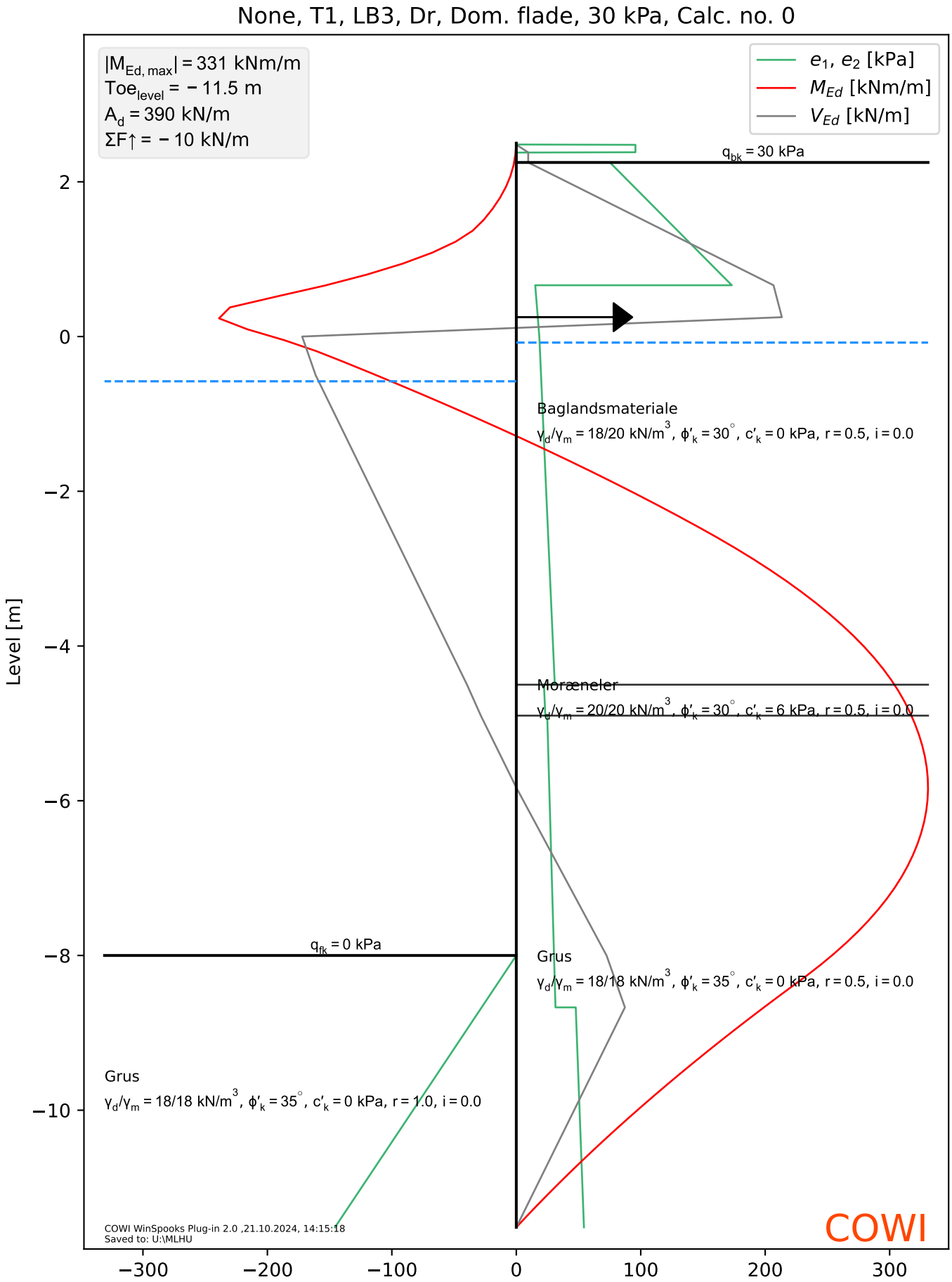

None, T1, LB3, Dr, Dom. flade, 30 kPa, Calc. no. 0
|M_Ed, max| = 331 kNm/m
Toe_level = − 11.5 m
A_d = 390 kN/m
ΣF↑ = − 10 kN/m
e1, e2 [kPa]
M_Ed [kNm/m]
V_Ed [kN/m]
q_bk = 30 kPa
Baglandsmateriale
γ_d/γ_m = 18/20 kN/m^3, ϕ'_k = 30°, c'_k = 0 kPa, r = 0.5, i = 0.0
Moræneler
γ_d/γ_m = 20/20 kN/m^3, ϕ'_k = 30°, c'_k = 6 kPa, r = 0.5, i = 0.0
q_fk = 0 kPa
Grus
γ_d/γ_m = 18/18 kN/m^3, ϕ'_k = 35°, c'_k = 0 kPa, r = 0.5, i = 0.0
Grus
γ_d/γ_m = 18/18 kN/m^3, ϕ'_k = 35°, c'_k = 0 kPa, r = 1.0, i = 0.0
Level [m]
2
0
−2
−4
−6
−8
−10
−300
−200
−100
0
100
200
300
COWI WinSpooks Plug-in 2.0 ,21.10.2024, 14:15:18
Saved to: U:\MLHU
COWI

0. Warnings

No warnings.

1. General information

1.1 Execution

Date:	21.10.2024
Project:	None
Initials:	None
Subject:	T1, LB3, Dr, Dom. flade, 30 kPa
Calculation no.:	0

1.2 Check

Checker:	None
Date:	

1.2 Approval

Approver:	None

2. Input parameters

Wall top, zT:	2.5	m
Anchor level, zA:	0.25	m
Anchor inclination:	0.0	deg.
Prescr. anchor force:	N/A	kN/m
Mass of wall:	110.0	kg/m/m of wall
Water density, gam_w:	10.0	kN/m3
State:	Drained	-
Slope back:	0.0	deg.
Slope front:	0.0	deg.

Soil profile:	SP1	-

2.1 Characteristic soil parameters back

z_top	g_d	g_m	cu	c'	phi'	i	r	Description	Keep drained
m	kN/m3	kN/m3	kN/m2	kN/m2	deg.	-	-	-	-
2.25	18	20	0	0	30	0.0	0.47	Baglandsmateriale	Yes
-4.50	20	20	60	6	30	0.0	0.47	Moræneler	No
-4.90	18	18	0	0	35	0.0	0.47	Grus	Yes

2.2 Characteristic soil parameters front

z_top	g_d	g_m	cu	c'	phi'	i	r	Description	Keep drained
m	kN/m3	kN/m3	kN/m2	kN/m2	deg.	-	-	-	-
-8.00	18	18	0	0	35	0.0	1.00	Grus	Yes

2.3 Water levels

w_b	w_f
[m]	[m]
0.0	-0.5

2.4 Additional pressure profile: AP4

z [m]	2.48	2.48	2.38	2.38
ez_k [kN/m2]	0.0	95.8	95.8	0.0
ez_d [kN/m2]	0.0	95.8	95.8	0.0

2.5 Loads

zR	q_bk	q_fk	Axial wall load (design)
m	kN/m2	kN/m2	kN/m
2.25	30.0	0.0	0.0

2.6 Safety

Alpha	1.0
Consequence class:	CC2

f_gamf	f_qf	f_cf	f_cuf	f_phif	f_wat	f_AP	f_gamb	f_qb	f_cb	f_cub	f_phib
1.0	0.0	1.2	1.8	1.2	1.0	1.0	1.0	1.5	1.2	1.8	1.2

2.7 Failure mode

Anchored wall		
iA	iB	iC
0.0	0.0	1.0

2.8 King post wall

Not king post wall.

3. Results

3.1 Summary

Max. |moment|:	330.9	kNm/m
Max. |shear force|:	213.4	kN/m
Toe level:	-11.5	m
Anchor force, Ad:	389.9	kN/m
Axial anchor force:	389.9	kN/m
|Moment| at anchor level:	239.5	kNm/m
Sum of tangential earth pressure*:	5.2	kN/m
Sum of vertical forces*:	-9.9	kN/m
*Tangential pressure and vertical forces are positive upwards.		

3.2 Pressure and structural forces

Level	e1	e2	dw	e-net	Ved	Med	Ju
m	kN/m2	kN/m2	kN/m2	kN/m2	kN/m	kNm/m	-
2.5	-0.0	0.0	0.0	0.0	0.0	0.0	3.0
2.5	-0.0	0.0	0.0	0.0	0.0	0.0	2.0
2.5	-0.0	95.8	0.0	95.8	0.2	0.0	2.0
2.4	-0.0	95.7	0.0	95.7	9.4	-0.5	2.0
2.4	-0.0	0.0	0.0	0.0	9.6	-0.5	2.0
2.2	-0.0	0.0	0.0	0.0	9.6	-1.7	1.0
2.2	-0.0	0.0	0.0	0.0	9.6	-1.7	3.0
2.2	-0.0	75.2	0.0	75.2	9.6	-1.7	3.0
0.7	-0.0	173.2	0.0	173.2	206.7	-152.8	2.0
0.7	-0.0	15.2	0.0	15.2	206.7	-152.8	3.0
0.2	-0.0	17.3	0.0	17.3	213.4	-239.5	2.0
0.0	-0.0	18.5	0.0	18.5	-172.1	-195.9	3.0
-0.5	-0.0	19.9	5.0	24.9	-161.2	-112.5	3.0

-4.5	-0.0	30.9	5.0	35.9	-39.6	303.9	1.0
-4.5	-0.0	22.2	5.0	27.2	-39.6	303.9	3.0
-4.9	-0.0	23.3	5.0	28.3	-28.5	317.5	1.0
-4.9	-0.0	24.9	5.0	29.9	-28.5	317.5	3.0
-5.8	-0.0	26.5	5.0	31.5	0.0	330.9	2.0
-8.0	-0.0	30.3	5.0	35.3	72.5	253.6	1.0
-8.7	-27.8	31.5	5.0	8.7	87.3	199.0	2.0
-8.7	-27.8	47.8	5.0	24.9	87.3	199.0	3.0
-11.5	-145.7	54.4	5.0	-86.3	0.0	0.0	2.0

4. Sheet pile add on

4.1 Input

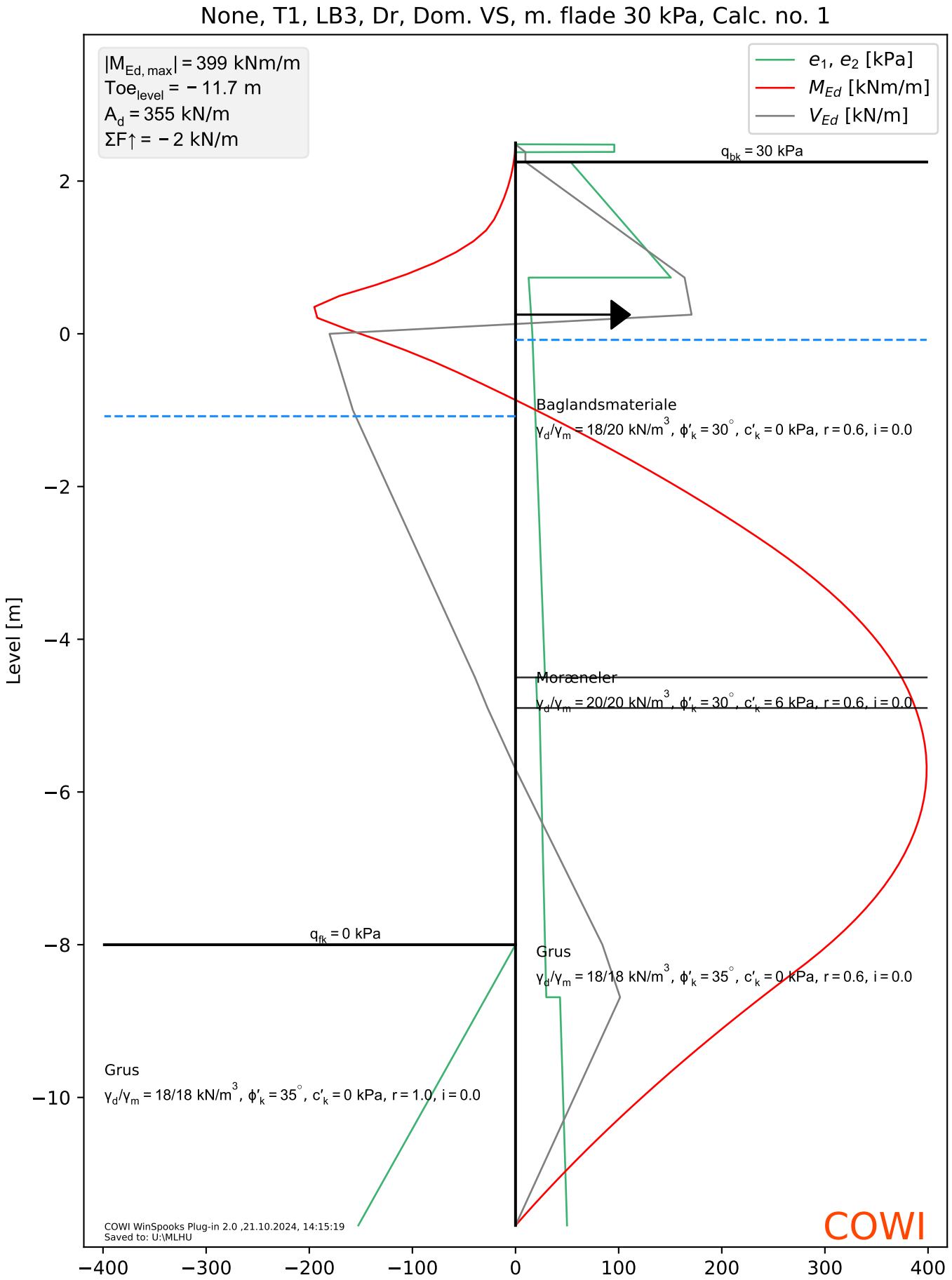
Add on active?:	Yes	-
Limit state:	ULS-Plastic	-
Control class:	Normal	-
Optimize:	Optimize-700	-
Max. utilization:	0.95	-
fyk:	355	MPa
Beta_B:	1	-
Beta_D:	1	-
Design life:	50	Years
Soil compaction:	Dense	-
Corrosion rates (total)		
Level (m)	Rate	Unit
2	1.2	mm/yr
1	1.2	mm/yr
0	1.2	mm/yr
-0.5	1.2	mm/yr
-1	1.2	mm/yr

