ALLEGATO C: *Verifiche di stabilità globale FASE 1: sistemazione al piede della discarica*

LISTATO DI CALCOLO - FASE 1

RICERCA SUPERFICIE CRITICA CIRCOLARE

Analisi di stabilità dei pendii con: JANBU (1956)

Lat./Long.	44.417087/9.129564
Normativa	NTC 2008
Numero di strati	4.0
Numero dei conci	25.0
Grado di sicurezza ritenuto accettabile	1.1
Coefficiente parziale resistenza	1.1
Analisi	Condizione drenata
Superficie di forma circolare	

Maglia dei Centri

Ascissa vertice sinistro inferiore xi	0.0 m
Ordinata vertice sinistro inferiore yi	80.0 m
Ascissa vertice destro superiore xs	160.0 m
Ordinata vertice destro superiore ys	350.0 m
Passo di ricerca	10.0
Numero di celle lungo x	20.0
Numero di celle lungo y	20.0

Coefficienti sismici [N.T.C.]

Dati generali

Tipo opera:	2 - Opere ordinarie
Classe d'uso:	Classe II
Vita nominale:	50.0 [anni]
Vita di riferimento:	50.0 [anni]

Parametri sismici su sito di riferimento

Categoria sottosuolo:	C
Categoria topografica:	T3

S.L. Stato limite	TR Tempo ritorno [anni]	ag [m/s²]	F0 [-]	TC* [sec]
S.L.O.	30.0	0.28	2.5	0.2
S.L.D.	50.0	0.35	2.55	0.22
S.L.V.	475.0	0.85	2.51	0.28
S.L.C.	975.0	1.13	2.48	0.29

Coefficienti sismici orizzontali e verticali

Opera: Stabilità dei pendii e Fondazioni

S.L. Stato limite	amax [m/s²]	beta [-]	kh [-]	kv [sec]
S.L.O.	0.504	0.2	0.0103	0.0051
S.L.D.	0.63	0.2	0.0128	0.0064
S.L.V.	1.53	0.2	0.0312	0.0156
S.L.C.	2.034	0.24	0.0498	0.0249

Coefficiente azione sismica orizzontale	0.031
Coefficiente azione sismica verticale	0.016

Vertici profilo

N	X m	y m
1	0.0	0.0
2	5.02	2.5
3	10.01	2.0
4	15.11	1.47
5	16.36	1.44
6	18.66	2.93
7	21.06	7.15
8	22.59	7.61
9	26.5	8.1
10	32.75	9.52
11	40.67	11.99
12	40.76	12.38
13	44.17	12.38
14	44.17	18.38
15	61.41	24.88
16	67.72	24.88
17	67.72	28.88
18	71.75	31.66
19	75.51	31.66
20	75.8	32.43
21	79.07	32.43
22	79.07	36.43
23	83.49	38.64
24	88.14	38.73
25	88.24	38.95
26	92.26	38.95
27	92.26	42.95
28	95.7	44.38
29	104.36	44.38
30	104.36	48.38
31	115.54	50.26
32	121.1	50.26
33	121.67	51.39
34	124.88	51.39
35	124.88	55.39
36	132.31	58.76
37	137.8	58.76
38	137.86	58.87
39	141.47	58.87
40	141.47	62.87
41	145.87	64.54
42	152.55	64.54
43	193.09	64.54
44	193.09	65.24
45	194.09	65.24
46	200.34	67.49
47	203.83	67.49
48	203.83	70.09
49	204.83	70.09
50	211.16	72.53
51	214.58	72.53
52	214.58	75.13
53	215.58	75.13
54	221.76	77.58
55	225.19	77.58
56	225.19	80.18
57	226.19	80.18
58	232.35	82.54
59	235.79	82.54

60	235.79	85.14
61	236.79	85.14
62	242.59	87.91
63	246.31	87.87
64	246.38	90.51
65	247.41	90.51
66	252.88	92.62
67	254.69	92.62
68	254.7	95.22
69	255.7	95.22
70	261.93	97.54
71	265.24	97.54
72	265.24	100.14
73	266.24	100.14
74	272.02	102.54
75	276.14	102.54
76	276.14	105.14
77	277.14	105.14
78	282.79	107.56
79	287.09	107.56
80	287.09	110.16
81	288.09	110.16
82	296.09	112.54
83	299.97	112.54
84	299.97	115.14
85	300.97	115.14
86	307.85	117.6
87	315.6	117.6
88	315.6	120.2
89	316.6	120.2
90	324.51	122.58
91	329.47	122.58
92	329.47	125.18
93	330.47	125.18
94	339.18	127.6
95	344.88	127.6
96	344.88	130.2
97	345.88	130.2
98	355.93	132.19
99	355.93	132.19
100	433.8	133.0 2

Falda

Nr.	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	10.01	2.0
4	15.11	1.47
5	16.36	1.44
6	18.66	2.93
7	20.45	6.09
8	102.78	20.1
9	102.8	20.1
10	159.6	43.29
11	159.6	43.29
12	239.69	73.41
13	264.1	78.29
14	294.34	93.97
15	330.58	113.29
16	330.6	113.29
17	363.07	118.29

18	363.1	118.29
19	414.23	131.4 5

Vertici strato 1

N	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	5.02	2.5
4	10.01	2.0
5	15.11	1.47
6	16.36	1.44
7	18.66	2.93
8	21.06	7.15
9	22.59	7.61
10	26.5	8.1
11	32.75	9.52
12	42.61	12.6
13	48.71	13.21
14	53.26	14.02
15	58.12	15.53
16	64.29	17.64
17	70.5	18.02
18	81.13	21.02
19	93.9	23.5
20	101.03	24.85
21	109.98	30.03
22	118.88	31.91
23	128.0	36.58
24	139.9	40.13
25	142.92	40.79
26	159.6	43.29
27	172.1	48.29
28	184.1	53.29
29	192.1	58.29
30	200.1	63.29
31	216.6	68.29
32	239.1	73.29
33	264.1	78.29
34	274.1	83.29
35	284.1	88.29
36	292.6	93.29
37	300.6	98.29
38	308.1	103.29
39	318.1	108.29
40	330.6	113.29
41	363.1	118.29
42	370.6	123.29
43	375.1	128.29
44	375.1	128.29
45	375.1	128.29
46	433.8	133.02
47	433.8	133.0 2

Vertici strato 2

N	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	5.02	2.5
4	10.01	2.0
5	15.11	1.47

6	16.36	1.44
7	18.66	2.93
8	19.56	4.52
9	22.25	5.7
10	66.68	13.34
11	100.36	19.1
12	118.09	19.1
13	161.53	39.47
14	200.09	51.87
15	224.02	63.38
16	261.26	69.58
17	289.18	80.21
18	310.9	95.71
19	344.58	107.22
20	376.94	110.76
21	433.8	116.0 5

ertici strato 3

N	X (m)	y (m)
1	0.0	-10.56
2	13.59	-7.3
3	29.81	-2.65
4	33.05	-1.72
5	39.85	0.02
6	54.66	2.02
7	70.5	4.15
8	87.26	6.45
9	90.23	7.38
10	93.4	8.38
11	96.57	9.37
12	100.79	10.7
13	108.18	13.01
14	111.13	14.19
15	115.57	15.33
16	117.58	15.96
17	119.26	16.49
18	124.31	18.08
19	127.17	18.98
20	131.46	20.67
21	138.89	23.6
22	144.47	25.8
23	150.88	28.32
24	155.61	30.19
25	163.73	33.38
26	171.63	36.49
27	179.77	39.7
28	185.34	41.9
29	192.38	44.67
30	194.63	45.56
31	202.06	48.48
32	207.37	50.36
33	212.01	51.32
34	216.59	52.5
35	222.0	53.88
36	224.95	55.07
37	226.44	55.02
38	230.89	56.16
39	236.44	57.58
40	243.1	59.29
41	251.98	61.57
42	265.52	65.03

43	273.41	67.06
44	277.44	68.18
45	285.22	71.4
46	299.4	77.28
47	308.54	81.07
48	314.66	83.6
49	327.98	89.12
50	334.95	91.81
51	377.91	98.27
52	396.1	101.0
53	414.03	103.62
54	433.8	106.1

Coefficienti parziali per i parametri geotecnici del terreno

Tangente angolo di resistenza al taglio	1.25
Coesione efficace	1.25
Coesione non drenata	1.4
Riduzione parametri geotecnici terreno	Si

Stratigrafia

c: coesione; cu: coesione non drenata; Fi: Angolo di attrito; G: Peso Specifico; Gs: Peso Specifico Saturo; K: Modulo di Winkler

Strato	c (kg/cm²)	cu (kg/cm²)	Fi (°)	G (Kg/m³)	Gs (Kg/m³)	K (Kg/cm³)	Litologia	
1	0.0383		29.6	1837	2063	0.00		
2	0		26.51	1695	1905	0.00		
3	0.3305		30.52	2402	2698	0.00		
4	0.4352		33.31	2402	2698	0.00		

Muri di sostegno - Caratteristiche geometriche

N°	x (m)	y (m)	Base mensola a valle (m)	Base mensola a monte (m)	Altezza muro (m)	Spessore testa (m)	Spessore base (m)	Peso specifico (Kg/m³)
1	44.17	12.38	0	0.1	6	2	4	2800
2	67.72	24.88	0	0.1	4	3	4	2800
3	79.07	32.43	0	0.1	4	3	4	2800
4	92.26	38.95	0	0.1	4	3	4	2800
5	104.36	44.38	0	0.1	4	3	4	2800
6	124.88	51.39	0	0.1	4	3	4	2800
7	141.47	58.87	0	0.1	4	3	4	280 0

Pali...

N°	x (m)	y (m)	Diametro (m)	Lunghezza (m)	Inclinazione (°)	Interasse (m)
1	41.06261	10.87895	0.2	6	90	3.6
2	43.08037	10.87895	0.2	6	90	3.6

Risultati analisi pendio [NTC 2008: [A2+M2+R2]]

Fs minimo individuato	1.07
Ascissa centro superficie	152.0 m
Ordinata centro superficie	350.0 m
Raggio superficie	284.58 m

Numero di superfici esaminate....(359)

N°	Xo	Yo	Ro	Fs
1	28.0	86.8	81.8	1.31
2	32.0	80.0	75.6	1.28

3	40.0	80.0	75.6	1.28
4	44.0	86.8	81.8	1.32
5	52.0	86.8	81.8	1.31
6	60.0	86.8	81.8	1.34
7	64.0	80.0	75.6	1.36
8	68.0	86.8	81.7	1.37
9	72.0	80.0	67.2	1.44
10	76.0	86.8	72.9	1.38
11	80.0	80.0	67.2	1.43
12	84.0	86.8	72.9	1.44
13	88.0	80.0	67.2	1.48
14	92.0	86.8	72.8	1.56
15	96.0	80.0	67.2	1.64
16	100.0	86.8	64.0	1.56
17	104.0	80.0	58.9	1.59
18	108.0	86.8	55.1	1.81
19	112.0	80.0	50.5	1.80
20	116.0	86.8	72.9	2.35
21	120.0	80.0	33.7	1.84
22	124.0	86.8	63.7	2.18
23	128.0	80.0	50.5	2.14
24	132.0	86.8	54.8	2.35
25	136.0	80.0	42.0	2.48
26	140.0	86.8	72.7	2.87
27	144.0	80.0	50.5	2.85
28	148.0	86.8	81.7	2.67
29	152.0	80.0	67.2	3.06
30	156.0	86.8	72.9	2.79
31	160.0	80.0	75.6	2.76
32	28.0	100.3	83.3	1.98
33	36.0	100.3	93.8	1.32
34	40.0	93.5	87.8	1.29
35	52.0	100.3	93.8	1.33
36	56.0	93.5	87.8	1.36
37	60.0	100.3	93.8	1.32
38	64.0	93.5	87.8	1.34
39	76.0	100.3	83.4	1.27
40	80.0	93.5	78.0	1.38
41	84.0	100.3	83.4	1.41
42	88.0	93.5	78.2	1.46
43	92.0	100.3	83.4	1.49
44	96.0	93.5	68.5	1.56
45	100.0	100.3	93.8	2.06
46	104.0	93.5	58.9	1.85
47	112.0	93.5	78.1	2.19
48	116.0	100.3	73.0	1.88
49	120.0	93.5	68.5	2.07
50	124.0	100.3	73.0	2.24
51	128.0	93.5	49.2	2.25
52	132.0	100.3	52.2	2.86
53	136.0	93.5	87.8	2.66
54	140.0	100.3	62.6	2.68
55	144.0	93.5	58.9	2.91
56	148.0	100.3	93.8	2.45
57	152.0	93.5	87.8	2.51
58	156.0	100.3	83.4	2.66
59	160.0	93.5	68.3	2.78
60	24.0	107.0	98.7	1.24
61	28.0	113.8	105.6	1.20
62	32.0	107.0	100.0	1.30
63	44.0	113.8	94.4	1.55
64	48.0	107.0	100.0	1.32
65	52.0	113.8	106.1	1.33

66	56.0	107.0	100.0	1.33
67	60.0	113.8	106.1	1.34
68	64.0	107.0	100.0	1.34
69	68.0	113.8	94.4	1.34
70	72.0	107.0	88.9	1.30
71	76.0	113.8	94.4	1.33
72	80.0	107.0	88.8	1.33
73	84.0	113.8	94.4	1.39
74	88.0	107.0	88.9	1.41
75	96.0	107.0	100.0	2.03
76	100.0	113.8	106.1	2.09
77	104.0	107.0	99.9	2.19
78	108.0	113.8	106.1	2.25
79	112.0	107.0	66.8	2.02
80	116.0	113.8	82.8	2.05
81	120.0	107.0	77.9	2.03
82	132.0	113.8	106.1	2.40
83	136.0	107.0	100.0	2.48
84	140.0	113.8	106.1	2.35
85	144.0	107.0	77.9	2.87
86	148.0	113.8	71.1	3.63
87	152.0	107.0	100.0	2.35
88	156.0	113.8	106.1	2.26
89	160.0	107.0	100.0	2.28
90	36.0	127.3	118.2	1.30
91	40.0	120.5	112.1	1.33
92	48.0	120.5	99.7	1.60
93	52.0	127.3	118.2	1.33
94	56.0	120.5	99.7	1.51
95	60.0	127.3	118.2	1.35
96	68.0	127.3	105.0	1.49
97	72.0	120.5	99.7	1.40
98	76.0	127.3	105.1	1.46
99	80.0	120.5	99.6	1.40
100	92.0	127.3	118.2	1.96
101	100.0	127.3	92.0	1.93
102	104.0	120.5	87.2	1.93
103	108.0	127.3	105.1	1.84
104	112.0	120.5	99.7	1.91
105	116.0	127.3	105.1	2.09
106	124.0	127.3	78.9	2.67
107	128.0	120.5	74.8	2.60
108	132.0	127.3	92.0	2.41
109	136.0	120.5	112.1	2.30
110	140.0	127.3	118.2	2.23
111	144.0	120.5	74.8	3.98
112	156.0	127.3	118.2	2.13
113	160.0	120.5	99.7	2.25
114	32.0	134.0	110.6	2.32
115	44.0	140.8	130.4	1.30
116	48.0	134.0	124.4	1.33
117	52.0	140.8	131.0	1.35
118	56.0	134.0	124.4	1.36
119	64.0	134.0	110.8	1.53
120	76.0	140.8	102.7	15.22
121	88.0	134.0	97.1	1.95
122	92.0	140.8	130.4	1.97
123	96.0	134.0	97.1	1.97
124	100.0	140.8	116.3	1.70
125	104.0	134.0	110.7	1.80
126	108.0	140.8	116.3	1.91
127	112.0	134.0	110.8	1.98
128	116.0	140.8	130.3	2.25

