

**STUDIO DI COMPATIBILITÀ IDRAULICA FINALIZZATO ALL'AMPLIAMENTO
DEL PORTO IN LOCALITÀ "MARANA" - GOLFO DI MARINELLA
(COMUNE DI GOLFO ARANCI)**

LOTTO FUNZIONALE 1



**ALL. C - STUDIO IDRAULICO ALLEGATO 2 - RISULTATI DI HEC RAS NELLA
SITUAZIONE DI PROGETTO**

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dott. geol. Giacomo DEIANA

ORDINE DEI GEOLOGI DELLA SARDEGNA N. 655

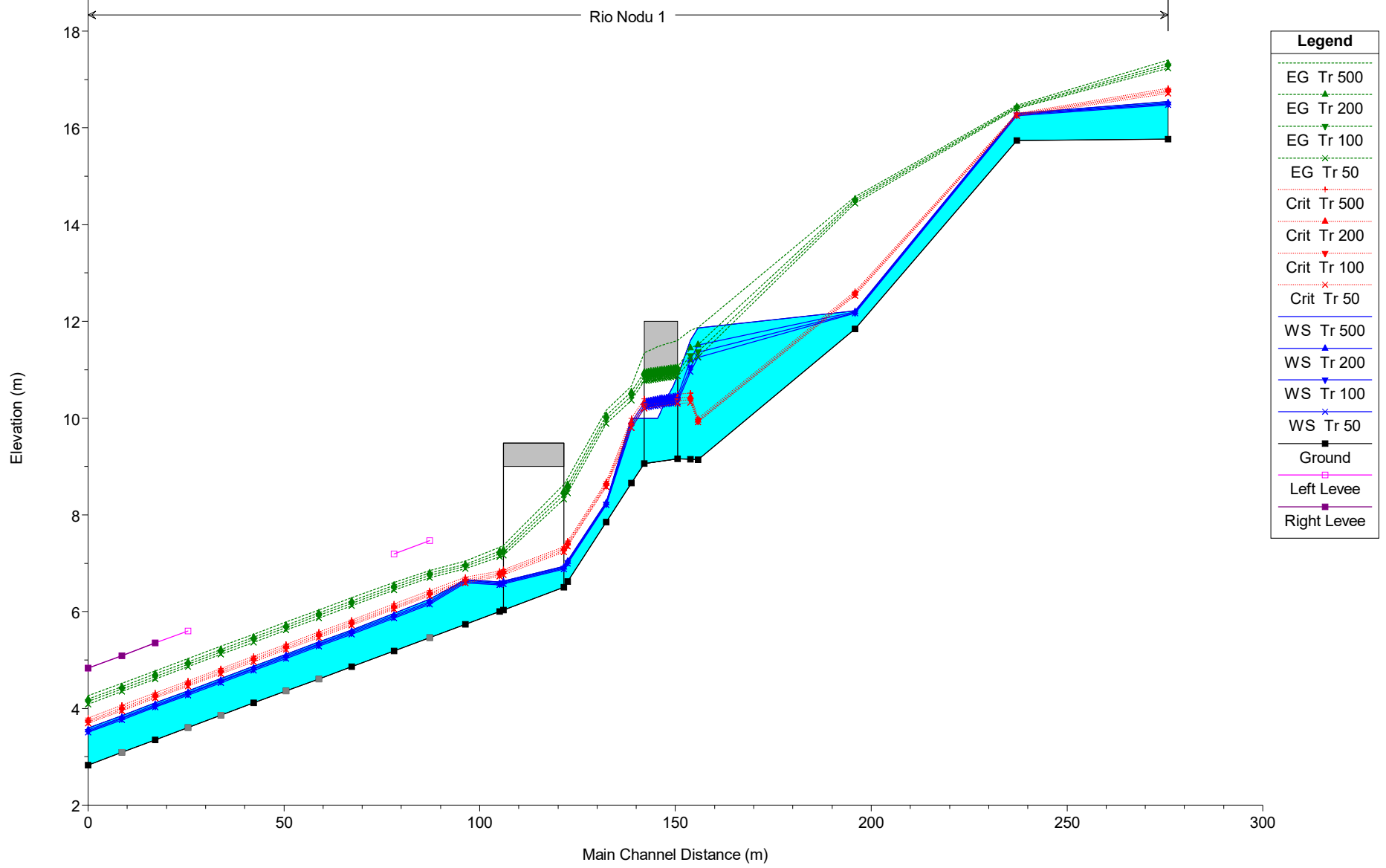
Cagliari, 28 gennaio 2020

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Rio Nodu 1

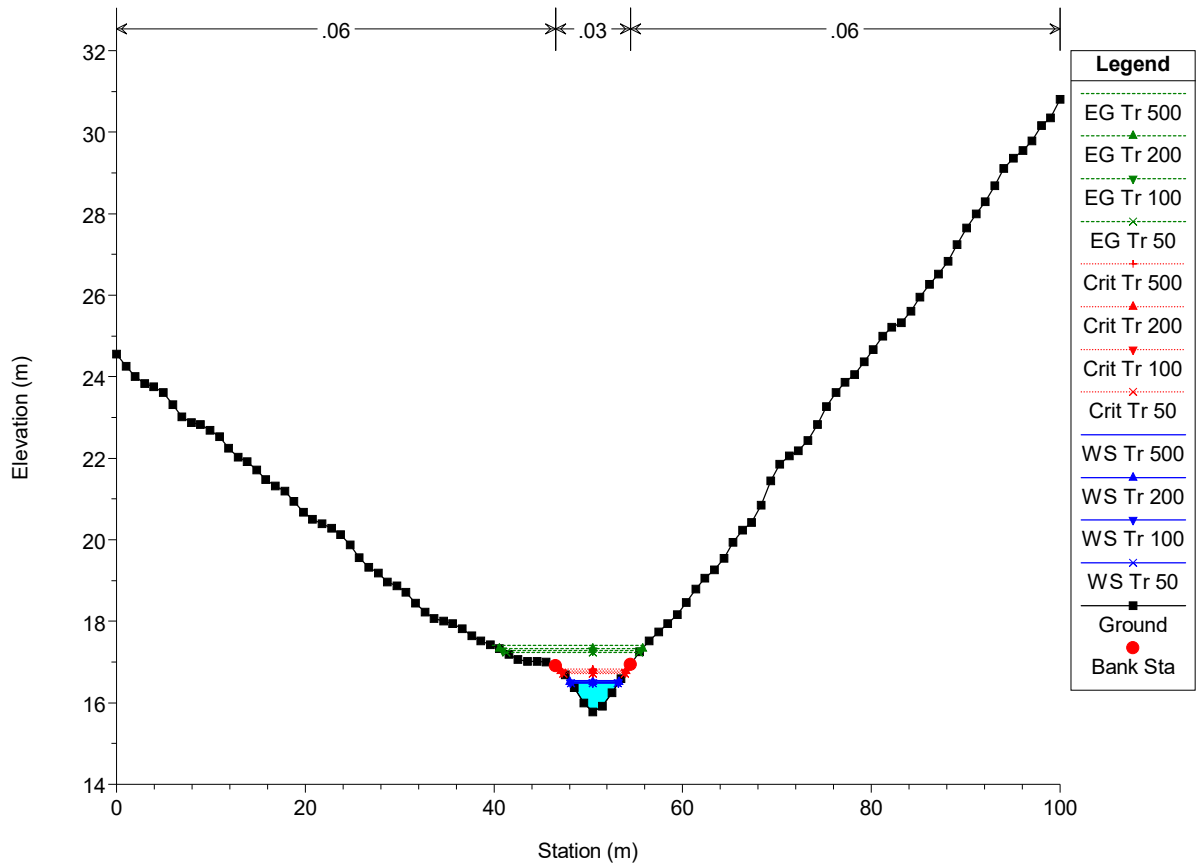


Legend

- EG Tr 500
- EG Tr 200
- EG Tr 100
- EG Tr 50
- Crit Tr 500
- Crit Tr 200
- Crit Tr 100
- Crit Tr 50
- WS Tr 500
- WS Tr 200
- WS Tr 100
- WS Tr 50
- Ground
- Left Levee
- Right Levee

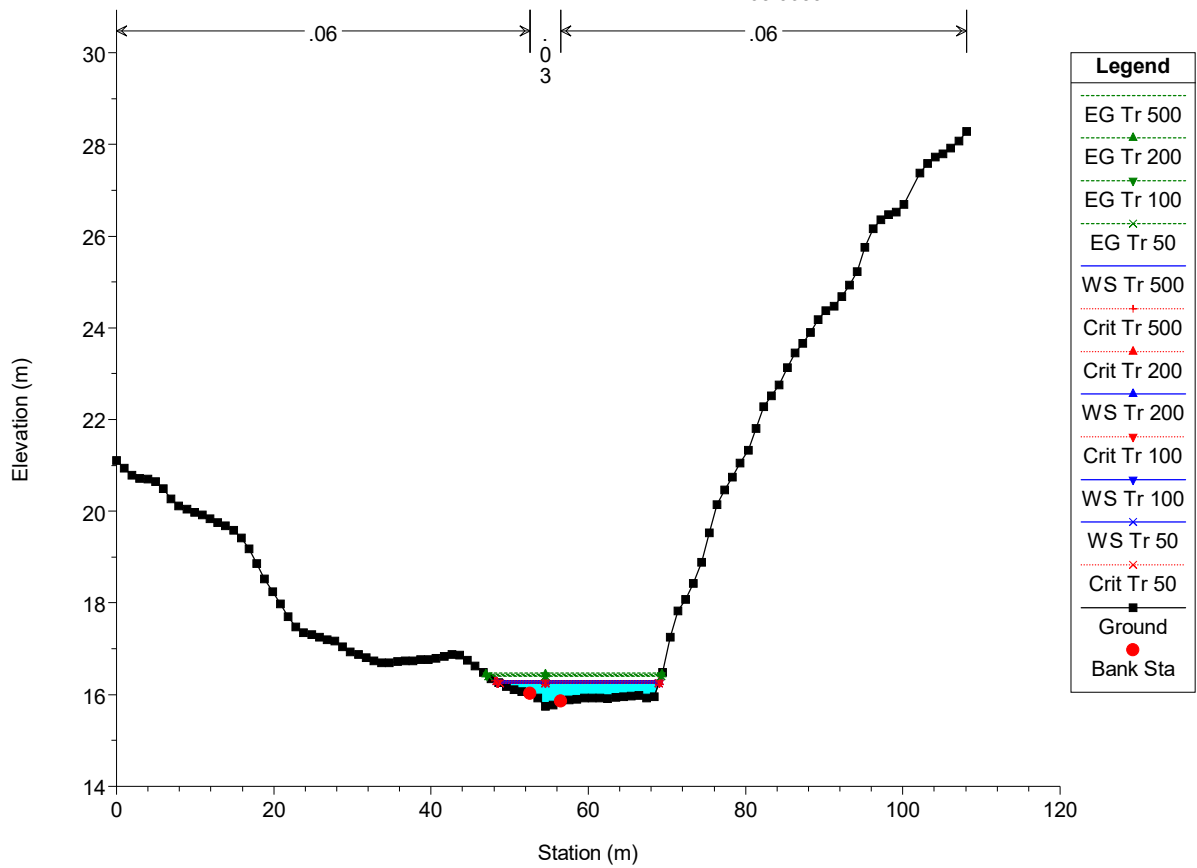
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River = Rio Nodu Reach = 1 RS = 301.7578



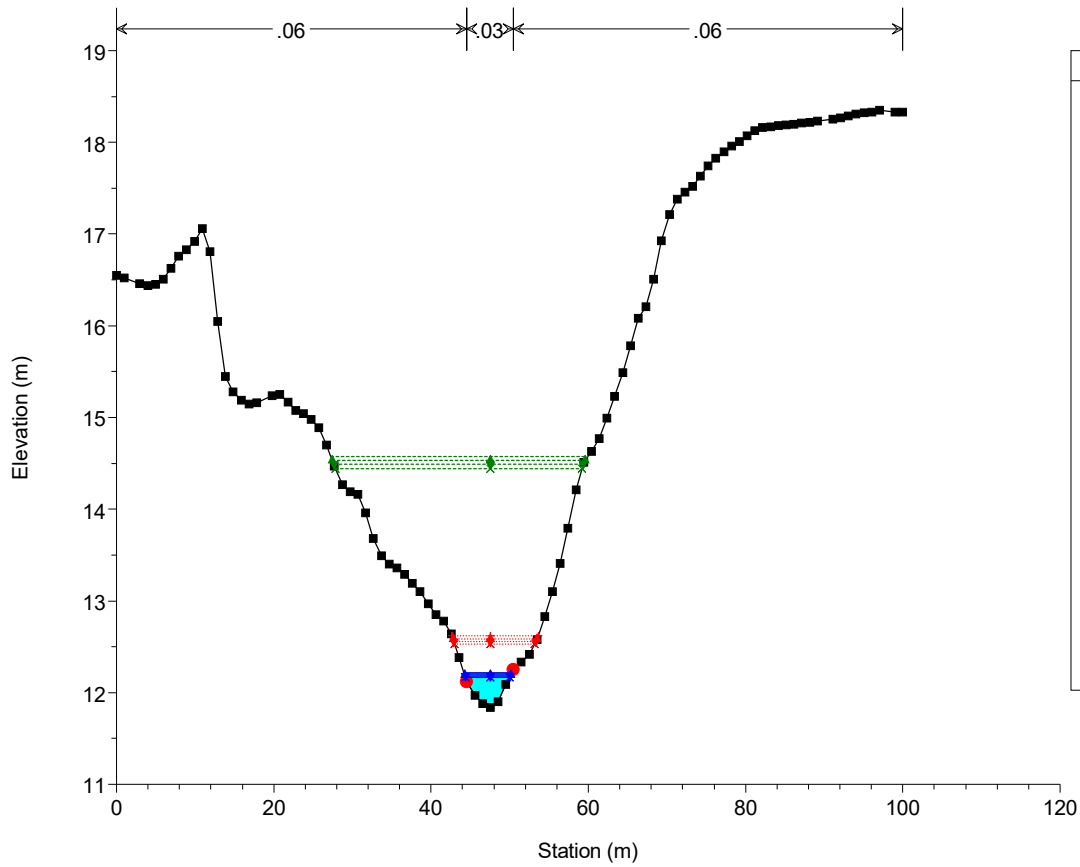
Marana-agg Plan: progetto 28/01/2020

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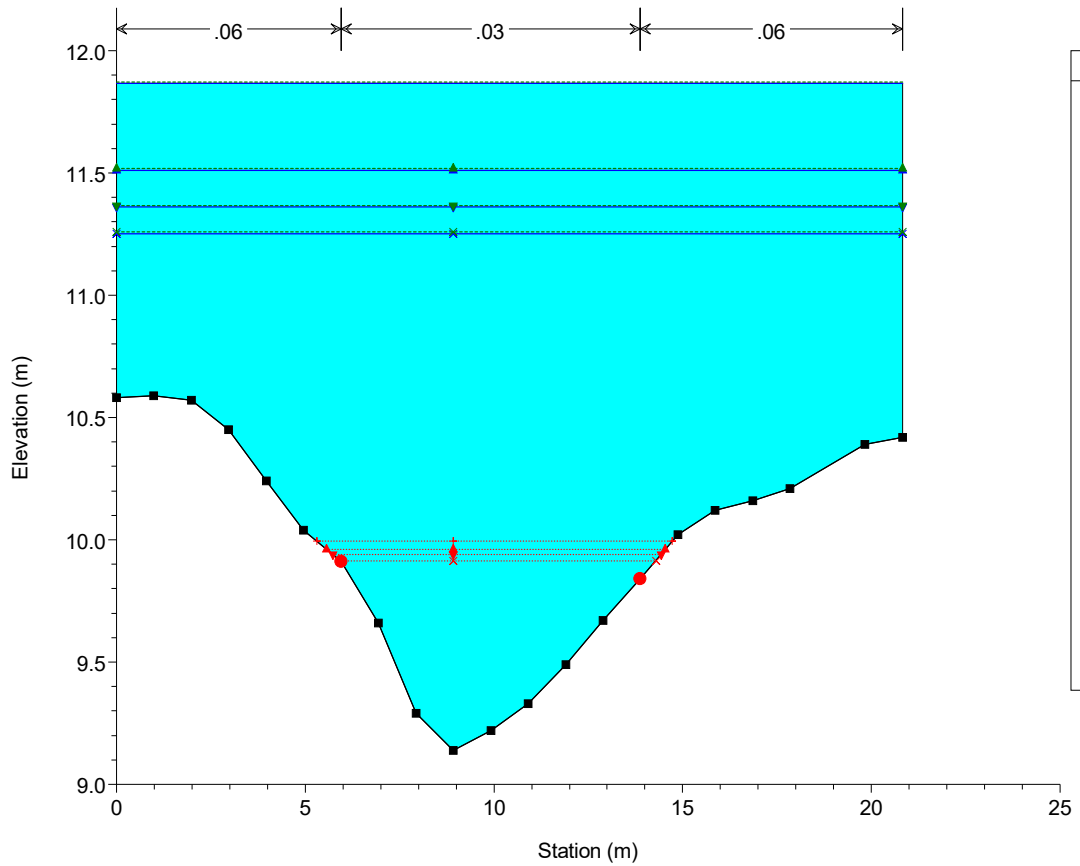
Marana-agg Plan: progetto 28/01/2020

River = Rio Nodu Reach = 1 RS = 221.7546

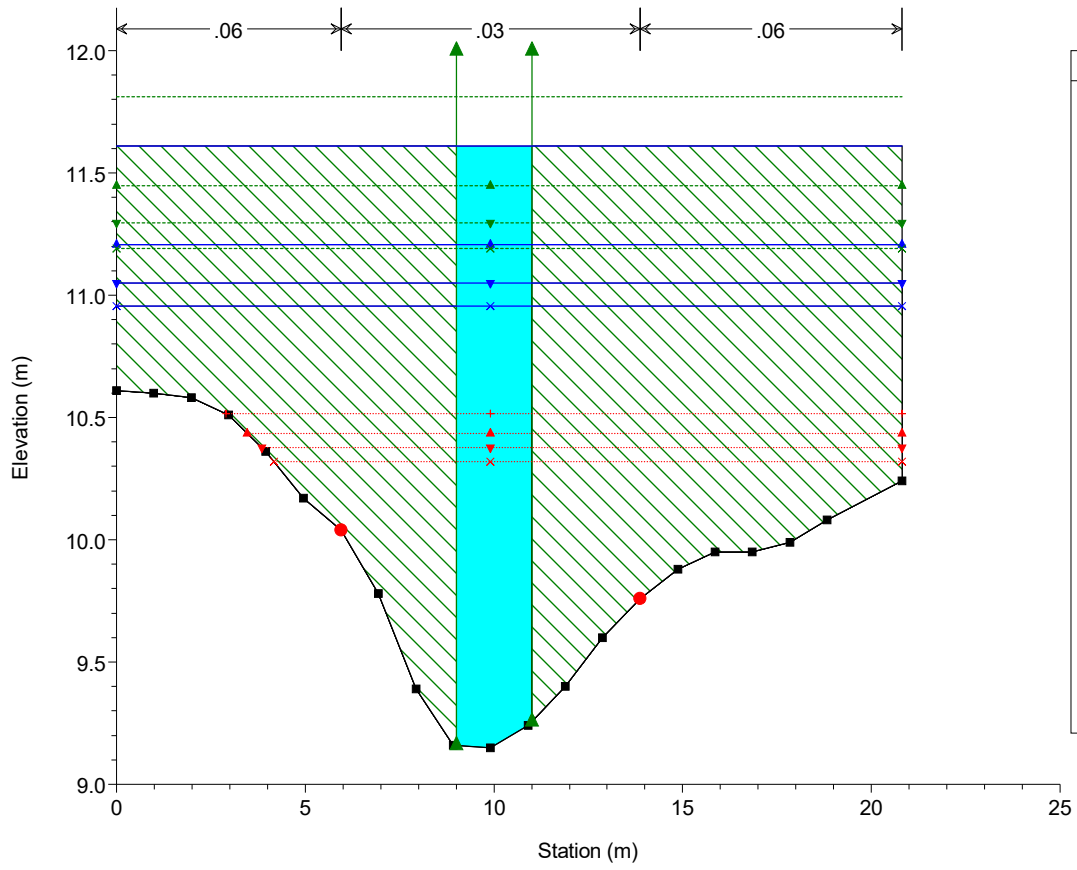


Marana-agg Plan: progetto 28/01/2020

River = Rio Nodu Reach = 1 RS = 181.6933

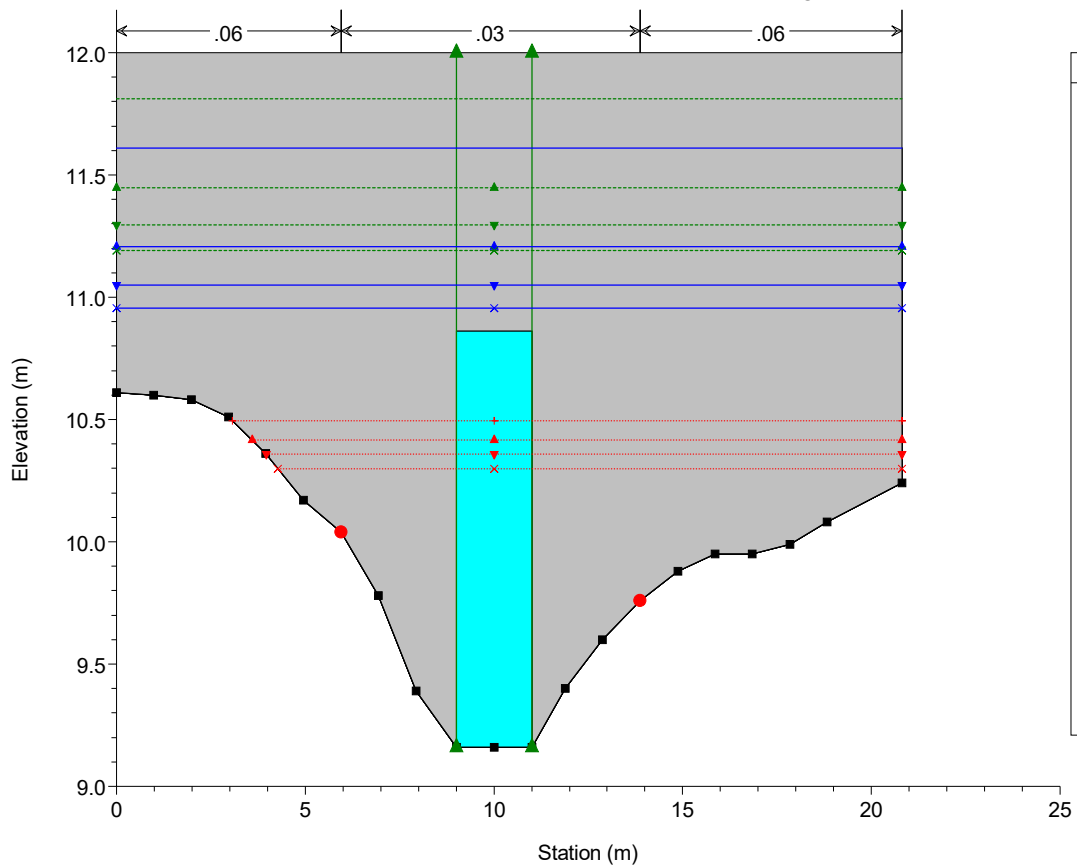


Marana-agg Plan: progetto 28/01/2020
 River = Rio Nodu Reach = 1 RS = 179.6928



Legend	
EG Tr 500	— (dotted green line)
WS Tr 500	— (solid blue line)
EG Tr 200	▲ (green triangle)
EG Tr 100	▼ (green inverted triangle)
WS Tr 200	▲ (blue triangle)
WS Tr 100	▼ (blue inverted triangle)
EG Tr 50	× (green cross)
WS Tr 50	× (blue cross)
Crit Tr 500	+ (red plus)
Crit Tr 200	▲ (red triangle)
Crit Tr 100	▼ (red inverted triangle)
Crit Tr 50	× (red cross)
Ground	■ (black square)
Ineff	▲ (green triangle)
Bank Sta	● (red circle)

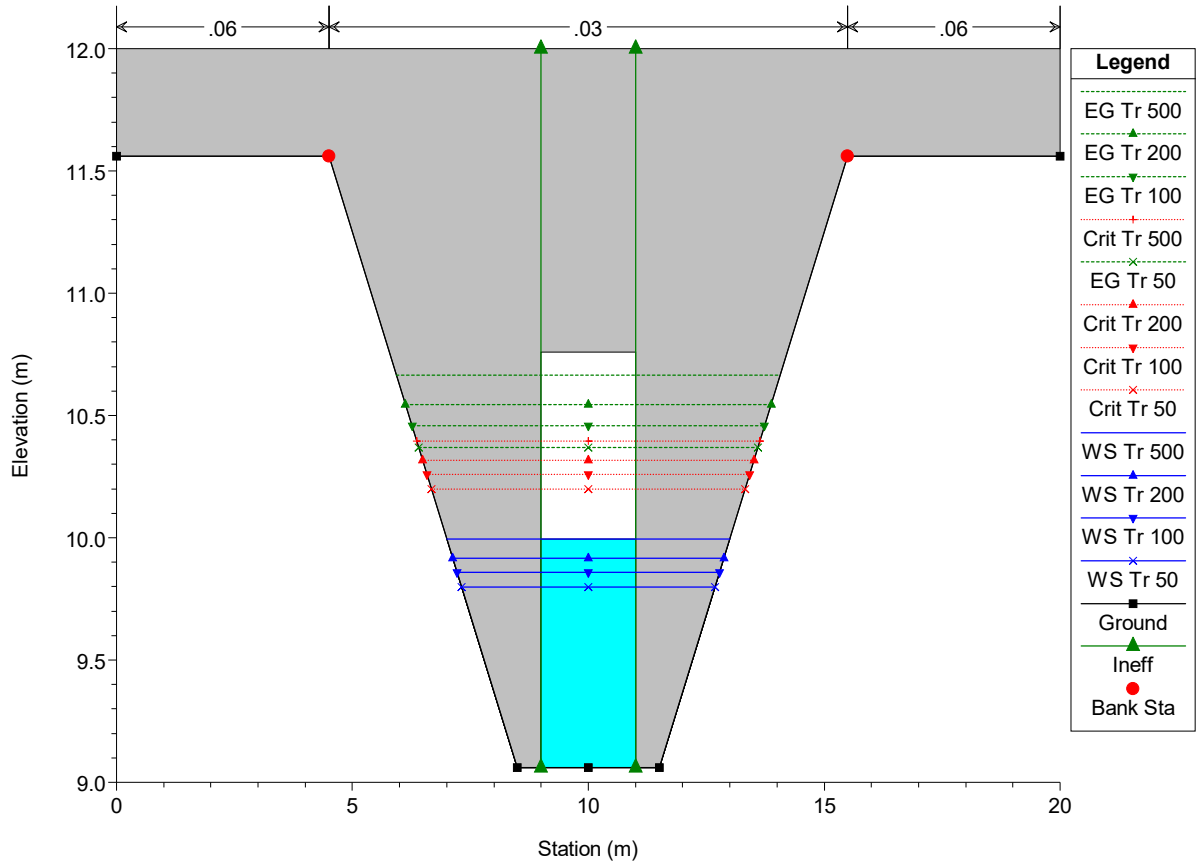
Marana-agg Plan: progetto 28/01/2020
 River = Rio Nodu Reach = 1 RS = 172.21 Culv



Legend	
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WS Tr 500	— (solid blue line)
EG Tr 200	▲ (green triangle)
EG Tr 100	▼ (green inverted triangle)
WS Tr 200	▲ (blue triangle)
WS Tr 100	▼ (blue inverted triangle)
EG Tr 50	× (green cross)
WS Tr 50	× (blue cross)
Crit Tr 500	+ (red plus)
Crit Tr 200	▲ (red triangle)
Crit Tr 100	▼ (red inverted triangle)
Crit Tr 50	× (red cross)
Ground	■ (black square)
Ineff	▲ (green triangle)
Bank Sta	● (red circle)

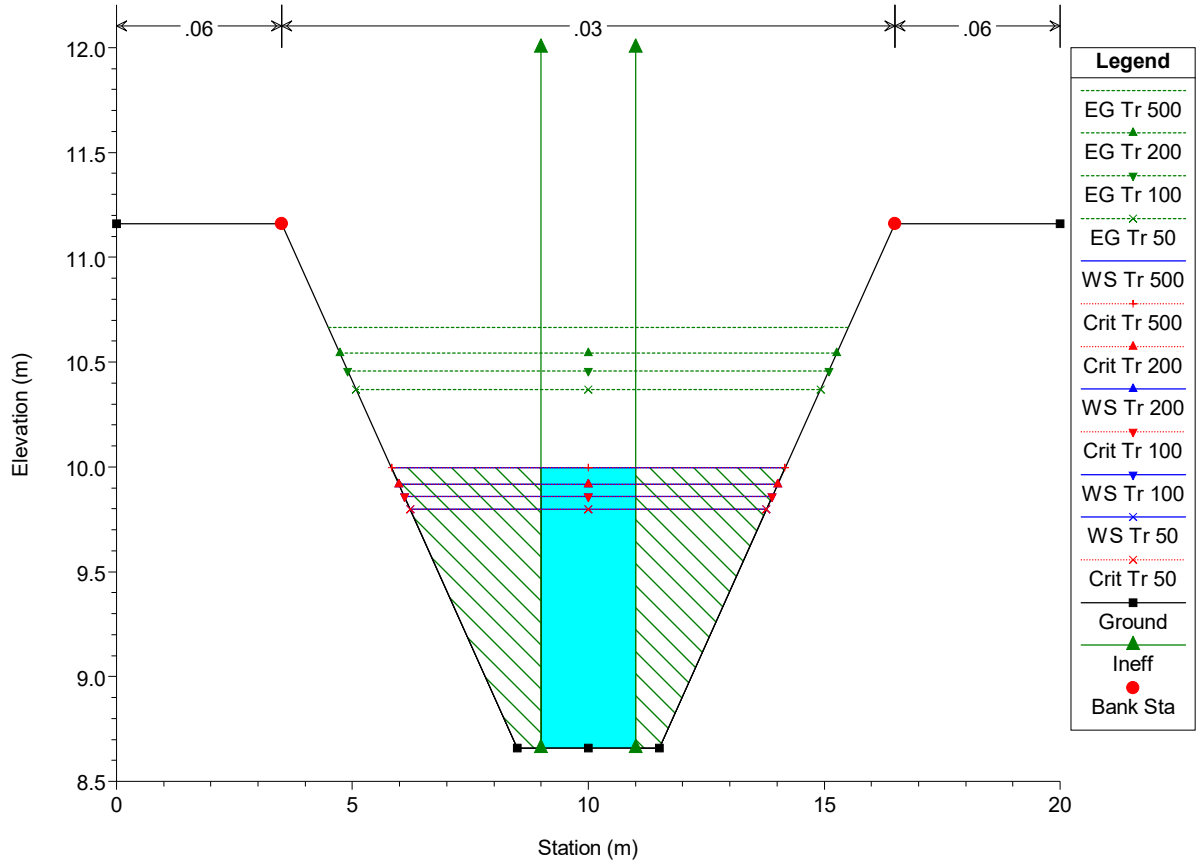
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River = Rio Nodu Reach = 1 RS = 172.21 Culv



