

Comune di Gubbio

PIANO REGOLATORE GENERALE

PARTE STRUTTURALE



VERIFICHE IDRAULICHE

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EI.D

1.1.1 Elaborazioni di calcolo tramite procedura HEC RAS

La verifica dal rischio di alluvionamento è stata elaborata con la procedura di calcolo del software HEC RAS adottando come base il rilievo delle sezioni, integrata con le indicazioni desumibili dalla carta tecnica regionale (scala 1:10000).

I calcoli hanno preso in considerazione tempi di ritorno pari a 200 anni e 50 anni.

I dati delle verifiche per $T_r = 50$ anni sono evidenziati nel cd rom allegato alla presente.

Il modello di simulazione HECRAS (River Analysis System) è stato sviluppato presso l'Hydrologic Engineering Center di Davis (USA) per lavorare in ambiente Windows e consente, nella versione attuale, il calcolo dei profili idraulici di moto permanente gradualmente vario, in reti di canali naturali o artificiali. Con il modello possono essere simulate condizioni di moto subcritico, supercritico e misto.

Il calcolo dell'andamento dei profili idraulici viene effettuato dal modello risolvendo in modo sequenziale l'equazione monodimensionale dell'energia fra due sezioni adiacenti trasversali al moto. In corrispondenza ad alcune tipologie di ponte o strutture in alveo, dove nascono condizioni di flusso complesse, vengono utilizzate invece specifiche equazioni dell'idraulica per determinare le variazioni di livello dovute a queste singolarità. Il modello consente un'ampia varietà di applicazioni e numerose opzioni sia nella fase di input che nella restituzione dei risultati, tutte guidate tramite un'interfaccia utente grafica che semplifica le fasi di implementazione del modello ed analisi dei risultati. Sinteticamente, il modello funziona calcolando le variazioni di livello idrometrico tra sezioni trasversali adiacenti sulla base del calcolo delle perdite di energia. Il calcolo comincia a partire da un'estremità del tronco d'alveo indagato, procedendo passo passo sino all'altra estremità, imponendo il verso del calcolo a seconda del tipo di moto: da valle verso monte per moto subcritico e da monte verso valle per moto supercritico. Il funzionamento del modello HECRAS si basa su alcune semplificazioni nelle ipotesi di partenza:

1. moto permanente gradualmente vario;
2. moto monodimensionale, con correzione della distribuzione orizzontale della velocità;
3. limitata pendenza del fondo;
4. perdite di fondo mediamente costanti fra due sezioni trasversali adiacenti;
5. arginature fisse.

E' stato effettuato il calcolo dei profili di moto permanente adottando per le sezioni coefficienti di scabrezza di Manning (m) pari a:

$m = 0.03$ o 0.035 per l'alveo, 0.25 o 0.20 per i tratti con rivestimento in cls;

$m = 0,035$ o 0.04 per le aree esterne.

Come condizioni al contorno del flusso per tutti i tratti considerati, sono state assunte la altezza critica a monte e la pendenza idraulica a valle.

La pendenza motrice è rilevata dai profili topografici.

Il regime di flusso è stato assunto di tipo misto.

I risultati delle elaborazioni sono inseriti all'interno delle sezioni riguardanti i singoli bacini con i relativi tabulati e grafici estratti dal programma Hec-Ras.

A monte e a valle in prossimità dei manufatti sono state introdotte aree non attive (ineffective flow areas) al fine del deflusso.

Per la modellazione dei manufatti di attraversamento esistenti è stato imputato al software la simulazione del metodo dell'energia.

Per la lettura della tabella riepilogativa la simbologia in testa ad ogni colonna ha i seguenti significati:

Qtotal..... portata totale nella sezione in esame;
Min Ch El..... quota di fondo canale;
W.S.Elev quota del pelo libero;
Crit.W.S quota critica del pelo libero;
E.G.Elev quota piezometrica totale;
E.G.Slop pendenza piezometrica;
Vel Ch nl..... velocità dell'acqua nel canale;
Flow Area area bagnata;
Top WidTh larghezza canale;
Froude#Ch..... numero di Froude di caratterizzazione del moto.

INDICE

CORSI D'ACQUA OGGETTO DI STUDIO IDRAULICO

TORRENTE CAVARELLO - MACROAREA 03 GUBBIO EST

FOSSO ZAPPACENERE - MACROAREA 03 GUBBIO EST

FOSSO DELL'ABBADIA - MACROAREA 06 PADULE

FOSSO DI PADULE - MACROAREA 06 PADULE

FOSSO DELLA FERMA - MACROAREA 08 SPADA

FOSSO GUALDESI-MIGLIAIOLO - MACROAREA 09 TORRE DEI CALZOLARI

FOSSO SCALETTE S.ANGELO - MACROAREA 09 TORRE DEI CALZOLARI

TORRENTE BURANO - AMBITO MONOFUNZIONALE Am19 SAN BARTOLOMEO

Cavarello50.rep

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

X X XXXXXX XXXX XXXX XX XXXX
X X X X X X X
X X X X X X X
XXXXXXXX XXXX XXX XXXX XXXX XXXX
X X X X X X X
X X X X X X X
X X XXXXXX XXXX X X X XXXXX

PROJECT DATA

Project Title: MACROAREA 03
Project File : Cavarello50.prj
Run Date and Time: 24/11/2006 16.58.45

Project in SI units

Project Description:
verifica MACROAREA 03 FOSSO CAVARELLO

FLOW DATA

Flow Title: Flow 50
Flow File : n:\2006\06033\Integrazione\HEC_CAVARELLO\HEC_Tr50\Cavarello50.f01

Flow Data (m3/s)

* River Reach RS * Q Tr50 *
* Fosso Cavarello 1 6 * 4.4 *

Boundary Conditions

* River Reach Profile * Upstream
Downstream *

* Fosso Cavarello 1 Q Tr50 * Critical
Normal S = 0.025 *

GEOMETRY DATA

Geometry Title: Geom 01
Geometry File : n:\2006\06033\Integrazione\HEC_CAVARELLO\HEC_Tr50\Cavarello50.g01

CROSS SECTION

RIVER: Fosso Cavarello
REACH: 1 RS: 6

INPUT

Description: Sez. aggiunta

Table with 12 columns: Station, Elev, Sta, Elev, num, Sta, Elev, Sta, Elev, Sta, Elev. It contains two rows of data for station elevations.

Manning's n Values
Sta n Val Sta n Val Sta n Val

Cavarello50.rep

 0 .04 2.77 .035 4.6 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 2.77 4.6 10 10 10 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 482.19 * Element * Left OB * Channel * Right OB
 * Vel Head (m) * 0.42 * wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 481.77 * Reach Len. (m) * 10.00 * 10.00 * 10.00
 * Crit w.S. (m) * 481.77 * Flow Area (m2) * * 1.53 *
 * E.G. Slope (m/m) *0.033446 * Area (m2) * * 1.53 *
 * Q Total (m3/s) * 4.40 * Flow (m3/s) * * 4.40 *
 * Top width (m) * 1.83 * Top width (m) * * 1.83 *
 * Vel Total (m/s) * 2.88 * Avg. Vel. (m/s) * * 2.88 *
 * Max Chl Dpth (m) * 0.97 * Hydr. Depth (m) * * 0.84 *
 * Conv. Total (m3/s) * 24.1 * Conv. (m3/s) * * 24.1 *
 * Length wtd. (m) * 10.00 * wetted Per. (m) * * 3.72 *
 * Min Ch El (m) * 480.80 * Shear (N/m2) * * 134.44 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 387.64 *
 * Frctn Loss (m) * 0.18 * Cum Volume (1000 m3) * * 0.04 *
 * C & E Loss (m) * 0.03 * Cum SA (1000 m2) * * 0.09 *
 *

 **

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Fosso Cavarello
 REACH: 1 RS: 5

INPUT

Description:

Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	482.65	2.77	481.75	2.77	480.85	3.03	480.85	3.03	480
4.56	480	4.6	481.05	8.1	481.91				

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	2.77	.035	4.6	.04

Cavarello50.rep

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	2.77	4.6		8.5	8.5	.3	.5
Ineffective Flow	num=		2				
Sta L	Sta R	Elev	Permanent				
0	3.03	484	T				
4.56	8.1	484	T				

CROSS SECTION OUTPUT Profile #Q Tr50

```
*****
**
* E.G. Elev (m)          * 481.66 * Element          * Left OB * Channel * Right OB
* vel Head (m)          * 1.02 * wt. n-Val.      *         * 0.035 *
* W.S. Elev (m)         * 480.64 * Reach Len. (m)  * 1.00 * 1.00 * 1.00
* Crit W.S. (m)         * 480.94 * Flow Area (m2)  *         * 0.98 *
* E.G. Slope (m/m)      *0.070378 * Area (m2)       *         * 0.99 *
* Q Total (m3/s)        * 4.40 * Flow (m3/s)     *         * 4.40 *
* Top width (m)         * 1.55 * Top width (m)   *         * 1.55 *
* vel Total (m/s)       * 4.47 * Avg. vel. (m/s) *         * 4.47 *
* Max Chl Dpth (m)     * 0.64 * Hydr. Depth (m) *         * 0.64 *
* Conv. Total (m3/s)   * 16.6 * Conv. (m3/s)    *         * 16.6 *
* Length wtd. (m)      * 1.00 * wetted Per. (m) *         * 2.17 *
* Min Ch El (m)        * 480.00 * Shear (N/m2)   *         * 312.57 *
* Alpha                * 1.00 * Stream Power (N/m s) *         * 1397.21 *
* Frctn Loss (m)       * 0.47 * Cum Volume (1000 m3) *         * 0.03 *
* C & E Loss (m)       * 0.06 * Cum SA (1000 m2) *         * 0.07 *
*****
**
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

BRIDGE

RIVER: Fosso Cavarello
 REACH: 1 RS: 4.5

INPUT

Description: Ponte con apertura stretta a monte e salto a valle

Distance from Upstream XS = 1
 Deck/Roadway width = 6.5
 Weir Coefficient = 1.44

Upstream Deck/Roadway Coordinates

num=	9										
Sta Hi	Cord	Lo	Cord	Sta Hi	Cord	Lo	Cord	Sta Hi	Cord	Lo	Cord
*****	*****										
0	484	480	3.03	484	3.03	484	481.87				
3.41	484	482.53	3.79	484	482.64	4.17	484	482.53			
4.56	484	481.87	4.56	484	8.1	484	480				

Upstream Bridge Cross Section Data

Station	Elevation	Data	num=	8							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
*****	*****										
0	482.65	2.77	481.75	2.77	480.85	3.03	480.85	3.03	480		

4.56 480 4.6 481.05

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val

0 .04 2.77 .035 4.6 .04

Bank Sta: Left Right Coeff Contr. Expan.
2.77 4.6 .3 .5

Ineffective Flow num= 2
Sta L Sta R Elev Permanent
0 3.03 484 T
4.56 8.1 484 T

Downstream Deck/Roadway Coordinates

num= 7
Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord

0 484 480 0 484 481 1.61 484 482.3
3.32 484 483 4.93 484 482.3 6.65 484 481
6.65 484 480

Downstream Bridge Cross Section Data

Station Elevation Data num= 4
Sta Elev Sta Elev Sta Elev Sta Elev

0 480.9 0 479.9 6.65 479.9 6.65 480.9

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val

0 .04 0 .035 6.65 .04

Bank Sta: Left Right Coeff Contr. Expan.
0 6.65 .3 .5

Ineffective Flow num= 2
Sta L Sta R Elev Permanent
0 2.56 484 T
4.09 6.65 484 T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins =
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy
Selected Low Flow Methods = Energy

High Flow Method
Energy Only

Additional Bridge Parameters

Add Friction component to Momentum
Do not add weight component to Momentum
Class B flow critical depth computations use critical depth
inside the bridge at the upstream end
criteria to check for pressure flow = Upstream water surface

BRIDGE OUTPUT Profile #Q Tr50

* E.G. US. (m) * 481.66 * Element *Inside BR US *Inside BR DS *
* W.S. US. (m) * 480.64 * E.G. Elev (m) * 481.51 * 481.38 *
* Q Total (m3/s) * 4.40 * W.S. Elev (m) * 480.74 * 481.07 *
* Q Bridge (m3/s) * 4.40 * Crit W.S. (m) * 480.94 * 480.84 *
* Q Weir (m3/s) * * Max Chl Dpth (m) * 0.74 * 1.17 *
* Weir Sta Lft (m) * * vel Total (m/s) * 3.87 * 2.47 *
* Weir Sta Rgt (m) * * Flow Area (m2) * 1.14 * 1.78 *
* Weir Submerg * * Froude # Chl * 1.43 * 0.73 *
* Weir Max Depth (m) * * Specif Force (m3) * 2.16 * 2.15 *
* Min El Weir Flow (m) * 484.00 * Hydr Depth (m) * 0.74 * 1.17 *
* Min El Prs (m) * 482.64 * W.P. Total (m) * 2.27 * 1.53 *
* Delta EG (m) * 481.66 * Conv. Total (m3/s) * 20.5 * 56.5 *


```

Cavarello50.rep
* Delta WS (m) * -0.20 * Top Width (m) * 1.53 * 6.65 *
* BR Open Area (m2) * 3.66 * Frctn Loss (m) * 0.04 *
* BR Open Vel (m/s) * 3.87 * C & E Loss (m) * 0.27 *
* Coef of Q * * Shear Total (N/m2) * 226.91 * 69.43 *
* Br Sel Method *Energy only * Power Total (N/m s) * 878.57 * 171.23 *
*****

```

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso Cavarello
REACH: 1 RS: 4

INPUT

Description:

```

Station Elevation Data num= 4
Sta Elev Sta Elev Sta Elev Sta Elev
*****
0 480.9 0 479.9 6.65 479.9 6.65 480.9

```

```

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
*****
0 .04 0 .035 6.65 .04

```

```

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 6.65 .1 .1 .1 .3 .5
Ineffective Flow num= 2
Sta L Sta R Elev Permanent
0 2.56 484 T
4.09 6.65 484 T

```

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m) * 481.32 * Element * Left OB * Channel * Right OB
*
* vel Head (m) * 0.48 * wt. n-Val. * * 0.035 *
*
* W.S. Elev (m) * 480.84 * Reach Len. (m) * 0.10 * 0.10 * 0.10
*
* Crit W.S. (m) * 480.84 * Flow Area (m2) * * 1.44 *
*
* E.G. Slope (m/m) *0.012421 * Area (m2) * * 6.26 *
*
* Q Total (m3/s) * 4.40 * Flow (m3/s) * * 4.40 *
*
* Top width (m) * 6.65 * Top width (m) * * 6.65 *
*
* vel Total (m/s) * 3.06 * Avg. vel. (m/s) * * 3.06 *
*
* Max Chl Dpth (m) * 0.94 * Hydr. Depth (m) * * 0.94 *
*
* Conv. Total (m3/s) * 39.5 * Conv. (m3/s) * * 39.5 *
*

```

```

Cavarello50.rep
* Length wtd. (m) * 0.10 * Wetted Per. (m) * 1.53 *
* Min Ch El (m) * 479.90 * Shear (N/m2) * 114.58 *
* Alpha * 1.00 * Stream Power (N/m s) * 350.27 *
* Frctn Loss (m) * 0.01 * Cum Volume (1000 m3) * 0.03 *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.07 *
*****
**

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

CROSS SECTION

RIVER: Fosso Cavarello
REACH: 1 RS: 3.5

INPUT

Description:

```

Station Elevation Data num= 4
Sta Elev Sta Elev Sta Elev Sta Elev
*****
0 478.4 0 477.4 6.65 477.4 6.65 478.4

```

```

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
*****
0 .04 0 .035 6.65 .04

```

```

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 6.65 9.4 9.4 9.4 .1 .3

```

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m) * 480.54 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 3.05 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 477.49 * Reach Len. (m) * 9.40 * 9.40 * 9.40
* Crit W.S. (m) * 477.75 * Flow Area (m2) * * 0.57 *
* E.G. Slope (m/m) *2.017403 * Area (m2) * * 0.57 *
* Q Total (m3/s) * 4.40 * Flow (m3/s) * * 4.40 *
* Top width (m) * 6.65 * Top width (m) * * 6.65 *
* Vel Total (m/s) * 7.74 * Avg. vel. (m/s) * * 7.74 *
* Max Chl Dpth (m) * 0.09 * Hydr. Depth (m) * * 0.09 *
* Conv. Total (m3/s) * 3.1 * Conv. (m3/s) * * 3.1 *
* Length wtd. (m) * 9.40 * Wetted Per. (m) * * 6.82 *
* Min Ch El (m) * 477.40 * Shear (N/m2) * * 1648.43 *
* Alpha * 1.00 * Stream Power (N/m s) * *12761.70 *
* Frctn Loss (m) * 0.00 * Cum Volume (1000 m3) * * 0.03 *
* C & E Loss (m) * 0.77 * Cum SA (1000 m2) * * 0.07 *
*****
**

```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso Cavarello
 REACH: 1 RS: 3

INPUT

Description:

Station Elevation Data num= 5
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 478.15 0 477.1 .9 476.9 2.5 477.45 2.5 478.15

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 0 .035 2.5 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 2.5 10 10 10 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 0 478.15 F
 2.5 2.5 477.45 F

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 478.25 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.64 * wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 477.61 * Reach Len. (m) * 1.00 * 1.00 * 1.00
 * Crit W.S. (m) * 477.80 * Flow Area (m2) * * 1.24 *
 * E.G. Slope (m/m) *0.056694 * Area (m2) * * 1.24 *
 * Q Total (m3/s) * 4.40 * Flow (m3/s) * * 4.40 *
 * Top width (m) * 2.50 * Top width (m) * * 2.50 *
 * vel Total (m/s) * 3.55 * Avg. vel. (m/s) * * 3.55 *
 * Max Chl Dpth (m) * 0.71 * Hydr. Depth (m) * * 0.50 *
 * Conv. Total (m3/s) * 18.5 * Conv. (m3/s) * * 18.5 *
 * Length wtd. (m) * * wetted Per. (m) * * 3.28 *
 * Min Ch El (m) * 476.90 * Shear (N/m2) * * 209.95 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 746.22 *
 * Frctn Loss (m) * 1.56 * Cum Volume (1000 m3) * * 0.02 *
 * C & E Loss (m) * 0.72 * Cum SA (1000 m2) * * 0.03 *
 *

 **

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

Note: section. This may indicate the need for additional cross sections.
 Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE

RIVER: Fosso Cavarello
 REACH: 1 RS: 2.5

INPUT

Description: Passaggio sotto strada
 Distance from Upstream XS = 1
 Deck/Roadway width = 8
 Weir Coefficient = 1.44
 Upstream Deck/Roadway Coordinates

num= 4				num= 4				num= 4						
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	478.55		476	0	478.55		478.15	2.5	478.55		478.15			
2.5	478.55		476											

Upstream Bridge Cross Section Data

Station Elevation Data num= 5									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	478.15	0	477.1	.9	476.9	2.5	477.45	2.5	478.15

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.035	2.5	.04

Bank Sta: Left Right Coeff Contr. Expan.
 0 2.5 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 0 478.15 F
 2.5 2.5 477.45 F

Downstream Deck/Roadway Coordinates

num= 4				num= 4				num= 4						
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	478.55		476	0	478.55		478.15	2.5	478.55		478.15			
2.5	478.55		476											

Downstream Bridge Cross Section Data

Station Elevation Data num= 5									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	478.15	0	477	.9	476.8	2.5	477.35	2.5	478.15

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.035	2.5	.04

Bank Sta: Left Right Coeff Contr. Expan.
 0 2.5 .3 .5

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy
 Selected Low Flow Methods = Energy

High Flow Method
 Energy Only

Additional Bridge Parameters

Add Friction component to Momentum
 Do not add weight component to Momentum
 Class B flow critical depth computations use critical depth
 inside the bridge at the upstream end
 Criteria to check for pressure flow = Upstream water surface

BRIDGE OUTPUT Profile #Q Tr50

```

*****
* E.G. US. (m) * 478.25 * Element *Inside BR US *Inside BR DS *
* W.S. US. (m) * 477.61 * E.G. Elev (m) * 478.18 * 478.08 *
* Q Total (m3/s) * 4.40 * W.S. Elev (m) * 477.96 * 477.86 *
* Q Bridge (m3/s) * 4.40 * Crit w.S. (m) * 477.80 * 477.69 *
* Q Weir (m3/s) * * Max Chl Dpth (m) * 1.06 * 1.06 *
* Weir Sta Lft (m) * * Vel Total (m/s) * 2.08 * 2.08 *
* Weir Sta Rgt (m) * * Flow Area (m2) * 2.12 * 2.12 *
* Weir Submerg * * Froude # Chl * 0.72 * 0.72 *
* Weir Max Depth (m) * * Specif Force (m3) * 1.86 * 1.86 *
* Min El Weir Flow (m) * 478.55 * Hydr Depth (m) * 0.85 * 0.85 *
* Min El Prs (m) * 478.15 * W.P. Total (m) * 3.98 * 3.98 *
* Delta EG (m) * 478.25 * Conv. Total (m3/s) * 39.7 * 39.7 *
* Delta WS (m) * -0.21 * Top Width (m) * 2.50 * 2.50 *
* BR Open Area (m2) * 2.60 * Frctn Loss (m) * * *
* BR Open Vel (m/s) * 2.08 * C & E Loss (m) * * *
* Coef of Q * * Shear Total (N/m2) * 64.13 * 63.93 *
* Br Sel Method *Energy only * Power Total (N/m s) * 133.37 * 132.74 *
*****
    
```

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

CROSS SECTION

RIVER: Fosso Cavarello
 REACH: 1 RS: 2

INPUT

Description: Sez. aggiunta

Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	478.15	0	477	.9	476.8	2.5	477.35	2.5	478.15

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.035	2.5	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	2.5		10	10	.3	.5

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m) * 478.06 * Element * Left OB * Channel * Right OB
*
* vel Head (m) * 0.24 * wt. n-Val. * * 0.035 *
    
```

Cavarello50.rep

```

*
* W.S. Elev (m) * 477.82 * Reach Len. (m) * 10.00 * 10.00 * 10.00
* Crit W.S. (m) * 477.69 * Flow Area (m2) * * 2.01 *
* E.G. Slope (m/m) *0.014097 * Area (m2) * * 2.01 *
* Q Total (m3/s) * 4.40 * Flow (m3/s) * * 4.40 *
* Top width (m) * 2.50 * Top width (m) * * 2.50 *
* Vel Total (m/s) * 2.18 * Avg. Vel. (m/s) * * 2.18 *
* Max Chl Dpth (m) * 1.02 * Hydr. Depth (m) * * 0.81 *
* Conv. Total (m3/s) * 37.1 * Conv. (m3/s) * * 37.1 *
* Length wtd. (m) * 10.00 * wetted Per. (m) * * 3.90 *
* Min Ch El (m) * 476.80 * Shear (N/m2) * * 71.42 *
* Alpha * 1.00 * Stream Power (N/m s) * * 156.00 *
* Frctn Loss (m) * 0.02 * Cum Volume (1000 m3) * * 0.02 *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 0.02 *

```

**

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

CROSS SECTION

RIVER: Fosso Cavarello
REACH: 1 RS: 1

INPUT

Description: Sez. aggiunta

Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	477.87	0	476.82	.9	476.62	2.5	477.17	2.5	477.87

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.035	2.5	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

0	2.5	10	10	10	.1	.3
---	-----	----	----	----	----	----

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m) * 477.85 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.35 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 477.51 * Reach Len. (m) * * *
* Crit W.S. (m) * 477.51 * Flow Area (m2) * * 1.68 *
* E.G. Slope (m/m) *0.023292 * Area (m2) * * 1.68 *
* Q Total (m3/s) * 4.40 * Flow (m3/s) * * 4.40 *
* Top width (m) * 2.50 * Top width (m) * * 2.50 *
* Vel Total (m/s) * 2.61 * Avg. Vel. (m/s) * * 2.61 *
* Max Chl Dpth (m) * 0.89 * Hydr. Depth (m) * * 0.67 *
* Conv. Total (m3/s) * 28.8 * Conv. (m3/s) * * 28.8 *

```

Cavarello50.rep

```

*
* Length Wtd. (m)      *          * wetted Per. (m)      *          *          * 3.64 *
* Min Ch El (m)      * 476.62 * Shear (N/m2)          *          * 105.85 *
* Alpha              * 1.00  * Stream Power (N/m s) *          * 276.42 *
* Frctn Loss (m)     * 0.18  * Cum Volume (1000 m3) *          *          *
* C & E Loss (m)     * 0.03  * Cum SA (1000 m2)     *          *          *

```

SUMMARY OF MANNING'S N VALUES

River: Fosso Cavarello

```

*****
* Reach      * River Sta. * n1      * n2      * n3      *
*****
*1           * 6          * .04*    * .035*   * .04*
*1           * 5          * .04*    * .035*   * .04*
*1           * 4.5        * Bridge  *         *         *
*1           * 4          * .04*    * .035*   * .04*
*1           * 3.5        * .04*    * .035*   * .04*
*1           * 3          * .04*    * .035*   * .04*
*1           * 2.5        * Bridge  *         *         *
*1           * 2          * .04*    * .035*   * .04*
*1           * 1          * .04*    * .035*   * .04*
*****

```

SUMMARY OF REACH LENGTHS

River: Fosso Cavarello

```

*****
* Reach      * River Sta. * Left    * Channel * Right   *
*****
*1           * 6          * 10*     * 10*     * 10*
*1           * 5          * 8.5*    * 8.5*    * 8.5*
*1           * 4.5        * Bridge  *         *         *
*1           * 4          * .1*     * .1*     * .1*
*1           * 3.5        * 9.4*    * 9.4*    * 9.4*
*1           * 3          * 10*     * 10*     * 10*
*1           * 2.5        * Bridge  *         *         *
*1           * 2          * 10*     * 10*     * 10*
*1           * 1          * 10*     * 10*     * 10*
*****

```

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Fosso Cavarello

```

*****
* Reach      * River Sta. * Contr.  * Expan.  *
*****
*1           * 6          * .1*     * .3*
*1           * 5          * .3*     * .5*
*1           * 4.5        * Bridge  *         *
*1           * 4          * .3*     * .5*
*1           * 3.5        * .1*     * .3*
*1           * 3          * .3*     * .5*
*1           * 2.5        * Bridge  *         *
*1           * 2          * .3*     * .5*
*1           * 1          * .1*     * .3*
*****

```

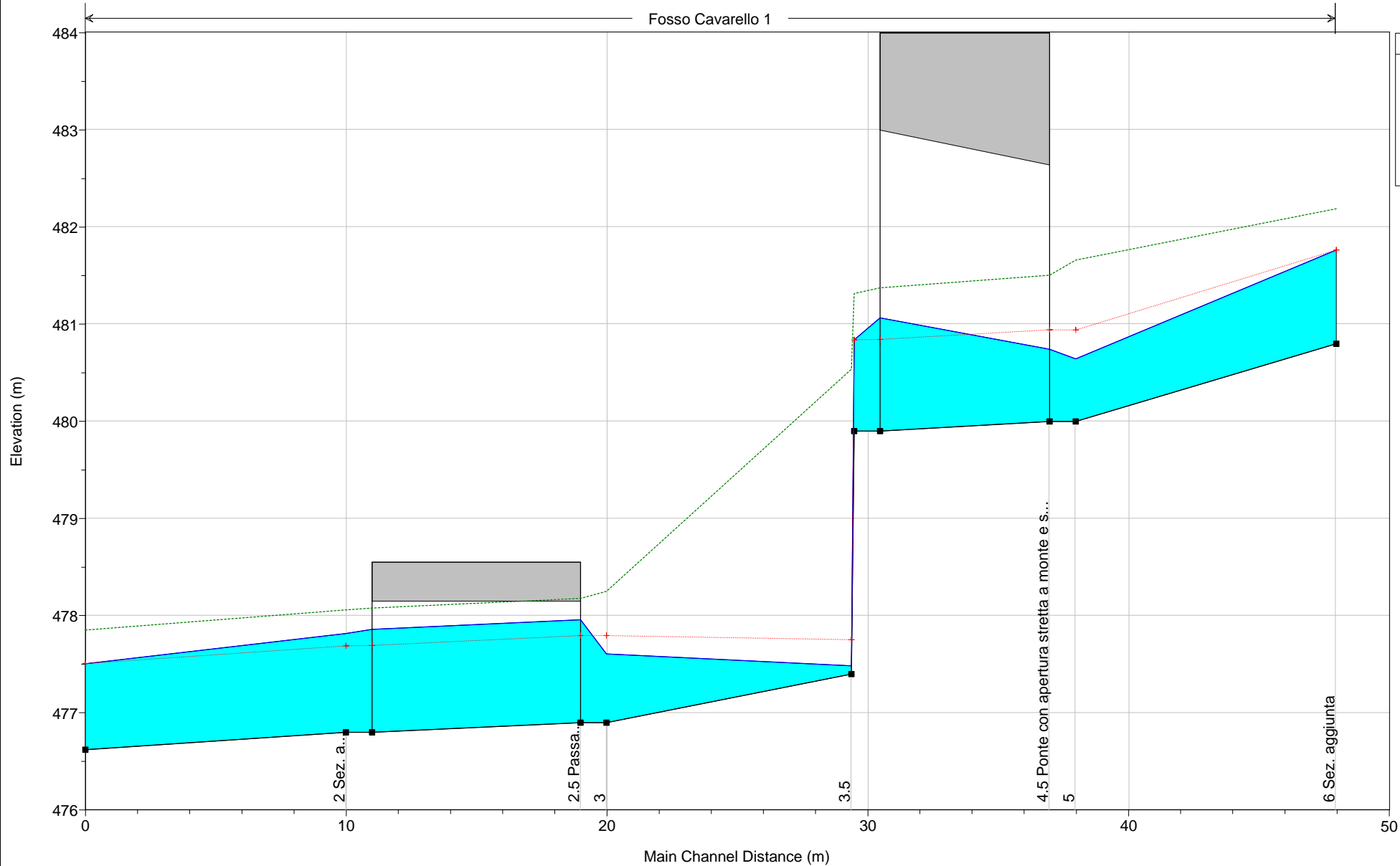
HEC-RAS Plan: Plan Tr50 River: Fosso Cavarello Reach: 1 Profile: Q Tr50

