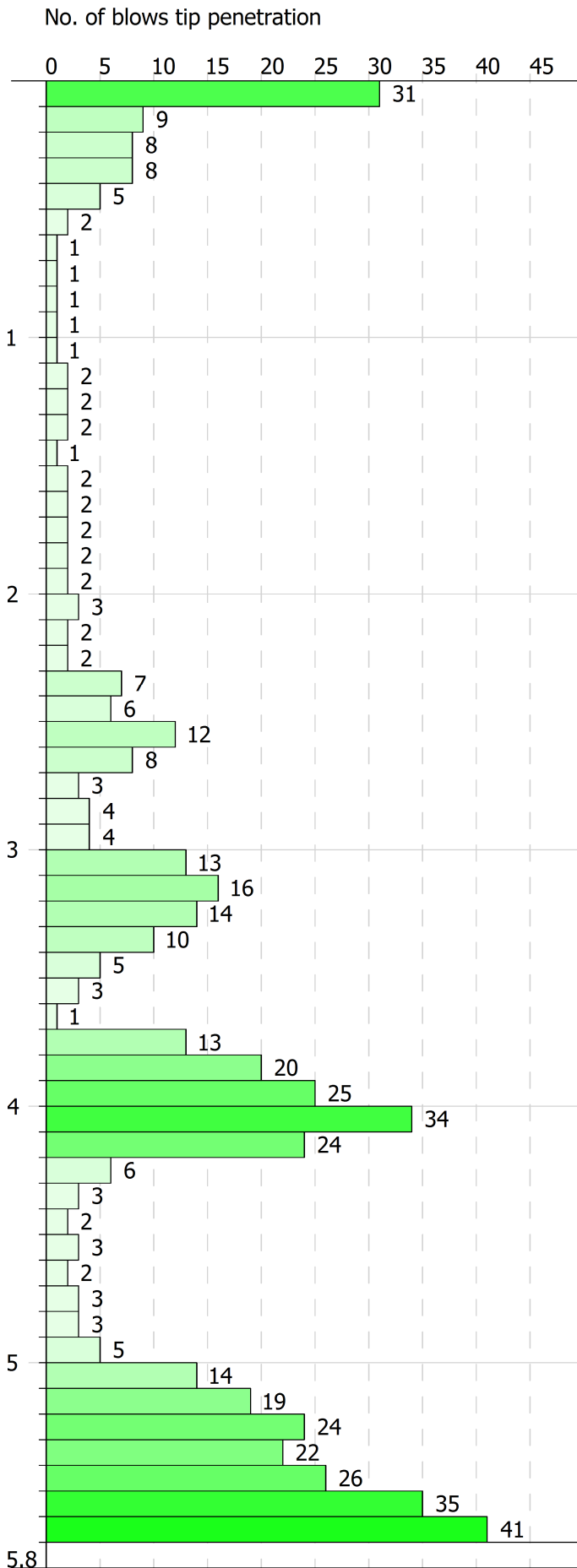
Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Liquefaction safety factor
Layer (3) Layer	8.14	1.90-2.70	8.14	Seed e Idriss (1971)	--
Layer (4) Layer	2.03	2.70-4.80	2.03	Seed e Idriss (1971)	--
Layer (5) Layer	14.24	4.80-6.00	14.24	Seed e Idriss (1971)	--

Coefficient of earth pressure at rest $K_0 = \sigma_H / \sigma_V$

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	K_0
Layer (3) Layer	8.14	1.90-2.70	8.14	Navfac 1971-1982	1.70
Layer (4) Layer	2.03	2.70-4.80	2.03	Navfac 1971-1982	0.28
Layer (5) Layer	14.24	4.80-6.00	14.24	Navfac 1971-1982	2.98

Q_c (CPT Cone resistance)

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Q_c (Mpa)
Layer (3) Layer	8.14	1.90-2.70	8.14	Robertson 1983	1.60
Layer (4) Layer	2.03	2.70-4.80	2.03	Robertson 1983	0.40
Layer (5) Layer	14.24	4.80-6.00	14.24	Robertson 1983	2.79



ESTIMATE TEST GEOTECHNICAL PARAMETERS DPH 2

COHESIVE SOILS

Undrained cohesion

Description	NSPT	Layer depth (m)	Correlation	Cu (KPa)
Layer (1) Layer	16.27	0.00-0.40	Terzaghi-Peck	107.68
Layer (2) Layer	2.03	0.40-2.30	Terzaghi-Peck	12.45

Qc (CPT Cone resistance)

Description	NSPT	Layer depth (m)	Correlation	Qc (Mpa)
Layer (1) Layer	16.27	0.00-0.40	Robertson (1983)	3.19
Layer (2) Layer	2.03	0.40-2.30	Robertson (1983)	0.40

Oedometric module

Description	NSPT	Layer depth (m)	Correlation	Eed (Mpa)
Layer (1) Layer	16.27	0.00-0.40	Trofimenkov (1974), Mitchell e Gardner	16.45
Layer (2) Layer	2.03	0.40-2.30	Trofimenkov (1974), Mitchell e Gardner	2.21

Young's modulus

Description	NSPT	Layer depth (m)	Correlation	Ey (Mpa)
Layer (1) Layer	16.27	0.00-0.40	Apollonia	15.96
Layer (2) Layer	2.03	0.40-2.30	Apollonia	1.99

AGI Classification (Assoc. It. Geolog.)

Description	NSPT	Layer depth (m)	Correlation	Classification
Layer (1) Layer	16.27	0.00-0.40	A.G.I. (1977)	MOLTO CONSISTENTE
Layer (2) Layer	2.03	0.40-2.30	A.G.I. (1977)	POCO CONSISTENTE

Unit weight

Description	NSPT	Layer depth (m)	Correlation	Unit weight (KN/m ³)
Layer (1) Layer	16.27	0.00-0.40	Meyerhof	20.40
Layer (2) Layer	2.03	0.40-2.30	Meyerhof	15.30

Saturated unit weight

Description	NSPT	Layer depth (m)	Correlation	Saturated unit weight (KN/m ³)
Layer (1) Layer	16.27	0.00-0.40	Meyerhof	22.46
Layer (2) Layer	2.03	0.40-2.30	Meyerhof	18.14

Shear wave velocity

Description	NSPT	Layer depth (m)	Correlation	Shear wave velocity (m/s)
Layer (1) Layer	16.27	0.00-0.40	Ohta & Goto (1978) Low plasticity clays and silty clays	81.24
Layer (2) Layer	2.03	0.40-2.30	Ohta & Goto (1978) Low plasticity clays and silty clays	81.94

COHESIONLESS SOILS

Relative density

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Relative density (%)
Layer (3) Layer	2.03	2.30-4.10	2.03	Meyerhof 1957	35.76
Layer (4) Layer	4.07	4.10-5.00	4.07	Meyerhof 1957	50.64
Layer (5) Layer	28.48	5.00-5.70	28.48	Meyerhof 1957	100

Shear resistance angle

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Angle of friction (°)
Layer (3) Layer	2.03	2.30-4.10	2.03	Meyerhof (1956)	20.58

Layer (4) Layer	4.07	4.10-5.00	4.07	Meyerhof (1956)	21.16
Layer (5) Layer	28.48	5.00-5.70	28.48	Meyerhof (1956)	28.14

Young's modulus

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Young's modulus (Mpa)
Layer (3) Layer	2.03	2.30-4.10	2.03	Bowles (1982) Sabbia Media	---
Layer (4) Layer	4.07	4.10-5.00	4.07	Bowles (1982) Sabbia Media	---
Layer (5) Layer	28.48	5.00-5.70	28.48	Bowles (1982) Sabbia Media	21.32

Oedometric module

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Oedometric module (Mpa)
Layer (3) Layer	2.03	2.30-4.10	2.03	Begemann 1974 (Ghiaia con sabbia)	3.10
Layer (4) Layer	4.07	4.10-5.00	4.07	Begemann 1974 (Ghiaia con sabbia)	3.51
Layer (5) Layer	28.48	5.00-5.70	28.48	Begemann 1974 (Ghiaia con sabbia)	8.43

AGI Classification (Assoc. It. Geolog.)

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	AGI Classification (Assoc. It. Geolog.)
Layer (3) Layer	2.03	2.30-4.10	2.03	Classification A.G.I	LOOSE
Layer (4) Layer	4.07	4.10-5.00	4.07	Classification A.G.I	SLIGHTLY THICKENED
Layer (5) Layer	28.48	5.00-5.70	28.48	Classification A.G.I	MODERATELY THICKENED

Unit weight

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Unit Weight (KN/m ³)
Layer (3)	2.03	2.30-4.10	2.03	Terzaghi-Peck	13.45

Layer				1948	
Layer (4) Layer	4.07	4.10-5.00	4.07	Terzaghi-Peck 1948	13.73
Layer (5) Layer	28.48	5.00-5.70	28.48	Terzaghi-Peck 1948	16.51

Saturated unit weight

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Saturated weight (KN/m ³)
Layer (3) Layer	2.03	2.30-4.10	2.03	Terzaghi-Peck 1948	18.18
Layer (4) Layer	4.07	4.10-5.00	4.07	Terzaghi-Peck 1948	18.35
Layer (5) Layer	28.48	5.00-5.70	28.48	Terzaghi-Peck 1948	20.08

Poisson's modulus

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Poisson
Layer (3) Layer	2.03	2.30-4.10	2.03	(A.G.I.)	0.35
Layer (4) Layer	4.07	4.10-5.00	4.07	(A.G.I.)	0.35
Layer (5) Layer	28.48	5.00-5.70	28.48	(A.G.I.)	0.3

Dynamic shear modulus

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	G (Mpa)
Layer (3) Layer	2.03	2.30-4.10	2.03	Ohsaki (Sabbie pulite)	12.40
Layer (4) Layer	4.07	4.10-5.00	4.07	Ohsaki (Sabbie pulite)	23.85
Layer (5) Layer	28.48	5.00-5.70	28.48	Ohsaki (Sabbie pulite)	148.49

Shear wave velocity

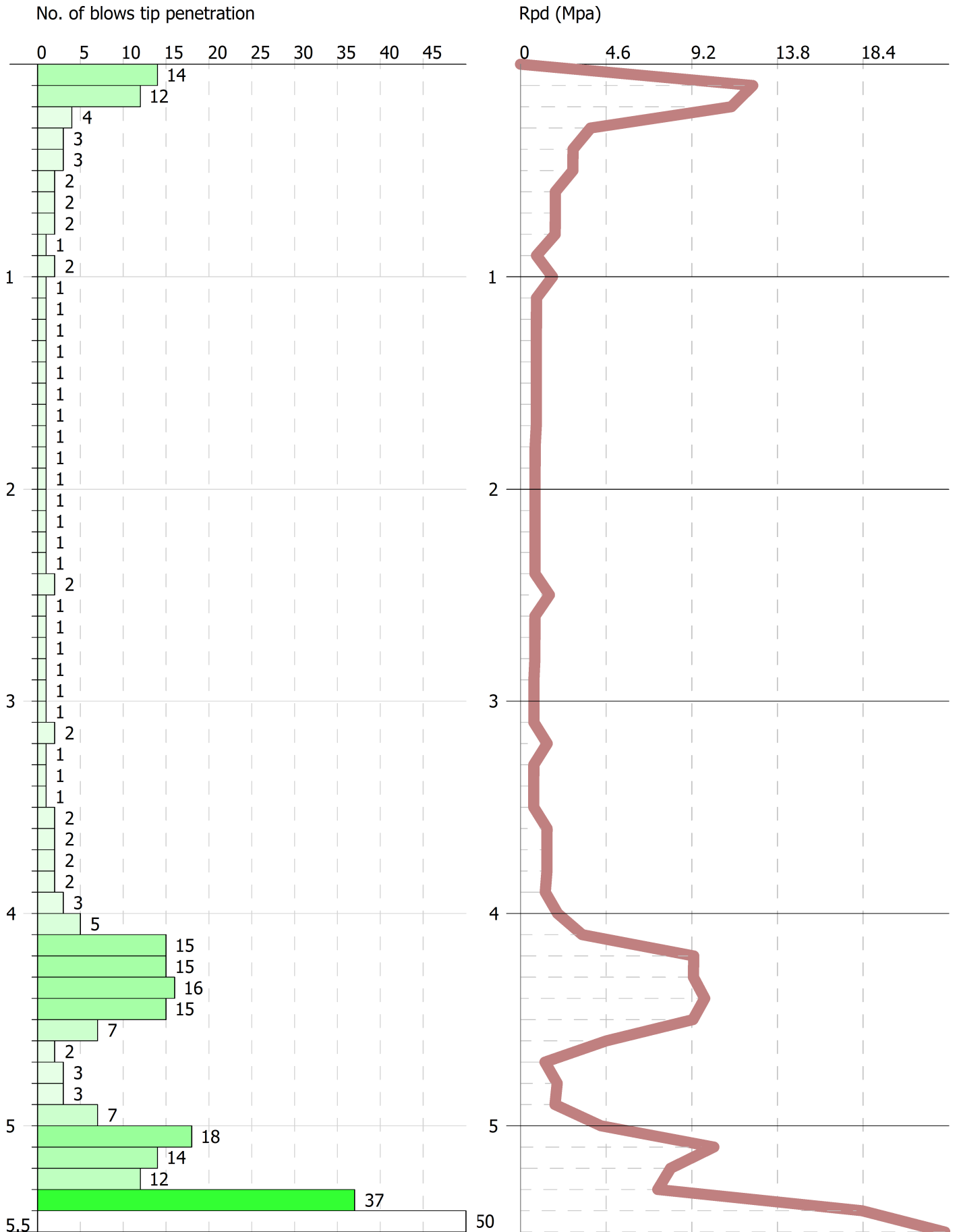
Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Shear wave velocity (m/s)
Layer (3) Layer	2.03	2.30-4.10	2.03	Ohta & Goto (1978) Silts	96.79
Layer (4) Layer	4.07	4.10-5.00	4.07	Ohta & Goto (1978) Silts	116.84
Layer (5) Layer	28.48	5.00-5.70	28.48	Ohta & Goto (1978) Silts	168.78

Coefficient of earth pressure at rest $K_0 = \sigma_H / P_0$

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	K_0
Layer (3) Layer	2.03	2.30-4.10	2.03	Navfac 1971-1982	0.28
Layer (4) Layer	4.07	4.10-5.00	4.07	Navfac 1971-1982	0.77
Layer (5) Layer	28.48	5.00-5.70	28.48	Navfac 1971-1982	5.39

Q_c (CPT Cone resistance)

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Q_c (Mpa)
Layer (3) Layer	2.03	2.30-4.10	2.03	Robertson 1983	0.40
Layer (4) Layer	4.07	4.10-5.00	4.07	Robertson 1983	0.80
Layer (5) Layer	28.48	5.00-5.70	28.48	Robertson 1983	5.59



ESTIMATE TEST GEOTECHNICAL PARAMETERS DPH 3

COHESIVE SOILS

Undrained cohesion

Description	NSPT	Layer depth (m)	Correlation	Cu (KPa)
Layer (1) Layer	24.41	0.00-0.20	Terzaghi-Peck	161.61
Layer (2) Layer	2.03	0.20-4.10	Terzaghi-Peck	12.45

Qc (CPT Cone resistance)

Description	NSPT	Layer depth (m)	Correlation	Qc (Mpa)
Layer (1) Layer	24.41	0.00-0.20	Robertson (1983)	4.79
Layer (2) Layer	2.03	0.20-4.10	Robertson (1983)	0.40

Oedometric module

Description	NSPT	Layer depth (m)	Correlation	Eed (Mpa)
Layer (1) Layer	24.41	0.00-0.20	Trofimenkov (1974), Mitchell e Gardner	24.59
Layer (2) Layer	2.03	0.20-4.10	Trofimenkov (1974), Mitchell e Gardner	2.21

Young's modulus

Description	NSPT	Layer depth (m)	Correlation	Ey (Mpa)
Layer (1) Layer	24.41	0.00-0.20	Apollonia	23.94
Layer (2) Layer	2.03	0.20-4.10	Apollonia	1.99

AGI Classification (Assoc. It. Geolog.)

Description	NSPT	Layer depth (m)	Correlation	Classification
Layer (1) Layer	24.41	0.00-0.20	A.G.I. (1977)	MOLTO CONSISTENTE
Layer (2) Layer	2.03	0.20-4.10	A.G.I. (1977)	POCO CONSISTENTE

Unit weight

Description	NSPT	Layer depth (m)	Correlation	Unit weight (KN/m ³)
Layer (1) Layer	24.41	0.00-0.20	Meyerhof	20.69
Layer (2) Layer	2.03	0.20-4.10	Meyerhof	15.30

Saturated unit weight

Description	NSPT	Layer depth (m)	Correlation	Saturated unit weight (KN/m ³)
Layer (1) Layer	24.41	0.00-0.20	Meyerhof	21.67
Layer (2) Layer	2.03	0.20-4.10	Meyerhof	18.14

Shear wave velocity

Description	NSPT	Layer depth (m)	Correlation	Shear wave velocity (m/s)
Layer (1) Layer	24.41	0.00-0.20	Ohta & Goto (1978) Low plasticity clays and silty clays	76.24
Layer (2) Layer	2.03	0.20-4.10	Ohta & Goto (1978) Low plasticity clays and silty clays	89.64

COHESIONLESS SOILS

Relative density

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Relative density (%)
Layer (3) Layer	4.07	4.10-5.40	4.07	Meyerhof 1957	50.64

Shear resistance angle

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Angle of friction (°)
Layer (3) Layer	4.07	4.10-5.40	4.07	Meyerhof (1956)	21.16

Young's modulus

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Young's modulus
-------------	------	-----------------	----------------	-------------	-----------------

					(Mpa)
Layer (3) Layer	4.07	4.10-5.40	4.07	Bowles (1982) Sabbia Media	---

Oedometric module

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Oedometric module (Mpa)
Layer (3) Layer	4.07	4.10-5.40	4.07	Begemann 1974 (Ghiaia con sabbia)	3.51

AGI Classification (Assoc. It. Geolog.)

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	AGI Classification (Assoc. It. Geolog.)
Layer (3) Layer	4.07	4.10-5.40	4.07	Classification A.G.I	SLIGHTLY THICKENED

Unit weight

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Unit Weight (KN/m ³)
Layer (3) Layer	4.07	4.10-5.40	4.07	Terzaghi-Peck 1948	13.73

Saturated unit weight

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Saturated weight (KN/m ³)
Layer (3) Layer	4.07	4.10-5.40	4.07	Terzaghi-Peck 1948	18.35

Poisson's modulus

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Poisson
Layer (3) Layer	4.07	4.10-5.40	4.07	(A.G.I.)	0.35

Dynamic shear modulus

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	G (Mpa)
Layer (3) Layer	4.07	4.10-5.40	4.07	Ohsaki (Sabbie pulite)	23.85

Shear wave velocity

Description	NSPT	Layer depth	N. Calculation	Correlation	Shear wave
-------------	------	-------------	----------------	-------------	------------

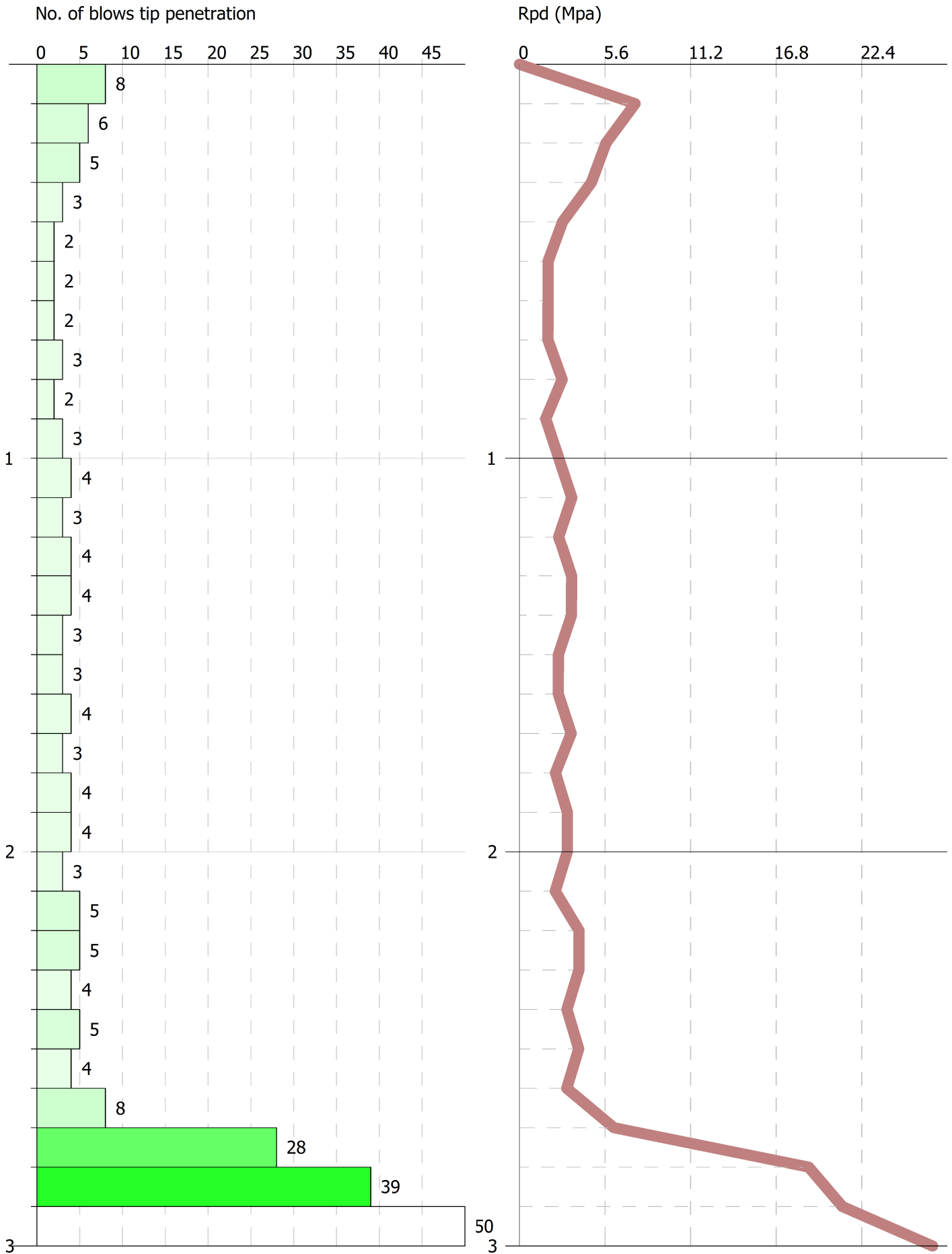
		(m)			velocity (m/s)
Layer (3) Layer	4.07	4.10-5.40	4.07	Ohta & Goto (1978) Silts	117.81

Coefficient of earth pressure at rest $K_0 = \sigma_H / \sigma_V$

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	K_0
Layer (3) Layer	4.07	4.10-5.40	4.07	Navfac 1971-1982	0.77

Q_c (CPT Cone resistance)

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Q_c (Mpa)
Layer (3) Layer	4.07	4.10-5.40	4.07	Robertson 1983	0.80



ESTIMATE TEST GEOTECHNICAL PARAMETERS DPH 4

COHESIONLESS SOILS

Relative density

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Relative density (%)
Layer (1) Layer	4.07	0.00-2.60	4.07	Meyerhof 1957	50.64
Layer (2) Layer	16.27	2.60-2.90	16.27	Meyerhof 1957	100

Shear resistance angle

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Angle of friction (°)
Layer (1) Layer	4.07	0.00-2.60	4.07	Meyerhof (1956)	21.16
Layer (2) Layer	16.27	2.60-2.90	16.27	Meyerhof (1956)	24.65

Young's modulus

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Young's modulus (Mpa)
Layer (1) Layer	4.07	0.00-2.60	4.07	Bowles (1982) Sabbia Media	---
Layer (2) Layer	16.27	2.60-2.90	16.27	Bowles (1982) Sabbia Media	15.33

Oedometric module

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Oedometric module (Mpa)
Layer (1) Layer	4.07	0.00-2.60	4.07	Begemann 1974 (Ghiaia con sabbia)	3.51
Layer (2) Layer	16.27	2.60-2.90	16.27	Begemann 1974 (Ghiaia con sabbia)	5.97

AGI Classification (Assoc. It. Geolog.)

