

Comune di PESCIA

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LAVORI DI RIDUZIONE E MESSA IN SICUREZZA DEL DISSESTO IDROGEOLOGICO IN LOCALITA' COLLODI-CASTELLO - 2° LOTTO FUNZIONALE -

PROGETTO ESECUTIVO

Venturi & Motta

Studio Tecnico Associato

PROGETTISTA e DLL :

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verifiche di stabilità.doc					

1. - VERIFICA DI STABILITA' GLOBALE PENDICE POST-INTERVENTO AREA CIMITERO

Il punto 6.3.4 delle NTC 2018 prevede che la valutazione del coefficiente di sicurezza dei pendii naturali venga eseguita impiegando i parametri geotecnici (congruenti con i caratteri del cinematiso atteso o accertato) presi con il loro valore caratteristico.

Stante ciò, la verifica di stabilità globale della pendice nella situazione post-intervento nell'area del Cimitero è svolta utilizzando i seguenti parametri geomeccanici dei terreni determinati nello studio geologico mediante tecniche di back-analysis.

Strato	Parametri strato
1	- Angolo attrito $\phi' = 16^\circ$ (back analysis) - Coesione $C' = \text{daN/cm}^2 0,00$ - Peso volume $G = \text{KN/mc} 18,0$ - Peso volume saturo $G_s = \text{KN/mc} 19,0$
2	- Angolo attrito $\phi' = 29^\circ$ - Coesione $C' = \text{daN/cm}^2 0,04$ - Peso volume $G = \text{KN/mc} 19,5$ - Peso volume saturo $G_s = \text{KN/mc} 20,5$

Il coefficiente γ_R è assunto pari a 1,10.

I coefficienti delle azioni sismiche considerate sono i seguenti.

- Vita nominale $V_N = 50$ anni
- Classe d'uso: II
- Coefficiente d'uso $C_U = 1$
- Periodo di riferimento $V_R = 50$ anni

Stato limite di salvaguardia della vita (SLV):

- tempo di ritorno = 475 anni
- latitudine sito = 43,90 - longitudine sito = 10,658
- $a_g = 0,137$ $F_0 = 2,423$ $T_c^* = 0,29$
- categoria topografica: T2 $S_T = 1,20$
- categoria del sottosuolo: E
- $S_S = 1,60$ $S = S_S \times S_T = 1,92$
- $k_h = \beta_s \times a_{\max} = 0,24 \times 1,92 \times 0,137 = 0,063$ - $k_v = 0,5$ $k_h = 0,032$

Le opere di consolidamento sono state schematizzate come strutture continue in conglomerato cementizio con la stessa resistenza a taglio.

La trincea drenante comporta un locale abbassamento della falda.

Nello schema di calcolo sono inseriti gli scarichi fondazionali dei blocchi loculi. In particolare questi scarichi sono valutabili in daN/cm^2 0,30-0,50. Poiché questi scarichi danno un contributo positivo alla verifica di stabilità, nello schema è inserito il valore minimo del range di variabilità (daN/cm^2 0,30).

La Cappella Scaglietti - Arcangeli è fondata su micropali e pertanto nello schema non è stato inserito nessun suo scarico fondazionale, anche perchè è stato comunque verificato che esso avrebbe dato un contributo positivo alla verifica di stabilità.

La verifica è svolta in condizioni sismiche con il programma STABL, che utilizza il metodo di Bishop modificato.

Nel seguito sono riportati gli stampati ottenuti con questo programma; in essi sono riassunti tutti i dati utilizzati nei calcoli (geometria del pendio, caratteristiche dei terreni, carichi esterni, ecc.) ed i risultati ottenuti.

Si è ottenuto in particolare un coefficiente di sicurezza F minimo pari a 1,25, superiore al valore minimo di γ_R richiesto.

A favore di sicurezza si è anche ripetuta la verifica utilizzando parametri geomeccanici dei terreni ridotti con i seguenti coefficienti γ_M :

- $\gamma_\phi = 1,25$ $\gamma_{c'} = 1,25$ $\gamma_\gamma = 1,00$

Strato	Parametri strato	Parametri ridotti
1	<ul style="list-style-type: none"> - Angolo attrito $\phi' = 16^\circ$ - Coesione $C' = \text{daN/cmq } 0,00$ - Peso volume $G = \text{KN/mc } 18,0$ - Peso volume saturo $G_s = \text{KN/mc } 19,0$ 	<ul style="list-style-type: none"> - Angolo attrito $\phi' = 12,9^\circ$ - Coesione $C' = \text{daN/cmq } 0,00$ - Peso volume $G = \text{KN/mc } 18,0$ - Peso volume saturo $G_s = \text{KN/mc } 19,0$
2	<ul style="list-style-type: none"> - Angolo attrito $\phi' = 29^\circ$ - Coesione $C' = \text{daN/cmq } 0,04$ - Peso volume $G = \text{KN/mc } 19,5$ - Peso volume saturo $G_s = \text{KN/mc } 20,5$ 	<ul style="list-style-type: none"> - Angolo attrito $\phi' = 23,9^\circ$ - Coesione $C' = \text{daN/cmq } 0,032$ - Peso volume $G = \text{KN/mc } 19,5$ - Peso volume saturo $G_s = \text{KN/mc } 20,5$

In queste condizioni cautelative si è ottenuto un coefficiente di sicurezza F minimo pari a 1,11, sempre superiore al valore minimo di γ_R richiesto.

Nel seguito è riportata la sezione schematica della pendice con gli interventi in progetto e con evidenziate le superfici di scivolamento più critiche.

--SLOPE STABILITY ANALYSIS--
 MODIFIED BISHOP METHOD OF SLICES
 IRREGULAR FAILURE SURFACES

VERIFICA DI STABILITA' PENDICE A MONTE AREA CIMITERIALE
 CONDIZIONI SISMICHE - PARAMETRI CARATTERISTICI

BOUNDARY COORDINATES

32 TOP BOUNDARIES 57 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT (M)	Y-LEFT (M)	X-RIGHT (M)	Y-RIGHT (M)	SOIL TYPE BELOW BND
1	1.00	10.00	5.00	10.00	1
2	5.00	10.00	5.01	11.32	1
3	5.01	11.32	20.06	11.62	1
4	20.06	11.62	20.36	11.62	3
5	20.36	11.62	20.37	11.99	1
6	20.37	11.99	26.07	11.99	1
7	26.07	11.99	26.37	11.99	3
8	26.37	11.99	26.38	16.05	1
9	26.38	16.05	43.72	16.05	1
10	43.72	16.05	43.73	16.25	1
11	43.73	16.25	45.47	16.25	1
12	45.47	16.25	45.48	17.45	1
13	45.48	17.45	48.36	19.05	1
14	48.36	19.05	49.65	19.05	1
15	49.65	19.05	50.23	19.05	3
16	50.23	19.05	53.34	20.09	1
17	53.34	20.09	57.16	20.85	1
18	57.16	20.85	74.66	24.55	1
19	74.66	24.55	78.16	25.55	1
20	78.16	25.55	82.16	25.55	1
21	82.16	25.55	84.16	26.55	1
22	84.16	26.55	98.16	28.05	1
23	98.16	28.05	119.66	32.55	2
24	119.66	32.55	125.16	34.55	2
25	125.16	34.55	128.66	36.55	2
26	128.66	36.55	143.16	39.55	2
27	143.16	39.55	147.16	39.55	2
28	147.16	39.55	152.16	40.55	2
29	152.16	40.55	159.16	42.55	2
30	159.16	42.55	176.16	46.55	2
31	176.16	46.55	181.16	48.55	2
32	181.16	48.55	200.66	52.55	2
33	20.06	11.62	20.07	8.39	1
34	20.07	8.39	20.08	4.34	2
35	20.08	4.34	20.34	4.34	2
36	20.34	4.34	20.35	8.39	2
37	20.35	8.39	20.36	11.62	1
38	26.07	11.99	26.08	8.66	1
39	26.08	8.66	26.09	4.71	2
40	26.09	4.71	26.35	4.71	2
41	26.35	4.71	26.36	8.66	2
42	26.36	8.66	26.37	11.99	1
43	49.65	19.05	49.66	13.73	1
44	49.66	13.73	49.67	6.65	2
45	49.67	6.65	50.21	6.65	2
46	50.21	6.65	50.22	13.84	2

47	50.22	13.84	50.23	19.05	1
48	1.00	8.11	20.07	8.39	2
49	20.35	8.39	24.16	8.45	2
50	24.16	8.45	26.08	8.66	2
51	26.36	8.66	28.66	8.95	2
52	28.66	8.95	44.66	12.45	2
53	44.66	12.45	49.66	13.73	2
54	50.22	13.84	62.66	17.05	2
55	62.66	17.05	94.66	24.95	2
56	94.66	24.95	96.71	25.65	2
57	96.71	25.65	98.16	28.05	2

ISOTROPIC SOIL PARAMETERS
3 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT. (KG/MC)	SATURATED UNIT WT. (KG/MC)	COHESION INTERCEPT (KG/MQ)	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT (KG/MQ)
1	1800.0	1900.0	.0	16.0	.00	.0
2	1950.0	2050.0	400.0	29.0	.00	.0
3	2500.0	2500.0	60000.0	.0	.00	.0

WATER SURFACE SPECIFIED BY 11 COORDINATE POINTS

POINT NO.	X-WATER (M)	Y-WATER (M)
1	1.00	8.64
2	8.63	9.92
3	20.37	10.92
4	31.63	11.45
5	38.04	14.44
6	51.26	16.30
7	63.70	21.85
8	74.06	24.05
9	96.16	27.35
10	119.66	32.05
11	200.66	50.55

BOUNDARY LOAD(S)
1 LOAD(S) SPECIFIED

LOAD NO.	X-LEFT (M)	X-RIGHT (M)	INTENSITY (KG/M2)	DEFLECTION (DEG)
1	20.37	23.10	3000.0	.0

NOTE - INTENSITY IS SPECIFIED AS A UNIFORMLY DISTRIBUTED FORCE ACTING ON A HORIZONTALLY PROJECTED SURFACE.