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
1	6	Q Tr50	4.40	480.80	481.77	481.77	482.19	0.033446	2.88	1.53	1.83	1.01
1	5	Q Tr50	4.40	480.00	480.64	480.94	481.66	0.070378	4.47	0.98	1.55	1.78
1	4.5	Bridge										
1	4	Q Tr50	4.40	479.90	480.84	480.84	481.32	0.012421	3.06	1.44	6.65	1.01
1	3.5	Q Tr50	4.40	477.40	477.49	477.75	480.54	2.017403	7.74	0.57	6.65	8.45
1	3	Q Tr50	4.40	476.90	477.61	477.80	478.25	0.056694	3.55	1.24	2.50	1.61
1	2.5	Bridge										
1	2	Q Tr50	4.40	476.80	477.82	477.69	478.06	0.014097	2.18	2.01	2.50	0.78
1	1	Q Tr50	4.40	476.62	477.51	477.51	477.85	0.023292	2.61	1.68	2.50	1.02

MACROAREA 03 Plan: Plan 01

Flow: Flow 50


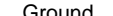


Fosso Cavarello 1

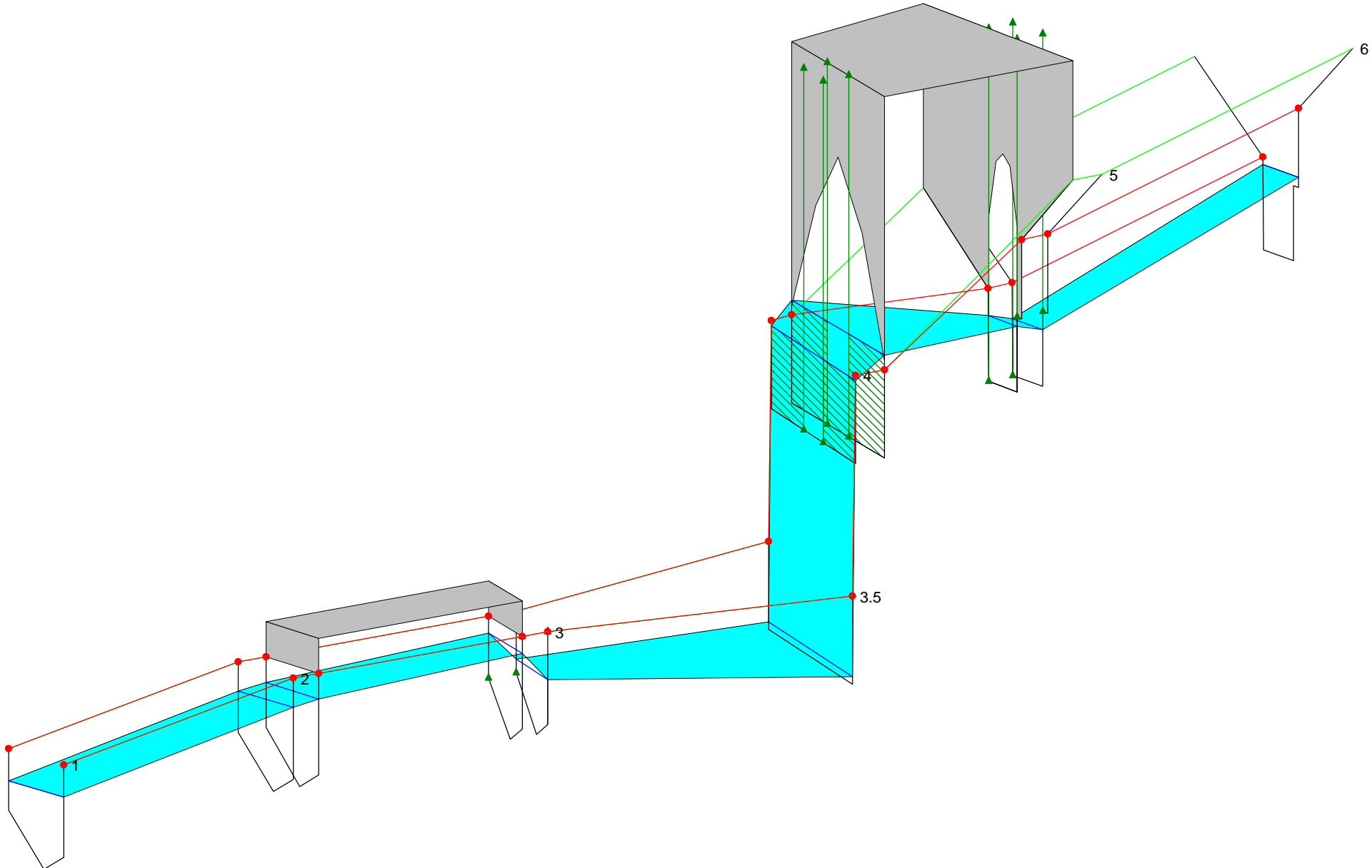


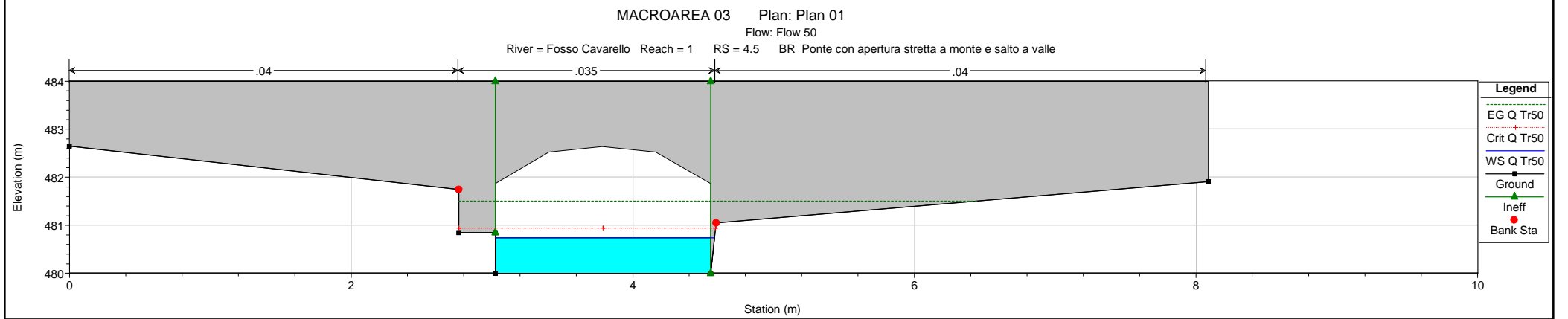
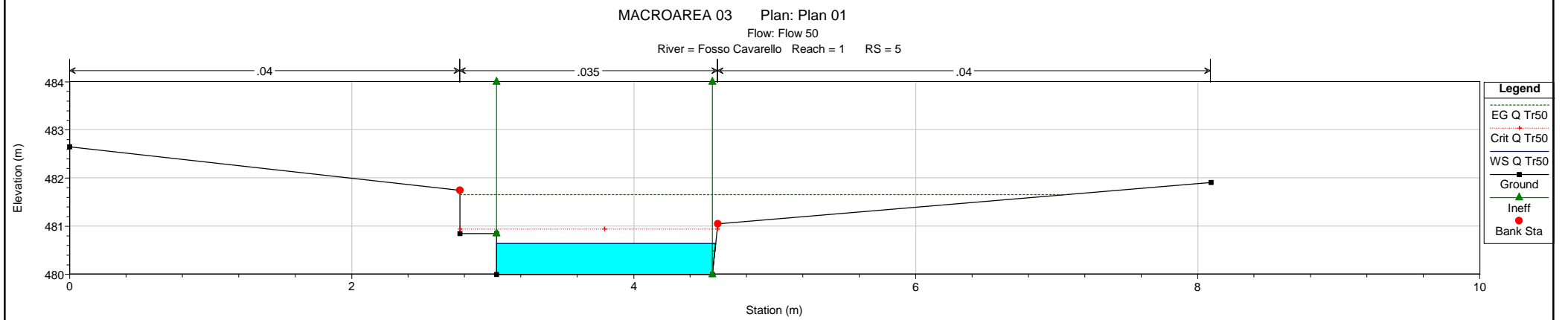
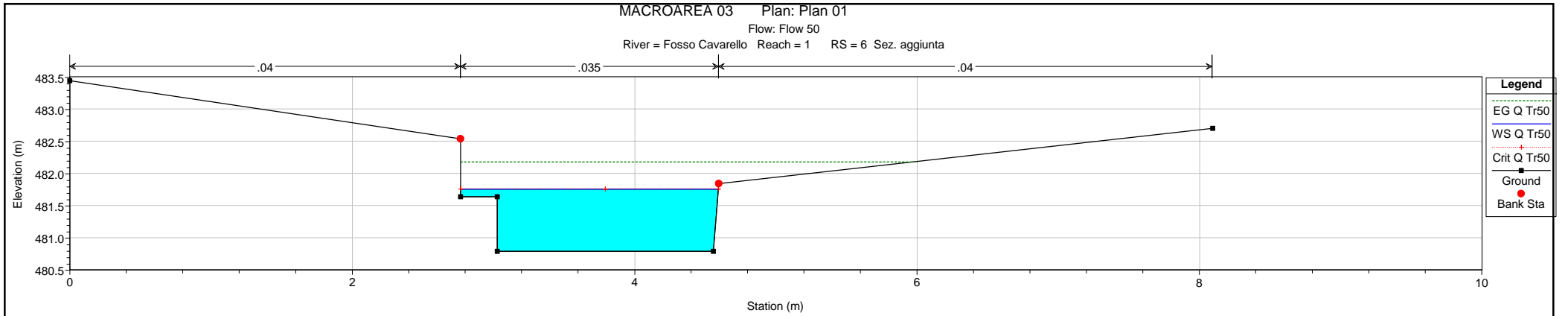
Legend

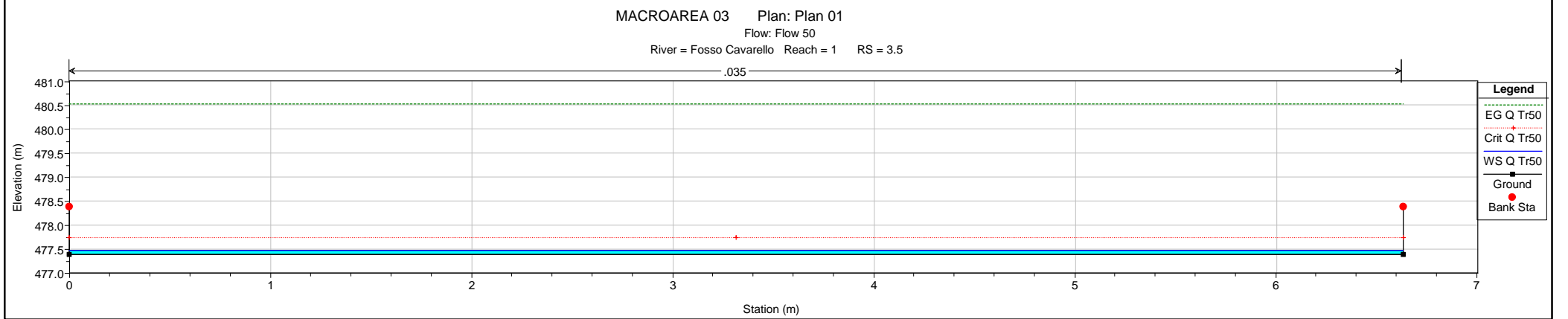
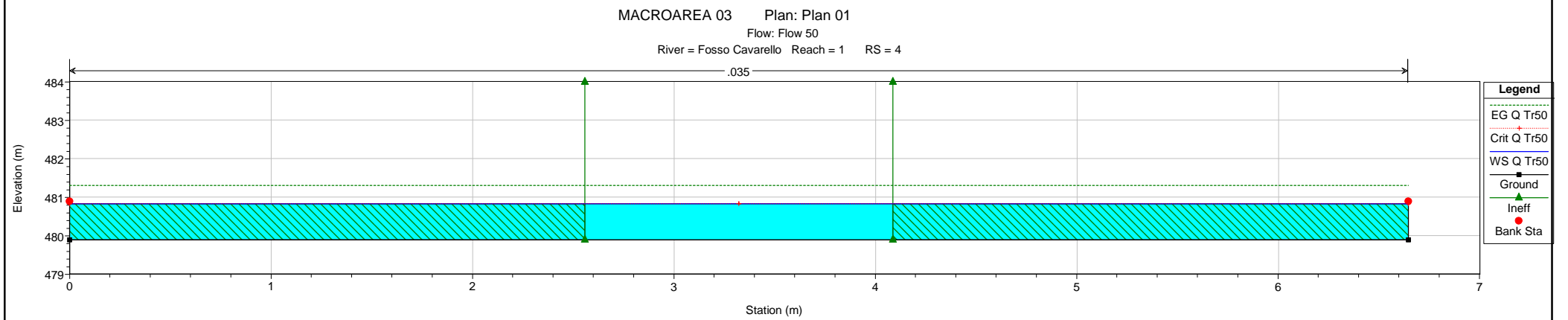
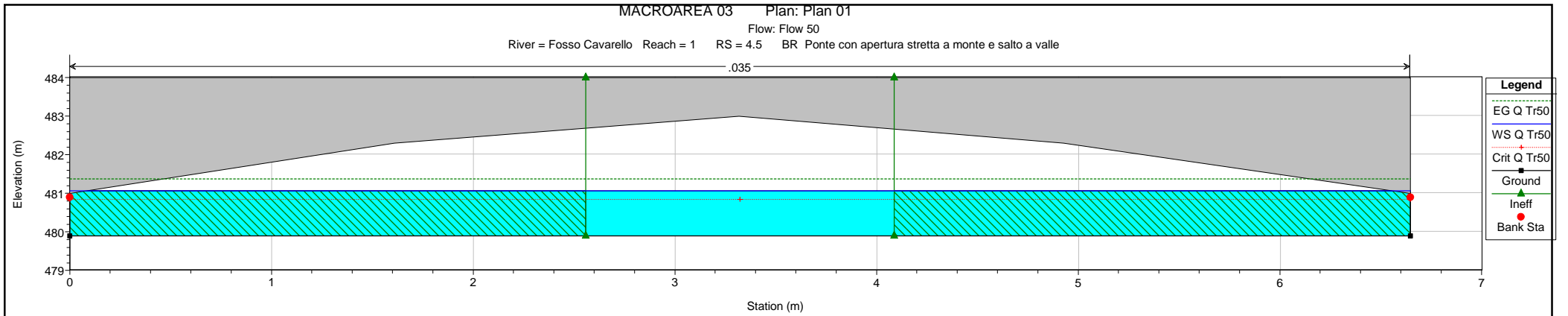
- EG Q Tr50
- Crit Q Tr50
- WS Q Tr50
- Ground

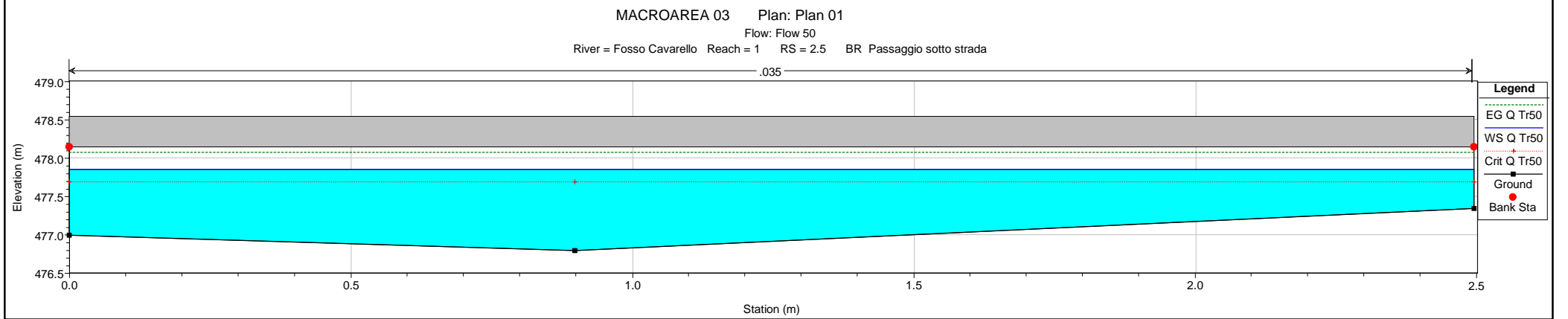
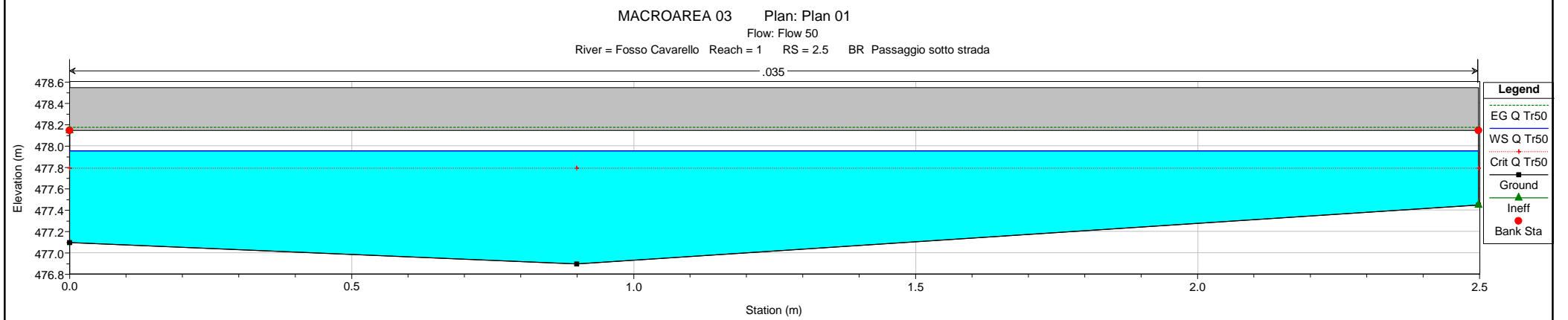
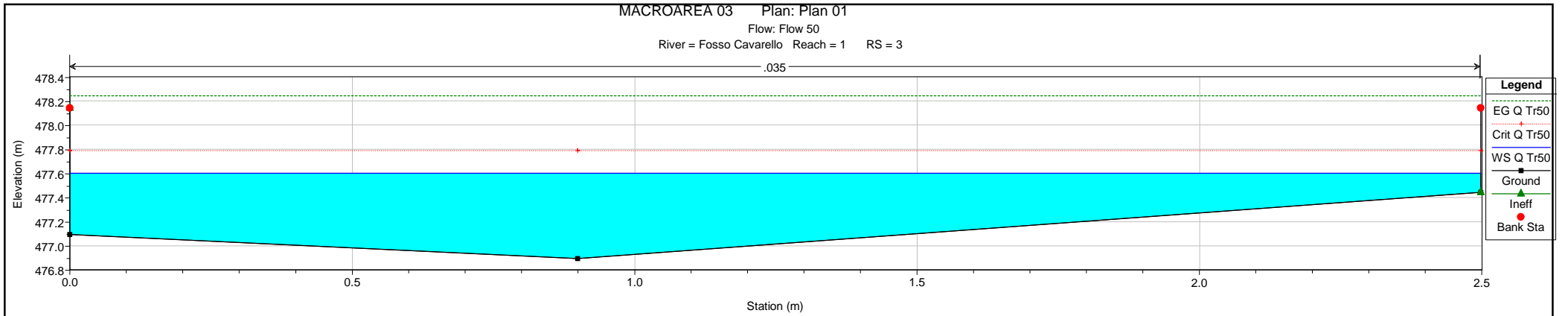
MACROAREA 03 Plan: Plan 01
Flow: Flow 50 FOSSO CAVARELLO

Legend	
	WS Q Tr50
	Ground
	Bank Sta
	Ineff

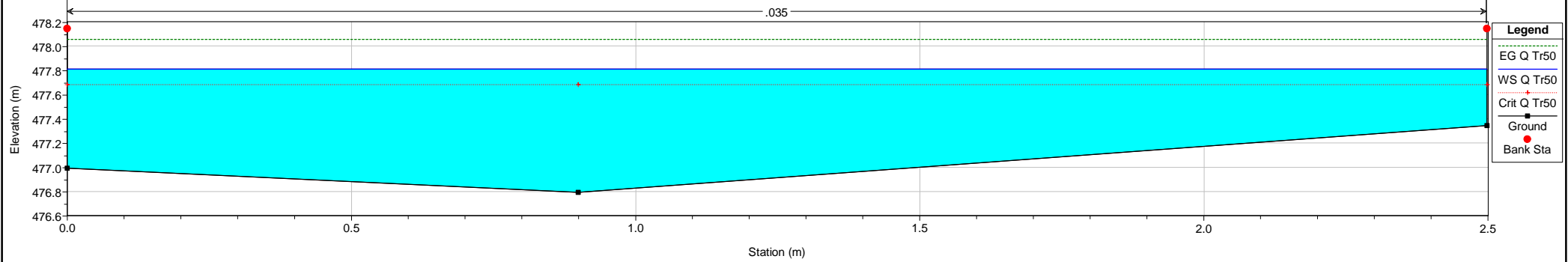




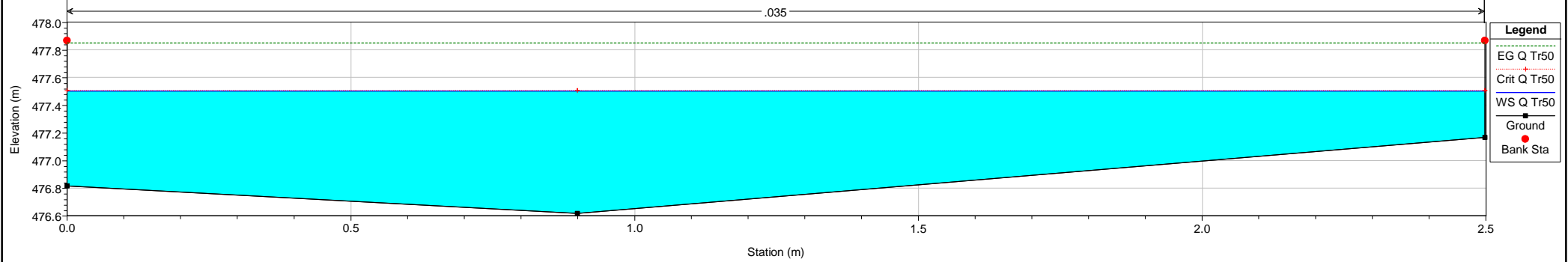




MACROAREA 03 Plan: Plan 01
 Flow: Flow 50
 River = Fosso Cavarello Reach = 1 RS = 2 Sez. aggiunta



MACROAREA 03 Plan: Plan 01
 Flow: Flow 50
 River = Fosso Cavarello Reach = 1 RS = 1 Sez. aggiunta



CAVARELLO.rep

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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PROJECT DATA

Project Title: MACROAREA 03
Project File : CAVARELLO.prj
Run Date and Time: 23/10/2006 9.54.09

Project in SI units

Project Description:
verifica MACROAREA 03 FOSSO CAVARELLO

FLOW DATA

Flow Title: Flow 01
Flow File : n:\2006\06033\Integrazione\HEC_CAVARELLO\CAVARELLO.f01

Flow Data (m3/s)

* River Reach RS * Q Tr200 *
* Fosso Cavarello 1 6 * 6.6 *

Boundary Conditions

* River Reach Profile * Upstream
Downstream *

* Fosso Cavarello 1 Q Tr200 * Critical
Normal S = 0.025 *

GEOMETRY DATA

Geometry Title: Geom 01
Geometry File : n:\2006\06033\Integrazione\HEC_CAVARELLO\CAVARELLO.g01

CROSS SECTION

RIVER: Fosso Cavarello
REACH: 1 RS: 6

INPUT

Description: Sez. aggiunta
Station Elevation Data num= 8
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

0 483.45 2.77 482.55 2.77 481.65 3.03 481.65 3.03 480.8
4.56 480.8 4.6 481.85 8.1 482.71

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val

0 .04 2.77 .035 4.6 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 2.77 4.6 10 10 10 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

```

**
* E.G. Elev (m)      * 482.56 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 0.45  * wt. n-Val.      *         * 0.035  * 0.040
* W.S. Elev (m)     * 482.11 * Reach Len. (m)  * 10.00  * 10.00  * 10.00
* Crit w.S. (m)     * 482.11 * Flow Area (m2)  *         * 2.16   * 0.14
* E.G. Slope (m/m)  * 0.026235 * Area (m2)      *         * 2.16   * 0.14
* Q Total (m3/s)    * 6.60  * Flow (m3/s)     *         * 6.46   * 0.14
* Top width (m)     * 2.90  * Top width (m)   *         * 1.83   * 1.07
* Vel Total (m/s)   * 2.87  * Avg. Vel. (m/s) *         * 2.99   * 1.02
* Max Chl Dpth (m) * 1.31  * Hydr. Depth (m) *         * 1.18   * 0.13
* Conv. Total (m3/s) * 40.7  * Conv. (m3/s)   *         * 39.9   * 0.9
* Length wtd. (m)  * 10.00 * wetted Per. (m) *         * 4.15   * 1.10
* Min Ch El (m)    * 480.80 * Shear (N/m2)   *         * 133.73 * 32.68
* Alpha            * 1.06  * Stream Power (N/m s) *         * 400.07 * 33.45
* Frctn Loss (m)   * 0.16  * Cum Volume (1000 m3) *         * 0.13   * 0.00
* C & E Loss (m)   * 0.01  * Cum SA (1000 m2) *         * 0.10   * 0.01
    
```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Fosso Cavarello
 REACH: 1 RS: 5

INPUT

Description:

Station	Elevation	Data	num=	8	Sta	Elev	Sta	Elev	Sta	Elev
0	482.65	2.77	481.75	2.77	480.85	3.03	480.85	3.03	480	
4.56	480	4.6	481.05	8.1	481.91					

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	2.77	.035	4.6	.04

Bank Sta: Left 2.77 Right 4.6 Lengths: Left 8.5 Channel 8.5 Right 8.5 Coeff Contr. .3 Expan. .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 3.03 484 T
 4.56 8.1 484 T