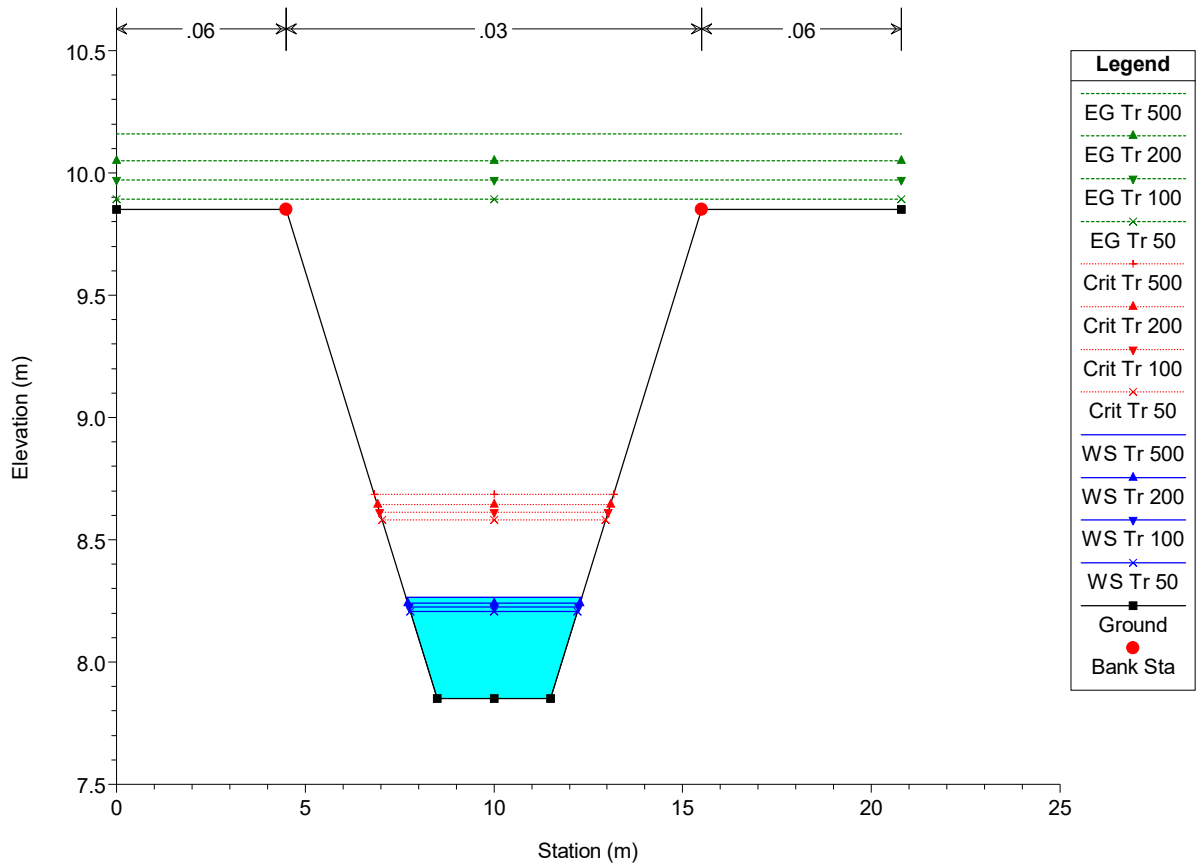
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River = Rio Nodu Reach = 1 RS = 164.7259



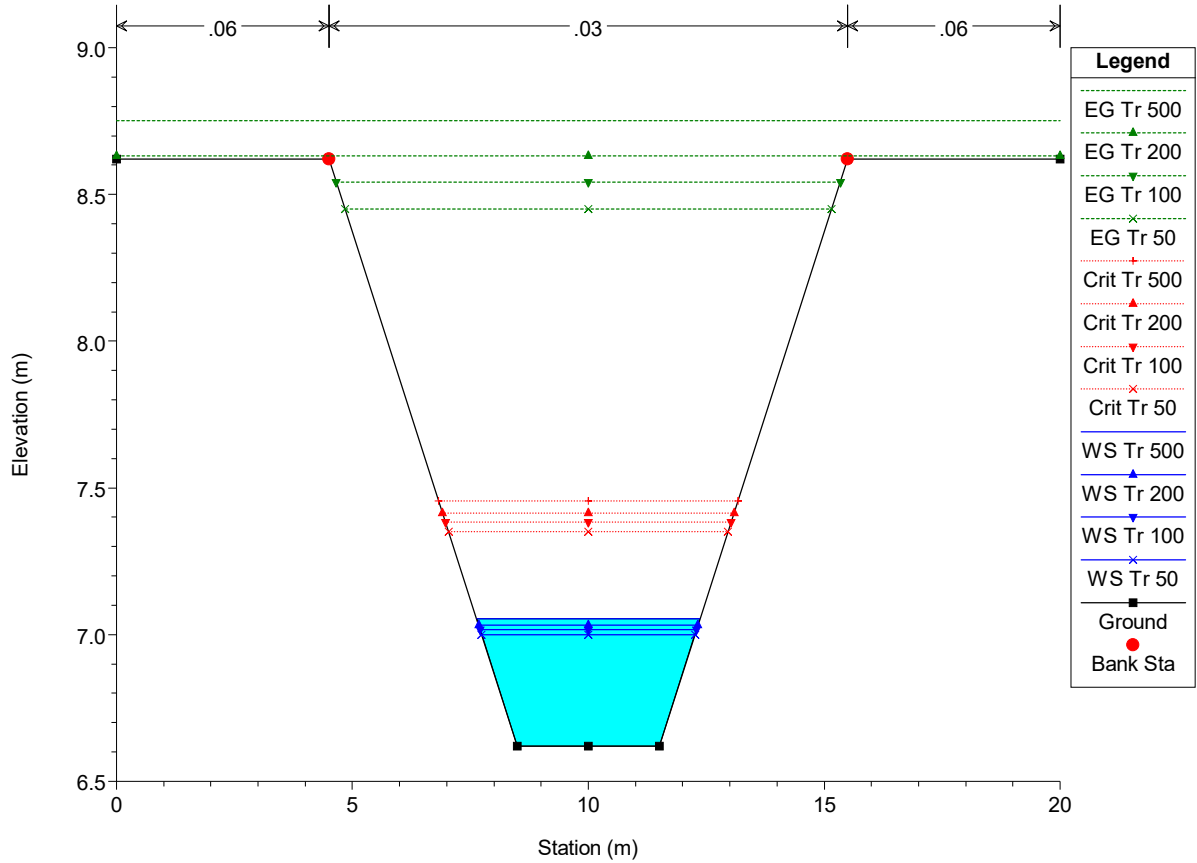
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River = Rio Nodu Reach = 1 RS = 158.2758



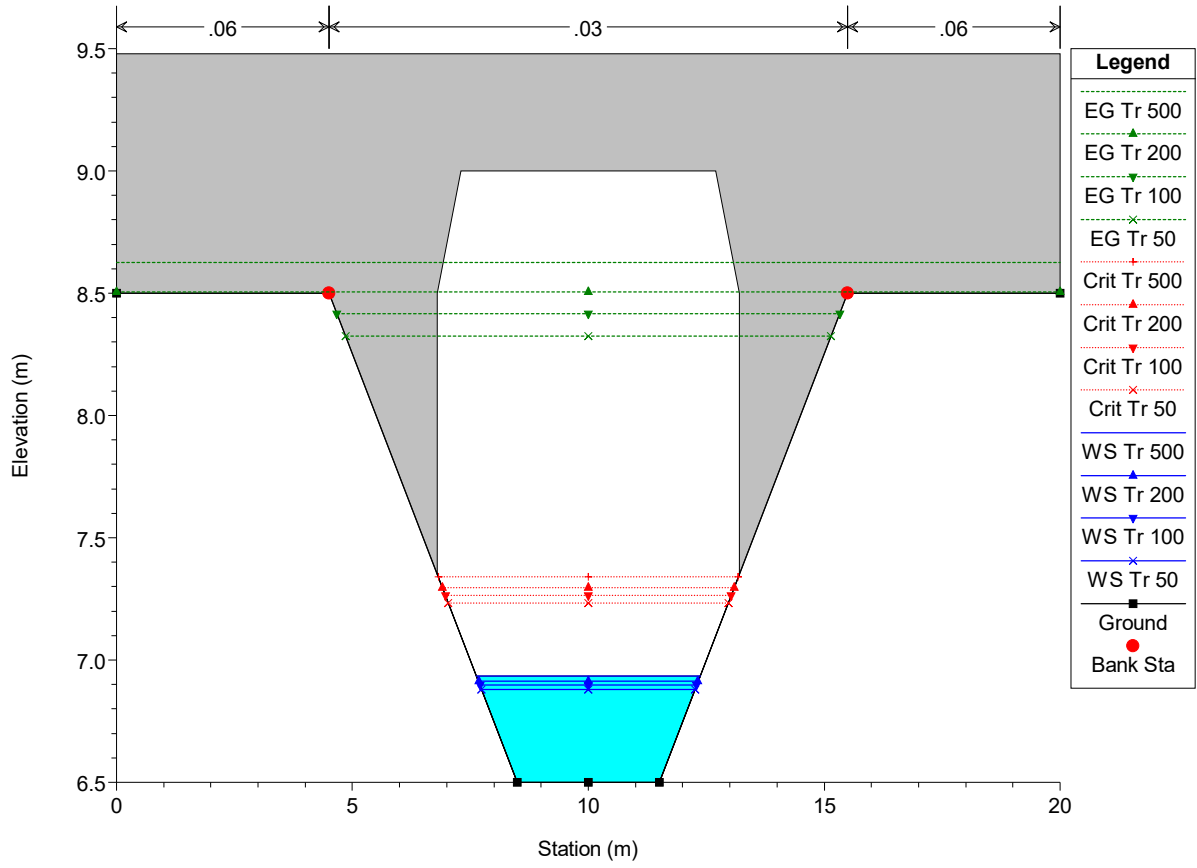
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River = Rio Nodu Reach = 1 RS = 148.44



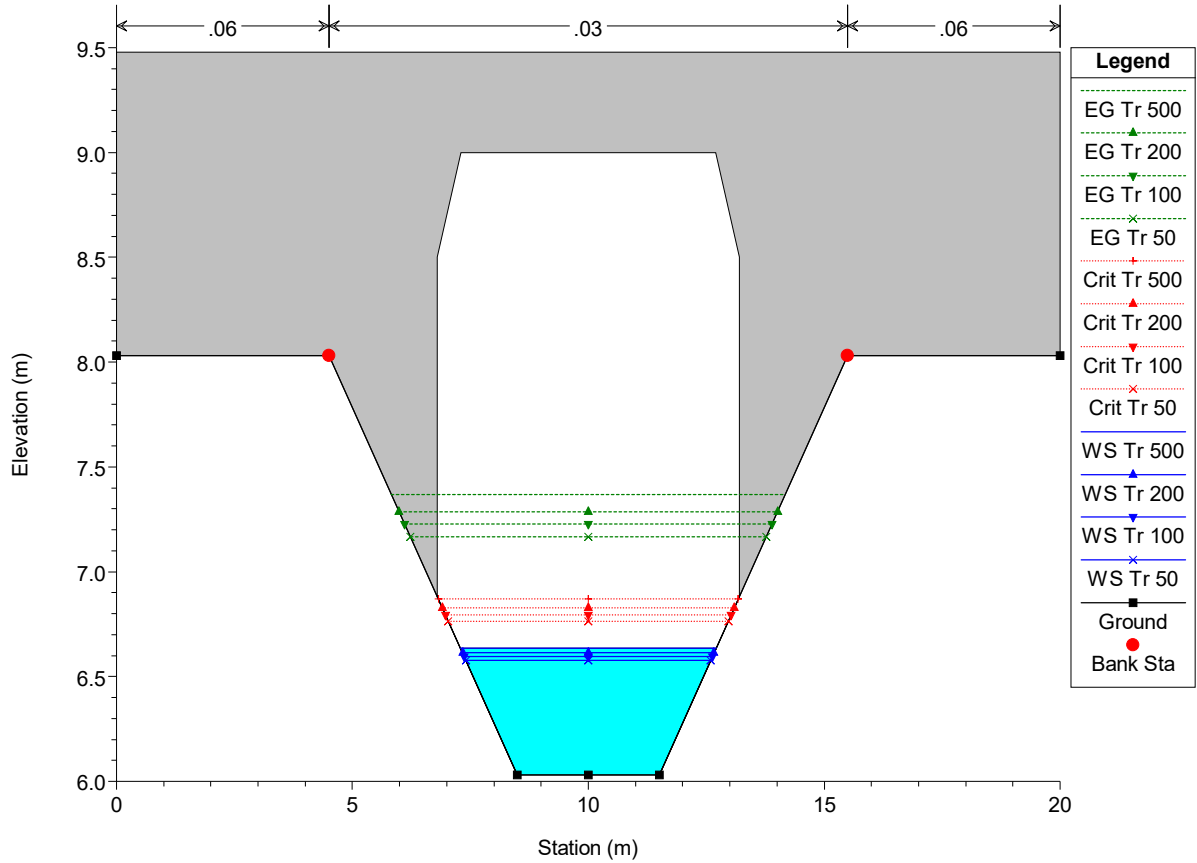
Marana-agg Plan: progetto 28/01/2020

River = Rio Nodu Reach = 1 RS = 139.74 BR



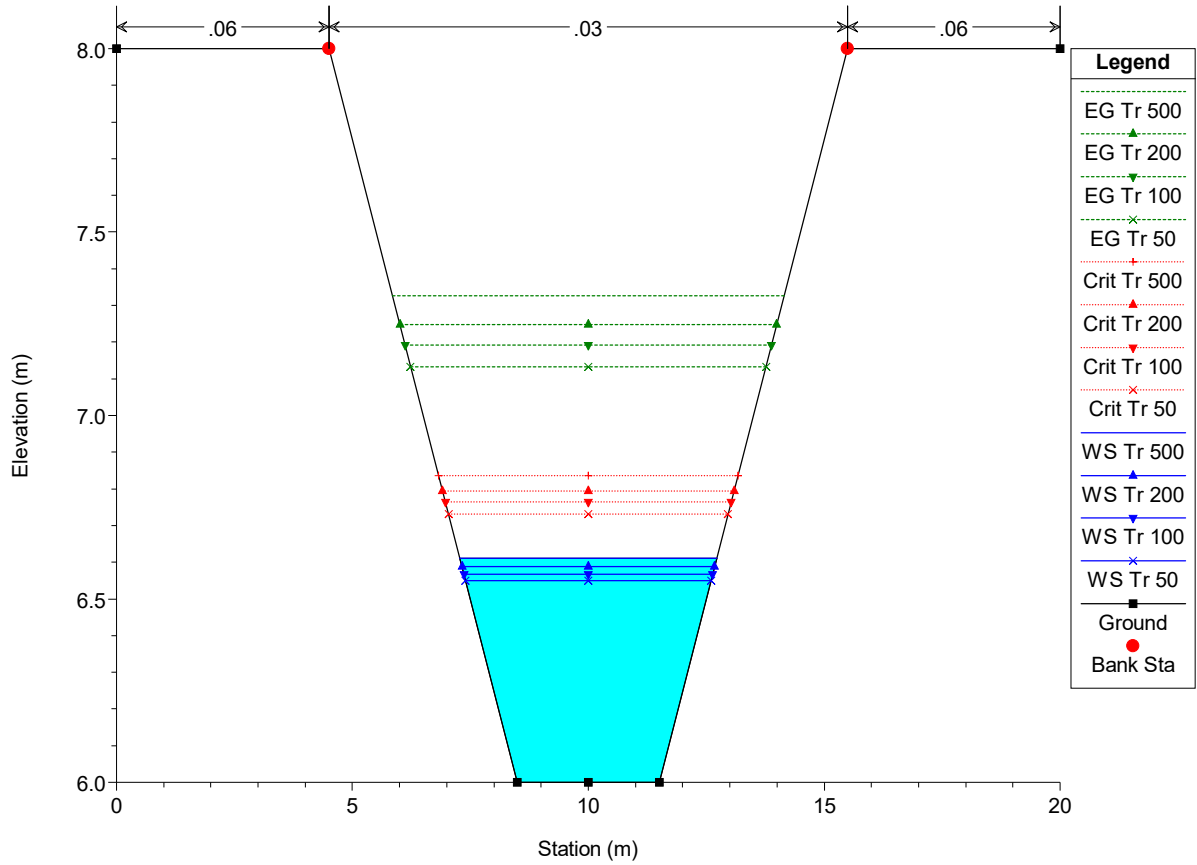
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River = Rio Nodu Reach = 1 RS = 139.74 BR



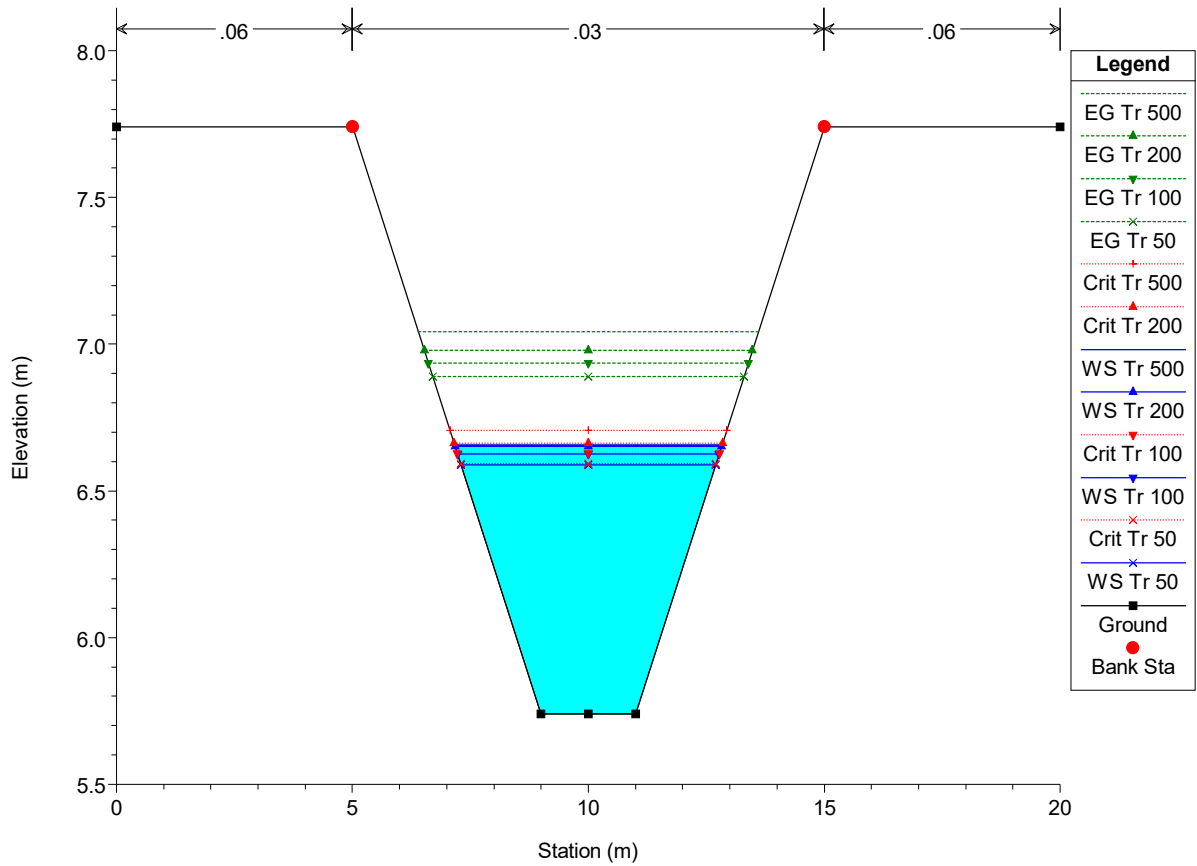
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River = Rio Nodu Reach = 1 RS = 131.04



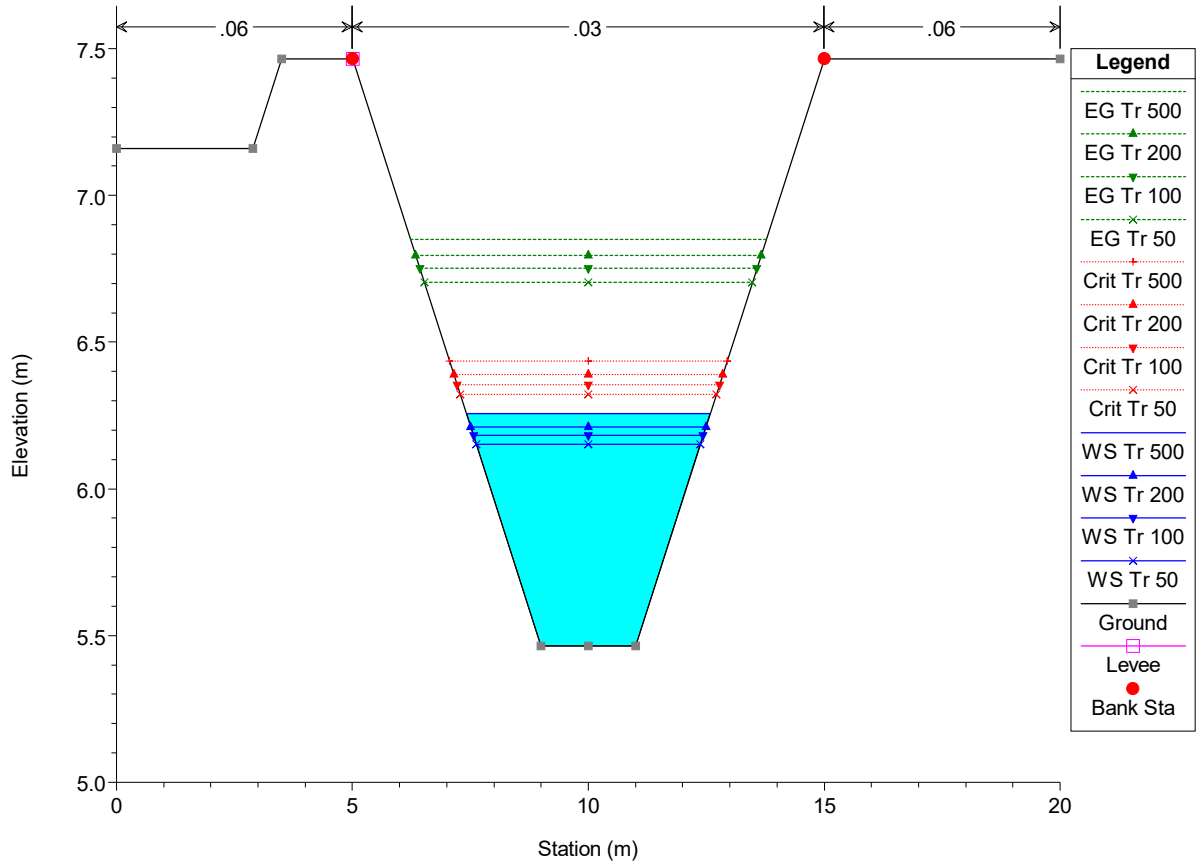
Marana-agg Plan: progetto 28/01/2020

River = Rio Nodu Reach = 1 RS = 122.3195



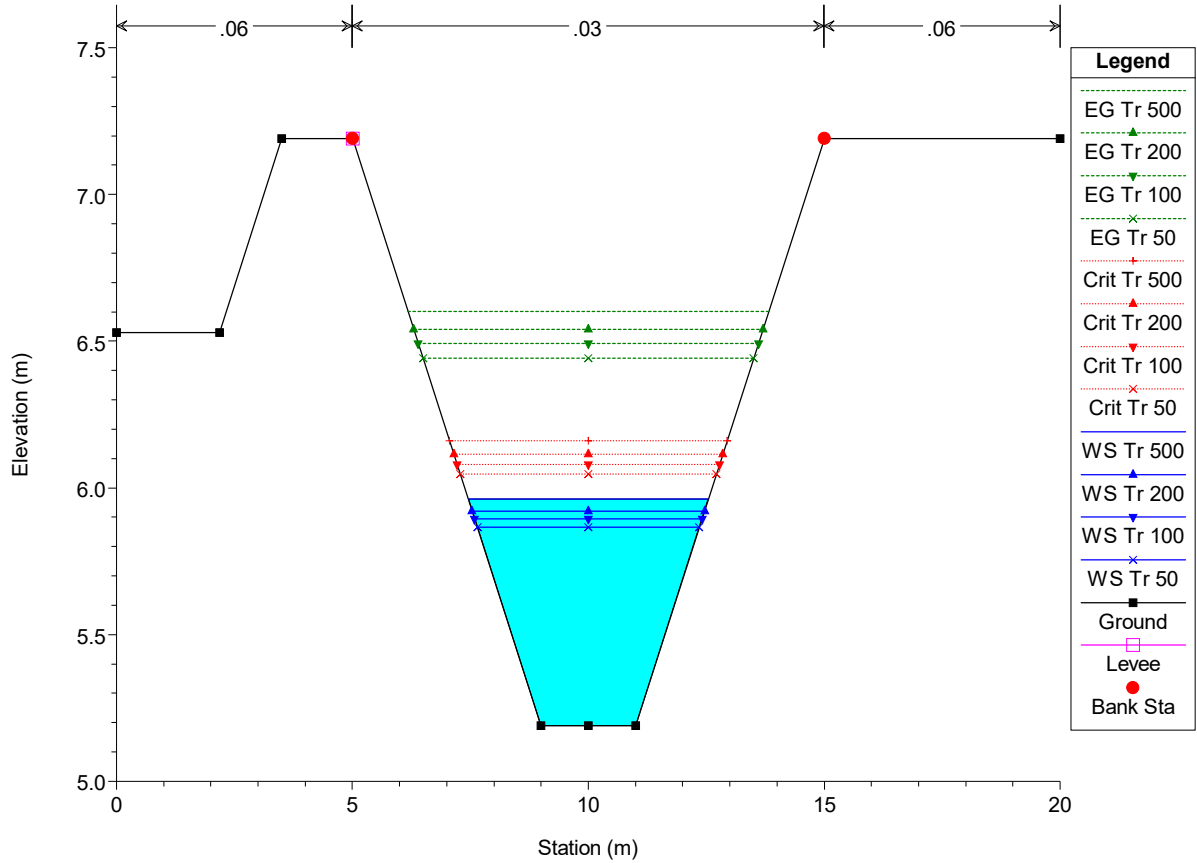
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River = Rio Nodu Reach = 1 RS = 113.20*



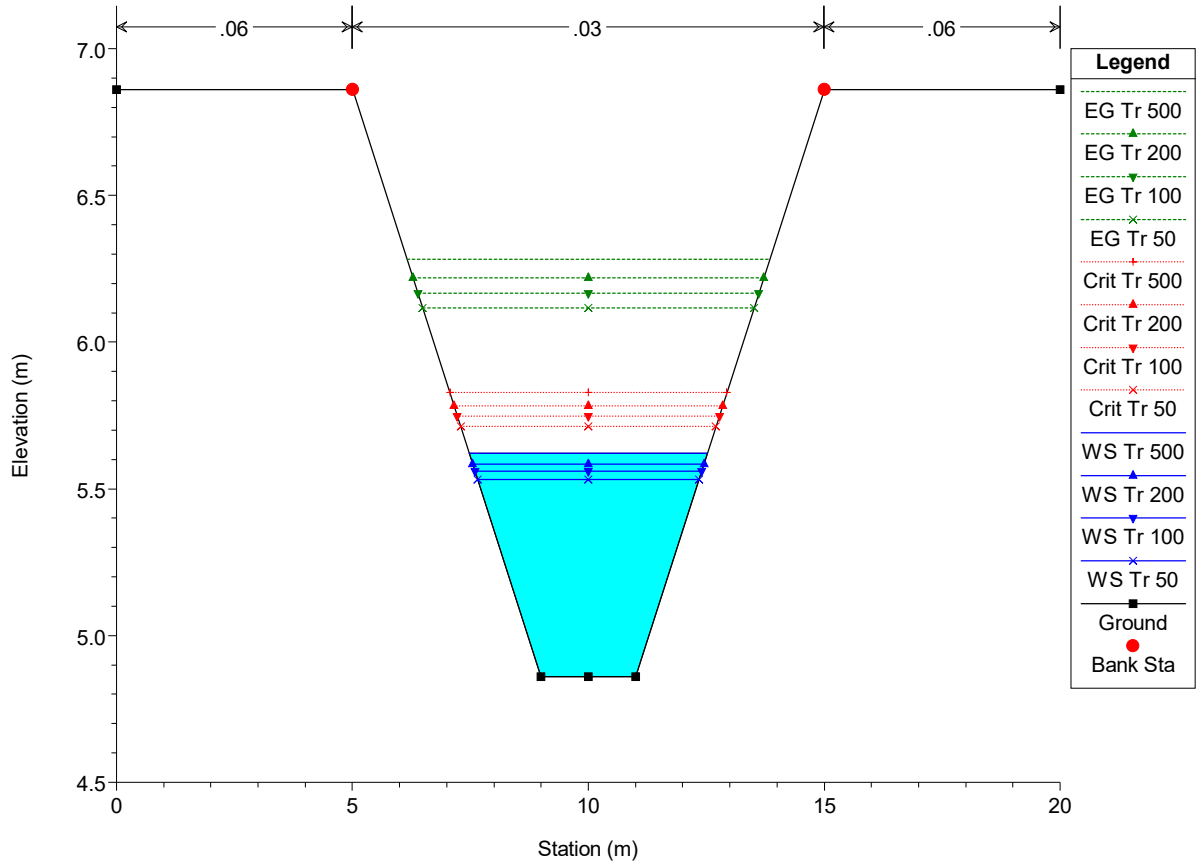
Marana-agg Plan: progetto 28/01/2020

River = Rio Nodu Reach = 1 RS = 104.0727



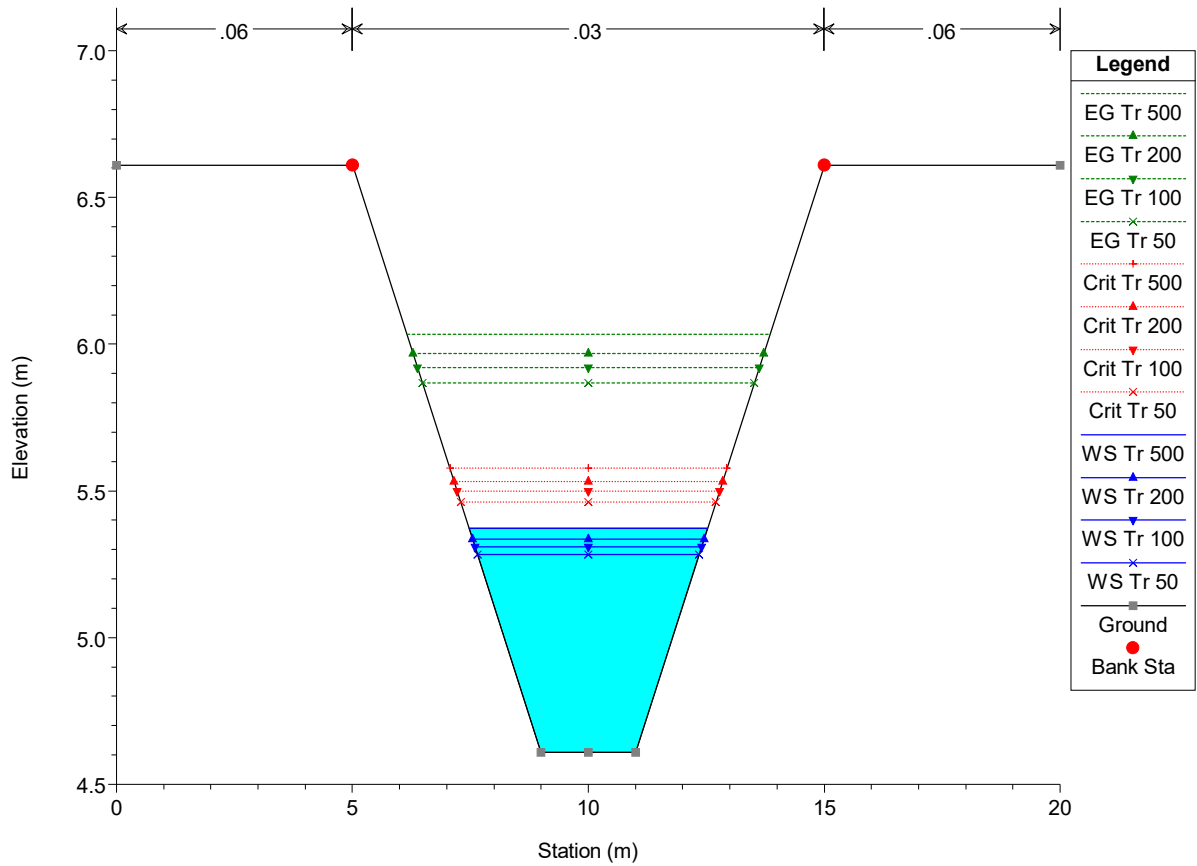
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River = Rio Nodu Reach = 1 RS = 93.18843



