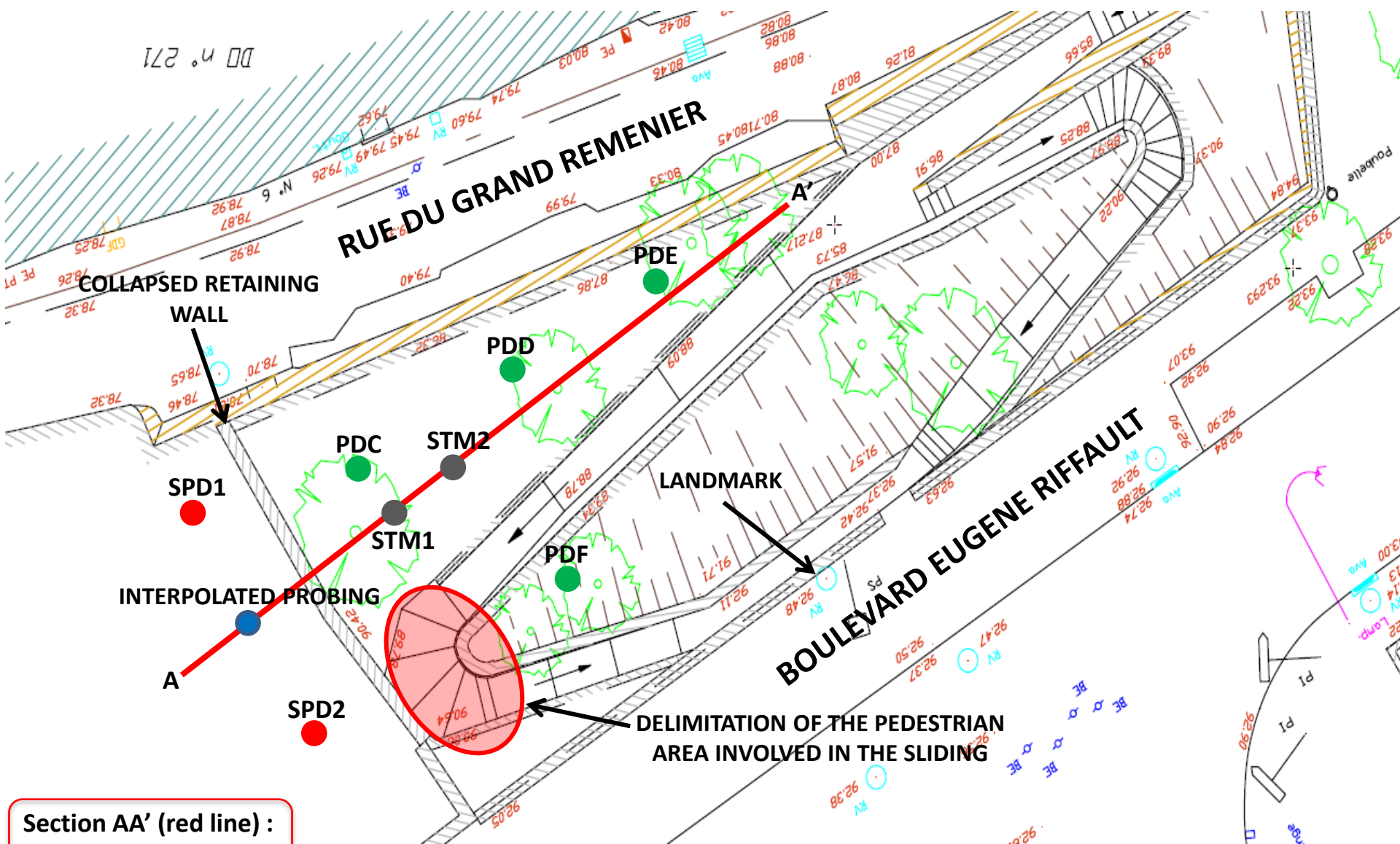


# Implantation of the probings

(without scale)



Compétence Géotechnique  
Centre Ouest





**Compétence Géotechnique**

Sondages et essais - Etudes de sol  
Ingénierie - Instrumentation  
Laboratoire - Expertise

Z.A. de la Haute Limouillère  
8 rue Pierre et Marie Curie  
37230 FONDETTES  
Tél.: 02.47.28.35.90  
Fax: 02.47.28.33.20

Site BLOIS (41)  
Site du Grand Remenier  
Diagnostic mur de soutènement

Folder T16-353

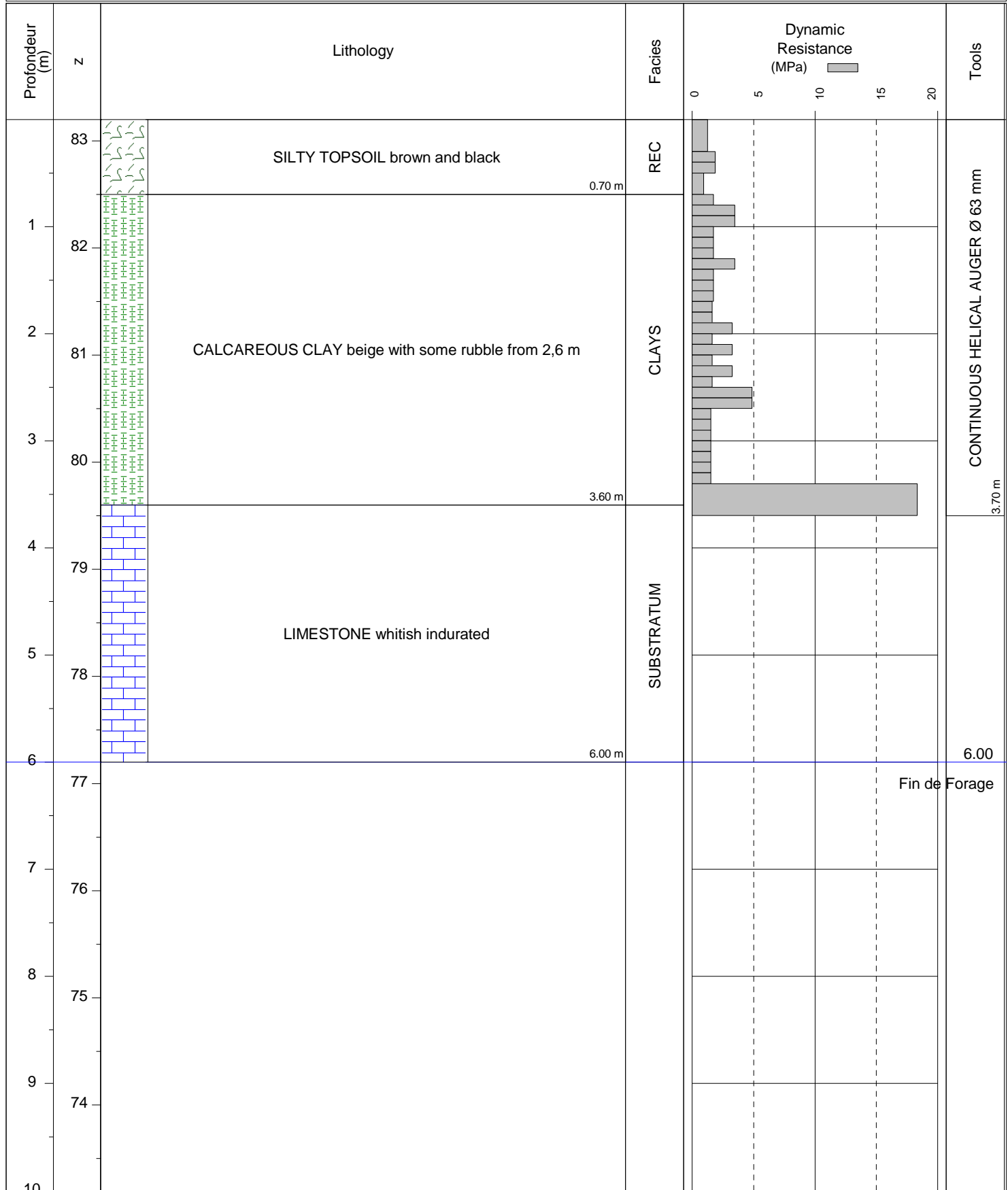
Echelle 1/50

PROBING SPD1

Customer: VILLE DE BLOIS

Machine: GRIZZLY Operator: BUYS

Z: 83.20



Obs: Without water



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Ingénierie - Instrumentation  
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Tél.: 02.47.28.35.90  
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Site: BLOIS (41)  
Site du Grand Remenier  
Diagnostic mur de soutènement

Folder: T16-353

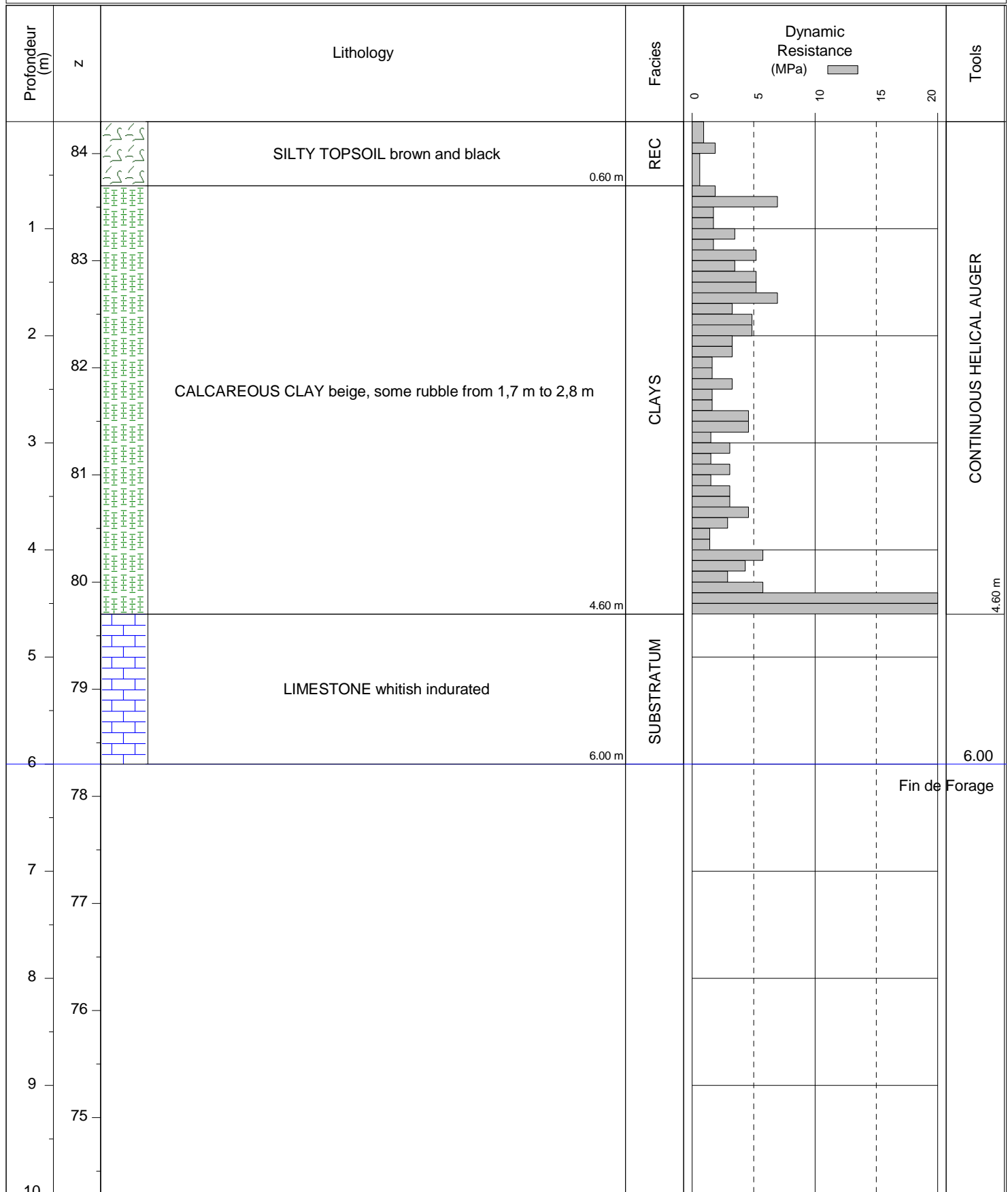
Echelle 1/50

PROBING SPD2

Customer: VILLE DE BLOIS

Machine: GRIZZLY Foreur: BUYS

Z: 84.30

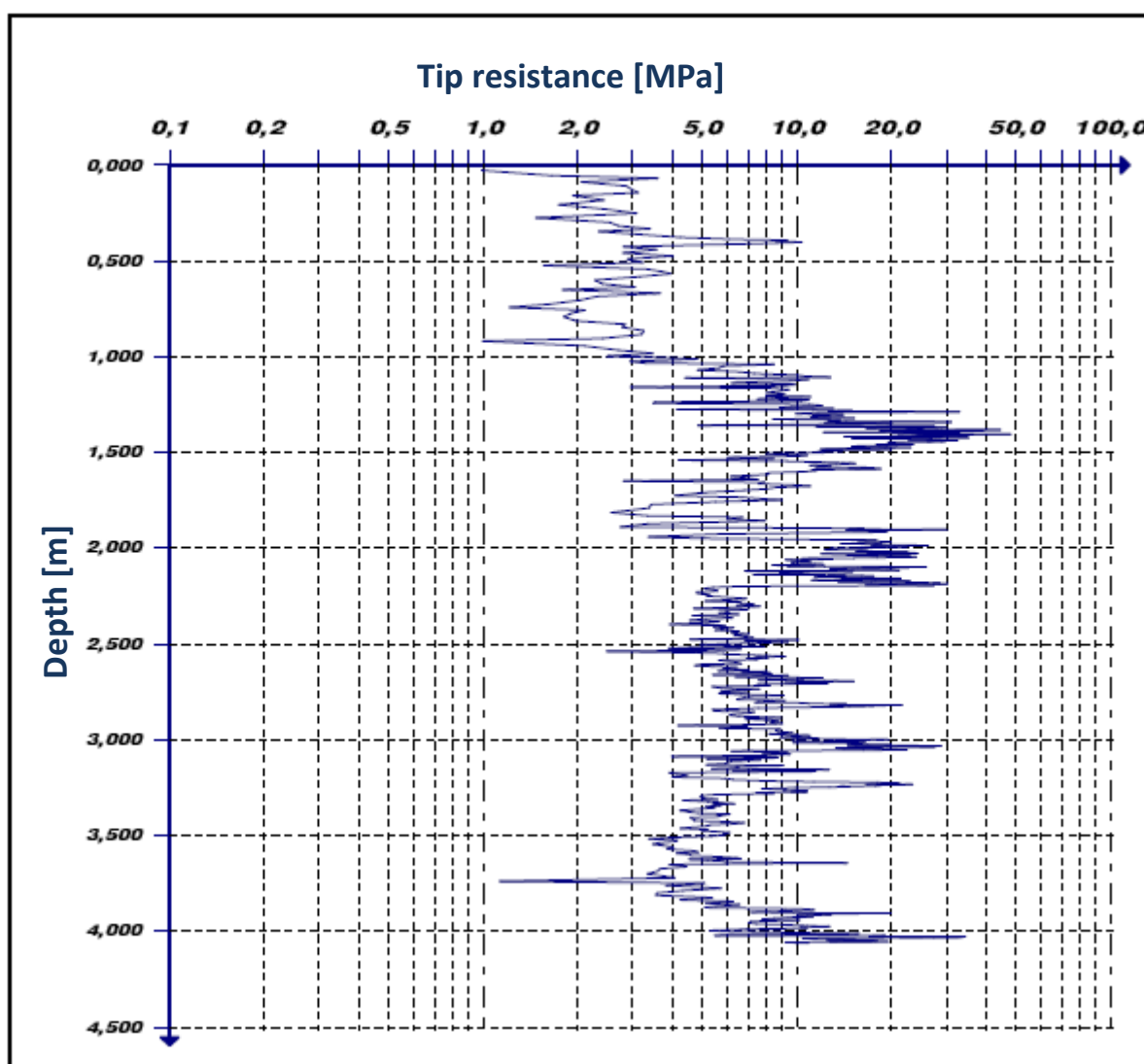


Obs: Without water

## Lightweight dynamic penetrometer test PANDA

SITE	DATE	OPERATOR	COMPANY
Blois	15 May 2017	R. POIRROTTE	CGCO

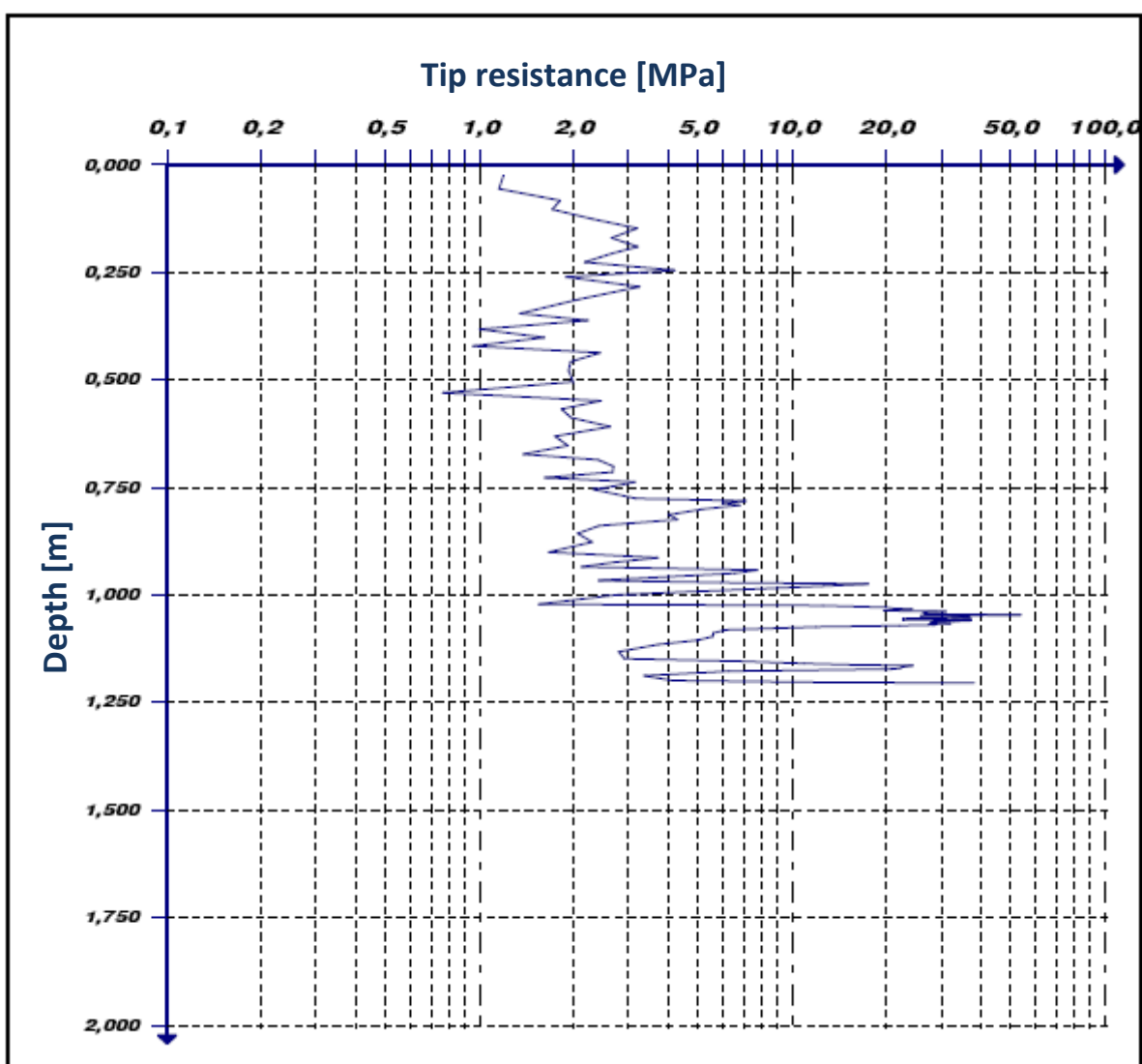
PROBING	PRE-DRILL DEPTH	TIP SECTION	MASS
PDC	0,0 m	4,0 cm <sup>2</sup>	PANDA hammer