A HORIZONTAL EARTHQUAKE LOADING COEFFICIENT OF 0.063 HAS BEEN ASSIGNED
A VERTICAL EARTHQUAKE LOADING COEFFICIENT OF -0.032 HAS BEEN ASSIGNED
CAVITATION PRESSURE = .0 KG/MQ

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

200 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 20 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = 12.00 M AND X = 26.00 M

EACH SURFACE TERMINATES BETWEEN X = 60.00 M AND X = 98.16 M

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = .00 M

2.00 M. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

RESTRICTIONS HAVE BEEN IMPOSED UPON THE ANGLE OF INITIATION.
THE ANGLE HAS BEEN RESTRICTED BETWEEN THE ANGLES OF -15.0 AND 0.0 DEG.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL FIRST.

FAILURE SURFACE SPECIFIED BY 39 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	14.95	11.52
2	16.95	11.44
3	18.95	11.38
4	20.95	11.36
5	22.95	11.36
6	24.95	11.39
7	26.94	11.44
8	28.94	11.53
9	30.94	11.64
10	32.93	11.78
11	34.93	11.94
12	36.92	12.14
13	38.91	12.36
14	40.89	12.60
15	42.87	12.88
16	44.85	13.18
17	46.82	13.51
18	48.79	13.87
19	50.75	14.25
20	52.71	14.66
21	54.66	15.10
22	56.61	15.56
23	58.55	16.05
24	60.48	16.57
25	62.40	17.11
26	64.32	17.68
27	66.23	18.28
28	68.13	18.90
29	70.02	19.55
30	71.90	20.22
31	73.78	20.92
32	75.64	21.65
33	77.50	22.40
34	79.34	23.18
35	81.17	23.98
36	82.99	24.80
37	84.80	25.66

38	86.60	26.53
39	87.30	26.89

*** 1.2540 ***

FAILURE SURFACE SPECIFIED BY 27 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	22.32	11.99
2	24.30	11.76
3	26.30	11.59
4	28.29	11.47
5	30.29	11.41
6	32.29	11.41
7	34.29	11.46
8	36.29	11.57
9	38.28	11.74
10	40.27	11.97
11	42.25	12.25
12	44.22	12.59
13	46.18	12.98
14	48.13	13.43
15	50.06	13.94
16	51.98	14.50
17	53.88	15.12
18	55.77	15.79
19	57.63	16.51
20	59.48	17.29
21	61.30	18.12
22	63.09	19.00
23	64.86	19.93
24	66.60	20.92
25	68.32	21.95
26	70.00	23.03
27	71.14	23.80

*** 1.2977 ***

FAILURE SURFACE SPECIFIED BY 35 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	17.16	11.56
2	19.15	11.43
3	21.15	11.34
4	23.15	11.28
5	25.15	11.26
6	27.15	11.27
7	29.15	11.31
8	31.15	11.39
9	33.15	11.50
10	35.14	11.65
11	37.13	11.84
12	39.12	12.05
13	41.10	12.30
14	43.08	12.59
15	45.06	12.91

16	47.03	13.26
17	48.99	13.65
18	50.94	14.07
19	52.89	14.53
20	54.83	15.02
21	56.76	15.54
22	58.68	16.10
23	60.59	16.69
24	62.49	17.31
25	64.38	17.96
26	66.26	18.65
27	68.13	19.37
28	69.98	20.12
29	71.82	20.91
30	73.65	21.72
31	75.46	22.57
32	77.25	23.45
33	79.04	24.36
34	80.80	25.30
35	81.25	25.55

*** 1.3276 ***

FAILURE SURFACE SPECIFIED BY 41 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	23.05	11.99
2	24.99	11.49
3	26.94	11.04
4	28.90	10.63
5	30.86	10.27
6	32.84	9.96
7	34.82	9.69
8	36.81	9.47
9	38.80	9.30
10	40.80	9.18
11	42.80	9.10
12	44.80	9.07
13	46.80	9.09
14	48.79	9.16
15	50.79	9.27
16	52.78	9.43
17	54.77	9.64
18	56.76	9.90
19	58.73	10.20
20	60.70	10.55
21	62.66	10.95
22	64.61	11.40
23	66.55	11.89
24	68.48	12.42
25	70.39	13.01
26	72.29	13.63
27	74.17	14.31
28	76.04	15.02
29	77.89	15.78
30	79.72	16.59
31	81.53	17.44
32	83.32	18.33
33	85.09	19.27

34	86.84	20.24
35	88.56	21.26
36	90.26	22.32
37	91.93	23.42
38	93.57	24.55
39	95.19	25.73
40	96.78	26.94
41	98.15	28.05

*** 1.3610 ***

FAILURE SURFACE SPECIFIED BY 42 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	22.32	11.99
2	24.25	11.47
3	26.19	11.00
4	28.15	10.58
5	30.11	10.20
6	32.08	9.87
7	34.06	9.59
8	36.05	9.35
9	38.04	9.16
10	40.04	9.02
11	42.03	8.93
12	44.03	8.88
13	46.03	8.89
14	48.03	8.94
15	50.03	9.04
16	52.02	9.18
17	54.01	9.38
18	56.00	9.62
19	57.98	9.91
20	59.95	10.25
21	61.91	10.63
22	63.87	11.06
23	65.81	11.54
24	67.74	12.06
25	69.66	12.63
26	71.56	13.25
27	73.45	13.91
28	75.32	14.61
29	77.17	15.36
30	79.01	16.16
31	80.82	17.00
32	82.62	17.88
33	84.39	18.80
34	86.14	19.77
35	87.87	20.77
36	89.57	21.82
37	91.25	22.91
38	92.90	24.04
39	94.53	25.21
40	96.12	26.42
41	97.69	27.66
42	98.15	28.05

*** 1.3621 ***

FAILURE SURFACE SPECIFIED BY 41 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	23.79	11.99
2	25.72	11.47
3	27.67	11.01
4	29.62	10.59
5	31.59	10.22
6	33.56	9.90
7	35.54	9.63
8	37.53	9.41
9	39.52	9.24
10	41.52	9.12
11	43.52	9.05
12	45.52	9.02
13	47.52	9.05
14	49.52	9.13
15	51.51	9.26
16	53.51	9.44
17	55.49	9.66
18	57.47	9.94
19	59.45	10.27
20	61.41	10.64
21	63.37	11.07
22	65.31	11.54
23	67.24	12.06
24	69.16	12.63
25	71.06	13.25
26	72.95	13.92
27	74.81	14.63
28	76.66	15.39
29	78.50	16.19
30	80.31	17.04
31	82.10	17.94
32	83.86	18.87
33	85.60	19.86
34	87.32	20.88
35	89.01	21.95
36	90.67	23.06
37	92.31	24.21
38	93.91	25.41
39	95.49	26.64
40	97.03	27.91
41	97.06	27.93

*** 1.3627 ***

FAILURE SURFACE SPECIFIED BY 41 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	23.79	11.99
2	25.73	11.49
3	27.67	11.04
4	29.63	10.63
5	31.60	10.27
6	33.58	9.96

7	35.56	9.70
8	37.55	9.48
9	39.54	9.32
10	41.54	9.20
11	43.54	9.13
12	45.54	9.11
13	47.53	9.13
14	49.53	9.21
15	51.53	9.33
16	53.52	9.50
17	55.51	9.72
18	57.49	9.99
19	59.47	10.31
20	61.43	10.67
21	63.39	11.08
22	65.34	11.54
23	67.27	12.04
24	69.20	12.60
25	71.10	13.19
26	73.00	13.84
27	74.87	14.53
28	76.73	15.26
29	78.58	16.04
30	80.40	16.87
31	82.20	17.74
32	83.98	18.65
33	85.74	19.60
34	87.47	20.60
35	89.18	21.64
36	90.87	22.72
37	92.52	23.84
38	94.15	25.00
39	95.75	26.19
40	97.32	27.43
41	98.06	28.04

*** 1.3633 ***

FAILURE SURFACE SPECIFIED BY 40 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	23.05	11.99
2	24.99	11.51
3	26.95	11.07
4	28.91	10.69
5	30.88	10.35
6	32.86	10.05
7	34.84	9.81
8	36.83	9.62
9	38.83	9.47
10	40.83	9.37
11	42.83	9.32
12	44.83	9.32
13	46.82	9.37
14	48.82	9.47
15	50.82	9.61
16	52.81	9.81
17	54.79	10.05
18	56.77	10.34

19	58.74	10.68
20	60.71	11.06
21	62.66	11.50
22	64.60	11.98
23	66.53	12.51
24	68.44	13.08
25	70.34	13.70
26	72.23	14.37
27	74.10	15.08
28	75.95	15.84
29	77.78	16.65
30	79.59	17.49
31	81.38	18.39
32	83.15	19.32
33	84.89	20.30
34	86.62	21.32
35	88.31	22.38
36	89.98	23.48
37	91.62	24.62
38	93.23	25.81
39	94.82	27.03
40	95.76	27.79

*** 1.3634 ***

FAILURE SURFACE SPECIFIED BY 40 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	23.79	11.99
2	25.73	11.50
3	27.68	11.05
4	29.64	10.65
5	31.61	10.30
6	33.58	10.00
7	35.57	9.75
8	37.56	9.54
9	39.55	9.39
10	41.55	9.28
11	43.55	9.22
12	45.55	9.21
13	47.55	9.25
14	49.55	9.34
15	51.54	9.48
16	53.53	9.67
17	55.52	9.90
18	57.50	10.19
19	59.47	10.52
20	61.43	10.90
21	63.39	11.33
22	65.33	11.80
23	67.26	12.33
24	69.18	12.90
25	71.08	13.52
26	72.97	14.18
27	74.84	14.89
28	76.69	15.64
29	78.52	16.44
30	80.33	17.29
31	82.12	18.18