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	AGI Classification (Assoc. It. Geolog.)
-------------	------	-----------------	----------------	-------------	---

Layer (1) Layer	4.07	0.00-2.60	4.07	Classification A.G.I	SLIGHTLY THICKENED
Layer (2) Layer	16.27	2.60-2.90	16.27	Classification A.G.I	MODERATELY THICKENED

Unit weight

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Unit Weight (KN/m ³)
Layer (1) Layer	4.07	0.00-2.60	4.07	Terzaghi-Peck 1948	13.73
Layer (2) Layer	16.27	2.60-2.90	16.27	Terzaghi-Peck 1948	15.24

Saturated unit weight

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Saturated weight (KN/m ³)
Layer (1) Layer	4.07	0.00-2.60	4.07	Terzaghi-Peck 1948	18.35
Layer (2) Layer	16.27	2.60-2.90	16.27	Terzaghi-Peck 1948	19.29

Poisson's modulus

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Poisson
Layer (1) Layer	4.07	0.00-2.60	4.07	(A.G.I.)	0.35
Layer (2) Layer	16.27	2.60-2.90	16.27	(A.G.I.)	0.32

Dynamic shear modulus

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	G (Mpa)
Layer (1) Layer	4.07	0.00-2.60	4.07	Ohsaki (Sabbie pulite)	23.85
Layer (2) Layer	16.27	2.60-2.90	16.27	Ohsaki (Sabbie pulite)	87.73

Shear wave velocity

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Shear wave velocity (m/s)
Layer (1) Layer	4.07	0.00-2.60	4.07	Ohta & Goto (1978) Silts	91.74
Layer (2) Layer	16.27	2.60-2.90	16.27	Ohta & Goto (1978) Silts	134.74

Coefficient of earth pressure at rest $K_0 = \sigma_H / P_0$

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	K_0
Layer (1) Layer	4.07	0.00-2.60	4.07	Navfac 1971-1982	0.77
Layer (2) Layer	16.27	2.60-2.90	16.27	Navfac 1971-1982	3.37

Q_c (CPT Cone resistance)

Description	NSPT	Layer depth (m)	N. Calculation	Correlation	Q_c (Mpa)
Layer (1) Layer	4.07	0.00-2.60	4.07	Robertson 1983	0.80
Layer (2) Layer	16.27	2.60-2.90	16.27	Robertson 1983	3.19

R.3. MERILNA OPREMA IN INTERPRETACIJA MERITEV

R.3.1. DINAMIČNI PENETROMETER RSG 135



Slika 15 - dinamični penetrometer RSG 135

Masa uteži: 50kg

Višina padca: 500mm

Jeklene palice \varnothing 32 mm; L 1000 mm; masa 3,56 kg/m

Krona \varnothing 43.7 mm; B 90°; A 15 cm²

Energija prenešana skozi drogovje je preračunana kot:

$$F(t) = A_a * E_a * \varepsilon_m(t)$$

Kjer je:

$$A_a \quad \text{Prerez drogovja}$$

$$E_a \quad \text{Modul elastičnosti drogovja}$$

$$\varepsilon_m(t) \quad \text{Merjena deformacija drogovja ob času t}$$

Razmerje med teoretično energijo in dejansko energijo preneseno skozi drogovje do krone je za vsak penetrometer definirano posebej kot:

$$E_r = \frac{EM}{ET}$$

Kjer je:

$$EM = \frac{1}{n} \sum_1^n E$$

dejanska prenešana energija skozi drogovje do krone

$$ET = m * g * h$$

teoretična – potencialna energija

$$E_r = 0,7$$

R.3.2. INTERPRETACIJA MERITEV

Odpornost tal je preračunana kot:

$$q_d = \left(\frac{m}{m + m'} \right) * r_d$$

$$r_d = \frac{EM}{A * e}$$

$$\delta_{dop} = \frac{r_d}{25}$$

Kjer je:

- m masa kladiva
- m' skupna masa aparature z drogovje,
- g zemeljski pospešek
- h višina padca kladiva
- A Površina krone
- E povprečen prodor krone

Vrednosti parametrov so izračunani s pomočjo Hoek-Brownove klasifikacije.

Odpornost tal je privzeta = intact uniaxial comp. strength (sigci)

GSI = 10 (plastificirana, strižno porušena hribina)

Pick GSI Value		SURFACE CONDITIONS				
Rock Type: <input type="text" value="General"/>		VERY GOOD	GOOD	FAIR	POOR	VERY POOR
GSI Selection: <input type="text" value="10"/> <input type="button" value="OK"/>		DECREASING SURFACE QUALITY →				
STRUCTURE		DECREASING INTERLOCKING OF ROCK PIECES ↓				
	INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities	90			N/A	N/A
	BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets	80	70			
	VERY BLOCKY- interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets		60	50		
	BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity			40	30	
	DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces				20	
	LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes	N/A	N/A			10

$m_i = 3$ (claystones 4 ± 2)

Disturbance factor (D) = 0

intact modulus (E_i) = 12000 MPa

Na podlagi tega sem izračunal Hoek-Brownove kriterije:

Hoek-Brown Criterion

$m_b = 0.121$

$s = 4.54e-5$

$a = 0.585$

Mohr-Coulomb Fit

cohesion = 0.003 MPa

friction angle = 22.85 deg

Modul stisljivosti sem določil po Nonveillerju:

$M_v(N) = c_1 + c_2 * N$ (enačba Nonveiller 5.12, $c_1 = 2000, c_2 = 400$)

$M_v(N) = c_1 + c_2 * N$ (enačba Nonveiller 5.12, $c_1 = 4000, c_2 = 800$, glej tabelo 5.3)

N = število udarcev pri dinamični penetraciji

$q = z * \gamma'$ (če je pod vodo)

Dr = relativna gostota glede na N' (N' iz dinamične penetracije niso direktno primerljivi s N' (SPT))

f_i' = po enačbi iz N (kvadratna enačba)

R.4. REZULTATI ANALIZE POSEDKOV

Analysis using finite element method

Topology

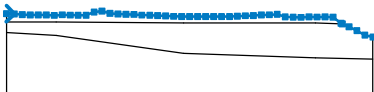
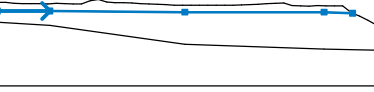
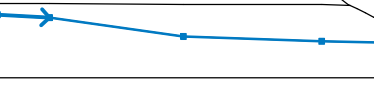
Project

Project : Analiza posedkov
Part : PR.1
Customer : Stanovanjski sklad republike Slovenije, Poljanska cesta 31, 1000 Ljubljana
Author : Tomaž Mayer, d.i.g.(UN)
Date : 15. 01. 2026
Project number : GG 25 11 1180





Global settings

Task geometry : Plane strain
Analysis type : Stress analysis
Tunnels : no
Allow to input water as the result of steady state water flow analysis : no
Allow dynamic analysis of earthquake : no
Concrete structures : EN 1992-1-1 (EC2)
Calculation of geostatic stress (1st stage) : Geostatic stress
Advanced mesh generating parameters : no
Advanced soil parameters : no
Detailed results : no





Interface

Number	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
1		0,00	6,77	1,19	6,74	2,37	6,63
		3,56	6,59	4,74	6,57	5,93	6,57
		7,12	6,51	8,30	6,60	9,49	6,56
		10,67	6,55	11,86	6,54	13,05	7,00
		14,23	7,16	15,42	6,81	16,60	6,71
		17,79	6,69	18,98	6,65	20,16	6,56
		21,35	6,55	22,53	6,47	23,72	6,45
		24,91	6,37	26,09	6,36	27,28	6,34
		28,46	6,33	29,65	6,33	30,84	6,33
		32,02	6,35	33,21	6,36	34,39	6,40
		35,58	6,46	36,77	6,48	37,95	6,58
		39,14	6,60	40,32	6,66	41,51	6,29
		42,70	6,25	43,88	6,22	45,07	6,30
		46,25	6,27	47,44	6,28	48,63	6,26
49,81	5,33	50,01	5,24	51,00	4,81		
52,18	4,23	53,37	3,58	54,56	3,29		
2		0,00	5,53	7,42	5,53	26,39	5,38
		46,00	5,38	50,01	5,24		
3		0,00	3,95	7,42	3,53	26,39	0,86
		46,00	0,18	54,56	0,00		





Soil parameters - basic data, uplift

Number	Pattern	Soil name Material model	Type of soil	γ [kN/m ³]	ν [-]	e_{in} [-]	γ_{sat} [kN/m ³]
1		peščen prod Modified Mohr-Coulomb	drained	20,50	0,35	1,000	20,50
2		Meljna glina Modified Mohr-Coulomb	drained	17,00	0,35	1,000	19,00
3		umetno nasutje - odpad Modified Mohr-Coulomb	drained	21,00	0,35	1,000	21,00
4		tamponsko nasutje Modified Mohr-Coulomb	drained	21,00	0,32	1,000	21,00

Soil parameters - data according to model - part 1/2

Number	Pattern	Soil name Material model	E_{ref} [MPa]	$E_{ur,ref}$ [MPa]	K_E [MPa/m]	K_{Eur} [MPa/m]
1		peščen prod Modified Mohr-Coulomb	30,00	100,00		
2		Meljna glina Modified Mohr-Coulomb	30,00	100,00	0,65	1,30
3		umetno nasutje - odpad Modified Mohr-Coulomb	20,00	50,00		
4		tamponsko nasutje Modified Mohr-Coulomb	50,00	150,00		

Soil parameters - data according to model - part 2/2

Number	Pattern	Soil name Material model	ϕ_{ef} [°]	c_{ef} [kPa]	ψ [°]
1		peščen prod Modified Mohr-Coulomb	35,00	1,00	24,00
2		Meljna glina Modified Mohr-Coulomb	26,00	4,00	17,00
3		umetno nasutje - odpad Modified Mohr-Coulomb	30,00	1,00	20,00
4		tamponsko nasutje Modified Mohr-Coulomb	37,00	3,00	25,00

Soil parameters

peščen prod

Material model

Material model type : Advanced elasto-plastic models

Material model : Modified Mohr-Coulomb

Basic data

Unit weight : $\gamma = 20,50$ [kN/m³]

Poisson's ratio : $\nu = 0,35$ [-]

Initial void ratio : $e_{in} = 1,000$ [-]

Type of soil : drained

Uplift pressure

Uplift calculation : standard

Unit weight of saturated soil : $\gamma_{sat} = 20,50$ [kN/m³]

Modified Mohr-Coulomb model

Elastic modulus : $E_{ref} = 30,00$ [MPa]
 Unload / reload modulus : $E_{ur,ref} = 100,00$ [MPa]
 Modulus : constant
 Softening / hardening : not consider
 Internal friction angle : $\varphi_{ef} = 35,00$ [°]
 Cohesion : $c_{ef} = 1,00$ [kPa]
 Dilatancy angle : $\psi = 24,00$ [°]
 Dilatancy cut-off : no

[View](#)

Sample :



Meljna glina

Material model

Material model type : Advanced elasto-plastic models
 Material model : Modified Mohr-Coulomb

Basic data

Unit weight : $\gamma = 17,00$ [kN/m³]
 Poisson's ratio : $\nu = 0,35$ [-]
 Initial void ratio : $e_{in} = 1,000$ [-]
 Type of soil : drained

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{sat} = 19,00$ [kN/m³]

Modified Mohr-Coulomb model

Elastic modulus : $E_{ref} = 30,00$ [MPa]
 Unload / reload modulus : $E_{ur,ref} = 100,00$ [MPa]
 Modulus : linear
 Change of E with depth : $K_E = 0,65$ [MPa/m]
 Change of E_{ur} with depth : $K_{Eur} = 1,30$ [MPa/m]
 Softening / hardening : not consider
 Internal friction angle : $\varphi_{ef} = 26,00$ [°]
 Cohesion : $c_{ef} = 4,00$ [kPa]
 Dilatancy angle : $\psi = 17,00$ [°]
 Dilatancy cut-off : no

[View](#)

Sample :



umetno nasutje - odpad

Material model

Material model type : Advanced elasto-plastic models
 Material model : Modified Mohr-Coulomb

Basic data

Unit weight : $\gamma = 21,00$ [kN/m³]
 Poisson's ratio : $\nu = 0,35$ [-]
 Initial void ratio : $e_{in} = 1,000$ [-]
 Type of soil : drained

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{sat} = 21,00$ [kN/m³]

Modified Mohr-Coulomb model

Elastic modulus : $E_{ref} = 20,00$ [MPa]
 Unload / reload modulus : $E_{ur,ref} = 50,00$ [MPa]
 Modulus : constant
 Softening / hardening : not consider
 Internal friction angle : $\varphi_{ef} = 30,00$ [°]
 Cohesion : $c_{ef} = 1,00$ [kPa]
 Dilatancy angle : $\psi = 20,00$ [°]
 Dilatancy cut-off : no

View

Sample :



tamponsko nasutje

Material model

Material model type : Advanced elasto-plastic models
 Material model : Modified Mohr-Coulomb

Basic data

Unit weight : $\gamma = 21,00$ [kN/m³]
 Poisson's ratio : $\nu = 0,32$ [-]
 Initial void ratio : $e_{in} = 1,000$ [-]
 Type of soil : drained

Uplift pressure

Uplift calculation : standard
 Unit weight of saturated soil : $\gamma_{sat} = 21,00$ [kN/m³]

Modified Mohr-Coulomb model

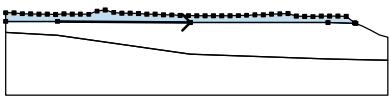

Elastic modulus : $E_{ref} = 50,00$ [MPa]
 Unload / reload modulus : $E_{ur,ref} = 150,00$ [MPa]
 Modulus : constant
 Softening / hardening : not consider
 Internal friction angle : $\varphi_{ef} = 37,00$ [°]
 Cohesion : $c_{ef} = 3,00$ [kPa]
 Dilatancy angle : $\psi = 25,00$ [°]
 Dilatancy cut-off : no

View

Sample :



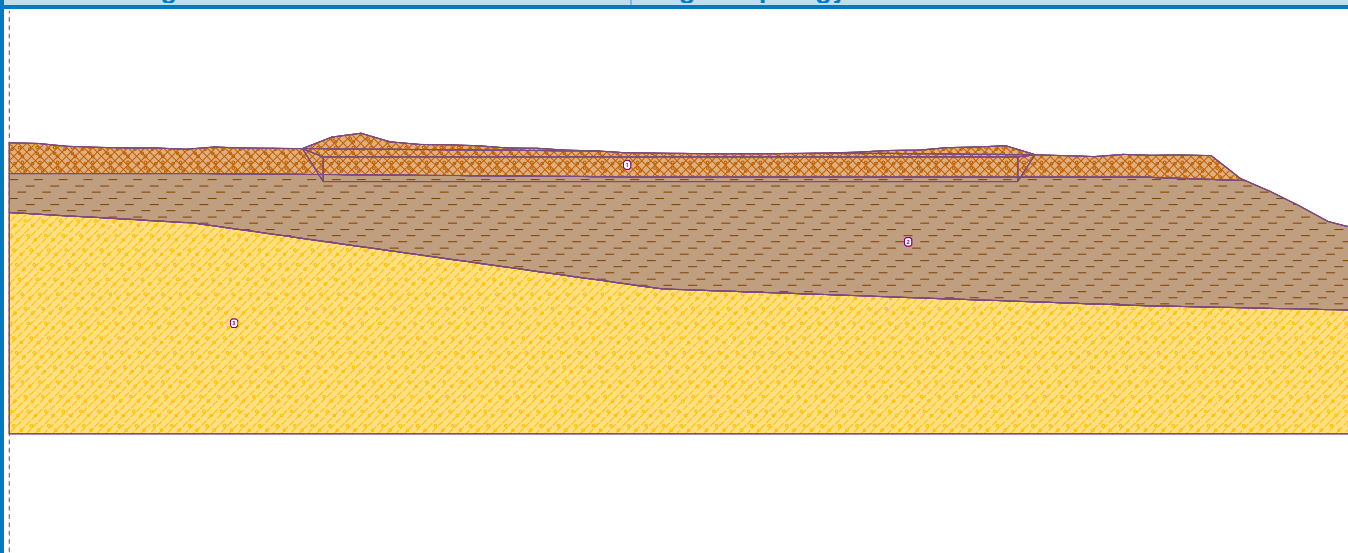
Assigning and surfaces

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
1		7,42	5,53	26,39	5,38	umetno nasutje - odpad 
		46,00	5,38	50,01	5,24	
		49,81	5,33	48,63	6,26	
		47,44	6,28	46,25	6,27	
		45,07	6,30	43,88	6,22	
		42,70	6,25	41,51	6,29	
		40,32	6,66	39,14	6,60	
		37,95	6,58	36,77	6,48	
		35,58	6,46	34,39	6,40	
		33,21	6,36	32,02	6,35	
		30,84	6,33	29,65	6,33	

Number	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
		28,46	6,33	27,28	6,34	
		26,09	6,36	24,91	6,37	
		23,72	6,45	22,53	6,47	
		21,35	6,55	20,16	6,56	
		18,98	6,65	17,79	6,69	
		16,60	6,71	15,42	6,81	
		14,23	7,16	13,05	7,00	
		11,86	6,54	10,67	6,55	
		9,49	6,56	8,30	6,60	
		7,12	6,51	5,93	6,57	
		4,74	6,57	3,56	6,59	
		2,37	6,63	1,19	6,74	
		0,00	6,77	0,00	5,53	
		2		7,42	3,53	
46,00	0,18			54,56	0,00	
54,56	3,29			53,37	3,58	
52,18	4,23			51,00	4,81	
50,01	5,24			46,00	5,38	
26,39	5,38			7,42	5,53	
0,00	5,53			0,00	3,95	
3		46,00	0,18	26,39	0,86	peščen prod
		7,42	3,53	0,00	3,95	
		0,00	-5,00	54,56	-5,00	
		54,56	0,00			

Name : Assign

Stage : topology



Free points

Number	Location		Number	Location		Number	Location		Number	Location	
	x [m]	z [m]		x [m]	z [m]		x [m]	z [m]		x [m]	z [m]
1	40,80	5,20	2	12,70	5,20	3	12,70	6,20	4	40,81	6,20

Free lines

Number	Type of line	Mode of input	Lines topology
1	segment		Origin (41,51; 6,29) [m] , end (11,86; 6,54) [m]
2	segment		Origin (11,86; 6,54) [m] , end (12,70; 5,20) [m]
3	segment		Origin (12,70; 5,20) [m] , end (40,80; 5,20) [m]
4	segment		Origin (40,80; 5,20) [m] , end (41,51; 6,29) [m]
5	segment		Origin (11,86; 6,54) [m] , end (12,70; 6,20) [m]
6	segment		Origin (12,70; 6,20) [m] , end (12,70; 5,20) [m]
7	segment		Origin (12,70; 6,20) [m] , end (40,81; 6,20) [m]
8	segment		Origin (40,81; 6,20) [m] , end (40,80; 5,20) [m]
9	segment		Origin (40,81; 6,20) [m] , end (41,51; 6,29) [m]

Mesh generation

Mesh generation parameters

Element edge length : 1,00 [m]
 Mesh smoothing : yes
 Generate multinode elements : yes

Mesh generation result

Finite element mesh was successfully generated.

