

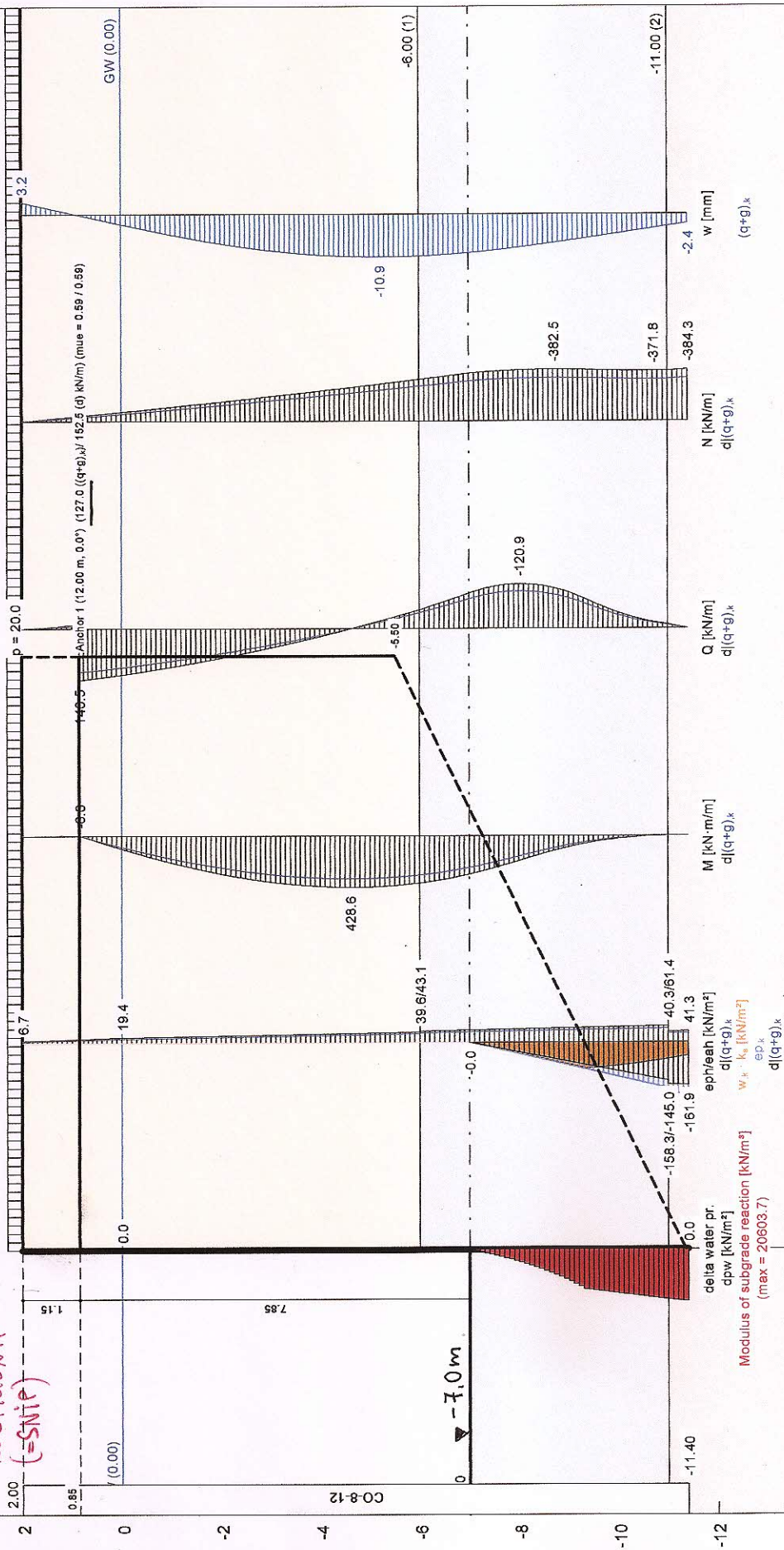
VBOP p18
Sheet pile wall
User-defined section properties
Calculation basis:
No ep redistribution
Active ep according to: DIN 4085
Equivalent ep coefficient $k_{eq} [] = 0.200$
Passive ep according to: DIN 4085 (new)
Section length of 13.40 m fixed and toe bedded
Req. section length = 13.40
Req. embedment depth = 4.40
 $\gamma_q = 1.20$

