CONCESSIONI AUTOSTRADALI LOMBARDE

tangenziale esterna

TANGENZIALE EST ESTERNA DI MILANO

CODICE C.U.P. I21B05000290007
CODICE C.I.G. 017107578C

VARIANTE AL PROGETTO ESECUTIVO

LOTTO B

PROGETTO ESECUTIVO DELLE CAVE DI PRESTITO

PROGETTO DELLE CAVE DI PRESTITO

CAVA DI GHIAIA E SABBIA NEI COMUNI DI POZZUOLO MARTESANA E MELZO

VERIFICHE STABILITA' SCARPATE

I PROGETTISTI

EN GEO S.r.l. ENGINEERING GEOLOGY

Dr. Geol. Carlo Caleffi
Ordine dei Geologi della Lombardia n° 554

Dr. Geol. Francesco Cerutti
Ordine dei Geologi dell'Emilia Romagna n° 691

CONSORZIO ARCOTEEM

consorzio arco teem

Dott. Ing. Sabino Del Balzo
Ordine Ingegneri di Potenza n. 631

CONSORZIO COSTRUTTORI TEEM
IL DIRETTORE TECNICO

Dott. Ing. Rocco Magri

RESPONSABILE INTEGRAZIONE PRESTAZIONI SPECIALISTICHE

Dott. Ing. Pietro Mazzoli
Ordine Ingegneri di Parma n. 821

IL CONCEDENTE

CONCESSIONI AUTOSTRADALI LOMBARDE

IL CONCESSIONARIO

tangenziale esterna

IL DIRETTORE DEI LAVORI

EM./REV	DATA	DESCRIZIONE	ELABORAZIONE PROGETTUALE	CONTR.	APPROVATO
0	30/04/2013	EMISSIONE	POLIDORO	CALEFFI	MAZZOLI

IDENTIFICAZIONE ELABORATO

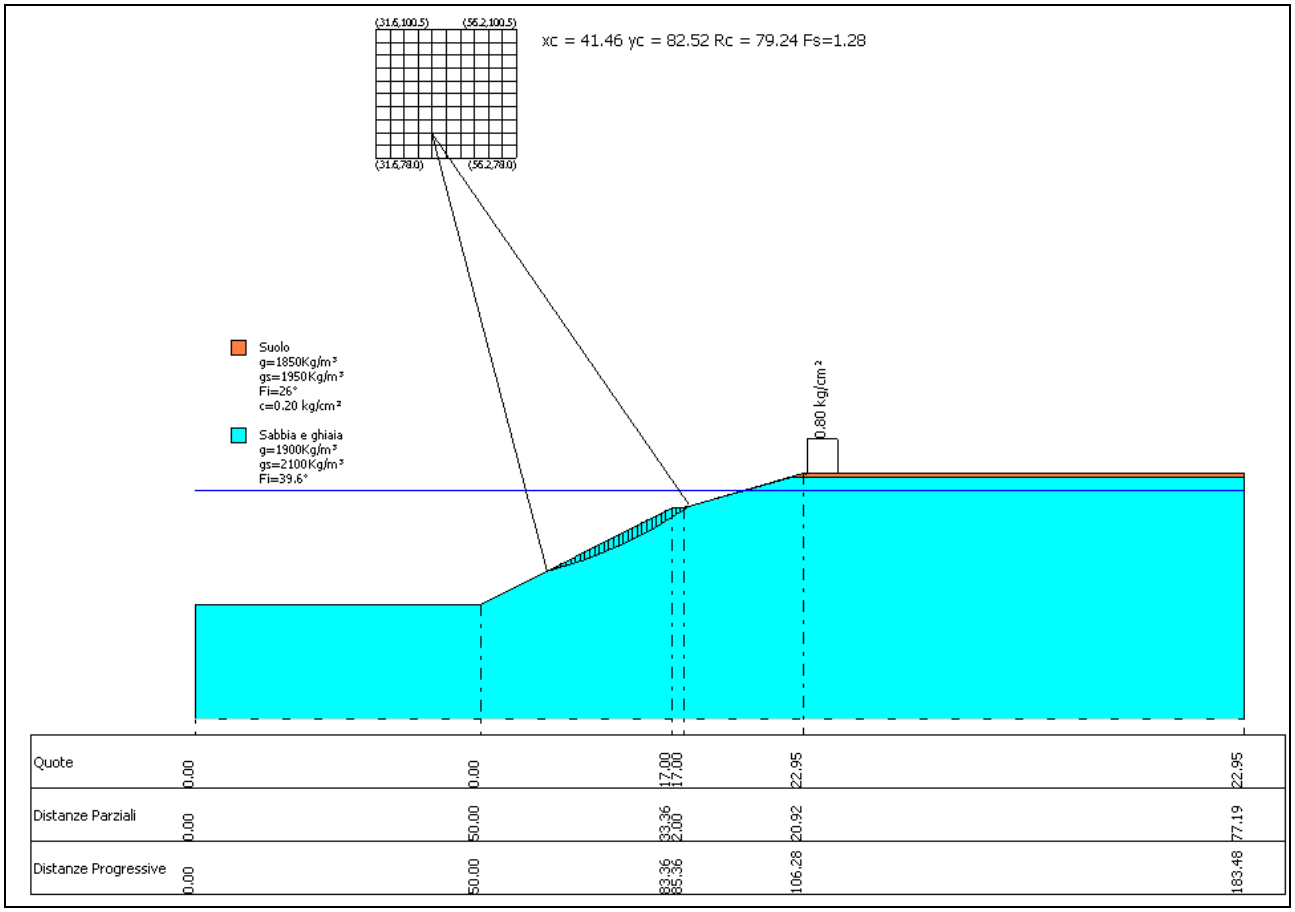
NUM. PROGR.	FASE	LOTTO	ZONA	OPERA	TRATTO OPERA	AMBITO	TIPO ELABORATO	PROGRESSIVA	REV.
B7526	V	B	AB3	000000	0	CP	RC	003	A