129	120.0	134.0	124.4	2.26
130	124.0	140.8	101.9	2.61
131	128.0	134.0	97.1	2.49
132	132.0	140.8	116.2	2.35
133	136.0	134.0	124.4	2.18
134	140.0	140.8	116.3	2.30
135	144.0	134.0	124.4	2.15
136	152.0	134.0	97.1	2.19
137	156.0	140.8	103.9	2.16
138	160.0	134.0	124.4	2.06
139	32.0	147.5	123.4	2.38
140	36.0	154.3	128.5	2.98
141	40.0	147.5	136.9	1.24
142	72.0	147.5	106.3	4.56
143	92.0	154.3	126.9	1.73
144	96.0	147.5	121.7	1.74
145	100.0	154.3	127.4	1.82
146	104.0	147.5	121.5	1.80
147	108.0	154.3	142.7	2.12
148	112.0	147.5	122.5	1.99
149	116.0	154.3	143.0	2.13
150	128.0	147.5	91.7	4.59
151	132.0	154.3	127.8	2.25
152	136.0	147.5	136.4	2.11
153	140.0	154.3	142.4	2.05
154	144.0	147.5	136.5	2.05
155	148.0	154.3	112.4	2.20
156	152.0	147.5	108.9	2.12
157	156.0	154.3	114.8	1.92
158	160.0	147.5	137.2	1.95
159	68.0	167.8	137.7	1.76
160	76.0	167.8	137.7	1.77
161	80.0	161.0	132.1	1.75
162	84.0	167.8	138.0	1.85
163	88.0	161.0	133.2	1.73
164	92.0	167.8	154.8	1.97
165	96.0	161.0	132.4	1.86
166	104.0	161.0	148.7	2.12
167	108.0	167.8	154.8	2.06
168	112.0	161.0	148.8	2.13
169	116.0	167.8	154.9	2.06
170	124.0	167.8	137.9	1.99
171	128.0	161.0	132.3	2.11
172	132.0	167.8	138.4	2.15
173	136.0	161.0	133.3	2.16
174	140.0	167.8	154.9	1.97
175	144.0	161.0	115.7	2.79
176	148.0	167.8	103.7	18.00
177	152.0	161.0	117.9	2.01
178	156.0	167.8	139.2	1.93
179	160.0	161.0	119.9	1.82
180	4.0	181.3	167.3	2.43
181	44.0	181.3	148.5	3.81
182	84.0	181.3	167.0	1.76
183	96.0	174.5	160.9	2.03
184	100.0	181.3	167.3	2.06
185	108.0	181.3	166.9	2.04
186	112.0	174.5	161.0	2.06
187	116.0	181.3	148.9	1.97
188	120.0	174.5	143.5	2.02
189	124.0	181.3	148.7	2.02
190	128.0	174.5	143.0	1.94
191	136.0	174.5	126.8	3.49

192	140.0	181.3	167.0	1.88
193	148.0	181.3	149.0	1.86
194	152.0	174.5	143.3	1.89
195	160.0	174.5	144.8	1.90
196	4.0	194.8	179.5	7.00
197	48.0	188.0	154.1	4.25
198	80.0	188.0	172.9	1.70
199	84.0	194.8	178.9	1.70
200	88.0	188.0	173.3	1.91
201	92.0	194.8	179.1	1.97
202	96.0	188.0	173.0	2.01
203	100.0	194.8	140.9	3.07
204	104.0	188.0	173.0	2.00
205	108.0	194.8	179.1	1.97
206	112.0	188.0	173.4	1.93
207	116.0	194.8	161.0	1.97
208	120.0	188.0	154.2	2.01
209	136.0	188.0	173.0	1.89
210	140.0	194.8	179.2	1.87
211	144.0	188.0	153.8	1.84
212	148.0	194.8	160.0	1.78
213	152.0	188.0	154.2	1.84
214	156.0	194.8	139.7	2.52
215	160.0	188.0	135.7	1.95
216	60.0	208.3	171.8	6.32
217	76.0	208.3	191.6	1.60
218	80.0	201.5	164.6	2.13
219	84.0	208.3	191.3	1.65
220	88.0	201.5	185.2	1.83
221	92.0	208.3	191.3	1.90
222	96.0	201.5	185.1	1.98
223	100.0	208.3	191.6	1.92
224	104.0	201.5	185.2	1.95
225	108.0	208.3	191.2	1.92
226	120.0	201.5	145.9	5.24
227	136.0	201.5	185.3	1.83
228	140.0	208.3	170.2	1.69
229	144.0	201.5	164.5	1.67
230	152.0	201.5	146.4	2.80
231	28.0	221.8	203.0	1.56
232	36.0	221.8	203.2	1.51
233	68.0	221.8	203.4	1.48
234	72.0	215.0	197.3	1.52
235	76.0	221.8	203.7	1.60
236	96.0	215.0	197.3	1.95
237	108.0	221.8	203.3	1.86
238	112.0	215.0	197.7	1.88
239	116.0	221.8	160.9	4.16
240	124.0	221.8	181.2	2.10
241	128.0	215.0	175.4	1.85
242	140.0	221.8	203.4	1.75
243	144.0	215.0	197.2	1.76
244	148.0	221.8	158.3	11.83
245	40.0	228.5	209.4	1.54
246	44.0	235.3	215.5	1.59
247	48.0	228.5	209.5	1.51
248	52.0	235.3	215.9	1.54
249	56.0	228.5	210.3	1.48
250	60.0	235.3	216.4	1.53
251	64.0	228.5	187.3	6.57
252	80.0	228.5	209.4	1.60
253	84.0	235.3	215.6	1.58
254	88.0	228.5	209.7	1.66

255	92.0	235.3	215.5	1.76
256	96.0	228.5	209.4	1.80
257	100.0	235.3	215.9	1.82
258	104.0	228.5	209.5	1.82
259	116.0	235.3	193.3	2.40
260	120.0	228.5	187.4	2.24
261	132.0	235.3	215.8	1.74
262	136.0	228.5	165.0	8.74
263	148.0	235.3	191.8	1.45
264	156.0	235.3	192.1	1.38
265	160.0	228.5	187.9	1.53
266	4.0	248.8	228.1	2.96
267	44.0	248.8	227.6	1.66
268	48.0	242.0	221.6	1.58
269	56.0	242.0	222.4	1.54
270	64.0	242.0	222.0	1.56
271	72.0	242.0	221.6	1.55
272	80.0	242.0	221.6	1.62
273	92.0	248.8	227.8	1.76
274	96.0	242.0	221.5	1.79
275	132.0	248.8	227.9	1.68
276	136.0	242.0	222.2	1.68
277	140.0	248.8	203.0	1.50
278	144.0	242.0	196.8	1.50
279	148.0	248.8	203.0	1.42
280	152.0	242.0	197.2	1.43
281	156.0	248.8	202.4	1.35
282	160.0	242.0	197.8	1.38
283	48.0	255.5	233.7	1.67
284	64.0	255.5	234.2	1.62
285	68.0	262.3	239.9	1.63
286	76.0	262.3	240.2	1.63
287	84.0	262.3	239.8	1.59
288	88.0	255.5	234.2	1.54
289	92.0	262.3	213.6	11.42
290	108.0	262.3	213.2	3.50
291	124.0	262.3	240.0	1.68
292	128.0	255.5	233.6	1.68
293	132.0	262.3	240.1	1.65
294	136.0	255.5	209.2	1.60
295	140.0	262.3	213.8	1.56
296	144.0	255.5	207.6	1.48
297	152.0	255.5	209.1	1.38
298	60.0	275.8	252.9	1.75
299	72.0	269.0	245.8	1.61
300	76.0	275.8	224.8	3.63
301	120.0	269.0	219.9	2.62
302	136.0	269.0	220.0	1.65
303	16.0	282.5	257.7	3.84
304	76.0	289.3	235.6	5.37
305	120.0	282.5	258.6	1.61
306	124.0	289.3	264.3	1.61
307	128.0	282.5	257.9	1.62
308	160.0	282.5	258.8	1.69
309	0.0	296.0	271.1	3.53
310	32.0	296.0	269.4	1.89
311	108.0	302.8	276.1	1.62
312	112.0	296.0	270.4	1.61
313	124.0	302.8	276.5	1.57
314	128.0	296.0	240.0	6.57
315	132.0	302.8	246.2	1.94
316	140.0	302.8	246.3	1.55
317	144.0	296.0	240.1	1.45

318	148.0	302.8	246.1	1.37
319	152.0	296.0	241.5	1.29
320	156.0	302.8	247.7	1.25
321	160.0	296.0	242.8	1.17
322	40.0	309.5	281.5	1.96
323	44.0	316.3	287.6	2.01
324	100.0	316.3	288.7	1.54
325	104.0	309.5	282.5	1.55
326	108.0	316.3	288.2	1.54
327	112.0	309.5	282.2	1.55
328	116.0	316.3	288.5	1.55
329	120.0	309.5	283.0	1.58
330	136.0	309.5	252.4	1.67
331	156.0	316.3	289.4	1.66
332	160.0	309.5	253.9	1.15
333	12.0	329.8	300.5	3.67
334	48.0	323.0	294.0	2.06
335	52.0	329.8	300.9	2.09
336	68.0	329.8	300.7	1.76
337	76.0	329.8	300.8	1.55
338	84.0	329.8	300.5	1.48
339	96.0	323.0	294.3	1.43
340	100.0	329.8	300.8	1.52
341	104.0	323.0	294.7	1.52
342	112.0	323.0	294.6	1.53
343	160.0	323.0	295.8	1.69
344	56.0	336.5	307.4	2.10
345	64.0	336.5	307.2	1.89
346	68.0	343.3	312.9	1.83
347	72.0	336.5	306.5	1.69
348	76.0	343.3	313.0	1.57
349	80.0	336.5	306.7	1.48
350	84.0	343.3	312.6	1.39
351	88.0	336.5	307.0	1.49
352	96.0	336.5	306.5	1.39
353	144.0	336.5	306.5	1.61
354	148.0	343.3	278.4	5.28
355	152.0	336.5	307.2	1.62
356	156.0	343.3	313.6	1.65
357	160.0	336.5	308.0	1.65
358	136.0	350.0	284.7	2.96
359	152.0	350.0	284.6	1.07

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CARICO LIMITE PALI ESISTENTI ALLA BASE

xc = 28.00 yc = 86.75 Rc = 81.835 Fs=1.3073
Micropali Fondazione x=41.06261 Y=10.87895 Plim=71.1 Kg Sbalzo del palo 6.18 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=71.1 Kg Sbalzo del palo 6.18 m

xc = 32.00 yc = 80.00 Rc = 75.619 Fs=1.2784
Micropali Fondazione x=41.06261 Y=10.87895 Plim=3580.0 Kg Sbalzo del palo 7.27 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=3580.0 Kg Sbalzo del palo 7.27 m

xc = 40.00 yc = 80.00 Rc = 75.619 Fs=1.2838
Micropali Fondazione x=41.06261 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m

xc = 44.00 yc = 86.75 Rc = 81.754 Fs=1.3181
Micropali Fondazione x=41.06261 Y=10.87895 Plim=4131.2 Kg Sbalzo del palo 7.37 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=4131.2 Kg Sbalzo del palo 7.37 m

xc = 52.00 yc = 86.75 Rc = 81.835 Fs=1.3102
Micropali Fondazione x=41.06261 Y=10.87895 Plim=1803.8 Kg Sbalzo del palo 6.90 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=1803.8 Kg Sbalzo del palo 6.90 m

xc = 36.00 yc = 100.25 Rc = 93.835 Fs=1.3156
Micropali Fondazione x=41.06261 Y=10.87895 Plim=146.5 Kg Sbalzo del palo 5.74 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=146.5 Kg Sbalzo del palo 5.74 m

xc = 40.00 yc = 93.50 Rc = 87.838 Fs=1.2917
Micropali Fondazione x=41.06261 Y=10.87895 Plim=1029.9 Kg Sbalzo del palo 6.68 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=1029.9 Kg Sbalzo del palo 6.68 m

xc = 52.00 yc = 100.25 Rc = 93.835 Fs=1.3286
Micropali Fondazione x=41.06261 Y=10.87895 Plim=606.6 Kg Sbalzo del palo 5.48 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=606.6 Kg Sbalzo del palo 5.48 m

xc = 60.00 yc = 100.25 Rc = 93.835 Fs=1.3204
Micropali Fondazione x=41.06261 Y=10.87895 Plim=3615.7 Kg Sbalzo del palo 4.31 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=3615.7 Kg Sbalzo del palo 4.31 m

xc = 76.00 yc = 100.25 Rc = 83.42 Fs=1.2662
Micropali Fondazione x=41.06261 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m

xc = 24.00 yc = 107.00 Rc = 98.749 Fs=1.2383
Micropali Fondazione x=41.06261 Y=10.87895 Plim=5056.0 Kg Sbalzo del palo 2.39 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=5056.0 Kg Sbalzo del palo 2.39 m

xc = 28.00 yc = 113.75 Rc = 105.552 Fs=1.1991
Micropali Fondazione x=41.06261 Y=10.87895 Plim=5056.0 Kg Sbalzo del palo 3.19 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=5056.0 Kg Sbalzo del palo 3.19 m

xc = 32.00 yc = 107.00 Rc = 99.956 Fs=1.2983
Micropali Fondazione x=41.06261 Y=10.87895 Plim=3184.7 Kg Sbalzo del palo 4.78 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=3184.7 Kg Sbalzo del palo 4.78 m

xc = 48.00 yc = 107.00 Rc = 99.956 Fs=1.3241
Micropali Fondazione x=41.06261 Y=10.87895 Plim=1483.3 Kg Sbalzo del palo 5.18 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=1483.3 Kg Sbalzo del palo 5.18 m

xc = 52.00 yc = 113.75 Rc = 106.096 Fs=1.3253
Micropali Fondazione x=41.06261 Y=10.87895 Plim=3637.5 Kg Sbalzo del palo 4.29 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=3637.5 Kg Sbalzo del palo 4.29 m

xc = 56.00 yc = 107.00 Rc = 99.956 Fs=1.3344
Micropali Fondazione x=41.06261 Y=10.87895 Plim=3462.1 Kg Sbalzo del palo 4.41 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=3462.1 Kg Sbalzo del palo 4.41 m

xc = 72.00 yc = 107.00 Rc = 88.912 Fs=1.2964
Micropali Fondazione x=41.06261 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m

xc = 76.00 yc = 113.75 Rc = 94.441 Fs=1.3305
Micropali Fondazione x=41.06261 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m

xc = 80.00 yc = 107.00 Rc = 88.80 Fs=1.3308
Micropali Fondazione x=41.06261 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m

xc = 36.00 yc = 127.25 Rc = 118.16 Fs=1.2953
Micropali Fondazione x=41.06261 Y=10.87895 Plim=5056.0 Kg Sbalzo del palo 3.11 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=5056.0 Kg Sbalzo del palo 3.11 m

xc = 40.00 yc = 120.50 Rc = 112.08 Fs=1.3346
Micropali Fondazione x=41.06261 Y=10.87895 Plim=4380.2 Kg Sbalzo del palo 3.93 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=4380.2 Kg Sbalzo del palo 3.93 m

xc = 52.00 yc = 127.25 Rc = 118.16 Fs=1.3281
Micropali Fondazione x=41.06261 Y=10.87895 Plim=5056.0 Kg Sbalzo del palo 2.92 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=5056.0 Kg Sbalzo del palo 2.92 m

xc = 44.00 yc = 140.75 Rc = 130.399 Fs=1.3033
Micropali Fondazione x=41.06261 Y=10.87895 Plim=5056.0 Kg Sbalzo del palo 2.02 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=5056.0 Kg Sbalzo del palo 2.02 m

xc = 48.00 yc = 134.00 Rc = 124.381 Fs=1.3291
Micropali Fondazione x=41.06261 Y=10.87895 Plim=5056.0 Kg Sbalzo del palo 2.64 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=5056.0 Kg Sbalzo del palo 2.64 m

xc = 40.00 yc = 147.50 Rc = 136.879 Fs=1.2386
Micropali Fondazione x=41.06261 Y=10.87895 Plim=5056.0 Kg Sbalzo del palo 1.74 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=5056.0 Kg Sbalzo del palo 1.74 m