-6	1.2	mm/yr
-7	1.2	mm/yr
-8	1.2	mm/yr
-9	1.2	mm/yr
-10	1.2	mm/yr

4.2 Results

Sheet pile profile:	AZ 12-700	
Max. relative utilization ratio:	0.93	-
Rotational capacity:	OK!	
Level (m)	Rel. utilisation ratio	
2.5	0.006	-
2.482	0.006	-
2.478	0.006	-
2.382	0.018	-
2.378	0.018	-
2.25	0.018	-
2.25	0.018	-
2.25	0.018	-
0.663	0.43	-
0.663	0.43	-
0.25	0.674	-
0.0	0.552	-
-0.5	0.317	-
-4.5	0.856	-
-4.5	0.856	-
-4.9	0.894	-
-4.9	0.894	-
-5.829	0.932	-
-8.0	0.714	-

-8.671	0.56	-
-8.671	0.56	-
-11.514	0.006	-


None, T1, LB3, Dr, Dom. VS, m. flade 30 kPa, Calc. no. 1
|M_Ed, max| = 399 kNm/m
Toe_level = − 11.7 m
A_d = 355 kN/m
ΣF↑ = − 2 kN/m
e1, e2 [kPa]
M_Ed [kNm/m]
V_Ed [kN/m]
q_bk = 30 kPa
Baglandsmateriale
γ_d/γ_m = 18/20 kN/m^3, ϕ'_k = 30°, c'_k = 0 kPa, r = 0.6, i = 0.0
Moræneler
γ_d/γ_m = 20/20 kN/m^3, ϕ'_k = 30°, c'_k = 6 kPa, r = 0.6, i = 0.0
q_fk = 0 kPa
Grus
γ_d/γ_m = 18/18 kN/m^3, ϕ'_k = 35°, c'_k = 0 kPa, r = 0.6, i = 0.0
Grus
γ_d/γ_m = 18/18 kN/m^3, ϕ'_k = 35°, c'_k = 0 kPa, r = 1.0, i = 0.0
Level [m]
2
0
−2
−4
−6
−8
−10
−400
−300
−200
−100
0
100
200
300
400
COWI WinSpooks Plug-in 2.0 ,21.10.2024, 14:15:19
Saved to: U:\MLHU
COWI

0. Warnings

No warnings.

1. General information

1.1 Execution

Date:	21.10.2024
Project:	None
Initials:	None
Subject:	T1, LB3, Dr, Dom. VS, m. flade 30 kPa
Calculation no.:	1

1.2 Check

Checker:	None
Date:	

1.2 Approval

Approver:	None

2. Input parameters

Wall top, zT:	2.5	m
Anchor level, zA:	0.25	m
Anchor inclination:	0.0	deg.
Prescr. anchor force:	N/A	kN/m
Mass of wall:	110.0	kg/m/m of wall
Water density, gam_w:	10.0	kN/m3
State:	Drained	-
Slope back:	0.0	deg.
Slope front:	0.0	deg.

Soil profile:	SP2	-

2.1 Characteristic soil parameters back

z_top	g_d	g_m	cu	c'	phi'	i	r	Description	Keep drained
m	kN/m3	kN/m3	kN/m2	kN/m2	deg.	-	-	-	-
2.25	18	20	0	0	30	0.0	0.55	Baglandsmateriale	Yes
-4.50	20	20	60	6	30	0.0	0.55	Moræneler	No
-4.90	18	18	0	0	35	0.0	0.55	Grus	Yes

2.2 Characteristic soil parameters front

z_top	g_d	g_m	cu	c'	phi'	i	r	Description	Keep drained
m	kN/m3	kN/m3	kN/m2	kN/m2	deg.	-	-	-	-
-8.00	18	18	0	0	35	0.0	1.00	Grus	Yes

2.3 Water levels

w_b	w_f
[m]	[m]
0.0	-1.0

2.4 Additional pressure profile: AP4

z [m]	2.48	2.48	2.38	2.38
ez_k [kN/m2]	0.0	95.8	95.8	0.0
ez_d [kN/m2]	0.0	95.8	95.8	0.0

2.5 Loads

zR	q_bk	q_fk	Axial wall load (design)
m	kN/m2	kN/m2	kN/m
2.25	30.0	0.0	0.0

2.6 Safety

Alpha	1.0
Consequence class:	CC2

f_gamf	f_qf	f_cf	f_cuf	f_phif	f_wat	f_AP	f_gamb	f_qb	f_cb	f_cub	f_phib
1.0	1.0	1.2	1.8	1.2	1.0	1.0	1.0	1.05	1.2	1.8	1.2

2.7 Failure mode

Anchored wall		
iA	iB	iC
0.0	0.0	1.0

2.8 King post wall

Not king post wall.

3. Results

3.1 Summary

Max. |moment|:	398.7	kNm/m
Max. |shear force|:	180.4	kN/m
Toe level:	-11.7	m
Anchor force, Ad:	355.0	kN/m
Axial anchor force:	355.0	kN/m
|Moment| at anchor level:	195.8	kNm/m
Sum of tangential earth pressure*:	12.9	kN/m
Sum of vertical forces*:	-2.4	kN/m
*Tangential pressure and vertical forces are positive upwards.		

3.2 Pressure and structural forces

Level	e1	e2	dw	e-net	Ved	Med	Ju
m	kN/m2	kN/m2	kN/m2	kN/m2	kN/m	kNm/m	-
2.5	-0.0	0.0	0.0	0.0	0.0	0.0	3.0
2.5	-0.0	0.0	0.0	0.0	0.0	0.0	2.0
2.5	-0.0	95.8	0.0	95.8	0.2	0.0	2.0
2.4	-0.0	95.7	0.0	95.7	9.4	-0.5	2.0
2.4	-0.0	0.0	0.0	0.0	9.6	-0.5	2.0
2.2	-0.0	0.0	0.0	0.0	9.6	-1.7	1.0
2.2	-0.0	0.0	0.0	0.0	9.6	-1.7	3.0
2.2	-0.0	53.4	0.0	53.4	9.6	-1.7	3.0
0.7	-0.0	150.6	0.0	150.6	164.0	-114.5	2.0
0.7	-0.0	12.7	0.0	12.7	164.0	-114.5	3.0
0.2	-0.0	15.1	0.0	15.1	170.7	-195.8	2.0
0.0	-0.0	16.3	0.0	16.3	-180.4	-150.2	3.0
-1.0	-0.0	19.0	10.0	29.0	-157.7	19.9	3.0

-4.5	-0.0	28.6	10.0	38.6	-39.3	374.4	1.0
-4.5	-0.0	19.9	10.0	29.9	-39.3	374.4	3.0
-4.9	-0.0	21.0	10.0	31.0	-27.1	387.8	1.0
-4.9	-0.0	23.2	10.0	33.2	-27.1	387.8	3.0
-5.7	-0.0	24.6	10.0	34.6	0.0	398.7	2.0
-8.0	-0.0	28.6	10.0	38.6	84.2	303.6	1.0
-8.7	-28.5	29.8	10.0	11.3	101.4	238.6	2.0
-8.7	-28.5	43.1	10.0	24.6	101.4	238.6	3.0
-11.7	-152.4	49.9	10.0	-92.5	0.0	0.0	2.0

4. Sheet pile add on

4.1 Input

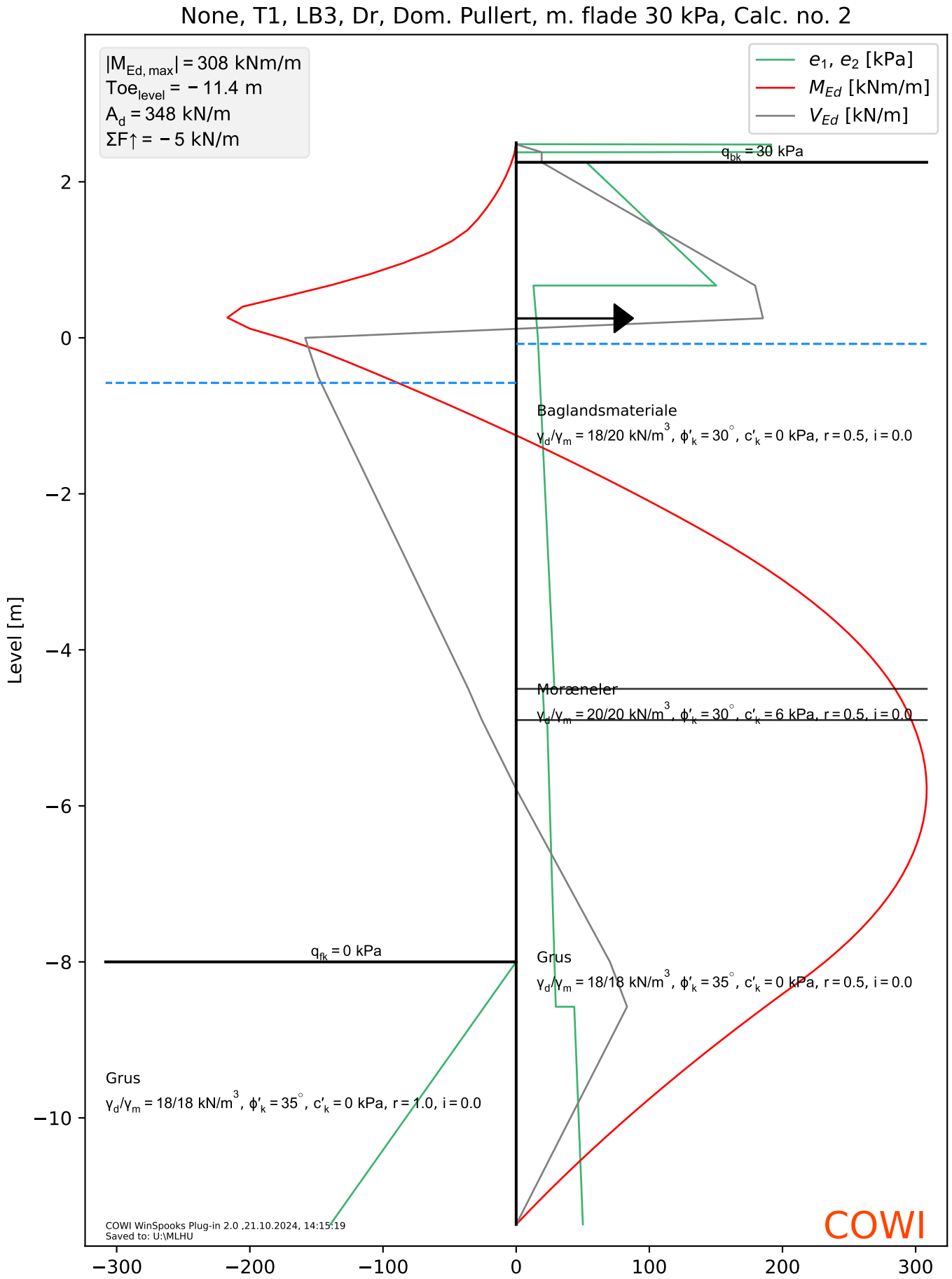
Add on active?:	Yes	-
Limit state:	ULS-Plastic	-
Control class:	Normal	-
Optimize:	Optimize-700	-
Max. utilization:	0.95	-
fyk:	355	MPa
Beta_B:	1	-
Beta_D:	1	-
Design life:	50	Years
Soil compaction:	Dense	-
Corrosion rates (total)		
Level (m)	Rate	Unit
2	1.2	mm/yr
1	1.2	mm/yr
0	1.2	mm/yr
-0.5	1.2	mm/yr
-1	1.2	mm/yr

-6	1.2	mm/yr
-7	1.2	mm/yr
-8	1.2	mm/yr
-9	1.2	mm/yr
-10	1.2	mm/yr

4.2 Results

Sheet pile profile:	AZ 13-700-10/10	
Max. relative utilization ratio:	0.91	-
Rotational capacity:	OK!	
Level (m)	Rel. utilisation ratio	
2.5	0.006	-
2.482	0.006	-
2.478	0.006	-
2.382	0.014	-
2.378	0.014	-
2.25	0.014	-
2.25	0.014	-
2.25	0.014	-
0.736	0.262	-
0.736	0.262	-
0.25	0.448	-
0.0	0.344	-
-1.0	0.228	-
-4.5	0.857	-
-4.5	0.857	-
-4.9	0.888	-
-4.9	0.888	-
-5.7	0.913	-
-8.0	0.695	-

-8.688	0.546	-
-8.688	0.546	-
-11.676	0.006	-


None, T1, LB3, Dr, Dom. Pullert, m. flade 30 kPa, Calc. no. 2
|M_Ed, max| = 308 kNm/m
Toe_level = − 11.4 m
A_d = 348 kN/m
ΣF↑ = − 5 kN/m
e1, e2 [kPa]
M_Ed [kNm/m]
V_Ed [kN/m]
q_bk = 30 kPa
Baglandsmateriale
γ_d/γ_m = 18/20 kN/m^3, ϕ'_k = 30°, c'_k = 0 kPa, r = 0.5, i = 0.0
Moræneler
γ_d/γ_m = 20/20 kN/m^3, ϕ'_k = 30°, c'_k = 6 kPa, r = 0.5, i = 0.0
q_fk = 0 kPa
Grus
γ_d/γ_m = 18/18 kN/m^3, ϕ'_k = 35°, c'_k = 0 kPa, r = 0.5, i = 0.0
Grus
γ_d/γ_m = 18/18 kN/m^3, ϕ'_k = 35°, c'_k = 0 kPa, r = 1.0, i = 0.0
Level [m]
2
0
−2
−4
−6
−8
−10
−300
−200
−100
0
100
200
300
COWI WinSpooks Plug-in 2.0 ,21.10.2024, 14:15:19
Saved to: U:\MLHU
COWI

0. Warnings

No warnings.

