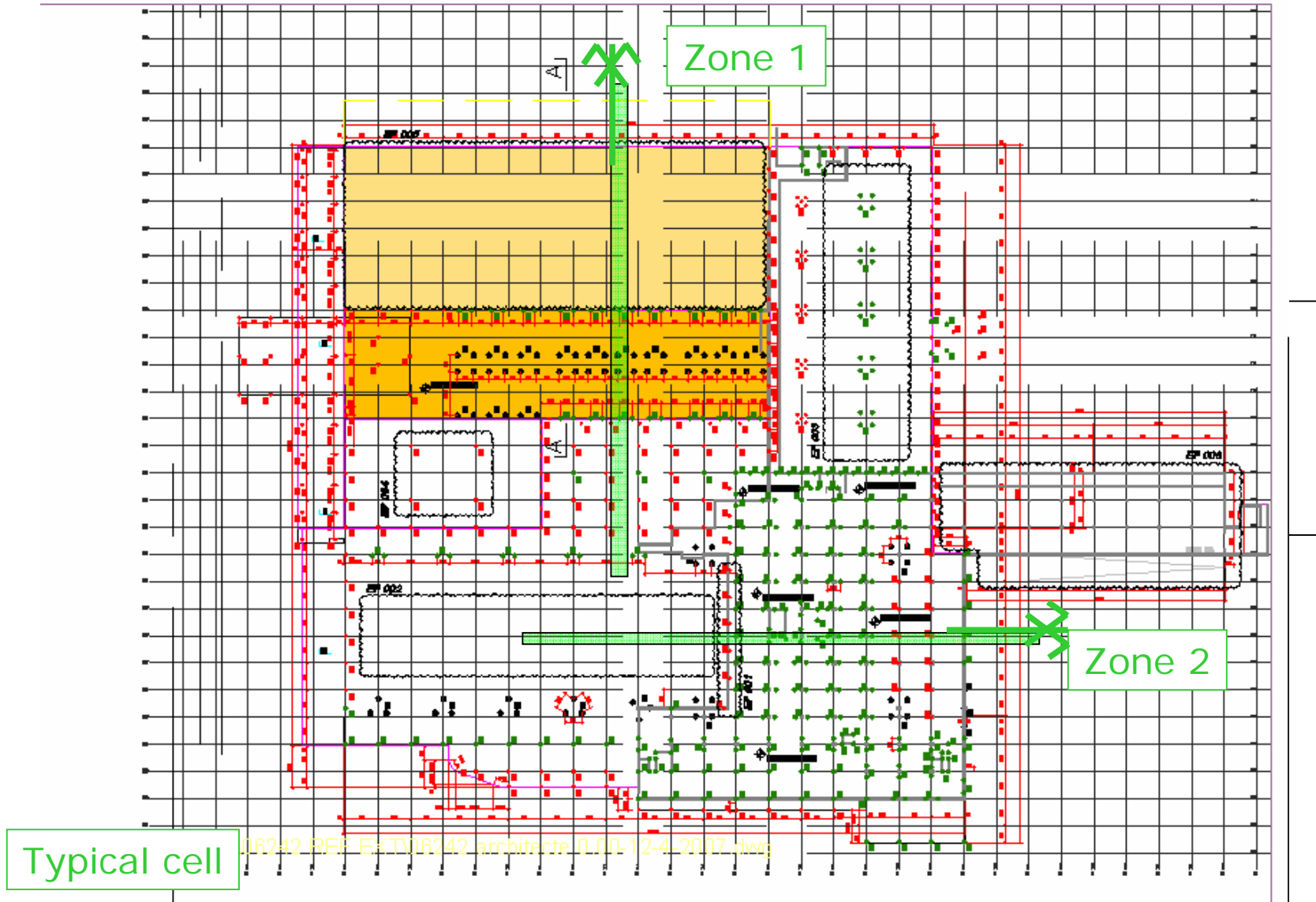


Case Study

Settlement analysis of an industrial building

Françoise Geiser - Stéphane Commend
GeoMod consulting engineers

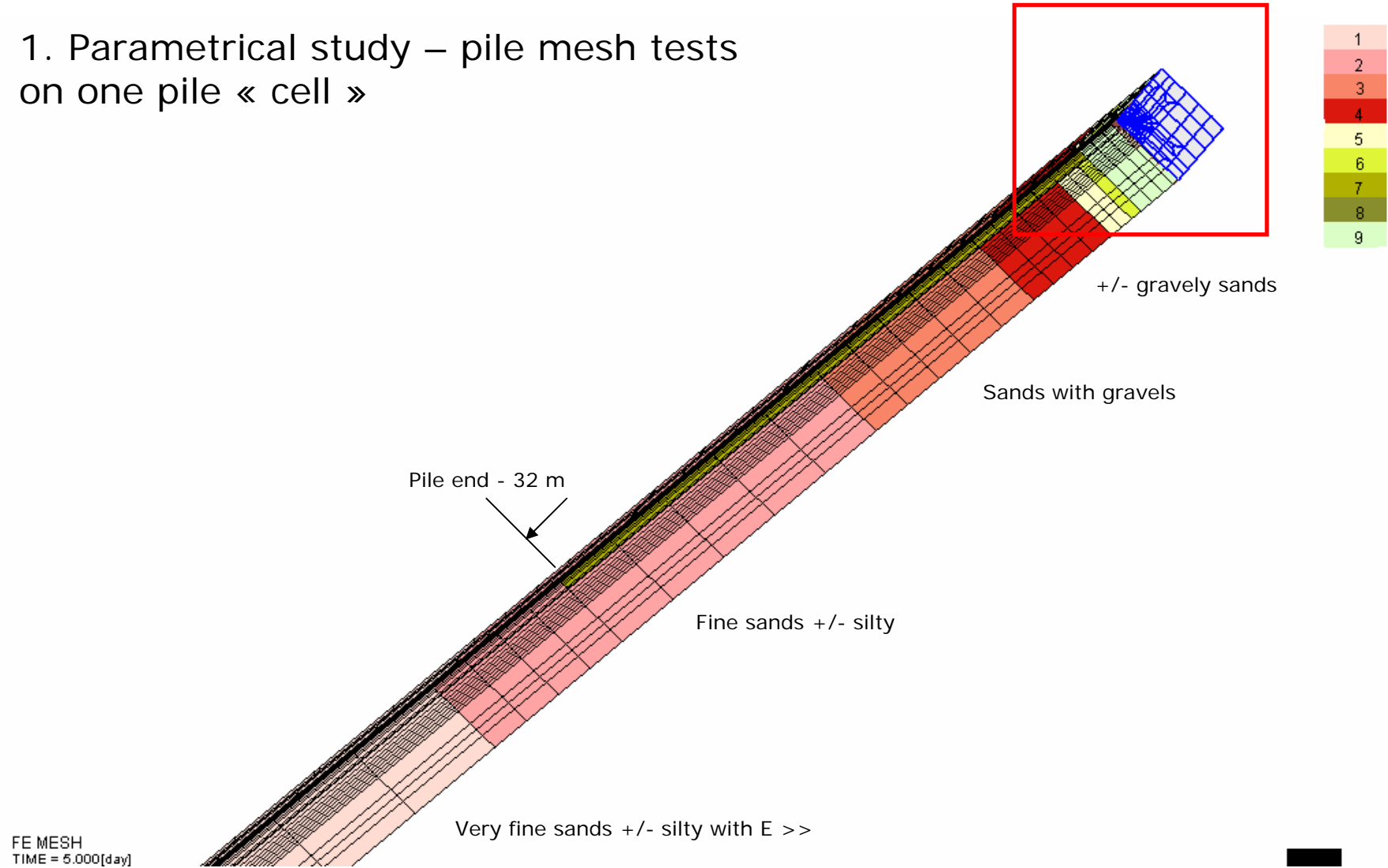


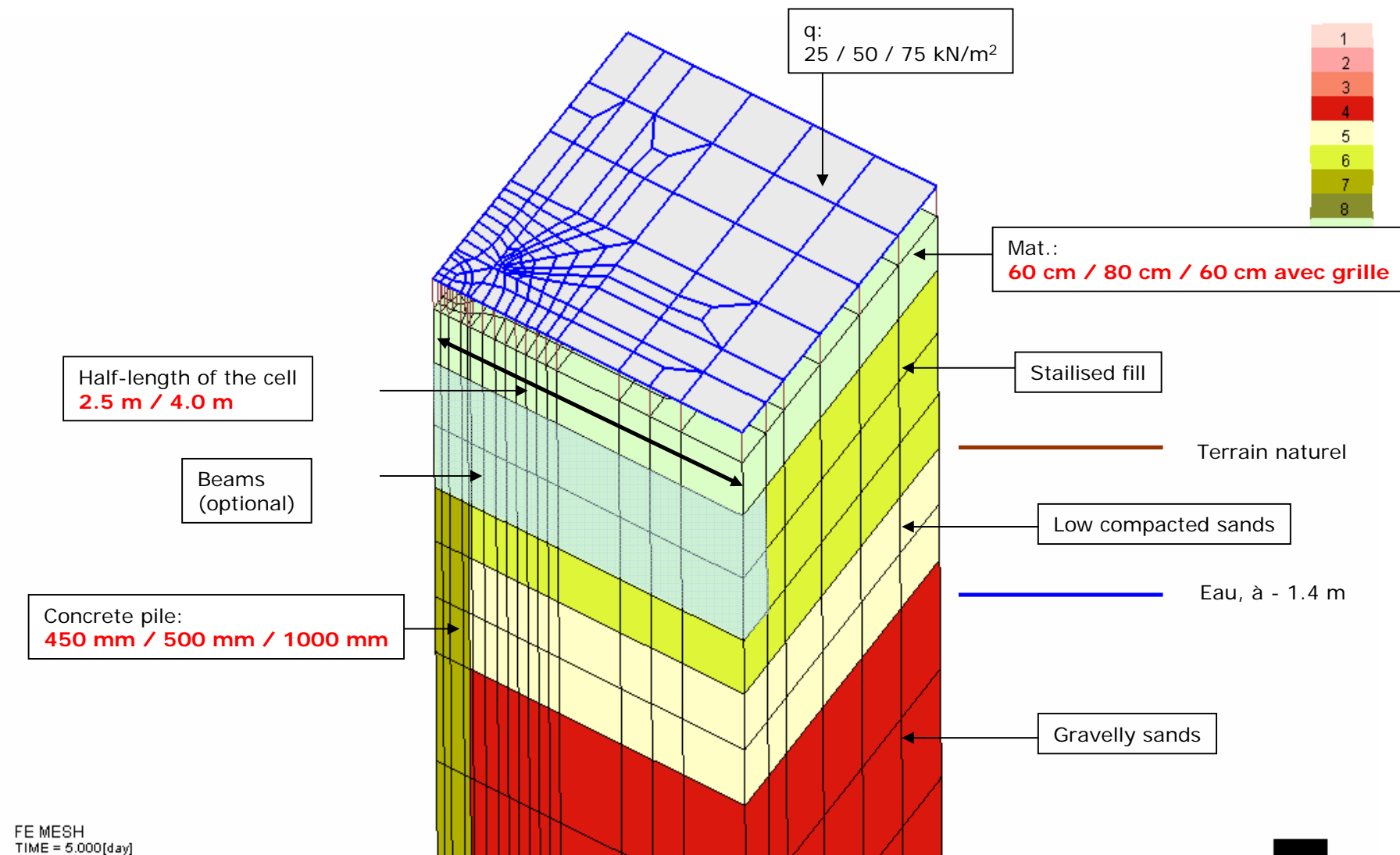


1. Parametrical study – pile mesh tests on one pile « cell »



