



Comune di San Giustino
Servizio lavori pubblici
Piazza Municipio n°17 06016 - San Giustino (PG)

Livello di progettazione: **Definitivo**
- I stralcio funzionale -

PROGETTO	Torrente VERTOLA Interventi di messa in sicurezza dell'abitato Zona industriale e Artigianale di San Giustino capoluogo
ELABORATO	VERIFICHE IDRAULICHE
Luglio 2015	



Idroprogetti s.r.l.
(MANDATARIA)

Società di Ingegneria
via Masaccio 60 - 50132 Firenze
Tel. 055/573274 - Fax.055/5534914
E.mail: idroprogetti@gmail.com
Progettista : Ing. Gesualdo Bavecchi

Società E.A. Group srl
(MANDANTE)

Via Galleria del Corso n°7 - Terni
tel. 0744-4066003, fax 0744-401074
P.IVA 00665020558

Arch. Monica Marcoaldi
(MANDANTE)

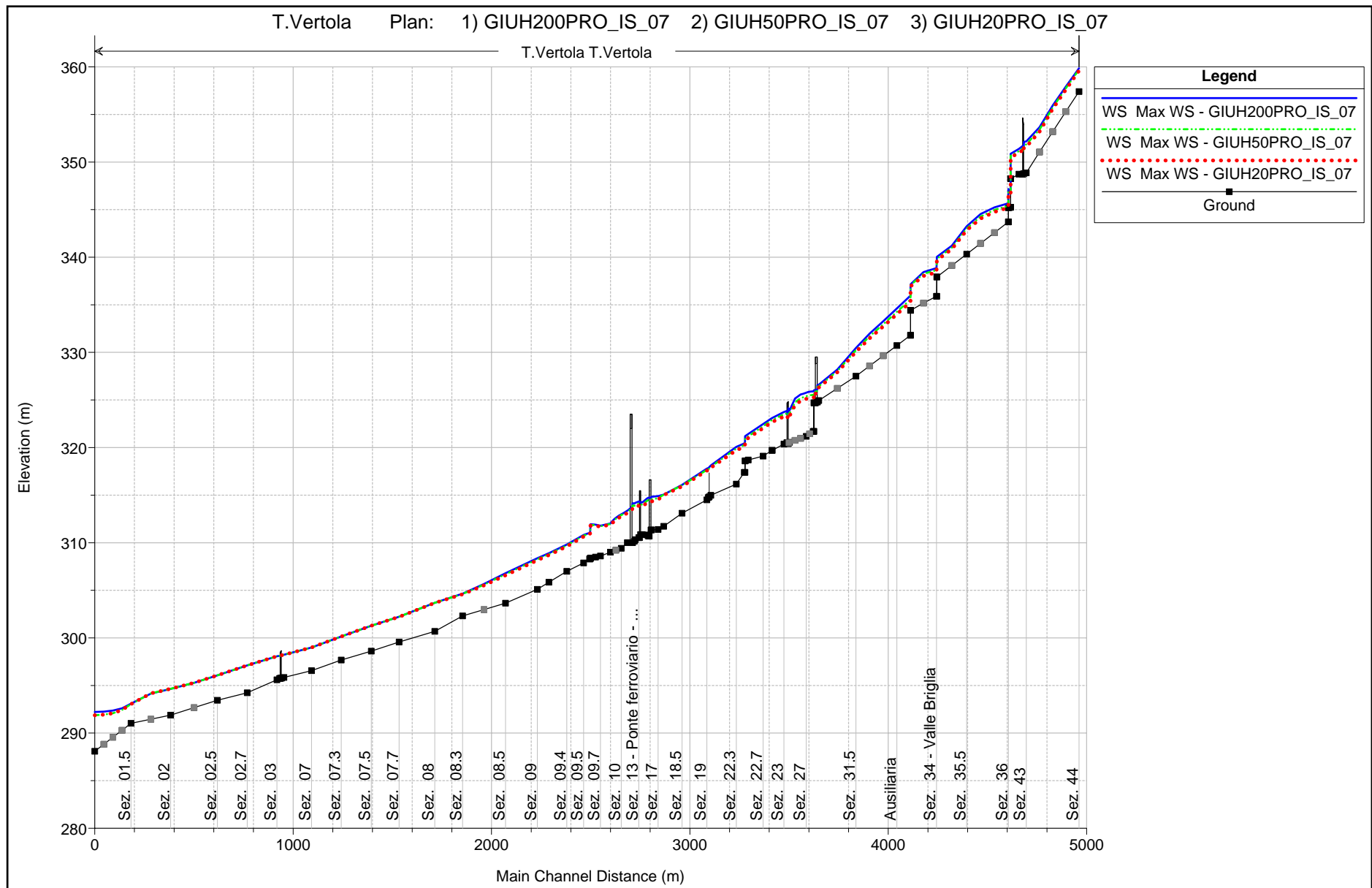
Via delle Fornaci 77/A, 58019 Porto
Santo Stefano - Monteargentario (GR),
tel. 3487937759
P.IVA 02063460568

