

# Regione Toscana

Direzione Generale Difesa del Suolo e Protezione Civile  
Settore Genio Civile Valdarno Superiore

REGIONE  
TOSCANA



## Titolo intervento:

SISTEMAZIONE IDRAULICA DEL RIO DI RIOLO E RIO DELLA RIPA- SITI NEL  
COMUNE DI AREZZO" codice DODS2022AR0004 - STRALCIO 1

## Intervento

RESPONSABILE DEL PROCEDIMENTO:

Ing. MARIANNA BIGIARINI

PROGETTISTI:

ing. ROBERTO PANCINI  
geol. FRANCESCO VANNINI

FASE:

**PROGETTO ESECUTIVO**

CODICE ELABORATO

**DC**

NUMERO ELABORATO:

**09**

SCALA :

CONTENUTO:

**RISULTATI MODELLAZIONI HEC STATO ATTUALE E DI PROGETTO**

DATA EMISSIONE: FEBBRAIO 2023

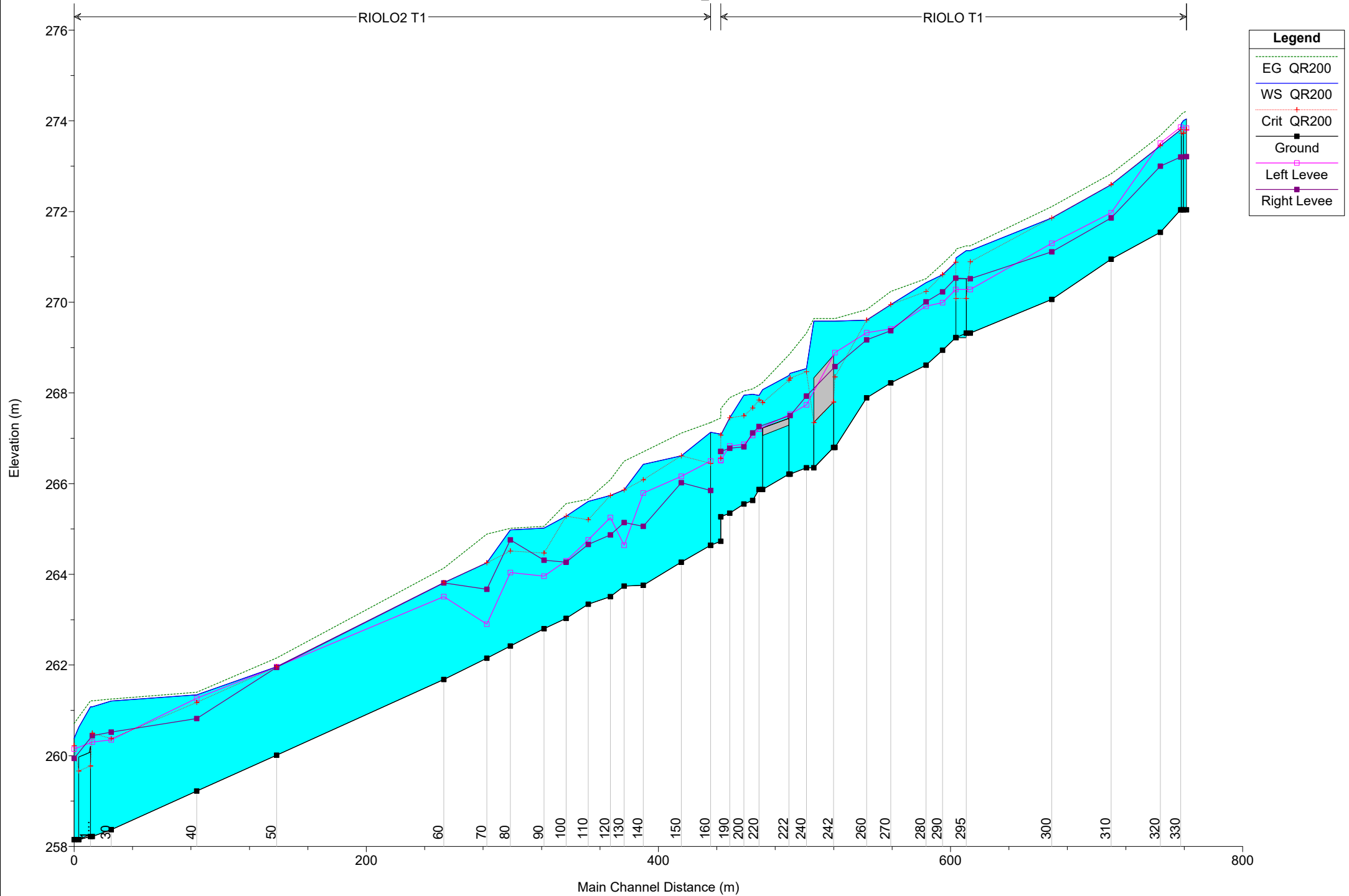
DATA VERIFICA: \_\_ / \_\_ / \_\_\_\_

REV: **00**

**RISULTATI  
MODELLAZIONI HEC  
STATO ATTUALE**

# Riolo attuale\_2023

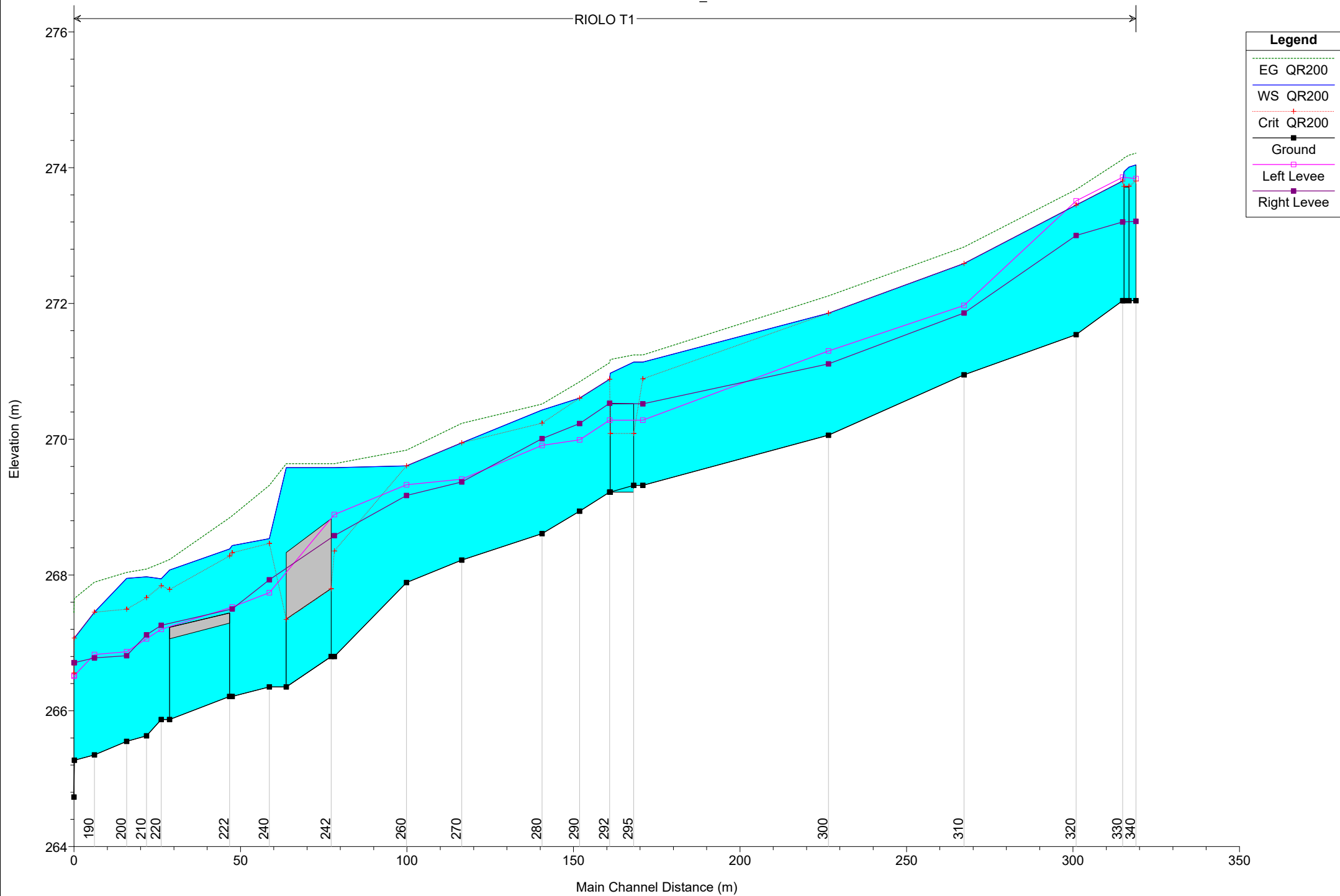
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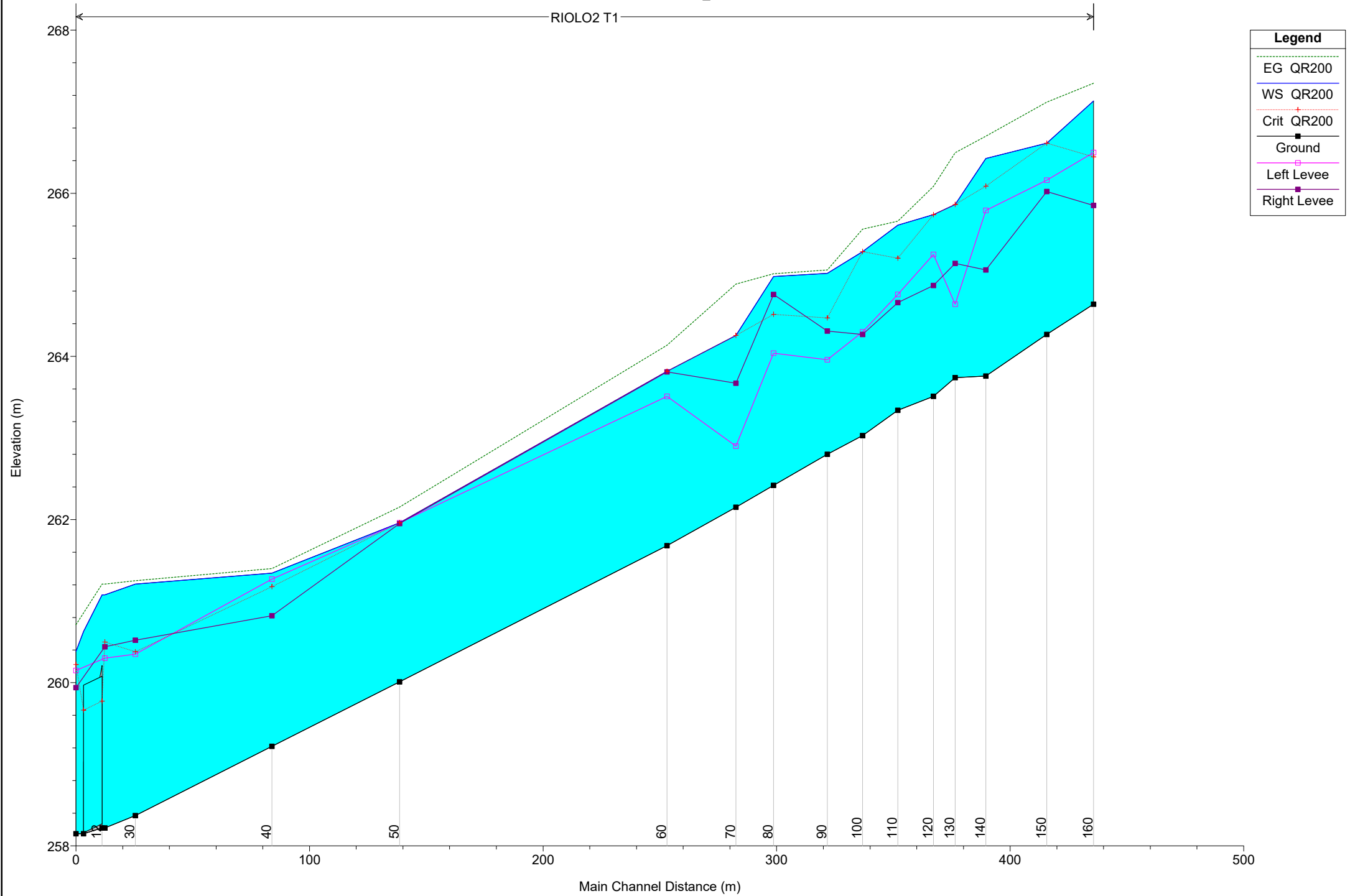
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RIOLO T1



# Riolo attuale\_2023

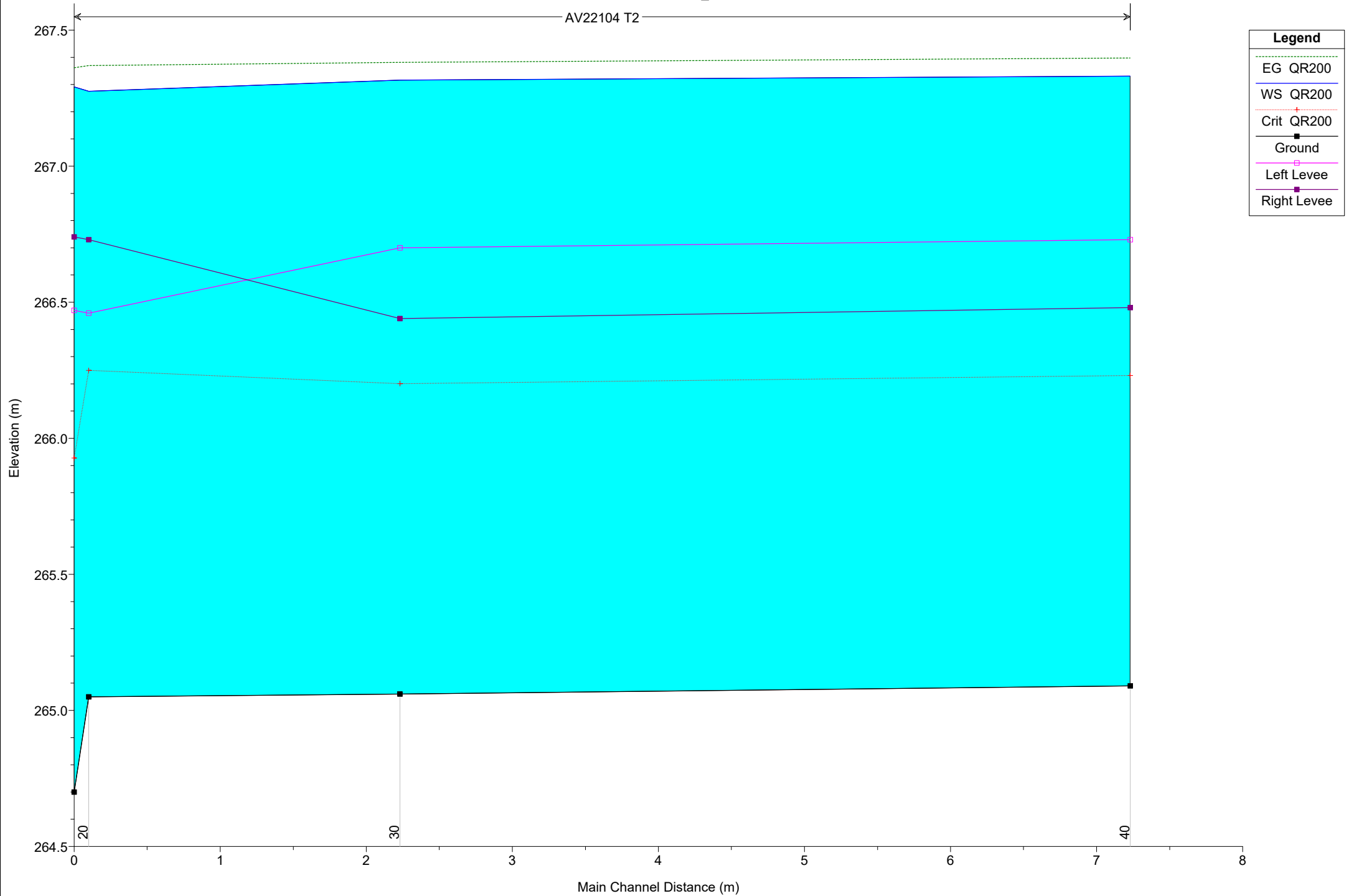
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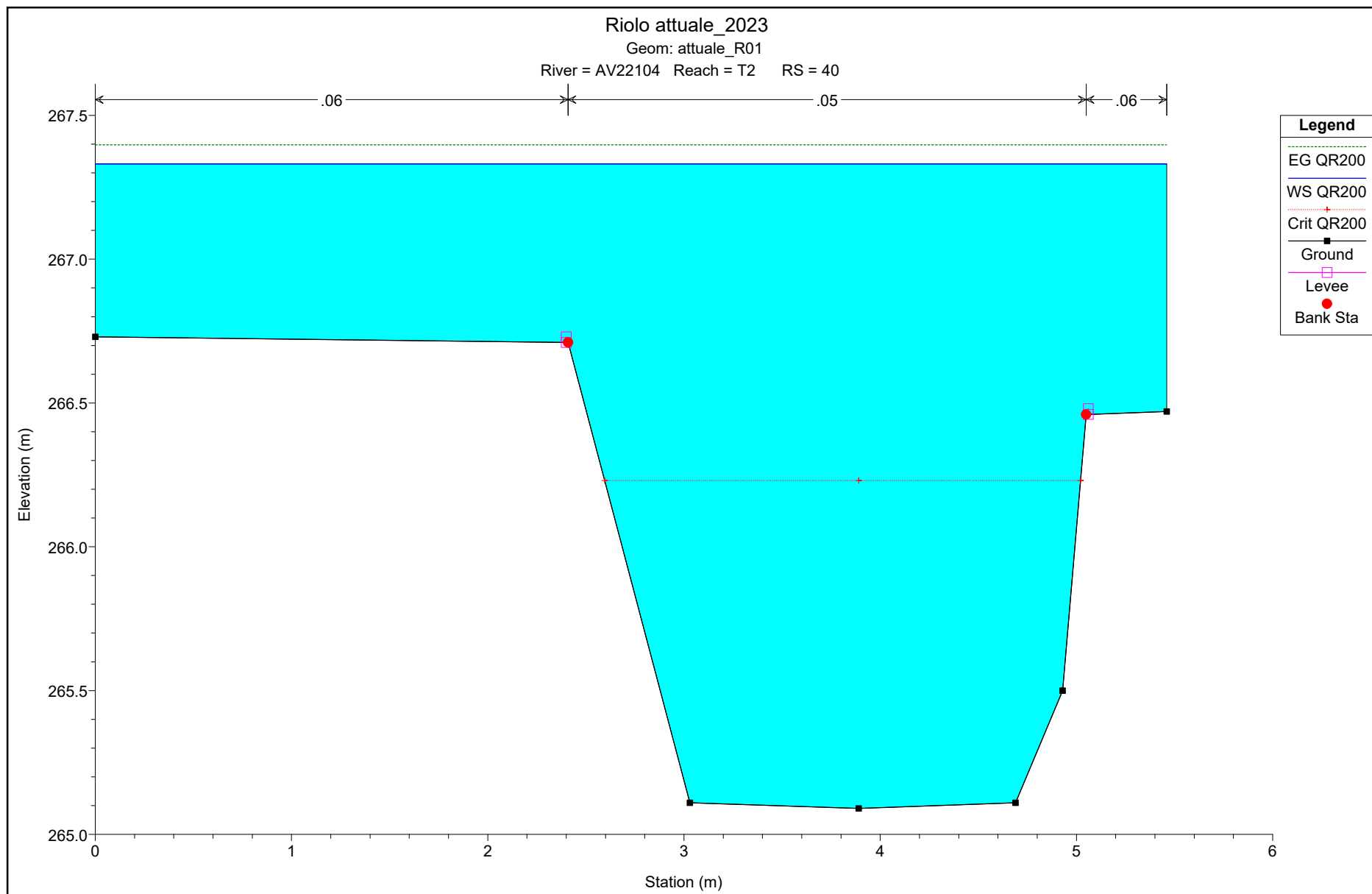


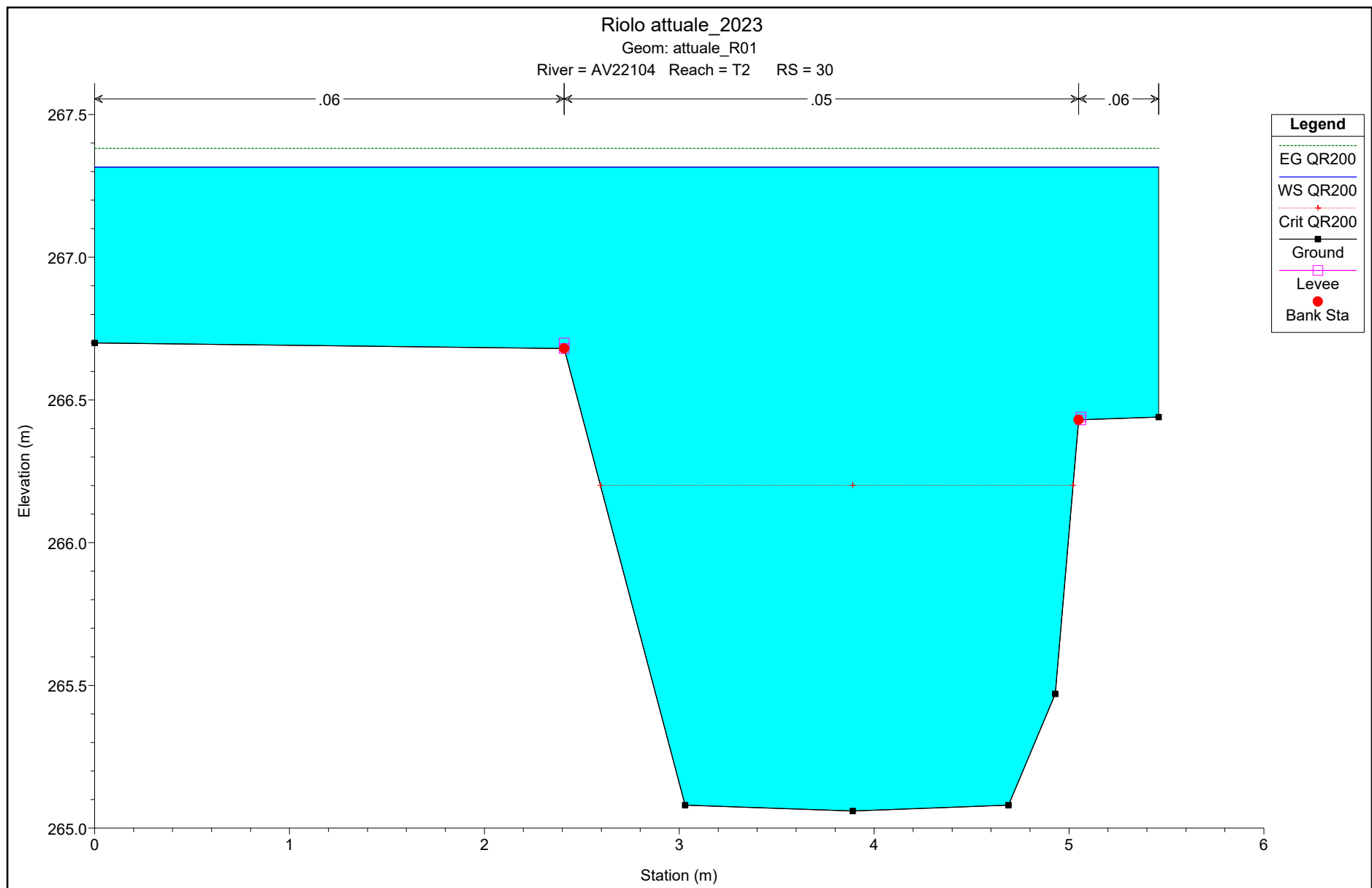
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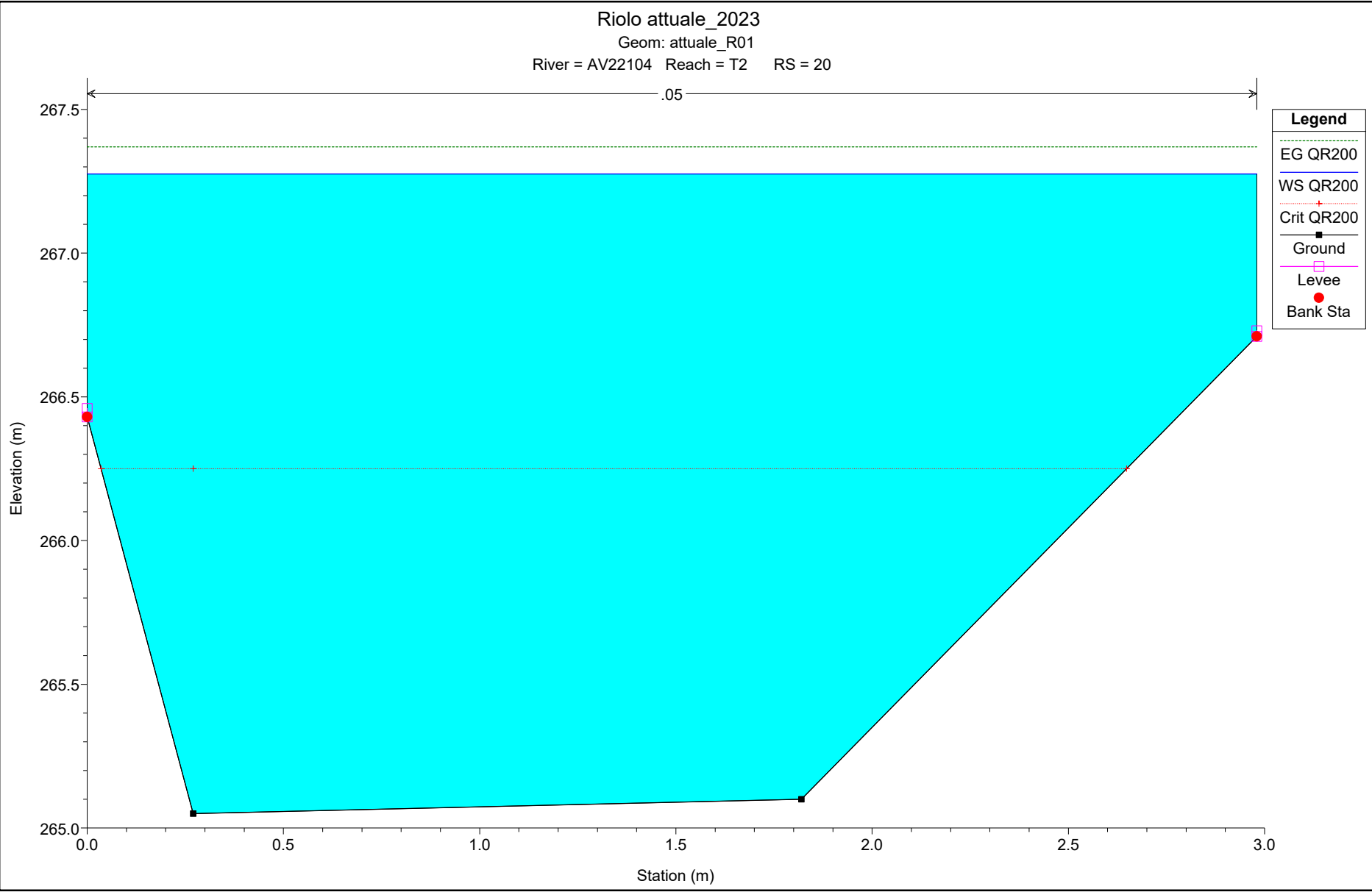
AV22104 T2



