POSTA DELLE CANNE S.r.l.

PROGETTO DEFINITIVO
PER LA REALIZZAZIONE DI UN PARCO EOLICO
RICADENTE NEI COMUNI DI ORTA NOVA E ORDONA (FG)
IN LOCALITA' "POSTA DELLE CANNE" E "MASCITELLI"

Via Napoli, 363/I - 70132 Bari - Italy
www.bfpgroup.net - info@bfpgroup.net
tel. (+39) 0805046361 - fax (+39) 0805619384

AZIENDA CON SISTEMA GESTIONE
UNI EN ISO 9001:2015
UNI EN ISO 14001:2015
OHSAS 18001:2007
CERTIFICATO DA CERTIQUALITY

Tecnico
ing. Danilo Pomponio

Collaborazioni
ing. Milena Miglionico
ing. Antonio Crisafulli
ing. Tommaso Mancini
ing. Giovanna Scuderi
ing. Dionisio Staffieri
ing. Giuseppe Federico Zingarelli
geom. Francesco Mangino
geom. Claudio A. Zingarelli

Responsabile Commessa
ing. Danilo Pomponio

ELABORATO	TITOLO	COMMESSA	TIPOLOGIA
V22	**RELAZIONE IDRAULICA**	**20053**	**D**
		CODICE ELABORATO	
		DC20053D-V22	
REVISIONE		SOSTITUISCE	**SOSTITUITO DA**
00		-	-
		NOME FILE	PAGINE
		DC20053D-V22.doc	**17 + copertina**

REV	DATA	MODIFICA	Elaborato	Controllato	Approvato
00	15/07/20	Emissione	Staffieri	Miglionico	Pomponio
01					
02					
03					
04					
05					
06					

Sommario

1.PREMESSA

La presente relazione è relativa alla redazione del progetto per la realizzazione di un parco eolico proposto dalla società **POSTA DELLE CANNE s.r.l. .**

La proposta progettuale è finalizzata alla realizzazione di un impianto eolico per la produzione di energia elettrica da fonte rinnovabile eolica, costituito da n. 10 aerogeneratori, ciascuno di potenza nominale pari a 5,6 MW per una potenza complessiva di 56,00 MW, da realizzarsi nella Provincia di Foggia, nel territorio comunale di Orta Nova e Ordona, in cui ricadono gli aerogeneratori e parte dell'elettrodotto esterno, mentre nel territorio comunale di Stornara ricade la restante parte dell'elettrodotto esterno e le opere di connessione alla RTN.

La relazione idraulica è redatta in conformità ai criteri dettati dall'Autorità di Bacino della Regione Puglia, istituita con L. R. n. 19 del 9 dicembre 2002, la quale ha approvato il Piano di Bacino per l'Assetto Idrogeologico (PAI), di cui alla Legge 183/89, il 30 novembre 2005.

Sulla base dello studio idrologico riportato nell'elaborato **DC20053D-V21** in allegato, che ha portato alla definizione delle portate di piena transitanti nei canali, per un tempo di ritorno di 200 anni, è stato condotto uno studio idraulico consistente nella modellazione e valutazione idraulica della rete idrografica potenzialmente soggette a criticità, ed il tutto è stato svolto in condizioni di moto stazionario. Per lo svolgimento della modellazione idraulica è stato utilizzato il software HEC- RAS River Analysis System.

Dai risultati dell'analisi monodimensionale si osserva come gli alvei attualmente esistenti risultano adeguati al trasporto della portata avente tempo di ritorno 200 anni. A questo fanno eccezione alcuni tratti dove a causa di una serie di fattori, quali le elevate portate e/o la presenza di attraversamenti con relativi ponti e canali tombati, anch'essi oggetto di modellazione, si osservano esondazioni idrauliche. Pertanto, è stata condotta una ulteriore modellazione idraulica bidimensionale non stazionaria mediante il software HEC- RAS River Analysis System.

Tale modellazione ha riguardato i seguenti tratti:

- Canale Santo Spirito
- Canale Trionfo
- Torrente Marana Pidocchiosa

Al fine di poter stimare l'eventuale fenomeno di escavazione si è fatto riferimento alla letteratura in materia di trasporto solido, in particolare "Sistemazione dei corsi d'acqua" di De Peppo et al. (2018). Dall'analisi condotta lungo gli otto canali oggetto d'indagine la profondità d'asportazione media, che raggiunge un valore massimo di 0.42 m, risulta sempre inferiore alla profondità di posa in opera dei cavidotti, che verrà realizzata comunque a non meno di 2 m dall'attuale fondo dell'alveo.

Complessivamente, dall'analisi emerge come nessuno degli aerogeneratori del presente impianto eolico risulta coinvolto dalle esondazioni.

2. METODOLOGIA APPLICATA PER LE MODELLAZIONI E VALUTAZIONI IDRAULICHE

Come innanzi accennato, la modellazione e valutazione idraulica dei tratti interessati nel presente studio, è state condotta con il software HEC – RAS River Analysis System, dell'US Army Corps of Engineers, Hydrologic Engineering Center. Il rilievo topografico rispetto al quale sono state condotte le verifiche idrauliche in moto stazionario monodimensionale e non stazionario bidimensionale e sono state definite le aree esondabili a seguito della modellazione idraulica eseguita è rappresentato dal Modello Digitale del Terreno (DTM) con cella 8x8 metri, reso disponibile del Sistema Informativo Territoriale (SIT) della Regione Puglia. Per la modellazione monodimensionale del Canale Biasifiocco e del Canale di Bonifica si è fatto invece riferimento a rilievi topografici al fine di definire con maggiore dettaglio le sezioni relative ai canali, comprensive di eventuali ponti e canali tombati.

L'analisi in condizioni di moto stazionario monodimensionale è stata effettuata modellando le situazioni attualmente esistenti. Per ciascun tratto il lavoro è stato articolato nelle seguenti fasi:

- Inserimento dei dati della geometria;
- Inserimento dei dati della portata;
- Svolgimento dei calcoli idraulici;
- Controllo dei risultati, conseguente integrazione dei dati di input ove necessario, correzione di questi ultimi e, ricalcolo del modello.

La prima fase, inserimento dati geometrici, ha riguardato innanzitutto il disegno dell'asta in esame tramite l'inserimento delle coordinate dei vertici. Si è quindi passati all'inserimento dei dati delle sezioni trasversali, con numerazione crescente da valle verso monte. Per le varie sezioni sono stati inseriti tutti i dati necessari al programma per l'elaborazione del modello. Per i coefficienti di Manning's si è tenuto conto di una situazione abbastanza sfavorevole.

Non è stato necessario inserire le aree a flusso nullo (Ineffective Flow Areas), finalizzate a poter definire aree, all'interno delle sezioni trasversali, che contengono acqua non attivamente convogliata, quindi zone in cui l'acqua "ristagna" e quindi la sua velocità, nella direzione del flusso, è relativamente bassa. Sono stati inoltre inseriti nel modello idraulico, dove presenti, i ponti. Terminato l'inserimento dei dati geometrici si è passati alla definizione dei dati relativi al moto permanente. È stato scelto un unico profilo da calcolare, quello relativo ad un tempo di ritorno di 200 anni, corrispondente al valore di portata ottenuto dallo studio idrologico. Il passaggio successivo è quello che riguarda le condizioni al contorno. Queste sono necessarie per stabilire il livello del pelo libero dell'acqua all'estremità del sistema (A monte e/o a valle). In un regime di corrente lenta, la condizione al contorno necessaria è quella di valle (Non risente di

ciò che accade a monte), in caso di corrente veloce la condizione necessaria quella di monte (Non risente di ciò che accade a valle). Se invece viene effettuato il caso in regime di flusso misto, come nel nostro caso, allora le condizioni al contorno devono essere immesse per entrambe le estremità del sistema. In particolare, in assenza di confluenze con altri tratti, si è considerata l'altezza critica, in questo caso non è necessario immettere nessuna ulteriore informazione, il programma calcolerà automaticamente l'altezza critica per ogni profilo e la userà come condizione al contorno. In presenza di confluenze con altri tratti, la condizione al contorno è rappresentata dall'inserimento delle "junction", ovvero elementi di connessione tra i tratti. Per il calcolo del profilo di moto permanente è stata utilizzata l'opzione mixed. Per il calcolo delle perdite di carico (friction Slope methods) è stato scelto "average convenience" impostato come metodo di default per il moto permanente. Effettuato il calcolo vengono visualizzati i risultati, sia in modo grafico che sotto forma tabellare, riportati in allegato alla presente relazione.

Per alcuni tratti caratterizzati da esondazione è stato necessario effettuare una modellazione in condizioni di moto non stazionario bidimensionale mediante il medesimo software HEC – RAS utilizzato per la modellazione in moto stazionario. Il primo step consiste nella definizione dell'area all'interno della quale valutare l'esondazione. La dimensione della stessa viene definita, attraverso un calcolo preliminare, in modo da valutare integralmente l'area inondata a seguito dell'esondazione. Il secondo step consiste nella definizione della portata sfiorata. Essa può essere calcolata, fornendo valori di portata a vantaggio di sicurezza, secondo l'equazione della foronomia valida per luci a stramazzo, ovvero:

$$Q = \mu \cdot A \cdot (2 \cdot g \cdot h)^{1/2}$$

con:

- Q = portata sfiorata
- μ = coefficiente di efflusso
- A = superficie di sfioro, pari all'altezza del fluido h al di sopra della soglia, e quindi del canale, moltiplicata per la larghezza della superficie di sfioro, individuata sulla base della distanza tra sezioni consecutive che comportano uno sfioro
- g = accelerazione gravitazionale.

Tuttavia, nel caso in cui è l'intera portata trasportata dal canale a sfiorare, per il calcolo verrà considerata l'intera portata introdotta per il tratto in esame nella modellazione monodimensionale. Le portate vengono introdotte secondo idrogrammi di piena triangolari con tempo di esaurimento pari al tempo di corrivazione stimato nell'analisi idrologica, pertanto la durata complessiva dell'evento simulato è pari a due volte il tempo di corrivazione. Da un punto di vista della rappresentazione grafica nelle Figure in A3, l'output della modellazione monodimensionale sarà di colore ciano mentre l'output della modellazione 2D sarà di colore blu.

3. PLANIMETRIE CON INDICAZIONE DELLE AREE INTERESSATE DALLA PORTATA DUECENTENNALE E RILIEVI FOTOGRAFICI

Nel presente paragrafo si riportano i rilievi topografici con una rappresentazione planimetrica dei tratti investigati con una indicazione delle aree interessate dalla portata avente tempo di ritorno 200 anni, attraverso rappresentazioni in A3. Tali mappe sono il risultato della modellazione in condizioni di moto stazionario monodimensionale e, su alcuni tratti, della modellazione in condizioni di moto non stazionario e bidimensionale. Per entrambe le modellazioni si è utilizzato il software HEC – RAS River Analysis System, dell'US Army Corps of Engineers, Hydrologic Engineering Center.

Vengono inoltre riportati gli output della modellazione monodimensionale, ovvero:

- rappresentazioni 3D per ogni tratto investigato con indicazione delle aree interessate dalla portata transitante;
- sezioni trasversali per ogni profilo investigato con indicazione del tirante idrico all'interno delle stesse;
- tabelle di output riepilogative dei risultati per ogni profilo:
- tabelle di dettaglio relative alle singole sezioni trasversali.

<u>Canale Marana San Marchitto</u>

Il tratto del Canale Marana San Marchitto oggetto di indagine interseca il cavidotto esterno che collega la sottostazione elettrica ai cavidotti interni ed agli aerogeneratori, passando nei pressi dell'aerogeneratore "WTG5". Dai risultati dell'analisi monodimensionale si osserva come l'alveo attualmente esistente risulta adeguato al trasporto della portata avente tempo di ritorno 200 anni. Come è possibile osservare nella rappresentazione in A3 (Figura 2), non è coinvolto nessun aerogeneratore.

Foto a monte dell'intersezione tra cavidotto esterno e Canale Marana San Marchitto

Foto trasversale all'intersezione tra cavidotto esterno e Canale Marana San Marchitto

Foto a valle dell'intersezione tra cavidotto esterno e Canale Marana San Marchitto

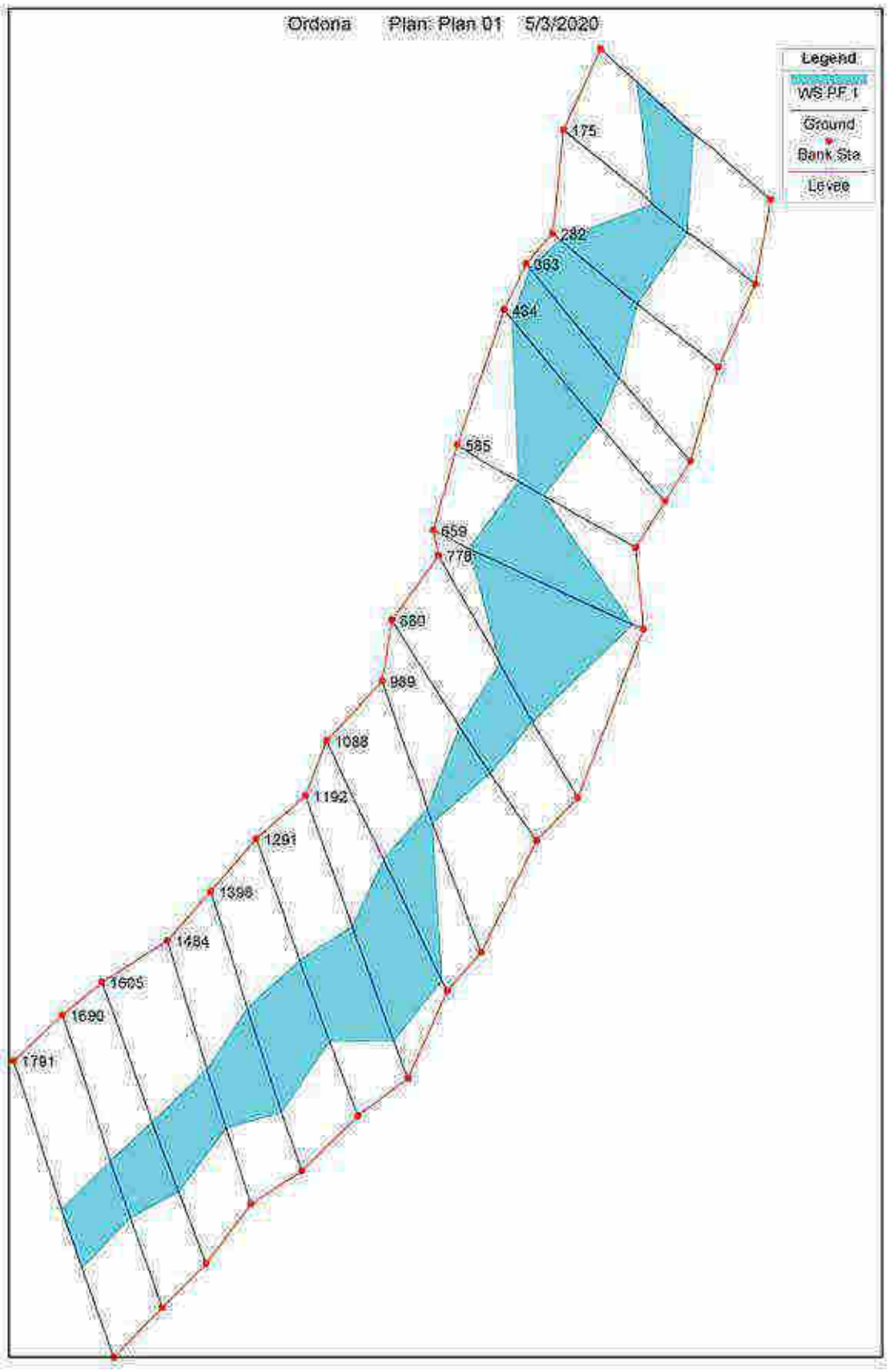
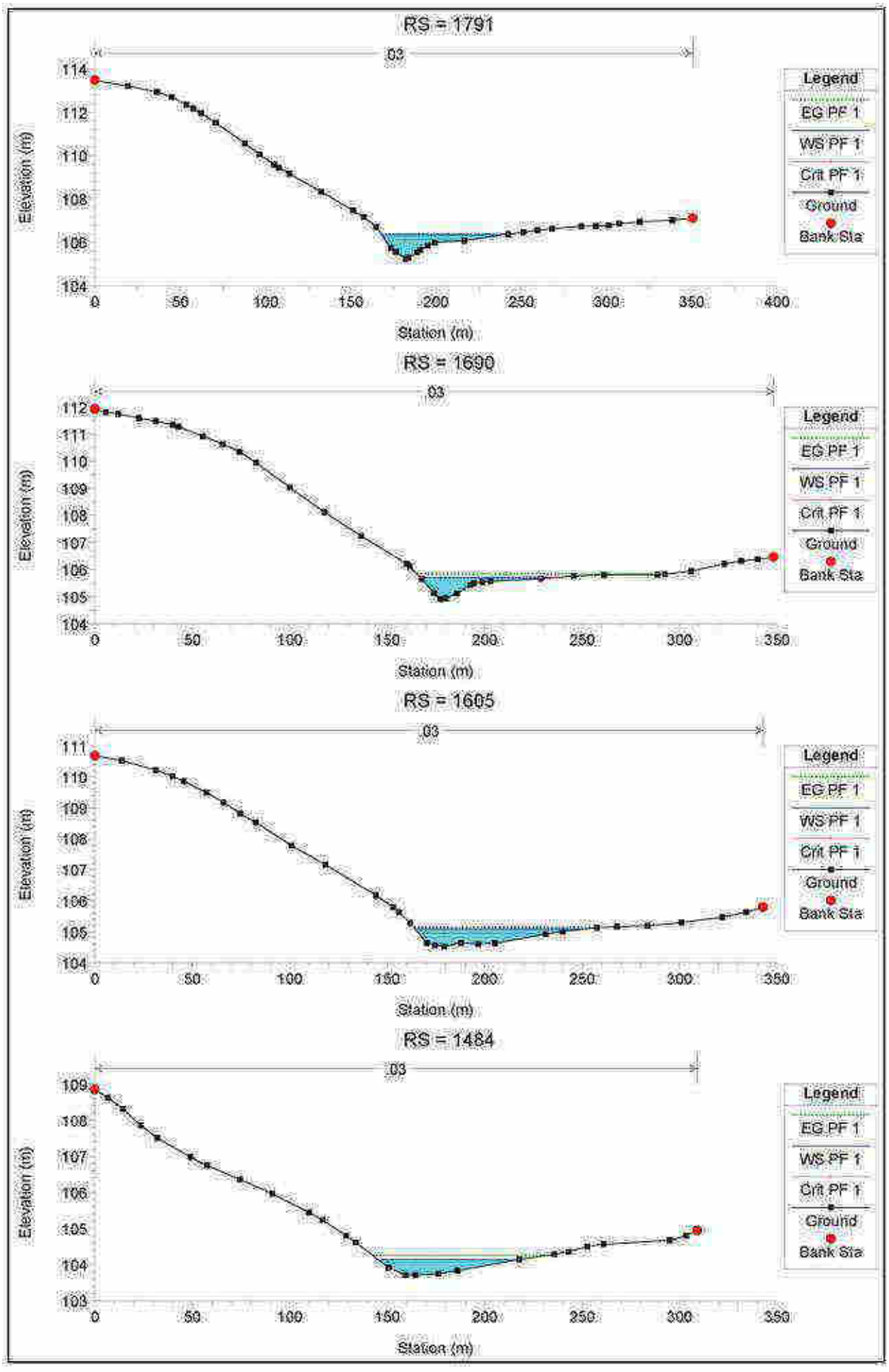
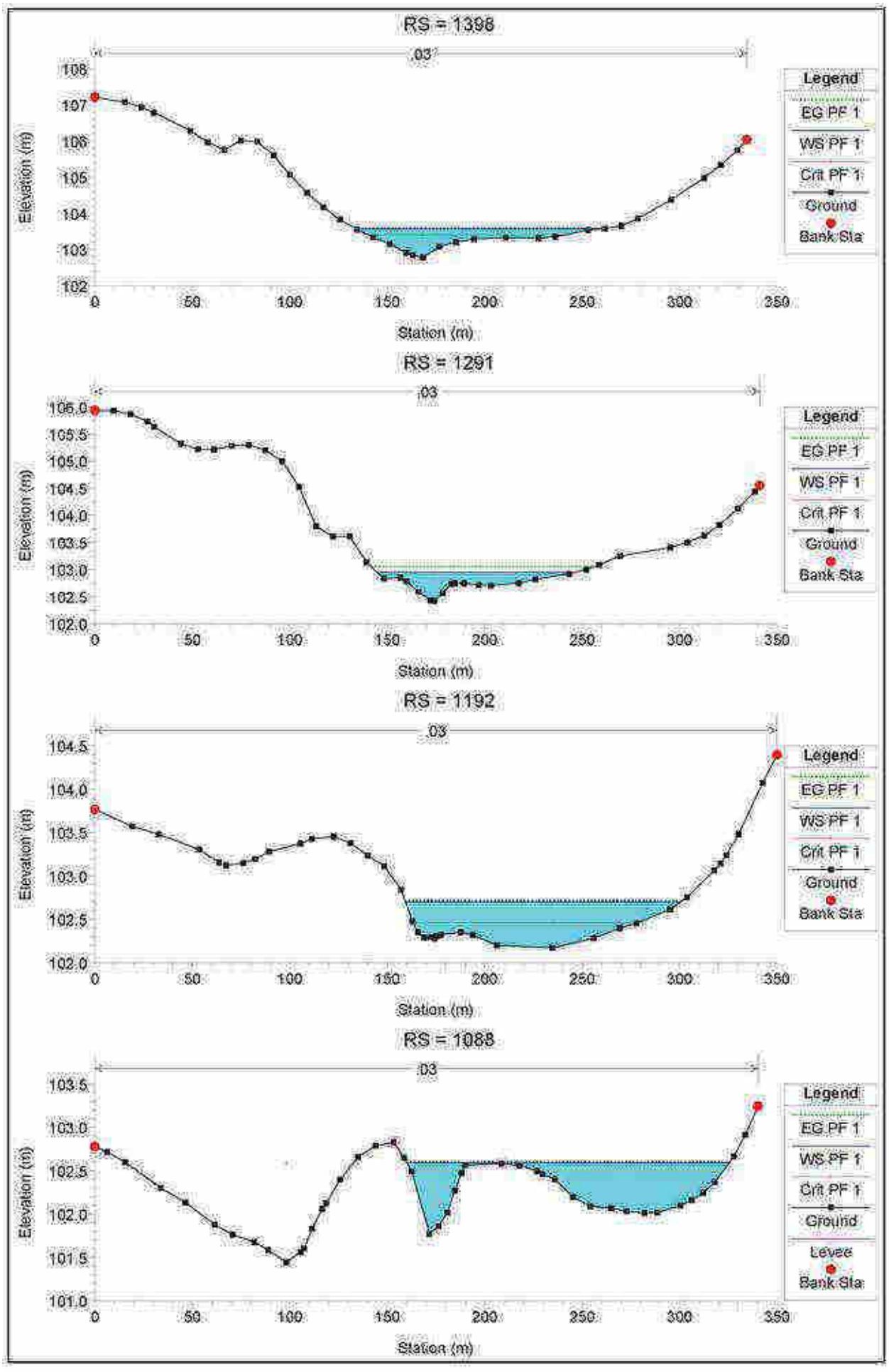
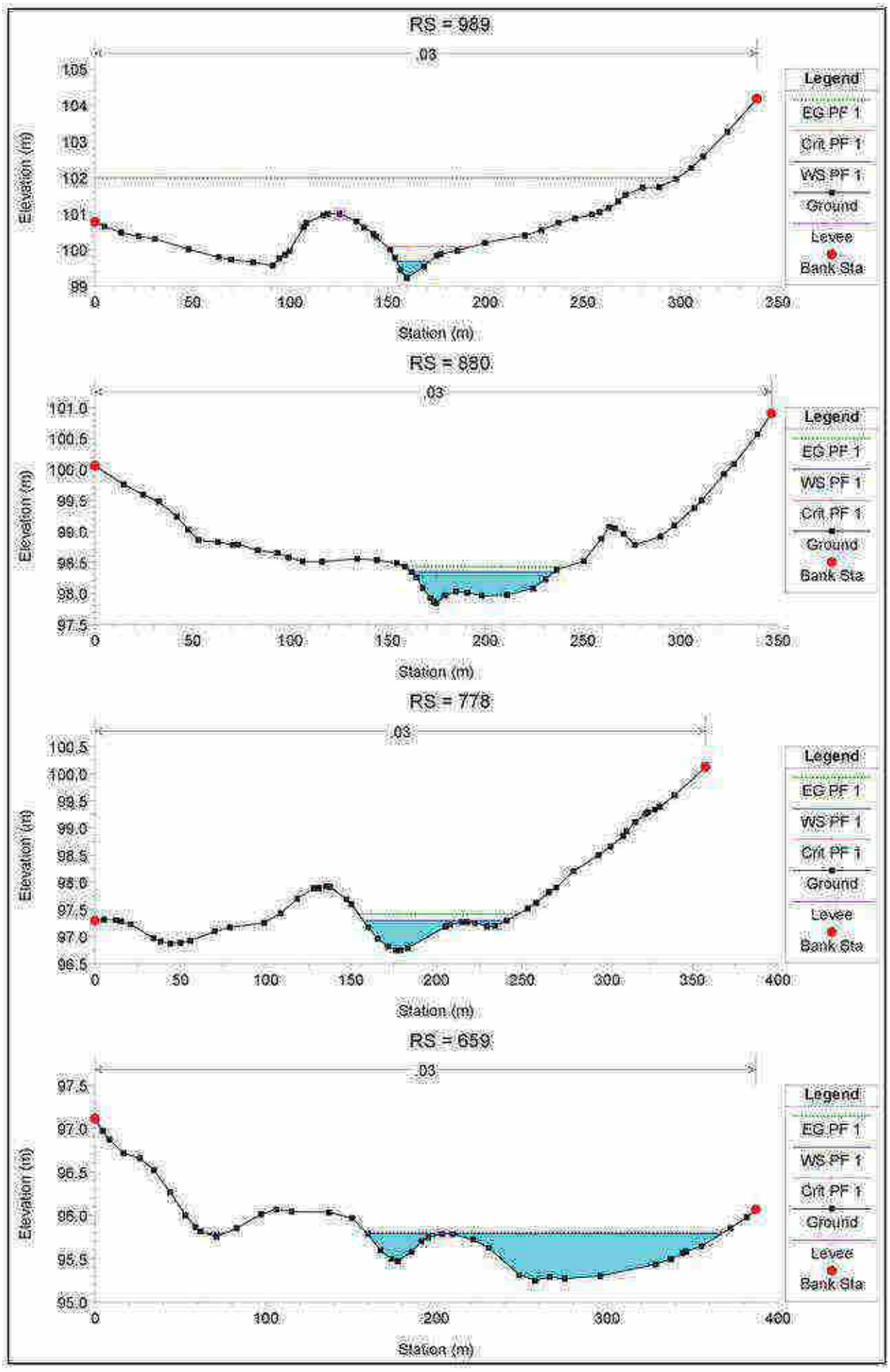
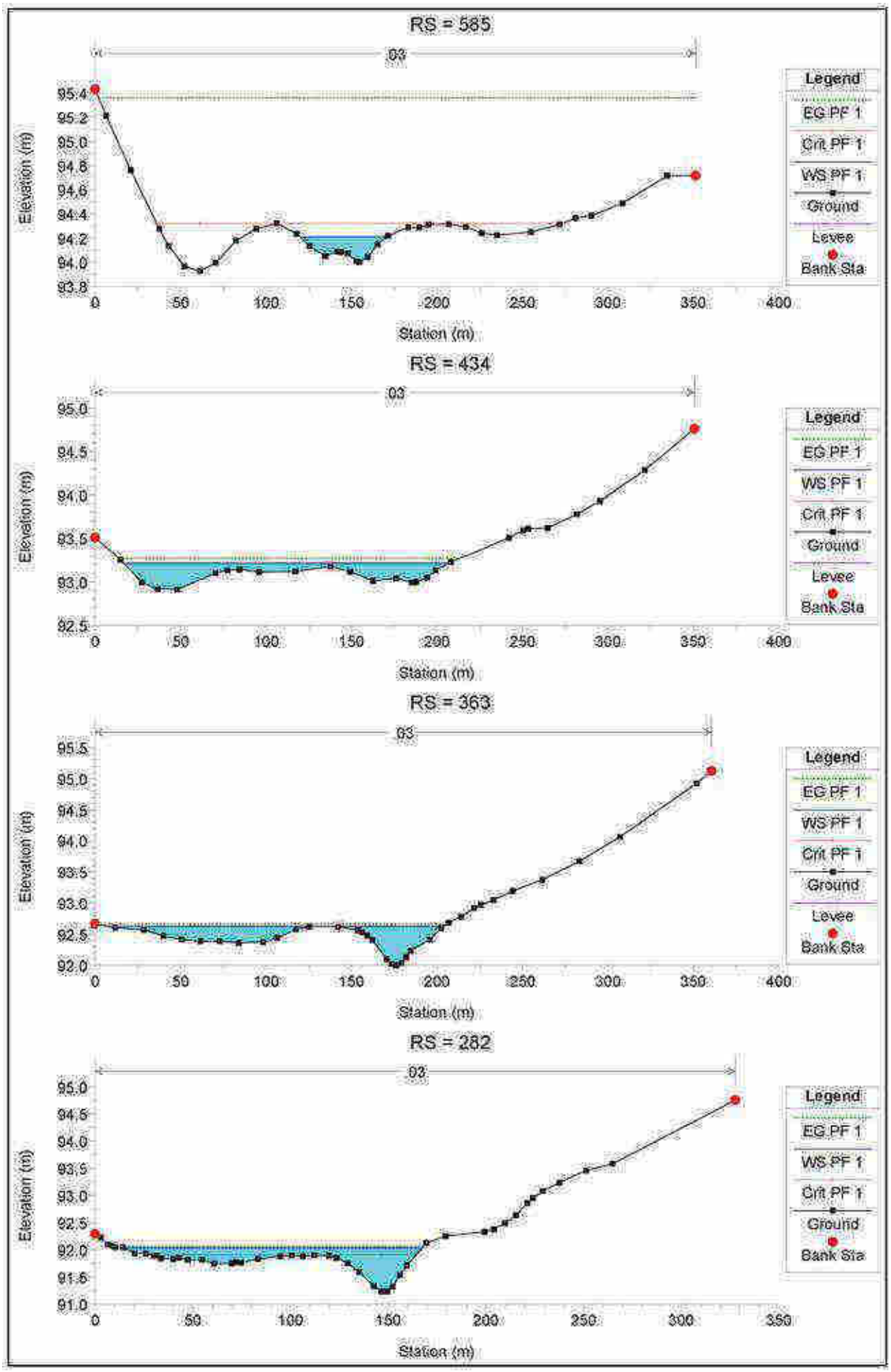


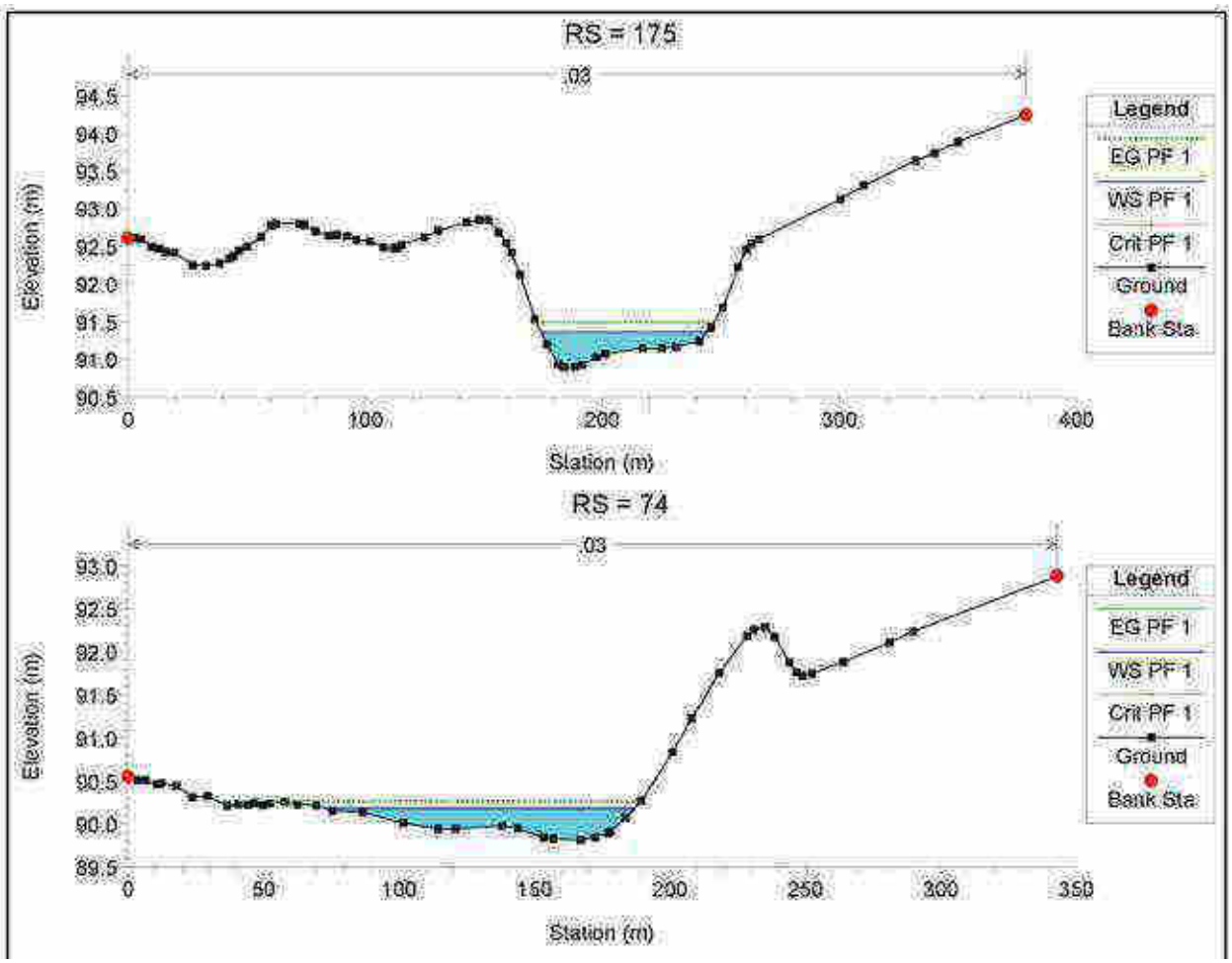
Figura 1. Rappresentazione 3D


RS = 1791
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 1690
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 1605
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 1484
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


RS = 1398
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 1291
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 1192
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 1088
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)


RS = 989
03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 880
RS = 778
RS = 659


RS = 585
03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 434
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 363
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 282
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)



HEC-RAS Plan: Plan 01 River: Marana_San_Ma Reach: Marana_San_Ma Profile: PF 1

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
Marana_San_Ma	1791	PF 1	29.15	105.23	106.34	106.12	106.39	0.002768	0.96	29.78	71.33	0.48
Marana_San_Ma	1690	PF 1	29.15	104.90	105.71	105.71	106.84	0.014322	1.61	18.06	70.11	1.02
Marana_San_Ma	1605	PF 1	29.15	104.52	105.09	104.95	105.14	0.004281	1.03	28.38	87.76	0.58
Marana_San_Ma	1484	PF 1	29.15	103.71	104.13	104.13	104.27	0.014219	1.60	18.20	71.18	1.01
Marana_San_Ma	1396	PF 1	29.15	102.78	103.56	103.40	103.59	0.002394	0.75	38.98	125.56	0.43
Marana_San_Ma	1291	PF 1	29.15	102.42	102.95	102.95	103.05	0.015738	1.43	20.32	101.10	1.02
Marana_San_Ma	1192	PF 1	29.15	102.17	102.70	102.46	102.72	0.001046	0.56	52.38	141.22	0.29
Marana_San_Ma	1088	PF 1	29.15	101.44	102.59	102.59	102.60	0.001095	0.53	55.02	165.24	0.29
Marana_San_Ma	989	PF 1	29.15	99.22	99.68	100.09	101.99	0.259152	6.73	4.33	17.30	4.30
Marana_San_Ma	890	PF 1	29.15	97.84	98.34	98.28	98.43	0.007356	1.30	22.41	73.02	0.75
Marana_San_Ma	778	PF 1	29.15	96.74	97.30	97.30	97.41	0.014642	1.51	19.32	64.44	1.01
Marana_San_Ma	659	PF 1	29.15	95.25	95.79	95.79	96.80	0.001209	0.49	59.67	218.02	0.30
Marana_San_Ma	565	PF 1	29.15	93.93	94.21	94.32	95.36	0.340627	4.75	6.14	50.89	4.37
Marana_San_Ma	434	PF 1	29.15	92.91	93.22	93.21	93.27	0.013441	1.06	27.42	190.04	0.89
Marana_San_Ma	363	PF 1	29.15	92.00	92.62	92.62	92.66	0.005998	0.82	35.39	196.29	0.62
Marana_San_Ma	252	PF 1	29.15	91.23	92.04	91.91	92.06	0.002798	0.72	40.21	152.54	0.45
Marana_San_Ma	175	PF 1	29.15	90.90	91.36	91.36	91.49	0.013947	1.60	18.17	69.84	1.00
Marana_San_Ma	74	PF 1	29.15	89.82	90.19	90.16	90.26	0.010000	1.19	24.50	114.84	0.82

Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 1791 Profile: PF 1

E.G. Elev (m)	106.39	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.		0.030	
W.S. Elev (m)	106.34	Reach Len. (m)	101.20	101.20	101.20
Crit W.S. (m)	106.12	Flow Area (m2)		29.78	
E.G. Slope (m/m)	0.002768	Area (m2)		29.78	
Q Total (m3/s)	29.15	Flow (m3/s)		29.15	
Top Width (m)	71.33	Top Width (m)		71.33	
Vel Total (m/s)	0.98	Avg. Vel. (m/s)		0.98	
Max Chl Dpth (m)	1.10	Hydr. Depth (m)		0.42	
Conv. Total (m3/s)	554.1	Conv. (m3/s)		554.1	
Length Wtd. (m)	101.20	Wetted Per. (m)		71.40	
Min Ch El (m)	105.23	Shear (N/m2)		11.32	
Alpha	1.00	Stream Power (N/m s)		11.09	
Frctn Loss (m)	0.54	Cum Volume (1000 m3)		48.77	
C & E Loss (m)	0.01	Cum SA (1000 m2)		189.13	

Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 1690 Profile: PF 1

E.G. Elev (m)	105.84	Element	Left OB	Channel	Right OB
Vel Head (m)	0.13	Wt. n-Val.		0.030	
W.S. Elev (m)	105.71	Reach Len. (m)	85.00	85.00	85.00
Crit W.S. (m)	105.71	Flow Area (m2)		18.06	
E.G. Slope (m/m)	0.014322	Area (m2)		18.06	
Q Total (m3/s)	29.15	Flow (m3/s)		29.15	
Top Width (m)	70.11	Top Width (m)		70.11	
Vel Total (m/s)	1.61	Avg. Vel. (m/s)		1.61	
Max Chl Dpth (m)	0.81	Hydr. Depth (m)		0.26	
Conv. Total (m3/s)	243.6	Conv. (m3/s)		243.6	
Length Wtd. (m)	85.00	Wetted Per. (m)		70.16	
Min Ch El (m)	104.90	Shear (N/m2)		36.15	
Alpha	1.00	Stream Power (N/m s)		58.36	
Frctn Loss (m)	0.61	Cum Volume (1000 m3)		46.35	
C & E Loss (m)	0.02	Cum SA (1000 m2)		181.98	

Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 1605 Profile: PF 1

E.G. Elev (m)	105.14	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.		0.030	
W.S. Elev (m)	105.09	Reach Len. (m)	121.10	121.10	121.10
Crit W.S. (m)	104.95	Flow Area (m2)		28.38	
E.G. Slope (m/m)	0.004281	Area (m2)		28.38	
Q Total (m3/s)	29.15	Flow (m3/s)		29.15	
Top Width (m)	87.76	Top Width (m)		87.76	
Vel Total (m/s)	1.03	Avg. Vel. (m/s)		1.03	
Max Chl Dpth (m)	0.57	Hydr. Depth (m)		0.32	
Conv. Total (m3/s)	445.5	Conv. (m3/s)		445.5	
Length Wtd. (m)	121.10	Wetted Per. (m)		87.78	
Min Ch El (m)	104.52	Shear (N/m2)		13.57	
Alpha	1.00	Stream Power (N/m s)		13.94	
Frctn Loss (m)	0.86	Cum Volume (1000 m3)		44.38	
C & E Loss (m)	0.01	Cum SA (1000 m2)		175.27	

Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 1484 Profile: PF 1

E.G. Elev (m)	104.27	Element	Left OB	Channel	Right OB
Vel Head (m)	0.13	Wt. n-Val.		0.030	
W.S. Elev (m)	104.13	Reach Len. (m)	86.00	86.00	86.00
Crit W.S. (m)	104.13	Flow Area (m2)		18.20	
E.G. Slope (m/m)	0.014219	Area (m2)		18.20	
Q Total (m3/s)	29.15	Flow (m3/s)		29.15	

Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 1464 Profile: PF 1 (Continued)

Top Width (m)	71.18	Top Width (m)		71.18	
Vel Total (m/s)	1.60	Avg. Vel. (m/s)		1.60	
Max Chl Dpth (m)	0.43	Hydr. Depth (m)		0.26	
Conv. Total (m3/s)	244.5	Conv. (m3/s)		244.5	
Length Wtd. (m)	86.00	Wetted Per. (m)		71.19	
Min Ch El (m)	103.71	Shear (N/m2)		35.66	
Alpha	1.00	Stream Power (N/m s)		57.10	
Frctn Loss (m)	0.41	Cum Volume (1000 m3)		41.58	
C & E Loss (m)	0.03	Cum SA (1000 m2)		165.64	

Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 1398 Profile: PF 1

E.G. Elev (m)	103.59	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.		0.030	
W.S. Elev (m)	103.56	Reach Len. (m)	107.30	107.30	107.30
Crit W.S. (m)	103.40	Flow Area (m2)		38.98	
E.G. Slope (m/m)	0.002394	Area (m2)		38.98	
Q Total (m3/s)	29.15	Flow (m3/s)		29.15	
Top Width (m)	125.58	Top Width (m)		125.58	
Vel Total (m/s)	0.75	Avg. Vel. (m/s)		0.75	
Max Chl Dpth (m)	0.79	Hydr. Depth (m)		0.31	
Conv. Total (m3/s)	595.7	Conv. (m3/s)		595.7	
Length Wtd. (m)	107.30	Wetted Per. (m)		125.60	
Min Ch El (m)	102.78	Shear (N/m2)		7.29	
Alpha	1.00	Stream Power (N/m s)		5.45	
Frctn Loss (m)	0.53	Cum Volume (1000 m3)		39.10	
C & E Loss (m)	0.01	Cum SA (1000 m2)		157.18	

Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 1291 Profile: PF 1

E.G. Elev (m)	103.05	Element	Left OB	Channel	Right OB
Vel Head (m)	0.10	Wt. n-Val.		0.030	
W.S. Elev (m)	102.95	Reach Len. (m)	98.80	98.80	98.80
Crit W.S. (m)	102.85	Flow Area (m2)		20.32	
E.G. Slope (m/m)	0.015738	Area (m2)		20.32	
Q Total (m3/s)	29.15	Flow (m3/s)		29.15	
Top Width (m)	101.10	Top Width (m)		101.10	
Vel Total (m/s)	1.43	Avg. Vel. (m/s)		1.43	
Max Chl Dpth (m)	0.53	Hydr. Depth (m)		0.20	
Conv. Total (m3/s)	232.4	Conv. (m3/s)		232.4	
Length Wtd. (m)	98.80	Wetted Per. (m)		101.11	
Min Ch El (m)	102.42	Shear (N/m2)		31.01	
Alpha	1.00	Stream Power (N/m s)		44.49	
Frctn Loss (m)	0.26	Cum Volume (1000 m3)		35.92	
C & E Loss (m)	0.03	Cum SA (1000 m2)		145.02	

Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 1192 Profile: PF 1

E.G. Elev (m)	102.72	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.		0.030	
W.S. Elev (m)	102.70	Reach Len. (m)	103.70	103.70	103.70
Crit W.S. (m)	102.46	Flow Area (m2)		52.38	
E.G. Slope (m/m)	0.001046	Area (m2)		52.38	
Q Total (m3/s)	29.15	Flow (m3/s)		29.15	
Top Width (m)	141.22	Top Width (m)		141.22	
Vel Total (m/s)	0.56	Avg. Vel. (m/s)		0.56	
Max Chl Dpth (m)	0.53	Hydr. Depth (m)		0.37	
Conv. Total (m3/s)	901.3	Conv. (m3/s)		901.3	
Length Wtd. (m)	103.70	Wetted Per. (m)		141.23	
Min Ch El (m)	102.17	Shear (N/m2)		3.80	

Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 1192 Profile: PF 1 (Continued)

Alpha	1.00	Stream Power (N/m s)		2.12	
Frctn Loss (m)	0.11	Cum Volume (1000 m3)		32.33	
C & E Loss (m)	0.00	Cum SA (1000 m2)		133.05	

Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 1098 Profile: PF 1

E.G. Elev (m)	102.60	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.		0.030	
W.S. Elev (m)	102.59	Reach Len. (m)	99.30	99.30	99.30
Crit W.S. (m)	102.59	Flow Area (m2)		55.02	
E.G. Slope (m/m)	0.001095	Area (m2)		55.02	
Q Total (m3/s)	29.15	Flow (m3/s)		29.15	
Top Width (m)	165.24	Top Width (m)		165.24	
Vel Total (m/s)	0.53	Avg. Vel. (m/s)		0.53	
Max Chl Dpth (m)	1.15	Hydr. Depth (m)		0.33	
Conv. Total (m3/s)	880.7	Conv. (m3/s)		880.7	
Length Wtd. (m)	99.30	Wetted Per. (m)		165.30	
Min Ch El (m)	101.44	Shear (N/m2)		3.58	
Alpha	1.00	Stream Power (N/m s)		1.89	
Frctn Loss (m)	0.36	Cum Volume (1000 m3)		26.76	
C & E Loss (m)	0.23	Cum SA (1000 m2)		117.16	

Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 989 Profile: PF 1

E.G. Elev (m)	101.99	Element	Left OB	Channel	Right OB
Vel Head (m)	2.31	Wt. n-Val.		0.030	
W.S. Elev (m)	99.68	Reach Len. (m)	109.00	109.00	109.00
Crit W.S. (m)	100.09	Flow Area (m2)		4.33	
E.G. Slope (m/m)	0.259152	Area (m2)		4.33	
Q Total (m3/s)	29.15	Flow (m3/s)		29.15	
Top Width (m)	17.30	Top Width (m)		17.30	
Vel Total (m/s)	6.73	Avg. Vel. (m/s)		6.73	
Max Chl Dpth (m)	0.46	Hydr. Depth (m)		0.25	
Conv. Total (m3/s)	57.3	Conv. (m3/s)		57.3	
Length Wtd. (m)	109.00	Wetted Per. (m)		17.33	
Min Ch El (m)	99.22	Shear (N/m2)		635.03	
Alpha	1.00	Stream Power (N/m s)		4275.00	
Frctn Loss (m)	1.04	Cum Volume (1000 m3)		23.81	
C & E Loss (m)	0.03	Cum SA (1000 m2)		108.10	

Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 880 Profile: PF 1

E.G. Elev (m)	98.43	Element	Left OB	Channel	Right OB
Vel Head (m)	0.09	Wt. n-Val.		0.030	
W.S. Elev (m)	98.34	Reach Len. (m)	101.80	101.80	101.80
Crit W.S. (m)	98.28	Flow Area (m2)		22.41	
E.G. Slope (m/m)	0.007356	Area (m2)		22.41	
Q Total (m3/s)	29.15	Flow (m3/s)		29.15	
Top Width (m)	73.02	Top Width (m)		73.02	
Vel Total (m/s)	1.30	Avg. Vel. (m/s)		1.30	
Max Chl Dpth (m)	0.50	Hydr. Depth (m)		0.31	
Conv. Total (m3/s)	339.9	Conv. (m3/s)		339.9	
Length Wtd. (m)	101.80	Wetted Per. (m)		73.04	
Min Ch El (m)	97.84	Shear (N/m2)		22.13	
Alpha	1.00	Stream Power (N/m s)		28.79	
Frctn Loss (m)	1.03	Cum Volume (1000 m3)		22.35	
C & E Loss (m)	0.00	Cum SA (1000 m2)		103.18	

Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 778 Profile: PF 1

E.G. Elev (m)	97.41	Element	Left OB	Channel	Right OB
Vel Head (m)	0.12	Wt. n-Val.		0.030	
W.S. Elev (m)	97.30	Reach Len. (m)	118.80	118.80	118.80
Crit W.S. (m)	97.30	Flow Area (m2)		19.32	
E.G. Slope (m/m)	0.014842	Area (m2)		19.32	
Q Total (m3/s)	29.15	Flow (m3/s)		29.15	
Top Width (m)	84.44	Top Width (m)		84.44	
Vel Total (m/s)	1.51	Avg. Vel. (m/s)		1.51	
Max Chl Dpth (m)	0.55	Hydr. Depth (m)		0.23	
Conv. Total (m3/s)	240.9	Conv. (m3/s)		240.9	
Length Wtd. (m)	118.80	Wetted Per. (m)		84.46	
Min Ch El (m)	96.74	Shear (N/m2)		32.85	
Alpha	1.00	Stream Power (N/m s)		49.56	
Frctn Loss (m)	0.35	Cum Volume (1000 m3)		20.23	
C & E Loss (m)	0.03	Cum SA (1000 m2)		95.16	

Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 659 Profile: PF 1

E.G. Elev (m)	95.80	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.		0.030	
W.S. Elev (m)	95.79	Reach Len. (m)	73.90	73.90	73.90
Crit W.S. (m)	95.79	Flow Area (m2)		59.67	
E.G. Slope (m/m)	0.001209	Area (m2)		59.67	
Q Total (m3/s)	29.15	Flow (m3/s)		29.15	
Top Width (m)	218.02	Top Width (m)		218.02	
Vel Total (m/s)	0.49	Avg. Vel. (m/s)		0.49	
Max Chl Dpth (m)	0.54	Hydr. Depth (m)		0.27	
Conv. Total (m3/s)	838.4	Conv. (m3/s)		838.4	
Length Wtd. (m)	73.90	Wetted Per. (m)		218.04	
Min Ch El (m)	95.25	Shear (N/m2)		3.24	
Alpha	1.00	Stream Power (N/m s)		1.58	
Frctn Loss (m)	0.32	Cum Volume (1000 m3)		15.54	
C & E Loss (m)	0.11	Cum SA (1000 m2)		77.19	

Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 585 Profile: PF 1

E.G. Elev (m)	95.36	Element	Left OB	Channel	Right OB
Vel Head (m)	1.15	Wt. n-Val.		0.030	
W.S. Elev (m)	94.21	Reach Len. (m)	150.90	150.90	150.90
Crit W.S. (m)	94.32	Flow Area (m2)		6.14	
E.G. Slope (m/m)	0.340827	Area (m2)		6.14	
Q Total (m3/s)	29.15	Flow (m3/s)		29.15	
Top Width (m)	50.89	Top Width (m)		50.89	
Vel Total (m/s)	4.75	Avg. Vel. (m/s)		4.75	
Max Chl Dpth (m)	0.28	Hydr. Depth (m)		0.12	
Conv. Total (m3/s)	49.9	Conv. (m3/s)		49.9	
Length Wtd. (m)	150.90	Wetted Per. (m)		50.90	
Min Ch El (m)	93.93	Shear (N/m2)		403.02	
Alpha	1.00	Stream Power (N/m s)		1914.25	
Frctn Loss (m)	1.12	Cum Volume (1000 m3)		13.11	
C & E Loss (m)	0.00	Cum SA (1000 m2)		67.26	

Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 434 Profile: PF 1

E.G. Elev (m)	93.27	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.		0.030	
W.S. Elev (m)	93.22	Reach Len. (m)	70.90	70.90	70.90
Crit W.S. (m)	93.21	Flow Area (m2)		27.42	
E.G. Slope (m/m)	0.013441	Area (m2)		27.42	
Q Total (m3/s)	29.15	Flow (m3/s)		29.15	

Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 434 Profile: PF 1 (Continued)

Top Width (m)	190.04	Top Width (m)		190.04	
Vel Total (m/s)	1.06	Avg. Vel. (m/s)		1.06	
Max Chl Dpth (m)	0.30	Hydr. Depth (m)		0.14	
Conv. Total (m3/s)	251.4	Conv. (m3/s)		251.4	
Length Wtd. (m)	70.90	Wetted Per. (m)		190.05	
Min Ch El (m)	92.91	Shear (N/m2)		19.02	
Alpha	1.00	Stream Power (N/m s)		20.22	
Frctn Loss (m)	0.61	Cum Volume (1000 m3)		10.58	
C & E Loss (m)	0.01	Cum SA (1000 m2)		49.08	

Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 363 Profile: PF 1

E.G. Elev (m)	92.68	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.		0.030	
W.S. Elev (m)	92.62	Reach Len. (m)	80.90	80.90	80.90
Crit W.S. (m)	92.62	Flow Area (m2)		35.39	
E.G. Slope (m/m)	0.005998	Area (m2)		35.39	
Q Total (m3/s)	29.15	Flow (m3/s)		29.15	
Top Width (m)	196.29	Top Width (m)		196.29	
Vel Total (m/s)	0.82	Avg. Vel. (m/s)		0.82	
Max Chl Dpth (m)	0.62	Hydr. Depth (m)		0.18	
Conv. Total (m3/s)	376.4	Conv. (m3/s)		376.4	
Length Wtd. (m)	80.90	Wetted Per. (m)		196.32	
Min Ch El (m)	92.00	Shear (N/m2)		10.60	
Alpha	1.00	Stream Power (N/m s)		8.73	
Frctn Loss (m)	0.32	Cum Volume (1000 m3)		8.35	
C & E Loss (m)	0.00	Cum SA (1000 m2)		35.38	

Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 282 Profile: PF 1

E.G. Elev (m)	92.06	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.		0.030	
W.S. Elev (m)	92.04	Reach Len. (m)	107.20	107.20	107.20
Crit W.S. (m)	91.91	Flow Area (m2)		40.21	
E.G. Slope (m/m)	0.002798	Area (m2)		40.21	
Q Total (m3/s)	29.15	Flow (m3/s)		29.15	
Top Width (m)	152.54	Top Width (m)		152.54	
Vel Total (m/s)	0.72	Avg. Vel. (m/s)		0.72	
Max Chl Dpth (m)	0.80	Hydr. Depth (m)		0.26	
Conv. Total (m3/s)	551.0	Conv. (m3/s)		551.0	
Length Wtd. (m)	107.20	Wetted Per. (m)		152.57	
Min Ch El (m)	91.23	Shear (N/m2)		7.23	
Alpha	1.00	Stream Power (N/m s)		5.24	
Frctn Loss (m)	0.57	Cum Volume (1000 m3)		5.29	
C & E Loss (m)	0.01	Cum SA (1000 m2)		21.27	

Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 175 Profile: PF 1

E.G. Elev (m)	91.49	Element	Left OB	Channel	Right OB
Vel Head (m)	0.13	Wt. n-Val.		0.030	
W.S. Elev (m)	91.36	Reach Len. (m)	101.30	101.30	101.30
Crit W.S. (m)	91.36	Flow Area (m2)		18.17	
E.G. Slope (m/m)	0.013947	Area (m2)		18.17	
Q Total (m3/s)	29.15	Flow (m3/s)		29.15	
Top Width (m)	69.84	Top Width (m)		69.84	
Vel Total (m/s)	1.60	Avg. Vel. (m/s)		1.60	
Max Chl Dpth (m)	0.46	Hydr. Depth (m)		0.26	
Conv. Total (m3/s)	246.8	Conv. (m3/s)		246.8	
Length Wtd. (m)	101.30	Wetted Per. (m)		69.86	
Min Ch El (m)	90.90	Shear (N/m2)		35.56	

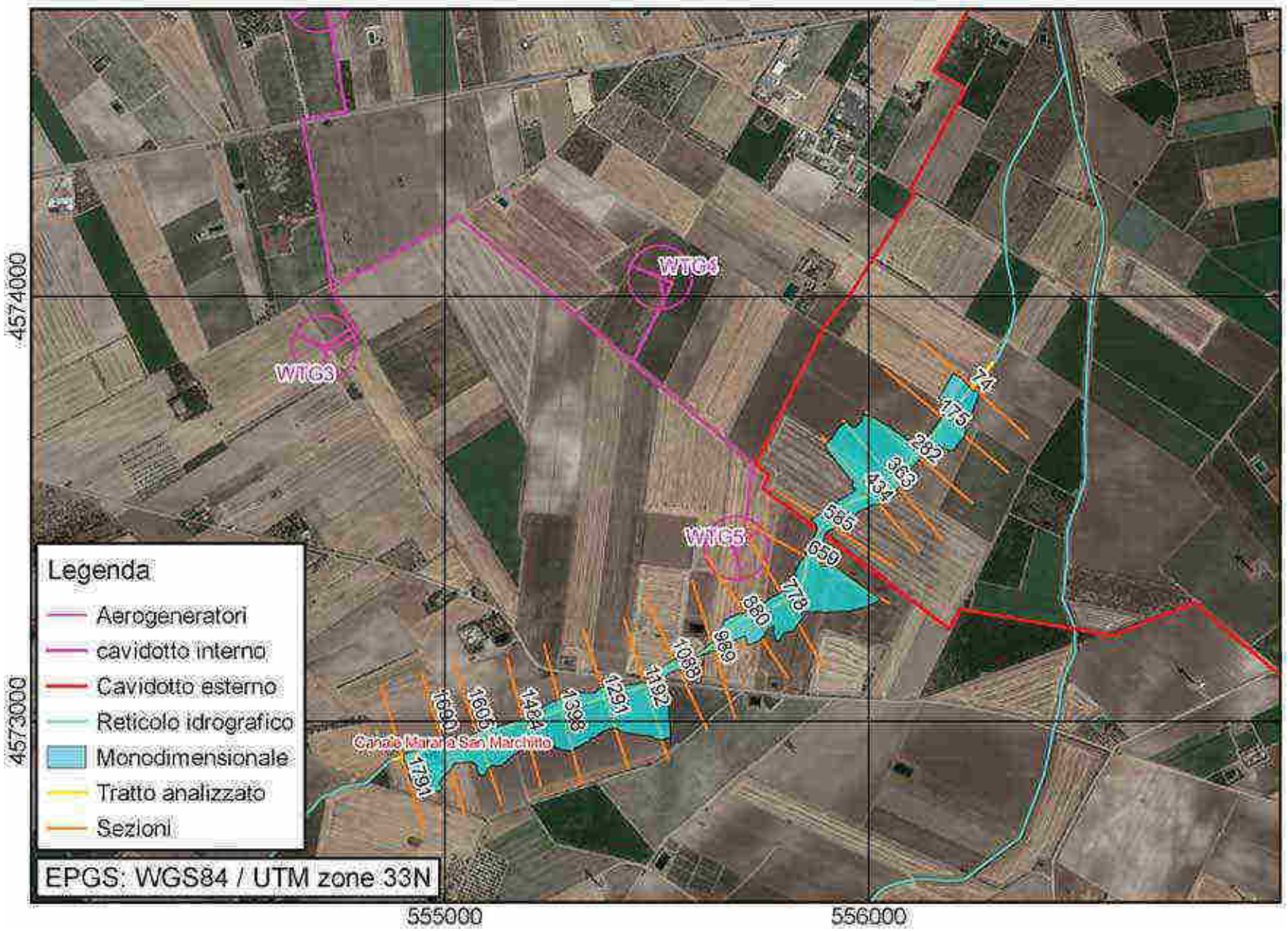
Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 175 Profile: PF 1 (Continued)

Alpha	1.00	Stream Power (N/m s)	57.07		
Frctn Loss (m)	1.19	Cum Volume (1000 m3)	2.16		
C & E Loss (m)	0.02	Cum SA (1000 m2)	9.35		

Plan: Plan 01 Marana_San_Ma Marana_San_Ma RS: 74 Profile: PF 1

E.G. Elev (m)	90.26	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.		0.030	
W.S. Elev (m)	90.19	Reach Len. (m)			
Crit W.S. (m)	90.16	Flow Area (m2)		24.50	
E.G. Slope (m/m)	0.010000	Area (m2)		24.50	
Q Total (m3/s)	29.15	Flow (m3/s)		29.15	
Top Width (m)	114.84	Top Width (m)		114.84	
Vel Total (m/s)	1.19	Avg. Vel. (m/s)		1.19	
Max Chl Dpth (m)	0.37	Hydr. Depth (m)		0.21	
Conv. Total (m3/s)	291.5	Conv. (m3/s)		291.5	
Length Wtd. (m)		Wetted Per. (m)		114.85	
Min Ch El (m)	89.82	Shear (N/m2)		20.92	
Alpha	1.00	Stream Power (N/m s)		24.89	
Frctn Loss (m)		Cum Volume (1000 m3)			
C & E Loss (m)		Cum SA (1000 m2)			

Figura 2. Planimetria con individuazione delle sezioni e delle aree potenzialmente interessate dalla portata avente tr = 200 anni



Canale Santo Spirito

Il tratto del Canale Santo Spirito oggetto di indagine interseca il cavidotto esterno che collega la sottostazione elettrica ai cavidotti interni ed agli aerogeneratori. In corrispondenza dell'intersezione sono presenti due canali tombati (codice sezioni in HEC-RAS - RS = 758 e RS = 553), caratterizzati entrambi da:

- RS = 758, due canali con diametro 90 mm (Figura 3);
- RS = 553, un canale con diametro 80 mm (Figura 4).

È stata pertanto condotta una verifica che ha tenuto conto degli attraversamenti, mettendo in evidenza come per effetto degli stessi sono presenti alcune esondazioni in destra e sinistra idraulica. Si è inoltre verificato l'eventuale coinvolgimento dell'aerogeneratore "WTG5" nell'esondazione. Sulla base della modellazione monodimensionale precedentemente condotta sono state stima le seguenti portate:

- in sinistra idraulica, sezioni da RS = 761 a RS = 755, Q = 4.70 m^3/s;
- in destra idraulica, sezioni da RS = 558 a RS = 553, Q = 3.36 m^3/s;

Essendo un'analisi condotta in condizioni non stazionarie le portate vengono introdotte secondo idrogrammi di piena triangolari con tempo di esaurimento pari al tempo di corrivazione stimato nell'analisi idrologica, pertanto la durata complessiva dell'evento simulato è pari a due volte il tempo di corrivazione. L'esondazione, come è possibile osservare nella rappresentazione in A3 (Figura 6), non coinvolge nessun aerogeneratore, interessando parzialmente i cavidotti esterni. La posa in opera dei cavidotti in corrispondenza dei canali tombati verrà pertanto realizzata con particolare attenzione attraverso una perforazione teleguidata (Trivellazione Orizzontale Teleguidata" T.O.C.) fino ad una profondità pari a 2 metri al di sotto del fondo alveo.

Di seguito si riporta un rilievo topografico del tratto investigato con foto a monte e valle dei due canali tombati.

Foto a monte della sezione RS = 758

Foto a valle della sezione RS = 758

Foto a monte della sezione RS = 553

Foto canale tombato RS = 553

Foto trasversale alla sezione RS = 553

Foto a valle della sezione RS = 553

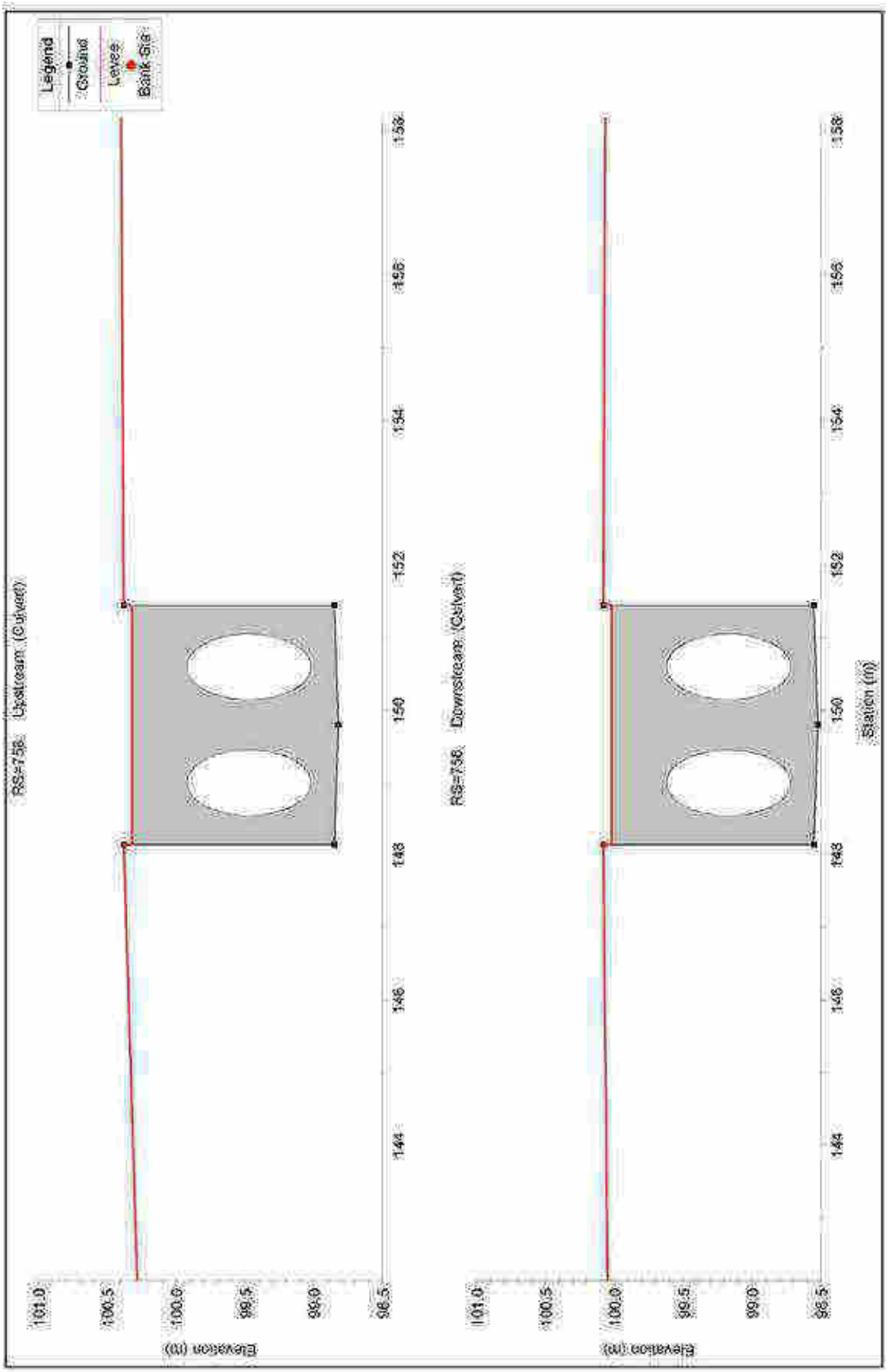


Figura 3. Modellazione in HEC-RAS del canale tombato RS = 758: Upstream (Sezione a monte) – Downstream (Sezione a valle)

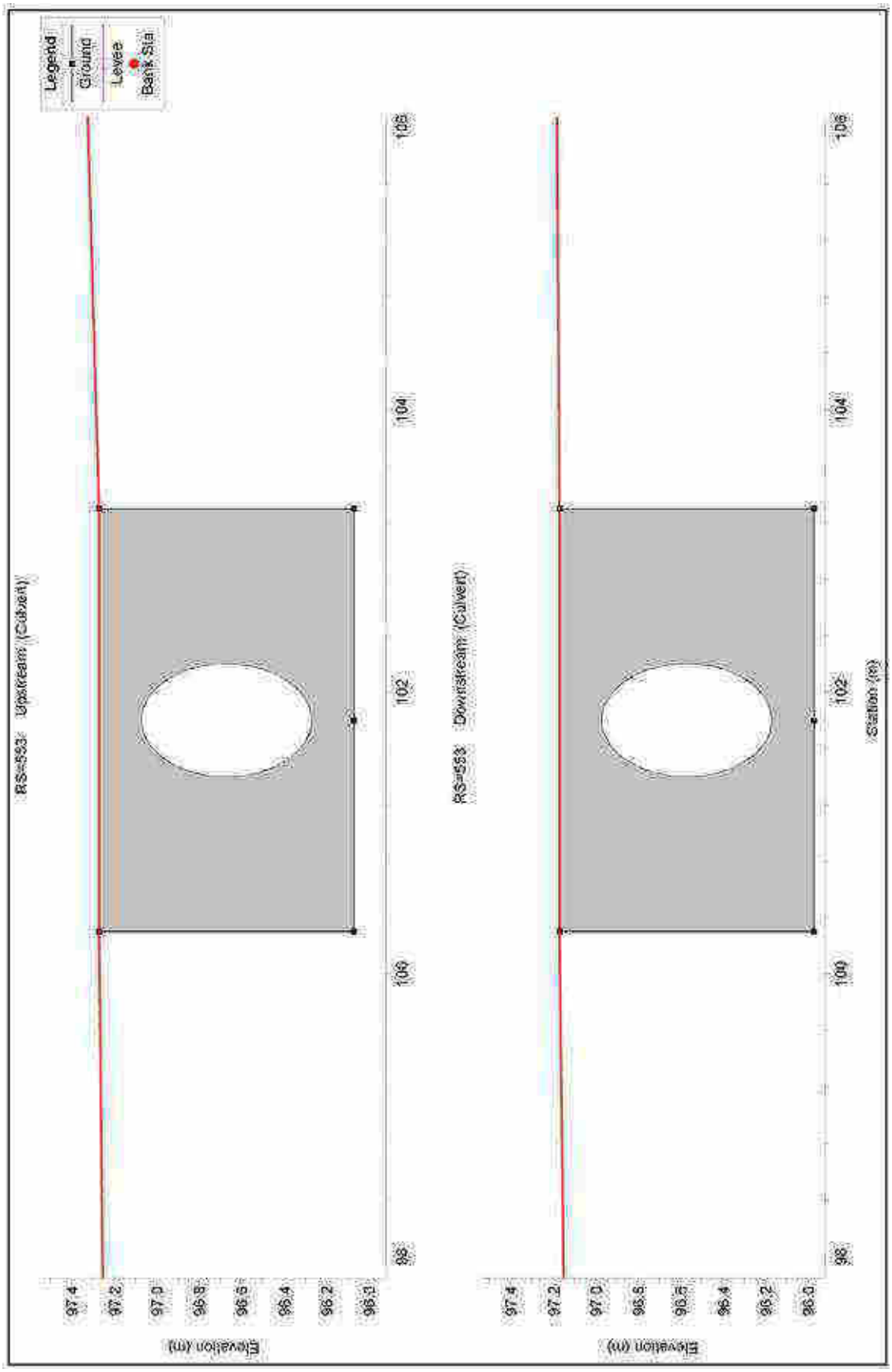


Figura 4. Modellazione in HEC-RAS del canale tombato RS = 553: Upstream (Sezione a monte) – Downstream (Sezione a valle)

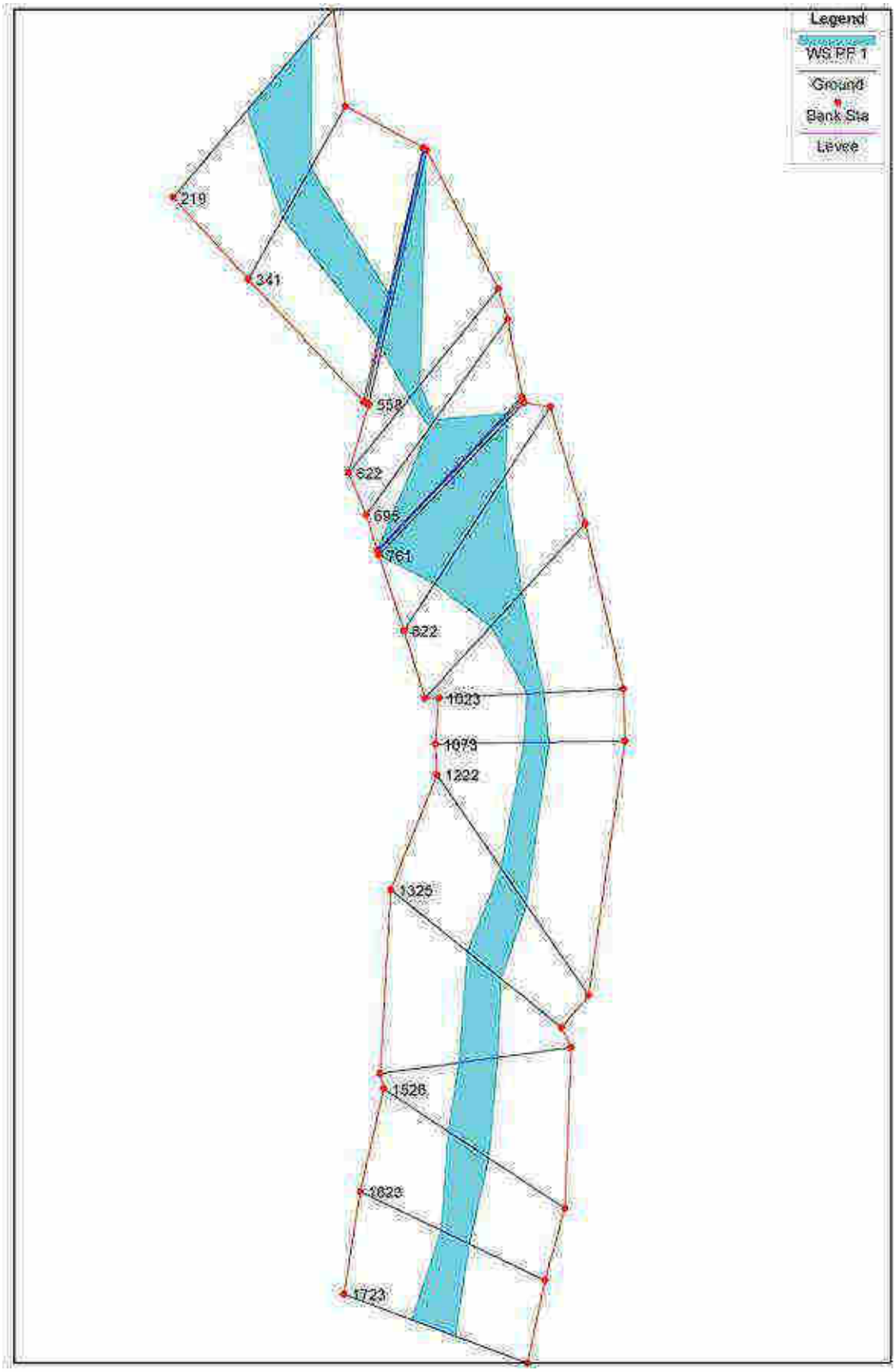
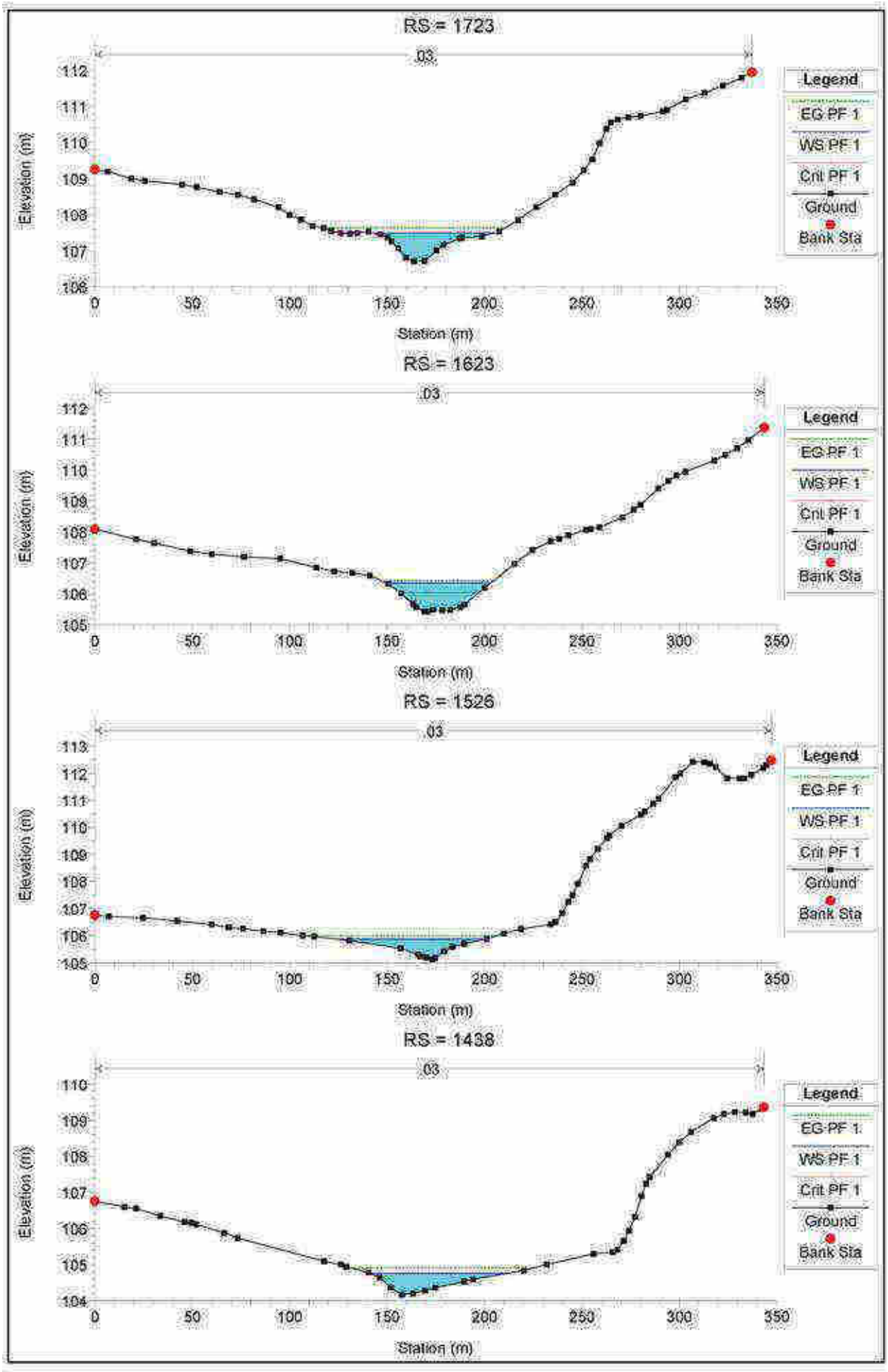
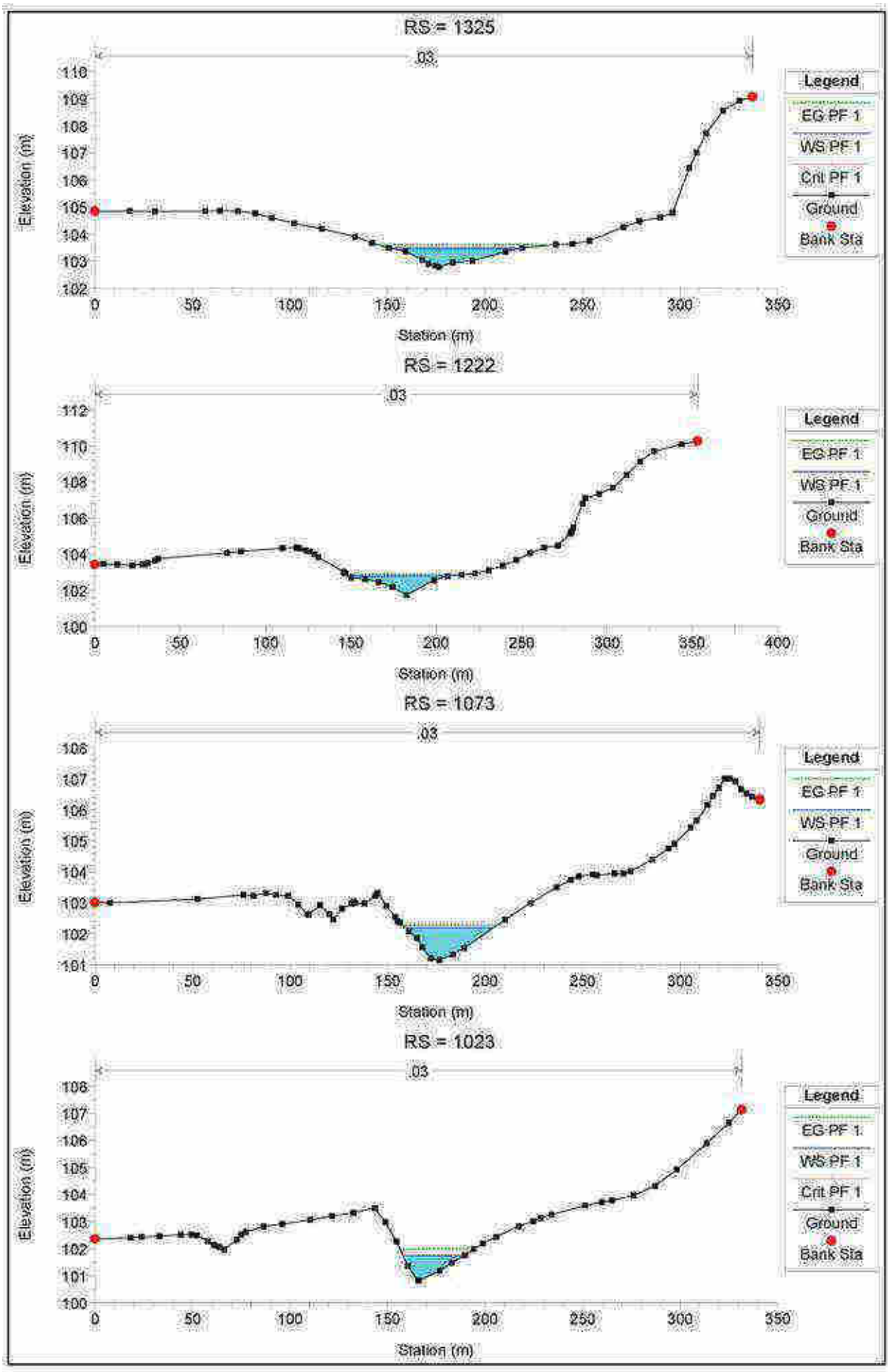
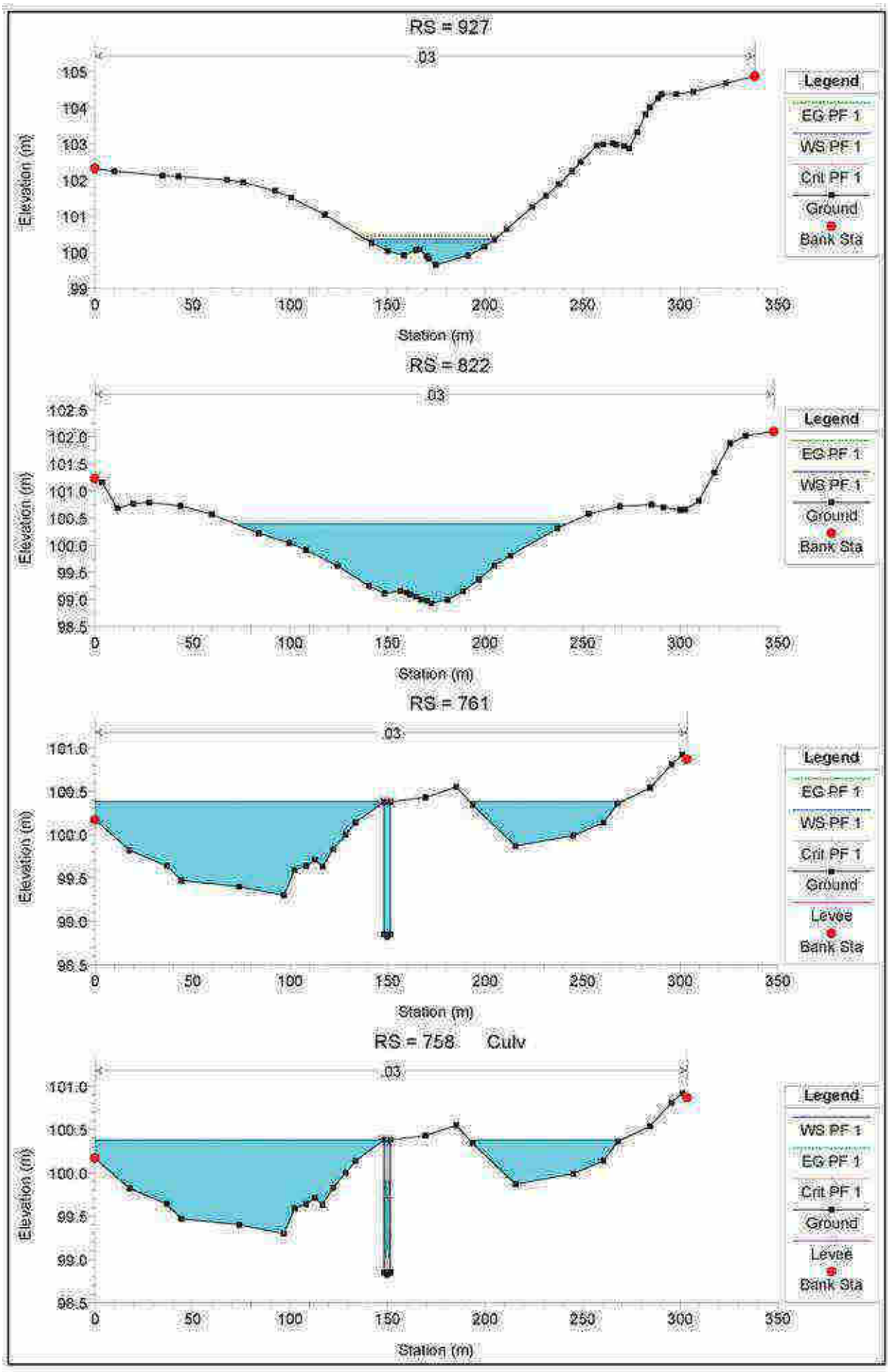
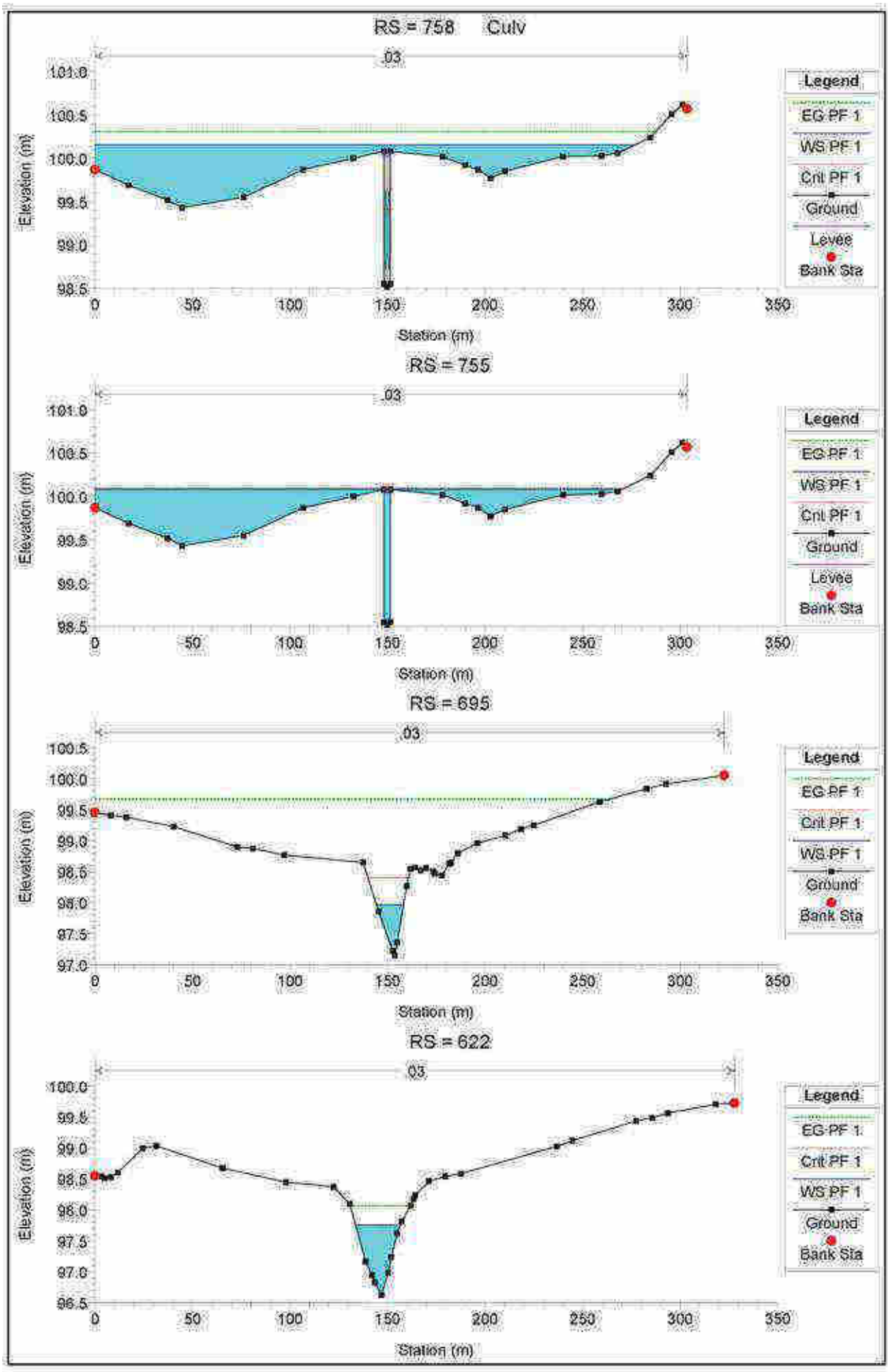