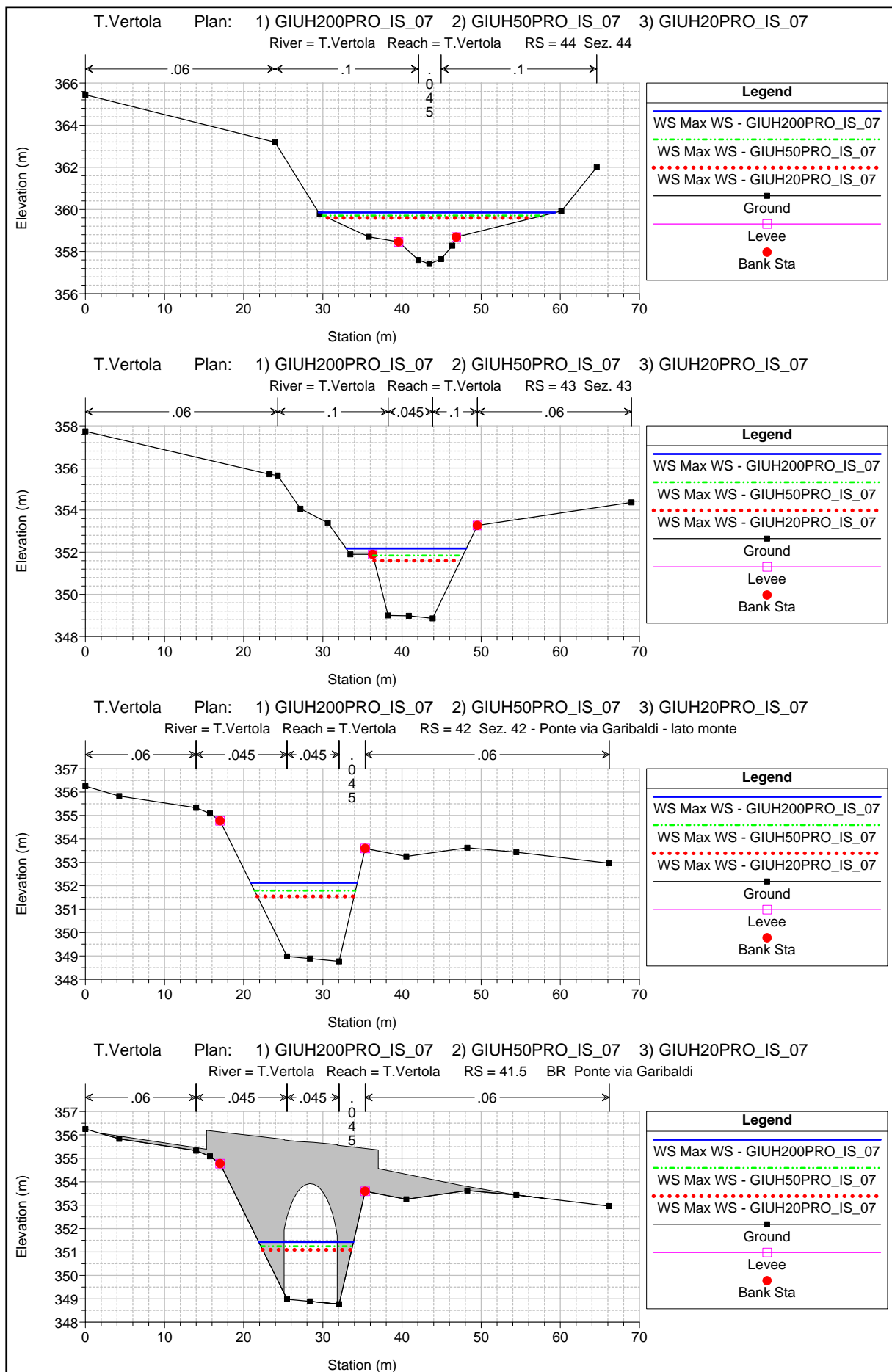
Allegato 1

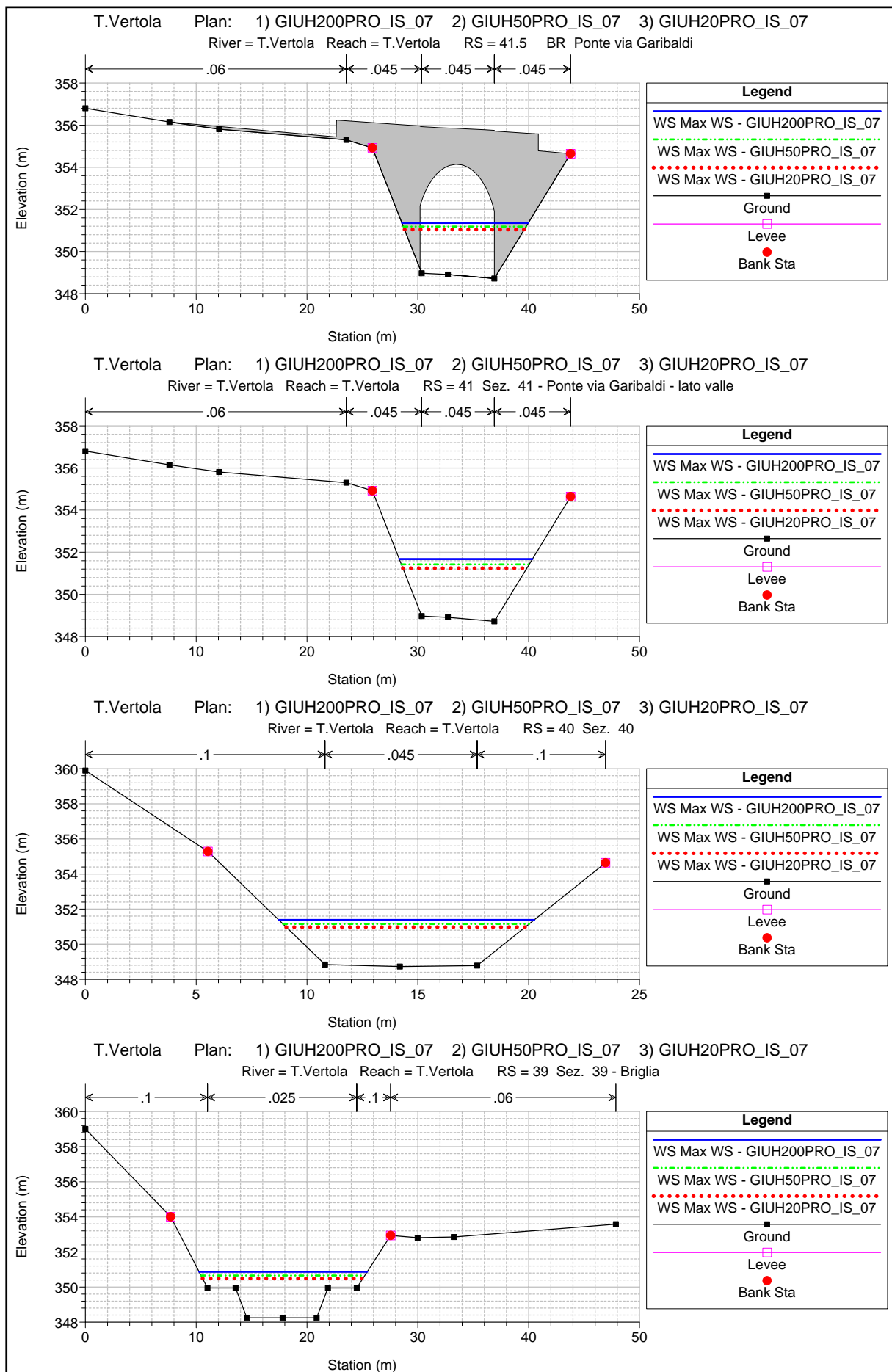
TORRENTE VERTOLA

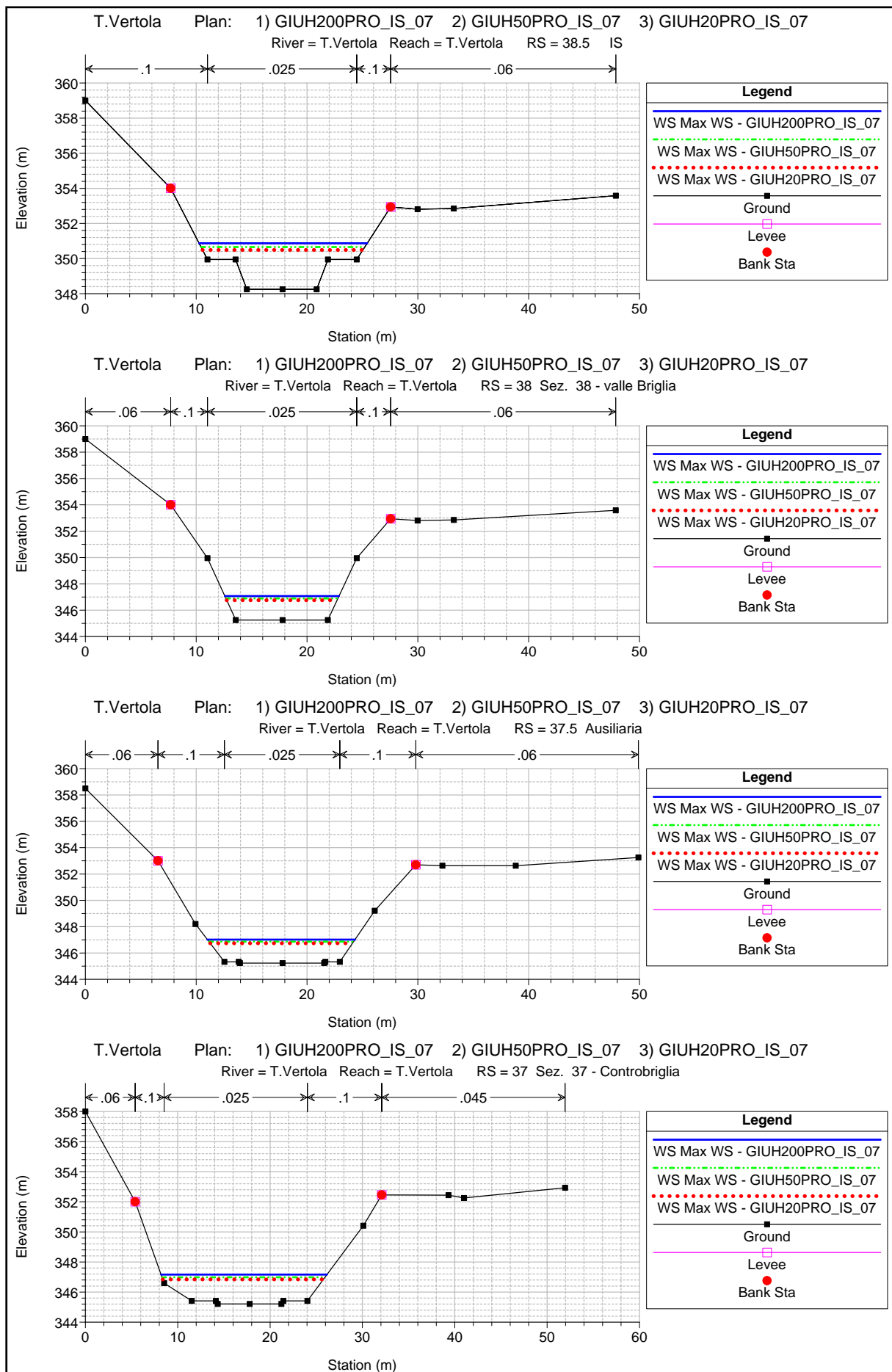
VERIFICHE IDRAULICHE STATO DI PROGETTO I STRALCIO FUNZIONALE

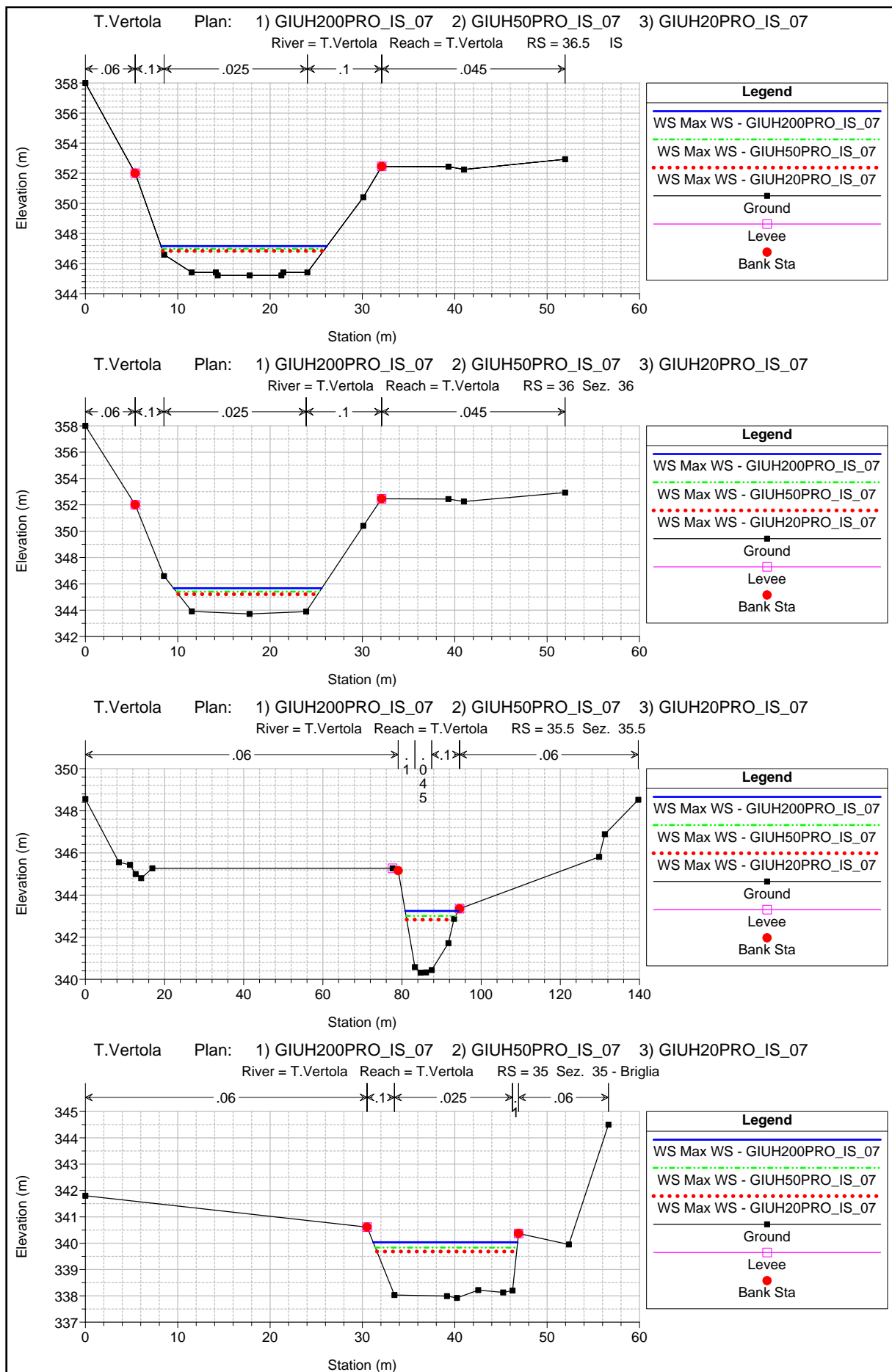
Tr 200, 50 e 20 anni

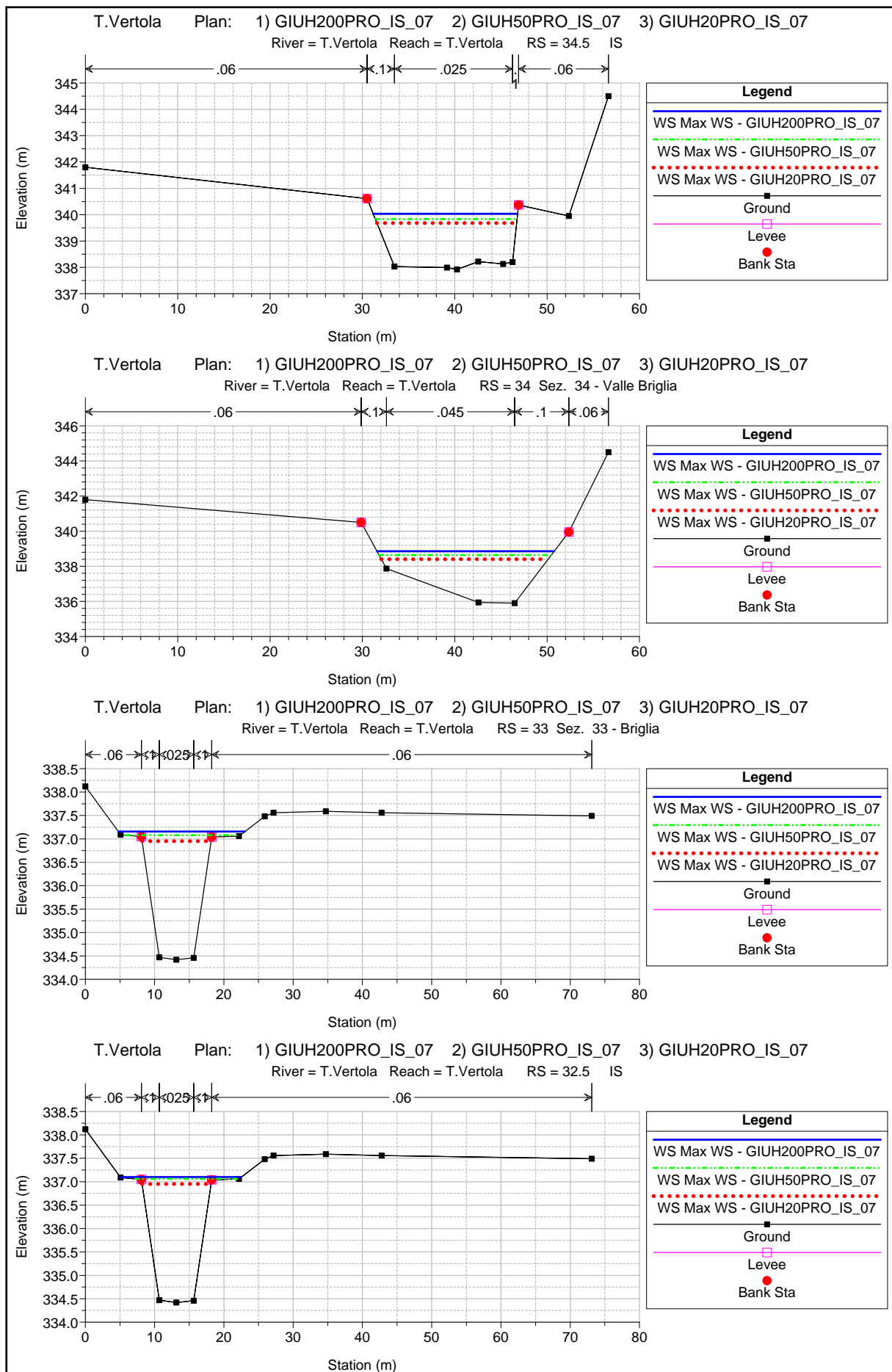


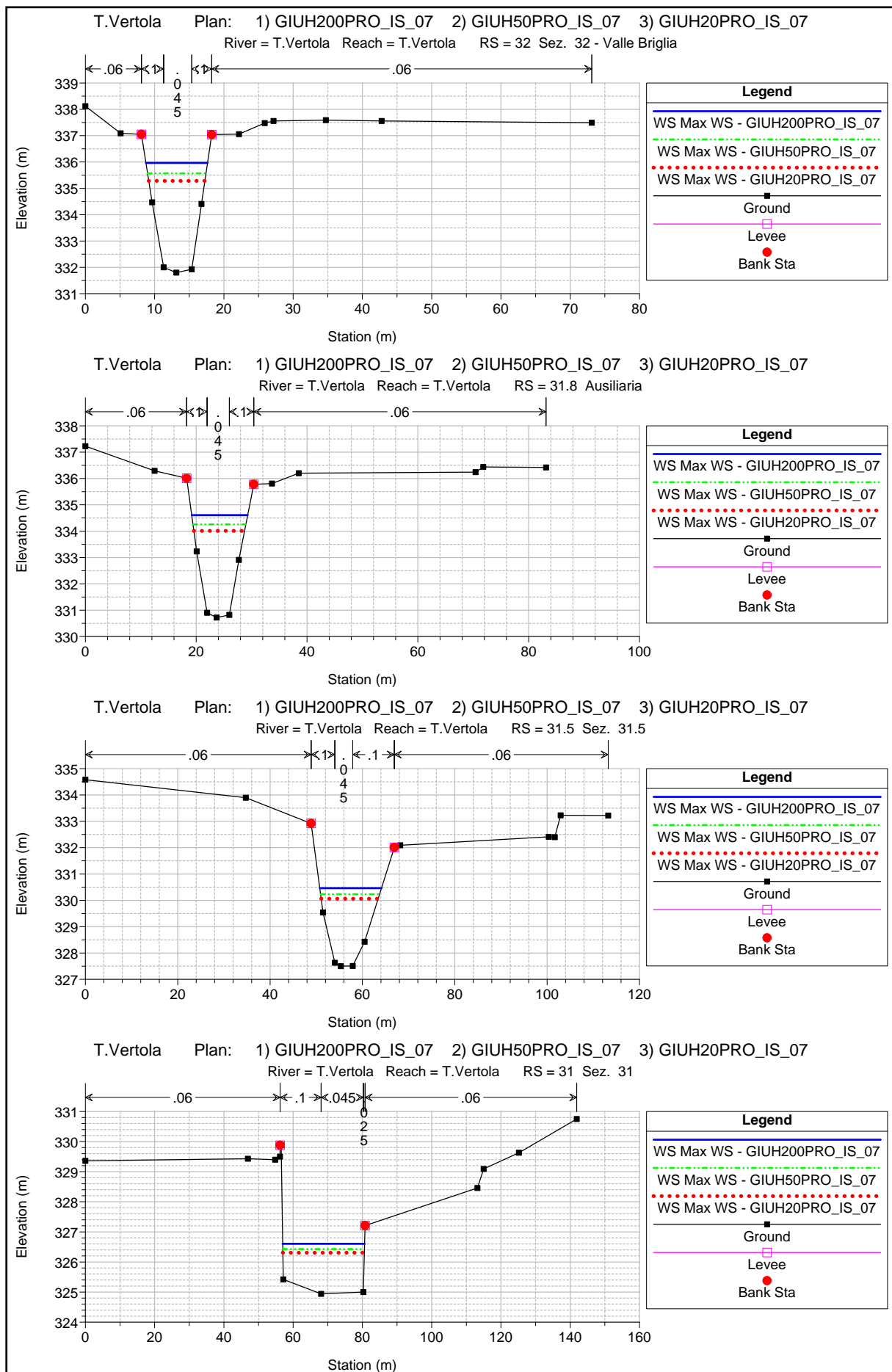


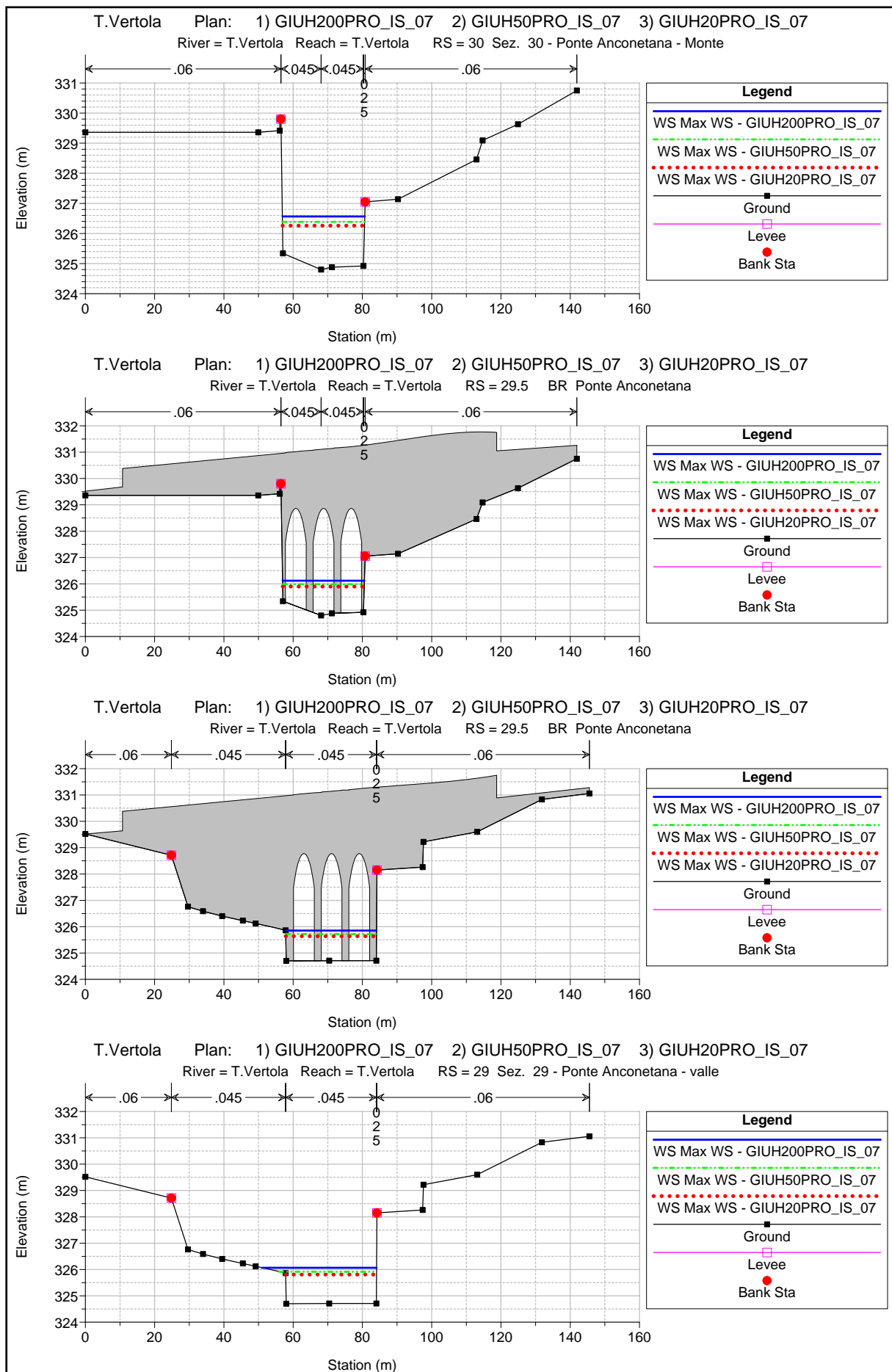


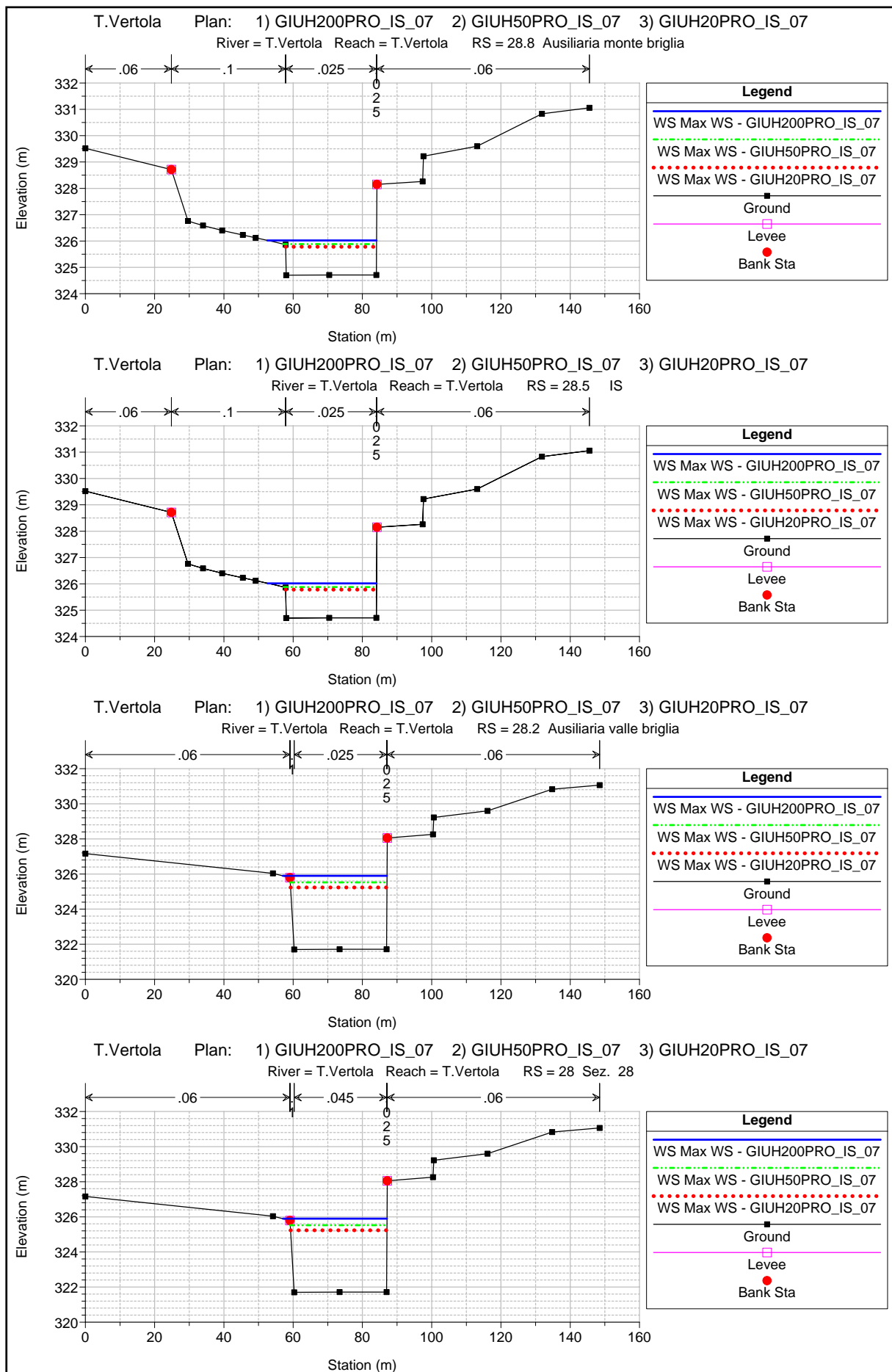


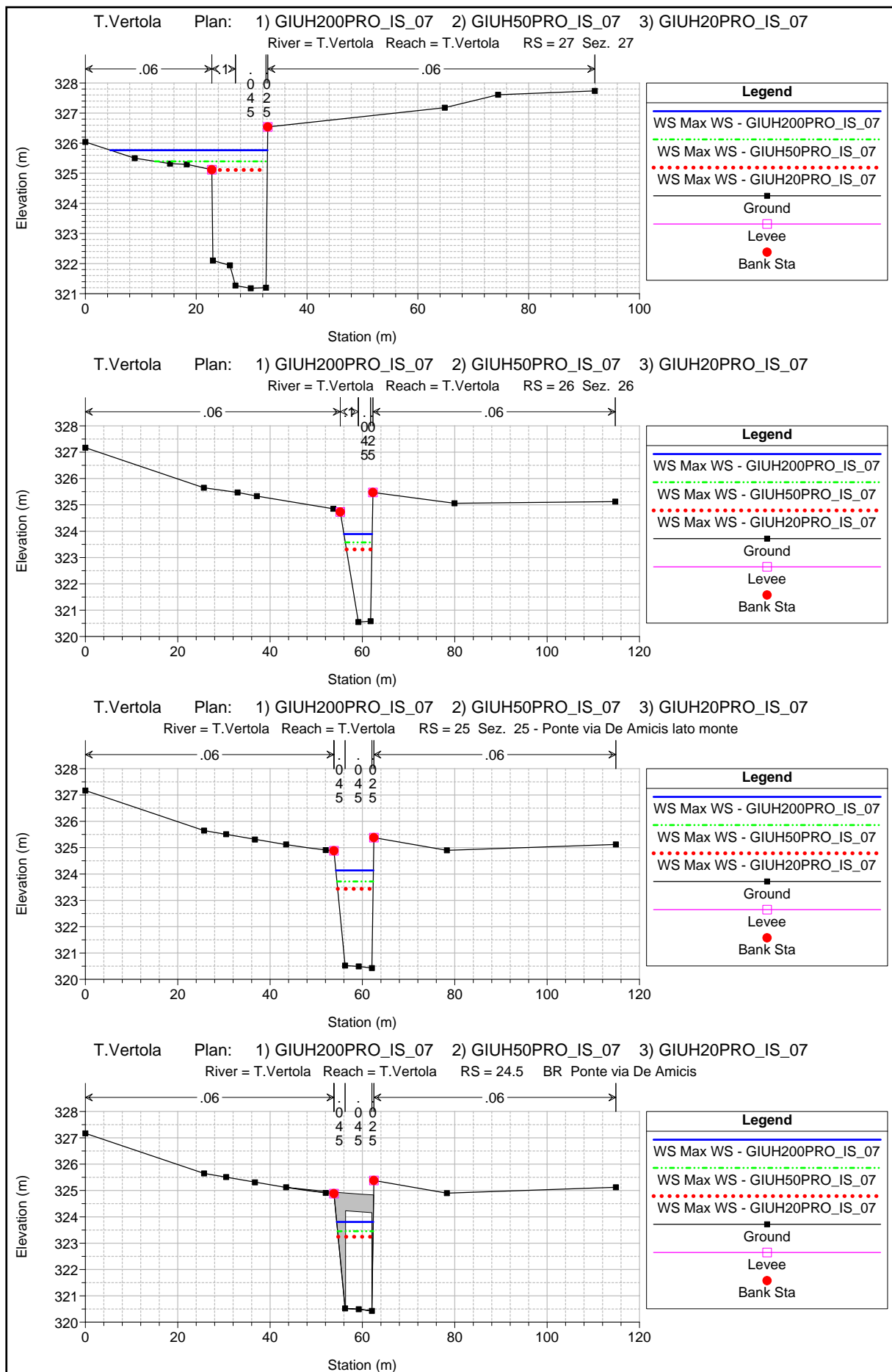


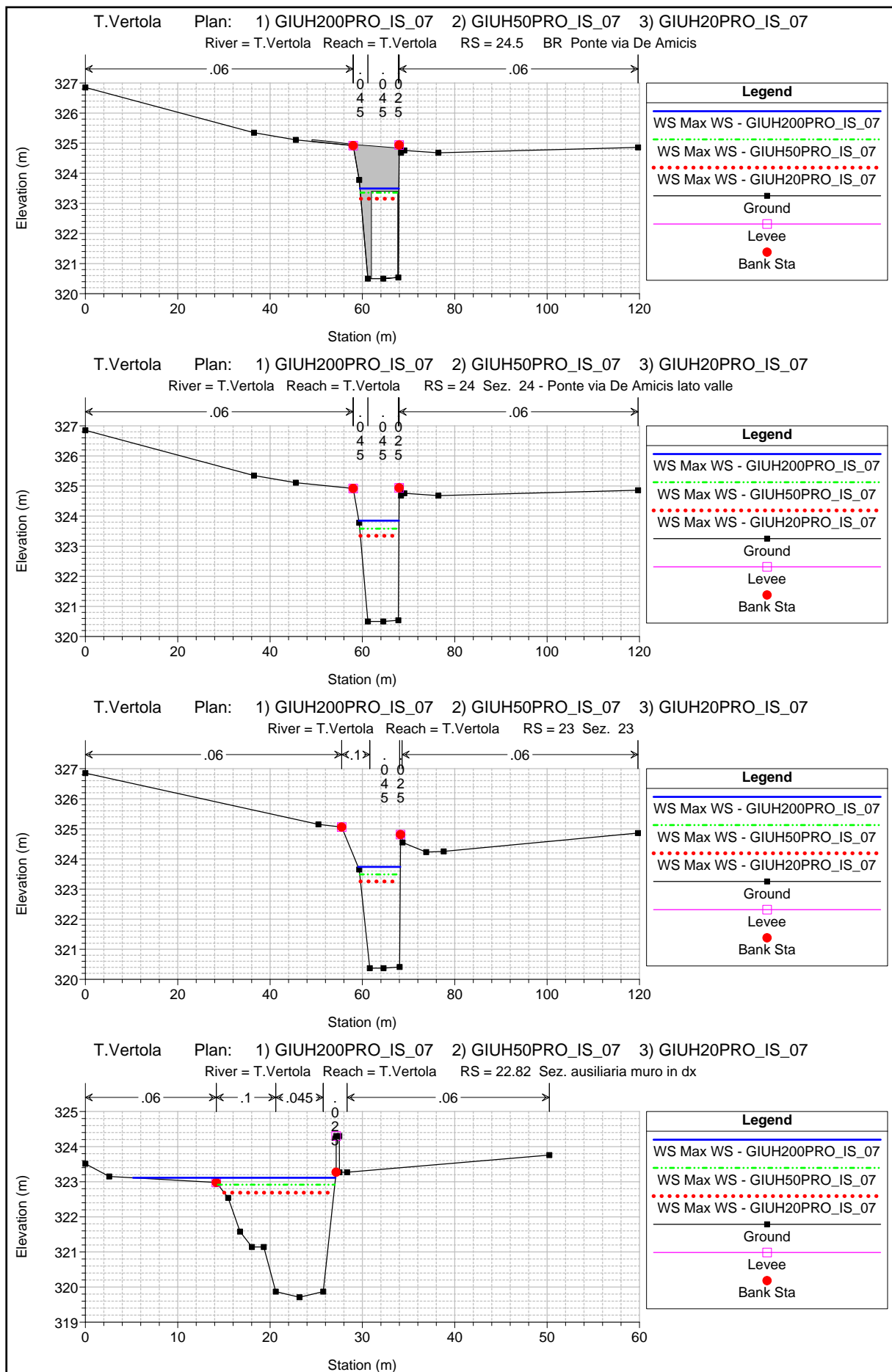


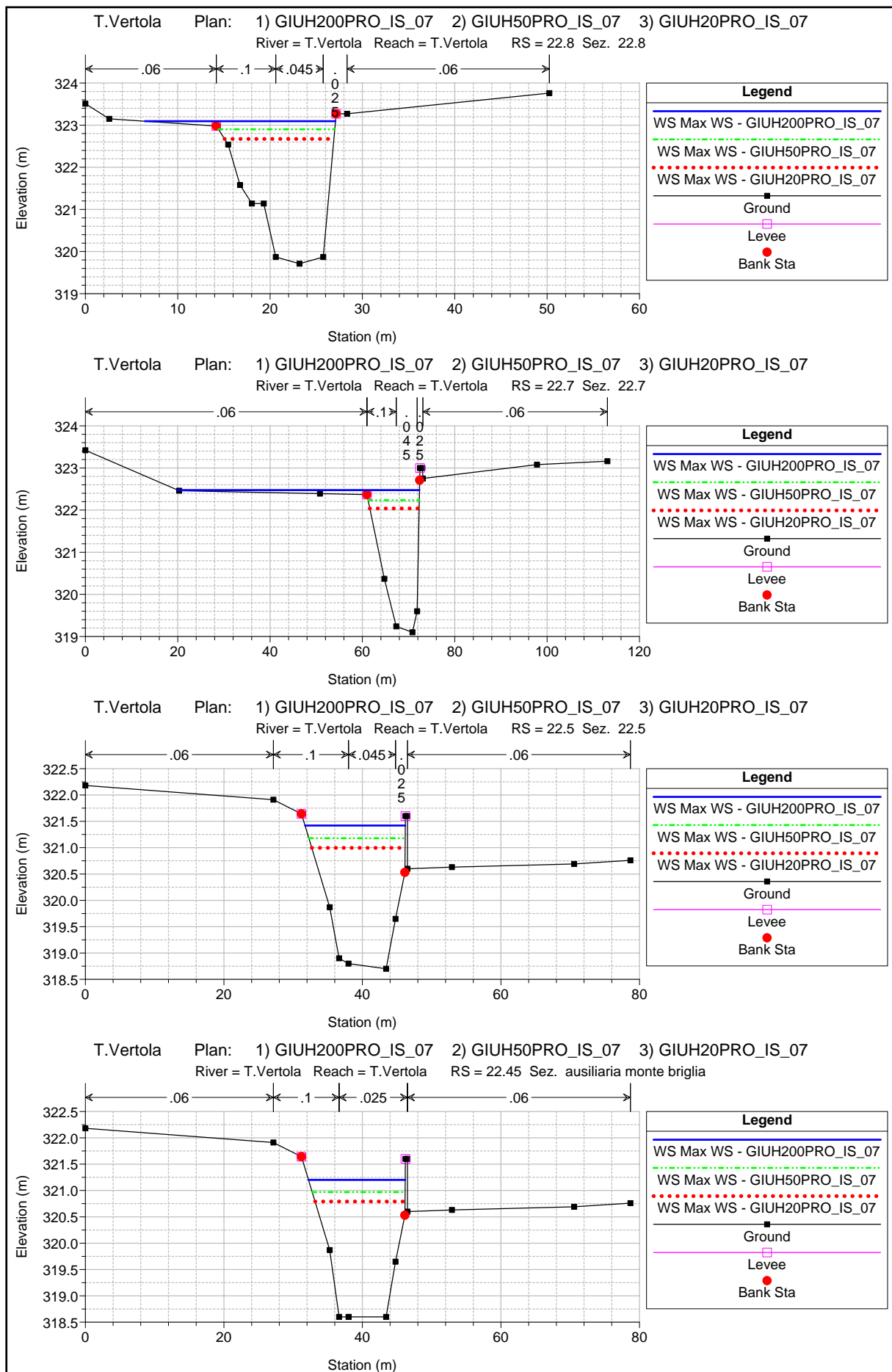


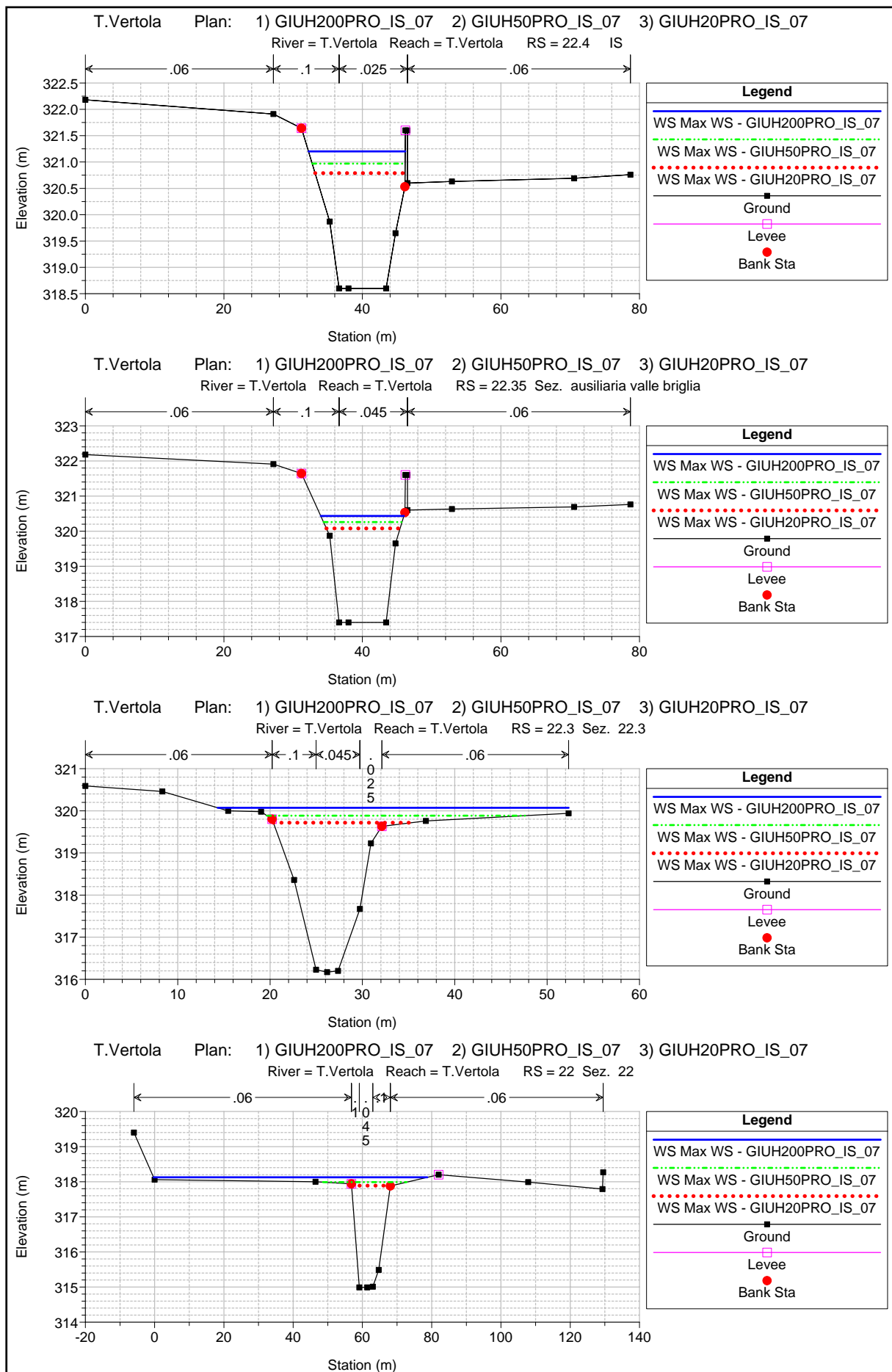


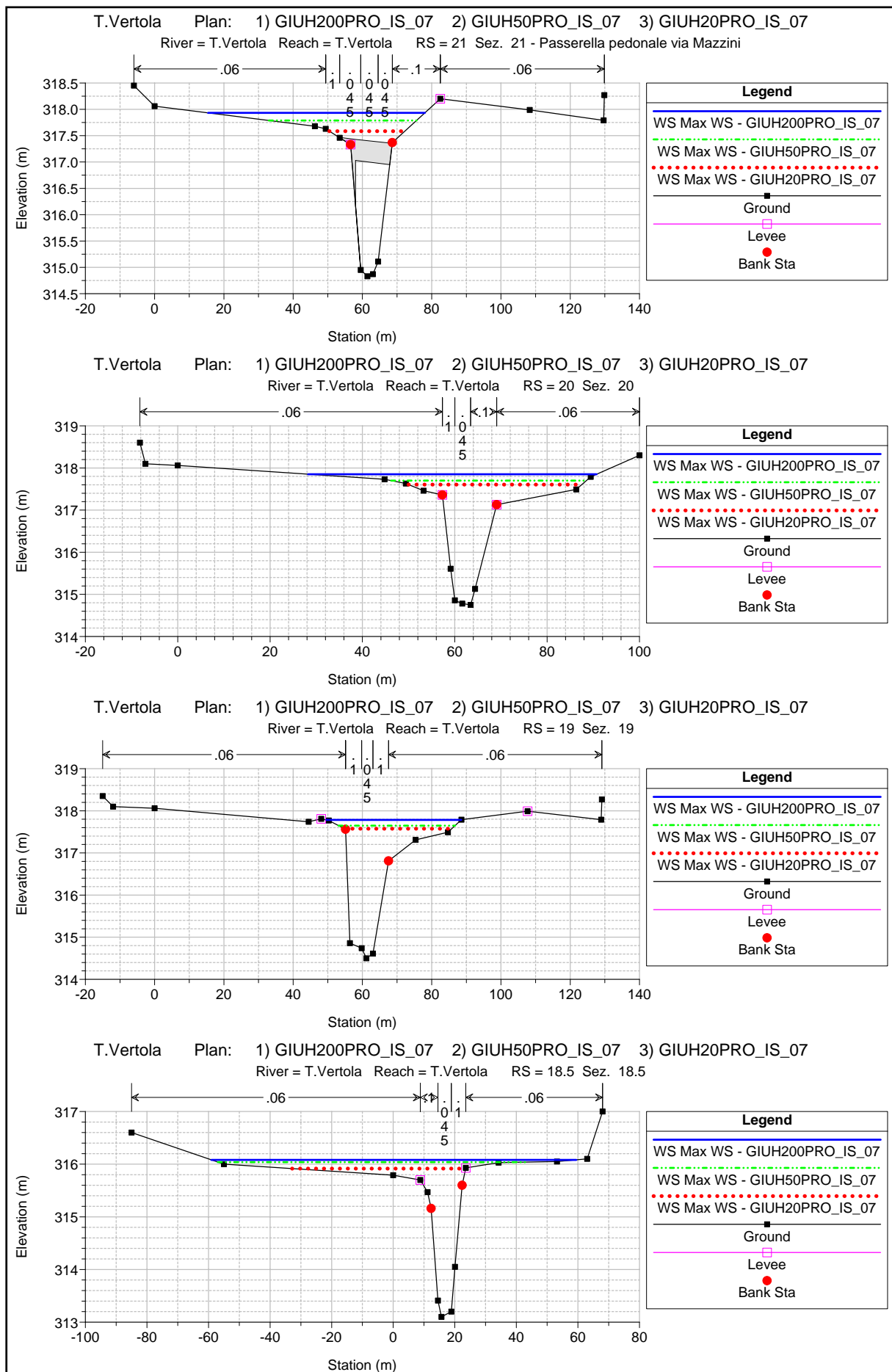


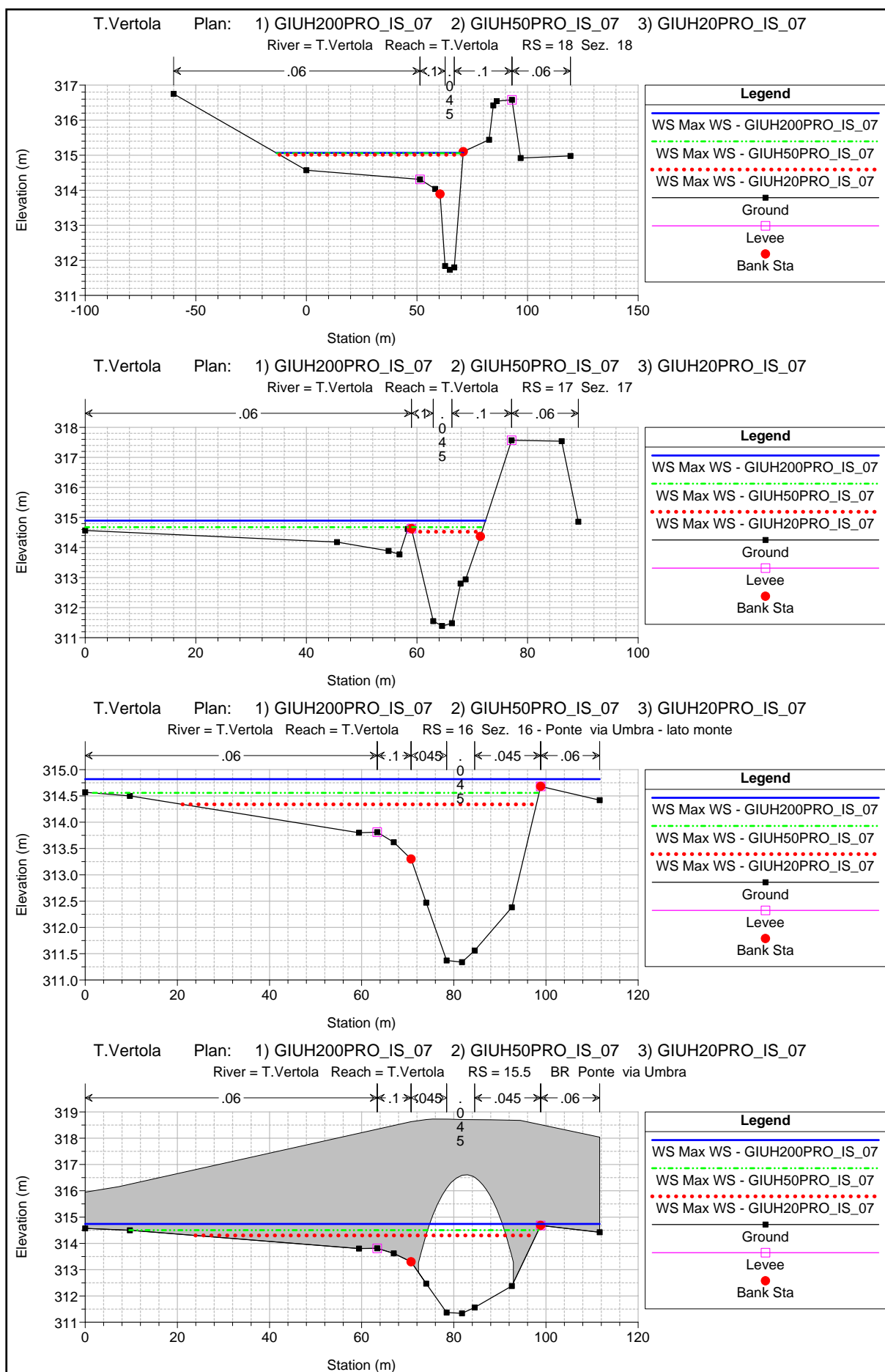


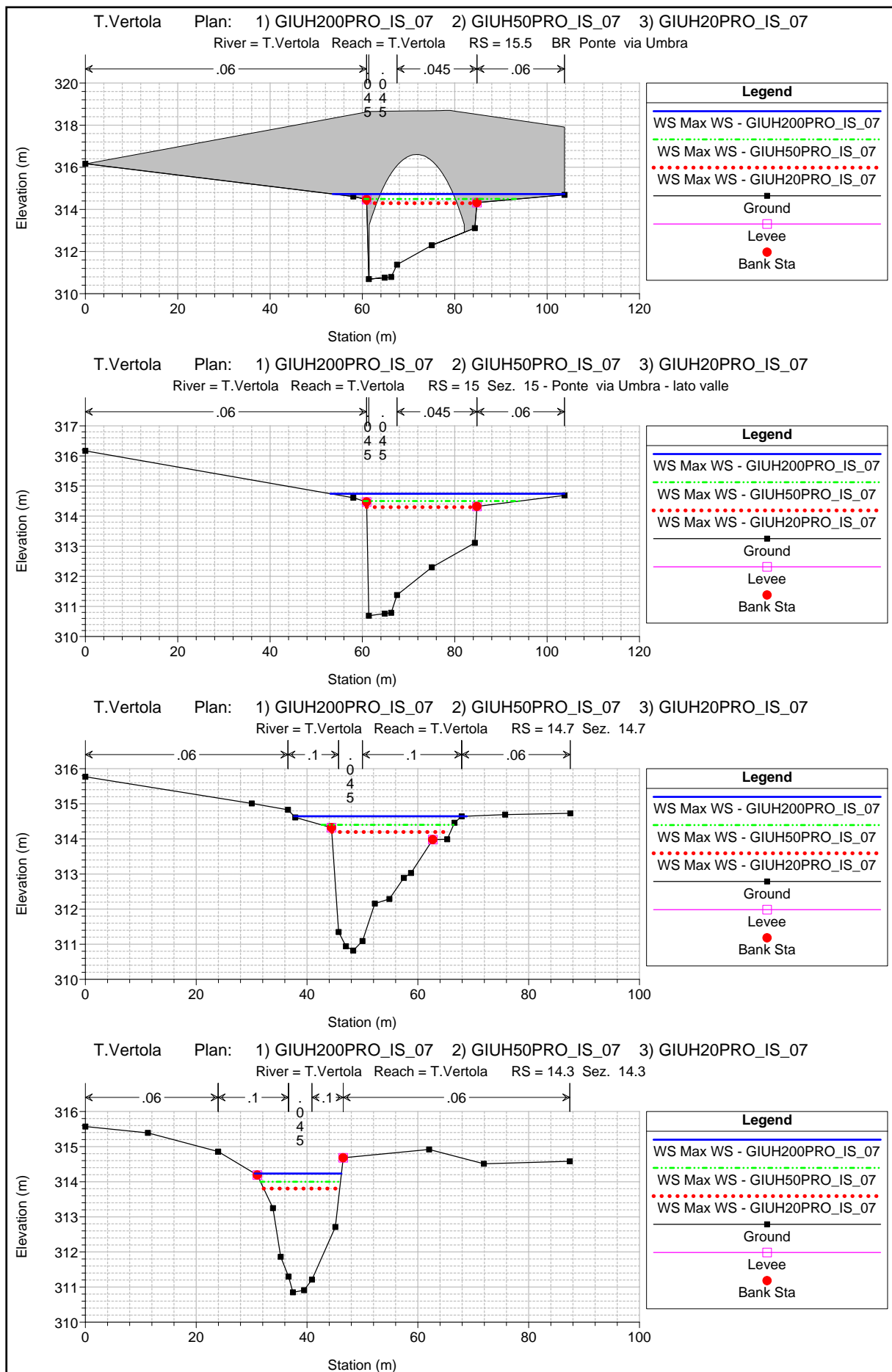


