



**REGIONE
LIGURIA**

**Autorità di Bacino
Distrettuale
Dell'Appennino
Settentrionale**



PIANO DI BACINO STRALCIO SUL RISCHIO IDROGEOLOGICO

(ai sensi dell'art.1, comma 1, del D.L. 180/1998 convertito in L. 267/1998)

Caratteristiche idrauliche e geologiche del territorio

Valutazione del rischio idraulico e geomorfologico

RIO CUCCO VERIFICHE IDRAULICHE

Ambiti di Bacino di rilievo regionale:

LETIMBRO - ARRESTRA

Bacino:

SANDA

Comuni:

ALBISOLA SUPERIORE

CELLE LIGURE

VARAZZE



APPROVAZIONE	Delibera del Consiglio Provinciale di Savona n. 47 del 25/11/2003
ULTIMA MODIFICA DELL'ELABORATO	Decreto del Direttore Generale n. 1482 del 10/03/2021
ENTRATA IN VIGORE	Pubblicazione sul BURL n. 12 del 24/03/2021 - parte II

RIO CUCCO

Tratto a monte dell'attraversamento FS

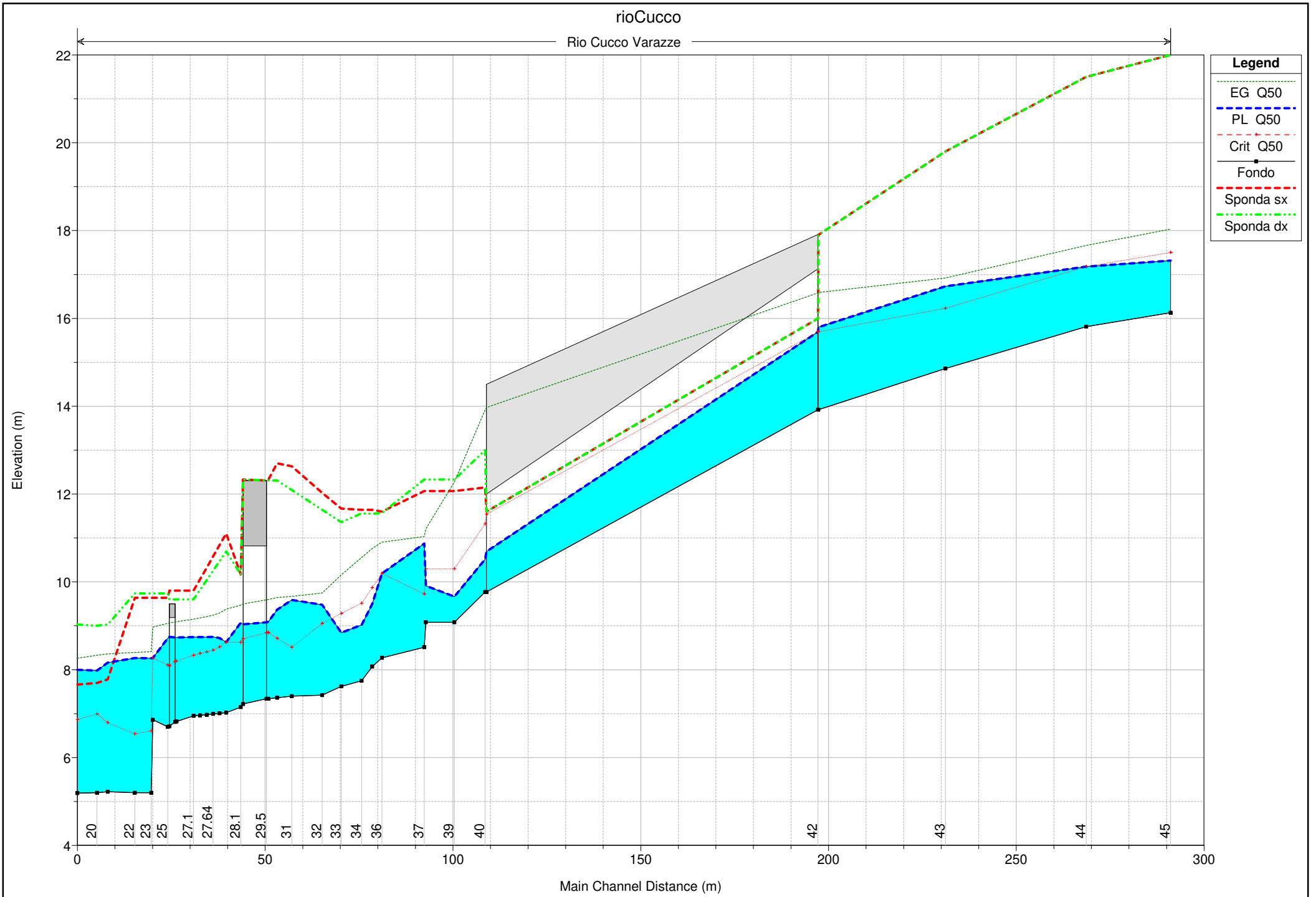
Sezioni da 45 a 19

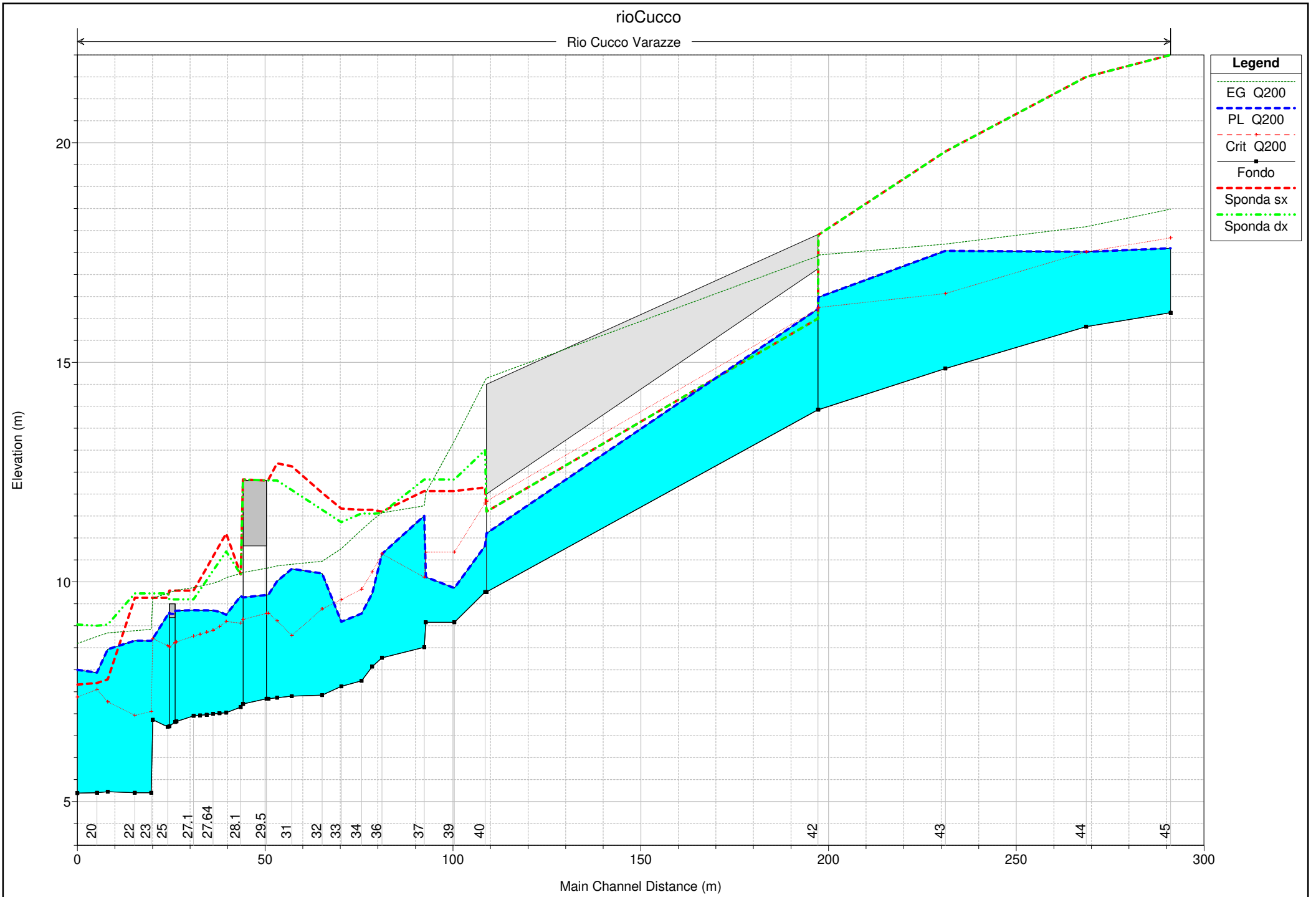
- **Profili**
- **Sezioni**
- **Tabelle dei risultati**