1. General information

1.1 Execution

Date:	21.10.2024
Project:	None
Initials:	None
Subject:	T1, LB3, Dr, Dom. Pullert, m. flade 30 kPa
Calculation no.:	2

1.2 Check

Checker:	None
Date:	

1.2 Approval

Approver:	None

2. Input parameters

Wall top, zT:	2.5	m
Anchor level, zA:	0.25	m
Anchor inclination:	0.0	deg.
Prescr. anchor force:	N/A	kN/m
Mass of wall:	110.0	kg/m/m of wall
Water density, gam_w:	10.0	kN/m3
State:	Drained	-
Slope back:	0.0	deg.
Slope front:	0.0	deg.

Soil profile:	SP1	-

2.1 Characteristic soil parameters back

z_top	g_d	g_m	cu	c'	phi'	i	r	Description	Keep drained
m	kN/m3	kN/m3	kN/m2	kN/m2	deg.	-	-	-	-
2.25	18	20	0	0	30	0.0	0.47	Baglandsmateriale	Yes
-4.50	20	20	60	6	30	0.0	0.47	Moræneler	No
-4.90	18	18	0	0	35	0.0	0.47	Grus	Yes

2.2 Characteristic soil parameters front

z_top	g_d	g_m	cu	c'	phi'	i	r	Description	Keep drained
m	kN/m3	kN/m3	kN/m2	kN/m2	deg.	-	-	-	-
-8.00	18	18	0	0	35	0.0	1.00	Grus	Yes

2.3 Water levels

w_b	w_f
[m]	[m]
0.0	-0.5

2.4 Additional pressure profile: AP5

z [m]	2.48	2.48	2.38	2.38
ez_k [kN/m2]	0.0	191.5	191.5	0.0
ez_d [kN/m2]	0.0	191.5	191.5	0.0

2.5 Loads

zR	q_bk	q_fk	Axial wall load (design)
m	kN/m2	kN/m2	kN/m
2.25	30.0	0.0	0.0

2.6 Safety

Alpha	1.0
Consequence class:	CC2

f_gamf	f_qf	f_cf	f_cuf	f_phif	f_wat	f_AP	f_gamb	f_qb	f_cb	f_cub	f_phib
1.0	1.0	1.2	1.8	1.2	1.0	1.0	1.0	1.05	1.2	1.8	1.2

2.7 Failure mode

Anchored wall		
iA	iB	iC
0.0	0.0	1.0

2.8 King post wall

Not king post wall.

3. Results

3.1 Summary

Max. |moment|:	308.3	kNm/m
Max. |shear force|:	185.3	kN/m
Toe level:	-11.4	m
Anchor force, Ad:	347.7	kN/m
Axial anchor force:	347.7	kN/m
|Moment| at anchor level:	216.6	kNm/m
Sum of tangential earth pressure*:	10.3	kN/m
Sum of vertical forces*:	-4.7	kN/m
*Tangential pressure and vertical forces are positive upwards.		

3.2 Pressure and structural forces

Level	e1	e2	dw	e-net	Ved	Med	Ju
m	kN/m2	kN/m2	kN/m2	kN/m2	kN/m	kNm/m	-
2.5	-0.0	0.0	0.0	0.0	0.0	0.0	3.0
2.5	-0.0	0.0	0.0	0.0	0.0	0.0	2.0
2.5	-0.0	191.5	0.0	191.5	0.4	-0.0	2.0
2.4	-0.0	191.5	0.0	191.5	18.8	-0.9	2.0
2.4	-0.0	0.0	0.0	0.0	19.1	-1.0	2.0
2.2	-0.0	0.0	0.0	0.0	19.1	-3.4	1.0
2.2	-0.0	0.0	0.0	0.0	19.1	-3.4	3.0
2.2	-0.0	52.7	0.0	52.7	19.1	-3.4	3.0
0.7	-0.0	150.2	0.0	150.2	179.5	-140.1	2.0
0.7	-0.0	13.0	0.0	13.0	179.5	-140.1	3.0
0.2	-0.0	15.1	0.0	15.1	185.3	-216.6	2.0
0.0	-0.0	16.3	0.0	16.3	-158.5	-176.5	3.0
-0.5	-0.0	17.7	5.0	22.7	-148.7	-99.6	3.0

-4.5	-0.0	28.7	5.0	33.7	-36.0	284.5	1.0
-4.5	-0.0	20.0	5.0	25.0	-36.0	284.5	3.0
-4.9	-0.0	21.1	5.0	26.1	-25.7	296.8	1.0
-4.9	-0.0	23.3	5.0	28.3	-25.7	296.8	3.0
-5.8	-0.0	24.9	5.0	29.9	0.0	308.3	2.0
-8.0	-0.0	28.7	5.0	33.7	70.4	231.9	1.0
-8.6	-23.9	29.8	5.0	10.9	83.3	187.0	2.0
-8.6	-23.9	43.6	5.0	24.8	83.3	187.0	3.0
-11.4	-139.5	50.1	5.0	-84.5	0.0	0.0	2.0

4. Sheet pile add on

4.1 Input

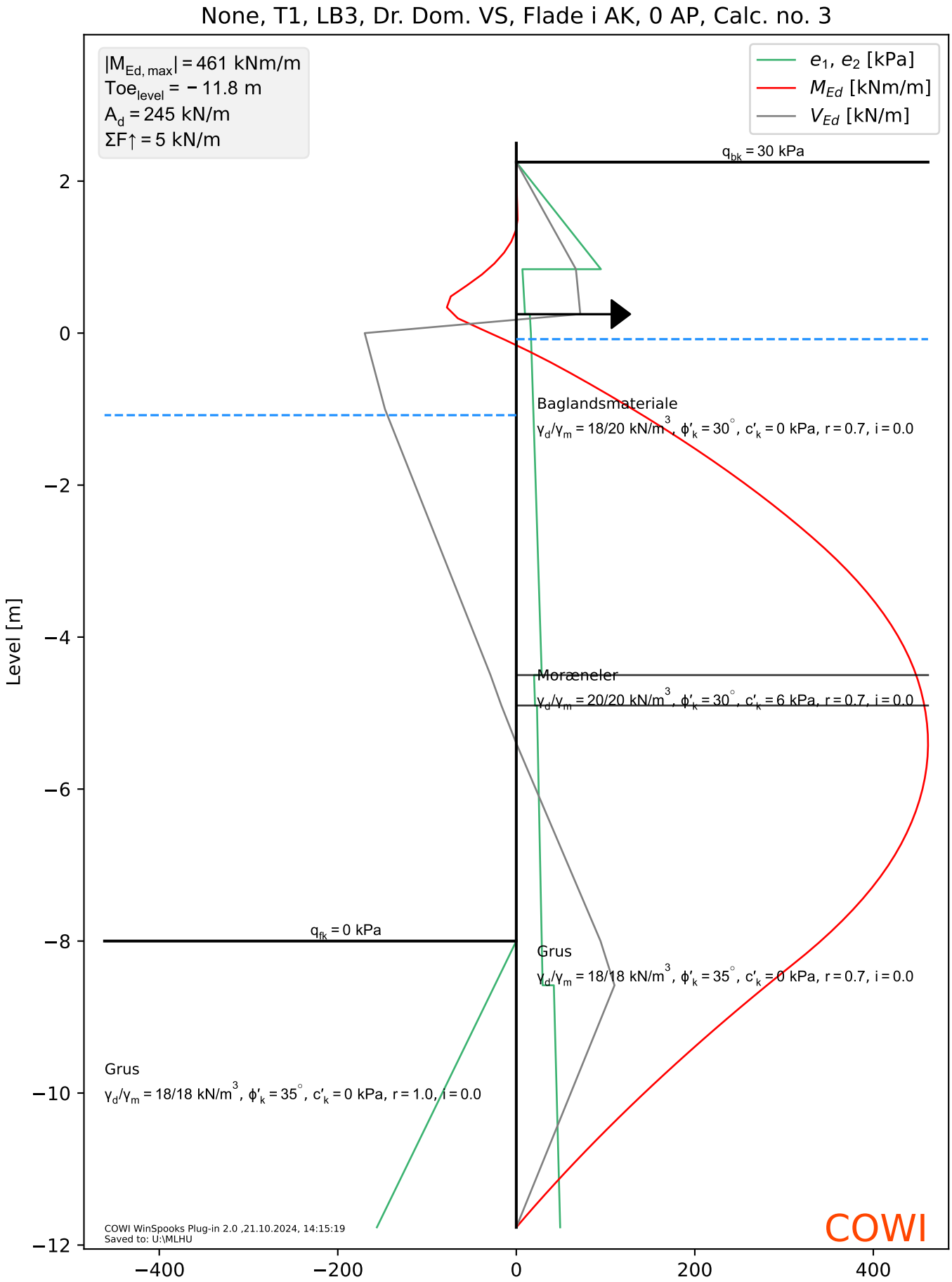
Add on active?:	Yes	-
Limit state:	ULS-Plastic	-
Control class:	Normal	-
Optimize:	Optimize-700	-
Max. utilization:	0.95	-
fyk:	355	MPa
Beta_B:	1	-
Beta_D:	1	-
Design life:	50	Years
Soil compaction:	Dense	-
Corrosion rates (total)		
Level (m)	Rate	Unit
2	1.2	mm/yr
1	1.2	mm/yr
0	1.2	mm/yr
-0.5	1.2	mm/yr
-1	1.2	mm/yr

-6	1.2	mm/yr
-7	1.2	mm/yr
-8	1.2	mm/yr
-9	1.2	mm/yr
-10	1.2	mm/yr

4.2 Results

Sheet pile profile:	AZ 12-700	
Max. relative utilization ratio:	0.87	-
Rotational capacity:	OK!	
Level (m)	Rel. utilisation ratio	
2.5	0.006	-
2.482	0.006	-
2.478	0.006	-
2.382	0.035	-
2.378	0.036	-
2.25	0.036	-
2.25	0.036	-
2.25	0.036	-
0.67	0.394	-
0.67	0.394	-
0.25	0.61	-
0.0	0.497	-
-0.5	0.28	-
-4.5	0.801	-
-4.5	0.801	-
-4.9	0.836	-
-4.9	0.836	-
-5.785	0.868	-
-8.0	0.653	-

-8.575	0.527	-
-8.575	0.527	-
-11.366	0.006	-


None, T1, LB3, Dr. Dom. VS, Flade i AK, 0 AP, Calc. no. 3
|M_Ed, max| = 461 kNm/m
Toe_level = − 11.8 m
A_d = 245 kN/m
ΣF↑ = 5 kN/m
e1, e2 [kPa]
M_Ed [kNm/m]
V_Ed [kN/m]
q_bk = 30 kPa
Baglandsmateriale
γ_d/γ_m = 18/20 kN/m^3, ϕ'_k = 30°, c'_k = 0 kPa, r = 0.7, i = 0.0
Moræneler
γ_d/γ_m = 20/20 kN/m^3, ϕ'_k = 30°, c'_k = 6 kPa, r = 0.7, i = 0.0
q_fk = 0 kPa
Grus
γ_d/γ_m = 18/18 kN/m^3, ϕ'_k = 35°, c'_k = 0 kPa, r = 0.7, i = 0.0
Grus
γ_d/γ_m = 18/18 kN/m^3, ϕ'_k = 35°, c'_k = 0 kPa, r = 1.0, i = 0.0
Level [m]
2
0
−2
−4
−6
−8
−10
−12
−400
−200
0
200
400
COWI WinSpooks Plug-in 2.0 ,21.10.2024, 14:15:19
Saved to: U:\MLHU
COWI

0. Warnings

No warnings.

1. General information

1.1 Execution

Date:	21.10.2024
Project:	None
Initials:	None
Subject:	T1, LB3, Dr. Dom. VS, Flade i AK, 0 AP
Calculation no.:	3

1.2 Check

Checker:	None
Date:	

1.2 Approval

Approver:	None

2. Input parameters

Wall top, zT:	2.5	m
Anchor level, zA:	0.25	m
Anchor inclination:	0.0	deg.
Prescr. anchor force:	N/A	kN/m
Mass of wall:	110.0	kg/m/m of wall
Water density, gam_w:	10.0	kN/m3
State:	Drained	-
Slope back:	0.0	deg.
Slope front:	0.0	deg.

Soil profile:	SP3	-

2.1 Characteristic soil parameters back

z_top	g_d	g_m	cu	c'	phi'	i	r	Description	Keep drained
m	kN/m3	kN/m3	kN/m2	kN/m2	deg.	-	-	-	-
2.25	18	20	0	0	30	0.0	0.65	Baglandsmateriale	Yes
-4.50	20	20	60	6	30	0.0	0.65	Moræneler	No
-4.90	18	18	0	0	35	0.0	0.65	Grus	Yes

2.2 Characteristic soil parameters front

z_top	g_d	g_m	cu	c'	phi'	i	r	Description	Keep drained
m	kN/m3	kN/m3	kN/m2	kN/m2	deg.	-	-	-	-
-8.00	18	18	0	0	35	0.0	1.00	Grus	Yes

2.3 Water levels

w_b	w_f
[m]	[m]
0.0	-1.0

2.4 Additional pressure profile: AP6

z [m]
ez_k [kN/m2]
ez_d [kN/m2]

2.5 Loads

zR	q_bk	q_fk	Axial wall load (design)
m	kN/m2	kN/m2	kN/m
0.25	30.0	0.0	0.0

2.6 Safety

Alpha	1.0
Consequence class:	CC2

f_gamf	f_qf	f_cf	f_cuf	f_phif	f_wat	f_AP	f_gamb	f_qb	f_cb	f_cub	f_phib
1.0	1.0	1.2	1.8	1.2	1.0	1.0	1.0	1.05	1.2	1.8	1.2

2.7 Failure mode

Anchored wall		
iA	iB	iC
0.0	0.0	1.0

2.8 King post wall

Not king post wall.

3. Results

3.1 Summary

Max. |moment|:	461.3	kNm/m
Max. |shear force|:	169.8	kN/m
Toe level:	-11.8	m
Anchor force, Ad:	245.5	kN/m
Axial anchor force:	245.5	kN/m
|Moment| at anchor level:	72.2	kNm/m
Sum of tangential earth pressure*:	20.7	kN/m
Sum of vertical forces*:	5.3	kN/m
*Tangential pressure and vertical forces are positive upwards.		