32	83.89	19.11
33	85.64	20.09
34	87.36	21.10
35	89.06	22.16
36	90.73	23.27
37	92.37	24.41
38	93.98	25.59
39	95.57	26.81
40	96.94	27.92

*** 1.3644 ***

FAILURE SURFACE SPECIFIED BY 39 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	23.79	11.99
2	25.73	11.50
3	27.68	11.06
4	29.64	10.66
5	31.61	10.32
6	33.59	10.02
7	35.57	9.78
8	37.56	9.59
9	39.56	9.44
10	41.56	9.35
11	43.56	9.30
12	45.56	9.31
13	47.56	9.37
14	49.55	9.48
15	51.55	9.63
16	53.54	9.84
17	55.52	10.10
18	57.49	10.41
19	59.46	10.77
20	61.42	11.17
21	63.37	11.63
22	65.30	12.14
23	67.22	12.69
24	69.13	13.29
25	71.02	13.94
26	72.90	14.64
27	74.75	15.38
28	76.59	16.17
29	78.41	17.01
30	80.20	17.89
31	81.97	18.82
32	83.72	19.79
33	85.44	20.81
34	87.14	21.87
35	88.81	22.97
36	90.45	24.11
37	92.06	25.30
38	93.65	26.52
39	95.13	27.72

*** 1.3657 ***

--SLOPE STABILITY ANALYSIS--
 MODIFIED BISHOP METHOD OF SLICES
 IRREGULAR FAILURE SURFACES

VERIFICA DI STABILITA' PENDICE A MONTE AREA CIMITERIALE
 CONDIZIONI SISMICHE - PARAMETRI RIDOTTI

BOUNDARY COORDINATES

32 TOP BOUNDARIES 57 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT (M)	Y-LEFT (M)	X-RIGHT (M)	Y-RIGHT (M)	SOIL TYPE BELOW BND
1	1.00	10.00	5.00	10.00	1
2	5.00	10.00	5.01	11.32	1
3	5.01	11.32	20.06	11.62	1
4	20.06	11.62	20.36	11.62	3
5	20.36	11.62	20.37	11.99	1
6	20.37	11.99	26.07	11.99	1
7	26.07	11.99	26.37	11.99	3
8	26.37	11.99	26.38	16.05	1
9	26.38	16.05	43.72	16.05	1
10	43.72	16.05	43.73	16.25	1
11	43.73	16.25	45.47	16.25	1
12	45.47	16.25	45.48	17.45	1
13	45.48	17.45	48.36	19.05	1
14	48.36	19.05	49.65	19.05	1
15	49.65	19.05	50.23	19.05	3
16	50.23	19.05	53.34	20.09	1
17	53.34	20.09	57.16	20.85	1
18	57.16	20.85	74.66	24.55	1
19	74.66	24.55	78.16	25.55	1
20	78.16	25.55	82.16	25.55	1
21	82.16	25.55	84.16	26.55	1
22	84.16	26.55	98.16	28.05	1
23	98.16	28.05	119.66	32.55	2
24	119.66	32.55	125.16	34.55	2
25	125.16	34.55	128.66	36.55	2
26	128.66	36.55	143.16	39.55	2
27	143.16	39.55	147.16	39.55	2
28	147.16	39.55	152.16	40.55	2
29	152.16	40.55	159.16	42.55	2
30	159.16	42.55	176.16	46.55	2
31	176.16	46.55	181.16	48.55	2
32	181.16	48.55	200.66	52.55	2
33	20.06	11.62	20.07	8.39	1
34	20.07	8.39	20.08	4.34	2
35	20.08	4.34	20.34	4.34	2
36	20.34	4.34	20.35	8.39	2
37	20.35	8.39	20.36	11.62	1
38	26.07	11.99	26.08	8.66	1
39	26.08	8.66	26.09	4.71	2
40	26.09	4.71	26.35	4.71	2
41	26.35	4.71	26.36	8.66	2
42	26.36	8.66	26.37	11.99	1
43	49.65	19.05	49.66	13.73	1
44	49.66	13.73	49.67	6.65	2
45	49.67	6.65	50.21	6.65	2
46	50.21	6.65	50.22	13.84	2

47	50.22	13.84	50.23	19.05	1
48	1.00	8.11	20.07	8.39	2
49	20.35	8.39	24.16	8.45	2
50	24.16	8.45	26.08	8.66	2
51	26.36	8.66	28.66	8.95	2
52	28.66	8.95	44.66	12.45	2
53	44.66	12.45	49.66	13.73	2
54	50.22	13.84	62.66	17.05	2
55	62.66	17.05	94.66	24.95	2
56	94.66	24.95	96.71	25.65	2
57	96.71	25.65	98.16	28.05	2

ISOTROPIC SOIL PARAMETERS

3 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT. (KG/MC)	SATURATED UNIT WT. (KG/MC)	COHESION INTERCEPT (KG/MQ)	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT (KG/MQ)
1	1800.0	1900.0	.0	12.9	.00	.0
2	1950.0	2050.0	320.0	23.9	.00	.0
3	2500.0	2500.0	60000.0	.0	.00	.0

WATER SURFACE SPECIFIED BY 11 COORDINATE POINTS

POINT NO.	X-WATER (M)	Y-WATER (M)
1	1.00	8.64
2	8.63	9.92
3	20.37	10.92
4	31.63	11.45
5	38.04	14.44
6	51.26	16.30
7	63.70	21.85
8	74.06	24.05
9	96.16	27.35
10	119.66	32.05
11	200.66	50.55

BOUNDARY LOAD(S)

1 LOAD(S) SPECIFIED

LOAD NO.	X-LEFT (M)	X-RIGHT (M)	INTENSITY (KG/M2)	DEFLECTION (DEG)
1	20.37	23.10	3000.0	.0

NOTE - INTENSITY IS SPECIFIED AS A UNIFORMLY DISTRIBUTED FORCE ACTING ON A HORIZONTALLY PROJECTED SURFACE.

A HORIZONTAL EARTHQUAKE LOADING COEFFICIENT OF 0.063 HAS BEEN ASSIGNED
 A VERTICAL EARTHQUAKE LOADING COEFFICIENT OF -0.032 HAS BEEN ASSIGNED
 CAVITATION PRESSURE = .0 KG/MQ

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

200 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 20 POINTS EQUALLY SPACED
ALONG THE GROUND SURFACE BETWEEN X = 12.00 M AND X = 26.00 M

EACH SURFACE TERMINATES BETWEEN X = 60.00 M AND X = 98.16 M

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
AT WHICH A SURFACE EXTENDS IS Y = .00 M

2.00 M. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

RESTRICTIONS HAVE BEEN IMPOSED UPON THE ANGLE OF INITIATION.
THE ANGLE HAS BEEN RESTRICTED BETWEEN THE ANGLES OF -15.0 AND 0.0 DEG.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL FIRST.

FAILURE SURFACE SPECIFIED BY 39 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	14.95	11.52
2	16.95	11.44
3	18.95	11.38
4	20.95	11.36
5	22.95	11.36
6	24.95	11.39
7	26.94	11.44
8	28.94	11.53
9	30.94	11.64
10	32.93	11.78
11	34.93	11.94
12	36.92	12.14
13	38.91	12.36
14	40.89	12.60
15	42.87	12.88
16	44.85	13.18
17	46.82	13.51
18	48.79	13.87
19	50.75	14.25
20	52.71	14.66
21	54.66	15.10
22	56.61	15.56
23	58.55	16.05
24	60.48	16.57
25	62.40	17.11
26	64.32	17.68
27	66.23	18.28
28	68.13	18.90
29	70.02	19.55
30	71.90	20.22
31	73.78	20.92
32	75.64	21.65
33	77.50	22.40
34	79.34	23.18
35	81.17	23.98
36	82.99	24.80
37	84.80	25.66

38	86.60	26.53
39	87.30	26.89

*** 1.1128 ***

FAILURE SURFACE SPECIFIED BY 41 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	23.05	11.99
2	24.99	11.49
3	26.94	11.04
4	28.90	10.63
5	30.86	10.27
6	32.84	9.96
7	34.82	9.69
8	36.81	9.47
9	38.80	9.30
10	40.80	9.18
11	42.80	9.10
12	44.80	9.07
13	46.80	9.09
14	48.79	9.16
15	50.79	9.27
16	52.78	9.43
17	54.77	9.64
18	56.76	9.90
19	58.73	10.20
20	60.70	10.55
21	62.66	10.95
22	64.61	11.40
23	66.55	11.89
24	68.48	12.42
25	70.39	13.01
26	72.29	13.63
27	74.17	14.31
28	76.04	15.02
29	77.89	15.78
30	79.72	16.59
31	81.53	17.44
32	83.32	18.33
33	85.09	19.27
34	86.84	20.24
35	88.56	21.26
36	90.26	22.32
37	91.93	23.42
38	93.57	24.55
39	95.19	25.73
40	96.78	26.94
41	98.15	28.05

*** 1.1232 ***

FAILURE SURFACE SPECIFIED BY 42 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	22.32	11.99

2	24.25	11.47
3	26.19	11.00
4	28.15	10.58
5	30.11	10.20
6	32.08	9.87
7	34.06	9.59
8	36.05	9.35
9	38.04	9.16
10	40.04	9.02
11	42.03	8.93
12	44.03	8.88
13	46.03	8.89
14	48.03	8.94
15	50.03	9.04
16	52.02	9.18
17	54.01	9.38
18	56.00	9.62
19	57.98	9.91
20	59.95	10.25
21	61.91	10.63
22	63.87	11.06
23	65.81	11.54
24	67.74	12.06
25	69.66	12.63
26	71.56	13.25
27	73.45	13.91
28	75.32	14.61
29	77.17	15.36
30	79.01	16.16
31	80.82	17.00
32	82.62	17.88
33	84.39	18.80
34	86.14	19.77
35	87.87	20.77
36	89.57	21.82
37	91.25	22.91
38	92.90	24.04
39	94.53	25.21
40	96.12	26.42
41	97.69	27.66
42	98.15	28.05

