

COMUNE DI VAIE

VERIFICHE IDROLOGICHE ED IDRAULICHE
CANALE CANTARANA E RII MINORI
ALL'INTERNO DEL TERRITORIO DEL COMUNE DI VAIE

Relazione

ubicazione: Comune di Vaie
committente: Amministrazione Comunale di Vaie

Premessa

La presente relazione è redatta in ottemperanza ai disposti del PAI in merito alle verifiche di compatibilità degli strumenti urbanistici.

La presente relazione prende in considerazione il reticolo idrografico minore del territorio del Comune di Vaie effettuandone le verifiche idrauliche in moto permanente.

La valutazione delle portate di piena del canale Cantarana e dei relativi sottobacini (torr. Combalossa e rii Margara, Penturetto, Arpiat, Trona, Bonetto e Vignassa) è stata effettuata secondo quanto indicato all'interno della "Direttiva di progetto da assumere per la progettazione e le verifiche di compatibilità idraulica", redatta dall'Autorità di Bacino del Fiume Po, e con riferimento alle indicazioni contenute nella "Deliberazione della Giunta Regionale 15 luglio 2002 n. 45-6656" pubblicata nel suppl. al n° 30 del B.U.R.P. del 25 luglio 2002.

Inquadramento

I bacini idrografici dei rii Arpiat, Penturetto e Margara si collocano topograficamente sul foglio n. 55 della Carta IGM in scala 1:100.000 e sui fogli n.154120 e n. 154080 della Carta Tecnica Regionale in scala 1:10.000.

L'area è caratterizzata da precipitazioni di tipo prevalentemente pluviale e nivo-pluviale. Le caratteristiche dei rii che sono presenti sul territorio comunale sono di seguito riassunti:

Il torrente Combalossa si estende per una superficie totale di 3,24 kmq, da quota 368 m s.l.m. a quota 1485 m s.l.m. ed è posto a est del bacino del rio Margara. Il reticolo idrografico segue una direzione di scolo principale individuabile da quota 1280 m s.l.m. L'asta principale del torrente Arpiat dall'origine fino alla sezione di immissione nel Canale Cantarana ha una lunghezza di circa 3,68 km e una pendenza media del 17,0 %.

Il rio Margara si estende per una superficie totale di 0,65 kmq, tra le isoipse 1137 e 390 m s.l.m. e lo spartiacque è delimitato dai bacini dei rii Penturetto e Conbalossa, ad est; come per il Penturetto il reticolo idrografico non è sviluppato, ma segue un'unica direzione di scolo lungo un canale principale senza una suddivisione in rami secondari. L'asta principale del rio Margara dall'origine fino alla sezione a monte dell'abitato di Vaie ha una lunghezza di circa 0,78 km e una pendenza media del 50,0 %.

Il rio Penturetto si estende per una superficie totale di 0,38 kmq, distribuiti in misura maggiore tra le isoipse 1300 e 800 m. s.l.m. con lo spartiacque è delimitato dai bacini dei rii Arpiat e Margara. Il bacino presenta un reticolo idrografico praticamente non sviluppato che segue un'unica direzione di scolo lungo un canale principale senza suddivisione in rami secondari. L'asta principale del rio Penturetto dall'origine fino alla sezione a monte dell'abitato di Vaie ha una lunghezza di circa 0,85 km ed una pendenza media del 51,0 %.

Il rio Arpiat si estende per una superficie totale di 1,23 kmq, da quota 400 m s.l.m. a quota 1390 m s.l.m. ed è posto tra i bacini del rio Trona, ad ovest, e del rio Penturetto ad est. Il reticolo idrografico segue una direzione di scolo principale individuabile da quota 1050 m s.l.m. ed un ramo secondario, posto più ad est da quota 800 m s.l.m., che si immette nel ramo principale a monte dell'abitato di Vaie. L'asta principale del torrente Arpiat dall'origine fino alla sezione a monte dell'abitato di Vaie ha una lunghezza di circa 2 km e una pendenza media del 28,0 %.

Il Canale Cantarana si estende per una superficie totale di 1,23 kmq, da quota 376 m s.l.m. a quota 368 m s.l.m. L'asta principale ha una lunghezza di circa 2 km e una pendenza media del 28,0 %.

Delimitazione dei sottobacini idrografici

Trattandosi di sottobacini elementari di piccole dimensioni la delimitazione degli stessi è stata individuata utilizzando la cartografia regionale a scala 1/10000 citata.

Per ognuno di essi sono state ricavate le seguenti grandezze:

Torrente/rio	Superficie bacino [kmq]	Pendenza media asta	Lunghezza asta [km]	Quota max [m]	Quota sez chiusura [m]
Combalossa	3,24	0,17	3,68	1485	368
Penturetto	0,38	0,51	0,85	1230	420
Margara	0,65	0,50	0,78	1130	392
Arpiat	1,23	0,28	2,03	1390	395
Trona	3,21	0,28	3,08	1600	382
Bonetto	1,51	0,24	2,71	1600	383
Vignassa	2,83	0,06	3,22	1660	382

La pendenza media è stata ottenuta suddividendo le aste torrentizie in tratti a pendenza costante e facendone la media pesata sulla lunghezza.

Linee segnalatrici di probabilità pluviometrica puntuali

Il regime pluviometrico del bacino dei torrenti oggetto d'indagine si inquadra in quello più esteso della Valle della Dora Riparia che, pur localizzata fra aree caratterizzate da elevate precipitazioni (Valli di Lanzo e Orco a Nord, bacini del Sangone, basso Chisone e Pellice a Sud), presenta massime precipitazioni che raggiungono valori modesti se rapportate a quelle delle valli contigue.

La previsione quantitativa delle piogge intense in un determinato punto viene effettuata attraverso la determinazione della curva di probabilità pluviometrica per un assegnato tempo di ritorno. Tale curva è comunemente espressa da una legge di potenza del tipo:

$$h(t) = a \cdot t^n$$

i cui parametri a ed n dipendono dallo specifico tempo di ritorno considerato. In assenza di dati diretti delle precipitazioni nelle aree oggetto dello studio, i valori di a ed n sono stati ricavati dall'allegato n°3 della "direttiva sulla piena di progetto da assumere per le progettazioni e le verifiche di compatibilità idraulica" redatta dall'Autorità di Bacino del Fiume Po facendo riferimento alla stazione di S. Valeriano. Il criterio seguito nella scelta della stazione è motivato, oltre che dall'ubicazione della stessa, anche dal fatto di poter disporre di un periodo continuativo di osservazioni il più lungo possibile.

Stazione	Tr 20		Tr 100		Tr 200		Tr 500	
	a	n	a	n	a	n	a	n
S. Valeriano	34,76	0,382	44,23	0,377	48,28	0,375	53,61	0,373

Calcolo della portata di piena

Trattandosi di torrenti generati da bacini idrografici di ridotte dimensioni e caratterizzati nella loro generalità da un buon livello di copertura del suolo, si è ritenuto valido utilizzare il "metodo razionale" descritto nella "direttiva sulla piena di progetto da assumere per le progettazioni e le verifiche di compatibilità idraulica".

Il valore della portata di piena risulta essere:

$$Q_c = 0,28 \cdot C \cdot i \cdot A$$

in cui:

Q_c = portata al colmo in mc/s

C = coefficiente di deflusso

i = intensità di pioggia = h/t_c

t_c = tempo di corrivazione

A = superficie del bacino in kmq

Si sono assunte inoltre le seguenti ipotesi:

- la precipitazione risulta essere uniforme su tutta la superficie del bacino;
- la portata stimata ha lo stesso tempo di ritorno di quello dell'intensità di pioggia;
- il tempo di formazione del colmo di piena è pari a quello della fase di riduzione;
- l'intensità di pioggia ha una durata pari a quella del tempo di corrivazione.

Per quanto riguarda il coefficiente di deflusso si è fatto riferimento ai valori raccomandati dall'"Handbook of applied Hydrology" e dall'"American Society of Civil Engineers" e da "Pollution Control Federation". In particolare si è assunto un valore pari a 0,30 corrispondente ad una classificazione del territorio "suolo con infiltrazione media, senza lenti argillose" ed un utilizzo dello stesso in parte a coltivazioni ed in parte a bosco.

Per il calcolo del tempo di corrivazione si è fatto uso della formula di Giandotti:

$$T_c = \frac{4\sqrt{S} + 1,5L}{0,8\sqrt{H}}$$

dove:

T_c = tempo di corrivazione [ore];

S = area del bacino idrografico [kmq];

L = lunghezza dell'asta principale [km];

H = altitudine media del sottobacino riferita alla sezione di chiusura [m].

I valori di portata ottenuti con riferimento alle formulazioni esposte sopra sono riportati di seguito.

COMBALOSSA

Area bacino 3,24 pendenza 0,17 Lungh 3,68 Hmax 1485 hmin 368

Deflusso		C=	0,30	MAGIPO stazione n°1385 - S. Valeriano		
Tr	a	n	tc	h	ic	Q
20	34,7600	0,3820	0,72	30,70	42,49	11,47
100	44,2300	0,3770	0,72	39,13	54,16	14,62
200	48,2800	0,3750	0,72	42,74	59,15	15,97
500	53,6100	0,3730	0,72	47,49	65,73	17,75

MARGARA

Area bacino 0,65 pendenza 0,5 Lungh 0,78 Hmax 1130 hmin 392

Deflusso		C=	0,30	MAGIPO stazione n°1385 - S. Valeriano		
Tr	a	n	tc	h	ic	Q
20	34,7600	0,3820	0,31	22,25	71,54	3,88
100	44,2300	0,3770	0,31	28,48	91,57	4,96
200	48,2800	0,3750	0,31	31,16	100,19	5,43
500	53,6100	0,3730	0,31	34,68	111,51	6,04

PENTURETTO

Area bacino 0,38 pendenza 0,51 Lungh 0,85 Hmax 1230 hmin 420

Deflusso		C=	0,30	MAGIPO stazione n°1385 - S. Valeriano		
Tr	a	n	tc	h	ic	Q
20	34,7600	0,3820	0,25	20,55	81,37	2,58
100	44,2300	0,3770	0,25	26,32	104,26	3,30
200	48,2800	0,3750	0,25	28,81	114,12	3,61
500	53,6100	0,3730	0,25	32,08	127,07	4,02

ARPIAT

Area bacino 1,23 pendenza 0,28 Lungh 2,03 Hmax 1390 hmin 395

Deflusso		C=	0,30	MAGIPO stazione n°1385 - S. Valeriano		
Tr	a	n	tc	h	ic	Q
20	34,7600	0,3820	0,45	25,67	56,78	5,82
100	44,2300	0,3770	0,45	32,79	72,54	7,43
200	48,2800	0,3750	0,45	35,85	79,30	8,13
500	53,6100	0,3730	0,45	39,87	88,20	9,04

TRONA

Area bacino 3,21 pendenza 0,28 Lungh 3,08 Hmax 1600 hmin 382

Deflusso		C=	0,30	MAGIPO stazione n°1385 - S. Valeriano		
Tr	a	n	tc	h	ic	Q
20	34,7600	0,3820	0,64	29,32	45,77	12,24
100	44,2300	0,3770	0,64	37,39	58,37	15,62
200	48,2800	0,3750	0,64	40,85	63,78	17,06
500	53,6100	0,3730	0,64	45,40	70,88	18,96

BONETTO

Area bacino 1,51 pendenza 0,24 Lungh 2,71 Hmax 1600 hmin 383

Deflusso		C=	0,30	MAGIPO stazione n°1385 - S. Valeriano		
Tr	a	n	tc	h	ic	Q
20	34,7600	0,3820	0,49	26,43	54,13	6,81
100	44,2300	0,3770	0,49	33,76	69,13	8,70
200	48,2800	0,3750	0,49	36,90	75,57	9,51
500	53,6100	0,3730	0,49	41,03	84,03	10,57

VIGNASSA

Area bacino 2,83 pendenza 0,06 Lungh 3,22 Hmax 1660 hmin 382

Deflusso		C=	0,30	MAGIPO stazione n°1385 - S. Valeriano		
Tr	a	n	tc	h	ic	Q
20	34,7600	0,3820	0,61	28,83	47,05	11,10
100	44,2300	0,3770	0,61	36,77	60,01	14,15
200	48,2800	0,3750	0,61	40,18	65,57	15,46
500	53,6100	0,3730	0,61	44,66	72,88	17,19

Tali valori necessitano di alcune considerazioni.

Tutti i rii oggetto d'indagine, ad esclusione del rio Arpiat e del torrente Combalossa, pur facendo parte del bacino del canale Cantarana non presentano una confluenza diretta e localizzabile sul canale stesso e quindi non è stato possibile stabilire con certezza se la portata calcolata in precedenza defluisca interamente nel Cantarana o venga dispersa nelle zone prossime allo sbocco in valle. Parimenti non è stato possibile definire, all'interno del modello, la posizione esatta del punto di confluenza.

Alla luce degli accertamenti e delle indagini svolte in loco e dell'analisi della morfologia del territorio si sono ipotizzate le seguenti percentuali di apporto, tenendo conto delle diversioni a monte:

- rio Vignassa: 0%
- rio Bonetto: 0%
- rio della Trona: 100%
- rio Arpiat: 100%
- rio Margara: 100%
- torr. Combalossa: 100%

In realtà le percentuali di apporto dei rii Vignassa, Bonetto, seppur minime, non sono pari a 0 né il rio della Trona contribuisce nella sua totalità. Tuttavia, non essendo certa l'esatta proporzione degli apporti, si è ritenuto in via semplificativa di non considerare i primi due ed utilizzare comunque, cautelativamente, l'intera portata del rio della Trona.

Studio idraulico e definizione dei livelli idrometrici

Il problema idraulico consiste nel calcolo del profilo corrispondente alla assegnata portata di piena in modo da verificare le possibili aree di esondazione.

Lo schema di calcolo adottato è quello del modo permanente, che consente di considerare la variazione graduale delle sezioni d'alveo e la presenza di manufatti, restringimenti e rapide variazioni di sezione.

La determinazione del profilo permanente viene realizzata utilizzando il codice HECRAS “River Analysis System” versione 3.1.1 (U.S. Army Corps of Engineers Hydrologic Engineering Center).

Il calcolo del profilo idraulico della corrente avviene in condizioni di moto unidimensionale gradualmente vario a portata costante, mediante la risoluzione delle equazioni di bilancio energetico; il codice applicato consente anche di calcolare rapide variazioni di profilo (dovute alla presenza di ostacoli al deflusso, restringimenti di sezione, passaggio di stato di una corrente).

Le elaborazioni sono riportate in allegato al termine della relazione. Il significato dei dati riportati nelle tabelle risulta il seguente:

- River Sta = numero della sezione di elaborazione (la numerazione procede in ordine decrescente da monte a valle);
- Qtotal = portata di calcolo;
- Min Ch El = quota di fondo alveo;
- W.S. Elev.= altezza idrometrica;
- W.S. Elev.= altezza idrometrica corrente critica;
- E.G. Elev. = altezza dell’energia;
- E.G. Slope= pendenza motrice;
- Vel Chnl = velocità di deflusso;
- Flow Area = sezione interessata dal deflusso;
- Top Width = larghezza pelo libero in sommità;
- Froude # Chi = numero di Froude della corrente.

La modellazione geometrica delle sezioni d’alveo è stata effettuata sulla base di rilievi topografici di dettaglio.

Le ipotesi di calcolo relative alle condizioni al contorno sono le seguenti:

- portata al colmo costante in tutto il tratto pari ai valori riportati nelle tabelle corrispondenti ai tempi di ritorno indicati;
- altezze idrometriche utilizzate come condizioni iniziali nelle sezioni a monte ed a valle calcolate in condizioni di moto uniforme indisturbato;
- il coefficiente di scabrezza (n di Manning) risulta variabile lungo i corsi d’acqua al variare dei materiali di cui è composta la sezione d’alveo.

Considerazioni sul trasporto solido

Per quanto riguarda l’entità del fenomeno del trasporto solido in un alveo torrentizio a fondo mobile, la bibliografia tecnica propone molte formulazioni; tuttavia il gran numero di parametri in gioco e la loro variabilità rende tali modelli estremamente indeterminati.

Il Servizio Assetto Idrogeologico della Regione Piemonte ha proposto ai progettisti incaricati della redazione dei progetti di sistemazione dei corsi d’acqua minori, alcuni criteri di dimensionamento delle sezioni di deflusso che tengano conto del trasporto solido.

In ottemperanza a tali indicazioni, è da riservarsi per il trasporto solido un’altezza pari ad $1/3 \div 1/6$ dell’altezza d’acqua calcolata dal modello in base al valore di portata assegnato in precedenza; in ipotesi cautelativa e considerate le caratteristiche montane dei bacini, si può assumere per il calcolo dell’altezza idrica comprensiva del trasporto solido il coefficiente di $1/3$.

Pertanto l’altezza idrometrica totale di calcolo risulta:

$$Y_{\text{tot}} = Y_{\text{idr}} + Y_{\text{sol}} = Y_{\text{idr}} + Y_{\text{idr}}/3$$

Dall'esame dei bacini si ritiene che tale ipotesi abbia valere esclusivamente per i rii provenienti dal versante destro con sbocco diretto nel canale di Cantarana, mentre per quanto riguarda i torrenti Penturetto e Margara l'apporto terminale viene assunto come esclusivamente liquido.

Considerazioni e risultati dell'elaborazione

Occorre rilevare che complessivamente le situazioni di esondazione evidenziate nelle elaborazioni sono di altezza decimetrica salvo alcune eccezioni e nel complesso le velocità sono estremamente limitate.

Bibliografia

- L. Da Deppo, C. Datei, P. Salandin: "Sistemazione dei corsi d'acqua" - Ed. Libreria Cortina, Padova, 2000;
- V. Ferro: "La sistemazione dei bacini idrografici" - McGraw-Hill, Milano, 2002;
- W. H. Graf: "Fluvial hydraulics - Flow and transport processes in channels of simple geometry" - John Wiley & Son, New York, 1998;
- U. Maione: "La sistemazione dei corsi d'acqua montani" - Ed. Bios s.a.s., Cosenza, 1998;
- P. Oria, G. Manzone, D. Fontan et al: "Studio sull'assetto idrogeologico della Comunità Montana Valle Sacra", 2000;
- CORINTEA S.c.a.r.l.: "Progetto Strategico "Manutenzione del Territorio" - Piano di manutenzione - Bacino del torrente Piova", 2002;
- Autorità di Bacino del Fiume Po: "Direttiva di progetto da assumere per la progettazione e le verifiche di compatibilità idraulica";
- Deliberazione della Giunta Regionale 15 luglio 2002 n. 45-6656, pubblicata nel suppl. al n. 30 del B.U.R.P. del 25 luglio 2002;
- Circolare del Presidente della Giunta Regionale 8 ottobre 1998, n. 14/LAP/PET "Determinazione delle distanze di fabbricati e manufatti dai corsi d'acqua, ai sensi dell'art. 96, lett. f), del T.U. approvato con R.D. 25 luglio 1904, n. 523;
- Comunicato dell'Assessore Regionale all'Ambiente, Energia, Pianificazione e Gestione Risorse Idriche, Lavori Pubblici e Tutela del Suolo - Protezione Civile "Nota Tecnica Esplicativa alla Circolare del Presidente della Giunta Regionale dell'8 maggio 1996, n° 7/LAP - L.R. 5 dicembre 1977, n. 56 e s. m. e. i. - Specifiche tecniche per l'elaborazione degli studi geologici a supporto degli strumenti urbanistici"

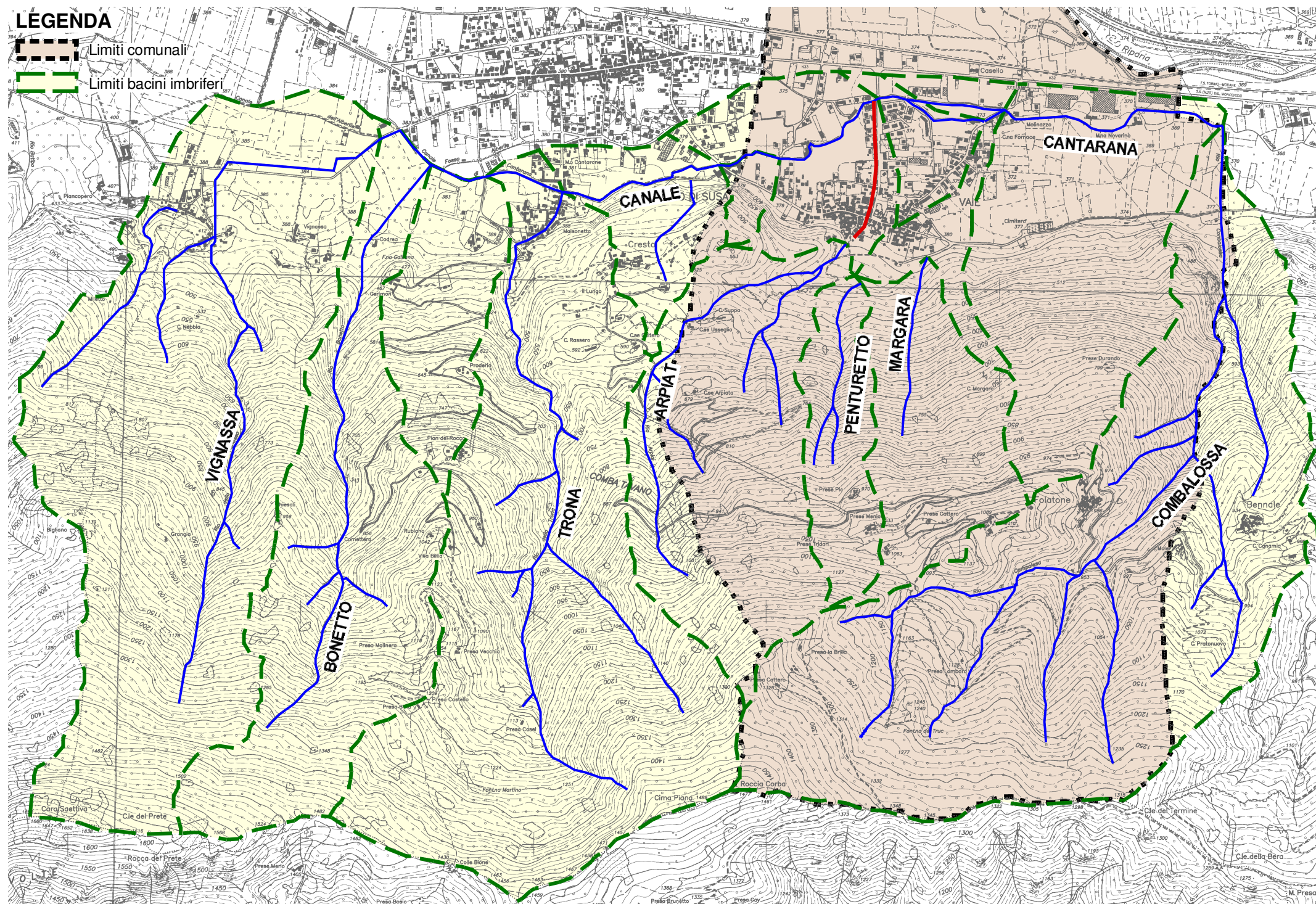
Allegati

- delimitazione dei sottobacini idrografici
- elaborazioni HEC RAS
- documentazione fotografica

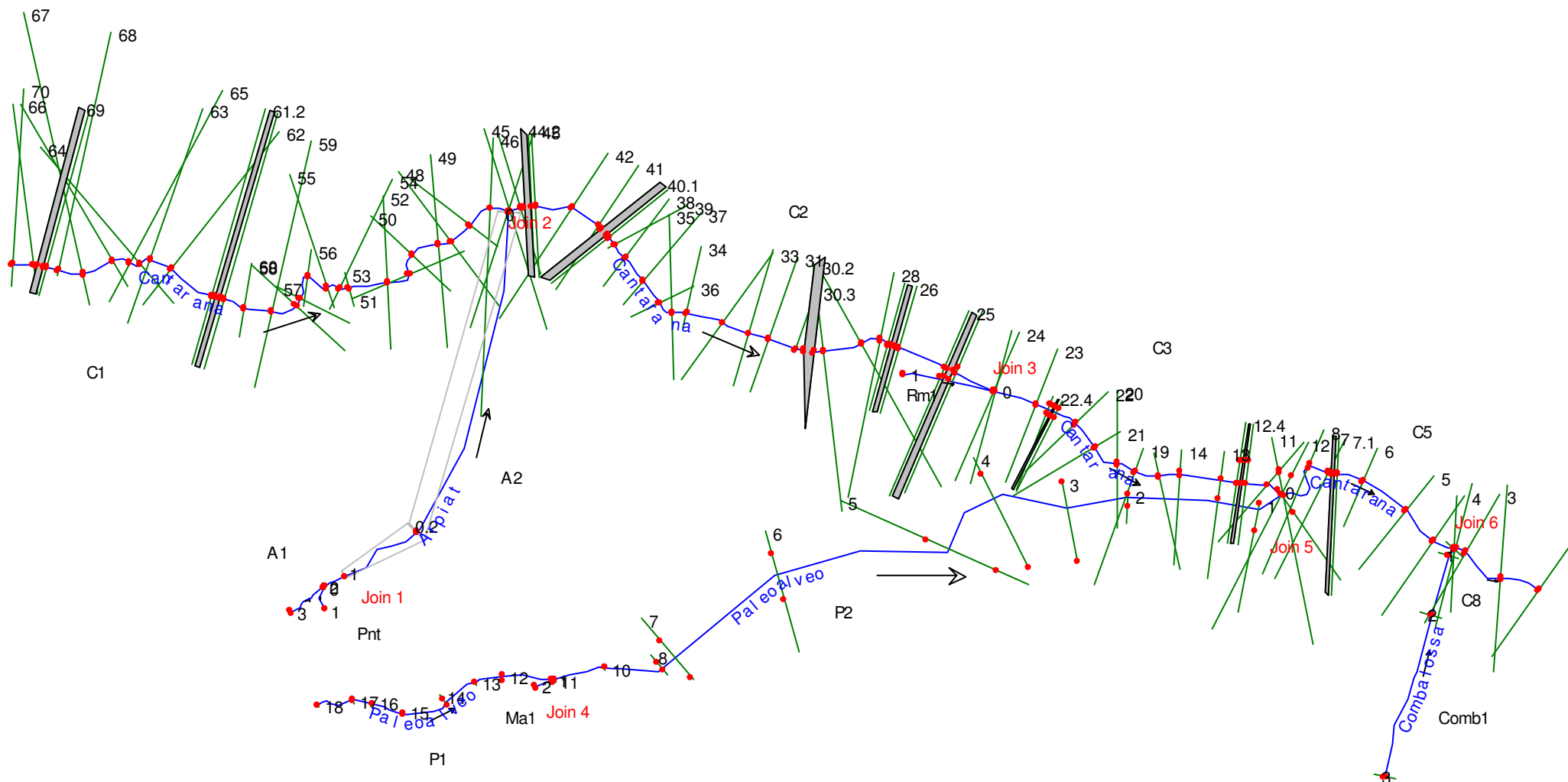
Delimitazione dei sottobacini idrografici

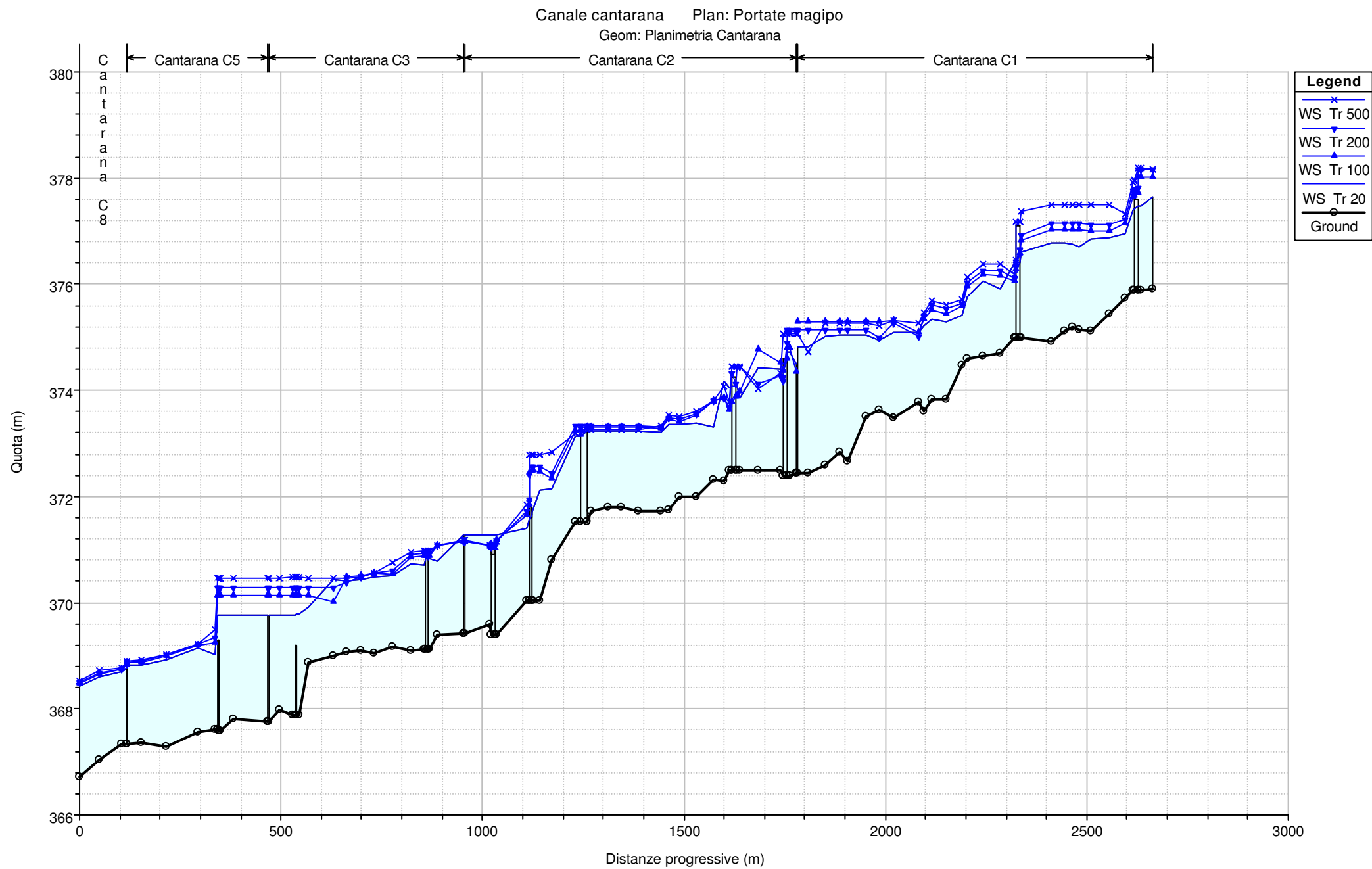
LEGENDA

-  Limiti comunali
-  Limiti bacini imbriferi

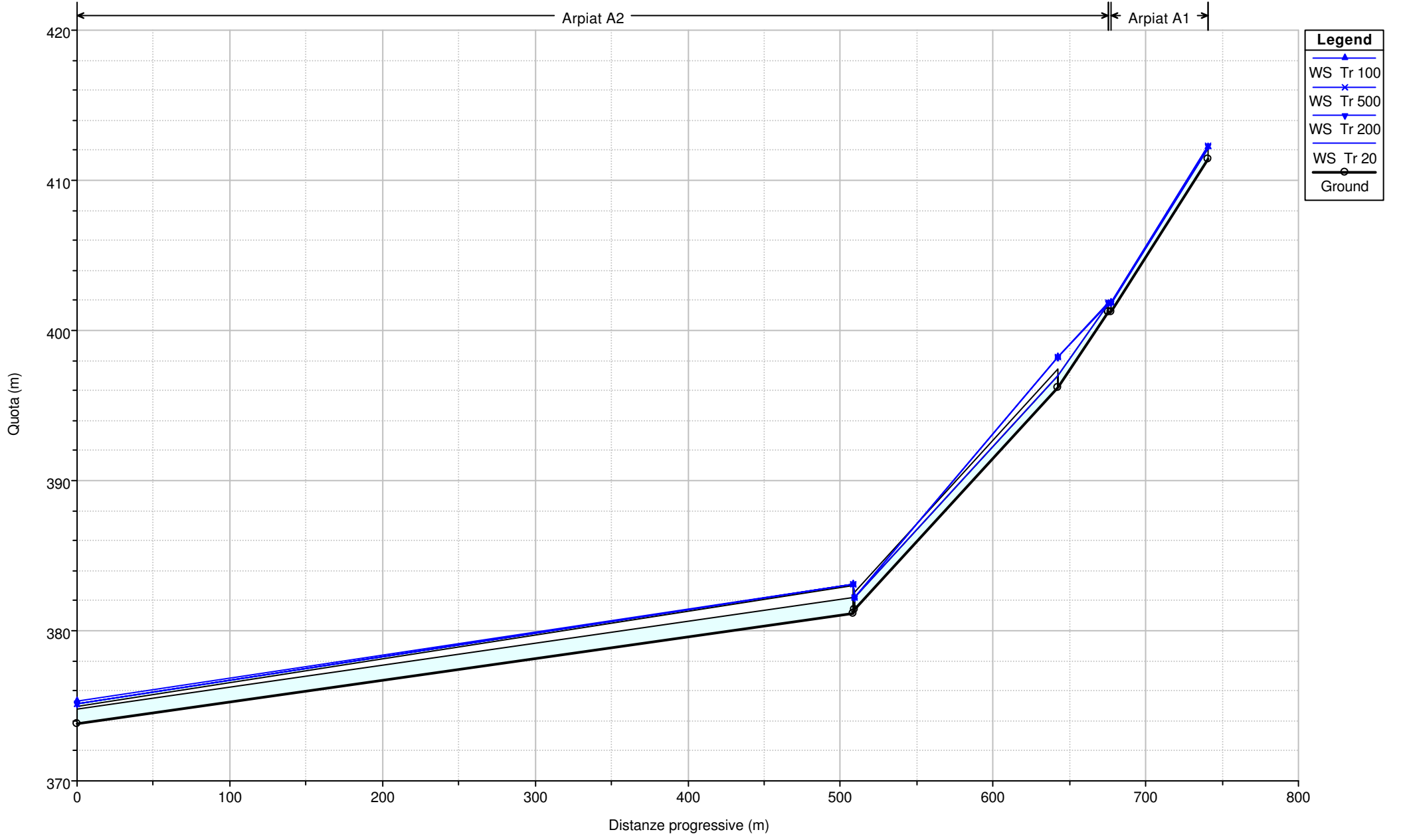


Elaborazioni HEC RAS

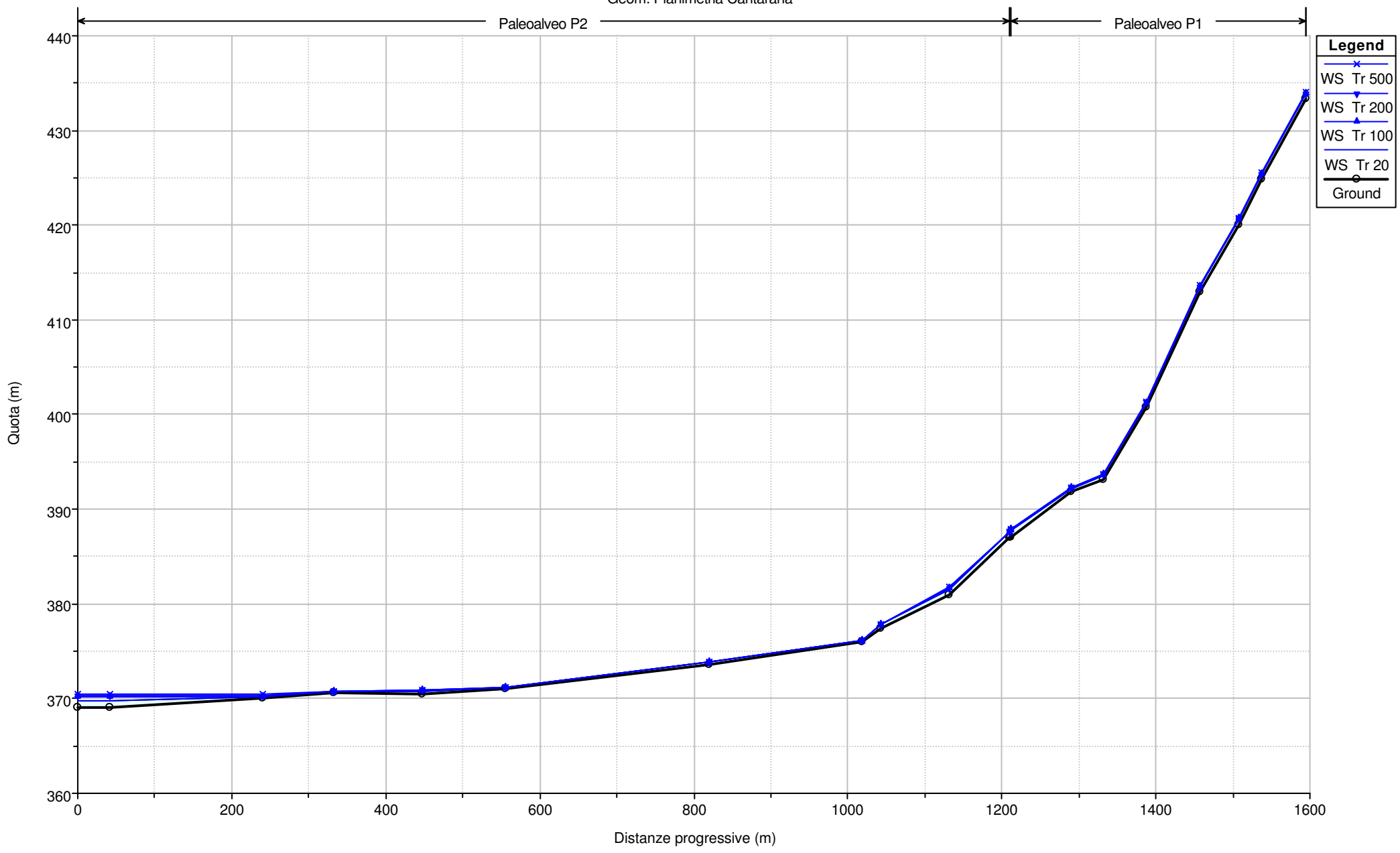




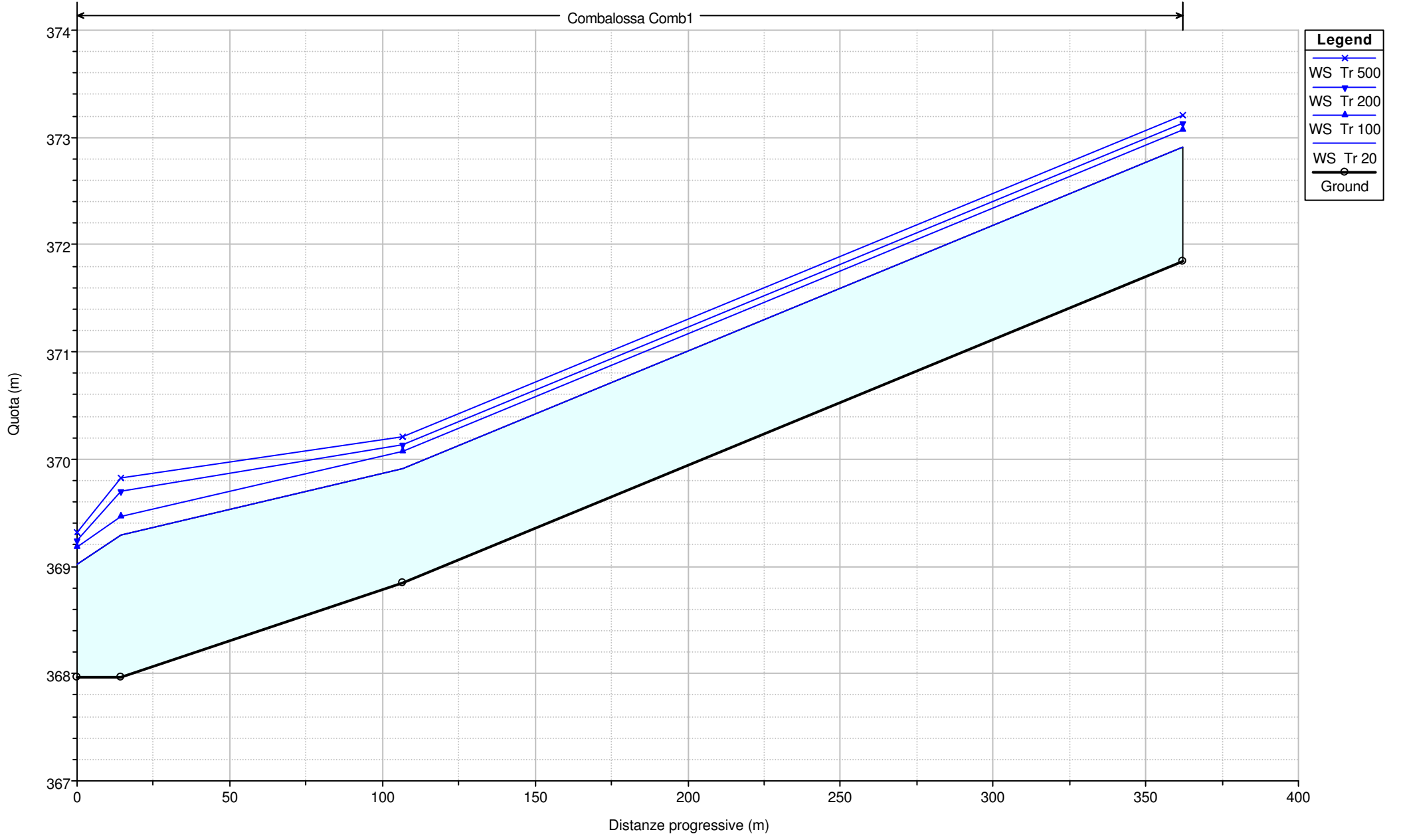
Canale cantarana Plan: Portate magipo
Geom: Planimetria Cantarana

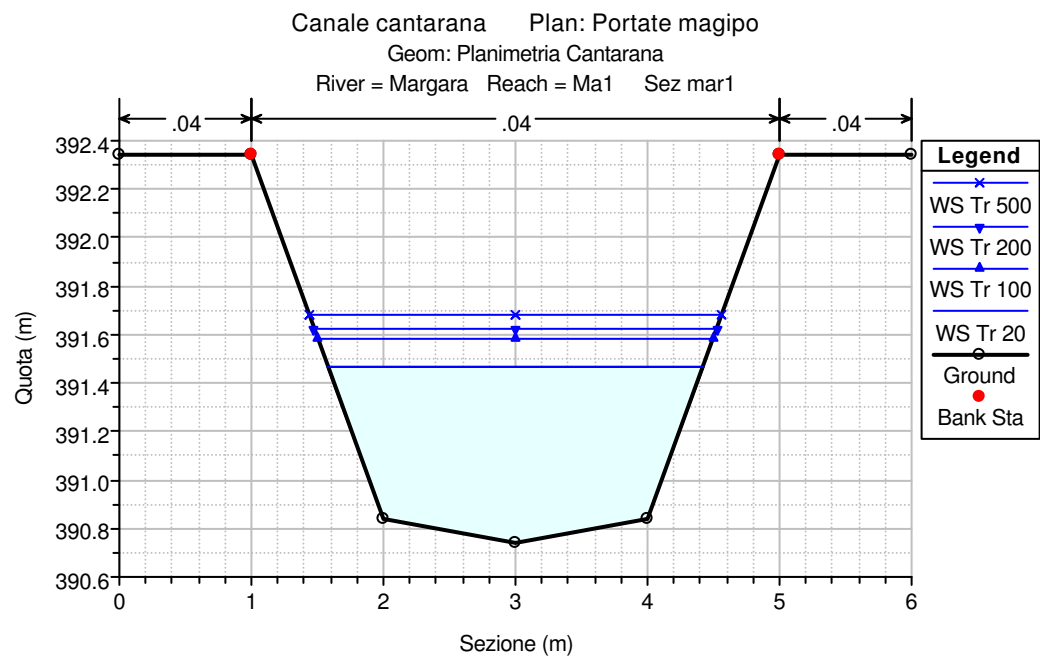
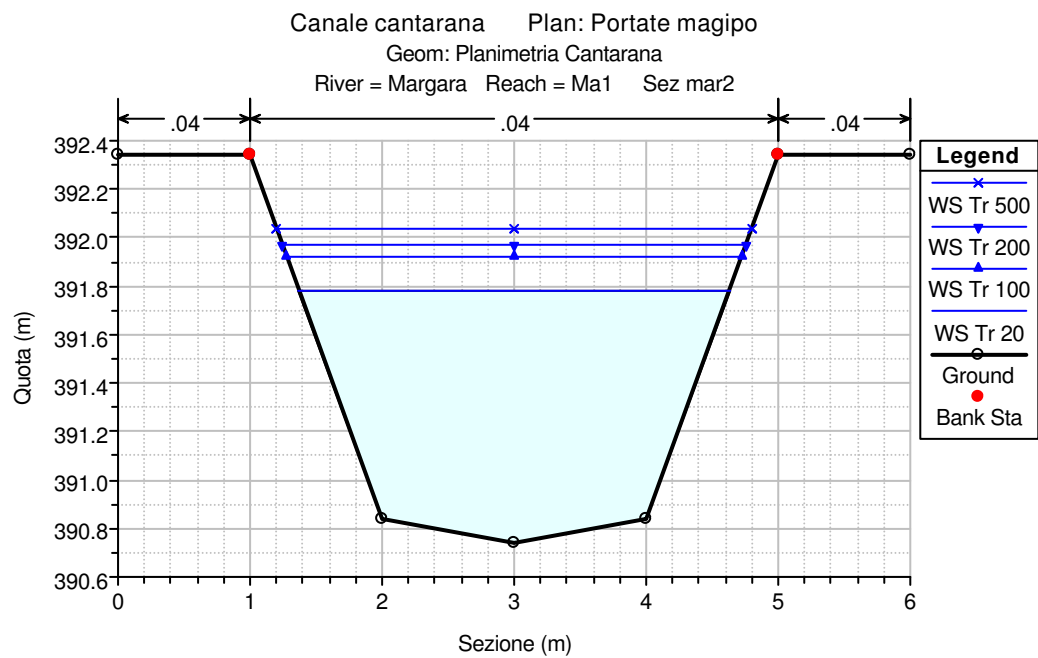
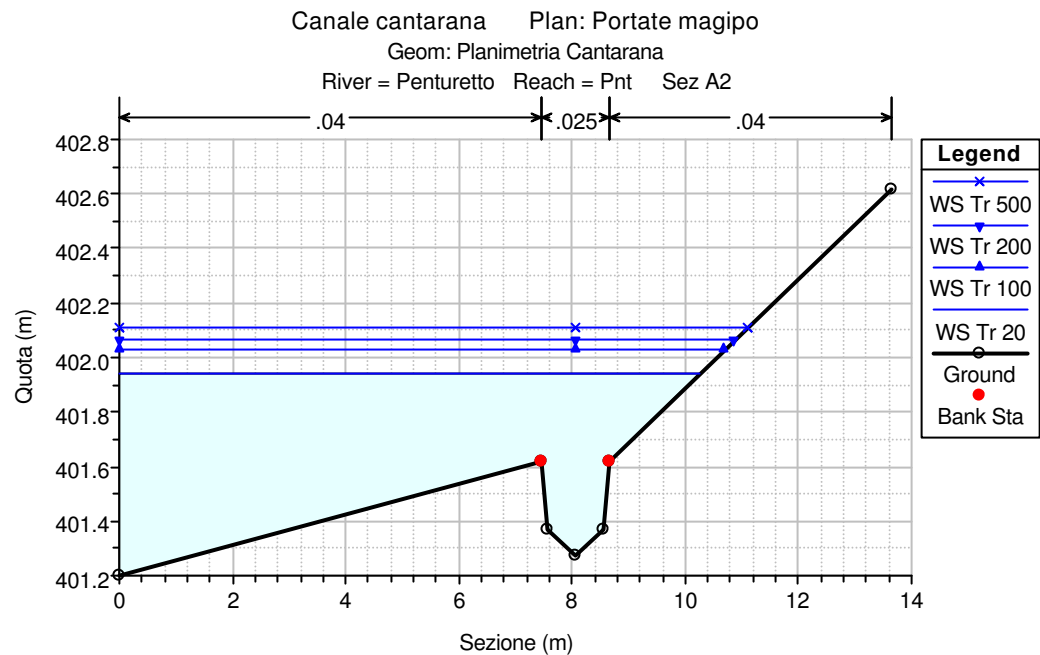
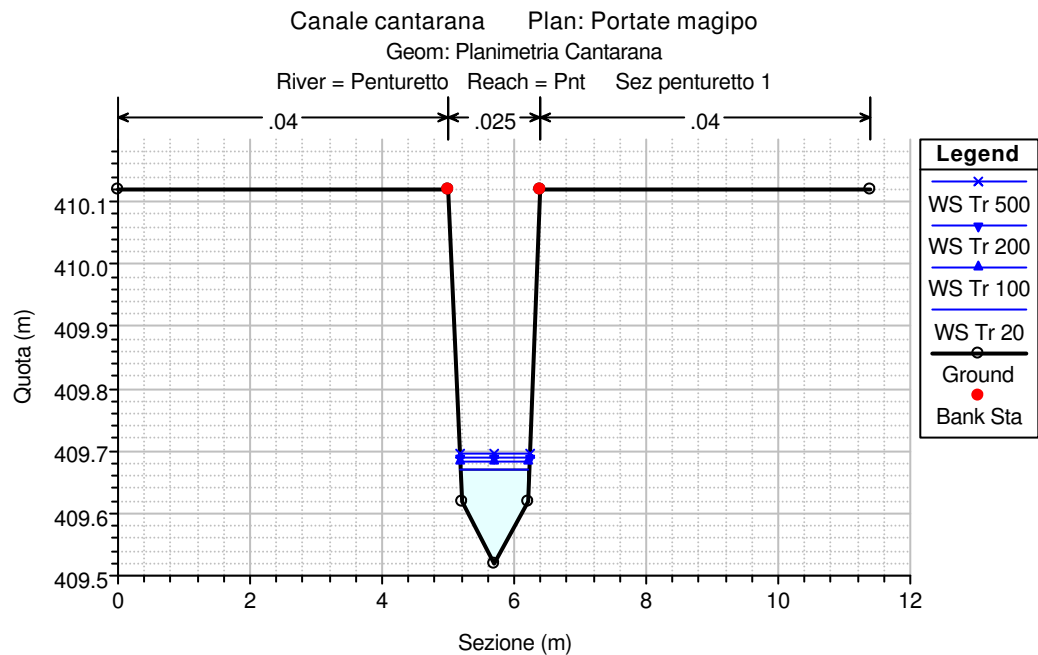


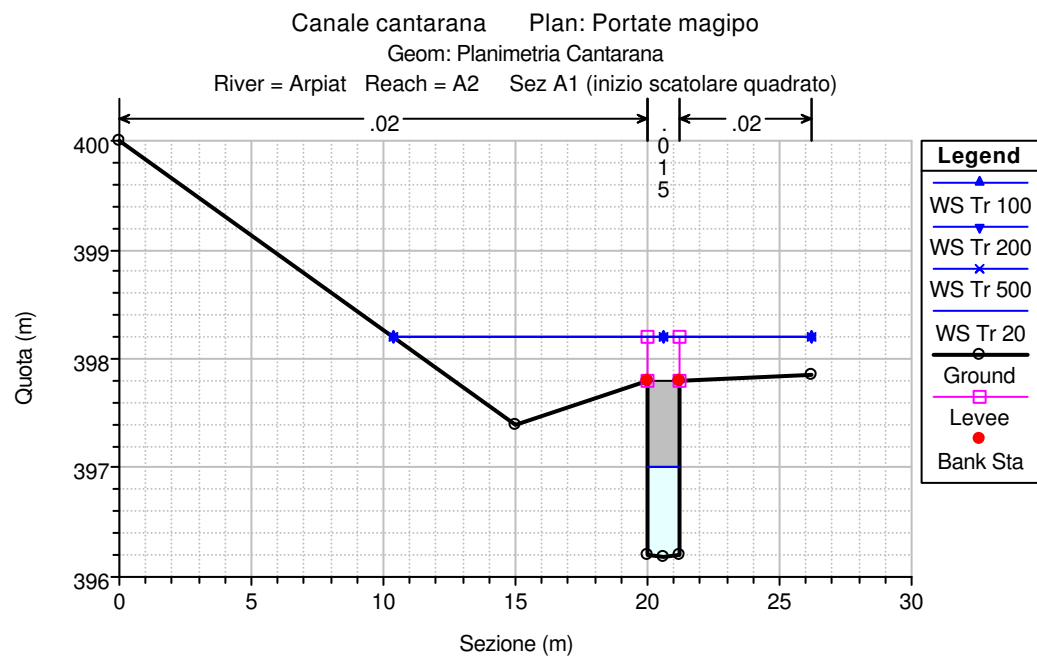
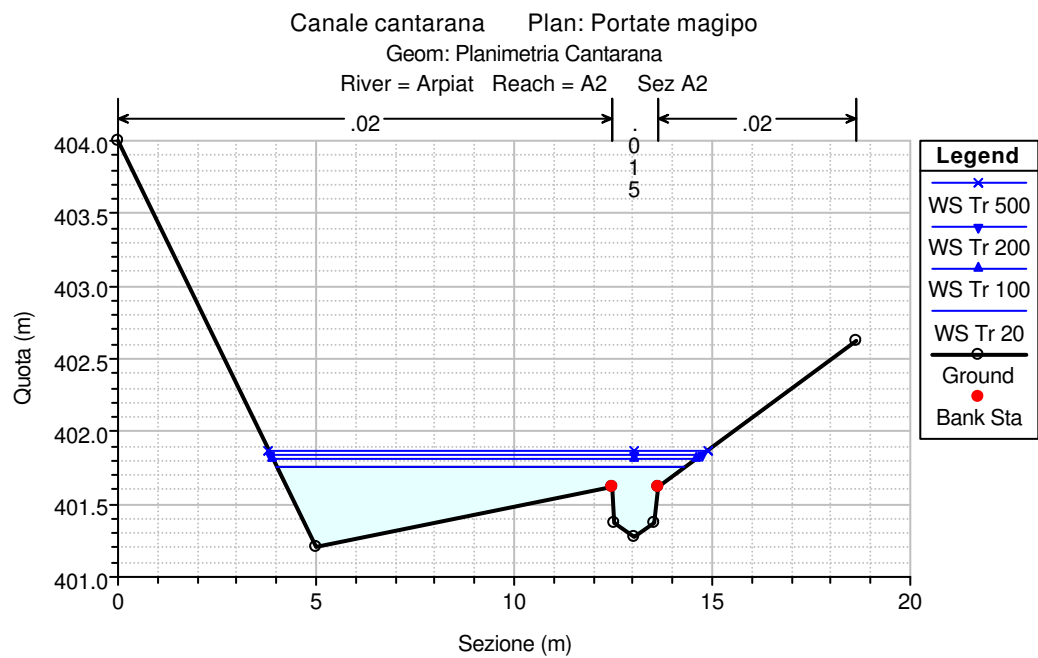
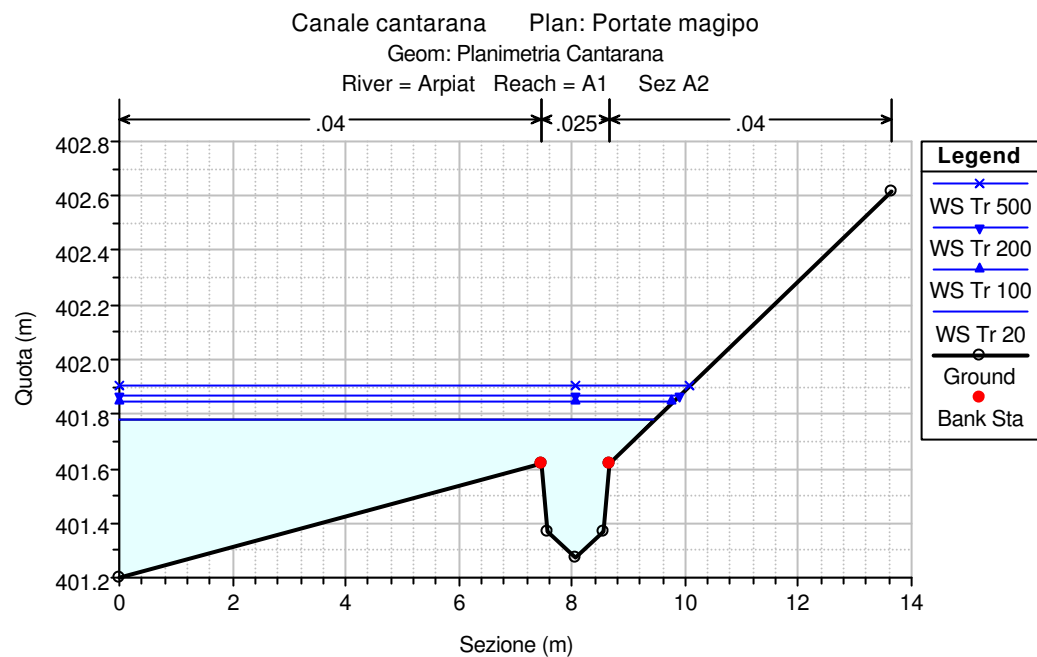
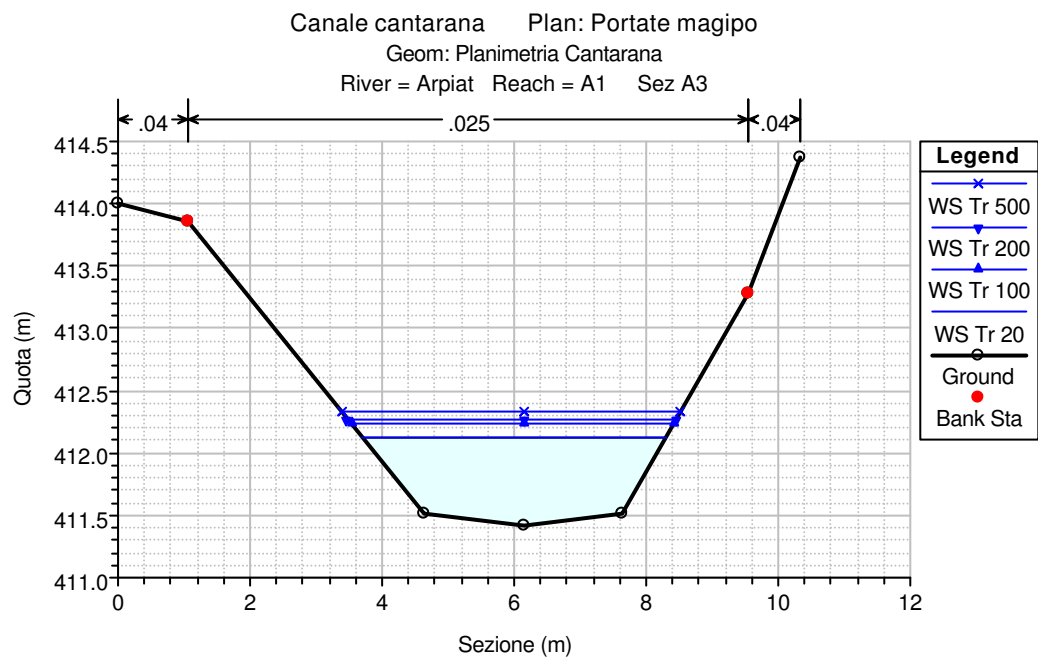
Canale cantarana Plan: Portate magipo
Geom: Planimetria Cantarana