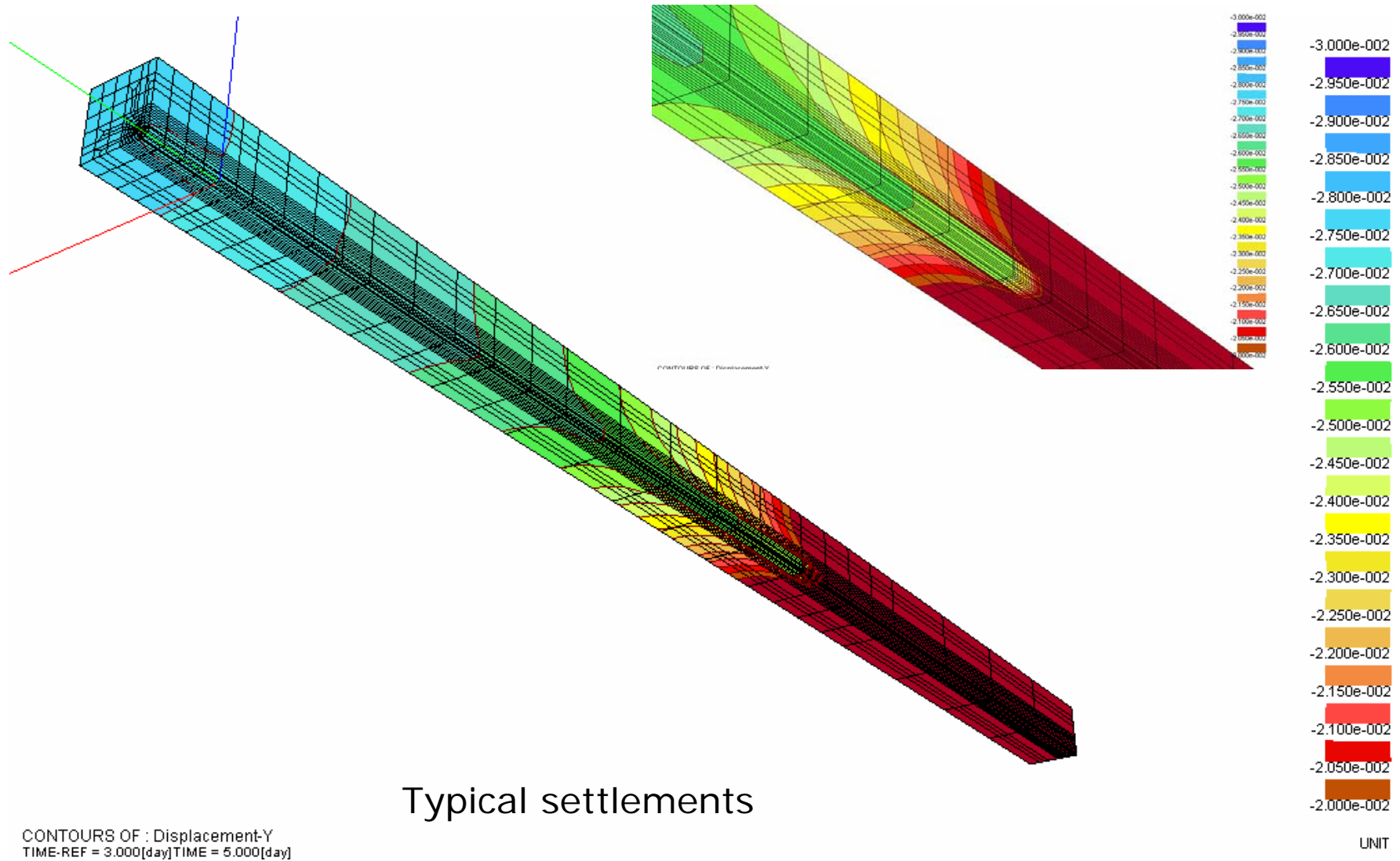
1. Parametrical study – pile mesh tests on one pile « cell »





Annexe 1.2. Etude paramétrique sur pieu isolé, sur 1/4 d'une trame type.
Maillage (zoom) avec indication des **paramètres variant dans l'analyse**