*** 1.1234 ***

FAILURE SURFACE SPECIFIED BY 41 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	23.79	11.99
2	25.72	11.47
3	27.67	11.01
4	29.62	10.59
5	31.59	10.22
6	33.56	9.90
7	35.54	9.63
8	37.53	9.41
9	39.52	9.24
10	41.52	9.12
11	43.52	9.05
12	45.52	9.02

13	47.52	9.05
14	49.52	9.13
15	51.51	9.26
16	53.51	9.44
17	55.49	9.66
18	57.47	9.94
19	59.45	10.27
20	61.41	10.64
21	63.37	11.07
22	65.31	11.54
23	67.24	12.06
24	69.16	12.63
25	71.06	13.25
26	72.95	13.92
27	74.81	14.63
28	76.66	15.39
29	78.50	16.19
30	80.31	17.04
31	82.10	17.94
32	83.86	18.87
33	85.60	19.86
34	87.32	20.88
35	89.01	21.95
36	90.67	23.06
37	92.31	24.21
38	93.91	25.41
39	95.49	26.64
40	97.03	27.91
41	97.06	27.93

*** 1.1251 ***

FAILURE SURFACE SPECIFIED BY 41 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	23.79	11.99
2	25.73	11.49
3	27.67	11.04
4	29.63	10.63
5	31.60	10.27
6	33.58	9.96
7	35.56	9.70
8	37.55	9.48
9	39.54	9.32
10	41.54	9.20
11	43.54	9.13
12	45.54	9.11
13	47.53	9.13
14	49.53	9.21
15	51.53	9.33
16	53.52	9.50
17	55.51	9.72
18	57.49	9.99
19	59.47	10.31
20	61.43	10.67
21	63.39	11.08
22	65.34	11.54
23	67.27	12.04
24	69.20	12.60

25	71.10	13.19
26	73.00	13.84
27	74.87	14.53
28	76.73	15.26
29	78.58	16.04
30	80.40	16.87
31	82.20	17.74
32	83.98	18.65
33	85.74	19.60
34	87.47	20.60
35	89.18	21.64
36	90.87	22.72
37	92.52	23.84
38	94.15	25.00
39	95.75	26.19
40	97.32	27.43
41	98.06	28.04

*** 1.1253 ***

FAILURE SURFACE SPECIFIED BY 40 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	23.79	11.99
2	25.73	11.50
3	27.68	11.05
4	29.64	10.65
5	31.61	10.30
6	33.58	10.00
7	35.57	9.75
8	37.56	9.54
9	39.55	9.39
10	41.55	9.28
11	43.55	9.22
12	45.55	9.21
13	47.55	9.25
14	49.55	9.34
15	51.54	9.48
16	53.53	9.67
17	55.52	9.90
18	57.50	10.19
19	59.47	10.52
20	61.43	10.90
21	63.39	11.33
22	65.33	11.80
23	67.26	12.33
24	69.18	12.90
25	71.08	13.52
26	72.97	14.18
27	74.84	14.89
28	76.69	15.64
29	78.52	16.44
30	80.33	17.29
31	82.12	18.18
32	83.89	19.11
33	85.64	20.09
34	87.36	21.10
35	89.06	22.16
36	90.73	23.27

37	92.37	24.41
38	93.98	25.59
39	95.57	26.81
40	96.94	27.92

*** 1.1273 ***

FAILURE SURFACE SPECIFIED BY 40 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	23.05	11.99
2	24.99	11.51
3	26.95	11.07
4	28.91	10.69
5	30.88	10.35
6	32.86	10.05
7	34.84	9.81
8	36.83	9.62
9	38.83	9.47
10	40.83	9.37
11	42.83	9.32
12	44.83	9.32
13	46.82	9.37
14	48.82	9.47
15	50.82	9.61
16	52.81	9.81
17	54.79	10.05
18	56.77	10.34
19	58.74	10.68
20	60.71	11.06
21	62.66	11.50
22	64.60	11.98
23	66.53	12.51
24	68.44	13.08
25	70.34	13.70
26	72.23	14.37
27	74.10	15.08
28	75.95	15.84
29	77.78	16.65
30	79.59	17.49
31	81.38	18.39
32	83.15	19.32
33	84.89	20.30
34	86.62	21.32
35	88.31	22.38
36	89.98	23.48
37	91.62	24.62
38	93.23	25.81
39	94.82	27.03
40	95.76	27.79

*** 1.1279 ***

FAILURE SURFACE SPECIFIED BY 40 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
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1	24.53	11.99
2	26.46	11.48
3	28.41	11.03
4	30.37	10.62
5	32.33	10.26
6	34.31	9.95
7	36.29	9.69
8	38.28	9.48
9	40.28	9.32
10	42.27	9.22
11	44.27	9.16
12	46.27	9.15
13	48.27	9.20
14	50.27	9.29
15	52.26	9.43
16	54.25	9.63
17	56.24	9.87
18	58.22	10.17
19	60.19	10.52
20	62.15	10.91
21	64.10	11.36
22	66.04	11.85
23	67.96	12.39
24	69.87	12.98
25	71.77	13.62
26	73.65	14.31
27	75.51	15.04
28	77.35	15.82
29	79.17	16.65
30	80.97	17.52
31	82.74	18.44
32	84.50	19.40
33	86.23	20.41
34	87.93	21.46
35	89.60	22.55
36	91.25	23.69
37	92.87	24.86
38	94.46	26.08
39	96.01	27.34
40	96.66	27.89

*** 1.1298 ***

FAILURE SURFACE SPECIFIED BY 39 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	23.79	11.99
2	25.73	11.50
3	27.68	11.06
4	29.64	10.66
5	31.61	10.32
6	33.59	10.02
7	35.57	9.78
8	37.56	9.59
9	39.56	9.44
10	41.56	9.35
11	43.56	9.30
12	45.56	9.31
13	47.56	9.37

14	49.55	9.48
15	51.55	9.63
16	53.54	9.84
17	55.52	10.10
18	57.49	10.41
19	59.46	10.77
20	61.42	11.17
21	63.37	11.63
22	65.30	12.14
23	67.22	12.69
24	69.13	13.29
25	71.02	13.94
26	72.90	14.64
27	74.75	15.38
28	76.59	16.17
29	78.41	17.01
30	80.20	17.89
31	81.97	18.82
32	83.72	19.79
33	85.44	20.81
34	87.14	21.87
35	88.81	22.97
36	90.45	24.11
37	92.06	25.30
38	93.65	26.52
39	95.13	27.72

*** 1.1300 ***

FAILURE SURFACE SPECIFIED BY 39 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	22.32	11.99
2	24.25	11.48
3	26.19	11.01
4	28.15	10.60
5	30.12	10.24
6	32.09	9.92
7	34.08	9.66
8	36.07	9.45
9	38.06	9.29
10	40.06	9.18
11	42.06	9.13
12	44.06	9.12
13	46.05	9.17
14	48.05	9.26
15	50.05	9.41
16	52.04	9.61
17	54.02	9.86
18	56.00	10.16
19	57.97	10.52
20	59.93	10.92
21	61.87	11.37
22	63.81	11.88
23	65.73	12.43
24	67.64	13.03
25	69.53	13.68
26	71.40	14.38
27	73.26	15.12

28	75.10	15.92
29	76.91	16.76
30	78.70	17.65
31	80.47	18.58
32	82.22	19.56
33	83.94	20.58
34	85.63	21.65
35	87.29	22.76
36	88.93	23.91
37	90.53	25.10
38	92.10	26.34
39	93.59	27.56

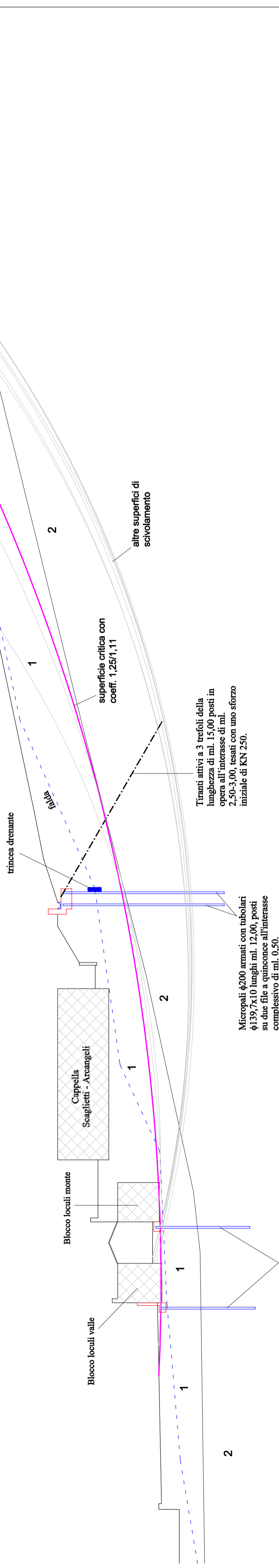
*** 1.1306 ***

VERIFICA DI STABILITA' POST-INTERVENTO PENDICE A MONTE AREA CIMITERIALE

(verifica effettuata con il programma STABL con il metodo di Bishop modificato)

VERIFICA IN CONDIZIONI SISMICHE

SEZIONE A - A (scala 1:200)



PARAMETRI GEOTECCNICI

valori caratteristici	Strato 1:	$\phi = 16,0^\circ$	$c = 0,000$ daN/cm ²	$\gamma = 18,0$ KN/mc	$\gamma_s = 19,0$ KN/mc
	Strato 2:	$\phi = 29,0^\circ$	$c = 0,040$ daN/cm ²	$\gamma = 19,5$ KN/mc	$\gamma_s = 20,5$ KN/mc
valori ridotti	Strato 1:	$\phi = 16,0^\circ$	$c = 0,000$ daN/cm ²	$\gamma = 18,0$ KN/mc	$\gamma_s = 19,0$ KN/mc
	Strato 2:	$\phi = 29,0^\circ$	$c = 0,040$ daN/cm ²	$\gamma = 19,5$ KN/mc	$\gamma_s = 20,5$ KN/mc

2. - VERIFICA DI STABILITA' PENDICE A VALLE VIA VIII MARZO

Il punto 6.3.4 delle NTC 2018 prevede che la valutazione del coefficiente di sicurezza dei pendii naturali venga eseguita impiegando i parametri geotecnici (congruenti con i caratteri del cinematisimo atteso o accertato) presi con il loro valore caratteristico.

