

AUTORITA' DI BACINO  
DI RILIEVO REGIONALE



PROVINCIA  
DI SAVONA

## PIANO DI BACINO CARENDA

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



## AGGIORNAMENTI PIANO DI BACINO CARENDA - VERIFICHE IDRAULICHE

DELIBERA	OGGETTO	DESCRIZIONE	ATTI MODIFICATI
DGP n. 114 Del .31/05/2005	Attuazione del comma 15 dell'art. 97 della L.R. 18/1999 relativo alle procedure di modifica ed integrazione dei piani di bacino di rilievo regionale	Aggiornamento dei Piani di Bacino sulla base delle attività finanziate con D.G.R. 1592/03, mediante approfondimenti geologici sul bacino del Centa, come approvato nel Comitato Tecnico Provinciale della Difesa del Suolo seduta del 21/09/04	<ul style="list-style-type: none"> <li>- Relazione generale</li> <li>- TAV. 02 Carta Geolitologica (CTP 21/09/05) CTR 245060-070 ; 245100-110-140-150</li> <li>- TAV. 03 Carta Geomorfologica (CTP 21/09/05) CTR 245060-070 ; 245100-110-140-150</li> <li>- TAV. 05 Carta della Franosità Reale (CTP 21/09/05) CTR 245060-070 ; 245100-110-140-150</li> </ul>
		Aggiornamento dei Piani di Bacino sulla base delle attività finanziate con D.G.R. 1592/03, mediante studio idraulico del Rio Antognano, come approvato nel Comitato Tecnico Provinciale della Difesa del Suolo seduta del 28/04/05	<ul style="list-style-type: none"> <li>- Relazione generale</li> <li>- Piano interventi</li> <li>- TAV. 09 Carta delle fasce di inondabilità (CTP 28/04/05) CTR 245110</li> <li>- TAV. 11 Carta del rischio idraulico (CTP 28/04/05) CTR 245110</li> <li>- TAV. 12 Carta degli interventi (CTP 28/04/05) CTR 245070-100-110-140-150</li> <li>- TAV. 14 Carta delle aree inondabili (CTP 28/04/05) CTR 245110</li> <li>- TAV. 17 Carta dei tratti indagati (CTP 28/04/05) CTR 245_1 – 245_2</li> <li>- Verifiche idrauliche</li> </ul>
		Aggiornamento dei Piani di Bacino sulla base delle attività finanziate con D.G.R. 1592/03, mediante revisione del piano interventi sul bacino del Fiume Centa, come approvato nel Comitato Tecnico Provinciale della Difesa del Suolo seduta del 28/04/05	<ul style="list-style-type: none"> <li>- Piano interventi</li> <li>- TAV. 12 Carta degli interventi (CTP 28/04/05) CTR 245110-100-140-150-070; 245070-060</li> </ul>