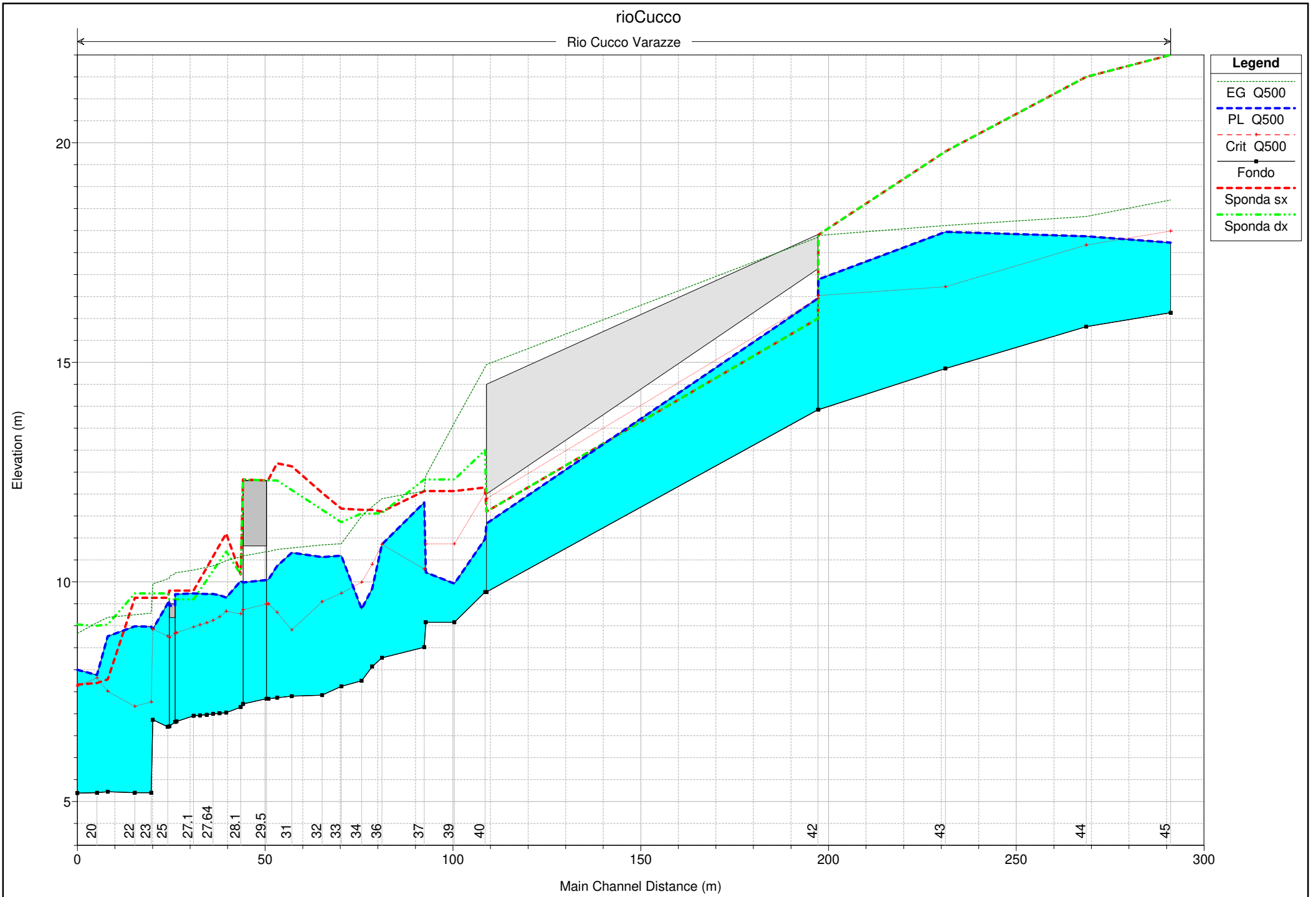
NOTA

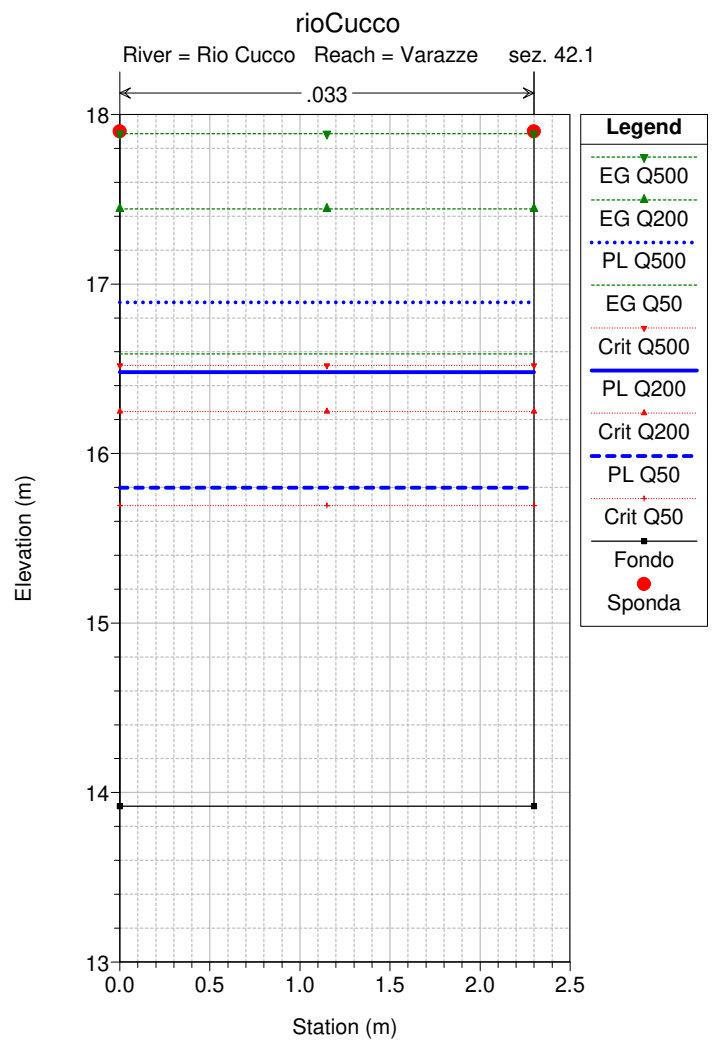
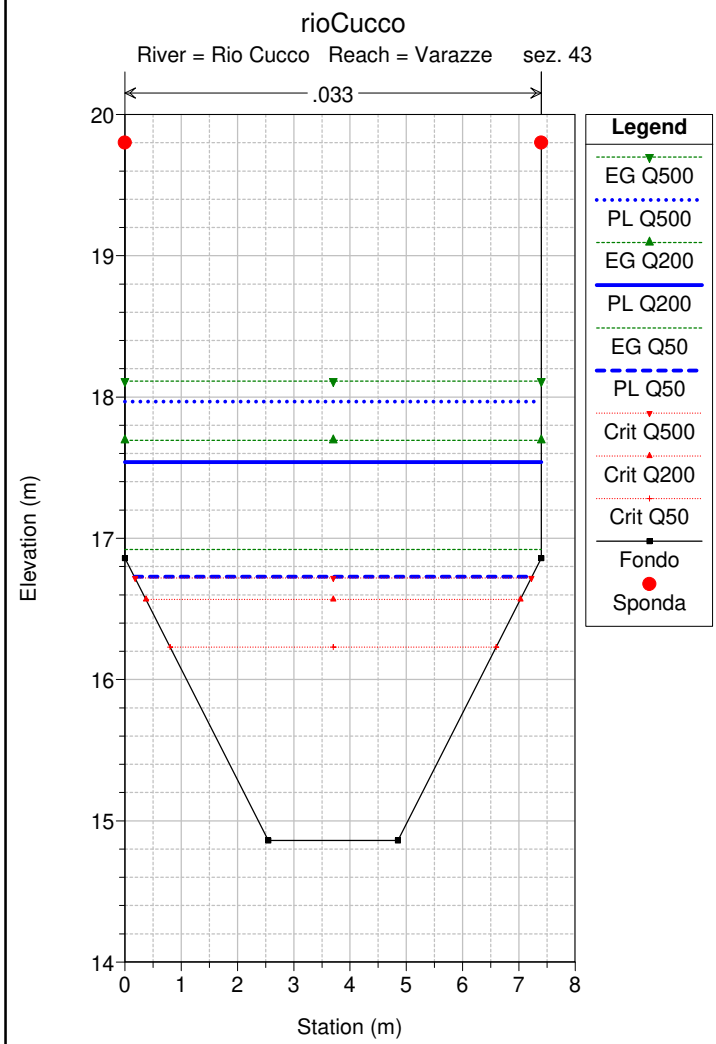
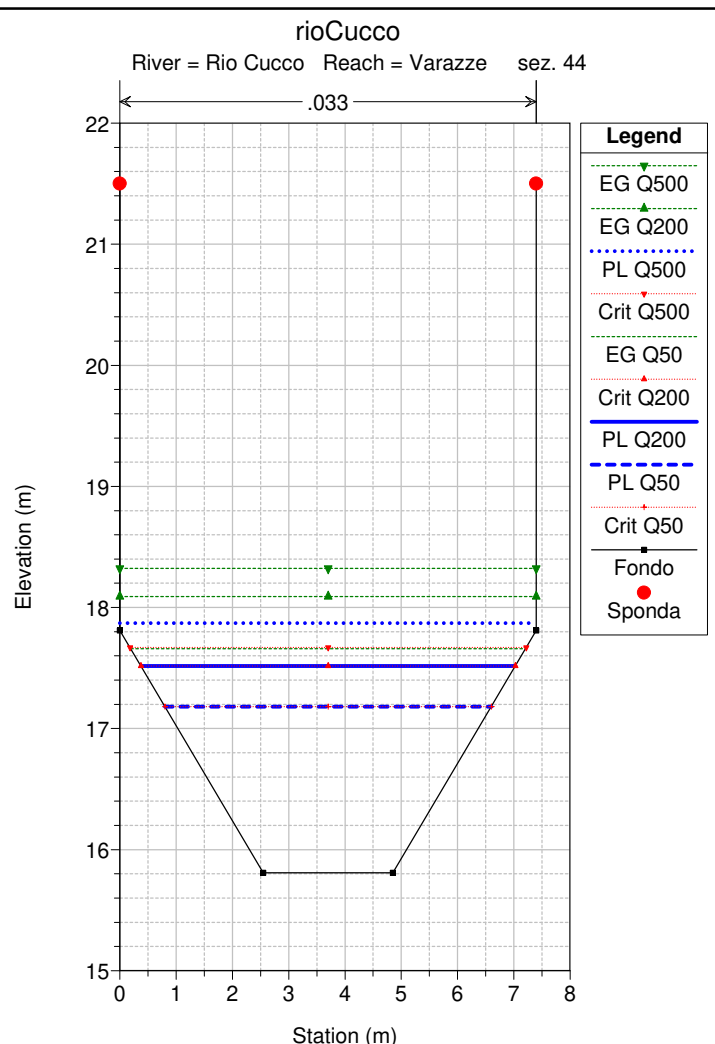
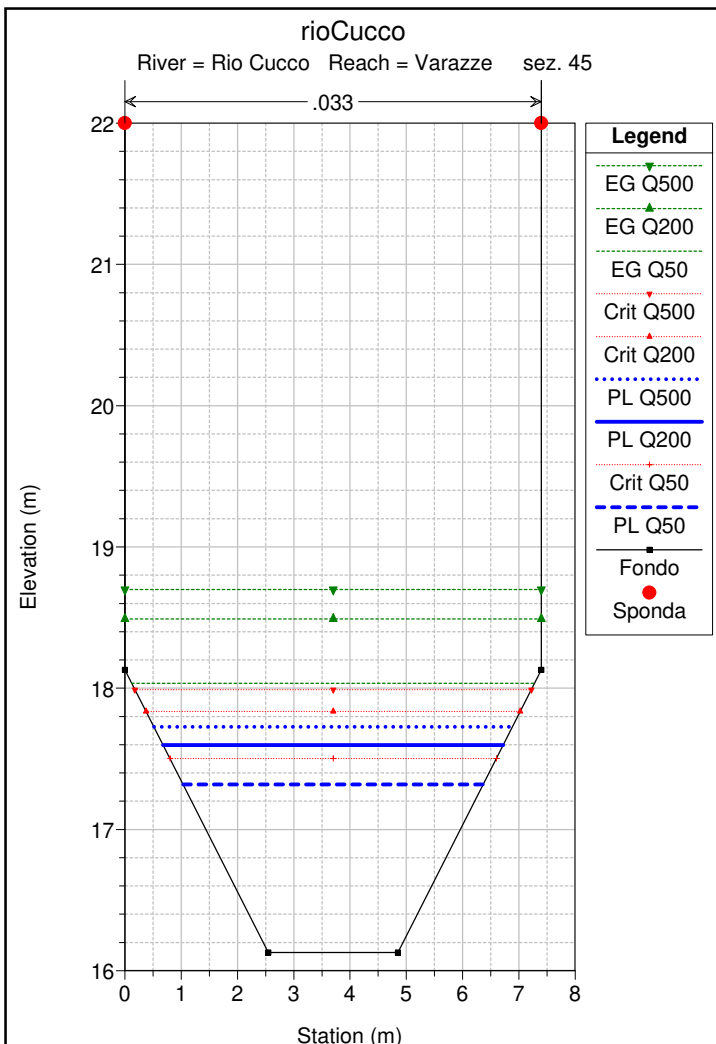
Il tratto tombinato terminale, a valle dell'attraversamento FS, risulta in grado di smaltire una portata di circa 8 m³/s, inferiore alla portata cinquantennale e pertanto, in questo tratto, non è stato predisposto il modello idraulico per i tre tempi di ritorno classici, in quanto non significativo.

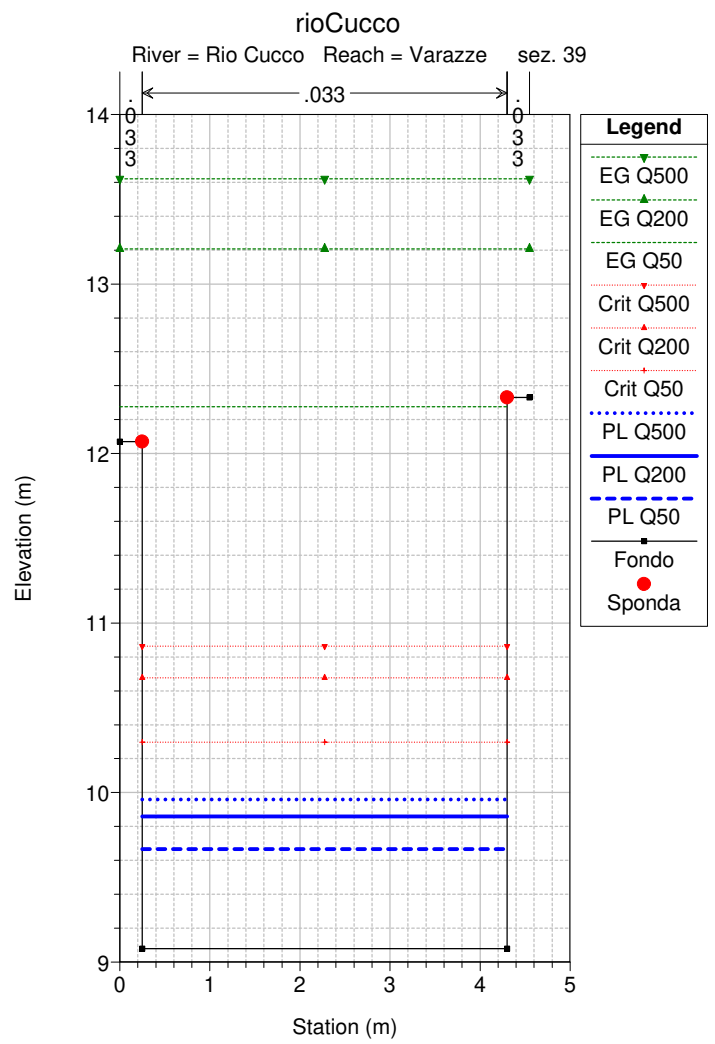
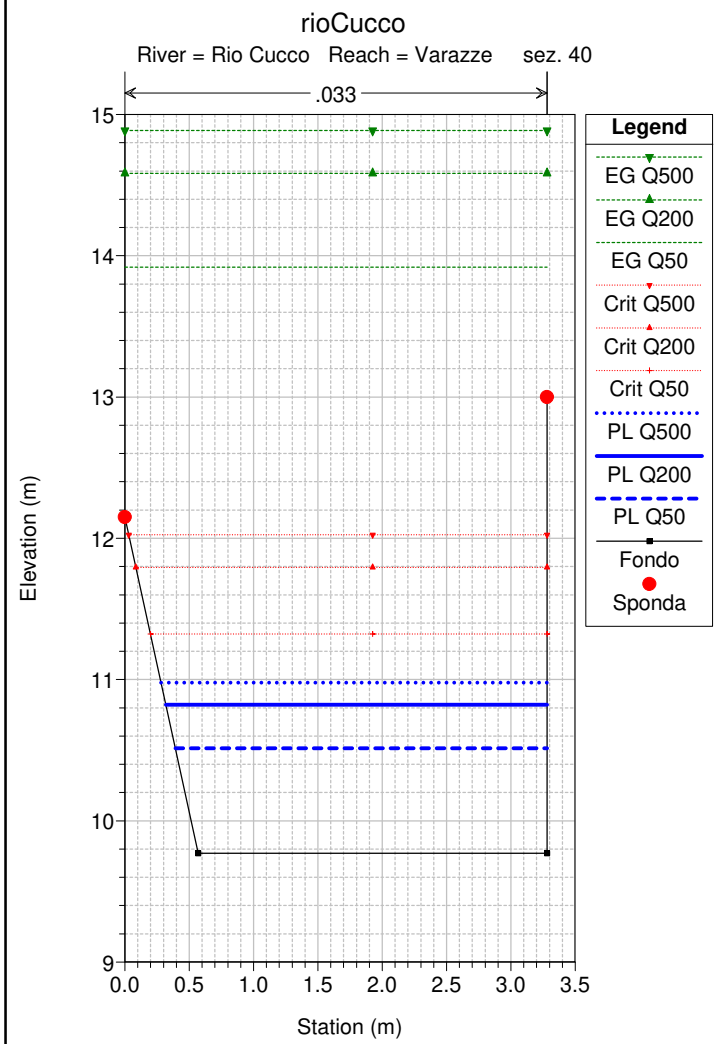
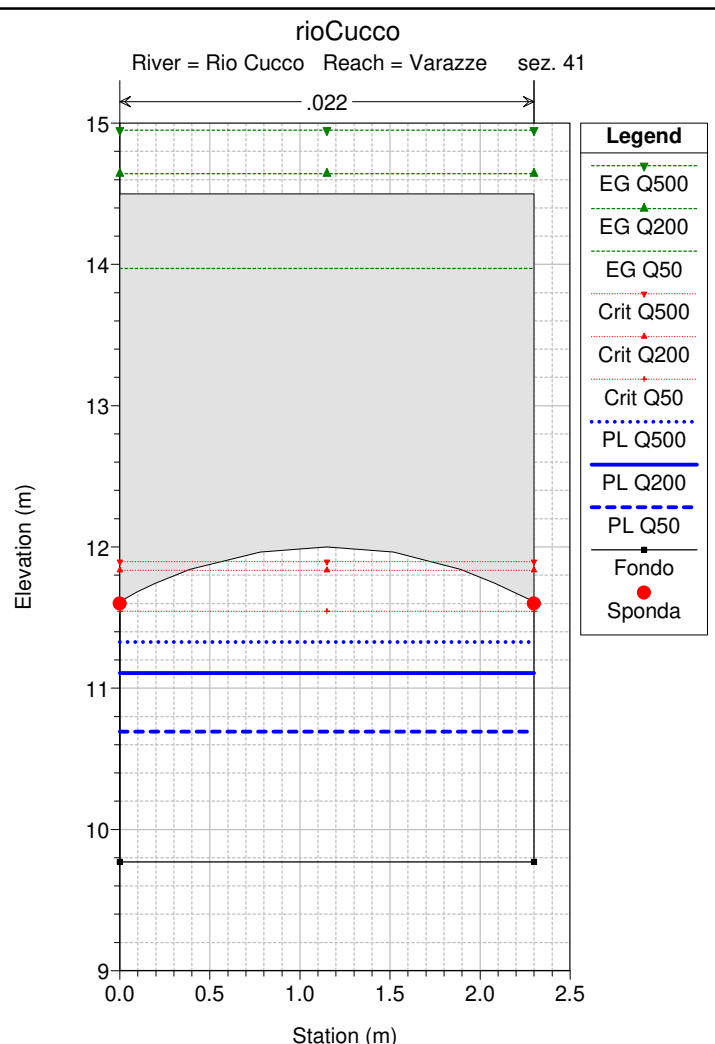
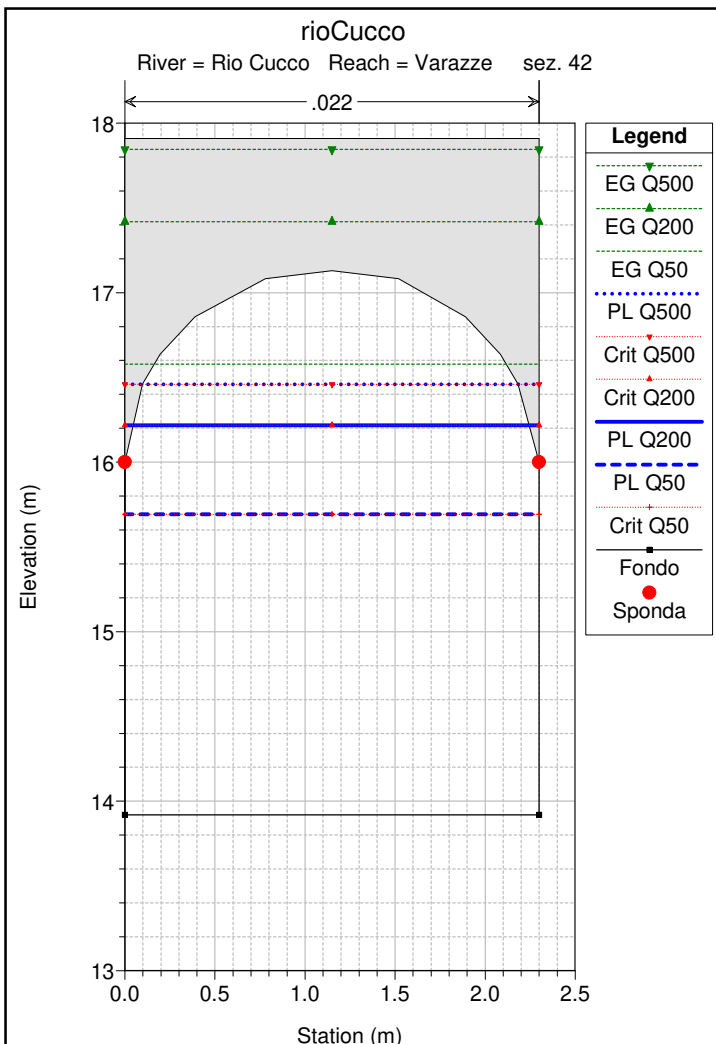
Quale condizione al contorno di valle, per il tratto indagato a monte, è stato assunto il livello della quota di esondazione in sponda destra a monte del tombino della ferrovia (8.00), che risulta comunque poco influente per la presenza della briglia poco a monte.