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m) * 482.10 * Element * Left OB * Channel * Right OB
* vel Head (m) * 1.21 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 480.88 * Reach Len. (m) * 1.00 * 1.00 * 1.00
* Crit W.S. (m) * 481.23 * Flow Area (m2) * * 1.35 *
* E.G. Slope (m/m) *0.062016 * Area (m2) * * 1.38 *
* Q Total (m3/s) * 6.60 * Flow (m3/s) * * 6.60 *
* Top width (m) * 1.82 * Top width (m) * * 1.82 *
* vel Total (m/s) * 4.88 * Avg. vel. (m/s) * * 4.88 *
* Max Chl Dpth (m) * 0.88 * Hydr. Depth (m) * * 0.88 *
* Conv. Total (m3/s) * 26.5 * Conv. (m3/s) * * 26.5 *
* Length wtd. (m) * * wetted Per. (m) * * 2.38 *
* Min Ch El (m) * 480.00 * Shear (N/m2) * * 345.51 *
* Alpha * 1.00 * Stream Power (N/m s) * * 1686.34 *
* Frctn Loss (m) * 0.39 * Cum Volume (1000 m3) * * 0.11 *
* C & E Loss (m) * 0.08 * Cum SA (1000 m2) * * 0.08 *
*****
**
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

BRIDGE

RIVER: Fosso Cavarello
 REACH: 1 RS: 4.5

INPUT

Description: Ponte con apertura stretta a monte e salto a valle
 Distance from Upstream XS = 1
 Deck/Roadway width = 6.5
 Weir Coefficient = 1.44
 Upstream Deck/Roadway Coordinates

num= 9				num= 9				num= 9						
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	484	480	3.03	484	3.03	484	481.87			3.03	484	481.87		
3.41	484	482.53	3.79	484	4.17	484	482.53			4.17	484	482.53		
4.56	484	481.87	4.56	484	8.1	484	480			8.1	484	480		

Upstream Bridge Cross Section Data

num= 8				num= 8				num= 8			
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	482.65	2.77	481.75	2.77	480.85	3.03	480.85	3.03	480		

4.56 480 4.6 481.05

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val

0 .04 2.77 .035 4.6 .04

Bank Sta: Left Right Coeff Contr. Expan.
2.77 4.6 .3 .5
Ineffective Flow num= 2
Sta L Sta R Elev Permanent
0 3.03 484 T
4.56 8.1 484 T

Downstream Deck/Roadway Coordinates

num= 7
Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord

0 484 480 0 484 481 1.61 484 482.3
3.32 484 483 4.93 484 482.3 6.65 484 481
6.65 484 480

Downstream Bridge Cross Section Data

Station Elevation Data num= 4
Sta Elev Sta Elev Sta Elev Sta Elev

0 480.9 0 479.9 6.65 479.9 6.65 480.9

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val

0 .04 0 .035 6.65 .04

Bank Sta: Left Right Coeff Contr. Expan.
0 6.65 .3 .5
Ineffective Flow num= 2
Sta L Sta R Elev Permanent
0 2.56 484 T
4.09 6.65 484 T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins =
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy
Selected Low Flow Methods = Energy

High Flow Method
Energy Only

Additional Bridge Parameters

Add Friction component to Momentum
Do not add weight component to Momentum
Class B flow critical depth computations use critical depth
inside the bridge at the upstream end
criteria to check for pressure flow = Upstream water surface

BRIDGE OUTPUT Profile #Q Tr200

* E.G. US. (m) * 482.10 * Element *Inside BR US *Inside BR DS *
* W.S. US. (m) * 480.88 * E.G. Elev (m) * 481.90 * 481.83 *
* Q Total (m3/s) * 6.60 * W.S. Elev (m) * 481.45 * 481.41 *
* Q Bridge (m3/s) * 6.60 * Crit W.S. (m) * 481.24 * 481.14 *
* Q Weir (m3/s) * * Max Chl Dpth (m) * 1.45 * 1.51 *
* Weir Sta Lft (m) * * Vel Total (m/s) * 2.97 * 2.85 *
* Weir Sta Rgt (m) * * Flow Area (m2) * 2.22 * 2.31 *
* Weir Submerg * * Froude # Chl * 0.79 * 0.74 *
* Weir Max Depth (m) * * Specif Force (m3) * 3.61 * 3.67 *
* Min El Weir Flow (m) * 484.00 * Hydr Depth (m) * 1.45 * 1.51 *
* Min El Prs (m) * 482.64 * W.P. Total (m) * 2.98 * 1.53 *
* Delta EG (m) * 482.10 * Conv. Total (m3/s) * 52.3 * 87.1 *

```

                                CAVARELLO.rep
* Delta WS (m)                *      -0.25 * Top Width (m)                *      1.53 *      6.65 *
* BR Open Area (m2)           *      3.66 * Frctn Loss (m)                *      *      0.10 *
* BR Open Vel (m/s)           *      2.97 * C & E Loss (m)                *      *      0.00 *
* Coef of Q                    *      *      * Shear Total (N/m2)           *      116.63 *      85.13 *
* Br Sel Method                *Energy only * Power Total (N/m s)           *      346.02 *      242.80 *
*****

```

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso Cavarello
 REACH: 1 RS: 4

INPUT

Description:

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	480.9	0	479.9	6.65	479.9	6.65	480.9

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.035	6.65	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	2.56	484	T
4.09	6.65	484	T

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m)                * 481.76 * Element                * Left OB * Channel * Right OB
* vel Head (m)                 * 0.62 * wt. n-Val.            *      *      0.035 *
* W.S. Elev (m)                * 481.13 * Reach Len. (m)        * 0.10 *      0.10 *      0.10
* Crit W.S. (m)                * 481.14 * Flow Area (m2)        *      *      1.89 *
* E.G. Slope (m/m)             *0.011301 * Area (m2)            *      *      8.21 *
* Q Total (m3/s)               * 6.60 * Flow (m3/s)           *      *      6.60 *
* Top width (m)                * 6.65 * Top width (m)         *      *      6.65 *
* vel Total (m/s)              * 3.49 * Avg. Vel. (m/s)       *      *      3.49 *
* Max Chl Dpth (m)            * 1.23 * Hydr. Depth (m)       *      *      1.23 *
* Conv. Total (m3/s)           * 62.1 * Conv. (m3/s)          *      *      62.1 *

```

CAVARELLO.rep

```
*
* Length Wtd. (m)      * 0.10 * wetted Per. (m)      *      * 1.53 *
* Min Ch El (m)       * 479.90 * Shear (N/m2)         *      * 136.79 *
* Alpha                * 1.00 * Stream Power (N/m s) *      * 478.05 *
* Frctn Loss (m)      * 0.01 * Cum Volume (1000 m3) *      * 0.11 *
* C & E Loss (m)      * 0.00 * Cum SA (1000 m2)    *      * 0.08 *
*
```

**

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The cross section had to be extended vertically during the critical depth calculations.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.

CROSS SECTION

RIVER: Fosso Cavarello
REACH: 1 RS: 3.5

INPUT

Description:

Station Elevation Data		num= 4		Sta	Elev	Sta	Elev
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	478.4	0	477.4	6.65	477.4	6.65	478.4

Manning's n Values		num= 3		Sta	n Val	Sta	n Val
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.035	6.65	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	6.65		9.4	9.4	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m)      * 478.67 * Element          * Left OB * Channel * Right OB
* Vel Head (m)       * 0.03 * wt. n-Val.      *      * 0.035 *
* W.S. Elev (m)      * 478.64 * Reach Len. (m)  * 9.40 * 9.40 * 9.40
* Crit W.S. (m)      * 477.86 * Flow Area (m2)  *      * 8.25 *
* E.G. Slope (m/m)   * 0.000897 * Area (m2)       *      * 8.25 *
* Q Total (m3/s)     * 6.60 * Flow (m3/s)     *      * 6.60 *
* Top width (m)      * 6.65 * Top width (m)   *      * 6.65 *
* Vel Total (m/s)    * 0.80 * Avg. vel. (m/s) *      * 0.80 *
* Max Chl Dpth (m)  * 1.24 * Hydr. Depth (m) *      * 1.24 *
* Conv. Total (m3/s) * 220.4 * Conv. (m3/s)    *      * 220.4 *
* Length Wtd. (m)   * 9.40 * wetted Per. (m) *      * 9.13 *
* Min Ch El (m)     * 477.40 * Shear (N/m2)    *      * 7.95 *
* Alpha              * 1.00 * Stream Power (N/m s) *      * 6.35 *
* Frctn Loss (m)    * 0.02 * Cum Volume (1000 m3) *      * 0.11 *
*
```

CAVARELLO.rep

* C & E Loss (m) * 0.02 * Cum SA (1000 m2) * 0.08 *

Warning: The cross-section end points had to be extended vertically for the computed water surface.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: Fosso Cavarello
 REACH: 1 RS: 3

INPUT

Description:

Station Elevation Data		num= 5	
Sta	Elev	Sta	Elev
0	478.15	0	477.1
		.9	476.9
		2.5	477.45
		2.5	478.15

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.04	0	.035
		2.5	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	2.5	10	10	10	.3	.5

Ineffective Flow		num= 2	
Sta L	Sta R	Elev	Permanent
0	0	478.15	F
2.5	2.5	477.45	F

CROSS SECTION OUTPUT Profile #Q Tr200

* E.G. Elev (m)	* 478.64	* Element	* Left OB	* Channel	* Right OB
* Vel Head (m)	* 0.20	* wt. n-Val.	* 0.035		
* W.S. Elev (m)	* 478.43	* Reach Len. (m)	* 1.00	* 1.00	* 1.00
* Crit W.S. (m)	* 478.01	* Flow Area (m2)	* 3.31		
* E.G. Slope (m/m)	* 0.008326	* Area (m2)	* 3.31		
* Q Total (m3/s)	* 6.60	* Flow (m3/s)	* 6.60		
* Top width (m)	* 2.50	* Top width (m)	* 2.50		
* Vel Total (m/s)	* 2.00	* Avg. Vel. (m/s)	* 2.00		
* Max Chl Dpth (m)	* 1.53	* Hydr. Depth (m)	* 1.32		
* Conv. Total (m3/s)	* 72.3	* Conv. (m3/s)	* 72.3		
* Length Wtd. (m)	* 1.00	* wetted Per. (m)	* 4.93		
* Min Ch El (m)	* 476.90	* Shear (N/m2)	* 54.72		
* Alpha	* 1.00	* Stream Power (N/m s)	* 109.26		
* Frctn Loss (m)	* 0.01	* Cum Volume (1000 m3)	* 0.05		
* C & E Loss (m)	* 0.04	* Cum SA (1000 m2)	* 0.04		

Warning: The cross-section end points had to be extended vertically for the computed water surface.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The cross section had to be extended vertically during the critical depth calculations.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE

RIVER: Fosso Cavarello
 REACH: 1 RS: 2.5

INPUT

Description: Passaggio sotto strada
 Distance from Upstream XS = 1
 Deck/Roadway width = 8
 Weir Coefficient = 1.44
 Upstream Deck/Roadway Coordinates

num= 4														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0		478.55		476	0		478.55		478.15	2.5		478.55		478.15
2.5		478.55		476										

Upstream Bridge Cross Section Data

Station Elevation Data		num= 5							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	478.15	0	477.1	.9	476.9	2.5	477.45	2.5	478.15

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.035	2.5	.04

Bank Sta: Left Right Coeff Contr. Expan.
 0 2.5 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 0 478.15 F
 2.5 2.5 477.45 F

Downstream Deck/Roadway Coordinates

num= 4														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0		478.55		476	0		478.55		478.15	2.5		478.55		478.15
2.5		478.55		476										

Downstream Bridge Cross Section Data

Station Elevation Data		num= 5							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	478.15	0	477	.9	476.8	2.5	477.35	2.5	478.15

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.035	2.5	.04

Bank Sta: Left Right Coeff Contr. Expan.
 0 2.5 .3 .5

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
 Energy
 Selected Low Flow Methods = Energy

High Flow Method
 Energy Only

Additional Bridge Parameters
 Add Friction component to Momentum
 Do not add weight component to Momentum
 Class B flow critical depth computations use critical depth
 inside the bridge at the upstream end
 Criteria to check for pressure flow = Upstream water surface

BRIDGE OUTPUT Profile #Q Tr200

```

*****
* E.G. US. (m) * 478.64 * Element *Inside BR US *Inside BR DS *
* W.S. US. (m) * 478.43 * E.G. Elev (m) * 478.59 * 478.41 *
* Q Total (m3/s) * 6.60 * W.S. Elev (m) * 478.26 * 478.13 *
* Q Bridge (m3/s) * 6.60 * Crit W.S. (m) * 478.00 * 477.91 *
* Q Weir (m3/s) * * Max Chl Dpth (m) * 1.36 * 1.33 *
* Weir Sta Lft (m) * * Vel Total (m/s) * 2.54 * 2.36 *
* Weir Sta Rgt (m) * * Flow Area (m2) * 2.60 * 2.79 *
* Weir Submerg * * Froude # chl * 0.76 * 0.71 *
* Weir Max Depth (m) * * Specif Force (m3) * 3.36 * 3.18 *
* Min El Weir Flow (m) * 478.55 * Hydr Depth (m) * * 1.12 *
* Min El Prs (m) * 478.15 * W.P. Total (m) * 6.86 * 4.52 *
* Delta EG (m) * 0.24 * Conv. Total (m3/s) * 38.8 * 57.9 *
* Delta WS (m) * 0.34 * Top width (m) * * 2.50 *
* BR Open Area (m2) * 2.60 * Frctn Loss (m) * 0.15 * 0.01 *
* BR Open Vel (m/s) * 2.54 * C & E Loss (m) * 0.02 * 0.01 *
* Coef of Q * * Shear Total (N/m2) * 107.46 * 78.67 *
* Br Sel Method *Energy only * Power Total (N/m s) * 273.30 * 185.79 *
*****
    
```

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Fosso Cavarello
 REACH: 1 RS: 2

INPUT

Description: Sez. aggiunta

Station Elevation Data		num= 5							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	478.15	0	477	.9	476.8	2.5	477.35	2.5	478.15

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.035	2.5	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	2.5		10	10	.3	.5

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
* *
* E.G. Elev (m) * 478.40 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.30 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 478.09 * Reach Len. (m) * 10.00 * 10.00 * 10.00
* Crit W.S. (m) * 477.90 * Flow Area (m2) * * 2.70 *
*****
    
```

CAVARELLO.rep

```

*
* E.G. Slope (m/m)      *0.014261 * Area (m2)           *           * 2.70 *
*
* Q Total (m3/s)       * 6.60 * Flow (m3/s)        *           * 6.60 *
*
* Top width (m)        * 2.50 * Top width (m)      *           * 2.50 *
*
* Vel Total (m/s)      * 2.45 * Avg. Vel. (m/s)    *           * 2.45 *
*
* Max Chl Dpth (m)    * 1.29 * Hydr. Depth (m)    *           * 1.08 *
*
* Conv. Total (m3/s)   * 55.3 * Conv. (m3/s)       *           * 55.3 *
*
* Length wtd. (m)     * 10.00 * wetted Per. (m)    *           * 4.45 *
*
* Min Ch El (m)       * 476.80 * Shear (N/m2)       *           * 84.87 *
*
* Alpha               * 1.00 * Stream Power (N/m s) *           * 207.58 *
*
* Frctn Loss (m)      * 0.18 * Cum Volume (1000 m3) *           * 0.02 *
*
* C & E Loss (m)      * 0.04 * Cum SA (1000 m2)   *           * 0.02 *

```

**

CROSS SECTION

RIVER: Fosso Cavarello
REACH: 1 RS: 1

INPUT

Description: Sez. aggiunta

Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	477.87	0	476.82	.9	476.62	2.5	477.17	2.5	477.87

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.035	2.5	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

0	2.5	10	10	10	.1	.3
---	-----	----	----	----	----	----

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m)      * 478.17 * Element           * Left OB * Channel * Right OB
*
* Vel Head (m)       * 0.45 * wt. n-Val.        *           * 0.035 *
*
* W.S. Elev (m)      * 477.72 * Reach Len. (m)    *           *           *
*
* Crit W.S. (m)      * 477.72 * Flow Area (m2)     *           * 2.22 *
*
* E.G. Slope (m/m)   *0.024145 * Area (m2)         *           * 2.22 *
*
* Q Total (m3/s)     * 6.60 * Flow (m3/s)       *           * 6.60 *
*
* Top width (m)      * 2.50 * Top width (m)      *           * 2.50 *
*
* Vel Total (m/s)    * 2.97 * Avg. Vel. (m/s)    *           * 2.97 *
*
* Max Chl Dpth (m)   * 1.10 * Hydr. Depth (m)    *           * 0.89 *
*
* Conv. Total (m3/s) * 42.5 * Conv. (m3/s)       *           * 42.5 *
*
* Length wtd. (m)    *           * wetted Per. (m)    *           * 4.07 *
*
* Min Ch El (m)      * 476.62 * Shear (N/m2)       *           * 129.46 *
*
* Alpha              * 1.00 * Stream Power (N/m s) *           * 384.29 *
*
* Frctn Loss (m)     *           * Cum Volume (1000 m3) *           *           *
*

```


* C & E Loss (m) * * Cum SA (1000 m2) * * *

**

Warning: Slope too steep for slope area to converge during supercritical flow calculations (normal depth is below critical depth). Water surface set to critical depth.

SUMMARY OF MANNING'S N VALUES

River: Fosso Cavarello

Reach	River Sta.	n1	n2	n3
1	6	.04	.035*	.04*
1	5	.04	.035*	.04*
*1	4.5	*Bridge	*	*
1	4	.04	.035*	.04*
1	3.5	.04	.035*	.04*
1	3	.04	.035*	.04*
*1	2.5	*Bridge	*	*
1	2	.04	.035*	.04*
1	1	.04	.035*	.04*

SUMMARY OF REACH LENGTHS

River: Fosso Cavarello

Reach	River Sta.	Left	Channel	Right
1	6	10	10*	10*
1	5	8.5	8.5*	8.5*
*1	4.5	*Bridge	*	*
1	4	.1	.1*	.1*
1	3.5	9.4	9.4*	9.4*
1	3	10	10*	10*
*1	2.5	*Bridge	*	*
1	2	10	10*	10*
1	1	10	10*	10*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Fosso Cavarello

Reach	River Sta.	Contr.	Expan.
1	6	.1	.3*
1	5	.3	.5*
*1	4.5	*Bridge	*
1	4	.3	.5*
1	3.5	.1	.3*
1	3	.3	.5*
*1	2.5	*Bridge	*
1	2	.3	.5*
1	1	.1	.3*

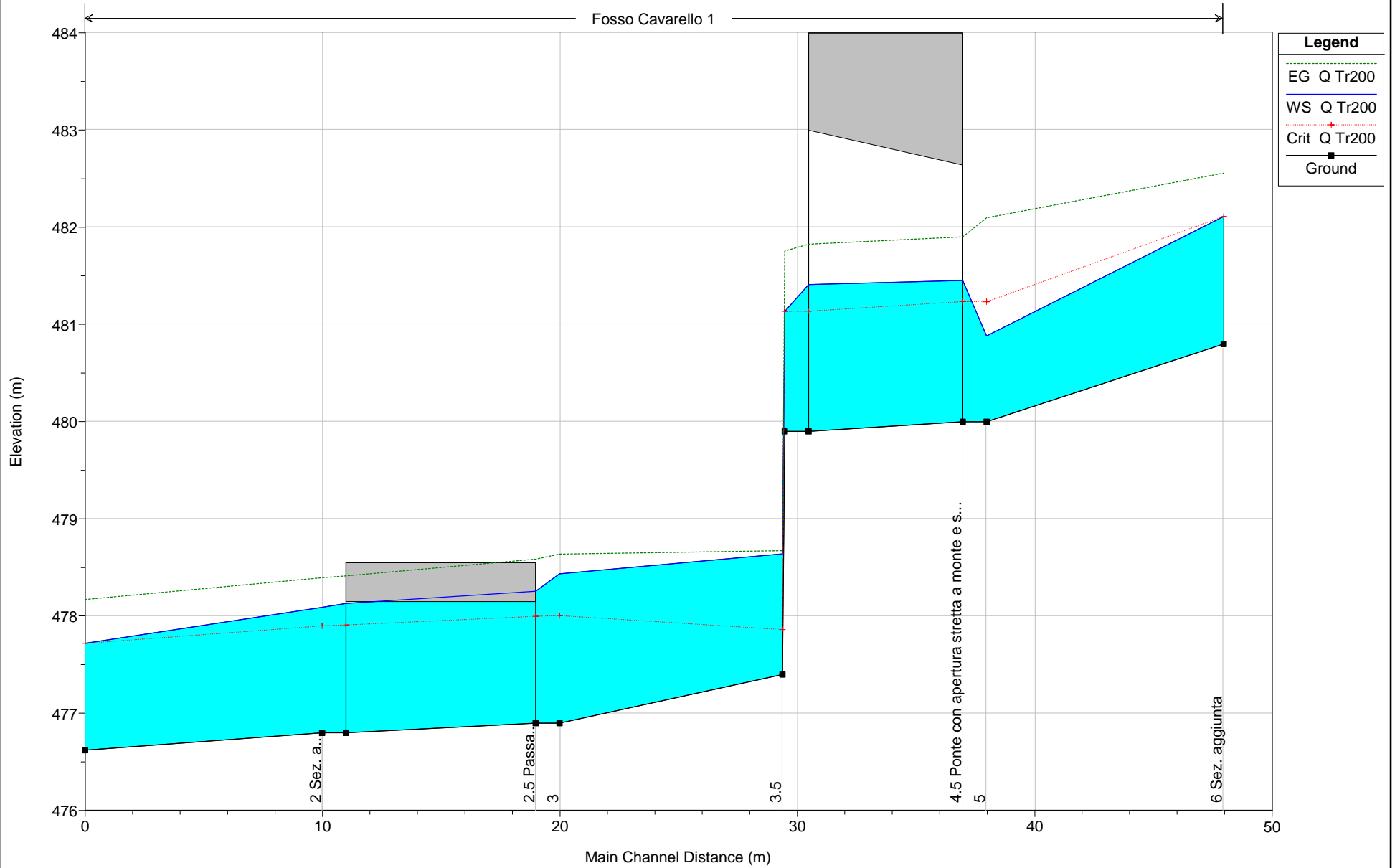
HEC-RAS Plan: Plan Tr200 River: Fosso Cavarello Reach: 1 Profile: Q Tr200

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
1	6	Q Tr200	6.60	480.80	482.11	482.11	482.56	0.026235	2.99	2.30	2.90	0.88
1	5	Q Tr200	6.60	480.00	480.88	481.23	482.10	0.062016	4.88	1.35	1.82	1.66
1	4.5	Bridge										
1	4	Q Tr200	6.60	479.90	481.13	481.14	481.76	0.011301	3.49	1.89	6.65	1.00
1	3.5	Q Tr200	6.60	477.40	478.64	477.86	478.67	0.000897	0.80	8.25	6.65	0.23
1	3	Q Tr200	6.60	476.90	478.43	478.01	478.64	0.008326	2.00	3.31	2.50	0.55
1	2.5	Bridge										
1	2	Q Tr200	6.60	476.80	478.09	477.90	478.40	0.014261	2.45	2.70	2.50	0.75
1	1	Q Tr200	6.60	476.62	477.72	477.72	478.17	0.024145	2.97	2.22	2.50	1.00




MACROAREA 03 Plan: Plan 01

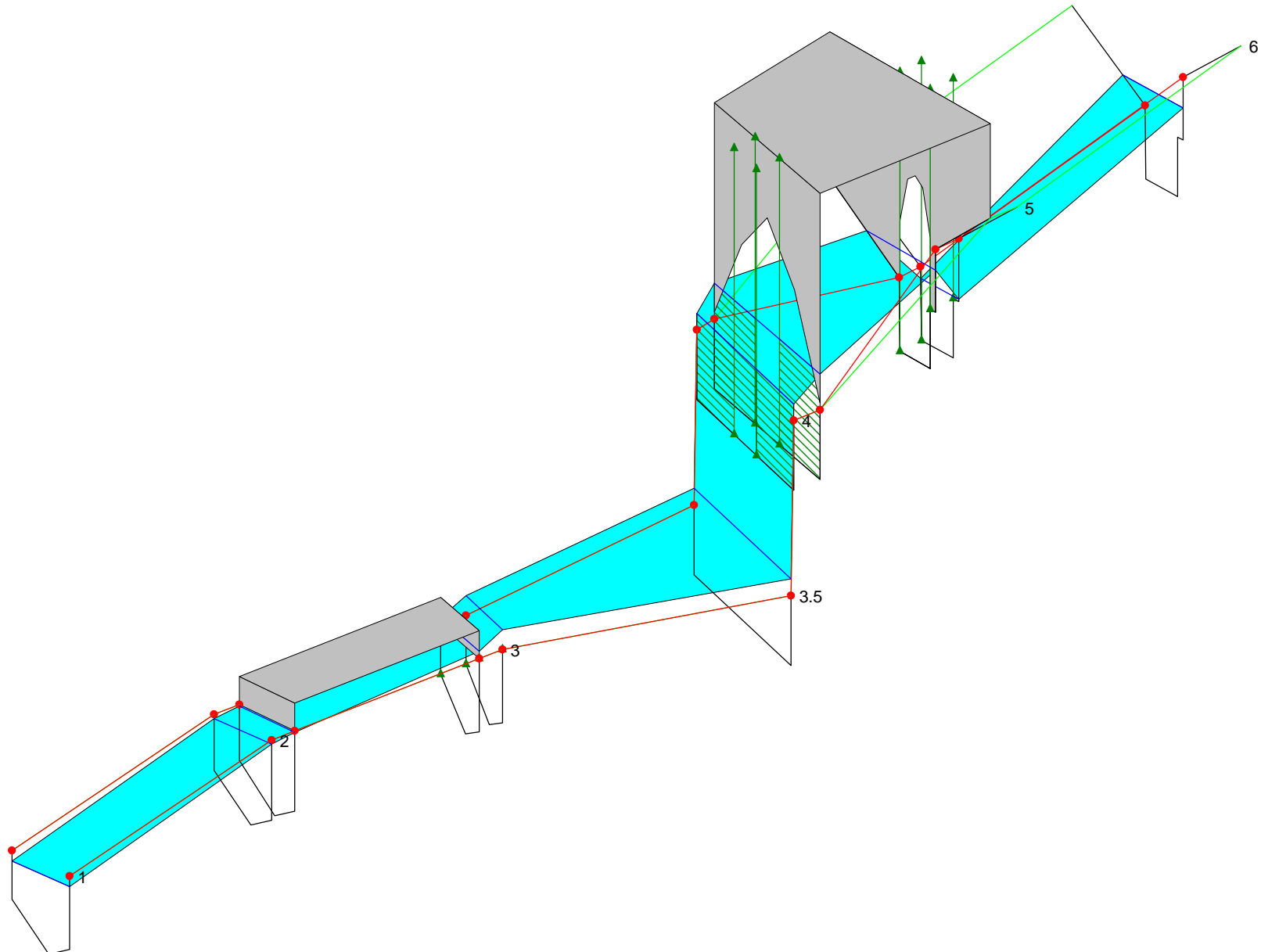
Flow: Flow 01

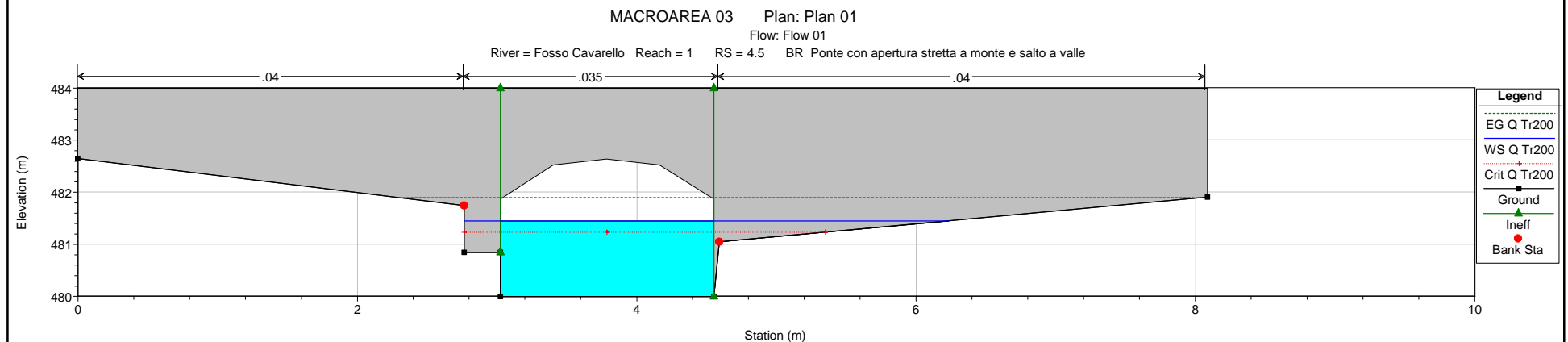
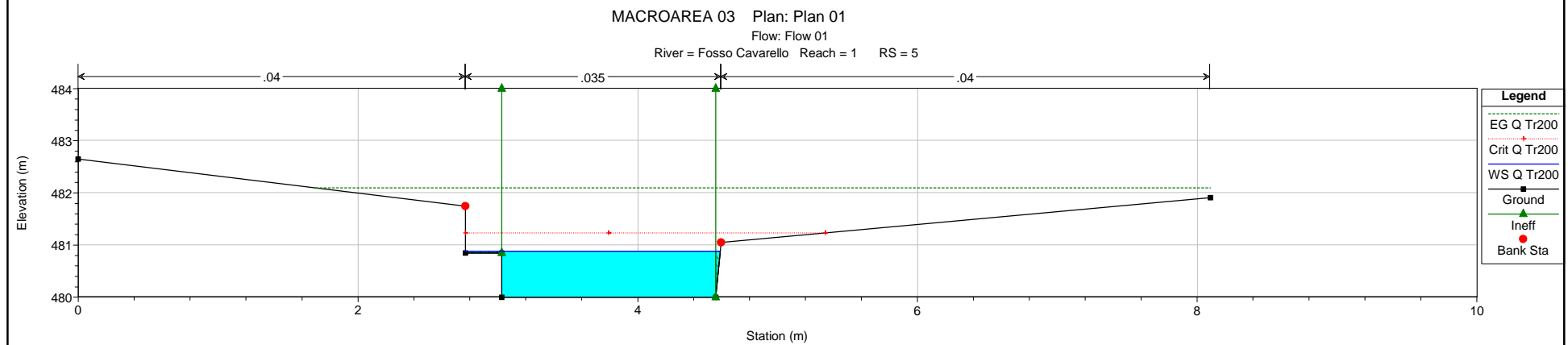
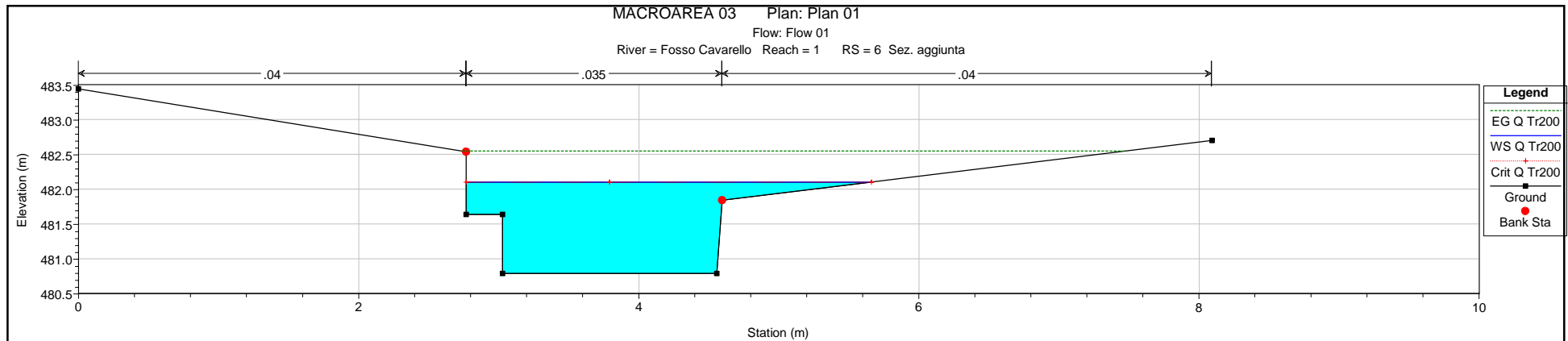
Fosso Cavarello 1