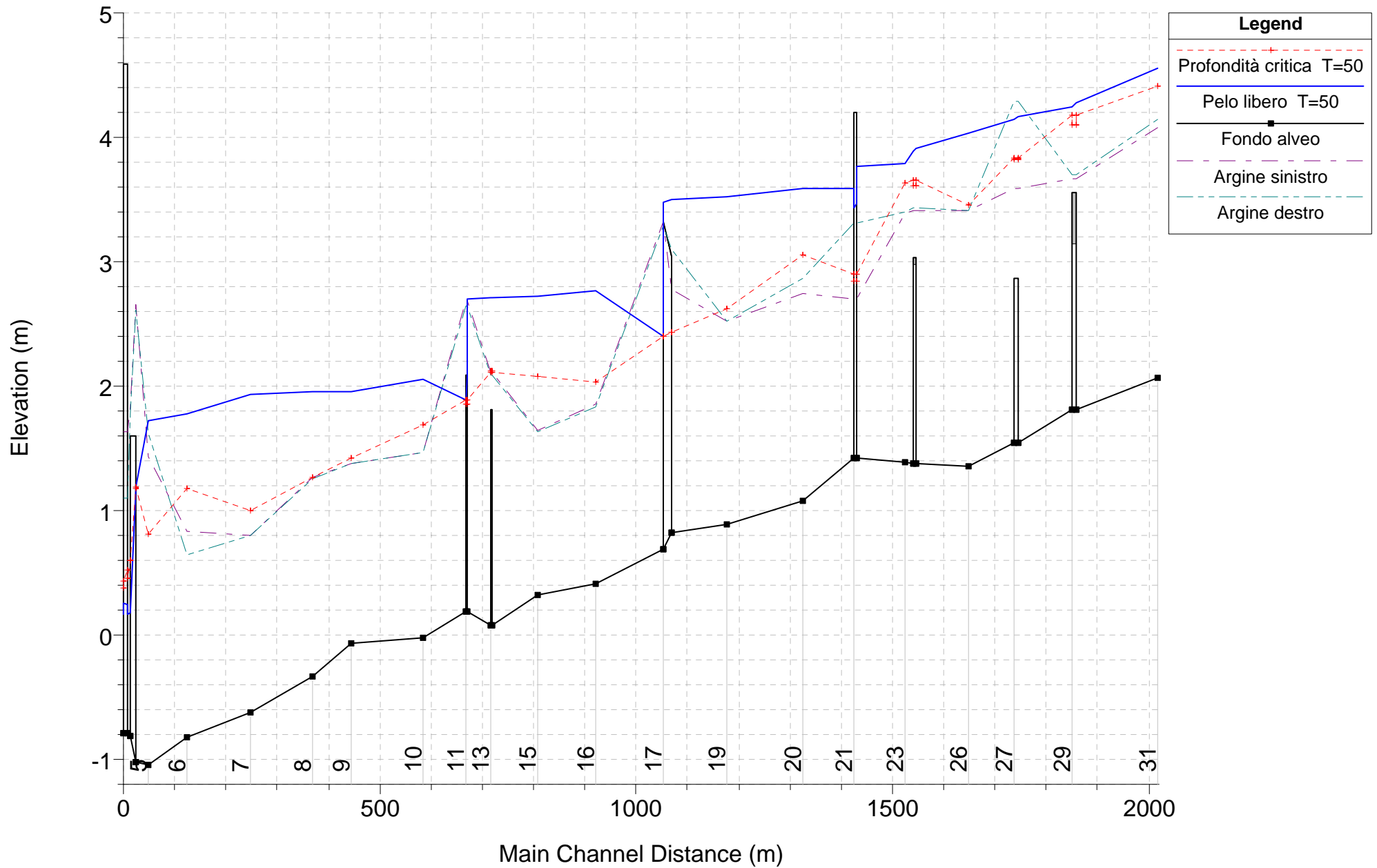


**PROFILI DI RIGURGITO IN CONDIZIONI DI MOTO  
PERMANENTE PER LE PORTATE T=50, 200, 500 ANNI**

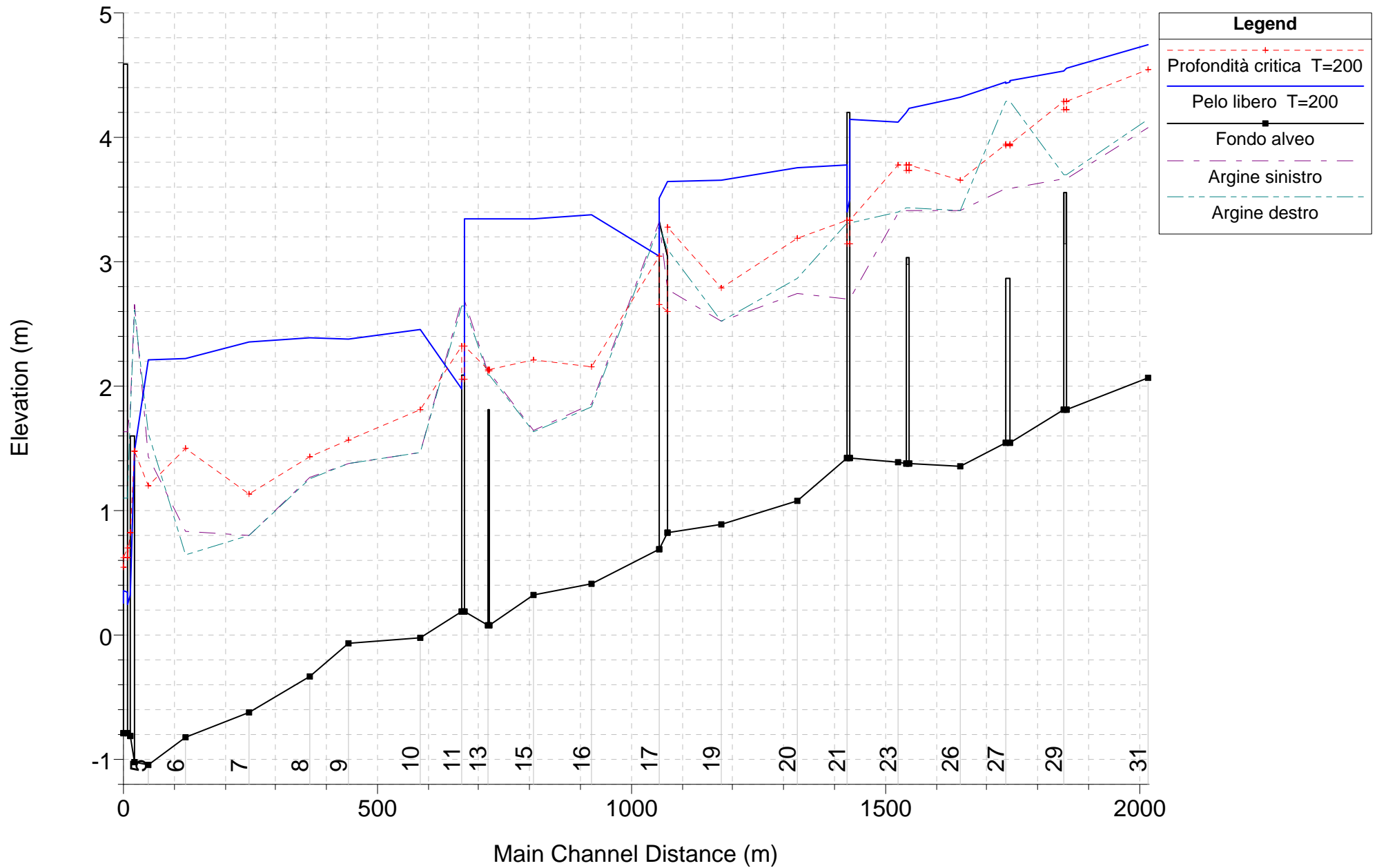
**RIO ANTOGNANO**



# Rio Antognano – profilo longitudinale di moto permanente T=50 anni

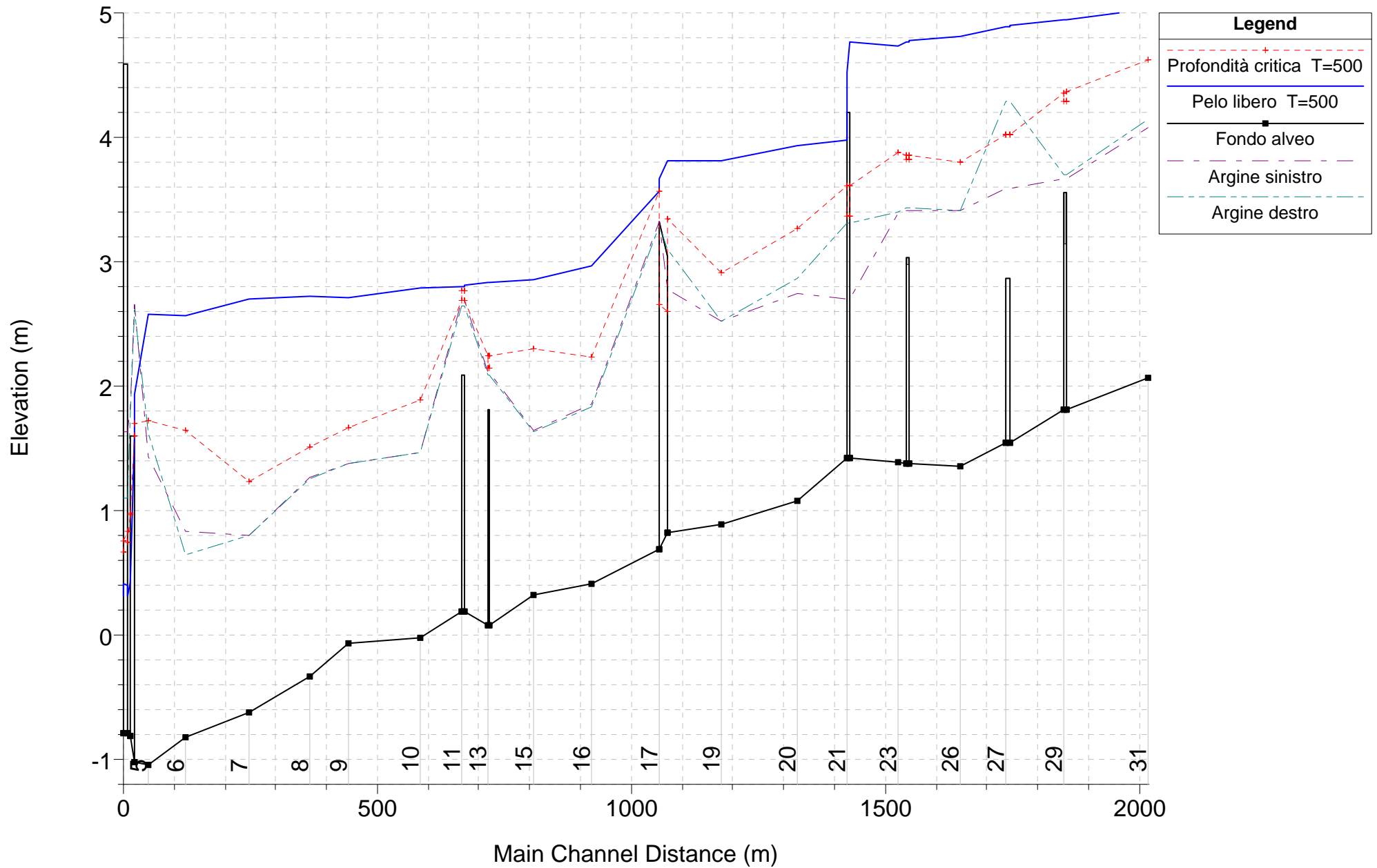


Rio Antognano – profilo longitudinale di moto permanente T=200 anni





Rio Antognano – 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**

**RIO ANTOGNANO**

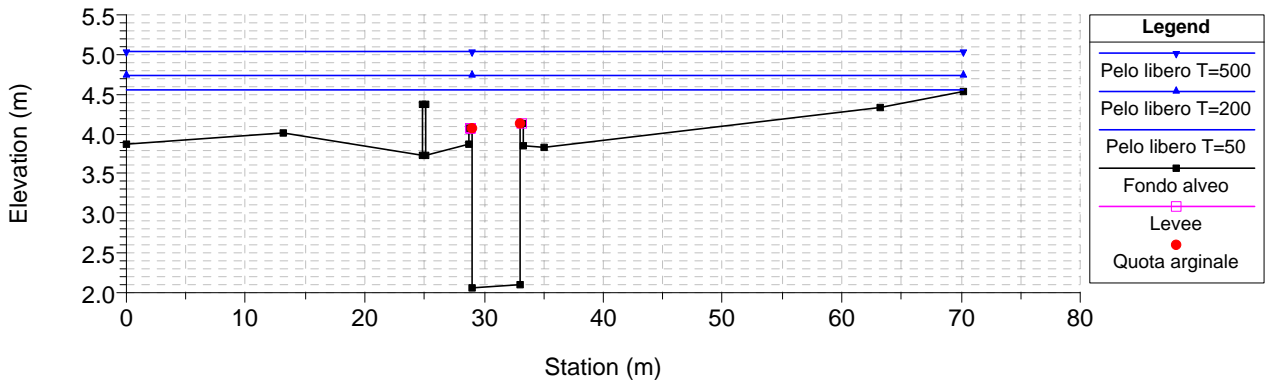
DALLA SEZ. 31  
ALLA SEZ. 1



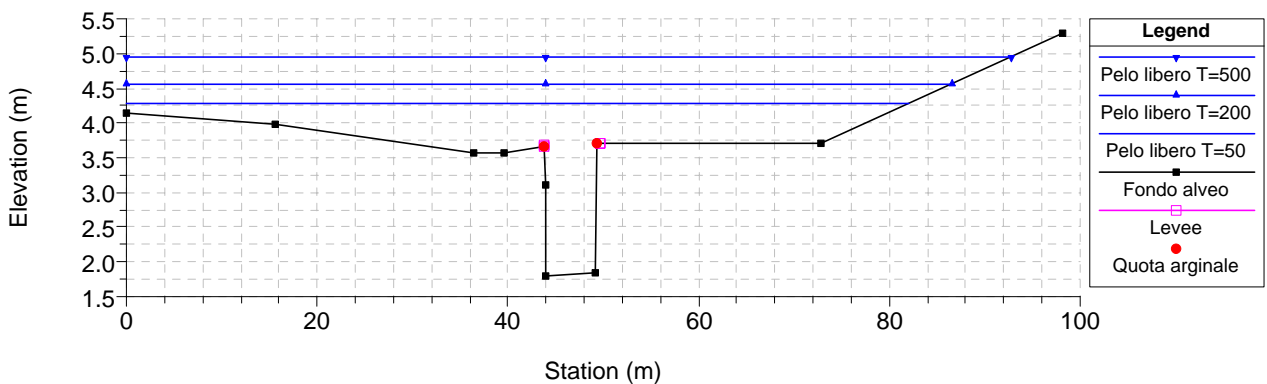
# RIO ANTOGNANO

## Sezioni trasversali

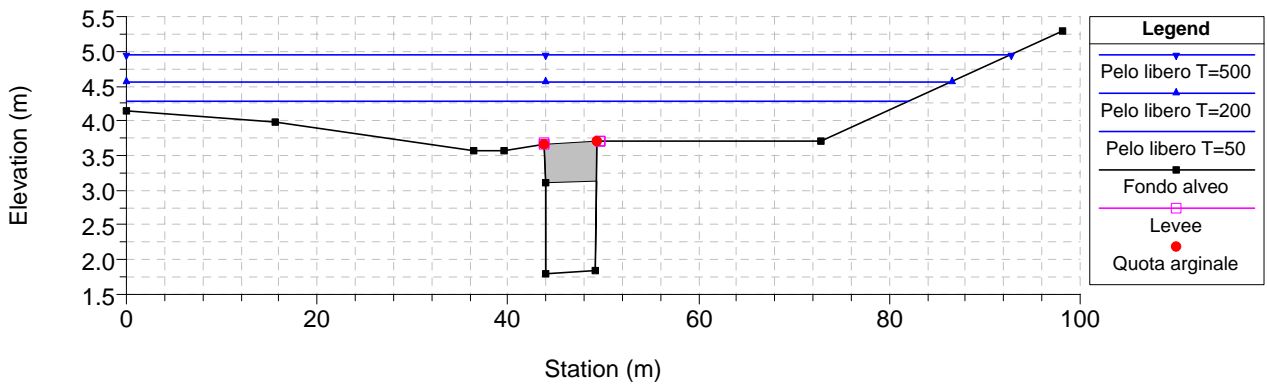
RS = 31



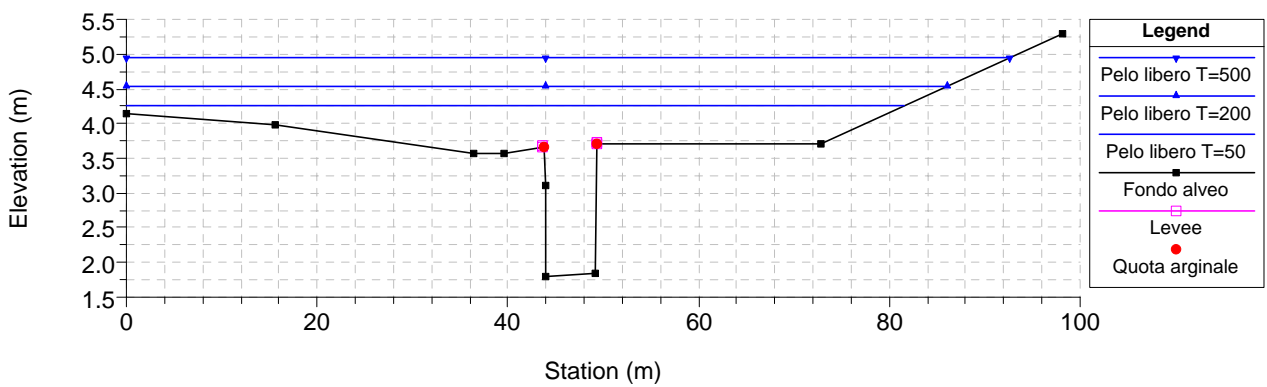
RS = 30



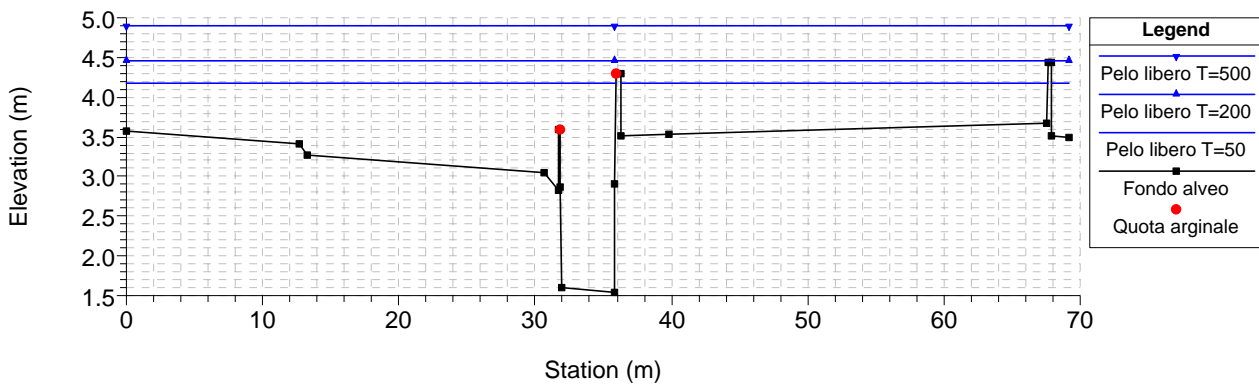
RS = 29.5 BR



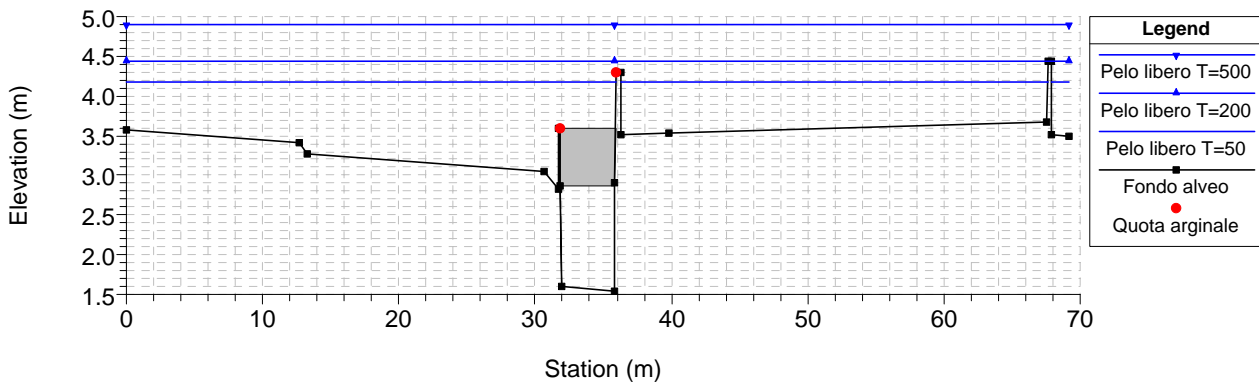
RS = 29



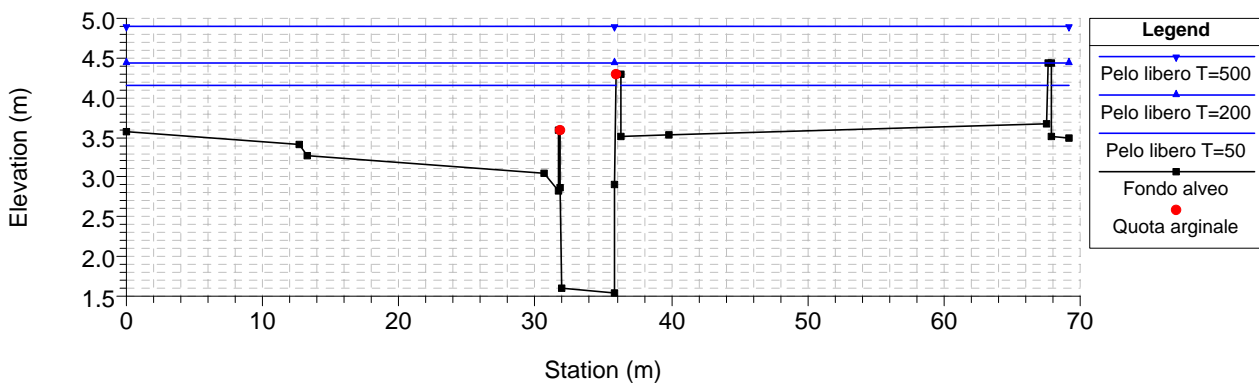
RS = 28



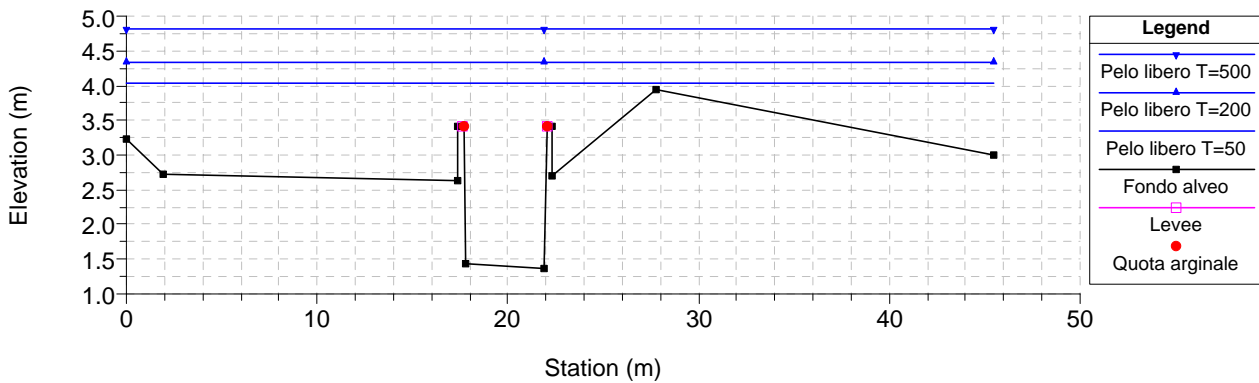
RS = 27.5 BR



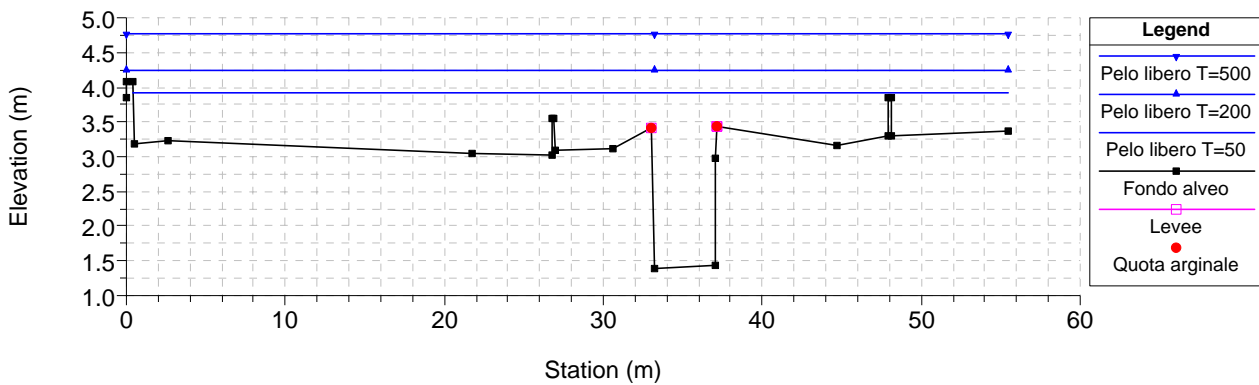
RS = 27



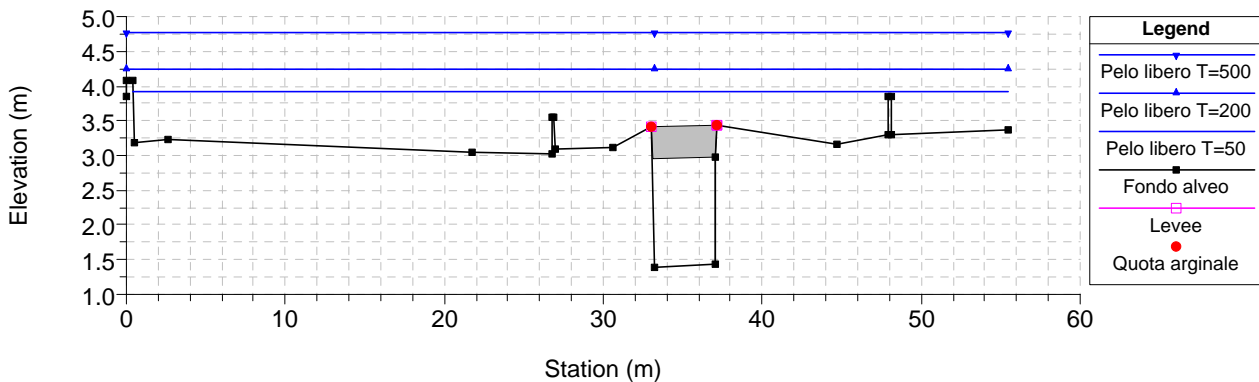
RS = 26



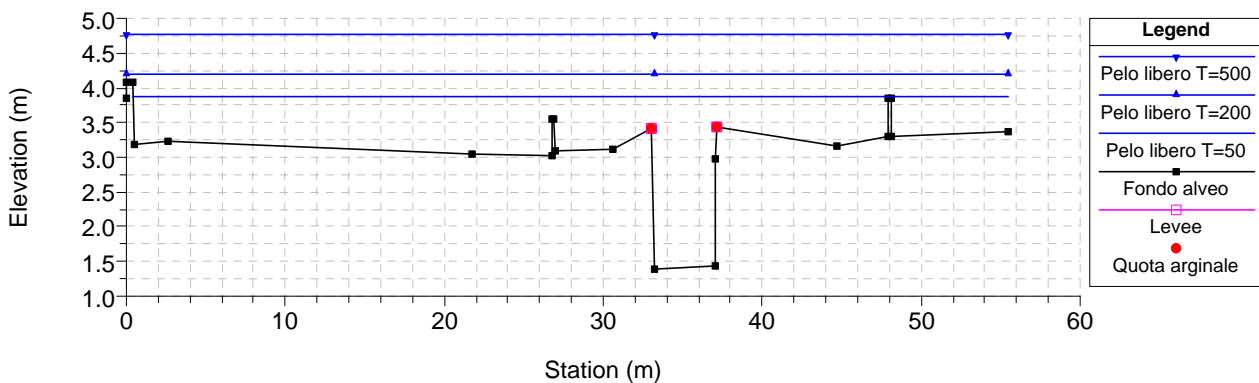
RS = 25



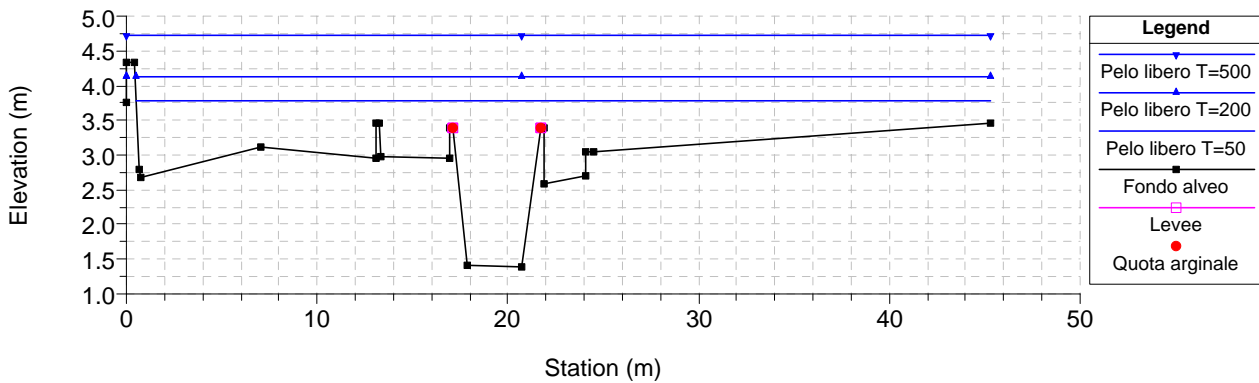
RS = 24.5 BR



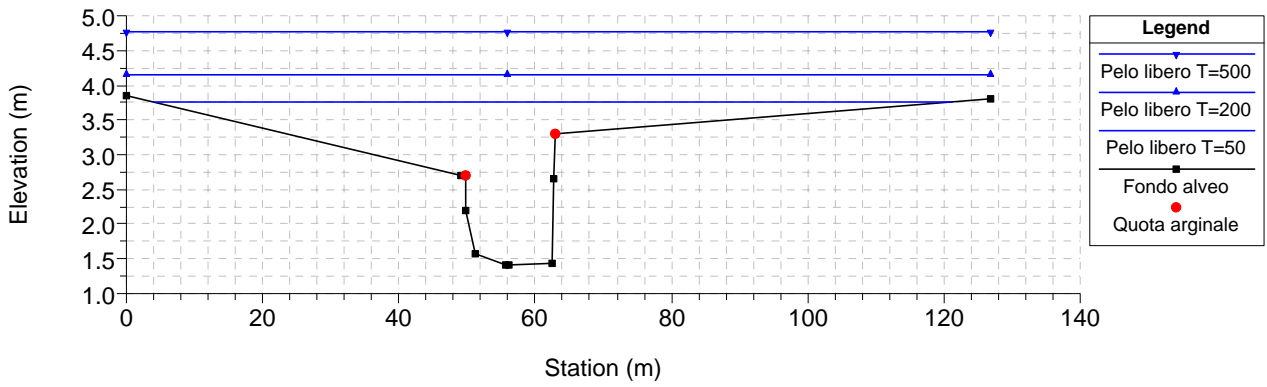