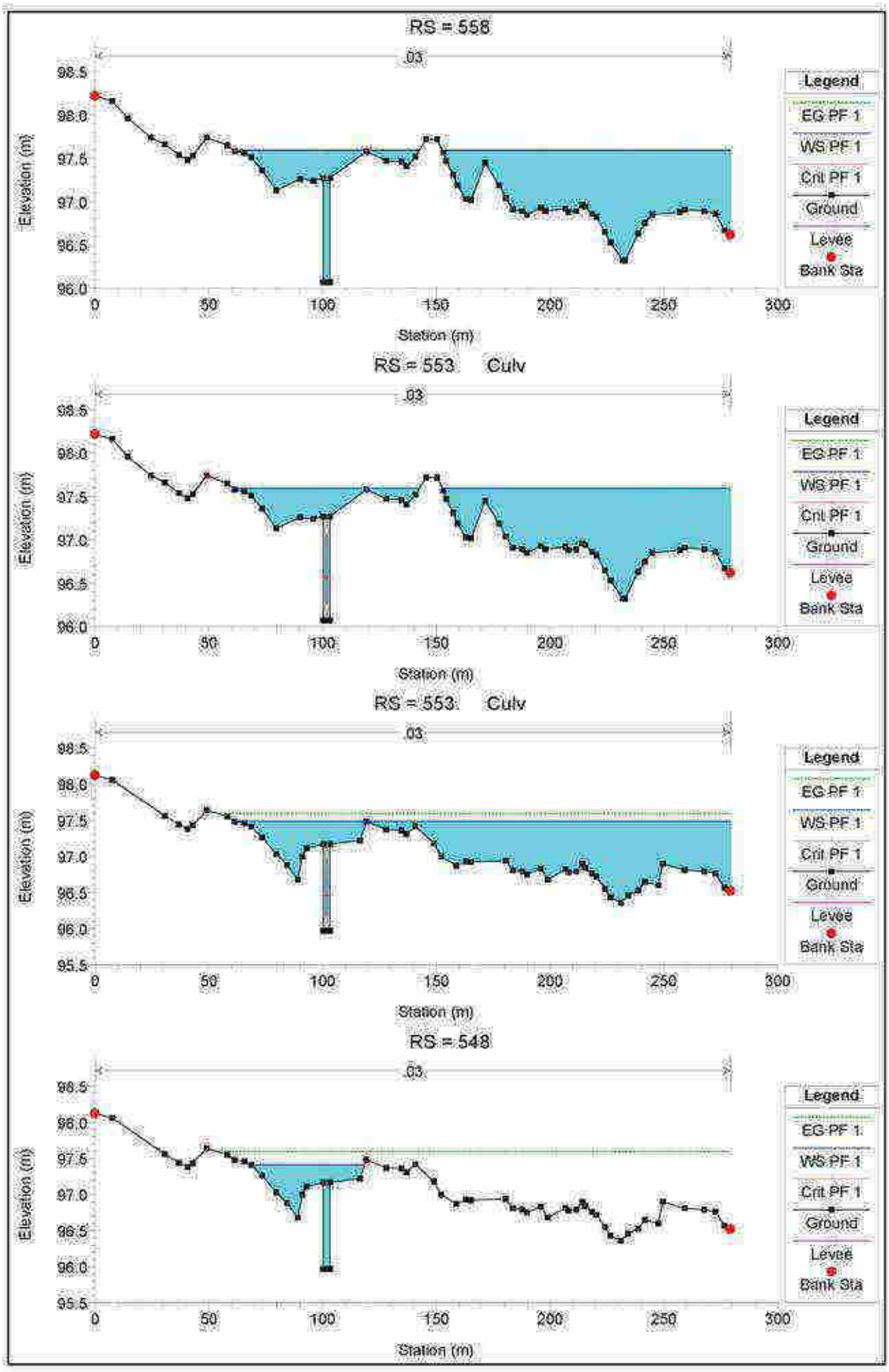
Figura 5. Rappresentazione 3D

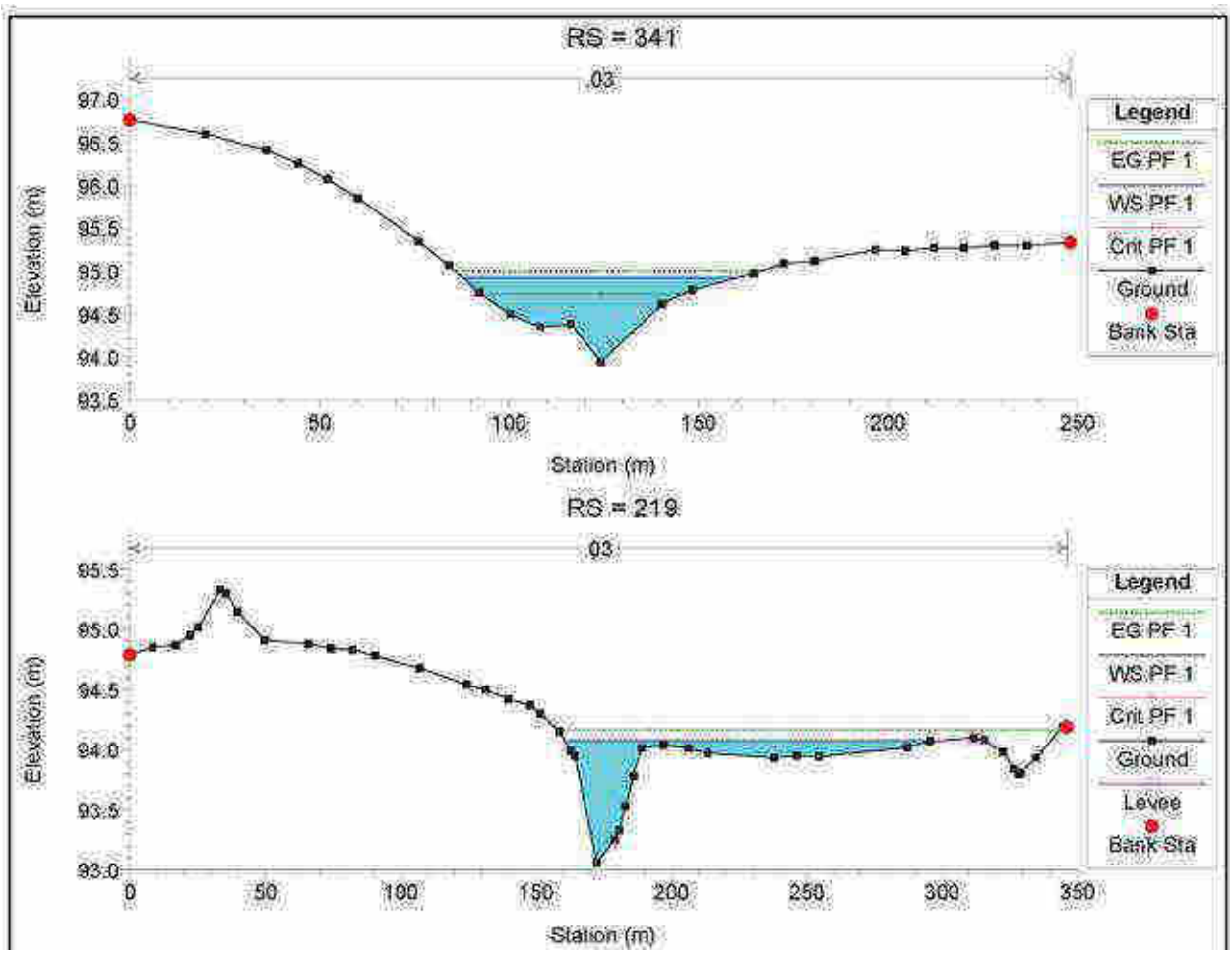

RS = 1723
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 1623
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 1526
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 1438
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


RS = 1325
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 1222
03
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 1073
03
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 1023
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


RS = 927
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 822
03
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 761
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 758 Culv
03
Legend
WS PF 1
EG PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)


RS = 758 Culv
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 755
RS = 695
RS = 622


RS = 558
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 553 Culv
RS = 553 Culv
RS = 548


RS = 341
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 219
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)

Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 1723 Profile: PF 1

E.G. Elev (m)	107.63	Element	Left OB	Channel	Right OB
Vel Head (m)	0.14	Wt. n-Val.		0.030	
W.S. Elev (m)	107.49	Reach Len. (m)	100.10	100.10	100.10
Crit W.S. (m)	107.49	Flow Area (m2)		20.79	
E.G. Slope (m/m)	0.013395	Area (m2)		20.79	
Q Total (m3/s)	34.68	Flow (m3/s)		34.68	
Top Width (m)	73.11	Top Width (m)		73.11	
Vel Total (m/s)	1.67	Avg. Vel. (m/s)		1.67	
Max Chl Dpth (m)	0.79	Hydr. Depth (m)		0.28	
Conv. Total (m3/s)	299.6	Conv. (m3/s)		299.6	
Length Wtd. (m)	100.10	Wetted Per. (m)		73.14	
Min Ch El (m)	106.70	Shear (N/m2)		37.34	
Alpha	1.00	Stream Power (N/m s)		62.28	
Frctn Loss (m)	0.45	Cum Volume (1000 m3)		51.41	
C & E Loss (m)	0.02	Cum SA (1000 m2)		118.28	

Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 1623 Profile: PF 1

E.G. Elev (m)	106.42	Element	Left OB	Channel	Right OB
Vel Head (m)	0.08	Wt. n-Val.		0.030	
W.S. Elev (m)	106.35	Reach Len. (m)	97.50	97.50	97.50
Crit W.S. (m)	106.04	Flow Area (m2)		31.45	
E.G. Slope (m/m)	0.002219	Area (m2)		31.45	
Q Total (m3/s)	34.68	Flow (m3/s)		34.68	
Top Width (m)	53.40	Top Width (m)		53.40	
Vel Total (m/s)	1.10	Avg. Vel. (m/s)		1.10	
Max Chl Dpth (m)	0.92	Hydr. Depth (m)		0.59	
Conv. Total (m3/s)	736.2	Conv. (m3/s)		736.2	
Length Wtd. (m)	97.50	Wetted Per. (m)		53.45	
Min Ch El (m)	105.43	Shear (N/m2)		12.81	
Alpha	1.00	Stream Power (N/m s)		14.12	
Frctn Loss (m)	0.42	Cum Volume (1000 m3)		48.79	
C & E Loss (m)	0.01	Cum SA (1000 m2)		111.95	

Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 1526 Profile: PF 1

E.G. Elev (m)	106.00	Element	Left OB	Channel	Right OB
Vel Head (m)	0.12	Wt. n-Val.		0.030	
W.S. Elev (m)	105.88	Reach Len. (m)	87.50	87.50	87.50
Crit W.S. (m)	105.86	Flow Area (m2)		22.42	
E.G. Slope (m/m)	0.011352	Area (m2)		22.42	
Q Total (m3/s)	34.68	Flow (m3/s)		34.68	
Top Width (m)	78.01	Top Width (m)		78.01	
Vel Total (m/s)	1.55	Avg. Vel. (m/s)		1.55	
Max Chl Dpth (m)	0.74	Hydr. Depth (m)		0.29	
Conv. Total (m3/s)	325.5	Conv. (m3/s)		325.5	
Length Wtd. (m)	87.50	Wetted Per. (m)		78.03	
Min Ch El (m)	105.14	Shear (N/m2)		31.99	
Alpha	1.00	Stream Power (N/m s)		49.48	
Frctn Loss (m)	1.09	Cum Volume (1000 m3)		46.17	
C & E Loss (m)	0.00	Cum SA (1000 m2)		105.55	

Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 1438 Profile: PF 1

E.G. Elev (m)	104.81	Element	Left OB	Channel	Right OB
Vel Head (m)	0.15	Wt. n-Val.		0.030	
W.S. Elev (m)	104.76	Reach Len. (m)	113.30	113.30	113.30
Crit W.S. (m)	104.76	Flow Area (m2)		20.33	
E.G. Slope (m/m)	0.013720	Area (m2)		20.33	
Q Total (m3/s)	34.68	Flow (m3/s)		34.68	

Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 1438 Profile: PF 1 (Continued)

Top Width (m)	70.35	Top Width (m)		70.35	
Vel Total (m/s)	1.71	Avg. Vel. (m/s)		1.71	
Max Chl Dpth (m)	0.59	Hydr. Depth (m)		0.29	
Conv. Total (m3/s)	296.1	Conv. (m3/s)		296.1	
Length Wtd. (m)	113.30	Wetted Per. (m)		70.37	
Min Ch El (m)	104.17	Shear (N/m2)		38.86	
Alpha	1.00	Stream Power (N/m s)		66.31	
Frctn Loss (m)	1.22	Cum Volume (1000 m3)		44.30	
C & E Loss (m)	0.01	Cum SA (1000 m2)		89.06	

Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 1325 Profile: PF 1

E.G. Elev (m)	103.60	Element	Left OB	Channel	Right OB
Vel Head (m)	0.12	Wt. n-Val.		0.030	
W.S. Elev (m)	103.49	Reach Len. (m)	102.80	102.80	102.80
Crit W.S. (m)	103.43	Flow Area (m2)		22.97	
E.G. Slope (m/m)	0.008702	Area (m2)		22.97	
Q Total (m3/s)	34.68	Flow (m3/s)		34.68	
Top Width (m)	67.88	Top Width (m)		67.88	
Vel Total (m/s)	1.51	Avg. Vel. (m/s)		1.51	
Max Chl Dpth (m)	0.71	Hydr. Depth (m)		0.34	
Conv. Total (m3/s)	371.8	Conv. (m3/s)		371.8	
Length Wtd. (m)	102.80	Wetted Per. (m)		67.90	
Min Ch El (m)	102.76	Shear (N/m2)		28.87	
Alpha	1.00	Stream Power (N/m s)		43.59	
Frctn Loss (m)	0.70	Cum Volume (1000 m3)		41.84	
C & E Loss (m)	0.01	Cum SA (1000 m2)		91.22	

Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 1222 Profile: PF 1

E.G. Elev (m)	102.90	Element	Left OB	Channel	Right OB
Vel Head (m)	0.10	Wt. n-Val.		0.030	
W.S. Elev (m)	102.80	Reach Len. (m)	149.50	149.50	149.50
Crit W.S. (m)		Flow Area (m2)		25.13	
E.G. Slope (m/m)	0.005461	Area (m2)		25.13	
Q Total (m3/s)	34.66	Flow (m3/s)		34.66	
Top Width (m)	59.89	Top Width (m)		59.89	
Vel Total (m/s)	1.38	Avg. Vel. (m/s)		1.38	
Max Chl Dpth (m)	1.05	Hydr. Depth (m)		0.42	
Conv. Total (m3/s)	469.3	Conv. (m3/s)		469.3	
Length Wtd. (m)	149.50	Wetted Per. (m)		58.93	
Min Ch El (m)	101.75	Shear (N/m2)		22.46	
Alpha	1.00	Stream Power (N/m s)		30.99	
Frctn Loss (m)	0.61	Cum Volume (1000 m3)		39.37	
C & E Loss (m)	0.00	Cum SA (1000 m2)		84.66	

Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 1073 Profile: PF 1

E.G. Elev (m)	102.28	Element	Left OB	Channel	Right OB
Vel Head (m)	0.09	Wt. n-Val.		0.030	
W.S. Elev (m)	102.20	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)		Flow Area (m2)		26.50	
E.G. Slope (m/m)	0.003168	Area (m2)		26.50	
Q Total (m3/s)	34.68	Flow (m3/s)		34.68	
Top Width (m)	45.41	Top Width (m)		45.41	
Vel Total (m/s)	1.31	Avg. Vel. (m/s)		1.31	
Max Chl Dpth (m)	1.05	Hydr. Depth (m)		0.58	
Conv. Total (m3/s)	616.2	Conv. (m3/s)		616.2	
Length Wtd. (m)	50.00	Wetted Per. (m)		45.47	
Min Ch El (m)	101.15	Shear (N/m2)		18.10	

Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 1073 Profile: PF 1 (Continued)

Alpha	1.00	Stream Power (N/m s)		23.69	
Frctn Loss (m)	0.27	Cum Volume (1000 m3)		35.51	
C & E Loss (m)	0.02	Cum SA (1000 m2)		76.79	

Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 1023 Profile: PF 1

E.G. Elev (m)	102.00	Element	Left OB	Channel	Right OB
Vel Head (m)	0.25	Wt. n-Val.		0.030	
W.S. Elev (m)	101.74	Reach Len. (m)	96.50	96.50	96.50
Crit W.S. (m)	101.74	Flow Area (m2)		15.53	
E.G. Slope (m/m)	0.011464	Area (m2)		15.53	
Q Total (m3/s)	34.68	Flow (m3/s)		34.68	
Top Width (m)	31.29	Top Width (m)		31.29	
Vel Total (m/s)	2.23	Avg. Vel. (m/s)		2.23	
Max Chl Dpth (m)	0.92	Hydr. Depth (m)		0.50	
Conv. Total (m3/s)	323.9	Conv. (m3/s)		323.9	
Length Wtd. (m)	96.50	Wetted Per. (m)		31.37	
Min Ch El (m)	100.82	Shear (N/m2)		55.65	
Alpha	1.00	Stream Power (N/m s)		124.29	
Frctn Loss (m)	0.81	Cum Volume (1000 m3)		34.48	
C & E Loss (m)	0.05	Cum SA (1000 m2)		74.87	

Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 927 Profile: PF 1

E.G. Elev (m)	100.46	Element	Left OB	Channel	Right OB
Vel Head (m)	0.10	Wt. n-Val.		0.030	
W.S. Elev (m)	100.36	Reach Len. (m)	105.20	105.20	105.20
Crit W.S. (m)	100.27	Flow Area (m2)		24.94	
E.G. Slope (m/m)	0.006386	Area (m2)		24.94	
Q Total (m3/s)	34.68	Flow (m3/s)		34.68	
Top Width (m)	66.12	Top Width (m)		66.12	
Vel Total (m/s)	1.39	Avg. Vel. (m/s)		1.39	
Max Chl Dpth (m)	0.71	Hydr. Depth (m)		0.38	
Conv. Total (m3/s)	434.0	Conv. (m3/s)		434.0	
Length Wtd. (m)	105.20	Wetted Per. (m)		66.14	
Min Ch El (m)	99.65	Shear (N/m2)		23.61	
Alpha	1.00	Stream Power (N/m s)		32.83	
Frctn Loss (m)	0.03	Cum Volume (1000 m3)		32.51	
C & E Loss (m)	0.03	Cum SA (1000 m2)		70.17	

Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 822 Profile: PF 1

E.G. Elev (m)	100.39	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.		0.030	
W.S. Elev (m)	100.39	Reach Len. (m)	60.90	60.90	60.90
Crit W.S. (m)		Flow Area (m2)		127.39	
E.G. Slope (m/m)	0.000097	Area (m2)		127.39	
Q Total (m3/s)	34.68	Flow (m3/s)		34.68	
Top Width (m)	169.29	Top Width (m)		169.29	
Vel Total (m/s)	0.27	Avg. Vel. (m/s)		0.27	
Max Chl Dpth (m)	1.46	Hydr. Depth (m)		0.75	
Conv. Total (m3/s)	3512.5	Conv. (m3/s)		3512.5	
Length Wtd. (m)	60.90	Wetted Per. (m)		169.32	
Min Ch El (m)	98.93	Shear (N/m2)		0.72	
Alpha	1.00	Stream Power (N/m s)		0.20	
Frctn Loss (m)	0.01	Cum Volume (1000 m3)		24.50	
C & E Loss (m)	0.00	Cum SA (1000 m2)		57.79	

Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 761 Profile: PF 1

E.G. Elev (m)	100.39	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.		0.030	
W.S. Elev (m)	100.38	Reach Len. (m)	6.30	6.30	6.30
Crit W.S. (m)	100.36	Flow Area (m2)		133.34	
E.G. Slope (m/m)	0.000131	Area (m2)		133.34	
Q Total (m3/s)	34.68	Flow (m3/s)		34.68	
Top Width (m)	230.38	Top Width (m)		230.38	
Vel Total (m/s)	0.26	Avg. Vel. (m/s)		0.26	
Max Chl Dpth (m)	1.56	Hydr. Depth (m)		0.58	
Conv. Total (m3/s)	3031.2	Conv. (m3/s)		3031.2	
Length Wtd. (m)	6.30	Wetted Per. (m)		236.75	
Min Ch El (m)	98.82	Shear (N/m2)		0.72	
Alpha	1.00	Stream Power (N/m s)		0.19	
Frctn Loss (m)		Cum Volume (1000 m3)		16.56	
C & E Loss (m)		Cum SA (1000 m2)		45.62	

Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 755 Profile: PF 1

E.G. Elev (m)	100.09	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.		0.030	
W.S. Elev (m)	100.08	Reach Len. (m)	59.80	59.80	59.80
Crit W.S. (m)	100.08	Flow Area (m2)		71.75	
E.G. Slope (m/m)	0.001279	Area (m2)		71.75	
Q Total (m3/s)	34.68	Flow (m3/s)		34.68	
Top Width (m)	270.04	Top Width (m)		270.04	
Vel Total (m/s)	0.48	Avg. Vel. (m/s)		0.48	
Max Chl Dpth (m)	1.56	Hydr. Depth (m)		0.27	
Conv. Total (m3/s)	973.2	Conv. (m3/s)		973.2	
Length Wtd. (m)	59.80	Wetted Per. (m)		276.38	
Min Ch El (m)	98.52	Shear (N/m2)		3.23	
Alpha	1.00	Stream Power (N/m s)		1.56	
Frctn Loss (m)	0.24	Cum Volume (1000 m3)		16.02	
C & E Loss (m)	0.17	Cum SA (1000 m2)		44.04	

Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 695 Profile: PF 1

E.G. Elev (m)	99.68	Element	Left OB	Channel	Right OB
Vel Head (m)	1.71	Wt. n-Val.		0.030	
W.S. Elev (m)	97.97	Reach Len. (m)	72.90	72.90	72.90
Crit W.S. (m)	98.40	Flow Area (m2)		5.99	
E.G. Slope (m/m)	0.094784	Area (m2)		5.99	
Q Total (m3/s)	34.68	Flow (m3/s)		34.68	
Top Width (m)	14.02	Top Width (m)		14.02	
Vel Total (m/s)	5.79	Avg. Vel. (m/s)		5.79	
Max Chl Dpth (m)	0.82	Hydr. Depth (m)		0.43	
Conv. Total (m3/s)	112.6	Conv. (m3/s)		112.6	
Length Wtd. (m)	72.90	Wetted Per. (m)		14.13	
Min Ch El (m)	97.15	Shear (N/m2)		393.95	
Alpha	1.00	Stream Power (N/m s)		2281.13	
Frctn Loss (m)	0.67	Cum Volume (1000 m3)		13.69	
C & E Loss (m)	0.02	Cum SA (1000 m2)		35.55	

Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 622 Profile: PF 1

E.G. Elev (m)	98.07	Element	Left OB	Channel	Right OB
Vel Head (m)	0.31	Wt. n-Val.		0.030	
W.S. Elev (m)	97.76	Reach Len. (m)	63.30	63.30	63.30
Crit W.S. (m)	97.76	Flow Area (m2)		13.98	
E.G. Slope (m/m)	0.010802	Area (m2)		13.98	
Q Total (m3/s)	34.68	Flow (m3/s)		34.68	

Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 622 Profile: PF 1 (Continued)

Top Width (m)	22.97	Top Width (m)		22.97	
Vel Total (m/s)	2.46	Avg. Vel. (m/s)		2.46	
Max Chl Dpth (m)	1.13	Hydr. Depth (m)		0.61	
Conv. Total (m3/s)	333.7	Conv. (m3/s)		333.7	
Length Wtd. (m)	63.30	Wetted Per. (m)		23.09	
Min Ch El (m)	96.63	Shear (N/m2)		64.15	
Alpha	1.00	Stream Power (N/m s)		159.06	
Frctn Loss (m)	0.04	Cum Volume (1000 m3)		12.96	
C & E Loss (m)	0.09	Cum SA (1000 m2)		34.20	

Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 558 Profile: PF 1

E.G. Elev (m)	97.60	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.		0.030	
W.S. Elev (m)	97.59	Reach Len. (m)	10.20	10.20	10.20
Crit W.S. (m)	97.59	Flow Area (m2)		108.11	
E.G. Slope (m/m)	0.000227	Area (m2)		108.11	
Q Total (m3/s)	34.68	Flow (m3/s)		34.68	
Top Width (m)	208.28	Top Width (m)		208.28	
Vel Total (m/s)	0.32	Avg. Vel. (m/s)		0.32	
Max Chl Dpth (m)	1.52	Hydr. Depth (m)		0.52	
Conv. Total (m3/s)	2301.9	Conv. (m3/s)		2301.9	
Length Wtd. (m)	10.20	Wetted Per. (m)		211.75	
Min Ch El (m)	96.07	Shear (N/m2)		1.14	
Alpha	1.00	Stream Power (N/m s)		0.36	
Frctn Loss (m)		Cum Volume (1000 m3)		9.10	
C & E Loss (m)		Cum SA (1000 m2)		26.88	

Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 548 Profile: PF 1

E.G. Elev (m)	97.59	Element	Left OB	Channel	Right OB
Vel Head (m)	0.18	Wt. n-Val.		0.030	
W.S. Elev (m)	97.41	Reach Len. (m)	206.60	206.60	206.60
Crit W.S. (m)	97.41	Flow Area (m2)		18.27	
E.G. Slope (m/m)	0.013190	Area (m2)		18.27	
Q Total (m3/s)	34.68	Flow (m3/s)		34.68	
Top Width (m)	49.87	Top Width (m)		49.87	
Vel Total (m/s)	1.90	Avg. Vel. (m/s)		1.90	
Max Chl Dpth (m)	1.44	Hydr. Depth (m)		0.37	
Conv. Total (m3/s)	302.0	Conv. (m3/s)		302.0	
Length Wtd. (m)	206.60	Wetted Per. (m)		52.32	
Min Ch El (m)	95.97	Shear (N/m2)		45.17	
Alpha	1.00	Stream Power (N/m s)		85.74	
Frctn Loss (m)	1.33	Cum Volume (1000 m3)		8.44	
C & E Loss (m)	0.03	Cum SA (1000 m2)		25.56	

Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 341 Profile: PF 1

E.G. Elev (m)	94.99	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.		0.030	
W.S. Elev (m)	94.92	Reach Len. (m)	122.00	122.00	122.00
Crit W.S. (m)	94.73	Flow Area (m2)		30.20	
E.G. Slope (m/m)	0.003809	Area (m2)		30.20	
Q Total (m3/s)	34.68	Flow (m3/s)		34.68	
Top Width (m)	72.40	Top Width (m)		72.40	
Vel Total (m/s)	1.15	Avg. Vel. (m/s)		1.15	
Max Chl Dpth (m)	0.98	Hydr. Depth (m)		0.42	
Conv. Total (m3/s)	561.9	Conv. (m3/s)		561.9	
Length Wtd. (m)	122.00	Wetted Per. (m)		72.44	
Min Ch El (m)	93.94	Shear (N/m2)		15.58	

Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 341 Profile: PF 1 (Continued)

Alpha	1.00	Stream Power (N/m s)		17.88	
Frctn Loss (m)	0.82	Cum Volume (1000 m3)		3.43	
C & E Loss (m)	0.00	Cum SA (1000 m2)		12.93	

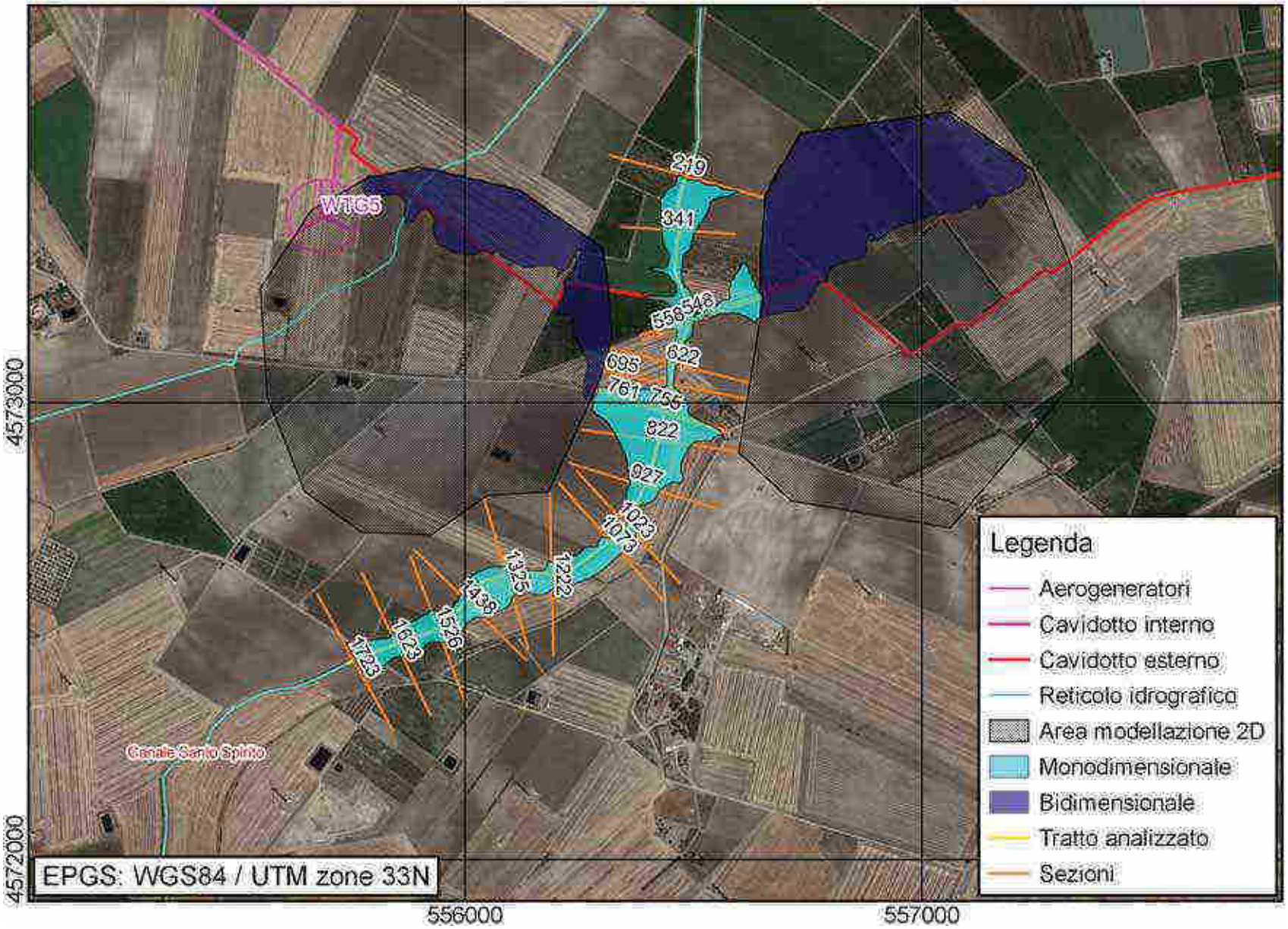
Plan: Plan 01 Santo_Spirito Santo_Spirito RS: 219 Profile: PF 1

E.G. Elev (m)	94.17	Element	Left OB	Channel	Right OB
Vel Head (m)	0.09	Wt. n-Val.		0.030	
W.S. Elev (m)	94.08	Reach Len. (m)			
Crit W.S. (m)	94.08	Flow Area (m2)		26.11	
E.G. Slope (m/m)	0.014863	Area (m2)		26.11	
Q Total (m3/s)	34.68	Flow (m3/s)		34.68	
Top Width (m)	139.62	Top Width (m)		139.62	
Vel Total (m/s)	1.33	Avg. Vel. (m/s)		1.33	
Max Chl Dpth (m)	1.02	Hydr. Depth (m)		0.19	
Conv. Total (m3/s)	284.5	Conv. (m3/s)		284.5	
Length Wtd. (m)		Wetted Per. (m)		139.70	
Min Ch El (m)	93.06	Shear (N/m2)		27.24	
Alpha	1.00	Stream Power (N/m s)		36.18	
Frctn Loss (m)		Cum Volume (1000 m3)			
C & E Loss (m)		Cum SA (1000 m2)			

HEC-RAS Plan: Plan 01 River: Santo_Spirito Reach: Santo_Spirito Profile: PF 1

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
Santo_Spirito	1723	PF 1	34.68	106.70	107.49	107.49	107.63	0.013395	1.67	20.79	73.11	1.00
Santo_Spirito	1623	PF 1	34.68	105.43	106.35	106.04	106.42	0.002219	1.10	31.45	53.40	0.46
Santo_Spirito	1526	PF 1	34.68	105.14	105.88	105.86	106.00	0.011352	1.55	22.42	78.01	0.92
Santo_Spirito	1438	PF 1	34.68	104.17	104.76	104.76	104.91	0.013720	1.71	20.33	70.35	1.01
Santo_Spirito	1325	PF 1	34.68	102.78	103.49	103.43	103.60	0.008702	1.51	22.97	67.88	0.83
Santo_Spirito	1222	PF 1	34.68	101.75	102.80		102.90	0.005461	1.38	25.13	59.89	0.68
Santo_Spirito	1073	PF 1	34.68	101.15	102.20		102.28	0.003188	1.31	26.50	45.41	0.55
Santo_Spirito	1023	PF 1	34.68	100.82	101.74	101.74	102.00	0.011464	2.23	15.53	31.29	1.01
Santo_Spirito	927	PF 1	34.68	99.65	100.36	100.27	100.46	0.006386	1.39	24.94	66.12	0.72
Santo_Spirito	822	PF 1	34.68	98.93	100.39		100.39	0.000097	0.27	127.39	169.29	0.10
Santo_Spirito	761	PF 1	34.68	98.82	100.38	100.38	100.39	0.000131	0.26	133.34	230.38	0.11
Santo_Spirito	758		Culvert									
Santo_Spirito	755	PF 1	34.68	98.52	100.08	100.08	100.09	0.001270	0.48	71.75	270.04	0.30
Santo_Spirito	695	PF 1	34.68	97.15	97.97	98.40	99.68	0.094784	5.79	5.99	14.02	2.83
Santo_Spirito	622	PF 1	34.68	96.63	97.76	97.76	98.07	0.010802	2.48	13.98	22.97	1.01
Santo_Spirito	558	PF 1	34.68	96.07	97.59	97.59	97.60	0.000227	0.32	108.11	208.28	0.14
Santo_Spirito	553		Culvert									
Santo_Spirito	548	PF 1	34.68	95.97	97.41	97.41	97.59	0.013190	1.90	18.27	49.67	1.00
Santo_Spirito	341	PF 1	34.68	93.94	94.92	94.73	94.99	0.003809	1.15	30.20	72.40	0.57
Santo_Spirito	219	PF 1	34.68	93.06	94.08	94.08	94.17	0.014863	1.33	26.11	139.62	0.98

Figura 6. Planimetria con individuazione delle sezioni e delle aree potenzialmente interessate dalla portata avente tr = 200 anni



Canale Ponticello

Il tratto del Canale Ponticello oggetto di indagine interseca il cavidotto esterno che collega la sottostazione elettrica ai cavidotti interni ed agli aerogeneratori.

Dai risultati dell'analisi monodimensionale si osserva come l'alveo attualmente esistente risulta adeguato al trasporto della portata avente tempo di ritorno 200 anni (Figura 8).

Sezione a monte dell'intersezione tra il Canale Ponticello ed il cavidotto esterno

Sezione trasversale all’intersezione tra il Canale Ponticello ed il cavidotto esterno

Sezione a valle dell’intersezione tra il Canale Ponticello ed il cavidotto esterno

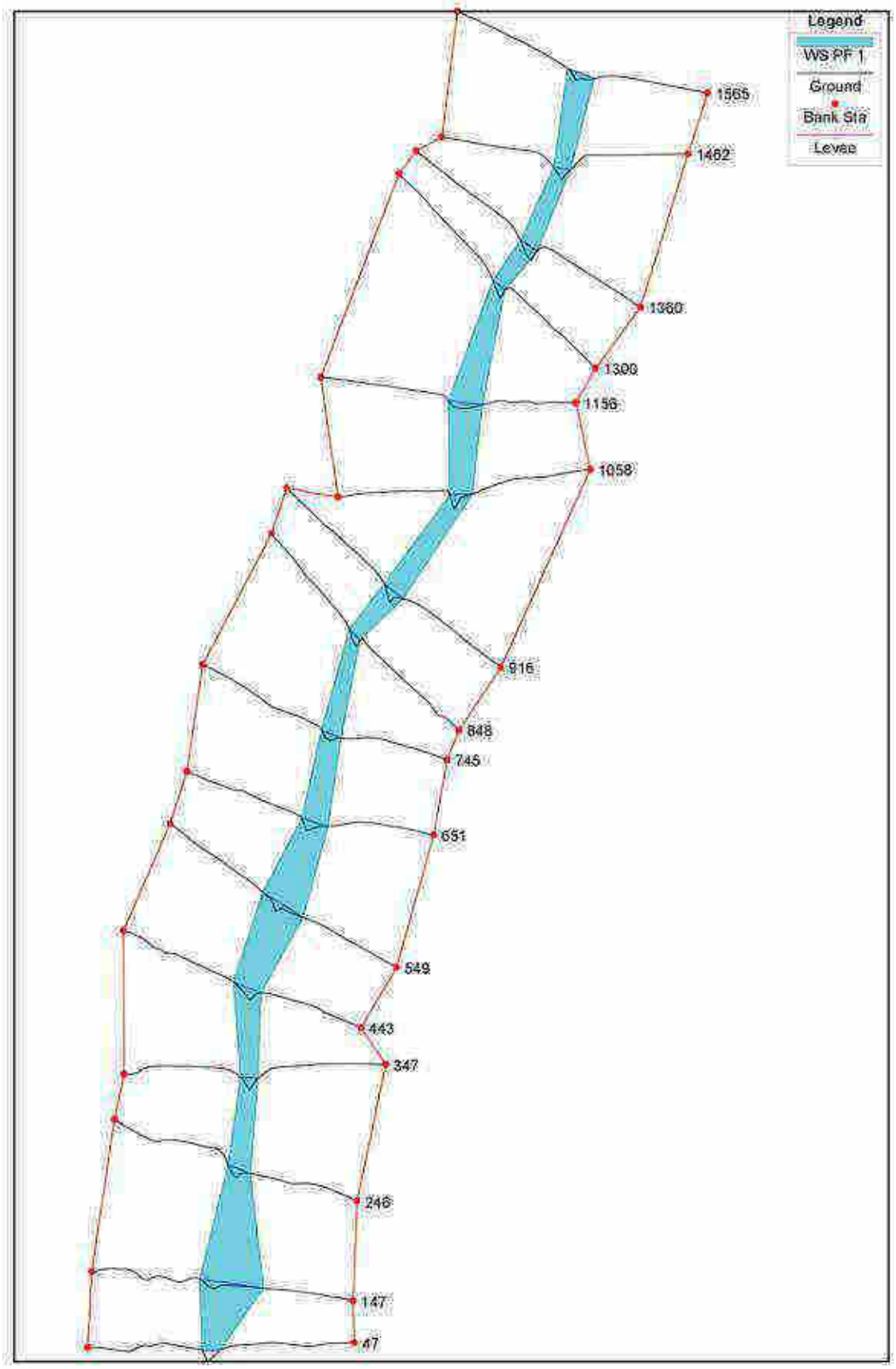
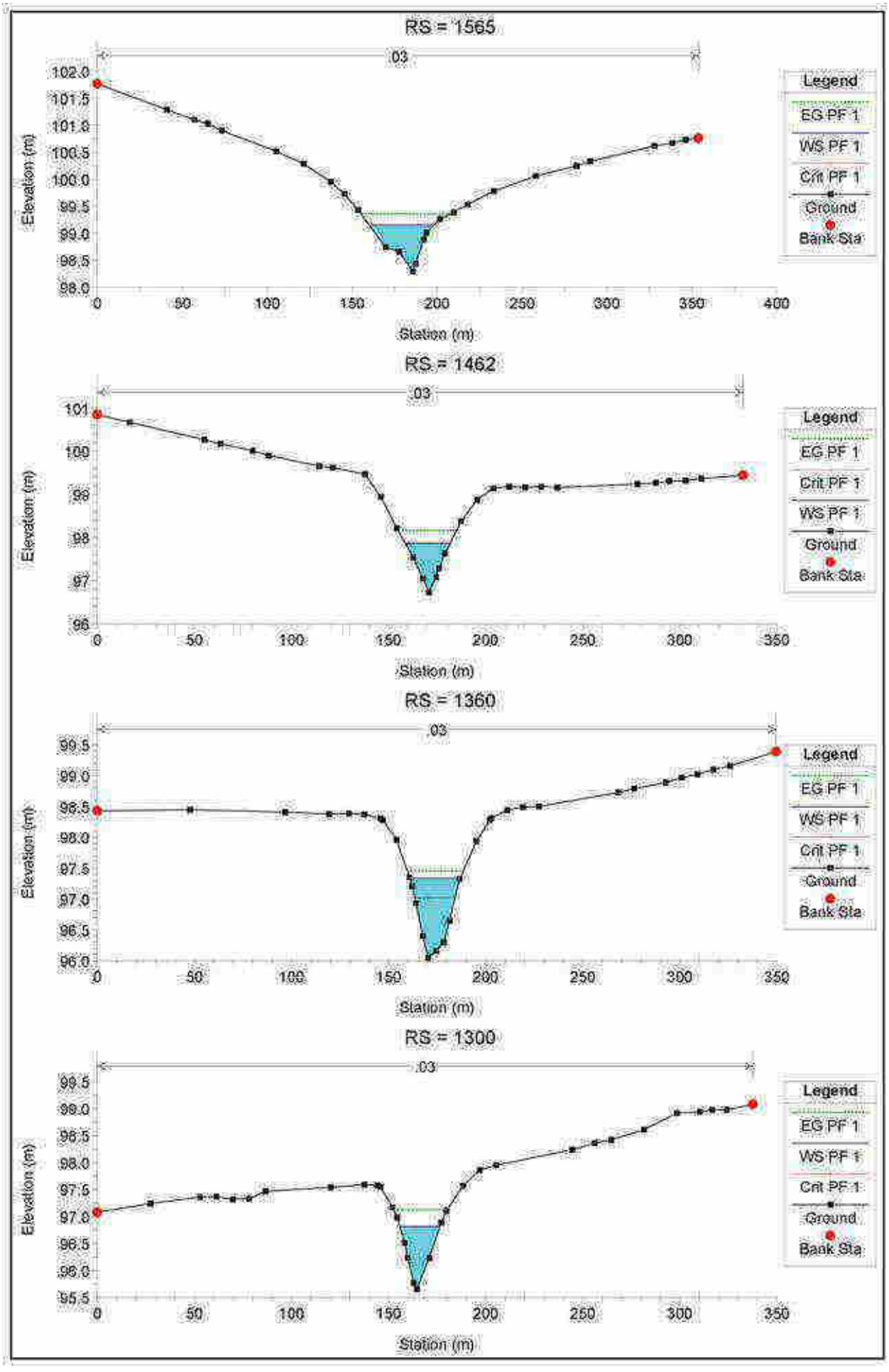
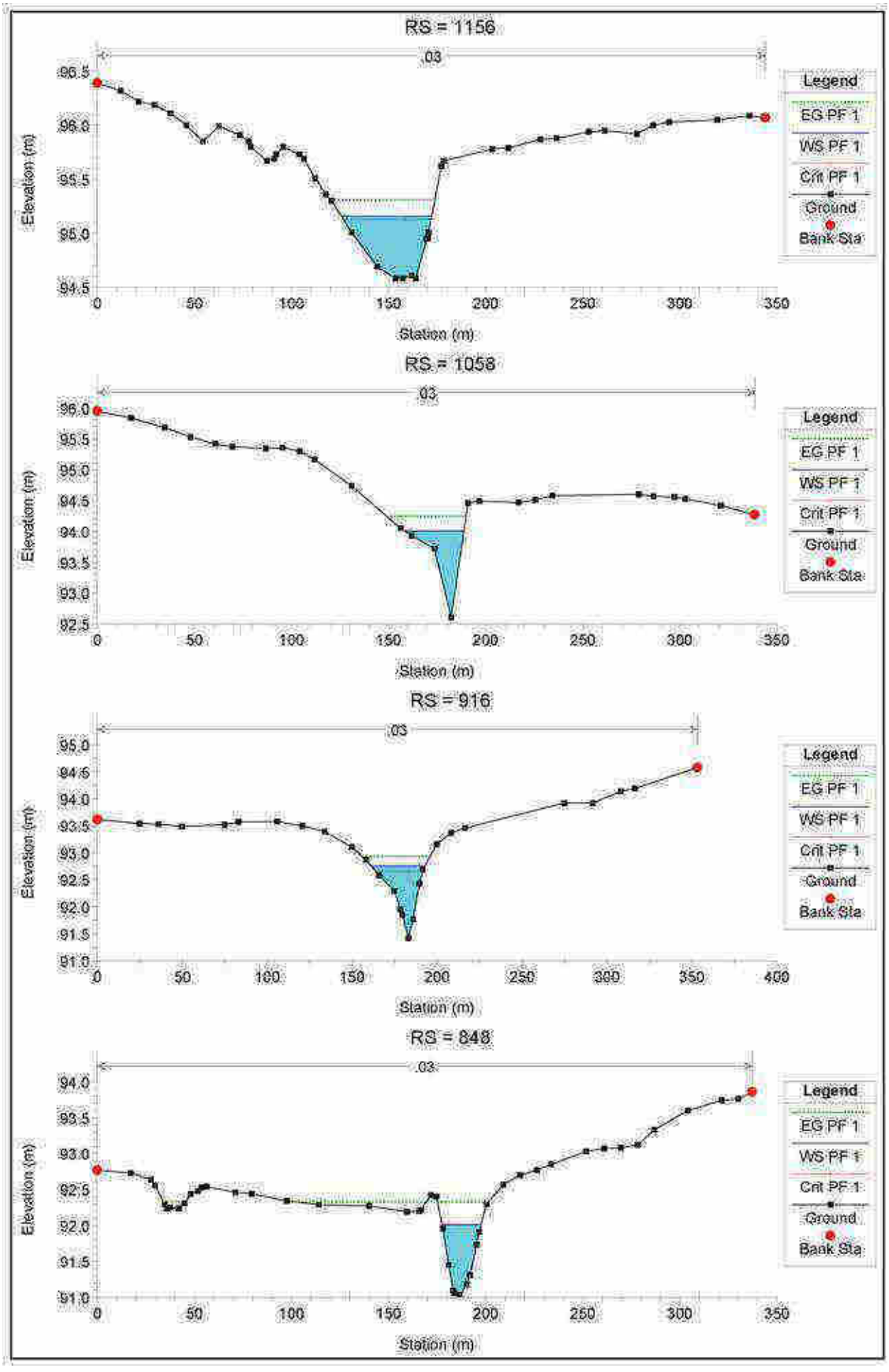
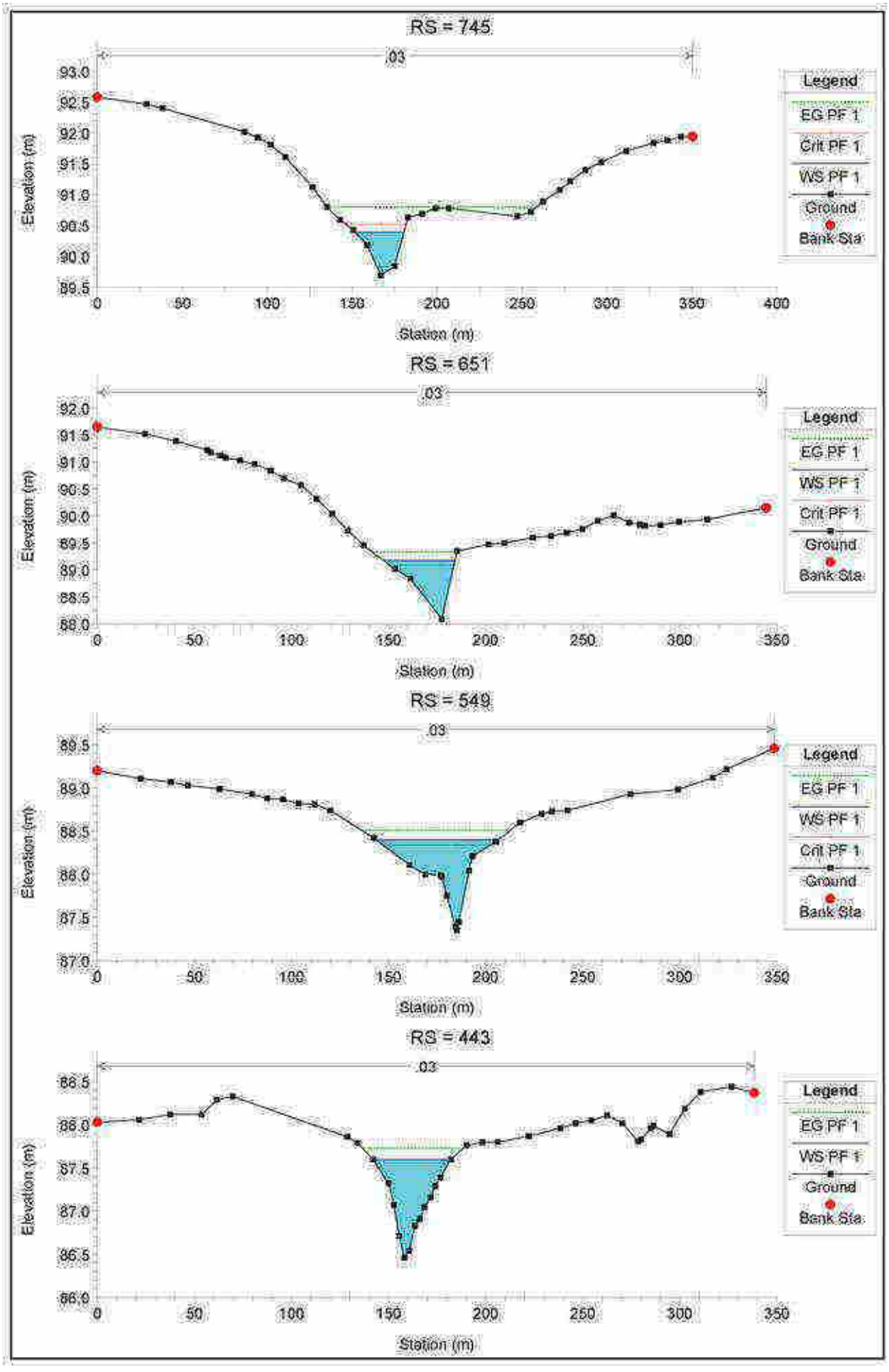
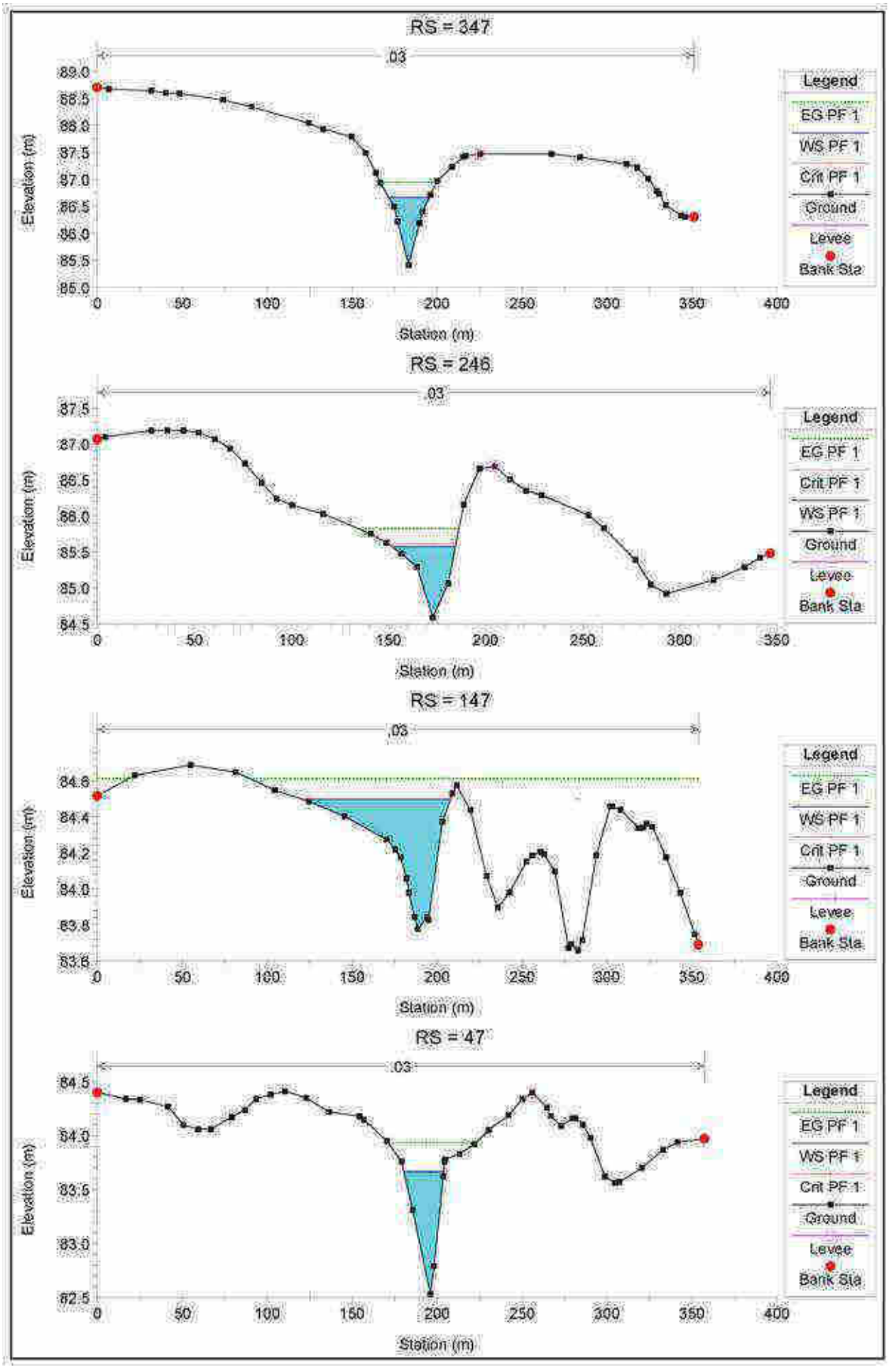


Figura 7. Rappresentazione 3D


RS = 1565
03
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
RS = 1462
03
Elevation (m)
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
RS = 1360
03
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
RS = 1300
03
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


RS = 1156
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 1058
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 916
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 848
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


RS = 745
.03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 651
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 549
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 443
.03
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


RS = 347
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 246
03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 147
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 47
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)

Plan: Plan 01 Ponticello Ponticello RS: 1565 Profile: PF 1

E.G. Elev (m)	99.36	Element	Left OB	Channel	Right OB
Vel Head (m)	0.21	W. n-Val.		0.030	
W.S. Elev (m)	99.15	Reach Len. (m)	103.30	103.30	103.30
Crit W.S. (m)	99.15	Flow Area (m2)		15.32	
E.G. Slope (m/m)	0.012357	Area (m2)		15.32	
Q Total (m3/s)	30.87	Flow (m3/s)		30.87	
Top Width (m)	38.14	Top Width (m)		38.14	
Vel Total (m/s)	2.02	Avg. Vel. (m/s)		2.02	
Max Chl Dpth (m)	0.86	Hydr. Depth (m)		0.40	
Conv. Total (m3/s)	277.7	Conv. (m3/s)		277.7	
Length Wtd. (m)	103.30	Wetted Per. (m)		38.20	
Min Ch El (m)	98.29	Shear (N/m2)		48.60	
Alpha	1.00	Stream Power (N/m s)		97.94	
Frctn Loss (m)	1.20	Cum Volume (1000 m3)		23.94	
C & E Loss (m)	0.01	Cum SA (1000 m2)		55.23	

Plan: Plan 01 Ponticello Ponticello RS: 1462 Profile: PF 1

E.G. Elev (m)	98.17	Element	Left OB	Channel	Right OB
Vel Head (m)	0.30	W. n-Val.		0.030	
W.S. Elev (m)	97.87	Reach Len. (m)	102.10	102.10	102.10
Crit W.S. (m)	97.88	Flow Area (m2)		12.69	
E.G. Slope (m/m)	0.011921	Area (m2)		12.69	
Q Total (m3/s)	30.87	Flow (m3/s)		30.87	
Top Width (m)	23.11	Top Width (m)		23.11	
Vel Total (m/s)	2.43	Avg. Vel. (m/s)		2.43	
Max Chl Dpth (m)	1.14	Hydr. Depth (m)		0.55	
Conv. Total (m3/s)	282.7	Conv. (m3/s)		282.7	
Length Wtd. (m)	102.10	Wetted Per. (m)		23.22	
Min Ch El (m)	96.73	Shear (N/m2)		63.89	
Alpha	1.00	Stream Power (N/m s)		155.43	
Frctn Loss (m)	0.54	Cum Volume (1000 m3)		22.49	
C & E Loss (m)	0.05	Cum SA (1000 m2)		52.07	

Plan: Plan 01 Ponticello Ponticello RS: 1360 Profile: PF 1

E.G. Elev (m)	97.46	Element	Left OB	Channel	Right OB
Vel Head (m)	0.12	W. n-Val.		0.030	
W.S. Elev (m)	97.33	Reach Len. (m)	59.90	59.90	59.90
Crit W.S. (m)	97.02	Flow Area (m2)		19.83	
E.G. Slope (m/m)	0.003148	Area (m2)		19.83	
Q Total (m3/s)	30.87	Flow (m3/s)		30.87	
Top Width (m)	25.94	Top Width (m)		25.94	
Vel Total (m/s)	1.56	Avg. Vel. (m/s)		1.56	
Max Chl Dpth (m)	1.29	Hydr. Depth (m)		0.76	
Conv. Total (m3/s)	550.2	Conv. (m3/s)		550.2	
Length Wtd. (m)	59.90	Wetted Per. (m)		26.10	
Min Ch El (m)	96.04	Shear (N/m2)		23.45	
Alpha	1.00	Stream Power (N/m s)		36.51	
Frctn Loss (m)	0.32	Cum Volume (1000 m3)		29.83	
C & E Loss (m)	0.02	Cum SA (1000 m2)		49.58	

Plan: Plan 01 Ponticello Ponticello RS: 1300 Profile: PF 1

E.G. Elev (m)	97.12	Element	Left OB	Channel	Right OB
Vel Head (m)	0.31	W. n-Val.		0.030	
W.S. Elev (m)	96.82	Reach Len. (m)	143.90	143.90	143.90
Crit W.S. (m)	96.82	Flow Area (m2)		12.58	
E.G. Slope (m/m)	0.010622	Area (m2)		12.58	
Q Total (m3/s)	30.87	Flow (m3/s)		30.87	

Plan: Plan 01 Ponticello Ponticello RS: 1300 Profile: PF 1 (Continued)

Top Width (m)	20.71	Top Width (m)		20.71	
Vel Total (m/s)	2.45	Avg. Vel. (m/s)		2.45	
Max Chl Dpth (m)	1.17	Hydr. Depth (m)		0.81	
Conv. Total (m3/s)	299.5	Conv. (m3/s)		299.5	
Length Wtd. (m)	143.90	Wetted Per. (m)		20.85	
Min Ch El (m)	95.85	Shear (N/m2)		82.87	
Alpha	1.00	Stream Power (N/m s)		154.28	
Frctn Loss (m)	1.47	Cum Volume (1000 m3)		19.86	
C & E Loss (m)	0.05	Cum SA (1000 m2)		48.17	

Plan: Plan 01 Ponticello Ponticello RS: 1156 Profile: PF 1

E.G. Elev (m)	95.31	Element	Left OB	Channel	Right OB
Vel Head (m)	0.15	Wt. n-Val.		0.030	
W.S. Elev (m)	95.16	Reach Len. (m)	98.10	98.10	98.10
Crit W.S. (m)	95.12	Flow Area (m2)		17.78	
E.G. Slope (m/m)	0.009771	Area (m2)		17.78	
Q Total (m3/s)	30.87	Flow (m3/s)		30.87	
Top Width (m)	46.48	Top Width (m)		46.48	
Vel Total (m/s)	1.74	Avg. Vel. (m/s)		1.74	
Max Chl Dpth (m)	0.58	Hydr. Depth (m)		0.38	
Conv. Total (m3/s)	312.3	Conv. (m3/s)		312.3	
Length Wtd. (m)	98.10	Wetted Per. (m)		46.51	
Min Ch El (m)	94.58	Shear (N/m2)		36.84	
Alpha	1.00	Stream Power (N/m s)		63.60	
Frctn Loss (m)	1.06	Cum Volume (1000 m3)		17.68	
C & E Loss (m)	0.01	Cum SA (1000 m2)		43.33	

Plan: Plan 01 Ponticello Ponticello RS: 1058 Profile: PF 1

E.G. Elev (m)	94.25	Element	Left OB	Channel	Right OB
Vel Head (m)	0.24	Wt. n-Val.		0.030	
W.S. Elev (m)	94.01	Reach Len. (m)	141.80	141.80	141.80
Crit W.S. (m)	94.01	Flow Area (m2)		14.21	
E.G. Slope (m/m)	0.011959	Area (m2)		14.21	
Q Total (m3/s)	30.87	Flow (m3/s)		30.87	
Top Width (m)	30.70	Top Width (m)		30.70	
Vel Total (m/s)	2.17	Avg. Vel. (m/s)		2.17	
Max Chl Dpth (m)	1.40	Hydr. Depth (m)		0.46	
Conv. Total (m3/s)	282.2	Conv. (m3/s)		282.2	
Length Wtd. (m)	141.80	Wetted Per. (m)		30.92	
Min Ch El (m)	92.61	Shear (N/m2)		53.95	
Alpha	1.00	Stream Power (N/m s)		117.19	
Frctn Loss (m)	1.28	Cum Volume (1000 m3)		16.11	
C & E Loss (m)	0.02	Cum SA (1000 m2)		39.55	

Plan: Plan 01 Ponticello Ponticello RS: 916 Profile: PF 1

E.G. Elev (m)	92.93	Element	Left OB	Channel	Right OB
Vel Head (m)	0.17	Wt. n-Val.		0.030	
W.S. Elev (m)	92.76	Reach Len. (m)	66.00	66.00	66.00
Crit W.S. (m)	92.65	Flow Area (m2)		16.83	
E.G. Slope (m/m)	0.007068	Area (m2)		16.83	
Q Total (m3/s)	30.87	Flow (m3/s)		30.87	
Top Width (m)	31.61	Top Width (m)		31.61	
Vel Total (m/s)	1.83	Avg. Vel. (m/s)		1.83	
Max Chl Dpth (m)	1.34	Hydr. Depth (m)		0.53	
Conv. Total (m3/s)	367.2	Conv. (m3/s)		367.2	
Length Wtd. (m)	66.00	Wetted Per. (m)		31.76	
Min Ch El (m)	91.42	Shear (N/m2)		38.72	

Plan: Plan 01 Ponticello Ponticello RS: 916 Profile: PF 1 (Continued)

Alpha	1.00	Stream Power (N/m s)		87.28	
Frctn Loss (m)	0.58	Cum Volume (1000 m3)		13.91	
C & E Loss (m)	0.01	Cum SA (1000 m2)		35.13	

Plan: Plan 01 Ponticello Ponticello RS: 848 Profile: PF 1

E.G. Elev (m)	92.33	Element	Left OB	Channel	Right OB
Vel Head (m)	0.31	Wt. n-Val.		0.030	
W.S. Elev (m)	92.01	Reach Len. (m)	103.10	103.10	103.10
Crit W.S. (m)	92.01	Flow Area (m2)		12.42	
E.G. Slope (m/m)	0.010603	Area (m2)		12.42	
Q Total (m3/s)	30.87	Flow (m3/s)		30.87	
Top Width (m)	20.05	Top Width (m)		20.05	
Vel Total (m/s)	2.48	Avg. Vel. (m/s)		2.48	
Max Chl Dpth (m)	0.97	Hydr. Depth (m)		0.62	
Conv. Total (m3/s)	299.8	Conv. (m3/s)		299.8	
Length Wtd. (m)	103.10	Wetted Per. (m)		20.17	
Min Ch El (m)	91.04	Shear (N/m2)		64.04	
Alpha	1.00	Stream Power (N/m s)		159.11	
Frctn Loss (m)	1.57	Cum Volume (1000 m3)		12.91	
C & E Loss (m)	0.03	Cum SA (1000 m2)		33.37	

Plan: Plan 01 Ponticello Ponticello RS: 745 Profile: PF 1

E.G. Elev (m)	90.79	Element	Left OB	Channel	Right OB
Vel Head (m)	0.40	Wt. n-Val.		0.030	
W.S. Elev (m)	90.39	Reach Len. (m)	94.00	94.00	94.00
Crit W.S. (m)	90.52	Flow Area (m2)		10.98	
E.G. Slope (m/m)	0.025386	Area (m2)		10.98	
Q Total (m3/s)	30.87	Flow (m3/s)		30.87	
Top Width (m)	28.49	Top Width (m)		28.49	
Vel Total (m/s)	2.81	Avg. Vel. (m/s)		2.81	
Max Chl Dpth (m)	0.70	Hydr. Depth (m)		0.39	
Conv. Total (m3/s)	193.7	Conv. (m3/s)		193.7	
Length Wtd. (m)	94.00	Wetted Per. (m)		28.53	
Min Ch El (m)	89.69	Shear (N/m2)		95.84	
Alpha	1.00	Stream Power (N/m s)		269.35	
Frctn Loss (m)	0.87	Cum Volume (1000 m3)		11.70	
C & E Loss (m)	0.02	Cum SA (1000 m2)		30.87	

Plan: Plan 01 Ponticello Ponticello RS: 651 Profile: PF 1

E.G. Elev (m)	89.33	Element	Left OB	Channel	Right OB
Vel Head (m)	0.16	Wt. n-Val.		0.030	
W.S. Elev (m)	89.18	Reach Len. (m)	101.60	101.60	101.60
Crit W.S. (m)	89.09	Flow Area (m2)		17.68	
E.G. Slope (m/m)	0.007339	Area (m2)		17.68	
Q Total (m3/s)	30.87	Flow (m3/s)		30.87	
Top Width (m)	36.86	Top Width (m)		36.86	
Vel Total (m/s)	1.75	Avg. Vel. (m/s)		1.75	
Max Chl Dpth (m)	1.09	Hydr. Depth (m)		0.48	
Conv. Total (m3/s)	360.4	Conv. (m3/s)		360.4	
Length Wtd. (m)	101.60	Wetted Per. (m)		36.97	
Min Ch El (m)	88.09	Shear (N/m2)		34.41	
Alpha	1.00	Stream Power (N/m s)		60.09	
Frctn Loss (m)	0.81	Cum Volume (1000 m3)		10.36	
C & E Loss (m)	0.01	Cum SA (1000 m2)		27.80	

Plan: Plan 01 Ponticello Ponticello RS: 549 Profile: PF 1

E.G. Elev (m)	88.51	Element	Left OB	Channel	Right OB
Vel Head (m)	0.11	Wt. n-Val.		0.030	
W.S. Elev (m)	88.40	Reach Len. (m)	105.80	105.80	105.80
Crit W.S. (m)	88.34	Flow Area (m2)		20.69	
E.G. Slope (m/m)	0.006765	Area (m2)		20.69	
Q Total (m3/s)	30.87	Flow (m3/s)		30.87	
Top Width (m)	62.50	Top Width (m)		62.50	
Vel Total (m/s)	1.49	Avg. Vel. (m/s)		1.49	
Max Chl Dpth (m)	1.05	Hydr. Depth (m)		0.33	
Conv. Total (m3/s)	329.7	Conv. (m3/s)		329.7	
Length Wtd. (m)	105.80	Wetted Per. (m)		62.57	
Min Ch El (m)	87.35	Shear (N/m2)		28.42	
Alpha	1.00	Stream Power (N/m s)		42.41	
Frctn Loss (m)	0.77	Cum Volume (1000 m3)		8.41	
C & E Loss (m)	0.00	Cum SA (1000 m2)		22.75	

Plan: Plan 01 Ponticello Ponticello RS: 443 Profile: PF 1

E.G. Elev (m)	87.73	Element	Left OB	Channel	Right OB
Vel Head (m)	0.13	Wt. n-Val.		0.030	
W.S. Elev (m)	87.60	Reach Len. (m)	96.10	96.10	96.10
Crit W.S. (m)		Flow Area (m2)		19.21	
E.G. Slope (m/m)	0.006186	Area (m2)		19.21	
Q Total (m3/s)	30.87	Flow (m3/s)		30.87	
Top Width (m)	39.96	Top Width (m)		39.96	
Vel Total (m/s)	1.61	Avg. Vel. (m/s)		1.61	
Max Chl Dpth (m)	1.14	Hydr. Depth (m)		0.48	
Conv. Total (m3/s)	392.5	Conv. (m3/s)		392.5	
Length Wtd. (m)	96.10	Wetted Per. (m)		40.04	
Min Ch El (m)	86.46	Shear (N/m2)		29.11	
Alpha	1.00	Stream Power (N/m s)		46.77	
Frctn Loss (m)	0.77	Cum Volume (1000 m3)		6.30	
C & E Loss (m)	0.01	Cum SA (1000 m2)		17.33	

Plan: Plan 01 Ponticello Ponticello RS: 347 Profile: PF 1

E.G. Elev (m)	86.94	Element	Left OB	Channel	Right OB
Vel Head (m)	0.28	Wt. n-Val.		0.030	
W.S. Elev (m)	86.66	Reach Len. (m)	100.60	100.60	100.60
Crit W.S. (m)	86.86	Flow Area (m2)		13.19	
E.G. Slope (m/m)	0.010918	Area (m2)		13.19	
Q Total (m3/s)	30.87	Flow (m3/s)		30.87	
Top Width (m)	23.79	Top Width (m)		23.79	
Vel Total (m/s)	2.34	Avg. Vel. (m/s)		2.34	
Max Chl Dpth (m)	1.25	Hydr. Depth (m)		0.55	
Conv. Total (m3/s)	295.4	Conv. (m3/s)		295.4	
Length Wtd. (m)	100.60	Wetted Per. (m)		23.93	
Min Ch El (m)	85.41	Shear (N/m2)		59.00	
Alpha	1.00	Stream Power (N/m s)		138.13	
Frctn Loss (m)	1.14	Cum Volume (1000 m3)		4.74	
C & E Loss (m)	0.02	Cum SA (1000 m2)		14.27	

Plan: Plan 01 Ponticello Ponticello RS: 246 Profile: PF 1

E.G. Elev (m)	85.83	Element	Left OB	Channel	Right OB
Vel Head (m)	0.26	Wt. n-Val.		0.030	
W.S. Elev (m)	85.57	Reach Len. (m)	99.10	99.10	99.10
Crit W.S. (m)	85.61	Flow Area (m2)		13.70	
E.G. Slope (m/m)	0.014490	Area (m2)		13.70	
Q Total (m3/s)	30.87	Flow (m3/s)		30.87	

Plan: Plan 01 Ponticello Ponticello RS: 246 Profile: PF 1 (Continued)

Top Width (m)	32.50	Top Width (m)		32.50	
Vel Total (m/s)	2.25	Avg. Vel. (m/s)		2.25	
Max Chl Dpth (m)	0.98	Hydr. Depth (m)		0.42	
Conv. Total (m3/s)	256.5	Conv. (m3/s)		256.5	
Length Wtd. (m)	99.10	Wetted Per. (m)		32.58	
Min Ch El (m)	84.59	Shear (N/m2)		59.77	
Alpha	1.00	Stream Power (N/m s)		134.62	
Frctn Loss (m)	1.19	Cum Volume (1000 m3)		3.39	
C & E Loss (m)	0.02	Cum SA (1000 m2)		11.44	

Plan: Plan 01 Ponticello Ponticello RS: 147 Profile: PF 1

E.G. Elev (m)	84.61	Element	Left OB	Channel	Right OB
Vel Head (m)	0.12	Wt. n-Val.		0.030	
W.S. Elev (m)	84.50	Reach Len. (m)	100.10	100.10	100.10
Crit W.S. (m)	84.50	Flow Area (m2)		20.42	
E.G. Slope (m/m)	0.014174	Area (m2)		20.42	
Q Total (m3/s)	30.87	Flow (m3/s)		30.87	
Top Width (m)	86.80	Top Width (m)		86.80	
Vel Total (m/s)	1.51	Avg. Vel. (m/s)		1.51	
Max Chl Dpth (m)	0.84	Hydr. Depth (m)		0.24	
Conv. Total (m3/s)	259.3	Conv. (m3/s)		259.3	
Length Wtd. (m)		Wetted Per. (m)		86.83	
Min Ch El (m)	83.66	Shear (N/m2)		32.69	
Alpha	1.00	Stream Power (N/m s)		49.42	
Frctn Loss (m)		Cum Volume (1000 m3)		1.70	
C & E Loss (m)		Cum SA (1000 m2)		5.53	

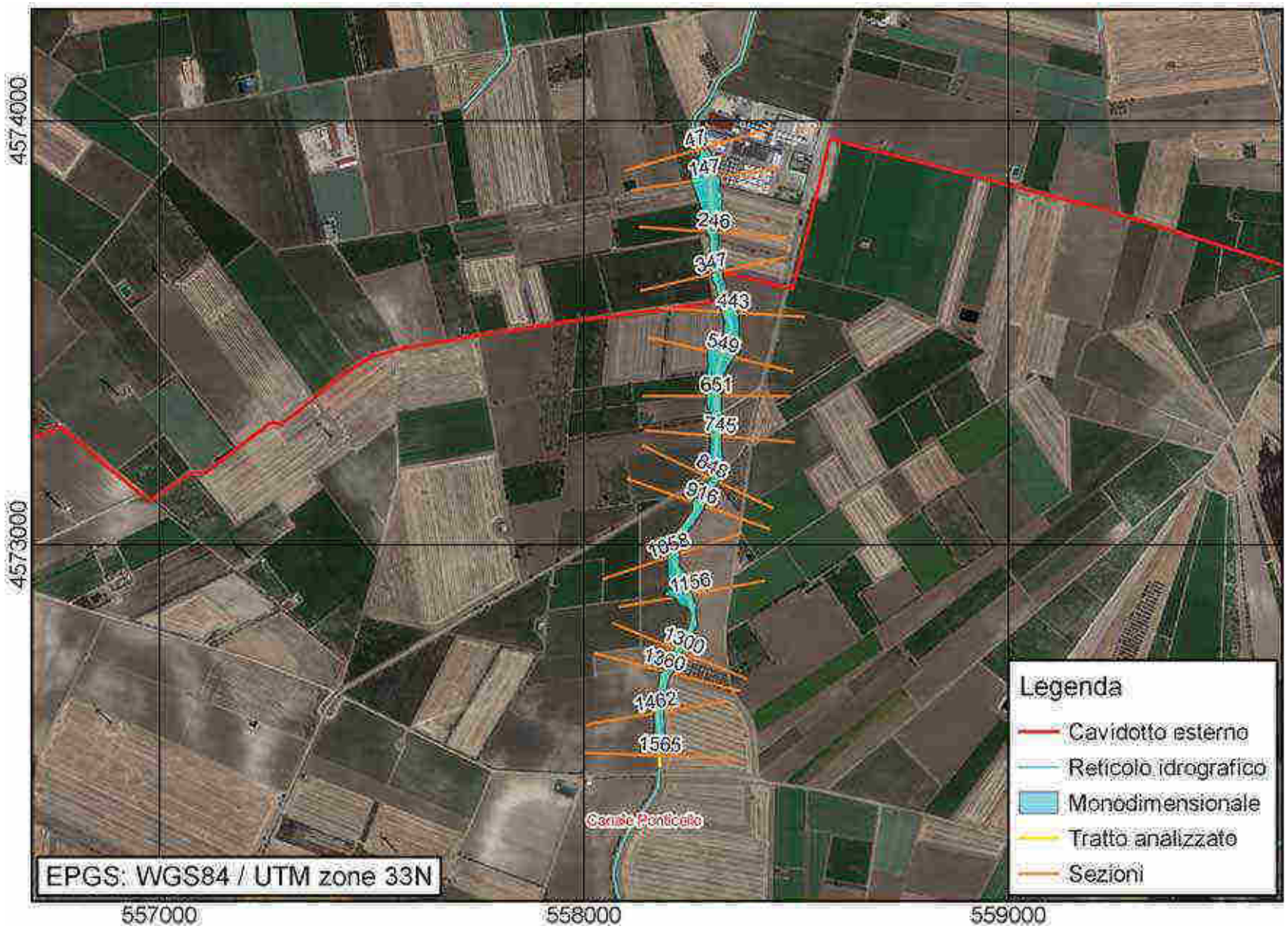
Plan: Plan 01 Ponticello Ponticello RS: 47 Profile: PF 1

E.G. Elev (m)	83.94	Element	Left OB	Channel	Right OB
Vel Head (m)	0.27	Wt. n-Val.		0.030	
W.S. Elev (m)	83.67	Reach Len. (m)			
Crit W.S. (m)	83.66	Flow Area (m2)		13.50	
E.G. Slope (m/m)	0.010002	Area (m2)		13.50	
Q Total (m3/s)	30.87	Flow (m3/s)		30.87	
Top Width (m)	23.62	Top Width (m)		23.62	
Vel Total (m/s)	2.29	Avg. Vel. (m/s)		2.29	
Max Chl Dpth (m)	1.14	Hydr. Depth (m)		0.57	
Conv. Total (m3/s)	308.7	Conv. (m3/s)		308.7	
Length Wtd. (m)		Wetted Per. (m)		23.74	
Min Ch El (m)	82.53	Shear (N/m2)		55.75	
Alpha	1.00	Stream Power (N/m s)		127.53	
Frctn Loss (m)		Cum Volume (1000 m3)			
C & E Loss (m)		Cum SA (1000 m2)			

HEC-RAS Plan: Plan 01 River: Ponticello Reach: Ponticello Profile: PF 1

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)	
Ponticello	1585	PF 1	30.87	96.29	99.15	99.15	99.38	0.012357	2.22	16.32	38.14	1.02
Ponticello	1462	PF 1	30.87	96.73	97.87	97.88	98.17	0.011621	2.42	12.69	20.11	1.05
Ponticello	1360	PF 1	30.87	95.04	97.33	97.02	97.46	0.003148	1.56	19.83	25.94	0.57
Ponticello	1300	PF 1	30.87	95.65	96.82	96.82	97.12	0.010622	2.45	12.58	20.77	1.01
Ponticello	1156	PF 1	30.87	94.55	95.15	95.12	95.31	0.009771	1.74	17.75	46.43	0.93
Ponticello	1058	PF 1	30.87	92.61	94.01	94.01	94.25	0.011906	2.17	14.21	30.70	1.02
Ponticello	956	PF 1	30.87	91.42	92.75	92.18	92.93	0.007068	1.83	16.82	31.61	0.82
Ponticello	848	PF 1	30.87	91.64	92.01	92.01	92.33	0.010603	2.48	12.42	20.65	1.01
Ponticello	745	PF 1	30.87	89.69	90.39	90.52	90.79	0.025986	2.91	10.90	28.49	1.45
Ponticello	651	PF 1	30.87	88.04	89.18	89.09	89.33	0.007806	1.75	17.68	36.86	0.81
Ponticello	546	PF 1	30.87	87.35	88.40	88.24	88.51	0.005705	1.49	20.69	62.53	0.83
Ponticello	443	PF 1	30.87	86.46	87.60		87.73	0.005186	1.61	19.21	35.96	0.74
Ponticello	347	PF 1	30.87	85.41	86.65	86.66	86.94	0.010915	2.34	13.15	23.79	1.00
Ponticello	246	PF 1	30.87	84.39	85.57	85.61	85.83	0.014400	2.25	13.70	32.50	1.11
Ponticello	147	PF 1	30.87	83.66	84.50	84.50	84.81	0.014174	1.31	20.42	86.83	1.00
Ponticello	47	PF 1	30.87	82.52	83.67	83.86	83.94	0.010002	2.29	13.50	23.62	0.87

Figura 8. Planimetria con individuazione delle sezioni e delle aree potenzialmente interessate dalla portata avente tr = 200 anni



Canale Trionfo

Il tratto del Canale Ponticello oggetto di indagine interseca il cavidotto esterno che collega la sottostazione elettrica ai cavidotti interni ed agli aerogeneratori. In corrispondenza dell'intersezione sono presenti due ponti (codice sezioni in HEC-RAS - RS = 420 e RS = 403.5), caratterizzati entrambi da un canale avente luce di larghezza e altezza pari a 100 cm. È stata pertanto condotta una verifica che ha tenuto conto dell'attraversamento mettendo in evidenza come, in corrispondenza dei due ponti e in alcuni tratti a monte ed a valle degli stessi, sono presenti alcune esondazioni in destra e sinistra idraulica.