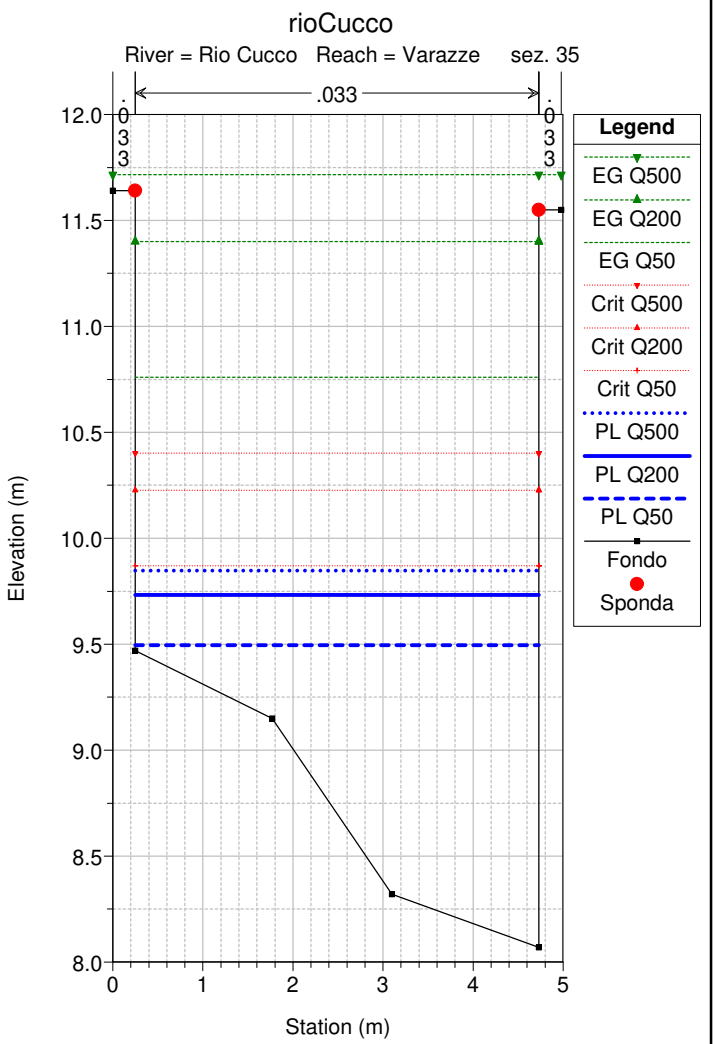
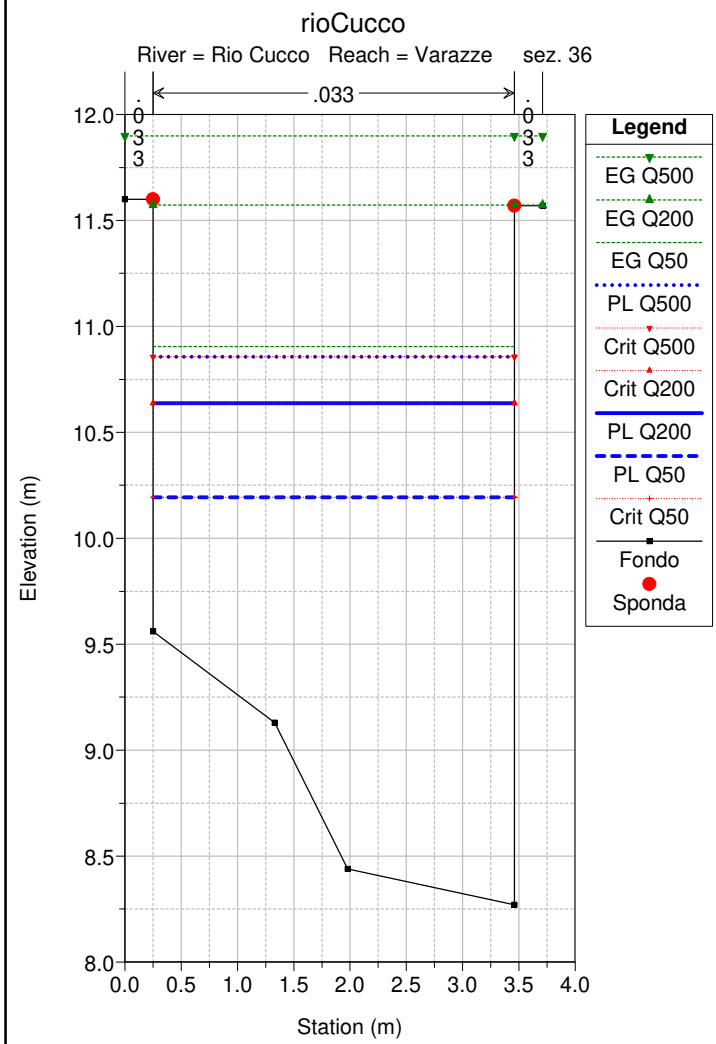
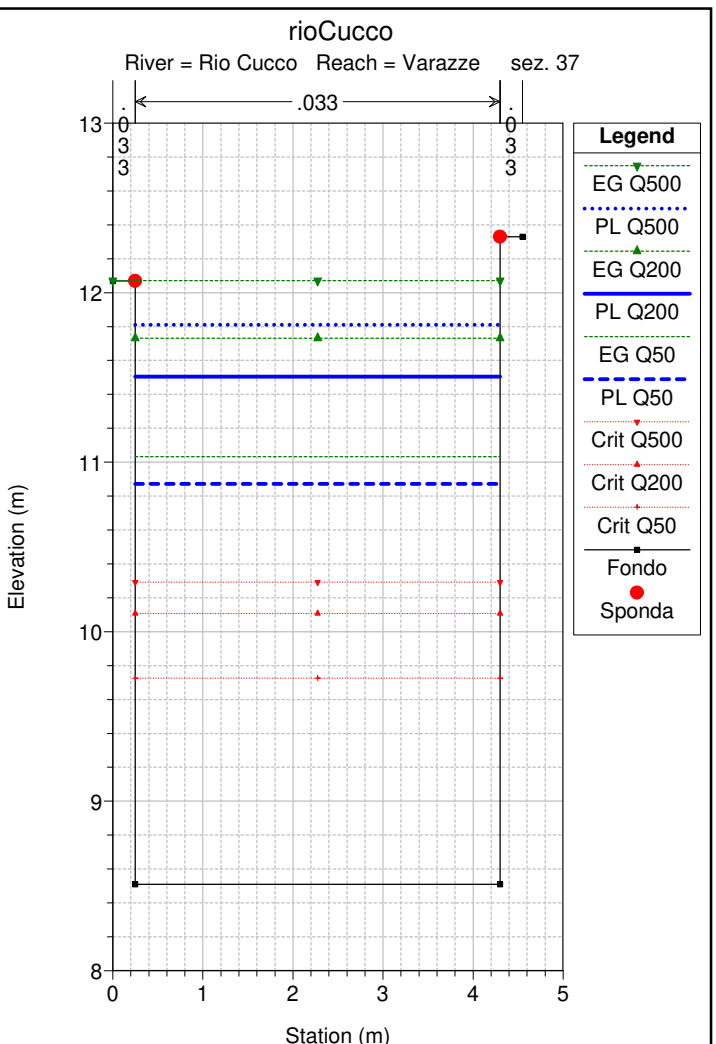
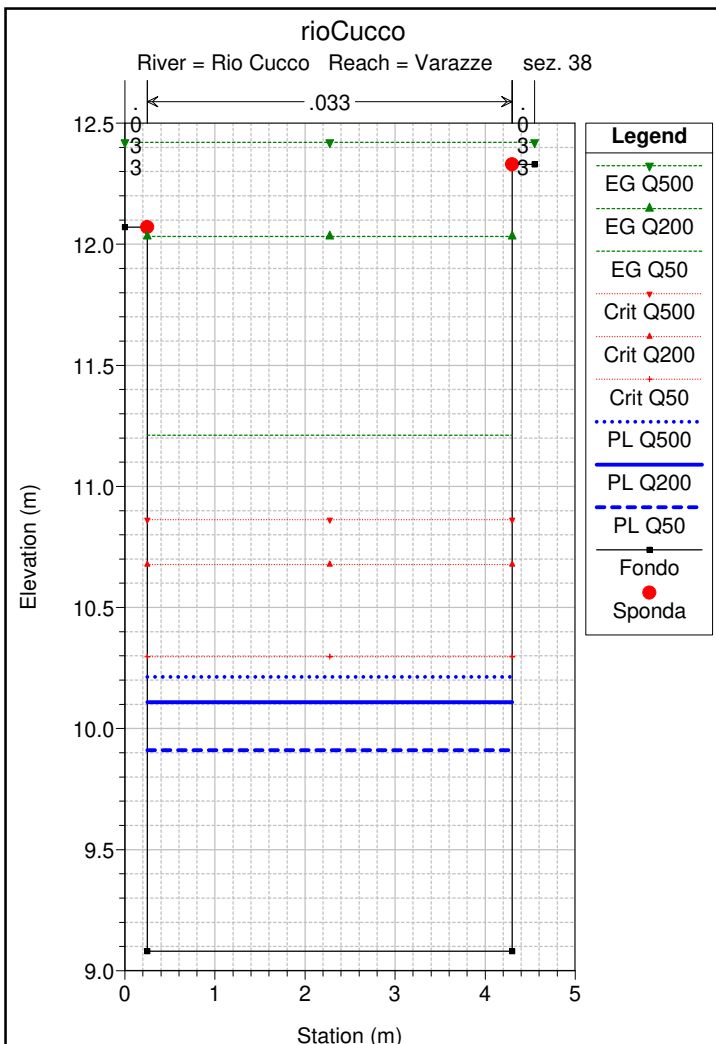


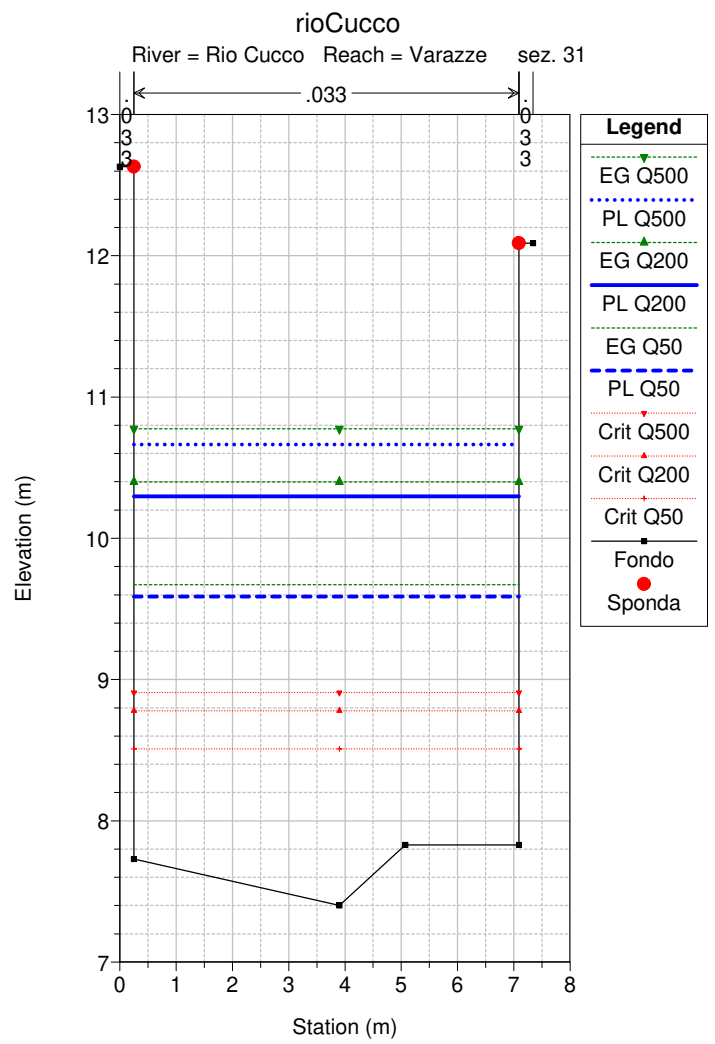
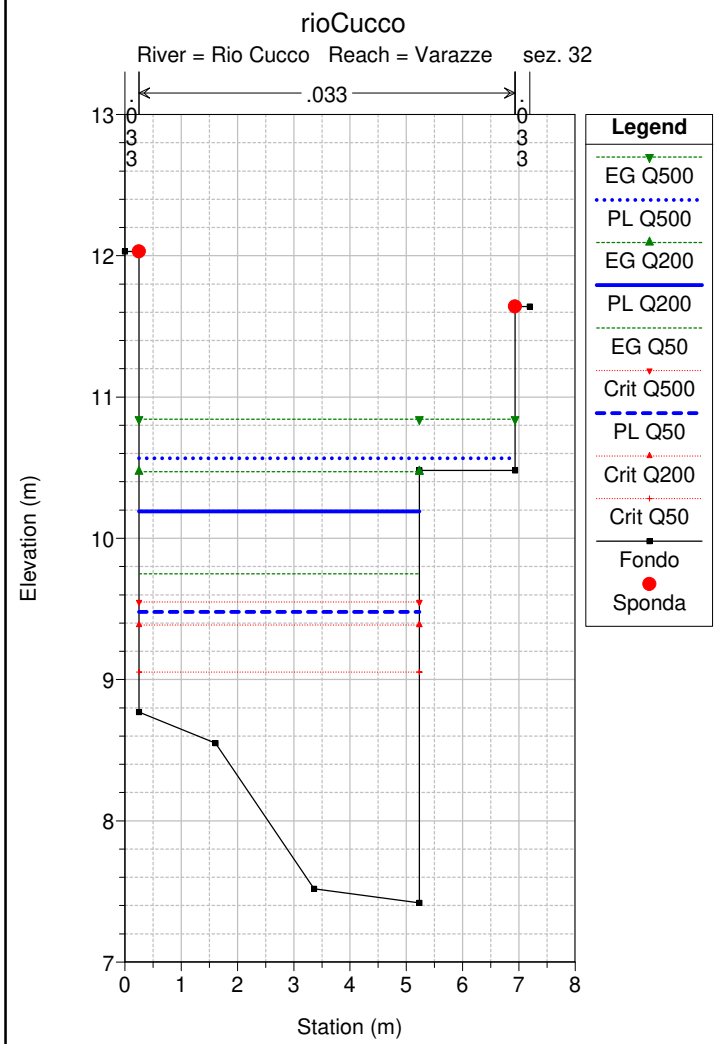
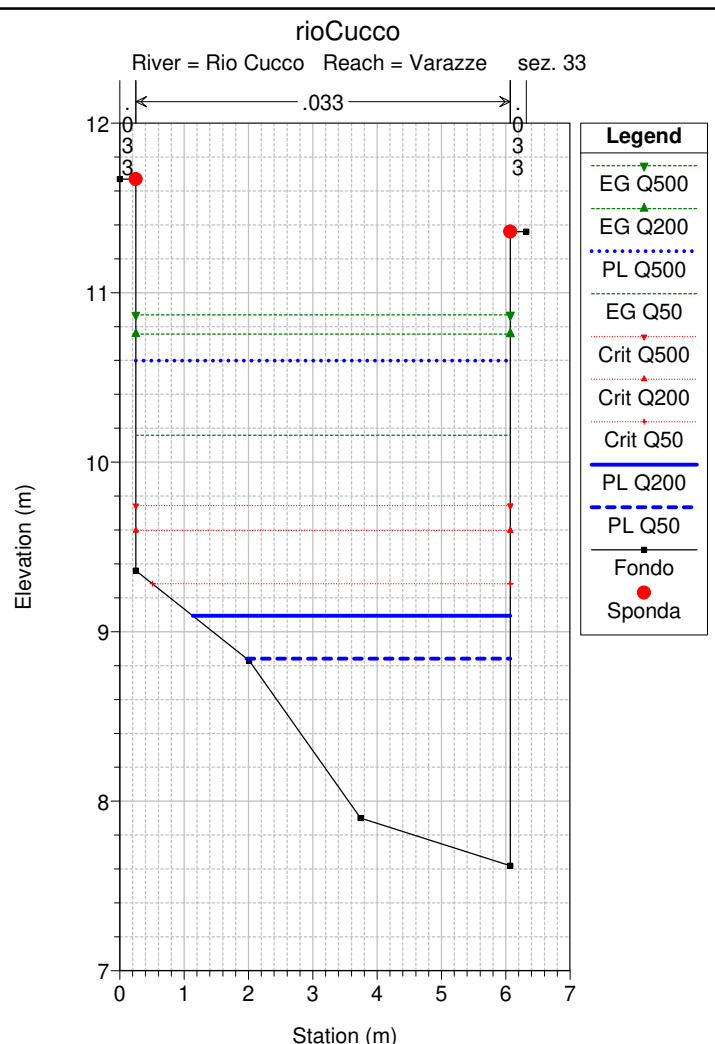
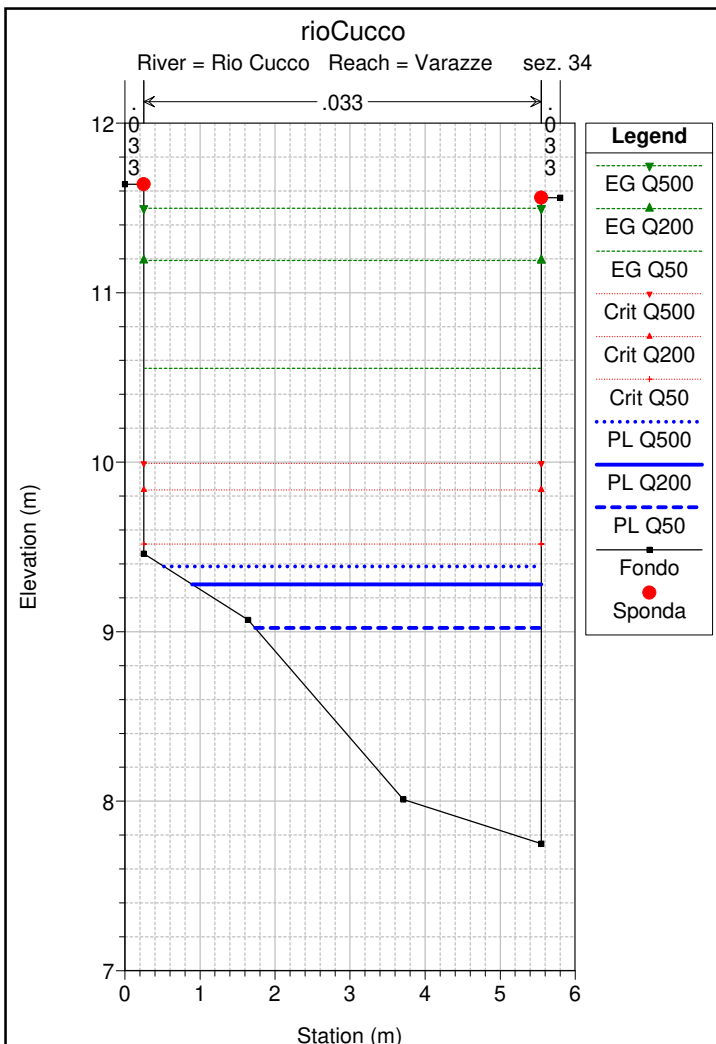