DATA: 30/04/2013

SCALA:

INDICE

1. VERIFICA DI STABILITÀ DELLE SCARPATE DI SCAVO



Analisi di stabilità dei pendii con SARMA

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Normativa	NTC 2008
Numero di strati	2.0
Numero dei conci	30.0
Grado di sicurezza ritenuto accettabile	1.1
Coefficiente parziale resistenza	1.1
Analisi	Condizione drenata

Superficie di forma circolare

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Maglia dei Centri

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Ascissa vertice sinistro inferiore xi	31.62 m
Ordinata vertice sinistro inferiore yi	78.01 m
Ascissa vertice destro superiore xs	56.22 m
Ordinata vertice destro superiore ys	100.53 m
Passo di ricerca	10.0
Numero di celle lungo x	10.0
Numero di celle lungo y	10.0

==========

Vertici profilo

N	X m	y m
1	0.0	0.0
2	50.0	0.0
3	83.36	17.0
4	85.36	17.0
5	106.28	22.95
6	183.48	22.9 5

Falda

Nr.	X (m)	y (m)
1	0.0	20.0
2	183.48	20. 0

Vertici strato 1

N	X (m)	y (m)
1	0.0	0.0
2	50.0	0.0
3	83.36	17.0
4	85.36	17.0
5	104.17	22.35
6	183.48	22.35

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

Strato	c (kg/cm²)	cu (kg/cm²)	Fi (°)	G (Kg/m³)	Gs (Kg/m³)	Litologia	
1	0.20		26	1850	1950	Suolo	
2	0		39.6	1900	2100	Sabbia e ghiaia	

Carichi distribuiti

N°	xi (m)	yi (m)	xf (m)	yf (m)	Carico esterno (kg/cm²)
1	107	22.95	112.5	22.95	0.8

R Raggio superficie 79.24 m

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

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Fs minimo individuato 1.28
Ascissa centro superficie 41.46 m
Ordinata centro superficie 82.52 m
Raggio superficie 79.24 m

==========

B: Larghezza del concio; Alfa: Angolo di inclinazione della base del concio; Li: Lunghezza della base del concio; Wi: Peso del concio; Ui: Forze derivanti dalle pressioni neutre; Ni: forze agenti normalmente alla direzione di scivolamento; Ti: forze agenti parallelamente alla superficie di scivolamento; Ei, Ei-1: Forze agenti normalmente alle facce del concio; Xi, Xi-1: Forze di tipo tagliante applicate sulle facce laterali.

Analisi dei conci. Superficie...xc = 41.459 yc = 82.518 Rc = 79.235 Fs=1.2818

Nr.	B m	Alfa (°)	Li m	Wi (Kg)
1	0.83	14.96	0.86	161.65
2	0.83	15.58	0.86	473.39
3	0.83	16.21	0.87	769.62
4	0.83	16.84	0.87	1050.21
5	0.83	17.47	0.87	1314.98
6	0.83	18.1	0.88	1563.79
7	0.83	18.74	0.88	1796.46
8	0.83	19.37	0.88	2012.81
9	0.83	20.01	0.89	2212.66
10	0.83	20.66	0.89	2395.8
11	0.83	21.3	0.89	2562.02
12	0.83	21.95	0.9	2711.12
13	0.83	22.6	0.9	2842.83
14	0.83	23.25	0.91	2956.94
15	0.83	23.91	0.91	3053.18
16	0.83	24.57	0.92	3131.28
17	0.83	25.24	0.92	3190.96
18	0.83	25.9	0.93	3231.9
19	0.83	26.58	0.93	3253.81
20	0.83	27.25	0.94	3256.34
21	0.83	27.93	0.94	3239.16
22	0.83	28.61	0.95	3201.87
23	0.83	29.3	0.96	3144.1
24	0.83	30.0	0.96	3065.43
25	0.83	30.69	0.97	2965.43
26	1.04	31.49	1.22	3543.1
27	0.62	32.2	0.73	1813.27
28	0.83	32.82	0.99	1695.4
29	0.83	33.54	1.0	833.49
30	0.83	34.26	1.01	264.62