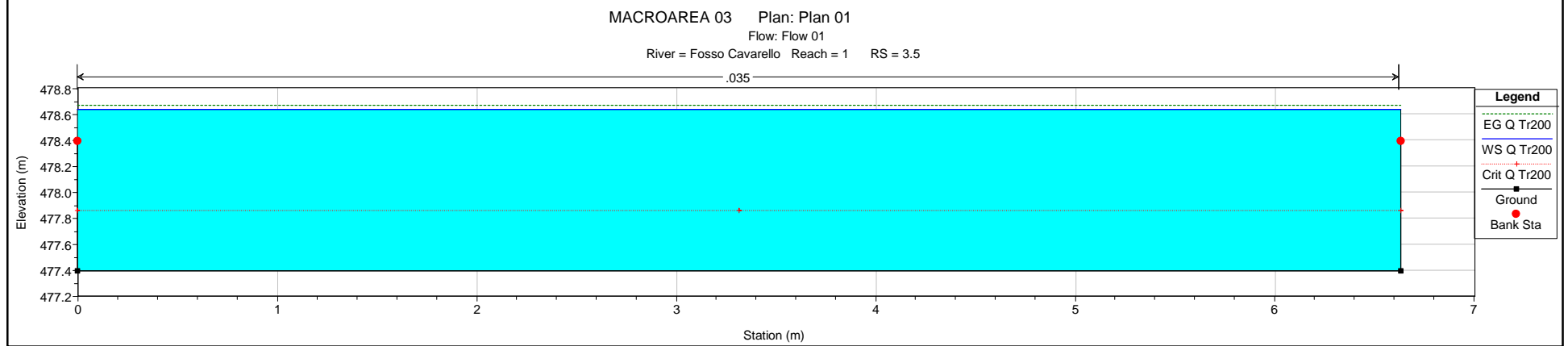
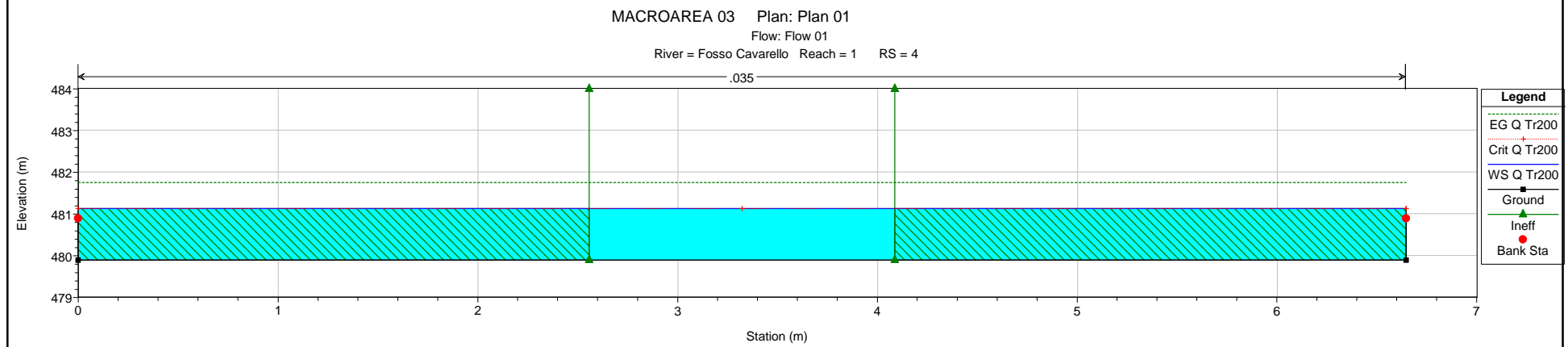
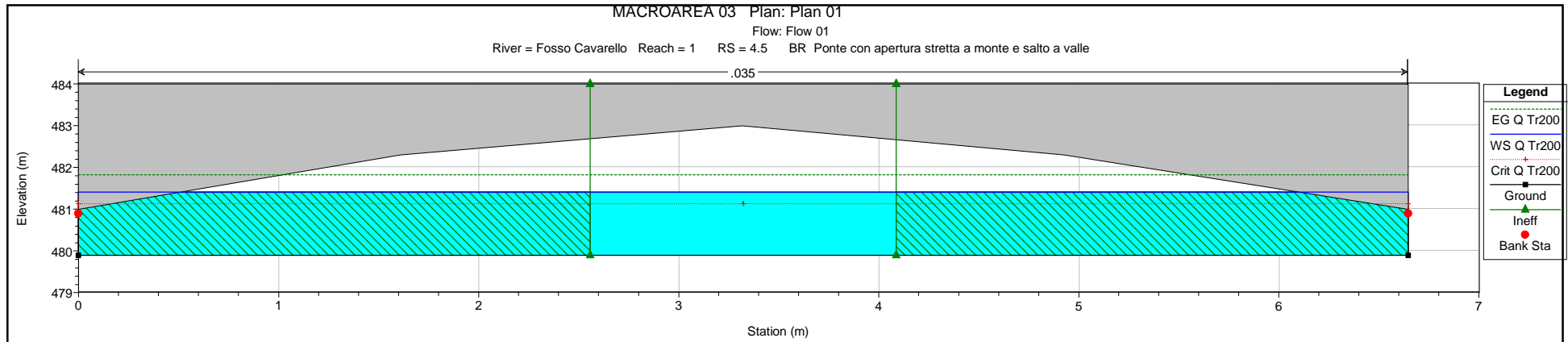


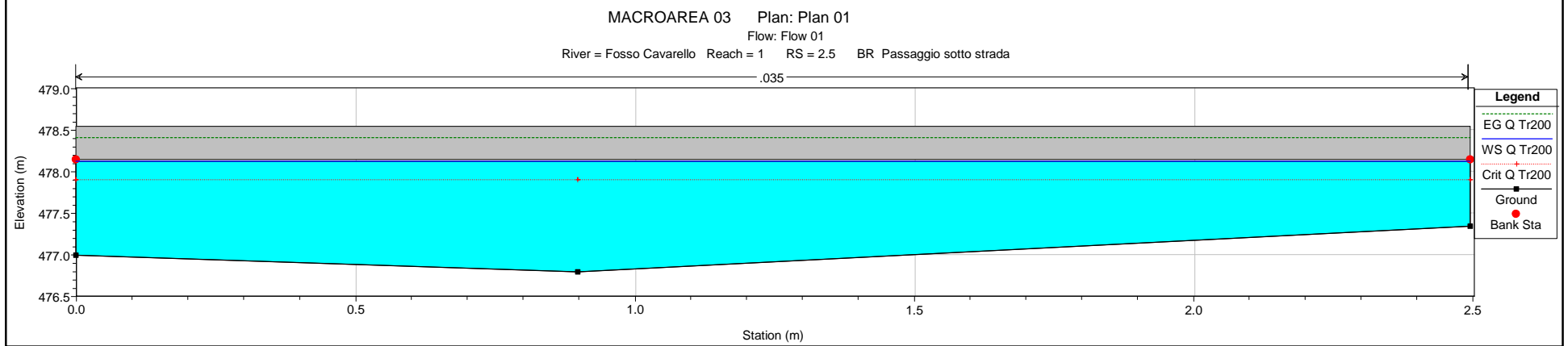
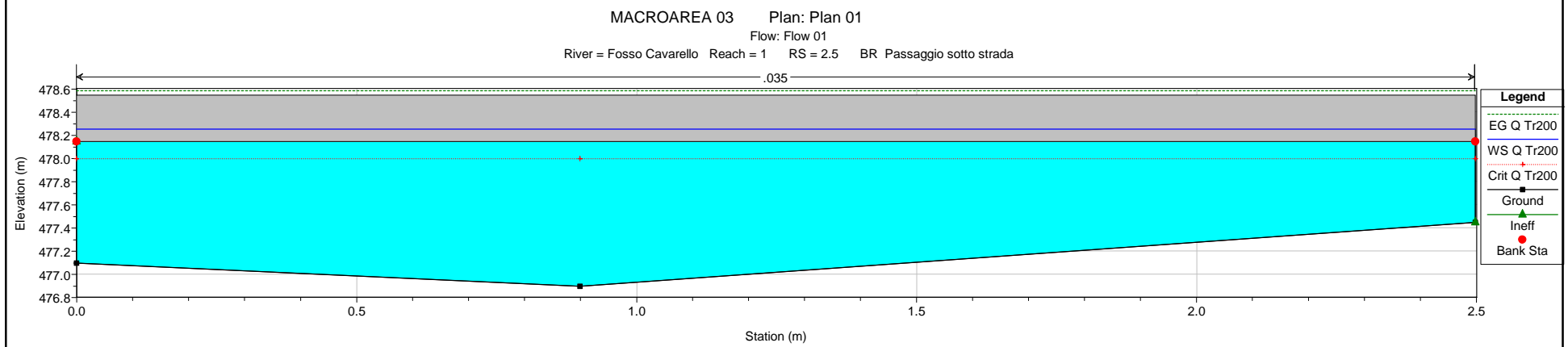
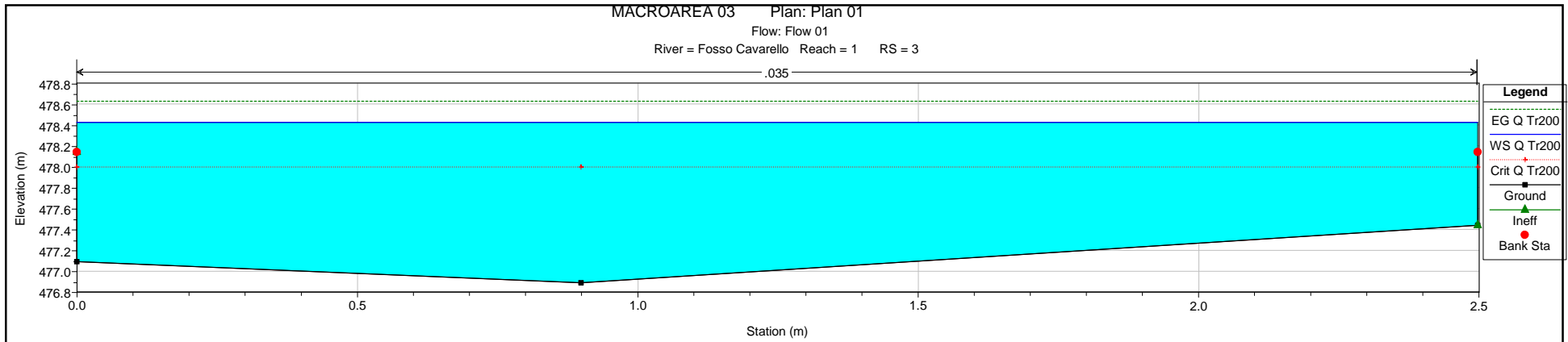
MACROAREA 03 Plan: Plan 01
Flow: Flow 01 FOSSO CAVARELLO

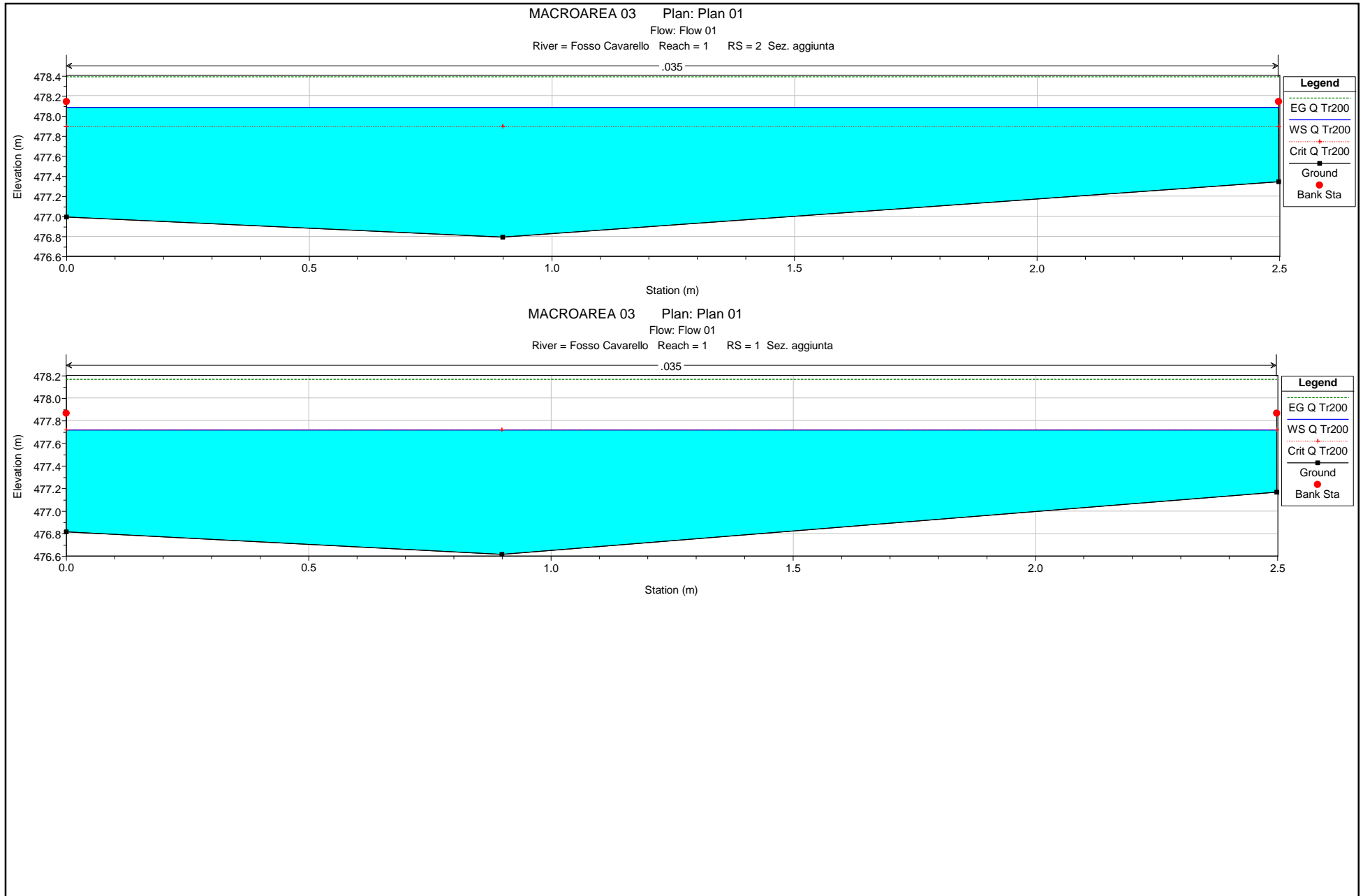
Legend	
	WS Q Tr200
	Bank Sta
	Ineff











HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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PROJECT DATA

Project Title: MACROAREA 03
Project File : zappacenerere50.prj
Run Date and Time: 24/01/2007 17.52.18

Project in SI units

Project Description:

verifica PRG GUBBIO MACROAREA 03 FOSSO ZAPPACENERE

PLAN DATA

Plan Title: Plan 01

Plan File : n:\2006\06033\Integrazione\HEC_ZAPPACENERE\sez aggiunte\finale_Tr50\zappacenerere50.p01

Geometry Title: FOSSO_ZAPPACENERE

Geometry File : n:\2006\06033\Integrazione\HEC_ZAPPACENERE\sez
aggiunte\finale_Tr50\zappacenerere50.g01

Flow Title : Flow 01

Flow File : n:\2006\06033\Integrazione\HEC_ZAPPACENERE\sez
aggiunte\finale_Tr50\zappacenerere50.f01

Plan Summary Information:

Number of: Cross Sections = 24 Multiple Openings = 0
Culverts = 2 Inline Structures = 0
Bridges = 1 Lateral Structures = 0

Computational Information

Water surface calculation tolerance = 0.003
Critical depth calculation tolerance = 0.003
Maximum number of iterations = 20
Maximum difference tolerance = 0.1
Flow tolerance factor = 0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: Flow 01

Flow File : n:\2006\06033\Integrazione\HEC_ZAPPACENERE\sez aggiunte\finale_Tr50\zappacenerere50.f01

Flow Data (m3/s)

* River Reach RS * Q Tr50 *
* Fosso ZAPPACENERE1 6 * 9.6 *

Boundary Conditions

* River Reach Profile * Upstream Downstream
*

* Fosso ZAPPACENERE1 Q Tr50 * Critical Normal S =
0.019 *

GEOMETRY DATA

Geometry Title: FOSSO_ZAPPACENERE
 Geometry File: n:\2006\06033\Integrazione\HEC_ZAPPACENERE\sez
 aggiunte\finale_Tr50\zappacenerere50.g01

CROSS SECTION

RIVER: Fssso ZAPPACENERE
 REACH: 1 RS: 6

INPUT

Description: Sez. aggiunta
 Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	487.19	.01	484.39	2.85	484.19	6.54	487.19

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.035	6.54	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	6.54		9	9	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

	*	485.65	*	Element	*	Left OB	*	Channel	*	Right OB	*
* Vel Head (m)	*	0.41	*	Wt. n-Val.	*		*	0.035	*		*
* W.S. Elev (m)	*	485.24	*	Reach Len. (m)	*	9.00	*	9.00	*	9.00	*
* Crit W.S. (m)	*	485.24	*	Flow Area (m2)	*		*	3.39	*		*
* E.G. Slope (m/m)	*	0.018198	*	Area (m2)	*		*	3.39	*		*
* Q Total (m3/s)	*	9.60	*	Flow (m3/s)	*		*	9.60	*		*
* Top Width (m)	*	4.14	*	Top Width (m)	*		*	4.14	*		*
* Vel Total (m/s)	*	2.84	*	Avg. Vel. (m/s)	*		*	2.84	*		*
* Max Chl Dpth (m)	*	1.05	*	Hydr. Depth (m)	*		*	0.82	*		*
* Conv. Total (m3/s)	*	71.2	*	Conv. (m3/s)	*		*	71.2	*		*
* Length Wtd. (m)	*	9.00	*	Wetted Per. (m)	*		*	5.37	*		*
* Min Ch El (m)	*	484.19	*	Shear (N/m2)	*		*	112.59	*		*
* Alpha	*	1.00	*	Stream Power (N/m s)	*		*	319.21	*		*
* Frctn Loss (m)	*	0.10	*	Cum Volume (1000 m3)	*		*	1.85	*		*
* C & E Loss (m)	*	0.06	*	Cum SA (1000 m2)	*		*	2.92	*		*

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for

additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical

depth, the calculated water surface came back below critical depth. This indicates that there

is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Fssso ZAPPACENERE
 REACH: 1 RS: 5

INPUT

Description:
 Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	486.8	.01	484	3.46	483.8	6.53	483.9	6.54	486.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.035	6.54	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	6.54		10	10	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	.01	487.5	T
6.53	6.54	487.5	T

CROSS SECTION OUTPUT Profile #Q Tr50

zappacenerere50.rep

```

*****
* E.G. Elev (m) * 485.25 * Element * Left OB * Channel * Right OB *
* Vel Head (m) * 1.05 * Wt. n-Val. * * 0.035 * *
* W.S. Elev (m) * 484.20 * Reach Len. (m) * 0.90 * 0.90 * 0.90 *
* Crit W.S. (m) * 484.48 * Flow Area (m2) * * 2.11 * *
* E.G. Slope (m/m) * 0.114363 * Area (m2) * * 2.11 * *
* Q Total (m3/s) * 9.60 * Flow (m3/s) * * 9.60 * *
* Top Width (m) * 6.52 * Top Width (m) * * 6.52 * *
* Vel Total (m/s) * 4.55 * Avg. Vel. (m/s) * * 4.55 * *
* Max Chl Dpth (m) * 0.40 * Hydr. Depth (m) * * 0.32 * *
* Conv. Total (m3/s) * 28.4 * Conv. (m3/s) * * 28.4 * *
* Length Wtd. (m) * 0.90 * Wetted Per. (m) * * 6.53 * *
* Min Ch El (m) * 483.80 * Shear (N/m2) * * 362.47 * *
* Alpha * 1.00 * Stream Power (N/m s) * * 1649.41 * *
* Frctn Loss (m) * 0.33 * Cum Volume (1000 m3) * * 1.83 * *
* C & E Loss (m) * 0.06 * Cum SA (1000 m2) * * 2.87 * *
*****

```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section. This may indicate the need for additional cross sections.

BRIDGE

RIVER: FSSO ZAPPACENERE
 REACH: 1 RS: 4.75

INPUT

Description: ponte di Via Porta Romana
 Distance from Upstream XS = .9
 Deck/Roadway Width = 8.2
 Weir Coefficient = 1.44
 Upstream Deck/Roadway Coordinates

num=	7	Sta Hi Cord Lo Cord				Sta Hi Cord Lo Cord				Sta Hi Cord Lo Cord			
0	487.5	480	.01	487.5	485	1.635	487.5	486.35					
3.27	487.5	486.7	4.905	487.5	486.35	6.53	487.5	485					
6.54	487.5	480											

Upstream Bridge Cross Section Data

Station	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	486.8	.01	484	3.46	483.8	6.53	483.9	6.54	486.8

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.035	6.54	.04

Bank Sta: Left Right Coeff Contr. Expan.
 0 6.54 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 .01 487.5 T
 6.53 6.54 487.5 T

Downstream Deck/Roadway Coordinates

num=	7	Sta Hi Cord Lo Cord				Sta Hi Cord Lo Cord				Sta Hi Cord Lo Cord			
0	487.5	480	.01	487.5	485	1.635	487.5	486.35					
3.27	487.5	486.7	4.905	487.5	486.35	6.53	487.5	485					
6.54	487.5	480											

Downstream Bridge Cross Section Data

Station	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	484.72	.01	481.92	3.46	481.72	6.53	481.82	6.54	484.72

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.035	6.54	.04

Bank Sta: Left Right Coeff Contr. Expan.
 0 6.54 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 .01 487.5 T
 6.53 6.54 487.5 T

```

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Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins =
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

```

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
 Energy
 Selected Low Flow Methods = Highest Energy Answer

High Flow Method
 Pressure and Weir flow
 Submerged Inlet Cd =
 Submerged Inlet + Outlet Cd = .8
 Max Low Cord =

Additional Bridge Parameters
 Add Friction component to Momentum
 Do not add Weight component to Momentum
 Class B flow critical depth computations use critical depth
 inside the bridge at the upstream end
 Criteria to check for pressure flow = Upstream water surface

```

BRIDGE OUTPUT Profile #Q Tr50
*****
* E.G. US. (m) * 485.25 * Element * Inside BR US * Inside BR DS *
* W.S. US. (m) * 484.20 * E.G. Elev (m) * 485.05 * 483.98 *
* Q Total (m3/s) * 9.60 * W.S. Elev (m) * 484.25 * 482.03 *
* Q Bridge (m3/s) * 9.60 * Crit W.S. (m) * 484.48 * 482.40 *
* Q Weir (m3/s) * * Max Chl Dpth (m) * 0.45 * 0.31 *
* Weir Sta Lft (m) * * Vel Total (m/s) * 3.97 * 6.17 *
* Weir Sta Rgt (m) * * Flow Area (m2) * 2.42 * 1.56 *
* Weir Submerg * * Froude # Chl * 2.08 * 4.03 *
* Weir Max Depth (m) * * Specif Force (m3) * 4.34 * 6.23 *
* Min El Weir Flow (m) * 487.50 * Hydr Depth (m) * 0.37 * 0.24 *
* Min El Prs (m) * 486.70 * W.P. Total (m) * 6.53 * 6.53 *
* Delta EG (m) * 485.25 * Conv. Total (m3/s) * 35.6 * 17.1 *
* Delta WS (m) * 2.13 * Top Width (m) * 6.52 * 6.52 *
* BR Open Area (m2) * 14.51 * Frctn Loss (m) * 0.08 * 1.02 *
* BR Open Vel (m/s) * 6.17 * C & E Loss (m) * 0.13 * 0.27 *
* Coef of Q * * Shear Total (N/m2) * 264.34 * 738.43 *
* Br Sel Method *Energy only * Power Total (N/m s) * 1050.64 * 4558.41 *
*****

```

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
 REACH: 1 RS: 4.5

INPUT

Description: Sez. aggiunta
 Station Elevation Data num= 5
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 484.72 .01 481.92 3.46 481.72 6.53 481.82 6.54 484.72

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 0 .035 6.54 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 6.54 18.35 18.35 18.35 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 .01 487.5 T
 6.53 6.54 487.5 T