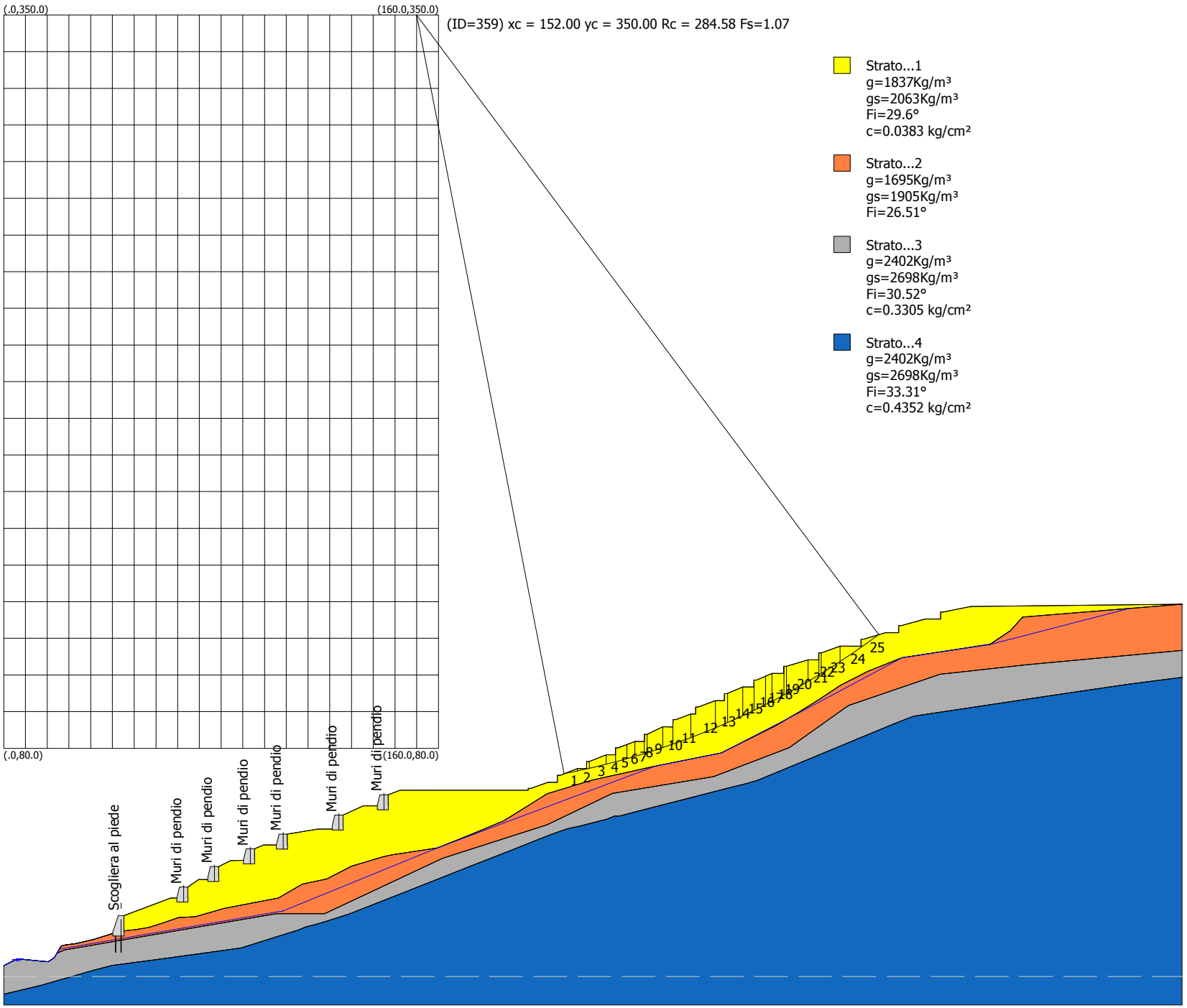
xc = 152.00 yc = 296.00 Rc = 241.513 Fs=1.2851
Micropali Fondazione x=41.06261 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m

xc = 156.00 yc = 302.75 Rc = 247.696 Fs=1.252
Micropali Fondazione x=41.06261 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m

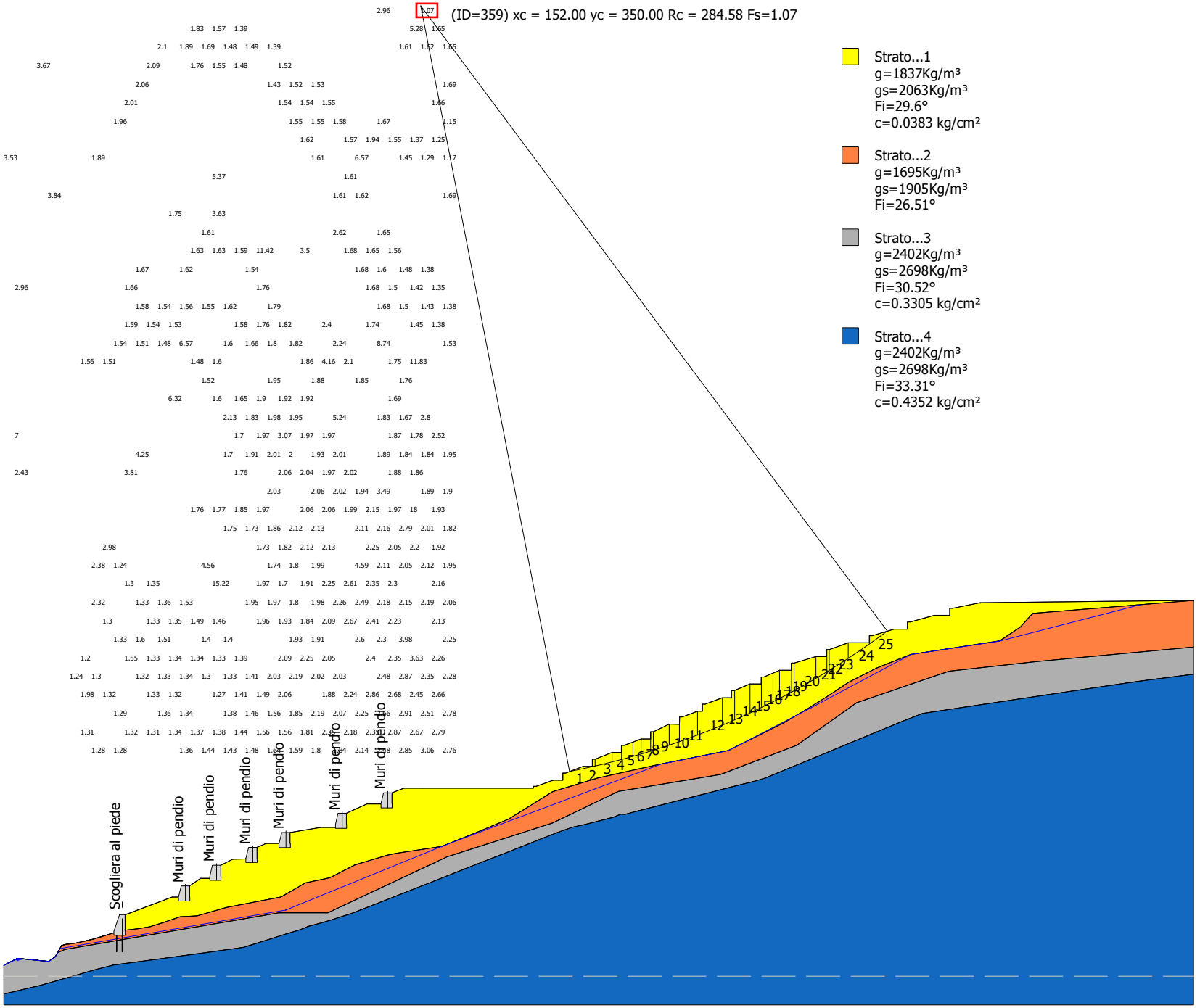
xc = 160.00 yc = 296.00 Rc = 242.821 Fs=1.1696
Micropali Fondazione x=41.06261 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m

xc = 160.00 yc = 309.50 Rc = 253.879 Fs=1.1467
Micropali Fondazione x=41.06261 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m

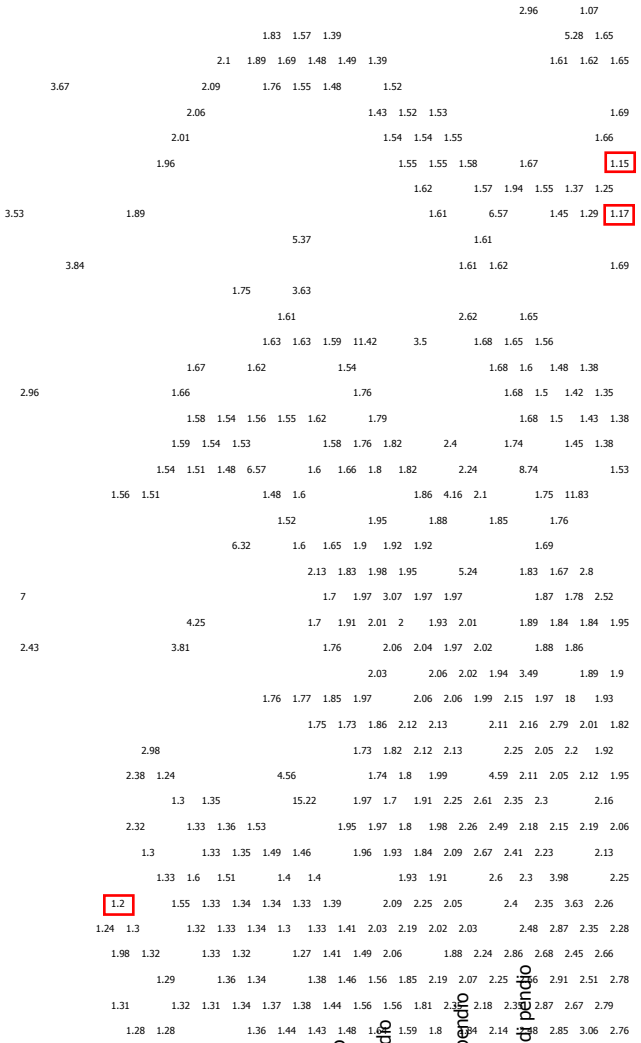
xc = 152.00 yc = 350.00 Rc = 284.578 Fs=1.0687
Micropali Fondazione x=41.06261 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m


(.0,350.0)
(160.0,350.0)
(ID=359) xc = 152.00 yc = 350.00 Rc = 284.58 Fs=1.07
Strato...1
g=1837Kg/m³
gs=2063Kg/m³
Fi=29.6°
c=0.0383 kg/cm²
Strato...2
g=1695Kg/m³
gs=1905Kg/m³
Fi=26.51°
Strato...3
g=2402Kg/m³
gs=2698Kg/m³
Fi=30.52°
c=0.3305 kg/cm²
Strato...4
g=2402Kg/m³
gs=2698Kg/m³
Fi=33.31°
c=0.4352 kg/cm²
(.0,80.0)
(160.0,80.0)
Scogliera al piede
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

SUPERFICIE A FATTORE MINIMO FS=1.07



SUPERFICI FATTORE FS>1.1 - FS (1.1-1.2)

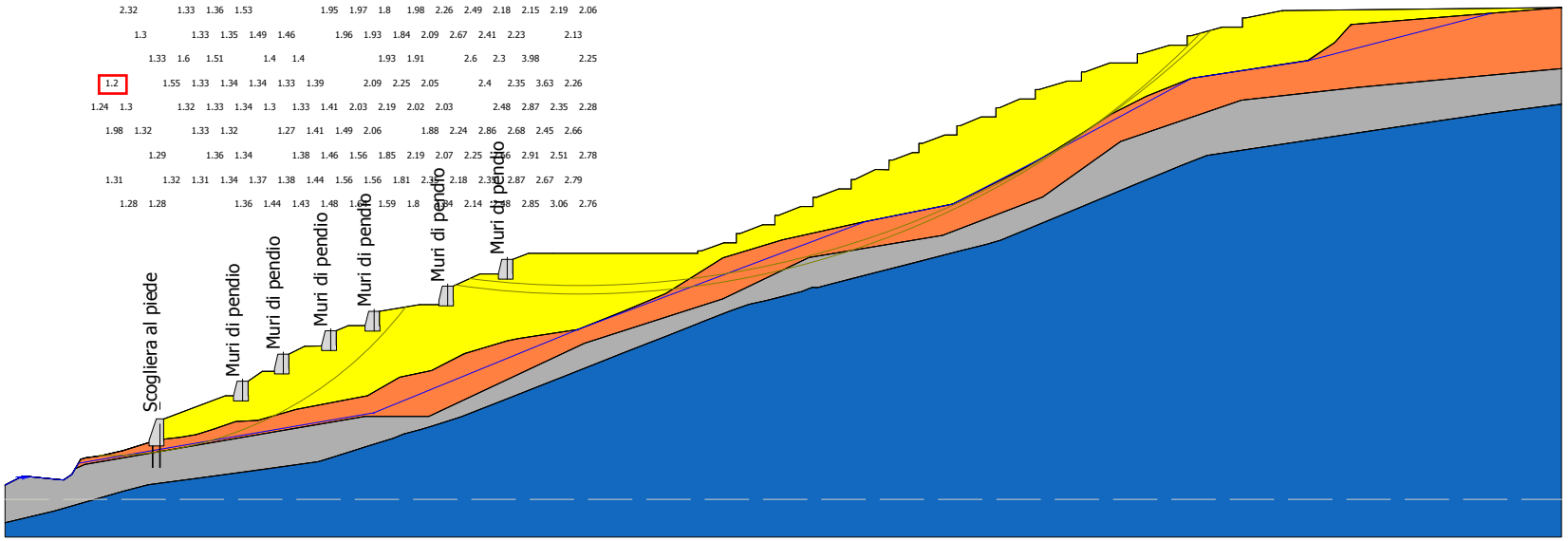


Strato...1
g=1837Kg/m³
gs=2063Kg/m³
Fi=29.6°
c=0.0383 kg/cm²

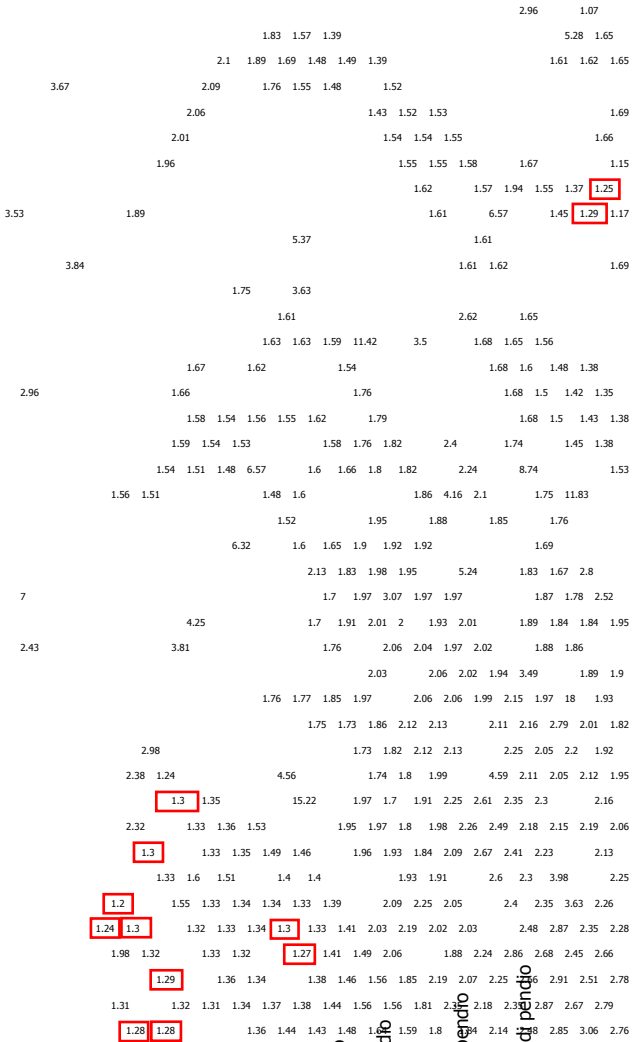
Strato...2
g=1695Kg/m³
gs=1905Kg/m³
Fi=26.51°

