

AUTORITA' DI BACINO
DI RILIEVO REGIONALE



PROVINCIA
DI SAVONA

PIANO DI BACINO NIMBALTO

Piano stralcio per la tutela dal rischio idrogeologico
di cui all'art.1, comma 1 del D.L. 11/06/1998 n.180,
convertito in legge 03/08/1998 n.267 e s.m.

VERIFICHE IDRAULICHE

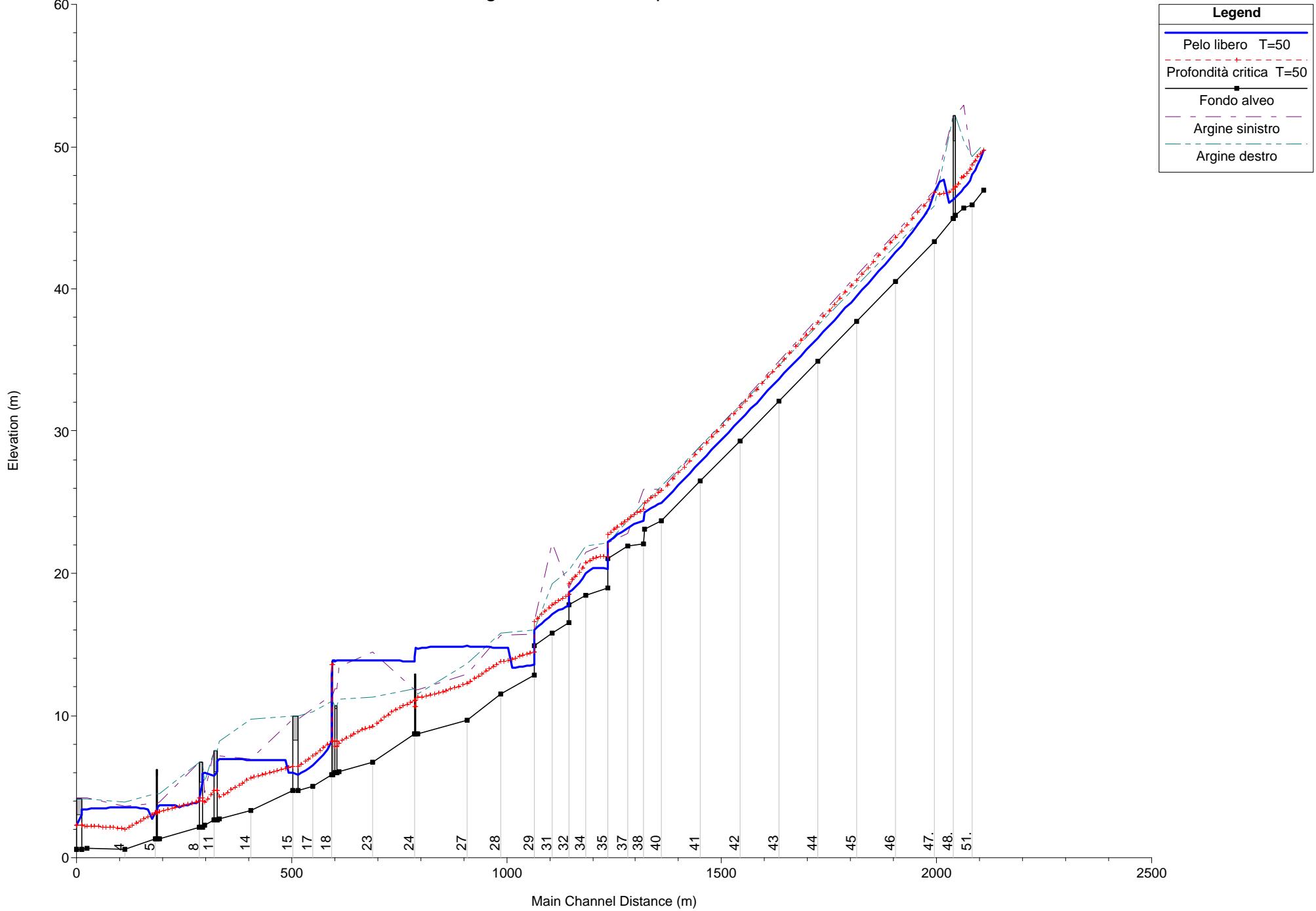
Approvato con D.C.P. n° 47 del 25/11/2003

PROFILI DI RIGURGITO IN CONDIZIONI DI MOTO
PERMANENTE PER LE PORTATE $T=50, 200, 500$ ANNI

NIMBALTO

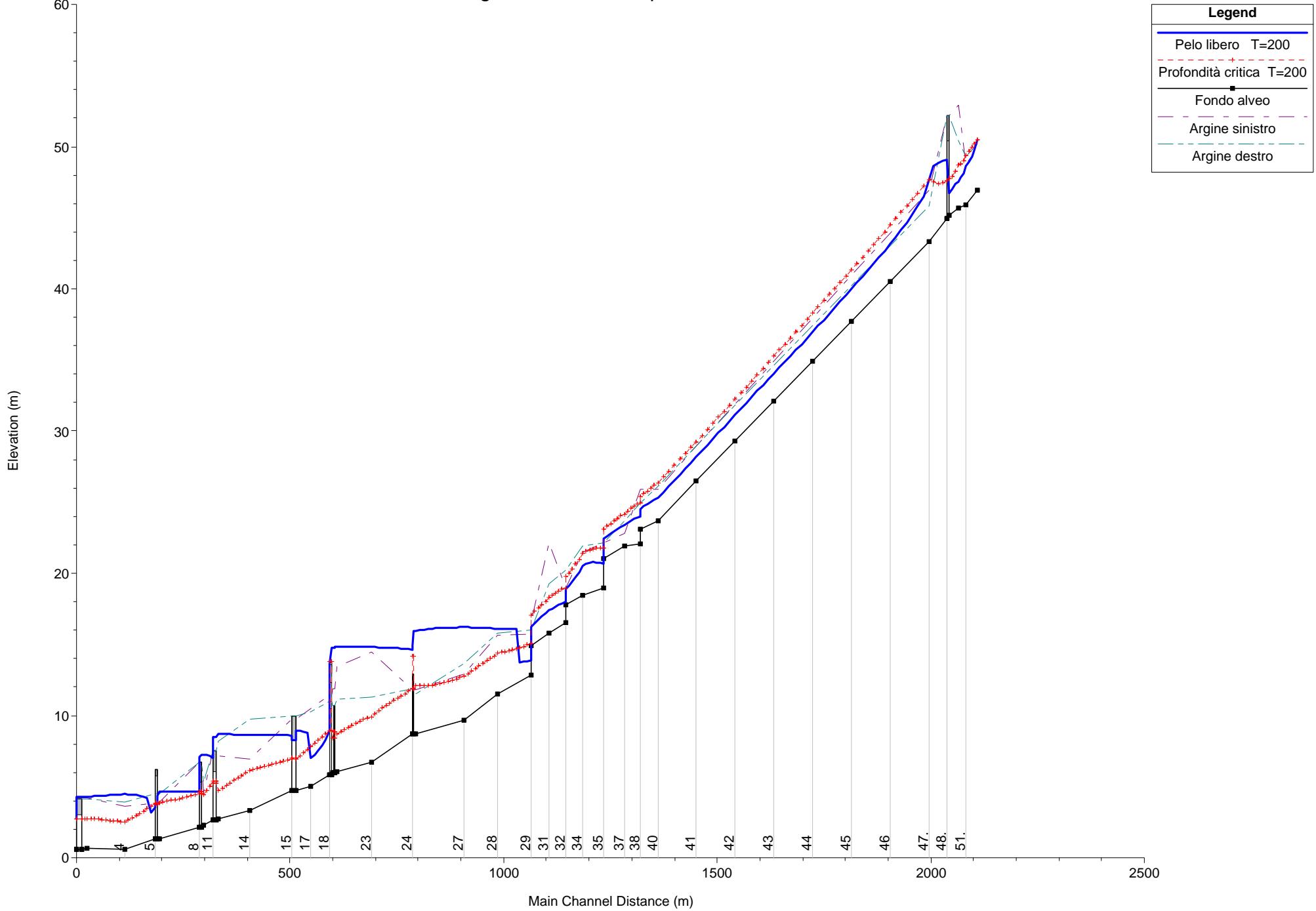
Profilo longitudinale di moto permanente

T=50 anni



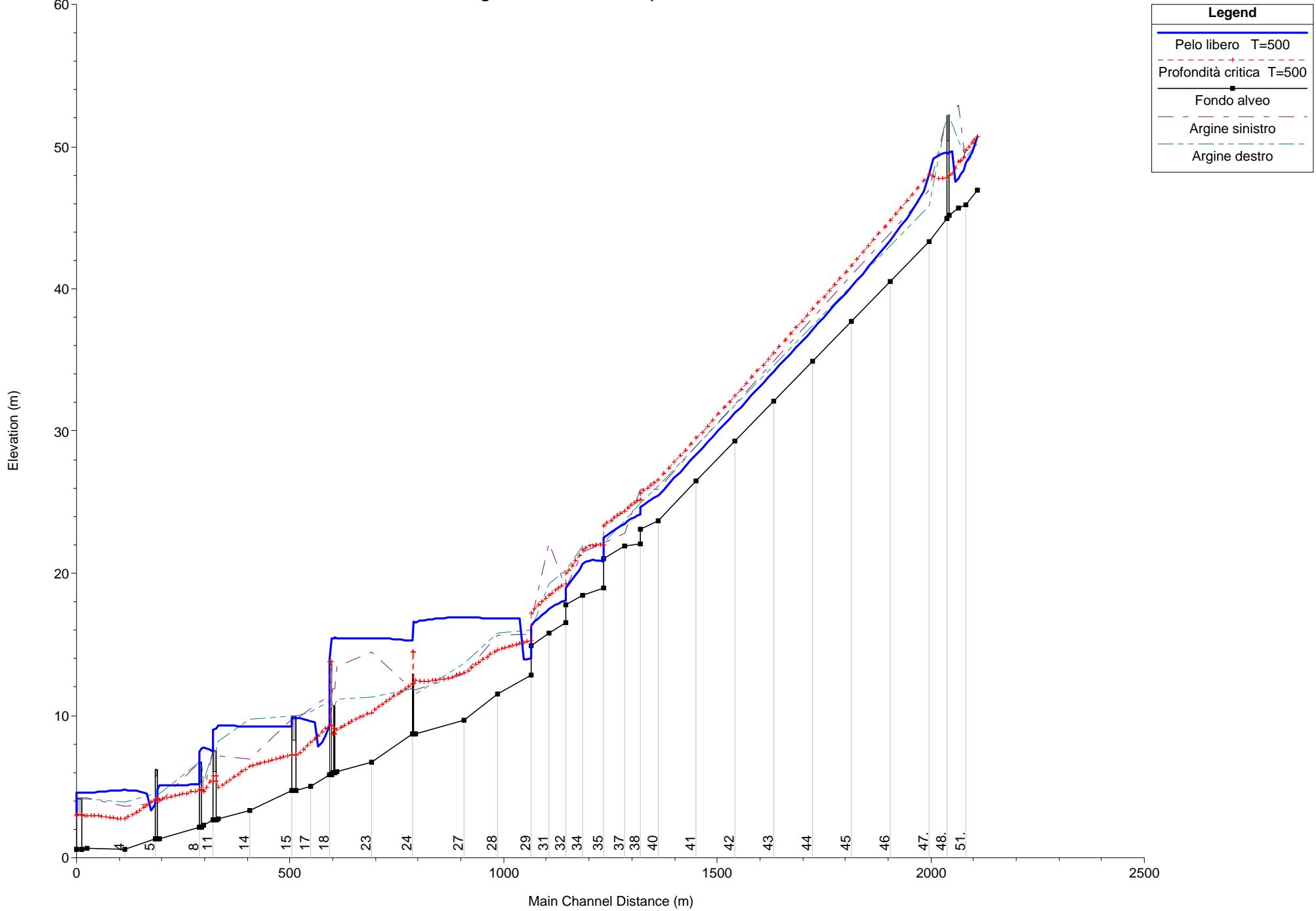
Profilo longitudinale di moto permanente

T=200 anni



Profilo longitudinale di moto permanente

T=500 anni



GEOMETRIA DELLE SEZIONI ED ALTEZZA DEL PELO
LIBERO IN CONDIZIONI DI MOTO PERMANENTE
PER LE PORTATE T=50, 200, 500 ANNI

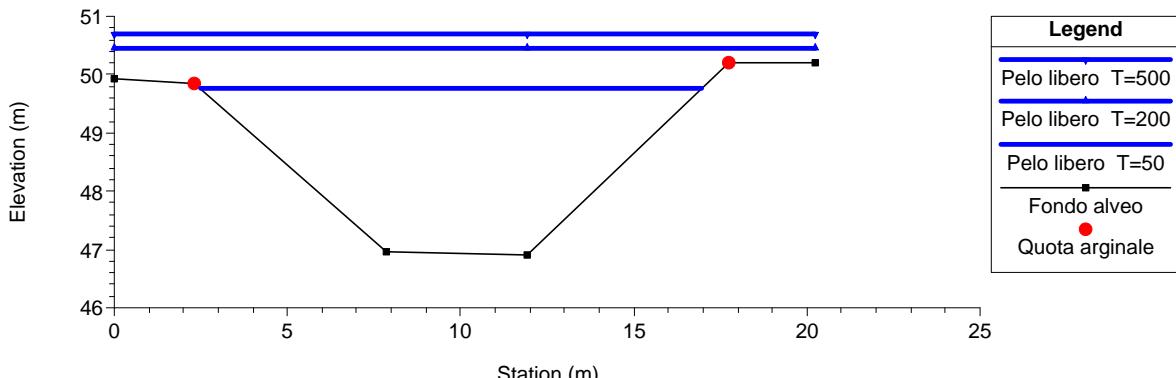
NIMBALTO

DALLA SEZ. 52
ALLA SEZ. 1

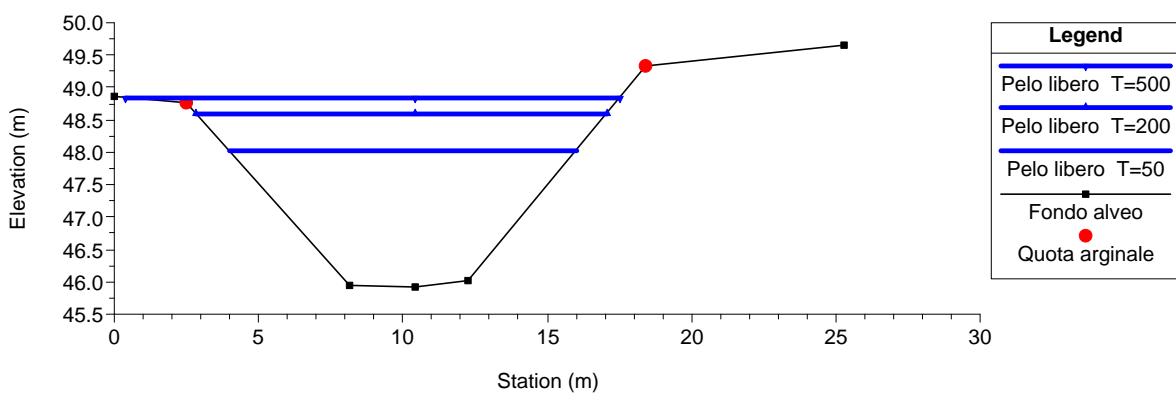
TORRENTE NIMBALTO

Sezioni trasversali

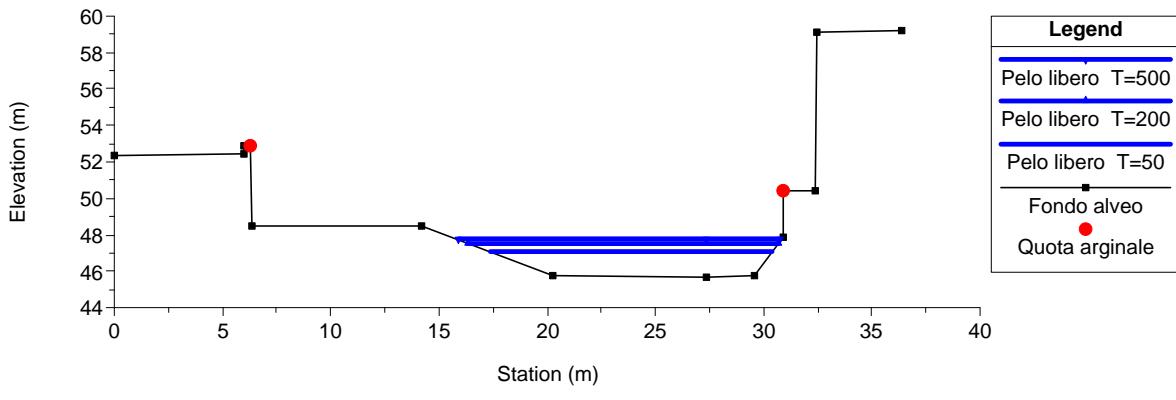
RS = 52.



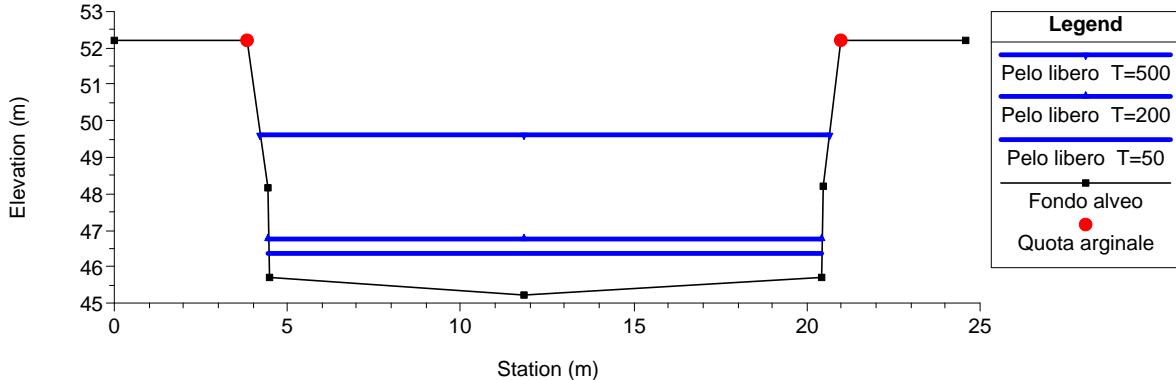
RS = 51.



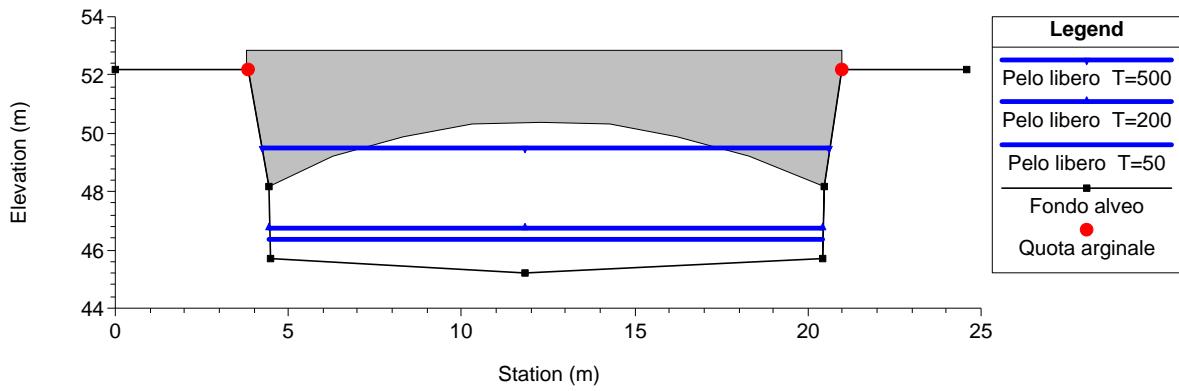
RS = 50.



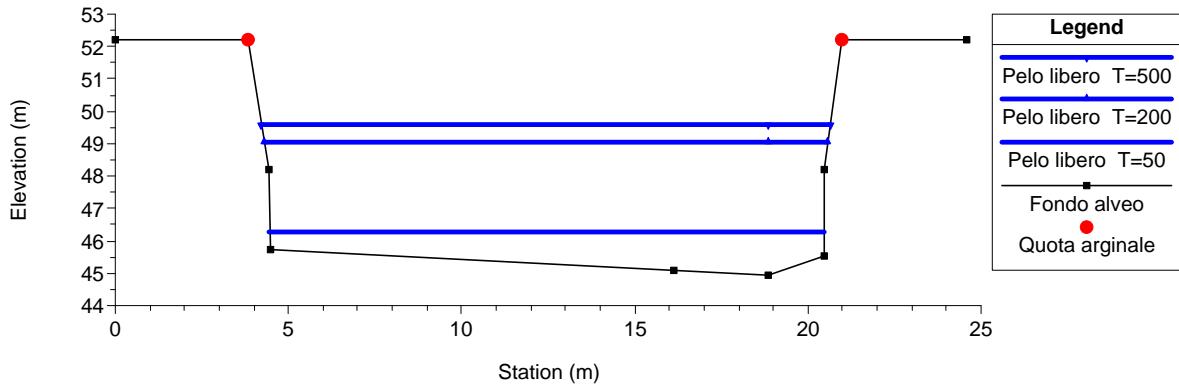
RS = 49.



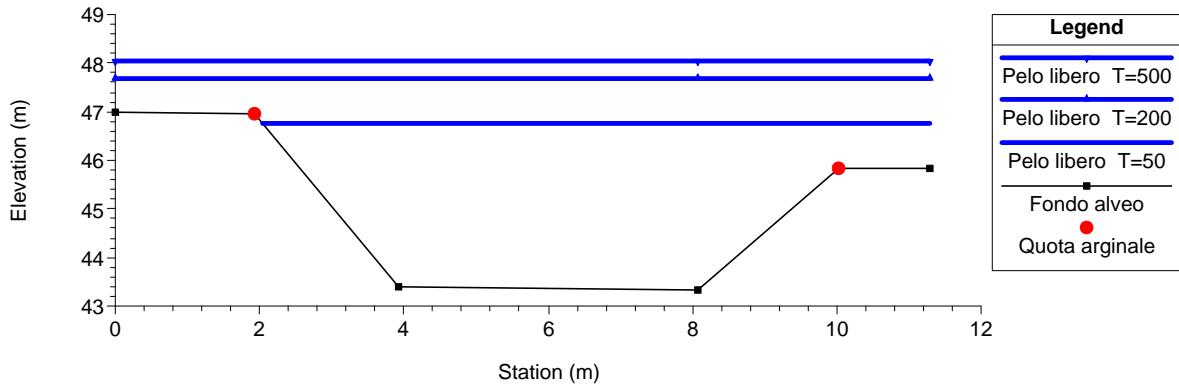
RS = 48.5 BR



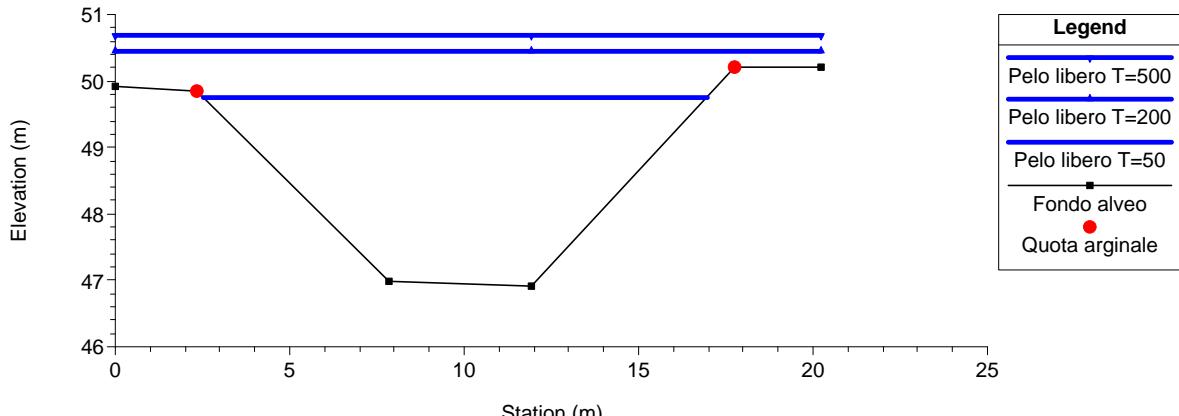
RS = 48.



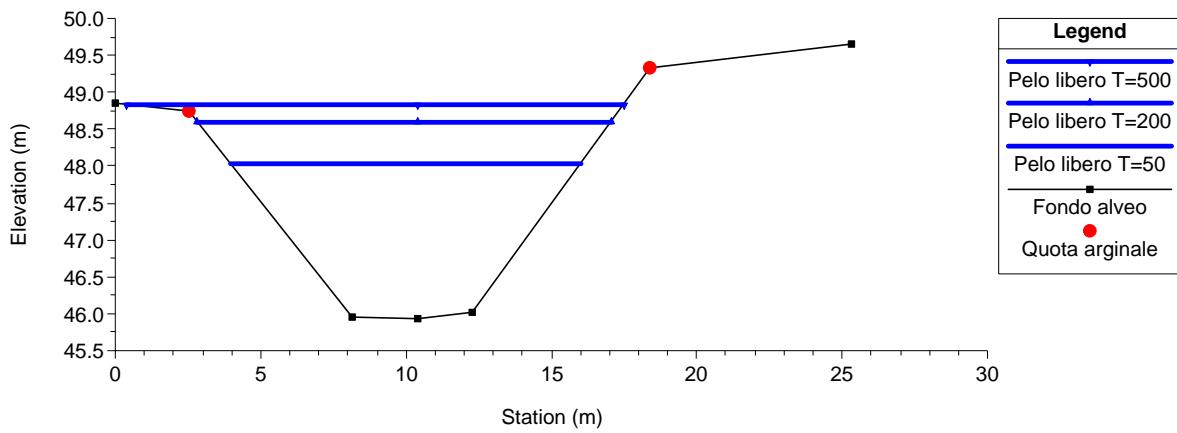
RS = 47.