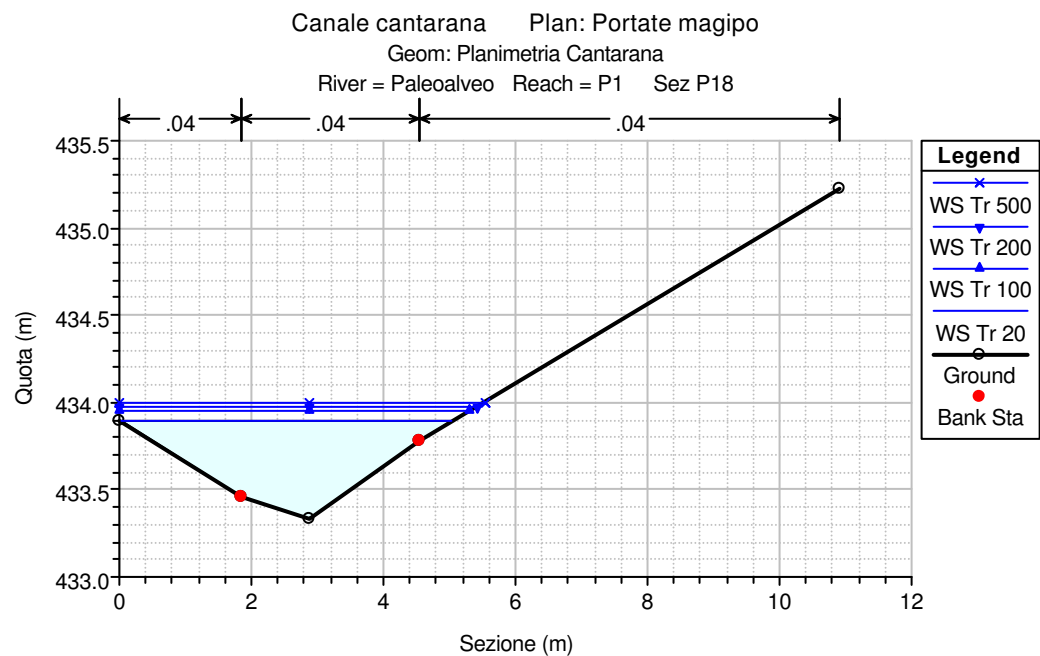
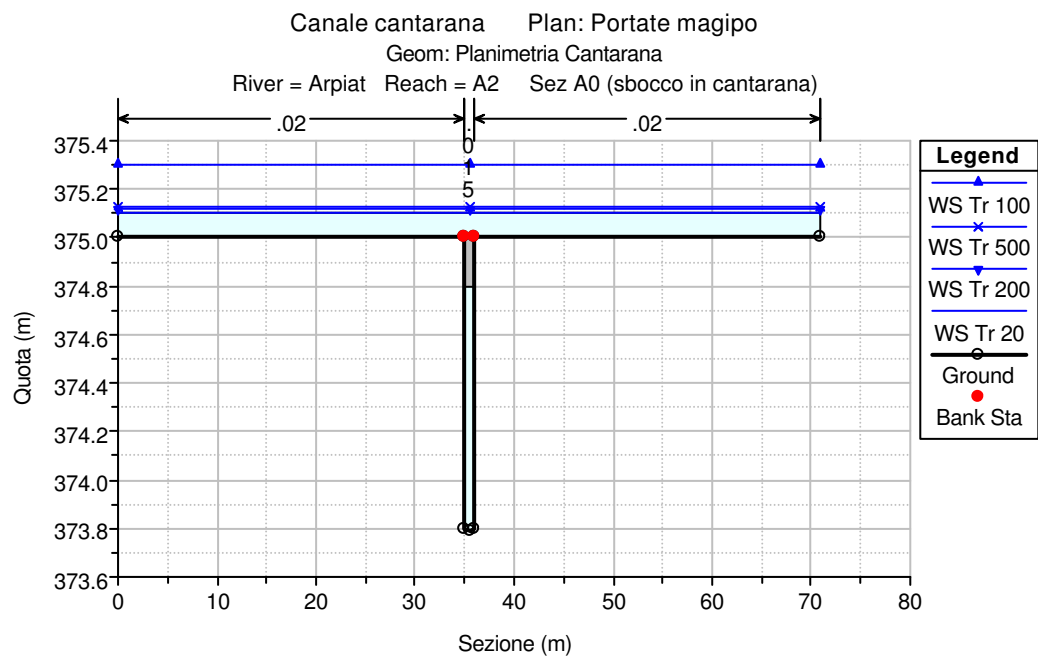
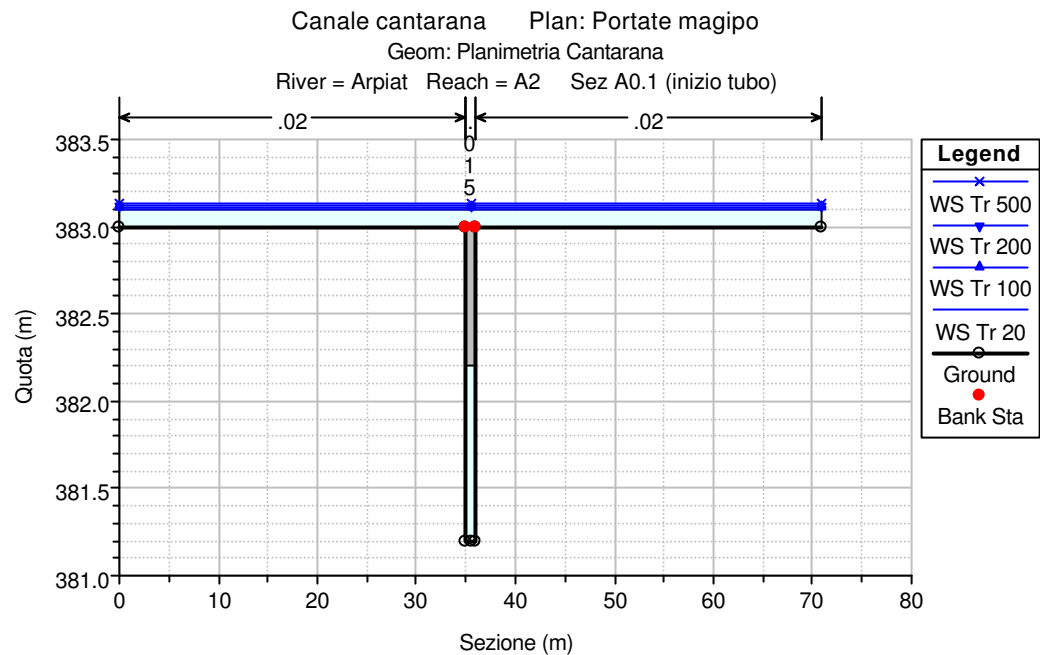
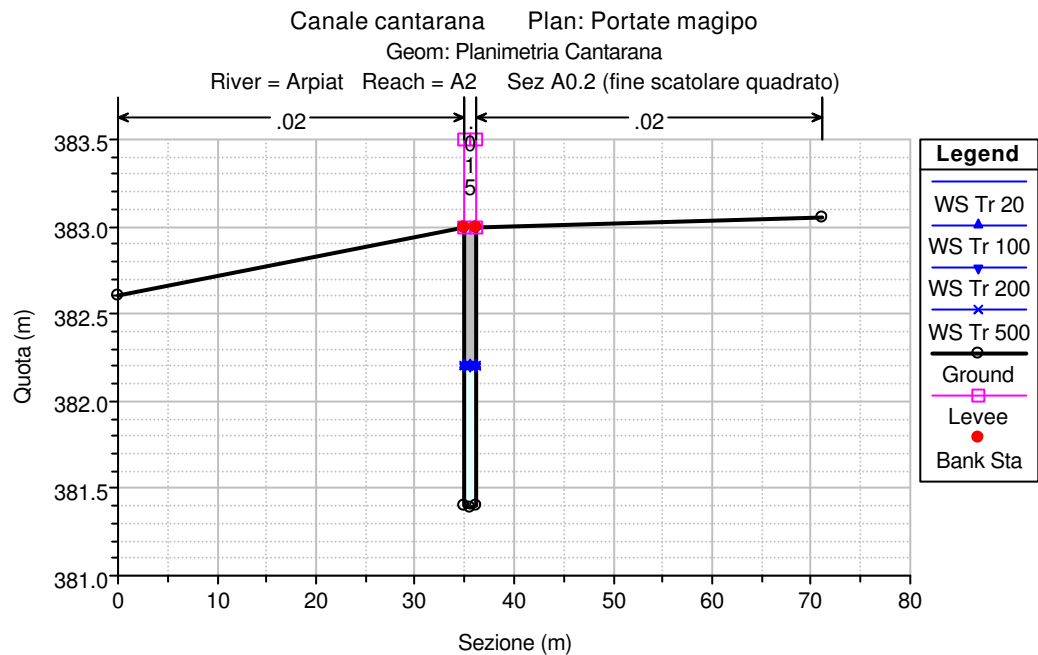


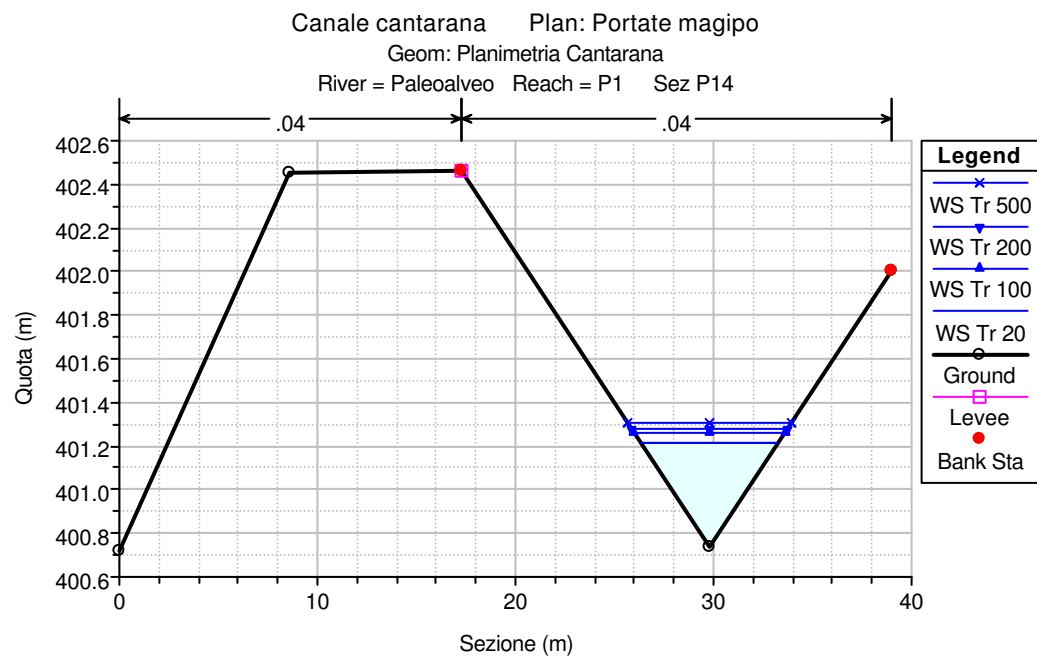
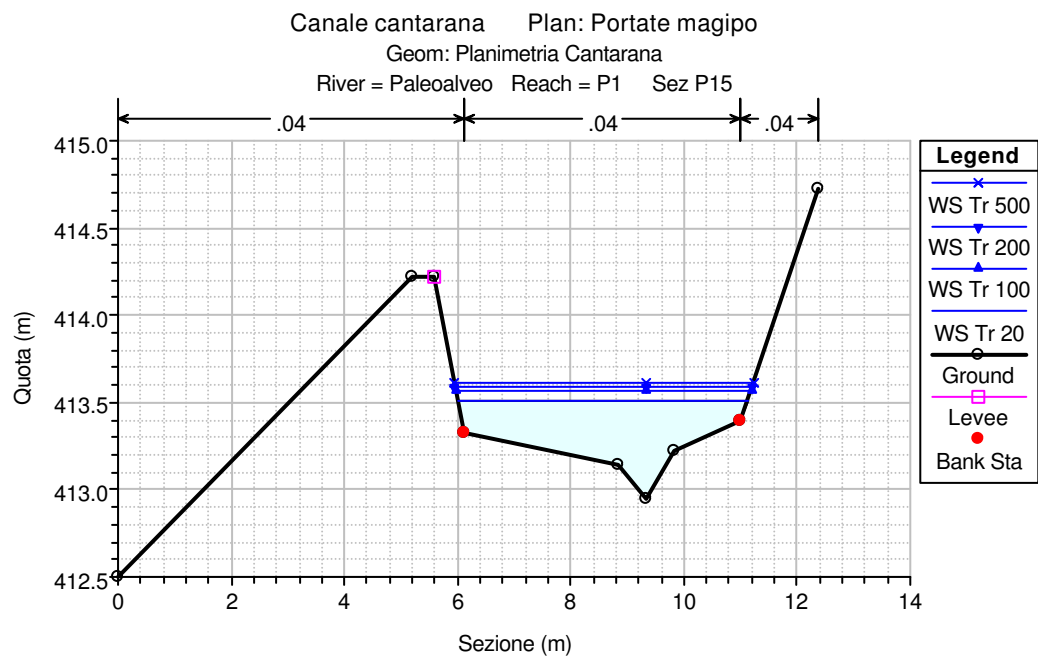
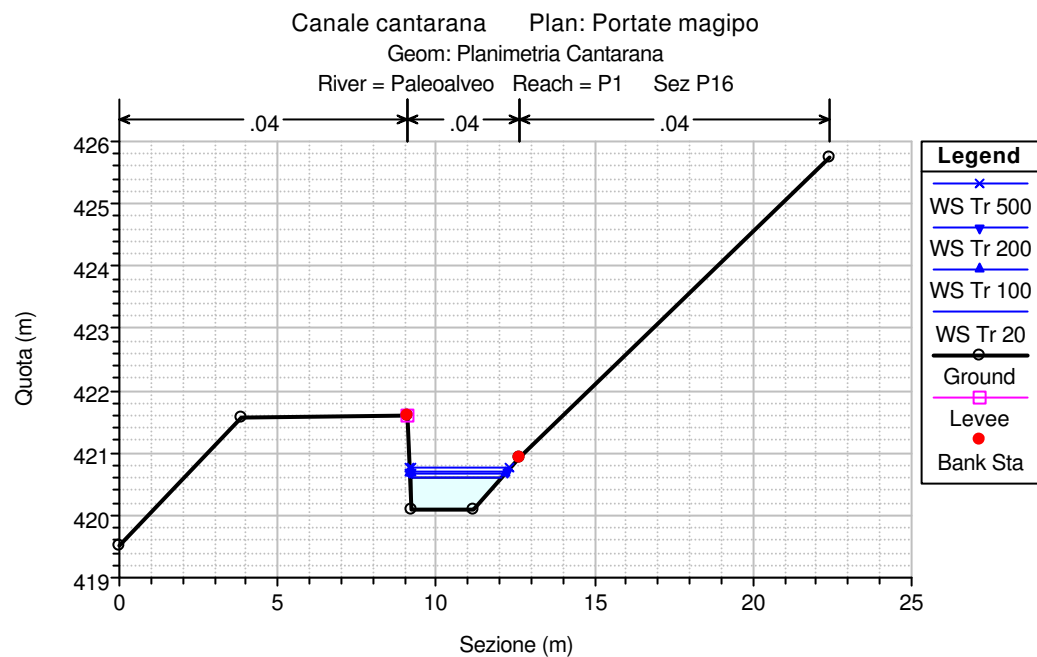
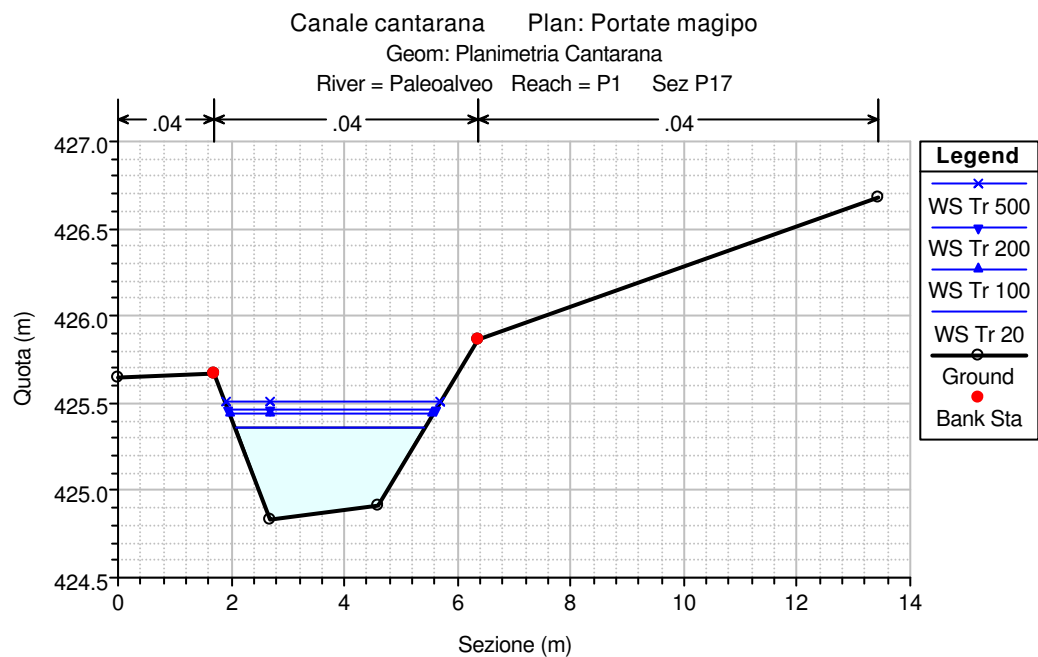
Canale cantarana Plan: Portate magipo
Geom: Planimetria Cantarana

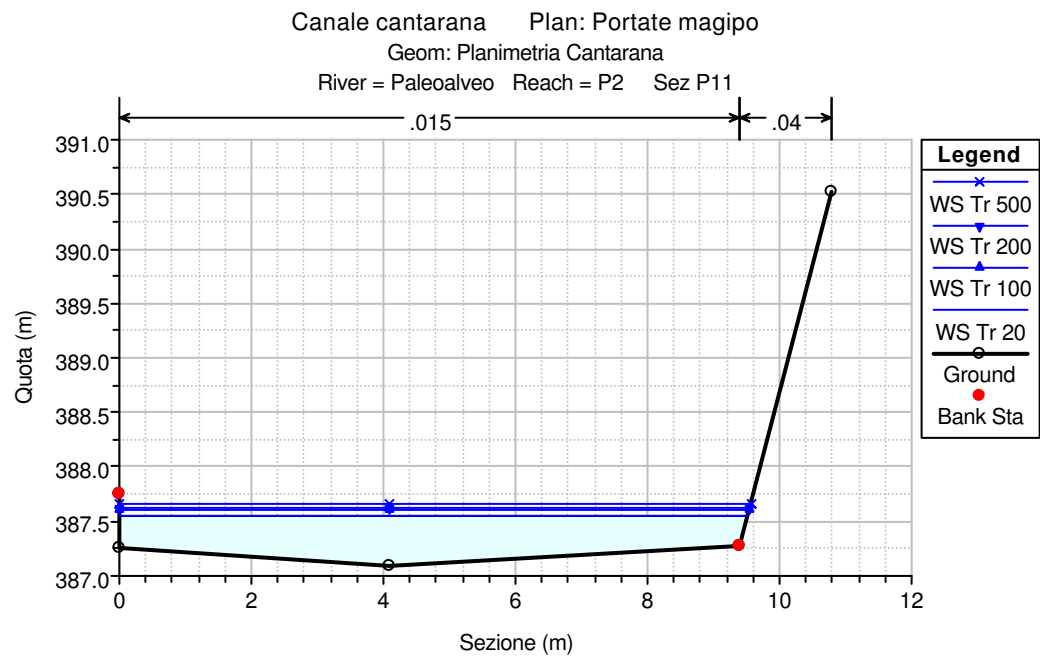
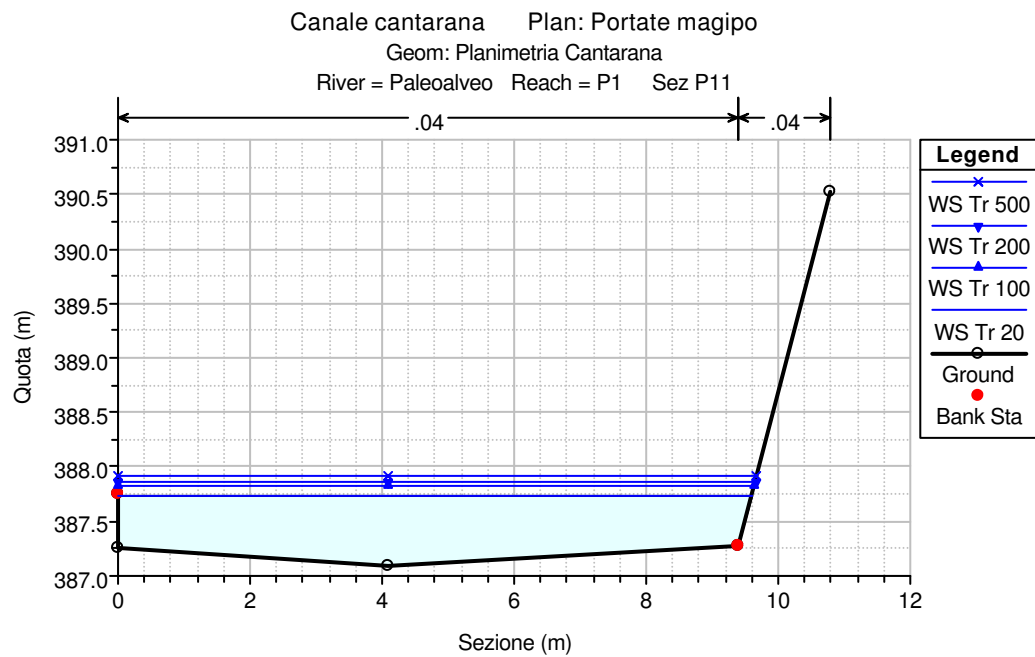
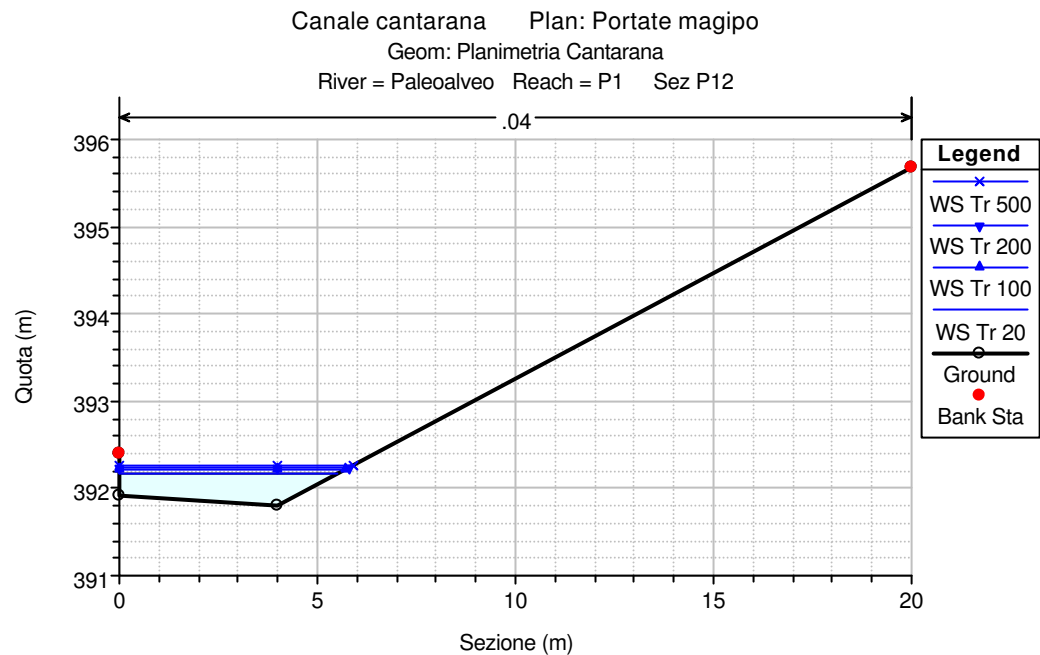
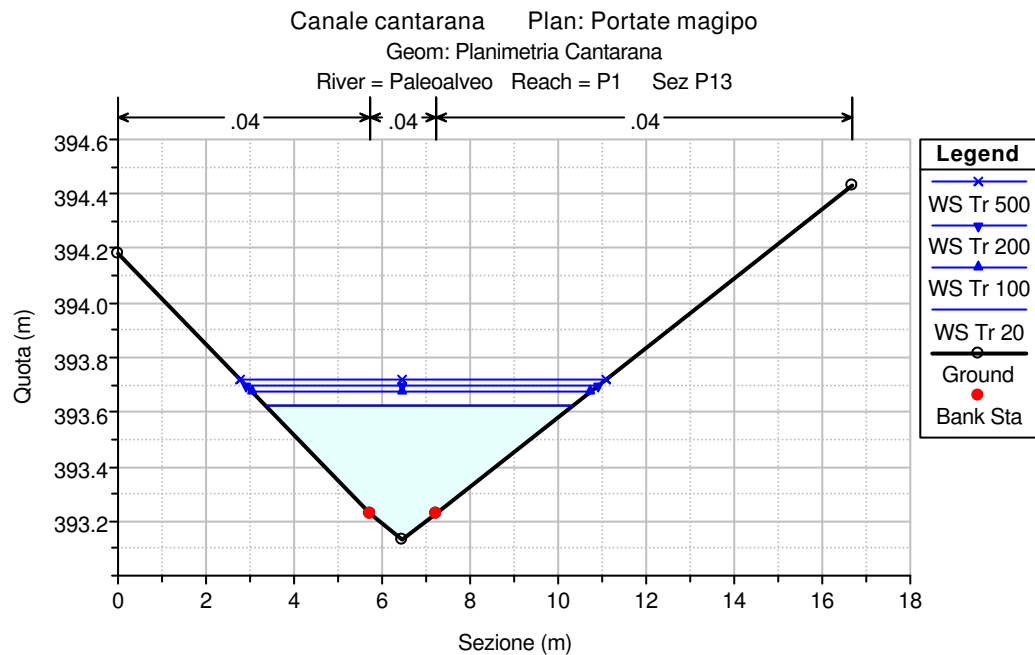


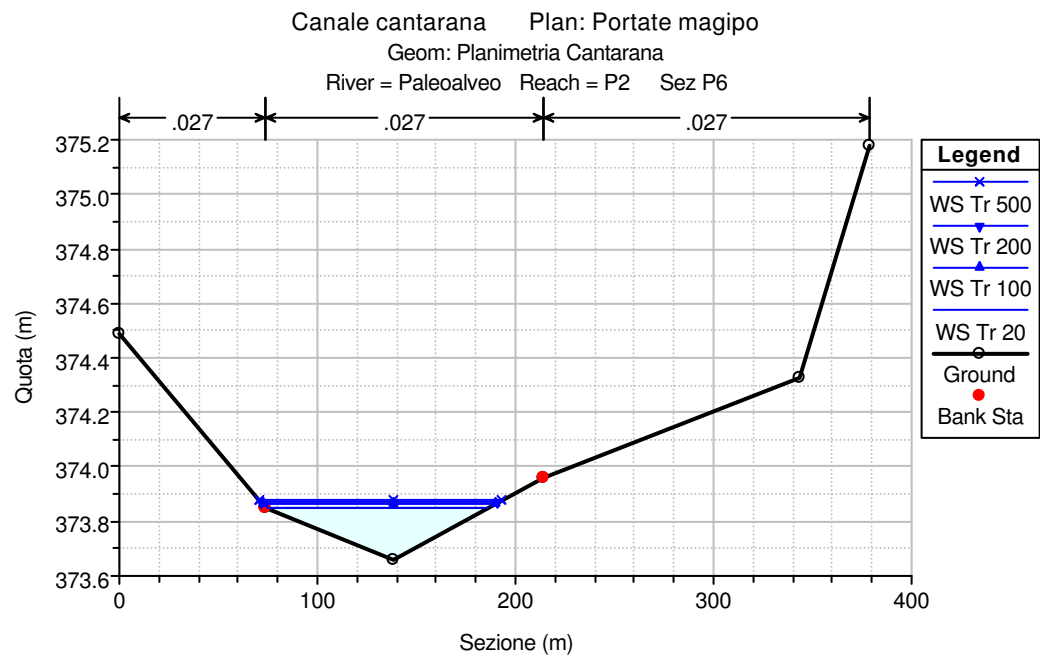
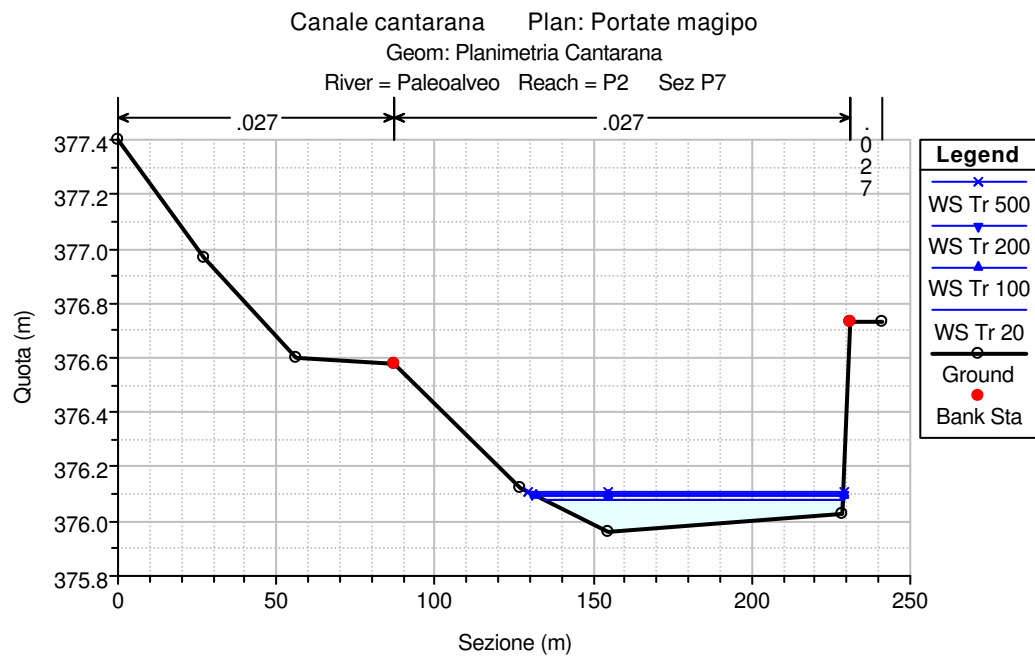
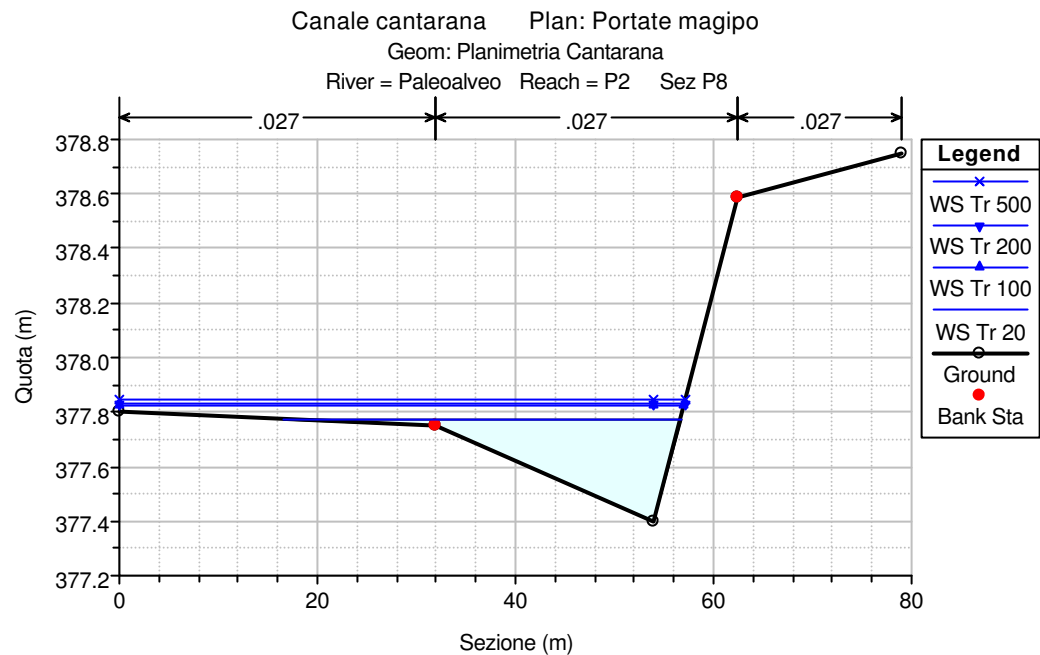
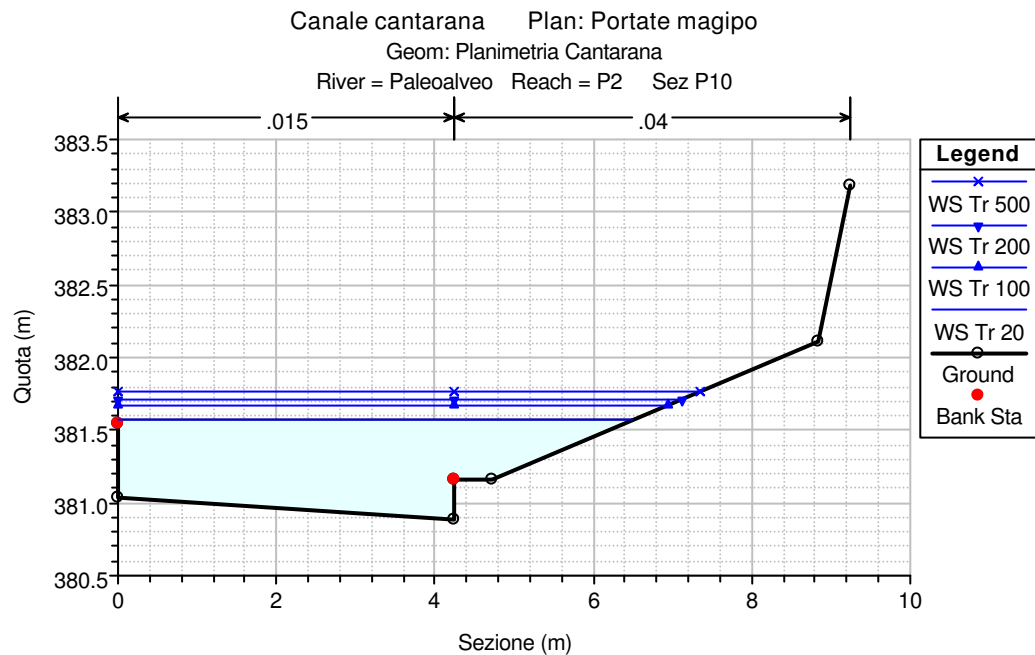


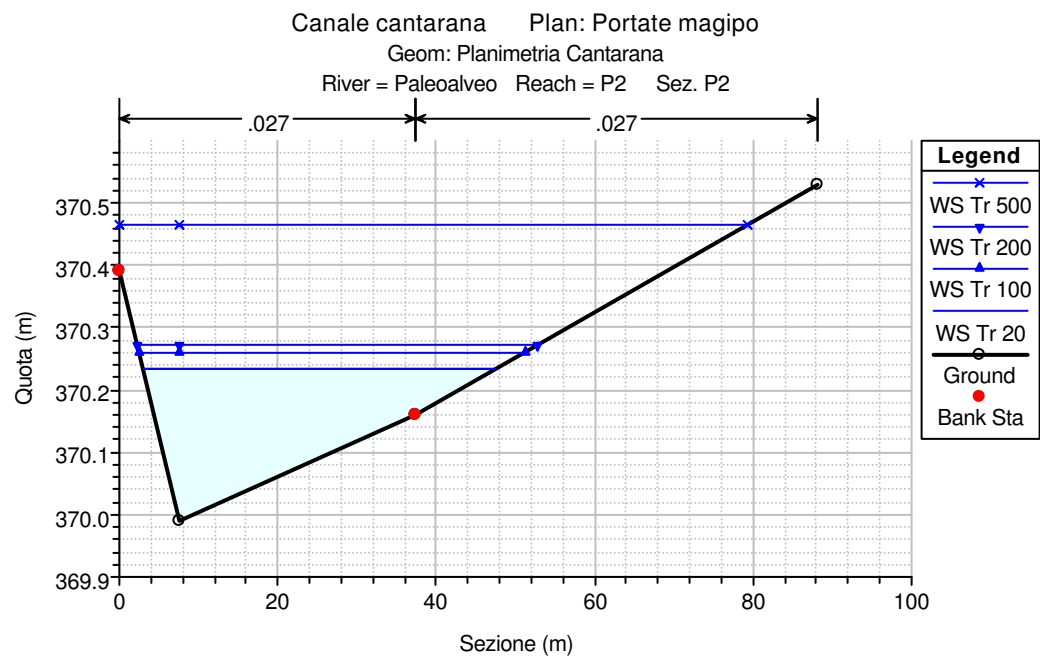
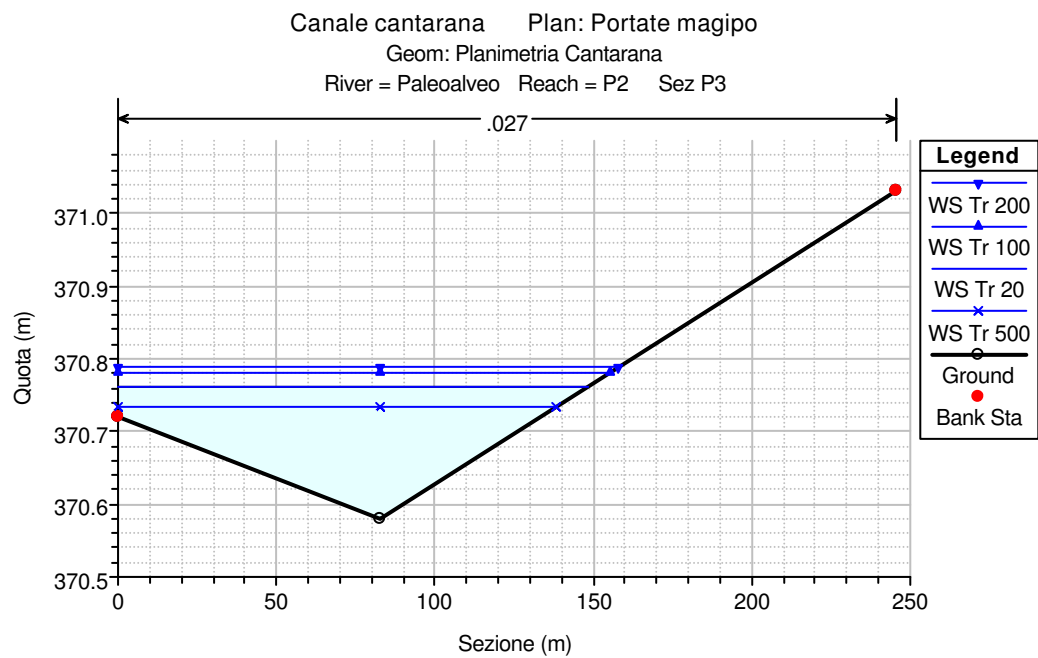
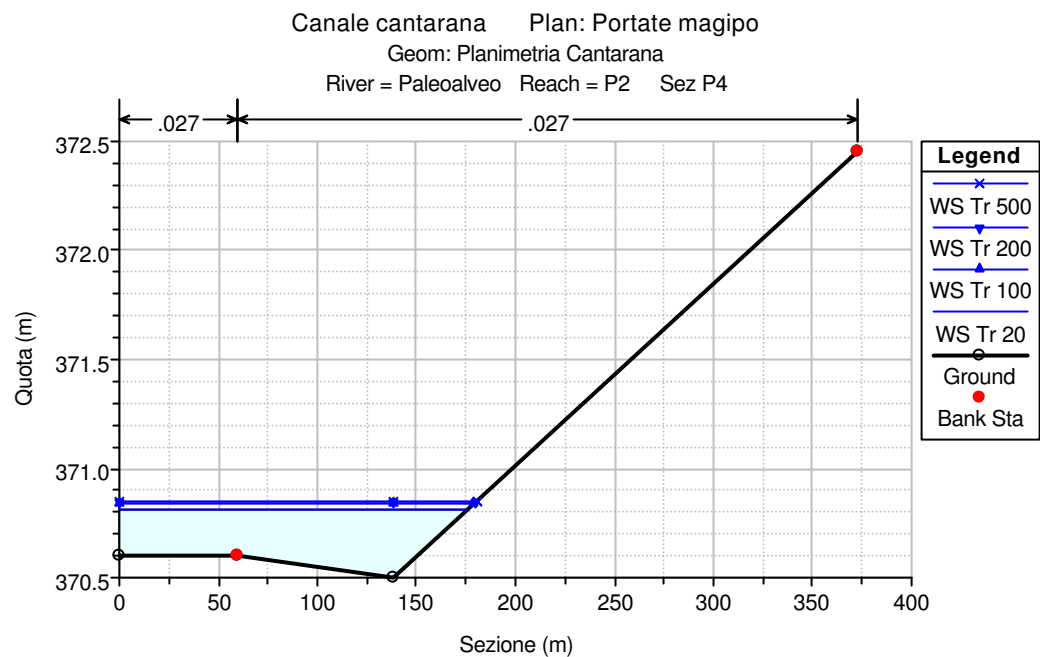
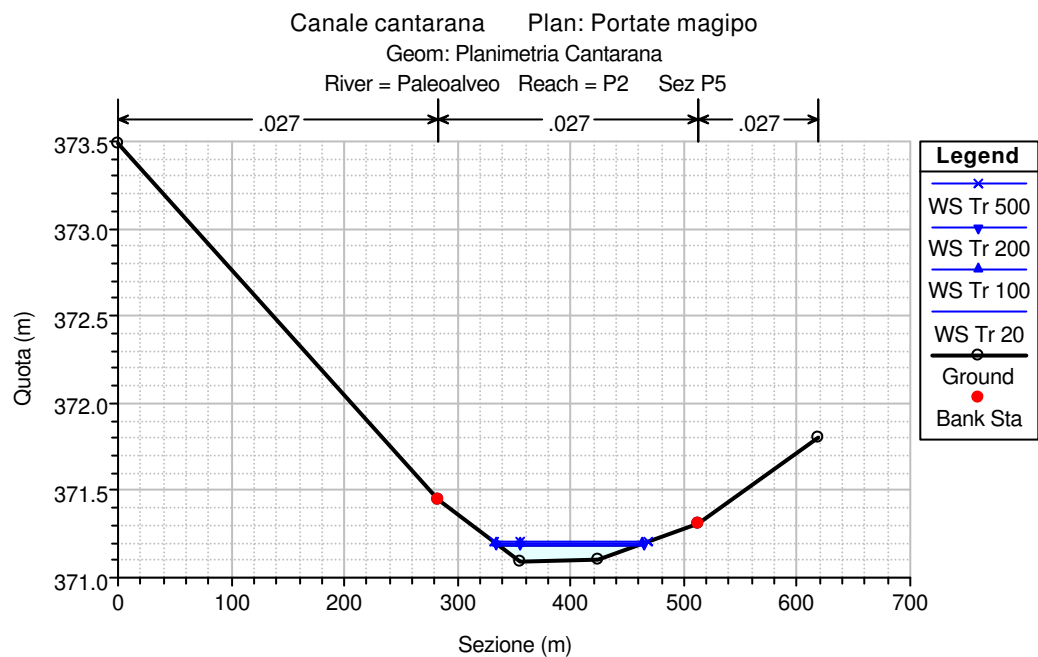


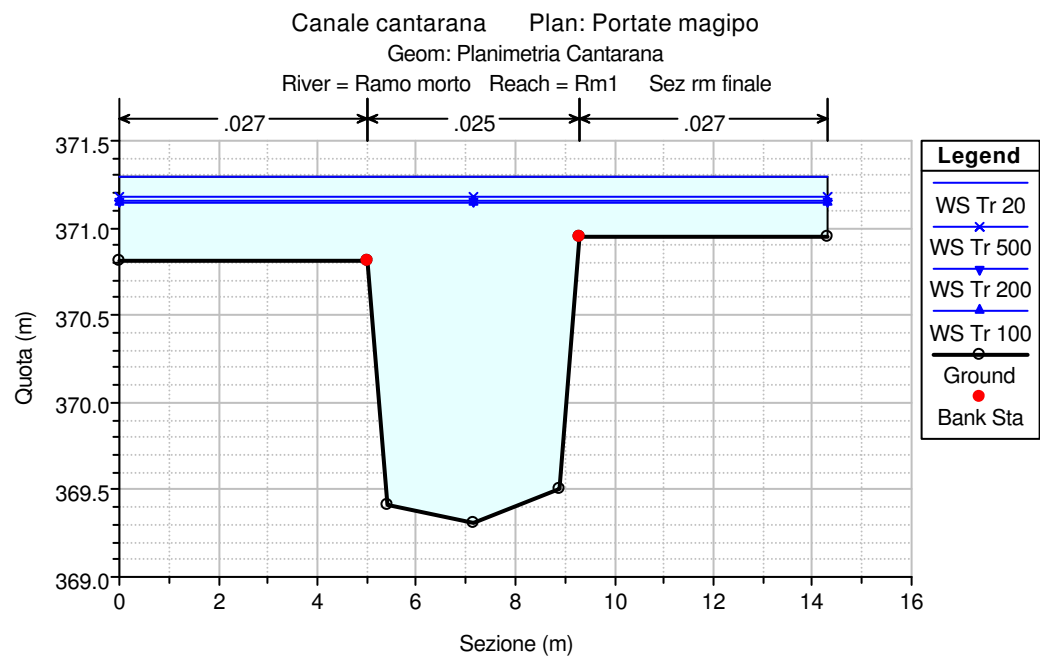
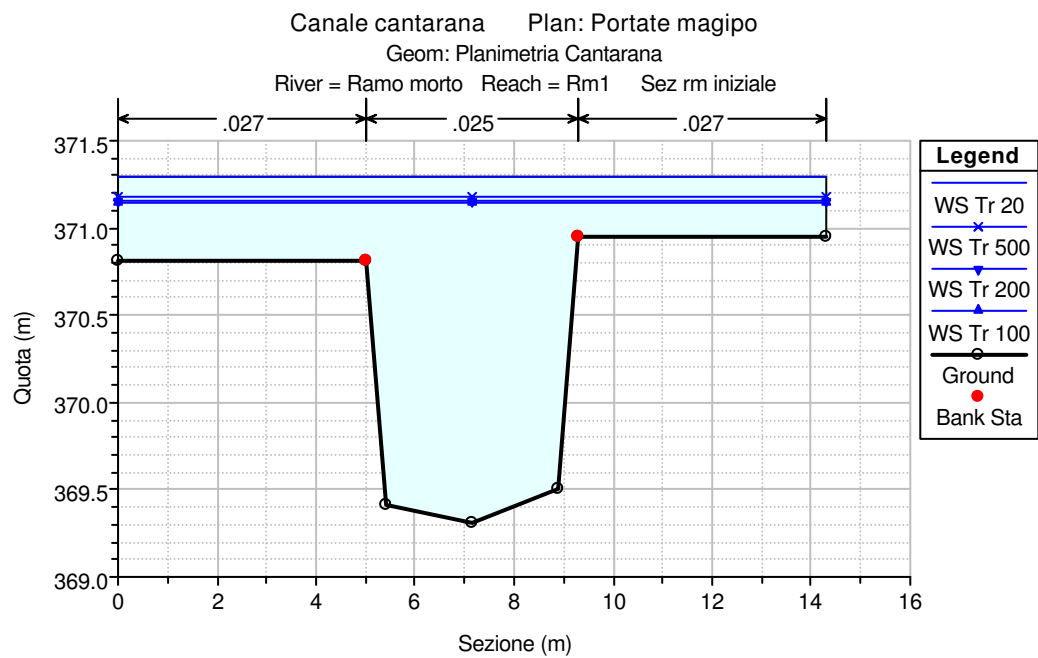
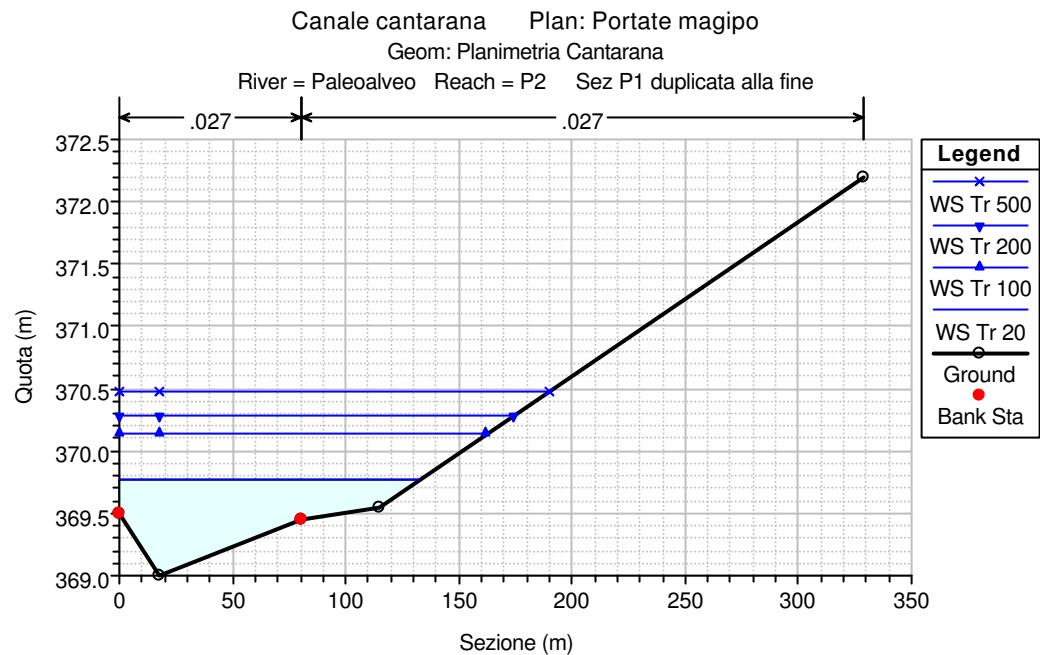
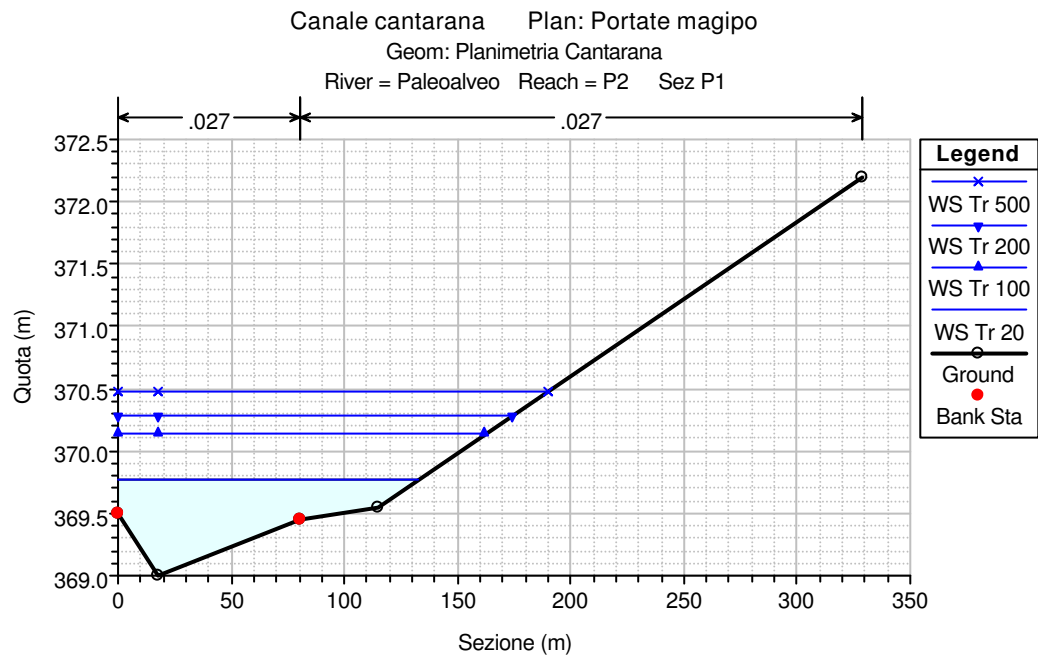