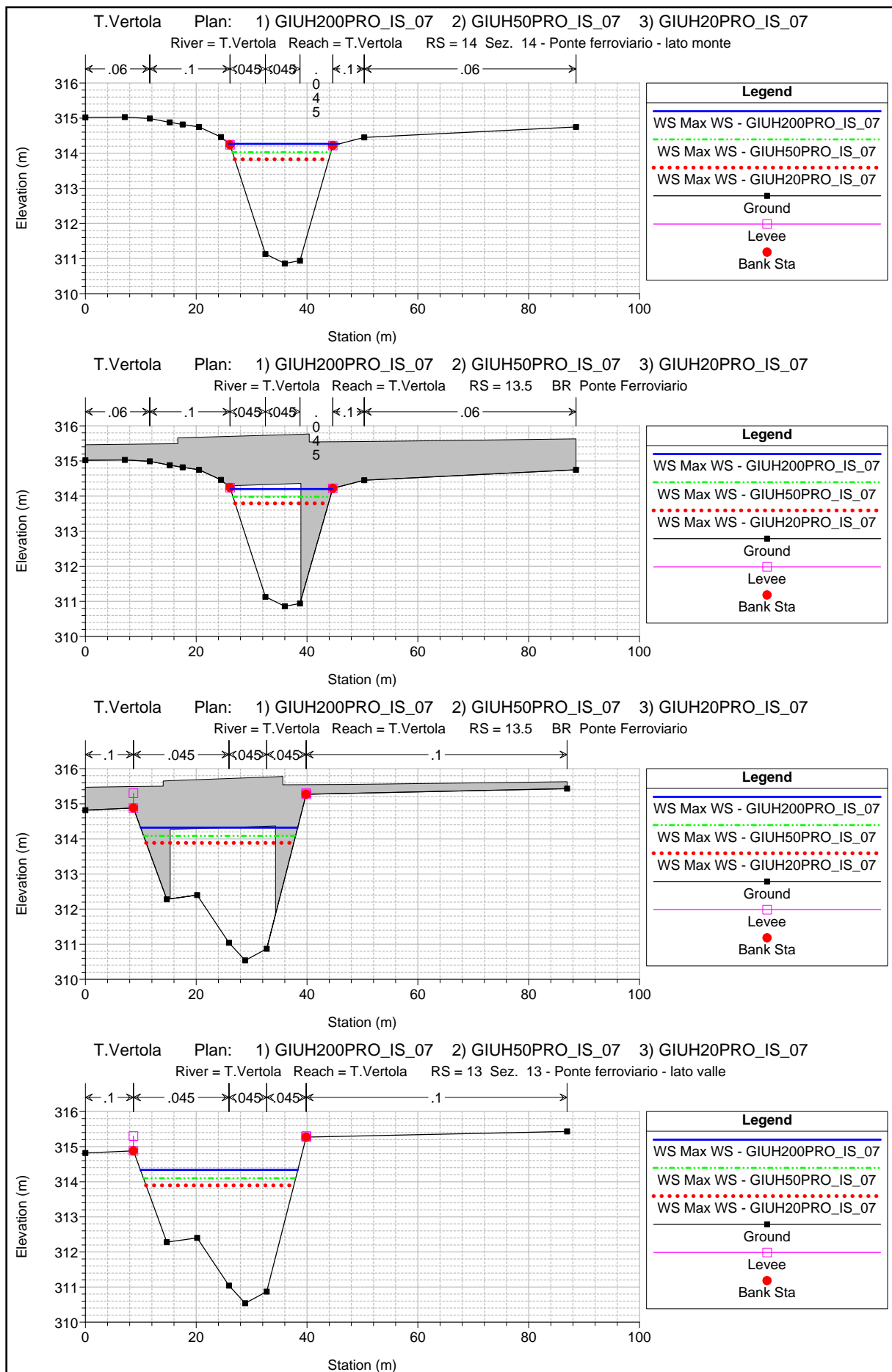


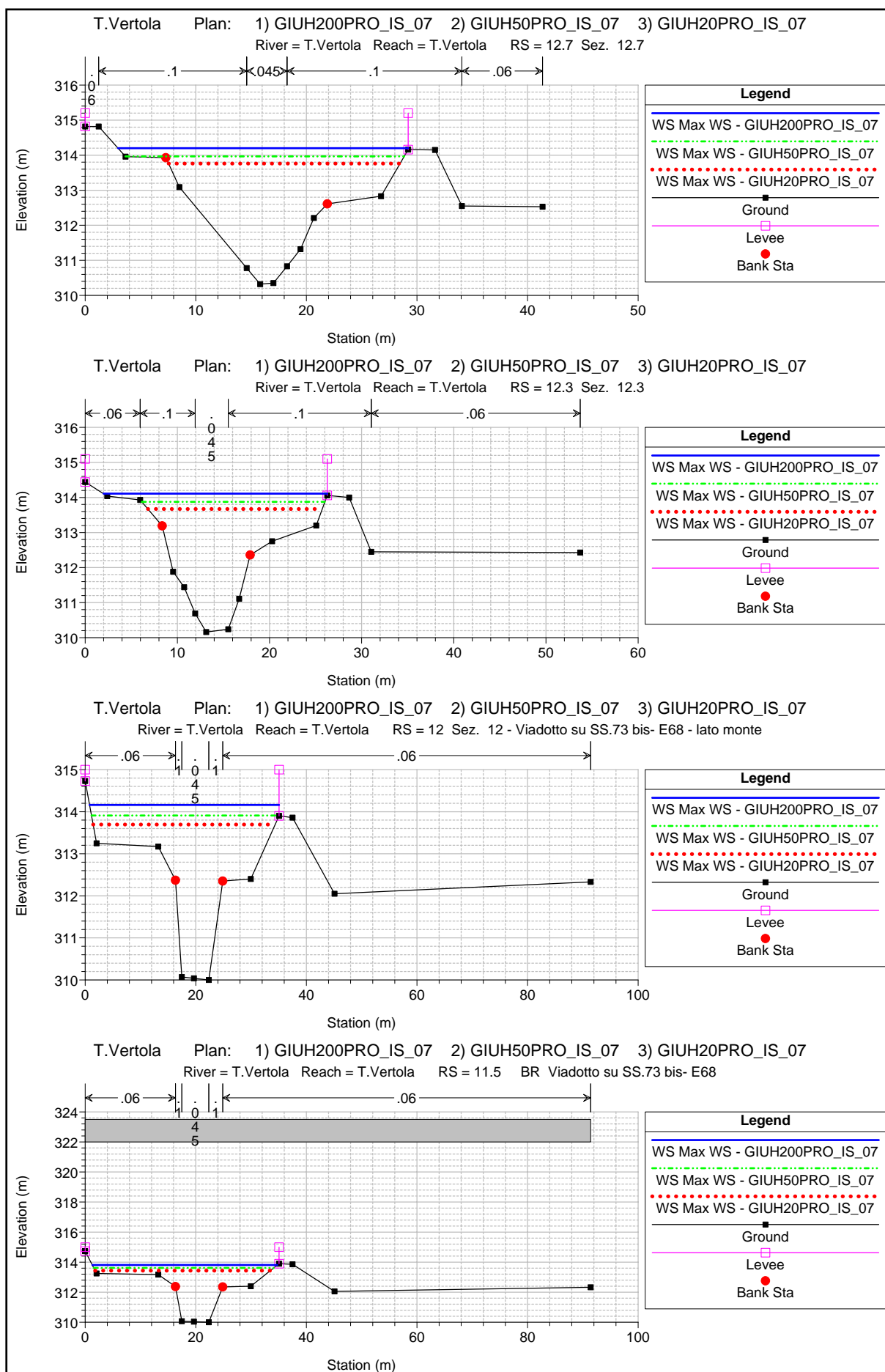


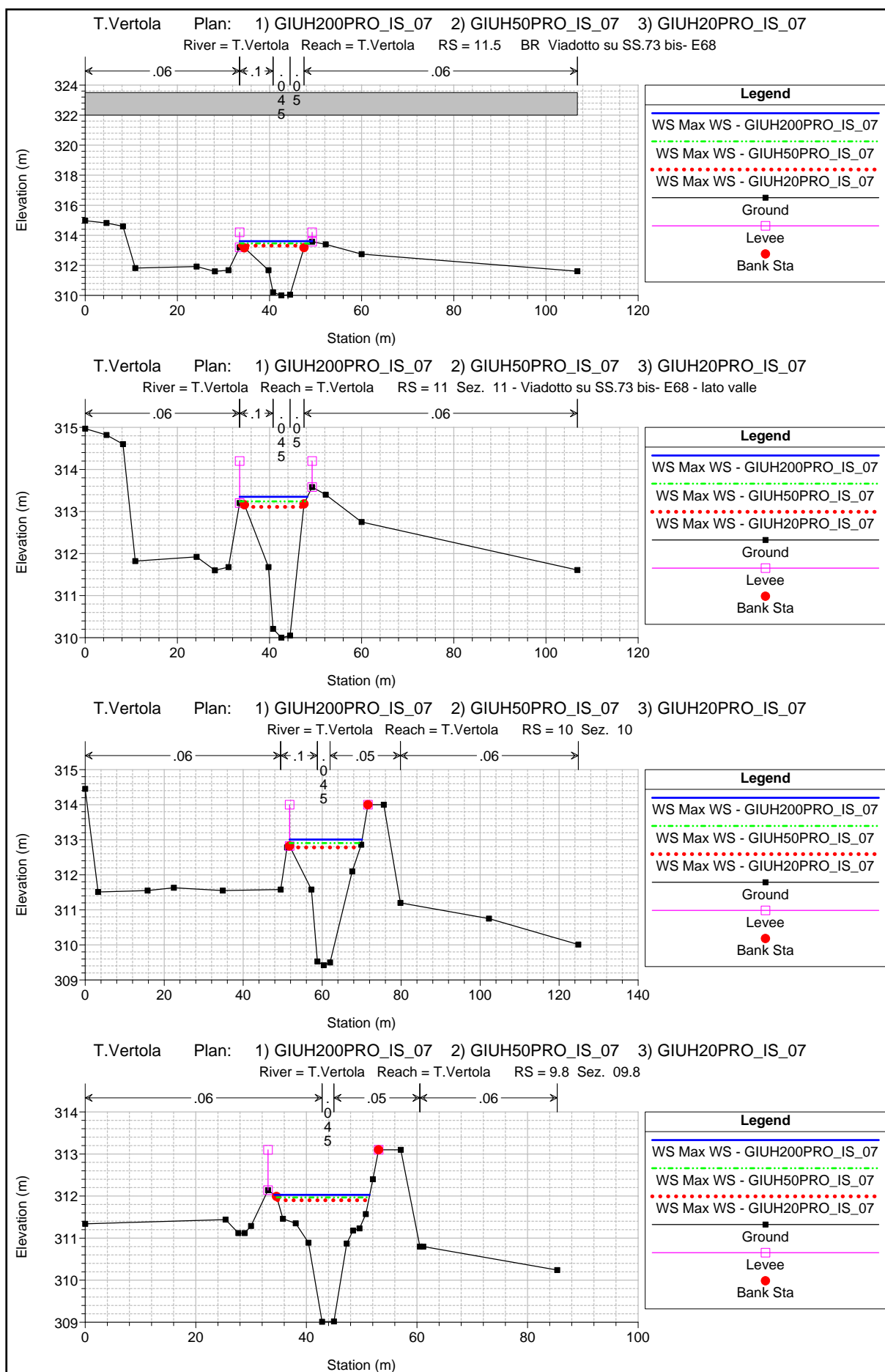


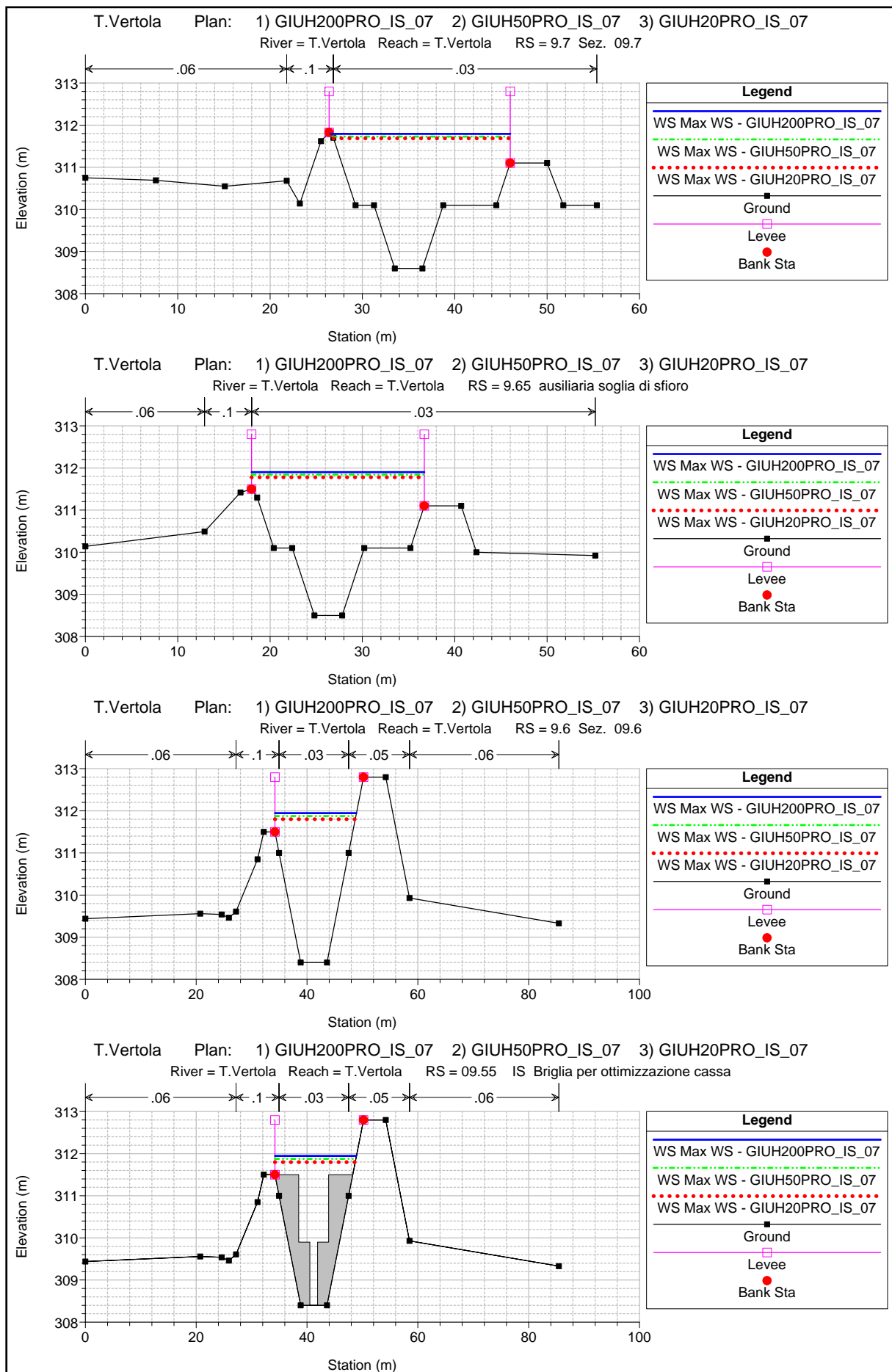


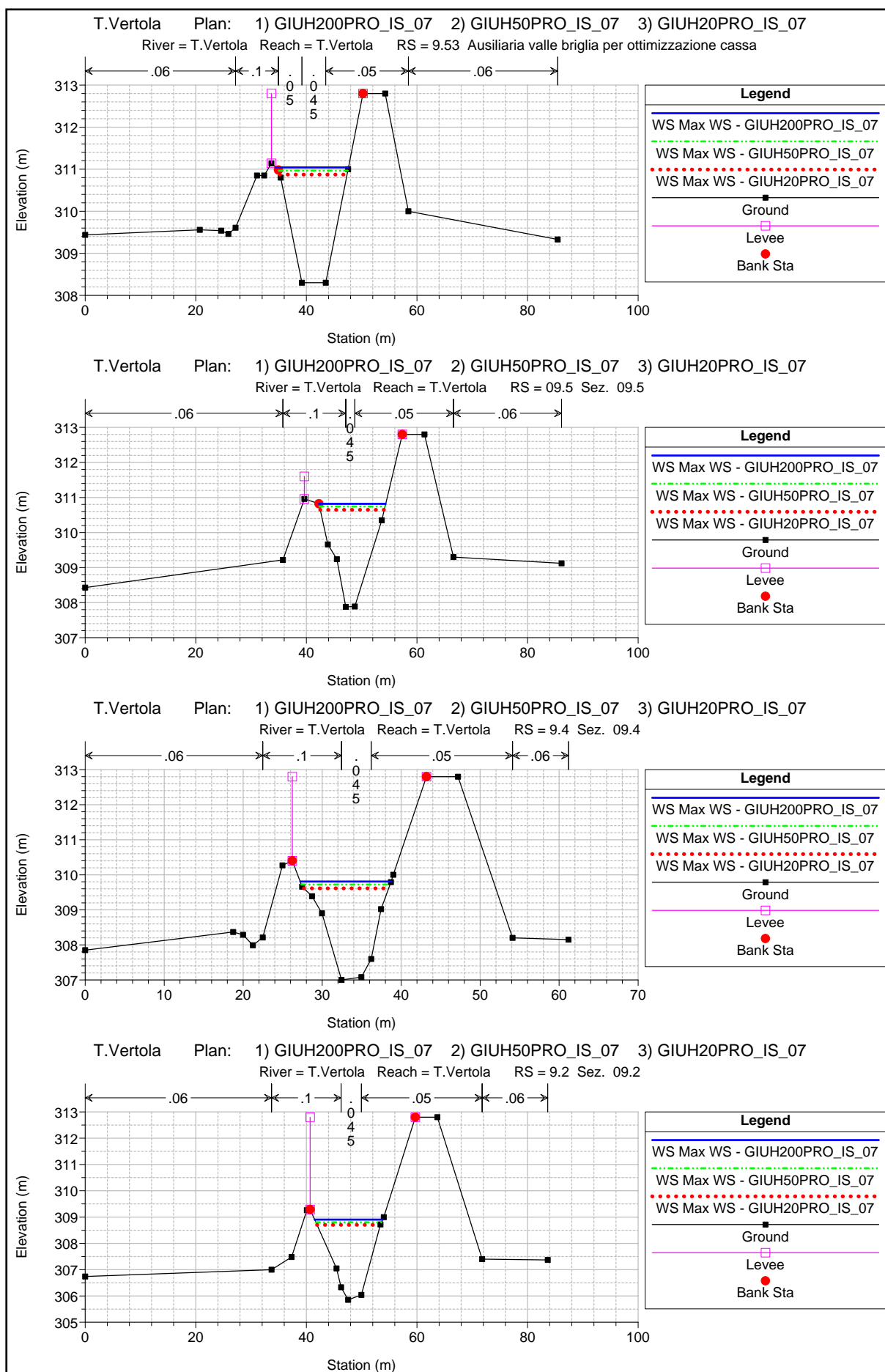


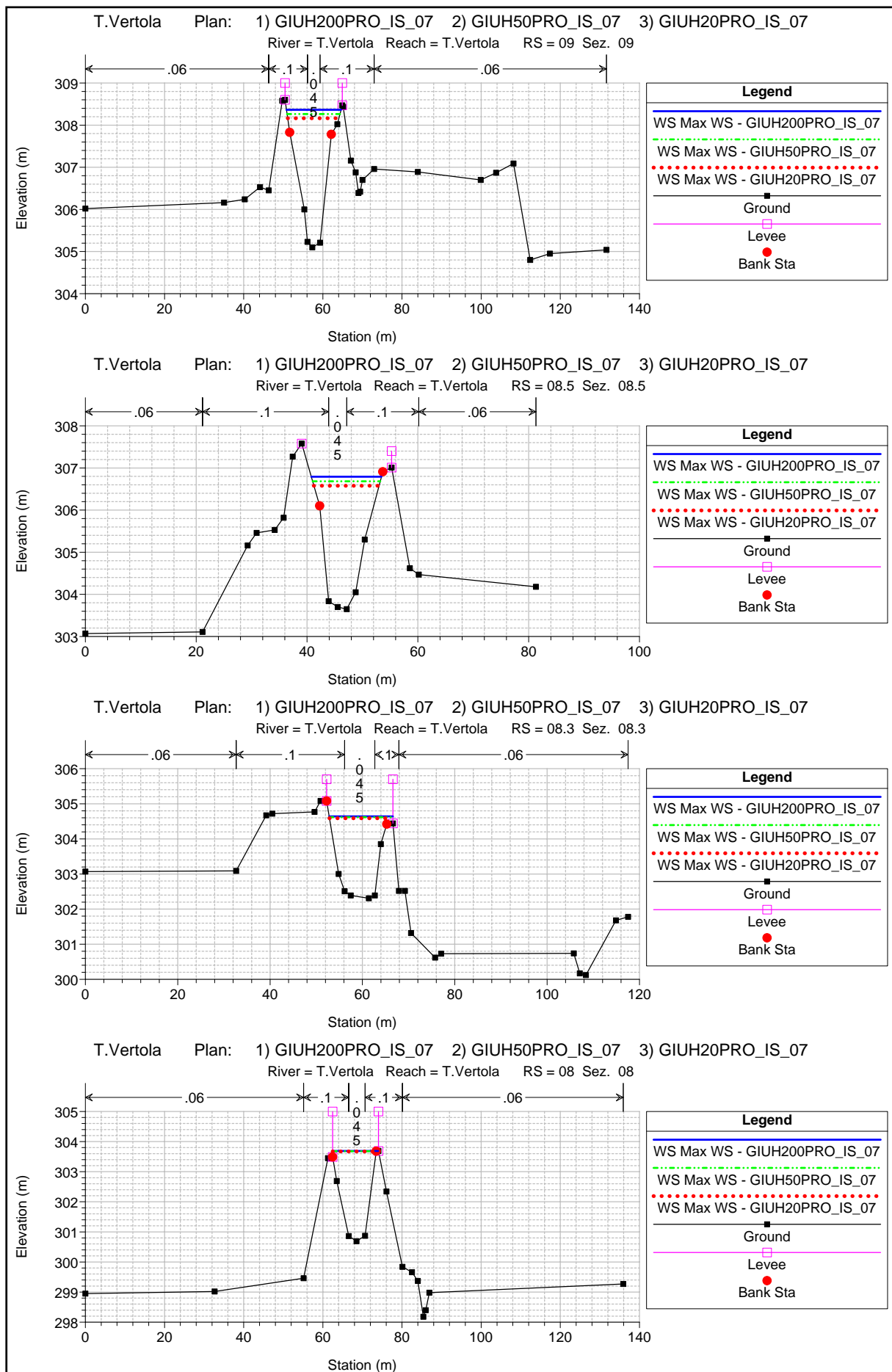


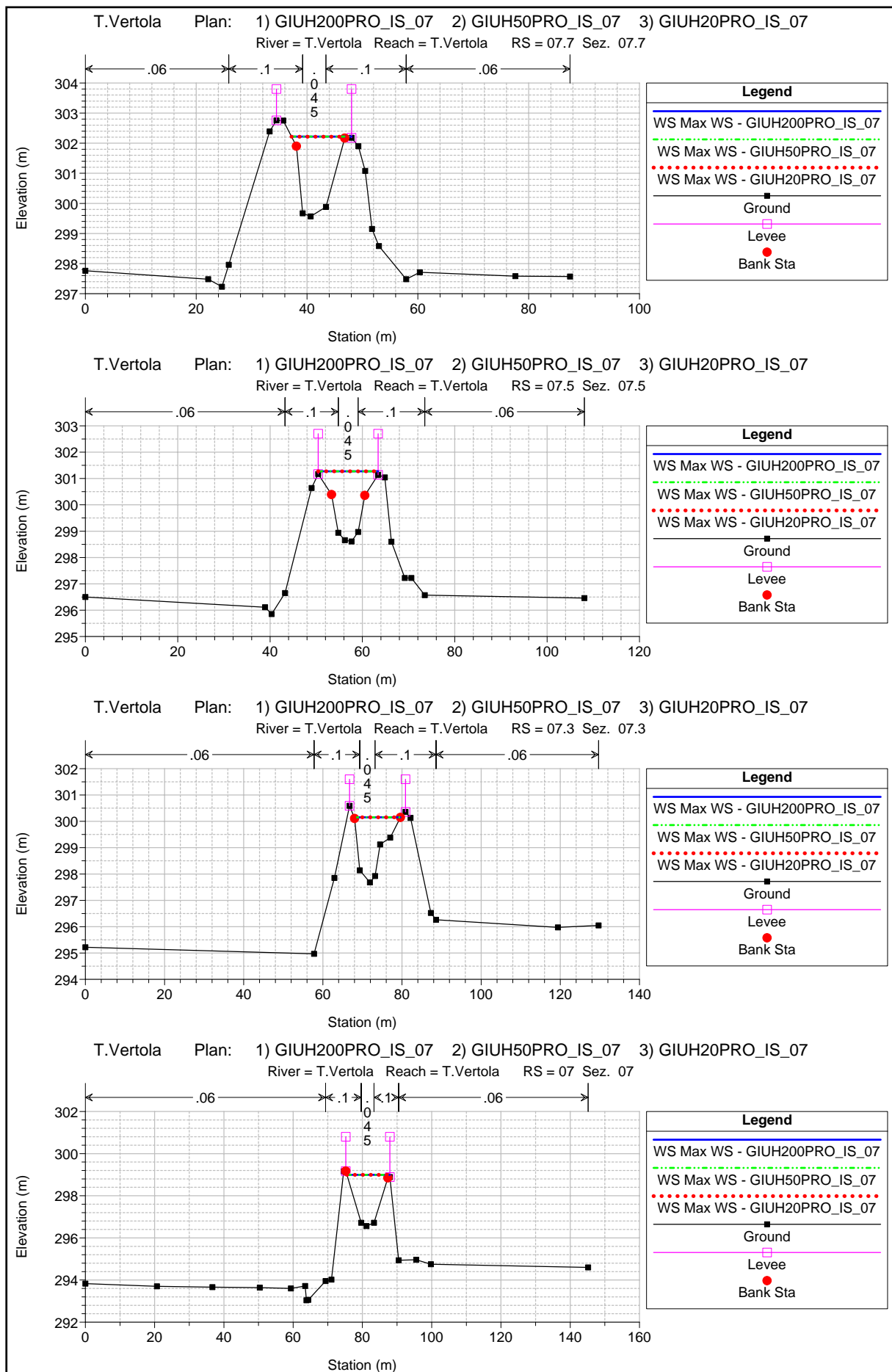


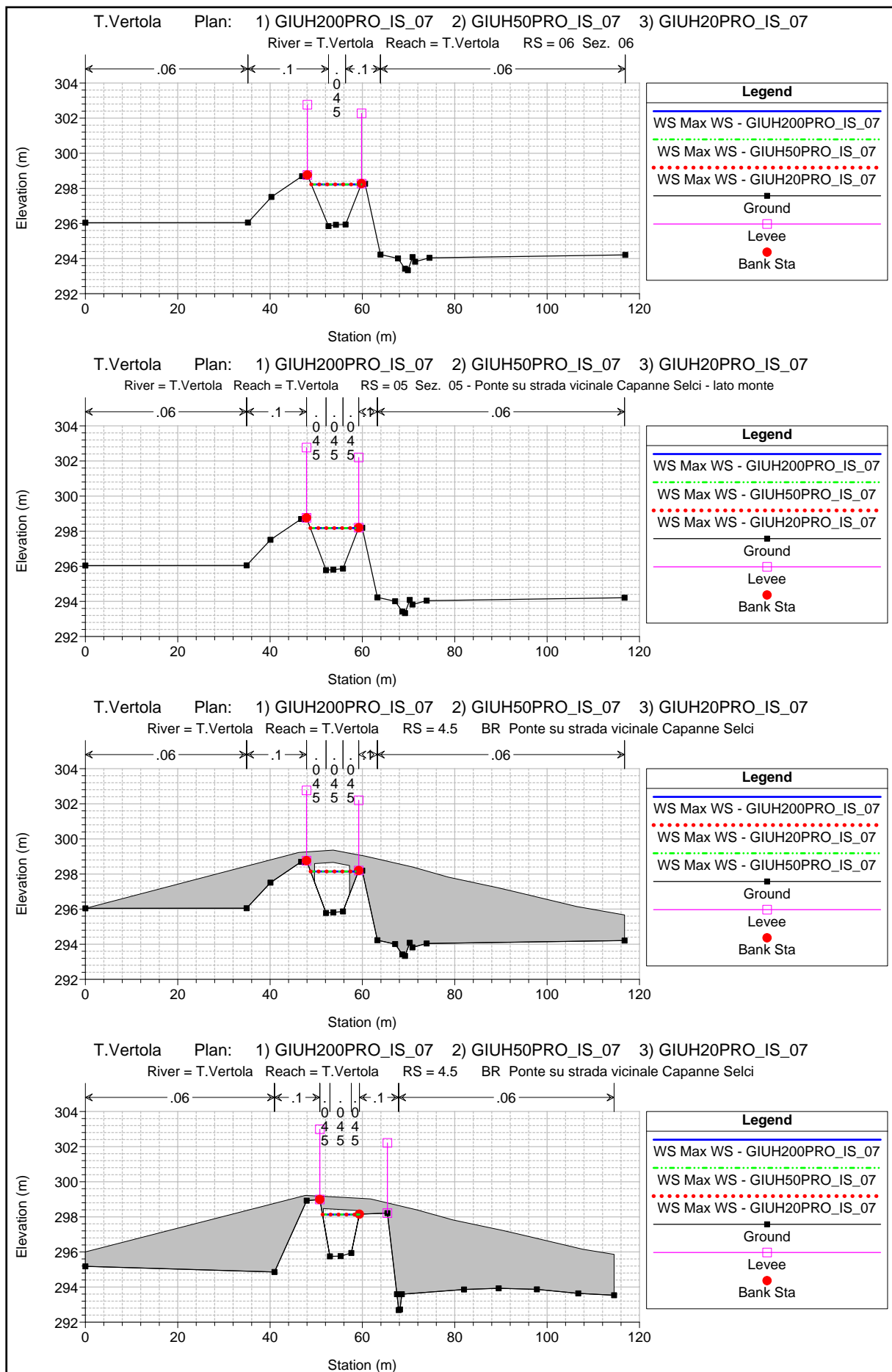


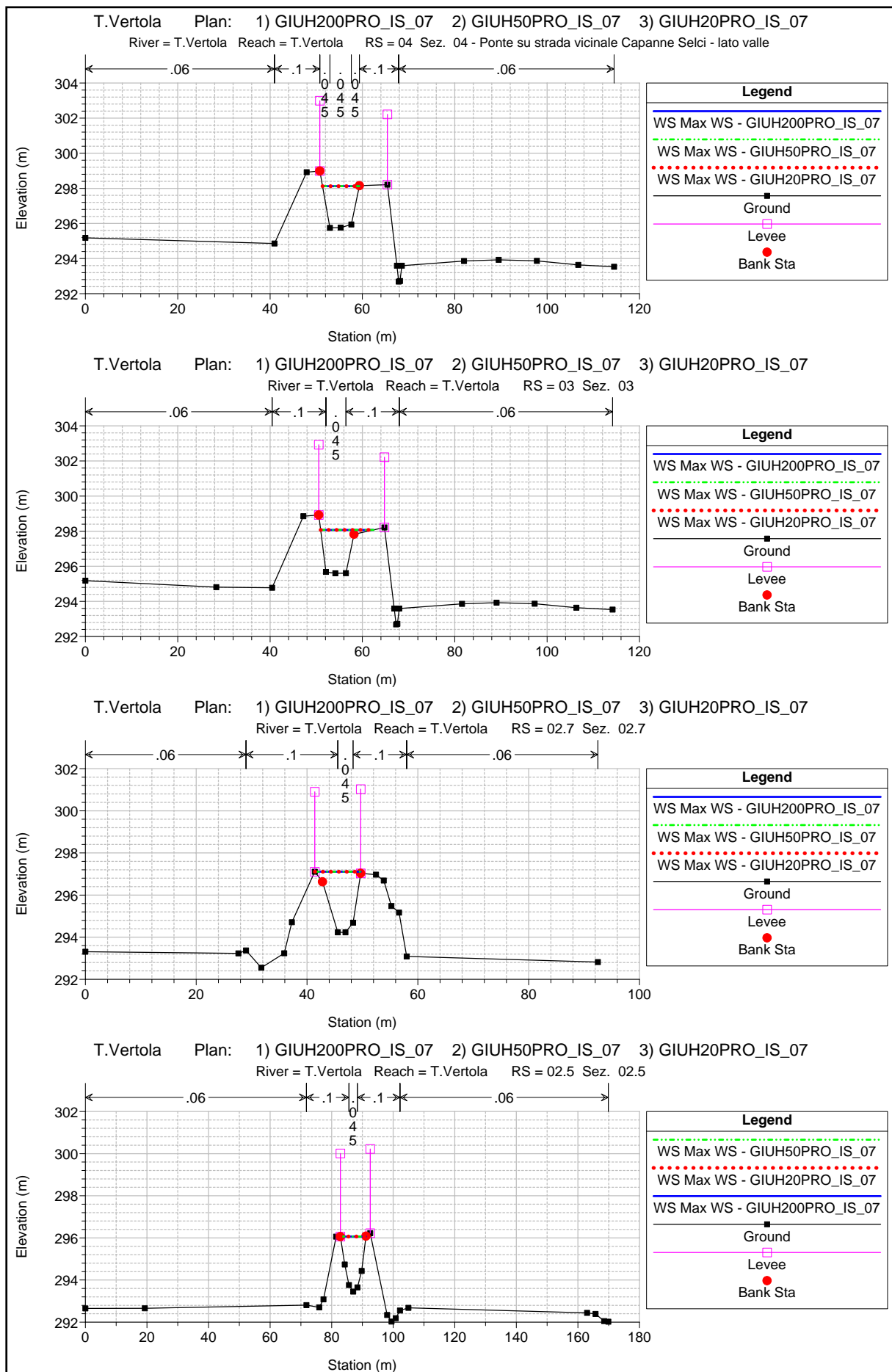


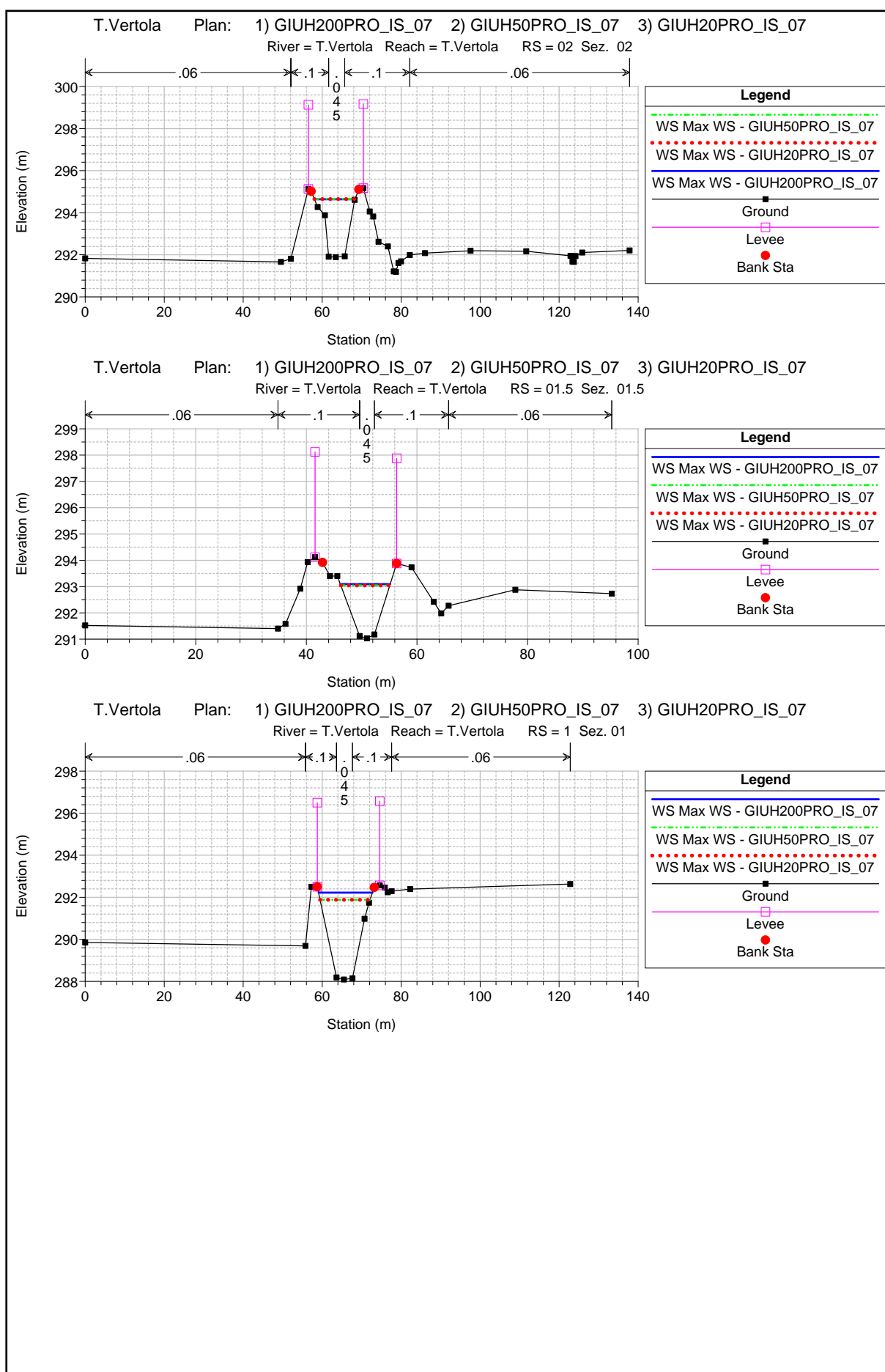












HEC-RAS River: T.Vertola Reach: T.Vertola Profile: Max WS

Reach	River Sta	Plan	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
T.Vertola	44	GIUH200PRO_IS_07	64.98	357.41	359.85		360.20	0.026302	3.03	30.51	29.92	0.68
T.Vertola	44	GIUH50PRO_IS_07	54.96	357.41	359.71		360.04	0.026533	2.90	26.45	27.94	0.68