Sulla base della modellazione monodimensionale precedentemente condotta sono state stima le seguenti portate:

- a monte del ponte RS = 420, in sinistra idraulica, sezioni da RS = 1969 a RS = 1362, Q = 9.02 m^3/s;
- in corrispondenza dei due ponti, in sinistra e destra idraulica, sezioni da RS = 619 a RS = 403.5, Q = 11.90 m^3/s;
- a valle del ponte RS = 403.5, in destra idraulica, sezioni da RS = 307 a RS = 66, Q = 7.25 m^3/s;

Essendo un'analisi condotta in condizioni non stazionarie le portate vengono introdotte secondo idrogrammi di piena triangolari con tempo di esaurimento pari al tempo di corrivazione stimato nell'analisi idrologica, pertanto la durata complessiva dell'evento simulato è pari a due volte il tempo di corrivazione. L'esondazione, come è possibile osservare nella rappresentazione in A3 (Figura 12), non coinvolge nessun aerogeneratore, interessando parzialmente i cavidotti esterni. La posa in opera dei cavidotti in corrispondenza dei due ponti verrà pertanto realizzata con particolare attenzione attraverso una perforazione teleguidata (Trivellazione Orizzontale Teleguidata" T.O.C.) fino ad una profondità pari a 2 metri al di sotto del fondo alveo.

Di seguito si riporta un rilievo topografico del tratto investigato con foto a monte e valle dei due ponti. È opportuna, al fine di garantire il corretto esercizio dei due canali, una pulizia dell'alveo in quanto, come da fotografie, allo stato attuale l'alveo risulta ostruito da rifiuti di origine antropica.

Foto trasversale al ponte RS = 703.5

Foto a valle del ponte RS = 703.5

Foto a valle del ponte RS = 703.5

Foto a valle del ponte RS = 703.5

Foto a monte del ponte RS = 703.5

Foto a valle del ponte RS = 720

Foto a monte del ponte RS = 720

Foto a monte del ponte RS = 720

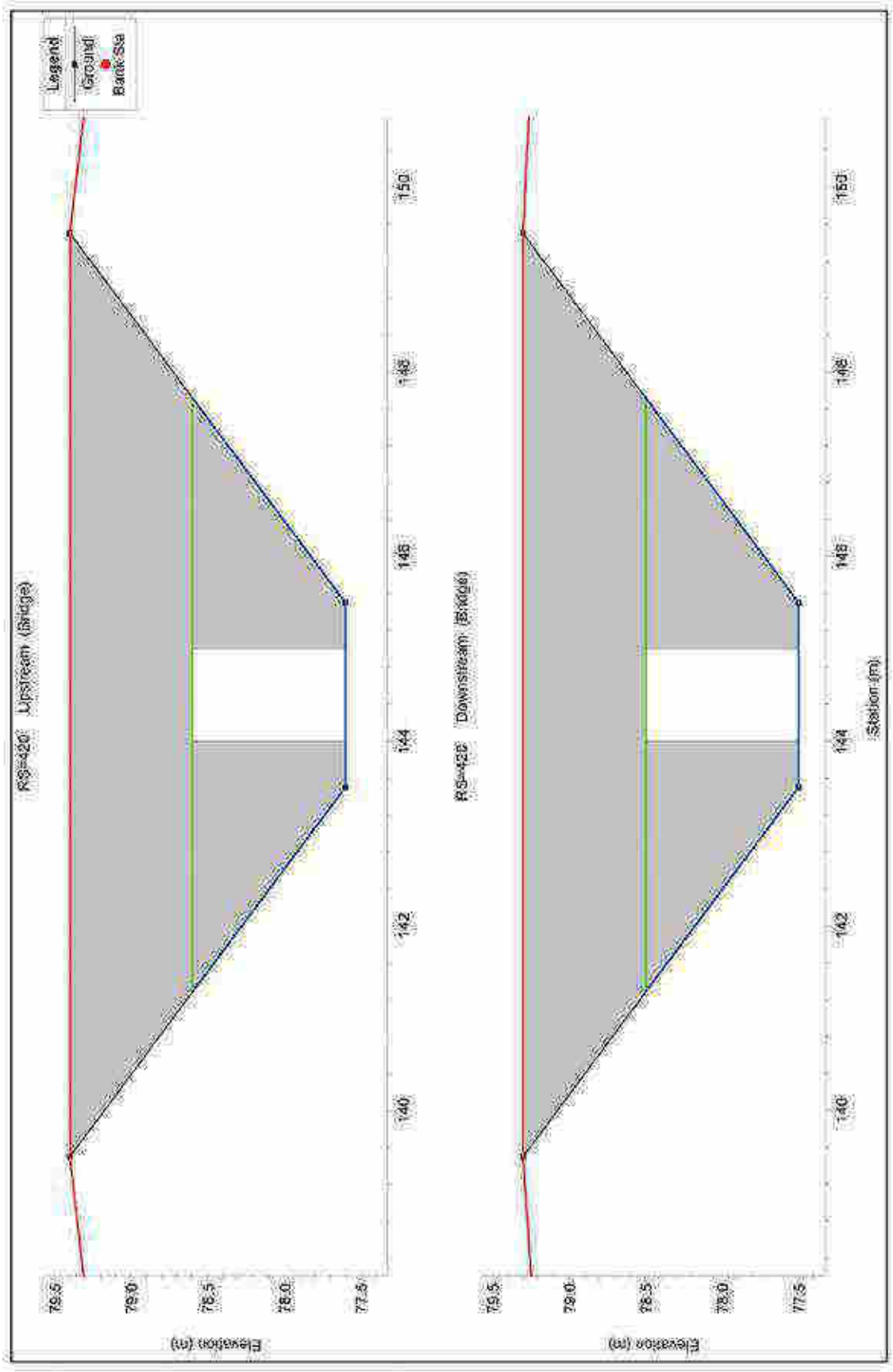


Figura 9. Modellazione in HEC-RAS del ponte RS = 720: Upstream (Sezione a monte) – Downstream (Sezione a valle)

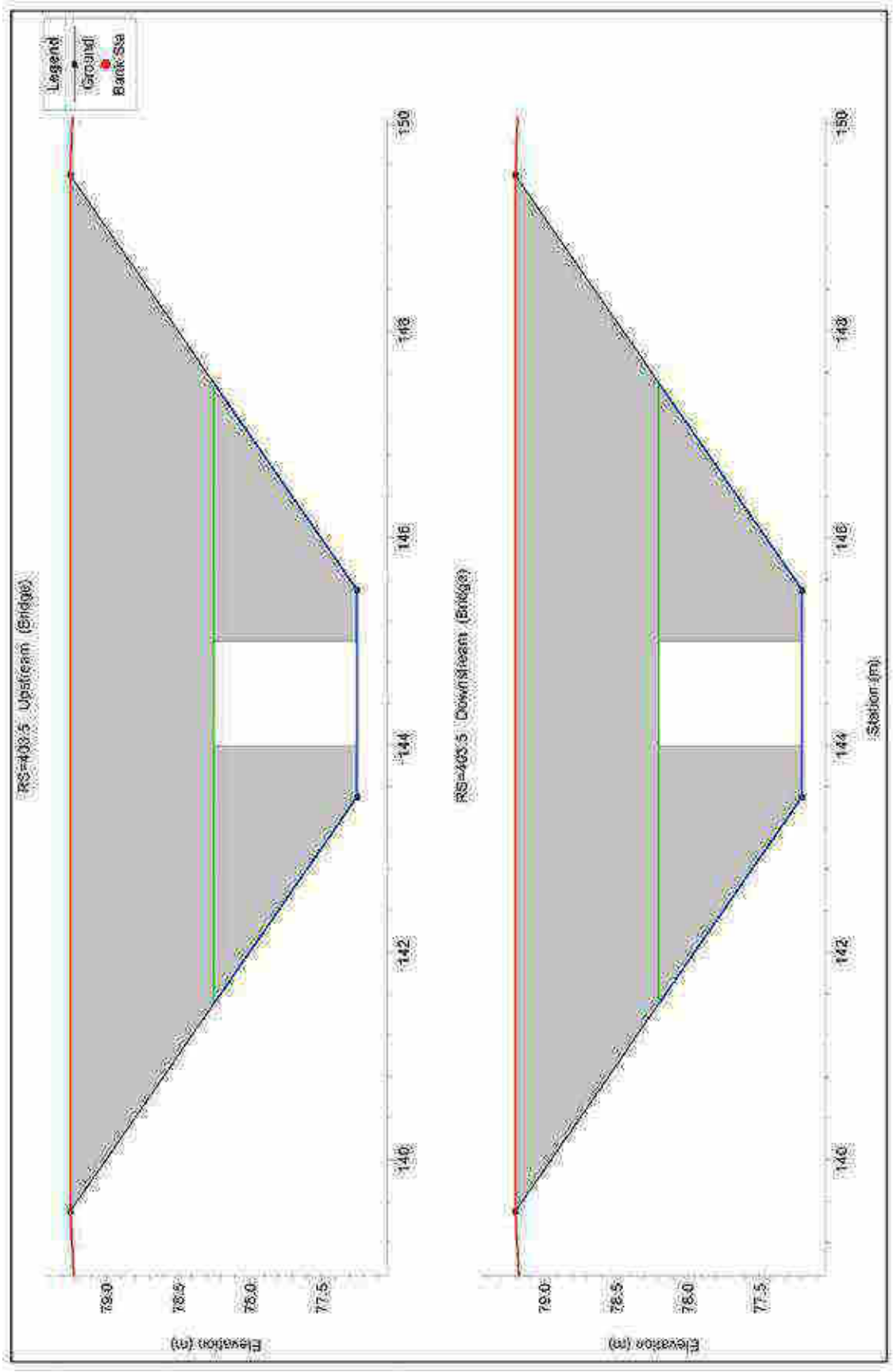


Figura 10. Modellazione in HEC-RAS del ponte RS = 703.5: Upstream (Sezione a monte) – Downstream (Sezione a valle)

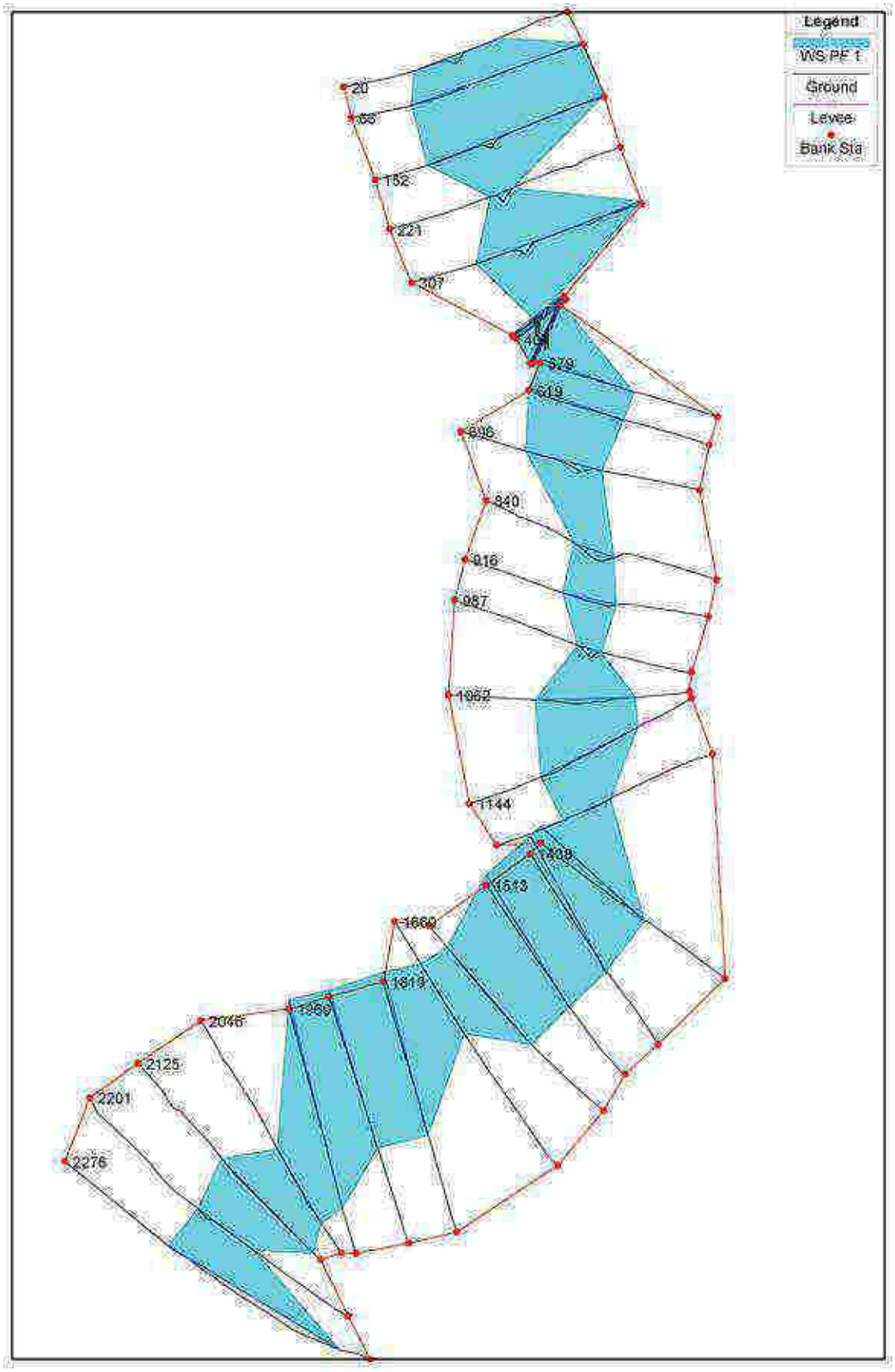
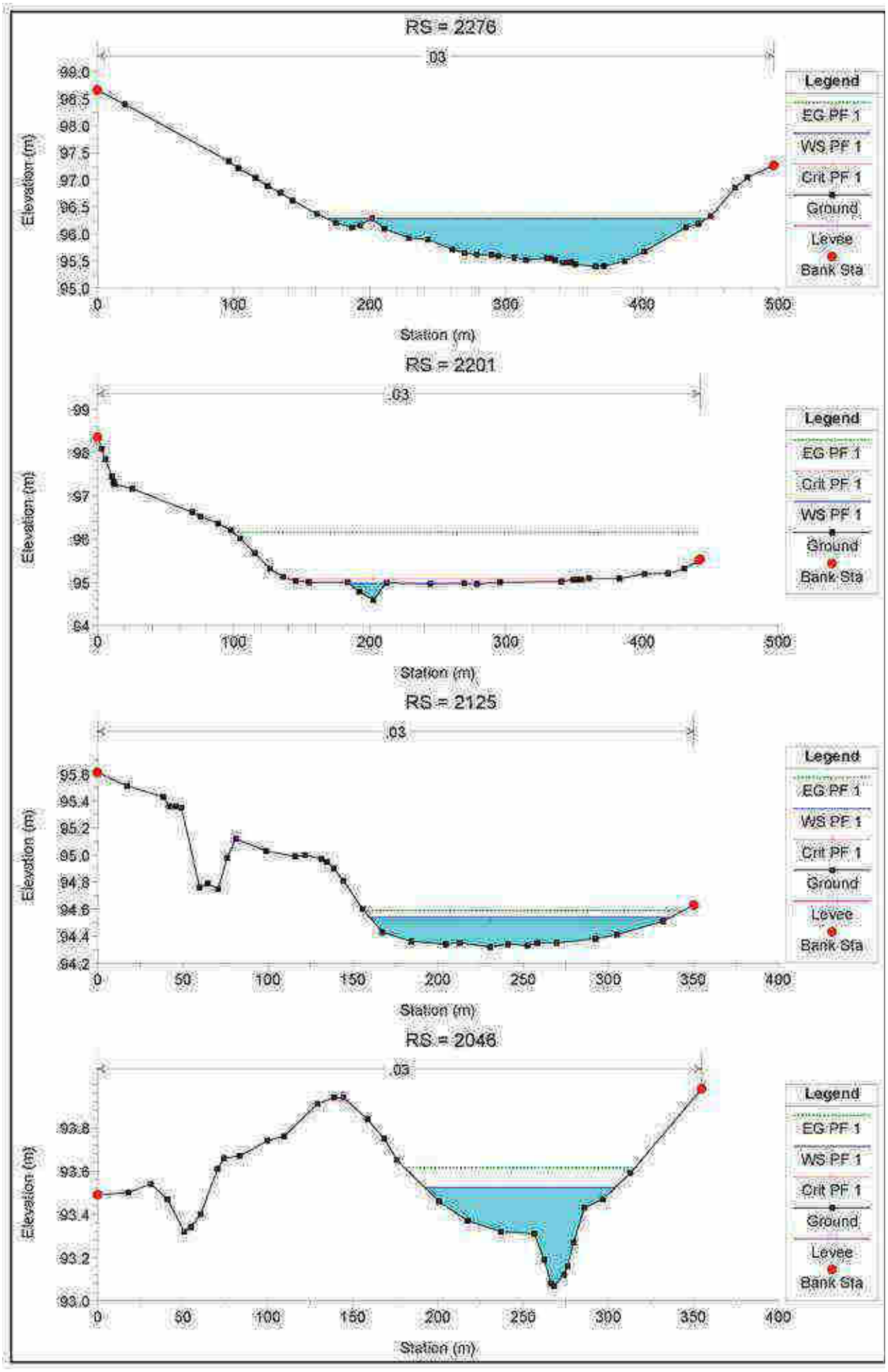
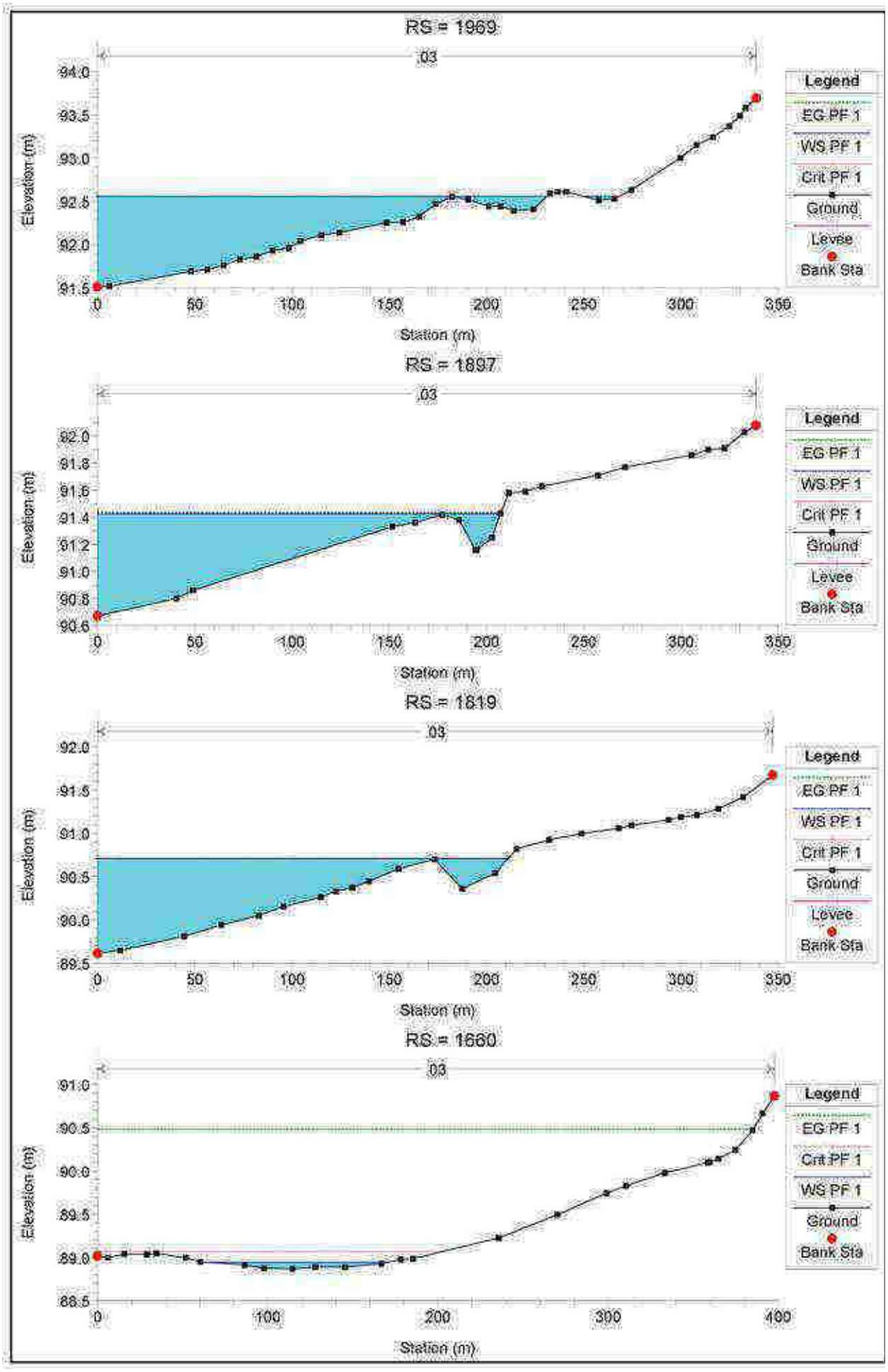
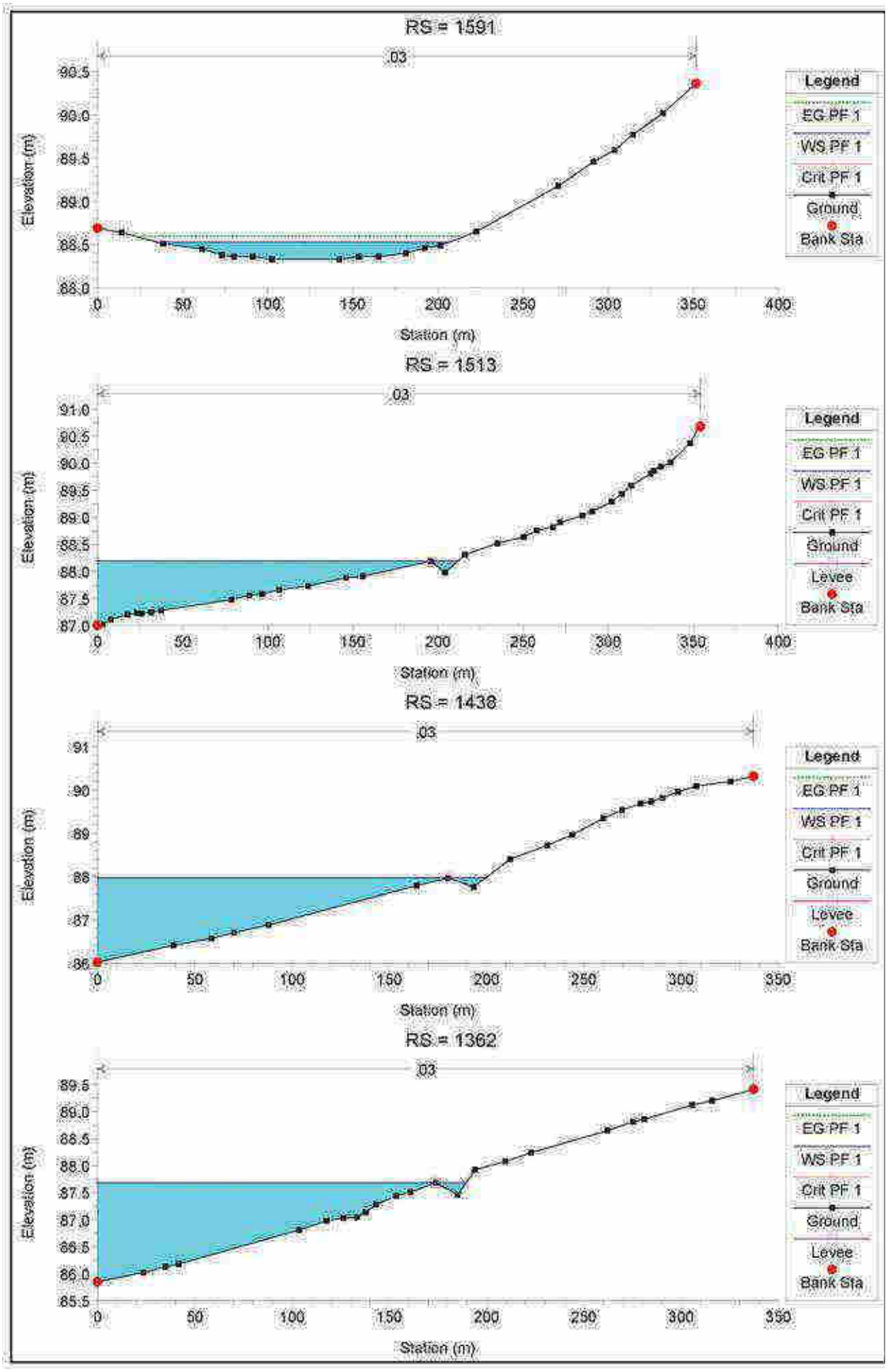
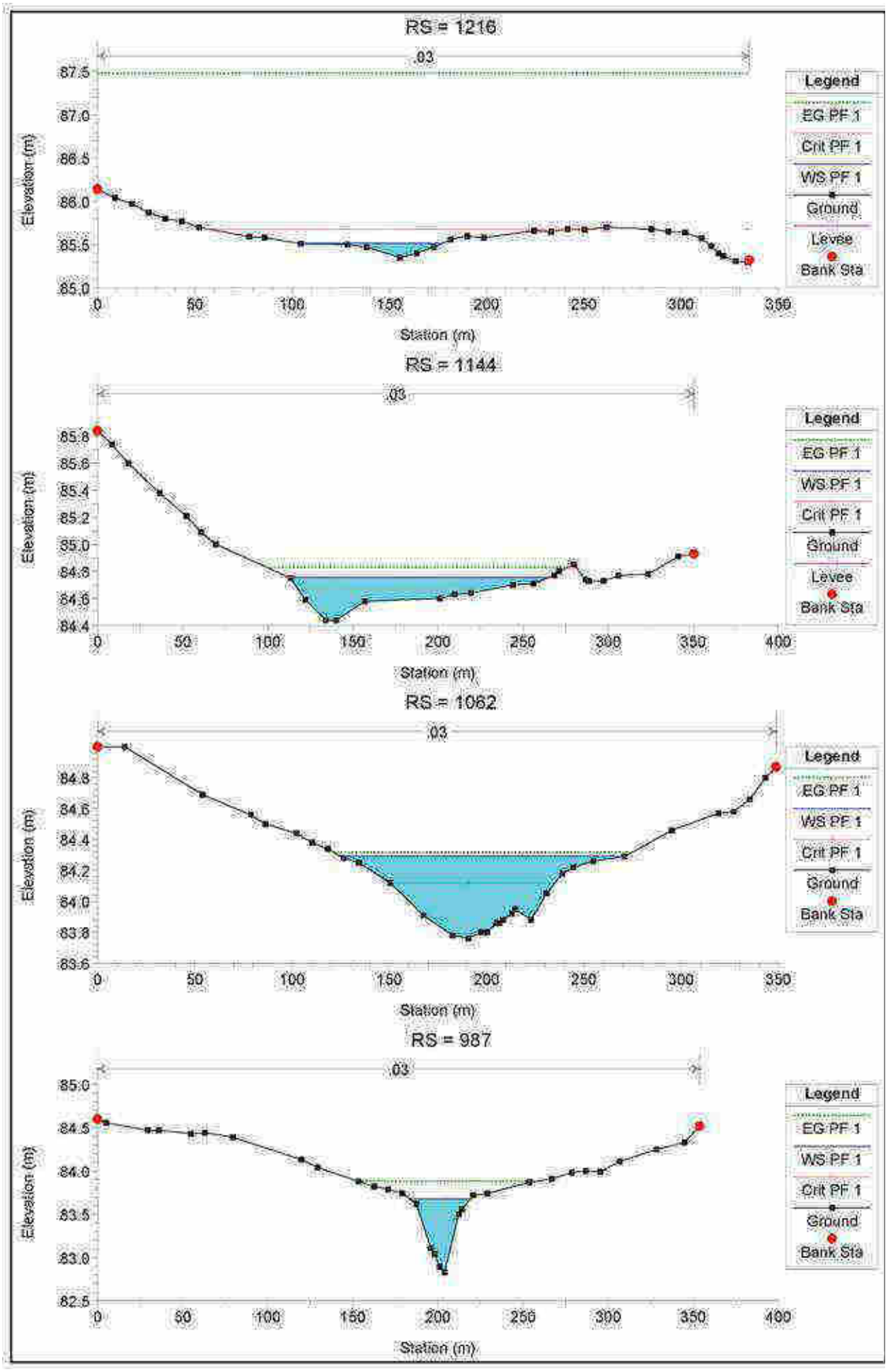


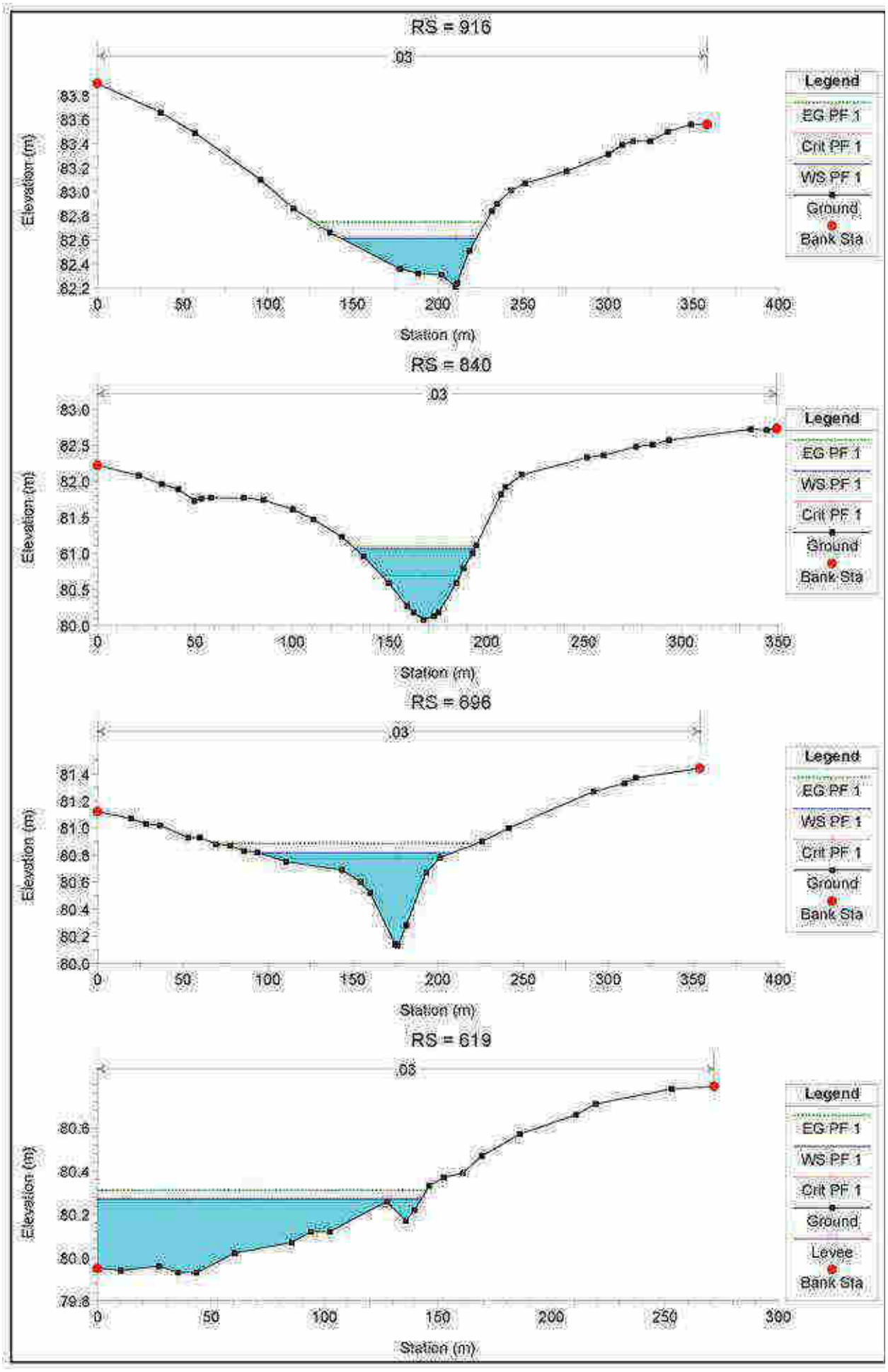
Figura 11. Rappresentazione 3D

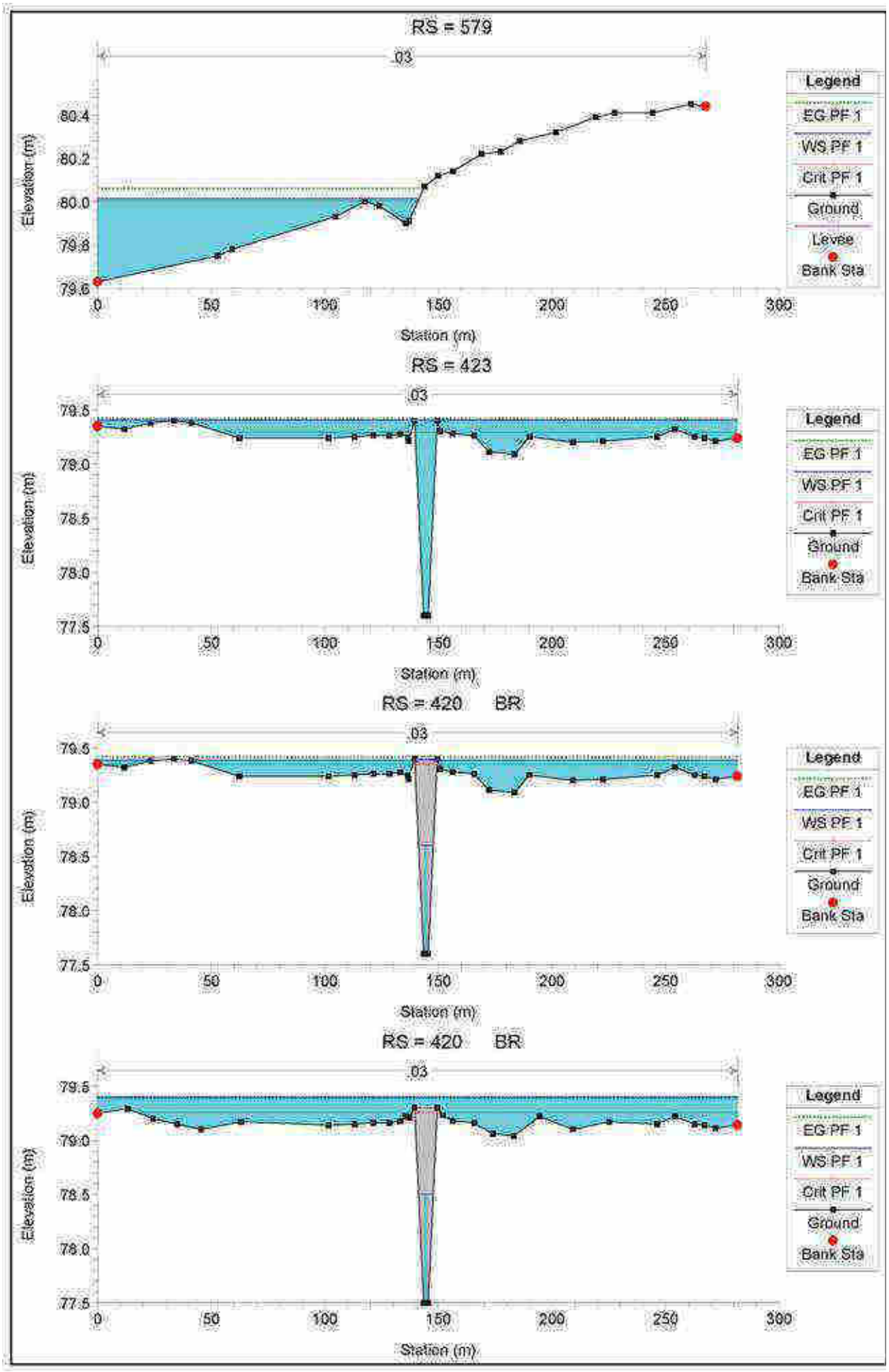

RS = 2276
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 2201
03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 2125
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 2046
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)

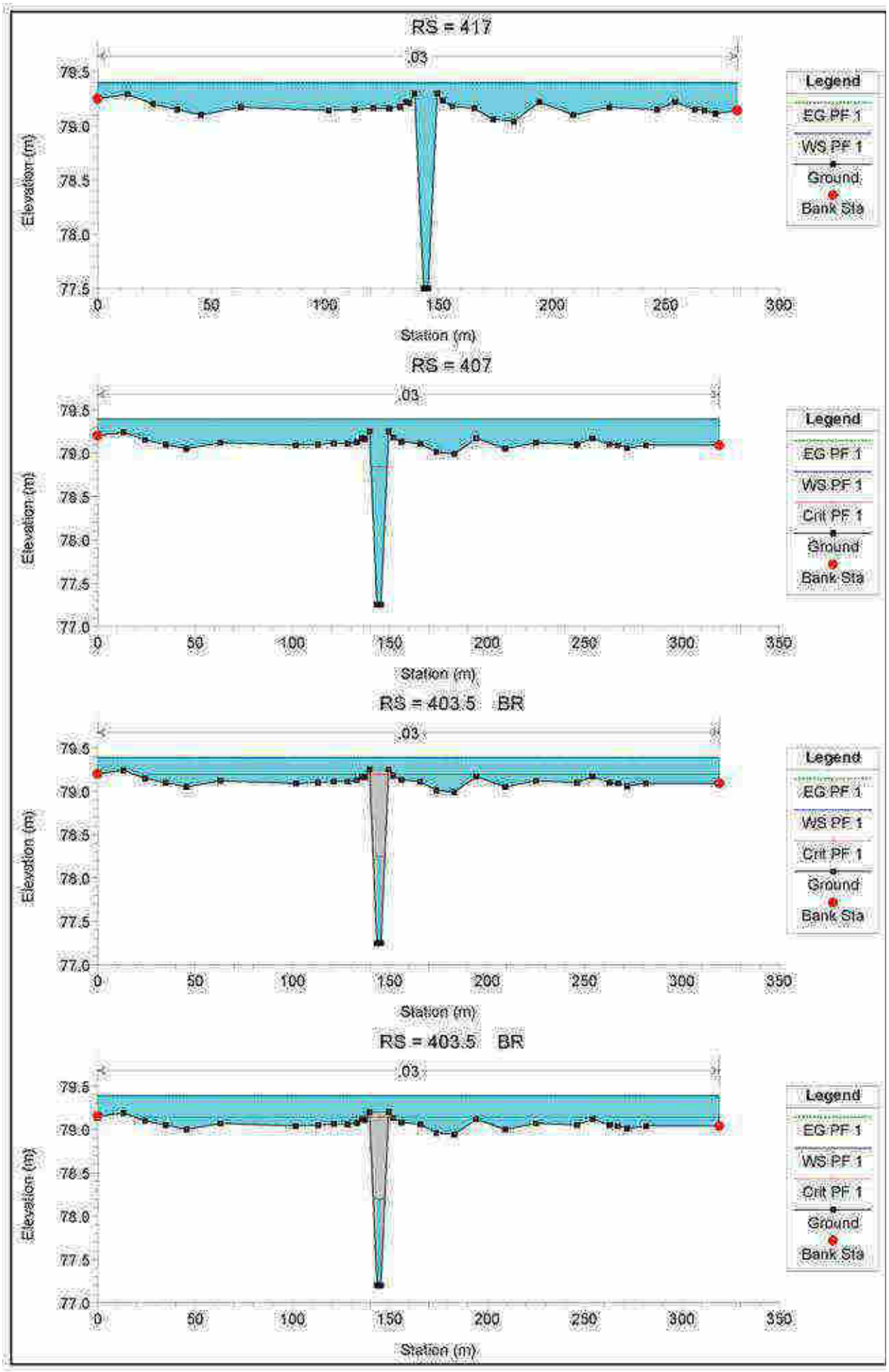

RS = 1969
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 1897
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 1819
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 1660
03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

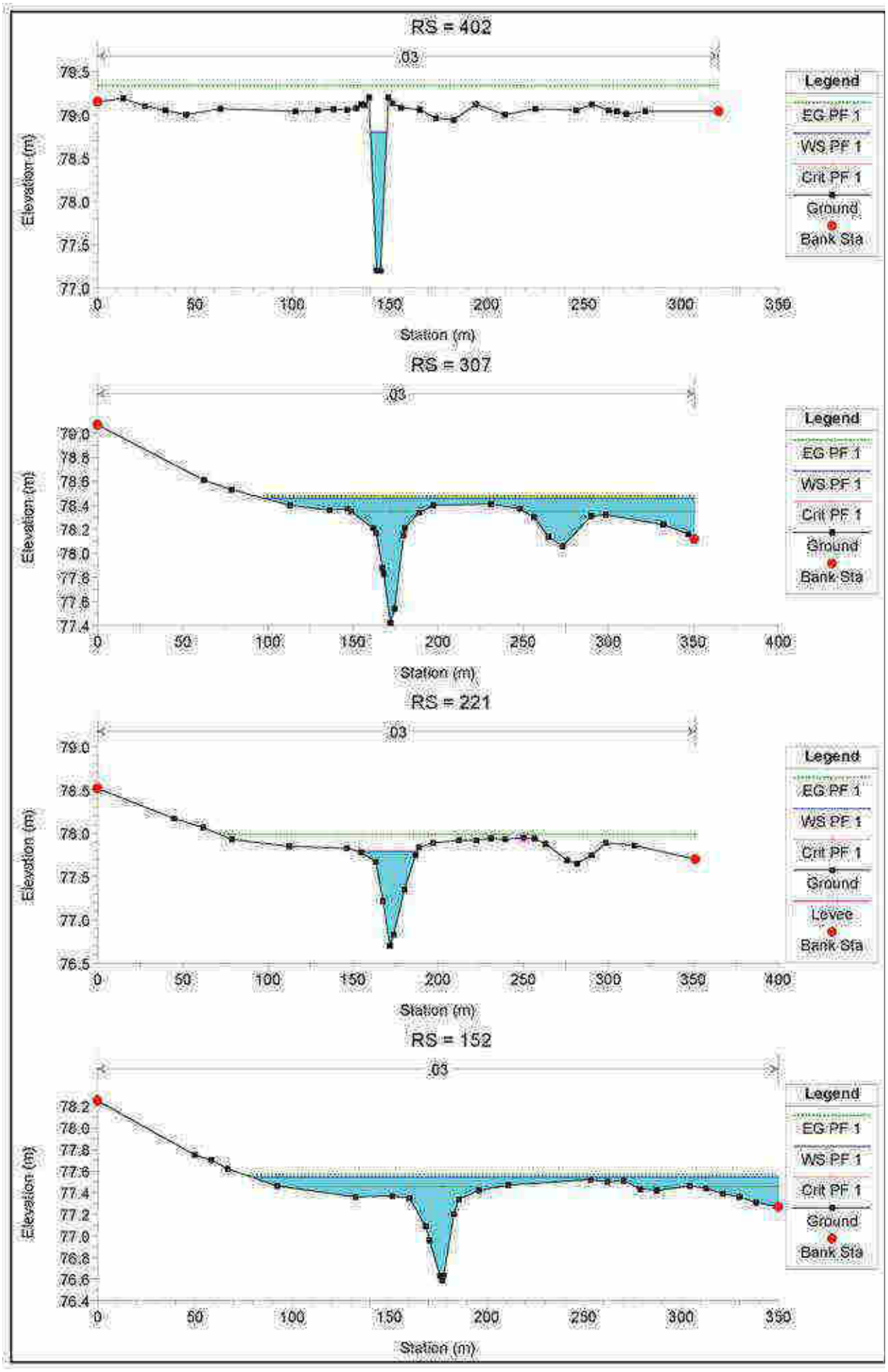

RS = 1591
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 1513
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 1438
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 1362
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)

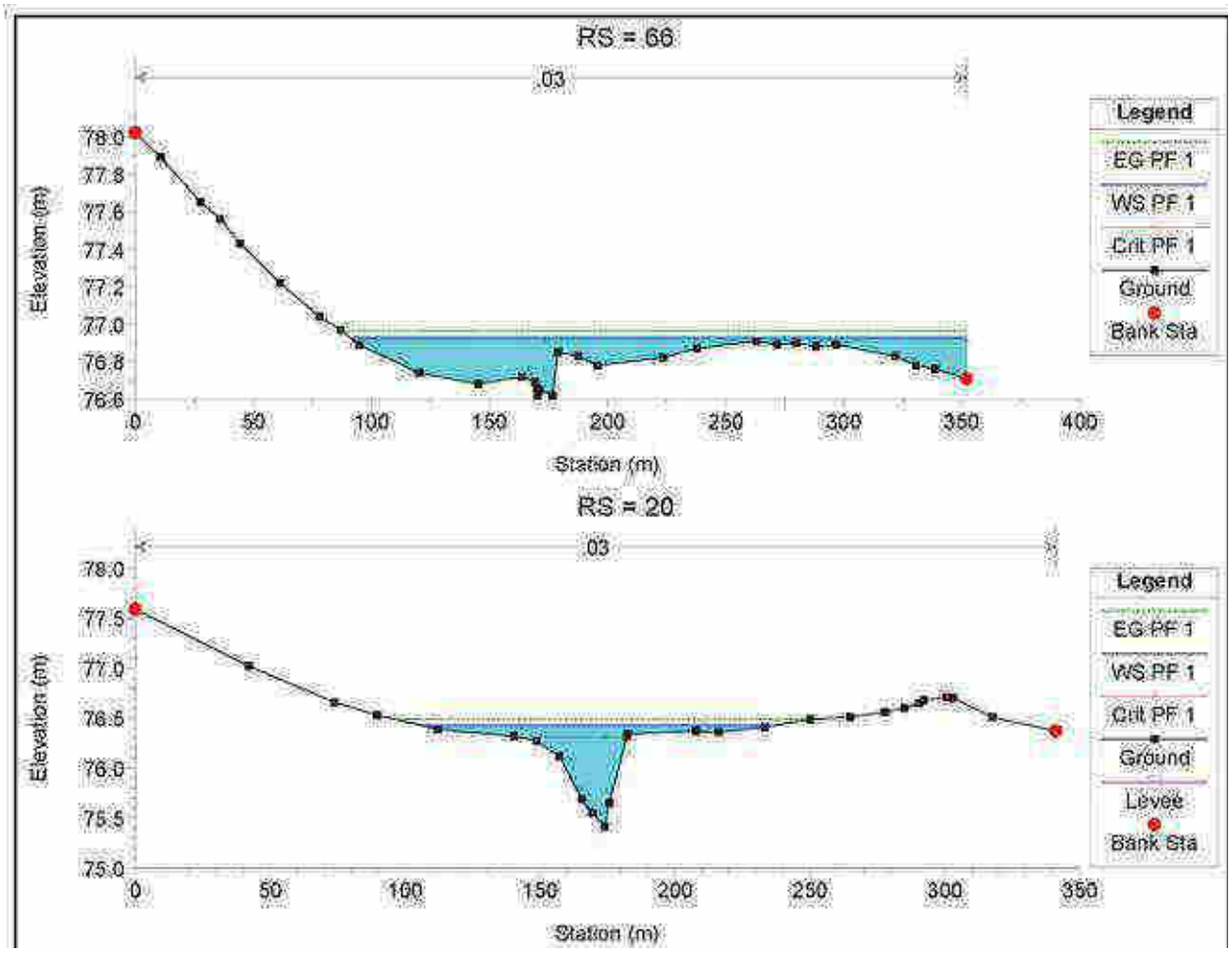

RS = 1216
03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 1144
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 1062
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 987
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


RS = 916
03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 840
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 696
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 619
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)


RS = 579
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
80.4
80.2
80.0
79.8
79.6
0
50
100
150
200
250
300
Station (m)
RS = 423
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
79.5
79.0
78.5
78.0
77.5
0
50
100
150
200
250
300
Station (m)
RS = 420 BR
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
79.5
79.0
78.5
78.0
77.5
0
50
100
150
200
250
300
Station (m)
RS = 420 BR
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
79.5
79.0
78.5
78.0
77.5
0
50
100
150
200
250
300
Station (m)


RS = 417
.03
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 407
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 403.5 BR
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 403.5 BR
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


RS = 402
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 307
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 221
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 152
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


RS = 66
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
78.0
77.8
77.6
77.4
77.2
77.0
76.8
76.6
0
50
100
150
200
250
300
350
400
Station (m)
RS = 20
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
78.0
77.5
77.0
76.5
76.0
75.5
75.0
0
50
100
150
200
250
300
350
Station (m)

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 2276 Profile: PF 1

E.G. Elev (m)	96.28	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.		0.030	
W.S. Elev (m)	96.28	Reach Len. (m)	74.70	74.70	74.70
Crit W.S. (m)	96.28	Flow Area (m2)		141.72	
E.G. Slope (m/m)	0.000081	Area (m2)		141.72	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	279.14	Top Width (m)		279.14	
Vel Total (m/s)	0.19	Avg. Vel. (m/s)		0.19	
Max Chl Dpth (m)	0.89	Hydr. Depth (m)		0.51	
Conv. Total (m3/s)	3006.3	Conv. (m3/s)		3006.3	
Length Wtd. (m)	74.70	Wetted Per. (m)		278.15	
Min Ch El (m)	95.39	Shear (N/m2)		0.40	
Alpha	1.00	Stream Power (N/m s)		0.08	
Frctn Loss (m)	0.02	Cum Volume (1000 m3)		114.90	
C & E Loss (m)	0.12	Cum SA (1000 m2)		344.46	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 2201 Profile: PF 1

E.G. Elev (m)	96.15	Element	Left OB	Channel	Right OB
Vel Head (m)	1.18	Wt. n-Val.		0.030	
W.S. Elev (m)	94.97	Reach Len. (m)	76.50	76.50	76.50
Crit W.S. (m)	95.08	Flow Area (m2)		5.62	
E.G. Slope (m/m)	0.569370	Area (m2)		5.62	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	67.17	Top Width (m)		67.17	
Vel Total (m/s)	4.81	Avg. Vel. (m/s)		4.81	
Max Chl Dpth (m)	0.38	Hydr. Depth (m)		0.08	
Conv. Total (m3/s)	35.8	Conv. (m3/s)		35.8	
Length Wtd. (m)	76.50	Wetted Per. (m)		67.16	
Min Ch El (m)	94.59	Shear (N/m2)		467.01	
Alpha	1.00	Stream Power (N/m s)		2246.58	
Frctn Loss (m)	0.57	Cum Volume (1000 m3)		109.40	
C & E Loss (m)	0.00	Cum SA (1000 m2)		331.53	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 2125 Profile: PF 1

E.G. Elev (m)	94.59	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.		0.030	
W.S. Elev (m)	94.54	Reach Len. (m)	78.90	78.90	78.90
Crit W.S. (m)	94.51	Flow Area (m2)		28.00	
E.G. Slope (m/m)	0.009802	Area (m2)		28.00	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	177.05	Top Width (m)		177.05	
Vel Total (m/s)	0.97	Avg. Vel. (m/s)		0.97	
Max Chl Dpth (m)	0.22	Hydr. Depth (m)		0.16	
Conv. Total (m3/s)	273.0	Conv. (m3/s)		273.0	
Length Wtd. (m)	78.90	Wetted Per. (m)		177.05	
Min Ch El (m)	94.32	Shear (N/m2)		15.29	
Alpha	1.00	Stream Power (N/m s)		14.88	
Frctn Loss (m)	0.97	Cum Volume (1000 m3)		108.11	
C & E Loss (m)	0.00	Cum SA (1000 m2)		322.19	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 2046 Profile: PF 1

E.G. Elev (m)	93.62	Element	Left OB	Channel	Right OB
Vel Head (m)	0.09	Wt. n-Val.		0.030	
W.S. Elev (m)	93.52	Reach Len. (m)	77.50	77.50	77.50
Crit W.S. (m)	93.52	Flow Area (m2)		20.16	
E.G. Slope (m/m)	0.015887	Area (m2)		20.16	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 2046 Profile: PF 1 (Continued)

Top Width (m)	111.85	Top Width (m)		111.85	
Vel Total (m/s)	1.34	Avg. Vel. (m/s)		1.34	
Max Chl Dpth (m)	0.45	Hydr. Depth (m)		0.18	
Conv. Total (m3/s)	214.5	Conv. (m3/s)		214.5	
Length Wtd. (m)	77.50	Wetted Per. (m)		111.85	
Min Ch El (m)	93.07	Shear (N/m2)		28.08	
Alpha	1.00	Stream Power (N/m s)		37.65	
Frctn Loss (m)	0.03	Cum Volume (1000 m3)		106.21	
C & E Loss (m)	0.03	Cum SA (1000 m2)		310.79	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 1989 Profile: PF 1

E.G. Elev (m)	92.56	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.		0.030	
W.S. Elev (m)	92.56	Reach Len. (m)	71.60	71.60	71.60
Crit W.S. (m)	92.56	Flow Area (m2)		117.21	
E.G. Slope (m/m)	0.000132	Area (m2)		117.21	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	250.13	Top Width (m)		250.13	
Vel Total (m/s)	0.23	Avg. Vel. (m/s)		0.23	
Max Chl Dpth (m)	1.05	Hydr. Depth (m)		0.47	
Conv. Total (m3/s)	2350.4	Conv. (m3/s)		2350.4	
Length Wtd. (m)	71.60	Wetted Per. (m)		251.19	
Min Ch El (m)	91.51	Shear (N/m2)		0.61	
Alpha	1.00	Stream Power (N/m s)		0.14	
Frctn Loss (m)	0.01	Cum Volume (1000 m3)		100.89	
C & E Loss (m)	0.00	Cum SA (1000 m2)		296.77	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 1897 Profile: PF 1

E.G. Elev (m)	91.43	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.		0.030	
W.S. Elev (m)	91.43	Reach Len. (m)	78.30	78.30	78.30
Crit W.S. (m)	91.43	Flow Area (m2)		72.58	
E.G. Slope (m/m)	0.000507	Area (m2)		72.58	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	207.04	Top Width (m)		207.04	
Vel Total (m/s)	0.37	Avg. Vel. (m/s)		0.37	
Max Chl Dpth (m)	0.76	Hydr. Depth (m)		0.35	
Conv. Total (m3/s)	1189.9	Conv. (m3/s)		1189.9	
Length Wtd. (m)	78.30	Wetted Per. (m)		207.80	
Min Ch El (m)	90.67	Shear (N/m2)		1.74	
Alpha	1.00	Stream Power (N/m s)		0.65	
Frctn Loss (m)	0.02	Cum Volume (1000 m3)		94.10	
C & E Loss (m)	0.00	Cum SA (1000 m2)		280.40	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 1819 Profile: PF 1

E.G. Elev (m)	90.71	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.		0.030	
W.S. Elev (m)	90.71	Reach Len. (m)	159.30	159.30	159.30
Crit W.S. (m)	90.71	Flow Area (m2)		112.36	
E.G. Slope (m/m)	0.000122	Area (m2)		112.36	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	211.05	Top Width (m)		211.05	
Vel Total (m/s)	0.24	Avg. Vel. (m/s)		0.24	
Max Chl Dpth (m)	1.10	Hydr. Depth (m)		0.53	
Conv. Total (m3/s)	2451.6	Conv. (m3/s)		2451.6	
Length Wtd. (m)	159.30	Wetted Per. (m)		212.18	
Min Ch El (m)	89.61	Shear (N/m2)		0.63	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 1819 Profile: PF 1 (Continued)

Alpha	1.00	Stream Power (N/m s)		0.15	
Frctn Loss (m)	0.08	Cum Volume (1000 m3)		86.86	
C & E Loss (m)	0.15	Cum SA (1000 m2)		264.03	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 1660 Profile: PF 1

E.G. Elev (m)	90.48	Element	Left OB	Channel	Right OB
Vel Head (m)	1.54	Wt. n-Val.		0.030	
W.S. Elev (m)	88.95	Reach Len. (m)	68.90	68.90	68.90
Crit W.S. (m)	89.07	Flow Area (m2)		4.93	
E.G. Slope (m/m)	1.842542	Area (m2)		4.93	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	106.99	Top Width (m)		106.99	
Vel Total (m/s)	5.49	Avg. Vel. (m/s)		5.49	
Max Chl Dpth (m)	0.68	Hydr. Depth (m)		0.05	
Conv. Total (m3/s)	21.1	Conv. (m3/s)		21.1	
Length Wtd. (m)	68.90	Wetted Per. (m)		106.99	
Min Ch El (m)	88.67	Shear (N/m2)		741.55	
Alpha	1.00	Stream Power (N/m s)		4069.31	
Frctn Loss (m)	0.56	Cum Volume (1000 m3)		77.51	
C & E Loss (m)	0.00	Cum SA (1000 m2)		238.70	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 1591 Profile: PF 1

E.G. Elev (m)	88.60	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.		0.030	
W.S. Elev (m)	88.53	Reach Len. (m)	78.20	78.20	78.20
Crit W.S. (m)	88.53	Flow Area (m2)		23.43	
E.G. Slope (m/m)	0.017012	Area (m2)		23.43	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	171.41	Top Width (m)		171.41	
Vel Total (m/s)	1.15	Avg. Vel. (m/s)		1.15	
Max Chl Dpth (m)	0.20	Hydr. Depth (m)		0.14	
Conv. Total (m3/s)	207.2	Conv. (m3/s)		207.2	
Length Wtd. (m)	78.20	Wetted Per. (m)		171.41	
Min Ch El (m)	88.33	Shear (N/m2)		22.60	
Alpha	1.00	Stream Power (N/m s)		26.31	
Frctn Loss (m)	0.03	Cum Volume (1000 m3)		76.54	
C & E Loss (m)	0.02	Cum SA (1000 m2)		229.11	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 1515 Profile: PF 1

E.G. Elev (m)	88.19	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.		0.030	
W.S. Elev (m)	88.19	Reach Len. (m)	74.90	74.90	74.90
Crit W.S. (m)	88.19	Flow Area (m2)		116.46	
E.G. Slope (m/m)	0.000108	Area (m2)		116.46	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	211.65	Top Width (m)		211.65	
Vel Total (m/s)	0.23	Avg. Vel. (m/s)		0.23	
Max Chl Dpth (m)	1.19	Hydr. Depth (m)		0.55	
Conv. Total (m3/s)	2597.0	Conv. (m3/s)		2597.0	
Length Wtd. (m)	74.90	Wetted Per. (m)		212.86	
Min Ch El (m)	87.00	Shear (N/m2)		0.58	
Alpha	1.00	Stream Power (N/m s)		0.13	
Frctn Loss (m)	0.00	Cum Volume (1000 m3)		71.07	
C & E Loss (m)	0.00	Cum SA (1000 m2)		214.13	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 1438 Profile: PF 1

E.G. Elev (m)	87.97	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.		0.030	
W.S. Elev (m)	87.97	Reach Len. (m)	75.60	75.60	75.60
Crit W.S. (m)	87.97	Flow Area (m2)		186.14	
E.G. Slope (m/m)	0.000021	Area (m2)		186.14	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	199.49	Top Width (m)		199.49	
Vel Total (m/s)	0.15	Avg. Vel. (m/s)		0.15	
Max Chl Dpth (m)	1.95	Hydr. Depth (m)		0.93	
Conv. Total (m3/s)	5886.0	Conv. (m3/s)		5886.0	
Length Wtd. (m)	75.60	Wetted Per. (m)		201.46	
Min Ch El (m)	86.02	Shear (N/m2)		0.19	
Alpha	1.00	Stream Power (N/m s)		0.03	
Frctn Loss (m)	0.00	Cum Volume (1000 m3)		59.73	
C & E Loss (m)	0.00	Cum SA (1000 m2)		198.73	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 1362 Profile: PF 1

E.G. Elev (m)	87.68	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.		0.030	
W.S. Elev (m)	87.68	Reach Len. (m)	146.40	146.40	146.40
Crit W.S. (m)	87.68	Flow Area (m2)		177.70	
E.G. Slope (m/m)	0.000023	Area (m2)		177.70	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	189.50	Top Width (m)		189.50	
Vel Total (m/s)	0.15	Avg. Vel. (m/s)		0.15	
Max Chl Dpth (m)	1.83	Hydr. Depth (m)		0.94	
Conv. Total (m3/s)	5638.3	Conv. (m3/s)		5638.3	
Length Wtd. (m)	146.40	Wetted Per. (m)		191.35	
Min Ch El (m)	85.85	Shear (N/m2)		0.21	
Alpha	1.00	Stream Power (N/m s)		0.03	
Frctn Loss (m)	0.01	Cum Volume (1000 m3)		45.98	
C & E Loss (m)	0.20	Cum SA (1000 m2)		184.03	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 1216 Profile: PF 1

E.G. Elev (m)	87.48	Element	Left OB	Channel	Right OB
Vel Head (m)	1.96	Wt. n-Val.		0.030	
W.S. Elev (m)	85.52	Reach Len. (m)	72.10	72.10	72.10
Crit W.S. (m)	85.68	Flow Area (m2)		4.36	
E.G. Slope (m/m)	1.512210	Area (m2)		4.36	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	73.99	Top Width (m)		73.99	
Vel Total (m/s)	6.20	Avg. Vel. (m/s)		6.20	
Max Chl Dpth (m)	0.22	Hydr. Depth (m)		0.06	
Conv. Total (m3/s)	22.0	Conv. (m3/s)		22.0	
Length Wtd. (m)		Wetted Per. (m)		73.99	
Min Ch El (m)	85.30	Shear (N/m2)		873.18	
Alpha	1.00	Stream Power (N/m s)		5417.18	
Frctn Loss (m)		Cum Volume (1000 m3)		32.65	
C & E Loss (m)		Cum SA (1000 m2)		184.74	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 1144 Profile: PF 1

E.G. Elev (m)	84.83	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.		0.030	
W.S. Elev (m)	84.76	Reach Len. (m)	62.00	62.00	62.00
Crit W.S. (m)	84.76	Flow Area (m2)		22.42	
E.G. Slope (m/m)	0.016969	Area (m2)		22.42	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 1144 Profile: PF 1 (Continued)

Top Width (m)	153.13	Top Width (m)		153.13	
Vel Total (m/s)	1.21	Avg. Vel. (m/s)		1.21	
Max Chl Dpth (m)	0.32	Hydr. Depth (m)		0.15	
Conv. Total (m3/s)	207.6	Conv. (m3/s)		207.6	
Length Wtd. (m)	82.00	Wetted Per. (m)		153.14	
Min Ch El (m)	84.44	Shear (N/m2)		24.35	
Alpha	1.00	Stream Power (N/m s)		29.38	
Frctn Loss (m)	0.49	Cum Volume (1000 m3)		31.89	
C & E Loss (m)	0.01	Cum SA (1000 m2)		156.55	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 1062 Profile: PF 1

E.G. Elev (m)	84.32	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.		0.030	
W.S. Elev (m)	84.29	Reach Len. (m)	75.20	75.20	75.20
Crit W.S. (m)	84.12	Flow Area (m2)		36.85	
E.G. Slope (m/m)	0.005041	Area (m2)		36.85	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	146.15	Top Width (m)		146.15	
Vel Total (m/s)	0.73	Avg. Vel. (m/s)		0.73	
Max Chl Dpth (m)	0.53	Hydr. Depth (m)		0.25	
Conv. Total (m3/s)	490.2	Conv. (m3/s)		490.2	
Length Wtd. (m)	75.20	Wetted Per. (m)		146.16	
Min Ch El (m)	83.76	Shear (N/m2)		7.52	
Alpha	1.00	Stream Power (N/m s)		5.52	
Frctn Loss (m)	0.42	Cum Volume (1000 m3)		29.26	
C & E Loss (m)	0.02	Cum SA (1000 m2)		144.28	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 987 Profile: PF 1

E.G. Elev (m)	83.88	Element	Left OB	Channel	Right OB
Vel Head (m)	0.20	Wt. n-Val.		0.030	
W.S. Elev (m)	83.68	Reach Len. (m)	71.40	71.40	71.40
Crit W.S. (m)	83.68	Flow Area (m2)		13.58	
E.G. Slope (m/m)	0.012956	Area (m2)		13.58	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	35.72	Top Width (m)		35.72	
Vel Total (m/s)	1.99	Avg. Vel. (m/s)		1.99	
Max Chl Dpth (m)	0.85	Hydr. Depth (m)		0.38	
Conv. Total (m3/s)	237.5	Conv. (m3/s)		237.5	
Length Wtd. (m)	71.40	Wetted Per. (m)		35.77	
Min Ch El (m)	82.83	Shear (N/m2)		48.25	
Alpha	1.00	Stream Power (N/m s)		96.02	
Frctn Loss (m)	1.11	Cum Volume (1000 m3)		27.36	
C & E Loss (m)	0.02	Cum SA (1000 m2)		137.44	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 916 Profile: PF 1

E.G. Elev (m)	82.75	Element	Left OB	Channel	Right OB
Vel Head (m)	0.14	Wt. n-Val.		0.030	
W.S. Elev (m)	82.61	Reach Len. (m)	76.40	76.40	76.40
Crit W.S. (m)	82.63	Flow Area (m2)		16.56	
E.G. Slope (m/m)	0.019424	Area (m2)		16.56	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	79.48	Top Width (m)		79.48	
Vel Total (m/s)	1.63	Avg. Vel. (m/s)		1.63	
Max Chl Dpth (m)	0.40	Hydr. Depth (m)		0.21	
Conv. Total (m3/s)	193.9	Conv. (m3/s)		193.9	
Length Wtd. (m)	76.40	Wetted Per. (m)		79.49	
Min Ch El (m)	82.21	Shear (N/m2)		39.68	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 916 Profile: PF 1 (Continued)

Alpha	1.00	Stream Power (N/m s)		64.77	
Frctn Loss (m)	0.25	Cum Volume (1000 m3)		26.29	
C & E Loss (m)	0.02	Cum SA (1000 m2)		133.33	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 840 Profile: PF 1

E.G. Elev (m)	81.09	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.		0.030	
W.S. Elev (m)	81.06	Reach Len. (m)	69.60	69.60	69.60
Crit W.S. (m)	80.69	Flow Area (m2)		32.87	
E.G. Slope (m/m)	0.001391	Area (m2)		32.87	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	61.07	Top Width (m)		61.07	
Vel Total (m/s)	0.82	Avg. Vel. (m/s)		0.82	
Max Chl Dpth (m)	0.98	Hydr. Depth (m)		0.54	
Conv. Total (m3/s)	724.8	Conv. (m3/s)		724.8	
Length Wtd. (m)	69.60	Wetted Per. (m)		61.11	
Min Ch El (m)	80.08	Shear (N/m2)		7.34	
Alpha	1.00	Stream Power (N/m s)		6.03	
Frctn Loss (m)	0.21	Cum Volume (1000 m3)		24.40	
C & E Loss (m)	0.00	Cum SA (1000 m2)		127.96	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 696 Profile: PF 1

E.G. Elev (m)	80.89	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.		0.030	
W.S. Elev (m)	80.82	Reach Len. (m)	76.50	76.50	76.50
Crit W.S. (m)	80.77	Flow Area (m2)		23.08	
E.G. Slope (m/m)	0.010335	Area (m2)		23.08	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	113.64	Top Width (m)		113.64	
Vel Total (m/s)	1.17	Avg. Vel. (m/s)		1.17	
Max Chl Dpth (m)	0.69	Hydr. Depth (m)		0.20	
Conv. Total (m3/s)	265.9	Conv. (m3/s)		265.9	
Length Wtd. (m)	76.50	Wetted Per. (m)		113.65	
Min Ch El (m)	80.13	Shear (N/m2)		20.59	
Alpha	1.00	Stream Power (N/m s)		24.10	
Frctn Loss (m)	0.56	Cum Volume (1000 m3)		22.45	
C & E Loss (m)	0.01	Cum SA (1000 m2)		121.88	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 619 Profile: PF 1

E.G. Elev (m)	80.31	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.		0.030	
W.S. Elev (m)	80.27	Reach Len. (m)	40.20	40.20	40.20
Crit W.S. (m)	80.27	Flow Area (m2)		30.55	
E.G. Slope (m/m)	0.005519	Area (m2)		30.55	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	142.67	Top Width (m)		142.67	
Vel Total (m/s)	0.88	Avg. Vel. (m/s)		0.88	
Max Chl Dpth (m)	0.34	Hydr. Depth (m)		0.21	
Conv. Total (m3/s)	363.8	Conv. (m3/s)		363.8	
Length Wtd. (m)	40.20	Wetted Per. (m)		142.99	
Min Ch El (m)	79.93	Shear (N/m2)		11.56	
Alpha	1.00	Stream Power (N/m s)		10.23	
Frctn Loss (m)	0.25	Cum Volume (1000 m3)		20.40	
C & E Loss (m)	0.00	Cum SA (1000 m2)		112.08	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 579 Profile: PF 1

E.G. Elev (m)	80.06	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.		0.030	
W.S. Elev (m)	80.01	Reach Len. (m)	156.30	156.30	156.30
Crit W.S. (m)	80.00	Flow Area (m2)		28.03	
E.G. Slope (m/m)	0.007275	Area (m2)		28.03	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	141.50	Top Width (m)		141.50	
Vel Total (m/s)	0.96	Avg. Vel. (m/s)		0.96	
Max Chl Dpth (m)	0.38	Hydr. Depth (m)		0.20	
Conv. Total (m3/s)	316.9	Conv. (m3/s)		316.9	
Length Wtd. (m)	156.30	Wetted Per. (m)		141.89	
Min Ch El (m)	79.63	Shear (N/m2)		14.09	
Alpha	1.00	Stream Power (N/m s)		13.59	
Frctn Loss (m)	0.64	Cum Volume (1000 m3)		19.22	
C & E Loss (m)	0.01	Cum SA (1000 m2)		106.37	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 423 Profile: PF 1

E.G. Elev (m)	79.42	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.		0.030	
W.S. Elev (m)	79.40	Reach Len. (m)	0.01	0.01	0.01
Crit W.S. (m)	79.30	Flow Area (m2)		50.17	
E.G. Slope (m/m)	0.002618	Area (m2)		50.17	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	281.52	Top Width (m)		281.52	
Vel Total (m/s)	0.54	Avg. Vel. (m/s)		0.54	
Max Chl Dpth (m)	1.80	Hydr. Depth (m)		0.18	
Conv. Total (m3/s)	528.3	Conv. (m3/s)		528.3	
Length Wtd. (m)	0.01	Wetted Per. (m)		282.53	
Min Ch El (m)	77.60	Shear (N/m2)		4.56	
Alpha	1.00	Stream Power (N/m s)		2.46	
Frctn Loss (m)	0.00	Cum Volume (1000 m3)		13.11	
C & E Loss (m)	0.00	Cum SA (1000 m2)		73.31	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 420 BR U Profile: PF 1

E.G. Elev (m)	79.42	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.		0.030	
W.S. Elev (m)	79.39	Reach Len. (m)	4.60	4.00	4.00
Crit W.S. (m)	79.35	Flow Area (m2)		36.38	
E.G. Slope (m/m)	0.007040	Area (m2)		36.38	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	281.44	Top Width (m)		281.44	
Vel Total (m/s)	0.74	Avg. Vel. (m/s)		0.74	
Max Chl Dpth (m)	1.79	Hydr. Depth (m)		0.14	
Conv. Total (m3/s)	322.2	Conv. (m3/s)		322.2	
Length Wtd. (m)	4.00	Wetted Per. (m)		265.76	
Min Ch El (m)	77.60	Shear (N/m2)		9.45	
Alpha	1.00	Stream Power (N/m s)		7.02	
Frctn Loss (m)	0.01	Cum Volume (1000 m3)		13.11	
C & E Loss (m)	0.01	Cum SA (1000 m2)		73.30	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 420 BR D Profile: PF 1

E.G. Elev (m)	79.40	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.		0.030	
W.S. Elev (m)	79.39	Reach Len. (m)	1.99	1.99	1.99
Crit W.S. (m)	79.26	Flow Area (m2)		55.11	
E.G. Slope (m/m)	0.001116	Area (m2)		55.11	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 420 BR D Profile: PF 1 (Continued)

Top Width (m)	281.52	Top Width (m)		281.52	
Vel Total (m/s)	0.42	Avg. Vel. (m/s)		0.42	
Max Chl Dpth (m)	1.89	Hydr. Depth (m)		0.23	
Conv. Total (m3/s)	809.0	Conv. (m3/s)		809.0	
Length Wtd. (m)	1.99	Wetted Per. (m)		286.04	
Min Ch El (m)	77.50	Shear (N/m2)		2.49	
Alpha	1.00	Stream Power (N/m s)		1.03	
Frctn Loss (m)	0.00	Cum Volume (1000 m3)		12.91	
C & E Loss (m)	0.00	Cum SA (1000 m2)		72.22	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 417 Profile: PF 1