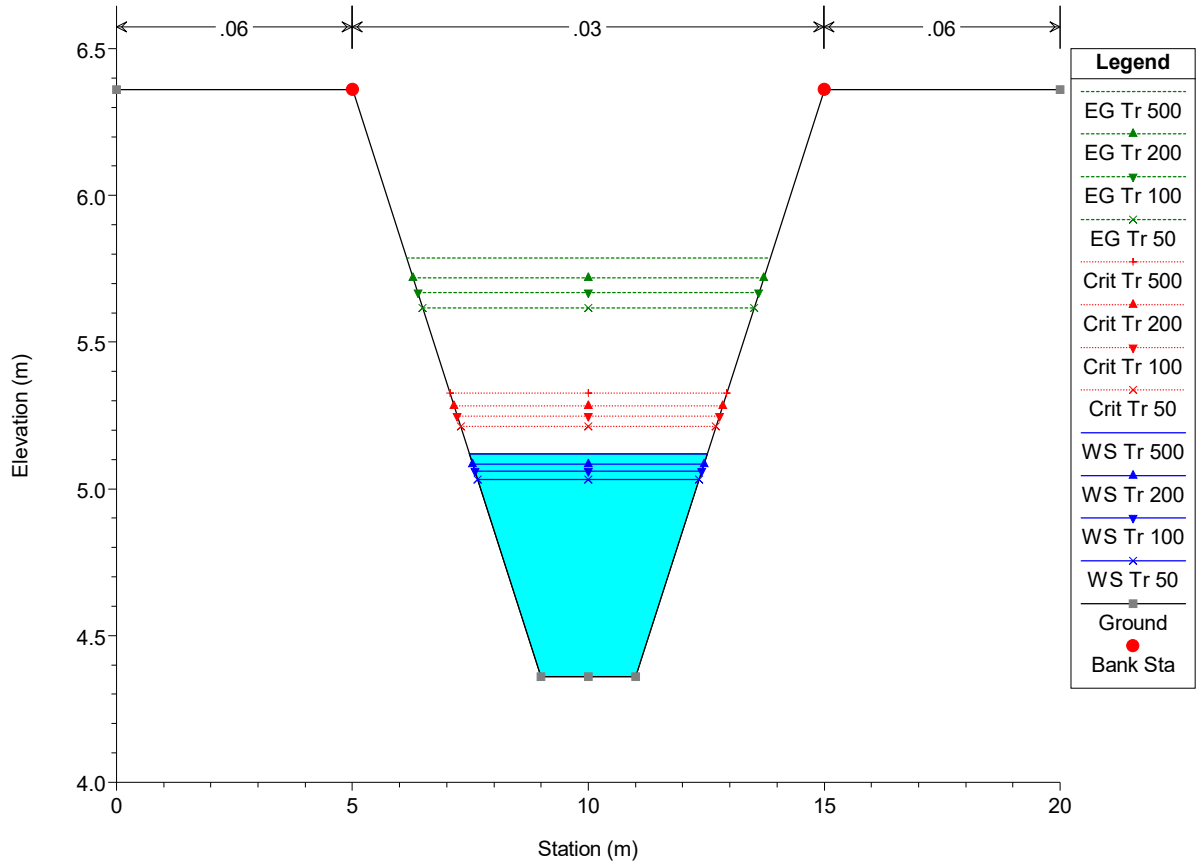
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River = Rio Nodu Reach = 1 RS = 84.845*



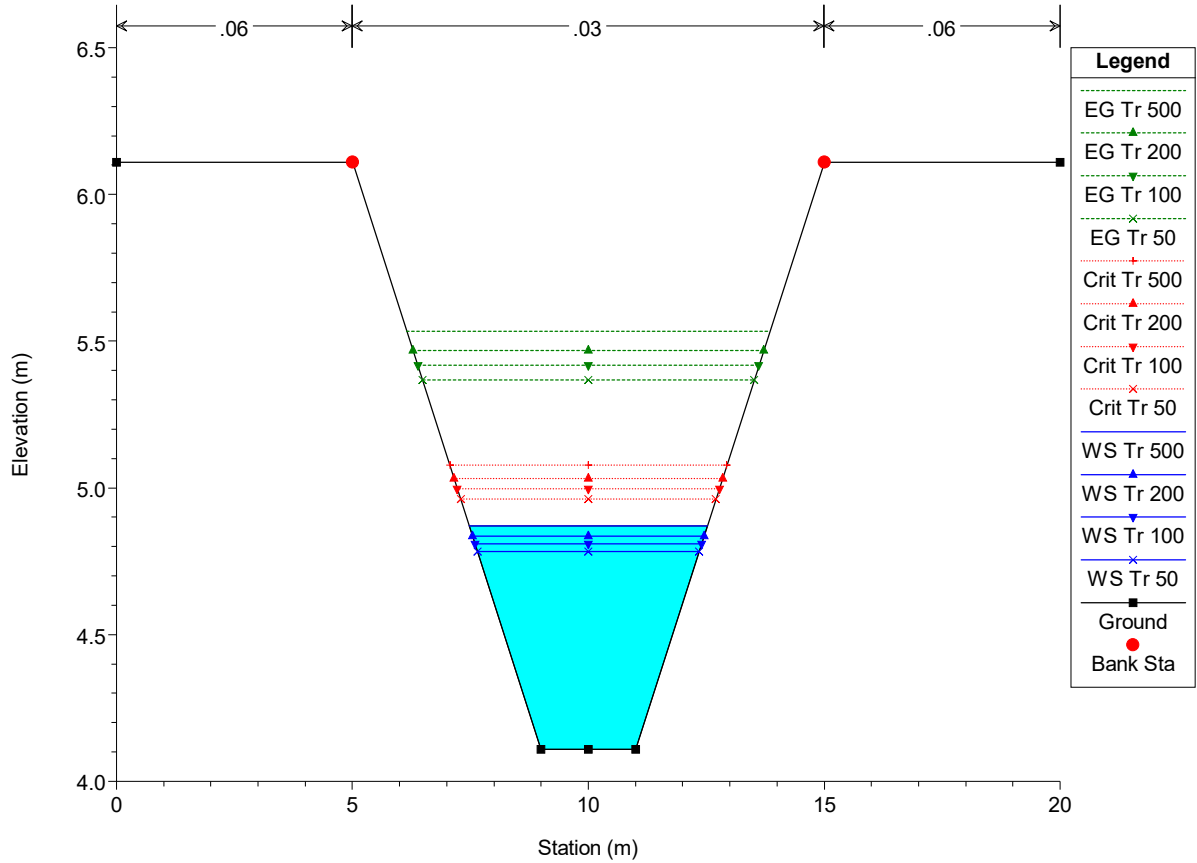
Marana-agg Plan: progetto 28/01/2020

River = Rio Nodu Reach = 1 RS = 76.502*



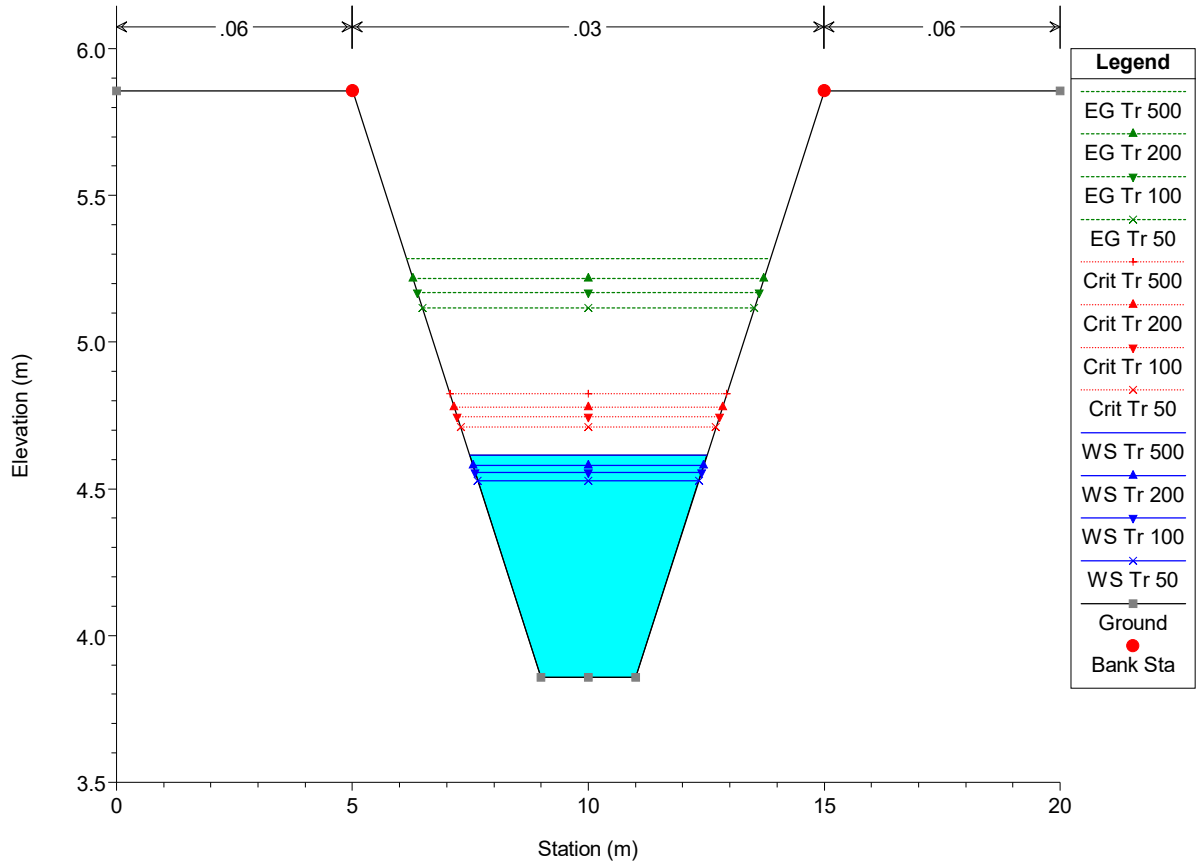
Marana-agg Plan: progetto 28/01/2020

River = Rio Nodu Reach = 1 RS = 68.15873



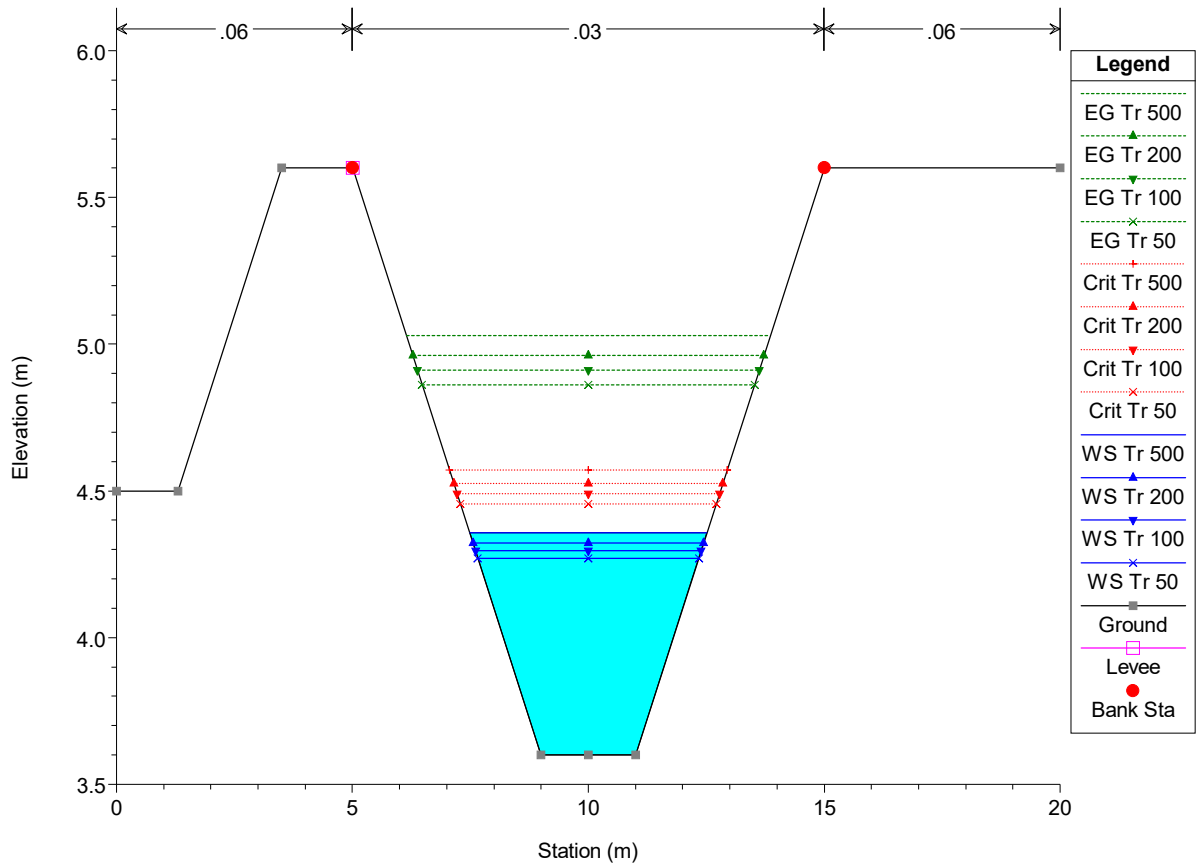
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River = Rio Nodu Reach = 1 RS = 59.788*



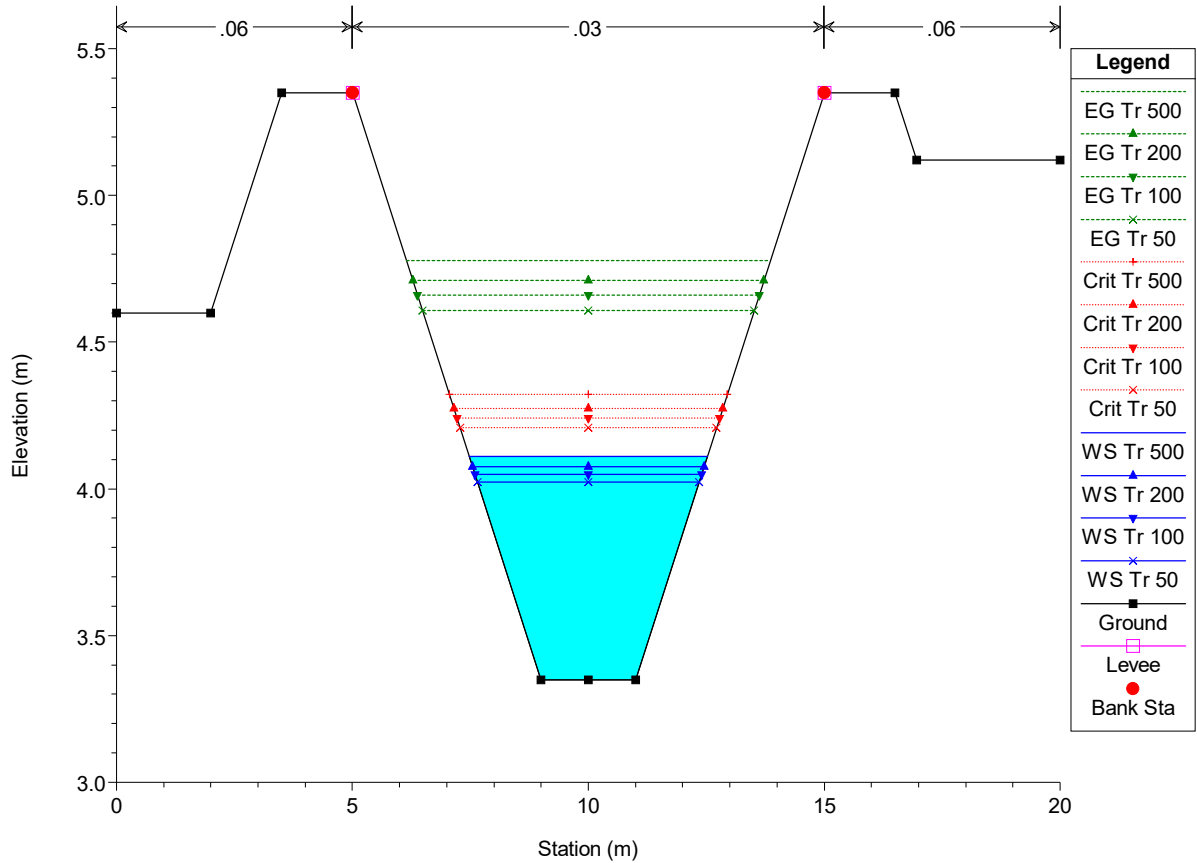
Marana-agg Plan: progetto 28/01/2020

River = Rio Nodu Reach = 1 RS = 51.418*



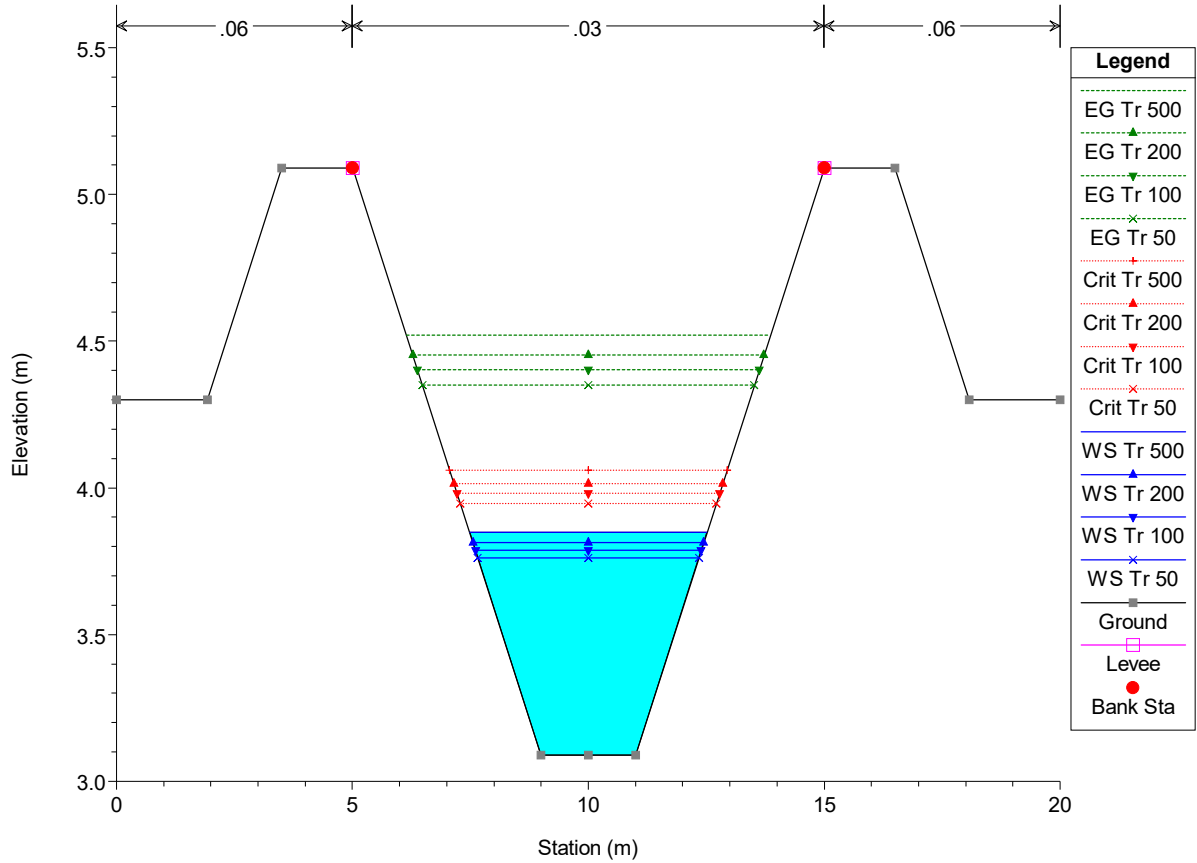
Marana-agg Plan: progetto 28/01/2020

River = Rio Nodu Reach = 1 RS = 43.04772



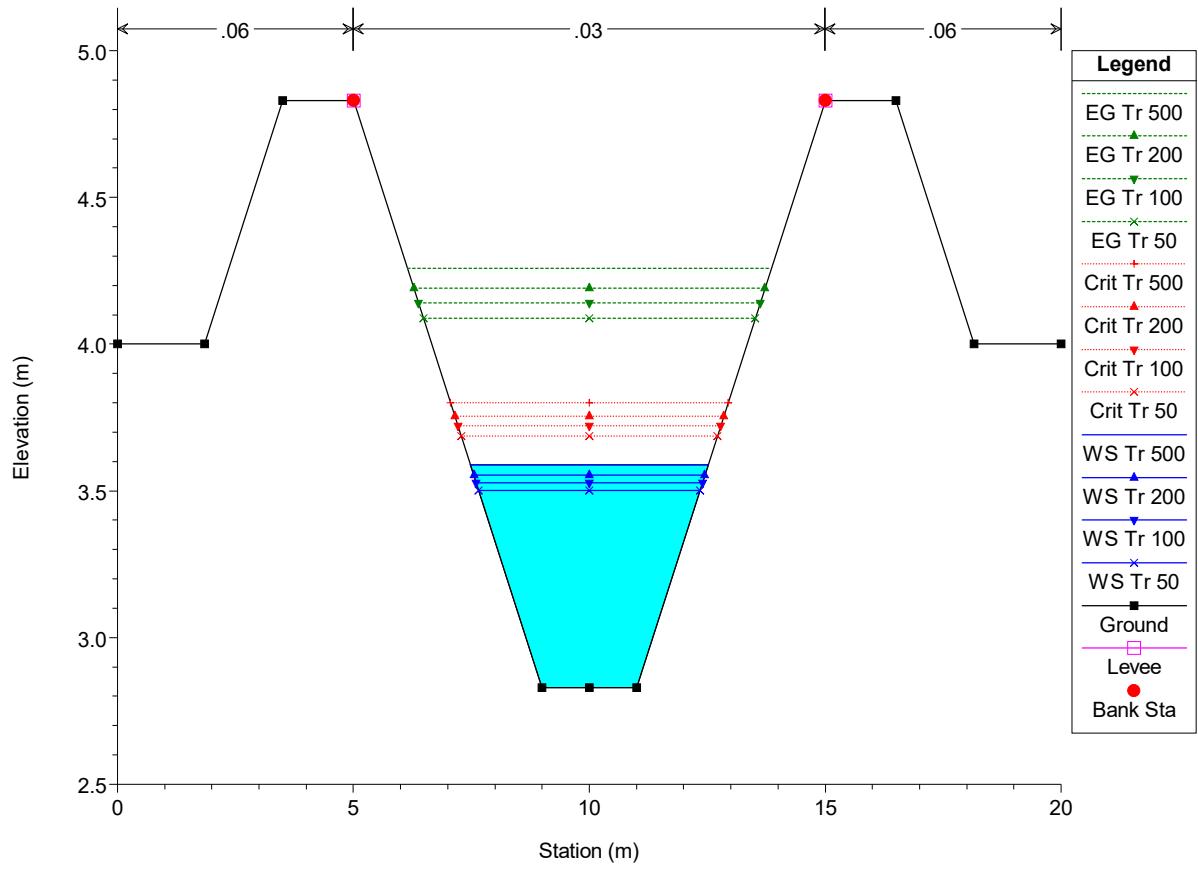
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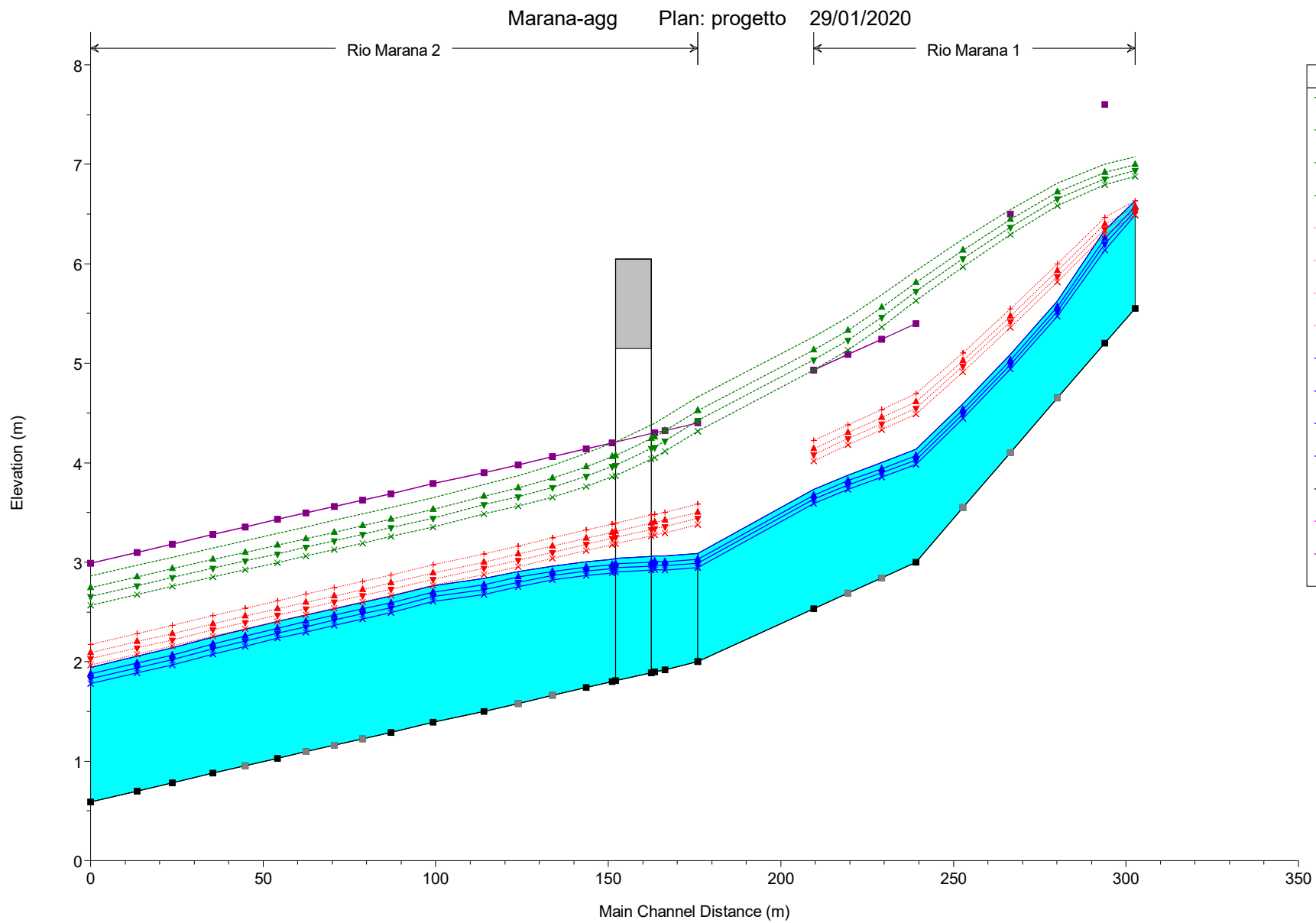
River = Rio Nodu Reach = 1 RS = 34.480*