3.2 Pressure and structural forces

Level	e1	e2	dw	e-net	Ved	Med	Ju
m	kN/m2	kN/m2	kN/m2	kN/m2	kN/m	kNm/m	-
2.5	-0.0	0.0	0.0	0.0	0.0	0.0	3.0
2.2	-0.0	0.0	0.0	0.0	0.0	0.0	1.0
2.2	-0.0	0.0	0.0	0.0	0.0	0.0	3.0
0.8	-0.0	94.8	0.0	94.8	66.8	-31.4	2.0
0.8	-0.0	6.9	0.0	6.9	66.8	-31.4	3.0
0.2	-0.0	9.7	0.0	9.7	71.7	-72.2	2.0
0.2	-0.0	15.1	0.0	15.1	71.7	-72.2	3.0
0.0	-0.0	16.4	0.0	16.4	-169.8	-29.2	3.0
-1.0	-0.0	19.1	10.0	29.1	-147.1	130.3	3.0
-4.5	-0.0	28.5	10.0	38.5	-28.9	448.0	1.0
-4.5	-0.0	19.9	10.0	29.9	-28.9	448.0	3.0
-4.9	-0.0	21.0	10.0	31.0	-16.7	457.1	1.0
-4.9	-0.0	23.2	10.0	33.2	-16.7	457.1	3.0

-5.4	-0.0	24.0	10.0	34.0	0.0	461.3	2.0
-8.0	-0.0	28.5	10.0	38.5	94.4	341.0	1.0
-8.6	-24.1	29.5	10.0	15.4	110.0	280.9	2.0
-8.6	-24.1	42.1	10.0	27.9	110.0	280.9	3.0
-11.8	-156.2	49.2	10.0	-97.0	0.0	0.0	2.0

4. Sheet pile add on

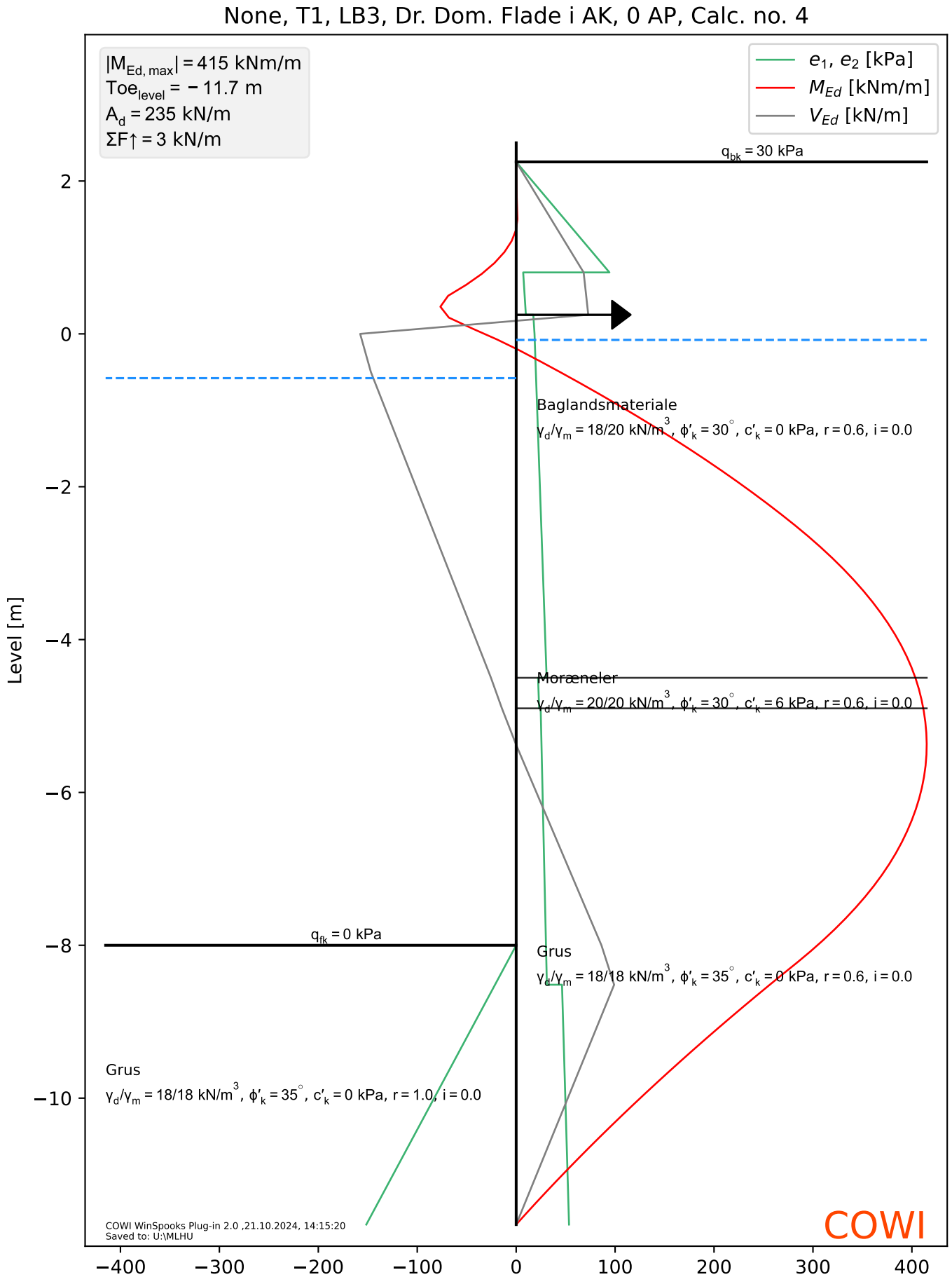
4.1 Input

Add on active?:	Yes	-
Limit state:	ULS-Plastic	-
Control class:	Normal	-
Optimize:	Optimize-700	-
Max. utilization:	0.95	-
fyk:	355	MPa
Beta_B:	1	-
Beta_D:	1	-
Design life:	50	Years
Soil compaction:	Dense	-
Corrosion rates (total)		
Level (m)	Rate	Unit
2	1.2	mm/yr
1	1.2	mm/yr
0	1.2	mm/yr
-0.5	1.2	mm/yr
-1	1.2	mm/yr
-6	1.2	mm/yr
-7	1.2	mm/yr
-8	1.2	mm/yr
-9	1.2	mm/yr

-10	1.2	mm/yr

4.2 Results

Sheet pile profile:	AZ 17-700	
Max. relative utilization ratio:	0.9	-
Rotational capacity:	OK!	
Level (m)	Rel. utilisation ratio	
2.5	0.005	-
2.25	0.005	-
2.25	0.005	-
0.841	0.108	-
0.841	0.108	-
0.25	0.141	-
0.25	0.141	-
0.0	0.276	-
-1.0	0.255	-
-4.5	0.878	-
-4.5	0.878	-
-4.9	0.895	-
-4.9	0.895	-
-5.397	0.904	-
-8.0	0.668	-
-8.582	0.55	-
-8.582	0.55	-
-11.767	0.005	-


None, T1, LB3, Dr. Dom. Flade i AK, 0 AP, Calc. no. 4
|M_Ed, max| = 415 kNm/m
Toe_level = − 11.7 m
A_d = 235 kN/m
ΣF↑ = 3 kN/m
e1, e2 [kPa]
M_Ed [kNm/m]
V_Ed [kN/m]
q_bk = 30 kPa
Baglandsmateriale
γ_d/γ_m = 18/20 kN/m^3, ϕ'_k = 30°, c'_k = 0 kPa, r = 0.6, i = 0.0
Moræneler
γ_d/γ_m = 20/20 kN/m^3, ϕ'_k = 30°, c'_k = 6 kPa, r = 0.6, i = 0.0
q_fk = 0 kPa
Grus
γ_d/γ_m = 18/18 kN/m^3, ϕ'_k = 35°, c'_k = 0 kPa, r = 0.6, i = 0.0
Grus
γ_d/γ_m = 18/18 kN/m^3, ϕ'_k = 35°, c'_k = 0 kPa, r = 1.0, i = 0.0
Level [m]
2
0
−2
−4
−6
−8
−10
−400
−300
−200
−100
0
100
200
300
400
COWI WinSpooks Plug-in 2.0 ,21.10.2024, 14:15:20
Saved to: U:\MLHU
COWI

0. Warnings

No warnings.

1. General information

1.1 Execution

Date:	21.10.2024
Project:	None
Initials:	None
Subject:	T1, LB3, Dr. Dom. Flade i AK, 0 AP
Calculation no.:	4

1.2 Check

Checker:	None
Date:	

1.2 Approval

Approver:	None

2. Input parameters

Wall top, zT:	2.5	m
Anchor level, zA:	0.25	m
Anchor inclination:	0.0	deg.
Prescr. anchor force:	N/A	kN/m
Mass of wall:	110.0	kg/m/m of wall
Water density, gam_w:	10.0	kN/m3
State:	Drained	-
Slope back:	0.0	deg.
Slope front:	0.0	deg.

Soil profile:	SP4	-

2.1 Characteristic soil parameters back

z_top	g_d	g_m	cu	c'	phi'	i	r	Description	Keep drained
m	kN/m3	kN/m3	kN/m2	kN/m2	deg.	-	-	-	-
2.25	18	20	0	0	30	0.0	0.58	Baglandsmateriale	Yes
-4.50	20	20	60	6	30	0.0	0.58	Moræneler	No
-4.90	18	18	0	0	35	0.0	0.58	Grus	Yes

2.2 Characteristic soil parameters front

z_top	g_d	g_m	cu	c'	phi'	i	r	Description	Keep drained
m	kN/m3	kN/m3	kN/m2	kN/m2	deg.	-	-	-	-
-8.00	18	18	0	0	35	0.0	1.00	Grus	Yes

2.3 Water levels

w_b	w_f
[m]	[m]
0.0	-0.5

2.4 Additional pressure profile: AP6

z [m]
ez_k [kN/m2]
ez_d [kN/m2]

2.5 Loads

zR	q_bk	q_fk	Axial wall load (design)
m	kN/m2	kN/m2	kN/m
0.25	30.0	0.0	0.0

2.6 Safety

Alpha	1.0
Consequence class:	CC2

f_gamf	f_qf	f_cf	f_cuf	f_phif	f_wat	f_AP	f_gamb	f_qb	f_cb	f_cub	f_phib
1.0	0.0	1.2	1.8	1.2	1.0	1.0	1.0	1.5	1.2	1.8	1.2

2.7 Failure mode

Anchored wall		
iA	iB	iC
0.0	0.0	1.0

2.8 King post wall

Not king post wall.

3. Results

3.1 Summary

Max. |moment|:	415.0	kNm/m
Max. |shear force|:	157.7	kN/m
Toe level:	-11.7	m
Anchor force, Ad:	235.0	kN/m
Axial anchor force:	235.0	kN/m
|Moment| at anchor level:	71.8	kNm/m
Sum of tangential earth pressure*:	18.1	kN/m
Sum of vertical forces*:	2.8	kN/m
*Tangential pressure and vertical forces are positive upwards.		

3.2 Pressure and structural forces

Level	e1	e2	dw	e-net	Ved	Med	Ju
m	kN/m2	kN/m2	kN/m2	kN/m2	kN/m	kNm/m	-
2.5	-0.0	0.0	0.0	0.0	0.0	0.0	3.0
2.2	-0.0	0.0	0.0	0.0	0.0	0.0	1.0
2.2	-0.0	0.0	0.0	0.0	0.0	0.0	3.0
0.8	-0.0	94.3	0.0	94.3	68.2	-32.9	2.0
0.8	-0.0	7.1	0.0	7.1	68.2	-32.9	3.0
0.2	-0.0	9.8	0.0	9.8	72.9	-71.9	2.0
0.2	-0.0	17.3	0.0	17.3	72.9	-71.9	3.0
0.0	-0.0	18.5	0.0	18.5	-157.7	-31.9	3.0
-0.5	-0.0	19.9	5.0	24.9	-146.8	44.4	3.0
-4.5	-0.0	30.8	5.0	35.8	-25.5	403.5	1.0
-4.5	-0.0	22.1	5.0	27.1	-25.5	403.5	3.0
-4.9	-0.0	23.2	5.0	28.2	-14.4	411.5	1.0
-4.9	-0.0	24.8	5.0	29.8	-14.4	411.5	3.0

-5.4	-0.0	25.6	5.0	30.6	0.0	415.0	2.0
-8.0	-0.0	30.1	5.0	35.1	86.2	304.5	1.0
-8.5	-21.4	31.0	5.0	14.7	99.0	256.3	2.0
-8.5	-21.4	46.3	5.0	30.0	99.0	256.3	3.0
-11.7	-151.5	53.4	5.0	-93.1	0.0	0.0	2.0