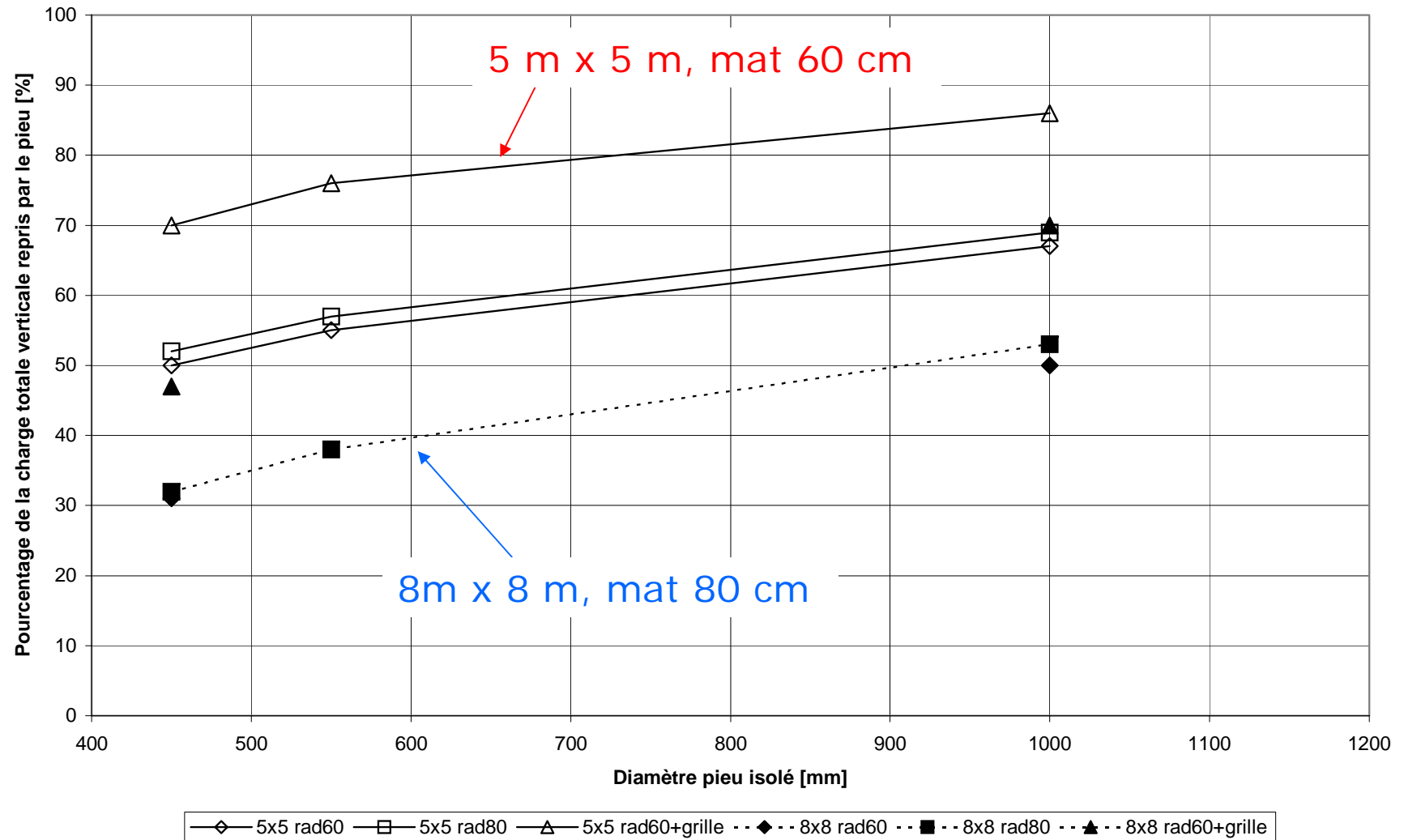


Typical settlements

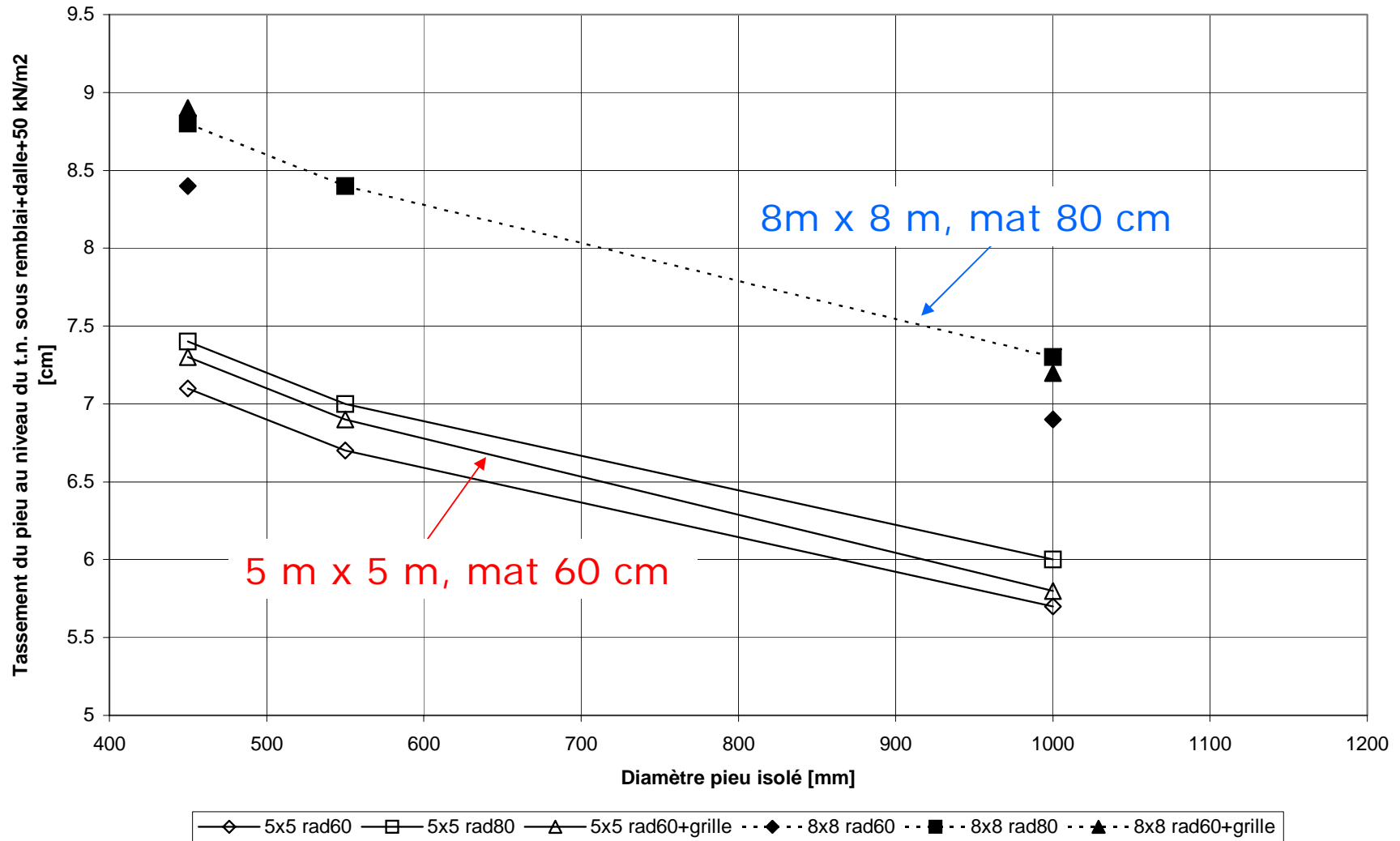
Annexe 1.11. Tassement avec pieu D = 1000 m , charge répartie
 $\Delta T = T5 - T3$



Percent of the total load transmitted to the piles for different geometries



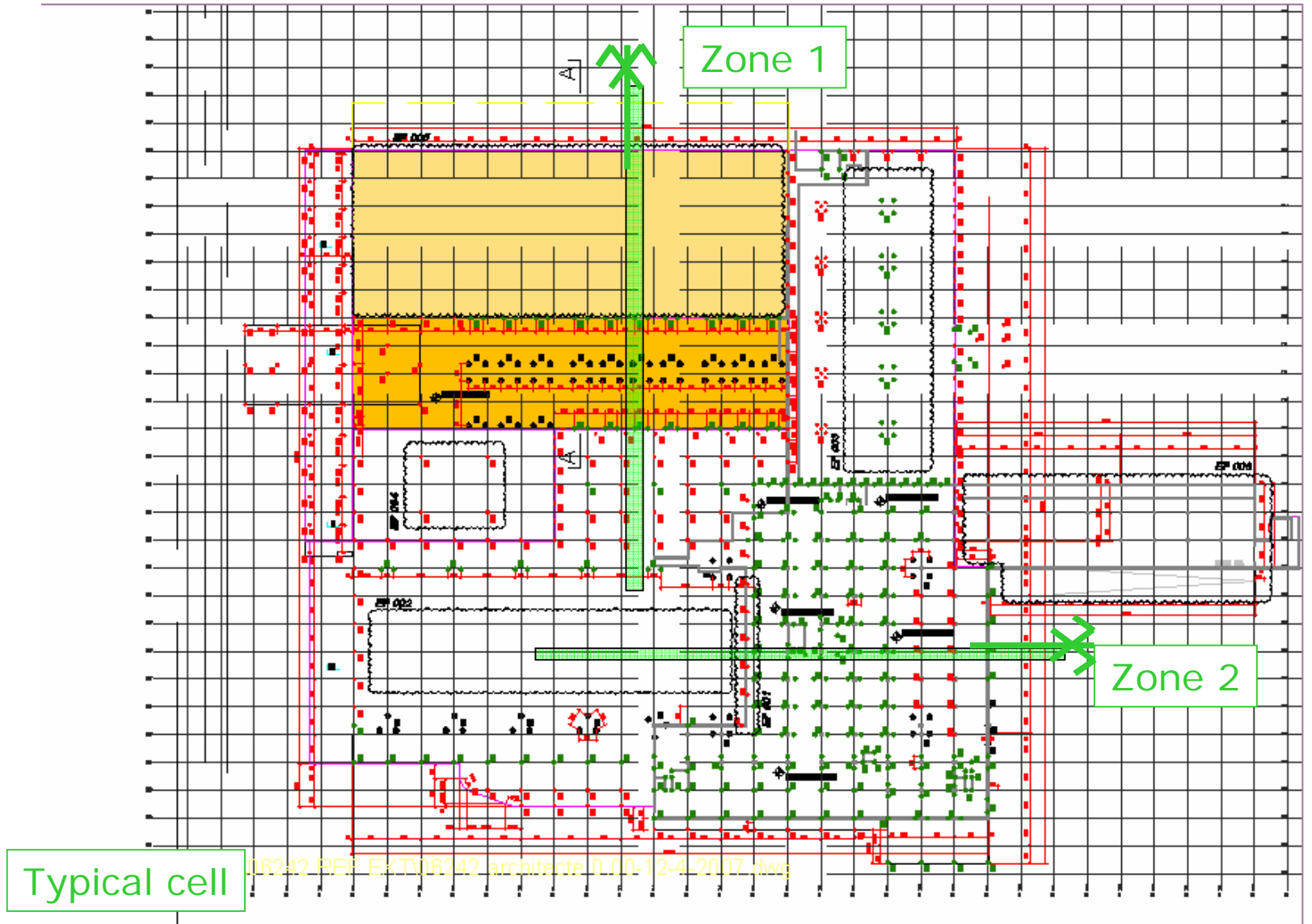
Settlements prediction for different geometries