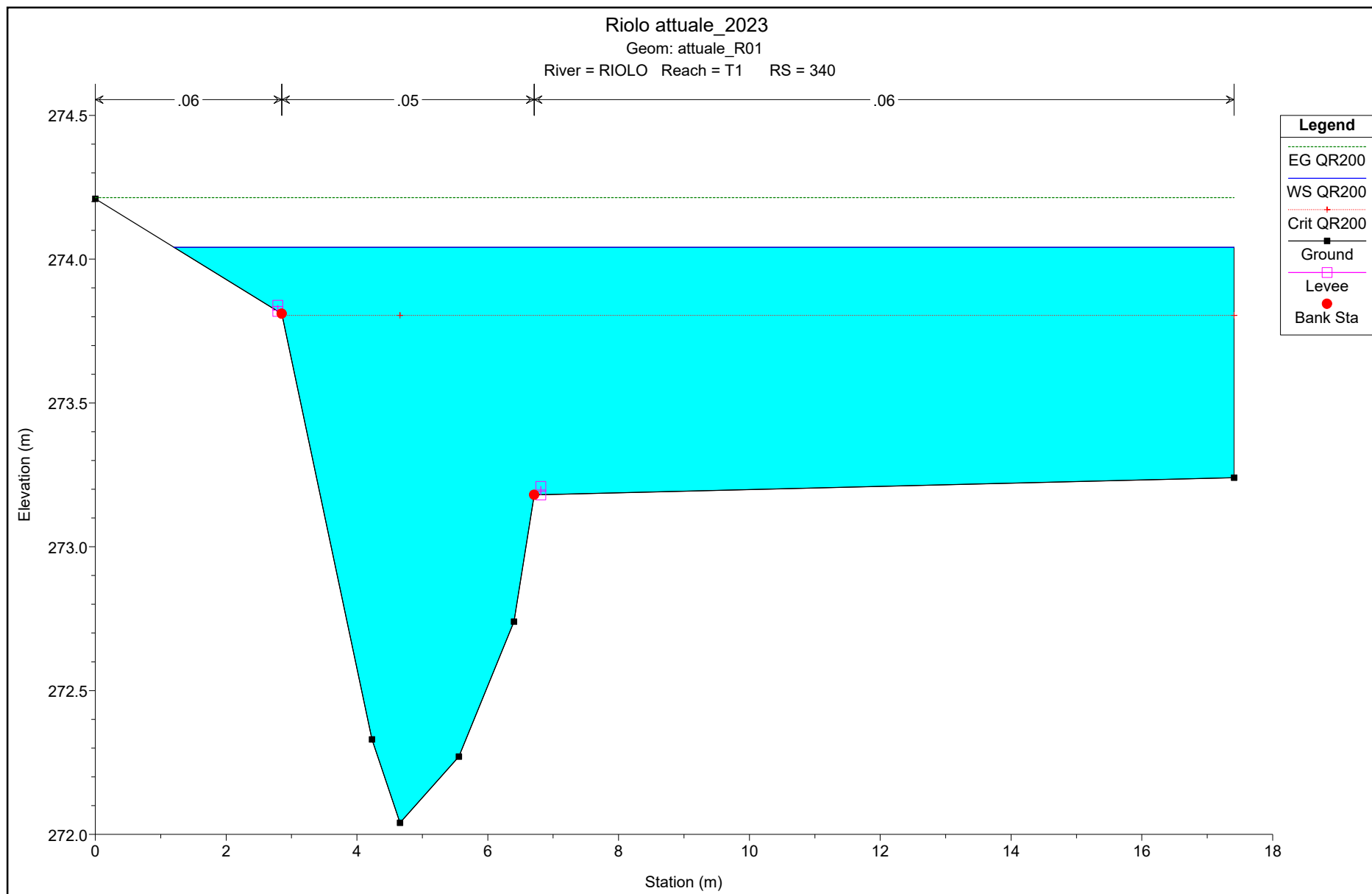


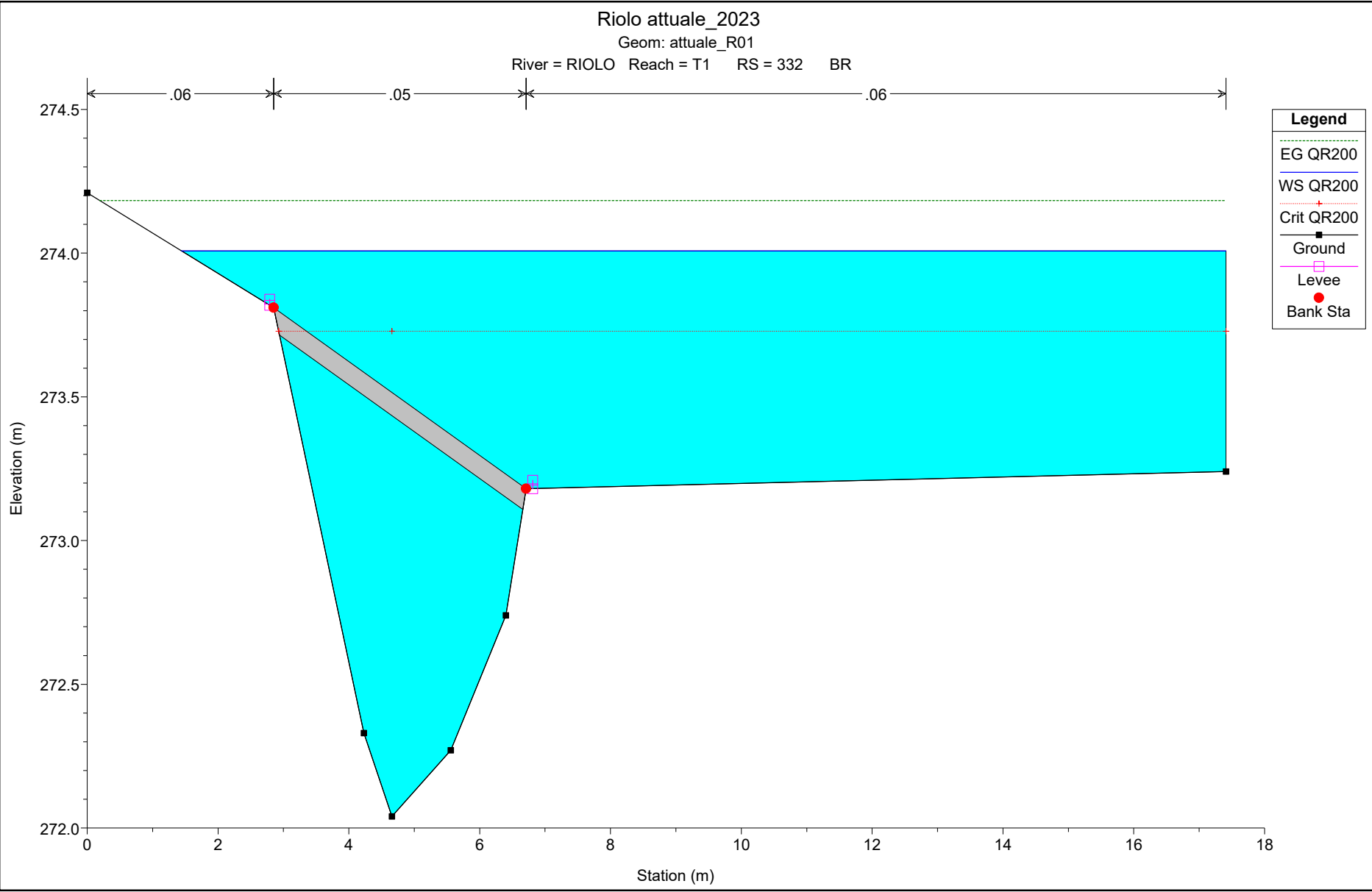


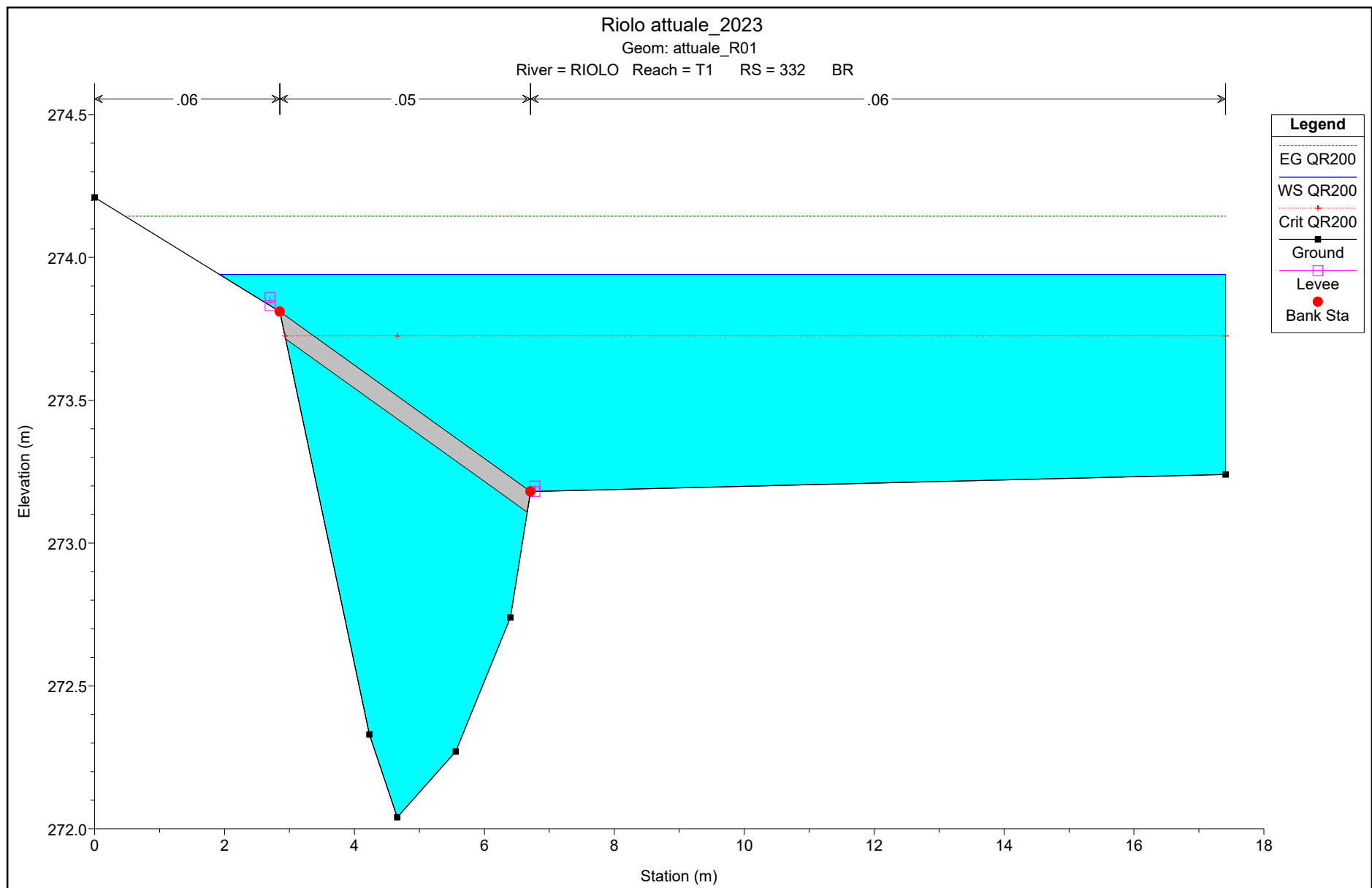


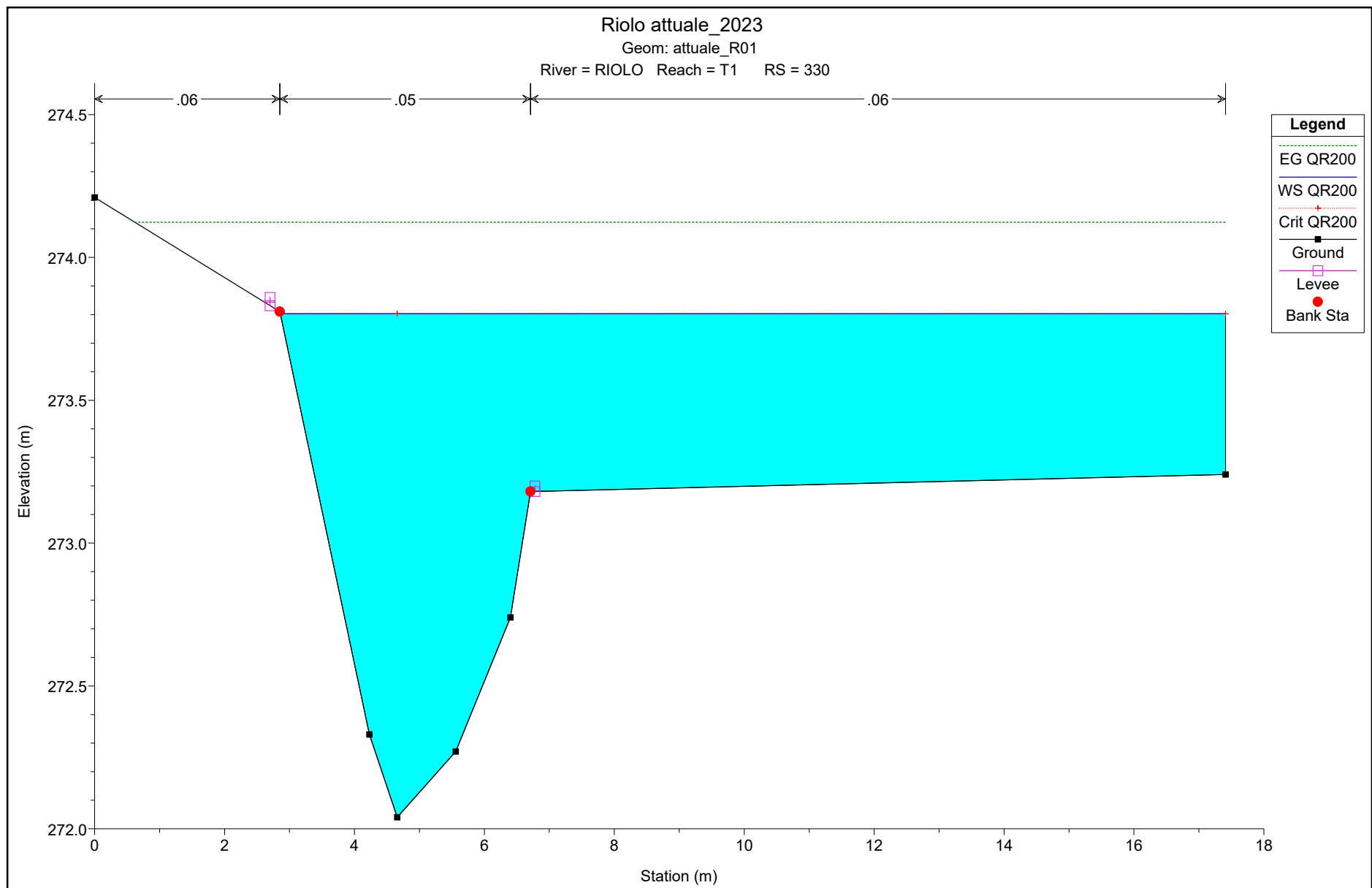


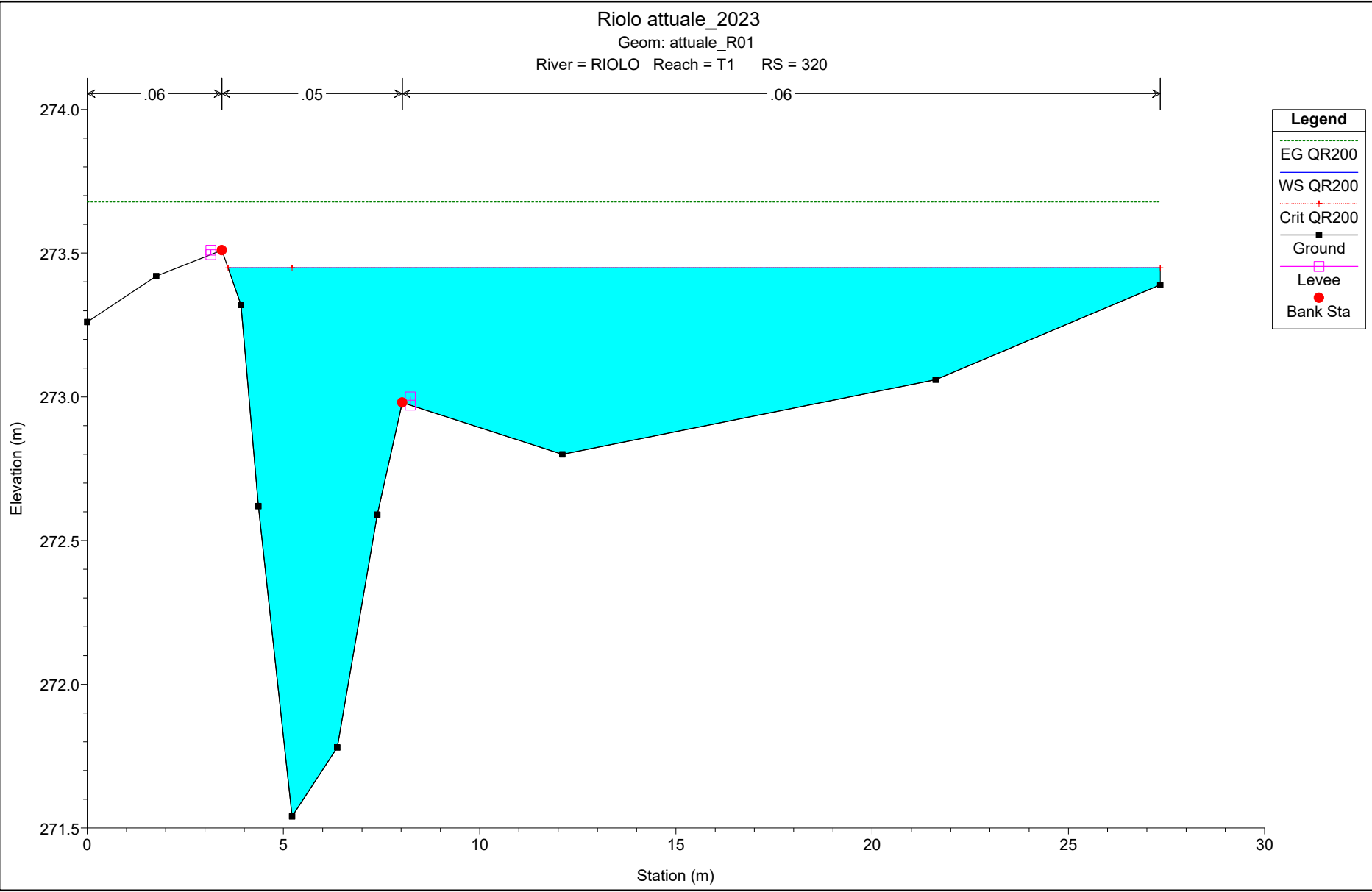


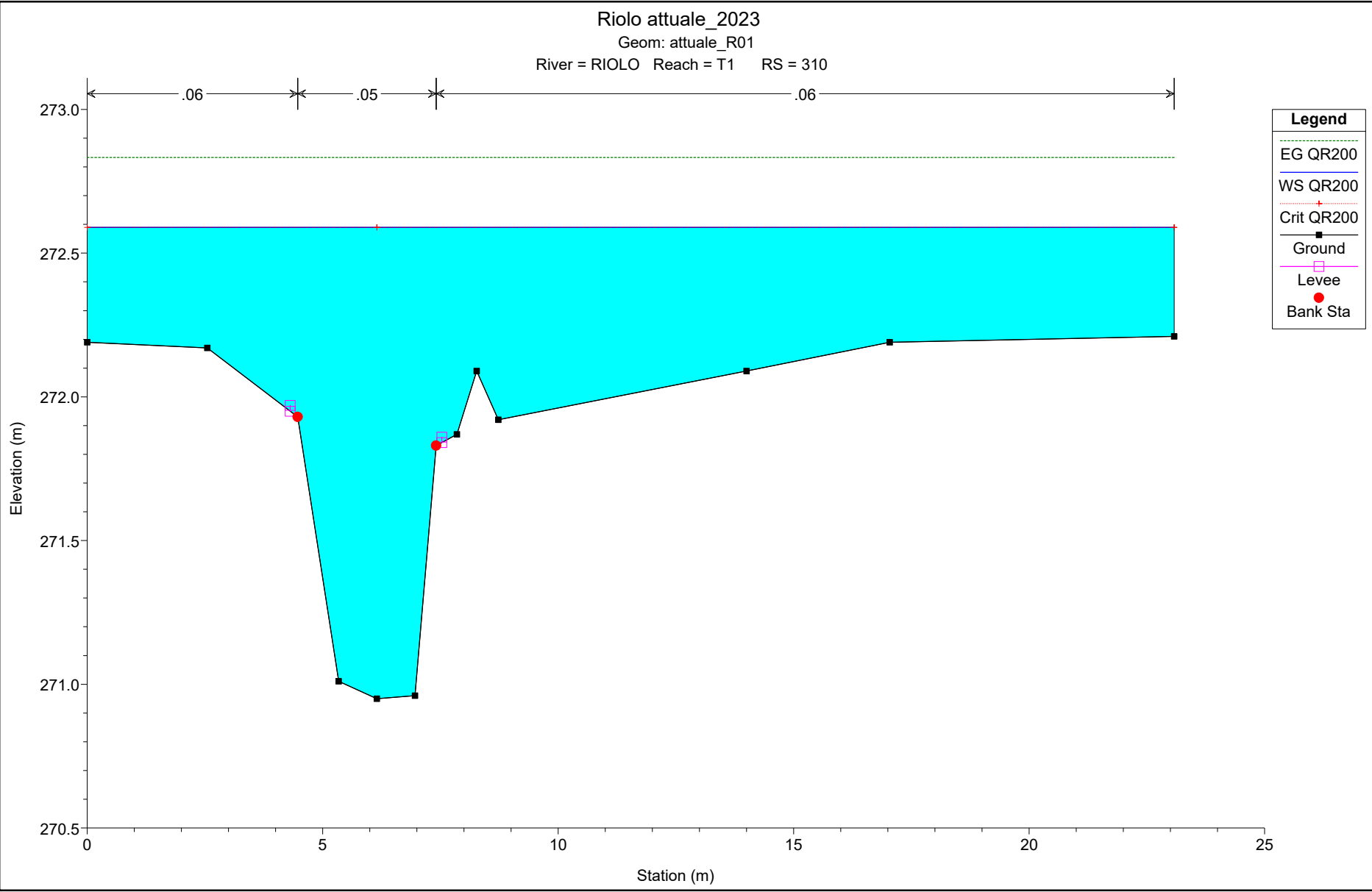




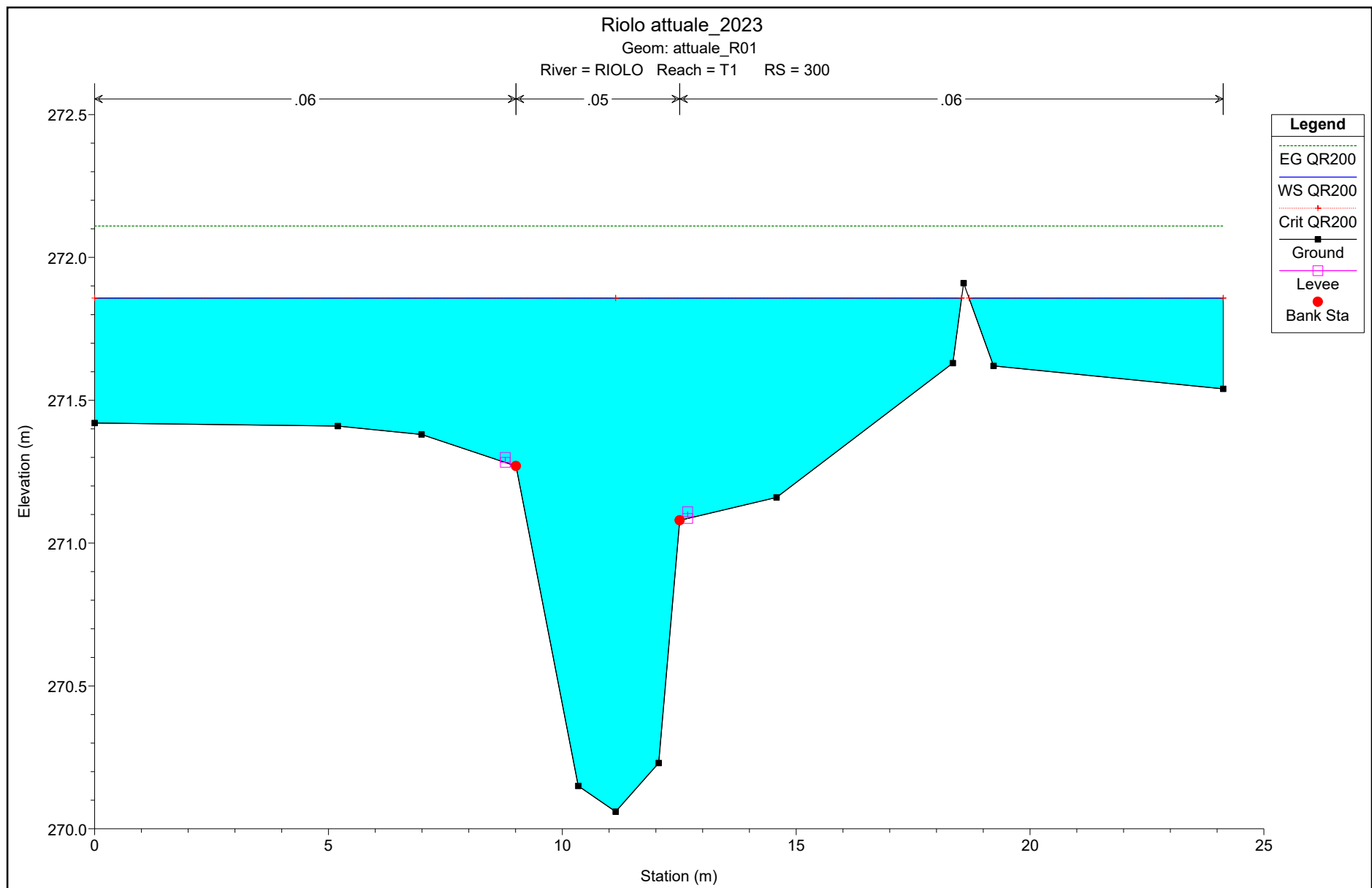


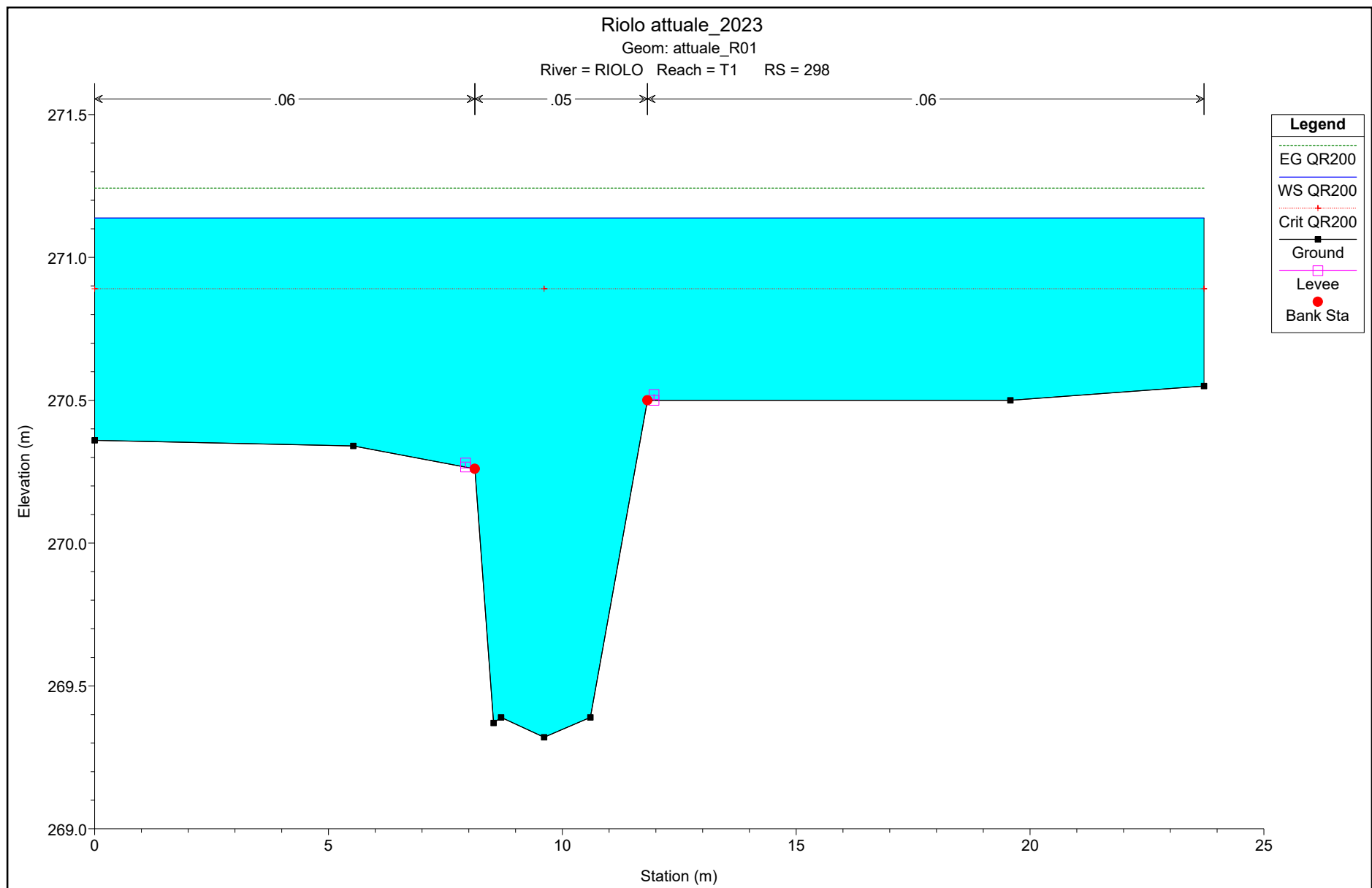


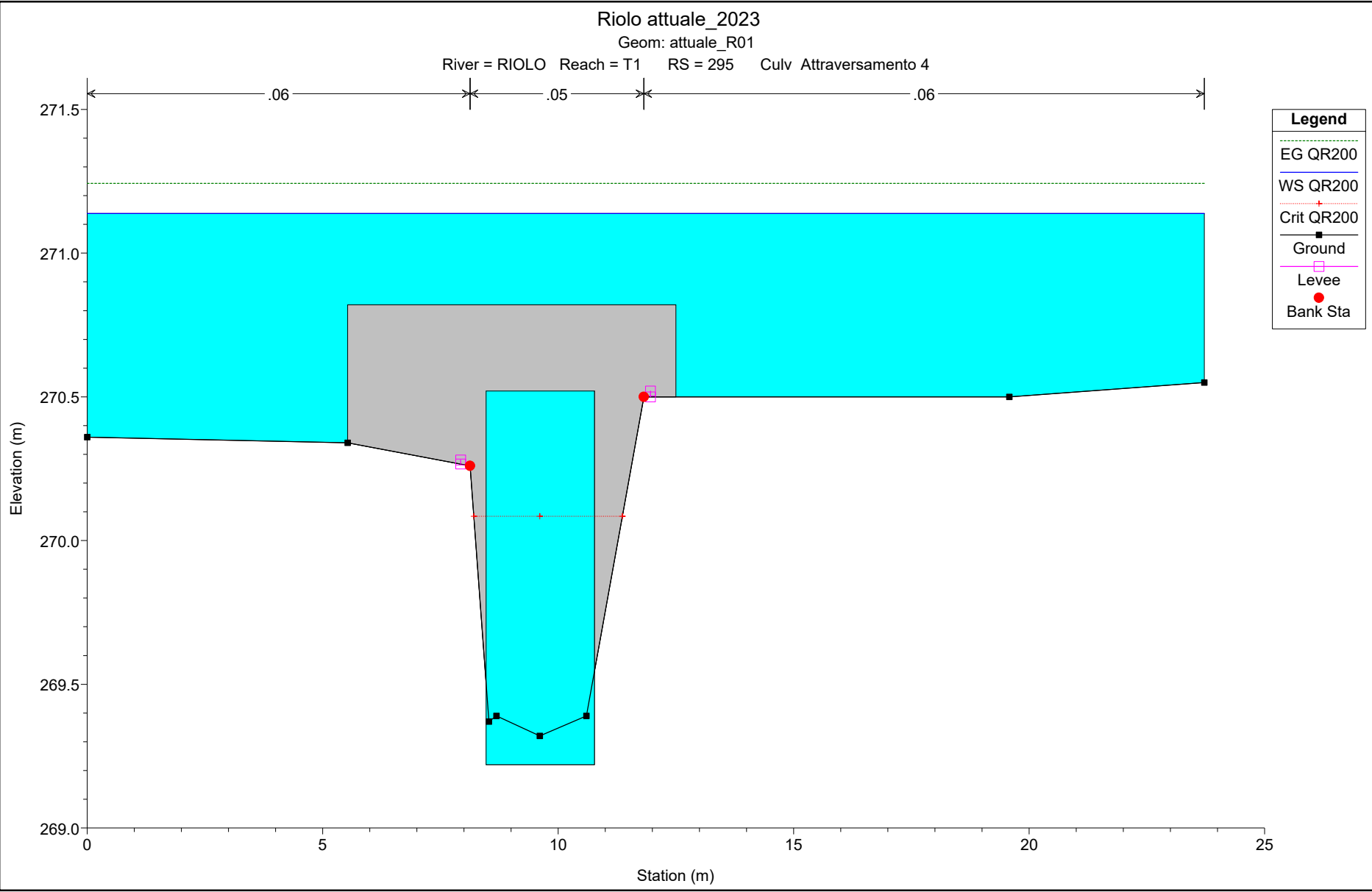


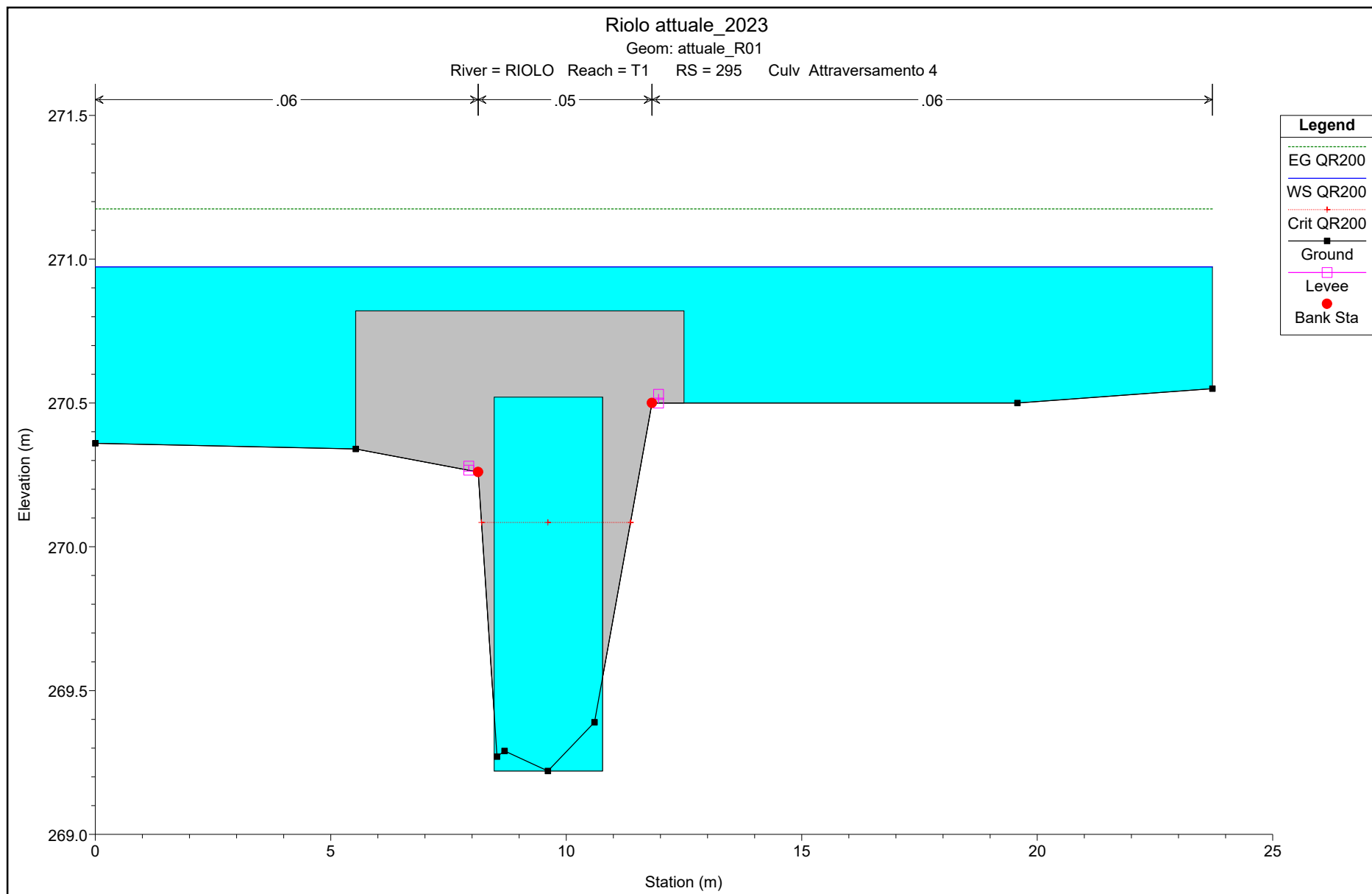


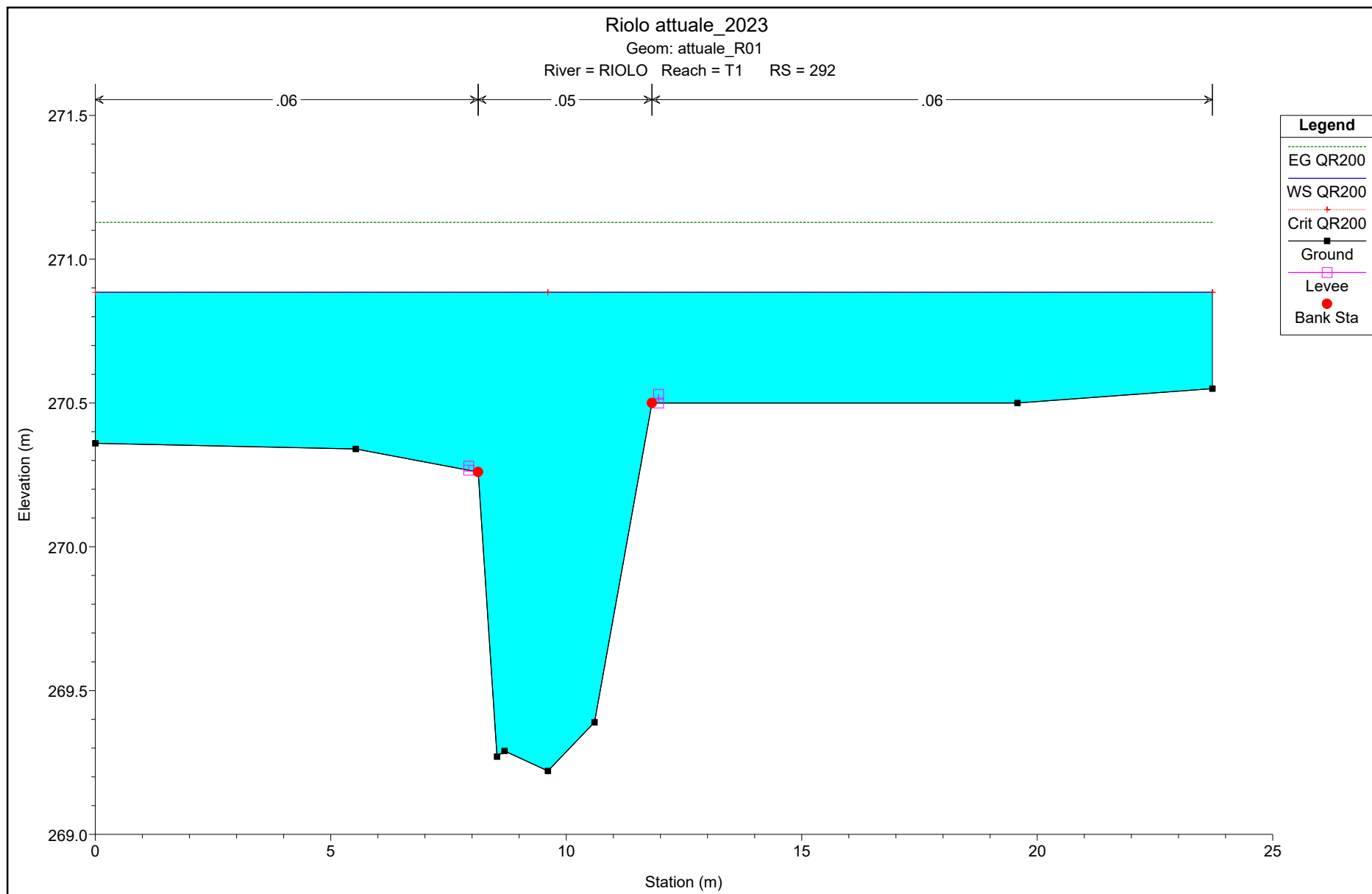


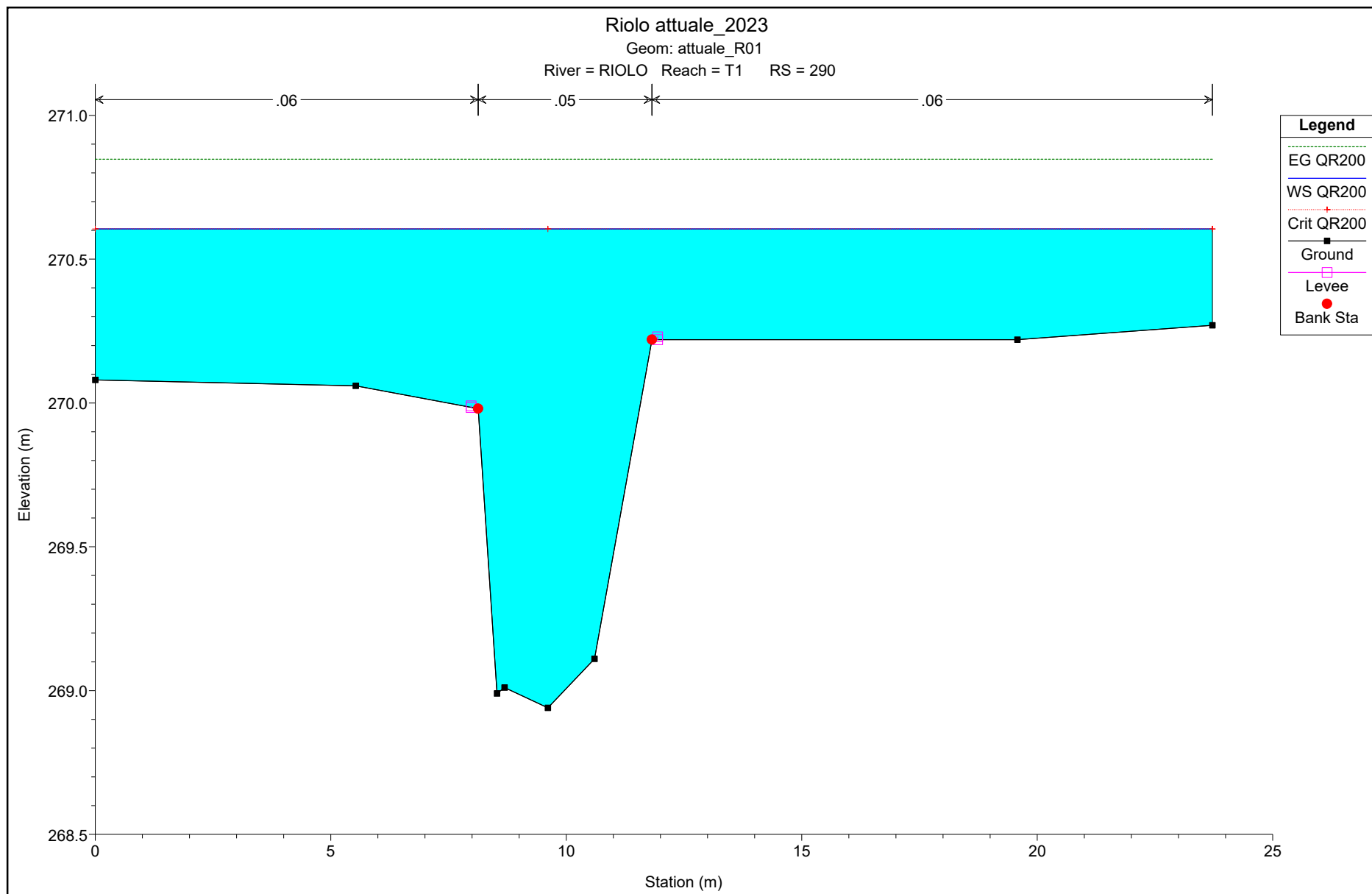


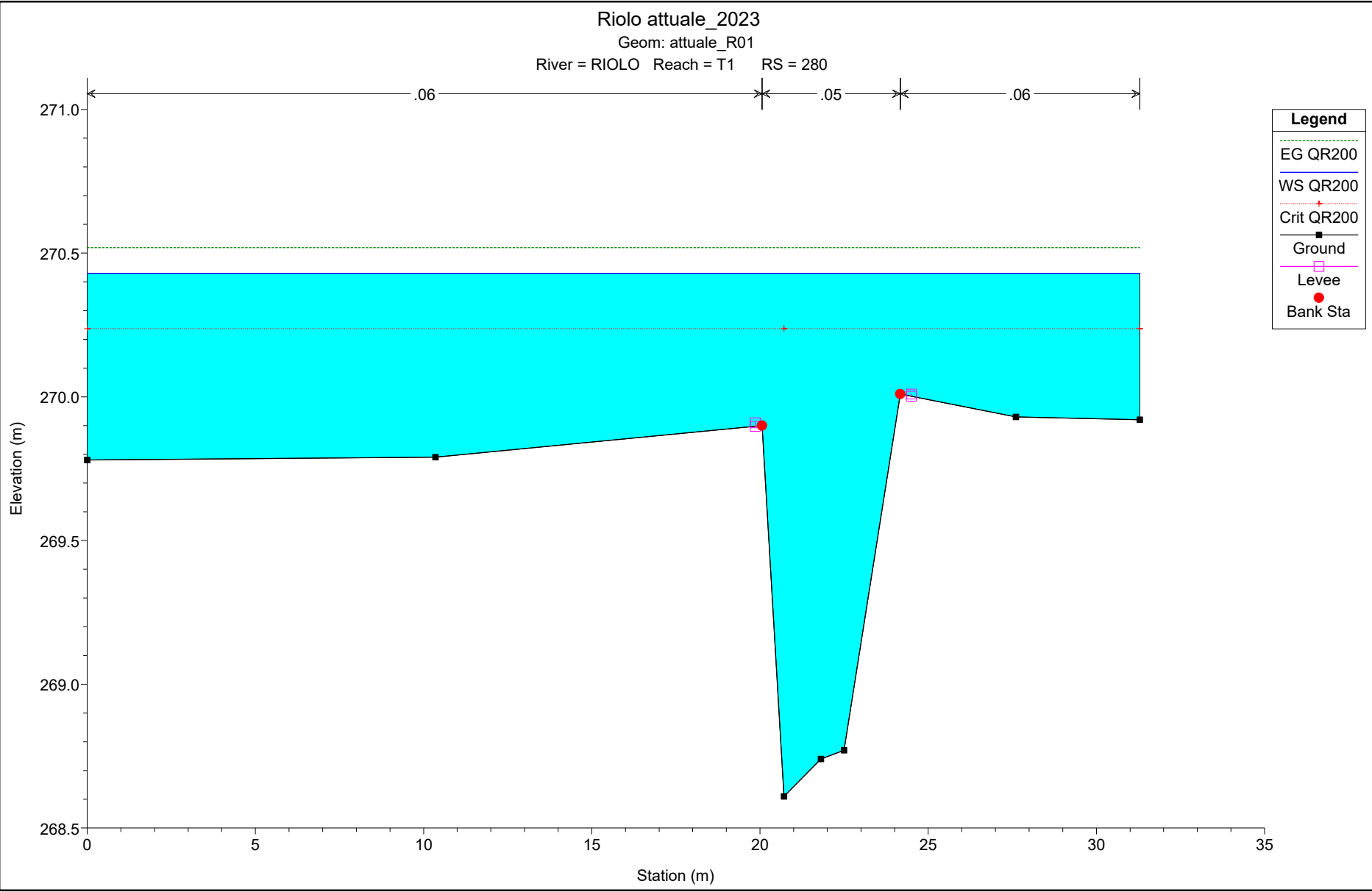


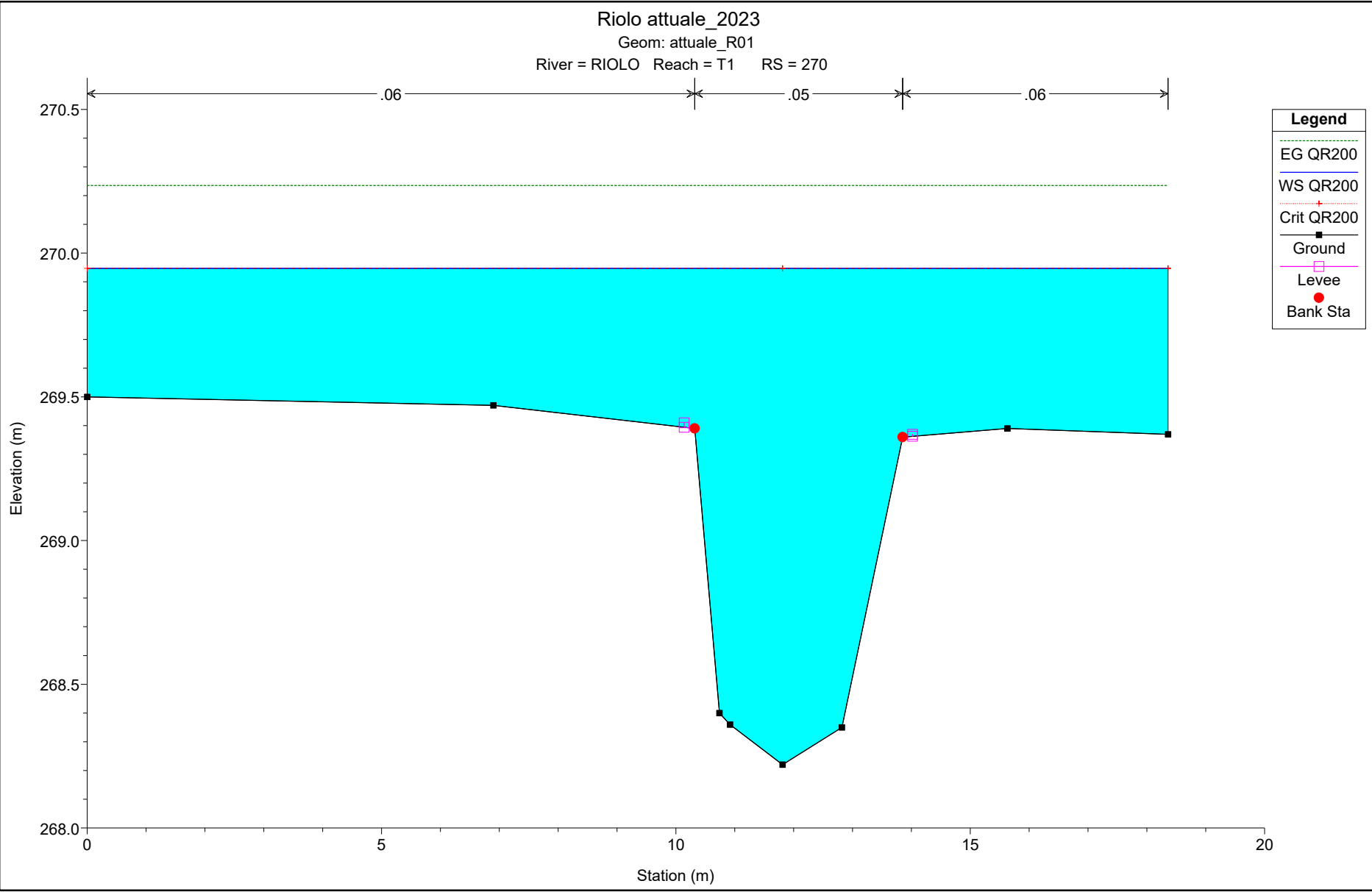




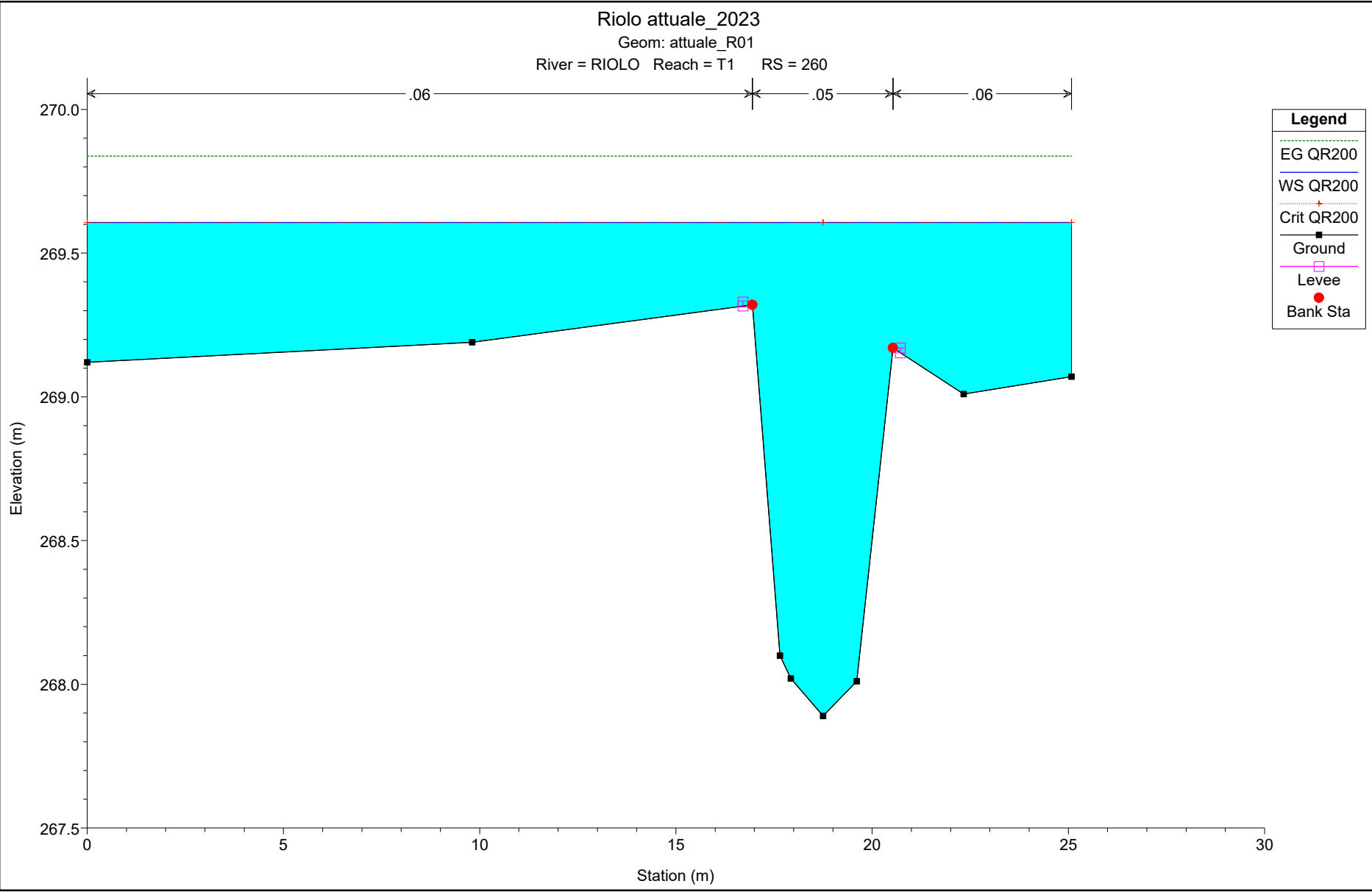


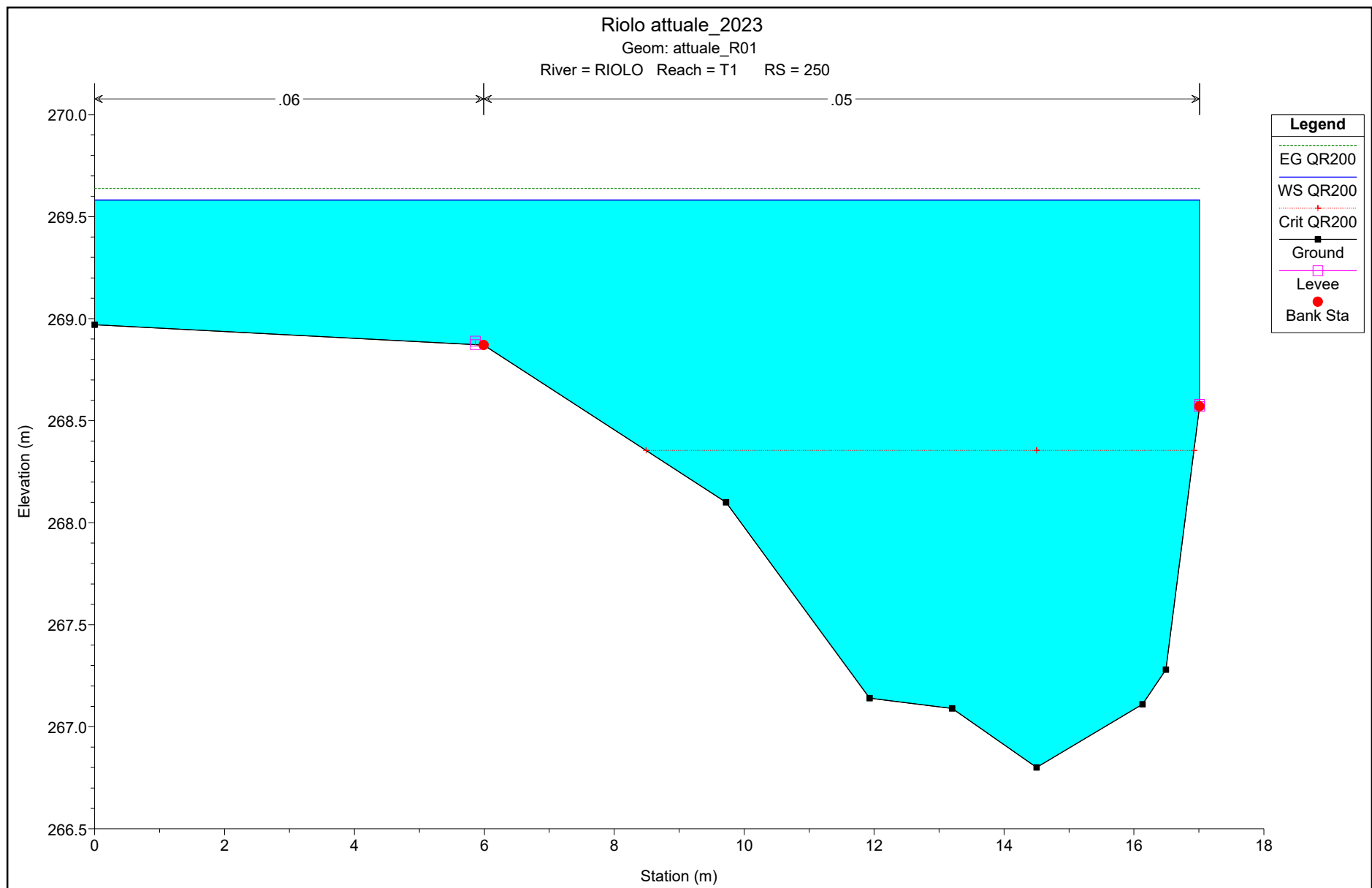


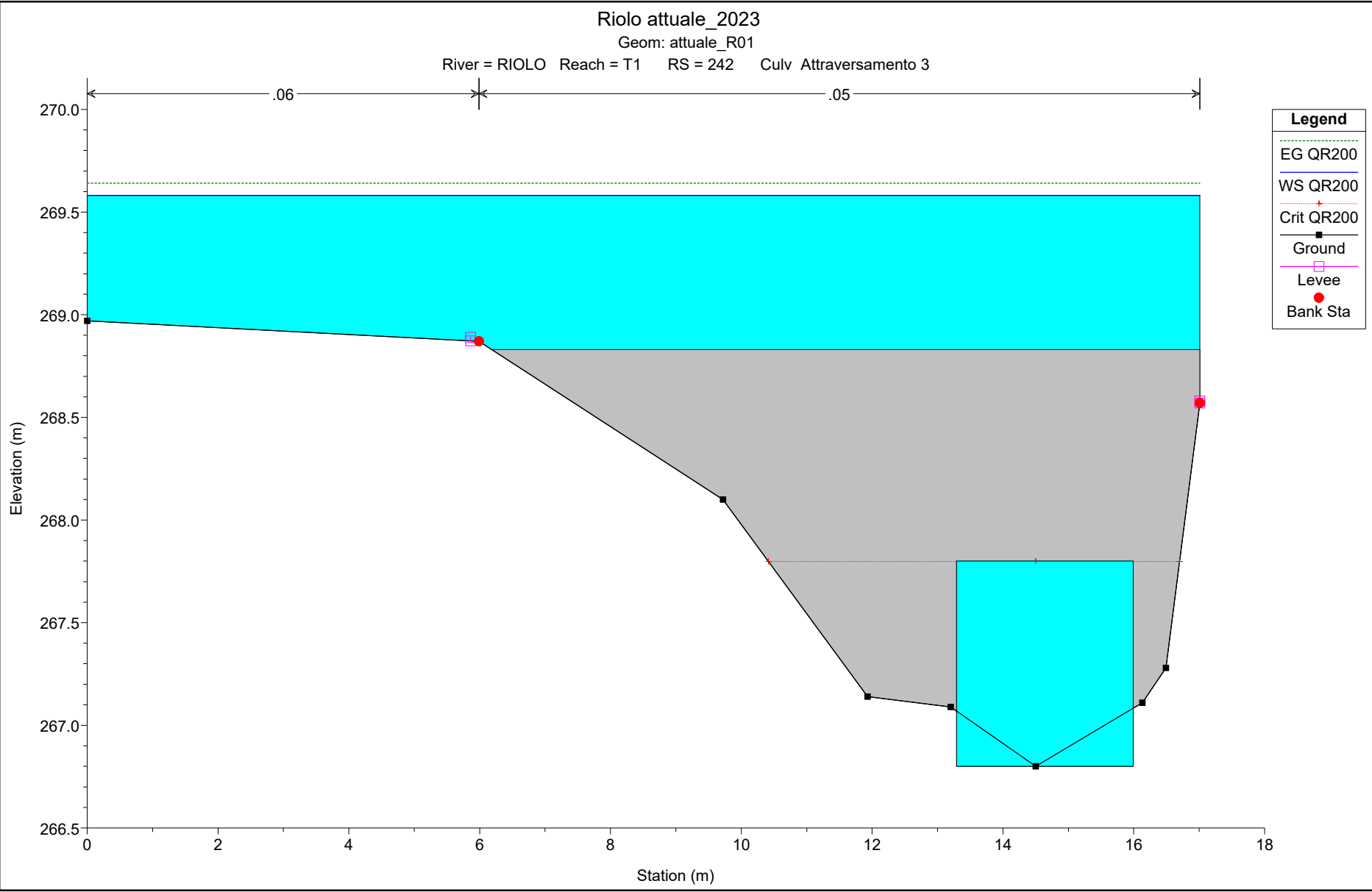


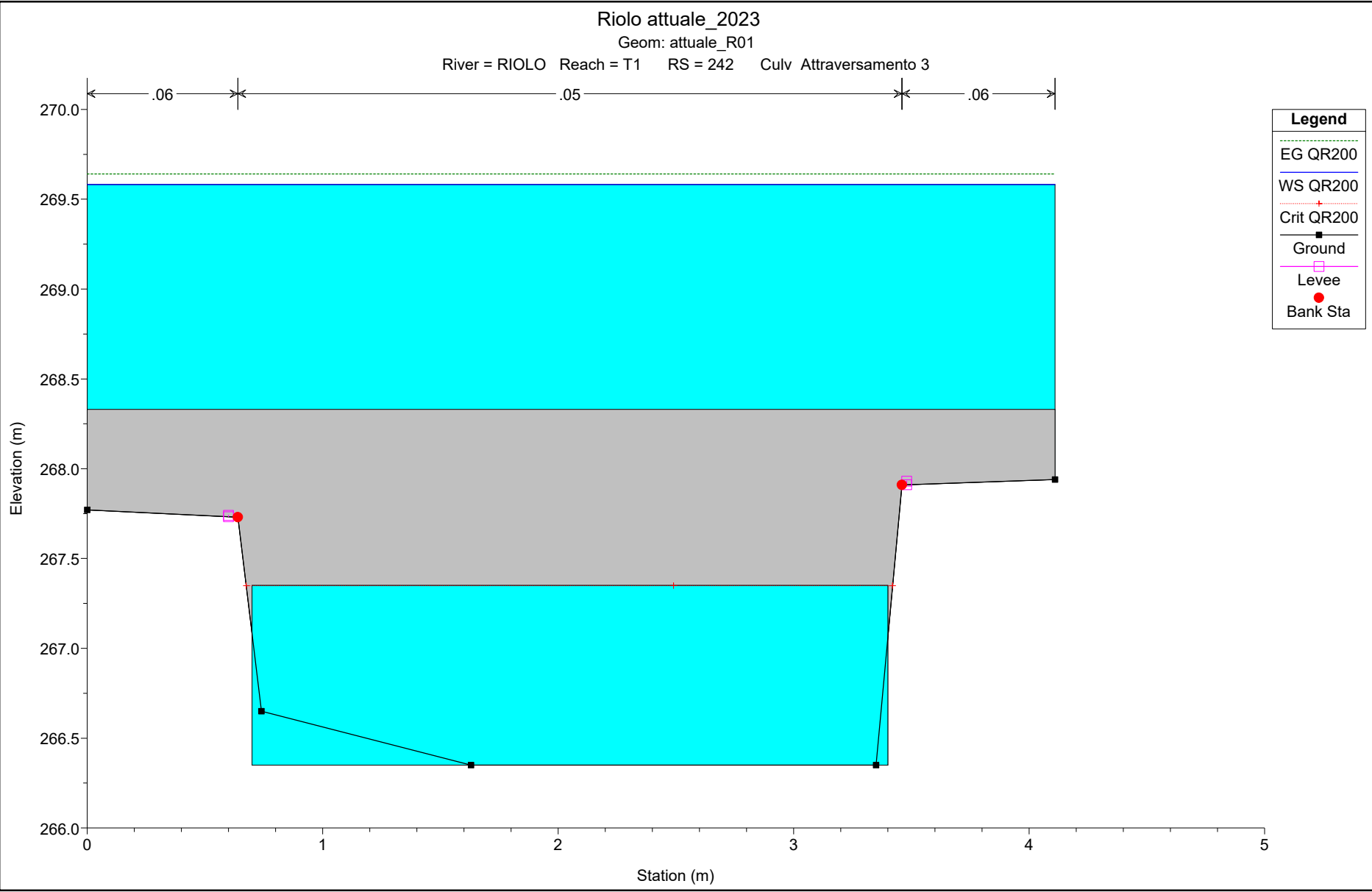


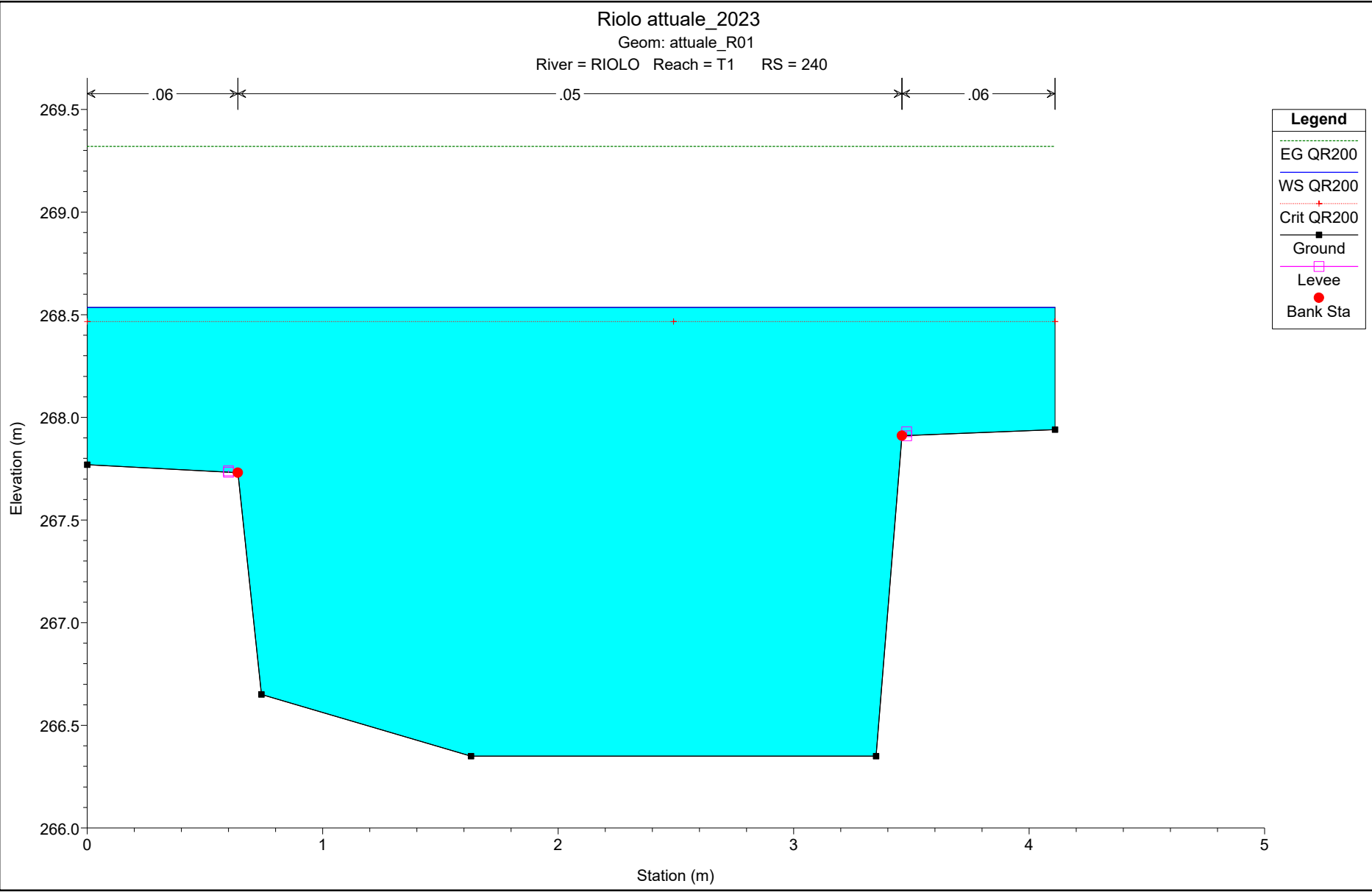


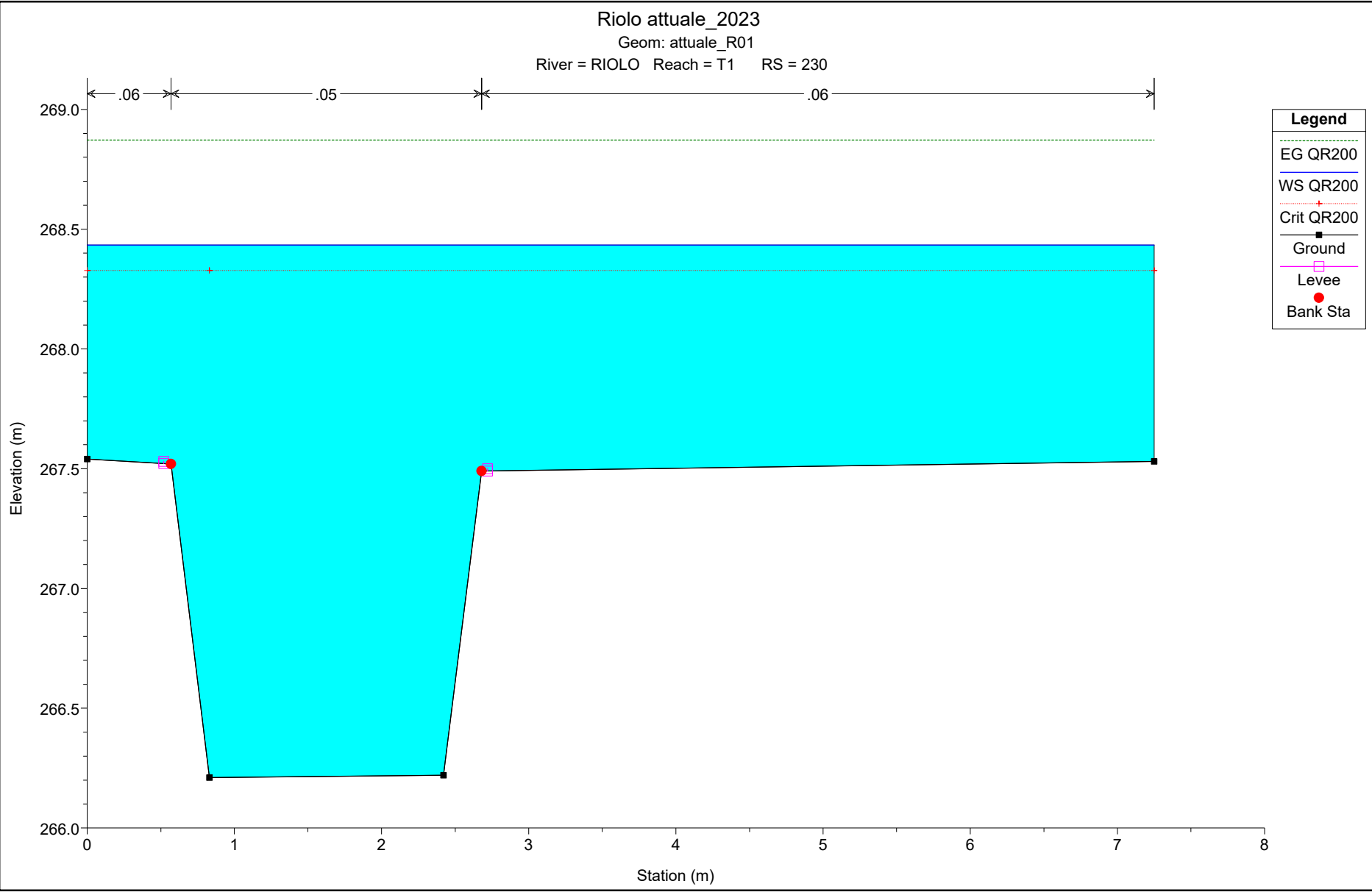


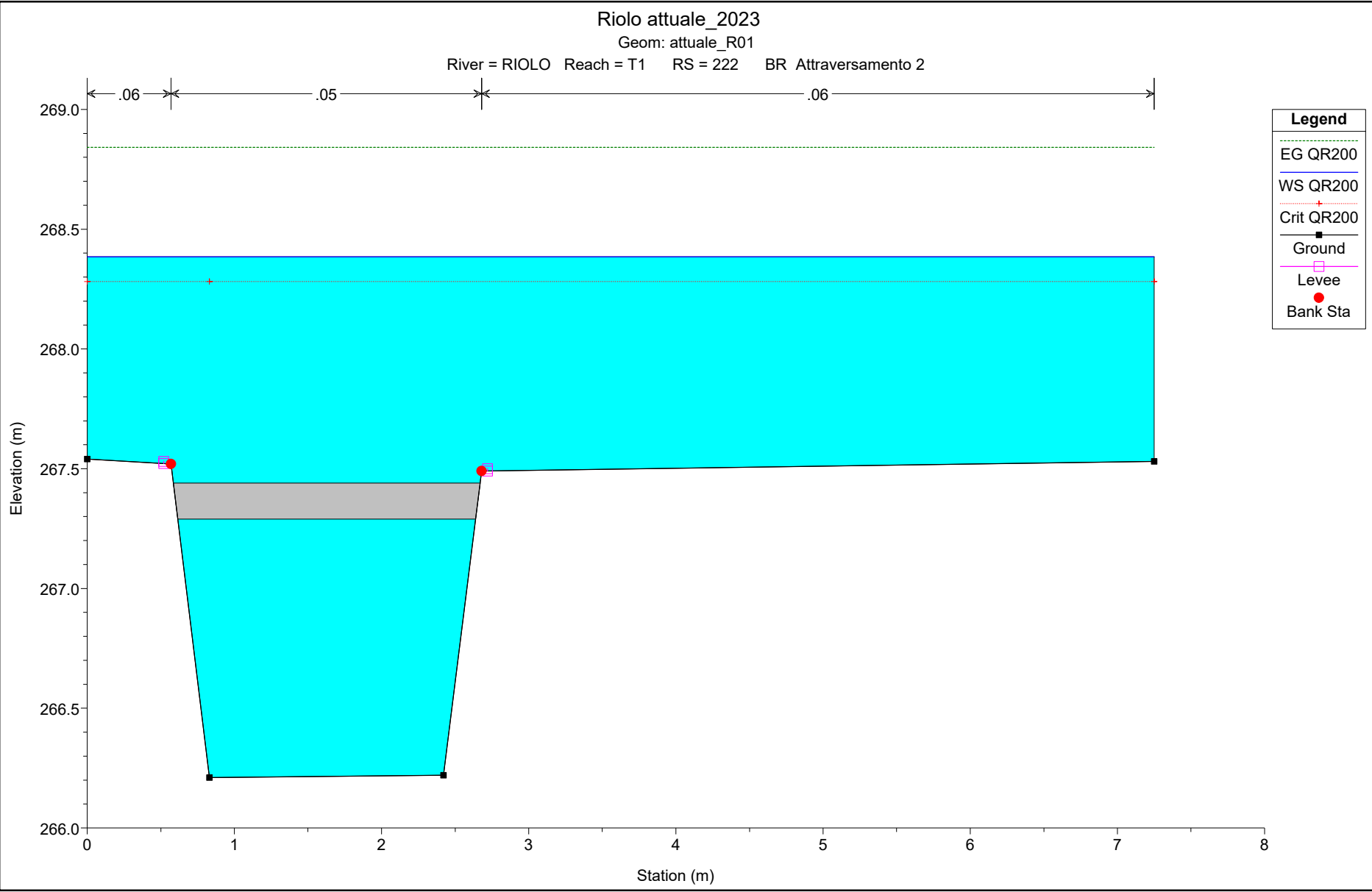


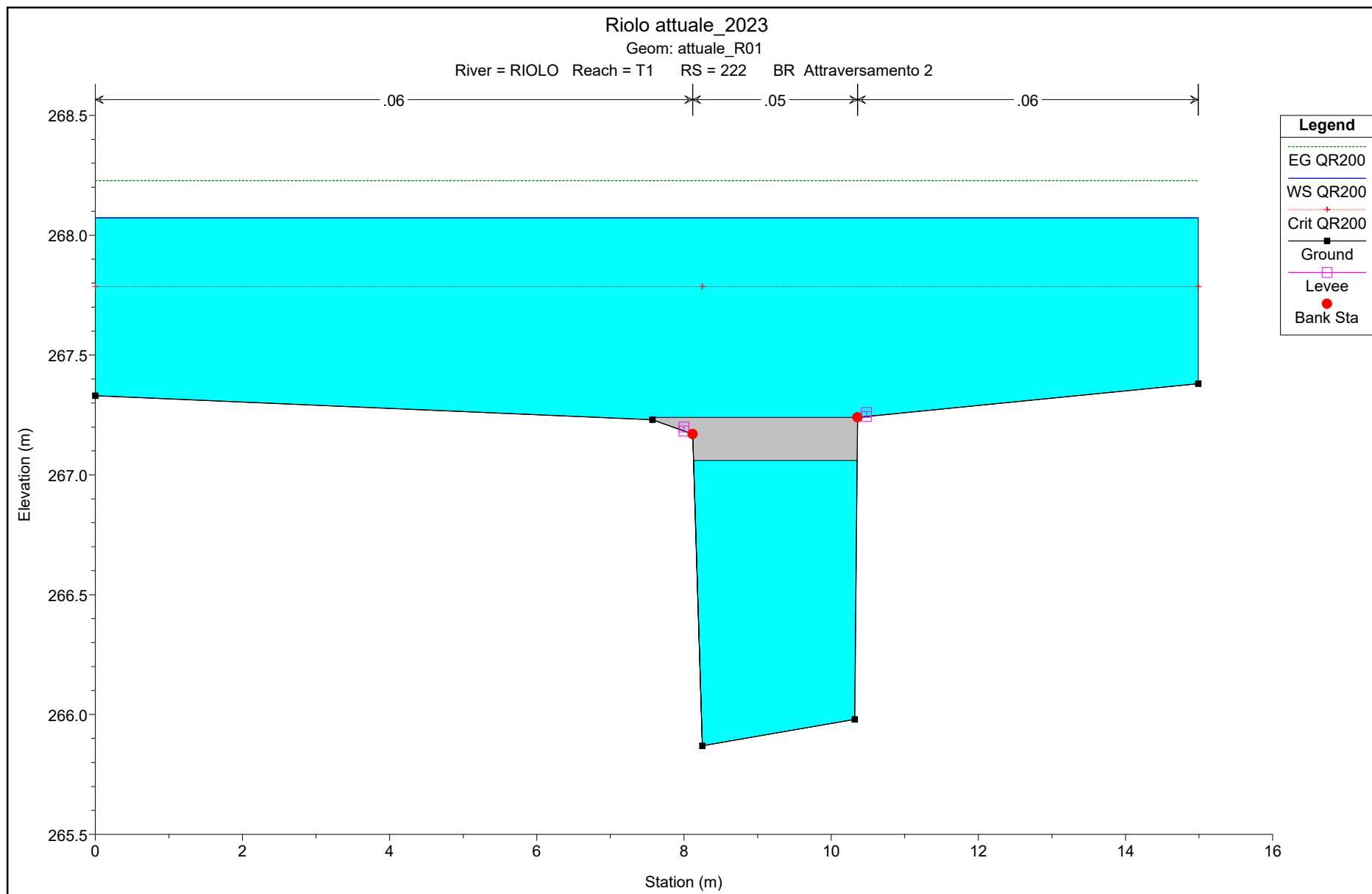




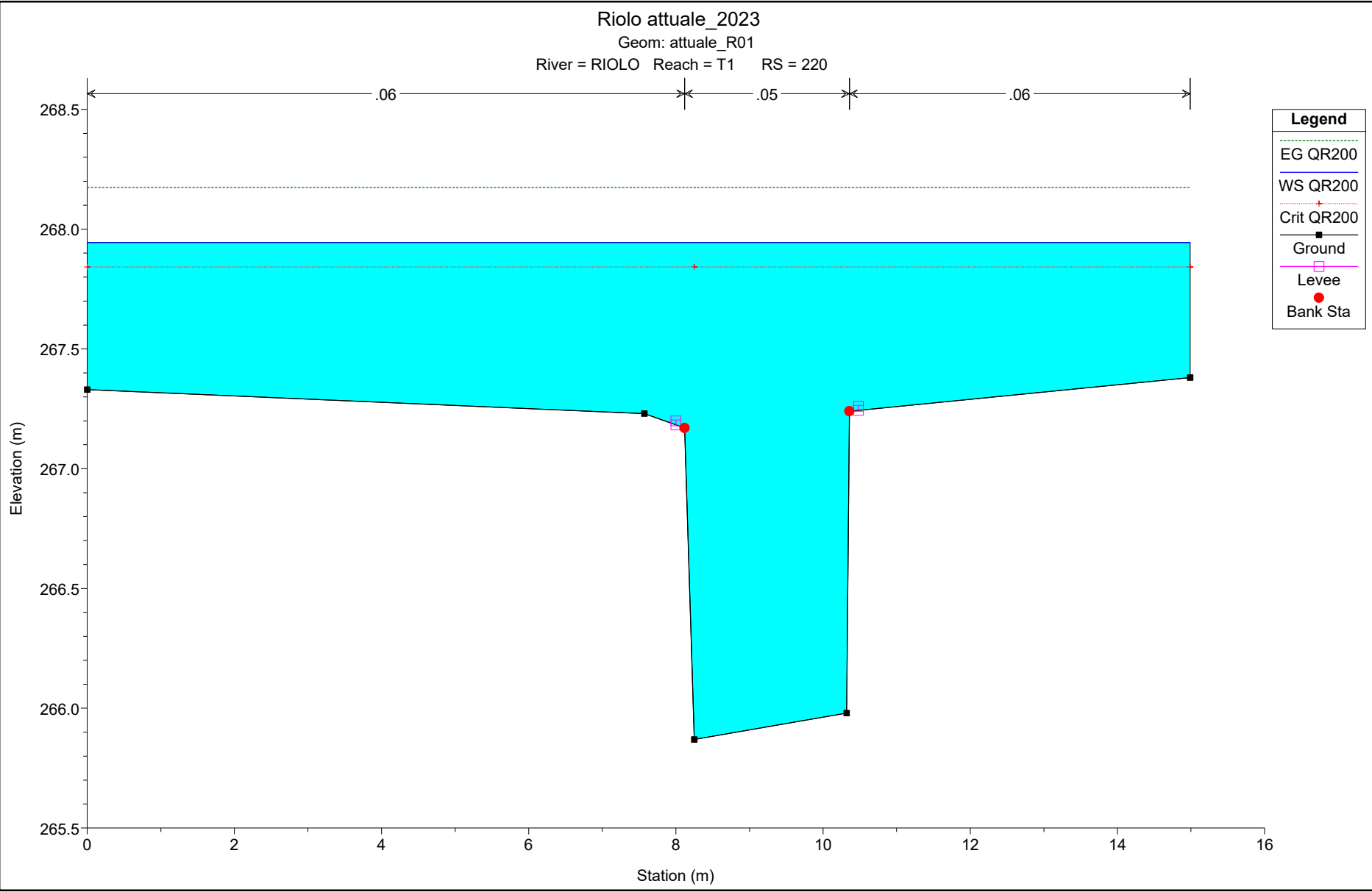


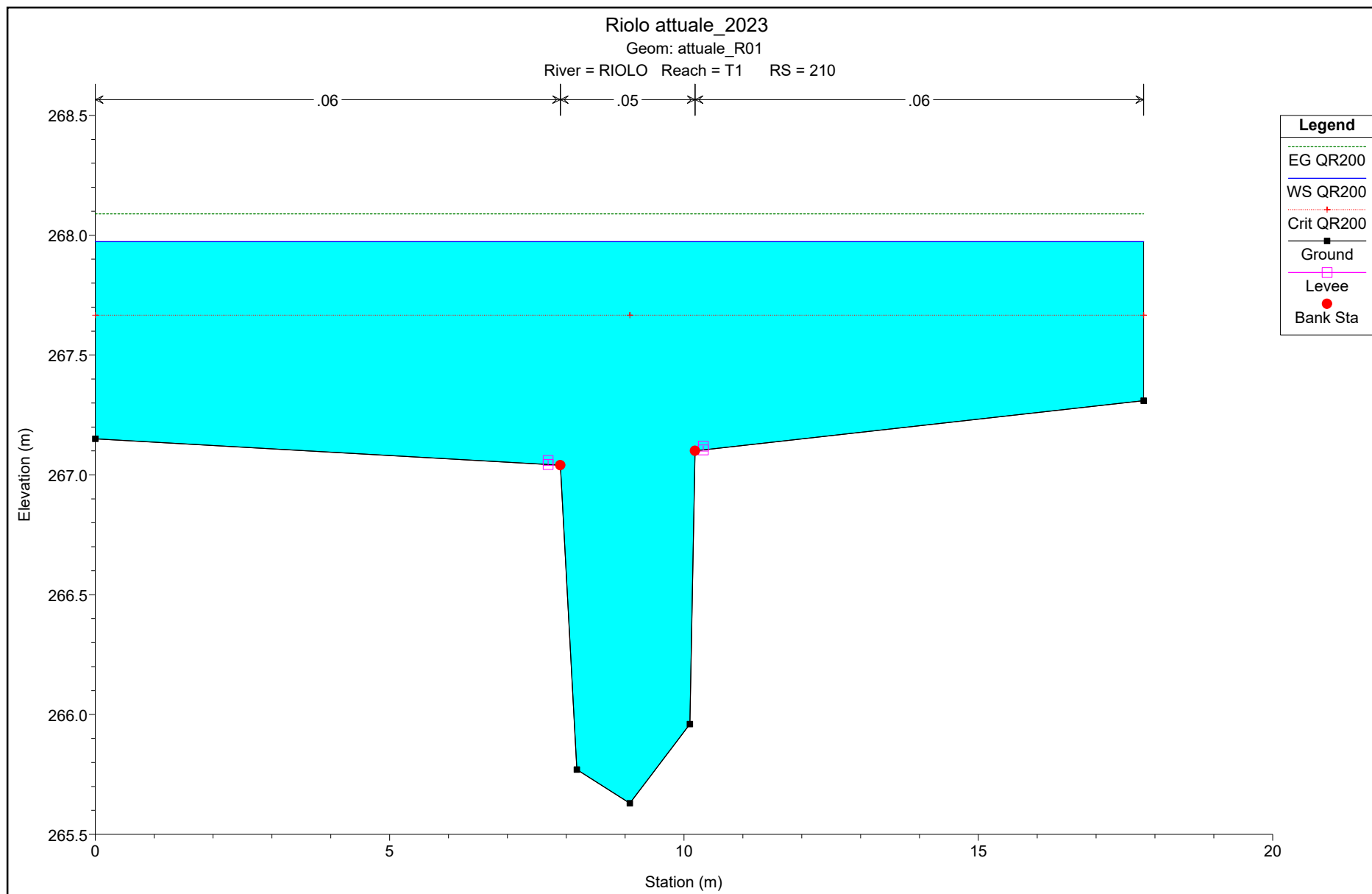


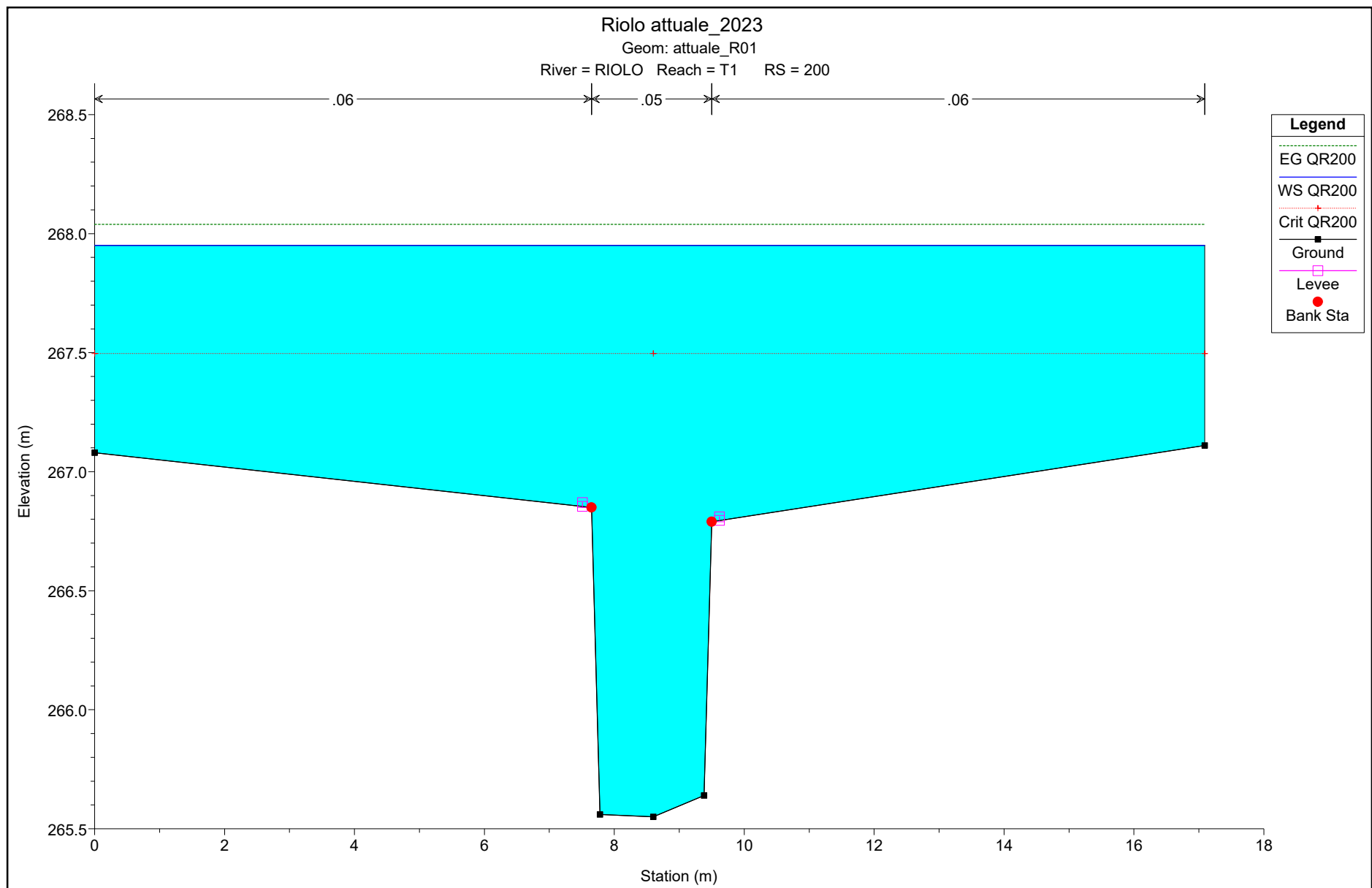


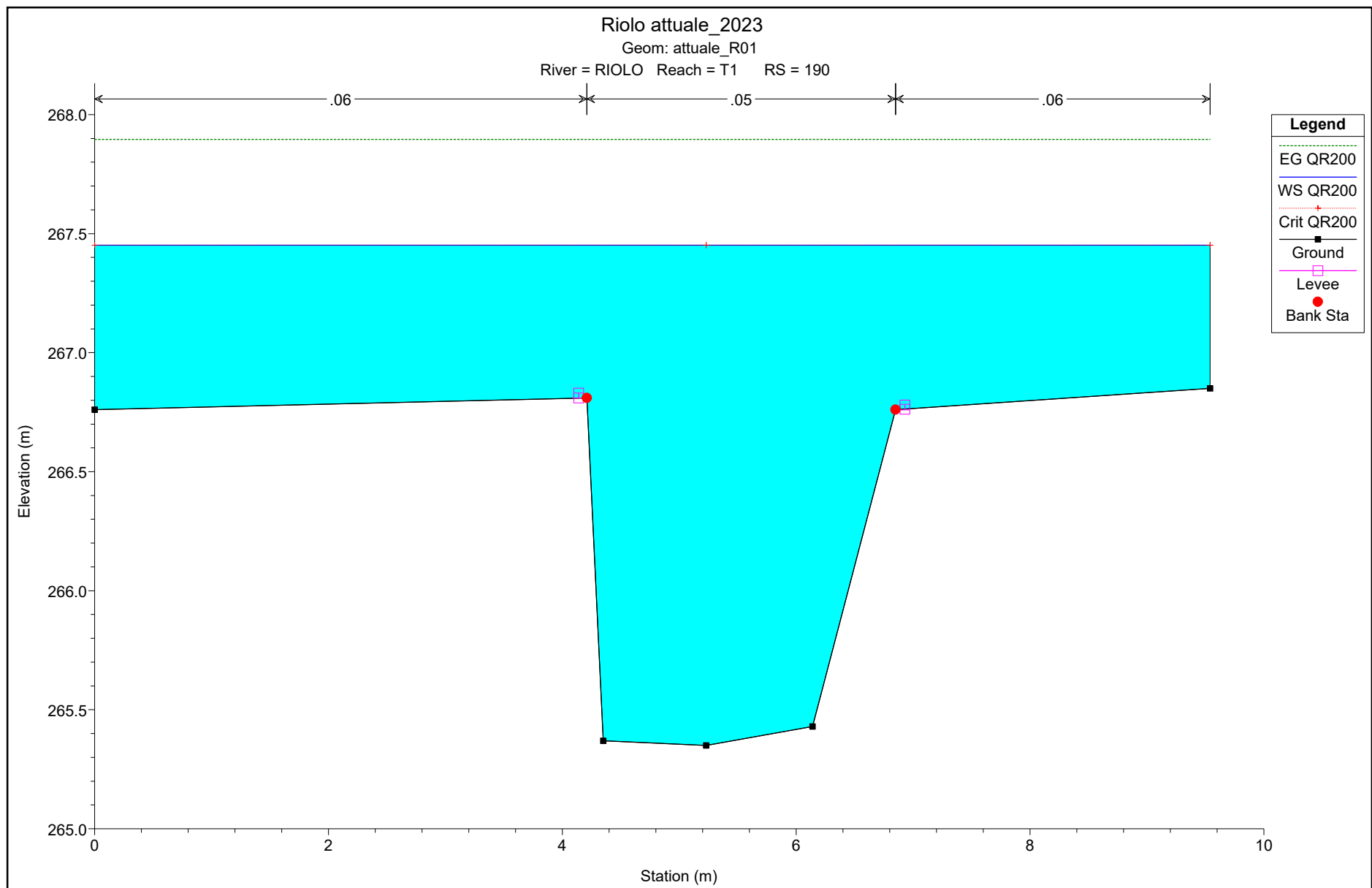


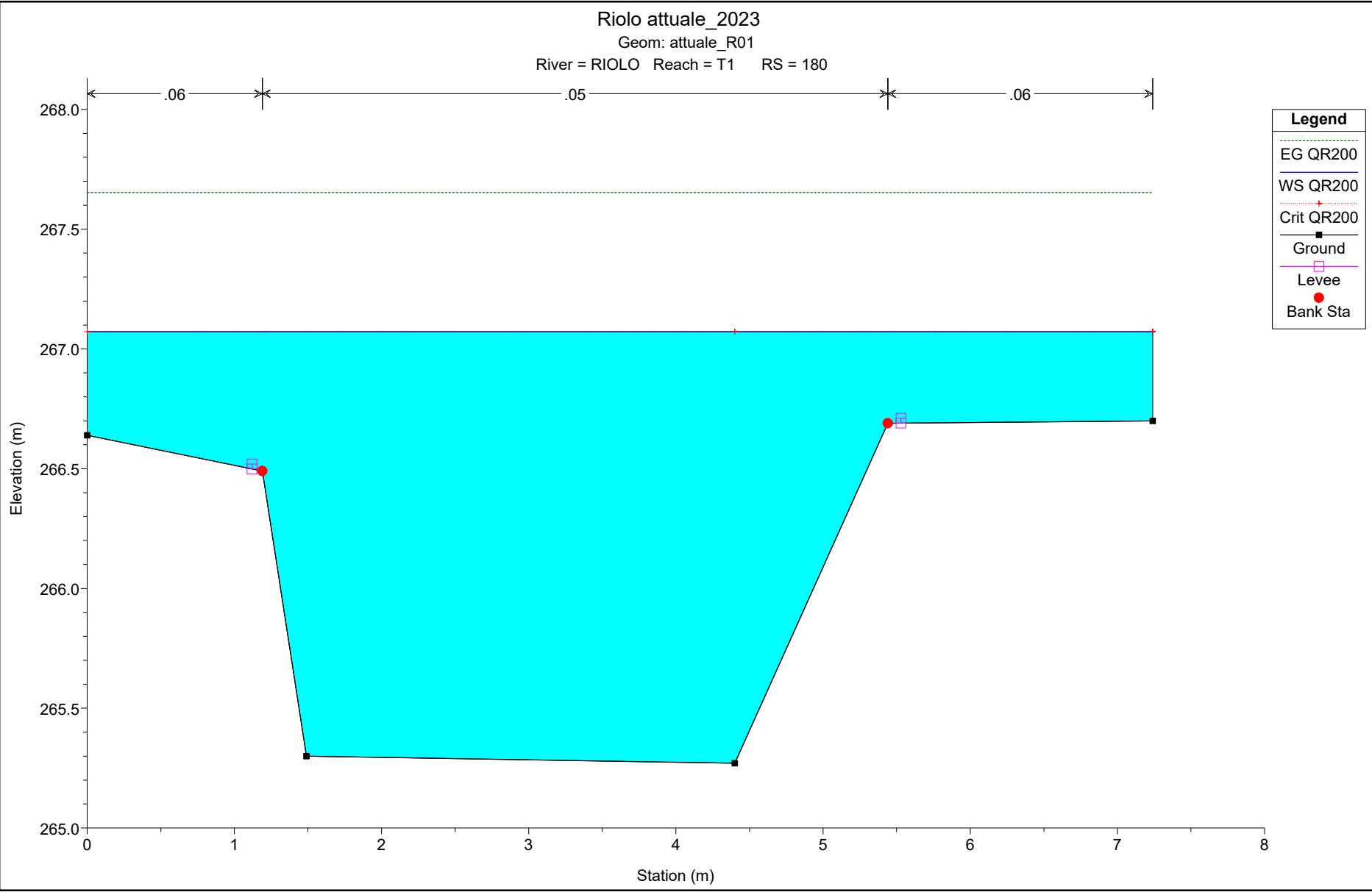


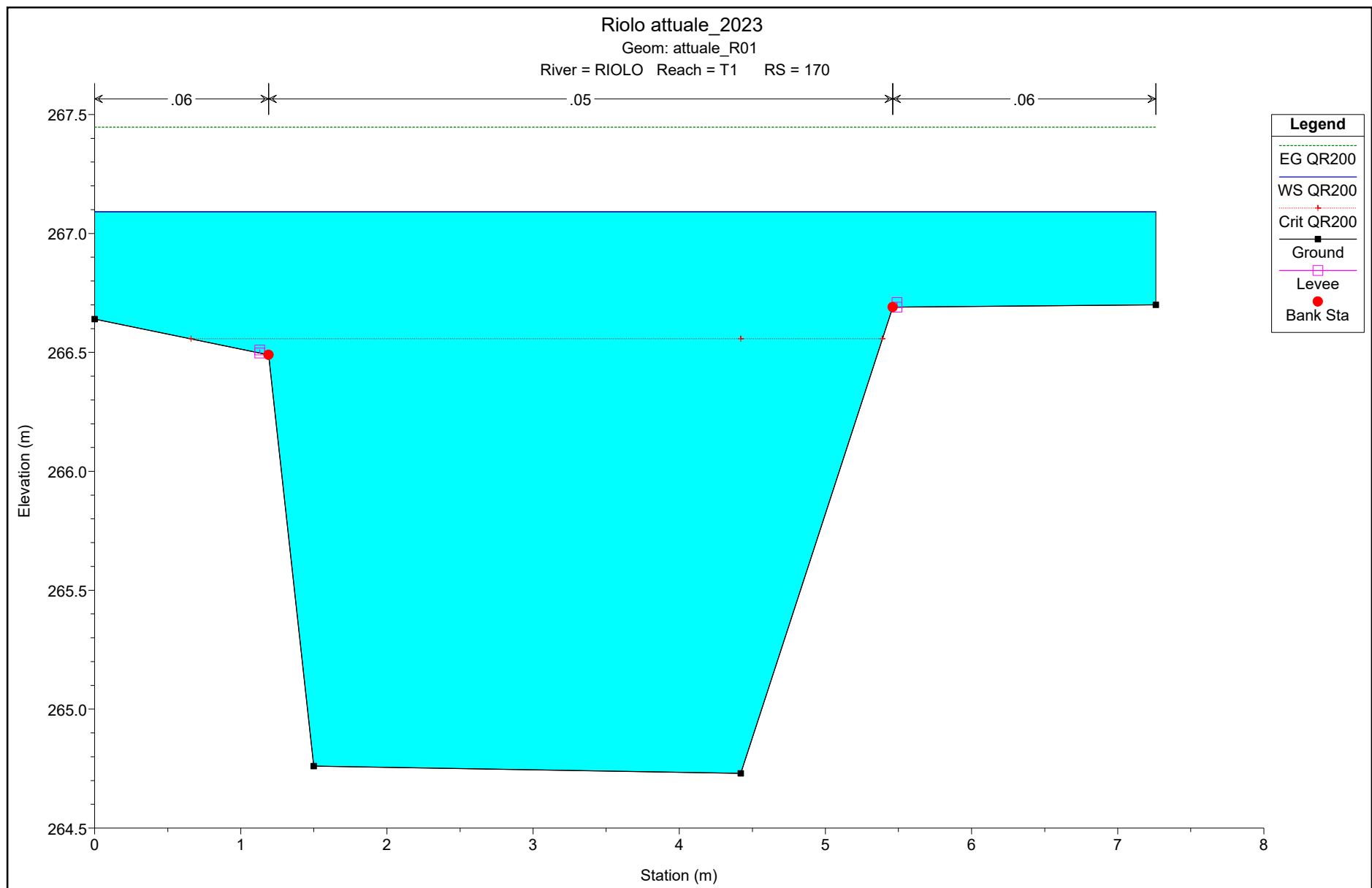


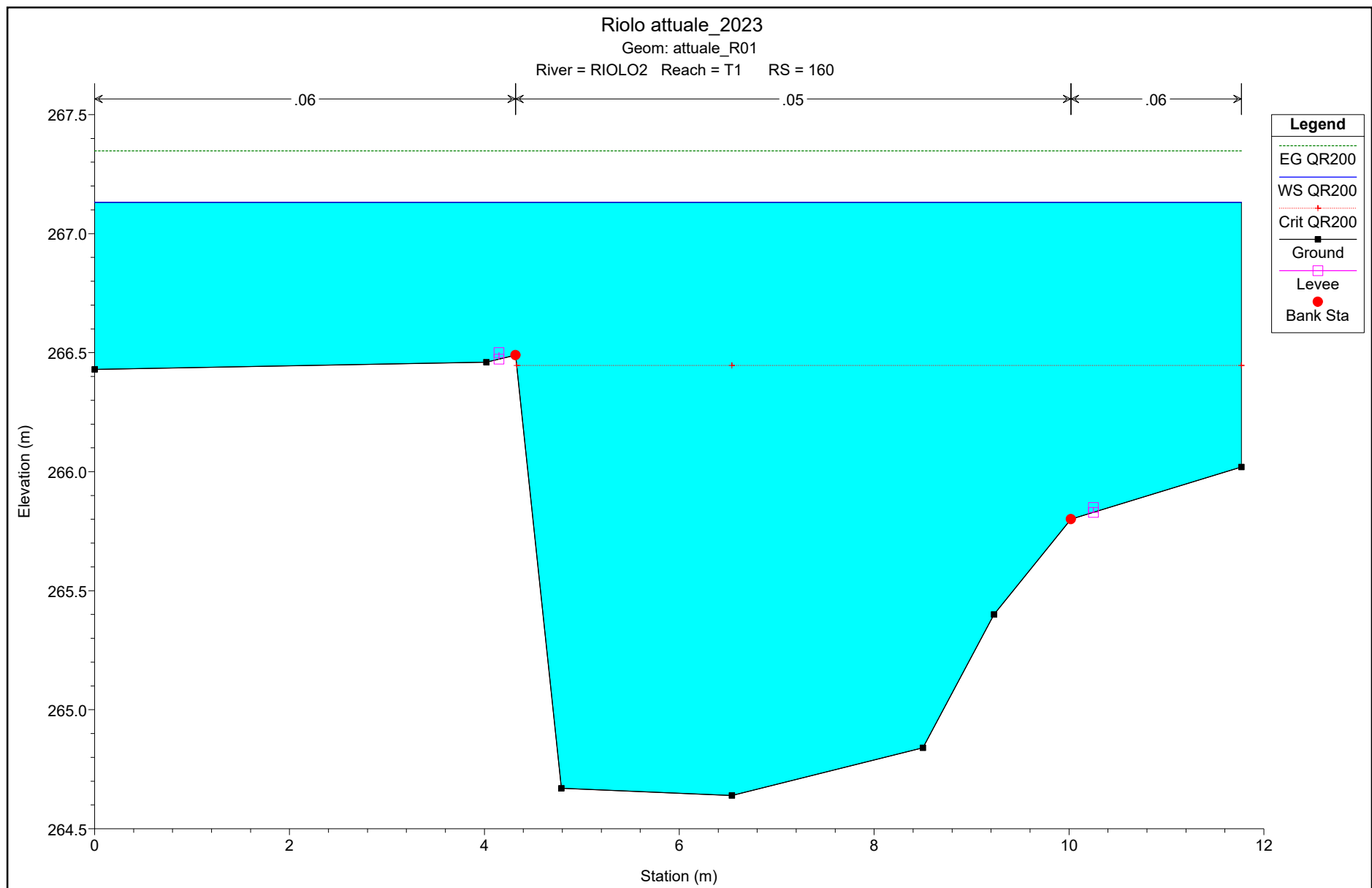


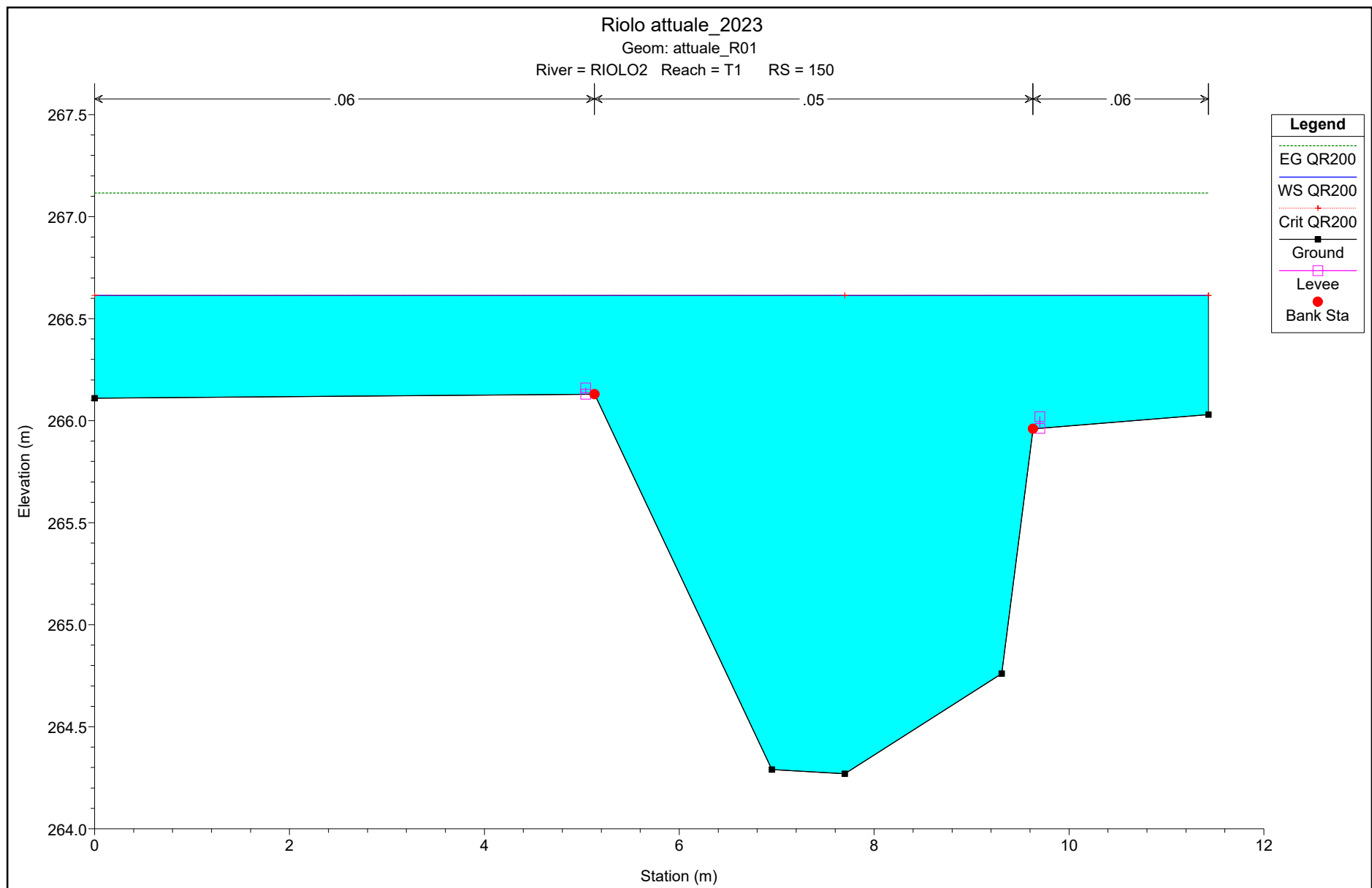




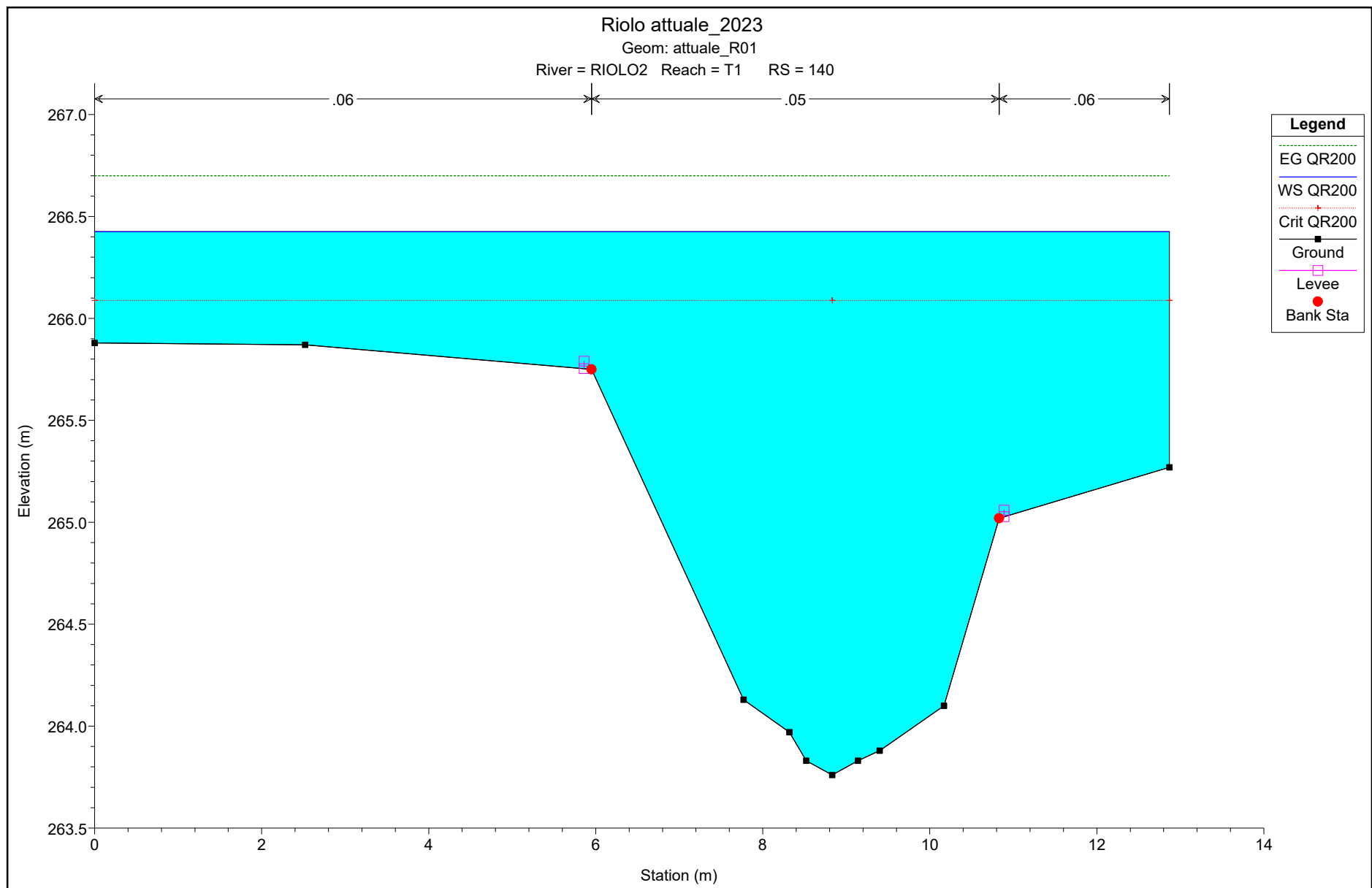


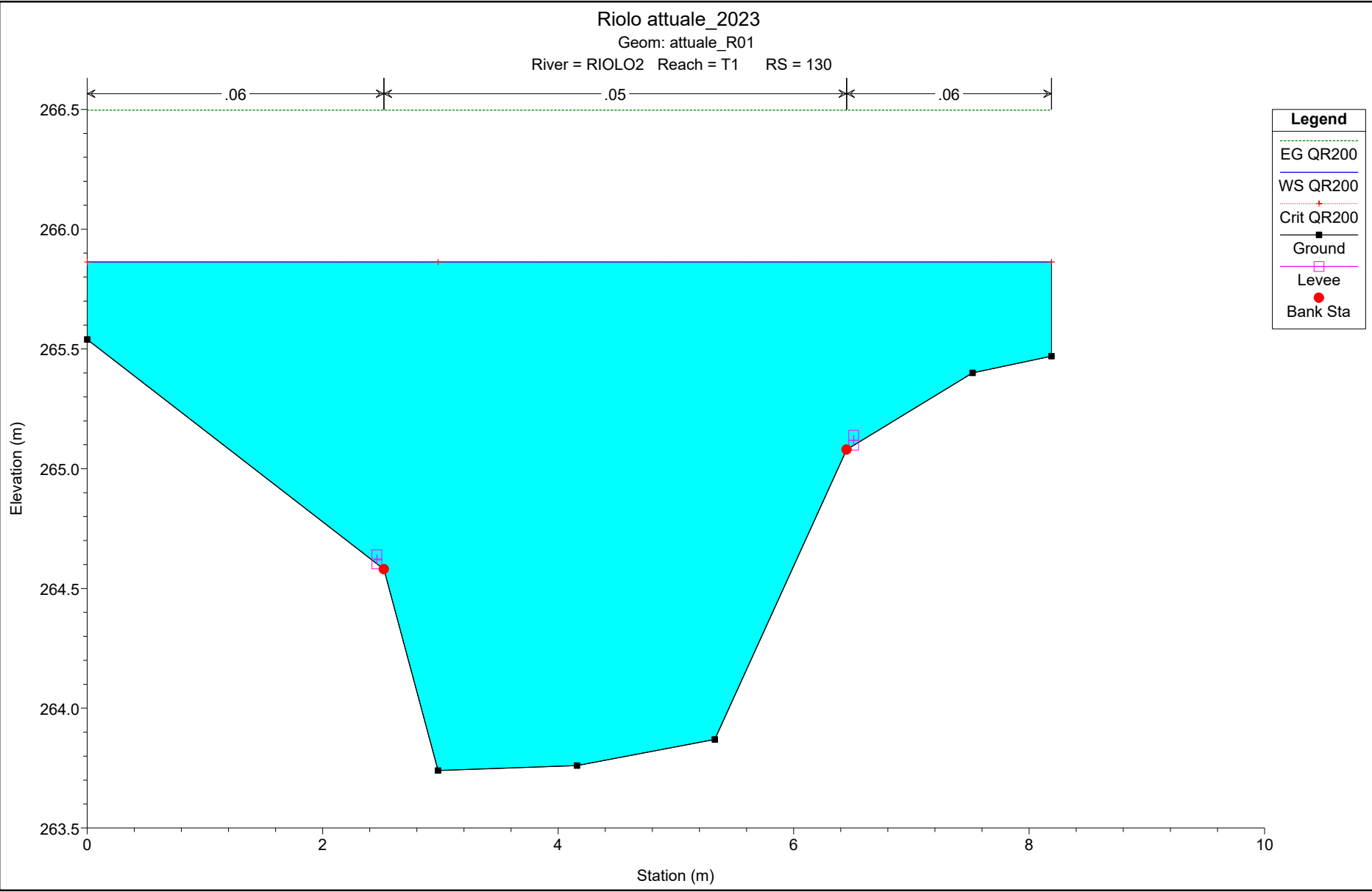


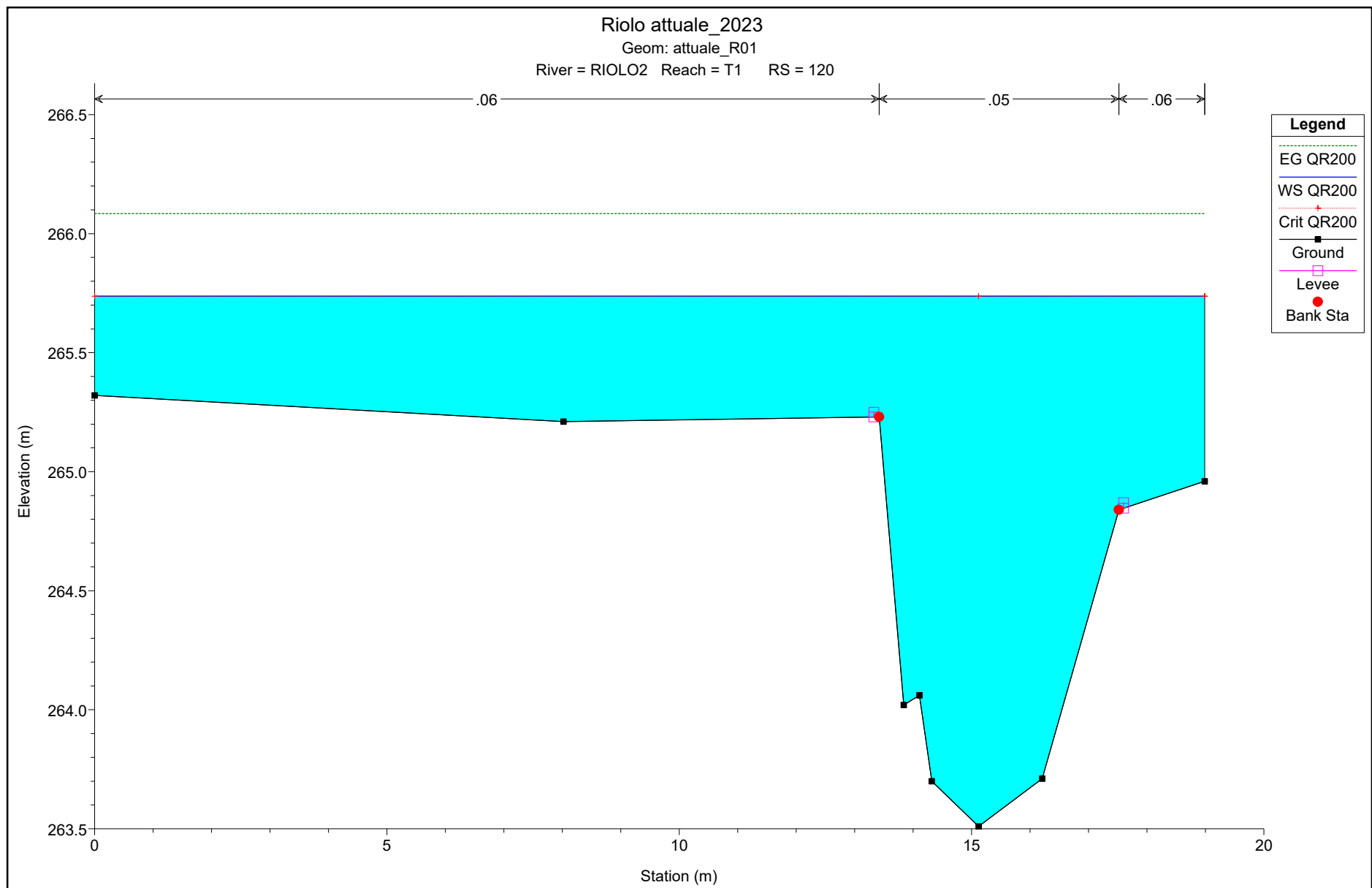


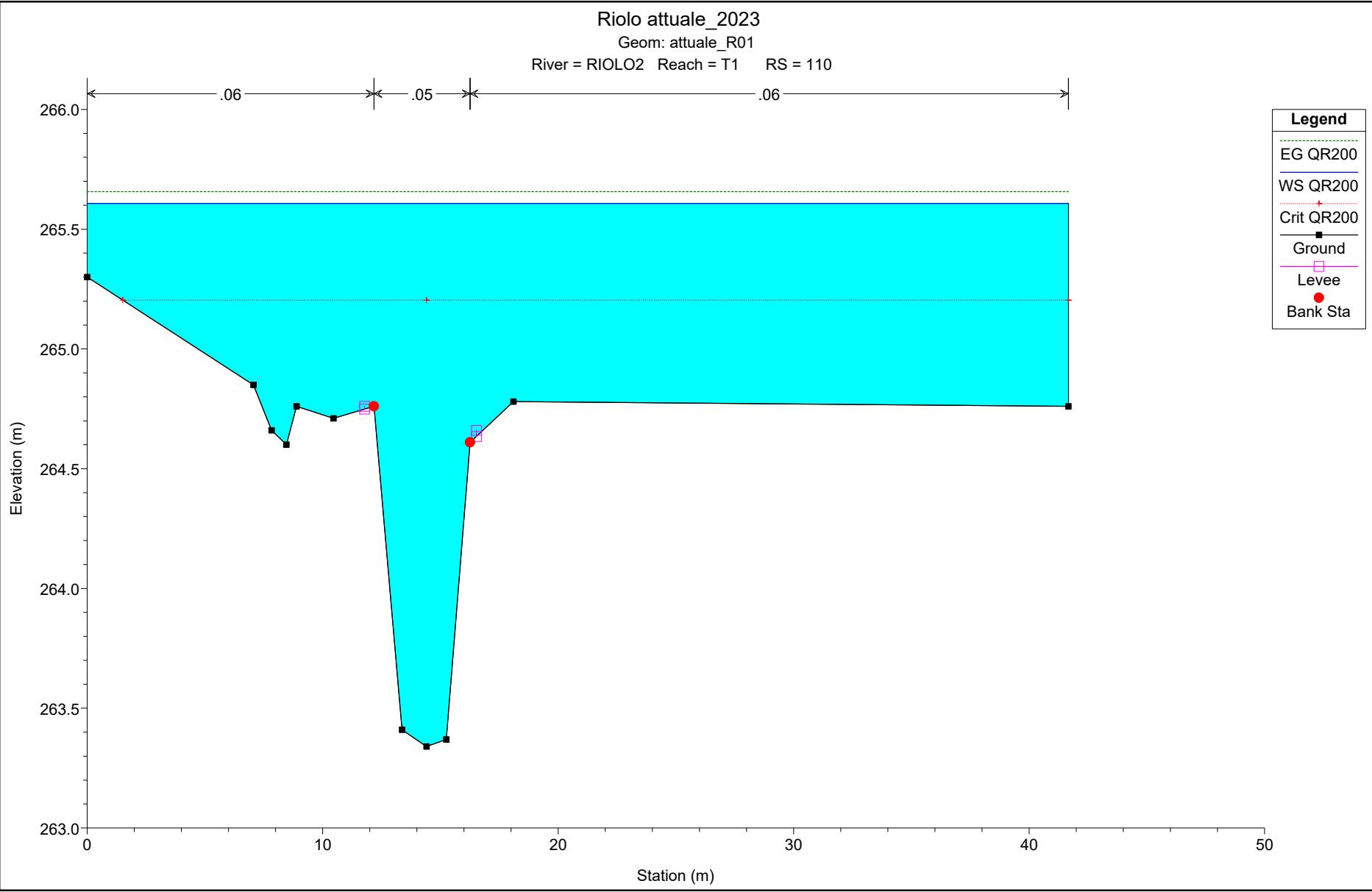


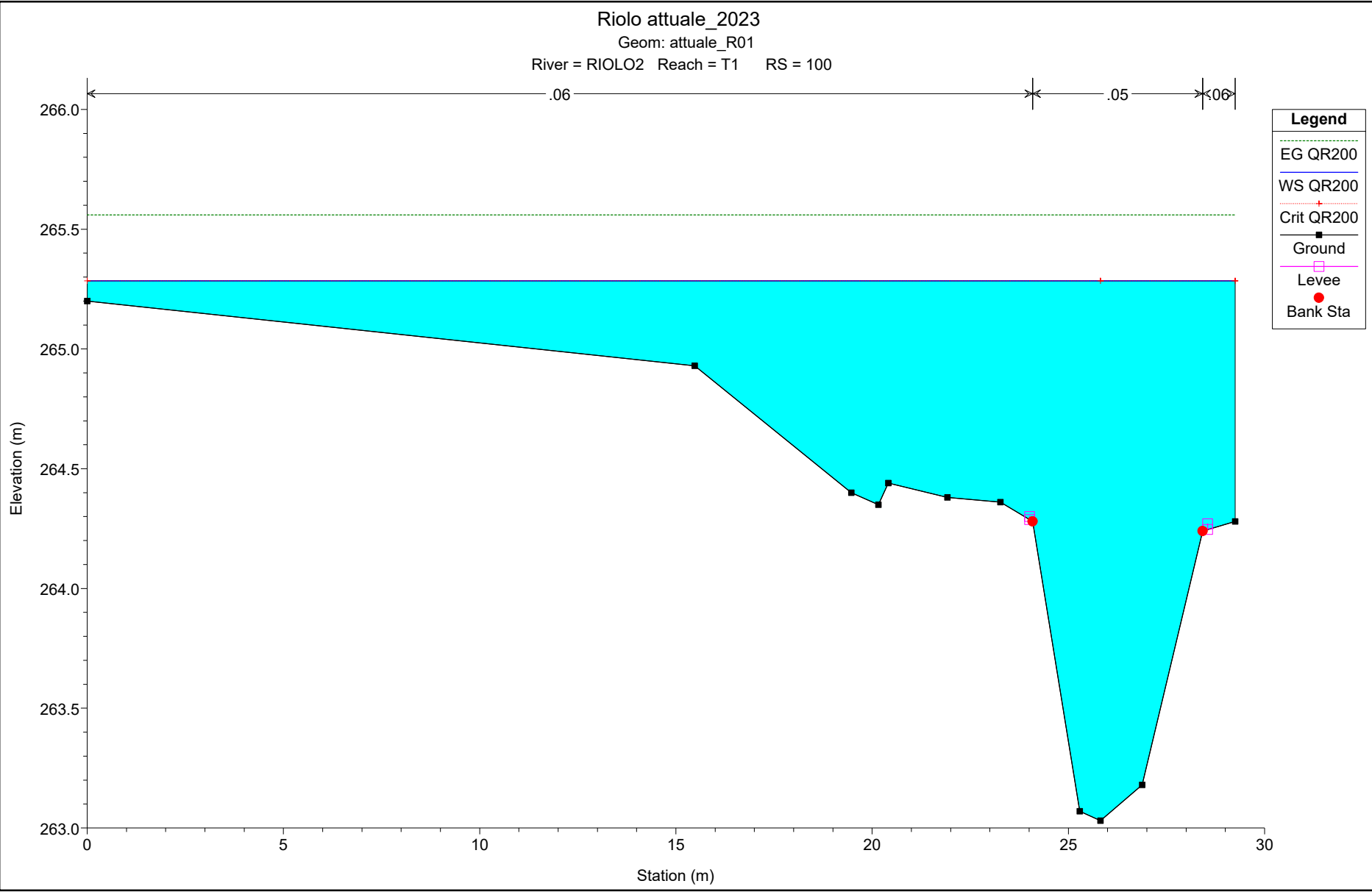


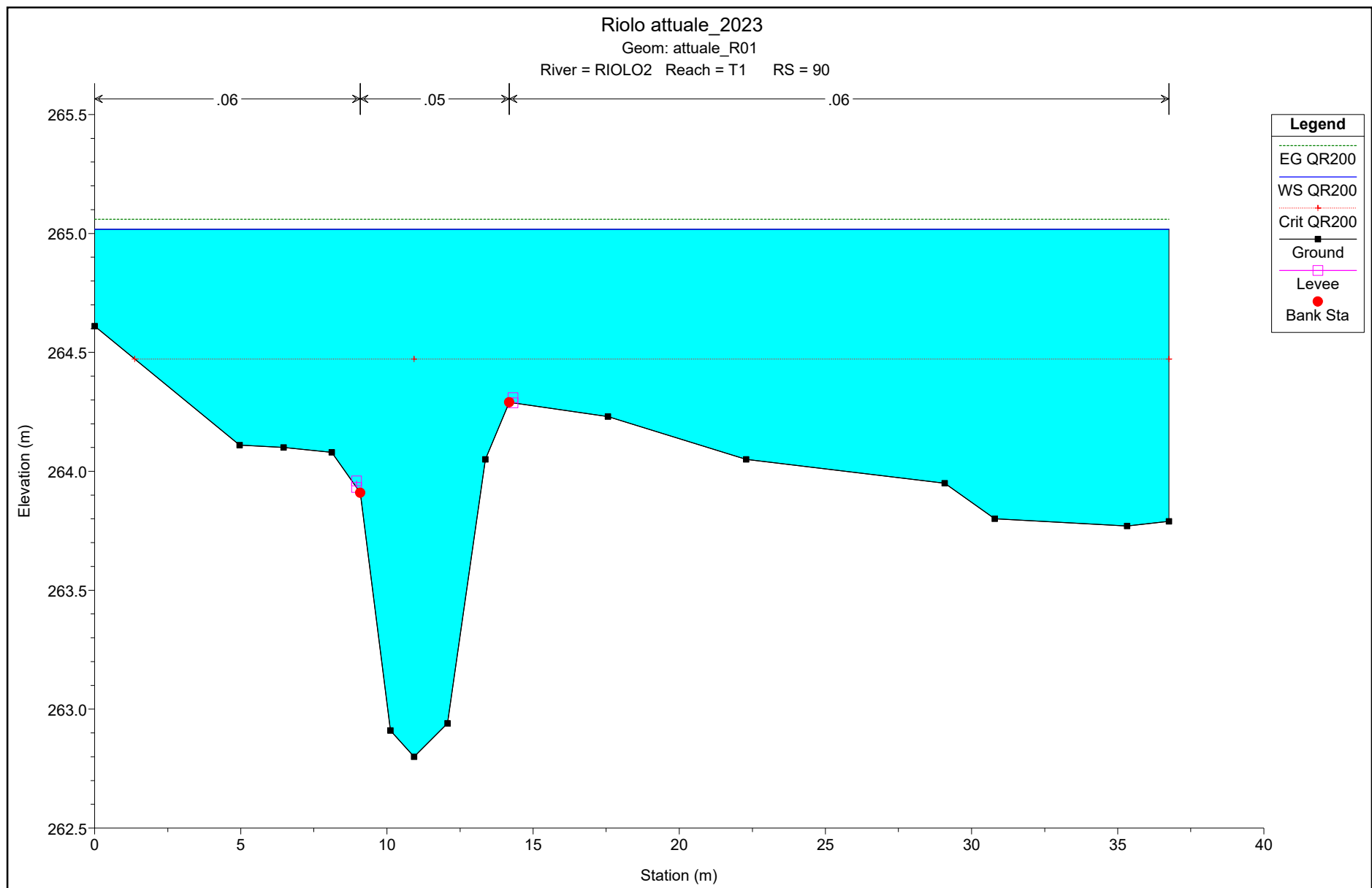


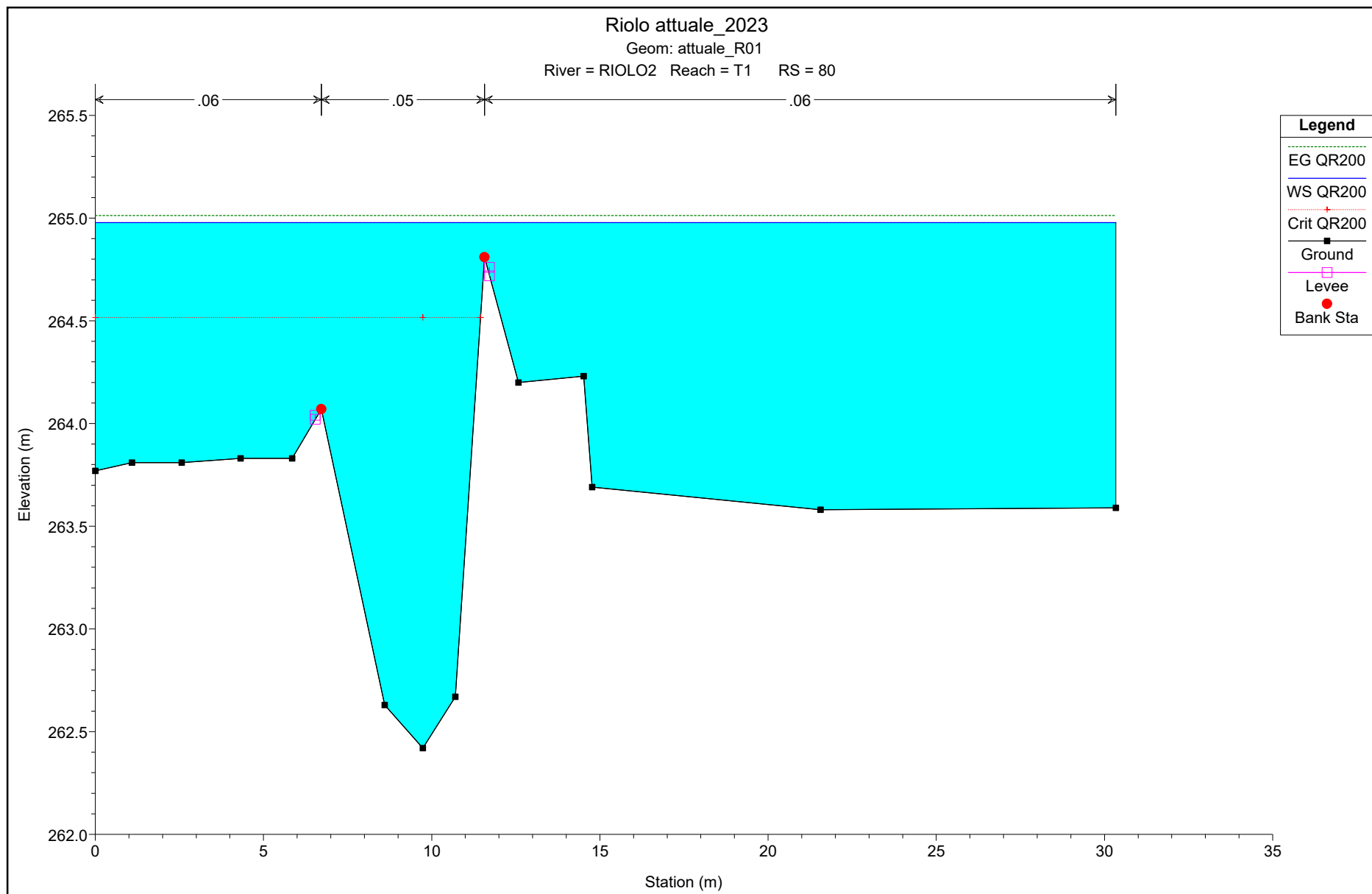


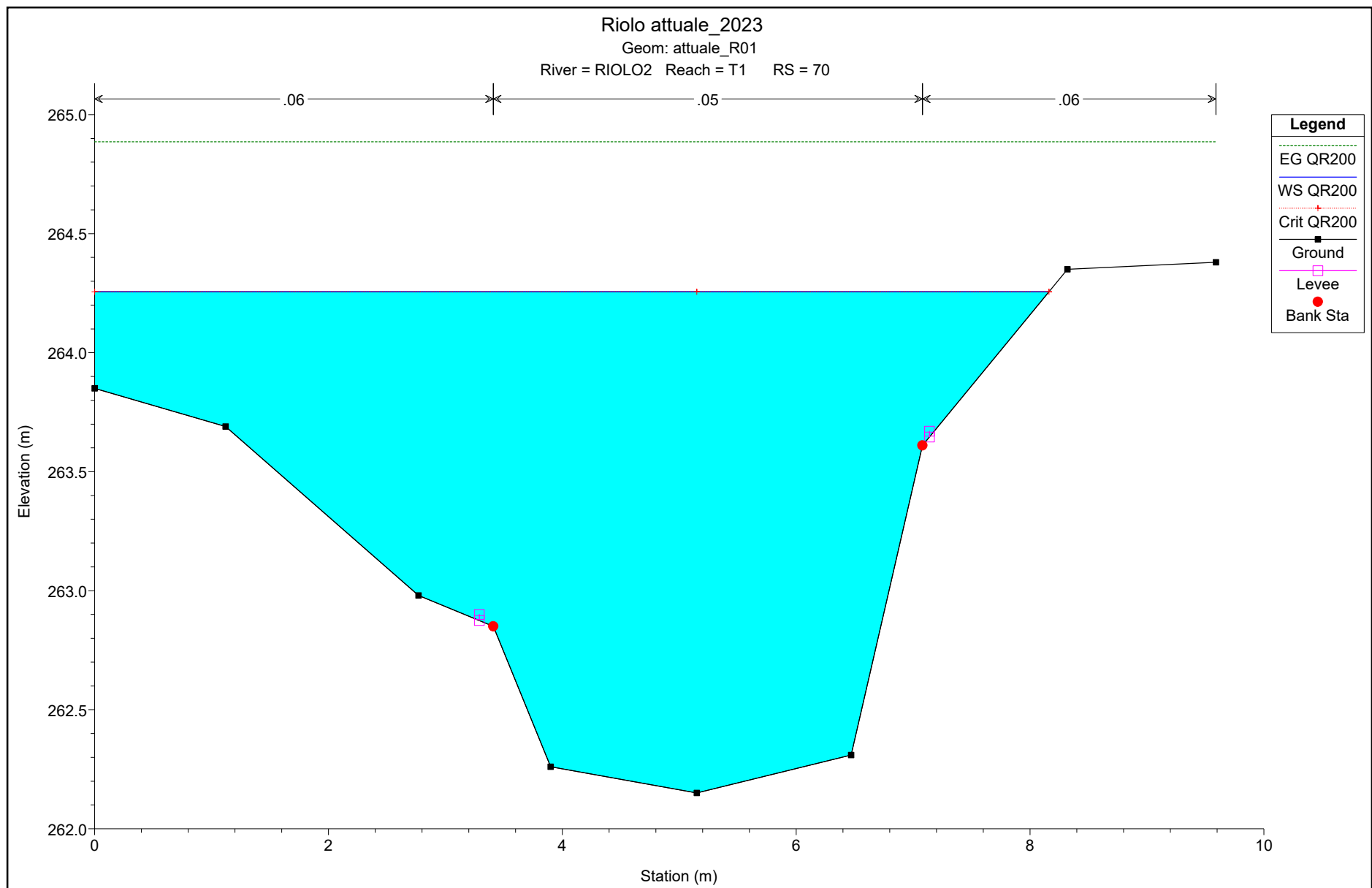






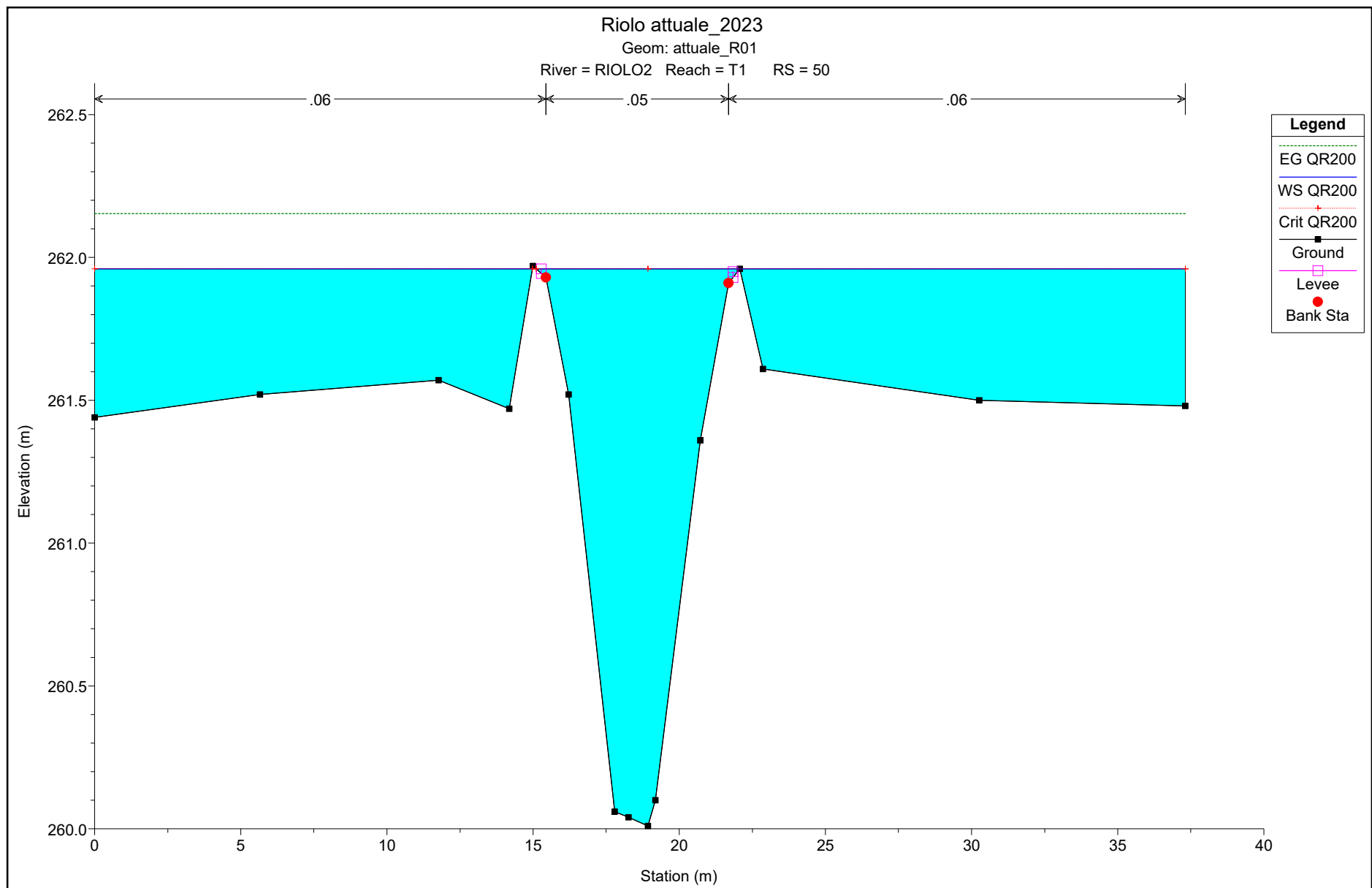


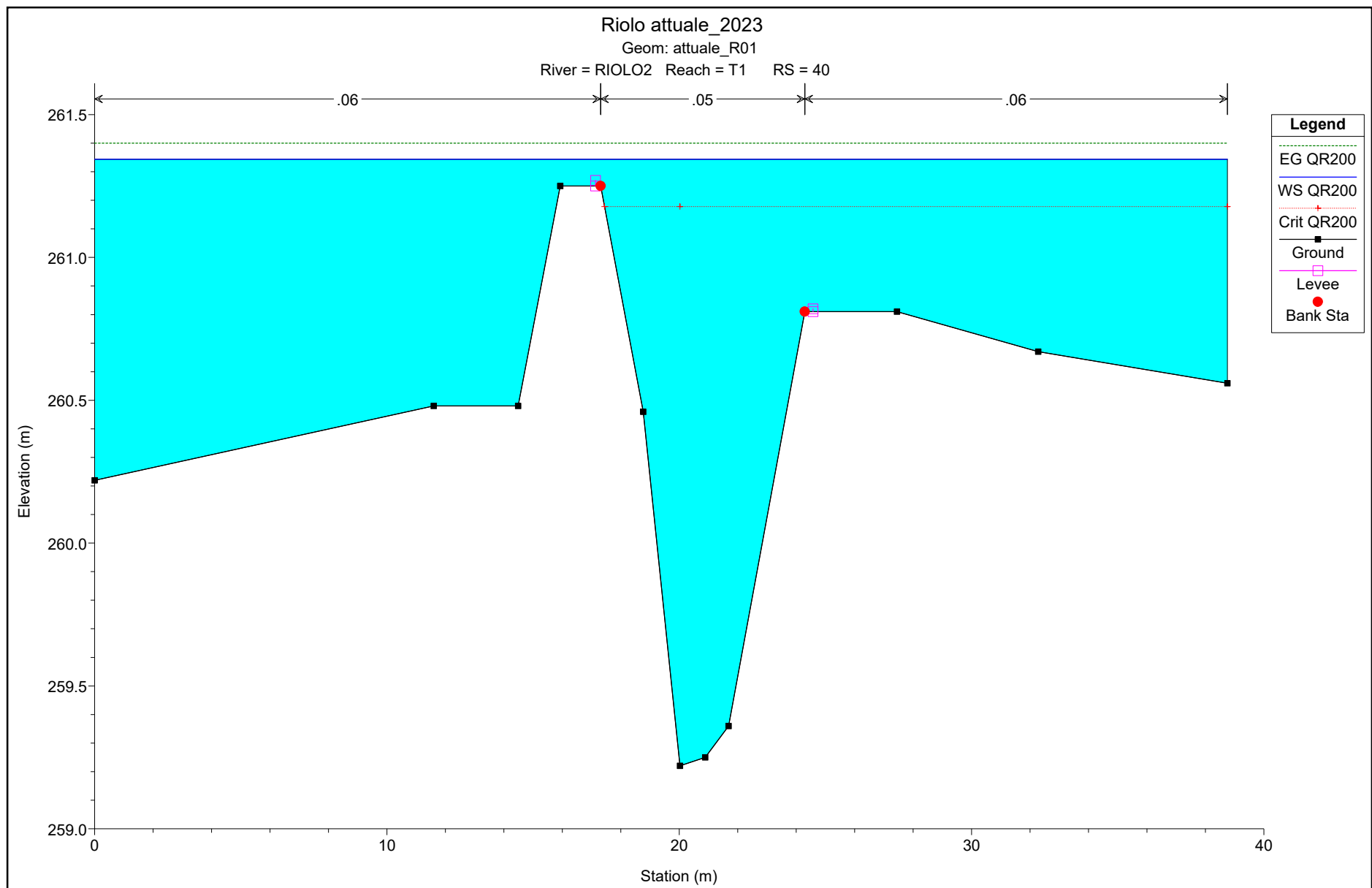


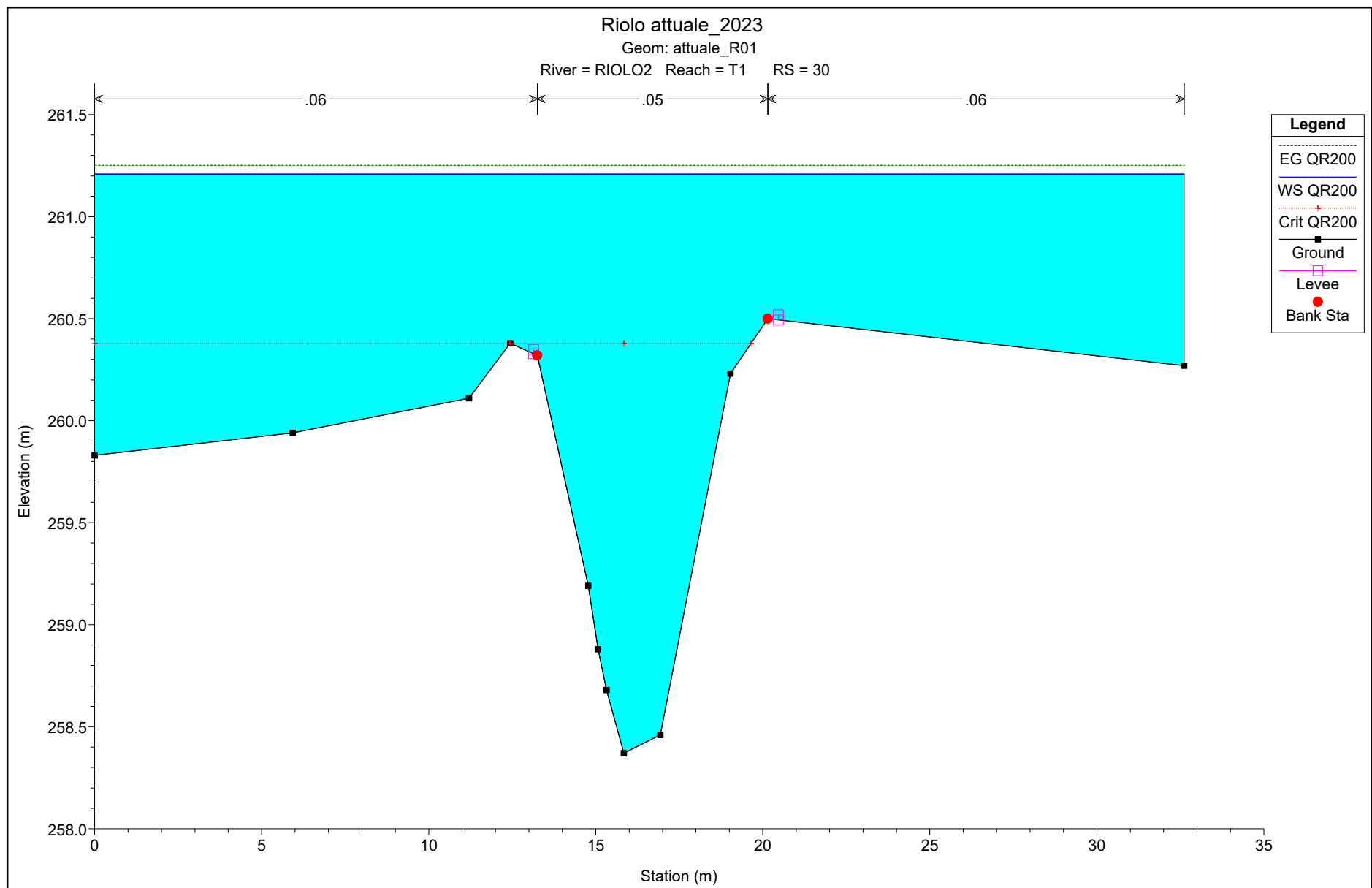


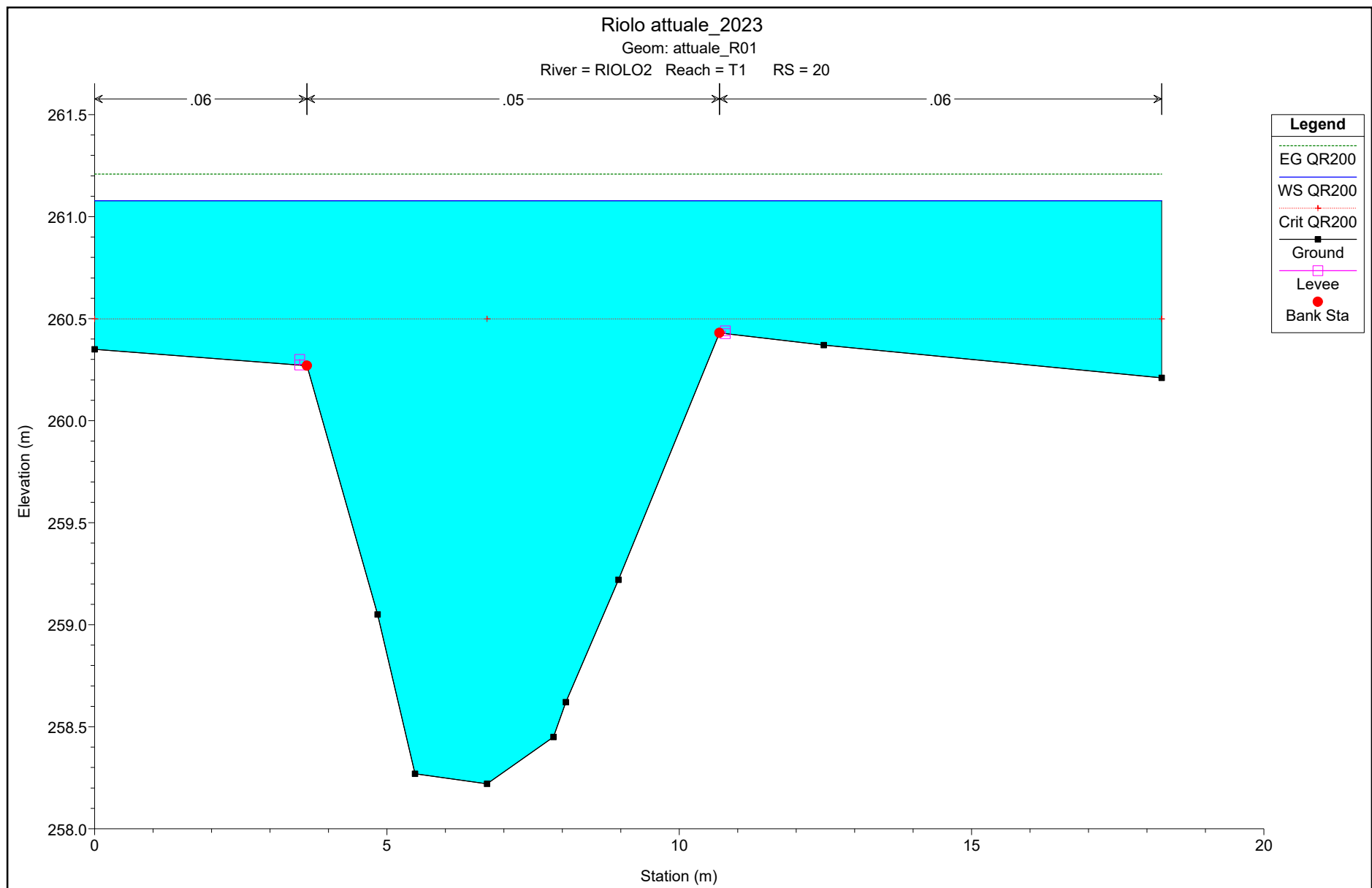


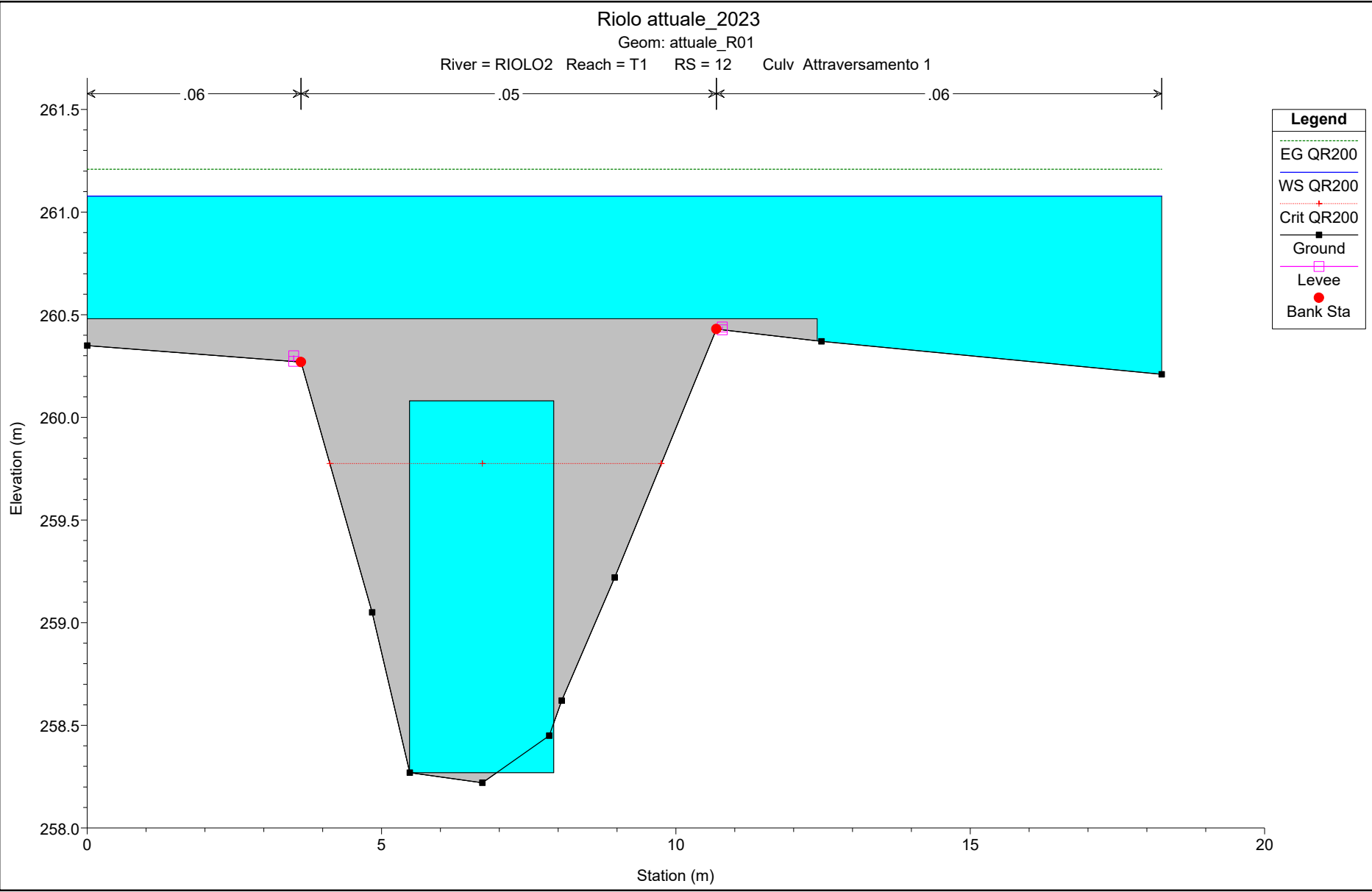


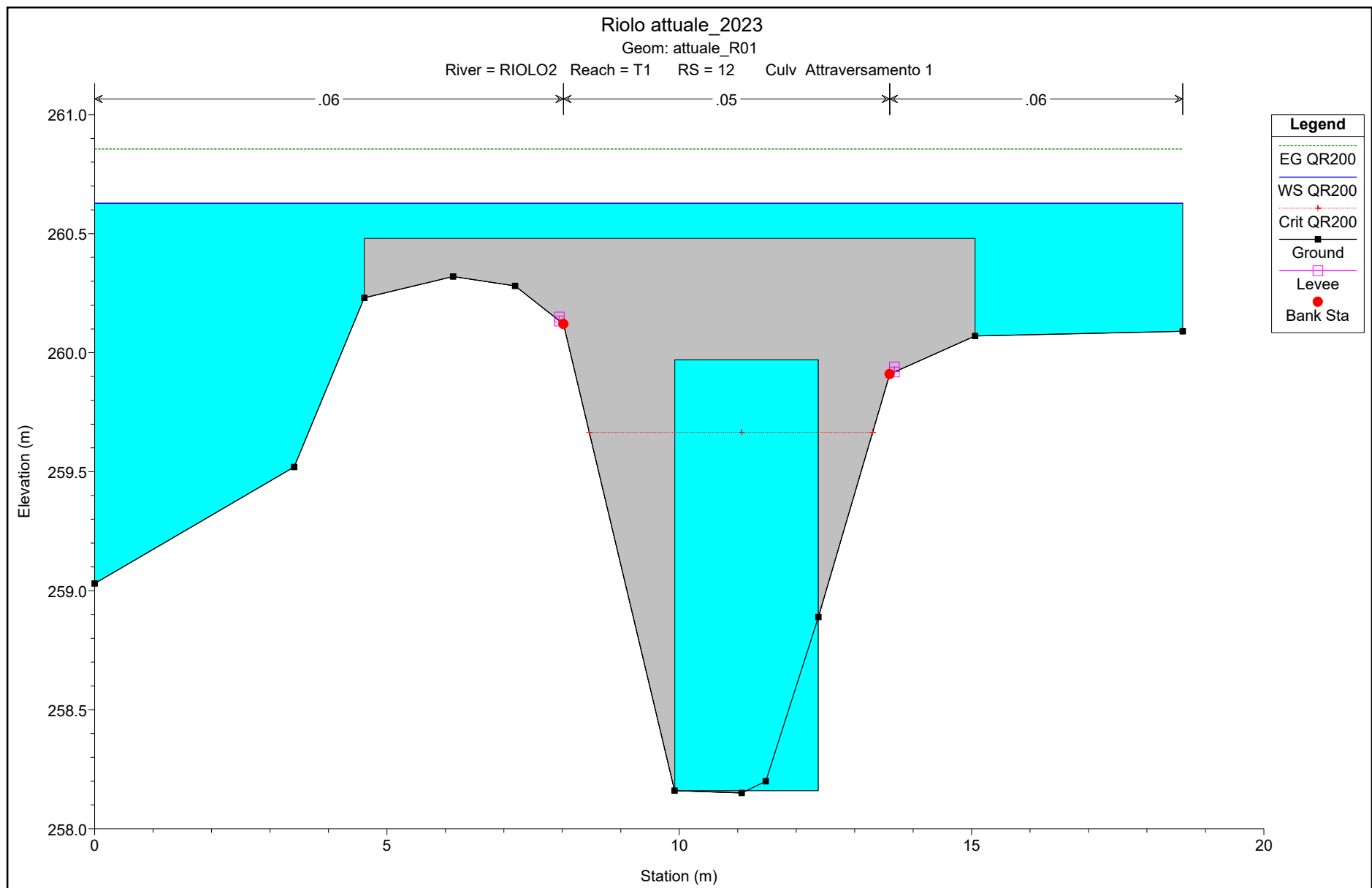


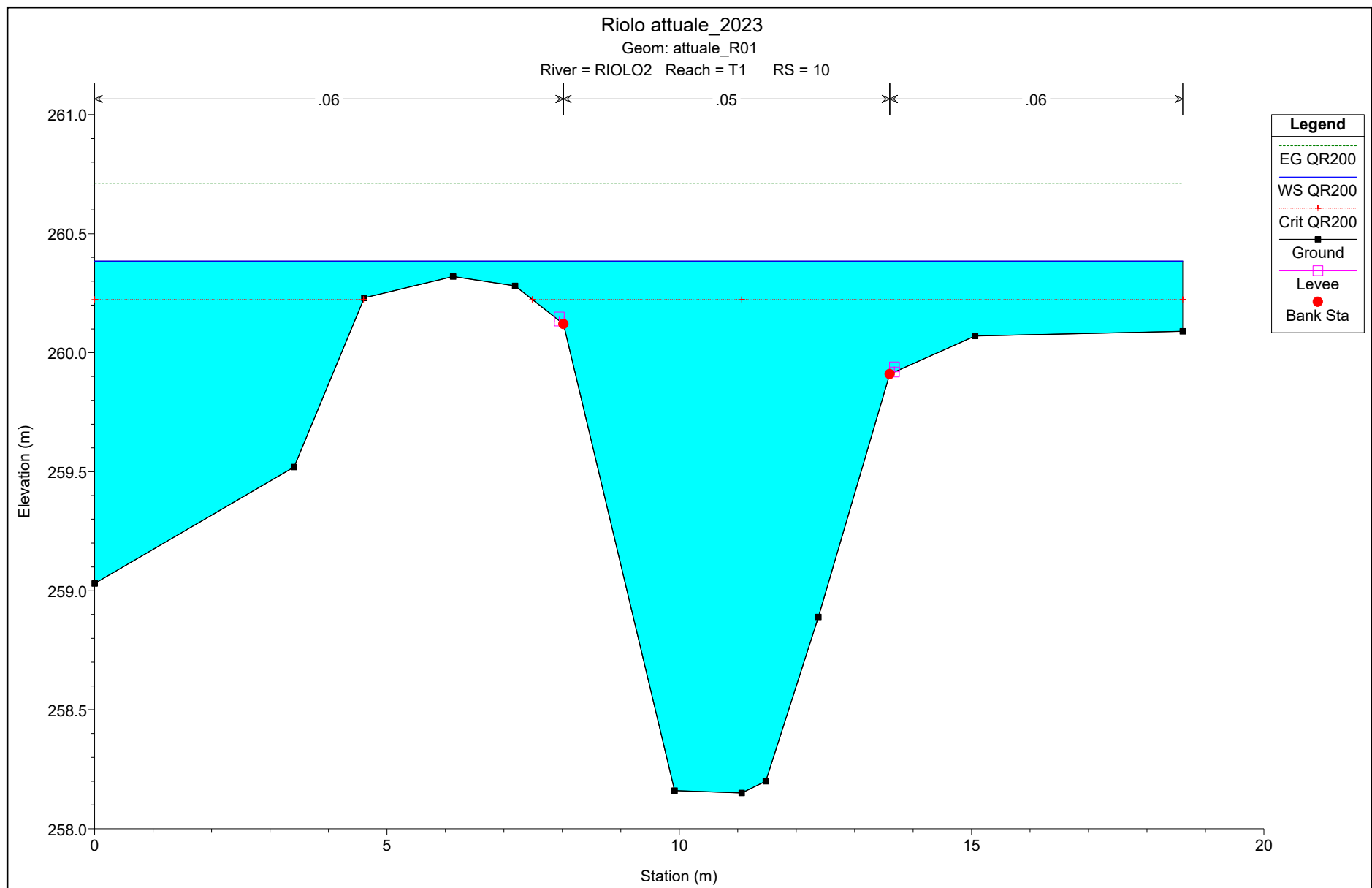














HEC-RAS Plan: 1 Profile: QR200

River	Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (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
RIOLO2	T1	160	QR200	32.25	264.64	267.13	266.45	267.35	0.006060	2.20	17.52	11.77	0.48
RIOLO2	T1	150	QR200	32.25	264.27	266.61	266.61	267.12	0.020146	3.37	11.73	11.43	0.80
RIOLO2	T1	140	QR200	32.25	263.76	266.43	266.09	266.70	0.008466	2.55	16.03	12.87	0.57
RIOLO2	T1	130	QR200	32.25	263.74	265.86	265.86	266.50	0.021480	3.77	10.20	8.19	0.89
RIOLO2	T1	120	QR200	32.25	263.51	265.74	265.74	266.08	0.016367	3.03	15.07	18.99	0.73
RIOLO2	T1	110	QR200	32.25	263.34	265.61	265.20	265.66	0.002768	1.35	37.40	41.67	0.31
RIOLO2	T1	100	QR200	32.25	263.03	265.28	265.28	265.56	0.010919	2.76	18.75	29.25	0.65
RIOLO2	T1	90	QR200	32.25	262.80	265.02	264.47	265.06	0.002206	1.19	38.60	36.75	0.29
RIOLO2	T1	80	QR200	32.25	262.42	264.98	264.52	265.01	0.001711	1.01	40.53	30.34	0.23
RIOLO2	T1	70	QR200	32.25	262.15	264.26	264.26	264.89	0.022268	3.79	10.13	8.16	0.89
RIOLO2	T1	60	QR200	32.25	261.68	263.82	263.82	264.14	0.016331	2.80	15.59	22.76	0.74
RIOLO2	T1	50	QR200	32.25	260.01	261.96	261.96	262.15	0.016785	2.44	19.88	37.18	0.74
RIOLO2	T1	40	QR200	32.25	259.22	261.34	261.18	261.40	0.003711	1.34	33.48	38.75	0.37
RIOLO2	T1	30	QR200	32.25	258.37	261.21	260.38	261.25	0.001776	1.13	38.99	32.61	0.26
RIOLO2	T1	20	QR200	32.25	258.22	261.08	260.50	261.21	0.003836	1.76	23.07	18.25	0.39
RIOLO2	T1	12		Culvert									
RIOLO2	T1	10	QR200	32.25	258.15	260.38	260.22	260.71	0.015002	2.82	15.15	18.61	0.72
RIOLO	T1	340	QR200	24.90	272.04	274.04	273.80	274.21	0.010627	2.20	14.55	16.21	0.59
RIOLO	T1	332		Bridge									
RIOLO	T1	330	QR200	24.90	272.04	273.80	273.80	274.12	0.024983	2.98	10.88	14.55	0.88
RIOLO	T1	320	QR200	24.90	271.54	273.45	273.45	273.68	0.019610	2.60	13.68	23.75	0.77
RIOLO	T1	310	QR200	24.90	270.95	272.59	272.59	272.83	0.018417	2.84	13.87	23.08	0.76
RIOLO	T1	300	QR200	24.90	270.06	271.86	271.86	272.11	0.016139	2.77	13.98	23.97	0.74
RIOLO	T1	298	QR200	24.90	269.32	271.14	270.89	271.24	0.006650	1.85	19.69	23.72	0.48
RIOLO	T1	295		Culvert									
RIOLO	T1	292	QR200	24.90	269.22	270.88	270.88	271.13	0.017968	2.72	13.87	23.72	0.75
RIOLO	T1	290	QR200	24.90	268.94	270.61	270.61	270.85	0.017923	2.72	13.87	23.72	0.75
RIOLO	T1	280	QR200	24.90	268.61	270.43	270.24	270.52	0.007142	1.75	21.37	31.29	0.48
RIOLO	T1	270	QR200	24.90	268.22	269.95	269.95	270.24	0.018764	2.89	12.53	18.36	0.77
RIOLO	T1	260	QR200	24.90	267.89	269.61	269.61	269.84	0.018644	2.69	14.21	25.08	0.74
RIOLO	T1	250	QR200	24.90	266.80	269.58	268.35	269.64	0.001634	1.10	24.95	17.01	0.25
RIOLO	T1	242		Culvert									
RIOLO	T1	240	QR200	24.90	266.35	268.54	268.47	269.32	0.035355	4.02	6.76	4.11	0.89
RIOLO	T1	230	QR200	24.90	266.21	268.43	268.33	268.87	0.026857	3.34	9.08	7.25	0.74
RIOLO	T1	222		Bridge									
RIOLO	T1	220	QR200	24.90	265.87	267.94	267.84	268.17	0.018163	2.61	12.79	14.99	0.59

HEC-RAS Plan: 1 Profile: QR200 (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	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/s)	(m2)	(m)	
RIOLO	T1	210	QR200	24.90	265.63	267.97	267.67	268.09	0.007990	1.90	17.62	17.81	0.42
RIOLO	T1	200	QR200	24.90	265.55	267.95	267.50	268.04	0.006039	1.60	19.37	17.09	0.34
RIOLO	T1	190	QR200	24.90	265.35	267.45	267.45	267.90	0.027580	3.38	9.42	9.54	0.79
RIOLO	T1	180	QR200	24.90	265.27	267.07	267.07	267.65	0.025584	3.48	7.97	7.24	0.89
RIOLO	T1	170	QR200	24.90	264.73	267.09	266.56	267.45	0.013317	2.70	10.08	7.26	0.60
AV22104	T2	40	QR200	7.35	265.09	267.33	266.23	267.40	0.003276	1.21	7.06	5.46	0.27
AV22104	T2	30	QR200	7.35	265.06	267.32	266.20	267.38	0.003186	1.20	7.14	5.46	0.27
AV22104	T2	20	QR200	7.35	265.05	267.28	266.25	267.37	0.005722	1.36	5.42	2.98	0.32
AV22104	T2	10	QR200	7.35	264.70	267.29	265.93	267.36	0.004073	1.18	6.24	2.98	0.26

Plan: 1 AV22104 T2 RS: 40 Profile: QR200

E.G. Elev (m)	267.40	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	267.33	Reach Len. (m)	5.00	5.00	5.00
Crit W.S. (m)	266.23	Flow Area (m2)	1.47	5.23	0.36
E.G. Slope (m/m)	0.003276	Area (m2)	1.47	5.23	0.36
Q Total (m3/s)	7.35	Flow (m3/s)	0.86	6.34	0.14
Top Width (m)	5.46	Top Width (m)	2.41	2.64	0.41
Vel Total (m/s)	1.04	Avg. Vel. (m/s)	0.59	1.21	0.40
Max Chl Dpth (m)	2.24	Hydr. Depth (m)	0.61	1.98	0.87
Conv. Total (m3/s)	128.4	Conv. (m3/s)	15.1	110.8	2.5
Length Wtd. (m)	5.00	Wetted Per. (m)	3.05	4.80	1.31
Min Ch El (m)	265.09	Shear (N/m2)	15.51	35.01	8.71
Alpha	1.21	Stream Power (N/m s)	261.41	114.91	242.26
Frctn Loss (m)	0.02	Cum Volume (1000 m3)	0.01	0.04	0.00
C & E Loss (m)	0.00	Cum SA (1000 m2)	0.01	0.02	0.00

Plan: 1 AV22104 T2 RS: 30 Profile: QR200

E.G. Elev (m)	267.38	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	267.32	Reach Len. (m)	2.13	2.13	2.13
Crit W.S. (m)	266.20	Flow Area (m2)	1.51	5.27	0.36
E.G. Slope (m/m)	0.003186	Area (m2)	1.51	5.27	0.36
Q Total (m3/s)	7.35	Flow (m3/s)	0.89	6.32	0.14
Top Width (m)	5.46	Top Width (m)	2.41	2.64	0.41
Vel Total (m/s)	1.03	Avg. Vel. (m/s)	0.59	1.20	0.40
Max Chl Dpth (m)	2.26	Hydr. Depth (m)	0.63	2.00	0.88
Conv. Total (m3/s)	130.2	Conv. (m3/s)	15.7	111.9	2.6
Length Wtd. (m)	2.13	Wetted Per. (m)	3.05	4.82	1.31
Min Ch El (m)	265.06	Shear (N/m2)	15.47	34.16	8.64
Alpha	1.21	Stream Power (N/m s)	261.41	115.39	242.26
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	0.00	0.01	0.00
C & E Loss (m)	0.00	Cum SA (1000 m2)	0.00	0.01	0.00

Plan: 1 AV22104 T2 RS: 20 Profile: QR200

E.G. Elev (m)	267.37	Element	Left OB	Channel	Right OB
Vel Head (m)	0.09	Wt. n-Val.		0.050	
W.S. Elev (m)	267.28	Reach Len. (m)	0.10	0.10	0.10
Crit W.S. (m)	266.25	Flow Area (m2)		5.42	
E.G. Slope (m/m)	0.005722	Area (m2)		5.42	
Q Total (m3/s)	7.35	Flow (m3/s)		7.35	
Top Width (m)	2.98	Top Width (m)		2.98	
Vel Total (m/s)	1.36	Avg. Vel. (m/s)		1.36	
Max Chl Dpth (m)	2.23	Hydr. Depth (m)		1.82	
Conv. Total (m3/s)	97.2	Conv. (m3/s)		97.2	
Length Wtd. (m)	0.10	Wetted Per. (m)		6.37	
Min Ch El (m)	265.05	Shear (N/m2)		47.69	
Alpha	1.00	Stream Power (N/m s)	142.68	0.00	142.68
Frctn Loss (m)	0.00	Cum Volume (1000 m3)		0.00	
C & E Loss (m)	0.01	Cum SA (1000 m2)		0.00	

Plan: 1 AV22104 T2 RS: 10 Profile: QR200

E.G. Elev (m)	267.36	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.		0.050	
W.S. Elev (m)	267.29	Reach Len. (m)	0.00	0.00	0.00
Crit W.S. (m)	265.93	Flow Area (m2)		6.24	
E.G. Slope (m/m)	0.004073	Area (m2)		6.24	
Q Total (m3/s)	7.35	Flow (m3/s)		7.35	

Plan: 1 AV22104 T2 RS: 10 Profile: QR200 (Continued)

Top Width (m)	2.98	Top Width (m)		2.98	
Vel Total (m/s)	1.18	Avg. Vel. (m/s)		1.18	
Max Chl Dpth (m)	2.59	Hydr. Depth (m)		2.09	
Conv. Total (m3/s)	115.2	Conv. (m3/s)		115.2	
Length Wtd. (m)	0.00	Wetted Per. (m)		7.04	
Min Ch EI (m)	264.70	Shear (N/m2)		35.40	
Alpha	1.00	Stream Power (N/m s)	142.68	0.00	142.68
Frctn Loss (m)	0.00	Cum Volume (1000 m3)			
C & E Loss (m)	0.01	Cum SA (1000 m2)			

Plan: 1 RIOLO T1 RS: 340 Profile: QR200

E.G. Elev (m)	274.21	Element	Left OB	Channel	Right OB
Vel Head (m)	0.17	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	274.04	Reach Len. (m)	2.12	2.12	2.12
Crit W.S. (m)	273.80	Flow Area (m2)	0.19	5.46	8.90
E.G. Slope (m/m)	0.010627	Area (m2)	0.19	5.46	8.90
Q Total (m3/s)	24.90	Flow (m3/s)	0.08	11.99	12.83
Top Width (m)	16.21	Top Width (m)	1.65	3.86	10.70
Vel Total (m/s)	1.71	Avg. Vel. (m/s)	0.40	2.20	1.44
Max Chl Dpth (m)	2.00	Hydr. Depth (m)	0.12	1.42	0.83
Conv. Total (m3/s)	241.5	Conv. (m3/s)	0.7	116.3	124.5
Length Wtd. (m)	2.12	Wetted Per. (m)	1.71	4.97	11.56
Min Ch EI (m)	272.04	Shear (N/m2)	11.64	114.49	80.19
Alpha	1.16	Stream Power (N/m s)	833.55	133.59	326.06
Frctn Loss (m)	0.03	Cum Volume (1000 m3)	1.25	2.16	1.45
C & E Loss (m)	0.00	Cum SA (1000 m2)	2.31	1.23	2.91

Plan: 1 RIOLO T1 RS: 332 BR U Profile: QR200

E.G. Elev (m)	274.18	Element	Left OB	Channel	Right OB
Vel Head (m)	0.18	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	274.01	Reach Len. (m)	1.50	1.50	1.50
Crit W.S. (m)	273.73	Flow Area (m2)	0.14	5.03	8.53
E.G. Slope (m/m)	0.021002	Area (m2)	0.14	5.03	8.53
Q Total (m3/s)	24.90	Flow (m3/s)	0.07	7.97	16.86
Top Width (m)	15.97	Top Width (m)	1.41	3.86	10.70
Vel Total (m/s)	1.82	Avg. Vel. (m/s)	0.50	1.58	1.98
Max Chl Dpth (m)	1.97	Hydr. Depth (m)	0.10	1.30	0.80
Conv. Total (m3/s)	171.8	Conv. (m3/s)	0.5	55.0	116.4
Length Wtd. (m)	1.50	Wetted Per. (m)	1.46	12.44	11.53
Min Ch EI (m)	272.04	Shear (N/m2)	19.54	83.26	152.46
Alpha	1.04	Stream Power (N/m s)	833.55	133.59	326.06
Frctn Loss (m)	0.04	Cum Volume (1000 m3)	1.25	2.15	1.44
C & E Loss (m)	0.00	Cum SA (1000 m2)	2.31	1.22	2.89

Plan: 1 RIOLO T1 RS: 332 BR D Profile: QR200

E.G. Elev (m)	274.14	Element	Left OB	Channel	Right OB
Vel Head (m)	0.20	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	273.94	Reach Len. (m)	0.38	0.38	0.38
Crit W.S. (m)	273.73	Flow Area (m2)	0.06	4.77	7.82
E.G. Slope (m/m)	0.027004	Area (m2)	0.06	4.77	7.82
Q Total (m3/s)	24.90	Flow (m3/s)	0.03	8.27	16.60
Top Width (m)	15.49	Top Width (m)	0.93	3.86	10.70
Vel Total (m/s)	1.97	Avg. Vel. (m/s)	0.42	1.73	2.12
Max Chl Dpth (m)	1.90	Hydr. Depth (m)	0.07	1.24	0.73
Conv. Total (m3/s)	151.5	Conv. (m3/s)	0.2	50.3	101.0
Length Wtd. (m)	0.38	Wetted Per. (m)	1.00	12.44	11.44
Min Ch EI (m)	272.04	Shear (N/m2)	16.10	101.54	180.90

Plan: 1 RIOLO T1 RS: 332 BR D Profile: QR200 (Continued)

Alpha	1.03	Stream Power (N/m s)	833.55	129.27	324.61
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	1.25	2.15	1.42
C & E Loss (m)	0.01	Cum SA (1000 m2)	2.31	1.21	2.87

Plan: 1 RIOLO T1 RS: 330 Profile: QR200

E.G. Elev (m)	274.12	Element	Left OB	Channel	Right OB
Vel Head (m)	0.32	Wt. n-Val.		0.050	0.060
W.S. Elev (m)	273.80	Reach Len. (m)	13.99	13.99	13.99
Crit W.S. (m)	273.80	Flow Area (m2)		4.54	6.34
E.G. Slope (m/m)	0.024983	Area (m2)		4.54	6.34
Q Total (m3/s)	24.90	Flow (m3/s)		13.53	11.37
Top Width (m)	14.55	Top Width (m)		3.85	10.70
Vel Total (m/s)	2.29	Avg. Vel. (m/s)		2.98	1.79
Max Chl Dpth (m)	1.76	Hydr. Depth (m)		1.18	0.59
Conv. Total (m3/s)	157.5	Conv. (m3/s)		85.6	71.9
Length Wtd. (m)	13.99	Wetted Per. (m)		4.96	11.30
Min Ch EI (m)	272.04	Shear (N/m2)		224.22	137.48
Alpha	1.20	Stream Power (N/m s)	833.55	129.27	324.61