Strato...3
g=2402Kg/m³
gs=2698Kg/m³
Fi=30.52°
c=0.3305 kg/cm²

Strato...4
g=2402Kg/m³
gs=2698Kg/m³
Fi=33.31°
c=0.4352 kg/cm²



SUPERFICI FATTORE FS>1.1 - FS (1.2-1.3)

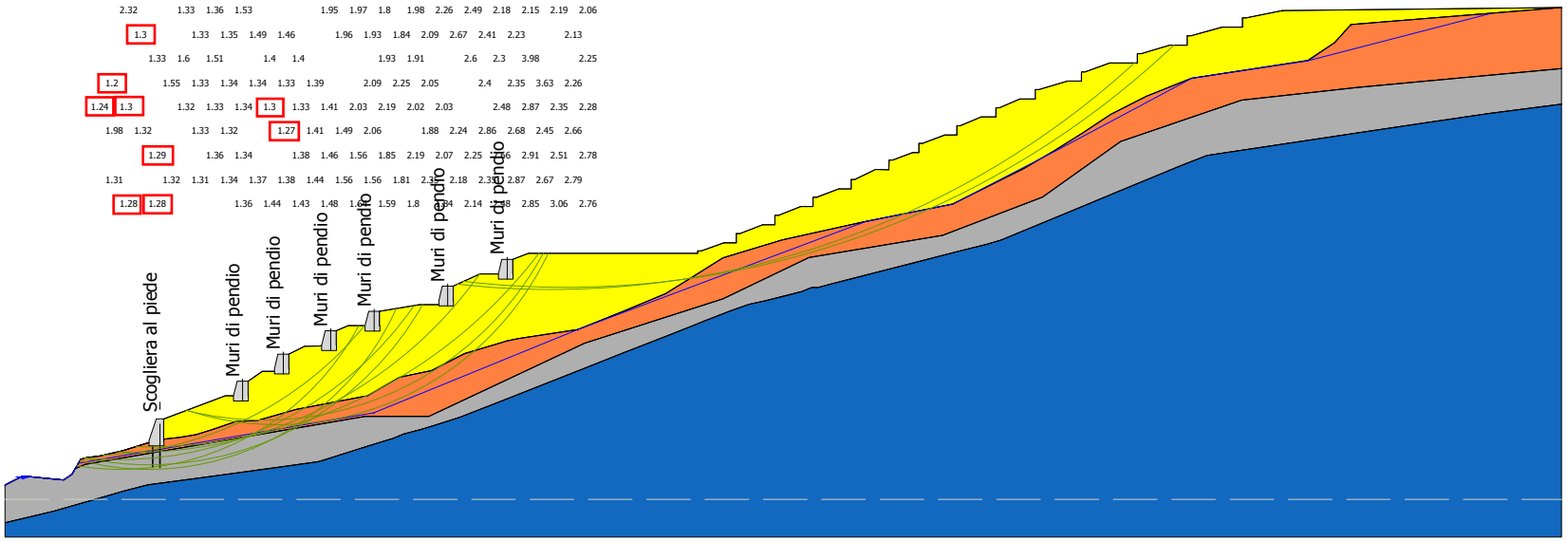


Strato...1
g=1837Kg/m³
gs=2063Kg/m³
Fi=29.6°
c=0.0383 kg/cm²

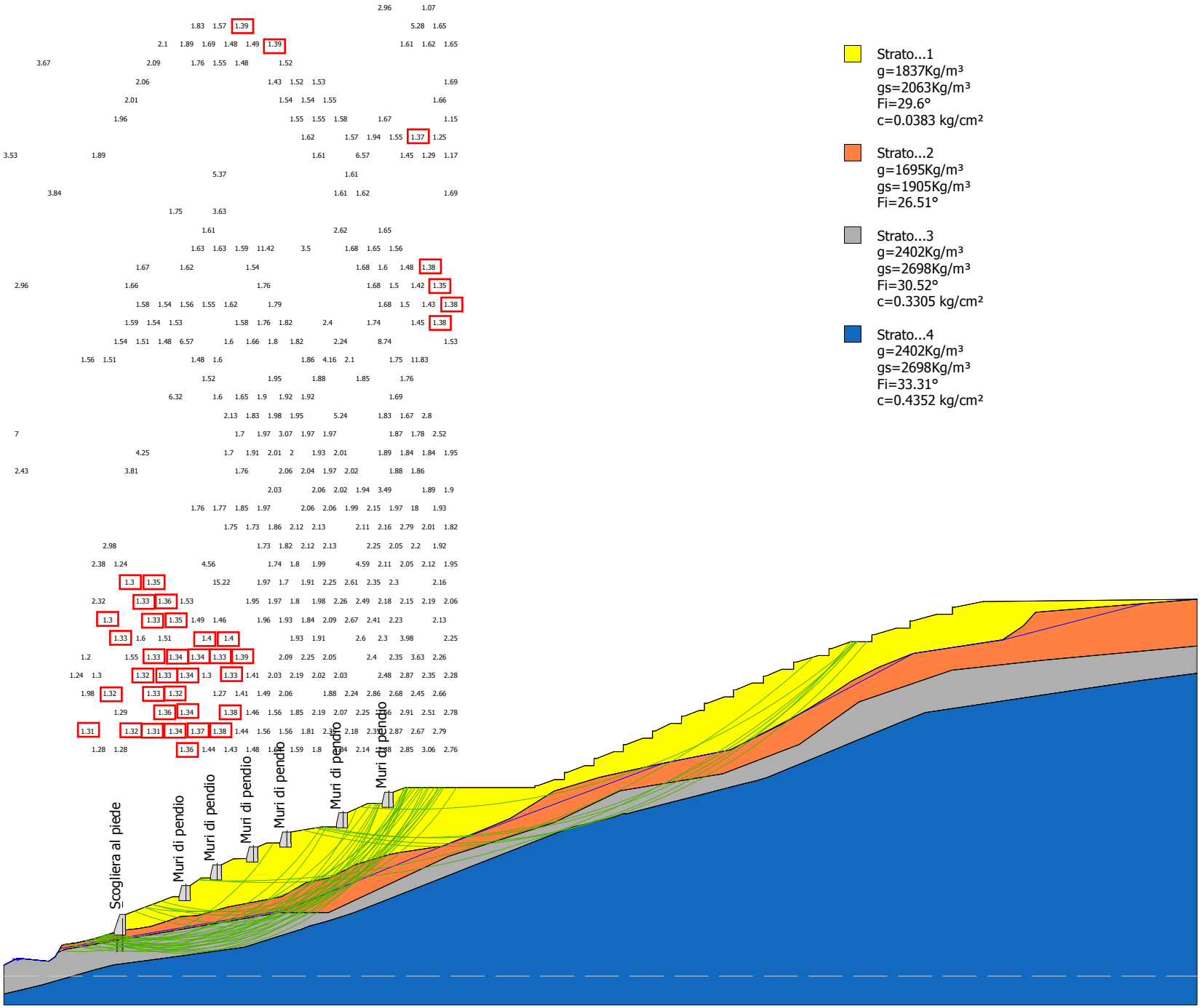
Strato...2
g=1695Kg/m³
gs=1905Kg/m³
Fi=26.51°

Strato...3
g=2402Kg/m³
gs=2698Kg/m³
Fi=30.52°
c=0.3305 kg/cm²

Strato...4
g=2402Kg/m³
gs=2698Kg/m³
Fi=33.31°
c=0.4352 kg/cm²



SUPERFICI FATTORE FS>1.1 - FS (1.3-1.4)



ANALISI SUPERFICIE GENERICA 1
Linea separatrice strato PREESISTENTE e strato nuovo di materiale oggetto di deposito

Analisi di stabilità dei pendii con: JANBU (1956)

Lat./Long.	44.417087/9.129564
Normativa	NTC 2008
Numero di strati	4.0
Numero dei conci	10.0
Grado di sicurezza ritenuto accettabile	1.1
Coefficiente parziale resistenza	1.1
Analisi	Condizione drenata
Superficie di forma generica	

Coefficienti sismici [N.T.C.]

Dati generali

Tipo opera:	2 - Opere ordinarie
Classe d'uso:	Classe II
Vita nominale:	50.0 [anni]
Vita di riferimento:	50.0 [anni]

Parametri sismici su sito di riferimento

Categoria sottosuolo:	C
Categoria topografica:	T3

S.L. Stato limite	TR Tempo ritorno [anni]	ag [m/s²]	F0 [-]	TC* [sec]
S.L.O.	30.0	0.28	2.5	0.2
S.L.D.	50.0	0.35	2.55	0.22
S.L.V.	475.0	0.85	2.51	0.28
S.L.C.	975.0	1.13	2.48	0.29

Coefficienti sismici orizzontali e verticali

Opera: Stabilità dei pendii e Fondazioni

S.L. Stato limite	amax [m/s²]	beta [-]	kh [-]	kv [sec]
S.L.O.	0.504	0.2	0.0103	0.0051
S.L.D.	0.63	0.2	0.0128	0.0064
S.L.V.	1.53	0.2	0.0312	0.0156
S.L.C.	2.034	0.24	0.0498	0.0249

Coefficiente azione sismica orizzontale	0.031
Coefficiente azione sismica verticale	0.016

Vertici profilo

N	X m	y m
1	0.0	0.0
2	5.02	2.5
3	10.01	2.0
4	15.11	1.47
5	16.36	1.44
6	18.66	2.93
7	21.06	7.15
8	22.59	7.61
9	26.5	8.1
10	32.75	9.52
11	40.67	11.99

12	40.76	12.38
13	44.17	12.38
14	44.17	18.38
15	61.41	24.88
16	67.72	24.88
17	67.72	28.88
18	71.75	31.66
19	75.51	31.66
20	75.8	32.43
21	79.07	32.43
22	79.07	36.43
23	83.49	38.64
24	88.14	38.73
25	88.24	38.95
26	92.26	38.95
27	92.26	42.95
28	95.7	44.38
29	104.36	44.38
30	104.36	48.38
31	115.54	50.26
32	121.1	50.26
33	121.67	51.39
34	124.88	51.39
35	124.88	55.39
36	132.31	58.76
37	137.8	58.76
38	137.86	58.87
39	141.47	58.87
40	141.47	62.87
41	145.87	64.54
42	152.55	64.54
43	193.09	64.54
44	193.09	65.24
45	194.09	65.24
46	200.34	67.49
47	203.83	67.49
48	203.83	70.09
49	204.83	70.09
50	211.16	72.53
51	214.58	72.53
52	214.58	75.13
53	215.58	75.13
54	221.76	77.58
55	225.19	77.58
56	225.19	80.18
57	226.19	80.18
58	232.35	82.54
59	235.79	82.54
60	235.79	85.14
61	236.79	85.14
62	242.59	87.91
63	246.31	87.87
64	246.38	90.51
65	247.41	90.51
66	252.88	92.62
67	254.69	92.62
68	254.7	95.22
69	255.7	95.22
70	261.93	97.54
71	265.24	97.54
72	265.24	100.14

73	266.24	100.14
74	272.02	102.54
75	276.14	102.54
76	276.14	105.14
77	277.14	105.14
78	282.79	107.56
79	287.09	107.56
80	287.09	110.16
81	288.09	110.16
82	296.09	112.54
83	299.97	112.54
84	299.97	115.14
85	300.97	115.14
86	307.85	117.6
87	315.6	117.6
88	315.6	120.2
89	316.6	120.2
90	324.51	122.58
91	329.47	122.58
92	329.47	125.18
93	330.47	125.18
94	339.18	127.6
95	344.88	127.6
96	344.88	130.2
97	345.88	130.2
98	355.93	132.19
99	355.93	132.19
100	433.8	133.0 2

Falda

Nr.	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	10.01	2.0
4	15.11	1.47
5	16.36	1.44
6	18.66	2.93
7	20.45	6.09
8	102.78	20.1
9	102.8	20.1
10	159.6	43.29
11	159.6	43.29
12	239.69	73.41
13	264.1	78.29
14	294.34	93.97
15	330.58	113.29
16	330.6	113.29
17	363.07	118.29
18	363.1	118.29
19	414.23	131.4 5

Vertici strato 1

N	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	5.02	2.5
4	10.01	2.0
5	15.11	1.47
6	16.36	1.44
7	18.66	2.93

8	21.06	7.15
9	22.59	7.61
10	26.5	8.1
11	32.75	9.52
12	42.61	12.6
13	48.71	13.21
14	53.26	14.02
15	58.12	15.53
16	64.29	17.64
17	70.5	18.02
18	81.13	21.02
19	93.9	23.5
20	101.03	24.85
21	109.98	30.03
22	118.88	31.91
23	128.0	36.58
24	139.9	40.13
25	142.92	40.79
26	159.6	43.29
27	172.1	48.29
28	184.1	53.29
29	192.1	58.29
30	200.1	63.29
31	216.6	68.29
32	239.1	73.29
33	264.1	78.29
34	274.1	83.29
35	284.1	88.29
36	292.6	93.29
37	300.6	98.29
38	308.1	103.29
39	318.1	108.29
40	330.6	113.29
41	363.1	118.29
42	370.6	123.29
43	375.1	128.29
44	375.1	128.29
45	375.1	128.29
46	433.8	133.02
47	433.8	133.0 2

Vertici strato 2

N	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	5.02	2.5
4	10.01	2.0
5	15.11	1.47
6	16.36	1.44
7	18.66	2.93
8	19.56	4.52
9	22.25	5.7
10	66.68	13.34
11	100.36	19.1
12	118.09	19.1
13	161.53	39.47
14	200.09	51.87
15	224.02	63.38
16	261.26	69.58
17	289.18	80.21
18	310.9	95.71