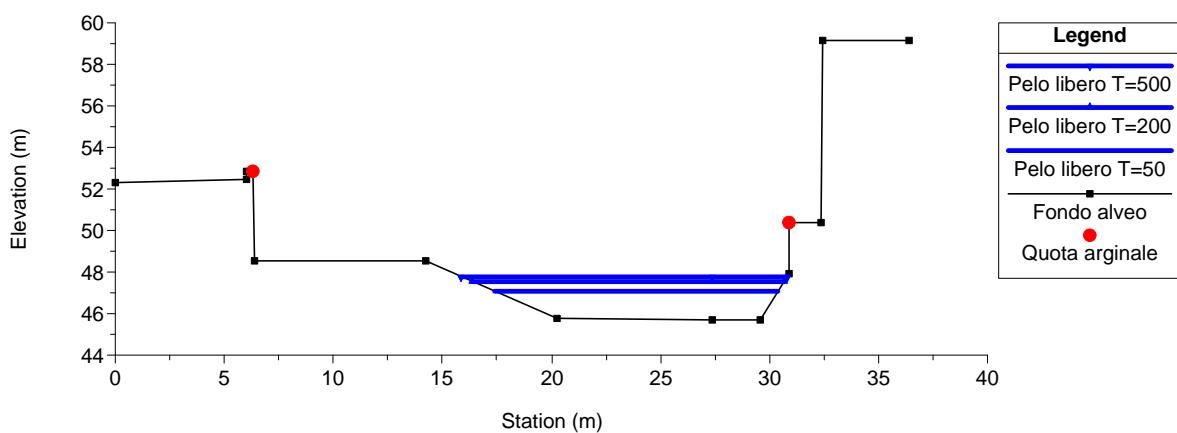
RS = 46



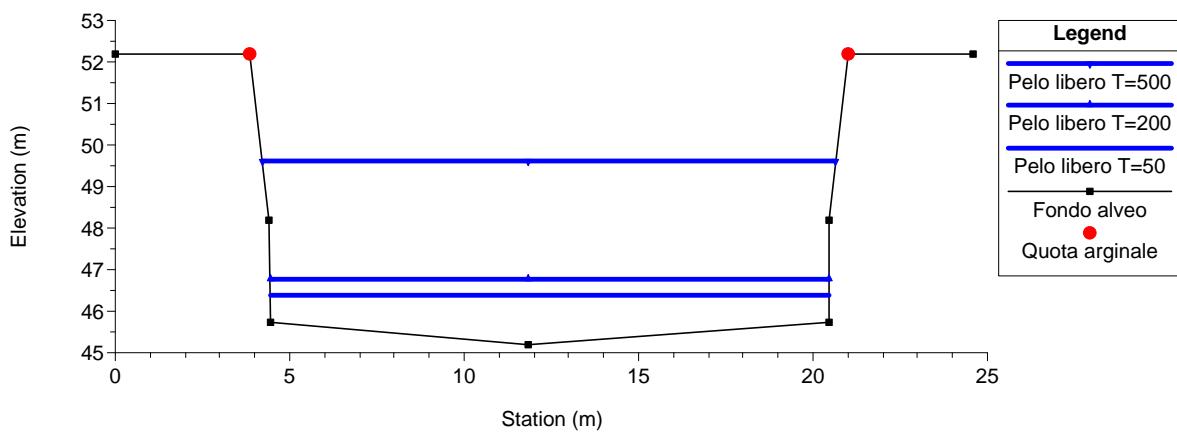
RS = 45



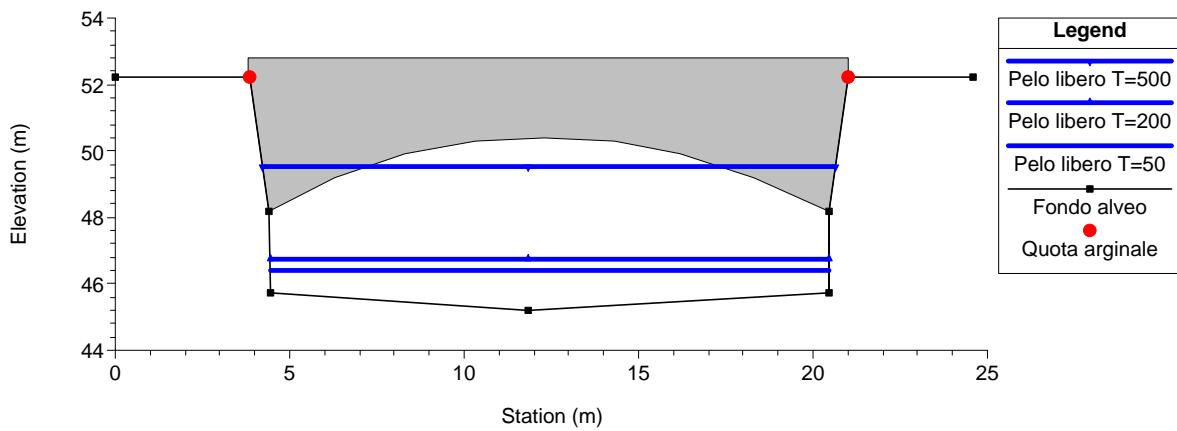
RS = 44



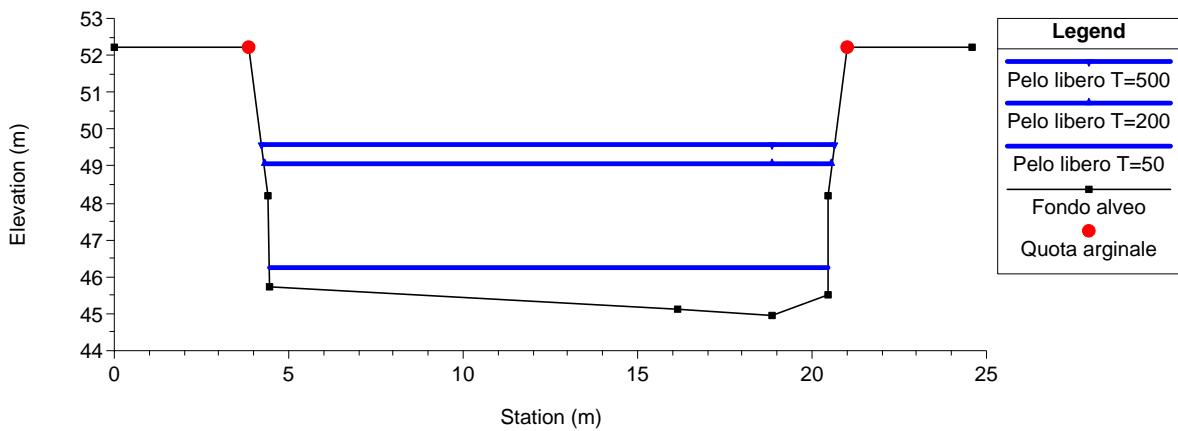
RS = 43



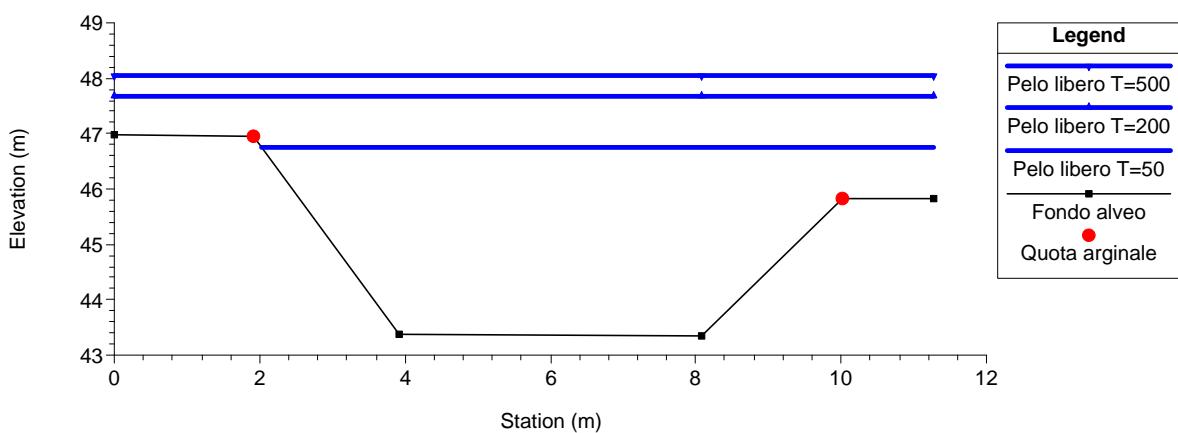
RS = 42.5 BR



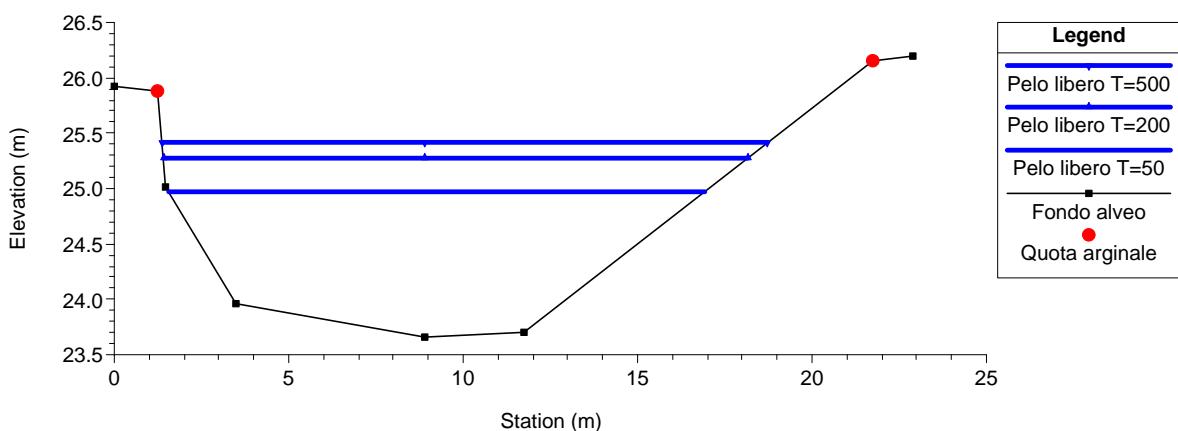
RS = 42



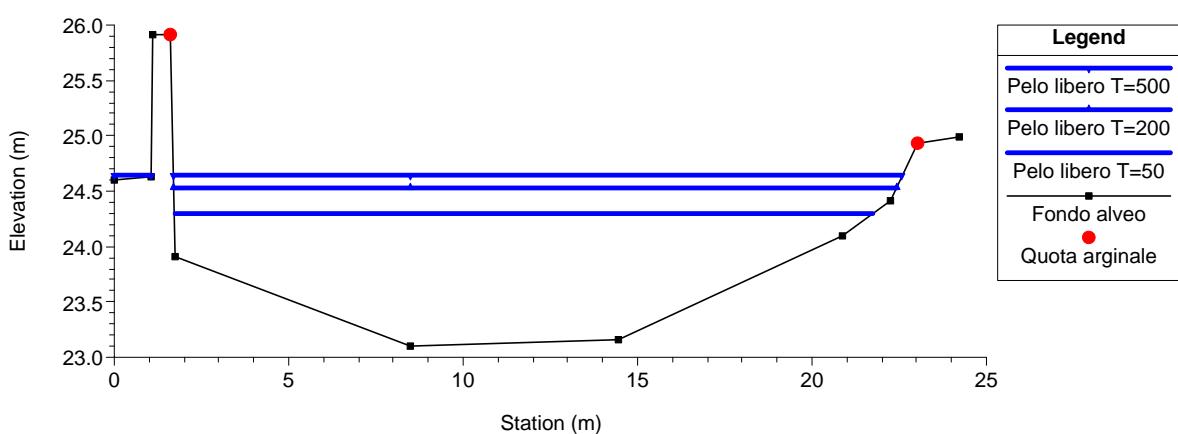
RS = 41



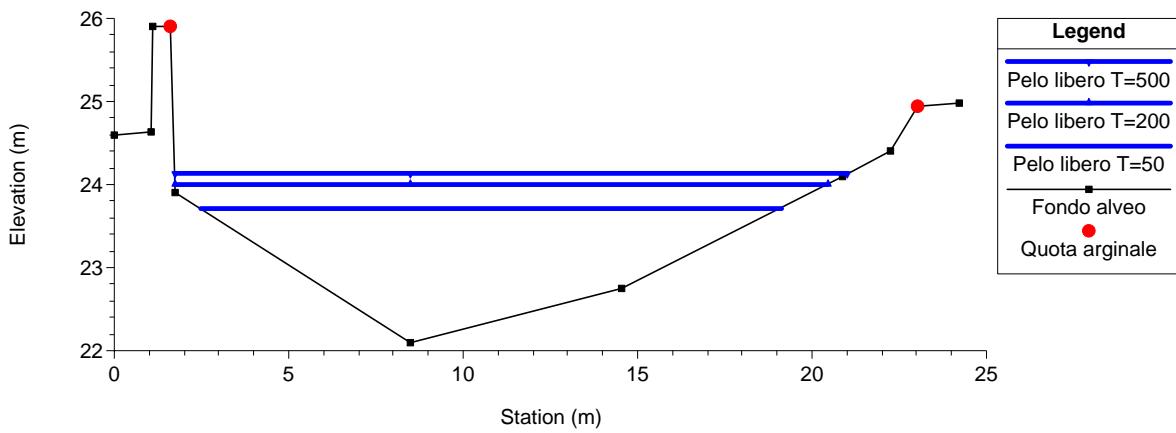
RS = 40



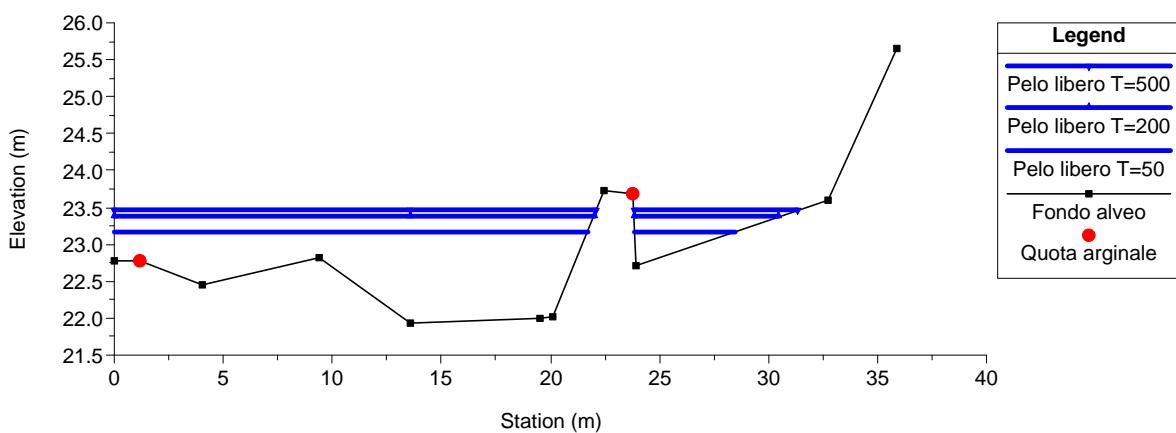
RS = 39



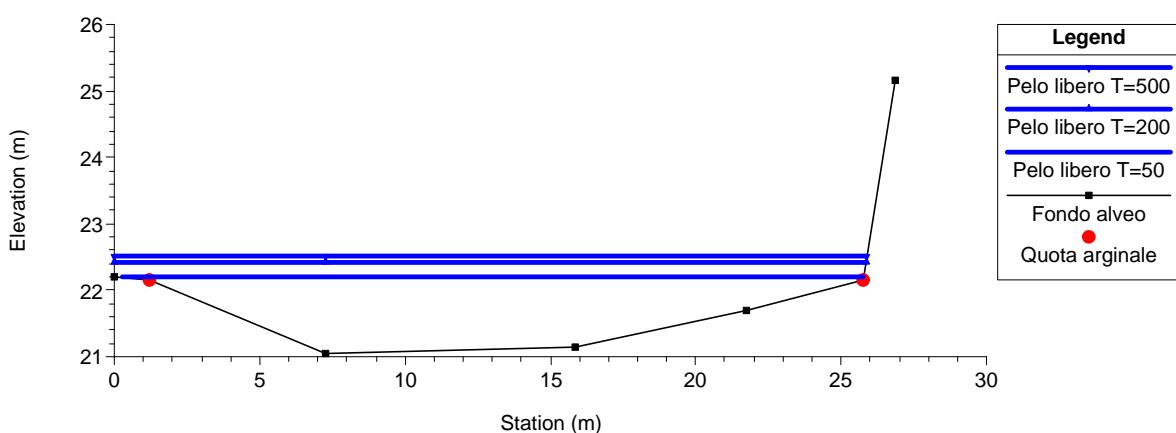
RS = 38



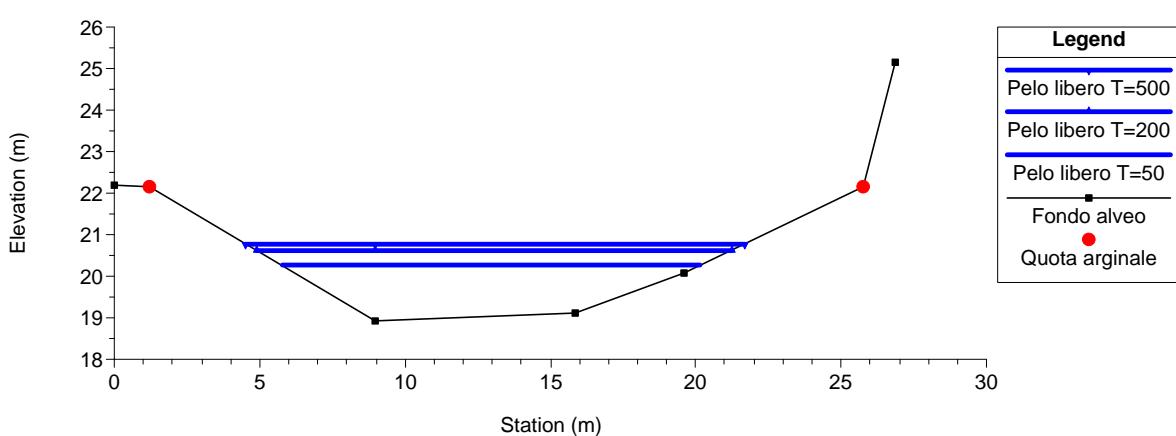
RS = 37



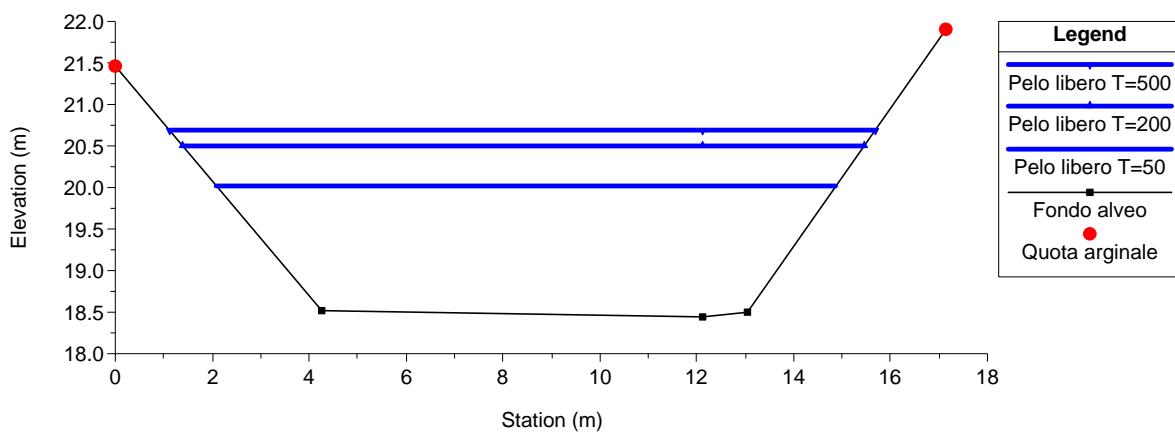
RS = 36



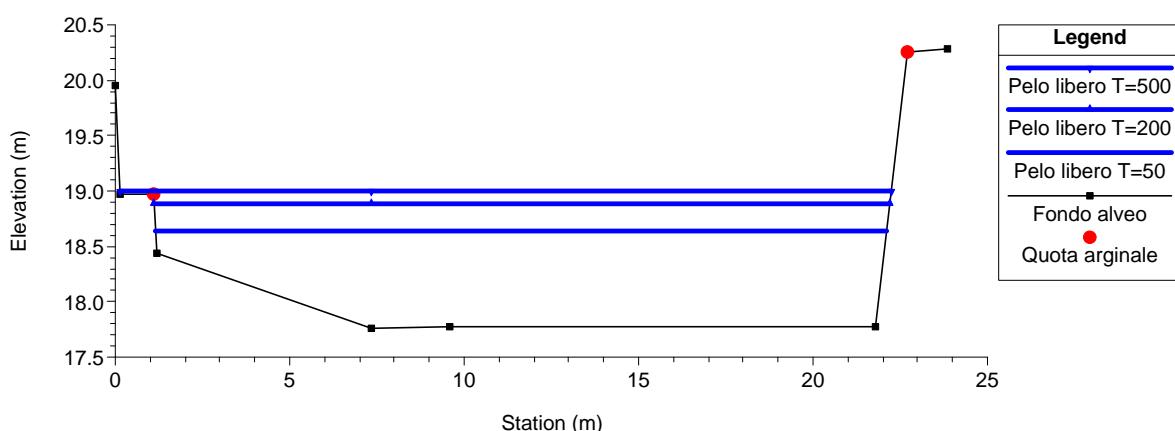
RS = 35



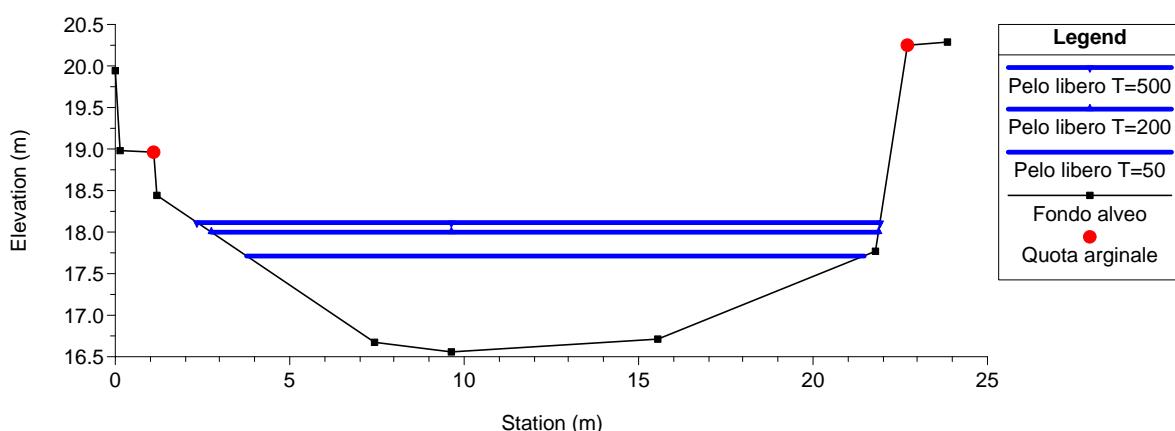
RS = 34



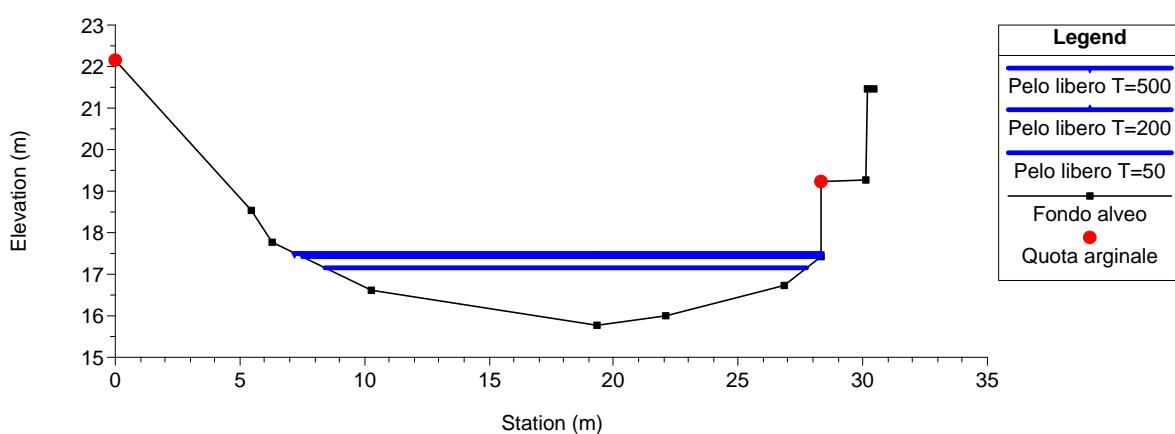
RS = 33



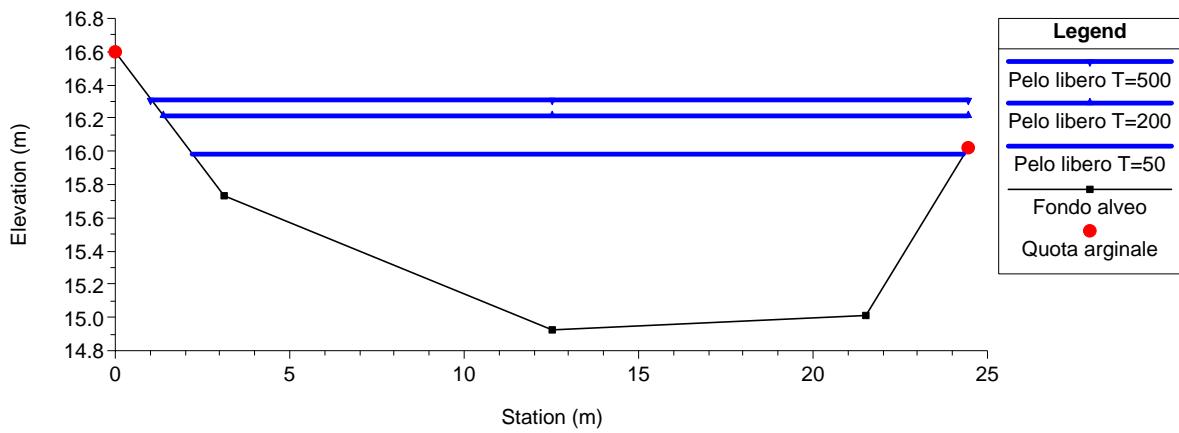
RS = 32



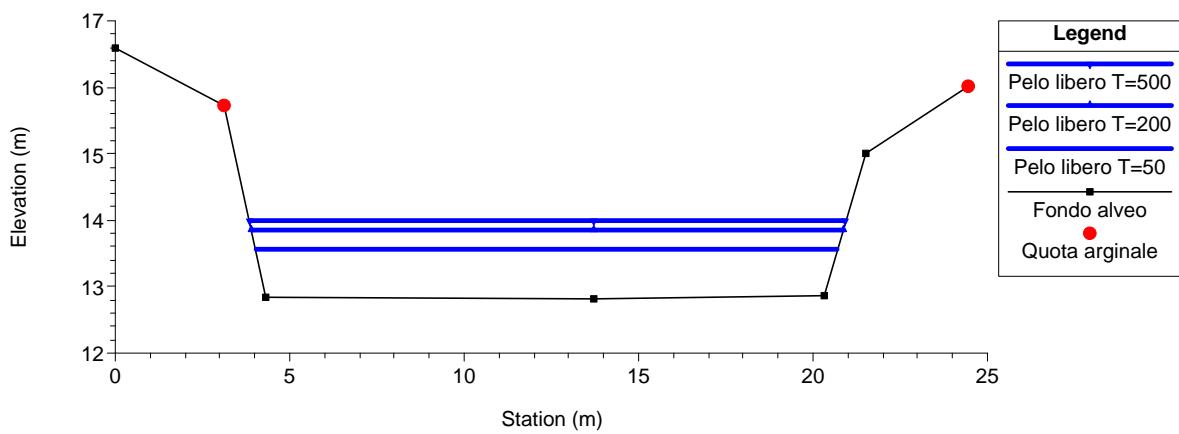
RS = 31



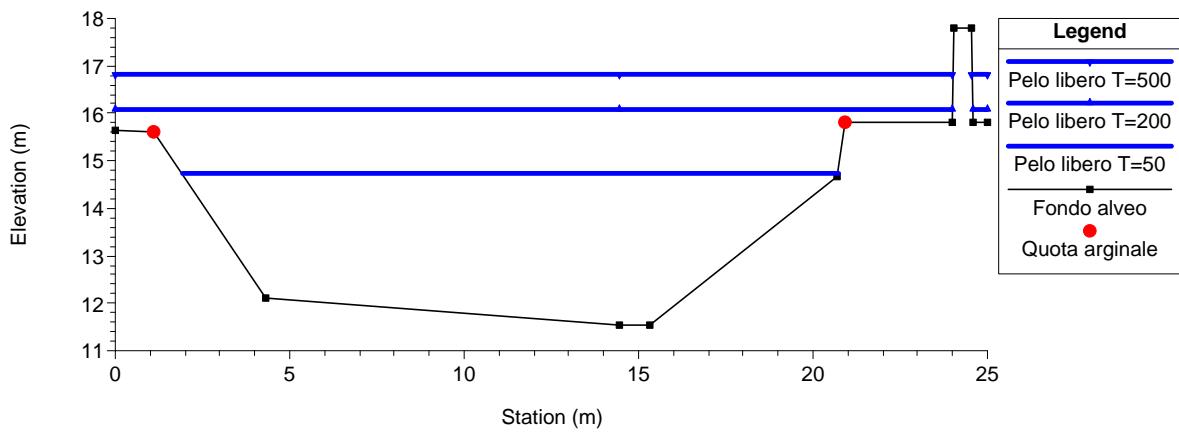
RS = 30



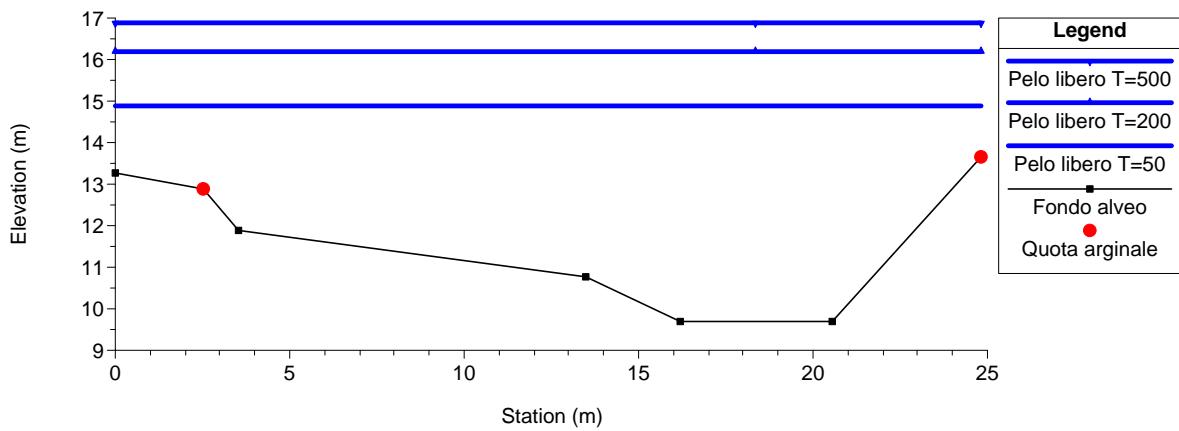