T.Vertola	44	GIUH20PRO_IS_07	47.83	357.41	359.60		359.91	0.026747	2.79	23.41	26.07	0.67
T.Vertola	43	GIUH200PRO_IS_07	65.02	348.86	352.18		352.44	0.013662	2.26	29.38	15.16	0.47
T.Vertola	43	GIUH50PRO_IS_07	54.93	348.86	351.84		352.10	0.014781	2.23	24.69	11.36	0.48
T.Vertola	43	GIUH20PRO_IS_07	47.81	348.86	351.60		351.84	0.014922	2.17	22.02	10.89	0.49
T.Vertola	42	GIUH200PRO_IS_07	65.02	348.77	352.12	350.82	352.33	0.003220	2.00	32.47	13.47	0.41
T.Vertola	42	GIUH50PRO_IS_07	54.93	348.77	351.79	350.63	351.98	0.003434	1.96	28.06	12.75	0.42
T.Vertola	42	GIUH20PRO_IS_07	47.81	348.77	351.54	350.48	351.73	0.003579	1.91	25.00	12.23	0.43
T.Vertola	41.5		Bridge									
T.Vertola	41	GIUH200PRO_IS_07	65.02	348.72	351.67		351.99	0.005619	2.48	26.24	12.01	0.54
T.Vertola	41	GIUH50PRO_IS_07	54.93	348.72	351.43		351.71	0.005563	2.35	23.33	11.54	0.53
T.Vertola	41	GIUH20PRO_IS_07	47.81	348.72	351.24		351.50	0.005501	2.25	21.21	11.18	0.52
T.Vertola	40	GIUH200PRO_IS_07	65.01	348.73	351.38		351.76	0.020135	2.72	23.91	11.52	0.60
T.Vertola	40	GIUH50PRO_IS_07	54.93	348.73	351.15		351.49	0.019191	2.58	21.31	11.10	0.59
T.Vertola	40	GIUH20PRO_IS_07	47.81	348.73	350.97		351.28	0.018404	2.46	19.40	10.79	0.59
T.Vertola	39	GIUH200PRO_IS_07	65.13	348.25	350.87	350.38	351.20	0.006216	2.54	25.64	15.17	0.62
T.Vertola	39	GIUH50PRO_IS_07	55.03	348.25	350.66	350.23	350.96	0.005746	2.45	22.42	14.77	0.64