19	344.58	107.22
20	376.94	110.76
21	433.8	116.0 5

Vertici strato 3

N	X (m)	y (m)
1	0.0	-10.56
2	13.59	-7.3
3	29.81	-2.65
4	33.05	-1.72
5	39.85	0.02
6	54.66	2.02
7	70.5	4.15
8	87.26	6.45
9	90.23	7.38
10	93.4	8.38
11	96.57	9.37
12	100.79	10.7
13	108.18	13.01
14	111.13	14.19
15	115.57	15.33
16	117.58	15.96
17	119.26	16.49
18	124.31	18.08
19	127.17	18.98
20	131.46	20.67
21	138.89	23.6
22	144.47	25.8
23	150.88	28.32
24	155.61	30.19
25	163.73	33.38
26	171.63	36.49
27	179.77	39.7
28	185.34	41.9
29	192.38	44.67
30	194.63	45.56
31	202.06	48.48
32	207.37	50.36
33	212.01	51.32
34	216.59	52.5
35	222.0	53.88
36	224.95	55.07
37	226.44	55.02
38	230.89	56.16
39	236.44	57.58
40	243.1	59.29
41	251.98	61.57
42	265.52	65.03
43	273.41	67.06
44	277.44	68.18
45	285.22	71.4
46	299.4	77.28
47	308.54	81.07
48	314.66	83.6
49	327.98	89.12
50	334.95	91.81
51	377.91	98.27
52	396.1	101.0
53	414.03	103.62
54	433.8	106. 1

Vertici superficie Nr...1

N	X m	y m
1	42.61	12.6
2	48.71	13.21
3	53.26	14.02
4	58.12	15.53
5	64.29	17.64
6	70.5	18.02
7	81.13	21.02
8	93.9	23.5
9	101.03	24.85
10	109.98	30.0
11	118.88	31.91
12	128.0	36.58
13	139.9	41.65
14	145.6	43.29
15	148.4	47.14
16	151.7	47.14
17	158.59	49.54
18	162.04	52.14
19	169.53	54.54
20	173.09	57.14
21	180.73	59.58
22	184.32	62.18
23	191.19	64.58

Coefficienti parziali per i parametri geotecnici del terreno

Tangente angolo di resistenza al taglio	1.25
Coesione efficace	1.25
Coesione non drenata	1.4
Riduzione parametri geotecnici terreno	Si

Stratigrafia

c: coesione; cu: coesione non drenata; Fi: Angolo di attrito; G: Peso Specifico; Gs: Peso Specifico Saturo; K: Modulo di Winkler

Strato	c (kg/cm²)	cu (kg/cm²)	Fi (°)	G (Kg/m³)	Gs (Kg/m³)	K (Kg/cm³)	Litologia	
1	0.0383		29.6	1837	2063	0.00		
2	0		26.51	1695	1905	0.00		
3	0.3305		30.52	2402	2698	0.00		
4	0.4352		33.31	2402	2698	0.00		

Muri di sostegno - Caratteristiche geometriche

N°	x (m)	y (m)	Base mensola a valle (m)	Base mensola a monte (m)	Altezza muro (m)	Spessore testa (m)	Spessore base (m)	Peso specifico (Kg/m³)
1	44.17	12.38	0	0.1	6	2	4	2800
2	67.72	24.88	0	0.1	4	3	4	2800
3	79.07	32.43	0	0.1	4	3	4	2800
4	92.26	38.95	0	0.1	4	3	4	2800
5	104.36	44.38	0	0.1	4	3	4	2800
6	124.88	51.39	0	0.1	4	3	4	2800
7	141.47	58.87	0	0.1	4	3	4	2800

Pali...

N°	x (m)	y (m)	Diametro (m)	Lunghezza (m)	Inclinazione (°)	Interasse (m)
1	41.06261	10.87895	0.2	6	90	3.6
2	43.08037	10.87895	0.2	6	90	3.6

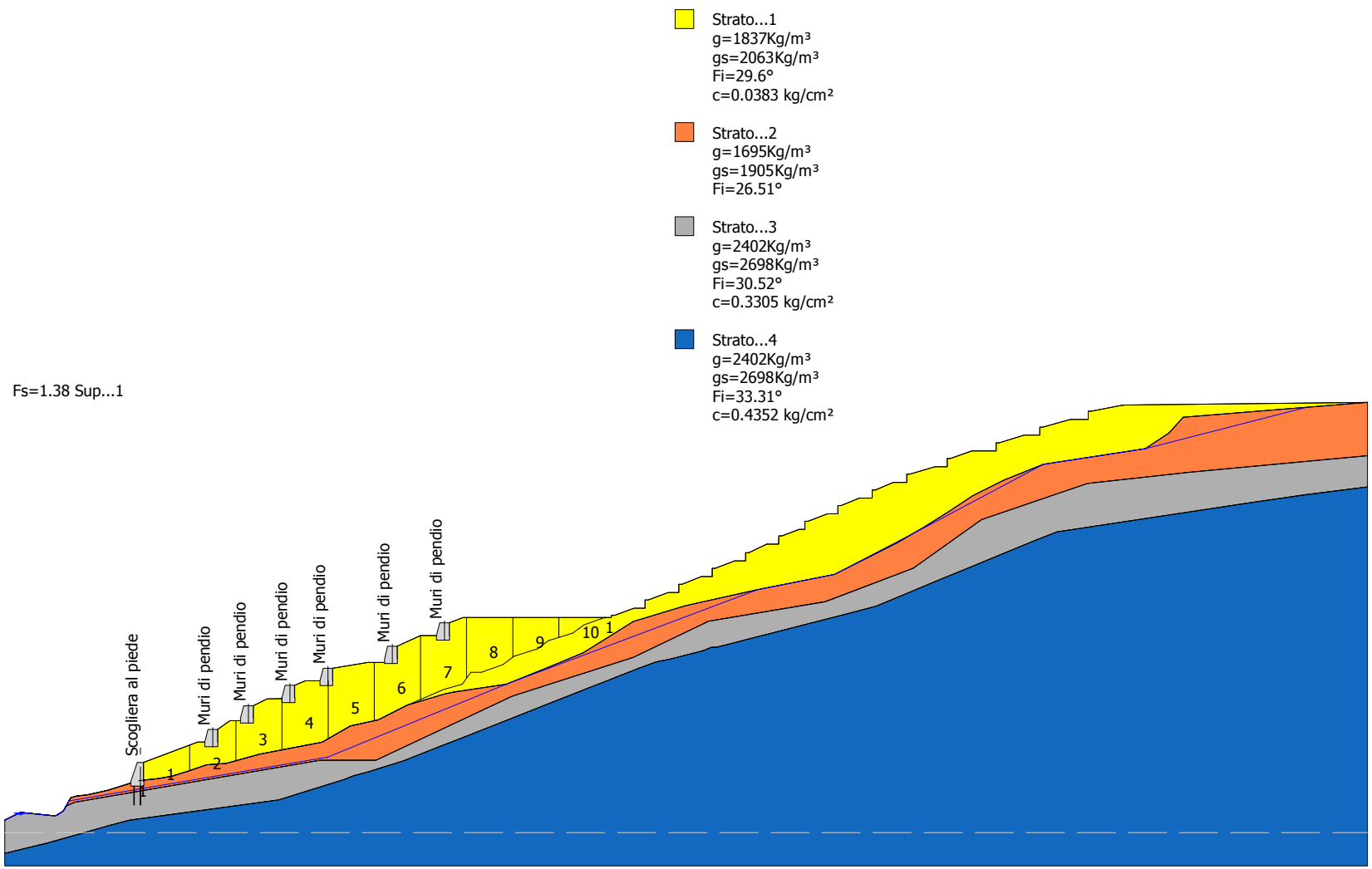
Superficie Nr...1 Fattore di sicurezza=1.38

Nr.	B m	Alfa (°)	Li m	Wi (Kg)	Kh•Wi (Kg)	Kv•Wi (Kg)	c (kg/cm²)	Fi (°)	Ui (Kg)	N'i (Kg)	Ti (Kg)
1	14.69	11.6	15.0	185387.1	5747.0	2966.19	0.03	24.4	0.0	175557.6	68007.6
2	14.69	11.9	15.02	259247.8	8036.68	4147.97	0.0	21.8	0.0	248446.6	79980.2
3	14.69	13.5	15.11	506158.5	15690.91	8098.54	0.0	21.8	0.0	483959.9	156758.2
4	14.69	13.6	15.11	600517.8	18616.05	9608.29	0.03	24.4	0.0	567716.0	213279.0
5	14.69	21.2	15.76	552638.9	17131.8	8842.22	0.0	21.8	0.0	528204.4	178432.2
6	14.69	24.8	16.18	606485.3	18801.04	9703.77	0.0	21.8	0.0	583180.2	202318.8
7	14.69	24.9	16.2	516348.4	16006.8	8261.57	0.03	24.4	0.0	486439.8	196705.5
8	14.69	24.4	16.13	431187.2	13366.8	6899.0	0.03	24.4	0.0	405664.0	164026.3
9	14.69	23.2	15.99	256342.9	7946.63	4101.49	0.03	24.4	0.0	240296.7	98016.3
10	14.69	23.4	16.0	85625.13	2654.38	1370.0	0.03	24.4	0.0	79309.7	35207.9

CARICO LIMITE PALI ESISTENTI

Superficie Nr...1 Fattore di sicurezza=1.38

Micropali Fondazione x=41.06261 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m


Strato...1
g=1837Kg/m³
gs=2063Kg/m³
Fi=29.6°
c=0.0383 kg/cm²
Strato...2
g=1695Kg/m³
gs=1905Kg/m³
Fi=26.51°
Strato...3
g=2402Kg/m³
gs=2698Kg/m³
Fi=30.52°
c=0.3305 kg/cm²
Strato...4
g=2402Kg/m³
gs=2698Kg/m³
Fi=33.31°
c=0.4352 kg/cm²
Fs=1.38 Sup...1
Scogliera al piede
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
1
2
3
4
5
6
7
8
9
10
1

ANALISI SUPERFICIE GENERICA 2
Linea separatrice strato COLTRE NATURALE e strato materiale oggetto di deposito (preesistente e nuovo)

Analisi di stabilità dei pendii con: JANBU (1956)

Lat./Long.	44.417087/9.129564
Normativa	NTC 2008
Numero di strati	4.0
Numero dei conci	21.0
Grado di sicurezza ritenuto accettabile	1.1
Coefficiente parziale resistenza	1.1
Analisi	Condizione drenata
Superficie di forma generica	

Coefficienti sismici [N.T.C.]

Dati generali

Tipo opera:	2 - Opere ordinarie
Classe d'uso:	Classe II
Vita nominale:	50.0 [anni]
Vita di riferimento:	50.0 [anni]

Parametri sismici su sito di riferimento

Categoria sottosuolo:	C
Categoria topografica:	T3

S.L. Stato limite	TR Tempo ritorno [anni]	ag [m/s²]	F0 [-]	TC* [sec]
S.L.O.	30.0	0.28	2.5	0.2
S.L.D.	50.0	0.35	2.55	0.22
S.L.V.	475.0	0.85	2.51	0.28
S.L.C.	975.0	1.13	2.48	0.29

Coefficienti sismici orizzontali e verticali

Opera: Stabilità dei pendii e Fondazioni

S.L. Stato limite	amax [m/s²]	beta [-]	kh [-]	kv [sec]
S.L.O.	0.504	0.2	0.0103	0.0051
S.L.D.	0.63	0.2	0.0128	0.0064
S.L.V.	1.53	0.2	0.0312	0.0156
S.L.C.	2.034	0.24	0.0498	0.0249

Coefficiente azione sismica orizzontale	0.031
Coefficiente azione sismica verticale	0.016

Vertici profilo

N	X m	y m
1	0.0	0.0
2	5.02	2.5
3	10.01	2.0
4	15.11	1.47
5	16.36	1.44
6	18.66	2.93
7	21.06	7.15
8	22.59	7.61
9	26.5	8.1
10	32.75	9.52
11	40.67	11.99

12	40.76	12.38
13	44.17	12.38
14	44.17	18.38
15	61.41	24.88
16	67.72	24.88
17	67.72	28.88
18	71.75	31.66
19	75.51	31.66
20	75.8	32.43
21	79.07	32.43
22	79.07	36.43
23	83.49	38.64
24	88.14	38.73
25	88.24	38.95
26	92.26	38.95
27	92.26	42.95
28	95.7	44.38
29	104.36	44.38
30	104.36	48.38
31	115.54	50.26
32	121.1	50.26
33	121.67	51.39
34	124.88	51.39
35	124.88	55.39
36	132.31	58.76
37	137.8	58.76
38	137.86	58.87
39	141.47	58.87
40	141.47	62.87
41	145.87	64.54
42	152.55	64.54
43	193.09	64.54
44	193.09	65.24
45	194.09	65.24
46	200.34	67.49
47	203.83	67.49
48	203.83	70.09
49	204.83	70.09
50	211.16	72.53
51	214.58	72.53
52	214.58	75.13
53	215.58	75.13
54	221.76	77.58
55	225.19	77.58
56	225.19	80.18
57	226.19	80.18
58	232.35	82.54
59	235.79	82.54
60	235.79	85.14
61	236.79	85.14
62	242.59	87.91
63	246.31	87.87
64	246.38	90.51
65	247.41	90.51
66	252.88	92.62
67	254.69	92.62
68	254.7	95.22
69	255.7	95.22
70	261.93	97.54
71	265.24	97.54
72	265.24	100.14

73	266.24	100.14
74	272.02	102.54
75	276.14	102.54
76	276.14	105.14
77	277.14	105.14
78	282.79	107.56
79	287.09	107.56
80	287.09	110.16
81	288.09	110.16
82	296.09	112.54
83	299.97	112.54
84	299.97	115.14
85	300.97	115.14
86	307.85	117.6
87	315.6	117.6
88	315.6	120.2
89	316.6	120.2
90	324.51	122.58
91	329.47	122.58
92	329.47	125.18
93	330.47	125.18
94	339.18	127.6
95	344.88	127.6
96	344.88	130.2
97	345.88	130.2
98	355.93	132.19
99	355.93	132.19
100	433.8	133.0 2

Falda

Nr.	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	10.01	2.0
4	15.11	1.47
5	16.36	1.44
6	18.66	2.93
7	20.45	6.09
8	102.78	20.1
9	102.8	20.1
10	159.6	43.29
11	159.6	43.29
12	239.69	73.41
13	264.1	78.29
14	294.34	93.97
15	330.58	113.29
16	330.6	113.29
17	363.07	118.29
18	363.1	118.29
19	414.23	131.4 5

Vertici strato 1

N	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	5.02	2.5
4	10.01	2.0
5	15.11	1.47
6	16.36	1.44
7	18.66	2.93

8	21.06	7.15
9	22.59	7.61
10	26.5	8.1
11	32.75	9.52
12	42.61	12.6
13	48.71	13.21
14	53.26	14.02
15	58.12	15.53
16	64.29	17.64
17	70.5	18.02
18	81.13	21.02
19	93.9	23.5
20	101.03	24.85
21	109.98	30.03
22	118.88	31.91
23	128.0	36.58
24	139.9	40.13
25	142.92	40.79
26	159.6	43.29
27	172.1	48.29
28	184.1	53.29
29	192.1	58.29
30	200.1	63.29
31	216.6	68.29
32	239.1	73.29
33	264.1	78.29
34	274.1	83.29
35	284.1	88.29
36	292.6	93.29
37	300.6	98.29
38	308.1	103.29
39	318.1	108.29
40	330.6	113.29
41	363.1	118.29
42	370.6	123.29
43	375.1	128.29
44	375.1	128.29
45	375.1	128.29
46	433.8	133.02
47	433.8	133.0 2

Vertici strato 2

N	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	5.02	2.5
4	10.01	2.0
5	15.11	1.47
6	16.36	1.44
7	18.66	2.93
8	19.56	4.52
9	22.25	5.7
10	66.68	13.34
11	100.36	19.1
12	118.09	19.1
13	161.53	39.47
14	200.09	51.87
15	224.02	63.38
16	261.26	69.58
17	289.18	80.21
18	310.9	95.71