## Lightweight dynamic penetrometer test PANDA

SITE	DATE	OPERATOR	COMPANY
Blois	15 May 2017	R. POIRROTTE	CGCO

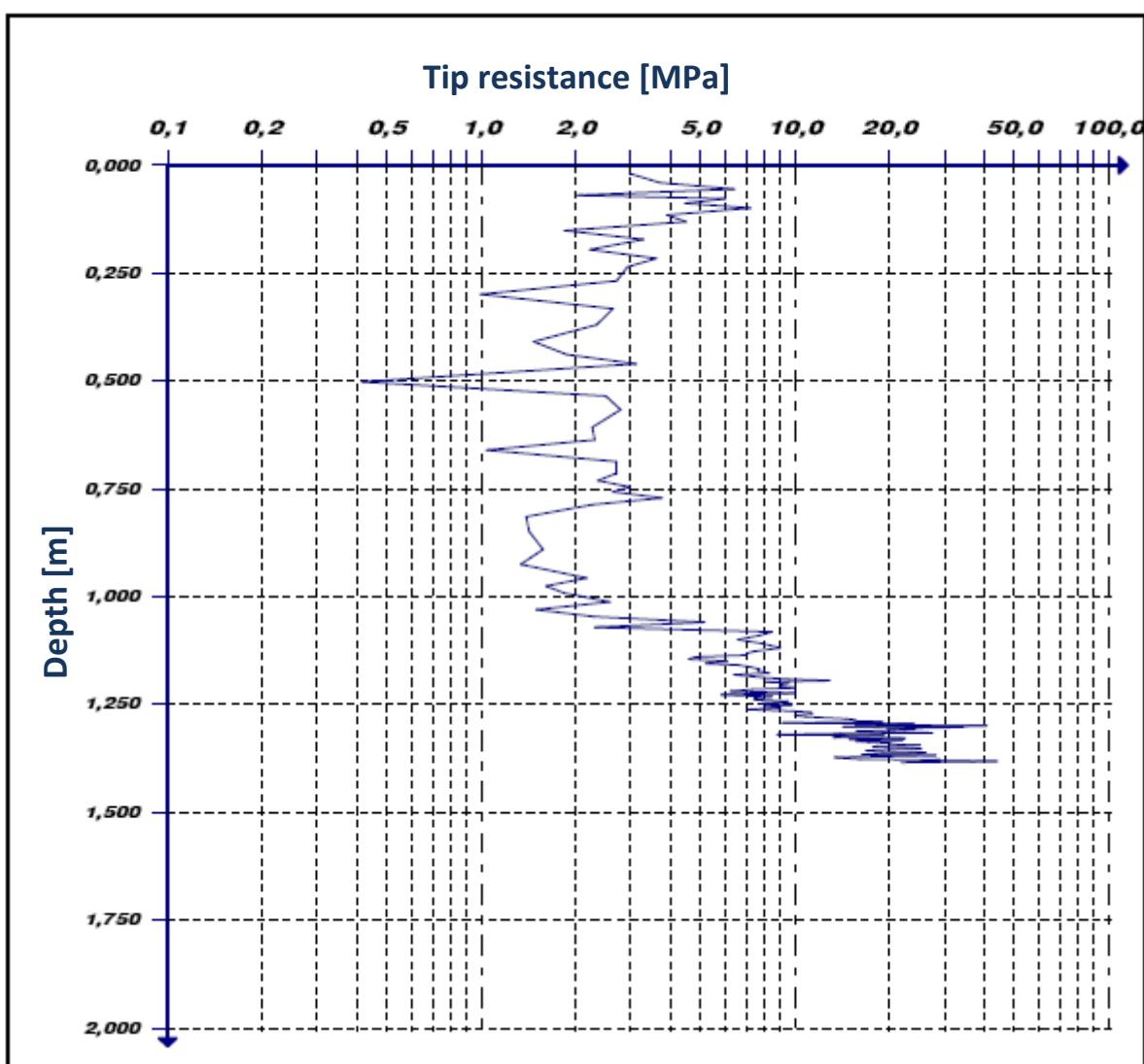
PROBING	PRE-DRILL DEPTH	TIP SECTION	MASS
PDD	0,0 m	4,0 cm <sup>2</sup>	PANDA hammer



## Lightweight dynamic penetrometer test PANDA

SITE	DATE	OPERATOR	COMPANY
Blois	15 May 2017	R. POIRROTTE	CGCO

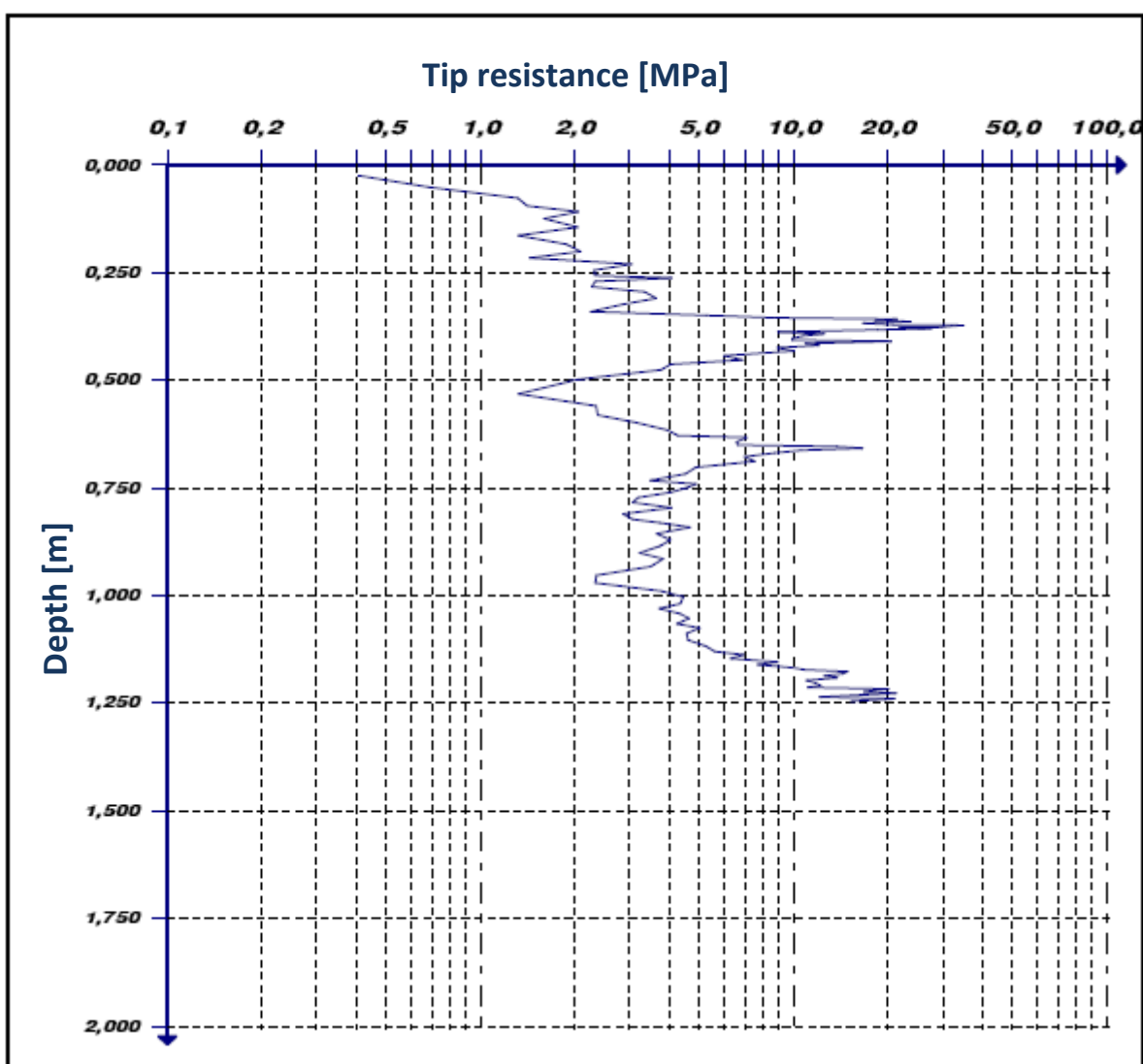
PROBING	PRE-DRILL DEPTH	TIP SECTION	MASS
PDE	0,0 m	4,0 cm <sup>2</sup>	PANDA hammer



## Lightweight dynamic penetrometer test PANDA

SITE	DATE	OPERATOR	COMPANY
Blois	15 May 2017	R. POIRROTTE	CGCO

PROBING	PRE-DRILL DEPTH	TIP SECTION	MASS
PDF	0,0 m	4,0 cm <sup>2</sup>	PANDA hammer





## Methylene blue value NF P 94-068

MINUTE  
LABORATORY

Compétence Géotechnique  
Centre-Ouest  
ZA la Haute Limouillère  
37230 Fondettes

Site : BLOIS

N°folder T17-080

Probing

STM1

Depth 1,5 m

Tel: 02.47.28.35.90  
Fax: 02.47.28.33.20  
centre-ouest@competence-geotechnique.fr

### 1 - General informations

Operator : POIRROTTE Romain

Sampling date : 20/05/2017

Date of writing : 25/05/2017

Sampling method : Hand auger

### 2 - Methylene blue value of the soil - NF P 94-068

Organoleptic characteristics : Clayey

☐  $D_{max} < 5 \text{ mm}$

Proportion 0/5 mm in the fraction 0/50 mm of the dry material:  $C = 1$

$$VBS = (B/m_0).C.100$$

$V \text{ (mL)} = 168,0$

$B \text{ (g)} = 1,68$

$m_0 \text{ (g)} = 38,2$

$$VBS = 4,4$$

### 3 - Water content

Method : ☐ Oven NF P 94-050

$T \text{ (g)} = 7,0$

$m(h)+T \text{ (g)} = 358,5$

$m(h) \text{ (g)} = 351,5$

Heating cycle :


time (h)	+24
$m(d)+T \text{ (g)}$	296,0
$m(d) \text{ (g)}$	289,0

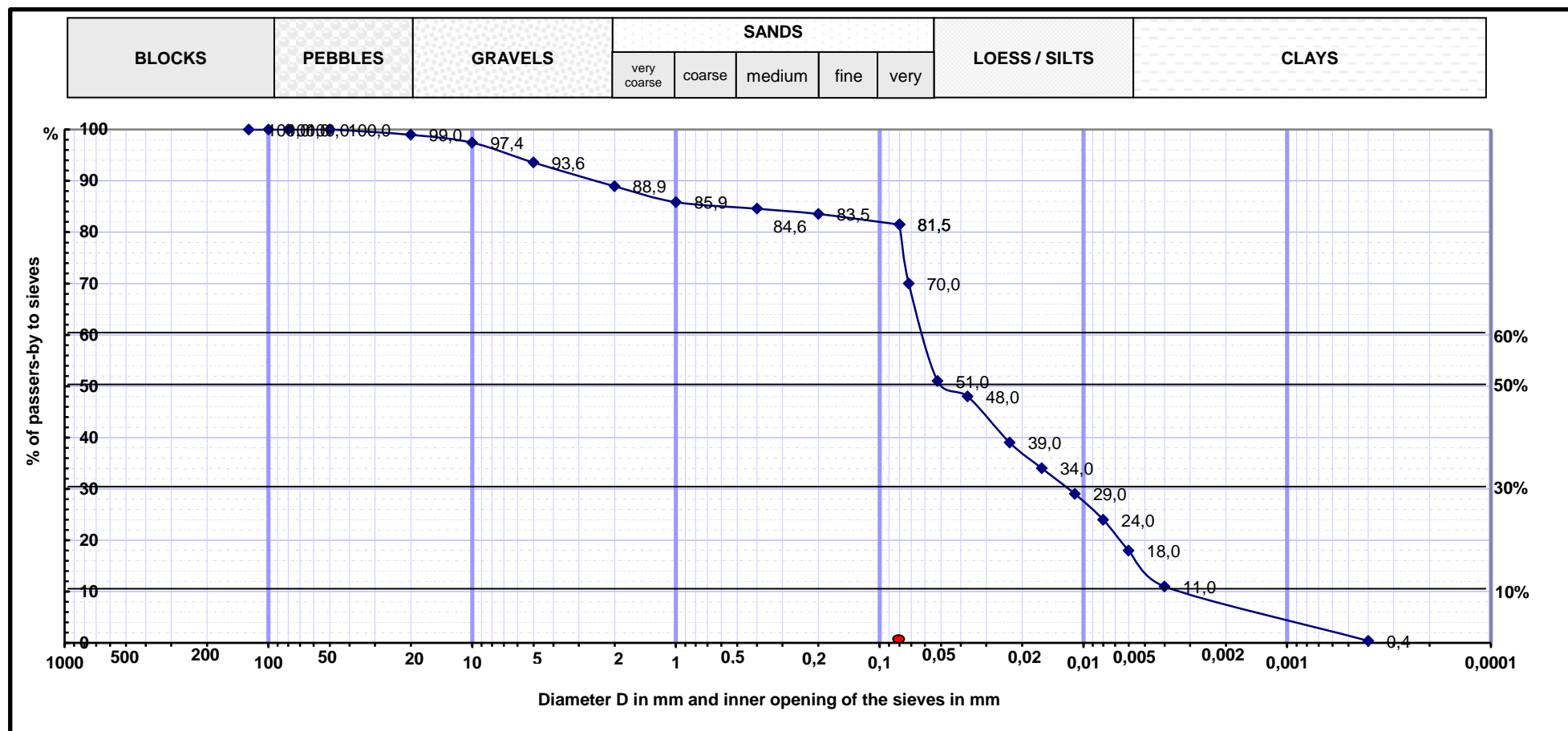
$$W(\%) = 21,63$$

### 4 - Summary and remarks

Methylene blue value (VBS)	Soil classification
$VBS < 0,1$	Insensitive to water
$0,2 \leq VBS \leq 1,5$	Silty sand soil, sensitive to water
$1,5 \leq VBS \leq 2,5$	Sandy-clayey soil
$2,5 \leq VBS \leq 6$	Silty soil, low plasticity
$6 \leq VBS \leq 8$	Clayey soil, medium plasticity
$VBS > 8$	Very clayey soil