Frctn Loss (m)	0.31	Cum Volume (1000 m3)	1.25	2.14	1.42
C & E Loss (m)	0.03	Cum SA (1000 m2)	2.31	1.21	2.87

Plan: 1 RIOLO T1 RS: 320 Profile: QR200

E.G. Elev (m)	273.68	Element	Left OB	Channel	Right OB
Vel Head (m)	0.23	Wt. n-Val.		0.050	0.060
W.S. Elev (m)	273.45	Reach Len. (m)	33.68	33.68	33.68
Crit W.S. (m)	273.45	Flow Area (m2)		5.18	8.50
E.G. Slope (m/m)	0.019610	Area (m2)		5.18	8.50
Q Total (m3/s)	24.90	Flow (m3/s)		13.47	11.43
Top Width (m)	23.75	Top Width (m)		4.44	19.31
Vel Total (m/s)	1.82	Avg. Vel. (m/s)		2.60	1.34
Max Chl Dpth (m)	1.91	Hydr. Depth (m)		1.17	0.44
Conv. Total (m3/s)	177.8	Conv. (m3/s)		96.2	81.6
Length Wtd. (m)	33.68	Wetted Per. (m)		5.79	19.44
Min Ch EI (m)	271.54	Shear (N/m2)		172.06	84.06
Alpha	1.36	Stream Power (N/m s)	1308.98	150.82	394.03
Frctn Loss (m)	0.64	Cum Volume (1000 m3)	1.25	2.08	1.32
C & E Loss (m)	0.00	Cum SA (1000 m2)	2.31	1.15	2.66

Plan: 1 RIOLO T1 RS: 310 Profile: QR200

E.G. Elev (m)	272.83	Element	Left OB	Channel	Right OB
Vel Head (m)	0.24	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	272.59	Reach Len. (m)	40.68	40.68	40.68
Crit W.S. (m)	272.59	Flow Area (m2)	2.08	4.14	7.65
E.G. Slope (m/m)	0.018417	Area (m2)	2.08	4.14	7.65
Q Total (m3/s)	24.90	Flow (m3/s)	2.65	11.75	10.50
Top Width (m)	23.08	Top Width (m)	4.47	2.94	15.67
Vel Total (m/s)	1.80	Avg. Vel. (m/s)	1.27	2.84	1.37
Max Chl Dpth (m)	1.64	Hydr. Depth (m)	0.47	1.41	0.49
Conv. Total (m3/s)	183.5	Conv. (m3/s)	19.5	86.6	77.4
Length Wtd. (m)	40.68	Wetted Per. (m)	4.92	3.87	16.18
Min Ch EI (m)	270.95	Shear (N/m2)	76.28	193.25	85.38
Alpha	1.48	Stream Power (N/m s)	1105.02	206.35	360.52
Frctn Loss (m)	0.70	Cum Volume (1000 m3)	1.21	1.92	1.04
C & E Loss (m)	0.00	Cum SA (1000 m2)	2.23	1.03	2.07

Plan: 1 RIOLO T1 RS: 300 Profile: QR200

E.G. Elev (m)	272.11	Element	Left OB	Channel	Right OB
Vel Head (m)	0.25	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	271.86	Reach Len. (m)	55.73	55.73	55.73
Crit W.S. (m)	271.86	Flow Area (m2)	4.21	5.05	4.72
E.G. Slope (m/m)	0.016139	Area (m2)	4.21	5.05	4.72
Q Total (m3/s)	24.90	Flow (m3/s)	5.18	13.96	5.75
Top Width (m)	23.97	Top Width (m)	9.01	3.50	11.46
Vel Total (m/s)	1.78	Avg. Vel. (m/s)	1.23	2.77	1.22
Max Chl Dpth (m)	1.80	Hydr. Depth (m)	0.47	1.44	0.41
Conv. Total (m3/s)	196.0	Conv. (m3/s)	40.8	109.9	45.3
Length Wtd. (m)	55.73	Wetted Per. (m)	9.49	4.44	12.02
Min Ch El (m)	270.06	Shear (N/m2)	70.21	179.84	62.17
Alpha	1.56	Stream Power (N/m s)	1155.30	420.37	607.09
Frctn Loss (m)	0.55	Cum Volume (1000 m3)	1.09	1.73	0.79
C & E Loss (m)	0.04	Cum SA (1000 m2)	1.96	0.90	1.52

Plan: 1 RIOLO T1 RS: 298 Profile: QR200

E.G. Elev (m)	271.24	Element	Left OB	Channel	Right OB
Vel Head (m)	0.10	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	271.14	Reach Len. (m)	10.00	10.00	10.00
Crit W.S. (m)	270.89	Flow Area (m2)	6.53	5.67	7.49
E.G. Slope (m/m)	0.006650	Area (m2)	6.53	5.67	7.49
Q Total (m3/s)	24.90	Flow (m3/s)	7.21	10.48	7.22
Top Width (m)	23.72	Top Width (m)	8.13	3.69	11.90
Vel Total (m/s)	1.26	Avg. Vel. (m/s)	1.10	1.85	0.96
Max Chl Dpth (m)	1.82	Hydr. Depth (m)	0.80	1.54	0.63
Conv. Total (m3/s)	305.4	Conv. (m3/s)	88.4	128.5	88.5
Length Wtd. (m)	10.00	Wetted Per. (m)	8.94	4.70	12.53
Min Ch El (m)	269.32	Shear (N/m2)	47.68	78.64	38.96
Alpha	1.29	Stream Power (N/m s)	1135.67	379.67	572.62
Frctn Loss (m)		Cum Volume (1000 m3)	0.79	1.43	0.45
C & E Loss (m)		Cum SA (1000 m2)	1.48	0.70	0.87

Plan: 1 RIOLO T1 RS: 292 Profile: QR200

E.G. Elev (m)	271.13	Element	Left OB	Channel	Right OB
Vel Head (m)	0.24	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	270.88	Reach Len. (m)	9.02	9.02	9.02
Crit W.S. (m)	270.88	Flow Area (m2)	4.48	4.91	4.47
E.G. Slope (m/m)	0.017968	Area (m2)	4.48	4.91	4.47
Q Total (m3/s)	24.90	Flow (m3/s)	6.43	13.37	5.10
Top Width (m)	23.72	Top Width (m)	8.13	3.69	11.90
Vel Total (m/s)	1.80	Avg. Vel. (m/s)	1.44	2.72	1.14
Max Chl Dpth (m)	1.66	Hydr. Depth (m)	0.55	1.33	0.38
Conv. Total (m3/s)	185.8	Conv. (m3/s)	48.0	99.8	38.0
Length Wtd. (m)	9.02	Wetted Per. (m)	8.68	4.81	12.30
Min Ch El (m)	269.22	Shear (N/m2)	90.85	180.19	64.13
Alpha	1.48	Stream Power (N/m s)	1135.67	379.67	572.62
Frctn Loss (m)	0.16	Cum Volume (1000 m3)	0.79	1.19	0.45
C & E Loss (m)	0.00	Cum SA (1000 m2)	1.40	0.66	0.75

Plan: 1 RIOLO T1 RS: 290 Profile: QR200

E.G. Elev (m)	270.85	Element	Left OB	Channel	Right OB
Vel Head (m)	0.24	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	270.61	Reach Len. (m)	11.28	11.28	11.28
Crit W.S. (m)	270.61	Flow Area (m2)	4.48	4.92	4.48
E.G. Slope (m/m)	0.017923	Area (m2)	4.48	4.92	4.48
Q Total (m3/s)	24.90	Flow (m3/s)	6.44	13.36	5.10

Plan: 1 RIOLO T1 RS: 290 Profile: QR200 (Continued)

Top Width (m)	23.72	Top Width (m)	8.13	3.69	11.90
Vel Total (m/s)	1.80	Avg. Vel. (m/s)	1.44	2.72	1.14
Max Chl Dpth (m)	1.66	Hydr. Depth (m)	0.55	1.33	0.38
Conv. Total (m3/s)	186.0	Conv. (m3/s)	48.1	99.8	38.1
Length Wtd. (m)	11.28	Wetted Per. (m)	8.67	4.81	12.25
Min Ch EI (m)	268.94	Shear (N/m2)	90.83	179.78	64.20
Alpha	1.48	Stream Power (N/m s)	1135.67	382.06	571.66
Frctn Loss (m)	0.12	Cum Volume (1000 m3)	0.75	1.15	0.41
C & E Loss (m)	0.05	Cum SA (1000 m2)	1.33	0.63	0.64

Plan: 1 RIOLO T1 RS: 280 Profile: QR200

E.G. Elev (m)	270.52	Element	Left OB	Channel	Right OB
Vel Head (m)	0.09	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	270.43	Reach Len. (m)	24.13	24.13	24.13
Crit W.S. (m)	270.24	Flow Area (m2)	12.35	5.59	3.44
E.G. Slope (m/m)	0.007142	Area (m2)	12.35	5.59	3.44
Q Total (m3/s)	24.90	Flow (m3/s)	12.31	9.75	2.84
Top Width (m)	31.29	Top Width (m)	20.06	4.11	7.12
Vel Total (m/s)	1.17	Avg. Vel. (m/s)	1.00	1.75	0.83
Max Chl Dpth (m)	1.82	Hydr. Depth (m)	0.62	1.36	0.48
Conv. Total (m3/s)	294.6	Conv. (m3/s)	145.7	115.3	33.6
Length Wtd. (m)	24.13	Wetted Per. (m)	20.73	5.32	7.65
Min Ch EI (m)	268.61	Shear (N/m2)	41.71	73.48	31.49
Alpha	1.30	Stream Power (N/m s)	1498.09	950.85	1173.01
Frctn Loss (m)	0.26	Cum Volume (1000 m3)	0.65	1.09	0.37
C & E Loss (m)	0.02	Cum SA (1000 m2)	1.17	0.58	0.53

Plan: 1 RIOLO T1 RS: 270 Profile: QR200

E.G. Elev (m)	270.24	Element	Left OB	Channel	Right OB
Vel Head (m)	0.29	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	269.95	Reach Len. (m)	16.58	16.58	16.58
Crit W.S. (m)	269.95	Flow Area (m2)	4.96	5.00	2.57
E.G. Slope (m/m)	0.018764	Area (m2)	4.96	5.00	2.57
Q Total (m3/s)	24.90	Flow (m3/s)	6.74	14.45	3.71
Top Width (m)	18.36	Top Width (m)	10.32	3.53	4.51
Vel Total (m/s)	1.99	Avg. Vel. (m/s)	1.36	2.89	1.44
Max Chl Dpth (m)	1.73	Hydr. Depth (m)	0.48	1.42	0.57
Conv. Total (m3/s)	181.8	Conv. (m3/s)	49.2	105.5	27.1
Length Wtd. (m)	16.58	Wetted Per. (m)	10.80	4.62	5.10
Min Ch EI (m)	268.22	Shear (N/m2)	84.50	199.20	92.59
Alpha	1.43	Stream Power (N/m s)	879.03	485.49	671.24
Frctn Loss (m)	0.31	Cum Volume (1000 m3)	0.44	0.96	0.30
C & E Loss (m)	0.02	Cum SA (1000 m2)	0.80	0.49	0.39

Plan: 1 RIOLO T1 RS: 260 Profile: QR200

E.G. Elev (m)	269.84	Element	Left OB	Channel	Right OB
Vel Head (m)	0.23	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	269.61	Reach Len. (m)	21.63	21.63	21.63
Crit W.S. (m)	269.61	Flow Area (m2)	6.94	4.78	2.49
E.G. Slope (m/m)	0.018644	Area (m2)	6.94	4.78	2.49
Q Total (m3/s)	24.90	Flow (m3/s)	8.54	12.86	3.50
Top Width (m)	25.08	Top Width (m)	16.95	3.58	4.55
Vel Total (m/s)	1.75	Avg. Vel. (m/s)	1.23	2.69	1.41
Max Chl Dpth (m)	1.72	Hydr. Depth (m)	0.41	1.33	0.55
Conv. Total (m3/s)	182.4	Conv. (m3/s)	62.6	94.2	25.6
Length Wtd. (m)	21.63	Wetted Per. (m)	17.47	4.88	5.13
Min Ch EI (m)	267.89	Shear (N/m2)	72.68	179.03	88.72

Plan: 1 RIOLO T1 RS: 260 Profile: QR200 (Continued)

Alpha	1.48	Stream Power (N/m s)	1200.77	800.04	992.03
Frctn Loss (m)	0.08	Cum Volume (1000 m3)	0.34	0.88	0.25
C & E Loss (m)	0.05	Cum SA (1000 m2)	0.57	0.43	0.32

Plan: 1 RIOLO T1 RS: 250 Profile: QR200

E.G. Elev (m)	269.64	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.	0.060	0.050	
W.S. Elev (m)	269.58	Reach Len. (m)	19.51	19.51	19.51
Crit W.S. (m)	268.35	Flow Area (m2)	3.96	20.99	
E.G. Slope (m/m)	0.001634	Area (m2)	3.96	20.99	
Q Total (m3/s)	24.90	Flow (m3/s)	1.89	23.01	
Top Width (m)	17.01	Top Width (m)	5.99	11.02	
Vel Total (m/s)	1.00	Avg. Vel. (m/s)	0.48	1.10	
Max Chl Dpth (m)	2.78	Hydr. Depth (m)	0.66	1.90	
Conv. Total (m3/s)	616.0	Conv. (m3/s)	46.8	569.2	
Length Wtd. (m)	19.51	Wetted Per. (m)	6.64	13.29	
Min Ch El (m)	266.80	Shear (N/m2)	9.56	25.30	
Alpha	1.13	Stream Power (N/m s)	814.40	280.57	814.40
Frctn Loss (m)		Cum Volume (1000 m3)	0.23	0.60	0.23
C & E Loss (m)		Cum SA (1000 m2)	0.33	0.27	0.27

Plan: 1 RIOLO T1 RS: 240 Profile: QR200

E.G. Elev (m)	269.32	Element	Left OB	Channel	Right OB
Vel Head (m)	0.78	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	268.54	Reach Len. (m)	11.19	11.19	11.19
Crit W.S. (m)	268.47	Flow Area (m2)	0.50	5.86	0.40
E.G. Slope (m/m)	0.035355	Area (m2)	0.50	5.86	0.40
Q Total (m3/s)	24.90	Flow (m3/s)	0.79	23.54	0.57
Top Width (m)	4.11	Top Width (m)	0.64	2.82	0.65
Vel Total (m/s)	3.68	Avg. Vel. (m/s)	1.57	4.02	1.43
Max Chl Dpth (m)	2.19	Hydr. Depth (m)	0.79	2.08	0.61
Conv. Total (m3/s)	132.4	Conv. (m3/s)	4.2	125.2	3.0
Length Wtd. (m)	11.19	Wetted Per. (m)	1.42	5.31	1.28
Min Ch El (m)	266.35	Shear (N/m2)	122.61	382.81	107.16
Alpha	1.13	Stream Power (N/m s)	196.77	28.73	166.61
Frctn Loss (m)	0.34	Cum Volume (1000 m3)	0.23	0.35	0.23
C & E Loss (m)	0.10	Cum SA (1000 m2)	0.26	0.14	0.26

Plan: 1 RIOLO T1 RS: 230 Profile: QR200

E.G. Elev (m)	268.87	Element	Left OB	Channel	Right OB
Vel Head (m)	0.44	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	268.43	Reach Len. (m)	0.78	0.78	0.78
Crit W.S. (m)	268.33	Flow Area (m2)	0.52	4.35	4.22
E.G. Slope (m/m)	0.026857	Area (m2)	0.52	4.35	4.22
Q Total (m3/s)	24.90	Flow (m3/s)	0.70	14.53	9.68
Top Width (m)	7.25	Top Width (m)	0.57	2.11	4.57
Vel Total (m/s)	2.74	Avg. Vel. (m/s)	1.35	3.34	2.29
Max Chl Dpth (m)	2.22	Hydr. Depth (m)	0.90	2.06	0.92
Conv. Total (m3/s)	151.9	Conv. (m3/s)	4.2	88.6	59.0
Length Wtd. (m)	0.78	Wetted Per. (m)	1.48	4.22	5.49
Min Ch El (m)	266.21	Shear (N/m2)	91.64	271.16	202.43
Alpha	1.15	Stream Power (N/m s)	347.11	24.90	130.23
Frctn Loss (m)	0.03	Cum Volume (1000 m3)	0.22	0.29	0.20
C & E Loss (m)	0.00	Cum SA (1000 m2)	0.25	0.11	0.23



Plan: 1 RIOLO T1 RS: 222 BR U Profile: QR200

E.G. Elev (m)	268.84	Element	Left OB	Channel	Right OB
Vel Head (m)	0.46	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	268.38	Reach Len. (m)	18.00	18.00	18.00
Crit W.S. (m)	268.28	Flow Area (m2)	0.49	3.93	3.99
E.G. Slope (m/m)	0.054108	Area (m2)	0.49	3.93	3.99
Q Total (m3/s)	24.90	Flow (m3/s)	0.92	11.38	12.60
Top Width (m)	7.25	Top Width (m)	0.57	2.11	4.57
Vel Total (m/s)	2.96	Avg. Vel. (m/s)	1.89	2.89	3.15
Max Chl Dpth (m)	2.17	Hydr. Depth (m)	0.85	1.86	0.87
Conv. Total (m3/s)	107.0	Conv. (m3/s)	4.0	48.9	54.2
Length Wtd. (m)	18.00	Wetted Per. (m)	1.43	8.02	5.44
Min Ch El (m)	266.21	Shear (N/m2)	180.52	260.15	389.39
Alpha	1.03	Stream Power (N/m s)	347.11	24.90	130.23
Frctn Loss (m)	0.52	Cum Volume (1000 m3)	0.22	0.29	0.20
C & E Loss (m)	0.09	Cum SA (1000 m2)	0.25	0.11	0.23

Plan: 1 RIOLO T1 RS: 222 BR D Profile: QR200

E.G. Elev (m)	268.23	Element	Left OB	Channel	Right OB
Vel Head (m)	0.16	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	268.07	Reach Len. (m)	2.50	2.50	2.50
Crit W.S. (m)	267.78	Flow Area (m2)	6.45	4.30	3.53
E.G. Slope (m/m)	0.018134	Area (m2)	6.45	4.30	3.53
Q Total (m3/s)	24.90	Flow (m3/s)	11.72	7.19	6.00
Top Width (m)	14.99	Top Width (m)	8.12	2.24	4.63
Vel Total (m/s)	1.74	Avg. Vel. (m/s)	1.82	1.67	1.70
Max Chl Dpth (m)	2.20	Hydr. Depth (m)	0.79	1.92	0.76
Conv. Total (m3/s)	184.9	Conv. (m3/s)	87.0	53.4	44.5
Length Wtd. (m)	2.50	Wetted Per. (m)	8.87	8.81	5.36
Min Ch El (m)	265.87	Shear (N/m2)	129.37	86.83	117.15
Alpha	1.00	Stream Power (N/m s)	717.69	383.03	501.76
Frctn Loss (m)	0.05	Cum Volume (1000 m3)	0.16	0.21	0.13
C & E Loss (m)	0.01	Cum SA (1000 m2)	0.18	0.07	0.15

Plan: 1 RIOLO T1 RS: 220 Profile: QR200

E.G. Elev (m)	268.17	Element	Left OB	Channel	Right OB
Vel Head (m)	0.23	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	267.94	Reach Len. (m)	4.42	4.42	4.42
Crit W.S. (m)	267.84	Flow Area (m2)	5.44	4.42	2.94
E.G. Slope (m/m)	0.018163	Area (m2)	5.44	4.42	2.94