$\gamma_q = 1.20$
 $\gamma_{ep} = 1.20$
Sum V met/ $\mu = 0.18$
File: p18-U2-7m.vrb
Date: 2/26/2013

Design values:
User-defined section properties
 $\sigma_r = 1.12 \text{ kN/cm}^2$
to -35.50 m : CO-8-12
 $E = 1200.00 \text{ kN/cm}^2$
 $I = 4300000.00 \text{ cm}^4/\text{m}$
 $W = 77045.00 \text{ cm}^3/\text{m}$
 $A = 3132.00 \text{ cm}^2/\text{m}$
 $\sigma_d = N_d / A + M_d / W$
 $N_d = 249.73 \text{ kN/m}$
 $M_d = 428.58 \text{ kN} \cdot \text{m}/\text{m}$
 $\sigma_d = 0.64 \text{ kN/cm}^2$

ENKURI: $\phi 60 \text{ mm (C3)}$, $s = 2.6 \text{ m}$
 $F_{R,d} = 61.9 \text{ t}/1.15 = 53.8 \text{ t} = 528 \text{ kN}$
 $F_{A,d} = 127 \text{ kN}/\text{m} \times 1.35 \times 1.15 \times 2.6 \text{ m} = 513 \text{ kN} < 528 \text{ kN}$

SAMAZINATI
KOEFICIENTI
(=SNIP)



Depth [m]	γ_k [kN/m³]	γ'_k [kN/m³]	ϕ_k [°]	$c(a)_k$ [kN/m²]	$c(p)_k$ [kN/m²]	δ/ϕ active	δ/ϕ passive	Designation
-6.00	19.0	10.0	30.0	0.0	0.0	0.667	-0.667	Uzberums
-11.00	19.0	10.0	28.0	0.0	0.0	0.667	-0.667	Smits 4
-16.00	19.5	10.5	0.0	75.0	75.0	0.500	-0.500	Smits 5
-24.50	18.2	9.2	0.0	40.0	40.0	0.500	-0.500	Smits 6
-29.50	18.6	9.6	0.0	65.0	65.0	0.500	-0.500	Smits 7
<-28.50	18.7	9.7	0.0	75.0	75.0	0.500	-0.500	Smits 8

Subgrade reaction moduli	Top	Bottom
Depth [m]		
0.00 - 4.00	10000.0	10000.0
4.00 - 9.00	20000.0	20000.0
9.00 - 17.50	30000.0	30000.0
17.50 - 22.50	40000.0	40000.0
22.50 - 28.50	40000.0	40000.0