CROSS SECTION OUTPUT Profile #Q Tr50

zappacenerere50.rep

```
* E.G. Elev (m) * 483.50 * Element * Left OB * Channel * Right OB *
* Vel Head (m) * 1.43 * Wt. n-Val. * * 0.035 * *
* W.S. Elev (m) * 482.07 * Reach Len. (m) * 18.35 * 18.35 * 18.35 *
* Crit W.S. (m) * 482.40 * Flow Area (m2) * * 1.81 * *
* E.G. Slope (m/m) *0.189018 * Area (m2) * * 1.81 * *
* Q Total (m3/s) * 9.60 * Flow (m3/s) * * 9.60 * *
* Top Width (m) * 6.52 * Top Width (m) * * 6.52 * *
* Vel Total (m/s) * 5.29 * Avg. Vel. (m/s) * * 5.29 * *
* Max Chl Dpth (m) * 0.35 * Hydr. Depth (m) * * 0.28 * *
* Conv. Total (m3/s) * 22.1 * Conv. (m3/s) * * 22.1 * *
* Length Wtd. (m) * 18.35 * Wetted Per. (m) * * 6.53 * *
* Min Ch El (m) * 481.72 * Shear (N/m2) * * 515.26 * *
* Alpha * 1.00 * Stream Power (N/m s) * * 2726.14 * *
* Frctn Loss (m) * 0.18 * Cum Volume (1000 m3) * * 1.83 * *
* C & E Loss (m) * 0.22 * Cum SA (1000 m2) * * 2.87 * *
*****
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
 REACH: 1 RS: 4.375*

INPUT

Description:

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	484.734	2.352	484.565	2.365	483.155	4.475	481.509	6.075	481.198
6.58	480.935	7.262	480.995	8.346	481.28	9.71	482.656	9.72	484.116
12.695	484.333	15.709	484.41						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.038	2.352	.035	9.72	.038

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	2.352	9.72		18.35	18.35	.3	.5

CROSS SECTION OUTPUT Profile #Q Tr50

```
* E.G. Elev (m) * 482.37 * Element * Left OB * Channel * Right OB *
* Vel Head (m) * 0.35 * Wt. n-Val. * * 0.035 * *
* W.S. Elev (m) * 482.02 * Reach Len. (m) * 18.35 * 18.35 * 18.35 *
* Crit W.S. (m) * 482.02 * Flow Area (m2) * * 3.67 * *
* E.G. Slope (m/m) *0.015743 * Area (m2) * * 3.67 * *
* Q Total (m3/s) * 9.60 * Flow (m3/s) * * 9.60 * *
* Top Width (m) * 5.26 * Top Width (m) * * 5.26 * *
* Vel Total (m/s) * 2.62 * Avg. Vel. (m/s) * * 2.62 * *
* Max Chl Dpth (m) * 1.09 * Hydr. Depth (m) * * 0.70 * *
* Conv. Total (m3/s) * 76.5 * Conv. (m3/s) * * 76.5 * *
* Length Wtd. (m) * 18.35 * Wetted Per. (m) * * 5.88 * *
* Min Ch El (m) * 480.94 * Shear (N/m2) * * 96.30 * *
* Alpha * 1.00 * Stream Power (N/m s) * * 252.02 * *
* Frctn Loss (m) * 0.30 * Cum Volume (1000 m3) * * 1.77 * *
* C & E Loss (m) * 0.01 * Cum SA (1000 m2) * * 2.76 * *
*****
```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
 REACH: 1 RS: 4.25

INPUT

Description: Sez. aggiunta

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	484.747	4.705	484.409	7.213	481.198	9.103	480.652	9.7	480.15
10.395	480.248	11.5	480.783	12.9	483.512	18.85	483.945	24.879	484.1

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 4.705 .035 12.9 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 4.705 12.9 23.1 23.1 23.1 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 * E.G. Elev (m) * 481.88 * Element * Left OB * Channel * Right OB *
 * Vel Head (m) * 0.62 * Wt. n-Val. * * 0.035 * *
 * W.S. Elev (m) * 481.26 * Reach Len. (m) * 23.10 * 23.10 * 23.10 *
 * Crit W.S. (m) * 481.43 * Flow Area (m2) * * 2.76 * *
 * E.G. Slope (m/m) * 0.035263 * Area (m2) * * 2.76 * *
 * Q Total (m3/s) * 9.60 * Flow (m3/s) * * 9.60 * *
 * Top Width (m) * 4.58 * Top Width (m) * * 4.58 * *
 * Vel Total (m/s) * 3.48 * Avg. Vel. (m/s) * * 3.48 * *
 * Max Chl Dpth (m) * 1.11 * Hydr. Depth (m) * * 0.60 * *
 * Conv. Total (m3/s) * 51.1 * Conv. (m3/s) * * 51.1 * *
 * Length Wtd. (m) * 23.10 * Wetted Per. (m) * * 5.29 * *
 * Min Ch El (m) * 480.15 * Shear (N/m2) * * 180.48 * *
 * Alpha * 1.00 * Stream Power (N/m s) * * 627.72 * *
 * Frctn Loss (m) * 0.42 * Cum Volume (1000 m3) * * 1.72 * *
 * C & E Loss (m) * 0.08 * Cum SA (1000 m2) * * 2.67 * *

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
 REACH: 1 RS: 4.125*

INPUT

Description:

Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 482.823 2.352 482.654 2.368 481.936 4.214 480.204 5.617 479.825
 6.06 479.54 6.638 479.597 7.556 479.876 8.707 481.241 8.72 482.206
 11.695 482.422 14.709 482.5

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .038 2.352 .035 8.72 .038

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 2.352 8.72 23.1 23.1 23.1 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 * E.G. Elev (m) * 481.15 * Element * Left OB * Channel * Right OB *
 * Vel Head (m) * 0.54 * Wt. n-Val. * * 0.035 * *
 * W.S. Elev (m) * 480.61 * Reach Len. (m) * 23.10 * 23.10 * 23.10 *
 * Crit W.S. (m) * 480.73 * Flow Area (m2) * * 2.95 * *
 * E.G. Slope (m/m) * 0.026763 * Area (m2) * * 2.95 * *
 * Q Total (m3/s) * 9.60 * Flow (m3/s) * * 9.60 * *
 * Top Width (m) * 4.39 * Top Width (m) * * 4.39 * *
 * Vel Total (m/s) * 3.26 * Avg. Vel. (m/s) * * 3.26 * *
 * Max Chl Dpth (m) * 1.07 * Hydr. Depth (m) * * 0.67 * *
 * Conv. Total (m3/s) * 58.7 * Conv. (m3/s) * * 58.7 * *
 * Length Wtd. (m) * 23.10 * Wetted Per. (m) * * 5.06 * *
 * Min Ch El (m) * 479.54 * Shear (N/m2) * * 152.76 * *
 * Alpha * 1.00 * Stream Power (N/m s) * * 497.75 * *
 * Frctn Loss (m) * 0.71 * Cum Volume (1000 m3) * * 1.65 * *
 * C & E Loss (m) * 0.02 * Cum SA (1000 m2) * * 2.57 * *

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
 REACH: 1 RS: 4

INPUT

Description: Sez. a monte del tratto intubato
 Station Elevation Data num= 5

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Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	480.9	.01	479.49	2.42	478.93	4.53	479	4.54	480.9

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.035	4.54	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
0	4.54	128	128	128	.3	.5	

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	.77	482	T
3.77	4.54	482	T

CROSS SECTION OUTPUT Profile #Q Tr50

* E.G. Elev (m)	* 480.60	* Element	* Left OB	* Channel	* Right OB
* Vel Head (m)	* 0.68	* Wt. n-Val.	* 0.035		
* W.S. Elev (m)	* 479.92	* Reach Len. (m)	* 128.00	* 128.00	* 128.00
* Crit W.S. (m)	* 480.06	* Flow Area (m2)	* 2.63		
* E.G. Slope (m/m)	* 0.019956	* Area (m2)	* 3.73		
* Q Total (m3/s)	* 9.60	* Flow (m3/s)	* 9.60		
* Top Width (m)	* 4.53	* Top Width (m)	* 4.53		
* Vel Total (m/s)	* 3.66	* Avg. Vel. (m/s)	* 3.66		
* Max Chl Dpth (m)	* 0.99	* Hydr. Depth (m)	* 0.88		
* Conv. Total (m3/s)	* 68.0	* Conv. (m3/s)	* 68.0		
* Length Wtd. (m)	* 128.00	* Wetted Per. (m)	* 3.04		
* Min Ch El (m)	* 478.93	* Shear (N/m2)	* 168.74		
* Alpha	* 1.00	* Stream Power (N/m s)	* 617.00		
* Frctn Loss (m)	* 0.53	* Cum Volume (1000 m3)	* 1.57		
* C & E Loss (m)	* 0.01	* Cum SA (1000 m2)	* 2.46		

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CULVERT

RIVER: FSSO ZAPPACENERE
 REACH: 1 RS: 3.7

INPUT

Description: Tubo Acciaio Corrugato
 Distance from Upstream XS = 8.55
 Deck/Roadway Width = 118
 Weir Coefficient = 1.44
 Upstream Deck/Roadway Coordinates

num=	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
2	0	482	4.54	482						

Upstream Bridge Cross Section Data

Station	Elevation	num=	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	480.9	5	.01	479.49	2.42	478.93	4.53	479	4.54	480.9

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.035	4.54	.04

Bank Sta: Left Right Coeff Contr. Expan.

Left	Right	Coeff	Contr.	Expan.
0	4.54	.3	.5	

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	.77	482	T
3.77	4.54	482	T

Downstream Deck/Roadway Coordinates

num=	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
2	0	481.7	3.7	481.7						

Downstream Bridge Cross Section Data

Station	Elevation	num=	Sta	Elev	Sta	Elev	Sta	Elev
0	481.8	4	0	477.46	3.6	477.46	3.6	481.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	0	.02	3.6	.02

Bank Sta: Left Right Coeff Contr. Expan.
 0 3.6 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 .3 481.7 T
 3.3 3.6 481.7 T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name Shape Rise Span
 Tubo Acciaio Circular 3
 FHWA Chart # 2 - Corrugated Metal Pipe Culvert
 FHWA Scale # 1 - Headwall
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 8.55 118 .026 .026 0 .5 .5
 Upstream Elevation = 478.28
 Centerline Station = 2.265
 Downstream Elevation = 477.5
 Centerline Station = 1.8

CULVERT OUTPUT Profile #Q Tr50 Culv Group: Tubo Acciaio

 * Q Culv Group (m3/s) * 9.60 * Culv Full Len (m) * *
 * # Barrels * 1 * Culv Vel US (m/s) * 3.94 *
 * Q Barrel (m3/s) * 9.60 * Culv Vel DS (m/s) * 3.16 *
 * E.G. US. (m) * 480.60 * Culv Inv El Up (m) * 478.28 *
 * W.S. US. (m) * 479.92 * Culv Inv El Dn (m) * 477.50 *
 * E.G. DS (m) * 478.98 * Culv Frctn Ls (m) * 0.86 *
 * W.S. DS (m) * 478.47 * Culv Exit Loss (m) * 0.36 *
 * Delta EG (m) * 1.62 * Culv Entr Loss (m) * 0.40 *
 * Delta WS (m) * 1.45 * Q Weir (m3/s) * *
 * E.G. IC (m) * * Weir Sta Lft (m) * *
 * E.G. OC (m) * * Weir Sta Rgt (m) * *
 * Culvert Control * Inlet * Weir Submerg * *
 * Culv WS Inlet (m) * 479.41 * Weir Max Depth (m) * *
 * Culv WS Outlet (m) * 478.83 * Weir Avg Depth (m) * *
 * Culv Nml Depth (m) * 1.55 * Weir Flow Area (m2) * *
 * Culv Crt Depth (m) * 1.33 * Min El Weir Flow (m) * 482.00 *

Note: During supercritical analysis, the culvert direct step method went to critical depth. The program then assumed critical depth at the outlet.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
 REACH: 1 RS: 3.5

INPUT
 Description: Sez. aggiunta tratto in cls
 Station Elevation Data num= 4
 Sta Elev Sta Elev Sta Elev Sta Elev

 0 481.8 0 477.46 3.6 477.46 3.6 481.8

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .02 0 .02 3.6 .02

Bank Sta: Left Right Lengths: Left Channel Right Right Coeff Contr. Expan.
 0 3.6 15 15 15 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 .3 481.7 T
 3.3 3.6 481.7 T

CROSS SECTION OUTPUT Profile #Q Tr50

 * E.G. Elev (m) * 479.14 * Element * Left OB * Channel * Right OB *
 * Vel Head (m) * 0.92 * Wt. n-Val. * * 0.020 * *
 * W.S. Elev (m) * 478.21 * Reach Len. (m) * 15.00 * 15.00 * 15.00 *
 * Crit W.S. (m) * 478.47 * Flow Area (m2) * * 2.25 * *
 * E.G. Slope (m/m) * 0.010610 * Area (m2) * * 2.71 * *
 * Q Total (m3/s) * 9.60 * Flow (m3/s) * * 9.60 * *
 * Top Width (m) * 3.60 * Top Width (m) * * 3.60 * *
 * Vel Total (m/s) * 4.26 * Avg. Vel. (m/s) * * 4.26 * *

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```

* Max Chl Dpth (m) * 0.75 * Hydr. Depth (m) * 0.75 *
* Conv. Total (m3/s) * 93.2 * Conv. (m3/s) * 93.2 *
* Length Wtd. (m) * 15.00 * Wetted Per. (m) * 3.00 *
* Min Ch El (m) * 477.46 * Shear (N/m2) * 78.20 *
* Alpha * 1.00 * Stream Power (N/m s) * 332.94 *
* Frctn Loss (m) * * Cum Volume (1000 m3) * 1.16 *
* C & E Loss (m) * * Cum SA (1000 m2) * 1.94 *
*****

```

CROSS SECTION

RIVER: FSSO ZAPPACENERO
REACH: 1 RS: 3.2

INPUT

Description: Sez. aggiunta fine tratto in cls

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	481.7	0	477.29	3.7	477.29	3.7	481.7

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	0	.02	3.7	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 3.7 23.75 23.75 23.75 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
* E.G. Elev (m) * 478.88 * Element * Left OB * Channel * Right OB *
* Vel Head (m) * 1.01 * Wt. n-Val. * * 0.020 * *
* W.S. Elev (m) * 477.87 * Reach Len. (m) * 23.75 * 23.75 * 23.75 *
* Crit W.S. (m) * 478.17 * Flow Area (m2) * * 2.16 * *
* E.G. Slope (m/m) * 0.023385 * Area (m2) * * 2.16 * *
* Q Total (m3/s) * 9.60 * Flow (m3/s) * * 9.60 * *
* Top Width (m) * 3.70 * Top Width (m) * * 3.70 * *
* Vel Total (m/s) * 4.45 * Avg. Vel. (m/s) * * 4.45 * *
* Max Chl Dpth (m) * 0.58 * Hydr. Depth (m) * * 0.58 * *
* Conv. Total (m3/s) * 62.8 * Conv. (m3/s) * * 62.8 * *
* Length Wtd. (m) * 23.75 * Wetted Per. (m) * * 4.87 * *
* Min Ch El (m) * 477.29 * Shear (N/m2) * * 101.72 * *
* Alpha * 1.00 * Stream Power (N/m s) * * 452.36 * *
* Frctn Loss (m) * 0.23 * Cum Volume (1000 m3) * * 1.12 * *
* C & E Loss (m) * 0.03 * Cum SA (1000 m2) * * 1.89 * *
*****

```

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO ZAPPACENERO
REACH: 1 RS: 3.1*

INPUT

Description:

Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	481.518	2.352	481.349	3.606	477.539	4.551	477.266	4.85	477.015
6.7	477.015	7.048	479.269	8.436	479.536	9.566	480.901	11.275	481.117
14.29	481.195								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	2.352	.027	9.566	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
2.352 9.566 23.75 23.75 23.75 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
* E.G. Elev (m) * 478.59 * Element * Left OB * Channel * Right OB *
* Vel Head (m) * 0.47 * Wt. n-Val. * * 0.027 * *
* W.S. Elev (m) * 478.12 * Reach Len. (m) * 23.75 * 23.75 * 23.75 *
* Crit W.S. (m) * 478.12 * Flow Area (m2) * * 3.18 * *
* E.G. Slope (m/m) * 0.012071 * Area (m2) * * 3.18 * *
* Q Total (m3/s) * 9.60 * Flow (m3/s) * * 9.60 * *
* Top Width (m) * 3.46 * Top Width (m) * * 3.46 * *
* Vel Total (m/s) * 3.02 * Avg. Vel. (m/s) * * 3.02 * *
* Max Chl Dpth (m) * 1.11 * Hydr. Depth (m) * * 0.92 * *
* Conv. Total (m3/s) * 87.4 * Conv. (m3/s) * * 87.4 * *
* Length Wtd. (m) * 23.75 * Wetted Per. (m) * * 4.96 * *
* Min Ch El (m) * 477.02 * Shear (N/m2) * * 75.79 * *
*****

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* Alpha * 1.00 * Stream Power (N/m s) * 229.11 *
* Frctn Loss (m) * 0.32 * Cum Volume (1000 m3) * 1.06 *
* C & E Loss (m) * 0.04 * Cum SA (1000 m2) * 1.80 *
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
REACH: 1 RS: 3

INPUT

Description:

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	481.337	4.705	480.999	7.213	477.788	9.103	477.242	9.7	476.74
10.395	476.838	13.171	477.373	15.431	480.102	18.85	480.535	24.879	480.69

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	4.705	.035	15.431	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4.705 15.431 15 15 15 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	7.2	481.19	T
13.2	24.879	481.19	T

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
* E.G. Elev (m) * 478.18 * Element * Left OB * Channel * Right OB *
* Vel Head (m) * 0.46 * Wt. n-Val. * * 0.035 * *
* W.S. Elev (m) * 477.72 * Reach Len. (m) * 15.00 * 15.00 * 15.00 *
* Crit W.S. (m) * 477.83 * Flow Area (m2) * * 3.19 * *
* E.G. Slope (m/m) * 0.026240 * Area (m2) * * 3.23 * *
* Q Total (m3/s) * 9.60 * Flow (m3/s) * * 9.60 * *
* Top Width (m) * 6.01 * Top Width (m) * * 6.01 * *
* Vel Total (m/s) * 3.01 * Avg. Vel. (m/s) * * 3.01 * *
* Max Chl Dpth (m) * 0.98 * Hydr. Depth (m) * * 0.55 * *
* Conv. Total (m3/s) * 59.3 * Conv. (m3/s) * * 59.3 * *
* Length Wtd. (m) * 15.00 * Wetted Per. (m) * * 6.07 * *
* Min Ch El (m) * 476.74 * Shear (N/m2) * * 135.07 * *
* Alpha * 1.00 * Stream Power (N/m s) * * 406.77 * *
* Frctn Loss (m) * 0.41 * Cum Volume (1000 m3) * * 0.98 * *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 1.69 * *
*****

```

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CULVERT

RIVER: FSSO ZAPPACENERE
REACH: 1 RS: 2.5

INPUT

Description: Ponte Via B. Croce

Distance from Upstream XS = 1
Deck/Roadway Width = 13
Weir Coefficient = 1.44

Upstream Deck/Roadway Coordinates
num= 2

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	481.19	24.88	481.19						

Upstream Bridge Cross Section Data
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	481.337	4.705	480.999	7.213	477.788	9.103	477.242	9.7	476.74
10.395	476.838	13.171	477.373	15.431	480.102	18.85	480.535	24.879	480.69

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 4.705 .035 15.431 .04

Bank Sta: Left Right Coeff Contr. Expan.
 4.705 15.431 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 7.2 481.19 T
 13.2 24.879 481.19 T

Downstream Deck/Roadway Coordinates
 num= 2
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord

 0 480.91 22.49 480.91

Downstream Bridge Cross Section Data
 Station Elevation Data num= 9
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 481.292 4.368 481.01 8.225 477.627 10.272 476.478 11.119 476.484
 11.977 476.549 14.249 477.205 17.204 480.438 22.494 480.75

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 4.368 .035 17.204 .04

Bank Sta: Left Right Coeff Contr. Expan.
 4.368 17.204 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 8.2 481.29 T
 14.2 22.494 481.29 T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name Shape Rise Span
 scat. Croce Box 3.7 6
 FHWA Chart # 58- Rectangular concrete
 FHWA Scale # 1 - Side tapered; Less favorable edges
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 1 13 .02 .03 0 .5 1
 Upstream Elevation = 476.74
 Centerline Station = 10.2
 Downstream Elevation = 476.48
 Centerline Station = 11.2

CULVERT OUTPUT Profile #Q Tr50 Culv Group: scat. Croce

 * Q Culv Group (m3/s) * 9.60 * Culv Full Len (m) * *
 * # Barrels * 1 * Culv Vel US (m/s) * 1.74 *
 * Q Barrel (m3/s) * 9.60 * Culv Vel DS (m/s) * 1.32 *
 * E.G. US. (m) * 478.18 * Culv Inv El Up (m) * 476.74 *
 * W.S. US. (m) * 477.72 * Culv Inv El Dn (m) * 476.48 *
 * E.G. DS (m) * 477.78 * Culv Frctn Ls (m) * 0.03 *
 * W.S. DS (m) * 477.45 * Culv Exit Loss (m) * *
 * Delta EG (m) * 0.40 * Culv Entr Loss (m) * 0.08 *
 * Delta WS (m) * 0.27 * Q Weir (m3/s) * *
 * E.G. IC (m) * 477.88 * Weir Sta Lft (m) * *
 * E.G. OC (m) * 477.89 * Weir Sta Rgt (m) * *
 * Culvert Control * Outlet * Weir Submerg * *
 * Culv WS Inlet (m) * 477.66 * Weir Max Depth (m) * *
 * Culv WS Outlet (m) * 477.69 * Weir Avg Depth (m) * *
 * Culv Nml Depth (m) * 0.54 * Weir Flow Area (m2) * *
 * Culv Crt Depth (m) * 0.64 * Min El Weir Flow (m) * 481.19 *

Warning: During subcritical analysis, the water surface upstream of culvert went to critical depth.
 Note: During the supercritical calculations a hydraulic jump occurred at the inlet of (going into) the culvert.

CROSS SECTION

RIVER: FSSO ZAPPACENERE

REACH: 1 RS: 2

INPUT

Description: Sez. aggiunta

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	481.292	4.368	481.01	8.225	477.627	10.272	476.478	11.119	476.484
11.977	476.549	14.249	477.205	17.204	480.438	22.494	480.75		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	4.368	.035	17.204	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
4.368	17.204	20	20	20	.3	.5	

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	8.2	481.29	T
14.2	22.494	481.29	T

CROSS SECTION OUTPUT Profile #Q Tr50

	*	477.78	* Element	*	Left OB	*	Channel	*	Right OB	*
* E.G. Elev (m)	*	0.33	* Wt. n-Val.	*		*	0.035	*		*
* Vel Head (m)	*	477.45	* Reach Len. (m)	*	20.00	*	20.00	*	20.00	*
* W.S. Elev (m)	*	477.45	* Flow Area (m2)	*		*	3.75	*		*
* Crit W.S. (m)	*	0.015077	* Area (m2)	*		*	3.79	*		*
* E.G. Slope (m/m)	*	9.60	* Flow (m3/s)	*		*	9.60	*		*
* Q Total (m3/s)	*	5.93	* Top Width (m)	*		*	5.93	*		*
* Top Width (m)	*	2.56	* Avg. Vel. (m/s)	*		*	2.56	*		*
* Vel Total (m/s)	*	0.97	* Hydr. Depth (m)	*		*	0.66	*		*
* Max Chl Dpth (m)	*	78.2	* Conv. (m3/s)	*		*	78.2	*		*
* Conv. Total (m3/s)	*	20.00	* Wetted Per. (m)	*		*	6.00	*		*
* Length Wtd. (m)	*	476.48	* Shear (N/m2)	*		*	92.26	*		*
* Min Ch El (m)	*	1.00	* Stream Power (N/m s)	*		*	236.36	*		*
* Alpha	*	0.30	* Cum Volume (1000 m3)	*		*	0.93	*		*
* Frctn Loss (m)	*	0.01	* Cum SA (1000 m2)	*		*	1.60	*		*
* C & E Loss (m)	*			*		*		*		*

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
REACH: 1 RS: 1

INPUT

Description: Sez. aggiunta

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	480.912	4.368	480.63	8.225	477.247	10.272	476.098	11.119	476.104
11.977	476.169	14.249	476.825	17.204	480.058	22.494	480.37		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	4.368	.035	17.204	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
4.368	17.204	23.636	23.636	23.636	.1	.3	

CROSS SECTION OUTPUT Profile #Q Tr50

	*	477.41	* Element	*	Left OB	*	Channel	*	Right OB	*
* E.G. Elev (m)	*	0.40	* Wt. n-Val.	*		*	0.035	*		*
* Vel Head (m)	*	477.01	* Reach Len. (m)	*	23.64	*	23.64	*	23.64	*
* W.S. Elev (m)	*	477.08	* Flow Area (m2)	*		*	3.41	*		*
* Crit W.S. (m)	*	0.021338	* Area (m2)	*		*	3.41	*		*
* E.G. Slope (m/m)	*	9.60	* Flow (m3/s)	*		*	9.60	*		*
* Q Total (m3/s)	*	5.76	* Top Width (m)	*		*	5.76	*		*
* Top Width (m)	*	2.81	* Avg. Vel. (m/s)	*		*	2.81	*		*
* Vel Total (m/s)	*	0.91	* Hydr. Depth (m)	*		*	0.59	*		*
* Max Chl Dpth (m)	*	65.7	* Conv. (m3/s)	*		*	65.7	*		*
* Conv. Total (m3/s)	*	23.64	* Wetted Per. (m)	*		*	6.17	*		*
* Length Wtd. (m)	*	476.10	* Shear (N/m2)	*		*	115.76	*		*
* Min Ch El (m)	*	1.00	* Stream Power (N/m s)	*		*	325.60	*		*
* Alpha	*			*		*		*		*

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* Frctn Loss (m) * 0.36 * Cum Volume (1000 m3) * 0.86 *
 * C & E Loss (m) * 0.02 * Cum SA (1000 m2) * 1.48 *

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fssso ZAPPACENERE
 REACH: 1 RS: .909090*

INPUT

Description:

Station Elevation Data num= 9
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 480.357 4.368 480.075 8.225 476.692 10.272 475.543 11.119 475.549
 11.977 475.614 14.249 476.27 17.204 479.503 22.494 479.815

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 4.368 .035 17.204 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 4.368 17.204 23.636 23.636 23.636 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 * E.G. Elev (m) * 476.87 * Element * Left OB * Channel * Right OB *
 * Vel Head (m) * 0.44 * Wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 476.42 * Reach Len. (m) * 23.64 * 23.64 * 23.64 *
 * Crit W.S. (m) * 476.52 * Flow Area (m2) * * 3.26 *
 * E.G. Slope (m/m) * 0.024364 * Area (m2) * * 3.26 *
 * Q Total (m3/s) * 9.60 * Flow (m3/s) * * 9.60 *
 * Top Width (m) * 5.69 * Top Width (m) * * 5.69 *
 * Vel Total (m/s) * 2.94 * Avg. Vel. (m/s) * * 2.94 *
 * Max Chl Dpth (m) * 0.88 * Hydr. Depth (m) * * 0.57 *
 * Conv. Total (m3/s) * 61.5 * Conv. (m3/s) * * 61.5 *
 * Length Wtd. (m) * 23.64 * Wetted Per. (m) * * 6.08 *
 * Min Ch El (m) * 475.54 * Shear (N/m2) * * 128.16 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 377.32 *
 * Frctn Loss (m) * 0.54 * Cum Volume (1000 m3) * * 0.78 *
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 1.35 *

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fssso ZAPPACENERE
 REACH: 1 RS: .818181*

INPUT

Description:

Station Elevation Data num= 9
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 479.803 4.368 479.521 8.225 476.138 10.272 474.989 11.119 474.995
 11.977 475.06 14.249 475.716 17.204 478.949 22.494 479.261