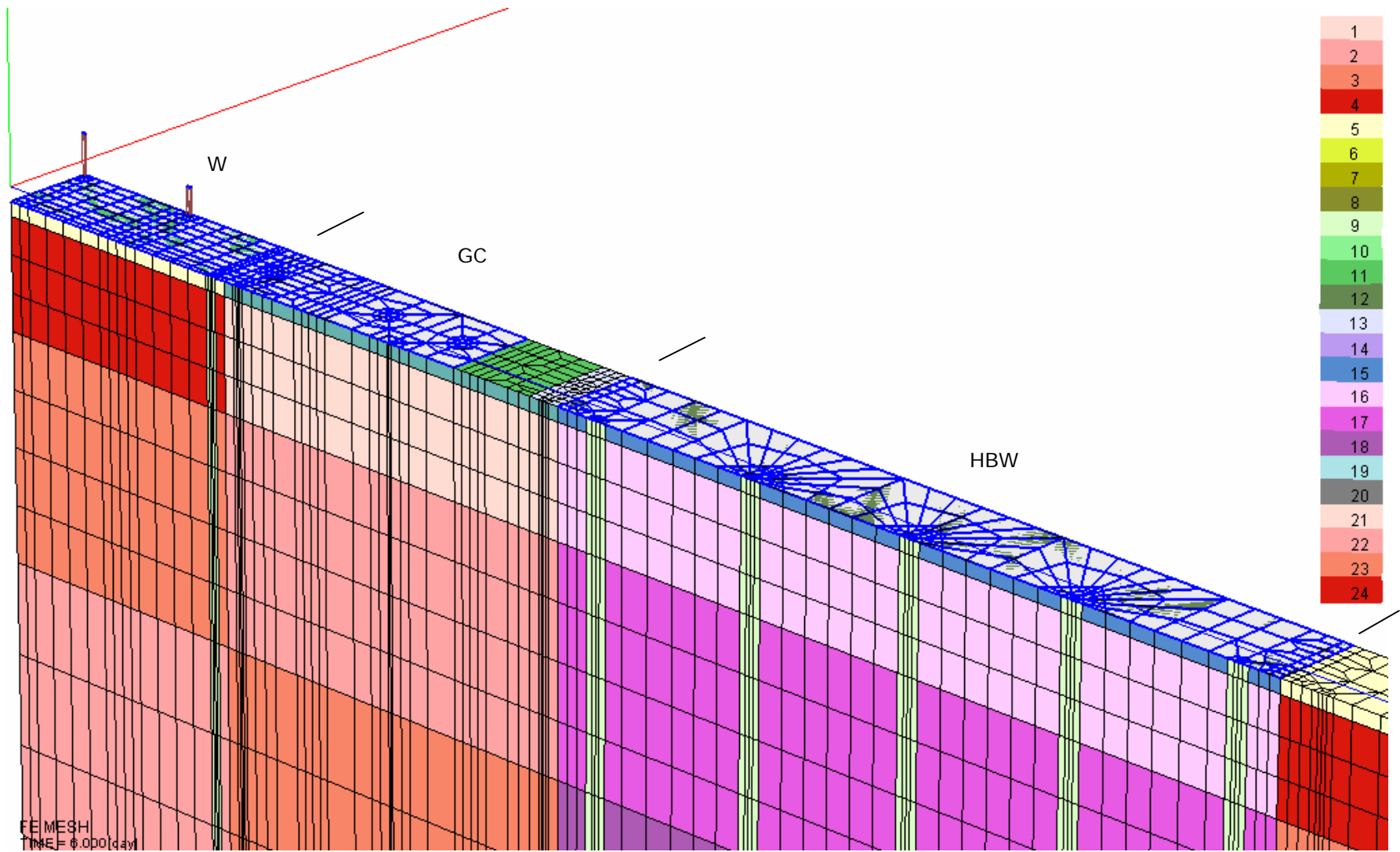


1. Settlement analysis on a representative slice

Zone 1



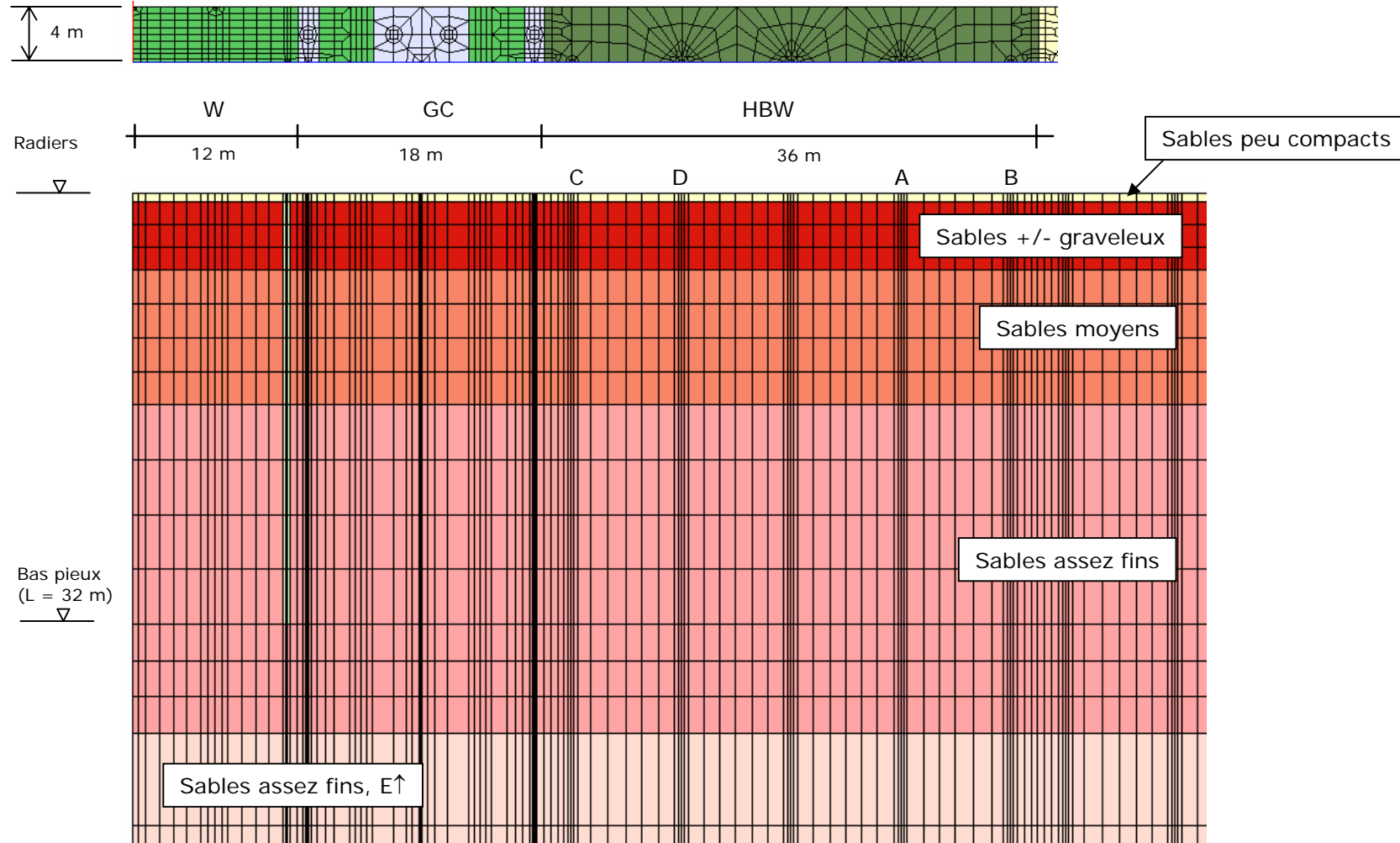




Annexe D1.0. Nouveau maillage (vue 3D de la demi-bande)