20 25

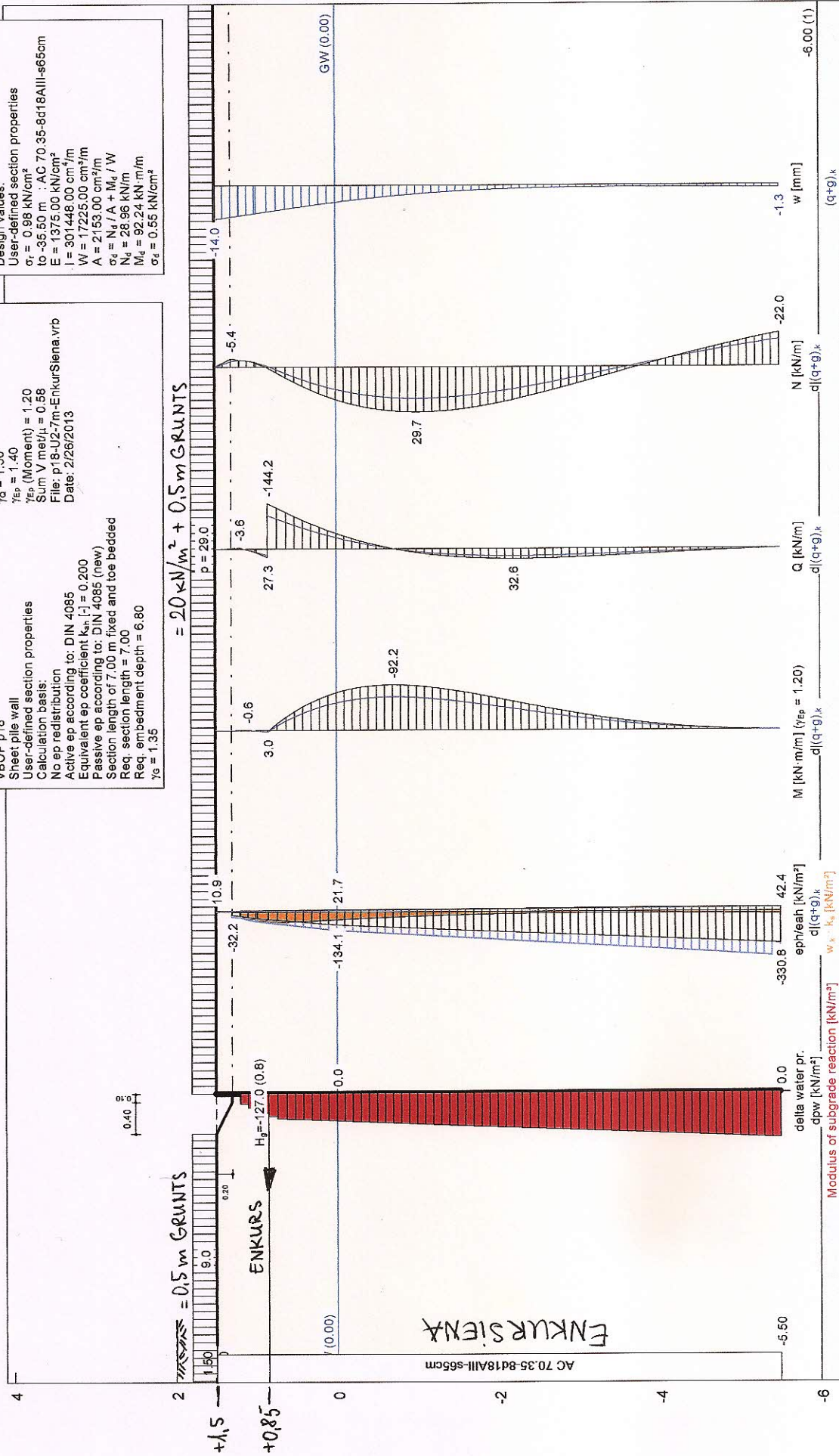
P18-1

VBOP p18

Sheet pile wall
User-defined section properties
Calculation basis:
No ep redistribution
Active ep according to: DIN 4085
Equivalent ep coefficient $k_{at} [\cdot] = 0.200$
Passive ep according to: DIN 4085 (new)
Section length of 7.00 m fixed and toe bedded
Req. section length = 7.00
Req. embedment depth = 6.80
 $\gamma_a = 1.35$

$\gamma_a = 1.50$
 $\gamma_{ep} = 1.40$
 $\gamma_{ep} \text{ (Moment)} = 1.20$
Sum $V \text{ met}/k = 0.58$
File: p18-U2-7m-Enkursiena.vrb
Date: 2/26/2013

Design values:
User-defined section properties
 $\sigma_c = 0.98 \text{ kN/cm}^2$
to -35.50 m : AC 70.35-8d18AIII-s65cm
 $E = 1375.00 \text{ kN/cm}^2$
 $I = 301448.00 \text{ cm}^4/\text{m}$
 $W = 17225.00 \text{ cm}^3/\text{m}$
 $A = 2153.00 \text{ cm}^2/\text{m}$
 $\sigma_d = N_d / A + M_d / W$
 $N_d = 28.96 \text{ kN/m}$
 $M_d = 92.24 \text{ kN-m/m}$
 $\sigma_d = 0.55 \text{ kN/cm}^2$