4. Sheet pile add on

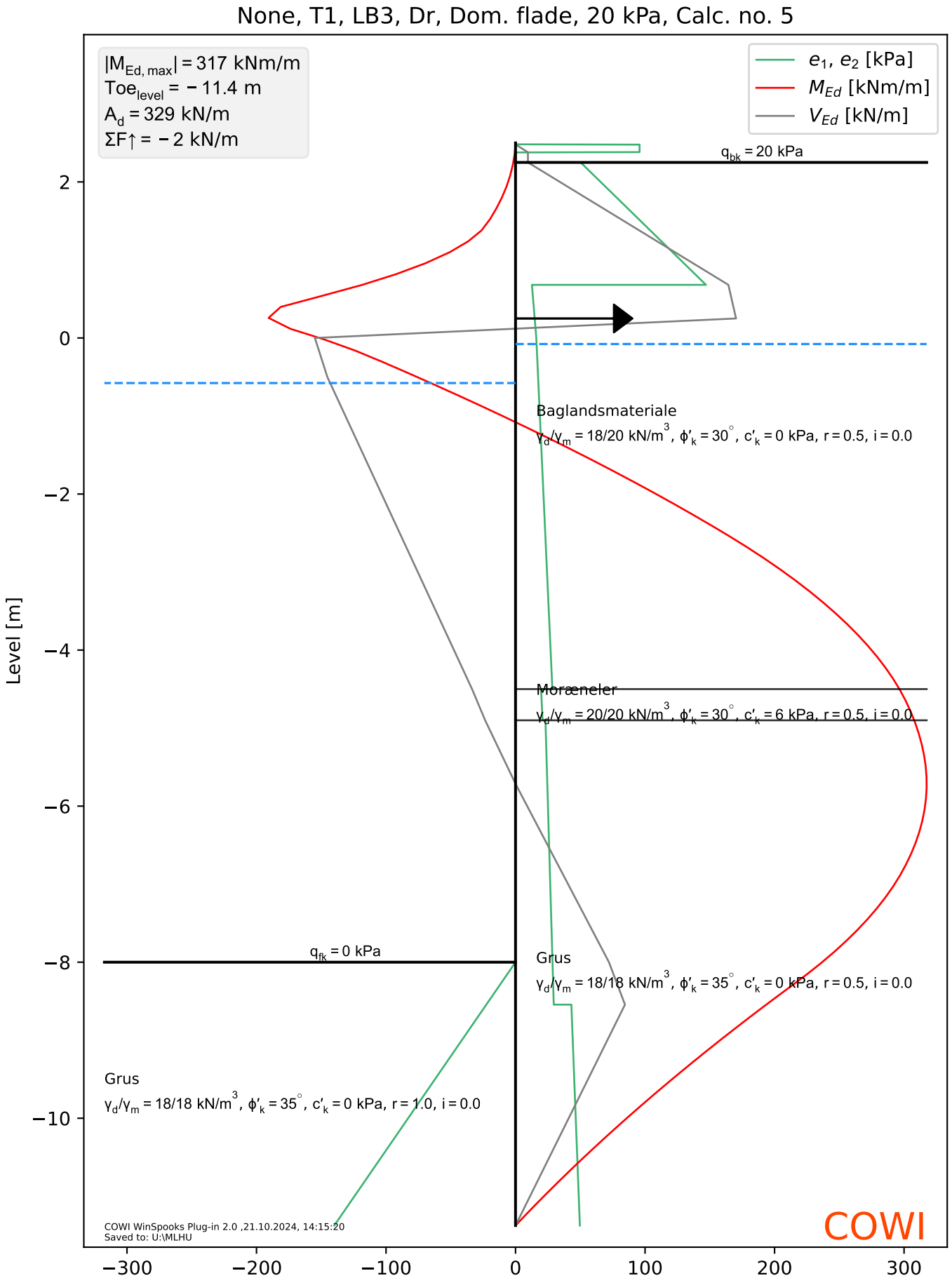
4.1 Input

Add on active?:	Yes	-
Limit state:	ULS-Plastic	-
Control class:	Normal	-
Optimize:	Optimize-700	-
Max. utilization:	0.95	-
fyk:	355	MPa
Beta_B:	1	-
Beta_D:	1	-
Design life:	50	Years
Soil compaction:	Dense	-
Corrosion rates (total)		
Level (m)	Rate	Unit
2	1.2	mm/yr
1	1.2	mm/yr
0	1.2	mm/yr
-0.5	1.2	mm/yr
-1	1.2	mm/yr
-6	1.2	mm/yr
-7	1.2	mm/yr
-8	1.2	mm/yr
-9	1.2	mm/yr

-10	1.2	mm/yr

4.2 Results

Sheet pile profile:	AZ 14-700	
Max. relative utilization ratio:	0.88	-
Rotational capacity:	OK!	
Level (m)	Rel. utilisation ratio	
2.5	0.005	-
2.25	0.005	-
2.25	0.005	-
0.804	0.091	-
0.804	0.091	-
0.25	0.153	-
0.25	0.153	-
0.0	0.21	-
-0.5	0.196	-
-4.5	0.859	-
-4.5	0.859	-
-4.9	0.876	-
-4.9	0.876	-
-5.377	0.883	-
-8.0	0.648	-
-8.516	0.545	-
-8.516	0.545	-
-11.654	0.005	-


None, T1, LB3, Dr, Dom. flade, 20 kPa, Calc. no. 5
|M_Ed, max| = 317 kNm/m
Toe_level = − 11.4 m
A_d = 329 kN/m
ΣF↑ = − 2 kN/m
e1, e2 [kPa]
M_Ed [kNm/m]
V_Ed [kN/m]
q_bk = 20 kPa
Baglandsmateriale
γ_d/γ_m = 18/20 kN/m^3, ϕ'_k = 30°, c'_k = 0 kPa, r = 0.5, i = 0.0
Moræneler
γ_d/γ_m = 20/20 kN/m^3, ϕ'_k = 30°, c'_k = 6 kPa, r = 0.5, i = 0.0
q_fk = 0 kPa
Grus
γ_d/γ_m = 18/18 kN/m^3, ϕ'_k = 35°, c'_k = 0 kPa, r = 0.5, i = 0.0
Grus
γ_d/γ_m = 18/18 kN/m^3, ϕ'_k = 35°, c'_k = 0 kPa, r = 1.0, i = 0.0
Level [m]
2
0
−2
−4
−6
−8
−10
−300
−200
−100
0
100
200
300
COWI WinSpooks Plug-in 2.0 ,21.10.2024, 14:15:20
Saved to: U:\MLHU
COWI

0. Warnings

No warnings.

1. General information

1.1 Execution

Date:	21.10.2024
Project:	None
Initials:	None
Subject:	T1, LB3, Dr, Dom. flade, 20 kPa
Calculation no.:	5

1.2 Check

Checker:	None
Date:	

1.2 Approval

Approver:	None

2. Input parameters

Wall top, zT:	2.5	m
Anchor level, zA:	0.25	m
Anchor inclination:	0.0	deg.
Prescr. anchor force:	N/A	kN/m
Mass of wall:	110.0	kg/m/m of wall
Water density, gam_w:	10.0	kN/m3
State:	Drained	-
Slope back:	0.0	deg.
Slope front:	0.0	deg.

Soil profile:	SP1	-

2.1 Characteristic soil parameters back

z_top	g_d	g_m	cu	c'	phi'	i	r	Description	Keep drained
m	kN/m3	kN/m3	kN/m2	kN/m2	deg.	-	-	-	-
2.25	18	20	0	0	30	0.0	0.47	Baglandsmateriale	Yes
-4.50	20	20	60	6	30	0.0	0.47	Moræneler	No
-4.90	18	18	0	0	35	0.0	0.47	Grus	Yes

2.2 Characteristic soil parameters front

z_top	g_d	g_m	cu	c'	phi'	i	r	Description	Keep drained
m	kN/m3	kN/m3	kN/m2	kN/m2	deg.	-	-	-	-
-8.00	18	18	0	0	35	0.0	1.00	Grus	Yes

2.3 Water levels

w_b	w_f
[m]	[m]
0.0	-0.5

2.4 Additional pressure profile: AP4

z [m]	2.48	2.48	2.38	2.38
ez_k [kN/m2]	0.0	95.8	95.8	0.0
ez_d [kN/m2]	0.0	95.8	95.8	0.0

2.5 Loads

zR	q_bk	q_fk	Axial wall load (design)
m	kN/m2	kN/m2	kN/m
2.25	20.0	0.0	0.0

2.6 Safety

Alpha	1.0
Consequence class:	CC2

f_gamf	f_qf	f_cf	f_cuf	f_phif	f_wat	f_AP	f_gamb	f_qb	f_cb	f_cub	f_phib
1.0	0.0	1.2	1.8	1.2	1.0	1.0	1.0	1.5	1.2	1.8	1.2

2.7 Failure mode

Anchored wall		
iA	iB	iC
0.0	0.0	1.0

2.8 King post wall

Not king post wall.

3. Results

3.1 Summary

Max. |moment|:	317.4	kNm/m
Max. |shear force|:	170.3	kN/m
Toe level:	-11.4	m
Anchor force, Ad:	329.0	kN/m
Axial anchor force:	329.0	kN/m
|Moment| at anchor level:	190.4	kNm/m
Sum of tangential earth pressure*:	12.9	kN/m
Sum of vertical forces*:	-2.1	kN/m
*Tangential pressure and vertical forces are positive upwards.		

3.2 Pressure and structural forces

Level	e1	e2	dw	e-net	Ved	Med	Ju
m	kN/m2	kN/m2	kN/m2	kN/m2	kN/m	kNm/m	-
2.5	-0.0	0.0	0.0	0.0	0.0	0.0	3.0
2.5	-0.0	0.0	0.0	0.0	0.0	0.0	2.0
2.5	-0.0	95.8	0.0	95.8	0.2	0.0	2.0
2.4	-0.0	95.7	0.0	95.7	9.4	-0.5	2.0
2.4	-0.0	0.0	0.0	0.0	9.6	-0.5	2.0
2.2	-0.0	0.0	0.0	0.0	9.6	-1.7	1.0
2.2	-0.0	0.0	0.0	0.0	9.6	-1.7	3.0
2.2	-0.0	50.3	0.0	50.3	9.6	-1.7	3.0
0.7	-0.0	147.1	0.0	147.1	164.3	-118.3	2.0
0.7	-0.0	12.7	0.0	12.7	164.3	-118.3	3.0
0.2	-0.0	14.8	0.0	14.8	170.3	-190.4	2.0
0.0	-0.0	16.0	0.0	16.0	-154.9	-151.2	3.0
-0.5	-0.0	17.4	5.0	22.4	-145.3	-76.0	3.0

-4.5	-0.0	28.4	5.0	33.4	-33.6	296.4	1.0
-4.5	-0.0	19.7	5.0	24.7	-33.6	296.4	3.0
-4.9	-0.0	20.8	5.0	25.8	-23.4	307.8	1.0
-4.9	-0.0	23.1	5.0	28.1	-23.4	307.8	3.0
-5.7	-0.0	24.5	5.0	29.5	0.0	317.4	2.0
-8.0	-0.0	28.6	5.0	33.6	72.1	236.7	1.0
-8.5	-22.6	29.5	5.0	11.9	84.5	193.6	2.0
-8.5	-22.6	43.1	5.0	25.5	84.5	193.6	3.0
-11.4	-139.9	49.7	5.0	-85.3	0.0	0.0	2.0

4. Sheet pile add on

4.1 Input

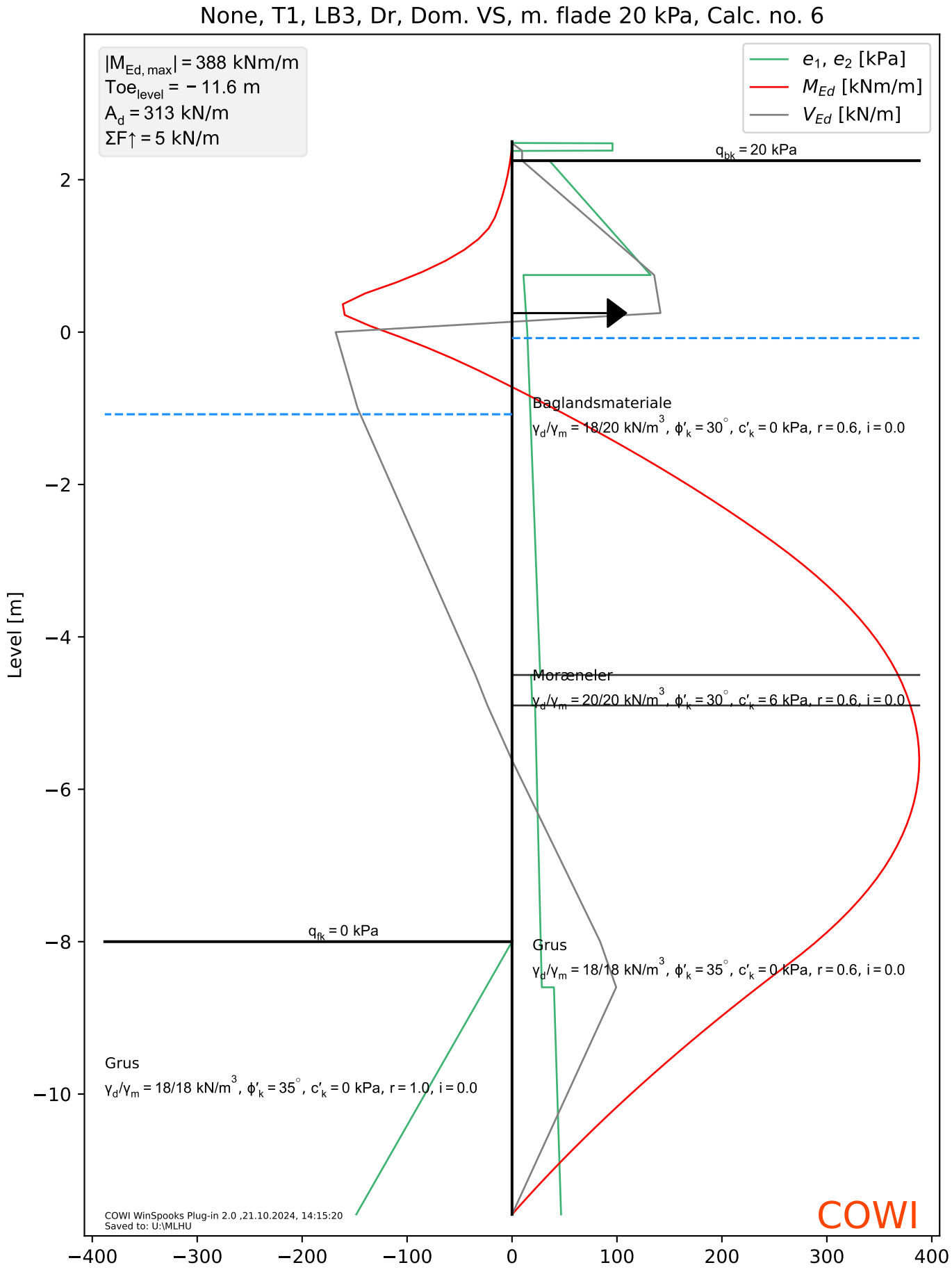
Add on active?:	Yes	-
Limit state:	ULS-Plastic	-
Control class:	Normal	-
Optimize:	Optimize-700	-
Max. utilization:	0.95	-
fyk:	355	MPa
Beta_B:	1	-
Beta_D:	1	-
Design life:	50	Years
Soil compaction:	Dense	-
Corrosion rates (total)		
Level (m)	Rate	Unit
2	1.2	mm/yr
1	1.2	mm/yr
0	1.2	mm/yr
-0.5	1.2	mm/yr
-1	1.2	mm/yr