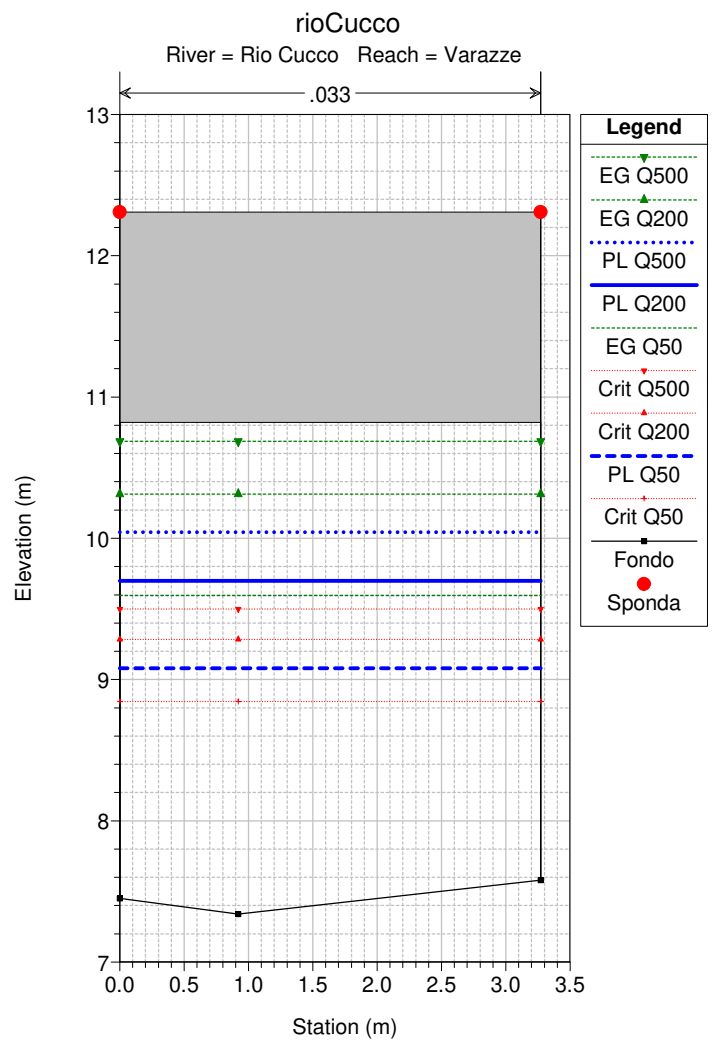
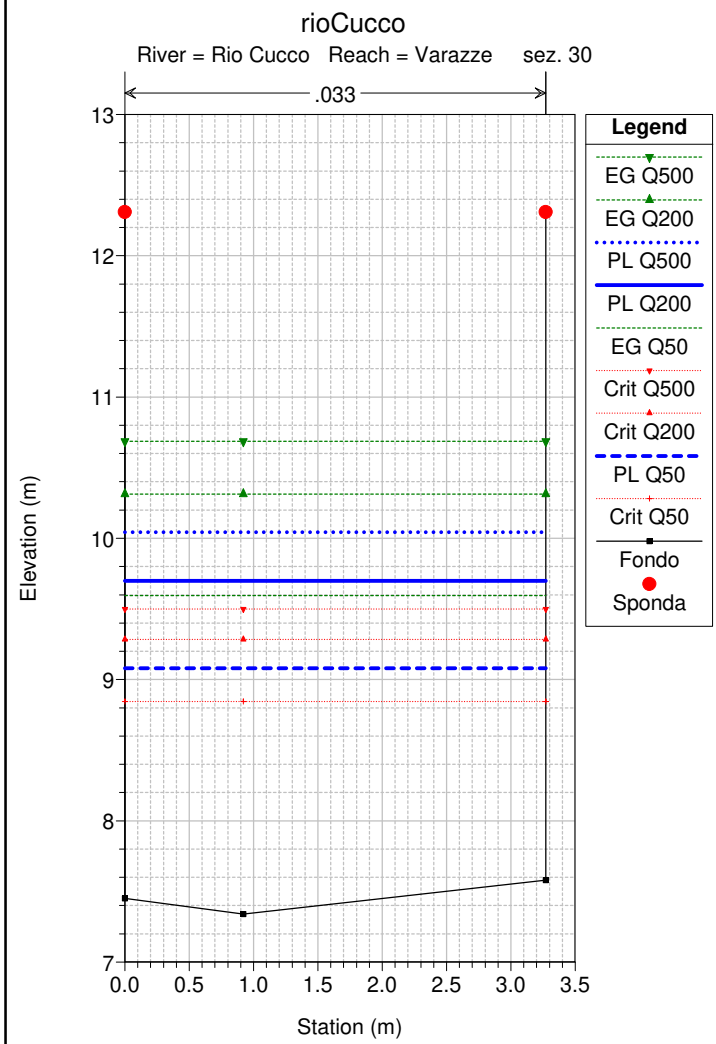
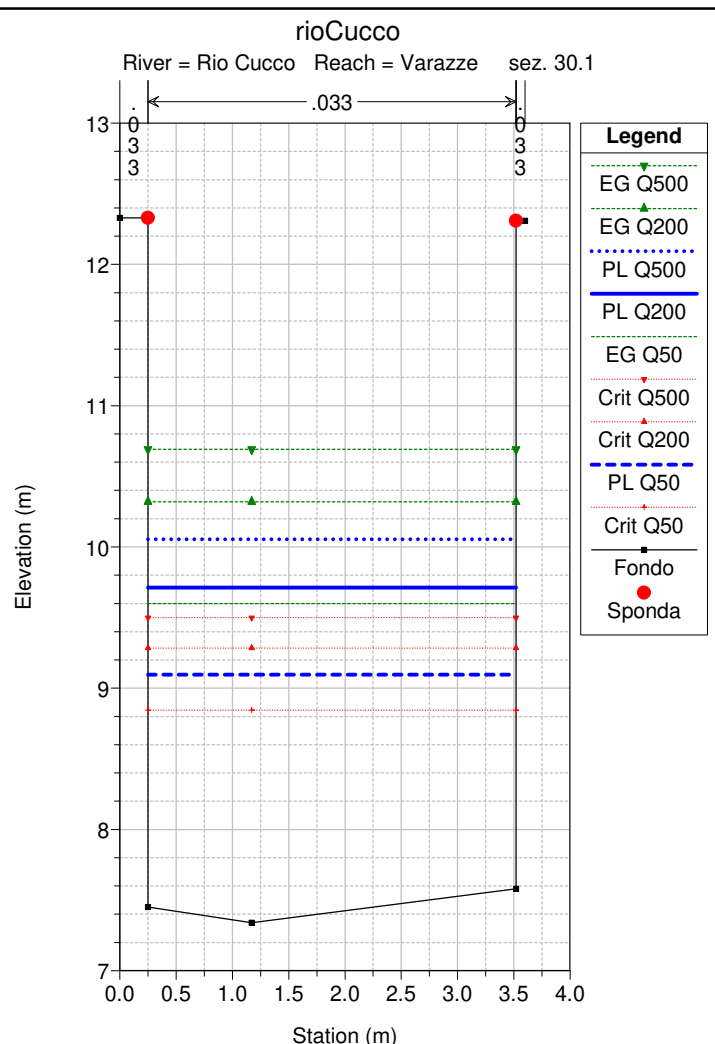
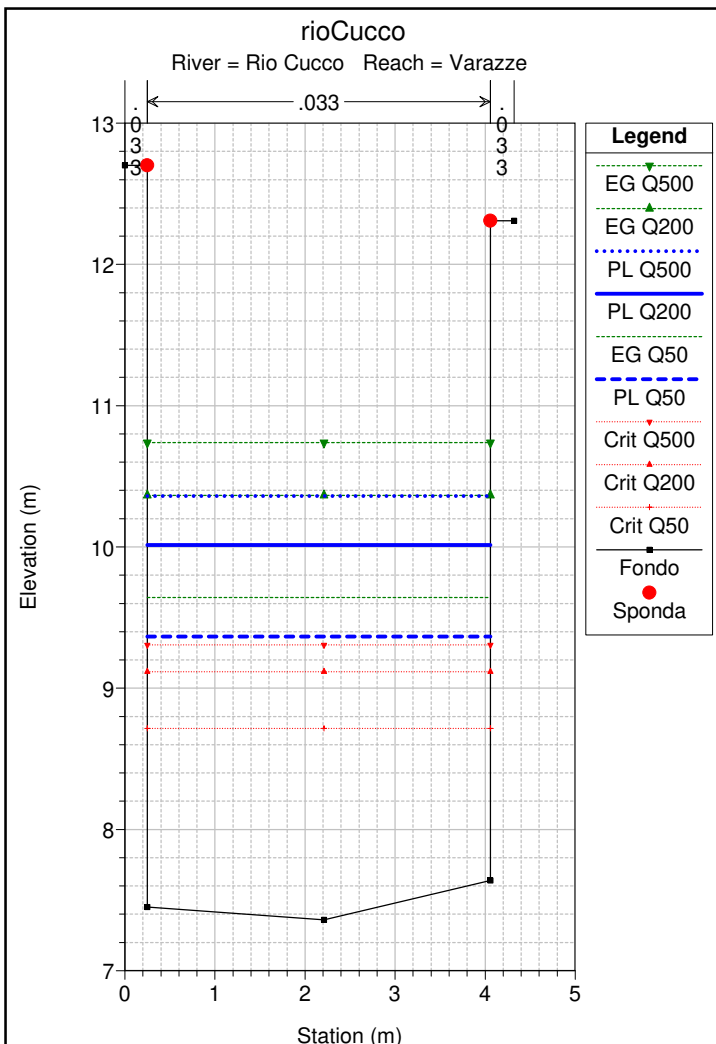