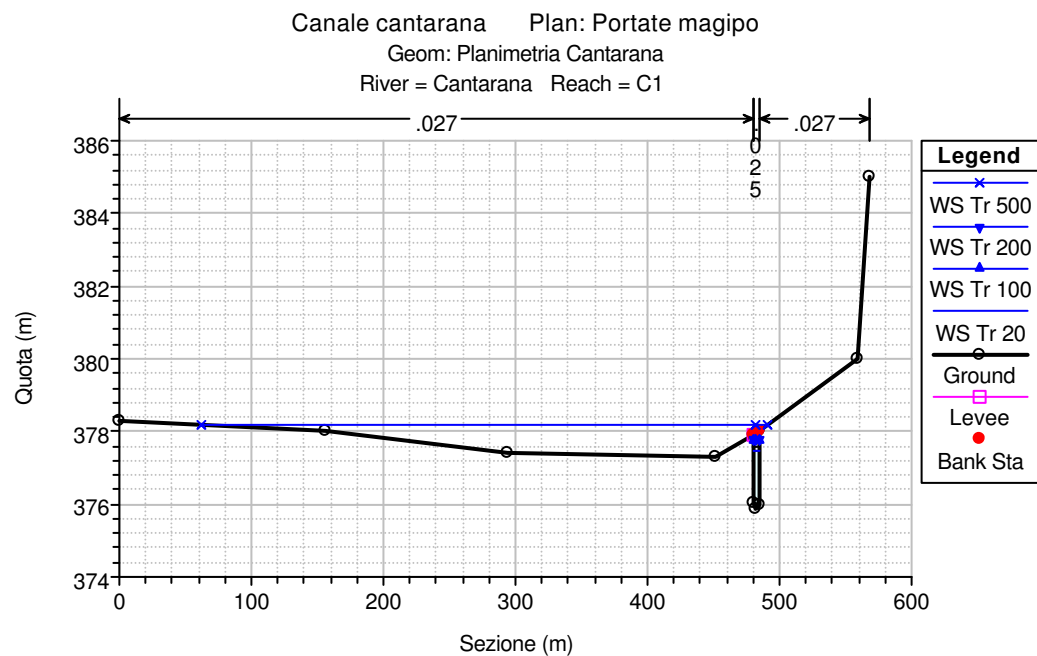
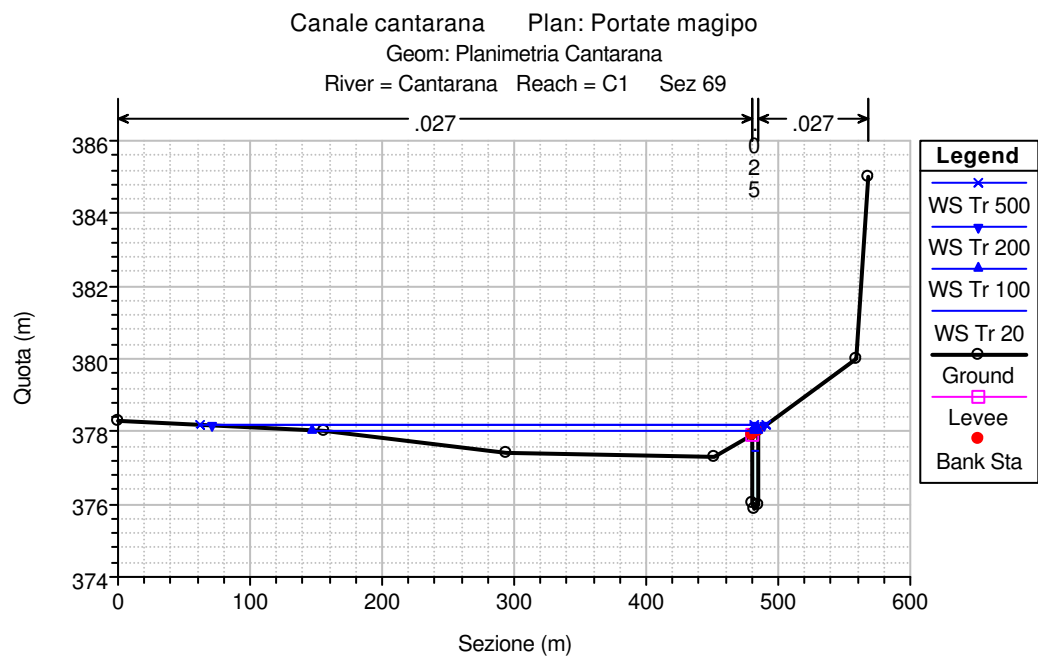
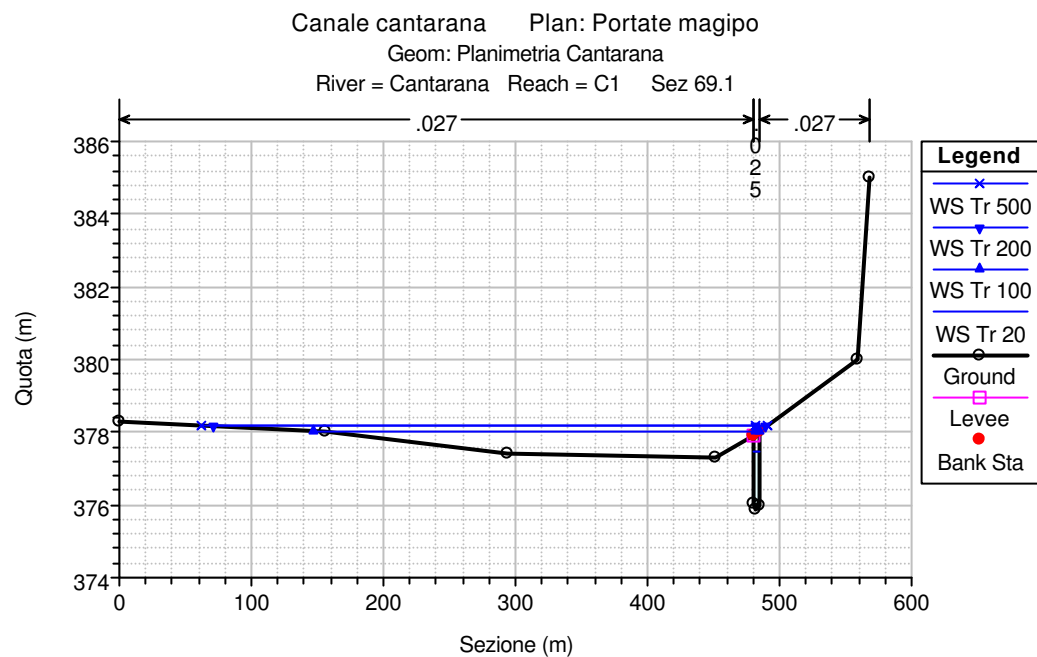
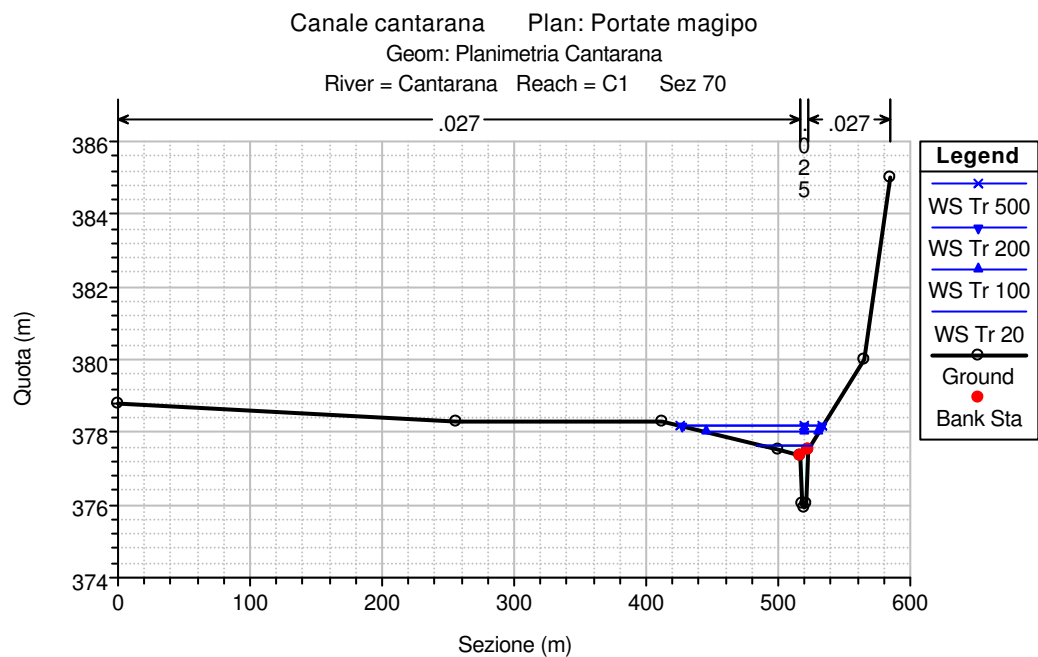


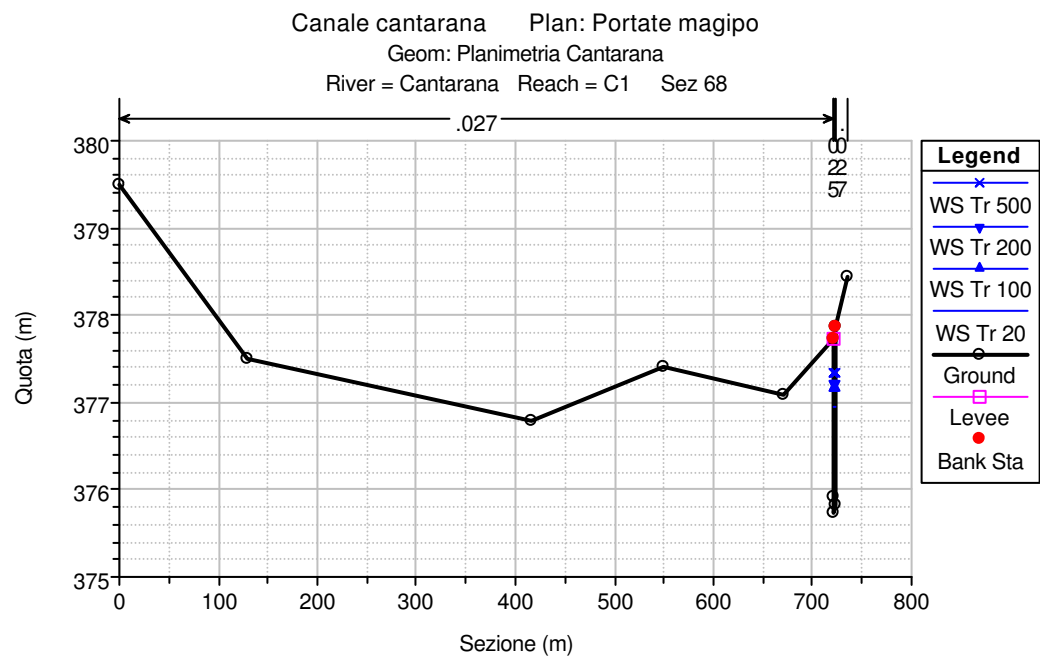
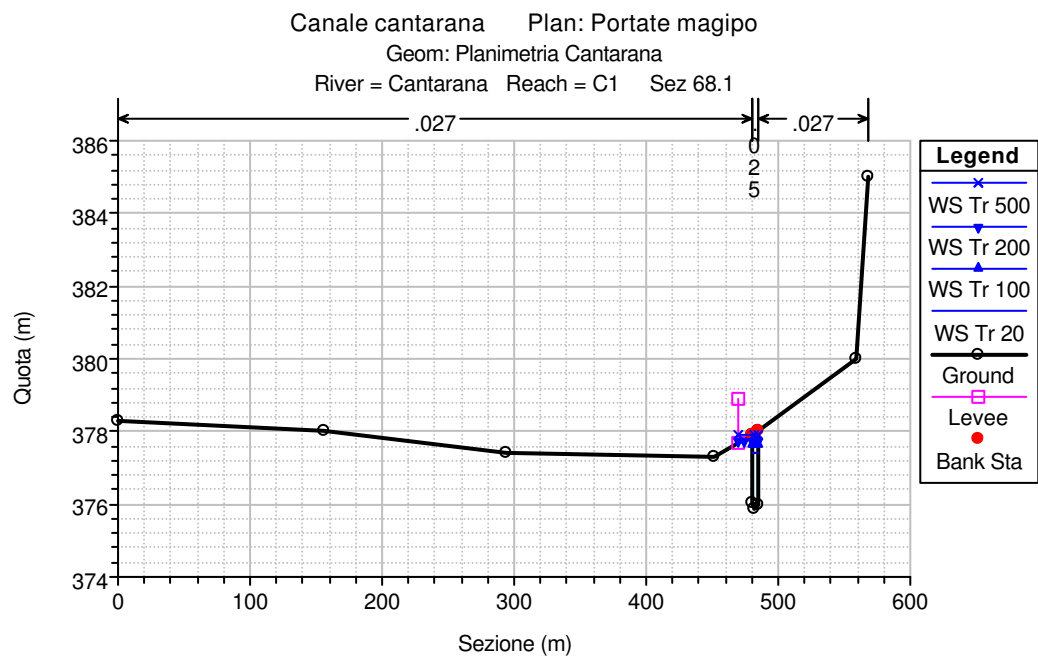
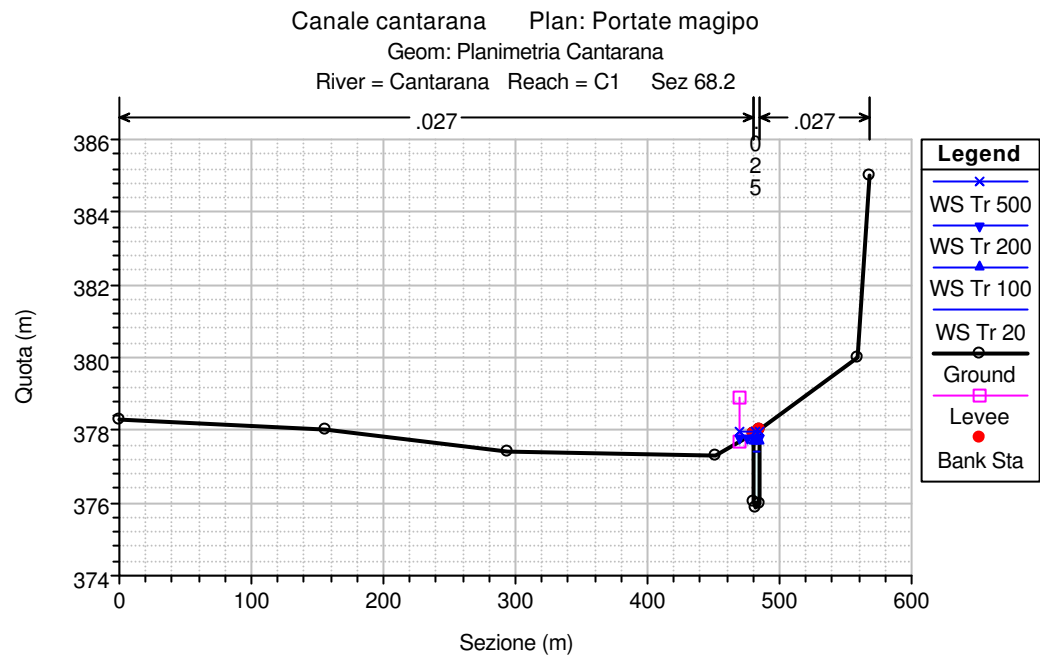
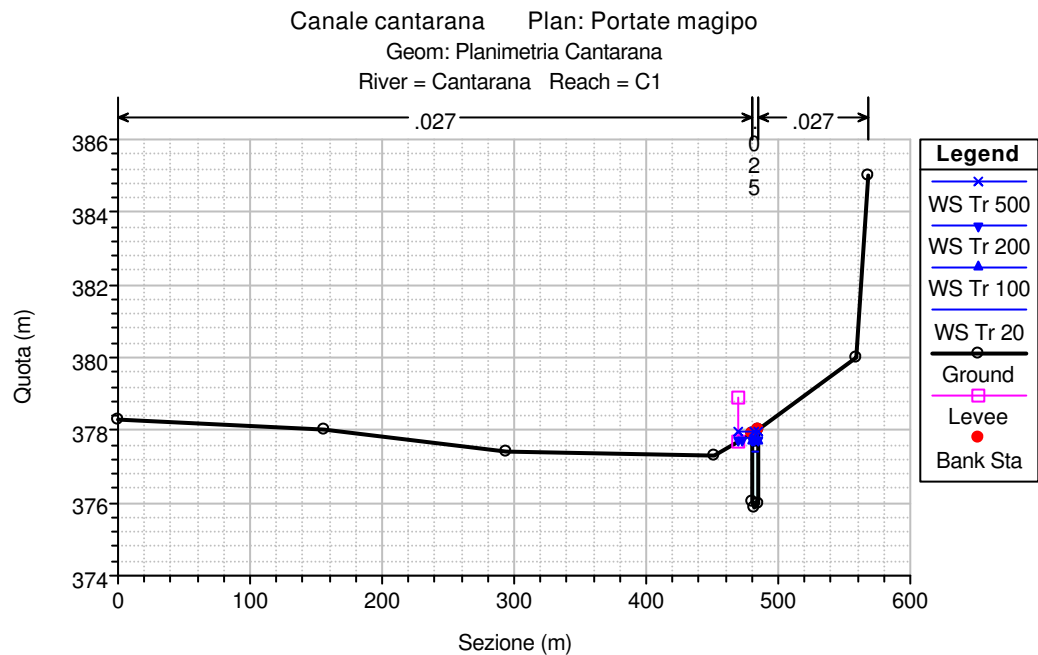


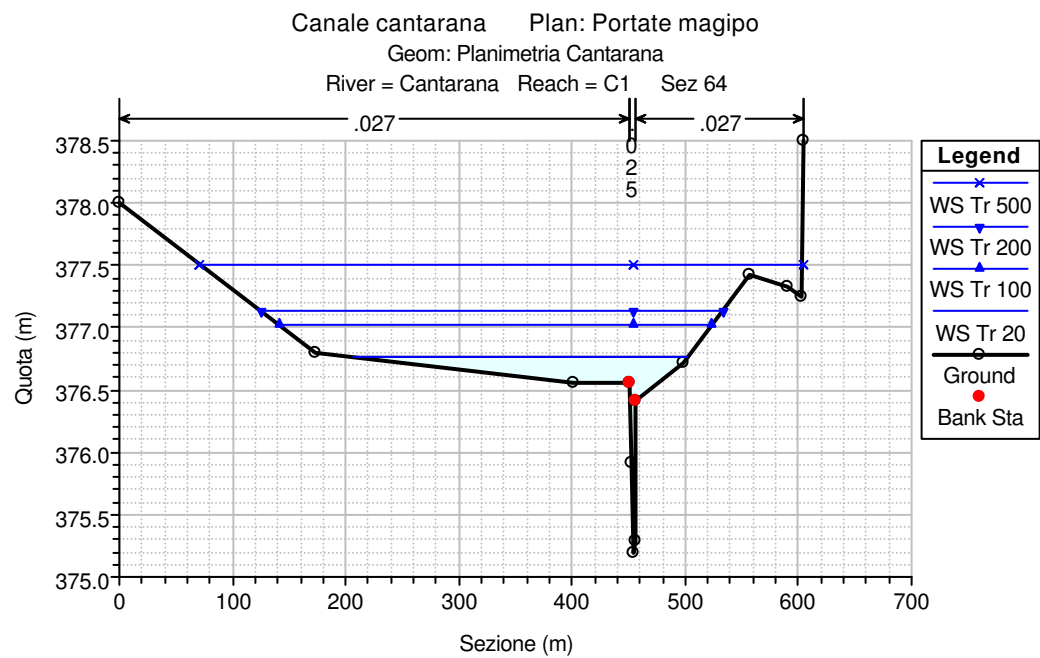
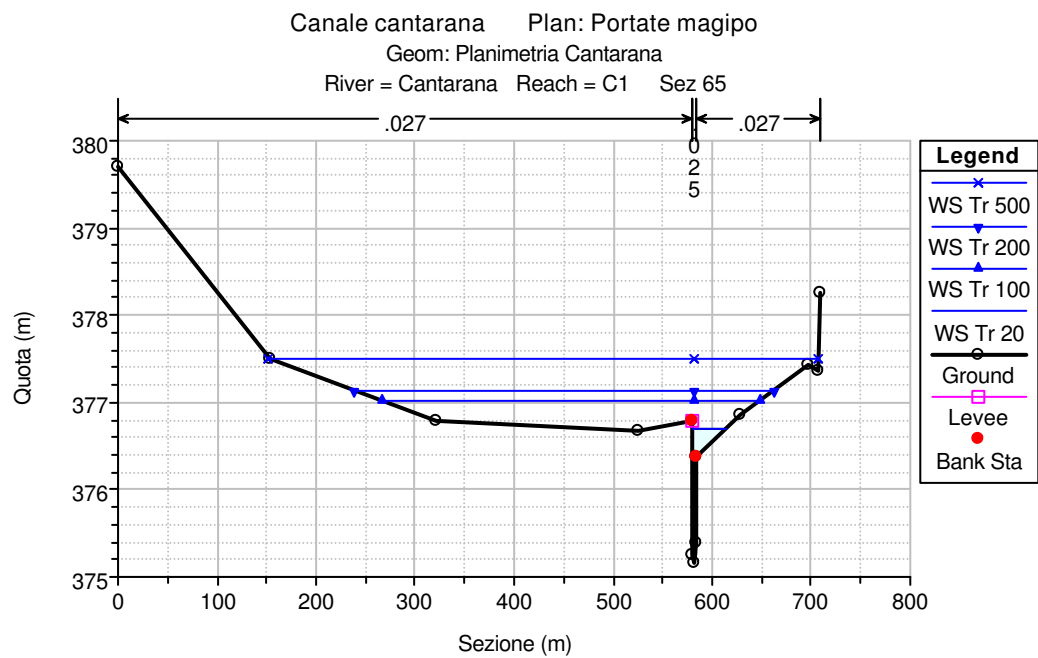
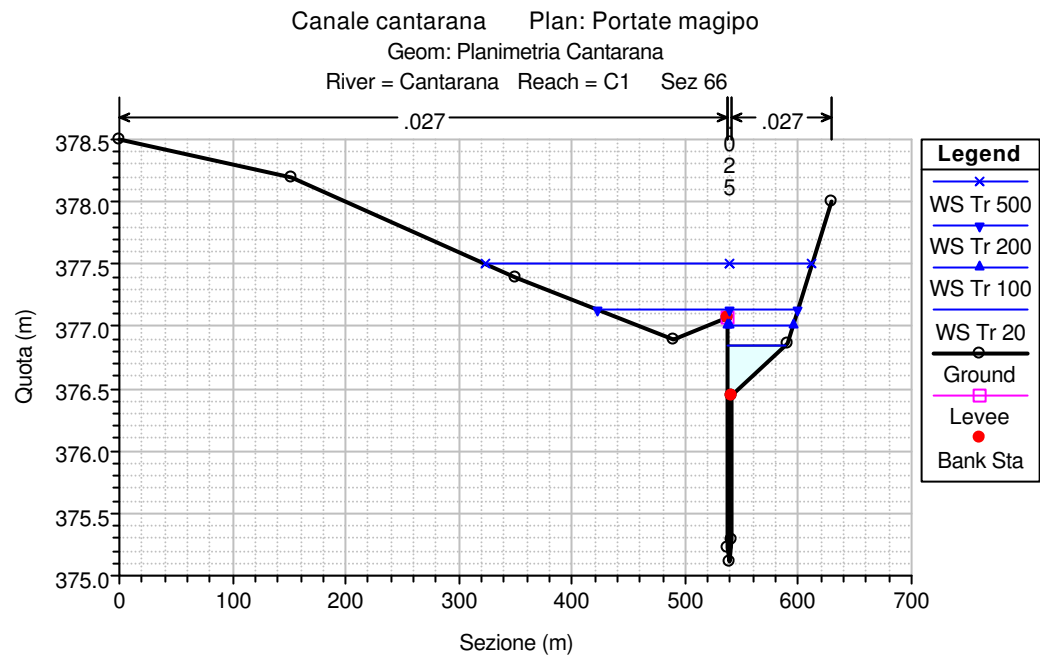
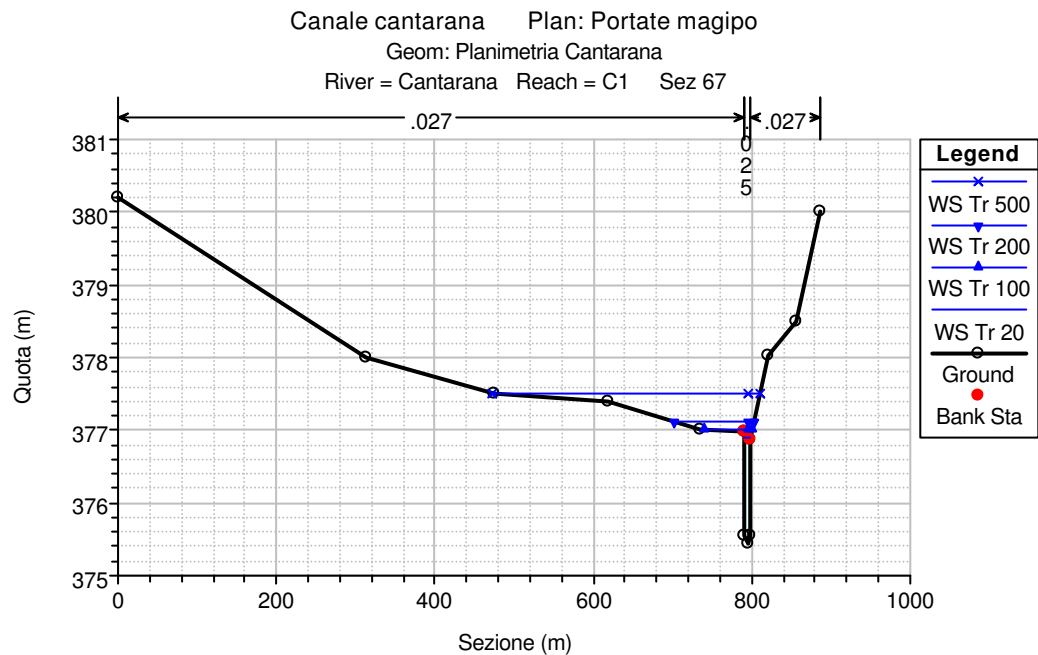


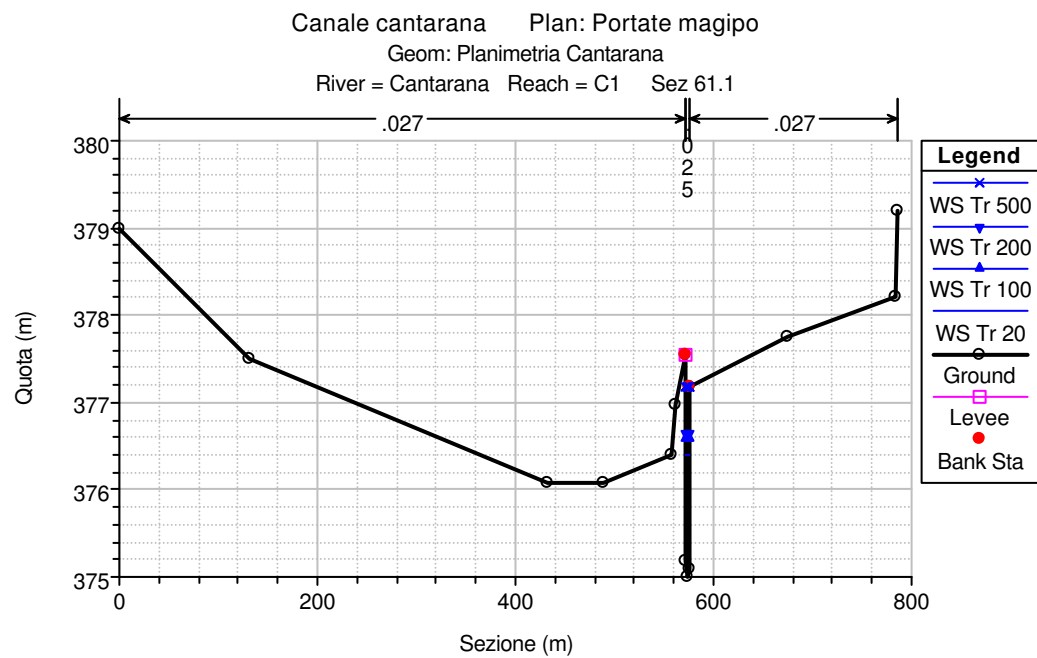
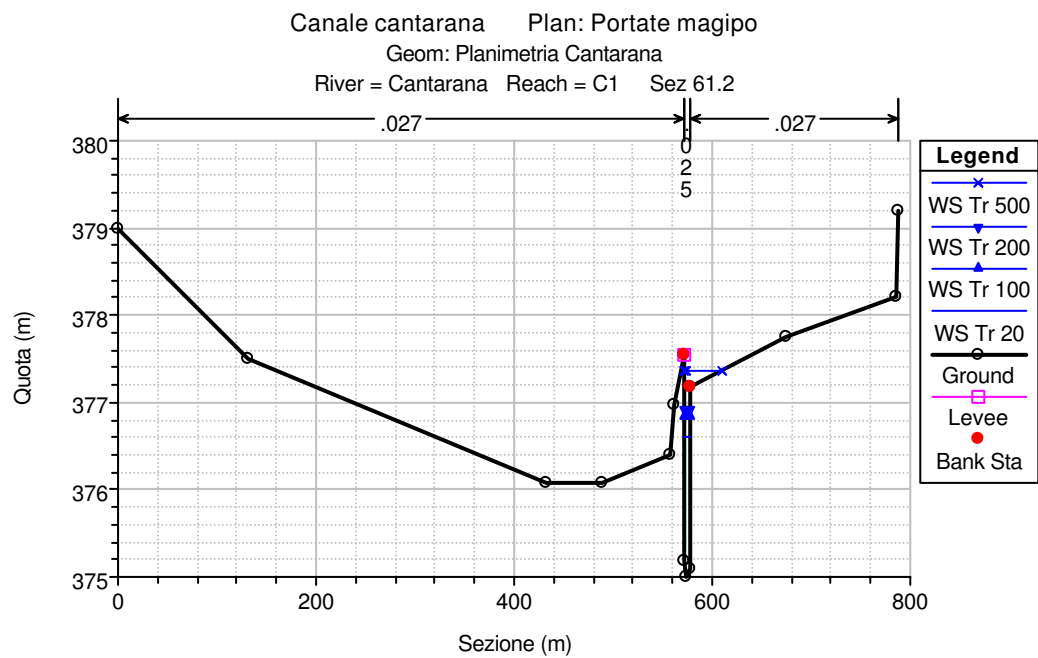
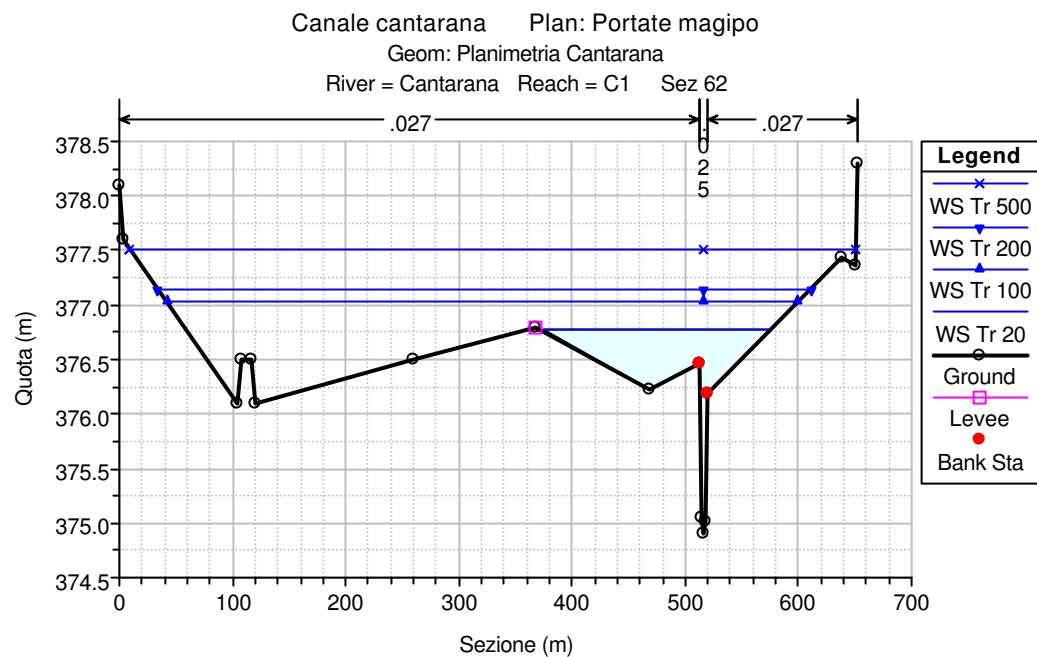
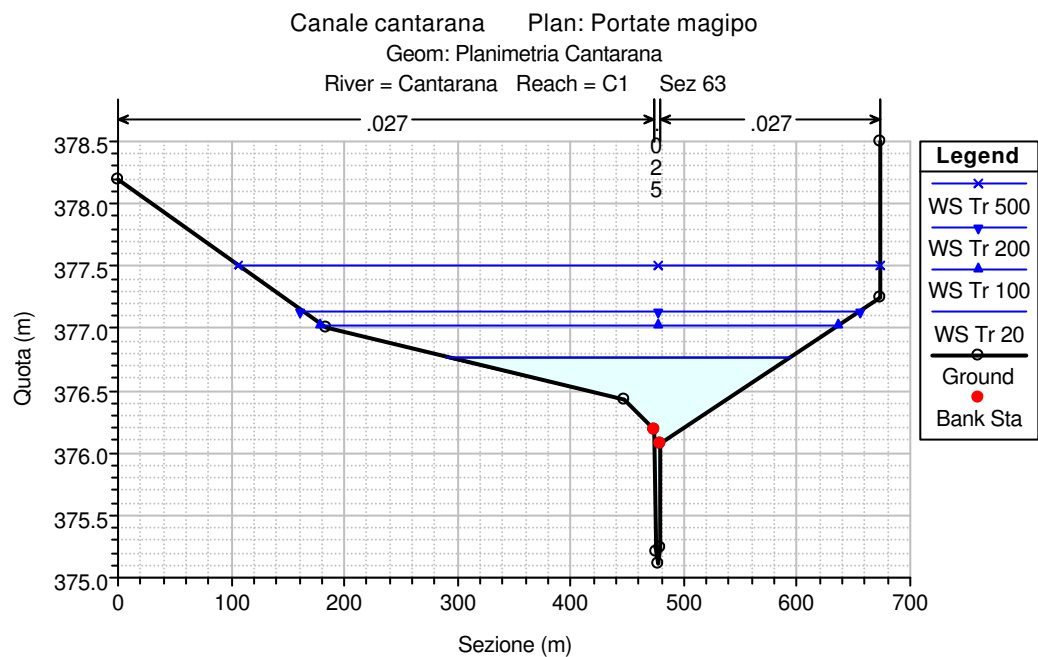


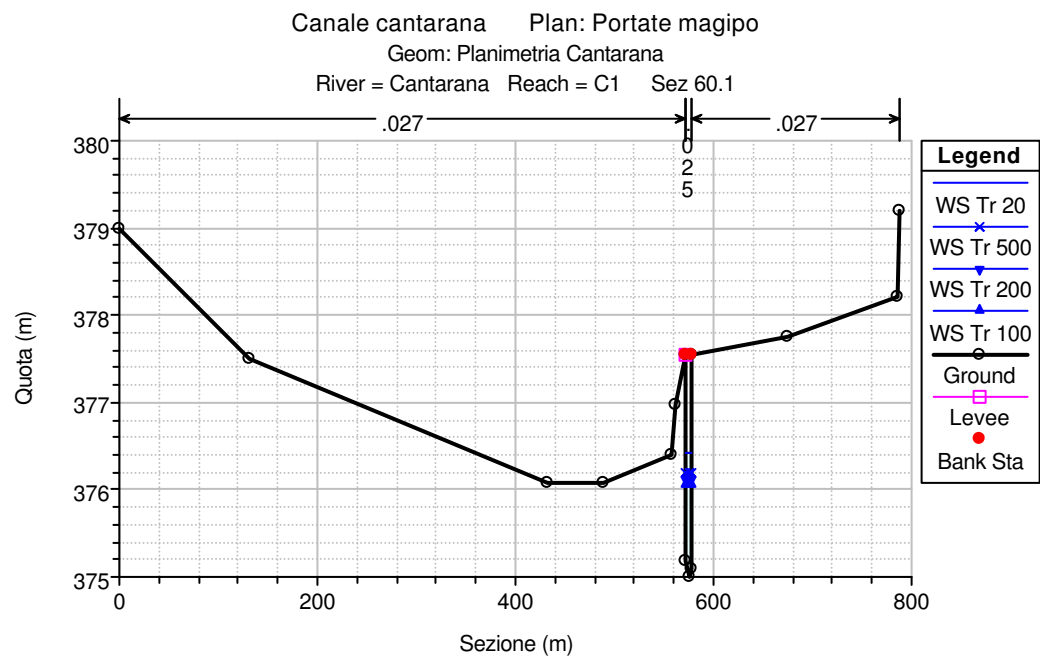
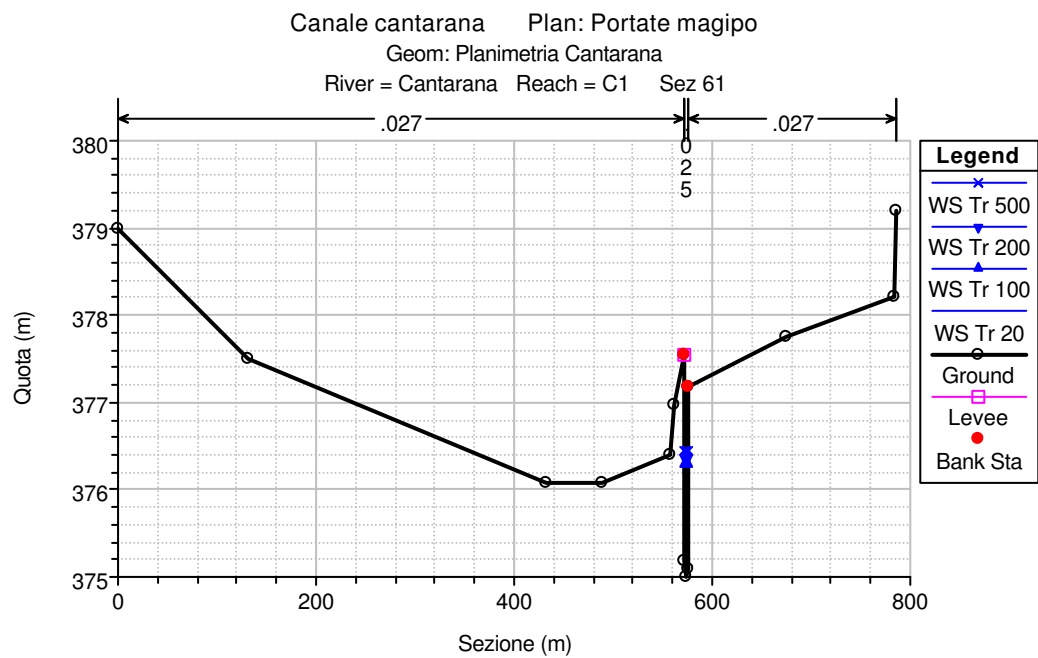
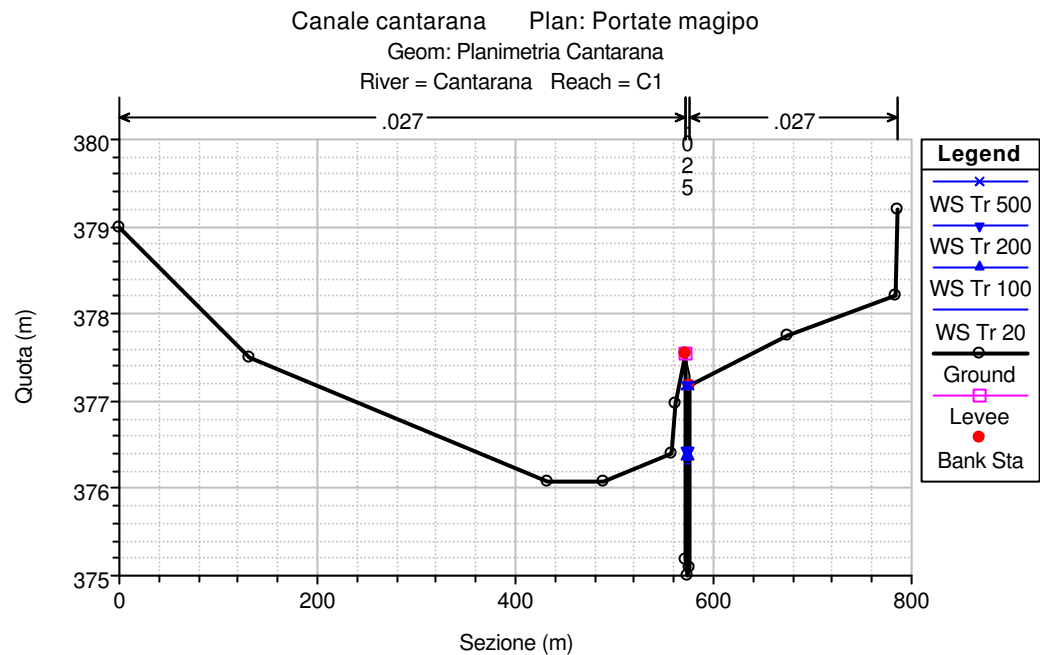
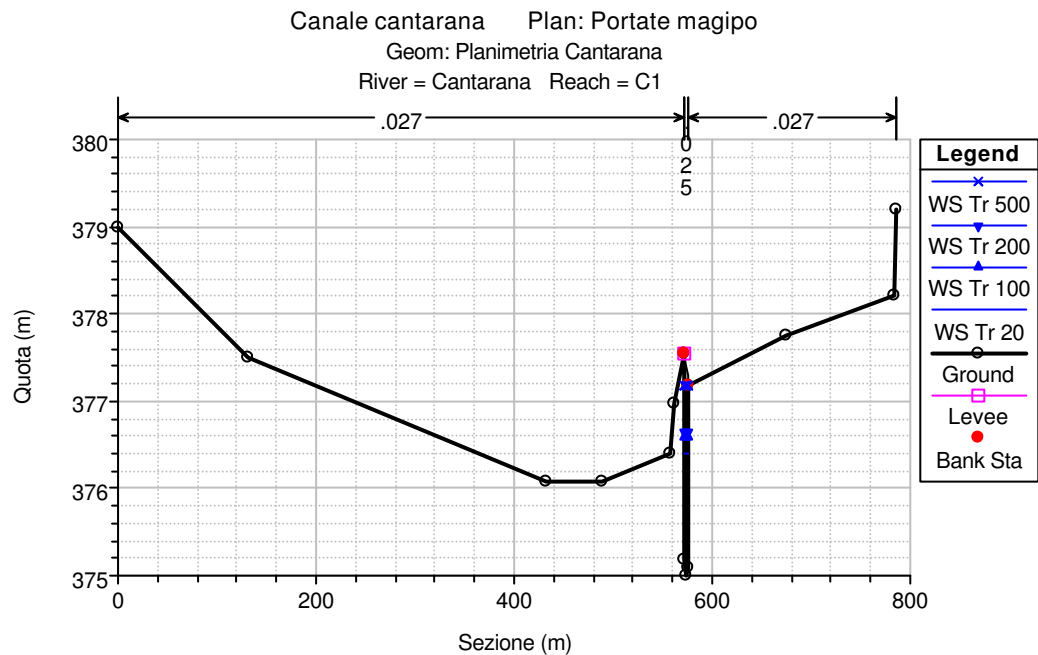


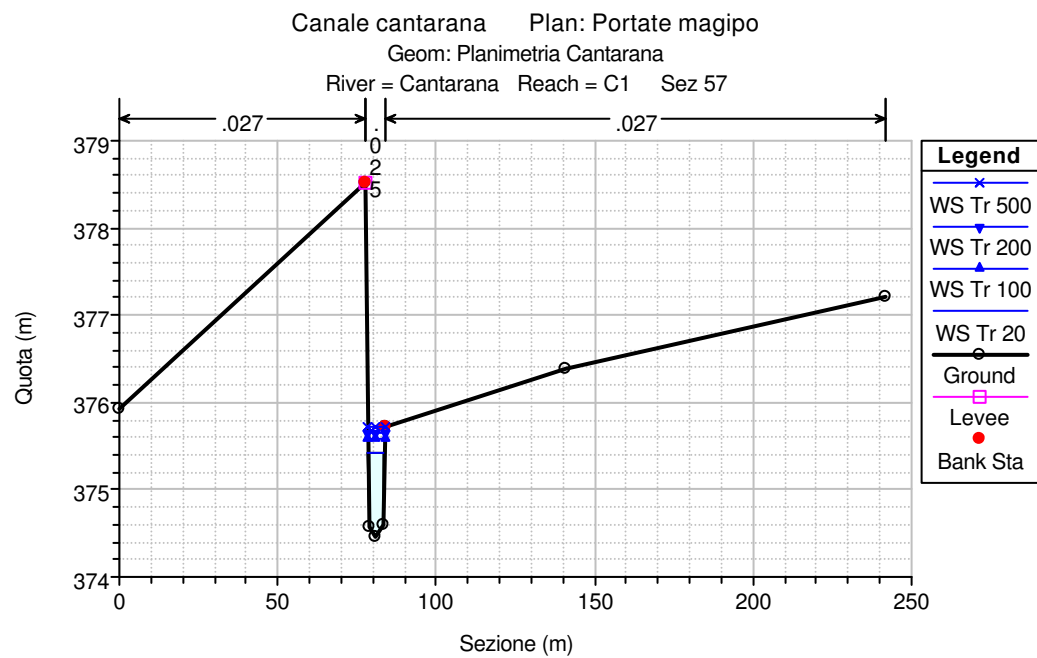
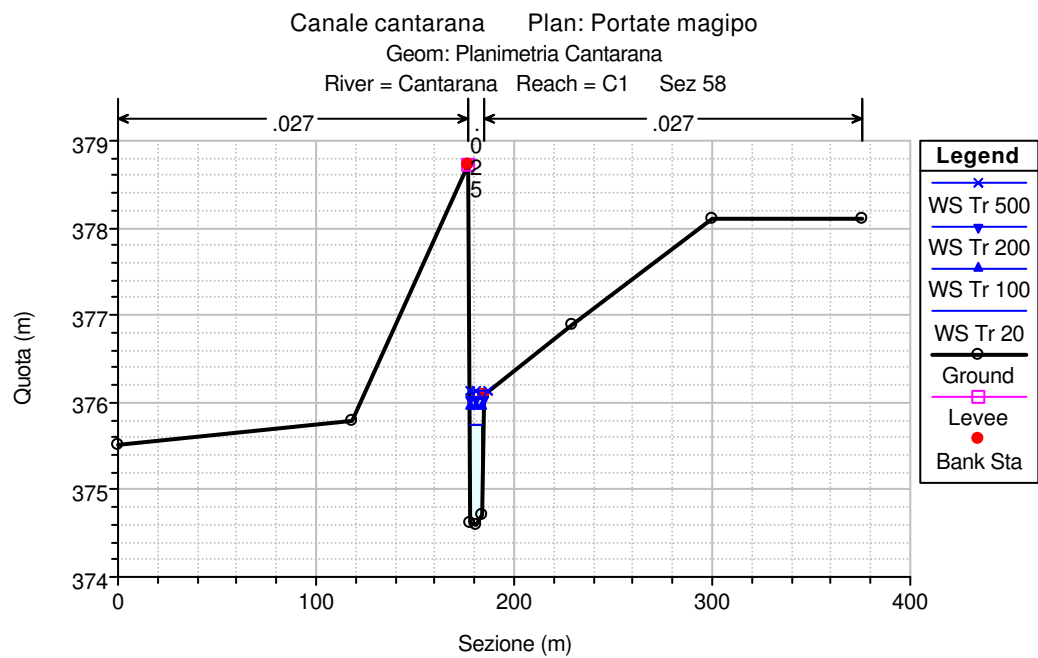
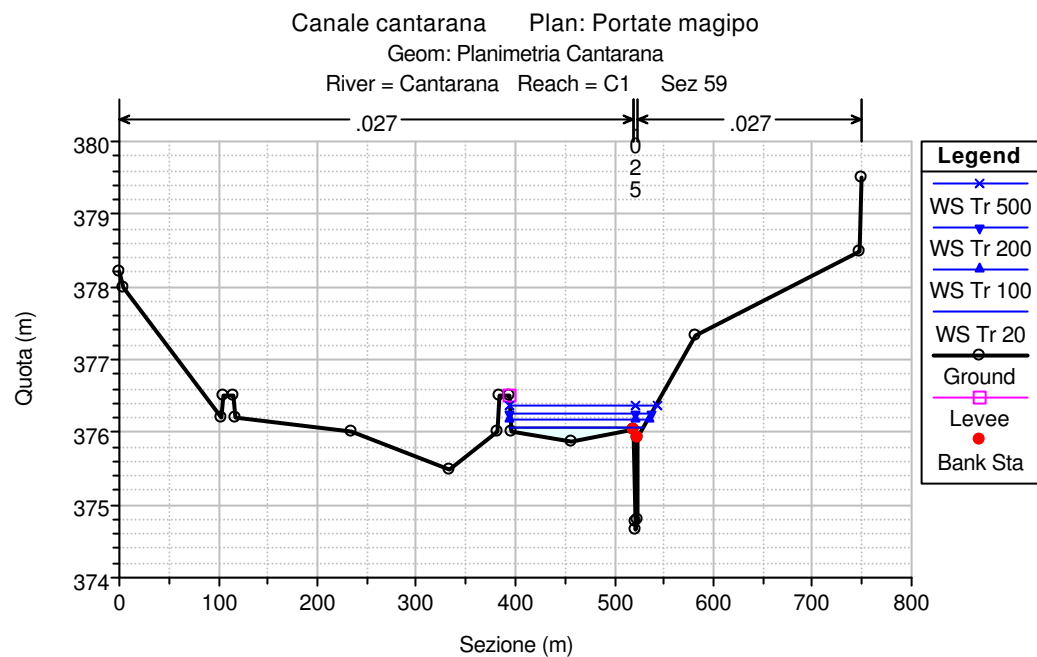
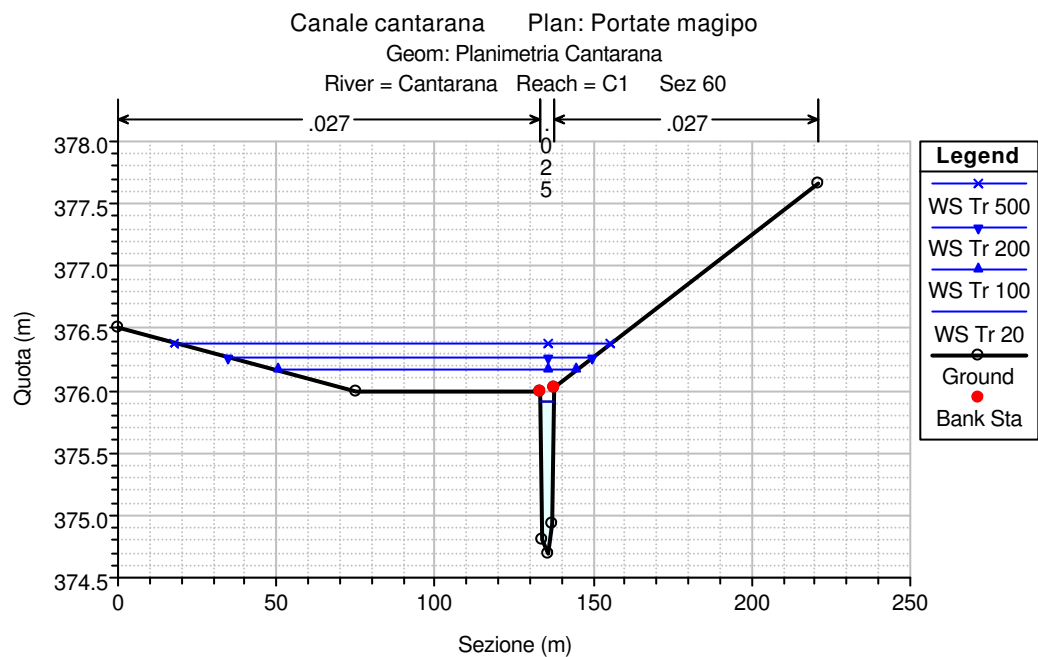


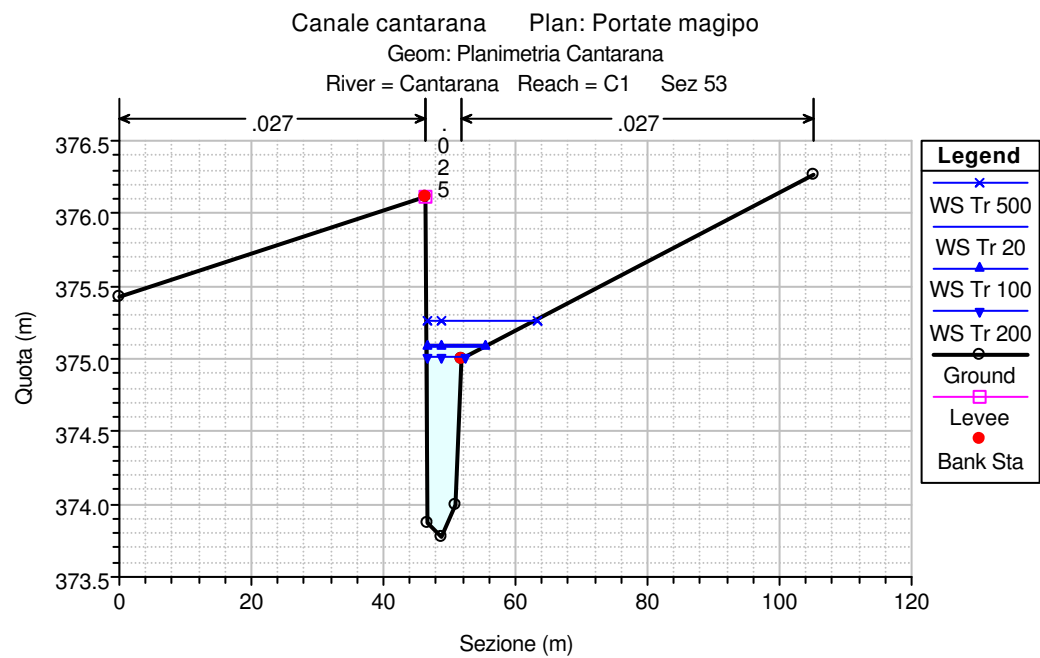
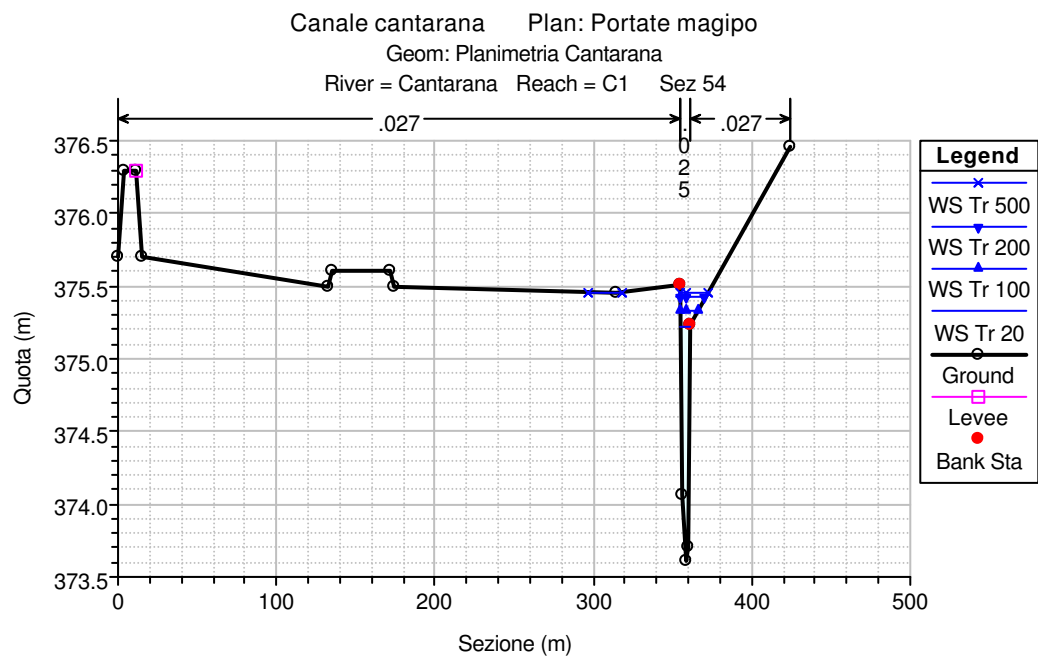
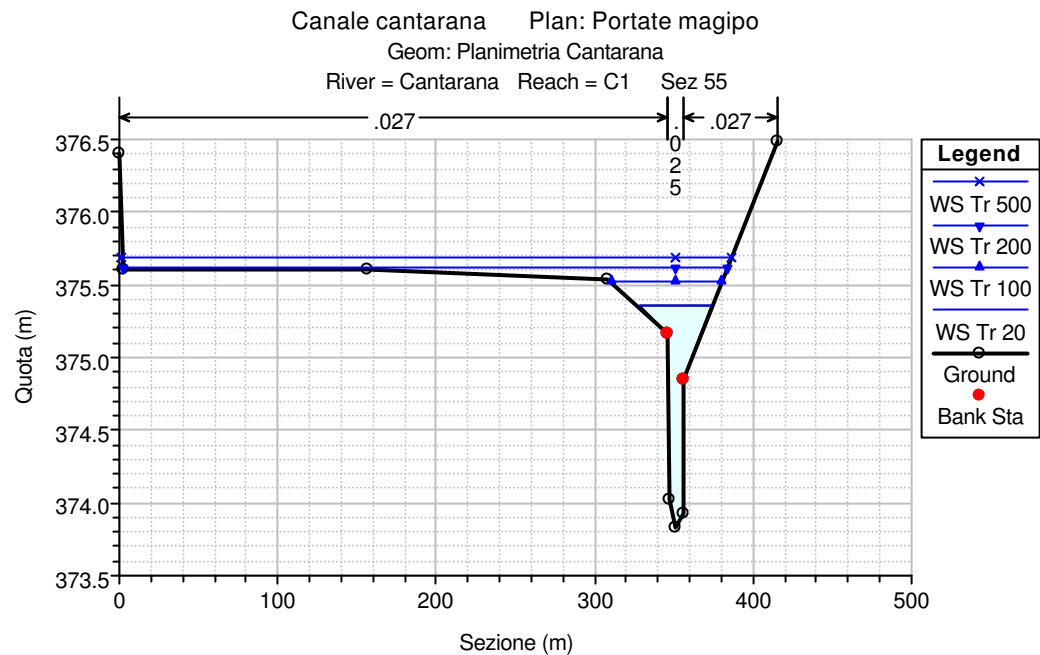
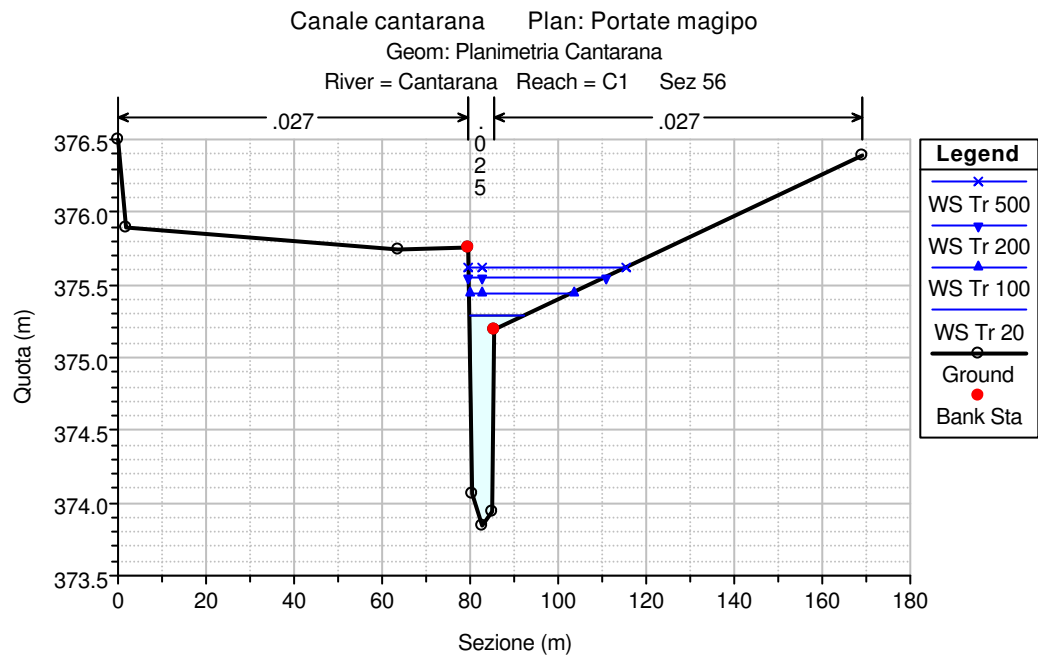