Sforzi sui conci

Nr.	Xi (Kg)	Ei (Kg)	Xi-1 (Kg)	Ei-1 (Kg)	N'i (Kg)	Ti (Kg)	Ui (Kg)
1	-24.93	33.52	0.0	0.0	171.6	80.54	0.0
2	-81.57	122.77	-24.93	33.52	486.56	228.38	0.0
3	-145.18	253.74	-81.57	122.77	763.54	358.39	0.0
4	-213.51	417.0	-145.18	253.74	1023.28	480.3	0.0
5	-284.52	603.76	-213.51	417.0	1265.99	594.22	0.0
6	-356.41	805.81	-284.52	603.76	1491.94	700.28	0.0
7	-427.58	1015.51	-356.41	805.81	1701.28	798.54	0.0
8	-496.64	1225.87	-427.58	1015.51	1894.2	889.09	0.0
9	-562.37	1430.4	-496.64	1225.87	2070.79	971.97	0.0
10	-623.73	1623.24	-562.37	1430.4	2231.17	1047.25	0.0
11	-679.83	1799.05	-623.73	1623.24	2375.38	1114.94	0.0
12	-729.97	1953.17	-679.83	1799.05	2503.5	1175.08	0.0
13	-773.53	2081.38	-729.97	1953.17	2615.45	1227.63	0.0
14	-810.04	2180.11	-773.53	2081.38	2711.27	1272.6	0.0
15	-839.18	2246.42	-810.04	2180.11	2790.9	1309.98	0.0
16	-860.72	2277.88	-839.18	2246.42	2854.2	1339.69	0.0
17	-874.52	2272.71	-860.72	2277.88	2901.08	1361.69	0.0
18	-880.54	2229.73	-874.52	2272.71	2931.36	1375.9	0.0
19	-878.87	2148.43	-880.54	2229.73	2944.89	1382.26	0.0
20	-869.63	2028.97	-878.87	2148.43	2941.41	1380.62	0.0
21	-853.04	1872.1	-869.63	2028.97	2920.66	1370.88	0.0
22	-829.39	1679.32	-853.04	1872.1	2882.34	1352.9	0.0
23	-799.04	1452.91	-829.39	1679.32	2826.14	1326.52	0.0
24	-762.37	1195.79	-799.04	1452.91	2751.62	1291.54	0.0
25	-719.88	911.74	-762.37	1195.79	2658.43	1247.8	0.0
26	-665.66	523.92	-719.88	911.74	3177.73	1491.55	0.0
27	-536.11	315.64	-665.66	523.92	1535.79	720.86	0.0
28	-333.17	114.5	-536.11	315.64	1363.25	639.87	0.0
29	-141.21	19.81	-333.17	114.5	587.03	275.54	0.0
30	0.0	0.0	-141.21	19.81	113.15	53.11	0.0

Numero di superfici esaminate....(210)

N°	Xo	Yo	Ro	Fs
1	31.6	78.0	81.3	18.17
2	34.1	78.0	82.1	2.46
3	35.3	79.1	80.6	18.17
4	36.5	78.0	79.9	18.17
5	37.8	79.1	78.2	18.17
6	39.0	78.0	77.6	18.17
7	40.2	79.1	75.7	18.17
8	41.5	78.0	75.0	18.17
9	42.7	79.1	76.4	18.17
10	43.9	78.0	79.2	1.58
11	45.1	79.1	80.6	1.64
12	46.4	78.0	72.9	18.17

13	47.6	79.1	74.3	18.17
14	48.8	78.0	73.6	18.17
15	50.1	79.1	78.7	1.56
16	51.3	78.0	85.7	2.27
17	52.5	79.1	71.7	18.17
18	53.8	78.0	70.9	18.17
19	55.0	79.1	72.3	18.17
20	56.2	78.0	79.7	1.81
21	35.3	81.4	85.7	18.17
22	36.5	80.3	78.9	18.17
23	37.8	81.4	80.3	18.17
24	39.0	80.3	79.7	18.17
25	40.2	81.4	77.9	18.17
26	41.5	80.3	77.1	18.17
27	42.7	81.4	78.5	18.17
28	43.9	80.3	77.8	18.17
29	45.1	81.4	75.8	18.17
30	46.4	80.3	75.0	1.34
31	47.6	81.4	76.4	18.17
32	48.8	80.3	75.6	18.17
33	50.1	81.4	77.0	18.17
34	51.3	80.3	72.5	18.17
35	52.5	81.4	93.0	2.65
36	53.8	80.3	80.9	1.70
37	55.0	81.4	74.4	1.58
38	56.2	80.3	77.7	1.68
39	32.8	83.6	86.9	18.17
40	34.1	82.5	86.3	18.17
41	36.5	82.5	81.0	18.17
42	37.8	83.6	85.6	1.77
43	39.0	82.5	88.1	2.29
44	40.2	83.6	86.4	1.86
45	41.5	82.5	79.2	1.28
46	42.7	83.6	80.6	18.17
47	43.9	82.5	86.7	1.98
48	45.1	83.6	77.9	18.17
49	46.4	82.5	77.1	18.17
50	47.6	83.6	89.1	2.10
51	48.8	82.5	85.0	1.78
52	50.1	83.6	79.1	18.17
53	51.3	82.5	74.6	18.17
54	52.5	83.6	75.9	18.17
55	53.8	82.5	75.1	18.17
56	55.0	83.6	76.5	1.60
57	56.2	82.5	91.8	2.46
58	31.6	84.8	87.6	18.17
59	32.8	85.9	89.1	18.17
60	36.5	84.8	83.2	18.17
61	37.8	85.9	84.6	18.17
62	39.0	84.8	83.9	18.17
63	40.2	85.9	82.1	18.17
64	41.5	84.8	87.9	1.89