Number of nodes 4508



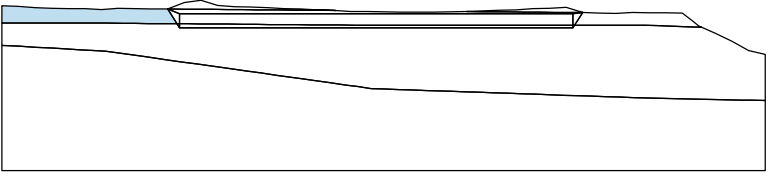



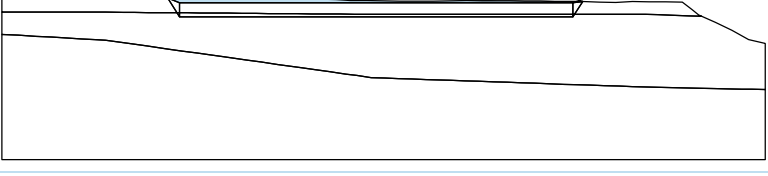

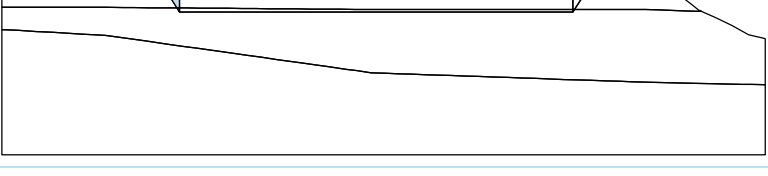

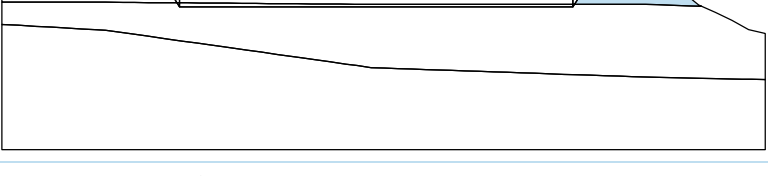

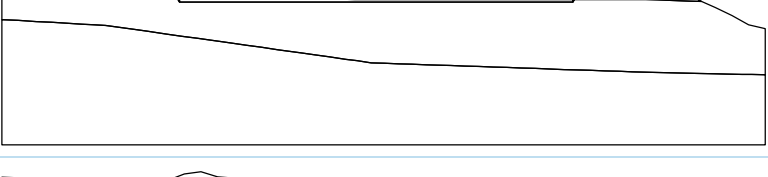

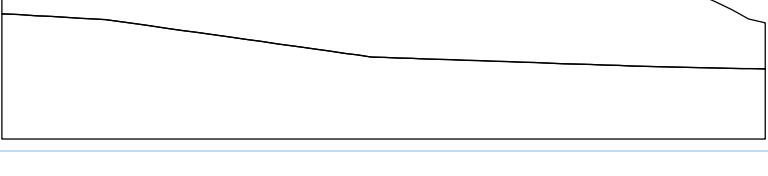

Number of elements 2752 (region 1474, beam 327, interface 951)

Warning

[W086] Mesh point (49,81; 5,33) is found too close to line LI{(46,00; 5,38) .. (50,01; 5,24)}.
 [W086] Mesh point (34,39; 6,40) is found too close to line LI{(41,51; 6,29) .. (33,21; 6,36)}.
 [W086] Mesh point (40,81; 6,20) is found too close to line LI{(41,51; 6,29) .. (33,21; 6,36)}.
 [W086] Mesh point (40,80; 5,38) is found too close to line LI{(40,80; 5,20) .. (40,92; 5,38)}.
 [W086] Mesh point (32,02; 6,35) is found too close to line LI{(33,21; 6,36) .. (23,89; 6,44)}.
 [W086] Mesh point (30,84; 6,33) is found too close to line LI{(33,21; 6,36) .. (23,89; 6,44)}.
 [W086] Mesh point (29,65; 6,33) is found too close to line LI{(33,21; 6,36) .. (23,89; 6,44)}.
 [W086] Mesh point (28,46; 6,33) is found too close to line LI{(33,21; 6,36) .. (23,89; 6,44)}.
 [W086] Mesh point (27,28; 6,34) is found too close to line LI{(33,21; 6,36) .. (23,89; 6,44)}.
 [W086] Mesh point (26,09; 6,36) is found too close to line LI{(33,21; 6,36) .. (23,89; 6,44)}.
 [W086] Mesh point (24,91; 6,37) is found too close to line LI{(33,21; 6,36) .. (23,89; 6,44)}.
 [W086] Mesh point (23,72; 6,45) is found too close to line LI{(23,89; 6,44) .. (11,86; 6,54)}.
 [W086] Mesh point (22,53; 6,47) is found too close to line LI{(23,89; 6,44) .. (11,86; 6,54)}.
 [W086] Mesh point (21,35; 6,55) is found too close to line LI{(23,89; 6,44) .. (11,86; 6,54)}.
 [W086] Mesh point (20,16; 6,56) is found too close to line LI{(23,89; 6,44) .. (11,86; 6,54)}.

Input data (Construction stage 1)

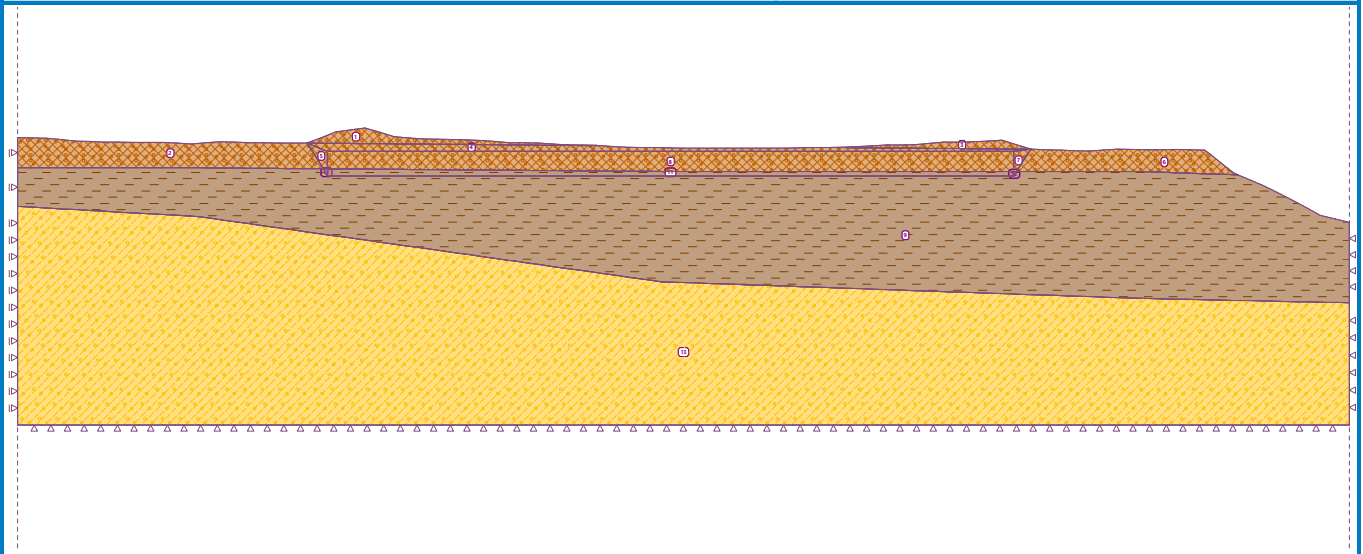
Assignment and activation

Number	Region	Active / inactive	Assigned soil
1		Active	umetno nasutje - odpad 
2		Active	umetno nasutje - odpad 
3		Active	umetno nasutje - odpad 
4		Active	umetno nasutje - odpad 
5		Active	umetno nasutje - odpad 
6		Active	umetno nasutje - odpad 
7		Active	umetno nasutje - odpad 
8		Active	umetno nasutje - odpad 

Number	Region	Active / inactive	Assigned soil
9		Active	Meljna glina
10		Active	Meljna glina
11		Active	Meljna glina
12		Active	Meljna glina
13		Active	peščen prod

Name : Assign

Stage : 1



Line supports

Number	Location	Support	
		Direction X	Direction Z
A1	Mesh line No. 59	fixed	free
A2	Mesh line No. 57	fixed	free
A3	Mesh line No. 47	fixed	free
A4	Mesh line No. 61	fixed	free
A5	Mesh line No. 52	fixed	free
A6	Mesh line No. 60	fixed	fixed

A1 up to A6 - automatically generated line supports along model edges

Water

Water type : No water

Analysis settings

Stress

Method : Newton - Raphson
 Stiffness matrix change : after each iteration
 Max. number of iterations for one calc. step : 100
 Initial calculation step : 0,1000
 Displacement error : 0,0100
 Imbalanced forces error : 0,0100
 Energy error : 0,0100
 Respect material interfaces : no

Plasticity

Return mapping error : 0,00100
 Max. number of iterations for one plast. step : 20

Newton - Raphson

Relaxation factor of calculation step : 2,00
 Maximum number of relaxations of calculation step : 2
 Min. number of iterations for one calc. step : 1

Line search

Solution method : iterate no
 Line search limit - minimum : 0,100
 Line search limit - maximum : 1,000

Results (Construction stage 1)

Stress analysis was successfully completed.

Analysis settings : standard
 Attained loading = 100,00 %

Extremes

Stress (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Total stress $\sigma_{z, tot}$ [kPa]	14,23	7,16	-1,66	0,00	-5,00	232,58
Effective stress $\sigma_{z, eff}$ [kPa]	14,23	7,16	-1,66	0,00	-5,00	232,58
Total stress $\sigma_{x, tot}$ [kPa]	26,09	6,36	-1,34	0,00	-5,00	125,22
Effective stress $\sigma_{x, eff}$ [kPa]	26,09	6,36	-1,34	0,00	-5,00	125,22

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Shear stress τ_{xz} [kPa]	50,73	2,54	-8,74	12,52	5,49	2,64

Strain (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Equivalent deviatoric strain E_d [%]	18,98	6,65	0,00	0,00	-5,00	0,56
Plastic equivalent deviatoric strain $E_{d,pl}$ [%]	11,86	6,54	0,00	49,81	5,33	0,20

Mobilization degree (extremes)

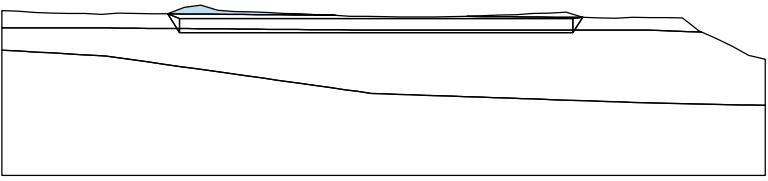
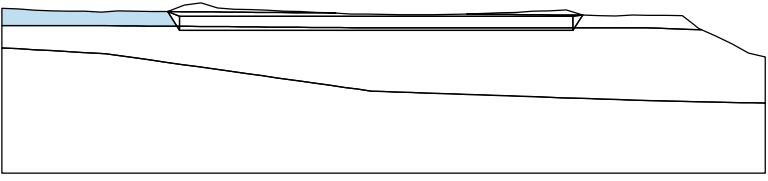

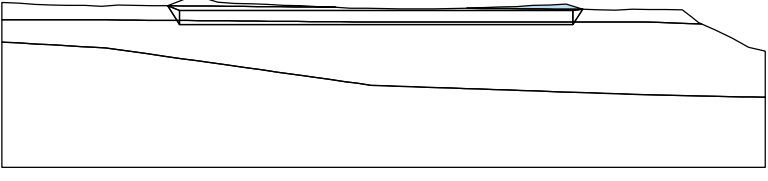
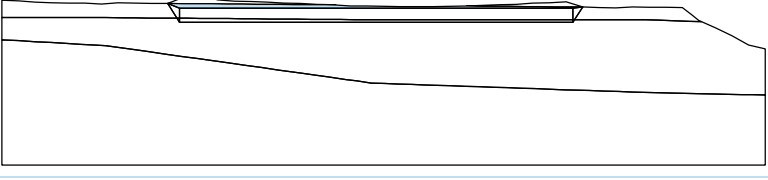

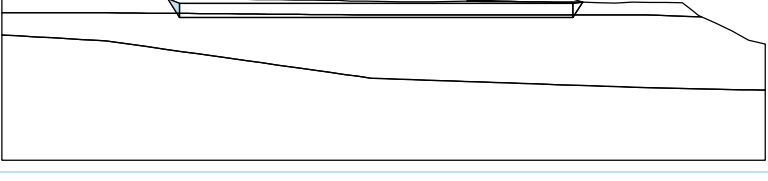

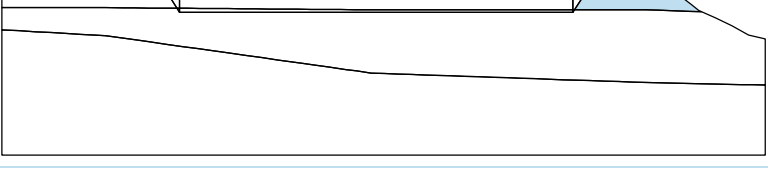

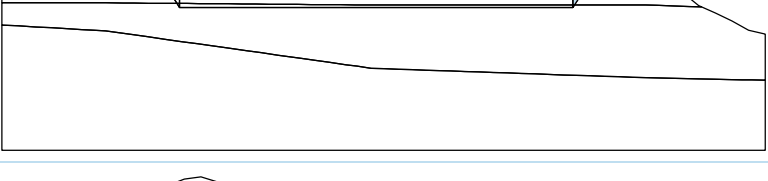

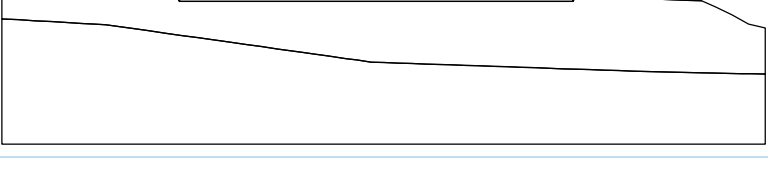

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Mobilized shear strength [%]	17,79	6,69	6,02	26,09	6,36	104,80

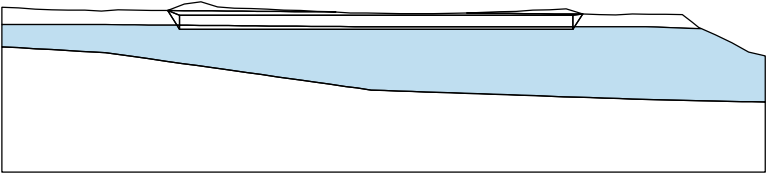

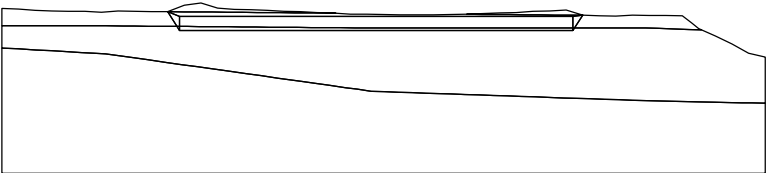

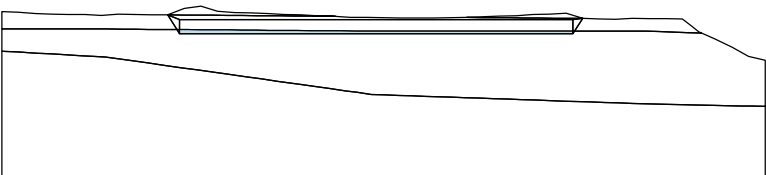



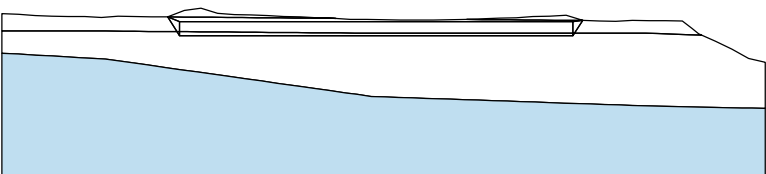

Pore pressures (extremes)

Variable	Location		Max
	x [m]	z [m]	
Total pore pressure u_{tot} [kPa]	11,86	6,54	0,00

Input data (Construction stage 2)

Assignment and activation

Number	Region	Active / inactive	Assigned soil
1		Inactive	
2		Active	umetno nasutje - odpad 
3		Inactive	
4		Active	umetno nasutje - odpad 
5		Active	umetno nasutje - odpad 
6		Active	umetno nasutje - odpad 
7		Active	umetno nasutje - odpad 
8		Active	umetno nasutje - odpad 

Number	Region	Active / inactive	Assigned soil
9		Active	Meljna glina 
10		Active	Meljna glina 
11		Active	Meljna glina 
12		Active	Meljna glina 
13		Active	peščen prod 

Line supports

Number	Line support		Location	Support	
	new	modified		Direction X	Direction Z
A1	Yes		Mesh line No. 59	fixed	free
A2	Yes		Mesh line No. 57	fixed	free
A3	Yes		Mesh line No. 47	fixed	free
A4	Yes		Mesh line No. 61	fixed	free
A5	Yes		Mesh line No. 52	fixed	free
A6	Yes		Mesh line No. 60	fixed	fixed

A1 up to A6 - automatically generated line supports along model edges

Water

Water type : No water

Analysis settings

Stress

Method : Newton - Raphson
 Stiffness matrix change : after each iteration
 Max. number of iterations for one calc. step : 100
 Initial calculation step : 0,1000

Displacement error :	0,0100
Imbalanced forces error :	0,0100
Energy error :	0,0100
Respect material interfaces :	no
Plasticity	
Return mapping error :	0,00100
Max. number of iterations for one plast. step :	20
Newton - Raphson	
Relaxation factor of calculation step :	2,00
Maximum number of relaxations of calculation step :	2
Min. number of iterations for one calc. step :	1
Line search	
Solution method :	iterate no
Line search limit - minimum :	0,100
Line search limit - maximum :	1,000

Results (Construction stage 2)

Stress analysis was successfully completed.

Analysis settings : standard
 Attained loading = 100,00 %

Extremes

Displacements (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Displacements x [mm]	10,14	1,85	-0,1	21,43	1,56	0,1
Displacements z [mm]	13,92	6,52	-0,6	0,00	6,77	0,0

Stress (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Total stress $\sigma_{z, tot}$ [kPa]	48,63	6,26	-1,16	0,00	-5,00	232,21
Effective stress $\sigma_{z, eff}$ [kPa]	48,63	6,26	-1,16	0,00	-5,00	232,21
Total stress $\sigma_{x, tot}$ [kPa]	29,65	6,33	-0,91	0,00	-5,00	125,00
Effective stress $\sigma_{x, eff}$ [kPa]	29,65	6,33	-0,91	0,00	-5,00	125,00
Shear stress τ_{xz} [kPa]	50,73	2,54	-8,71	44,28	4,57	0,64

Strain (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Equivalent deviatoric strain E_d [%]	3,56	6,59	0,00	0,00	-5,00	0,56
Plastic equivalent deviatoric strain $E_{d, pl}$ [%]	12,52	5,49	0,00	49,81	5,33	0,21

Mobilization degree (extremes)

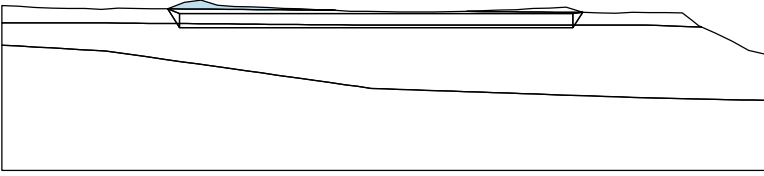
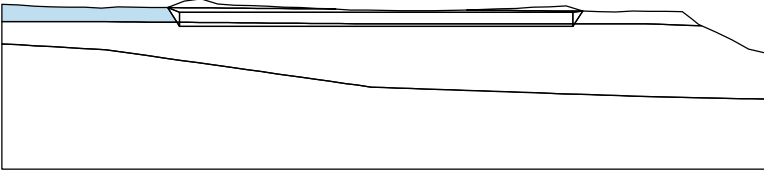

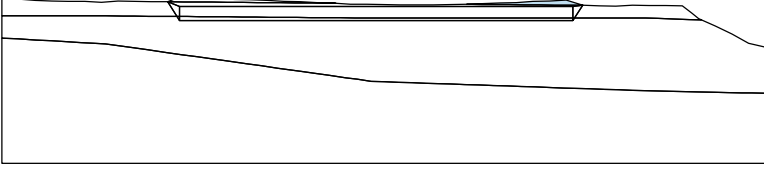
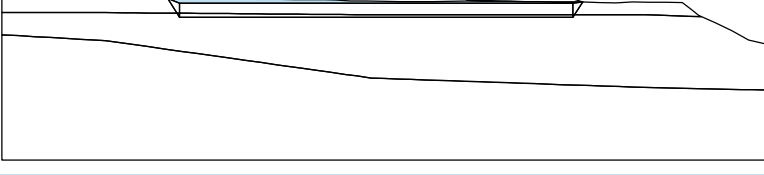
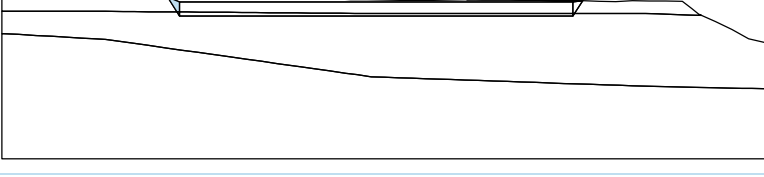
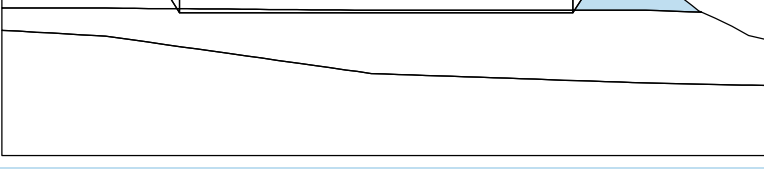