RS = 29



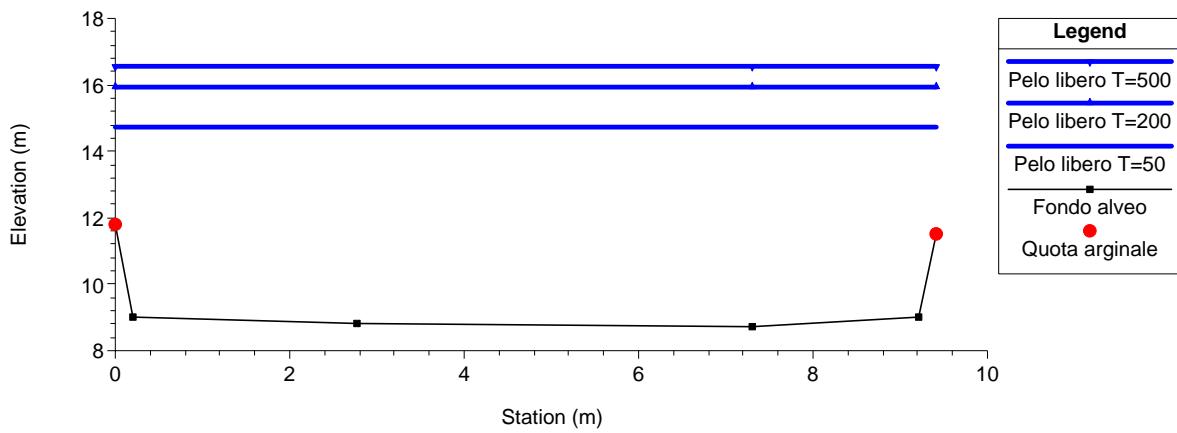
RS = 28



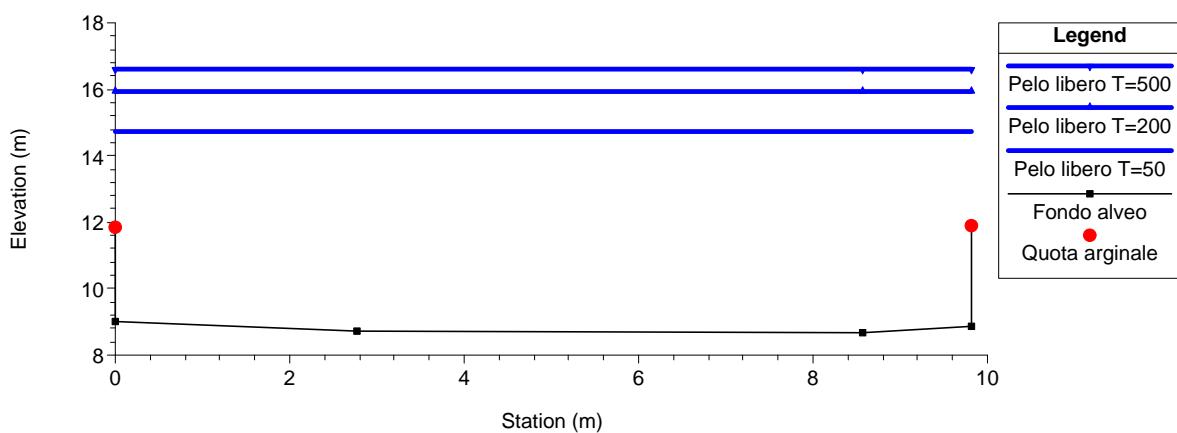
RS = 27



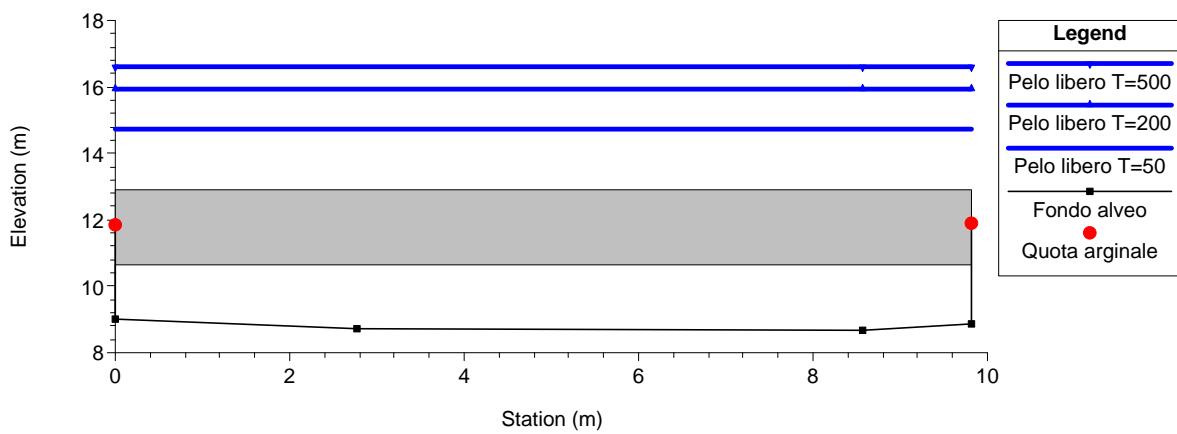
RS = 26



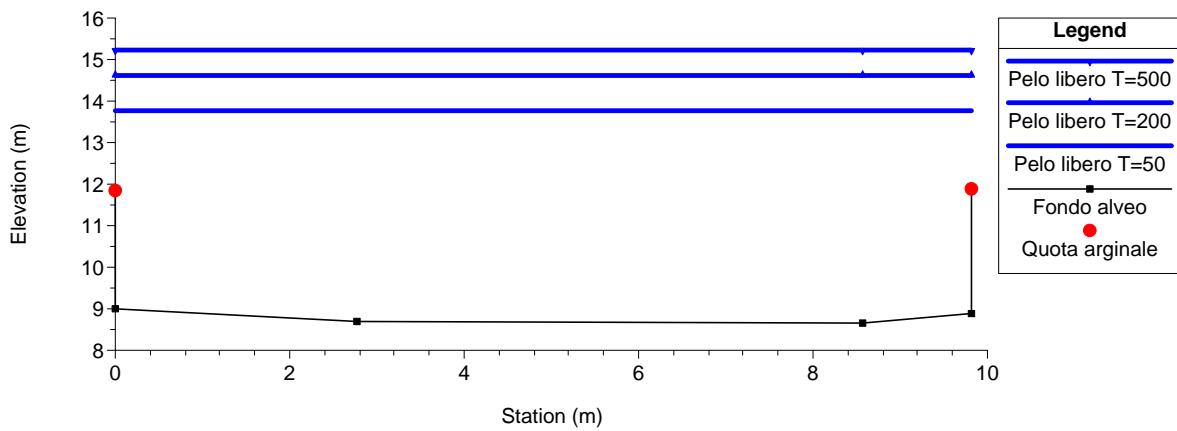
RS = 25



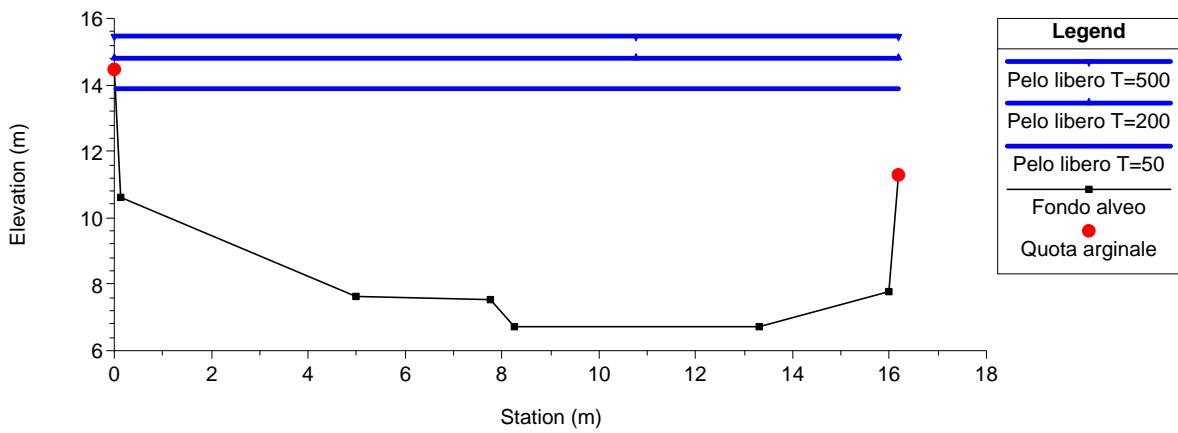
RS = 24.5 BR



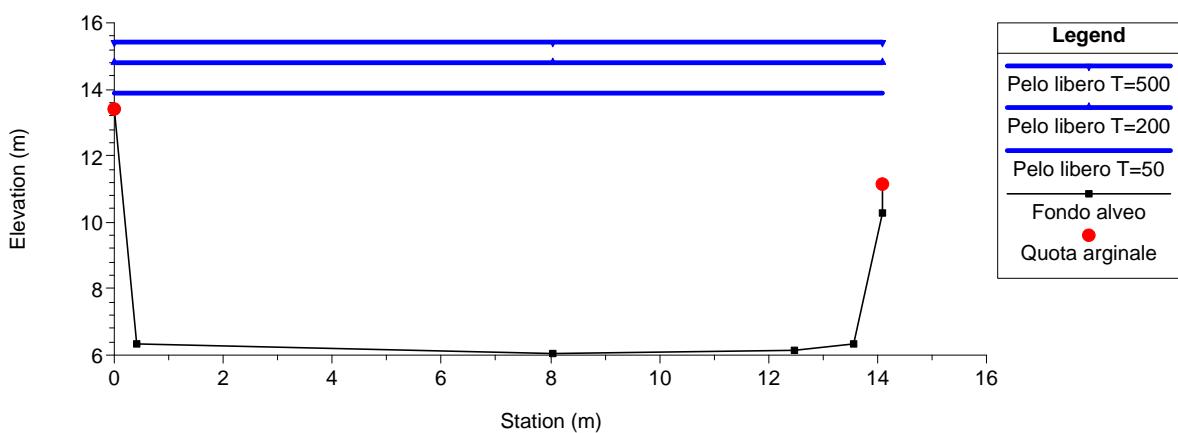
RS = 24



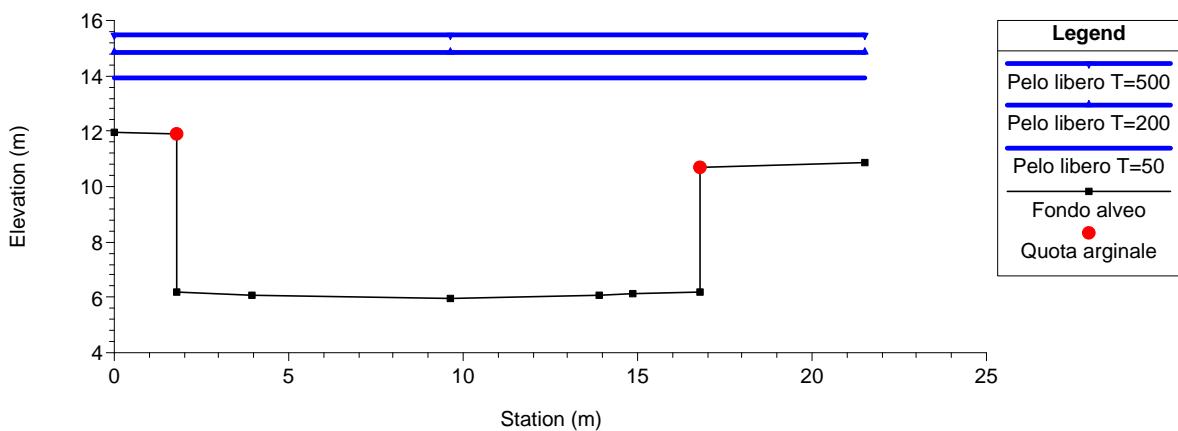
RS = 23



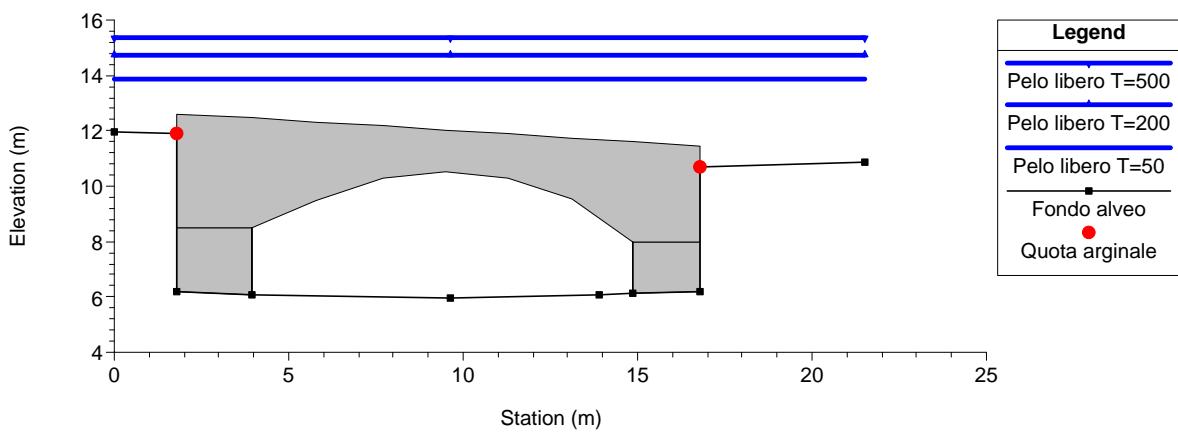
RS = 22



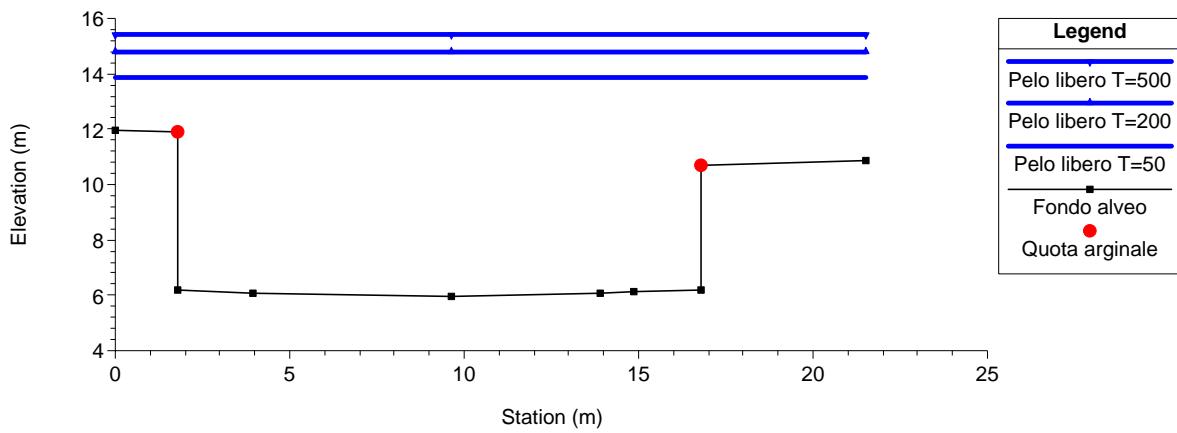
RS = 21



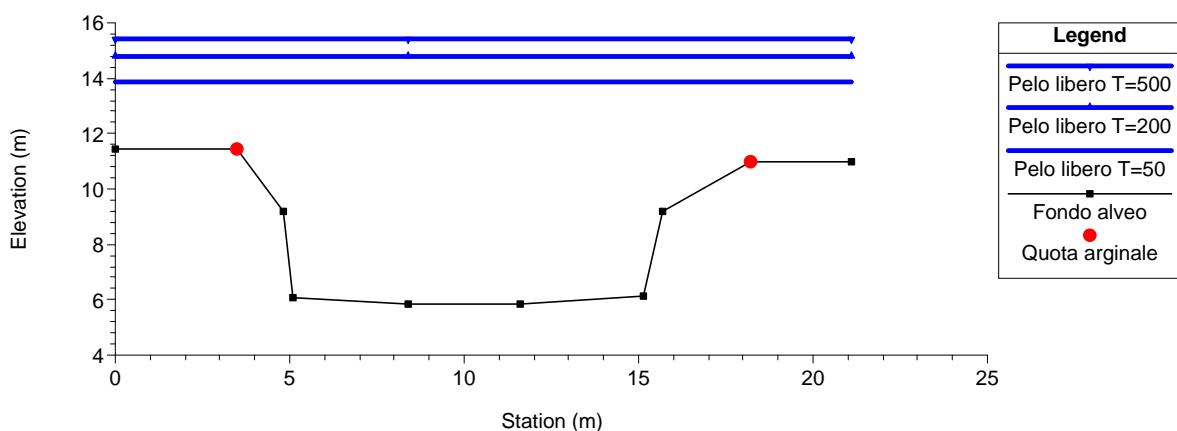
RS = 20.5 BR



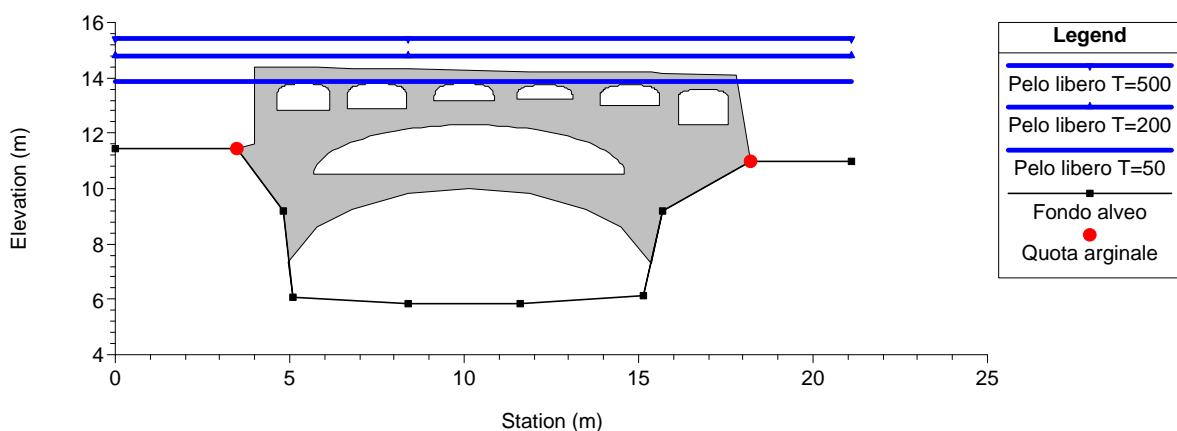
RS = 20



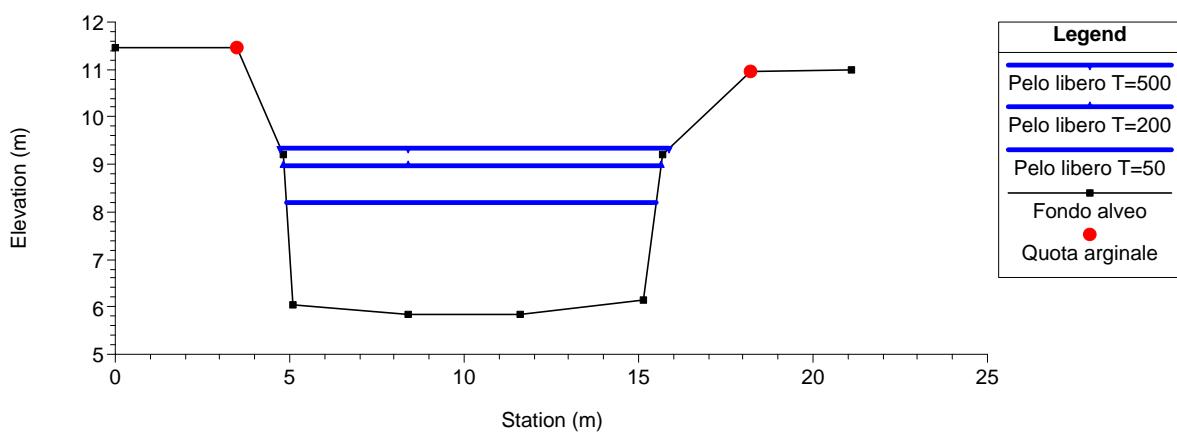
RS = 19



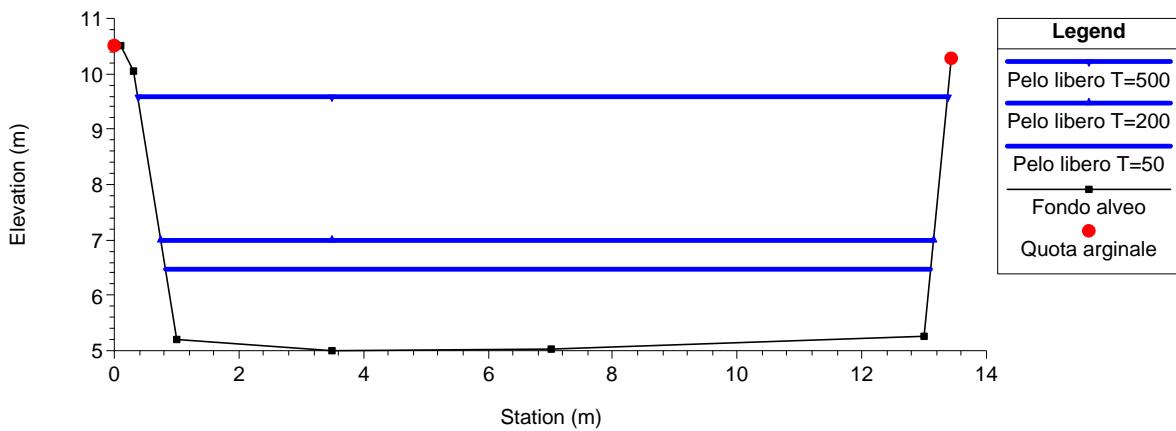
RS = 18.5 Culv



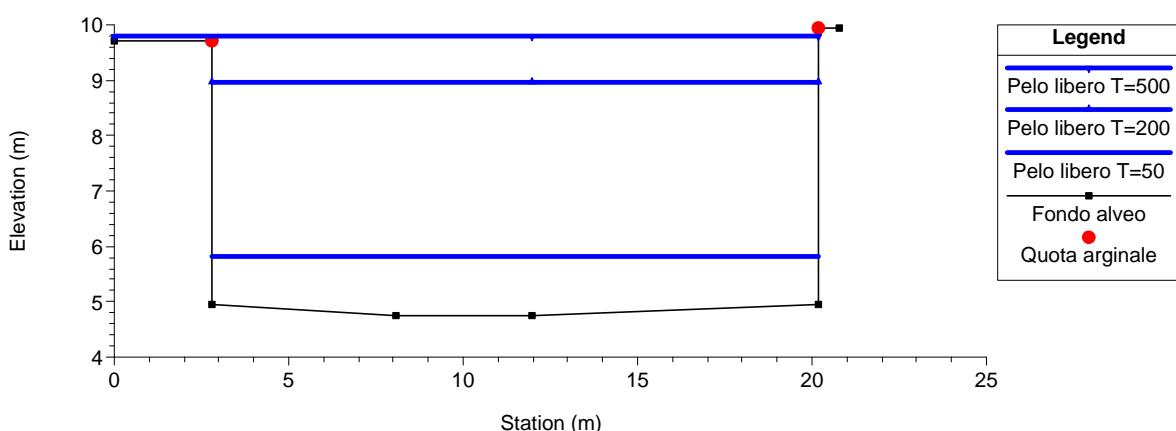
RS = 18



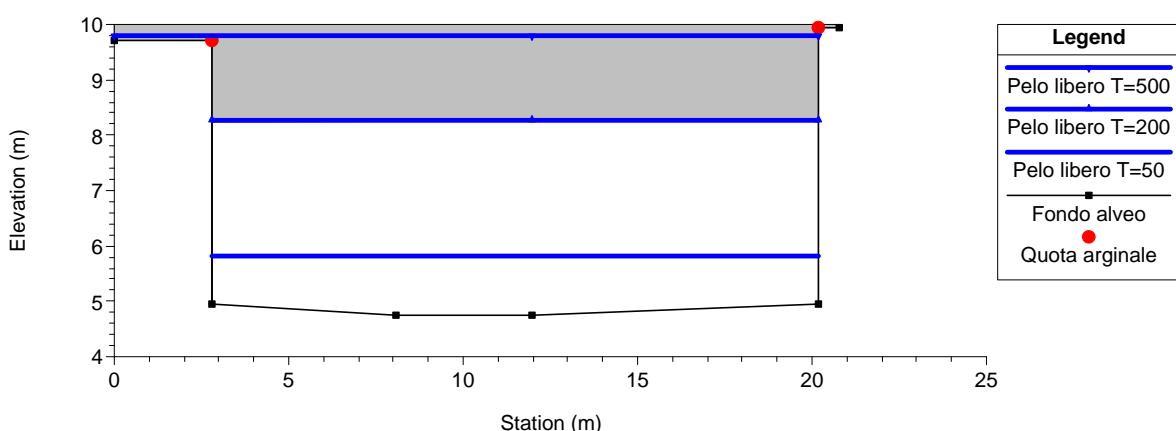
RS = 17



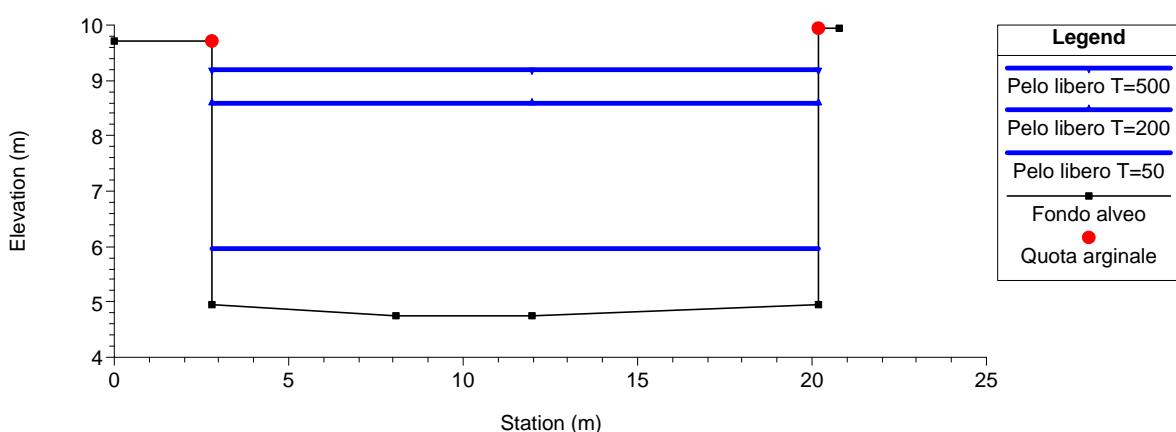
RS = 16



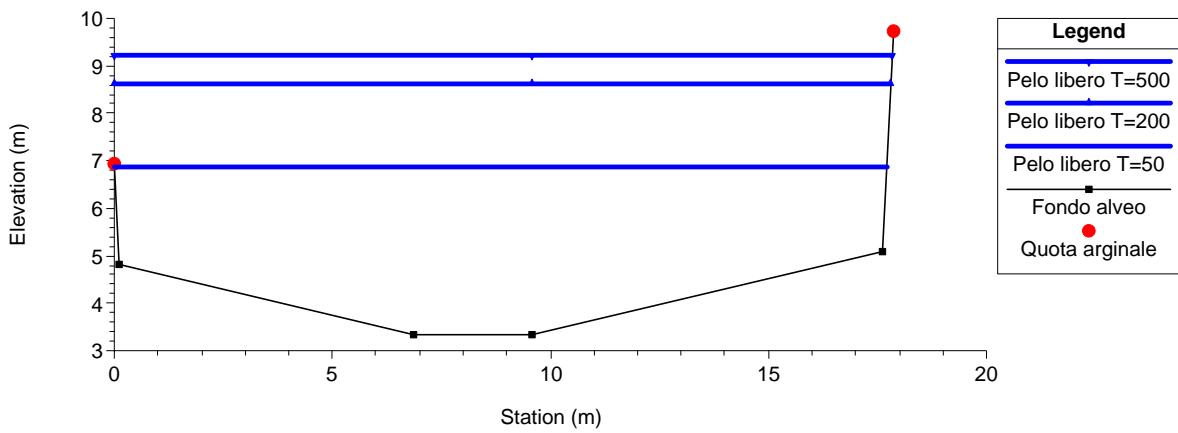
RS = 15.5 BR



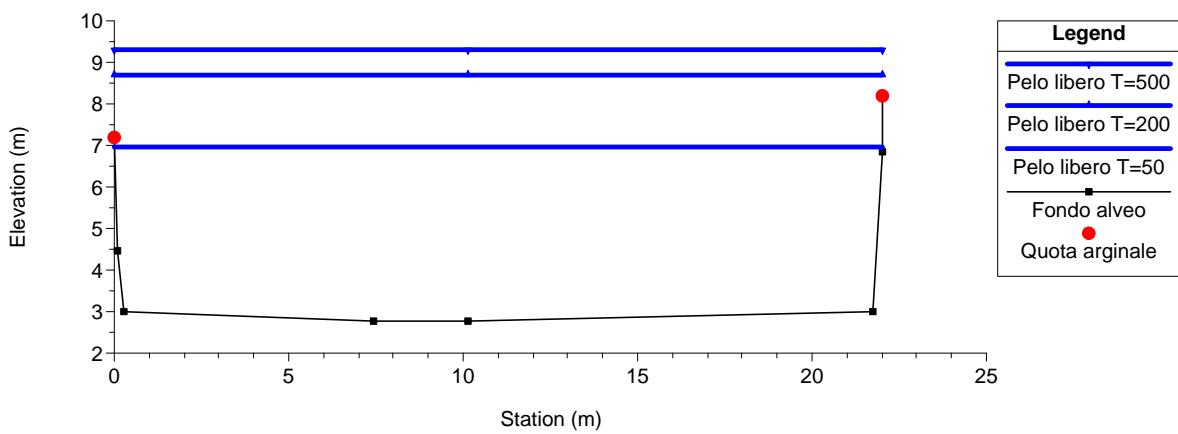
RS = 15



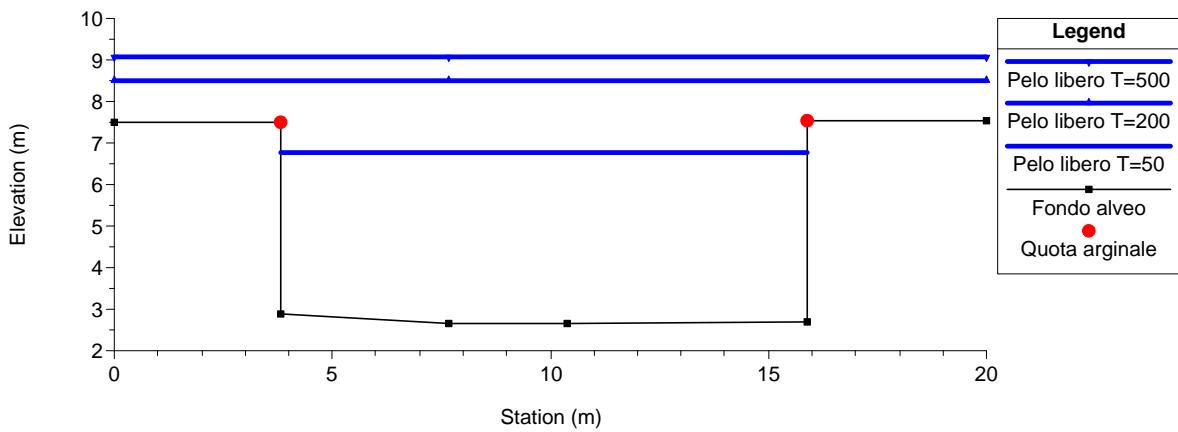