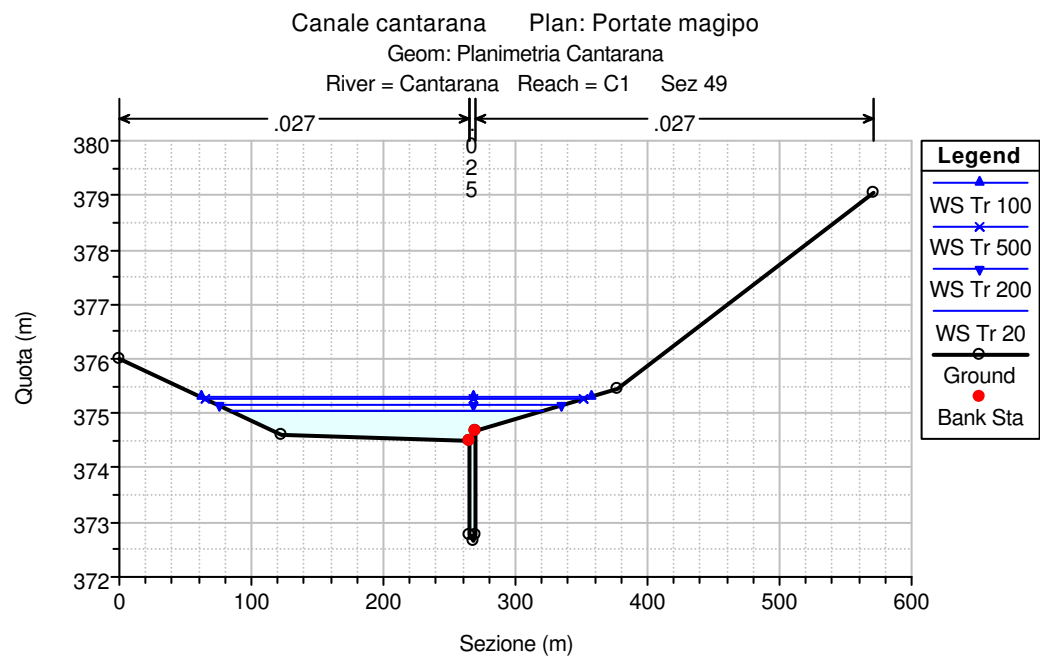
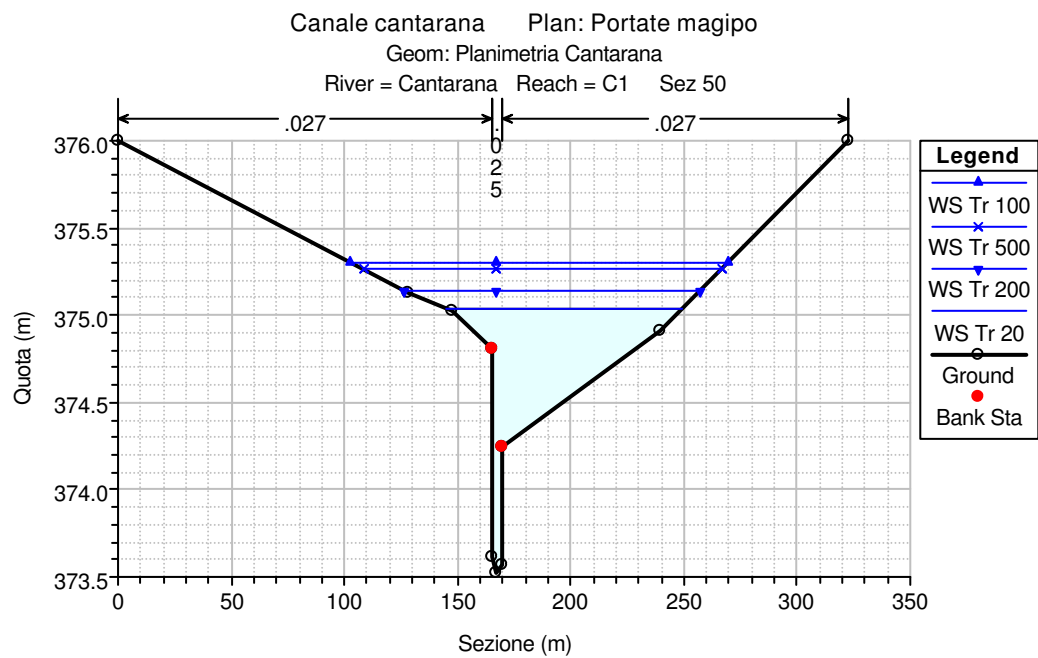
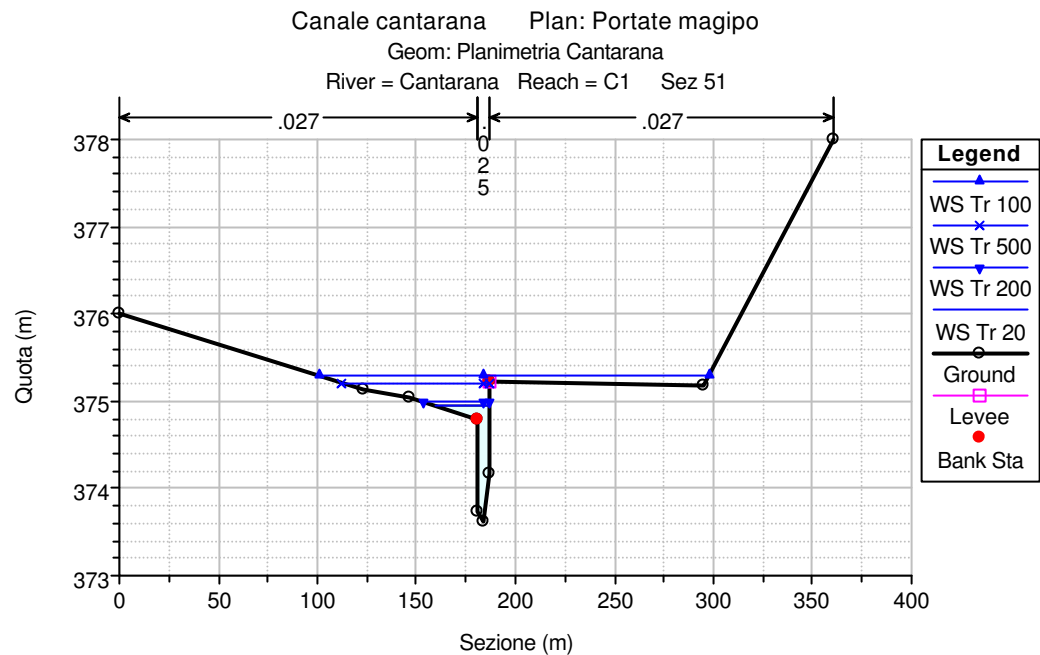
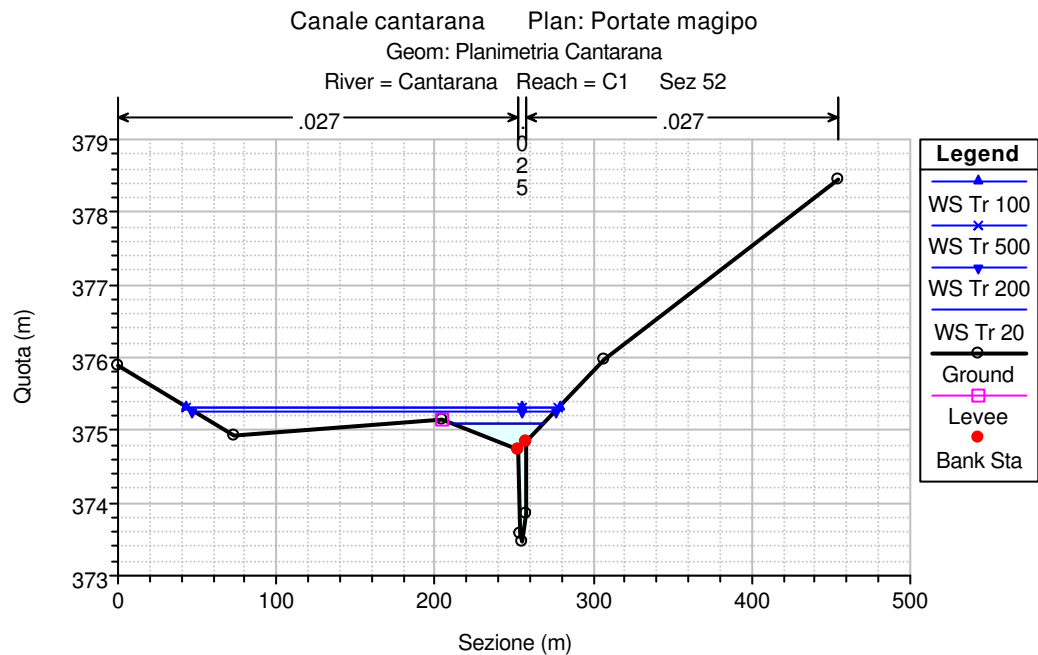


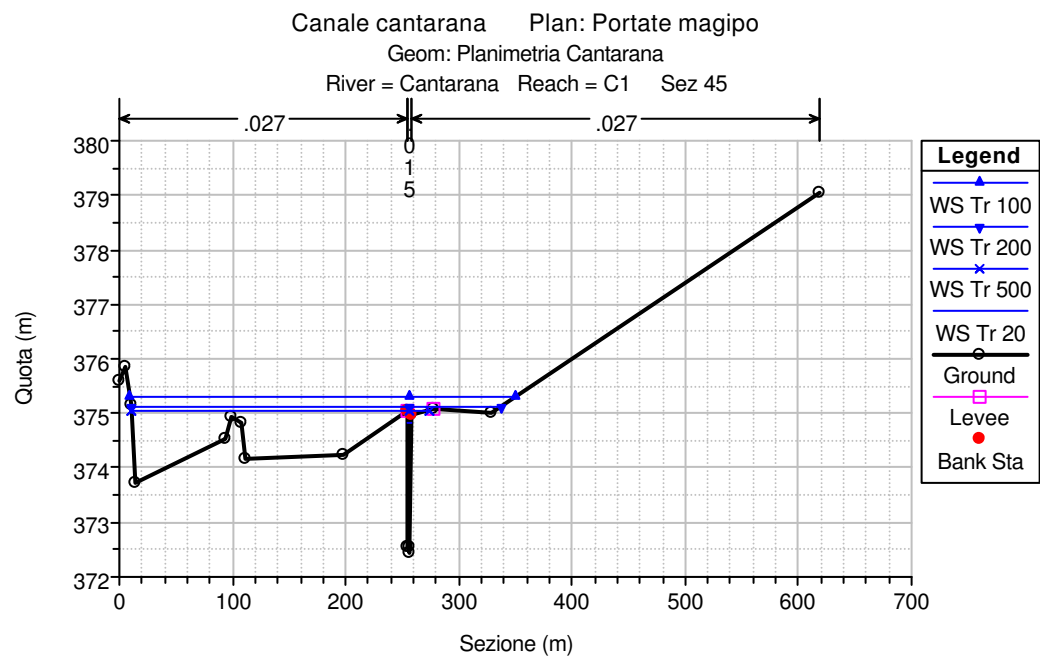
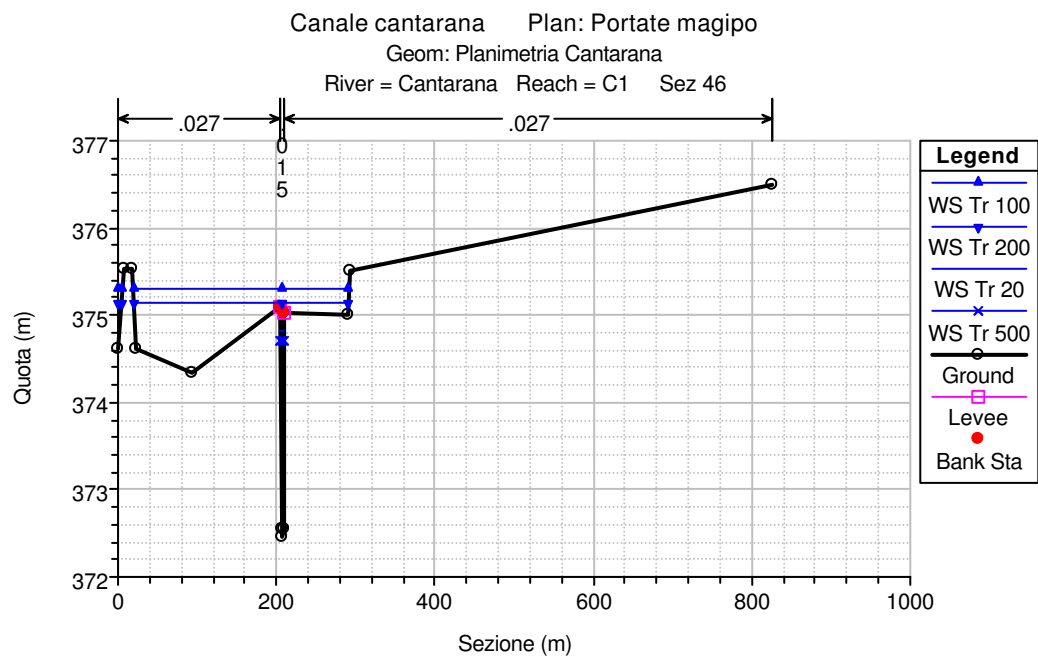
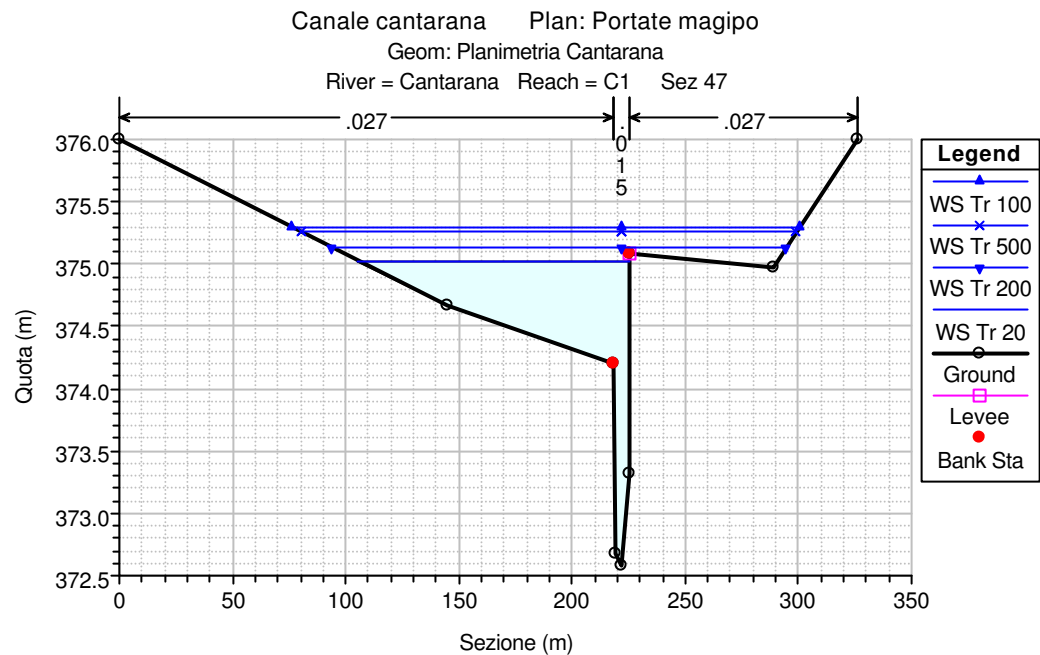
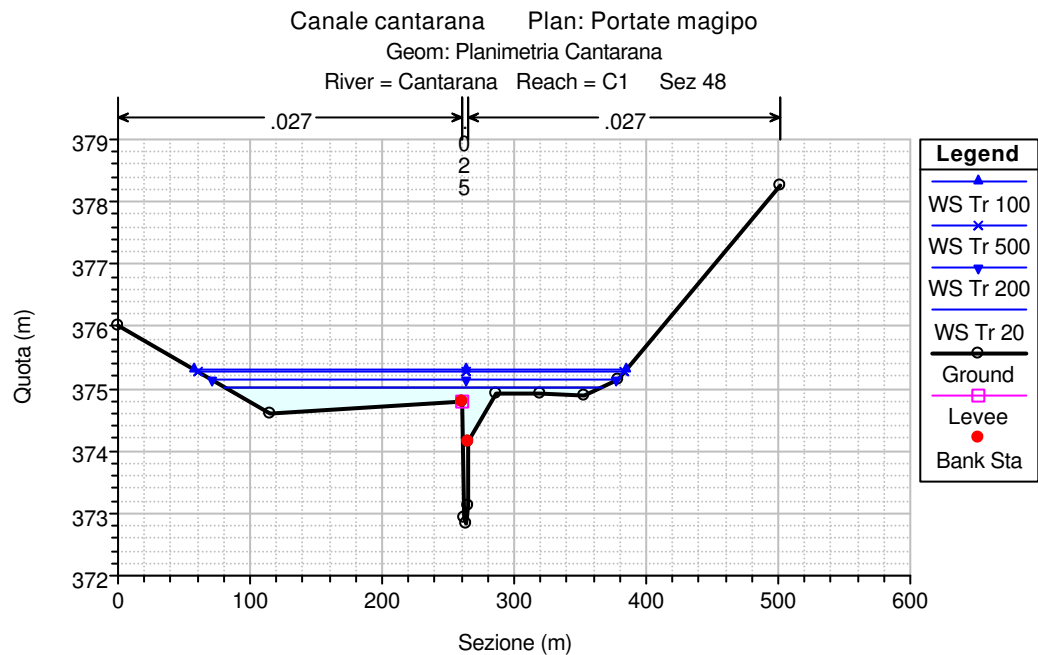


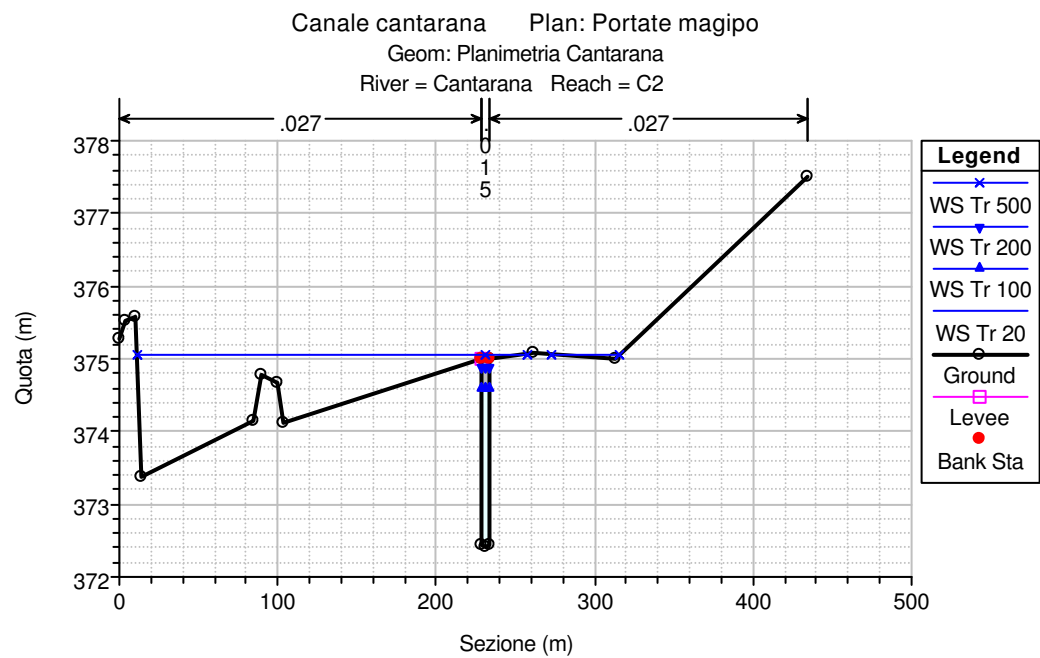
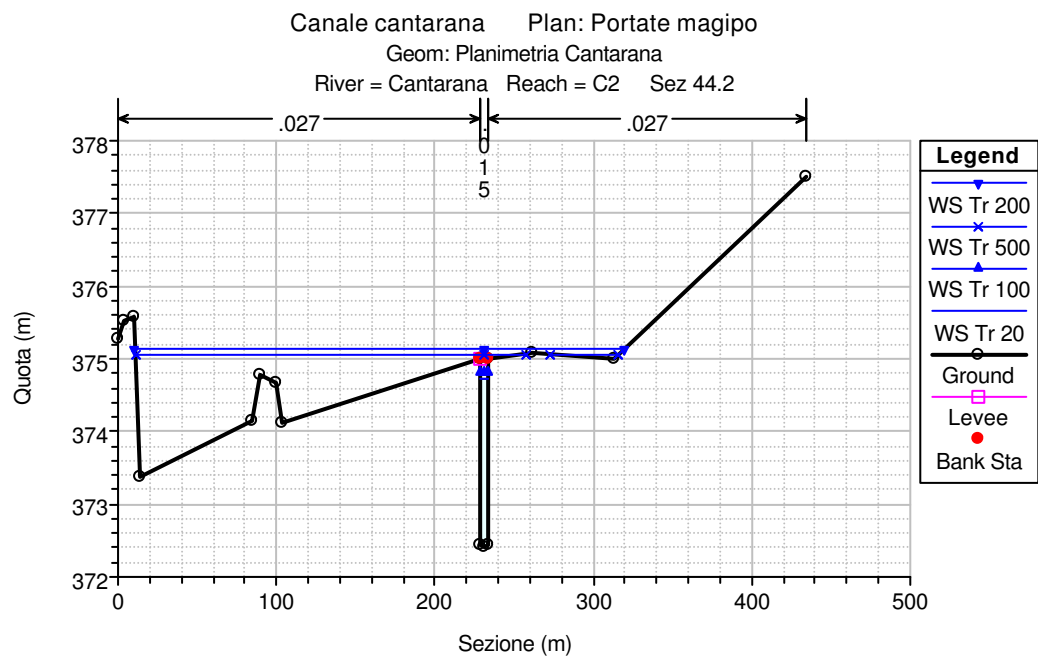
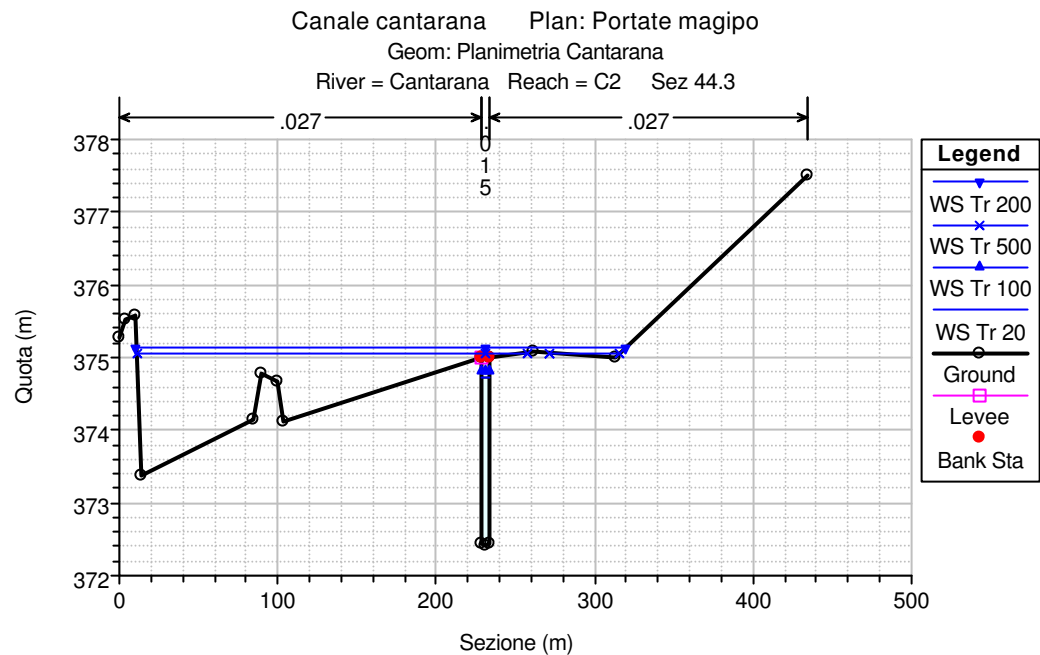
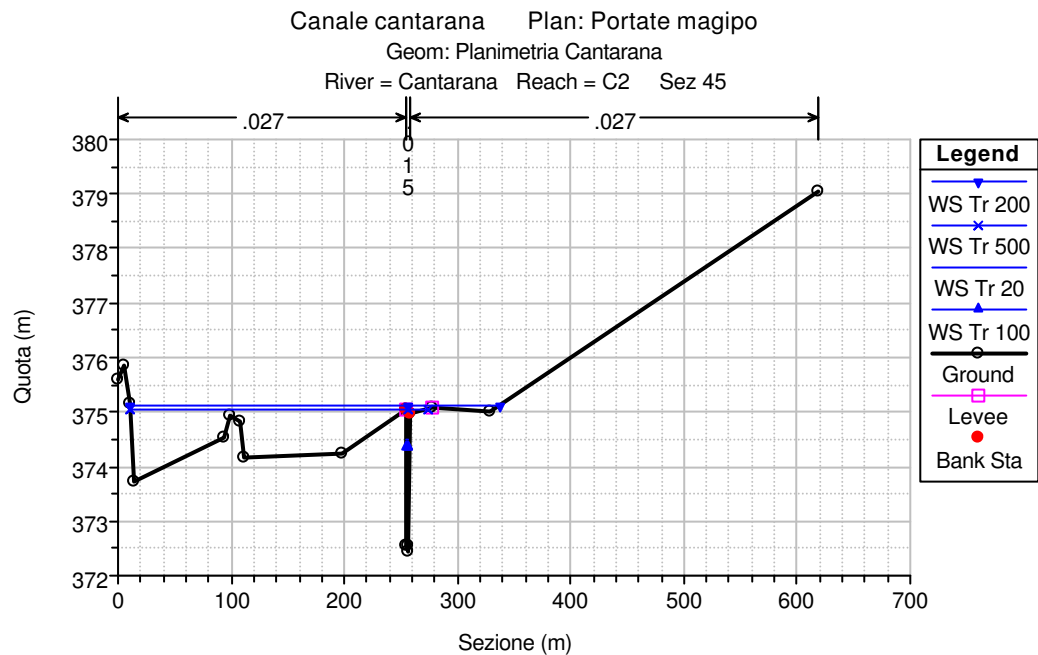


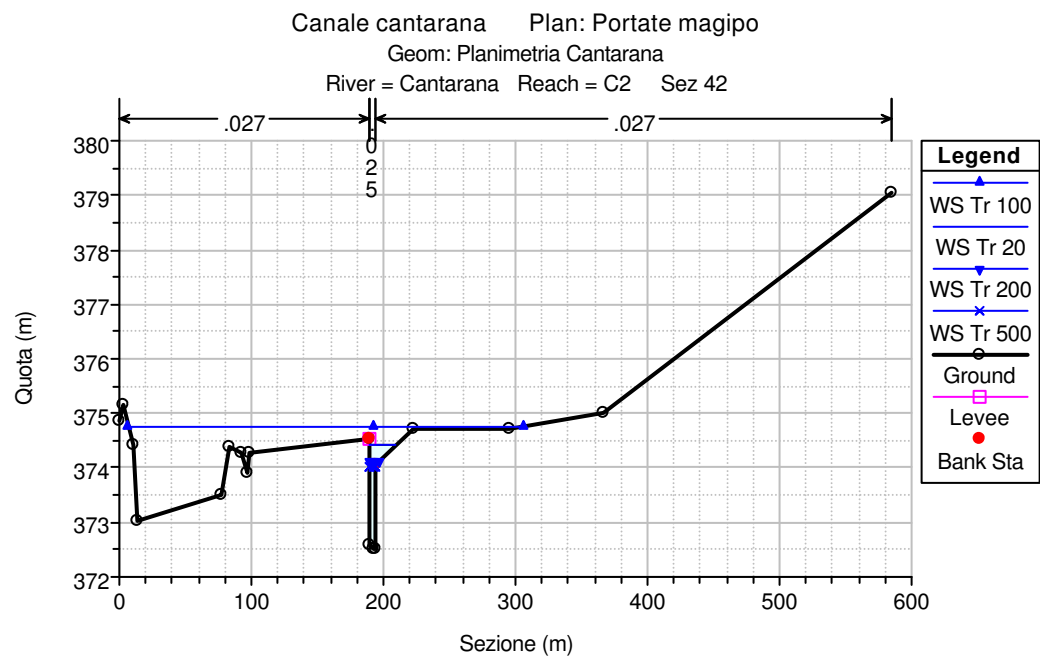
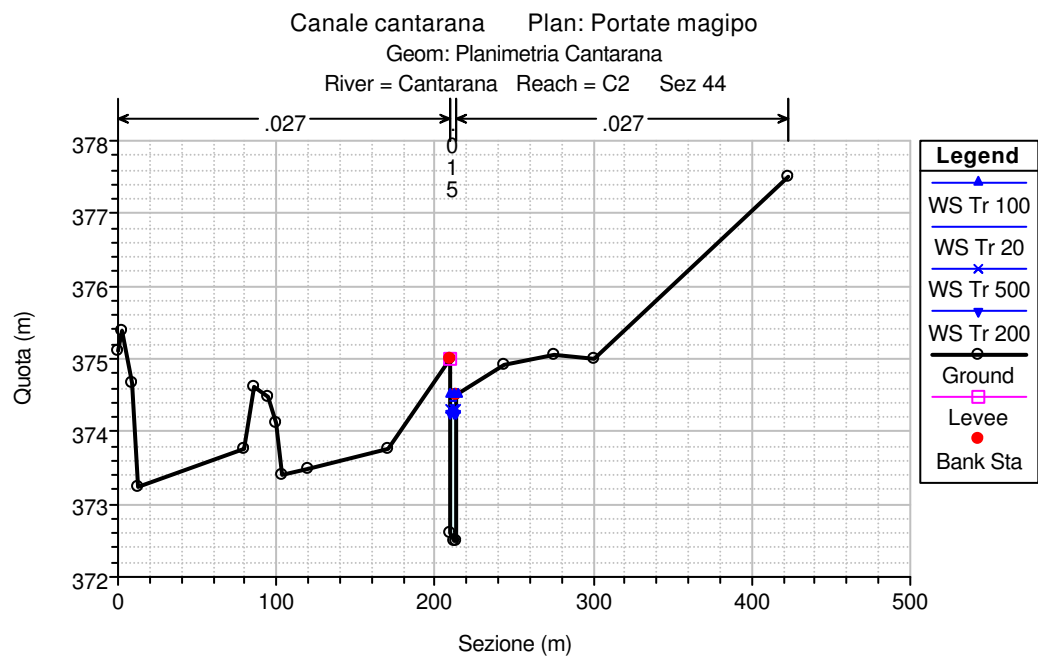
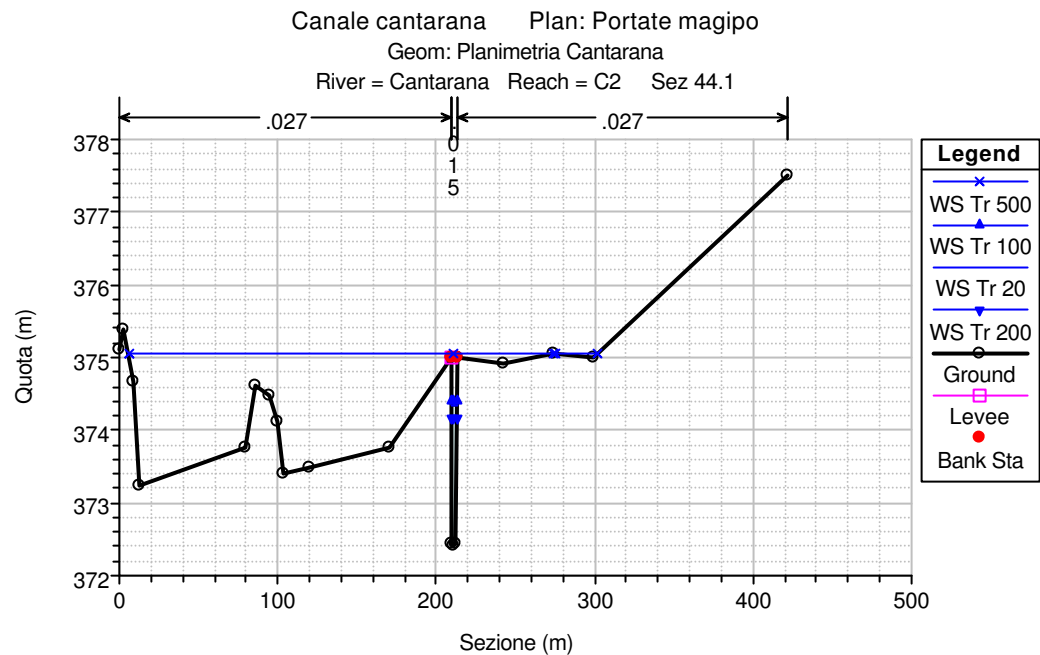
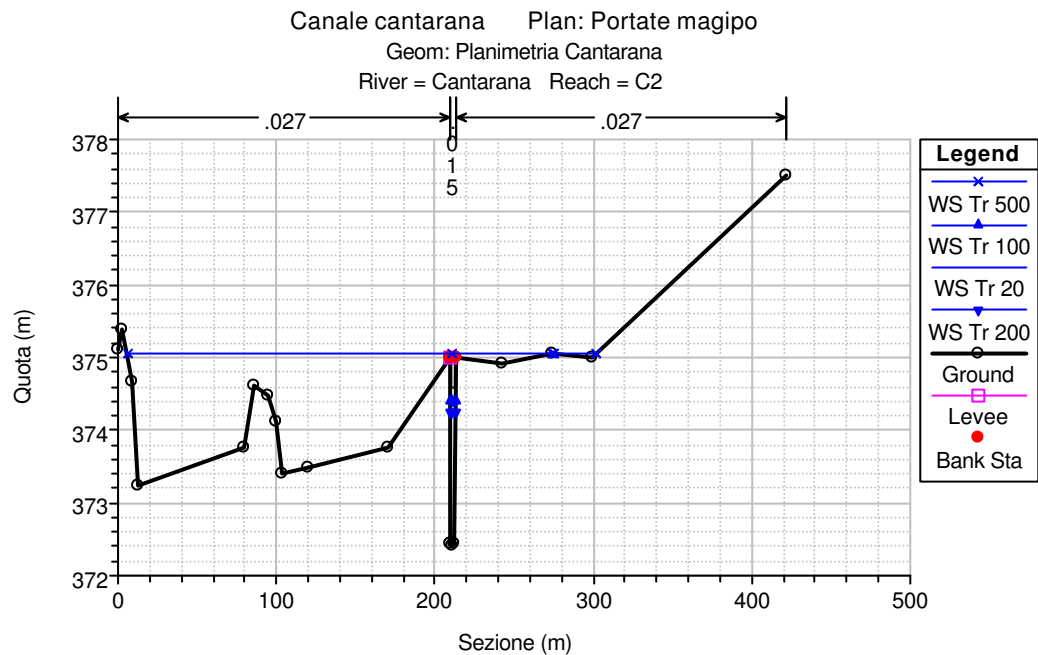


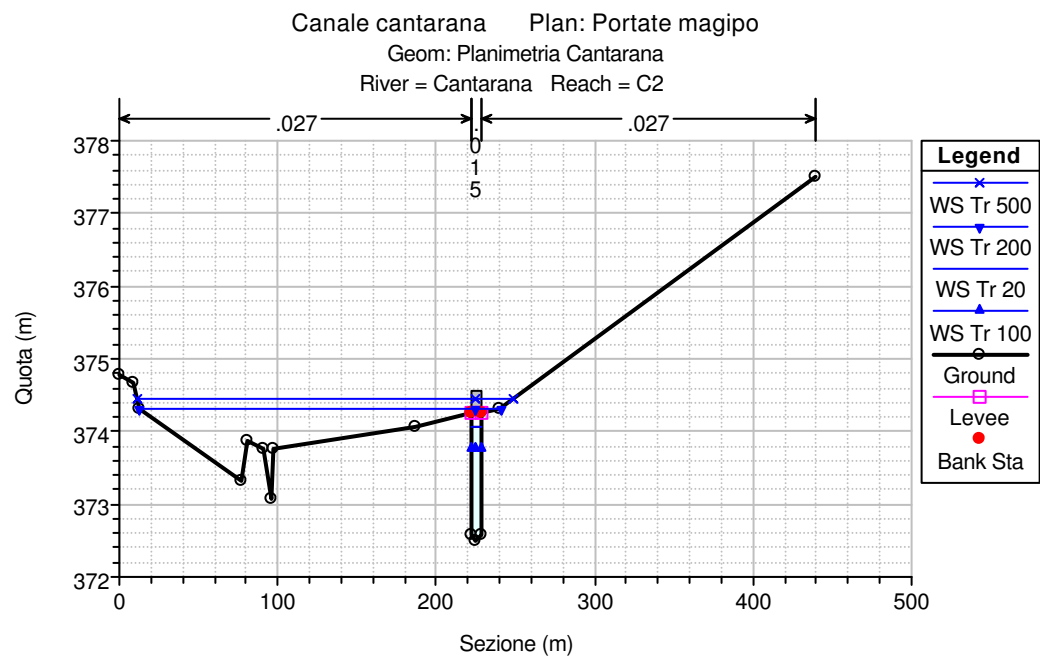
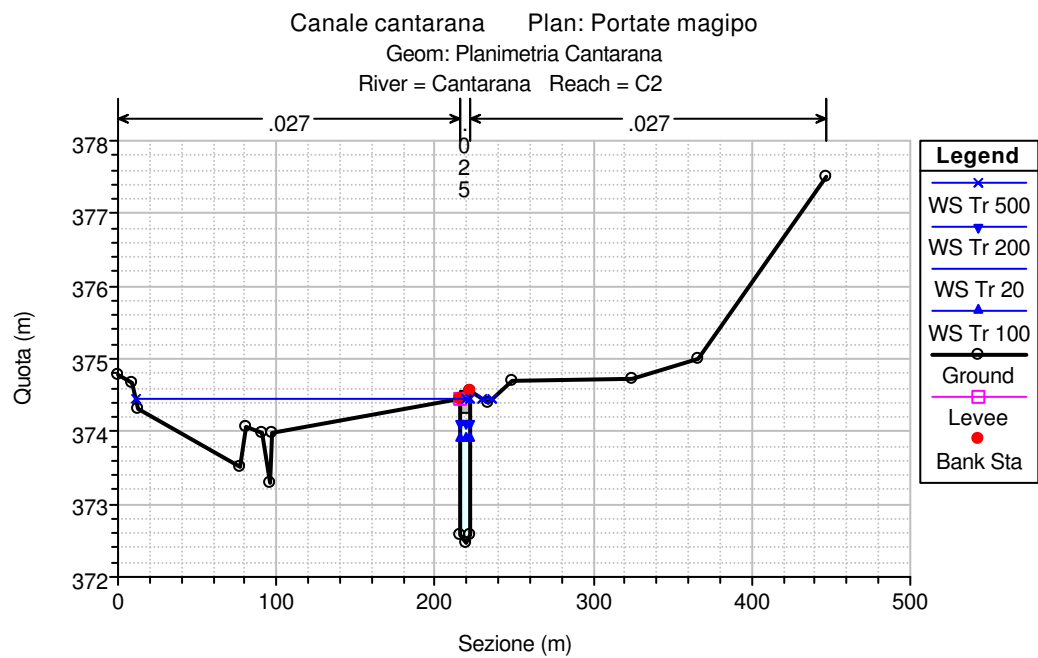
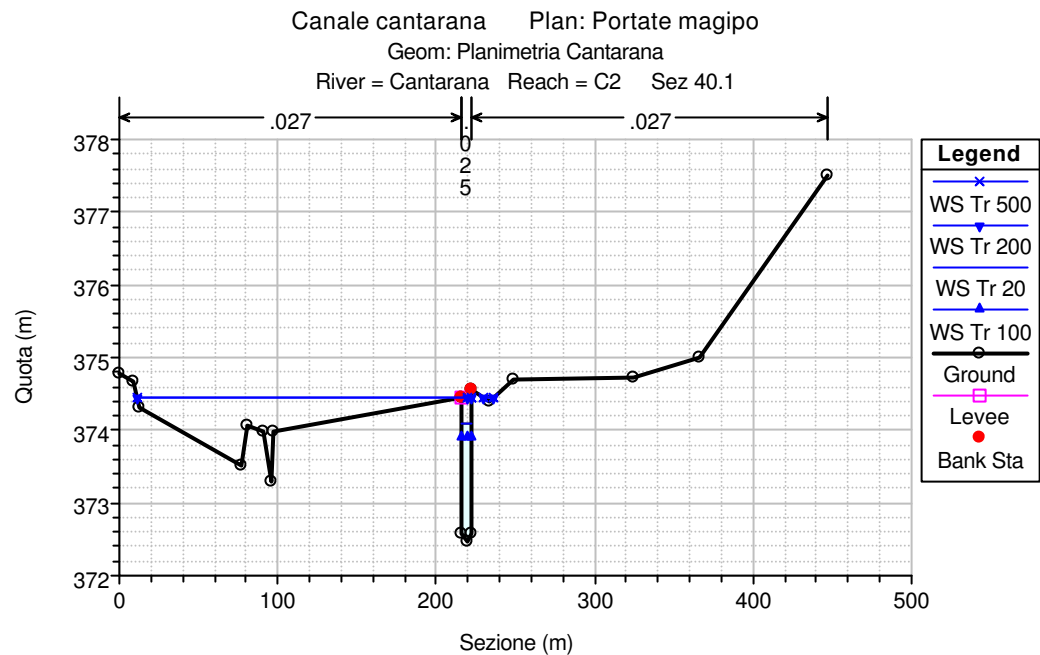
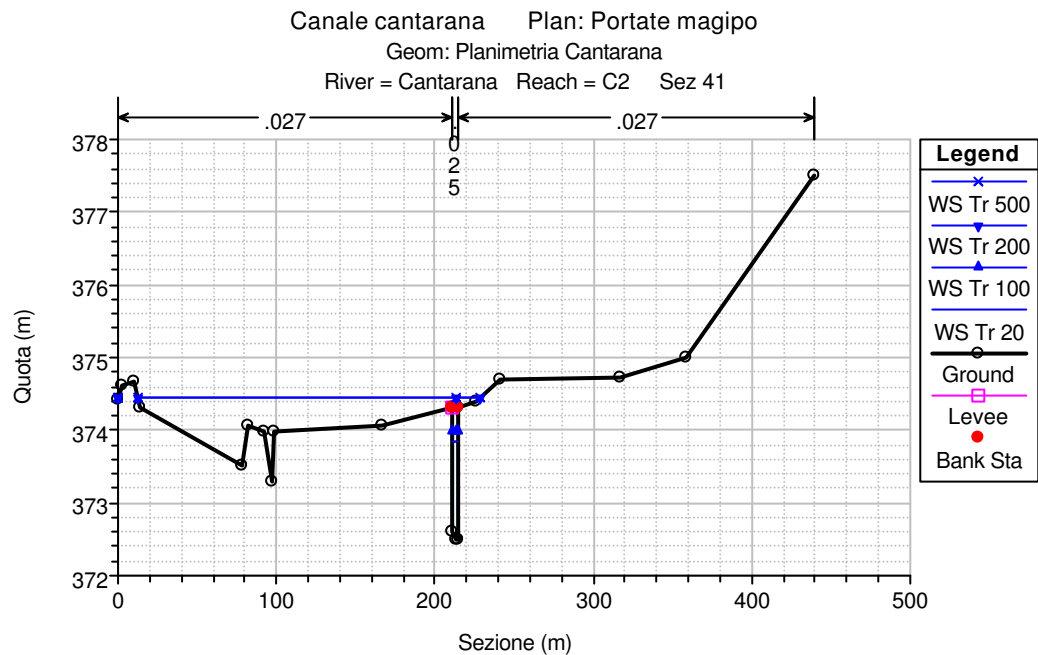


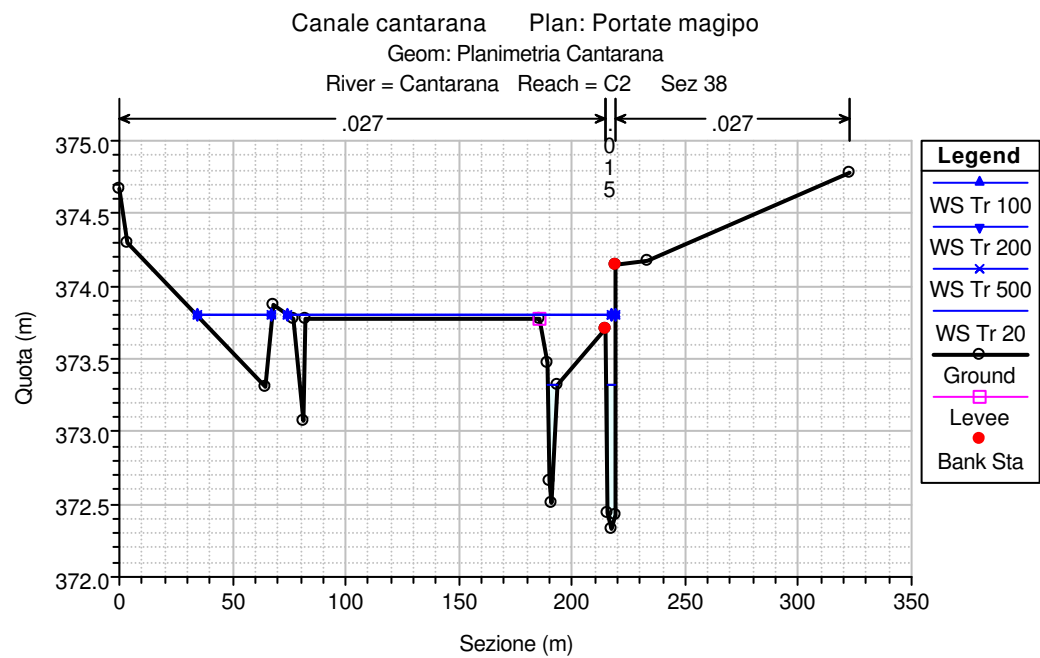
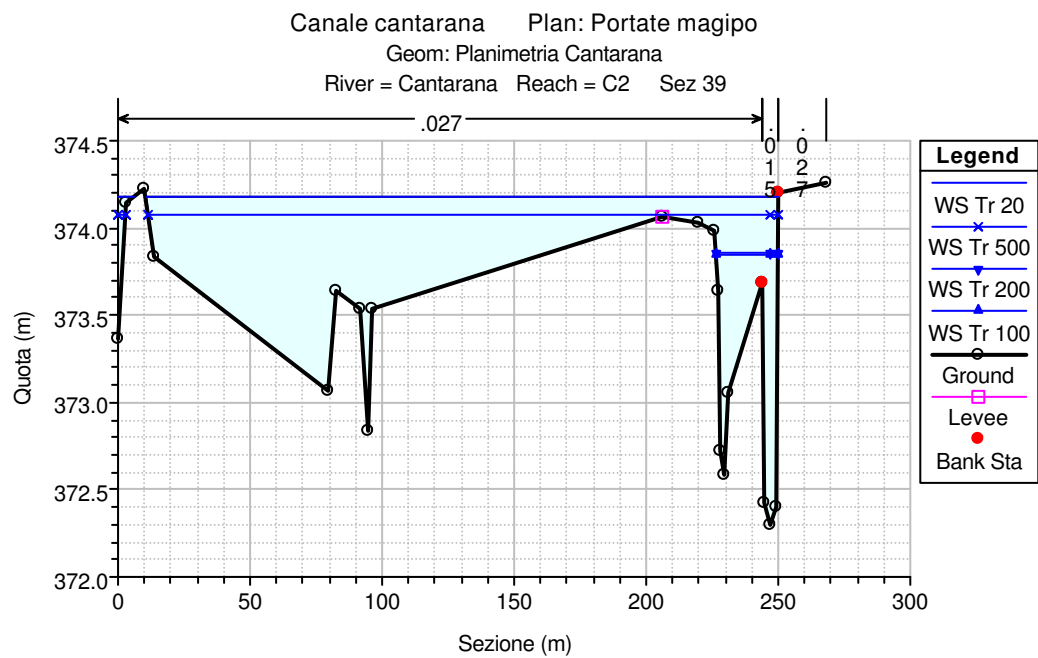
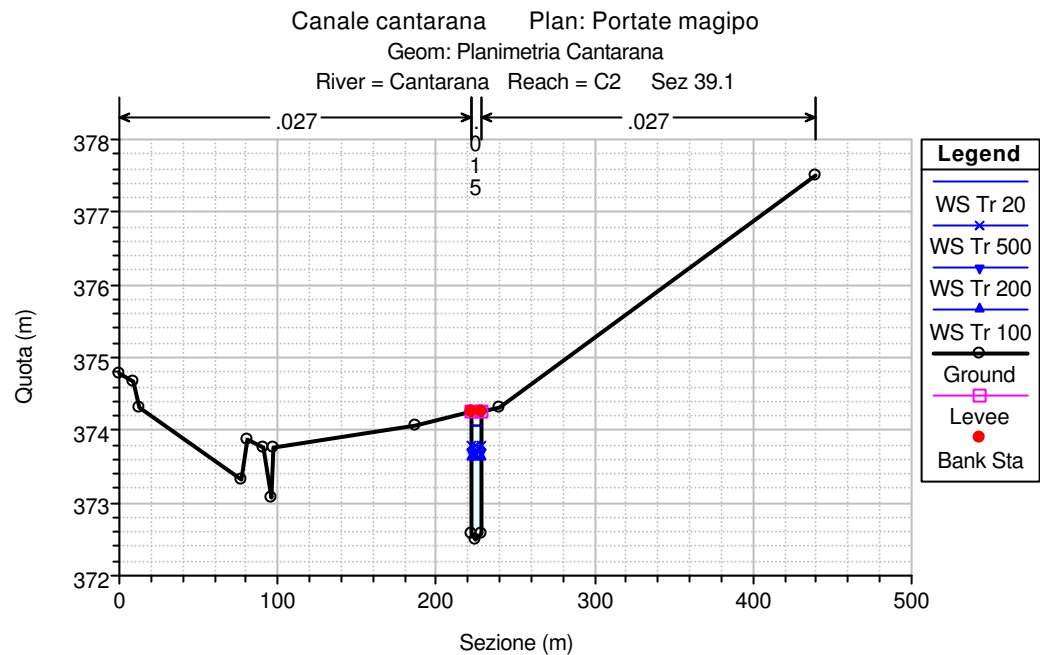
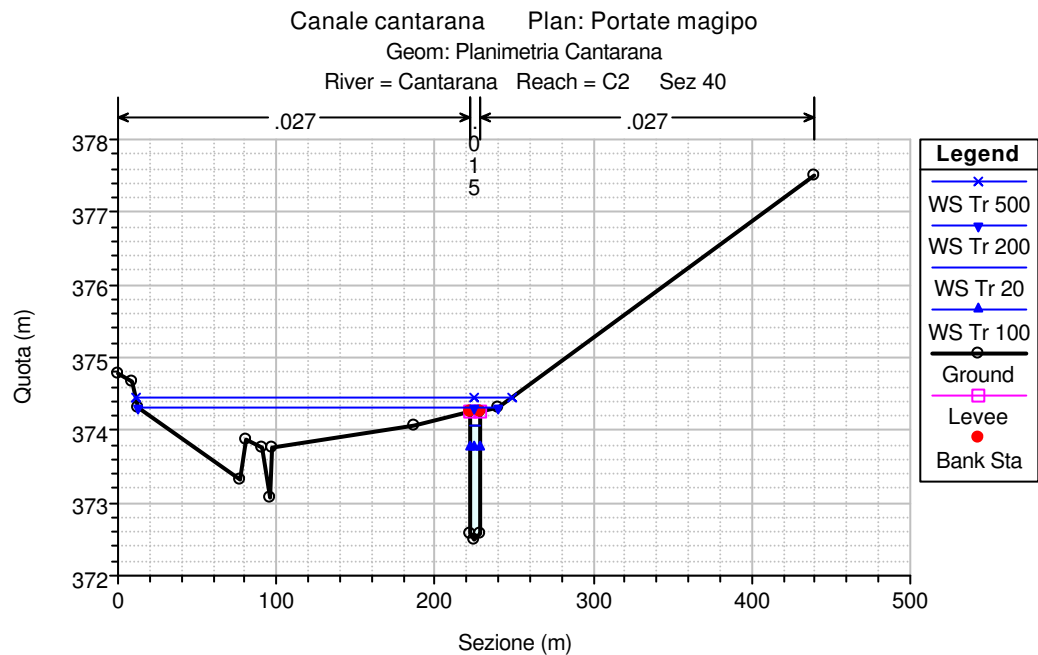