T.Vertola	39	GIUH20PRO_IS_07	47.89	348.25	350.49	350.12	350.78	0.005396	2.39	20.00	14.47	0.65
T.Vertola	38.5		Inl Struct									
T.Vertola	38	GIUH200PRO_IS_07	65.07	345.25	347.07	347.02	347.82	0.006141	3.84	16.92	10.31	0.96
T.Vertola	38	GIUH50PRO_IS_07	55.03	345.25	346.89	346.84	347.57	0.006097	3.63	15.14	10.11	0.95
T.Vertola	38	GIUH20PRO_IS_07	47.89	345.25	346.76	346.71	347.37	0.006080	3.47	13.80	9.97	0.94
T.Vertola	37.5	GIUH200PRO_IS_07	65.48	345.23	347.02		347.52	0.017815	3.14	20.84	13.32	0.80
T.Vertola	37.5	GIUH50PRO_IS_07	55.48	345.23	346.86		347.31	0.016479	2.96	18.74	13.05	0.79
T.Vertola	37.5	GIUH20PRO_IS_07	48.35	345.23	346.74		347.14	0.015381	2.81	17.19	12.84	0.78
T.Vertola	37	GIUH200PRO_IS_07	65.27	345.21	347.16	346.63	347.42	0.005517	2.27	28.79	17.97	0.57