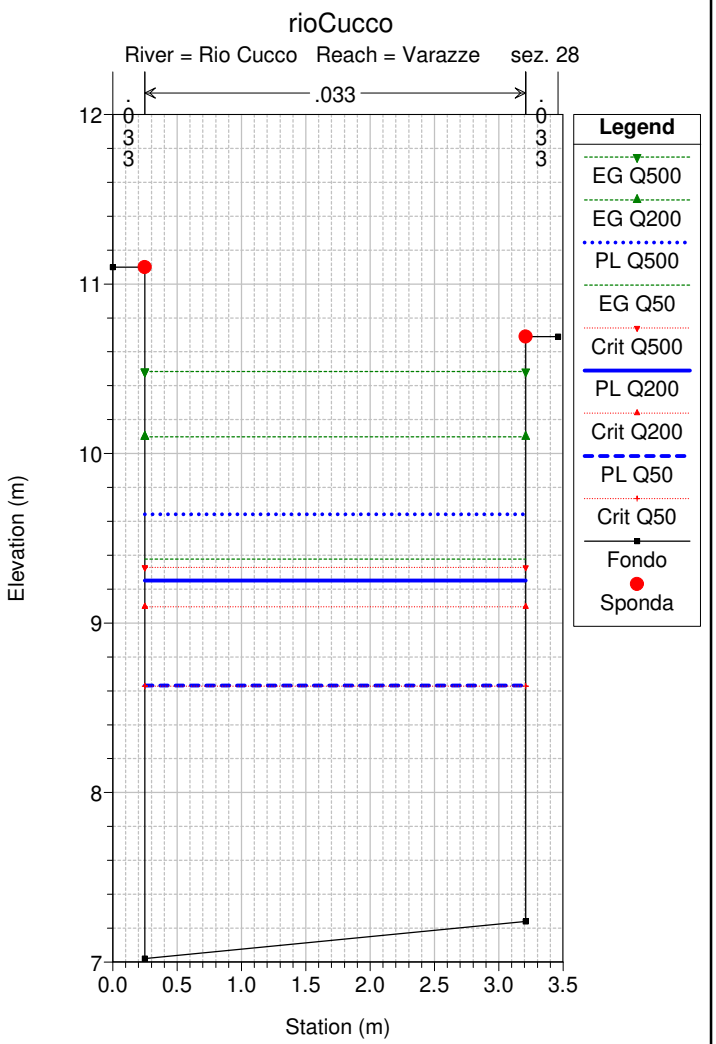
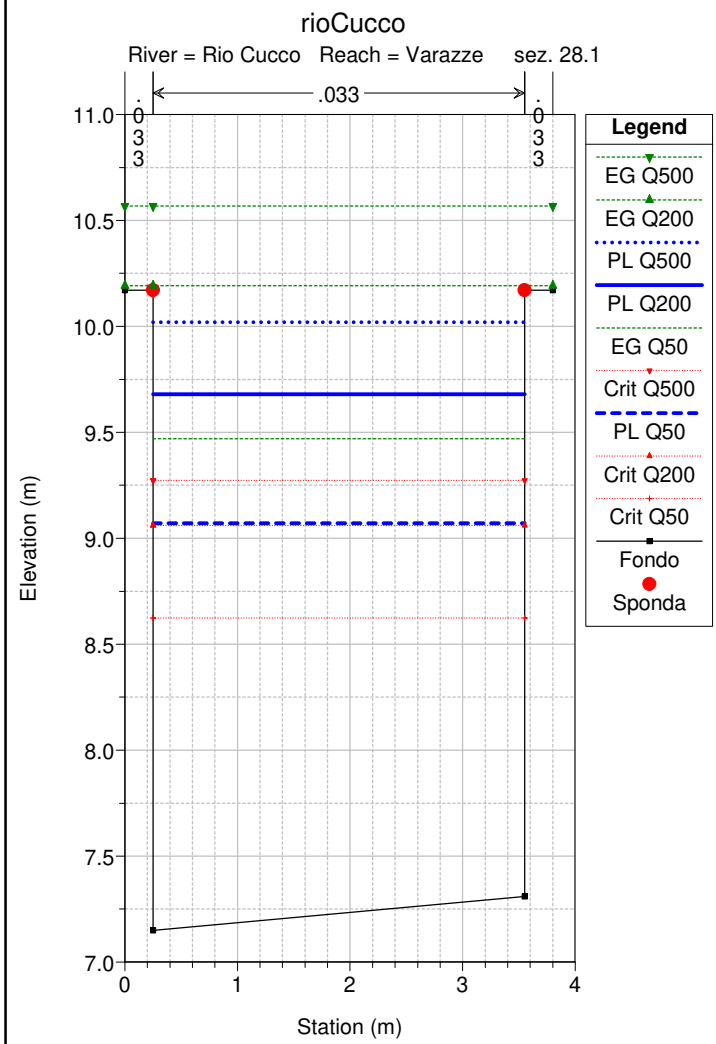
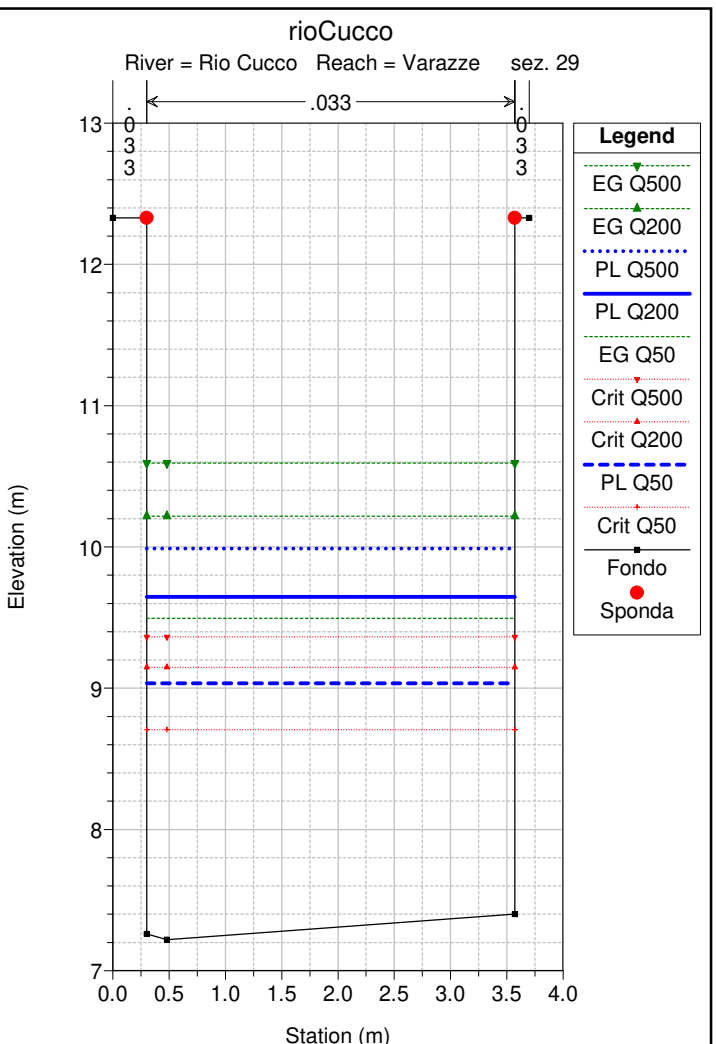
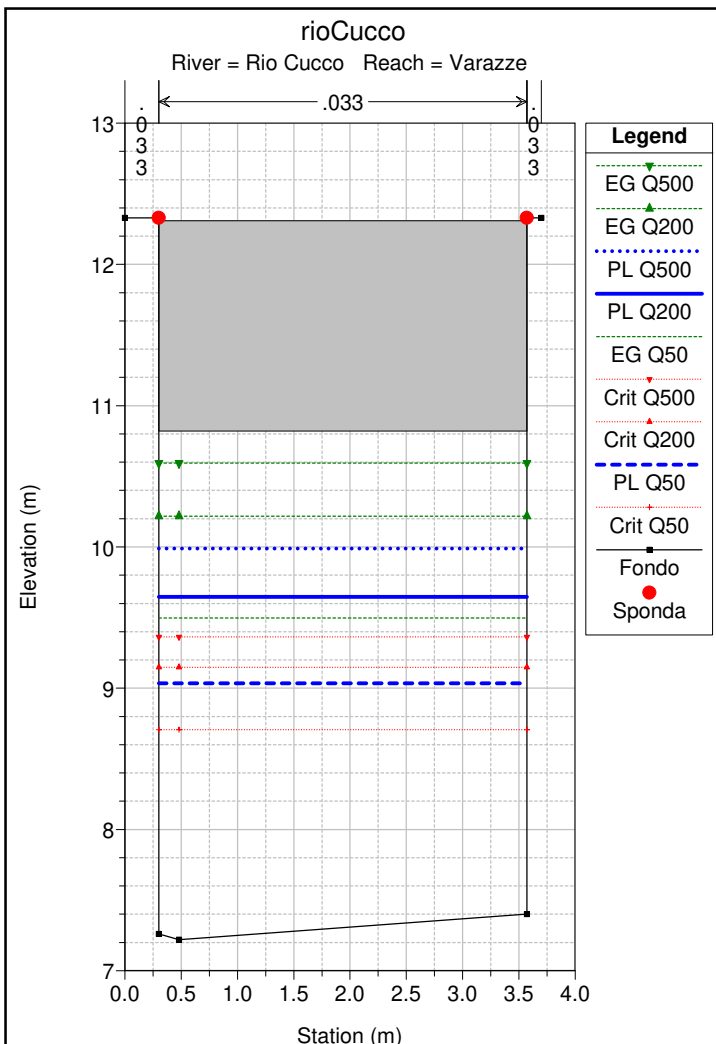


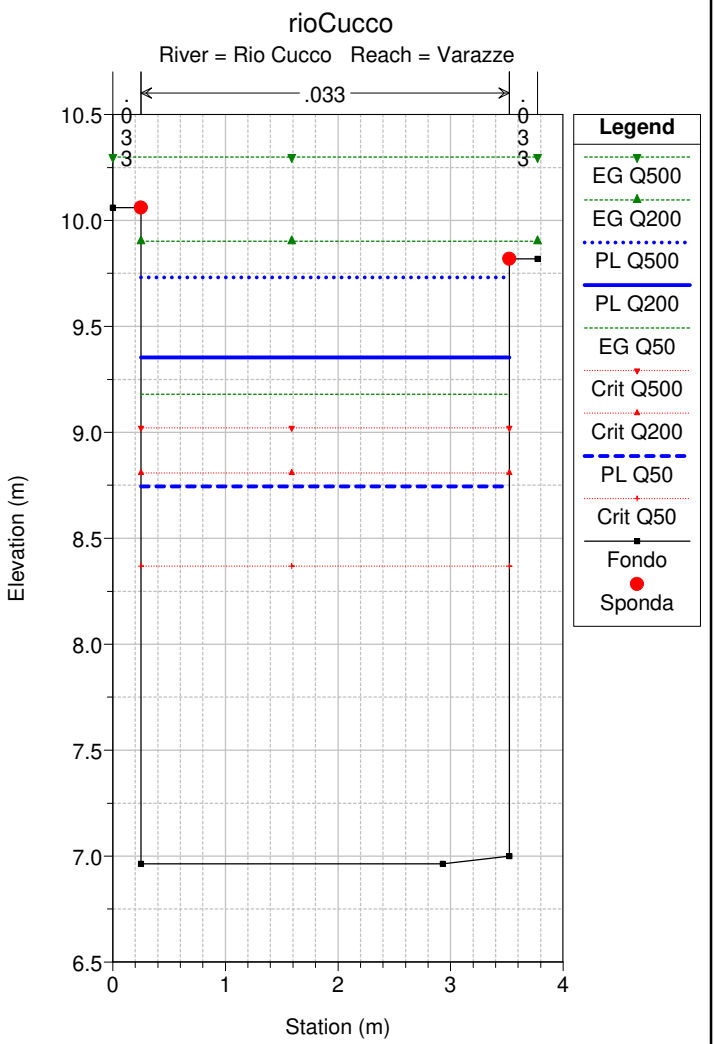
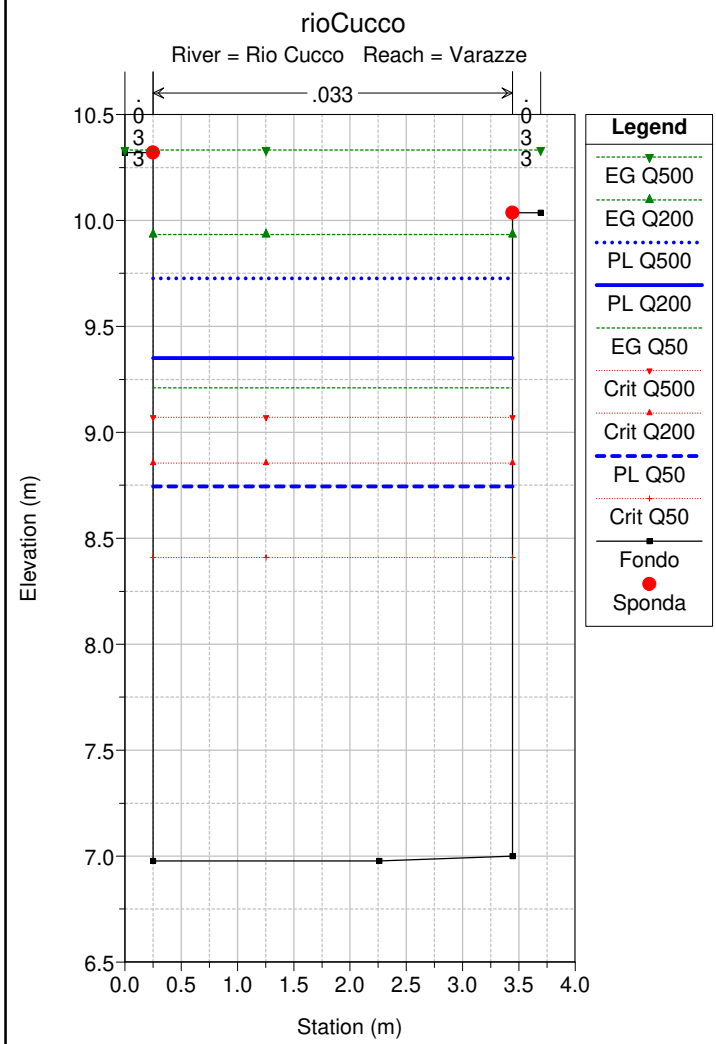
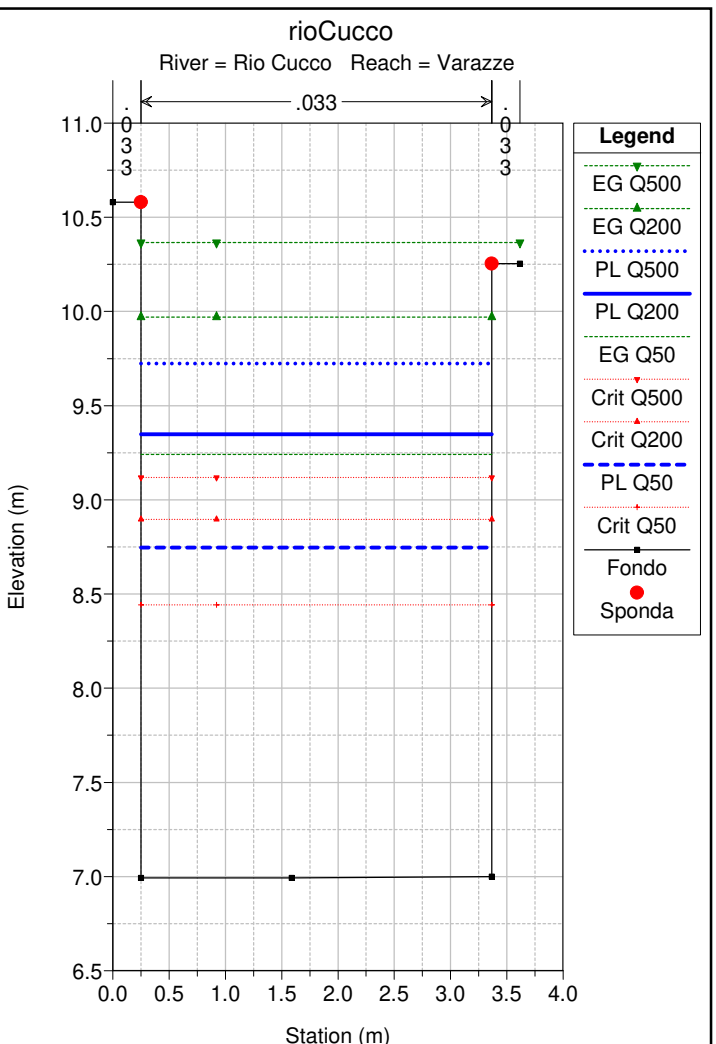
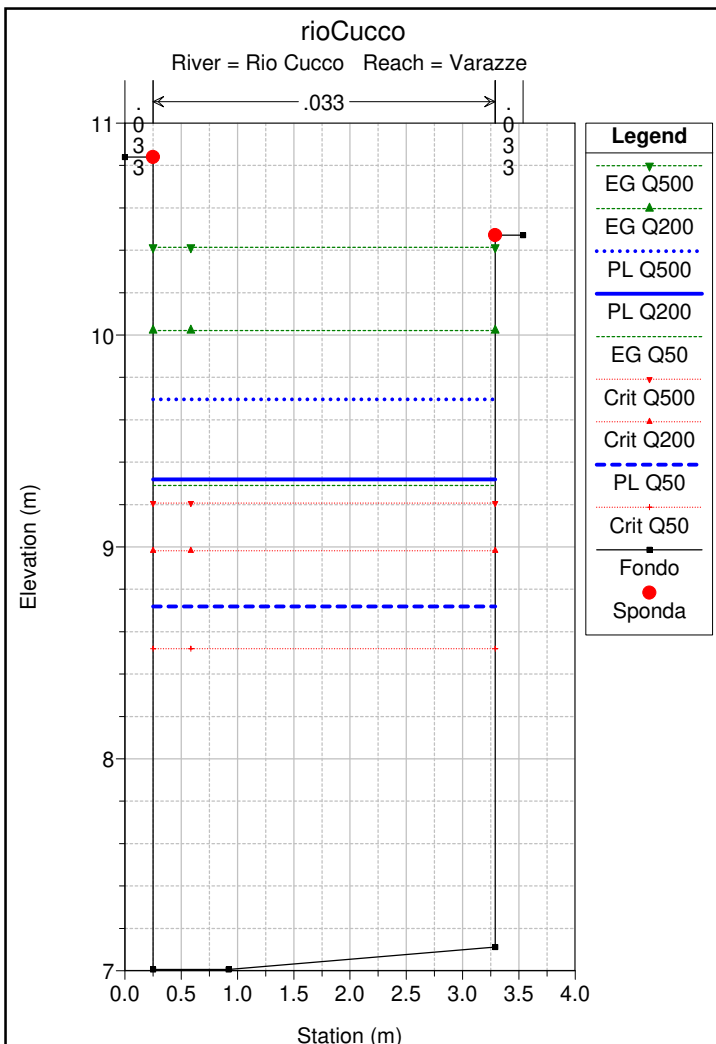