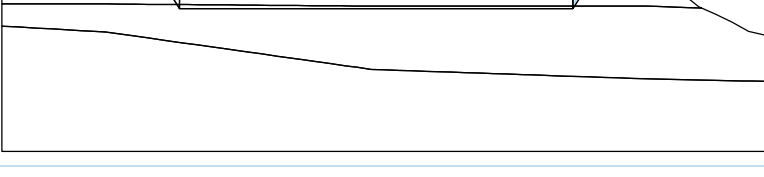
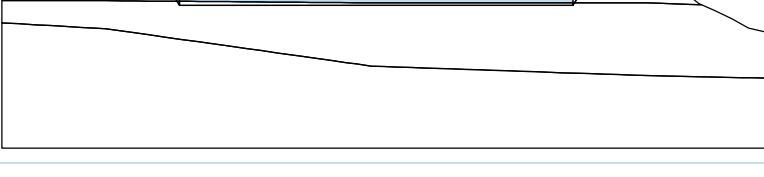
Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Mobilized shear strength [%]	36,25	6,33	5,00	49,81	5,33	104,27

Pore pressures (extremes)

Variable	Location		Max
	x [m]	z [m]	
Total pore pressure u_{tot} [kPa]	12,52	5,49	0,00

Input data (Construction stage 3)

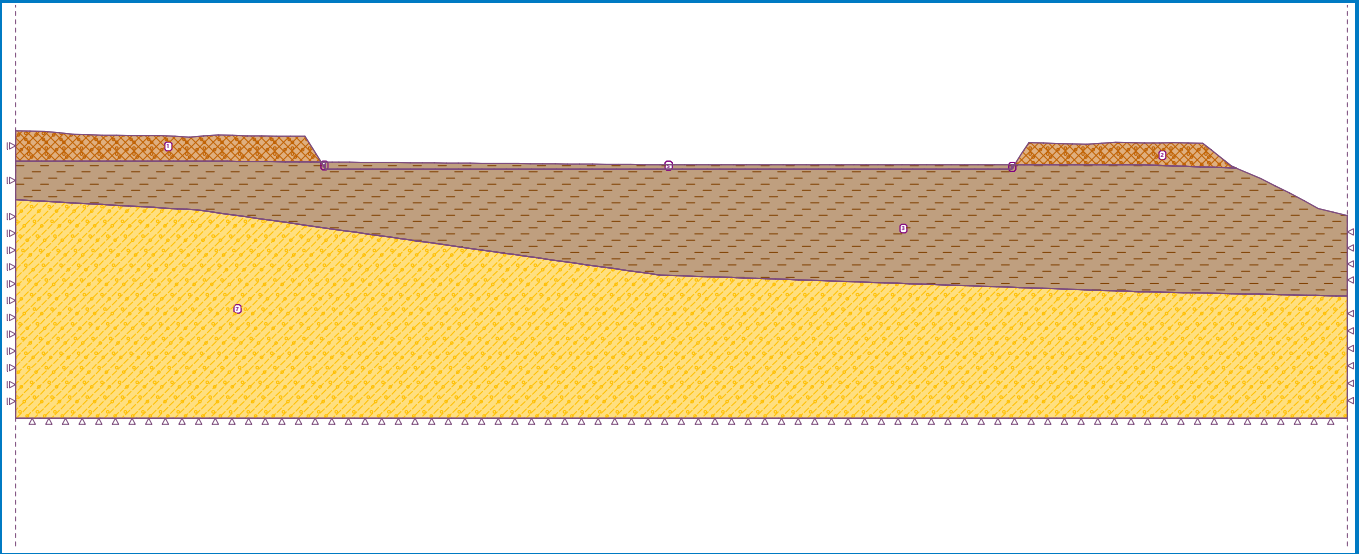
Assignment and activation

Number	Region	Active / inactive	Assigned soil
1		Inactive	
2		Active	umetno nasutje - odpad 
3		Inactive	
4		Inactive	
5		Inactive	
6		Active	umetno nasutje - odpad 
7		Inactive	
8		Inactive	

Number	Region	Active / inactive	Assigned soil
9		Active	Meljna glina
10		Active	Meljna glina
11		Active	Meljna glina
12		Active	Meljna glina
13		Active	peščen prod

Name : Assign

Stage : 3



Line supports

Number	Line support		Location	Support	
	new	modified		Direction X	Direction Z
A1	Yes		Mesh line No. 59	fixed	free
A2	Yes		Mesh line No. 57	fixed	free
A3	Yes		Mesh line No. 47	fixed	free
A4	Yes		Mesh line No. 61	fixed	free
A5	Yes		Mesh line No. 52	fixed	free
A6	Yes		Mesh line No. 60	fixed	fixed

A1 up to A6 - automatically generated line supports along model edges

Water

Water type : No water

Analysis settings

Stress

Method : Newton - Raphson
 Stiffness matrix change : after each iteration
 Max. number of iterations for one calc. step : 100
 Initial calculation step : 0,1000
 Displacement error : 0,0100
 Imbalanced forces error : 0,0100
 Energy error : 0,0100
 Respect material interfaces : no

Plasticity

Return mapping error : 0,00100
 Max. number of iterations for one plast. step : 20

Newton - Raphson

Relaxation factor of calculation step : 2,00
 Maximum number of relaxations of calculation step : 2
 Min. number of iterations for one calc. step : 1

Line search

Solution method : iterate no
 Line search limit - minimum : 0,100
 Line search limit - maximum : 1,000

Results (Construction stage 3)

Stress analysis was successfully completed.

Analysis settings : standard
 Attained loading = 100,00 %

Extremes

Displacements (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Displacements x [mm]	12,00	0,96	-0,5	41,57	1,75	0,4
Displacements z [mm]	17,16	5,45	-1,8	0,00	6,77	0,2

Stress (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Total stress $\sigma_{z, \text{tot}}$ [kPa]	48,63	6,26	-1,15	0,00	-5,00	231,14
Effective stress $\sigma_{z, \text{eff}}$ [kPa]	48,63	6,26	-1,15	0,00	-5,00	231,14
Total stress $\sigma_{x, \text{tot}}$ [kPa]	14,14	5,48	-1,85	0,00	-5,00	124,40
Effective stress $\sigma_{x, \text{eff}}$ [kPa]	14,14	5,48	-1,85	0,00	-5,00	124,40
Shear stress τ_{xz} [kPa]	50,73	2,54	-8,59	40,92	5,38	5,36

Strain (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Equivalent deviatoric strain E_d [%]	11,86	6,54	0,00	0,00	-5,00	0,56
Plastic equivalent deviatoric strain $E_{d, \text{pl}}$ [%]	0,00	5,53	0,00	49,81	5,33	0,21

Mobilization degree (extremes)


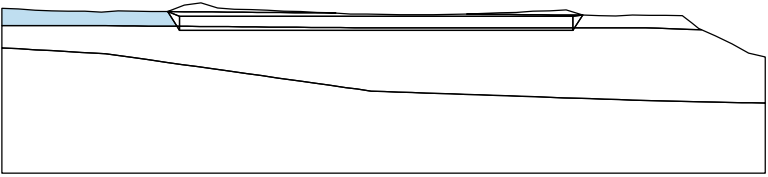

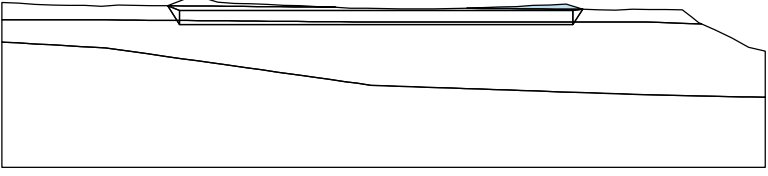
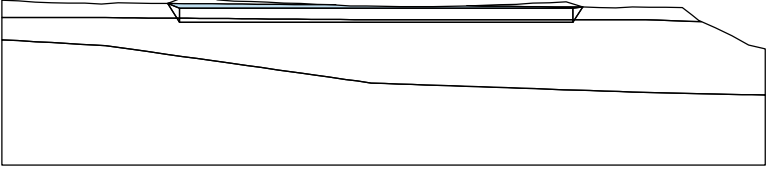
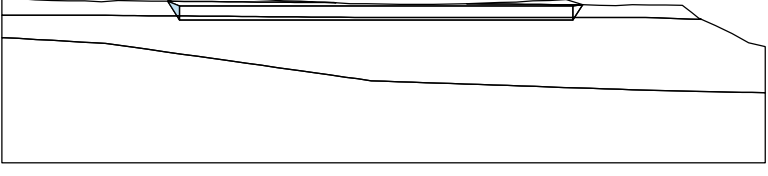
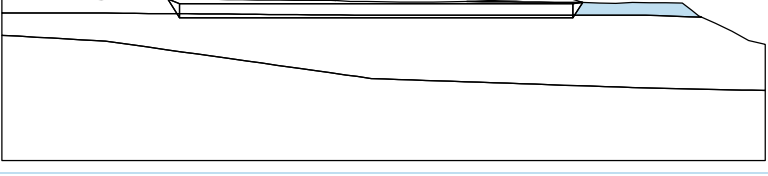

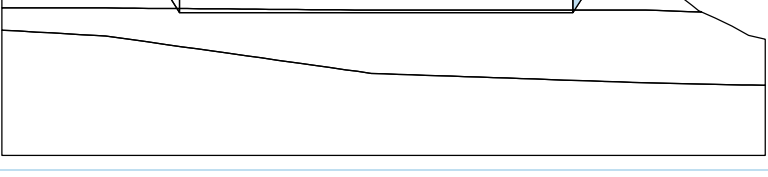
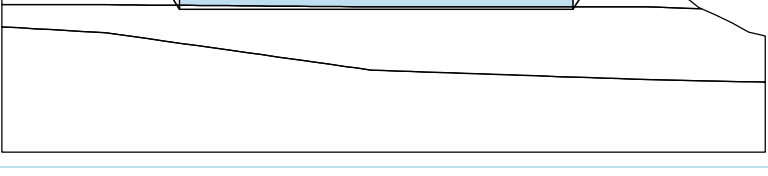
Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Mobilized shear strength [%]	34,34	5,38	1,20	49,81	5,33	104,21

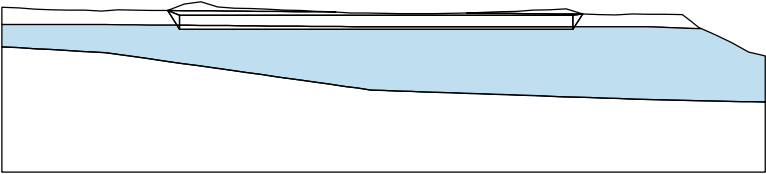

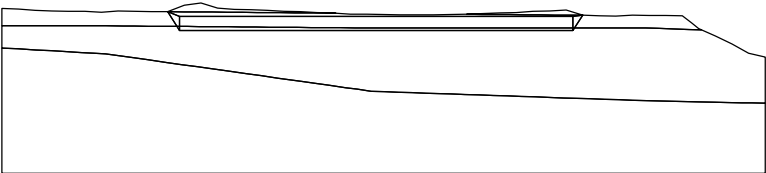
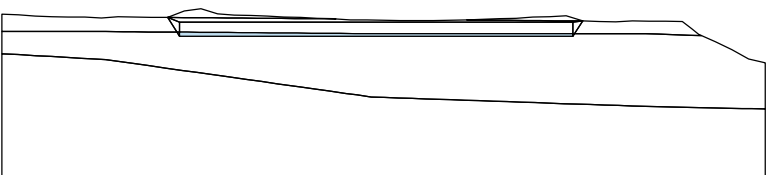

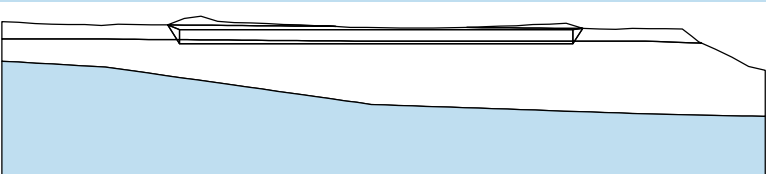

Pore pressures (extremes)

Variable	Location		Max
	x [m]	z [m]	
Total pore pressure u_{tot} [kPa]	12,52	5,49	0,00

Input data (Construction stage 4)

Assignment and activation

Number	Region	Active / inactive	Assigned soil
1		Inactive	
2		Active	umetno nasutje - odpad 
3		Inactive	
4		Inactive	
5		Inactive	
6		Active	umetno nasutje - odpad 
7		Inactive	
8		Inactive	

Number	Region	Active / inactive	Assigned soil
9		Active	Meljna glina 
10		Inactive	
11		Inactive	
12		Inactive	
13		Active	peščen prod 

Line supports

Number	Line support		Location	Support	
	new	modified		Direction X	Direction Z
A1	Yes		Mesh line No. 59	fixed	free
A2	Yes		Mesh line No. 57	fixed	free
A3	Yes		Mesh line No. 47	fixed	free
A4	Yes		Mesh line No. 61	fixed	free
A5	Yes		Mesh line No. 52	fixed	free
A6	Yes		Mesh line No. 60	fixed	fixed

A1 up to A6 - automatically generated line supports along model edges

Water

Water type : No water

Analysis settings

Stress

Method : Newton - Raphson
 Stiffness matrix change : after each iteration
 Max. number of iterations for one calc. step : 100
 Initial calculation step : 0,1000

Displacement error :	0,0100
Imbalanced forces error :	0,0100
Energy error :	0,0100
Respect material interfaces :	no
Plasticity	
Return mapping error :	0,00100
Max. number of iterations for one plast. step :	20
Newton - Raphson	
Relaxation factor of calculation step :	2,00
Maximum number of relaxations of calculation step :	2
Min. number of iterations for one calc. step :	1
Line search	
Solution method :	iterate no
Line search limit - minimum :	0,100
Line search limit - maximum :	1,000

Results (Construction stage 4)

Stress analysis was successfully completed.

Analysis settings : standard
 Attained loading = 100,00 %

Extremes

Displacements (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Displacements x [mm]	12,00	0,96	-0,5	41,57	0,91	0,5
Displacements z [mm]	16,70	5,20	-2,0	0,00	6,77	0,2

Stress (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Total stress $\sigma_{z, tot}$ [kPa]	11,86	6,54	-1,20	0,00	-5,00	231,00
Effective stress $\sigma_{z, eff}$ [kPa]	11,86	6,54	-1,20	0,00	-5,00	231,00
Total stress $\sigma_{x, tot}$ [kPa]	14,62	5,20	-1,64	0,00	-5,00	124,32
Effective stress $\sigma_{x, eff}$ [kPa]	14,62	5,20	-1,64	0,00	-5,00	124,32
Shear stress τ_{xz} [kPa]	50,73	2,54	-8,59	40,92	5,38	5,99

Strain (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Equivalent deviatoric strain E_d [%]	5,93	6,57	0,00	0,00	-5,00	0,56
Plastic equivalent deviatoric strain $E_{d, pl}$ [%]	0,00	5,53	0,00	49,81	5,33	0,21

Mobilization degree (extremes)

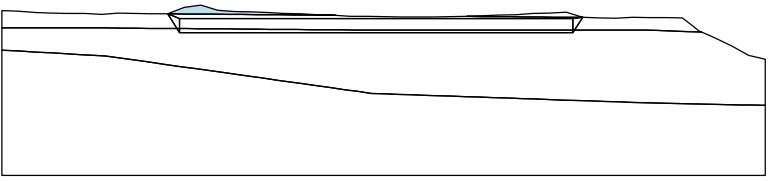
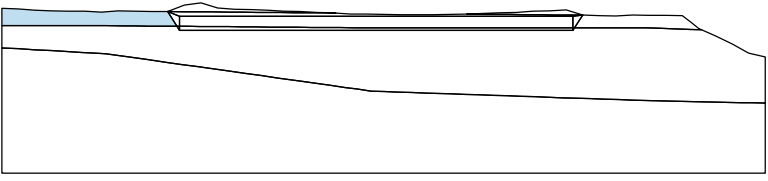

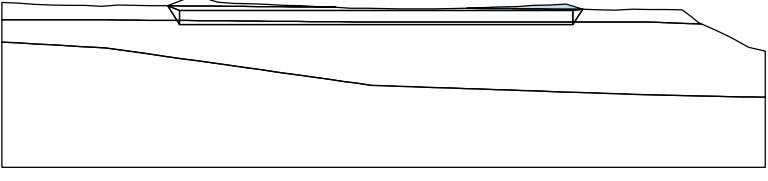
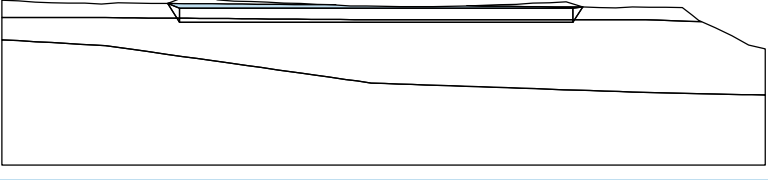
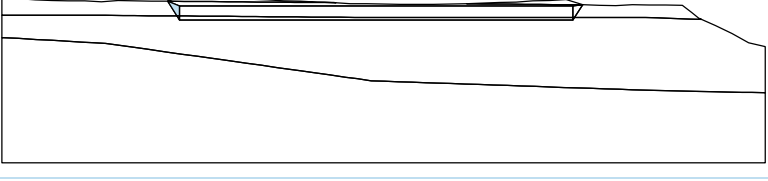
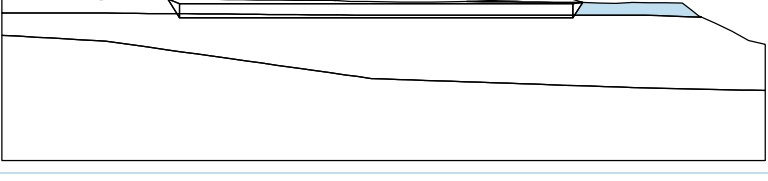

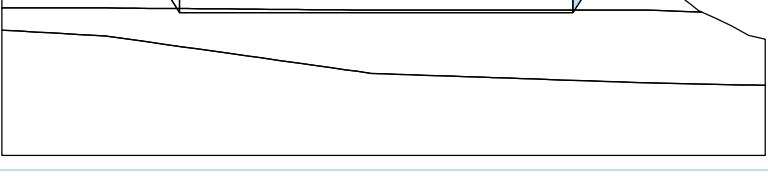
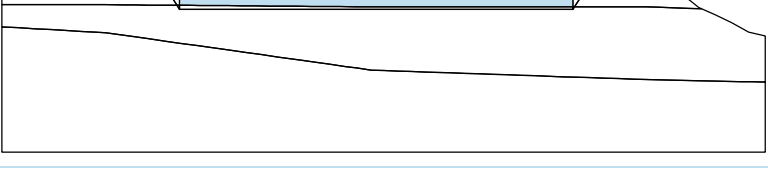
Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Mobilized shear strength [%]	33,88	5,20	3,19	49,81	5,33	104,20

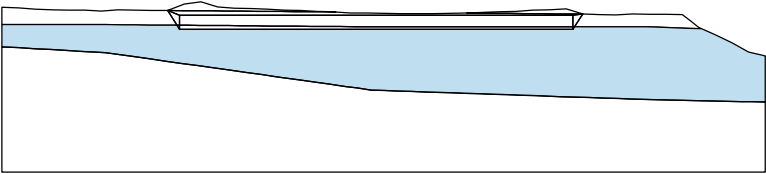

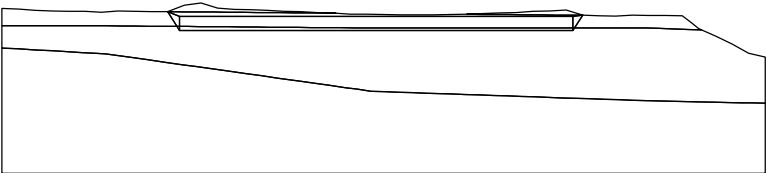

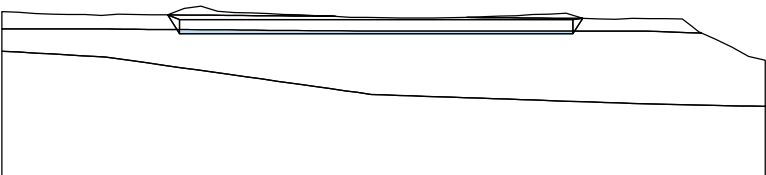



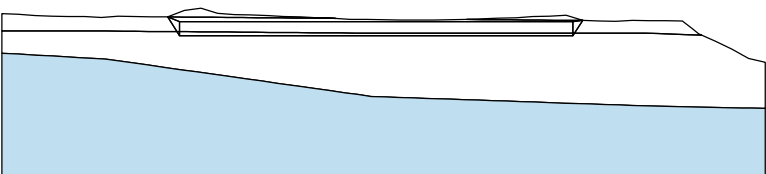

Pore pressures (extremes)

Variable	Location		Max
	x [m]	z [m]	
Total pore pressure u_{tot} [kPa]	12,52	5,49	0,00

Input data (Construction stage 5)

Assignment and activation

Number	Region	Active / inactive	Assigned soil
1		Inactive	
2		Active	umetno nasutje - odpad 
3		Inactive	
4		Inactive	
5		Inactive	
6		Active	umetno nasutje - odpad 
7		Inactive	
8		Inactive	

Number	Region	Active / inactive	Assigned soil
9		Active	Meljna glina 
10		Active	tamponsko nasutje 
11		Active	tamponsko nasutje 
12		Active	tamponsko nasutje 
13		Active	peščen prod 

Line supports

Number	Line support		Location	Support	
	new	modified		Direction X	Direction Z
A1	Yes		Mesh line No. 59	fixed	free
A2	Yes		Mesh line No. 57	fixed	free
A3	Yes		Mesh line No. 47	fixed	free
A4	Yes		Mesh line No. 61	fixed	free
A5	Yes		Mesh line No. 52	fixed	free
A6	Yes		Mesh line No. 60	fixed	fixed

A1 up to A6 - automatically generated line supports along model edges

Water

Water type : No water

Analysis settings

Stress

Method : Newton - Raphson
 Stiffness matrix change : after each iteration
 Max. number of iterations for one calc. step : 100
 Initial calculation step : 0,1000

Displacement error :	0,0100
Imbalanced forces error :	0,0100
Energy error :	0,0100
Respect material interfaces :	no
Plasticity	
Return mapping error :	0,00100
Max. number of iterations for one plast. step :	20
Newton - Raphson	
Relaxation factor of calculation step :	2,00
Maximum number of relaxations of calculation step :	2
Min. number of iterations for one calc. step :	1
Line search	
Solution method :	iterate no
Line search limit - minimum :	0,100
Line search limit - maximum :	1,000

Results (Construction stage 5)

Stress analysis was successfully completed.