-6	1.2	mm/yr
-7	1.2	mm/yr
-8	1.2	mm/yr
-9	1.2	mm/yr
-10	1.2	mm/yr

4.2 Results

Sheet pile profile:	AZ 12-700	
Max. relative utilization ratio:	0.89	-
Rotational capacity:	OK!	
Level (m)	Rel. utilisation ratio	
2.5	0.006	-
2.482	0.006	-
2.478	0.006	-
2.382	0.018	-
2.378	0.018	-
2.25	0.018	-
2.25	0.018	-
2.25	0.018	-
0.681	0.333	-
0.681	0.333	-
0.25	0.536	-
0.0	0.426	-
-0.5	0.271	-
-4.5	0.835	-
-4.5	0.835	-
-4.9	0.867	-
-4.9	0.867	-
-5.714	0.894	-
-8.0	0.667	-

-8.544	0.545	-
-8.544	0.545	-
-11.375	0.006	-


None, T1, LB3, Dr, Dom. VS, m. flade 20 kPa, Calc. no. 6
|M_Ed, max| = 388 kNm/m
Toe_level = − 11.6 m
A_d = 313 kN/m
ΣF↑ = 5 kN/m
e1, e2 [kPa]
M_Ed [kNm/m]
V_Ed [kN/m]
q_bk = 20 kPa
Baglandsmateriale
γ_d/γ_m = 18/20 kN/m^3, ϕ'_k = 30°, c'_k = 0 kPa, r = 0.6, i = 0.0
Moræneler
γ_d/γ_m = 20/20 kN/m^3, ϕ'_k = 30°, c'_k = 6 kPa, r = 0.6, i = 0.0
q_fk = 0 kPa
Grus
γ_d/γ_m = 18/18 kN/m^3, ϕ'_k = 35°, c'_k = 0 kPa, r = 0.6, i = 0.0
Grus
γ_d/γ_m = 18/18 kN/m^3, ϕ'_k = 35°, c'_k = 0 kPa, r = 1.0, i = 0.0
Level [m]
2
0
−2
−4
−6
−8
−10
−400
−300
−200
−100
0
100
200
300
400
COWI WinSpooks Plug-in 2.0 ,21.10.2024, 14:15:20
Saved to: U:\MLHU
COWI

0. Warnings

No warnings.

1. General information

1.1 Execution

Date:	21.10.2024
Project:	None
Initials:	None
Subject:	T1, LB3, Dr, Dom. VS, m. flade 20 kPa
Calculation no.:	6

1.2 Check

Checker:	None
Date:	

1.2 Approval

Approver:	None

2. Input parameters

Wall top, zT:	2.5	m
Anchor level, zA:	0.25	m
Anchor inclination:	0.0	deg.
Prescr. anchor force:	N/A	kN/m
Mass of wall:	110.0	kg/m/m of wall
Water density, gam_w:	10.0	kN/m3
State:	Drained	-
Slope back:	0.0	deg.
Slope front:	0.0	deg.

Soil profile:	SP2	-

2.1 Characteristic soil parameters back

z_top	g_d	g_m	cu	c'	phi'	i	r	Description	Keep drained
m	kN/m3	kN/m3	kN/m2	kN/m2	deg.	-	-	-	-
2.25	18	20	0	0	30	0.0	0.55	Baglandsmateriale	Yes
-4.50	20	20	60	6	30	0.0	0.55	Moræneler	No
-4.90	18	18	0	0	35	0.0	0.55	Grus	Yes

2.2 Characteristic soil parameters front

z_top	g_d	g_m	cu	c'	phi'	i	r	Description	Keep drained
m	kN/m3	kN/m3	kN/m2	kN/m2	deg.	-	-	-	-
-8.00	18	18	0	0	35	0.0	1.00	Grus	Yes

2.3 Water levels

w_b	w_f
[m]	[m]
0.0	-1.0

2.4 Additional pressure profile: AP4

z [m]	2.48	2.48	2.38	2.38
ez_k [kN/m2]	0.0	95.8	95.8	0.0
ez_d [kN/m2]	0.0	95.8	95.8	0.0

2.5 Loads

zR	q_bk	q_fk	Axial wall load (design)
m	kN/m2	kN/m2	kN/m
2.25	20.0	0.0	0.0

2.6 Safety

Alpha	1.0
Consequence class:	CC2

f_gamf	f_qf	f_cf	f_cuf	f_phif	f_wat	f_AP	f_gamb	f_qb	f_cb	f_cub	f_phib
1.0	1.0	1.2	1.8	1.2	1.0	1.0	1.0	1.05	1.2	1.8	1.2

2.7 Failure mode

Anchored wall		
iA	iB	iC
0.0	0.0	1.0

2.8 King post wall

Not king post wall.

3. Results

3.1 Summary

Max. |moment|:	388.1	kNm/m
Max. |shear force|:	168.1	kN/m
Toe level:	-11.6	m
Anchor force, Ad:	313.0	kN/m
Axial anchor force:	313.0	kN/m
|Moment| at anchor level:	161.5	kNm/m
Sum of tangential earth pressure*:	20.1	kN/m
Sum of vertical forces*:	4.9	kN/m
*Tangential pressure and vertical forces are positive upwards.		

3.2 Pressure and structural forces

Level	e1	e2	dw	e-net	Ved	Med	Ju
m	kN/m2	kN/m2	kN/m2	kN/m2	kN/m	kNm/m	-
2.5	-0.0	0.0	0.0	0.0	0.0	0.0	3.0
2.5	-0.0	0.0	0.0	0.0	0.0	0.0	2.0
2.5	-0.0	95.8	0.0	95.8	0.2	0.0	2.0
2.4	-0.0	95.7	0.0	95.7	9.4	-0.5	2.0
2.4	-0.0	0.0	0.0	0.0	9.6	-0.5	2.0
2.2	-0.0	0.0	0.0	0.0	9.6	-1.7	1.0
2.2	-0.0	0.0	0.0	0.0	9.6	-1.7	3.0
2.2	-0.0	35.6	0.0	35.6	9.6	-1.7	3.0
0.7	-0.0	132.1	0.0	132.1	135.5	-92.5	2.0
0.7	-0.0	10.9	0.0	10.9	135.5	-92.5	3.0
0.2	-0.0	13.3	0.0	13.3	141.5	-161.5	2.0
0.0	-0.0	14.6	0.0	14.6	-168.1	-119.1	3.0
-1.0	-0.0	17.3	10.0	27.3	-147.1	39.6	3.0

-4.5	-0.0	26.8	10.0	36.8	-34.9	367.9	1.0
-4.5	-0.0	18.2	10.0	28.2	-34.9	367.9	3.0
-4.9	-0.0	19.3	10.0	29.3	-23.4	379.6	1.0
-4.9	-0.0	22.0	10.0	32.0	-23.4	379.6	3.0
-5.6	-0.0	23.2	10.0	33.2	0.0	388.1	2.0
-8.0	-0.0	27.4	10.0	37.4	84.0	290.0	1.0
-8.6	-24.8	28.4	10.0	13.6	99.3	234.4	2.0
-8.6	-24.8	39.9	10.0	25.1	99.3	234.4	3.0
-11.6	-148.4	46.7	10.0	-91.7	0.0	0.0	2.0

4. Sheet pile add on

4.1 Input

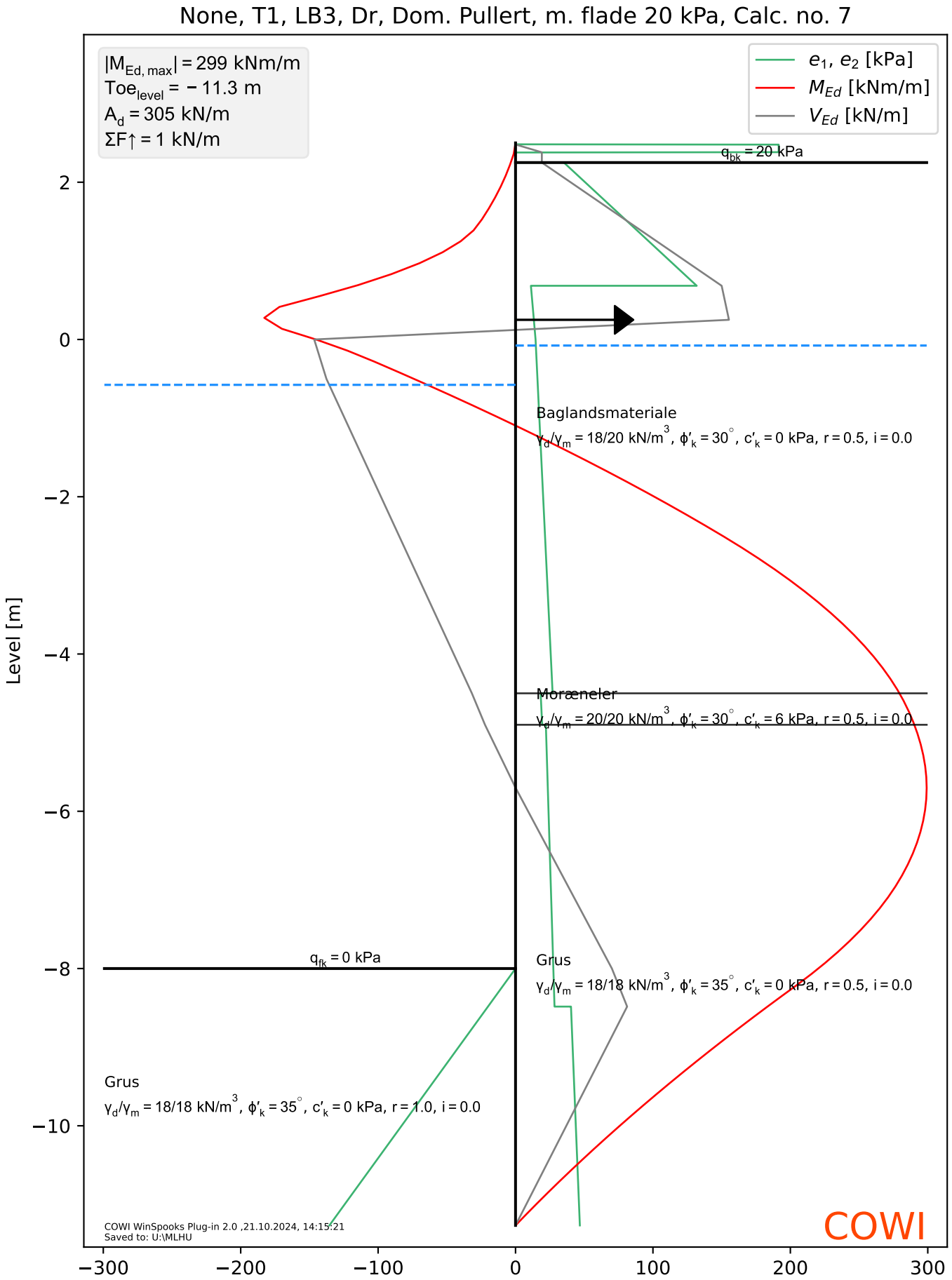
Add on active?:	Yes	-
Limit state:	ULS-Plastic	-
Control class:	Normal	-
Optimize:	Optimize-700	-
Max. utilization:	0.95	-
fyk:	355	MPa
Beta_B:	1	-
Beta_D:	1	-
Design life:	50	Years
Soil compaction:	Dense	-
Corrosion rates (total)		
Level (m)	Rate	Unit
2	1.2	mm/yr
1	1.2	mm/yr
0	1.2	mm/yr
-0.5	1.2	mm/yr
-1	1.2	mm/yr

-6	1.2	mm/yr
-7	1.2	mm/yr
-8	1.2	mm/yr
-9	1.2	mm/yr
-10	1.2	mm/yr

4.2 Results

Sheet pile profile:	AZ 13-700	
Max. relative utilization ratio:	0.95	-
Rotational capacity:	OK!	
Level (m)	Rel. utilisation ratio	
2.5	0.006	-
2.482	0.006	-
2.478	0.006	-
2.382	0.015	-
2.378	0.015	-
2.25	0.015	-
2.25	0.015	-
2.25	0.015	-
0.749	0.226	-
0.749	0.226	-
0.25	0.395	-
0.0	0.291	-
-1.0	0.231	-
-4.5	0.901	-
-4.5	0.901	-
-4.9	0.929	-
-4.9	0.929	-
-5.619	0.95	-
-8.0	0.71	-

-8.599	0.574	-
-8.599	0.574	-
-11.58	0.006	-


None, T1, LB3, Dr, Dom. Pullert, m. flade 20 kPa, Calc. no. 7
|M_Ed, max| = 299 kNm/m
Toe_level = − 11.3 m
A_d = 305 kN/m
ΣF↑ = 1 kN/m
e1, e2 [kPa]
M_Ed [kNm/m]
V_Ed [kN/m]
q_bk = 20 kPa
Baglandsmateriale
γ_d/γ_m = 18/20 kN/m^3, ϕ'_k = 30°, c'_k = 0 kPa, r = 0.5, i = 0.0
Moræneler
γ_d/γ_m = 20/20 kN/m^3, ϕ'_k = 30°, c'_k = 6 kPa, r = 0.5, i = 0.0
q_fk = 0 kPa
Grus
γ_d/γ_m = 18/18 kN/m^3, ϕ'_k = 35°, c'_k = 0 kPa, r = 0.5, i = 0.0
Grus
γ_d/γ_m = 18/18 kN/m^3, ϕ'_k = 35°, c'_k = 0 kPa, r = 1.0, i = 0.0
Level [m]
2
0
−2
−4
−6
−8
−10
−300
−200
−100
0
100
200
300
COWI WinSpooks Plug-in 2.0 ,21.10.2024, 14:15:21
Saved to: U:\MLHU
COWI

0. Warnings

No warnings.