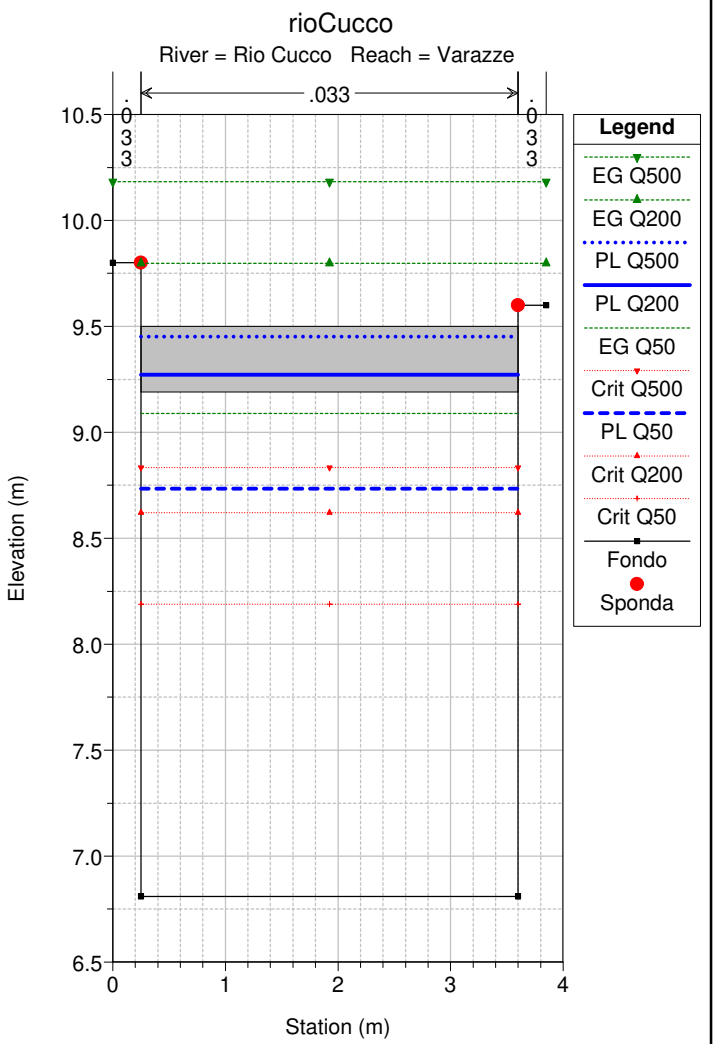
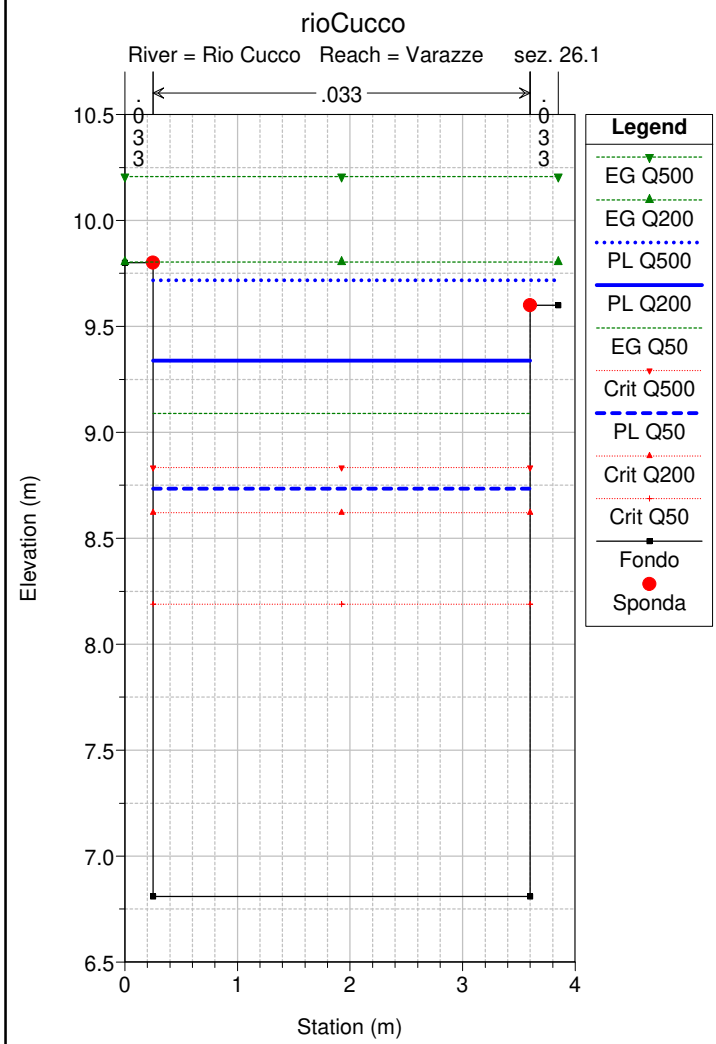
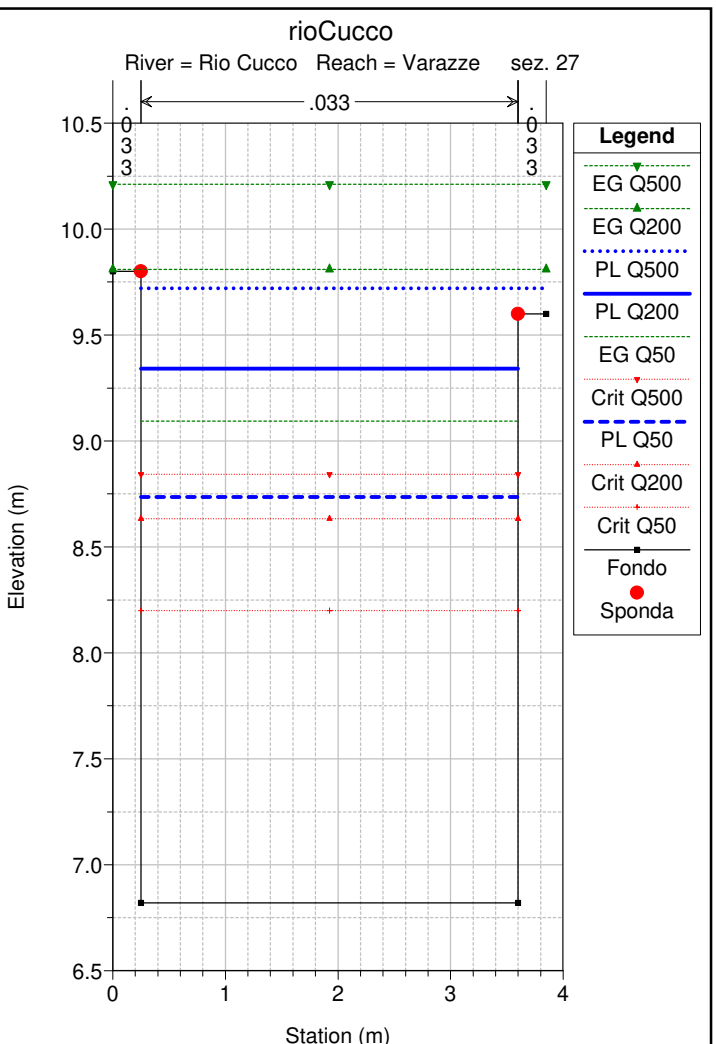
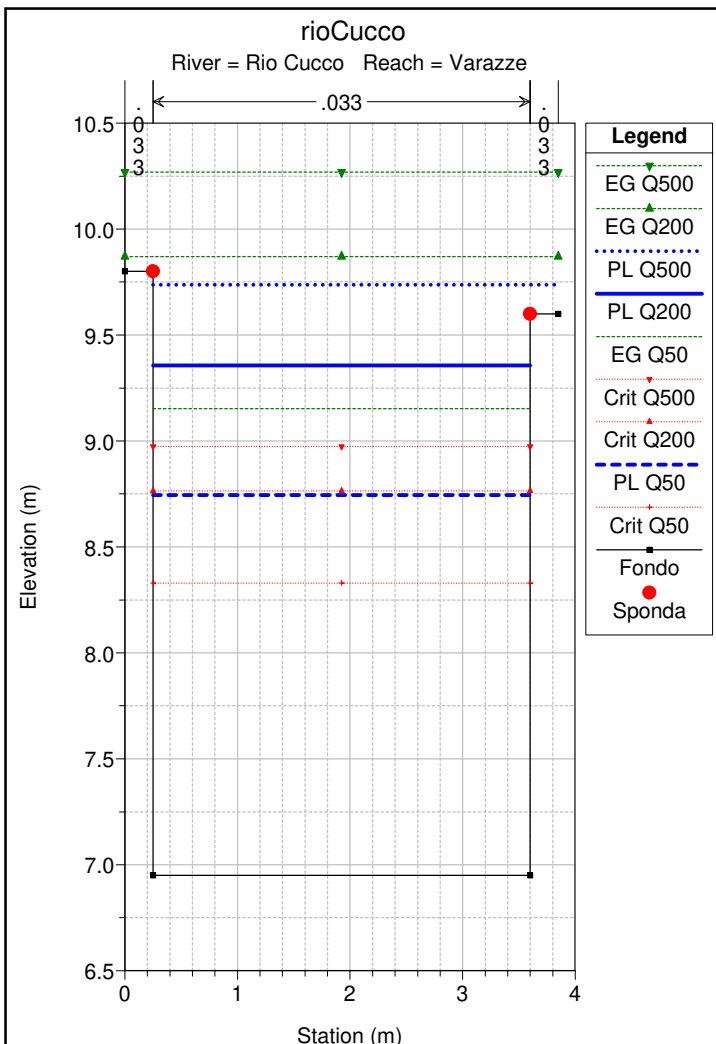


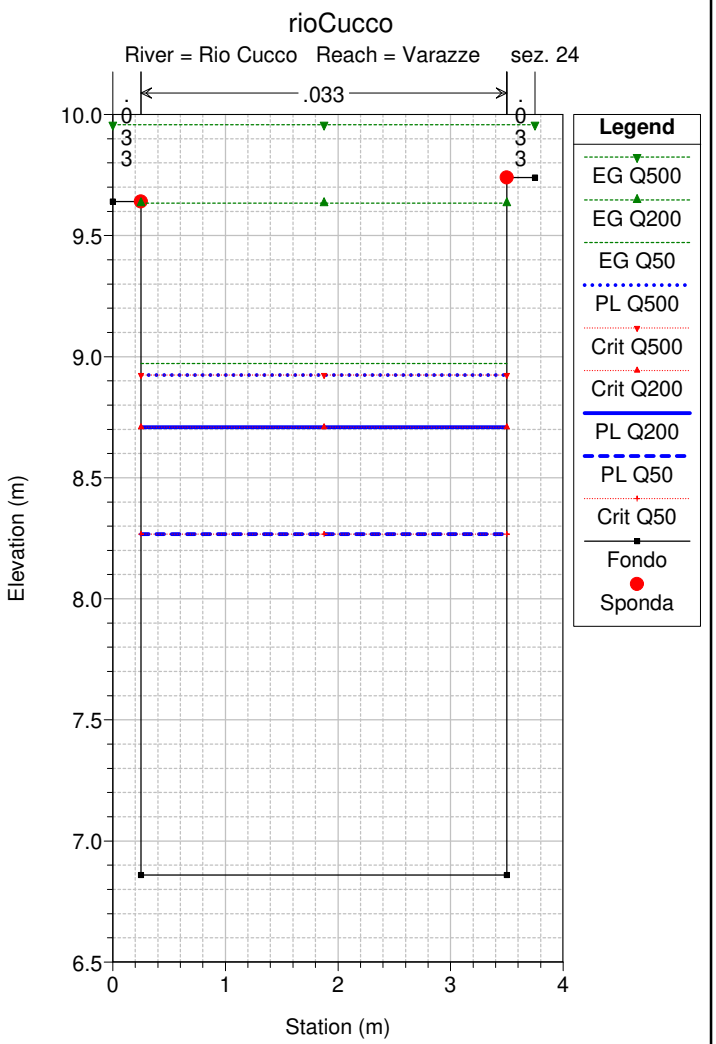
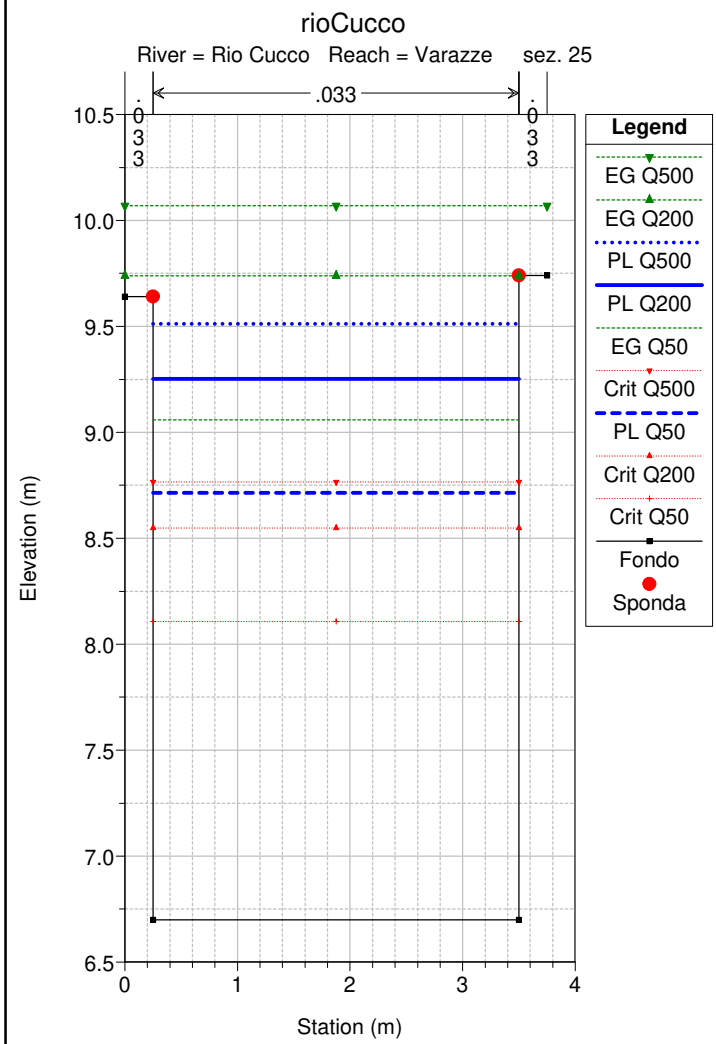
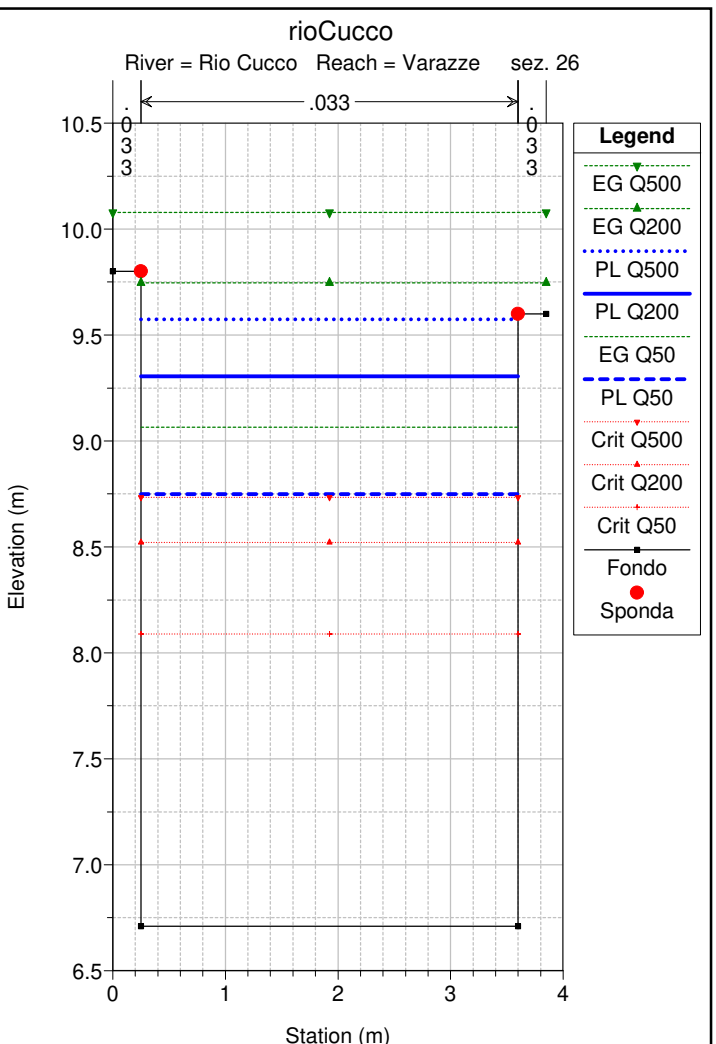
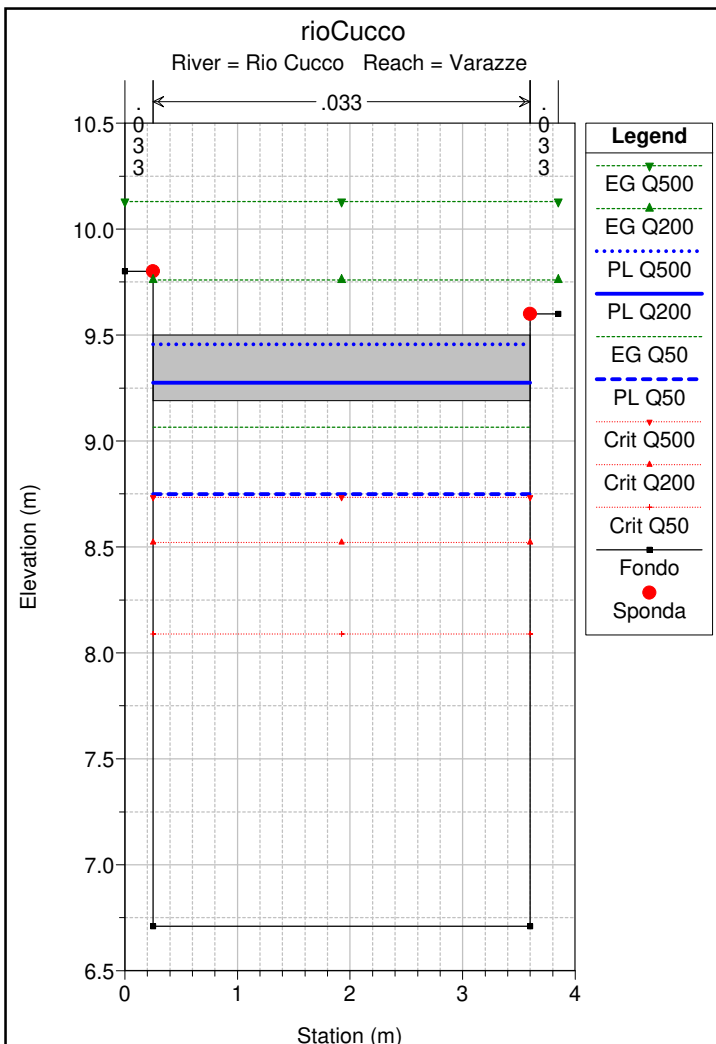