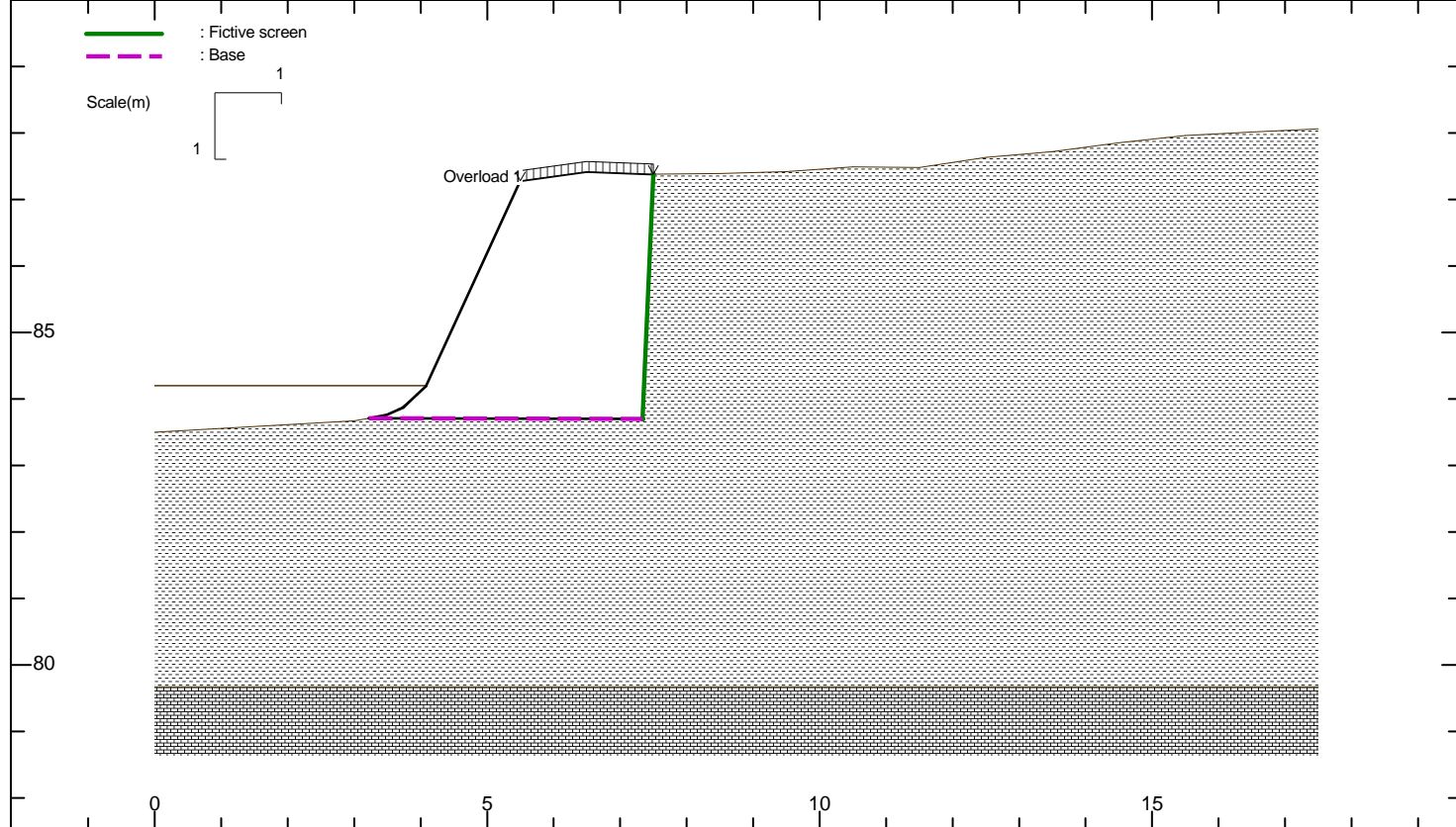



Site	BLOIS	<b>MINUTE</b> <b>PARTICLE SIZE DISTRIBUTION ANALYSIS</b> <b>BY DRY SIEVING AFTER WASHING AND BY</b> <b>SEDIMENTATION</b>	 <b>Compétence Géotechnique</b> <i>Centre Ouest</i> ZA La Haute Limougère – 8 rue Pierre et Marie Curie 37230 FONDETTES Tél. : 02.47.28.35.90  centre-ouest@competence-geotechnique.fr www.competence-geotechnique.fr
Folder	T17-080		
Probing	STM1		
Nature of the material	Silty embankment		
Depth	1,5 m		
Operator	Romain POIRROTTE	According to the french standards NF P 94-056 and NF P 94-057	
Date of writing	02/06/2017		



Passer-by to 80 $\mu$ m	81,49 %
dmax :	20 mm
d50 :	0,05 mm



VBS	4,4	g/100g
Wnat	21,6	%





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 Parc d'Affaires International, F-74160 ARCHAMPS

Tél : + 33 (0)4 50 95 38 14  
 Fax : + 33 (0)4 50 95 99 36

SOILS		$\gamma$	C	$\phi$	$\delta$	Ca
	1	18.00	5.00	25.00	0.00	0.00
	2	20.00	50.00	35.00	0.00	0.00

WALL		$\gamma$	BASE		C	$\phi$	q1	qu	Soil type
		18.00			5.00	25.00	0.00	160.00	Coherent

OVERLOADS		Xg	Xd	Qg	Qd	$\alpha$
	1	5.50	7.50	3.00	3.00	0.00

Files : BLOIS (41) - geomur (5).gmr

Units : KN, m

CULMANN Method

Precalculated broken surfaces


Xi inclined at delta

Consideration of the cohesion for the calculation  
 of the active earth pressure :  
 Integration of the positive part of the diagram  
 of stress, calculated with the cohesion.

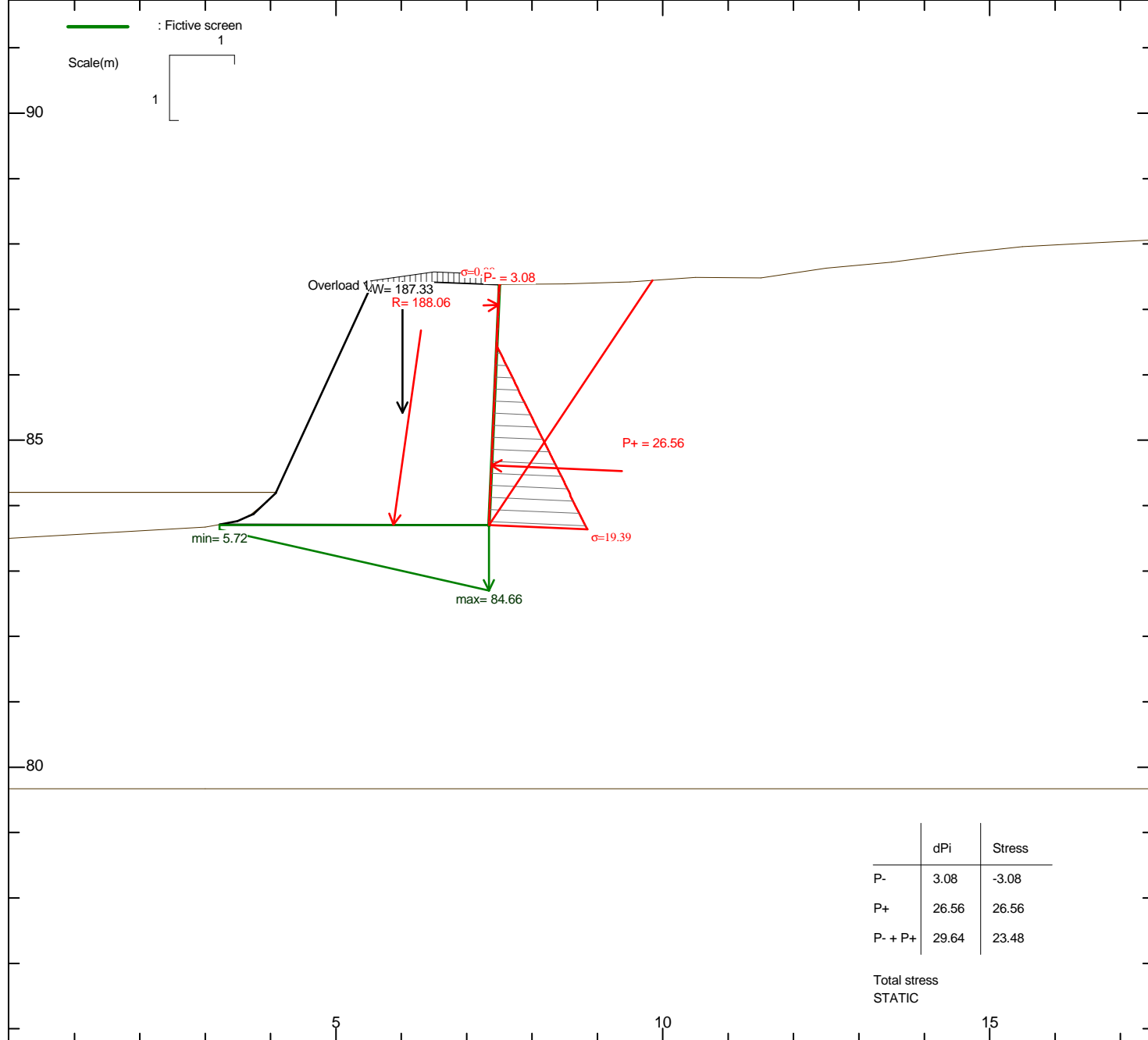
17_RP	GEOMUR (Approach 2)	PROFILE
	EXTERNAL STABILITY VERIFICATION Punching and shift verification Combinaison A1+M1+R2	

Partial safety factor	Criteria	Static	Sismic	
			Weighing	Easing
$\gamma_g = 1.350$ $\gamma_q = 1.500$ $\gamma_g = 1.000$ $\gamma_q = 0.000$  $\gamma_{R,v} = 1.400$ $\gamma_{R,h} = 1.100$ $\gamma_{R,e} = 1.400$  $\gamma_{R,rst} = 1.000$				
	Shift ()	Rh = 97.481 kN Eh = 35.826 kN $Rh/(Eh * gR;h) = 2.721$	-	-
	Reversal ()	Mr,o = 517.522 kN.m Mm,o = 32.397 kN.m $Mm,o/Mr,o = 15.974$	-	-
	Punching ()	q'ref = 87.650 kPa q'lim= 132.456 kPa $q'lim/(q'ref * gr,e) = 1.079$	-	-
			-	-
	Shift ()	Rh = 97.652 kN Eh = 26.538 kN $Rh/(Eh * gR;h) = 3.680$	-	-
	Reversal ()	Mr,o = 519.202 kN.m Mm,o = 23.998 kN.m $Mm,o/Mr,o = 21.636$	-	-
	Punching ()	q'ref= 89.382 kPa q'lim= 139.319 kPa $q'lim/(q'ref * gr,e) = 1.113$	-	-
			-	-

INTERMEDIARY CALCULTATION RESULTS (CLASSICAL METHOD )		
Static		
Eccentricity = -0.60	id = 0.83	
qmin = 5.72 kPa	qmax = 84.66 kPa	
qref = 64.93 kPa	Vol. wall = 10.07 m²	

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17_RP	GEOMUR (Approach 2)	PROFILE
	EXTERNAL STABILITY VERIFICATION Punching and shift verification Combinaison A1+M1+R2	



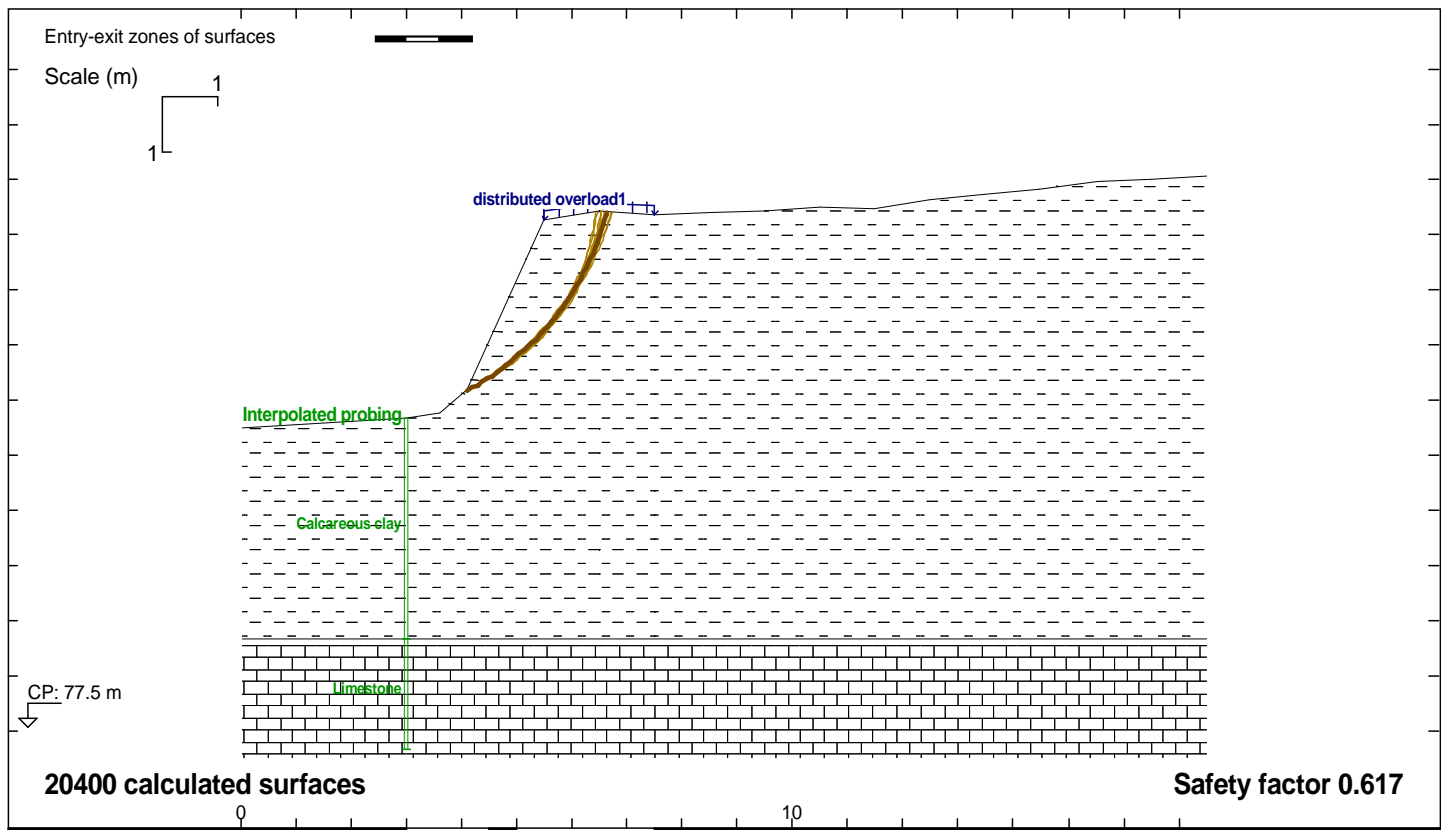
WEIGHT OF THE WALL	W= 187.33 kN	Xg= 6.02 m	Yg= 85.42 m
including : W wall= 181.33 kN	W loads= 6.00 kN	W soil/footing= 0.00 kN	W soil under footing= 0.00 kN
			W water= 0.00 kN

TOTAL ACTIVE EARTH PRESSURE	P= 26.56 kN	$\tau = -2.49^\circ$	Pv = -1.15 kN	Ph = 26.54 kN	X = 7.38 m	Y = 84.61 m
Poussée due au sol	P= 26.56 kN	$\tau = -2.49^\circ$	Pv = -1.15 kN	Ph = 26.54 kN	X = 7.38 m	Y = 84.61 m
Active earth pressure due to the load	P= 0.00 kN	$\tau = 0.00^\circ$	Pv = 0.00 kN	Ph = 0.00 kN	X = 0.00 m	Y = 0.00 m

RESULTANT	R= 188.06 kN	$\tau = 81.89^\circ$	Rv= 186.18 kN	Rh= 26.54 kN	X = 5.88 m	Y = 83.71 m
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site web : <a href="http://www.geos.fr">http://www.geos.fr</a> e-mail : <a href="mailto:info@geos.fr">info@geos.fr</a>	Parc d'Affaires International, F-74160 ARCHAMPS	Fax : + 33 (0)4 50 95 99 36

17_RP	GEOMUR (Approach 2)	PROFILE
	EXTERNAL STABILITY VERIFICATION Punching and shift verification Combinaison A1+M1+R2	



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 Archamps Technopole, 74160 ARCHAMPS - France

TEL: +334 50 95 38 14  
 FAX: +334 50 95 99 36

SOILS	( $\gamma$ ; $\gamma_{sat}$ )	C	$\phi$	qs
1	(18.00; 18.00) * 1.00	5.000 / 1.25	25.00 / 1.25	49.20 / 1.10
2	(20.00; 20.00) * 1.00	50.00 / 1.25	35.00 / 1.25	150.0 / 1.10

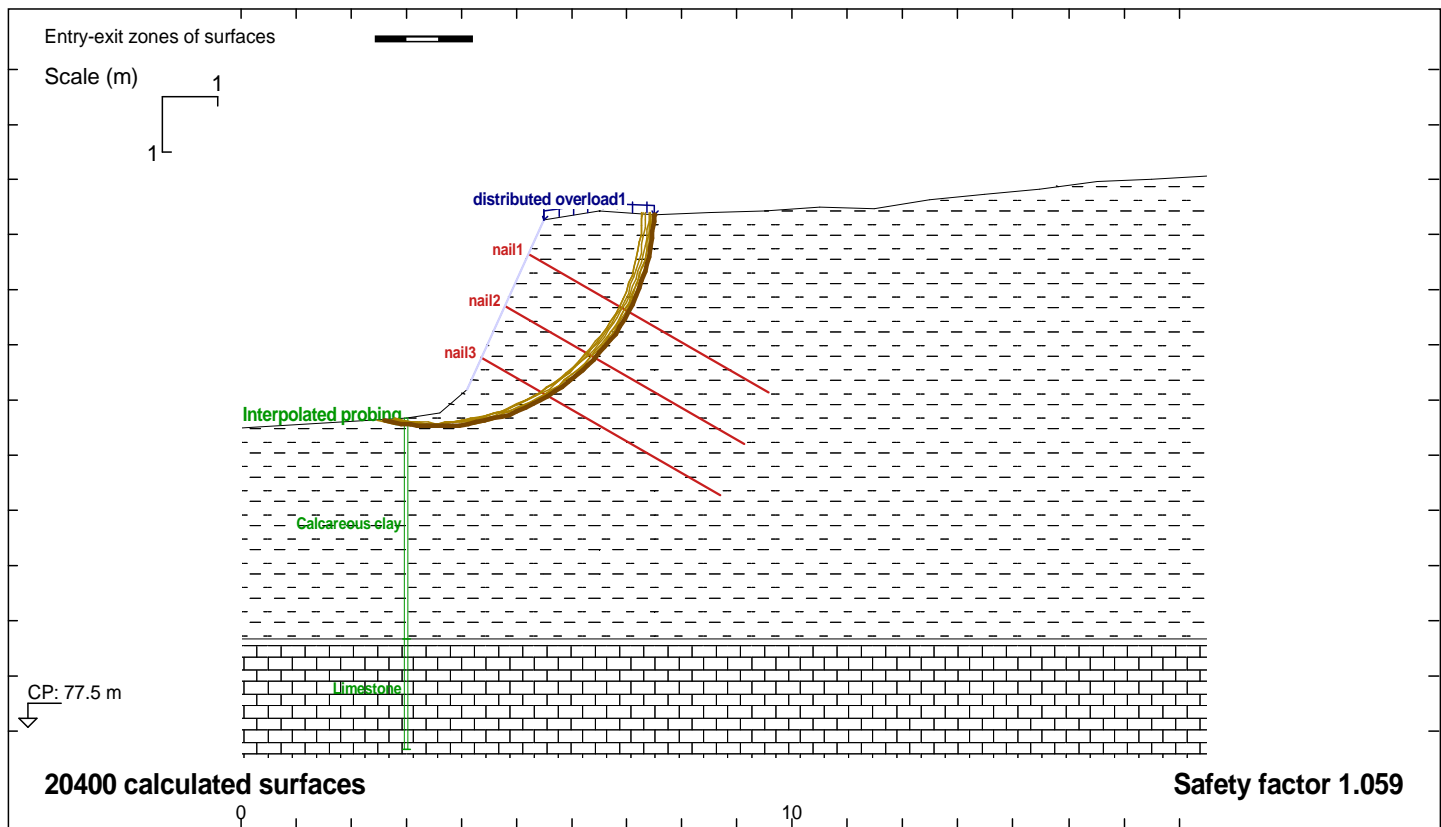
File "GEOSTAB (Approach 3)"  
 BISHOP's modified method"  
 EC7 Approche 3  
 Action of soil  $\gamma_r$ , e: 1  
 Resistance of soil  $\gamma_r$ , e: 1  
 Method Coefficient 1.2  
 Units : kN, m