Vue aérienne de la demi bande de 4 m de largeur

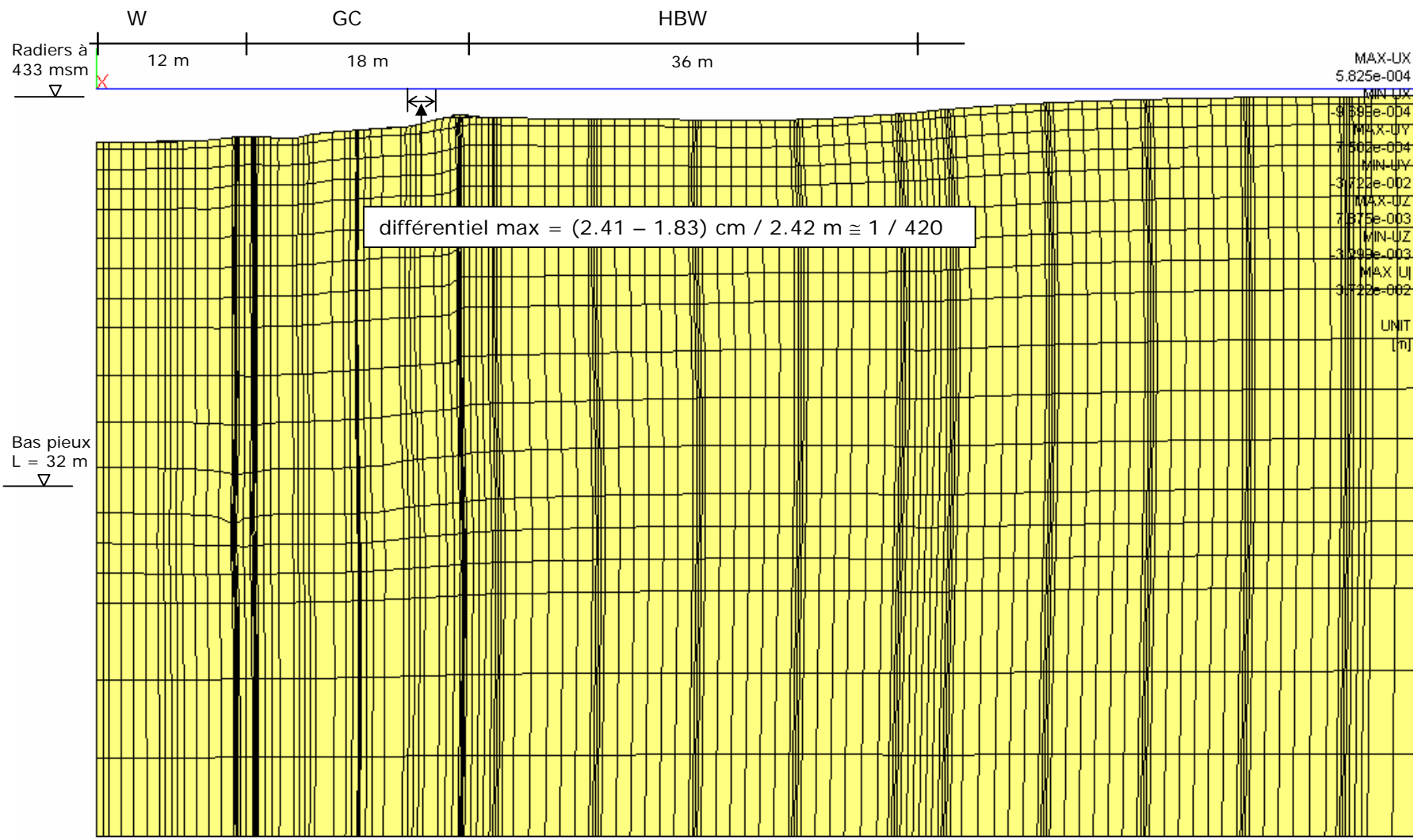


Etape	WS b = 12 m	GC b = 18 m	HBW b = 36 m
T = 0	Initial state	Initial state	Initial state
T = 2	Mat construction e = 24 cm	Mat construction e = 24 cm+ spread footings e = 220 cm	Mat construction e = 60 cm
T = 3	Permanent load	Permanent load g = 20 kN/m ² distributed	Permanent load g = 7 kN/m ² distributed
T = 4	Load q	-	-
T = 5	-	Load q q = 130 kN/m ² distributed	-
T = 6	-	-	Load q q = 28 kN/m ² distributed



Case study	W	GC	HBW
①	Piles without preloading	Piles preload 2m	No piles preload 2m
②	Piles without preloading	No piles preload 2m	No piles preload 2m
③	Piles without preloading	Piles without preloading	Piles without preloading
④	Piles without preloading	Piles without preloading	No piles No preloading

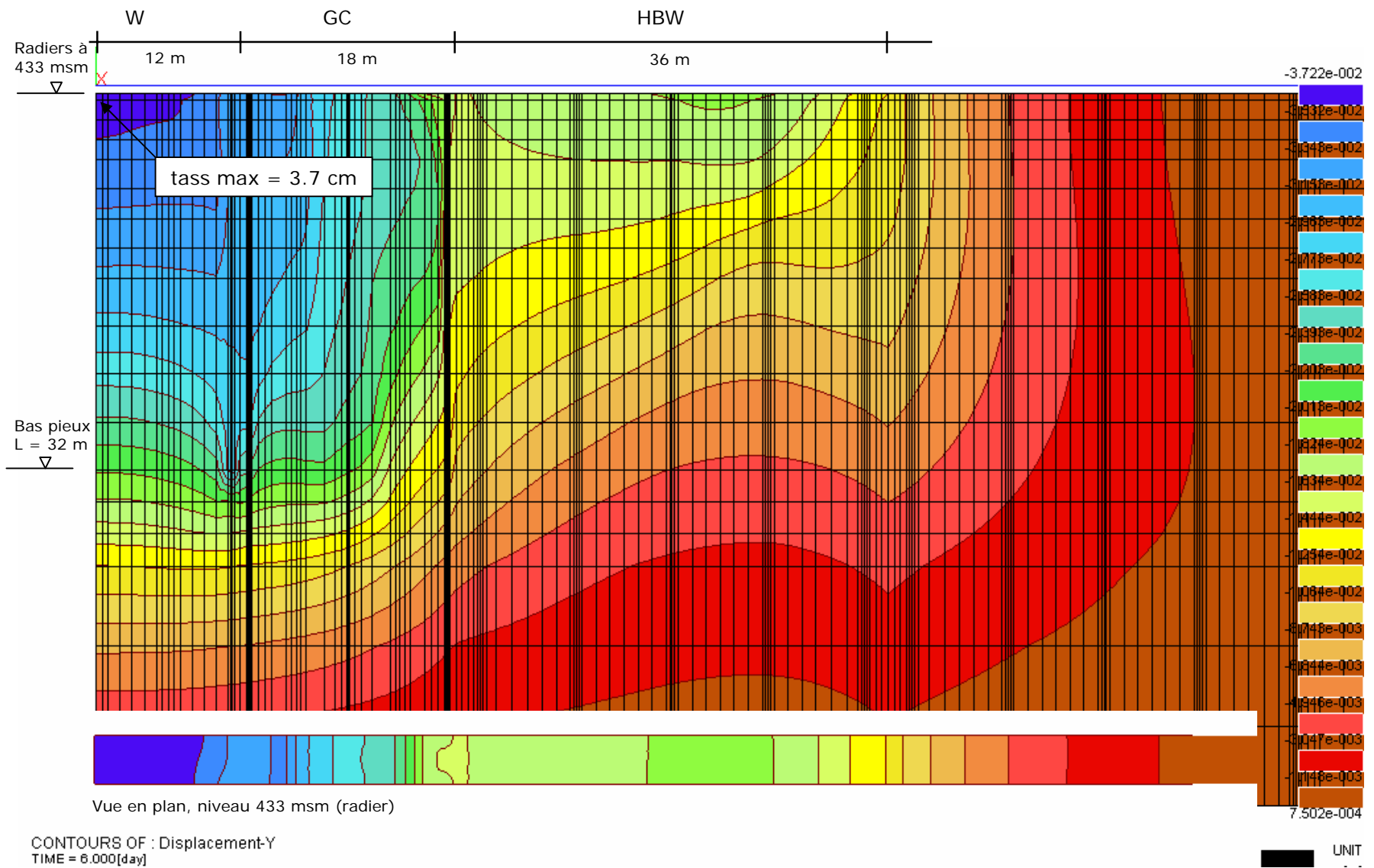




DEFORMED MESH
 TIME = 6.000[day]