RS = 24



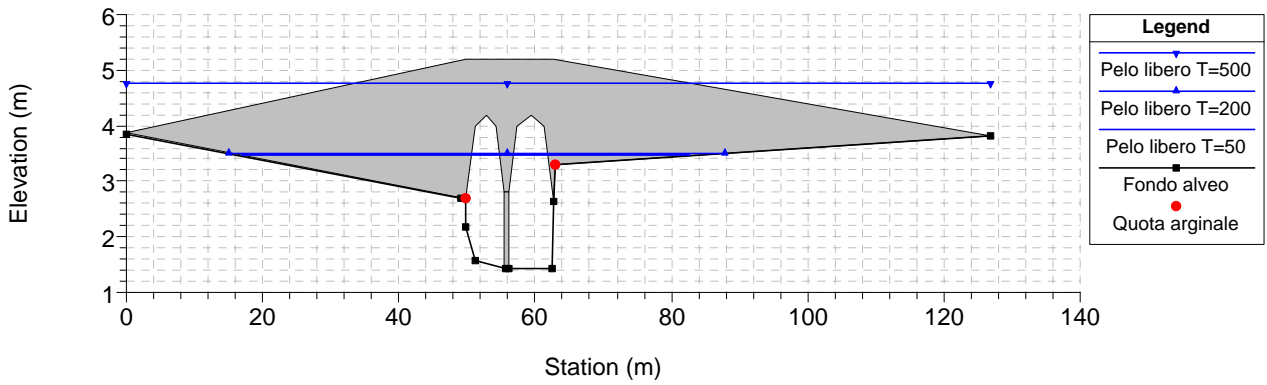
RS = 23



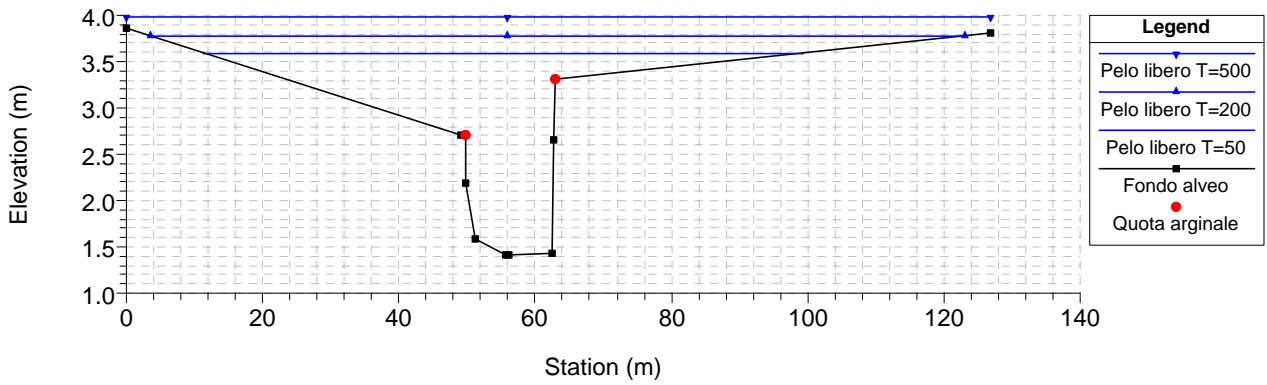
RS = 22



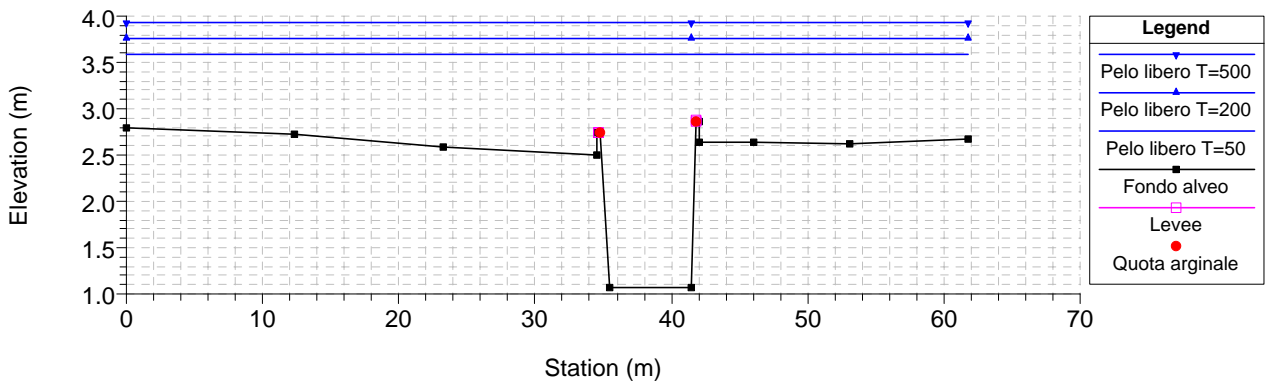
RS = 21.5 BR



RS = 21

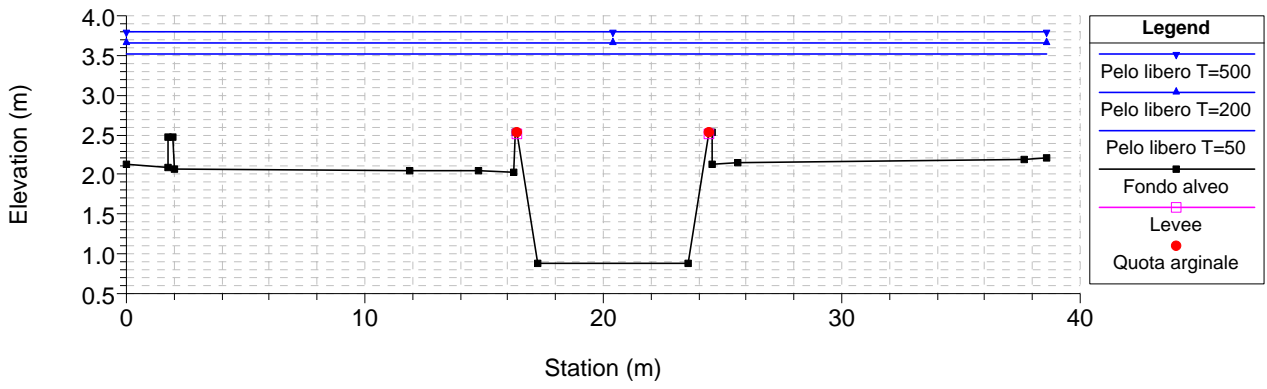


RS = 20

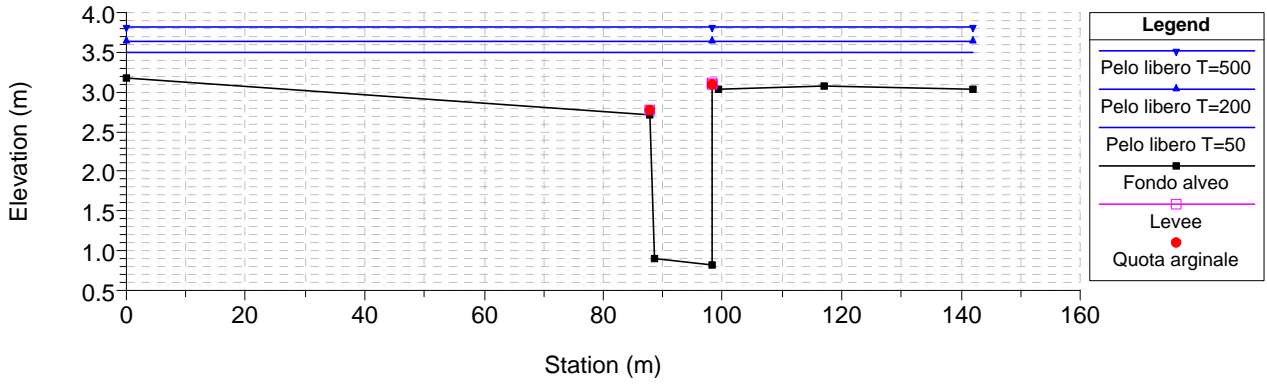




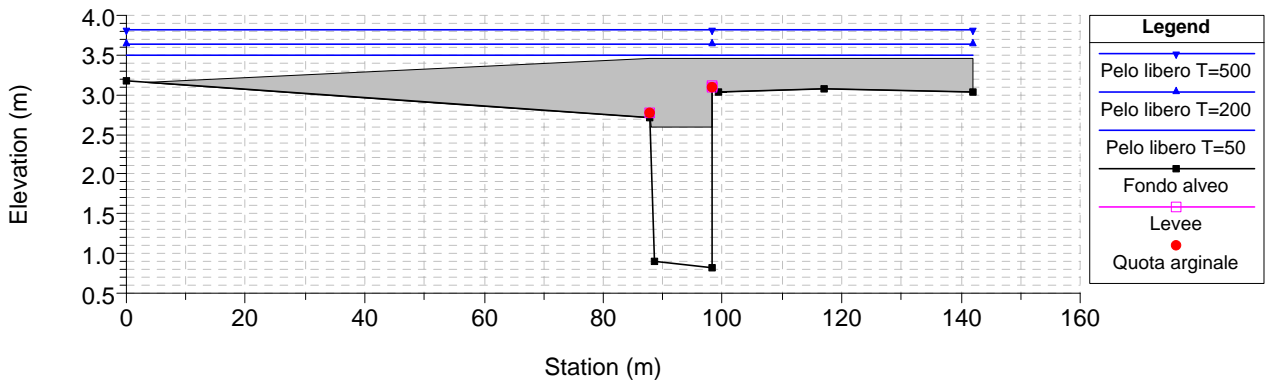
RS = 19



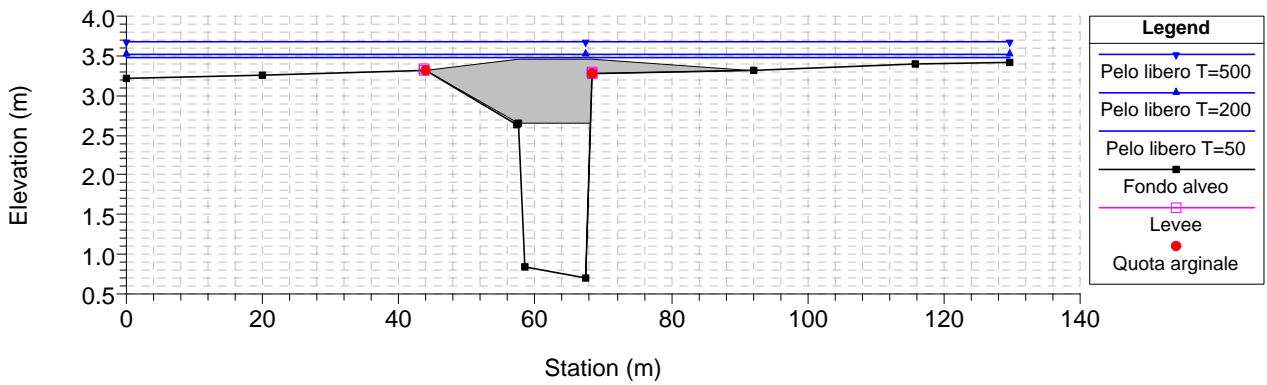
RS = 18



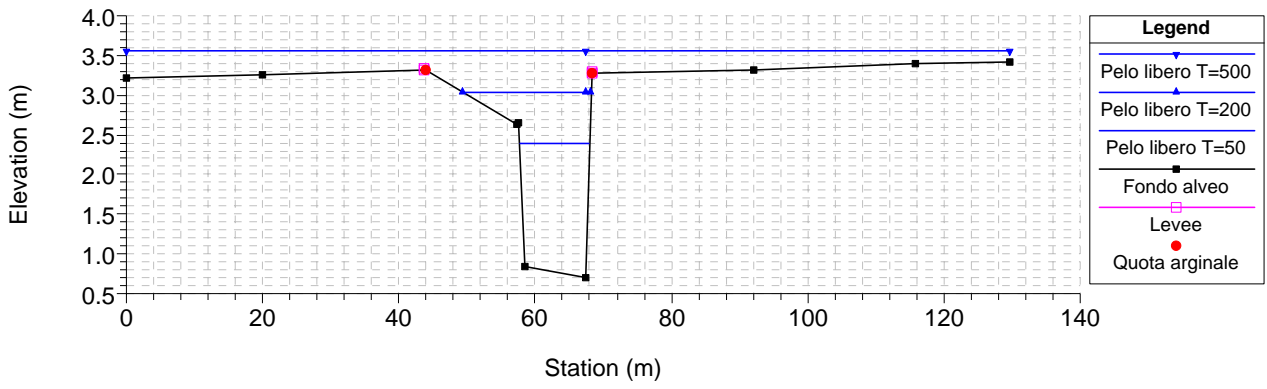
RS = 17.5 BR



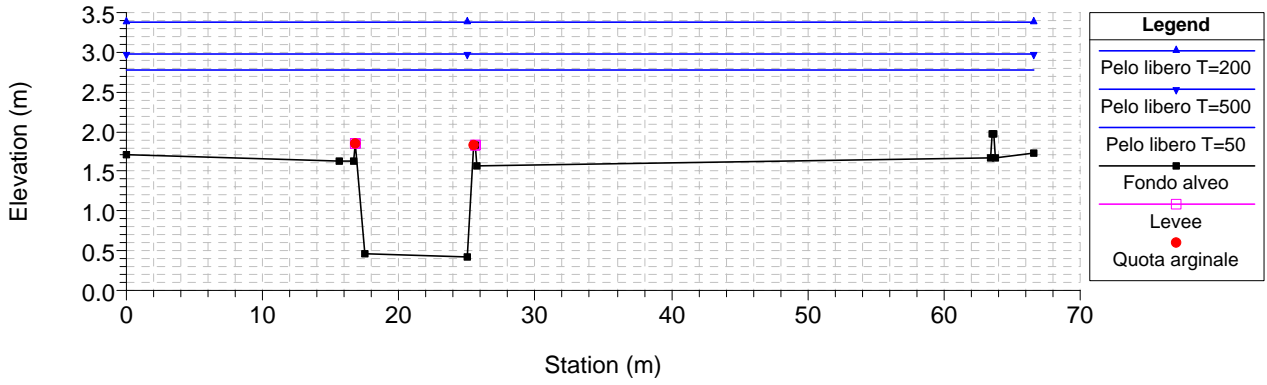
RS = 17.5 BR



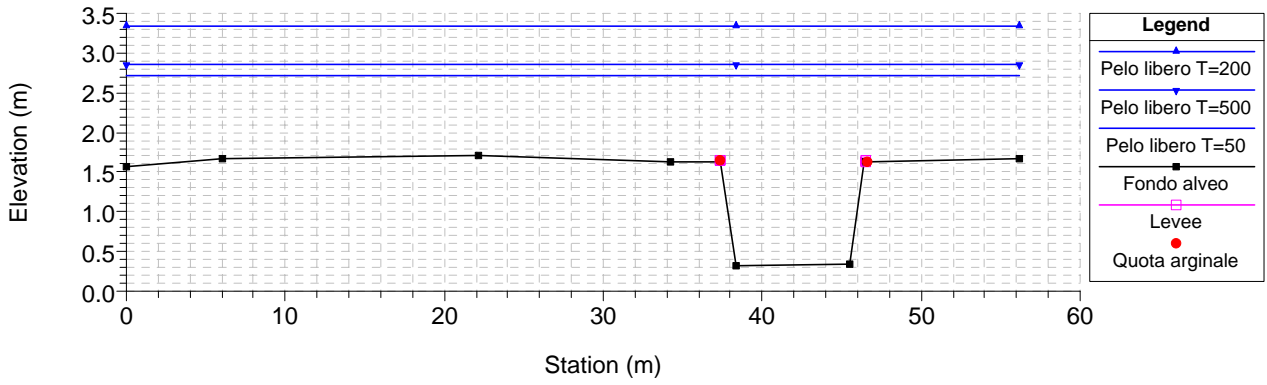
RS = 17



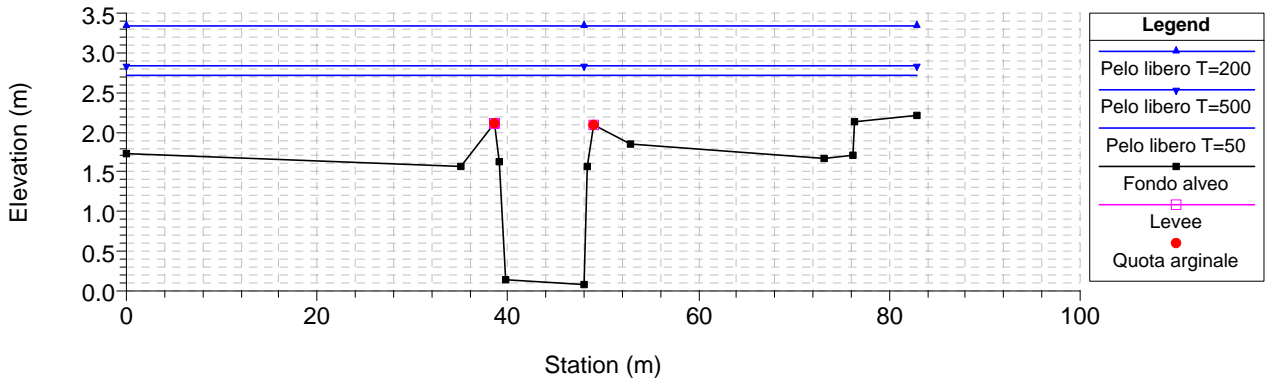
RS = 16



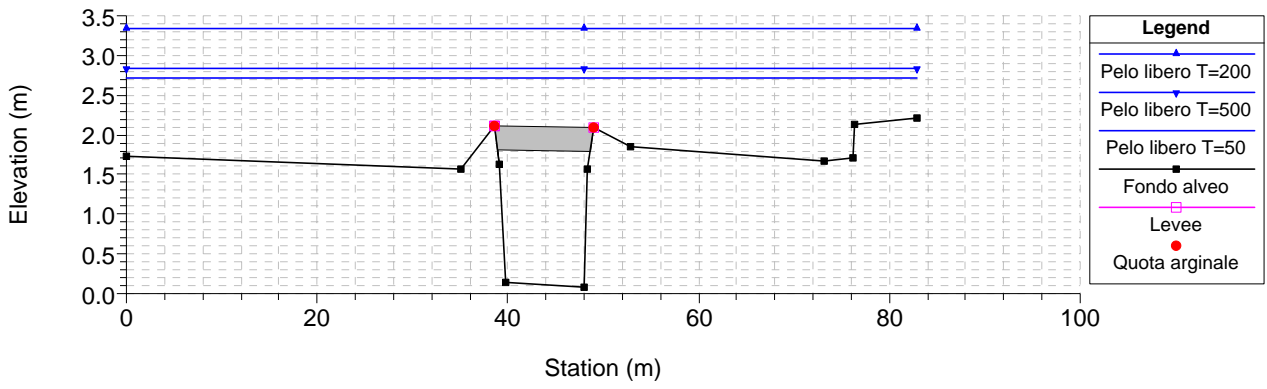
RS = 15



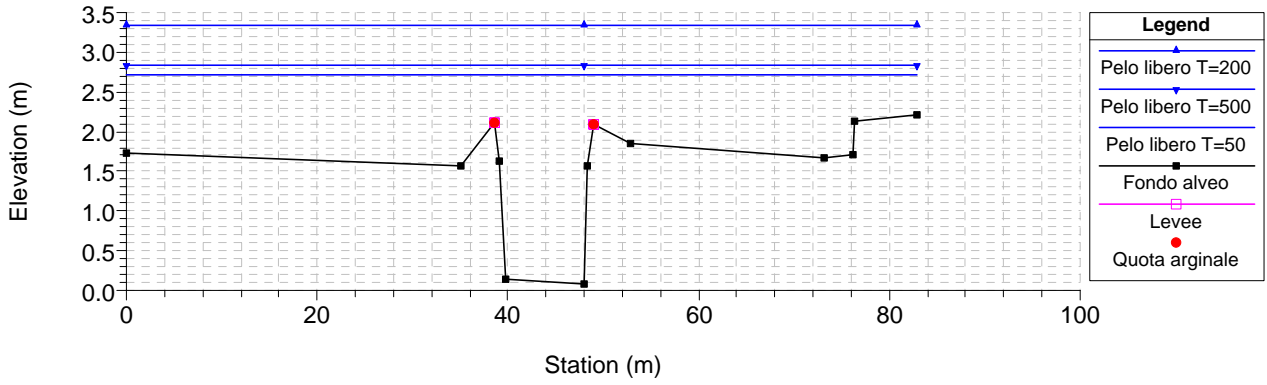
RS = 14



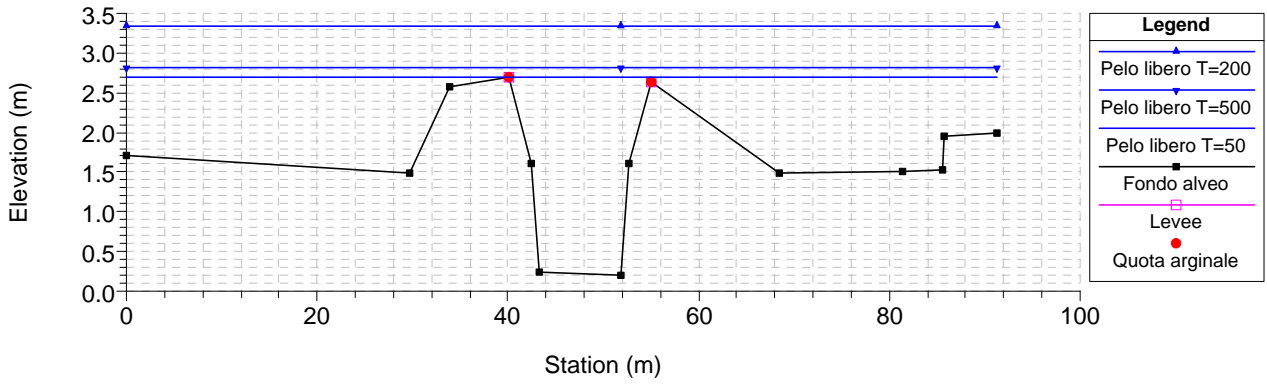
RS = 13.5 BR



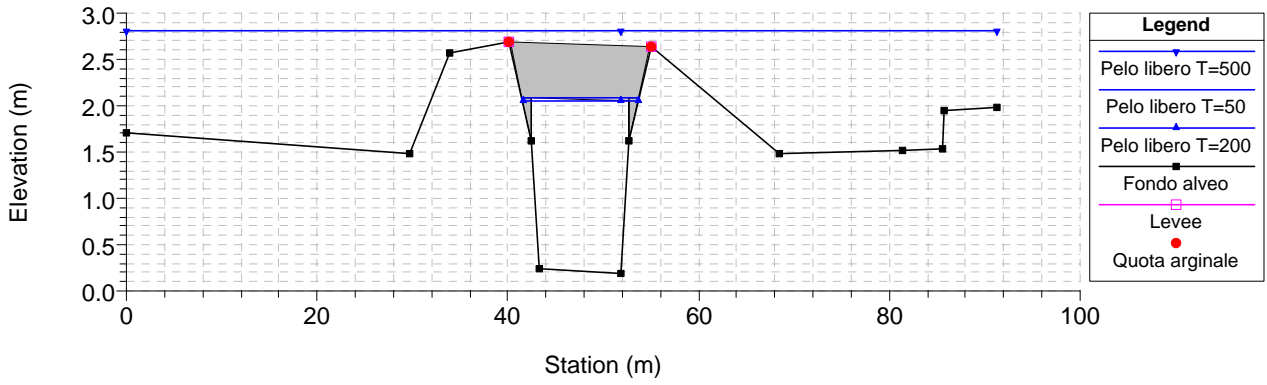
RS = 13



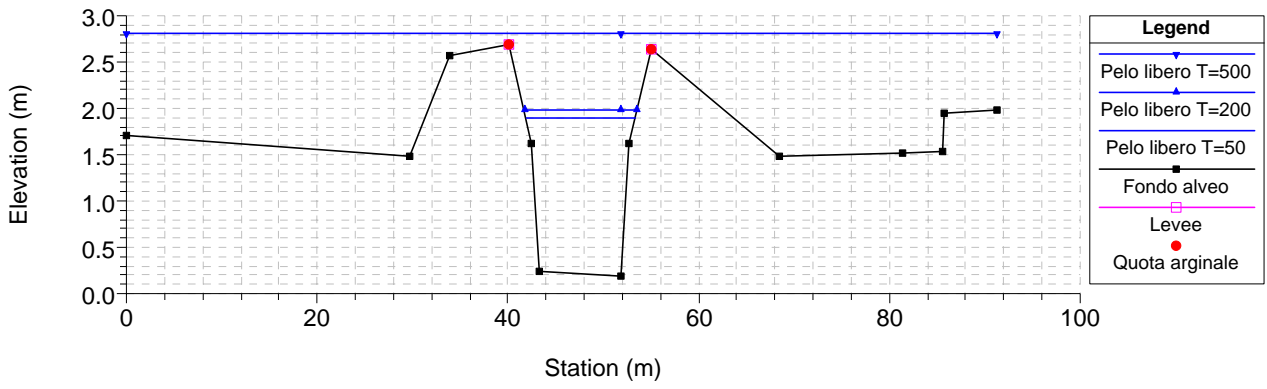
RS = 12



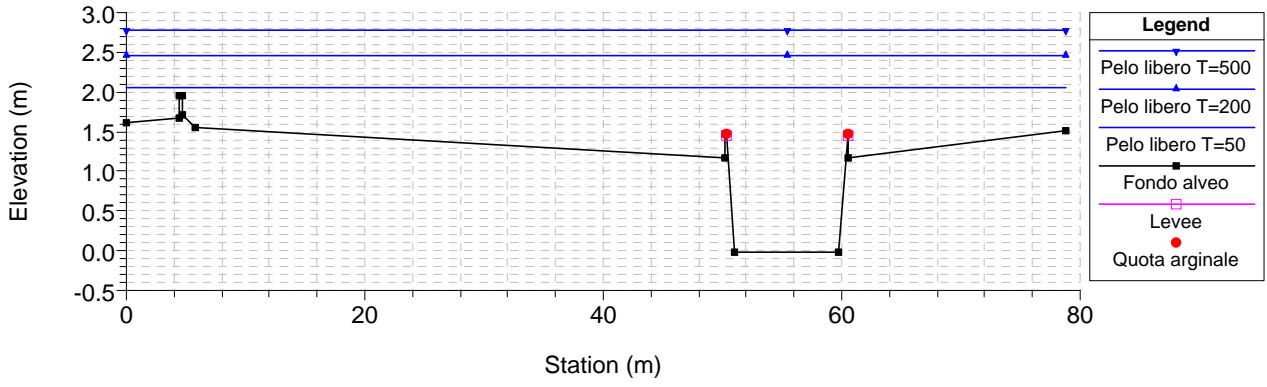
RS = 11.5 BR



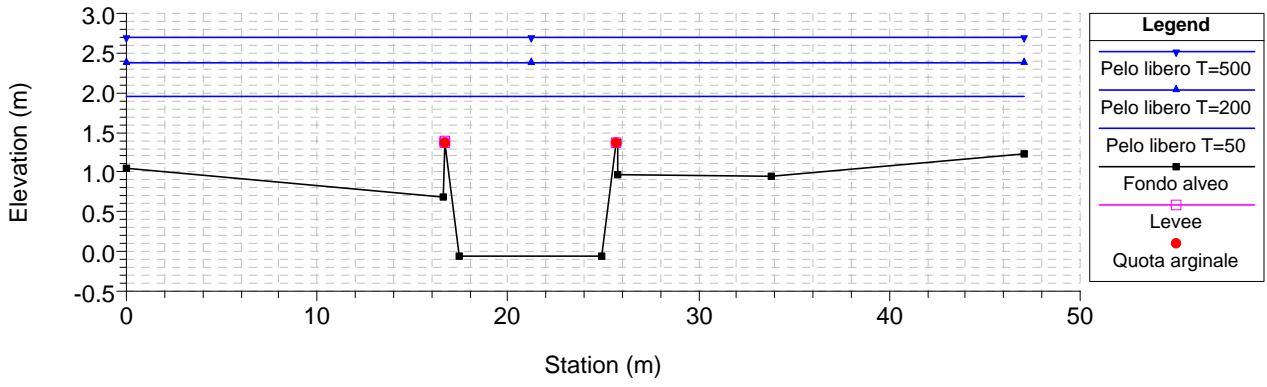
RS = 11



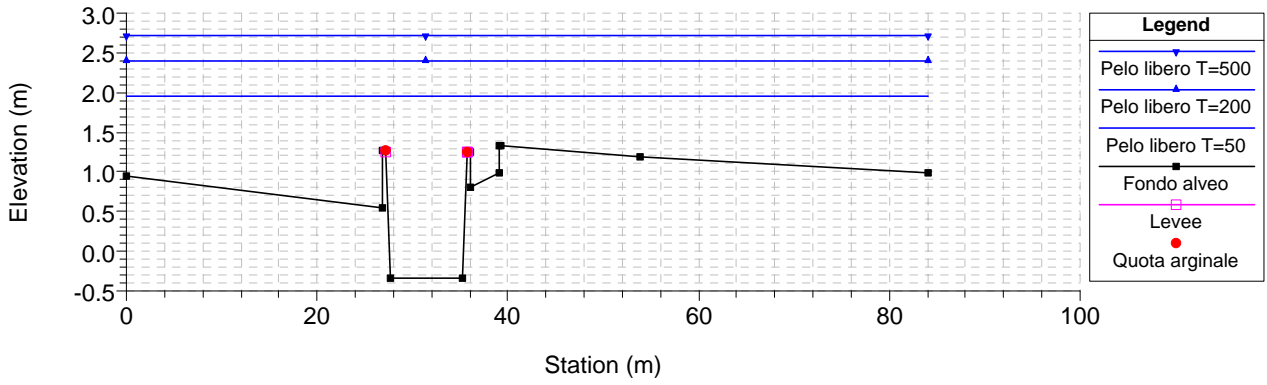
RS = 10



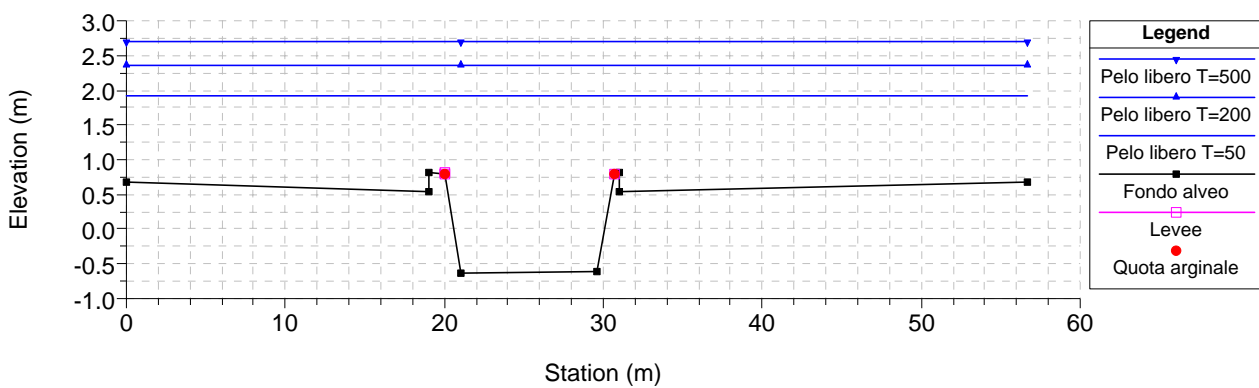
RS = 9



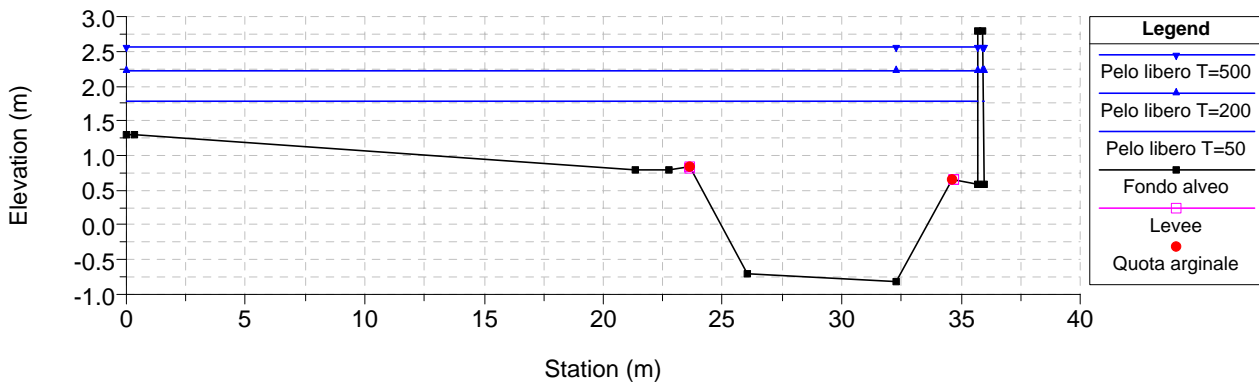
RS = 8



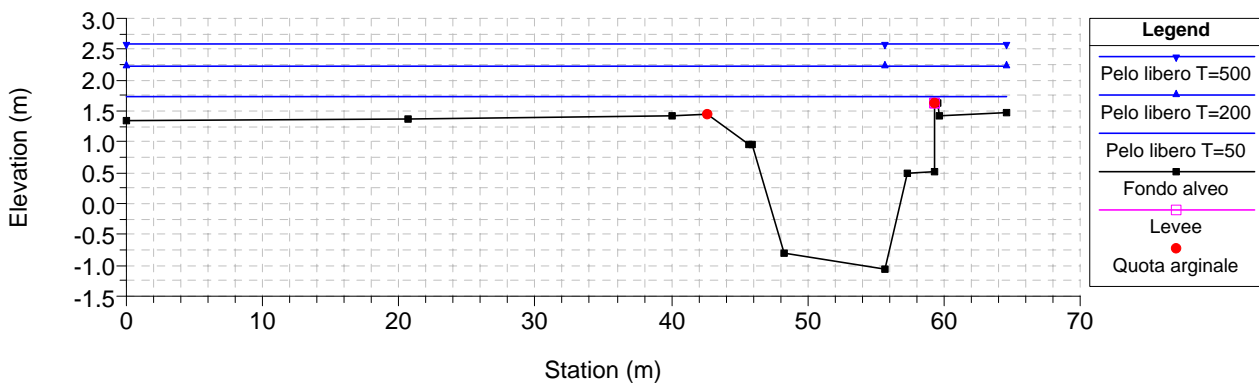
RS = 7



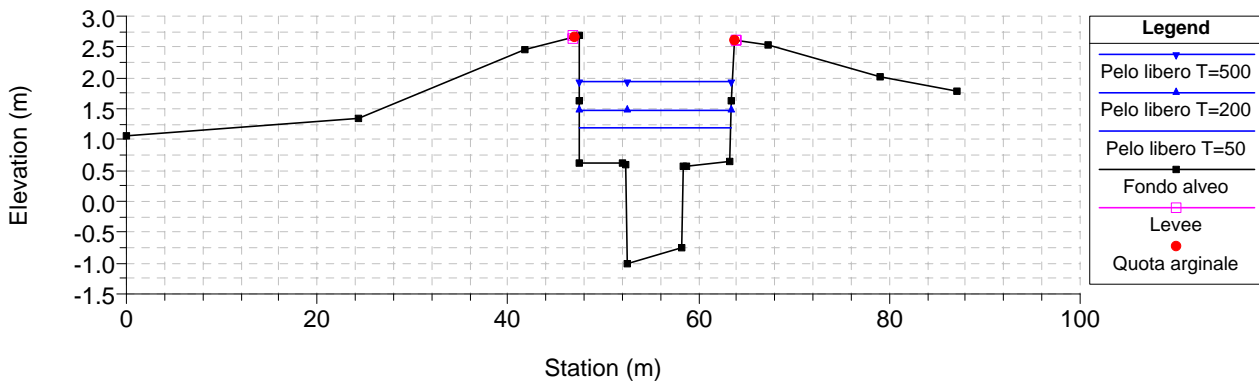