Analysis settings : standard
 Attained loading = 100,00 %

Extremes

Displacements (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Displacements x [mm]	12,00	0,96	-0,4	41,57	1,75	0,4
Displacements z [mm]	16,70	5,20	-1,7	0,00	6,77	0,2

Stress (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Total stress $\sigma_{z, tot}$ [kPa]	11,86	6,54	-1,51	0,00	-5,00	231,16
Effective stress $\sigma_{z, eff}$ [kPa]	11,86	6,54	-1,51	0,00	-5,00	231,16
Total stress $\sigma_{x, tot}$ [kPa]	11,86	6,54	-1,34	0,00	-5,00	124,42
Effective stress $\sigma_{x, eff}$ [kPa]	11,86	6,54	-1,34	0,00	-5,00	124,42
Shear stress τ_{xz} [kPa]	50,73	2,54	-8,58	41,18	4,42	4,78

Strain (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Equivalent deviatoric strain E_d [%]	34,34	5,38	0,00	0,00	-5,00	0,56
Plastic equivalent deviatoric strain $E_{d, pl}$ [%]	0,00	5,53	0,00	49,81	5,33	0,21

Mobilization degree (extremes)


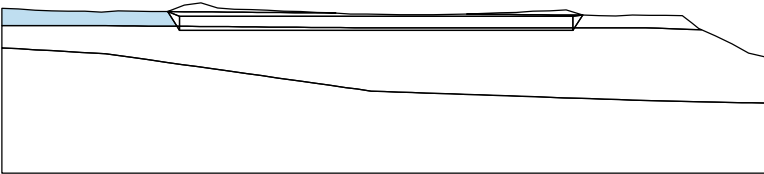


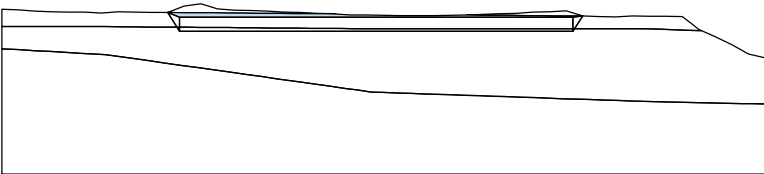


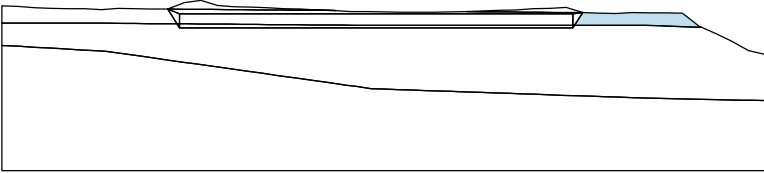

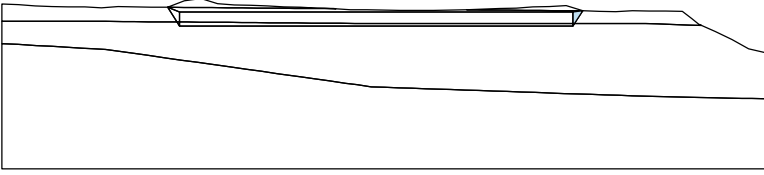

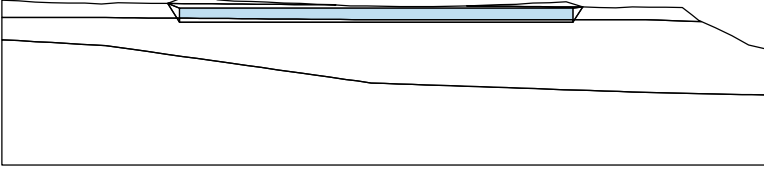

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Mobilized shear strength [%]	36,31	5,38	1,36	49,81	5,33	104,23

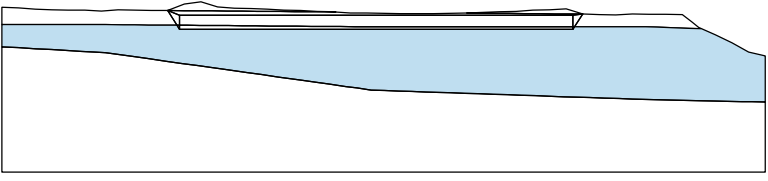

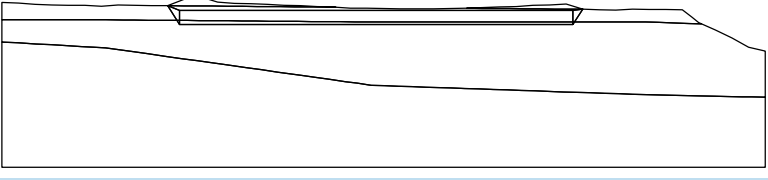

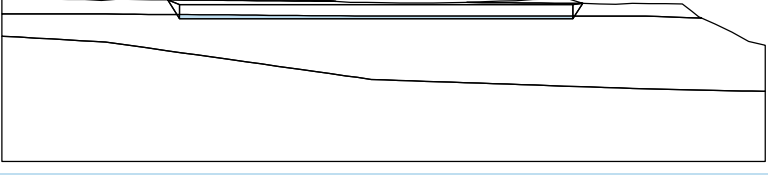

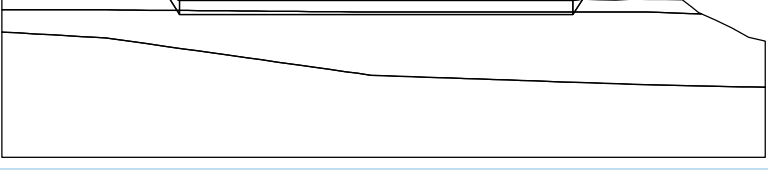

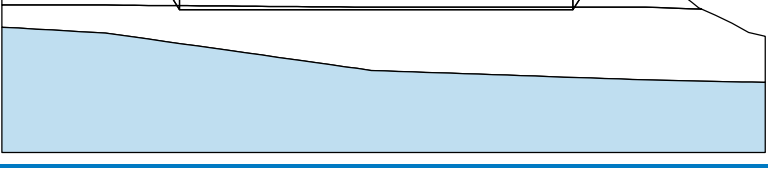

Pore pressures (extremes)

Variable	Location		Max
	x [m]	z [m]	
Total pore pressure u_{tot} [kPa]	12,52	5,49	0,00

Input data (Construction stage 6)

Assignment and activation

Number	Region	Active / inactive	Assigned soil
1		Inactive	
2		Active	umetno nasutje - odpad 
3		Inactive	
4		Inactive	
5		Active	tamponsko nasutje 
6		Active	umetno nasutje - odpad 
7		Active	tamponsko nasutje 
8		Active	tamponsko nasutje 

Number	Region	Active / inactive	Assigned soil
9		Active	Meljna glina 
10		Active	tamponsko nasutje 
11		Active	tamponsko nasutje 
12		Active	tamponsko nasutje 
13		Active	peščen prod 

Line supports

Number	Line support		Location	Support	
	new	modified		Direction X	Direction Z
A1	Yes		Mesh line No. 59	fixed	free
A2	Yes		Mesh line No. 57	fixed	free
A3	Yes		Mesh line No. 47	fixed	free
A4	Yes		Mesh line No. 61	fixed	free
A5	Yes		Mesh line No. 52	fixed	free
A6	Yes		Mesh line No. 60	fixed	fixed

A1 up to A6 - automatically generated line supports along model edges

Water

Water type : No water

Analysis settings

Stress

Method : Newton - Raphson
 Stiffness matrix change : after each iteration
 Max. number of iterations for one calc. step : 100
 Initial calculation step : 0,1000

Displacement error :	0,0100
Imbalanced forces error :	0,0100
Energy error :	0,0100
Respect material interfaces :	no
Plasticity	
Return mapping error :	0,00100
Max. number of iterations for one plast. step :	20
Newton - Raphson	
Relaxation factor of calculation step :	2,00
Maximum number of relaxations of calculation step :	2
Min. number of iterations for one calc. step :	1
Line search	
Solution method :	iterate no
Line search limit - minimum :	0,100
Line search limit - maximum :	1,000

Results (Construction stage 6)

Stress analysis was successfully completed.

Analysis settings : standard
 Attained loading = 100,00 %

Extremes

Displacements (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Displacements x [mm]	11,31	1,89	-0,2	41,51	6,29	0,1
Displacements z [mm]	14,62	5,20	-0,7	0,00	6,77	0,1

Stress (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Total stress $\sigma_{z, tot}$ [kPa]	48,63	6,26	-1,18	0,00	-5,00	231,90
Effective stress $\sigma_{z, eff}$ [kPa]	48,63	6,26	-1,18	0,00	-5,00	231,90
Total stress $\sigma_{x, tot}$ [kPa]	11,86	6,54	-3,10	0,00	-5,00	124,83
Effective stress $\sigma_{x, eff}$ [kPa]	11,86	6,54	-3,10	0,00	-5,00	124,83
Shear stress τ_{xz} [kPa]	50,73	2,54	-8,62	12,70	5,49	2,28

Strain (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Equivalent deviatoric strain E_d [%]	19,55	6,20	0,00	0,00	-5,00	0,56
Plastic equivalent deviatoric strain $E_{d, pl}$ [%]	0,00	5,53	0,00	49,81	5,33	0,21

Mobilization degree (extremes)


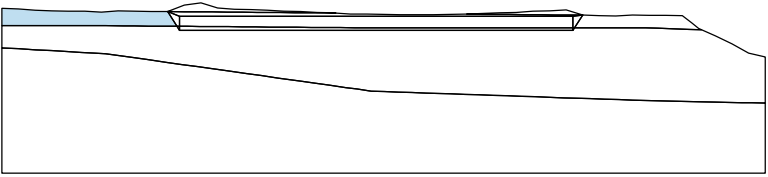

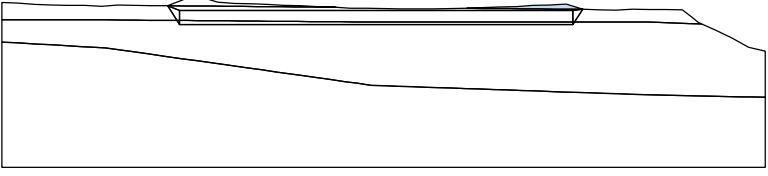
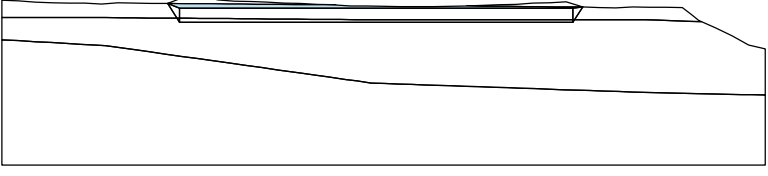
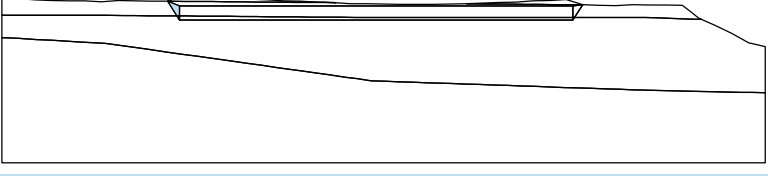

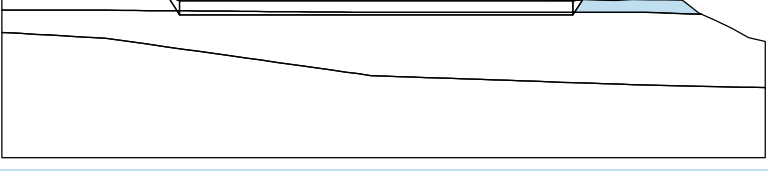

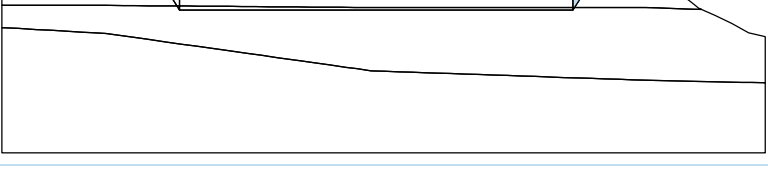

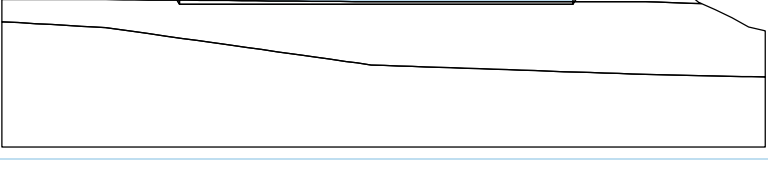

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Mobilized shear strength [%]	12,70	6,20	7,77	49,81	5,33	104,41

Pore pressures (extremes)

Variable	Location		Max
	x [m]	z [m]	
Total pore pressure u_{tot} [kPa]	12,52	5,49	0,00

Input data (Construction stage 7)

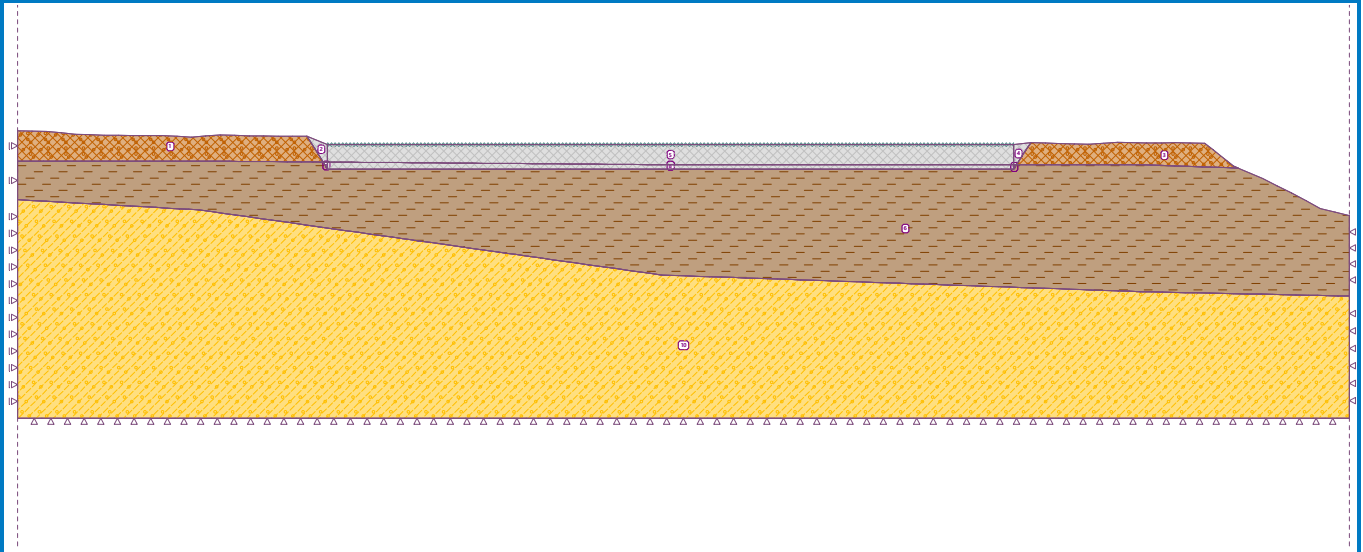
Assignment and activation

Number	Region	Active / inactive	Assigned soil
1		Inactive	
2		Active	umetno nasutje - odpad 
3		Inactive	
4		Inactive	
5		Active	tamponsko nasutje 
6		Active	umetno nasutje - odpad 
7		Active	tamponsko nasutje 
8		Active	tamponsko nasutje 

Number	Region	Active / inactive	Assigned soil
9		Active	Meljna glina
10		Active	tamponsko nasutje
11		Active	tamponsko nasutje
12		Active	tamponsko nasutje
13		Active	peščen prod

Name : Assign

Stage : 7



Beams

Number	Beam		Location	Support [m]		Include self weight	Fictitious beam	Cross-section	Material	Contacts	
	new	modified		Start pt.	End pt.					left	right
1	Yes		Free line No. 7	┌	┌	Yes	No	1,00 (b) x 0,25 (h) m	C 25/30	(not input)	(not input)

Number	Cross-section		Material	
	I_y [m ⁴ /m]	A [m ² /m]	E [MPa]	G [MPa]
1	1,30E-03	2,50E-01	31000,00	12917,00

Line supports

Number	Line support		Location	Support	
	new	modified		Direction X	Direction Z
A1	Yes		Mesh line No. 59	fixed	free
A2	Yes		Mesh line No. 57	fixed	free
A3	Yes		Mesh line No. 47	fixed	free
A4	Yes		Mesh line No. 61	fixed	free
A5	Yes		Mesh line No. 52	fixed	free
A6	Yes		Mesh line No. 60	fixed	fixed

A1 up to A6 - automatically generated line supports along model edges

Water

Water type : No water

Analysis settings

Stress

Method : Newton - Raphson
 Stiffness matrix change : after each iteration
 Max. number of iterations for one calc. step : 100
 Initial calculation step : 0,1000
 Displacement error : 0,0100
 Imbalanced forces error : 0,0100
 Energy error : 0,0100
 Respect material interfaces : no

Plasticity

Return mapping error : 0,00100
 Max. number of iterations for one plast. step : 20

Newton - Raphson

Relaxation factor of calculation step : 2,00
 Maximum number of relaxations of calculation step : 2
 Min. number of iterations for one calc. step : 1

Line search

Solution method : iterate no
 Line search limit - minimum : 0,100
 Line search limit - maximum : 1,000

Results (Construction stage 7)

Stress analysis was successfully completed.

Analysis settings : standard
 Attained loading = 100,00 %

Extremes

Displacements (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Displacements x [mm]	37,11	0,49	-0,1	41,51	6,29	0,2
Displacements z [mm]	13,65	5,20	-0,4	30,14	6,20	0,9

Stress (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Total stress $\sigma_{z, tot}$ [kPa]	11,86	6,54	-1,57	0,00	-5,00	232,18
Effective stress $\sigma_{z, eff}$ [kPa]	11,86	6,54	-1,57	0,00	-5,00	232,18
Total stress $\sigma_{x, tot}$ [kPa]	11,86	6,54	-3,61	0,00	-5,00	124,99
Effective stress $\sigma_{x, eff}$ [kPa]	11,86	6,54	-3,61	0,00	-5,00	124,99
Shear stress τ_{xz} [kPa]	50,73	2,54	-8,66	12,70	5,49	3,69

Strain (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Equivalent deviatoric strain E_d [%]	3,56	6,59	0,00	0,00	-5,00	0,56
Plastic equivalent deviatoric strain $E_{d, pl}$ [%]	0,00	5,53	0,00	49,81	5,33	0,21

Mobilization degree (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Mobilized shear strength [%]	1,19	6,74	21,48	49,81	5,33	104,48

Pore pressures (extremes)


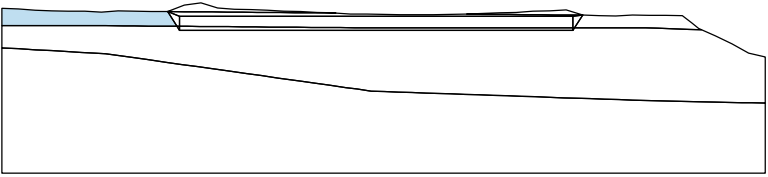

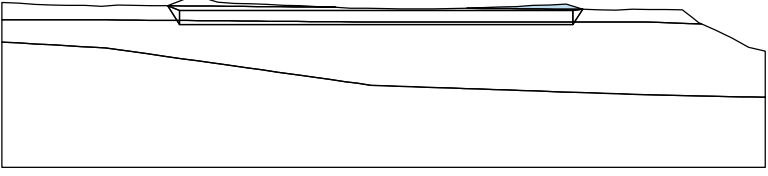
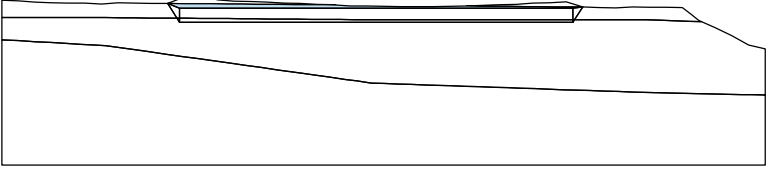
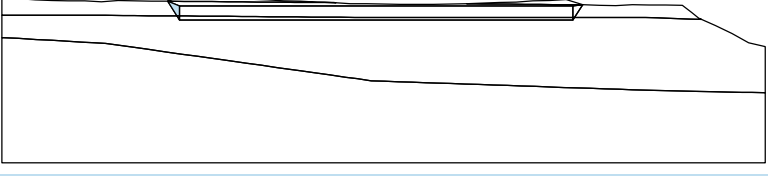