RS = 14



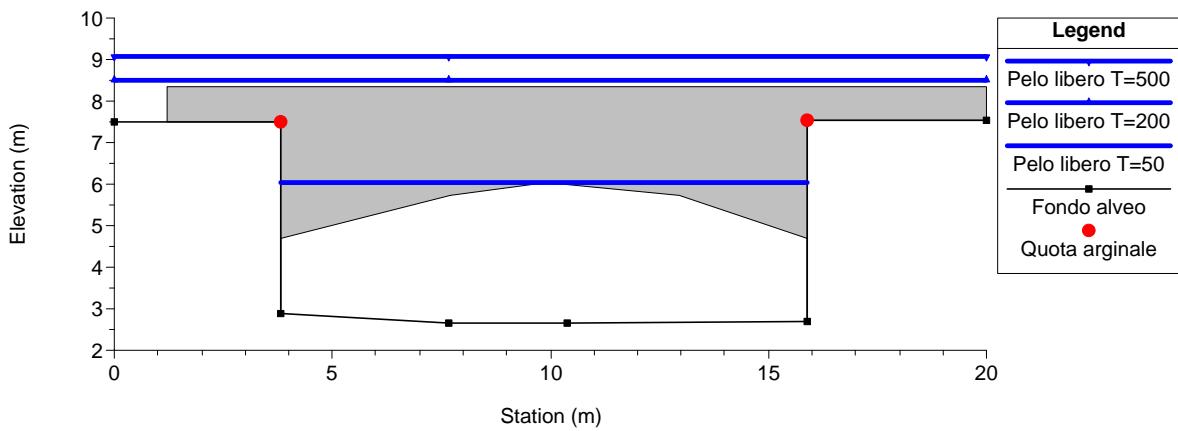
RS = 13



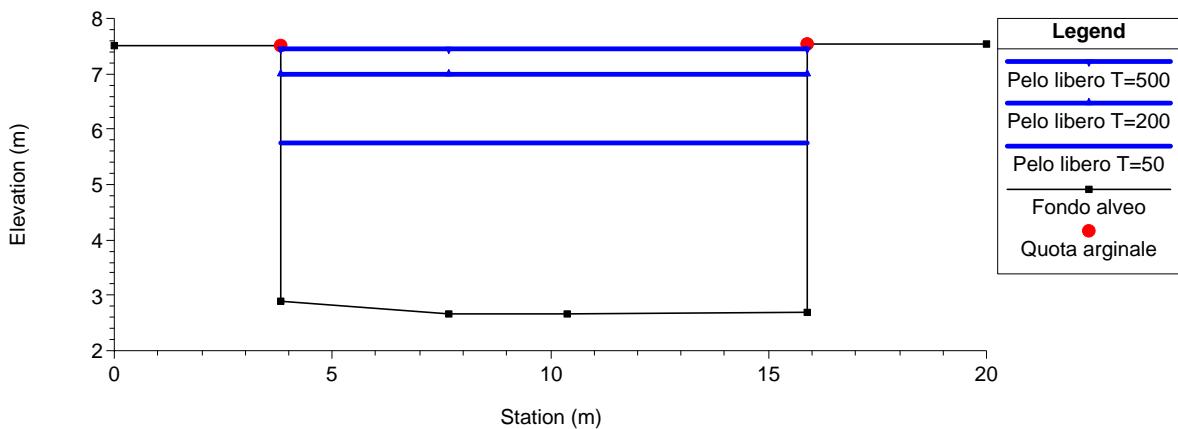
RS = 12



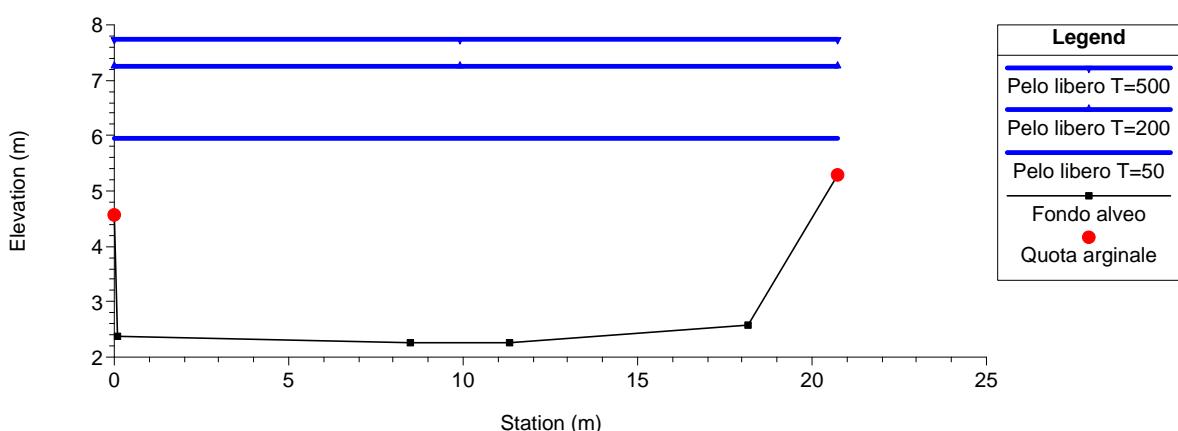
RS = 11.5 BR



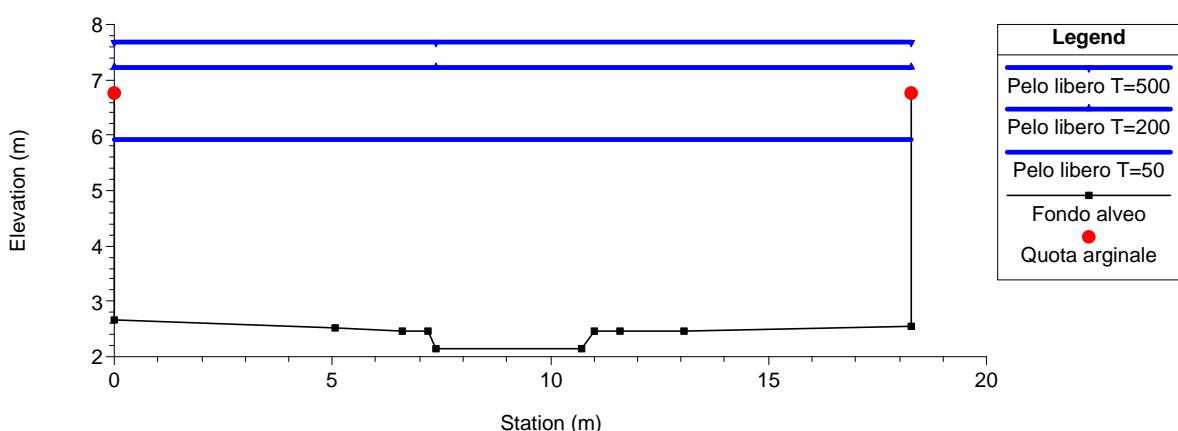
RS = 11



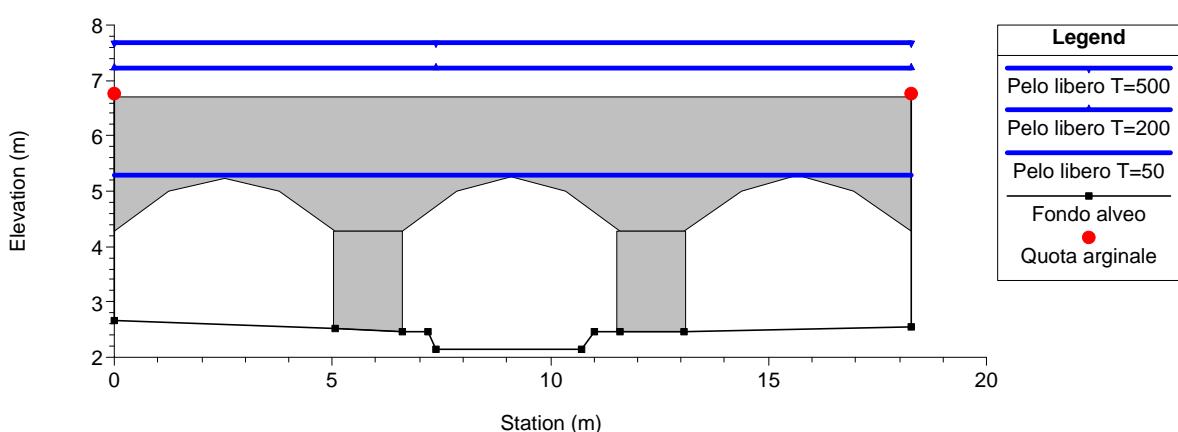
RS = 10



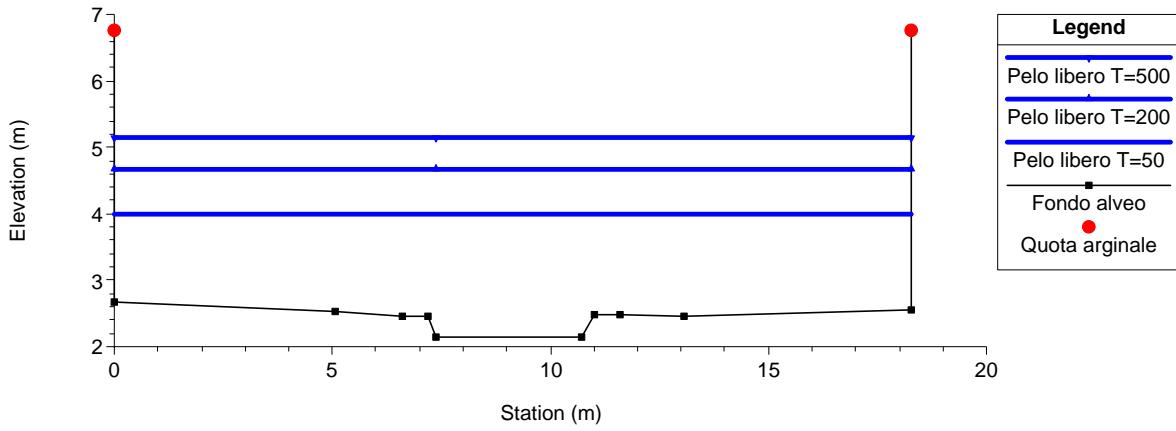
RS = 9



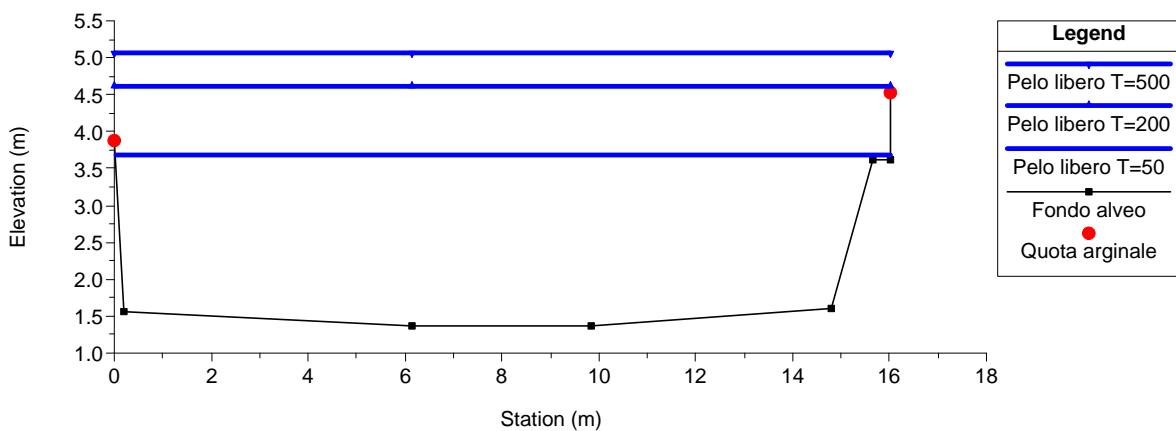
RS = 8.5 BR



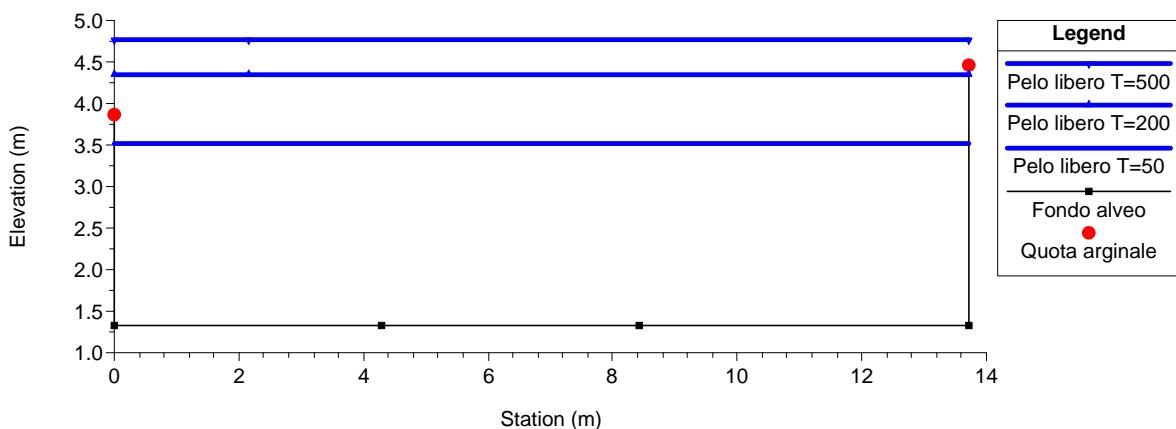
RS = 8



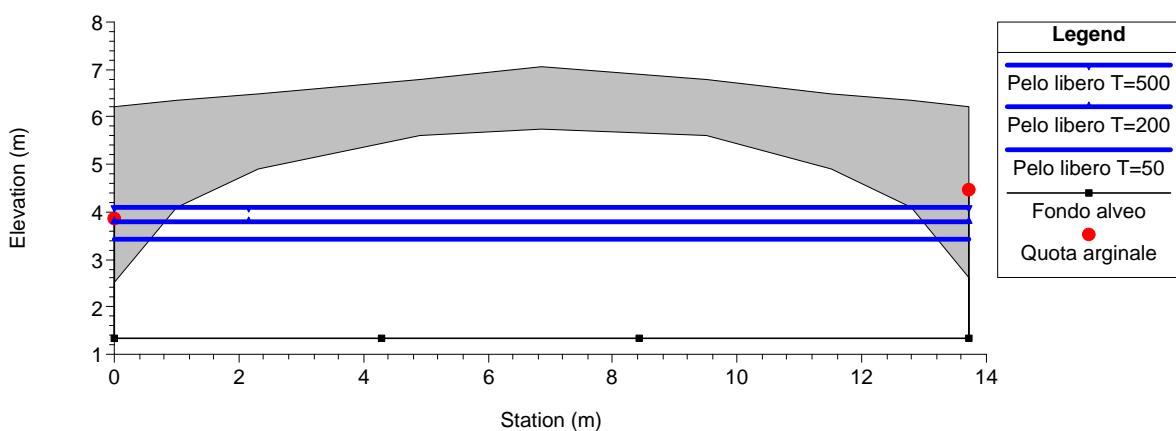
RS = 7



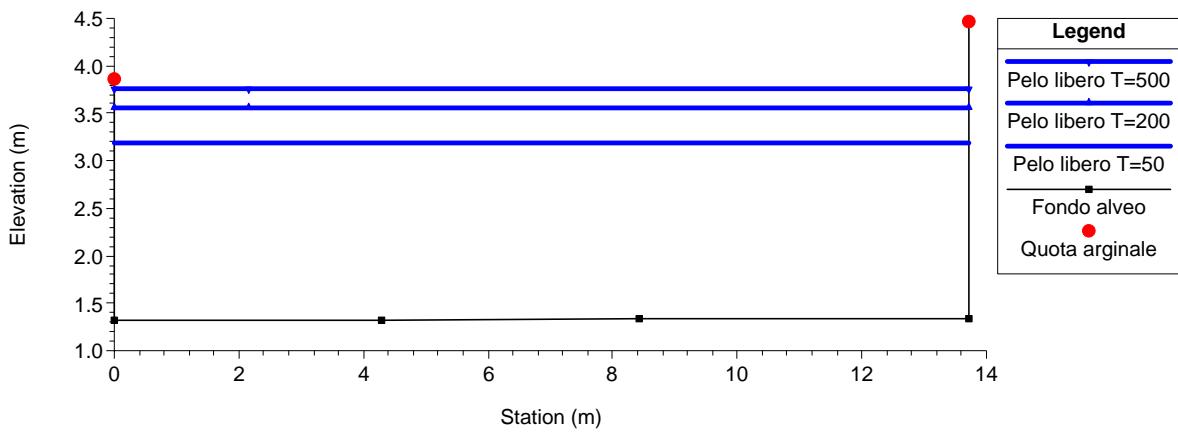
RS = 6



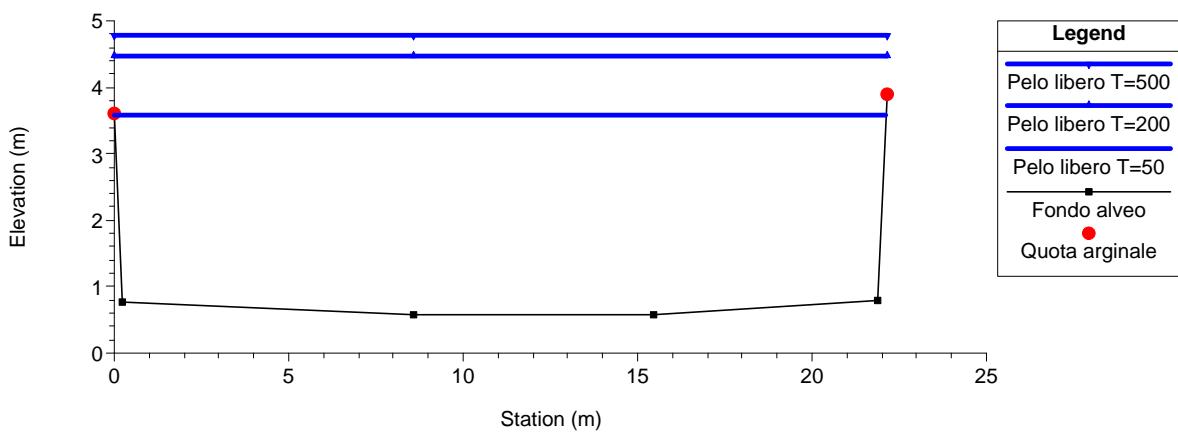
RS = 5.5 BR



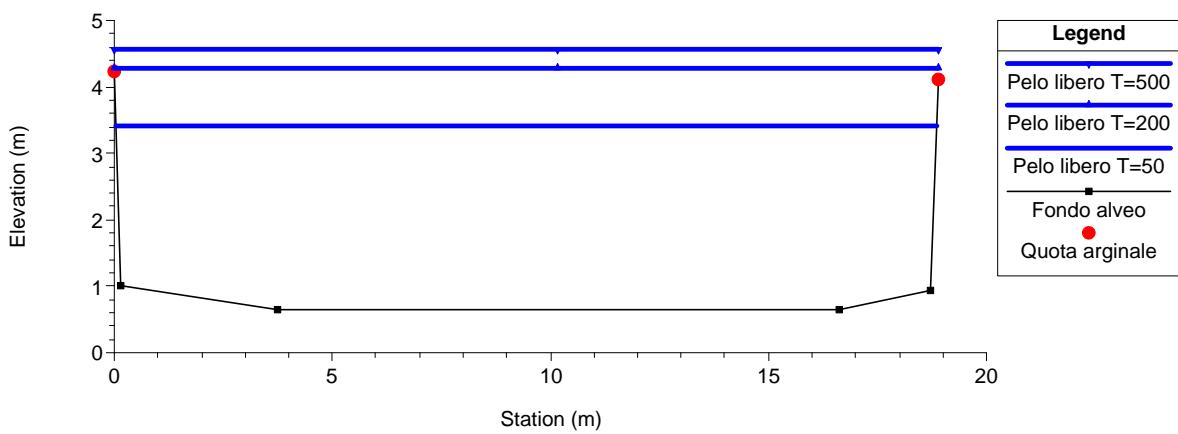
RS = 5



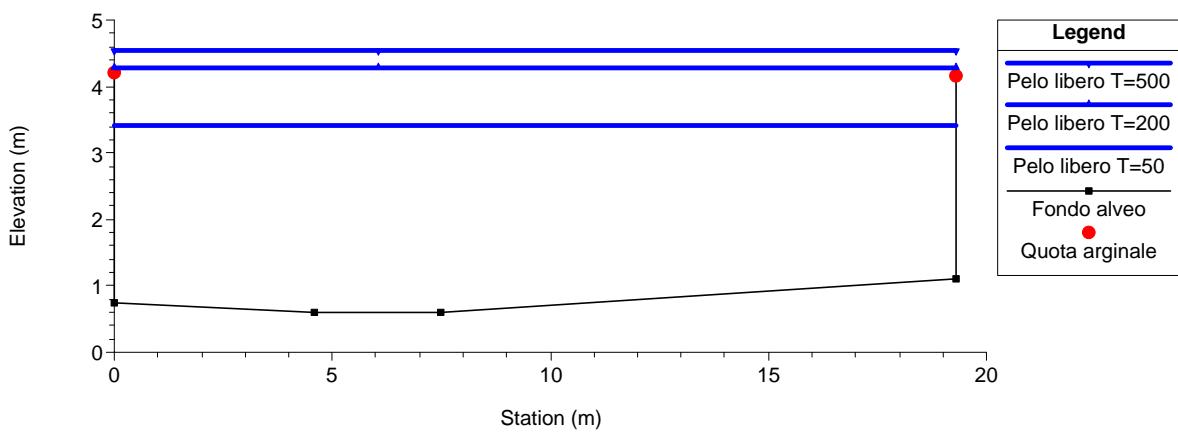
RS = 4



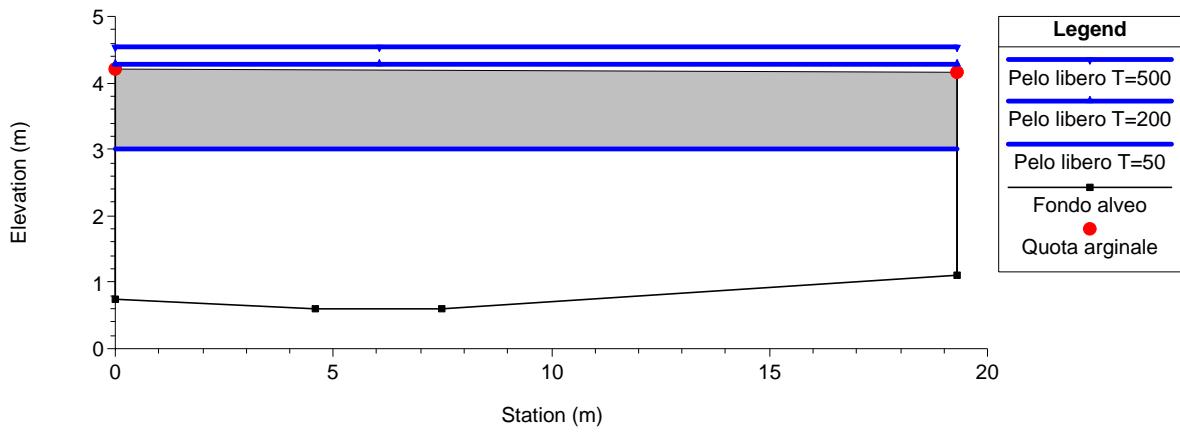
RS = 3



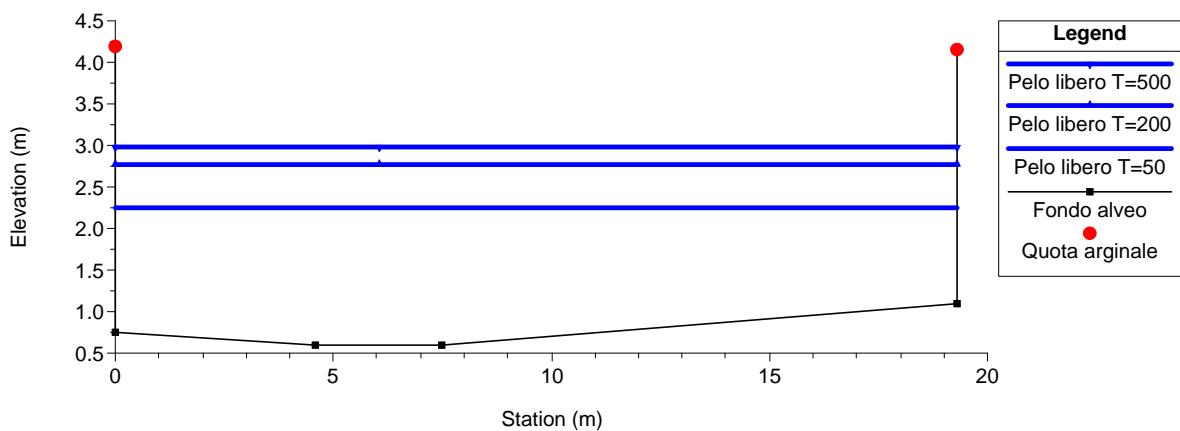
RS = 2



$RS = 1.5$ BR



$RS = 1$



MODELLAZIONE IDRAULICA IN CONDIZIONI DI MOTO
PERMANENTE:
TABELLE DELLE GRANDEZZE IDRAULICHE SIGNIFICATIVE
PER LE PORTATE T=50, 200, 500 ANNI