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 4.368 .035 17.204 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 4.368 17.204 23.636 23.636 23.636 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 * E.G. Elev (m) * 476.30 * Element * Left OB * Channel * Right OB *
 * Vel Head (m) * 0.42 * Wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 475.89 * Reach Len. (m) * 23.64 * 23.64 * 23.64 *
 * Crit W.S. (m) * 475.97 * Flow Area (m2) * * 3.35 *
 * E.G. Slope (m/m) * 0.022534 * Area (m2) * * 3.35 *
 * Q Total (m3/s) * 9.60 * Flow (m3/s) * * 9.60 *
 * Top Width (m) * 5.73 * Top Width (m) * * 5.73 *
 * Vel Total (m/s) * 2.87 * Avg. Vel. (m/s) * * 2.87 *
 * Max Chl Dpth (m) * 0.90 * Hydr. Depth (m) * * 0.58 *
 * Conv. Total (m3/s) * 64.0 * Conv. (m3/s) * * 64.0 *
 * Length Wtd. (m) * 23.64 * Wetted Per. (m) * * 6.13 *
 * Min Ch El (m) * 474.99 * Shear (N/m2) * * 120.71 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 345.97 *
 * Frctn Loss (m) * 0.55 * Cum Volume (1000 m3) * * 0.70 *

* C & E Loss (m) * 0.01 * Cum SA (1000 m2) * 1.21 *

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO ZAPPACENERE

REACH: 1 RS: .727272*

INPUT

Description:

Station Elevation Data		num= 9							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	479.248	4.368	478.966	8.225	475.583	10.272	474.434	11.119	474.44
11.977	474.505	14.249	475.161	17.204	478.394	22.494	478.706		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	4.368	.035	17.204	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	4.368	17.204		23.636	23.636		.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

* E.G. Elev (m)	* 475.75	* Element	* Left OB	* Channel	* Right OB
* Vel Head (m)	* 0.44	* Wt. n-Val.	* 23.64	* 0.035	* 23.64
* W.S. Elev (m)	* 475.32	* Reach Len. (m)			
* Crit W.S. (m)	* 475.41	* Flow Area (m2)		* 3.28	
* E.G. Slope (m/m)	* 0.023860	* Area (m2)		* 3.28	
* Q Total (m3/s)	* 9.60	* Flow (m3/s)		* 9.60	
* Top Width (m)	* 5.70	* Top Width (m)		* 5.70	
* Vel Total (m/s)	* 2.92	* Avg. Vel. (m/s)		* 2.92	
* Max Chl Dpth (m)	* 0.88	* Hydr. Depth (m)		* 0.58	
* Conv. Total (m3/s)	* 62.1	* Conv. (m3/s)		* 62.1	
* Length Wtd. (m)	* 23.64	* Wetted Per. (m)		* 6.09	
* Min Ch El (m)	* 474.43	* Shear (N/m2)		* 126.12	
* Alpha	* 1.00	* Stream Power (N/m s)		* 368.66	
* Frctn Loss (m)	* 0.55	* Cum Volume (1000 m3)		* 0.62	
* C & E Loss (m)	* 0.00	* Cum SA (1000 m2)		* 1.08	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO ZAPPACENERE

REACH: 1 RS: .636363*

INPUT

Description:

Station Elevation Data		num= 9							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	478.694	4.368	478.412	8.225	475.029	10.272	473.88	11.119	473.886
11.977	473.951	14.249	474.607	17.204	477.84	22.494	478.152		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	4.368	.035	17.204	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	4.368	17.204		23.636	23.636		.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

* E.G. Elev (m)	* 475.20	* Element	* Left OB	* Channel	* Right OB
* Vel Head (m)	* 0.43	* Wt. n-Val.	* 23.64	* 0.035	* 23.64
* W.S. Elev (m)	* 474.77	* Reach Len. (m)			
* Crit W.S. (m)	* 474.86	* Flow Area (m2)		* 3.32	
* E.G. Slope (m/m)	* 0.023139	* Area (m2)		* 3.32	
* Q Total (m3/s)	* 9.60	* Flow (m3/s)		* 9.60	
* Top Width (m)	* 5.71	* Top Width (m)		* 5.71	
* Vel Total (m/s)	* 2.89	* Avg. Vel. (m/s)		* 2.89	
* Max Chl Dpth (m)	* 0.89	* Hydr. Depth (m)		* 0.58	
* Conv. Total (m3/s)	* 63.1	* Conv. (m3/s)		* 63.1	
* Length Wtd. (m)	* 23.64	* Wetted Per. (m)		* 6.11	
* Min Ch El (m)	* 473.88	* Shear (N/m2)		* 123.19	
* Alpha	* 1.00	* Stream Power (N/m s)		* 356.31	
* Frctn Loss (m)	* 0.56	* Cum Volume (1000 m3)		* 0.55	
* C & E Loss (m)	* 0.00	* Cum SA (1000 m2)		* 0.94	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
REACH: 1 RS: .545454*

INPUT

Description:

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	478.139	4.368	477.857	8.225	474.474	10.272	473.325	11.119	473.331		
11.977	473.396	14.249	474.052	17.204	477.285	22.494	477.597				

Manning's n Values		num= 3		Sta n Val		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	4.368	.035	17.204	.04				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	4.368	17.204		23.636	23.636	23.636	.1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

* E.G. Elev (m)	* 474.64	* Element	* Left OB	* Channel	* Right OB
* Vel Head (m)	* 0.43	* Wt. n-Val.	*	* 0.035	*
* W.S. Elev (m)	* 474.21	* Reach Len. (m)	* 23.64	* 23.64	* 23.64
* Crit W.S. (m)	* 474.30	* Flow Area (m2)	*	* 3.30	*
* E.G. Slope (m/m)	* 0.023562	* Area (m2)	*	* 3.30	*
* Q Total (m3/s)	* 9.60	* Flow (m3/s)	*	* 9.60	*
* Top Width (m)	* 5.70	* Top Width (m)	*	* 5.70	*
* Vel Total (m/s)	* 2.91	* Avg. Vel. (m/s)	*	* 2.91	*
* Max Chl Dpth (m)	* 0.89	* Hydr. Depth (m)	*	* 0.58	*
* Conv. Total (m3/s)	* 62.5	* Conv. (m3/s)	*	* 62.5	*
* Length Wtd. (m)	* 23.64	* Wetted Per. (m)	*	* 6.10	*
* Min Ch El (m)	* 473.33	* Shear (N/m2)	*	* 124.91	*
* Alpha	* 1.00	* Stream Power (N/m s)	*	* 363.55	*
* Frctn Loss (m)	* 0.55	* Cum Volume (1000 m3)	*	* 0.47	*
* C & E Loss (m)	* 0.00	* Cum SA (1000 m2)	*	* 0.81	*

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
REACH: 1 RS: .454545*

INPUT

Description:

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	477.585	4.368	477.303	8.225	473.92	10.272	472.771	11.119	472.777		
11.977	472.842	14.249	473.498	17.204	476.731	22.494	477.043				

Manning's n Values		num= 3		Sta n Val		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	4.368	.035	17.204	.04				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	4.368	17.204		23.636	23.636	23.636	.1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

* E.G. Elev (m)	* 474.09	* Element	* Left OB	* Channel	* Right OB
* Vel Head (m)	* 0.43	* Wt. n-Val.	*	* 0.035	*
* W.S. Elev (m)	* 473.66	* Reach Len. (m)	* 23.64	* 23.64	* 23.64
* Crit W.S. (m)	* 473.75	* Flow Area (m2)	*	* 3.31	*
* E.G. Slope (m/m)	* 0.023319	* Area (m2)	*	* 3.31	*
* Q Total (m3/s)	* 9.60	* Flow (m3/s)	*	* 9.60	*
* Top Width (m)	* 5.71	* Top Width (m)	*	* 5.71	*
* Vel Total (m/s)	* 2.90	* Avg. Vel. (m/s)	*	* 2.90	*
* Max Chl Dpth (m)	* 0.89	* Hydr. Depth (m)	*	* 0.58	*
* Conv. Total (m3/s)	* 62.9	* Conv. (m3/s)	*	* 62.9	*
* Length Wtd. (m)	* 23.64	* Wetted Per. (m)	*	* 6.11	*
* Min Ch El (m)	* 472.77	* Shear (N/m2)	*	* 123.92	*
* Alpha	* 1.00	* Stream Power (N/m s)	*	* 359.38	*
* Frctn Loss (m)	* 0.55	* Cum Volume (1000 m3)	*	* 0.39	*
* C & E Loss (m)	* 0.00	* Cum SA (1000 m2)	*	* 0.67	*

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fssso ZAPPACENERE

REACH: 1 RS: .363636*

INPUT

Description:

Station Elevation Data		num= 9							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	477.03	4.368	476.748	8.225	473.365	10.272	472.216	11.119	472.222
11.977	472.287	14.249	472.943	17.204	476.176	22.494	476.488		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	4.368	.035	17.204	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	4.368	17.204		23.636	23.636	23.636	.1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

* E.G. Elev (m)	* 473.54	* Element	* Left OB	* Channel	* Right OB
* Vel Head (m)	* 0.43	* Wt. n-Val.	* *	* 0.035	* *
* W.S. Elev (m)	* 473.10	* Reach Len. (m)	* 23.64	* 23.64	* 23.64
* Crit W.S. (m)	* 473.19	* Flow Area (m2)	* *	* 3.29	* *
* E.G. Slope (m/m)	* 0.023646	* Area (m2)	* *	* 3.29	* *
* Q Total (m3/s)	* 9.60	* Flow (m3/s)	* *	* 9.60	* *
* Top Width (m)	* 5.70	* Top Width (m)	* *	* 5.70	* *
* Vel Total (m/s)	* 2.91	* Avg. Vel. (m/s)	* *	* 2.91	* *
* Max Chl Dpth (m)	* 0.89	* Hydr. Depth (m)	* *	* 0.58	* *
* Conv. Total (m3/s)	* 62.4	* Conv. (m3/s)	* *	* 62.4	* *
* Length Wtd. (m)	* 23.64	* Wetted Per. (m)	* *	* 6.10	* *
* Min Ch El (m)	* 472.22	* Shear (N/m2)	* *	* 125.25	* *
* Alpha	* 1.00	* Stream Power (N/m s)	* *	* 364.99	* *
* Frctn Loss (m)	* 0.56	* Cum Volume (1000 m3)	* *	* 0.31	* *
* C & E Loss (m)	* 0.00	* Cum SA (1000 m2)	* *	* 0.54	* *

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fssso ZAPPACENERE

REACH: 1 RS: .272727*

INPUT

Description:

Station Elevation Data		num= 9							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	476.476	4.368	476.194	8.225	472.811	10.272	471.662	11.119	471.668
11.977	471.733	14.249	472.389	17.204	475.622	22.494	475.934		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	4.368	.035	17.204	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	4.368	17.204		23.636	23.636	23.636	.1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

* E.G. Elev (m)	* 472.98	* Element	* Left OB	* Channel	* Right OB
* Vel Head (m)	* 0.43	* Wt. n-Val.	* *	* 0.035	* *
* W.S. Elev (m)	* 472.55	* Reach Len. (m)	* 23.64	* 23.64	* 23.64
* Crit W.S. (m)	* 472.64	* Flow Area (m2)	* *	* 3.31	* *
* E.G. Slope (m/m)	* 0.023355	* Area (m2)	* *	* 3.31	* *
* Q Total (m3/s)	* 9.60	* Flow (m3/s)	* *	* 9.60	* *
* Top Width (m)	* 5.71	* Top Width (m)	* *	* 5.71	* *
* Vel Total (m/s)	* 2.90	* Avg. Vel. (m/s)	* *	* 2.90	* *
* Max Chl Dpth (m)	* 0.89	* Hydr. Depth (m)	* *	* 0.58	* *
* Conv. Total (m3/s)	* 62.8	* Conv. (m3/s)	* *	* 62.8	* *
* Length Wtd. (m)	* 23.64	* Wetted Per. (m)	* *	* 6.11	* *
* Min Ch El (m)	* 471.66	* Shear (N/m2)	* *	* 124.07	* *
* Alpha	* 1.00	* Stream Power (N/m s)	* *	* 360.01	* *
* Frctn Loss (m)	* 0.56	* Cum Volume (1000 m3)	* *	* 0.23	* *
* C & E Loss (m)	* 0.00	* Cum SA (1000 m2)	* *	* 0.40	* *

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fsso ZAPPACENERE
REACH: 1 RS: .181818*

INPUT

Description:

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	475.921	4.368	475.639	8.225	472.256	10.272	471.107	11.119	471.113		
11.977	471.178	14.249	471.834	17.204	475.067	22.494	475.379				

Manning's n Values		num= 3		Sta n Val		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	4.368	.035	17.204	.04				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	4.368	17.204		23.636	23.636		.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

* E.G. Elev (m)	* 472.42	* Element	* Left OB	* Channel	* Right OB
* Vel Head (m)	* 0.43	* Wt. n-Val.	* 23.64	* 0.035	* 23.64
* W.S. Elev (m)	* 472.00	* Reach Len. (m)			
* Crit W.S. (m)	* 472.08	* Flow Area (m2)		* 3.31	
* E.G. Slope (m/m)	* 0.023366	* Area (m2)		* 3.31	
* Q Total (m3/s)	* 9.60	* Flow (m3/s)		* 9.60	
* Top Width (m)	* 5.71	* Top Width (m)		* 5.71	
* Vel Total (m/s)	* 2.90	* Avg. Vel. (m/s)		* 2.90	
* Max Chl Dpth (m)	* 0.89	* Hydr. Depth (m)		* 0.58	
* Conv. Total (m3/s)	* 62.8	* Conv. (m3/s)		* 62.8	
* Length Wtd. (m)	* 23.64	* Wetted Per. (m)		* 6.11	
* Min Ch El (m)	* 471.11	* Shear (N/m2)		* 124.11	
* Alpha	* 1.00	* Stream Power (N/m s)		* 360.18	
* Frctn Loss (m)	* 0.55	* Cum Volume (1000 m3)		* 0.16	
* C & E Loss (m)	* 0.00	* Cum SA (1000 m2)		* 0.27	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fsso ZAPPACENERE
REACH: 1 RS: .090909*

INPUT

Description:

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	475.367	4.368	475.085	8.225	471.702	10.272	470.553	11.119	470.559		
11.977	470.624	14.249	471.28	17.204	474.513	22.494	474.825				

Manning's n Values		num= 3		Sta n Val		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	4.368	.035	17.204	.04				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	4.368	17.204		23.636	23.636		.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

* E.G. Elev (m)	* 471.87	* Element	* Left OB	* Channel	* Right OB
* Vel Head (m)	* 0.43	* Wt. n-Val.	* 23.64	* 0.035	* 23.64
* W.S. Elev (m)	* 471.44	* Reach Len. (m)			
* Crit W.S. (m)	* 471.53	* Flow Area (m2)		* 3.30	
* E.G. Slope (m/m)	* 0.023519	* Area (m2)		* 3.30	
* Q Total (m3/s)	* 9.60	* Flow (m3/s)		* 9.60	
* Top Width (m)	* 5.70	* Top Width (m)		* 5.70	
* Vel Total (m/s)	* 2.91	* Avg. Vel. (m/s)		* 2.91	
* Max Chl Dpth (m)	* 0.89	* Hydr. Depth (m)		* 0.58	
* Conv. Total (m3/s)	* 62.6	* Conv. (m3/s)		* 62.6	
* Length Wtd. (m)	* 23.64	* Wetted Per. (m)		* 6.10	
* Min Ch El (m)	* 470.55	* Shear (N/m2)		* 124.74	
* Alpha	* 1.00	* Stream Power (N/m s)		* 362.80	
* Frctn Loss (m)	* 0.55	* Cum Volume (1000 m3)		* 0.08	
* C & E Loss (m)	* 0.00	* Cum SA (1000 m2)		* 0.13	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
REACH: 1 RS: 0

INPUT

Description: Sez. aggiunta

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	474.812	4.368	474.53	8.225	471.147	10.272	469.998	11.119	470.004
11.977	470.069	14.249	470.725	17.204	473.958	22.494	474.27		

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	4.368	.035	17.204	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	4.368	17.204		0	0	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

* E.G. Elev (m)	* 471.32	* Element	* Left OB	* Channel	* Right OB
* Vel Head (m)	* 0.43	* Wt. n-Val.	* *	* 0.035	* *
* W.S. Elev (m)	* 470.89	* Reach Len. (m)	* *	* *	* *
* Crit W.S. (m)	* 470.97	* Flow Area (m2)	* *	* 3.31	* *
* E.G. Slope (m/m)	* 0.023408	* Area (m2)	* *	* 3.31	* *
* Q Total (m3/s)	* 9.60	* Flow (m3/s)	* *	* 9.60	* *
* Top Width (m)	* 5.71	* Top Width (m)	* *	* 5.71	* *
* Vel Total (m/s)	* 2.90	* Avg. Vel. (m/s)	* *	* 2.90	* *
* Max Chl Dpth (m)	* 0.89	* Hydr. Depth (m)	* *	* 0.58	* *
* Conv. Total (m3/s)	* 62.7	* Conv. (m3/s)	* *	* 62.7	* *
* Length Wtd. (m)	*	* Wetted Per. (m)	* *	* 6.11	* *
* Min Ch El (m)	* 470.00	* Shear (N/m2)	* *	* 124.28	* *
* Alpha	* 1.00	* Stream Power (N/m s)	* *	* 360.91	* *
* Frctn Loss (m)	* 0.55	* Cum Volume (1000 m3)	* *	*	* *
* C & E Loss (m)	* 0.00	* Cum SA (1000 m2)	* *	*	* *

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

SUMMARY OF MANNING'S N VALUES

River: FSSO ZAPPACENERE

Reach	River Sta.	n1	n2	n3
*1	* 6	* .04*	* .035*	* .04*
*1	* 5	* .04*	* .035*	* .04*
*1	* 4.75	* Bridge	*	*
*1	* 4.5	* .04*	* .035*	* .04*
*1	* 4.375*	* .038*	* .035*	* .038*
*1	* 4.25	* .04*	* .035*	* .04*
*1	* 4.125*	* .038*	* .035*	* .038*
*1	* 4	* .04*	* .035*	* .04*
*1	* 3.7	* Culvert	*	*
*1	* 3.5	* .02*	* .02*	* .02*
*1	* 3.2	* .02*	* .02*	* .02*
*1	* 3.1*	* .03*	* .027*	* .03*
*1	* 3	* .04*	* .035*	* .04*
*1	* 2.5	* Culvert	*	*
*1	* 2	* .04*	* .035*	* .04*
*1	* 1	* .04*	* .035*	* .04*
*1	* .909090*	* .04*	* .035*	* .04*
*1	* .818181*	* .04*	* .035*	* .04*
*1	* .727272*	* .04*	* .035*	* .04*
*1	* .636363*	* .04*	* .035*	* .04*
*1	* .545454*	* .04*	* .035*	* .04*
*1	* .454545*	* .04*	* .035*	* .04*
*1	* .363636*	* .04*	* .035*	* .04*
*1	* .272727*	* .04*	* .035*	* .04*
*1	* .181818*	* .04*	* .035*	* .04*
*1	* .090909*	* .04*	* .035*	* .04*
*1	* 0	* .04*	* .035*	* .04*

SUMMARY OF REACH LENGTHS

River: FSSO ZAPPACENERE

zappacenerere50.rep

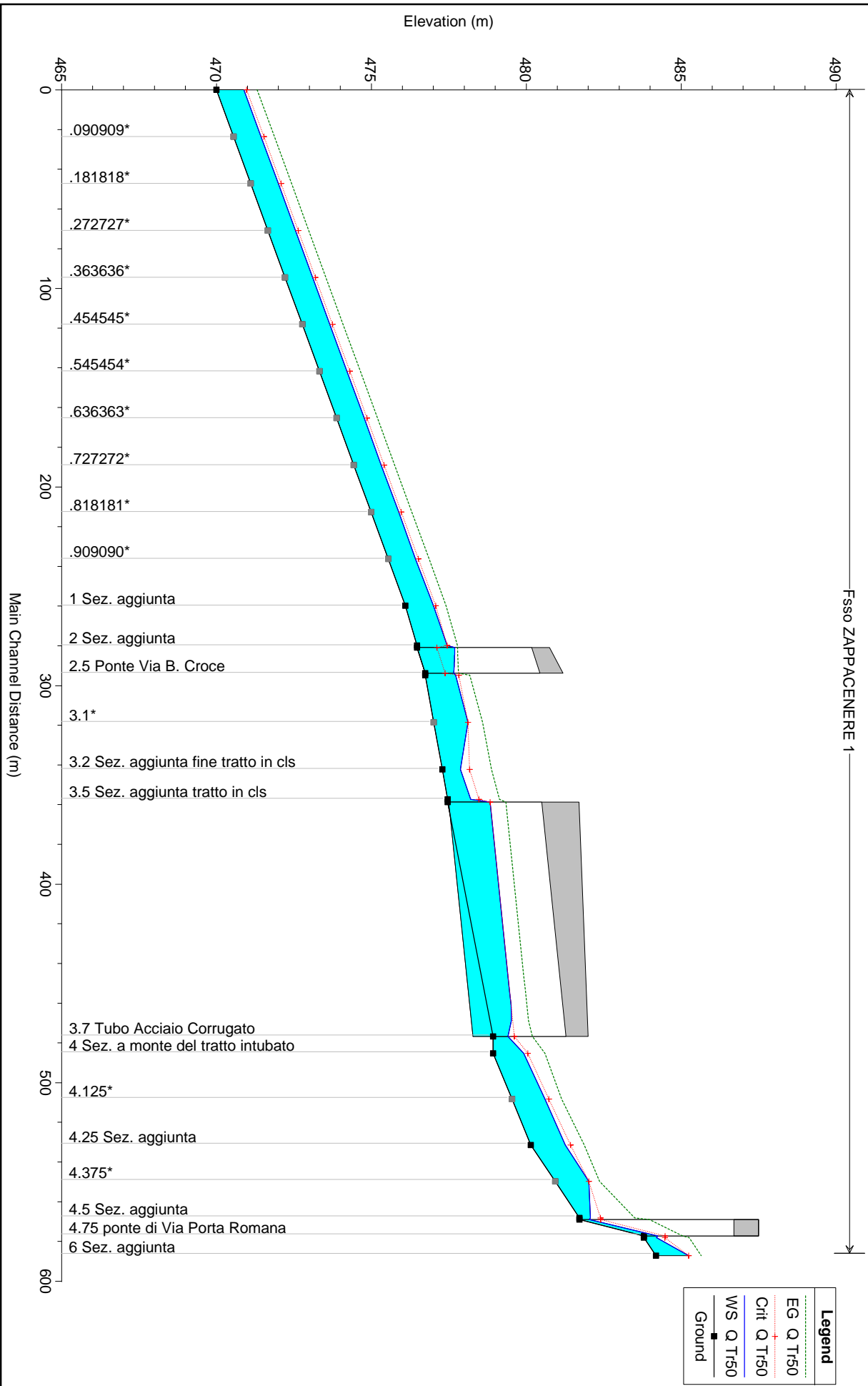
* Reach	* River Sta.	* Left	* Channel	* Right
1	6	9	9*	9*
1	5	10	10*	10*
*1	4.75	*Bridge	*	*
1	4.5	18.35	18.35*	18.35*
1	4.375	18.35*	18.35*	18.35*
1	4.25	23.1	23.1*	23.1*
1	4.125	23.1*	23.1*	23.1*
1	4	128	128*	128*
*1	3.7	*Culvert	*	*
1	3.5	15	15*	15*
1	3.2	23.75	23.75*	23.75*
1	3.1	23.75*	23.75*	23.75*
1	3	15	15*	15*
*1	2.5	*Culvert	*	*
1	2	20	20*	20*
1	1	23.636	23.636*	23.636*
1	.909090	23.636*	23.636*	23.636*
1	.818181	23.636*	23.636*	23.636*
1	.727272	23.636*	23.636*	23.636*
1	.636363	23.636*	23.636*	23.636*
1	.545454	23.636*	23.636*	23.636*
1	.454545	23.636*	23.636*	23.636*
1	.363636	23.636*	23.636*	23.636*
1	.272727	23.636*	23.636*	23.636*
1	.181818	23.636*	23.636*	23.636*
1	.090909	23.636*	23.636*	23.636*
1	0	0	0*	0*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: FSSO ZAPPACENERE

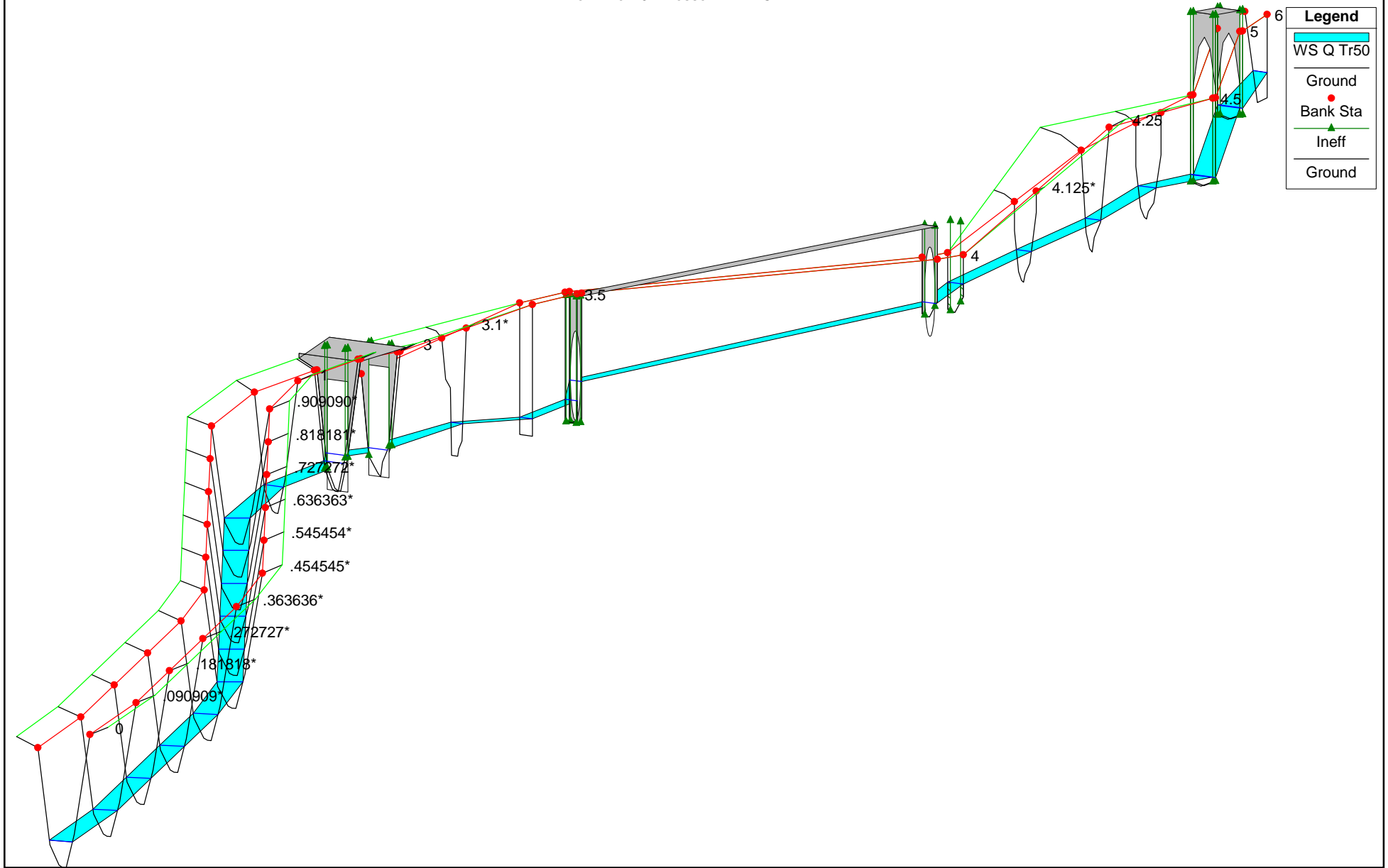
* Reach	* River Sta.	* Contr.	* Expan.
1	6	.1	.3*
1	5	.3	.5*
*1	4.75	*Bridge	*
1	4.5	.3	.5*
1	4.375	.3*	.5*
1	4.25	.1	.3*
1	4.125	.1*	.3*
1	4	.3	.5*
*1	3.7	*Culvert	*
1	3.5	.3	.5*
1	3.2	.1	.3*
1	3.1	.1*	.3*
1	3	.3	.5*
*1	2.5	*Culvert	*
1	2	.3	.5*
1	1	.1	.3*
*1	.909090**	.1*	.3*
*1	.818181**	.1*	.3*
*1	.727272**	.1*	.3*
*1	.636363**	.1*	.3*
*1	.545454**	.1*	.3*
*1	.454545**	.1*	.3*
*1	.363636**	.1*	.3*
*1	.272727**	.1*	.3*
*1	.181818**	.1*	.3*
*1	.090909**	.1*	.3*
1	0	.1	.3*