RS = 6



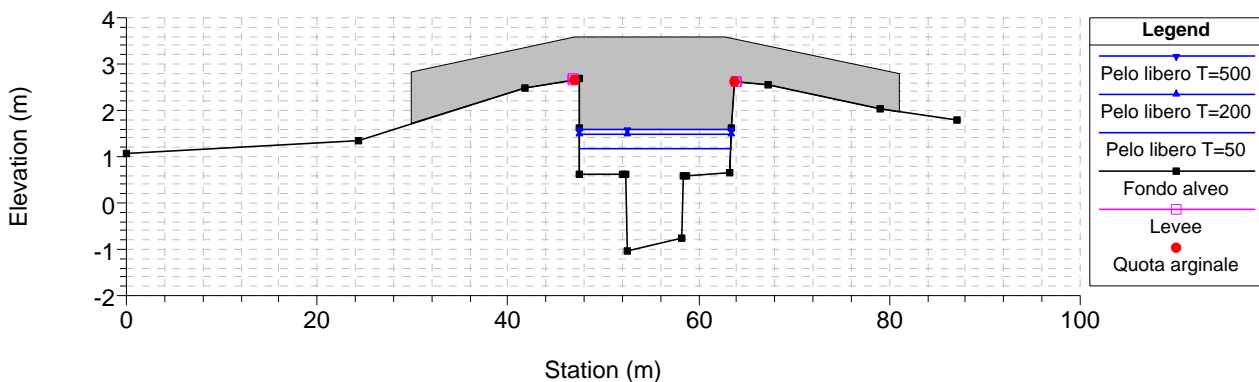
RS = 5



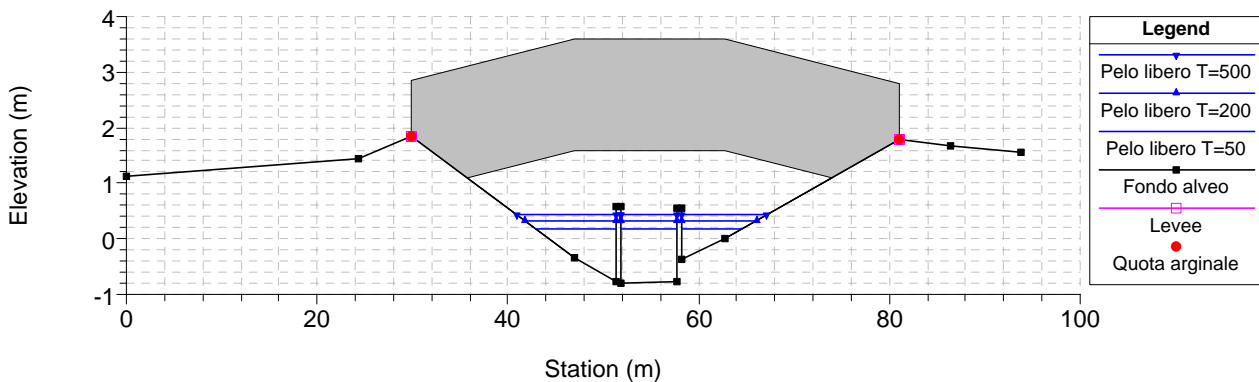
RS = 4



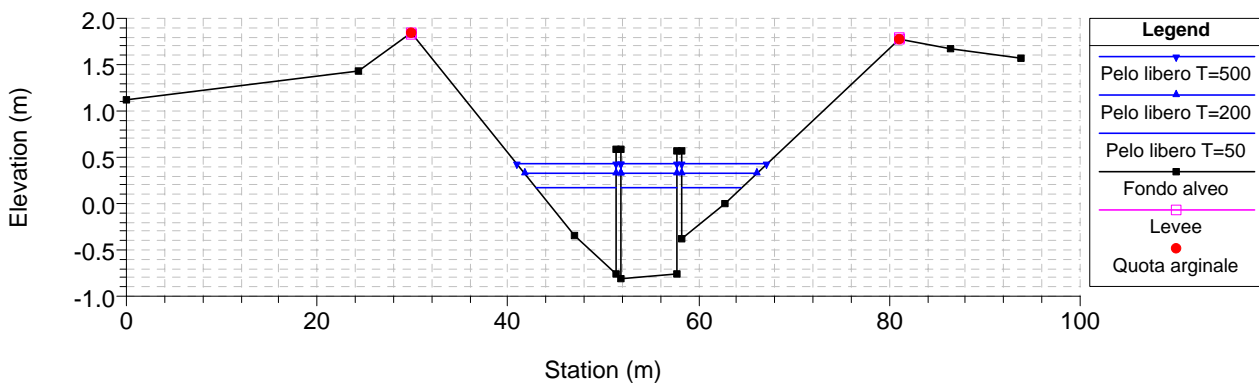
RS = 3.5 BR



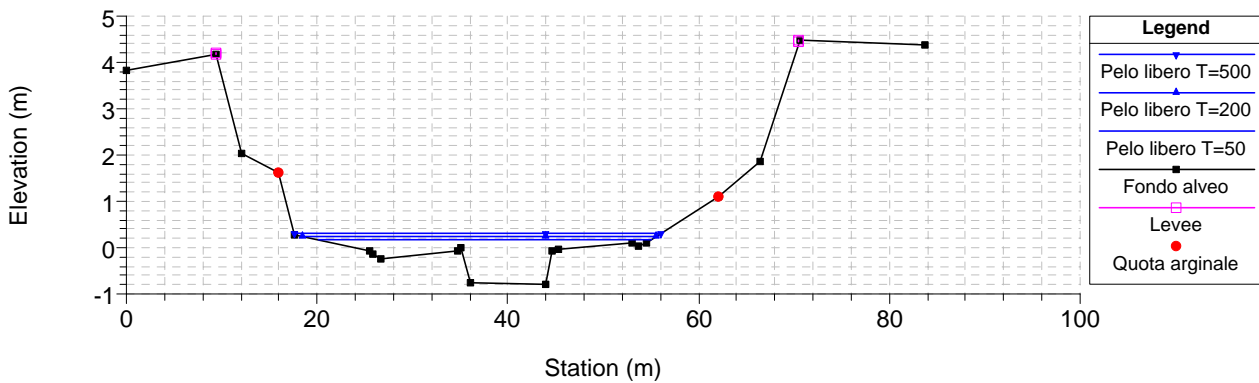
RS = 3.5 BR



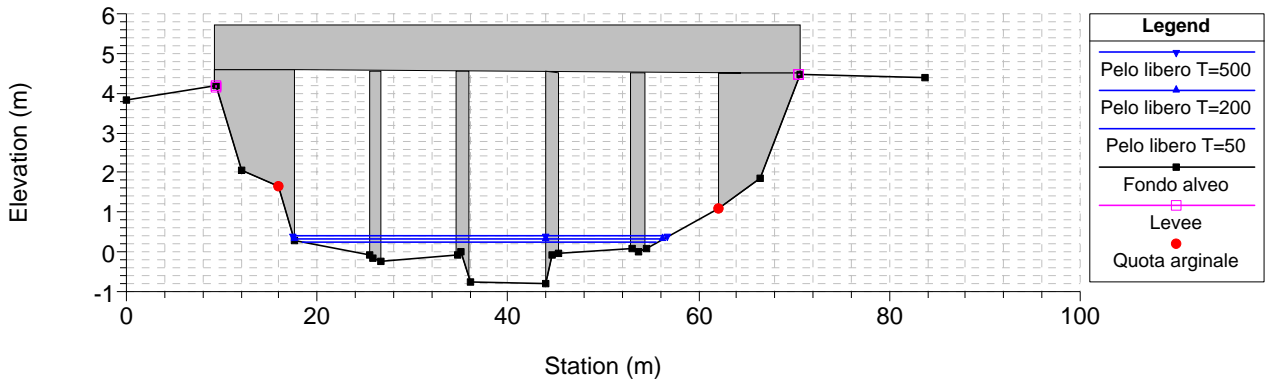
RS = 3



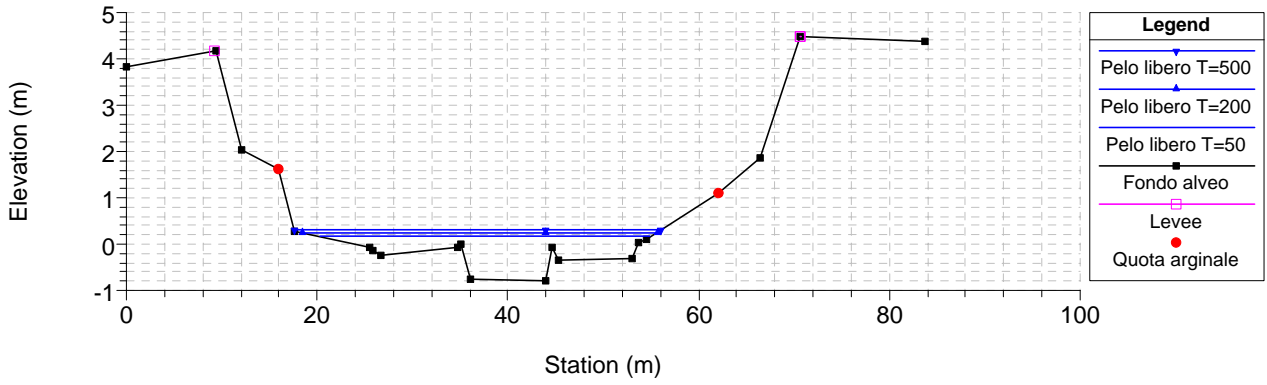
RS = 2



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**

**RIO ANTOGNANO**



### Rio Antognano 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
31	105	2.07	4.08	4.14	5.03	4.62	5.13	1.34	78.11	0.41
30	105	1.81	3.67	3.7	4.95	4.36	5	0.98	106.85	0.29
29.5	Bridge									
29	105	1.81	3.67	3.7	4.94	4.36	4.99	0.99	106.31	0.29
28	105	1.55	3.59	4.29	4.9	4.02	4.95	0.98	107.67	0.25
27.5	Bridge									
27	105	1.55	3.59	4.29	4.89	4.02	4.94	0.98	107.23	0.25
26	105	1.36	3.41	3.41	4.81	3.8	4.9	1.25	83.82	0.29
25	105	1.38	3.41	3.43	4.78	3.85	4.84	1.11	94.18	0.27
24.5	Bridge									
24	105	1.38	3.41	3.43	4.77	3.85	4.84	1.12	93.91	0.27
23	105	1.39	3.39	3.4	4.73	3.87	4.82	1.33	79.19	0.32
22	105	1.42	2.7	3.31	4.77	3.61	4.78	0.54	193.75	0.14
21.5	Bridge									
21	105	1.42	2.7	3.31	3.98	3.61	4.08	1.12	93.77	0.42
20	105	1.08	2.74	2.87	3.93	3.27	4.01	1.17	89.49	0.31