E.G. Elev (m)	79.40	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.		0.030	
W.S. Elev (m)	79.39	Reach Len. (m)	10.10	10.10	10.10
Crit W.S. (m)		Flow Area (m2)		74.84	
E.G. Slope (m/m)	0.000691	Area (m2)		74.84	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	281.52	Top Width (m)		281.52	
Vel Total (m/s)	0.36	Avg. Vel. (m/s)		0.36	
Max Chl Dpth (m)	1.89	Hydr. Depth (m)		0.27	
Conv. Total (m3/s)	1028.5	Conv. (m3/s)		1028.5	
Length Wtd. (m)	10.10	Wetted Per. (m)		282.70	
Min Ch El (m)	77.50	Shear (N/m2)		1.79	
Alpha	1.00	Stream Power (N/m s)		0.65	
Frctn Loss (m)	0.00	Cum Volume (1000 m3)		12.77	
C & E Loss (m)	0.00	Cum SA (1000 m2)		71.86	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 407 Profile: PF 1

E.G. Elev (m)	79.39	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.		0.030	
W.S. Elev (m)	79.39	Reach Len. (m)	0.10	0.10	0.10
Crit W.S. (m)	78.85	Flow Area (m2)		100.78	
E.G. Slope (m/m)	0.000303	Area (m2)		100.78	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	319.29	Top Width (m)		319.29	
Vel Total (m/s)	0.27	Avg. Vel. (m/s)		0.27	
Max Chl Dpth (m)	2.14	Hydr. Depth (m)		0.32	
Conv. Total (m3/s)	1552.7	Conv. (m3/s)		1552.7	
Length Wtd. (m)	0.10	Wetted Per. (m)		320.73	
Min Ch El (m)	77.25	Shear (N/m2)		0.93	
Alpha	1.00	Stream Power (N/m s)		0.25	
Frctn Loss (m)	0.00	Cum Volume (1000 m3)		11.88	
C & E Loss (m)	0.00	Cum SA (1000 m2)		68.62	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 403.5 BR U Profile: PF 1

E.G. Elev (m)	79.39	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.		0.030	
W.S. Elev (m)	79.39	Reach Len. (m)	4.00	4.00	4.00
Crit W.S. (m)	79.19	Flow Area (m2)		89.43	
E.G. Slope (m/m)	0.000457	Area (m2)		89.43	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	319.29	Top Width (m)		319.29	
Vel Total (m/s)	0.30	Avg. Vel. (m/s)		0.30	
Max Chl Dpth (m)	2.14	Hydr. Depth (m)		0.28	
Conv. Total (m3/s)	1264.2	Conv. (m3/s)		1264.2	
Length Wtd. (m)	4.00	Wetted Per. (m)		323.80	
Min Ch El (m)	77.25	Shear (N/m2)		1.24	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 403.5 BR U Profile: PF 1 (Continued)

Alpha	1.00	Stream Power (N/m s)		0.37	
Frctn Loss (m)	0.00	Cum Volume (1000 m3)		11.87	
C & E Loss (m)	0.00	Cum SA (1000 m2)		68.59	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 403.5 BR D Profile: PF 1

E.G. Elev (m)	79.39	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.		0.030	
W.S. Elev (m)	79.39	Reach Len. (m)	0.50	0.50	0.50
Crit W.S. (m)	79.14	Flow Area (m2)		105.24	
E.G. Slope (m/m)	0.000266	Area (m2)		105.24	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	319.29	Top Width (m)		319.29	
Vel Total (m/s)	0.26	Avg. Vel. (m/s)		0.26	
Max Chl Dpth (m)	2.19	Hydr. Depth (m)		0.33	
Conv. Total (m3/s)	1658.0	Conv. (m3/s)		1658.0	
Length Wtd. (m)	0.50	Wetted Per. (m)		323.90	
Min Ch El (m)	77.20	Shear (N/m2)		0.85	
Alpha	1.00	Stream Power (N/m s)		0.22	
Frctn Loss (m)	0.00	Cum Volume (1000 m3)		11.48	
C & E Loss (m)	0.05	Cum SA (1000 m2)		67.32	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 402 Profile: PF 1

E.G. Elev (m)	79.34	Element	Left OB	Channel	Right OB
Vel Head (m)	0.54	Wt. n-Val.		0.030	
W.S. Elev (m)	78.80	Reach Len. (m)	94.70	94.70	94.70
Crit W.S. (m)	78.80	Flow Area (m2)		8.33	
E.G. Slope (m/m)	0.010769	Area (m2)		8.33	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	8.40	Top Width (m)		8.40	
Vel Total (m/s)	3.25	Avg. Vel. (m/s)		3.25	
Max Chl Dpth (m)	1.60	Hydr. Depth (m)		0.99	
Conv. Total (m3/s)	260.5	Conv. (m3/s)		260.5	
Length Wtd. (m)		Wetted Per. (m)		8.16	
Min Ch El (m)	77.20	Shear (N/m2)		96.01	
Alpha	1.00	Stream Power (N/m s)		311.66	
Frctn Loss (m)		Cum Volume (1000 m3)		11.46	
C & E Loss (m)		Cum SA (1000 m2)		67.23	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 307 Profile: PF 1

E.G. Elev (m)	78.48	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.		0.030	
W.S. Elev (m)	78.46	Reach Len. (m)	85.70	85.70	85.70
Crit W.S. (m)	78.35	Flow Area (m2)		45.65	
E.G. Slope (m/m)	0.003103	Area (m2)		45.65	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	253.03	Top Width (m)		253.03	
Vel Total (m/s)	0.59	Avg. Vel. (m/s)		0.59	
Max Chl Dpth (m)	1.04	Hydr. Depth (m)		0.18	
Conv. Total (m3/s)	485.3	Conv. (m3/s)		485.3	
Length Wtd. (m)	85.70	Wetted Per. (m)		253.45	
Min Ch El (m)	77.42	Shear (N/m2)		5.48	
Alpha	1.00	Stream Power (N/m s)		3.24	
Frctn Loss (m)	0.47	Cum Volume (1000 m3)		8.90	
C & E Loss (m)	0.02	Cum SA (1000 m2)		54.85	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 221 Profile: PF 1

E.G. Elev (m)	77.99	Element	Left OB	Channel	Right OB
Vel Head (m)	0.20	Wt. n-Val.		0.030	
W.S. Elev (m)	77.79	Reach Len. (m)	69.00	69.00	69.00
Crit W.S. (m)	77.79	Flow Area (m2)		13.73	
E.G. Slope (m/m)	0.012068	Area (m2)		13.73	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	34.76	Top Width (m)		34.76	
Vel Total (m/s)	1.97	Avg. Vel. (m/s)		1.97	
Max Chl Dpth (m)	1.09	Hydr. Depth (m)		0.40	
Conv. Total (m3/s)	246.0	Conv. (m3/s)		246.0	
Length Wtd. (m)		Wetted Per. (m)		34.85	
Min Ch El (m)	76.70	Shear (N/m2)		46.64	
Alpha	1.00	Stream Power (N/m s)		91.79	
Frctn Loss (m)		Cum Volume (1000 m3)		6.36	
C & E Loss (m)		Cum SA (1000 m2)		42.52	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 152 Profile: PF 1

E.G. Elev (m)	77.56	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.		0.030	
W.S. Elev (m)	77.54	Reach Len. (m)	86.20	86.20	86.20
Crit W.S. (m)	77.46	Flow Area (m2)		41.35	
E.G. Slope (m/m)	0.004719	Area (m2)		41.35	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	270.71	Top Width (m)		270.71	
Vel Total (m/s)	0.65	Avg. Vel. (m/s)		0.65	
Max Chl Dpth (m)	0.95	Hydr. Depth (m)		0.15	
Conv. Total (m3/s)	393.5	Conv. (m3/s)		393.5	
Length Wtd. (m)	86.20	Wetted Per. (m)		271.04	
Min Ch El (m)	76.59	Shear (N/m2)		7.06	
Alpha	1.00	Stream Power (N/m s)		4.62	
Frctn Loss (m)	0.59	Cum Volume (1000 m3)		4.46	
C & E Loss (m)	0.00	Cum SA (1000 m2)		31.98	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 66 Profile: PF 1

E.G. Elev (m)	76.97	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.		0.030	
W.S. Elev (m)	76.93	Reach Len. (m)	46.30	46.30	46.30
Crit W.S. (m)	76.91	Flow Area (m2)		31.72	
E.G. Slope (m/m)	0.010857	Area (m2)		31.72	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	
Top Width (m)	260.87	Top Width (m)		260.87	
Vel Total (m/s)	0.85	Avg. Vel. (m/s)		0.85	
Max Chl Dpth (m)	0.31	Hydr. Depth (m)		0.12	
Conv. Total (m3/s)	259.4	Conv. (m3/s)		259.4	
Length Wtd. (m)	46.30	Wetted Per. (m)		261.11	
Min Ch El (m)	76.62	Shear (N/m2)		12.94	
Alpha	1.00	Stream Power (N/m s)		11.02	
Frctn Loss (m)	0.48	Cum Volume (1000 m3)		1.31	
C & E Loss (m)	0.00	Cum SA (1000 m2)		9.07	

Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 20 Profile: PF 1

E.G. Elev (m)	76.49	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.		0.030	
W.S. Elev (m)	76.43	Reach Len. (m)			
Crit W.S. (m)	76.31	Flow Area (m2)		24.68	
E.G. Slope (m/m)	0.010006	Area (m2)		24.68	
Q Total (m3/s)	27.03	Flow (m3/s)		27.03	

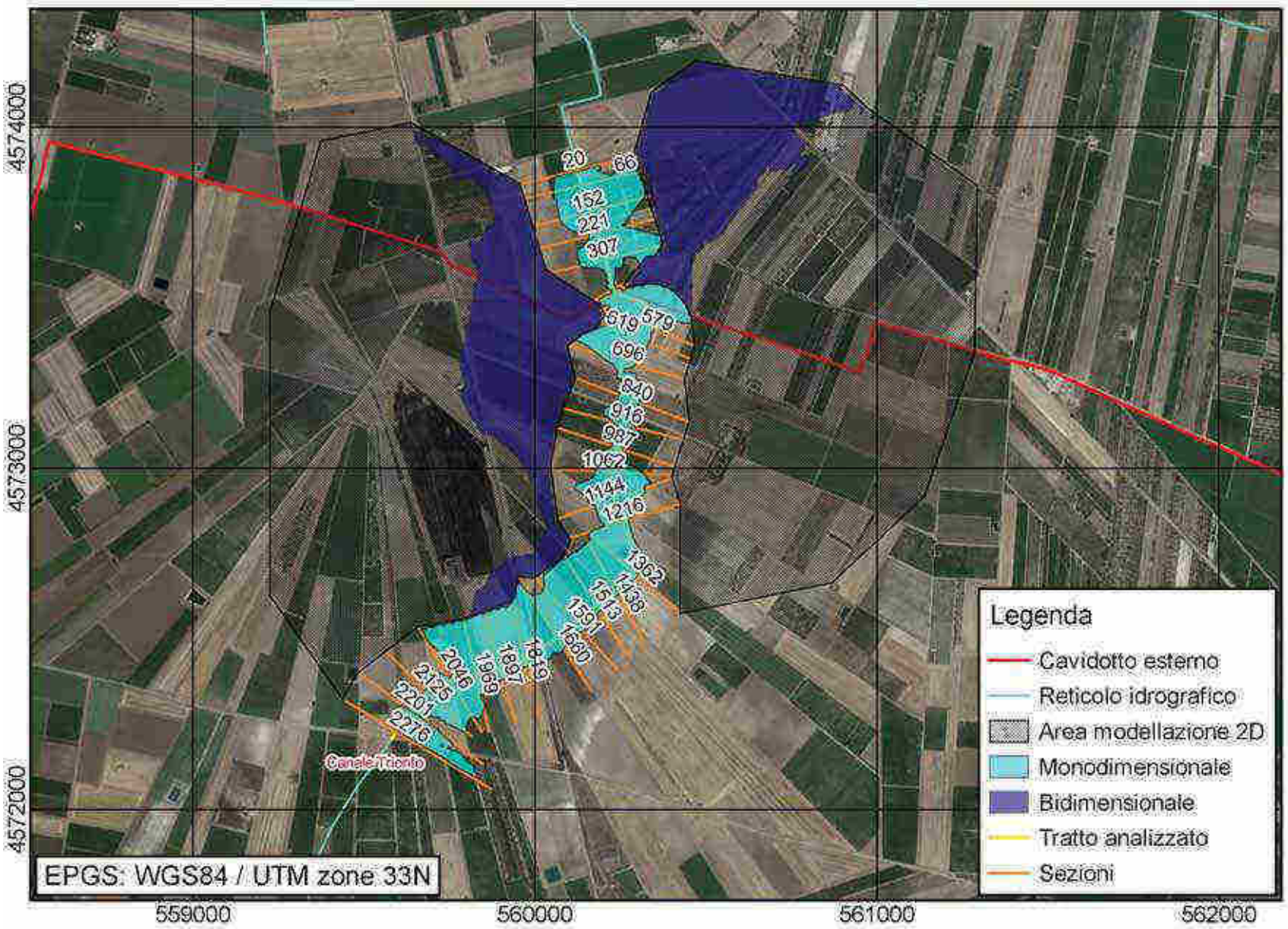
Plan: Plan 01 Canale_Trionfo Canale_Trionfo RS: 20 Profile: PF 1 (Continued)

Top Width (m)	131.05	Top Width (m)	131.05
Vel Total (m/s)	1.10	Avg. Vel. (m/s)	1.10
Max Chl Dpth (m)	1.01	Hydr. Depth (m)	0.19
Conv. Total (m3/s)	270.2	Conv. (m3/s)	270.2
Length Wtd. (m)		Wetted Per. (m)	131.12
Min Ch El (m)	75.42	Shear (N/m2)	18.47
Alpha	1.00	Stream Power (N/m s)	20.23
Frctn Loss (m)		Cum Volume (1000 m3)	
C & E Loss (m)		Cum SA (1000 m2)	

HEC-RAS Plan: Plan 01 River: Canale_Trionfo Reach: Canale_Trionfo Profile: PF 1

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)	
Canale_Trionfo	2276	PF 1	27.03	95.39	96.28	96.28	96.28	0.000081	0.19	141.72	279.14	0.09
Canale_Trionfo	2201	PF 1	27.03	94.59	94.97	95.08	96.15	0.569370	4.81	5.62	67.17	5.31
Canale_Trionfo	2125	PF 1	27.03	94.32	94.54	94.51	94.59	0.009802	0.97	28.00	177.05	0.78
Canale_Trionfo	2046	PF 1	27.03	93.07	93.52	93.52	93.62	0.015887	1.34	20.16	111.85	1.01
Canale_Trionfo	1969	PF 1	27.03	91.51	92.56	92.56	92.56	0.000132	0.23	117.21	250.13	0.11
Canale_Trionfo	1897	PF 1	27.03	90.67	91.43	91.43	91.43	0.000507	0.37	72.58	207.04	0.20
Canale_Trionfo	1819	PF 1	27.03	89.61	90.71	90.71	90.71	0.000122	0.24	112.36	211.05	0.11
Canale_Trionfo	1660	PF 1	27.03	88.87	88.95	89.07	90.48	1.642542	5.49	4.93	106.99	8.17
Canale_Trionfo	1591	PF 1	27.03	88.33	88.53	88.53	88.60	0.017012	1.15	23.43	171.41	1.00
Canale_Trionfo	1513	PF 1	27.03	87.00	88.19	88.19	88.19	0.000108	0.23	118.46	211.65	0.10
Canale_Trionfo	1438	PF 1	27.03	86.02	87.97	87.97	87.97	0.000021	0.15	186.14	199.49	0.05
Canale_Trionfo	1362	PF 1	27.03	85.85	87.68	87.68	87.68	0.000023	0.15	177.70	189.50	0.05
Canale_Trionfo	1218	PF 1	27.03	85.30	85.52	85.88	87.48	1.512210	6.20	4.36	73.99	8.16
Canale_Trionfo	1144	PF 1	27.03	84.44	84.76	84.78	84.83	0.018980	1.21	22.42	153.13	1.01
Canale_Trionfo	1062	PF 1	27.03	83.76	84.29	84.12	84.32	0.003041	0.73	36.85	146.15	0.47
Canale_Trionfo	987	PF 1	27.03	82.83	83.68	83.68	83.88	0.012956	1.99	13.58	35.72	1.03
Canale_Trionfo	916	PF 1	27.03	82.21	82.81	82.83	82.75	0.019424	1.83	18.56	79.48	1.14
Canale_Trionfo	840	PF 1	27.03	80.06	81.06	80.89	81.09	0.001391	0.82	32.87	81.07	0.36
Canale_Trionfo	696	PF 1	27.03	80.13	80.82	80.77	80.89	0.010335	1.17	23.08	113.64	0.83
Canale_Trionfo	619	PF 1	27.03	79.93	80.27	80.27	80.31	0.005519	0.88	30.55	142.67	0.61
Canale_Trionfo	579	PF 1	27.03	79.63	80.01	80.00	80.06	0.007275	0.98	28.03	141.50	0.69
Canale_Trionfo	423	PF 1	27.03	77.60	79.40	79.30	79.42	0.002818	0.54	50.17	281.52	0.41
Canale_Trionfo	420		Bridge									
Canale_Trionfo	417	PF 1	27.03	77.50	79.39		79.40	0.000691	0.36	74.84	281.52	0.22
Canale_Trionfo	407	PF 1	27.03	77.25	79.39	78.85	79.39	0.000303	0.27	100.78	319.29	0.15
Canale_Trionfo	403.5		Bridge									
Canale_Trionfo	402	PF 1	27.03	77.20	78.80	78.80	79.34	0.010799	3.25	8.33	8.40	1.04
Canale_Trionfo	307	PF 1	27.03	77.42	78.46	78.35	78.48	0.003103	0.59	45.65	253.03	0.45
Canale_Trionfo	221	PF 1	27.03	78.70	77.79	77.79	77.99	0.012088	1.97	13.73	34.78	1.00
Canale_Trionfo	152	PF 1	27.03	78.59	77.54	77.48	77.56	0.004719	0.85	41.35	270.71	0.53
Canale_Trionfo	66	PF 1	27.03	76.62	76.93	76.91	76.97	0.010857	0.85	31.72	260.87	0.78
Canale_Trionfo	20	PF 1	27.03	75.42	76.43	76.31	76.49	0.010006	1.10	24.68	131.05	0.81

Figura 12. Planimetria con individuazione delle sezioni e delle aree potenzialmente interessate dalla portata avente tr = 200 anni



Torrente Marana Pidocchiosa

Il tratto del Torrente Marana Pidocchiosa oggetto di indagine interseca un ponte (codice sezione in HEC-RAS - RS = 755) lungo il quale è previsto il passaggio del cavidotto esterno che collega la sottostazione elettrica ai cavidotti interni ed agli aerogeneratori. Il canale al di sotto del ponte presenta sezione rettangolare con base di dimensioni 250cm ed altezza 120cm. È stata pertanto condotta una verifica che ha tenuto conto dell'attraversamento mettendo in evidenza come l'alveo dell'affluente risulta in grado di garantire il trasporto della portata con tempo di ritorno 200 anni.

Dai risultati dell'analisi monodimensionale si osserva come l'alveo attualmente esistente risulta adeguato al trasporto della portata avente tempo di ritorno 200 anni. A questo fa eccezioni un tratto caratterizzato da una esondazione in sinistra idraulica con una portata sfiorata pari a 11.25 m^3/s, stimata sulla base della modellazione monodimensionale precedentemente condotta, in corrispondenza della intersezione col ponte. Essendo un'analisi condotta in condizioni non stazionarie le portate vengono introdotte secondo idrogrammi di piena triangolari con tempo di esaurimento pari al tempo di corrivazione stimato nell'analisi idrologica, pertanto la durata complessiva dell'evento simulato è pari a due volte il tempo di corrivazione. L'esondazione, come è possibile osservare nella rappresentazione in A3 (Figura 15), non coinvolge nessun aerogeneratore, interessando parzialmente i cavidotti esterni. La posa in opera dei cavidotti in corrispondenza del ponte verrà pertanto realizzata con particolare attenzione attraverso una perforazione teleguidata (Trivellazione Orizzontale Teleguidata" T.O.C.) fino ad una profondità pari a 2 metri al di sotto del fondo alveo.

Di seguito si riporta un rilievo topografico del tratto investigato con foto a monte e valle del ponte (RS = 755).


PX1


PX2


PX3


PX4


PX5


PX6

PX7

PX8

PX9

PX10

PX11

PX12

PX13

PX Monte (RS = 755)

PX Valle (RS = 755)

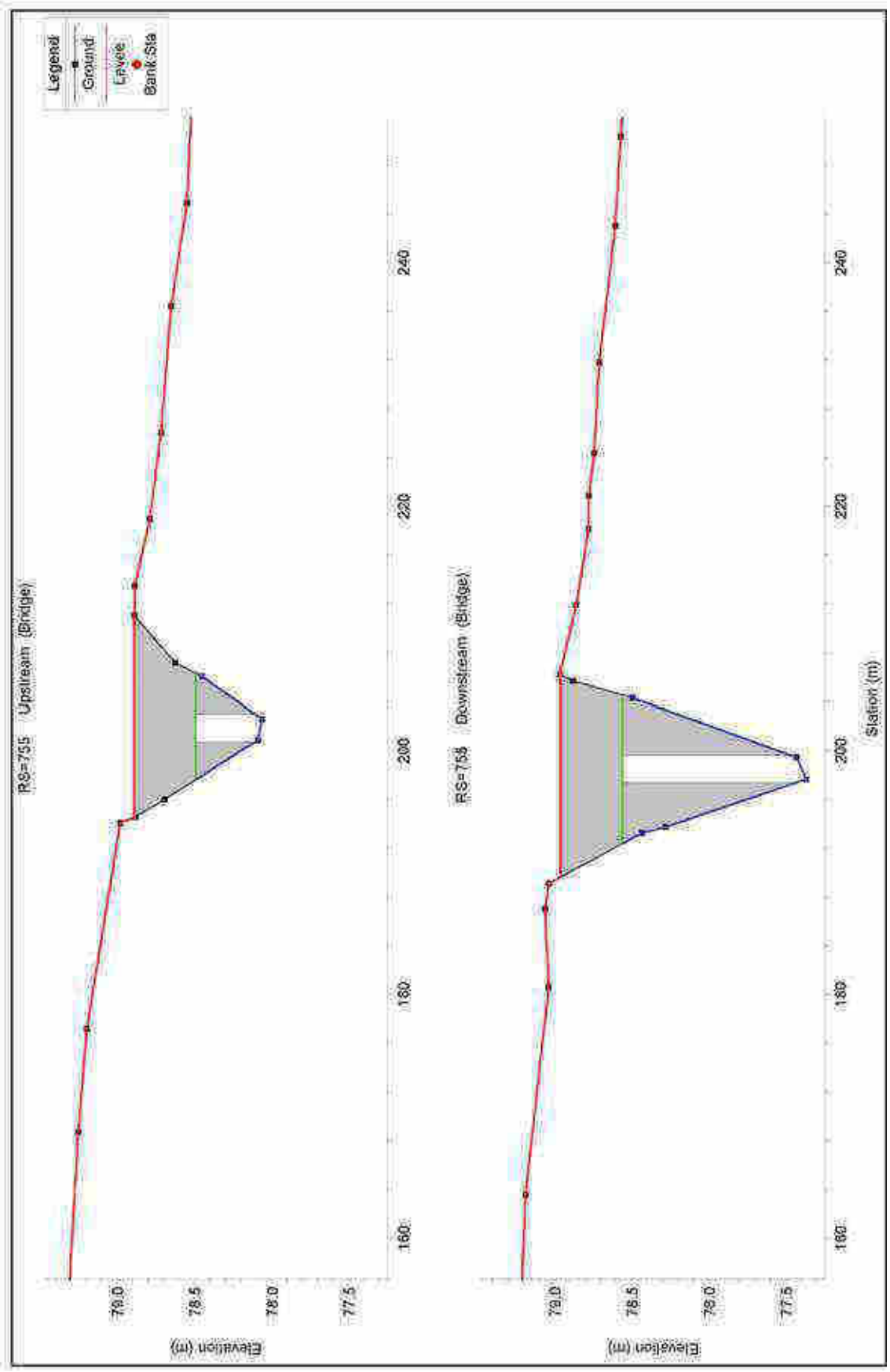


Figura 13. Modellazione in HEC-RAS del ponte RS = 755: Upstream (Sezione a monte) – Downstream (Sezione a valle)

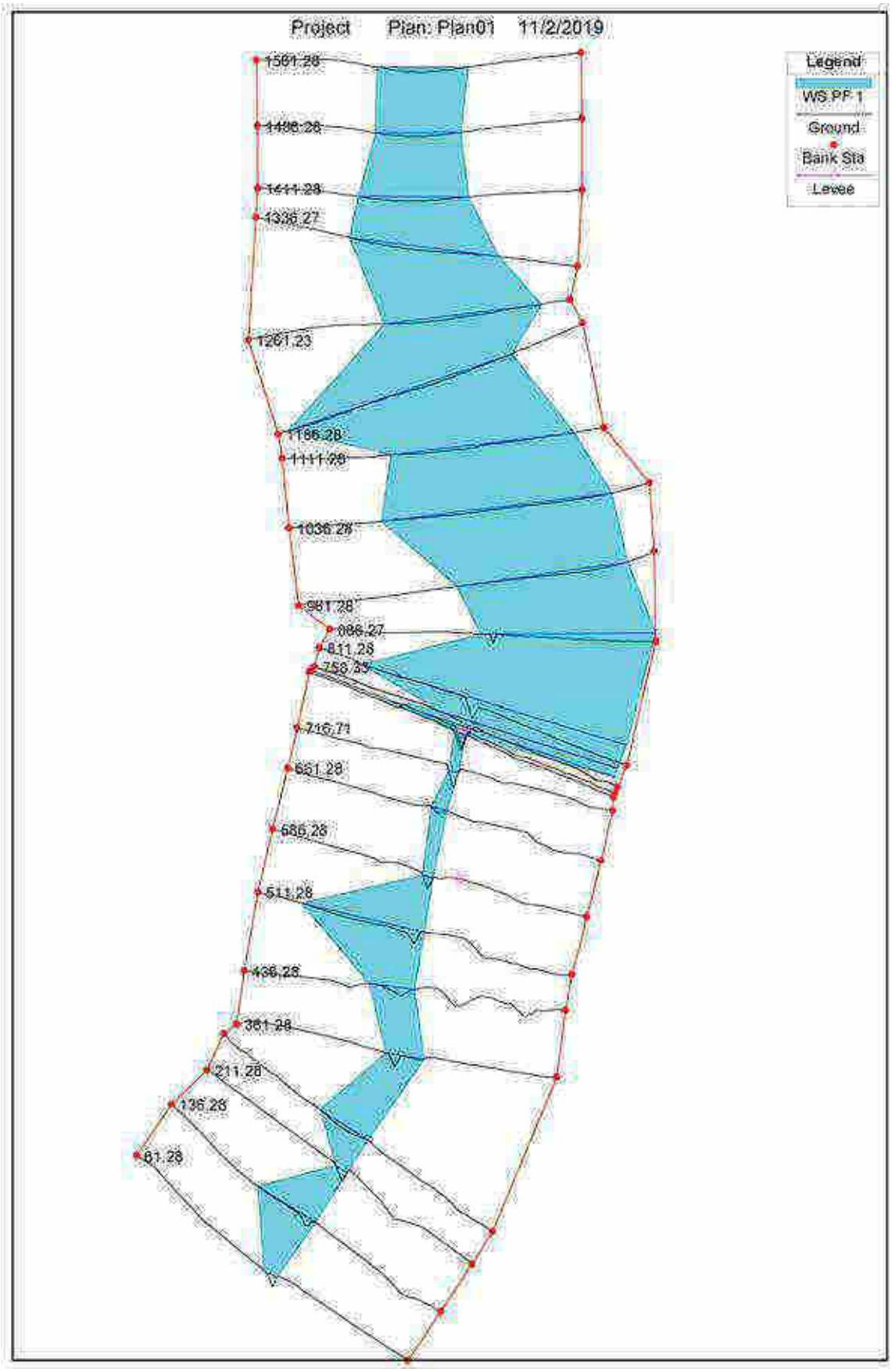
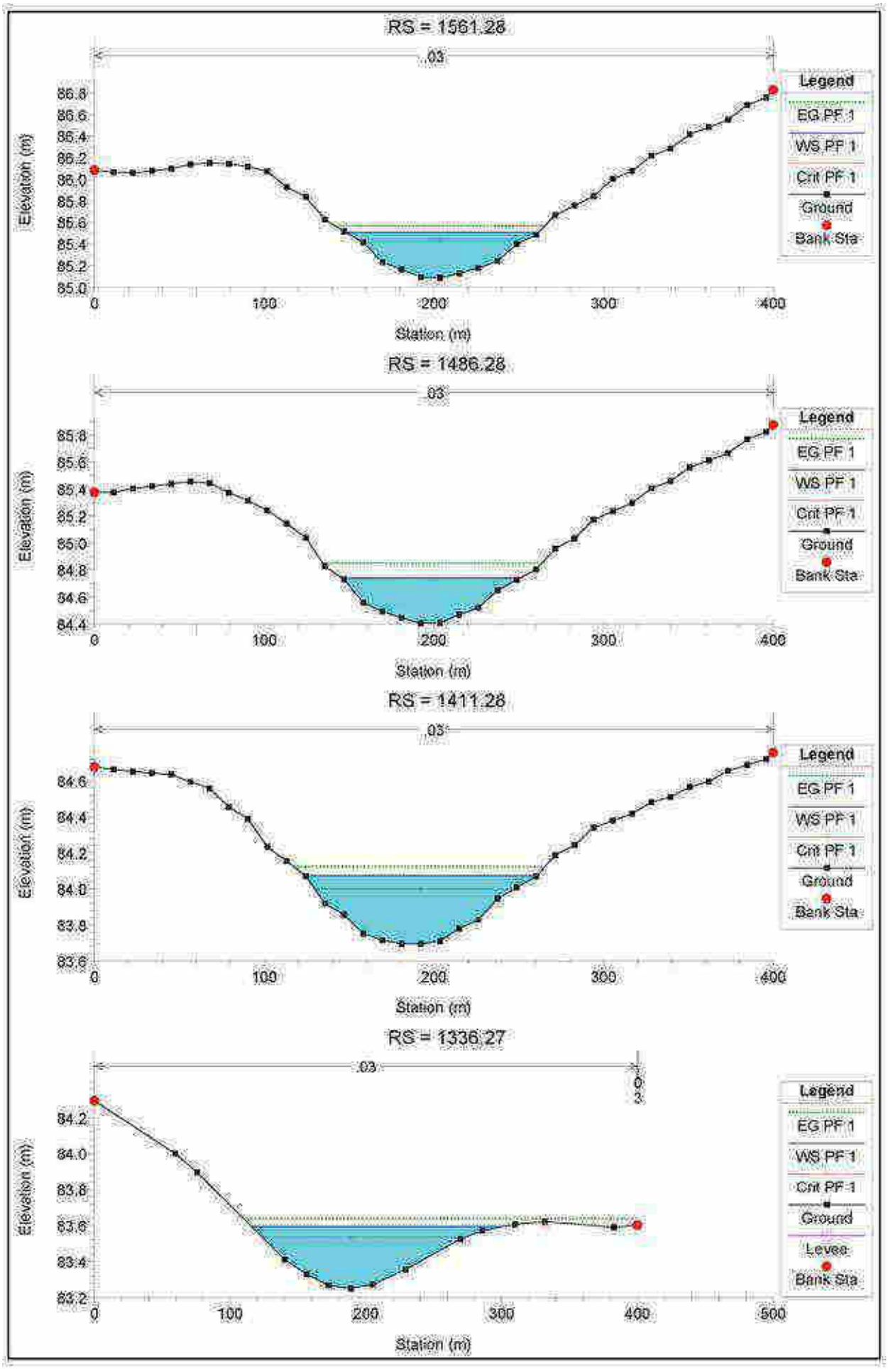
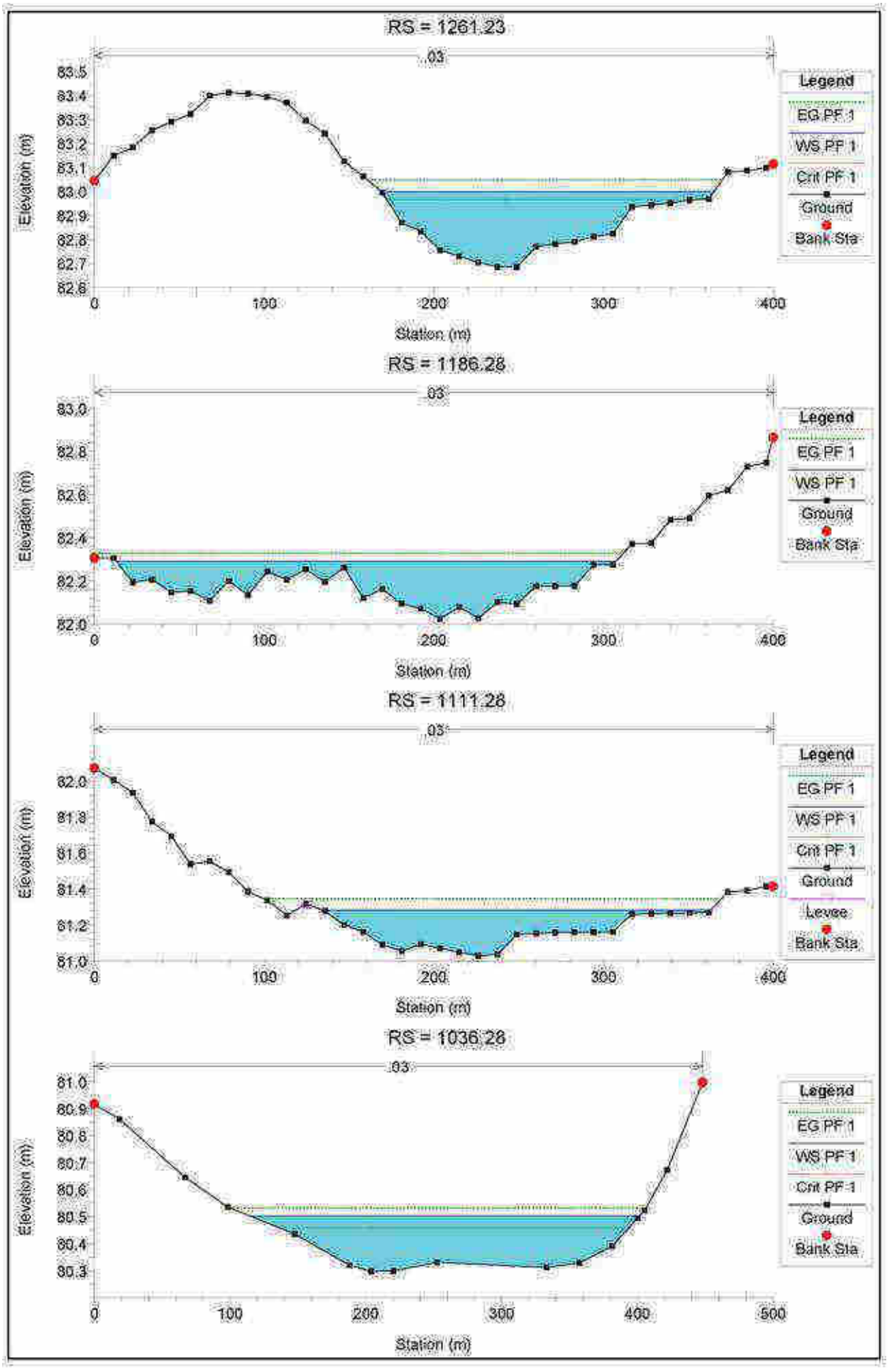
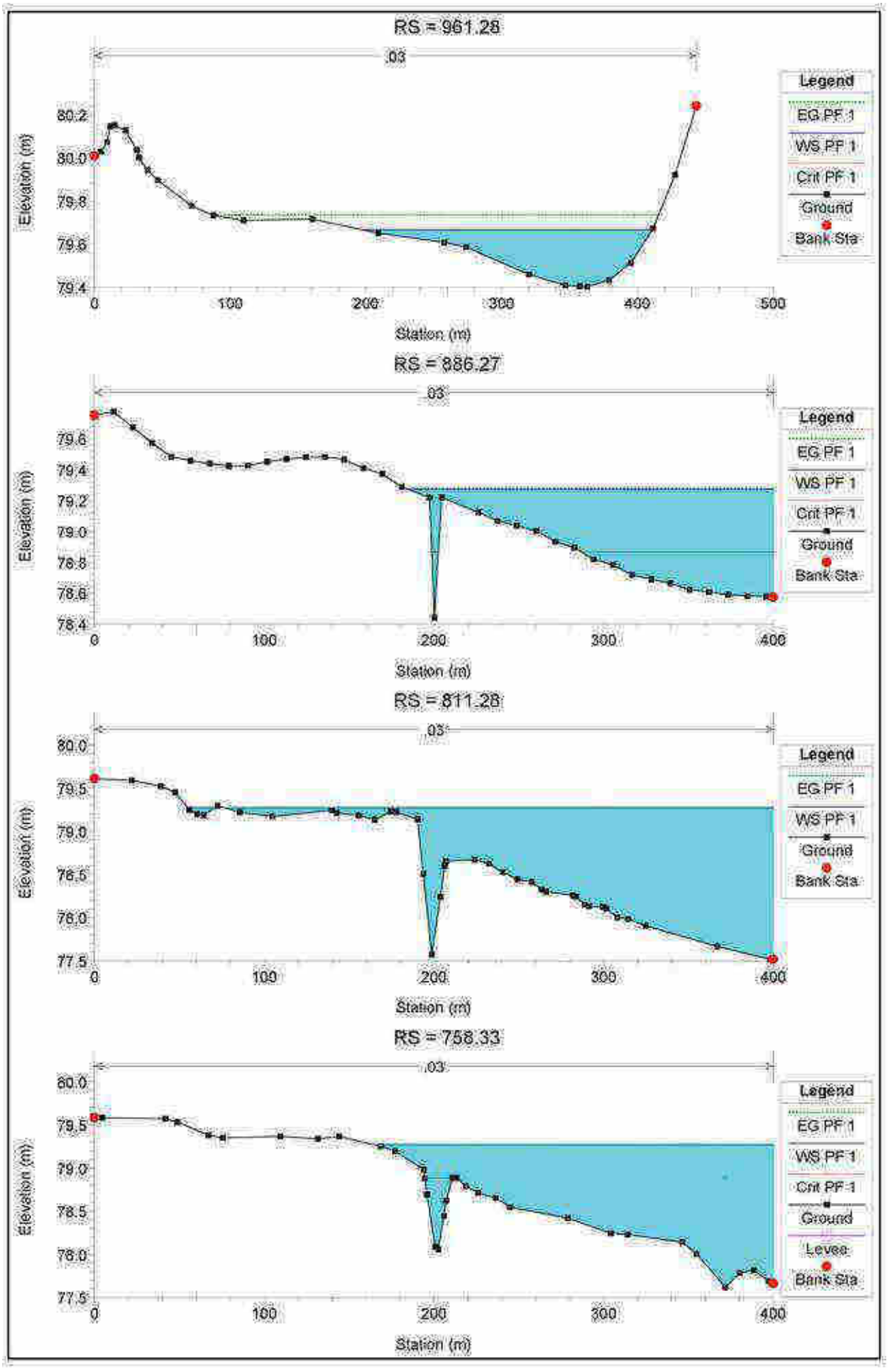
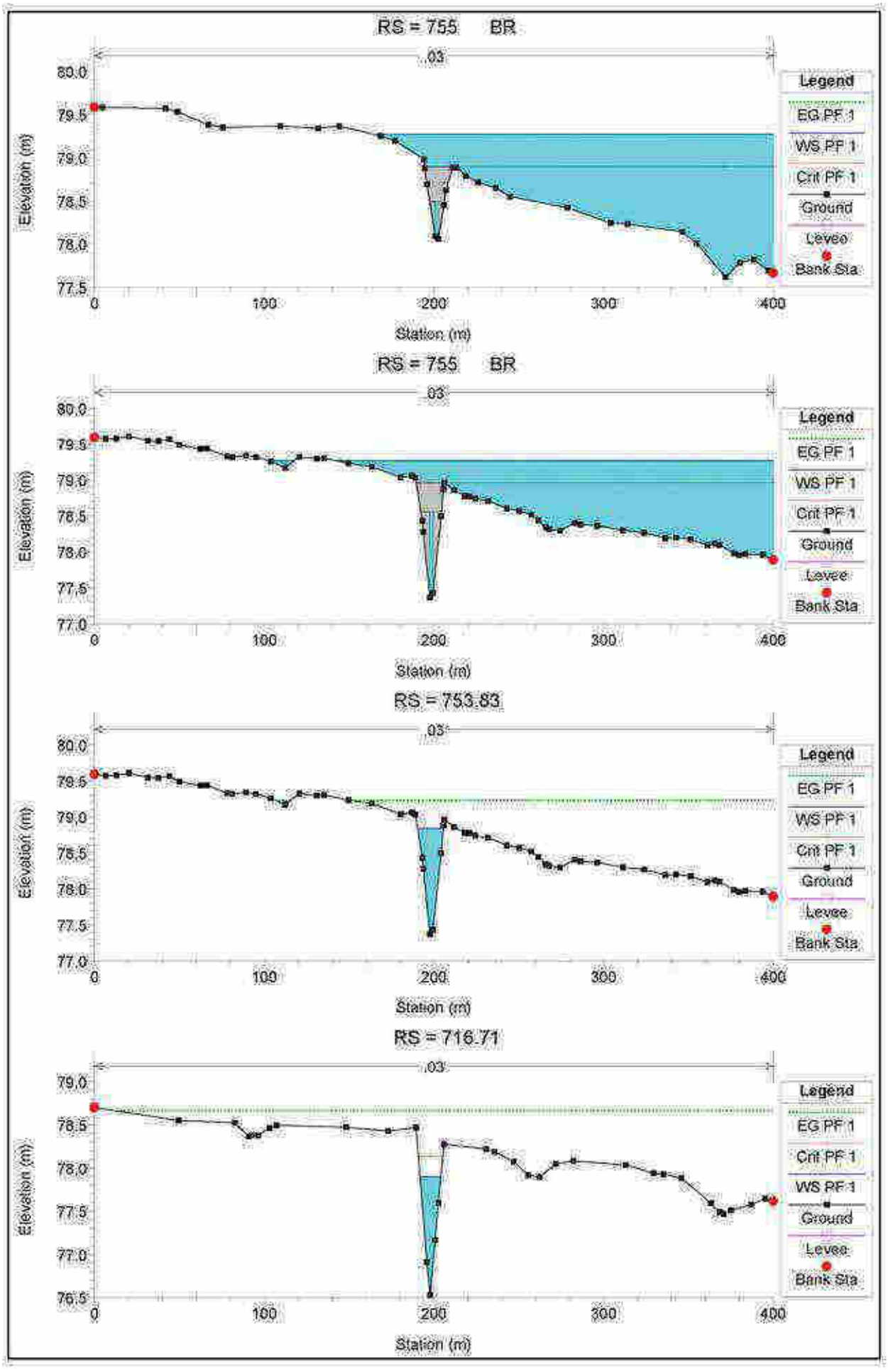


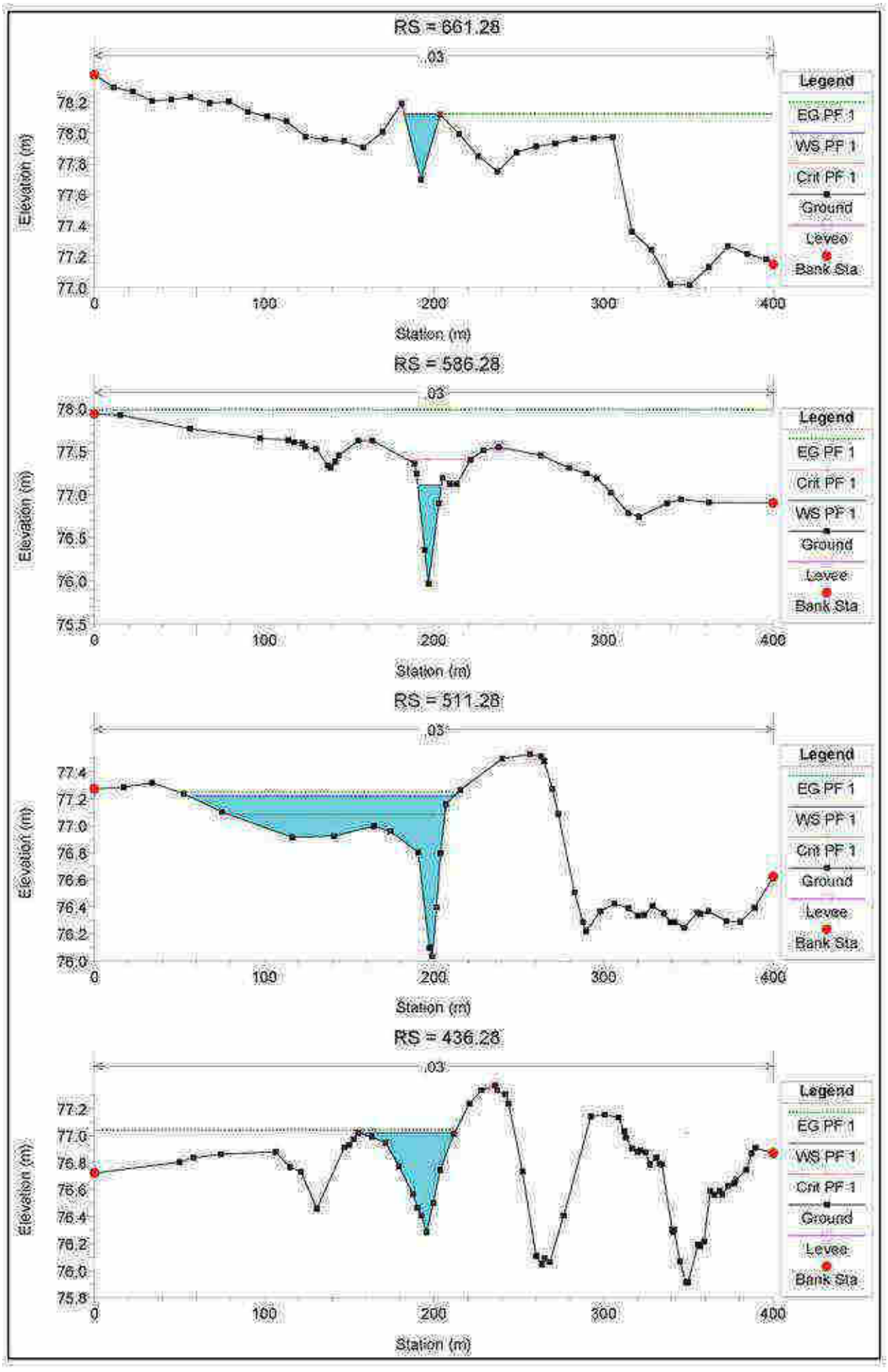
Figura 14. Rappresentazione 3D

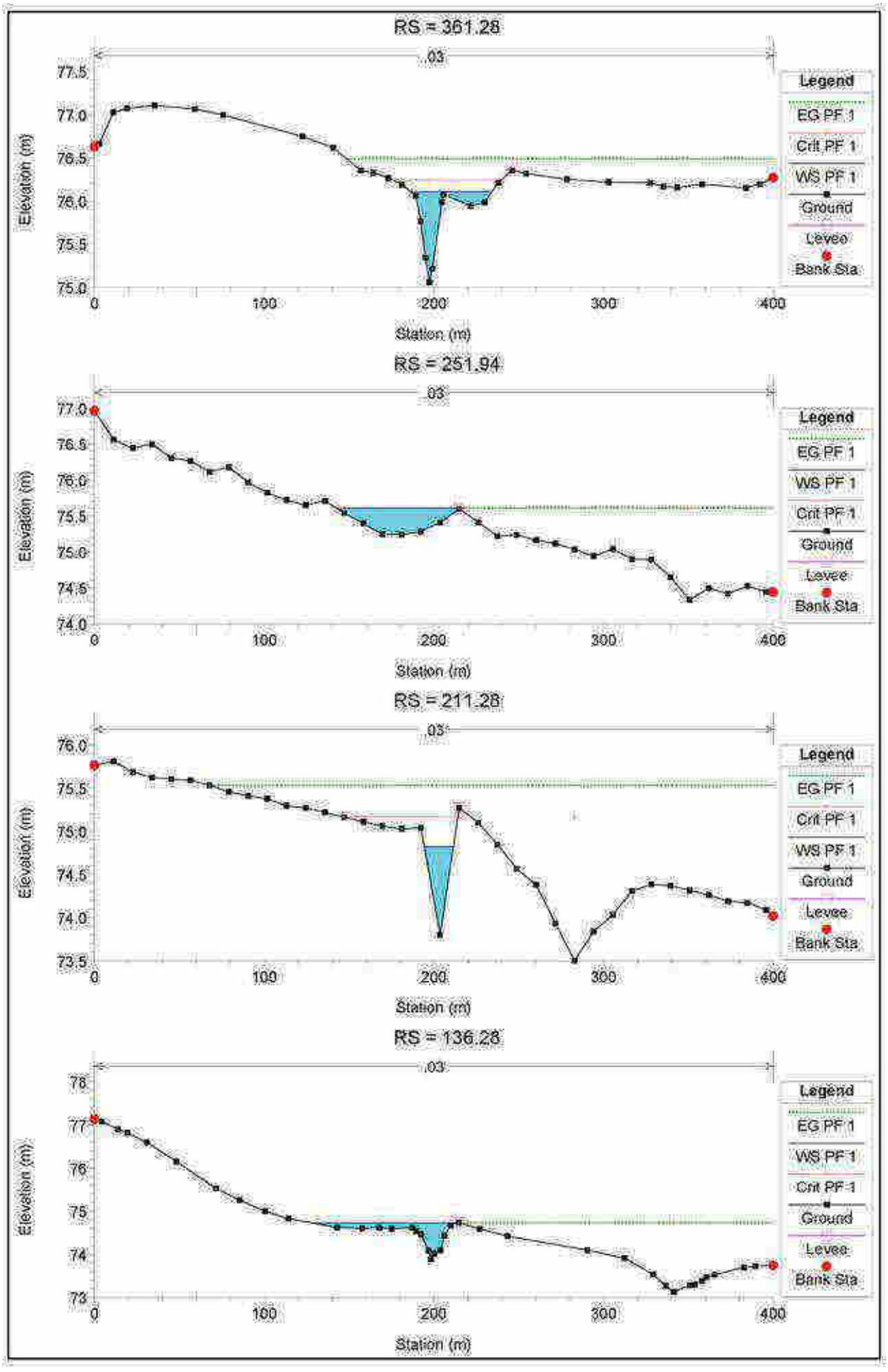

RS = 1561.28
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 1486.28
RS = 1411.28
RS = 1336.27
Levee

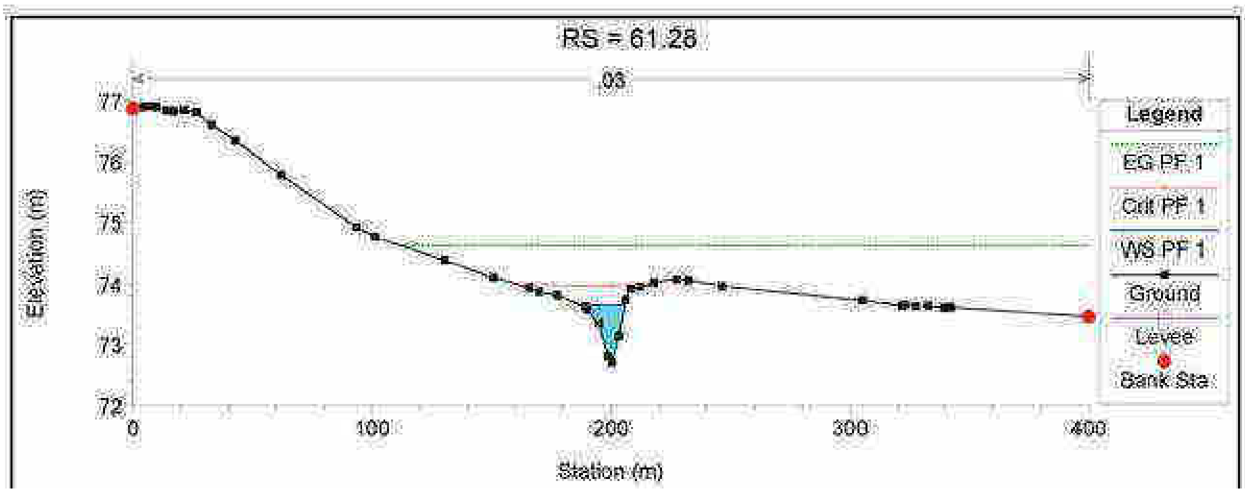

RS = 1261.23
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 1186.28
03
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
RS = 1111.28
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 1036.28
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


RS = 961.28
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
80.2
80.0
79.8
79.6
79.4
0
100
200
300
400
500
Station (m)
RS = 886.27
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
79.6
79.4
79.2
79.0
78.8
78.6
78.4
0
100
200
300
400
Station (m)
RS = 811.28
03
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
80.0
79.5
79.0
78.5
78.0
77.5
0
100
200
300
400
Station (m)
RS = 758.33
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
80.0
79.5
79.0
78.5
78.0
77.5
0
100
200
300
400
Station (m)


RS = 755 BR
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 755 BR
03
RS = 753.83
03
RS = 716.71
03


RS = 661.28
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
78.2
78.0
77.8
77.6
77.4
77.2
77.0
0
100
200
300
400
Station (m)
RS = 586.28
03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (m)
78.0
77.5
77.0
76.5
76.0
75.5
0
100
200
300
400
Station (m)
RS = 511.28
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
77.4
77.2
77.0
76.8
76.6
76.4
76.2
76.0
0
100
200
300
400
Station (m)
RS = 436.28
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
77.2
77.0
76.8
76.6
76.4
76.2
76.0
75.8
0
100
200
300
400
Station (m)


RS = 361.28
03
77.5
77.0
76.5
76.0
75.5
75.0
Elevation (m)
0
100
200
300
400
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
RS = 251.94
03
77.0
76.5
76.0
75.5
75.0
74.5
74.0
Elevation (m)
0
100
200
300
400
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
RS = 211.28
03
76.0
75.5
75.0
74.5
74.0
73.5
Elevation (m)
0
100
200
300
400
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
RS = 136.28
03
78
77
76
75
74
73
Elevation (m)
0
100
200
300
400
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta



HEC-RAS Plan: Plan01 River: Afft_riverent Reach: Afft_riverent Profile: PF 1

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)	
Afft_riverent	1561.28	PF 1	32.95	83.38	83.51	83.43	83.57	0.008355	1.11	29.74	113.06	0.69
Afft_riverent	1498.28	PF 1	32.95	84.40	84.74	84.74	84.85	0.015004	1.46	22.55	105.30	1.01
Afft_riverent	1411.28	PF 1	32.95	83.86	84.07	84.00	84.12	0.005672	1.00	32.49	130.54	0.85
Afft_riverent	1336.27	PF 1	32.95	83.25	83.50	83.50	83.54	0.008997	0.93	35.62	160.17	0.68
Afft_riverent	1301.28	PF 1	32.95	82.68	83.00	82.97	83.05	0.009016	0.98	33.67	193.06	0.75
Afft_riverent	1198.28	PF 1	32.95	82.02	82.29		82.33	0.010157	0.86	38.24	234.38	0.76
Afft_riverent	1111.28	PF 1	32.95	81.03	81.28	81.28	81.33	0.017486	1.12	29.35	226.44	1.05
Afft_riverent	1038.28	PF 1	32.95	80.30	80.56	80.44	80.59	0.010077	0.78	42.16	286.39	0.65
Afft_riverent	981.28	PF 1	32.95	79.40	79.67	79.67	79.75	0.017738	1.16	28.45	213.48	1.01
Afft_riverent	886.27	PF 1	32.95	76.44	79.27	78.07	79.28	0.000385	0.38	90.25	215.06	0.18
Afft_riverent	811.28	PF 1	32.95	77.50	79.27		79.27	0.000032	0.13	255.50	339.93	0.05
Afft_riverent	758.33	PF 1	32.95	77.92	79.27	78.89	79.27	0.000036	0.18	269.66	235.57	0.08
Afft_riverent	755		Bridge									
Afft_riverent	753.33	PF 1	32.95	77.37	78.04	78.04	78.23	0.009746	2.77	11.91	15.12	1.90
Afft_riverent	715.71	PF 1	32.95	76.53	77.99	78.14	78.67	0.022755	3.88	8.50	12.23	1.49
Afft_riverent	661.28	PF 1	32.95	77.01	78.12	78.12	78.12	0.000236	0.33	108.21	297.37	0.14
Afft_riverent	586.28	PF 1	32.95	75.97	77.10	77.41	77.98	0.033381	4.36	7.93	13.94	1.76
Afft_riverent	511.28	PF 1	32.95	76.10	77.22	77.08	77.25	0.002644	0.78	43.34	156.01	0.46
Afft_riverent	436.28	PF 1	32.95	75.21	77.02	77.02	77.04	0.002694	0.66	50.04	212.10	0.43
Afft_riverent	361.28	PF 1	32.95	75.08	76.11	76.24	76.49	0.043058	2.74	12.02	46.03	1.75
Afft_riverent	251.84	PF 1	32.95	74.24	75.61	75.61	75.61	0.000050	0.22	150.89	257.42	0.09
Afft_riverent	211.28	PF 1	32.95	73.56	74.60	75.16	75.32	0.030801	3.72	8.86	11.28	1.68
Afft_riverent	136.28	PF 1	32.95	73.13	74.73	74.73	74.75	0.000072	0.20	163.35	271.44	0.06
Afft_riverent	61.28	PF 1	32.95	72.76	73.66	73.88	74.62	0.056201	4.35	7.58	13.54	2.17

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 1561.28 Profile: PF 1

E.G. Elev (m)	85.57	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.		0.030	
W.S. Elev (m)	85.51	Reach Len. (m)	75.00	75.00	75.00
Crit W.S. (m)	85.43	Flow Area (m2)		29.74	
E.G. Slope (m/m)	0.006555	Area (m2)		29.74	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	113.09	Top Width (m)		113.09	
Vel Total (m/s)	1.11	Avg. Vel. (m/s)		1.11	
Max Chl Dpth (m)	0.42	Hydr. Depth (m)		0.26	
Conv. Total (m3/s)	407.0	Conv. (m3/s)		407.0	
Length Wtd. (m)	75.00	Wetted Per. (m)		113.09	
Min Ch El (m)	85.08	Shear (N/m2)		16.90	
Alpha	1.00	Stream Power (N/m s)		18.73	
Frctn Loss (m)	0.71	Cum Volume (1000 m3)		91.04	
C & E Loss (m)	0.00	Cum SA (1000 m2)		262.39	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 1486.28 Profile: PF 1

E.G. Elev (m)	84.85	Element	Left OB	Channel	Right OB
Vel Head (m)	0.11	Wt. n-Val.		0.030	
W.S. Elev (m)	84.74	Reach Len. (m)	75.00	75.00	75.00
Crit W.S. (m)	84.74	Flow Area (m2)		22.55	
E.G. Slope (m/m)	0.015004	Area (m2)		22.55	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	105.30	Top Width (m)		105.30	
Vel Total (m/s)	1.46	Avg. Vel. (m/s)		1.46	
Max Chl Dpth (m)	0.34	Hydr. Depth (m)		0.21	
Conv. Total (m3/s)	269.0	Conv. (m3/s)		269.0	
Length Wtd. (m)	75.00	Wetted Per. (m)		105.30	
Min Ch El (m)	84.40	Shear (N/m2)		31.50	
Alpha	1.00	Stream Power (N/m s)		46.04	
Frctn Loss (m)	0.67	Cum Volume (1000 m3)		89.08	
C & E Loss (m)	0.02	Cum SA (1000 m2)		254.20	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 1411.28 Profile: PF 1

E.G. Elev (m)	84.12	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.		0.030	
W.S. Elev (m)	84.07	Reach Len. (m)	75.01	75.01	75.01
Crit W.S. (m)	84.00	Flow Area (m2)		32.98	
E.G. Slope (m/m)	0.005972	Area (m2)		32.98	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	136.54	Top Width (m)		136.54	
Vel Total (m/s)	1.00	Avg. Vel. (m/s)		1.00	
Max Chl Dpth (m)	0.38	Hydr. Depth (m)		0.24	
Conv. Total (m3/s)	426.4	Conv. (m3/s)		426.4	
Length Wtd. (m)	75.01	Wetted Per. (m)		136.54	
Min Ch El (m)	83.69	Shear (N/m2)		14.15	
Alpha	1.00	Stream Power (N/m s)		14.13	
Frctn Loss (m)	0.48	Cum Volume (1000 m3)		87.00	
C & E Loss (m)	0.00	Cum SA (1000 m2)		245.13	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 1336.27 Profile: PF 1

E.G. Elev (m)	83.64	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.		0.030	
W.S. Elev (m)	83.60	Reach Len. (m)	75.04	75.04	75.04
Crit W.S. (m)	83.53	Flow Area (m2)		35.62	
E.G. Slope (m/m)	0.006987	Area (m2)		35.62	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 1336.27 Profile: PF 1 (Continued)

Top Width (m)	186.17	Top Width (m)		186.17	
Vel Total (m/s)	0.93	Avg. Vel. (m/s)		0.93	
Max Chl Dpth (m)	0.35	Hydr. Depth (m)		0.18	
Conv. Total (m3/s)	394.2	Conv. (m3/s)		394.2	
Length Wtd. (m)	75.04	Wetted Per. (m)		186.17	
Min Ch El (m)	83.25	Shear (N/m2)		13.11	
Alpha	1.00	Stream Power (N/m s)		12.13	
Frctn Loss (m)	0.59	Cum Volume (1000 m3)		84.43	
C & E Loss (m)	0.00	Cum SA (1000 m2)		233.02	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 1261.23 Profile: PF 1

E.G. Elev (m)	83.05	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.		0.030	
W.S. Elev (m)	83.00	Reach Len. (m)	74.96	74.96	74.96
Crit W.S. (m)	82.97	Flow Area (m2)		33.67	
E.G. Slope (m/m)	0.009016	Area (m2)		33.67	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	195.89	Top Width (m)		195.89	
Vel Total (m/s)	0.98	Avg. Vel. (m/s)		0.98	
Max Chl Dpth (m)	0.31	Hydr. Depth (m)		0.17	
Conv. Total (m3/s)	347.0	Conv. (m3/s)		347.0	
Length Wtd. (m)	74.96	Wetted Per. (m)		195.89	
Min Ch El (m)	82.68	Shear (N/m2)		15.20	
Alpha	1.00	Stream Power (N/m s)		14.87	
Frctn Loss (m)	0.72	Cum Volume (1000 m3)		81.83	
C & E Loss (m)	0.00	Cum SA (1000 m2)		218.69	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 1186.28 Profile: PF 1

E.G. Elev (m)	82.33	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.		0.030	
W.S. Elev (m)	82.29	Reach Len. (m)	75.00	75.00	75.00
Crit W.S. (m)		Flow Area (m2)		38.24	
E.G. Slope (m/m)	0.010157	Area (m2)		38.24	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	294.39	Top Width (m)		294.39	
Vel Total (m/s)	0.86	Avg. Vel. (m/s)		0.86	
Max Chl Dpth (m)	0.27	Hydr. Depth (m)		0.13	
Conv. Total (m3/s)	326.9	Conv. (m3/s)		326.9	
Length Wtd. (m)	75.00	Wetted Per. (m)		294.48	
Min Ch El (m)	82.02	Shear (N/m2)		12.94	
Alpha	1.00	Stream Power (N/m s)		11.15	
Frctn Loss (m)	0.98	Cum Volume (1000 m3)		79.13	
C & E Loss (m)	0.00	Cum SA (1000 m2)		200.32	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 1111.28 Profile: PF 1

E.G. Elev (m)	81.35	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.		0.030	
W.S. Elev (m)	81.28	Reach Len. (m)	75.00	75.00	75.00
Crit W.S. (m)	81.28	Flow Area (m2)		29.35	
E.G. Slope (m/m)	0.017488	Area (m2)		29.35	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	228.44	Top Width (m)		228.44	
Vel Total (m/s)	1.12	Avg. Vel. (m/s)		1.12	
Max Chl Dpth (m)	0.25	Hydr. Depth (m)		0.13	
Conv. Total (m3/s)	249.2	Conv. (m3/s)		249.2	
Length Wtd. (m)		Wetted Per. (m)		228.44	
Min Ch El (m)	81.03	Shear (N/m2)		22.04	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 1111.28 Profile: PF 1 (Continued)

Alpha	1.00	Stream Power (N/m s)		24.74	
Frctn Loss (m)		Cum Volume (1000 m3)		76.80	
C & E Loss (m)		Cum SA (1000 m2)		180.71	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 1036.28 Profile: PF 1

E.G. Elev (m)	80.53	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.		0.030	
W.S. Elev (m)	80.50	Reach Len. (m)	75.00	75.00	75.00
Crit W.S. (m)	80.46	Flow Area (m2)		42.18	
E.G. Slope (m/m)	0.007077	Area (m2)		42.18	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	286.89	Top Width (m)		286.89	
Vel Total (m/s)	0.78	Avg. Vel. (m/s)		0.78	
Max Chl Dpth (m)	0.20	Hydr. Depth (m)		0.15	
Conv. Total (m3/s)	391.7	Conv. (m3/s)		391.7	
Length Wtd. (m)	75.00	Wetted Per. (m)		286.89	
Min Ch El (m)	80.30	Shear (N/m2)		10.20	
Alpha	1.00	Stream Power (N/m s)		7.97	
Frctn Loss (m)	0.80	Cum Volume (1000 m3)		73.91	
C & E Loss (m)	0.00	Cum SA (1000 m2)		161.38	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 961.28 Profile: PF 1

E.G. Elev (m)	79.73	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.		0.030	
W.S. Elev (m)	79.67	Reach Len. (m)	75.01	75.01	75.01
Crit W.S. (m)	79.67	Flow Area (m2)		28.45	
E.G. Slope (m/m)	0.017736	Area (m2)		28.45	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	213.48	Top Width (m)		213.48	
Vel Total (m/s)	1.16	Avg. Vel. (m/s)		1.16	
Max Chl Dpth (m)	0.25	Hydr. Depth (m)		0.13	
Conv. Total (m3/s)	247.4	Conv. (m3/s)		247.4	
Length Wtd. (m)	75.01	Wetted Per. (m)		213.48	
Min Ch El (m)	79.40	Shear (N/m2)		23.16	
Alpha	1.00	Stream Power (N/m s)		26.85	
Frctn Loss (m)	0.09	Cum Volume (1000 m3)		71.26	
C & E Loss (m)	0.92	Cum SA (1000 m2)		142.82	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 886.27 Profile: PF 1

E.G. Elev (m)	79.28	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.		0.030	
W.S. Elev (m)	79.27	Reach Len. (m)	74.99	74.99	74.99
Crit W.S. (m)	78.87	Flow Area (m2)		90.28	
E.G. Slope (m/m)	0.000383	Area (m2)		90.28	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	215.09	Top Width (m)		215.09	
Vel Total (m/s)	0.36	Avg. Vel. (m/s)		0.36	
Max Chl Dpth (m)	0.83	Hydr. Depth (m)		0.42	
Conv. Total (m3/s)	1682.6	Conv. (m3/s)		1682.6	
Length Wtd. (m)	74.99	Wetted Per. (m)		215.97	
Min Ch El (m)	78.44	Shear (N/m2)		1.57	
Alpha	1.00	Stream Power (N/m s)		0.57	
Frctn Loss (m)	0.00	Cum Volume (1000 m3)		66.81	
C & E Loss (m)	0.00	Cum SA (1000 m2)		126.55	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 811.28 Profile: PF 1

E.G. Elev (m)	79.27	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.		0.030	
W.S. Elev (m)	79.27	Reach Len. (m)	52.95	52.95	52.95
Crit W.S. (m)		Flow Area (m2)		255.50	
E.G. Slope (m/m)	0.000022	Area (m2)		255.50	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	339.93	Top Width (m)		339.93	
Vel Total (m/s)	0.13	Avg. Vel. (m/s)		0.13	
Max Chl Dpth (m)	1.75	Hydr. Depth (m)		0.75	
Conv. Total (m3/s)	7013.5	Conv. (m3/s)		7013.5	
Length Wtd. (m)	52.95	Wetted Per. (m)		341.91	
Min Ch El (m)	77.52	Shear (N/m2)		0.16	
Alpha	1.00	Stream Power (N/m s)		0.02	
Frctn Loss (m)	0.00	Cum Volume (1000 m3)		53.85	
C & E Loss (m)	0.00	Cum SA (1000 m2)		105.74	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 758.33 Profile: PF 1

E.G. Elev (m)	79.27	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.		0.030	
W.S. Elev (m)	79.27	Reach Len. (m)	0.10	0.10	0.10
Crit W.S. (m)	78.89	Flow Area (m2)		209.68	
E.G. Slope (m/m)	0.000026	Area (m2)		209.68	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	235.57	Top Width (m)		235.57	
Vel Total (m/s)	0.16	Avg. Vel. (m/s)		0.16	
Max Chl Dpth (m)	1.65	Hydr. Depth (m)		0.89	
Conv. Total (m3/s)	6436.2	Conv. (m3/s)		6436.2	
Length Wtd. (m)	0.10	Wetted Per. (m)		237.30	
Min Ch El (m)	77.62	Shear (N/m2)		0.23	
Alpha	1.00	Stream Power (N/m s)		0.04	
Frctn Loss (m)	0.00	Cum Volume (1000 m3)		41.53	
C & E Loss (m)	0.00	Cum SA (1000 m2)		90.50	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 755 BR U Profile: PF 1

E.G. Elev (m)	79.27	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.		0.030	
W.S. Elev (m)	79.27	Reach Len. (m)	3.00	3.00	3.00
Crit W.S. (m)	78.90	Flow Area (m2)		203.52	
E.G. Slope (m/m)	0.000030	Area (m2)		203.52	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	235.55	Top Width (m)		235.55	
Vel Total (m/s)	0.16	Avg. Vel. (m/s)		0.16	
Max Chl Dpth (m)	1.21	Hydr. Depth (m)		0.86	
Conv. Total (m3/s)	6021.4	Conv. (m3/s)		6021.4	
Length Wtd. (m)	3.00	Wetted Per. (m)		243.38	
Min Ch El (m)	78.06	Shear (N/m2)		0.25	
Alpha	1.00	Stream Power (N/m s)		0.04	
Frctn Loss (m)	0.00	Cum Volume (1000 m3)		41.51	
C & E Loss (m)	0.00	Cum SA (1000 m2)		90.48	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 755 BR D Profile: PF 1

E.G. Elev (m)	79.27	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.		0.030	
W.S. Elev (m)	79.27	Reach Len. (m)	1.40	1.40	1.40
Crit W.S. (m)	78.97	Flow Area (m2)		194.53	
E.G. Slope (m/m)	0.000043	Area (m2)		194.53	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 755 BR D Profile: PF 1 (Continued)

Top Width (m)	274.00	Top Width (m)		274.00	
Vel Total (m/s)	0.17	Avg. Vel. (m/s)		0.17	
Max Chl Dpth (m)	1.90	Hydr. Depth (m)		0.71	
Conv. Total (m3/s)	5041.2	Conv. (m3/s)		5041.2	
Length Wtd. (m)	1.40	Wetted Per. (m)		283.78	
Min Ch El (m)	77.37	Shear (N/m2)		0.29	
Alpha	1.00	Stream Power (N/m s)		0.05	
Frctn Loss (m)	0.00	Cum Volume (1000 m3)		40.91	
C & E Loss (m)	0.04	Cum SA (1000 m2)		89.71	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 753.53 Profile: PF 1

E.G. Elev (m)	79.23	Element	Left OB	Channel	Right OB
Vel Head (m)	0.39	Wt. n-Val.		0.030	
W.S. Elev (m)	78.84	Reach Len. (m)	37.11	37.11	37.11
Crit W.S. (m)	78.84	Flow Area (m2)		11.91	
E.G. Slope (m/m)	0.009746	Area (m2)		11.91	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	15.12	Top Width (m)		15.12	
Vel Total (m/s)	2.77	Avg. Vel. (m/s)		2.77	
Max Chl Dpth (m)	1.47	Hydr. Depth (m)		0.79	
Conv. Total (m3/s)	333.8	Conv. (m3/s)		333.8	
Length Wtd. (m)	37.11	Wetted Per. (m)		15.45	
Min Ch El (m)	77.37	Shear (N/m2)		73.69	
Alpha	1.00	Stream Power (N/m s)		203.89	
Frctn Loss (m)	0.53	Cum Volume (1000 m3)		40.77	
C & E Loss (m)	0.04	Cum SA (1000 m2)		89.51	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 716.71 Profile: PF 1

E.G. Elev (m)	78.67	Element	Left OB	Channel	Right OB
Vel Head (m)	0.77	Wt. n-Val.		0.030	
W.S. Elev (m)	77.90	Reach Len. (m)	55.44	55.44	55.44
Crit W.S. (m)	78.14	Flow Area (m2)		8.50	
E.G. Slope (m/m)	0.022755	Area (m2)		8.50	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	12.23	Top Width (m)		12.23	
Vel Total (m/s)	3.88	Avg. Vel. (m/s)		3.88	
Max Chl Dpth (m)	1.37	Hydr. Depth (m)		0.69	
Conv. Total (m3/s)	218.4	Conv. (m3/s)		218.4	
Length Wtd. (m)	55.44	Wetted Per. (m)		12.54	
Min Ch El (m)	76.53	Shear (N/m2)		151.18	
Alpha	1.00	Stream Power (N/m s)		586.40	
Frctn Loss (m)	0.00	Cum Volume (1000 m3)		40.39	
C & E Loss (m)	0.00	Cum SA (1000 m2)		89.00	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 651.28 Profile: PF 1

E.G. Elev (m)	78.12	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.		0.030	
W.S. Elev (m)	78.12	Reach Len. (m)	75.00	75.00	75.00
Crit W.S. (m)	78.12	Flow Area (m2)		109.31	
E.G. Slope (m/m)	0.000206	Area (m2)		109.31	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	217.37	Top Width (m)		217.37	
Vel Total (m/s)	0.30	Avg. Vel. (m/s)		0.30	
Max Chl Dpth (m)	1.11	Hydr. Depth (m)		0.50	
Conv. Total (m3/s)	2297.0	Conv. (m3/s)		2297.0	
Length Wtd. (m)	75.00	Wetted Per. (m)		218.38	
Min Ch El (m)	77.01	Shear (N/m2)		1.01	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 661.28 Profile: PF 1 (Continued)

Alpha	1.00	Stream Power (N/m s)		0.30	
Frctn Loss (m)	0.05	Cum Volume (1000 m3)		37.12	
C & E Loss (m)	0.09	Cum SA (1000 m2)		82.64	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 586.28 Profile: PF 1

E.G. Elev (m)	77.98	Element	Left OB	Channel	Right OB
Vel Head (m)	0.86	Wt. n-Val.		0.030	
W.S. Elev (m)	77.10	Reach Len. (m)	75.00	75.00	75.00
Crit W.S. (m)	77.41	Flow Area (m2)		7.93	
E.G. Slope (m/m)	0.033581	Area (m2)		7.93	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	13.94	Top Width (m)		13.94	
Vel Total (m/s)	4.16	Avg. Vel. (m/s)		4.16	
Max Chl Dpth (m)	1.14	Hydr. Depth (m)		0.57	
Conv. Total (m3/s)	179.8	Conv. (m3/s)		179.8	
Length Wtd. (m)	75.00	Wetted Per. (m)		14.12	
Min Ch El (m)	75.97	Shear (N/m2)		184.84	
Alpha	1.00	Stream Power (N/m s)		768.27	
Frctn Loss (m)	0.35	Cum Volume (1000 m3)		32.79	
C & E Loss (m)	0.03	Cum SA (1000 m2)		73.96	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 511.28 Profile: PF 1

E.G. Elev (m)	77.25	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.		0.030	
W.S. Elev (m)	77.22	Reach Len. (m)	75.00	75.00	75.00
Crit W.S. (m)	77.08	Flow Area (m2)		43.54	
E.G. Slope (m/m)	0.002844	Area (m2)		43.54	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	156.61	Top Width (m)		156.61	
Vel Total (m/s)	0.76	Avg. Vel. (m/s)		0.76	
Max Chl Dpth (m)	1.19	Hydr. Depth (m)		0.28	
Conv. Total (m3/s)	617.9	Conv. (m3/s)		617.9	
Length Wtd. (m)	75.00	Wetted Per. (m)		156.73	
Min Ch El (m)	76.03	Shear (N/m2)		7.75	
Alpha	1.00	Stream Power (N/m s)		5.86	
Frctn Loss (m)	0.21	Cum Volume (1000 m3)		30.60	
C & E Loss (m)	0.00	Cum SA (1000 m2)		67.57	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 436.28 Profile: PF 1

E.G. Elev (m)	77.04	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.		0.030	
W.S. Elev (m)	77.02	Reach Len. (m)	75.00	75.00	75.00
Crit W.S. (m)	77.02	Flow Area (m2)		50.04	
E.G. Slope (m/m)	0.002884	Area (m2)		50.04	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	212.16	Top Width (m)		212.16	
Vel Total (m/s)	0.66	Avg. Vel. (m/s)		0.66	
Max Chl Dpth (m)	1.11	Hydr. Depth (m)		0.24	
Conv. Total (m3/s)	636.1	Conv. (m3/s)		636.1	
Length Wtd. (m)	75.00	Wetted Per. (m)		212.50	
Min Ch El (m)	75.91	Shear (N/m2)		6.20	
Alpha	1.00	Stream Power (N/m s)		4.08	
Frctn Loss (m)	0.52	Cum Volume (1000 m3)		27.29	
C & E Loss (m)	0.04	Cum SA (1000 m2)		53.74	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 381.28 Profile: PF 1

E.G. Elev (m)	76.49	Element	Left OB	Channel	Right OB
Vel Head (m)	0.38	Wt. n-Val.		0.030	
W.S. Elev (m)	76.11	Reach Len. (m)	109.34	109.34	109.34
Crit W.S. (m)	76.24	Flow Area (m2)		12.02	
E.G. Slope (m/m)	0.043059	Area (m2)		12.02	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	48.03	Top Width (m)		48.03	
Vel Total (m/s)	2.74	Avg. Vel. (m/s)		2.74	
Max Chl Dpth (m)	1.05	Hydr. Depth (m)		0.25	
Conv. Total (m3/s)	158.8	Conv. (m3/s)		158.8	
Length Wtd. (m)	109.34	Wetted Per. (m)		48.16	
Min Ch El (m)	75.06	Shear (N/m2)		105.37	
Alpha	1.00	Stream Power (N/m s)		288.90	
Frctn Loss (m)	0.03	Cum Volume (1000 m3)		24.96	
C & E Loss (m)	0.04	Cum SA (1000 m2)		43.98	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 251.94 Profile: PF 1

E.G. Elev (m)	75.61	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.		0.030	
W.S. Elev (m)	75.61	Reach Len. (m)	40.66	40.66	40.66
Crit W.S. (m)	75.61	Flow Area (m2)		150.09	
E.G. Slope (m/m)	0.000090	Area (m2)		150.09	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	257.42	Top Width (m)		257.42	
Vel Total (m/s)	0.22	Avg. Vel. (m/s)		0.22	
Max Chl Dpth (m)	1.27	Hydr. Depth (m)		0.58	
Conv. Total (m3/s)	3480.6	Conv. (m3/s)		3480.6	
Length Wtd. (m)	40.66	Wetted Per. (m)		258.63	
Min Ch El (m)	74.34	Shear (N/m2)		0.51	
Alpha	1.00	Stream Power (N/m s)		0.11	
Frctn Loss (m)	0.01	Cum Volume (1000 m3)		16.10	
C & E Loss (m)	0.07	Cum SA (1000 m2)		27.28	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 211.28 Profile: PF 1

E.G. Elev (m)	75.53	Element	Left OB	Channel	Right OB
Vel Head (m)	0.71	Wt. n-Val.		0.030	
W.S. Elev (m)	74.82	Reach Len. (m)	75.00	75.00	75.00
Crit W.S. (m)	75.16	Flow Area (m2)		8.86	
E.G. Slope (m/m)	0.030601	Area (m2)		8.86	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	17.26	Top Width (m)		17.26	
Vel Total (m/s)	3.72	Avg. Vel. (m/s)		3.72	
Max Chl Dpth (m)	1.32	Hydr. Depth (m)		0.51	
Conv. Total (m3/s)	188.4	Conv. (m3/s)		188.4	
Length Wtd. (m)	75.00	Wetted Per. (m)		17.38	
Min Ch El (m)	73.50	Shear (N/m2)		152.93	
Alpha	1.00	Stream Power (N/m s)		568.94	
Frctn Loss (m)	0.02	Cum Volume (1000 m3)		12.87	
C & E Loss (m)	0.04	Cum SA (1000 m2)		21.70	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 136.28 Profile: PF 1

E.G. Elev (m)	74.73	Element	Left OB	Channel	Right OB
Vel Head (m)	0.00	Wt. n-Val.		0.030	
W.S. Elev (m)	74.73	Reach Len. (m)	75.00	75.00	75.00
Crit W.S. (m)	74.73	Flow Area (m2)		163.35	
E.G. Slope (m/m)	0.000072	Area (m2)		163.35	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	

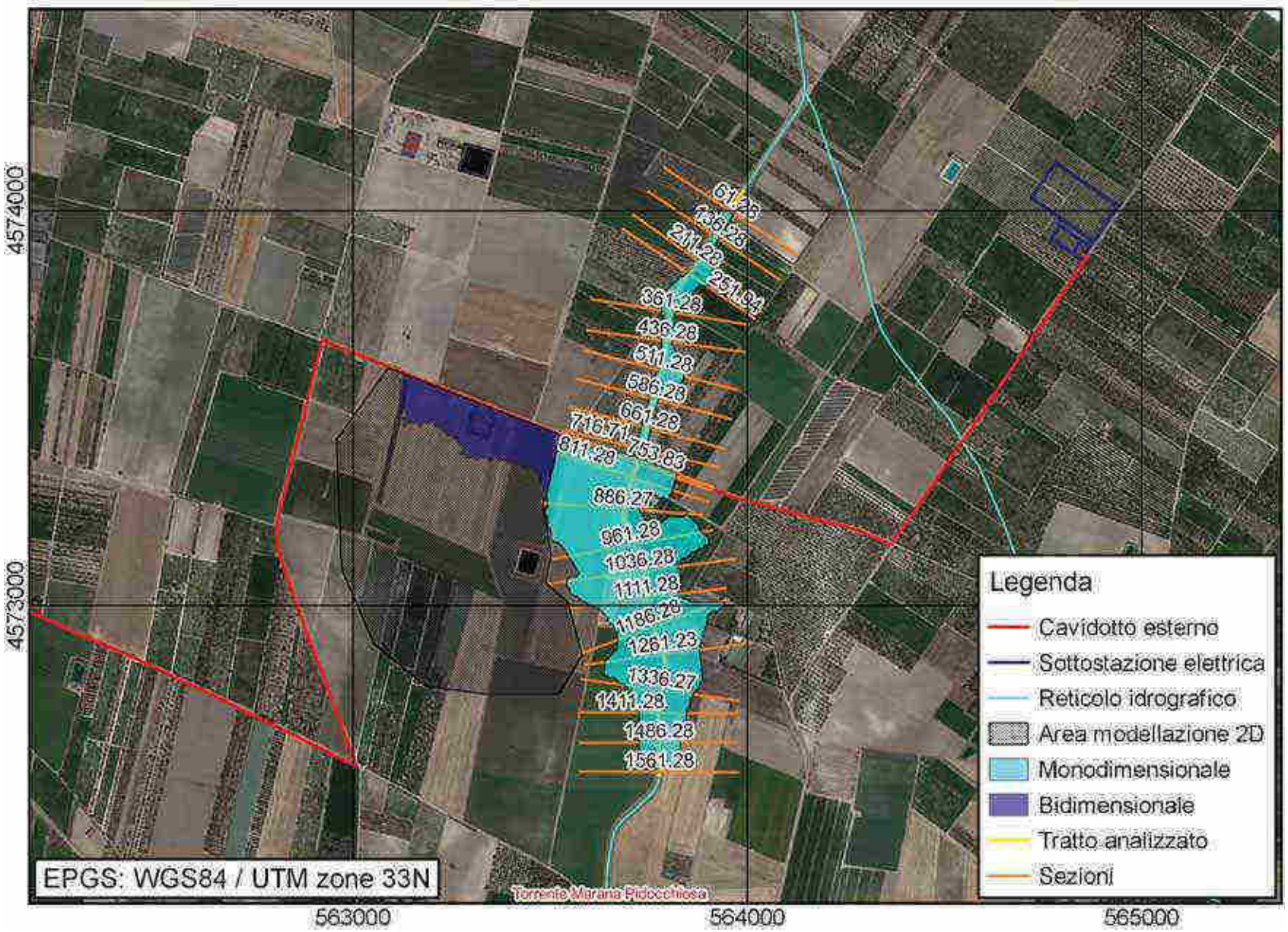
Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 136.28 Profile: PF 1 (Continued)

Top Width (m)	271.44	Top Width (m)		271.44	
Vel Total (m/s)	0.20	Avg. Vel. (m/s)		0.20	
Max Chl Dpth (m)	1.60	Hydr. Depth (m)		0.60	
Conv. Total (m3/s)	3871.0	Conv. (m3/s)		3871.0	
Length Wtd. (m)	75.00	Wetted Per. (m)		272.51	
Min Ch El (m)	73.13	Shear (N/m2)		0.43	
Alpha	1.00	Stream Power (N/m s)		0.09	
Frctn Loss (m)	0.02	Cum Volume (1000 m3)		6.41	
C & E Loss (m)	0.10	Cum SA (1000 m2)		10.87	

Plan: Plan01 Affl1_riverentit Affl1_riverentit RS: 61.28 Profile: PF 1

E.G. Elev (m)	74.62	Element	Left OB	Channel	Right OB
Vel Head (m)	0.96	Wt. n-Val.		0.030	
W.S. Elev (m)	73.66	Reach Len. (m)			
Crit W.S. (m)	73.98	Flow Area (m2)		7.58	
E.G. Slope (m/m)	0.056501	Area (m2)		7.58	
Q Total (m3/s)	32.95	Flow (m3/s)		32.95	
Top Width (m)	18.54	Top Width (m)		18.54	
Vel Total (m/s)	4.35	Avg. Vel. (m/s)		4.35	
Max Chl Dpth (m)	0.95	Hydr. Depth (m)		0.41	
Conv. Total (m3/s)	138.6	Conv. (m3/s)		138.6	
Length Wtd. (m)		Wetted Per. (m)		18.87	
Min Ch El (m)	72.70	Shear (N/m2)		225.03	
Alpha	1.00	Stream Power (N/m s)		977.82	
Frctn Loss (m)		Cum Volume (1000 m3)			
C & E Loss (m)		Cum SA (1000 m2)			

Figura 15. Planimetria con individuazione delle sezioni e delle aree potenzialmente interessate dalla portata avente tr = 200 anni



Affluente Canale la Pidocchiosa

L'affluente del Canale la Pidocchiosa oggetto di indagine interseca il cavidotto esterno che collega la sottostazione elettrica ai cavidotti interni ed agli aerogeneratori. Come è possibile osservare dalle foto riportate in seguito, tale affluente è di fatto un avvallamento nel terreno. Inoltre, dai risultati dell'analisi monodimensionale si osserva come l'alveo attualmente esistente risulta adeguato al trasporto della portata avente tempo di ritorno 200 anni.