Deformed mesh (x 100) under all the loads (pp + g + q)

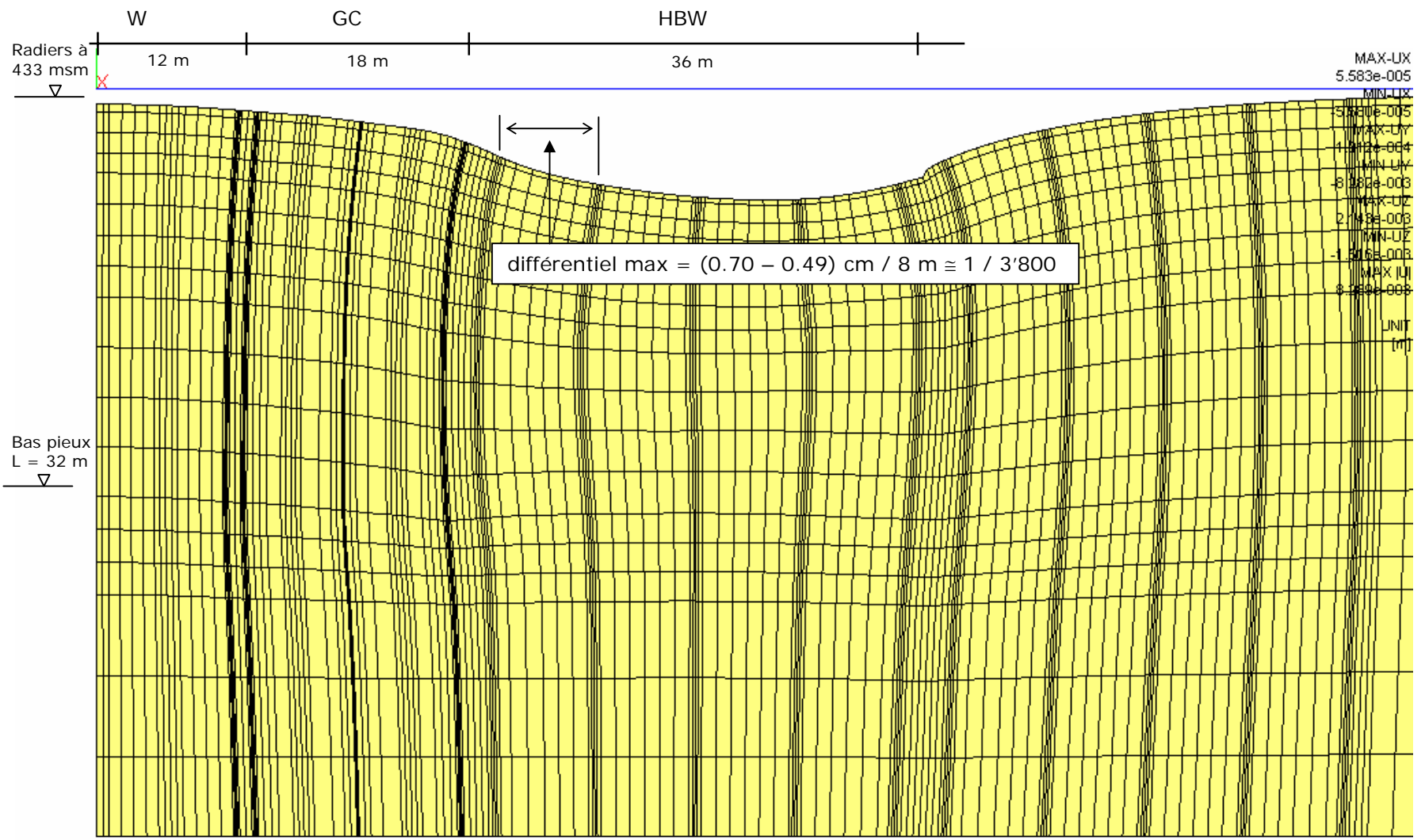




Vue en plan, niveau 433 msm (radier)

Annexe D2.2. Déplacements verticaux sous l'effet de toutes les charges (poids propre + g + q) GC avec pieux et Ex2 (recharge), HBW sans pieux et Ex4 (recharge)





DEFORMED MESH
 TIME-REF = 5.000[day] TIME = 6.000[day]

Deformed mesh (x 1000) under q HBW



cas	Hypothèses			Annexes	Tassements absolus		Tassements dus à q utile sur HBW	
	Workshop	GC	HBW		uy max [cm]	Diff. max. GC	Δ uy max [cm]	Diff. max. HBW
1	E, avec pieux	Ex2, avec pieux	Ex4, sans pieux	D2.1 - D2.4	3.7	1 / 420	0.21	1 / 3'800
2	E, avec pieux	Ex2, sans pieux	Ex4, sans pieux	D3.1 - D3.4	5.7	1 / 340	0.11	1 / 7'200
3	E, avec pieux	E, avec pieux	E, avec pieux	D4.1 - D4.4	5.5	1 / 420	0.39	1 / 2'050
4	E, avec pieux	E, avec pieux	E, sans pieux	D5.1 - D5.4	5.5	1 / 510	0.86	1 / 930

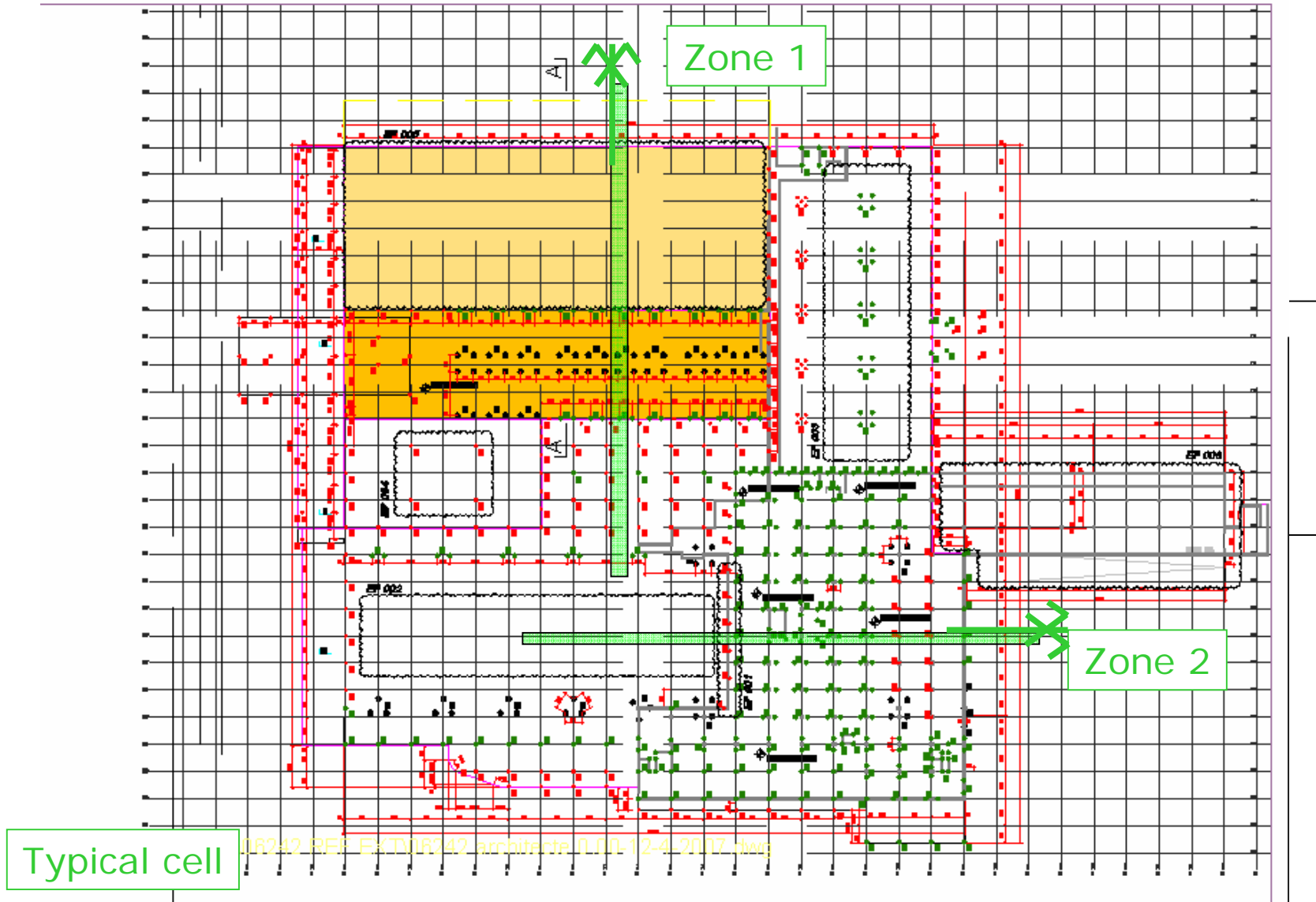
cas	Hypothèses			Annexes	Modules de réaction moyens Ks [kN/m3]			
	Workshop	GC	HBW		GC sol	GC pieux	HBW sol	HBW pieux
1	E, avec pieux	Ex2, avec pieux	Ex4, sans pieux	D2.1 - D2.4	500	80'000	3'000	-
2	E, avec pieux	Ex2, sans pieux	Ex4, sans pieux	D3.1 - D3.4	2500	-	2'500	-
3	E, avec pieux	E, avec pieux	E, avec pieux	D4.1 - D4.4	250	50'000	500	80'000
4	E, avec pieux	E, avec pieux	E, sans pieux	D5.1 - D5.4	250	50'000	1'000	-