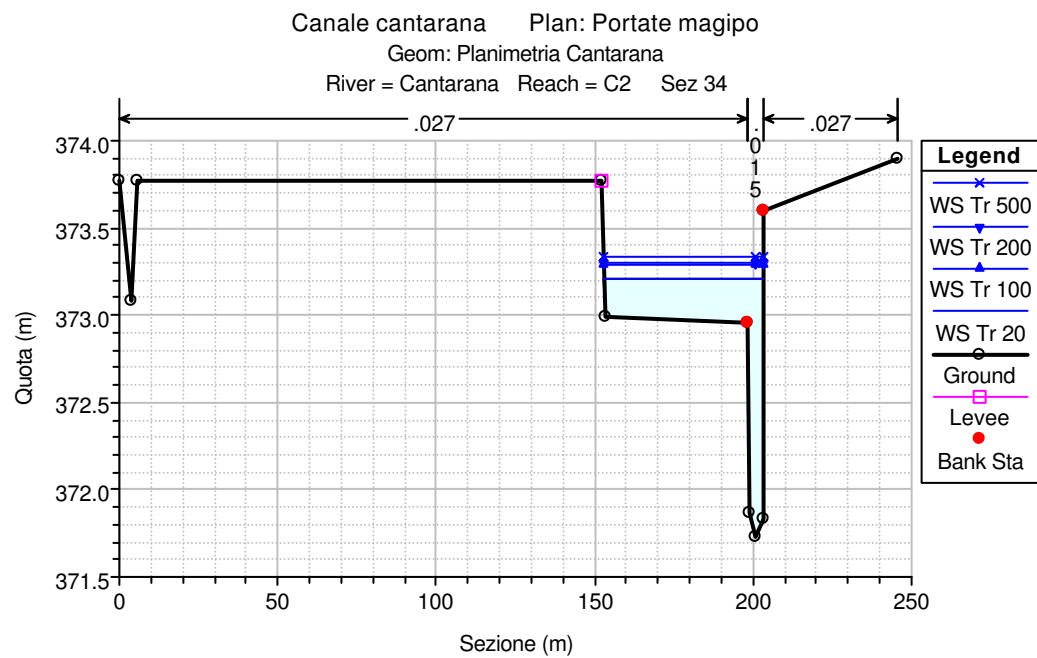
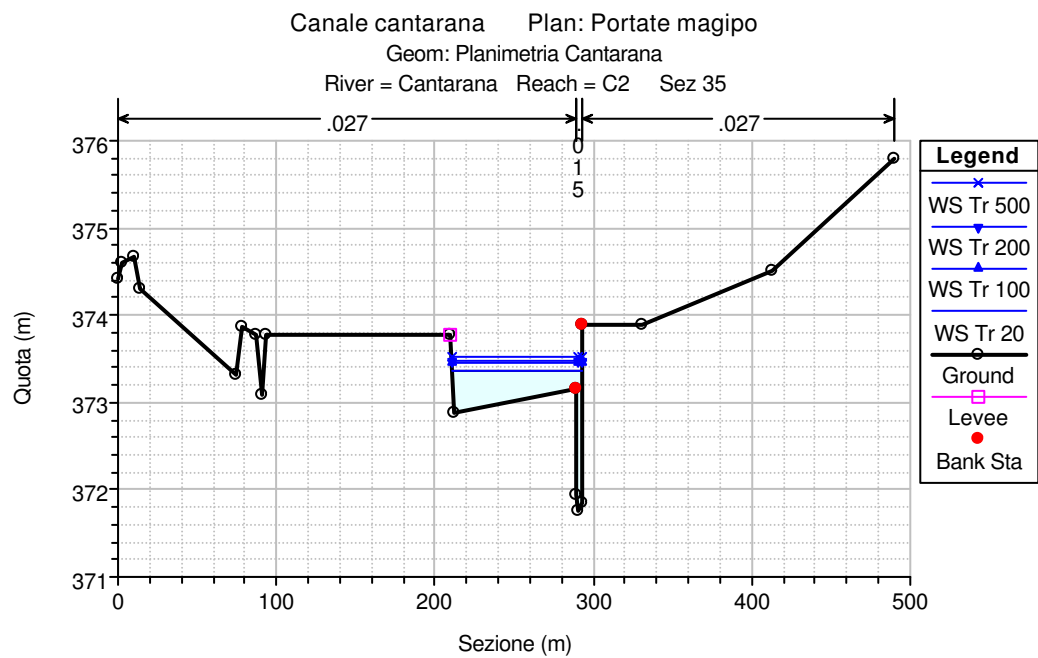
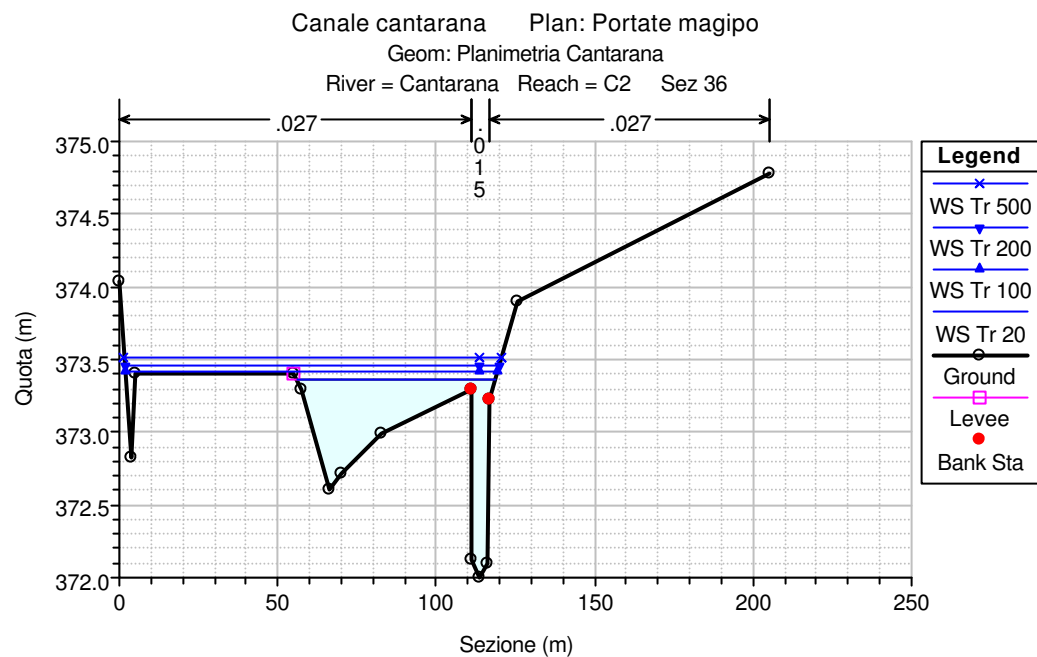
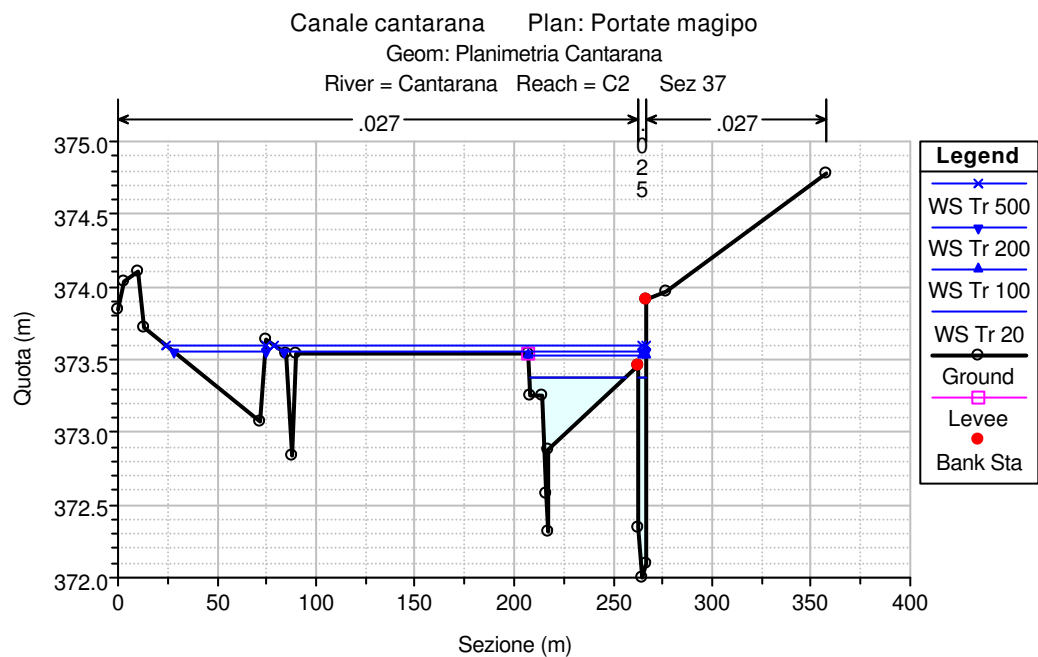


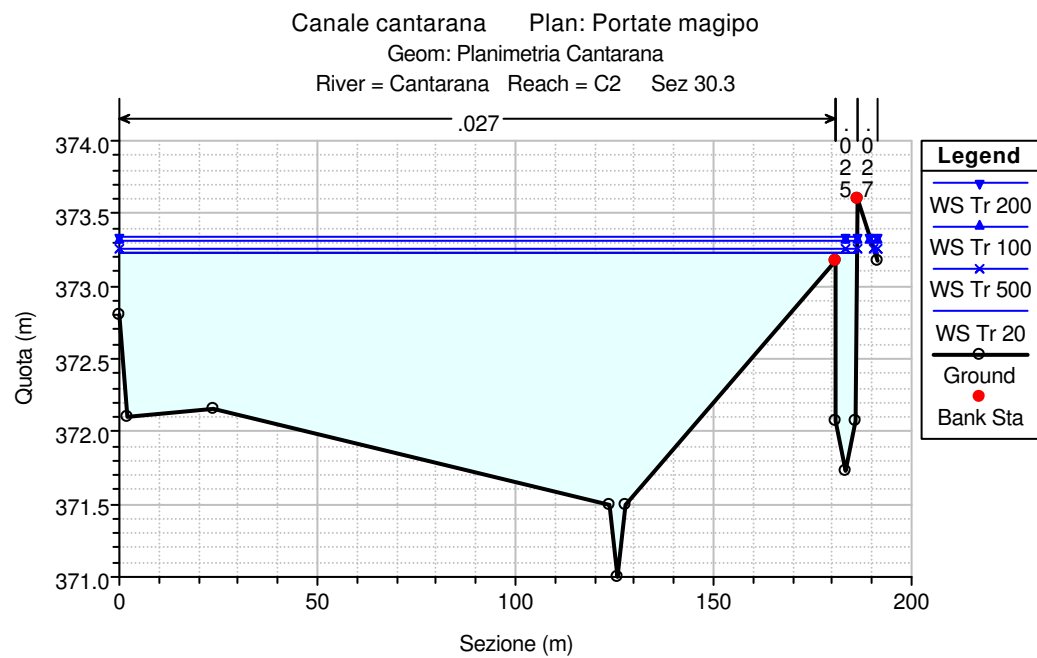
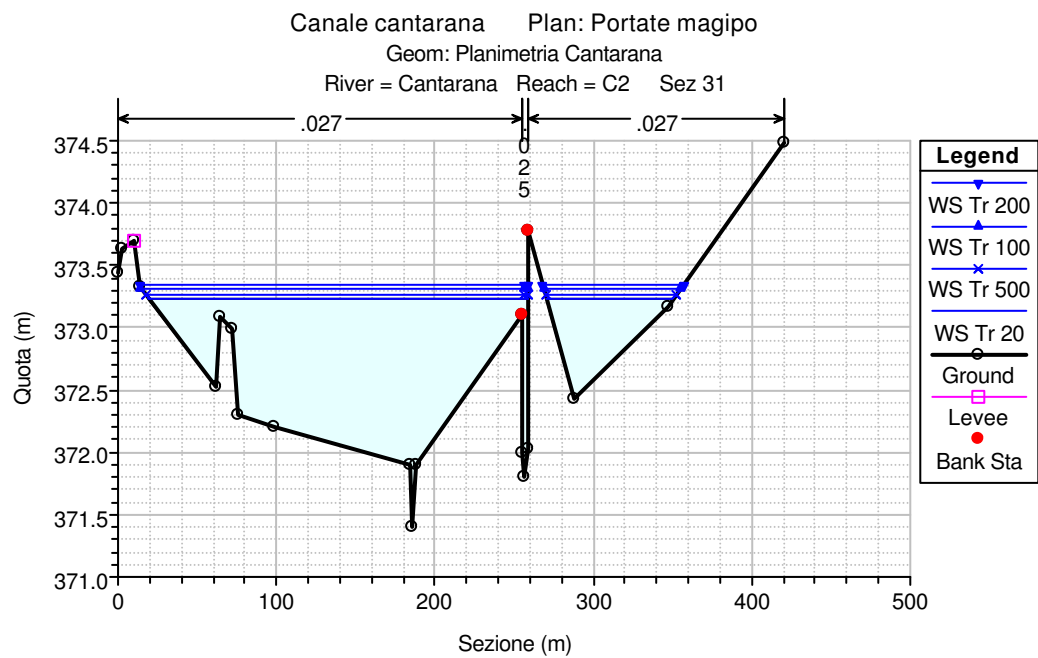
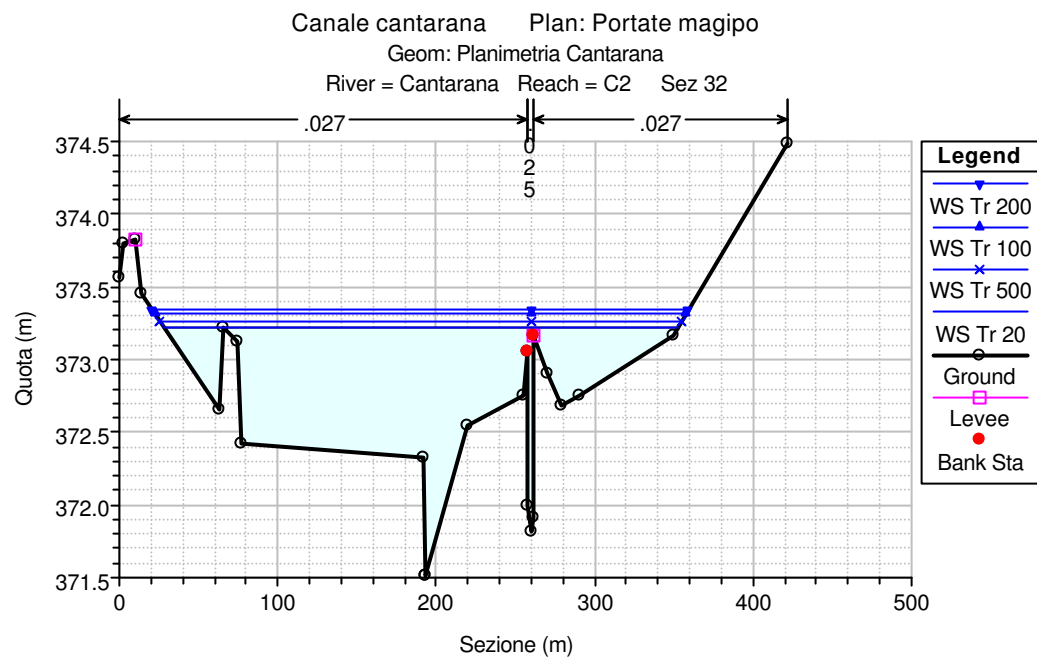
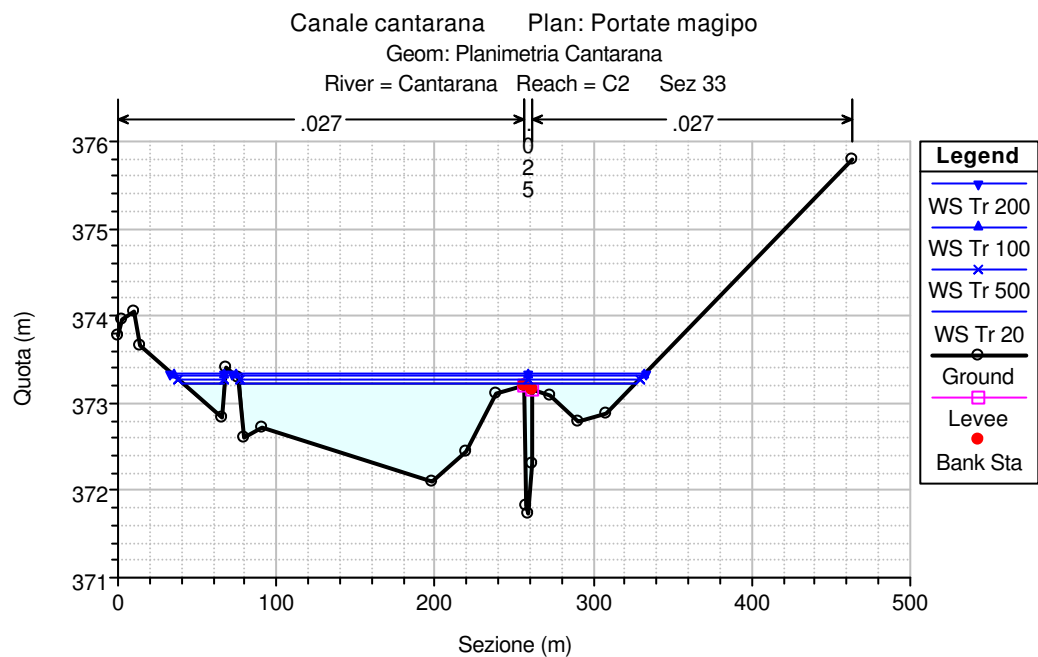


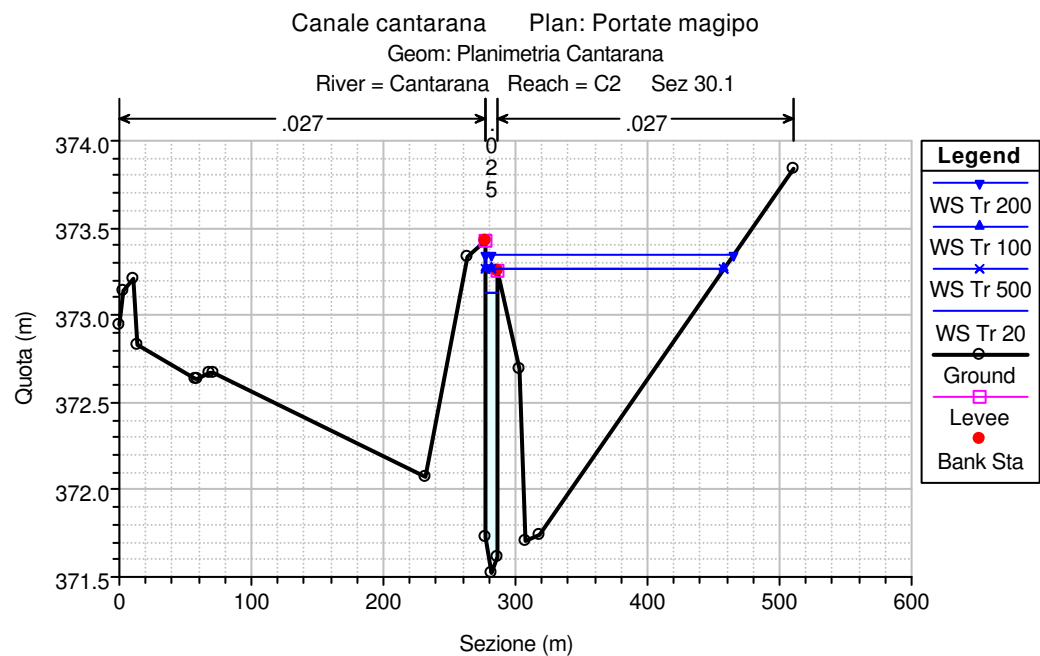
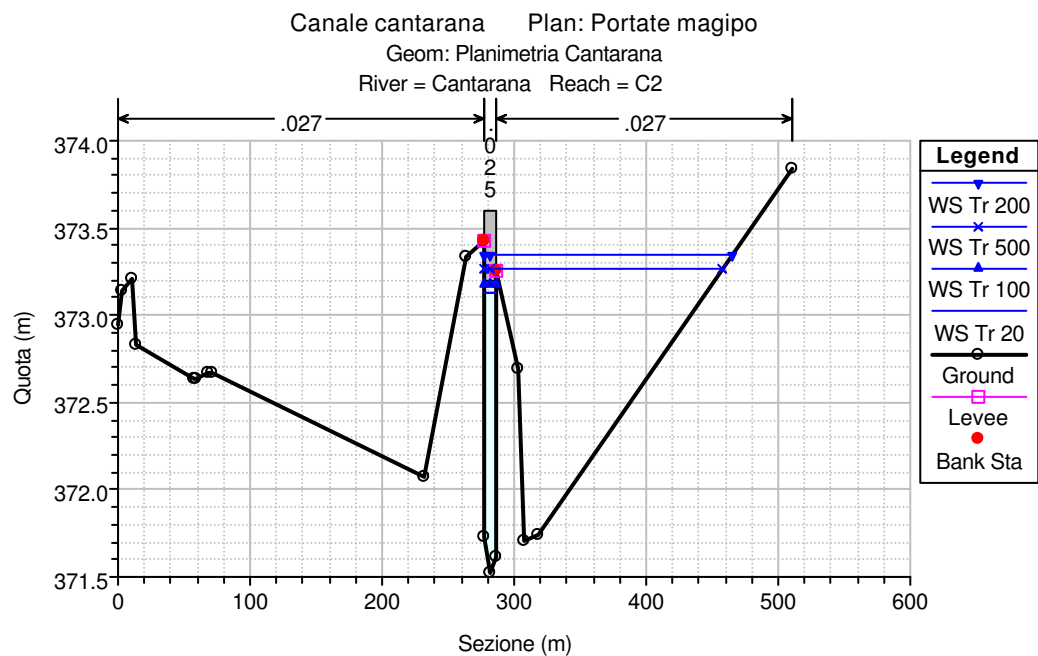
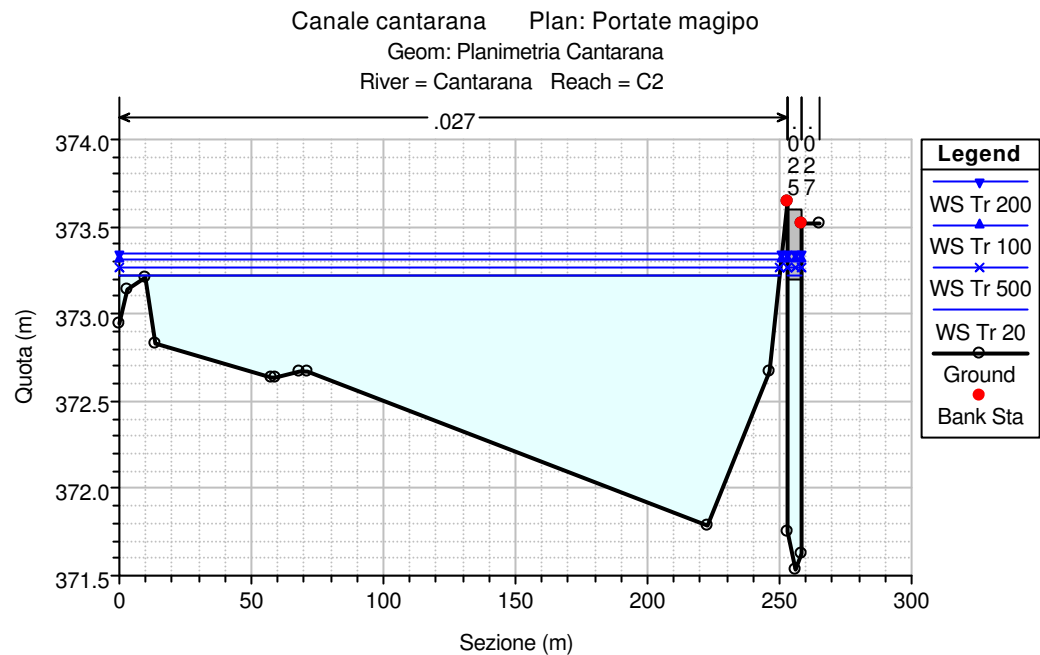
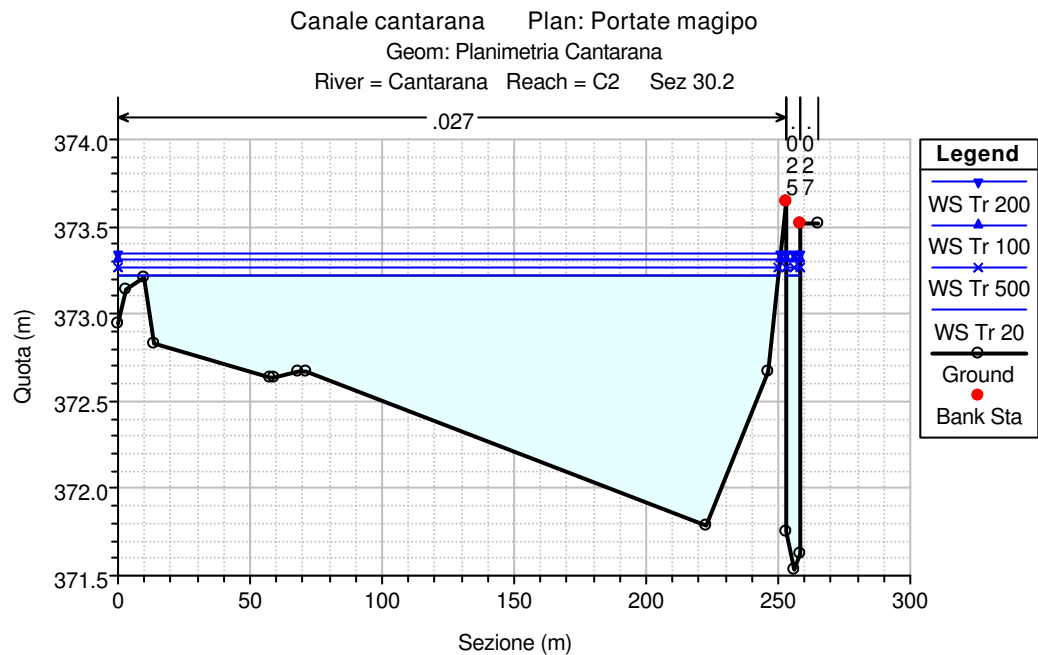


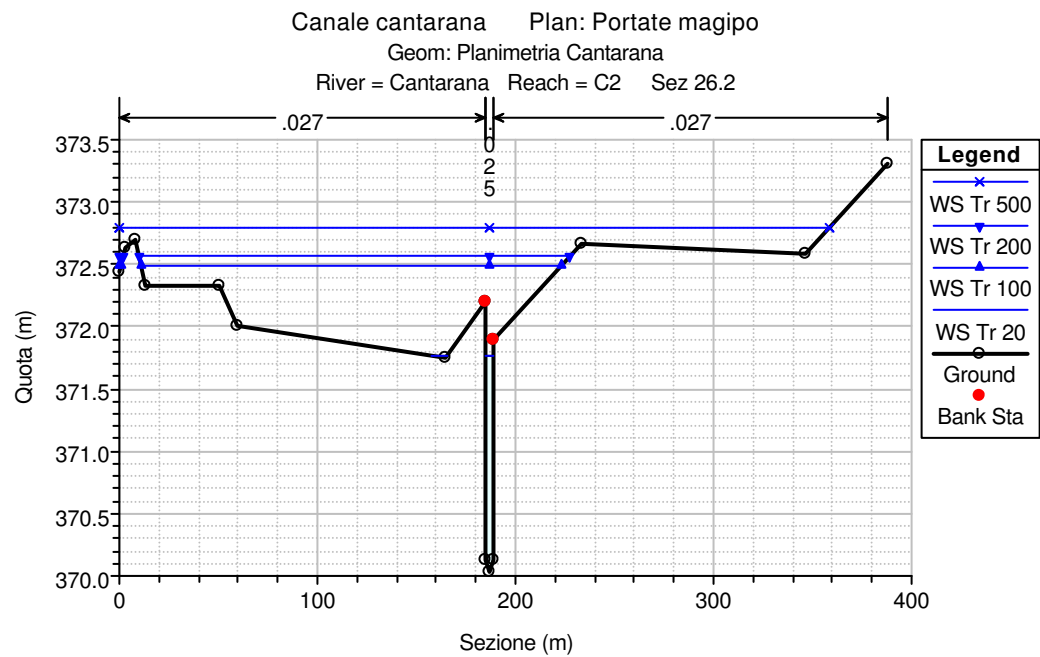
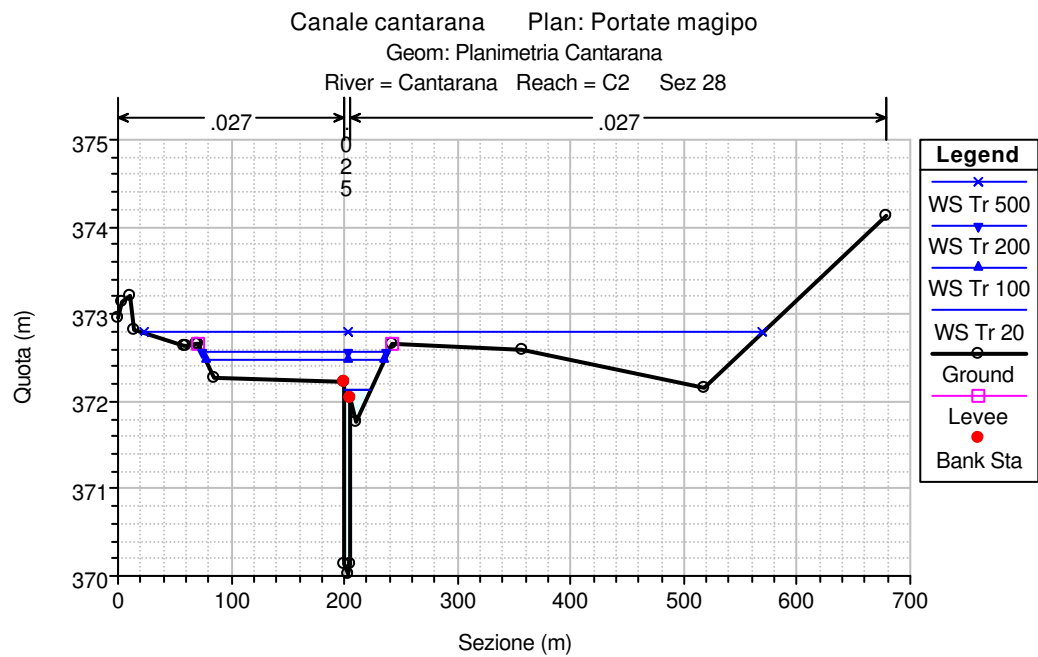
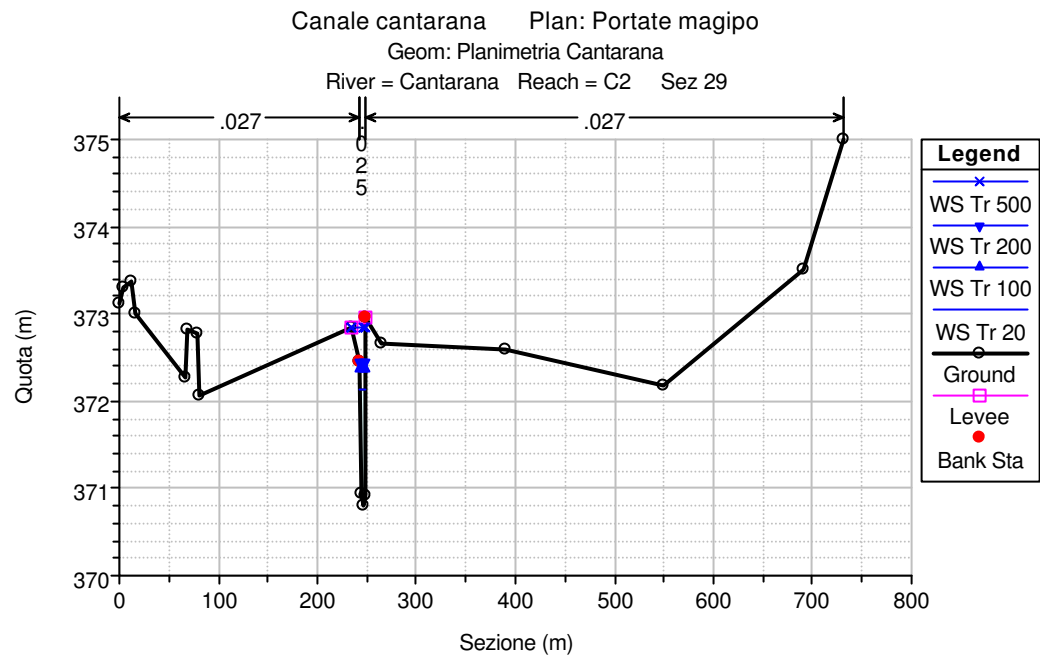
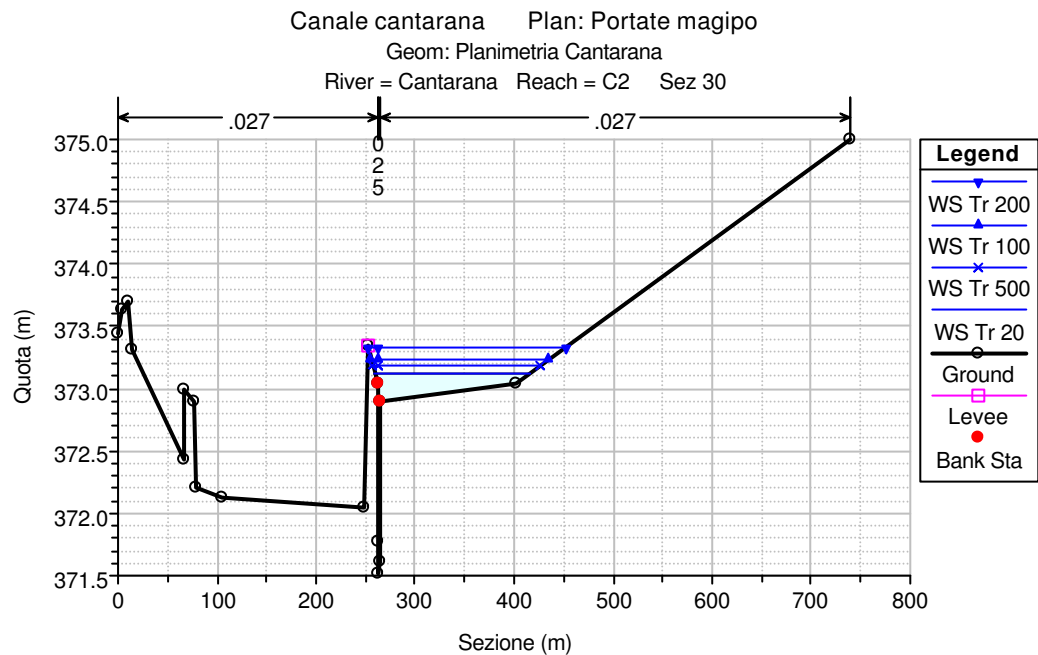


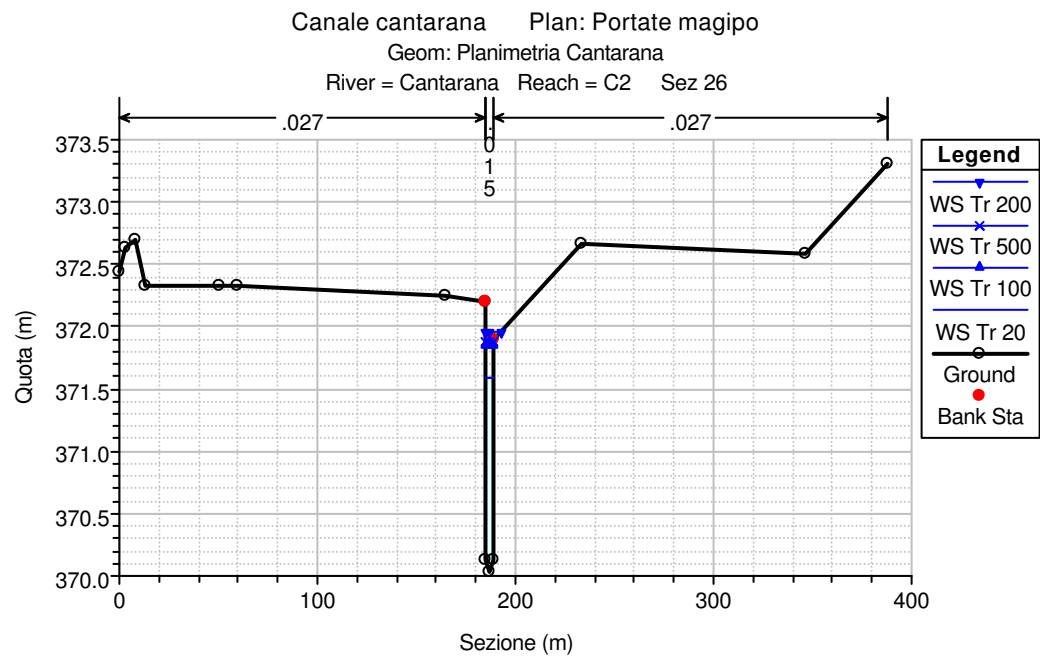
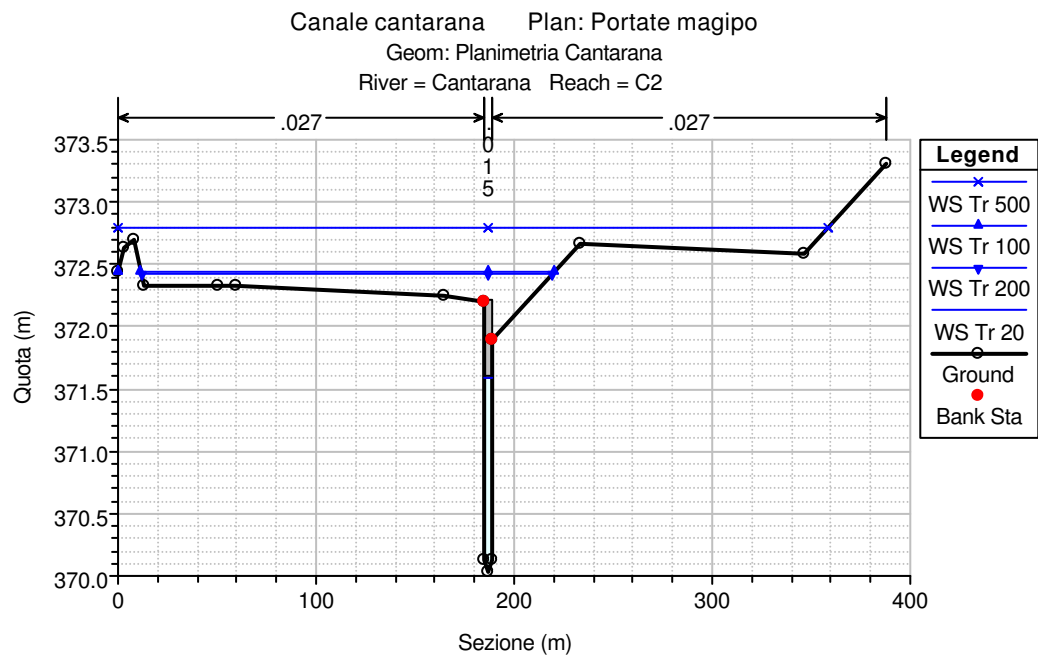
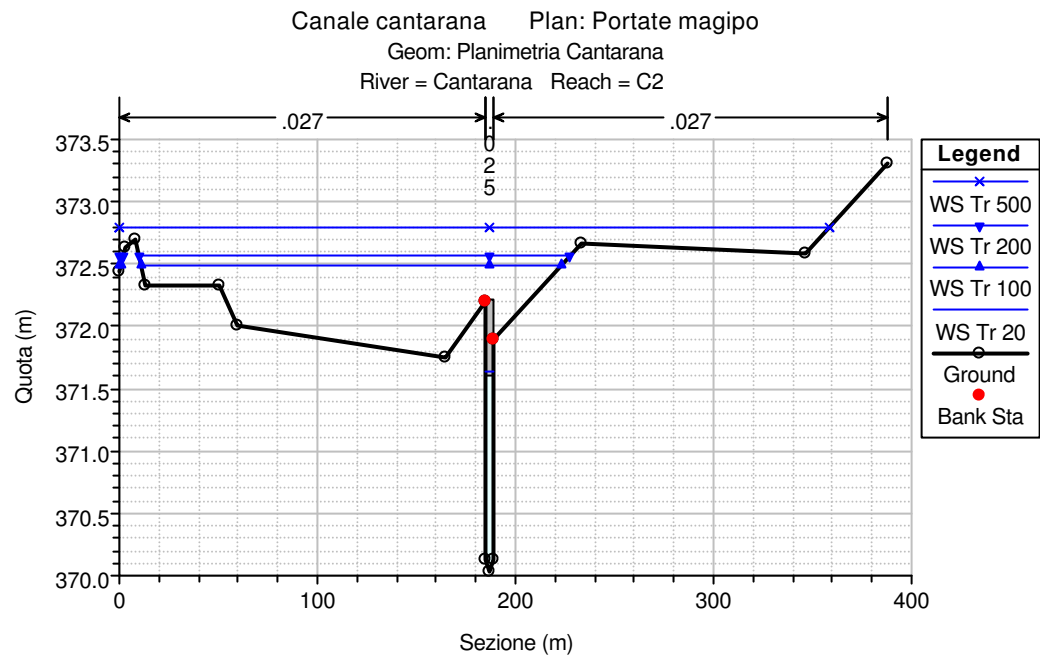
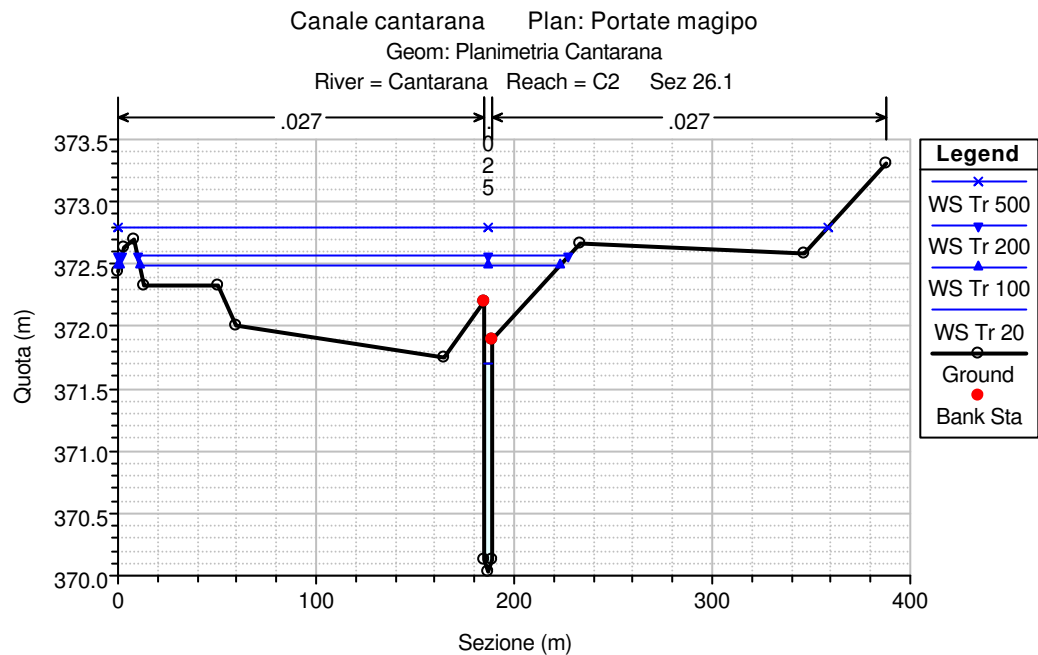


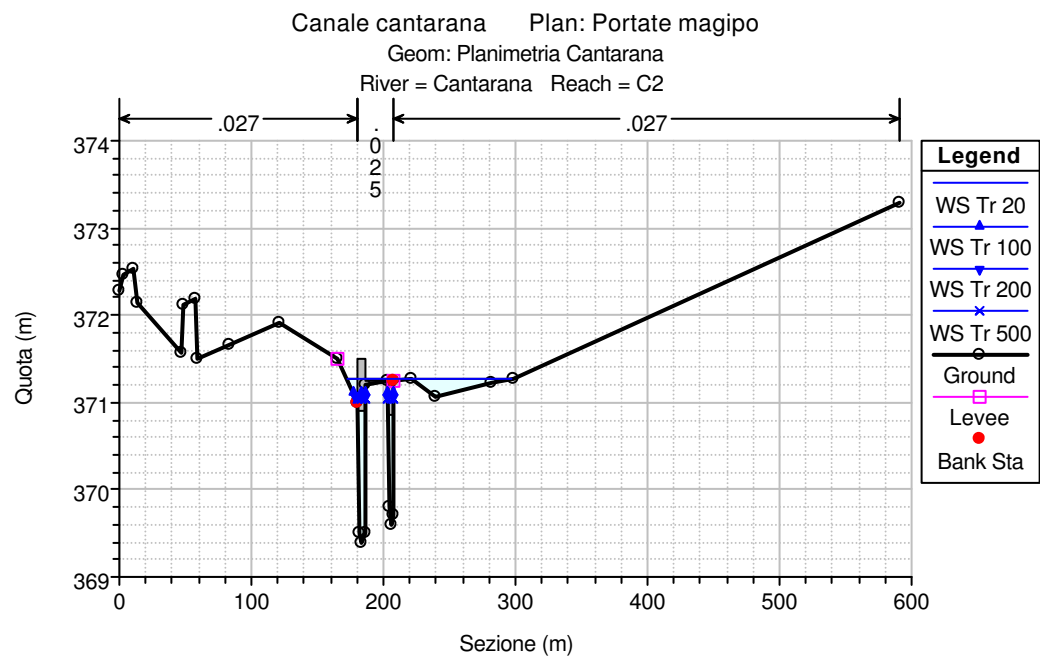
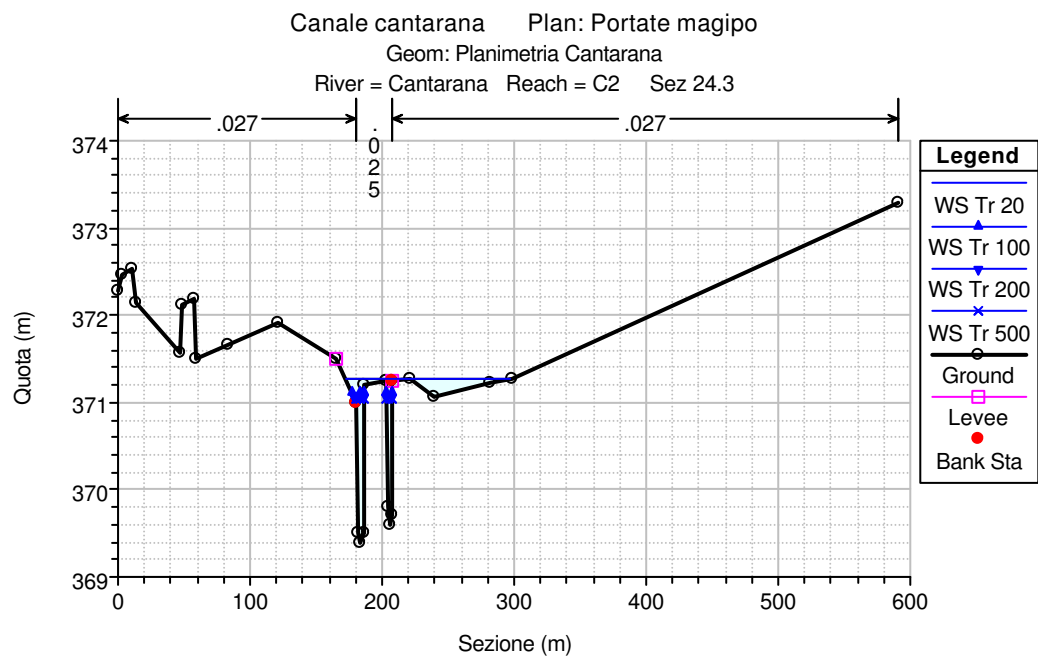
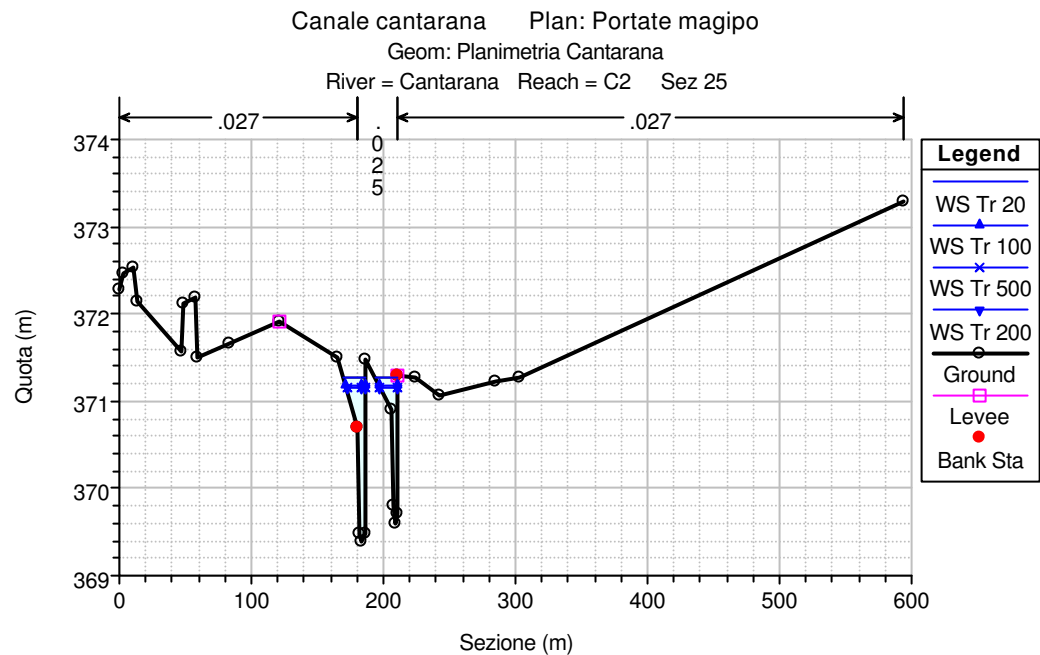
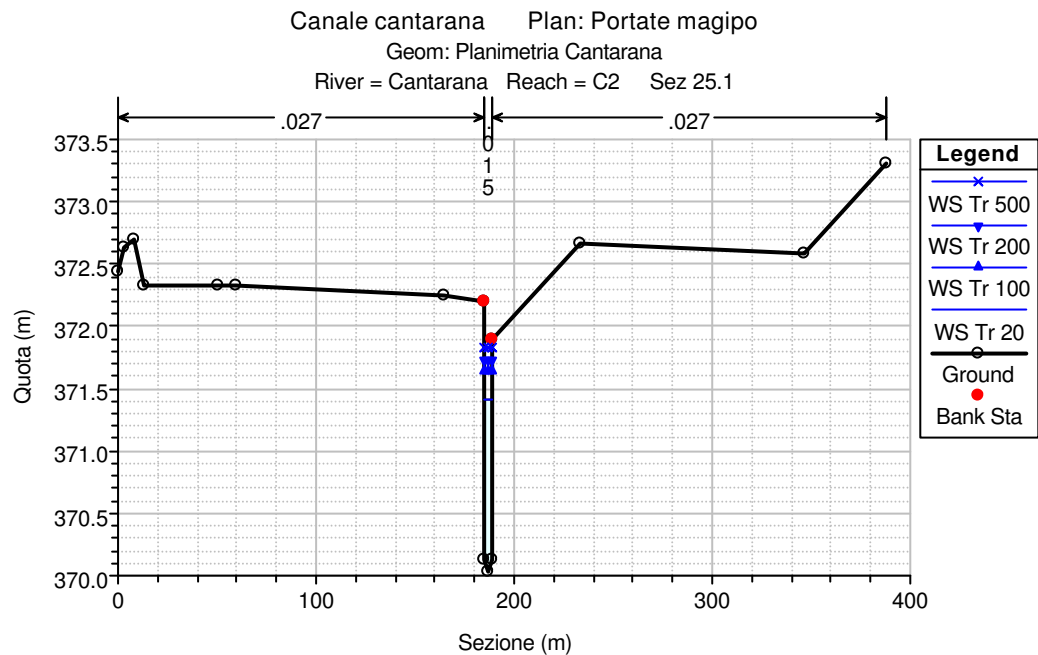


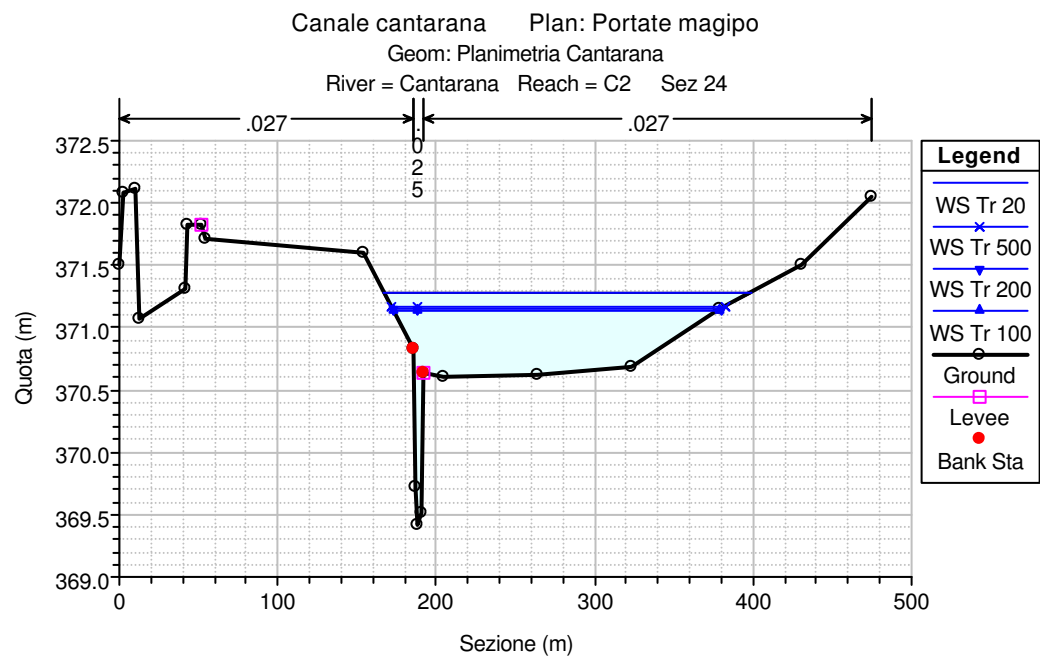
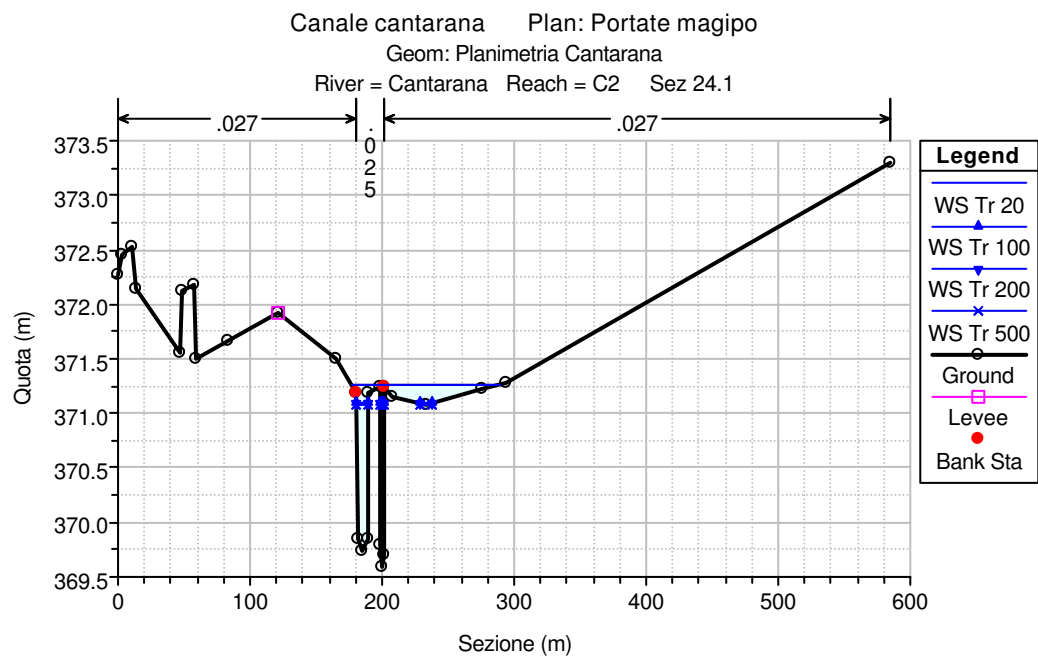
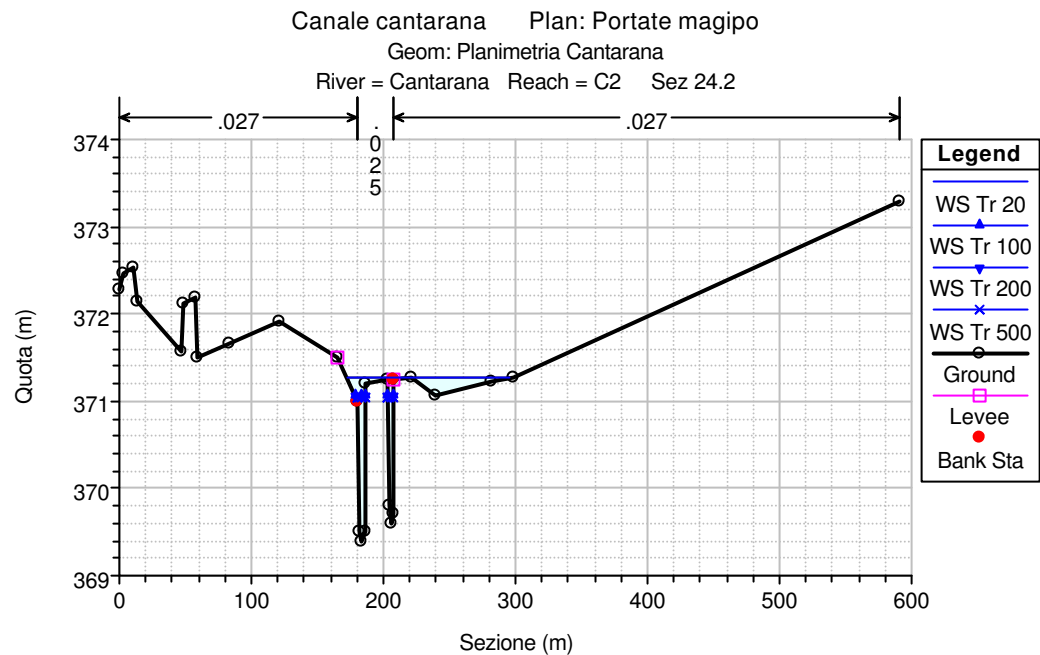
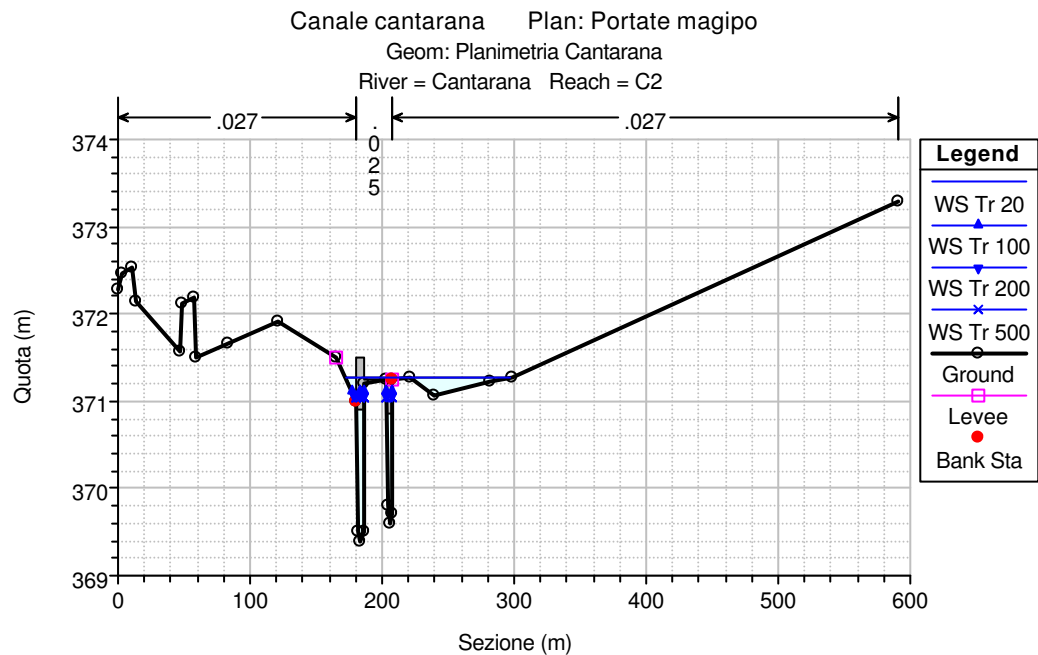