19	105	0.89	2.52	2.52	3.81	2.91	3.92	1.42	73.74	0.33
18	105	0.82	2.78	3.1	3.81	3.35	3.85	0.75	139.2	0.24
17.5	Bridge									
17	105	0.69	3.32	3.28	3.56	3.56	3.8	1.69	62.09	0.78
16	105	0.41	1.86	1.84	2.97	2.24	3.03	1.07	97.86	0.28
15	105	0.32	1.64	1.63	2.85	2.3	2.96	1.36	77.48	0.37
14	105	0.07	2.11	2.09	2.84	2.25	2.89	1.01	103.86	0.29
13.5	Bridge									
13	105	0.07	2.11	2.09	2.83	2.25	2.89	1.01	103.58	0.29
12	105	0.19	2.69	2.64	2.81	2.69	2.87	0.99	106.41	0.29
11.5	Bridge									
11	105	0.19	2.69	2.64	2.8	2.69	2.86	0.99	105.64	0.29
10	105	-0.03	1.46	1.46	2.79	1.89	2.83	0.84	124.6	0.21
9	105	-0.06	1.38	1.38	2.71	1.67	2.78	1.17	90.05	0.27
8	105	-0.33	1.26	1.26	2.72	1.51	2.75	0.67	156.04	0.16
7	105	-0.62	0.8	0.8	2.7	1.23	2.73	0.81	129.43	0.17
6	105	-0.82	0.83	0.65	2.56	1.65	2.69	1.47	71.58	0.33
5	105	-1.05	1.44	1.62	2.57	1.72	2.64	1.03	102.21	0.26
4	105	-1.02	2.65	2.61	1.93	1.7	2.56	3.52	29.81	0.82
3.5	Bridge									
3	105	-0.81	1.84	1.78	0.43	0.97	2.27	6.02	17.44	2.31
2	105	-0.79	1.64	1.1	0.31	0.74	1.93	5.65	18.6	2.59
1.5	Bridge									
1	105	-0.79	1.64	1.1	0.31	0.67	1.49	4.81	21.85	2.04

### Rio Antognano T=200 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
31	85	2.07	4.08	4.14	4.74	4.54	4.87	1.46	58.14	0.51