Q Total (m3/s)	24.90	Flow (m3/s)	8.88	11.53	4.49
Top Width (m)	14.99	Top Width (m)	8.12	2.24	4.63
Vel Total (m/s)	1.95	Avg. Vel. (m/s)	1.63	2.61	1.53
Max Chl Dpth (m)	2.07	Hydr. Depth (m)	0.67	1.97	0.63
Conv. Total (m3/s)	184.8	Conv. (m3/s)	65.9	85.5	33.3
Length Wtd. (m)	4.42	Wetted Per. (m)	8.77	4.64	5.23
Min Ch El (m)	265.87	Shear (N/m2)	110.42	169.63	100.04
Alpha	1.19	Stream Power (N/m s)	717.69	383.03	501.76
Frctn Loss (m)	0.05	Cum Volume (1000 m3)	0.14	0.20	0.12
C & E Loss (m)	0.03	Cum SA (1000 m2)	0.16	0.07	0.14

Plan: 1 RIOLO T1 RS: 210 Profile: QR200

E.G. Elev (m)	268.09	Element	Left OB	Channel	Right OB
Vel Head (m)	0.12	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	267.97	Reach Len. (m)	6.01	6.01	6.01
Crit W.S. (m)	267.67	Flow Area (m2)	6.93	4.84	5.85
E.G. Slope (m/m)	0.007990	Area (m2)	6.93	4.84	5.85
Q Total (m3/s)	24.90	Flow (m3/s)	8.84	9.17	6.89

Plan: 1 RIOLO T1 RS: 210 Profile: QR200 (Continued)

Top Width (m)	17.81	Top Width (m)	7.90	2.29	7.62
Vel Total (m/s)	1.41	Avg. Vel. (m/s)	1.27	1.90	1.18
Max Chl Dpth (m)	2.34	Hydr. Depth (m)	0.88	2.11	0.77
Conv. Total (m3/s)	278.6	Conv. (m3/s)	98.9	102.6	77.1
Length Wtd. (m)	6.01	Wetted Per. (m)	8.76	4.43	8.32
Min Ch El (m)	265.63	Shear (N/m2)	62.03	85.58	55.11
Alpha	1.14	Stream Power (N/m s)	852.71	368.19	494.58
Frctn Loss (m)	0.04	Cum Volume (1000 m3)	0.12	0.18	0.10
C & E Loss (m)	0.01	Cum SA (1000 m2)	0.12	0.06	0.11

Plan: 1 RIOLO T1 RS: 200 Profile: QR200

E.G. Elev (m)	268.04	Element	Left OB	Channel	Right OB
Vel Head (m)	0.09	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	267.95	Reach Len. (m)	9.65	9.65	9.65
Crit W.S. (m)	267.50	Flow Area (m2)	7.54	4.24	7.59
E.G. Slope (m/m)	0.006039	Area (m2)	7.54	4.24	7.59
Q Total (m3/s)	24.90	Flow (m3/s)	8.97	6.78	9.15
Top Width (m)	17.09	Top Width (m)	7.65	1.85	7.59
Vel Total (m/s)	1.29	Avg. Vel. (m/s)	1.19	1.60	1.20
Max Chl Dpth (m)	2.40	Hydr. Depth (m)	0.99	2.29	1.00
Conv. Total (m3/s)	320.4	Conv. (m3/s)	115.5	87.2	117.7
Length Wtd. (m)	9.65	Wetted Per. (m)	8.56	4.06	8.47
Min Ch El (m)	265.55	Shear (N/m2)	52.18	61.84	53.12
Alpha	1.05	Stream Power (N/m s)	818.24	359.56	460.59
Frctn Loss (m)	0.11	Cum Volume (1000 m3)	0.07	0.15	0.06
C & E Loss (m)	0.04	Cum SA (1000 m2)	0.07	0.04	0.06

Plan: 1 RIOLO T1 RS: 190 Profile: QR200

E.G. Elev (m)	267.90	Element	Left OB	Channel	Right OB
Vel Head (m)	0.44	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	267.45	Reach Len. (m)	6.05	6.05	6.05
Crit W.S. (m)	267.45	Flow Area (m2)	2.81	4.87	1.74
E.G. Slope (m/m)	0.027580	Area (m2)	2.81	4.87	1.74
Q Total (m3/s)	24.90	Flow (m3/s)	5.32	16.45	3.12
Top Width (m)	9.54	Top Width (m)	4.21	2.64	2.69
Vel Total (m/s)	2.64	Avg. Vel. (m/s)	1.90	3.38	1.80
Max Chl Dpth (m)	2.10	Hydr. Depth (m)	0.67	1.84	0.65
Conv. Total (m3/s)	149.9	Conv. (m3/s)	32.1	99.1	18.8
Length Wtd. (m)	6.05	Wetted Per. (m)	4.94	4.75	3.33
Min Ch El (m)	265.35	Shear (N/m2)	153.52	277.42	141.36
Alpha	1.25	Stream Power (N/m s)	456.75	198.22	331.79
Frctn Loss (m)	0.16	Cum Volume (1000 m3)	0.02	0.11	0.02
C & E Loss (m)	0.01	Cum SA (1000 m2)	0.02	0.02	0.01

Plan: 1 RIOLO T1 RS: 180 Profile: QR200

E.G. Elev (m)	267.65	Element	Left OB	Channel	Right OB
Vel Head (m)	0.58	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	267.07	Reach Len. (m)	0.10	0.10	0.10
Crit W.S. (m)	267.07	Flow Area (m2)	0.60	6.69	0.68
E.G. Slope (m/m)	0.025584	Area (m2)	0.60	6.69	0.68
Q Total (m3/s)	24.90	Flow (m3/s)	0.81	23.26	0.82
Top Width (m)	7.24	Top Width (m)	1.19	4.25	1.80
Vel Total (m/s)	3.12	Avg. Vel. (m/s)	1.35	3.48	1.21
Max Chl Dpth (m)	1.80	Hydr. Depth (m)	0.51	1.57	0.38
Conv. Total (m3/s)	155.7	Conv. (m3/s)	5.1	145.4	5.1
Length Wtd. (m)	0.10	Wetted Per. (m)	1.67	5.90	2.21
Min Ch El (m)	265.27	Shear (N/m2)	90.40	284.50	76.93

Plan: 1 RIOLO T1 RS: 180 Profile: QR200 (Continued)

Alpha	1.17	Stream Power (N/m s)	346.63	53.63	264.76
Frctn Loss (m)	0.00	Cum Volume (1000 m3)	0.01	0.07	0.01
C & E Loss (m)	0.07	Cum SA (1000 m2)	0.00	0.00	0.00

Plan: 1 RIOLO T1 RS: 170 Profile: QR200

E.G. Elev (m)	267.45	Element	Left OB	Channel	Right OB
Vel Head (m)	0.36	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	267.09	Reach Len. (m)	6.95	6.95	6.95
Crit W.S. (m)	266.56	Flow Area (m2)	0.63	8.74	0.71
E.G. Slope (m/m)	0.013317	Area (m2)	0.63	8.74	0.71
Q Total (m3/s)	24.90	Flow (m3/s)	0.63	23.63	0.64
Top Width (m)	7.26	Top Width (m)	1.19	4.27	1.80
Vel Total (m/s)	2.47	Avg. Vel. (m/s)	1.00	2.70	0.90
Max Chl Dpth (m)	2.36	Hydr. Depth (m)	0.53	2.05	0.40
Conv. Total (m3/s)	215.8	Conv. (m3/s)	5.4	204.8	5.6
Length Wtd. (m)	6.95	Wetted Per. (m)	1.68	6.90	2.23
Min Ch El (m)	264.73	Shear (N/m2)	48.81	165.55	41.76
Alpha	1.14	Stream Power (N/m s)	347.59	54.10	262.85
Frctn Loss (m)	0.06	Cum Volume (1000 m3)	0.01	0.07	0.01
C & E Loss (m)	0.04	Cum SA (1000 m2)			

Plan: 1 RIOLO2 T1 RS: 160 Profile: QR200

E.G. Elev (m)	267.35	Element	Left OB	Channel	Right OB
Vel Head (m)	0.22	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	267.13	Reach Len. (m)	20.02	20.02	20.02
Crit W.S. (m)	266.45	Flow Area (m2)	2.96	12.43	2.14
E.G. Slope (m/m)	0.006060	Area (m2)	2.96	12.43	2.14
Q Total (m3/s)	32.25	Flow (m3/s)	2.67	27.32	2.25
Top Width (m)	11.77	Top Width (m)	4.32	5.70	1.75
Vel Total (m/s)	1.84	Avg. Vel. (m/s)	0.90	2.20	1.05
Max Chl Dpth (m)	2.49	Hydr. Depth (m)	0.68	2.18	1.22
Conv. Total (m3/s)	414.3	Conv. (m3/s)	34.3	351.0	28.9
Length Wtd. (m)	20.02	Wetted Per. (m)	5.08	7.41	2.92
Min Ch El (m)	264.64	Shear (N/m2)	34.60	99.73	43.54
Alpha	1.25	Stream Power (N/m s)	563.52	198.69	490.75
Frctn Loss (m)	0.20	Cum Volume (1000 m3)	4.39	6.07	4.52
C & E Loss (m)	0.03	Cum SA (1000 m2)	5.06	2.48	4.46

Plan: 1 RIOLO2 T1 RS: 150 Profile: QR200

E.G. Elev (m)	267.12	Element	Left OB	Channel	Right OB
Vel Head (m)	0.50	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	266.61	Reach Len. (m)	26.12	26.12	26.12
Crit W.S. (m)	266.61	Flow Area (m2)	2.53	8.09	1.11
E.G. Slope (m/m)	0.020146	Area (m2)	2.53	8.09	1.11
Q Total (m3/s)	32.25	Flow (m3/s)	3.50	27.22	1.54
Top Width (m)	11.43	Top Width (m)	5.13	4.50	1.80
Vel Total (m/s)	2.75	Avg. Vel. (m/s)	1.38	3.37	1.38
Max Chl Dpth (m)	2.34	Hydr. Depth (m)	0.49	1.80	0.62
Conv. Total (m3/s)	227.2	Conv. (m3/s)	24.6	191.8	10.8
Length Wtd. (m)	26.12	Wetted Per. (m)	5.69	6.26	2.50
Min Ch El (m)	264.27	Shear (N/m2)	87.93	255.07	88.06
Alpha	1.31	Stream Power (N/m s)	547.24	241.30	464.41
Frctn Loss (m)	0.33	Cum Volume (1000 m3)	4.34	5.86	4.49
C & E Loss (m)	0.07	Cum SA (1000 m2)	4.97	2.38	4.43

Plan: 1 RIOLO2 T1 RS: 140 Profile: QR200

E.G. Elev (m)	266.70	Element	Left OB	Channel	Right OB
Vel Head (m)	0.27	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	266.43	Reach Len. (m)	13.10	13.10	13.10
Crit W.S. (m)	266.09	Flow Area (m2)	3.50	9.92	2.61
E.G. Slope (m/m)	0.008466	Area (m2)	3.50	9.92	2.61
Q Total (m3/s)	32.25	Flow (m3/s)	3.52	25.28	3.44
Top Width (m)	12.87	Top Width (m)	5.95	4.88	2.04
Vel Total (m/s)	2.01	Avg. Vel. (m/s)	1.01	2.55	1.32
Max Chl Dpth (m)	2.67	Hydr. Depth (m)	0.59	2.03	1.28
Conv. Total (m3/s)	350.5	Conv. (m3/s)	38.3	274.8	37.4
Length Wtd. (m)	13.10	Wetted Per. (m)	6.57	6.09	3.28
Min Ch El (m)	263.76	Shear (N/m2)	44.19	135.31	66.20
Alpha	1.33	Stream Power (N/m s)	616.18	280.57	521.39
Frctn Loss (m)	0.17	Cum Volume (1000 m3)	4.26	5.63	4.44
C & E Loss (m)	0.04	Cum SA (1000 m2)	4.82	2.26	4.38

Plan: 1 RIOLO2 T1 RS: 130 Profile: QR200

E.G. Elev (m)	266.50	Element	Left OB	Channel	Right OB
Vel Head (m)	0.63	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	265.86	Reach Len. (m)	9.30	9.30	9.30
Crit W.S. (m)	265.86	Flow Area (m2)	2.02	7.23	0.95
E.G. Slope (m/m)	0.021480	Area (m2)	2.02	7.23	0.95
Q Total (m3/s)	32.25	Flow (m3/s)	3.72	27.22	1.31
Top Width (m)	8.19	Top Width (m)	2.52	3.93	1.74
Vel Total (m/s)	3.16	Avg. Vel. (m/s)	1.84	3.77	1.37
Max Chl Dpth (m)	2.12	Hydr. Depth (m)	0.80	1.84	0.55
Conv. Total (m3/s)	220.0	Conv. (m3/s)	25.4	185.7	8.9
Length Wtd. (m)	9.30	Wetted Per. (m)	3.09	4.96	2.27
Min Ch El (m)	263.74	Shear (N/m2)	137.75	306.81	88.55
Alpha	1.25	Stream Power (N/m s)	392.12	117.78	311.68
Frctn Loss (m)	0.17	Cum Volume (1000 m3)	4.22	5.52	4.42
C & E Loss (m)	0.09	Cum SA (1000 m2)	4.77	2.20	4.35

Plan: 1 RIOLO2 T1 RS: 120 Profile: QR200

E.G. Elev (m)	266.08	Element	Left OB	Channel	Right OB
Vel Head (m)	0.35	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	265.74	Reach Len. (m)	15.25	15.25	15.25
Crit W.S. (m)	265.74	Flow Area (m2)	6.58	7.26	1.23
E.G. Slope (m/m)	0.016367	Area (m2)	6.58	7.26	1.23
Q Total (m3/s)	32.25	Flow (m3/s)	8.54	21.98	1.73
Top Width (m)	18.99	Top Width (m)	13.42	4.10	1.47
Vel Total (m/s)	2.14	Avg. Vel. (m/s)	1.30	3.03	1.41
Max Chl Dpth (m)	2.23	Hydr. Depth (m)	0.49	1.77	0.84
Conv. Total (m3/s)	252.1	Conv. (m3/s)	66.7	171.8	13.5
Length Wtd. (m)	15.25	Wetted Per. (m)	13.88	5.63	2.30
Min Ch El (m)	263.51	Shear (N/m2)	76.12	206.81	85.94
Alpha	1.49	Stream Power (N/m s)	909.20	638.22	842.65
Frctn Loss (m)	0.08	Cum Volume (1000 m3)	4.18	5.45	4.41
C & E Loss (m)	0.09	Cum SA (1000 m2)	4.69	2.16	4.34

Plan: 1 RIOLO2 T1 RS: 110 Profile: QR200

E.G. Elev (m)	265.66	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	265.61	Reach Len. (m)	15.12	15.12	15.12
Crit W.S. (m)	265.20	Flow Area (m2)	8.31	7.66	21.43
E.G. Slope (m/m)	0.002768	Area (m2)	8.31	7.66	21.43
Q Total (m3/s)	32.25	Flow (m3/s)	5.53	10.33	16.39

Plan: 1 RIOLO2 T1 RS: 110 Profile: QR200 (Continued)

Top Width (m)	41.67	Top Width (m)	12.18	4.08	25.41
Vel Total (m/s)	0.86	Avg. Vel. (m/s)	0.67	1.35	0.76
Max Chl Dpth (m)	2.27	Hydr. Depth (m)	0.68	1.88	0.84
Conv. Total (m3/s)	612.9	Conv. (m3/s)	105.0	196.4	311.6
Length Wtd. (m)	15.12	Wetted Per. (m)	12.58	5.28	26.32
Min Ch EI (m)	263.34	Shear (N/m2)	17.93	39.38	22.11
Alpha	1.29	Stream Power (N/m s)	1995.08	564.00	791.42
Frctn Loss (m)	0.07	Cum Volume (1000 m3)	4.07	5.34	4.23
C & E Loss (m)	0.02	Cum SA (1000 m2)	4.50	2.10	4.13

Plan: 1 RIOLO2 T1 RS: 100 Profile: QR200

E.G. Elev (m)	265.56	Element	Left OB	Channel	Right OB
Vel Head (m)	0.28	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	265.28	Reach Len. (m)	15.12	15.12	15.12
Crit W.S. (m)	265.28	Flow Area (m2)	10.05	7.85	0.85
E.G. Slope (m/m)	0.010919	Area (m2)	10.05	7.85	0.85
Q Total (m3/s)	32.25	Flow (m3/s)	9.73	21.65	0.87
Top Width (m)	29.25	Top Width (m)	24.09	4.33	0.83
Vel Total (m/s)	1.72	Avg. Vel. (m/s)	0.97	2.76	1.02
Max Chl Dpth (m)	2.25	Hydr. Depth (m)	0.42	1.81	1.02
Conv. Total (m3/s)	308.6	Conv. (m3/s)	93.1	207.2	8.3
Length Wtd. (m)	15.12	Wetted Per. (m)	24.26	5.18	1.88
Min Ch EI (m)	263.03	Shear (N/m2)	44.37	162.38	48.34
Alpha	1.83	Stream Power (N/m s)	1400.43	1149.55	1366.91
Frctn Loss (m)	0.06	Cum Volume (1000 m3)	3.93	5.22	4.07
C & E Loss (m)	0.07	Cum SA (1000 m2)	4.22	2.04	3.93

Plan: 1 RIOLO2 T1 RS: 90 Profile: QR200

E.G. Elev (m)	265.06	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	265.02	Reach Len. (m)	23.02	23.02	23.02
Crit W.S. (m)	264.47	Flow Area (m2)	7.16	8.52	22.92
E.G. Slope (m/m)	0.002206	Area (m2)	7.16	8.52	22.92
Q Total (m3/s)	32.25	Flow (m3/s)	4.61	10.16	17.47
Top Width (m)	36.75	Top Width (m)	9.09	5.09	22.57
Vel Total (m/s)	0.84	Avg. Vel. (m/s)	0.64	1.19	0.76
Max Chl Dpth (m)	2.22	Hydr. Depth (m)	0.79	1.67	1.02
Conv. Total (m3/s)	686.6	Conv. (m3/s)	98.2	216.4	372.0
Length Wtd. (m)	23.02	Wetted Per. (m)	9.59	5.96	23.85
Min Ch EI (m)	262.80	Shear (N/m2)	16.15	30.95	20.79
Alpha	1.18	Stream Power (N/m s)	1759.51	428.98	685.14
Frctn Loss (m)	0.04	Cum Volume (1000 m3)	3.80	5.09	3.89
C & E Loss (m)	0.00	Cum SA (1000 m2)	3.97	1.96	3.76

Plan: 1 RIOLO2 T1 RS: 80 Profile: QR200

E.G. Elev (m)	265.01	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	264.98	Reach Len. (m)	16.07	16.07	16.07
Crit W.S. (m)	264.52	Flow Area (m2)	7.70	9.27	23.56
E.G. Slope (m/m)	0.001711	Area (m2)	7.70	9.27	23.56
Q Total (m3/s)	32.25	Flow (m3/s)	5.18	9.40	17.67
Top Width (m)	30.34	Top Width (m)	6.72	4.85	18.77
Vel Total (m/s)	0.80	Avg. Vel. (m/s)	0.67	1.01	0.75
Max Chl Dpth (m)	2.56	Hydr. Depth (m)	1.15	1.91	1.26
Conv. Total (m3/s)	779.6	Conv. (m3/s)	125.1	227.3	427.2
Length Wtd. (m)	16.07	Wetted Per. (m)	8.00	6.83	20.75
Min Ch EI (m)	262.42	Shear (N/m2)	16.15	22.78	19.05