HEC-RAS River: T.Vertola Reach: T.Vertola Profile: Max WS (Continued)

Reach	River Sta	Plan	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
T.Vertola	37	GIUH50PRO_IS_07	55.17	345.21	346.98	346.50	347.22	0.005151	2.16	25.57	17.65	0.57
T.Vertola	37	GIUH20PRO_IS_07	48.03	345.21	346.84	346.40	347.06	0.004874	2.07	23.18	17.40	0.57
T.Vertola	36.5		Inl Struct									
T.Vertola	36	GIUH200PRO_IS_07	65.23	343.71	345.67		345.98	0.005522	2.48	26.35	16.05	0.62
T.Vertola	36	GIUH50PRO_IS_07	55.14	343.71	345.41		345.72	0.006098	2.48	22.22	15.51	0.66
T.Vertola	36	GIUH20PRO_IS_07	47.99	343.71	345.22		345.53	0.006681	2.49	19.27	15.11	0.70
T.Vertola	35.5	GIUH200PRO_IS_07	65.81	340.32	343.25		343.57	0.023318	2.52	26.12	13.45	0.58
T.Vertola	35.5	GIUH50PRO_IS_07	55.60	340.32	343.01		343.31	0.022407	2.41	23.05	12.54	0.57
T.Vertola	35.5	GIUH20PRO_IS_07	48.39	340.32	342.83		343.11	0.021508	2.32	20.90	11.92	0.56
T.Vertola	35	GIUH200PRO_IS_07	66.26	337.92	340.03	339.43	340.32	0.008087	2.36	28.02	15.64	0.56
T.Vertola	35	GIUH50PRO_IS_07	55.99	337.92	339.83	339.28	340.09	0.007671	2.25	24.90	15.35	0.56
T.Vertola	35	GIUH20PRO_IS_07	48.73	337.92	339.68	339.18	339.92	0.007344	2.16	22.61	15.13	0.56
T.Vertola	34.5		Inl Struct									
T.Vertola	34	GIUH200PRO_IS_07	65.81	335.90	338.86		339.01	0.005757	1.74	37.79	19.19	0.40
T.Vertola	34	GIUH50PRO_IS_07	55.60	335.90	338.64		338.78	0.005543	1.65	33.63	18.64	0.39
T.Vertola	34	GIUH20PRO_IS_07	48.70	335.90	338.40		338.54	0.006063	1.66	29.33	18.06	0.42
T.Vertola	33	GIUH200PRO_IS_07	63.17	334.42	337.16	336.64	337.62	0.025409	3.03	21.48	18.26	0.68
T.Vertola	33	GIUH50PRO_IS_07	56.99	334.42	337.08	336.51	337.49	0.023734	2.85	20.13	16.53	0.65
T.Vertola	33	GIUH20PRO_IS_07	49.04	334.42	336.95	336.33	337.30	0.021035	2.63	18.68	9.96	0.61
T.Vertola	32.5		Inl Struct									
T.Vertola	32	GIUH200PRO_IS_07	69.57	331.80	335.96		336.32	0.020535	2.64	26.40	8.90	0.49
T.Vertola	32	GIUH50PRO_IS_07	56.91	331.80	335.57		335.88	0.019384	2.48	22.96	8.44	0.48
T.Vertola	32	GIUH20PRO_IS_07	49.04	331.80	335.29		335.57	0.018749	2.38	20.62	8.11	0.48
T.Vertola	31.8	GIUH200PRO_IS_07	68.62	330.72	334.61		334.94	0.019761	2.56	26.79	10.10	0.50
T.Vertola	31.8	GIUH50PRO_IS_07	56.75	330.72	334.26		334.56	0.019073	2.43	23.34	9.54	0.50
T.Vertola	31.8	GIUH20PRO_IS_07	49.21	330.72	334.01		334.29	0.018614	2.34	21.02	9.14	0.49

HEC-RAS River: T.Vertola Reach: T.Vertola Profile: Max WS (Continued)

Reach	River Sta	Plan	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
T.Vertola	31.5	GIUH200PRO_IS_07	68.51	327.50	330.46		330.80	0.024035	2.57	26.62	13.36	0.58
T.Vertola	31.5	GIUH50PRO_IS_07	57.19	327.50	330.23		330.53	0.023118	2.43	23.55	12.76	0.57
T.Vertola	31.5	GIUH20PRO_IS_07	49.78	327.50	330.06		330.33	0.022443	2.32	21.44	12.33	0.56
T.Vertola	31	GIUH200PRO_IS_07	69.21	324.94	326.61		326.79	0.012664	1.93	35.90	23.64	0.50
T.Vertola	31	GIUH50PRO_IS_07	57.84	324.94	326.43		326.60	0.013092	1.82	31.76	23.58	0.50
T.Vertola	31	GIUH20PRO_IS_07	50.35	324.94	326.31		326.46	0.013480	1.74	28.86	23.54	0.50
T.Vertola	30	GIUH200PRO_IS_07	69.21	324.80	326.56	325.94	326.74	0.004093	1.85	37.40	23.80	0.47
T.Vertola	30	GIUH50PRO_IS_07	57.83	324.80	326.39	325.83	326.54	0.004209	1.74	33.16	23.73	0.47
T.Vertola	30	GIUH20PRO_IS_07	50.34	324.80	326.26	325.75	326.40	0.004312	1.67	30.21	23.68	0.47
T.Vertola	29.5		Bridge									
T.Vertola	29	GIUH200PRO_IS_07	69.21	324.70	326.07		326.25	0.006948	1.91	36.23	33.10	0.58
T.Vertola	29	GIUH50PRO_IS_07	57.84	324.70	325.92		326.09	0.006178	1.83	31.64	28.12	0.55
T.Vertola	29	GIUH20PRO_IS_07	50.34	324.70	325.81		325.96	0.005859	1.75	28.78	26.24	0.53
T.Vertola	28.8	GIUH200PRO_IS_07	69.20	324.70	326.02	325.61	326.22	0.006423	1.99	34.73	31.55	0.61
T.Vertola	28.8	GIUH50PRO_IS_07	57.83	324.70	325.88	325.50	326.06	0.002549	1.88	30.69	26.96	0.56
T.Vertola	28.8	GIUH20PRO_IS_07	50.34	324.70	325.78	325.43	325.94	0.002039	1.80	28.00	26.24	0.56
T.Vertola	28.5		Int Struct									
T.Vertola	28.2	GIUH200PRO_IS_07	68.96	321.70	325.89		325.91	0.000106	0.60	114.69	30.08	0.10
T.Vertola	28.2	GIUH50PRO_IS_07	57.81	321.70	325.52		325.54	0.000097	0.55	104.23	27.94	0.09
T.Vertola	28.2	GIUH20PRO_IS_07	50.33	321.70	325.23		325.25	0.000091	0.52	96.09	27.84	0.09
T.Vertola	28	GIUH200PRO_IS_07	68.96	321.70	325.89		325.91	0.000196	0.60	114.68	30.07	0.10
T.Vertola	28	GIUH50PRO_IS_07	57.80	321.70	325.52		325.54	0.000182	0.55	104.21	27.94	0.09
T.Vertola	28	GIUH20PRO_IS_07	50.33	321.70	325.23		325.25	0.000175	0.52	96.08	27.84	0.09
T.Vertola	27	GIUH200PRO_IS_07	68.90	321.18	325.77		325.89	0.003415	1.57	48.61	28.38	0.24
T.Vertola	27	GIUH50PRO_IS_07	57.71	321.18	325.40		325.51	0.003559	1.51	39.31	20.27	0.25
T.Vertola	27	GIUH20PRO_IS_07	50.41	321.18	325.11		325.21	0.003534	1.43	35.25	10.00	0.24
T.Vertola	26	GIUH200PRO_IS_07	69.04	320.55	323.89	323.85	325.03	0.065120	4.73	14.61	6.12	0.98

HEC-RAS River: T.Vertola Reach: T.Vertola Profile: Max WS (Continued)

Reach	River Sta	Plan	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
T.Vertola	26	GIUH50PRO_IS_07	58.48	320.55	323.57	323.56	324.65	0.066286	4.60	12.71	5.78	0.99
T.Vertola	26	GIUH20PRO_IS_07	50.61	320.55	323.31	323.33	324.35	0.068144	4.52	11.20	5.51	1.01
T.Vertola	25	GIUH200PRO_IS_07	69.05	320.43	324.13	322.82	324.51	0.005187	2.72	25.41	8.12	0.49
T.Vertola	25	GIUH50PRO_IS_07	58.25	320.43	323.72	322.58	324.07	0.005467	2.64	22.06	7.85	0.50
T.Vertola	25	GIUH20PRO_IS_07	50.62	320.43	323.44	322.39	323.77	0.005522	2.55	19.89	7.68	0.50
T.Vertola	24.5		Bridge									
T.Vertola	24	GIUH200PRO_IS_07	69.05	320.50	323.85		324.22	0.005371	2.71	25.46	8.69	0.51
T.Vertola	24	GIUH50PRO_IS_07	58.20	320.50	323.59		323.91	0.004949	2.51	23.20	8.49	0.48
T.Vertola	24	GIUH20PRO_IS_07	50.62	320.50	323.35		323.64	0.004837	2.39	21.20	8.34	0.48
T.Vertola	23	GIUH200PRO_IS_07	69.09	320.37	323.74		324.10	0.011533	2.67	25.90	9.13	0.51
T.Vertola	23	GIUH50PRO_IS_07	58.21	320.37	323.49		323.80	0.009983	2.46	23.68	8.77	0.48
T.Vertola	23	GIUH20PRO_IS_07	50.65	320.37	323.25		323.53	0.009497	2.34	21.65	8.60	0.47
T.Vertola	22.82	GIUH200PRO_IS_07	69.18	319.71	323.11		323.40	0.012330	2.36	29.81	21.92	0.50
T.Vertola	22.82	GIUH50PRO_IS_07	58.38	319.71	322.92		323.16	0.011542	2.19	26.70	12.65	0.48
T.Vertola	22.82	GIUH20PRO_IS_07	50.79	319.71	322.69		322.92	0.011293	2.12	23.91	11.89	0.48
T.Vertola	22.8	GIUH200PRO_IS_07	69.21	319.71	323.09		323.38	0.012699	2.38	29.42	20.65	0.51
T.Vertola	22.8	GIUH50PRO_IS_07	58.37	319.71	322.90		323.15	0.011735	2.20	26.51	12.60	0.48
T.Vertola	22.8	GIUH20PRO_IS_07	50.80	319.71	322.67		322.91	0.011489	2.14	23.73	11.84	0.48
T.Vertola	22.7	GIUH200PRO_IS_07	69.26	319.10	322.48	321.56	322.81	0.015313	2.58	29.10	52.37	0.54
T.Vertola	22.7	GIUH50PRO_IS_07	58.50	319.10	322.23		322.54	0.015272	2.45	23.85	11.09	0.53
T.Vertola	22.7	GIUH20PRO_IS_07	50.91	319.10	322.04		322.32	0.014719	2.34	21.72	10.69	0.52
T.Vertola	22.5	GIUH200PRO_IS_07	69.48	318.70	321.42		321.73	0.013485	2.45	28.38	14.47	0.56
T.Vertola	22.5	GIUH50PRO_IS_07	58.73	318.70	321.18		321.46	0.013467	2.35	24.98	13.91	0.56
T.Vertola	22.5	GIUH20PRO_IS_07	51.10	318.70	321.00		321.26	0.013474	2.27	22.47	13.48	0.56
T.Vertola	22.45	GIUH200PRO_IS_07	69.53	318.60	321.20	320.56	321.55	0.010242	2.60	26.71	13.96	0.60
T.Vertola	22.45	GIUH50PRO_IS_07	58.77	318.60	320.97	320.38	321.29	0.009852	2.50	23.51	13.41	0.60
T.Vertola	22.45	GIUH20PRO_IS_07	51.14	318.60	320.79	320.24	321.09	0.009532	2.42	21.16	12.99	0.60

HEC-RAS River: T.Vertola Reach: T.Vertola Profile: Max WS (Continued)

Reach	River Sta	Plan	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
T.Vertola	22.4		Inl Struct									
T.Vertola	22.35	GIUH200PRO_IS_07	69.54	317.40	320.43		320.78	0.012913	2.63	26.43	12.00	0.57
T.Vertola	22.35	GIUH50PRO_IS_07	58.77	317.40	320.26		320.55	0.010903	2.41	24.41	11.34	0.52
T.Vertola	22.35	GIUH20PRO_IS_07	51.12	317.40	320.08		320.34	0.009808	2.28	22.42	10.64	0.50
T.Vertola	22.3	GIUH200PRO_IS_07	69.62	316.17	320.07		320.33	0.009916	2.33	34.13	37.99	0.48
T.Vertola	22.3	GIUH50PRO_IS_07	58.87	316.17	319.88		320.14	0.010192	2.23	27.70	27.93	0.48
T.Vertola	22.3	GIUH20PRO_IS_07	51.22	316.17	319.72		319.95	0.009951	2.12	24.27	14.98	0.47
T.Vertola	22.28		Lat Struct									
T.Vertola	22	GIUH200PRO_IS_07	69.94	314.99	318.13	317.33	318.44	0.020685	2.56	33.04	79.04	0.54
T.Vertola	22	GIUH50PRO_IS_07	59.25	314.99	317.99		318.29	0.020452	2.45	24.61	24.14	0.53
T.Vertola	22	GIUH20PRO_IS_07	50.41	314.99	317.89		318.13	0.017281	2.19	23.04	11.53	0.49
T.Vertola	21	GIUH200PRO_IS_07	69.96	314.83	317.93	316.97	318.25	0.025073	2.68	33.90	77.98	0.45
T.Vertola	21	GIUH50PRO_IS_07	59.27	314.83	317.79	316.93	318.14	0.028242	2.69	25.21	42.66	0.48
T.Vertola	21	GIUH20PRO_IS_07	50.40	314.83	317.59	316.76	317.97	0.034883	2.75	19.09	21.80	0.53
T.Vertola	20	GIUH200PRO_IS_07	69.97	314.75	317.85		318.04	0.013797	2.11	41.02	62.50	0.45
T.Vertola	20	GIUH50PRO_IS_07	59.28	314.75	317.70		317.90	0.014840	2.09	33.21	42.28	0.46
T.Vertola	20	GIUH20PRO_IS_07	50.40	314.75	317.60		317.78	0.013836	1.96	29.44	37.52	0.44
T.Vertola	19	GIUH200PRO_IS_07	69.98	314.50	317.78		317.95	0.010048	1.88	42.22	38.96	0.37
T.Vertola	19	GIUH50PRO_IS_07	59.30	314.50	317.65		317.80	0.009537	1.77	37.34	33.66	0.36
T.Vertola	19	GIUH20PRO_IS_07	50.37	314.50	317.57		317.70	0.008007	1.59	34.97	30.99	0.33
T.Vertola	18.5	GIUH200PRO_IS_07	70.41	313.10	316.08	315.60	316.36	0.017738	2.56	40.27	118.57	0.55
T.Vertola	18.5	GIUH50PRO_IS_07	46.74	313.10	316.04		316.19	0.009260	1.83	35.51	100.24	0.40
T.Vertola	18.5	GIUH20PRO_IS_07	51.93	313.10	315.92	315.21	316.19	0.016873	2.37	25.98	56.40	0.53
T.Vertola	18	GIUH200PRO_IS_07	70.66	311.73	315.06		315.13	0.005421	1.41	69.17	84.48	0.29
T.Vertola	18	GIUH50PRO_IS_07	54.52	311.73	315.06		315.10	0.003306	1.10	68.52	84.26	0.23
T.Vertola	18	GIUH20PRO_IS_07	52.11	311.73	315.01		315.05	0.003499	1.13	64.70	82.95	0.23
T.Vertola	17	GIUH200PRO_IS_07	70.77	311.39	314.90		314.97	0.006034	1.37	63.59	72.40	0.29

HEC-RAS River: T.Vertola Reach: T.Vertola Profile: Max WS (Continued)