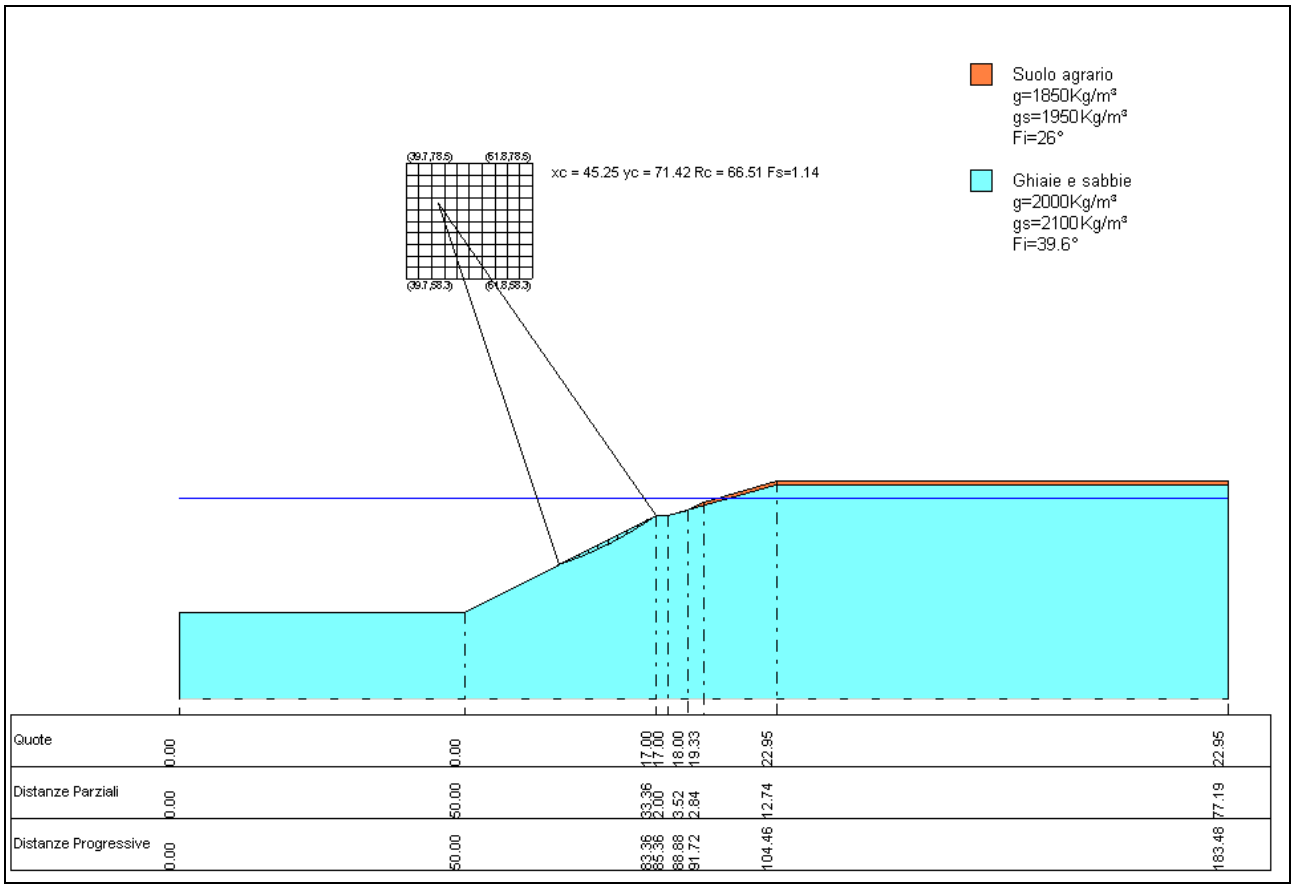
65	42.7	85.9	82.7	18.17
66	43.9	84.8	82.0	18.17
67	45.1	85.9	80.0	18.17
68	46.4	84.8	79.2	18.17
69	47.6	85.9	80.6	18.17
70	48.8	84.8	79.8	18.17
71	50.1	85.9	88.5	1.83
72	51.3	84.8	76.7	18.17
73	52.5	85.9	78.0	18.17
74	53.8	84.8	77.2	18.17
75	55.0	85.9	78.6	18.17
76	56.2	84.8	77.8	1.65
77	31.6	87.0	89.7	2.32
78	32.8	88.1	91.2	2.24
79	34.1	87.0	90.5	2.24
80	35.3	88.1	86.0	18.17
81	36.5	87.0	85.3	18.17
82	37.8	88.1	86.7	18.17
83	39.0	87.0	86.0	1.35
84	40.2	88.1	84.2	18.17
85	41.5	87.0	83.5	18.17
86	42.7	88.1	84.8	18.17
87	43.9	87.0	84.1	1.42
88	45.1	88.1	88.9	1.59
89	46.4	87.0	91.7	2.04
90	47.6	88.1	82.7	18.17
91	48.8	87.0	81.9	18.17
92	50.1	88.1	83.3	18.17
93	51.3	87.0	82.5	1.57
94	52.5	88.1	80.2	18.17
95	53.8	87.0	79.4	1.59
96	55.0	88.1	80.7	18.17
97	56.2	87.0	79.9	18.17
98	31.6	89.3	89.0	18.17
99	35.3	90.4	88.2	18.17
100	36.5	89.3	90.4	1.62
101	37.8	90.4	94.9	2.18
102	39.0	89.3	91.2	1.75
103	40.2	90.4	86.3	18.17
104	41.5	89.3	85.6	18.17
105	42.7	90.4	87.0	1.40
106	43.9	89.3	86.2	18.17
107	45.1	90.4	94.3	1.97
108	46.4	89.3	90.3	1.65
109	47.6	90.4	98.7	2.42
110	48.8	89.3	91.1	1.76
111	50.1	90.4	85.4	18.17
112	51.3	89.3	81.0	18.17
113	52.5	90.4	86.0	1.63
114	53.8	89.3	85.3	1.65
115	55.0	90.4	82.8	1.65
116	56.2	89.3	93.7	2.11