Plan: 1 RIOLO2 T1 RS: 80 Profile: QR200 (Continued)

Alpha	1.08	Stream Power (N/m s)	1452.62	313.13	561.12
Frctn Loss (m)	0.07	Cum Volume (1000 m3)	3.63	4.89	3.35
C & E Loss (m)	0.06	Cum SA (1000 m2)	3.79	1.85	3.28

Plan: 1 RIOLO2 T1 RS: 70 Profile: QR200

E.G. Elev (m)	264.89	Element	Left OB	Channel	Right OB
Vel Head (m)	0.63	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	264.26	Reach Len. (m)	29.54	29.54	29.54
Crit W.S. (m)	264.26	Flow Area (m2)	2.92	6.86	0.35
E.G. Slope (m/m)	0.022268	Area (m2)	2.92	6.86	0.35
Q Total (m3/s)	32.25	Flow (m3/s)	5.86	26.03	0.36
Top Width (m)	8.16	Top Width (m)	3.41	3.67	1.08
Vel Total (m/s)	3.18	Avg. Vel. (m/s)	2.00	3.79	1.03
Max Chl Dpth (m)	2.11	Hydr. Depth (m)	0.86	1.87	0.32
Conv. Total (m3/s)	216.1	Conv. (m3/s)	39.2	174.5	2.4
Length Wtd. (m)	29.54	Wetted Per. (m)	4.04	4.79	1.31
Min Ch El (m)	262.15	Shear (N/m2)	158.01	312.98	58.33
Alpha	1.22	Stream Power (N/m s)	459.15	157.52	341.85
Frctn Loss (m)	0.56	Cum Volume (1000 m3)	3.54	4.76	3.16
C & E Loss (m)	0.09	Cum SA (1000 m2)	3.71	1.78	3.12

Plan: 1 RIOLO2 T1 RS: 60 Profile: QR200

E.G. Elev (m)	264.14	Element	Left OB	Channel	Right OB
Vel Head (m)	0.32	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	263.82	Reach Len. (m)	114.48	114.48	114.48
Crit W.S. (m)	263.82	Flow Area (m2)	3.76	8.75	3.08
E.G. Slope (m/m)	0.016331	Area (m2)	3.76	8.75	3.08
Q Total (m3/s)	32.25	Flow (m3/s)	3.76	24.50	3.99
Top Width (m)	22.76	Top Width (m)	11.30	6.00	5.46
Vel Total (m/s)	2.07	Avg. Vel. (m/s)	1.00	2.80	1.29
Max Chl Dpth (m)	2.14	Hydr. Depth (m)	0.33	1.46	0.56
Conv. Total (m3/s)	252.4	Conv. (m3/s)	29.4	191.7	31.2
Length Wtd. (m)	114.48	Wetted Per. (m)	11.67	7.63	6.52
Min Ch El (m)	261.68	Shear (N/m2)	51.59	183.72	75.75
Alpha	1.47	Stream Power (N/m s)	1089.70	535.76	832.12
Frctn Loss (m)	1.90	Cum Volume (1000 m3)	3.45	4.53	3.11
C & E Loss (m)	0.04	Cum SA (1000 m2)	3.49	1.64	3.02

Plan: 1 RIOLO2 T1 RS: 50 Profile: QR200

E.G. Elev (m)	262.15	Element	Left OB	Channel	Right OB
Vel Head (m)	0.19	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	261.96	Reach Len. (m)	54.64	54.64	54.64
Crit W.S. (m)	261.96	Flow Area (m2)	6.51	6.90	6.46
E.G. Slope (m/m)	0.016785	Area (m2)	6.51	6.90	6.46
Q Total (m3/s)	32.25	Flow (m3/s)	7.84	16.86	7.55
Top Width (m)	37.18	Top Width (m)	15.31	6.25	15.62
Vel Total (m/s)	1.62	Avg. Vel. (m/s)	1.20	2.44	1.17
Max Chl Dpth (m)	1.95	Hydr. Depth (m)	0.43	1.10	0.41
Conv. Total (m3/s)	248.9	Conv. (m3/s)	60.5	130.2	58.3
Length Wtd. (m)	54.64	Wetted Per. (m)	16.01	7.54	16.22
Min Ch El (m)	260.01	Shear (N/m2)	66.99	150.72	65.56
Alpha	1.44	Stream Power (N/m s)	1786.32	731.57	1045.66
Frctn Loss (m)	0.38	Cum Volume (1000 m3)	2.86	3.63	2.56
C & E Loss (m)	0.04	Cum SA (1000 m2)	1.97	0.94	1.82

Plan: 1 RIOLO2 T1 RS: 40 Profile: QR200

E.G. Elev (m)	261.40	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	261.34	Reach Len. (m)	58.53	58.53	58.53
Crit W.S. (m)	261.18	Flow Area (m2)	14.84	9.34	9.31
E.G. Slope (m/m)	0.003711	Area (m2)	14.84	9.34	9.31
Q Total (m3/s)	32.25	Flow (m3/s)	12.92	12.53	6.79
Top Width (m)	38.75	Top Width (m)	17.31	6.99	14.45
Vel Total (m/s)	0.96	Avg. Vel. (m/s)	0.87	1.34	0.73
Max Chl Dpth (m)	2.12	Hydr. Depth (m)	0.86	1.34	0.64
Conv. Total (m3/s)	529.4	Conv. (m3/s)	212.2	205.7	111.5
Length Wtd. (m)	58.53	Wetted Per. (m)	18.67	8.08	15.26
Min Ch El (m)	259.22	Shear (N/m2)	28.92	42.04	22.19
Alpha	1.20	Stream Power (N/m s)	1855.27	820.63	1176.84
Frctn Loss (m)	0.15	Cum Volume (1000 m3)	2.27	3.19	2.13
C & E Loss (m)	0.00	Cum SA (1000 m2)	1.08	0.58	1.00

Plan: 1 RIOLO2 T1 RS: 30 Profile: QR200

E.G. Elev (m)	261.25	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	261.21	Reach Len. (m)	13.00	13.00	13.00
Crit W.S. (m)	260.38	Flow Area (m2)	15.97	12.76	10.26
E.G. Slope (m/m)	0.001776	Area (m2)	15.97	12.76	10.26
Q Total (m3/s)	32.25	Flow (m3/s)	11.85	14.38	6.01
Top Width (m)	32.61	Top Width (m)	13.25	6.90	12.46
Vel Total (m/s)	0.83	Avg. Vel. (m/s)	0.74	1.13	0.59
Max Chl Dpth (m)	2.84	Hydr. Depth (m)	1.21	1.85	0.82
Conv. Total (m3/s)	765.3	Conv. (m3/s)	281.3	341.4	142.7
Length Wtd. (m)	13.00	Wetted Per. (m)	14.71	8.24	13.45
Min Ch El (m)	258.37	Shear (N/m2)	18.91	26.95	13.28
Alpha	1.22	Stream Power (N/m s)	1561.30	629.11	980.06
Frctn Loss (m)	0.03	Cum Volume (1000 m3)	1.37	2.54	1.56
C & E Loss (m)	0.01	Cum SA (1000 m2)	0.18	0.17	0.21

Plan: 1 RIOLO2 T1 RS: 20 Profile: QR200

E.G. Elev (m)	261.21	Element	Left OB	Channel	Right OB
Vel Head (m)	0.13	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	261.08	Reach Len. (m)	12.40	12.40	12.40
Crit W.S. (m)	260.50	Flow Area (m2)	2.79	14.52	5.76
E.G. Slope (m/m)	0.003836	Area (m2)	2.79	14.52	5.76
Q Total (m3/s)	32.25	Flow (m3/s)	2.12	25.53	4.60
Top Width (m)	18.25	Top Width (m)	3.63	7.06	7.56
Vel Total (m/s)	1.40	Avg. Vel. (m/s)	0.76	1.76	0.80
Max Chl Dpth (m)	2.86	Hydr. Depth (m)	0.77	2.06	0.76
Conv. Total (m3/s)	520.7	Conv. (m3/s)	34.2	412.2	74.3
Length Wtd. (m)	12.40	Wetted Per. (m)	4.41	8.58	8.46
Min Ch El (m)	258.22	Shear (N/m2)	23.76	63.62	25.62
Alpha	1.32	Stream Power (N/m s)	873.77	168.06	516.60
Frctn Loss (m)		Cum Volume (1000 m3)	1.25	2.37	1.45
C & E Loss (m)		Cum SA (1000 m2)	0.07	0.08	0.08

Plan: 1 RIOLO2 T1 RS: 10 Profile: QR200

E.G. Elev (m)	260.71	Element	Left OB	Channel	Right OB
Vel Head (m)	0.33	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	260.38	Reach Len. (m)			
Crit W.S. (m)	260.22	Flow Area (m2)	4.80	8.69	1.66
E.G. Slope (m/m)	0.015002	Area (m2)	4.80	8.69	1.66
Q Total (m3/s)	32.25	Flow (m3/s)	6.16	24.55	1.55

Plan: 1 RIOLO2 T1 RS: 10 Profile: QR200 (Continued)

Top Width (m)	18.61	Top Width (m)	8.02	5.58	5.01
Vel Total (m/s)	2.13	Avg. Vel. (m/s)	1.28	2.82	0.93
Max Chl Dpth (m)	2.23	Hydr. Depth (m)	0.60	1.56	0.33
Conv. Total (m3/s)	263.3	Conv. (m3/s)	50.3	200.4	12.6
Length Wtd. (m)		Wetted Per. (m)	9.66	7.02	5.36
Min Ch El (m)	258.15	Shear (N/m2)	73.18	182.19	45.49
Alpha	1.42	Stream Power (N/m s)	891.00	380.63	654.97
Frctn Loss (m)		Cum Volume (1000 m3)			
C & E Loss (m)		Cum SA (1000 m2)			



Plan: 1 RIOLO T1 RS: 295 Culv Group: Culvert #1 Profile: QR200

Q Culv Group (m3/s)	5.79	Culv Full Len (m)	7.00
# Barrels	1	Culv Vel US (m/s)	1.94
Q Barrel (m3/s)	5.79	Culv Vel DS (m/s)	1.94
E.G. US. (m)	271.24	Culv Inv El Up (m)	269.22
W.S. US. (m)	271.14	Culv Inv El Dn (m)	269.22
E.G. DS (m)	271.13	Culv Frctn Ls (m)	0.02
W.S. DS (m)	270.88	Culv Exit Loss (m)	0.00
Delta EG (m)	0.11	Culv Entr Loss (m)	0.10
Delta WS (m)	0.25	Q Weir (m3/s)	19.11
E.G. IC (m)	271.20	Weir Sta Lft (m)	0.00
E.G. OC (m)	271.24	Weir Sta Rgt (m)	23.72
Culvert Control	Outlet	Weir Submerg	0.49
Culv WS Inlet (m)	270.52	Weir Max Depth (m)	0.90
Culv WS Outlet (m)	270.52	Weir Avg Depth (m)	0.68
Culv Nml Depth (m)		Weir Flow Area (m2)	16.11
Culv Crt Depth (m)	0.86	Min El Weir Flow (m)	270.34

Plan: 1 RIOLO T1 RS: 242 Culv Group: Culvert #1 Profile: QR200

Q Culv Group (m3/s)	8.43	Culv Full Len (m)	13.50
# Barrels	1	Culv Vel US (m/s)	3.12
Q Barrel (m3/s)	8.43	Culv Vel DS (m/s)	3.12
E.G. US. (m)	269.64	Culv Inv El Up (m)	266.80
W.S. US. (m)	269.58	Culv Inv El Dn (m)	266.35
E.G. DS (m)	269.32	Culv Frctn Ls (m)	0.07
W.S. DS (m)	268.54	Culv Exit Loss (m)	0.00
Delta EG (m)	0.32	Culv Entr Loss (m)	0.25
Delta WS (m)	1.05	Q Weir (m3/s)	16.47
E.G. IC (m)	269.57	Weir Sta Lft (m)	0.00
E.G. OC (m)	269.64	Weir Sta Rgt (m)	17.01
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (m)	267.80	Weir Max Depth (m)	0.81
Culv WS Outlet (m)	267.35	Weir Avg Depth (m)	0.78
Culv Nml Depth (m)		Weir Flow Area (m2)	13.28
Culv Crt Depth (m)	1.00	Min El Weir Flow (m)	268.83

Plan: 1 RIOLO2 T1 RS: 12 Culv Group: Culvert #1 Profile: QR200

Q Culv Group (m3/s)	14.17	Culv Full Len (m)	8.00
# Barrels	1	Culv Vel US (m/s)	3.20
Q Barrel (m3/s)	14.17	Culv Vel DS (m/s)	3.20
E.G. US. (m)	261.21	Culv Inv El Up (m)	258.27
W.S. US. (m)	261.08	Culv Inv El Dn (m)	258.16
E.G. DS (m)	260.71	Culv Frctn Ls (m)	0.04
W.S. DS (m)	260.38	Culv Exit Loss (m)	0.19
Delta EG (m)	0.50	Culv Entr Loss (m)	0.26
Delta WS (m)	0.69	Q Weir (m3/s)	18.08
E.G. IC (m)	261.21	Weir Sta Lft (m)	0.00
E.G. OC (m)	261.21	Weir Sta Rgt (m)	18.25
Culvert Control	Outlet	Weir Submerg	0.04
Culv WS Inlet (m)	260.08	Weir Max Depth (m)	1.00
Culv WS Outlet (m)	259.97	Weir Avg Depth (m)	0.79
Culv Nml Depth (m)		Weir Flow Area (m2)	14.43
Culv Crt Depth (m)	1.51	Min El Weir Flow (m)	260.44

Plan: 1 RIOLO T1 RS: 332 Profile: QR200

E.G. US. (m)	274.21	Element	Inside BR US	Inside BR DS
W.S. US. (m)	274.04	E.G. Elev (m)	274.18	274.14
Q Total (m3/s)	24.90	W.S. Elev (m)	274.01	273.94
Q Bridge (m3/s)	4.43	Crit W.S. (m)	273.73	273.73
Q Weir (m3/s)		Max Chl Dpth (m)	1.97	1.90
Weir Sta Lft (m)		Vel Total (m/s)	1.82	1.97
Weir Sta Rgt (m)		Flow Area (m2)	13.70	12.64
Weir Submerg		Froude # Chl	0.42	0.46
Weir Max Depth (m)		Specif Force (m3)	12.05	11.54
Min El Weir Flow (m)	273.18	Hydr Depth (m)	0.86	0.82
Min El Prs (m)	273.72	W.P. Total (m)	25.43	24.87
Delta EG (m)	0.09	Conv. Total (m3/s)	171.8	151.5
Delta WS (m)	0.24	Top Width (m)	15.97	15.49
BR Open Area (m2)	3.05	Frctn Loss (m)	0.04	0.01
BR Open Vel (m/s)	1.45	C & E Loss (m)	0.00	0.01
Coef of Q		Shear Total (N/m2)	110.96	134.62
Br Sel Method	Energy only	Power Total (N/m s)	0.00	0.00

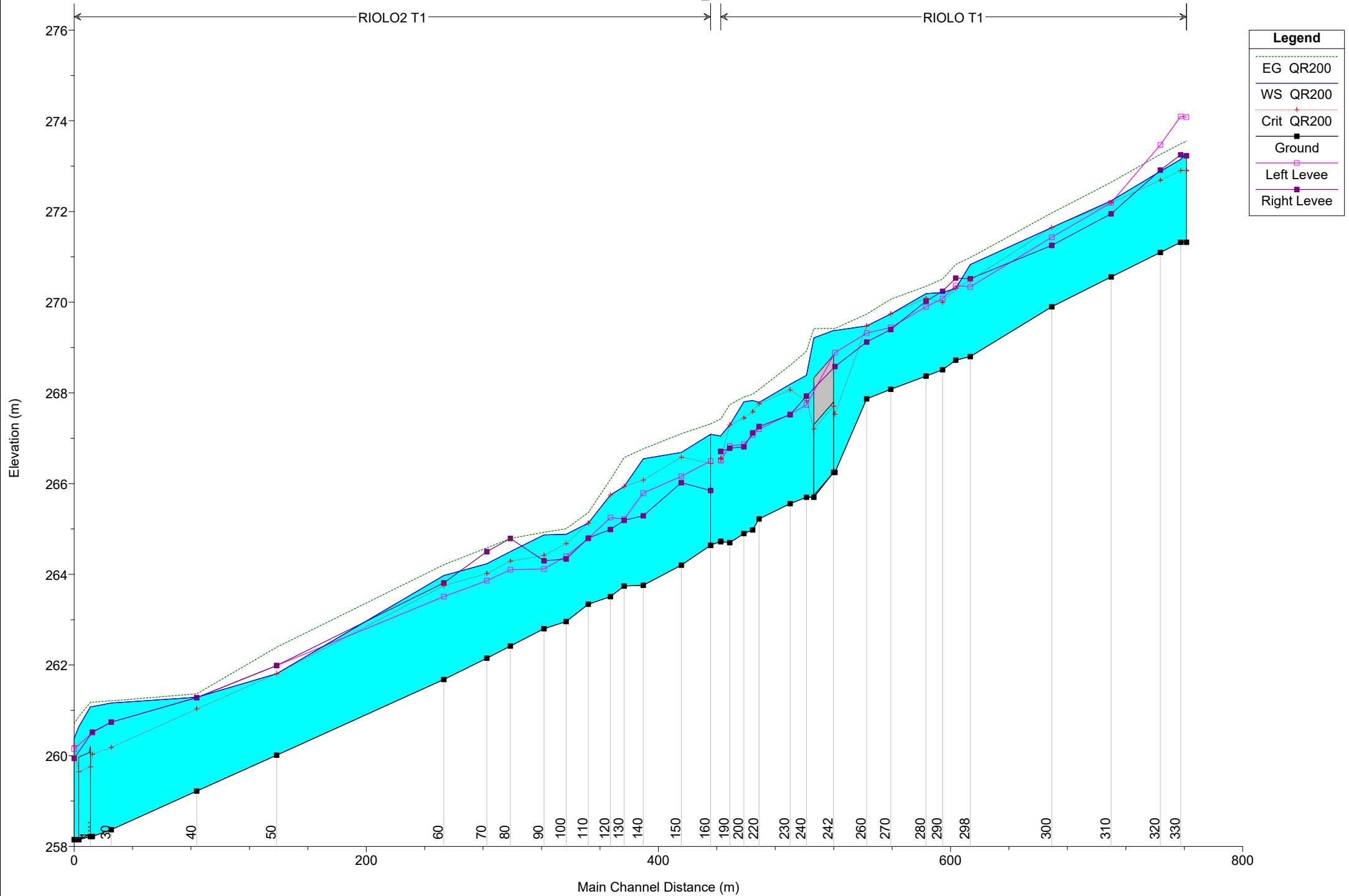
Plan: 1 RIOLO T1 RS: 222 Profile: QR200

E.G. US. (m)	268.87	Element	Inside BR US	Inside BR DS
W.S. US. (m)	268.43	E.G. Elev (m)	268.84	268.23
Q Total (m3/s)	24.90	W.S. Elev (m)	268.38	268.07
Q Bridge (m3/s)	4.09	Crit W.S. (m)	268.28	267.78
Q Weir (m3/s)		Max Chl Dpth (m)	2.17	2.20
Weir Sta Lft (m)		Vel Total (m/s)	2.96	1.74
Weir Sta Rgt (m)		Flow Area (m2)	8.42	14.29
Weir Submerg		Froude # Chl	0.65	0.38
Weir Max Depth (m)		Specif Force (m3)	13.60	12.96
Min El Weir Flow (m)	267.44	Hydr Depth (m)	1.16	0.95
Min El Prs (m)	267.29	W.P. Total (m)	14.90	23.04
Delta EG (m)	0.70	Conv. Total (m3/s)	107.0	184.9
Delta WS (m)	0.49	Top Width (m)	7.25	14.99
BR Open Area (m2)	1.94	Frctn Loss (m)	0.52	0.05
BR Open Vel (m/s)	2.11	C & E Loss (m)	0.09	0.01
Coef of Q		Shear Total (N/m2)	299.72	110.26
Br Sel Method	Energy only	Power Total (N/m s)	0.00	0.00

**RISULTATI  
MODELLAZIONI HEC  
STATO DI PROGETTO**

# Riolo variato\_2023

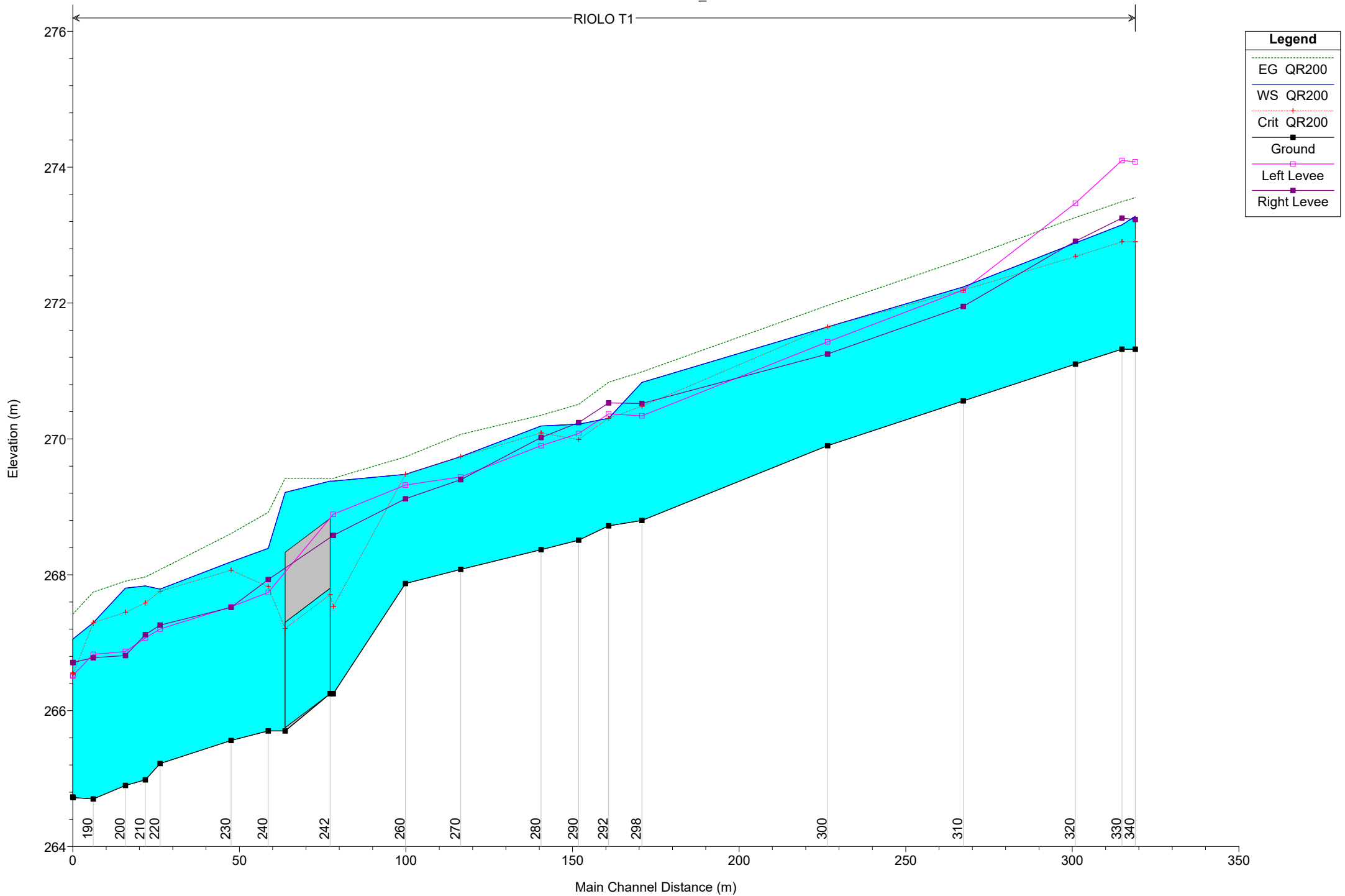
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# Riolo variato\_2023

Geom: variato\_R01

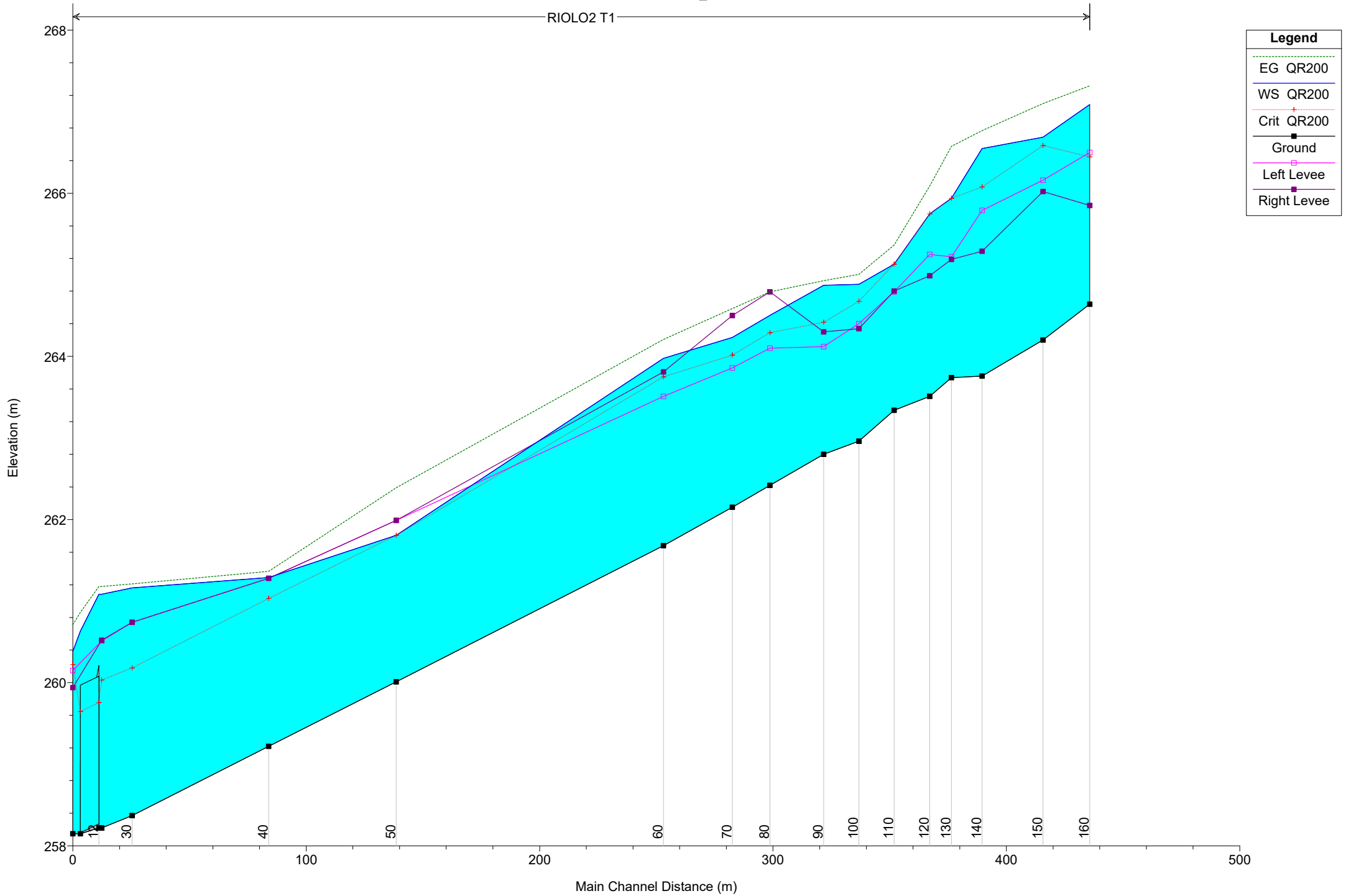
RIOLO T1



# Riolo variato\_2023

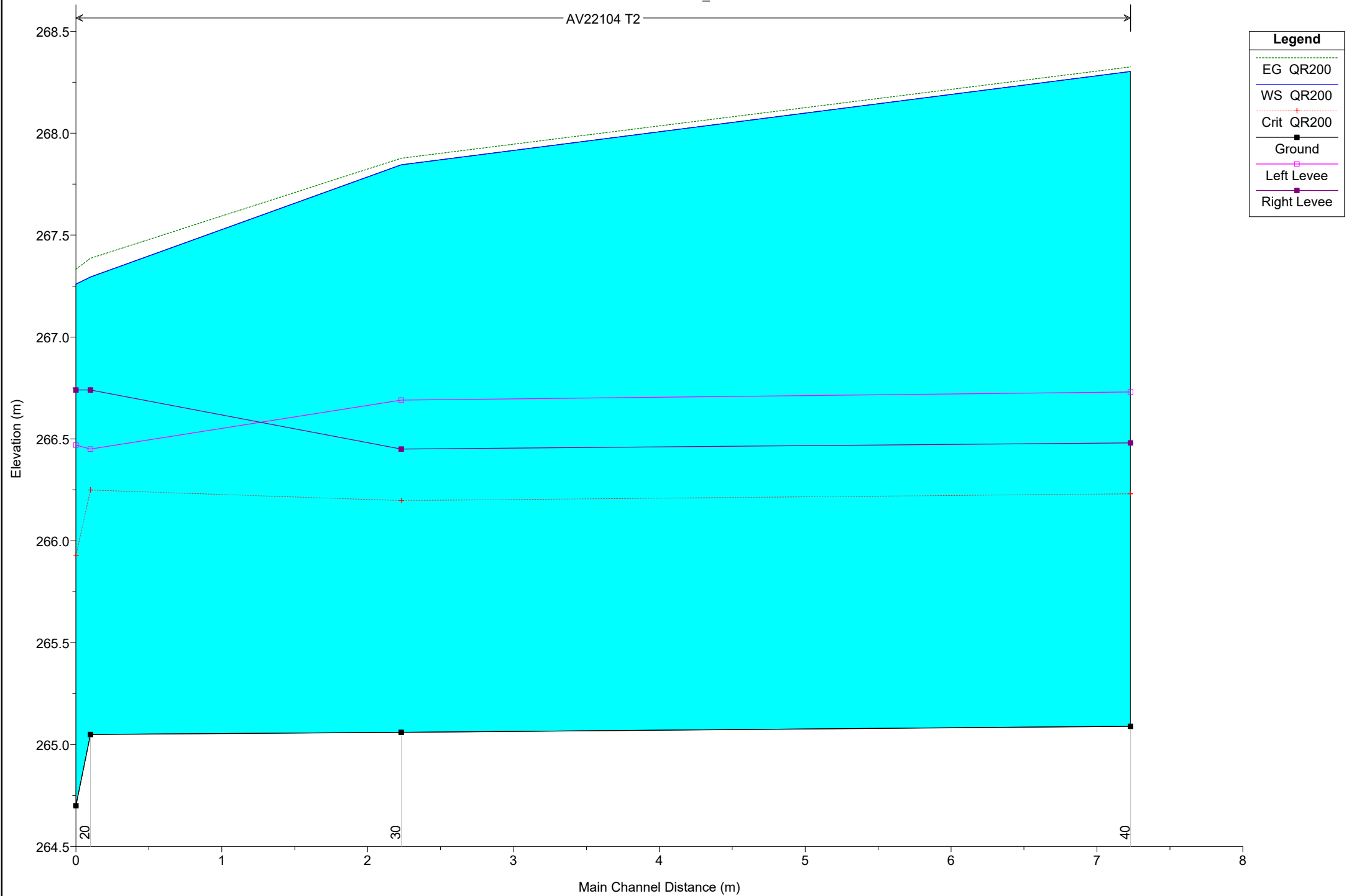
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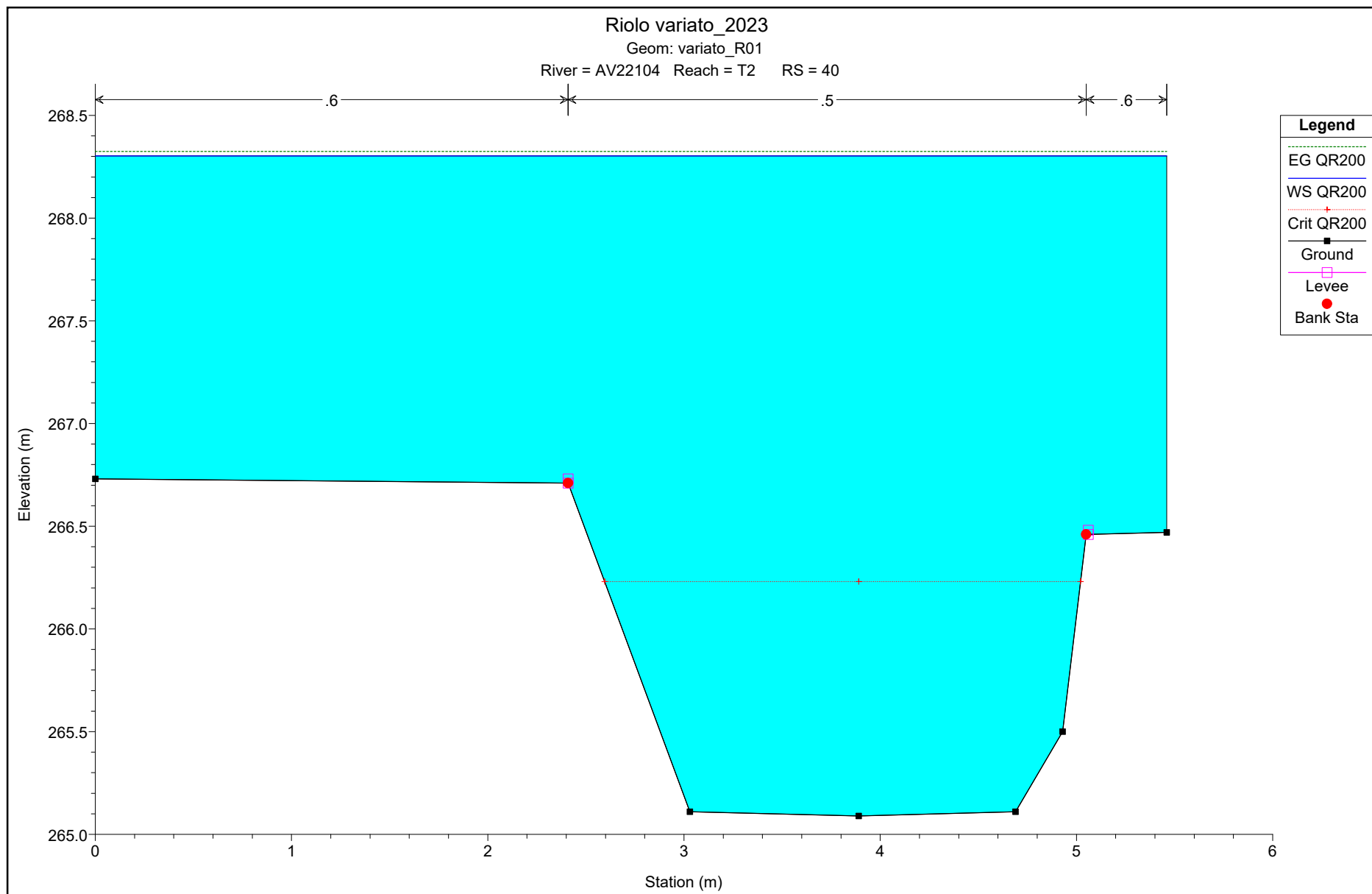
RIOLO2 T1



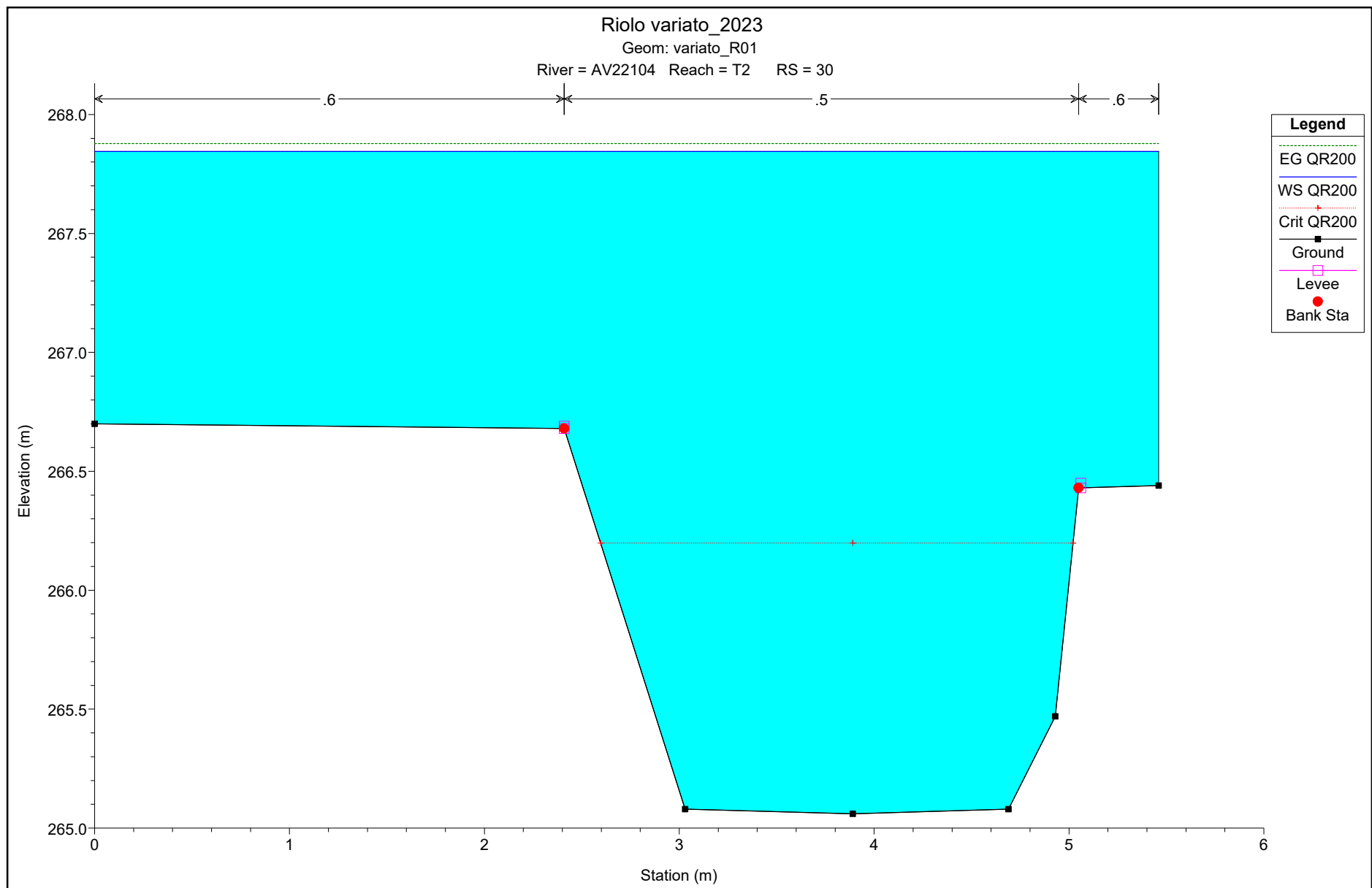
# Riolo variato\_2023

Geom: variato\_R01

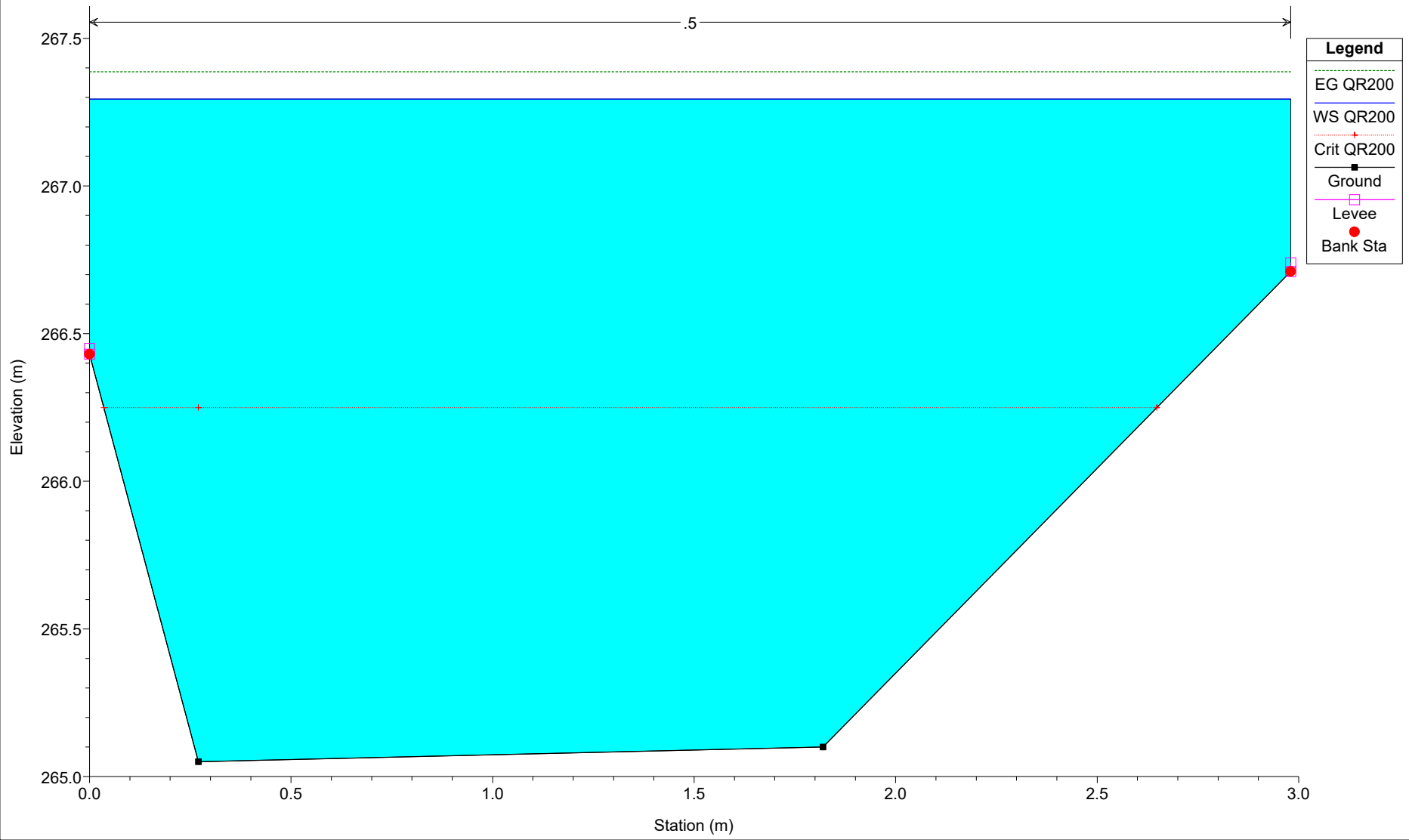




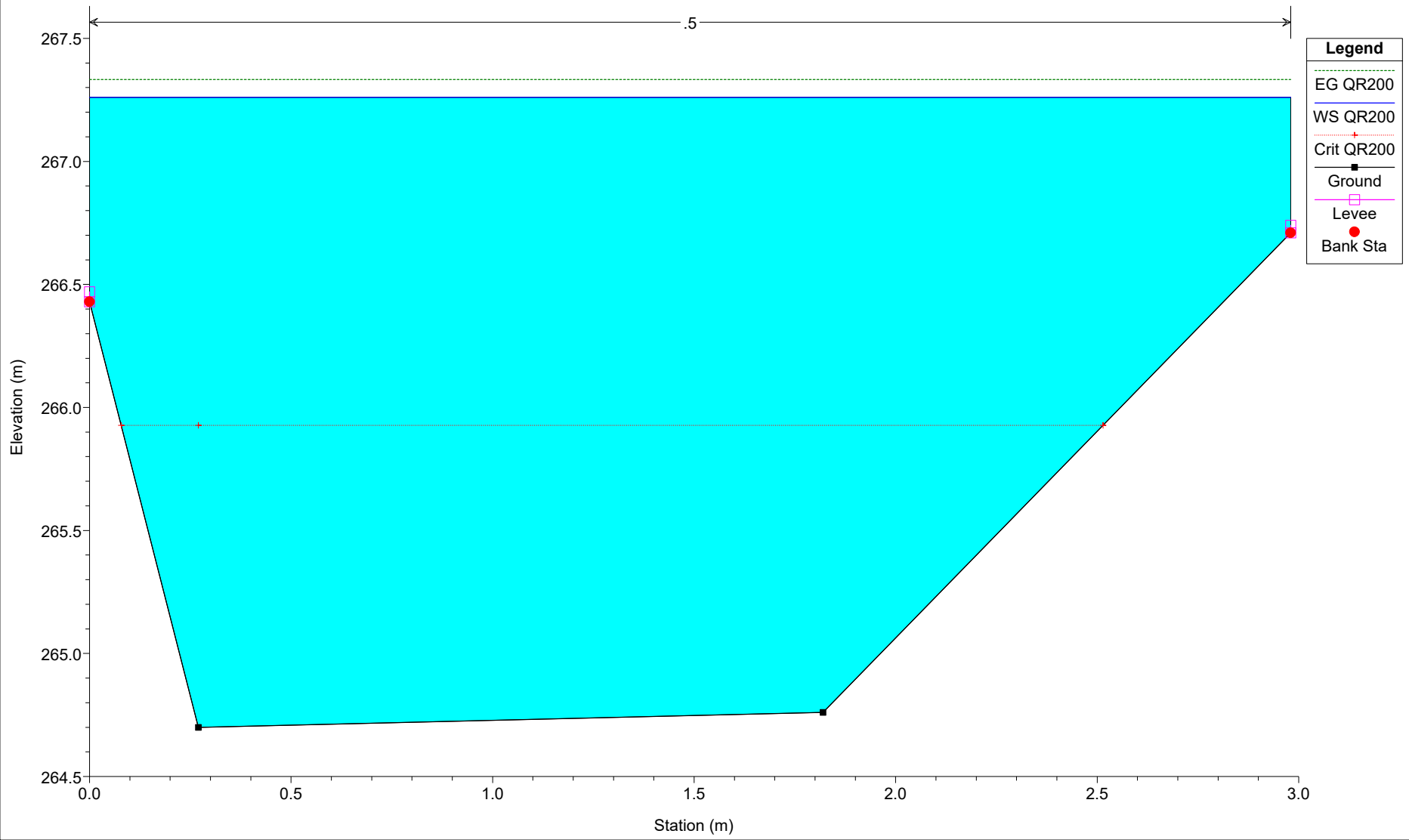


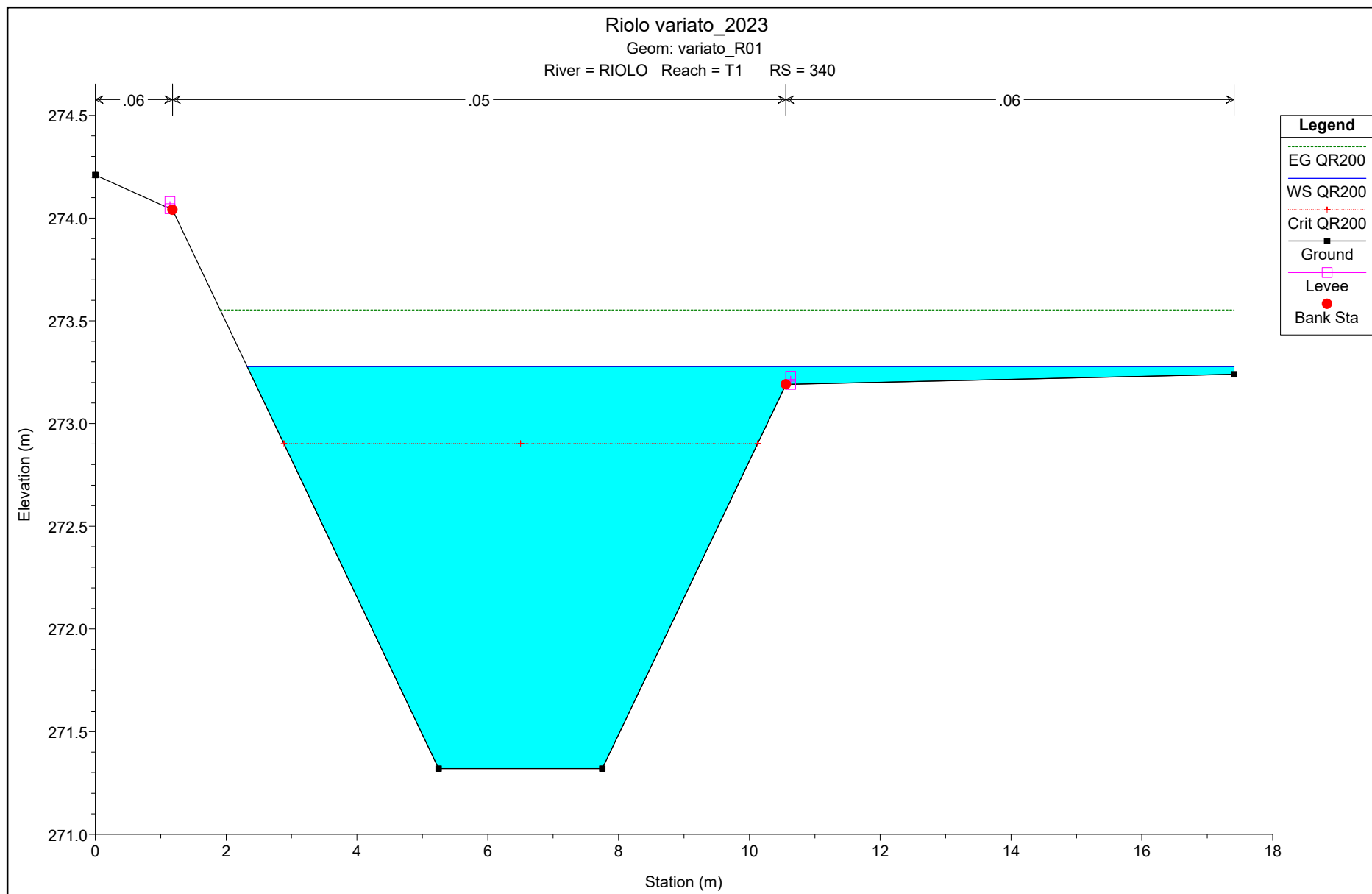


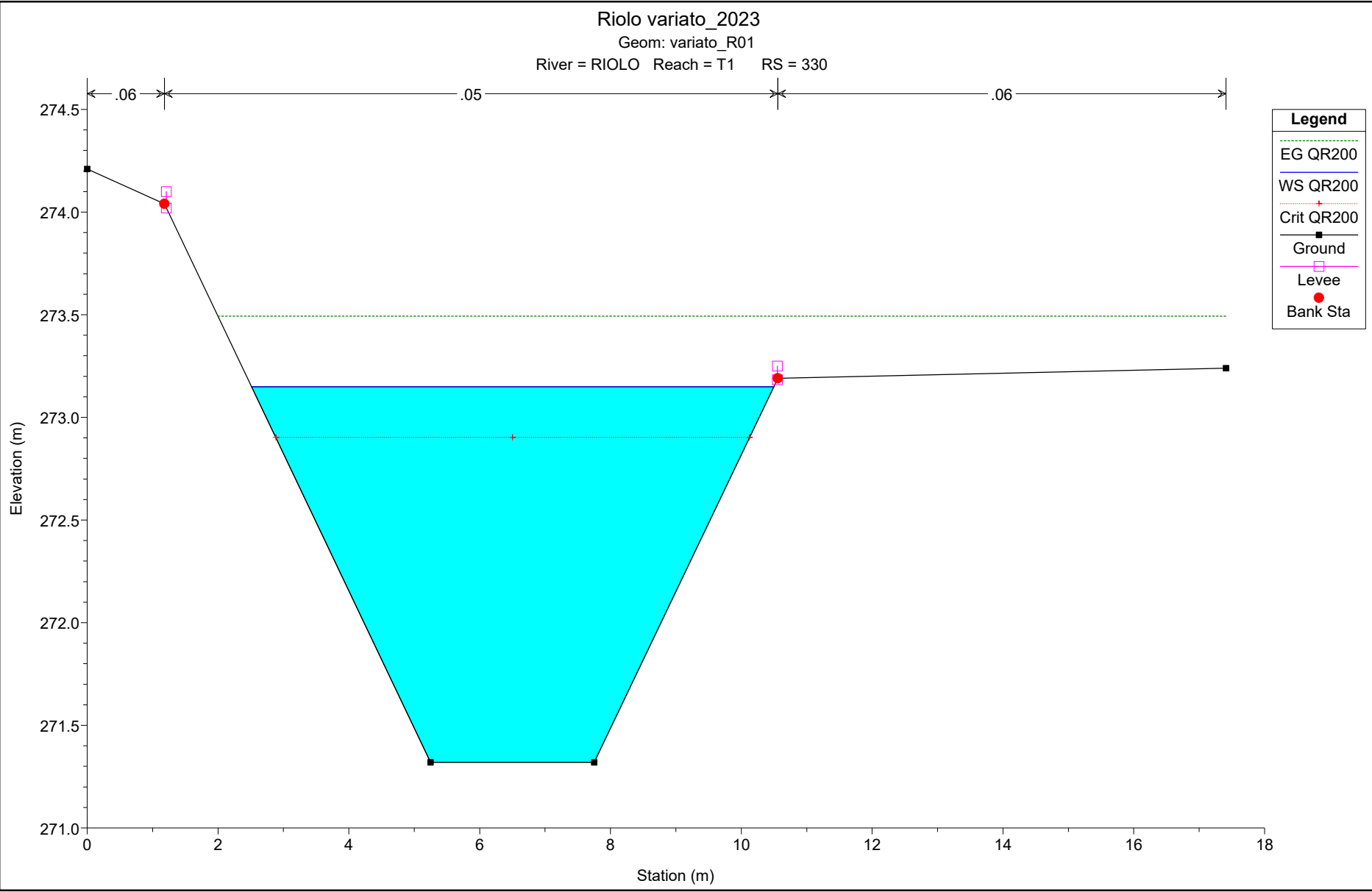
Riolo variato\_2023  
Geom: variato\_R01  
River = AV22104 Reach = T2 RS = 20

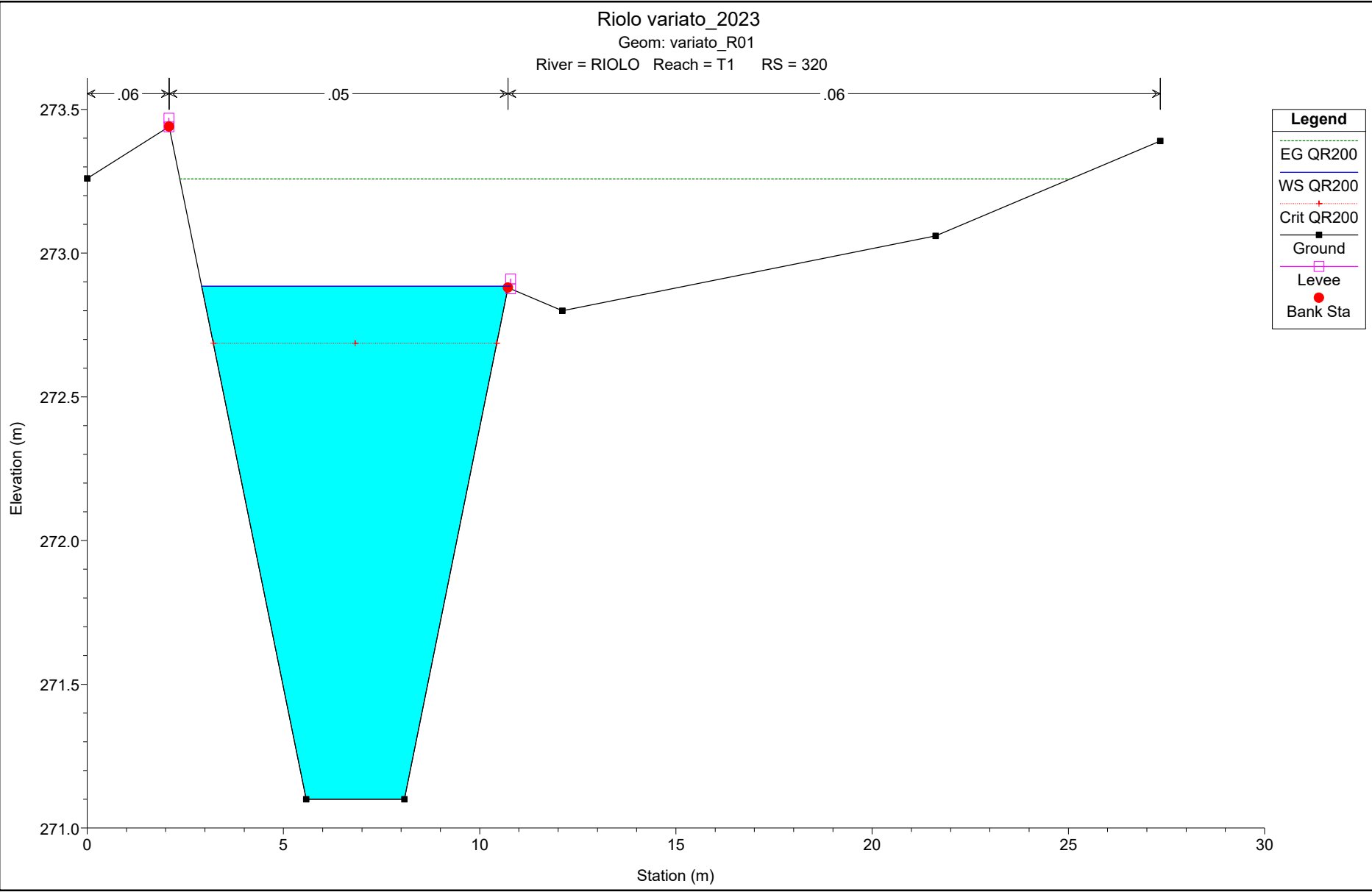


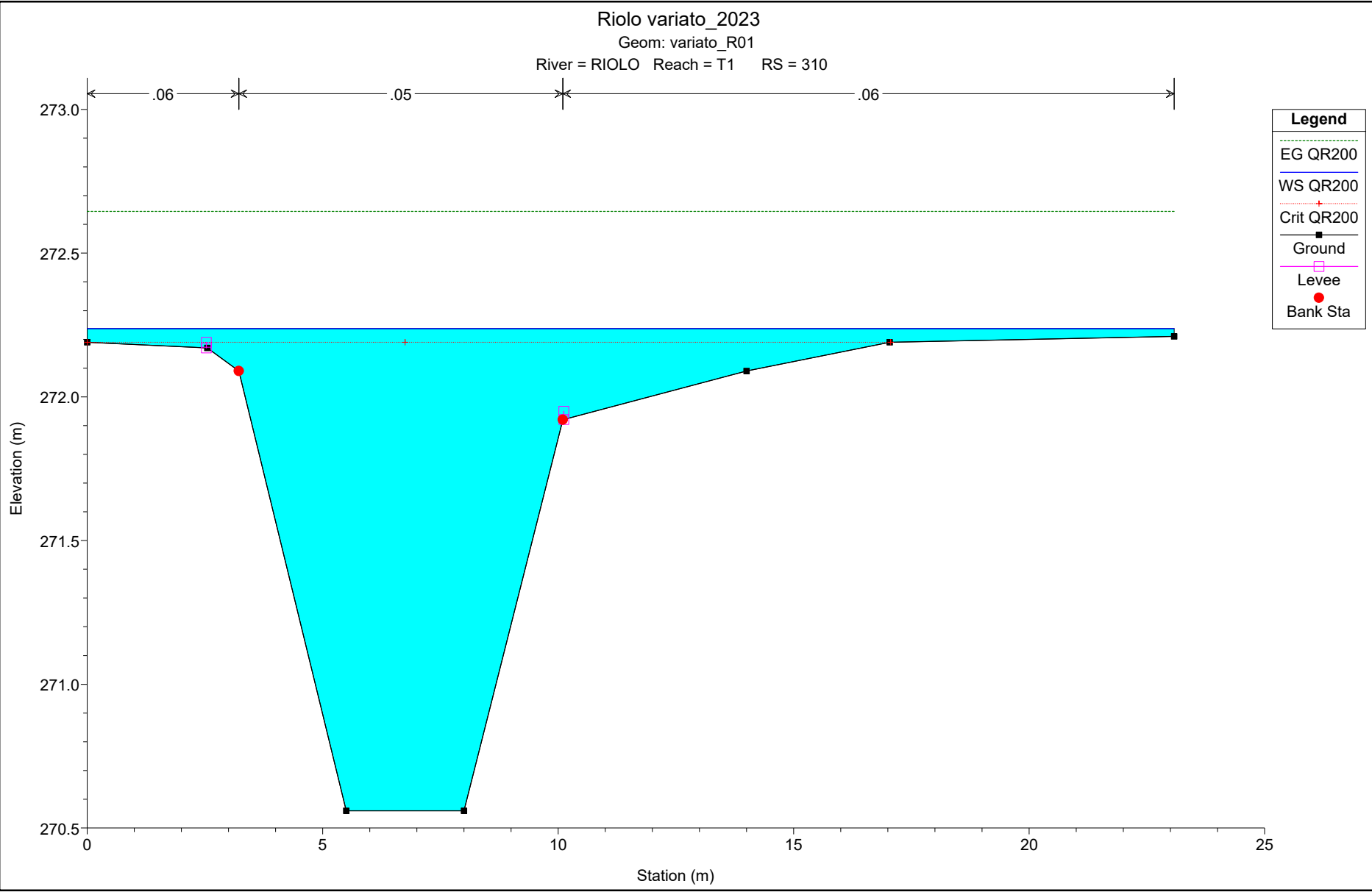
Riolo variato\_2023  
Geom: variato\_R01  
River = AV22104 Reach = T2 RS = 10