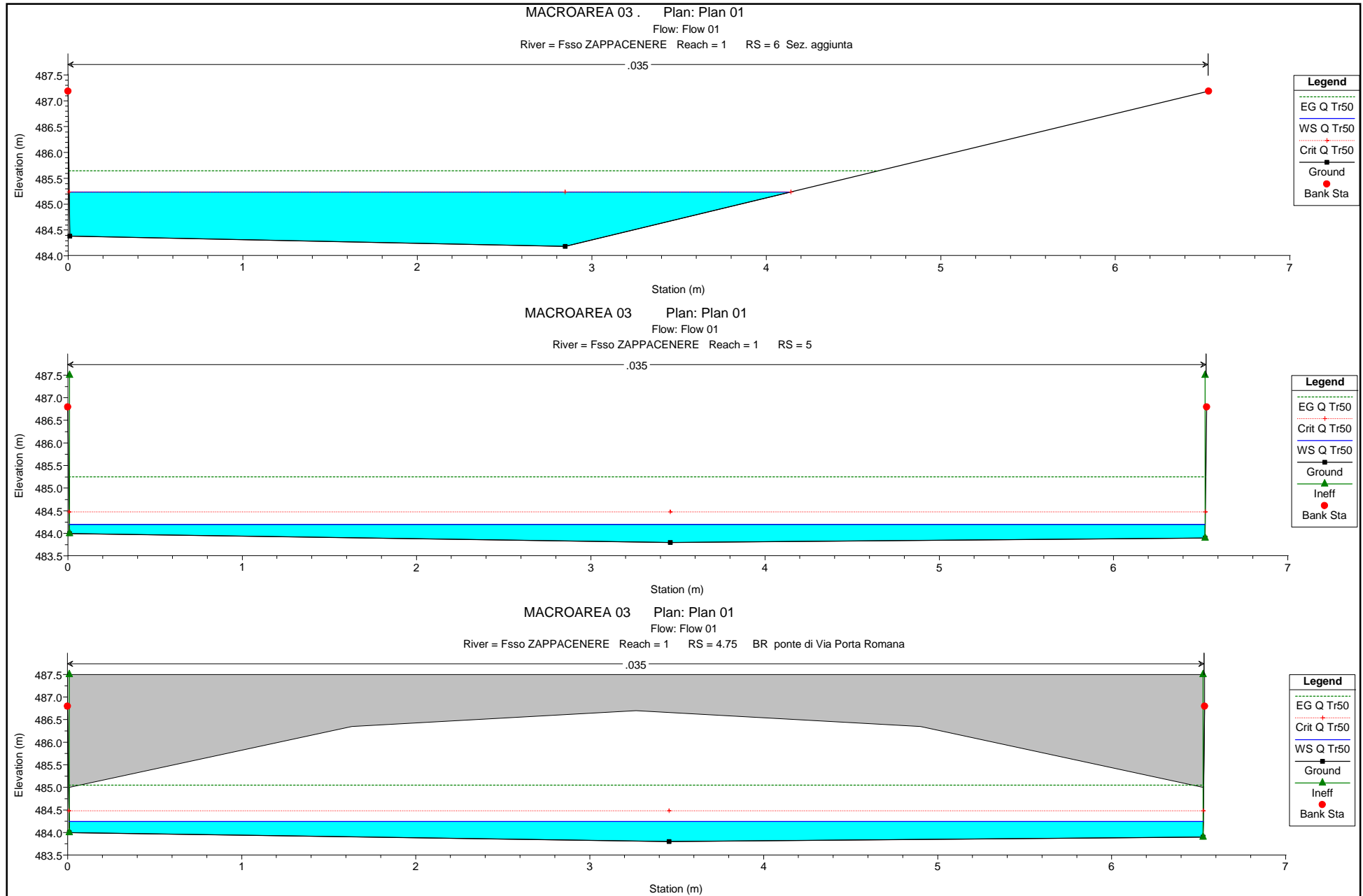
HEC-RAS Plan: Plan QTr50 River: Fssso ZAPPACENERE Reach: 1 Profile: Q Tr50

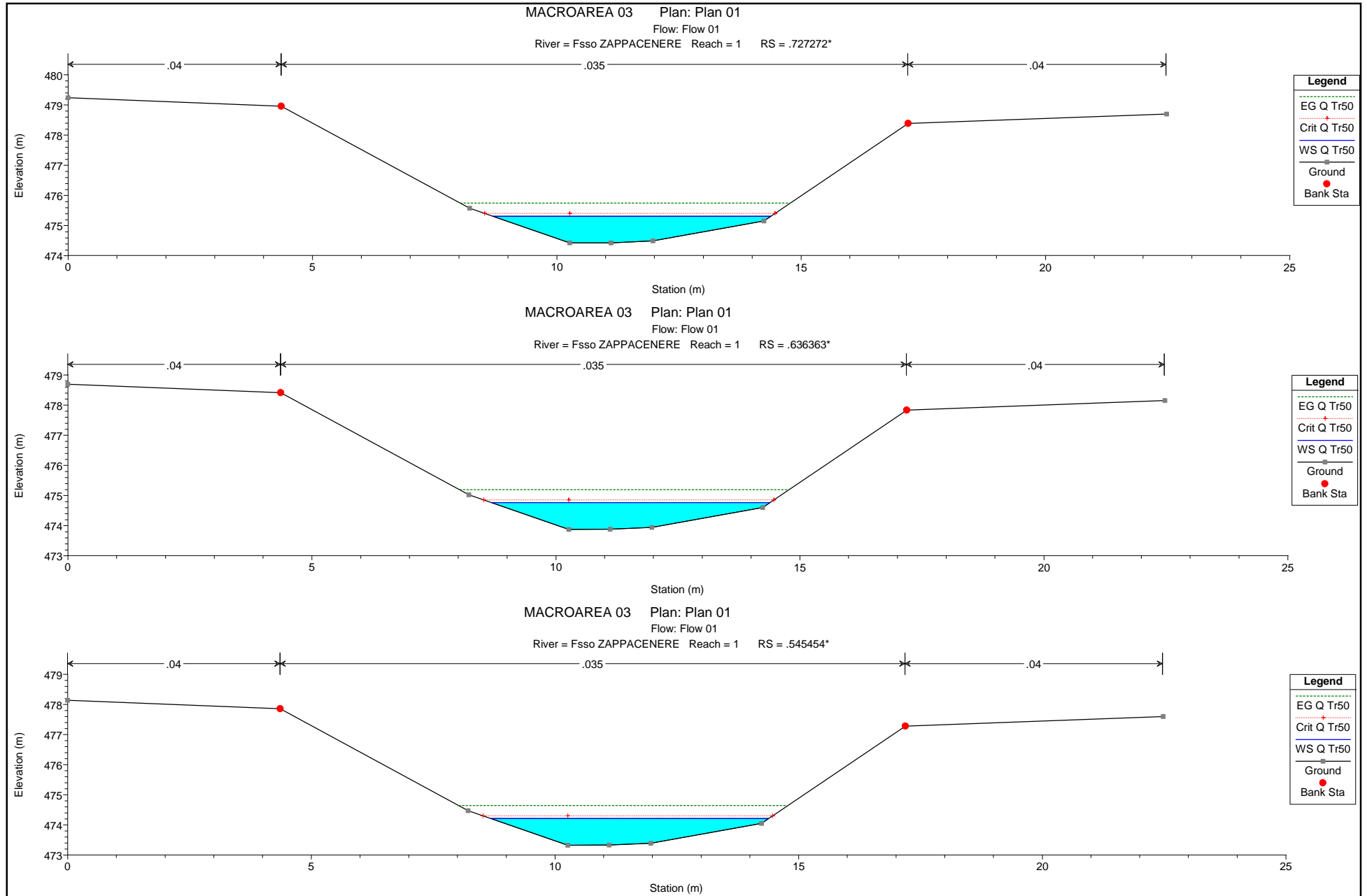
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
1	6	Q Tr50	9.60	484.19	485.24	485.24	485.65	0.018198	2.84	3.39	4.14	1.00
1	5	Q Tr50	9.60	483.80	484.20	484.48	485.25	0.114363	4.55	2.11	6.52	2.55
1	4.75		Bridge									
1	4.5	Q Tr50	9.60	481.72	482.07	482.40	483.50	0.189018	5.29	1.81	6.52	3.20
1	4.375*	Q Tr50	9.60	480.94	482.02	482.02	482.37	0.015743	2.62	3.67	5.26	1.00
1	4.25	Q Tr50	9.60	480.15	481.26	481.43	481.88	0.035263	3.48	2.76	4.58	1.43
1	4.125*	Q Tr50	9.60	479.54	480.61	480.73	481.15	0.026763	3.26	2.95	4.39	1.27
1	4	Q Tr50	9.60	478.93	479.92	480.06	480.60	0.019956	3.66	2.63	4.53	1.25
1	3.7		Culvert									
1	3.5	Q Tr50	9.60	477.46	478.21	478.47	479.14	0.010610	4.26	2.25	3.60	1.25
1	3.2	Q Tr50	9.60	477.29	477.87	478.17	478.88	0.023385	4.45	2.16	3.70	1.86
1	3.1*	Q Tr50	9.60	477.02	478.12	478.12	478.59	0.012071	3.02	3.18	3.46	1.01
1	3	Q Tr50	9.60	476.74	477.72	477.83	478.18	0.026240	3.01	3.19	6.01	1.29
1	2.5		Culvert									
1	2	Q Tr50	9.60	476.48	477.45	477.45	477.78	0.015077	2.56	3.75	5.93	1.00
1	1	Q Tr50	9.60	476.10	477.01	477.08	477.41	0.021338	2.81	3.41	5.76	1.17
1	.909090*	Q Tr50	9.60	475.54	476.42	476.52	476.87	0.024364	2.94	3.26	5.69	1.24
1	.818181*	Q Tr50	9.60	474.99	475.89	475.97	476.30	0.022534	2.87	3.35	5.73	1.20
1	.727272*	Q Tr50	9.60	474.43	475.32	475.41	475.75	0.023860	2.92	3.28	5.70	1.23
1	.636363*	Q Tr50	9.60	473.88	474.77	474.86	475.20	0.023139	2.89	3.32	5.71	1.21
1	.545454*	Q Tr50	9.60	473.33	474.21	474.30	474.64	0.023562	2.91	3.30	5.70	1.22
1	.454545*	Q Tr50	9.60	472.77	473.66	473.75	474.09	0.023319	2.90	3.31	5.71	1.22
1	.363636*	Q Tr50	9.60	472.22	473.10	473.19	473.54	0.023646	2.91	3.29	5.70	1.22
1	.272727*	Q Tr50	9.60	471.66	472.55	472.64	472.98	0.023355	2.90	3.31	5.71	1.22
1	.181818*	Q Tr50	9.60	471.11	472.00	472.08	472.42	0.023366	2.90	3.31	5.71	1.22
1	.090909*	Q Tr50	9.60	470.55	471.44	471.53	471.87	0.023519	2.91	3.30	5.70	1.22
1	0	Q Tr50	9.60	470.00	470.89	470.97	471.32	0.023408	2.90	3.31	5.71	1.22

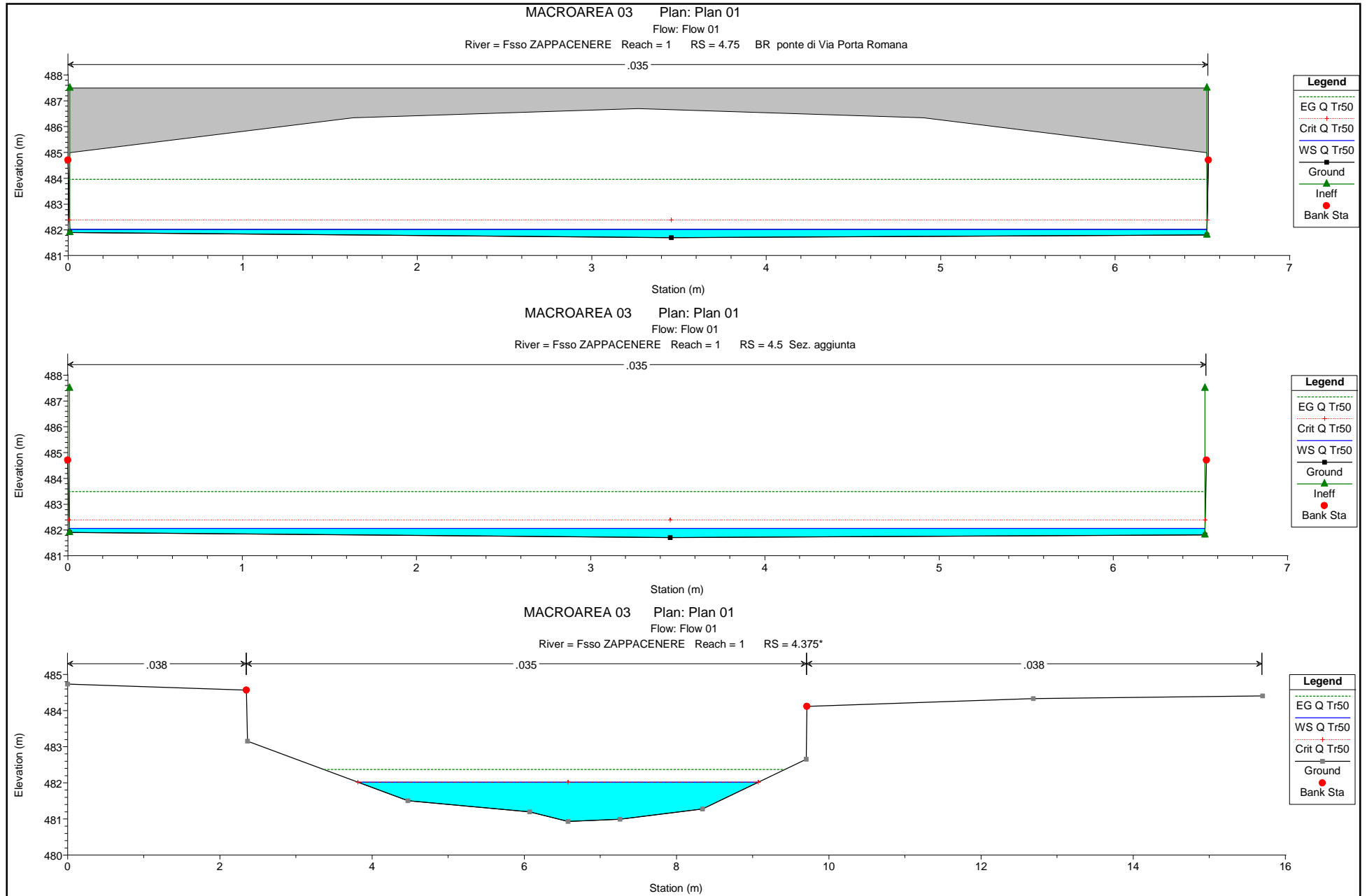


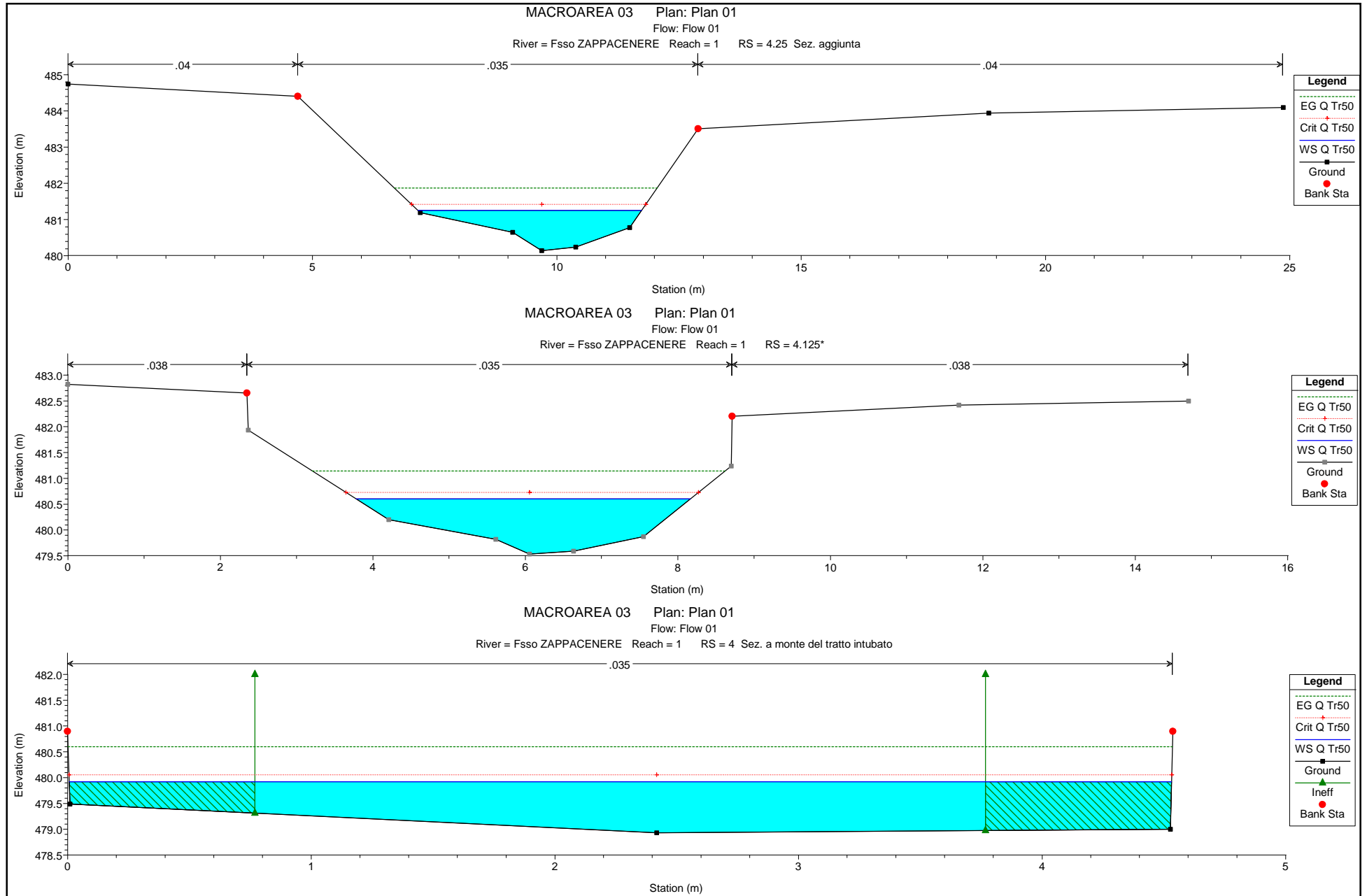
MACROAREA 03 Plan: Plan 01
 Flow: Flow 01 Fosso ZAPPACENERE