NIMBALTO

Torrente Nimbalto T=50 anni										
Sezioni	Portata totale (m3/s)	Fondo alveo (m)	Argine sinistro (m)	Argine destro (m)	Pelo libero (m)	Profondità critica (m)	Energia (m2)	Velocità (m/s)	Area bagnata (m2)	N° Froude
52	110	46.91	49.85	50.21	49.76	49.76	50.66	4.22	26.06	1
51	110	45.93	48.75	49.33	48.03	48.74	50.26	6.61	16.63	1.8
50	110	45.68	52.88	50.41	47.07	47.89	49.83	7.37	14.92	2.19
49	110	45.2	52.2	52.2	46.38	47.15	49.21	7.45	14.77	2.47
48.5	Bridge									
48	110	44.94	52.2	52.2	46.26	47.02	49.03	7.37	14.93	2.43
47	110	43.33	46.95	45.83	46.76	46.76	48.03	5.04	22.68	0.98
46	110	40.52	43.94	43.02	42.58	43.65	46.22	8.45	13.02	2.18
45	110	37.71	40.93	40.21	39.5	40.63	43.56	8.92	12.33	2.49
44	110	34.9	37.92	37.4	36.55	37.63	40.52	8.83	12.46	2.59
43	110	32.09	34.91	34.59	33.65	34.64	37.4	8.58	12.82	2.58
42	110	29.28	31.9	31.78	30.74	31.66	34.25	8.3	13.25	2.61
41	110	26.47	28.89	28.97	27.85	28.72	31.1	7.99	13.76	2.59
40	110	23.65	25.88	26.15	24.97	25.8	28.02	7.75	14.2	2.57
39	110	23.1	25.91	24.94	24.29	24.92	26.54	6.65	16.55	2.33
38	110	22.09	25.91	24.94	23.72	24.47	26.48	7.37	14.93	2.48
37	110	21.92	22.78	23.69	23.17	23.78	25.23	6.44	18.16	2.28
36	110	21.06	22.16	22.16	22.19	22.7	24	5.95	18.5	2.19
35	110	18.94	22.16	22.16	20.26	21.19	23.81	8.34	13.19	2.78
34	110	18.43	21.47	21.9	20.03	20.72	22.24	6.6	16.68	1.84
33	110	17.76	18.97	20.25	18.64	19.29	21.09	6.94	15.86	2.55
32	110	16.56	18.97	20.25	17.72	18.52	20.99	8.02	13.71	2.91
31	110	15.77	22.17	19.24	17.15	17.8	19.4	6.64	16.56	2.29
30	110	14.92	16.6	16.02	15.98	16.59	18.18	6.57	16.73	2.41
29	110	12.81	15.73	16.02	13.56	14.49	17.95	9.29	11.85	3.52
28	110	11.55	15.62	15.8	14.74	13.77	15.06	2.48	44.29	0.52
27	110	9.7	12.89	13.67	14.87	12.24	14.95	1.25	90.96	0.2
26	110	8.74	11.81	11.52	14.71	11.3	14.92	2.01	54.67	0.27
25	110	8.67	11.84	11.9	14.73	11.07	14.91	1.87	58.74	0.24
24.5	Bridge									
24	110	8.67	11.84	11.9	13.78	11.07	14.04	2.22	49.49	0.32
23	110	6.74	14.46	11.28	13.89	9.23	13.95	1.11	98.73	0.14
22	110	6.04	13.4	11.13	13.88	8.07	13.94	1.04	106.18	0.12
21	110	5.95	11.9	10.7	13.9	7.82	13.93	0.89	135.77	0.1
20.5	Bridge									
20	110	5.95	11.9	10.7	13.87	7.82	13.91	0.89	135.28	0.1
19	110	5.83	11.45	10.96	13.86	8.21	13.91	1.06	115.77	0.13
18.5	Culvert									
18	110	5.83	11.45	10.96	8.21	8.21	9.32	4.67	23.55	1
17	110	5.01	10.51	10.29	6.48	7.14	8.67	6.55	16.79	1.79
16	110	4.76	9.71	9.95	5.83	6.44	7.92	6.4	17.18	2.05
15.5	Bridge									
15	110	4.76	9.71	9.95	5.97	6.44	7.56	5.59	19.69	1.67
14	110	3.33	6.94	9.74	6.88	5.61	7.12	2.19	50.19	0.42
13	110	2.76	7.18	8.2	6.97	4.26	7.05	1.23	89.14	0.2
12	110	2.66	7.51	7.53	6.77	4.73	7.03	2.24	49.19	0.35
11.5	Bridge									
11	110	2.66	7.51	7.53	5.74	4.74	6.2	3	36.73	0.55
10	110	2.27	4.56	5.28	5.96	3.89	6.08	1.56	70.58	0.27
9	110	2.14	6.75	6.75	5.93	4	6.08	1.73	63.49	0.3
8.5	Bridge									
8	110	2.14	6.75	6.75	4	4	4.77	3.9	28.21	1

7	110	1.36	3.89	4.53	3.68	3.22	4.22	3.26	33.77	0.72
6	110	1.32	3.86	4.47	3.52	3.2	4.2	3.66	30.07	0.79
5.5	Bridge									
5	110	1.32	3.86	4.47	3.2	3.2	4.13	4.28	25.67	1
4	110	0.58	3.6	3.91	3.57	2.02	3.72	1.72	63.9	0.32
3	110	0.65	4.22	4.1	3.42	2.22	3.66	2.16	50.82	0.42
2	110	0.6	4.2	4.16	3.41	2.26	3.65	2.16	50.93	0.42
1.5	Bridge									
1	110	0.6	4.2	4.16	2.26	2.26	3.01	3.84	28.66	1.01

8	170	2.14	6.75	6.75	4.68	4.52	5.57	4.18	40.71	0.89
7	170	1.36	3.89	4.53	4.61	3.83	5.24	3.49	48.65	0.64
6	170	1.32	3.86	4.47	4.34	3.82	5.2	4.1	41.44	0.75
5.5	Bridge									
5	170	1.32	3.86	4.47	3.56	3.82	5.12	5.53	30.73	1.18
4	170	0.58	3.6	3.91	4.47	2.48	4.68	2.03	83.86	0.33
3	170	0.65	4.22	4.1	4.29	2.74	4.61	2.53	67.18	0.43
2	170	0.6	4.2	4.16	4.28	2.76	4.6	2.51	67.72	0.43
1.5	Bridge									
1	170	0.6	4.2	4.16	2.76	2.76	3.76	4.42	38.43	1

Torrente Nimbalto T=500 anni

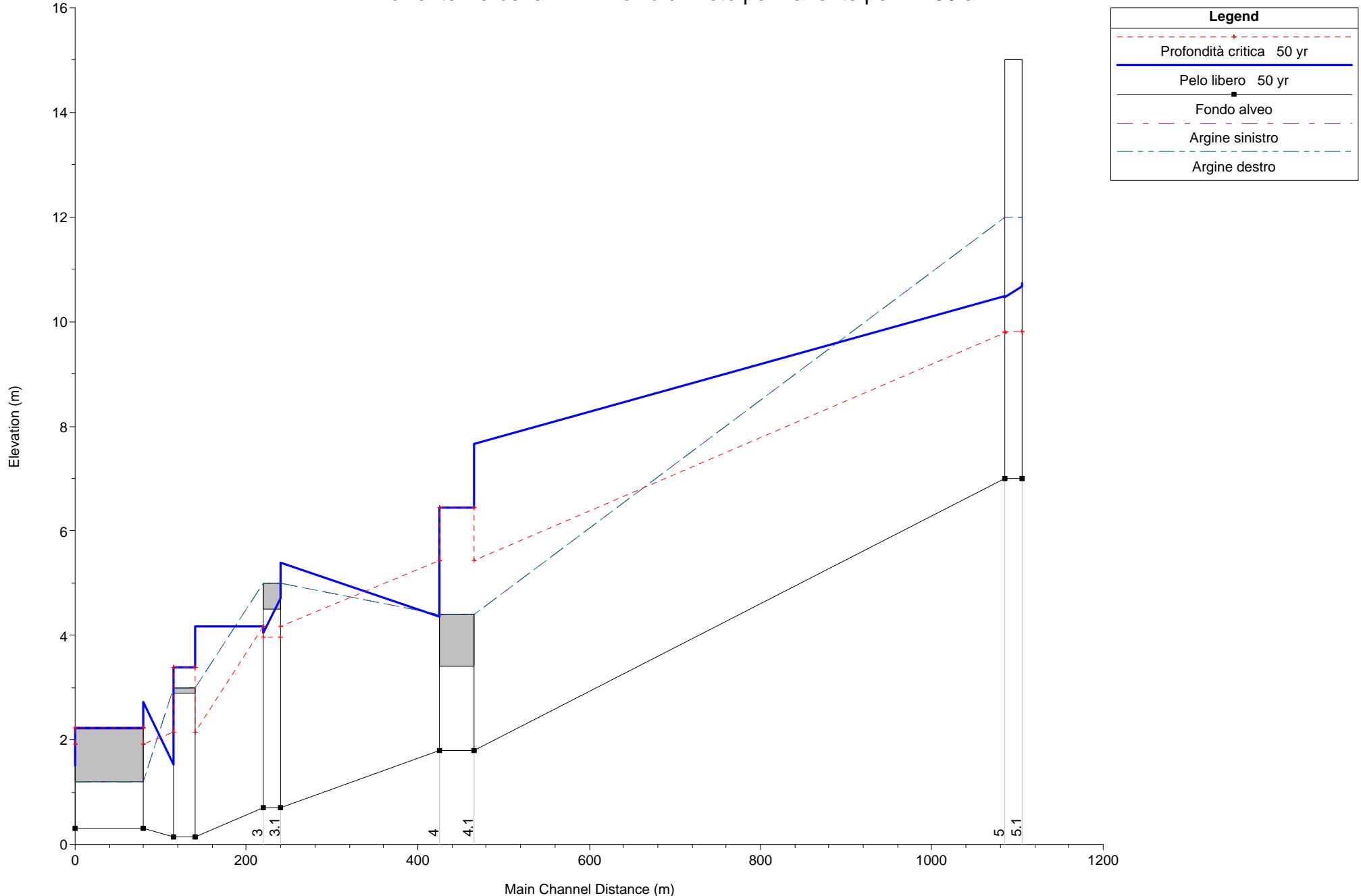
8	200	2.14	6.75	6.75	5.15	4.75	5.99	4.05	49.38	0.79
7	200	1.36	3.89	4.53	5.07	4.09	5.72	3.58	55.93	0.61
6	200	1.32	3.86	4.47	4.78	4.11	5.68	4.22	47.37	0.73
5.5	Bridge									
5	200	1.32	3.86	4.47	3.76	4.11	5.58	5.99	33.42	1.22
4	200	0.58	3.6	3.91	4.78	2.69	5.03	2.21	90.63	0.35
3	200	0.65	4.22	4.1	4.56	2.97	4.95	2.76	72.34	0.45
2	200	0.6	4.2	4.16	4.55	2.99	4.94	2.74	72.99	0.45
1.5	Bridge									
1	200	0.6	4.2	4.16	2.99	2.99	4.1	4.67	42.81	1