117	31.6	91.5	91.2	18.17
118	32.8	92.7	92.6	18.17
119	35.3	92.7	90.3	18.17
120	36.5	91.5	89.6	18.17
121	37.8	92.7	97.0	2.15
122	39.0	91.5	90.2	18.17
123	40.2	92.7	88.5	18.17
124	41.5	91.5	97.3	2.23
125	42.7	92.7	89.1	18.17
126	43.9	91.5	88.3	18.17
127	45.1	92.7	96.4	1.96
128	46.4	91.5	85.6	18.17
129	47.6	92.7	90.4	1.56
130	48.8	91.5	86.2	18.17
131	50.1	92.7	94.6	1.82
132	51.3	91.5	83.1	18.17
133	52.5	92.7	91.8	1.72
134	53.8	91.5	94.9	1.99
135	55.0	92.7	84.9	1.67
136	56.2	91.5	95.8	2.11
137	31.6	93.8	93.3	18.17
138	32.8	94.9	94.7	1.28
139	34.1	93.8	96.9	18.17
140	35.3	94.9	92.5	18.17
141	36.5	93.8	91.7	18.17
142	37.8	94.9	93.1	18.17
143	39.0	93.8	92.3	1.39
144	40.2	94.9	93.7	1.44
145	41.5	93.8	89.8	18.17
146	42.7	94.9	91.2	18.17
147	43.9	93.8	97.0	1.91
148	45.1	94.9	88.5	1.43
149	46.4	93.8	87.7	18.17
150	47.6	94.9	95.9	1.70
151	48.8	93.8	88.3	18.17
152	50.1	94.9	89.6	18.17
153	51.3	93.8	92.5	1.68
154	52.5	94.9	104.8	2.60
155	53.8	93.8	96.9	1.99
156	55.0	94.9	90.8	1.74
157	56.2	93.8	97.8	2.11
158	31.6	96.0	95.5	18.17
159	32.8	97.2	96.9	18.17
160	34.1	96.0	93.2	18.17
161	35.3	97.2	94.6	18.17
162	36.5	96.0	93.8	1.32
163	37.8	97.2	101.2	2.11
164	39.0	96.0	91.4	18.17
165	40.2	97.2	92.8	18.17
166	41.5	96.0	92.0	1.40
167	42.7	97.2	99.7	1.85
168	43.9	96.0	99.1	1.90