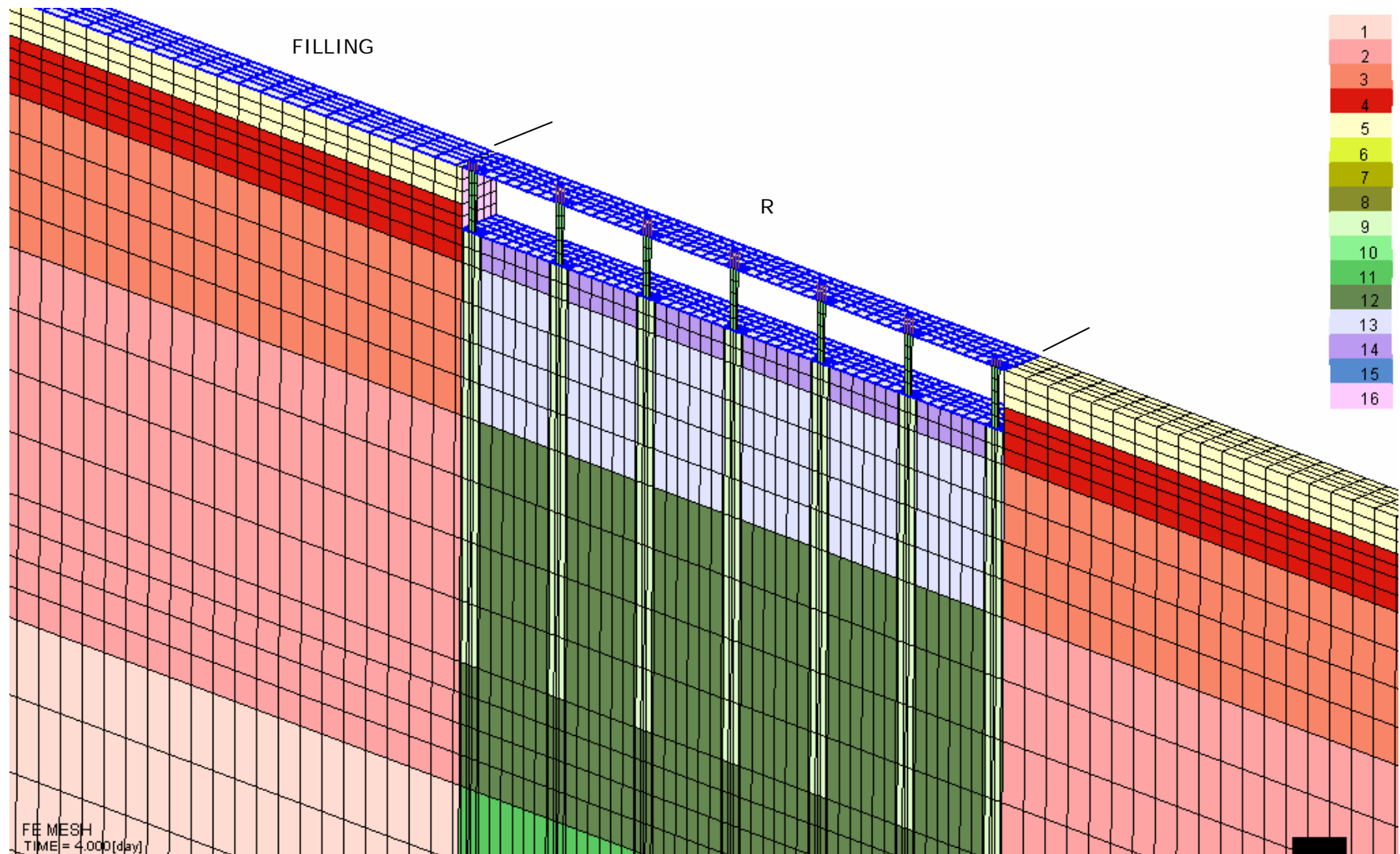


1. Settlement analysis on a representative slice

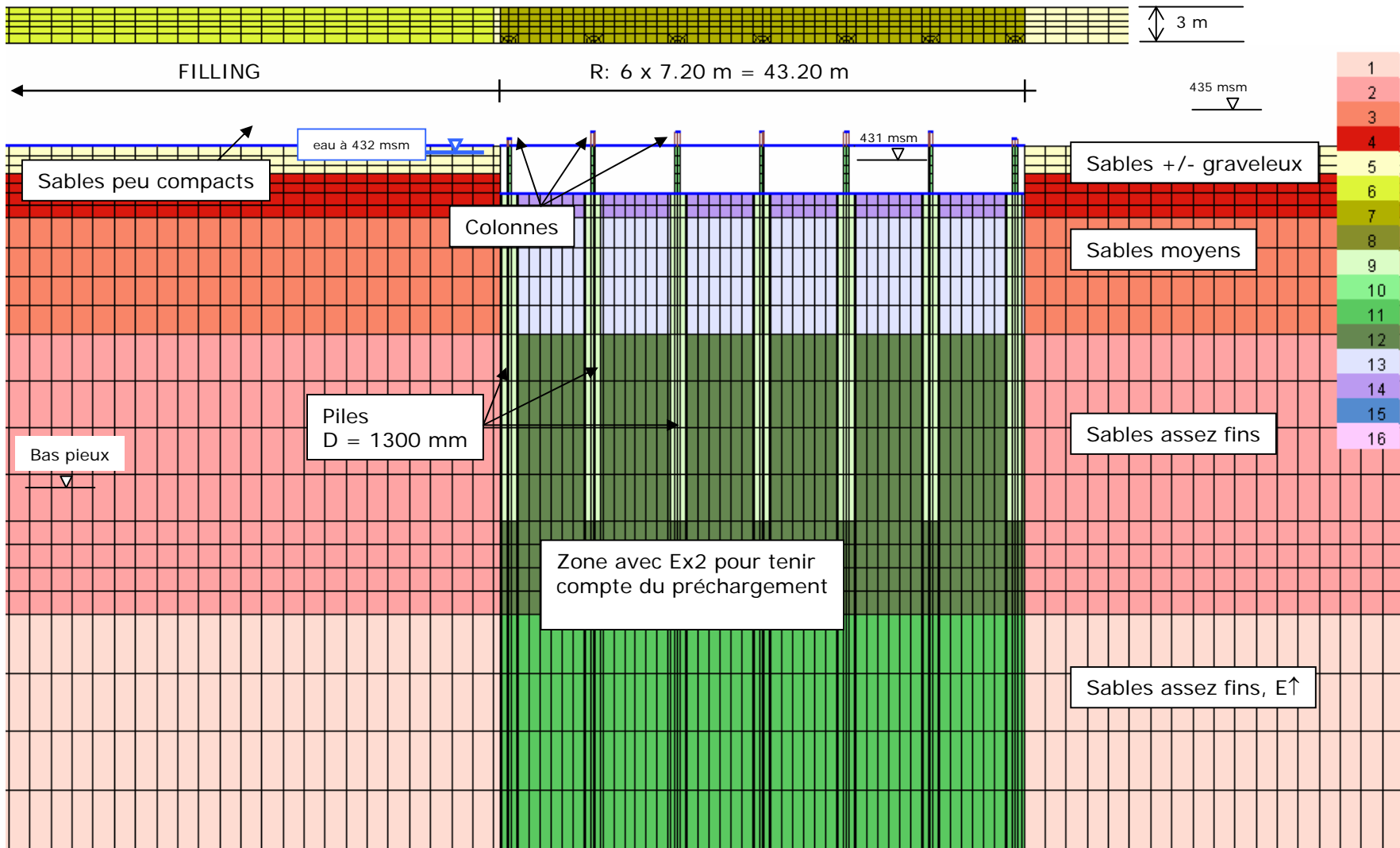
Zone 2







Vue aérienne de la demi bande de 3 m de largeur



FE MESH
TIME = 4.000[day]