Stante ciò, la verifica di stabilità globale della pendice a valle Via VIII Marzo nella situazione post-intervento del Cimitero è svolta utilizzando i seguenti parametri geomeccanici dei terreni determinati nello studio geologico anche mediante tecniche di back-analysis.

Strato	Parametri strato
1	- Angolo attrito $\phi' = 24^\circ$ - Coesione $C' = \text{daN/cm}^2 0,03$ - Peso volume $G = \text{KN/mc } 18,0$ - Peso volume saturo $G_s = \text{KN/mc } 19,0$
2	- Angolo attrito $\phi' = 29^\circ$ - Coesione $C' = \text{daN/cm}^2 0,07$ - Peso volume $G = \text{KN/mc } 19,0$ - Peso volume saturo $G_s = \text{KN/mc } 20,5$
3	- Angolo attrito $\phi' = 30^\circ$ - Coesione $C' = \text{daN/cm}^2 0,50$ - Peso volume $G = \text{KN/mc } 21,0$ - Peso volume saturo $G_s = \text{KN/mc } 22,5$

Il coefficiente γ_R è assunto pari a 1,10.

I coefficienti delle azioni sismiche considerate sono i seguenti.

- Vita nominale $V_N = 50$ anni
- Classe d'uso: II
- Coefficiente d'uso $C_U = 1$
- Periodo di riferimento $V_R = 50$ anni

Stato limite di salvaguardia della vita (SLV):

- tempo di ritorno = 475 anni
- latitudine sito = 43,90 - longitudine sito = 10,658
- $a_g = 0,137$ $F_0 = 2,423$ $T_c^* = 0,29$
- categoria topografica: T2 $S_T = 1,20$
- categoria del sottosuolo: E
- $S_s = 1,60$ $S = S_s \times S_T = 1,92$
- $k_h = \beta_s \times a_{\max} = 0,24 \times 1,92 \times 0,137 = 0,063$ - $k_v = 0,5$ $k_h = 0,032$

Le opere di consolidamento sono state schematizzate come strutture continue in conglomerato cementizio con la stessa resistenza a taglio.

La verifica è svolta in condizioni sismiche con il programma STABL, che utilizza il metodo di Bishop modificato.

In queste condizioni sismiche il carico mobile sulla sede stradale di Via VIII Marzo è pari a 0,00 ($\psi_2 = 0,00$).

Nel seguito sono riportati gli stampati ottenuti con questo programma; in essi sono riassunti tutti i dati utilizzati nei calcoli (geometria del pendio, caratteristiche dei terreni, carichi esterni, ecc.) ed i risultati ottenuti.

Si è ottenuto in particolare un coefficiente di sicurezza F minimo pari a 1,43, superiore al valore minimo di γ_R richiesto.

A favore di sicurezza si è anche ripetuta la verifica utilizzando parametri geomeccanici dei terreni ridotti con i seguenti coefficienti γ_M :

- $\gamma_\phi = 1,25$ $\gamma_{c'} = 1,25$ $\gamma_\gamma = 1,00$

Strato	Parametri strato	Parametri ridotti
1	<ul style="list-style-type: none"> - Angolo attrito $\phi' = 24^\circ$ - Coesione $C' = \text{daN/cmq } 0,03$ - Peso volume $G = \text{KN/mc } 18,0$ - Peso volume saturo $G_s = \text{KN/mc } 19,0$ 	<ul style="list-style-type: none"> - Angolo attrito $\phi' = 19,6^\circ$ - Coesione $C' = \text{daN/cmq } 0,024$ - Peso volume $G = \text{KN/mc } 18,0$ - Peso volume saturo $G_s = \text{KN/mc } 19,0$
2	<ul style="list-style-type: none"> - Angolo attrito $\phi' = 29^\circ$ - Coesione $C' = \text{daN/cmq } 0,07$ - Peso volume $G = \text{KN/mc } 19,0$ - Peso volume saturo $G_s = \text{KN/mc } 20,5$ 	<ul style="list-style-type: none"> - Angolo attrito $\phi' = 24^\circ$ - Coesione $C' = \text{daN/cmq } 0,056$ - Peso volume $G = \text{KN/mc } 19,0$ - Peso volume saturo $G_s = \text{KN/mc } 20,5$
3	<ul style="list-style-type: none"> - Angolo attrito $\phi' = 30^\circ$ - Coesione $C' = \text{daN/cmq } 0,50$ - Peso volume $G = \text{KN/mc } 21,0$ - Peso volume saturo $G_s = \text{KN/mc } 22,5$ 	<ul style="list-style-type: none"> - Angolo attrito $\phi' = 24,8^\circ$ - Coesione $C' = \text{daN/cmq } 0,40$ - Peso volume $G = \text{KN/mc } 21,0$ - Peso volume saturo $G_s = \text{KN/mc } 22,5$

In queste condizioni cautelative si è ottenuto un coefficiente di sicurezza F minimo pari a 1,25, sempre superiore al valore minimo di γ_r richiesto.

Nel seguito è riportata la sezione schematica della pendice con gli interventi in progetto e con evidenziate le superfici di scivolamento più critiche.

--SLOPE STABILITY ANALYSIS--
 MODIFIED BISHOP METHOD OF SLICES
 IRREGULAR FAILURE SURFACES

VERIFICA DI STABILITA' PENDICE A VALLE VIA VIII MARZO
 CONDIZIONI SISMICHE - PARAMETRI CARATTERISTICI

BOUNDARY COORDINATES

32 TOP BOUNDARIES 60 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT (M)	Y-LEFT (M)	X-RIGHT (M)	Y-RIGHT (M)	SOIL TYPE BELOW BND
1	.00	4.68	.40	4.68	1
2	.40	4.68	1.21	5.69	1
3	1.21	5.69	2.22	5.89	1
4	2.22	5.89	4.00	8.00	1
5	4.00	8.00	6.75	8.21	1
6	6.75	8.21	7.26	8.71	1
7	7.26	8.71	8.27	9.00	1
8	8.27	9.00	15.32	10.23	1
9	15.32	10.23	16.32	11.29	1
10	16.32	11.29	17.33	11.99	1
11	17.33	11.99	18.34	12.24	1
12	18.34	12.24	19.65	13.96	1
13	19.65	13.96	20.66	14.26	1
14	20.66	14.26	23.28	14.66	1
15	23.28	14.66	23.88	15.42	1
16	23.88	15.42	24.89	15.82	1
17	24.89	15.82	25.39	16.73	1
18	25.39	16.73	27.20	17.28	1
19	27.20	17.28	28.31	19.30	1
20	28.31	19.30	29.32	19.60	1
21	29.32	19.60	30.33	19.60	1
22	30.33	19.60	32.34	19.95	1
23	32.34	19.95	32.64	20.71	1
24	32.64	20.71	34.15	21.11	1
25	34.15	21.11	36.67	23.83	1
26	36.67	23.83	37.17	23.83	4
27	37.17	23.83	40.67	23.83	1
28	40.67	23.83	41.92	24.24	2
29	41.92	24.24	43.05	25.28	2
30	43.05	25.28	44.35	27.08	2
31	44.35	27.08	45.67	27.18	2
32	45.67	27.18	46.92	28.09	2
33	36.67	23.83	36.68	21.54	1
34	36.68	21.54	36.69	18.82	2
35	36.69	18.82	36.70	15.53	3
36	36.70	15.53	37.14	15.53	3
37	37.14	15.53	37.15	19.09	3
38	37.15	19.09	37.16	21.74	2
39	37.16	21.74	37.17	23.83	1
40	.00	4.13	2.93	5.75	2
41	2.93	5.75	5.88	7.39	2
42	5.88	7.39	10.34	8.64	2
43	10.34	8.64	15.00	9.97	2
44	15.00	9.97	17.64	11.00	2
45	17.64	11.00	20.97	12.59	2
46	20.97	12.59	23.75	14.25	2

47	23.75	14.25	28.11	17.26	2
48	28.11	17.26	28.93	17.96	2
49	28.93	17.96	31.19	19.25	2
50	31.19	19.25	36.68	21.54	2
51	37.16	21.74	40.67	23.83	2
52	.00	2.52	4.90	3.89	3
53	4.90	3.89	9.90	5.51	3
54	9.90	5.51	15.27	7.26	3
55	15.27	7.26	17.65	8.11	3
56	17.65	8.11	22.47	10.48	3
57	22.47	10.48	25.29	12.27	3
58	25.29	12.27	36.69	18.82	3
59	37.15	19.09	38.96	20.13	3
60	38.96	20.13	46.92	24.00	3

ISOTROPIC SOIL PARAMETERS

4 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT. (KG/MC)	SATURATED UNIT WT. (KG/MC)	COHESION INTERCEPT (KG/MQ)	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT (KG/MQ)
1	1800.0	1900.0	300.0	24.0	.00	.0
2	1950.0	2050.0	700.0	29.0	.00	.0
3	2100.0	2250.0	5000.0	30.0	.00	.0
4	2500.0	2500.0	60000.0	.0	.00	.0

WATER SURFACE SPECIFIED BY 9 COORDINATE POINTS

POINT NO.	X-WATER (M)	Y-WATER (M)
1	.00	3.50
2	6.38	5.54
3	13.87	8.13
4	21.53	11.66
5	26.32	15.83
6	34.10	20.40
7	37.24	22.60
8	40.67	22.82
9	46.92	26.30

A HORIZONTAL EARTHQUAKE LOADING COEFFICIENT OF 0.063 HAS BEEN ASSIGNED
 A VERTICAL EARTHQUAKE LOADING COEFFICIENT OF -0.032 HAS BEEN ASSIGNED
 CAVITATION PRESSURE = .0 KG/MQ

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM
 TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

200 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 20 POINTS EQUALLY SPACED

ALONG THE GROUND SURFACE BETWEEN X = 15.32 M AND X = 27.20 M

EACH SURFACE TERMINATES BETWEEN X = 37.70 M AND X = 45.67 M

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION

AT WHICH A SURFACE EXTENDS IS Y = .00 M

1.00 M. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

RESTRICTIONS HAVE BEEN IMPOSED UPON THE ANGLE OF INITIATION.
THE ANGLE HAS BEEN RESTRICTED BETWEEN THE ANGLES OF 0.0 AND 15.0 DEG.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL FIRST.