Soil	Depth [m]	γ'_k [kN/m³]	γ'_k [kN/m³]	ϕ_k [°]	$c(p)_k$ [kN/m²]	δ/ϕ active	δ/ϕ passive	Designation
	-6.00	19.0	10.0	30.0	0.0	0.0	0.667	Uzberums
	-11.00	19.0	10.0	28.0	0.0	0.0	0.667	Snills 4
	-16.00	19.5	10.5	0.0	75.0	0.500	0.500	Snills 5
	-24.50	18.2	9.2	0.0	40.0	0.500	0.500	Snills 6
	-29.50	18.6	9.6	0.0	65.0	0.500	0.500	Snills 7
	<-29.50	18.7	9.7	0.0	75.0	0.500	0.500	Snills 8

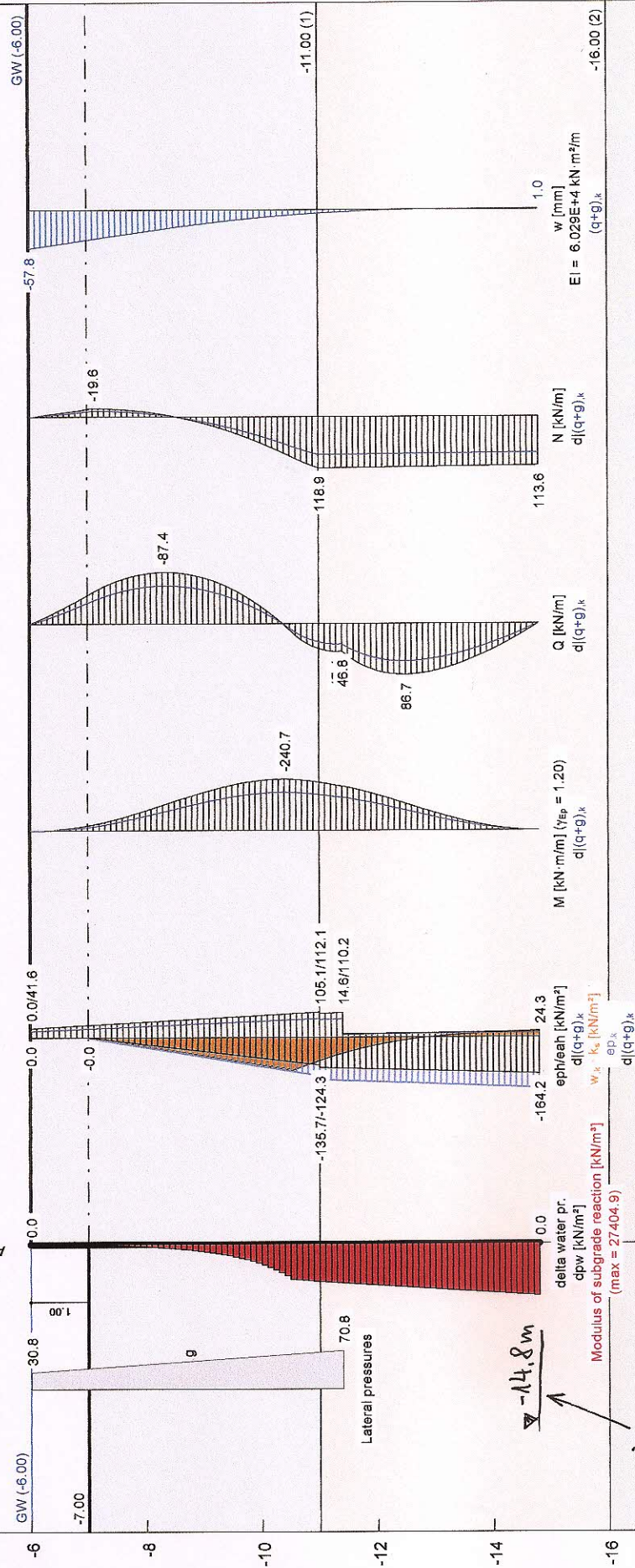
Subgrade reaction moduli	Top	Bottom
Depth [m]		
0.00 - 7.30	10000.0	20000.0
7.30 - 12.30	20000.0	30000.0
12.30 - 17.30	30000.0	40000.0
17.30 - 25.80	40000.0	40000.0
25.80 - 36.80	40000.0	40000.0