Reach	River Sta	Plan	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
T.Vertola	17	GIUH50PRO_IS_07	60.03	311.39	314.68		314.78	0.009547	1.61	47.85	72.01	0.36
T.Vertola	17	GIUH20PRO_IS_07	52.19	311.39	314.52		314.77	0.019487	2.21	23.64	12.61	0.51
T.Vertola	16	GIUH200PRO_IS_07	70.93	311.34	314.82	312.93	314.85	0.000411	0.82	123.58	111.66	0.17
T.Vertola	16	GIUH50PRO_IS_07	60.16	311.34	314.56	312.82	314.59	0.000497	0.85	94.38	96.84	0.18
T.Vertola	16	GIUH20PRO_IS_07	52.31	311.34	314.34	312.72	314.37	0.000554	0.85	75.69	76.80	0.19
T.Vertola	15.5		Bridge									
T.Vertola	15	GIUH200PRO_IS_07	70.93	310.69	314.74		314.80	0.000723	1.06	71.82	50.67	0.20
T.Vertola	15	GIUH50PRO_IS_07	60.16	310.69	314.50		314.55	0.000721	0.99	61.43	33.73	0.20
T.Vertola	15	GIUH20PRO_IS_07	52.31	310.69	314.30		314.34	0.000715	0.94	55.75	23.85	0.20
T.Vertola	14.7	GIUH200PRO_IS_07	70.97	310.82	314.65		314.77	0.007845	1.61	46.79	31.16	0.33
T.Vertola	14.7	GIUH50PRO_IS_07	60.19	310.82	314.40		314.52	0.008353	1.54	40.07	23.82	0.34
T.Vertola	14.7	GIUH20PRO_IS_07	52.34	310.82	314.20		314.31	0.008878	1.49	35.57	21.41	0.34
T.Vertola	14.3	GIUH200PRO_IS_07	71.08	310.85	314.23		314.49	0.017057	2.24	31.76	15.63	0.49
T.Vertola	14.3	GIUH50PRO_IS_07	60.27	310.85	314.00		314.23	0.016507	2.13	28.30	14.45	0.49
T.Vertola	14.3	GIUH20PRO_IS_07	52.42	310.85	313.80		314.02	0.016066	2.05	25.55	13.73	0.48
T.Vertola	14	GIUH200PRO_IS_07	71.11	310.86	314.27	312.93	314.42	0.002410	1.75	40.76	19.88	0.38
T.Vertola	14	GIUH50PRO_IS_07	60.29	310.86	314.03	312.75	314.17	0.002377	1.66	36.38	17.76	0.37
T.Vertola	14	GIUH20PRO_IS_07	52.44	310.86	313.83	312.61	313.96	0.002363	1.59	32.91	16.98	0.37
T.Vertola	13.5		Bridge									
T.Vertola	13	GIUH200PRO_IS_07	71.11	310.54	314.34		314.40	0.000864	1.09	65.05	28.41	0.23
T.Vertola	13	GIUH50PRO_IS_07	60.30	310.54	314.10		314.15	0.000846	1.03	58.46	27.48	0.23
T.Vertola	13	GIUH20PRO_IS_07	52.44	310.54	313.90		313.95	0.000853	0.99	52.94	26.68	0.22
T.Vertola	12.98		Lat Struct									
T.Vertola	12.7	GIUH200PRO_IS_07	71.20	310.32	314.20		314.33	0.007191	1.69	47.03	26.23	0.34
T.Vertola	12.7	GIUH50PRO_IS_07	60.37	310.32	313.96		314.09	0.007457	1.61	40.96	25.21	0.34
T.Vertola	12.7	GIUH20PRO_IS_07	52.51	310.32	313.76		313.88	0.007688	1.56	36.55	20.92	0.34

HEC-RAS River: T.Vertola Reach: T.Vertola Profile: Max WS (Continued)

Reach	River Sta	Plan	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
T.Vertola	12.3	GIUH200PRO_IS_07	71.17	310.16	314.11		314.30	0.008747	2.08	40.54	24.28	0.38
T.Vertola	12.3	GIUH50PRO_IS_07	60.39	310.16	313.87		314.05	0.008809	1.98	35.36	19.85	0.38
T.Vertola	12.3	GIUH20PRO_IS_07	52.53	310.16	313.67		313.84	0.009041	1.91	31.43	18.91	0.38
T.Vertola	12	GIUH200PRO_IS_07	70.58	310.00	314.16	312.67	314.24	0.002777	1.36	60.69	34.26	0.23
T.Vertola	12	GIUH50PRO_IS_07	60.42	310.00	313.91	312.24	313.99	0.003133	1.38	52.16	33.91	0.24
T.Vertola	12	GIUH20PRO_IS_07	52.56	310.00	313.69	312.07	313.78	0.003504	1.39	44.96	32.91	0.25
T.Vertola	11.5		Bridge									
T.Vertola	11	GIUH200PRO_IS_07	70.59	310.00	313.35		313.77	0.024321	2.87	24.81	14.70	0.66
T.Vertola	11	GIUH50PRO_IS_07	60.42	310.00	313.24		313.59	0.021828	2.61	23.21	14.21	0.62
T.Vertola	11	GIUH20PRO_IS_07	52.56	310.00	313.11		313.42	0.020555	2.45	21.48	12.68	0.60
T.Vertola	10.99		Lat Struct									
T.Vertola	10	GIUH200PRO_IS_07	68.40	309.42	313.01		313.22	0.011601	2.06	33.16	18.37	0.49
T.Vertola	10	GIUH50PRO_IS_07	60.02	309.42	312.90		313.09	0.010667	1.92	31.27	18.22	0.47
T.Vertola	10	GIUH20PRO_IS_07	52.67	309.42	312.78		312.95	0.010067	1.81	29.06	17.74	0.45
T.Vertola	09.98		Lat Struct									
T.Vertola	9.8	GIUH200PRO_IS_07	66.41	309.01	312.03		312.44	0.017805	2.85	23.28	17.24	0.77
T.Vertola	9.8	GIUH50PRO_IS_07	59.75	309.01	311.97		312.33	0.016497	2.68	22.27	16.71	0.74
T.Vertola	9.8	GIUH20PRO_IS_07	52.87	309.01	311.90		312.22	0.015050	2.50	21.14	16.45	0.70
T.Vertola	9.7	GIUH200PRO_IS_07	40.67	308.60	311.79		311.85	0.000565	1.08	37.61	19.47	0.25
T.Vertola	9.7	GIUH50PRO_IS_07	59.54	308.60	311.73		311.86	0.001240	1.64	36.38	19.25	0.38
T.Vertola	9.7	GIUH20PRO_IS_07	52.72	308.60	311.69		311.80	0.001001	1.48	35.61	19.13	0.35
T.Vertola	9.65	GIUH200PRO_IS_07	46.76	308.50	311.90		311.97	0.000552	1.18	39.73	18.70	0.26
T.Vertola	9.65	GIUH50PRO_IS_07	42.35	308.50	311.84		311.90	0.000493	1.10	38.64	18.70	0.24
T.Vertola	9.65	GIUH20PRO_IS_07	37.88	308.50	311.78		311.83	0.000435	1.01	37.44	18.70	0.23
T.Vertola	9.6	GIUH200PRO_IS_07	34.69	308.40	311.94	309.89	311.99	0.000565	0.98	35.54	14.72	0.20
T.Vertola	9.6	GIUH50PRO_IS_07	32.46	308.40	311.88	309.84	311.92	0.000526	0.94	34.51	14.61	0.20
T.Vertola	9.6	GIUH20PRO_IS_07	30.17	308.40	311.80	309.78	311.84	0.000486	0.90	33.42	14.50	0.19

HEC-RAS River: T.Vertola Reach: T.Vertola Profile: Max WS (Continued)

Reach	River Sta	Plan	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
T.Vertola	09.55		Inl Struct									
T.Vertola	9.53	GIUH200PRO_IS_07	34.68	308.30	311.04		311.16	0.002733	1.49	23.26	13.16	0.35
T.Vertola	9.53	GIUH50PRO_IS_07	32.45	308.30	310.96		311.07	0.002718	1.46	22.25	12.50	0.35
T.Vertola	9.53	GIUH20PRO_IS_07	30.17	308.30	310.87		310.98	0.002685	1.43	21.13	12.17	0.35
T.Vertola	9.51		Lat Struct									
T.Vertola	09.5	GIUH200PRO_IS_07	34.85	307.88	310.82		310.97	0.009636	1.74	20.05	12.08	0.43
T.Vertola	09.5	GIUH50PRO_IS_07	32.58	307.88	310.74		310.89	0.009574	1.70	19.13	11.86	0.43
T.Vertola	09.5	GIUH20PRO_IS_07	30.28	307.88	310.65		310.79	0.009747	1.68	18.01	11.58	0.43
T.Vertola	09.48		Lat Struct									
T.Vertola	9.4	GIUH200PRO_IS_07	35.29	307.00	309.81		310.00	0.013422	1.94	18.20	11.51	0.49
T.Vertola	9.4	GIUH50PRO_IS_07	32.95	307.00	309.72		309.91	0.013598	1.92	17.21	11.23	0.49
T.Vertola	9.4	GIUH20PRO_IS_07	30.60	307.00	309.61		309.80	0.013852	1.91	16.03	10.74	0.50
T.Vertola	9.2	GIUH200PRO_IS_07	35.70	305.85	308.90		309.05	0.007805	1.66	21.45	12.30	0.40
T.Vertola	9.2	GIUH50PRO_IS_07	33.28	305.85	308.80		308.94	0.007831	1.65	20.22	11.86	0.40
T.Vertola	9.2	GIUH20PRO_IS_07	30.82	305.85	308.70		308.83	0.007763	1.62	19.05	11.45	0.40
T.Vertola	09	GIUH200PRO_IS_07	39.76	305.10	308.37		308.51	0.009523	1.70	24.17	13.81	0.37
T.Vertola	09	GIUH50PRO_IS_07	36.83	305.10	308.26		308.40	0.009641	1.66	22.79	13.37	0.37
T.Vertola	09	GIUH20PRO_IS_07	34.09	305.10	308.16		308.30	0.009790	1.62	21.48	12.95	0.37
T.Vertola	8.99		Lat Struct									
T.Vertola	8.978		Lat Struct									
T.Vertola	08.5	GIUH200PRO_IS_07	39.76	303.65	306.79		306.94	0.010187	1.69	23.96	12.67	0.37
T.Vertola	08.5	GIUH50PRO_IS_07	36.82	303.65	306.68		306.82	0.010142	1.65	22.60	12.21	0.37
T.Vertola	08.5	GIUH20PRO_IS_07	34.08	303.65	306.58		306.71	0.010082	1.61	21.34	11.76	0.37
T.Vertola	08.3	GIUH200PRO_IS_07	36.42	302.31	304.64		304.79	0.009246	1.68	21.92	13.81	0.41
T.Vertola	08.3	GIUH50PRO_IS_07	34.76	302.31	304.62		304.75	0.008805	1.63	21.57	13.78	0.40

HEC-RAS River: T.Vertola Reach: T.Vertola Profile: Max WS (Continued)

Reach	River Sta	Plan	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
T.Vertola	08.3	GIUH20PRO_IS_07	32.94	302.31	304.59		304.71	0.008323	1.57	21.17	13.74	0.39
T.Vertola	08	GIUH200PRO_IS_07	29.16	300.69	303.69		303.77	0.005934	1.30	22.46	11.49	0.29
T.Vertola	08	GIUH50PRO_IS_07	28.86	300.69	303.68		303.77	0.005869	1.29	22.39	11.13	0.29
T.Vertola	08	GIUH20PRO_IS_07	28.49	300.69	303.67		303.76	0.005790	1.28	22.29	11.00	0.29
T.Vertola	07.7	GIUH200PRO_IS_07	26.66	299.57	302.22		302.36	0.010113	1.63	16.49	10.84	0.38
T.Vertola	07.7	GIUH50PRO_IS_07	26.61	299.57	302.22		302.35	0.010094	1.63	16.48	10.84	0.38
T.Vertola	07.7	GIUH20PRO_IS_07	26.53	299.57	302.22		302.35	0.010061	1.63	16.46	10.84	0.38
T.Vertola	07.5	GIUH200PRO_IS_07	22.20	298.61	301.27		301.36	0.004398	1.35	18.52	12.97	0.29
T.Vertola	07.5	GIUH50PRO_IS_07	22.19	298.61	301.27		301.36	0.004397	1.35	18.51	12.97	0.29
T.Vertola	07.5	GIUH20PRO_IS_07	22.17	298.61	301.27		301.36	0.004393	1.35	18.51	12.97	0.29
T.Vertola	07.3	GIUH200PRO_IS_07	20.47	297.68	300.15		300.24	0.010452	1.32	15.50	11.69	0.36
T.Vertola	07.3	GIUH50PRO_IS_07	20.47	297.68	300.15		300.24	0.010448	1.32	15.50	11.69	0.36
T.Vertola	07.3	GIUH20PRO_IS_07	20.46	297.68	300.15		300.24	0.010451	1.32	15.50	11.68	0.36
T.Vertola	07	GIUH200PRO_IS_07	19.77	296.56	298.99		299.05	0.005557	1.09	18.27	12.40	0.28
T.Vertola	07	GIUH50PRO_IS_07	19.77	296.56	298.99		299.05	0.005555	1.09	18.27	12.40	0.28
T.Vertola	07	GIUH20PRO_IS_07	19.76	296.56	298.99		299.05	0.005554	1.09	18.27	12.40	0.28
T.Vertola	06	GIUH200PRO_IS_07	18.40	295.85	298.22		298.29	0.005632	1.09	16.88	10.83	0.28
T.Vertola	06	GIUH50PRO_IS_07	18.40	295.85	298.22		298.29	0.005631	1.09	16.88	10.83	0.28
T.Vertola	06	GIUH20PRO_IS_07	18.40	295.85	298.22		298.29	0.005630	1.09	16.88	10.83	0.28
T.Vertola	05	GIUH200PRO_IS_07	18.40	295.78	298.18	296.99	298.24	0.001583	1.10	16.67	10.47	0.28
T.Vertola	05	GIUH50PRO_IS_07	18.40	295.78	298.18	296.99	298.24	0.001583	1.10	16.67	10.47	0.28
T.Vertola	05	GIUH20PRO_IS_07	18.40	295.78	298.18	296.99	298.24	0.001583	1.10	16.67	10.47	0.28
T.Vertola	4.5		Bridge									
T.Vertola	04	GIUH200PRO_IS_07	18.40	295.75	298.12		298.21	0.002042	1.27	14.55	7.96	0.30
T.Vertola	04	GIUH50PRO_IS_07	18.40	295.75	298.12		298.21	0.002042	1.26	14.55	7.96	0.30
T.Vertola	04	GIUH20PRO_IS_07	18.40	295.75	298.12		298.21	0.002042	1.26	14.55	7.96	0.30
T.Vertola	3.99		Lat Struct									

HEC-RAS River: T.Vertola Reach: T.Vertola Profile: Max WS (Continued)

Reach	River Sta	Plan	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
T.Vertola	3.98		Lat Struct									
T.Vertola	03	GIUH200PRO_IS_07	18.40	295.60	298.07		298.15	0.006040	1.28	14.83	11.44	0.29
T.Vertola	03	GIUH50PRO_IS_07	18.40	295.60	298.07		298.15	0.006040	1.28	14.83	11.44	0.29
T.Vertola	03	GIUH20PRO_IS_07	18.40	295.60	298.07		298.15	0.006040	1.28	14.83	11.44	0.29
T.Vertola	02.7	GIUH200PRO_IS_07	17.90	294.23	297.11		297.19	0.006801	1.27	14.33	8.28	0.29
T.Vertola	02.7	GIUH50PRO_IS_07	17.90	294.23	297.11		297.19	0.006800	1.27	14.33	8.28	0.29
T.Vertola	02.7	GIUH20PRO_IS_07	17.90	294.23	297.11		297.19	0.006800	1.27	14.33	8.28	0.29
T.Vertola	02.5	GIUH200PRO_IS_07	17.44	293.45	296.07		296.14	0.007166	1.22	14.23	8.28	0.30
T.Vertola	02.5	GIUH50PRO_IS_07	17.43	293.45	296.07		296.14	0.007158	1.22	14.24	8.28	0.30
T.Vertola	02.5	GIUH20PRO_IS_07	17.43	293.45	296.07		296.14	0.007158	1.22	14.24	8.28	0.30
T.Vertola	02	GIUH200PRO_IS_07	17.44	291.89	294.64		294.69	0.004735	1.00	17.42	10.24	0.24
T.Vertola	02	GIUH50PRO_IS_07	17.43	291.89	294.65		294.70	0.004668	0.99	17.53	10.29	0.24
T.Vertola	02	GIUH20PRO_IS_07	17.43	291.89	294.65		294.70	0.004667	0.99	17.53	10.29	0.24
T.Vertola	01.5	GIUH200PRO_IS_07	17.44	291.03	293.09		293.21	0.014556	1.51	11.56	9.03	0.43
T.Vertola	01.5	GIUH50PRO_IS_07	17.43	291.03	293.04		293.17	0.016169	1.57	11.09	8.86	0.45
T.Vertola	01.5	GIUH20PRO_IS_07	17.43	291.03	293.04		293.17	0.016169	1.57	11.09	8.86	0.45
T.Vertola	1	GIUH200PRO_IS_07	7.01	288.09	292.22	288.77	292.22	0.000117	0.20	34.98	13.66	0.04
T.Vertola	1	GIUH50PRO_IS_07	5.01	288.09	291.88	288.65	291.88	0.000083	0.16	30.51	12.66	0.03
T.Vertola	1	GIUH20PRO_IS_07	7.01	288.09	291.88	288.77	291.88	0.000163	0.23	30.51	12.66	0.05