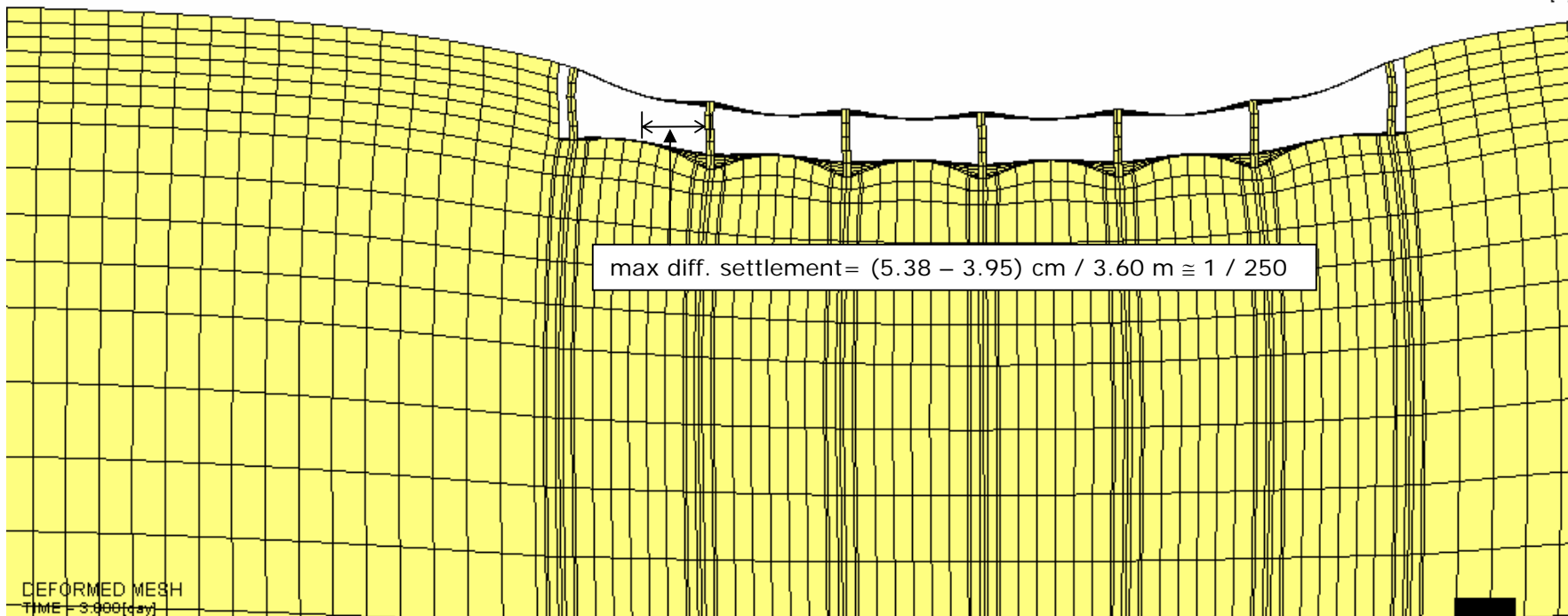
Mesh and materials



GEOMOD
Z_SOIL.PC DAY 2008

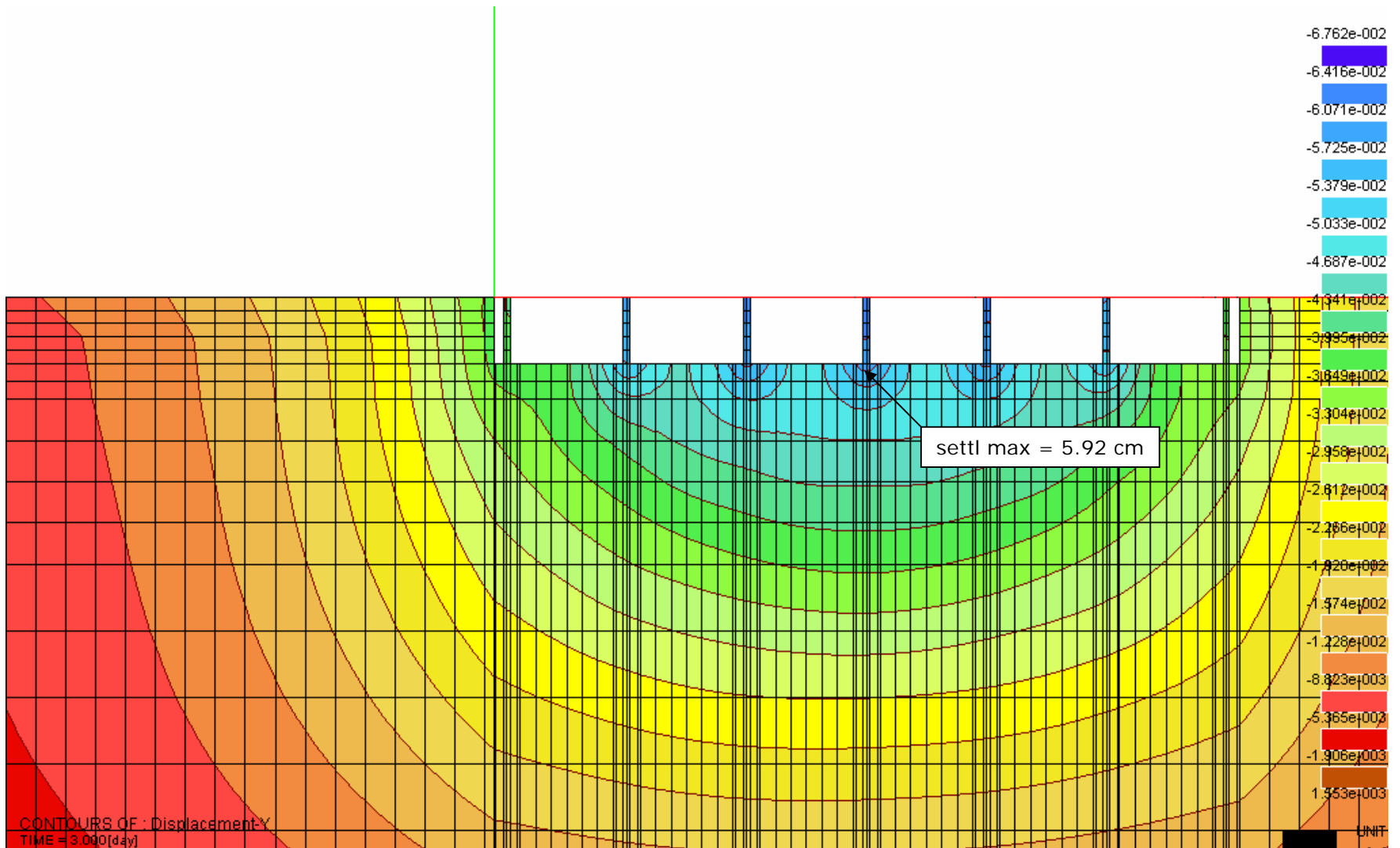
MAX-UX
1.046e-002
MIN-UX
-8.495e-003
MAX-UY
1.553e-003
MIN-UY
-6.762e-002
MAX-UZ
3.098e-005
MIN-UZ
-1.079e-003
MAX |U|
6.763e-002

UNIT
[m]



Deformed mesh (x 100) under all the loads (pp + g + q)





Settlements under all loads