30	85	1.81	3.67	3.7	4.56	4.29	4.64	1.18	71.94	0.41
29.5	Bridge									
29	85	1.81	3.67	3.7	4.53	4.29	4.62	1.22	69.59	0.43
28	85	1.55	3.59	4.29	4.45	3.95	4.52	1.1	76.94	0.33
27.5	Bridge									
27	85	1.55	3.59	4.29	4.44	3.95	4.51	1.12	76.08	0.34
26	85	1.36	3.41	3.41	4.32	3.66	4.43	1.38	61.58	0.38
25	85	1.38	3.41	3.43	4.23	3.78	4.33	1.33	64.07	0.39
24.5	Bridge									
24	85	1.38	3.41	3.43	4.2	3.78	4.3	1.37	62.19	0.41
23	85	1.39	3.39	3.4	4.13	3.77	4.27	1.64	51.78	0.49
22	85	1.42	2.7	3.31	4.14	3.34	4.19	0.74	115.1	0.25
21.5	Bridge									
21	85	1.42	2.7	3.31	3.78	3.34	3.92	1.23	68.93	0.52
20	85	1.08	2.74	2.87	3.76	3.19	3.83	1.08	78.67	0.31
19	85	0.89	2.52	2.52	3.66	2.79	3.74	1.25	67.86	0.3
18	85	0.82	2.78	3.1	3.64	3.28	3.68	0.74	114.89	0.26
17.5	Bridge									
17	85	0.69	3.32	3.28	3.04	3.04	3.68	3.54	24.04	1
16	85	0.41	1.86	1.84	3.38	2.16	3.4	0.68	125.27	0.16
15	85	0.32	1.64	1.63	3.35	2.21	3.38	0.81	105.21	0.19
14	85	0.07	2.11	2.09	3.35	2.13	3.37	0.58	146.41	0.14
13.5	Bridge									
13	85	0.07	2.11	2.09	3.35	2.13	3.37	0.58	146.34	0.14
12	85	0.19	2.69	2.64	3.34	2.32	3.36	0.55	154.92	0.13
11.5	Bridge									
11	85	0.19	2.69	2.64	1.98	2.32	3.24	4.97	17.1	1.32