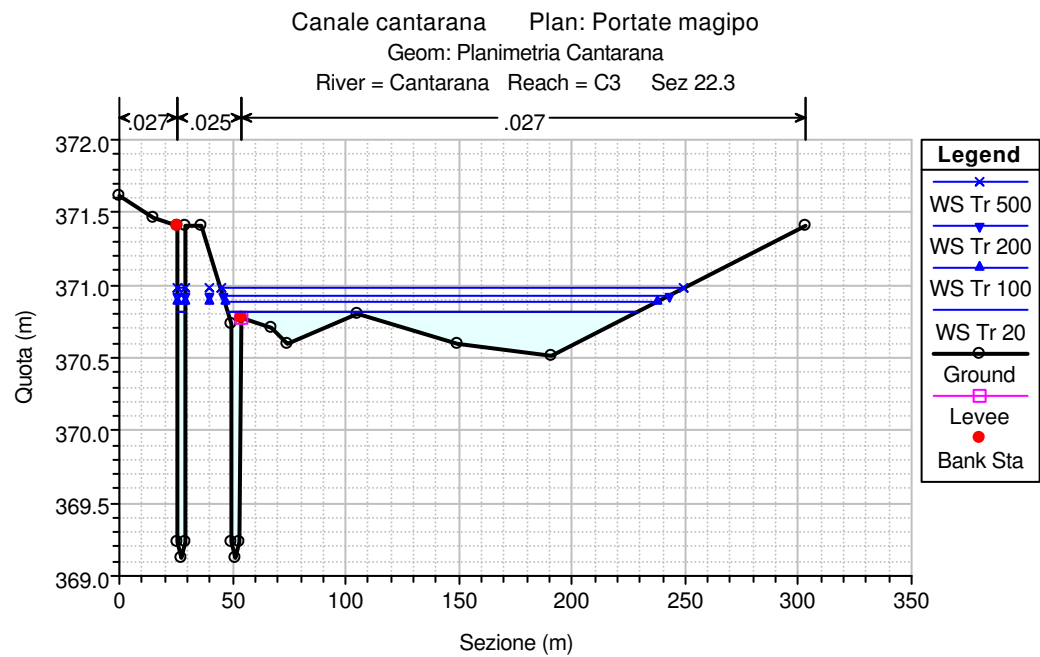
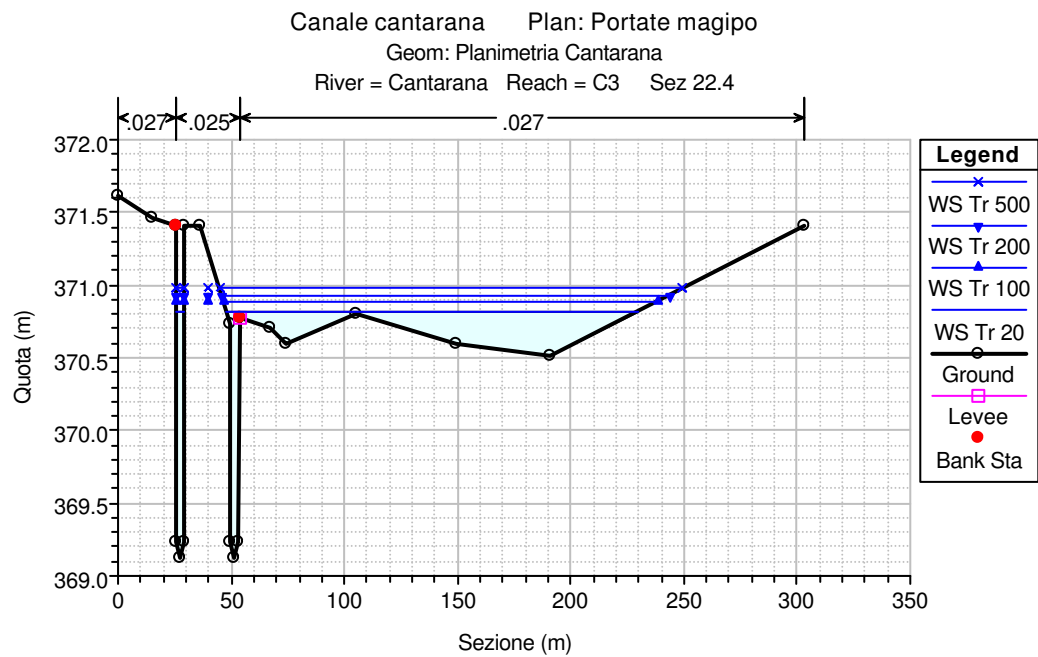
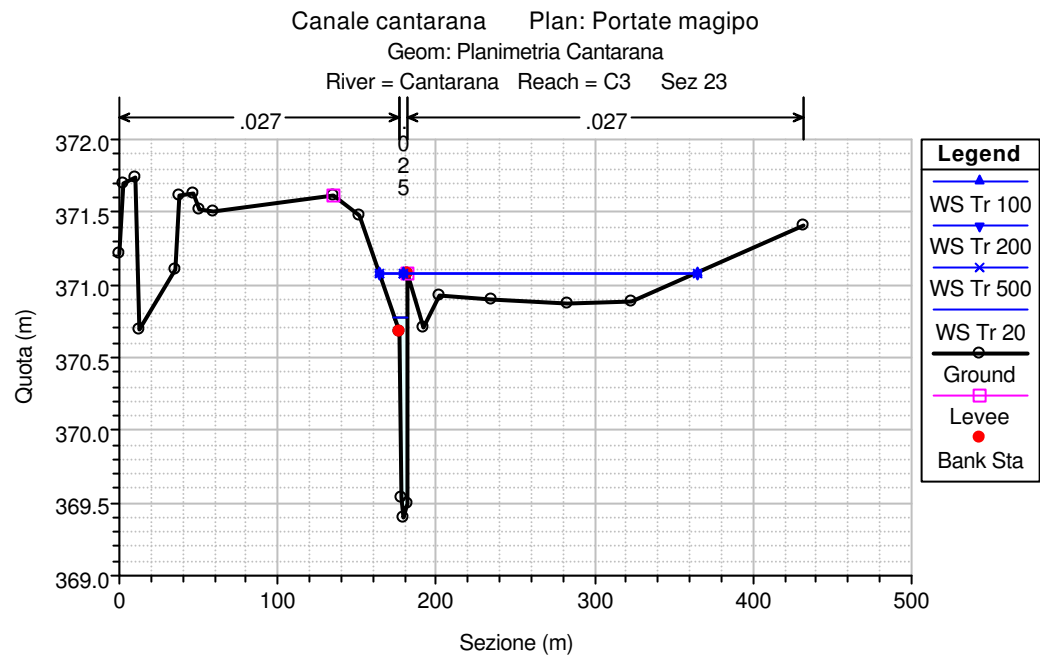
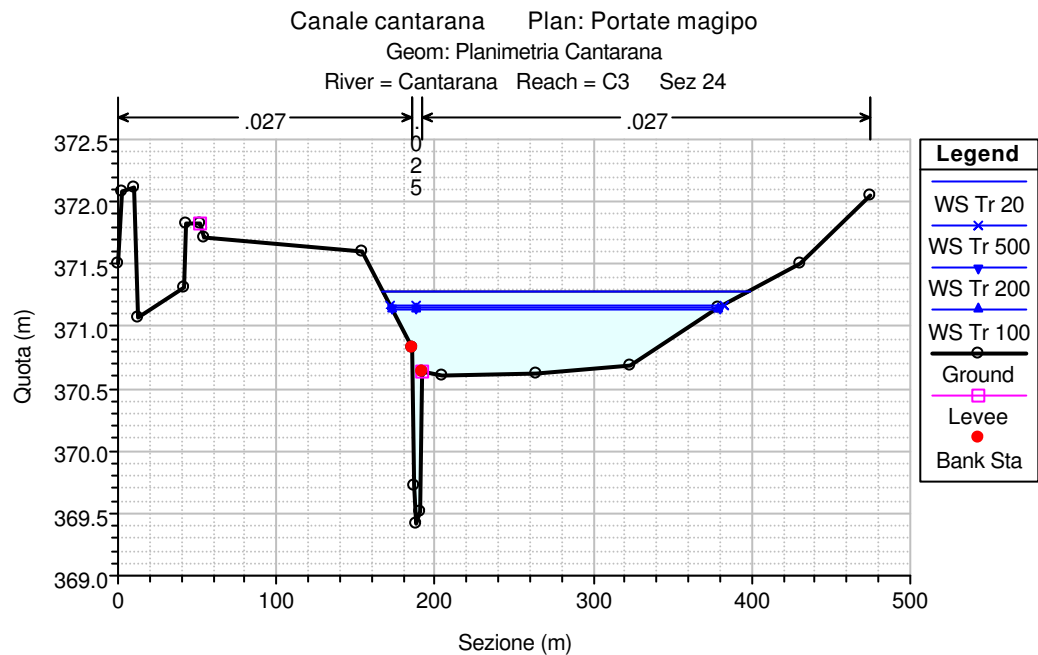


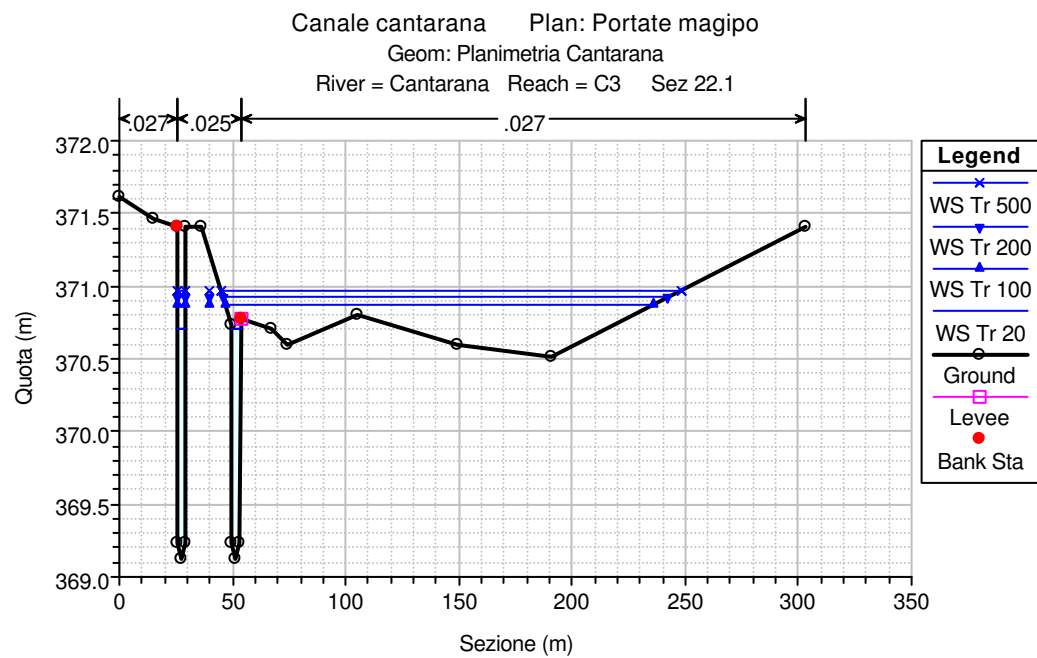
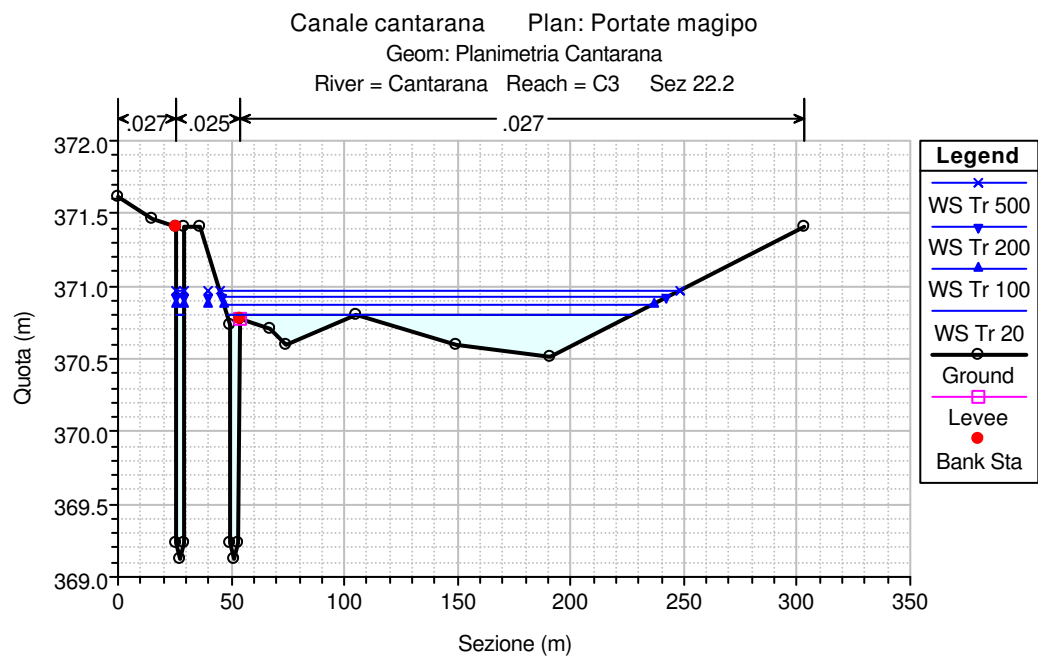
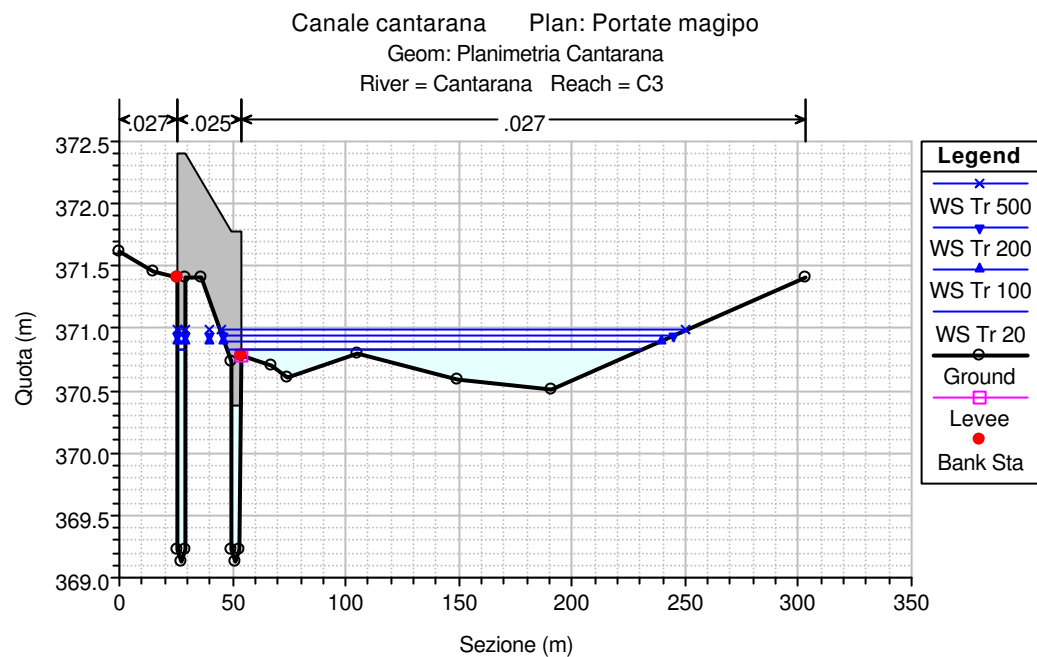
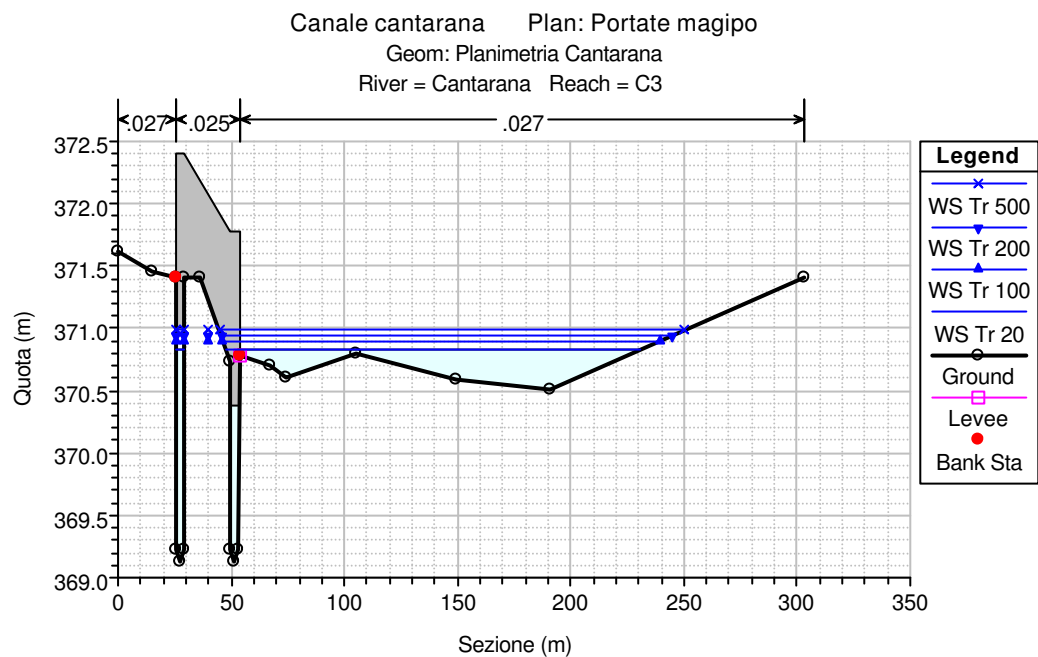


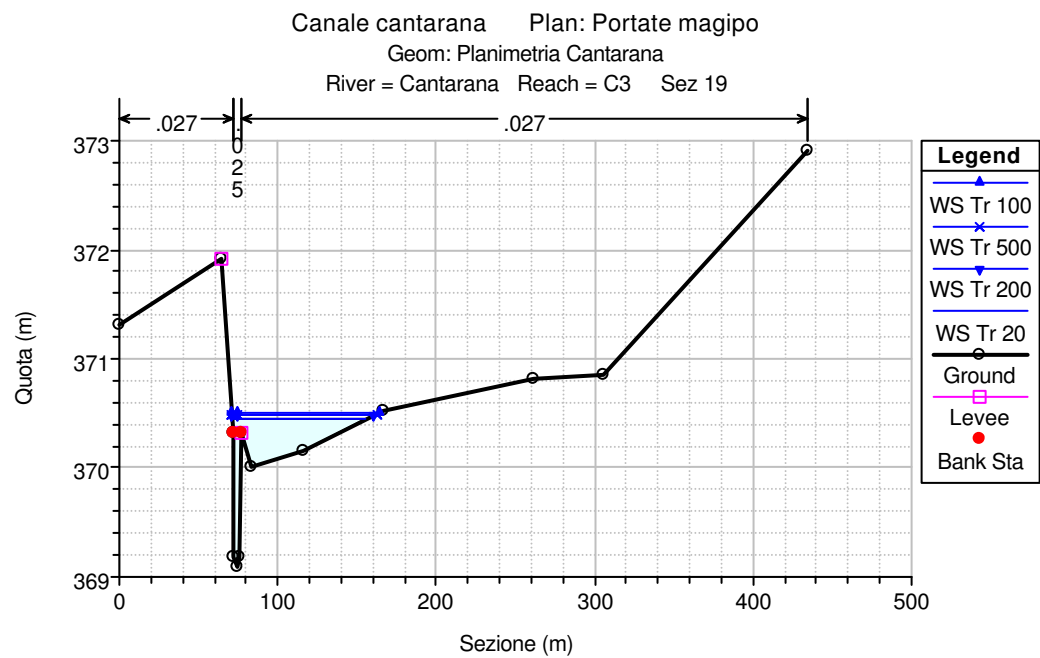
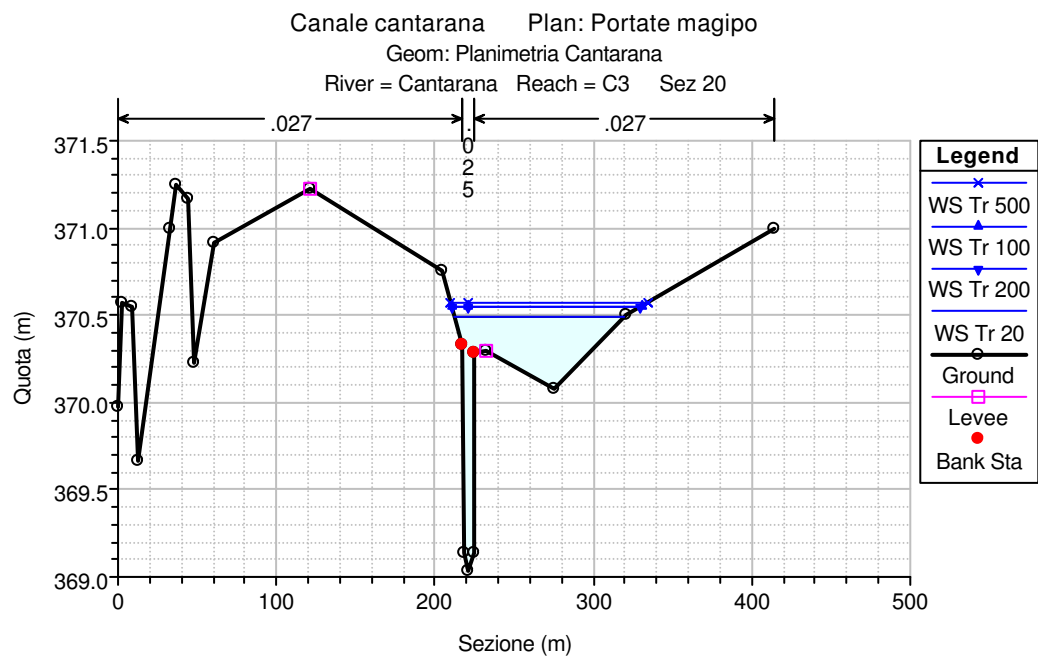
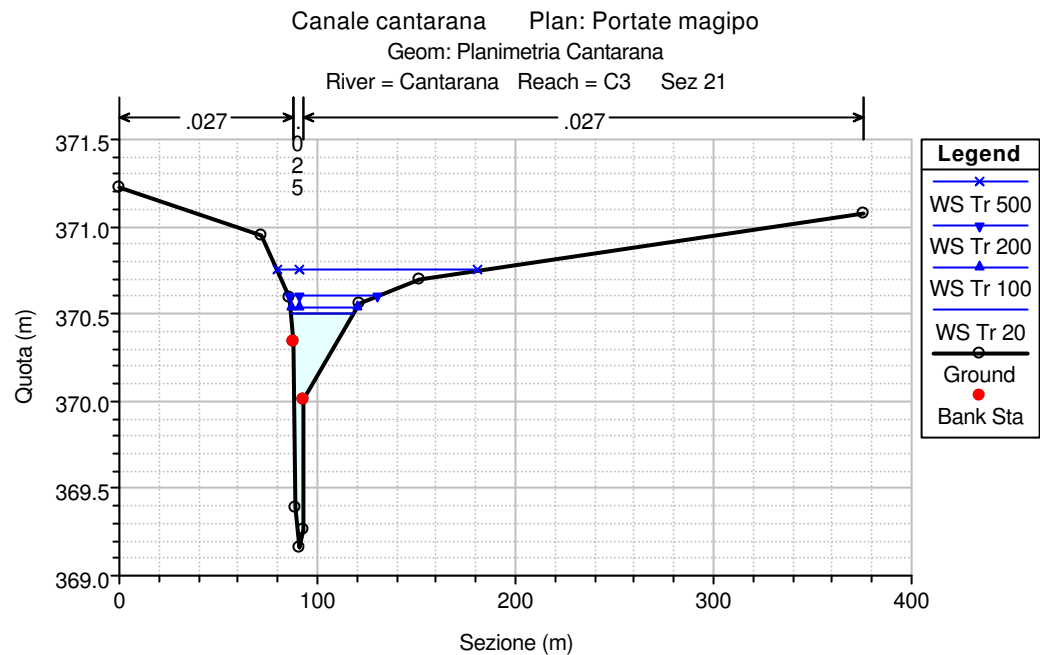
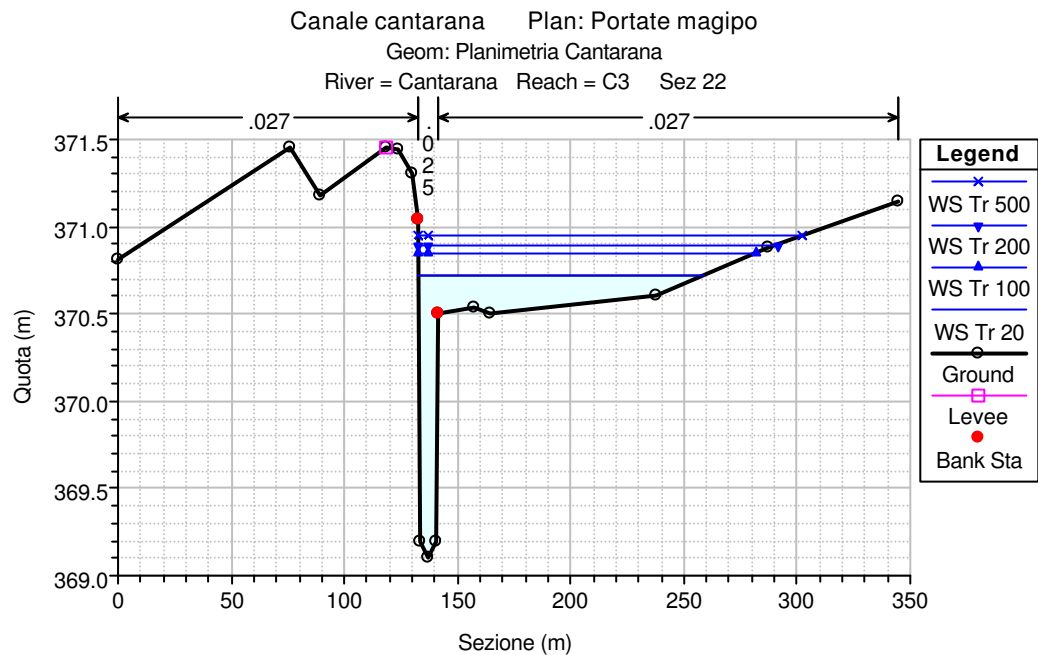


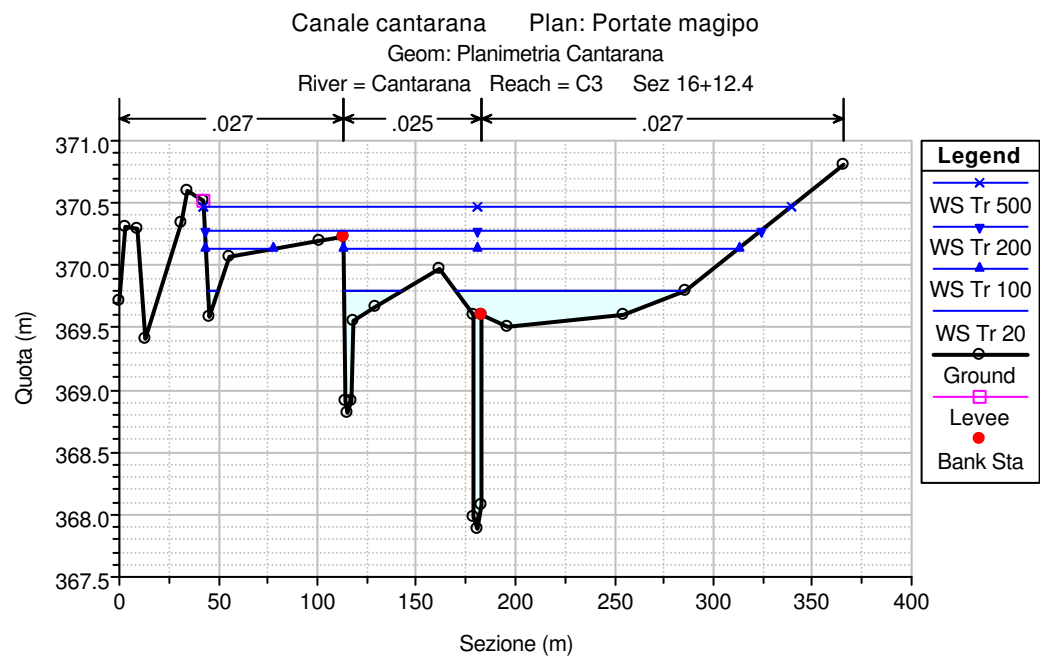
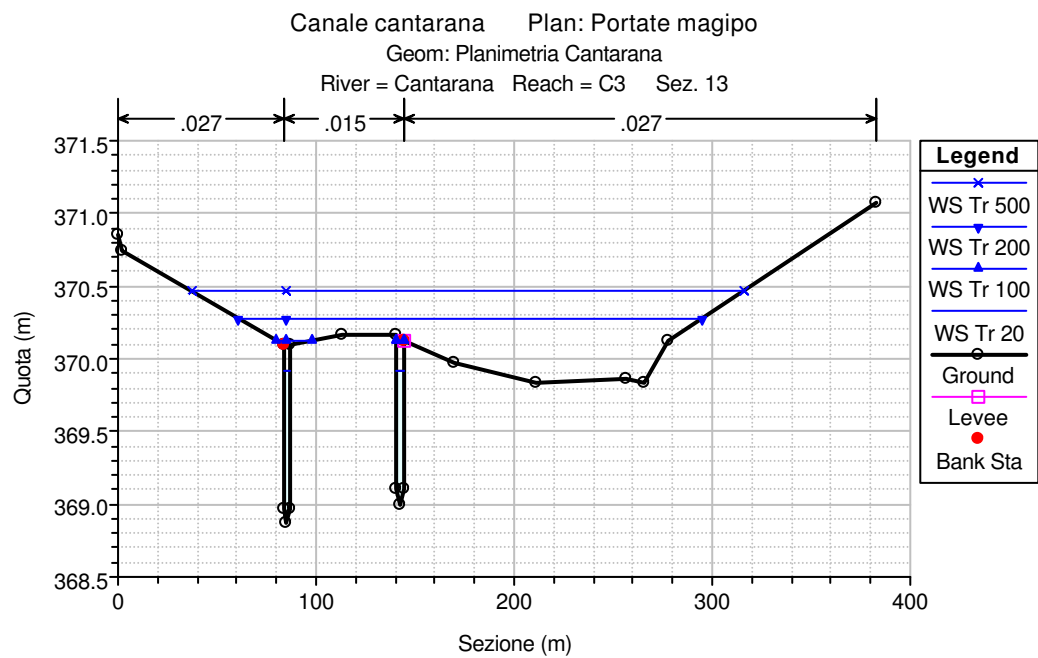
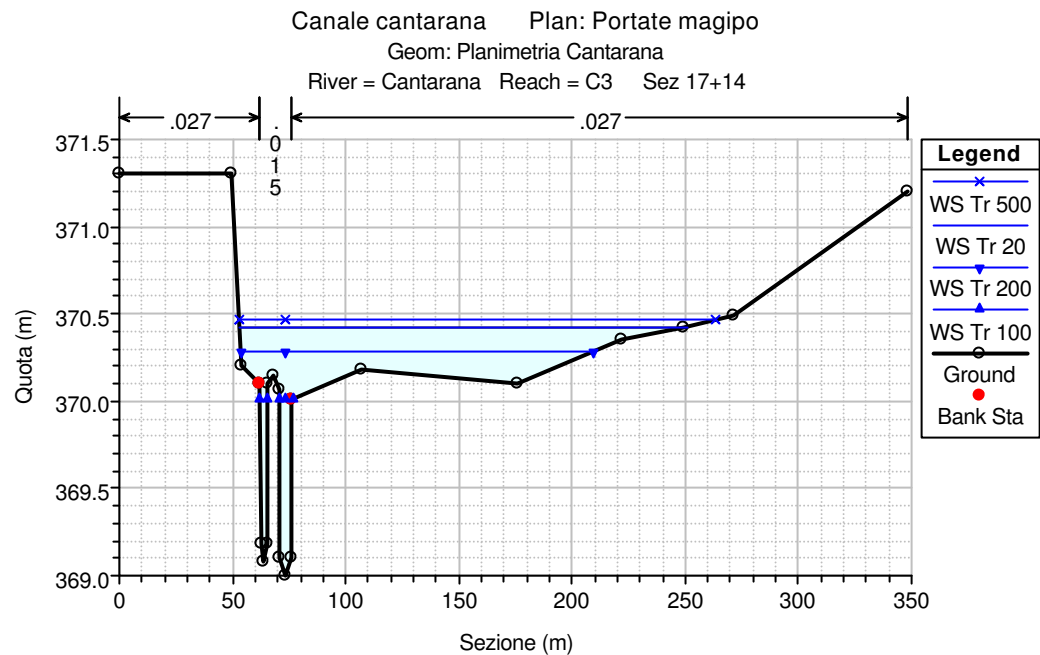
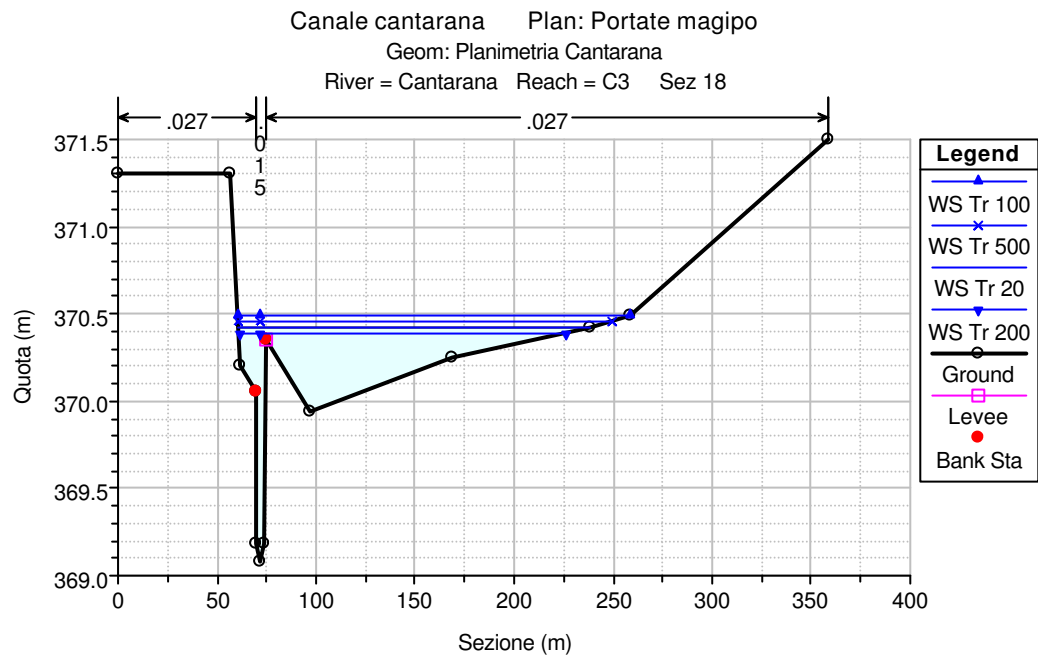


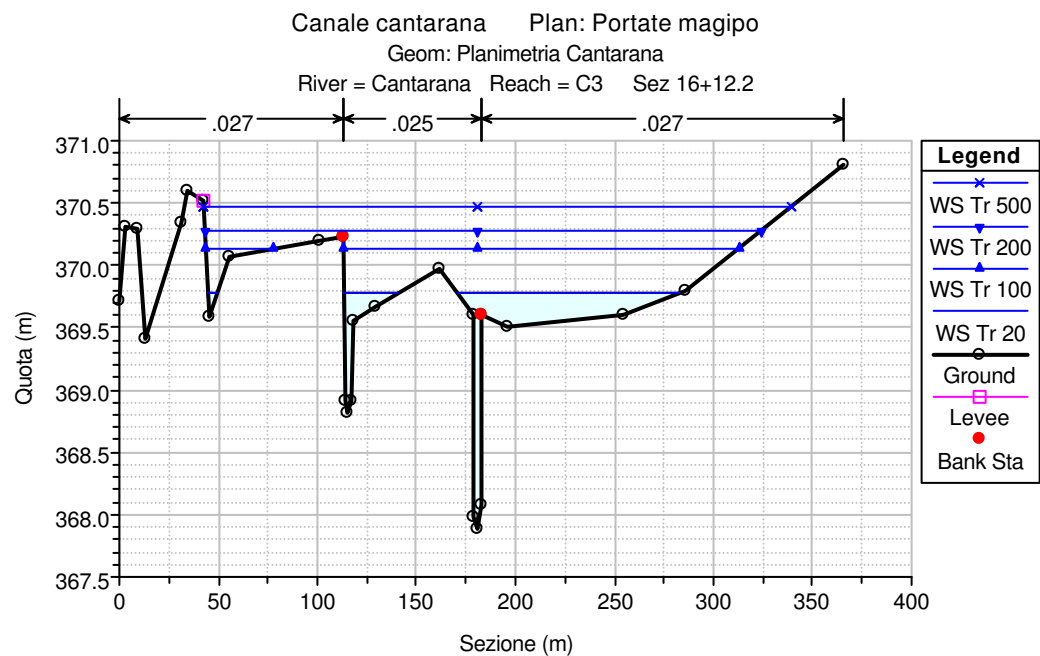
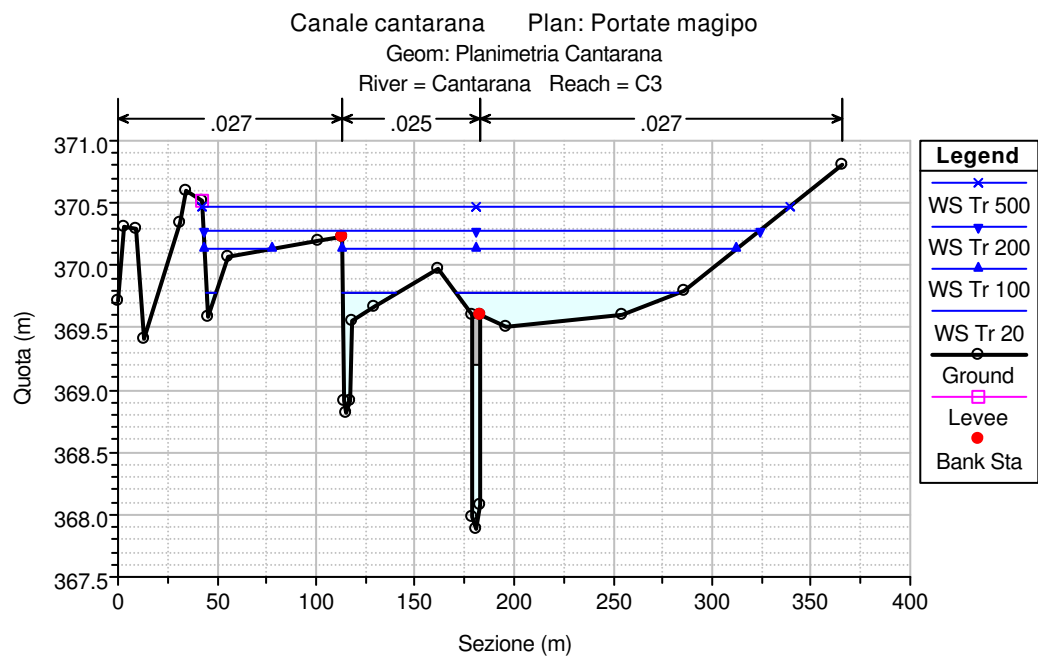
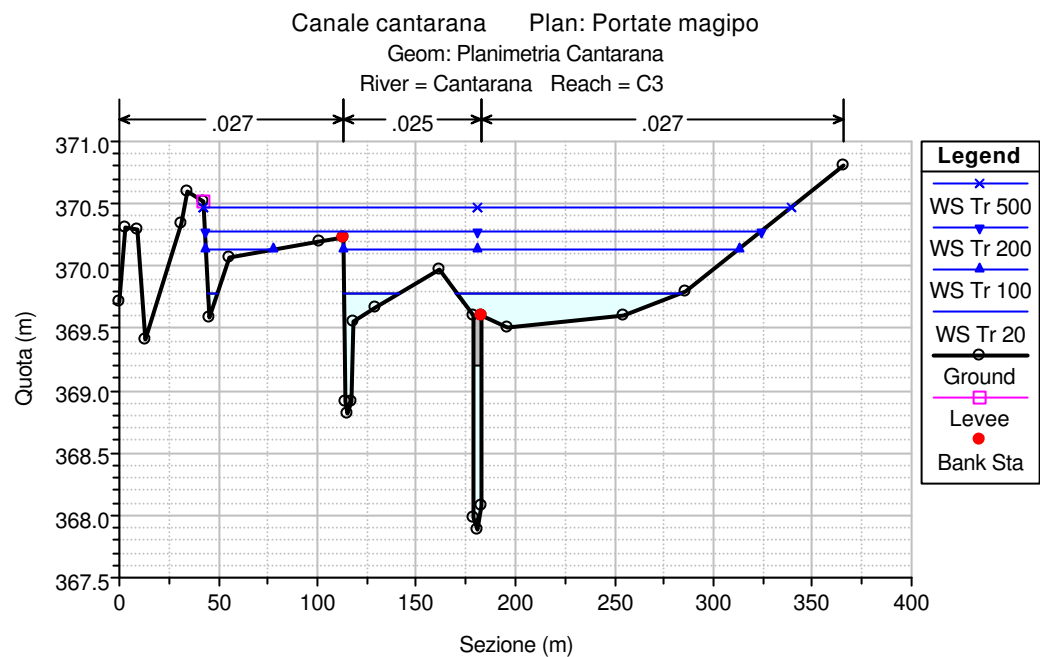
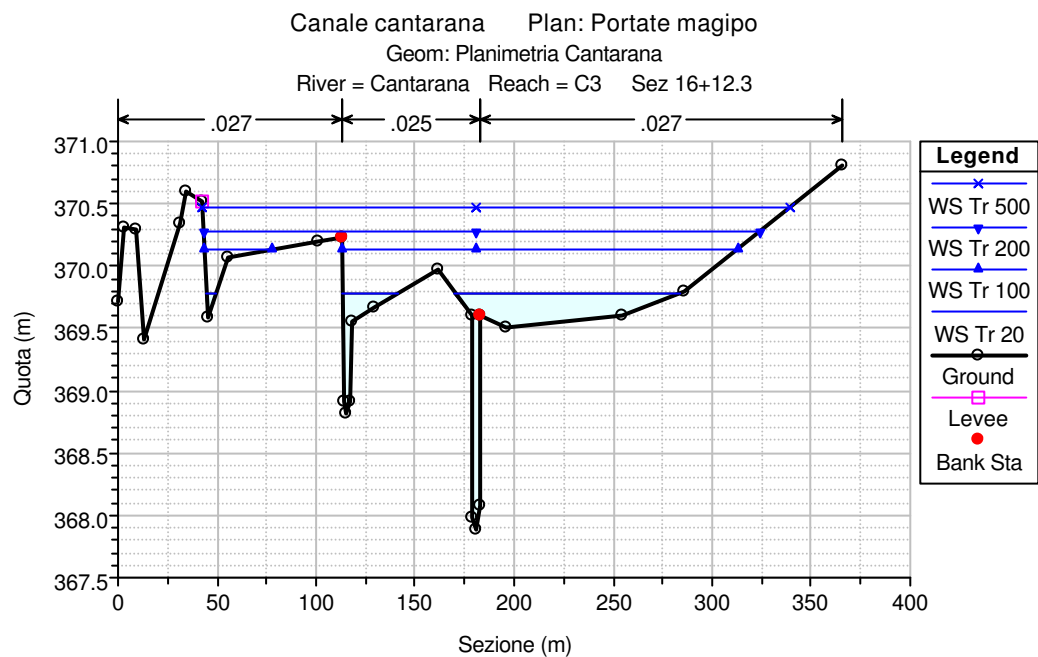


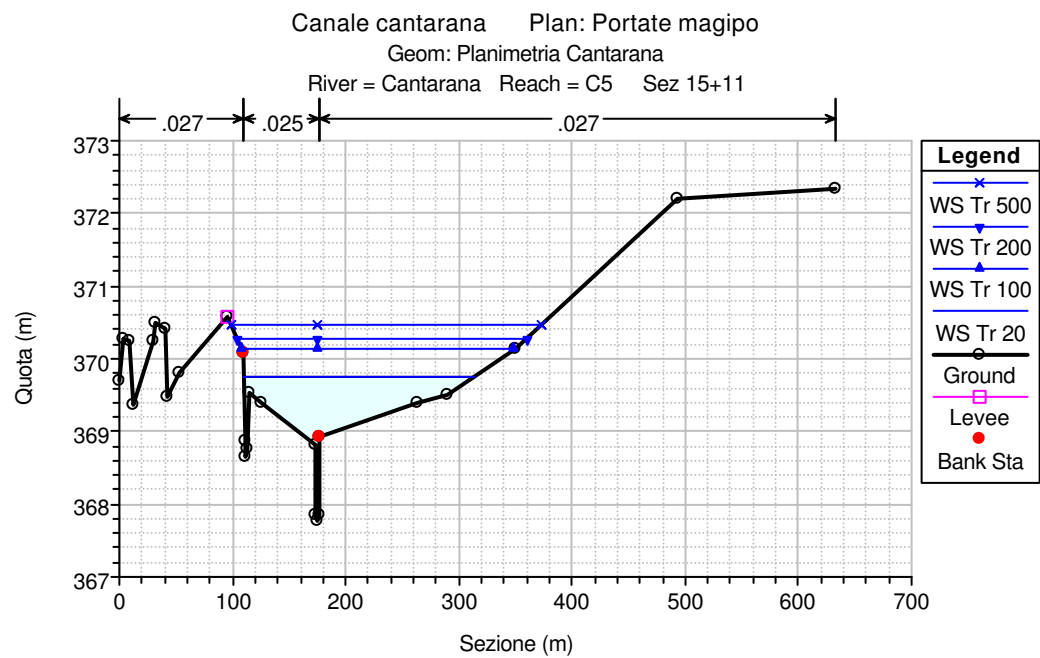
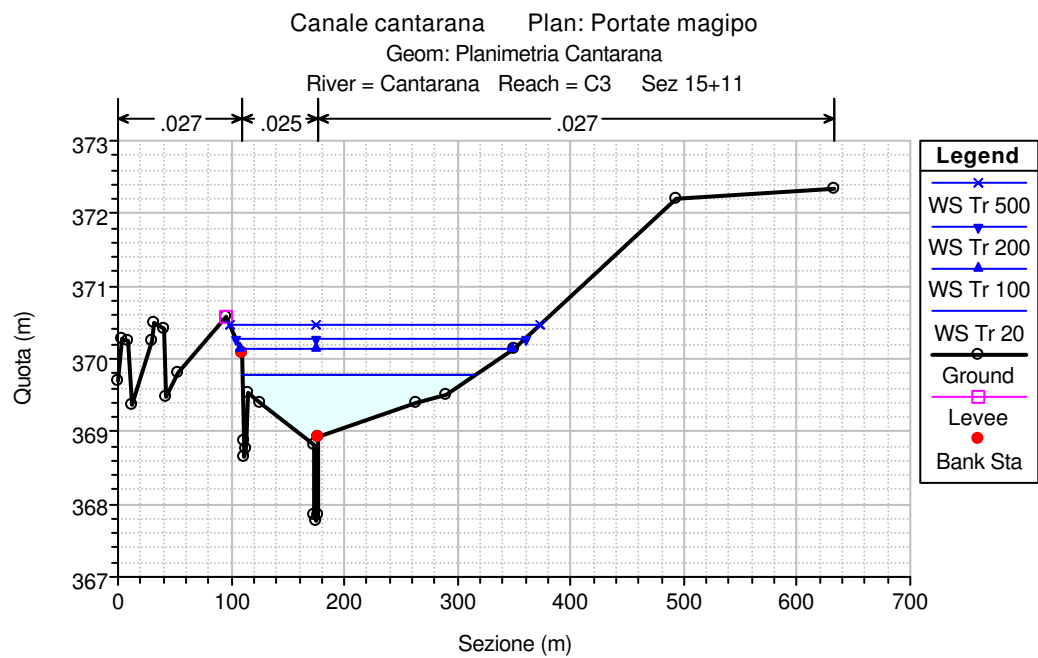
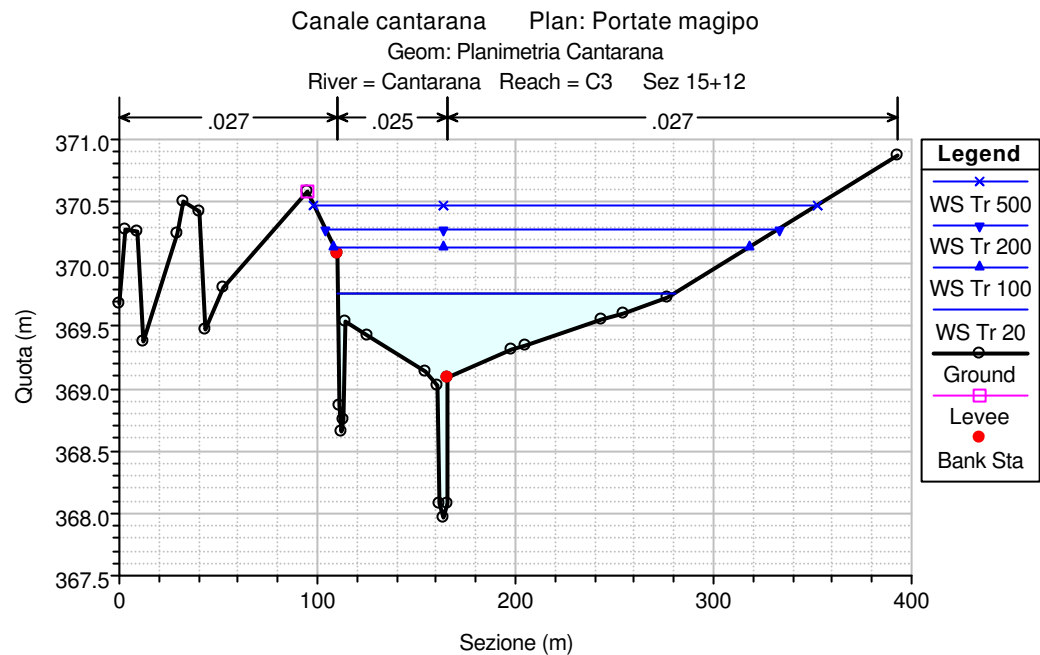
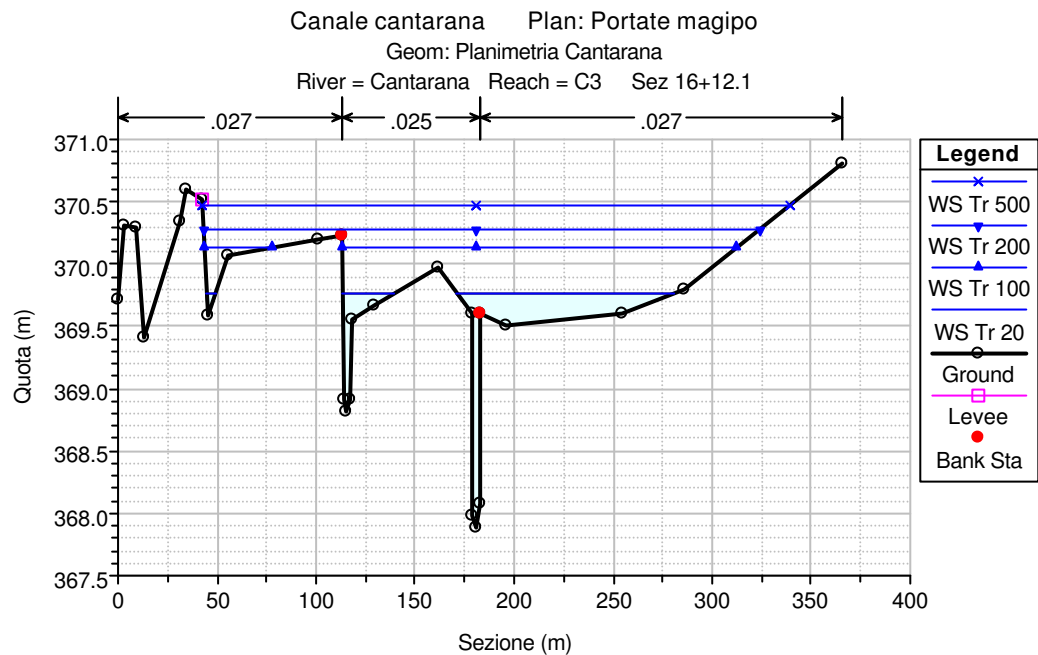


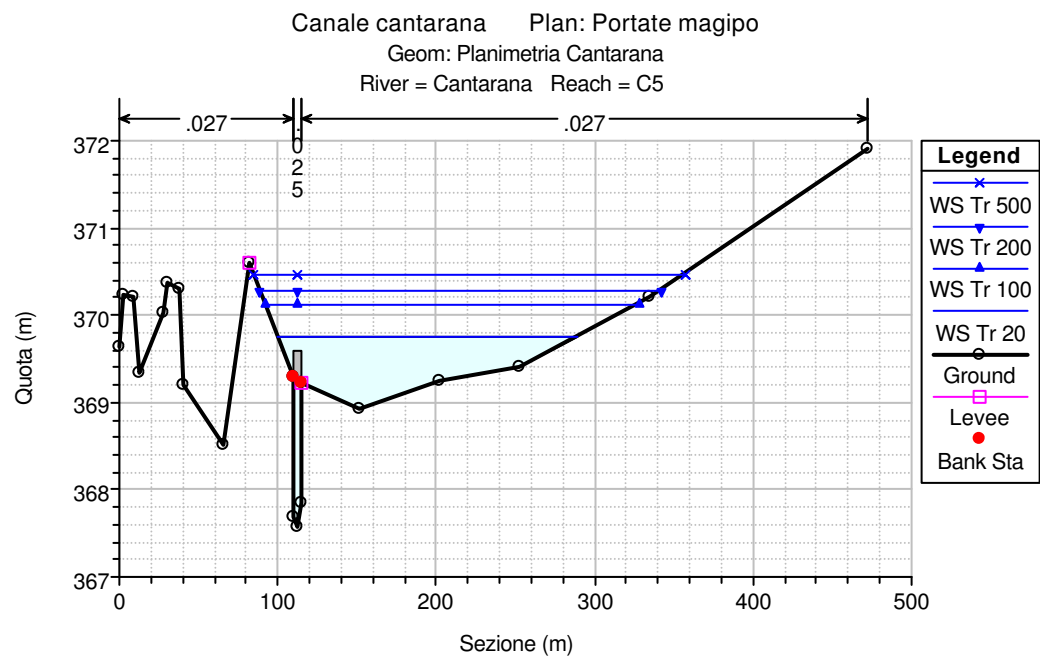
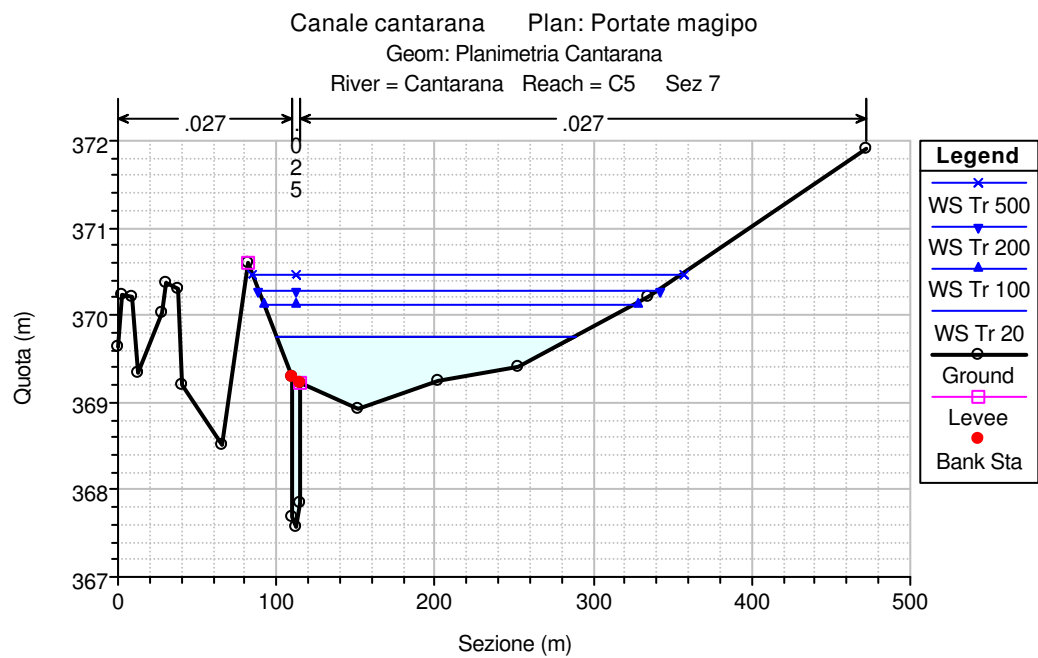
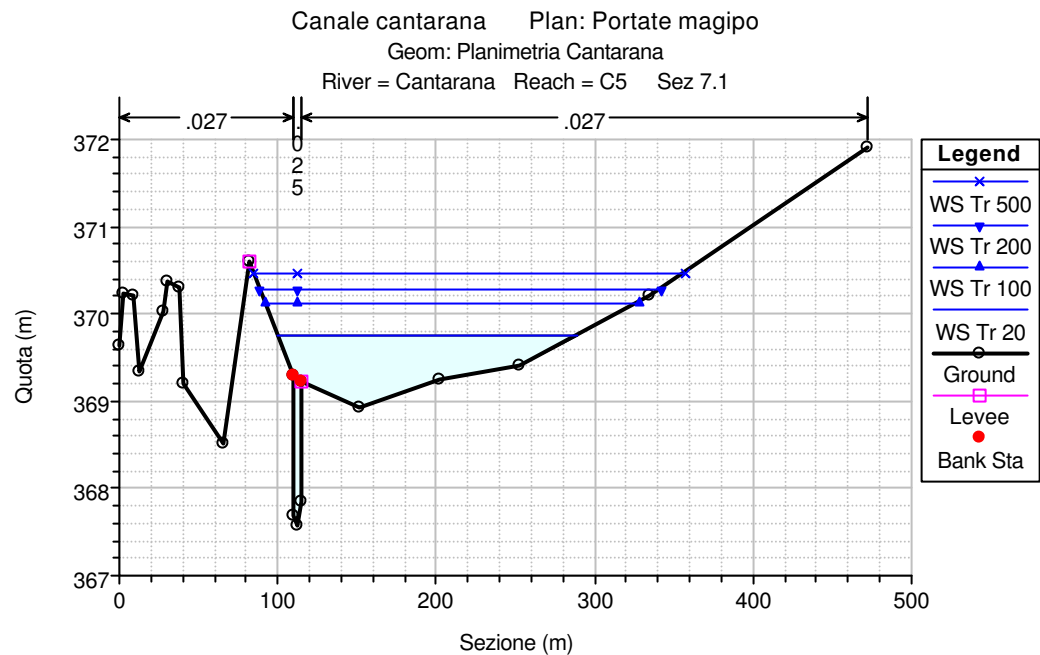
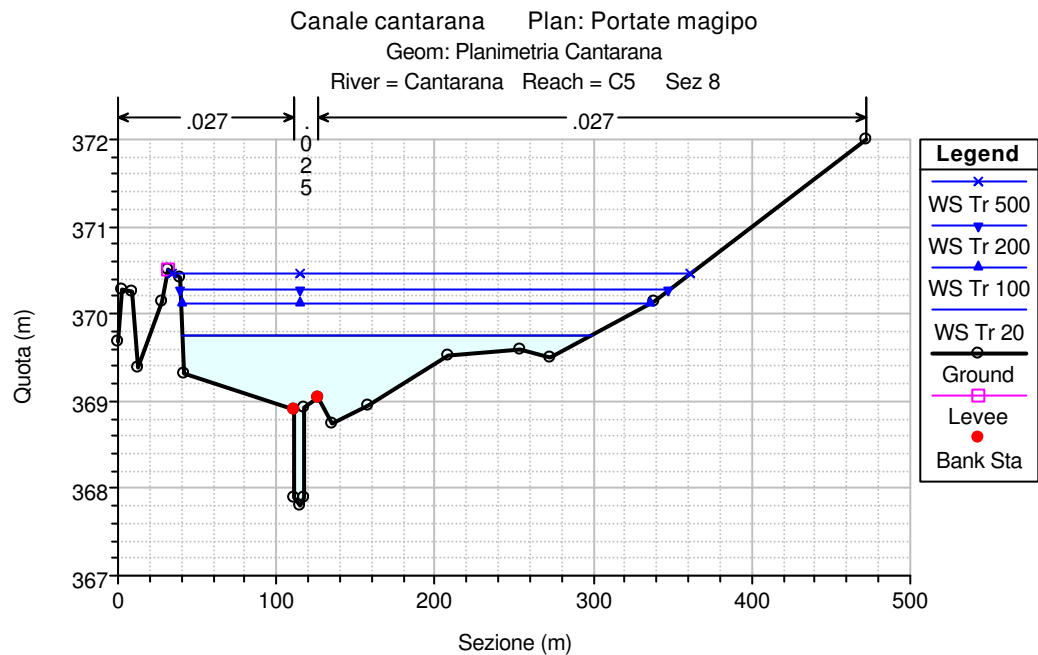