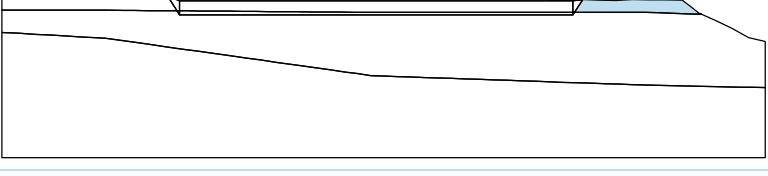

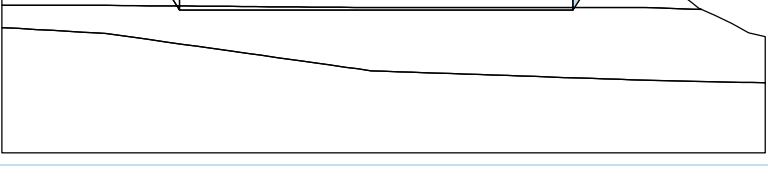

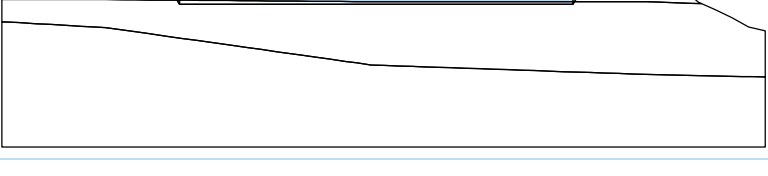

Variable	Location		Max
	x [m]	z [m]	
Total pore pressure u_{tot} [kPa]	12,52	5,49	0,00

Distributions on beams (extremes)

Number	Coordinates		D [mm]	N [kN/m]	M [kNm/m]	Q [kN/m]
	x [m]	z [m]				
1	12,70	6,20	0,2	-0,385	0,000	2,179
	14,57	6,20	0,2	-0,460	0,835	-0,125
	20,55	6,20	-0,2	0,578	-0,319	-0,095
	21,53	6,20	-0,3	0,446	-0,344	0,062
	30,14	6,20	-0,9	-2,796	0,542	-0,020
	31,15	6,20	-0,8	-2,868	0,553	-0,113
	40,81	6,20	-0,1	-0,502	0,000	-2,171

Input data (Construction stage 8)

Assignment and activation

Number	Region	Active / inactive	Assigned soil
1		Inactive	
2		Active	umetno nasutje - odpad 
3		Inactive	
4		Inactive	
5		Active	tamponsko nasutje 
6		Active	umetno nasutje - odpad 
7		Active	tamponsko nasutje 
8		Active	tamponsko nasutje 

Number	Region	Active / inactive	Assigned soil
9		Active	Meljna glina
10		Active	tamponsko nasutje
11		Active	tamponsko nasutje
12		Active	tamponsko nasutje
13		Active	peščen prod

Beams

Number	Beam		Location	Support [m]		Include self weight	Fictitious beam	Cross-section	Material	Contacts	
	new	modified		Start pt.	End pt.					left	right
1	No	No	Free line No. 7	┌	┌	Yes	No	without modification	without modification	(not input)	(not input)

Number	Cross-section		Material	
	I_y [m ⁴ /m]	A [m ² /m]	E [MPa]	G [MPa]
1	1,30E-03	2,50E-01	31000,00	12917,00

Line supports

Number	Line support		Location	Support	
	new	modified		Direction X	Direction Z
A1	Yes		Mesh line No. 59	fixed	free
A2	Yes		Mesh line No. 57	fixed	free
A3	Yes		Mesh line No. 47	fixed	free
A4	Yes		Mesh line No. 61	fixed	free
A5	Yes		Mesh line No. 52	fixed	free

Number	Line support		Location	Support	
	new	modified		Direction X	Direction Z
A6	Yes		Mesh line No. 60	fixed	fixed
A1 up to A6 - automatically generated line supports along model edges					

Beam loads

Number	Beam load		Beam	Type of load	Direction	Angle α [°]	Origin x [m]	Length l [m]	Magnitude		
	new	change							f, m, q, q ₁	q ₂	unit
1	Yes		Beam No. 1	distr. uniform on the whole beam	perpendicular to beam	0,00			10,00		[kN/m ²]

Water

Water type : No water

Analysis settings

Stress

Method : Newton - Raphson
 Stiffness matrix change : after each iteration
 Max. number of iterations for one calc. step : 100
 Initial calculation step : 0,1000
 Displacement error : 0,0100
 Imbalanced forces error : 0,0100
 Energy error : 0,0100
 Respect material interfaces : no

Plasticity

Return mapping error : 0,00100
 Max. number of iterations for one plast. step : 20

Newton - Raphson

Relaxation factor of calculation step : 2,00
 Maximum number of relaxations of calculation step : 2
 Min. number of iterations for one calc. step : 1

Line search

Solution method : iterate no
 Line search limit - minimum : 0,100
 Line search limit - maximum : 1,000

Results (Construction stage 8)

Stress analysis was successfully completed.

Analysis settings : standard
 Attained loading = 100,00 %

Extremes

Displacements (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Displacements x [mm]	40,74	1,07	-0,7	15,06	0,85	0,4
Displacements z [mm]	49,81	5,33	-0,2	29,04	6,20	3,3

Stress (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Total stress $\sigma_{z, \text{tot}}$ [kPa]	11,86	6,54	-3,68	14,88	-5,00	233,38
Effective stress $\sigma_{z, \text{eff}}$ [kPa]	11,86	6,54	-3,68	14,88	-5,00	233,38
Total stress $\sigma_{x, \text{tot}}$ [kPa]	11,86	6,54	-3,86	14,88	-5,00	125,67
Effective stress $\sigma_{x, \text{eff}}$ [kPa]	11,86	6,54	-3,86	14,88	-5,00	125,67
Shear stress τ_{xz} [kPa]	46,62	-5,00	-9,58	12,70	5,49	6,16

Strain (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Equivalent deviatoric strain E_d [%]	3,56	6,59	0,00	17,86	-5,00	0,56
Plastic equivalent deviatoric strain $E_{d, \text{pl}}$ [%]	0,00	5,53	0,00	49,81	5,33	0,21

Mobilization degree (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Mobilized shear strength [%]	1,19	6,74	20,56	10,67	6,55	108,23

Pore pressures (extremes)


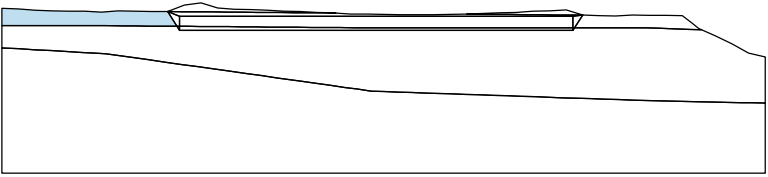


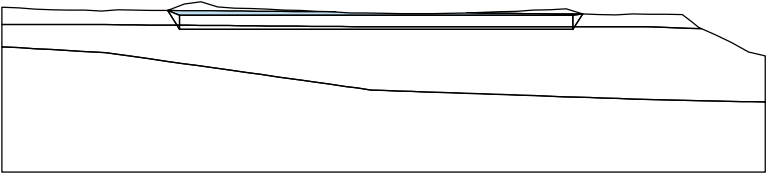
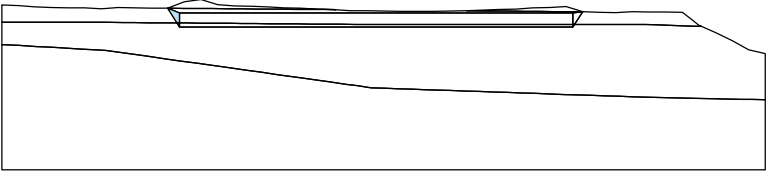

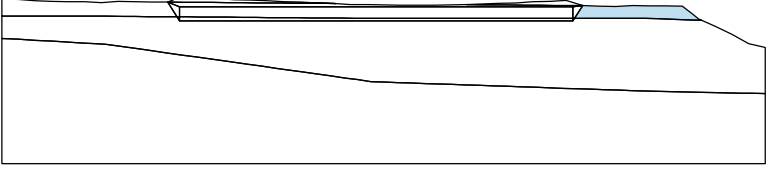

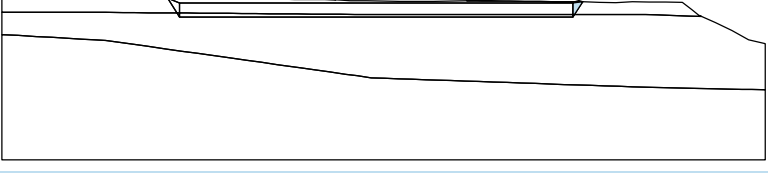

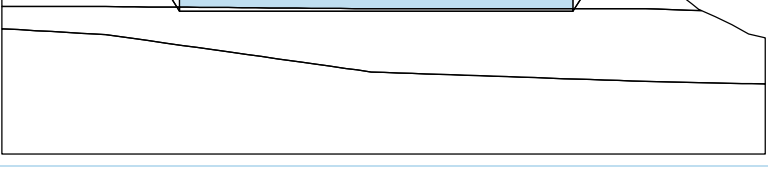

Variable	Location		Max
	x [m]	z [m]	
Total pore pressure u_{tot} [kPa]	12,52	5,49	0,00

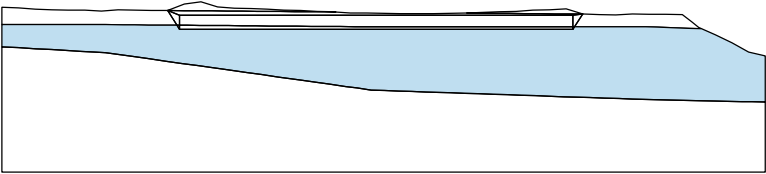

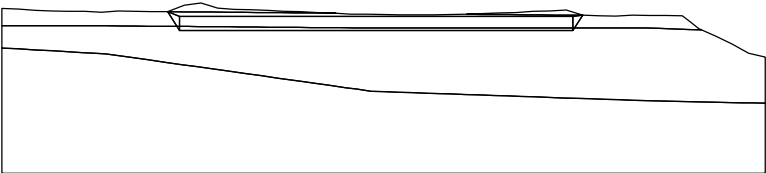

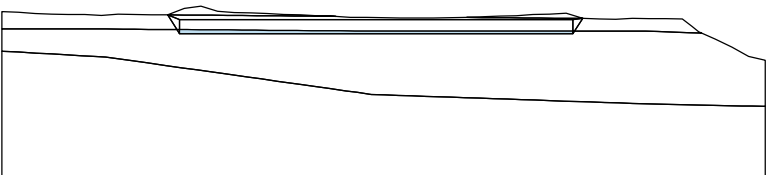



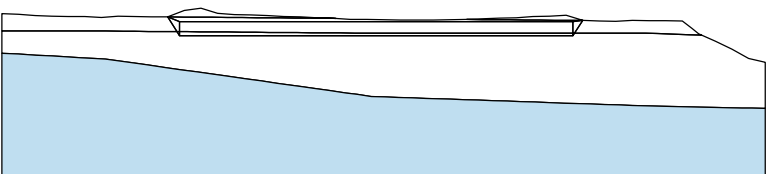

Distributions on beams (extremes)

Number	Coordinates		D [mm]	N [kN/m]	M [kNm/m]	Q [kN/m]
	x [m]	z [m]				
1	12,70	6,20	-0,6	-0,830	0,000	5,467
	29,04	6,20	-3,3	-3,554	0,693	0,067
	36,81	6,20	-2,5	-4,915	1,890	0,680
	38,90	6,20	-2,0	-4,275	3,116	0,053
	40,81	6,20	-1,3	-2,236	0,000	-6,456

Input data (Construction stage 9)

Assignment and activation

Number	Region	Active / inactive	Assigned soil
1		Inactive	
2		Active	umetno nasutje - odpad 
3		Inactive	
4		Inactive	
5		Active	tamponsko nasutje 
6		Active	umetno nasutje - odpad 
7		Active	tamponsko nasutje 
8		Active	tamponsko nasutje 

Number	Region	Active / inactive	Assigned soil
9		Active	Meljna glina 
10		Active	tamponsko nasutje 
11		Active	tamponsko nasutje 
12		Active	tamponsko nasutje 
13		Active	peščen prod 

Beams

Number	Beam		Location	Support [m]		Include self weight	Fictitious beam	Cross-section	Material	Contacts	
	new	modified		Start pt.	End pt.					left	right
1	No	No	Free line No. 7	┌	┌	Yes	No	without modification	without modification	(not input)	(not input)

Number	Cross-section		Material	
	I_y [m ⁴ /m]	A [m ² /m]	E [MPa]	G [MPa]
1	1,30E-03	2,50E-01	31000,00	12917,00

Line supports

Number	Line support		Location	Support	
	new	modified		Direction X	Direction Z
A1	Yes		Mesh line No. 59	fixed	free
A2	Yes		Mesh line No. 57	fixed	free
A3	Yes		Mesh line No. 47	fixed	free
A4	Yes		Mesh line No. 61	fixed	free
A5	Yes		Mesh line No. 52	fixed	free

Number	Line support		Location	Support	
	new	modified		Direction X	Direction Z
A6	Yes		Mesh line No. 60	fixed	fixed
A1 up to A6 - automatically generated line supports along model edges					

Beam loads

Number	Beam load		Beam	Type of load	Direction	Angle α [°]	Origin x [m]	Length l [m]	Magnitude		
	new	change							f, m, q, q ₁	q ₂	unit
1	No	Yes	Beam No. 1	distr. uniform on the whole beam	perpendicular to beam	0,00			20,00		[kN/m ²]

Water

Water type : No water

Analysis settings

Stress

Method : Newton - Raphson
 Stiffness matrix change : after each iteration
 Max. number of iterations for one calc. step : 100
 Initial calculation step : 0,1000
 Displacement error : 0,0100
 Imbalanced forces error : 0,0100
 Energy error : 0,0100
 Respect material interfaces : no

Plasticity

Return mapping error : 0,00100
 Max. number of iterations for one plast. step : 20

Newton - Raphson

Relaxation factor of calculation step : 2,00
 Maximum number of relaxations of calculation step : 2
 Min. number of iterations for one calc. step : 1

Line search

Solution method : iterate no
 Line search limit - minimum : 0,100
 Line search limit - maximum : 1,000

Results (Construction stage 9)

Stress analysis was successfully completed.

Analysis settings : standard
 Attained loading = 100,00 %

Extremes

Displacements (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Displacements x [mm]	40,74	1,07	-1,3	14,08	0,85	1,0
Displacements z [mm]	49,81	5,33	-0,3	29,04	6,20	5,7

Stress (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Total stress $\sigma_{z, \text{tot}}$ [kPa]	11,86	6,54	-6,35	20,83	-5,00	241,90
Effective stress $\sigma_{z, \text{eff}}$ [kPa]	11,86	6,54	-6,35	20,83	-5,00	241,90
Total stress $\sigma_{x, \text{tot}}$ [kPa]	11,86	6,54	-3,51	21,82	-5,00	130,22
Effective stress $\sigma_{x, \text{eff}}$ [kPa]	11,86	6,54	-3,51	21,82	-5,00	130,22
Shear stress τ_{xz} [kPa]	45,63	-5,00	-11,21	12,70	5,49	9,01

Strain (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Equivalent deviatoric strain E_d [%]	4,74	6,57	0,00	19,84	-5,00	0,58
Plastic equivalent deviatoric strain $E_{d, \text{pl}}$ [%]	0,00	5,53	0,00	49,81	5,33	0,21

Mobilization degree (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Mobilized shear strength [%]	2,37	6,63	19,32	9,49	6,56	111,75

Pore pressures (extremes)


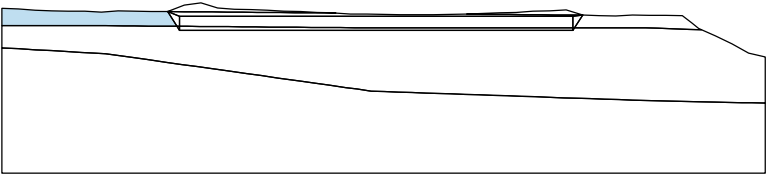

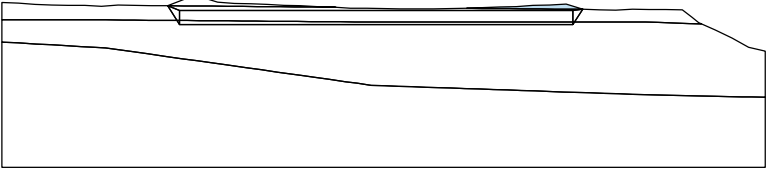
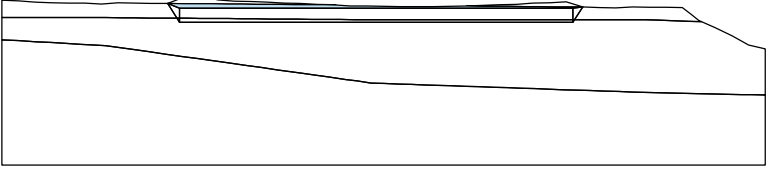
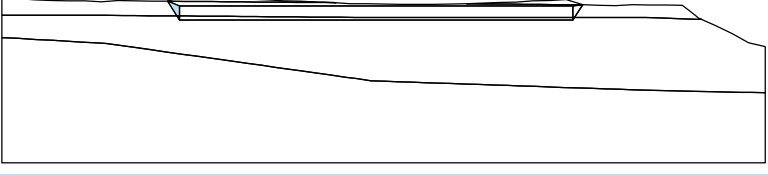

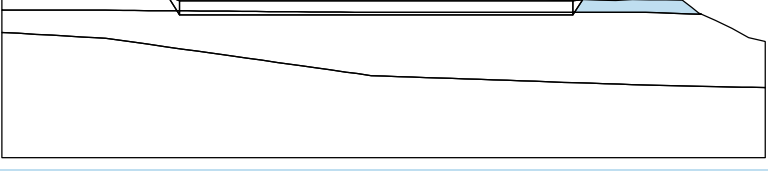

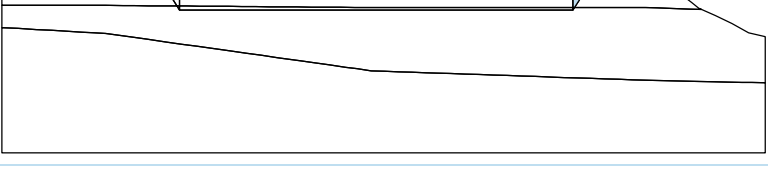

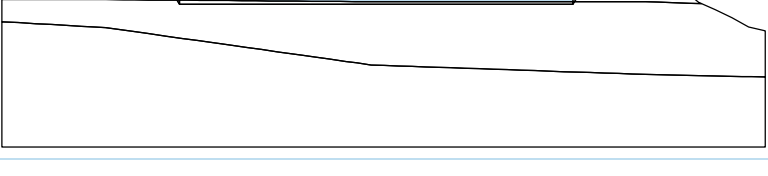

Variable	Location		Max
	x [m]	z [m]	
Total pore pressure u_{tot} [kPa]	12,52	5,49	0,00

Distributions on beams (extremes)

Number	Coordinates		D [mm]	N [kN/m]	M [kNm/m]	Q [kN/m]
	x [m]	z [m]				
1	12,70	6,20	-1,8	-2,765	0,000	9,700
	25,45	6,20	-5,5	0,070	0,570	0,407
	29,04	6,20	-5,7	-0,914	0,802	0,117
	37,88	6,20	-4,2	-6,504	4,910	1,023
	38,90	6,20	-3,7	-6,117	5,677	-0,068
	40,81	6,20	-2,5	-3,212	0,000	-10,783

Input data (Construction stage 10)

Assignment and activation

Number	Region	Active / inactive	Assigned soil
1		Inactive	
2		Active	umetno nasutje - odpad 
3		Inactive	
4		Inactive	
5		Active	tamponsko nasutje 
6		Active	umetno nasutje - odpad 
7		Active	tamponsko nasutje 
8		Active	tamponsko nasutje 

Number	Region	Active / inactive	Assigned soil
9		Active	Meljna glina
10		Active	tamponsko nasutje
11		Active	tamponsko nasutje
12		Active	tamponsko nasutje
13		Active	peščen prod

Beams

Number	Beam		Location	Support [m]		Include self weight	Fictitious beam	Cross-section	Material	Contacts	
	new	modified		Start pt.	End pt.					left	right
1	No	No	Free line No. 7	┌	┌	Yes	No	without modification	without modification	(not input)	(not input)

Number	Cross-section		Material	
	I_y [m ⁴ /m]	A [m ² /m]	E [MPa]	G [MPa]
1	1,30E-03	2,50E-01	31000,00	12917,00

Line supports

Number	Line support		Location	Support	
	new	modified		Direction X	Direction Z
A1	Yes		Mesh line No. 59	fixed	free
A2	Yes		Mesh line No. 57	fixed	free
A3	Yes		Mesh line No. 47	fixed	free
A4	Yes		Mesh line No. 61	fixed	free
A5	Yes		Mesh line No. 52	fixed	free

Number	Line support		Location	Support	
	new	modified		Direction X	Direction Z
A6	Yes		Mesh line No. 60	fixed	fixed
A1 up to A6 - automatically generated line supports along model edges					

Beam loads

Number	Beam load		Beam	Type of load	Direction	Angle α [°]	Origin x [m]	Length l [m]	Magnitude		
	new	change							f, m, q, q ₁	q ₂	unit
1	No	Yes	Beam No. 1	distr. uniform on the whole beam	perpendicular to beam	0,00			80,00		[kN/m ²]

Water

Water type : No water

Analysis settings

Stress

Method : Newton - Raphson
 Stiffness matrix change : after each iteration
 Max. number of iterations for one calc. step : 100
 Initial calculation step : 0,1000
 Displacement error : 0,0100
 Imbalanced forces error : 0,0100
 Energy error : 0,0100
 Respect material interfaces : no

Plasticity

Return mapping error : 0,00100
 Max. number of iterations for one plast. step : 20

Newton - Raphson

Relaxation factor of calculation step : 2,00
 Maximum number of relaxations of calculation step : 2
 Min. number of iterations for one calc. step : 1

Line search

Solution method : iterate no
 Line search limit - minimum : 0,100
 Line search limit - maximum : 1,000

Results (Construction stage 10)

Stress analysis was successfully completed.