1. General information

1.1 Execution

Date:	21.10.2024
Project:	None
Initials:	None
Subject:	T1, LB3, Dr, Dom. Pullert, m. flade 20 kPa
Calculation no.:	7

1.2 Check

Checker:	None
Date:	

1.2 Approval

Approver:	None

2. Input parameters

Wall top, zT:	2.5	m
Anchor level, zA:	0.25	m
Anchor inclination:	0.0	deg.
Prescr. anchor force:	N/A	kN/m
Mass of wall:	110.0	kg/m/m of wall
Water density, gam_w:	10.0	kN/m3
State:	Drained	-
Slope back:	0.0	deg.
Slope front:	0.0	deg.

Soil profile:	SP1	-

2.1 Characteristic soil parameters back

z_top	g_d	g_m	cu	c'	phi'	i	r	Description	Keep drained
m	kN/m3	kN/m3	kN/m2	kN/m2	deg.	-	-	-	-
2.25	18	20	0	0	30	0.0	0.47	Baglandsmateriale	Yes
-4.50	20	20	60	6	30	0.0	0.47	Moræneler	No
-4.90	18	18	0	0	35	0.0	0.47	Grus	Yes

2.2 Characteristic soil parameters front

z_top	g_d	g_m	cu	c'	phi'	i	r	Description	Keep drained
m	kN/m3	kN/m3	kN/m2	kN/m2	deg.	-	-	-	-
-8.00	18	18	0	0	35	0.0	1.00	Grus	Yes

2.3 Water levels

w_b	w_f
[m]	[m]
0.0	-0.5

2.4 Additional pressure profile: AP5

z [m]	2.48	2.48	2.38	2.38
ez_k [kN/m2]	0.0	191.5	191.5	0.0
ez_d [kN/m2]	0.0	191.5	191.5	0.0

2.5 Loads

zR	q_bk	q_fk	Axial wall load (design)
m	kN/m2	kN/m2	kN/m
2.25	20.0	0.0	0.0

2.6 Safety

Alpha	1.0
Consequence class:	CC2

f_gamf	f_qf	f_cf	f_cuf	f_phif	f_wat	f_AP	f_gamb	f_qb	f_cb	f_cub	f_phib
1.0	1.0	1.2	1.8	1.2	1.0	1.0	1.0	1.05	1.2	1.8	1.2

2.7 Failure mode

Anchored wall		
iA	iB	iC
0.0	0.0	1.0

2.8 King post wall

Not king post wall.

3. Results

3.1 Summary

Max. |moment|:	299.2	kNm/m
Max. |shear force|:	155.3	kN/m
Toe level:	-11.3	m
Anchor force, Ad:	305.3	kN/m
Axial anchor force:	305.3	kN/m
|Moment| at anchor level:	182.3	kNm/m
Sum of tangential earth pressure*:	15.7	kN/m
Sum of vertical forces*:	0.8	kN/m
*Tangential pressure and vertical forces are positive upwards.		

3.2 Pressure and structural forces

Level	e1	e2	dw	e-net	Ved	Med	Ju
m	kN/m2	kN/m2	kN/m2	kN/m2	kN/m	kNm/m	-
2.5	-0.0	0.0	0.0	0.0	0.0	0.0	3.0
2.5	-0.0	0.0	0.0	0.0	0.0	0.0	2.0
2.5	-0.0	191.5	0.0	191.5	0.4	-0.0	2.0
2.4	-0.0	191.5	0.0	191.5	18.8	-0.9	2.0
2.4	-0.0	0.0	0.0	0.0	19.1	-1.0	2.0
2.2	-0.0	0.0	0.0	0.0	19.1	-3.4	1.0
2.2	-0.0	0.0	0.0	0.0	19.1	-3.4	3.0
2.2	-0.0	35.2	0.0	35.2	19.1	-3.4	3.0
0.7	-0.0	131.9	0.0	131.9	150.0	-116.2	2.0
0.7	-0.0	11.2	0.0	11.2	150.0	-116.2	3.0
0.2	-0.0	13.3	0.0	13.3	155.3	-182.3	2.0
0.0	-0.0	14.6	0.0	14.6	-146.5	-145.2	3.0
-0.5	-0.0	16.0	5.0	21.0	-137.6	-74.1	3.0

-4.5	-0.0	27.0	5.0	32.0	-31.8	279.4	1.0
-4.5	-0.0	18.3	5.0	23.3	-31.8	279.4	3.0
-4.9	-0.0	19.4	5.0	24.4	-22.2	290.2	1.0
-4.9	-0.0	22.1	5.0	27.1	-22.2	290.2	3.0
-5.7	-0.0	23.5	5.0	28.5	0.0	299.2	2.0
-8.0	-0.0	27.5	5.0	32.5	70.1	220.3	1.0
-8.5	-20.1	28.4	5.0	13.3	81.2	183.4	2.0
-8.5	-20.1	40.4	5.0	25.3	81.2	183.4	3.0
-11.3	-135.5	46.8	5.0	-83.7	0.0	0.0	2.0

4. Sheet pile add on

4.1 Input

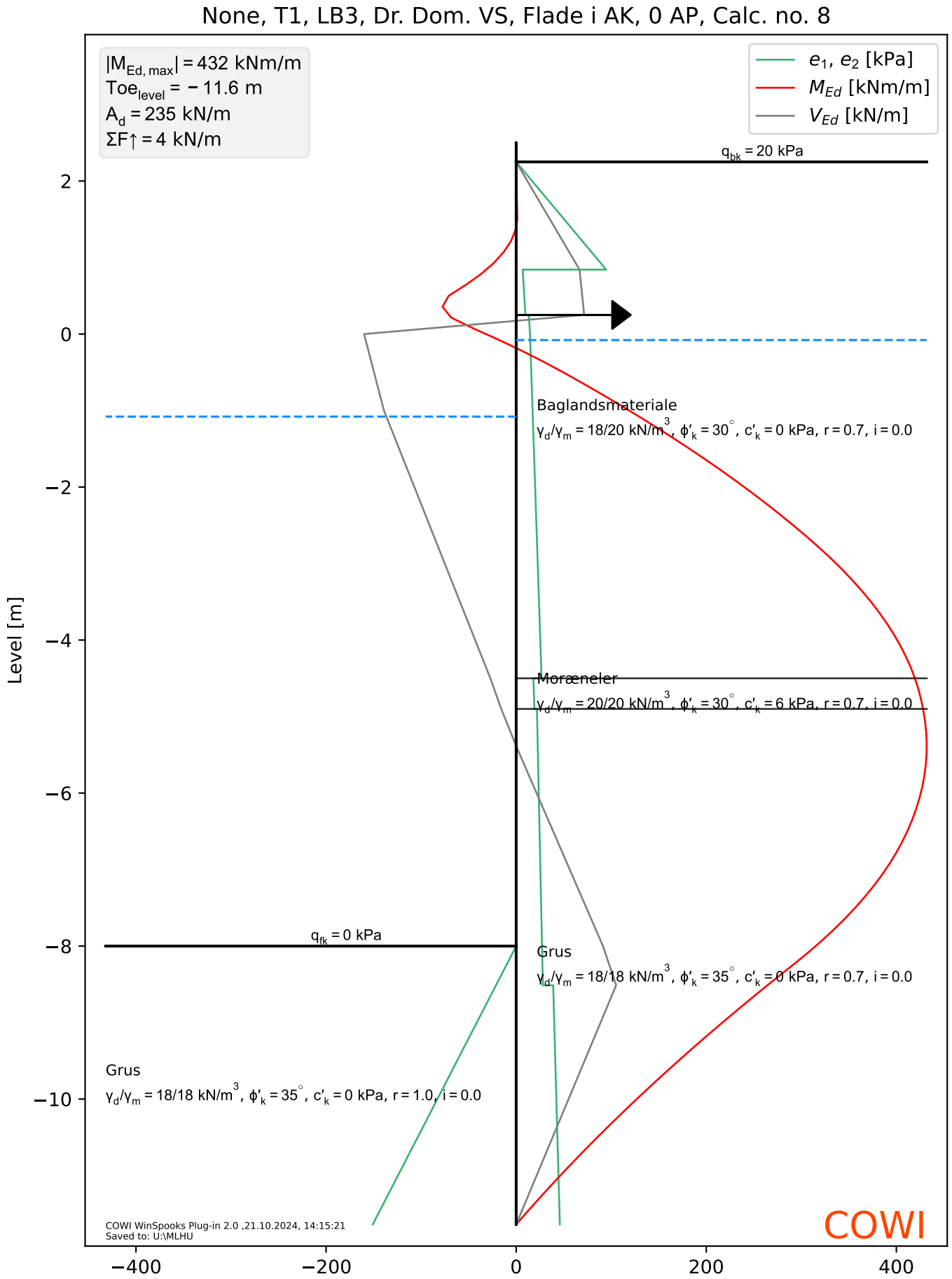
Add on active?:	Yes	-
Limit state:	ULS-Plastic	-
Control class:	Normal	-
Optimize:	Optimize-700	-
Max. utilization:	0.95	-
fyk:	355	MPa
Beta_B:	1	-
Beta_D:	1	-
Design life:	50	Years
Soil compaction:	Dense	-
Corrosion rates (total)		
Level (m)	Rate	Unit
2	1.2	mm/yr
1	1.2	mm/yr
0	1.2	mm/yr
-0.5	1.2	mm/yr
-1	1.2	mm/yr

-6	1.2	mm/yr
-7	1.2	mm/yr
-8	1.2	mm/yr
-9	1.2	mm/yr
-10	1.2	mm/yr

4.2 Results

Sheet pile profile:	AZ 12-700	
Max. relative utilization ratio:	0.84	-
Rotational capacity:	OK!	
Level (m)	Rel. utilisation ratio	
2.5	0.006	-
2.482	0.006	-
2.478	0.006	-
2.382	0.035	-
2.378	0.036	-
2.25	0.036	-
2.25	0.036	-
2.25	0.036	-
0.683	0.327	-
0.683	0.327	-
0.25	0.513	-
0.0	0.409	-
-0.5	0.257	-
-4.5	0.787	-
-4.5	0.787	-
-4.9	0.817	-
-4.9	0.817	-
-5.7	0.843	-
-8.0	0.621	-

-8.484	0.516	-
-8.484	0.516	-
-11.267	0.006	-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|M_Ed, max| = 432 kNm/m
Toe_level = − 11.6 m
A_d = 235 kN/m
ΣF↑ = 4 kN/m
e1, e2 [kPa]
M_Ed [kNm/m]
V_Ed [kN/m]
q_bk = 20 kPa
Baglandsmateriale
γ_d/γ_m = 18/20 kN/m^3, ϕ'_k = 30°, c'_k = 0 kPa, r = 0.7, i = 0.0
Moræneler
γ_d/γ_m = 20/20 kN/m^3, ϕ'_k = 30°, c'_k = 6 kPa, r = 0.7, i = 0.0
q_fk = 0 kPa
Grus
γ_d/γ_m = 18/18 kN/m^3, ϕ'_k = 35°, c'_k = 0 kPa, r = 0.7, i = 0.0
Grus
γ_d/γ_m = 18/18 kN/m^3, ϕ'_k = 35°, c'_k = 0 kPa, r = 1.0, i = 0.0
Level [m]
2
0
−2
−4
−6
−8
−10
−400
−200
0
200
400
COWI WinSpooks Plug-in 2.0 ,21.10.2024, 14:15:21
Saved to: U:\MLHU
COWI

0. Warnings

No warnings.

1. General information

1.1 Execution

Date:	21.10.2024
Project:	None
Initials:	None
Subject:	T1, LB3, Dr. Dom. VS, Flade i AK, 0 AP
Calculation no.:	8

1.2 Check

Checker:	None
Date:	

1.2 Approval

Approver:	None

2. Input parameters

Wall top, zT:	2.5	m
Anchor level, zA:	0.25	m
Anchor inclination:	0.0	deg.
Prescr. anchor force:	N/A	kN/m
Mass of wall:	110.0	kg/m/m of wall
Water density, gam_w:	10.0	kN/m3
State:	Drained	-
Slope back:	0.0	deg.
Slope front:	0.0	deg.

Soil profile:	SP3	-

2.1 Characteristic soil parameters back

z_top	g_d	g_m	cu	c'	phi'	i	r	Description	Keep drained
m	kN/m3	kN/m3	kN/m2	kN/m2	deg.	-	-	-	-
2.25	18	20	0	0	30	0.0	0.65	Baglandsmateriale	Yes
-4.50	20	20	60	6	30	0.0	0.65	Moræneler	No
-4.90	18	18	0	0	35	0.0	0.65	Grus	Yes

2.2 Characteristic soil parameters front

z_top	g_d	g_m	cu	c'	phi'	i	r	Description	Keep drained
m	kN/m3	kN/m3	kN/m2	kN/m2	deg.	-	-	-	-
-8.00	18	18	0	0	35	0.0	1.00	Grus	Yes

2.3 Water levels

w_b	w_f
[m]	[m]
0.0	-1.0

2.4 Additional pressure profile: AP6

z [m]
ez_k [kN/m2]
ez_d [kN/m2]

2.5 Loads

zR	q_bk	q_fk	Axial wall load (design)
m	kN/m2	kN/m2	kN/m
0.25	20.0	0.0	0.0

2.6 Safety

Alpha	1.0
Consequence class:	CC2

f_gamf	f_qf	f_cf	f_cuf	f_phif	f_wat	f_AP	f_gamb	f_qb	f_cb	f_cub	f_phib
1.0	1.0	1.2	1.8	1.2	1.0	1.0	1.0	1.05	1.2	1.8	1.2

2.7 Failure mode

Anchored wall		
iA	iB	iC
0.0	0.0	1.0

2.8 King post wall

Not king post wall.

3. Results

3.1 Summary

Max. |moment|:	431.9	kNm/m
Max. |shear force|:	160.0	kN/m
Toe level:	-11.6	m
Anchor force, Ad:	235.1	kN/m
Axial anchor force:	235.1	kN/m
|Moment| at anchor level:	72.1	kNm/m
Sum of tangential earth pressure*:	19.5	kN/m
Sum of vertical forces*:	4.3	kN/m
*Tangential pressure and vertical forces are positive upwards.		