Marana-agg Plan: progetto 28/01/2020

River = Rio Nodu Reach = 1 RS = 25.91271

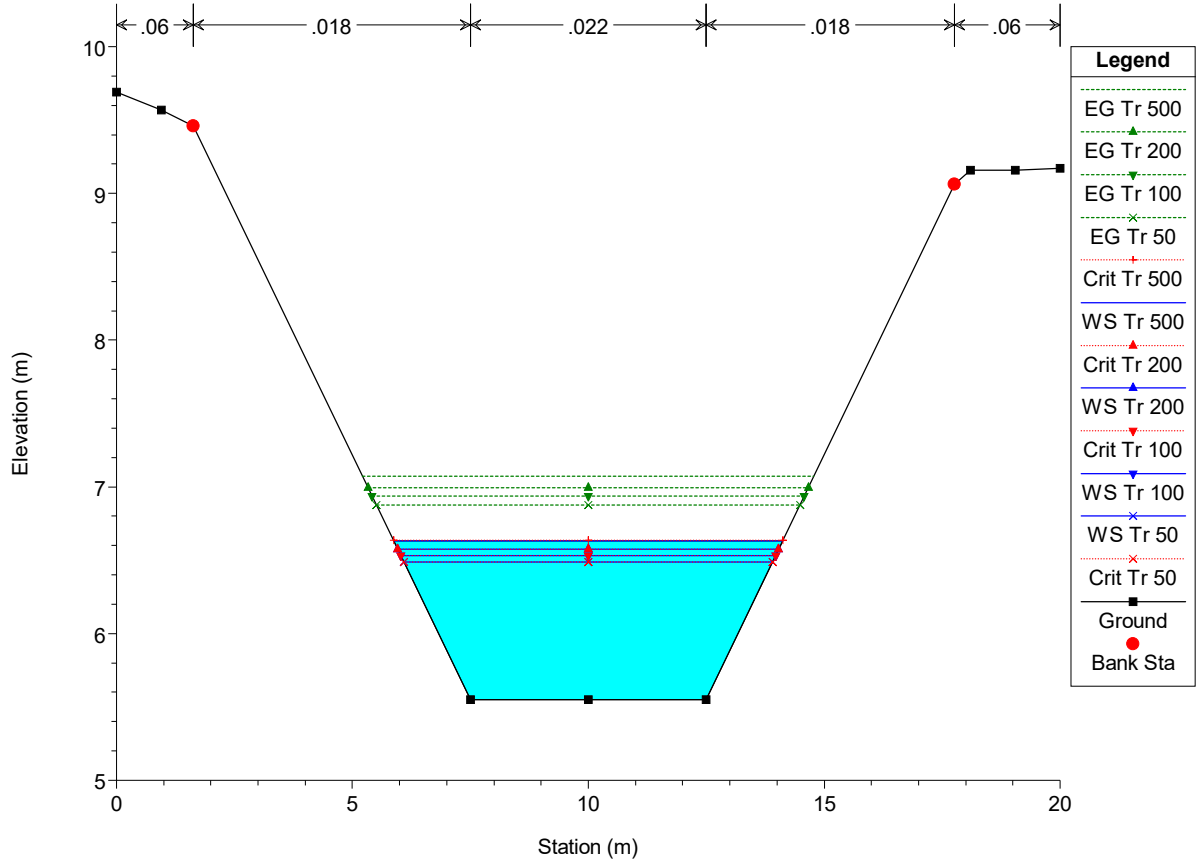




Legend	
EG Tr 500	▲ (Green)
EG Tr 200	▼ (Green)
EG Tr 100	× (Green)
EG Tr 50	× (Green)
Crit Tr 500	▲ (Red)
Crit Tr 200	▼ (Red)
Crit Tr 100	▲ (Red)
Crit Tr 50	× (Red)
WS Tr 500	▲ (Blue)
WS Tr 200	▼ (Blue)
WS Tr 100	▲ (Blue)
WS Tr 50	× (Blue)
Ground	■ (Black)
Left Levee	□ (Pink)
Right Levee	■ (Purple)

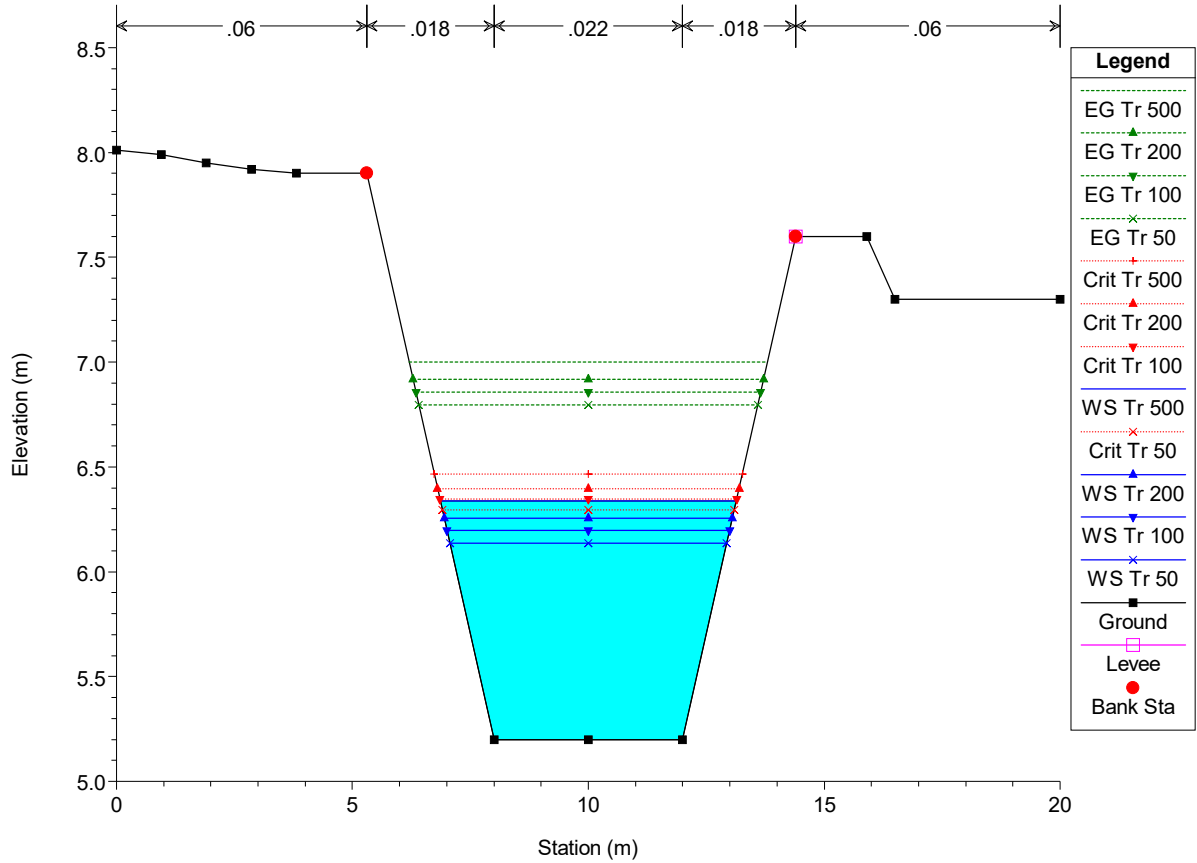
Marana-agg Plan: progetto 28/01/2020

River = Rio Marana Reach = 1 RS = 323.36



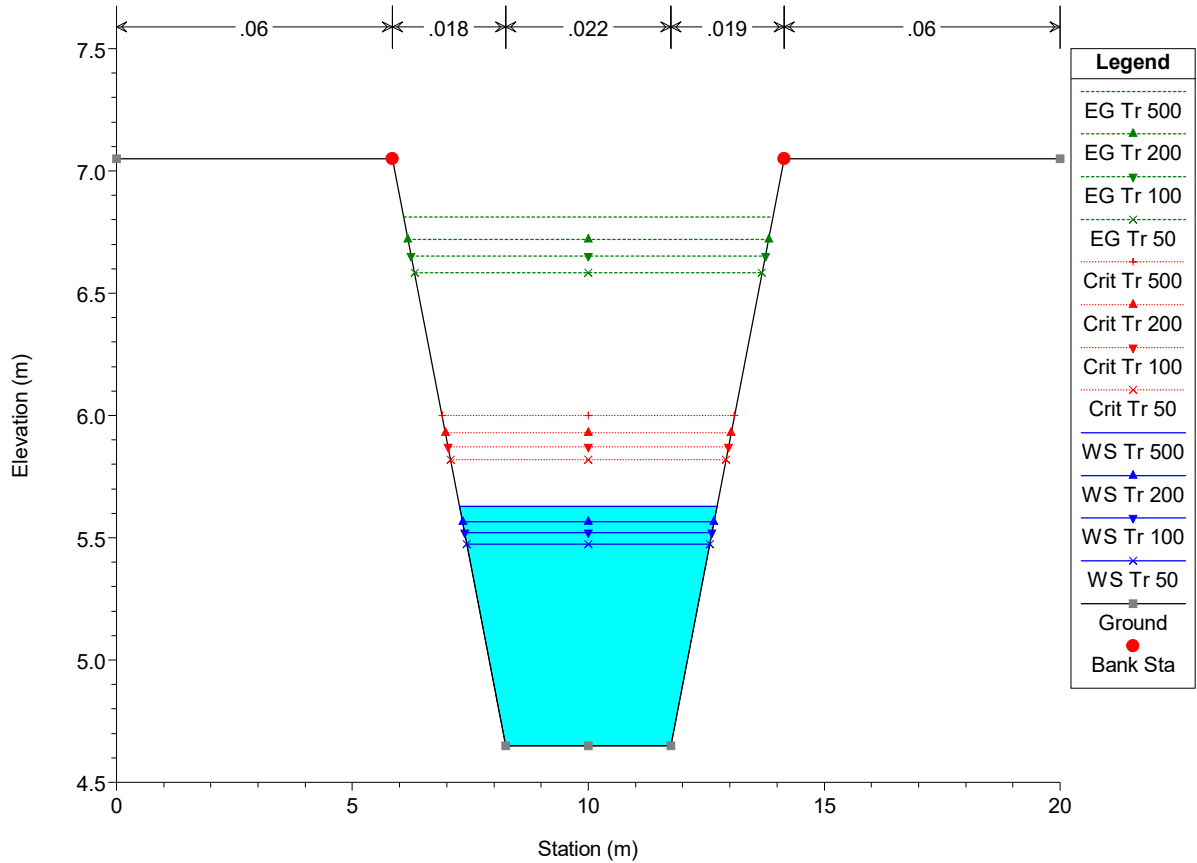
Marana-agg Plan: progetto 28/01/2020

River = Rio Marana Reach = 1 RS = 314.51



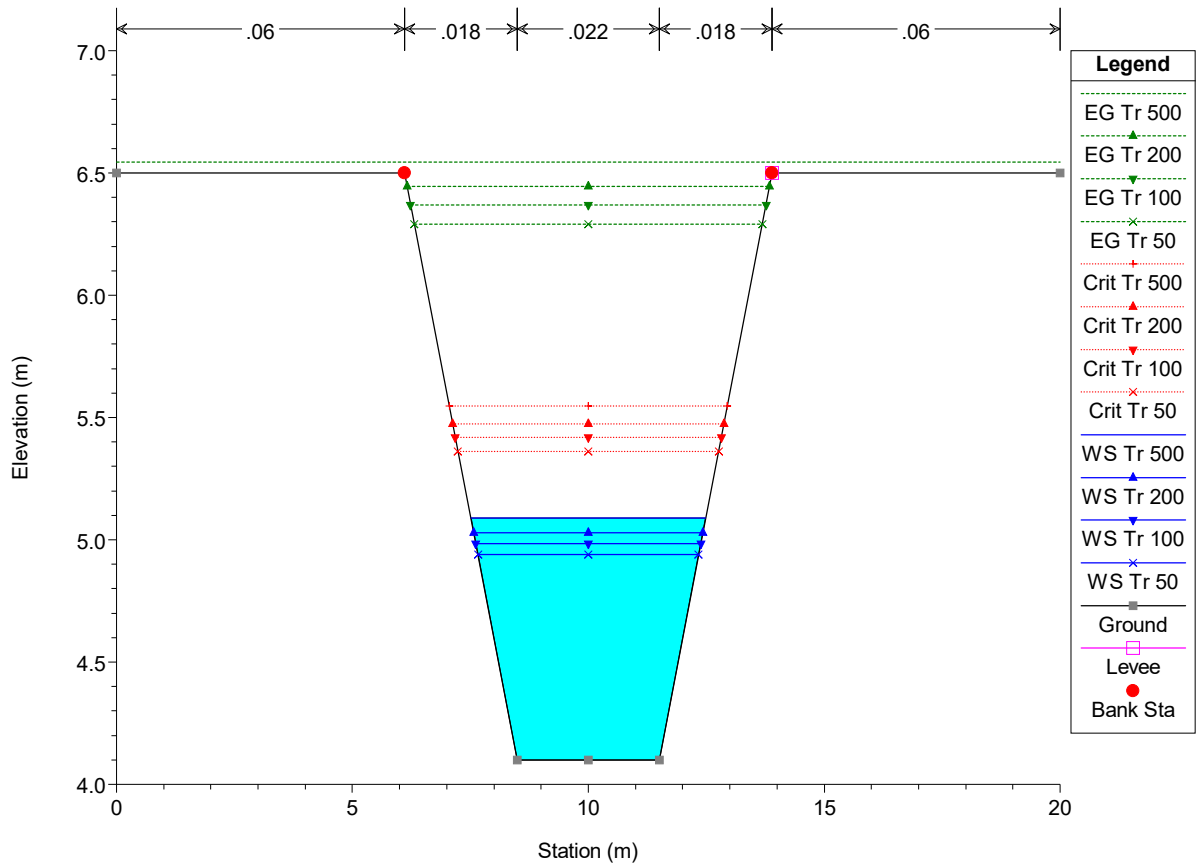
Marana-agg Plan: progetto 28/01/2020

River = Rio Marana Reach = 1 RS = 300.84*



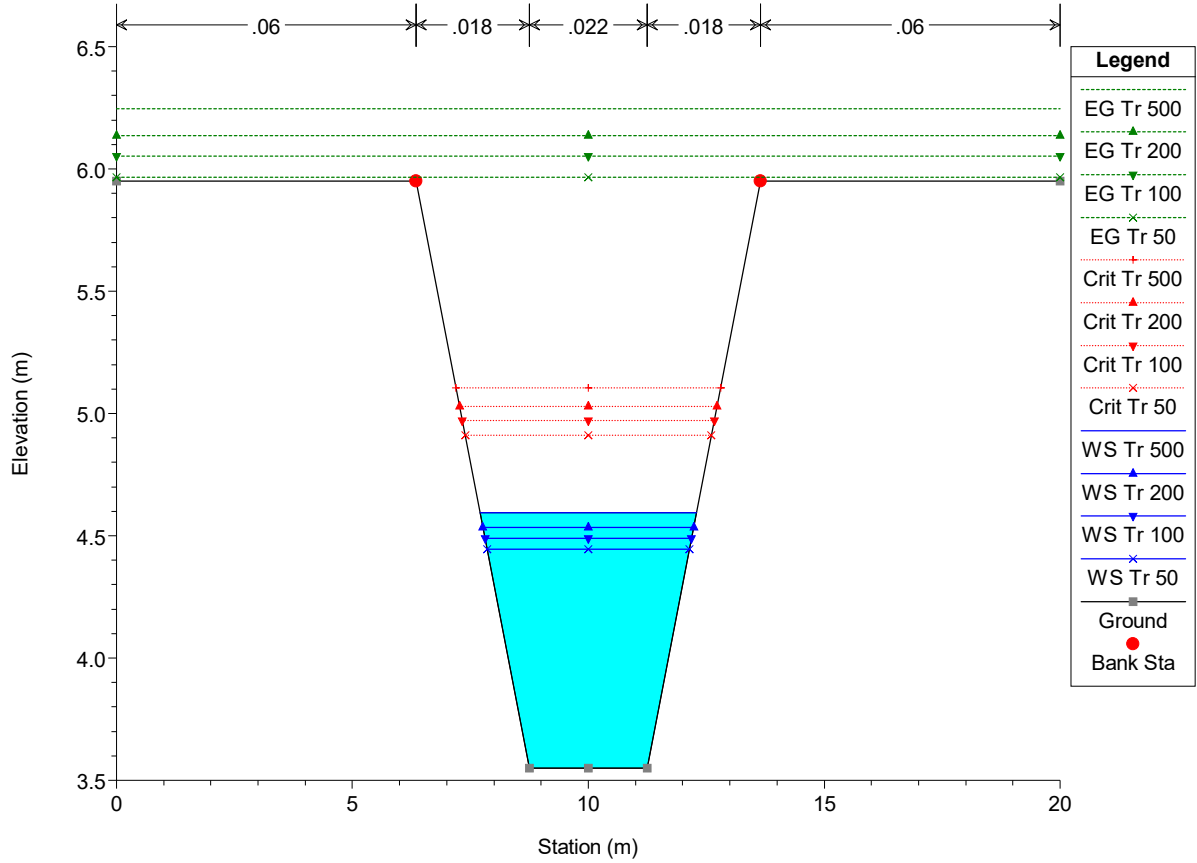
Marana-agg Plan: progetto 28/01/2020

River = Rio Marana Reach = 1 RS = 287.18*



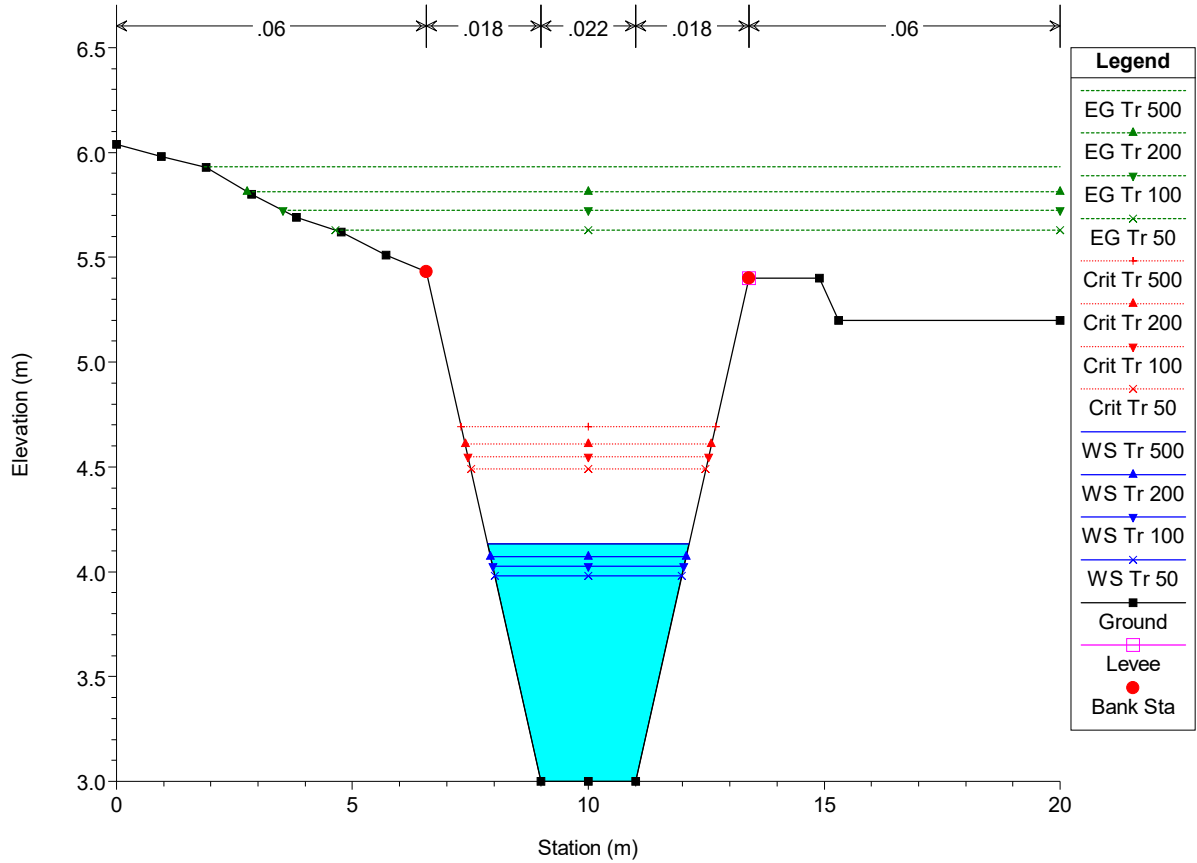
Marana-agg Plan: progetto 28/01/2020

River = Rio Marana Reach = 1 RS = 273.51*



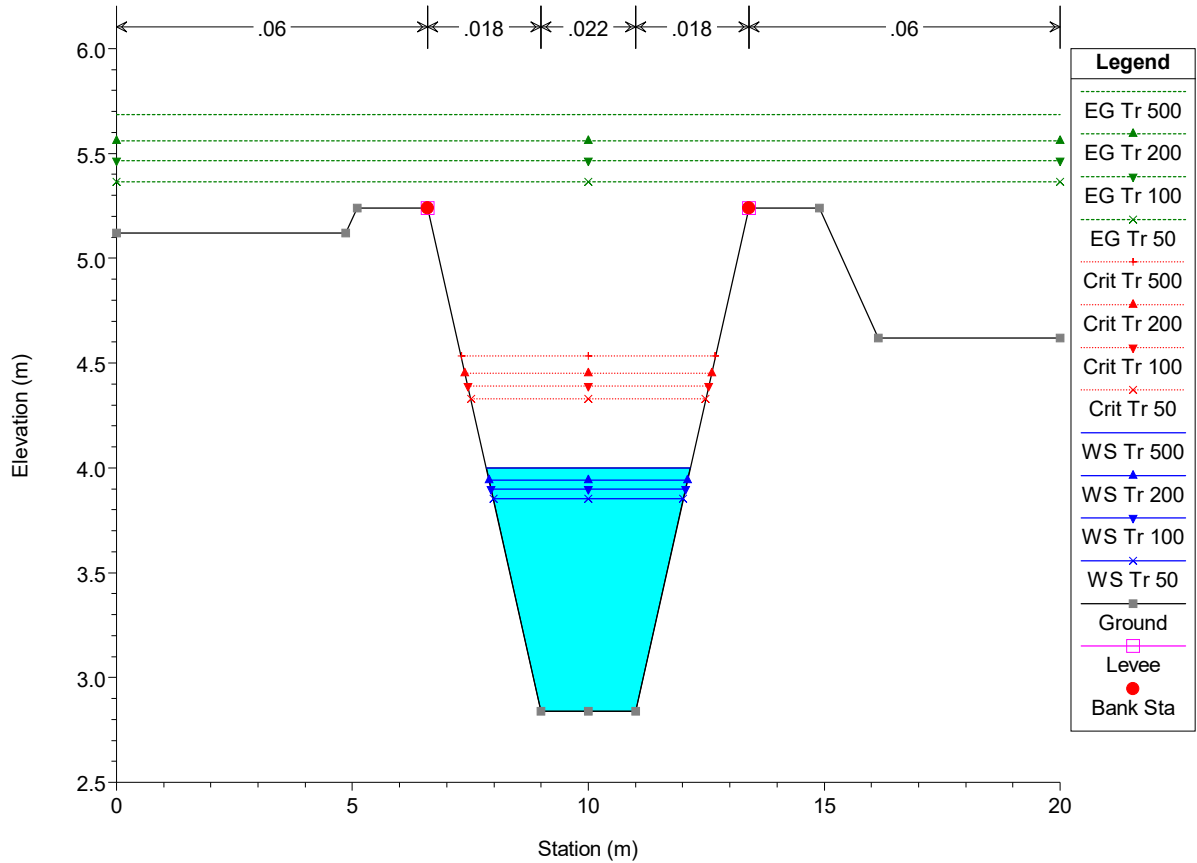
Marana-agg Plan: progetto 28/01/2020

River = Rio Marana Reach = 1 RS = 259.84



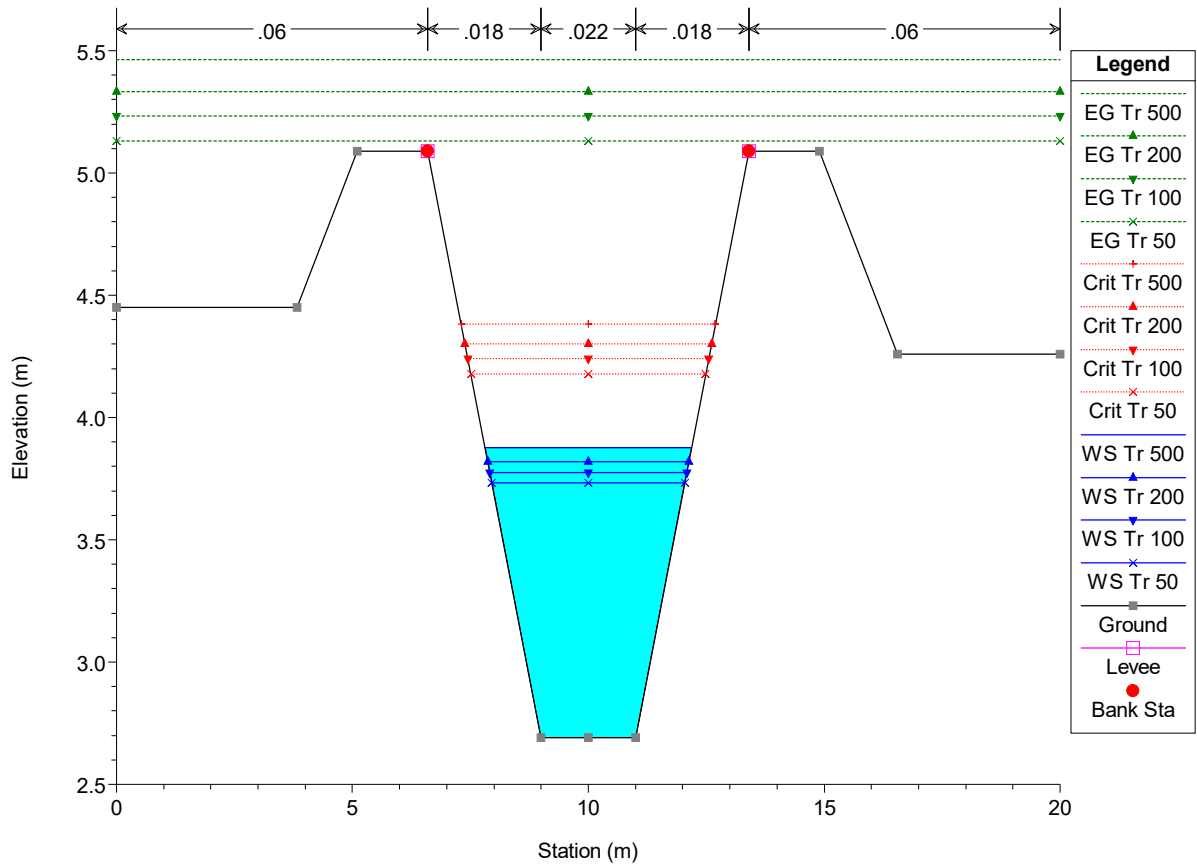
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River = Rio Marana Reach = 1 RS = 249.98°