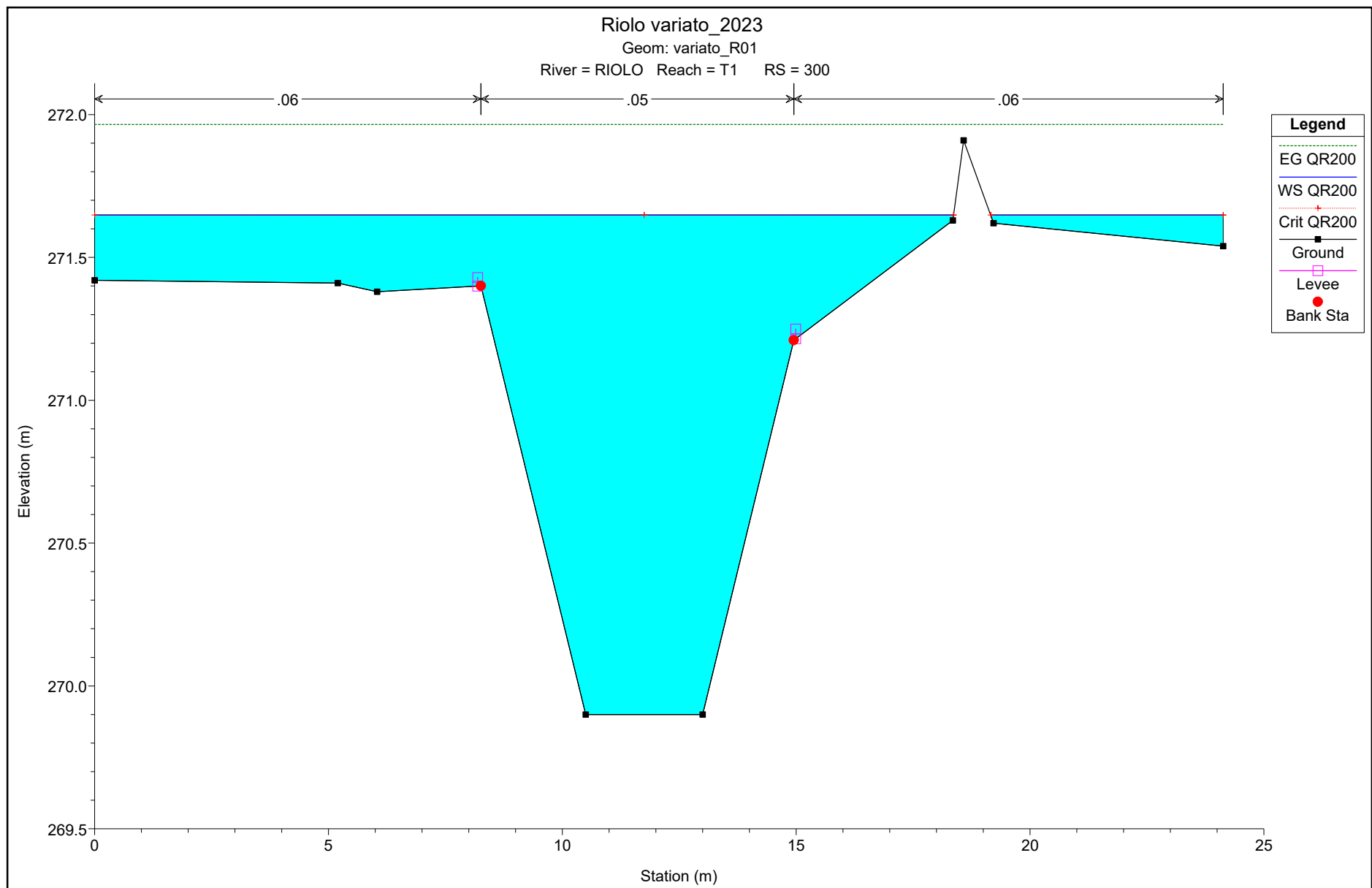




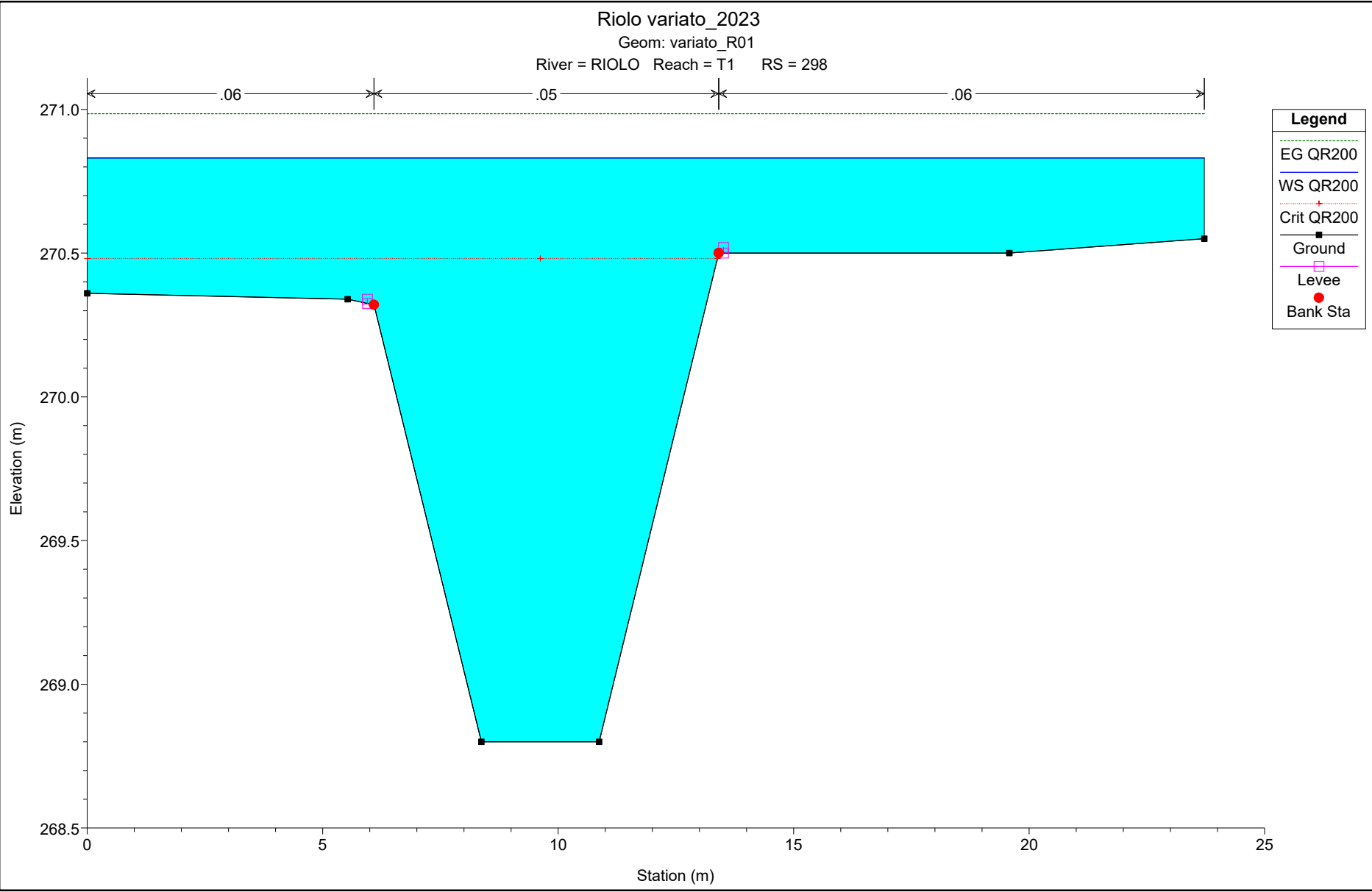


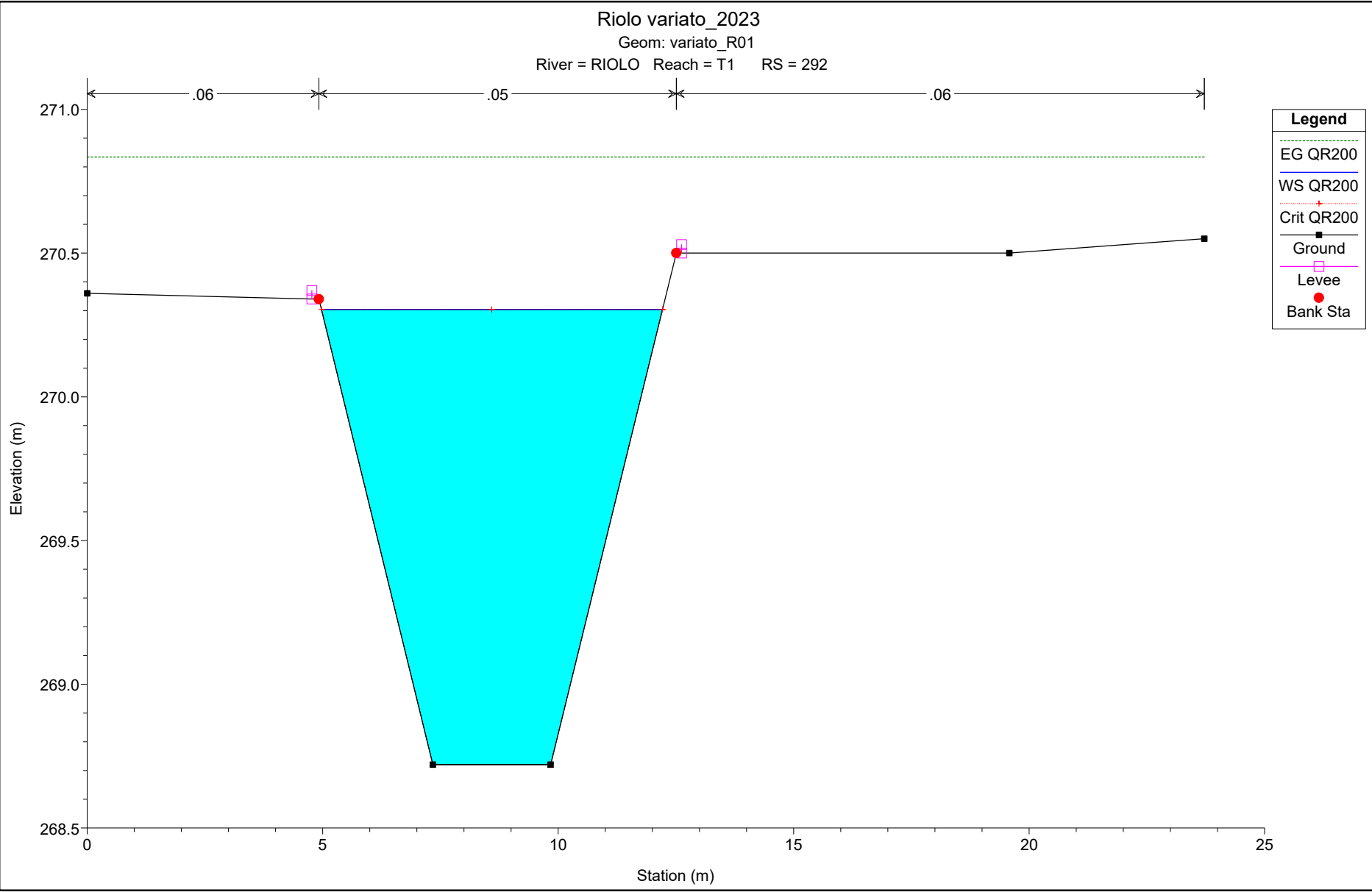


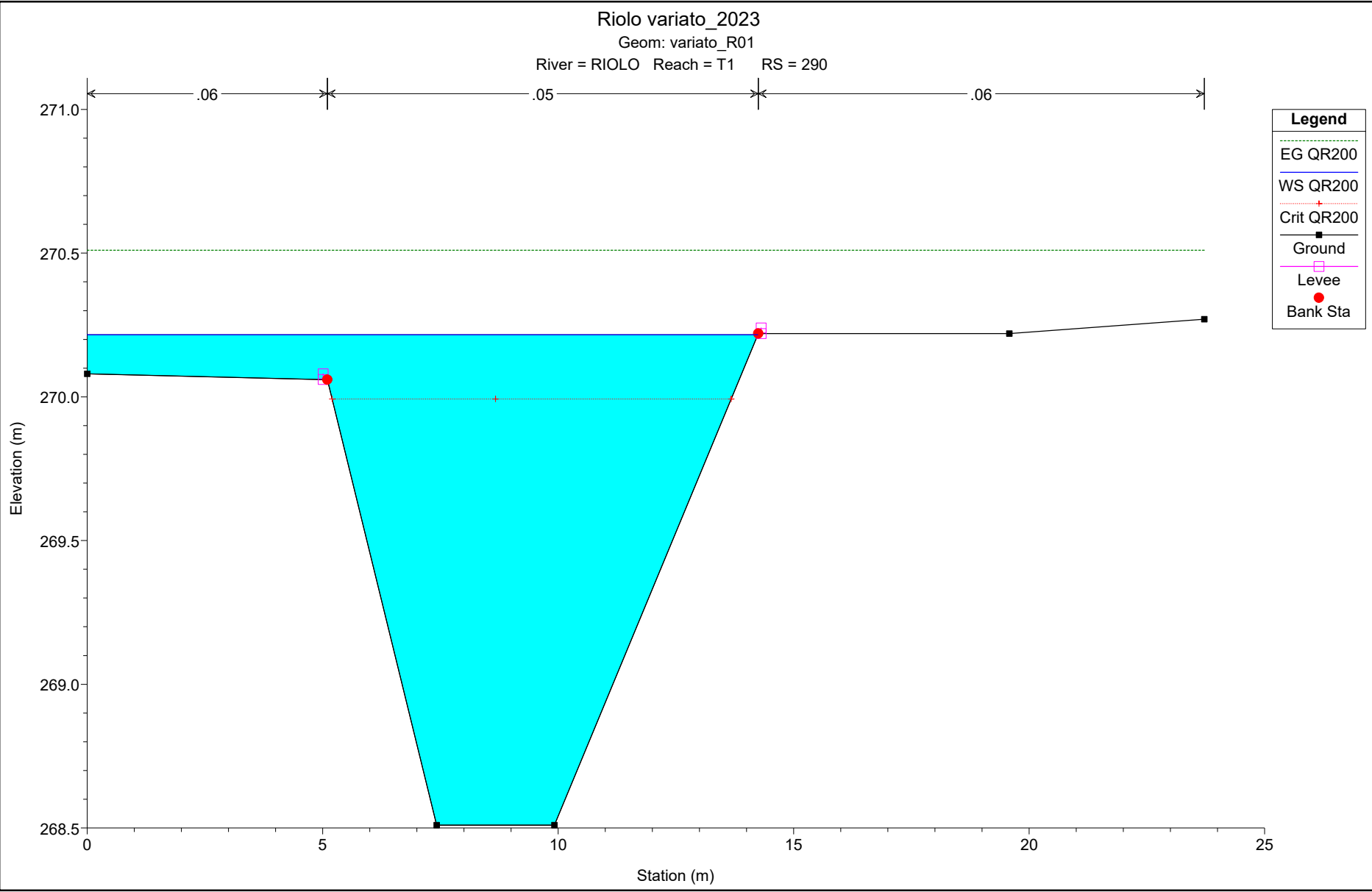


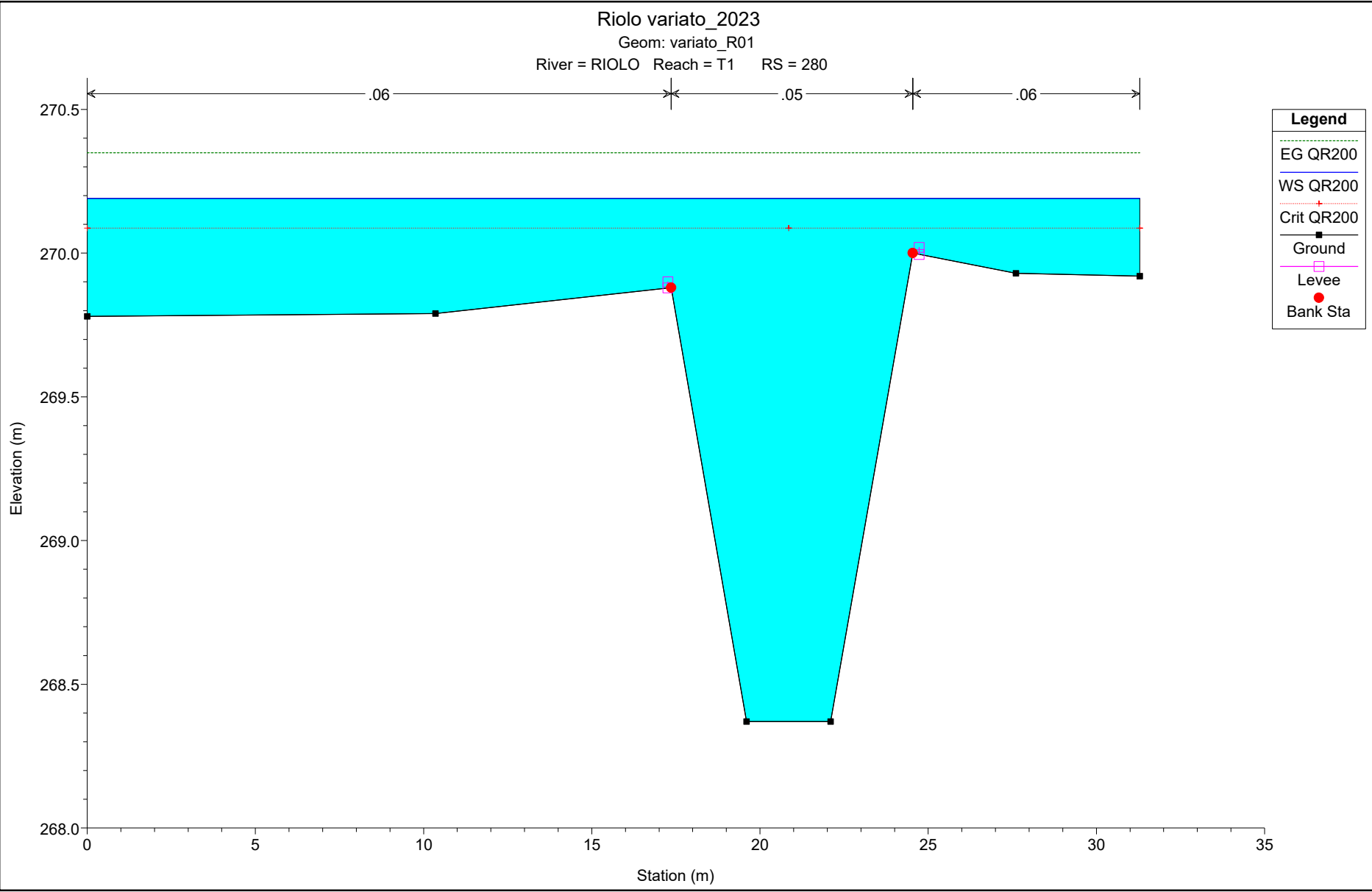


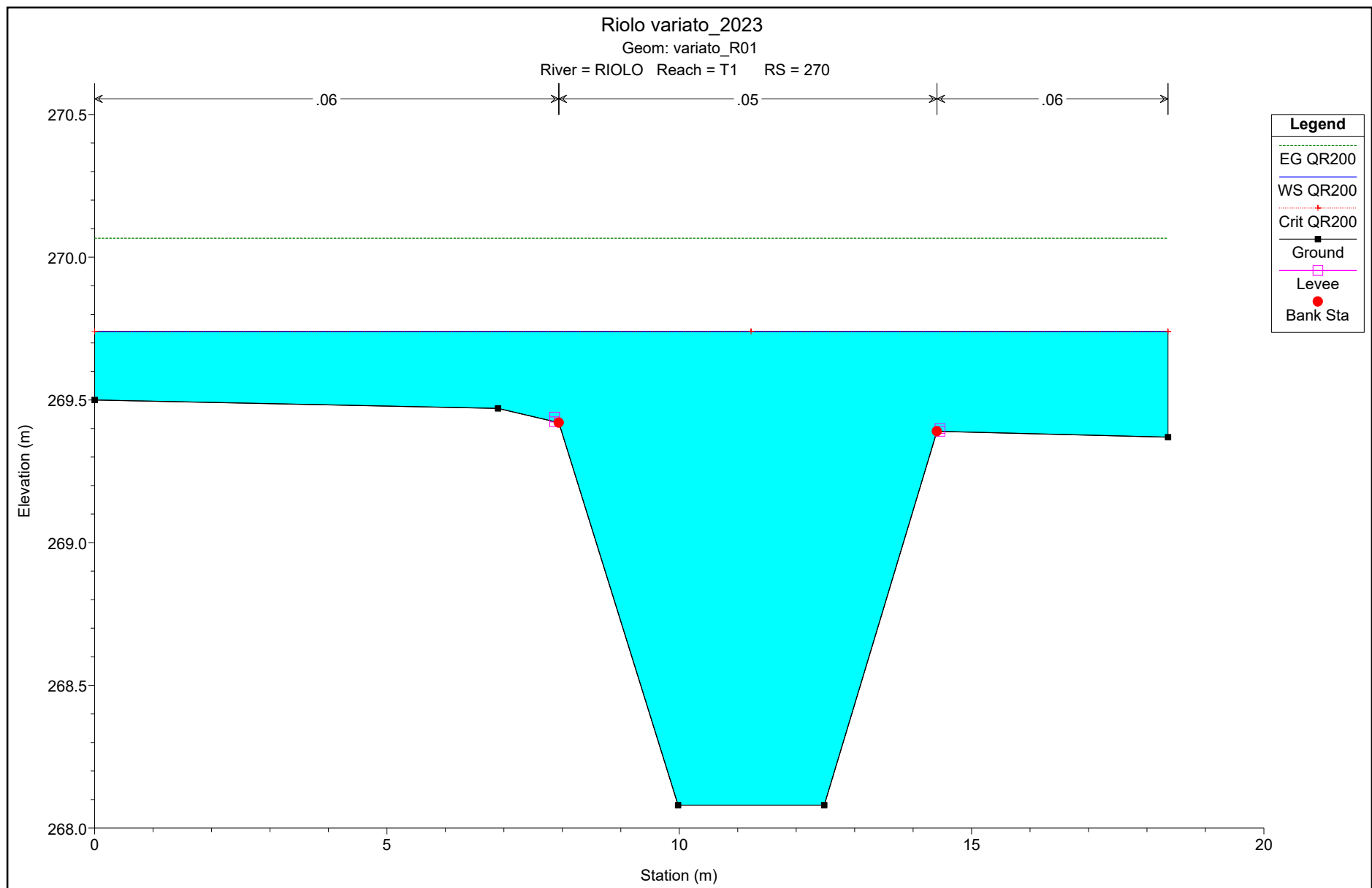


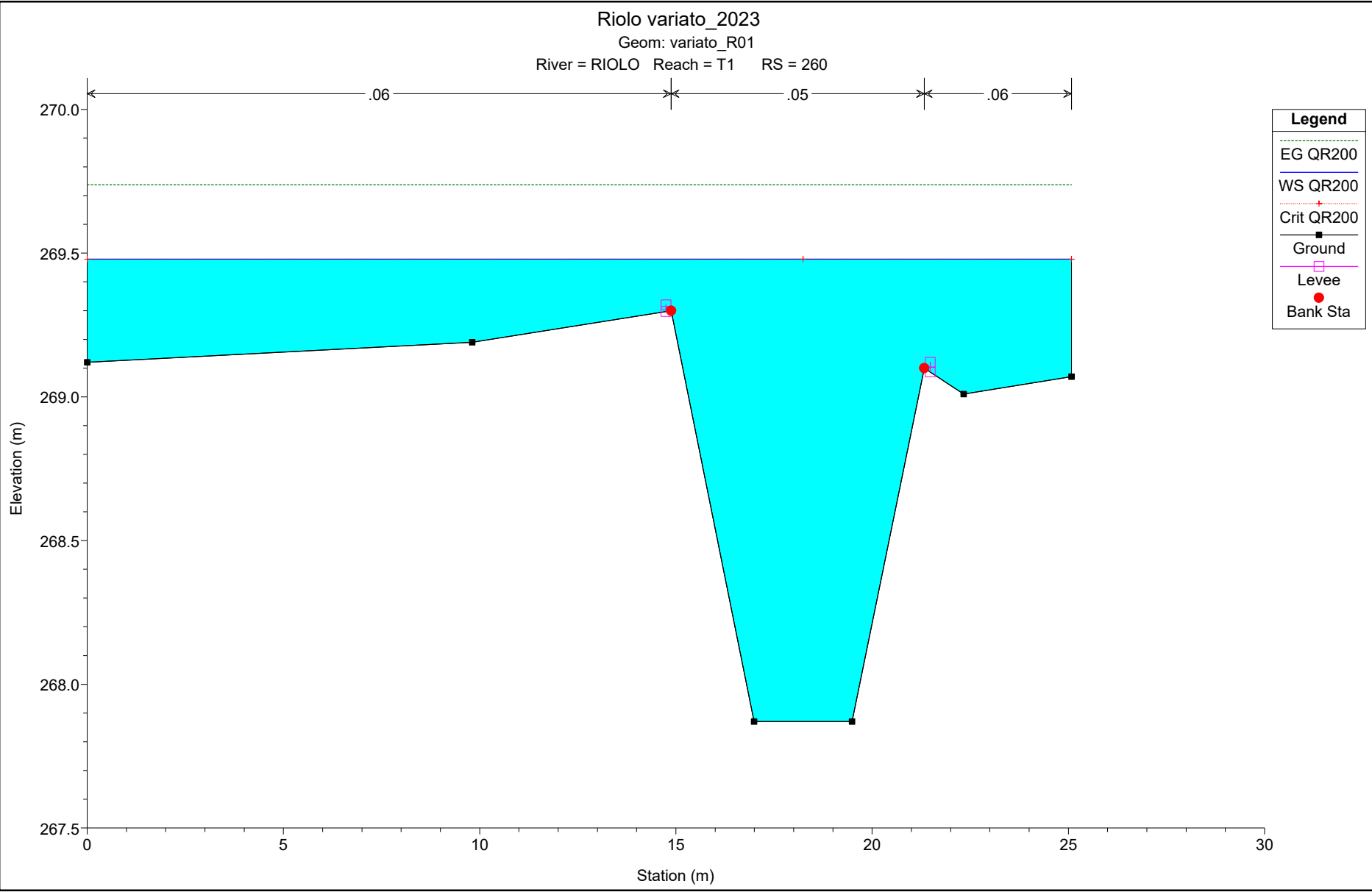


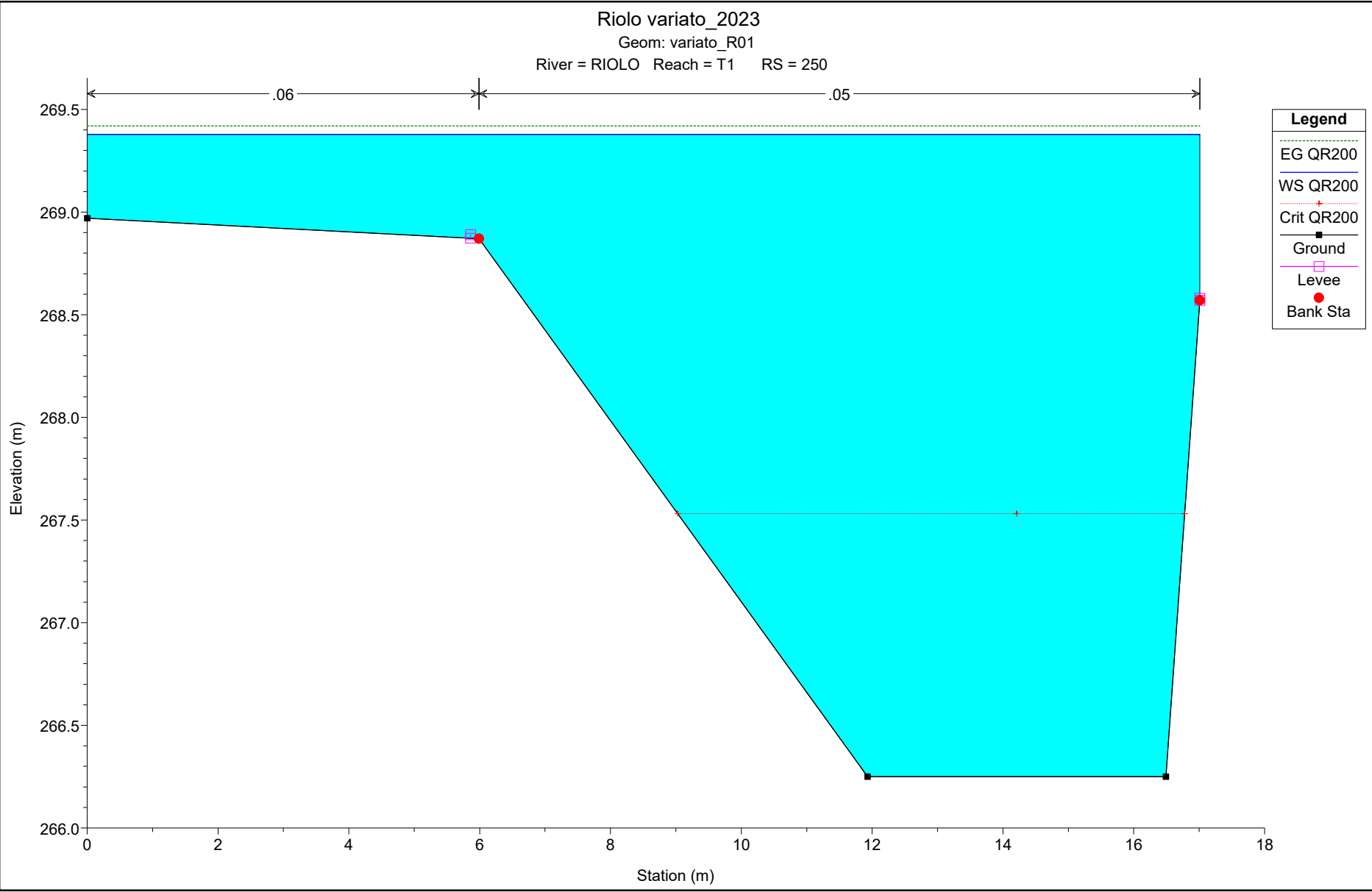


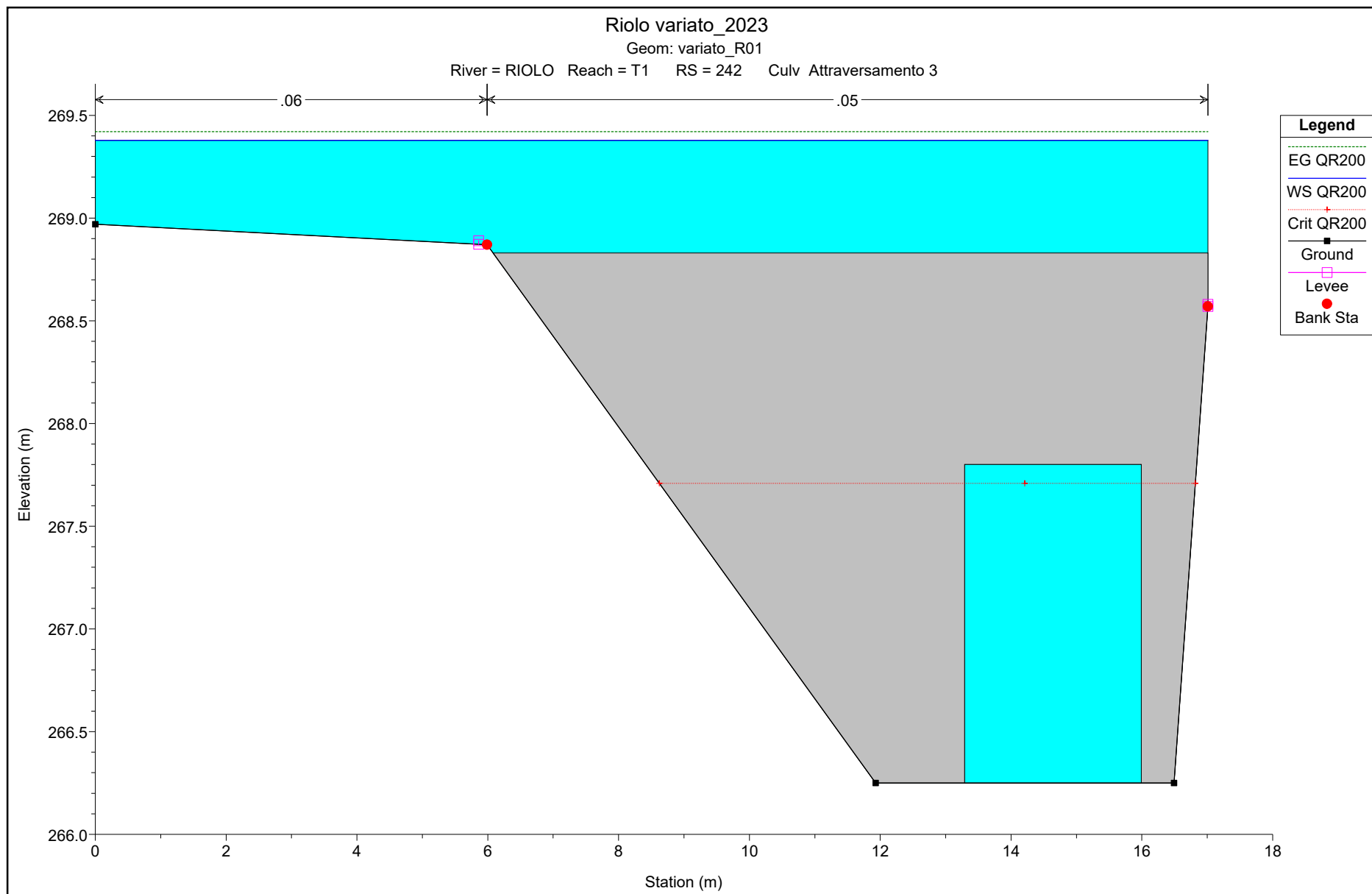




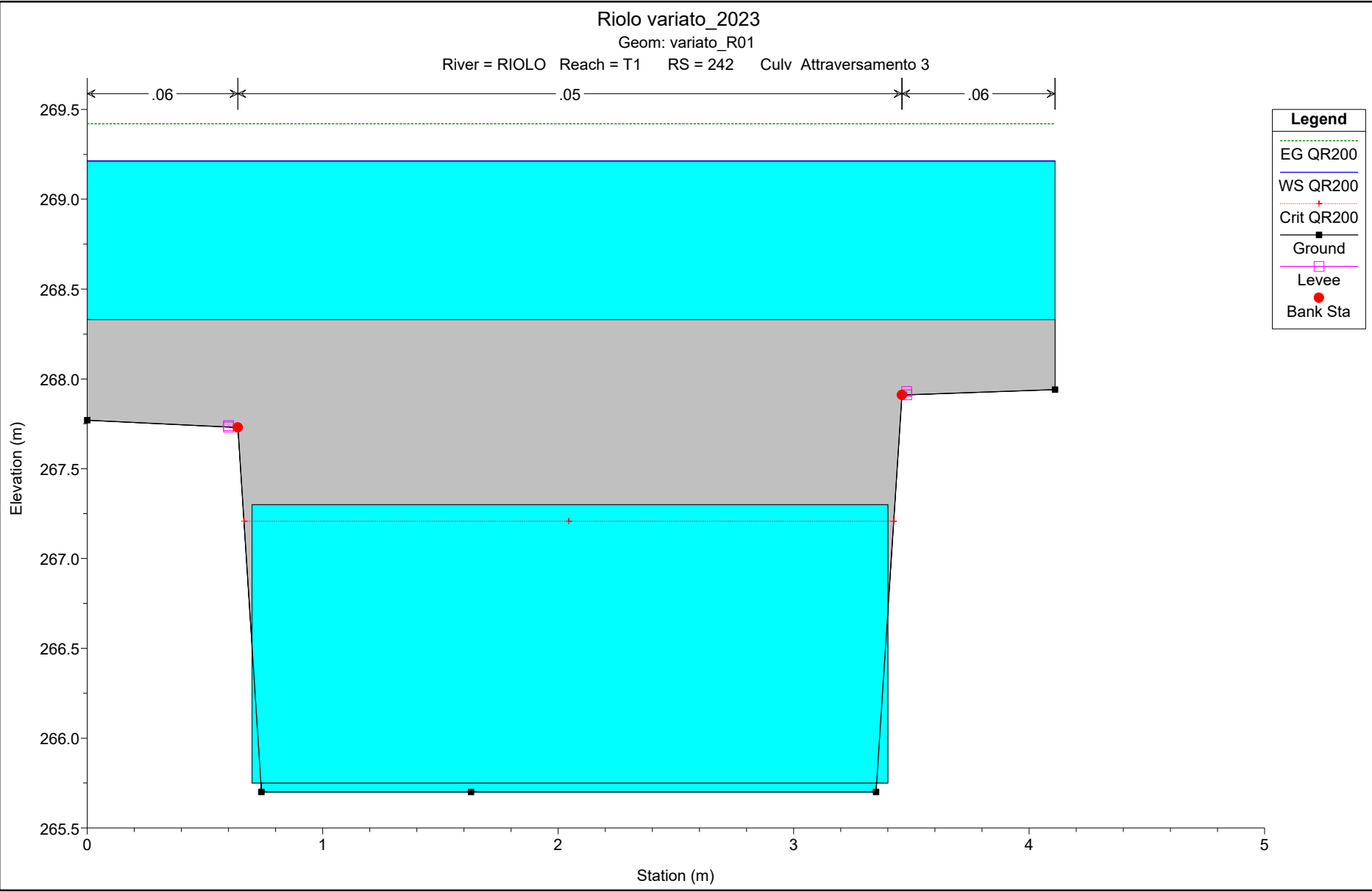


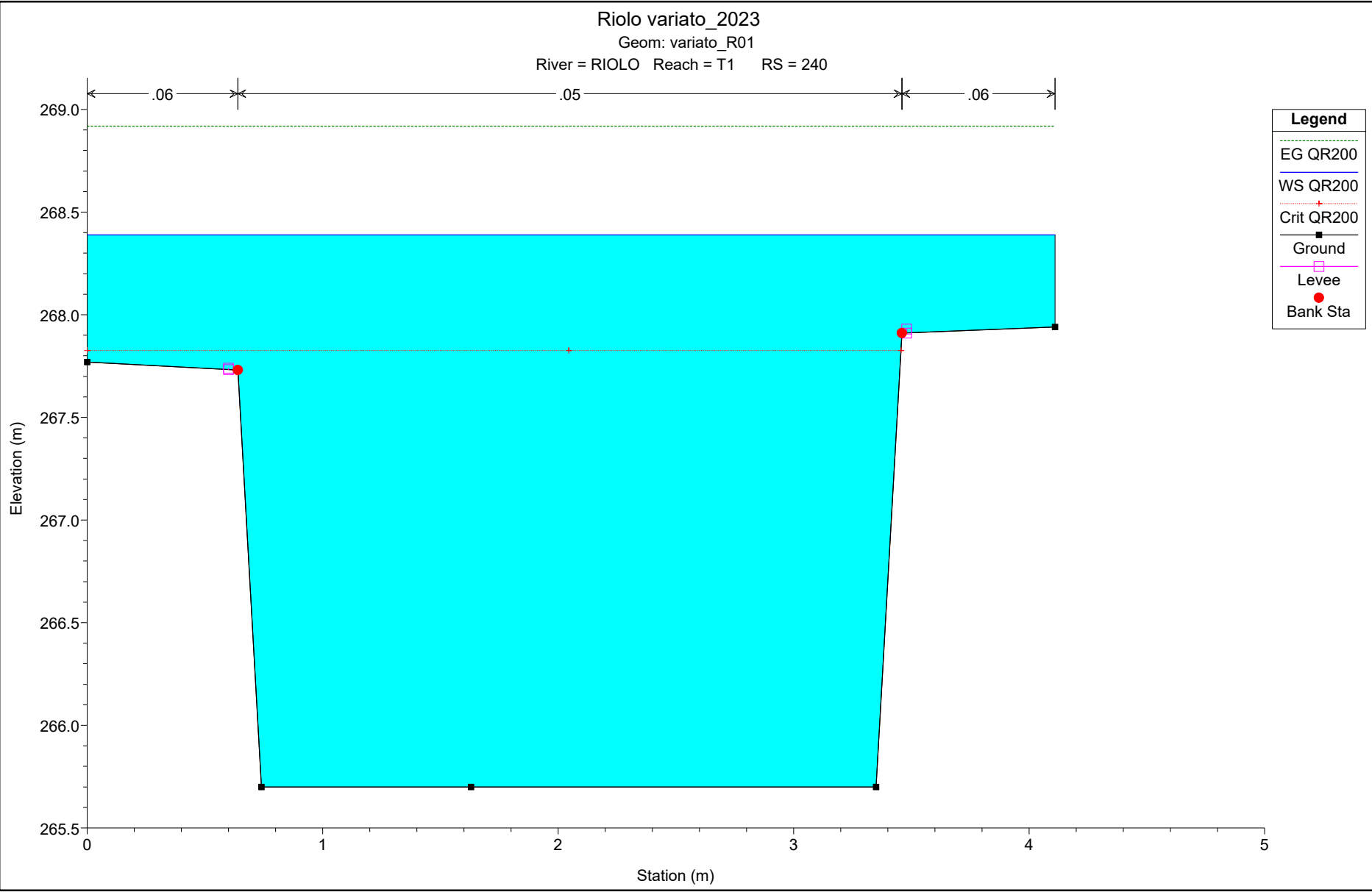


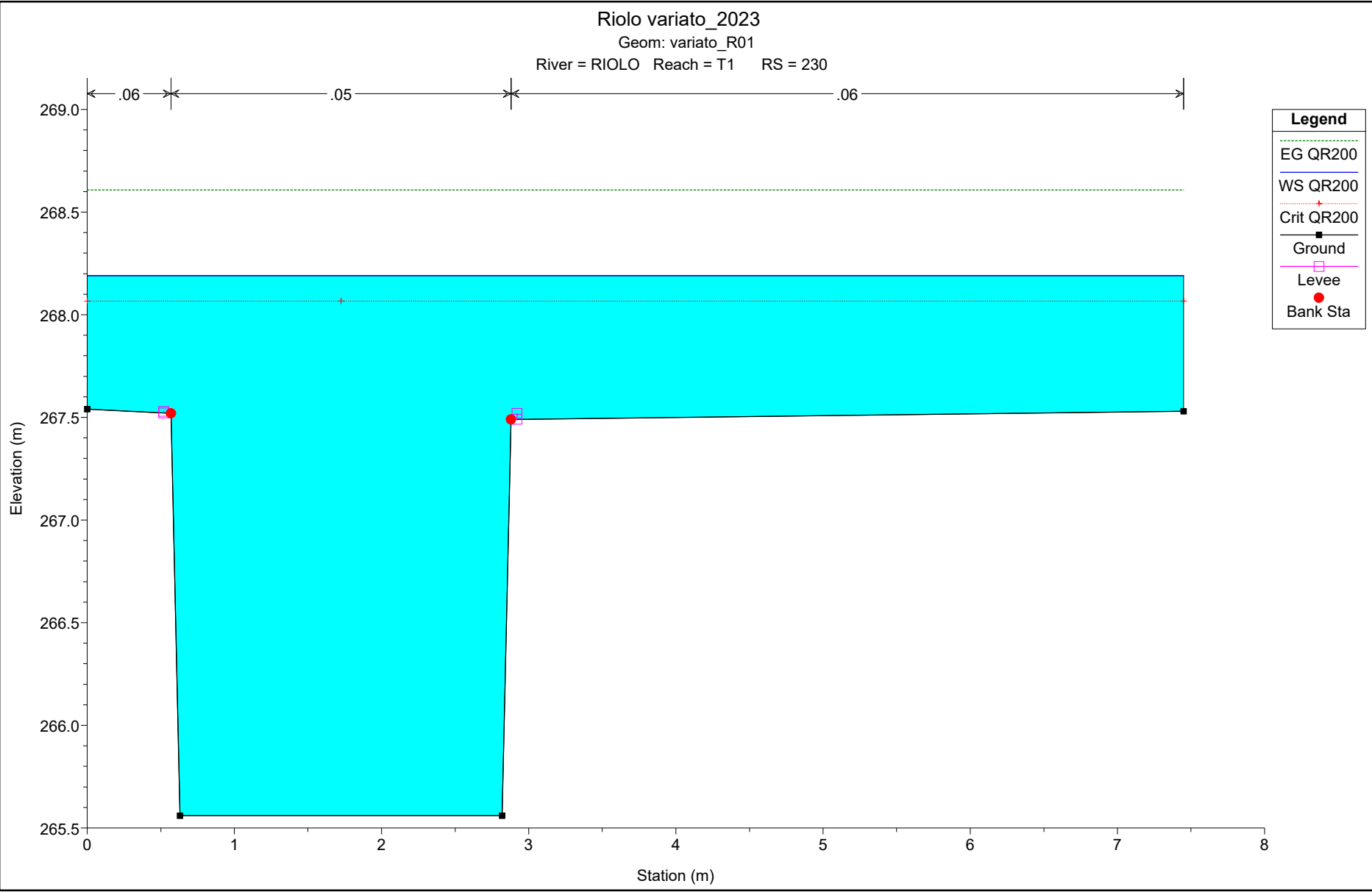


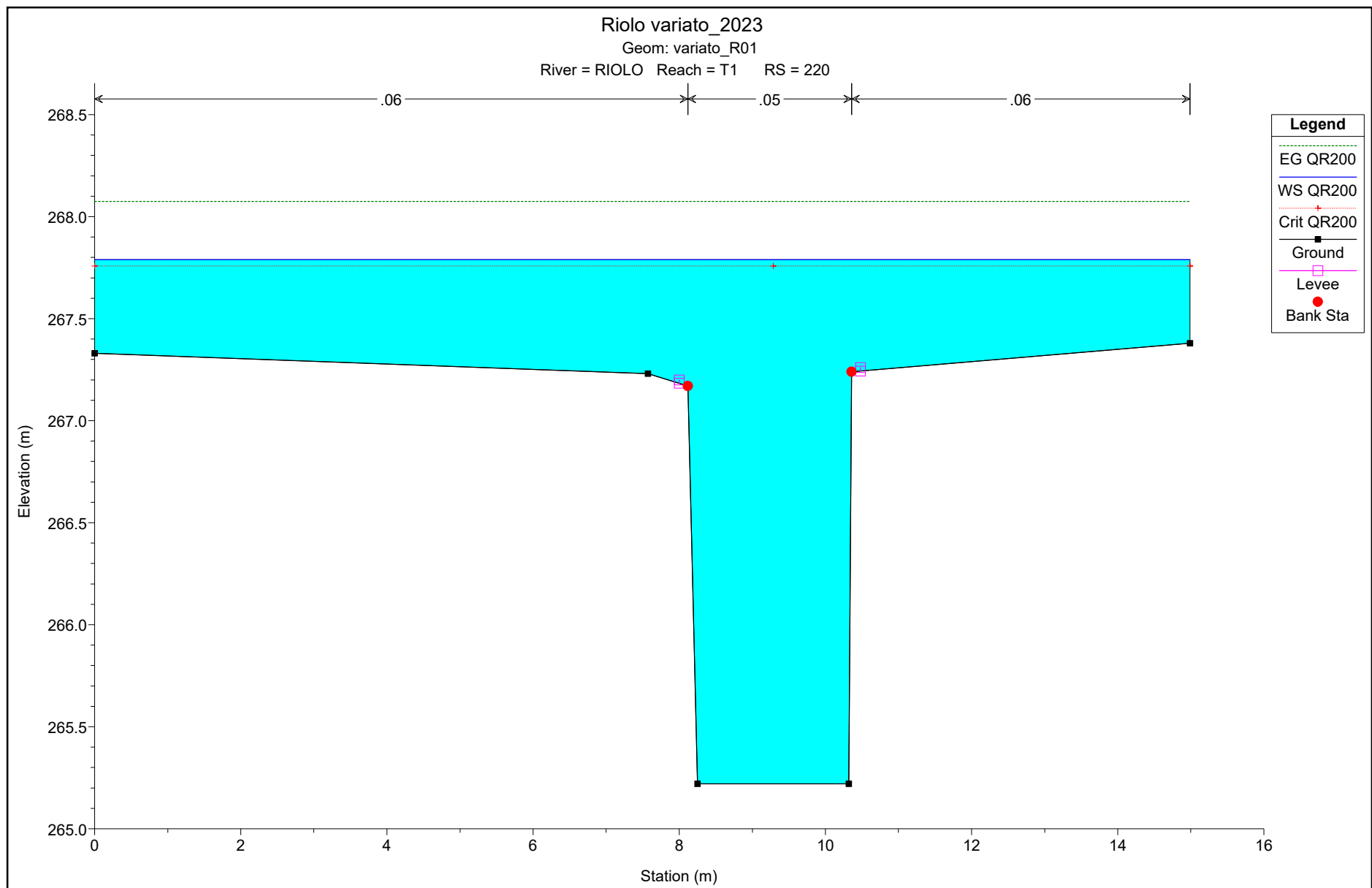


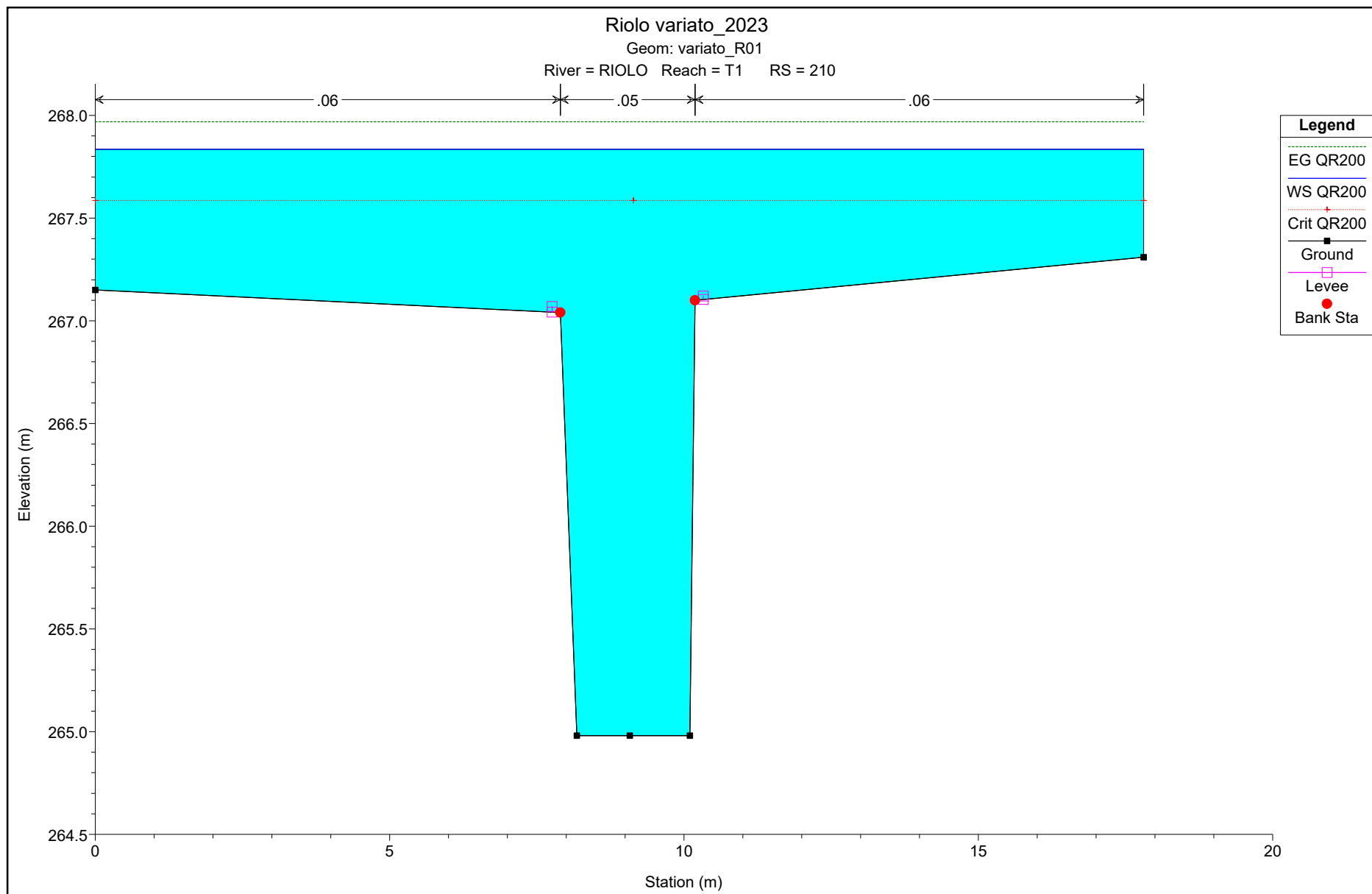




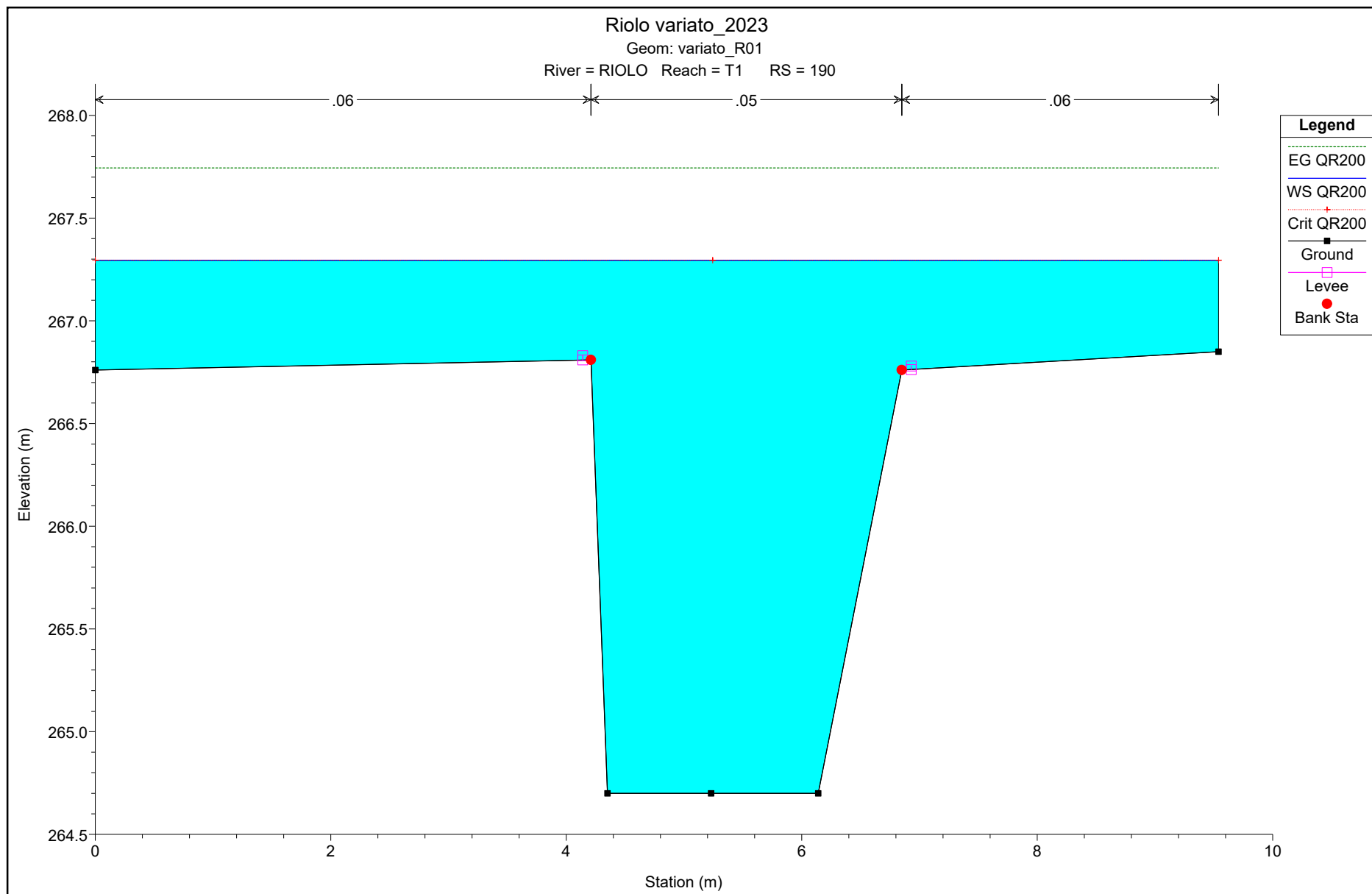


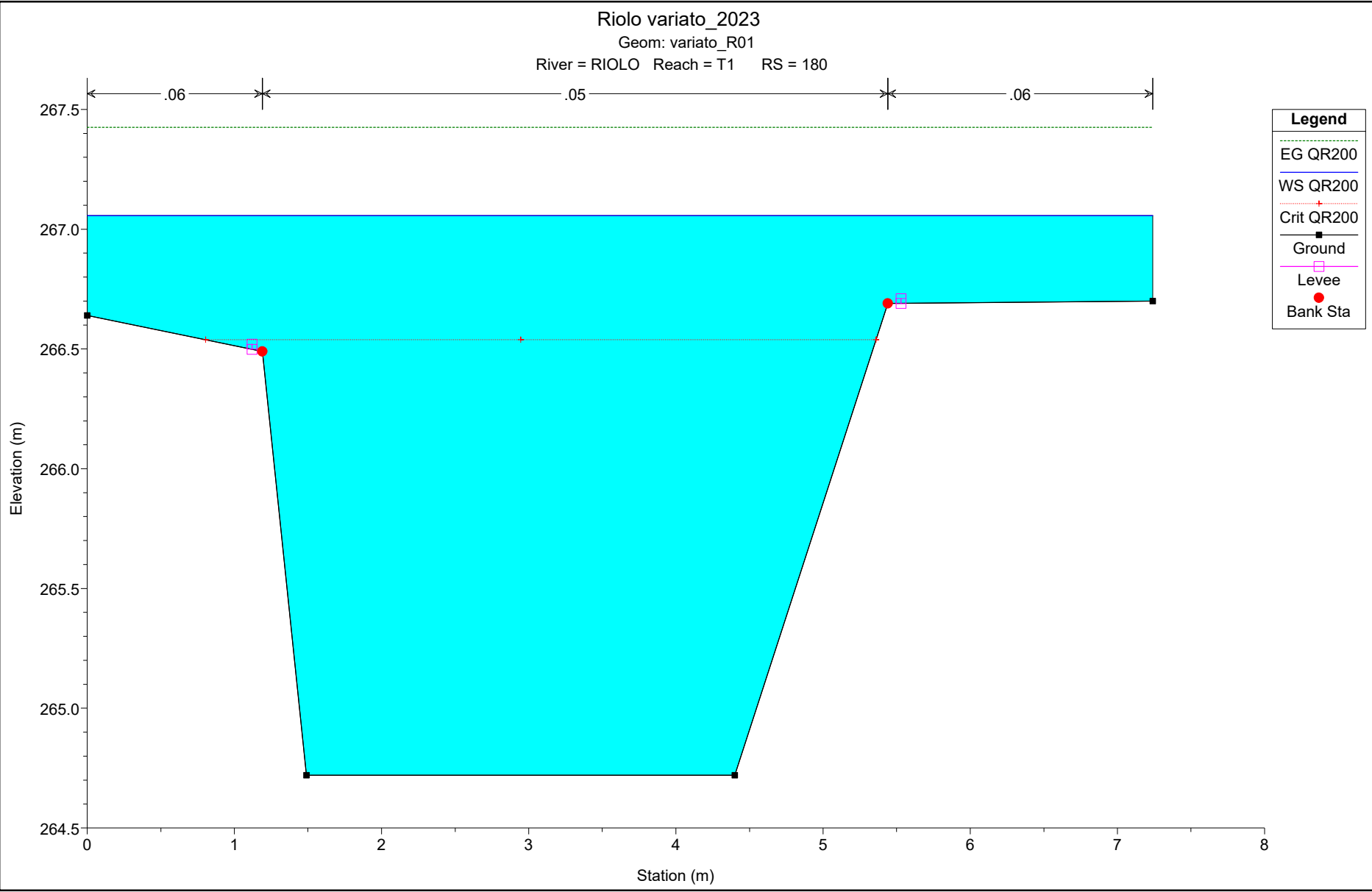






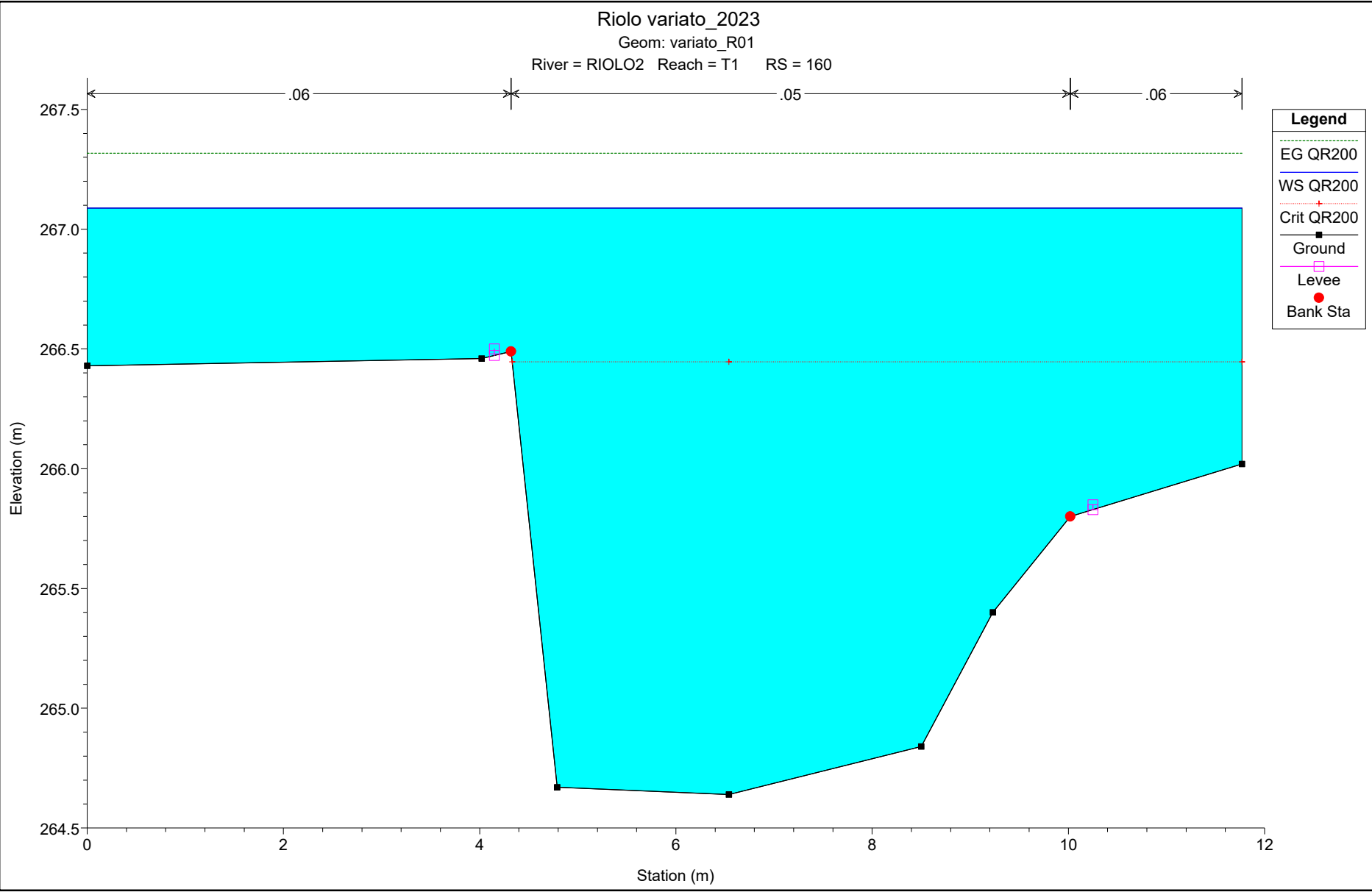


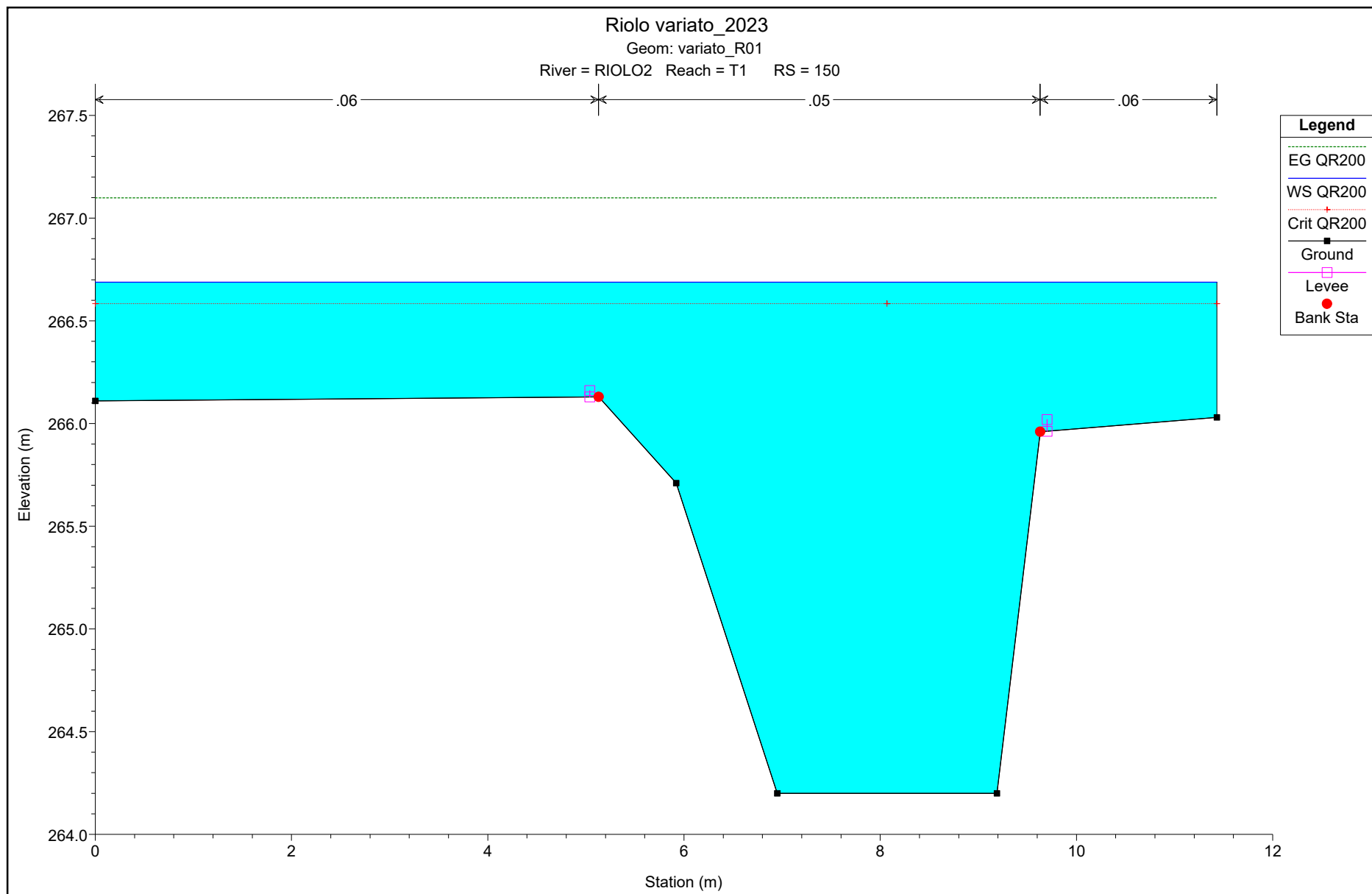


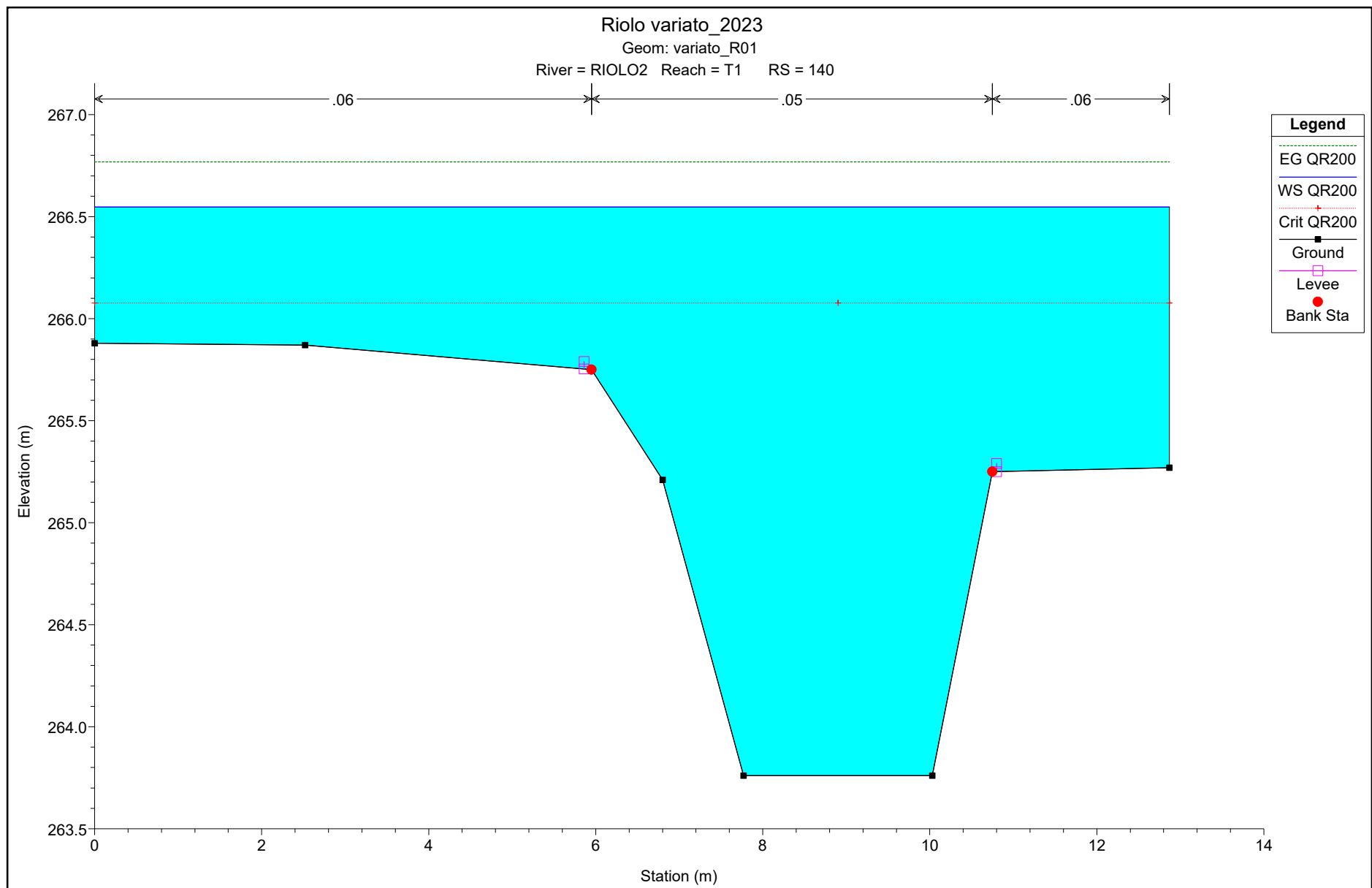


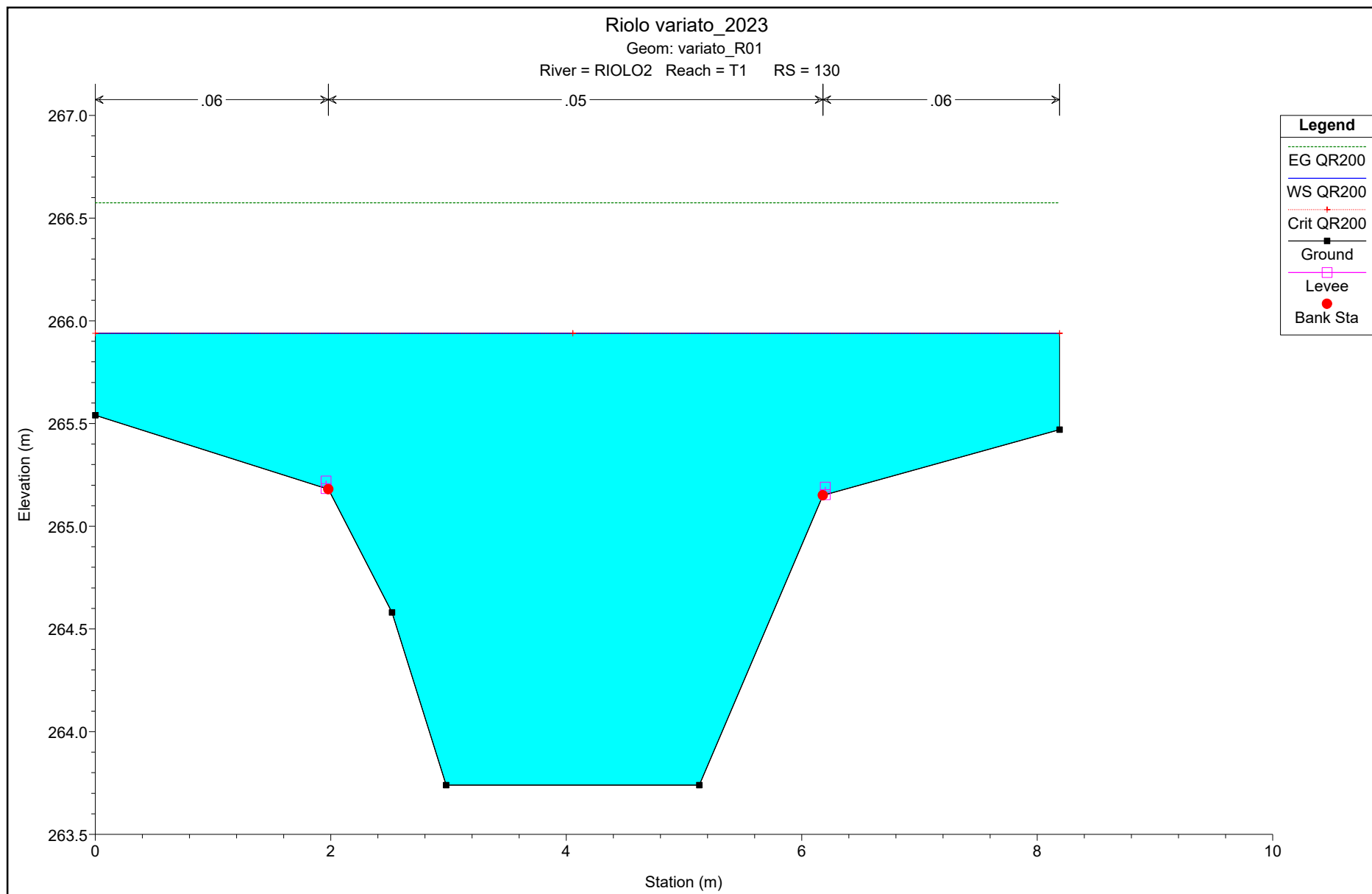


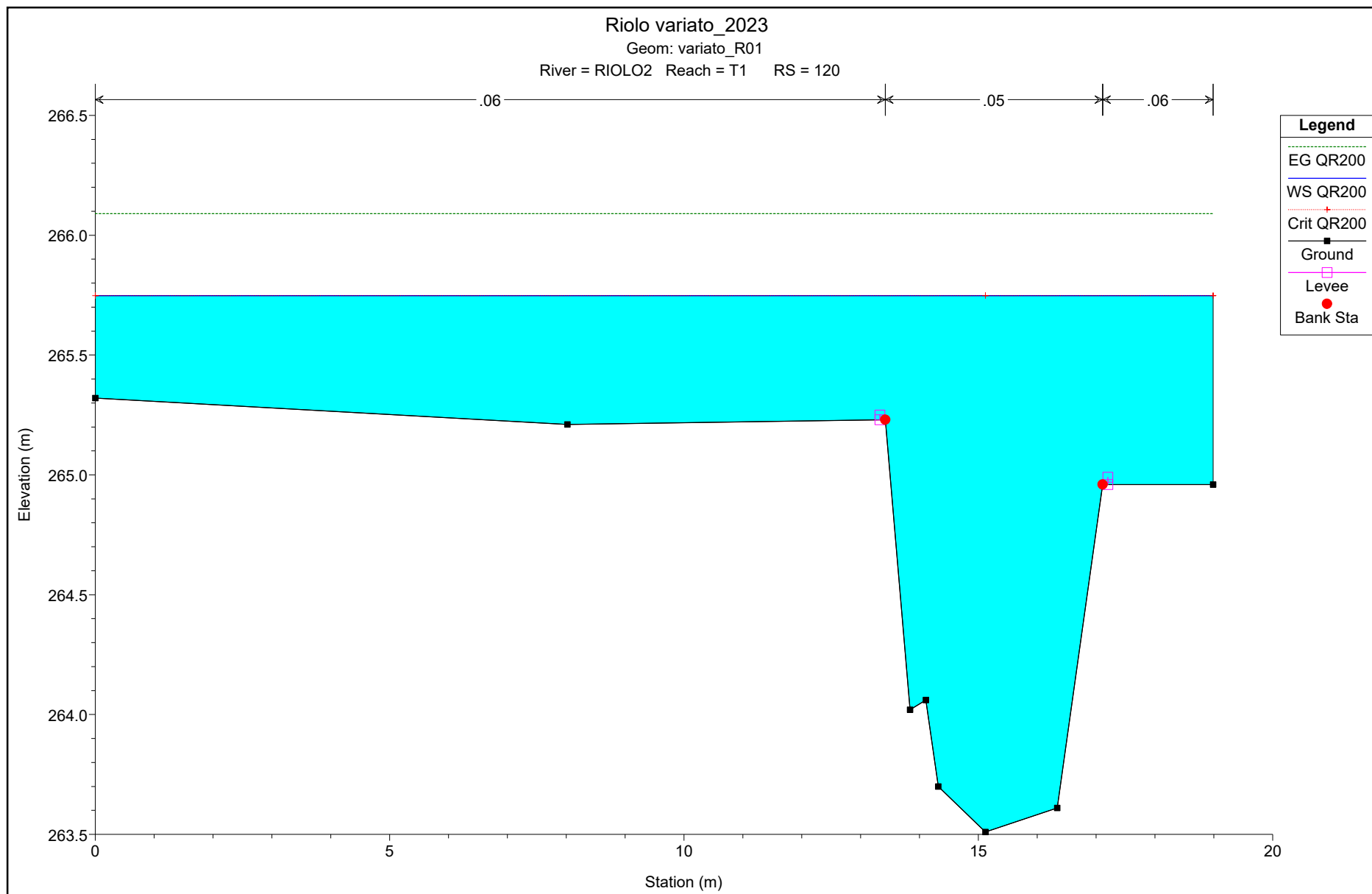


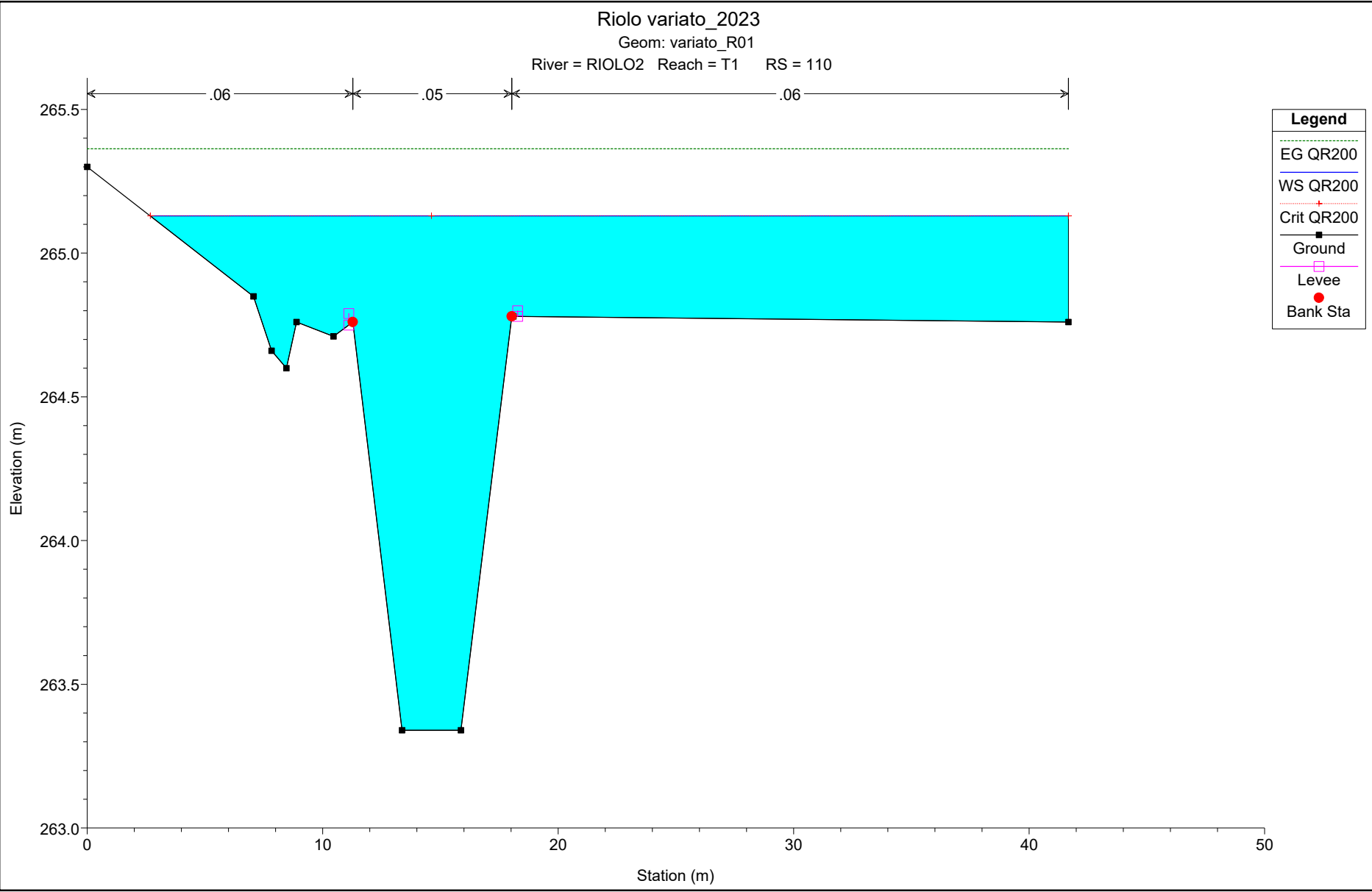


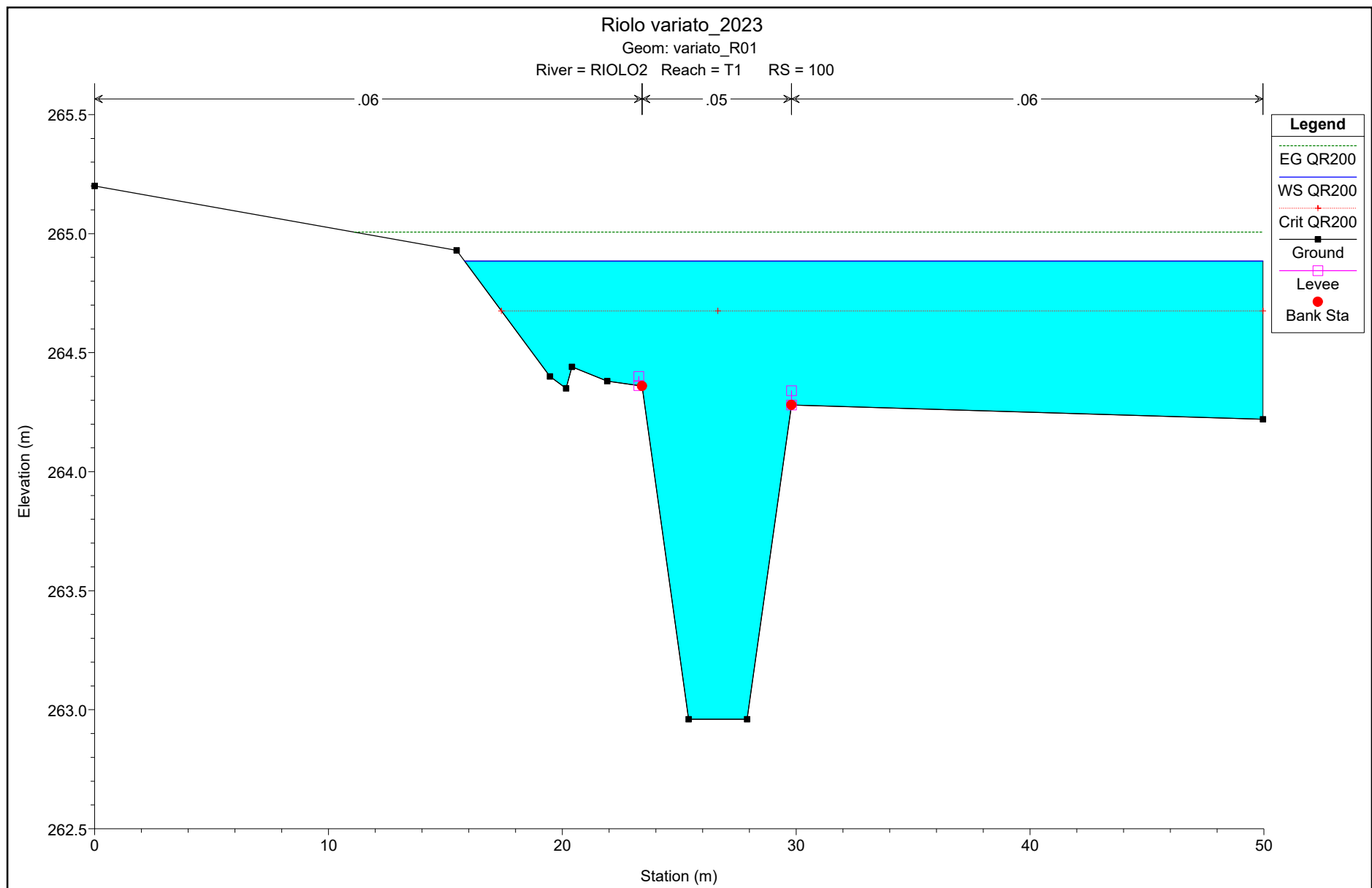




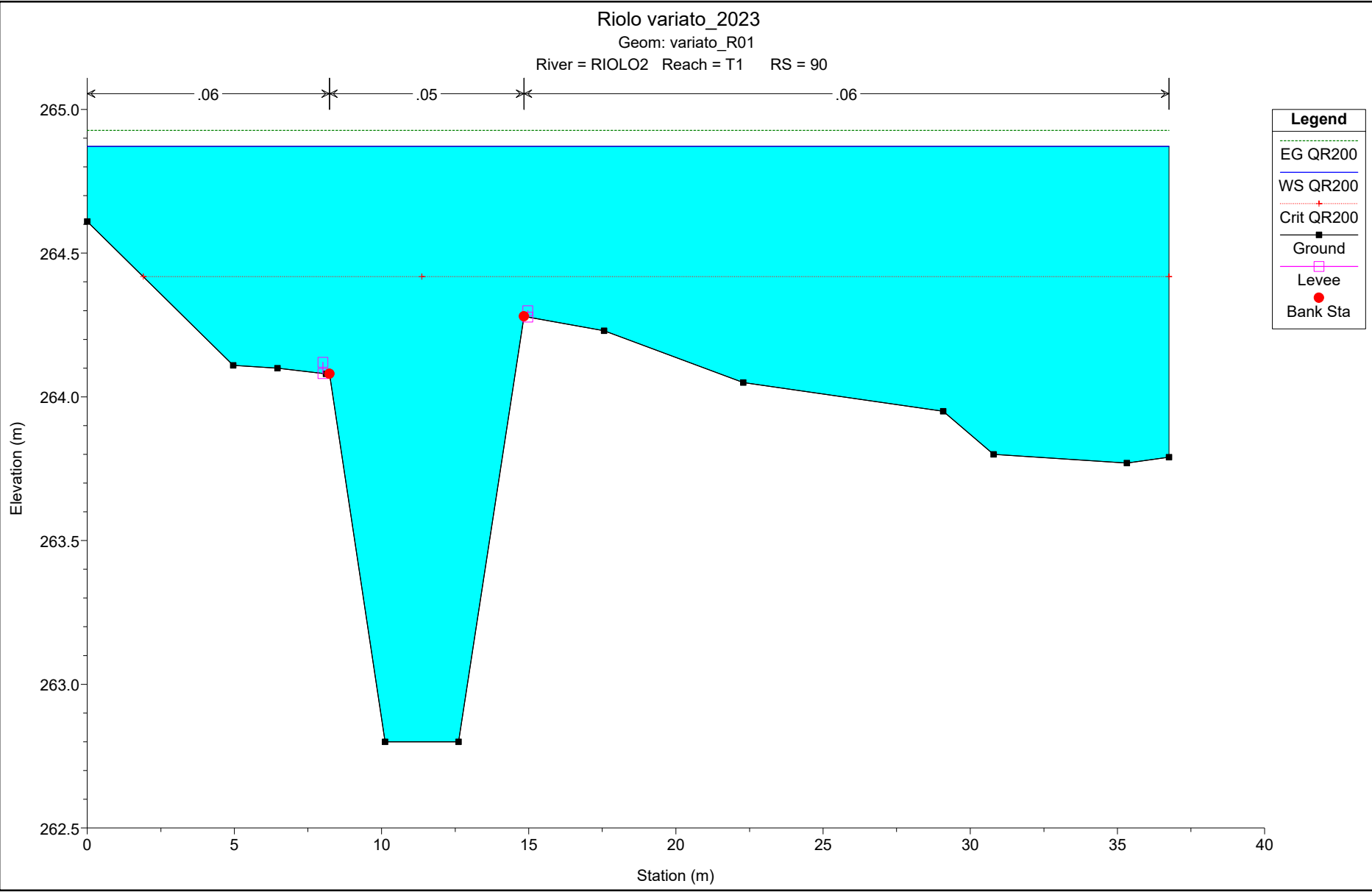


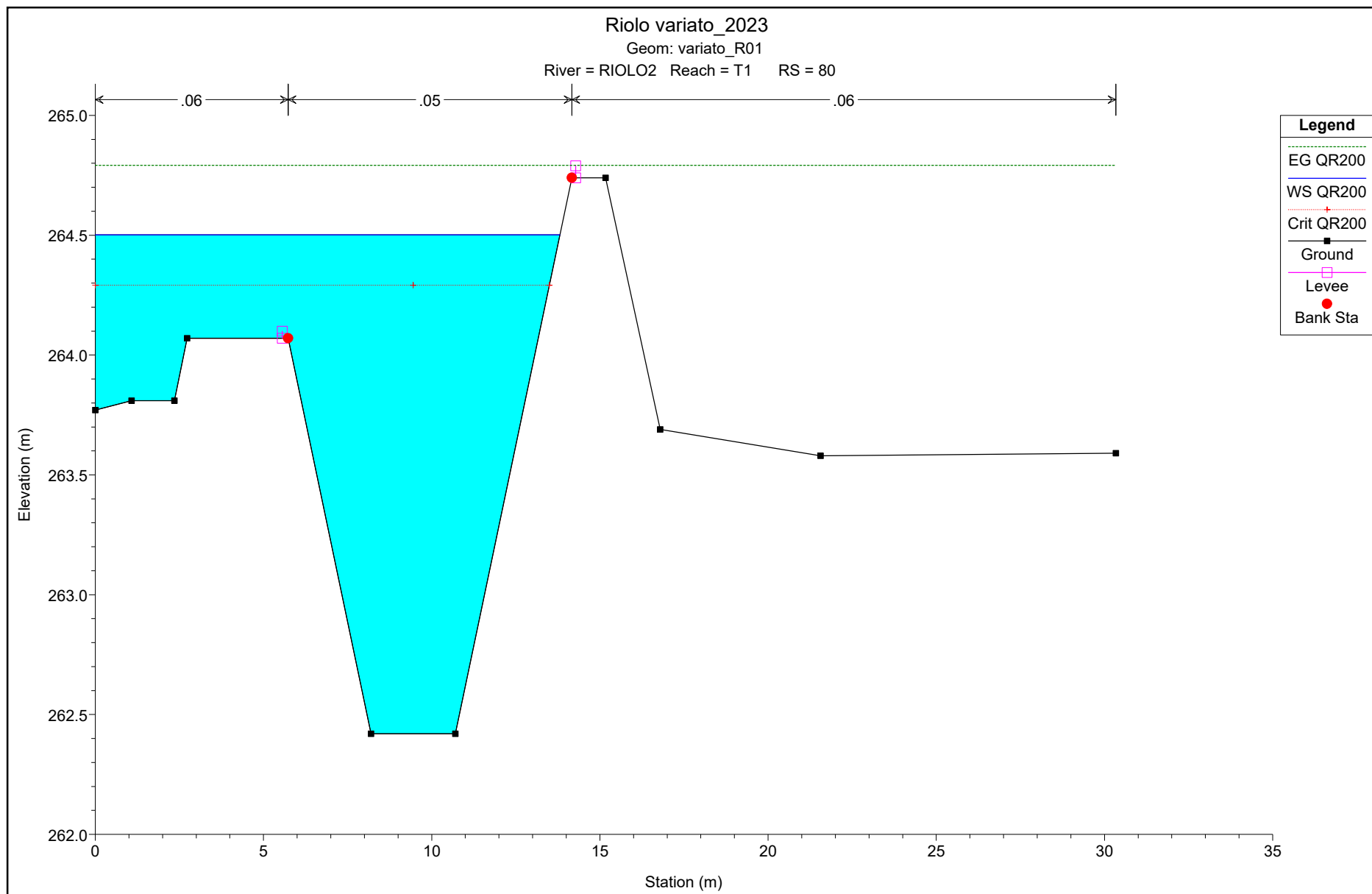


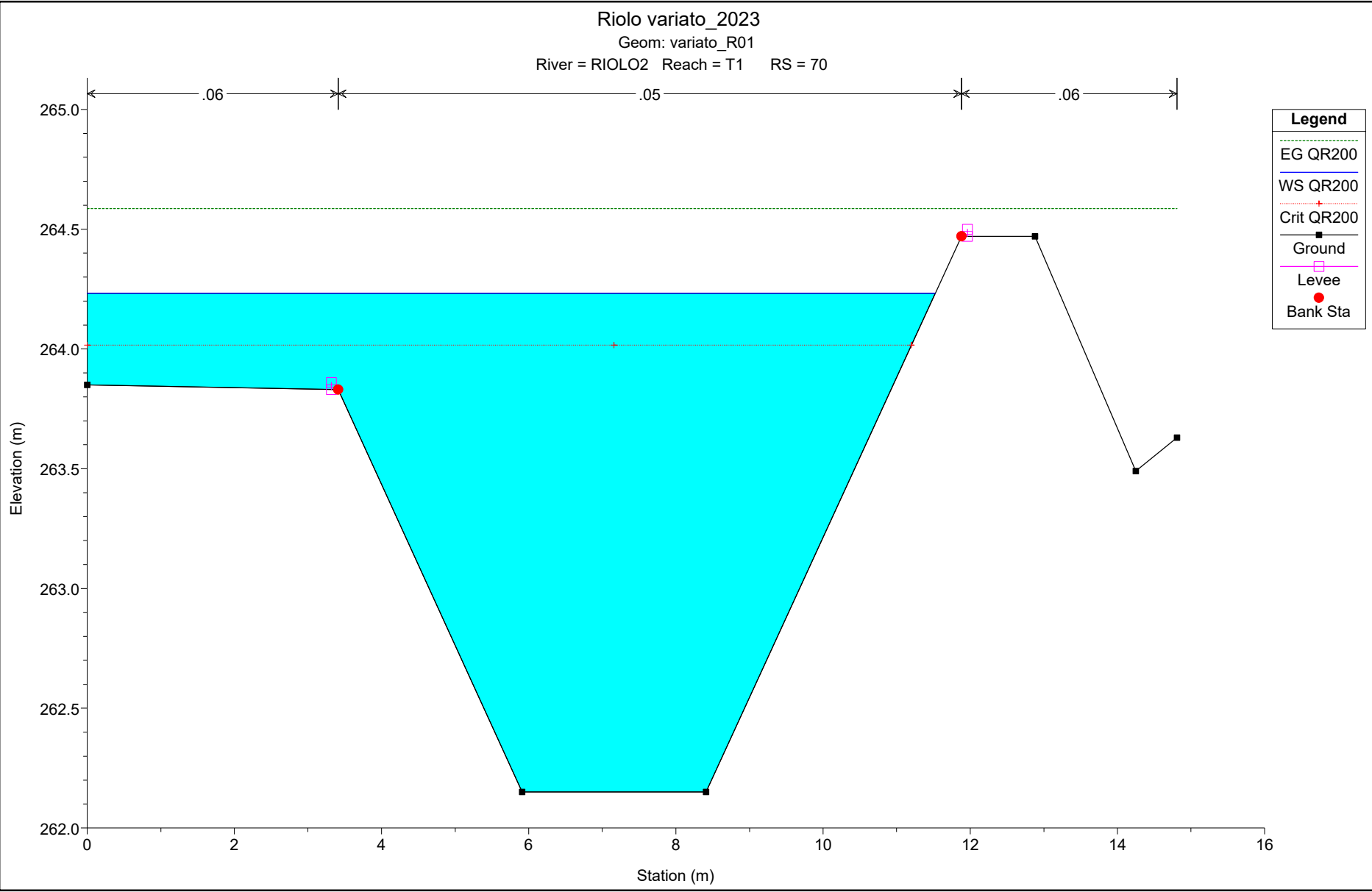


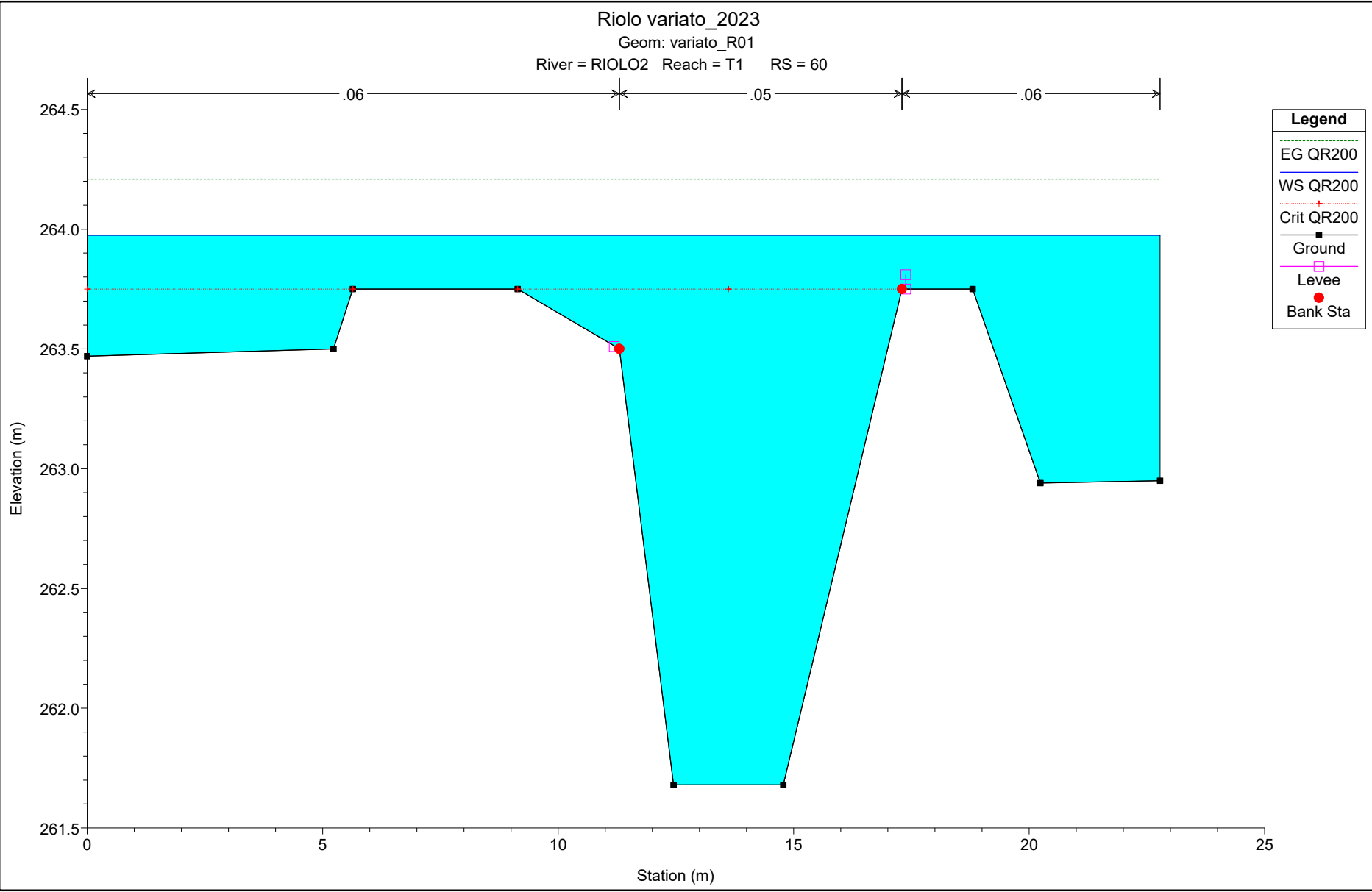


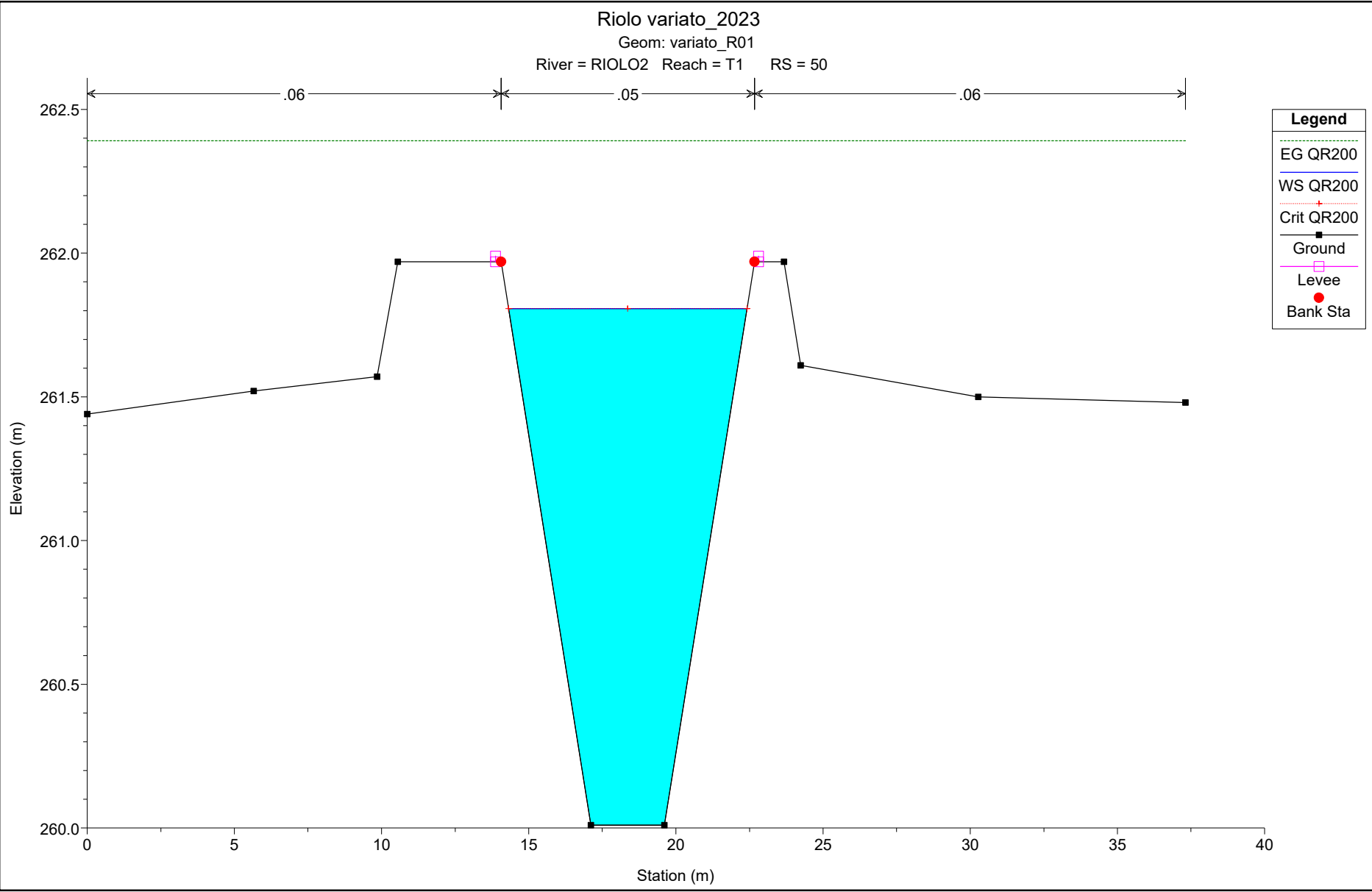


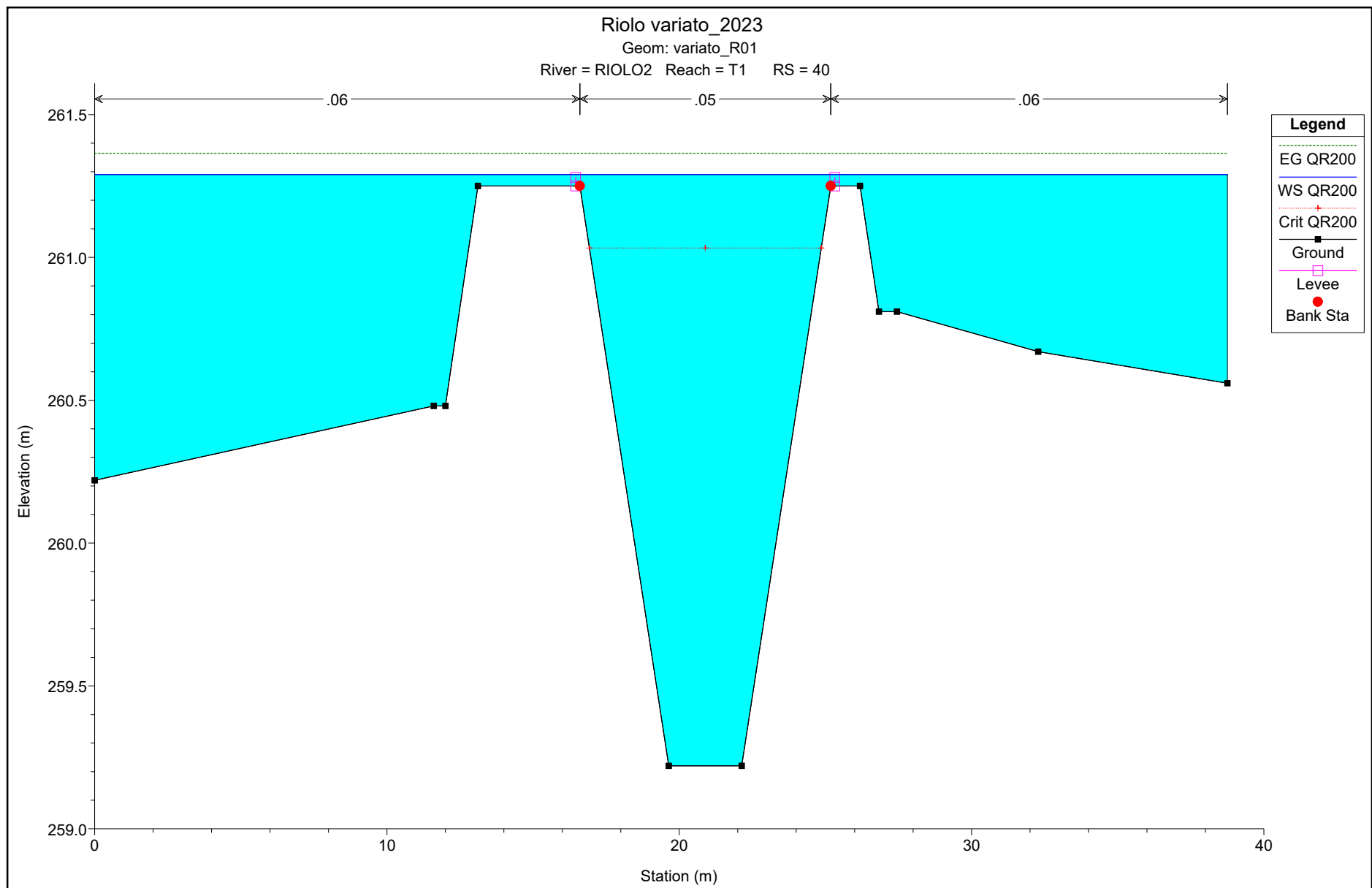


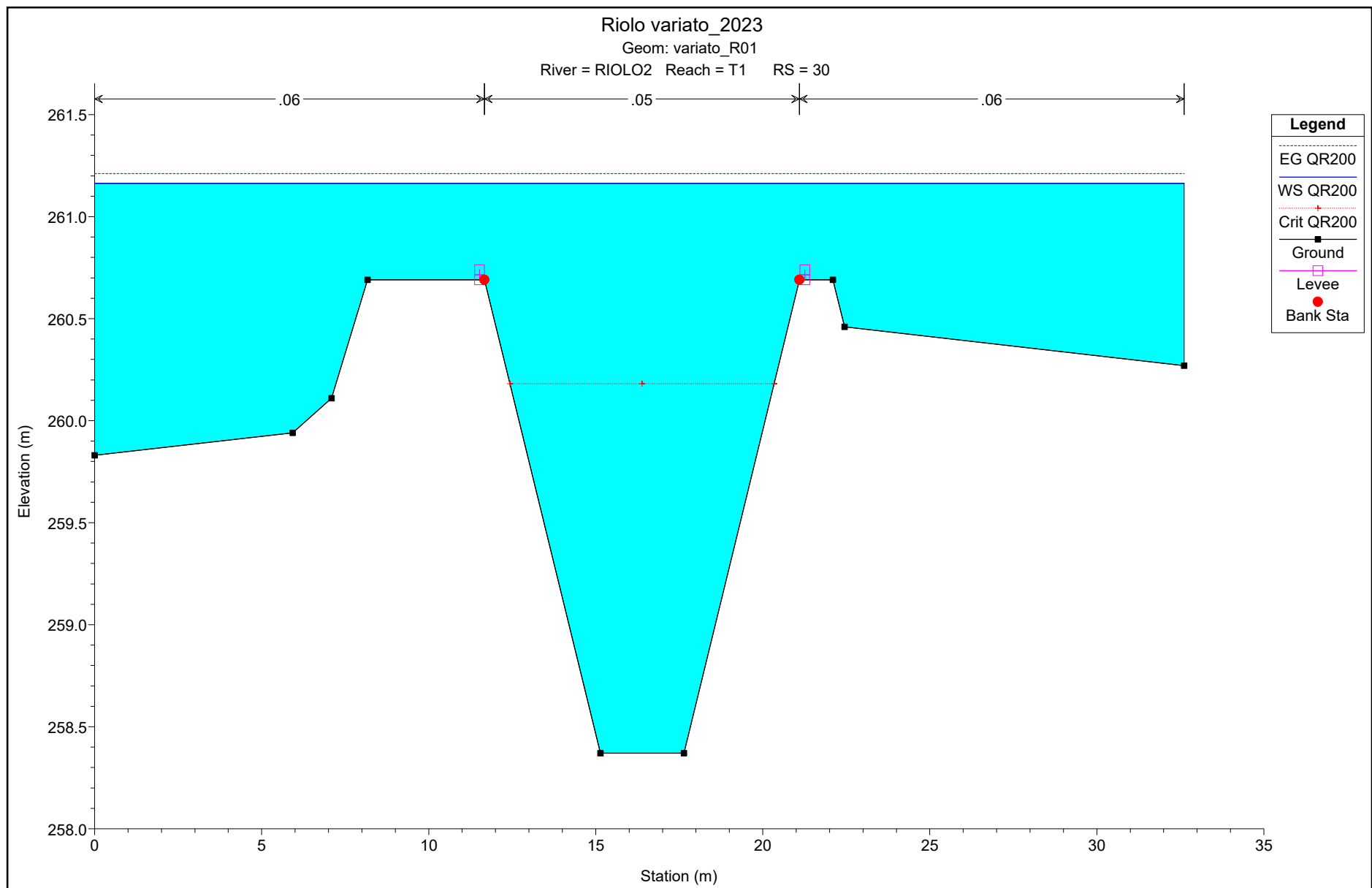


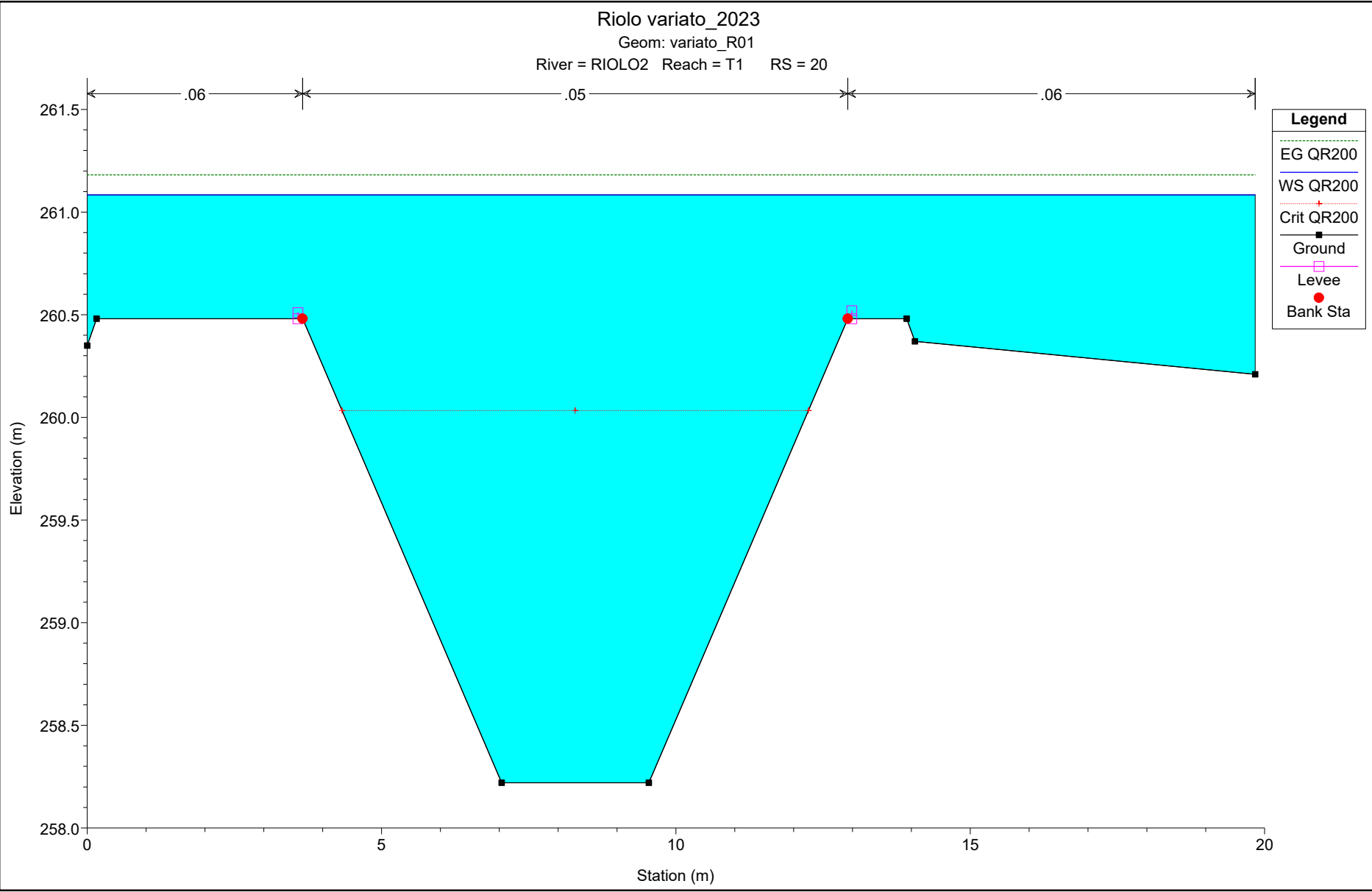




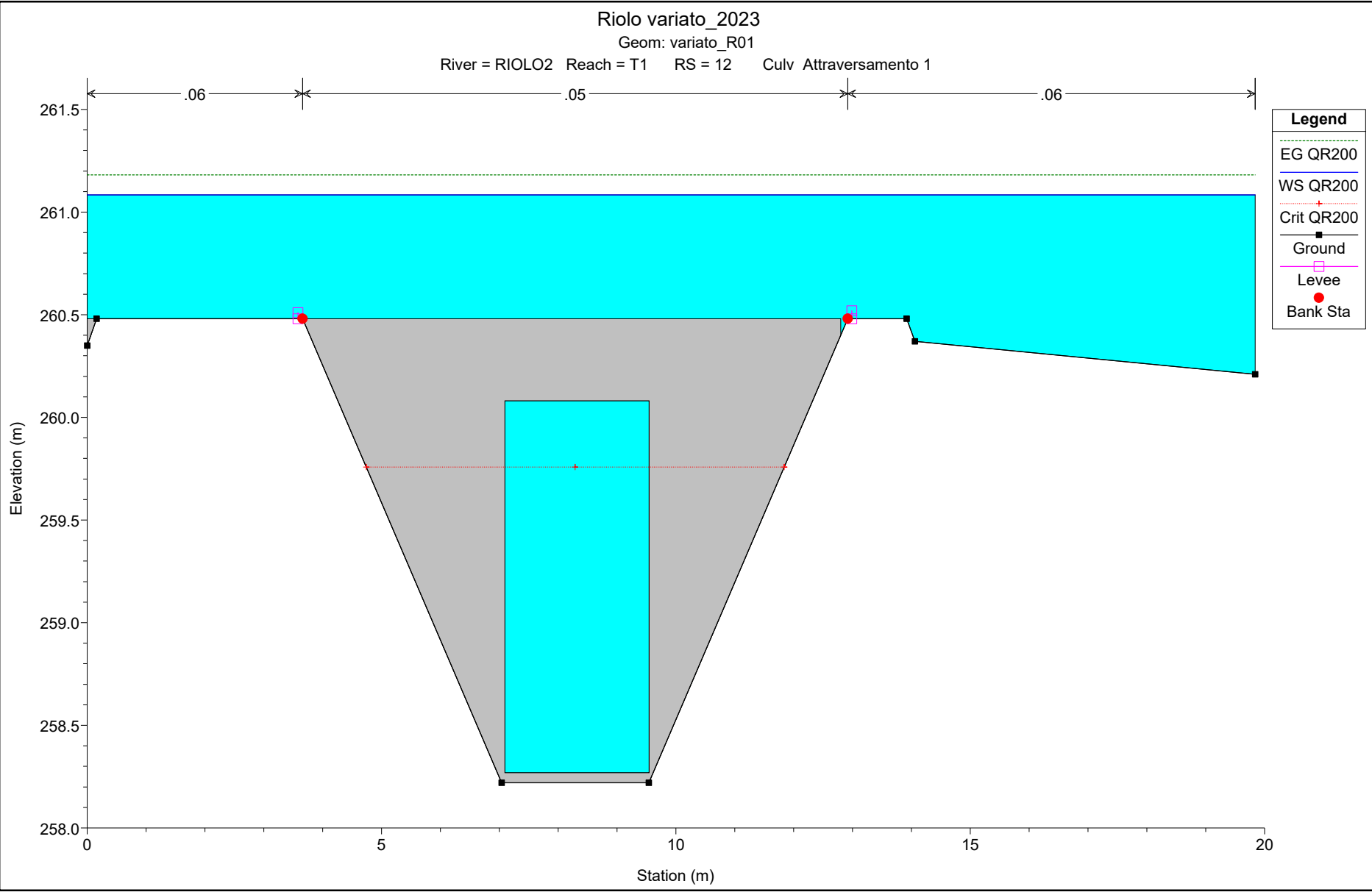


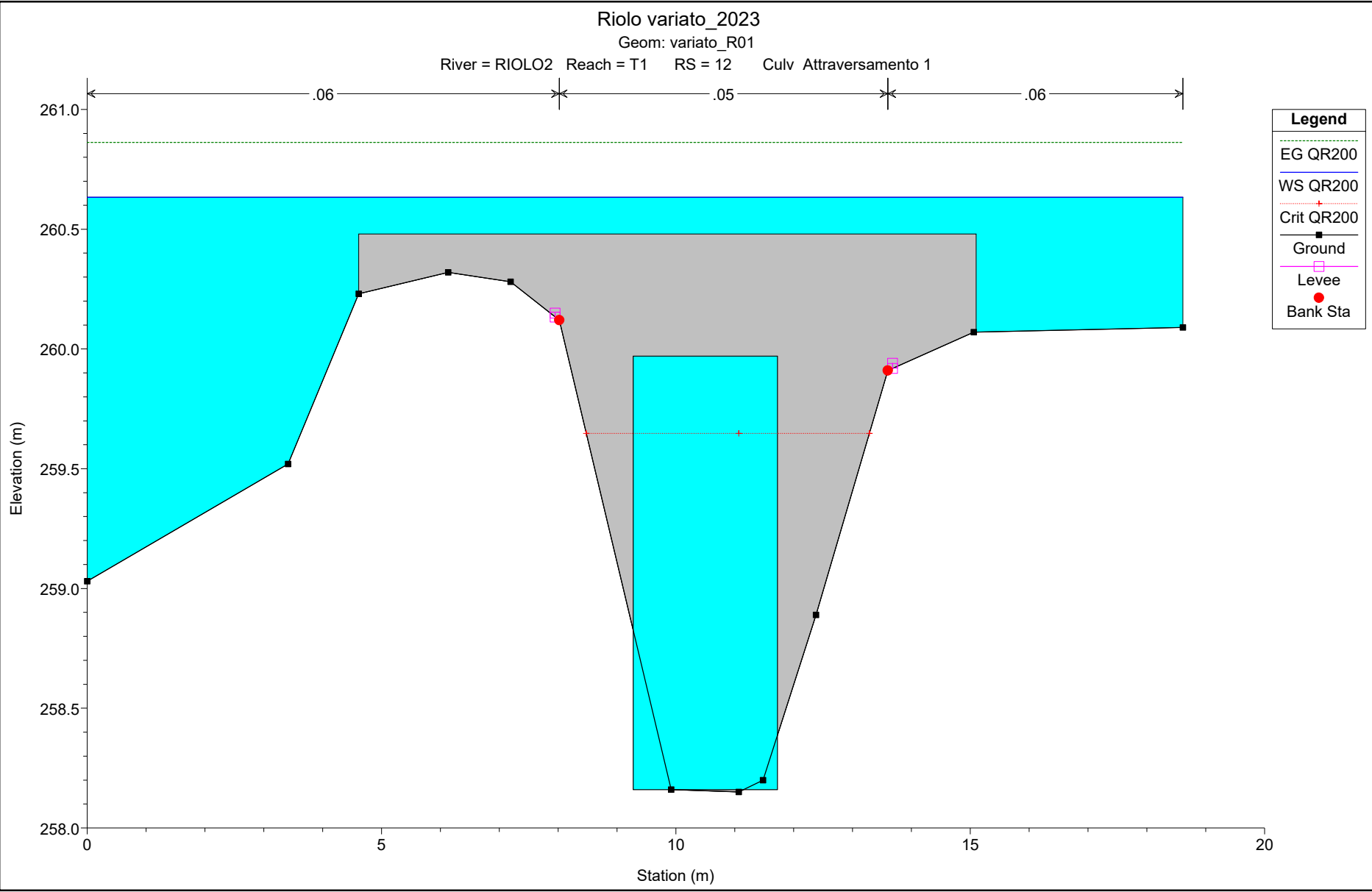


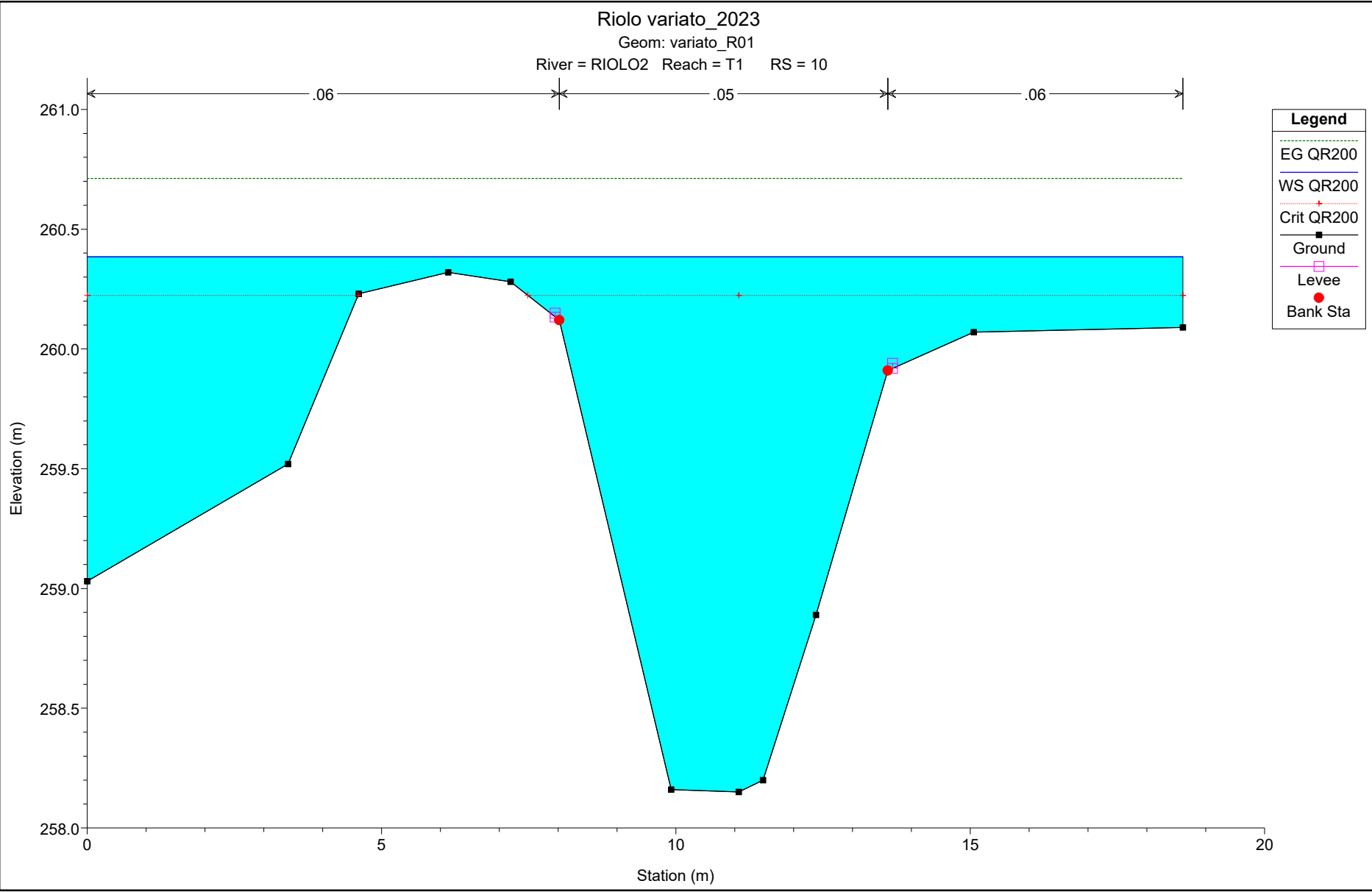












HEC-RAS Plan: 1 Profile: QR200

River	Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (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
RIOLO2	T1	160	QR200	32.25	264.64	267.09	266.45	267.32	0.006571	2.26	17.01	11.77	0.49
RIOLO2	T1	150	QR200	32.25	264.20	266.69	266.58	267.10	0.016910	3.07	12.83	11.43	0.70
RIOLO2	T1	140	QR200	32.25	263.76	266.55	266.08	266.77	0.007102	2.31	17.62	12.87	0.49
RIOLO2	T1	130	QR200	32.25	263.74	265.94	265.94	266.57	0.022984	3.71	10.10	8.19	0.88
RIOLO2	T1	120	QR200	32.25	263.51	265.75	265.75	266.09	0.017706	3.05	15.05	18.99	0.72
RIOLO2	T1	110	QR200	32.25	263.34	265.13	265.13	265.36	0.012397	2.49	19.89	38.99	0.69
RIOLO2	T1	100	QR200	32.25	262.96	264.88	264.68	265.01	0.006173	1.89	25.28	34.14	0.49
RIOLO2	T1	90	QR200	32.25	262.80	264.87	264.42	264.93	0.002691	1.33	35.13	36.75	0.33