Analysis settings : standard
 Attained loading = 100,00 %

Extremes

Displacements (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Displacements x [mm]	40,74	1,07	-5,1	13,03	0,95	4,5
Displacements z [mm]	0,00	6,77	-1,6	27,95	6,20	20,1

Stress (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Total stress $\sigma_{z, tot}$ [kPa]	41,51	6,29	-21,99	25,79	-5,00	300,15
Effective stress $\sigma_{z, eff}$ [kPa]	41,51	6,29	-21,99	25,79	-5,00	300,15
Total stress $\sigma_{x, tot}$ [kPa]	45,07	6,30	-3,30	25,79	-5,00	161,62
Effective stress $\sigma_{x, eff}$ [kPa]	45,07	6,30	-3,30	25,79	-5,00	161,62
Shear stress τ_{xz} [kPa]	41,66	-5,00	-24,38	12,70	5,49	22,73

Strain (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Equivalent deviatoric strain E_d [%]	45,07	6,30	0,00	25,79	-5,00	0,72
Plastic equivalent deviatoric strain $E_{d, pl}$ [%]	0,00	5,53	0,00	49,81	5,33	0,21

Mobilization degree (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Mobilized shear strength [%]	4,74	6,57	22,99	43,88	6,22	116,17

Pore pressures (extremes)


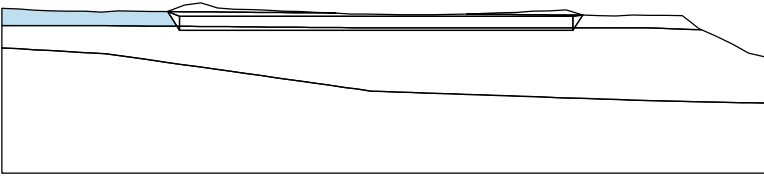

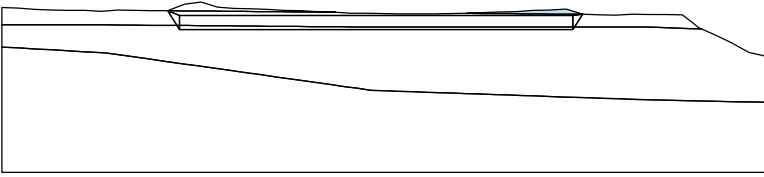
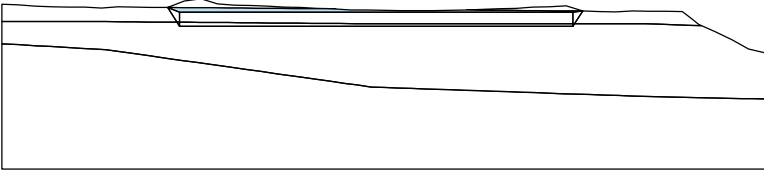
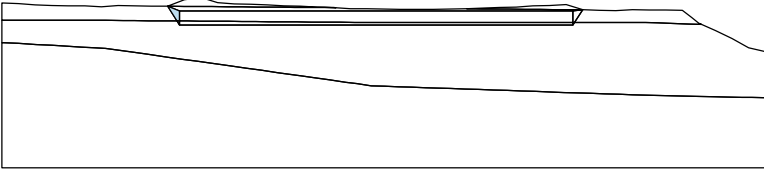

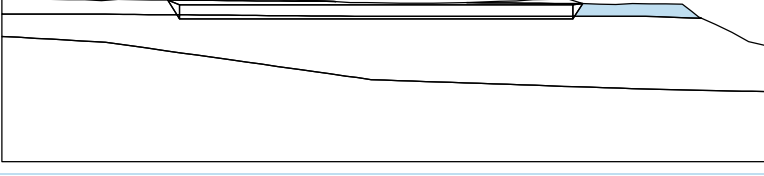

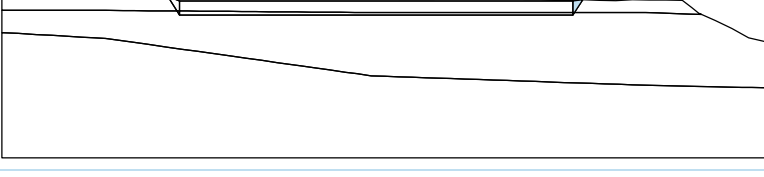

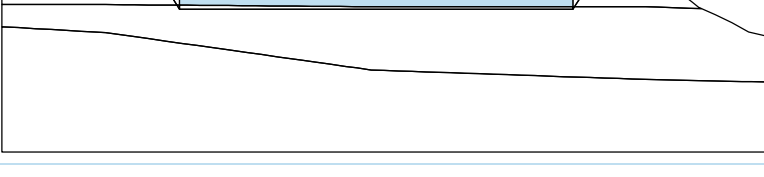

Variable	Location		Max
	x [m]	z [m]	
Total pore pressure u_{tot} [kPa]	12,52	5,49	0,00

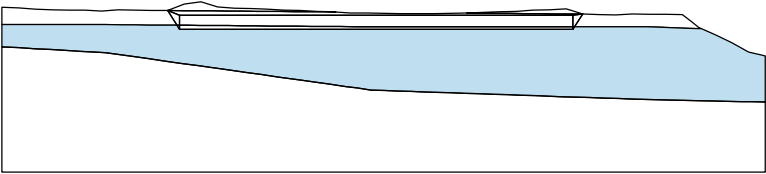

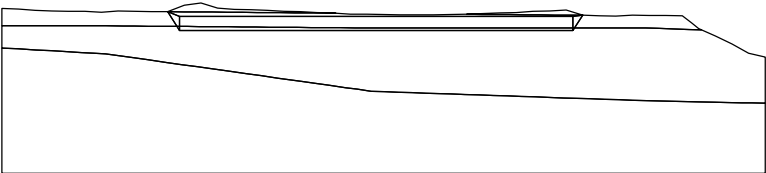

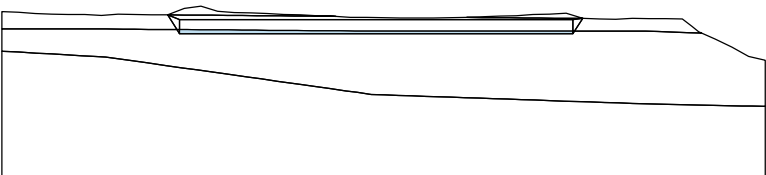



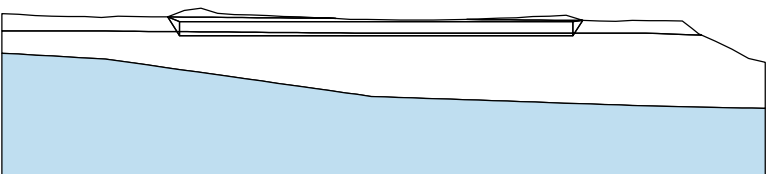

Distributions on beams (extremes)

Number	Coordinates		D [mm]	N [kN/m]	M [kNm/m]	Q [kN/m]
	x [m]	z [m]				
1	12,70	6,20	-9,1	-10,055	0,000	31,920
	15,63	6,20	-15,1	-17,799	17,559	-2,801
	26,54	6,20	-20,1	18,180	0,999	-3,172
	27,95	6,20	-20,1	17,509	1,154	2,611
	38,90	6,20	-14,1	-15,463	19,195	-1,566
	40,81	6,20	-9,8	-4,868	0,000	-32,780

Input data (Construction stage 11)

Assignment and activation

Number	Region	Active / inactive	Assigned soil
1		Inactive	
2		Active	umetno nasutje - odpad 
3		Inactive	
4		Inactive	
5		Active	tamponsko nasutje 
6		Active	umetno nasutje - odpad 
7		Active	tamponsko nasutje 
8		Active	tamponsko nasutje 

Number	Region	Active / inactive	Assigned soil
9		Active	Meljna glina 
10		Active	tamponsko nasutje 
11		Active	tamponsko nasutje 
12		Active	tamponsko nasutje 
13		Active	peščen prod 

Beams

Number	Beam		Location	Support [m]		Include self weight	Fictitious beam	Cross-section	Material	Contacts	
	new	modified		Start pt.	End pt.					left	right
1	No	No	Free line No. 7	┌	┌	Yes	No	without modification	without modification	(not input)	(not input)

Number	Cross-section		Material	
	I_y [m ⁴ /m]	A [m ² /m]	E [MPa]	G [MPa]
1	1,30E-03	2,50E-01	31000,00	12917,00

Line supports

Number	Line support		Location	Support	
	new	modified		Direction X	Direction Z
A1	Yes		Mesh line No. 59	fixed	free
A2	Yes		Mesh line No. 57	fixed	free
A3	Yes		Mesh line No. 47	fixed	free
A4	Yes		Mesh line No. 61	fixed	free
A5	Yes		Mesh line No. 52	fixed	free

Number	Line support		Location	Support	
	new	modified		Direction X	Direction Z
A6	Yes		Mesh line No. 60	fixed	fixed
A1 up to A6 - automatically generated line supports along model edges					

Water

Water type : No water

Analysis settings

Stress

Method : Newton - Raphson
 Stiffness matrix change : after each iteration
 Max. number of iterations for one calc. step : 100
 Initial calculation step : 0,1000
 Displacement error : 0,0100
 Imbalanced forces error : 0,0100
 Energy error : 0,0100
 Respect material interfaces : no

Plasticity

Return mapping error : 0,00100
 Max. number of iterations for one plast. step : 20

Newton - Raphson

Relaxation factor of calculation step : 2,00
 Maximum number of relaxations of calculation step : 2
 Min. number of iterations for one calc. step : 1

Line search

Solution method : iterate no
 Line search limit - minimum : 0,100
 Line search limit - maximum : 1,000

Results (Construction stage 11)

Stress analysis was successfully completed.

Analysis settings : standard
 Attained loading = 100,00 %

Extremes

Displacements (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Displacements x [mm]	40,74	1,07	-3,6	13,03	0,95	3,1
Displacements z [mm]	0,00	6,77	-1,1	29,04	6,20	14,2

Stress (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Total stress $\sigma_{z, tot}$ [kPa]	41,51	6,29	-3,16	0,00	-5,00	232,34
Effective stress $\sigma_{z, eff}$ [kPa]	41,51	6,29	-3,16	0,00	-5,00	232,34
Total stress $\sigma_{x, tot}$ [kPa]	5,93	6,57	-0,45	0,00	-5,00	125,08
Effective stress $\sigma_{x, eff}$ [kPa]	5,93	6,57	-0,45	0,00	-5,00	125,08

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Shear stress τ_{xz} [kPa]	50,73	2,54	-9,03	41,51	6,29	2,39

Strain (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Equivalent deviatoric strain E_d [%]	5,93	6,57	0,00	24,80	-5,00	0,66
Plastic equivalent deviatoric strain $E_{d,pl}$ [%]	0,00	5,53	0,00	49,81	5,33	0,21

Mobilization degree (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Mobilized shear strength [%]	14,57	6,20	18,03	49,81	5,33	97,52

Pore pressures (extremes)


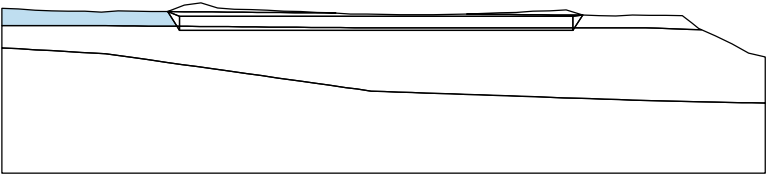

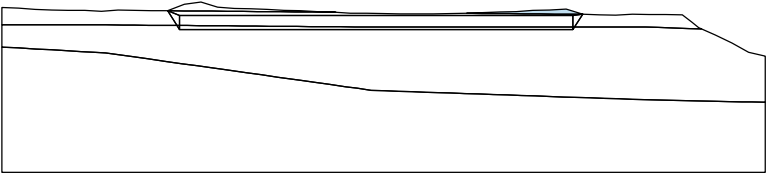
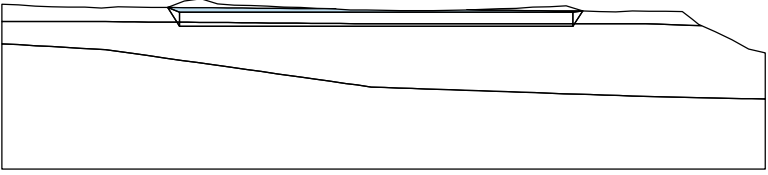
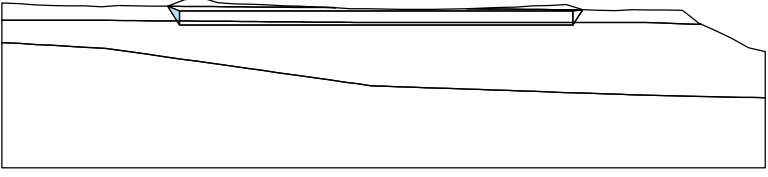

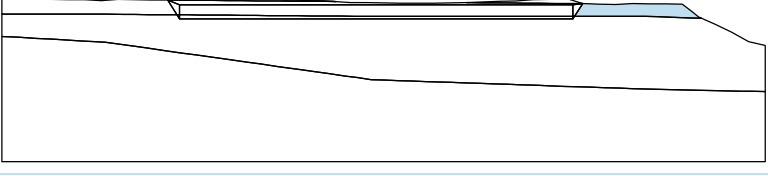

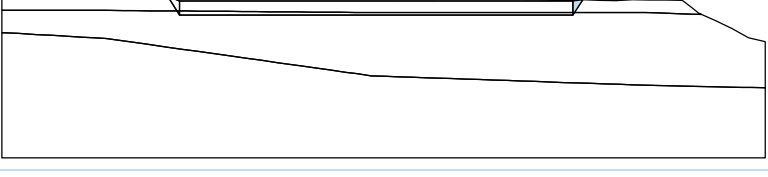

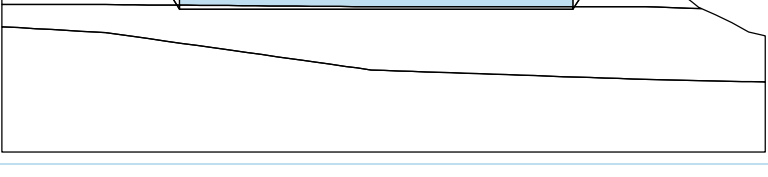

Variable	Location		Max
	x [m]	z [m]	
Total pore pressure u_{tot} [kPa]	12,52	5,49	0,00

Distributions on beams (extremes)

Number	Coordinates		D [mm]	N [kN/m]	M [kNm/m]	Q [kN/m]
	x [m]	z [m]				
1	12,70	6,20	-6,3	-2,313	0,000	5,943
	13,61	6,20	-7,6	-1,903	5,679	6,943
	29,04	6,20	-14,2	-6,700	1,203	0,266
	30,14	6,20	-14,2	-6,757	1,567	0,359
	37,88	6,20	-11,0	-2,651	11,525	0,825
	39,82	6,20	-8,5	-1,247	6,300	-6,805
	40,81	6,20	-7,0	0,666	0,000	-6,475

Input data (Construction stage 12)

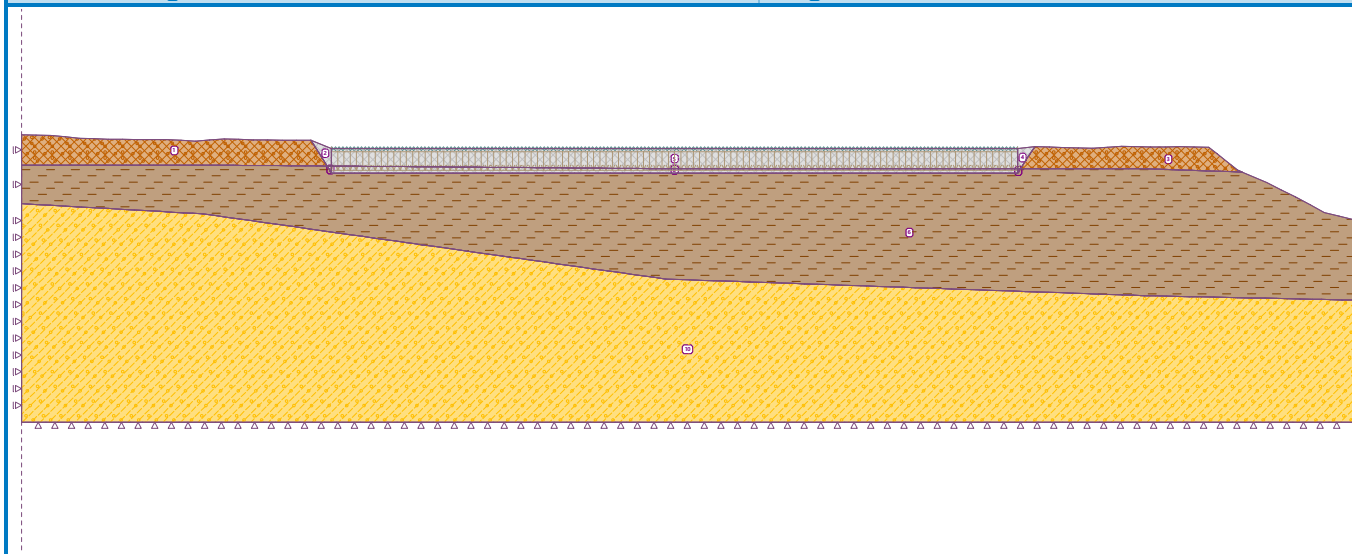
Assignment and activation

Number	Region	Active / inactive	Assigned soil
1		Inactive	
2		Active	umetno nasutje - odpad 
3		Inactive	
4		Inactive	
5		Active	tamponsko nasutje 
6		Active	umetno nasutje - odpad 
7		Active	tamponsko nasutje 
8		Active	tamponsko nasutje 

Number	Region	Active / inactive	Assigned soil
9		Active	Meljna glina
10		Active	tamponsko nasutje
11		Active	tamponsko nasutje
12		Active	tamponsko nasutje
13		Active	peščen prod

Name : Assign

Stage : 12



Beams

Number	Beam		Location	Support [m]		Include self weight	Fictitious beam	Cross-section	Material	Contacts	
	new	modified		Start pt.	End pt.					left	right
1	No	No	Free line No. 7	┌	┌	Yes	No	without modification	without modification	(not input)	(not input)

Number	Cross-section		Material	
	I_y [m ⁴ /m]	A [m ² /m]	E [MPa]	G [MPa]
1	1,30E-03	2,50E-01	31000,00	12917,00

Line supports

Number	Line support		Location	Support	
	new	modified		Direction X	Direction Z
A1	Yes		Mesh line No. 59	fixed	free
A2	Yes		Mesh line No. 57	fixed	free
A3	Yes		Mesh line No. 47	fixed	free
A4	Yes		Mesh line No. 61	fixed	free
A5	Yes		Mesh line No. 52	fixed	free
A6	Yes		Mesh line No. 60	fixed	fixed

A1 up to A6 - automatically generated line supports along model edges

Beam loads

Number	Beam load		Beam	Type of load	Direction	Angle α [°]	Origin x [m]	Length l [m]	Magnitude		
	new	change							f, m, q, q ₁	q ₂	unit
1	Yes		Beam No. 1	distr. uniform on the whole beam	perpendicular to beam	0,00			60,00		[kN/m ²]

Water

Water type : No water

Analysis settings

Stress

Method : Newton - Raphson
 Stiffness matrix change : after each iteration
 Max. number of iterations for one calc. step : 100
 Initial calculation step : 0,1000
 Displacement error : 0,0100
 Imbalanced forces error : 0,0100
 Energy error : 0,0100
 Respect material interfaces : no

Plasticity

Return mapping error : 0,00100
 Max. number of iterations for one plast. step : 20

Newton - Raphson

Relaxation factor of calculation step : 2,00
 Maximum number of relaxations of calculation step : 2
 Min. number of iterations for one calc. step : 1