FAILURE SURFACE SPECIFIED BY 32 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	19.07	13.20
2	20.07	13.26
3	21.07	13.34
4	22.06	13.46
5	23.05	13.60
6	24.04	13.77
7	25.01	13.97
8	25.99	14.20
9	26.95	14.46
10	27.91	14.74
11	28.86	15.05
12	29.80	15.39
13	30.74	15.76
14	31.65	16.15
15	32.56	16.57
16	33.46	17.02
17	34.34	17.49
18	35.21	17.98
19	36.06	18.51
20	36.90	19.05
21	37.72	19.62
22	38.53	20.21
23	39.31	20.83
24	40.08	21.47
25	40.83	22.13
26	41.57	22.81
27	42.28	23.51
28	42.97	24.24
29	43.64	24.98
30	44.29	25.74
31	44.91	26.52
32	45.39	27.16

*** 1.4342 ***

FAILURE SURFACE SPECIFIED BY 34 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	17.20	11.90
2	18.19	12.03
3	19.17	12.19
4	20.16	12.37
5	21.14	12.57
6	22.11	12.80

7	23.08	13.04
8	24.04	13.31
9	25.00	13.60
10	25.95	13.91
11	26.89	14.25
12	27.83	14.60
13	28.76	14.98
14	29.67	15.37
15	30.58	15.79
16	31.48	16.23
17	32.37	16.69
18	33.25	17.16
19	34.12	17.66
20	34.97	18.18
21	35.82	18.72
22	36.65	19.27
23	37.47	19.85
24	38.27	20.44
25	39.06	21.05
26	39.84	21.68
27	40.61	22.32
28	41.35	22.99
29	42.09	23.67
30	42.81	24.36
31	43.51	25.07
32	44.19	25.80
33	44.86	26.55
34	45.39	27.16

*** 1.4538 ***

FAILURE SURFACE SPECIFIED BY 31 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	20.32	14.16
2	21.32	14.21
3	22.32	14.28
4	23.31	14.39
5	24.30	14.53
6	25.29	14.69
7	26.27	14.89
8	27.24	15.11
9	28.21	15.37
10	29.17	15.65
11	30.12	15.96
12	31.06	16.30
13	31.99	16.67
14	32.91	17.07
15	33.81	17.49
16	34.71	17.94
17	35.59	18.42
18	36.45	18.92
19	37.30	19.45
20	38.13	20.01
21	38.94	20.59
22	39.74	21.19
23	40.52	21.82
24	41.28	22.47
25	42.02	23.14

26	42.74	23.84
27	43.43	24.56
28	44.11	25.29
29	44.76	26.05
30	45.39	26.83
31	45.66	27.18

*** 1.5100 ***

FAILURE SURFACE SPECIFIED BY 32 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	19.70	13.97
2	20.70	14.01
3	21.69	14.08
4	22.69	14.18
5	23.68	14.30
6	24.67	14.46
7	25.65	14.65
8	26.63	14.86
9	27.60	15.11
10	28.56	15.38
11	29.51	15.68
12	30.46	16.01
13	31.39	16.37
14	32.31	16.76
15	33.22	17.17
16	34.12	17.61
17	35.00	18.08
18	35.87	18.57
19	36.73	19.09
20	37.57	19.64
21	38.39	20.21
22	39.19	20.80
23	39.98	21.42
24	40.75	22.06
25	41.49	22.73
26	42.22	23.41
27	42.93	24.12
28	43.61	24.85
29	44.28	25.60
30	44.92	26.36
31	45.53	27.15
32	45.55	27.17

*** 1.5129 ***

FAILURE SURFACE SPECIFIED BY 30 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	20.95	14.30
2	21.95	14.36
3	22.94	14.44
4	23.94	14.56
5	24.93	14.71
6	25.91	14.88

7	26.89	15.09
8	27.86	15.32
9	28.82	15.59
10	29.78	15.89
11	30.72	16.21
12	31.66	16.56
13	32.58	16.95
14	33.50	17.36
15	34.40	17.80
16	35.28	18.26
17	36.15	18.75
18	37.01	19.27
19	37.84	19.82
20	38.67	20.39
21	39.47	20.98
22	40.25	21.60
23	41.02	22.24
24	41.77	22.91
25	42.49	23.60
26	43.19	24.31
27	43.87	25.04
28	44.53	25.80
29	45.17	26.57
30	45.64	27.18

*** 1.5171 ***

FAILURE SURFACE SPECIFIED BY 33 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	17.82	12.11
2	18.81	12.27
3	19.79	12.46
4	20.77	12.66
5	21.74	12.89
6	22.71	13.14
7	23.68	13.41
8	24.63	13.70
9	25.58	14.01
10	26.53	14.34
11	27.46	14.70
12	28.39	15.07
13	29.31	15.46
14	30.22	15.88
15	31.12	16.31
16	32.01	16.76
17	32.89	17.23
18	33.76	17.73
19	34.62	18.24
20	35.47	18.77
21	36.31	19.31
22	37.13	19.88
23	37.95	20.46
24	38.74	21.07
25	39.53	21.68
26	40.30	22.32
27	41.06	22.97
28	41.80	23.64
29	42.53	24.33

30	43.24	25.03
31	43.94	25.74
32	44.62	26.48
33	45.22	27.15

*** 1.5305 ***

FAILURE SURFACE SPECIFIED BY 30 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	20.95	14.30
2	21.95	14.32
3	22.95	14.37
4	23.94	14.46
5	24.94	14.58
6	25.92	14.74
7	26.90	14.93
8	27.88	15.15
9	28.85	15.41
10	29.80	15.70
11	30.75	16.03
12	31.68	16.39
13	32.60	16.78
14	33.51	17.20
15	34.40	17.65
16	35.28	18.13
17	36.13	18.65
18	36.97	19.19
19	37.79	19.76
20	38.59	20.36
21	39.37	20.99
22	40.13	21.65
23	40.86	22.33
24	41.57	23.03
25	42.25	23.76
26	42.91	24.52
27	43.54	25.29
28	44.14	26.09
29	44.72	26.91
30	44.86	27.12

*** 1.5429 ***

FAILURE SURFACE SPECIFIED BY 29 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	17.20	11.90
2	18.19	11.97
3	19.19	12.07
4	20.18	12.20
5	21.17	12.36
6	22.15	12.55
7	23.12	12.77
8	24.09	13.02
9	25.05	13.30
10	26.00	13.61

11	26.94	13.96
12	27.87	14.33
13	28.79	14.72
14	29.69	15.15
15	30.58	15.60
16	31.46	16.09
17	32.32	16.60
18	33.17	17.13
19	33.99	17.69
20	34.80	18.28
21	35.59	18.89
22	36.37	19.53
23	37.12	20.18
24	37.85	20.87
25	38.56	21.57
26	39.25	22.30
27	39.91	23.05
28	40.55	23.81
29	40.56	23.83

*** 1.5438 ***

FAILURE SURFACE SPECIFIED BY 30 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	20.32	14.16
2	21.32	14.16
3	22.32	14.20
4	23.32	14.28
5	24.31	14.39
6	25.30	14.53
7	26.29	14.71
8	27.26	14.92
9	28.23	15.17
10	29.19	15.45
11	30.14	15.76
12	31.08	16.11
13	32.01	16.49
14	32.92	16.90
15	33.82	17.34
16	34.70	17.81
17	35.56	18.31
18	36.41	18.85
19	37.23	19.41
20	38.04	20.00
21	38.83	20.62
22	39.59	21.26
23	40.33	21.93
24	41.05	22.63
25	41.74	23.35
26	42.41	24.10
27	43.05	24.86
28	43.67	25.65
29	44.25	26.46
30	44.68	27.11

*** 1.5531 ***

FAILURE SURFACE SPECIFIED BY 31 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	15.95	10.89
2	16.94	10.99
3	17.93	11.11
4	18.92	11.25
5	19.91	11.43
6	20.89	11.63
7	21.86	11.86
8	22.83	12.12
9	23.79	12.40
10	24.74	12.71
11	25.68	13.04
12	26.61	13.40
13	27.53	13.79
14	28.45	14.20
15	29.35	14.64
16	30.23	15.10
17	31.11	15.58
18	31.97	16.09
19	32.81	16.63
20	33.65	17.18
21	34.46	17.76
22	35.26	18.36
23	36.04	18.99
24	36.81	19.63
25	37.55	20.29
26	38.28	20.98
27	38.99	21.69
28	39.68	22.41
29	40.35	23.15
30	41.00	23.91
31	41.02	23.95

*** 1.5535 ***

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VERIFICA DI STABILITA' PENDICE A VALLE VIA VIII MARZO
 CONDIZIONI SISMICHE - PARAMETRI RIDOTTI