19	344.58	107.22
20	376.94	110.76
21	433.8	116.0 5

Vertici strato 3

N	X (m)	y (m)
1	0.0	-10.56
2	13.59	-7.3
3	29.81	-2.65
4	33.05	-1.72
5	39.85	0.02
6	54.66	2.02
7	70.5	4.15
8	87.26	6.45
9	90.23	7.38
10	93.4	8.38
11	96.57	9.37
12	100.79	10.7
13	108.18	13.01
14	111.13	14.19
15	115.57	15.33
16	117.58	15.96
17	119.26	16.49
18	124.31	18.08
19	127.17	18.98
20	131.46	20.67
21	138.89	23.6
22	144.47	25.8
23	150.88	28.32
24	155.61	30.19
25	163.73	33.38
26	171.63	36.49
27	179.77	39.7
28	185.34	41.9
29	192.38	44.67
30	194.63	45.56
31	202.06	48.48
32	207.37	50.36
33	212.01	51.32
34	216.59	52.5
35	222.0	53.88
36	224.95	55.07
37	226.44	55.02
38	230.89	56.16
39	236.44	57.58
40	243.1	59.29
41	251.98	61.57
42	265.52	65.03
43	273.41	67.06
44	277.44	68.18
45	285.22	71.4
46	299.4	77.28
47	308.54	81.07
48	314.66	83.6
49	327.98	89.12
50	334.95	91.81
51	377.91	98.27
52	396.1	101.0
53	414.03	103.62
54	433.8	106. 1

Vertici superficie Nr...1

N	X m	y m
1	39.28	11.67
2	48.71	13.21
3	53.26	14.02
4	58.12	15.53
5	64.29	17.64
6	70.5	18.02
7	81.13	21.02
8	93.9	23.5
9	101.03	24.85
10	109.98	30.0
11	118.88	31.91
12	128.0	36.58
13	139.9	40.13
14	142.92	40.79
15	159.6	43.29
16	172.1	48.29
17	184.1	53.29
18	192.1	58.29
19	200.1	63.29
20	216.6	68.29
21	239.1	73.29
22	264.1	78.29
23	274.1	83.29
24	284.1	88.29
25	292.6	93.29
26	300.6	98.29
27	303.97	100.54
28	308.1	103.29
29	318.1	108.29
30	330.6	113.29
31	363.1	118.29
32	370.6	123.29
33	378.99	132.5

Coefficienti parziali per i parametri geotecnici del terreno

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Tangente angolo di resistenza al taglio	1.25
Coesione efficace	1.25
Coesione non drenata	1.4
Riduzione parametri geotecnici terreno	Si

========== =

Stratigrafia

c: coesione; cu: coesione non drenata; Fi: Angolo di attrito; G: Peso Specifico; Gs: Peso Specifico Saturo; K: Modulo di Winkler

Strato	c (kg/cm²)	cu (kg/cm²)	Fi (°)	G (Kg/m³)	Gs (Kg/m³)	K (Kg/cm³)	Litologia	
1	0.0383		29.6	1837	2063	0.00		
2	0		26.51	1695	1905	0.00		
3	0.3305		30.52	2402	2698	0.00		
4	0.4352		33.31	2402	2698	0.00		

Muri di sostegno - Caratteristiche geometriche

N°	x (m)	y (m)	Base mensola a valle (m)	Base mensola a monte (m)	Altezza muro (m)	Spessore testa (m)	Spessore base (m)	Peso specifico (Kg/m³)
1	44.17	12.38	0	0.1	6	2	4	2800
2	67.72	24.88	0	0.1	4	3	4	2800
3	79.07	32.43	0	0.1	4	3	4	2800

4	92.26	38.95	0	0.1	4	3	4	2800
5	104.36	44.38	0	0.1	4	3	4	2800
6	124.88	51.39	0	0.1	4	3	4	2800
7	141.47	58.87	0	0.1	4	3	4	280 0

Pali...

N°	x (m)	y (m)	Diametro (m)	Lunghezza (m)	Inclinazione (°)	Interasse (m)
1	41.06261	10.87895	0.2	6	90	3.6
2	43.08037	10.87895	0.2	6	90	3.6

Superficie Nr...1 Fattore di sicurezza=1.33

Nr.	B m	Alfa (°)	Li m	Wi (Kg)	Kh•Wi (Kg)	Kv•Wi (Kg)	c (kg/cm²)	Fi (°)	Ui (Kg)	N'i (Kg)	Ti (Kg)
1	16.14	11.0	16.44	259856.9	8055.56	4157.71	0.03	24.4	0.0	246073.3	97855.9
2	16.14	12.6	16.54	296539.8	9192.73	4744.64	0.0	21.8	0.0	283100.1	95153.9
3	16.14	13.6	16.61	546867.9	16952.9	8749.89	0.0	21.8	0.0	521252.7	175938.2
4	16.14	15.4	16.74	641266.0	19879.25	10260.26	0.03	24.4	0.0	602058.1	237640.5
5	16.14	20.3	17.21	588725.7	18250.5	9419.61	0.0	21.8	0.0	559780.4	195744.2
6	16.14	21.6	17.35	680598.3	21098.55	10889.57	0.0	21.8	0.0	647838.8	228496.1
7	16.14	10.8	16.43	749828.8	23244.69	11997.26	0.0	21.8	0.0	718374.8	239900.3
8	16.14	16.6	16.84	588547.0	18244.96	9416.75	0.03	24.4	0.0	551499.1	219356.4
9	16.14	23.2	17.56	414949.5	12863.44	6639.19	0.03	24.4	0.0	387510.9	162298.3
10	16.14	30.9	18.82	189151.3	5863.69	3026.42	0.0	21.8	0.0	184292.4	70478.1
11	16.14	16.6	16.84	171472.6	5315.65	2743.56	0.0	21.8	0.0	162990.4	55793.3
12	16.14	12.5	16.53	293292.9	9092.08	4692.69	0.0	21.8	0.0	280034.8	94097.2
13	16.14	11.7	16.48	407588.9	12635.26	6521.42	0.0	21.8	64.9	388743.2	130230.6
14	16.14	13.2	16.58	554776.5	17198.07	8876.43	0.03	24.4	0.0	523040.9	204976.4
15	16.14	26.6	18.05	572790.1	17756.49	9164.64	0.0	21.8	188.6	547243.1	200693.4
16	16.14	30.5	18.74	555358.1	17216.1	8885.73	0.03	24.4	0.0	526078.4	233671.9
17	16.14	30.8	18.79	456349.9	14146.85	7301.6	0.0	21.8	0.0	444366.2	169672.4
18	16.14	22.9	17.53	358831.6	11123.78	5741.31	0.0	21.8	0.0	342144.5	121863.1
19	16.14	8.8	16.33	383260.5	11881.08	6132.17	0.0	21.8	15.9	368809.6	122425.9
20	16.14	8.7	16.33	443347.2	13743.76	7093.56	0.0	21.8	4.3	426947.2	141694.1
21	16.14	41.3	21.5	207911.7	6445.26	3326.59	0.03	24.4	0.0	204828.3	109118.4

CARICO LIMITE PALI ESISTENTI

Superficie Nr...1 Fattore di sicurezza=1.33

Micropali Fondazione x=41.06261 Y=10.87895 Plim=516.4 Kg Sbalzo del palo 6.48 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=516.4 Kg Sbalzo del palo 6.48 m

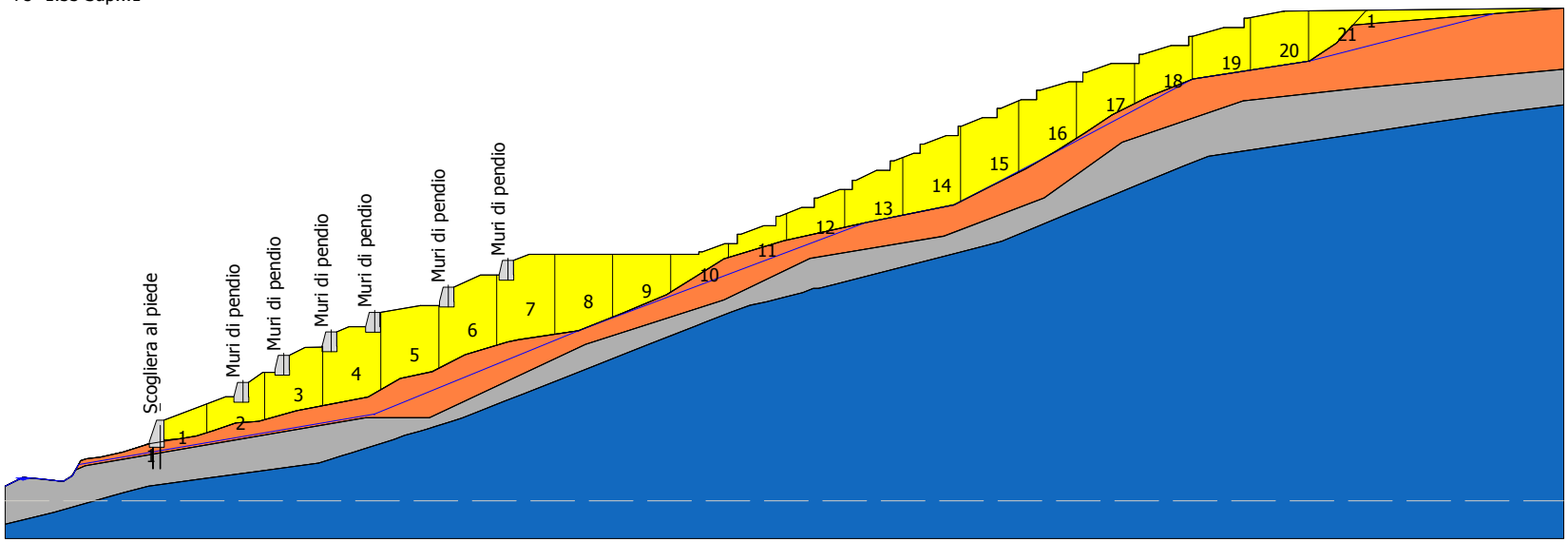
Strato...1
g=1837 Kg/m³
gs=2063 Kg/m³
Fi=29.6°
c=0.0383 kg/cm²

Strato...2
g=1695 Kg/m³
gs=1905 Kg/m³
Fi=26.51°

Strato...3
g=2402 Kg/m³
gs=2698 Kg/m³
Fi=30.52°
c=0.3305 kg/cm²

Strato...4
g=2402 Kg/m³
gs=2698 Kg/m³
Fi=33.31°
c=0.4352 kg/cm²

Fs=1.33 Sup...1



ANALISI SUPERFICIE GENERICA 3
Linea separatrice CAPPELLACCIO DI ALTERAZIONE SUBSTRATO ROCCIOSO e strato COLTRE NATURALE

Analisi di stabilità dei pendii con: JANBU (1956)

Lat./Long.	44.417087/9.129564
Normativa	NTC 2008
Numero di strati	4.0
Numero dei conci	21.0
Grado di sicurezza ritenuto accettabile	1.1
Coefficiente parziale resistenza	1.1
Analisi	Condizione drenata
Superficie di forma generica	

Coefficienti sismici [N.T.C.]

Dati generali

Tipo opera:	2 - Opere ordinarie
Classe d'uso:	Classe II
Vita nominale:	50.0 [anni]
Vita di riferimento:	50.0 [anni]

Parametri sismici su sito di riferimento

Categoria sottosuolo:	C
Categoria topografica:	T3

S.L. Stato limite	TR Tempo ritorno [anni]	ag [m/s²]	F0 [-]	TC* [sec]
S.L.O.	30.0	0.28	2.5	0.2
S.L.D.	50.0	0.35	2.55	0.22
S.L.V.	475.0	0.85	2.51	0.28
S.L.C.	975.0	1.13	2.48	0.29

Coefficienti sismici orizzontali e verticali

Opera: Stabilità dei pendii e Fondazioni

S.L. Stato limite	amax [m/s²]	beta [-]	kh [-]	kv [sec]
S.L.O.	0.504	0.2	0.0103	0.0051
S.L.D.	0.63	0.2	0.0128	0.0064
S.L.V.	1.53	0.2	0.0312	0.0156
S.L.C.	2.034	0.24	0.0498	0.0249

Coefficiente azione sismica orizzontale	0.031
Coefficiente azione sismica verticale	0.016

Vertici profilo

N	X m	y m
1	0.0	0.0
2	5.02	2.5
3	10.01	2.0
4	15.11	1.47
5	16.36	1.44
6	18.66	2.93
7	21.06	7.15
8	22.59	7.61
9	26.5	8.1
10	32.75	9.52
11	40.67	11.99

12	40.76	12.38
13	44.17	12.38
14	44.17	18.38
15	61.41	24.88
16	67.72	24.88
17	67.72	28.88
18	71.75	31.66
19	75.51	31.66
20	75.8	32.43
21	79.07	32.43
22	79.07	36.43
23	83.49	38.64
24	88.14	38.73
25	88.24	38.95
26	92.26	38.95
27	92.26	42.95
28	95.7	44.38
29	104.36	44.38
30	104.36	48.38
31	115.54	50.26
32	121.1	50.26
33	121.67	51.39
34	124.88	51.39
35	124.88	55.39
36	132.31	58.76
37	137.8	58.76
38	137.86	58.87
39	141.47	58.87
40	141.47	62.87
41	145.87	64.54
42	152.55	64.54
43	193.09	64.54
44	193.09	65.24
45	194.09	65.24
46	200.34	67.49
47	203.83	67.49
48	203.83	70.09
49	204.83	70.09
50	211.16	72.53
51	214.58	72.53
52	214.58	75.13
53	215.58	75.13
54	221.76	77.58
55	225.19	77.58
56	225.19	80.18
57	226.19	80.18
58	232.35	82.54
59	235.79	82.54
60	235.79	85.14
61	236.79	85.14
62	242.59	87.91
63	246.31	87.87
64	246.38	90.51
65	247.41	90.51
66	252.88	92.62
67	254.69	92.62
68	254.7	95.22
69	255.7	95.22
70	261.93	97.54
71	265.24	97.54
72	265.24	100.14

73	266.24	100.14
74	272.02	102.54
75	276.14	102.54
76	276.14	105.14
77	277.14	105.14
78	282.79	107.56
79	287.09	107.56
80	287.09	110.16
81	288.09	110.16
82	296.09	112.54
83	299.97	112.54
84	299.97	115.14
85	300.97	115.14
86	307.85	117.6
87	315.6	117.6
88	315.6	120.2
89	316.6	120.2
90	324.51	122.58
91	329.47	122.58
92	329.47	125.18
93	330.47	125.18
94	339.18	127.6
95	344.88	127.6
96	344.88	130.2
97	345.88	130.2
98	355.93	132.19
99	355.93	132.19
100	433.8	133.0 2

Falda

Nr.	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	10.01	2.0
4	15.11	1.47
5	16.36	1.44
6	18.66	2.93
7	20.45	6.09
8	102.78	20.1
9	102.8	20.1
10	159.6	43.29
11	159.6	43.29
12	239.69	73.41
13	264.1	78.29
14	294.34	93.97
15	330.58	113.29
16	330.6	113.29
17	363.07	118.29
18	363.1	118.29
19	414.23	131.4 5

Vertici strato 1

N	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	5.02	2.5
4	10.01	2.0
5	15.11	1.47
6	16.36	1.44
7	18.66	2.93