10	85	-0.03	1.46	1.46	2.46	1.81	2.5	0.86	98.87	0.25
9	85	-0.06	1.38	1.38	2.37	1.57	2.44	1.14	74.39	0.29
8	85	-0.33	1.26	1.26	2.39	1.43	2.41	0.67	127.61	0.17
7	85	-0.62	0.8	0.8	2.36	1.13	2.39	0.77	110.31	0.18
6	85	-0.82	0.83	0.65	2.22	1.5	2.34	1.43	59.34	0.35
5	85	-1.05	1.44	1.62	2.21	1.2	2.29	1.08	78.91	0.31
4	85	-1.02	2.65	2.61	1.48	1.48	2.2	3.74	22.7	1
3.5	Bridge									
3	85	-0.81	1.84	1.78	0.33	0.82	1.96	5.66	15.01	2.26
2	85	-0.79	1.64	1.1	0.25	0.62	1.61	5.17	16.43	2.48
1.5	Bridge									
1	85	-0.79	1.64	1.1	0.25	0.54	1.21	4.33	19.64	1.9

### Rio Antognano 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
31	105	2.07	4.08	4.14	5.03	4.62	5.13	1.34	78.11	0.41
30	105	1.81	3.67	3.7	4.95	4.36	5	0.98	106.85	0.29
29.5	Bridge									
29	105	1.81	3.67	3.7	4.94	4.36	4.99	0.99	106.31	0.29
28	105	1.55	3.59	4.29	4.9	4.02	4.95	0.98	107.67	0.25
27.5	Bridge									
27	105	1.55	3.59	4.29	4.89	4.02	4.94	0.98	107.23	0.25
26	105	1.36	3.41	3.41	4.81	3.8	4.9	1.25	83.82	0.29
25	105	1.38	3.41	3.43	4.78	3.85	4.84	1.11	94.18	0.27
24.5	Bridge									
24	105	1.38	3.41	3.43	4.77	3.85	4.84	1.12	93.91	0.27
23	105	1.39	3.39	3.4	4.73	3.87	4.82	1.33	79.19	0.32
22	105	1.42	2.7	3.31	4.77	3.61	4.78	0.54	193.75	0.14
21.5	Bridge									