169	45.1	97.2	90.7	18.17
170	46.4	96.0	99.9	2.00
171	47.6	97.2	91.2	18.17
172	48.8	96.0	104.3	2.45
173	50.1	97.2	98.8	1.82
174	51.3	96.0	101.7	2.21
175	52.5	97.2	88.7	18.17
176	53.8	96.0	102.7	2.32
177	55.0	97.2	89.2	18.17
178	56.2	96.0	88.4	18.17
179	31.6	98.3	97.7	18.17
180	32.8	99.4	99.0	18.17
181	34.1	98.3	95.4	18.17
182	35.3	99.4	96.8	18.17
183	36.5	98.3	96.0	18.17
184	37.8	99.4	97.4	1.39
185	39.0	98.3	93.6	18.17
186	40.2	99.4	94.9	18.17
187	41.5	98.3	97.3	1.49
188	42.7	99.4	95.5	18.17
189	43.9	98.3	94.7	18.17
190	45.1	99.4	105.9	2.30
191	46.4	98.3	92.0	1.51
192	47.6	99.4	106.8	2.39
193	48.8	98.3	92.5	18.17
194	50.1	99.4	90.4	18.17
195	51.3	98.3	89.5	18.17
196	52.5	99.4	90.8	18.17
197	53.8	98.3	97.3	1.80
198	55.0	99.4	98.7	1.85
199	56.2	98.3	109.4	2.76
200	31.6	100.5	99.8	18.17
201	34.1	100.5	97.6	18.17
202	36.5	100.5	98.2	18.17
203	39.0	100.5	104.8	2.11
204	41.5	100.5	96.3	18.17
205	43.9	100.5	93.6	18.17
206	46.4	100.5	94.1	18.17
207	48.8	100.5	94.7	18.17
208	51.3	100.5	95.2	1.68
209	53.8	100.5	110.4	2.65
210	56.2	100.5	92.6	18.17

==========

2. VERIFICA DI STABILITÀ DELLE SCARPATE DI RECUPERO



Analisi di stabilità dei pendii con SARMA

==========

Normativa	NTC 2008
Numero di strati	2.0
Numero dei conci	10.0
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	39.74 m
Ordinata vertice sinistro inferiore yi	58.3 m
Ascissa vertice destro superiore xs	61.79 m
Ordinata vertice destro superiore ys	78.49 m

Passo di ricerca 10.0
Numero di celle lungo x 10.0
Numero di celle lungo y 10.0
==========

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: T1

S.L. Stato limite	TR Tempo ritorno [anni]	ag [m/s²]	F0 [-]	TC* [sec]
S.L.O.	30.0	0.25	2.5	0.19
S.L.D.	50.0	0.31	2.52	0.21
S.L.V.	475.0	0.76	2.55	0.28
S.L.C.	975.0	0.97	2.54	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.	0.375	0.2	0.0076	0.0038
S.L.D.	0.465	0.2	0.0095	0.0047
S.L.V.	1.14	0.2	0.0233	0.0116
S.L.C.	1.455	0.2	0.0297	0.0148

Coefficiente azione sismica orizzontale 0.0233
Coefficiente azione sismica verticale 0.0116

Vertici profilo

N	X m	y m
1	0.0	0.0
2	50.0	0.0
3	83.36	17.0
4	85.36	17.0
5	88.88	18.0
6	91.72	19.33
7	104.46	22.95
8	106.28	22.95
9	183.48	22.9 5

Falda

Nr.	X (m)	y (m)
1	0.0	20.0
2	183.48	20. 0

Vertici strato 1

N	X (m)	y (m)
1	0.0	0.0
2	50.0	0.0
3	83.36	17.0
4	85.36	17.0
5	104.17	22.35
6	183.48	22.35

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

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Stratigrafia

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

Strato	c (kg/cm²)	cu (kg/cm²)	Fi (°)	G (Kg/m³)	Gs (Kg/m³)	Litologia	
1	0		26	1850	1950	Suolo agrario	
2	0		39.6	2000	2100	Ghiaie e sabbie	

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

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Fs minimo individuato	1.14
Ascissa centro superficie	45.25 m
Ordinata centro superficie	71.42 m
Raggio superficie	66.51 m

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Analisi dei conci. Superficie...xc = 45.254 yc = 71.424 Rc = 66.514 Fs=1.1364

Nr.	B m	Alfa (°)	Li m	Wi (Kg)
1	1.71	19.34	1.81	483.96
2	1.71	20.91	1.83	1317.8
3	1.71	22.49	1.85	1968.26
4	1.71	24.09	1.87	2429.24

5	1.71	25.71	1.89	2693.73
6	1.71	27.35	1.92	2753.84
7	1.71	29.02	1.95	2600.59
8	1.71	30.72	1.99	2223.75
9	1.71	32.44	2.02	1611.6
10	1.71	34.2	2.06	750.7

Sforzi sui conci

Nr.	Xi (Kg)	Ei (Kg)	Xi-1 (Kg)	Ei-1 (Kg)	N'i (Kg)	Ti (Kg)	Ui (Kg)
1	-11.52	64.68	0.0	0.0	442.83	234.46	0.0
2	-80.46	207.86	-11.52	64.68	1234.75	653.74	0.0
3	-168.94	362.46	-80.46	207.86	1825.83	966.69	0.0
4	-242.11	479.49	-168.94	362.46	2216.46	1173.51	0.0
5	-279.97	528.87	-242.11	479.49	2415.87	1279.09	0.0
6	-275.07	498.8	-279.97	528.87	2429.55	1286.34	0.0
7	-230.55	395.59	-275.07	498.8	2259.41	1196.26	0.0
8	-158.39	244.25	-230.55	395.59	1903.82	1007.98	0.0
9	-78.16	89.63	-158.39	244.25	1357.64	718.81	0.0
10	0.0	0.0	-78.16	89.63	597.99	316.61	0.0