3.2 Pressure and structural forces

Level	e1	e2	dw	e-net	Ved	Med	Ju
m	kN/m2	kN/m2	kN/m2	kN/m2	kN/m	kNm/m	-
2.5	-0.0	0.0	0.0	0.0	0.0	0.0	3.0
2.2	-0.0	0.0	0.0	0.0	0.0	0.0	1.0
2.2	-0.0	0.0	0.0	0.0	0.0	0.0	3.0
0.8	-0.0	94.7	0.0	94.7	66.7	-31.3	2.0
0.8	-0.0	6.8	0.0	6.8	66.7	-31.3	3.0
0.2	-0.0	9.7	0.0	9.7	71.6	-72.1	2.0
0.2	-0.0	13.3	0.0	13.3	71.6	-72.1	3.0
0.0	-0.0	14.6	0.0	14.6	-160.0	-31.7	3.0
-1.0	-0.0	17.3	10.0	27.3	-139.1	118.9	3.0
-4.5	-0.0	26.7	10.0	36.7	-27.1	419.5	1.0
-4.5	-0.0	18.1	10.0	28.1	-27.1	419.5	3.0
-4.9	-0.0	19.2	10.0	29.2	-15.7	428.1	1.0
-4.9	-0.0	21.9	10.0	31.9	-15.7	428.1	3.0

-5.4	-0.0	22.7	10.0	32.7	0.0	431.9	2.0
-8.0	-0.0	27.2	10.0	37.2	91.3	315.1	1.0
-8.5	-21.3	28.1	10.0	16.8	105.2	264.3	2.0
-8.5	-21.3	39.0	10.0	27.7	105.2	264.3	3.0
-11.6	-150.9	45.9	10.0	-95.0	0.0	0.0	2.0

4. Sheet pile add on

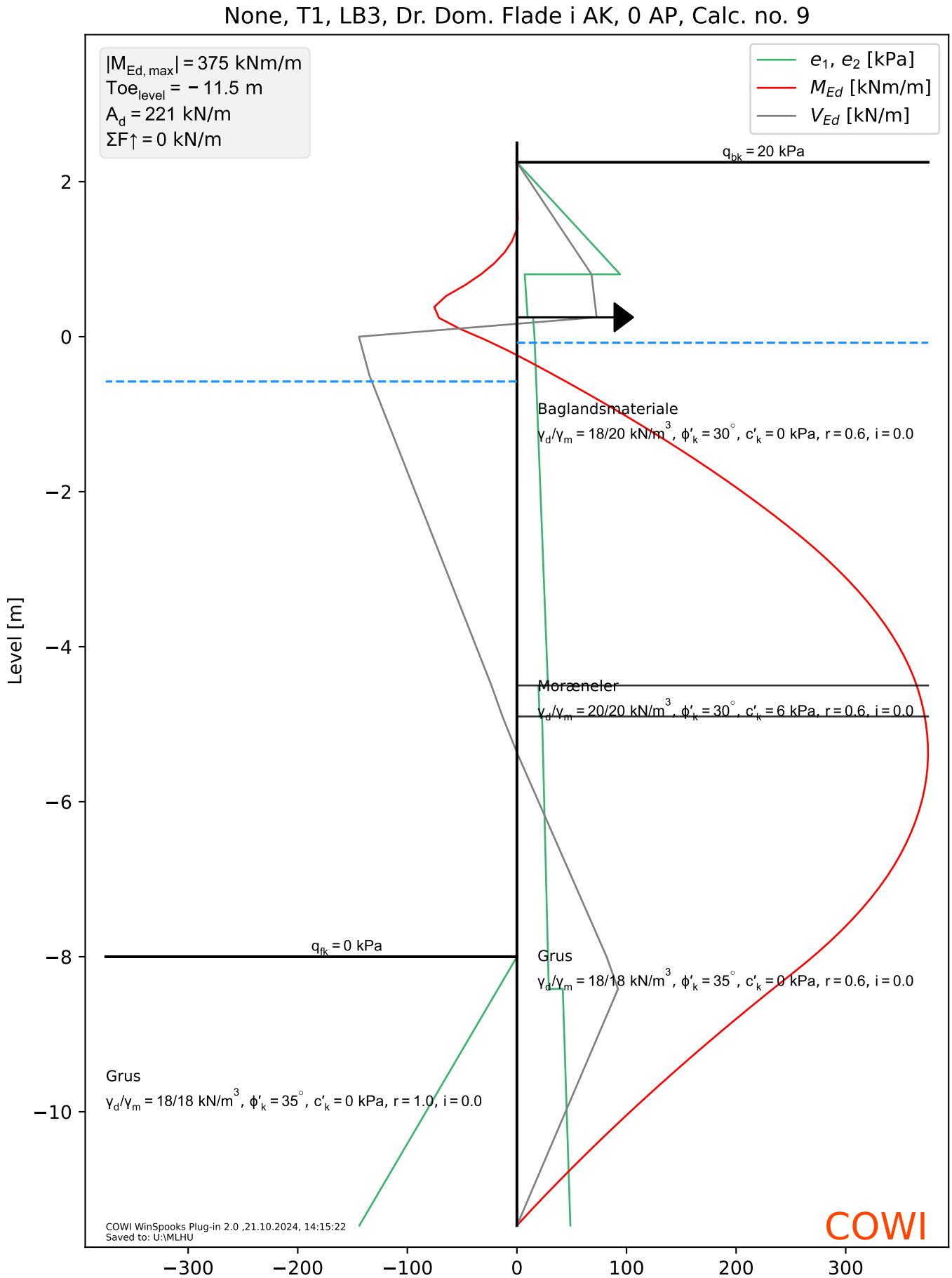
4.1 Input

Add on active?:	Yes	-
Limit state:	ULS-Plastic	-
Control class:	Normal	-
Optimize:	Optimize-700	-
Max. utilization:	0.95	-
fyk:	355	MPa
Beta_B:	1	-
Beta_D:	1	-
Design life:	50	Years
Soil compaction:	Dense	-
Corrosion rates (total)		
Level (m)	Rate	Unit
2	1.2	mm/yr
1	1.2	mm/yr
0	1.2	mm/yr
-0.5	1.2	mm/yr
-1	1.2	mm/yr
-6	1.2	mm/yr
-7	1.2	mm/yr
-8	1.2	mm/yr
-9	1.2	mm/yr

-10	1.2	mm/yr

4.2 Results

Sheet pile profile:	AZ 14-700	
Max. relative utilization ratio:	0.92	-
Rotational capacity:	OK!	
Level (m)	Rel. utilisation ratio	
2.5	0.005	-
2.25	0.005	-
2.25	0.005	-
0.842	0.089	-
0.842	0.089	-
0.25	0.153	-
0.25	0.153	-
0.0	0.213	-
-1.0	0.253	-
-4.5	0.893	-
-4.5	0.893	-
-4.9	0.911	-
-4.9	0.911	-
-5.386	0.919	-
-8.0	0.671	-
-8.513	0.562	-
-8.513	0.562	-
-11.639	0.005	-


None, T1, LB3, Dr. Dom. Flade i AK, 0 AP, Calc. no. 9
|M_Ed, max| = 375 kNm/m
Toe_level = − 11.5 m
A_d = 221 kN/m
ΣF↑ = 0 kN/m
e1, e2 [kPa]
M_Ed [kNm/m]
V_Ed [kN/m]
q_bk = 20 kPa
Baglandsmateriale
γ_d/γ_m = 18/20 kN/m^3, ϕ'_k = 30°, c'_k = 0 kPa, r = 0.6, i = 0.0
Moræneler
γ_d/γ_m = 20/20 kN/m^3, ϕ'_k = 30°, c'_k = 6 kPa, r = 0.6, i = 0.0
q_fk = 0 kPa
Grus
γ_d/γ_m = 18/18 kN/m^3, ϕ'_k = 35°, c'_k = 0 kPa, r = 0.6, i = 0.0
Grus
γ_d/γ_m = 18/18 kN/m^3, ϕ'_k = 35°, c'_k = 0 kPa, r = 1.0, i = 0.0
Level [m]
2
0
−2
−4
−6
−8
−10
−300
−200
−100
0
100
200
300
COWI WinSpooks Plug-in 2.0 ,21.10.2024, 14:15:22
Saved to: U:\MLHU
COWI

0. Warnings

No warnings.

1. General information

1.1 Execution

Date:	21.10.2024
Project:	None
Initials:	None
Subject:	T1, LB3, Dr. Dom. Flade i AK, 0 AP
Calculation no.:	9

1.2 Check

Checker:	None
Date:	

1.2 Approval

Approver:	None

2. Input parameters

Wall top, zT:	2.5	m
Anchor level, zA:	0.25	m
Anchor inclination:	0.0	deg.
Prescr. anchor force:	N/A	kN/m
Mass of wall:	110.0	kg/m/m of wall
Water density, gam_w:	10.0	kN/m3
State:	Drained	-
Slope back:	0.0	deg.
Slope front:	0.0	deg.

Soil profile:	SP4	-

2.1 Characteristic soil parameters back

z_top	g_d	g_m	cu	c'	phi'	i	r	Description	Keep drained
m	kN/m3	kN/m3	kN/m2	kN/m2	deg.	-	-	-	-
2.25	18	20	0	0	30	0.0	0.58	Baglandsmateriale	Yes
-4.50	20	20	60	6	30	0.0	0.58	Moræneler	No
-4.90	18	18	0	0	35	0.0	0.58	Grus	Yes

2.2 Characteristic soil parameters front

z_top	g_d	g_m	cu	c'	phi'	i	r	Description	Keep drained
m	kN/m3	kN/m3	kN/m2	kN/m2	deg.	-	-	-	-
-8.00	18	18	0	0	35	0.0	1.00	Grus	Yes

2.3 Water levels

w_b	w_f
[m]	[m]
0.0	-0.5

2.4 Additional pressure profile: AP6

z [m]
ez_k [kN/m2]
ez_d [kN/m2]

2.5 Loads

zR	q_bk	q_fk	Axial wall load (design)
m	kN/m2	kN/m2	kN/m
0.25	20.0	0.0	0.0

2.6 Safety

Alpha	1.0
Consequence class:	CC2

f_gamf	f_qf	f_cf	f_cuf	f_phif	f_wat	f_AP	f_gamb	f_qb	f_cb	f_cub	f_phib
1.0	0.0	1.2	1.8	1.2	1.0	1.0	1.0	1.5	1.2	1.8	1.2

2.7 Failure mode

Anchored wall		
iA	iB	iC
0.0	0.0	1.0

2.8 King post wall

Not king post wall.

3. Results

3.1 Summary

Max. |moment|:	375.1	kNm/m
Max. |shear force|:	144.2	kN/m
Toe level:	-11.5	m
Anchor force, Ad:	220.7	kN/m
Axial anchor force:	220.7	kN/m
|Moment| at anchor level:	71.8	kNm/m
Sum of tangential earth pressure*:	15.2	kN/m
Sum of vertical forces*:	0.1	kN/m
*Tangential pressure and vertical forces are positive upwards.		

3.2 Pressure and structural forces

Level	e1	e2	dw	e-net	Ved	Med	Ju
m	kN/m2	kN/m2	kN/m2	kN/m2	kN/m	kNm/m	-
2.5	-0.0	0.0	0.0	0.0	0.0	0.0	3.0
2.2	-0.0	0.0	0.0	0.0	0.0	0.0	1.0
2.2	-0.0	0.0	0.0	0.0	0.0	0.0	3.0
0.8	-0.0	94.2	0.0	94.2	68.0	-32.8	2.0
0.8	-0.0	7.1	0.0	7.1	68.0	-32.8	3.0
0.2	-0.0	9.8	0.0	9.8	72.7	-71.8	2.0
0.2	-0.0	14.8	0.0	14.8	72.7	-71.8	3.0
0.0	-0.0	16.0	0.0	16.0	-144.2	-35.2	3.0
-0.5	-0.0	17.4	5.0	22.4	-134.6	34.6	3.0
-4.5	-0.0	28.3	5.0	33.3	-23.3	364.8	1.0
-4.5	-0.0	19.6	5.0	24.6	-23.3	364.8	3.0
-4.9	-0.0	20.7	5.0	25.7	-13.2	372.1	1.0
-4.9	-0.0	23.0	5.0	28.0	-13.2	372.1	3.0

-5.4	-0.0	23.8	5.0	28.8	0.0	375.1	2.0
-8.0	-0.0	28.3	5.0	33.3	81.8	270.0	1.0
-8.4	-17.3	29.1	5.0	16.8	92.2	233.5	2.0
-8.4	-17.3	41.8	5.0	29.6	92.2	233.5	3.0
-11.5	-143.8	48.7	5.0	-90.0	0.0	0.0	2.0

4. Sheet pile add on

4.1 Input

Add on active?:	Yes	-
Limit state:	ULS-Plastic	-
Control class:	Normal	-
Optimize:	Optimize-700	-
Max. utilization:	0.95	-
fyk:	355	MPa
Beta_B:	1	-
Beta_D:	1	-
Design life:	50	Years
Soil compaction:	Dense	-
Corrosion rates (total)		
Level (m)	Rate	Unit
2	1.2	mm/yr
1	1.2	mm/yr
0	1.2	mm/yr
-0.5	1.2	mm/yr
-1	1.2	mm/yr
-6	1.2	mm/yr
-7	1.2	mm/yr
-8	1.2	mm/yr
-9	1.2	mm/yr

-10	1.2	mm/yr

4.2 Results

Sheet pile profile:	AZ 13-700	
Max. relative utilization ratio:	0.92	-
Rotational capacity:	OK!	
Level (m)	Rel. utilisation ratio	
2.5	0.006	-
2.25	0.006	-
2.25	0.006	-
0.805	0.107	-
0.805	0.107	-
0.25	0.176	-
0.25	0.176	-
0.0	0.226	-
-0.5	0.211	-
-4.5	0.893	-
-4.5	0.893	-
-4.9	0.911	-
-4.9	0.911	-
-5.365	0.918	-
-8.0	0.661	-
-8.416	0.572	-
-8.416	0.572	-
-11.468	0.006	-