#### Surface loads and Line loads

	ls	rs	S	Gamm	$\theta$
1	3.00	3.00		*1.00	0.00

No.	Xc	Yc	R (radius)	SF
1	1.7600	88.620	5.0100	0.617
2	2.3500	88.040	4.2300	0.617
3	2.2000	88.250	4.4800	0.617
4	2.2900	88.050	4.2700	0.617
5	2.4300	87.870	4.0400	0.617
6	1.4100	89.010	5.5200	0.617
7	2.2600	88.230	4.4400	0.617
8	1.6000	88.690	5.1500	0.617
9	1.6000	88.910	5.3500	0.617
10	2.3800	87.870	4.0700	0.618

17_RP	<b>GENERAL STABILITY VERIFICATION (Approach 3)</b>	Natural land + overload - Initial case	PROFIL
	General stability verification Approach 3 Combination A2+M2+R3		<b>1</b>



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 Archamps Technopole, 74160 ARCHAMPS - France

TEL: +334 50 95 38 14  
 FAX: +334 50 95 99 36

SOILS	( $\gamma$ ; $\gamma_{sat}$ )	C	$\phi$	qs
1	(18.00; 18.00) * 1.00	5.000 / 1.25	25.00 / 1.25	35.00 / 1.10
2	(20.00; 20.00) * 1.00	50.00 / 1.25	35.00 / 1.25	150.0 / 1.10

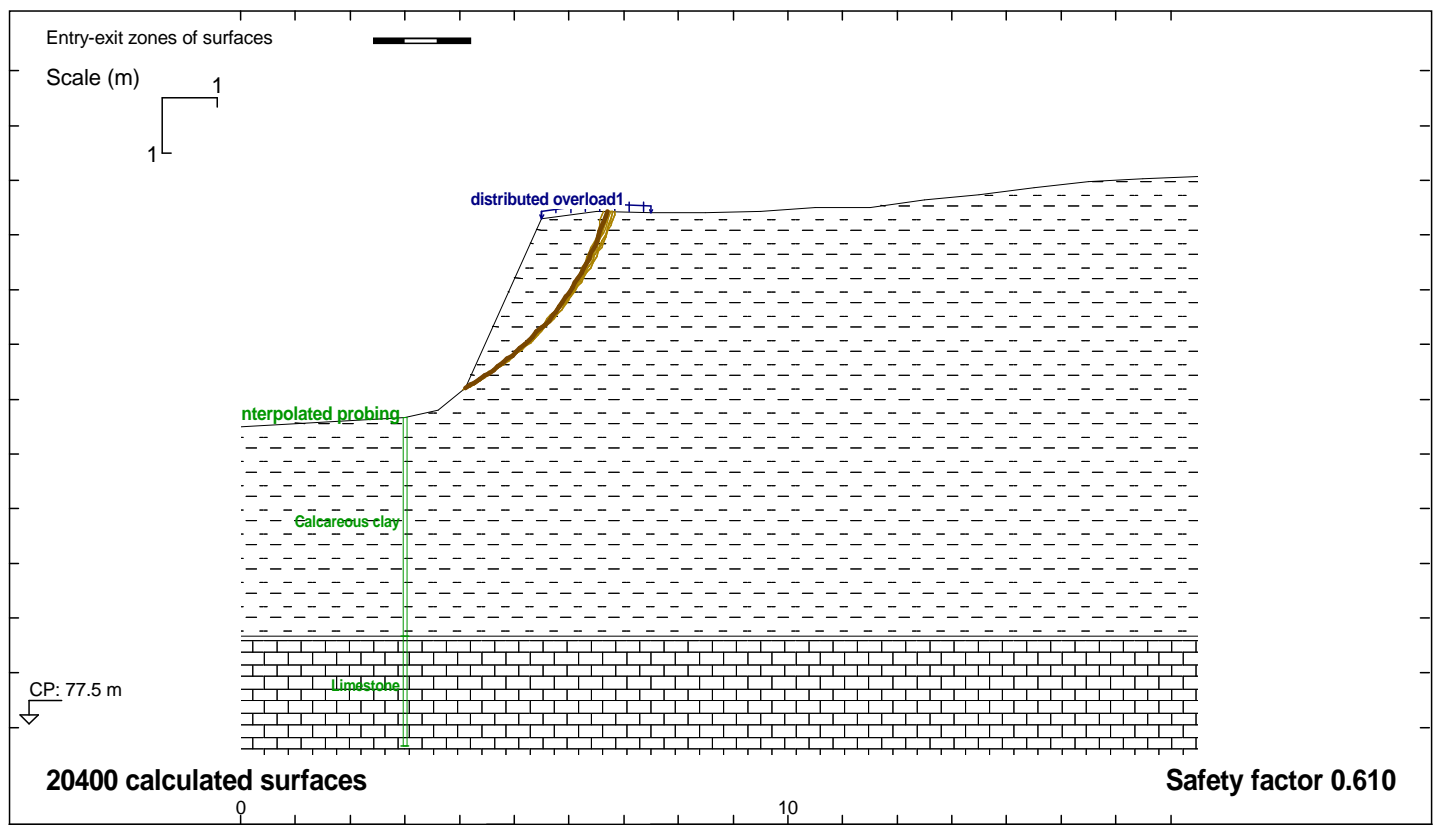
	Yhead	L	$\alpha$	Spa	$\emptyset$	F rein
NAIL 1	86.6400	5.000	30.0	2.00	0.100	70.00 / 1.250
NAIL 2	85.6900	5.000	30.0	2.00	0.100	70.00 / 1.250
NAIL 3	84.7800	5.000	30.0	2.00	0.100	70.00 / 1.250

File "GEOSTAB (Approach 3)"  
 BISHOP's modified method"  
 EC7 Approche 3  
 Action of soil  $\gamma_r$ , e: 1  
 Resistance of soil  $\gamma_r$ , e: 1  
 Method Coefficient 1.2  
 Units : kN, m

Surface loads and Line loads					
1s	rs	S	Gamm	$\theta$	
1	3.00	3.00	*1.30	0.00	

No.	Xc	Yc	R (radius)	SF	Sf(N ou NL N ou NL N ou NL (nail)3 Σ tens.	tens.	tens.	tens.
1	3.5500	87.460	3.9300	1.059	0.781	0.0000	31.240	36.090
2	3.3800	87.460	3.8900	1.059	0.752	0.0000	32.990	37.640
3	3.4000	87.510	3.9300	1.059	0.754	0.0000	32.740	37.490
4	3.5400	87.460	3.9400	1.059	0.781	0.0000	31.260	36.100
5	3.5300	87.460	3.8800	1.060	0.763	0.0000	31.930	36.800
6	3.4100	87.540	4.0200	1.060	0.773	0.0000	31.970	36.730
7	3.4200	87.550	3.9700	1.060	0.756	0.0000	32.500	37.350
8	3.5500	87.490	3.9100	1.060	0.765	0.0000	31.700	36.670
9	3.3700	87.460	3.8900	1.060	0.752	0.0000	33.030	37.660
10	3.5300	87.460	3.9400	1.060	0.781	0.0000	31.280	36.100
Limit strength in nails (SF = 1.3) :					40.736	53.605	60.924	155.27
Strenght on the facing (SF = 1.3):					25.336	38.286	48.543	112.17
T1 Strenght (SF = 1.3) :					0.0000	0.0000	0.0000	0.0000
T2 Strenght (SF = 1.3; T2/Pa = 1; $\delta/\phi = 0$ ) :					5.2057	12.305	22.469	39.980
Maximums T0, T1, T2 :					25.336	38.286	48.543	

17_RP	<b>MIXT STABILITY VERIFICATION (Approach 3)</b>	With nails - Case 1	PROFIL
	Mixt stability verification Approach 3 Combination A2+M2+R3		<b>2</b>



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E-mail: [logiciels@geos.fr](mailto:logiciels@geos.fr)

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Archamps Technopole, 74160 ARCHAMPS - France

TEL: +334 50 95 38 14

FAX: +334 50 95 99 36

SOILS	( $\gamma$ ; $\gamma_{sat}$ )	C	$\phi$	qs
1	(18.00; 18.00) * 1.00	5.000 / 1.25	25.00 / 1.25	49.20 / 1.10
2	(20.00; 20.00) * 1.00	50.00 / 1.25	35.00 / 1.25	150.0 / 1.10

File "GEOSTAB (Approach 3) - Perturbations"

Perturbations method

EC7 Approche 3

Action of soil  $\gamma_r$ , e: 1

Resistance of soil  $\gamma_r$ , e: 1

Method Coefficient 1.2

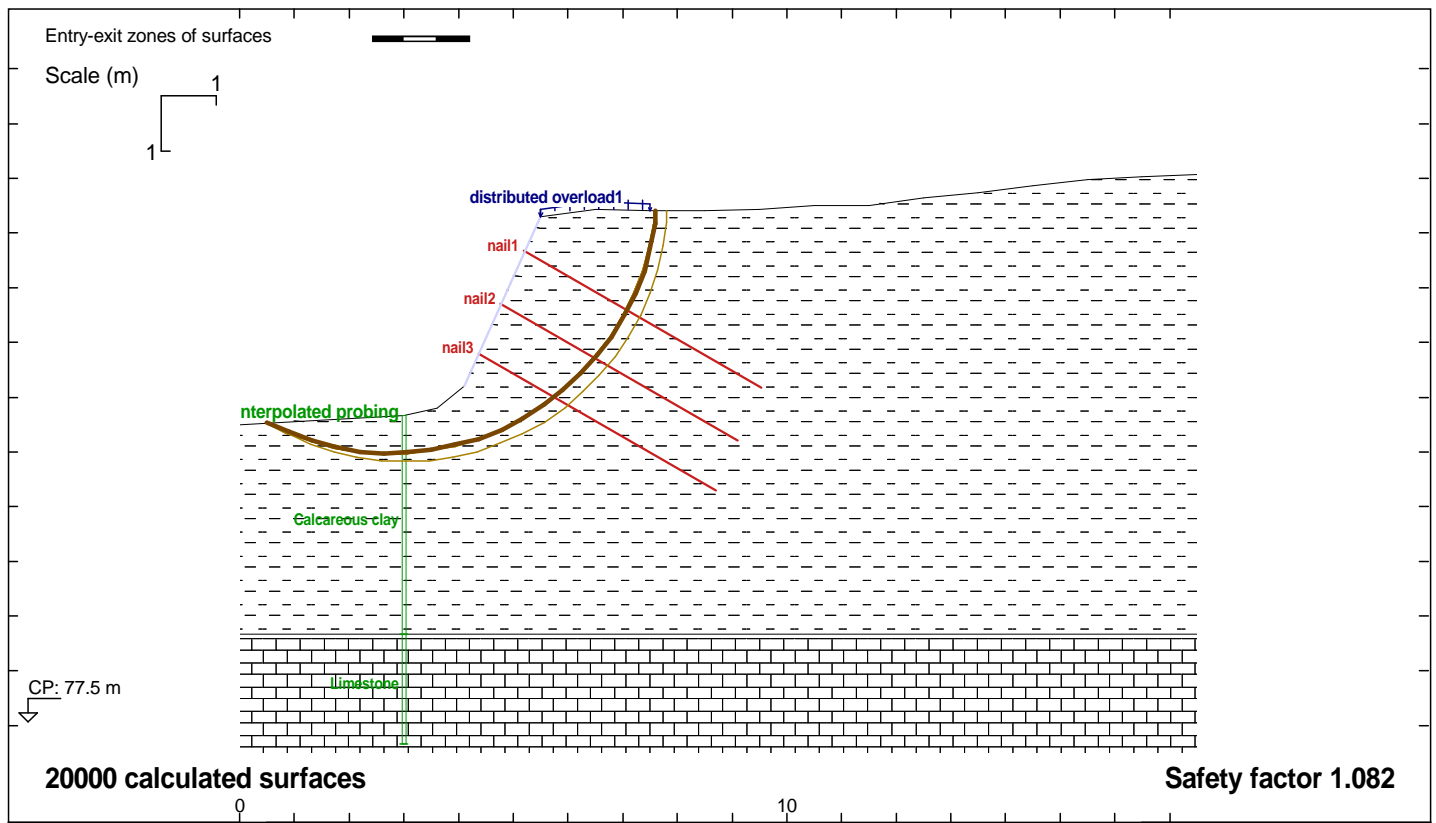
Units : kN, m

Surface loads and Line loads

	Is	rs	S	Gamm	$\theta$
1	3.00	3.00		*1.30	0.00

No.	Xc	Yc	R (radius)	SF
1	1.4100	89.010	5.5200	0.610
2	1.2000	89.390	5.9500	0.610
3	1.6000	88.910	5.3500	0.610
4	1.4100	89.250	5.7300	0.611
5	1.5700	88.920	5.3700	0.611
6	1.4400	89.010	5.5000	0.611
7	1.3900	89.260	5.7500	0.611
8	1.2300	89.380	5.9300	0.611
9	0.9000	89.570	6.2600	0.611
10	1.7600	88.620	5.0100	0.611

17_RP	<b>GENERAL STABILITY VERIFICATION (Approach 3)</b> Natural land + overload - Initial case	PROFIL
	General stability verification Approach 3 Combination A2+M2+R3	<b>1</b>



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FAX: +334 50 95 99 36

SOILS	( $\gamma$ ; $\gamma_{sat}$ )	C	$\phi$	qs
1	(18.00; 18.00) * 1.00	5.000 / 1.25	25.00 / 1.25	35.00 / 1.10
2	(20.00; 20.00) * 1.00	50.00 / 1.25	35.00 / 1.25	150.0 / 1.10

	Yhead	L	$\alpha$	Spa	$\emptyset$	F rein
NAIL 1	86.6400	5.000	30.0	2.00	0.100	70.00 / 1.250
NAIL 2	85.6900	5.000	30.0	2.00	0.100	70.00 / 1.250
NAIL 3	84.7800	5.000	30.0	2.00	0.100	70.00 / 1.250

File "GEOSTAB (Approach 3) - Perturbations"