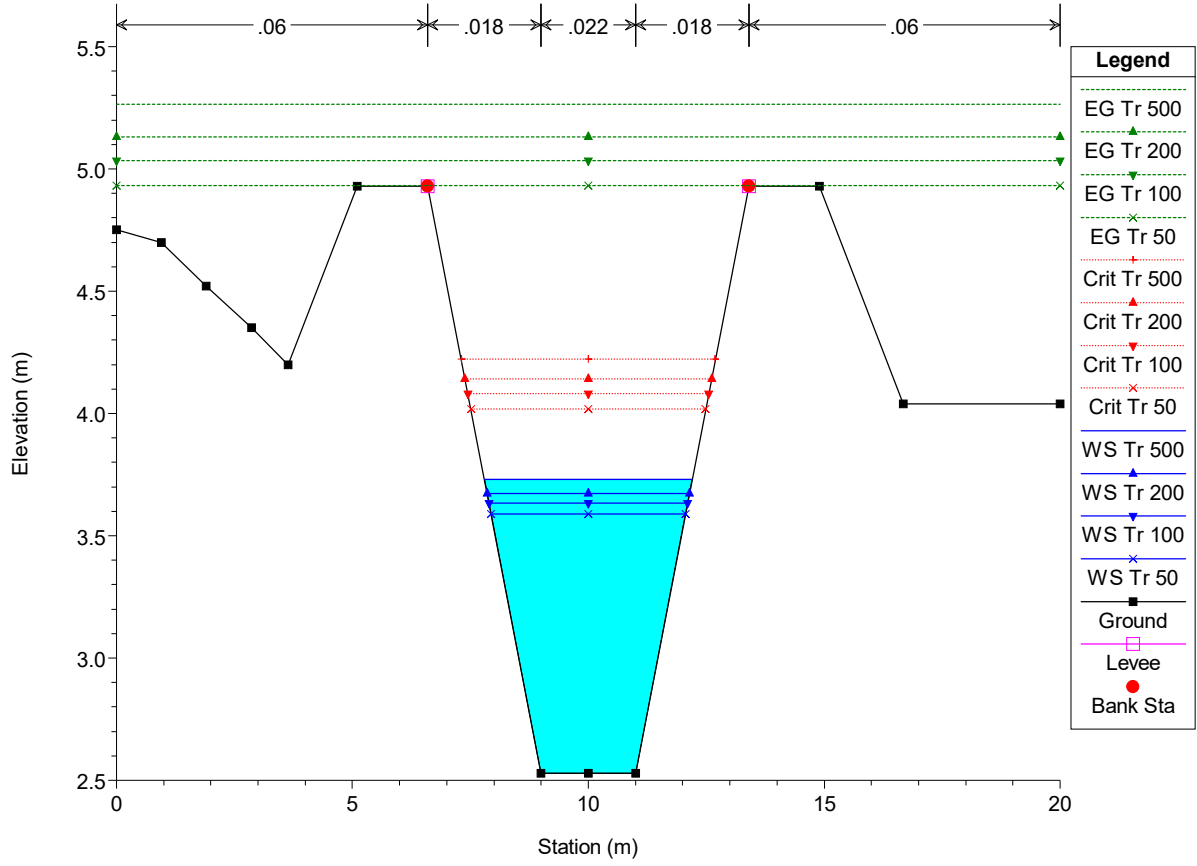
Marana-agg Plan: progetto 28/01/2020

River = Rio Marana Reach = 1 RS = 240.12°



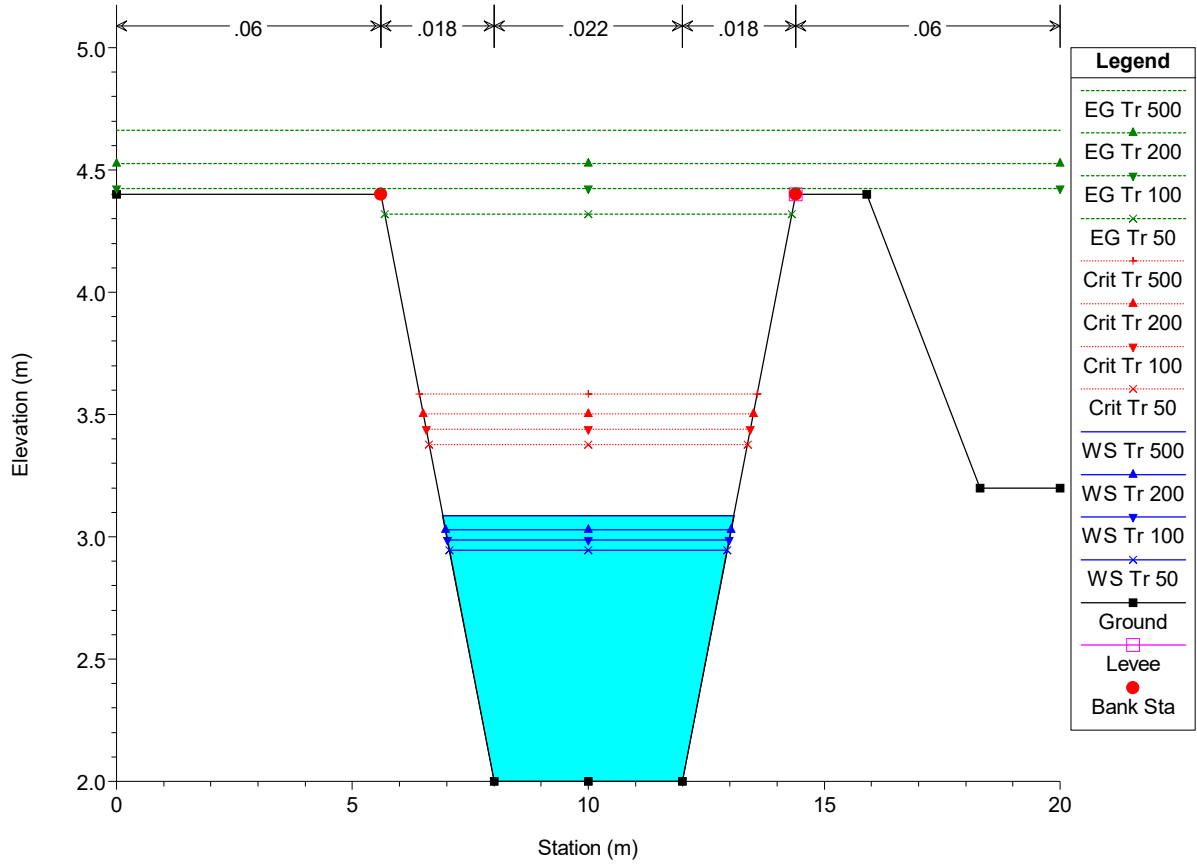
Marana-agg Plan: progetto 28/01/2020

River = Rio Marana Reach = 1 RS = 230.26



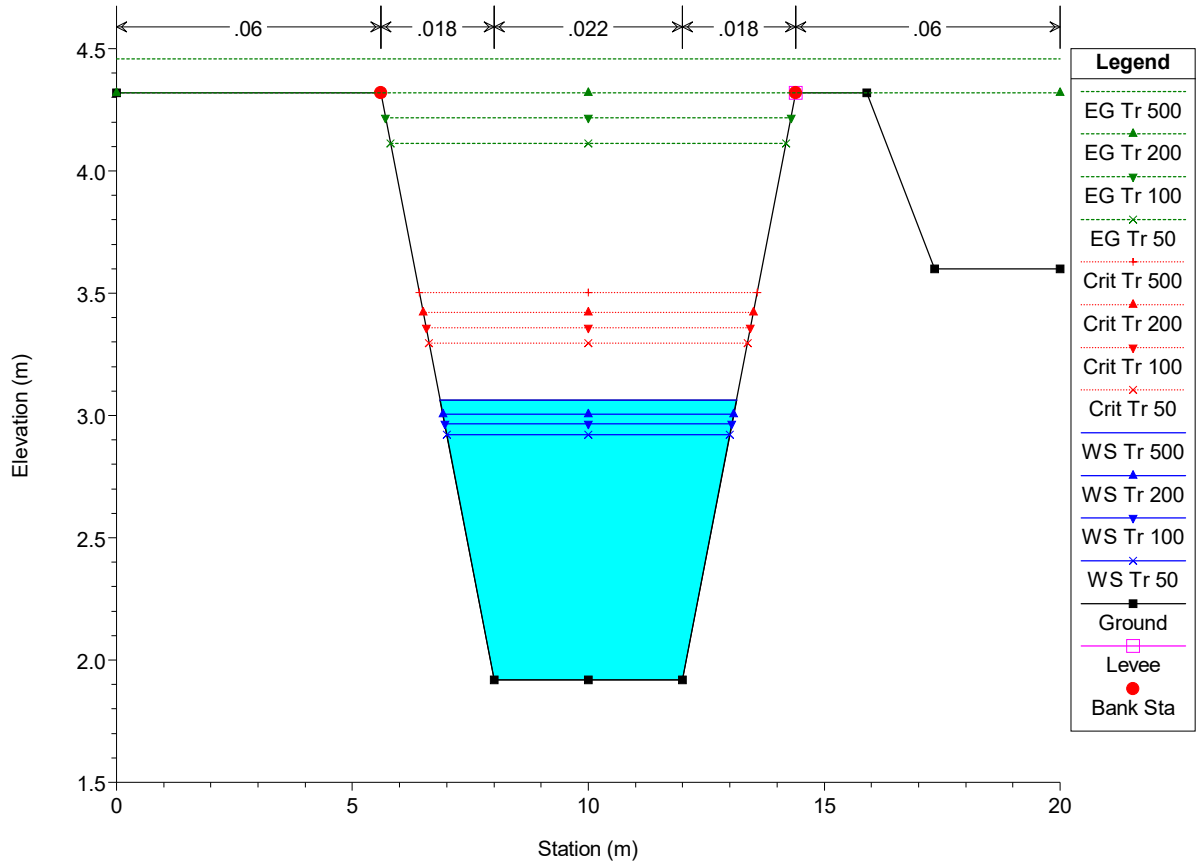
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River = Rio Marana Reach = 2 RS = 196.61



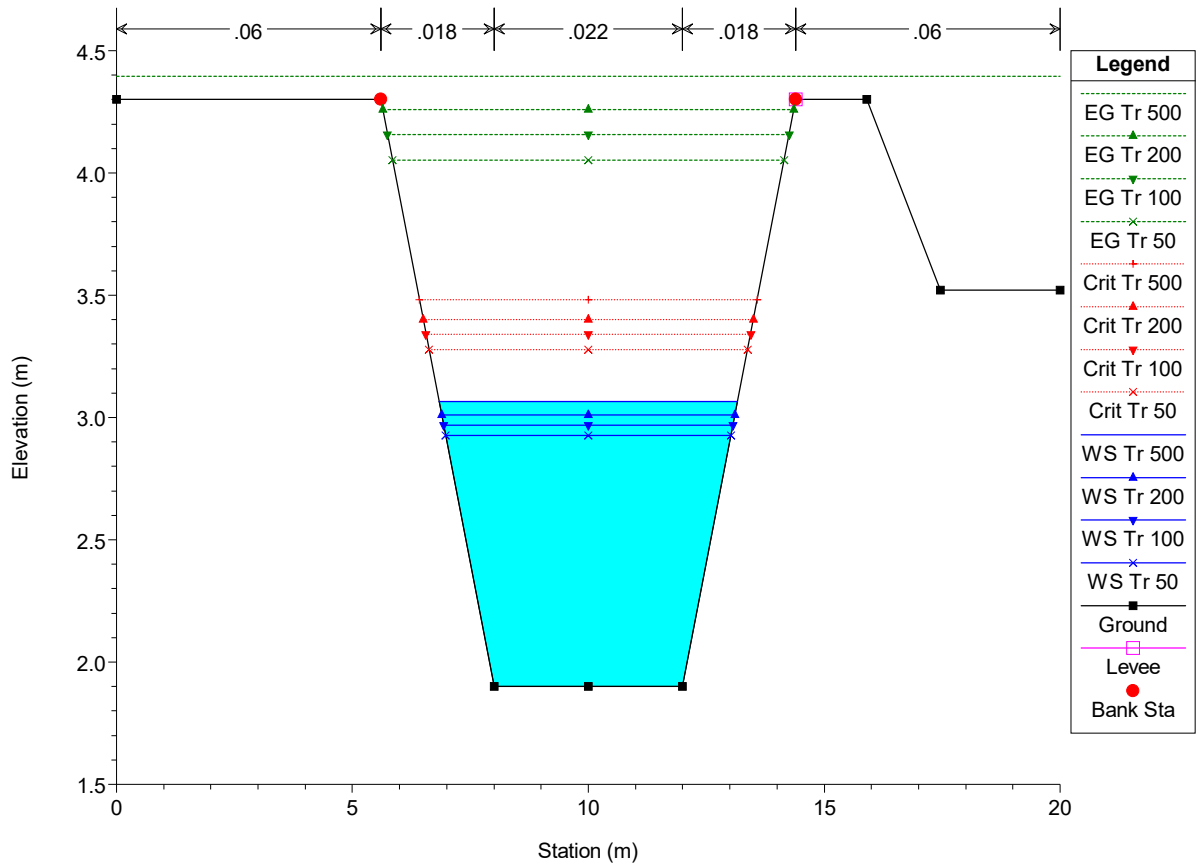
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River = Rio Marana Reach = 2 RS = 187.20



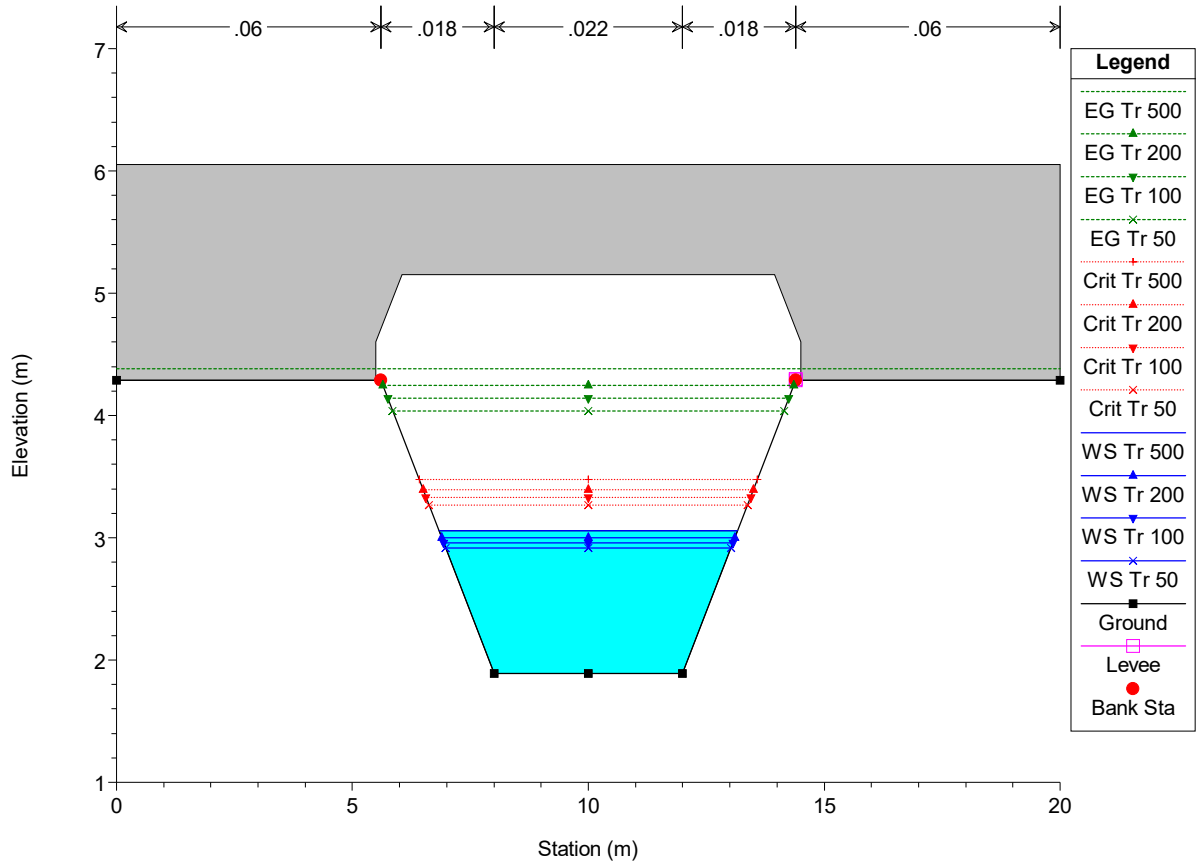
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River = Rio Marana Reach = 2 RS = 184.20



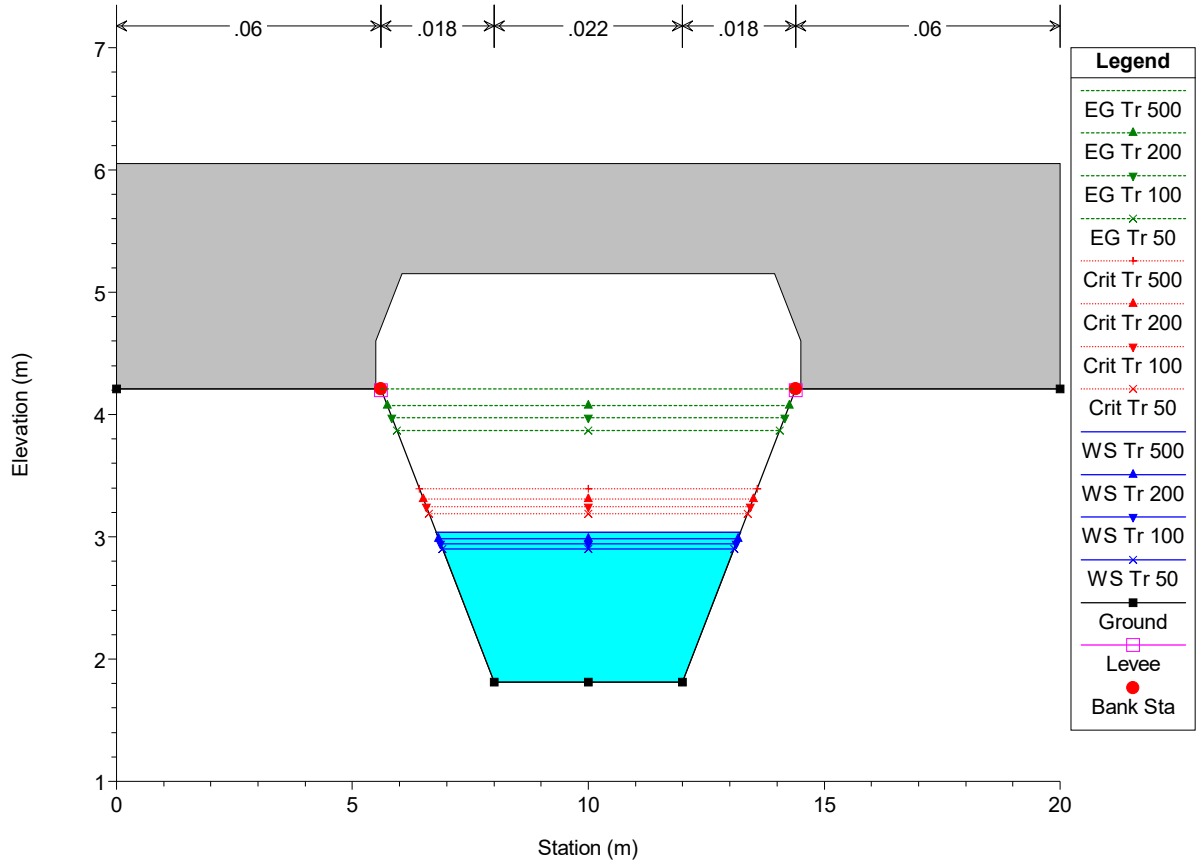
Marana-agg Plan: progetto 29/01/2020

River = Rio Marana Reach = 2 RS = 178 BR



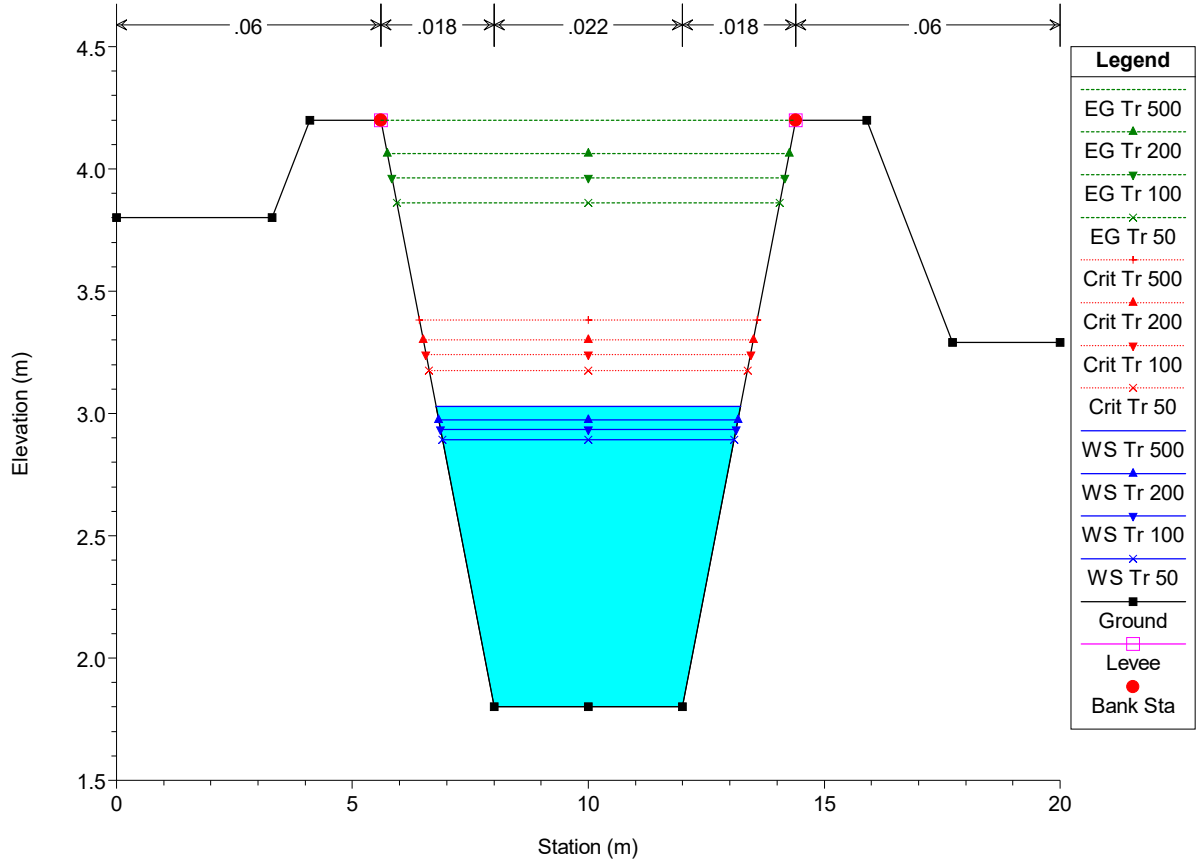
Marana-agg Plan: progetto 29/01/2020

River = Rio Marana Reach = 2 RS = 178 BR



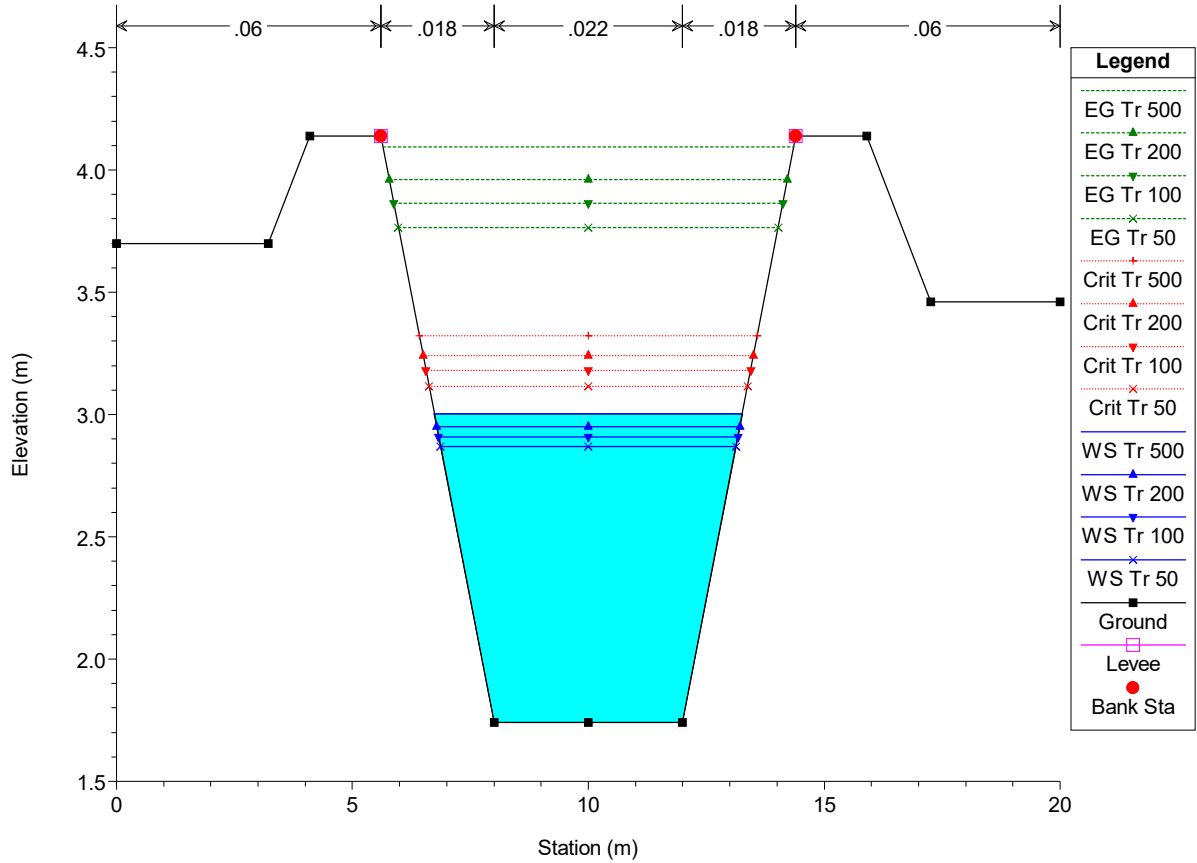
Marana-agg Plan: progetto 28/01/2020

River = Rio Marana Reach = 2 RS = 171.80



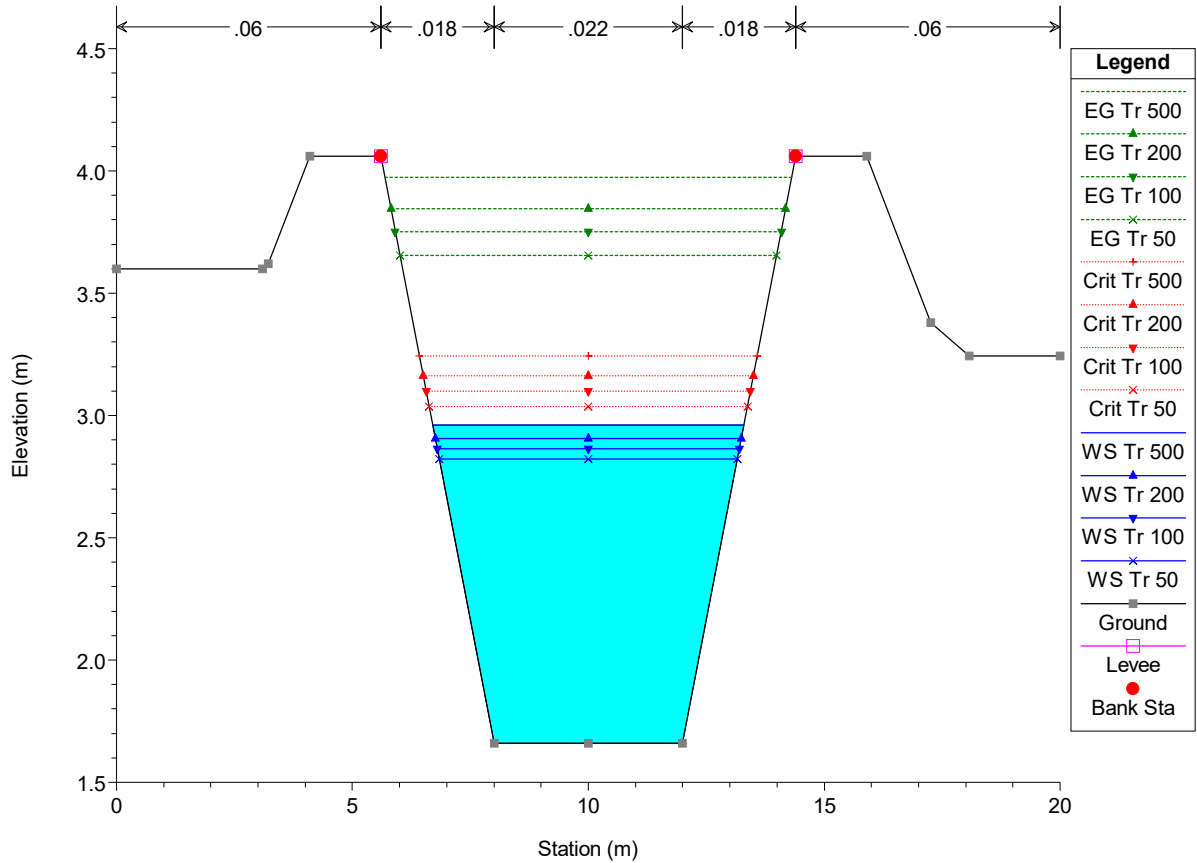
Marana-agg Plan: progetto 28/01/2020

River = Rio Marana Reach = 2 RS = 164.36



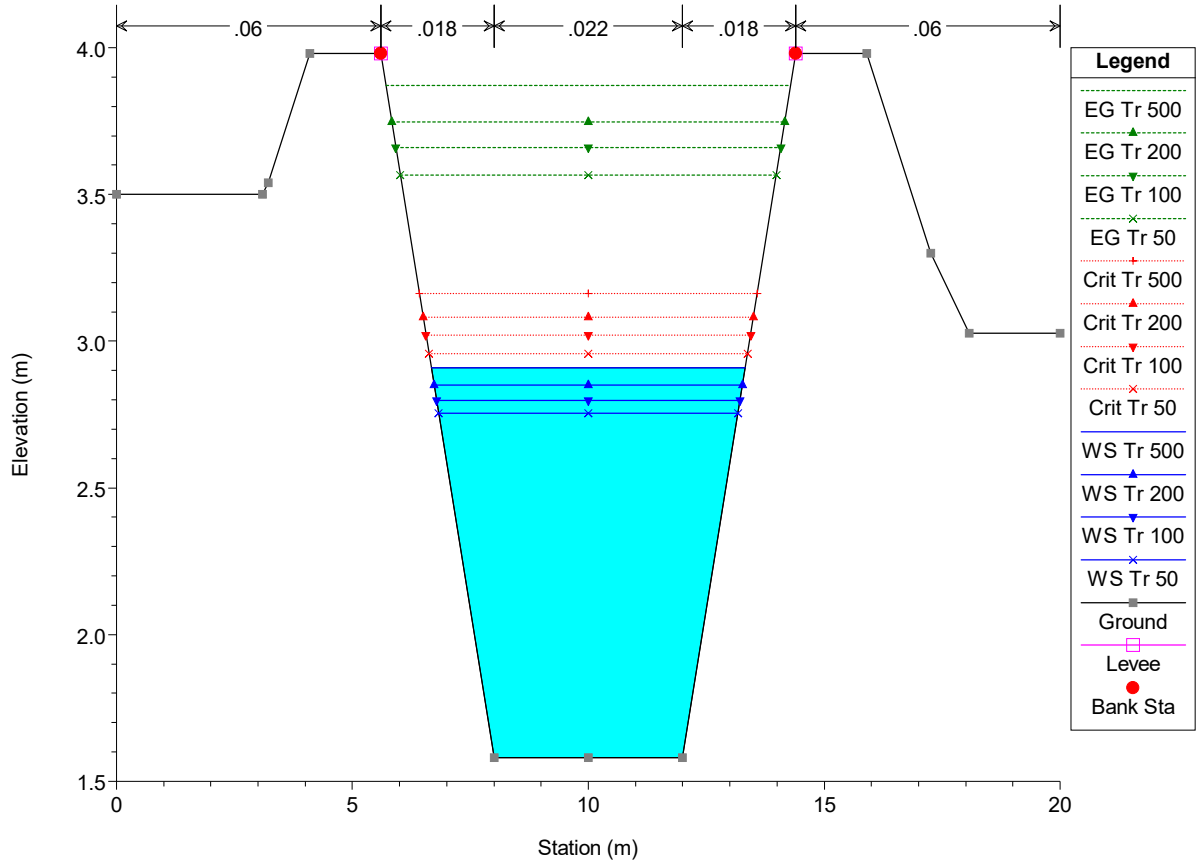
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River = Rio Marana Reach = 2 RS = 154.48*



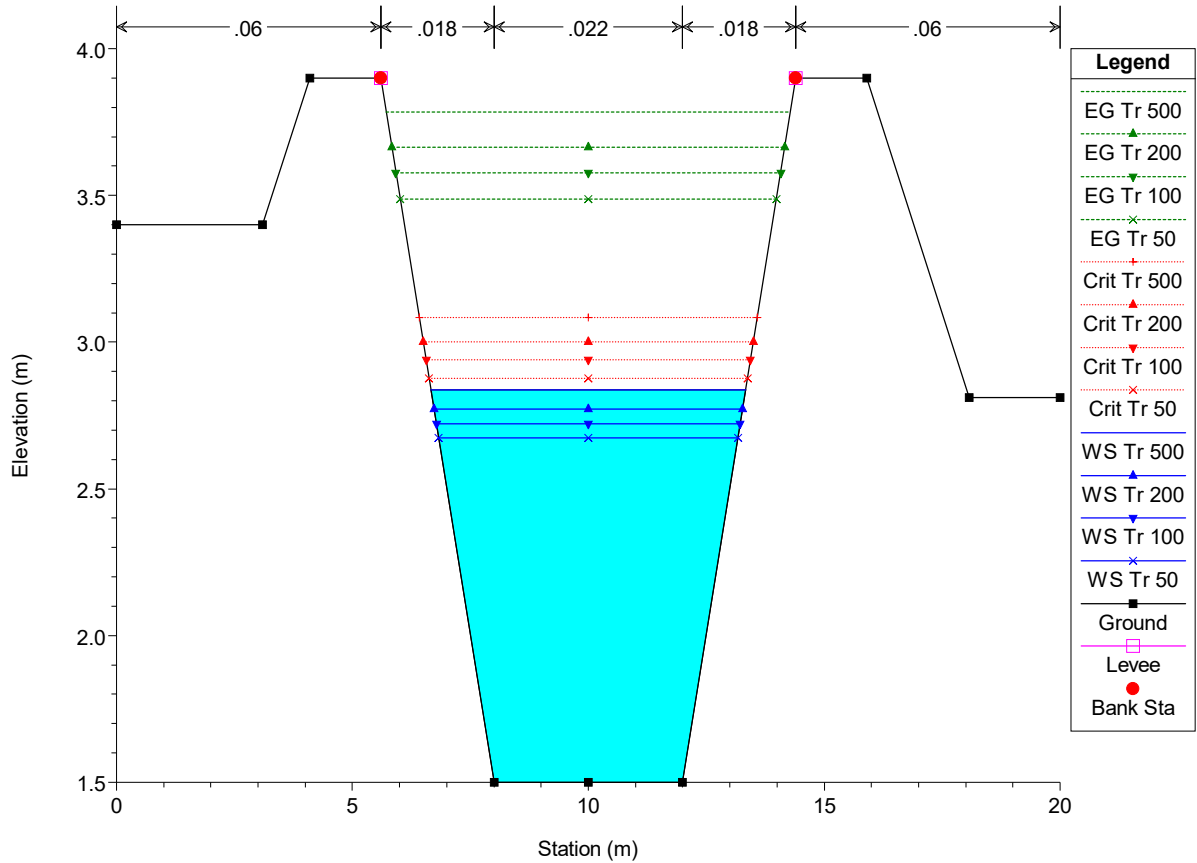
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River = Rio Marana Reach = 2 RS = 144.60*