RIOLO2	T1	80	QR200	32.25	262.42	264.50	264.29	264.79	0.011495	2.49	14.71	13.81	0.67
RIOLO2	T1	70	QR200	32.25	262.15	264.23	264.02	264.59	0.013376	2.68	12.89	11.52	0.72
RIOLO2	T1	60	QR200	32.25	261.68	263.98	263.75	264.21	0.010058	2.40	18.23	22.78	0.59
RIOLO2	T1	50	QR200	32.25	260.01	261.81	261.81	262.39	0.027183	3.39	9.53	8.10	1.00
RIOLO2	T1	40	QR200	32.25	259.22	261.29	261.03	261.36	0.004330	1.47	30.98	38.75	0.40
RIOLO2	T1	30	QR200	32.25	258.37	261.16	260.18	261.21	0.001603	1.14	38.46	32.61	0.26
RIOLO2	T1	20	QR200	32.25	258.22	261.08	260.03	261.18	0.002508	1.47	26.38	19.84	0.33
RIOLO2	T1	12		Culvert									
RIOLO2	T1	10	QR200	32.25	258.15	260.38	260.22	260.71	0.015002	2.82	15.15	18.61	0.72
RIOLO	T1	340	QR200	24.90	271.32	273.28	272.90	273.55	0.011532	2.33	11.05	15.09	0.66
RIOLO	T1	330	QR200	24.90	271.32	273.15	272.90	273.49	0.015697	2.60	9.59	7.99	0.76
RIOLO	T1	320	QR200	24.90	271.10	272.89	272.69	273.26	0.017489	2.71	9.20	7.87	0.80
RIOLO	T1	310	QR200	24.90	270.56	272.24	272.19	272.65	0.018687	2.88	10.01	23.08	0.83
RIOLO	T1	300	QR200	24.90	269.90	271.65	271.65	271.97	0.013925	2.60	11.85	23.34	0.73
RIOLO	T1	298	QR200	24.90	268.80	270.83	270.48	270.99	0.006106	1.88	17.23	23.72	0.49
RIOLO	T1	292	QR200	24.90	268.72	270.30	270.30	270.83	0.028242	3.23	7.72	7.24	1.00
RIOLO	T1	290	QR200	24.90	268.51	270.22	269.99	270.51	0.014334	2.42	10.86	14.24	0.74
RIOLO	T1	280	QR200	24.90	268.37	270.19	270.09	270.35	0.008175	1.99	17.75	31.29	0.56
RIOLO	T1	270	QR200	24.90	268.08	269.74	269.74	270.07	0.015627	2.69	11.59	18.36	0.77
RIOLO	T1	260	QR200	24.90	267.87	269.48	269.48	269.74	0.014404	2.50	13.74	25.08	0.73
RIOLO	T1	250	QR200	24.90	266.25	269.38	267.53	269.42	0.000953	0.92	28.83	17.01	0.19
RIOLO	T1	242		Culvert									
RIOLO	T1	240	QR200	24.90	265.70	268.39	267.83	268.92	0.024337	3.27	8.07	4.11	0.65
RIOLO	T1	230	QR200	24.90	265.56	268.19	268.07	268.61	0.025234	3.13	9.44	7.45	0.62
RIOLO	T1	220	QR200	24.90	265.22	267.79	267.76	268.08	0.021345	2.77	11.99	14.99	0.56
RIOLO	T1	210	QR200	24.90	264.98	267.84	267.59	267.97	0.009550	1.96	16.81	17.81	0.38
RIOLO	T1	200	QR200	24.90	264.90	267.80	267.45	267.91	0.007956	1.71	18.02	17.09	0.33
RIOLO	T1	190	QR200	24.90	264.70	267.29	267.29	267.74	0.027160	3.26	9.43	9.54	0.69