**PROFILI DI RIGURGITO IN CONDIZIONI DI MOTO
PERMANENTE PER LE PORTATE T=50, 200, 500 ANNI**

BERBENA

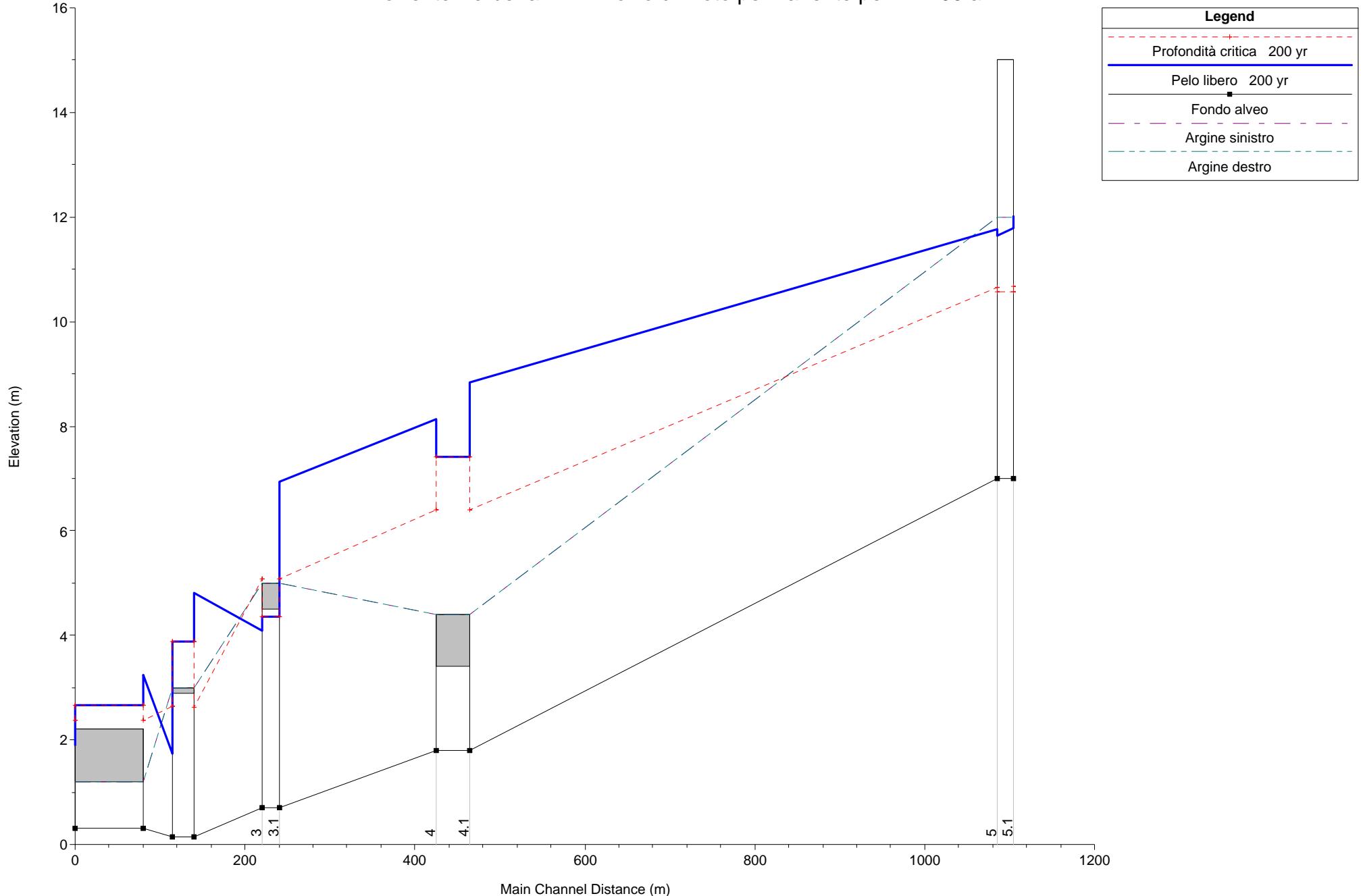
Torrente Berbena

Profilo di moto permanente per T= 50 anni



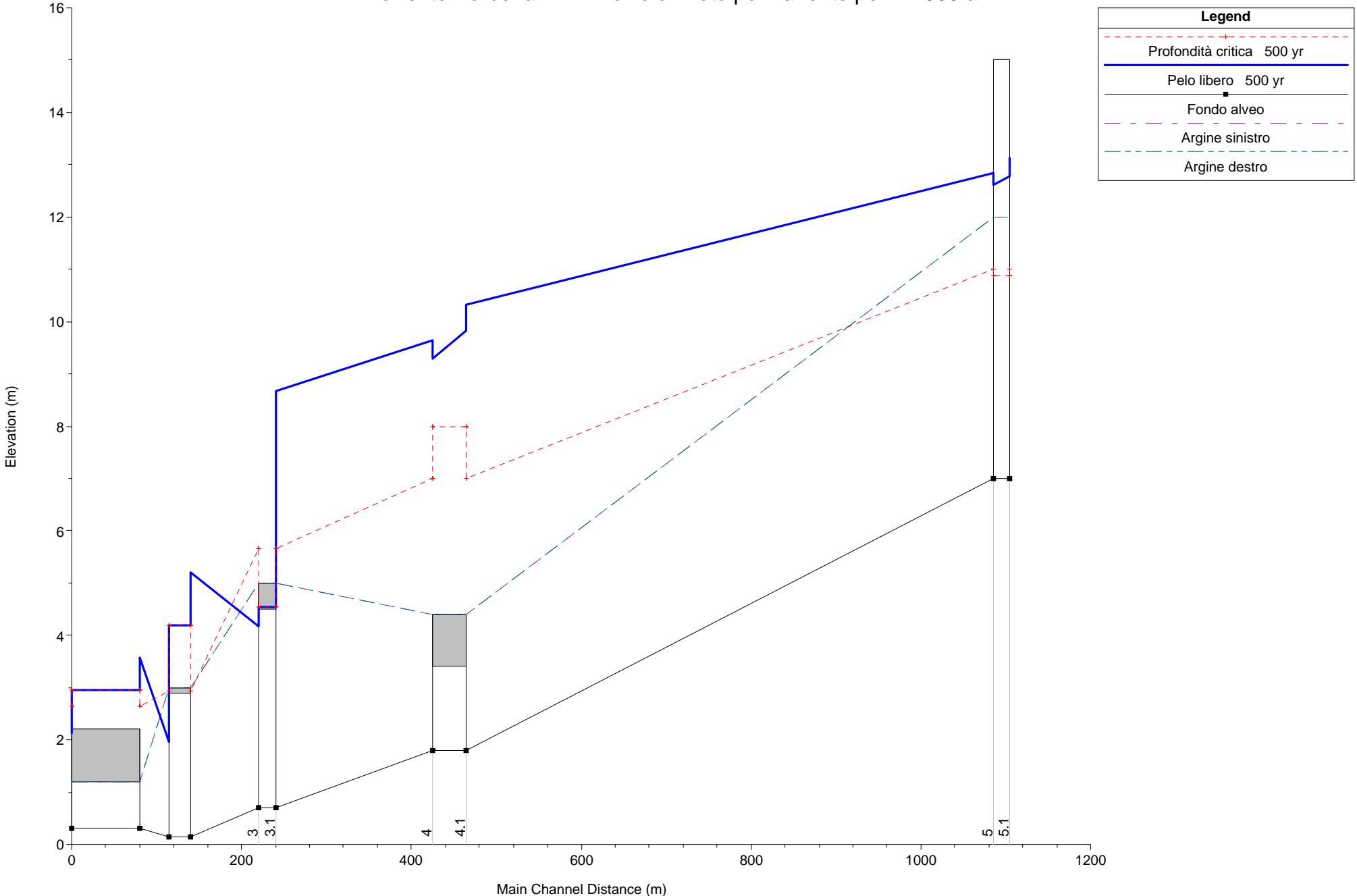
Torrente Berbena

Profilo di moto permanente per T= 200 anni



Torrente Berbena

Profilo di moto permanente per T= 500 anni



GEOMETRIA DELLE SEZIONI ED ALTEZZA DEL PELO
LIBERO IN CONDIZIONI DI MOTO PERMANENTE
PER LE PORTATE T=50, 200, 500 ANNI

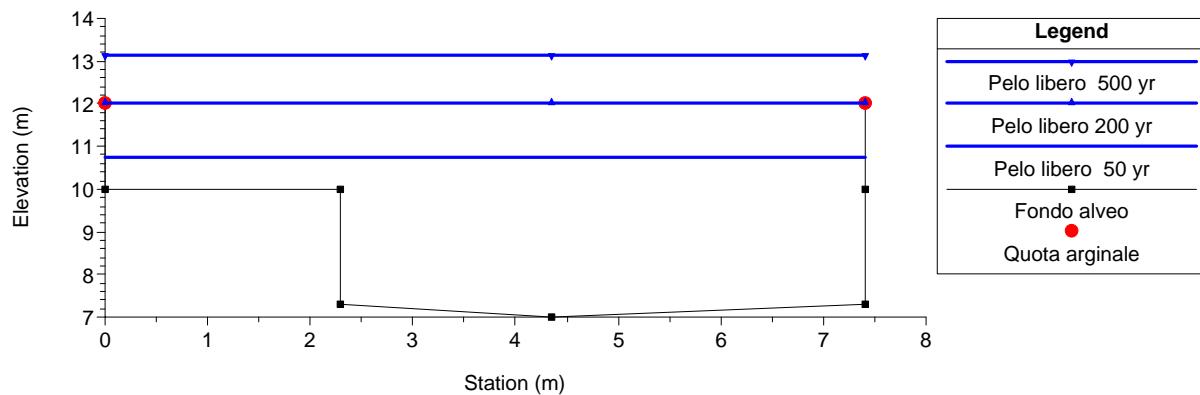
BERBENA

DALLA SEZ. 5.2
ALLA SEZ. 1

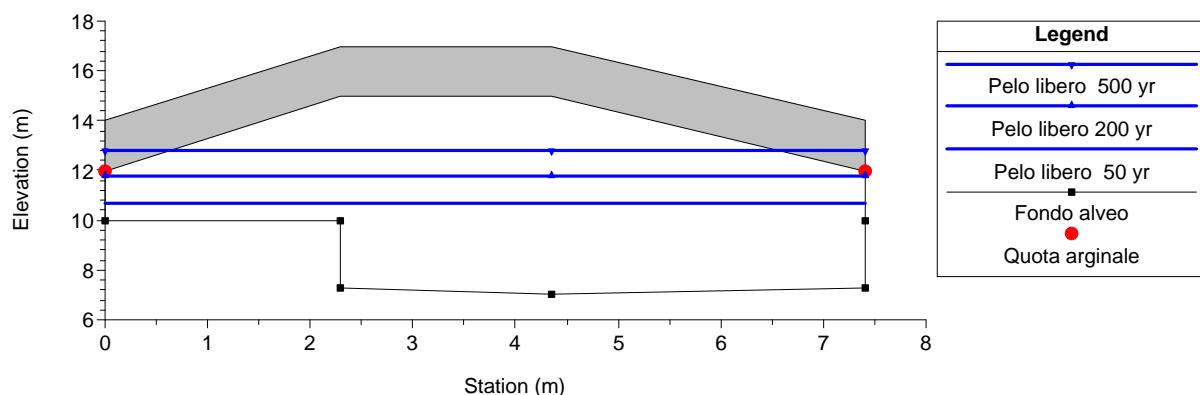
TORRENTE BERBENA

Sezioni trasversali

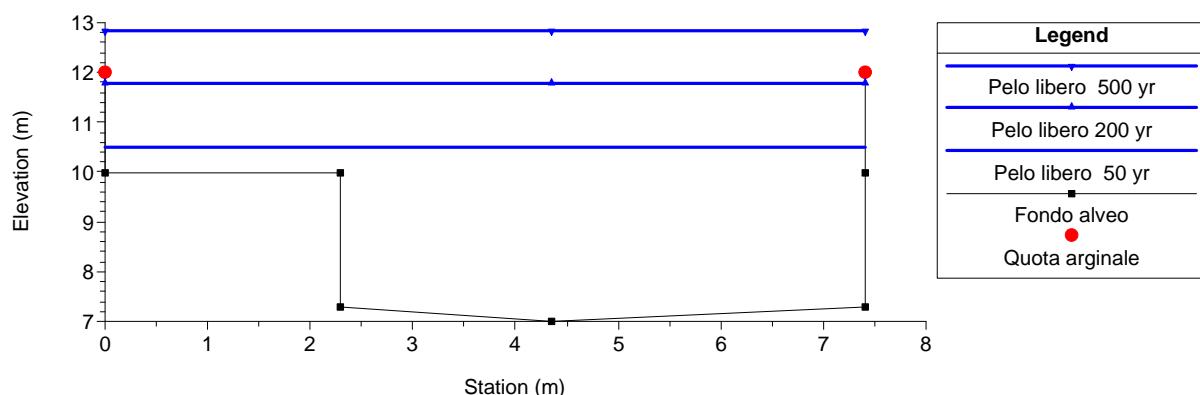
viadotto Monte Carmelo RS = 5.2



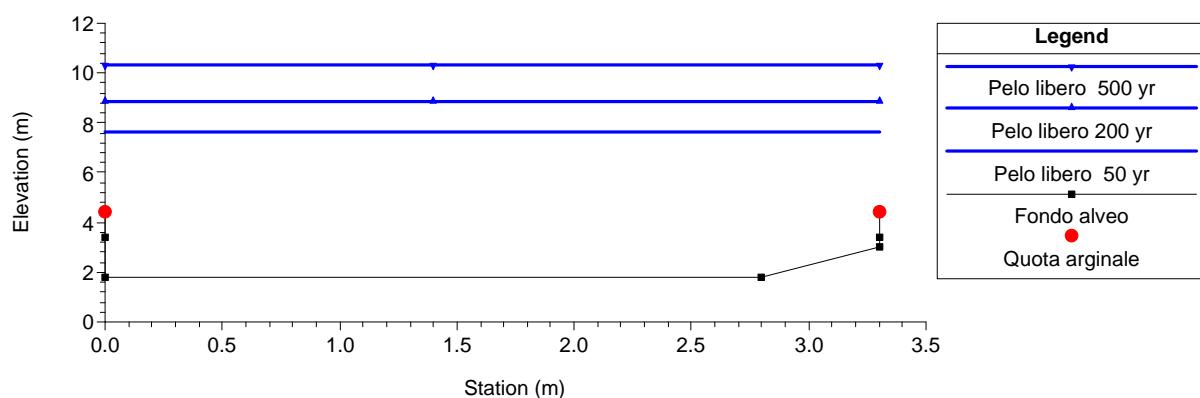
RS = 5.1 BR U



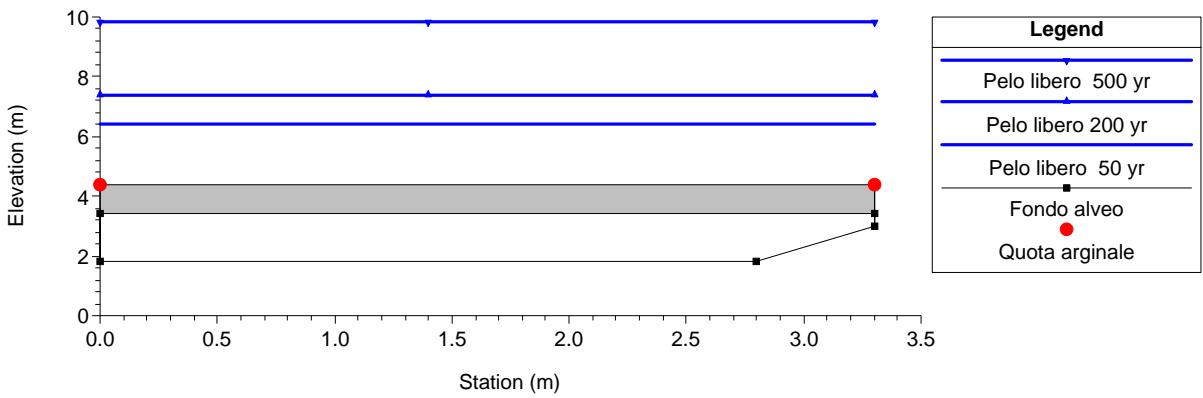
viadotto Monte Carmelo RS = 5



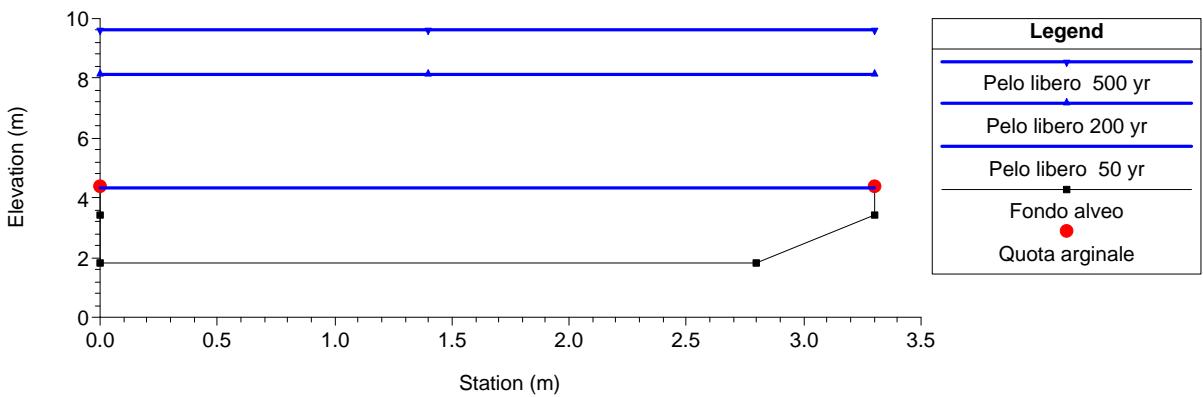
ponte Aurelia RS = 4.2



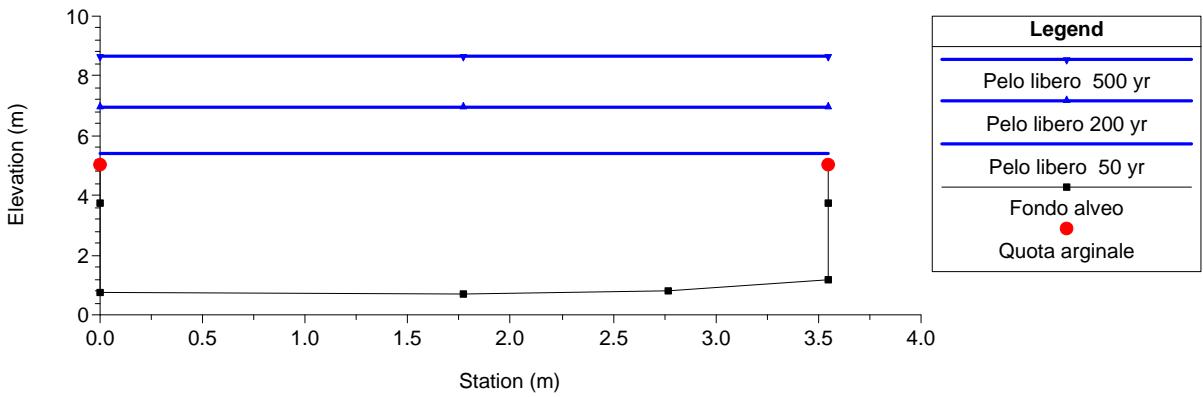
RS = 4.1 BR U



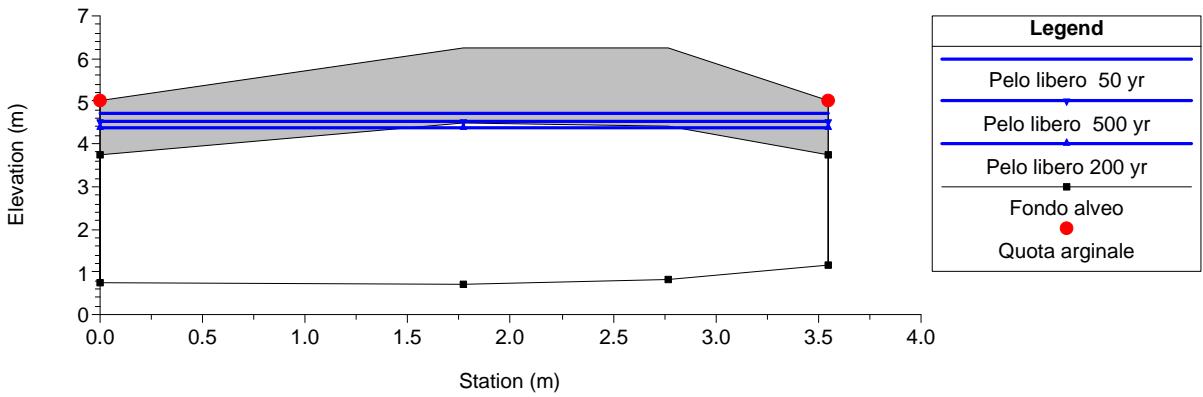
ponte Aurelia RS = 4



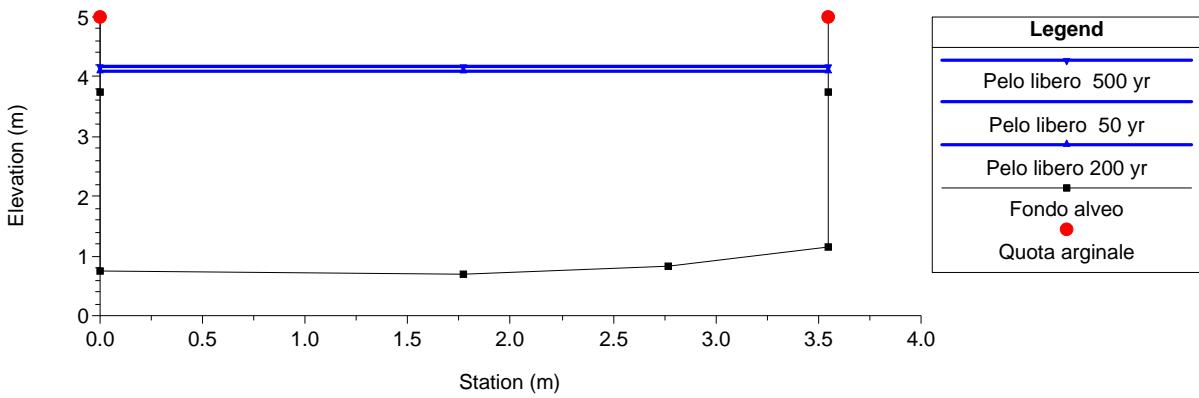
ponte F.S RS = 3.2



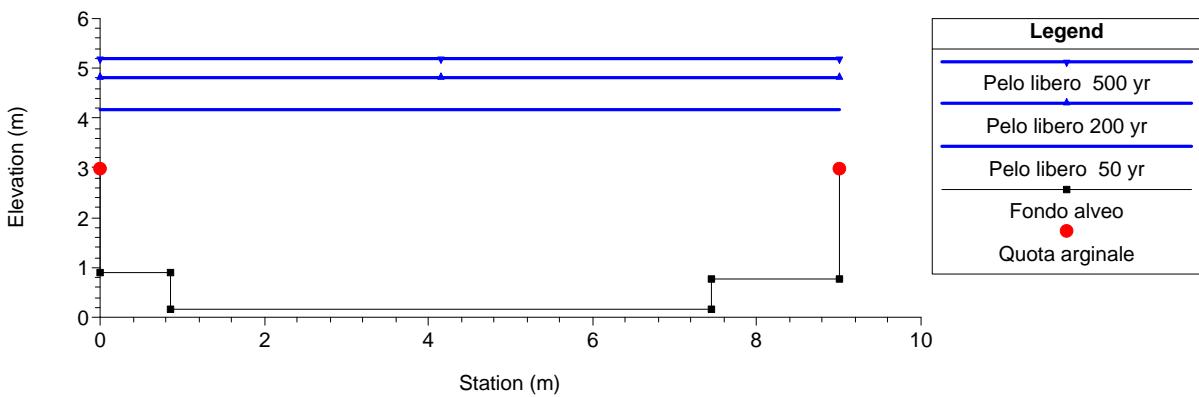
RS = 3.1 BR U



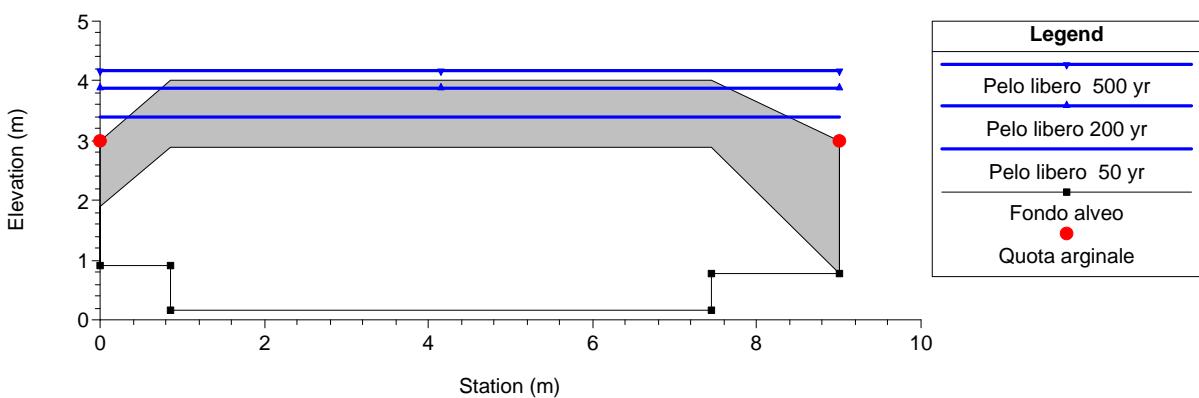
ponte F.S RS = 3



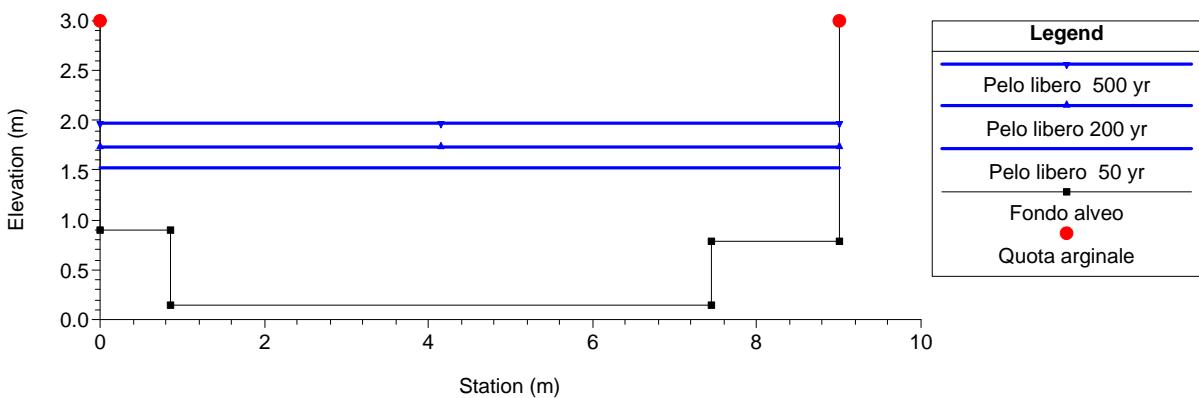
ponte lungomare RS = 2.2



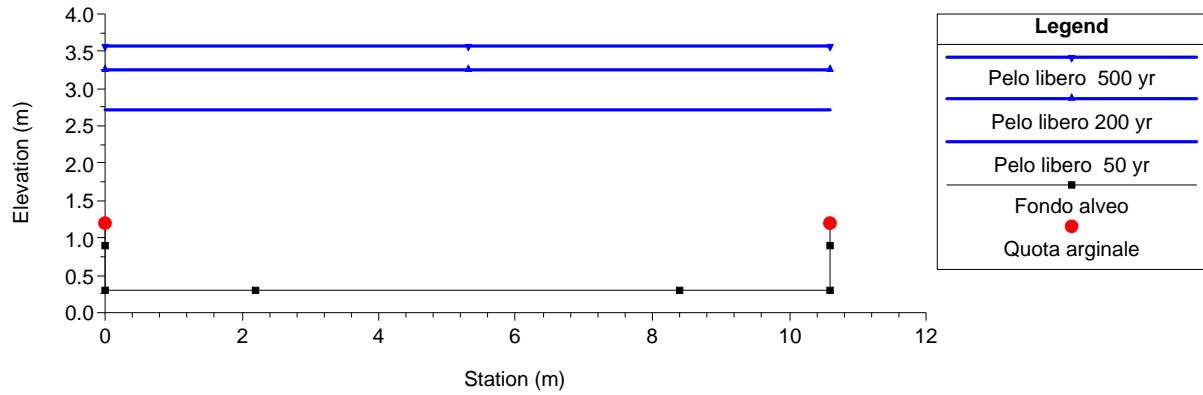
RS = 2.1 BR U



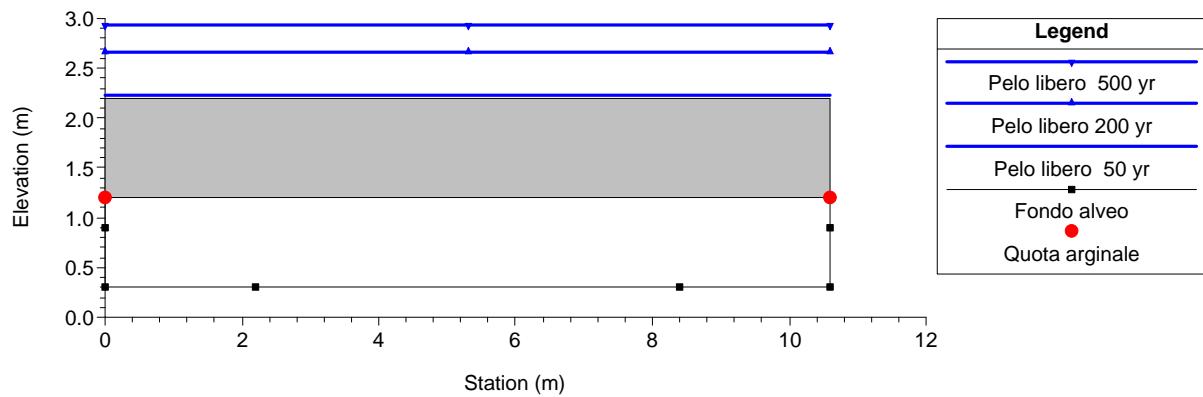
ponte lungomare RS = 2



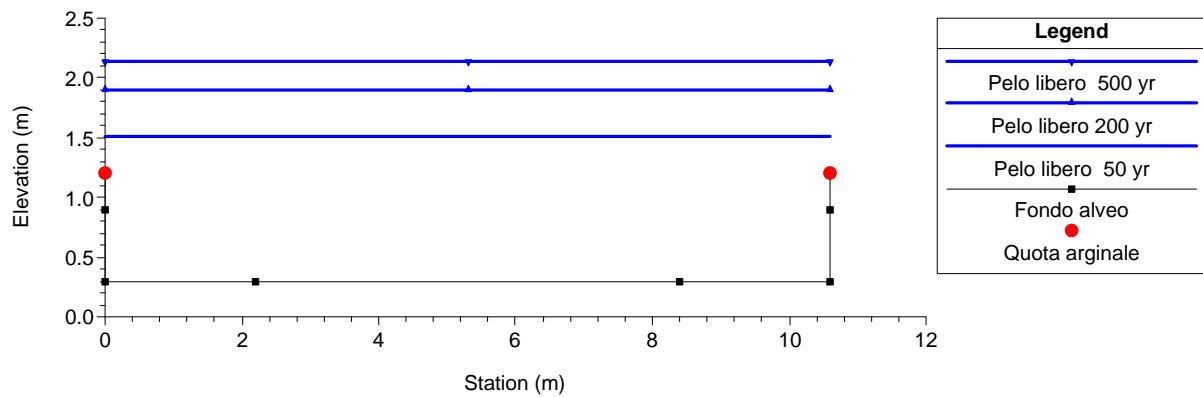
piazzale porto RS = 1.2



RS = 1.1 BR U



piazzale porto RS = 1



MODELLAZIONE IDRAULICA IN CONDIZIONI DI MOTO
PERMANENTE:
TABELLE DELLE GRANDEZZE IDRAULICHE SIGNIFICATIVE
PER LE PORTATE T=50, 200, 500 ANNI

BERBENA

Rio Berbena T=50 anni										
Sezioni	Portata totale (m3/s)	Fondo alveo (m)	Argine sinistro (m)	Argine destro (m)	Pelo libero (m)	Profondità critica (m)	Energia (m2)	Velocità (m/s)	Area bagnata (m2)	N° Froude
5,2	69	7	10	10	10,74	2,8	11,35	3,45	20	0,67
5,1	Bridge									
5	69	7	12	12	10,49	2,78	11,23	3,79	18,18	0,77
4,2	69	1,8	4,4	4,4	7,65	3,63	8,32	3,63	19,01	0,48
4,1	Bridge									
4	69	1,8	4,4	4,4	4,35	3,63	8,03	8,49	8,13	1,73
3,2	69	0,7	5	5	5,38	3,47	6,29	4,24	16,29	0,63
3,1	Bridge									
3	69	0,7	5	5	4,16	3,46	5,86	5,76	11,97	1
2,2	69	0,15	3	3	4,16	2	4,37	2	34,51	0,33
2,1	Bridge									
2	69	0,15	3	3	1,52	2	3,63	6,44	10,71	1,88
1,2	69	0,3	1,2	1,2	2,72	1,63	3,09	2,69	25,65	0,55
1,1	Bridge									
1	69	0,3	1,2	1,2	1,51	1,63	2,98	5,36	12,87	1,55

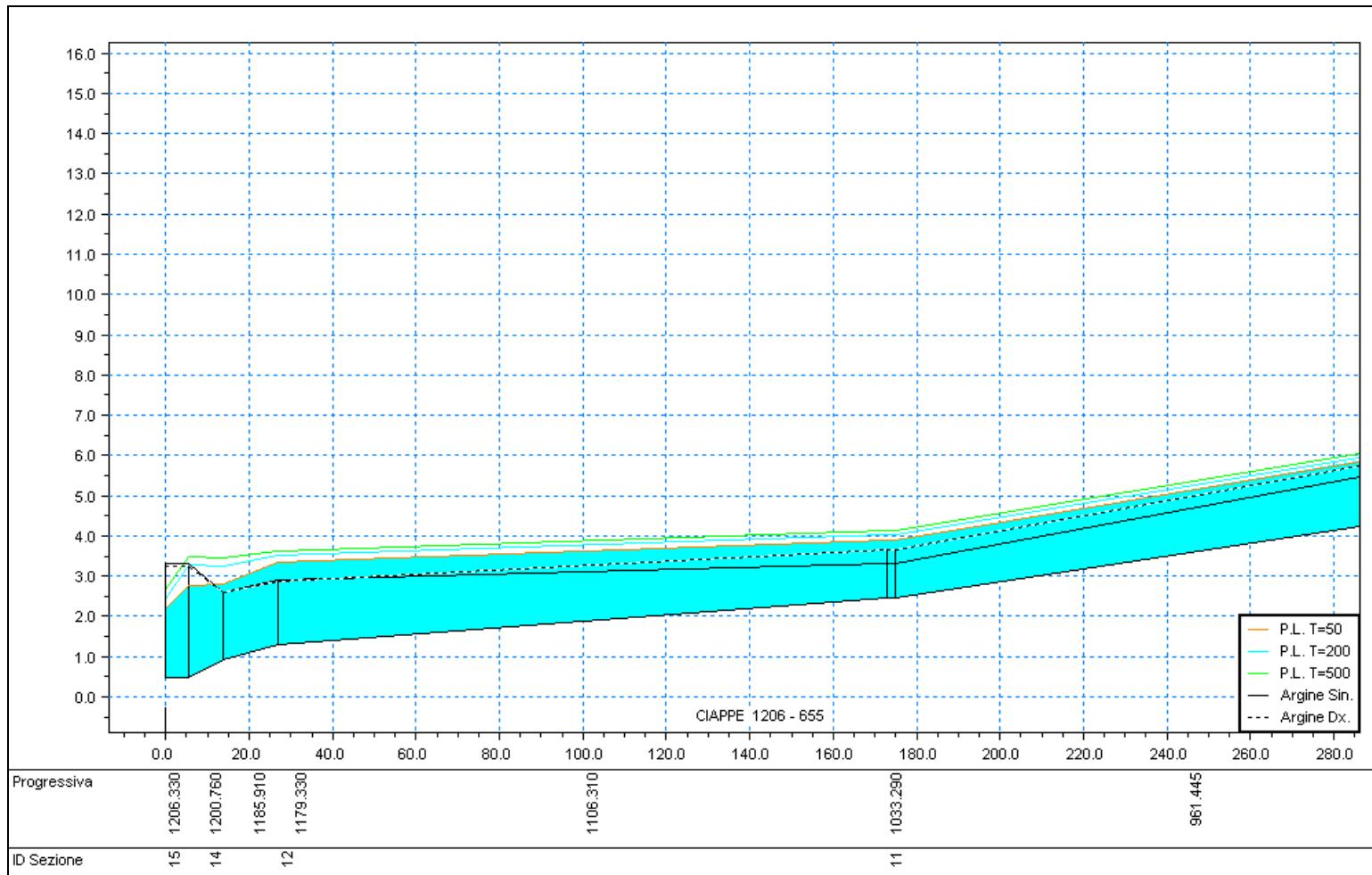
Rio Berbena T=200 anni

Sezioni	Portata totale (m ³ /s)	Fondo alveo (m)	Argine sinistro (m)	Argine destro (m)	Pelo libero (m)	Profondità critica (m)	Energia (m ²)	Velocità (m/s)	Area bagnata (m ²)	N° Froude
5,2	99	7	10	10	12,02	3,67	12,6	3,35	29,51	0,54
5,1	Bridge									
5	99	7	12	12	11,77	3,66	12,42	3,58	27,63	0,59
4,2	99	1,8	4,4	4,4	8,84	4,6	9,79	4,32	22,93	0,52
4,1	Bridge									
4	99	1,8	4,4	4,4	8,14	4,6	9,31	4,8	20,61	0,61
3,2	99	0,7	5	5	6,93	4,39	7,98	4,54	21,8	0,59
3,1	Bridge									
3	99	0,7	5	5	4,1	4,39	7,72	8,44	11,73	1,48
2,2	99	0,15	3	3	4,82	2,48	5,12	2,45	40,39	0,37
2,1	Bridge									
2	99	0,15	3	3	1,74	2,49	4,84	7,81	12,68	2,1
1,2	99	0,3	1,2	1,2	3,25	2,07	3,76	3,17	31,28	0,59
1,1	Bridge									
1	99	0,3	1,2	1,2	1,9	2,07	3,63	5,84	16,96	1,47

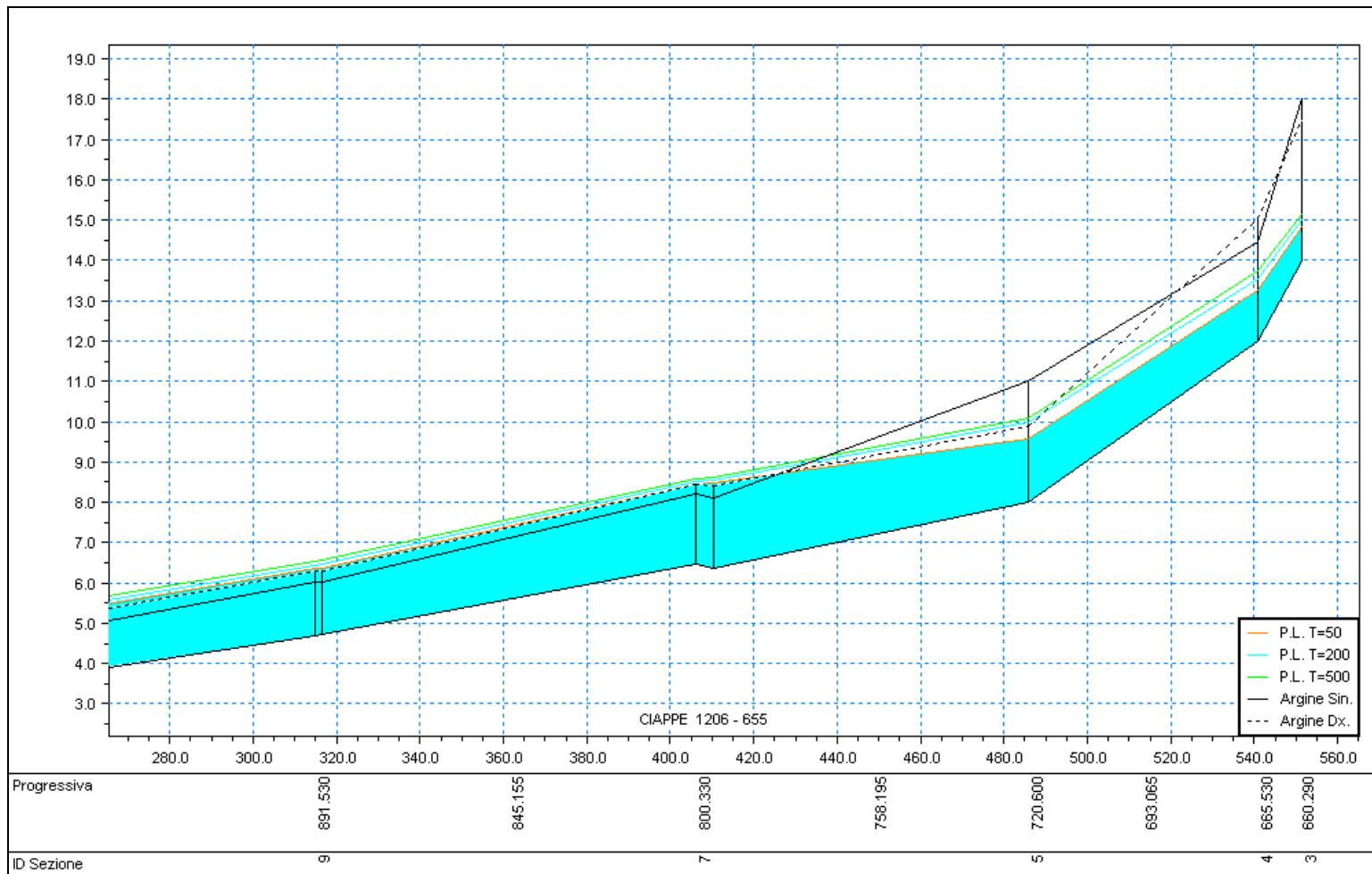
Rio Berbena T=500 anni										
Sezioni	Portata totale (m3/s)	Fondo alveo (m)	Argine sinistro (m)	Argine destro (m)	Pelo libero (m)	Profondità critica (m)	Energia (m2)	Velocità (m/s)	Area bagnata (m2)	N° Froude
5,2	119	7	10	10	13,14	4,01	13,64	3,15	37,73	0,45
5,1	Bridge									
5	119	7	12	12	12,83	4	13,4	3,35	35,49	0,49
4,2	119	1,8	4,4	4,4	10,31	5,19	11,25	4,28	27,8	0,47
4,1	Bridge									
4	119	1,8	4,4	4,4	9,65	5,19	10,75	4,65	25,61	0,53
3,2	119	0,7	5	5	8,67	4,95	9,59	4,25	27,98	0,48
3,1	Bridge									
3	119	0,7	5	5	4,17	4,95	9,18	9,92	12	1,72
2,2	119	0,15	3	3	5,21	2,79	5,58	2,71	43,93	0,39
2,1	Bridge									
2	119	0,15	3	3	1,97	2,79	5,28	8,07	14,75	2,01
1,2	119	0,3	1,2	1,2	3,57	2,34	4,17	3,43	34,66	0,61
1,1	Bridge									
1	119	0,3	1,2	1,2	2,14	2,34	4,04	6,11	19,48	1,44

PROFILI DI RIGURGITO IN CONDIZIONI DI MOTO
PERMANENTE PER LE PORTATE $T=50, 200, 500$ ANNI

RIO CIAPPE



Rio Ciappe, tratto di valle - Profili idraulici per i tempi di ritorno T=50, 200 e 500 anni



Rio Ciappe, tratto di monte - Profili idraulici per i tempi di ritorno $T = 50, 200$ e 500 anni