Perturbations method

EC7 Approche 3

Action of soil  $\gamma_r$ , e: 1

Resistance of soil  $\gamma_r$ , e: 1

Method Coefficient 1.2

Units : kN, m

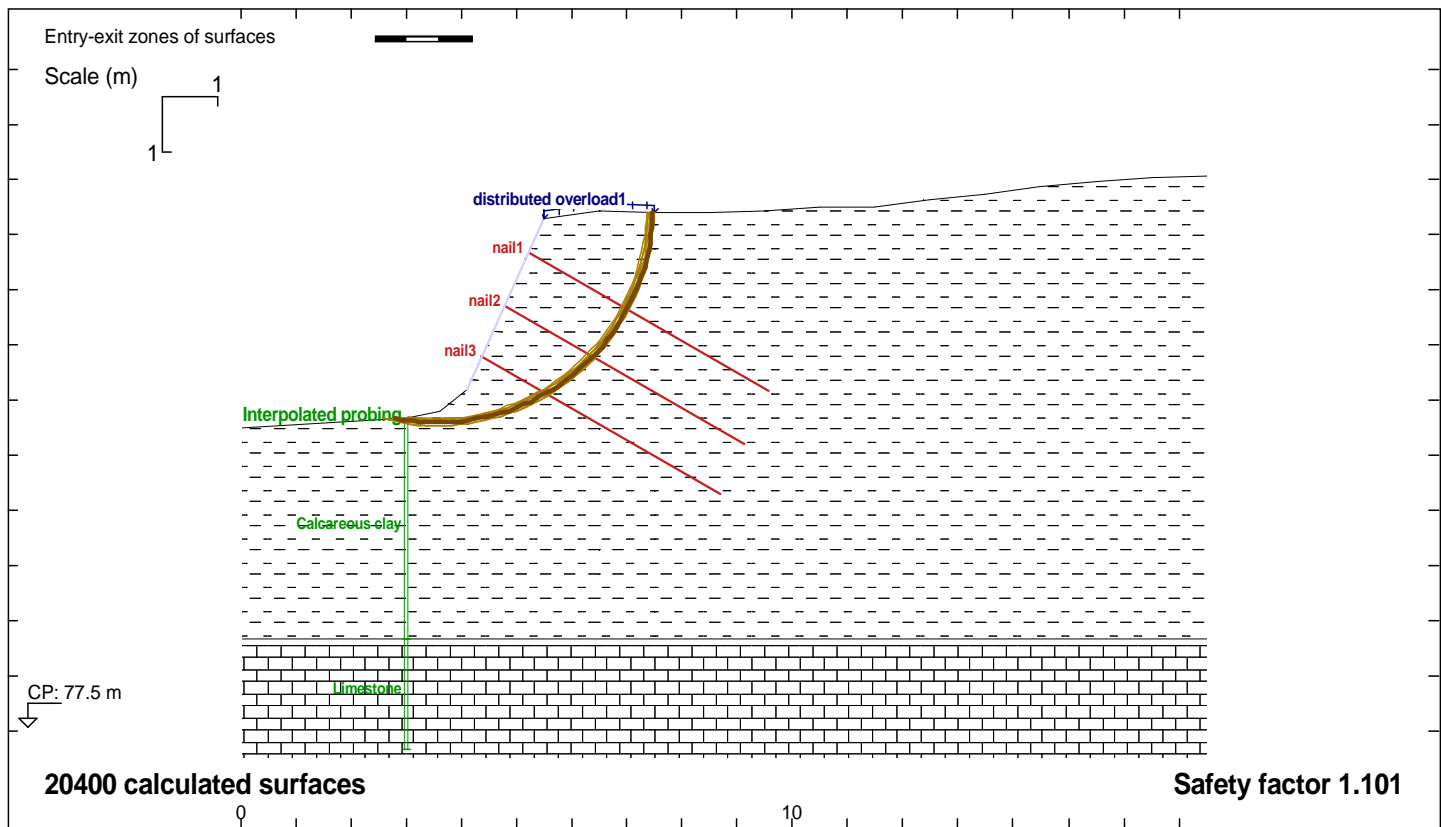
Surface loads and Line loads

	Is	rs	S	Gamm	$\theta$
1	3.00	3.00		*1.30	0.00

No.	Xc	Yc	R (radius)	SF	Sf(N ou NL N ou NL N ou NL (nail)3 Σ tens. tens. tens. tens.
1	2.7700	87.820	4.8500	1.082	0.899 0.0000 30.230 34.110 64.340
2	2.7700	87.820	4.8500	1.082	0.900 0.0000 30.250 34.130 64.380
3	2.7600	87.820	4.8500	1.082	0.900 0.0000 30.280 34.150 64.430
4	2.7600	87.820	4.8500	1.083	0.900 0.0000 30.300 34.170 64.470
5	2.7500	87.820	4.8600	1.083	0.900 0.0000 30.330 34.190 64.520
6	2.7500	87.820	4.8600	1.083	0.900 0.0000 30.350 34.210 64.560
7	2.7500	87.820	4.8600	1.084	0.901 0.0000 30.380 34.230 64.610
8	2.7400	87.820	4.8600	1.084	0.901 0.0000 30.400 34.250 64.650
9	2.7400	87.820	4.8600	1.084	0.901 0.0000 30.430 34.270 64.700
10	3.0200	87.600	4.7900	1.085	0.937 0.0000 27.560 31.290 58.850
Limit strength in nails (SF = 1.3) :					45.184 61.297 69.094 175.58
Strenght on the facing (SF = 1.3):					25.438 41.383 51.185 118.01
T1 Strenght (SF = 1.3) :					0.0000 0.0000 0.0000 0.0000
T2 Strenght (SF = 1.3; T2/Pa = 1; $\delta/\phi = 0$ ) :					5.2057 12.305 22.469 39.980
Maximums T0, T1, T2 :					25.438 41.383 51.185

17_RP	<b>MIXT STABILITY VERIFICATION (Approach 3)</b>	With nails - Case 1	PROFIL
	Mixt stability verification Approach 3 Combination A2+M2+R3		<b>2</b>





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FAX: +334 50 95 99 36

SOILS	( $\gamma$ ; $\gamma_{sat}$ )	C	$\phi$	qs
1	(18.00; 18.00) * 1.00	5.000 / 1.00	25.00 / 1.00	35.00 / 1.40
2	(20.00; 20.00) * 1.00	50.00 / 1.00	35.00 / 1.00	150.0 / 1.40

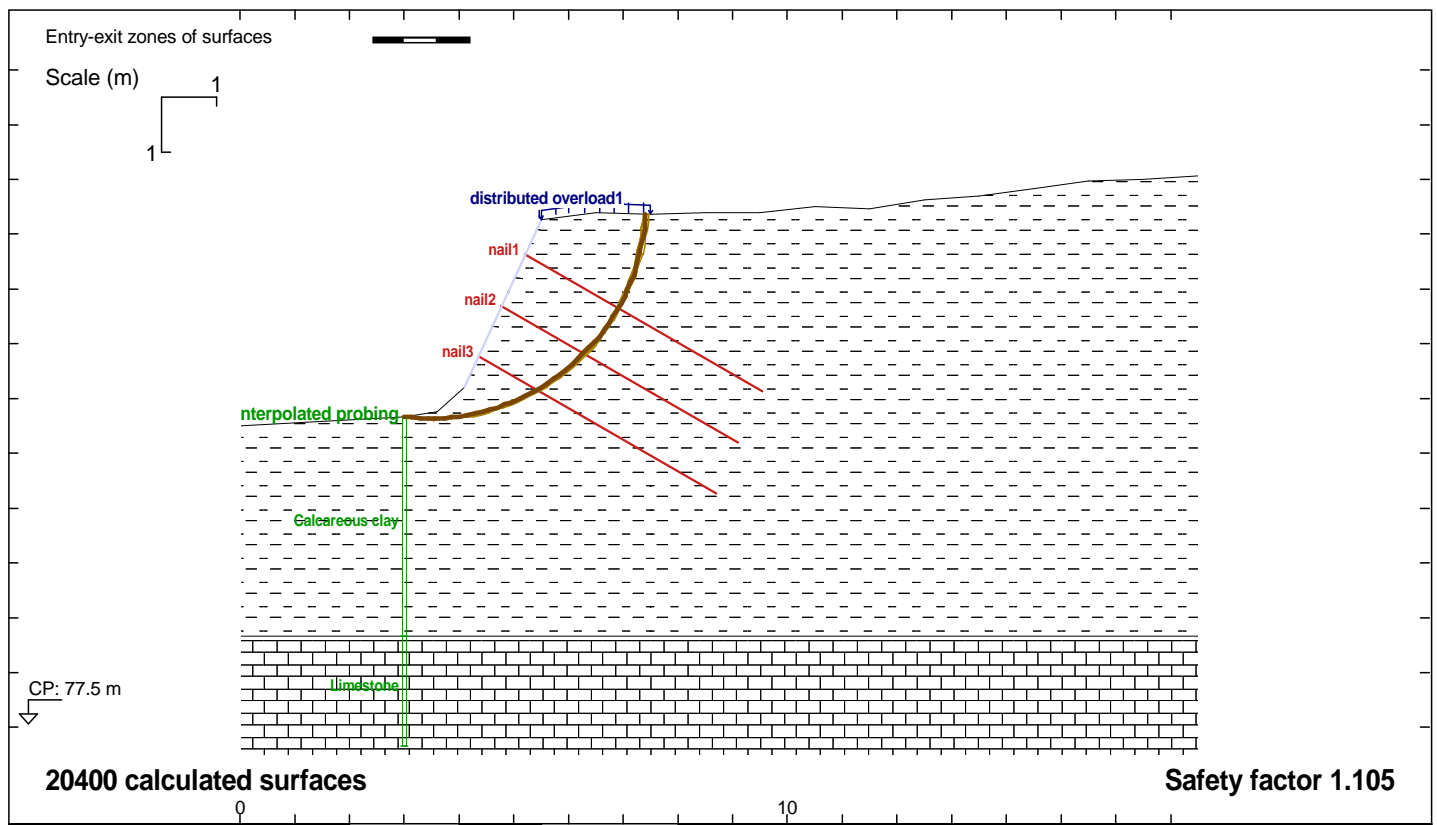
	Yhead	L	$\alpha$	Spa	$\emptyset$	F rein
NAIL 1	86.6400	5.000	30.0	2.00	0.100	70.00 / 1.250
NAIL 2	85.6900	5.000	30.0	2.00	0.100	70.00 / 1.250
NAIL 3	84.7800	5.000	30.0	2.00	0.100	70.00 / 1.250

File "GEOSTAB (Approach 2)"  
BISHOP's modified method"  
EC7 Approche 2  
Action of soil  $\gamma_r$ , e: 1.35  
Resistance of soil  $\gamma_r$ , e: 1.1  
Method Coefficient 1  
Units : kN, m

Surface loads and Line loads					
1s	rs	S	Gamm	$\theta$	
1	3.00	3.00	*1.00	0.00	

No.	Xc	Yc	R (radius)	SF	Sf(N ou NL N ou NL N ou NL (nail)3 Σ tens.	tens.	tens.	tens.
1	3.5500	87.490	3.9100	1.101	0.812	0.0000	24.910	28.810
2	3.5300	87.460	3.8800	1.101	0.810	0.0000	25.090	28.910
3	3.5300	87.460	3.8400	1.101	0.796	0.0000	25.410	29.280
4	3.5500	87.460	3.9300	1.101	0.828	0.0000	24.540	28.360
5	3.5400	87.490	3.9100	1.102	0.812	0.0000	24.930	28.820
6	3.4800	87.500	3.8700	1.102	0.787	0.0000	25.730	29.610
7	3.5200	87.460	3.8800	1.102	0.810	0.0000	25.110	28.920
8	3.5200	87.460	3.8400	1.102	0.795	0.0000	25.460	29.310
9	3.5400	87.460	3.9400	1.102	0.828	0.0000	24.560	28.360
10	3.5500	87.460	3.8200	1.102	0.791	0.0000	25.440	29.370
Limit strength in nails (SF = 1.3) :					29.750	39.744	45.245	114.74
Strenght on the facing (SF = 1.3):					17.615	28.672	36.751	83.038
T1 Strenght (SF = 1.3) :					0.0000	0.0000	0.0000	0.0000
T2 Strenght (SF = 1.3; T2/Pa = 1; $\delta/\phi = 0$ ) :					2.1356	5.0483	9.2179	16.402
Maximums T0, T1, T2 :					17.615	28.672	36.751	

17_RP	<b>GEOSTAB (Approach 2)</b>	With nails - Case 1	PROFIL
	INTERNAL STABILITY VERIFICATION Approach 2 Combination A1+M1+R2		<b>2</b>



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TEL: +334 50 95 38 14

FAX: +334 50 95 99 36

SOILS	( $\gamma$ ; $\gamma_{sat}$ )	C	$\phi$	qs
1	(18.00; 18.00) * 1.00	5.000 / 1.00	25.00 / 1.00	35.00 / 1.40
2	(20.00; 20.00) * 1.00	50.00 / 1.00	35.00 / 1.00	150.0 / 1.40

	Yhead	L	$\alpha$	Spa	$\emptyset$	F rein
NAIL 1	86.6400	5.000	30.0	2.00	0.100	70.00 / 1.250
NAIL 2	85.6900	5.000	30.0	2.00	0.100	70.00 / 1.250
NAIL 3	84.7800	5.000	30.0	2.00	0.100	70.00 / 1.250

File "GEOSTAB (Approach 2) - Perturbations"

Perturbations method

EC7 Approche 2

Action of soil  $\gamma_r$ , e: 1.35

Resistance of soil  $\gamma_r$ , e: 1.1

Method Coefficient 1

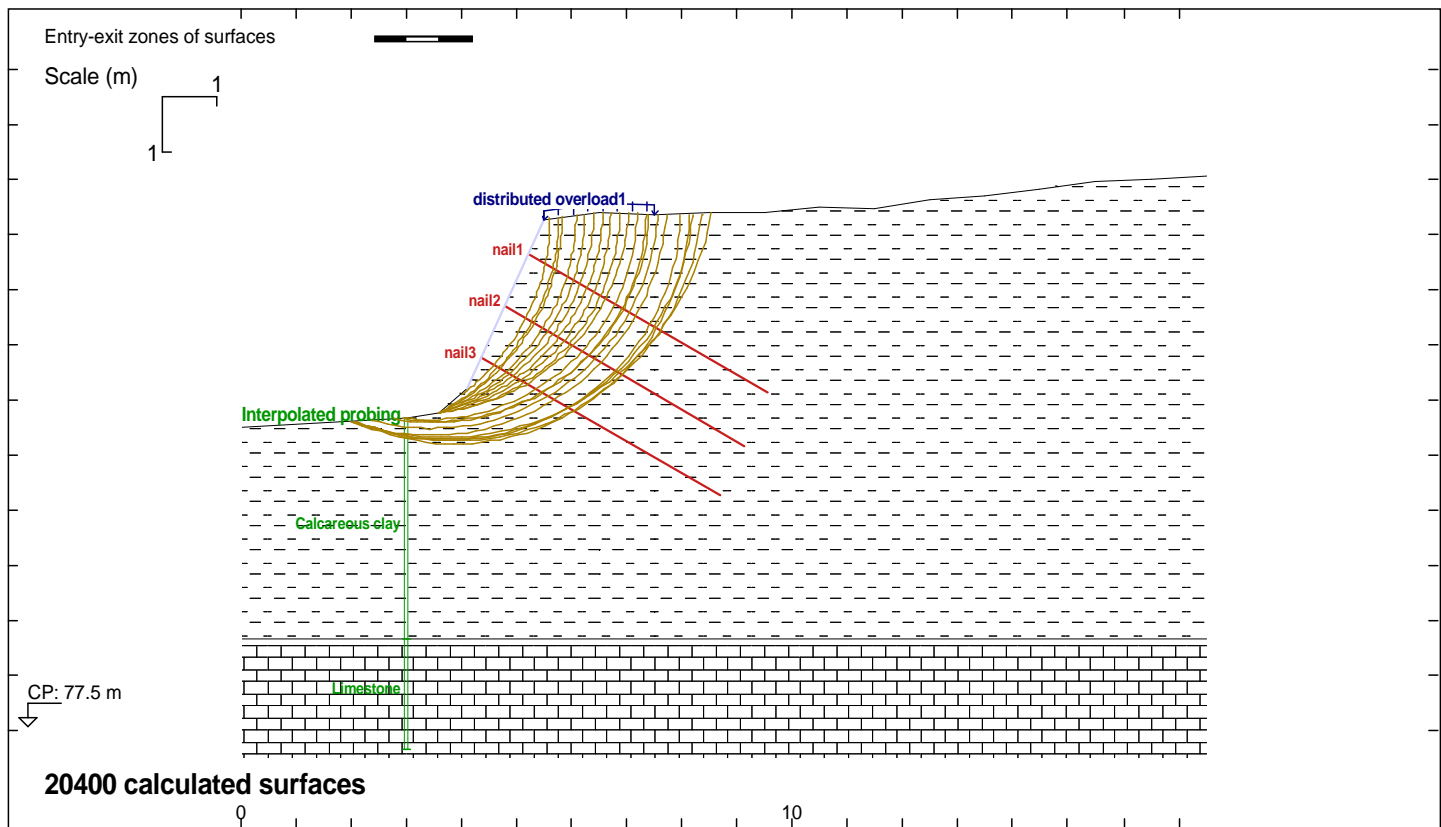
Units : kN, m

Surface loads and Line loads

	Is	rs	S	Gamm	$\theta$
1	3.00	3.00		*1.00	0.00

No.	Xc	Yc	R (radius)	SF	Sf(N ou NL N ou NL N ou NL (nail)3 $\Sigma$	tens.	tens.	tens.	tens.
1	3.4500	87.610	3.9700	1.105	0.841	0.0000	25.700	29.690	55.390
2	3.5000	87.550	3.9100	1.105	0.846	0.0000	25.530	29.490	55.020
3	3.5400	87.460	3.8400	1.105	0.852	0.0000	25.360	29.240	54.600
4	3.4600	87.660	4.0200	1.105	0.843	0.0000	25.540	29.610	55.150
5	3.4500	87.560	3.9100	1.105	0.840	0.0000	25.860	29.780	55.640
6	3.5400	87.460	3.8300	1.105	0.848	0.0000	25.470	29.370	54.840
7	3.4600	87.610	3.9600	1.105	0.841	0.0000	25.690	29.690	55.380
8	3.5400	87.500	3.8700	1.105	0.850	0.0000	25.340	29.290	54.630
9	3.4900	87.500	3.8700	1.105	0.844	0.0000	25.670	29.570	55.240
10	3.4500	87.560	3.9100	1.105	0.839	0.0000	25.850	29.780	55.630
Limit strength in nails (SF = 1.3) :						33.854	42.578	48.780	125.21
Strenght on the facing (SF = 1.3):						20.965	30.289	38.733	89.987
T1 Strenght (SF = 1.3) :						0.0000	0.0000	0.0000	0.0000
T2 Strenght (SF = 1.3; T2/Pa = 1; $\delta/\phi = 0$ ) :						2.1356	5.0483	9.2179	16.402
Maximums T0, T1, T2 :						20.965	30.289	38.733	

17_RP	<b>GEOSTAB (Approach 2)</b>	With nails - Case 1	PROFIL
	INTERNAL STABILITY VERIFICATION Approach 2 Combination A1+M1+R2		<b>2</b>