La modellazione eseguita sulla base del Modello Digitale del Terreno (DTM) con cella 8x8 metri, reso disponibile del Sistema Informativo Territoriale (SIT) della Regione Puglia, ha messo in evidenza un percorso dell'affluente leggermente diverso rispetto al reticolo idrografico, anch'esso reso disponibile del Sistema Informativo Territoriale (SIT) della Regione Puglia. Comunque, come è possibile osservare nella rappresentazione in A3 (Figura 17), non coinvolge nessun aerogeneratore, interessando parzialmente i cavidotti esterni.

Foto a monte dell'incrocio tra cavidotto e l'affluente del Canale la Pidocchiosa

Foto trasversale dell'incrocio tra cavidotto e l'affluente del Canale la Pidocchiosa

Foto a valle dell'incrocio tra cavidotto e l'affluente del Canale la Pidocchiosa

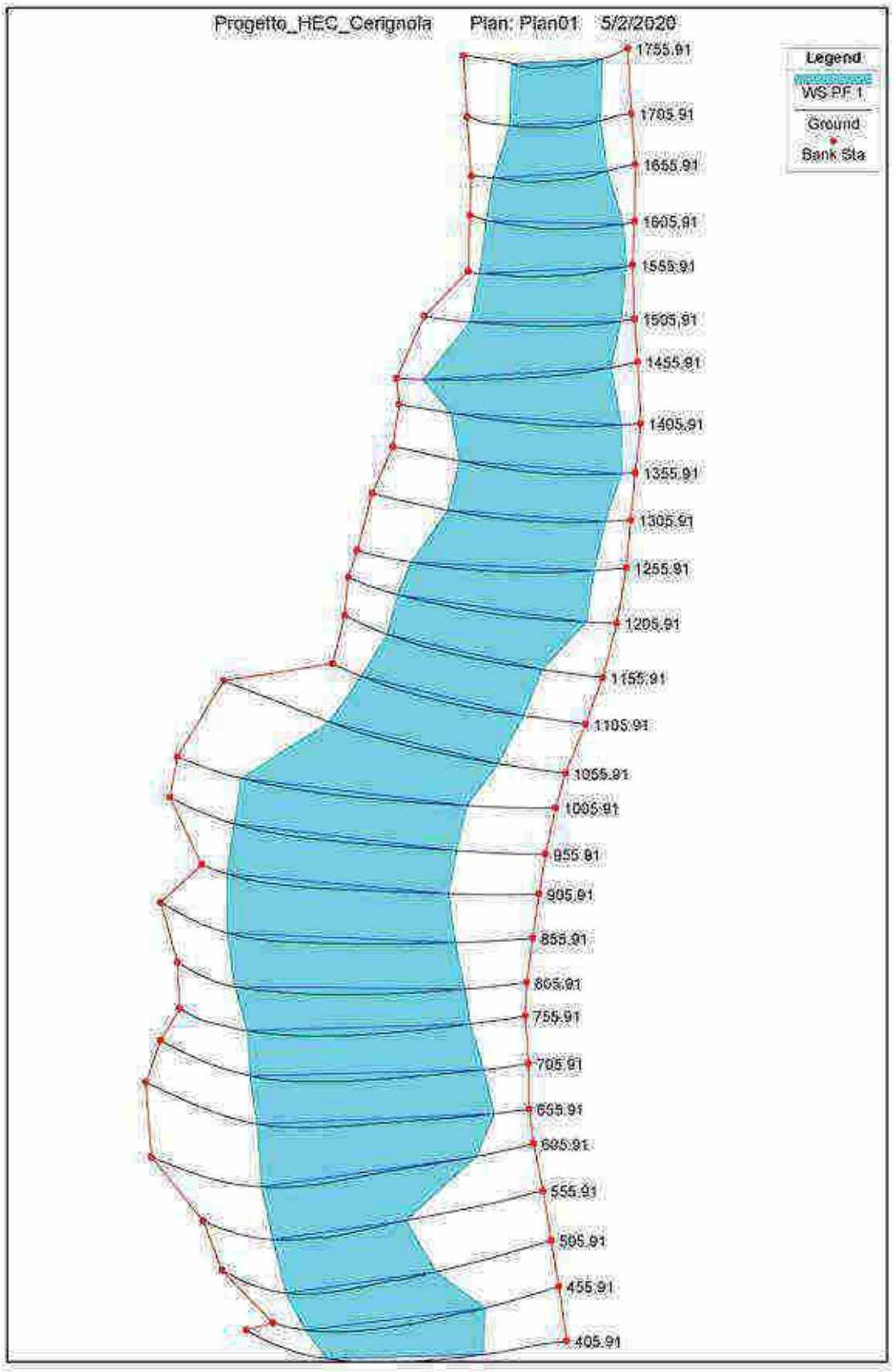
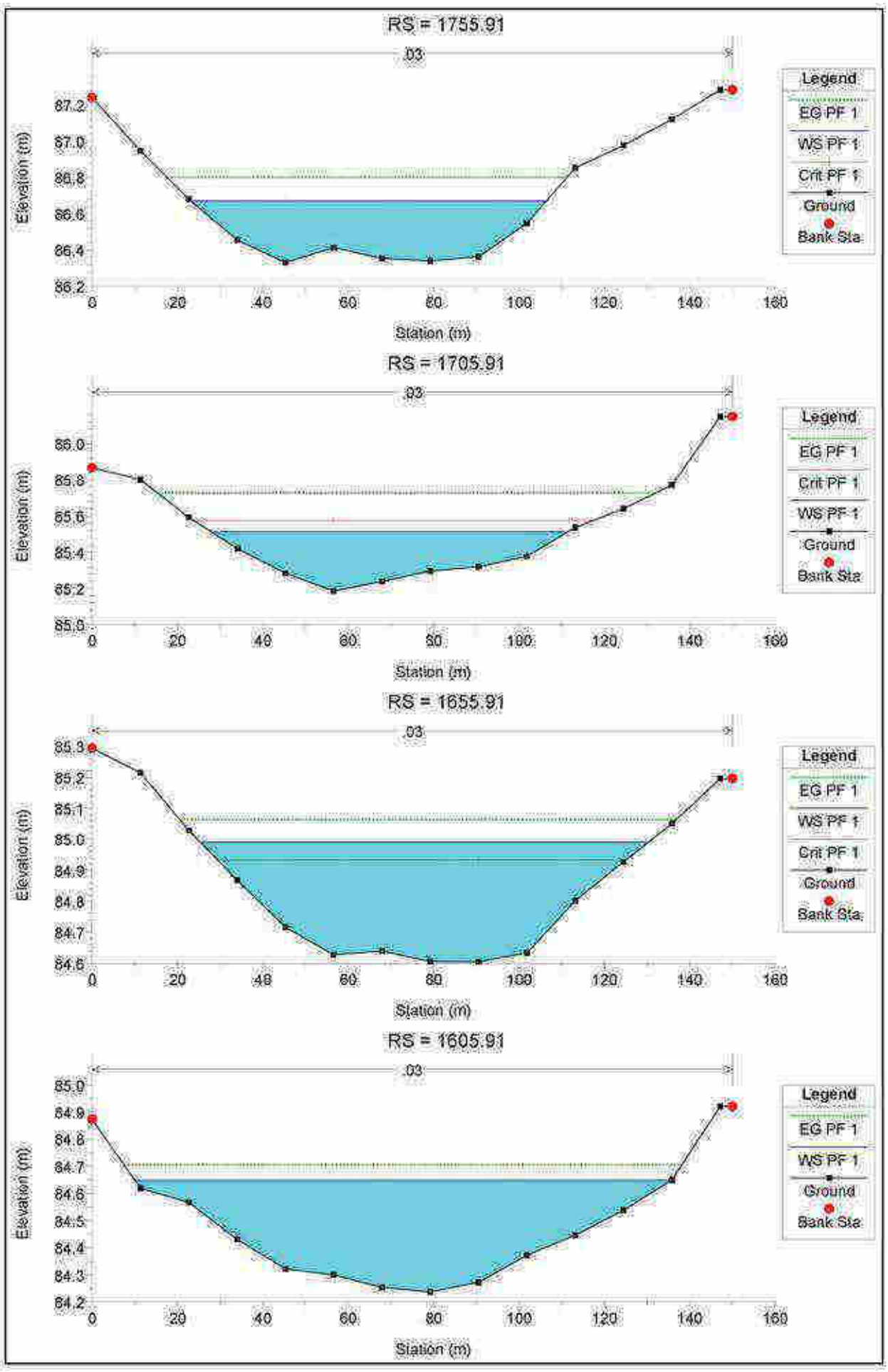
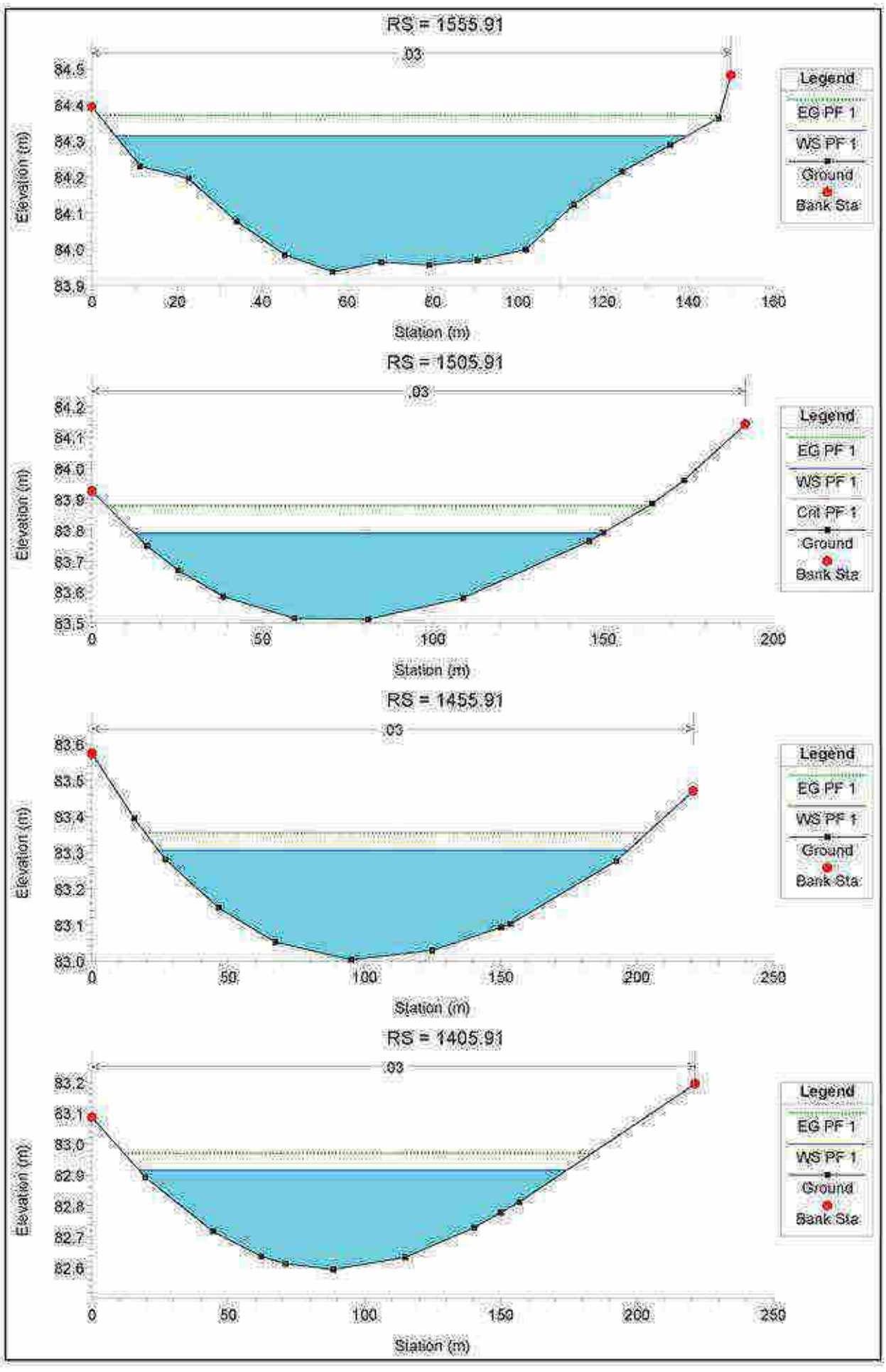
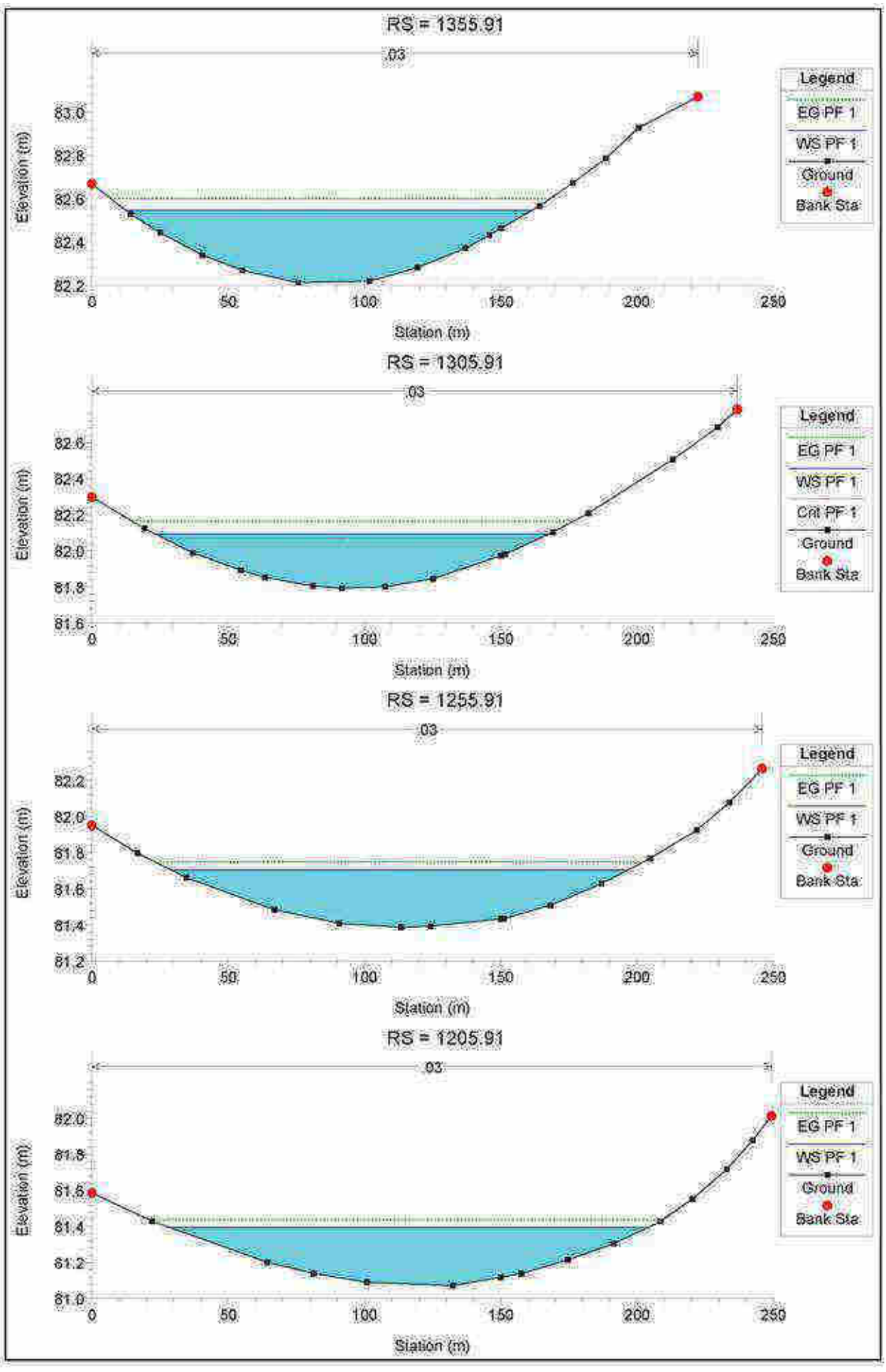
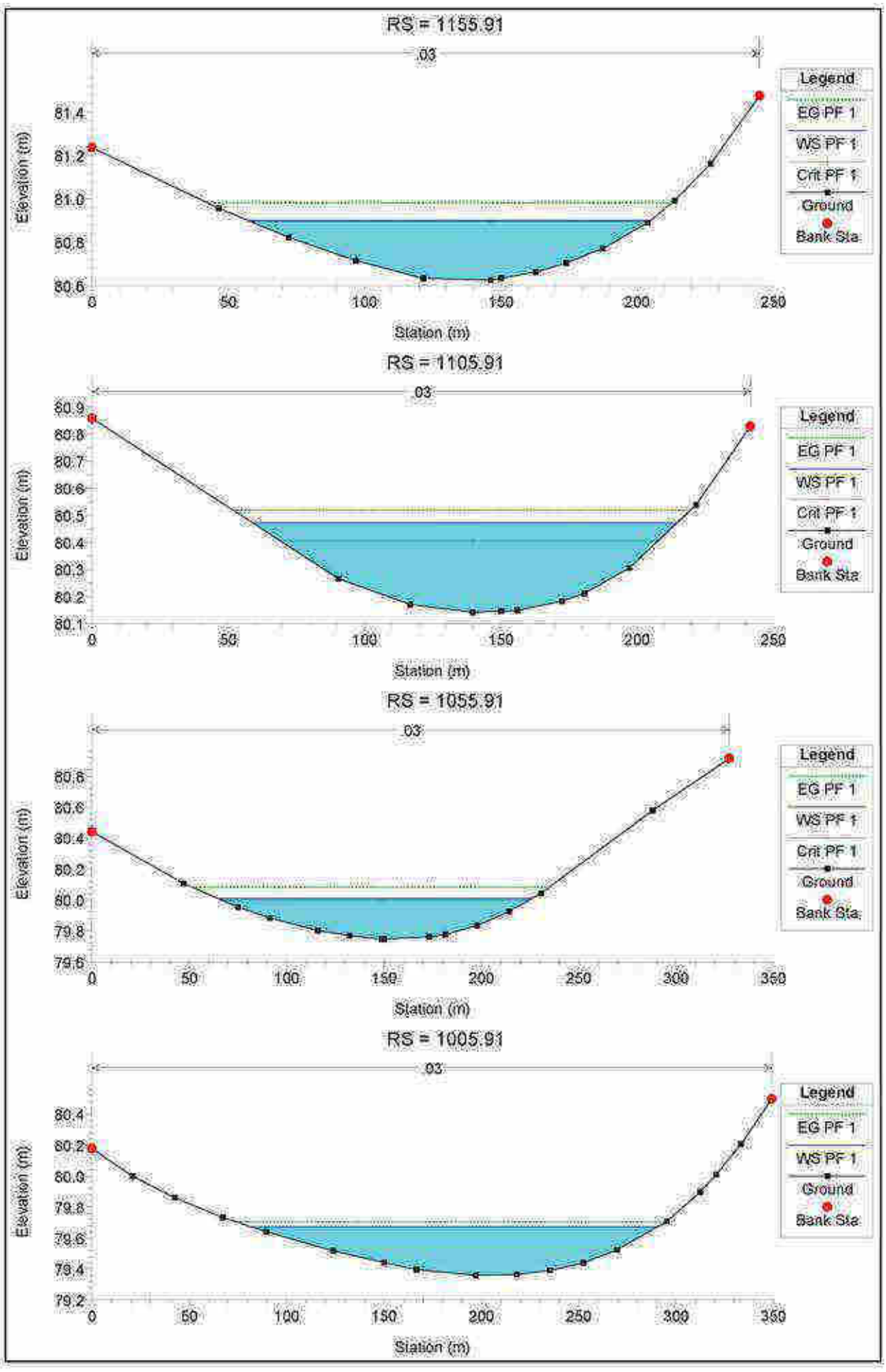


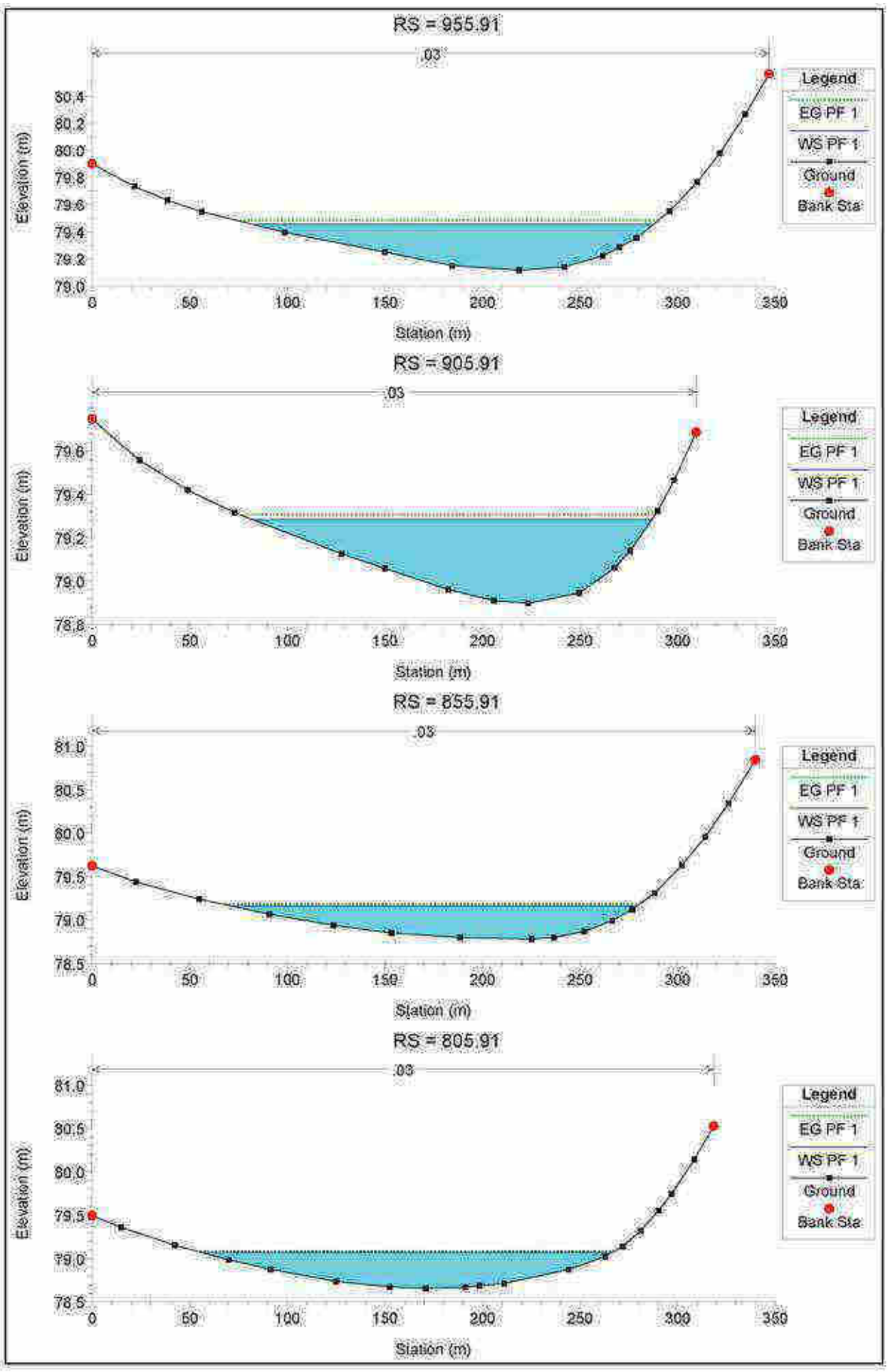
Figura 16. Rappresentazione 3D

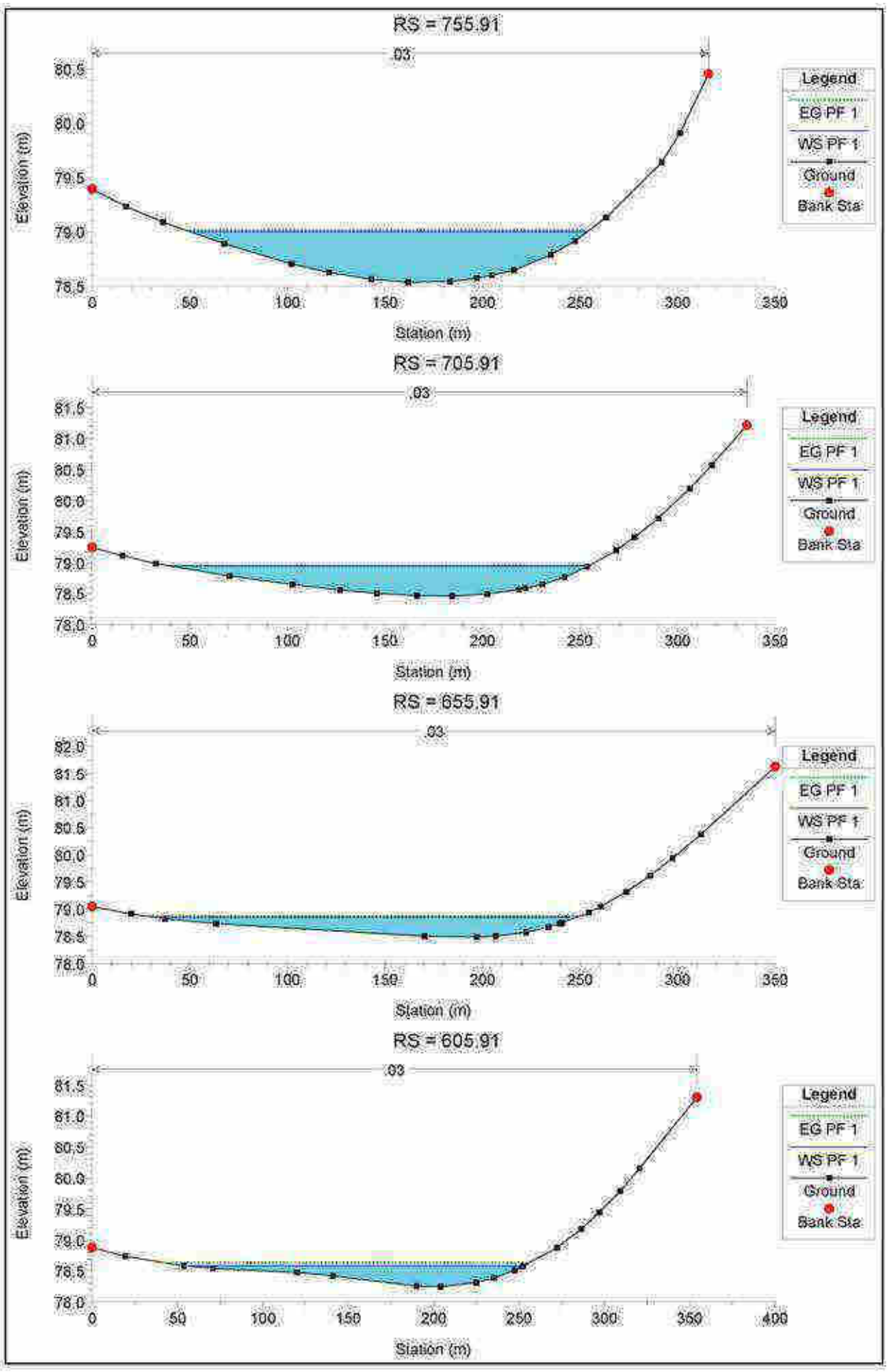

RS = 1755.91
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
87.2
87.0
86.8
86.6
86.4
86.2
0
20
40
60
80
100
120
140
160
Station (m)
RS = 1705.91
03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
86.0
85.8
85.6
85.4
85.2
85.0
0
20
40
60
80
100
120
140
160
Station (m)
RS = 1655.91
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
85.3
85.2
85.1
85.0
84.9
84.8
84.7
84.6
0
20
40
60
80
100
120
140
160
Station (m)
RS = 1605.91
03
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
85.0
84.9
84.8
84.7
84.6
84.5
84.4
84.3
84.2
0
20
40
60
80
100
120
140
160
Station (m)

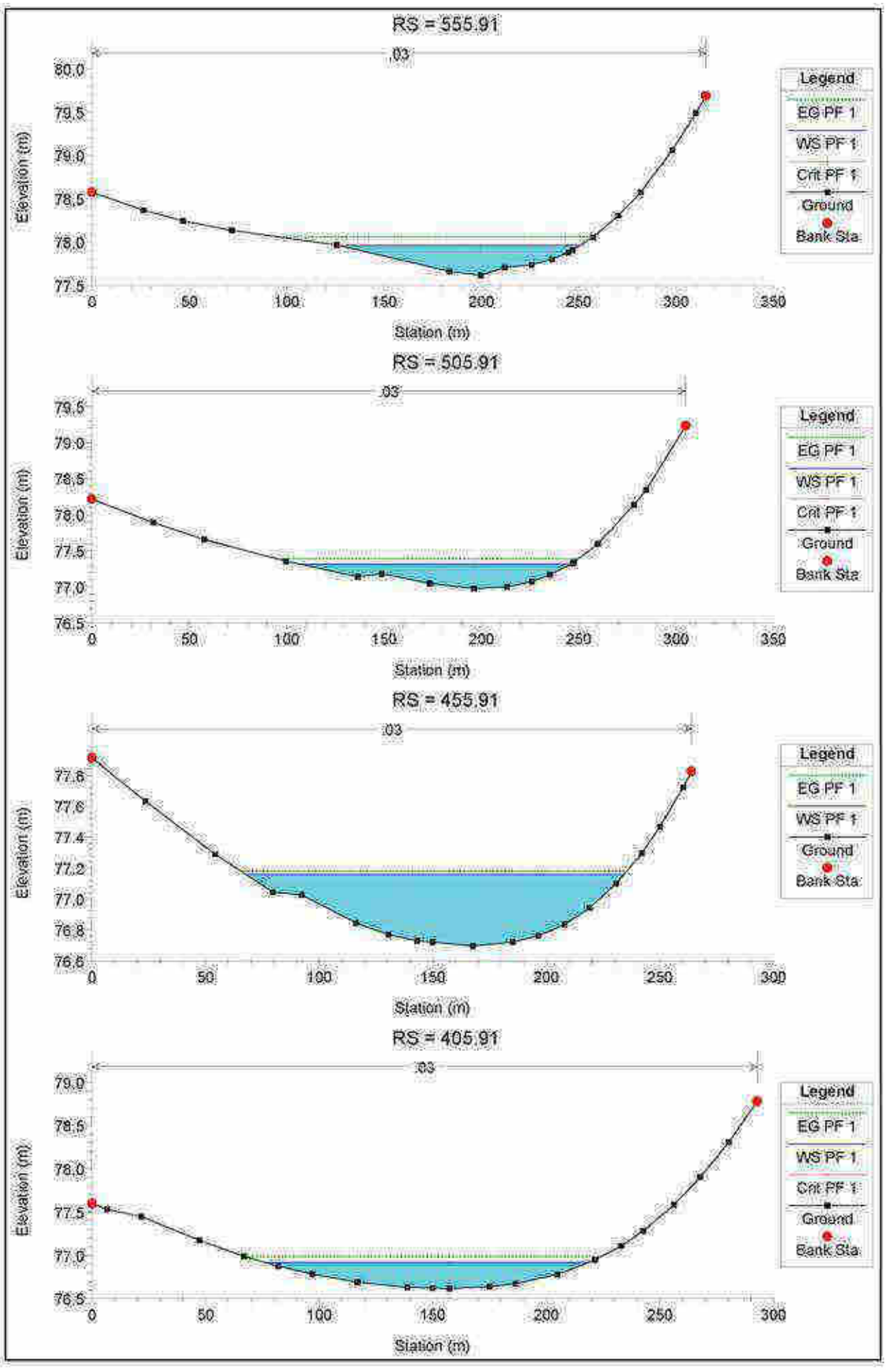

RS = 1555.91
03
84.5
84.4
84.3
84.2
84.1
84.0
83.9
Elevation (m)
0
20
40
60
80
100
120
140
160
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
RS = 1505.91
03
84.2
84.1
84.0
83.9
83.8
83.7
83.6
83.5
Elevation (m)
0
50
100
150
200
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
RS = 1455.91
03
83.6
83.5
83.4
83.3
83.2
83.1
83.0
Elevation (m)
0
50
100
150
200
250
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
RS = 1405.91
03
83.2
83.1
83.0
82.9
82.8
82.7
82.6
Elevation (m)
0
50
100
150
200
250
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta


RS = 1355.91
03
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
83.0
82.8
82.6
82.4
82.2
0
50
100
150
200
250
Station (m)
RS = 1305.91
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
82.6
82.4
82.2
82.0
81.8
81.6
0
50
100
150
200
250
Station (m)
RS = 1255.91
03
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
82.2
82.0
81.8
81.6
81.4
81.2
0
50
100
150
200
250
Station (m)
RS = 1205.91
03
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
82.0
81.8
81.6
81.4
81.2
81.0
0
50
100
150
200
250
Station (m)


RS = 1155.91
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
81.4
81.2
81.0
80.8
80.6
0
50
100
150
200
250
Station (m)
RS = 1105.91
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
80.9
80.8
80.7
80.6
80.5
80.4
80.3
80.2
80.1
0
50
100
150
200
250
Station (m)
RS = 1055.91
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
80.6
80.4
80.2
80.0
79.8
79.6
0
50
100
150
200
250
300
350
Station (m)
RS = 1005.91
03
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
80.4
80.2
80.0
79.8
79.6
79.4
79.2
0
50
100
150
200
250
300
350
Station (m)


RS = 955.91
03
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
80.4
80.2
80.0
79.8
79.6
79.4
79.2
79.0
0
50
100
150
200
250
300
350
Station (m)
RS = 905.91
03
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
79.6
79.4
79.2
79.0
78.8
0
50
100
150
200
250
300
350
Station (m)
RS = 855.91
03
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
81.0
80.5
80.0
79.5
79.0
78.5
0
50
100
150
200
250
300
350
Station (m)
RS = 805.91
03
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
81.0
80.5
80.0
79.5
79.0
78.5
0
50
100
150
200
250
300
350
Station (m)


RS = 755.91
.03
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
RS = 705.91
.03
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
RS = 655.91
.03
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
RS = 605.91
.03
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta


RS = 555.91
03
80.0
79.5
79.0
78.5
78.0
77.5
Elevation (m)
0
50
100
150
200
250
300
350
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
RS = 505.91
03
79.5
79.0
78.5
78.0
77.5
77.0
76.5
Elevation (m)
0
50
100
150
200
250
300
350
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
RS = 455.91
03
77.6
77.6
77.4
77.2
77.0
76.8
76.6
Elevation (m)
0
50
100
150
200
250
300
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
RS = 405.91
03
79.0
78.5
78.0
77.5
77.0
76.5
Elevation (m)
0
50
100
150
200
250
300
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

Plan: Plan River_Pidocchios River_Pidocchios RS: 1755.91 Profile: PF 1

E.G. Elev (m)	86.80	Element	Left OB	Channel	Right OB
Vel Head (m)	0.13	Wt. n-Val.		0.030	
W.S. Elev (m)	86.67	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)	86.67	Flow Area (m2)		21.60	
E.G. Slope (m/m)	0.014284	Area (m2)		21.00	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	83.28	Top Width (m)		83.28	
Vel Total (m/s)	1.59	Avg. Vel. (m/s)		1.58	
Max Chl Dpth (m)	0.34	Hydr. Depth (m)		0.25	
Conv. Total (m3/s)	279.4	Conv. (m3/s)		279.4	
Length Wtd. (m)	50.00	Wetted Per. (m)		83.28	
Min Ch El (m)	86.33	Shear (N/m2)		35.32	
Alpha	1.00	Stream Power (N/m s)		56.16	
Frctn Loss (m)	1.06	Cum Volume (1000 m3)		50.34	
C & E Loss (m)	0.01	Cum SA (1000 m2)		221.53	

Plan: Plan River_Pidocchios River_Pidocchios RS: 1705.91 Profile: PF 1

E.G. Elev (m)	85.73	Element	Left OB	Channel	Right OB
Vel Head (m)	0.22	Wt. n-Val.		0.030	
W.S. Elev (m)	85.51	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)	85.58	Flow Area (m2)		16.11	
E.G. Slope (m/m)	0.034583	Area (m2)		16.11	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	83.29	Top Width (m)		83.29	
Vel Total (m/s)	2.07	Avg. Vel. (m/s)		2.07	
Max Chl Dpth (m)	0.33	Hydr. Depth (m)		0.19	
Conv. Total (m3/s)	179.6	Conv. (m3/s)		179.6	
Length Wtd. (m)	50.00	Wetted Per. (m)		83.29	
Min Ch El (m)	85.18	Shear (N/m2)		65.56	
Alpha	1.00	Stream Power (N/m s)		135.87	
Frctn Loss (m)	0.51	Cum Volume (1000 m3)		40.42	
C & E Loss (m)	0.01	Cum SA (1000 m2)		217.96	

Plan: Plan River_Pidocchios River_Pidocchios RS: 1655.91 Profile: PF 1

E.G. Elev (m)	85.06	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.		0.030	
W.S. Elev (m)	84.99	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)	84.93	Flow Area (m2)		27.83	
E.G. Slope (m/m)	0.007603	Area (m2)		27.83	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	104.90	Top Width (m)		104.90	
Vel Total (m/s)	1.20	Avg. Vel. (m/s)		1.20	
Max Chl Dpth (m)	0.39	Hydr. Depth (m)		0.27	
Conv. Total (m3/s)	382.9	Conv. (m3/s)		382.9	
Length Wtd. (m)	50.00	Wetted Per. (m)		104.90	
Min Ch El (m)	84.60	Shear (N/m2)		19.78	
Alpha	1.00	Stream Power (N/m s)		23.73	
Frctn Loss (m)	0.35	Cum Volume (1000 m3)		48.32	
C & E Loss (m)	0.00	Cum SA (1000 m2)		212.56	

Plan: Plan River_Pidocchios River_Pidocchios RS: 1605.91 Profile: PF 1

E.G. Elev (m)	84.71	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.		0.030	
W.S. Elev (m)	84.65	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)		Flow Area (m2)		31.18	
E.G. Slope (m/m)	0.006817	Area (m2)		31.18	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	

Plan: Plan River_Pidocchios River_Pidocchios RS: 1505.91 Profile: PF 1 (Continued)

Top Width (m)	125.59	Top Width (m)		125.59
Vel Total (m/s)	1.07	Avg. Vel. (m/s)		1.07
Max Chl Dpth (m)	0.41	Hydr. Depth (m)		0.25
Conv. Total (m3/s)	410.5	Conv. (m3/s)		410.5
Length Wtd. (m)	50.00	Wetted Per. (m)		125.59
Min Ch El (m)	84.24	Shear (N/m2)		18.11
Alpha	1.00	Stream Power (N/m s)		17.25
Frctn Loss (m)	0.34	Cum Volume (1000 m3)		46.84
C & E Loss (m)	0.00	Cum SA (1000 m2)		208.90

Plan: Plan River_Pidocchios River_Pidocchios RS: 1555.91 Profile: PF 1

E.G. Elev (m)	84.37	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.		0.030	
W.S. Elev (m)	84.31	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)		Flow Area (m2)		31.70	
E.G. Slope (m/m)	0.006839	Area (m2)		31.70	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	134.22	Top Width (m)		134.22	
Vel Total (m/s)	1.05	Avg. Vel. (m/s)		1.05	
Max Chl Dpth (m)	0.38	Hydr. Depth (m)		0.24	
Conv. Total (m3/s)	403.8	Conv. (m3/s)		403.8	
Length Wtd. (m)	50.00	Wetted Per. (m)		134.23	
Min Ch El (m)	83.94	Shear (N/m2)		15.84	
Alpha	1.00	Stream Power (N/m s)		16.68	
Frctn Loss (m)	0.49	Cum Volume (1000 m3)		45.27	
C & E Loss (m)	0.00	Cum SA (1000 m2)		200.40	

Plan: Plan River_Pidocchios River_Pidocchios RS: 1505.91 Profile: PF 1

E.G. Elev (m)	83.85	Element	Left OB	Channel	Right OB
Vel Head (m)	0.09	Wt. n-Val.		0.030	
W.S. Elev (m)	83.76	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)	83.78	Flow Area (m2)		25.27	
E.G. Slope (m/m)	0.015055	Area (m2)		25.27	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	137.64	Top Width (m)		137.64	
Vel Total (m/s)	1.32	Avg. Vel. (m/s)		1.32	
Max Chl Dpth (m)	0.28	Hydr. Depth (m)		0.18	
Conv. Total (m3/s)	272.1	Conv. (m3/s)		272.1	
Length Wtd. (m)	50.00	Wetted Per. (m)		137.65	
Min Ch El (m)	83.51	Shear (N/m2)		27.11	
Alpha	1.00	Stream Power (N/m s)		35.82	
Frctn Loss (m)	0.51	Cum Volume (1000 m3)		43.85	
C & E Loss (m)	0.01	Cum SA (1000 m2)		193.60	

Plan: Plan River_Pidocchios River_Pidocchios RS: 1455.91 Profile: PF 1

E.G. Elev (m)	83.36	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.		0.030	
W.S. Elev (m)	83.31	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)		Flow Area (m2)		34.11	
E.G. Slope (m/m)	0.007475	Area (m2)		34.11	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	172.29	Top Width (m)		172.29	
Vel Total (m/s)	0.98	Avg. Vel. (m/s)		0.98	
Max Chl Dpth (m)	0.30	Hydr. Depth (m)		0.20	
Conv. Total (m3/s)	286.2	Conv. (m3/s)		286.2	
Length Wtd. (m)	50.00	Wetted Per. (m)		172.29	
Min Ch El (m)	83.00	Shear (N/m2)		14.51	

Plan: Plan River_Pidocchios River_Pidocchios RS: 1455.91 Profile: PF 1 (Continued)

Alpha	1.00	Stream Power (N/m s)		14.21
Frctn Loss (m)	0.39	Cum Volume (1000 m3)		42.36
C & E Loss (m)	0.00	Cum SA (1000 m2)		185.86

Plan: Plan River_Pidocchios River_Pidocchios RS: 1405.91 Profile: PF 1

E.G. Elev (m)	82.97	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.		0.030	
W.S. Elev (m)	82.92	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)		Flow Area (m2)		32.27	
E.G. Slope (m/m)	0.007947	Area (m2)		32.27	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	157.02	Top Width (m)		157.02	
Vel Total (m/s)	1.03	Avg. Vel. (m/s)		1.03	
Max Chl Dpth (m)	0.32	Hydr. Depth (m)		0.21	
Conv. Total (m3/s)	374.6	Conv. (m3/s)		374.6	
Length Wtd. (m)	50.00	Wetted Per. (m)		157.02	
Min Ch El (m)	82.59	Shear (N/m2)		16.01	
Alpha	1.00	Stream Power (N/m s)		16.57	
Frctn Loss (m)	0.37	Cum Volume (1000 m3)		40.70	
C & E Loss (m)	0.00	Cum SA (1000 m2)		177.62	

Plan: Plan River_Pidocchios River_Pidocchios RS: 1355.91 Profile: PF 1

E.G. Elev (m)	82.60	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.		0.030	
W.S. Elev (m)	82.55	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)		Flow Area (m2)		32.86	
E.G. Slope (m/m)	0.006981	Area (m2)		32.86	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	149.12	Top Width (m)		149.12	
Vel Total (m/s)	1.02	Avg. Vel. (m/s)		1.02	
Max Chl Dpth (m)	0.33	Hydr. Depth (m)		0.22	
Conv. Total (m3/s)	399.6	Conv. (m3/s)		399.6	
Length Wtd. (m)	50.00	Wetted Per. (m)		145.12	
Min Ch El (m)	82.21	Shear (N/m2)		15.09	
Alpha	1.00	Stream Power (N/m s)		15.33	
Frctn Loss (m)	0.42	Cum Volume (1000 m3)		39.07	
C & E Loss (m)	0.00	Cum SA (1000 m2)		169.97	

Plan: Plan River_Pidocchios River_Pidocchios RS: 1305.91 Profile: PF 1

E.G. Elev (m)	82.16	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.		0.030	
W.S. Elev (m)	82.09	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)	82.07	Flow Area (m2)		28.25	
E.G. Slope (m/m)	0.011058	Area (m2)		28.25	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	144.31	Top Width (m)		144.31	
Vel Total (m/s)	1.18	Avg. Vel. (m/s)		1.18	
Max Chl Dpth (m)	0.30	Hydr. Depth (m)		0.20	
Conv. Total (m3/s)	317.4	Conv. (m3/s)		317.4	
Length Wtd. (m)	50.00	Wetted Per. (m)		144.31	
Min Ch El (m)	81.79	Shear (N/m2)		21.24	
Alpha	1.00	Stream Power (N/m s)		25.11	
Frctn Loss (m)	0.41	Cum Volume (1000 m3)		37.55	
C & E Loss (m)	0.01	Cum SA (1000 m2)		162.63	

Plan: Plan River_Pidocchios River_Pidocchios RS: 1255.91 Profile: PF 1

E.G. Elev (m)	81.75	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.		0.030	
W.S. Elev (m)	81.70	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)		Flow Area (m2)		35.44	
E.G. Slope (m/m)	0.006328	Area (m2)		35.44	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	167.31	Top Width (m)		167.31	
Vel Total (m/s)	0.94	Avg. Vel. (m/s)		0.94	
Max Chl Dpth (m)	0.32	Hydr. Depth (m)		0.21	
Conv. Total (m3/s)	419.7	Conv. (m3/s)		419.7	
Length Wtd. (m)	50.00	Wetted Per. (m)		167.31	
Min Ch El (m)	81.39	Shear (N/m2)		13.14	
Alpha	1.00	Stream Power (N/m s)		12.38	
Frctn Loss (m)	0.31	Cum Volume (1000 m3)		25.95	
C & E Loss (m)	0.00	Cum SA (1000 m2)		154.84	

Plan: Plan River_Pidocchios River_Pidocchios RS: 1205.91 Profile: PF 1

E.G. Elev (m)	81.44	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.		0.030	
W.S. Elev (m)	81.40	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)		Flow Area (m2)		36.53	
E.G. Slope (m/m)	0.006095	Area (m2)		36.53	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	175.48	Top Width (m)		175.48	
Vel Total (m/s)	0.91	Avg. Vel. (m/s)		0.91	
Max Chl Dpth (m)	0.32	Hydr. Depth (m)		0.21	
Conv. Total (m3/s)	427.7	Conv. (m3/s)		427.7	
Length Wtd. (m)	50.00	Wetted Per. (m)		175.48	
Min Ch El (m)	81.07	Shear (N/m2)		12.44	
Alpha	1.00	Stream Power (N/m s)		11.37	
Frctn Loss (m)	0.45	Cum Volume (1000 m3)		34.16	
C & E Loss (m)	0.00	Cum SA (1000 m2)		146.27	

Plan: Plan River_Pidocchios River_Pidocchios RS: 1155.91 Profile: PF 1

E.G. Elev (m)	80.86	Element	Left OB	Channel	Right OB
Vel Head (m)	0.08	Wt. n-Val.		0.030	
W.S. Elev (m)	80.80	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)	80.89	Flow Area (m2)		26.24	
E.G. Slope (m/m)	0.014599	Area (m2)		26.24	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	147.75	Top Width (m)		147.75	
Vel Total (m/s)	1.27	Avg. Vel. (m/s)		1.27	
Max Chl Dpth (m)	0.28	Hydr. Depth (m)		0.18	
Conv. Total (m3/s)	276.3	Conv. (m3/s)		276.3	
Length Wtd. (m)	50.00	Wetted Per. (m)		147.75	
Min Ch El (m)	80.63	Shear (N/m2)		25.43	
Alpha	1.00	Stream Power (N/m s)		32.35	
Frctn Loss (m)	0.45	Cum Volume (1000 m3)		32.59	
C & E Loss (m)	0.01	Cum SA (1000 m2)		138.19	

Plan: Plan River_Pidocchios River_Pidocchios RS: 1105.91 Profile: PF 1

E.G. Elev (m)	80.52	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.		0.030	
W.S. Elev (m)	80.47	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)	80.41	Flow Area (m2)		34.72	
E.G. Slope (m/m)	0.006151	Area (m2)		34.72	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	

Plan: Plan River_Pidocchios River_Pidocchios RS: 1105.91 Profile: PF 1 (Continued)

Top Width (m)	155.56	Top Width (m)		155.56	
Vel Total (m/s)	0.96	Avg. Vel. (m/s)		0.96	
Max Chl Dpth (m)	0.33	Hydr. Depth (m)		0.22	
Conv. Total (m3/s)	425.8	Conv. (m3/s)		425.8	
Length Wtd. (m)	50.00	Wetted Per. (m)		155.57	
Min Ch El (m)	80.14	Shear (N/m2)		13.46	
Alpha	1.00	Stream Power (N/m s)		12.95	
Frctn Loss (m)	0.43	Cum Volume (1000 m3)		31.06	
C & E Loss (m)	0.00	Cum SA (1000 m2)		139.61	

Plan: Plan River_Pidocchios River_Pidocchios RS: 1055.91 Profile: PF 1

E.G. Elev (m)	80.00	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.		0.030	
W.S. Elev (m)	80.01	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)	80.00	Flow Area (m2)		28.11	
E.G. Slope (m/m)	0.013083	Area (m2)		28.11	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	161.62	Top Width (m)		161.62	
Vel Total (m/s)	1.19	Avg. Vel. (m/s)		1.19	
Max Chl Dpth (m)	0.26	Hydr. Depth (m)		0.17	
Conv. Total (m3/s)	291.9	Conv. (m3/s)		291.9	
Length Wtd. (m)	50.00	Wetted Per. (m)		161.62	
Min Ch El (m)	79.75	Shear (N/m2)		22.31	
Alpha	1.00	Stream Power (N/m s)		26.51	
Frctn Loss (m)	0.06	Cum Volume (1000 m3)		29.49	
C & E Loss (m)	0.01	Cum SA (1000 m2)		122.68	

Plan: Plan River_Pidocchios River_Pidocchios RS: 1005.91 Profile: PF 1

E.G. Elev (m)	79.71	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.		0.030	
W.S. Elev (m)	79.67	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)		Flow Area (m2)		42.50	
E.G. Slope (m/m)	0.004643	Area (m2)		42.50	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	208.89	Top Width (m)		208.89	
Vel Total (m/s)	0.79	Avg. Vel. (m/s)		0.79	
Max Chl Dpth (m)	0.31	Hydr. Depth (m)		0.20	
Conv. Total (m3/s)	490.0	Conv. (m3/s)		490.0	
Length Wtd. (m)	50.00	Wetted Per. (m)		208.89	
Min Ch El (m)	79.36	Shear (N/m2)		9.28	
Alpha	1.00	Stream Power (N/m s)		7.28	
Frctn Loss (m)	0.22	Cum Volume (1000 m3)		27.73	
C & E Loss (m)	0.00	Cum SA (1000 m2)		113.42	

Plan: Plan River_Pidocchios River_Pidocchios RS: 955.91 Profile: PF 1

E.G. Elev (m)	79.48	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.		0.030	
W.S. Elev (m)	79.45	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)		Flow Area (m2)		43.33	
E.G. Slope (m/m)	0.004259	Area (m2)		43.33	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	205.44	Top Width (m)		205.44	
Vel Total (m/s)	0.77	Avg. Vel. (m/s)		0.77	
Max Chl Dpth (m)	0.34	Hydr. Depth (m)		0.21	
Conv. Total (m3/s)	511.7	Conv. (m3/s)		511.7	
Length Wtd. (m)	50.00	Wetted Per. (m)		205.45	
Min Ch El (m)	79.12	Shear (N/m2)		8.81	

Plan: Plan River_Pidocchios River_Pidocchios RS: 955.91 Profile: PF 1 (Continued)

Alpha	1.00	Stream Power (N/m s)	5.79
Frctn Loss (m)	0.18	Cum Volume (1000 m3)	25.58
C & E Loss (m)	0.00	Cum SA (1000 m2)	103.66

Plan: Plan River_Pidocchios River_Pidocchios RS: 905.91 Profile: PF 1

E.G. Elev (m)	79.31	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.		0.030	
W.S. Elev (m)	79.28	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)		Flow Area (m2)		48.28	
E.G. Slope (m/m)	0.002945	Area (m2)		48.28	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	204.23	Top Width (m)		204.23	
Vel Total (m/s)	0.69	Avg. Vel. (m/s)		0.69	
Max Chl Dpth (m)	0.39	Hydr. Depth (m)		0.24	
Conv. Total (m3/s)	615.2	Conv. (m3/s)		615.2	
Length Wtd. (m)	50.00	Wetted Per. (m)		204.23	
Min Ch El (m)	78.90	Shear (N/m2)		6.83	
Alpha	1.00	Stream Power (N/m s)		4.72	
Frctn Loss (m)	0.12	Cum Volume (1000 m3)		23.29	
C & E Loss (m)	0.00	Cum SA (1000 m2)		92.82	

Plan: Plan River_Pidocchios River_Pidocchios RS: 855.91 Profile: PF 1

E.G. Elev (m)	79.19	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.		0.030	
W.S. Elev (m)	79.16	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)		Flow Area (m2)		53.91	
E.G. Slope (m/m)	0.002008	Area (m2)		53.91	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	208.68	Top Width (m)		208.68	
Vel Total (m/s)	0.62	Avg. Vel. (m/s)		0.62	
Max Chl Dpth (m)	0.38	Hydr. Depth (m)		0.26	
Conv. Total (m3/s)	729.0	Conv. (m3/s)		729.0	
Length Wtd. (m)	50.00	Wetted Per. (m)		208.68	
Min Ch El (m)	78.78	Shear (N/m2)		5.32	
Alpha	1.00	Stream Power (N/m s)		3.29	
Frctn Loss (m)	0.10	Cum Volume (1000 m3)		20.74	
C & E Loss (m)	0.00	Cum SA (1000 m2)		82.49	

Plan: Plan River_Pidocchios River_Pidocchios RS: 805.91 Profile: PF 1

E.G. Elev (m)	79.09	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.		0.030	
W.S. Elev (m)	79.07	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)		Flow Area (m2)		57.15	
E.G. Slope (m/m)	0.001745	Area (m2)		57.15	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	210.24	Top Width (m)		210.24	
Vel Total (m/s)	0.58	Avg. Vel. (m/s)		0.58	
Max Chl Dpth (m)	0.41	Hydr. Depth (m)		0.27	
Conv. Total (m3/s)	799.3	Conv. (m3/s)		799.3	
Length Wtd. (m)	50.00	Wetted Per. (m)		210.24	
Min Ch El (m)	78.66	Shear (N/m2)		4.65	
Alpha	1.00	Stream Power (N/m s)		2.72	
Frctn Loss (m)	0.07	Cum Volume (1000 m3)		17.98	
C & E Loss (m)	0.00	Cum SA (1000 m2)		72.02	

Plan: Plan River_Pidocchios River_Pidocchios RS: 755.91 Profile: PF 1

E.G. Elev (m)	79.01	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.		0.030	
W.S. Elev (m)	79.00	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)		Flow Area (m2)		62.87	
E.G. Slope (m/m)	0.001216	Area (m2)		62.87	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	203.58	Top Width (m)		203.58	
Vel Total (m/s)	0.53	Avg. Vel. (m/s)		0.53	
Max Chl Dpth (m)	0.47	Hydr. Depth (m)		0.31	
Conv. Total (m3/s)	957.5	Conv. (m3/s)		957.5	
Length Wtd. (m)	50.00	Wetted Per. (m)		203.58	
Min Ch El (m)	78.53	Shear (N/m2)		3.68	
Alpha	1.00	Stream Power (N/m s)		1.96	
Frctn Loss (m)	0.06	Cum Volume (1000 m3)		14.96	
C & E Loss (m)	0.00	Cum SA (1000 m2)		61.68	

Plan: Plan River_Pidocchios River_Pidocchios RS: 705.91 Profile: PF 1

E.G. Elev (m)	78.96	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.		0.030	
W.S. Elev (m)	78.95	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)		Flow Area (m2)		67.01	
E.G. Slope (m/m)	0.001051	Area (m2)		67.01	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	214.02	Top Width (m)		214.02	
Vel Total (m/s)	0.50	Avg. Vel. (m/s)		0.50	
Max Chl Dpth (m)	0.48	Hydr. Depth (m)		0.31	
Conv. Total (m3/s)	1029.8	Conv. (m3/s)		1029.8	
Length Wtd. (m)	50.00	Wetted Per. (m)		214.02	
Min Ch El (m)	78.46	Shear (N/m2)		3.23	
Alpha	1.00	Stream Power (N/m s)		1.61	
Frctn Loss (m)	0.05	Cum Volume (1000 m3)		11.71	
C & E Loss (m)	0.00	Cum SA (1000 m2)		51.24	

Plan: Plan River_Pidocchios River_Pidocchios RS: 655.91 Profile: PF 1

E.G. Elev (m)	78.87	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.		0.030	
W.S. Elev (m)	78.85	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)		Flow Area (m2)		46.38	
E.G. Slope (m/m)	0.002959	Area (m2)		46.38	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	216.82	Top Width (m)		216.82	
Vel Total (m/s)	0.68	Avg. Vel. (m/s)		0.68	
Max Chl Dpth (m)	0.37	Hydr. Depth (m)		0.23	
Conv. Total (m3/s)	613.8	Conv. (m3/s)		613.8	
Length Wtd. (m)	50.00	Wetted Per. (m)		216.82	
Min Ch El (m)	78.48	Shear (N/m2)		6.81	
Alpha	1.00	Stream Power (N/m s)		4.47	
Frctn Loss (m)	0.24	Cum Volume (1000 m3)		8.80	
C & E Loss (m)	0.00	Cum SA (1000 m2)		40.47	

Plan: Plan River_Pidocchios River_Pidocchios RS: 605.91 Profile: PF 1

E.G. Elev (m)	78.63	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.		0.030	
W.S. Elev (m)	78.59	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)		Flow Area (m2)		34.45	
E.G. Slope (m/m)	0.008801	Area (m2)		34.45	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	

Plan: Plan River_Pidocchios River_Pidocchios RS: 605.91 Profile: PF 1 (Continued)

Top Width (m)	199.68	Top Width (m)		199.68	
Vel Total (m/s)	0.97	Avg. Vel. (m/s)		0.97	
Max Chl Dpth (m)	0.34	Hydr. Depth (m)		0.17	
Conv. Total (m3/s)	355.9	Conv. (m3/s)		355.9	
Length Wtd. (m)	50.00	Wetted Per. (m)		199.68	
Min Ch El (m)	78.25	Shear (N/m2)		14.89	
Alpha	1.00	Stream Power (N/m s)		14.43	
Frctn Loss (m)	0.57	Cum Volume (1000 m3)		6.71	
C & E Loss (m)	0.01	Cum SA (1000 m2)		36.05	

Plan: Plan River_Pidocchios River_Pidocchios RS: 555.91 Profile: PF 1

E.G. Elev (m)	78.06	Element	Left OB	Channel	Right OB
Vel Head (m)	0.10	Wt. n-Val.		0.030	
W.S. Elev (m)	77.96	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)	77.96	Flow Area (m2)		24.01	
E.G. Slope (m/m)	0.015509	Area (m2)		24.01	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	123.89	Top Width (m)		123.89	
Vel Total (m/s)	1.39	Avg. Vel. (m/s)		1.39	
Max Chl Dpth (m)	0.34	Hydr. Depth (m)		0.19	
Conv. Total (m3/s)	268.1	Conv. (m3/s)		268.1	
Length Wtd. (m)	50.00	Wetted Per. (m)		123.89	
Min Ch El (m)	77.61	Shear (N/m2)		29.48	
Alpha	1.00	Stream Power (N/m s)		40.99	
Frctn Loss (m)	0.63	Cum Volume (1000 m3)		5.25	
C & E Loss (m)	0.01	Cum SA (1000 m2)		21.96	

Plan: Plan River_Pidocchios River_Pidocchios RS: 505.91 Profile: PF 1

E.G. Elev (m)	77.39	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.		0.030	
W.S. Elev (m)	77.32	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)	77.29	Flow Area (m2)		28.31	
E.G. Slope (m/m)	0.010316	Area (m2)		28.31	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	139.68	Top Width (m)		139.68	
Vel Total (m/s)	1.18	Avg. Vel. (m/s)		1.18	
Max Chl Dpth (m)	0.34	Hydr. Depth (m)		0.20	
Conv. Total (m3/s)	323.6	Conv. (m3/s)		323.6	
Length Wtd. (m)	50.00	Wetted Per. (m)		139.68	
Min Ch El (m)	76.95	Shear (N/m2)		20.90	
Alpha	1.00	Stream Power (N/m s)		24.66	
Frctn Loss (m)	0.19	Cum Volume (1000 m3)		3.94	
C & E Loss (m)	0.01	Cum SA (1000 m2)		15.38	

Plan: Plan River_Pidocchios River_Pidocchios RS: 455.91 Profile: PF 1

E.G. Elev (m)	77.18	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.		0.030	
W.S. Elev (m)	77.16	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)		Flow Area (m2)		50.12	
E.G. Slope (m/m)	0.001970	Area (m2)		50.12	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	166.43	Top Width (m)		166.43	
Vel Total (m/s)	0.67	Avg. Vel. (m/s)		0.67	
Max Chl Dpth (m)	0.46	Hydr. Depth (m)		0.30	
Conv. Total (m3/s)	750.5	Conv. (m3/s)		750.5	
Length Wtd. (m)	50.00	Wetted Per. (m)		166.44	
Min Ch El (m)	76.70	Shear (N/m2)		5.84	

Plan: Plan River_Pidocchios River_Pidocchios RS: 455.91 Profile: PF 1 (Continued)

Alpha	1.00	Stream Power (N/m s)		3.89	
Frctn Loss (m)	0.19	Cum Volume (1000 m3)		1.98	
C & E Loss (m)	0.00	Cum SA (1000 m2)		7.72	

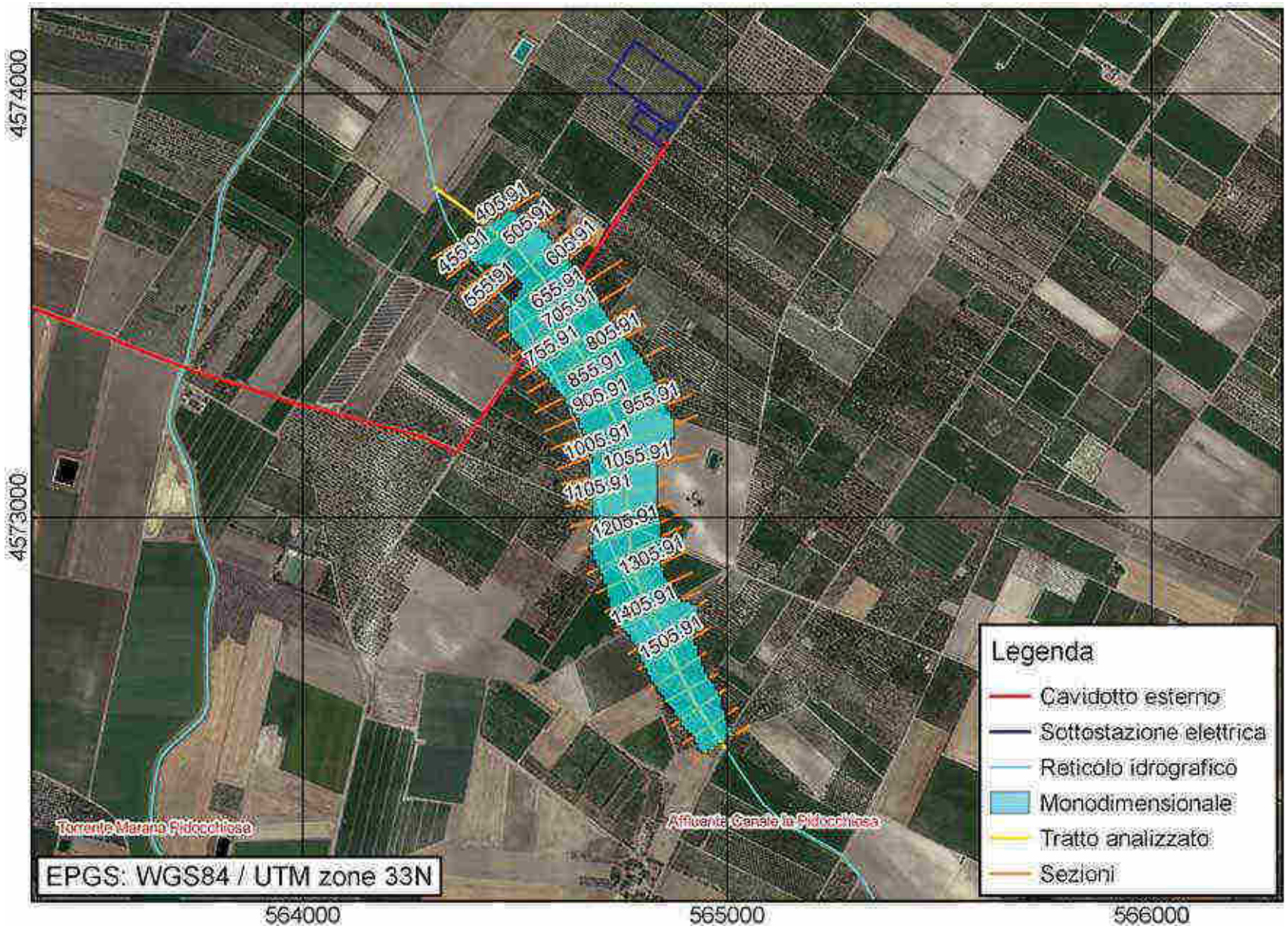
Plan: Plan River_Pidocchios River_Pidocchios RS: 405.91 Profile: PF 1

E.G. Elev (m)	76.99	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.		0.030	
W.S. Elev (m)	76.92	Reach Len. (m)			
Crit W.S. (m)	76.89	Flow Area (m2)		28.96	
E.G. Slope (m/m)	0.010011	Area (m2)		28.96	
Q Total (m3/s)	33.39	Flow (m3/s)		33.39	
Top Width (m)	142.46	Top Width (m)		142.46	
Vel Total (m/s)	1.15	Avg. Vel. (m/s)		1.15	
Max Chl Dpth (m)	0.30	Hydr. Depth (m)		0.20	
Conv. Total (m3/s)	333.7	Conv. (m3/s)		333.7	
Length Wtd. (m)		Wetted Per. (m)		142.46	
Min Ch El (m)	76.62	Shear (N/m2)		19.96	
Alpha	1.00	Stream Power (N/m s)		23.01	
Frctn Loss (m)		Cum Volume (1000 m3)			
C & E Loss (m)		Cum SA (1000 m2)			

HEC-RAS Plan: Plan River: River_Pidocchios Reach: River_Pidocchios Profile: PF 1

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
River_Pidocchios	1755.91	PF 1	33.39	88.33	89.42	89.02	89.60	0.014284	1.58	21.00	30.38	1.01
River_Pidocchios	1705.91	PF 1	33.39	85.10	85.51	85.51	85.73	0.038483	2.07	16.11	63.26	1.65
River_Pidocchios	1655.91	PF 1	33.39	84.55	84.88	84.52	84.96	0.007501	1.25	27.82	104.30	0.74
River_Pidocchios	1605.91	PF 1	33.39	84.24	84.65		84.71	0.008617	1.05	31.18	125.39	0.69
River_Pidocchios	1555.91	PF 1	33.39	83.94	84.21		84.27	0.009205	1.05	31.79	124.22	0.69
River_Pidocchios	1505.91	PF 1	33.39	83.51	83.79	83.76	83.88	0.015238	1.35	25.27	127.54	0.88
River_Pidocchios	1455.91	PF 1	33.39	83.00	83.31		83.36	0.007475	0.98	34.11	172.20	0.70
River_Pidocchios	1405.91	PF 1	33.39	82.50	82.82		82.87	0.007947	1.03	32.27	167.02	0.75
River_Pidocchios	1355.91	PF 1	33.39	82.21	82.55		82.60	0.005587	1.02	32.88	149.10	0.68
River_Pidocchios	1305.91	PF 1	33.39	81.79	82.09	82.07	82.16	0.011008	1.19	28.26	144.31	0.85
River_Pidocchios	1255.91	PF 1	33.39	81.39	81.70		81.75	0.006321	0.94	35.44	167.31	0.65
River_Pidocchios	1205.91	PF 1	33.39	81.37	81.40		81.44	0.006634	0.91	36.52	175.48	0.64
River_Pidocchios	1155.91	PF 1	33.39	80.60	80.90	80.80	80.98	0.014509	1.27	26.34	147.78	0.96
River_Pidocchios	1105.91	PF 1	33.39	80.14	80.47	80.41	80.52	0.006518	0.96	34.72	155.36	0.69
River_Pidocchios	1055.91	PF 1	33.39	79.75	80.01	80.00	80.09	0.013209	1.19	28.11	161.02	0.91
River_Pidocchios	1005.91	PF 1	33.39	79.36	79.67		79.71	0.008640	0.78	42.50	305.82	0.56
River_Pidocchios	955.91	PF 1	33.39	79.12	79.45		79.48	0.004384	0.77	40.08	205.44	0.54
River_Pidocchios	905.91	PF 1	33.39	78.90	79.28		79.31	0.002945	0.69	48.28	204.23	0.45
River_Pidocchios	855.91	PF 1	33.39	78.79	79.15		79.18	0.002094	0.62	53.91	208.88	0.39
River_Pidocchios	805.91	PF 1	33.39	78.80	79.07		79.09	0.001743	0.58	57.15	200.24	0.36
River_Pidocchios	755.91	PF 1	33.39	78.53	78.93		78.91	0.001718	0.50	67.07	203.59	0.31
River_Pidocchios	705.91	PF 1	33.39	78.46	78.85		78.86	0.001051	0.50	67.01	214.52	0.28
River_Pidocchios	655.91	PF 1	33.39	78.48	78.85		78.87	0.002894	0.88	44.36	296.62	0.45
River_Pidocchios	605.91	PF 1	33.39	78.25	78.58		78.63	0.00890	0.97	34.45	190.06	0.75
River_Pidocchios	555.91	PF 1	33.39	77.61	77.86	77.81	78.05	0.015028	1.34	24.81	125.58	1.01
River_Pidocchios	505.91	PF 1	33.39	76.91	77.32	77.20	77.59	0.010211	1.19	28.21	129.88	0.84
River_Pidocchios	455.91	PF 1	33.39	76.70	77.19		77.19	0.007071	0.87	38.12	169.40	0.39
River_Pidocchios	405.91	PF 1	33.39	76.62	76.92	76.89	76.99	0.010011	1.15	28.96	142.46	0.82

Figura 17. Planimetria con individuazione delle sezioni e delle aree potenzialmente interessate dalla portata avente tr = 200 anni



Canale Biasifiocco

Il tratto del Canale Biasifiocco oggetto di indagine è ubicato in prossimità dell'aerogeneratore "WTG9". Lungo questo tratto sono presenti un canale tombato con diametro 1000 mm (codice sezione in HEC-RAS - RS = 3141, Figura 18) e due ponti (codice sezioni in HEC-RAS - RS = 1497 e 233, Figure 19 e 20). Dai risultati dell'analisi monodimensionale si osserva come l'alveo attualmente esistente risulta adeguato al trasporto della portata avente tempo di ritorno 200 anni. Come è possibile osservare nella rappresentazione in A3 (Figura 22), non è coinvolto nessun aerogeneratore.