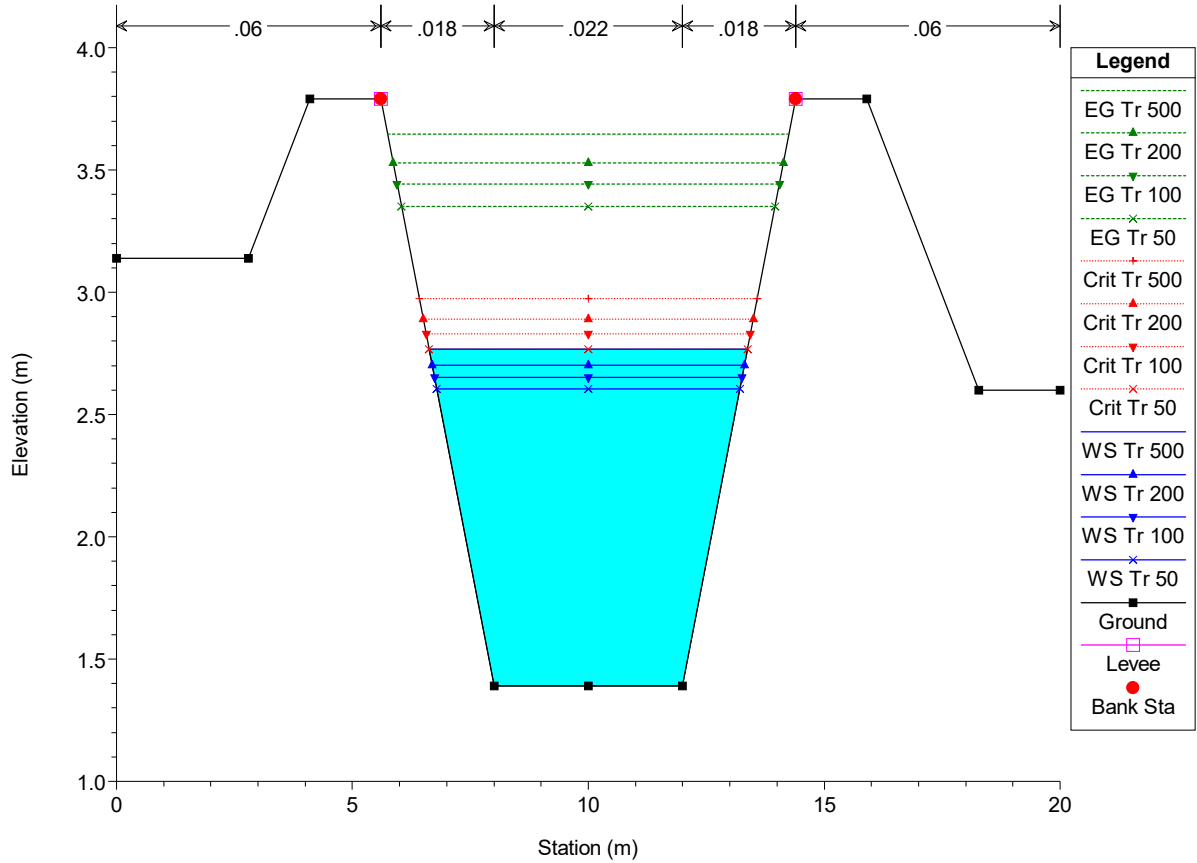
Marana-agg Plan: progetto 28/01/2020

River = Rio Marana Reach = 2 RS = 134.72



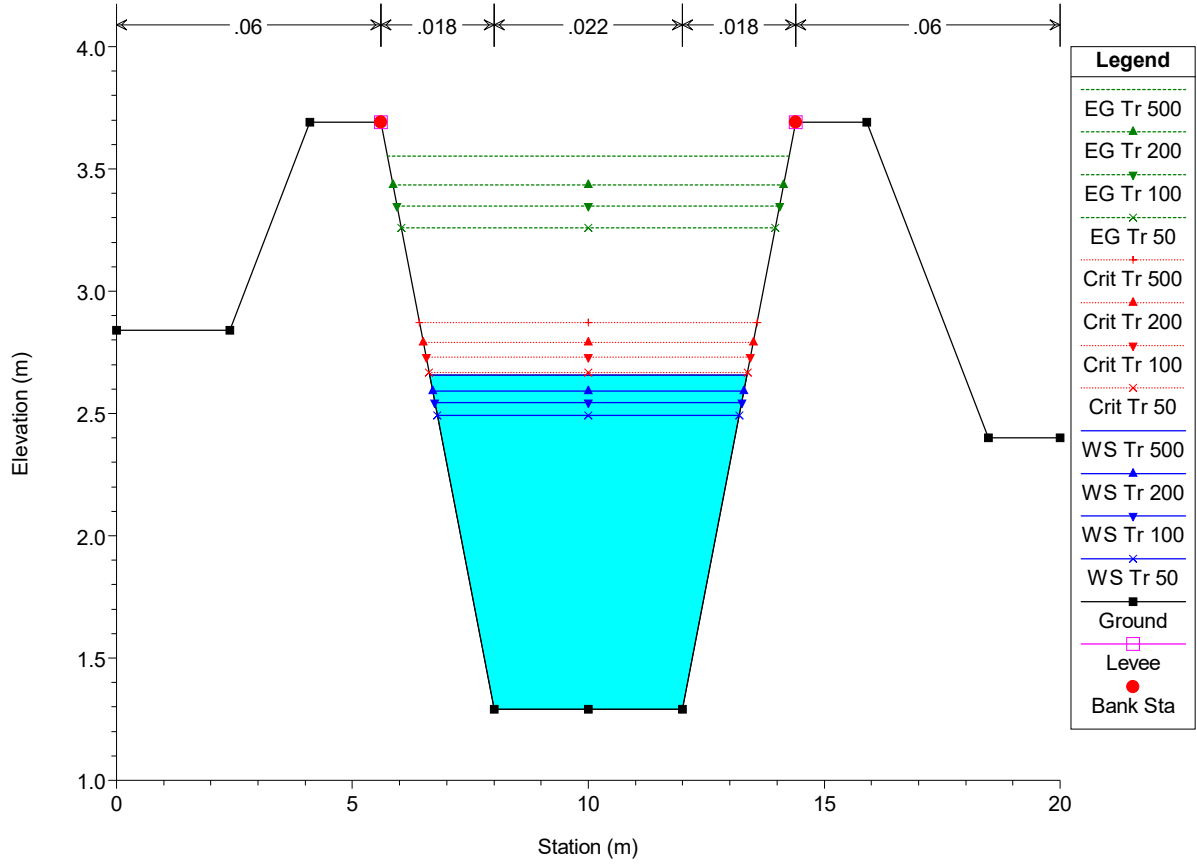
Marana-agg Plan: progetto 28/01/2020

River = Rio Marana Reach = 2 RS = 120.01



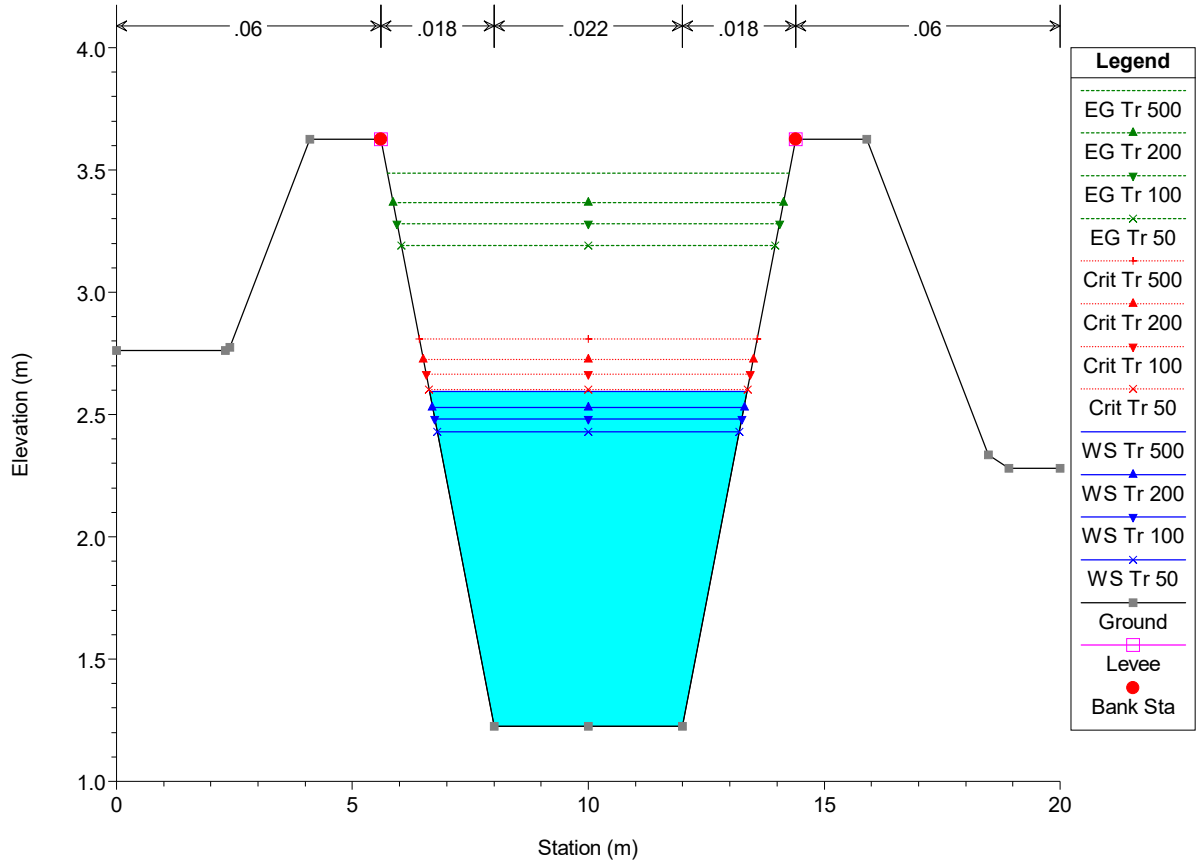
Marana-agg Plan: progetto 28/01/2020

River = Rio Marana Reach = 2 RS = 107.72



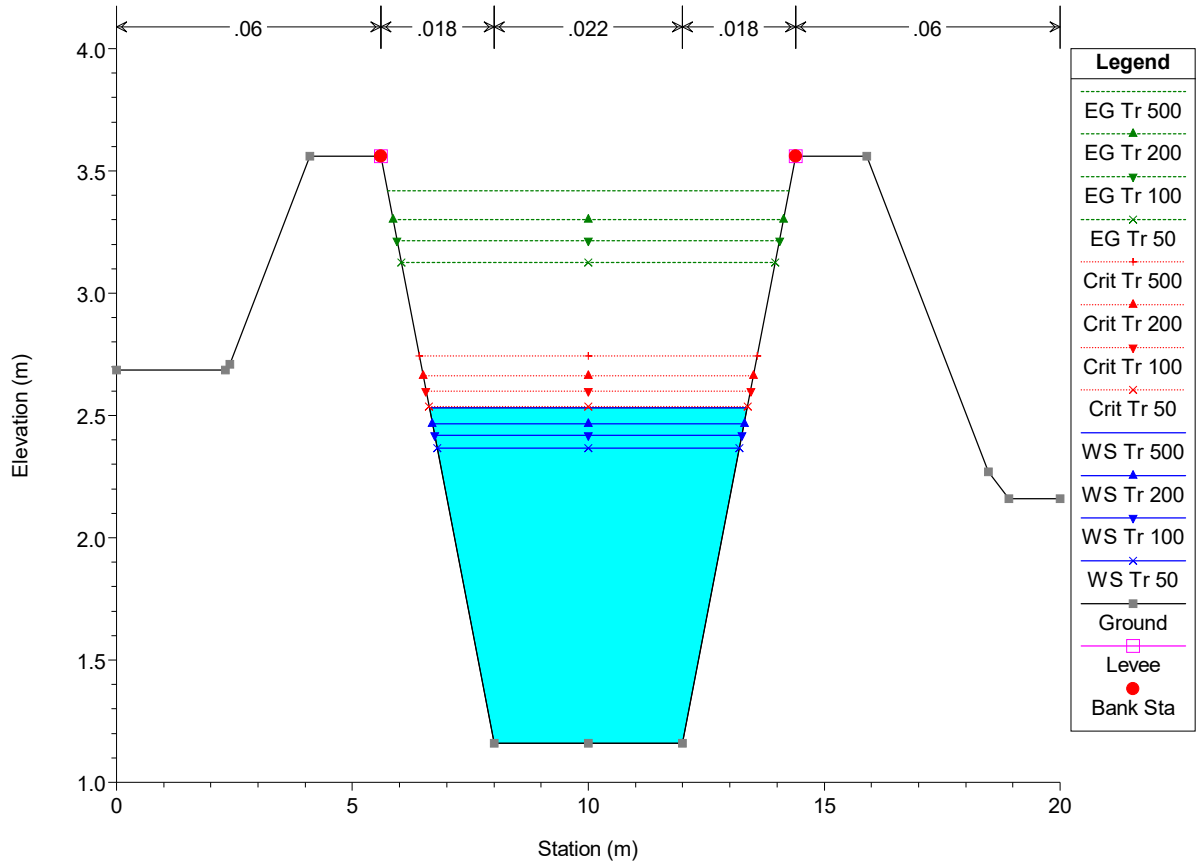
Marana-agg Plan: progetto 28/01/2020

River = Rio Marana Reach = 2 RS = 99.51*



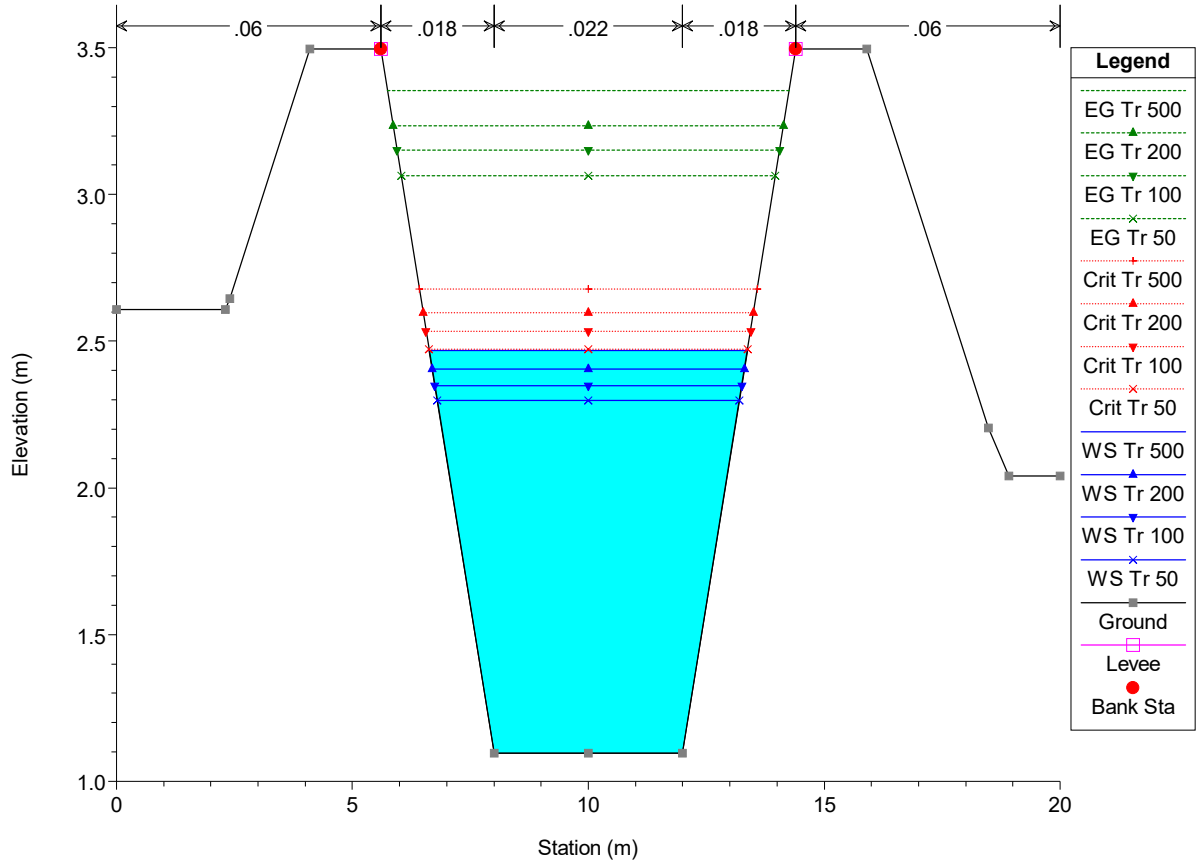
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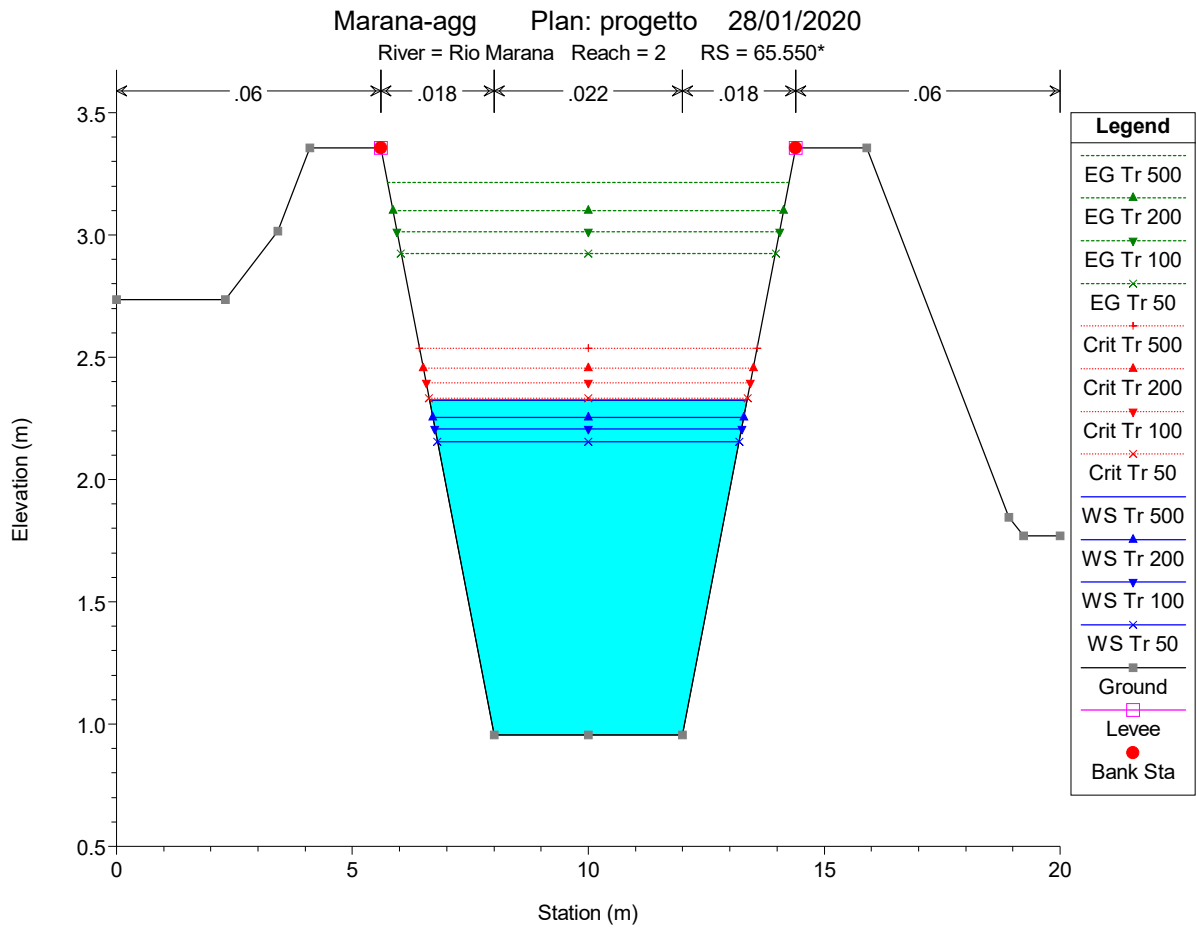
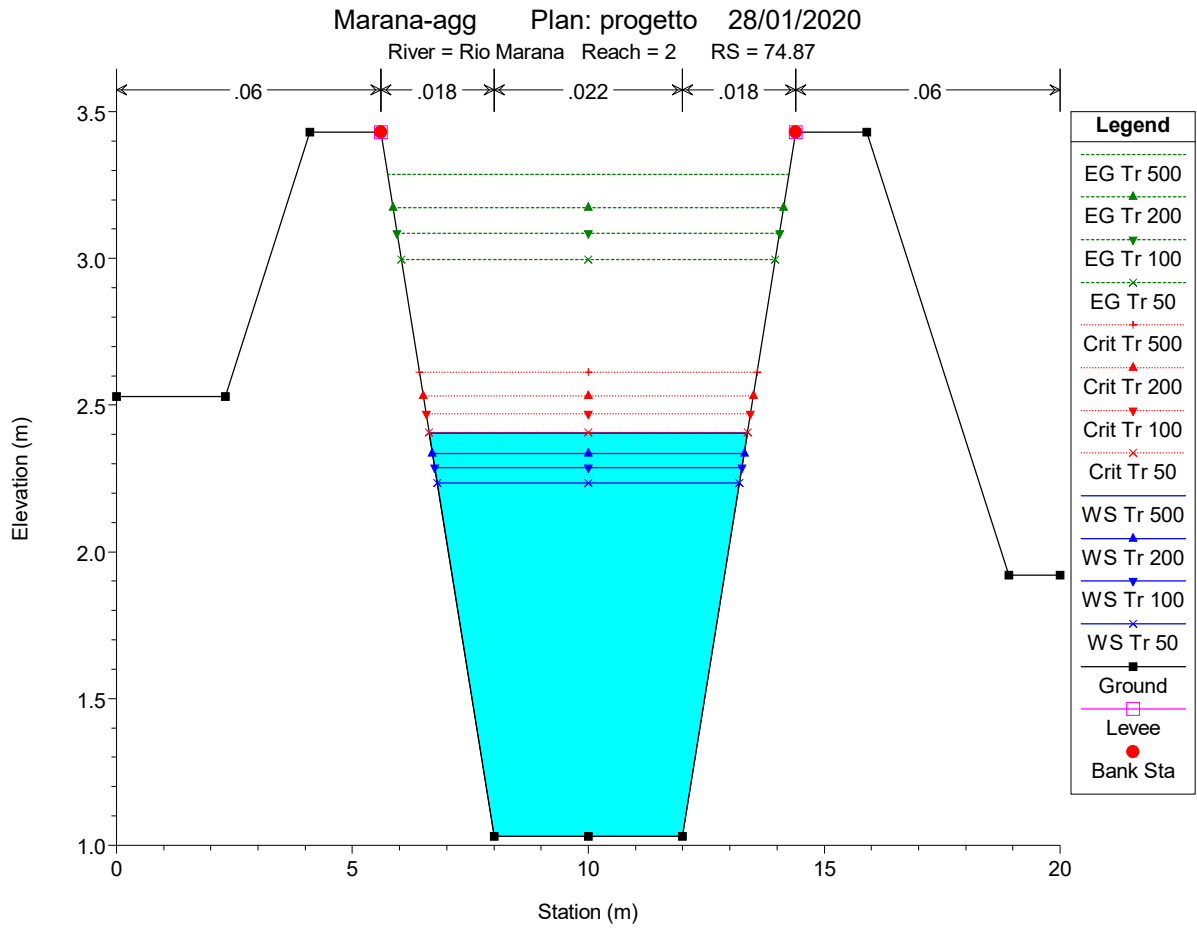
River = Rio Marana Reach = 2 RS = 91.30*



Marana-agg Plan: progetto 28/01/2020

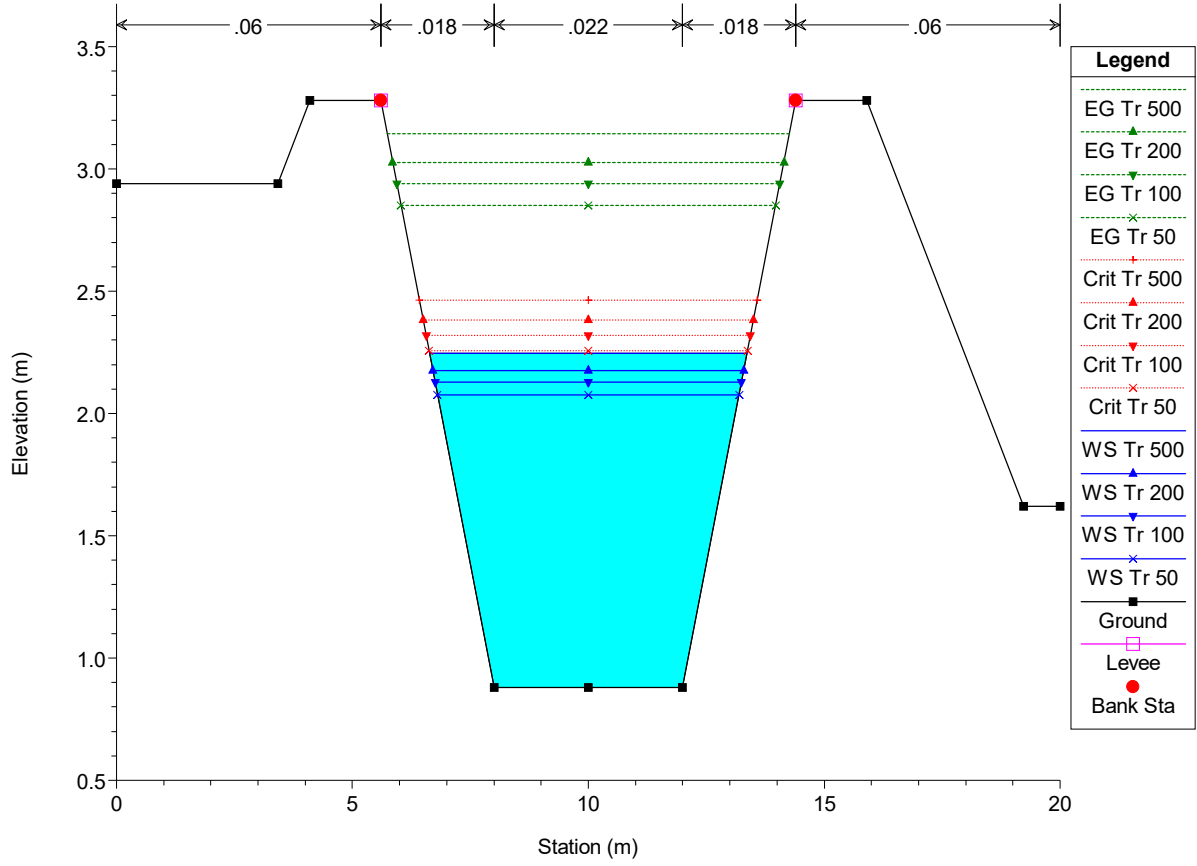
River = Rio Marana Reach = 2 RS = 83.08*





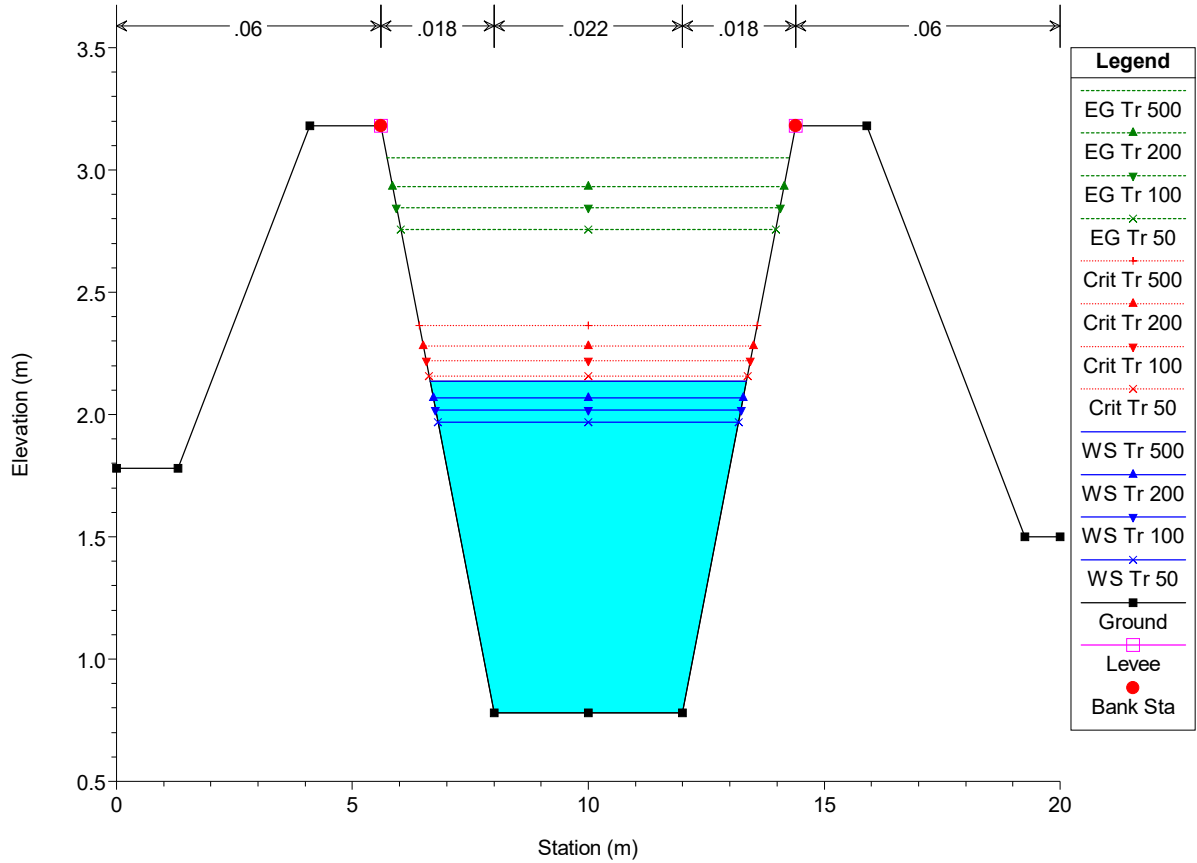
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River = Rio Marana Reach = 2 RS = 56.23