P18-2

Design values:
 Chosen: Arcelor AU 14
 $E = 210000.00 \text{ kN/cm}^2$
 $I = 28710.00 \text{ cm}^4/\text{m}$
 $h = 40.80 \text{ cm}$
 $b = 75.00 \text{ cm}$
 $S \cdot \sin(\alpha) / s = 732.00 \text{ cm}^2/\text{m}$
 $\sigma_a = N_d / A + M_d / W$
 $M_d = 240.7 \text{ kN-m/m}$
 $N_d = 84.2 \text{ kN/m}$
 $\sigma_d = 17.74 \text{ kN/cm}^2$

$\sigma_r = 32.27 \text{ kN/cm}^2$
 $\tau = (Q_d \cdot S \cdot \sin(\alpha) \cdot b) / (I \cdot s)$
 $Q_d = 87.4 \text{ kN/m}$
 $\tau_d = 1.67 \text{ kN/cm}^2$
 $\tau_r = 18.63 \text{ kN/cm}^2$
 $\sigma_{v,d} = 17.81 \text{ kN/cm}^2$
 (with: $t = -10.80 \text{ m}$)
 $M_d = 240.1 \text{ kN-m/m}$
 $Q_d = 19.6 \text{ kN/m}$
 $N_d = 97.1 \text{ kN/m}$
 $\sigma_{v,r} = 35.50 \text{ kN/cm}^2$

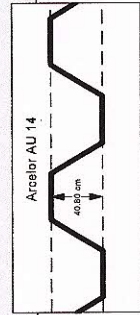
VBOP p18
 Sheet pile wall
 Arcelor AU 14
 Calculation basis:
 $\gamma_a = 1.35$
 $\gamma_s = 1.50$
 $\gamma_{ep} = 1.40$
 $\gamma_{ep} \text{ (Moment)} = 1.20$
 Sum V not met
 Active ep according to: DIN 4085
 Equivalent ep coefficient $k_{\alpha} [\cdot] = 0.200$
 Passive ep according to: DIN 4085 (new)
 Section length automatic and toe bedded
 Section length = 8.80 m
 Req. section length = 8.80
 Req. embedment depth = 7.80