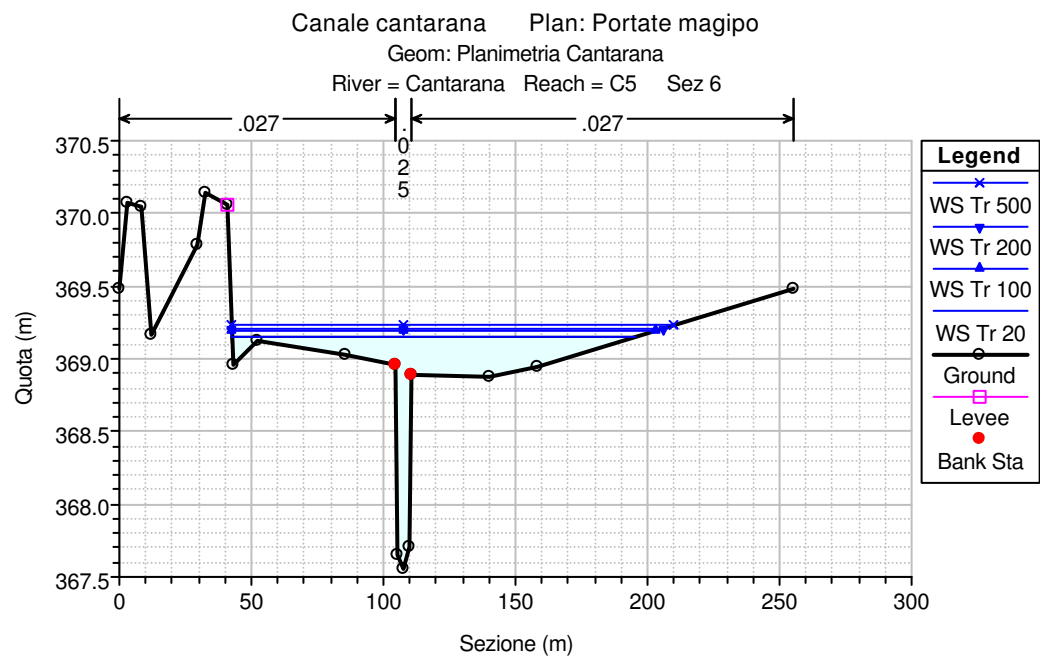
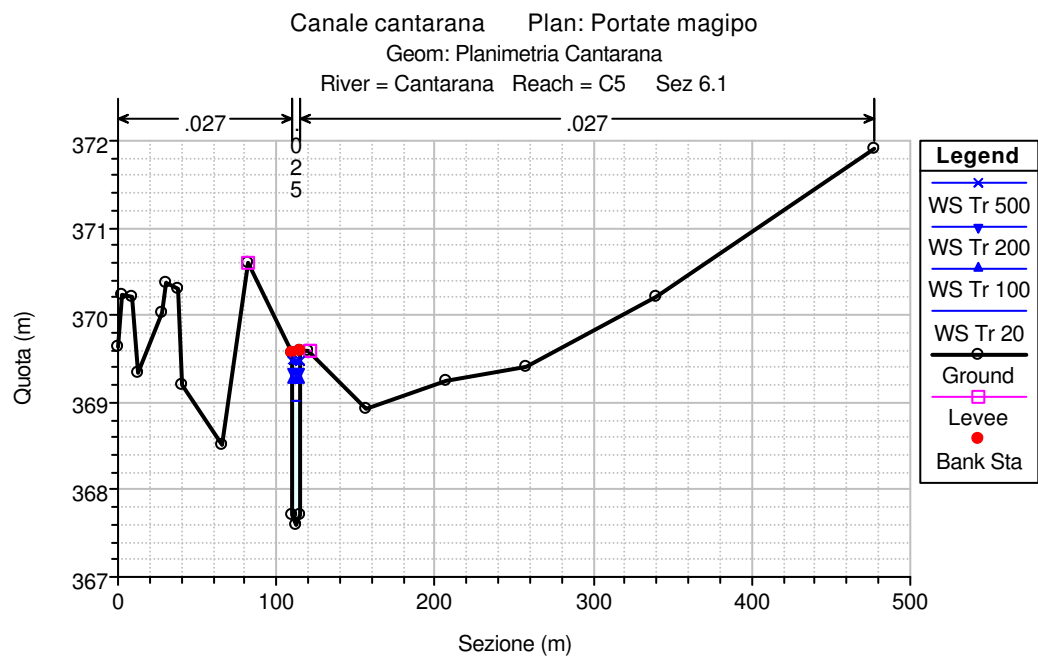
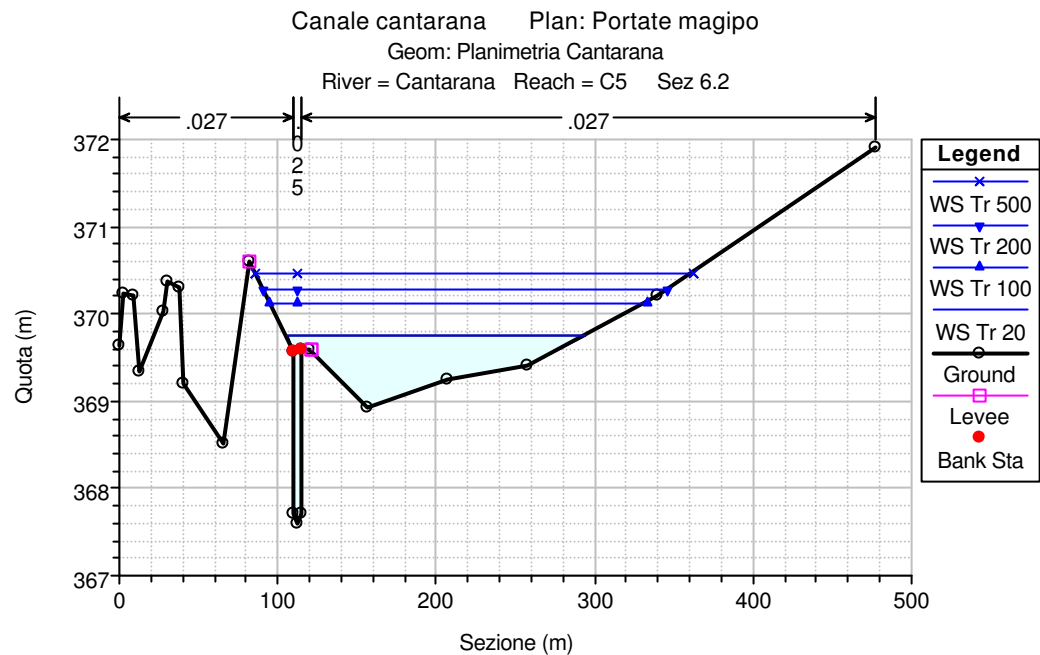
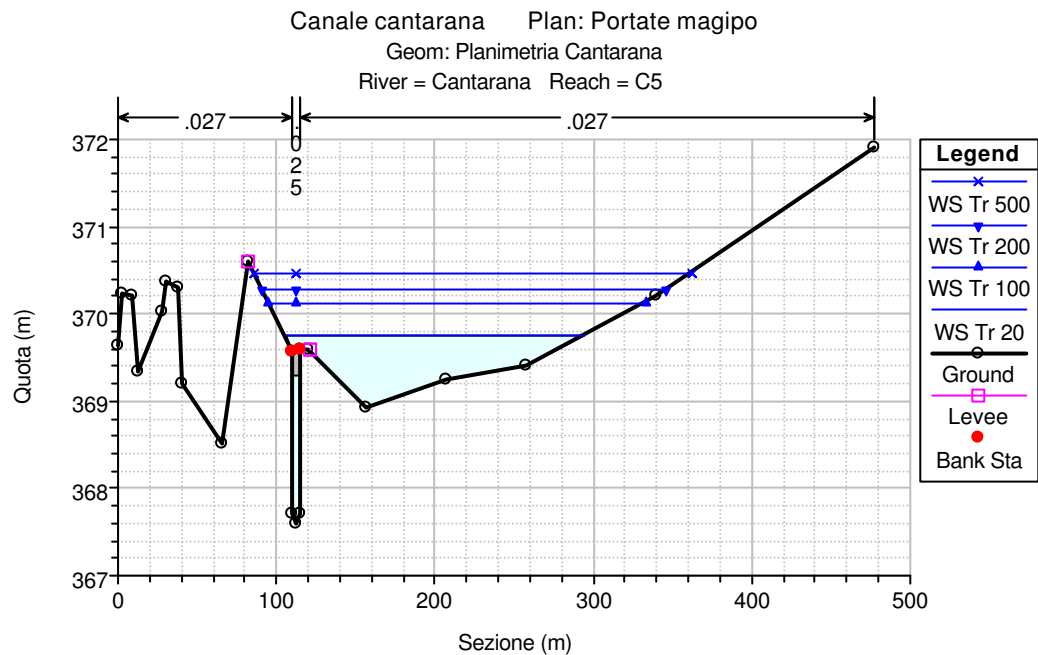


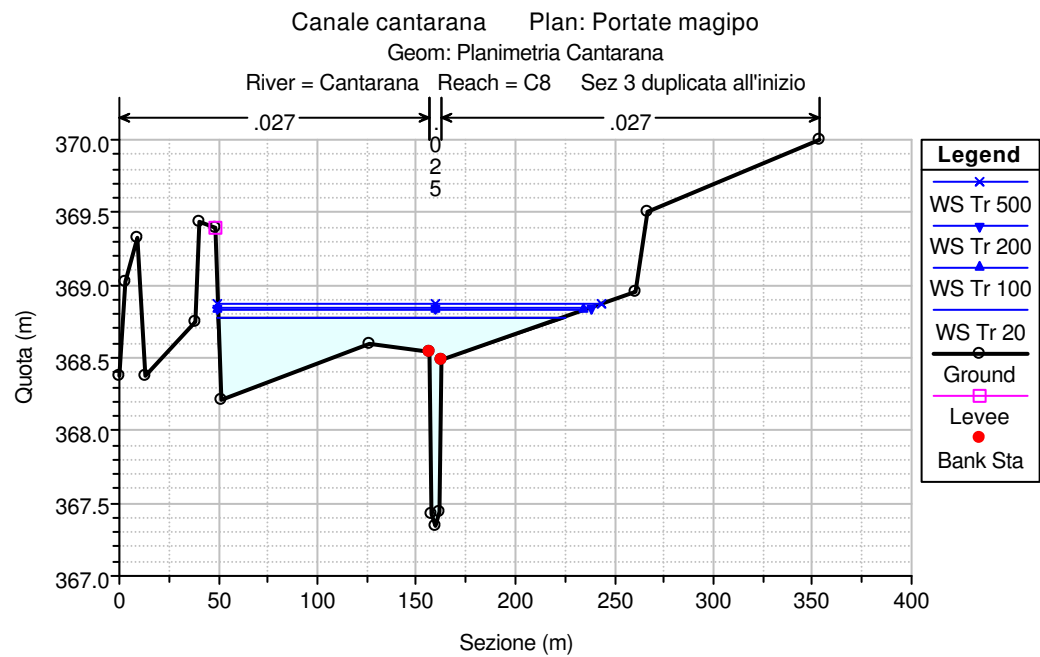
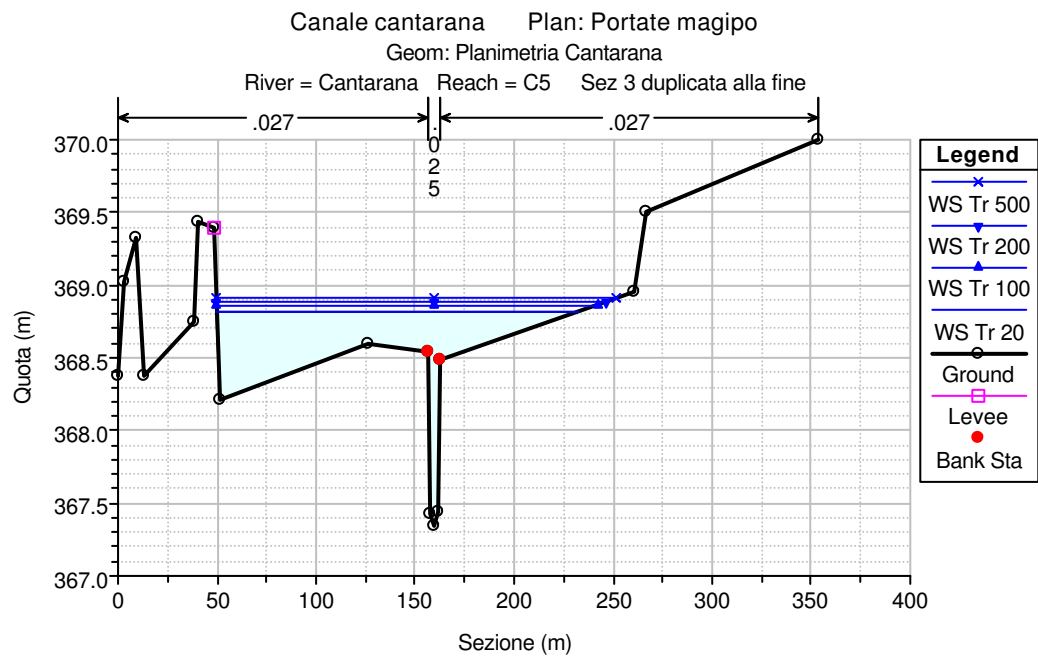
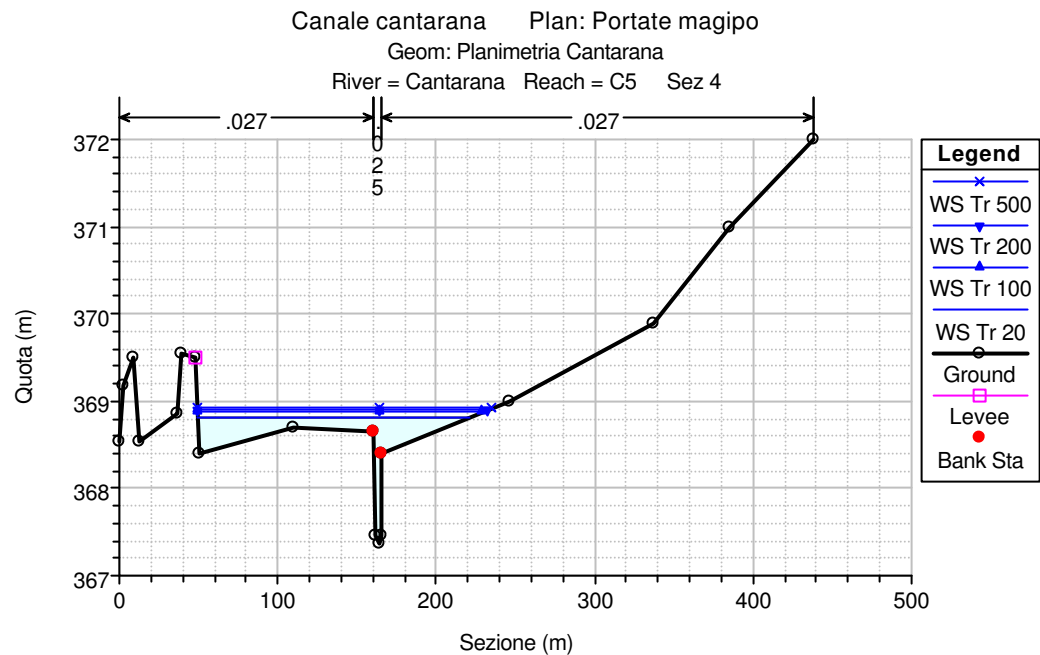
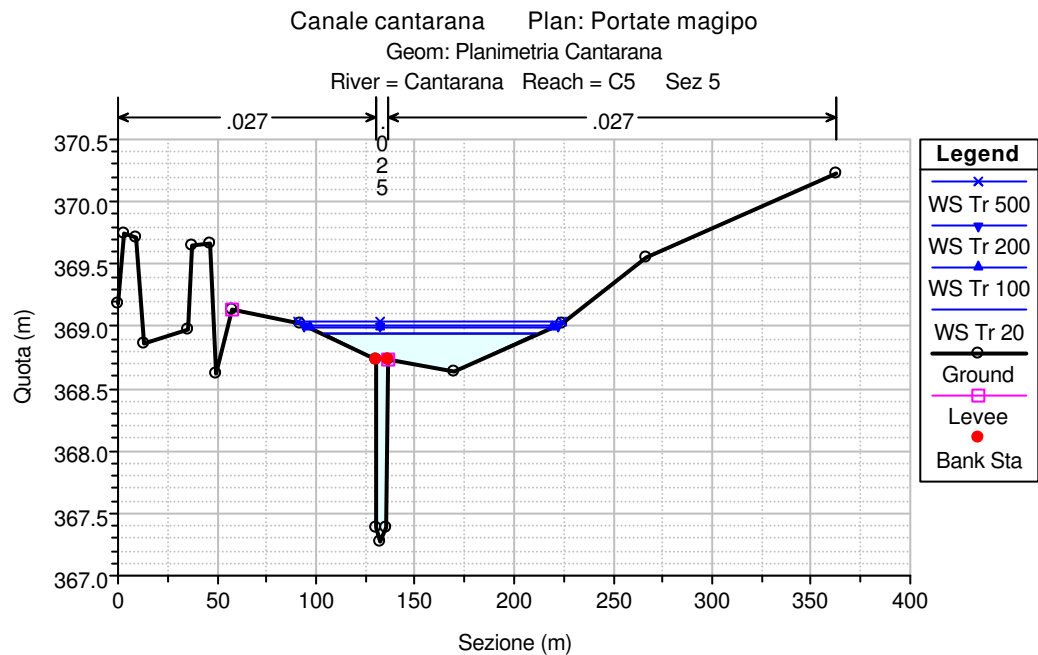


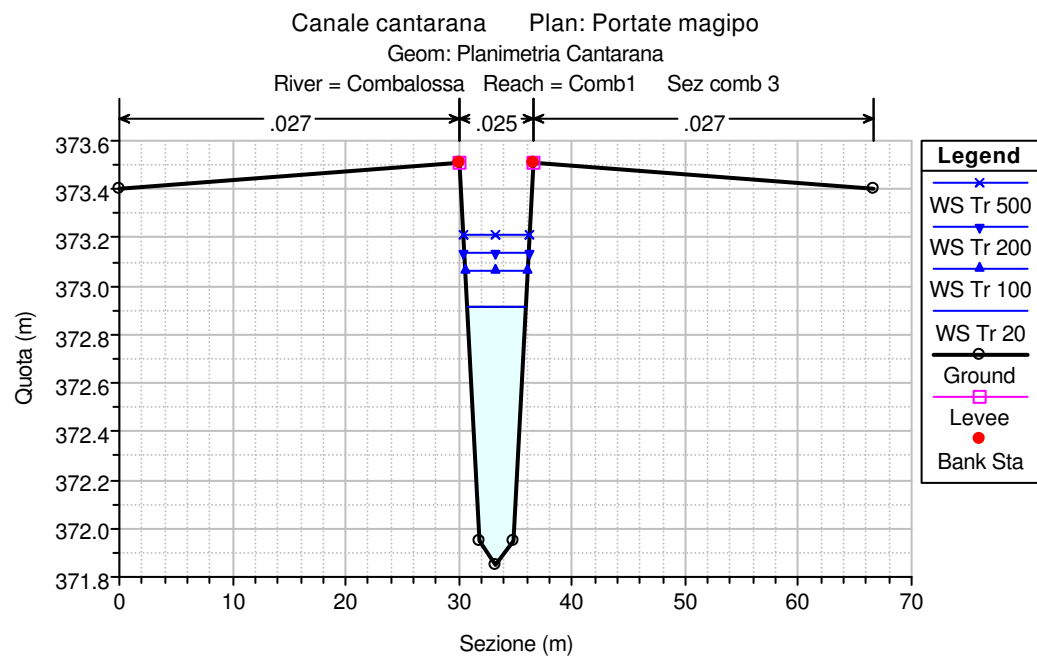
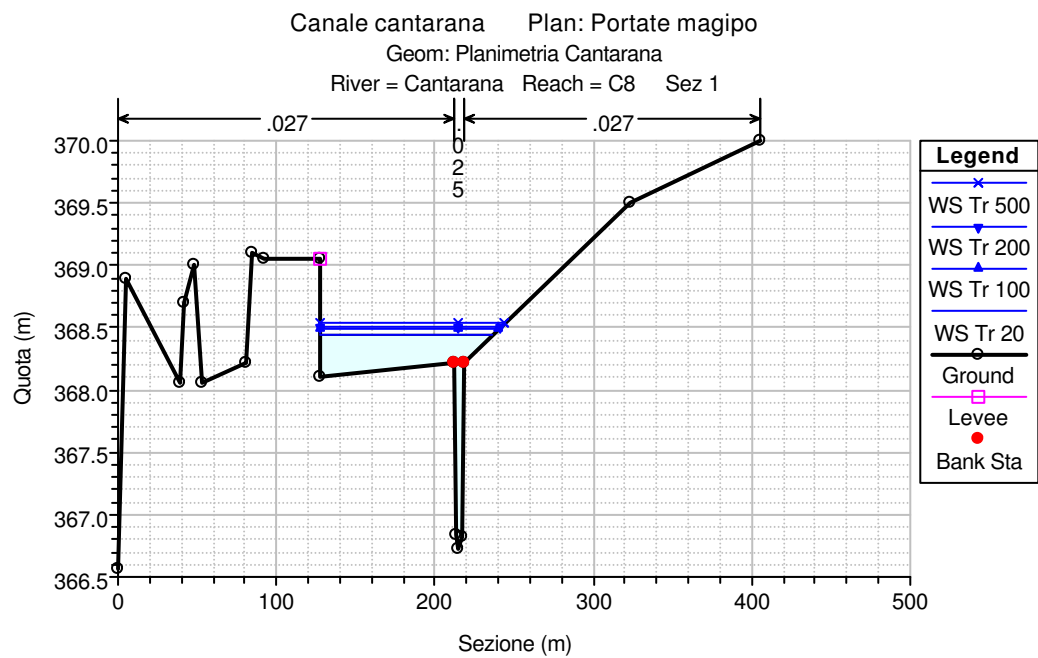
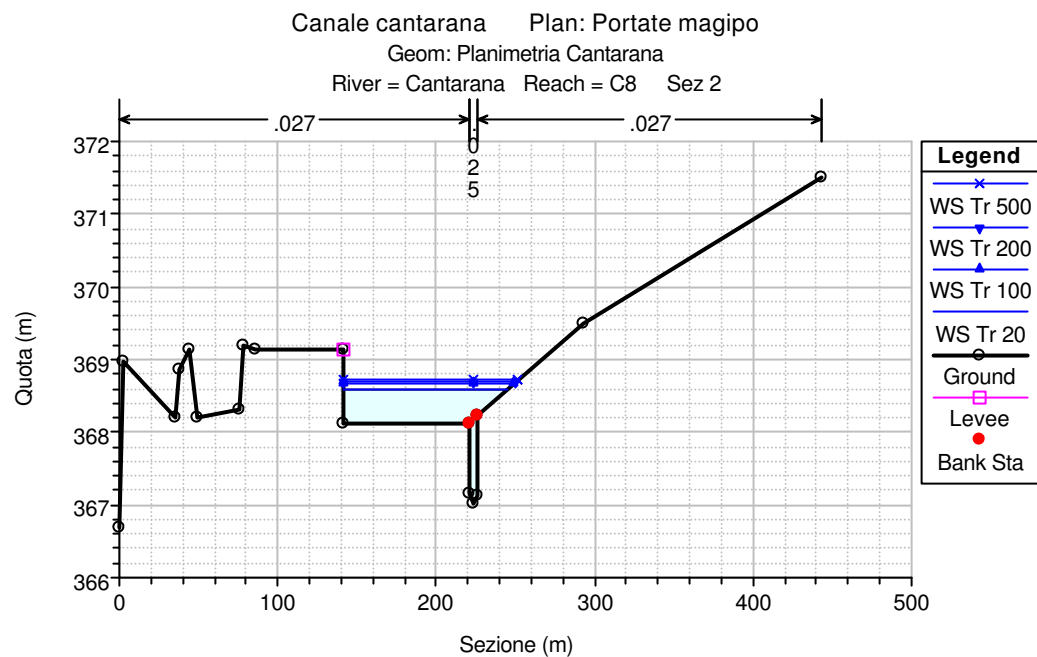
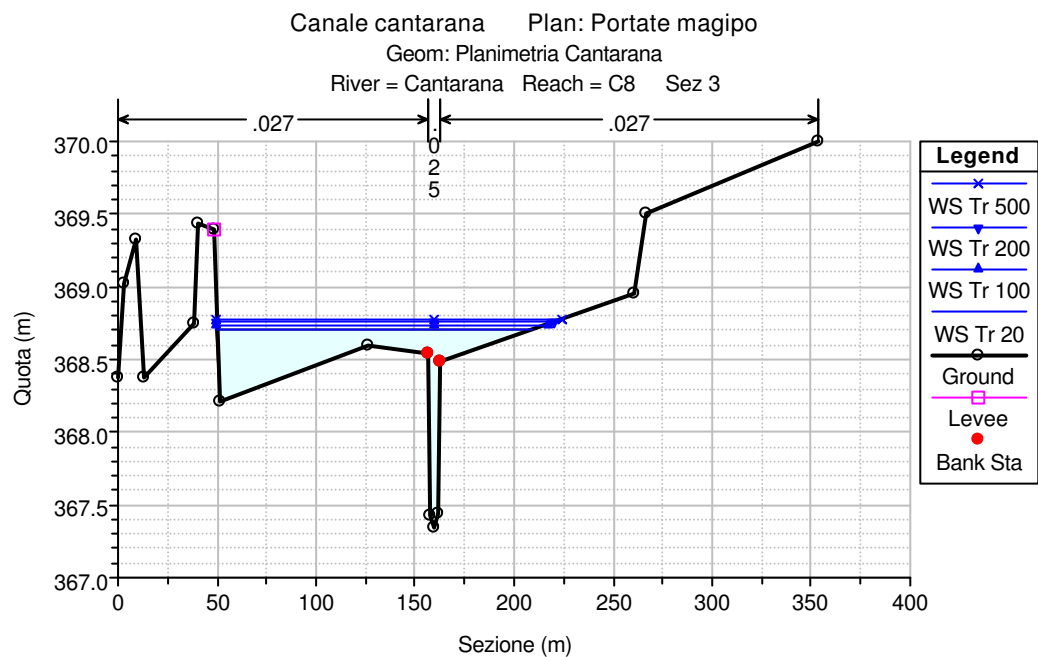


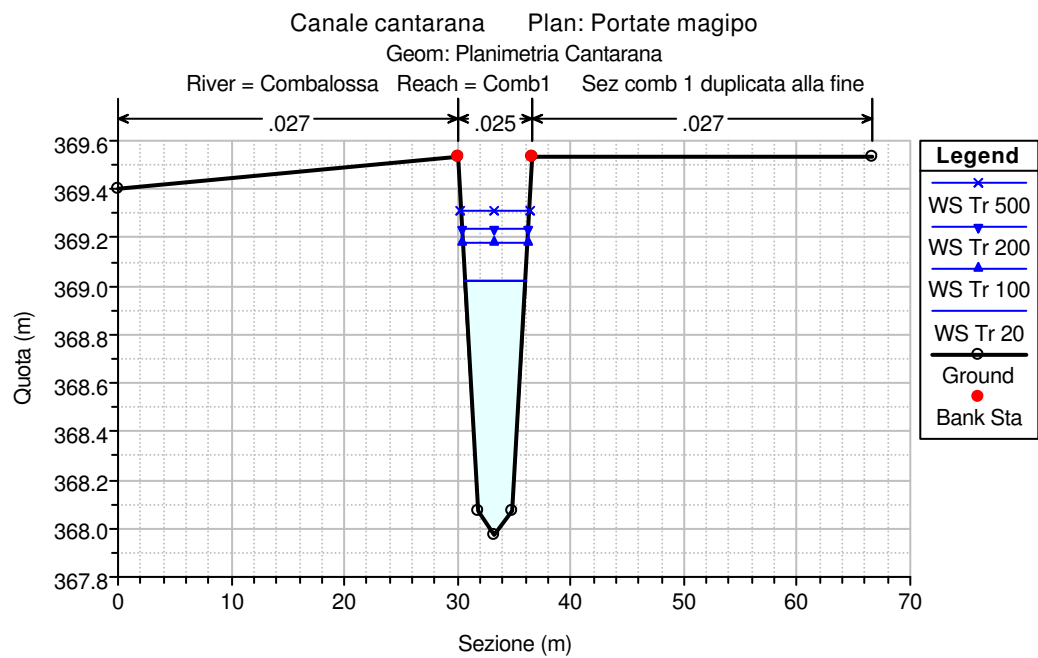
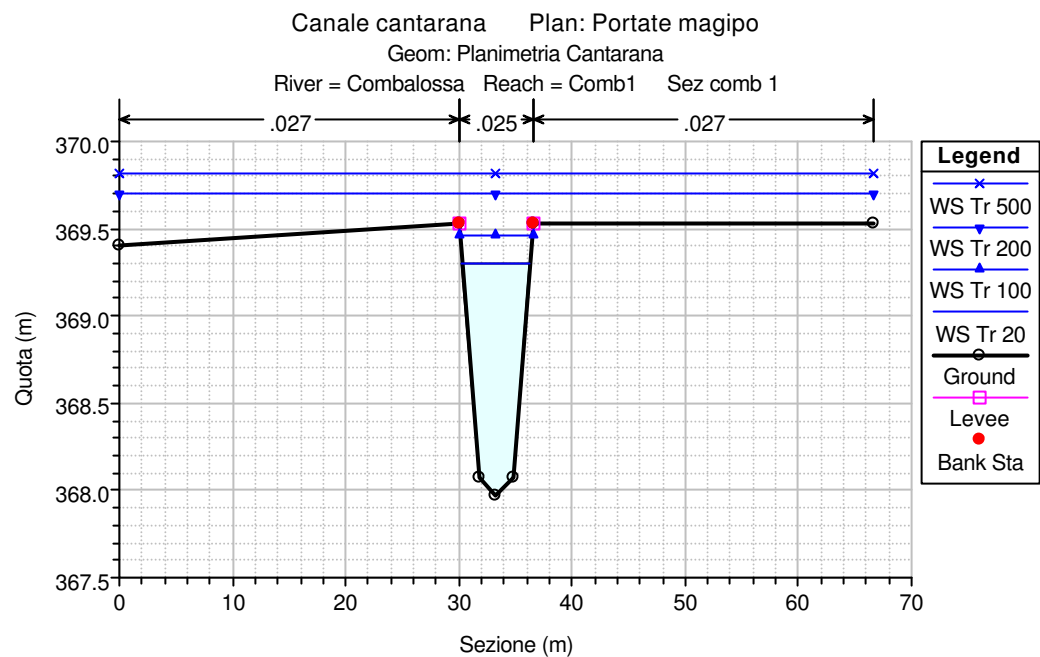
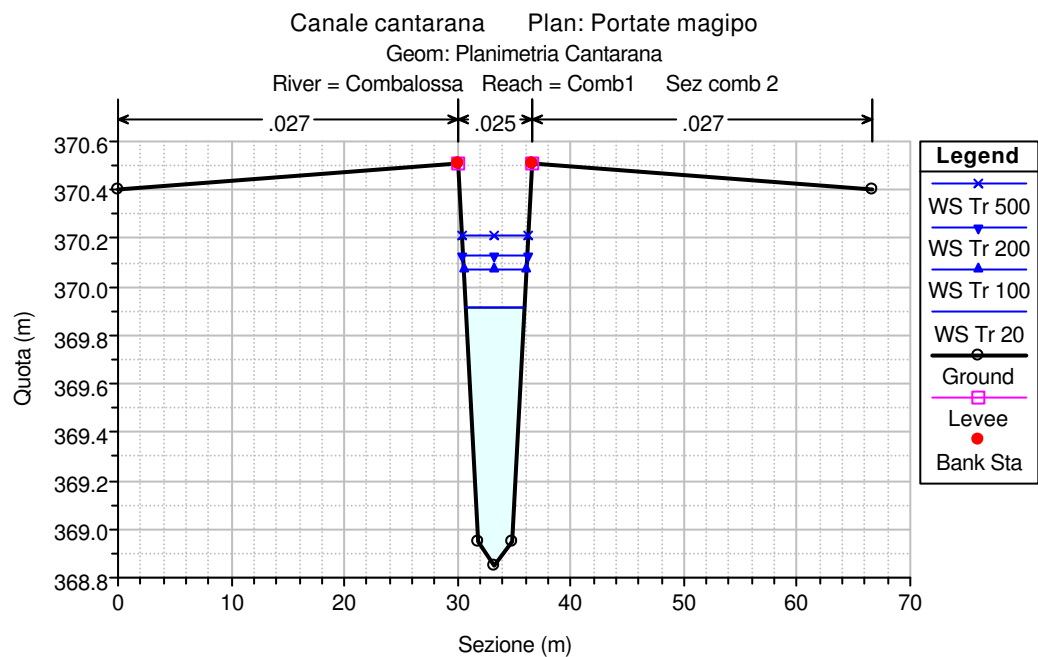












River	Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Combalossa	Comb1	3	Tr 20	11.47	371.85	372.91	372.91	373.31	0.007961	2.79	4.11	5.22	1.00
Combalossa	Comb1	3	Tr 100	14.62	371.85	373.07	373.07	373.51	0.007751	2.96	4.94	5.58	1.00
Combalossa	Comb1	3	Tr 200	15.97	371.85	373.13	373.13	373.59	0.007549	3.00	5.32	5.73	1.00
Combalossa	Comb1	3	Tr 500	17.74	371.85	373.21	373.21	373.69	0.007442	3.07	5.77	5.91	0.99
Combalossa	Comb1	2	Tr 20	11.47	368.85	369.91	369.91	370.31	0.007966	2.79	4.11	5.22	1.00
Combalossa	Comb1	2	Tr 100	14.62	368.85	370.07	370.07	370.51	0.007696	2.95	4.95	5.58	1.00
Combalossa	Comb1	2	Tr 200	15.97	368.85	370.13	370.13	370.59	0.007592	3.01	5.31	5.73	1.00
Combalossa	Comb1	2	Tr 500	17.74	368.85	370.21	370.21	370.69	0.007490	3.08	5.76	5.91	1.00
Combalossa	Comb1	1	Tr 20	11.47	367.97	369.30	369.02	369.50	0.003287	2.02	5.69	6.03	0.66
Combalossa	Comb1	1	Tr 100	14.62	367.97	369.47	369.18	369.71	0.003361	2.17	6.74	6.44	0.68
Combalossa	Comb1	1	Tr 200	15.97	367.97	369.70	369.24	369.76	0.001013	1.34	20.27	66.60	0.38
Combalossa	Comb1	1	Tr 500	17.74	367.97	369.82	369.32	369.86	0.000567	1.07	28.49	66.60	0.29
Combalossa	Comb1	0	Tr 20	11.47	367.97	369.02	369.02	369.42	0.007971	2.77	4.13	5.35	1.01
Combalossa	Comb1	0	Tr 100	14.62	367.97	369.18	369.18	369.62	0.007748	2.94	4.97	5.73	1.01
Combalossa	Comb1	0	Tr 200	15.97	367.97	369.24	369.24	369.69	0.007570	2.99	5.35	5.88	1.00
Combalossa	Comb1	0	Tr 500	17.74	367.97	369.31	369.31	369.79	0.007547	3.07	5.78	6.06	1.00
Cantarana	C1	70	Tr 20	12.24	375.91	377.66		377.73	0.000838	1.26	13.73	41.43	0.33
Cantarana	C1	70	Tr 100	15.62	375.91	378.01		378.03	0.000264	0.81	36.01	86.20	0.19
Cantarana	C1	70	Tr 200	17.06	375.91	378.16		378.17	0.000154	0.66	50.57	105.65	0.15
Cantarana	C1	70	Tr 500	18.96	375.91	378.17		378.19	0.000178	0.71	52.19	107.60	0.16
Cantarana	C1	69.1	Tr 20	12.24	375.88	377.48	376.92	377.67	0.002666	1.93	6.35	4.18	0.50
Cantarana	C1	69.1	Tr 100	15.62	375.88	378.02	377.09	378.02	0.000015	0.17	168.15	338.08	0.04
Cantarana	C1	69.1	Tr 200	17.06	375.88	378.16	377.15	378.16	0.000009	0.14	223.51	419.53	0.03
Cantarana	C1	69.1	Tr 500	18.96	375.88	378.18	377.24	378.18	0.000011	0.15	230.40	428.59	0.03
Cantarana	C1	69	Tr 20	12.24	375.88	377.46	376.92	377.66	0.002755	1.95	6.28	4.17	0.51
Cantarana	C1	69	Tr 100	15.62	375.88	378.02	377.09	378.02	0.000015	0.17	168.12	338.04	0.04
Cantarana	C1	69	Tr 200	17.06	375.88	378.16	377.15	378.16	0.000009	0.14	223.49	419.51	0.03
Cantarana	C1	69	Tr 500	18.96	375.88	378.18	377.24	378.18	0.000011	0.15	230.39	428.57	0.03
Cantarana	C1	68.21		Bridge									
Cantarana	C1	68.2	Tr 20	12.24	375.88	377.43	376.92	377.63	0.002964	2.00	6.11	4.17	0.53
Cantarana	C1	68.2	Tr 100	15.62	375.88	377.68	377.09	377.92	0.003101	2.17	7.18	4.19	0.53
Cantarana	C1	68.2	Tr 200	17.06	375.88	377.79	377.16	378.04	0.003114	2.23	7.89	9.30	0.53
Cantarana	C1	68.2	Tr 500	18.96	375.88	377.95	377.24	378.18	0.002732	2.16	10.02	14.34	0.49
Cantarana	C1	68.1	Tr 20	12.24	375.88	377.40	376.92	377.61	0.003098	2.03	6.02	4.17	0.54
Cantarana	C1	68.1	Tr 100	15.62	375.88	377.66	377.09	377.91	0.003223	2.21	7.08	4.18	0.54
Cantarana	C1	68.1	Tr 200	17.06	375.88	377.76	377.16	378.02	0.003255	2.26	7.66	8.00	0.54
Cantarana	C1	68.1	Tr 500	18.96	375.88	377.92	377.24	378.17	0.002948	2.23	9.57	14.34	0.51
Cantarana	C1	68	Tr 20	12.24	375.73	376.95	376.95	377.49	0.010310	3.24	3.78	3.49	0.99
Cantarana	C1	68	Tr 100	15.62	375.73	377.15	377.15	377.77	0.010603	3.50	4.46	3.56	1.00
Cantarana	C1	68	Tr 200	17.06	375.73	377.22	377.22	377.88	0.010733	3.60	4.74	3.59	1.00
Cantarana	C1	68	Tr 500	18.96	375.73	377.33	377.33	378.03	0.010749	3.70	5.12	3.63	0.99
Cantarana	C1	67	Tr 20	12.24	375.44	376.89		376.96	0.000889	1.23	9.98	8.03	0.34
Cantarana	C1	67	Tr 100	15.62	375.44	377.00	376.30	377.10	0.001108	1.44	11.25	61.77	0.38
Cantarana	C1	67	Tr 200	17.06	375.44	377.11		377.19	0.000801	1.29	20.74	100.84	0.33
Cantarana	C1	67	Tr 500	18.96	375.44	377.51		377.51	0.000107	0.55	90.73	338.21	0.13
Cantarana	C1	66	Tr 20	12.24	375.12	376.85	376.27	376.91	0.001036	1.30	15.97	51.18	0.34
Cantarana	C1	66	Tr 100	15.62	375.12	377.01	376.76	377.04	0.000657	1.09	24.60	57.56	0.27
Cantarana	C1	66	Tr 200	17.06	375.12	377.13	376.80	377.15	0.000289	0.75	47.71	176.78	0.18
Cantarana	C1	66	Tr 500	18.96	375.12	377.51	376.84	377.51	0.000033	0.29	135.05	289.00	0.06
Cantarana	C1	65	Tr 20	12.24	375.15	376.71	376.71	376.86	0.002931	1.97	9.81	34.61	0.56
Cantarana	C1	65	Tr 100	15.62	375.15	377.03	376.81	377.03	0.000075	0.36	106.84	381.93	0.09
Cantarana	C1	65	Tr 200	17.06	375.15	377.14	376.82	377.14	0.000033	0.25	152.76	422.92	0.06
Cantarana	C1	65	Tr 500	18.96	375.15	377.51	376.83	377.51	0.000005	0.11	333.38	555.56	0.02
Cantarana	C1	64	Tr 20	12.24	375.19	376.77		376.78	0.000409	0.76	44.84	295.43	0.23
Cantarana	C1	64	Tr 100	15.62	375.19	377.03		377.03	0.000035	0.25	136.45	382.56	0.07
Cantarana	C1	64	Tr 200	17.06	375.19	377.14		377.14	0.000018	0.19	181.63	408.48	0.05
Cantarana	C1	64	Tr 500	18.96	375.19	377.51		377.51	0.000003	0.10	354.28	532.54	0.02
Cantarana	C1	63	Tr 20	12.24	375.11	376.77		376.77	0.000061	0.36	86.00	304.42	0.09
Cantarana	C1	63	Tr 100	15.62	375.11	377.03		377.03	0.000016	0.20	184.62	458.00	0.05
Cantarana	C1	63	Tr 200	17.06	375.11	377.14		377.14	0.000009	0.16	239.06	494.58	0.04
Cantarana	C1	63	Tr 500	18.96	375.11	377.51		377.51	0.000002	0.08	436.63	567.58	0.02
Cantarana	C1	62	Tr 20	12.24	374.91	376.77	375.82	376.77	0.000064	0.38	71.22	200.95	0.10
Cantarana	C1	62	Tr 100	15.62	374.91	377.03	375.97	377.03	0.000004	0.10	308.80	557.98	0.02
Cantarana	C1	62	Tr 200	17.06	374.91	377.14	376.03	377.14	0.000003	0.09	373.64	576.65	0.02

HEC-RAS Plan: MagiPo (Continued)

River	Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Cantarana	C1	62	Tr 500	18.96	374.91	377.51	376.10	377.51	0.000001	0.05	597.85	641.18	0.01
Cantarana	C1	61.2	Tr 20	12.24	375.00	376.60	375.97	376.74	0.001893	1.70	7.22	4.92	0.45
Cantarana	C1	61.2	Tr 100	15.62	375.00	376.83	376.13	377.01	0.002032	1.86	8.38	4.98	0.46
Cantarana	C1	61.2	Tr 200	17.06	375.00	376.93	376.19	377.12	0.002056	1.92	8.90	5.00	0.46
Cantarana	C1	61.2	Tr 500	18.96	375.00	377.37	376.27	377.50	0.001236	1.63	14.25	37.53	0.35
Cantarana	C1	61.1	Tr 20	12.24	375.00	376.40	376.11	376.71	0.005171	2.47	4.96	3.76	0.69
Cantarana	C1	61.1	Tr 100	15.62	375.00	376.58	376.29	376.97	0.005969	2.78	5.62	3.77	0.73
Cantarana	C1	61.1	Tr 200	17.06	375.00	376.66	376.37	377.08	0.006124	2.87	5.94	3.77	0.73
Cantarana	C1	61.1	Tr 500	18.96	375.00	377.17	376.46	377.47	0.003559	2.41	7.88	4.42	0.53
Cantarana	C1	61.01	Bridge										
Cantarana	C1	61	Tr 20	12.24	375.00	376.28	376.11	376.66	0.006720	2.71	4.51	3.75	0.79
Cantarana	C1	61	Tr 100	15.62	375.00	376.29	376.29	376.89	0.010730	3.44	4.54	3.75	1.00
Cantarana	C1	61	Tr 200	17.06	375.00	376.37	376.37	377.00	0.010804	3.53	4.83	3.76	0.99
Cantarana	C1	61	Tr 500	18.96	375.00	376.46	376.46	377.14	0.011080	3.67	5.16	3.76	1.00
Cantarana	C1	60.1	Tr 20	12.24	375.00	376.42	375.91	376.57	0.002145	1.75	7.00	5.35	0.49
Cantarana	C1	60.1	Tr 100	15.62	375.00	376.06	376.05	376.54	0.008805	3.06	5.10	5.27	0.99
Cantarana	C1	60.1	Tr 200	17.06	375.00	376.11	376.11	376.62	0.008923	3.17	5.39	5.28	1.00
Cantarana	C1	60.1	Tr 500	18.96	375.00	376.19	376.19	376.74	0.008906	3.27	5.80	5.30	1.00
Cantarana	C1	60	Tr 20	12.24	374.70	375.92	375.92	376.41	0.008950	3.09	3.97	4.12	1.00
Cantarana	C1	60	Tr 100	15.62	374.70	376.16		376.28	0.002558	1.88	17.36	94.10	0.55
Cantarana	C1	60	Tr 200	17.06	374.70	376.27		376.31	0.001101	1.30	28.37	115.21	0.37
Cantarana	C1	60	Tr 500	18.96	374.70	376.38		376.40	0.000533	0.96	42.40	137.49	0.26
Cantarana	C1	59	Tr 20	12.24	374.66	376.06	376.06	376.12	0.001570	1.41	20.25	134.96	0.43
Cantarana	C1	59	Tr 100	15.62	374.66	376.19	376.09	376.20	0.000569	0.91	37.14	140.55	0.26
Cantarana	C1	59	Tr 200	17.06	374.66	376.27	376.10	376.28	0.000307	0.70	49.10	144.39	0.20
Cantarana	C1	59	Tr 500	18.96	374.66	376.38	376.11	376.38	0.000165	0.54	65.00	149.33	0.15
Cantarana	C1	58	Tr 20	12.24	374.60	375.75	375.41	375.92	0.002580	1.82	6.73	6.44	0.57
Cantarana	C1	58	Tr 100	15.62	374.60	375.95	375.54	376.14	0.002505	1.95	8.03	6.59	0.56
Cantarana	C1	58	Tr 200	17.06	374.60	376.03	375.60	376.23	0.002485	1.99	8.55	6.65	0.56
Cantarana	C1	58	Tr 500	18.96	374.60	376.13	375.66	376.35	0.002445	2.05	9.28	9.09	0.56
Cantarana	C1	57	Tr 20	12.24	374.47	375.43	375.43	375.84	0.008467	2.86	4.28	5.09	0.99
Cantarana	C1	57	Tr 100	15.62	374.47	375.58	375.58	376.06	0.008440	3.08	5.07	5.21	1.00
Cantarana	C1	57	Tr 200	17.06	374.47	375.64	375.64	376.15	0.008402	3.16	5.39	5.26	1.00
Cantarana	C1	57	Tr 500	18.96	374.47	375.72	375.72	376.26	0.008367	3.26	5.81	5.32	1.00
Cantarana	C1	56	Tr 20	12.24	373.84	375.29		375.45	0.002115	1.78	7.17	12.50	0.52
Cantarana	C1	56	Tr 100	15.62	373.84	375.45		375.62	0.002096	1.89	10.02	23.60	0.52
Cantarana	C1	56	Tr 200	17.06	373.84	375.55		375.69	0.001708	1.78	12.91	31.02	0.47
Cantarana	C1	56	Tr 500	18.96	373.84	375.62		375.75	0.001637	1.78	15.10	35.66	0.47
Cantarana	C1	55	Tr 20	12.24	373.83	375.35		375.39	0.000355	0.85	18.87	46.57	0.24
Cantarana	C1	55	Tr 100	15.62	373.83	375.52		375.55	0.000287	0.83	28.97	70.62	0.22
Cantarana	C1	55	Tr 200	17.06	373.83	375.61		375.64	0.000252	0.81	44.44	381.95	0.21
Cantarana	C1	55	Tr 500	18.96	373.83	375.69		375.70	0.000155	0.66	73.40	384.90	0.16
Cantarana	C1	54	Tr 20	12.24	373.61	375.22	374.67	375.36	0.001788	1.66	7.37	5.99	0.48
Cantarana	C1	54	Tr 100	15.62	373.61	375.33	374.83	375.52	0.002217	1.93	8.29	11.03	0.54
Cantarana	C1	54	Tr 200	17.06	373.61	375.42	374.90	375.61	0.002124	1.95	9.44	15.63	0.53
Cantarana	C1	54	Tr 500	18.96	373.61	375.46	374.97	375.67	0.002381	2.09	10.11	39.43	0.56
Cantarana	C1	53	Tr 20	12.24	373.77	375.09	374.79	375.32	0.003378	2.10	5.98	9.15	0.64
Cantarana	C1	53	Tr 100	15.62	373.77	375.09	374.95	375.46	0.005578	2.69	5.94	8.96	0.82
Cantarana	C1	53	Tr 200	17.06	373.77	375.01	375.01	375.52	0.008319	3.16	5.40	5.80	0.99
Cantarana	C1	53	Tr 500	18.96	373.77	375.27	375.27	375.61	0.004664	2.67	8.23	16.57	0.75
Cantarana	C1	52	Tr 20	12.24	373.48	375.09	374.63	375.16	0.001177	1.39	15.21	57.88	0.39
Cantarana	C1	52	Tr 100	15.62	373.48	375.32	375.06	375.33	0.000114	0.48	75.75	235.60	0.12
Cantarana	C1	52	Tr 200	17.06	373.48	375.27	375.09	375.28	0.000227	0.67	62.91	229.10	0.17
Cantarana	C1	52	Tr 500	18.96	373.48	375.32	375.14	375.32	0.000178	0.60	74.18	234.82	0.15
Cantarana	C1	51	Tr 20	12.24	373.63	374.95	374.59	375.10	0.002159	1.74	8.39	27.08	0.54
Cantarana	C1	51	Tr 100	15.62	373.63	375.29	374.73	375.32	0.000449	0.93	37.88	196.33	0.25
Cantarana	C1	51	Tr 200	17.06	373.63	375.00	374.78	375.23	0.003394	2.23	9.84	33.38	0.68
Cantarana	C1	51	Tr 500	18.96	373.63	375.21	375.05	375.30	0.001330	1.54	21.60	74.55	0.43
Cantarana	C1	50	Tr 20	12.24	373.52	375.03		375.04	0.000160	0.55	41.15	103.96	0.15
Cantarana	C1	50	Tr 100	15.62	373.52	375.30		375.31	0.000061	0.38	77.95	167.20	0.09
Cantarana	C1	50	Tr 200	17.06	373.52	375.14		375.15	0.000171	0.59	53.64	130.78	0.16
Cantarana	C1	50	Tr 500	18.96	373.52	375.26		375.27	0.000111	0.50	71.12	157.83	0.13
Cantarana	C1	49	Tr 20	12.24	372.67	375.03		375.04	0.000032	0.27	94.88	235.16	0.06

HEC-RAS Plan: MagiPo (Continued)