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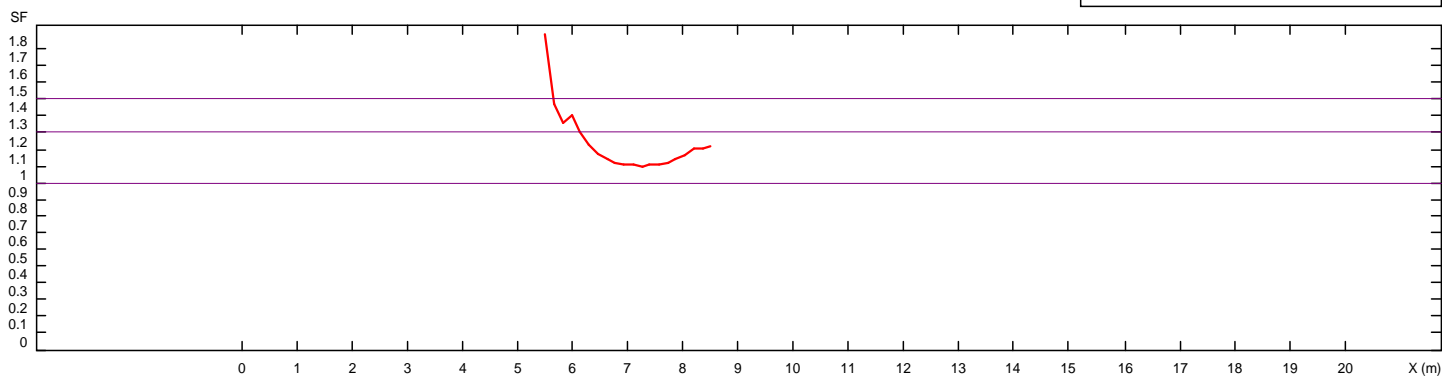
TEL: +334 50 95 38 14  
FAX: +334 50 95 99 36

SOILS	( $\gamma$ ; $\gamma_{sat}$ )	C	$\phi$	qs
1	(18.00; 18.00) * 1.00	5.000 / 1.00	25.00 / 1.00	35.00 / 1.40
2	(20.00; 20.00) * 1.00	50.00 / 1.00	35.00 / 1.00	150.0 / 1.40

File "GEOSTAB (Approach 2) - Copie"  
BISHOP's modified method"  
EC7 Approche 2  
Action of soil  $\gamma_r$ , e: 1.35  
Resistance of soil  $\gamma_r$ , e: 1.1  
Method Coefficient 1  
Units : kN, m

#### Surface loads and Line loads

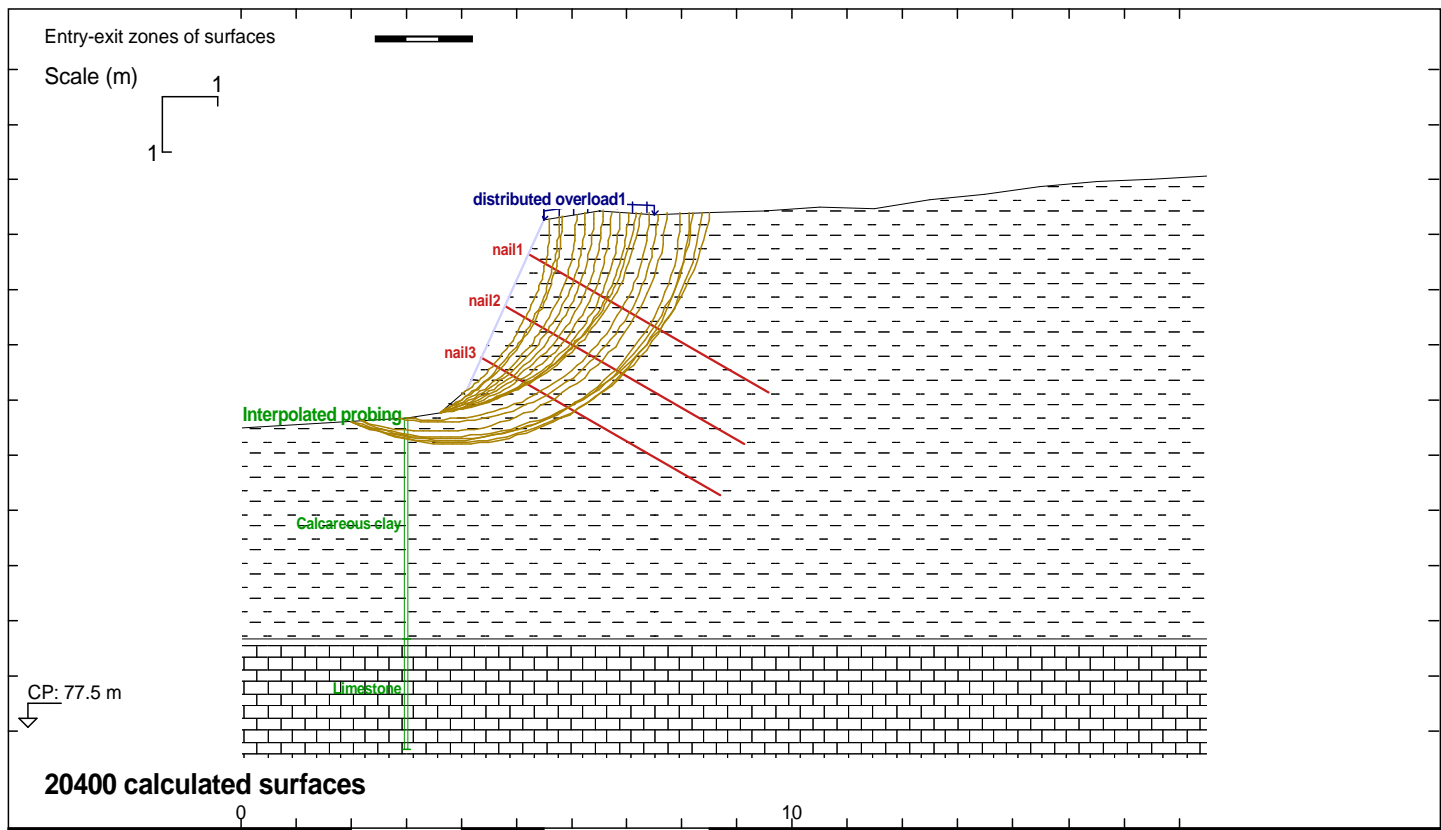
	ls	rs	S	Gamm	$\theta$
1	3.00	3.00		*1.00	0.00



#### SF depending on the distance from the ridge

dist (m)	1	2	3					
X (m)	6.50	7.50	8.50					
SF	1.16	1.11	1.22					

17_RP	<b>GEOSTAB (Approach 2)</b>	With nails - Case 1	PROFIL
	INTERNAL STABILITY VERIFICATION Approach 2 Combination A1+M1+R2		<b>2</b>



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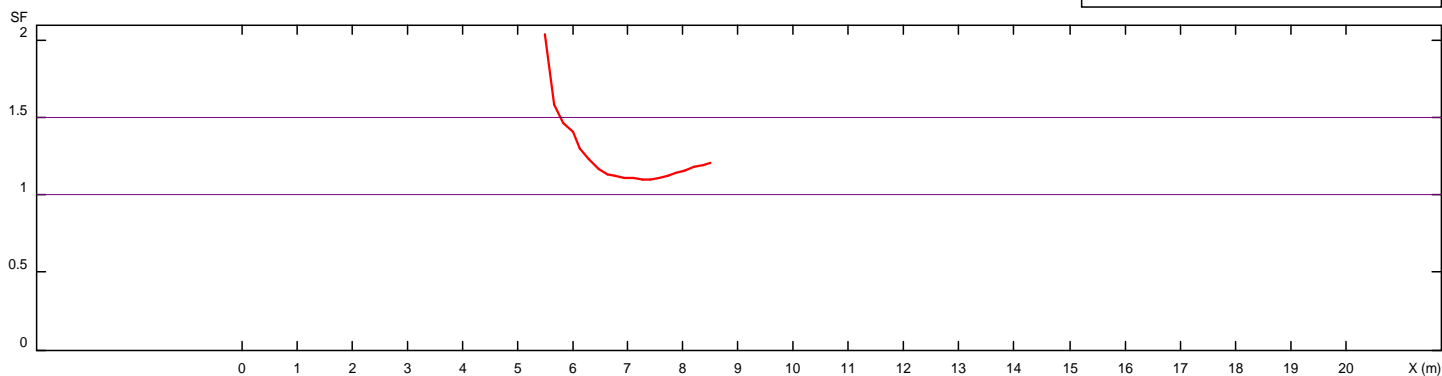
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 Archamps Technopole, 74160 ARCHAMPS - France

TEL: +334 50 95 38 14  
 FAX: +334 50 95 99 36

SOILS	( $\gamma$ ; $\gamma_{sat}$ )	C	$\phi$	qs
1	(18.00; 18.00) * 1.00	5.000 / 1.00	25.00 / 1.00	35.00 / 1.40
2	(20.00; 20.00) * 1.00	50.00 / 1.00	35.00 / 1.00	150.0 / 1.40

File "GEOSTAB (Approach 2) - Perturbations - Copie"  
 Perturbations method  
 EC7 Approche 2  
 Action of soil  $\gamma_r$ , e: 1.35  
 Resistance of soil  $\gamma_r$ , e: 1.1  
 Method Coefficient 1  
 Units : kN, m

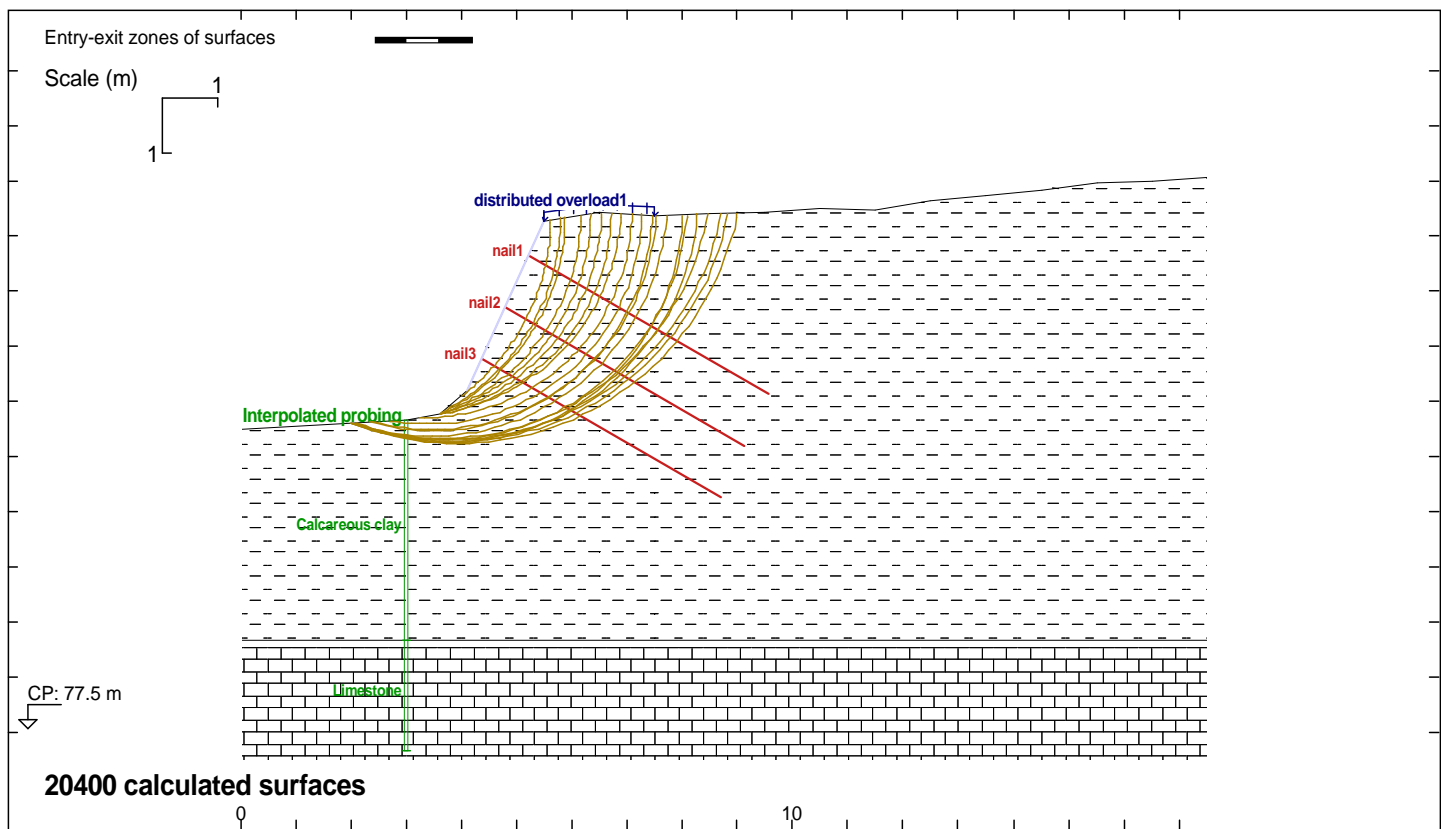
Surface loads and Line loads				
ls	rs	S	Gamm	$\theta$
1	3.00	3.00	*1.00	0.00



#### SF depending on the distance from the ridge

dist (m)	1	2	3					
X (m)	6.50	7.50	8.50					
SF	1.16	1.11	1.21					

17_RP	<b>GEOSTAB (Approach 2)</b>	With nails - Case 1	PROFIL
	INTERNAL STABILITY VERIFICATION Approach 2 Combination A1+M1+R2		<b>2</b>



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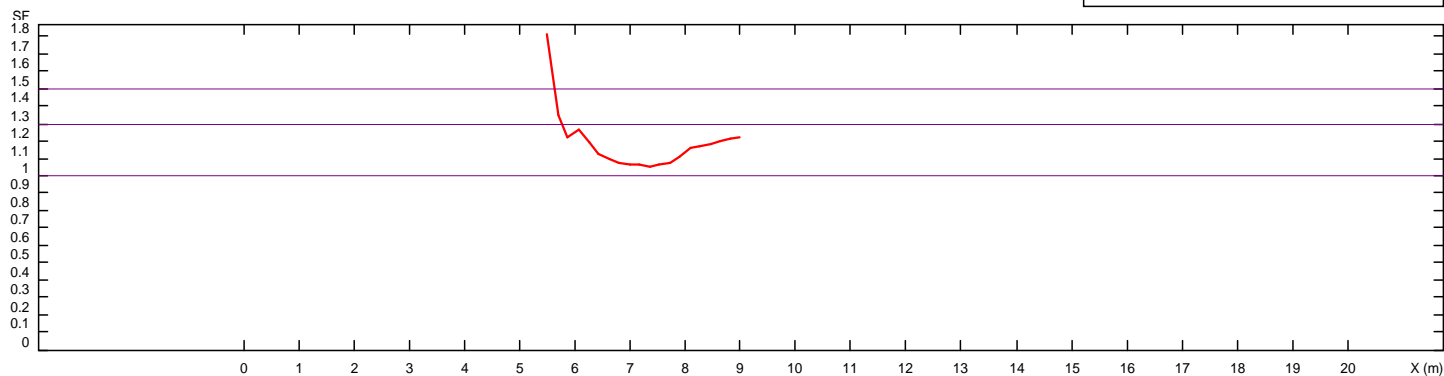
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TEL: +334 50 95 38 14  
FAX: +334 50 95 99 36

SOILS	( $\gamma$ ; $\gamma_{sat}$ )	C	$\phi$	qs
1	(18.00; 18.00) * 1.00	5.000 / 1.25	25.00 / 1.25	35.00 / 1.10
2	(20.00; 20.00) * 1.00	50.00 / 1.25	35.00 / 1.25	150.0 / 1.10

File "GEOSTAB (Approach 3) - Copie"  
BISHOP's modified method"  
EC7 Approche 3  
Action of soil  $\gamma_r$ , e: 1  
Resistance of soil  $\gamma_r$ , e: 1  
Method Coefficient 1.2  
Units : kN, m

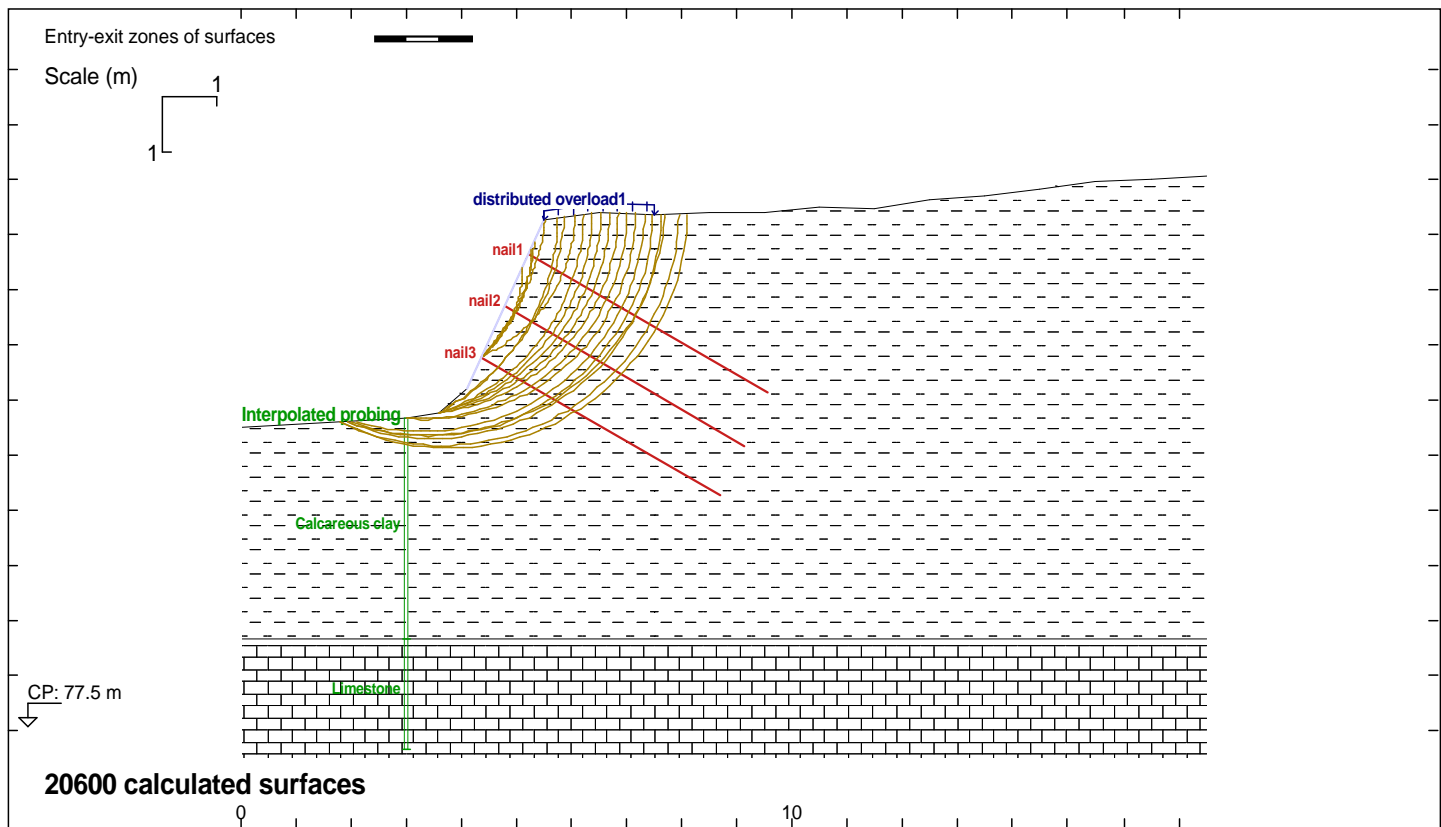
Surface loads and Line loads				
ls	rs	S	Gamm	$\theta$
1	3.00	3.00	*1.30	0.00