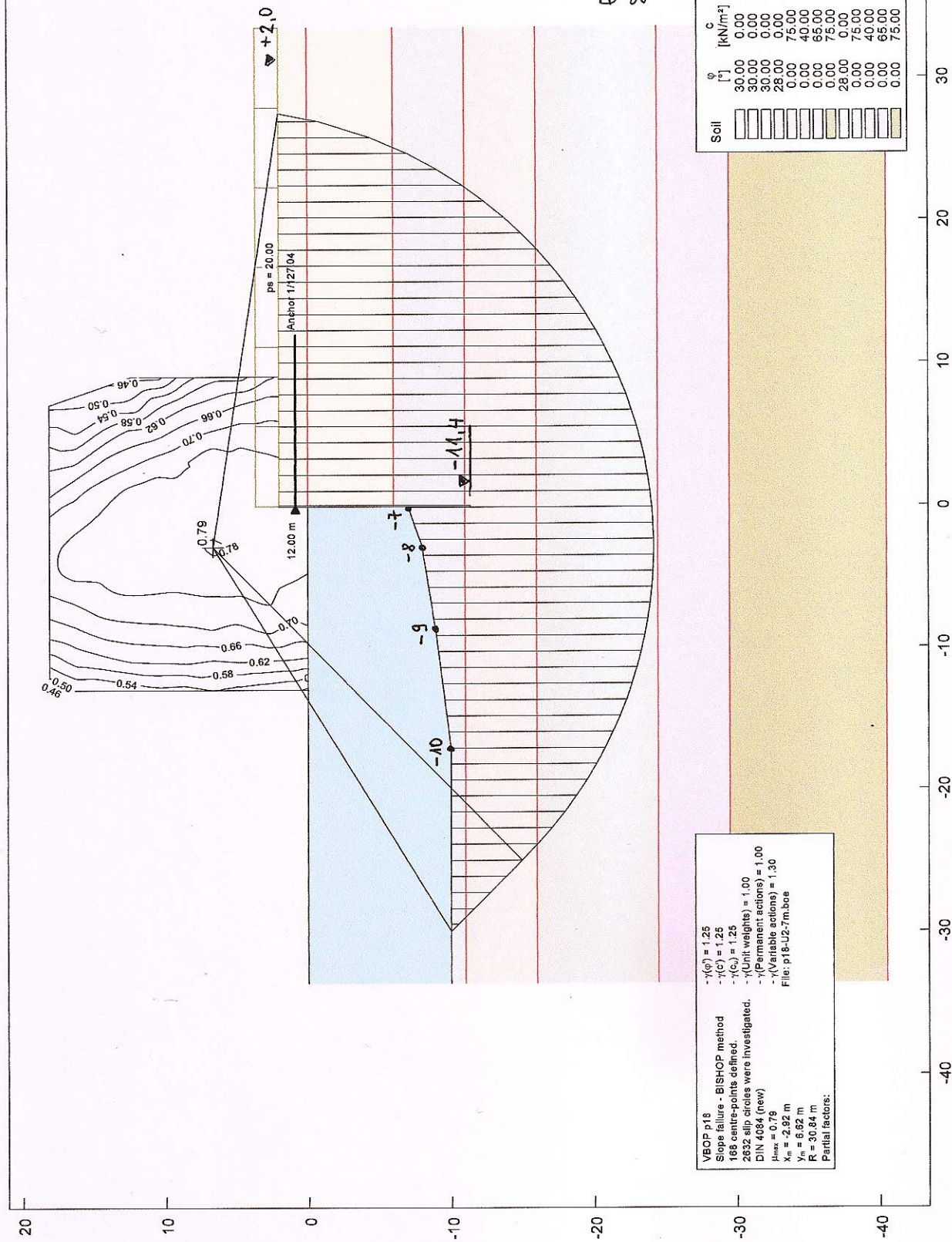
GULTNES RIEVSĪENA

Soil	Depth [m]	γ'_k [kN/m³]	γ_k [kN/m³]	ϕ_k [°]	$c(a)_k$ [kN/m²]	$c(p)_k$ [kN/m²]	δ/ϕ active	δ/ϕ passive	Designation
1	-11.00	19.0	10.0	28.0	0.0	0.0	0.667	-0.667	Smits 4
2	-16.00	19.5	10.5	28.0	0.0	0.0	0.500	-0.500	Smits 5
3	-24.50	18.2	9.2	0.0	40.0	40.0	0.500	-0.500	Smits 6
4	-29.50	18.6	9.6	0.0	65.0	65.0	0.500	-0.500	Smits 7
5	-29.50	18.7	9.7	0.0	75.0	75.0	0.500	-0.500	Smits 8

Subgrade reaction moduli	Top [m]	Bottom [m]	Top [kN/m]	Bottom [kN/m]
1	0.00 - 4.00	10000.0	20000.0	30000.0
2	4.00 - 8.00	20000.0	30000.0	40000.0
3	8.00 - 17.50	30000.0	40000.0	50000.0
4	17.50 - 22.50	40000.0	50000.0	60000.0
5	22.50 - 26.50	50000.0	60000.0	70000.0



PIE GULTNES ATZ. -7.0m



Esosā
SITUĀCIJA

P18-5

VBOP p18
Slope failure - BISHOP method
168 centre-points defined.
2632 ellip circles were investigated.
DIN 4084 (new)
 $\beta_{max} = 0.79$
 $\gamma_{int} = -2.92$
 $\gamma_{ext} = 6.62$
 $R = 30.84$
Partial factors:
- $\gamma(\phi) = 1.25$
- $\gamma(c) = 1.25$
- $\gamma(\gamma_{int}) = 1.25$
- $\gamma(\text{Unit weights}) = 1.00$
- $\gamma(\text{Permanent actions}) = 1.00$
- $\gamma(\text{Variable actions}) = 1.30$
File: p18-12-7m.bee