River	Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Cantarana	C1	49	Tr 100	15.62	372.67	375.30		375.30	0.000012	0.18	166.33	296.29	0.04
Cantarana	C1	49	Tr 200	17.06	372.67	375.14		375.14	0.000033	0.28	121.26	259.41	0.06
Cantarana	C1	49	Tr 500	18.96	372.67	375.26		375.26	0.000022	0.24	154.23	286.85	0.05
Cantarana	C1	48	Tr 20	12.24	372.84	375.03	373.97	375.03	0.000053	0.36	85.89	286.88	0.08
Cantarana	C1	48	Tr 100	15.62	372.84	375.30	374.13	375.30	0.000013	0.20	169.38	326.65	0.04
Cantarana	C1	48	Tr 200	17.06	372.84	375.14	374.27	375.14	0.000045	0.34	117.70	306.14	0.08
Cantarana	C1	48	Tr 500	18.96	372.84	375.26	374.45	375.26	0.000025	0.27	155.84	321.55	0.06
Cantarana	C1	47	Tr 20	12.24	372.58	375.03	373.51	375.03	0.000026	0.45	65.91	120.12	0.10
Cantarana	C1	47	Tr 100	15.62	372.58	375.30	373.65	375.30	0.000014	0.36	121.78	225.02	0.07
Cantarana	C1	47	Tr 200	17.06	372.58	375.13	373.69	375.14	0.000033	0.52	86.15	200.84	0.11
Cantarana	C1	47	Tr 500	18.96	372.58	375.26	373.76	375.26	0.000025	0.47	112.01	218.65	0.10
Cantarana	C1	46	Tr 20	12.24	372.45	374.83	373.82	375.01	0.000924	1.90	6.44	3.05	0.42
Cantarana	C1	46	Tr 100	15.62	372.45	375.30	374.05	375.30	0.000012	0.24	158.34	277.37	0.05
Cantarana	C1	46	Tr 200	17.06	372.45	375.13	374.14	375.14	0.000037	0.40	112.39	274.97	0.08
Cantarana	C1	46	Tr 500	18.96	372.45	374.72	374.26	375.21	0.002539	3.10	6.11	3.02	0.70
Cantarana	C1	45	Tr 20	12.24	372.45	374.83	373.71	374.98	0.000689	1.70	7.19	3.27	0.37
Cantarana	C1	45	Tr 100	15.62	372.45	375.30	373.92	375.30	0.000003	0.12	269.84	340.18	0.02
Cantarana	C1	45	Tr 200	17.06	372.45	375.14	374.00	375.14	0.000006	0.17	214.59	326.89	0.03
Cantarana	C1	45	Tr 500	18.96	372.45	375.06	374.11	375.06	0.000010	0.21	188.97	263.51	0.04
Cantarana	C2	45	Tr 20	18.16	372.45	374.49	374.07	374.95	0.002323	2.98	6.09	3.22	0.69
Cantarana	C2	45	Tr 100	23.18	372.45	374.34	374.34	375.21	0.004714	4.14	5.60	3.19	1.00
Cantarana	C2	45	Tr 200	25.32	372.45	375.14	374.45	375.14	0.000013	0.25	214.40	326.85	0.05
Cantarana	C2	45	Tr 500	28.14	372.45	375.06	374.58	375.06	0.000022	0.31	188.75	263.33	0.06
Cantarana	C2	44.3	Tr 20	18.16	372.40	374.72	373.50	374.83	0.000356	1.47	12.35	5.56	0.31
Cantarana	C2	44.3	Tr 100	23.18	372.40	374.80	373.69	374.97	0.000528	1.81	12.78	5.57	0.38
Cantarana	C2	44.3	Tr 200	25.32	372.40	375.13	373.76	375.14	0.000012	0.29	204.45	308.38	0.06
Cantarana	C2	44.3	Tr 500	28.14	372.40	375.06	373.86	375.06	0.000020	0.37	181.14	289.34	0.07
Cantarana	C2	44.2	Tr 20	18.16	372.40	374.72	373.46	374.83	0.000333	1.42	12.75	5.59	0.30
Cantarana	C2	44.2	Tr 100	23.18	372.40	374.80	373.63	374.96	0.000494	1.76	13.19	5.59	0.37
Cantarana	C2	44.2	Tr 200	25.32	372.40	375.13	373.72	375.14	0.000012	0.29	204.82	308.38	0.06
Cantarana	C2	44.2	Tr 500	28.14	372.40	375.06	373.81	375.06	0.000020	0.37	181.49	289.19	0.07
Cantarana	C2	44.11		Bridge									
Cantarana	C2	44.1	Tr 20	18.16	372.40	374.34	373.82	374.71	0.001786	2.68	6.77	3.57	0.62
Cantarana	C2	44.1	Tr 100	23.18	372.40	374.38	374.07	374.95	0.002731	3.34	6.93	3.58	0.77
Cantarana	C2	44.1	Tr 200	25.32	372.40	374.17	374.17	375.03	0.004439	4.10	6.17	3.57	1.00
Cantarana	C2	44.1	Tr 500	28.14	372.40	375.06	374.30	375.06	0.000006	0.17	268.17	293.85	0.03
Cantarana	C2	44	Tr 20	18.16	372.50	374.41	373.78	374.66	0.001040	2.22	8.18	4.68	0.54
Cantarana	C2	44	Tr 100	23.18	372.50	374.51	374.00	374.88	0.001447	2.68	8.66	5.01	0.63
Cantarana	C2	44	Tr 200	25.32	372.50	374.27	374.09	374.85	0.002540	3.37	7.52	4.63	0.84
Cantarana	C2	44	Tr 500	28.14	372.50	374.32	374.20	374.99	0.002894	3.63	7.75	4.65	0.90
Cantarana	C2	42	Tr 20	18.16	372.50	374.41	373.65	374.56	0.001564	1.76	12.26	20.54	0.42
Cantarana	C2	42	Tr 100	23.18	372.50	374.77	373.84	374.77	0.000019	0.21	172.31	299.59	0.05
Cantarana	C2	42	Tr 200	25.32	372.50	374.12	373.92	374.62	0.005964	3.13	8.15	7.57	0.81
Cantarana	C2	42	Tr 500	28.14	372.50	374.02	374.02	374.73	0.009001	3.72	7.56	5.31	1.00
Cantarana	C2	41	Tr 20	18.16	372.50	373.85	373.77	374.38	0.008203	3.22	5.64	4.40	0.91
Cantarana	C2	41	Tr 100	23.18	372.50	373.99	373.99	374.69	0.010113	3.72	6.23	4.43	1.00
Cantarana	C2	41	Tr 200	25.32	372.50	374.45	374.08	374.45	0.000126	0.47	97.32	216.28	0.11
Cantarana	C2	41	Tr 500	28.14	372.50	374.46	374.18	374.46	0.000147	0.51	99.36	217.02	0.12
Cantarana	C2	40.1	Tr 20	18.16	372.48	374.09	373.45	374.25	0.001822	1.78	10.17	6.58	0.46
Cantarana	C2	40.1	Tr 100	23.18	372.48	373.89	373.61	374.24	0.004384	2.60	8.90	6.57	0.71
Cantarana	C2	40.1	Tr 200	25.32	372.48	374.44	373.69	374.45	0.000161	0.58	87.59	216.68	0.13
Cantarana	C2	40.1	Tr 500	28.14	372.48	374.45	373.76	374.46	0.000188	0.63	89.51	217.86	0.15
Cantarana	C2	40.01		Bridge									
Cantarana	C2	40	Tr 20	18.16	372.49	374.07	373.47	374.23	0.000692	1.82	9.99	6.59	0.47
Cantarana	C2	40	Tr 100	23.18	372.49	373.77	373.63	374.19	0.002120	2.88	8.05	6.57	0.83
Cantarana	C2	40	Tr 200	25.32	372.49	374.32	373.69	374.33	0.000088	0.70	100.01	227.87	0.17
Cantarana	C2	40	Tr 500	28.14	372.49	374.45	373.78	374.46	0.000052	0.57	131.01	237.52	0.13
Cantarana	C2	39.1	Tr 20	18.16	372.49	374.06	373.47	374.23	0.000698	1.82	9.96	6.59	0.47
Cantarana	C2	39.1	Tr 100	23.18	372.49	373.63	373.63	374.17	0.003043	3.25	7.13	6.56	0.99
Cantarana	C2	39.1	Tr 200	25.32	372.49	373.69	373.69	374.27	0.003081	3.36	7.54	6.57	1.00
Cantarana	C2	39.1	Tr 500	28.14	372.49	373.78	373.78	374.39	0.003052	3.47	8.12	6.57	1.00
Cantarana	C2	39	Tr 20	18.16	372.30	374.18	373.50	374.18	0.000026	0.38	131.90	245.12	0.10
Cantarana	C2	39	Tr 100	23.18	372.30	373.84	373.63	374.00	0.001020	2.12	17.32	23.30	0.59

HEC-RAS Plan: MagiPo (Continued)

River	Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Cantarana	C2	39	Tr 200	25.32	372.30	373.86	373.72	374.04	0.001158	2.27	17.66	23.36	0.63
Cantarana	C2	39	Tr 500	28.14	372.30	374.07	373.76	374.08	0.000117	0.78	105.98	240.90	0.20
Cantarana	C2	38	Tr 20	18.16	372.33	373.32	373.32	374.10	0.007373	4.29	5.40	8.14	1.48
Cantarana	C2	38	Tr 100	23.18	372.33	373.80	373.80	373.97	0.001566	2.41	29.82	178.42	0.68
Cantarana	C2	38	Tr 200	25.32	372.33	373.80	373.80	374.00	0.001868	2.63	29.82	178.42	0.75
Cantarana	C2	38	Tr 500	28.14	372.33	373.80	373.80	374.05	0.002307	2.92	29.82	178.42	0.83
Cantarana	C2	37	Tr 20	18.16	372.00	373.38	373.33	373.47	0.002624	1.78	17.41	52.82	0.53
Cantarana	C2	37	Tr 100	23.18	372.00	373.52	373.39	373.58	0.001607	1.46	25.63	59.42	0.41
Cantarana	C2	37	Tr 200	25.32	372.00	373.55	373.41	373.60	0.001760	1.55	41.20	228.70	0.43
Cantarana	C2	37	Tr 500	28.14	372.00	373.60	373.44	373.63	0.001219	1.31	52.05	237.70	0.36
Cantarana	C2	36	Tr 20	18.16	372.00	373.36	373.15	373.43	0.000516	1.46	26.05	62.40	0.42
Cantarana	C2	36	Tr 100	23.18	372.00	373.41	373.25	373.53	0.000835	1.91	31.02	117.31	0.54
Cantarana	C2	36	Tr 200	25.32	372.00	373.46	373.29	373.55	0.000684	1.78	37.01	118.13	0.49
Cantarana	C2	36	Tr 500	28.14	372.00	373.51	373.34	373.59	0.000606	1.71	42.69	118.90	0.47
Cantarana	C2	35	Tr 20	18.16	371.75	373.36	373.26	373.40	0.000531	1.39	31.99	81.85	0.38
Cantarana	C2	35	Tr 100	23.18	371.75	373.45	373.30	373.49	0.000492	1.38	39.27	82.02	0.36
Cantarana	C2	35	Tr 200	25.32	371.75	373.49	373.32	373.52	0.000482	1.38	42.07	82.08	0.36
Cantarana	C2	35	Tr 500	28.14	371.75	373.53	373.33	373.56	0.000478	1.40	45.38	82.16	0.36
Cantarana	C2	34	Tr 20	18.16	371.73	373.21	373.21	373.38	0.001047	2.09	17.05	50.24	0.58
Cantarana	C2	34	Tr 100	23.18	371.73	373.28	373.28	373.46	0.001155	2.26	20.74	50.40	0.61
Cantarana	C2	34	Tr 200	25.32	371.73	373.31	373.31	373.49	0.001238	2.35	21.79	50.44	0.63
Cantarana	C2	34	Tr 500	28.14	371.73	373.34	373.34	373.53	0.001285	2.43	23.55	50.52	0.65
Cantarana	C2	33	Tr 20	18.16	371.73	373.22	373.16	373.23	0.000019	0.16	152.56	276.52	0.05
Cantarana	C2	33	Tr 100	23.18	371.73	373.32	373.20	373.32	0.000020	0.17	178.37	289.18	0.05
Cantarana	C2	33	Tr 200	25.32	371.73	373.34	373.20	373.35	0.000021	0.18	186.77	295.14	0.05
Cantarana	C2	33	Tr 500	28.14	371.73	373.26	373.20	373.27	0.000037	0.23	163.76	281.50	0.07
Cantarana	C2	32	Tr 20	18.16	371.81	373.22	372.26	373.22	0.000011	0.11	196.82	324.36	0.03
Cantarana	C2	32	Tr 100	23.18	371.81	373.32	372.32	373.32	0.000012	0.12	226.97	335.16	0.03
Cantarana	C2	32	Tr 200	25.32	371.81	373.34	372.46	373.34	0.000012	0.13	236.64	338.56	0.04
Cantarana	C2	32	Tr 500	28.14	371.81	373.26	372.47	373.26	0.000022	0.16	209.82	329.06	0.05
Cantarana	C2	31	Tr 20	18.16	371.81	373.22	372.17	373.22	0.000006	0.09	232.34	318.36	0.03
Cantarana	C2	31	Tr 100	23.18	371.81	373.32	372.19	373.32	0.000007	0.10	262.02	331.14	0.03
Cantarana	C2	31	Tr 200	25.32	371.81	373.34	372.21	373.34	0.000008	0.10	271.57	333.89	0.03
Cantarana	C2	31	Tr 500	28.14	371.81	373.26	372.23	373.26	0.000013	0.13	245.07	323.90	0.04
Cantarana	C2	30.3	Tr 20	18.16	371.73	373.22		373.22	0.000004	0.07	226.99	186.67	0.02
Cantarana	C2	30.3	Tr 100	23.18	371.73	373.32		373.32	0.000005	0.09	244.08	187.77	0.02
Cantarana	C2	30.3	Tr 200	25.32	371.73	373.34		373.34	0.000005	0.09	249.47	188.12	0.02
Cantarana	C2	30.3	Tr 500	28.14	371.73	373.26		373.26	0.000008	0.11	234.35	187.15	0.03
Cantarana	C2	30.2	Tr 20	18.16	371.53	373.22	372.15	373.22	0.000007	0.11	214.14	255.32	0.03
Cantarana	C2	30.2	Tr 100	23.18	371.53	373.32	372.19	373.32	0.000008	0.12	237.47	255.99	0.03
Cantarana	C2	30.2	Tr 200	25.32	371.53	373.34	372.21	373.34	0.000008	0.12	244.82	256.20	0.03
Cantarana	C2	30.2	Tr 500	28.14	371.53	373.26	372.22	373.26	0.000014	0.15	224.17	255.61	0.04
Cantarana	C2	30.11		Bridge									
Cantarana	C2	30.1	Tr 20	18.16	371.52	373.13	372.34	373.22	0.000841	1.29	14.05	9.35	0.34
Cantarana	C2	30.1	Tr 100	23.18	371.52	373.26	372.48	373.26	0.000023	0.22	148.04	180.69	0.06
Cantarana	C2	30.1	Tr 200	25.32	371.52	373.34	372.53	373.34	0.000021	0.22	162.99	188.11	0.05
Cantarana	C2	30.1	Tr 500	28.14	371.52	373.26	372.60	373.26	0.000034	0.27	147.99	180.66	0.07
Cantarana	C2	30	Tr 20	18.16	371.52	373.13	373.13	373.19	0.001765	1.58	27.62	158.06	0.42
Cantarana	C2	30	Tr 100	23.18	371.52	373.23	373.15	373.26	0.000887	1.18	45.46	179.64	0.30
Cantarana	C2	30	Tr 200	25.32	371.52	373.33	373.16	373.34	0.000440	0.86	63.80	199.39	0.21
Cantarana	C2	30	Tr 500	28.14	371.52	373.18	373.18	373.25	0.002299	1.85	36.13	168.69	0.48
Cantarana	C2	29	Tr 20	18.16	370.81	372.14	372.14	372.74	0.009829	3.46	5.25	4.28	1.00
Cantarana	C2	29	Tr 100	23.18	370.81	372.35	372.35	373.07	0.010102	3.74	6.19	4.33	1.00
Cantarana	C2	29	Tr 200	25.32	370.81	372.45	372.45	373.20	0.010124	3.84	6.60	4.35	0.99
Cantarana	C2	29	Tr 500	28.14	370.81	372.84	372.84	372.85	0.000261	0.69	83.81	220.72	0.16
Cantarana	C2	28	Tr 20	18.16	370.03	372.13	371.06	372.22	0.000812	1.35	15.77	22.95	0.31
Cantarana	C2	28	Tr 100	23.18	370.03	372.48	371.23	372.50	0.000299	0.91	51.91	156.66	0.19
Cantarana	C2	28	Tr 200	25.32	370.03	372.56	371.30	372.58	0.000224	0.80	64.82	162.55	0.17
Cantarana	C2	28	Tr 500	28.14	370.03	372.79	371.39	372.79	0.000039	0.35	208.00	545.74	0.07
Cantarana	C2	26.2	Tr 20	18.16	370.03	371.77	371.41	372.16	0.005317	2.78	6.59	11.79	0.70
Cantarana	C2	26.2	Tr 100	23.18	370.03	372.49		372.49	0.000083	0.42	104.08	213.09	0.09
Cantarana	C2	26.2	Tr 200	25.32	370.03	372.57		372.57	0.000065	0.38	120.55	219.67	0.08
Cantarana	C2	26.2	Tr 500	28.14	370.03	372.79		372.79	0.000027	0.26	191.54	358.49	0.05

HEC-RAS Plan: MagiPo (Continued)

River	Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Cantarana	C2	26.1	Tr 20	18.16	370.03	371.70	371.41	372.13	0.005969	2.90	6.25	4.03	0.74
Cantarana	C2	26.1	Tr 100	23.18	370.03	372.49	371.64	372.49	0.000084	0.43	103.99	213.05	0.09
Cantarana	C2	26.1	Tr 200	25.32	370.03	372.57	372.07	372.57	0.000065	0.38	120.47	219.64	0.08
Cantarana	C2	26.1	Tr 500	28.14	370.03	372.79	372.07	372.79	0.000027	0.26	191.49	358.49	0.05
Cantarana	C2	26.01		Bridge									
Cantarana	C2	26	Tr 20	18.16	370.03	371.59	371.41	372.09	0.002650	3.14	5.79	4.01	0.83
Cantarana	C2	26	Tr 100	23.18	370.03	371.85	371.64	372.43	0.002709	3.37	6.87	4.06	0.83
Cantarana	C2	26	Tr 200	25.32	370.03	371.96	371.73	372.57	0.002710	3.47	7.43	7.93	0.83
Cantarana	C2	26	Tr 500	28.14	370.03	371.88	371.85	372.71	0.003851	4.04	6.96	4.07	0.99
Cantarana	C2	25.1	Tr 20	18.16	370.03	371.41	371.41	372.06	0.003780	3.56	5.09	3.97	1.00
Cantarana	C2	25.1	Tr 100	23.18	370.03	371.64	371.64	372.40	0.003892	3.85	6.02	4.02	1.01
Cantarana	C2	25.1	Tr 200	25.32	370.03	371.73	371.73	372.53	0.003940	3.96	6.39	4.04	1.01
Cantarana	C2	25.1	Tr 500	28.14	370.03	371.84	371.84	372.71	0.004106	4.14	6.80	4.06	1.02
Cantarana	C2	25	Tr 20	18.16	369.40	371.28	370.33	371.32	0.000932	0.92	21.17	34.07	0.33
Cantarana	C2	25	Tr 100	23.18	369.40	371.17	370.47	371.27	0.002066	1.40	17.74	28.04	0.49
Cantarana	C2	25	Tr 200	25.32	369.40	371.16	370.53	371.28	0.002541	1.55	17.40	27.37	0.54
Cantarana	C2	25	Tr 500	28.14	369.40	371.17	370.60	371.31	0.003088	1.71	17.58	27.73	0.60
Cantarana	C2	24.3	Tr 20	18.16	369.40	371.27	370.34	371.31	0.001411	0.96	25.22	124.81	0.40
Cantarana	C2	24.3	Tr 100	23.18	369.40	371.10	370.48	371.25	0.001910	1.71	13.70	12.60	0.46
Cantarana	C2	24.3	Tr 200	25.32	369.40	371.07	370.54	371.26	0.002435	1.91	13.32	11.61	0.52
Cantarana	C2	24.3	Tr 500	28.14	369.40	371.04	370.60	371.28	0.003187	2.17	13.02	10.74	0.59
Cantarana	C2	24.21		Bridge									
Cantarana	C2	24.2	Tr 20	18.16	369.40	371.27	370.34	371.31	0.001495	0.98	24.43	122.32	0.41
Cantarana	C2	24.2	Tr 100	23.18	369.40	371.06	370.48	371.22	0.002073	1.76	13.24	11.37	0.48
Cantarana	C2	24.2	Tr 200	25.32	369.40	371.06	370.54	371.25	0.002508	1.93	13.16	11.16	0.52
Cantarana	C2	24.2	Tr 500	28.14	369.40	371.04	370.60	371.28	0.003175	2.16	13.04	10.79	0.59
Cantarana	C2	24.1	Tr 20	18.16	369.60	371.27	370.40	371.30	0.000678	0.85	28.65	113.32	0.29
Cantarana	C2	24.1	Tr 100	23.18	369.60	371.09	370.51	371.20	0.001420	1.46	15.97	22.92	0.42
Cantarana	C2	24.1	Tr 200	25.32	369.60	371.09	370.56	371.22	0.001696	1.59	15.96	22.65	0.46
Cantarana	C2	24.1	Tr 500	28.14	369.60	371.09	370.61	371.25	0.002104	1.78	15.92	21.67	0.51
Cantarana	C2	24	Tr 20	18.16	369.41	371.29	370.78	371.29	0.000034	0.28	122.14	232.09	0.07
Cantarana	C2	24	Tr 100	23.18	369.41	371.14	370.81	371.15	0.000121	0.50	90.67	205.51	0.13
Cantarana	C2	24	Tr 200	25.32	369.41	371.15	370.82	371.16	0.000135	0.53	93.03	207.47	0.14
Cantarana	C2	24	Tr 500	28.14	369.41	371.17	370.83	371.18	0.000152	0.57	96.44	210.50	0.15
Cantarana	C3	24	Tr 20	18.16	369.41	371.29	370.78	371.29	0.000034	0.28	122.13	232.08	0.07
Cantarana	C3	24	Tr 100	23.18	369.41	371.14	370.81	371.15	0.000122	0.50	90.61	205.47	0.13
Cantarana	C3	24	Tr 200	25.32	369.41	371.15	370.82	371.16	0.000135	0.53	92.97	207.41	0.14
Cantarana	C3	24	Tr 500	28.14	369.41	371.17	370.83	371.18	0.000152	0.57	96.37	210.44	0.15
Cantarana	C3	23	Tr 20	18.16	369.40	370.78	370.78	371.23	0.006786	3.01	6.17	8.88	0.94
Cantarana	C3	23	Tr 100	23.18	369.40	371.08	371.08	371.13	0.001023	1.34	41.94	200.75	0.38
Cantarana	C3	23	Tr 200	25.32	369.40	371.08	371.08	371.13	0.001221	1.47	41.94	200.75	0.41
Cantarana	C3	23	Tr 500	28.14	369.40	371.08	371.08	371.15	0.001508	1.63	41.94	200.75	0.46
Cantarana	C3	22.4	Tr 20	18.16	369.13	370.82	369.99	370.84	0.000521	0.82	42.15	185.78	0.22
Cantarana	C3	22.4	Tr 100	23.18	369.13	370.89	370.13	370.91	0.000483	0.77	55.39	195.74	0.22
Cantarana	C3	22.4	Tr 200	25.32	369.13	370.93	370.19	370.95	0.000412	0.70	63.98	201.95	0.20
Cantarana	C3	22.4	Tr 500	28.14	369.13	370.98	370.26	370.99	0.000364	0.65	73.22	208.42	0.19
Cantarana	C3	22.3	Tr 20	18.16	369.13	370.82	369.99	370.84	0.000538	0.83	41.44	185.23	0.23
Cantarana	C3	22.3	Tr 100	23.18	369.13	370.89	370.13	370.90	0.000494	0.78	54.86	195.35	0.22
Cantarana	C3	22.3	Tr 200	25.32	369.13	370.93	370.19	370.94	0.000419	0.71	63.52	201.62	0.20
Cantarana	C3	22.3	Tr 500	28.14	369.13	370.98	370.26	370.99	0.000370	0.66	72.82	208.14	0.19
Cantarana	C3	22.21		Bridge									
Cantarana	C3	22.2	Tr 20	18.16	369.13	370.80	369.99	370.83	0.000600	0.88	38.98	183.31	0.24
Cantarana	C3	22.2	Tr 100	23.18	369.13	370.88	370.13	370.90	0.000529	0.80	53.20	194.14	0.23
Cantarana	C3	22.2	Tr 200	25.32	369.13	370.92	370.19	370.94	0.000439	0.72	62.28	200.74	0.21
Cantarana	C3	22.2	Tr 500	28.14	369.13	370.97	370.26	370.98	0.000384	0.67	71.75	207.40	0.20
Cantarana	C3	22.1	Tr 20	18.16	369.13	370.71	369.99	370.82	0.001594	1.47	12.33	8.16	0.38
Cantarana	C3	22.1	Tr 100	23.18	369.13	370.87	370.13	370.89	0.000545	0.82	52.48	193.60	0.23
Cantarana	C3	22.1	Tr 200	25.32	369.13	370.92	370.19	370.94	0.000448	0.73	61.78	200.38	0.21
Cantarana	C3	22.1	Tr 500	28.14	369.13	370.97	370.26	370.98	0.000390	0.68	71.31	207.10	0.20
Cantarana	C3	22	Tr 20	18.16	369.10	370.72	370.01	370.77	0.000580	1.09	30.77	126.21	0.29
Cantarana	C3	22	Tr 100	23.18	369.10	370.85	370.16	370.88	0.000410	0.96	48.28	148.98	0.25
Cantarana	C3	22	Tr 200	25.32	369.10	370.90	370.22	370.92	0.000362	0.92	55.80	158.47	0.23
Cantarana	C3	22	Tr 500	28.14	369.10	370.95	370.29	370.97	0.000338	0.90	63.63	168.98	0.22

HEC-RAS Plan: MagiPo (Continued)

River	Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Cantarana	C3	21	Tr 20	18.16	369.16	370.50	370.50	370.70	0.003375	2.27	11.96	31.29	0.68
Cantarana	C3	21	Tr 100	23.18	369.16	370.53	370.53	370.81	0.004645	2.71	13.00	33.16	0.80
Cantarana	C3	21	Tr 200	25.32	369.16	370.60	370.60	370.86	0.004188	2.68	15.64	45.02	0.77
Cantarana	C3	21	Tr 500	28.14	369.16	370.75	370.75	370.92	0.002742	2.33	25.39	101.32	0.63
Cantarana	C3	20	Tr 20	18.16	369.04	370.49	370.05	370.52	0.000614	1.04	32.92	107.01	0.29
Cantarana	C3	20	Tr 100	23.18	369.04	370.55	370.21	370.58	0.000653	1.11	40.33	120.12	0.31
Cantarana	C3	20	Tr 200	25.32	369.04	370.55	370.41	370.59	0.000796	1.23	39.91	119.37	0.34
Cantarana	C3	20	Tr 500	28.14	369.04	370.57	370.43	370.62	0.000845	1.28	42.86	124.63	0.35
Cantarana	C3	19	Tr 20	18.16	369.09	370.44	370.35	370.49	0.001382	1.38	25.03	84.04	0.41
Cantarana	C3	19	Tr 100	23.18	369.09	370.51	370.39	370.56	0.001370	1.42	30.94	93.33	0.41
Cantarana	C3	19	Tr 200	25.32	369.09	370.48	370.41	370.55	0.002028	1.70	28.25	89.22	0.50
Cantarana	C3	19	Tr 500	28.14	369.09	370.49	370.44	370.57	0.002217	1.80	29.74	91.53	0.52
Cantarana	C3	18	Tr 20	18.16	369.08	370.42	370.35	370.46	0.000470	1.33	43.21	177.57	0.38
Cantarana	C3	18	Tr 100	23.18	369.08	370.49	370.37	370.52	0.000404	1.29	57.29	198.42	0.36
Cantarana	C3	18	Tr 200	25.32	369.08	370.39	370.39	370.49	0.001188	2.09	37.91	164.67	0.61
Cantarana	C3	18	Tr 500	28.14	369.08	370.46	370.41	370.52	0.000805	1.78	50.29	188.82	0.50
Cantarana	C3	14	Tr 20	18.16	369.00	370.43	369.87	370.44	0.000186	0.77	55.59	197.97	0.25
Cantarana	C3	14	Tr 100	23.18	369.00	370.01	370.01	370.46	0.003277	2.94	7.88	9.71	1.00
Cantarana	C3	14	Tr 200	25.32	369.00	370.28	370.28	370.39	0.001144	1.71	30.32	155.17	0.61
Cantarana	C3	14	Tr 500	28.14	369.00	370.46		370.49	0.000339	1.07	63.32	210.08	0.34
Cantarana	C3	13	Tr 20	18.16	368.87	369.91	369.91	370.37	0.003951	2.98	6.09	6.76	1.00
Cantarana	C3	13	Tr 100	23.18	368.87	370.13	370.13	370.17	0.001322	1.19	36.61	155.39	0.58
Cantarana	C3	13	Tr 200	25.32	368.87	370.28	370.13	370.29	0.000370	0.49	68.03	234.01	0.31
Cantarana	C3	13	Tr 500	28.14	368.87	370.47	370.14	370.48	0.000092	0.36	116.89	279.30	0.17
Cantarana	C3	12.4	Tr 20	18.16	367.88	369.79	369.22	369.81	0.001139	0.64	35.49	148.78	0.34
Cantarana	C3	12.4	Tr 100	23.18	367.88	370.13	369.37	370.14	0.000103	0.25	100.86	233.65	0.11
Cantarana	C3	12.4	Tr 200	25.32	367.88	370.28	369.43	370.29	0.000050	0.21	140.03	281.05	0.08
Cantarana	C3	12.4	Tr 500	28.14	367.88	370.47	369.72	370.47	0.000024	0.17	194.78	296.59	0.06
Cantarana	C3	12.3	Tr 20	18.16	367.88	369.78	369.22	369.80	0.001220	0.66	34.44	146.38	0.35
Cantarana	C3	12.3	Tr 100	23.18	367.88	370.13	369.69	370.14	0.000104	0.25	100.74	233.43	0.11
Cantarana	C3	12.3	Tr 200	25.32	367.88	370.28	369.71	370.29	0.000050	0.21	139.96	281.03	0.08
Cantarana	C3	12.3	Tr 500	28.14	367.88	370.47	369.72	370.47	0.000024	0.17	194.74	296.58	0.06
Cantarana	C3	12.21		Bridge									
Cantarana	C3	12.2	Tr 20	18.16	367.88	369.78	369.22	369.79	0.001310	0.69	33.37	143.90	0.37
Cantarana	C3	12.2	Tr 100	23.18	367.88	370.13	369.69	370.14	0.000104	0.25	100.63	233.24	0.11
Cantarana	C3	12.2	Tr 200	25.32	367.88	370.28	369.71	370.28	0.000050	0.21	139.79	280.98	0.08
Cantarana	C3	12.2	Tr 500	28.14	367.88	370.47	369.72	370.47	0.000024	0.17	194.72	296.58	0.06
Cantarana	C3	12.1	Tr 20	18.16	367.88	369.77	369.22	369.79	0.001417	0.72	32.22	141.16	0.38
Cantarana	C3	12.1	Tr 100	23.18	367.88	370.13	369.37	370.14	0.000104	0.25	100.51	233.01	0.11
Cantarana	C3	12.1	Tr 200	25.32	367.88	370.28	369.43	370.28	0.000051	0.21	139.72	280.96	0.08
Cantarana	C3	12.1	Tr 500	28.14	367.88	370.47	369.72	370.47	0.000024	0.17	194.69	296.57	0.06
Cantarana	C3	12	Tr 20	18.16	367.97	369.77	369.31	369.77	0.000130	0.32	71.11	171.04	0.13
Cantarana	C3	12	Tr 100	23.18	367.97	370.13	369.36	370.13	0.000030	0.21	140.40	209.93	0.07
Cantarana	C3	12	Tr 200	25.32	367.97	370.28	369.38	370.28	0.000020	0.19	173.24	229.54	0.06
Cantarana	C3	12	Tr 500	28.14	367.97	370.47	369.40	370.47	0.000013	0.17	219.36	254.54	0.05
Cantarana	C3	11	Tr 20	18.16	367.76	369.77	369.14	369.77	0.000042	0.20	109.60	204.78	0.08
Cantarana	C3	11	Tr 100	23.18	367.76	370.13	369.18	370.13	0.000013	0.15	190.71	240.80	0.05
Cantarana	C3	11	Tr 200	25.32	367.76	370.28	369.20	370.28	0.000009	0.14	227.87	255.98	0.04
Cantarana	C3	11	Tr 500	28.14	367.76	370.47	369.22	370.47	0.000007	0.12	278.43	274.79	0.03
Cantarana	C5	11	Tr 20	24.52	367.76	369.77	369.19	369.77	0.000077	0.27	109.29	204.64	0.10
Cantarana	C5	11	Tr 100	31.33	367.76	370.13	369.24	370.13	0.000024	0.20	190.52	240.70	0.06
Cantarana	C5	11	Tr 200	34.24	367.76	370.28	369.26	370.28	0.000017	0.18	227.70	255.92	0.05
Cantarana	C5	11	Tr 500	38.07	367.76	370.47	369.28	370.47	0.000012	0.17	278.29	274.74	0.05
Cantarana	C5	8	Tr 20	24.52	367.80	369.76	369.11	369.76	0.000048	0.30	135.31	258.58	0.09
Cantarana	C5	8	Tr 100	31.33	367.80	370.13	369.16	370.13	0.000016	0.20	237.70	295.90	0.05
Cantarana	C5	8	Tr 200	34.24	367.80	370.28	369.17	370.28	0.000011	0.18	283.02	307.74	0.04
Cantarana	C5	8	Tr 500	38.07	367.80	370.47	369.20	370.47	0.000008	0.17	343.30	327.30	0.04
Cantarana	C5	7.1	Tr 20	24.52	367.58	369.76	369.04	369.76	0.000094	0.46	98.98	188.91	0.10
Cantarana	C5	7.1	Tr 100	31.33	367.58	370.13	369.34	370.13	0.000031	0.30	177.96	235.60	0.06
Cantarana	C5	7.1	Tr 200	34.24	367.58	370.28	369.36	370.28	0.000022	0.26	214.75	252.64	0.05
Cantarana	C5	7.1	Tr 500	38.07	367.58	370.47	369.39	370.47	0.000015	0.23	264.93	272.21	0.04
Cantarana	C5	7	Tr 20	24.52	367.58	369.76	369.27	369.76	0.000094	0.46	98.89	188.85	0.10
Cantarana	C5	7	Tr 100	31.33	367.58	370.13	369.34	370.13	0.000031	0.30	177.92	235.58	0.06

HEC-RAS Plan: MagiPo (Continued)

River	Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Cantarana	C5	7	Tr 200	34.24	367.58	370.28	369.36	370.28	0.000022	0.26	214.72	252.63	0.05
Cantarana	C5	7	Tr 500	38.07	367.58	370.47	369.39	370.47	0.000015	0.23	264.91	272.21	0.04
Cantarana	C5	6.21	Bridge										
Cantarana	C5	6.2	Tr 20	24.52	367.60	369.75	369.01	369.76	0.000123	0.50	90.87	188.39	0.11
Cantarana	C5	6.2	Tr 100	31.33	367.60	370.13	369.26	370.13	0.000036	0.30	170.49	237.59	0.06
Cantarana	C5	6.2	Tr 200	34.24	367.60	370.28	369.36	370.28	0.000025	0.26	207.70	255.58	0.05
Cantarana	C5	6.2	Tr 500	38.07	367.60	370.47	369.48	370.47	0.000017	0.22	258.60	276.34	0.04
Cantarana	C5	6.1	Tr 20	24.52	367.60	369.01	369.01	369.69	0.009637	3.64	6.73	4.97	1.00
Cantarana	C5	6.1	Tr 100	31.33	367.60	369.26	369.26	370.05	0.009849	3.94	7.94	4.98	1.00
Cantarana	C5	6.1	Tr 200	34.24	367.60	369.36	369.36	370.20	0.009963	4.06	8.43	4.99	1.00
Cantarana	C5	6.1	Tr 500	38.07	367.60	369.48	369.48	370.38	0.010082	4.20	9.06	4.99	1.00
Cantarana	C5	6	Tr 20	24.52	367.55	369.15	369.15	369.25	0.001577	1.71	31.28	153.02	0.47
Cantarana	C5	6	Tr 100	31.33	367.55	369.20	369.20	369.29	0.001774	1.85	37.87	160.77	0.50
Cantarana	C5	6	Tr 200	34.24	367.55	369.21	369.21	369.31	0.001849	1.90	40.43	163.68	0.52
Cantarana	C5	6	Tr 500	38.07	367.55	369.23	369.23	369.33	0.001939	1.97	43.62	167.24	0.53
Cantarana	C5	5	Tr 20	24.52	367.28	368.94	368.94	369.06	0.001977	1.88	25.34	106.60	0.51
Cantarana	C5	5	Tr 100	31.33	367.28	368.99	368.99	369.11	0.002100	1.99	32.09	122.64	0.53
Cantarana	C5	5	Tr 200	34.24	367.28	369.01	369.01	369.14	0.002172	2.04	34.59	128.06	0.54
Cantarana	C5	5	Tr 500	38.07	367.28	369.03	369.03	369.16	0.002340	2.14	37.10	133.89	0.56
Cantarana	C5	4	Tr 20	24.52	367.36	368.82	368.77	368.86	0.001128	1.35	41.62	172.21	0.39
Cantarana	C5	4	Tr 100	31.33	367.36	368.87	368.80	368.91	0.001080	1.36	51.27	179.78	0.39
Cantarana	C5	4	Tr 200	34.24	367.36	368.89	368.81	368.93	0.001072	1.37	54.99	182.61	0.39
Cantarana	C5	4	Tr 500	38.07	367.36	368.92	368.83	368.96	0.001065	1.38	59.66	186.11	0.39
Cantarana	C5	3	Tr 20	24.52	367.34	368.81	368.65	368.83	0.000448	0.88	57.48	182.52	0.25
Cantarana	C5	3	Tr 100	31.33	367.34	368.86	368.69	368.88	0.000492	0.95	66.91	193.10	0.26
Cantarana	C5	3	Tr 200	34.24	367.34	368.88	368.70	368.90	0.000509	0.98	70.64	197.13	0.27
Cantarana	C5	3	Tr 500	38.07	367.34	368.91	368.71	368.93	0.000530	1.01	75.40	202.16	0.28
Cantarana	C8	4	Tr 20	35.99	367.34	368.78	368.70	368.83	0.001288	1.47	51.40	175.36	0.42
Cantarana	C8	4	Tr 100	45.95	367.34	368.83	368.74	368.88	0.001422	1.58	59.77	185.14	0.45
Cantarana	C8	4	Tr 200	50.21	367.34	368.84	368.76	368.90	0.001479	1.63	63.00	188.79	0.46
Cantarana	C8	4	Tr 500	55.81	367.34	368.87	368.78	368.92	0.001547	1.69	67.13	193.34	0.47
Cantarana	C8	3	Tr 20	35.99	367.34	368.70	368.70	368.80	0.002597	2.00	38.87	159.58	0.59
Cantarana	C8	3	Tr 100	45.95	367.34	368.74	368.74	368.85	0.003015	2.20	44.57	166.94	0.64
Cantarana	C8	3	Tr 200	50.21	367.34	368.76	368.76	368.87	0.003076	2.25	47.44	170.53	0.65
Cantarana	C8	3	Tr 500	55.81	367.34	368.78	368.78	368.89	0.003209	2.32	50.70	174.51	0.67
Cantarana	C8	2	Tr 20	35.99	367.03	368.60	368.42	368.64	0.000906	1.31	48.13	104.20	0.36
Cantarana	C8	2	Tr 100	45.95	367.03	368.66	368.47	368.71	0.001026	1.44	54.74	107.49	0.39
Cantarana	C8	2	Tr 200	50.21	367.03	368.68	368.49	368.74	0.001069	1.49	57.42	108.81	0.40
Cantarana	C8	2	Tr 500	55.81	367.03	368.71	368.52	368.77	0.001128	1.55	60.70	110.38	0.41
Cantarana	C8	1	Tr 20	35.99	366.72	368.44	368.44	368.56	0.002422	2.12	33.59	108.44	0.56
Cantarana	C8	1	Tr 100	45.95	366.72	368.49	368.49	368.62	0.002693	2.29	39.26	112.64	0.60
Cantarana	C8	1	Tr 200	50.21	366.72	368.51	368.51	368.65	0.002844	2.37	41.22	114.06	0.61
Cantarana	C8	1	Tr 500	55.81	366.72	368.53	368.53	368.68	0.002969	2.44	44.02	116.06	0.63
Ramo morto	Rm1	1	Tr 20	0.01	369.31	371.29		371.29	0.000000	0.00	11.64	14.30	0.00
Ramo morto	Rm1	1	Tr 100	0.01	369.31	371.15		371.15	0.000000	0.00	9.63	14.30	0.00
Ramo morto	Rm1	1	Tr 200	0.01	369.31	371.16		371.16	0.000000	0.00	9.80	14.30	0.00
Ramo morto	Rm1	1	Tr 500	0.01	369.31	371.18		371.18	0.000000	0.00	10.05	14.30	0.00
Ramo morto	Rm1	0	Tr 20	0.01	369.31	371.29		371.29	0.000000	0.00	11.64	14.30	0.00
Ramo morto	Rm1	0	Tr 100	0.01	369.31	371.15		371.15	0.000000	0.00	9.63	14.30	0.00
Ramo morto	Rm1	0	Tr 200	0.01	369.31	371.16		371.16	0.000000	0.00	9.80	14.30	0.00
Ramo morto	Rm1	0	Tr 500	0.01	369.31	371.18		371.18	0.000000	0.00	10.05	14.30	0.00
Paleoalveo	P1	18	Tr 20	2.48	433.33	433.89	433.89	434.05	0.019529	1.85	1.49	5.00	0.94
Paleoalveo	P1	18	Tr 100	3.19	433.33	433.95	433.95	434.13	0.018735	1.99	1.80	5.31	0.94
Paleoalveo	P1	18	Tr 200	3.49	433.33	433.97	433.97	434.16	0.018463	2.05	1.92	5.41	0.94
Paleoalveo	P1	18	Tr 500	3.89	433.33	434.00	434.00	434.20	0.018078	2.11	2.09	5.54	0.94
Paleoalveo	P1	17	Tr 20	2.48	424.83	425.36	425.36	425.55	0.024709	1.95	1.27	3.35	1.01
Paleoalveo	P1	17	Tr 100	3.19	424.83	425.44	425.44	425.65	0.023991	2.07	1.54	3.59	1.01
Paleoalveo	P1	17	Tr 200	3.49	424.83	425.47	425.47	425.69	0.023725	2.12	1.65	3.68	1.01
Paleoalveo	P1	17	Tr 500	3.89	424.83	425.50	425.50	425.74	0.023247	2.17	1.80	3.80	1.01
Paleoalveo	P1	16	Tr 20	2.48	420.09	420.60	420.60	420.81	0.027000	2.04	1.22	2.86	1.00
Paleoalveo	P1	16	Tr 100	3.19	420.09	420.68	420.68	420.93	0.026803	2.19	1.46	3.01	1.01
Paleoalveo	P1	16	Tr 200	3.49	420.09	420.71	420.71	420.97	0.026837	2.25	1.55	3.07	1.01
Paleoalveo	P1	16	Tr 500	3.89	420.09	420.76	420.76	421.03	0.026115	2.30	1.69	3.15	1.00

HEC-RAS Plan: MagiPo (Continued)

River	Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Paleoalveo	P1	15	Tr 20	2.48	412.95	413.51	413.51	413.66	0.023821	1.69	1.48	5.14	0.99
Paleoalveo	P1	15	Tr 100	3.19	412.95	413.57	413.57	413.74	0.023092	1.85	1.74	5.22	1.00
Paleoalveo	P1	15	Tr 200	3.49	412.95	413.59	413.59	413.77	0.021705	1.88	1.88	5.26	0.98
Paleoalveo	P1	15	Tr 500	3.89	412.95	413.62	413.62	413.81	0.021863	1.97	2.01	5.30	1.00
Paleoalveo	P1	14	Tr 20	2.48	400.74	401.21	401.21	401.33	0.025655	1.52	1.63	6.88	1.00
Paleoalveo	P1	14	Tr 100	3.19	400.74	401.26	401.26	401.39	0.024660	1.60	2.00	7.62	1.00
Paleoalveo	P1	14	Tr 200	3.49	400.74	401.28	401.28	401.42	0.024614	1.63	2.14	7.88	1.00
Paleoalveo	P1	14	Tr 500	3.89	400.74	401.31	401.31	401.45	0.023695	1.65	2.35	8.27	0.99
Paleoalveo	P1	13	Tr 20	2.48	393.13	393.62	393.62	393.75	0.017533	1.92	1.75	6.98	0.92
Paleoalveo	P1	13	Tr 100	3.19	393.13	393.68	393.68	393.82	0.017082	2.04	2.14	7.72	0.92
Paleoalveo	P1	13	Tr 200	3.49	393.13	393.70	393.70	393.84	0.017045	2.09	2.29	8.00	0.93
Paleoalveo	P1	13	Tr 500	3.89	393.13	393.72	393.72	393.87	0.016948	2.15	2.50	8.34	0.93
Paleoalveo	P1	12	Tr 20	2.48	391.81	392.17	392.17	392.31	0.026355	1.65	1.50	5.49	1.01
Paleoalveo	P1	12	Tr 100	3.19	391.81	392.22	392.22	392.38	0.025521	1.77	1.80	5.71	1.01
Paleoalveo	P1	12	Tr 200	3.49	391.81	392.24	392.24	392.41	0.025139	1.82	1.92	5.79	1.01
Paleoalveo	P1	12	Tr 500	3.89	391.81	392.27	392.27	392.45	0.024739	1.87	2.08	5.91	1.01
Paleoalveo	P1	11	Tr 20	2.48	387.10	387.73		387.74	0.000874	0.48	5.21	9.60	0.21
Paleoalveo	P1	11	Tr 100	3.19	387.10	387.83		387.84	0.000848	0.52	6.15	9.64	0.21
Paleoalveo	P1	11	Tr 200	3.49	387.10	387.87		387.88	0.000836	0.54	6.53	9.65	0.21
Paleoalveo	P1	11	Tr 500	3.89	387.10	387.92		387.94	0.000825	0.56	7.01	9.68	0.21
Paleoalveo	P2	11	Tr 20	6.36	387.10	387.54	387.54	387.72	0.003292	1.89	3.38	9.51	1.01
Paleoalveo	P2	11	Tr 100	8.15	387.10	387.61	387.61	387.82	0.003151	2.05	3.99	9.54	1.01
Paleoalveo	P2	11	Tr 200	8.92	387.10	387.63	387.63	387.86	0.003083	2.11	4.25	9.55	1.01
Paleoalveo	P2	11	Tr 500	9.93	387.10	387.67	387.67	387.91	0.003000	2.18	4.58	9.57	1.00
Paleoalveo	P2	10	Tr 20	6.36	380.89	381.57	381.57	381.84	0.003102	2.37	3.13	6.50	0.97
Paleoalveo	P2	10	Tr 100	8.15	380.89	381.67	381.67	381.99	0.003030	2.56	3.81	6.94	0.97
Paleoalveo	P2	10	Tr 200	8.92	380.89	381.71	381.71	382.04	0.003000	2.63	4.10	7.12	0.97
Paleoalveo	P2	10	Tr 500	9.93	380.89	381.77	381.77	382.12	0.002960	2.72	4.48	7.34	0.97
Paleoalveo	P2	8	Tr 20	6.36	377.40	377.77	377.77	377.86	0.010626	1.30	5.07	40.16	0.93
Paleoalveo	P2	8	Tr 100	8.15	377.40	377.82	377.82	377.89	0.007459	1.24	7.56	57.01	0.81
Paleoalveo	P2	8	Tr 200	8.92	377.40	377.83	377.83	377.91	0.007458	1.27	8.14	57.09	0.81
Paleoalveo	P2	8	Tr 500	9.93	377.40	377.84	377.84	377.92	0.007531	1.32	8.84	57.17	0.82
Paleoalveo	P2	7	Tr 20	6.36	375.96	376.08	376.08	376.12	0.017098	0.88	7.27	94.60	1.01
Paleoalveo	P2	7	Tr 100	8.15	375.96	376.09	376.09	376.14	0.015878	0.93	8.72	97.29	1.00
Paleoalveo	P2	7	Tr 200	8.92	375.96	376.10	376.10	376.15	0.015670	0.96	9.28	98.31	1.00
Paleoalveo	P2	7	Tr 500	9.93	375.96	376.11	376.11	376.16	0.015309	0.99	10.02	99.64	1.00
Paleoalveo	P2	6	Tr 20	6.36	373.66	373.85	373.82	373.87	0.006463	0.61	10.35	110.45	0.64
Paleoalveo	P2	6	Tr 100	8.15	373.66	373.86	373.83	373.89	0.006559	0.67	12.18	116.92	0.66
Paleoalveo	P2	6	Tr 200	8.92	373.66	373.87	373.84	373.89	0.006688	0.69	12.86	119.03	0.67
Paleoalveo	P2	6	Tr 500	9.93	373.66	373.88	373.85	373.90	0.006795	0.72	13.75	121.77	0.68
Paleoalveo	P2	5	Tr 20	6.36	371.09	371.18	371.18	371.21	0.017790	0.80	7.90	120.22	1.00
Paleoalveo	P2	5	Tr 100	8.15	371.09	371.19	371.19	371.23	0.017410	0.86	9.46	127.94	1.01
Paleoalveo	P2	5	Tr 200	8.92	371.09	371.20	371.20	371.24	0.016831	0.87	10.20	131.44	1.00
Paleoalveo	P2	5	Tr 500	9.93	371.09	371.20	371.20	371.24	0.016468	0.90	11.09	135.51	1.00
Paleoalveo	P2	4	Tr 20	6.36	370.50	370.81		370.81	0.000142	0.16	39.20	175.72	0.11
Paleoalveo	P2	4	Tr 100	8.15	370.50	370.84		370.84	0.000168	0.19	43.58	178.70	0.12
Paleoalveo	P2	4	Tr 200	8.92	370.50	370.85		370.85	0.000176	0.20	45.44	179.95	0.12
Paleoalveo	P2	4	Tr 500	9.93	370.50	370.85		370.85	0.000208	0.22	46.16	180.43	0.14
Paleoalveo	P2	3	Tr 20	6.36	370.58	370.76	370.71	370.77	0.002645	0.42	15.24	148.61	0.42
Paleoalveo	P2	3	Tr 100	8.15	370.58	370.78	370.72	370.79	0.002633	0.45	18.02	155.25	0.42
Paleoalveo	P2	3	Tr 200	8.92	370.58	370.79	370.73	370.80	0.002591	0.46	19.26	158.10	0.42
Paleoalveo	P2	3	Tr 500	9.93	370.58	370.73	370.73	370.77	0.016399	0.89	11.19	138.40	1.00
Paleoalveo	P2	2	Tr 20	6.36	369.99	370.23	370.23	370.30	0.012256	1.17	5.64	44.47	0.96
Paleoalveo	P2	2	Tr 100	8.15	369.99	370.26	370.26	370.34	0.011286	1.25	6.94	48.78	0.94
Paleoalveo	P2	2	Tr 200	8.92	369.99	370.27	370.27	370.35	0.011115	1.28	7.44	50.38	0.94
Paleoalveo	P2	2	Tr 500	9.93	369.99	370.46		370.48	0.000922	0.57	20.08	79.17	0.30
Paleoalveo	P2	1	Tr 20	6.36	369.00	369.77		369.77	0.000028	0.13	54.61	132.80	0.06
Paleoalveo	P2	1	Tr 100	8.15	369.00	370.13		370.13	0.000006	0.09	108.28	162.18	0.03
Paleoalveo	P2	1	Tr 200	8.92	369.00	370.28		370.28	0.000004	0.08	133.40	174.24	0.02
Paleoalveo	P2	1	Tr 500	9.93	369.00	370.47		370.47	0.000003	0.07	168.04	189.62	0.02
Paleoalveo	P2	0	Tr 20	6.36	369.00	369.77		369.77	0.000028	0.13	54.45	132.70	0.06
Paleoalveo	P2	0	Tr 100	8.15	369.00	370.13		370.13	0.000006	0.09	108.24	162.16	0.03
Paleoalveo	P2	0	Tr 200	8.92	369.00	370.28		370.28	0.000004	0.08	133.37	174.23	0.02
Paleoalveo	P2	0	Tr 500	9.93	369.00	370.47		370.47	0.000003	0.07	168.02	189.61	0.02

HEC-RAS Plan: MagiPo (Continued)

River	Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Arpiat	A1	3	Tr 20	5.82	411.41	412.13	412.13	412.40	0.008614	2.33	2.50	4.61	1.01
Arpiat	A1	3	Tr 100	7.44	411.41	412.23	412.23	412.55	0.008360	2.48	3.00	4.88	1.01
Arpiat	A1	3	Tr 200	8.13	411.41	412.28	412.28	412.60	0.008269	2.53	3.21	4.99	1.01
Arpiat	A1	3	Tr 500	9.04	411.41	412.33	412.33	412.67	0.008147	2.60	3.48	5.13	1.01
Arpiat	A1	2	Tr 20	5.82	401.27	401.78	401.78	401.96	0.018039	2.56	3.31	9.43	1.25
Arpiat	A1	2	Tr 100	7.44	401.27	401.84	401.84	402.05	0.017249	2.75	3.94	9.76	1.25
Arpiat	A1	2	Tr 200	8.13	401.27	401.87	401.87	402.09	0.016800	2.82	4.21	9.90	1.25
Arpiat	A1	2	Tr 500	9.04	401.27	401.90	401.90	402.14	0.016610	2.92	4.53	10.06	1.25
Arpiat	A2	2	Tr 20	5.92	401.27	401.75	401.75	401.92	0.005176	2.20	3.35	10.30	1.11
Arpiat	A2	2	Tr 100	7.56	401.27	401.81	401.81	402.01	0.004982	2.36	3.97	10.70	1.11
Arpiat	A2	2	Tr 200	8.26	401.27	401.84	401.84	402.04	0.004874	2.42	4.24	10.87	1.11
Arpiat	A2	2	Tr 500	9.18	401.27	401.87	401.87	402.08	0.004715	2.49	4.60	11.09	1.10
Arpiat	A2	1	Tr 20	5.92	396.19	397.00	397.00	398.91	0.034784	6.12	0.97	1.20	2.18
Arpiat	A2	1	Tr 100	7.56	396.19	398.20	398.20	398.23	0.000765	0.90	9.61	15.82	0.18
Arpiat	A2	1	Tr 200	8.26	396.19	398.20	398.20	398.24	0.000913	0.99	9.61	15.82	0.19
Arpiat	A2	1	Tr 500	9.18	396.19	398.20	398.20	398.25	0.001127	1.10	9.61	15.82	0.22
Arpiat	A2	0.2	Tr 20	5.92	381.39	382.20	382.20	384.10	0.034517	6.11	0.97	1.20	2.17
Arpiat	A2	0.2	Tr 100	7.56	381.39	382.20	382.20	385.30	0.056393	7.80	0.97	1.20	2.77
Arpiat	A2	0.2	Tr 200	8.26	381.39	382.20	382.20	385.91	0.067330	8.53	0.97	1.20	3.03
Arpiat	A2	0.2	Tr 500	9.18	381.39	382.20	382.20	386.78	0.083177	9.48	0.97	1.20	3.37
Arpiat	A2	0.1	Tr 20	5.92	381.19	383.10	383.10	383.14	0.003096	1.36	8.33	71.00	0.16
Arpiat	A2	0.1	Tr 100	7.56	381.19	383.12	383.12	383.16	0.003752	1.51	9.22	71.00	0.19
Arpiat	A2	0.1	Tr 200	8.26	381.19	383.12	383.12	383.17	0.003898	1.54	9.65	71.00	0.20
Arpiat	A2	0.1	Tr 500	9.18	381.19	383.13	383.13	383.18	0.004041	1.58	10.22	71.00	0.21
Arpiat	A2	0	Tr 20	5.92	373.79	375.10	375.10	375.14	0.003145	1.37	8.29	71.00	0.20
Arpiat	A2	0	Tr 100	7.56	373.79	375.30	375.11	375.30	0.000231	0.41	22.14	71.00	0.09
Arpiat	A2	0	Tr 200	8.26	373.79	375.12	375.12	375.17	0.003882	1.54	9.66	71.00	0.24
Arpiat	A2	0	Tr 500	9.18	373.79	375.13	375.13	375.18	0.004041	1.58	10.22	71.00	0.25
Margara	Ma1	2	Tr 20	3.88	390.74	391.78		391.90	0.007069	1.50	2.58	3.26	0.54
Margara	Ma1	2	Tr 100	4.96	390.74	391.92		392.06	0.007439	1.63	3.04	3.44	0.55
Margara	Ma1	2	Tr 200	5.43	390.74	391.97		392.12	0.007579	1.68	3.22	3.51	0.56
Margara	Ma1	2	Tr 500	6.04	390.74	392.04		392.20	0.007733	1.74	3.46	3.60	0.57
Margara	Ma1	1	Tr 20	3.88	390.74	391.47	391.47	391.76	0.025549	2.39	1.63	2.84	1.01
Margara	Ma1	1	Tr 100	4.96	390.74	391.58	391.58	391.91	0.025244	2.55	1.95	2.99	1.01
Margara	Ma1	1	Tr 200	5.43	390.74	391.63	391.63	391.97	0.025050	2.61	2.08	3.05	1.01
Margara	Ma1	1	Tr 500	6.04	390.74	391.68	391.68	392.05	0.024981	2.68	2.25	3.12	1.01
Penturetto	Pnt	1	Tr 20	0.10	409.52	409.67	409.67	409.72	0.014980	0.98	0.10	1.04	1.00
Penturetto	Pnt	1	Tr 100	0.12	409.52	409.68	409.68	409.74	0.014468	1.04	0.12	1.05	1.00
Penturetto	Pnt	1	Tr 200	0.13	409.52	409.69	409.69	409.75	0.014782	1.07	0.12	1.06	1.01
Penturetto	Pnt	1	Tr 500	0.14	409.52	409.70	409.70	409.76	0.014595	1.10	0.13	1.06	1.01
Penturetto	Pnt	0	Tr 20	0.10	401.27	401.94		401.94	0.000002	0.03	4.89	10.24	0.01
Penturetto	Pnt	0	Tr 100	0.12	401.27	402.03		402.03	0.000001	0.03	5.83	10.69	0.01
Penturetto	Pnt	0	Tr 200	0.13	401.27	402.06		402.06	0.000001	0.03	6.21	10.86	0.01
Penturetto	Pnt	0	Tr 500	0.14	401.27	402.11		402.11	0.000001	0.03	6.70	11.09	0.01

Documentazione fotografica



Canale Cantarana sez. 66 a valle



Canale Cantarana sez. 62



Canale Cantarana sez. 66 a monte



Canale Cantarana sez. 64



Canale Cantarana sez. 61 a monte



Canale Cantarana sez. 47



Canale Cantarana sez. 62



Canale Cantarana sez. 61



Canale Cantarana sez. 45 a monte



Canale Cantarana sez. 44 a monte



Canale Cantarana sez. 41 a monte



Canale Cantarana sez. 41 a valle



Canale Cantarana sez. 41 a valle



Canale Cantarana sez. 40 a valle



Canale Cantarana sez. 39 a valle



Canale Cantarana sez. 37 a valle



Canale Cantarana sez. 33



Canale Cantarana sez. 30



Canale Cantarana sez. 36 a valle



Canale Cantarana sez. 31 a valle



Canale Cantarana sez. 26



Canale Cantarana sez. 25



Canale Cantarana sez. 28



Canale Cantarana sez. 25



Canale Cantarana sez. 25 a valle



Canale Cantarana sez. 24 a monte



Canale Cantarana sez. 24 a monte



Canale Cantarana sez. 24 a monte



Canale Cantarana sez. 24 a valle



Canale Cantarana sez. 23 a valle



Canale Cantarana sez. 23



Canale Cantarana sez. 22



Canale Cantarana sez. 21 a monte



Canale Cantarana sez. 19 a valle



Canale Cantarana sez. 17



Canale Cantarana sez. 13 a valle



Canale Cantarana sez. 13 a monte



Canale Cantarana sez. 13 a valle



Canale Cantarana sez. 13 a valle

COMUNE DI VAIE

VERIFICHE IDROLOGICHE ED IDRAULICHE
CANALE CANTARANA E RII MINORI
ALL'INTERNO DEL TERRITORIO DEL COMUNE DI VAIE

Planimetria con indicazione delle sezioni
Scala 1/5000

ubicazione: Comune di Vaie
committente: Amministrazione Comunale di Vaie

dott. ing. Paolo Giuseppe ORIA - via W. Fillak 1 - 10082 Cuorgnè (TO)
tel. / fax 0124/629055 - cell. 335/8014307 - E-mail studio.oria@libero.it