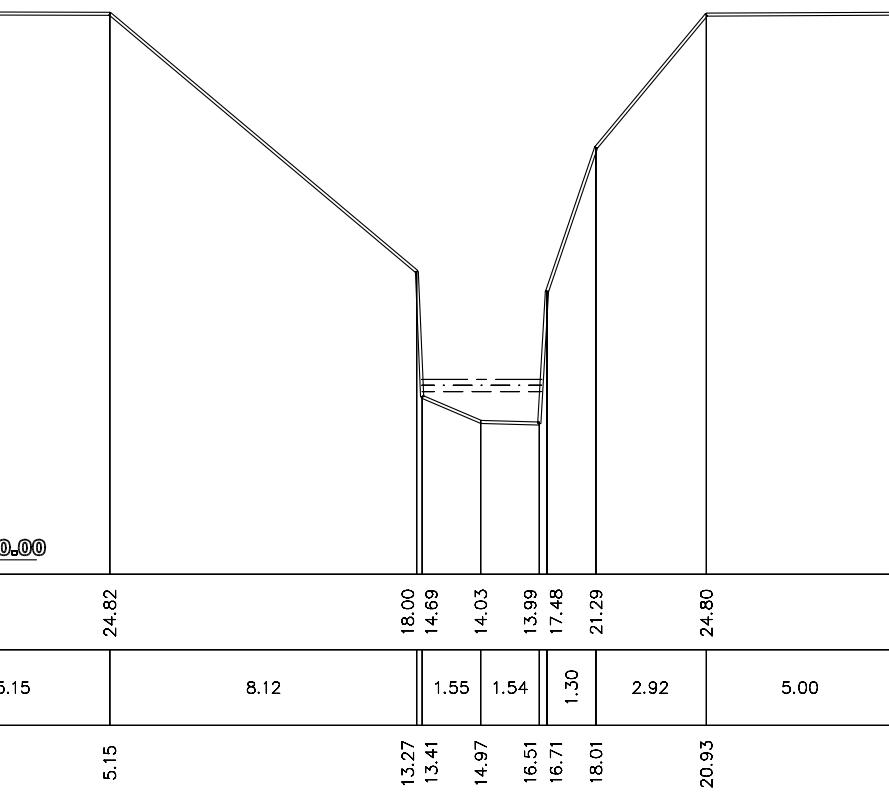
GEOMETRIA DELLE SEZIONI ED ALTEZZA DEL PELO
LIBERO IN CONDIZIONI DI MOTO PERMANENTE
PER LE PORTATE $T=50, 200, 500$ ANNI

RIO CIAPPE

SEZIONE 3

—— Tr=500
 - - - Tr=200
 - - - Tr=50

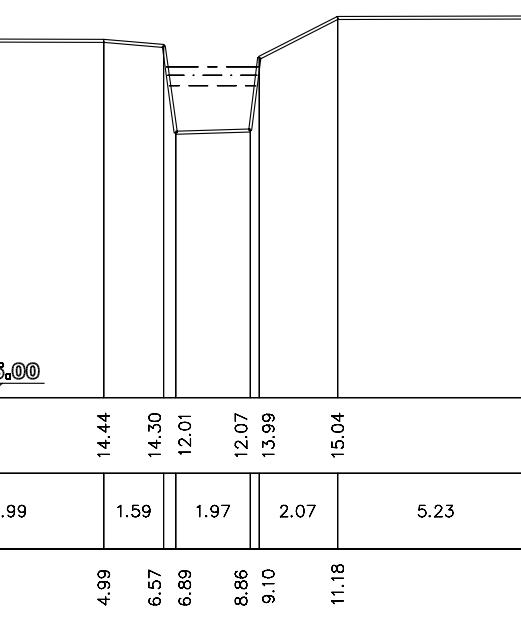
Scala 1/200



SEZIONE 4

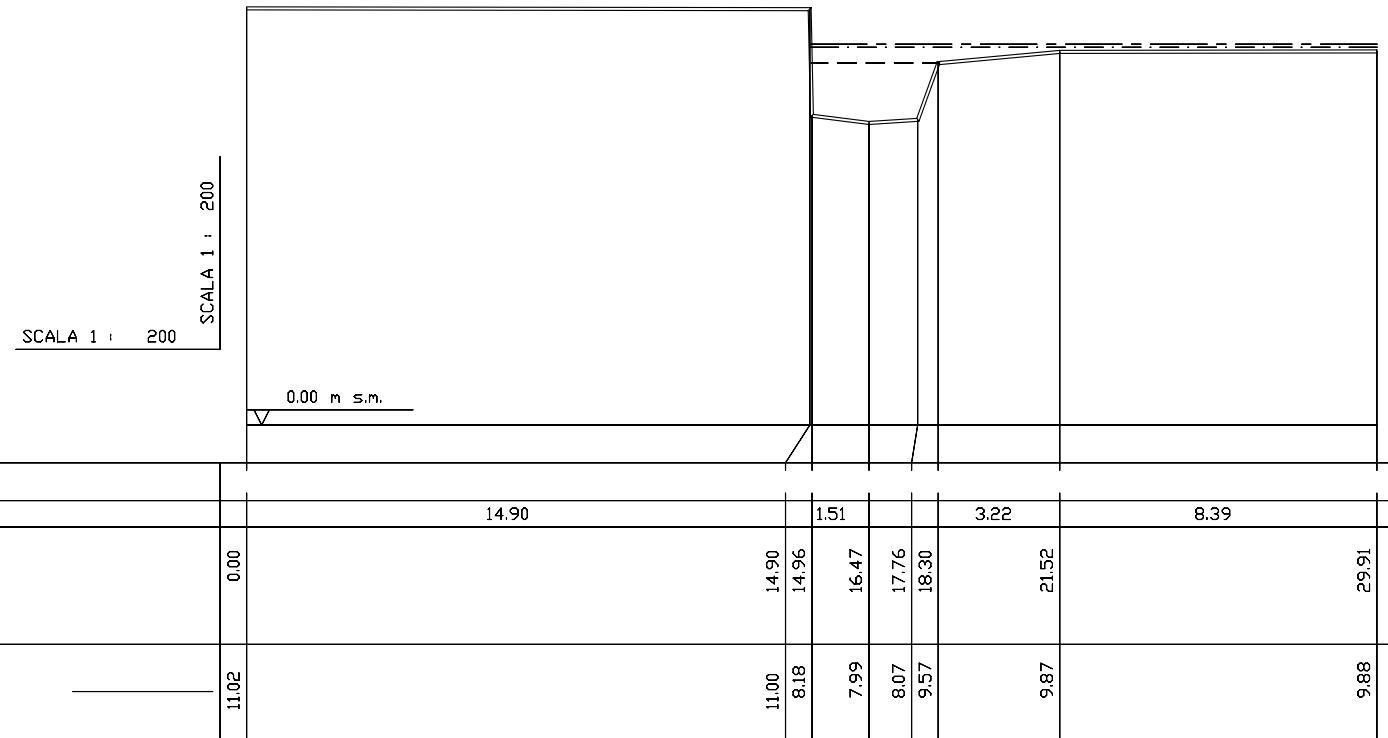
—— Tr=500
 - - - Tr=200
 - - - Tr=50

Scala 1/200



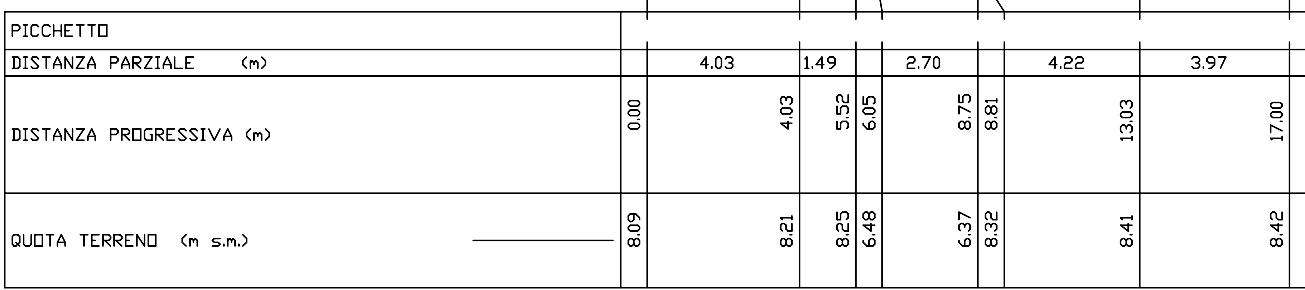
SEZIONE 5

—— Tr=500
 - - - Tr=200
 - - - Tr=50



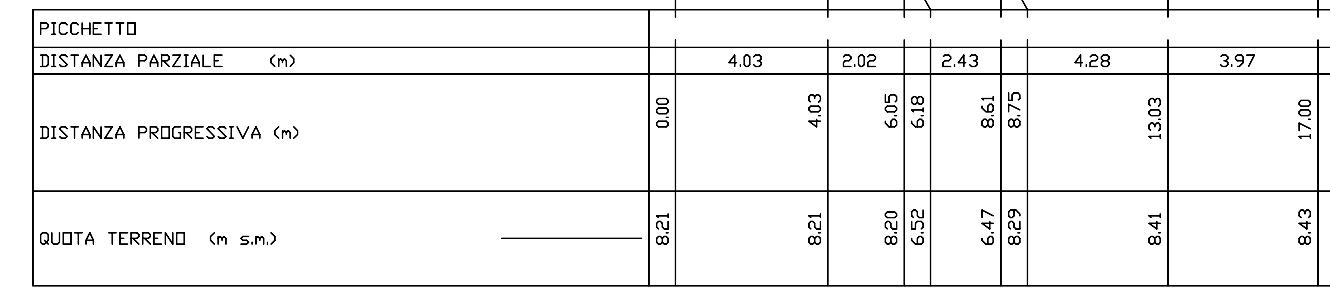
SEZIONE 6

—— Tr=500
 - - - Tr=200
 - - - Tr=50



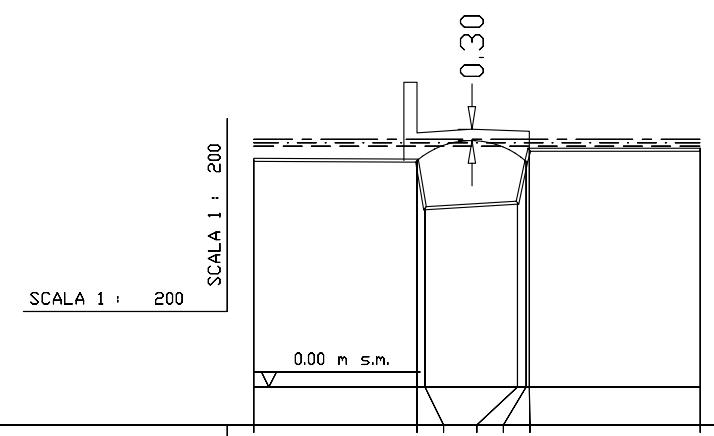
SEZIONE 7

—— Tr=500
 - - - Tr=200
 - - - Tr=50



SEZIONE 8

— Tr=500
- - - Tr=200
--- Tr=50

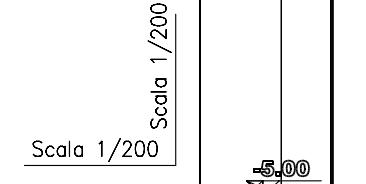


PICCHETTO

DISTANZA PARZIALE (m)	4.32	4.52
DISTANZA PROGRESSIVA (m)	6.01	0.00
QUOTA TERRENO (m s.m.)	5.99	4.32
	4.73	4.53
	4.88	6.98
	5.97	7.21
	6.28	7.29
	6.28	11.81

SEZIONE 10

— Tr=500
- - - Tr=200
--- Tr=50

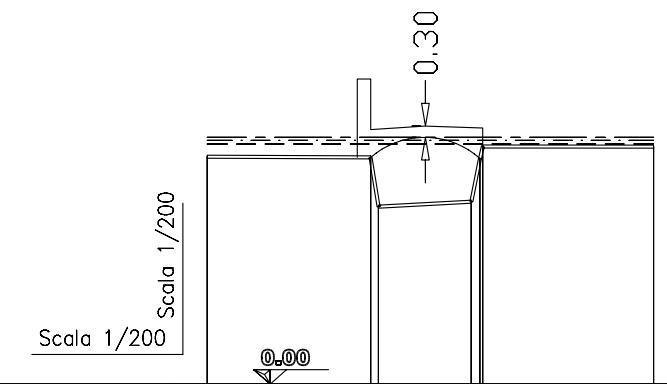


Quote terreno

	3.30	3.55	3.78	2.72
Distanze parziali	2.15	1.31	4.72	8.23
Distanze progressive	0.00	3.46	3.51	8.33
	3.51	2.72	11.45	3.67

SEZIONE 9

— Tr=500
- - - Tr=200
--- Tr=50

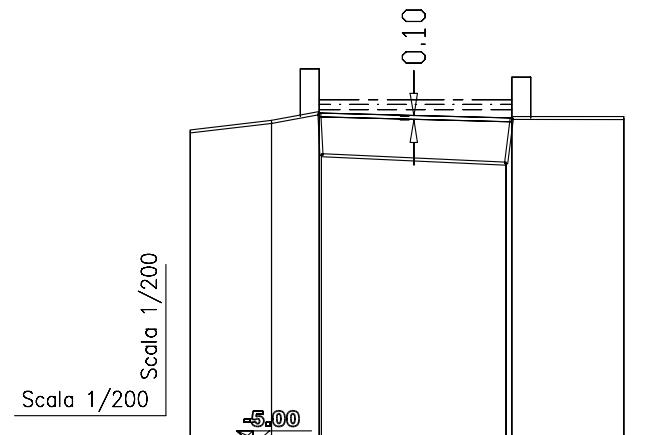


Quote terreno

	6.01	4.32	2.45	4.52
Distanze parziali	0.00	4.32	6.98	11.81
Distanze progressive	0.00	4.32	4.53	6.28
	4.32	6.98	7.29	11.81
	6.00	4.83	6.28	11.81
	4.69	2.45	4.52	11.81

SEZIONE 11

— Tr=500
- - - Tr=200
--- Tr=50

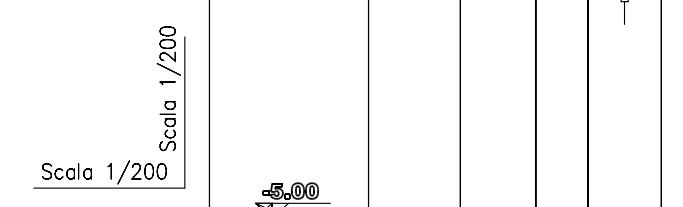


Quote terreno

	3.30	3.55	3.79	2.68
Distanze parziali	2.15	1.26	4.89	3.66
Distanze progressive	0.00	3.41	3.47	11.47
	3.41	2.68	4.89	3.66
	2.45	2.96	4.89	3.66
	3.66	2.96	4.89	3.66

SEZIONE 12

— Tr=500
- - - Tr=200
--- Tr=50



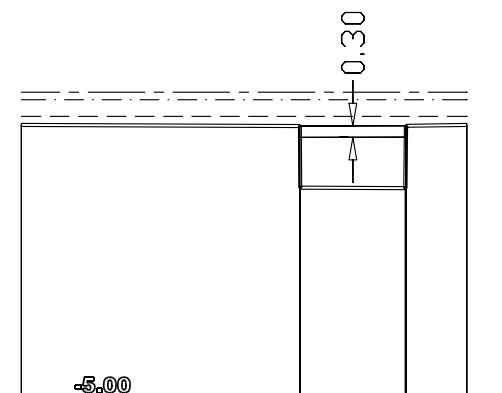
Quote terreno

	2.92	2.94	2.96	2.49	1.29	1.94	2.00	1.38	6.64	10.02	11.96	1.34	2.59	2.88	2.88	4.52	21.00	2.89	
Distanze parziali	4.21	2.43	2.00	2.49	1.29	1.94	2.00	1.38	6.64	10.02	11.96	1.34	2.59	2.88	2.88	4.52	21.00	2.89	
Distanze progressive	0.00	4.21	2.43	2.00	2.49	1.29	1.94	2.00	1.38	6.64	10.02	11.96	1.34	2.59	2.88	2.88	4.52	21.00	2.89
	4.21	2.43	2.00	2.49	1.29	1.94	2.00	1.38	6.64	10.02	11.96	1.34	2.59	2.88	2.88	4.52	21.00	2.89	
	13.96	1.15	2.59	2.88	1.29	1.94	2.00	1.38	6.64	10.02	11.96	1.34	2.59	2.88	2.88	4.52	21.00	2.89	
	15.12	1.37	2.88	2.88	1.29	1.94	2.00	1.38	6.64	10.02	11.96	1.34	2.59	2.88	2.88	4.52	21.00	2.89	
	16.48	1.37	2.88	2.88	1.29	1.94	2.00	1.38	6.64	10.02	11.96	1.34	2.59	2.88	2.88	4.52	21.00	2.89	

SEZIONE 13

— Tr=500
- - - Tr=200
- - - Tr=50

Scala 1/200



Quote terreno

Distanze parziali

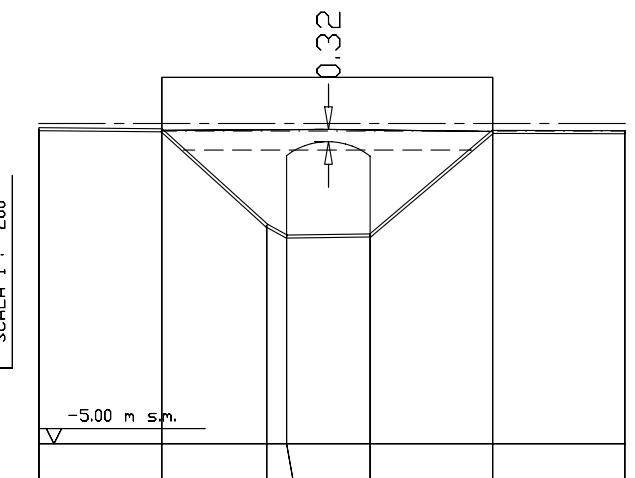
Distanze progressive

	2.59	2.56 0.93	0.91 2.56	2.58
		7.37 7.38	2.78	1.61
	0.00	10.16 10.18	11.79	

SEZIONE 14

— Tr=500
- - - Tr=200
- - - Tr=50

SCALA 1 : 200
-5.00 m s.m.



PICCHETTO

DISTANZA PARZIALE (m)

DISTANZA PROGRESSIVA (m)

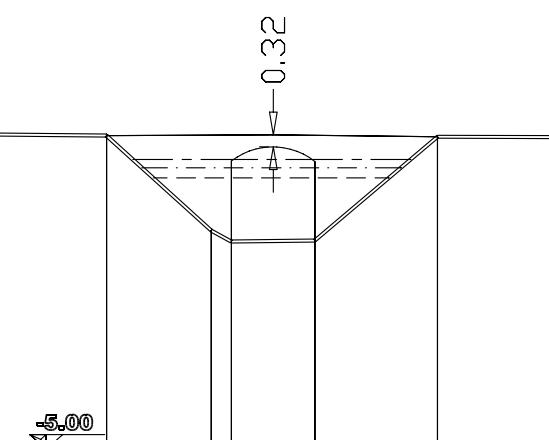
QUOTA TERRENO (m s.m.)

	3.25	2.78	2.21	3.24	3.50
3.32	0.00				
3.29	3.25				
3.25	0.77 6.03	0.48 6.56	0.51 8.77	3.25	12.01
3.22	0.48 0.77	0.51 8.77	3.25	12.01	15.51

SEZIONE 15

— Tr=500
- - - Tr=200
- - - Tr=50

Scala 1/200



Quote terreno

Distanze parziali

Distanze progressive

	3.32	3.29	0.78 0.49	0.52	3.26	3.25
			6.03 6.56	8.77	12.01	15.51
	0.00	3.25	2.77 0.53	2.21	3.24	3.50
			6.56 8.77			

**MODELLAZIONE IDRAULICA IN CONDIZIONI DI MOTO
PERMANENTE:
TABELLE DELLE GRANDEZZE IDRAULICHE SIGNIFICATIVE
PER LE PORTATE T=50, 200, 500 ANNI**

RIO CIAPPE

RIO CIAPPE – PROFILO DI CORRENTE PER T=50 ANNI							
ID Sez.	Progr. (m)	Quota fondo (m s.m.)	P.L. (m s.m.)	A (m ²)	b (m)	v (m/s)	Fr (-)
3	655.05	13.98	14.83	2.05	2.99	7.33	2.83
4	665.53	12.01	13.25	2.58	2.29	5.81	1.75
5	720.60	7.99	9.58	4.68	3.49	3.20	0.88
6	795.79	6.37	8.49	8.69	17.00	1.73	0.77
7	800.33	6.47	8.44	6.76	17.00	2.22	1.12
8	889.98	4.73	6.38	6.35	11.81	2.36	1.03
9	891.53	4.69	6.35	6.17	11.81	2.43	1.07
10	1031.36	2.47	3.89	8.22	11.45	1.83	0.69
11	1033.29	2.45	3.88	8.54	11.47	1.76	0.65
12	1179.23	1.29	3.36	16.47	21.00	0.91	0.33
13	1192.49	0.91	2.81	7.38	11.79	2.03	0.82
14	1200.76	0.49	2.77	11.33	7.60	1.32	0.35
15	1206.33	0.49	2.17	7.22	6.24	2.08	0.62

Rio Ciappe - Risultati delle simulazioni idrauliche – T = 50 anni

RIO CIAPPE – PROFILO DI CORRENTE PER T=200 ANNI							
ID Sez.	Progr. (m)	Quota fondo (m s.m.)	P.L. (m s.m.)	A (m ²)	b (m)	v (m/s)	Fr (-)
3	655.05	13.98	15.00	2.56	3.10	7.81	2.75
4	665.53	12.01	13.53	3.23	2.36	6.20	1.69
5	720.60	7.99	10.00	8.00	14.99	2.50	1.09
6	795.79	6.37	8.56	9.97	17.00	2.01	0.84
7	800.33	6.47	8.51	7.97	17.00	2.51	1.17
8	889.98	4.73	6.47	7.47	11.81	2.68	1.07
9	891.53	4.69	6.45	7.29	11.81	2.74	1.12
10	1031.36	2.47	4.03	9.78	11.45	2.05	0.71
11	1033.29	2.45	4.02	10.11	11.47	1.98	0.67
12	1179.23	1.29	3.52	19.81	21.00	1.01	0.33
13	1192.49	0.91	3.25	12.64	11.79	1.58	0.49
14	1200.76	0.49	3.27	15.58	12.92	1.28	0.37
15	1206.33	0.49	2.44	8.94	6.85	2.24	0.62

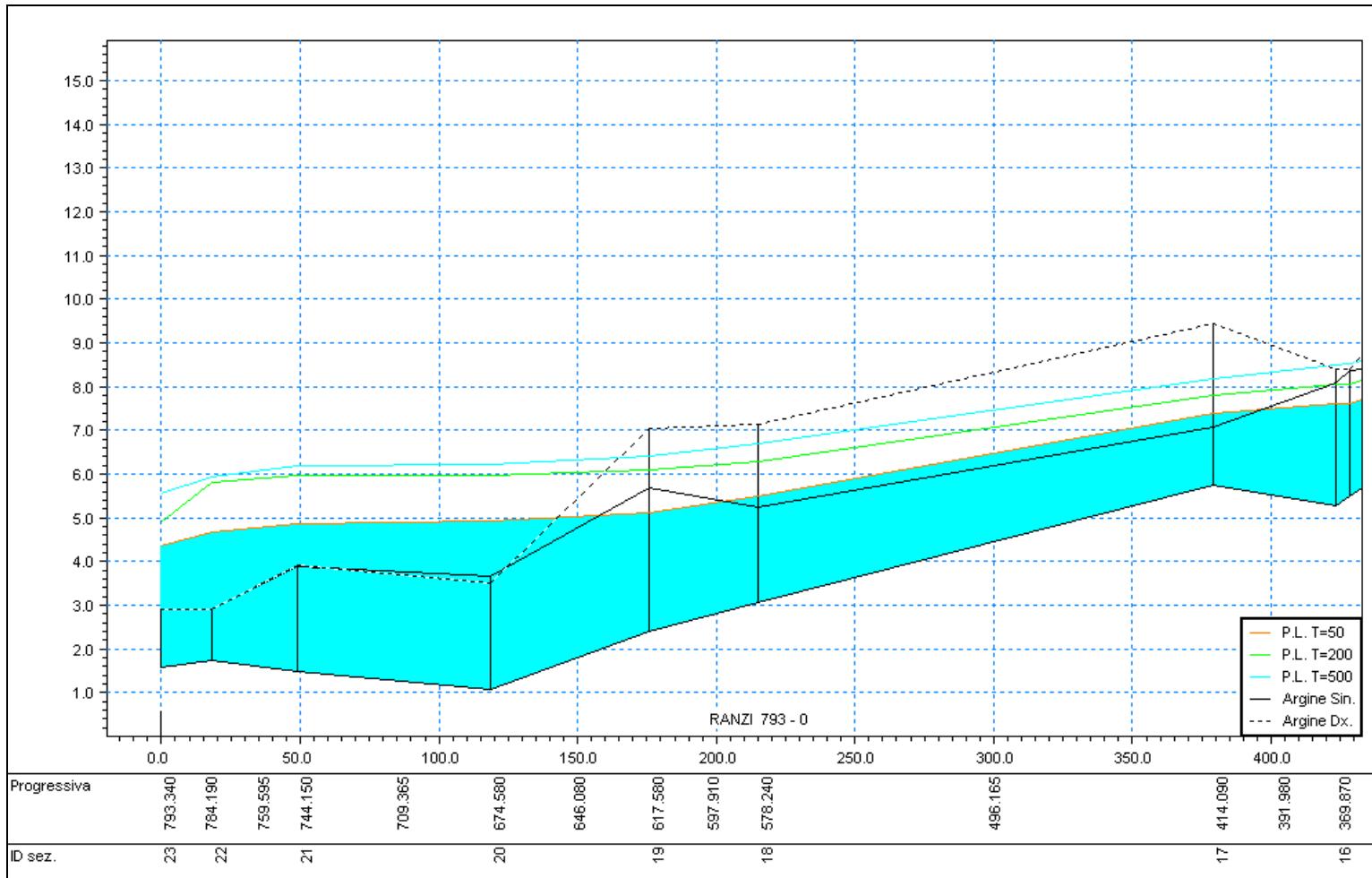
Rio Ciappe - Risultati delle simulazioni idrauliche – T = 200 anni

RIO CIAPPE – PROFILO DI CORRENTE PER T=500 ANNI							
ID Sez.	Progr. (m)	Quota fondo (m s.m.)	P.L. (m s.m.)	A (m ²)	b (m)	v (m/s)	Fr (-)
3	655.05	13.98	15.15	3.04	3.19	8.21	2.68
4	665.53	12.01	13.75	3.77	2.42	6.62	1.69
5	720.60	7.99	10.08	9.16	14.99	2.73	1.12
6	795.79	6.37	8.63	11.13	17.00	2.25	0.89
7	800.33	6.47	8.57	9.07	17.00	2.76	1.20
8	889.98	4.73	6.56	8.49	11.81	2.94	1.11
9	891.53	4.69	6.53	8.31	11.81	3.01	1.14
10	1031.36	2.47	4.15	11.14	11.45	2.24	0.73
11	1033.29	2.45	4.14	11.48	11.47	2.18	0.70
12	1179.23	1.29	3.64	22.15	21.00	1.13	0.35
13	1192.49	0.91	3.45	14.99	11.79	1.67	0.47
14	1200.76	0.49	3.47	18.49	15.51	1.35	0.40
15	1206.33	0.49	2.66	10.55	7.36	2.37	0.63

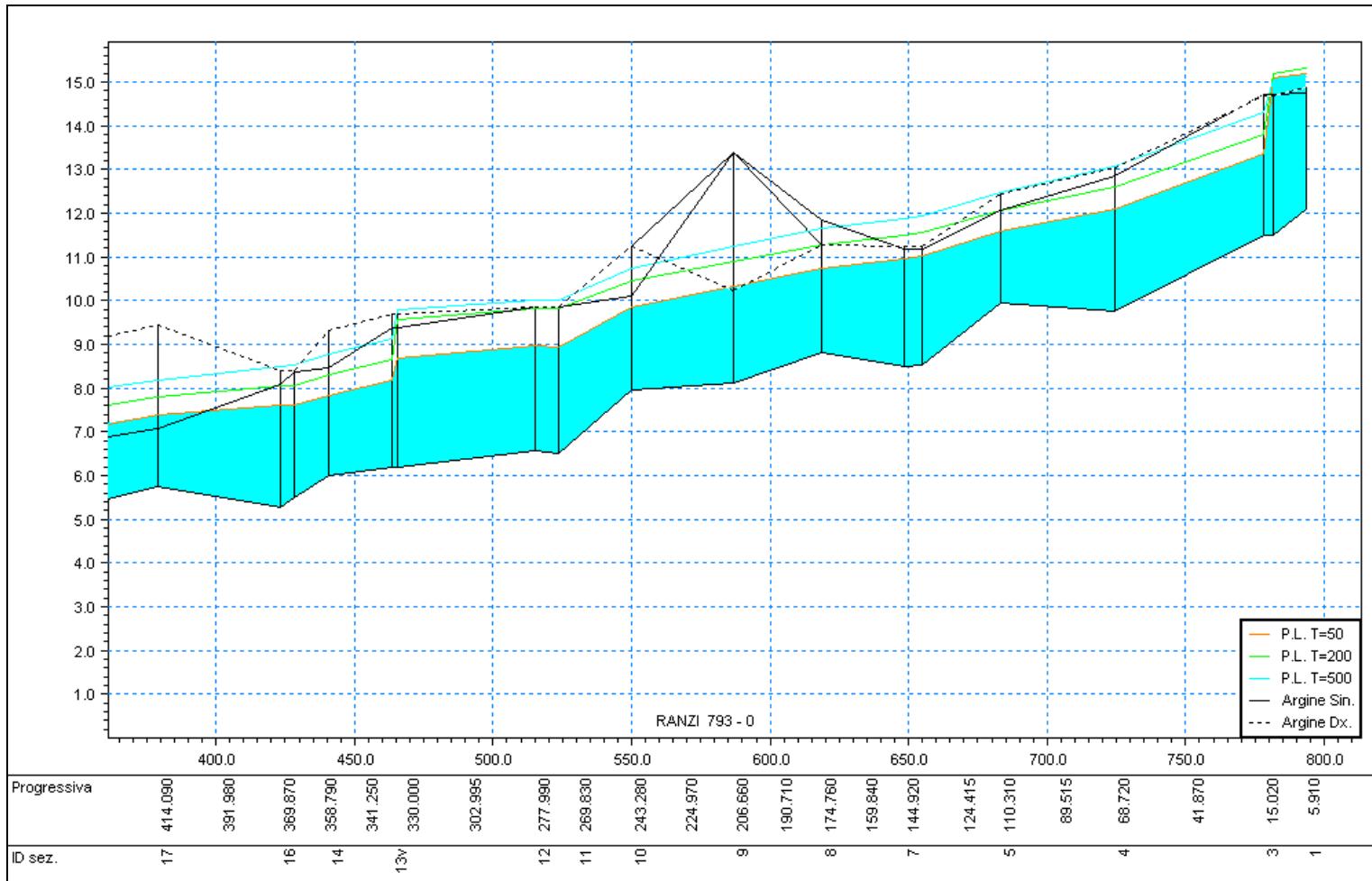
Rio Ciappe - Risultati delle simulazioni idrauliche – T = 500 anni