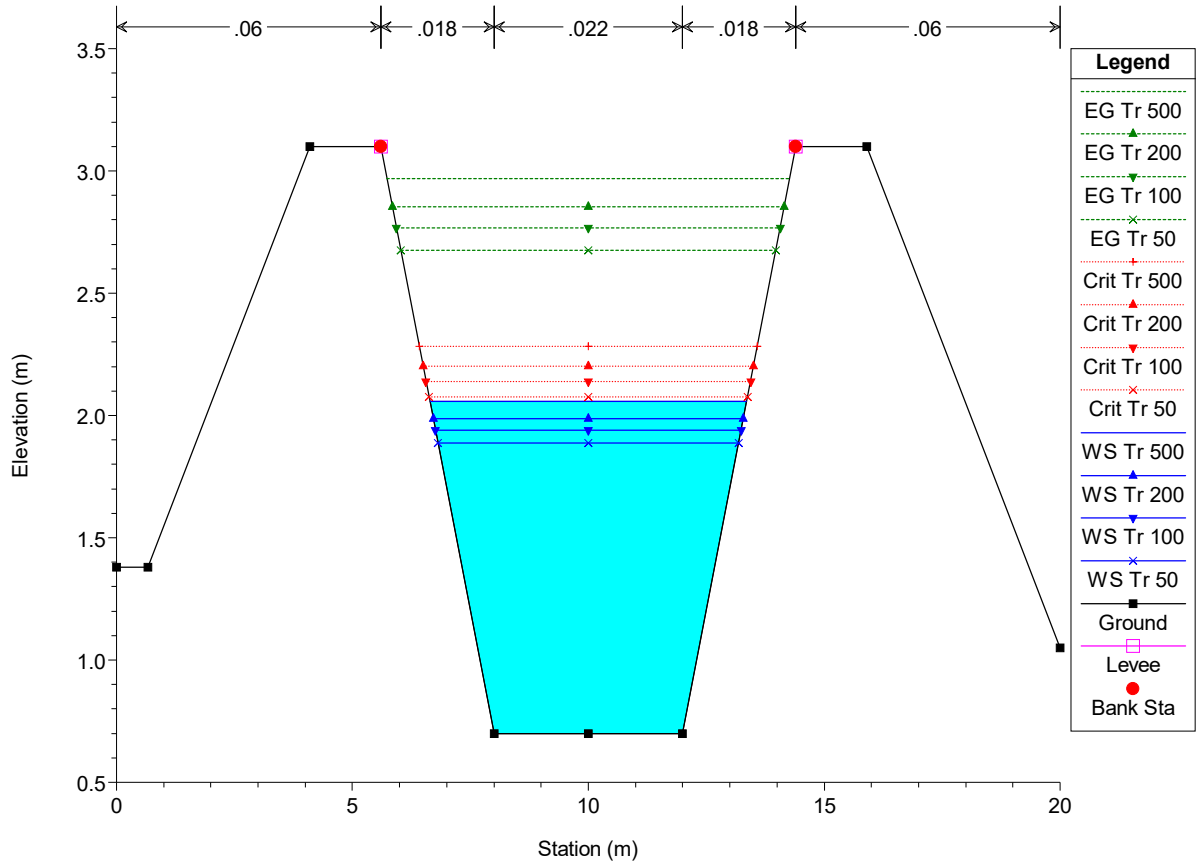
Marana-agg Plan: progetto 28/01/2020

River = Rio Marana Reach = 2 RS = 44.34



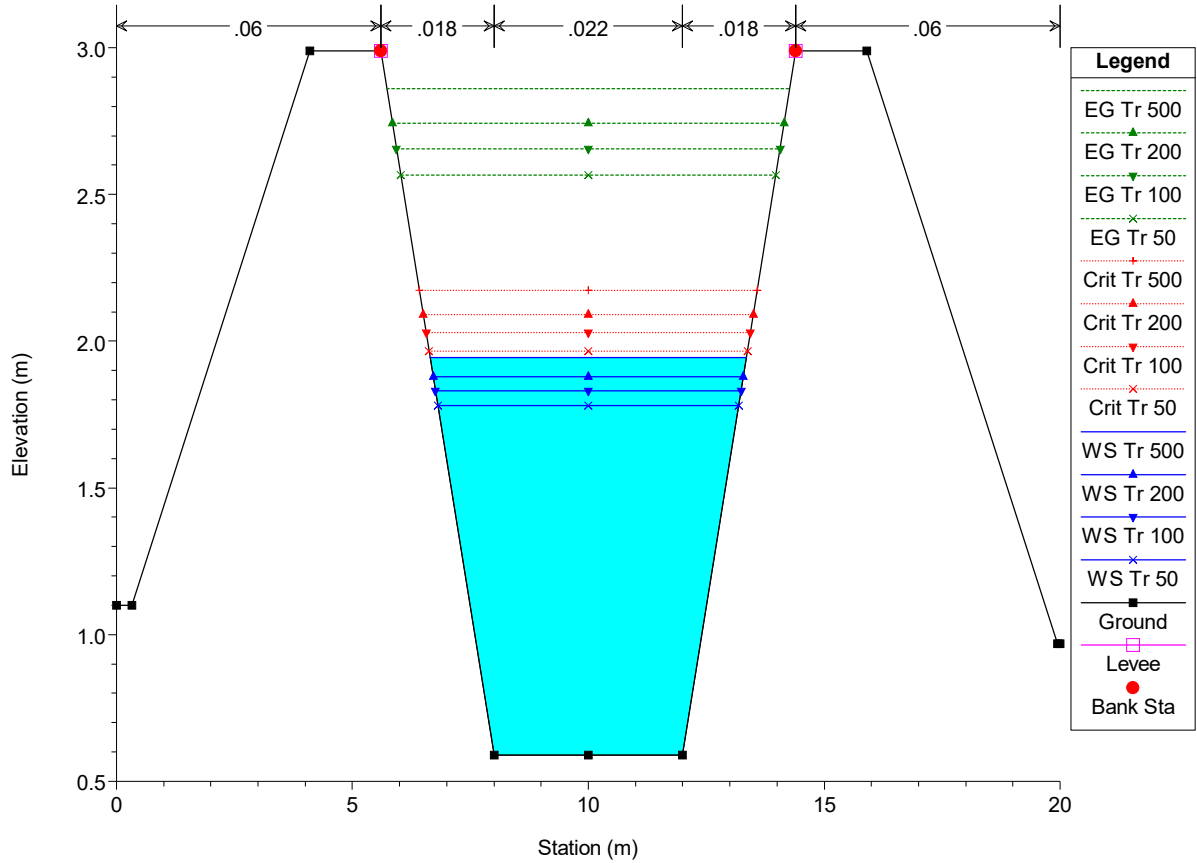
Marana-agg Plan: progetto 28/01/2020

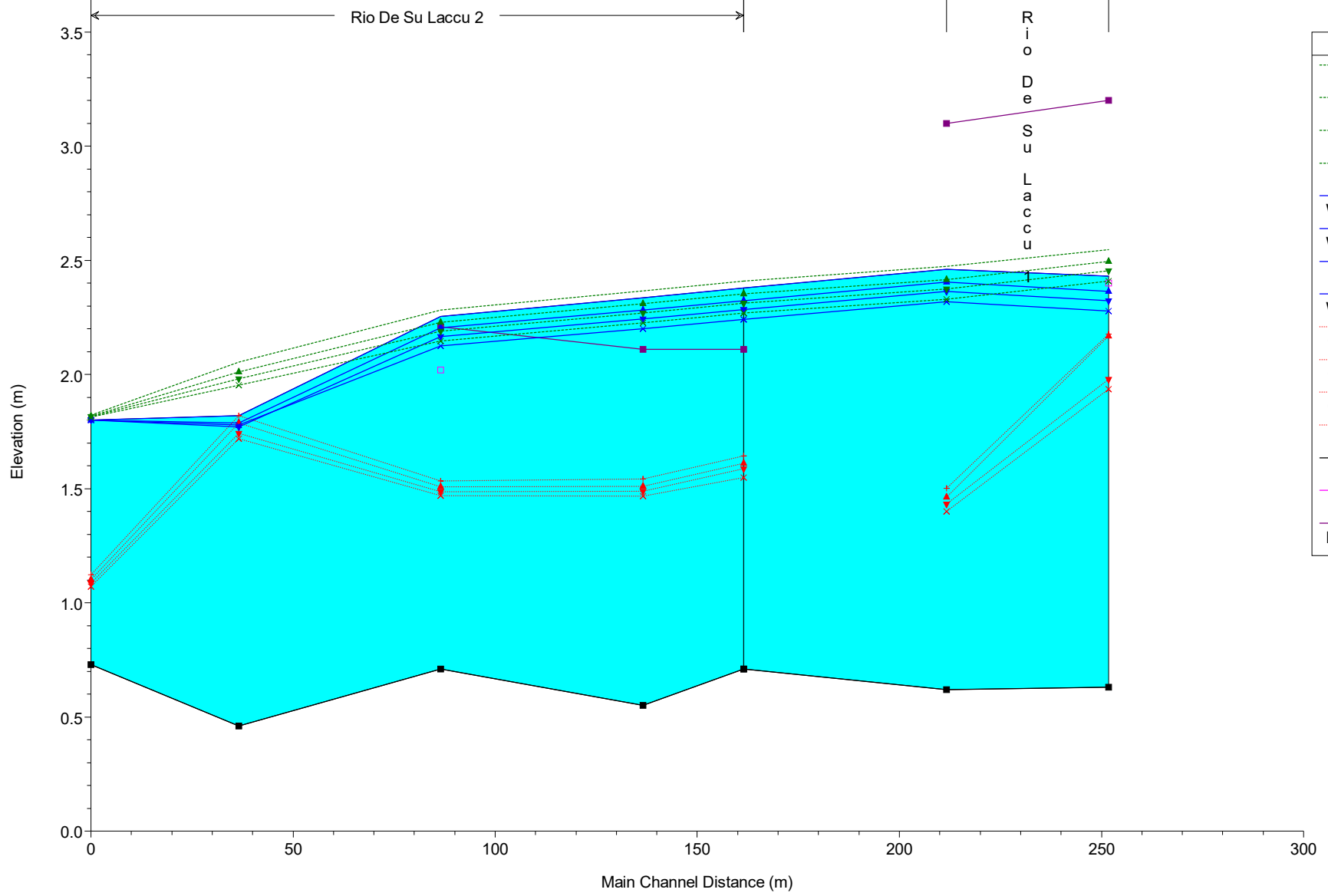
River = Rio Marana Reach = 2 RS = 34.22



Marana-agg Plan: progetto 28/01/2020

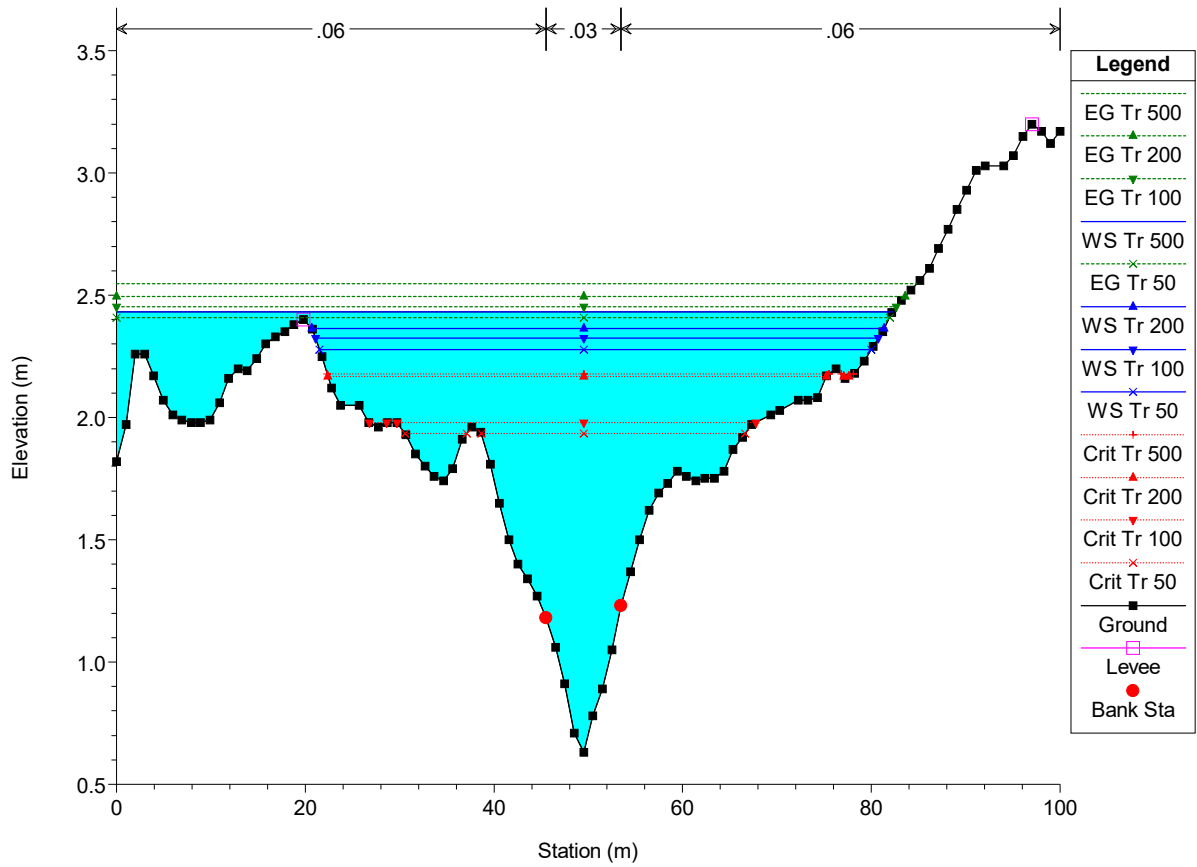
River = Rio Marana Reach = 2 RS = 20.72



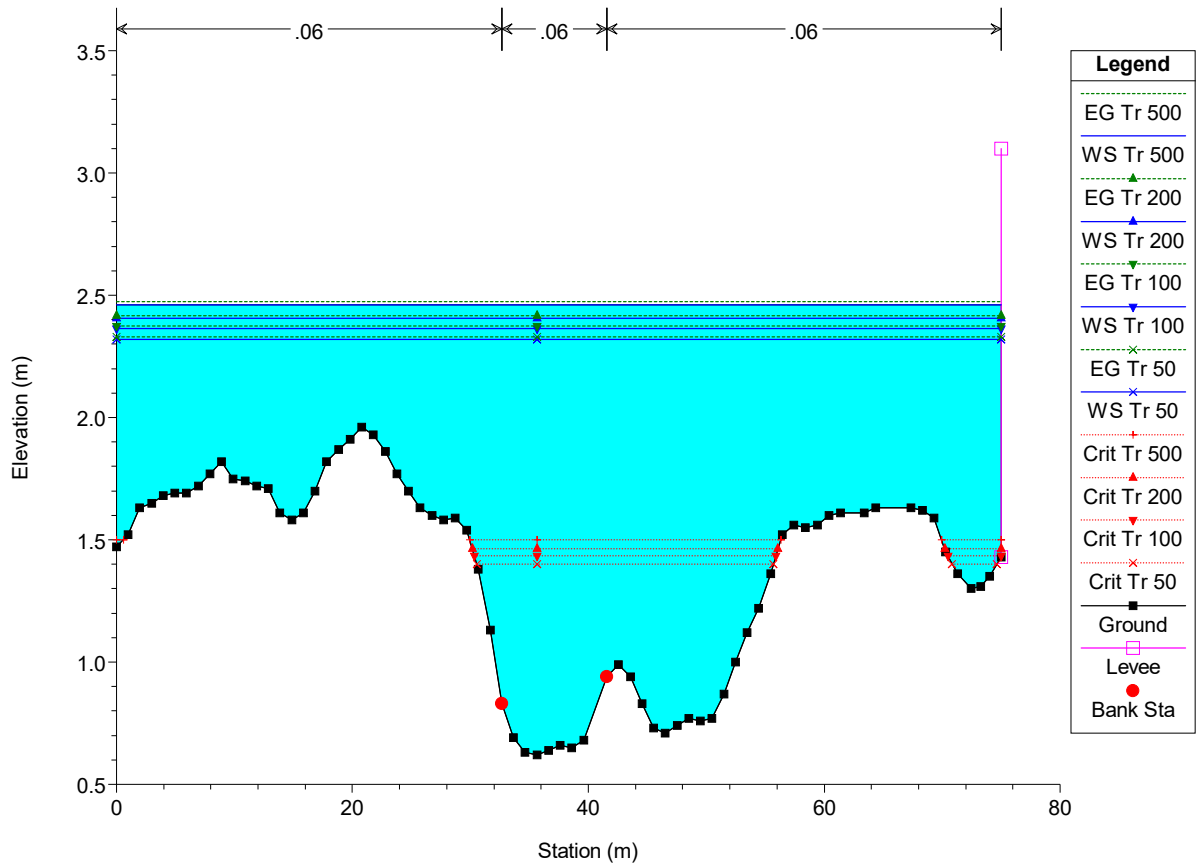


Legend	
EG Tr 500	▲ (green dotted)
EG Tr 200	▼ (green dotted)
EG Tr 100	× (green dotted)
EG Tr 50	× (green dotted)
WS Tr 500	▲ (blue solid)
WS Tr 200	▼ (blue solid)
WS Tr 100	× (blue solid)
WS Tr 50	▲ (blue solid)
Crit Tr 500	▲ (red dotted)
Crit Tr 200	▼ (red dotted)
Crit Tr 100	× (red dotted)
Crit Tr 50	× (red dotted)
Ground	■ (black solid)
Left Levee	□ (pink solid)
Right Levee	■ (purple solid)

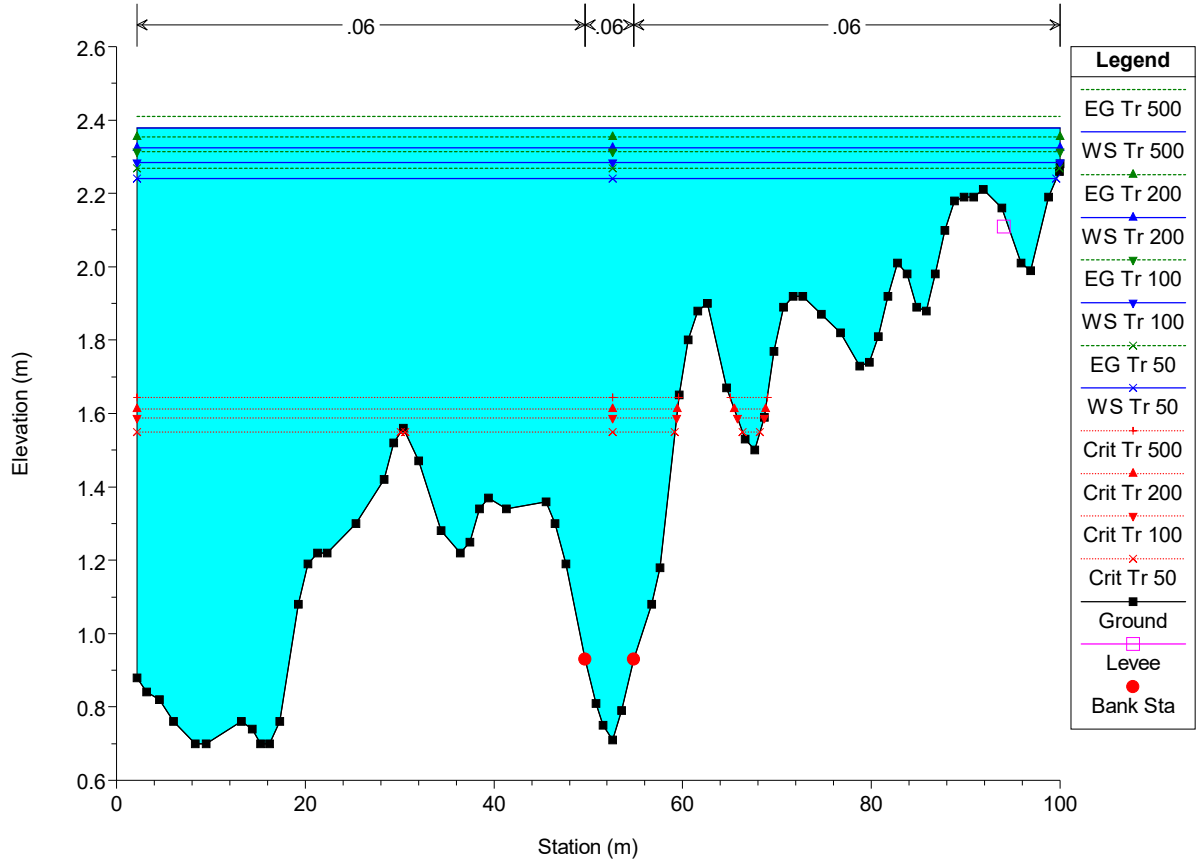
Marana-agg Plan: progetto 28/01/2020
 River = Rio De Su Laccu Reach = 1 RS = 265.1963



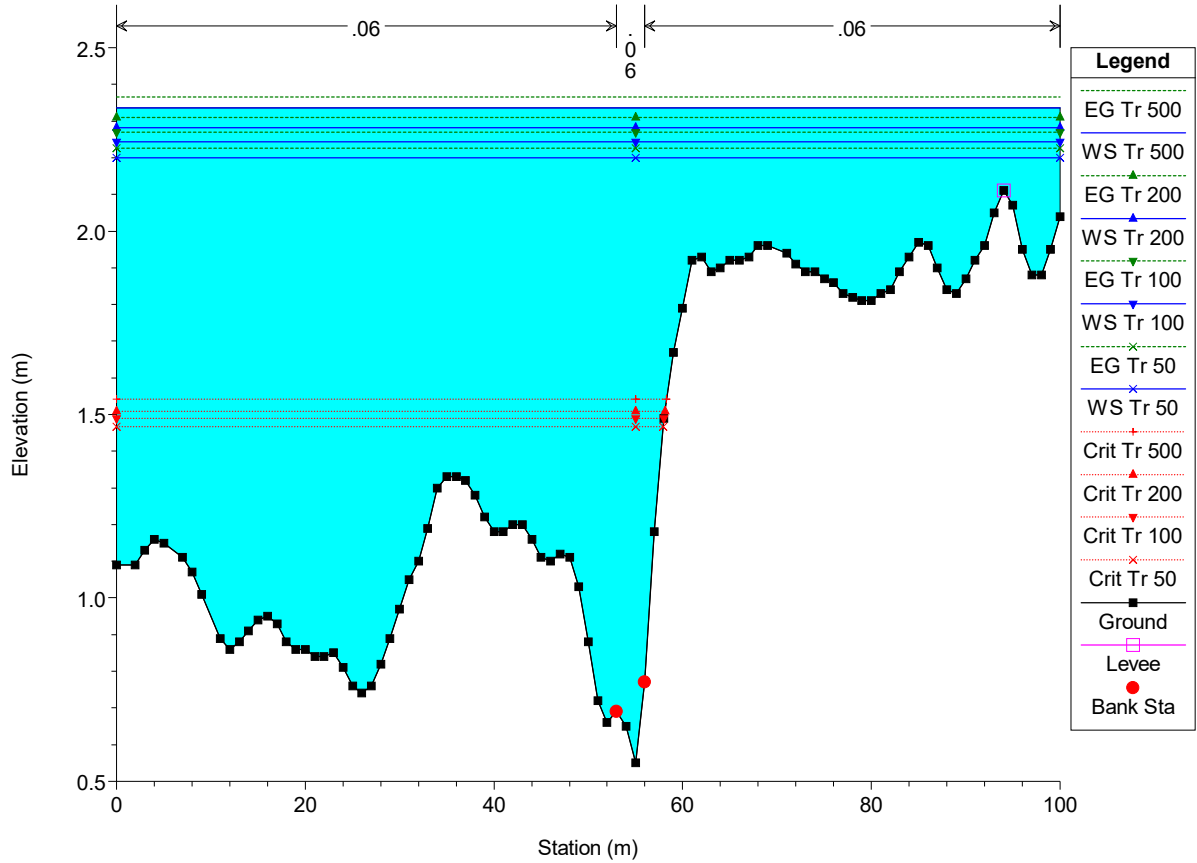
Marana-agg Plan: progetto 28/01/2020
 River = Rio De Su Laccu Reach = 1 RS = 225.1963