#### SF depending on the distance from the ridge

dist (m)	1	2	3					
X (m)	6.50	7.50	8.50					
SF	1.11	1.06	1.18					

17_RP	<b>MIXT STABILITY VERIFICATION (Approach 3)</b>	With nails - Case 1	PROFIL
	Mixt stability verification Approach 3 Combination A2+M2+R3		<b>2</b>



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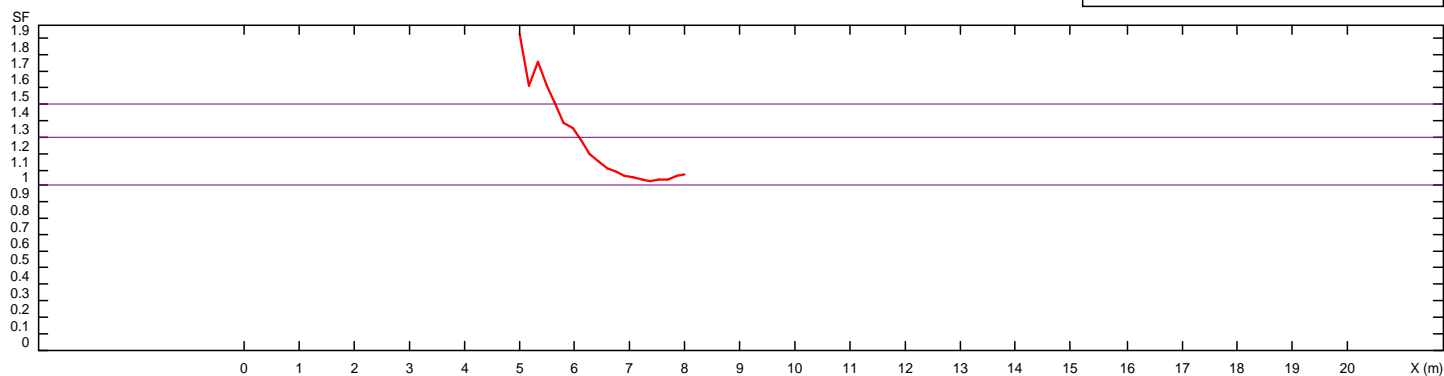
GEOS INGENIEURS CONSEILS, 310 av. Marie Curie, Bât. Europa 2  
 Archamps Technopole, 74160 ARCHAMPS - France

TEL: +334 50 95 38 14  
 FAX: +334 50 95 99 36

SOILS	( $\gamma$ ; $\gamma_{sat}$ )	C	$\phi$	qs
1	(18.00; 18.00) * 1.00	5.000 / 1.25	25.00 / 1.25	35.00 / 1.10
2	(20.00; 20.00) * 1.00	50.00 / 1.25	35.00 / 1.25	150.0 / 1.10

File "GEOSTAB (Approach 3) - Copie"  
 Perturbations method  
 EC7 Approche 3  
 Action of soil  $\gamma_r$ , e: 1  
 Resistance of soil  $\gamma_r$ , e: 1  
 Method Coefficient 1.2  
 Units : kN, m

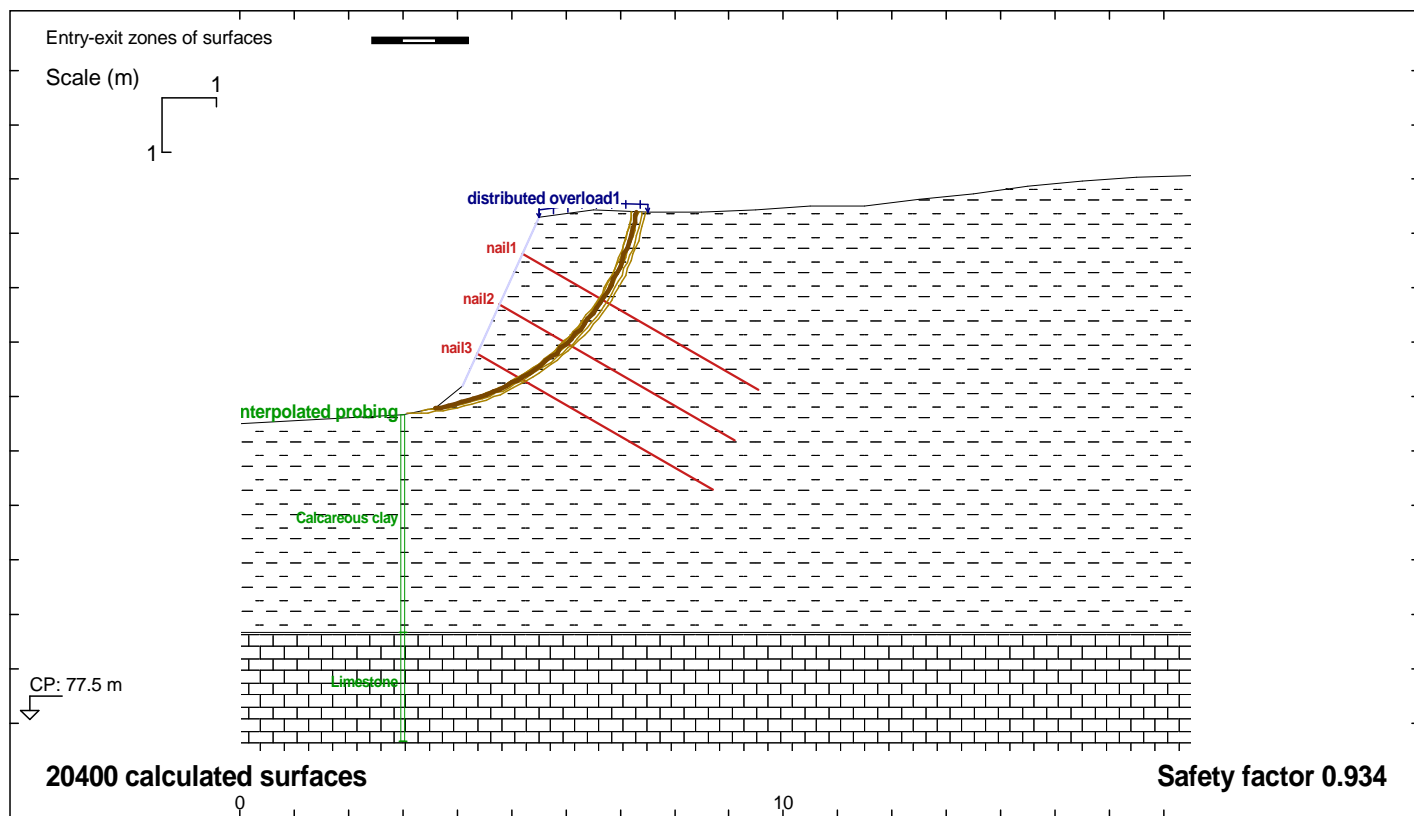
Surface loads and Line loads				
1s	rs	S	Gamm	$\theta$
1 3.00	3.00		*1.30	0.00



#### SF depending on the distance from the ridge

dist (m)	1	2	3					
X (m)	6.00	7.00	8.00					
SF	1.33	1.06	1.07					

17_RP	<b>MIXT STABILITY VERIFICATION (Approach 3)</b>	With nails - Case 1	PROFIL
	Mixt stability verification Approach 3 Combination A2+M2+R3		<b>2</b>



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TEL: +334 50 95 38 14  
FAX: +334 50 95 99 36

SOILS	( $\gamma$ ; $\gamma_{sat}$ )	C	$\phi$	qs
1	(18.00; 18.00) * 1.00	5.000 / 1.00	25.00 / 1.00	35.00 / 1.40
2	(20.00; 20.00) * 1.00	50.00 / 1.00	35.00 / 1.00	150.0 / 1.40

	Yhead	L	$\alpha$	Spa	$\emptyset$	F rein
NAIL 1	86.6400	5.000	30.0	2.00	0.100	70.00 / 1.250
NAIL 2	85.6900	5.000	30.0	2.00	0.100	70.00 / 1.250
NAIL 3	84.7800	5.000	30.0	2.00	0.100	70.00 / 1.250

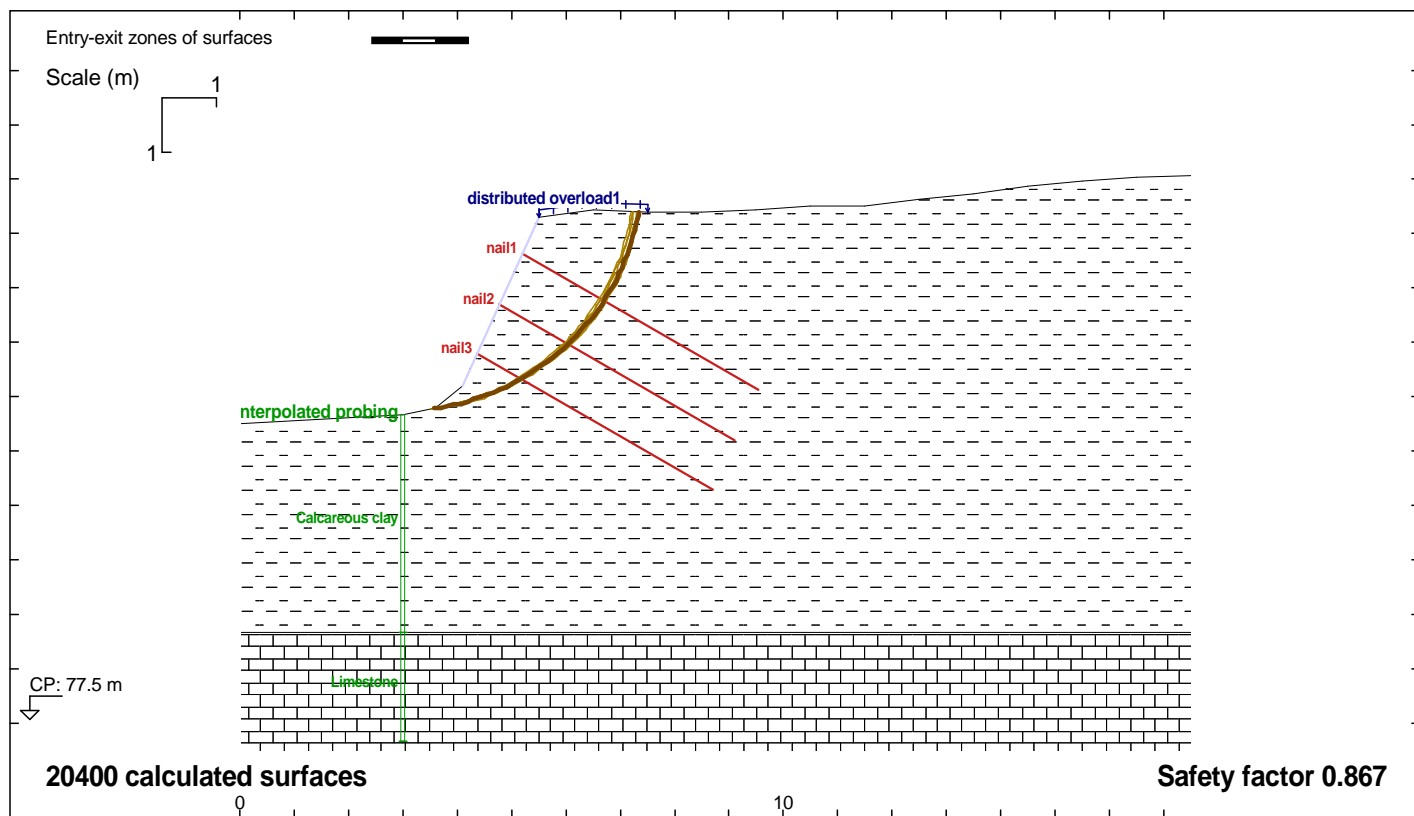
File "GEOSTAB (Approach 2) - Earthquake"  
BISHOP's modified method"  
EC7 Approche 2  
Action of soil  $\gamma_r$ , e: 1.35  
Resistance of soil  $\gamma_r$ , e: 1.1  
Method Coefficient 1  
Units : kN, m

SEISMIC			$\sigma_v$
$\sigma_h$	$\sigma_v$	Pcav	$\sigma_h$
0.150	0.070	0.0000	

Surface loads and Line loads				
Is	rs	S	Gamm	$\theta$
1 3.00	3.00		*1.00	0.00

No.	Xc	Yc	R (radius)	SF	Sf(N ou NL N ou NL N ou NL (nail)3	tens.	tens.	tens.	tens.
1	2.9400	88.150	4.4200	0.934	0.601	0.0000	27.660	31.650	59.310
2	2.8800	88.250	4.5200	0.936	0.601	0.0000	27.710	31.740	59.450
3	2.9600	88.150	4.4200	0.936	0.603	0.0000	27.590	31.600	59.190
4	2.8600	88.250	4.5300	0.939	0.602	0.0000	27.800	31.810	59.610
5	2.9400	88.150	4.4200	0.939	0.604	0.0000	27.670	31.660	59.330
6	2.9100	88.090	4.3600	0.940	0.598	0.0000	27.980	31.860	59.840
7	2.9800	88.150	4.4200	0.940	0.608	0.0000	27.460	31.500	58.960
8	2.8400	88.160	4.4500	0.940	0.596	0.0000	28.130	32.010	60.140
9	3.0400	88.150	4.4300	0.942	0.626	0.0000	26.980	31.070	58.050
10	3.0500	88.160	4.4800	0.942	0.643	0.0000	26.600	30.670	57.270
Limit strength in nails (SF = 1.3) :						40.426	52.007	60.218	152.65
Strenght on the facing (SF = 1.3):						24.439	38.540	49.807	112.79
T1 Strenght (SF = 1.3) :						0.0000	0.0000	0.0000	0.0000
T2 Strenght (SF = 1.3; T2/Pa = 1; $\delta/\phi = 0$ ) :						2.1356	5.0483	9.2179	16.402
Maximums T0,T1, T2 :						24.439	38.540	49.807	

17_RP	<b>GEOSTAB (Approach 2)</b>	With nails - Case 1	PROFIL
	INTERNAL STABILITY VERIFICATION Approach 2 Combination A1+M1+R2		<b>2</b>



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TEL: +334 50 95 38 14  
FAX: +334 50 95 99 36

SOILS	( $\gamma$ ; $\gamma_{sat}$ )	C	$\phi$	qs
1	(18.00; 18.00) * 1.00	5.000 / 1.00	25.00 / 1.00	35.00 / 1.40
2	(20.00; 20.00) * 1.00	50.00 / 1.00	35.00 / 1.00	150.0 / 1.40

	Yhead	L	$\alpha$	Spa	$\emptyset$	F rein
NAIL 1	86.6400	5.000	30.0	2.00	0.100	70.00 / 1.250
NAIL 2	85.6900	5.000	30.0	2.00	0.100	70.00 / 1.250
NAIL 3	84.7800	5.000	30.0	2.00	0.100	70.00 / 1.250

File "GEOSTAB (Approach 2) - Earthquake"  
BISHOP's modified method"  
EC7 Approche 2  
Action of soil  $\gamma_r$ , e: 1.35  
Resistance of soil  $\gamma_r$ , e: 1.1  
Method Coefficient 1  
Units : kN, m