8	21.06	7.15
9	22.59	7.61
10	26.5	8.1
11	32.75	9.52
12	42.61	12.6
13	48.71	13.21
14	53.26	14.02
15	58.12	15.53
16	64.29	17.64
17	70.5	18.02
18	81.13	21.02
19	93.9	23.5
20	101.03	24.85
21	109.98	30.03
22	118.88	31.91
23	128.0	36.58
24	139.9	40.13
25	142.92	40.79
26	159.6	43.29
27	172.1	48.29
28	184.1	53.29
29	192.1	58.29
30	200.1	63.29
31	216.6	68.29
32	239.1	73.29
33	264.1	78.29
34	274.1	83.29
35	284.1	88.29
36	292.6	93.29
37	300.6	98.29
38	308.1	103.29
39	318.1	108.29
40	330.6	113.29
41	363.1	118.29
42	370.6	123.29
43	375.1	128.29
44	375.1	128.29
45	375.1	128.29
46	433.8	133.02
47	433.8	133.0 2

Vertici strato 2

N	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	5.02	2.5
4	10.01	2.0
5	15.11	1.47
6	16.36	1.44
7	18.66	2.93
8	19.56	4.52
9	22.25	5.7
10	66.68	13.34
11	100.36	19.1
12	118.09	19.1
13	161.53	39.47
14	200.09	51.87
15	224.02	63.38
16	261.26	69.58
17	289.18	80.21
18	310.9	95.71

19	344.58	107.22
20	376.94	110.76
21	433.8	116.0 5

Vertici strato 3

N	X (m)	y (m)
1	0.0	-10.56
2	13.59	-7.3
3	29.81	-2.65
4	33.05	-1.72
5	39.85	0.02
6	54.66	2.02
7	70.5	4.15
8	87.26	6.45
9	90.23	7.38
10	93.4	8.38
11	96.57	9.37
12	100.79	10.7
13	108.18	13.01
14	111.13	14.19
15	115.57	15.33
16	117.58	15.96
17	119.26	16.49
18	124.31	18.08
19	127.17	18.98
20	131.46	20.67
21	138.89	23.6
22	144.47	25.8
23	150.88	28.32
24	155.61	30.19
25	163.73	33.38
26	171.63	36.49
27	179.77	39.7
28	185.34	41.9
29	192.38	44.67
30	194.63	45.56
31	202.06	48.48
32	207.37	50.36
33	212.01	51.32
34	216.59	52.5
35	222.0	53.88
36	224.95	55.07
37	226.44	55.02
38	230.89	56.16
39	236.44	57.58
40	243.1	59.29
41	251.98	61.57
42	265.52	65.03
43	273.41	67.06
44	277.44	68.18
45	285.22	71.4
46	299.4	77.28
47	308.54	81.07
48	314.66	83.6
49	327.98	89.12
50	334.95	91.81
51	377.91	98.27
52	396.1	101.0
53	414.03	103.62
54	433.8	106. 1

Vertici superficie Nr...1

N	X m	y m
1	20.2	5.8
2	22.25	5.7
3	66.68	13.34
4	100.36	19.1
5	118.09	19.1
6	161.53	39.47
7	200.09	51.87
8	224.02	63.38
9	261.26	69.58
10	289.18	80.21
11	310.9	95.71
12	344.58	107.22
13	363.1	118.29
14	370.6	123.29
15	378.99	132.5

Coefficienti parziali per i parametri geotecnici del terreno

Tangente angolo di resistenza al taglio	1.25
Coesione efficace	1.25
Coesione non drenata	1.4
Riduzione parametri geotecnici terreno	Si

Stratigrafia

c: coesione; cu: coesione non drenata; Fi: Angolo di attrito; G: Peso Specifico; Gs: Peso Specifico Saturo; K: Modulo di Winkler

Strato	c (kg/cm²)	cu (kg/cm²)	Fi (°)	G (Kg/m³)	Gs (Kg/m³)	K (Kg/cm³)	Litologia	
1	0.0383		29.6	1837	2063	0.00		
2	0		26.51	1695	1905	0.00		
3	0.3305		30.52	2402	2698	0.00		
4	0.4352		33.31	2402	2698	0.00		

Muri di sostegno - Caratteristiche geometriche

N°	x (m)	y (m)	Base mensola a valle (m)	Base mensola a monte (m)	Altezza muro (m)	Spessore testa (m)	Spessore base (m)	Peso specifico (Kg/m³)
1	44.17	12.38	0	0.1	6	2	4	2800
2	67.72	24.88	0	0.1	4	3	4	2800
3	79.07	32.43	0	0.1	4	3	4	2800
4	92.26	38.95	0	0.1	4	3	4	2800
5	104.36	44.38	0	0.1	4	3	4	2800
6	124.88	51.39	0	0.1	4	3	4	2800
7	141.47	58.87	0	0.1	4	3	4	280 0

Pali...

N°	x (m)	y (m)	Diametro (m)	Lunghezza (m)	Inclinazione (°)	Interasse (m)
1	41.06261	10.87895	0.2	6	90	3.6
2	43.08037	10.87895	0.2	6	90	3.6

Superficie Nr...1 Fattore di sicurezza=1.23

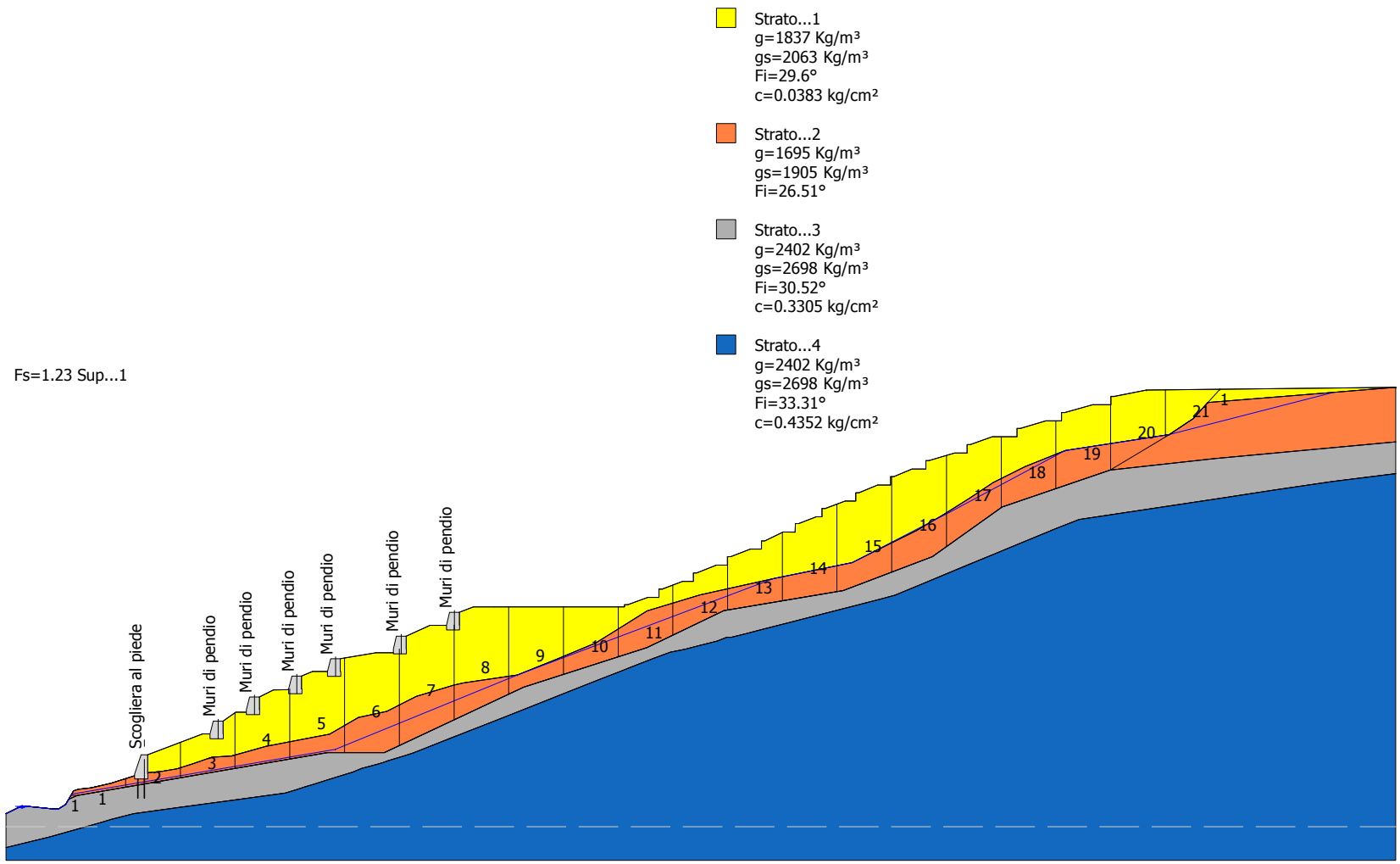
Nr.	B m	Alfa (°)	Li m	Wi (Kg)	Kh•Wi (Kg)	Kv•Wi (Kg)	c (kg/cm²)	Fi (°)	Ui (Kg)	N'i (Kg)	Ti (Kg)
1	17.08	8.4	17.26	47547.87	1473.98	760.77	0.0	21.8	465.8	38039.9	13607.5
2	17.08	9.8	17.33	352467.3	10926.49	5639.48	0.26	25.2	649.8	316618.1	175615.8

3	17.08	9.7	17.33	429954.5	13328.59	6879.27	0.26	25.2	621.4	390459.8206945.5
4	17.08	9.7	17.33	713692.9	22124.4811419.09		0.26	25.2	600.9	659514.9321095.0
5	17.08	6.7	17.2	876291.8	27165.0414020.67		0.26	25.2	1040.7	819334.4385694.3
6	17.08	7.3	17.22	926610.1	28724.9114825.76		0.0	21.8	4567.7	818438.7292029.9
7	17.08	25.1	18.86	1085168.0	33640.2117362.69		0.0	21.8	6444.2	923698.1361076.5
8	17.08	25.1	18.86	979403.3	30361.515670.45		0.26	25.2	5410.1	801695.7419236.1
9	17.08	19.9	18.16	767968.4	23807.0212287.49		0.26	25.2	5104.7	615452.8319018.7
10	17.08	17.8	17.94	579651.4	17969.19	9274.42	0.0	21.8	5694.7	454945.9169136.6
11	17.08	21.6	18.37	462285.9	14330.86	7396.58	0.0	21.8	5983.1	339711.3129349.4
12	17.08	24.6	18.79	498891.8	15465.65	7982.27	0.26	25.2	5099.4	363164.6215616.4
13	17.08	9.5	17.31	555299.1	17214.27	8884.79	0.26	25.2	6182.0	419909.9219221.5
14	17.08	9.5	17.31	761740.0	23613.9412187.84		0.26	25.2	7797.3	589421.2291102.4
15	17.08	19.7	18.13	904347.1	28034.7614469.55		0.0	21.8	7958.8	724396.9272241.0
16	17.08	25.0	18.84	897463.6	27821.3714359.42		0.0	21.8	9787.2	691627.5270018.9
17	17.08	35.5	20.98	826880.7	25633.313230.09		0.26	25.2	8683.1	614976.3376468.5
18	17.08	19.2	18.08	712645.4	22092.0111402.33		0.26	25.2	8718.6	508180.1269967.5
19	17.08	19.0	18.06	713743.1	22126.0411419.89		0.0	21.8	9769.4	515579.1193006.0
20	17.08	30.9	19.9	608527.8	18864.36	9736.45	0.0	21.8	4350.2	513718.9211821.4
21	17.08	41.1	22.66	230815.1	7155.27	3693.04	0.03	24.4	0.0	222635.0127253.7

CARICO LIMITE PALI ESISTENTI

Superficie Nr...1 Fattore di sicurezza=1.23

Micropali Fondazione x=41.06261 Y=10.87895 Plim=23297.6 Kg Sbalzo del palo 9.25 m
Micropali Fondazione x=43.08037 Y=10.87895 Plim=23297.6 Kg Sbalzo del palo 9.25 m


Strato...1
g=1837 Kg/m³
gs=2063 Kg/m³
Fi=29.6°
c=0.0383 kg/cm²
Strato...2
g=1695 Kg/m³
gs=1905 Kg/m³
Fi=26.51°
Strato...3
g=2402 Kg/m³
gs=2698 Kg/m³
Fi=30.52°
c=0.3305 kg/cm²
Strato...4
g=2402 Kg/m³
gs=2698 Kg/m³
Fi=33.31°
c=0.4352 kg/cm²
Fs=1.23 Sup...1
Scogliera al piede
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio

ANALISI SUPERFICIE GENERICA 4
Linea separatrice SUBSTRATO ROCCIOSO e strato CAPPELLACCIO DI ALTERAZIONE SUBSTRATO ROCCIOSO

Analisi di stabilità dei pendii con: JANBU (1956)

Lat./Long.	44.417087/9.129564
Normativa	NTC 2008
Numero di strati	4.0
Numero dei conci	23.0
Grado di sicurezza ritenuto accettabile	1.1
Coefficiente parziale resistenza	1.1
Analisi	Condizione drenata
Superficie di forma generica	

Coefficienti sismici [N.T.C.]

Dati generali

Tipo opera:	2 - Opere ordinarie
Classe d'uso:	Classe II
Vita nominale:	50.0 [anni]
Vita di riferimento:	50.0 [anni]

Parametri sismici su sito di riferimento

Categoria sottosuolo:	C
Categoria topografica:	T3

S.L. Stato limite	TR Tempo ritorno [anni]	ag [m/s²]	F0 [-]	TC* [sec]
S.L.O.	30.0	0.28	2.5	0.2
S.L.D.	50.0	0.35	2.55	0.22
S.L.V.	475.0	0.85	2.51	0.28
S.L.C.	975.0	1.13	2.48	0.29

Coefficienti sismici orizzontali e verticali

Opera: Stabilità dei pendii e Fondazioni

S.L. Stato limite	amax [m/s²]	beta [-]	kh [-]	kv [sec]
S.L.O.	0.504	0.2	0.0103	0.0051
S.L.D.	0.63	0.2	0.0128	0.0064
S.L.V.	1.53	0.2	0.0312	0.0156
S.L.C.	2.034	0.24	0.0498	0.0249

Coefficiente azione sismica orizzontale	0.031
Coefficiente azione sismica verticale	0.016

Vertici profilo

N	X m	y m
1	0.0	0.0
2	5.02	2.5
3	10.01	2.0
4	15.11	1.47
5	16.36	1.44
6	18.66	2.93
7	21.06	7.15
8	22.59	7.61
9	26.5	8.1
10	32.75	9.52
11	40.67	11.99
12	40.76	12.38
13	44.17	12.38

14	44.17	18.38
15	61.41	24.88
16	67.72	24.88
17	67.72	28.88
18	71.75	31.66
19	75.51	31.66
20	75.8	32.43
21	79.07	32.43
22	79.07	36.43
23	83.49	38.64
24	88.14	38.73
25	88.24	38.95
26	92.26	38.95
27	92.26	42.95
28	95.7	44.38
29	104.36	44.38
30	104.36	48.38
31	115.54	50.26
32	121.1	50.26
33	121.67	51.39
34	124.88	51.39
35	124.88	55.39
36	132.31	58.76
37	137.8	58.76
38	137.86	58.87
39	141.47	58.87
40	141.47	62.87
41	145.87	64.54
42	152.55	64.54
43	193.09	64.54
44	193.09	65.24
45	194.09	65.24
46	200.34	67.49
47	203.83	67.49
48	203.83	70.09
49	204.83	70.09
50	211.16	72.53
51	214.58	72.53
52	214.58	75.13
53	215.58	75.13
54	221.76	77.58
55	225.19	77.58
56	225.19	80.18
57	226.19	80.18
58	232.35	82.54
59	235.79	82.54
60	235.79	85.14
61	236.79	85.14
62	242.59	87.91
63	246.31	87.87
64	246.38	90.51
65	247.41	90.51
66	252.88	92.62
67	254.69	92.62
68	254.7	95.22
69	255.7	95.22
70	261.93	97.54
71	265.24	97.54
72	265.24	100.14
73	266.24	100.14
74	272.02	102.54
75	276.14	102.54
76	276.14	105.14