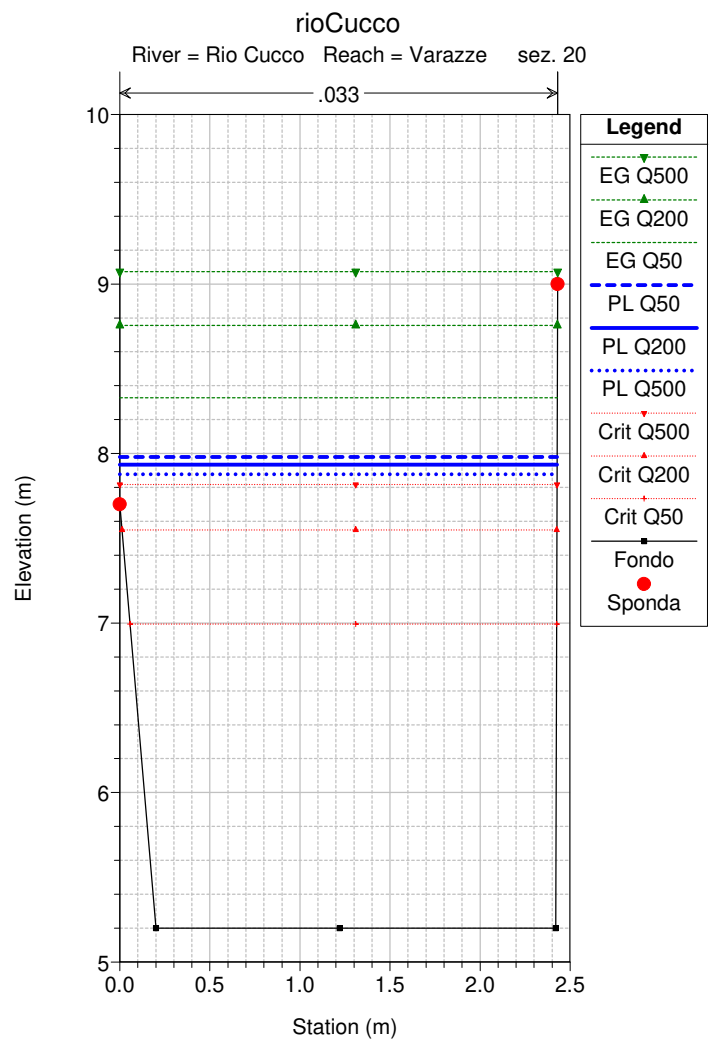
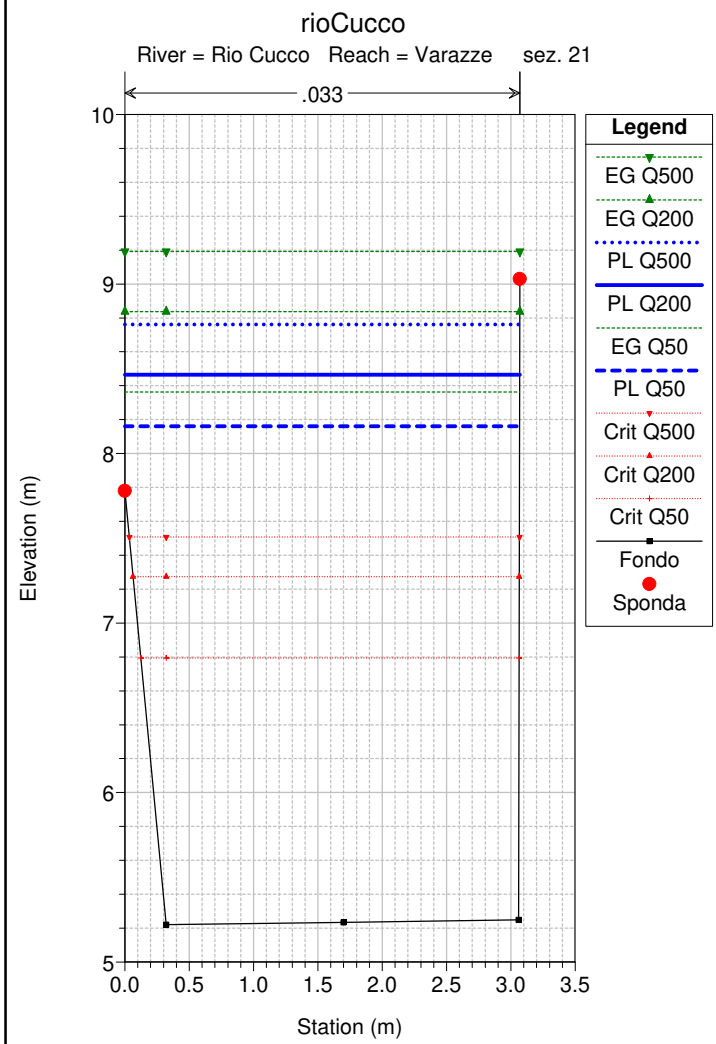
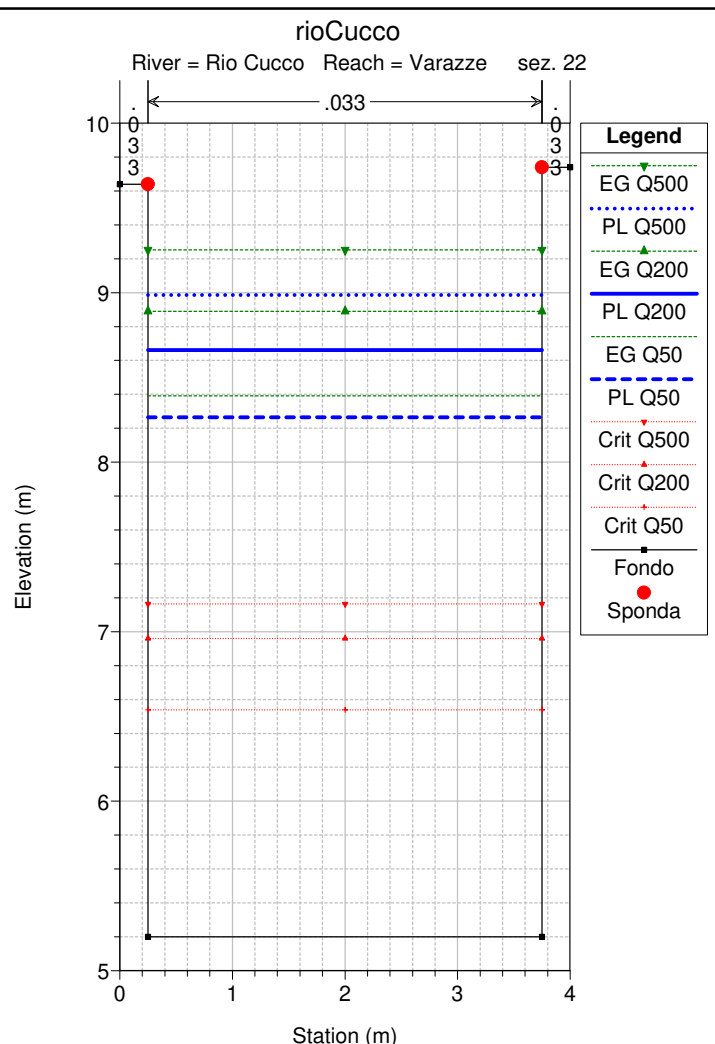
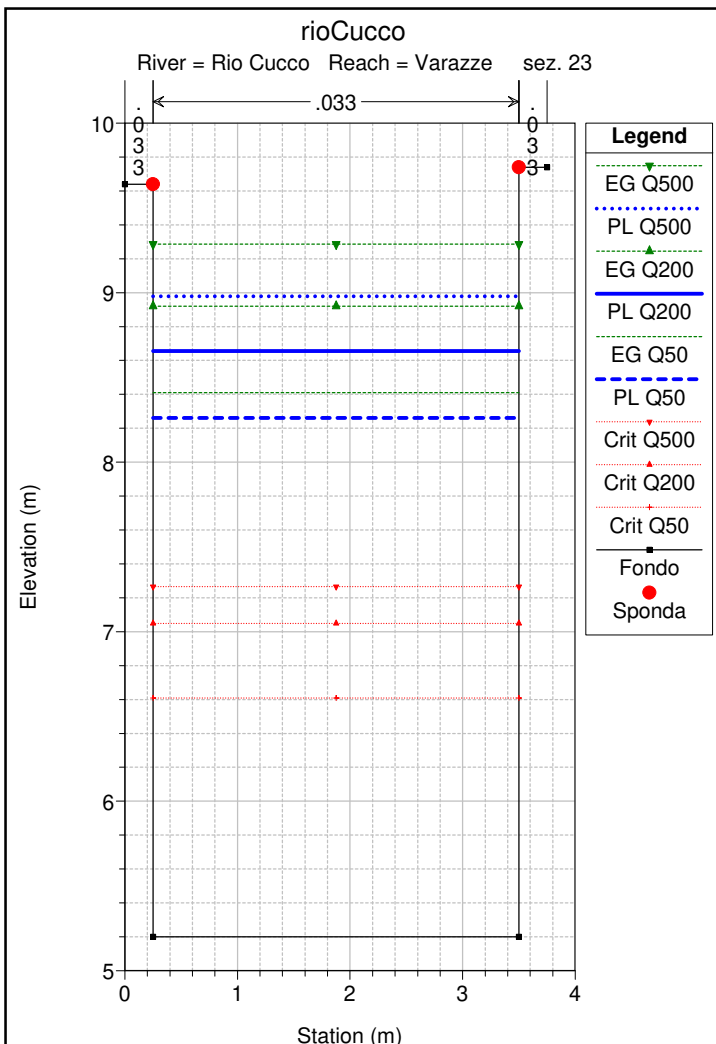