Marana-agg Plan: progetto 28/01/2020
 River = Rio De Su Laccu Reach = 2 RS = 175

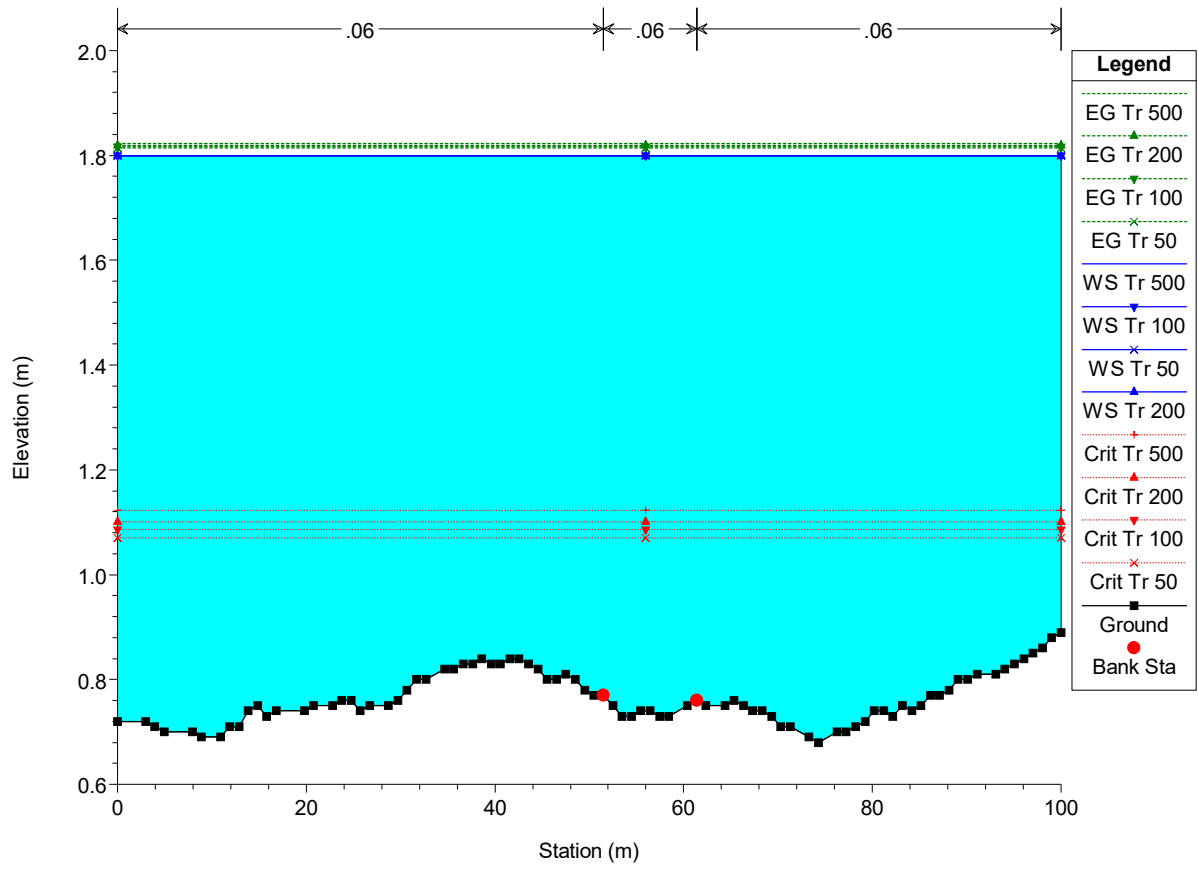


Marana-agg Plan: progetto 28/01/2020
 River = Rio De Su Laccu Reach = 2 RS = 150



Marana-agg Plan: progetto 28/01/2020

River = Rio De Su Laccu Reach = 2 RS = 13.47104



HEC-RAS Plan: progetto

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
Rio Nodu	1	301.7578	Tr 500	9.67	15.77	16.55	16.82	17.40	0.048009	4.09	2.36	5.40	1.97
Rio Nodu	1	301.7578	Tr 200	8.82	15.77	16.52	16.78	17.33	0.048013	4.00	2.21	5.22	1.96
Rio Nodu	1	301.7578	Tr 100	8.22	15.77	16.50	16.75	17.28	0.048010	3.93	2.09	5.09	1.96
Rio Nodu	1	301.7578	Tr 50	7.62	15.77	16.47	16.72	17.23	0.048004	3.85	1.98	4.94	1.95
Rio Nodu	1	263.0639	Tr 500	9.67	15.74	16.30	16.30	16.47	0.015595	2.46	7.07	20.94	1.16
Rio Nodu	1	263.0639	Tr 200	8.82	15.74	16.28	16.28	16.44	0.015487	2.37	6.65	20.68	1.15
Rio Nodu	1	263.0639	Tr 100	8.22	15.74	16.26	16.26	16.42	0.015612	2.32	6.32	20.47	1.15
Rio Nodu	1	263.0639	Tr 50	7.62	15.74	16.25	16.25	16.40	0.015725	2.27	5.98	20.24	1.14
Rio Nodu	1	221.7546	Tr 500	9.67	11.84	12.22	12.62	14.58	0.271491	6.81	1.43	6.09	4.37
Rio Nodu	1	221.7546	Tr 200	8.82	11.84	12.19	12.59	14.53	0.292392	6.77	1.31	5.88	4.49
Rio Nodu	1	221.7546	Tr 100	8.22	11.84	12.18	12.56	14.49	0.307339	6.73	1.23	5.74	4.57
Rio Nodu	1	221.7546	Tr 50	7.62	11.84	12.17	12.53	14.44	0.324301	6.68	1.14	5.59	4.65
Rio Nodu	1	181.6933	Tr 500	9.67	9.14	11.87	9.99	11.87	0.000039	0.37	39.70	20.82	0.08
Rio Nodu	1	181.6933	Tr 200	8.82	9.14	11.51	9.96	11.52	0.000059	0.41	32.32	20.82	0.09
Rio Nodu	1	181.6933	Tr 100	8.22	9.14	11.36	9.94	11.37	0.000069	0.42	29.18	20.82	0.10
Rio Nodu	1	181.6933	Tr 50	7.62	9.14	11.25	9.91	11.26	0.000074	0.42	26.91	20.82	0.10
Rio Nodu	1	179.6928	Tr 500	9.67	9.15	11.61	10.52	11.81	0.001093	1.99	4.86	20.81	0.41
Rio Nodu	1	179.6928	Tr 200	8.82	9.15	11.21	10.44	11.45	0.001669	2.18	4.05	20.81	0.49
Rio Nodu	1	179.6928	Tr 100	8.22	9.15	11.05	10.38	11.30	0.001895	2.20	3.74	20.81	0.51
Rio Nodu	1	179.6928	Tr 50	7.62	9.15	10.96	10.32	11.19	0.001933	2.15	3.55	20.81	0.51
Rio Nodu	1	172.21											
Rio Nodu	1		Culvert										
Rio Nodu	1	164.7259	Tr 500	9.67	8.66	10.00	10.00	10.66	0.008026	3.62	2.67	8.34	1.00
Rio Nodu	1	164.7259	Tr 200	8.82	8.66	9.92	9.92	10.54	0.008185	3.51	2.51	8.02	1.00
Rio Nodu	1	164.7259	Tr 100	8.22	8.66	9.86	9.86	10.46	0.008327	3.43	2.40	7.79	1.00
Rio Nodu	1	164.7259	Tr 50	7.62	8.66	9.80	9.80	10.37	0.008478	3.35	2.28	7.55	1.00
Rio Nodu	1	158.2758	Tr 500	9.67	7.85	8.26	8.69	10.16	0.148596	6.10	1.59	4.66	3.34
Rio Nodu	1	158.2758	Tr 200	8.82	7.85	8.24	8.64	10.05	0.151114	5.96	1.48	4.57	3.34
Rio Nodu	1	158.2758	Tr 100	8.22	7.85	8.22	8.61	9.97	0.153419	5.86	1.40	4.50	3.35
Rio Nodu	1	158.2758	Tr 50	7.62	7.85	8.21	8.58	9.89	0.156047	5.75	1.33	4.43	3.35
Rio Nodu	1	148.44	Tr 500	9.67	6.62	7.05	7.46	8.75	0.126745	5.77	1.68	4.73	3.10
Rio Nodu	1	148.44	Tr 200	8.82	6.62	7.03	7.41	8.63	0.126236	5.60	1.57	4.65	3.07
Rio Nodu	1	148.44	Tr 100	8.22	6.62	7.02	7.38	8.54	0.125777	5.47	1.50	4.58	3.05
Rio Nodu	1	148.44	Tr 50	7.62	6.62	7.00	7.35	8.45	0.125195	5.33	1.43	4.52	3.03
Rio Nodu	1	139.74											
Rio Nodu	1		Bridge										
Rio Nodu	1	131.04	Tr 500	9.67	6.00	6.61	6.84	7.33	0.036622	3.75	2.58	5.44	1.74
Rio Nodu	1	131.04	Tr 200	8.82	6.00	6.59	6.79	7.25	0.035259	3.60	2.45	5.35	1.70
Rio Nodu	1	131.04	Tr 100	8.22	6.00	6.57	6.76	7.19	0.034595	3.50	2.35	5.27	1.67
Rio Nodu	1	131.04	Tr 50	7.62	6.00	6.55	6.73	7.13	0.033521	3.38	2.25	5.20	1.64
Rio Nodu	1	122.3195	Tr 500	9.67	5.74	6.66	6.71	7.04	0.014192	2.75	3.52	5.67	1.11
Rio Nodu	1	122.3195	Tr 200	8.82	5.74	6.65	6.66	6.98	0.012062	2.53	3.49	5.65	1.03
Rio Nodu	1	122.3195	Tr 100	8.22	5.74	6.63	6.63	6.93	0.011776	2.46	3.34	5.54	1.01
Rio Nodu	1	122.3195	Tr 50	7.62	5.74	6.59	6.59	6.89	0.012039	2.43	3.14	5.39	1.02
Rio Nodu	1	113.20*	Tr 500	9.67	5.47	6.26	6.44	6.85	0.025670	3.42	2.83	5.16	1.47
Rio Nodu	1	113.20*	Tr 200	8.82	5.47	6.21	6.39	6.79	0.026739	3.38	2.61	4.99	1.49
Rio Nodu	1	113.20*	Tr 100	8.22	5.47	6.18	6.36	6.75	0.027335	3.34	2.46	4.87	1.50
Rio Nodu	1	113.20*	Tr 50	7.62	5.47	6.15	6.32	6.70	0.027747	3.29	2.31	4.75	1.51
Rio Nodu	1	104.0727	Tr 500	9.67	5.19	5.96	6.16	6.60	0.028350	3.54	2.73	5.08	1.54
Rio Nodu	1	104.0727	Tr 200	8.82	5.19	5.92	6.11	6.54	0.028993	3.48	2.53	4.93	1.55
Rio Nodu	1	104.0727	Tr 100	8.22	5.19	5.90	6.08	6.49	0.029086	3.42	2.40	4.82	1.55
Rio Nodu	1	104.0727	Tr 50	7.62	5.19	5.87	6.05	6.44	0.029281	3.36	2.27	4.71	1.54
Rio Nodu	1	93.18843	Tr 500	9.67	4.86	5.62	5.83	6.28	0.029646	3.60	2.69	5.05	1.58
Rio Nodu	1	93.18843	Tr 200	8.82	4.86	5.59	5.78	6.22	0.029982	3.52	2.50	4.90	1.58
Rio Nodu	1	93.18843	Tr 100	8.22	4.86	5.56	5.75	6.17	0.029800	3.45	2.38	4.80	1.56
Rio Nodu	1	93.18843	Tr 50	7.62	4.86	5.53	5.71	6.12	0.029952	3.38	2.25	4.69	1.56
Rio Nodu	1	84.845*	Tr 500	9.67	4.61	5.37	5.58	6.03	0.029659	3.60	2.69	5.05	1.58
Rio Nodu	1	84.845*	Tr 200	8.82	4.61	5.34	5.53	5.97	0.029982	3.52	2.50	4.90	1.58
Rio Nodu	1	84.845*	Tr 100	8.22	4.61	5.31	5.50	5.92	0.029996	3.46	2.38	4.80	1.57
Rio Nodu	1	84.845*	Tr 50	7.62	4.61	5.28	5.46	5.87	0.029974	3.39	2.25	4.69	1.56
Rio Nodu	1	76.502*	Tr 500	9.67	4.36	5.12	5.33	5.79	0.029991	3.61	2.68	5.04	1.58
Rio Nodu	1	76.502*	Tr 200	8.82	4.36	5.09	5.28	5.72	0.029969	3.52	2.50	4.90	1.57
Rio Nodu	1	76.502*	Tr 100	8.22	4.36	5.06	5.25	5.67	0.029866	3.45	2.38	4.80	1.57
Rio Nodu	1	76.502*	Tr 50	7.62	4.36	5.03	5.21	5.62	0.029932	3.38	2.25	4.69	1.56
Rio Nodu	1	68.15873	Tr 500	9.67	4.11	4.87	5.08	5.53	0.029819	3.61	2.68	5.04	1.58
Rio Nodu	1	68.15873	Tr 200	8.82	4.11	4.84	5.03	5.47	0.029969	3.52	2.50	4.90	1.57
Rio Nodu	1	68.15873	Tr 100	8.22	4.11	4.81	5.00	5.42	0.029829	3.45	2.38	4.80	1.56
Rio Nodu	1	68.15873	Tr 50	7.62	4.11	4.78	4.96	5.37	0.029926	3.38	2.25	4.69	1.56
Rio Nodu	1	59.788*	Tr 500	9.67	3.86	4.62	4.82	5.29	0.030224	3.62	2.67	5.03	1.59
Rio Nodu	1	59.788*	Tr 200	8.82	3.86	4.58	4.78	5.22	0.030230	3.54	2.49	4.89	1.58
Rio Nodu	1	59.788*	Tr 100	8.22	3.86	4.55	4.74	5.17	0.030258	3.47	2.37	4.79	1.58
Rio Nodu	1	59.788*	Tr 50	7.62	3.86	4.53	4.71	5.12	0.030253	3.40	2.24	4.68	1.57
Rio Nodu	1	51.418*	Tr 500	9.67	3.60	4.36	4.57	5.03	0.030327	3.63	2.66	5.03	1.59
Rio Nodu	1	51.418*	Tr 200	8.82	3.60	4.32	4.52	4.96	0.030349	3.54	2.49	4.89	1.58
Rio Nodu	1	51.418*	Tr 100	8.22	3.60	4.30	4.49	4.91	0.030364	3.47	2.37	4.79	1.58
Rio Nodu	1	51.418*	Tr 50	7.62	3.60	4.27	4.45	4.86	0.030373	3.40	2.24	4.68	1.57

HEC-RAS Plan: progetto (Continued)

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
Rio Nodu	1	43.04772	Tr 500	9.67	3.35	4.11	4.32	4.78	0.030079	3.62	2.67	5.04	1.59
Rio Nodu	1	43.04772	Tr 200	8.82	3.35	4.07	4.27	4.71	0.030079	3.53	2.50	4.90	1.58
Rio Nodu	1	43.04772	Tr 100	8.22	3.35	4.05	4.24	4.66	0.030077	3.46	2.37	4.80	1.57
Rio Nodu	1	43.04772	Tr 50	7.62	3.35	4.02	4.21	4.61	0.030071	3.39	2.25	4.69	1.56
Rio Nodu	1	34.480*	Tr 500	9.67	3.09	3.85	4.06	4.52	0.030329	3.63	2.66	5.03	1.59
Rio Nodu	1	34.480*	Tr 200	8.82	3.09	3.81	4.01	4.45	0.030337	3.54	2.49	4.89	1.58
Rio Nodu	1	34.480*	Tr 100	8.22	3.09	3.79	3.98	4.40	0.030344	3.47	2.37	4.79	1.58
Rio Nodu	1	34.480*	Tr 50	7.62	3.09	3.76	3.95	4.35	0.030352	3.40	2.24	4.68	1.57
Rio Nodu	1	25.91271	Tr 500	9.67	2.83	3.59	3.80	4.26	0.030149	3.62	2.67	5.04	1.59
Rio Nodu	1	25.91271	Tr 200	8.82	2.83	3.55	3.75	4.19	0.030156	3.53	2.50	4.90	1.58
Rio Nodu	1	25.91271	Tr 100	8.22	2.83	3.53	3.72	4.14	0.030160	3.46	2.37	4.79	1.57
Rio Nodu	1	25.91271	Tr 50	7.62	2.83	3.50	3.69	4.09	0.030163	3.39	2.25	4.69	1.57
Rio Marana	1	323.36	Tr 500	21.08	5.55	6.63	6.63	7.07	0.004738	2.94	7.18	8.25	1.01
Rio Marana	1	323.36	Tr 200	19.23	5.55	6.58	6.58	7.00	0.004827	2.87	6.70	8.07	1.01
Rio Marana	1	323.36	Tr 100	17.92	5.55	6.53	6.53	6.94	0.004898	2.82	6.36	7.95	1.01
Rio Marana	1	323.36	Tr 50	16.62	5.55	6.49	6.49	6.88	0.004970	2.76	6.01	7.81	1.01
Rio Marana	1	314.51	Tr 500	21.08	5.20	6.34	6.47	7.00	0.007042	3.60	5.86	6.28	1.19
Rio Marana	1	314.51	Tr 200	19.23	5.20	6.26	6.40	6.92	0.007684	3.60	5.34	6.11	1.23
Rio Marana	1	314.51	Tr 100	17.92	5.20	6.20	6.35	6.86	0.008133	3.59	4.99	6.00	1.26
Rio Marana	1	314.51	Tr 50	16.62	5.20	6.14	6.30	6.79	0.008747	3.59	4.63	5.87	1.29
Rio Marana	1	300.84*	Tr 500	21.08	4.65	5.63	6.00	6.81	0.015716	4.82	4.38	5.46	1.72
Rio Marana	1	300.84*	Tr 200	19.23	4.65	5.57	5.93	6.72	0.016510	4.76	4.04	5.33	1.74
Rio Marana	1	300.84*	Tr 100	17.92	4.65	5.52	5.87	6.65	0.017140	4.71	3.80	5.24	1.77
Rio Marana	1	300.84*	Tr 50	16.62	4.65	5.47	5.82	6.58	0.017884	4.67	3.56	5.15	1.79
Rio Marana	1	287.18*	Tr 500	21.08	4.10	5.09	5.55	6.55	0.019327	5.35	3.94	4.98	1.92
Rio Marana	1	287.18*	Tr 200	19.23	4.10	5.03	5.47	6.44	0.020153	5.27	3.65	4.86	1.94
Rio Marana	1	287.18*	Tr 100	17.92	4.10	4.99	5.42	6.37	0.020798	5.21	3.44	4.77	1.96
Rio Marana	1	287.18*	Tr 50	16.62	4.10	4.94	5.36	6.29	0.021529	5.15	3.23	4.68	1.98
Rio Marana	1	273.51*	Tr 500	21.08	3.55	4.59	5.11	6.25	0.021479	5.69	3.70	4.59	2.02
Rio Marana	1	273.51*	Tr 200	19.23	3.55	4.53	5.03	6.14	0.022228	5.61	3.43	4.47	2.04
Rio Marana	1	273.51*	Tr 100	17.92	3.55	4.49	4.97	6.05	0.022802	5.54	3.24	4.38	2.06
Rio Marana	1	273.51*	Tr 50	16.62	3.55	4.45	4.91	5.97	0.023436	5.46	3.04	4.29	2.07
Rio Marana	1	259.84	Tr 500	21.08	3.00	4.13	4.69	5.93	0.022554	5.94	3.55	4.27	2.08
Rio Marana	1	259.84	Tr 200	19.23	3.00	4.07	4.61	5.81	0.023192	5.84	3.29	4.14	2.09
Rio Marana	1	259.84	Tr 100	17.92	3.00	4.03	4.55	5.72	0.023673	5.77	3.11	4.05	2.10
Rio Marana	1	259.84	Tr 50	16.62	3.00	3.98	4.49	5.63	0.024193	5.69	2.92	3.96	2.11
Rio Marana	1	249.98*	Tr 500	21.08	2.84	4.00	4.53	5.69	0.020600	5.75	3.67	4.32	1.99
Rio Marana	1	249.98*	Tr 200	19.23	2.84	3.94	4.45	5.56	0.020936	5.63	3.41	4.20	2.00
Rio Marana	1	249.98*	Tr 100	17.92	2.84	3.90	4.39	5.46	0.021176	5.54	3.23	4.11	2.00
Rio Marana	1	249.98*	Tr 50	16.62	2.84	3.85	4.33	5.37	0.021415	5.45	3.05	4.03	2.00
Rio Marana	1	240.12*	Tr 500	21.08	2.69	3.88	4.38	5.46	0.018906	5.58	3.78	4.37	1.92
Rio Marana	1	240.12*	Tr 200	19.23	2.69	3.82	4.30	5.33	0.019047	5.45	3.53	4.26	1.91
Rio Marana	1	240.12*	Tr 100	17.92	2.69	3.78	4.24	5.23	0.019133	5.35	3.35	4.17	1.91
Rio Marana	1	240.12*	Tr 50	16.62	2.69	3.73	4.18	5.13	0.019203	5.24	3.17	4.09	1.90
Rio Marana	1	230.26	Tr 500	21.08	2.53	3.73	4.22	5.26	0.018031	5.48	3.84	4.40	1.87
Rio Marana	1	230.26	Tr 200	19.23	2.53	3.67	4.14	5.13	0.018079	5.35	3.60	4.29	1.86
Rio Marana	1	230.26	Tr 100	17.92	2.53	3.63	4.08	5.03	0.018096	5.24	3.42	4.20	1.86
Rio Marana	1	230.26	Tr 50	16.62	2.53	3.59	4.02	4.93	0.018096	5.13	3.24	4.12	1.85
Rio Marana	2	196.61	Tr 500	30.75	2.00	3.09	3.58	4.66	0.017696	5.56	5.53	6.17	1.88
Rio Marana	2	196.61	Tr 200	28.05	2.00	3.03	3.50	4.53	0.017885	5.42	5.18	6.06	1.87
Rio Marana	2	196.61	Tr 100	26.14	2.00	2.99	3.44	4.42	0.018019	5.31	4.92	5.97	1.87
Rio Marana	2	196.61	Tr 50	24.24	2.00	2.94	3.38	4.32	0.018155	5.19	4.67	5.89	1.86
Rio Marana	2	187.20	Tr 500	30.75	1.92	3.06	3.50	4.46	0.014822	5.23	5.88	6.29	1.73
Rio Marana	2	187.20	Tr 200	28.05	1.92	3.01	3.42	4.32	0.014782	5.08	5.52	6.17	1.71
Rio Marana	2	187.20	Tr 100	26.14	1.92	2.96	3.36	4.22	0.014732	4.96	5.27	6.09	1.70
Rio Marana	2	187.20	Tr 50	24.24	1.92	2.92	3.30	4.11	0.014664	4.83	5.02	6.01	1.69
Rio Marana	2	184.20	Tr 500	30.75	1.90	3.07	3.48	4.40	0.013828	5.11	6.02	6.33	1.67
Rio Marana	2	184.20	Tr 200	28.05	1.90	3.01	3.40	4.26	0.013718	4.95	5.67	6.22	1.66
Rio Marana	2	184.20	Tr 100	26.14	1.90	2.97	3.34	4.16	0.013613	4.83	5.42	6.14	1.64
Rio Marana	2	184.20	Tr 50	24.24	1.90	2.93	3.28	4.05	0.013483	4.70	5.16	6.05	1.62
Rio Marana	2	178		Bridge									
Rio Marana	2	171.80	Tr 500	30.75	1.80	3.03	3.38	4.20	0.011453	4.79	6.42	6.46	1.53
Rio Marana	2	171.80	Tr 200	28.05	1.80	2.97	3.30	4.06	0.011224	4.62	6.07	6.35	1.51
Rio Marana	2	171.80	Tr 100	26.14	1.80	2.93	3.24	3.96	0.011031	4.49	5.82	6.27	1.49
Rio Marana	2	171.80	Tr 50	24.24	1.80	2.89	3.18	3.86	0.010808	4.36	5.56	6.19	1.47
Rio Marana	2	164.36	Tr 500	30.75	1.74	3.00	3.32	4.09	0.010331	4.62	6.65	6.53	1.46
Rio Marana	2	164.36	Tr 200	28.05	1.74	2.95	3.24	3.96	0.010077	4.45	6.30	6.42	1.44
Rio Marana	2	164.36	Tr 100	26.14	1.74	2.91	3.18	3.86	0.009869	4.33	6.04	6.34	1.41
Rio Marana	2	164.36	Tr 50	24.24	1.74	2.87	3.12	3.76	0.009638	4.19	5.79	6.26	1.39
Rio Marana	2	154.48*	Tr 500	30.75	1.66	2.96	3.24	3.97	0.009291	4.46	6.90	6.60	1.39
Rio Marana	2	154.48*	Tr 200	28.05	1.66	2.91	3.16	3.85	0.009055	4.29	6.53	6.49	1.37
Rio Marana	2	154.48*	Tr 100	26.14	1.66	2.86	3.10	3.75	0.008874	4.17	6.27	6.41	1.35
Rio Marana	2	154.48*	Tr 50	24.24	1.66	2.82	3.04	3.65	0.008685	4.04	6.00	6.32	1.33
Rio Marana	2	144.60*	Tr 500	30.75	1.58	2.91	3.16	3.87	0.008633	4.35	7.08	6.66	1.35
Rio Marana	2	144.60*	Tr 200	28.05	1.58	2.85	3.08	3.75	0.008457	4.19	6.69	6.54	1.32

HEC-RAS Plan: progetto (Continued)

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
Rio Marana	2	144.60*	Tr 100	26.14	1.58	2.80	3.02	3.66	0.008513	4.11	6.36	6.44	1.32
Rio Marana	2	144.60*	Tr 50	24.24	1.58	2.75	2.96	3.57	0.008383	3.99	6.07	6.35	1.30
Rio Marana	2	134.72	Tr 500	30.75	1.50	2.84	3.08	3.78	0.008414	4.31	7.14	6.68	1.33
Rio Marana	2	134.72	Tr 200	28.05	1.50	2.77	3.00	3.66	0.008382	4.18	6.71	6.55	1.32
Rio Marana	2	134.72	Tr 100	26.14	1.50	2.72	2.94	3.58	0.008423	4.10	6.38	6.44	1.31
Rio Marana	2	134.72	Tr 50	24.24	1.50	2.67	2.88	3.49	0.008383	3.99	6.07	6.35	1.30
Rio Marana	2	120.01	Tr 500	30.75	1.39	2.77	2.97	3.65	0.007596	4.16	7.40	6.75	1.27
Rio Marana	2	120.01	Tr 200	28.05	1.39	2.70	2.89	3.53	0.007524	4.03	6.96	6.62	1.25
Rio Marana	2	120.01	Tr 100	26.14	1.39	2.65	2.83	3.44	0.007482	3.93	6.65	6.53	1.24
Rio Marana	2	120.01	Tr 50	24.24	1.39	2.60	2.73	3.35	0.007416	3.83	6.33	6.43	1.23
Rio Marana	2	107.72	Tr 500	30.75	1.29	2.66	2.87	3.55	0.007751	4.19	7.34	6.74	1.28
Rio Marana	2	107.72	Tr 200	28.05	1.29	2.59	2.79	3.43	0.007709	4.06	6.91	6.60	1.27
Rio Marana	2	107.72	Tr 100	26.14	1.29	2.54	2.73	3.35	0.007689	3.97	6.58	6.51	1.26
Rio Marana	2	107.72	Tr 50	24.24	1.29	2.49	2.67	3.26	0.007690	3.88	6.25	6.40	1.25
Rio Marana	2	99.51*	Tr 500	30.75	1.22	2.60	2.81	3.49	0.007712	4.18	7.36	6.74	1.28
Rio Marana	2	99.51*	Tr 200	28.05	1.22	2.53	2.73	3.37	0.007658	4.05	6.92	6.61	1.26
Rio Marana	2	99.51*	Tr 100	26.14	1.22	2.48	2.66	3.28	0.007631	3.96	6.60	6.51	1.26
Rio Marana	2	99.51*	Tr 50	24.24	1.22	2.43	2.60	3.19	0.007623	3.87	6.27	6.41	1.25
Rio Marana	2	91.30*	Tr 500	30.75	1.16	2.53	2.74	3.42	0.007683	4.17	7.37	6.74	1.28
Rio Marana	2	91.30*	Tr 200	28.05	1.16	2.47	2.66	3.30	0.007620	4.05	6.93	6.61	1.26
Rio Marana	2	91.30*	Tr 100	26.14	1.16	2.42	2.60	3.21	0.007587	3.95	6.61	6.52	1.25
Rio Marana	2	91.30*	Tr 50	24.24	1.16	2.37	2.54	3.13	0.007577	3.86	6.28	6.41	1.24
Rio Marana	2	83.08*	Tr 500	30.75	1.10	2.47	2.68	3.35	0.007648	4.17	7.38	6.75	1.27
Rio Marana	2	83.08*	Tr 200	28.05	1.10	2.40	2.60	3.23	0.007574	4.04	6.95	6.62	1.26
Rio Marana	2	83.08*	Tr 100	26.14	1.10	2.35	2.53	3.15	0.007675	3.97	6.59	6.51	1.26
Rio Marana	2	83.08*	Tr 50	24.24	1.10	2.30	2.47	3.06	0.007670	3.87	6.26	6.41	1.25
Rio Marana	2	74.87	Tr 500	30.75	1.03	2.41	2.61	3.29	0.007602	4.16	7.39	6.75	1.27
Rio Marana	2	74.87	Tr 200	28.05	1.03	2.33	2.53	3.17	0.007667	4.05	6.92	6.61	1.27
Rio Marana	2	74.87	Tr 100	26.14	1.03	2.29	2.47	3.09	0.007619	3.96	6.61	6.51	1.25
Rio Marana	2	74.87	Tr 50	24.24	1.03	2.24	2.41	3.00	0.007611	3.86	6.27	6.41	1.25
Rio Marana	2	65.550*	Tr 500	30.75	0.95	2.33	2.54	3.22	0.007709	4.18	7.36	6.74	1.28
Rio Marana	2	65.550*	Tr 200	28.05	0.95	2.25	2.46	3.10	0.007766	4.07	6.89	6.60	1.27
Rio Marana	2	65.550*	Tr 100	26.14	0.95	2.21	2.39	3.01	0.007734	3.98	6.57	6.50	1.26
Rio Marana	2	65.550*	Tr 50	24.24	0.95	2.15	2.33	2.92	0.007733	3.88	6.24	6.40	1.26
Rio Marana	2	56.23	Tr 500	30.75	0.88	2.25	2.46	3.14	0.007795	4.19	7.33	6.73	1.28
Rio Marana	2	56.23	Tr 200	28.05	0.88	2.18	2.38	3.03	0.007845	4.09	6.86	6.59	1.28
Rio Marana	2	56.23	Tr 100	26.14	0.88	2.13	2.32	2.94	0.007823	3.99	6.55	6.49	1.27
Rio Marana	2	56.23	Tr 50	24.24	0.88	2.08	2.26	2.85	0.007826	3.90	6.21	6.39	1.26
Rio Marana	2	44.34	Tr 500	30.75	0.78	2.14	2.36	3.05	0.007979	4.23	7.27	6.71	1.30
Rio Marana	2	44.34	Tr 200	28.05	0.78	2.07	2.28	2.93	0.008035	4.12	6.81	6.58	1.29
Rio Marana	2	44.34	Tr 100	26.14	0.78	2.02	2.22	2.85	0.008006	4.03	6.49	6.48	1.28
Rio Marana	2	44.34	Tr 50	24.24	0.78	1.97	2.16	2.76	0.008007	3.93	6.17	6.38	1.28
Rio Marana	2	34.22	Tr 500	30.75	0.70	2.06	2.28	2.97	0.007978	4.23	7.27	6.71	1.30
Rio Marana	2	34.22	Tr 200	28.05	0.70	1.99	2.20	2.85	0.008035	4.12	6.81	6.58	1.29
Rio Marana	2	34.22	Tr 100	26.14	0.70	1.94	2.14	2.77	0.008006	4.03	6.49	6.48	1.28
Rio Marana	2	34.22	Tr 50	24.24	0.70	1.89	2.08	2.68	0.008007	3.93	6.17	6.38	1.28
Rio Marana	2	20.72	Tr 500	30.75	0.59	1.94	2.17	2.86	0.008048	4.24	7.25	6.71	1.30
Rio Marana	2	20.72	Tr 200	28.05	0.59	1.88	2.09	2.74	0.007999	4.11	6.82	6.58	1.29
Rio Marana	2	20.72	Tr 100	26.14	0.59	1.83	2.03	2.65	0.007960	4.02	6.51	6.48	1.28
Rio Marana	2	20.72	Tr 50	24.24	0.59	1.78	1.97	2.57	0.007960	3.92	6.18	6.38	1.27
Rio De Su Laccu	1	265.1963	Tr 500	38.13	0.63	2.43	2.18	2.55	0.001877	1.90	46.95	82.21	0.49
Rio De Su Laccu	1	265.1963	Tr 200	34.79	0.63	2.36	2.17	2.50	0.002101	1.95	37.28	60.70	0.52
Rio De Su Laccu	1	265.1963	Tr 100	32.41	0.63	2.32	1.98	2.45	0.002127	1.93	34.78	59.63	0.52
Rio De Su Laccu	1	265.1963	Tr 50	30.06	0.63	2.28	1.94	2.41	0.002178	1.91	32.10	58.47	0.52
Rio De Su Laccu	1	225.1963	Tr 500	38.13	0.62	2.46	1.50	2.47	0.000668	0.63	81.54	75.00	0.15
Rio De Su Laccu	1	225.1963	Tr 200	34.79	0.62	2.40	1.46	2.42	0.000656	0.61	77.32	75.00	0.15
Rio De Su Laccu	1	225.1963	Tr 100	32.41	0.62	2.36	1.43	2.37	0.000646	0.59	74.23	75.00	0.15
Rio De Su Laccu	1	225.1963	Tr 50	30.06	0.62	2.32	1.40	2.33	0.000640	0.58	70.90	75.00	0.15
Rio De Su Laccu	2	175	Tr 500	68.88	0.71	2.38	1.64	2.41	0.001869	0.97	92.51	97.83	0.25
Rio De Su Laccu	2	175	Tr 200	62.84	0.71	2.32	1.61	2.35	0.001854	0.95	87.18	97.83	0.25
Rio De Su Laccu	2	175	Tr 100	58.55	0.71	2.28	1.59	2.31	0.001840	0.93	83.28	97.83	0.24
Rio De Su Laccu	2	175	Tr 50	54.30	0.71	2.24	1.55	2.27	0.001838	0.91	79.05	97.42	0.24
Rio De Su Laccu	2	150	Tr 500	68.88	0.55	2.34	1.54	2.37	0.001625	0.95	95.80	100.00	0.23
Rio De Su Laccu	2	150	Tr 200	62.84	0.55	2.28	1.51	2.31	0.001596	0.92	90.42	100.00	0.23
Rio De Su Laccu	2	150	Tr 100	58.55	0.55	2.24	1.49	2.27	0.001571	0.90	86.49	100.00	0.23
Rio De Su Laccu	2	150	Tr 50	54.30	0.55	2.20	1.47	2.23	0.001557	0.88	82.18	100.00	0.22
Rio De Su Laccu	2	100	Tr 500	68.88	0.71	2.25	1.53	2.28	0.001725	0.88	98.02	100.00	0.23
Rio De Su Laccu	2	100	Tr 200	62.84	0.71	2.20	1.51	2.23	0.001623	0.83	91.50	89.90	0.23
Rio De Su Laccu	2	100	Tr 100	58.55	0.71	2.17	1.49	2.19	0.001573	0.80	88.18	88.89	0.22
Rio De Su Laccu	2	100	Tr 50	54.30	0.71	2.13	1.47	2.15	0.001544	0.78	84.48	88.21	0.22
Rio De Su Laccu	2	49.99997	Tr 500	68.88	0.46	1.82	1.82	2.05	0.020613	2.62	39.62	88.07	0.78
Rio De Su Laccu	2	49.99997	Tr 200	62.84	0.46	1.79	1.79	2.01	0.020286	2.55	36.80	81.68	0.77
Rio De Su Laccu	2	49.99997	Tr 100	58.55	0.46	1.77	1.74	1.98	0.019124	2.46	35.55	80.48	0.75
Rio De Su Laccu	2	49.99997	Tr 50	54.30	0.46	1.78	1.72	1.95	0.015846	2.25	36.10	80.78	0.68
Rio De Su Laccu	2	13.47104	Tr 500	68.88	0.73	1.80	1.12	1.82	0.001538	0.68	104.00	100.00	0.21

HEC-RAS Plan: progetto (Continued)

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
Rio De Su Laccu	2	13.47104	Tr 200	62.84	0.73	1.80	1.10	1.82	0.001281	0.62	104.00	100.00	0.19
Rio De Su Laccu	2	13.47104	Tr 100	58.55	0.73	1.80	1.09	1.82	0.001112	0.58	104.00	100.00	0.18
Rio De Su Laccu	2	13.47104	Tr 50	54.30	0.73	1.80	1.07	1.81	0.000956	0.54	104.00	100.00	0.17