Numero di superfici esaminate....(221)

N°	Xo	Yo	Ro	Fs
1	39.7	58.3	60.0	1.68
2	40.8	59.3	61.3	1.65
3	41.9	58.3	60.9	1.71
4	43.0	59.3	58.5	1.17
5	44.2	58.3	58.0	1.19
6	45.3	59.3	59.1	1.24
7	46.4	58.3	58.1	1.25
8	47.5	59.3	59.1	1.29
9	48.6	58.3	54.3	1.15
10	49.7	59.3	55.3	1.20
11	50.8	58.3	54.3	1.23
12	51.9	59.3	55.3	1.27
13	53.0	58.3	54.3	1.30
14	54.1	59.3	55.3	1.33
15	55.2	58.3	50.5	1.16
16	56.3	59.3	51.5	1.25
17	57.4	58.3	50.5	1.28
18	58.5	59.3	51.5	1.35
19	59.6	58.3	50.5	1.36
20	60.7	59.3	51.5	1.40
21	61.8	58.3	50.5	1.43
22	39.7	60.3	61.8	1.59
23	40.8	61.3	63.1	1.58
24	41.9	60.3	62.6	1.66
25	43.0	61.3	60.3	1.17
26	44.2	60.3	59.8	1.20

27	45.3	61.3	61.1	1.25
28	46.4	60.3	60.1	1.27
29	47.5	61.3	57.4	1.15
30	48.6	60.3	56.3	1.17
31	49.7	61.3	57.4	1.23
32	50.8	60.3	56.3	1.25
33	51.9	61.3	57.4	1.29
34	53.0	60.3	56.3	1.31
35	54.1	61.3	57.4	1.35
36	55.2	60.3	52.5	1.20
37	56.3	61.3	53.6	1.27
38	57.4	60.3	52.5	1.31
39	58.5	61.3	53.6	1.36
40	59.6	60.3	52.5	1.38
41	60.7	61.3	53.6	1.42
42	61.8	60.3	52.5	1.45
43	39.7	62.3	63.6	1.51
44	40.8	63.3	64.9	1.53
45	41.9	62.3	64.4	1.62
46	43.0	63.3	62.1	1.17
47	44.2	62.3	61.6	1.21
48	45.3	63.3	62.9	1.25
49	46.4	62.3	62.2	1.29
50	47.5	63.3	59.4	1.16
51	48.6	62.3	58.4	1.19
52	49.7	63.3	59.4	1.25
53	50.8	62.3	58.4	1.26
54	51.9	63.3	59.4	1.31
55	53.0	62.3	58.4	1.33
56	54.1	63.3	55.6	1.19
57	55.2	62.3	54.6	1.24
58	56.3	63.3	55.6	1.31
59	57.4	62.3	54.6	1.34
60	58.5	63.3	55.6	1.37
61	59.6	62.3	54.6	1.40
62	60.7	63.3	55.6	1.44
63	61.8	62.3	54.6	1.46
64	39.7	64.4	65.4	1.44
65	40.8	65.4	66.7	1.48
66	41.9	64.4	66.2	1.57
67	43.0	65.4	63.9	1.17
68	44.2	64.4	63.4	1.22
69	45.3	65.4	64.7	1.26
70	46.4	64.4	60.4	1.15
71	47.5	65.4	61.4	1.19
72	48.6	64.4	60.4	1.22
73	49.7	65.4	61.4	1.26
74	50.8	64.4	60.4	1.29
75	51.9	65.4	61.4	1.32
76	53.0	64.4	60.4	1.34
77	54.1	65.4	57.6	1.23
78	55.2	64.4	56.6	1.27

79	56.3	65.4	57.6	1.34
80	57.4	64.4	56.6	1.36
81	58.5	65.4	57.6	1.39
82	59.6	64.4	56.6	1.42
83	60.7	65.4	57.6	1.45
84	61.8	64.4	56.6	1.48
85	39.7	66.4	67.2	1.36
86	40.8	67.4	68.5	1.44
87	41.9	66.4	64.5	1.15
88	43.0	67.4	65.8	1.18
89	44.2	66.4	65.2	1.23
90	45.3	67.4	66.5	1.27
91	46.4	66.4	62.2	1.15
92	47.5	67.4	63.4	1.22
93	48.6	66.4	62.4	1.25
94	49.7	67.4	63.4	1.29
95	50.8	66.4	62.4	1.30
96	51.9	67.4	63.4	1.33
97	53.0	66.4	62.4	1.35
98	54.1	67.4	59.6	1.27
99	55.2	66.4	58.6	1.30
100	56.3	67.4	59.6	1.35
101	57.4	66.4	58.6	1.37
102	58.5	67.4	59.6	1.41
103	59.6	66.4	58.6	1.44
104	60.7	67.4	59.6	1.47
105	61.8	66.4	58.6	1.49
106	39.7	68.4	72.4	1.95
107	40.8	69.4	70.3	1.40
108	41.9	68.4	66.3	1.15
109	43.0	69.4	67.6	1.20
110	44.2	68.4	67.0	1.24
111	45.3	69.4	68.3	1.28
112	46.4	68.4	64.0	1.16
113	47.5	69.4	65.3	1.23
114	48.6	68.4	64.4	1.26
115	49.7	69.4	65.4	1.30
116	50.8	68.4	64.4	1.32
117	51.9	69.4	65.4	1.35
118	53.0	68.4	60.6	1.23
119	54.1	69.4	61.6	1.30
120	55.2	68.4	60.6	1.34
121	56.3	69.4	61.6	1.37
122	57.4	68.4	60.6	1.39
123	58.5	69.4	61.6	1.43
124	59.6	68.4	60.6	1.45
125	60.7	69.4	61.6	1.48
126	61.8	68.4	60.6	1.51
127	39.7	70.4	74.2	1.91
128	40.8	71.4	72.1	1.36
129	41.9	70.4	68.2	1.15
130	43.0	71.4	69.4	1.21