BOUNDARY COORDINATES

32 TOP BOUNDARIES 60 TOTAL BOUNDARIES

BOUNDARY NO.	X-LEFT (M)	Y-LEFT (M)	X-RIGHT (M)	Y-RIGHT (M)	SOIL TYPE BELOW BND
1	.00	4.68	.40	4.68	1
2	.40	4.68	1.21	5.69	1
3	1.21	5.69	2.22	5.89	1
4	2.22	5.89	4.00	8.00	1
5	4.00	8.00	6.75	8.21	1
6	6.75	8.21	7.26	8.71	1
7	7.26	8.71	8.27	9.00	1
8	8.27	9.00	15.32	10.23	1
9	15.32	10.23	16.32	11.29	1
10	16.32	11.29	17.33	11.99	1
11	17.33	11.99	18.34	12.24	1
12	18.34	12.24	19.65	13.96	1
13	19.65	13.96	20.66	14.26	1
14	20.66	14.26	23.28	14.66	1
15	23.28	14.66	23.88	15.42	1
16	23.88	15.42	24.89	15.82	1
17	24.89	15.82	25.39	16.73	1
18	25.39	16.73	27.20	17.28	1
19	27.20	17.28	28.31	19.30	1
20	28.31	19.30	29.32	19.60	1
21	29.32	19.60	30.33	19.60	1
22	30.33	19.60	32.34	19.95	1
23	32.34	19.95	32.64	20.71	1
24	32.64	20.71	34.15	21.11	1
25	34.15	21.11	36.67	23.83	1
26	36.67	23.83	37.17	23.83	4
27	37.17	23.83	40.67	23.83	1
28	40.67	23.83	41.92	24.24	2
29	41.92	24.24	43.05	25.28	2
30	43.05	25.28	44.35	27.08	2
31	44.35	27.08	45.67	27.18	2
32	45.67	27.18	46.92	28.09	2
33	36.67	23.83	36.68	21.54	1
34	36.68	21.54	36.69	18.82	2
35	36.69	18.82	36.70	15.53	3
36	36.70	15.53	37.14	15.53	3
37	37.14	15.53	37.15	19.09	3
38	37.15	19.09	37.16	21.74	2
39	37.16	21.74	37.17	23.83	1
40	.00	4.13	2.93	5.75	2
41	2.93	5.75	5.88	7.39	2
42	5.88	7.39	10.34	8.64	2
43	10.34	8.64	15.00	9.97	2
44	15.00	9.97	17.64	11.00	2
45	17.64	11.00	20.97	12.59	2
46	20.97	12.59	23.75	14.25	2

47	23.75	14.25	28.11	17.26	2
48	28.11	17.26	28.93	17.96	2
49	28.93	17.96	31.19	19.25	2
50	31.19	19.25	36.68	21.54	2
51	37.16	21.74	40.67	23.83	2
52	.00	2.52	4.90	3.89	3
53	4.90	3.89	9.90	5.51	3
54	9.90	5.51	15.27	7.26	3
55	15.27	7.26	17.65	8.11	3
56	17.65	8.11	22.47	10.48	3
57	22.47	10.48	25.29	12.27	3
58	25.29	12.27	36.69	18.82	3
59	37.15	19.09	38.96	20.13	3
60	38.96	20.13	46.92	24.00	3

ISOTROPIC SOIL PARAMETERS

4 TYPE(S) OF SOIL

SOIL TYPE NO.	TOTAL UNIT WT. (KG/MC)	SATURATED UNIT WT. (KG/MC)	COHESION INTERCEPT (KG/MQ)	FRICTION ANGLE (DEG)	PORE PRESSURE PARAMETER	PRESSURE CONSTANT (KG/MQ)
1	1800.0	1900.0	240.0	19.6	.00	.0
2	1950.0	2050.0	560.0	24.0	.00	.0
3	2100.0	2250.0	4000.0	24.8	.00	.0
4	2500.0	2500.0	60000.0	.0	.00	.0

WATER SURFACE SPECIFIED BY 9 COORDINATE POINTS

POINT NO.	X-WATER (M)	Y-WATER (M)
1	.00	3.50
2	6.38	5.54
3	13.87	8.13
4	21.53	11.66
5	26.32	15.83
6	34.10	20.40
7	37.24	22.60
8	40.67	22.82
9	46.92	26.30

A HORIZONTAL EARTHQUAKE LOADING COEFFICIENT OF 0.063 HAS BEEN ASSIGNED
 A VERTICAL EARTHQUAKE LOADING COEFFICIENT OF -0.032 HAS BEEN ASSIGNED
 CAVITATION PRESSURE = .0 KG/MQ

A CRITICAL FAILURE SURFACE SEARCHING METHOD, USING A RANDOM
 TECHNIQUE FOR GENERATING CIRCULAR SURFACES, HAS BEEN SPECIFIED.

200 TRIAL SURFACES HAVE BEEN GENERATED.

10 SURFACES INITIATE FROM EACH OF 20 POINTS EQUALLY SPACED
 ALONG THE GROUND SURFACE BETWEEN X = 15.32 M AND X = 27.20 M

EACH SURFACE TERMINATES BETWEEN X = 37.70 M AND X = 45.67 M

UNLESS FURTHER LIMITATIONS WERE IMPOSED, THE MINIMUM ELEVATION
 AT WHICH A SURFACE EXTENDS IS Y = .00 M

1.00 M. LINE SEGMENTS DEFINE EACH TRIAL FAILURE SURFACE.

RESTRICTIONS HAVE BEEN IMPOSED UPON THE ANGLE OF INITIATION.
THE ANGLE HAS BEEN RESTRICTED BETWEEN THE ANGLES OF 0.0 AND 15.0 DEG.

FOLLOWING ARE DISPLAYED THE TEN MOST CRITICAL OF THE TRIAL
FAILURE SURFACES EXAMINED. THEY ARE ORDERED - MOST CRITICAL FIRST.

FAILURE SURFACE SPECIFIED BY 32 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	19.07	13.20
2	20.07	13.26
3	21.07	13.34
4	22.06	13.46
5	23.05	13.60
6	24.04	13.77
7	25.01	13.97
8	25.99	14.20
9	26.95	14.46
10	27.91	14.74
11	28.86	15.05
12	29.80	15.39
13	30.74	15.76
14	31.65	16.15
15	32.56	16.57
16	33.46	17.02
17	34.34	17.49
18	35.21	17.98
19	36.06	18.51
20	36.90	19.05
21	37.72	19.62
22	38.53	20.21
23	39.31	20.83
24	40.08	21.47
25	40.83	22.13
26	41.57	22.81
27	42.28	23.51
28	42.97	24.24
29	43.64	24.98
30	44.29	25.74
31	44.91	26.52
32	45.39	27.16

*** 1.2579 ***

FAILURE SURFACE SPECIFIED BY 34 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	17.20	11.90
2	18.19	12.03
3	19.17	12.19
4	20.16	12.37
5	21.14	12.57
6	22.11	12.80

7	23.08	13.04
8	24.04	13.31
9	25.00	13.60
10	25.95	13.91
11	26.89	14.25
12	27.83	14.60
13	28.76	14.98
14	29.67	15.37
15	30.58	15.79
16	31.48	16.23
17	32.37	16.69
18	33.25	17.16
19	34.12	17.66
20	34.97	18.18
21	35.82	18.72
22	36.65	19.27
23	37.47	19.85
24	38.27	20.44
25	39.06	21.05
26	39.84	21.68
27	40.61	22.32
28	41.35	22.99
29	42.09	23.67
30	42.81	24.36
31	43.51	25.07
32	44.19	25.80
33	44.86	26.55
34	45.39	27.16

*** 1.2746 ***

FAILURE SURFACE SPECIFIED BY 31 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	20.32	14.16
2	21.32	14.21
3	22.32	14.28
4	23.31	14.39
5	24.30	14.53
6	25.29	14.69
7	26.27	14.89
8	27.24	15.11
9	28.21	15.37
10	29.17	15.65
11	30.12	15.96
12	31.06	16.30
13	31.99	16.67
14	32.91	17.07
15	33.81	17.49
16	34.71	17.94
17	35.59	18.42
18	36.45	18.92
19	37.30	19.45
20	38.13	20.01
21	38.94	20.59
22	39.74	21.19
23	40.52	21.82
24	41.28	22.47
25	42.02	23.14

26	42.74	23.84
27	43.43	24.56
28	44.11	25.29
29	44.76	26.05
30	45.39	26.83
31	45.66	27.18

*** 1.3278 ***

FAILURE SURFACE SPECIFIED BY 32 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	19.70	13.97
2	20.70	14.01
3	21.69	14.08
4	22.69	14.18
5	23.68	14.30
6	24.67	14.46
7	25.65	14.65
8	26.63	14.86
9	27.60	15.11
10	28.56	15.38
11	29.51	15.68
12	30.46	16.01
13	31.39	16.37
14	32.31	16.76
15	33.22	17.17
16	34.12	17.61
17	35.00	18.08
18	35.87	18.57
19	36.73	19.09
20	37.57	19.64
21	38.39	20.21
22	39.19	20.80
23	39.98	21.42
24	40.75	22.06
25	41.49	22.73
26	42.22	23.41
27	42.93	24.12
28	43.61	24.85
29	44.28	25.60
30	44.92	26.36
31	45.53	27.15
32	45.55	27.17

*** 1.3309 ***

FAILURE SURFACE SPECIFIED BY 30 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	20.95	14.30
2	21.95	14.36
3	22.94	14.44
4	23.94	14.56
5	24.93	14.71
6	25.91	14.88