Foto a monte del canale tombato (HEC-RAS - RS = 3141)

Foto a valle del canale tombato (HEC-RAS - RS = 3141)

Foto del canale tombato (HEC-RAS - RS = 3141)

Foto a monte del ponte (HEC-RAS - RS = 1497)

Foto a valle del ponte (HEC-RAS - RS = 1497)

Foto del ponte (HEC-RAS - RS = 1497)

Foto a monte del ponte (HEC-RAS - RS = 233)

Foto a valle del ponte (HEC-RAS - RS = 233)

Foto del ponte (HEC-RAS - RS = 233)

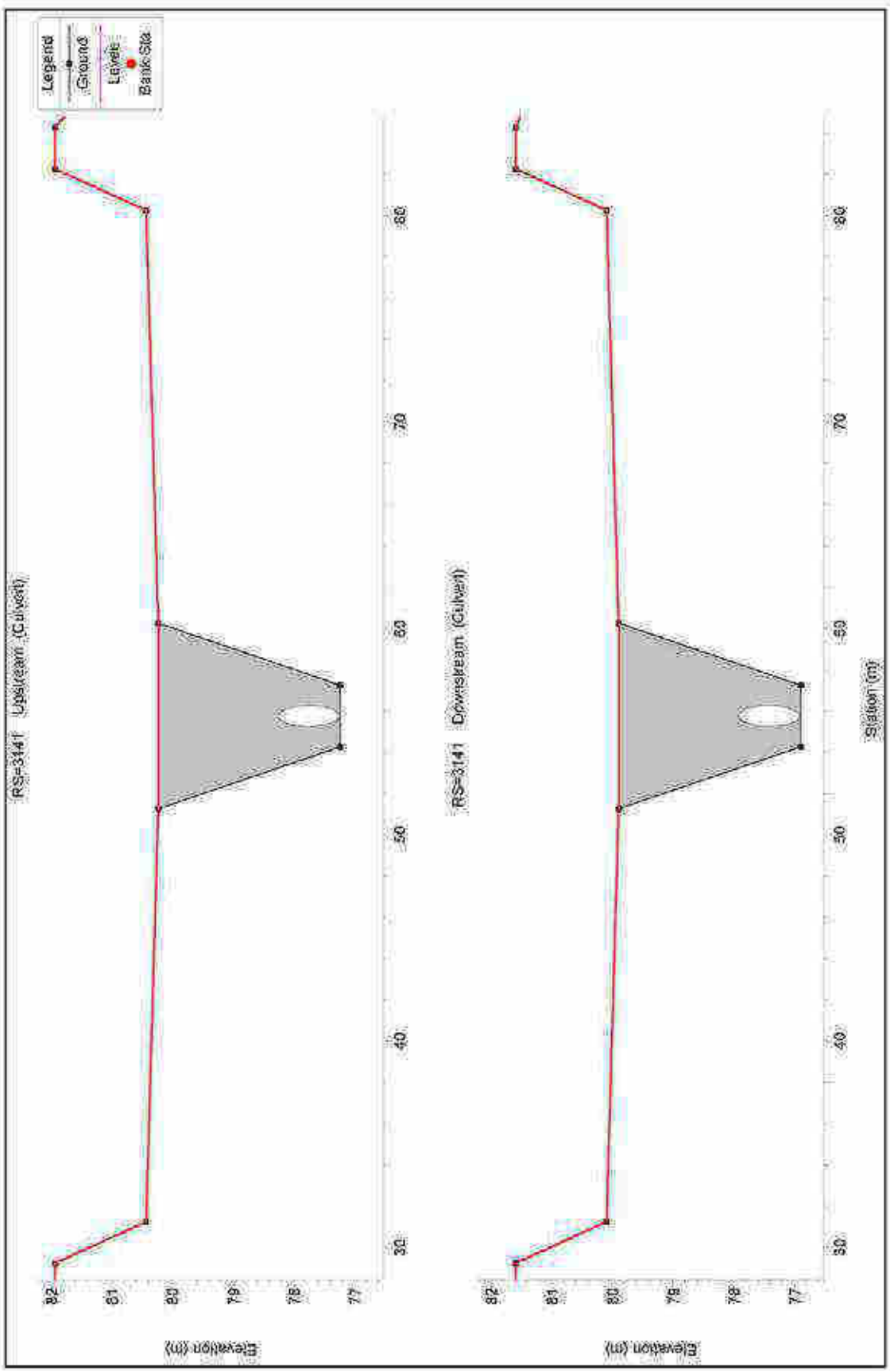


Figura 18. Modellazione in HEC-RAS del canale tombato RS = 3141: Upstream (Sezione a monte) – Downstream (Sezione a valle)

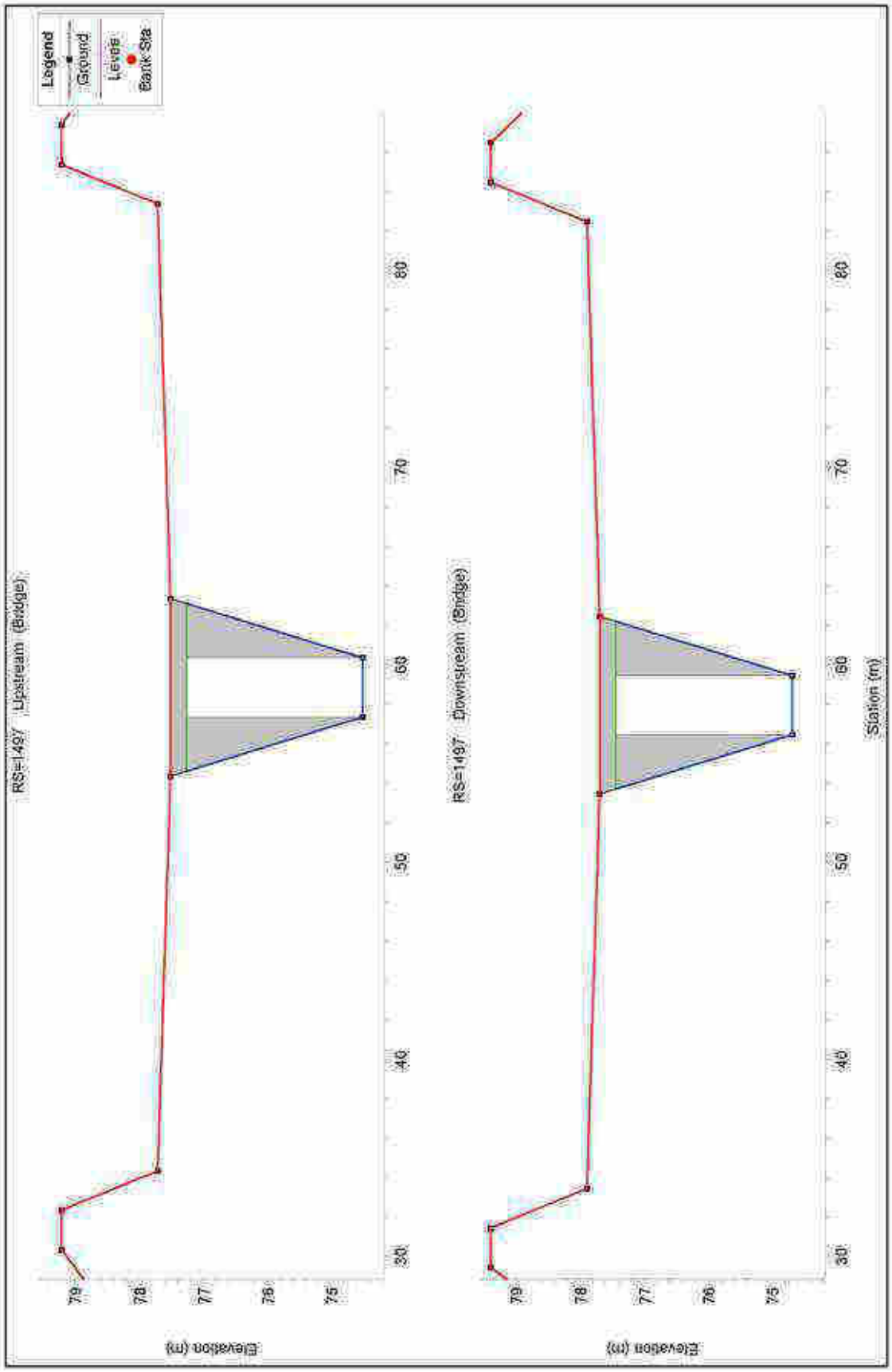


Figura 19. Modellazione in HEC-RAS del ponte RS = 1497: Upstream (Sezione a monte) – Downstream (Sezione a valle)

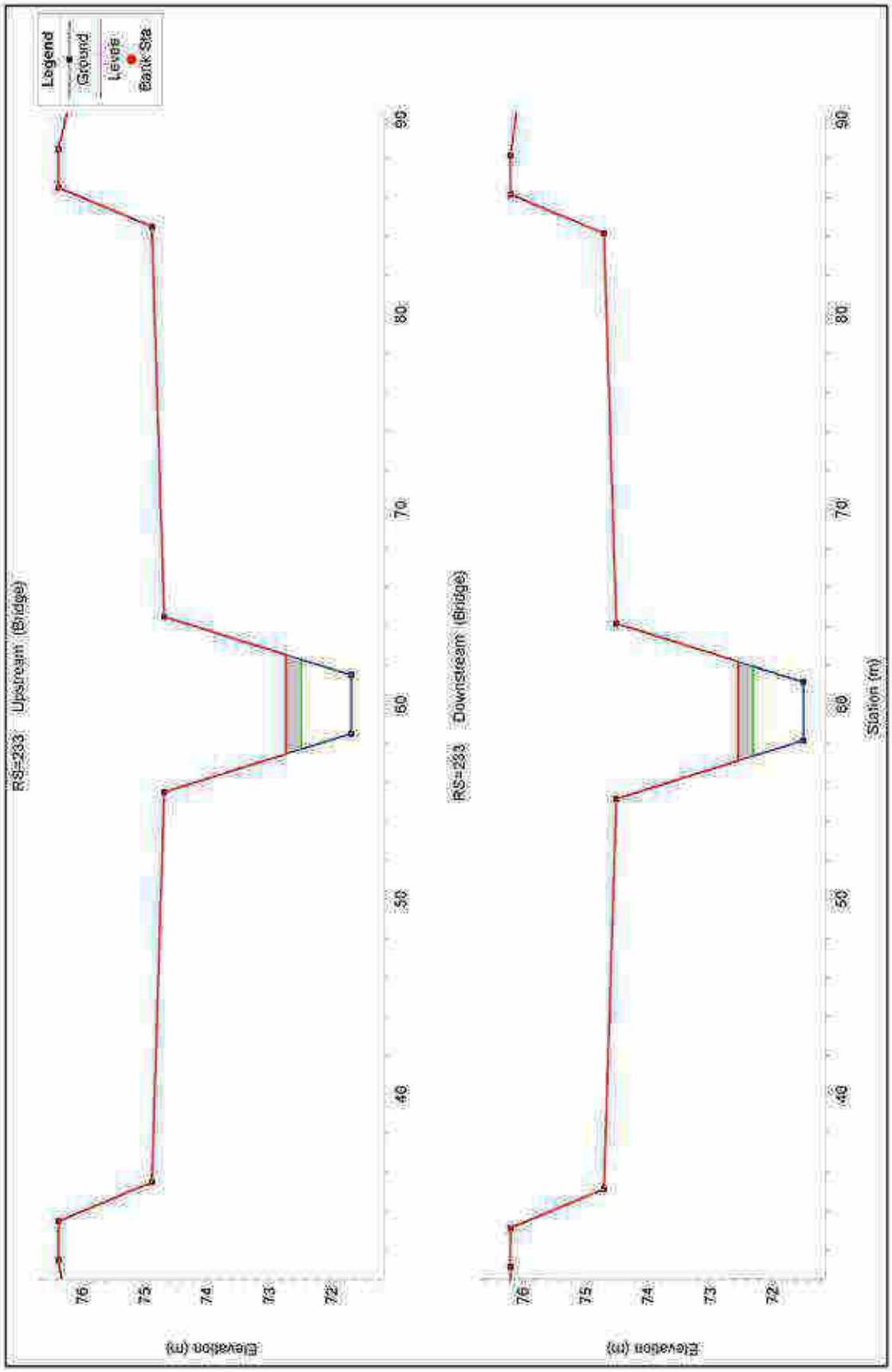


Figura 20. Modellazione in HEC-RAS del ponte RS = 1497: Upstream (Sezione a monte) – Downstream (Sezione a valle)

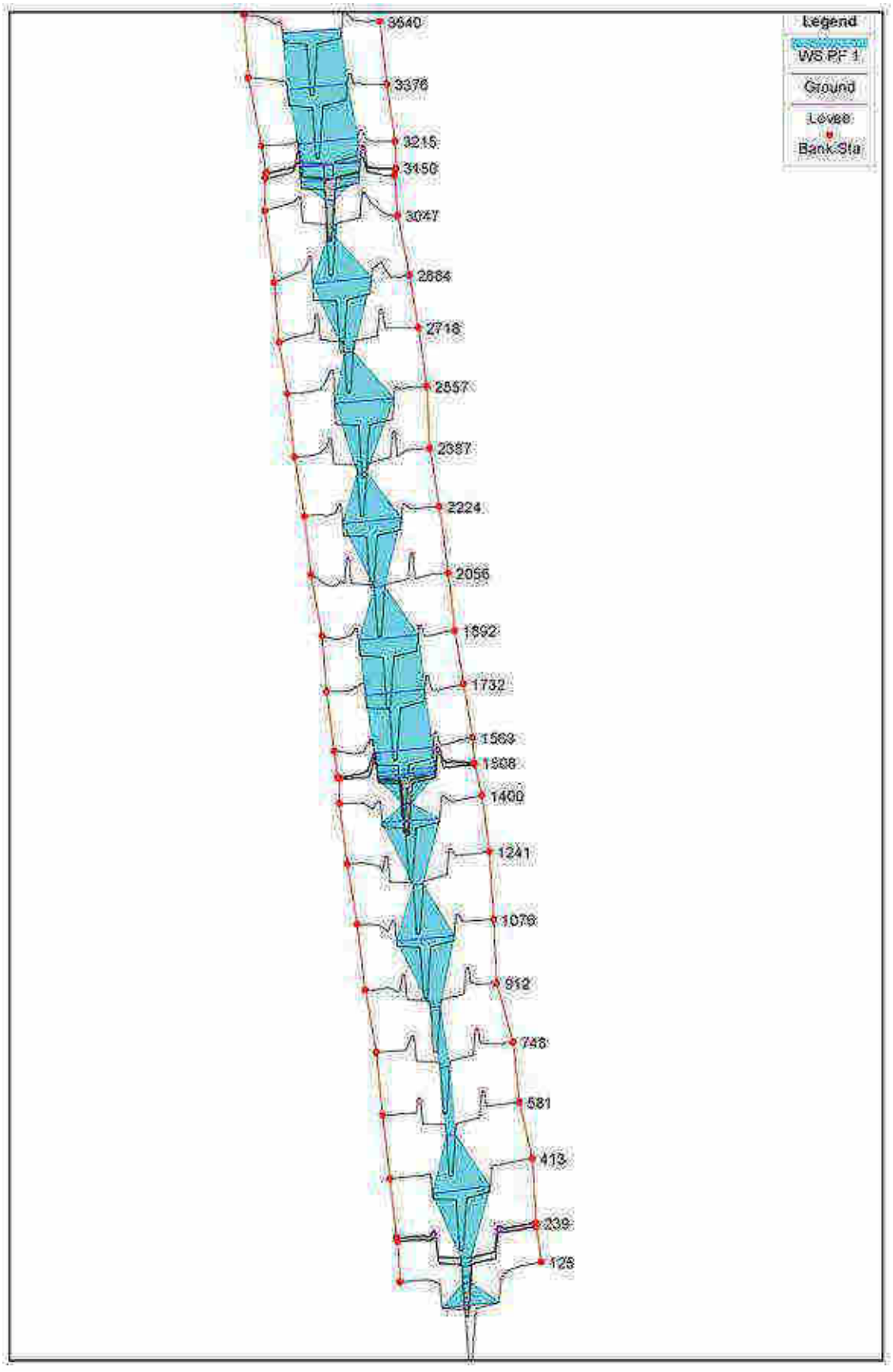
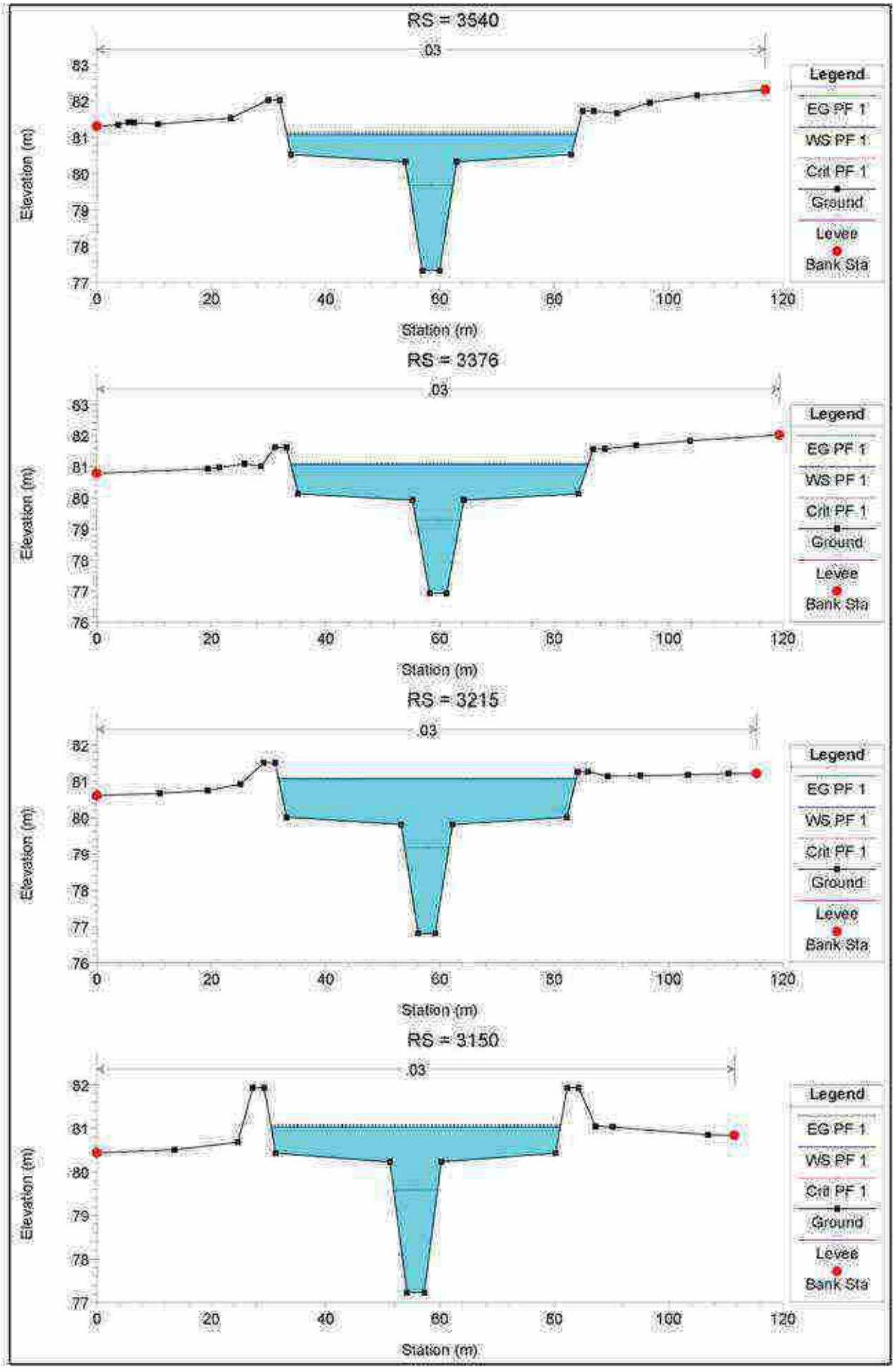
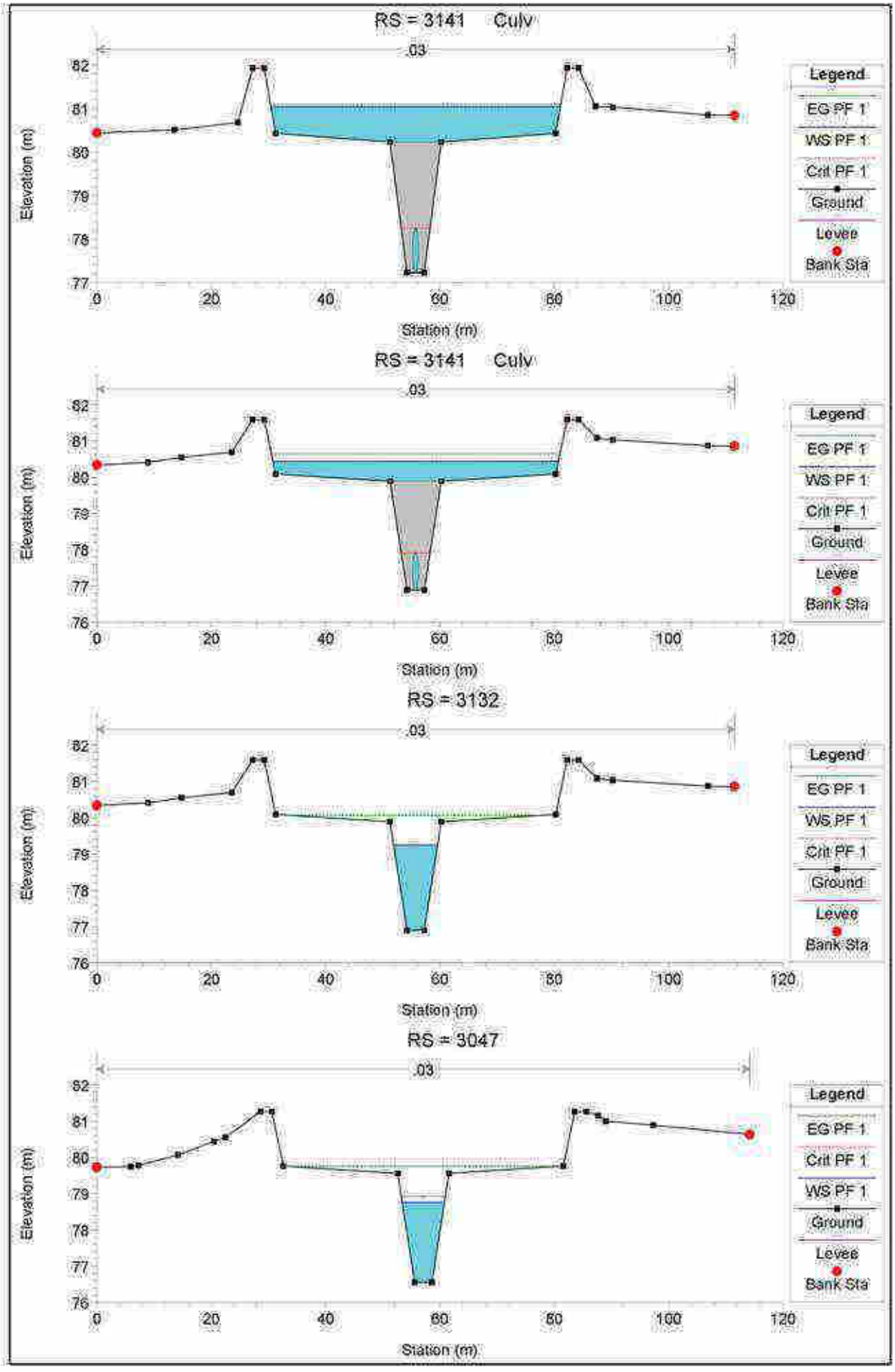
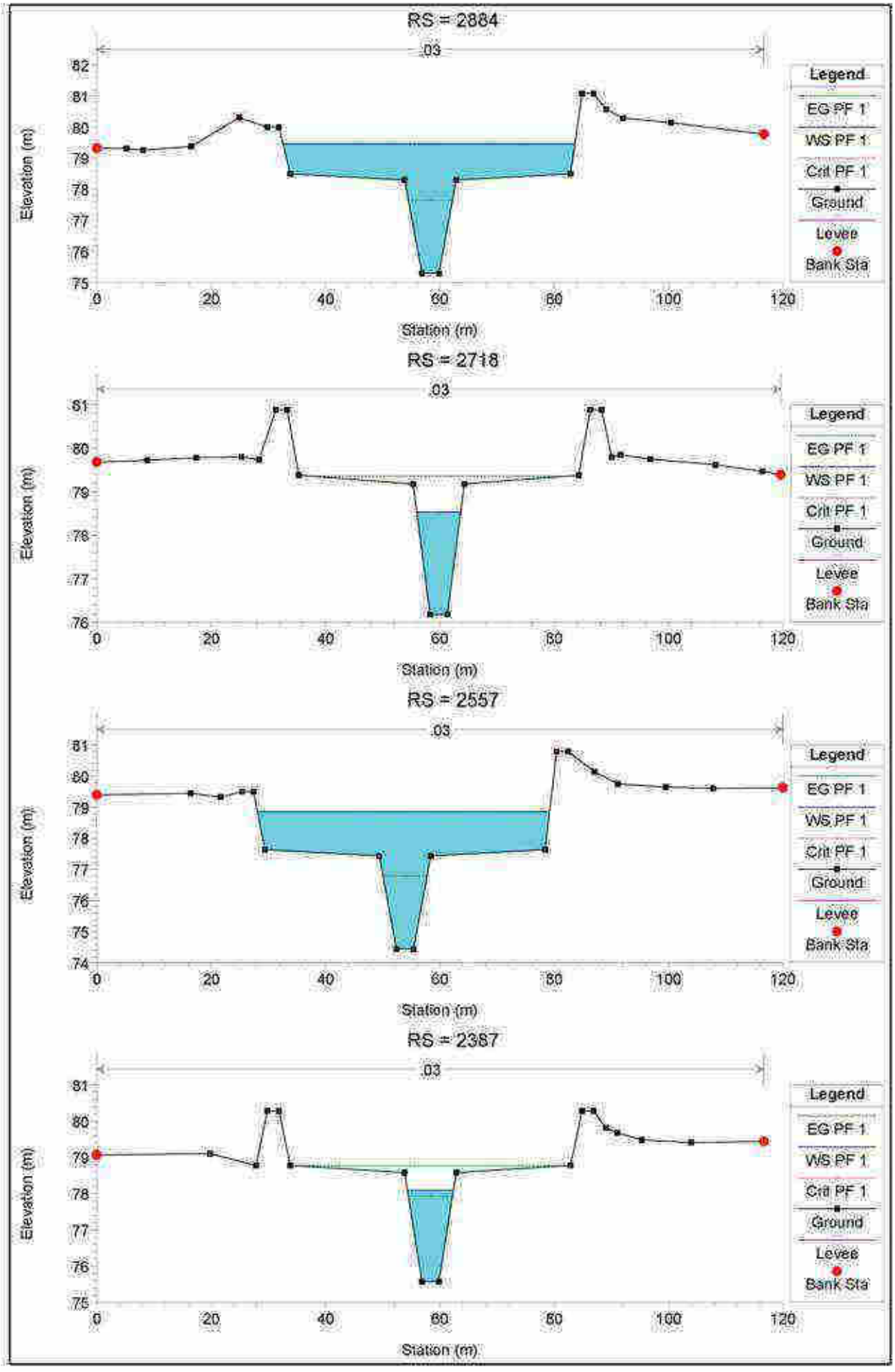
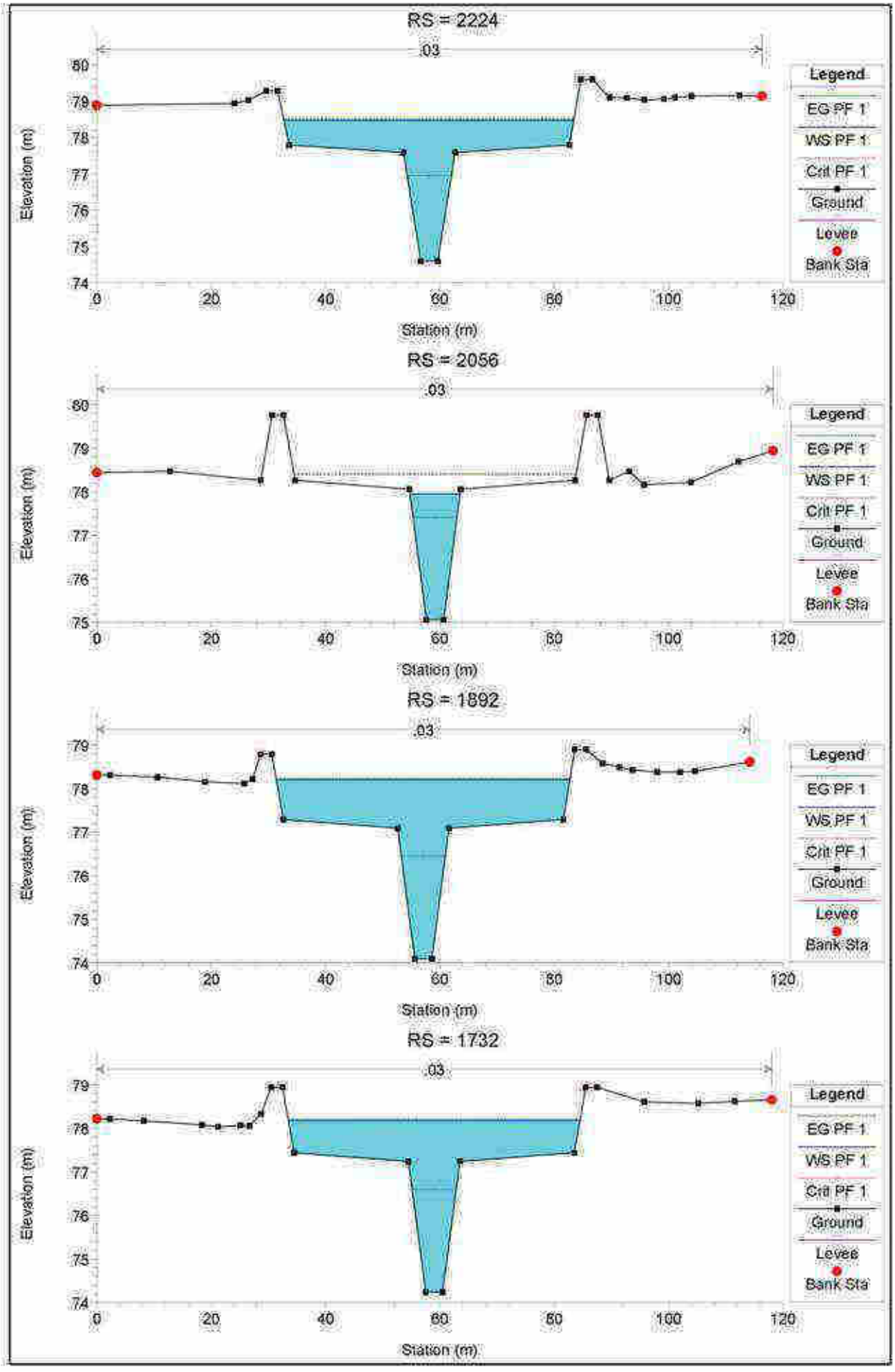


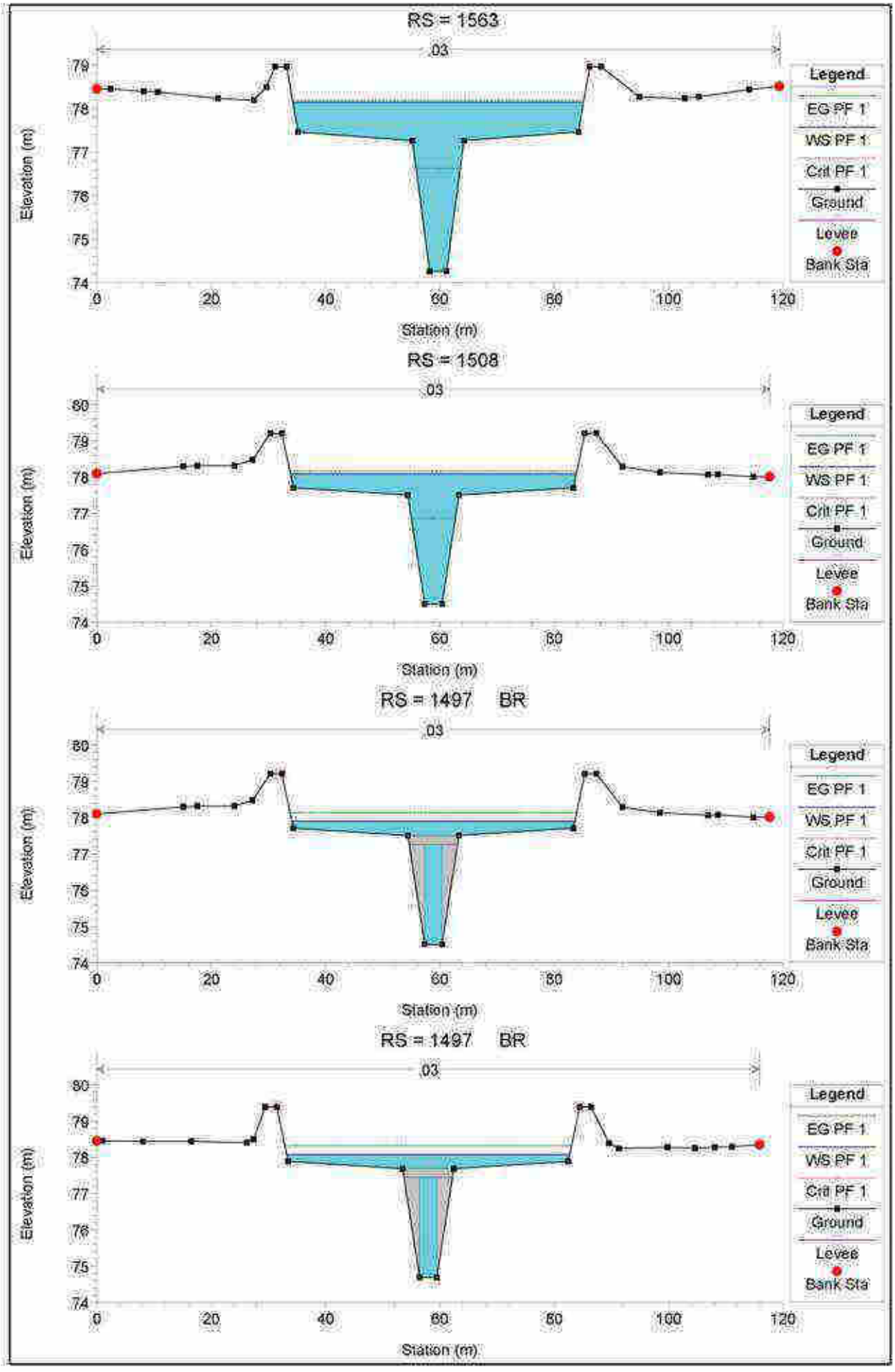
Figura 21. Rappresentazione 3D

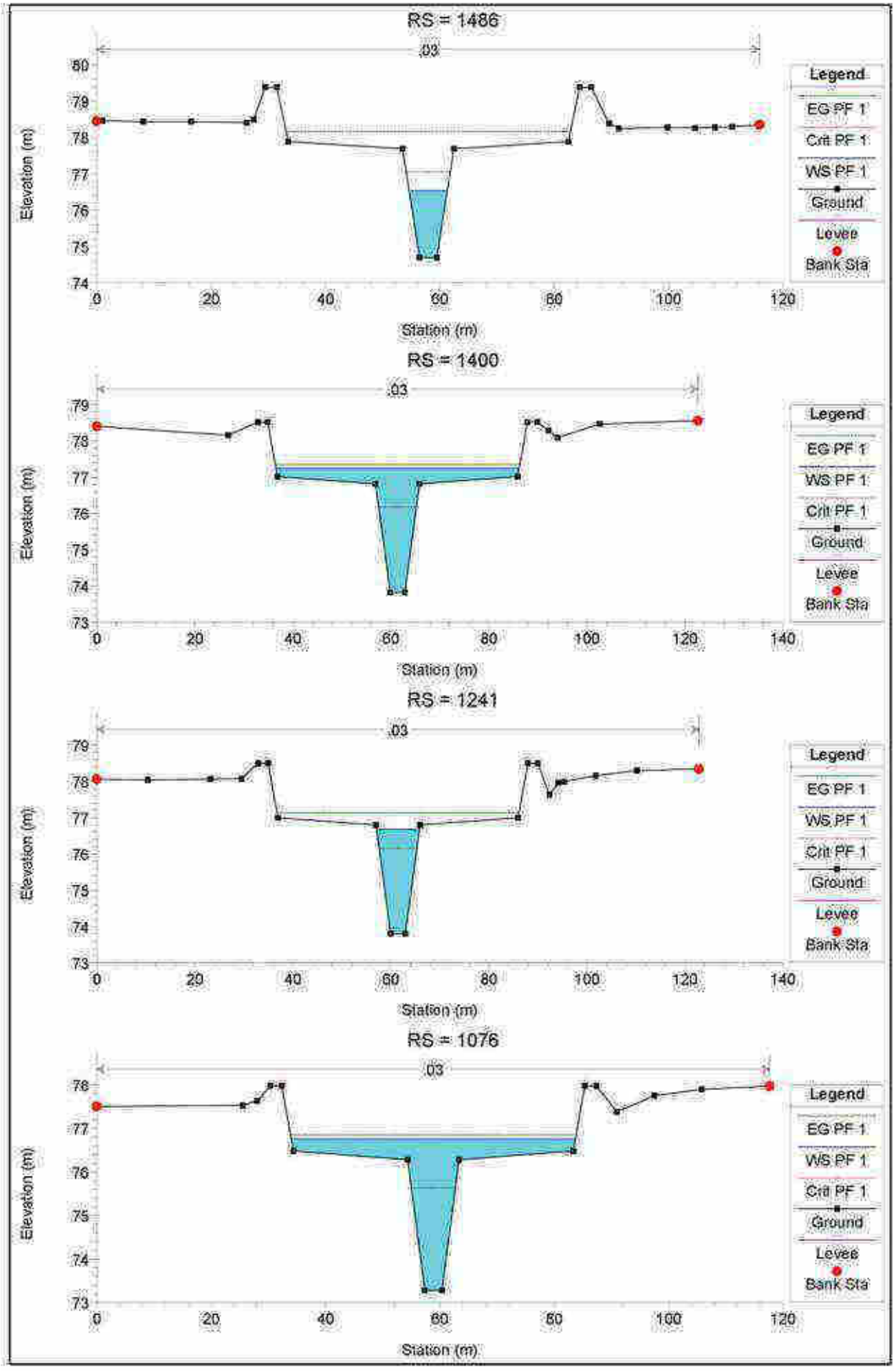

RS = 3540
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 3376
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 3215
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 3150
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)

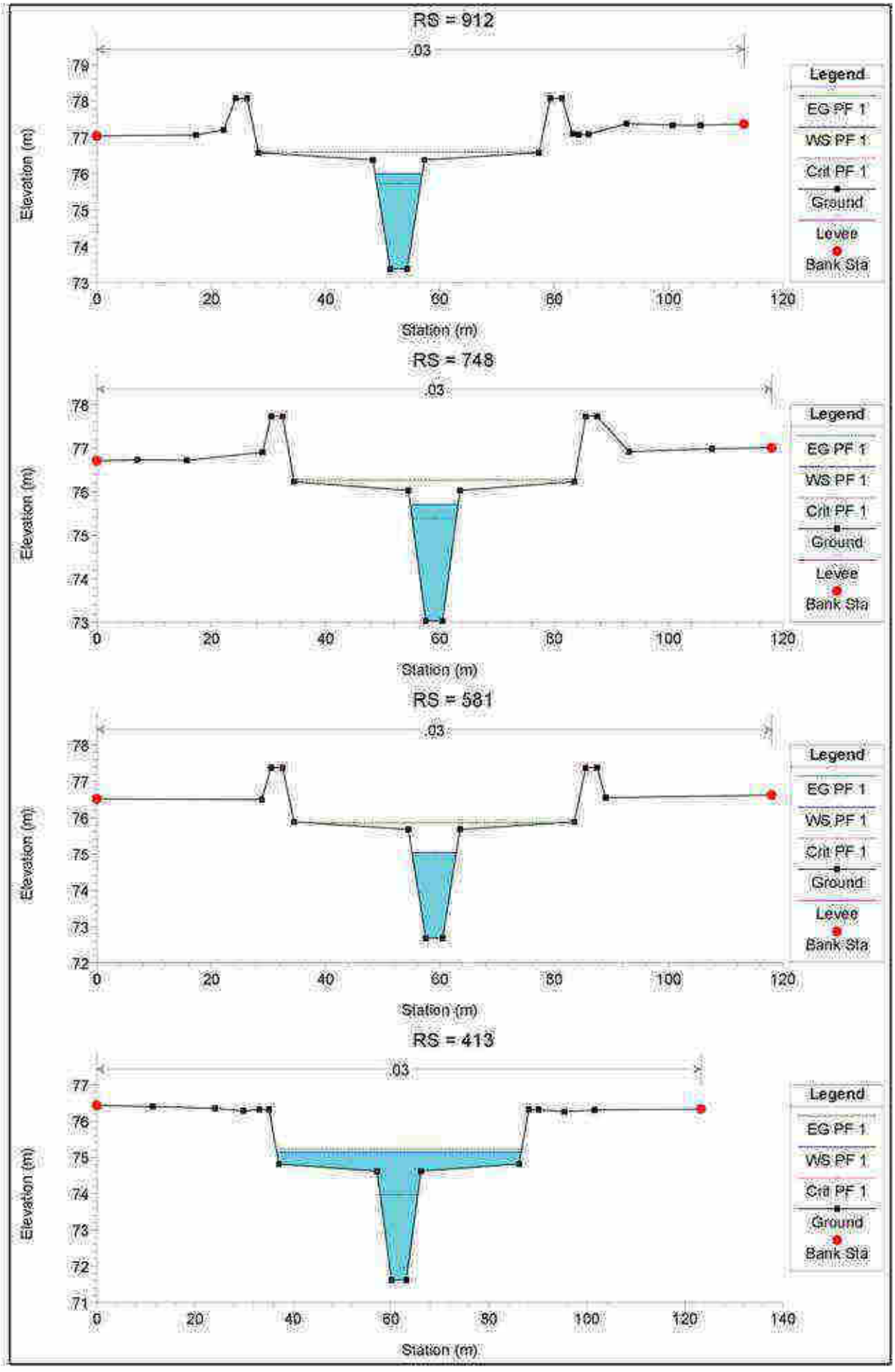

RS = 3141 Culv
.03
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
RS = 3141 Culv
.03
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
RS = 3132
.03
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
RS = 3047
.03
Elevation (m)
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta

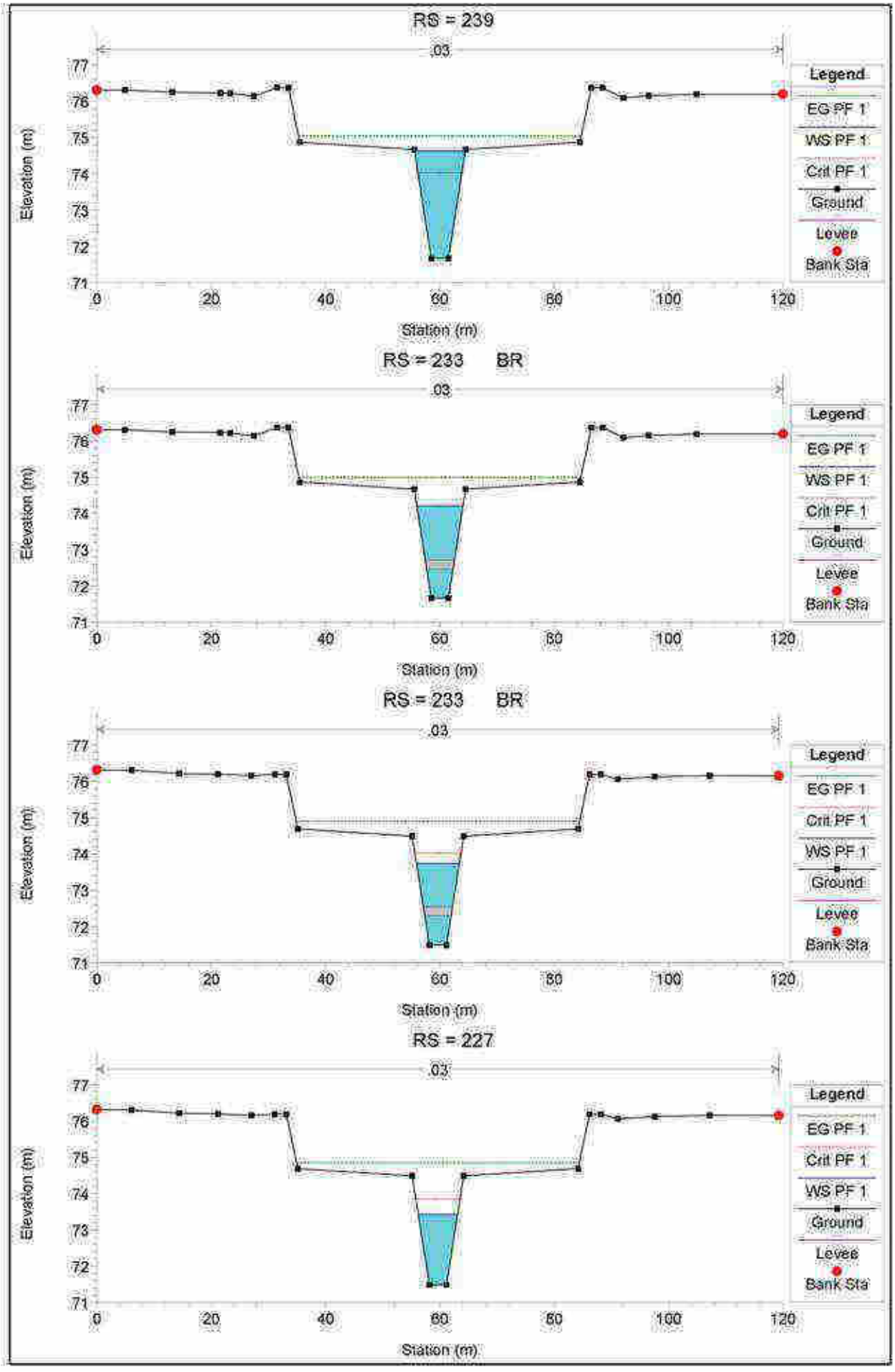

RS = 2884
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 2718
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 2557
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 2387
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)

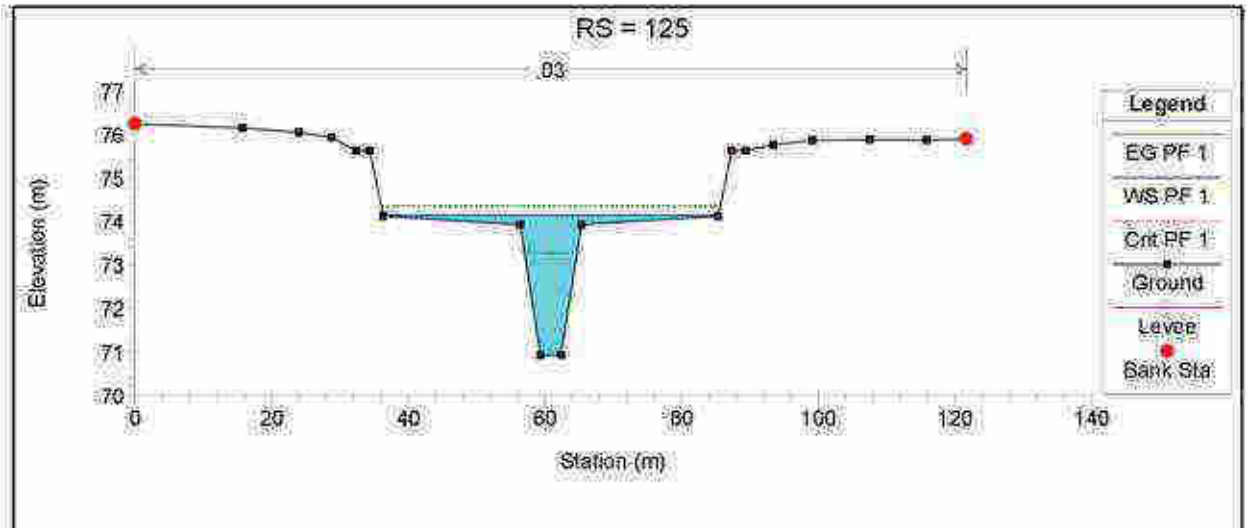

RS = 2224
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 2056
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 1892
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 1732
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)


RS = 1563
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 1508
RS = 1497 BR
RS = 1497 BR


RS = 1486
03
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 1400
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 1241
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 1076
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)


RS = 912
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 748
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 581
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 413
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


RS = 239
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 233 BR
.03
RS = 233 BR
.03
RS = 227
.03



HEC-RAS Plan: Plan 02 River: River 1 Reach: Reach 1 Profile: PF 1

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)	
Reach 1	3540	PF 1	50.68	77.33	81.09	79.86	81.14	0.000868	0.98	51.80	50.67	0.31
Reach 1	3379	PF 1	50.68	78.93	81.06	79.26	81.10	0.000314	0.71	71.73	51.97	0.19
Reach 1	3215	PF 1	50.68	76.81	81.07	79.17	81.09	0.000246	0.65	77.26	52.04	0.17
Reach 1	3150	PF 1	50.68	77.22	81.05	78.59	81.08	0.000764	0.94	53.93	50.81	0.29
Reach 1	3141		Culvert									
Reach 1	3132	PF 1	50.68	78.89	78.25	78.25	80.07	0.019987	4.09	12.84	7.72	1.00
Reach 1	3047	PF 1	50.68	76.56	78.75	78.50	79.76	0.010102	4.41	11.48	7.41	1.13
Reach 1	2884	PF 1	50.68	75.39	79.46	77.95	79.48	0.000311	0.71	71.59	51.01	0.19
Reach 1	2716	PF 1	50.68	76.16	78.54	78.54	79.06	0.010117	4.01	12.63	7.71	1.00
Reach 1	2557	PF 1	50.68	74.44	76.85	76.90	78.87	0.008162	0.66	84.36	51.07	0.15
Reach 1	2397	PF 1	50.68	75.58	76.10	77.94	78.77	0.007809	3.64	13.90	8.04	0.88
Reach 1	2224	PF 1	50.68	74.39	76.47	76.36	78.51	0.000636	0.88	57.74	50.66	0.28
Reach 1	2086	PF 1	50.68	75.06	77.95	77.42	78.40	0.004537	2.67	17.02	8.78	0.68
Reach 1	1892	PF 1	50.68	74.09	76.20	76.45	78.23	0.000342	0.73	69.69	51.36	0.20
Reach 1	1732	PF 1	50.68	74.24	76.17	76.40	78.21	0.000540	0.84	60.48	50.96	0.25
Reach 1	1583	PF 1	50.68	74.29	76.14	76.62	78.18	0.000628	0.86	57.75	50.61	0.26
Reach 1	1508	PF 1	50.68	74.51	76.09	76.87	78.16	0.001764	1.19	42.48	50.01	0.41
Reach 1	1497		Bridge									
Reach 1	1486	PF 1	50.68	74.69	76.64	77.05	78.17	0.025697	5.63	8.99	8.69	1.56
Reach 1	1460	PF 1	50.68	73.82	77.24	76.16	77.33	0.003243	1.45	34.89	49.60	0.55
Reach 1	1241	PF 1	50.68	73.30	76.67	76.16	77.15	0.004862	3.00	16.85	8.74	0.89
Reach 1	1075	PF 1	50.68	73.28	76.75	75.94	76.85	0.002572	1.35	37.45	49.74	0.50
Reach 1	912	PF 1	50.68	73.38	76.09	75.74	76.60	0.006878	3.43	14.74	8.24	0.82
Reach 1	748	PF 1	50.68	73.03	75.71	75.39	76.27	0.006160	3.33	15.19	8.35	0.79
Reach 1	581	PF 1	50.68	72.68	75.04	75.04	75.86	0.018012	5.99	12.60	7.79	1.00
Reach 1	413	PF 1	50.68	71.62	75.15	73.97	75.23	0.002870	1.26	40.03	49.88	0.45
Reach 1	232	PF 1	50.68	71.87	74.62	74.06	75.04	0.004169	2.88	17.57	8.90	0.65
Reach 1	233		Bridge									
Reach 1	227	PF 1	50.68	71.49	73.48	73.96	74.66	0.021558	5.36	9.55	8.67	1.44
Reach 1	123	PF 1	50.68	70.92	74.14	73.27	74.35	0.010006	2.04	24.75	49.05	0.92

Plan: Plan 02 River 1 Reach 1 RS: 3540 Profile: PF 1

E.G. Elev (m)	81.14	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.		0.030	
W.S. Elev (m)	81.09	Reach Len. (m)	49.80	49.80	49.80
Crit W.S. (m)	79.65	Flow Area (m2)		51.60	
E.G. Slope (m/m)	0.000908	Area (m2)		51.60	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	50.57	Top Width (m)		50.57	
Vel Total (m/s)	0.98	Avg. Vel. (m/s)		0.98	
Max Chl Dpth (m)	3.75	Hydr. Depth (m)		1.02	
Conv. Total (m3/s)	1679.0	Conv. (m3/s)		1679.0	
Length Wtd. (m)	49.80	Wetted Per. (m)		53.59	
Min Ch El (m)	77.33	Shear (N/m2)		6.59	
Alpha	1.00	Stream Power (N/m s)		8.42	
Frctn Loss (m)	0.02	Cum Volume (1000 m3)		40.22	
C & E Loss (m)	0.01	Cum SA (1000 m2)		32.99	

Plan: Plan 02 River 1 Reach 1 RS: 3376 Profile: PF 1

E.G. Elev (m)	81.10	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.		0.030	
W.S. Elev (m)	81.08	Reach Len. (m)	49.10	49.10	49.10
Crit W.S. (m)	79.29	Flow Area (m2)		71.73	
E.G. Slope (m/m)	0.000314	Area (m2)		71.73	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	51.97	Top Width (m)		51.97	
Vel Total (m/s)	0.71	Avg. Vel. (m/s)		0.71	
Max Chl Dpth (m)	4.15	Hydr. Depth (m)		1.38	
Conv. Total (m3/s)	2853.4	Conv. (m3/s)		2853.4	
Length Wtd. (m)	49.10	Wetted Per. (m)		55.02	
Min Ch El (m)	76.93	Shear (N/m2)		4.02	
Alpha	1.00	Stream Power (N/m s)		2.84	
Frctn Loss (m)	0.01	Cum Volume (1000 m3)		37.15	
C & E Loss (m)	0.00	Cum SA (1000 m2)		30.44	

Plan: Plan 02 River 1 Reach 1 RS: 3215 Profile: PF 1

E.G. Elev (m)	81.09	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.		0.030	
W.S. Elev (m)	81.07	Reach Len. (m)	19.80	19.80	19.80
Crit W.S. (m)	79.17	Flow Area (m2)		77.26	
E.G. Slope (m/m)	0.000246	Area (m2)		77.26	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	52.04	Top Width (m)		52.04	
Vel Total (m/s)	0.65	Avg. Vel. (m/s)		0.65	
Max Chl Dpth (m)	4.28	Hydr. Depth (m)		1.48	
Conv. Total (m3/s)	3223.0	Conv. (m3/s)		3223.0	
Length Wtd. (m)	19.80	Wetted Per. (m)		55.19	
Min Ch El (m)	76.81	Shear (N/m2)		3.38	
Alpha	1.00	Stream Power (N/m s)		2.22	
Frctn Loss (m)	0.01	Cum Volume (1000 m3)		33.49	
C & E Loss (m)	0.00	Cum SA (1000 m2)		27.88	

Plan: Plan 02 River 1 Reach 1 RS: 3150 Profile: PF 1

E.G. Elev (m)	81.08	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.		0.030	
W.S. Elev (m)	81.03	Reach Len. (m)	5.40	5.40	5.40
Crit W.S. (m)	79.59	Flow Area (m2)		53.93	
E.G. Slope (m/m)	0.000784	Area (m2)		53.93	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	

Plan: Plan 02 River 1 Reach 1 RS: 3150 Profile: PF 1 (Continued)

Top Width (m)	50.61	Top Width (m)		50.61	
Vel Total (m/s)	0.94	Avg. Vel. (m/s)		0.94	
Max Chl Dpth (m)	3.81	Hydr. Depth (m)		1.07	
Conv. Total (m3/s)	1807.2	Conv. (m3/s)		1807.2	
Length Wtd. (m)	5.40	Wetted Per. (m)		53.50	
Min Ch El (m)	77.23	Shear (N/m2)		7.75	
Alpha	1.00	Stream Power (N/m s)		7.27	
Frctn Loss (m)		Cum Volume (1000 m3)		32.19	
C & E Loss (m)		Cum SA (1000 m2)		26.87	

Plan: Plan 02 River 1 Reach 1 RS: 3132 Profile: PF 1

E.G. Elev (m)	80.07	Element	Left OB	Channel	Right OB
Vel Head (m)	0.82	Wt. n-Val.		0.030	
W.S. Elev (m)	79.25	Reach Len. (m)	25.80	25.80	25.80
Crit W.S. (m)	79.25	Flow Area (m2)		12.64	
E.G. Slope (m/m)	0.010097	Area (m2)		12.64	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	7.72	Top Width (m)		7.72	
Vel Total (m/s)	4.00	Avg. Vel. (m/s)		4.00	
Max Chl Dpth (m)	2.36	Hydr. Depth (m)		1.64	
Conv. Total (m3/s)	503.6	Conv. (m3/s)		503.6	
Length Wtd. (m)	25.80	Wetted Per. (m)		9.87	
Min Ch El (m)	76.89	Shear (N/m2)		129.40	
Alpha	1.00	Stream Power (N/m s)		518.05	
Frctn Loss (m)	0.30	Cum Volume (1000 m3)		31.95	
C & E Loss (m)	0.02	Cum SA (1000 m2)		26.71	

Plan: Plan 02 River 1 Reach 1 RS: 3047 Profile: PF 1

E.G. Elev (m)	79.75	Element	Left OB	Channel	Right OB
Vel Head (m)	0.99	Wt. n-Val.		0.030	
W.S. Elev (m)	78.76	Reach Len. (m)	49.60	49.60	49.60
Crit W.S. (m)	78.92	Flow Area (m2)		11.48	
E.G. Slope (m/m)	0.013102	Area (m2)		11.48	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	7.41	Top Width (m)		7.41	
Vel Total (m/s)	4.41	Avg. Vel. (m/s)		4.41	
Max Chl Dpth (m)	2.20	Hydr. Depth (m)		1.55	
Conv. Total (m3/s)	442.1	Conv. (m3/s)		442.1	
Length Wtd. (m)	49.60	Wetted Per. (m)		9.24	
Min Ch El (m)	76.56	Shear (N/m2)		159.63	
Alpha	1.00	Stream Power (N/m s)		703.91	
Frctn Loss (m)	0.04	Cum Volume (1000 m3)		31.63	
C & E Loss (m)	0.21	Cum SA (1000 m2)		26.52	

Plan: Plan 02 River 1 Reach 1 RS: 2884 Profile: PF 1

E.G. Elev (m)	79.48	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.		0.030	
W.S. Elev (m)	79.46	Reach Len. (m)	50.60	50.60	50.60
Crit W.S. (m)	77.85	Flow Area (m2)		71.56	
E.G. Slope (m/m)	0.000311	Area (m2)		71.56	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	51.01	Top Width (m)		51.01	
Vel Total (m/s)	0.71	Avg. Vel. (m/s)		0.71	
Max Chl Dpth (m)	4.16	Hydr. Depth (m)		1.40	
Conv. Total (m3/s)	2867.9	Conv. (m3/s)		2867.9	
Length Wtd. (m)	50.60	Wetted Per. (m)		54.29	
Min Ch El (m)	75.30	Shear (N/m2)		4.02	

Plan: Plan 02 River 1 Reach 1 RS: 2884 Profile: PF 1 (Continued)

Alpha	1.00	Stream Power (N/m s)		2.85	
Frctn Loss (m)	0.05	Cum Volume (1000 m3)		29.56	
C & E Loss (m)	0.08	Cum SA (1000 m2)		25.07	

Plan: Plan 02 River 1 Reach 1 RS: 2718 Profile: PF 1

E.G. Elev (m)	79.38	Element	Left OB	Channel	Right OB
Vel Head (m)	0.82	Wt. n-Val.		0.030	
W.S. Elev (m)	78.54	Reach Len. (m)	49.20	49.20	49.20
Crit W.S. (m)	78.54	Flow Area (m2)		12.63	
E.G. Slope (m/m)	0.010117	Area (m2)		12.63	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	7.71	Top Width (m)		7.71	
Vel Total (m/s)	4.01	Avg. Vel. (m/s)		4.01	
Max Chl Dpth (m)	2.36	Hydr. Depth (m)		1.64	
Conv. Total (m3/s)	503.1	Conv. (m3/s)		503.1	
Length Wtd. (m)	49.20	Wetted Per. (m)		9.67	
Min Ch El (m)	76.18	Shear (N/m2)		129.60	
Alpha	1.00	Stream Power (N/m s)		519.25	
Frctn Loss (m)	0.03	Cum Volume (1000 m3)		27.45	
C & E Loss (m)	0.24	Cum SA (1000 m2)		23.58	

Plan: Plan 02 River 1 Reach 1 RS: 2557 Profile: PF 1

E.G. Elev (m)	78.87	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.		0.030	
W.S. Elev (m)	78.85	Reach Len. (m)	51.90	51.90	51.90
Crit W.S. (m)	76.80	Flow Area (m2)		84.36	
E.G. Slope (m/m)	0.000182	Area (m2)		84.36	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	51.07	Top Width (m)		51.07	
Vel Total (m/s)	0.60	Avg. Vel. (m/s)		0.60	
Max Chl Dpth (m)	4.41	Hydr. Depth (m)		1.65	
Conv. Total (m3/s)	3753.5	Conv. (m3/s)		3753.5	
Length Wtd. (m)	51.90	Wetted Per. (m)		54.70	
Min Ch El (m)	74.44	Shear (N/m2)		2.75	
Alpha	1.00	Stream Power (N/m s)		1.65	
Frctn Loss (m)	0.03	Cum Volume (1000 m3)		25.06	
C & E Loss (m)	0.07	Cum SA (1000 m2)		22.13	

Plan: Plan 02 River 1 Reach 1 RS: 2367 Profile: PF 1

E.G. Elev (m)	78.77	Element	Left OB	Channel	Right OB
Vel Head (m)	0.68	Wt. n-Val.		0.030	
W.S. Elev (m)	78.10	Reach Len. (m)	49.70	49.70	49.70
Crit W.S. (m)	77.94	Flow Area (m2)		13.90	
E.G. Slope (m/m)	0.007809	Area (m2)		13.90	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	8.04	Top Width (m)		8.04	
Vel Total (m/s)	3.64	Avg. Vel. (m/s)		3.64	
Max Chl Dpth (m)	2.52	Hydr. Depth (m)		1.73	
Conv. Total (m3/s)	572.6	Conv. (m3/s)		572.6	
Length Wtd. (m)	49.70	Wetted Per. (m)		10.13	
Min Ch El (m)	75.58	Shear (N/m2)		105.18	
Alpha	1.00	Stream Power (N/m s)		382.68	
Frctn Loss (m)	0.08	Cum Volume (1000 m3)		22.51	
C & E Loss (m)	0.19	Cum SA (1000 m2)		20.60	

Plan: Plan 02 River 1 Reach 1 RS: 2224 Profile: PF 1

E.G. Elev (m)	78.51	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.		0.030	
W.S. Elev (m)	78.47	Reach Len. (m)	51.30	51.30	51.30
Crit W.S. (m)	76.95	Flow Area (m2)		57.74	
E.G. Slope (m/m)	0.000626	Area (m2)		57.74	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	50.66	Top Width (m)		50.66	
Vel Total (m/s)	0.88	Avg. Vel. (m/s)		0.88	
Max Chl Dpth (m)	3.68	Hydr. Depth (m)		1.14	
Conv. Total (m3/s)	2021.8	Conv. (m3/s)		2021.8	
Length Wtd. (m)	51.30	Wetted Per. (m)		53.64	
Min Ch El (m)	74.59	Shear (N/m2)		6.61	
Alpha	1.00	Stream Power (N/m s)		5.79	
Frctn Loss (m)	0.07	Cum Volume (1000 m3)		20.73	
C & E Loss (m)	0.04	Cum SA (1000 m2)		19.14	

Plan: Plan 02 River 1 Reach 1 RS: 2066 Profile: PF 1

E.G. Elev (m)	78.40	Element	Left OB	Channel	Right OB
Vel Head (m)	0.45	Wt. n-Val.		0.030	
W.S. Elev (m)	77.95	Reach Len. (m)	50.10	50.10	50.10
Crit W.S. (m)	77.42	Flow Area (m2)		17.02	
E.G. Slope (m/m)	0.004537	Area (m2)		17.02	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	8.78	Top Width (m)		8.78	
Vel Total (m/s)	2.97	Avg. Vel. (m/s)		2.97	
Max Chl Dpth (m)	2.89	Hydr. Depth (m)		1.94	
Conv. Total (m3/s)	751.2	Conv. (m3/s)		751.2	
Length Wtd. (m)	50.10	Wetted Per. (m)		11.17	
Min Ch El (m)	75.06	Shear (N/m2)		67.78	
Alpha	1.00	Stream Power (N/m s)		201.46	
Frctn Loss (m)	0.04	Cum Volume (1000 m3)		18.81	
C & E Loss (m)	0.13	Cum SA (1000 m2)		17.62	

Plan: Plan 02 River 1 Reach 1 RS: 1892 Profile: PF 1

E.G. Elev (m)	78.23	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.		0.030	
W.S. Elev (m)	78.20	Reach Len. (m)	48.80	48.80	48.80
Crit W.S. (m)	76.45	Flow Area (m2)		69.69	
E.G. Slope (m/m)	0.000342	Area (m2)		69.69	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	51.36	Top Width (m)		51.36	
Vel Total (m/s)	0.73	Avg. Vel. (m/s)		0.73	
Max Chl Dpth (m)	4.11	Hydr. Depth (m)		1.36	
Conv. Total (m3/s)	2737.6	Conv. (m3/s)		2737.6	
Length Wtd. (m)	48.80	Wetted Per. (m)		54.47	
Min Ch El (m)	74.09	Shear (N/m2)		4.29	
Alpha	1.00	Stream Power (N/m s)		3.11	
Frctn Loss (m)	0.02	Cum Volume (1000 m3)		16.64	
C & E Loss (m)	0.00	Cum SA (1000 m2)		16.11	

Plan: Plan 02 River 1 Reach 1 RS: 1732 Profile: PF 1

E.G. Elev (m)	78.21	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.		0.030	
W.S. Elev (m)	78.17	Reach Len. (m)	51.50	51.50	51.50
Crit W.S. (m)	76.60	Flow Area (m2)		60.49	
E.G. Slope (m/m)	0.000540	Area (m2)		60.49	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	

Plan: Plan 02 River 1 Reach 1 RS: 1732 Profile: PF 1 (Continued)

Top Width (m)	50.96	Top Width (m)		50.96	
Vel Total (m/s)	0.84	Avg. Vel. (m/s)		0.84	
Max Chl Dpth (m)	3.93	Hydr. Depth (m)		1.19	
Conv. Total (m3/s)	2176.8	Conv. (m3/s)		2176.8	
Length Wtd. (m)	51.50	Wetted Per. (m)		53.93	
Min Ch El (m)	74.24	Shear (N/m2)		5.94	
Alpha	1.00	Stream Power (N/m s)		4.97	
Frctn Loss (m)	0.03	Cum Volume (1000 m3)		13.46	
C & E Loss (m)	0.00	Cum SA (1000 m2)		13.61	

Plan: Plan 02 River 1 Reach 1 RS: 1563 Profile: PF 1

E.G. Elev (m)	78.15	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.		0.030	
W.S. Elev (m)	78.14	Reach Len. (m)	16.80	16.80	16.80
Crit W.S. (m)	76.52	Flow Area (m2)		57.75	
E.G. Slope (m/m)	0.000628	Area (m2)		57.75	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	50.81	Top Width (m)		50.81	
Vel Total (m/s)	0.88	Avg. Vel. (m/s)		0.88	
Max Chl Dpth (m)	3.88	Hydr. Depth (m)		1.14	
Conv. Total (m3/s)	2019.0	Conv. (m3/s)		2019.0	
Length Wtd. (m)	16.80	Wetted Per. (m)		53.75	
Min Ch El (m)	74.25	Shear (N/m2)		6.62	
Alpha	1.00	Stream Power (N/m s)		5.80	
Frctn Loss (m)	0.02	Cum Volume (1000 m3)		10.42	
C & E Loss (m)	0.00	Cum SA (1000 m2)		10.99	

Plan: Plan 02 River 1 Reach 1 RS: 1508 Profile: PF 1

E.G. Elev (m)	78.15	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.		0.030	
W.S. Elev (m)	78.09	Reach Len. (m)	1.00	1.00	1.00
Crit W.S. (m)	76.87	Flow Area (m2)		42.48	
E.G. Slope (m/m)	0.001704	Area (m2)		42.48	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	50.01	Top Width (m)		50.01	
Vel Total (m/s)	1.19	Avg. Vel. (m/s)		1.19	
Max Chl Dpth (m)	3.56	Hydr. Depth (m)		0.85	
Conv. Total (m3/s)	1225.8	Conv. (m3/s)		1225.8	
Length Wtd. (m)	1.00	Wetted Per. (m)		52.75	
Min Ch El (m)	74.51	Shear (N/m2)		13.46	
Alpha	1.00	Stream Power (N/m s)		16.03	
Frctn Loss (m)	0.00	Cum Volume (1000 m3)		9.58	
C & E Loss (m)	0.02	Cum SA (1000 m2)		10.15	

Plan: Plan 02 River 1 Reach 1 RS: 1497 BR U Profile: PF 1

E.G. Elev (m)	78.14	Element	Left OB	Channel	Right OB
Vel Head (m)	0.24	Wt. n-Val.		0.030	
W.S. Elev (m)	77.90	Reach Len. (m)	5.00	5.00	5.00
Crit W.S. (m)	77.90	Flow Area (m2)		23.52	
E.G. Slope (m/m)	0.014995	Area (m2)		23.52	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	49.51	Top Width (m)		49.51	
Vel Total (m/s)	2.15	Avg. Vel. (m/s)		2.15	
Max Chl Dpth (m)	3.39	Hydr. Depth (m)		0.48	
Conv. Total (m3/s)	413.2	Conv. (m3/s)		413.2	
Length Wtd. (m)	5.00	Wetted Per. (m)		61.49	
Min Ch El (m)	74.51	Shear (N/m2)		56.26	

Plan: Plan 02 River 1 Reach 1 RS: 1497 BR U Profile: PF 1 (Continued)

Alpha	1.00	Stream Power (N/m s)		121.01	
Frctn Loss (m)		Cum Volume (1000 m3)		9.54	
C & E Loss (m)		Cum SA (1000 m2)		10.10	

Plan: Plan 02 River 1 Reach 1 RS: 1497 BR D Profile: PF 1

E.G. Elev (m)	78.32	Element	Left OB	Channel	Right OB
Vel Head (m)	0.24	Wt. n-Val.		0.030	
W.S. Elev (m)	78.08	Reach Len. (m)	0.60	0.60	0.60
Crit W.S. (m)	78.08	Flow Area (m2)		23.52	
E.G. Slope (m/m)	0.015053	Area (m2)		23.52	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	49.51	Top Width (m)		49.51	
Vel Total (m/s)	2.15	Avg. Vel. (m/s)		2.15	
Max Chl Dpth (m)	3.39	Hydr. Depth (m)		0.47	
Conv. Total (m3/s)	412.4	Conv. (m3/s)		412.4	
Length Wtd. (m)	0.60	Wetted Per. (m)		51.62	
Min Ch El (m)	74.69	Shear (N/m2)		56.33	
Alpha	1.00	Stream Power (N/m s)		121.21	
Frctn Loss (m)	0.08	Cum Volume (1000 m3)		9.43	
C & E Loss (m)	0.00	Cum SA (1000 m2)		9.85	

Plan: Plan 02 River 1 Reach 1 RS: 1486 Profile: PF 1

E.G. Elev (m)	78.17	Element	Left OB	Channel	Right OB
Vel Head (m)	1.63	Wt. n-Val.		0.030	
W.S. Elev (m)	76.54	Reach Len. (m)	26.30	26.30	26.30
Crit W.S. (m)	77.05	Flow Area (m2)		8.95	
E.G. Slope (m/m)	0.025697	Area (m2)		8.95	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	6.69	Top Width (m)		6.69	
Vel Total (m/s)	5.65	Avg. Vel. (m/s)		5.65	
Max Chl Dpth (m)	1.85	Hydr. Depth (m)		1.34	
Conv. Total (m3/s)	315.7	Conv. (m3/s)		315.7	
Length Wtd. (m)	26.30	Wetted Per. (m)		8.22	
Min Ch El (m)	74.69	Shear (N/m2)		274.27	
Alpha	1.00	Stream Power (N/m s)		1550.63	
Frctn Loss (m)	0.14	Cum Volume (1000 m3)		9.42	
C & E Loss (m)	0.21	Cum SA (1000 m2)		9.83	

Plan: Plan 02 River 1 Reach 1 RS: 1460 Profile: PF 1

E.G. Elev (m)	77.35	Element	Left OB	Channel	Right OB
Vel Head (m)	0.11	Wt. n-Val.		0.030	
W.S. Elev (m)	77.24	Reach Len. (m)	48.40	48.40	48.40
Crit W.S. (m)	76.18	Flow Area (m2)		34.89	
E.G. Slope (m/m)	0.003243	Area (m2)		34.89	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	49.60	Top Width (m)		49.60	
Vel Total (m/s)	1.45	Avg. Vel. (m/s)		1.45	
Max Chl Dpth (m)	3.42	Hydr. Depth (m)		0.70	
Conv. Total (m3/s)	888.6	Conv. (m3/s)		888.6	
Length Wtd. (m)	48.40	Wetted Per. (m)		52.24	
Min Ch El (m)	73.82	Shear (N/m2)		21.24	
Alpha	1.00	Stream Power (N/m s)		30.81	
Frctn Loss (m)	0.19	Cum Volume (1000 m3)		8.84	
C & E Loss (m)	0.04	Cum SA (1000 m2)		9.09	

Plan: Plan 02 River 1 Reach 1 RS: 1241 Profile: PF 1

E.G. Elev (m)	77.13	Element	Left OB	Channel	Right OB
Vel Head (m)	0.46	Wt. n-Val.		0.030	
W.S. Elev (m)	76.67	Reach Len. (m)	50.40	50.40	50.40
Crit W.S. (m)	76.18	Flow Area (m2)		16.85	
E.G. Slope (m/m)	0.004662	Area (m2)		16.85	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	8.74	Top Width (m)		8.74	
Vel Total (m/s)	3.00	Avg. Vel. (m/s)		3.00	
Max Chl Dpth (m)	2.87	Hydr. Depth (m)		1.93	
Conv. Total (m3/s)	741.1	Conv. (m3/s)		741.1	
Length Wtd. (m)	50.40	Wetted Per. (m)		11.12	
Min Ch El (m)	73.80	Shear (N/m2)		69.29	
Alpha	1.00	Stream Power (N/m s)		208.06	
Frctn Loss (m)	0.17	Cum Volume (1000 m3)		7.59	
C & E Loss (m)	0.11	Cum SA (1000 m2)		7.68	

Plan: Plan 02 River 1 Reach 1 RS: 1078 Profile: PF 1

E.G. Elev (m)	76.85	Element	Left OB	Channel	Right OB
Vel Head (m)	0.09	Wt. n-Val.		0.030	
W.S. Elev (m)	76.76	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)	75.84	Flow Area (m2)		37.45	
E.G. Slope (m/m)	0.002572	Area (m2)		37.45	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	49.74	Top Width (m)		49.74	
Vel Total (m/s)	1.35	Avg. Vel. (m/s)		1.35	
Max Chl Dpth (m)	3.48	Hydr. Depth (m)		0.75	
Conv. Total (m3/s)	997.8	Conv. (m3/s)		997.8	
Length Wtd. (m)	50.00	Wetted Per. (m)		52.41	
Min Ch El (m)	73.28	Shear (N/m2)		18.02	
Alpha	1.00	Stream Power (N/m s)		24.35	
Frctn Loss (m)	0.20	Cum Volume (1000 m3)		6.22	
C & E Loss (m)	0.05	Cum SA (1000 m2)		6.21	

Plan: Plan 02 River 1 Reach 1 RS: 912 Profile: PF 1

E.G. Elev (m)	76.60	Element	Left OB	Channel	Right OB
Vel Head (m)	0.60	Wt. n-Val.		0.030	
W.S. Elev (m)	76.00	Reach Len. (m)	50.00	50.00	50.00
Crit W.S. (m)	75.74	Flow Area (m2)		14.74	
E.G. Slope (m/m)	0.006676	Area (m2)		14.74	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	8.24	Top Width (m)		8.24	
Vel Total (m/s)	3.43	Avg. Vel. (m/s)		3.43	
Max Chl Dpth (m)	2.62	Hydr. Depth (m)		1.79	
Conv. Total (m3/s)	619.3	Conv. (m3/s)		619.3	
Length Wtd. (m)	50.00	Wetted Per. (m)		10.42	
Min Ch El (m)	73.38	Shear (N/m2)		92.64	
Alpha	1.00	Stream Power (N/m s)		318.03	
Frctn Loss (m)	0.32	Cum Volume (1000 m3)		4.91	
C & E Loss (m)	0.01	Cum SA (1000 m2)		4.76	

Plan: Plan 02 River 1 Reach 1 RS: 748 Profile: PF 1

E.G. Elev (m)	76.27	Element	Left OB	Channel	Right OB
Vel Head (m)	0.57	Wt. n-Val.		0.030	
W.S. Elev (m)	75.71	Reach Len. (m)	50.90	50.90	50.90
Crit W.S. (m)	75.39	Flow Area (m2)		15.19	
E.G. Slope (m/m)	0.006160	Area (m2)		15.19	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	

Plan: Plan 02 River 1 Reach 1 RS: 748 Profile: PF 1 (Continued)

Top Width (m)	8.35	Top Width (m)		8.35	
Vel Total (m/s)	3.33	Avg. Vel. (m/s)		3.33	
Max Chl Dpth (m)	2.68	Hydr. Depth (m)		1.82	
Conv. Total (m3/s)	644.7	Conv. (m3/s)		644.7	
Length Wtd. (m)	50.90	Wetted Per. (m)		10.57	
Min Ch El (m)	73.03	Shear (N/m2)		86.81	
Alpha	1.00	Stream Power (N/m s)		289.23	
Frctn Loss (m)	0.39	Cum Volume (1000 m3)		4.17	
C & E Loss (m)	0.02	Cum SA (1000 m2)		4.34	

Plan: Plan 02 River 1 Reach 1 RS: 581 Profile: PF 1

E.G. Elev (m)	75.86	Element	Left OB	Channel	Right OB
Vel Head (m)	0.81	Wt. n-Val.		0.030	
W.S. Elev (m)	75.04	Reach Len. (m)	51.30	51.30	51.30
Crit W.S. (m)	75.04	Flow Area (m2)		12.68	
E.G. Slope (m/m)	0.010013	Area (m2)		12.68	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	7.73	Top Width (m)		7.73	
Vel Total (m/s)	3.99	Avg. Vel. (m/s)		3.99	
Max Chl Dpth (m)	2.38	Hydr. Depth (m)		1.64	
Conv. Total (m3/s)	505.7	Conv. (m3/s)		505.7	
Length Wtd. (m)	51.30	Wetted Per. (m)		9.69	
Min Ch El (m)	72.66	Shear (N/m2)		128.53	
Alpha	1.00	Stream Power (N/m s)		513.02	
Frctn Loss (m)	0.20	Cum Volume (1000 m3)		3.46	
C & E Loss (m)	0.22	Cum SA (1000 m2)		3.93	

Plan: Plan 02 River 1 Reach 1 RS: 413 Profile: PF 1

E.G. Elev (m)	75.23	Element	Left OB	Channel	Right OB
Vel Head (m)	0.08	Wt. n-Val.		0.030	
W.S. Elev (m)	75.15	Reach Len. (m)	53.00	53.00	53.00
Crit W.S. (m)	73.97	Flow Area (m2)		40.03	
E.G. Slope (m/m)	0.002070	Area (m2)		40.03	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	49.88	Top Width (m)		49.88	
Vel Total (m/s)	1.26	Avg. Vel. (m/s)		1.26	
Max Chl Dpth (m)	3.53	Hydr. Depth (m)		0.80	
Conv. Total (m3/s)	1112.3	Conv. (m3/s)		1112.3	
Length Wtd. (m)	53.00	Wetted Per. (m)		52.58	
Min Ch El (m)	71.62	Shear (N/m2)		15.45	
Alpha	1.00	Stream Power (N/m s)		19.53	
Frctn Loss (m)	0.15	Cum Volume (1000 m3)		2.11	
C & E Loss (m)	0.03	Cum SA (1000 m2)		2.46	

Plan: Plan 02 River 1 Reach 1 RS: 239 Profile: PF 1

E.G. Elev (m)	75.04	Element	Left OB	Channel	Right OB
Vel Head (m)	0.42	Wt. n-Val.		0.030	
W.S. Elev (m)	74.62	Reach Len. (m)	1.00	1.00	1.00
Crit W.S. (m)	74.03	Flow Area (m2)		17.57	
E.G. Slope (m/m)	0.004169	Area (m2)		17.57	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	8.90	Top Width (m)		8.90	
Vel Total (m/s)	2.88	Avg. Vel. (m/s)		2.88	
Max Chl Dpth (m)	2.95	Hydr. Depth (m)		1.97	
Conv. Total (m3/s)	783.7	Conv. (m3/s)		783.7	
Length Wtd. (m)	1.00	Wetted Per. (m)		11.35	
Min Ch El (m)	71.67	Shear (N/m2)		63.29	

Plan: Plan 02 River 1 Reach 1 RS: 239 Profile: PF 1 (Continued)

Alpha	1.00	Stream Power (N/m s)		182.29	
Frctn Loss (m)	0.01	Cum Volume (1000 m3)		0.56	
C & E Loss (m)	0.04	Cum SA (1000 m2)		0.80	

Plan: Plan 02 River 1 Reach 1 RS: 233 BR U Profile: PF 1

E.G. Elev (m)	75.00	Element	Left OB	Channel	Right OB
Vel Head (m)	0.79	Wt. n-Val.		0.030	
W.S. Elev (m)	74.21	Reach Len. (m)	2.00	2.00	2.00
Crit W.S. (m)	74.21	Flow Area (m2)		12.82	
E.G. Slope (m/m)	0.023960	Area (m2)		12.82	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	8.07	Top Width (m)		8.07	
Vel Total (m/s)	3.95	Avg. Vel. (m/s)		3.95	
Max Chl Dpth (m)	2.54	Hydr. Depth (m)		1.59	
Conv. Total (m3/s)	326.9	Conv. (m3/s)		326.9	
Length Wtd. (m)	2.00	Wetted Per. (m)		19.16	
Min Ch El (m)	71.67	Shear (N/m2)		157.20	
Alpha	1.00	Stream Power (N/m s)		620.43	
Frctn Loss (m)		Cum Volume (1000 m3)		0.56	
C & E Loss (m)		Cum SA (1000 m2)		0.89	

Plan: Plan 02 River 1 Reach 1 RS: 233 BR D Profile: PF 1

E.G. Elev (m)	74.90	Element	Left OB	Channel	Right OB
Vel Head (m)	1.16	Wt. n-Val.		0.030	
W.S. Elev (m)	73.74	Reach Len. (m)	0.70	0.70	0.70
Crit W.S. (m)	74.03	Flow Area (m2)		10.59	
E.G. Slope (m/m)	0.042773	Area (m2)		10.59	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	7.50	Top Width (m)		7.50	
Vel Total (m/s)	4.78	Avg. Vel. (m/s)		4.78	
Max Chl Dpth (m)	2.25	Hydr. Depth (m)		1.41	
Conv. Total (m3/s)	244.7	Conv. (m3/s)		244.7	
Length Wtd. (m)	0.70	Wetted Per. (m)		18.35	
Min Ch El (m)	71.49	Shear (N/m2)		242.03	
Alpha	1.00	Stream Power (N/m s)		1156.43	
Frctn Loss (m)	0.02	Cum Volume (1000 m3)		0.54	
C & E Loss (m)	0.03	Cum SA (1000 m2)		0.87	

Plan: Plan 02 River 1 Reach 1 RS: 227 Profile: PF 1

E.G. Elev (m)	74.86	Element	Left OB	Channel	Right OB
Vel Head (m)	1.43	Wt. n-Val.		0.030	
W.S. Elev (m)	73.42	Reach Len. (m)	31.10	31.10	31.10
Crit W.S. (m)	73.85	Flow Area (m2)		9.55	
E.G. Slope (m/m)	0.021553	Area (m2)		9.55	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	6.87	Top Width (m)		6.87	
Vel Total (m/s)	5.30	Avg. Vel. (m/s)		5.30	
Max Chl Dpth (m)	1.93	Hydr. Depth (m)		1.39	
Conv. Total (m3/s)	344.7	Conv. (m3/s)		344.7	
Length Wtd. (m)	31.10	Wetted Per. (m)		8.47	
Min Ch El (m)	71.49	Shear (N/m2)		238.20	
Alpha	1.00	Stream Power (N/m s)		1262.33	
Frctn Loss (m)	0.25	Cum Volume (1000 m3)		0.53	
C & E Loss (m)	0.11	Cum SA (1000 m2)		0.87	

Plan: Plan 02 River 1 Reach 1 RS: 125 Profile: PF 1

E.G. Elev (m)	74.35	Element	Left OB	Channel	Right OB
Vel Head (m)	0.21	Wt. n-Val.		0.030	
W.S. Elev (m)	74.14	Reach Len. (m)			
Crit W.S. (m)	73.27	Flow Area (m2)		24.75	
E.G. Slope (m/m)	0.010006	Area (m2)		24.75	
Q Total (m3/s)	50.60	Flow (m3/s)		50.60	
Top Width (m)	49.05	Top Width (m)		49.05	
Vel Total (m/s)	2.04	Avg. Vel. (m/s)		2.04	
Max Chl Dpth (m)	3.22	Hydr. Depth (m)		0.50	
Conv. Total (m3/s)	505.8	Conv. (m3/s)		505.8	
Length Wtd. (m)		Wetted Per. (m)		51.55	
Min Ch El (m)	70.92	Shear (N/m2)		47.11	
Alpha	1.00	Stream Power (N/m s)		96.32	
Frctn Loss (m)		Cum Volume (1000 m3)			
C & E Loss (m)		Cum SA (1000 m2)			

Figura 22. Planimetria con individuazione delle sezioni e delle aree potenzialmente interessate dalla portata avente tr = 200 anni

Canale di Bonifica

Il tratto del Canale di Bonifica ("Canale Ponticello" nella modellazione in HEC-RAS) oggetto di indagine è ubicato in prossimità dell'aerogeneratore "WTG10". Lungo questo tratto sono presenti due ponti (codice sezioni in HEC-RAS - RS = 850 e 400, Figure 23 e 24). Dai risultati dell'analisi monodimensionale si osserva come l'alveo attualmente esistente risulta adeguato al trasporto della portata avente tempo di ritorno 200 anni. A questo fa eccezione una esondazione in destra idraulica in prossimità indotta dal ponte "RS = 400" e che coinvolge anche la sezione "RS = 450.6874". Tuttavia, gli aerogeneratori del parco eolico oggetto del presente studio sono collocati in sinistra idraulica rispetto al presente Canale di Bonifica. Pertanto, l'esondazione in destra idraulica, come è possibile osservare nella rappresentazione in A3 (Figura 26), non può coinvolgere nessun aerogeneratore.