131	44.2	70.4	68.9	1.25
132	45.3	71.4	66.5	1.14
133	46.4	70.4	65.9	1.18
134	47.5	71.4	67.1	1.25
135	48.6	70.4	66.4	1.28
136	49.7	71.4	67.4	1.31
137	50.8	70.4	66.4	1.33
138	51.9	71.4	67.4	1.36
139	53.0	70.4	62.6	1.26
140	54.1	71.4	63.7	1.33
141	55.2	70.4	62.6	1.35
142	56.3	71.4	63.7	1.39
143	57.4	70.4	62.6	1.41
144	58.5	71.4	63.7	1.45
145	59.6	70.4	62.6	1.46
146	60.7	71.4	63.7	1.50
147	61.8	70.4	62.6	1.52
148	39.7	72.4	76.0	1.86
149	40.8	73.4	77.3	1.86
150	41.9	72.4	70.0	1.16
151	43.0	73.4	71.3	1.23
152	44.2	72.4	70.7	1.25
153	45.3	73.4	68.4	1.14
154	46.4	72.4	67.7	1.19
155	47.5	73.4	69.0	1.25
156	48.6	72.4	68.3	1.29
157	49.7	73.4	69.5	1.33
158	50.8	72.4	68.5	1.35
159	51.9	73.4	69.5	1.37
160	53.0	72.4	64.7	1.29
161	54.1	73.4	65.7	1.35
162	55.2	72.4	64.7	1.37
163	56.3	73.4	65.7	1.41
164	57.4	72.4	64.7	1.43
165	58.5	73.4	65.7	1.46
166	59.6	72.4	64.7	1.48
167	60.7	73.4	65.7	1.52
168	61.8	72.4	64.7	1.54
169	39.7	74.5	77.8	1.83
170	40.8	75.5	72.5	1.14
171	41.9	74.5	71.9	1.17
172	43.0	75.5	73.1	1.24
173	44.2	74.5	72.5	1.27
174	45.3	75.5	70.3	1.15
175	46.4	74.5	69.6	1.21
176	47.5	75.5	70.8	1.27
177	48.6	74.5	70.2	1.30
178	49.7	75.5	71.4	1.35
179	50.8	74.5	70.5	1.36
180	51.9	75.5	67.7	1.29
181	53.0	74.5	66.7	1.33
182	54.1	75.5	67.7	1.37

183	55.2	74.5	66.7	1.37
184	56.3	75.5	67.7	1.42
185	57.4	74.5	66.7	1.44
186	58.5	75.5	67.7	1.47
187	59.6	74.5	66.7	1.49
188	60.7	75.5	67.7	1.53
189	61.8	74.5	62.9	1.55
190	39.7	76.5	76.4	1.24
191	40.8	77.5	74.4	1.15
192	41.9	76.5	73.7	1.19
193	43.0	77.5	75.0	1.25
194	44.2	76.5	74.4	1.28
195	45.3	77.5	72.1	1.17
196	46.4	76.5	71.5	1.23
197	47.5	77.5	72.7	1.29
198	48.6	76.5	72.1	1.32
199	49.7	77.5	73.3	1.35
200	50.8	76.5	72.5	1.37
201	51.9	77.5	69.7	1.32
202	53.0	76.5	68.7	1.35
203	54.1	77.5	69.7	1.36
204	55.2	76.5	68.7	1.40
205	56.3	77.5	69.7	1.44
206	57.4	76.5	68.7	1.45
207	58.5	77.5	69.7	1.49
208	59.6	76.5	68.7	1.51
209	60.7	77.5	69.7	1.55
210	61.8	76.5	64.9	1.55
211	39.7	78.5	78.2	1.25
212	41.9	78.5	75.6	1.21
213	44.2	78.5	76.3	1.28
214	46.4	78.5	73.4	1.25
215	48.6	78.5	73.9	1.33
216	50.8	78.5	74.5	1.38
217	53.0	78.5	70.7	1.36
218	55.2	78.5	70.7	1.42
219	57.4	78.5	70.7	1.47
220	59.6	78.5	70.7	1.53
221	61.8	78.5	66.9	1.54

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