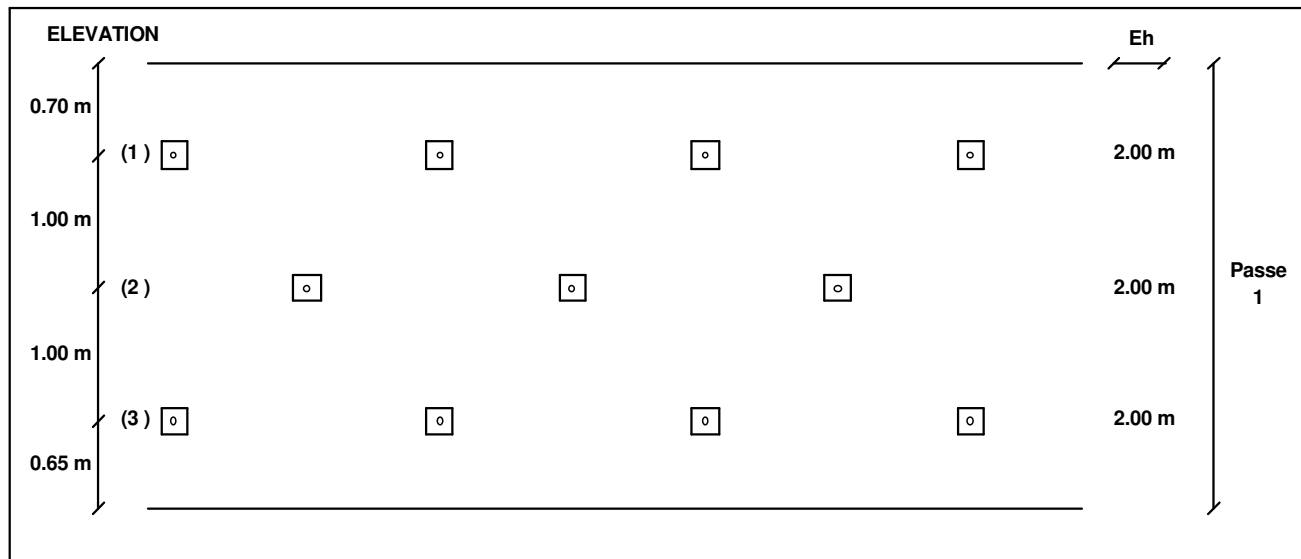
SEISMIC			$\sigma_h$
$\sigma_h$	$\sigma_v$	Pcav	$\sigma_v$
0.150	-0.070	0.0000	

Surface loads and Line loads				
Is	rs	S	Gamm	$\theta$
1 3.00	3.00		*1.00	0.00

No.	Xc	Yc	R (radius)	SF	Sf(N ou NL N ou NL N ou NL (nail)3	tens.	tens.	tens.	tens.
1	2.9700	88.200	4.4600	0.867	0.587	0.0000	27.450	31.530	58.980
2	2.9700	88.050	4.3200	0.867	0.580	0.0000	27.800	31.710	59.510
3	2.9700	88.050	4.3100	0.868	0.580	0.0000	27.810	31.720	59.530
4	3.0400	88.110	4.3700	0.868	0.590	0.0000	27.280	31.360	58.640
5	3.1100	88.050	4.3000	0.868	0.598	0.0000	27.040	31.110	58.150
6	2.9500	88.200	4.4700	0.869	0.587	0.0000	27.520	31.580	59.100
7	2.9900	88.050	4.3100	0.869	0.583	0.0000	27.700	31.640	59.340
8	3.0500	88.050	4.3000	0.869	0.588	0.0000	27.400	31.410	58.810
9	2.9300	88.050	4.3300	0.869	0.578	0.0000	28.000	31.860	59.860
10	3.1100	88.040	4.2900	0.870	0.594	0.0000	27.100	31.180	58.280
Limit strength in nails (SF = 1.3) :						48.165	63.093	73.808	185.07
Strenght on the facing (SF = 1.3):						31.229	47.251	61.905	140.39
T1 Strenght (SF = 1.3) :						0.0000	0.0000	0.0000	0.0000
T2 Strenght (SF = 1.3; T2/Pa = 1; $\delta/\phi = 0$ ) :						2.1356	5.0483	9.2179	16.402
Maximums T0,T1, T2 :						31.229	47.251	61.905	

17_RP	11/02/18 16:55	<b>GEOSTAB (Approach 2)</b>	With nails - Case 1	PROFIL
		INTERNAL STABILITY VERIFICATION with earthquake Approach 3 Combination A1+M1+R2	2	





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Bâtiment Europa 2, 74160 ARCHAMPS - FRANCE

TEL: 04 50 95 38 14  
FAX: 04 50 95 99 36

### DONNEES

Force dans les clous	(1)	(2)	(3)	
ELU fondamental	29.75	39.74	45.24	kN
ELS	22.04	29.44	33.51	kN
Rapport entre contrainte min et contrainte max : 0.000				

#### Plaque d'appui

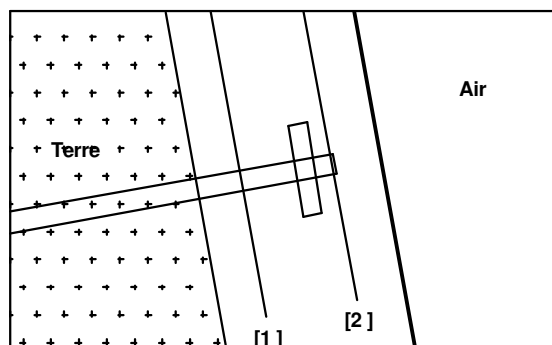
Dimensions	20.00 * 20.00	cm
PI (sol derrière béton)	0.20	MPa

#### Béton

Epaisseur	20.	cm
Epaisseur sous plaque	11.	cm
Enrobage terre [1]	5.	cm
Enrobage air [2]	5.	cm
Fck	25.00	MPa
Classe d'exposition	X0	

#### Armatures

	[1]	[2]
Type Acier	S-500	S-500
Adherence	Classe C	Classe A



### EPAISSEUR DE PLAQUE

Lit n°	(1)	(2)	(3)	
	0.435	0.503	0.537	cm

### PASSE 1

FLEXION		Appui [1] Horizontal	Appui [1] Vertical	Travée [2] Horizontal	Travée [2] Vertical	
ELU fondamental	moment	-8.67	-8.33	1.76	0.771	kN.m/m
	section d'acier	1.19	1.14	0.26	0.11	cm²/m
ELS	moment	-6.42	-6.17	1.30	0.571	kN.m/m
	section d'acier	1.12	1.08	0.22	0.10	cm²/m
Section d'acier retenue		1.19	1.14	0.26	0.11	cm²/m
Sections d'acier suivant la norme NF EN 1992-1-1						

**Paroi clouée**

**BLOIS (41)**  
**Rue du Grand Remenier**  
**Dimensionnement d'une paroi clouée**

**PAREMENT**

**1 - 1**



Fissuration suivant NF 1992-1-1 /NA	Appui [1] Horizontal	Appui [1] Vertical	Travée [2] Horizontal	Travée [2] Vertical	
Espacement proposé	150.00	150.00	300.00	300.00	mm
Diamètre proposé	6.00	6.00	6.00	6.00	mm
Section proposée	1.88	1.88	0.94	0.94	cm <sup>2</sup> /m
Contrainte dans le béton	3.21	3.09	0.88	0.38	MPa
Contrainte admissible dans le béton	11.25	11.25	11.25	11.25	MPa
Ouverture de fissuration maxi admissible	0.40	0.40	0.40	0.40	mm
Ouverture de fissuration	0.36	0.34	0.24	0.11	mm

POINÇONNEMENT	Ved ;	VEd,0	VRd,max	VEd,1	VRd,c
ELU fondamental	45.24 kN	0.94	< 4.50	0.49	< 0.49
Pas de panier de renforcement en tete de clou					

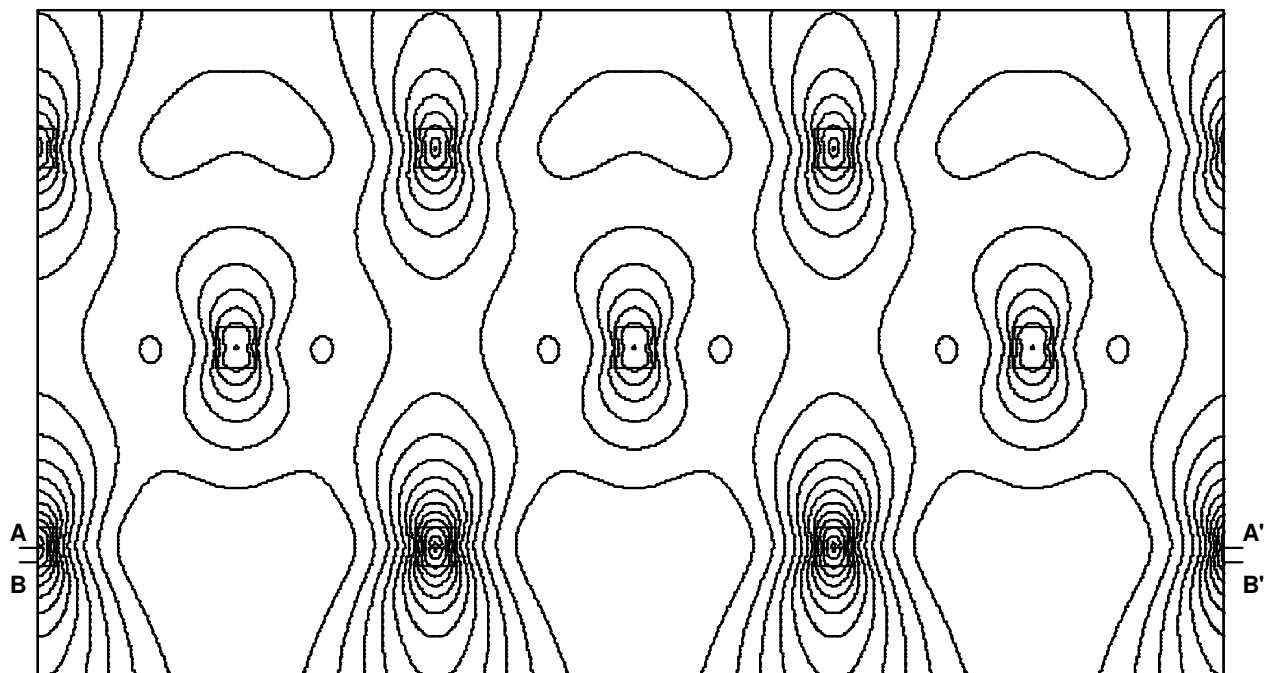
	<b>Paroi clouée</b>	<b>PAREMENT</b>  <b>1 - 2</b>
	<b>BLOIS (41)</b>	
	<b>Rue du Grand Remenier</b> <b>Dimensionnement d'une paroi clouée</b>	



## CARTE ISOVALEURS

## Moments selon X :

## ELU fondamental



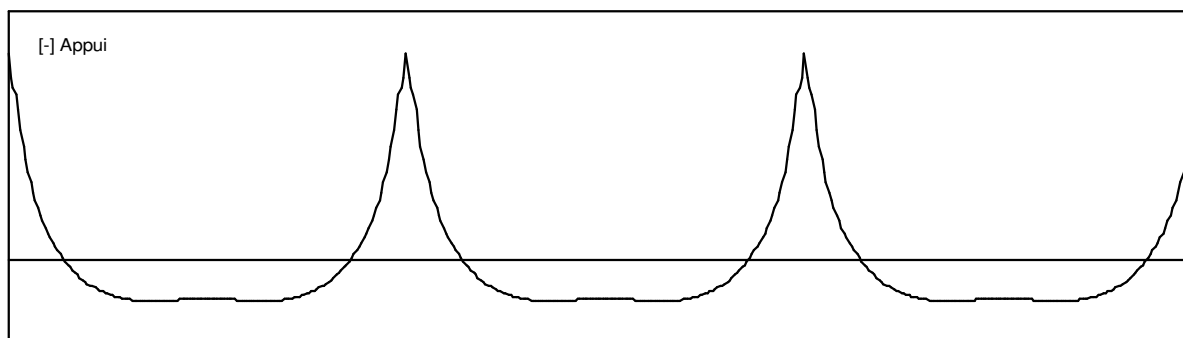
## COUPE AA' MAXIMUM SUR APPUIS

Moment sur appui (kN.m) =

-8.66762

Moment écreté (kN.m) =

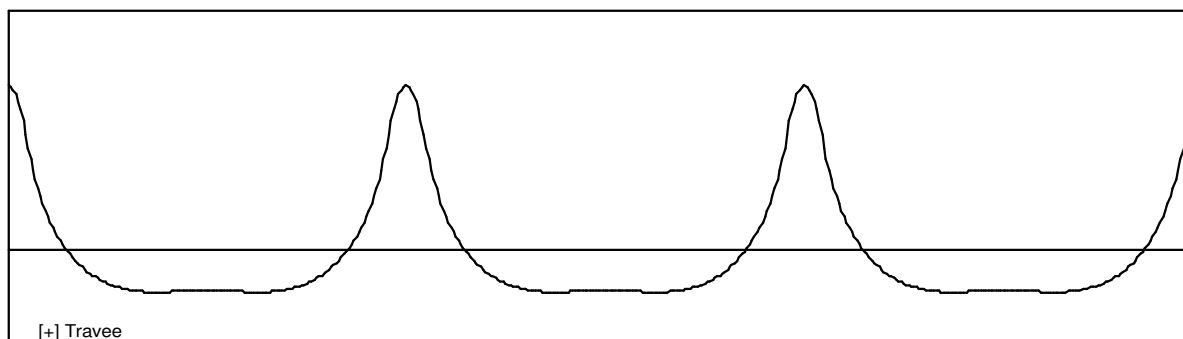
-8.66762



## COUPE BB' MAXIMUM EN TRAVÉE

Moment en travée (kN.m) =

1.76113



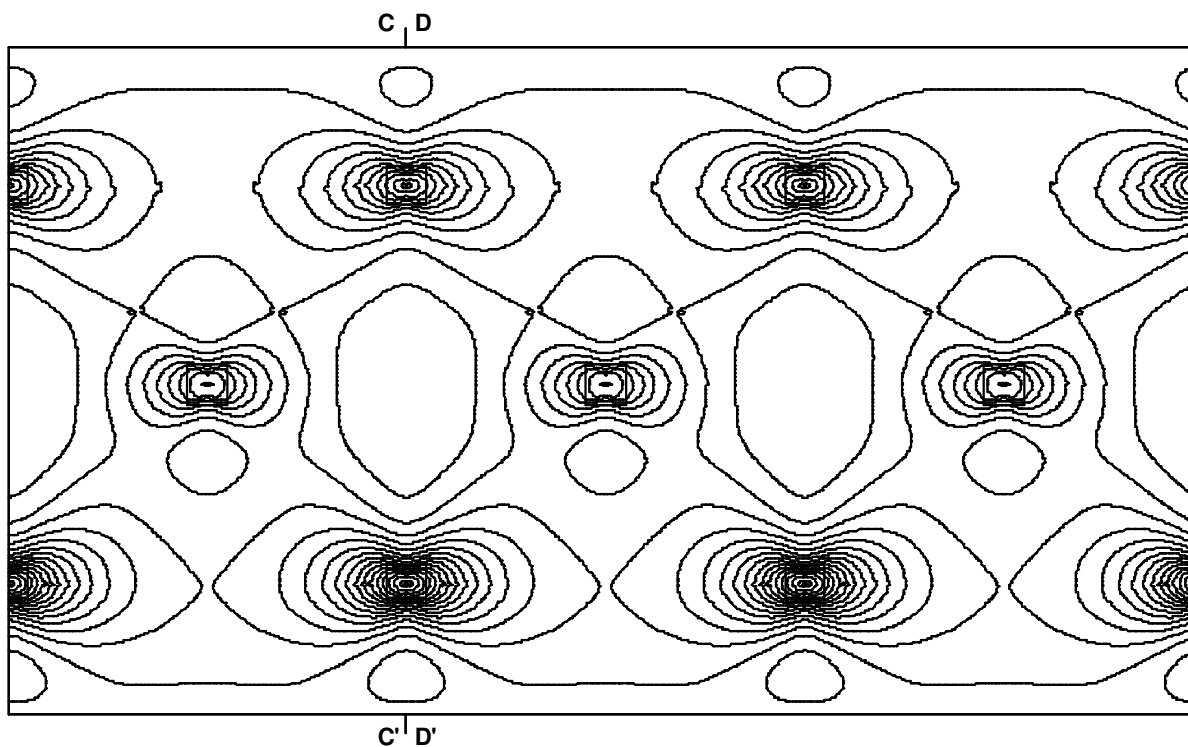
	Paroi clouée	PAREMENT  1 - 3
	BLOIS (41)	
	Rue du Grand Remenier Dimensionnement d'une paroi clouée	



## CARTE ISOVALEURS

## Moments selon Y :

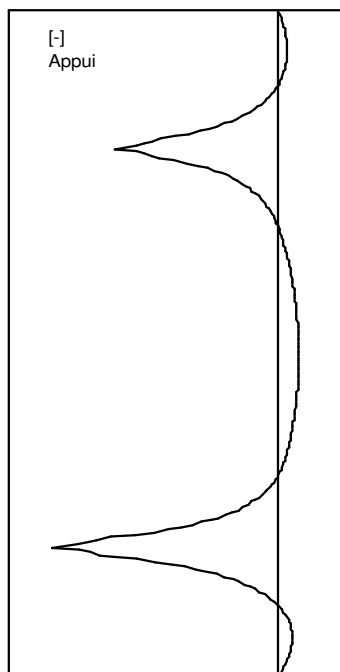
## ELU fondamental



## COUPE CC' MAXIMUM SUR APPUIS

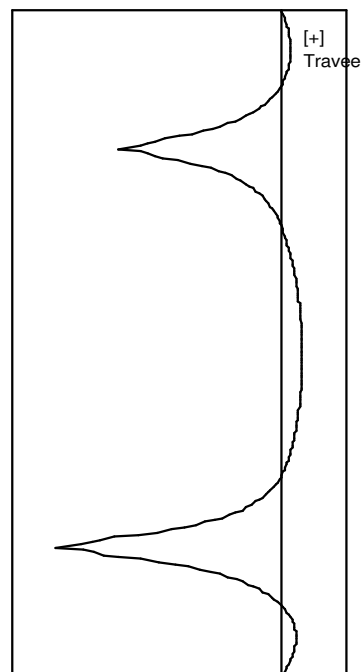
Moment sur appui (kN.m) = -8.32834

Moment écrété (kN.m) = -8.32834



## COUPE DD' MAXIMUM EN TRAVÉE

Moment en travée (kN.m) = 0.770900



Paroi clouée

BLOIS (41)

Rue du Grand Remenier

Dimensionnement d'une paroi clouée

PAREMENT

1 - 4