7	26.89	15.09
8	27.86	15.32
9	28.82	15.59
10	29.78	15.89
11	30.72	16.21
12	31.66	16.56
13	32.58	16.95
14	33.50	17.36
15	34.40	17.80
16	35.28	18.26
17	36.15	18.75
18	37.01	19.27
19	37.84	19.82
20	38.67	20.39
21	39.47	20.98
22	40.25	21.60
23	41.02	22.24
24	41.77	22.91
25	42.49	23.60
26	43.19	24.31
27	43.87	25.04
28	44.53	25.80
29	45.17	26.57
30	45.64	27.18

*** 1.3349 ***

FAILURE SURFACE SPECIFIED BY 33 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	17.82	12.11
2	18.81	12.27
3	19.79	12.46
4	20.77	12.66
5	21.74	12.89
6	22.71	13.14
7	23.68	13.41
8	24.63	13.70
9	25.58	14.01
10	26.53	14.34
11	27.46	14.70
12	28.39	15.07
13	29.31	15.46
14	30.22	15.88
15	31.12	16.31
16	32.01	16.76
17	32.89	17.23
18	33.76	17.73
19	34.62	18.24
20	35.47	18.77
21	36.31	19.31
22	37.13	19.88
23	37.95	20.46
24	38.74	21.07
25	39.53	21.68
26	40.30	22.32
27	41.06	22.97
28	41.80	23.64
29	42.53	24.33

30	43.24	25.03
31	43.94	25.74
32	44.62	26.48
33	45.22	27.15

*** 1.3455 ***

FAILURE SURFACE SPECIFIED BY 31 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	15.95	10.89
2	16.94	10.99
3	17.93	11.11
4	18.92	11.25
5	19.91	11.43
6	20.89	11.63
7	21.86	11.86
8	22.83	12.12
9	23.79	12.40
10	24.74	12.71
11	25.68	13.04
12	26.61	13.40
13	27.53	13.79
14	28.45	14.20
15	29.35	14.64
16	30.23	15.10
17	31.11	15.58
18	31.97	16.09
19	32.81	16.63
20	33.65	17.18
21	34.46	17.76
22	35.26	18.36
23	36.04	18.99
24	36.81	19.63
25	37.55	20.29
26	38.28	20.98
27	38.99	21.69
28	39.68	22.41
29	40.35	23.15
30	41.00	23.91
31	41.02	23.95

*** 1.3616 ***

FAILURE SURFACE SPECIFIED BY 30 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	20.95	14.30
2	21.95	14.32
3	22.95	14.37
4	23.94	14.46
5	24.94	14.58
6	25.92	14.74
7	26.90	14.93
8	27.88	15.15
9	28.85	15.41

10	29.80	15.70
11	30.75	16.03
12	31.68	16.39
13	32.60	16.78
14	33.51	17.20
15	34.40	17.65
16	35.28	18.13
17	36.13	18.65
18	36.97	19.19
19	37.79	19.76
20	38.59	20.36
21	39.37	20.99
22	40.13	21.65
23	40.86	22.33
24	41.57	23.03
25	42.25	23.76
26	42.91	24.52
27	43.54	25.29
28	44.14	26.09
29	44.72	26.91
30	44.86	27.12

*** 1.3617 ***

FAILURE SURFACE SPECIFIED BY 30 COORDINATE POINTS

POINT NO.	X-SURF (M)	Y-SURF (M)
1	20.32	14.16
2	21.32	14.16
3	22.32	14.20
4	23.32	14.28
5	24.31	14.39
6	25.30	14.53
7	26.29	14.71
8	27.26	14.92
9	28.23	15.17
10	29.19	15.45
11	30.14	15.76
12	31.08	16.11
13	32.01	16.49
14	32.92	16.90
15	33.82	17.34
16	34.70	17.81
17	35.56	18.31
18	36.41	18.85
19	37.23	19.41
20	38.04	20.00
21	38.83	20.62
22	39.59	21.26
23	40.33	21.93
24	41.05	22.63
25	41.74	23.35
26	42.41	24.10
27	43.05	24.86
28	43.67	25.65
29	44.25	26.46
30	44.68	27.11

*** 1.3713 ***

FAILURE SURFACE SPECIFIED BY 29 COORDINATE POINTS

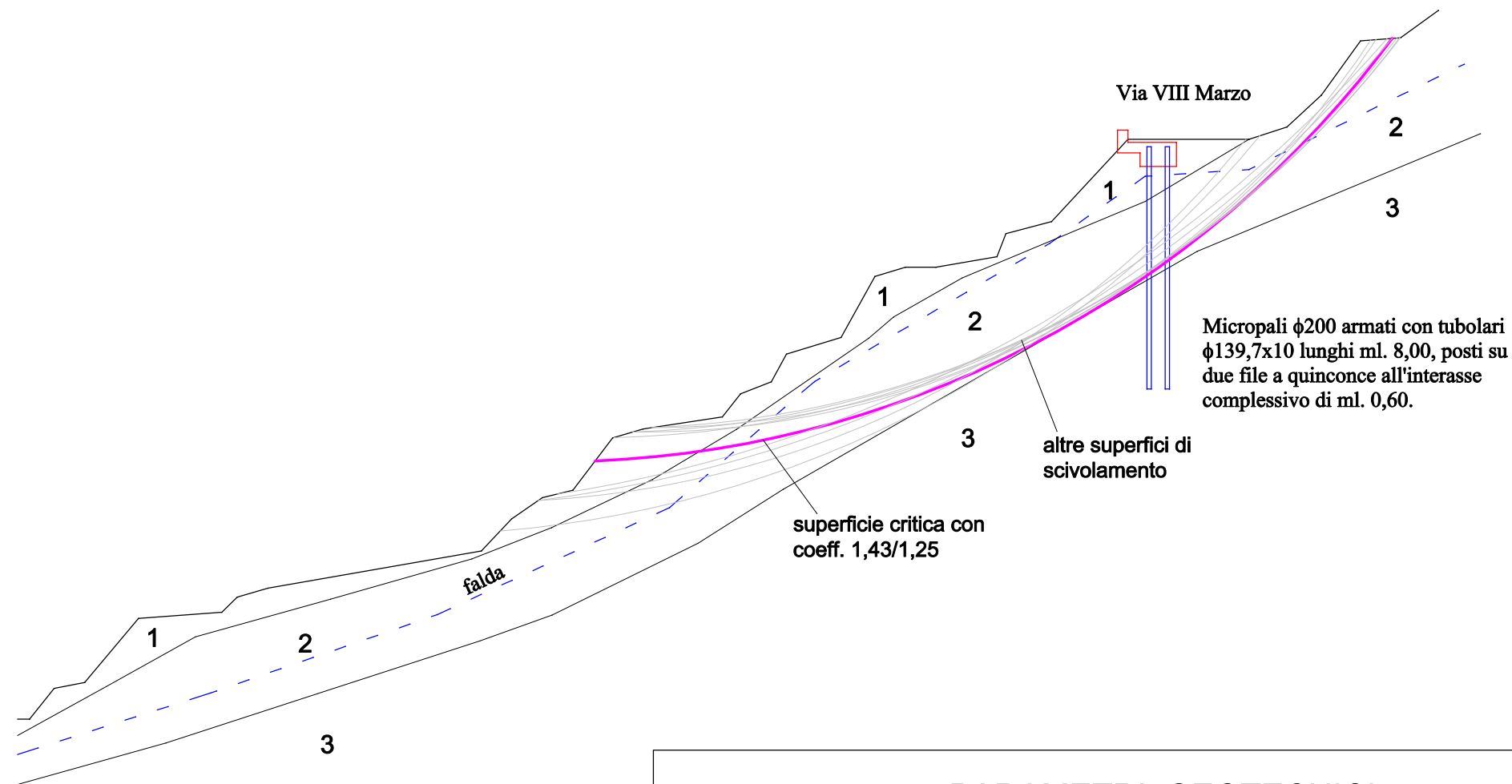
POINT NO.	X-SURF (M)	Y-SURF (M)
1	17.20	11.90
2	18.19	11.97
3	19.19	12.07
4	20.18	12.20
5	21.17	12.36
6	22.15	12.55
7	23.12	12.77
8	24.09	13.02
9	25.05	13.30
10	26.00	13.61
11	26.94	13.96
12	27.87	14.33
13	28.79	14.72
14	29.69	15.15
15	30.58	15.60
16	31.46	16.09
17	32.32	16.60
18	33.17	17.13
19	33.99	17.69
20	34.80	18.28
21	35.59	18.89
22	36.37	19.53
23	37.12	20.18
24	37.85	20.87
25	38.56	21.57
26	39.25	22.30
27	39.91	23.05
28	40.55	23.81
29	40.56	23.83

*** 1.3732 ***

VERIFICA DI STABILITA' POST-INTERVENTO PENDICE A VALE VIA VIII MARZO (scala 1:200)

(verifica effettuata con il programma STABL con il metodo di Bishop modificato)

VERIFICA IN CONDIZIONI SISMICHE



PARAMETRI GEOTECNICI	
valori caratteristici	Strato 1: $\phi = 24,0^\circ$ $c = 0,030$ daN/cm q $\gamma = 18,0$ KN/mc $\gamma_s = 19,0$ KN/mc
	Strato 2: $\phi = 29,0^\circ$ $c = 0,070$ daN/cm q $\gamma = 19,0$ KN/mc $\gamma_s = 20,5$ KN/mc
	Strato 3: $\phi = 30,0^\circ$ $c = 0,500$ daN/cm q $\gamma = 21,0$ KN/mc $\gamma_s = 22,5$ KN/mc
valori ridotti	Strato 1: $\phi = 19,6^\circ$ $c = 0,024$ daN/cm q $\gamma = 18,0$ KN/mc $\gamma_s = 19,0$ KN/mc
	Strato 2: $\phi = 24,0^\circ$ $c = 0,056$ daN/cm q $\gamma = 19,0$ KN/mc $\gamma_s = 20,5$ KN/mc
	Strato 3: $\phi = 24,8^\circ$ $c = 0,400$ daN/cm q $\gamma = 21,0$ KN/mc $\gamma_s = 22,5$ KN/mc