21	105	1.42	2.7	3.31	3.98	3.61	4.08	1.12	93.77	0.42
20	105	1.08	2.74	2.87	3.93	3.27	4.01	1.17	89.49	0.31
19	105	0.89	2.52	2.52	3.81	2.91	3.92	1.42	73.74	0.33
18	105	0.82	2.78	3.1	3.81	3.35	3.85	0.75	139.2	0.24
17.5	Bridge									
17	105	0.69	3.32	3.28	3.56	3.56	3.8	1.69	62.09	0.78
16	105	0.41	1.86	1.84	2.97	2.24	3.03	1.07	97.86	0.28
15	105	0.32	1.64	1.63	2.85	2.3	2.96	1.36	77.48	0.37
14	105	0.07	2.11	2.09	2.84	2.25	2.89	1.01	103.86	0.29
13.5	Bridge									
13	105	0.07	2.11	2.09	2.83	2.25	2.89	1.01	103.58	0.29
12	105	0.19	2.69	2.64	2.81	2.69	2.87	0.99	106.41	0.29
11.5	Bridge									
11	105	0.19	2.69	2.64	2.8	2.69	2.86	0.99	105.64	0.29
10	105	-0.03	1.46	1.46	2.79	1.89	2.83	0.84	124.6	0.21
9	105	-0.06	1.38	1.38	2.71	1.67	2.78	1.17	90.05	0.27
8	105	-0.33	1.26	1.26	2.72	1.51	2.75	0.67	156.04	0.16
7	105	-0.62	0.8	0.8	2.7	1.23	2.73	0.81	129.43	0.17
6	105	-0.82	0.83	0.65	2.56	1.65	2.69	1.47	71.58	0.33
5	105	-1.05	1.44	1.62	2.57	1.72	2.64	1.03	102.21	0.26
4	105	-1.02	2.65	2.61	1.93	1.7	2.56	3.52	29.81	0.82
3.5	Bridge									
3	105	-0.81	1.84	1.78	0.43	0.97	2.27	6.02	17.44	2.31
2	105	-0.79	1.64	1.1	0.31	0.74	1.93	5.65	18.6	2.59
1.5	Bridge									
1	105	-0.79	1.64	1.1	0.31	0.67	1.49	4.81	21.85	2.04