HEC-RAS Plan: 1 Profile: QR200 (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	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/s)	(m2)	(m)	
RIOLO	T1	180	QR200	24.90	264.72	267.06	266.54	267.43	0.014079	2.75	9.88	7.24	0.62
RIOLO	T1	170	QR200	24.90	264.73	267.05	266.56	267.42	0.014508	2.78	9.76	7.26	0.63
AV22104	T2	40	QR200	7.35	265.09	268.30	266.23	268.33	0.067693	0.72	12.37	5.46	0.13
AV22104	T2	30	QR200	7.35	265.06	267.84	266.20	267.88	0.123073	0.87	10.03	5.46	0.18
AV22104	T2	20	QR200	7.35	265.05	267.29	266.25	267.39	0.558171	1.34	5.47	2.98	0.32
AV22104	T2	10	QR200	7.35	264.70	267.26	265.93	267.33	0.423395	1.20	6.15	2.98	0.27

Plan: 1 AV22104 T2 RS: 40 Profile: QR200

E.G. Elev (m)	268.33	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.600	0.500	0.600
W.S. Elev (m)	268.30	Reach Len. (m)	5.00	5.00	5.00
Crit W.S. (m)	266.23	Flow Area (m2)	3.82	7.80	0.75
E.G. Slope (m/m)	0.067693	Area (m2)	3.82	7.80	0.75
Q Total (m3/s)	7.35	Flow (m3/s)	1.60	5.59	0.16
Top Width (m)	5.46	Top Width (m)	2.41	2.64	0.41
Vel Total (m/s)	0.59	Avg. Vel. (m/s)	0.42	0.72	0.21
Max Chl Dpth (m)	3.21	Hydr. Depth (m)	1.58	2.95	1.84
Conv. Total (m3/s)	28.2	Conv. (m3/s)	6.2	21.5	0.6
Length Wtd. (m)	5.00	Wetted Per. (m)	4.00	4.82	2.28
Min Ch EI (m)	265.09	Shear (N/m2)	632.69	1073.65	219.16
Alpha	1.22	Stream Power (N/m s)	261.41	115.39	242.26
Frctn Loss (m)	0.45	Cum Volume (1000 m3)	0.02	0.05	0.00
C & E Loss (m)	0.00	Cum SA (1000 m2)	0.01	0.02	0.00

Plan: 1 AV22104 T2 RS: 30 Profile: QR200

E.G. Elev (m)	267.88	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.600	0.500	0.600
W.S. Elev (m)	267.84	Reach Len. (m)	2.13	2.13	2.13
Crit W.S. (m)	266.20	Flow Area (m2)	2.78	6.67	0.58
E.G. Slope (m/m)	0.123073	Area (m2)	2.78	6.67	0.58
Q Total (m3/s)	7.35	Flow (m3/s)	1.38	5.82	0.16
Top Width (m)	5.46	Top Width (m)	2.41	2.64	0.41
Vel Total (m/s)	0.73	Avg. Vel. (m/s)	0.50	0.87	0.27
Max Chl Dpth (m)	2.78	Hydr. Depth (m)	1.15	2.53	1.41
Conv. Total (m3/s)	21.0	Conv. (m3/s)	3.9	16.6	0.4
Length Wtd. (m)	2.13	Wetted Per. (m)	3.56	4.81	1.85
Min Ch EI (m)	265.06	Shear (N/m2)	942.16	1672.51	376.10
Alpha	1.21	Stream Power (N/m s)	261.41	115.39	242.26
Frctn Loss (m)	0.49	Cum Volume (1000 m3)	0.00	0.01	0.00
C & E Loss (m)	0.01	Cum SA (1000 m2)	0.00	0.01	0.00

Plan: 1 AV22104 T2 RS: 20 Profile: QR200

E.G. Elev (m)	267.39	Element	Left OB	Channel	Right OB
Vel Head (m)	0.09	Wt. n-Val.		0.500	
W.S. Elev (m)	267.29	Reach Len. (m)	0.10	0.10	0.10
Crit W.S. (m)	266.25	Flow Area (m2)		5.47	
E.G. Slope (m/m)	0.558171	Area (m2)		5.47	
Q Total (m3/s)	7.35	Flow (m3/s)		7.35	
Top Width (m)	2.98	Top Width (m)		2.98	
Vel Total (m/s)	1.34	Avg. Vel. (m/s)		1.34	
Max Chl Dpth (m)	2.24	Hydr. Depth (m)		1.84	
Conv. Total (m3/s)	9.8	Conv. (m3/s)		9.8	
Length Wtd. (m)	0.10	Wetted Per. (m)		6.42	
Min Ch EI (m)	265.05	Shear (N/m2)		4665.21	
Alpha	1.00	Stream Power (N/m s)	142.68	0.00	142.68
Frctn Loss (m)	0.05	Cum Volume (1000 m3)		0.00	
C & E Loss (m)	0.01	Cum SA (1000 m2)		0.00	

Plan: 1 AV22104 T2 RS: 10 Profile: QR200

E.G. Elev (m)	267.33	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.		0.500	
W.S. Elev (m)	267.26	Reach Len. (m)	0.00	0.00	0.00
Crit W.S. (m)	265.93	Flow Area (m2)		6.15	
E.G. Slope (m/m)	0.423395	Area (m2)		6.15	
Q Total (m3/s)	7.35	Flow (m3/s)		7.35	

Plan: 1 AV22104 T2 RS: 10 Profile: QR200 (Continued)

Top Width (m)	2.98	Top Width (m)		2.98	
Vel Total (m/s)	1.20	Avg. Vel. (m/s)		1.20	
Max Chl Dpth (m)	2.56	Hydr. Depth (m)		2.06	
Conv. Total (m3/s)	11.3	Conv. (m3/s)		11.3	
Length Wtd. (m)	0.00	Wetted Per. (m)		6.98	
Min Ch EI (m)	264.70	Shear (N/m2)		3656.49	
Alpha	1.00	Stream Power (N/m s)	142.68	0.00	142.68
Frctn Loss (m)	0.00	Cum Volume (1000 m3)			
C & E Loss (m)	0.02	Cum SA (1000 m2)			

Plan: 1 RIOLO T1 RS: 340 Profile: QR200

E.G. Elev (m)	273.55	Element	Left OB	Channel	Right OB
Vel Head (m)	0.28	Wt. n-Val.		0.050	0.060
W.S. Elev (m)	273.28	Reach Len. (m)	4.00	4.00	4.00
Crit W.S. (m)	272.90	Flow Area (m2)		10.63	0.42
E.G. Slope (m/m)	0.011532	Area (m2)		10.63	0.42
Q Total (m3/s)	24.90	Flow (m3/s)		24.78	0.12
Top Width (m)	15.09	Top Width (m)		8.24	6.85
Vel Total (m/s)	2.25	Avg. Vel. (m/s)		2.33	0.28
Max Chl Dpth (m)	1.96	Hydr. Depth (m)		1.29	0.06
Conv. Total (m3/s)	231.9	Conv. (m3/s)		230.8	1.1
Length Wtd. (m)	4.00	Wetted Per. (m)		9.40	6.97
Min Ch EI (m)	271.32	Shear (N/m2)		127.91	6.89
Alpha	1.07	Stream Power (N/m s)	833.55	54.58	508.94
Frctn Loss (m)	0.05	Cum Volume (1000 m3)	0.66	3.01	0.48
C & E Loss (m)	0.01	Cum SA (1000 m2)	1.91	2.03	1.78

Plan: 1 RIOLO T1 RS: 330 Profile: QR200

E.G. Elev (m)	273.49	Element	Left OB	Channel	Right OB
Vel Head (m)	0.34	Wt. n-Val.		0.050	
W.S. Elev (m)	273.15	Reach Len. (m)	13.99	13.99	13.99
Crit W.S. (m)	272.90	Flow Area (m2)		9.59	
E.G. Slope (m/m)	0.015697	Area (m2)		9.59	
Q Total (m3/s)	24.90	Flow (m3/s)		24.90	
Top Width (m)	7.99	Top Width (m)		7.99	
Vel Total (m/s)	2.60	Avg. Vel. (m/s)		2.60	
Max Chl Dpth (m)	1.83	Hydr. Depth (m)		1.20	
Conv. Total (m3/s)	198.7	Conv. (m3/s)		198.7	
Length Wtd. (m)	13.99	Wetted Per. (m)		9.09	
Min Ch EI (m)	271.32	Shear (N/m2)		162.34	
Alpha	1.00	Stream Power (N/m s)	833.55	57.93	505.11
Frctn Loss (m)	0.23	Cum Volume (1000 m3)	0.66	2.97	0.48
C & E Loss (m)	0.00	Cum SA (1000 m2)	1.91	2.00	1.77

Plan: 1 RIOLO T1 RS: 320 Profile: QR200

E.G. Elev (m)	273.26	Element	Left OB	Channel	Right OB
Vel Head (m)	0.37	Wt. n-Val.		0.050	0.001
W.S. Elev (m)	272.89	Reach Len. (m)	33.68	33.68	33.68
Crit W.S. (m)	272.69	Flow Area (m2)		9.20	0.00
E.G. Slope (m/m)	0.017489	Area (m2)		9.20	0.00
Q Total (m3/s)	24.90	Flow (m3/s)		24.90	0.00
Top Width (m)	7.87	Top Width (m)		7.80	0.07
Vel Total (m/s)	2.71	Avg. Vel. (m/s)		2.71	0.07
Max Chl Dpth (m)	1.78	Hydr. Depth (m)		1.18	0.01
Conv. Total (m3/s)	188.3	Conv. (m3/s)		188.3	0.0
Length Wtd. (m)	33.68	Wetted Per. (m)		8.89	0.08
Min Ch EI (m)	271.10	Shear (N/m2)		177.51	

Plan: 1 RIOLO T1 RS: 320 Profile: QR200 (Continued)

Alpha	1.00	Stream Power (N/m s)	1308.98	99.58	516.60
Frctn Loss (m)	0.61	Cum Volume (1000 m3)	0.66	2.84	0.48
C & E Loss (m)	0.00	Cum SA (1000 m2)	1.91	1.89	1.77

Plan: 1 RIOLO T1 RS: 310 Profile: QR200

E.G. Elev (m)	272.65	Element	Left OB	Channel	Right OB
Vel Head (m)	0.41	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	272.24	Reach Len. (m)	40.68	40.68	40.68
Crit W.S. (m)	272.19	Flow Area (m2)	0.22	8.37	1.43
E.G. Slope (m/m)	0.018687	Area (m2)	0.22	8.37	1.43
Q Total (m3/s)	24.90	Flow (m3/s)	0.08	24.08	0.74
Top Width (m)	23.08	Top Width (m)	3.22	6.88	12.98
Vel Total (m/s)	2.49	Avg. Vel. (m/s)	0.37	2.88	0.52
Max Chl Dpth (m)	1.68	Hydr. Depth (m)	0.07	1.22	0.11
Conv. Total (m3/s)	182.2	Conv. (m3/s)	0.6	176.1	5.4
Length Wtd. (m)	40.68	Wetted Per. (m)	3.31	7.75	13.07
Min Ch EI (m)	270.56	Shear (N/m2)	12.05	197.89	19.99
Alpha	1.30	Stream Power (N/m s)	1105.02	121.14	484.52
Frctn Loss (m)	0.65	Cum Volume (1000 m3)	0.65	2.54	0.46
C & E Loss (m)	0.03	Cum SA (1000 m2)	1.85	1.64	1.55

Plan: 1 RIOLO T1 RS: 300 Profile: QR200

E.G. Elev (m)	271.97	Element	Left OB	Channel	Right OB
Vel Head (m)	0.32	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	271.65	Reach Len. (m)	55.73	55.73	55.73
Crit W.S. (m)	271.65	Flow Area (m2)	2.00	8.74	1.11
E.G. Slope (m/m)	0.013925	Area (m2)	2.00	8.74	1.11
Q Total (m3/s)	24.90	Flow (m3/s)	1.49	22.74	0.66
Top Width (m)	23.34	Top Width (m)	8.26	6.69	8.39
Vel Total (m/s)	2.10	Avg. Vel. (m/s)	0.75	2.60	0.60
Max Chl Dpth (m)	1.75	Hydr. Depth (m)	0.24	1.31	0.13
Conv. Total (m3/s)	211.0	Conv. (m3/s)	12.6	192.7	5.6
Length Wtd. (m)	55.73	Wetted Per. (m)	8.55	7.55	8.61
Min Ch EI (m)	269.90	Shear (N/m2)	31.92	158.15	17.64
Alpha	1.41	Stream Power (N/m s)	1155.30	392.12	717.69
Frctn Loss (m)	0.49	Cum Volume (1000 m3)	0.61	2.19	0.41
C & E Loss (m)	0.05	Cum SA (1000 m2)	1.62	1.37	1.11

Plan: 1 RIOLO T1 RS: 298 Profile: QR200

E.G. Elev (m)	270.99	Element	Left OB	Channel	Right OB
Vel Head (m)	0.15	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	270.83	Reach Len. (m)	10.00	10.00	10.00
Crit W.S. (m)	270.48	Flow Area (m2)	2.94	10.98	3.31
E.G. Slope (m/m)	0.006106	Area (m2)	2.94	10.98	3.31
Q Total (m3/s)	24.90	Flow (m3/s)	2.24	20.68	1.98
Top Width (m)	23.72	Top Width (m)	6.09	7.32	10.31
Vel Total (m/s)	1.44	Avg. Vel. (m/s)	0.76	1.88	0.60
Max Chl Dpth (m)	2.03	Hydr. Depth (m)	0.48	1.50	0.32
Conv. Total (m3/s)	318.6	Conv. (m3/s)	28.7	264.6	25.4
Length Wtd. (m)	10.00	Wetted Per. (m)	6.59	8.30	10.63
Min Ch EI (m)	268.80	Shear (N/m2)	26.74	79.23	18.66
Alpha	1.45	Stream Power (N/m s)	1135.67	284.87	646.83
Frctn Loss (m)	0.11	Cum Volume (1000 m3)	0.47	1.65	0.28
C & E Loss (m)	0.04	Cum SA (1000 m2)	1.22	0.98	0.59



Plan: 1 RIOLO T1 RS: 292 Profile: QR200

E.G. Elev (m)	270.83	Element	Left OB	Channel	Right OB
Vel Head (m)	0.53	Wt. n-Val.		0.050	
W.S. Elev (m)	270.30	Reach Len. (m)	9.02	9.02	9.02
Crit W.S. (m)	270.30	Flow Area (m2)		7.72	
E.G. Slope (m/m)	0.028242	Area (m2)		7.72	
Q Total (m3/s)	24.90	Flow (m3/s)		24.90	
Top Width (m)	7.24	Top Width (m)		7.24	
Vel Total (m/s)	3.23	Avg. Vel. (m/s)		3.23	
Max Chl Dpth (m)	1.58	Hydr. Depth (m)		1.07	
Conv. Total (m3/s)	148.2	Conv. (m3/s)		148.2	
Length Wtd. (m)	9.02	Wetted Per. (m)		8.20	
Min Ch EI (m)	268.72	Shear (N/m2)		260.52	
Alpha	1.00	Stream Power (N/m s)	1135.67	228.38	604.22
Frctn Loss (m)	0.18	Cum Volume (1000 m3)	0.45	1.55	0.27
C & E Loss (m)	0.07	Cum SA (1000 m2)	1.19	0.90	0.54

Plan: 1 RIOLO T1 RS: 290 Profile: QR200

E.G. Elev (m)	270.51	Element	Left OB	Channel	Right OB
Vel Head (m)	0.29	Wt. n-Val.	0.060	0.050	
W.S. Elev (m)	270.22	Reach Len. (m)	11.28	11.28	11.28
Crit W.S. (m)	269.99	Flow Area (m2)	0.75	10.11	
E.G. Slope (m/m)	0.014334	Area (m2)	0.75	10.11	
Q Total (m3/s)	24.90	Flow (m3/s)	0.40	24.50	
Top Width (m)	14.24	Top Width (m)	5.10	9.14	
Vel Total (m/s)	2.29	Avg. Vel. (m/s)	0.54	2.42	
Max Chl Dpth (m)	1.71	Hydr. Depth (m)	0.15	1.11	
Conv. Total (m3/s)	208.0	Conv. (m3/s)	3.4	204.6	
Length Wtd. (m)	11.28	Wetted Per. (m)	5.28	9.93	
Min Ch EI (m)	268.51	Shear (N/m2)	19.86	143.06	
Alpha	1.10	Stream Power (N/m s)	1135.67	239.87	685.14
Frctn Loss (m)	0.12	Cum Volume (1000 m3)	0.45	1.47	0.27
C & E Loss (m)	0.04	Cum SA (1000 m2)	1.17	0.83	0.54

Plan: 1 RIOLO T1 RS: 280 Profile: QR200

E.G. Elev (m)	270.35	Element	Left OB	Channel	Right OB
Vel Head (m)	0.16	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	270.19	Reach Len. (m)	24.13	24.13	24.13
Crit W.S. (m)	270.09	Flow Area (m2)	6.69	9.39	1.67
E.G. Slope (m/m)	0.008175	Area (m2)	6.69	9.39	1.67
Q Total (m3/s)	24.90	Flow (m3/s)	5.25	18.69	0.96
Top Width (m)	31.29	Top Width (m)	17.36	7.18	6.75
Vel Total (m/s)	1.40	Avg. Vel. (m/s)	0.78	1.99	0.58
Max Chl Dpth (m)	1.82	Hydr. Depth (m)	0.39	1.31	0.25
Conv. Total (m3/s)	275.4	Conv. (m3/s)	58.0	206.7	10.6
Length Wtd. (m)	24.13	Wetted Per. (m)	17.81	8.14	7.07
Min Ch EI (m)	268.37	Shear (N/m2)	30.11	92.55	18.94
Alpha	1.58	Stream Power (N/m s)	1498.09	826.37	1184.02
Frctn Loss (m)	0.27	Cum Volume (1000 m3)	0.41	1.36	0.26
C & E Loss (m)	0.02	Cum SA (1000 m2)	1.04	0.74	0.50

Plan: 1 RIOLO T1 RS: 270 Profile: QR200

E.G. Elev (m)	270.07	Element	Left OB	Channel	Right OB
Vel Head (m)	0.33	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	269.74	Reach Len. (m)	16.58	16.58	16.58
Crit W.S. (m)	269.74	Flow Area (m2)	2.06	8.11	1.42
E.G. Slope (m/m)	0.015627	Area (m2)	2.06	8.11	1.42
Q Total (m3/s)	24.90	Flow (m3/s)	1.71	21.78	1.40

Plan: 1 RIOLO T1 RS: 270 Profile: QR200 (Continued)

Top Width (m)	18.36	Top Width (m)	7.94	6.47	3.95
Vel Total (m/s)	2.15	Avg. Vel. (m/s)	0.83	2.69	0.99
Max Chl Dpth (m)	1.66	Hydr. Depth (m)	0.26	1.25	0.36
Conv. Total (m3/s)	199.2	Conv. (m3/s)	13.7	174.3	11.2
Length Wtd. (m)	16.58	Wetted Per. (m)	8.21	7.27	4.34
Min Ch EI (m)	268.08	Shear (N/m2)	38.49	170.78	50.14
Alpha	1.39	Stream Power (N/m s)	879.03	376.80	692.31
Frctn Loss (m)	0.25	Cum Volume (1000 m3)	0.30	1.15	0.22
C & E Loss (m)	0.02	Cum SA (1000 m2)	0.73	0.57	0.37

Plan: 1 RIOLO T1 RS: 260 Profile: QR200

E.G. Elev (m)	269.74	Element	Left OB	Channel	Right OB
Vel Head (m)	0.26	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	269.48	Reach Len. (m)	21.63	21.63	21.63
Crit W.S. (m)	269.48	Flow Area (m2)	4.37	7.74	1.63
E.G. Slope (m/m)	0.014404	Area (m2)	4.37	7.74	1.63
Q Total (m3/s)	24.90	Flow (m3/s)	3.79	19.38	1.73
Top Width (m)	25.08	Top Width (m)	14.88	6.45	3.75
Vel Total (m/s)	1.81	Avg. Vel. (m/s)	0.87	2.50	1.06
Max Chl Dpth (m)	1.61	Hydr. Depth (m)	0.29	1.20	0.44
Conv. Total (m3/s)	207.5	Conv. (m3/s)	31.6	161.5	14.4
Length Wtd. (m)	21.63	Wetted Per. (m)	15.29	7.26	4.23
Min Ch EI (m)	267.87	Shear (N/m2)	40.36	150.52	54.48
Alpha	1.54	Stream Power (N/m s)	1200.77	706.19	1028.41
Frctn Loss (m)	0.05	Cum Volume (1000 m3)	0.25	1.02	0.20
C & E Loss (m)	0.06	Cum SA (1000 m2)	0.55	0.47	0.31

Plan: 1 RIOLO T1 RS: 250 Profile: QR200

E.G. Elev (m)	269.42	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.060	0.050	
W.S. Elev (m)	269.38	Reach Len. (m)	19.51	19.51	19.51
Crit W.S. (m)	267.53	Flow Area (m2)	2.74	26.09	
E.G. Slope (m/m)	0.000953	Area (m2)	2.74	26.09	
Q Total (m3/s)	24.90	Flow (m3/s)	0.80	24.10	
Top Width (m)	17.01	Top Width (m)	5.99	11.02	
Vel Total (m/s)	0.86	Avg. Vel. (m/s)	0.29	0.92	
Max Chl Dpth (m)	3.13	Hydr. Depth (m)	0.46	2.37	
Conv. Total (m3/s)	806.7	Conv. (m3/s)	25.9	780.8	
Length Wtd. (m)	19.51	Wetted Per. (m)	6.43	14.25	
Min Ch EI (m)	266.25	Shear (N/m2)	3.98	17.11	
Alpha	1.11	Stream Power (N/m s)	814.40	280.57	814.40
Frctn Loss (m)		Cum Volume (1000 m3)	0.17	0.65	0.18
C & E Loss (m)		Cum SA (1000 m2)	0.32	0.28	0.27

Plan: 1 RIOLO T1 RS: 240 Profile: QR200

E.G. Elev (m)	268.92	Element	Left OB	Channel	Right OB
Vel Head (m)	0.53	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	268.39	Reach Len. (m)	11.19	11.19	11.19
Crit W.S. (m)	267.83	Flow Area (m2)	0.41	7.36	0.30
E.G. Slope (m/m)	0.024337	Area (m2)	0.41	7.36	0.30
Q Total (m3/s)	24.90	Flow (m3/s)	0.50	24.08	0.32
Top Width (m)	4.11	Top Width (m)	0.64	2.82	0.65
Vel Total (m/s)	3.09	Avg. Vel. (m/s)	1.22	3.27	1.07
Max Chl Dpth (m)	2.69	Hydr. Depth (m)	0.64	2.61	0.46
Conv. Total (m3/s)	159.6	Conv. (m3/s)	3.2	154.3	2.1
Length Wtd. (m)	11.19	Wetted Per. (m)	1.28	6.86	1.14
Min Ch EI (m)	265.70	Shear (N/m2)	76.54	256.24	63.27

Plan: 1 RIOLO T1 RS: 240 Profile: QR200 (Continued)

Alpha	1.09	Stream Power (N/m s)	196.77	28.73	166.61
Frctn Loss (m)	0.28	Cum Volume (1000 m3)	0.17	0.43	0.18
C & E Loss (m)	0.03	Cum SA (1000 m2)	0.26	0.14	0.26

Plan: 1 RIOLO T1 RS: 230 Profile: QR200

E.G. Elev (m)	268.61	Element	Left OB	Channel	Right OB
Vel Head (m)	0.42	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	268.19	Reach Len. (m)	21.28	21.28	21.28
Crit W.S. (m)	268.07	Flow Area (m2)	0.38	5.96	3.11
E.G. Slope (m/m)	0.025234	Area (m2)	0.38	5.96	3.11
Q Total (m3/s)	24.90	Flow (m3/s)	0.45	18.68	5.77
Top Width (m)	7.45	Top Width (m)	0.57	2.31	4.57
Vel Total (m/s)	2.64	Avg. Vel. (m/s)	1.20	3.13	1.86
Max Chl Dpth (m)	2.63	Hydr. Depth (m)	0.66	2.58	0.68
Conv. Total (m3/s)	156.7	Conv. (m3/s)	2.8	117.6	36.3
Length Wtd. (m)	21.28	Wetted Per. (m)	1.24	6.08	5.29
Min Ch El (m)	265.56	Shear (N/m2)	75.27	242.46	145.41
Alpha	1.18	Stream Power (N/m s)	356.69	24.90	139.80
Frctn Loss (m)	0.49	Cum Volume (1000 m3)	0.17	0.35	0.16
C & E Loss (m)	0.04	Cum SA (1000 m2)	0.25	0.11	0.23

Plan: 1 RIOLO T1 RS: 220 Profile: QR200

E.G. Elev (m)	268.08	Element	Left OB	Channel	Right OB
Vel Head (m)	0.29	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	267.79	Reach Len. (m)	4.42	4.42	4.42
Crit W.S. (m)	267.76	Flow Area (m2)	4.18	5.59	2.22
E.G. Slope (m/m)	0.021345	Area (m2)	4.18	5.59	2.22
Q Total (m3/s)	24.90	Flow (m3/s)	6.29	15.50	3.11
Top Width (m)	14.99	Top Width (m)	8.12	2.24	4.63
Vel Total (m/s)	2.08	Avg. Vel. (m/s)	1.50	2.77	1.40
Max Chl Dpth (m)	2.57	Hydr. Depth (m)	0.51	2.49	0.48
Conv. Total (m3/s)	170.4	Conv. (m3/s)	43.0	106.1	21.3
Length Wtd. (m)	4.42	Wetted Per. (m)	8.62	6.04	5.07
Min Ch El (m)	265.22	Shear (N/m2)	101.56	193.53	91.57
Alpha	1.30	Stream Power (N/m s)	717.69	383.03	501.76
Frctn Loss (m)	0.06	Cum Volume (1000 m3)	0.12	0.23	0.10
C & E Loss (m)	0.05	Cum SA (1000 m2)	0.16	0.07	0.14

Plan: 1 RIOLO T1 RS: 210 Profile: QR200

E.G. Elev (m)	267.97	Element	Left OB	Channel	Right OB
Vel Head (m)	0.13	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	267.84	Reach Len. (m)	6.01	6.01	6.01
Crit W.S. (m)	267.59	Flow Area (m2)	5.85	6.15	4.80
E.G. Slope (m/m)	0.009550	Area (m2)	5.85	6.15	4.80
Q Total (m3/s)	24.90	Flow (m3/s)	7.34	12.07	5.49
Top Width (m)	17.81	Top Width (m)	7.90	2.29	7.62
Vel Total (m/s)	1.48	Avg. Vel. (m/s)	1.26	1.96	1.14
Max Chl Dpth (m)	2.86	Hydr. Depth (m)	0.74	2.69	0.63
Conv. Total (m3/s)	254.8	Conv. (m3/s)	75.1	123.5	56.1
Length Wtd. (m)	6.01	Wetted Per. (m)	8.64	6.12	8.18
Min Ch El (m)	264.98	Shear (N/m2)	63.37	94.17	54.99
Alpha	1.19	Stream Power (N/m s)	852.71	371.53	494.58
Frctn Loss (m)	0.05	Cum Volume (1000 m3)	0.10	0.20	0.09
C & E Loss (m)	0.01	Cum SA (1000 m2)	0.12	0.06	0.11

Plan: 1 RIOLO T1 RS: 200 Profile: QR200

E.G. Elev (m)	267.91	Element	Left OB	Channel	Right OB
Vel Head (m)	0.10	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	267.80	Reach Len. (m)	9.65	9.65	9.65
Crit W.S. (m)	267.45	Flow Area (m2)	6.41	5.13	6.48
E.G. Slope (m/m)	0.007956	Area (m2)	6.41	5.13	6.48
Q Total (m3/s)	24.90	Flow (m3/s)	7.96	8.80	8.15
Top Width (m)	17.09	Top Width (m)	7.65	1.85	7.59
Vel Total (m/s)	1.38	Avg. Vel. (m/s)	1.24	1.71	1.26
Max Chl Dpth (m)	2.90	Hydr. Depth (m)	0.84	2.77	0.85
Conv. Total (m3/s)	279.2	Conv. (m3/s)	89.2	98.6	91.3
Length Wtd. (m)	9.65	Wetted Per. (m)	8.41	5.45	8.32
Min Ch El (m)	264.90	Shear (N/m2)	59.50	73.48	60.73
Alpha	1.07	Stream Power (N/m s)	818.24	359.56	460.59
Frctn Loss (m)	0.13	Cum Volume (1000 m3)	0.06	0.17	0.05
C & E Loss (m)	0.03	Cum SA (1000 m2)	0.07	0.04	0.06

Plan: 1 RIOLO T1 RS: 190 Profile: QR200

E.G. Elev (m)	267.74	Element	Left OB	Channel	Right OB
Vel Head (m)	0.45	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	267.29	Reach Len. (m)	6.05	6.05	6.05
Crit W.S. (m)	267.29	Flow Area (m2)	2.14	5.97	1.32
E.G. Slope (m/m)	0.027160	Area (m2)	2.14	5.97	1.32
Q Total (m3/s)	24.90	Flow (m3/s)	3.45	19.44	2.01
Top Width (m)	9.54	Top Width (m)	4.21	2.64	2.69
Vel Total (m/s)	2.64	Avg. Vel. (m/s)	1.61	3.26	1.53
Max Chl Dpth (m)	2.59	Hydr. Depth (m)	0.51	2.26	0.49
Conv. Total (m3/s)	151.1	Conv. (m3/s)	20.9	117.9	12.2
Length Wtd. (m)	6.05	Wetted Per. (m)	4.79	6.08	3.17
Min Ch El (m)	264.70	Shear (N/m2)	119.37	261.40	110.63
Alpha	1.27	Stream Power (N/m s)	456.75	198.22	331.79
Frctn Loss (m)	0.12	Cum Volume (1000 m3)	0.02	0.12	0.02
C & E Loss (m)	0.02	Cum SA (1000 m2)	0.02	0.02	0.01

Plan: 1 RIOLO T1 RS: 180 Profile: QR200

E.G. Elev (m)	267.43	Element	Left OB	Channel	Right OB
Vel Head (m)	0.37	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	267.06	Reach Len. (m)	0.10	0.10	0.10
Crit W.S. (m)	266.54	Flow Area (m2)	0.59	8.64	0.65
E.G. Slope (m/m)	0.014079	Area (m2)	0.59	8.64	0.65
Q Total (m3/s)	24.90	Flow (m3/s)	0.58	23.75	0.57
Top Width (m)	7.24	Top Width (m)	1.19	4.25	1.80
Vel Total (m/s)	2.52	Avg. Vel. (m/s)	0.99	2.75	0.88
Max Chl Dpth (m)	2.34	Hydr. Depth (m)	0.49	2.03	0.36
Conv. Total (m3/s)	209.9	Conv. (m3/s)	4.9	200.2	4.8
Length Wtd. (m)	0.10	Wetted Per. (m)	1.66	6.93	2.20
Min Ch El (m)	264.72	Shear (N/m2)	48.71	172.08	40.93
Alpha	1.14	Stream Power (N/m s)	346.63	53.63	264.76
Frctn Loss (m)	0.00	Cum Volume (1000 m3)	0.01	0.07	0.01
C & E Loss (m)	0.00	Cum SA (1000 m2)	0.00	0.00	0.00

Plan: 1 RIOLO T1 RS: 170 Profile: QR200

E.G. Elev (m)	267.42	Element	Left OB	Channel	Right OB
Vel Head (m)	0.38	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	267.05	Reach Len. (m)	6.95	6.95	6.95
Crit W.S. (m)	266.56	Flow Area (m2)	0.57	8.55	0.63
E.G. Slope (m/m)	0.014508	Area (m2)	0.57	8.55	0.63
Q Total (m3/s)	24.90	Flow (m3/s)	0.57	23.77	0.56

Plan: 1 RIOLO T1 RS: 170 Profile: QR200 (Continued)

Top Width (m)	7.26	Top Width (m)	1.19	4.27	1.80
Vel Total (m/s)	2.55	Avg. Vel. (m/s)	1.00	2.78	0.88
Max Chl Dpth (m)	2.32	Hydr. Depth (m)	0.48	2.00	0.35
Conv. Total (m3/s)	206.7	Conv. (m3/s)	4.8	197.4	4.6
Length Wtd. (m)	6.95	Wetted Per. (m)	1.63	6.90	2.19
Min Ch El (m)	264.73	Shear (N/m2)	49.97	176.40	41.16
Alpha	1.14	Stream Power (N/m s)	347.59	54.10	262.85
Frctn Loss (m)	0.06	Cum Volume (1000 m3)	0.01	0.07	0.01
C & E Loss (m)	0.04	Cum SA (1000 m2)			

Plan: 1 RIOLO2 T1 RS: 160 Profile: QR200

E.G. Elev (m)	267.32	Element	Left OB	Channel	Right OB
Vel Head (m)	0.23	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	267.09	Reach Len. (m)	20.02	20.02	20.02
Crit W.S. (m)	266.45	Flow Area (m2)	2.77	12.18	2.06
E.G. Slope (m/m)	0.006571	Area (m2)	2.77	12.18	2.06
Q Total (m3/s)	32.25	Flow (m3/s)	2.51	27.51	2.23
Top Width (m)	11.77	Top Width (m)	4.32	5.70	1.75
Vel Total (m/s)	1.90	Avg. Vel. (m/s)	0.91	2.26	1.08
Max Chl Dpth (m)	2.45	Hydr. Depth (m)	0.64	2.14	1.18
Conv. Total (m3/s)	397.8	Conv. (m3/s)	31.0	339.4	27.5
Length Wtd. (m)	20.02	Wetted Per. (m)	5.03	7.41	2.87
Min Ch El (m)	264.64	Shear (N/m2)	35.43	105.97	46.22
Alpha	1.25	Stream Power (N/m s)	563.52	198.69	490.75
Frctn Loss (m)	0.20	Cum Volume (1000 m3)	2.59	7.87	2.36
C & E Loss (m)	0.02	Cum SA (1000 m2)	3.32	3.11	2.92

Plan: 1 RIOLO2 T1 RS: 150 Profile: QR200

E.G. Elev (m)	267.10	Element	Left OB	Channel	Right OB
Vel Head (m)	0.41	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	266.69	Reach Len. (m)	26.12	26.12	26.12
Crit W.S. (m)	266.58	Flow Area (m2)	2.91	8.67	1.25
E.G. Slope (m/m)	0.016910	Area (m2)	2.91	8.67	1.25
Q Total (m3/s)	32.25	Flow (m3/s)	4.00	26.58	1.67
Top Width (m)	11.43	Top Width (m)	5.13	4.50	1.80
Vel Total (m/s)	2.51	Avg. Vel. (m/s)	1.37	3.07	1.34
Max Chl Dpth (m)	2.49	Hydr. Depth (m)	0.57	1.93	0.69
Conv. Total (m3/s)	248.0	Conv. (m3/s)	30.8	204.4	12.8
Length Wtd. (m)	26.12	Wetted Per. (m)	5.77	6.78	2.57
Min Ch El (m)	264.20	Shear (N/m2)	83.74	212.19	80.35
Alpha	1.28	Stream Power (N/m s)	547.24	241.30	464.41
Frctn Loss (m)	0.27	Cum Volume (1000 m3)	2.54	7.66	2.33
C & E Loss (m)	0.06	Cum SA (1000 m2)	3.23	3.01	2.89

Plan: 1 RIOLO2 T1 RS: 140 Profile: QR200

E.G. Elev (m)	266.77	Element	Left OB	Channel	Right OB
Vel Head (m)	0.22	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	266.55	Reach Len. (m)	13.10	13.10	13.10
Crit W.S. (m)	266.08	Flow Area (m2)	4.22	10.68	2.73
E.G. Slope (m/m)	0.007102	Area (m2)	4.22	10.68	2.73
Q Total (m3/s)	32.25	Flow (m3/s)	4.36	24.63	3.26
Top Width (m)	12.87	Top Width (m)	5.95	4.80	2.12
Vel Total (m/s)	1.83	Avg. Vel. (m/s)	1.03	2.31	1.20
Max Chl Dpth (m)	2.79	Hydr. Depth (m)	0.71	2.22	1.29
Conv. Total (m3/s)	382.7	Conv. (m3/s)	51.7	292.3	38.7
Length Wtd. (m)	13.10	Wetted Per. (m)	6.69	6.67	3.48
Min Ch El (m)	263.76	Shear (N/m2)	43.93	111.53	54.67

Plan: 1 RIOLO2 T1 RS: 140 Profile: QR200 (Continued)

Alpha	1.30	Stream Power (N/m s)	616.18	280.57	517.08
Frctn Loss (m)	0.15	Cum Volume (1000 m3)	2.44	7.41	2.28
C & E Loss (m)	0.04	Cum SA (1000 m2)	3.08	2.88	2.83

Plan: 1 RIOLO2 T1 RS: 130 Profile: QR200

E.G. Elev (m)	266.57	Element	Left OB	Channel	Right OB
Vel Head (m)	0.64	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	265.94	Reach Len. (m)	9.30	9.30	9.30
Crit W.S. (m)	265.94	Flow Area (m2)	1.15	7.69	1.26
E.G. Slope (m/m)	0.022984	Area (m2)	1.15	7.69	1.26
Q Total (m3/s)	32.25	Flow (m3/s)	1.73	28.53	1.99
Top Width (m)	8.19	Top Width (m)	1.98	4.20	2.01
Vel Total (m/s)	3.19	Avg. Vel. (m/s)	1.51	3.71	1.57
Max Chl Dpth (m)	2.20	Hydr. Depth (m)	0.58	1.83	0.63
Conv. Total (m3/s)	212.7	Conv. (m3/s)	11.4	188.2	13.1
Length Wtd. (m)	9.30	Wetted Per. (m)	2.48	5.67	2.58
Min Ch EI (m)	263.74	Shear (N/m2)	104.01	305.38	110.51
Alpha	1.22	Stream Power (N/m s)	392.12	93.83	296.84
Frctn Loss (m)	0.19	Cum Volume (1000 m3)	2.41	7.29	2.25
C & E Loss (m)	0.09	Cum SA (1000 m2)	3.03	2.83	2.81

Plan: 1 RIOLO2 T1 RS: 120 Profile: QR200

E.G. Elev (m)	266.09	Element	Left OB	Channel	Right OB
Vel Head (m)	0.34	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	265.75	Reach Len. (m)	15.25	15.25	15.25
Crit W.S. (m)	265.75	Flow Area (m2)	6.73	6.84	1.48
E.G. Slope (m/m)	0.017706	Area (m2)	6.73	6.84	1.48
Q Total (m3/s)	32.25	Flow (m3/s)	9.21	20.85	2.19
Top Width (m)	18.99	Top Width (m)	13.42	3.69	1.88
Vel Total (m/s)	2.14	Avg. Vel. (m/s)	1.37	3.05	1.48
Max Chl Dpth (m)	2.24	Hydr. Depth (m)	0.50	1.85	0.79
Conv. Total (m3/s)	242.4	Conv. (m3/s)	69.2	156.7	16.4
Length Wtd. (m)	15.25	Wetted Per. (m)	13.89	5.57	2.73
Min Ch EI (m)	263.51	Shear (N/m2)	84.12	213.08	94.32
Alpha	1.46	Stream Power (N/m s)	909.20	638.22	823.49
Frctn Loss (m)	0.22	Cum Volume (1000 m3)	2.37	7.22	2.24
C & E Loss (m)	0.03	Cum SA (1000 m2)	2.96	2.79	2.79

Plan: 1 RIOLO2 T1 RS: 110 Profile: QR200

E.G. Elev (m)	265.36	Element	Left OB	Channel	Right OB
Vel Head (m)	0.23	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	265.13	Reach Len. (m)	15.12	15.12	15.12
Crit W.S. (m)	265.13	Flow Area (m2)	2.35	9.04	8.50
E.G. Slope (m/m)	0.012397	Area (m2)	2.35	9.04	8.50
Q Total (m3/s)	32.25	Flow (m3/s)	1.82	22.55	7.88
Top Width (m)	38.99	Top Width (m)	8.60	6.75	23.64
Vel Total (m/s)	1.62	Avg. Vel. (m/s)	0.77	2.49	0.93
Max Chl Dpth (m)	1.79	Hydr. Depth (m)	0.27	1.34	0.36
Conv. Total (m3/s)	289.6	Conv. (m3/s)	16.3	202.6	70.8
Length Wtd. (m)	15.12	Wetted Per. (m)	8.75	7.62	24.05
Min Ch EI (m)	263.34	Shear (N/m2)	32.67	144.17	42.95
Alpha	1.75	Stream Power (N/m s)	1995.08	531.92	875.21
Frctn Loss (m)	0.13	Cum Volume (1000 m3)	2.30	7.10	2.16
C & E Loss (m)	0.03	Cum SA (1000 m2)	2.79	2.71	2.59

Plan: 1 RIOLO2 T1 RS: 100 Profile: QR200

E.G. Elev (m)	265.01	Element	Left OB	Channel	Right OB
Vel Head (m)	0.12	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	264.88	Reach Len. (m)	15.12	15.12	15.12
Crit W.S. (m)	264.68	Flow Area (m2)	2.84	9.65	12.79
E.G. Slope (m/m)	0.006173	Area (m2)	2.84	9.65	12.79
Q Total (m3/s)	32.25	Flow (m3/s)	1.91	18.26	12.08
Top Width (m)	34.14	Top Width (m)	7.59	6.39	20.16
Vel Total (m/s)	1.28	Avg. Vel. (m/s)	0.67	1.89	0.94
Max Chl Dpth (m)	1.92	Hydr. Depth (m)	0.37	1.51	0.63
Conv. Total (m3/s)	410.5	Conv. (m3/s)	24.3	232.4	153.8
Length Wtd. (m)	15.12	Wetted Per. (m)	7.71	7.31	20.88
Min Ch El (m)	262.96	Shear (N/m2)	22.30	79.96	37.08
Alpha	1.47	Stream Power (N/m s)	2391.98	1114.12	1426.76
Frctn Loss (m)	0.06	Cum Volume (1000 m3)	2.26	6.96	2.00
C & E Loss (m)	0.02	Cum SA (1000 m2)	2.67	2.61	2.26

Plan: 1 RIOLO2 T1 RS: 90 Profile: QR200

E.G. Elev (m)	264.93	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	264.87	Reach Len. (m)	23.02	23.02	23.02
Crit W.S. (m)	264.42	Flow Area (m2)	5.07	10.84	19.23
E.G. Slope (m/m)	0.002691	Area (m2)	5.07	10.84	19.23
Q Total (m3/s)	32.25	Flow (m3/s)	3.08	14.43	14.74
Top Width (m)	36.75	Top Width (m)	8.23	6.61	21.91
Vel Total (m/s)	0.92	Avg. Vel. (m/s)	0.61	1.33	0.77
Max Chl Dpth (m)	2.07	Hydr. Depth (m)	0.62	1.64	0.88
Conv. Total (m3/s)	621.7	Conv. (m3/s)	59.4	278.2	284.0
Length Wtd. (m)	23.02	Wetted Per. (m)	8.59	7.45	23.05
Min Ch El (m)	262.80	Shear (N/m2)	15.56	38.39	22.02
Alpha	1.30	Stream Power (N/m s)	1759.51	383.51	716.73
Frctn Loss (m)	0.11	Cum Volume (1000 m3)	2.20	6.80	1.76
C & E Loss (m)	0.02	Cum SA (1000 m2)	2.55	2.51	1.95

Plan: 1 RIOLO2 T1 RS: 80 Profile: QR200

E.G. Elev (m)	264.79	Element	Left OB	Channel	Right OB
Vel Head (m)	0.29	Wt. n-Val.	0.060	0.050	
W.S. Elev (m)	264.50	Reach Len. (m)	16.07	16.07	16.07
Crit W.S. (m)	264.29	Flow Area (m2)	3.16	11.55	
E.G. Slope (m/m)	0.011495	Area (m2)	3.16	11.55	
Q Total (m3/s)	32.25	Flow (m3/s)	3.45	28.80	
Top Width (m)	13.81	Top Width (m)	5.73	8.08	
Vel Total (m/s)	2.19	Avg. Vel. (m/s)	1.09	2.49	
Max Chl Dpth (m)	2.08	Hydr. Depth (m)	0.55	1.43	
Conv. Total (m3/s)	300.8	Conv. (m3/s)	32.2	268.6	
Length Wtd. (m)	16.07	Wetted Per. (m)	6.60	9.22	
Min Ch El (m)	262.42	Shear (N/m2)	53.92	141.29	
Alpha	1.18	Stream Power (N/m s)	1452.62	266.19	683.69
Frctn Loss (m)	0.20	Cum Volume (1000 m3)	2.11	6.54	1.54
C & E Loss (m)	0.01	Cum SA (1000 m2)	2.39	2.34	1.69

Plan: 1 RIOLO2 T1 RS: 70 Profile: QR200

E.G. Elev (m)	264.59	Element	Left OB	Channel	Right OB
Vel Head (m)	0.35	Wt. n-Val.	0.060	0.050	
W.S. Elev (m)	264.23	Reach Len. (m)	29.54	29.54	29.54
Crit W.S. (m)	264.02	Flow Area (m2)	1.34	11.55	
E.G. Slope (m/m)	0.013376	Area (m2)	1.34	11.55	
Q Total (m3/s)	32.25	Flow (m3/s)	1.27	30.98	

Plan: 1 RIOLO2 T1 RS: 70 Profile: QR200 (Continued)

Top Width (m)	11.52	Top Width (m)	3.41	8.11	
Vel Total (m/s)	2.50	Avg. Vel. (m/s)	0.95	2.68	
Max Chl Dpth (m)	2.08	Hydr. Depth (m)	0.39	1.42	
Conv. Total (m3/s)	278.9	Conv. (m3/s)	11.0	267.8	
Length Wtd. (m)	29.54	Wetted Per. (m)	3.85	9.26	
Min Ch El (m)	262.15	Shear (N/m2)	45.55	163.69	
Alpha	1.11	Stream Power (N/m s)	709.07	158.95	572.62
Frctn Loss (m)	0.34	Cum Volume (1000 m3)	2.07	6.36	1.54
C & E Loss (m)	0.04	Cum SA (1000 m2)	2.32	2.21	1.69

Plan: 1 RIOLO2 T1 RS: 60 Profile: QR200

E.G. Elev (m)	264.21	Element	Left OB	Channel	Right OB
Vel Head (m)	0.23	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	263.98	Reach Len. (m)	114.48	114.48	114.48
Crit W.S. (m)	263.75	Flow Area (m2)	4.25	10.12	3.86
E.G. Slope (m/m)	0.010058	Area (m2)	4.25	10.12	3.86
Q Total (m3/s)	32.25	Flow (m3/s)	3.58	24.25	4.41
Top Width (m)	22.78	Top Width (m)	11.30	6.00	5.48
Vel Total (m/s)	1.77	Avg. Vel. (m/s)	0.84	2.40	1.14
Max Chl Dpth (m)	2.30	Hydr. Depth (m)	0.38	1.69	0.70
Conv. Total (m3/s)	321.6	Conv. (m3/s)	35.7	241.8	44.0
Length Wtd. (m)	114.48	Wetted Per. (m)	11.89	7.74	6.84
Min Ch El (m)	261.68	Shear (N/m2)	35.28	128.87	55.73
Alpha	1.46	Stream Power (N/m s)	1090.67	535.76	832.12
Frctn Loss (m)	1.78	Cum Volume (1000 m3)	1.99	6.04	1.48
C & E Loss (m)	0.04	Cum SA (1000 m2)	2.10	2.00	1.61

Plan: 1 RIOLO2 T1 RS: 50 Profile: QR200

E.G. Elev (m)	262.39	Element	Left OB	Channel	Right OB
Vel Head (m)	0.58	Wt. n-Val.		0.050	
W.S. Elev (m)	261.81	Reach Len. (m)	54.64	54.64	54.64
Crit W.S. (m)	261.81	Flow Area (m2)		9.53	
E.G. Slope (m/m)	0.027183	Area (m2)		9.53	
Q Total (m3/s)	32.25	Flow (m3/s)		32.25	
Top Width (m)	8.10	Top Width (m)		8.10	
Vel Total (m/s)	3.39	Avg. Vel. (m/s)		3.39	
Max Chl Dpth (m)	1.80	Hydr. Depth (m)		1.18	
Conv. Total (m3/s)	195.6	Conv. (m3/s)		195.6	
Length Wtd. (m)	54.64	Wetted Per. (m)		9.16	
Min Ch El (m)	260.01	Shear (N/m2)		277.35	
Alpha	1.00	Stream Power (N/m s)	1786.32	664.06	1092.10
Frctn Loss (m)	0.48	Cum Volume (1000 m3)	1.75	4.91	1.26
C & E Loss (m)	0.15	Cum SA (1000 m2)	1.45	1.20	1.30

Plan: 1 RIOLO2 T1 RS: 40 Profile: QR200

E.G. Elev (m)	261.36	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	261.29	Reach Len. (m)	58.53	58.53	58.53
Crit W.S. (m)	261.03	Flow Area (m2)	11.85	11.60	7.54
E.G. Slope (m/m)	0.004330	Area (m2)	11.85	11.60	7.54
Q Total (m3/s)	32.25	Flow (m3/s)	9.85	17.06	5.34
Top Width (m)	38.75	Top Width (m)	16.60	8.58	13.57
Vel Total (m/s)	1.04	Avg. Vel. (m/s)	0.83	1.47	0.71
Max Chl Dpth (m)	2.07	Hydr. Depth (m)	0.71	1.35	0.56
Conv. Total (m3/s)	490.1	Conv. (m3/s)	149.6	259.2	81.2
Length Wtd. (m)	58.53	Wetted Per. (m)	17.97	9.81	14.50
Min Ch El (m)	259.22	Shear (N/m2)	28.00	50.19	22.08



Plan: 1 RIOLO2 T1 RS: 40 Profile: QR200 (Continued)

Alpha	1.33	Stream Power (N/m s)	1855.27	788.08	1212.27
Frctn Loss (m)	0.15	Cum Volume (1000 m3)	1.42	4.34	1.05
C & E Loss (m)	0.01	Cum SA (1000 m2)	1.00	0.74	0.93

Plan: 1 RIOLO2 T1 RS: 30 Profile: QR200

E.G. Elev (m)	261.21	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	261.16	Reach Len. (m)	13.00	13.00	13.00
Crit W.S. (m)	260.18	Flow Area (m2)	11.38	18.30	8.79
E.G. Slope (m/m)	0.001603	Area (m2)	11.38	18.30	8.79
Q Total (m3/s)	32.25	Flow (m3/s)	6.86	20.78	4.62
Top Width (m)	32.61	Top Width (m)	11.67	9.43	11.51
Vel Total (m/s)	0.84	Avg. Vel. (m/s)	0.60	1.14	0.53
Max Chl Dpth (m)	2.79	Hydr. Depth (m)	0.98	1.94	0.76
Conv. Total (m3/s)	805.5	Conv. (m3/s)	171.2	518.9	115.3
Length Wtd. (m)	13.00	Wetted Per. (m)	13.26	10.84	12.57
Min Ch El (m)	258.37	Shear (N/m2)	13.49	26.54	10.99
Alpha	1.35	Stream Power (N/m s)	1561.30	551.55	1017.89
Frctn Loss (m)	0.03	Cum Volume (1000 m3)	0.74	3.46	0.58
C & E Loss (m)	0.00	Cum SA (1000 m2)	0.17	0.21	0.19

Plan: 1 RIOLO2 T1 RS: 20 Profile: QR200

E.G. Elev (m)	261.18	Element	Left OB	Channel	Right OB
Vel Head (m)	0.10	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	261.08	Reach Len. (m)	12.40	12.40	12.40
Crit W.S. (m)	260.03	Flow Area (m2)	2.22	18.88	5.28
E.G. Slope (m/m)	0.002508	Area (m2)	2.22	18.88	5.28
Q Total (m3/s)	32.25	Flow (m3/s)	1.16	27.73	3.37
Top Width (m)	19.84	Top Width (m)	3.66	9.26	6.92
Vel Total (m/s)	1.22	Avg. Vel. (m/s)	0.52	1.47	0.64
Max Chl Dpth (m)	2.86	Hydr. Depth (m)	0.61	2.04	0.76
Conv. Total (m3/s)	644.0	Conv. (m3/s)	23.1	553.7	67.3
Length Wtd. (m)	12.40	Wetted Per. (m)	4.50	10.63	7.91
Min Ch El (m)	258.22	Shear (N/m2)	12.13	43.67	16.42
Alpha	1.28	Stream Power (N/m s)	949.90	171.40	621.93
Frctn Loss (m)		Cum Volume (1000 m3)	0.66	3.22	0.48
C & E Loss (m)		Cum SA (1000 m2)	0.07	0.09	0.07

Plan: 1 RIOLO2 T1 RS: 10 Profile: QR200

E.G. Elev (m)	260.71	Element	Left OB	Channel	Right OB
Vel Head (m)	0.33	Wt. n-Val.	0.060	0.050	0.060
W.S. Elev (m)	260.38	Reach Len. (m)			
Crit W.S. (m)	260.22	Flow Area (m2)	4.80	8.69	1.66
E.G. Slope (m/m)	0.015002	Area (m2)	4.80	8.69	1.66
Q Total (m3/s)	32.25	Flow (m3/s)	6.16	24.55	1.55
Top Width (m)	18.61	Top Width (m)	8.02	5.58	5.01
Vel Total (m/s)	2.13	Avg. Vel. (m/s)	1.28	2.82	0.93
Max Chl Dpth (m)	2.23	Hydr. Depth (m)	0.60	1.56	0.33
Conv. Total (m3/s)	263.3	Conv. (m3/s)	50.3	200.4	12.6
Length Wtd. (m)		Wetted Per. (m)	9.66	7.02	5.36
Min Ch El (m)	258.15	Shear (N/m2)	73.18	182.19	45.49
Alpha	1.42	Stream Power (N/m s)	891.00	380.63	654.97
Frctn Loss (m)		Cum Volume (1000 m3)			
C & E Loss (m)		Cum SA (1000 m2)			

Plan: 1 RIOLO T1 RS: 242 Culv Group: Culvert #1 Profile: QR200

Q Culv Group (m3/s)	14.90	Culv Full Len (m)	13.50
# Barrels	1	Culv Vel US (m/s)	3.56
Q Barrel (m3/s)	14.90	Culv Vel DS (m/s)	3.56
E.G. US. (m)	269.42	Culv Inv El Up (m)	266.25
W.S. US. (m)	269.38	Culv Inv El Dn (m)	265.75
E.G. DS (m)	268.92	Culv Frctn Ls (m)	0.06
W.S. DS (m)	268.39	Culv Exit Loss (m)	0.12
Delta EG (m)	0.50	Culv Entr Loss (m)	0.32
Delta WS (m)	0.99	Q Weir (m3/s)	10.00
E.G. IC (m)	269.38	Weir Sta Lft (m)	0.00
E.G. OC (m)	269.42	Weir Sta Rgt (m)	17.01
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (m)	267.80	Weir Max Depth (m)	0.59
Culv WS Outlet (m)	267.30	Weir Avg Depth (m)	0.56
Culv Nml Depth (m)		Weir Flow Area (m2)	9.52
Culv Crt Depth (m)	1.46	Min El Weir Flow (m)	268.83

Plan: 1 RIOLO2 T1 RS: 12 Culv Group: Culvert #1 Profile: QR200

Q Culv Group (m3/s)	13.93	Culv Full Len (m)	8.00
# Barrels	1	Culv Vel US (m/s)	3.14
Q Barrel (m3/s)	13.93	Culv Vel DS (m/s)	3.14
E.G. US. (m)	261.18	Culv Inv El Up (m)	258.27
W.S. US. (m)	261.08	Culv Inv El Dn (m)	258.16
E.G. DS (m)	260.71	Culv Frctn Ls (m)	0.04
W.S. DS (m)	260.38	Culv Exit Loss (m)	0.18
Delta EG (m)	0.47	Culv Entr Loss (m)	0.25
Delta WS (m)	0.70	Q Weir (m3/s)	18.32
E.G. IC (m)	261.17	Weir Sta Lft (m)	0.00
E.G. OC (m)	261.18	Weir Sta Rgt (m)	19.84
Culvert Control	Outlet	Weir Submerg	0.04
Culv WS Inlet (m)	260.08	Weir Max Depth (m)	0.97
Culv WS Outlet (m)	259.97	Weir Avg Depth (m)	0.75
Culv Nml Depth (m)		Weir Flow Area (m2)	14.97
Culv Crt Depth (m)	1.49	Min El Weir Flow (m)	260.40