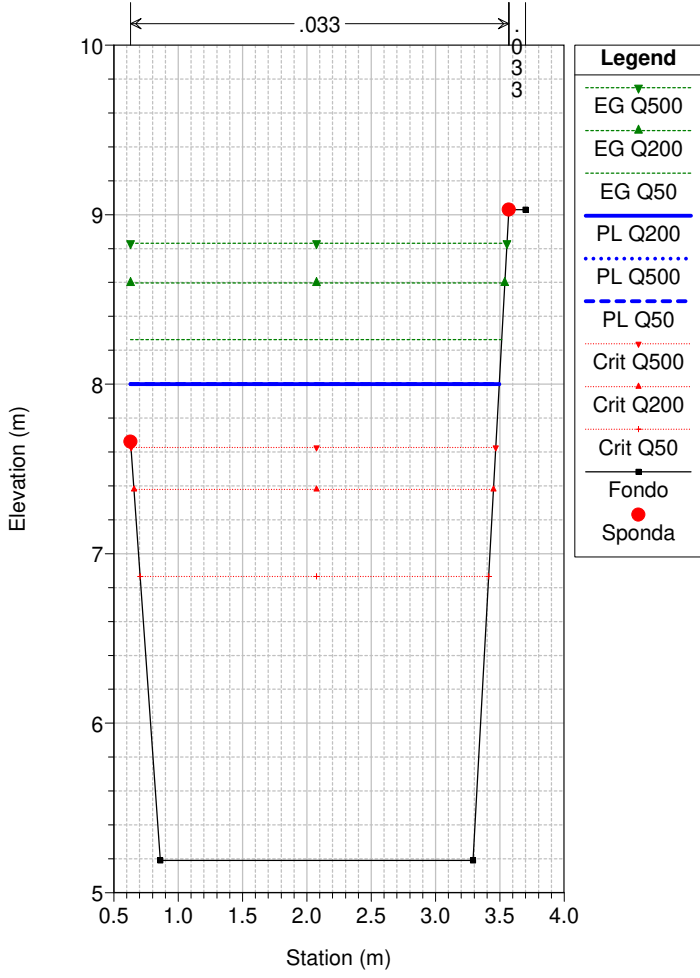






rioCucco

River = Rio Cucco Reach = Varazze sez. 19



Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	LOB Elev	L. Freeboard	ROB Elev	R. Freeboard	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Varazze	45	Q50	17.00	16.13	17.32	22.00	4.68	22.00	4.68	17.50	18.04	0.023005	3.75	4.53	5.33	1.30
Varazze	45	Q200	25.60	16.13	17.60	22.00	4.40	22.00	4.40	17.84	18.49	0.023007	4.18	6.12	6.04	1.33
Varazze	45	Q500	30.20	16.13	17.73	22.00	4.27	22.00	4.27	17.99	18.70	0.023008	4.37	6.92	6.37	1.34
Varazze	44	Q50	17.00	15.81	17.18	21.50	4.32	21.50	4.32	17.18	17.66	0.013219	3.06	5.55	5.80	1.00
Varazze	44	Q200	25.60	15.81	17.52	21.50	3.98	21.50	3.98	17.52	18.09	0.012638	3.35	7.64	6.65	1.00
Varazze	44	Q500	30.20	15.81	17.87	21.50	3.63	21.50	3.63	17.67	18.32	0.008116	2.98	10.14	7.40	0.81
Varazze	43	Q50	17.00	14.86	16.73	19.80	3.07	19.80	3.07	16.23	16.92	0.003868	1.94	8.75	7.06	0.56
Varazze	43	Q200	25.60	14.86	17.54	19.80	2.26	19.80	2.26	16.57	17.69	0.002002	1.74	14.72	7.40	0.39
Varazze	43	Q500	30.20	14.86	17.97	19.80	1.83	19.80	1.83	16.72	18.11	0.001619	1.69	17.90	7.40	0.35
Varazze	42.1	Q50	17.00	13.92	15.80	17.90	2.10	17.90	2.10	15.69	16.59	0.026447	3.93	4.32	2.30	0.92
Varazze	42.1	Q200	25.60	13.92	16.48	17.90	1.42	17.90	1.42	16.25	17.44	0.028042	4.35	5.89	2.30	0.87
Varazze	42.1	Q500	30.20	13.92	16.89	17.90	1.01	17.90	1.01	16.52	17.89	0.027311	4.42	6.83	2.30	0.82
Varazze	42	Q50	17.00	13.92	15.69	16.00	0.31	16.00	0.31	15.69	16.58	0.013589	4.17	4.08	2.30	1.00
Varazze	42	Q200	25.60	13.92	16.22	16.00	-0.22	16.00	-0.22	16.22	17.42	0.016346	4.85	5.27	2.20	1.02
Varazze	42	Q500	30.20	13.92	16.46	16.00	-0.46	16.00	-0.46	16.46	17.85	0.018266	5.22	5.79	2.09	1.05
Varazze	41	Q50	17.00	9.77	10.69	11.61	0.92	11.60	0.91	11.54	13.97	0.076055	8.02	2.12	2.30	2.67
Varazze	41	Q200	25.60	9.77	11.11	11.61	0.51	11.60	0.49	11.83	14.64	0.063731	8.33	3.07	2.30	2.30
Varazze	41	Q500	30.20	9.77	11.33	11.61	0.28	11.60	0.27	11.90	14.95	0.059625	8.43	3.58	2.30	2.16
Varazze	40	Q50	17.00	9.77	10.51	12.15	1.64	13.00	2.49	11.32	13.92	0.186617	8.17	2.08	2.89	3.07
Varazze	40	Q200	25.60	9.77	10.82	12.15	1.33	13.00	2.18	11.79	14.58	0.153525	8.59	2.98	2.96	2.74
Varazze	40	Q500	30.20	9.77	10.98	12.15	1.17	13.00	2.02	12.02	14.89	0.142913	8.76	3.45	3.00	2.61
Varazze	39	Q50	17.00	9.08	9.67	12.07	2.40	12.33	2.66	10.30	12.28	0.159202	7.15	2.38	4.05	2.98
Varazze	39	Q200	25.60	9.08	9.86	12.07	2.21	12.33	2.47	10.68	13.21	0.153750	8.10	3.16	4.05	2.93
Varazze	39	Q500	30.20	9.08	9.96	12.07	2.11	12.33	2.37	10.86	13.62	0.150059	8.47	3.56	4.05	2.88
Varazze	38	Q50	17.00	9.08	9.91	12.07	2.16	12.33	2.42	10.30	11.21	0.056218	5.05	3.37	4.05	1.77
Varazze	38	Q200	25.60	9.08	10.11	12.07	1.96	12.33	2.22	10.68	12.03	0.068398	6.14	4.17	4.05	1.93
Varazze	38	Q500	30.20	9.08	10.21	12.07	1.86	12.33	2.12	10.86	12.42	0.072166	6.58	4.59	4.05	1.97
Varazze	37	Q50	17.00	8.51	10.87	12.07	1.20	12.33	1.46	9.73	11.03	0.003064	1.78	9.57	4.05	0.37
Varazze	37	Q200	25.60	8.51	11.50	12.07	0.57	12.33	0.83	10.11	11.73	0.003773	2.11	12.13	4.05	0.39
Varazze	37	Q500	30.20	8.51	11.81	12.07	0.26	12.33	0.52	10.29	12.07	0.004106	2.26	13.37	4.05	0.40
Varazze	36	Q50	17.00	8.27	10.19	11.60	1.41	11.57	1.38	10.19	10.90	0.022709	3.73	4.55	3.21	1.00
Varazze	36	Q200	25.60	8.27	10.64	11.60	0.96	11.57	0.93	10.64	11.57	0.024857	4.28	5.98	3.21	1.00
Varazze	36	Q500	30.20	8.27	10.86	11.60	0.74	11.57	0.71	10.86	11.90	0.025857	4.52	6.68	3.21	1.00
Varazze	35	Q50	17.00	8.07	9.50	11.64	2.14	11.55	2.05	9.87	10.76	0.060050	4.98	3.42	4.48	1.82
Varazze	35	Q200	25.60	8.07	9.73	11.64	1.91	11.55	1.82	10.23	11.40	0.060945	5.72	4.48	4.48	1.83
Varazze	35	Q500	30.20	8.07	9.85	11.64	1.79	11.55	1.70	10.40	11.72	0.061765	6.05	4.99	4.48	1.83
Varazze	34	Q50	17.00	7.75	9.02	11.64	2.62	11.56	2.54	9.52	10.55	0.067725	5.48	3.10	3.82	1.94

HEC-RAS Plan: monte River: Rio Cucco Reach: Varazze (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	LOB Elev	L. Freeboard	ROB Elev	R. Freeboard	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Varazze	34	Q200	25.60	7.75	9.28	11.64	2.36	11.56	2.28	9.84	11.19	0.073258	6.12	4.18	4.66	2.06
Varazze	34	Q500	30.20	7.75	9.38	11.64	2.26	11.56	2.18	9.99	11.50	0.076713	6.44	4.69	5.03	2.13
Varazze	33	Q50	17.00	7.62	8.84	11.67	2.83	11.36	2.52	9.28	10.16	0.055603	5.08	3.34	4.10	1.80
Varazze	33	Q200	25.60	7.62	9.09	11.67	2.58	11.36	2.27	9.60	10.76	0.060626	5.71	4.48	4.94	1.91
Varazze	33	Q500	30.20	7.62	10.60	11.67	1.07	11.36	0.76	9.74	10.87	0.004213	2.30	13.12	5.82	0.49
Varazze	32	Q50	17.00	7.42	9.48	12.03	2.55	11.64	2.16	9.05	9.75	0.006447	2.30	7.39	4.98	0.60
Varazze	32	Q200	25.60	7.42	10.19	12.03	1.84	11.64	1.45	9.39	10.47	0.004914	2.34	10.95	4.98	0.50
Varazze	32	Q500	30.20	7.42	10.57	12.03	1.46	11.64	1.07	9.55	10.84	0.005294	2.33	12.96	6.68	0.53
Varazze	31	Q50	17.00	7.40	9.59	12.63	3.04	12.09	2.50	8.51	9.67	0.001326	1.28	13.24	6.84	0.29
Varazze	31	Q200	25.60	7.40	10.30	12.63	2.33	12.09	1.79	8.78	10.40	0.001256	1.41	18.09	6.84	0.28
Varazze	31	Q500	30.20	7.40	10.67	12.63	1.96	12.09	1.42	8.91	10.77	0.001226	1.47	20.61	6.84	0.27
Varazze	30.2	Q50	17.00	7.36	9.37	12.70	3.33	12.31	2.94	8.72	9.64	0.006114	2.33	7.29	3.81	0.54
Varazze	30.2	Q200	25.60	7.36	10.01	12.70	2.69	12.31	2.30	9.12	10.36	0.006485	2.62	9.77	3.81	0.52
Varazze	30.2	Q500	30.20	7.36	10.36	12.70	2.34	12.31	1.95	9.31	10.74	0.006554	2.73	11.08	3.81	0.51
Varazze	30.1	Q50	17.00	7.34	9.10	12.33	3.23	12.31	3.21	8.84	9.60	0.013581	3.14	5.41	3.27	0.78
Varazze	30.1	Q200	25.60	7.34	9.71	12.33	2.62	12.31	2.60	9.28	10.32	0.013544	3.45	7.43	3.27	0.73
Varazze	30.1	Q500	30.20	7.34	10.05	12.33	2.28	12.31	2.26	9.50	10.69	0.013225	3.53	8.55	3.27	0.70
Varazze	30	Q50	17.00	7.34	9.08	12.31	3.23	12.31	3.23	8.84	9.59	0.013934	3.17	5.36	3.27	0.79
Varazze	30	Q200	25.60	7.34	9.70	12.31	2.61	12.31	2.61	9.28	10.31	0.013744	3.47	7.38	3.27	0.74
Varazze	30	Q500	30.20	7.34	10.04	12.31	2.27	12.31	2.27	9.50	10.69	0.013379	3.55	8.51	3.27	0.70
Varazze	29.5		Bridge													
Varazze	29	Q50	17.00	7.22	9.03	12.33	3.30	12.33	3.30	8.71	9.50	0.012341	3.01	5.65	3.27	0.73
Varazze	29	Q200	25.60	7.22	9.65	12.33	2.68	12.33	2.68	9.15	10.22	0.012749	3.35	7.65	3.27	0.70
Varazze	29	Q500	30.20	7.22	9.99	12.33	2.34	12.33	2.34	9.36	10.59	0.012572	3.44	8.77	3.27	0.67
Varazze	28.1	Q50	17.00	7.15	9.07	10.17	1.10	10.17	1.10	8.62	9.47	0.010279	2.80	6.07	3.30	0.66
Varazze	28.1	Q200	25.60	7.15	9.68	10.17	0.49	10.17	0.49	9.06	10.19	0.011127	3.17	8.09	3.30	0.65
Varazze	28.1	Q500	30.20	7.15	10.02	10.17	0.15	10.17	0.15	9.27	10.57	0.011168	3.28	9.21	3.30	0.63
Varazze	28	Q50	17.00	7.02	8.63	11.10	2.47	10.69	2.06	8.63	9.38	0.023615	3.82	4.44	2.96	1.00
Varazze	28	Q200	25.60	7.02	9.25	11.10	1.85	10.69	1.44	9.10	10.10	0.021758	4.08	6.28	2.96	0.89
Varazze	28	Q500	30.20	7.02	9.64	11.10	1.46	10.69	1.05	9.33	10.48	0.019784	4.06	7.43	2.96	0.82
Varazze	27.82	Q50	17.00	7.01	8.72	10.84	2.12	10.47	1.75	8.52	9.29	0.016459	3.35	5.08	3.04	0.83
Varazze	27.82	Q200	25.60	7.01	9.32	10.84	1.52	10.47	1.15	8.98	10.02	0.016915	3.71	6.90	3.04	0.79
Varazze	27.82	Q500	30.20	7.01	9.70	10.84	1.14	10.47	0.78	9.21	10.41	0.016012	3.75	8.05	3.04	0.74
Varazze	27.64	Q50	17.00	6.99	8.75	10.58	1.83	10.25	1.51	8.44	9.24	0.013629	3.11	5.46	3.12	0.75
Varazze	27.64	Q200	25.60	6.99	9.35	10.58	1.23	10.25	0.91	8.90	9.97	0.014450	3.49	7.33	3.12	0.73
Varazze	27.64	Q500	30.20	6.99	9.72	10.58	0.86	10.25	0.53	9.12	10.37	0.013885	3.55	8.50	3.12	0.69

HEC-RAS Plan: monte River: Rio Cucco Reach: Varazze (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	LOB Elev	L. Freeboard	ROB Elev	R. Freeboard	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Varazze	27.46	Q50	17.00	6.98	8.74	10.32	1.58	10.04	1.29	8.41	9.21	0.012537	3.02	5.63	3.19	0.73
Varazze	27.46	Q200	25.60	6.98	9.35	10.32	0.97	10.04	0.69	8.85	9.93	0.013260	3.38	7.56	3.19	0.70
Varazze	27.46	Q500	30.20	6.98	9.73	10.32	0.59	10.04	0.31	9.07	10.33	0.012738	3.45	8.77	3.19	0.66
Varazze	27.28	Q50	17.00	6.96	8.74	10.06	1.32	9.82	1.07	8.37	9.18	0.011467	2.92	5.81	3.27	0.70
Varazze	27.28	Q200	25.60	6.96	9.35	10.06	0.71	9.82	0.46	8.81	9.90	0.012132	3.28	7.81	3.27	0.68
Varazze	27.28	Q500	30.20	6.96	9.73	10.06	0.33	9.82	0.09	9.02	10.30	0.011664	3.34	9.04	3.27	0.64
Varazze	27.1	Q50	17.00	6.95	8.74	9.80	1.06	9.60	0.86	8.33	9.15	0.010538	2.83	6.01	3.35	0.67
Varazze	27.1	Q200	25.60	6.95	9.36	9.80	0.44	9.60	0.24	8.76	9.87	0.011162	3.18	8.06	3.35	0.65
Varazze	27.1	Q500	30.20	6.95	9.74	9.80	0.06	9.60	-0.14	8.97	10.27	0.010494	3.23	9.37	3.60	0.62
Varazze	27	Q50	17.00	6.82	8.74	9.80	1.06	9.60	0.86	8.20	9.09	0.008872	2.65	6.42	3.35	0.61
Varazze	27	Q200	25.60	6.82	9.34	9.80	0.46	9.60	0.26	8.63	9.81	0.009919	3.03	8.45	3.35	0.61
Varazze	27	Q500	30.20	6.82	9.72	9.80	0.08	9.60	-0.12	8.84	10.21	0.009530	3.11	9.75	3.60	0.58
Varazze	26.1	Q50	17.00	6.81	8.73	9.80	1.07	9.60	0.87	8.19	9.09	0.008771	2.64	6.45	3.35	0.61
Varazze	26.1	Q200	25.60	6.81	9.34	9.80	0.46	9.60	0.26	8.62	9.80	0.009851	3.02	8.47	3.35	0.61
Varazze	26.1	Q500	30.20	6.81	9.72	9.80	0.08	9.60	-0.12	8.83	10.21	0.009478	3.10	9.77	3.60	0.58
Varazze	26.05		Bridge													
Varazze	26	Q50	17.00	6.71	8.75	9.80	1.05	9.60	0.85	8.09	9.06	0.007539	2.49	6.83	3.35	0.56
Varazze	26	Q200	25.60	6.71	9.30	9.80	0.50	9.60	0.30	8.52	9.75	0.009225	2.95	8.69	3.35	0.58
Varazze	26	Q500	30.20	6.71	9.57	9.80	0.23	9.60	0.03	8.73	10.08	0.010024	3.15	9.59	3.35	0.59
Varazze	25	Q50	17.00	6.70	8.71	9.64	0.93	9.74	1.03	8.11	9.06	0.008453	2.60	6.55	3.25	0.58
Varazze	25	Q200	25.60	6.70	9.25	9.64	0.39	9.74	0.49	8.55	9.74	0.010472	3.09	8.29	3.25	0.62
Varazze	25	Q500	30.20	6.70	9.51	9.64	0.13	9.74	0.23	8.77	10.07	0.011434	3.30	9.14	3.25	0.63
Varazze	24	Q50	17.00	6.86	8.27	9.64	1.37	9.74	1.47	8.27	8.97	0.021909	3.72	4.57	3.25	1.00
Varazze	24	Q200	25.60	6.86	8.71	9.64	0.93	9.74	1.03	8.71	9.63	0.024003	4.26	6.01	3.25	1.00
Varazze	24	Q500	30.20	6.86	8.92	9.64	0.72	9.74	0.82	8.92	9.96	0.025068	4.50	6.71	3.25	1.00
Varazze	23	Q50	17.00	5.20	8.26	9.64	1.38	9.74	1.48	6.61	8.41	0.002937	1.71	9.95	3.25	0.31
Varazze	23	Q200	25.60	5.20	8.65	9.64	0.99	9.74	1.09	7.05	8.92	0.004954	2.28	11.23	3.25	0.39
Varazze	23	Q500	30.20	5.20	8.98	9.64	0.66	9.74	0.76	7.27	9.29	0.005557	2.46	12.28	3.25	0.40
Varazze	22	Q50	17.00	5.20	8.26	9.64	1.38	9.74	1.48	6.54	8.39	0.002370	1.59	10.72	3.50	0.29
Varazze	22	Q200	25.60	5.20	8.66	9.64	0.98	9.74	1.08	6.96	8.89	0.003978	2.11	12.12	3.50	0.36
Varazze	22	Q500	30.20	5.20	8.99	9.64	0.65	9.74	0.75	7.16	9.25	0.004449	2.28	13.25	3.50	0.37
Varazze	21	Q50	17.00	5.22	8.16	7.78	-0.38	9.03	0.87	6.79	8.36	0.004330	1.99	8.56	3.07	0.38
Varazze	21	Q200	25.60	5.22	8.47	7.78	-0.69	9.03	0.56	7.27	8.84	0.007615	2.70	9.49	3.07	0.49
Varazze	21	Q500	30.20	5.22	8.76	7.78	-0.98	9.03	0.27	7.51	9.19	0.008487	2.90	10.40	3.07	0.50
Varazze	20	Q50	17.00	5.20	7.98	7.70	-0.28	9.00	1.02	6.99	8.33	0.009548	2.62	6.49	2.43	0.51
Varazze	20	Q200	25.60	5.20	7.94	7.70	-0.24	9.00	1.07	7.55	8.76	0.022535	4.01	6.38	2.43	0.79
Varazze	20	Q500	30.20	5.20	7.88	7.70	-0.18	9.00	1.12	7.82	9.07	0.033081	4.84	6.24	2.43	0.96

HEC-RAS Plan: monte River: Rio Cucco Reach: Varazze (Continued)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	LOB Elev (m)	L. Freeboard (m)	ROB Elev (m)	R. Freeboard (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Varazze	19	Q50	17.00	5.19	8.00	7.66	-0.34	9.03	1.03	6.86	8.26	0.006227	2.27	7.48	2.86	0.45
Varazze	19	Q200	25.60	5.19	8.00	7.66	-0.34	9.03	1.03	7.38	8.60	0.014121	3.42	7.48	2.86	0.68
Varazze	19	Q500	30.20	5.19	8.00	7.66	-0.34	9.03	1.03	7.63	8.83	0.019651	4.04	7.48	2.86	0.80