77	277.14	105.14
78	282.79	107.56
79	287.09	107.56
80	287.09	110.16
81	288.09	110.16
82	296.09	112.54
83	299.97	112.54
84	299.97	115.14
85	300.97	115.14
86	307.85	117.6
87	315.6	117.6
88	315.6	120.2
89	316.6	120.2
90	324.51	122.58
91	329.47	122.58
92	329.47	125.18
93	330.47	125.18
94	339.18	127.6
95	344.88	127.6
96	344.88	130.2
97	345.88	130.2
98	355.93	132.19
99	355.93	132.19
100	433.8	133.0 2

Falda

Nr.	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	10.01	2.0
4	15.11	1.47
5	16.36	1.44
6	18.66	2.93
7	20.45	6.09
8	102.78	22.6
9	102.8	22.6
10	159.6	45.8
11	159.6	45.8
12	294.28	96.5
13	294.29	96.5
14	330.58	115.8
15	330.6	115.8
16	363.07	120.8
17	363.1	120.8
18	414.33	131.5
19	433.8	136.4 5

Vertici strato 1

N	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	5.02	2.5
4	10.01	2.0
5	15.11	1.47
6	16.36	1.44
7	18.66	2.93
8	21.06	7.15
9	22.59	7.61
10	26.5	8.1
11	32.75	9.52
12	42.61	12.6

13	48.71	13.21
14	53.26	14.02
15	58.12	15.53
16	64.29	17.64
17	70.5	18.02
18	81.13	21.02
19	93.9	23.5
20	101.03	24.85
21	109.98	30.03
22	118.88	31.91
23	128.0	36.58
24	139.9	40.13
25	142.92	40.79
26	159.6	43.29
27	172.1	48.29
28	184.1	53.29
29	192.1	58.29
30	200.1	63.29
31	216.6	68.29
32	239.1	73.29
33	264.1	78.29
34	274.1	83.29
35	284.1	88.29
36	292.6	93.29
37	300.6	98.29
38	308.1	103.29
39	318.1	108.29
40	330.6	113.29
41	363.1	118.29
42	370.6	123.29
43	375.1	128.29
44	375.1	128.29
45	375.1	128.29
46	433.8	133.02
47	433.8	133.0 2

Vertici strato 2

N	X (m)	y (m)
1	0.0	0.0
2	5.02	2.5
3	5.02	2.5
4	10.01	2.0
5	15.11	1.47
6	16.36	1.44
7	18.66	2.93
8	19.56	4.52
9	22.25	5.7
10	66.68	13.34
11	100.36	19.1
12	118.09	19.1
13	161.53	39.47
14	200.09	51.87
15	224.02	63.38
16	261.26	69.58
17	289.18	80.21
18	310.9	95.71
19	344.58	107.22
20	376.94	110.76
21	433.8	116.0 5

Vertici strato 3

N	X (m)	y (m)
1	0.0	-10.56
2	13.59	-7.3
3	29.81	-2.65
4	33.05	-1.72
5	39.85	0.02
6	54.66	2.02
7	70.5	4.15
8	87.26	6.45
9	90.23	7.38
10	93.4	8.38
11	96.57	9.37
12	100.79	10.7
13	108.18	13.01
14	111.13	14.19
15	115.57	15.33
16	117.58	15.96
17	119.26	16.49
18	124.31	18.08
19	127.17	18.98
20	131.46	20.67
21	138.89	23.6
22	144.47	25.8
23	150.88	28.32
24	155.61	30.19
25	163.73	33.38
26	171.63	36.49
27	179.77	39.7
28	185.34	41.9
29	192.38	44.67
30	194.63	45.56
31	202.06	48.48
32	207.37	50.36
33	212.01	51.32
34	216.59	52.5
35	222.0	53.88
36	224.95	55.07
37	226.44	55.02
38	230.89	56.16
39	236.44	57.58
40	243.1	59.29
41	251.98	61.57
42	265.52	65.03
43	273.41	67.06
44	277.44	68.18
45	285.22	71.4
46	299.4	77.28
47	308.54	81.07
48	314.66	83.6
49	327.98	89.12
50	334.95	91.81
51	377.91	98.27
52	396.1	101.0
53	414.03	103.62
54	433.8	106. 1

Vertici superficie Nr...1

N	X m	y m
1	17.16	2.07
2	26.86	0.43

3	39.85	0.02
4	54.66	2.02
5	70.5	4.15
6	87.26	6.45
7	90.23	7.38
8	93.4	8.38
9	96.57	9.37
10	100.79	10.7
11	108.18	13.01
12	111.13	14.19
13	115.57	15.33
14	117.58	15.96
15	119.26	16.49
16	124.31	18.08
17	127.17	18.98
18	131.46	20.67
19	138.89	23.6
20	144.47	25.8
21	150.88	28.32
22	155.61	30.19
23	163.73	33.38
24	171.63	36.49
25	179.77	39.7
26	185.34	41.9
27	192.38	44.67
28	194.63	45.56
29	202.06	48.48
30	207.37	50.36
31	212.01	51.32
32	216.59	52.5
33	222.0	53.88
34	224.95	55.07
35	226.44	55.02
36	230.89	56.16
37	236.44	57.58
38	243.1	59.29
39	251.98	61.57
40	265.52	65.03
41	273.41	67.06
42	277.44	68.18
43	285.22	71.4
44	299.4	77.28
45	308.54	81.07
46	314.66	83.6
47	327.98	89.12
48	334.95	91.81
49	357.78	100.53
50	380.61	112.19
51	405.32	128.03
52	413.36	132.85

Coefficienti parziali per i parametri geotecnici del terreno

Tangente angolo di resistenza al taglio	1.25
Coesione efficace	1.25
Coesione non drenata	1.4
Riduzione parametri geotecnici terreno	Si

Stratigrafia

c: coesione; cu: coesione non drenata; Fi: Angolo di attrito; G: Peso Specifico; Gs: Peso Specifico Saturo; K: Modulo di Winkler

Strato	c (kg/cm²)	cu (kg/cm²)	Fi (°)	G (Kg/m³)	Gs (Kg/m³)	K (Kg/cm³)	Litologia	
1	0.0383		29.6	1837	2063	0.00		
2	0		26.51	1695	1905	0.00		
3	0.3305		30.52	2402	2698	0.00		
4	0.4352		33.31	2402	2698	0.00		

Muri di sostegno - Caratteristiche geometriche

N°	x (m)	y (m)	Base mensola a valle (m)	Base mensola a monte (m)	Altezza muro (m)	Spessore testa (m)	Spessore base (m)	Peso specifico (Kg/m³)
1	44.17	12.38	0	0.1	6	2	4	2800
2	67.72	24.88	0	0.1	4	3	4	2800
3	79.07	32.43	0	0.1	4	3	4	2800
4	92.26	38.95	0	0.1	4	3	4	2800
5	104.36	44.38	0	0.1	4	3	4	2800
6	124.88	51.39	0	0.1	4	3	4	2800
7	141.47	58.87	0	0.1	4	3	4	280 0

Pali...

N°	x (m)	y (m)	Diametro (m)	Lunghezza (m)	Inclinazione (°)	Interasse (m)
1	41.06261	10.87895	0.2	6	90	3.6
2	43.08037	10.87895	0.2	6	90	3.6

Superficie Nr...1 Fattore di sicurezza=1.30

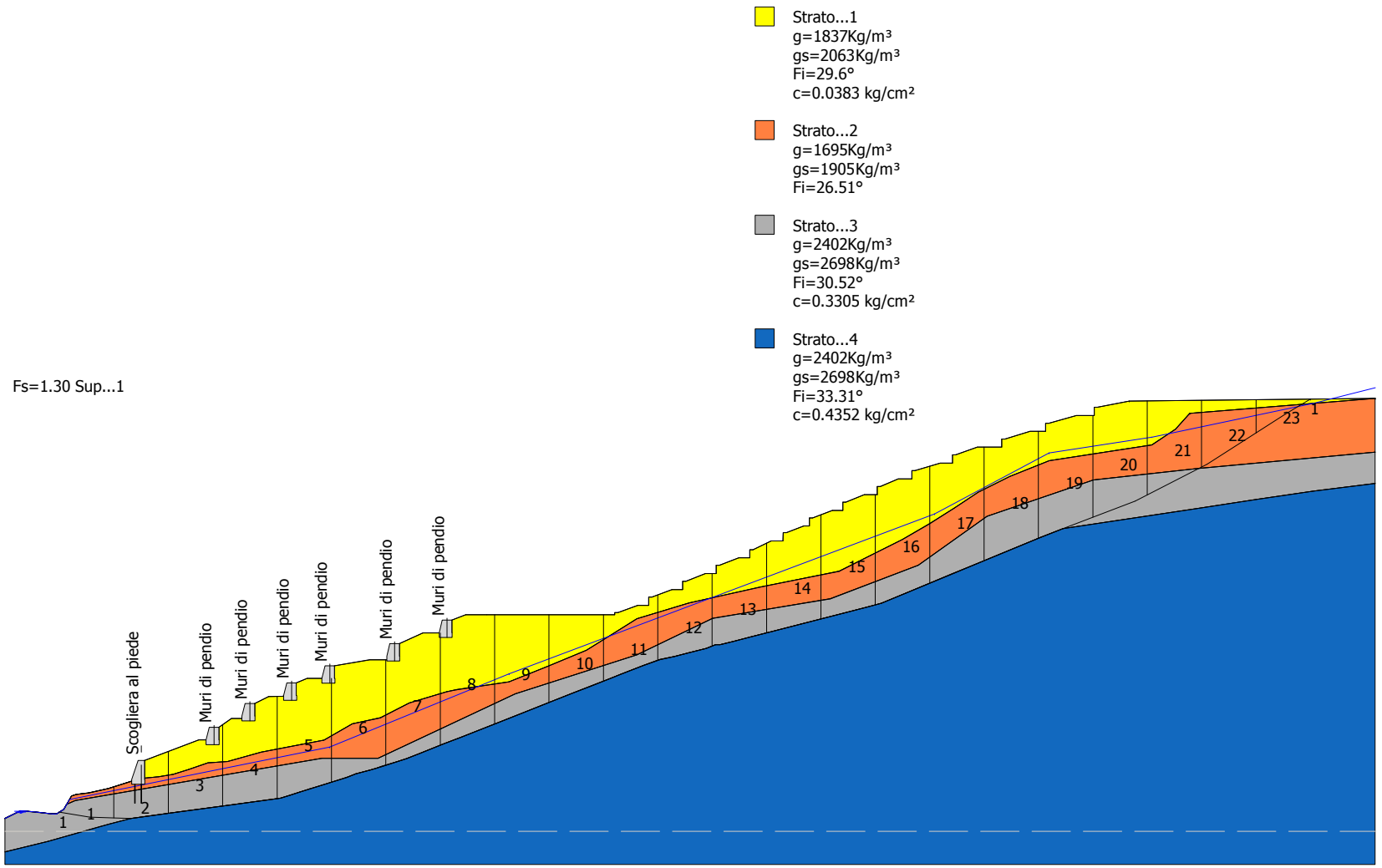
Nr.	B m	Alfa (°)	Li m	Wi (Kg)	Kh•Wi (Kg)	Kv•Wi (Kg)	c (kg/cm²)	Fi (°)	Ui (Kg)	N'i (Kg)	Ti (Kg)
1	17.22	-6.1	17.32	294655.0	9134.31	4714.48	0.26	25.2	6061.5	204231.0	119825.9
2	17.22	4.7	17.28	551376.1	17092.66	8822.02	0.26	25.2	9726.8	369904.7	185189.7
3	17.22	7.7	17.37	879791.8	27273.54	14076.67	0.26	25.2	11306.8	651466.4	298761.8
4	17.22	7.8	17.38	1066216.0	33052.71	17059.46	0.26	25.2	12420.9	811073.3	362580.8
5	17.22	16.8	17.99	1299788.0	40293.44	20796.62	0.26	25.2	12088.8	1007898.0	458013.6
6	17.22	17.4	18.04	1192165.0	36957.11	19074.64	0.35	27.7	0.0	1083158.0	555541.3
7	17.22	20.0	18.32	1301314.0	40340.72	20821.02	0.26	25.2	13345.2	983950.4	457217.3
8	17.22	21.5	18.5	1350953.0	41879.54	21615.25	0.35	27.7	0.0	1219064.0	635527.8
9	17.22	21.5	18.5	1102428.0	34175.25	17638.84	0.26	25.2	13974.8	787475.6	378735.2
10	17.22	21.5	18.5	869081.4	26941.52	13905.3	0.26	25.2	13674.3	575287.8	288562.8
11	17.22	21.0	18.44	699653.5	21689.26	11194.46	0.35	27.7	0.0	623361.9	351853.9
12	17.22	14.7	17.8	826420.3	25619.03	13222.72	0.26	25.2	14384.6	532674.8	258585.7
13	17.22	13.5	17.71	950483.1	29464.97	15207.73	0.26	25.2	16533.5	616763.2	291170.2
14	17.22	14.4	17.77	1086820.0	33691.41	17389.12	0.35	27.7	0.0	996138.7	506779.9
15	17.22	14.5	17.78	1235653.0	38305.23	19770.44	0.26	25.2	20786.5	813247.6	372891.2
16	17.22	21.8	18.54	1288954.0	39957.56	20623.26	0.26	25.2	21599.4	838669.4	401333.6
17	17.22	22.5	18.64	1353832.0	41968.79	21661.31	0.26	25.2	22171.1	889432.6	425389.6
18	17.22	22.5	18.64	1334587.0	41372.18	21353.39	0.35	27.7	0.0	1202476.0	632563.1
19	17.22	21.1	18.45	1293568.0	40100.62	20697.09	0.26	25.2	24491.0	797206.3	381578.6
20	17.22	22.3	18.61	1188706.0	36849.89	19019.3	0.26	25.2	20290.4	766056.8	372084.3
21	17.22	27.0	19.33	864046.0	26785.43	13824.74	0.26	25.2	15399.7	541306.8	288375.9
22	17.22	32.1	20.33	503402.3	15605.47	8054.44	0.0	21.8	9196.9	336721.7	133023.8
23	17.22	31.9	20.28	165897.1	5142.81	2654.35	0.0	21.8	2031.7	127620.1	50280.8

CARICO LIMITE PALI ESISTENTI

Superficie Nr...1 Fattore di sicurezza=1.30

Micropali Fondazione x=41.06261 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m

Micropali Fondazione x=43.08037 Y=10.87895 Plim=0.0 Kg Sbalzo del palo 0.00 m


Strato...1
g=1837Kg/m³
gs=2063Kg/m³
Fi=29.6°
c=0.0383 kg/cm²
Strato...2
g=1695Kg/m³
gs=1905Kg/m³
Fi=26.51°
Strato...3
g=2402Kg/m³
gs=2698Kg/m³
Fi=30.52°
c=0.3305 kg/cm²
Strato...4
g=2402Kg/m³
gs=2698Kg/m³
Fi=33.31°
c=0.4352 kg/cm²
Fs=1.30 Sup...1
Scogliera al piede
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio
Muri di pendio