**PROFILI DI RIGURGITO IN CONDIZIONI DI MOTO
PERMANENTE PER LE PORTATE T=50, 200, 500 ANNI**

RIO RANZI



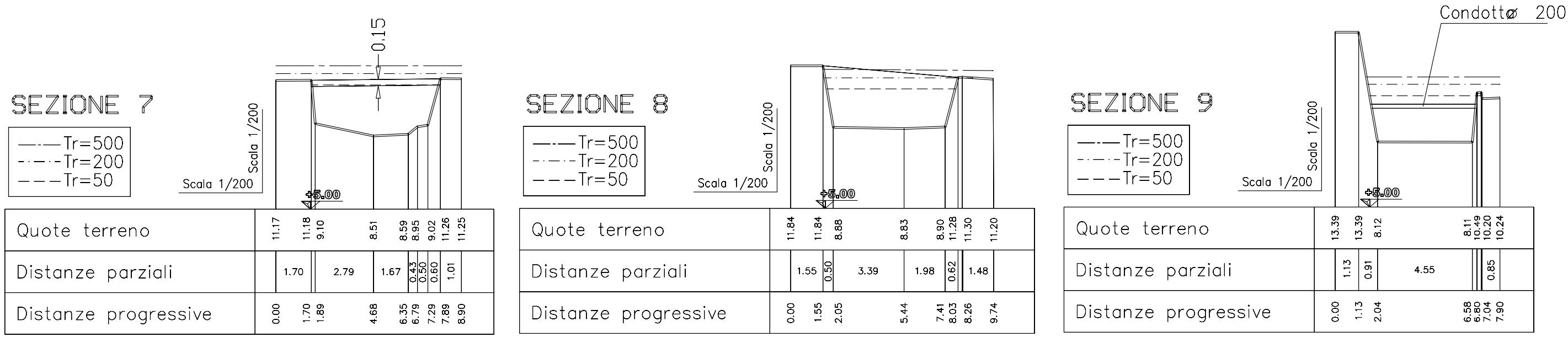
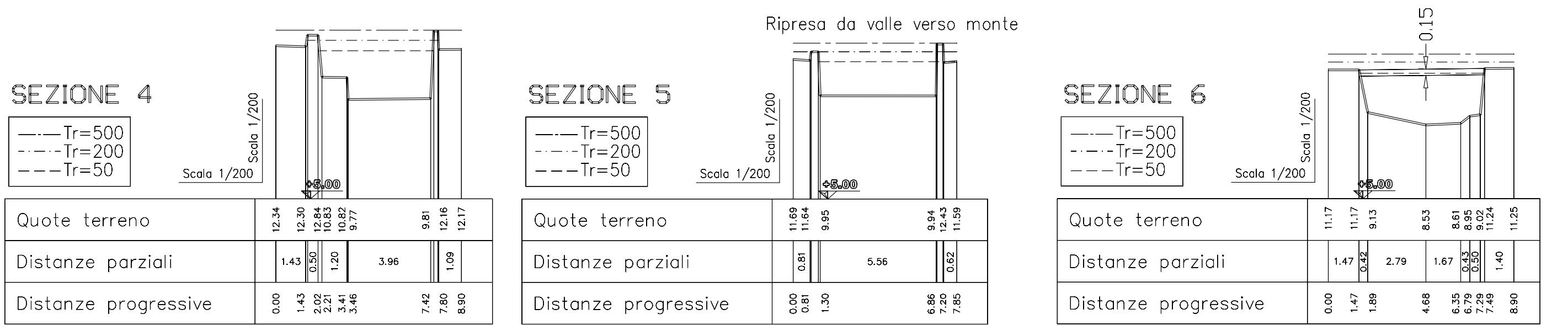
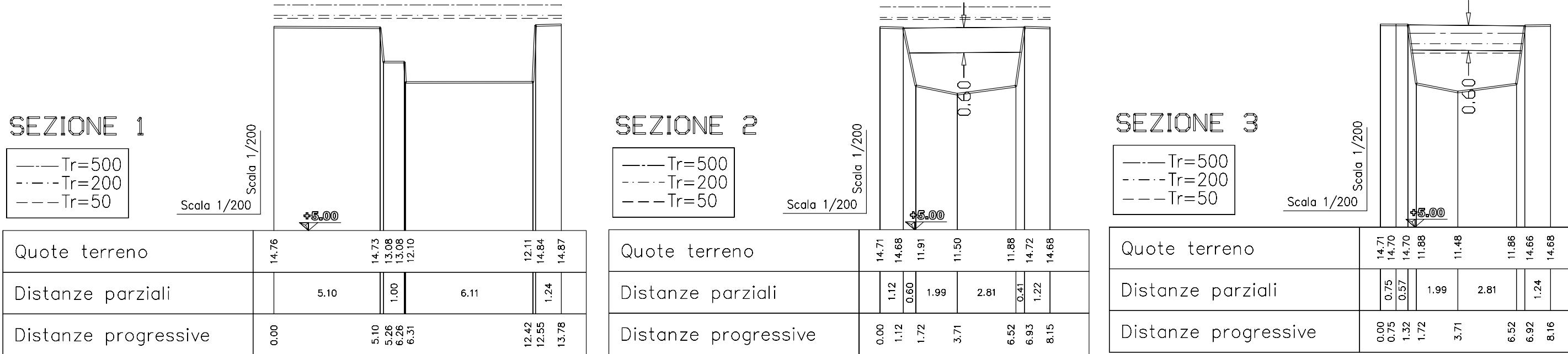
Rio Ranzi, tratto di valle - Profili idraulici per i tempi di ritorno $T = 50, 200$ e 500 anni



Rio Ranzi, tratto di monte - Profili idraulici per i tempi di ritorno T = 50, 200 e 500 anni

GEOMETRIA DELLE SEZIONI ED ALTEZZA DEL PELO
LIBERO IN CONDIZIONI DI MOTO PERMANENTE
PER LE PORTATE $T=50, 200, 500$ ANNI

RIO RANZI



SEZIONE 10

— Tr=500
- - - Tr=200
--- Tr=50

Scala 1/200
Scala 1/200

Quote terreno

Distanze parziali

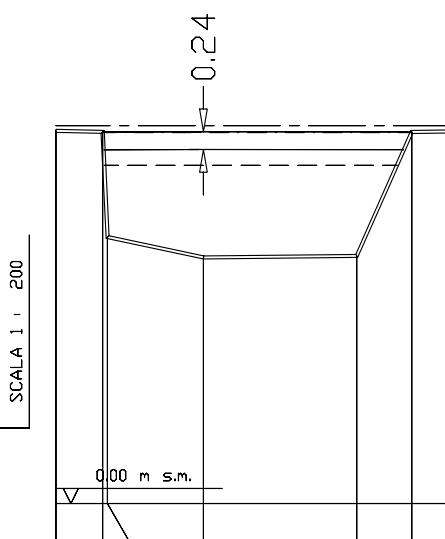
Distanze progressive

	10.10	10.07	7.97	8.16	11.24	11.26
	1.65	0.47	2.13	3.28	2.23	
	5.40		7.63	1.24	8.87	11.26

SEZIONE 11

— Tr=500
- - - Tr=200
--- Tr=50

SCALA 1 : 200



PICCHETTO

DISTANZA PARZIALE (m)

DISTANZA PROGRESSIVA (m)

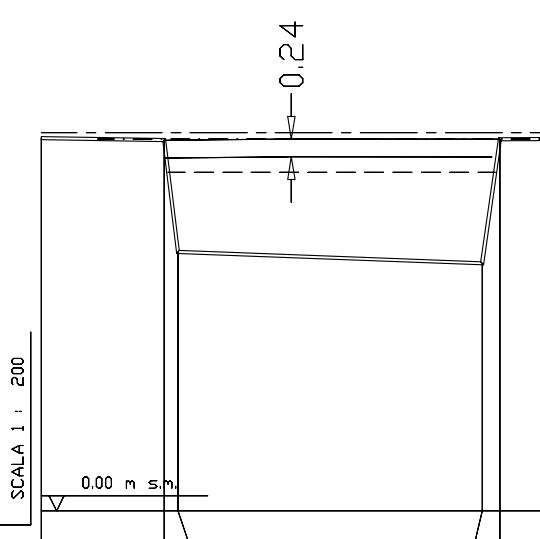
QUOTA TERRENO (m s.m.)

	0.00	2.54	4.05	1.46
	9.86	0.00		
	9.83	1.24		
	7.05	1.37		
	6.51	3.91		
	6.55	7.96		
	9.83	9.42		
	9.84	10.38		

SEZIONE 12

— Tr=500
- - - Tr=200
--- Tr=50

SCALA 1 : 200
SCALA 1 : 200



PICCHETTO

DISTANZA PARZIALE (m)

DISTANZA PROGRESSIVA (m)

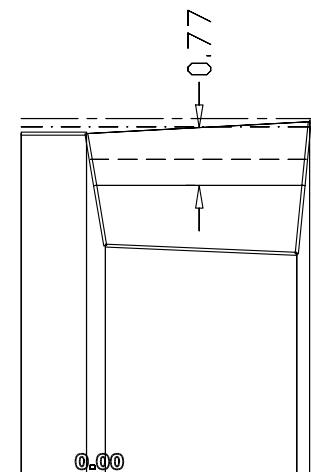
QUOTA TERRENO (m s.m.)

	3.25	8.05	1.74
	9.81	3.25	
	6.85	3.61	
	9.83	11.66	
	6.55	12.13	
	9.84	13.87	

SEZIONE 13

— Tr=500
- - - Tr=200
--- Tr=50

Scala 1/200
Scala 1/200



Quote terreno

Distanze parziali

Distanze progressive

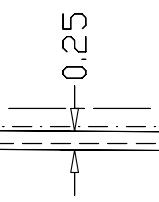
	9.38	9.38	6.20
	1.72	6.42	9.70
	0.50		9.70
	2.22		
	5.07		
	0.61		
	7.29		
	7.63		
	8.24		

SEZIONE 14

— Tr=500
- - - Tr=200
--- Tr=50

SCALA 1 : 200
SCALA 1 : 200

Ripresa da valle verso monte

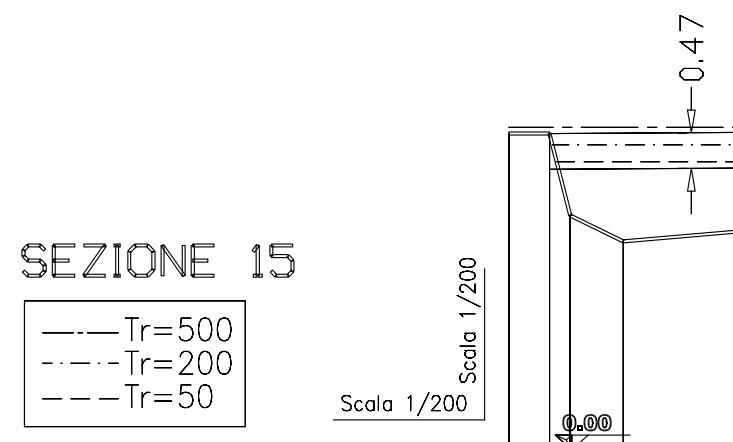


Quote terreno

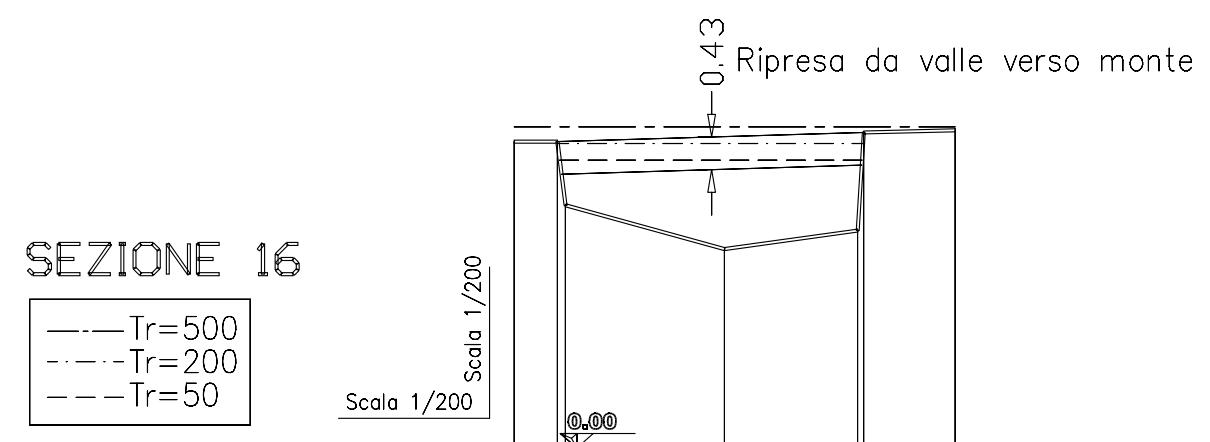
Distanze parziali

Distanze progressive

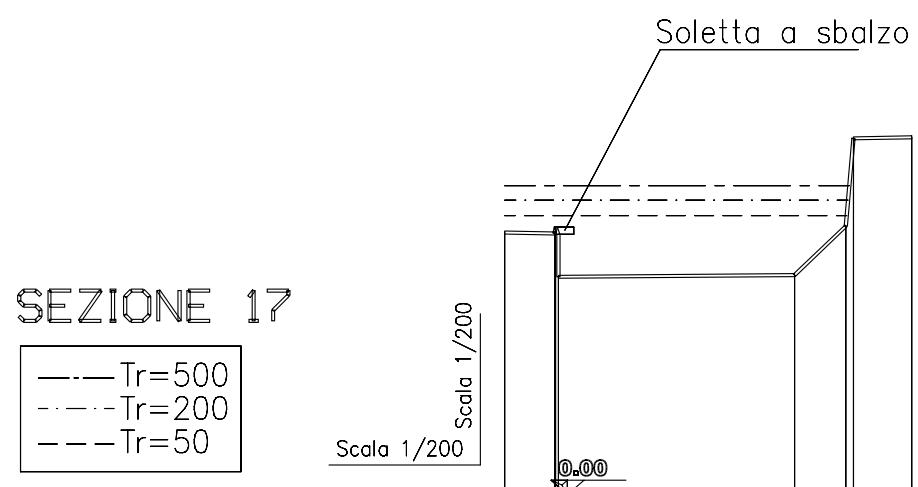
	8.47	8.47	6.01
	0.67	0.67	8.15
	0.76	0.76	1.77
	5.09		
	5.84		
	6.08		
	7.85		
	9.32		



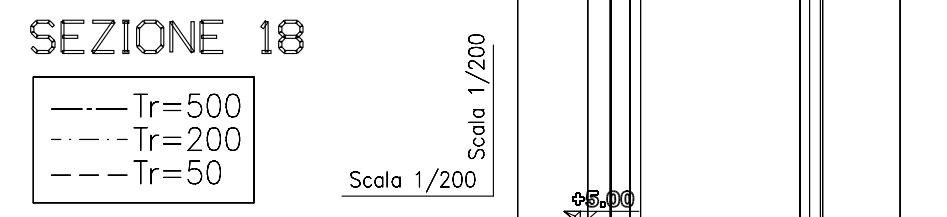
Quote terreno	8.36	8.36	5.95	8.40	8.40
Distanze parziali	1.07	0.55	1.40	1.26	
Distanze progressive	0.00	1.62	3.02	5.21	



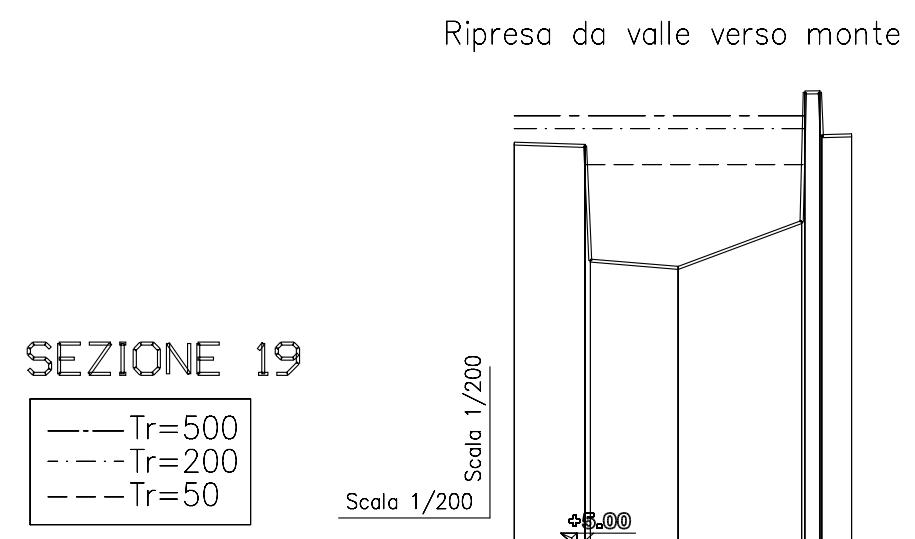
Quote terreno	8.10	8.10	5.26	5.75	8.34	8.40
Distanze parziali	1.15	6.42	4.21	3.52	2.42	
Distanze progressive	0.00	1.15	1.36	5.57	9.09	11.67



Quote terreno	6.93	6.91	5.76	5.81	7.10	9.42	9.45	
Distanze parziali	1.32			6.25	1.36	1.54		
Distanze progressive	0.00	1.32	1.42			7.67	9.03	9.23

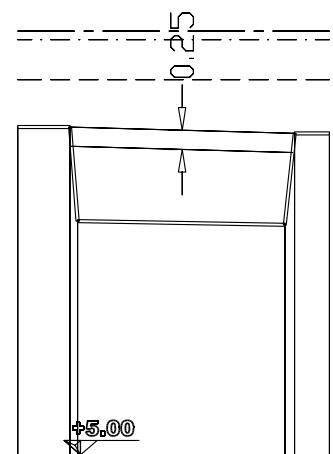


Quote terreno	4.43	4.62	4.65	5.24	3.07	3.10	7.15	4.65	4.63
Distanze parziali	1.85	2.45	0.60	0.50		4.22		2.05	
Distanze progressive	0.00	1.85	2.97	3.25		7.47	7.72	8.07	10.12

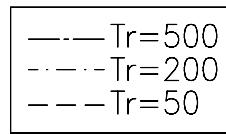


Quote terreno	5.68	5.62	2.59	3.61	5.88	5.90
Distanze parziali	1.87	2.01	2.32	3.27	0.79	
Distanze progressive	0.00	1.87	4.33	7.60	8.13	8.92

Ripresa da valle verso monte



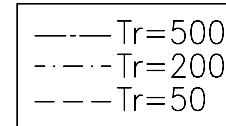
SEZIONE 20



Scala 1/200

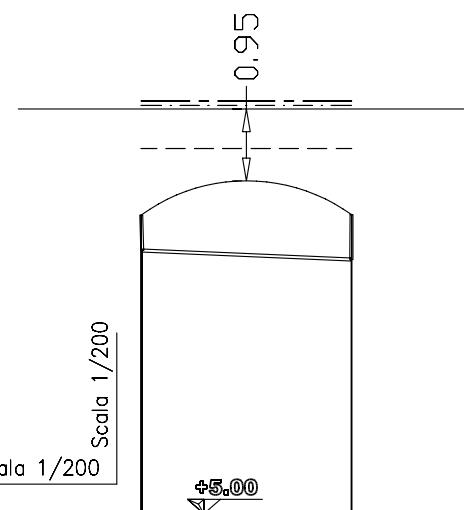
Quote terreno	3.67	3.67	1.18	1.08	3.50	3.50
Distanze parziali	0.00	1.38		7.06	7.32	0.92
Distanze progressive	0.00	1.38	1.58	5.48	7.32	8.25

SEZIONE 21

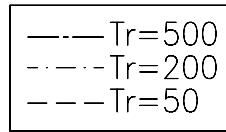


Scala 1/200

Quote terreno	3.89	3.89	2.01	1.47	1.48	1.71	3.93	3.93
Distanze parziali	1.62	0.54		3.41		2.24	1.16	1.72
Distanze progressive	0.00	1.62	2.16		5.57	5.95	8.19	11.07



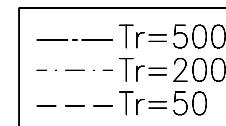
SEZIONE 22



Scala 1/200

Quote terreno	2.96		1.72	2.91
Distanze parziali		5.53		
Distanze progressive	0.03		5.56	5.57

SEZIONE 23



Scala 1/200

Quote terreno	2.90		1.59	2.91
Distanze parziali			5.45	
Distanze progressive	0.00	0.11		5.56

MODELLAZIONE IDRAULICA IN CONDIZIONI DI MOTO
PERMANENTE:
TABELLE DELLE GRANDEZZE IDRAULICHE SIGNIFICATIVE
PER LE PORTATE T=50, 200, 500 ANNI

RIO RANZI

RIO RANZI – PROFILO DI CORRENTE PER T=50 ANNI							
ID Sez.	Progr. (m)	Quota fondo (ms.m.)	P.L. (ms.m.)	A (m ²)	b (m)	v (m/s)	Fr (-)
1	0.00	12.10	15.18	24.08	13.78	1.66	0.40
2	11.82	11.50	15.09	19.06	8.15	2.10	0.44
3	15.02	11.48	13.35	8.37	5.22	4.78	1.20
4	68.72	9.76	12.10	10.99	5.44	3.64	0.82
5	110.31	9.94	11.58	9.16	5.66	4.37	1.09
6	138.52	8.53	11.01	12.67	5.97	3.16	0.69
7	144.92	8.51	10.96	12.64	6.09	3.17	0.70
8	174.76	8.82	10.73	10.78	6.15	3.71	0.89
9	206.66	8.11	10.34	10.86	6.01	3.68	0.87
10	243.28	7.97	9.85	7.26	4.92	5.51	1.45
11	269.83	6.51	8.95	16.61	7.74	2.41	0.52
12	277.99	6.55	8.96	18.82	8.65	2.13	0.46
13	328.00	6.20	8.70	12.86	5.70	3.11	0.66
13v	330.00	6.20	8.19	9.97	5.56	4.01	0.96
14	352.50	6.01	7.84	9.37	5.34	4.27	1.03
15	365.08	5.50	7.61	12.74	7.20	3.14	0.75
16	369.87	5.26	7.61	15.06	7.99	2.66	0.62
17	414.09	5.76	7.38	11.93	9.05	3.35	0.93
18	578.24	3.07	5.49	13.15	7.62	3.04	0.74
19	617.58	2.39	5.13	13.25	5.74	3.02	0.63
20	674.58	1.08	4.92	23.22	6.87	1.72	0.30
21	744.15	1.47	4.85	24.15	9.35	1.65	0.33
22	775.04	1.72	4.66	15.69	5.57	2.49	0.47
23	793.34	1.59	4.32	14.73	5.57	2.67	0.52

Rio Ranzi-Risultati delle simulazioni idrauliche – T=50 anni

RIO RANZI – PROFILO DI CORRENTE PER T=200 ANNI							
ID Sez.	Progr. (m)	Quota fondo (ms.m.)	P.L. (ms.m.)	A (m ²)	b (m)	v (m/s)	Fr (-)
1	0.00	12.10	15.32	25.93	13.78	2.12	0.49
2	11.82	11.50	15.19	19.82	8.15	2.77	0.57
3	15.02	11.48	13.80	10.73	5.35	5.13	1.16
4	68.72	9.76	12.60	13.72	5.51	4.01	0.81
5	110.31	9.94	12.06	11.92	5.75	4.61	1.02
6	138.52	8.53	11.55	16.87	8.90	3.26	0.76
7	144.92	8.51	11.50	16.72	8.90	3.29	0.77
8	174.76	8.82	11.26	14.15	7.03	3.89	0.88
9	206.66	8.11	10.89	14.27	6.34	3.85	0.82
10	243.28	7.97	10.46	11.04	7.07	4.98	1.27
11	269.83	6.51	9.82	23.61	9.82	2.33	0.48
12	277.99	6.55	9.84	26.62	13.02	2.07	0.46
13	328.00	6.20	9.56	18.19	7.62	3.02	0.62
13v	330.00	6.20	8.64	12.52	5.68	4.39	0.95
14	352.50	6.01	8.29	11.79	5.60	4.67	1.03
15	365.08	5.50	8.06	15.98	7.38	3.44	0.75
16	369.87	5.26	8.05	18.60	8.08	2.96	0.62
17	414.09	5.76	7.79	15.66	9.09	3.51	0.85
18	578.24	3.07	6.29	19.25	7.67	2.86	0.58
19	617.58	2.39	6.08	19.56	7.66	2.81	0.56
20	674.58	1.08	5.98	30.56	6.87	1.80	0.27
21	744.15	1.47	5.97	34.61	9.35	1.59	0.26
22	775.04	1.72	5.80	22.00	5.57	2.50	0.40
23	793.34	1.59	4.91	18.02	5.57	3.05	0.54

Tabella7–Rio Ranzi-Risultati delle simulazioni idrauliche – T=200 anni

RIO RANZI – PROFILO DI CORRENTE PER T=500 ANNI							
ID Sez.	Progr. (m)	Quota fondo (ms.m.)	P.L. (ms.m.)	A (m ²)	b (m)	v (m/s)	Fr (-)
1	0.00	12.10	15.82	23.49	13.78	3.19	0.78
2	11.82	11.50	15.69	18.66	8.15	4.02	0.85
3	15.02	11.48	14.30	13.44	5.49	5.58	1.14
4	68.72	9.76	13.09	16.51	6.05	4.54	0.88
5	110.31	9.94	12.47	14.40	6.04	5.21	1.08
6	138.52	8.53	11.93	20.26	8.90	3.70	0.78
7	144.92	8.51	11.88	20.14	8.90	3.72	0.79
8	174.76	8.82	11.67	17.32	8.16	4.33	0.95
9	206.66	8.11	11.24	16.51	6.40	4.54	0.90
10	243.28	7.97	10.73	12.96	7.26	5.79	1.38
11	269.83	6.51	10.00	25.40	10.38	2.95	0.60
12	277.99	6.55	10.01	28.98	13.87	2.59	0.57
13	328.00	6.20	9.78	19.83	7.63	3.78	0.75
13v	330.00	6.20	9.14	15.40	5.82	4.87	0.96
14	352.50	6.01	8.77	14.86	7.02	5.05	1.11
15	365.08	5.50	8.52	19.61	8.57	3.82	0.81
16	369.87	5.26	8.49	22.93	11.67	3.27	0.75
17	414.09	5.76	8.17	19.15	9.12	3.92	0.86
18	578.24	3.07	6.68	22.25	7.69	3.37	0.63
19	617.58	2.39	6.42	22.14	7.67	3.39	0.64
20	674.58	1.08	6.21	32.09	6.87	2.34	0.35
21	744.15	1.47	6.20	36.71	9.35	2.04	0.33
22	775.04	1.72	5.92	22.71	5.57	3.30	0.52
23	793.34	1.59	5.57	21.72	5.57	3.45	0.56

Rio Ranzi-Risultati delle simulazioni idrauliche–T=500 anni