Line search

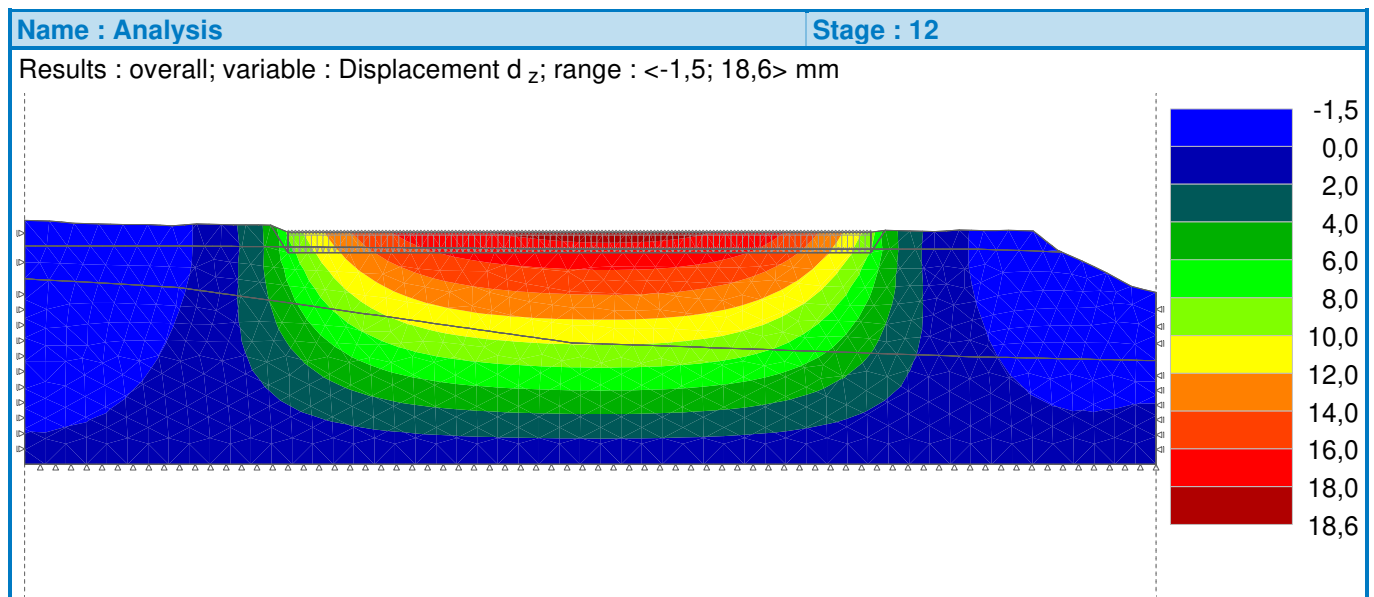
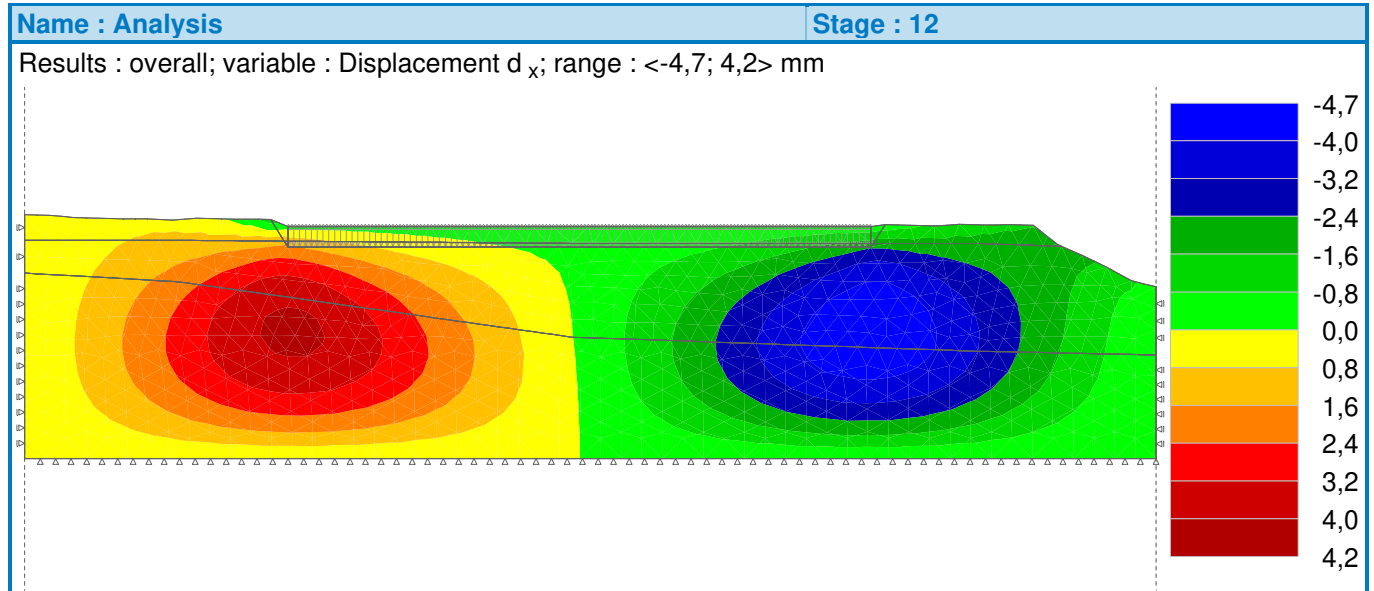
Solution method : iterate no
 Line search limit - minimum : 0,100
 Line search limit - maximum : 1,000

Results (Construction stage 12)

Stress analysis was successfully completed.

Analysis settings : standard

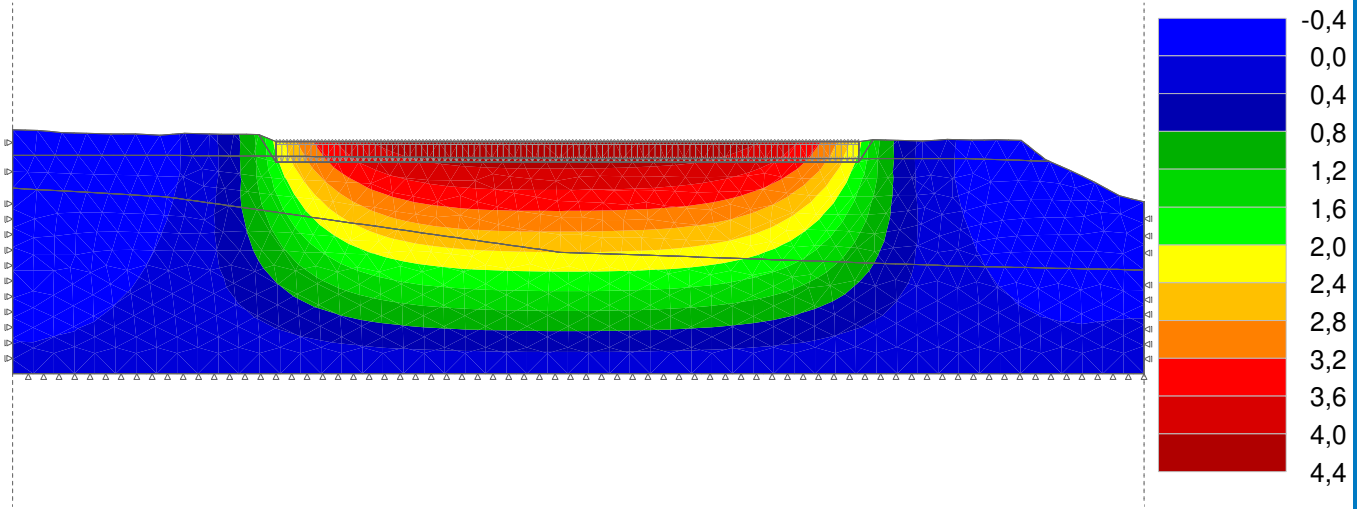
Attained loading = 100,00 %



Name : Analysis

Stage : 12

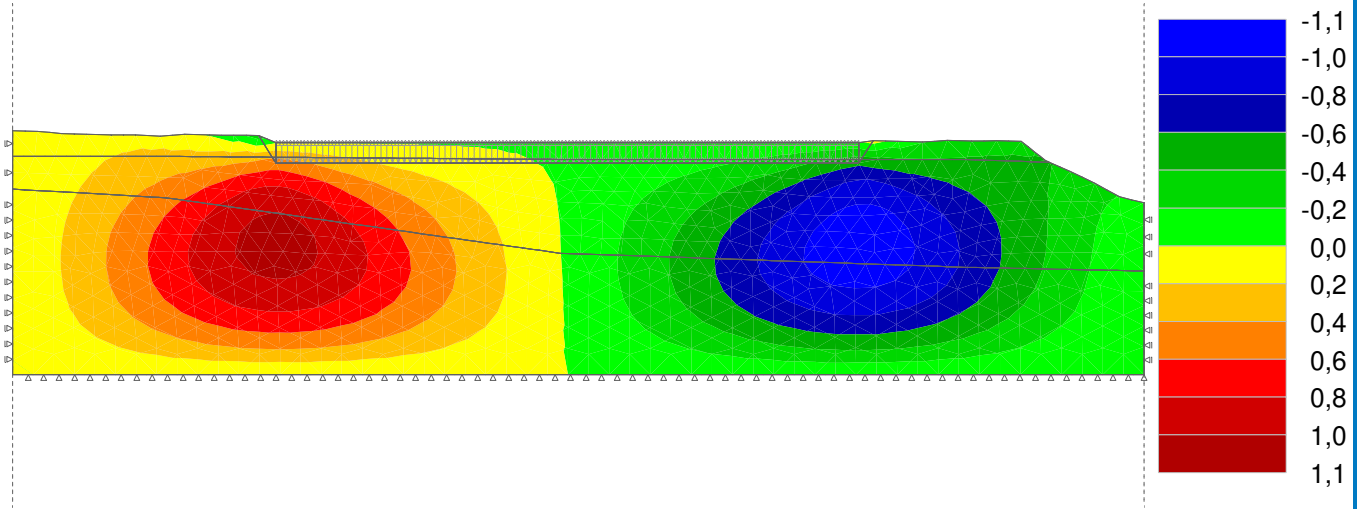
Results : compare to previous stage; variable : Displacement d_z ; range : <-0,4; 4,4> mm



Name : Analysis

Stage : 12

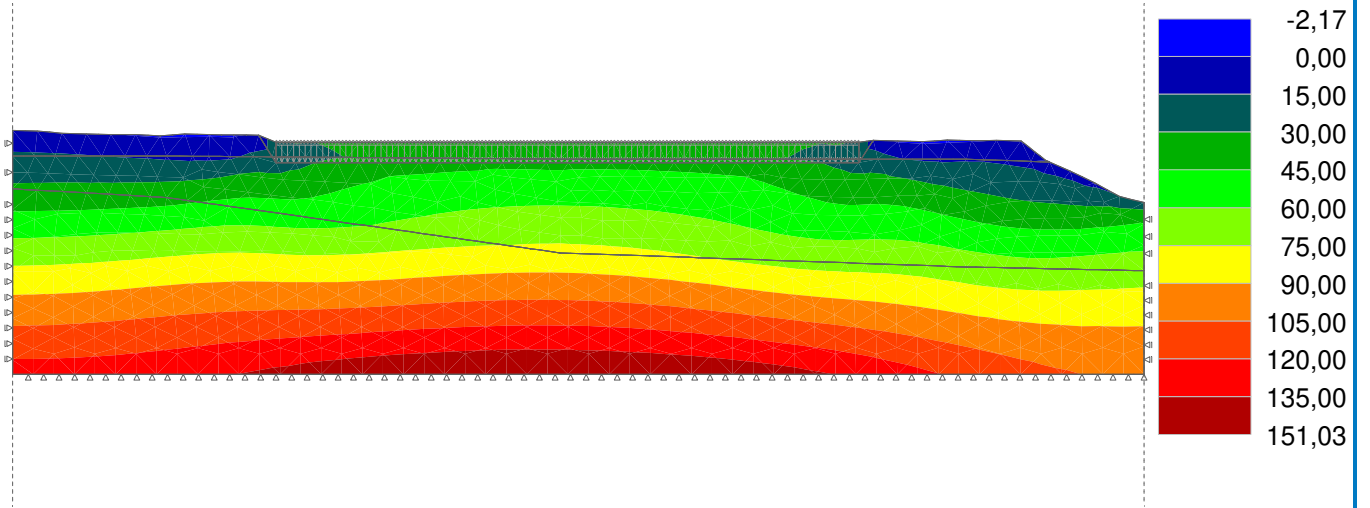
Results : compare to previous stage; variable : Displacement d_x ; range : <-1,1; 1,1> mm



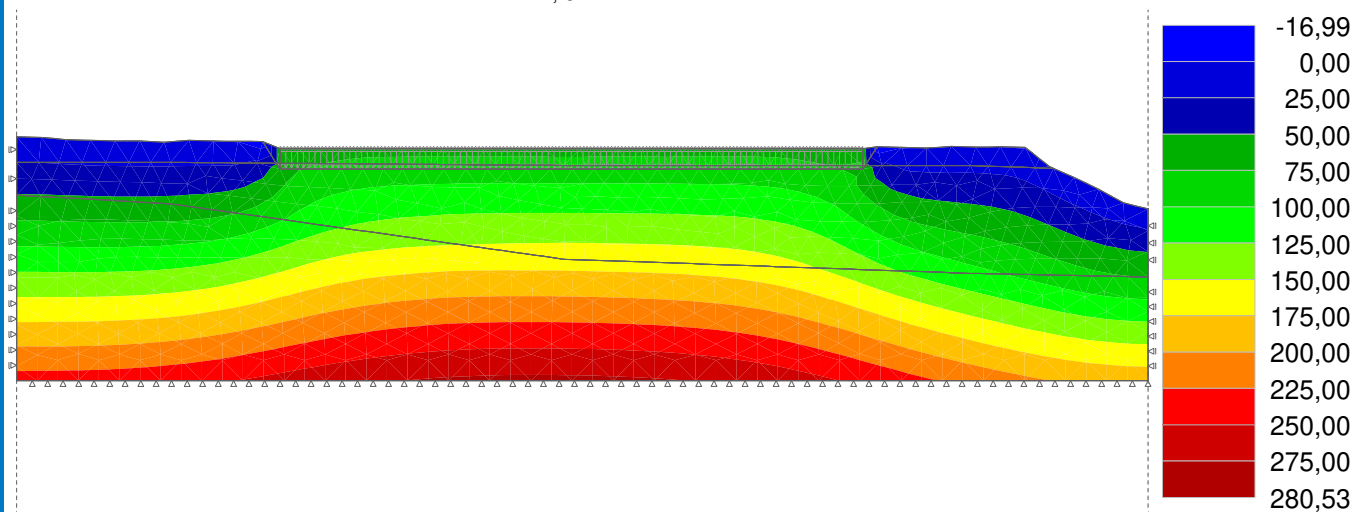
Name : Analysis

Stage : 12

Results : overall; variable : Effective stress $\sigma_{x, eff}$; range : <-2,17; 151,03> kPa



Name : Analysis
Stage : 12

 Results : overall; variable : Effective stress $\sigma_{z, \text{eff}}$; range : <-16,99; 280,53> kPa

Extremes
Displacements (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Displacements x [mm]	40,74	1,07	-4,7	13,03	0,95	4,2
Displacements z [mm]	0,00	6,77	-1,5	27,95	6,20	18,6

Stress (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Total stress $\sigma_{z, \text{tot}}$ [kPa]	41,51	6,29	-16,99	24,80	-5,00	280,53
Effective stress $\sigma_{z, \text{eff}}$ [kPa]	41,51	6,29	-16,99	24,80	-5,00	280,53
Total stress $\sigma_{x, \text{tot}}$ [kPa]	45,07	6,30	-2,17	25,79	-5,00	151,03
Effective stress $\sigma_{x, \text{eff}}$ [kPa]	45,07	6,30	-2,17	25,79	-5,00	151,03
Shear stress τ_{xz} [kPa]	41,66	-5,00	-19,68	12,70	5,49	16,95

Strain (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Equivalent deviatoric strain E_d [%]	45,07	6,30	0,00	24,80	-5,00	0,71
Plastic equivalent deviatoric strain $E_{d, \text{pl}}$ [%]	0,00	5,53	0,00	49,81	5,33	0,21

Mobilization degree (extremes)

Variable	Location		Min	Location		Max
	x [m]	z [m]		x [m]	z [m]	
Mobilized shear strength [%]	4,74	6,57	21,99	49,81	5,33	97,34

Pore pressures (extremes)

Variable	Location		Max
	x [m]	z [m]	
Total pore pressure u_{tot} [kPa]	12,52	5,49	0,00

Distributions on beams (extremes)

Number	Coordinates		D [mm]	N [kN/m]	M [kNm/m]	Q [kN/m]
	x [m]	z [m]				
1	12,70	6,20	-8,4	-8,465	0,000	25,559
	15,63	6,20	-13,9	-14,054	15,995	-2,294
	26,54	6,20	-18,6	11,976	0,965	-2,427
	27,95	6,20	-18,6	11,420	1,112	2,038
	38,90	6,20	-13,0	-12,129	17,153	-1,791
	40,81	6,20	-9,1	-4,024	0,000	-26,490

R.5. VRTINE

GEOTEHNIČNI PROFIL VRTINE

V- 1/2026

0 m - 10 m

		GLOBINA:	10 m	VRTALNI STROJ:	GEO 305
		NIVO VODE:	2,1 m	DATUM VRTANJA:	29.12.2025
NAROČNIK:	Stanovanjski sklad RS	KOTA TERENA:	186,87 m n.v.	OBDELAL:	Tomaž Mayer, u.d.i.g.
OBJEKT:	Večstanovanjski objekt	E:	535074,234	PREGLEDAL:	Tomaž Mayer, u.d.i.g.
LOKACIJA:	PARCELA 4131/5 k.o. 144 Kobilje	N:	169011,012	LIST:	1/1

Metoda vrtanja	Globina (m)	LITOLOŠKI STOLPEC	AC KLASIFIKACIJA	LITOLOŠKI OPIS	RQD	RAZPOKE	SPT	PRESIOMETER	VZOREC	OPOMBE	NIVO VODE
	1,00			UMETNO NASUTJE (MEŠANICA GLINE, GRAMOZA IN OPEKE)							
	2,10		CIM	SREDNJE PLASTIČNA PEŠČENA GLINA (RJAVA), TRDE. KONS.							↓
	10,00		GrW-siGr	DOBRO ZRNAT PROD Z MELJEM IN PESKOM (GW-GM)							

GEOTEHNIČNI PROFIL VRTINE

V- 2/2026

0 m - 10 m

		GLOBINA:	10 m	VRTALNI STROJ:	GEO 305
		NIVO VODE:	2,6 m	DATUM VRTANJA:	29.12.2025
NAROČNIK:	Stanovanjski sklad RS	KOTA TERENA:	187,15 m n.v.	OBDELAL:	Tomaž Mayer, u.d.i.g.
OBJEKT:	Večstanovanjski objekt	E:	535048,479	PREGLEDAL:	Tomaž Mayer, u.d.i.g.
LOKACIJA:	PARCELA 4131/5 k.o. 144 Kobilje	N:	169002,204	LIST:	1/1

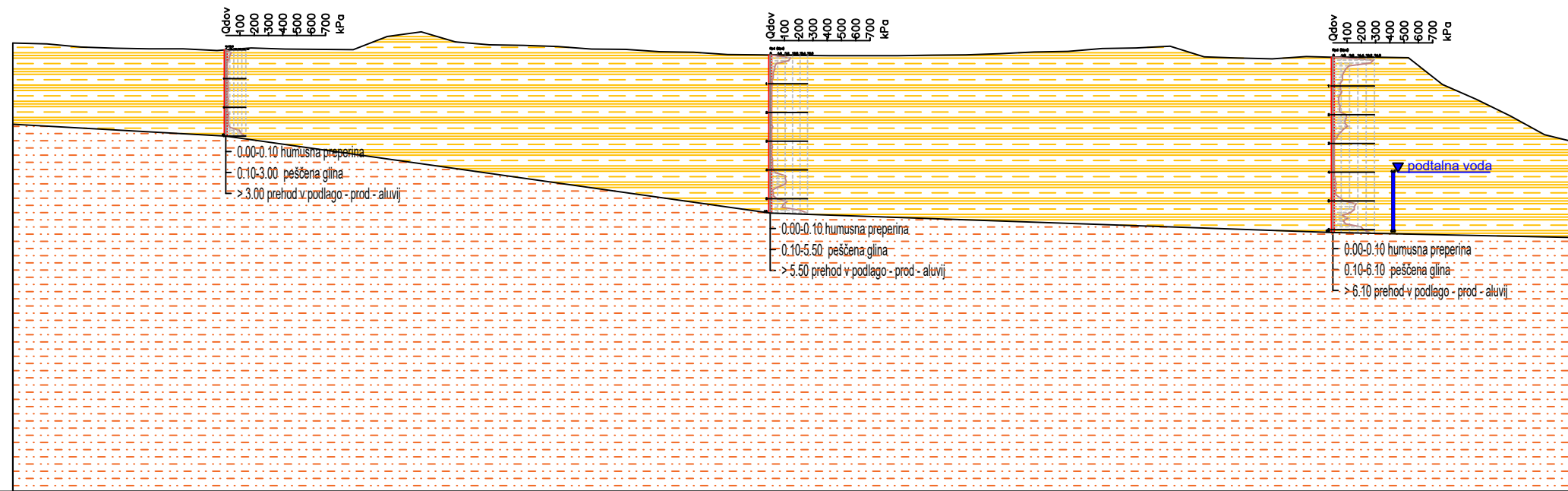
Metoda vrtanja	Globina (m)	LITOLOŠKI STOLPEC	AC KLASIFIKACIJA	LITOLOŠKI OPIS	RQD	RAZPOKE	SPT	PRESIOMETER	VZOREC	OPOMBE	NIVO VODE
1.10	1.10			UMETNO NASUTJE (MEŠANICA GLINE, GRAMOZA IN OPEKE)							
2.60	2.60		CIM	SREDNJE PLASTIČNA PEŠČENA GLINA (RJAVA), TRDE. KONS.							↓
4.50	4.50		GrW-siGr	DOBRO ZRNAT PROD Z MELJEM IN PESKOM (GW-GM)						Na globini 5m smo med vrtanjem naleteli na konglomerat	↓
10.00	10.00		GrW-siGr	DOBRO ZRNAT PROD Z MELJEM IN PESKOM (GW-GM) – NIZKO PENETRABILNEN							↓

G. GRAFIKE

DPH 4

DPH 3

DPH 1



PR.1

terena	187,54	54,56	183,7
stacionaža	0,00		

LEGENDA:

- Qdov DOVOLJENA NAPETOST V ZEMLJINI
- DP — LOKACIJE MERTIVE Z DINAMIČNIM PENETRO

Naročnik
Stanovanjski sklad Republike Slovenije
Poljanska cesta 31, 1000 Ljubljana

Izvajalec:
PNV inženiring

Podizvajalec:

Naziv	Ime in priimek	Ident. št.	Podpis
Odg.vodja proj.:			
Poobl. Inženir:	mag. Janez MAYER u.d.i.r.g.	RG-0038	
Projektant 1:	Tomaž MAYER d.i.g.(UN)		
Projektant 2:			

Projekt:
Geološko geotehnično poročilo za parc. št. 4131/5, 4131/7, 4131/8 k.o. 144 Kobilje

Odsek:

Pododsek:

Opis risbe: Geološko geotehnični profil PR.1

Del risbe:			
Št. projekta:	25/11/1180	Faza:	DGD
Št. načrta:		Merilo:	1:200
Šifra CC:		Datum:	dec 2025

Št. odseka:	Arhivska št.:	Faza/Objekt:	Šifra risbe:
Št. priloge:	G.2	Avtor risbe:	PNV inženiring, Tomaž Mayer
		Ident. št. risbe:	