Foto a monte del ponte (HEC-RAS - RS = 850)

Foto a valle del ponte (HEC-RAS - RS = 850)

Foto a monte del ponte (HEC-RAS - RS = 400)

Foto a valle del ponte (HEC-RAS - RS = 400)

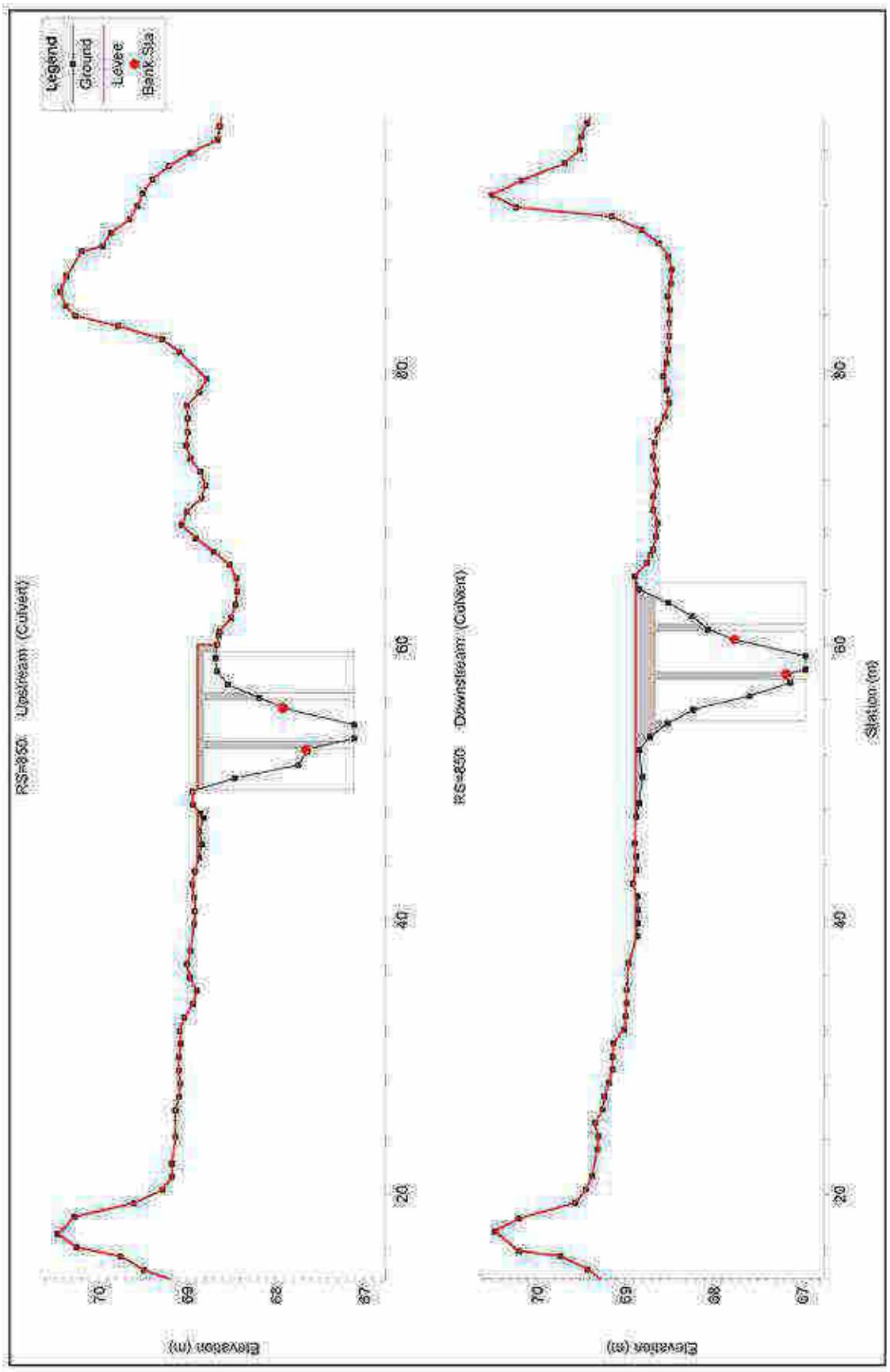


Figura 23. Modellazione in HEC-RAS del ponte RS = 850: Upstream (Sezione a monte) – Downstream (Sezione a valle)

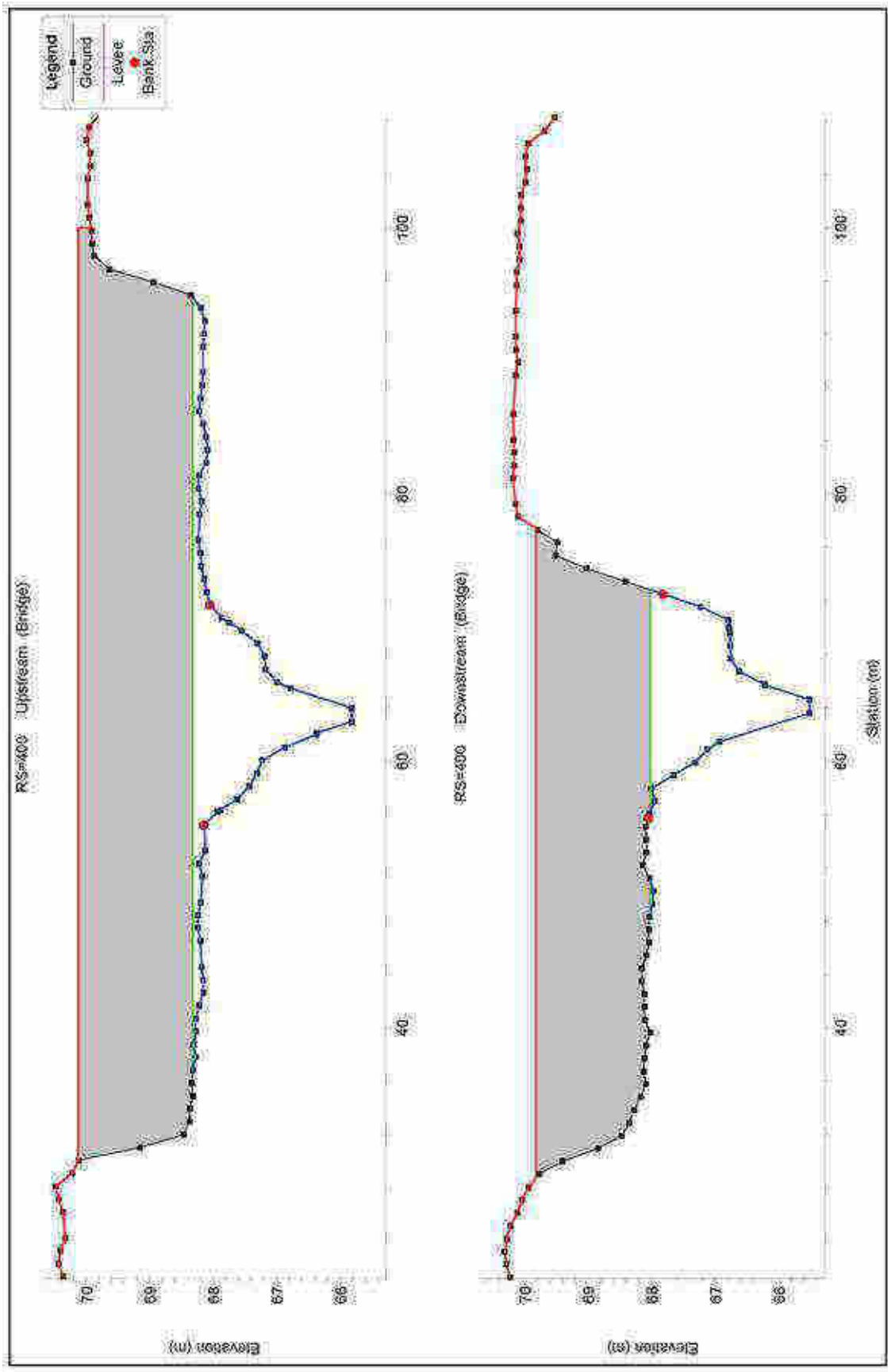


Figura 24. Modellazione in HEC-RAS del ponte RS = 400: Upstream (Sezione a monte) – Downstream (Sezione a valle)

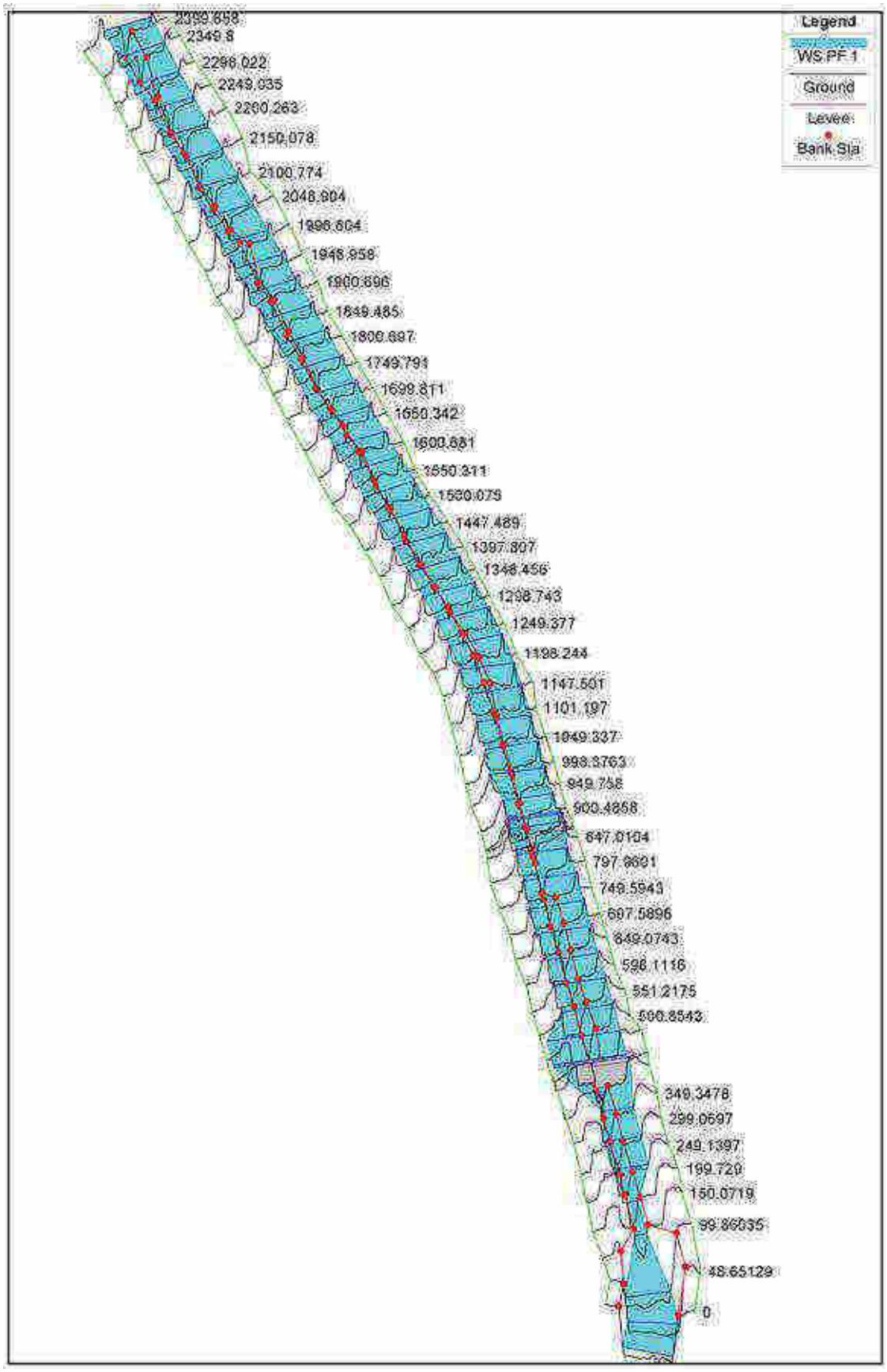
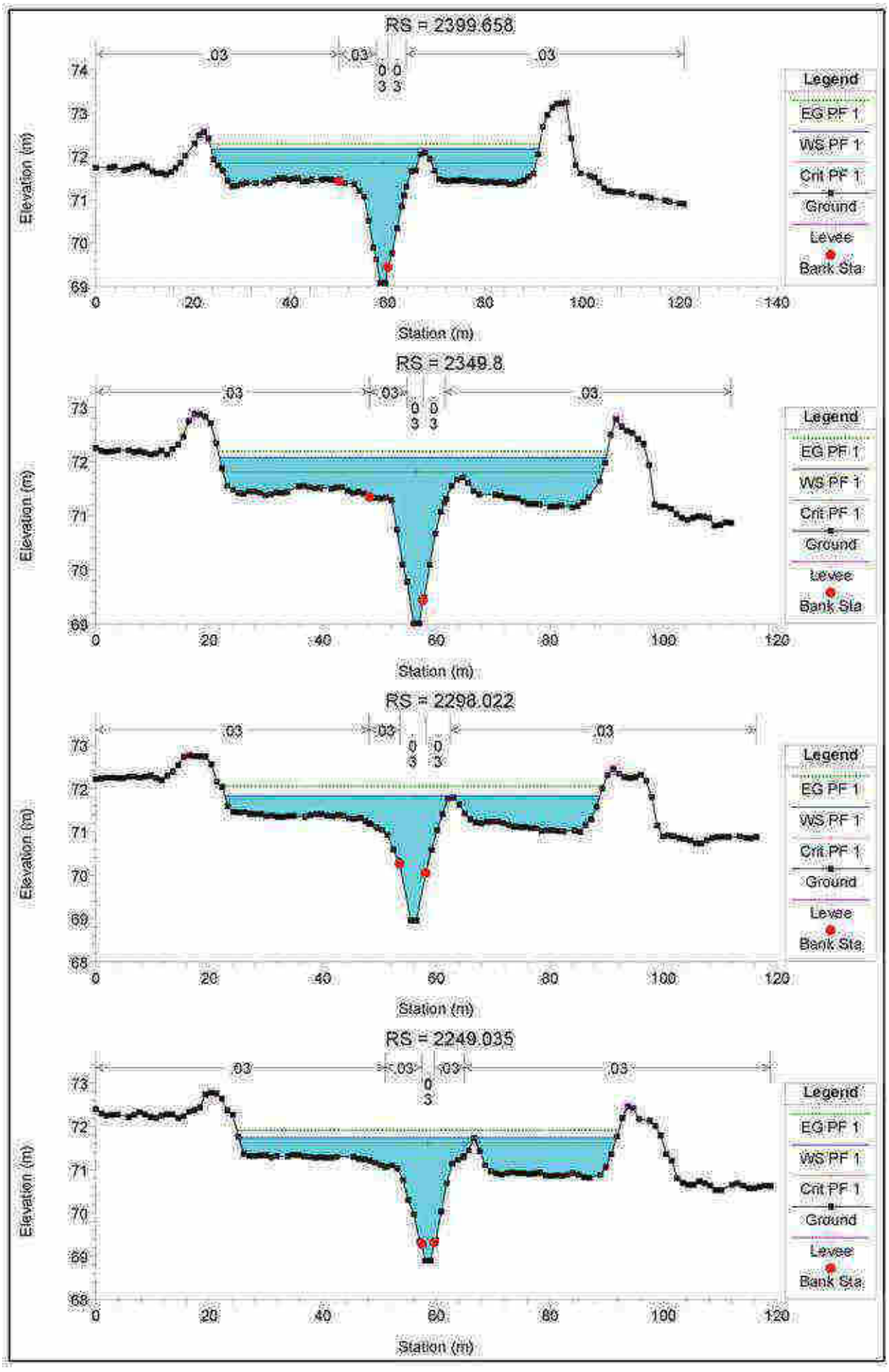
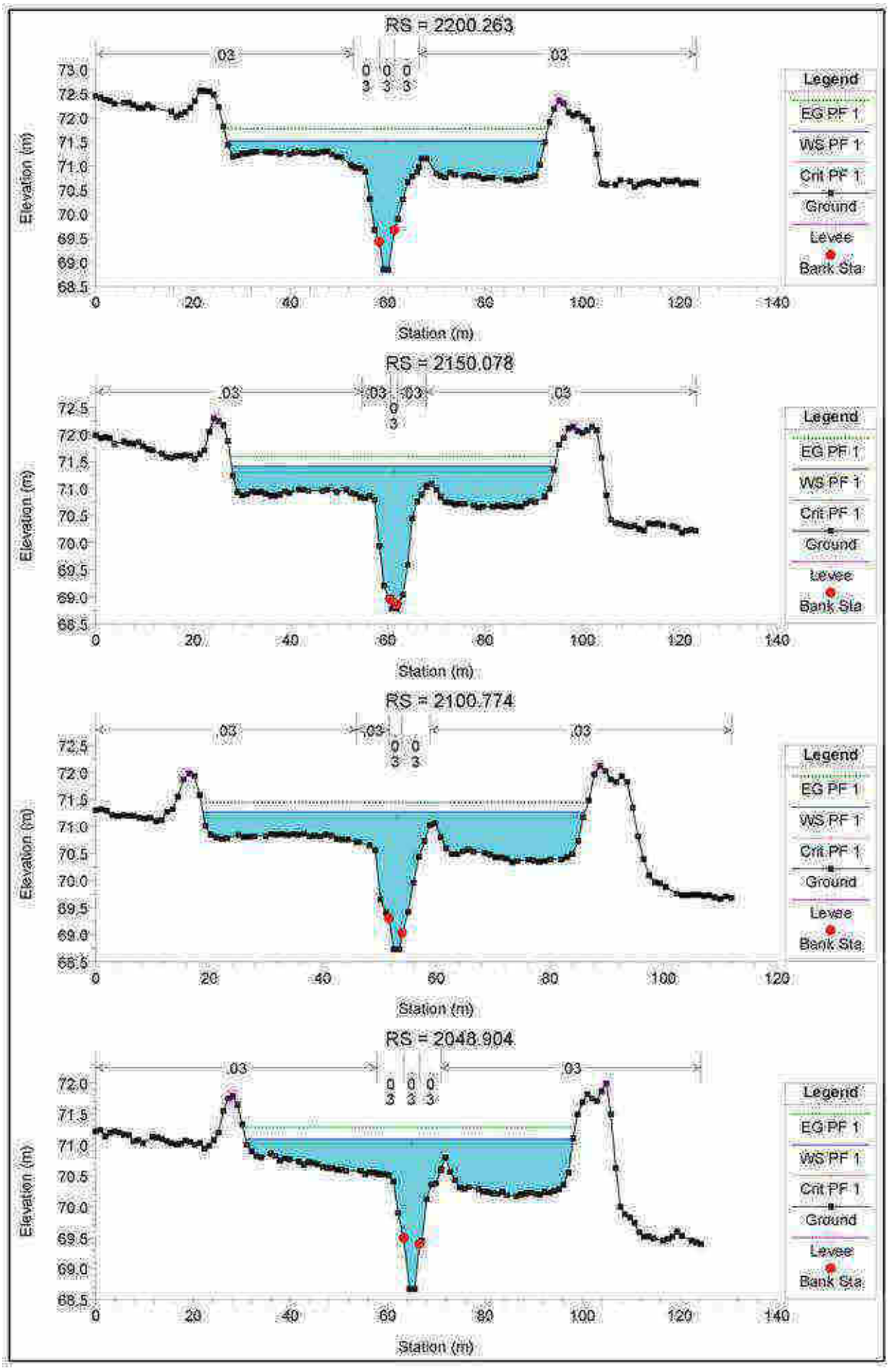
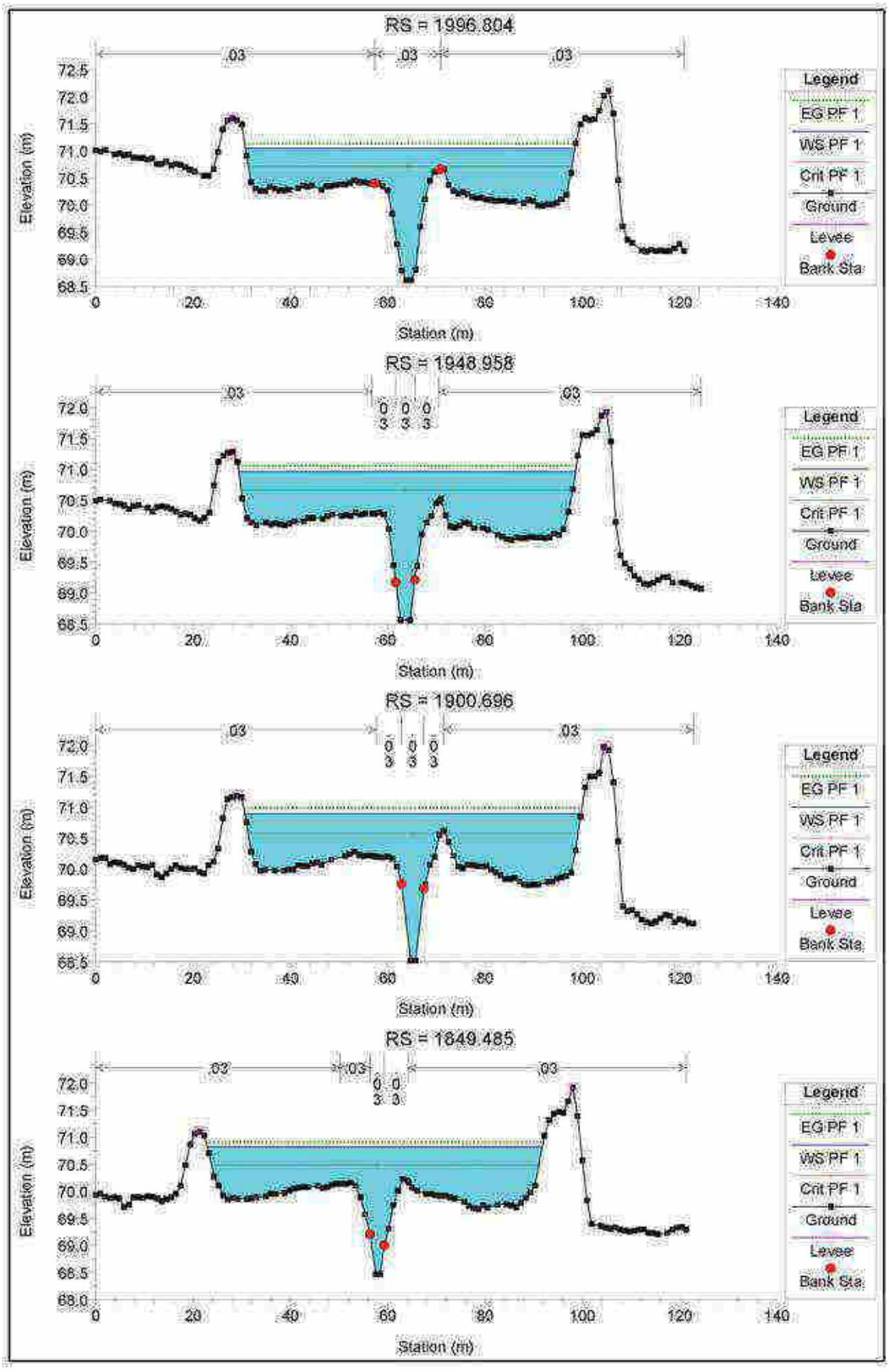
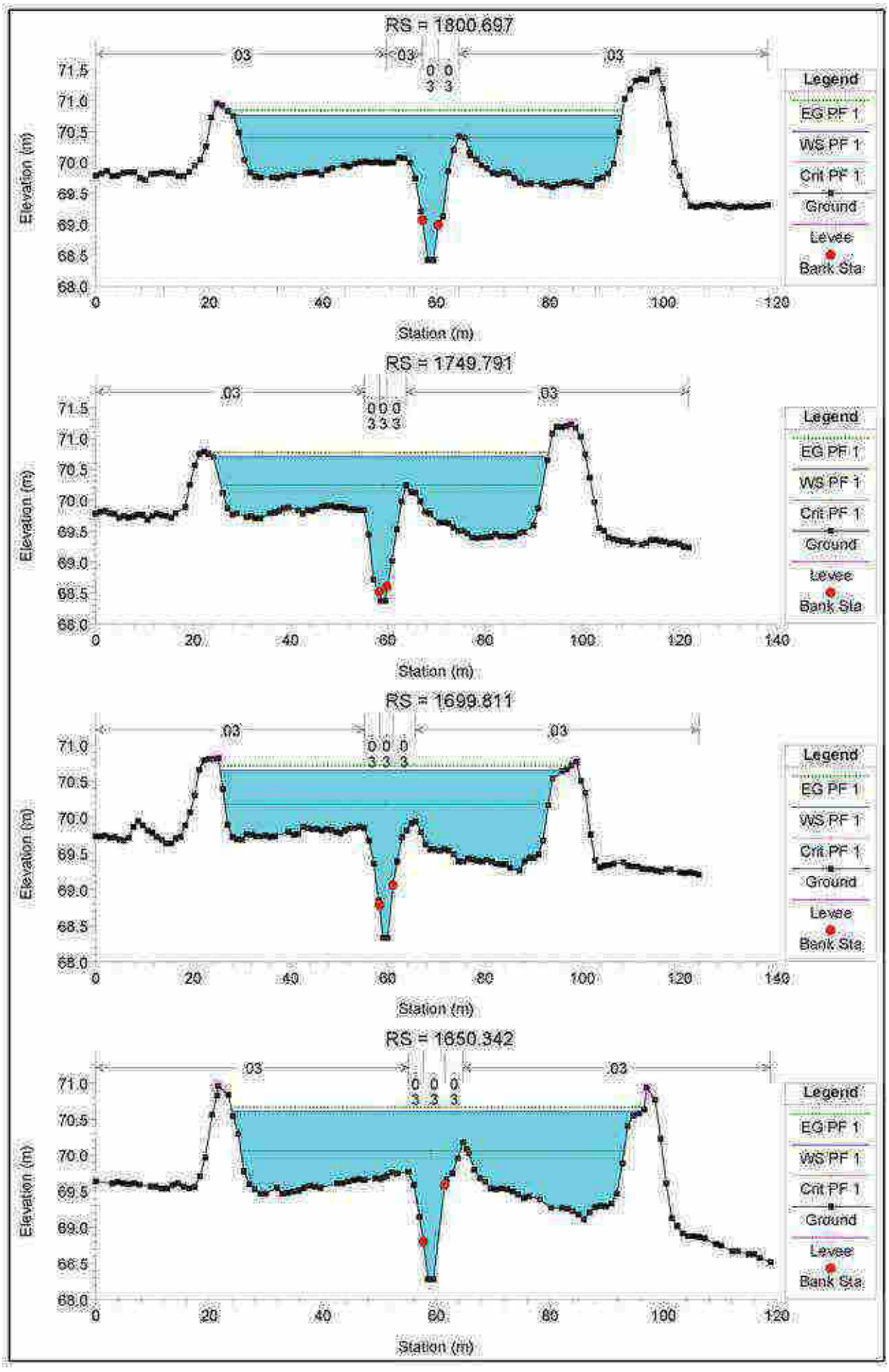


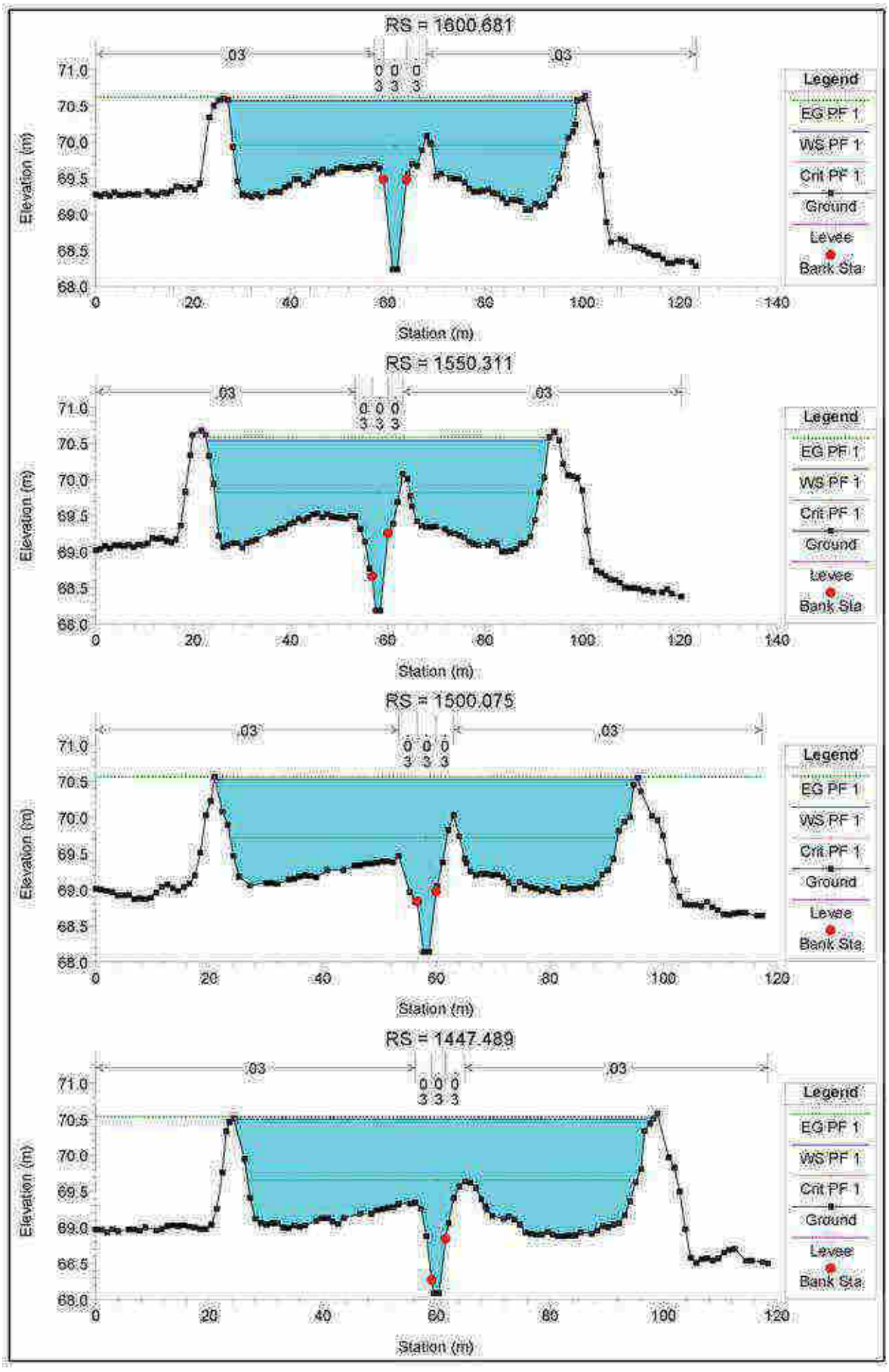
Figura 25. Rappresentazione 3D

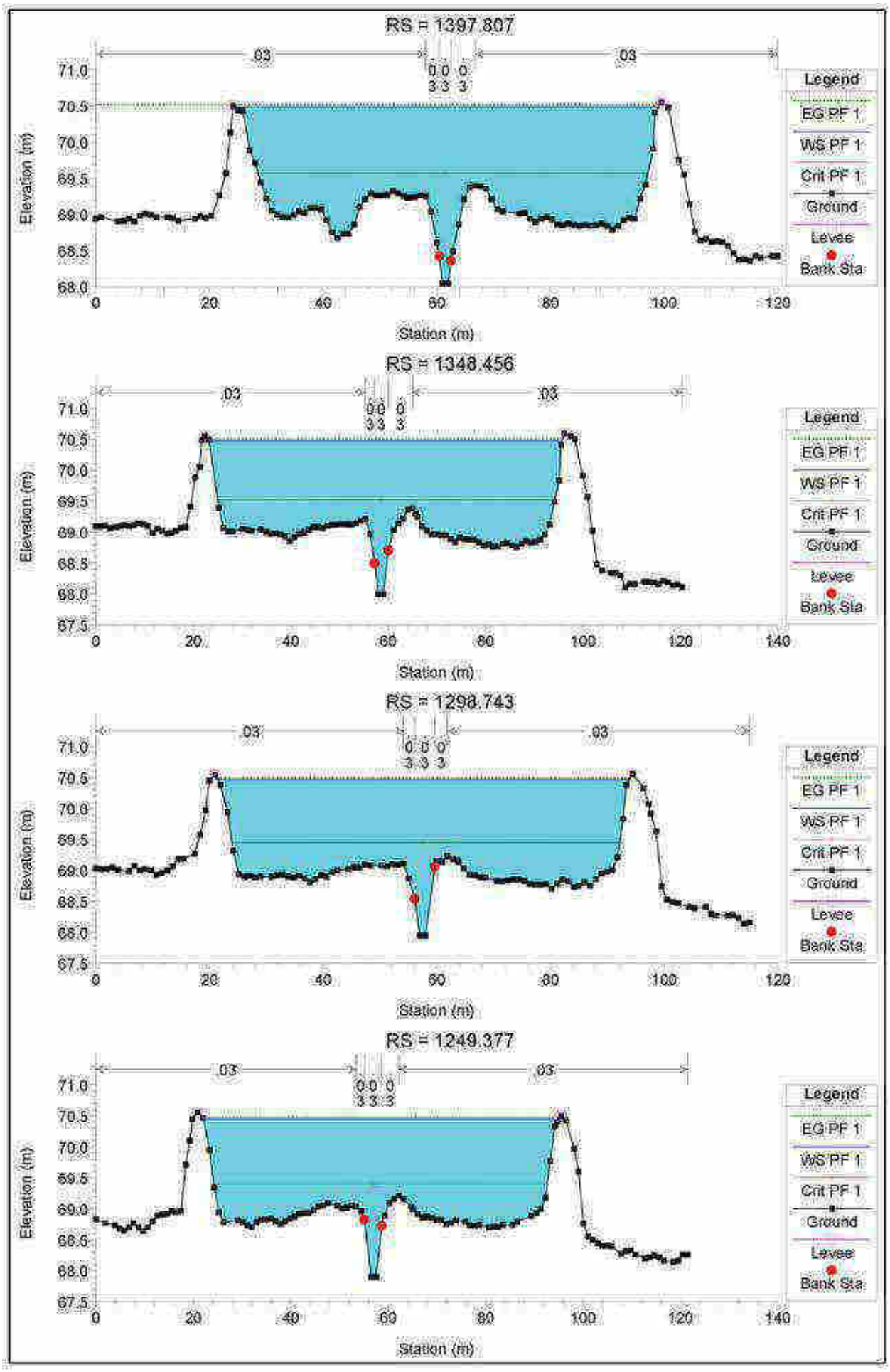

RS = 2399.658
RS = 2349.8
RS = 2298.022
RS = 2249.035
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta

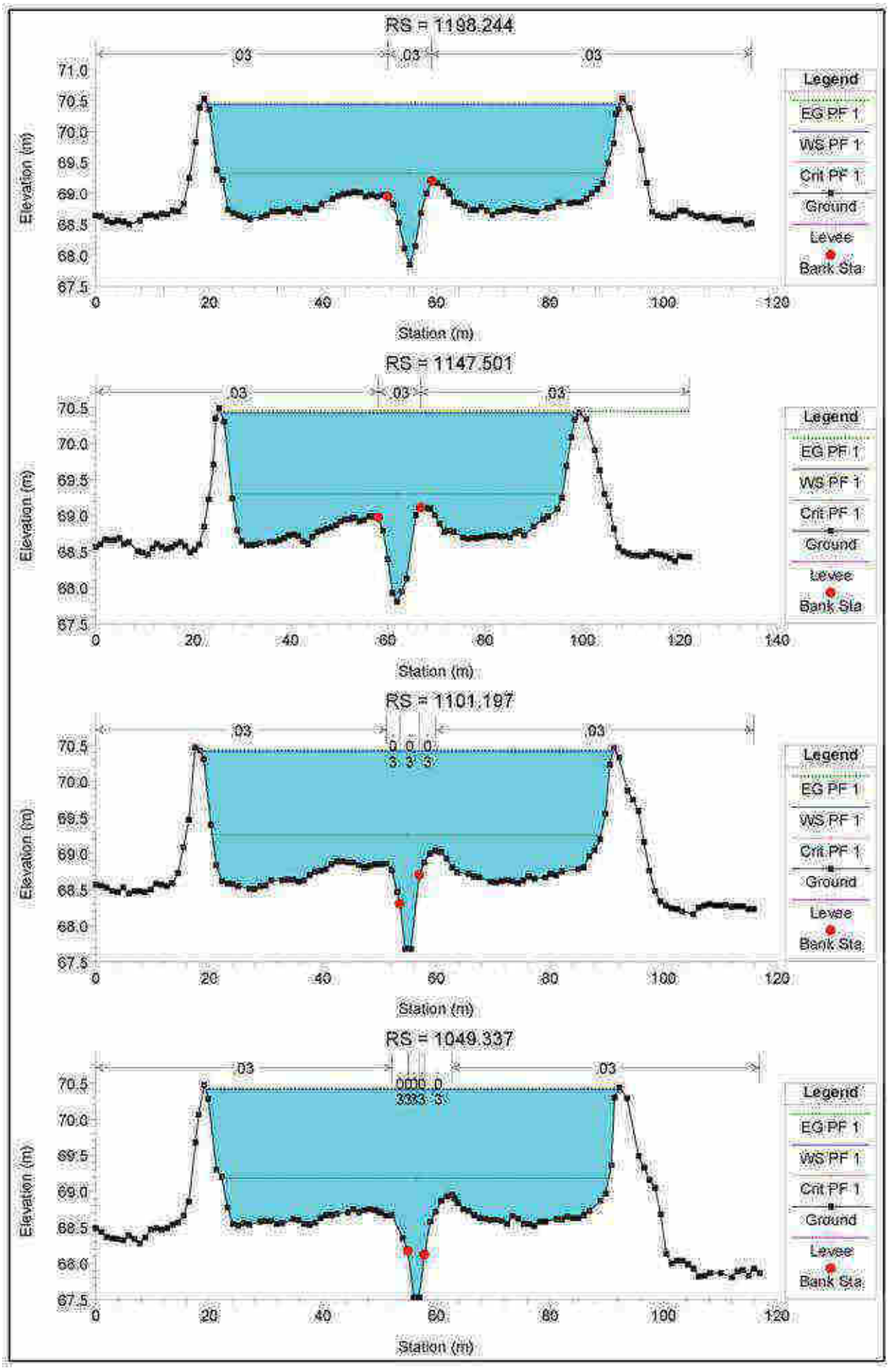

RS = 2200.263
RS = 2150.078
RS = 2100.774
RS = 2048.904
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta

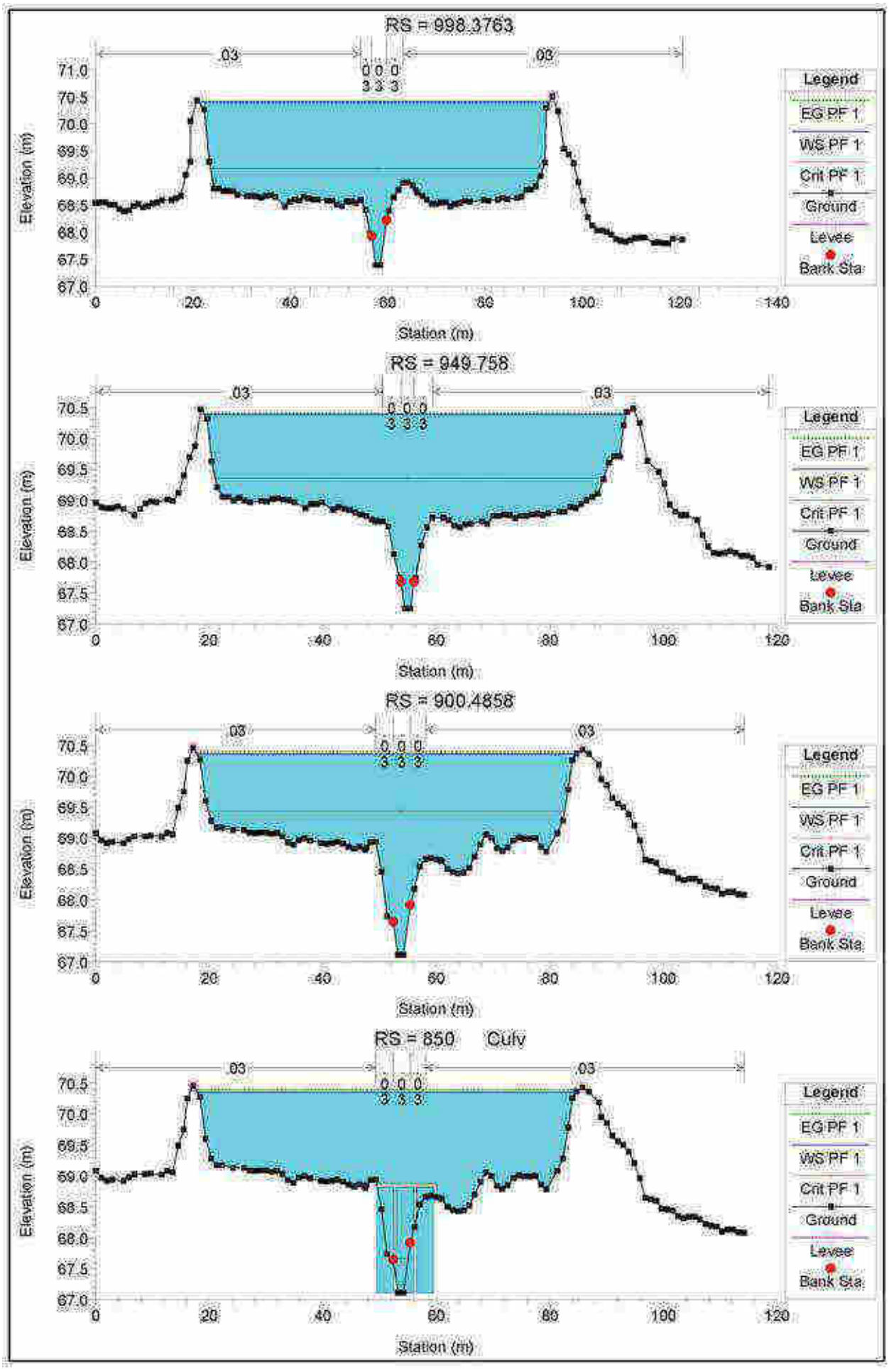

RS = 1996.804
.03
.03
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 1948.958
RS = 1900.696
RS = 1849.485

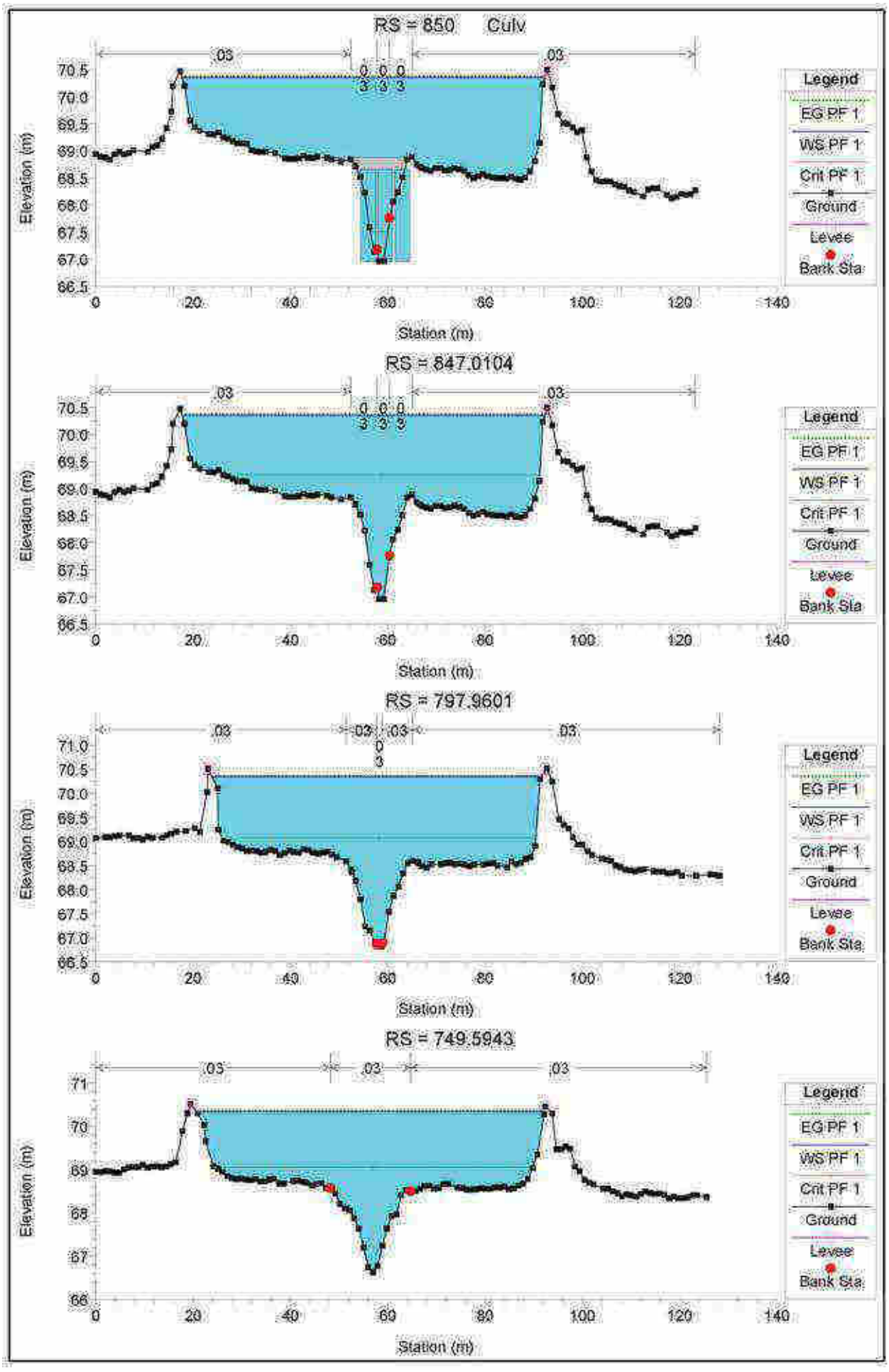

RS = 1800.697
RS = 1749.791
RS = 1699.611
RS = 1650.342
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta

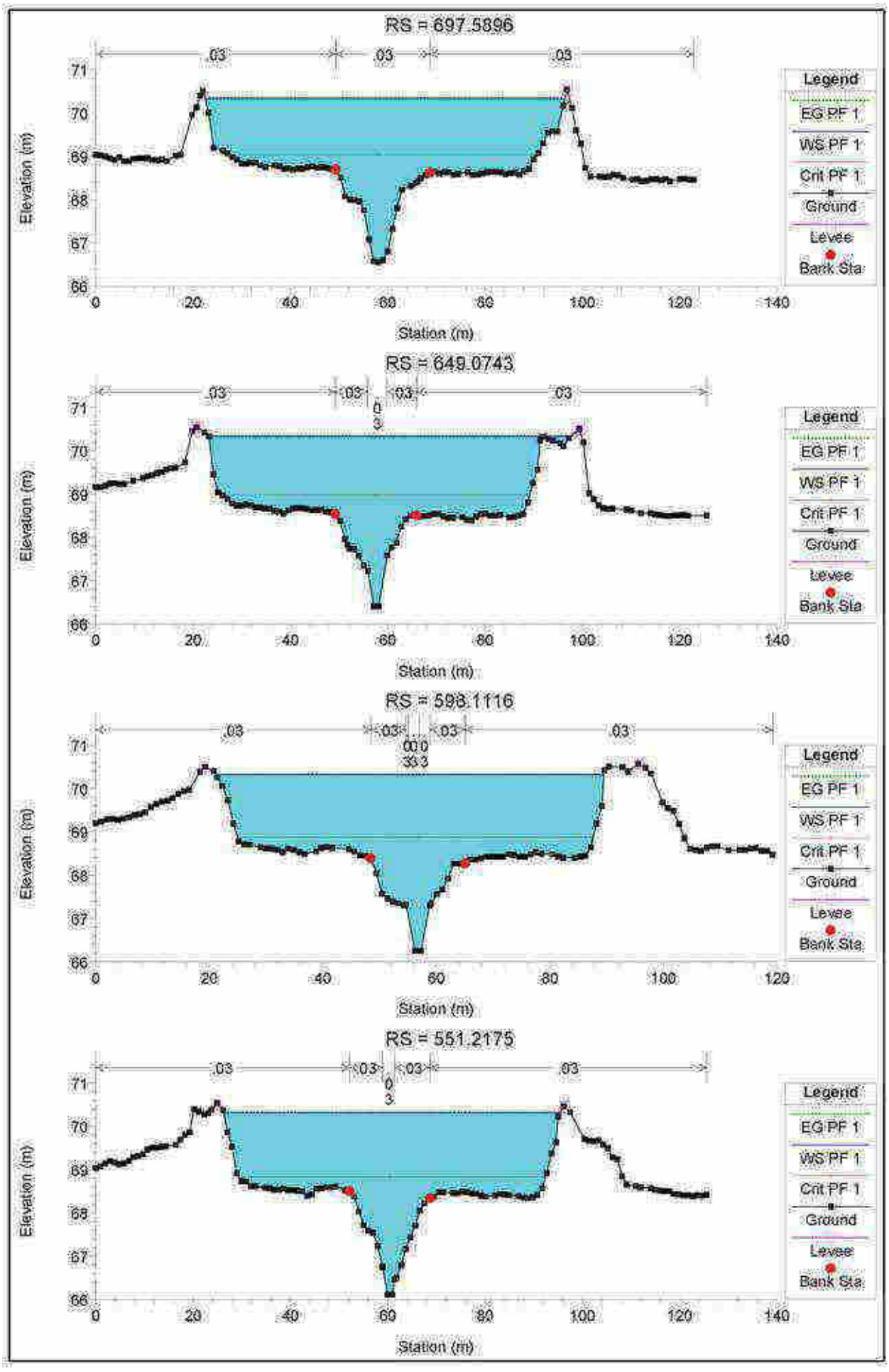

RS = 1600.681
RS = 1550.311
RS = 1500.075
RS = 1447.489
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)

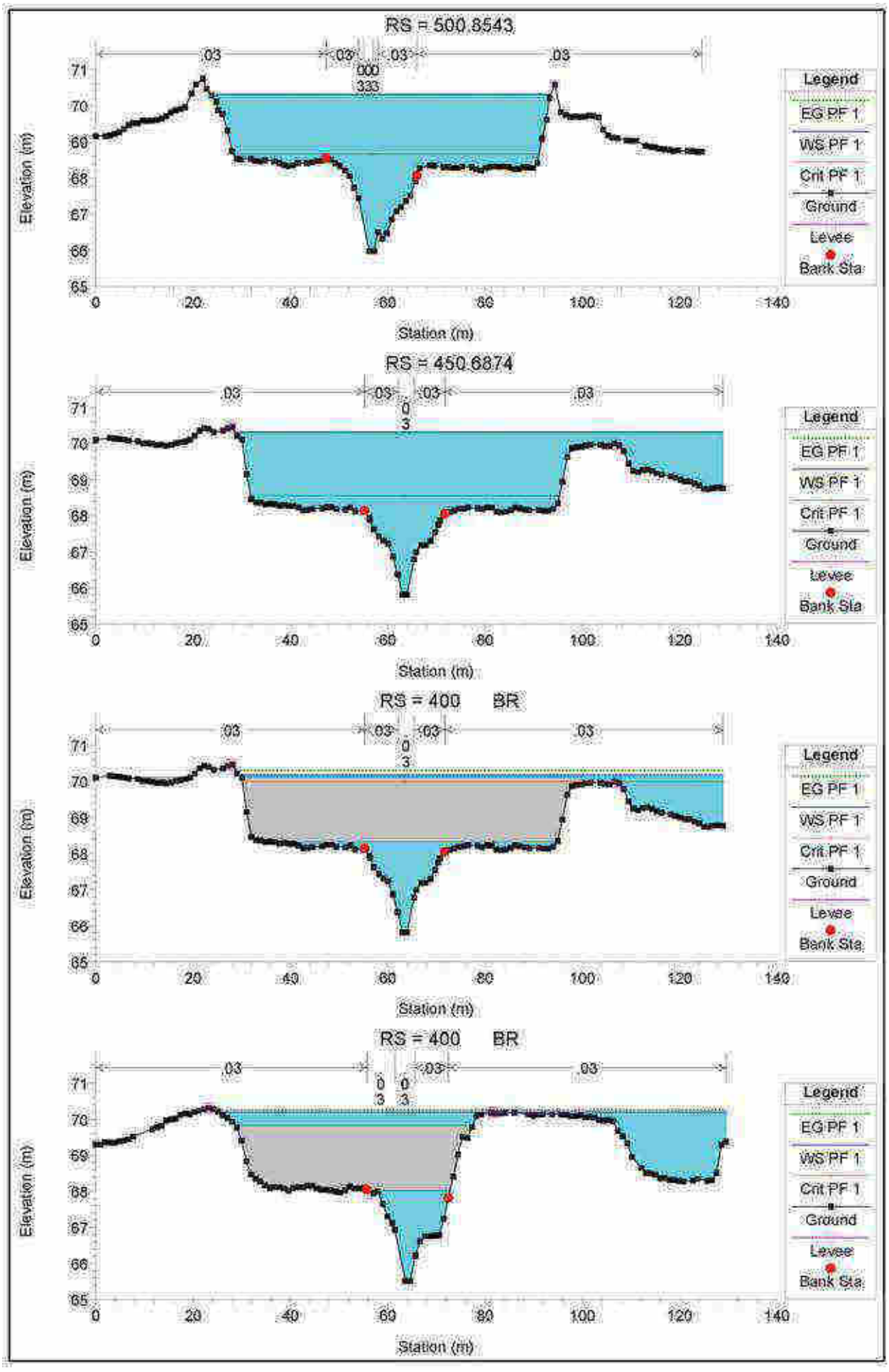

RS = 1397.807
RS = 1348.456
RS = 1298.743
RS = 1249.377
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta

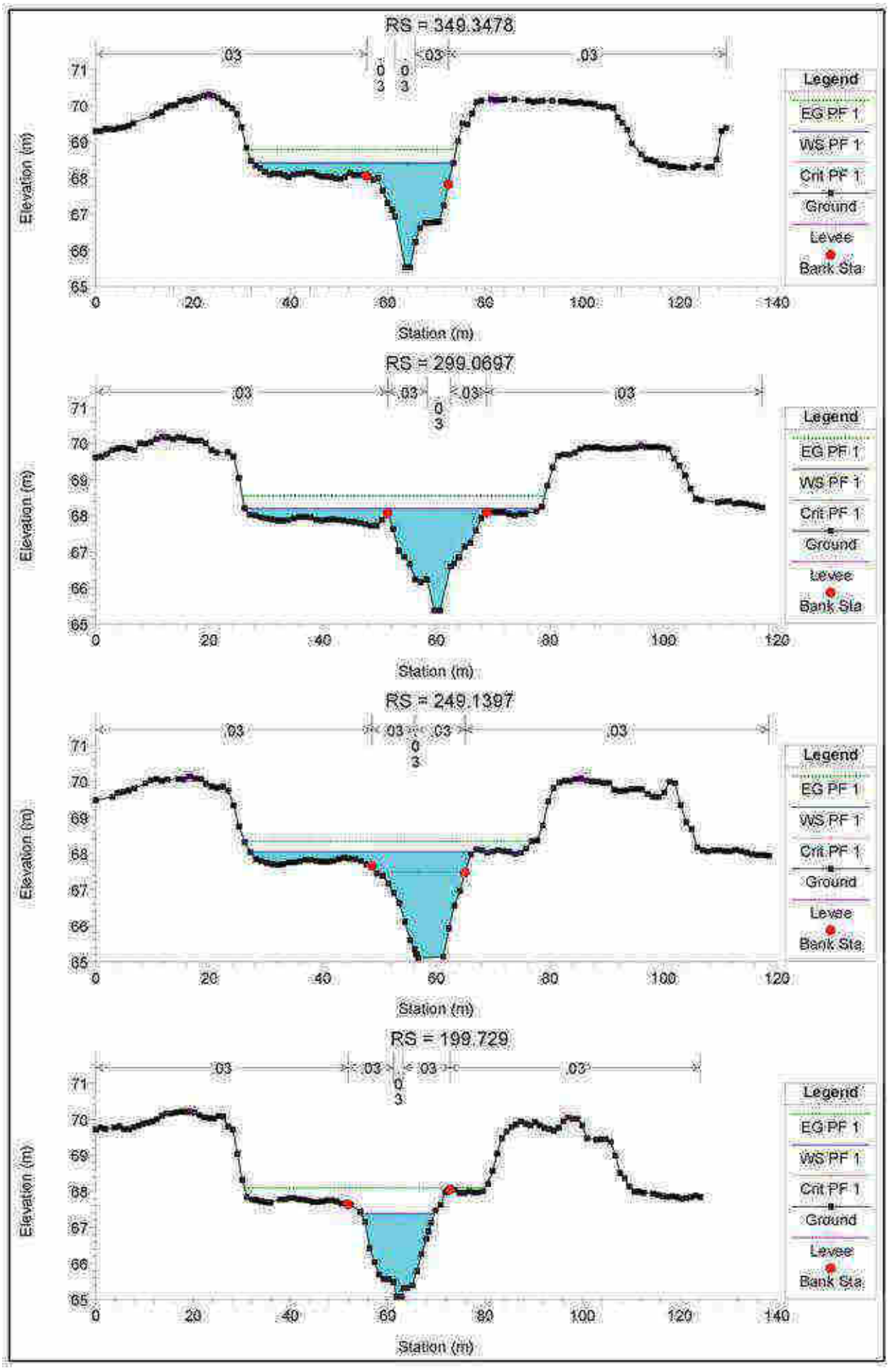

RS = 1198.244
03
03
03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 1147.501
RS = 1101.197
RS = 1049.337

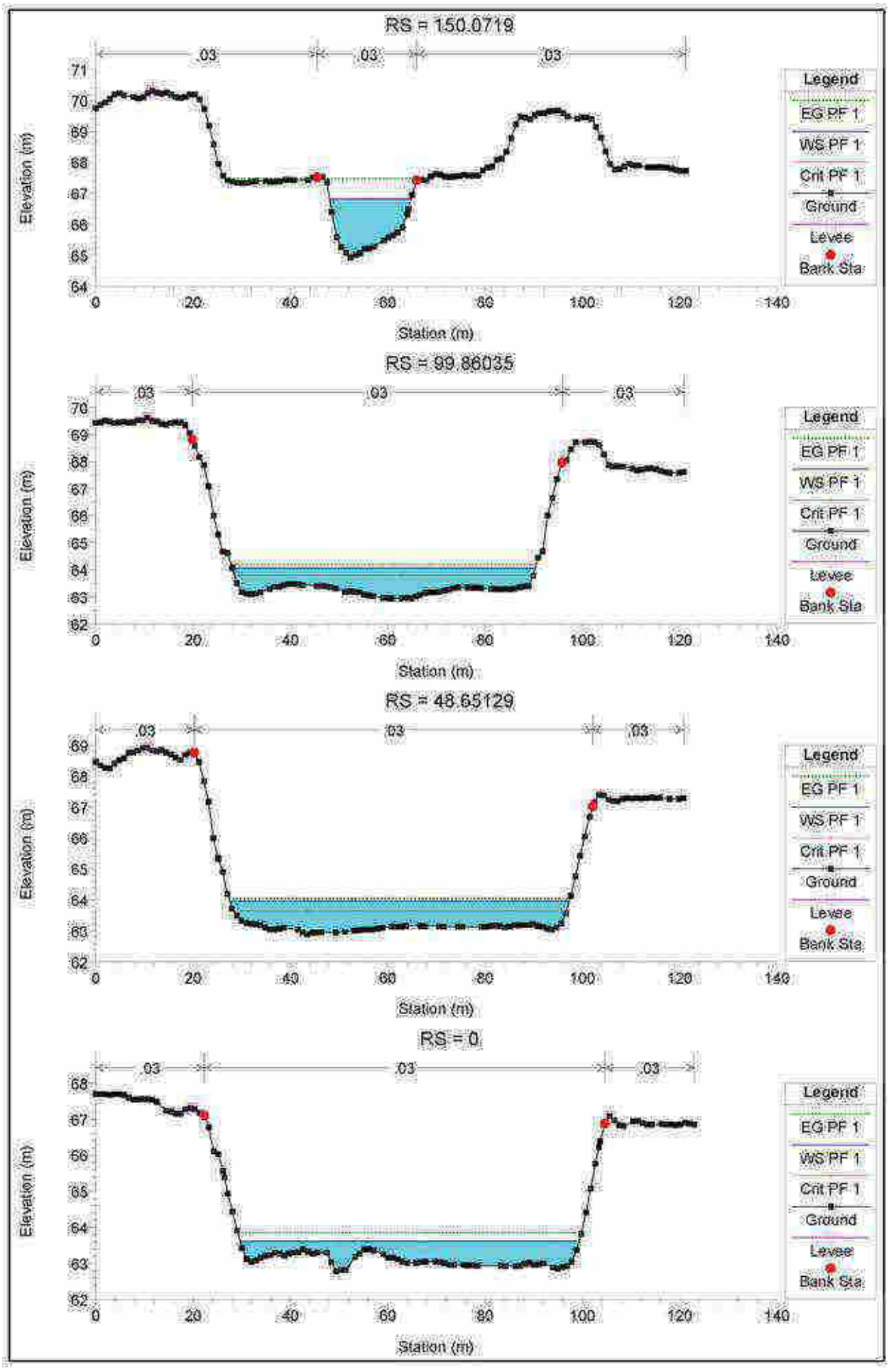

RS = 998.3763
RS = 949.758
RS = 900.4658
RS = 850 Culv
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)


RS = 850 Culv
.03
.03
.03
0 0 0
3 3 3
70.5
70.0
69.5
69.0
68.5
68.0
67.5
67.0
66.5
Elevation (m)
0
20
40
60
80
100
120
140
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
RS = 847.0104
.03
.03
.03
0 0 0
3 3 3
70.5
70.0
69.5
69.0
68.5
68.0
67.5
67.0
66.5
Elevation (m)
0
20
40
60
80
100
120
140
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
RS = 797.9601
.03
.03
.03
.03
0
3
71.0
70.5
70.0
69.5
69.0
68.5
68.0
67.5
67.0
66.5
Elevation (m)
0
20
40
60
80
100
120
140
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
RS = 749.5943
.03
.03
.03
71
70
69
68
67
66
Elevation (m)
0
20
40
60
80
100
120
140
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta


RS = 697.5896
RS = 649.0743
RS = 593.1116
RS = 551.2175
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta


RS = 500.8543
RS = 450.6874
RS = 400 BR
RS = 400 BR
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta


RS = 349.3478
RS = 299.0697
RS = 249.1397
RS = 199.729
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta


RS = 150.0719
.03
.03
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
RS = 99.86035
RS = 48.65129
RS = 0

Plan: 1 C.le Ponticello Principale RS: 2399.656 Profile: PF 1

E.G. Elev (m)	72.28	Element	Left OB	Channel	Right OB
Vel Head (m)	0.11	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	72.17	Reach Len. (m)	49.86	49.86	49.86
Crit W.S. (m)	71.85	Flow Area (m2)	18.62	16.14	24.35
E.G. Slope (m/m)	0.001664	Area (m2)	18.62	16.14	24.35
Q Total (m3/s)	79.41	Flow (m3/s)	20.00	28.91	30.50
Top Width (m)	67.40	Top Width (m)	26.39	9.98	31.03
Vel Total (m/s)	1.34	Avg. Vel. (m/s)	1.07	1.79	1.25
Max Chl Dpth (m)	3.10	Hydr. Depth (m)	0.71	1.62	0.78
Conv. Total (m3/s)	1947.0	Conv. (m3/s)	490.4	708.7	747.9
Length Wtd. (m)	49.86	Wetted Per. (m)	26.51	10.68	31.62
Min Ch El (m)	69.07	Shear (N/m2)	11.46	24.66	12.49
Alpha	1.14	Stream Power (N/m s)	12.31	44.17	15.64
Frctn Loss (m)	0.09	Cum Volume (1000 m3)	72.54	51.35	82.07
C & E Loss (m)	0.00	Cum SA (1000 m2)	68.06	25.71	68.70

Plan: 1 C.le Ponticello Principale RS: 2349.8 Profile: PF 1

E.G. Elev (m)	72.19	Element	Left OB	Channel	Right OB
Vel Head (m)	0.11	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	72.08	Reach Len. (m)	51.78	51.78	51.78
Crit W.S. (m)	71.81	Flow Area (m2)	15.74	15.23	26.61
E.G. Slope (m/m)	0.001852	Area (m2)	15.74	15.23	26.61
Q Total (m3/s)	79.41	Flow (m3/s)	15.93	28.60	34.88
Top Width (m)	68.13	Top Width (m)	26.45	9.41	32.27
Vel Total (m/s)	1.38	Avg. Vel. (m/s)	1.01	1.88	1.31
Max Chl Dpth (m)	3.06	Hydr. Depth (m)	0.60	1.62	0.82
Conv. Total (m3/s)	1845.0	Conv. (m3/s)	370.1	664.6	810.3
Length Wtd. (m)	51.78	Wetted Per. (m)	26.57	10.17	32.89
Min Ch El (m)	69.01	Shear (N/m2)	10.76	27.21	14.69
Alpha	1.17	Stream Power (N/m s)	10.89	51.11	19.26
Frctn Loss (m)	0.12	Cum Volume (1000 m3)	71.69	50.56	80.79
C & E Loss (m)	0.01	Cum SA (1000 m2)	66.74	25.23	67.12

Plan: 1 C.le Ponticello Principale RS: 2298.022 Profile: PF 1

E.G. Elev (m)	72.06	Element	Left OB	Channel	Right OB
Vel Head (m)	0.23	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	71.83	Reach Len. (m)	48.99	48.99	48.99
Crit W.S. (m)	71.77	Flow Area (m2)	16.51	11.06	19.95
E.G. Slope (m/m)	0.002880	Area (m2)	16.51	11.06	19.95
Q Total (m3/s)	79.41	Flow (m3/s)	20.65	32.24	26.52
Top Width (m)	66.06	Top Width (m)	30.79	4.60	30.67
Vel Total (m/s)	1.67	Avg. Vel. (m/s)	1.25	2.91	1.33
Max Chl Dpth (m)	2.88	Hydr. Depth (m)	0.54	2.41	0.65
Conv. Total (m3/s)	1479.7	Conv. (m3/s)	384.7	600.8	494.2
Length Wtd. (m)	48.99	Wetted Per. (m)	30.98	5.32	31.21
Min Ch El (m)	68.95	Shear (N/m2)	15.05	58.72	18.05
Alpha	1.59	Stream Power (N/m s)	18.82	171.12	24.00
Frctn Loss (m)	0.13	Cum Volume (1000 m3)	70.85	49.88	79.59
C & E Loss (m)	0.01	Cum SA (1000 m2)	65.26	24.67	65.49

Plan: 1 C.le Ponticello Principale RS: 2249.035 Profile: PF 1

E.G. Elev (m)	71.92	Element	Left OB	Channel	Right OB
Vel Head (m)	0.18	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	71.74	Reach Len. (m)	48.77	48.77	48.77
Crit W.S. (m)	71.62	Flow Area (m2)	19.49	6.04	25.35
E.G. Slope (m/m)	0.002421	Area (m2)	19.49	6.04	25.35
Q Total (m3/s)	79.41	Flow (m3/s)	25.53	18.05	35.83

Plan: 1 C.le Ponticello Principale RS: 2249.035 Profile: PF 1 (Continued)

Top Width (m)	66.54	Top Width (m)	32.25	2.21	32.08
Vel Total (m/s)	1.56	Avg. Vel. (m/s)	1.31	2.99	1.41
Max Chl Dpth (m)	2.84	Hydr. Depth (m)	0.60	2.73	0.79
Conv. Total (m3/s)	1614.0	Conv. (m3/s)	518.9	366.8	728.3
Length Wtd. (m)	46.77	Wetted Per. (m)	32.71	2.46	32.91
Min Ch El (m)	68.90	Shear (N/m2)	14.14	58.32	18.29
Alpha	1.43	Stream Power (N/m s)	18.53	174.16	25.85
Frctn Loss (m)	0.14	Cum Volume (1000 m3)	69.97	49.46	78.48
C & E Loss (m)	0.01	Cum SA (1000 m2)	69.71	24.70	83.95

Plan: 1 C.le Ponticello Principale RS: 2200.253 Profile: PF 1

E.G. Elev (m)	71.77	Element	Left OB	Channel	Right OB
Vel Head (m)	0.25	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	71.52	Reach Len. (m)	50.18	50.18	50.18
Crit W.S. (m)	71.50	Flow Area (m2)	12.62	7.54	23.38
E.G. Slope (m/m)	0.003414	Area (m2)	12.62	7.54	23.38
Q Total (m3/s)	79.41	Flow (m3/s)	16.96	24.40	38.06
Top Width (m)	65.39	Top Width (m)	31.33	3.10	30.96
Vel Total (m/s)	1.82	Avg. Vel. (m/s)	1.32	3.24	1.63
Max Chl Dpth (m)	2.68	Hydr. Depth (m)	0.41	2.43	0.76
Conv. Total (m3/s)	1359.0	Conv. (m3/s)	290.2	417.5	651.3
Length Wtd. (m)	50.18	Wetted Per. (m)	31.77	3.52	31.37
Min Ch El (m)	68.84	Shear (N/m2)	13.51	71.73	24.96
Alpha	1.47	Stream Power (N/m s)	17.87	232.19	40.62
Frctn Loss (m)	0.16	Cum Volume (1000 m3)	69.18	49.13	77.29
C & E Loss (m)	0.02	Cum SA (1000 m2)	62.16	24.57	62.42

Plan: 1 C.le Ponticello Principale RS: 2150.078 Profile: PF 1

E.G. Elev (m)	71.59	Element	Left OB	Channel	Right OB
Vel Head (m)	0.16	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	71.41	Reach Len. (m)	49.30	49.30	49.30
Crit W.S. (m)	71.31	Flow Area (m2)	19.95	3.55	24.68
E.G. Slope (m/m)	0.002949	Area (m2)	19.95	3.55	24.68
Q Total (m3/s)	79.41	Flow (m3/s)	26.40	11.74	39.26
Top Width (m)	66.42	Top Width (m)	32.68	1.36	32.38
Vel Total (m/s)	1.64	Avg. Vel. (m/s)	1.42	3.31	1.59
Max Chl Dpth (m)	2.62	Hydr. Depth (m)	0.61	2.60	0.77
Conv. Total (m3/s)	1462.3	Conv. (m3/s)	523.0	216.2	723.0
Length Wtd. (m)	49.30	Wetted Per. (m)	33.38	1.44	33.06
Min Ch El (m)	68.79	Shear (N/m2)	17.29	71.47	21.77
Alpha	1.33	Stream Power (N/m s)	24.61	235.46	34.55
Frctn Loss (m)	0.14	Cum Volume (1000 m3)	68.36	48.85	76.08
C & E Loss (m)	0.00	Cum SA (1000 m2)	60.56	24.46	60.83

Plan: 1 C.le Ponticello Principale RS: 2100.774 Profile: PF 1

E.G. Elev (m)	71.45	Element	Left OB	Channel	Right OB
Vel Head (m)	0.18	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	71.27	Reach Len. (m)	51.87	51.87	51.87
Crit W.S. (m)	71.17	Flow Area (m2)	17.70	5.53	26.20
E.G. Slope (m/m)	0.002866	Area (m2)	17.70	5.53	26.20
Q Total (m3/s)	79.41	Flow (m3/s)	22.19	16.47	40.76
Top Width (m)	67.30	Top Width (m)	32.78	2.30	32.22
Vel Total (m/s)	1.61	Avg. Vel. (m/s)	1.25	2.98	1.56
Max Chl Dpth (m)	2.54	Hydr. Depth (m)	0.54	2.40	0.81
Conv. Total (m3/s)	1483.4	Conv. (m3/s)	414.5	307.6	761.3
Length Wtd. (m)	51.87	Wetted Per. (m)	33.28	2.57	32.85
Min Ch El (m)	68.73	Shear (N/m2)	14.95	60.57	22.42

Plan: 1 C.le Ponticello Principale RS: 2100.774 Profile: PF 1 (Continued)

Alpha	1.36	Stream Power (N/m s)	18.74	180.36	34.67
Frctn Loss (m)	0.16	Cum Volume (1000 m3)	67.43	48.63	74.82
C & E Loss (m)	0.00	Cum SA (1000 m2)	58.94	24.37	59.24

Plan: 1 C.le Ponticello Principale RS: 2048.904 Profile: PF 1

E.G. Elev (m)	71.29	Element	Left OB	Channel	Right OB
Vel Head (m)	0.19	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	71.09	Reach Len. (m)	52.10	52.10	52.10
Crit W.S. (m)	71.02	Flow Area (m2)	15.09	7.14	25.28
E.G. Slope (m/m)	0.003208	Area (m2)	15.09	7.14	25.28
Q Total (m3/s)	79.41	Flow (m3/s)	17.96	20.58	40.87
Top Width (m)	67.26	Top Width (m)	32.46	3.32	31.47
Vel Total (m/s)	1.67	Avg. Vel. (m/s)	1.19	2.88	1.62
Max Chl Dpth (m)	2.42	Hydr. Depth (m)	0.46	2.15	0.80
Conv. Total (m3/s)	1402.1	Conv. (m3/s)	317.1	363.4	721.7
Length Wtd. (m)	52.10	Wetted Per. (m)	32.71	3.79	31.98
Min Ch El (m)	68.87	Shear (N/m2)	14.51	59.29	24.87
Alpha	1.37	Stream Power (N/m s)	17.27	170.79	40.20
Frctn Loss (m)	0.12	Cum Volume (1000 m3)	66.58	48.30	73.49
C & E Loss (m)	0.03	Cum SA (1000 m2)	57.25	24.22	57.56

Plan: 1 C.le Ponticello Principale RS: 1996.804 Profile: PF 1

E.G. Elev (m)	71.14	Element	Left OB	Channel	Right OB
Vel Head (m)	0.10	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	71.04	Reach Len. (m)	47.85	47.85	47.85
Crit W.S. (m)	70.71	Flow Area (m2)	16.12	17.64	24.28
E.G. Slope (m/m)	0.001799	Area (m2)	16.12	17.64	24.28
Q Total (m3/s)	79.41	Flow (m3/s)	19.70	28.45	31.27
Top Width (m)	67.73	Top Width (m)	26.82	13.54	27.57
Vel Total (m/s)	1.32	Avg. Vel. (m/s)	1.09	1.61	1.29
Max Chl Dpth (m)	2.43	Hydr. Depth (m)	0.68	1.30	0.88
Conv. Total (m3/s)	1876.8	Conv. (m3/s)	465.5	672.3	739.0
Length Wtd. (m)	47.85	Wetted Per. (m)	26.79	14.42	27.84
Min Ch El (m)	68.61	Shear (N/m2)	11.88	21.47	15.32
Alpha	1.07	Stream Power (N/m s)	12.91	34.63	19.72
Frctn Loss (m)	0.08	Cum Volume (1000 m3)	65.72	47.66	72.19
C & E Loss (m)	0.00	Cum SA (1000 m2)	55.71	23.78	56.05

Plan: 1 C.le Ponticello Principale RS: 1948.958 Profile: PF 1

E.G. Elev (m)	71.06	Element	Left OB	Channel	Right OB
Vel Head (m)	0.09	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.97	Reach Len. (m)	48.26	48.26	48.26
Crit W.S. (m)	70.67	Flow Area (m2)	25.04	8.73	30.58
E.G. Slope (m/m)	0.001393	Area (m2)	25.04	8.73	30.58
Q Total (m3/s)	79.41	Flow (m3/s)	26.10	17.52	35.79
Top Width (m)	69.22	Top Width (m)	32.30	3.88	33.04
Vel Total (m/s)	1.23	Avg. Vel. (m/s)	1.04	2.01	1.17
Max Chl Dpth (m)	2.40	Hydr. Depth (m)	0.78	2.25	0.93
Conv. Total (m3/s)	2127.8	Conv. (m3/s)	699.4	469.4	959.1
Length Wtd. (m)	48.26	Wetted Per. (m)	32.75	4.26	33.51
Min Ch El (m)	68.57	Shear (N/m2)	10.45	27.97	12.46
Alpha	1.22	Stream Power (N/m s)	10.89	56.12	14.59
Frctn Loss (m)	0.07	Cum Volume (1000 m3)	64.68	47.03	70.88
C & E Loss (m)	0.00	Cum SA (1000 m2)	54.30	23.37	54.60

Plan: 1 C.le Ponticello Principale RS: 1900.696 Profile: PF 1

E.G. Elev (m)	70.99	Element	Left OB	Channel	Right OB
Vel Head (m)	0.09	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.90	Reach Len. (m)	51.20	51.20	51.20
Crit W.S. (m)	70.58	Flow Area (m2)	24.83	8.77	28.80
E.G. Slope (m/m)	0.001598	Area (m2)	24.83	8.77	28.80
Q Total (m3/s)	79.41	Flow (m3/s)	27.67	16.30	35.44
Top Width (m)	69.08	Top Width (m)	32.23	4.60	32.25
Vel Total (m/s)	1.27	Avg. Vel. (m/s)	1.11	1.86	1.23
Max Chl Dpth (m)	2.36	Hydr. Depth (m)	0.77	1.91	0.89
Conv. Total (m3/s)	1986.5	Conv. (m3/s)	692.2	407.7	886.6
Length Wtd. (m)	51.20	Wetted Per. (m)	32.45	5.33	32.68
Min Ch El (m)	68.52	Shear (N/m2)	11.99	25.79	13.81
Alpha	1.12	Stream Power (N/m s)	13.36	47.92	16.99
Frctn Loss (m)	0.08	Cum Volume (1000 m3)	63.48	46.60	69.45
C & E Loss (m)	0.00	Cum SA (1000 m2)	52.74	23.16	53.02

Plan: 1 C.le Ponticello Principale RS: 1849.485 Profile: PF 1

E.G. Elev (m)	70.91	Element	Left OB	Channel	Right OB
Vel Head (m)	0.09	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.82	Reach Len. (m)	46.79	46.79	46.79
Crit W.S. (m)	70.48	Flow Area (m2)	27.40	6.20	30.96
E.G. Slope (m/m)	0.001426	Area (m2)	27.40	6.20	30.96
Q Total (m3/s)	79.41	Flow (m3/s)	30.05	11.93	37.43
Top Width (m)	68.81	Top Width (m)	33.44	2.90	32.48
Vel Total (m/s)	1.23	Avg. Vel. (m/s)	1.10	1.92	1.21
Max Chl Dpth (m)	2.35	Hydr. Depth (m)	0.82	2.14	0.95
Conv. Total (m3/s)	2102.9	Conv. (m3/s)	795.8	316.0	991.2
Length Wtd. (m)	46.79	Wetted Per. (m)	33.73	3.28	32.89
Min Ch El (m)	68.47	Shear (N/m2)	11.36	26.42	13.16
Alpha	1.12	Stream Power (N/m s)	12.46	50.83	15.91
Frctn Loss (m)	0.07	Cum Volume (1000 m3)	62.14	46.22	67.92
C & E Loss (m)	0.00	Cum SA (1000 m2)	51.06	22.97	51.36

Plan: 1 C.le Ponticello Principale RS: 1800.697 Profile: PF 1

E.G. Elev (m)	70.84	Element	Left OB	Channel	Right OB
Vel Head (m)	0.09	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.75	Reach Len. (m)	50.91	50.91	50.91
Crit W.S. (m)	70.40	Flow Area (m2)	28.17	5.97	30.45
E.G. Slope (m/m)	0.001428	Area (m2)	28.17	5.97	30.45
Q Total (m3/s)	79.41	Flow (m3/s)	31.49	11.51	36.41
Top Width (m)	68.44	Top Width (m)	33.33	2.80	32.32
Vel Total (m/s)	1.23	Avg. Vel. (m/s)	1.12	1.93	1.20
Max Chl Dpth (m)	2.33	Hydr. Depth (m)	0.85	2.14	0.94
Conv. Total (m3/s)	2101.2	Conv. (m3/s)	833.1	304.5	963.5
Length Wtd. (m)	50.91	Wetted Per. (m)	33.70	3.16	32.94
Min Ch El (m)	68.42	Shear (N/m2)	11.71	26.49	12.95
Alpha	1.12	Stream Power (N/m s)	13.09	51.04	15.49
Frctn Loss (m)	0.06	Cum Volume (1000 m3)	60.79	45.92	66.42
C & E Loss (m)	0.00	Cum SA (1000 m2)	49.44	22.63	49.78

Plan: 1 C.le Ponticello Principale RS: 1749.791 Profile: PF 1

E.G. Elev (m)	70.77	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.70	Reach Len. (m)	49.98	49.98	49.98
Crit W.S. (m)	70.25	Flow Area (m2)	31.00	3.58	35.68
E.G. Slope (m/m)	0.001079	Area (m2)	31.00	3.58	35.68
Q Total (m3/s)	79.41	Flow (m3/s)	32.31	6.50	40.60

Plan: 1 C.le Ponticello Principale RS: 1749.791 Profile: PF 1 (Continued)

Top Width (m)	68.81	Top Width (m)	34.14	1.56	33.11
Vel Total (m/s)	1.13	Avg. Vel. (m/s)	1.04	1.82	1.14
Max Chl Dpth (m)	2.33	Hydr. Depth (m)	0.91	2.29	1.08
Conv. Total (m3/s)	2417.6	Conv. (m3/s)	983.8	197.9	1235.9
Length Wtd. (m)	49.98	Wetted Per. (m)	34.62	1.68	33.70
Min Ch El (m)	68.38	Shear (N/m2)	9.47	22.59	11.20
Alpha	1.08	Stream Power (N/m s)	9.88	41.62	12.74
Frctn Loss (m)	0.05	Cum Volume (1000 m3)	59.28	45.68	64.74
C & E Loss (m)	0.00	Cum SA (1000 m2)	47.72	22.72	48.12

Plan: 1 C.le Ponticello Principale RS: 1699.811 Profile: PF 1

E.G. Elev (m)	70.72	Element	Left OB	Channel	Right OB
Vel Head (m)	0.07	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.65	Reach Len. (m)	49.47	49.47	49.47
Crit W.S. (m)	70.19	Flow Area (m2)	28.48	5.90	36.79
E.G. Slope (m/m)	0.001078	Area (m2)	28.48	5.90	36.79
Q Total (m3/s)	79.41	Flow (m3/s)	26.37	9.82	41.22
Top Width (m)	70.71	Top Width (m)	32.76	2.78	35.16
Vel Total (m/s)	1.12	Avg. Vel. (m/s)	1.00	1.67	1.12
Max Chl Dpth (m)	2.32	Hydr. Depth (m)	0.87	2.12	1.05
Conv. Total (m3/s)	2418.6	Conv. (m3/s)	864.1	299.0	1255.6
Length Wtd. (m)	49.47	Wetted Per. (m)	33.16	3.14	35.55
Min Ch El (m)	68.33	Shear (N/m2)	9.08	19.84	10.94
Alpha	1.08	Stream Power (N/m s)	9.04	33.03	12.26
Frctn Loss (m)	0.05	Cum Volume (1000 m3)	57.80	45.44	62.93
C & E Loss (m)	0.00	Cum SA (1000 m2)	46.05	22.61	46.41

Plan: 1 C.le Ponticello Principale RS: 1650.342 Profile: PF 1

E.G. Elev (m)	70.67	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.61	Reach Len. (m)	49.66	49.66	49.66
Crit W.S. (m)	70.06	Flow Area (m2)	33.07	7.22	35.85
E.G. Slope (m/m)	0.000906	Area (m2)	33.07	7.22	35.85
Q Total (m3/s)	79.41	Flow (m3/s)	32.53	10.24	36.64
Top Width (m)	72.21	Top Width (m)	33.74	3.74	34.73
Vel Total (m/s)	1.04	Avg. Vel. (m/s)	0.98	1.42	1.02
Max Chl Dpth (m)	2.33	Hydr. Depth (m)	0.98	1.93	1.03
Conv. Total (m3/s)	2538.1	Conv. (m3/s)	1040.8	340.0	1217.3
Length Wtd. (m)	49.66	Wetted Per. (m)	34.14	4.29	35.10
Min Ch El (m)	68.28	Shear (N/m2)	8.61	14.94	9.08
Alpha	1.05	Stream Power (N/m s)	8.47	21.19	9.28
Frctn Loss (m)	0.04	Cum Volume (1000 m3)	56.27	45.12	61.13
C & E Loss (m)	0.00	Cum SA (1000 m2)	44.40	22.46	44.68

Plan: 1 C.le Ponticello Principale RS: 1600.681 Profile: PF 1

E.G. Elev (m)	70.62	Element	Left OB	Channel	Right OB
Vel Head (m)	0.05	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.57	Reach Len. (m)	50.37	50.37	50.37
Crit W.S. (m)	69.95	Flow Area (m2)	34.05	8.73	39.15
E.G. Slope (m/m)	0.000715	Area (m2)	34.05	8.73	39.15
Q Total (m3/s)	79.41	Flow (m3/s)	31.47	10.63	37.31
Top Width (m)	71.93	Top Width (m)	31.94	4.72	35.27
Vel Total (m/s)	0.97	Avg. Vel. (m/s)	0.92	1.22	0.95
Max Chl Dpth (m)	2.34	Hydr. Depth (m)	1.07	1.85	1.11
Conv. Total (m3/s)	2968.9	Conv. (m3/s)	1176.4	397.6	1394.9
Length Wtd. (m)	50.37	Wetted Per. (m)	32.29	5.47	35.70
Min Ch El (m)	68.23	Shear (N/m2)	7.40	11.20	7.69

Plan: 1 C.le Ponticello Principale RS: 1600.681 Profile: PF 1 (Continued)

Alpha	1.03	Stream Power (N/m s)	6.84	13.64	7.33
Frctn Loss (m)	0.03	Cum Volume (1000 m3)	54.81	44.72	59.27
C & E Loss (m)	0.00	Cum SA (1000 m2)	42.77	22.24	42.94

Plan: 1 C.le Ponticello Principale RS: 1550.311 Profile: PF 1

E.G. Elev (m)	70.59	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.55	Reach Len. (m)	50.24	50.24	50.24
Crit W.S. (m)	69.82	Flow Area (m2)	40.53	6.80	39.77
E.G. Slope (m/m)	0.000568	Area (m2)	40.53	6.80	39.77
Q Total (m3/s)	79.41	Flow (m3/s)	35.91	7.98	35.52
Top Width (m)	70.36	Top Width (m)	34.03	3.32	33.01
Vel Total (m/s)	0.91	Avg. Vel. (m/s)	0.89	1.17	0.89
Max Chl Dpth (m)	2.36	Hydr. Depth (m)	1.19	2.05	1.20
Conv. Total (m3/s)	3331.2	Conv. (m3/s)	1506.4	334.9	1489.9
Length Wtd. (m)	50.24	Wetted Per. (m)	34.52	3.79	33.52
Min Ch El (m)	68.19	Shear (N/m2)	6.54	10.01	6.61
Alpha	1.02	Stream Power (N/m s)	5.80	11.75	5.90
Frctn Loss (m)	0.03	Cum Volume (1000 m3)	52.73	44.33	57.28
C & E Loss (m)	0.00	Cum SA (1000 m2)	41.11	22.04	41.22

Plan: 1 C.le Ponticello Principale RS: 1500.075 Profile: PF 1

E.G. Elev (m)	70.56	Element	Left OB	Channel	Right OB
Vel Head (m)	0.04	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.53	Reach Len. (m)	52.59	52.59	52.59
Crit W.S. (m)	69.72	Flow Area (m2)	44.09	6.97	43.99
E.G. Slope (m/m)	0.000455	Area (m2)	44.09	6.97	43.99
Q Total (m3/s)	79.41	Flow (m3/s)	36.01	7.49	35.91
Top Width (m)	74.21	Top Width (m)	35.54	3.29	35.38
Vel Total (m/s)	0.84	Avg. Vel. (m/s)	0.82	1.07	0.82
Max Chl Dpth (m)	2.39	Hydr. Depth (m)	1.24	2.12	1.24
Conv. Total (m3/s)	3722.8	Conv. (m3/s)	1688.4	351.1	1683.3
Length Wtd. (m)	52.59	Wetted Per. (m)	35.87	3.76	35.95
Min Ch El (m)	68.14	Shear (N/m2)	5.48	8.28	5.46
Alpha	1.02	Stream Power (N/m s)	4.48	8.90	4.46
Frctn Loss (m)	0.02	Cum Volume (1000 m3)	50.60	43.99	55.18
C & E Loss (m)	0.00	Cum SA (1000 m2)	39.36	21.87	39.51

Plan: 1 C.le Ponticello Principale RS: 1447.469 Profile: PF 1

E.G. Elev (m)	70.54	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.50	Reach Len. (m)	49.68	49.68	49.68
Crit W.S. (m)	69.86	Flow Area (m2)	45.39	5.36	47.77
E.G. Slope (m/m)	0.000403	Area (m2)	45.39	5.36	47.77
Q Total (m3/s)	79.41	Flow (m3/s)	35.83	5.68	37.91
Top Width (m)	73.89	Top Width (m)	34.91	2.40	36.58
Vel Total (m/s)	0.81	Avg. Vel. (m/s)	0.79	1.06	0.79
Max Chl Dpth (m)	2.42	Hydr. Depth (m)	1.30	2.23	1.31
Conv. Total (m3/s)	3957.5	Conv. (m3/s)	1785.4	282.9	1889.2
Length Wtd. (m)	49.68	Wetted Per. (m)	35.44	2.59	37.04
Min Ch El (m)	68.09	Shear (N/m2)	5.06	7.67	5.09
Alpha	1.02	Stream Power (N/m s)	2.99	8.34	4.04
Frctn Loss (m)	0.02	Cum Volume (1000 m3)	48.25	43.66	52.76
C & E Loss (m)	0.00	Cum SA (1000 m2)	37.51	21.72	37.61

Plan: 1 C.le Ponticello Principale RS: 1397.807 Profile: PF 1

E.G. Elev (m)	70.52	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.49	Reach Len. (m)	49.35	49.35	49.35
Crit W.S. (m)	69.57	Flow Area (m2)	46.65	4.81	52.68
E.G. Slope (m/m)	0.000339	Area (m2)	46.65	4.81	52.68
Q Total (m3/s)	79.41	Flow (m3/s)	33.74	4.69	40.78
Top Width (m)	74.84	Top Width (m)	36.07	2.04	36.52
Vel Total (m/s)	0.76	Avg. Vel. (m/s)	0.72	1.02	0.77
Max Chl Dpth (m)	2.45	Hydr. Depth (m)	1.29	2.36	1.44
Conv. Total (m3/s)	4313.3	Conv. (m3/s)	1832.7	265.8	2214.8
Length Wtd. (m)	49.35	Wetted Per. (m)	36.53	2.25	37.16
Min Ch El (m)	68.04	Shear (N/m2)	4.24	7.10	4.71
Alpha	1.02	Stream Power (N/m s)	3.07	7.24	3.65
Frctn Loss (m)	0.02	Cum Volume (1000 m3)	45.96	43.41	50.27
C & E Loss (m)	0.00	Cum SA (1000 m2)	35.75	21.61	35.89

Plan: 1 C.le Ponticello Principale RS: 1348.456 Profile: PF 1

E.G. Elev (m)	70.50	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.47	Reach Len. (m)	49.71	49.71	49.71
Crit W.S. (m)	69.52	Flow Area (m2)	47.04	6.40	52.99
E.G. Slope (m/m)	0.000305	Area (m2)	47.04	6.40	52.99
Q Total (m3/s)	79.41	Flow (m3/s)	33.67	5.94	39.80
Top Width (m)	72.45	Top Width (m)	34.02	2.61	35.82
Vel Total (m/s)	0.75	Avg. Vel. (m/s)	0.72	0.93	0.75
Max Chl Dpth (m)	2.48	Hydr. Depth (m)	1.38	2.28	1.49
Conv. Total (m3/s)	4548.1	Conv. (m3/s)	1928.3	340.4	2279.3
Length Wtd. (m)	49.71	Wetted Per. (m)	34.50	3.17	36.21
Min Ch El (m)	68.00	Shear (N/m2)	4.08	6.03	4.37
Alpha	1.01	Stream Power (N/m s)	2.92	5.61	3.29
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	43.65	43.13	47.66
C & E Loss (m)	0.00	Cum SA (1000 m2)	34.02	21.49	34.02

Plan: 1 C.le Ponticello Principale RS: 1298.743 Profile: PF 1

E.G. Elev (m)	70.49	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.46	Reach Len. (m)	49.37	49.37	49.37
Crit W.S. (m)	69.45	Flow Area (m2)	49.00	7.74	51.40
E.G. Slope (m/m)	0.000290	Area (m2)	49.00	7.74	51.40
Q Total (m3/s)	79.41	Flow (m3/s)	34.73	6.74	37.95
Top Width (m)	72.39	Top Width (m)	34.69	3.55	34.15
Vel Total (m/s)	0.73	Avg. Vel. (m/s)	0.71	0.87	0.74
Max Chl Dpth (m)	2.51	Hydr. Depth (m)	1.41	2.18	1.50
Conv. Total (m3/s)	4665.8	Conv. (m3/s)	2040.5	395.8	2229.5
Length Wtd. (m)	49.37	Wetted Per. (m)	35.12	4.07	34.66
Min Ch El (m)	67.95	Shear (N/m2)	3.96	5.40	4.21
Alpha	1.01	Stream Power (N/m s)	2.81	4.70	3.11
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	41.26	42.78	45.07
C & E Loss (m)	0.00	Cum SA (1000 m2)	32.31	21.33	32.28

Plan: 1 C.le Ponticello Principale RS: 1249.377 Profile: PF 1

E.G. Elev (m)	70.47	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.45	Reach Len. (m)	51.13	51.13	51.13
Crit W.S. (m)	69.40	Flow Area (m2)	48.68	8.06	54.61
E.G. Slope (m/m)	0.000265	Area (m2)	48.68	8.06	54.61
Q Total (m3/s)	79.41	Flow (m3/s)	33.96	6.82	38.63

Plan: 1 C.le Ponticello Principale RS: 1249.377 Profile: PF 1 (Continued)

Top Width (m)	72.92	Top Width (m)	33.00	3.62	36.30
Vel Total (m/s)	0.71	Avg. Vel. (m/s)	0.70	0.85	0.71
Max Chl Dpth (m)	2.55	Hydr. Depth (m)	1.48	2.23	1.59
Conv. Total (m3/s)	4877.2	Conv. (m3/s)	2086.0	418.9	2372.3
Length Wtd. (m)	51.13	Wetted Per. (m)	33.41	4.14	36.72
Min Ch El (m)	67.90	Shear (N/m2)	3.79	5.06	3.87
Alpha	1.01	Stream Power (N/m s)	2.64	4.28	2.73
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	38.65	42.39	42.45
C & E Loss (m)	0.00	Cum SA (1000 m2)	30.64	21.16	30.54

Plan: 1 C.le Ponticello Principale RS: 1198.244 Profile: PF 1

E.G. Elev (m)	70.46	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.44	Reach Len. (m)	50.74	50.74	50.74
Crit W.S. (m)	69.33	Flow Area (m2)	49.37	14.81	50.22
E.G. Slope (m/m)	0.000242	Area (m2)	49.37	14.81	50.22
Q Total (m3/s)	79.41	Flow (m3/s)	33.95	11.40	34.06
Top Width (m)	72.81	Top Width (m)	31.86	7.76	33.19
Vel Total (m/s)	0.69	Avg. Vel. (m/s)	0.69	0.77	0.68
Max Chl Dpth (m)	2.59	Hydr. Depth (m)	1.55	1.91	1.51
Conv. Total (m3/s)	5104.2	Conv. (m3/s)	2182.2	733.0	2188.9
Length Wtd. (m)	50.74	Wetted Per. (m)	32.33	8.19	33.58
Min Ch El (m)	67.85	Shear (N/m2)	3.82	4.29	3.55
Alpha	1.01	Stream Power (N/m s)	2.49	3.31	2.41
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	36.35	41.81	39.77
C & E Loss (m)	0.00	Cum SA (1000 m2)	28.98	20.87	28.77

Plan: 1 C.le Ponticello Principale RS: 1147.501 Profile: PF 1

E.G. Elev (m)	70.45	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.42	Reach Len. (m)	46.30	46.30	46.30
Crit W.S. (m)	69.30	Flow Area (m2)	50.52	17.59	47.76
E.G. Slope (m/m)	0.000233	Area (m2)	50.52	17.59	47.76
Q Total (m3/s)	79.41	Flow (m3/s)	34.29	13.85	31.27
Top Width (m)	73.51	Top Width (m)	32.35	8.71	32.45
Vel Total (m/s)	0.69	Avg. Vel. (m/s)	0.68	0.79	0.65
Max Chl Dpth (m)	2.61	Hydr. Depth (m)	1.56	2.02	1.47
Conv. Total (m3/s)	5202.6	Conv. (m3/s)	2246.5	907.3	2048.8
Length Wtd. (m)	46.30	Wetted Per. (m)	32.80	9.14	32.71
Min Ch El (m)	67.81	Shear (N/m2)	3.52	4.40	3.34
Alpha	1.01	Stream Power (N/m s)	2.39	3.46	2.18
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	33.81	40.98	37.28
C & E Loss (m)	0.00	Cum SA (1000 m2)	27.35	20.46	27.10

Plan: 1 C.le Ponticello Principale RS: 1101.197 Profile: PF 1

E.G. Elev (m)	70.44	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.41	Reach Len. (m)	51.87	51.87	51.87
Crit W.S. (m)	69.28	Flow Area (m2)	57.41	8.43	54.09
E.G. Slope (m/m)	0.000207	Area (m2)	57.41	8.43	54.09
Q Total (m3/s)	79.41	Flow (m3/s)	37.78	6.67	34.96
Top Width (m)	72.68	Top Width (m)	35.10	3.48	34.10
Vel Total (m/s)	0.66	Avg. Vel. (m/s)	0.66	0.79	0.65
Max Chl Dpth (m)	2.74	Hydr. Depth (m)	1.64	2.42	1.59
Conv. Total (m3/s)	5524.1	Conv. (m3/s)	2628.3	463.8	2432.0
Length Wtd. (m)	51.87	Wetted Per. (m)	35.67	3.98	34.53
Min Ch El (m)	67.68	Shear (N/m2)	3.26	4.30	3.17

Plan: 1 C.le Ponticello Principale RS: 1101.197 Profile: PF 1 (Continued)

Alpha	1.01	Stream Power (N/m s)	2.15	3.40	2.05
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	31.31	40.38	34.93
C & E Loss (m)	0.00	Cum SA (1000 m2)	25.79	20.17	25.56

Plan: 1 C.le Ponticello Principale RS: 1049.337 Profile: PF 1

E.G. Elev (m)	70.43	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.41	Reach Len. (m)	50.96	50.96	50.96
Crit W.S. (m)	69.19	Flow Area (m2)	60.53	7.62	57.11
E.G. Slope (m/m)	0.000179	Area (m2)	60.53	7.62	57.11
Q Total (m3/s)	79.41	Flow (m3/s)	38.06	6.02	35.32
Top Width (m)	72.69	Top Width (m)	35.69	2.85	34.15
Vel Total (m/s)	0.63	Avg. Vel. (m/s)	0.63	0.79	0.62
Max Chl Dpth (m)	2.87	Hydr. Depth (m)	1.70	2.67	1.67
Conv. Total (m3/s)	5940.4	Conv. (m3/s)	2847.4	450.6	2642.3
Length Wtd. (m)	50.96	Wetted Per. (m)	36.18	3.22	34.93
Min Ch El (m)	67.53	Shear (N/m2)	2.93	4.14	2.87
Alpha	1.01	Stream Power (N/m s)	1.84	3.28	1.77
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	28.25	39.97	32.04
C & E Loss (m)	0.00	Cum SA (1000 m2)	23.95	20.00	23.79

Plan: 1 C.le Ponticello Principale RS: 998.3763 Profile: PF 1

E.G. Elev (m)	70.42	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.40	Reach Len. (m)	48.62	48.62	48.62
Crit W.S. (m)	69.17	Flow Area (m2)	60.14	8.44	56.92
E.G. Slope (m/m)	0.000176	Area (m2)	60.14	8.44	56.92
Q Total (m3/s)	79.41	Flow (m3/s)	37.39	6.77	35.25
Top Width (m)	72.03	Top Width (m)	35.57	3.05	33.41
Vel Total (m/s)	0.63	Avg. Vel. (m/s)	0.62	0.80	0.62
Max Chl Dpth (m)	3.01	Hydr. Depth (m)	1.69	2.77	1.70
Conv. Total (m3/s)	5980.3	Conv. (m3/s)	2815.7	509.6	2655.0
Length Wtd. (m)	48.62	Wetted Per. (m)	36.22	3.48	34.39
Min Ch El (m)	67.39	Shear (N/m2)	2.87	4.22	2.66
Alpha	1.02	Stream Power (N/m s)	1.78	3.38	1.77
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	25.18	39.56	29.14
C & E Loss (m)	0.00	Cum SA (1000 m2)	22.14	19.85	22.07

Plan: 1 C.le Ponticello Principale RS: 949.758 Profile: PF 1

E.G. Elev (m)	70.41	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.38	Reach Len. (m)	49.27	49.27	49.27
Crit W.S. (m)	69.36	Flow Area (m2)	50.73	6.92	57.65
E.G. Slope (m/m)	0.000235	Area (m2)	50.73	6.92	57.65
Q Total (m3/s)	79.41	Flow (m3/s)	33.39	6.86	39.15
Top Width (m)	74.30	Top Width (m)	34.62	2.30	37.38
Vel Total (m/s)	0.69	Avg. Vel. (m/s)	0.66	0.99	0.68
Max Chl Dpth (m)	3.13	Hydr. Depth (m)	1.47	3.01	1.54
Conv. Total (m3/s)	5179.9	Conv. (m3/s)	2178.3	447.5	2554.1
Length Wtd. (m)	49.27	Wetted Per. (m)	35.19	2.55	37.68
Min Ch El (m)	67.25	Shear (N/m2)	3.32	6.23	3.51
Alpha	1.04	Stream Power (N/m s)	2.19	6.17	2.38
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	22.48	39.18	26.35
C & E Loss (m)	0.00	Cum SA (1000 m2)	20.43	19.72	20.35

Plan: 1 C.le Ponticello Principale RS: 900.4858 Profile: PF 1

E.G. Elev (m)	70.39	Element	Left OB	Channel	Right OB
Vel Head (m)	0.03	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.36	Reach Len. (m)	53.48	53.48	53.48
Crit W.S. (m)	69.43	Flow Area (m2)	47.47	9.10	44.05
E.G. Slope (m/m)	0.000318	Area (m2)	47.47	9.10	44.05
Q Total (m3/s)	79.41	Flow (m3/s)	34.84	10.37	34.20
Top Width (m)	66.78	Top Width (m)	34.61	3.62	29.15
Vel Total (m/s)	0.79	Avg. Vel. (m/s)	0.73	1.14	0.78
Max Chl Dpth (m)	3.25	Hydr. Depth (m)	1.37	3.01	1.51
Conv. Total (m3/s)	4454.3	Conv. (m3/s)	1954.3	581.6	1918.4
Length Wtd. (m)	53.48	Wetted Per. (m)	35.27	3.42	29.69
Min Ch El (m)	67.11	Shear (N/m2)	4.20	6.28	4.62
Alpha	1.07	Stream Power (N/m s)	3.08	9.44	3.59
Frctn Loss (m)		Cum Volume (1000 m3)	20.07	38.79	23.85
C & E Loss (m)		Cum SA (1000 m2)	18.73	19.59	18.71

Plan: 1 C.le Ponticello Principale RS: 847.0104 Profile: PF 1

E.G. Elev (m)	70.38	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.36	Reach Len. (m)	49.05	49.05	49.05
Crit W.S. (m)	69.26	Flow Area (m2)	56.61	8.04	55.17
E.G. Slope (m/m)	0.000205	Area (m2)	56.61	8.04	55.17
Q Total (m3/s)	79.41	Flow (m3/s)	34.46	7.70	37.25
Top Width (m)	74.58	Top Width (m)	40.14	2.52	31.91
Vel Total (m/s)	0.56	Avg. Vel. (m/s)	0.61	0.96	0.68
Max Chl Dpth (m)	3.40	Hydr. Depth (m)	1.41	3.19	1.73
Conv. Total (m3/s)	5550.6	Conv. (m3/s)	2408.5	538.5	2603.6
Length Wtd. (m)	49.05	Wetted Per. (m)	40.73	2.83	32.81
Min Ch El (m)	66.96	Shear (N/m2)	2.79	5.71	3.38
Alpha	1.06	Stream Power (N/m s)	1.70	5.47	2.28
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	20.07	31.00	23.85
C & E Loss (m)	0.00	Cum SA (1000 m2)	16.73	19.44	17.08

Plan: 1 C.le Ponticello Principale RS: 797.9601 Profile: PF 1

E.G. Elev (m)	70.37	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.35	Reach Len. (m)	48.37	48.37	48.37
Crit W.S. (m)	69.07	Flow Area (m2)	57.26	4.06	61.24
E.G. Slope (m/m)	0.000169	Area (m2)	57.26	4.06	61.24
Q Total (m3/s)	79.41	Flow (m3/s)	35.69	4.00	39.72
Top Width (m)	67.75	Top Width (m)	33.83	1.15	32.76
Vel Total (m/s)	0.65	Avg. Vel. (m/s)	0.62	0.99	0.65
Max Chl Dpth (m)	3.53	Hydr. Depth (m)	1.69	3.52	1.87
Conv. Total (m3/s)	6112.9	Conv. (m3/s)	2747.6	307.9	3057.4
Length Wtd. (m)	48.37	Wetted Per. (m)	34.97	1.18	33.80
Min Ch El (m)	66.82	Shear (N/m2)	2.71	5.68	2.99
Alpha	1.03	Stream Power (N/m s)	1.69	5.60	1.94
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	17.27	30.71	20.99
C & E Loss (m)	0.00	Cum SA (1000 m2)	14.91	19.35	15.49

Plan: 1 C.le Ponticello Principale RS: 749.5943 Profile: PF 1

E.G. Elev (m)	70.36	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.34	Reach Len. (m)	52.00	52.00	52.00
Crit W.S. (m)	69.06	Flow Area (m2)	40.16	42.25	45.50
E.G. Slope (m/m)	0.000155	Area (m2)	40.16	42.25	45.50
Q Total (m3/s)	79.41	Flow (m3/s)	21.20	32.12	26.09

Plan: 1 C.le Ponticello Principale RS: 749.5943 Profile: PF 1 (Continued)

Top Width (m)	71.57	Top Width (m)	27.62	16.36	27.57
Vel Total (m/s)	0.62	Avg. Vel. (m/s)	0.53	0.78	0.57
Max Chl Dpth (m)	3.71	Hydr. Depth (m)	1.45	2.58	1.65
Conv. Total (m3/s)	6384.3	Conv. (m3/s)	1704.1	2582.7	2097.6
Length Wtd. (m)	52.00	Wetted Per. (m)	27.96	17.01	27.98
Min Ch El (m)	66.63	Shear (N/m2)	2.18	3.77	2.47
Alpha	1.08	Stream Power (N/m s)	1.15	2.86	1.41
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	14.92	29.59	18.41
C & E Loss (m)	0.00	Cum SA (1000 m2)	13.43	18.93	14.63

Plan: 1 C.le Ponticello Principale RS: 697.5896 Profile: PF 1

E.G. Elev (m)	70.35	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.33	Reach Len. (m)	48.52	48.52	48.52
Crit W.S. (m)	69.04	Flow Area (m2)	38.80	49.10	41.73
E.G. Slope (m/m)	0.000153	Area (m2)	38.80	49.10	41.73
Q Total (m3/s)	79.41	Flow (m3/s)	20.27	36.65	22.50
Top Width (m)	73.93	Top Width (m)	26.89	19.36	27.69
Vel Total (m/s)	0.61	Avg. Vel. (m/s)	0.52	0.75	0.54
Max Chl Dpth (m)	3.78	Hydr. Depth (m)	1.44	2.54	1.51
Conv. Total (m3/s)	6411.9	Conv. (m3/s)	1636.4	2959.1	1816.4
Length Wtd. (m)	48.52	Wetted Per. (m)	27.27	20.20	27.97
Min Ch El (m)	66.55	Shear (N/m2)	2.14	3.66	2.24
Alpha	1.09	Stream Power (N/m s)	1.12	2.73	1.21
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	12.86	27.21	16.14
C & E Loss (m)	0.00	Cum SA (1000 m2)	12.01	18.00	12.60

Plan: 1 C.le Ponticello Principale RS: 649.6743 Profile: PF 1

E.G. Elev (m)	70.35	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.33	Reach Len. (m)	50.96	50.96	50.96
Crit W.S. (m)	68.98	Flow Area (m2)	40.87	44.08	44.77
E.G. Slope (m/m)	0.000143	Area (m2)	40.87	44.08	44.77
Q Total (m3/s)	79.41	Flow (m3/s)	21.80	32.73	24.88
Top Width (m)	74.18	Top Width (m)	25.94	16.77	31.48
Vel Total (m/s)	0.61	Avg. Vel. (m/s)	0.53	0.74	0.56
Max Chl Dpth (m)	3.92	Hydr. Depth (m)	1.58	2.63	1.42
Conv. Total (m3/s)	6639.0	Conv. (m3/s)	1822.7	2736.0	2080.3
Length Wtd. (m)	50.96	Wetted Per. (m)	26.42	17.66	32.02
Min Ch El (m)	66.41	Shear (N/m2)	2.17	3.50	1.96
Alpha	1.07	Stream Power (N/m s)	1.16	2.60	1.09
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	10.93	24.95	14.04
C & E Loss (m)	0.00	Cum SA (1000 m2)	10.73	17.12	11.16

Plan: 1 C.le Ponticello Principale RS: 598.1116 Profile: PF 1

E.G. Elev (m)	70.34	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.32	Reach Len. (m)	46.89	46.89	46.89
Crit W.S. (m)	68.87	Flow Area (m2)	42.93	47.29	44.09
E.G. Slope (m/m)	0.000125	Area (m2)	42.93	47.29	44.09
Q Total (m3/s)	79.41	Flow (m3/s)	21.44	34.12	23.85
Top Width (m)	68.40	Top Width (m)	27.31	16.60	24.48
Vel Total (m/s)	0.59	Avg. Vel. (m/s)	0.50	0.72	0.54
Max Chl Dpth (m)	4.06	Hydr. Depth (m)	1.57	2.85	1.80
Conv. Total (m3/s)	7107.6	Conv. (m3/s)	1919.1	3053.7	2134.8
Length Wtd. (m)	46.89	Wetted Per. (m)	27.65	17.54	25.18
Min Ch El (m)	66.25	Shear (N/m2)	1.90	3.30	2.14

Plan: 1 C.le Ponticello Principale RS: 596.1116 Profile: PF 1 (Continued)

Alpha	1.08	Stream Power (N/m s)	0.95	2.36	1.16
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	8.80	22.62	11.78
C & E Loss (m)	0.00	Cum SA (1000 m2)	9.37	16.27	9.73

Plan: 1 C.le Ponticello Principale RS: 551.2175 Profile: PF 1

E.G. Elev (m)	70.33	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.31	Reach Len. (m)	50.36	50.36	50.36
Crit W.S. (m)	68.84	Flow Area (m2)	42.18	48.05	47.11
E.G. Slope (m/m)	0.000117	Area (m2)	42.18	48.05	47.11
Q Total (m3/s)	79.41	Flow (m3/s)	20.87	34.08	24.46
Top Width (m)	69.15	Top Width (m)	25.84	16.58	26.73
Vel Total (m/s)	0.58	Avg. Vel. (m/s)	0.49	0.71	0.52
Max Chl Dpth (m)	4.20	Hydr. Depth (m)	1.63	2.90	1.76
Conv. Total (m3/s)	7339.8	Conv. (m3/s)	1929.2	3150.2	2260.4
Length Wtd. (m)	50.36	Wetted Per. (m)	26.24	17.43	27.28
Min Ch El (m)	66.12	Shear (N/m2)	1.85	3.15	1.98
Alpha	1.09	Stream Power (N/m s)	0.91	2.24	1.03
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	6.80	20.39	9.64
C & E Loss (m)	0.00	Cum SA (1000 m2)	8.12	15.50	8.53

Plan: 1 C.le Ponticello Principale RS: 500.8543 Profile: PF 1

E.G. Elev (m)	70.33	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.31	Reach Len. (m)	50.17	50.17	50.17
Crit W.S. (m)	68.86	Flow Area (m2)	38.50	56.11	52.50
E.G. Slope (m/m)	0.000095	Area (m2)	38.50	56.11	52.50
Q Total (m3/s)	79.41	Flow (m3/s)	17.11	36.49	25.81
Top Width (m)	69.82	Top Width (m)	23.82	18.76	27.44
Vel Total (m/s)	0.54	Avg. Vel. (m/s)	0.44	0.65	0.49
Max Chl Dpth (m)	4.34	Hydr. Depth (m)	1.63	2.99	1.91
Conv. Total (m3/s)	8159.7	Conv. (m3/s)	1758.2	3749.3	2652.1
Length Wtd. (m)	50.17	Wetted Per. (m)	24.01	19.77	28.14
Min Ch El (m)	65.97	Shear (N/m2)	1.49	2.64	1.73
Alpha	1.08	Stream Power (N/m s)	0.86	1.71	0.85
Frctn Loss (m)	0.00	Cum Volume (1000 m3)	4.77	17.76	7.13
C & E Loss (m)	0.00	Cum SA (1000 m2)	6.88	14.61	7.17

Plan: 1 C.le Ponticello Principale RS: 450.6874 Profile: PF 1

E.G. Elev (m)	70.32	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.31	Reach Len. (m)	42.00	42.00	42.00
Crit W.S. (m)	68.55	Flow Area (m2)	50.49	52.51	82.41
E.G. Slope (m/m)	0.000068	Area (m2)	50.49	52.51	82.41
Q Total (m3/s)	79.41	Flow (m3/s)	20.99	30.19	28.23
Top Width (m)	100.14	Top Width (m)	26.51	16.47	57.16
Vel Total (m/s)	0.43	Avg. Vel. (m/s)	0.42	0.57	0.34
Max Chl Dpth (m)	4.49	Hydr. Depth (m)	1.90	3.19	1.44
Conv. Total (m3/s)	9623.4	Conv. (m3/s)	2544.0	3658.4	3420.9
Length Wtd. (m)	42.00	Wetted Per. (m)	27.17	17.38	59.30
Min Ch El (m)	65.82	Shear (N/m2)	1.24	2.02	0.93
Alpha	1.16	Stream Power (N/m s)	0.52	1.16	0.32
Frctn Loss (m)	0.01	Cum Volume (1000 m3)	2.54	15.04	3.75
C & E Loss (m)	0.01	Cum SA (1000 m2)	5.62	13.72	5.05

Plan: 1 C.le Ponticello Principale RS: 400 BR U Profile: PF 1

E.G. Elev (m)	70.30	Element	Left OB	Channel	Right OB
Vel Head (m)	0.12	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.18	Reach Len. (m)	5.60	5.60	5.60
Crit W.S. (m)	69.99	Flow Area (m2)	3.52	20.65	29.82
E.G. Slope (m/m)	0.005387	Area (m2)	3.52	20.65	29.82
Q Total (m3/s)	79.41	Flow (m3/s)	1.26	27.91	50.24
Top Width (m)	99.41	Top Width (m)	25.78	16.47	57.16
Vel Total (m/s)	1.47	Avg. Vel. (m/s)	0.36	1.35	1.68
Max Chl Dpth (m)	4.36	Hydr. Depth (m)	0.14	1.25	0.52
Conv. Total (m3/s)	1082.0	Conv. (m3/s)	17.2	380.3	684.5
Length Wtd. (m)	5.60	Wetted Per. (m)	62.62	50.32	105.09
Min Ch El (m)	65.82	Shear (N/m2)	2.97	21.68	14.99
Alpha	1.13	Stream Power (N/m s)	1.07	29.30	25.25
Frctn Loss (m)	0.02	Cum Volume (1000 m3)	1.40	13.50	1.39
C & E Loss (m)	0.02	Cum SA (1000 m2)	4.52	13.03	2.65

Plan: 1 C.le Ponticello Principale RS: 400 BR D Profile: PF 1

E.G. Elev (m)	70.26	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	70.21	Reach Len. (m)	53.74	53.74	53.74
Crit W.S. (m)	70.21	Flow Area (m2)	11.10	25.24	40.91
E.G. Slope (m/m)	0.001986	Area (m2)	11.10	25.24	40.91
Q Total (m3/s)	79.41	Flow (m3/s)	7.98	23.59	47.84
Top Width (m)	104.27	Top Width (m)	30.46	16.78	57.03
Vel Total (m/s)	1.03	Avg. Vel. (m/s)	0.72	0.93	1.17
Max Chl Dpth (m)	4.69	Hydr. Depth (m)	0.36	1.50	0.72
Conv. Total (m3/s)	1782.1	Conv. (m3/s)	179.0	529.5	1073.6
Length Wtd. (m)	53.74	Wetted Per. (m)	35.47	59.55	59.15
Min Ch El (m)	65.52	Shear (N/m2)	6.09	9.72	13.47
Alpha	1.07	Stream Power (N/m s)	4.38	9.09	15.75
Frctn Loss (m)	0.15	Cum Volume (1000 m3)	1.36	13.37	1.19
C & E Loss (m)	0.03	Cum SA (1000 m2)	4.37	12.94	2.33

Plan: 1 C.le Ponticello Principale RS: 349.3478 Profile: PF 1

E.G. Elev (m)	68.79	Element	Left OB	Channel	Right OB
Vel Head (m)	0.36	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	68.42	Reach Len. (m)	50.28	50.28	50.28
Crit W.S. (m)	68.37	Flow Area (m2)	7.54	25.52	0.30
E.G. Slope (m/m)	0.004398	Area (m2)	7.54	25.52	0.30
Q Total (m3/s)	79.41	Flow (m3/s)	7.81	71.33	0.27
Top Width (m)	41.21	Top Width (m)	23.43	16.78	0.99
Vel Total (m/s)	2.38	Avg. Vel. (m/s)	1.04	2.80	0.90
Max Chl Dpth (m)	2.91	Hydr. Depth (m)	0.32	1.52	0.30
Conv. Total (m3/s)	1197.4	Conv. (m3/s)	117.8	1075.6	4.0
Length Wtd. (m)	50.28	Wetted Per. (m)	23.47	17.94	1.16
Min Ch El (m)	65.52	Shear (N/m2)	13.85	61.34	11.11
Alpha	1.26	Stream Power (N/m s)	14.35	171.48	9.95
Frctn Loss (m)	0.23	Cum Volume (1000 m3)	0.86	12.01	0.09
C & E Loss (m)	0.00	Cum SA (1000 m2)	2.92	12.03	0.77

Plan: 1 C.le Ponticello Principale RS: 299.0697 Profile: PF 1

E.G. Elev (m)	68.56	Element	Left OB	Channel	Right OB
Vel Head (m)	0.36	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	68.20	Reach Len. (m)	49.93	49.93	49.93
Crit W.S. (m)	68.20	Flow Area (m2)	7.66	25.44	1.12
E.G. Slope (m/m)	0.004635	Area (m2)	7.66	25.44	1.12
Q Total (m3/s)	79.41	Flow (m3/s)	7.86	70.93	0.62

Plan: 1 C.le Ponticello Principale RS: 299.0697 Profile: PF 1 (Continued)

Top Width (m)	51.90	Top Width (m)	25.16	17.46	9.28
Vel Total (m/s)	2.32	Avg. Vel. (m/s)	1.03	2.79	0.55
Max Chl Dpth (m)	2.83	Hydr. Depth (m)	0.30	1.46	0.12
Conv. Total (m3/s)	1166.4	Conv. (m3/s)	115.5	1041.8	9.1
Length Wtd. (m)	49.93	Wetted Per. (m)	25.22	16.69	9.29
Min Ch El (m)	65.37	Shear (N/m2)	13.81	61.88	5.49
Alpha	1.31	Stream Power (N/m s)	14.17	172.49	3.05
Frctn Loss (m)	0.17	Cum Volume (1000 m3)	0.48	10.73	0.05
C & E Loss (m)	0.02	Cum SA (1000 m2)	1.70	11.17	0.51

Plan: 1 C.le Ponticello Principale RS: 249.1397 Profile: PF 1

E.G. Elev (m)	68.34	Element	Left OB	Channel	Right OB
Vel Head (m)	0.29	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (m)	68.06	Reach Len. (m)	49.41	49.41	49.41
Crit W.S. (m)	67.49	Flow Area (m2)	5.78	30.90	0.48
E.G. Slope (m/m)	0.002509	Area (m2)	5.78	30.90	0.48
Q Total (m3/s)	79.41	Flow (m3/s)	4.01	75.16	0.23
Top Width (m)	43.49	Top Width (m)	21.50	16.40	5.59
Vel Total (m/s)	2.14	Avg. Vel. (m/s)	0.69	2.43	0.49
Max Chl Dpth (m)	2.96	Hydr. Depth (m)	0.27	1.88	0.09
Conv. Total (m3/s)	1585.5	Conv. (m3/s)	80.1	1500.7	4.7
Length Wtd. (m)	49.41	Wetted Per. (m)	21.54	17.56	5.72
Min Ch El (m)	65.10	Shear (N/m2)	6.60	43.27	2.06
Alpha	1.23	Stream Power (N/m s)	4.58	105.26	1.01
Frctn Loss (m)	0.21	Cum Volume (1000 m3)	0.14	9.32	0.01
C & E Loss (m)	0.04	Cum SA (1000 m2)	0.53	10.33	0.14

Plan: 1 C.le Ponticello Principale RS: 199.729 Profile: PF 1

E.G. Elev (m)	68.09	Element	Left OB	Channel	Right OB
Vel Head (m)	0.71	Wt. n-Val.		0.030	
W.S. Elev (m)	67.39	Reach Len. (m)	49.66	49.66	49.66
Crit W.S. (m)	67.39	Flow Area (m2)		21.34	
E.G. Slope (m/m)	0.008812	Area (m2)		21.34	
Q Total (m3/s)	79.41	Flow (m3/s)		79.41	
Top Width (m)	15.14	Top Width (m)		15.14	
Vel Total (m/s)	3.72	Avg. Vel. (m/s)		3.72	
Max Chl Dpth (m)	2.31	Hydr. Depth (m)		1.41	
Conv. Total (m3/s)	855.7	Conv. (m3/s)		855.7	
Length Wtd. (m)	49.66	Wetted Per. (m)		16.17	
Min Ch El (m)	65.08	Shear (N/m2)		111.43	
Alpha	1.00	Stream Power (N/m s)		414.67	
Frctn Loss (m)	0.43	Cum Volume (1000 m3)		8.03	
C & E Loss (m)	0.01	Cum SA (1000 m2)		9.55	

Plan: 1 C.le Ponticello Principale RS: 150.0719 Profile: PF 1

E.G. Elev (m)	67.46	Element	Left OB	Channel	Right OB
Vel Head (m)	0.66	Wt. n-Val.		0.030	
W.S. Elev (m)	66.82	Reach Len. (m)	50.21	50.21	50.21
Crit W.S. (m)	66.82	Flow Area (m2)		22.09	
E.G. Slope (m/m)	0.008568	Area (m2)		22.09	
Q Total (m3/s)	79.41	Flow (m3/s)		79.41	
Top Width (m)	16.73	Top Width (m)		16.73	
Vel Total (m/s)	3.59	Avg. Vel. (m/s)		3.59	
Max Chl Dpth (m)	1.89	Hydr. Depth (m)		1.32	
Conv. Total (m3/s)	857.9	Conv. (m3/s)		857.9	
Length Wtd. (m)	50.21	Wetted Per. (m)		17.57	
Min Ch El (m)	64.93	Shear (N/m2)		105.66	

Plan: 1 C.le Ponticello Principale RS: 150.0719 Profile: PF 1 (Continued)

Alpha	1.00	Stream Power (N/m s)		379.84	
Frctn Loss (m)	0.23	Cum Volume (1000 m3)		6.95	
C & E Loss (m)	0.16	Cum SA (1000 m2)		8.76	

Plan: 1 C.le Ponticello Principale RS: 99.66035 Profile: PF 1

E.G. Elev (m)	64.20	Element	Left OB	Channel	Right OB
Vel Head (m)	0.12	Wt. n-Val.		0.030	
W.S. Elev (m)	64.07	Reach Len. (m)	51.20	51.20	51.20
Crit W.S. (m)	63.80	Flow Area (m2)		50.87	
E.G. Slope (m/m)	0.002900	Area (m2)		50.87	
Q Total (m3/s)	79.41	Flow (m3/s)		79.41	
Top Width (m)	62.31	Top Width (m)		62.31	
Vel Total (m/s)	1.56	Avg. Vel. (m/s)		1.56	
Max Chl Dpth (m)	1.13	Hydr. Depth (m)		0.82	
Conv. Total (m3/s)	1474.7	Conv. (m3/s)		1474.7	
Length Wtd. (m)	51.20	Wetted Per. (m)		62.71	
Min Ch El (m)	62.94	Shear (N/m2)		23.06	
Alpha	1.00	Stream Power (N/m s)		36.00	
Frctn Loss (m)	0.13	Cum Volume (1000 m3)		5.12	
C & E Loss (m)	0.01	Cum SA (1000 m2)		6.77	

Plan: 1 C.le Ponticello Principale RS: 48.65129 Profile: PF 1

E.G. Elev (m)	64.06	Element	Left OB	Channel	Right OB
Vel Head (m)	0.09	Wt. n-Val.		0.030	
W.S. Elev (m)	63.97	Reach Len. (m)	48.65	48.65	48.65
Crit W.S. (m)	63.83	Flow Area (m2)		58.63	
E.G. Slope (m/m)	0.002095	Area (m2)		58.63	
Q Total (m3/s)	79.41	Flow (m3/s)		79.41	
Top Width (m)	69.79	Top Width (m)		69.79	
Vel Total (m/s)	1.35	Avg. Vel. (m/s)		1.35	
Max Chl Dpth (m)	1.08	Hydr. Depth (m)		0.84	
Conv. Total (m3/s)	1734.8	Conv. (m3/s)		1734.8	
Length Wtd. (m)	48.65	Wetted Per. (m)		70.09	
Min Ch El (m)	62.89	Shear (N/m2)		17.19	
Alpha	1.00	Stream Power (N/m s)		23.28	
Frctn Loss (m)	0.19	Cum Volume (1000 m3)		2.32	
C & E Loss (m)	0.01	Cum SA (1000 m2)		3.39	

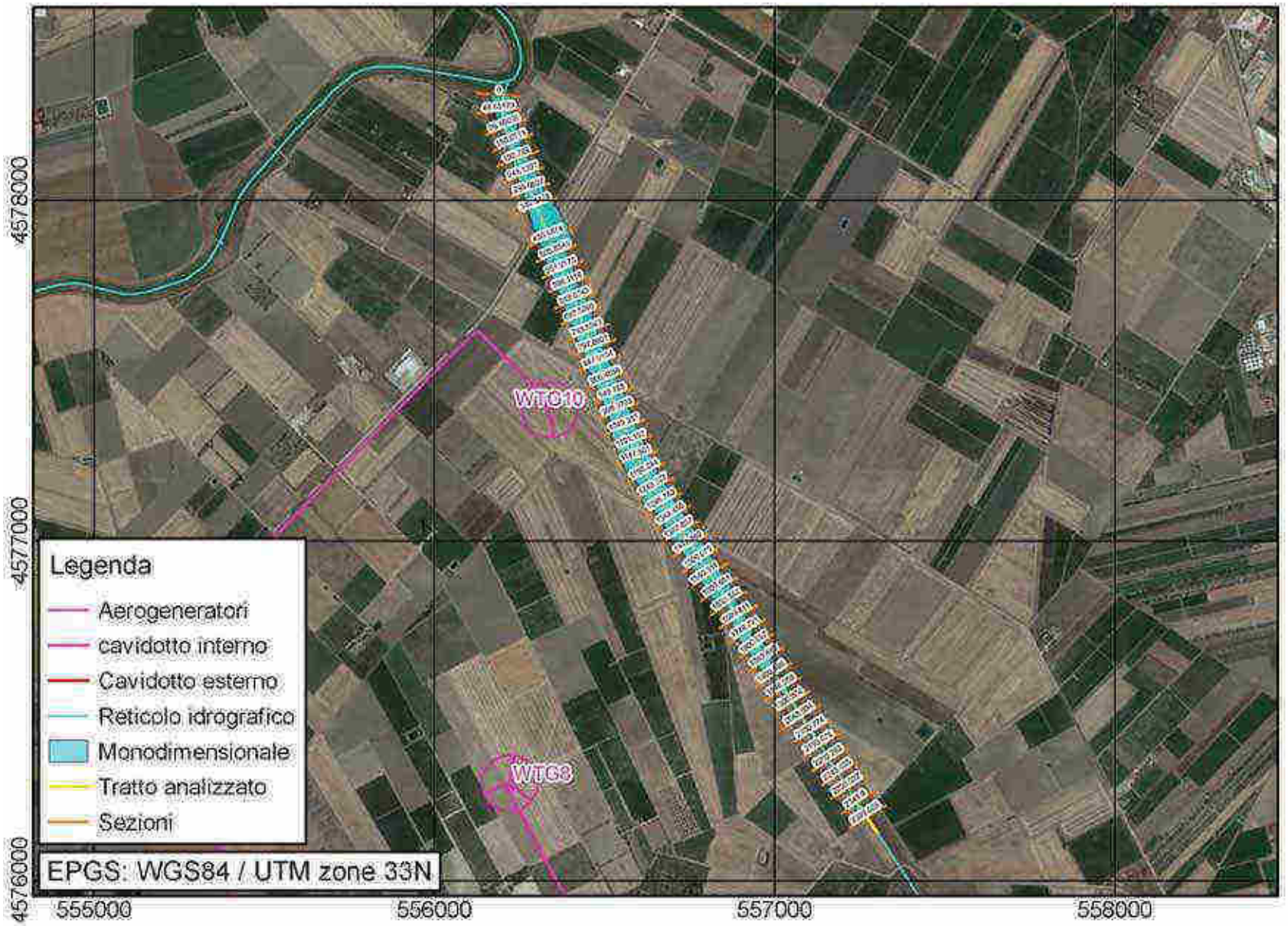
Plan: 1 C.le Ponticello Principale RS: 0 Profile: PF 1

E.G. Elev (m)	63.85	Element	Left OB	Channel	Right OB
Vel Head (m)	0.24	Wt. n-Val.		0.030	
W.S. Elev (m)	63.62	Reach Len. (m)			
Crit W.S. (m)	63.60	Flow Area (m2)		36.66	
E.G. Slope (m/m)	0.010004	Area (m2)		36.66	
Q Total (m3/s)	79.41	Flow (m3/s)		79.41	
Top Width (m)	69.66	Top Width (m)		69.66	
Vel Total (m/s)	2.17	Avg. Vel. (m/s)		2.17	
Max Chl Dpth (m)	0.84	Hydr. Depth (m)		0.53	
Conv. Total (m3/s)	793.9	Conv. (m3/s)		793.9	
Length Wtd. (m)		Wetted Per. (m)		70.02	
Min Ch El (m)	62.78	Shear (N/m2)		51.37	
Alpha	1.00	Stream Power (N/m s)		111.25	
Frctn Loss (m)		Cum Volume (1000 m3)			
C & E Loss (m)		Cum SA (1000 m2)			

HEC-RAS Plan: 1 River: Cle Pontcelle Reach: Principale Profile: PF 1

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)	
Principale	2359.658	PF 1	79.41	68.07	72.17	71.85	72.36	0.005564	1.76	59.11	67.40	0.45
Principale	2349.8	PF 1	79.41	69.01	72.06	71.87	72.19	0.001852	1.65	57.58	66.13	0.47
Principale	2336.022	PF 1	79.41	68.95	71.83	71.77	72.06	0.002865	2.01	47.52	66.66	0.60
Principale	2249.035	PF 1	79.41	68.90	71.74	71.682	71.92	0.002421	2.02	50.89	66.54	0.58
Principale	2200.362	PF 1	79.41	69.04	71.52	71.59	71.77	0.003414	2.24	40.14	65.26	0.66
Principale	2150.078	PF 1	79.41	65.79	71.41	71.31	71.59	0.002549	2.31	46.06	66.42	0.65
Principale	2100.734	PF 1	79.41	68.73	71.27	71.17	71.45	0.002696	2.66	46.44	67.30	0.67
Principale	2048.904	PF 1	79.41	68.67	71.26	71.02	71.29	0.000208	2.63	47.52	67.26	0.63
Principale	1996.804	PF 1	79.41	68.61	71.04	70.71	71.14	0.001799	1.61	60.04	67.75	0.49
Principale	1946.368	PF 1	79.41	68.57	70.97	70.97	71.05	0.001399	2.01	64.36	69.22	0.48
Principale	1900.696	PF 1	79.41	68.52	70.90	70.58	70.99	0.001598	1.66	62.40	69.56	0.48
Principale	1849.485	PF 1	79.41	68.47	70.82	70.46	70.91	0.001428	1.62	64.56	68.81	0.47
Principale	1800.897	PF 1	79.41	68.42	70.75	70.40	70.84	0.001438	1.64	64.80	68.44	0.47
Principale	1749.791	PF 1	79.41	68.38	70.70	70.23	70.77	0.001079	1.48	70.26	69.81	0.38
Principale	1699.811	PF 1	79.41	68.33	70.65	70.19	70.72	0.001078	1.50	71.17	70.73	0.39
Principale	1650.342	PF 1	79.41	68.28	70.61	70.04	70.67	0.000906	1.43	76.13	72.23	0.38
Principale	1600.081	PF 1	79.41	68.23	70.57	69.85	70.62	0.000715	1.27	81.93	71.93	0.28
Principale	1550.311	PF 1	79.41	68.19	70.55	69.82	70.59	0.000568	1.17	87.10	70.36	0.26
Principale	1500.075	PF 1	79.41	68.14	70.53	69.72	70.56	0.000435	1.07	95.05	74.21	0.24
Principale	1447.482	PF 1	79.41	68.09	70.50	69.66	70.54	0.000403	1.06	98.35	73.85	0.23
Principale	1397.807	PF 1	79.41	68.04	70.49	69.57	70.52	0.000339	1.00	104.13	74.64	0.21
Principale	1348.456	PF 1	79.41	68.00	70.47	69.52	70.50	0.000305	0.98	105.43	72.45	0.20
Principale	1298.745	PF 1	79.41	67.95	70.46	69.45	70.49	0.000266	0.87	108.14	72.39	0.19
Principale	1249.877	PF 1	79.41	67.93	70.45	69.40	70.47	0.000265	0.85	111.38	72.92	0.18
Principale	1198.244	PF 1	79.41	67.85	70.44	69.31	70.46	0.000242	0.77	114.39	72.83	0.18
Principale	1147.501	PF 1	79.41	67.81	70.42	69.30	70.45	0.000233	0.79	115.88	73.51	0.18
Principale	1101.197	PF 1	79.41	67.68	70.41	69.26	70.44	0.000207	0.78	119.62	72.68	0.16
Principale	1049.237	PF 1	79.41	67.53	70.41	69.19	70.43	0.000179	0.79	125.26	72.85	0.15
Principale	998.2763	PF 1	79.41	67.39	70.40	69.17	70.42	0.000176	0.80	125.50	72.83	0.15
Principale	946.758	PF 1	79.41	67.23	70.38	69.09	70.41	0.000235	0.99	115.38	74.30	0.18
Principale	902.4838	PF 1	79.41	67.11	70.36	69.43	70.39	0.000318	1.14	100.82	66.78	0.21
Principale	850		Culvert									
Principale	847.3104	PF 1	79.41	66.58	70.26	68.28	70.28	0.000285	0.96	116.82	74.58	0.17
Principale	797.9601	PF 1	79.41	66.62	70.25	68.07	70.27	0.000169	0.86	122.36	67.75	0.17
Principale	749.3943	PF 1	79.41	66.63	70.24	68.06	70.26	0.000155	0.76	127.91	71.57	0.15
Principale	697.8996	PF 1	79.41	66.55	70.23	68.04	70.25	0.000153	0.76	120.64	73.03	0.15
Principale	645.9743	PF 1	79.41	66.41	70.22	68.08	70.25	0.000145	0.74	128.72	74.16	0.15
Principale	598.1168	PF 1	79.41	66.25	70.22	68.87	70.24	0.000135	0.72	134.31	69.40	0.14
Principale	551.2175	PF 1	79.41	66.12	70.21	68.84	70.23	0.000117	0.71	137.35	69.15	0.13
Principale	500.8543	PF 1	79.41	65.97	70.21	68.08	70.23	0.000095	0.65	147.10	69.82	0.12
Principale	450.6874	PF 1	79.41	65.82	70.21	68.05	70.22	0.000068	0.57	165.41	100.14	0.10
Principale	400		Bridge									
Principale	349.3478	PF 1	79.41	65.52	69.42	68.37	69.70	0.004356	1.80	30.35	41.23	0.72
Principale	299.9697	PF 1	79.41	65.37	69.26	68.29	69.56	0.004615	2.73	34.23	51.90	0.74
Principale	249.1397	PF 1	79.41	65.10	68.56	67.49	68.34	0.002509	2.40	37.15	43.49	0.57
Principale	198.729	PF 1	79.41	65.08	67.59	67.39	68.09	0.005612	3.72	21.34	15.14	1.00
Principale	150.0719	PF 1	79.41	64.95	66.85	66.82	67.48	0.006568	3.69	22.00	19.75	1.00
Principale	99.96035	PF 1	79.41	62.94	64.07	63.89	64.20	0.002908	1.56	50.87	62.31	0.55
Principale	48.93128	PF 1	79.41	62.89	63.97	63.63	64.06	0.002095	1.35	58.63	69.79	0.47
Principale	0	PF 1	79.41	62.78	63.82	63.63	63.95	0.010064	2.17	36.66	69.66	0.95

Figura 26. Planimetria con individuazione delle sezioni e delle aree potenzialmente interessate dalla portata avente tr = 200 anni



4. VALUTAZIONE DELL'ESCAVAZIONE E DEL TRASPORTO SOLIDO

Al fine di poter stimare l'eventuale fenomeno di escavazione si è fatto riferimento alla letteratura in materia di trasporto solido, in particolare "Sistemazione dei corsi d'acqua" di De Peppo et al. (2018). Tale indagine è finalizzata a valutare se la profondità di esportazione del terreno, per effetto dell'azione erosiva della corrente, possa raggiungere la profondità di posa dei cavidotti. Dall'analisi condotta lungo gli otto canali oggetto d'indagine la profondità d'asportazione media, che raggiunge un valore massimo di 0.42 m, risulta sempre inferiore alla profondità di posa in opera dei cavidotti, che verrà realizzata comunque a non meno di 2 m dall'attuale fondo dell'alveo.

Canale Marana San Marchitto

Il Canale Marana San Marchitto, nel tratto esaminato è caratterizzato dai seguenti parametri:

- Pendenza: $i = 0.020$
- Tirante idrico: $h = 0.60$ m
- Raggio idraulico: $R_H = 0.58$ m
- Peso specifico acqua: $\gamma_w = 9810$ N/m^3
- Densità acqua: $\rho_w = 1000$ kg/m^3

Materiale costitutivo dell'alveo avente dimensioni

- Diametro del granulo: $d = 15$ mm $= 0.015$ m;
- Peso specifico materiale: $\gamma_s = 26000$ N/m^3
- Densità materiale: $\rho_s = 2651.36$ kg/m^3
- Coefficiente di Strickler: $k_s = 1/0.03 = 33.33$ m$^{1/3}$/s

La tensione tangenziale τ è:

- $\tau = \gamma_w R_H i = 114.35$ N/m^2

Tensione tangenziale critica dalla formula di Shield (Moto incipiente del granulo) τ_{cr} è:

- $\tau_{cr} = 0.06 (\gamma_s - \gamma_w) d = 14.57$ N/m^2

La condizione di stabilità del fondo risulta quando $\tau_{cr} \geq \tau$, ossia quando la tensione tangenziale critica è maggiore o uguale a quella di moto incipiente esercitata dalla corrente. Quindi essendo $\tau > \tau_{cr}$ può esserci moto per le particelle analizzate.

La portata liquida q (in massa) è:

- $q = \rho_w k_s h^{2/3} i^{1/2} h = 2015.2$ kg / (s, m)

Posta la velocità d'attrito

- $v^* = (\tau_{cr}/\rho_w)^{1/2} = (14.57/9810)^{1/2} = 0.04$

Dalla relazione di Shield si calcola la portata solida ed il volume solido:

- $q_s = q \times 10[(\tau-\tau_{cr}) / \tau_{cr}] \times [\gamma_w / (\gamma_s - \gamma_w)] \times i \times ØRe^* = 100.34$ kg / (s, m)

  dove: $ØRe^* = \tau_{cr} / (\gamma_s - \gamma_w)\ d = 0.06$

- $V_s = q_s/\rho_s = 0.0378\ m^3$

considerando la larghezza della sola parte di sezione costituente l'alveo pari a circa 0.5 m, la profondità d'asportazione media è di circa h = 0.08 m. L'attraversamento in sotterraneo avverrà comunque a non meno di 2 m dall'attuale fondo dell'alveo.

Canale Santo Spirito

Il Canale Santo Spirito, nel tratto esaminato è caratterizzato dai seguenti parametri:

- Pendenza: i = 0.020
- Tirante idrico: h = 1.05 m
- Raggio idraulico: $R_H = 0.50$ m
- Peso specifico acqua: $\gamma_w = 9810\ N/m^3$
- Densità acqua: $\rho_w = 1000\ kg/m^3$

Materiale costitutivo dell'alveo avente dimensioni

- Diametro del granulo: d = 15 mm = 0.015 m;
- Peso specifico materiale: $\gamma_s = 26000\ N/m^3$
- Densità materiale: $\rho_s = 2651.36\ kg/m^3$
- Coefficiente di Strickler: $k_s = 1/0.03 = 33.33\ m^{1/3}/s$

La tensione tangenziale τ è:

- $\tau = \gamma_w R_H i = 97.73\ N/m^2$

Tensione tangenziale critica dalla formula di Shield (Moto incipiente del granulo) τ_{cr} è:

- $\tau_{cr} = 0.06 (\gamma_s - \gamma_w) d = 14.57\ N/m^2$

La condizione di stabilità del fondo risulta quando $\tau_{cr} \geq \tau$, ossia quando la tensione tangenziale critica è maggiore o uguale a quella di moto incipiente esercitata dalla corrente. Quindi essendo $\tau > \tau_{cr}$ può esserci moto per le particelle analizzate.

La portata liquida q (in massa) è:

- $q = \rho_w k_s h^{2/3} i^{1/2} h = 5145$ kg / (s, m)

Posta la velocità d'attrito

- $v^* = (\tau_{cr}/\rho_w)^{1/2} = (14.57/9810)^{1/2} = 0.04$

Dalla relazione di Shield si calcola la portata solida ed il volume solido:

- $q_s = q \times 10[(\tau-\tau_{cr}) / \tau_{cr}] \times [\gamma_w / (\gamma_s - \gamma_w)] \times i \times ØRe^* = 213.52$ kg / (s, m)

  dove: $ØRe^* = \tau_{cr} / (\gamma_s - \gamma_w)\ d = 0.06$

- $V_s = q_s/\rho_s = 0.0805\ m^3$

considerando la larghezza della sola parte di sezione costituente l'alveo pari a circa 1 m, la

profondità d'asportazione media è di circa h = 0.08 m. L'attraversamento in sotterraneo avverrà comunque a non meno di 2 m dall'attuale fondo dell'alveo.

Canale Ponticello

Il Canale Ponticello, nel tratto esaminato è caratterizzato dai seguenti parametri:

- Pendenza: i = 0.024
- Tirante idrico: h = 1.06 m
- Raggio idraulico: R_H = 0.63 m
- Peso specifico acqua: γ_w = 9810 N/m^3
- Densità acqua: ρ_w = 1000 kg/m^3

Materiale costitutivo dell'alveo avente dimensioni

- Diametro del granulo: d = 15 mm = 0.015 m;
- Peso specifico materiale: γ_s = 26000 N/m^3
- Densità materiale: ρ_s = 2651.36 kg/m^3
- Coefficiente di Strickler: k_s = 1/0.03 = 33.33 m$^{1/3}$/s

La tensione tangenziale τ è:

- $\tau = \gamma_w R_H i$ = 148.59 N/m^2

Tensione tangenziale critica dalla formula di Shield (Moto incipiente del granulo) τ_{cr} è:

- $\tau_{cr} = 0.06 (\gamma_s - \gamma_w) d$ = 14.57 N/m^2

La condizione di stabilità del fondo risulta quando $\tau_{cr} \geq \tau$, ossia quando la tensione tangenziale critica è maggiore o uguale a quella di moto incipiente esercitata dalla corrente. Quindi essendo $\tau > \tau_{cr}$ può esserci moto per le particelle analizzate.

La portata liquida q (in massa) è:

- $q = \rho_w k_s h^{2/3} i^{1/2} h$ = 5679.5 kg / (s, m)

Posta la velocità d'attrito

- $v^* = (\tau_{cr}/\rho_w)^{1/2} = (14.57/9810)^{1/2}$ = 0.04

Dalla relazione di Shield si calcola la portata solida ed il volume solido:

- $q_s = q \times 10[(\tau-\tau_{cr}) / \tau_{cr}] \times [\gamma_w / (\gamma_s - \gamma_w)] \times i \times \text{ØRe}^*$ = 455.81 kg / (s, m)

  dove: $\text{ØRe}^* = \tau_{cr} / (\gamma_s - \gamma_w) d$ = 0.06

- $V_s = q_s/\rho_s$ = 0.1719 m^3

considerando la larghezza della sola parte di sezione costituente l'alveo pari a circa 1 m, la profondità d'asportazione media è di circa h = 0.17 m. L'attraversamento in sotterraneo avverrà comunque a non meno di 2 m dall'attuale fondo dell'alveo.

Canale Trionfo

Il Canale Trionfo, nel tratto esaminato è caratterizzato dai seguenti parametri:

- Pendenza: $i = 0.015$
- Tirante idrico: $h = 0.89$ m
- Raggio idraulico: $R_H = 0.57$ m
- Peso specifico acqua: $\gamma_w = 9810$ N/m^3
- Densità acqua: $\rho_w = 1000$ kg/m^3

Materiale costitutivo dell'alveo avente dimensioni

- Diametro del granulo: $d = 15$ mm $= 0.015$ m;
- Peso specifico materiale: $\gamma_s = 26000$ N/m^3
- Densità materiale: $\rho_s = 2651.36$ kg/m^3
- Coefficiente di Strickler: $k_s = 1/0.03 = 33.33$ m$^{1/3}$/s

La tensione tangenziale τ è:

- $\tau = \gamma_w R_H i = 84.16$ N/m^2

Tensione tangenziale critica dalla formula di Shield (Moto incipiente del granulo) τ_{cr} è:

- $\tau_{cr} = 0.06 (\gamma_s - \gamma_w) d = 14.57$ N/m^2

La condizione di stabilità del fondo risulta quando $\tau_{cr} \geq \tau$, ossia quando la tensione tangenziale critica è maggiore o uguale a quella di moto incipiente esercitata dalla corrente. Quindi essendo $\tau > \tau_{cr}$ può esserci moto per le particelle analizzate.

La portata liquida q (in massa) è:

- $q = \rho_w k_s h^{2/3} i^{1/2} h = 3349.2$ kg / (s, m)

Posta la velocità d'attrito

- $v^* = (\tau_{cr}/\rho_w)^{1/2} = (14.57/9810)^{1/2} = 0.04$

Dalla relazione di Shield si calcola la portata solida ed il volume solido:

- $q_s = q \times 10[(\tau-\tau_{cr}) / \tau_{cr}] \times [\gamma_w / (\gamma_s - \gamma_w)] \times i \times \text{ØRe}^* = 87.23$ kg / (s, m)

  dove: $\text{ØRe}^* = \tau_{cr} / (\gamma_s - \gamma_w) d = 0.06$

- $V_s = q_s/\rho_s = 0.0329$ m^3

considerando la larghezza della sola parte di sezione costituente l'alveo pari a circa 1 m, la profondità d'asportazione media è di circa h = 0.03 m. L'attraversamento in sotterraneo avverrà comunque a non meno di 2 m dall'attuale fondo dell'alveo.

Torrente Marana Pidocchiosa

Il Torrente Marana Pidocchiosa, nel tratto esaminato è caratterizzato dai seguenti parametri:

- Pendenza: $i = 0.014$
- Tirante idrico: $h = 0.89$ m
- Raggio idraulico: $R_H = 0.53$ m
- Peso specifico acqua: $\gamma_w = 9810$ N/m^3
- Densità acqua: $\rho_w = 1000$ kg/m^3

Materiale costitutivo dell'alveo avente dimensioni

- Diametro del granulo: $d = 15$ mm $= 0.015$ m;
- Peso specifico materiale: $\gamma_s = 26000$ N/m^3
- Densità materiale: $\rho_s = 2651.36$ kg/m^3
- Coefficiente di Strickler: $k_s = 1/0.03 = 33.33$ m$^{1/3}$/s

La tensione tangenziale τ è:

- $\tau = \gamma_w R_H i = 73.34$ N/m^2

Tensione tangenziale critica dalla formula di Shield (Moto incipiente del granulo) τ_{cr} è:

- $\tau_{cr} = 0.06 (\gamma_s - \gamma_w) d = 14.57$ N/m^2

La condizione di stabilità del fondo risulta quando $\tau_{cr} \geq \tau$, ossia quando la tensione tangenziale critica è maggiore o uguale a quella di moto incipiente esercitata dalla corrente. Quindi essendo $\tau > \tau_{cr}$ può esserci moto per le particelle analizzate.

La portata liquida q (in massa) è:

- $q = \rho_w k_s h^{2/3} i^{1/2} h = 3270$ kg / (s, m)

Posta la velocità d'attrito

- $v^* = (\tau_{cr}/\rho_w)^{1/2} = (14.57/9810)^{1/2} = 0.04$

Dalla relazione di Shield si calcola la portata solida ed il volume solido:

- $q_s = q \times 10[(\tau-\tau_{cr}) / \tau_{cr}] \times [\gamma_w / (\gamma_s - \gamma_w)] \times i \times \text{ØRe}^* = 67.12$ kg / (s, m)

  dove: $\text{ØRe}^* = \tau_{cr} / (\gamma_s - \gamma_w) d = 0.06$

- $V_s = q_s/\rho_s = 0.0253$ m^3

considerando la larghezza della sola parte di sezione costituente l'alveo pari a circa 2.5 m, la profondità d'asportazione media è di circa $h = 0.01$ m. L'attraversamento in sotterraneo avverrà comunque a non meno di 2 m dall'attuale fondo dell'alveo.

Affluente la Pidocchiosa

L'affluente la Pidocchiosa, nel tratto esaminato è caratterizzato dai seguenti parametri:

- Pendenza: $i = 0.011$
- Tirante idrico: $h = 0.35$ m
- Raggio idraulico: $R_H = 0.39$ m
- Peso specifico acqua: $\gamma_w = 9810$ N/m^3
- Densità acqua: $\rho_w = 1000$ kg/m^3

Materiale costitutivo dell'alveo avente dimensioni

- Diametro del granulo: $d = 15$ mm $= 0.015$ m;
- Peso specifico materiale: $\gamma_s = 26000$ N/m^3
- Densità materiale: $\rho_s = 2651.36$ kg/m^3
- Coefficiente di Strickler: $k_s = 1/0.03 = 33.33$ m$^{1/3}$/s

La tensione tangenziale τ è:

- $\tau = \gamma_w R_H i = 42.13$ N/m^2

Tensione tangenziale critica dalla formula di Shield (Moto incipiente del granulo) τ_{cr} è:

- $\tau_{cr} = 0.06 (\gamma_s - \gamma_w) d = 14.57$ N/m^2

La condizione di stabilità del fondo risulta quando $\tau_{cr} \geq \tau$, ossia quando la tensione tangenziale critica è maggiore o uguale a quella di moto incipiente esercitata dalla corrente. Quindi essendo $\tau > \tau_{cr}$ può esserci moto per le particelle analizzate.

La portata liquida q (in massa) è:

- $q = \rho_w k_s h^{2/3} i^{1/2} h = 615.2$ kg / (s, m)

Posta la velocità d'attrito

- $v^* = (\tau_{cr}/\rho_w)^{1/2} = (14.57/9810)^{1/2} = 0.04$

Dalla relazione di Shield si calcola la portata solida ed il volume solido:

- $q_s = q \times 10[(\tau-\tau_{cr}) / \tau_{cr}] \times [\gamma_w / (\gamma_s - \gamma_w)] \times i \times \text{ØRe}^* = 4.65$ kg / (s, m)

  dove: $\text{ØRe}^* = \tau_{cr} / (\gamma_s - \gamma_w) d = 0.06$

- $V_s = q_s/\rho_s = 0.002$ m^3

considerando la larghezza della sola parte di sezione costituente l'alveo pari a circa 0.5 m, la profondità d'asportazione media è di circa $h = 0.004$ m. L'attraversamento in sotterraneo avverrà comunque a non meno di 2 m dall'attuale fondo dell'alveo.

Canale Biasifiocco

In Canale Biasifiocco, nel tratto esaminato è caratterizzato dai seguenti parametri:

- Pendenza: $i = 0.019$
- Tirante idrico: $h = 3.23$ m
- Raggio idraulico: $R_H = 1.25$ m
- Peso specifico acqua: $\gamma_w = 9810$ N/m^3
- Densità acqua: $\rho_w = 1000$ kg/m^3

Materiale costitutivo dell'alveo avente dimensioni

- Diametro del granulo: $d = 15$ mm $= 0.015$ m;
- Peso specifico materiale: $\gamma_s = 26000$ N/m^3
- Densità materiale: $\rho_s = 2651.36$ kg/m^3
- Coefficiente di Strickler: $k_s = 1/0.03 = 33.33$ m$^{1/3}$/s

La tensione tangenziale τ è:

- $\tau = \gamma_w R_H i = 232.38$ N/m^2

Tensione tangenziale critica dalla formula di Shield (Moto incipiente del granulo) τ_{cr} è:

- $\tau_{cr} = 0.06 (\gamma_s - \gamma_w) d = 14.57$ N/m^2

La condizione di stabilità del fondo risulta quando $\tau_{cr} \geq \tau$, ossia quando la tensione tangenziale critica è maggiore o uguale a quella di moto incipiente esercitata dalla corrente. Quindi essendo $\tau > \tau_{cr}$ può esserci moto per le particelle analizzate.

La portata liquida q (in massa) è:

- $q = \rho_w k_s h^{2/3} i^{1/2} h = 32397.5$ kg / (s, m)

Posta la velocità d'attrito

- $v^* = (\tau_{cr}/\rho_w)^{1/2} = (14.57/9810)^{1/2} = 0.04$

Dalla relazione di Shield si calcola la portata solida ed il volume solido:

- $q_s = q \times 10[(\tau-\tau_{cr}) / \tau_{cr}] \times [\gamma_w / (\gamma_s - \gamma_w)] \times i \times ØRe^* = 3345.16$ kg / (s, m)

  dove: $ØRe^* = \tau_{cr} / (\gamma_s - \gamma_w) d = 0.06$

- $V_s = q_s/\rho_s = 1.26$ m^3

considerando la larghezza della sola parte di sezione costituente la parte centrale dell'alveo pari a circa 3 m, la profondità d'asportazione media è di circa h = 0.42 m. L'attraversamento in sotterraneo avverrà comunque a non meno di 2 m dall'attuale fondo dell'alveo.

Canale di Bonifica

Canale di Bonifica, nel tratto esaminato è caratterizzato dai seguenti parametri:

- Pendenza: $i = 0.018$
- Tirante idrico: $h = 2.79$ m
- Raggio idraulico: $R_H = 0.92$ m
- Peso specifico acqua: $\gamma_w = 9810$ N/m^3
- Densità acqua: $\rho_w = 1000$ kg/m^3

Materiale costitutivo dell'alveo avente dimensioni

- Diametro del granulo: $d = 15$ mm $= 0.015$ m;
- Peso specifico materiale: $\gamma_s = 26000$ N/m^3
- Densità materiale: $\rho_s = 2651.36$ kg/m^3
- Coefficiente di Strickler: $k_s = 1/0.03 = 33.33$ m$^{1/3}$/s

La tensione tangenziale τ è:

- $\tau = \gamma_w R_H i = 163.16$ N/m^2

Tensione tangenziale critica dalla formula di Shield (Moto incipiente del granulo) τ_{cr} è:

- $\tau_{cr} = 0.06 (\gamma_s - \gamma_w) d = 14.57$ N/m^2

La condizione di stabilità del fondo risulta quando $\tau_{cr} \geq \tau$, ossia quando la tensione tangenziale critica è maggiore o uguale a quella di moto incipiente esercitata dalla corrente. Quindi essendo $\tau > \tau_{cr}$ può esserci moto per le particelle analizzate.

La portata liquida q (in massa) è:

- $q = \rho_w k_s h^{2/3} i^{1/2} h = 24756.3$ kg / (s, m)

Posta la velocità d'attrito

- $v^* = (\tau_{cr}/\rho_w)^{1/2} = (14.57/9810)^{1/2} = 0.04$

Dalla relazione di Shield si calcola la portata solida ed il volume solido:

- $q_s = q \times 10[(\tau-\tau_{cr}) / \tau_{cr}] \times [\gamma_w / (\gamma_s - \gamma_w)] \times i \times \text{ØRe}^* = 1652.04$ kg / (s, m)

  dove: $\text{ØRe}^* = \tau_{cr} / (\gamma_s - \gamma_w) d = 0.06$

- $V_s = q_s/\rho_s = 0.002$ m^3

considerando la larghezza della sola parte di sezione costituente la parte centrale dell'alveo pari a circa 3 m, la profondità d'asportazione media è di circa $h = 0.21$ m. L'attraversamento in sotterraneo avverrà comunque a non meno di 2 m dall'attuale fondo dell'alveo.

5.CONCLUSIONI

Sulla base dello studio idrologico riportato nell'elaborato **DC20053D-V21** in allegato, che ha portato alla definizione delle portate di piena transitanti nei canali, per un tempo di ritorno di 200 anni, è stato condotto uno studio idraulico consistente nella modellazione e valutazione idraulica della rete idrografica potenzialmente soggette a criticità, ed il tutto è stato svolto in condizioni di moto stazionario. Per lo svolgimento della modellazione idraulica è stato utilizzato il software HEC- RAS River Analysis System.

Dai risultati dell'analisi monodimensionale si osserva come gli alvei attualmente esistenti risultano adeguati al trasporto della portata avente tempo di ritorno 200 anni. A questo fanno eccezione alcuni tratti dove a causa di una serie di fattori, quali le elevate portate e/o la presenza di attraversamenti con relativi ponti o canali tombati, anch'essi oggetto di modellazione, si osservano esondazioni idrauliche.

Pertanto, è stata condotta una ulteriore modellazione idraulica bidimensionale non stazionaria mediante il software HEC- RAS River Analysis System.

Tale modellazione ha riguardato i seguenti tratti:

- Canale Santo Spirito
- Canale Trionfo
- Torrente Marana Pidocchiosa

Al fine di poter stimare l'eventuale fenomeno di escavazione si è fatto riferimento alla letteratura in materia di trasporto solido, in particolare "Sistemazione dei corsi d'acqua" di De Peppo et al. (2018). Dall'analisi condotta lungo gli otto canali oggetto d'indagine la profondità d'asportazione media, che raggiunge un valore massimo di 0.42 m, risulta sempre inferiore alla profondità di posa in opera dei cavidotti, che verrà realizzata comunque a non meno di 2 m dall'attuale fondo dell'alveo.

Complessivamente, dall'analisi emerge come nessuno degli aerogeneratori del presente impianto eolico risulta coinvolto dalle esondazioni.

RIFERIMENTI BIBLIOGRAFICI

- De Peppo, L., Datei, C., Salandin, P. (2018). "Sistemazione dei corsi d'acqua." *Progetto Libreria*, Edizione 11.