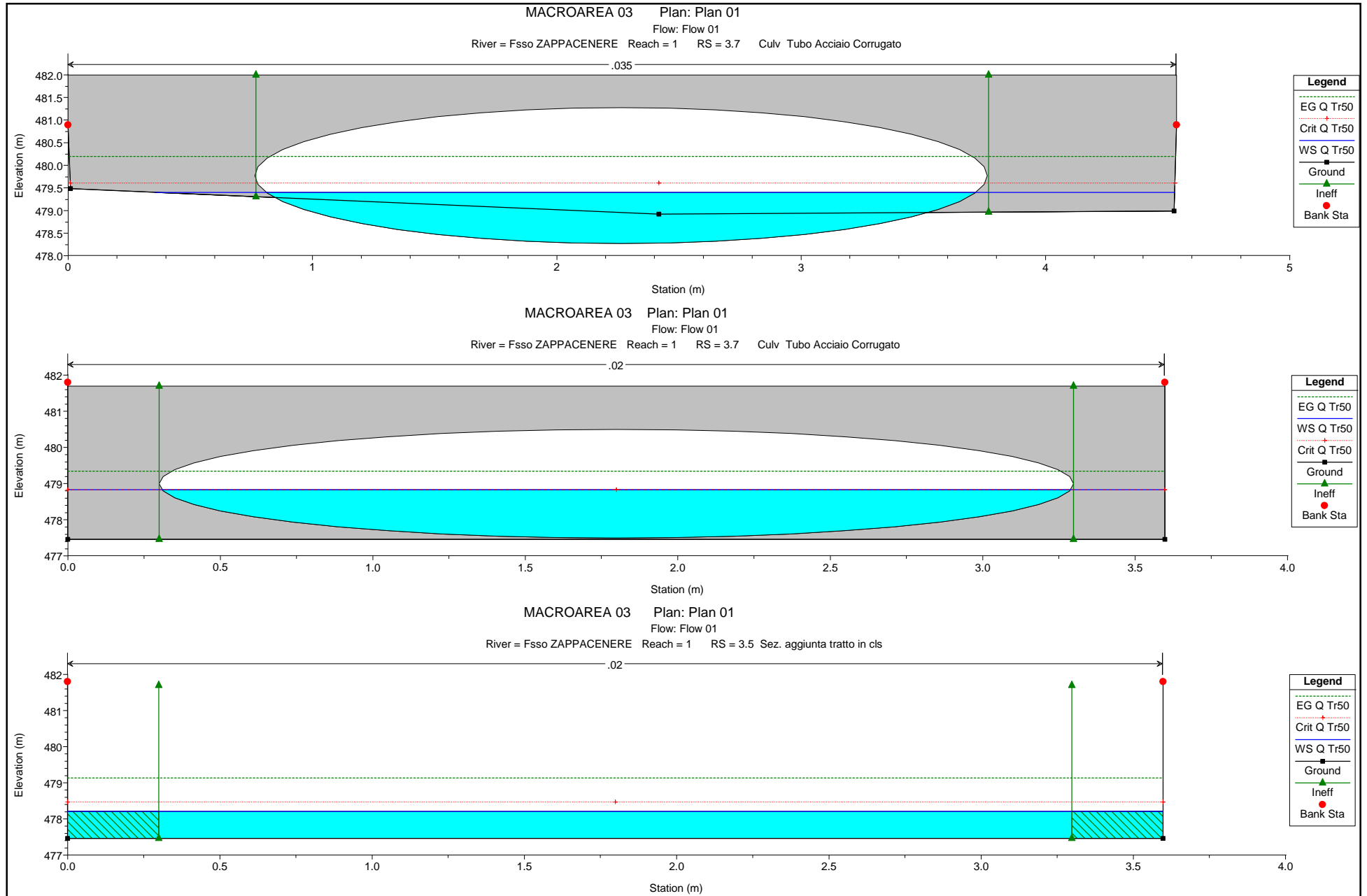


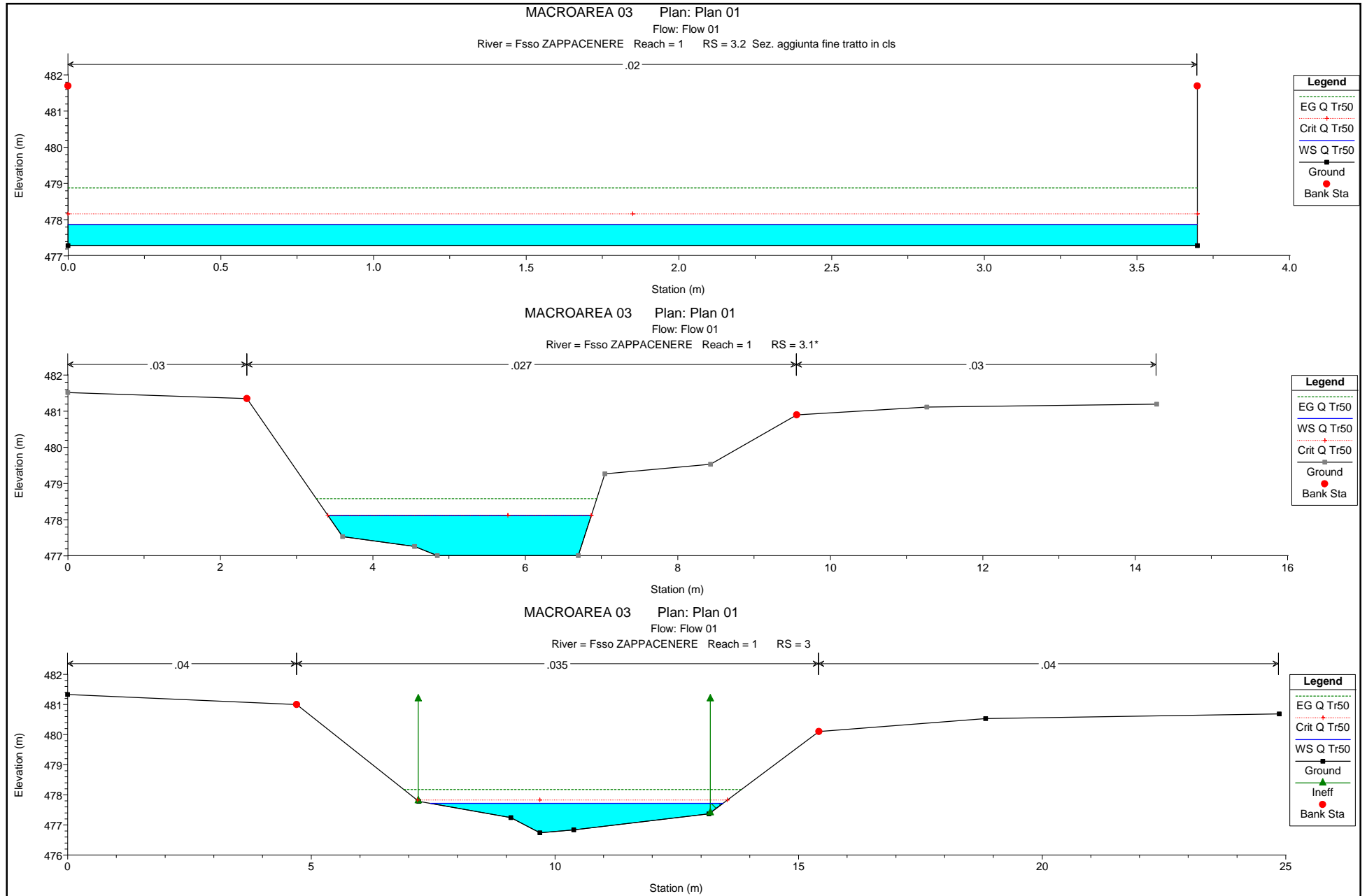


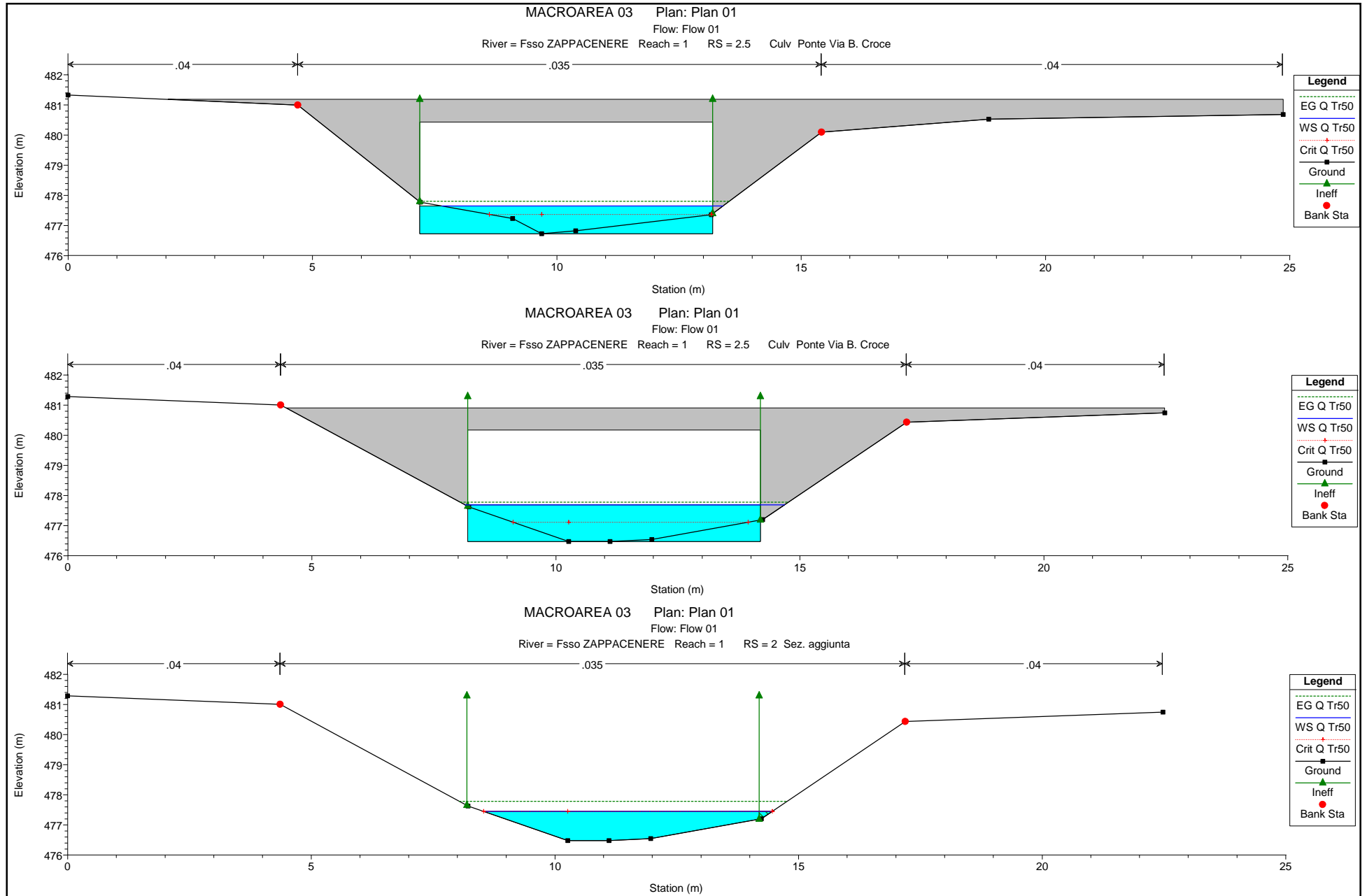


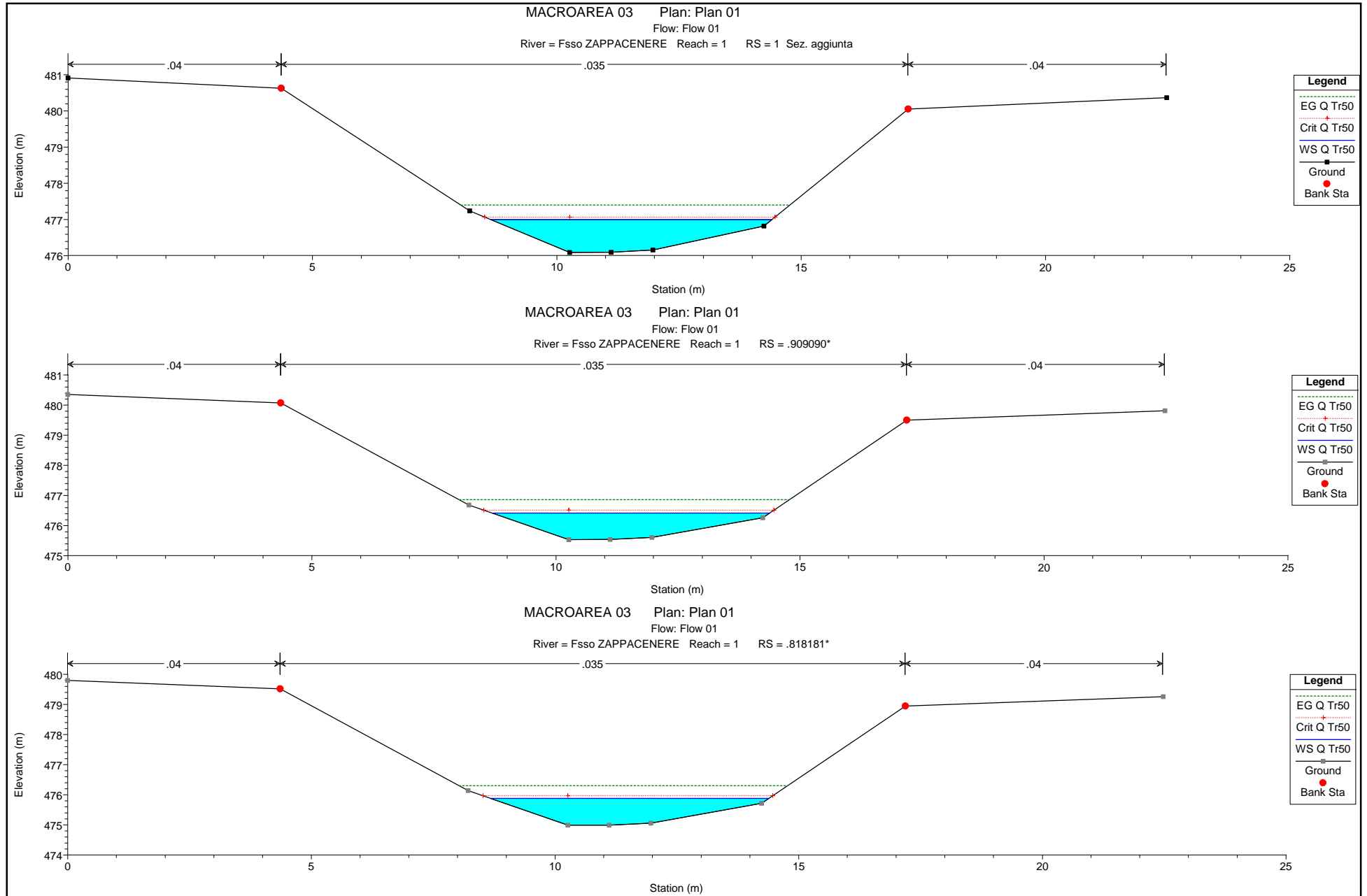


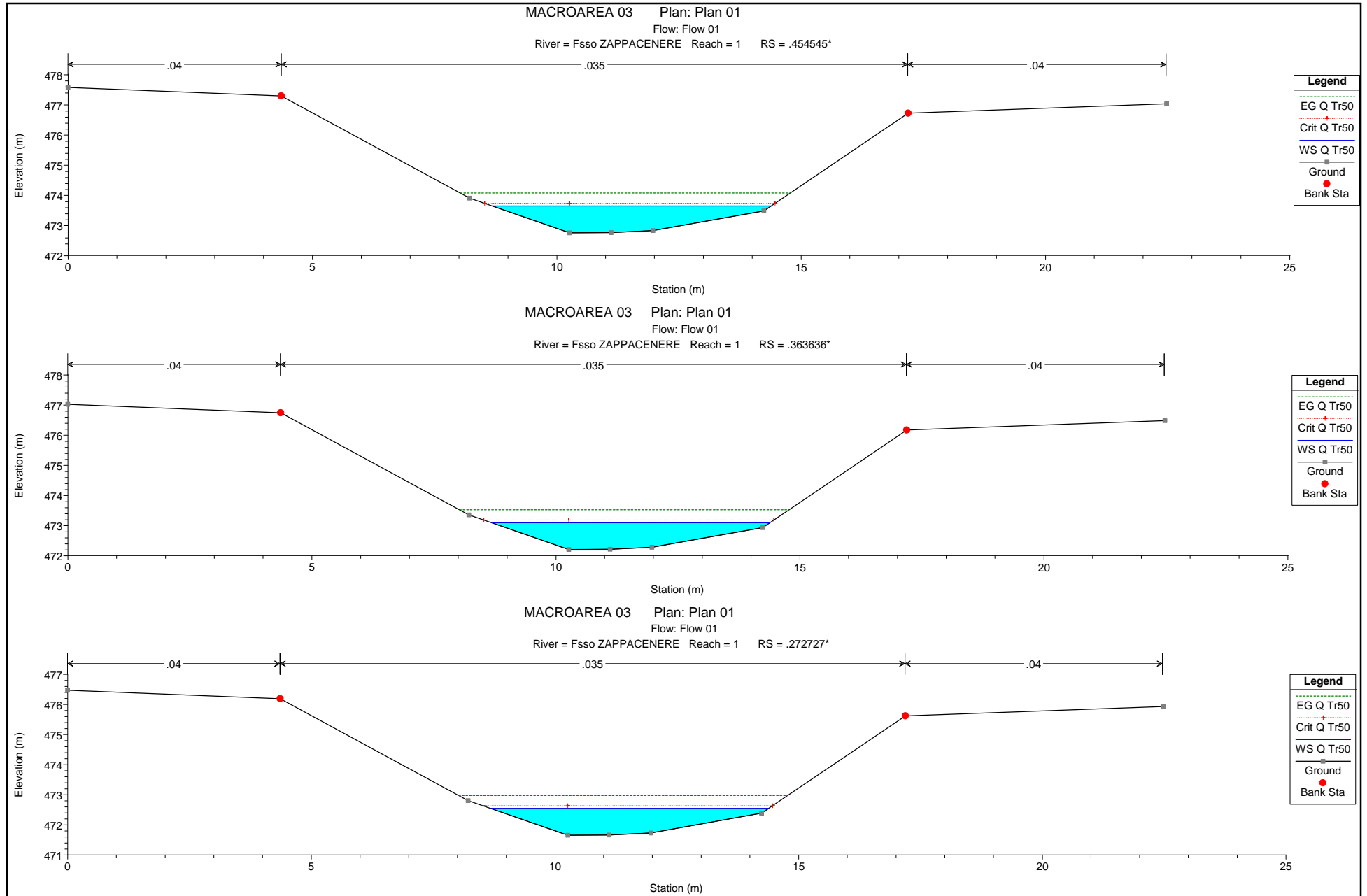


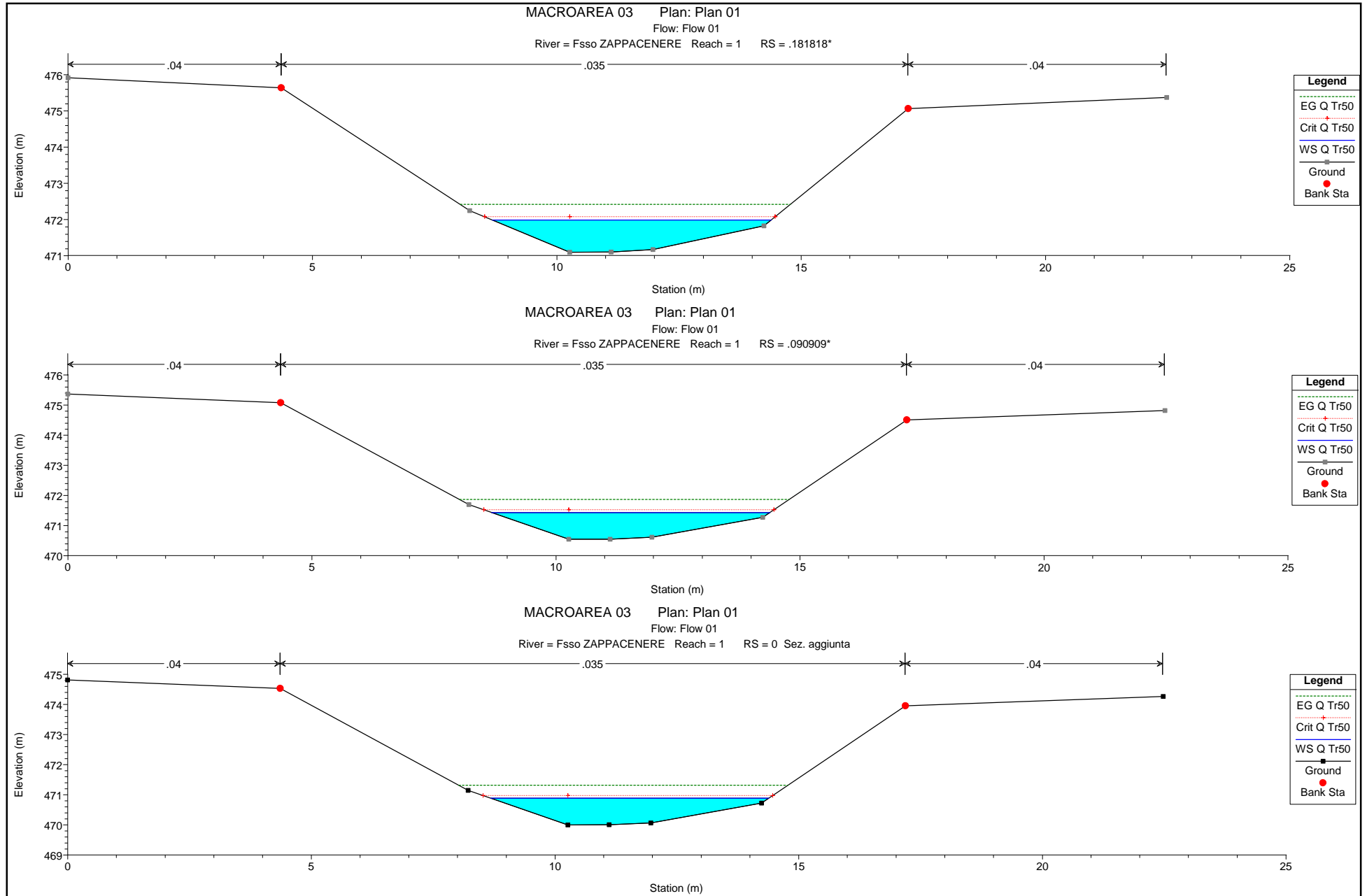












HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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PROJECT DATA

Project Title: MACROAREA 03
Project File : zappacenererep
Run Date and Time: 24/01/2007 13.33.16

Project in SI units

Project Description:

verifica PRG GUBBIO MACROAREA 03 FOSSO ZAPPACENERE

PLAN DATA

Plan Title: Plan 01
Plan File : n:\2006\06033\Integrazione\HEC_ZAPPACENERE\sez aggiunte\finale\zappacenererep

Geometry Title: FOSSO_ZAPPACENERE

Geometry File : n:\2006\06033\Integrazione\HEC_ZAPPACENERE\sez
aggiunte\finale\zappacenererep

Flow Title : Flow 01

Flow File : n:\2006\06033\Integrazione\HEC_ZAPPACENERE\sez
aggiunte\finale\zappacenererep

Plan Summary Information:

Number of: Cross Sections = 24 Multiple Openings = 0
Culverts = 2 Inline Structures = 0
Bridges = 1 Lateral Structures = 0

Computational Information

Water surface calculation tolerance = 0.003
Critical depth calculation tolerance = 0.003
Maximum number of iterations = 20
Maximum difference tolerance = 0.1
Flow tolerance factor = 0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: Flow 01
Flow File : n:\2006\06033\Integrazione\HEC_ZAPPACENERE\sez aggiunte\finale\zappacenererep

Flow Data (m3/s)

* River Reach RS * Q Tr200 *
* Fosso ZAPPACENERE1 6 * 14 *

Boundary Conditions

* River Reach Profile * Upstream Downstream
*

* Fosso ZAPPACENERE1 Q Tr200 * Critical Normal S =
0.019 *

GEOMETRY DATA

Geometry Title: FOSSO_ZAPPACENERE

Geometry File : n:\2006\06033\Integrazione\HEC_ZAPPACENERE\sez aggiunte\finale\zappacenera.g01

CROSS SECTION

RIVER: Fssso ZAPPACENERE
 REACH: 1 RS: 6

INPUT

Description: Sez. aggiunta

Station Elevation Data num= 4
 Sta Elev Sta Elev Sta Elev Sta Elev

 0 487.19 .01 484.39 2.85 484.19 6.54 487.19

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 0 .035 6.54 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 6.54 9 9 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

 * E.G. Elev (m) * 485.99 * Element * Left OB * Channel * Right OB *
 * Vel Head (m) * 0.51 * Wt. n-Val. * * 0.035 * *
 * W.S. Elev (m) * 485.49 * Reach Len. (m) * 9.00 * 9.00 *
 * Crit W.S. (m) * 485.49 * Flow Area (m2) * * 4.44 * *
 * E.G. Slope (m/m) * 0.018155 * Area (m2) * * 4.44 * *
 * Q Total (m3/s) * 14.00 * Flow (m3/s) * * 14.00 * *
 * Top Width (m) * 4.44 * Top Width (m) * * 4.44 * *
 * Vel Total (m/s) * 3.15 * Avg. Vel. (m/s) * * 3.15 * *
 * Max Chl Dpth (m) * 1.30 * Hydr. Depth (m) * * 1.00 * *
 * Conv. Total (m3/s) * 103.9 * Conv. (m3/s) * * 103.9 * *
 * Length Wtd. (m) * 9.00 * Wetted Per. (m) * * 6.00 * *
 * Min Ch El (m) * 484.19 * Shear (N/m2) * * 131.78 * *
 * Alpha * 1.00 * Stream Power (N/m s) * * 415.09 * *
 * Frctn Loss (m) * 0.09 * Cum Volume (1000 m3) * * 2.44 * *
 * C & E Loss (m) * 0.07 * Cum SA (1000 m2) * * 3.09 * *

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Fssso ZAPPACENERE
 REACH: 1 RS: 5

INPUT

Description:

Station Elevation Data num= 5
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 486.8 .01 484 3.46 483.8 6.53 483.9 6.54 486.8

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 0 .035 6.54 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 6.54 10 10 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 .01 487.5 T
 6.53 6.54 487.5 T

CROSS SECTION OUTPUT Profile #Q Tr200

zappacenerere.rep

```

* E.G. Elev (m) * 485.60 * Element * Left OB * Channel * Right OB *
* Vel Head (m) * 1.30 * Wt. n-Val. * * * 0.035 * *
* W.S. Elev (m) * 484.30 * Reach Len. (m) * 0.90 * 0.90 * 0.90 *
* Crit W.S. (m) * 484.65 * Flow Area (m2) * * * 2.77 * *
* E.G. Slope (m/m) * 0.097555 * Area (m2) * * * 2.78 * *
* Q Total (m3/s) * 14.00 * Flow (m3/s) * * * 14.00 * *
* Top Width (m) * 6.52 * Top Width (m) * * * 6.52 * *
* Vel Total (m/s) * 5.05 * Avg. Vel. (m/s) * * * 5.05 * *
* Max Chl Dpth (m) * 0.50 * Hydr. Depth (m) * * * 0.43 * *
* Conv. Total (m3/s) * 44.8 * Conv. (m3/s) * * * 44.8 * *
* Length Wtd. (m) * 0.90 * Wetted Per. (m) * * * 6.53 * *
* Min Ch El (m) * 483.80 * Shear (N/m2) * * * 406.69 * *
* Alpha * 1.00 * Stream Power (N/m s) * * * 2051.87 * *
* Frctn Loss (m) * 0.32 * Cum Volume (1000 m3) * * * 2.41 * *
* C & E Loss (m) * 0.08 * Cum SA (1000 m2) * * * 3.04 * *
*****

```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

BRIDGE

RIVER: Fsso ZAPPACENERE

REACH: 1 RS: 4.75

INPUT

Description: ponte di Via Porta Romana
 Distance from Upstream XS = .9
 Deck/Roadway Width = 8.2
 Weir Coefficient = 1.44
 Upstream Deck/Roadway Coordinates

num= 7														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	487.5		480		.01	487.5		485		1.635	487.5		486.35	
3.27	487.5		486.7		4.905	487.5		486.35		6.53	487.5		485	
6.54	487.5		480											

Upstream Bridge Cross Section Data

Station Elevation Data num= 5											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	486.8	.01	484	3.46	483.8	6.53	483.9	6.54	486.8		

Manning's n Values

num= 3					
Sta	n	Val	Sta	n	Val
0	.04		0	.035	
			6.54	.04	

Bank Sta: Left Right Coeff Contr. Expan.
 0 6.54 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 .01 487.5 T
 6.53 6.54 487.5 T

Downstream Deck/Roadway Coordinates

num= 7														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	487.5		480		.01	487.5		485		1.635	487.5		486.35	
3.27	487.5		486.7		4.905	487.5		486.35		6.53	487.5		485	
6.54	487.5		480											

Downstream Bridge Cross Section Data

Station Elevation Data num= 5											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	484.72	.01	481.92	3.46	481.72	6.53	481.82	6.54	484.72		

Manning's n Values

num= 3					
Sta	n	Val	Sta	n	Val
0	.04		0	.035	
			6.54	.04	

Bank Sta: Left Right Coeff Contr. Expan.
 0 6.54 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 .01 487.5 T
 6.53 6.54 487.5 T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical

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Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
 Energy
 Selected Low Flow Methods = Highest Energy Answer

High Flow Method
 Pressure and Weir flow
 Submerged Inlet Cd =
 Submerged Inlet + Outlet Cd = .8
 Max Low Cord =

Additional Bridge Parameters
 Add Friction component to Momentum
 Do not add Weight component to Momentum
 Class B flow critical depth computations use critical depth
 inside the bridge at the upstream end
 Criteria to check for pressure flow = Upstream water surface

BRIDGE OUTPUT Profile #Q Tr200

* E.G. US. (m)	*	485.60	* Element	* Inside BR US	* Inside BR DS	*
* W.S. US. (m)	*	484.30	* E.G. Elev (m)	*	485.41	* 484.25 *
* Q Total (m3/s)	*	14.00	* W.S. Elev (m)	*	484.35	* 482.13 *
* Q Bridge (m3/s)	*	14.00	* Crit W.S. (m)	*	484.65	* 482.57 *
* Q Weir (m3/s)	*		* Max Chl Dpth (m)	*	0.55	* 0.41 *
* Weir Sta Lft (m)	*		* Vel Total (m/s)	*	4.57	* 6.45 *
* Weir Sta Rgt (m)	*		* Flow Area (m2)	*	3.07	* 2.17 *
* Weir Submerg	*		* Froude # Chl	*	2.13	* 3.57 *
* Weir Max Depth (m)	*		* Specif Force (m3)	*	7.24	* 9.57 *
* Min El Weir Flow (m)	*	487.50	* Hydr Depth (m)	*	0.47	* 0.33 *
* Min El Prs (m)	*	486.70	* W.P. Total (m)	*	6.53	* 6.53 *
* Delta EG (m)	*	485.60	* Conv. Total (m3/s)	*	52.9	* 29.8 *
* Delta WS (m)	*	2.14	* Top Width (m)	*	6.52	* 6.52 *
* BR Open Area (m2)	*	14.51	* Frctn Loss (m)	*	0.07	* 0.92 *
* BR Open Vel (m/s)	*	6.45	* C & E Loss (m)	*	0.12	* 0.30 *
* Coef of Q	*		* Shear Total (N/m2)	*	322.17	* 720.58 *
* Br Sel Method	*Energy only		* Power Total (N/m s)	*	1471.00	* 4645.60 *

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
 REACH: 1 RS: 4.5

INPUT

Description: Sez. aggiunta
 Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	484.72	.01	481.92	3.46	481.72	6.53	481.82	6.54	484.72

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.035	6.54	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
	0	6.54	18.35	18.35	18.35	.3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	.01	487.5	T
6.53	6.54	487.5	T

CROSS SECTION OUTPUT Profile #Q Tr200

 * E.G. Elev (m) * 483.88 * Element * Left OB * Channel * Right OB *

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```

* Vel Head (m) * 1.72 * Wt. n-Val. * 0.035 *
* W.S. Elev (m) * 482.17 * Reach Len. (m) * 18.35 * 18.35 * 18.35 *
* Crit W.S. (m) * 482.57 * Flow Area (m2) * 2.41 *
* E.G. Slope (m/m) * 0.155700 * Area (m2) * 2.41 *
* Q Total (m3/s) * 14.00 * Flow (m3/s) * 14.00 *
* Top Width (m) * 6.52 * Top Width (m) * 6.52 *
* Vel Total (m/s) * 5.80 * Avg. Vel. (m/s) * 5.80 *
* Max Chl Dpth (m) * 0.45 * Hydr. Depth (m) * 0.37 *
* Conv. Total (m3/s) * 35.5 * Conv. (m3/s) * 35.5 *
* Length Wtd. (m) * 18.35 * Wetted Per. (m) * 6.53 *
* Min Ch El (m) * 481.72 * Shear (N/m2) * 564.14 *
* Alpha * 1.00 * Stream Power (N/m s) * 3274.83 *
* Frctn Loss (m) * 0.16 * Cum Volume (1000 m3) * 2.40 *
* C & E Loss (m) * 0.19 * Cum SA (1000 m2) * 3.03 *
*****

```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
REACH: 1 RS: 4.375*

INPUT

Description:

Station Elevation Data		num= 12		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	484.734	2.352	484.565	2.365	483.155	4.475	481.509	6.075	481.198
6.58	480.935	7.262	480.995	8.346	481.28	9.71	482.656	9.72	484.116
12.695	484.333	15.709	484.41						

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.038	2.352	.035	9.72	.038

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	2.352	9.72		18.35	18.35	18.35	.3 .5

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
* E.G. Elev (m) * 482.66 * Element * Left OB * Channel * Right OB *
* Vel Head (m) * 0.42 * Wt. n-Val. * 0.035 *
* W.S. Elev (m) * 482.24 * Reach Len. (m) * 18.35 * 18.35 * 18.35 *
* Crit W.S. (m) * 482.24 * Flow Area (m2) * 4.86 *
* E.G. Slope (m/m) * 0.015087 * Area (m2) * 4.86 *
* Q Total (m3/s) * 14.00 * Flow (m3/s) * 14.00 *
* Top Width (m) * 5.75 * Top Width (m) * 5.75 *
* Vel Total (m/s) * 2.88 * Avg. Vel. (m/s) * 2.88 *
* Max Chl Dpth (m) * 1.30 * Hydr. Depth (m) * 0.84 *
* Conv. Total (m3/s) * 114.0 * Conv. (m3/s) * 114.0 *
* Length Wtd. (m) * 18.35 * Wetted Per. (m) * 6.54 *
* Min Ch El (m) * 480.94 * Shear (N/m2) * 110.00 *
* Alpha * 1.00 * Stream Power (N/m s) * 316.83 *
* Frctn Loss (m) * 0.29 * Cum Volume (1000 m3) * 2.34 *
* C & E Loss (m) * 0.01 * Cum SA (1000 m2) * 2.92 *
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
REACH: 1 RS: 4.25

INPUT

Description: Sez. aggiunta

Station Elevation Data		num= 10		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	484.747	4.705	484.409	7.213	481.198	9.103	480.652	9.7	480.15
10.395	480.248	11.5	480.783	12.9	483.512	18.85	483.945	24.879	484.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	4.705	.035	12.9	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	4.705	12.9		23.1	23.1	23.1	.1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

	*	482.19	*	Element	*	Left OB	*	Channel	*	Right OB	*
* E.G. Elev (m)	*	482.19	*	Element	*	Left OB	*	Channel	*	Right OB	*
* Vel Head (m)	*	0.72	*	Wt. n-Val.	*		*	0.035	*		*
* W.S. Elev (m)	*	481.46	*	Reach Len. (m)	*	23.10	*	23.10	*	23.10	*
* Crit W.S. (m)	*	481.65	*	Flow Area (m2)	*		*	3.71	*		*
* E.G. Slope (m/m)	*	0.031392	*	Area (m2)	*		*	3.71	*		*
* Q Total (m3/s)	*	14.00	*	Flow (m3/s)	*		*	14.00	*		*
* Top Width (m)	*	4.84	*	Top Width (m)	*		*	4.84	*		*
* Vel Total (m/s)	*	3.77	*	Avg. Vel. (m/s)	*		*	3.77	*		*
* Max Chl Dpth (m)	*	1.31	*	Hydr. Depth (m)	*		*	0.77	*		*
* Conv. Total (m3/s)	*	79.0	*	Conv. (m3/s)	*		*	79.0	*		*
* Length Wtd. (m)	*	23.10	*	Wetted Per. (m)	*		*	5.77	*		*
* Min Ch El (m)	*	480.15	*	Shear (N/m2)	*		*	197.97	*		*
* Alpha	*	1.00	*	Stream Power (N/m s)	*		*	746.66	*		*
* Frctn Loss (m)	*	0.39	*	Cum Volume (1000 m3)	*		*	2.26	*		*
* C & E Loss (m)	*	0.09	*	Cum SA (1000 m2)	*		*	2.82	*		*

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
 REACH: 1 RS: 4.125*

INPUT

Description:

Station	Elevation	Data	num=	12	Sta	Elev	Sta	Elev	Sta	Elev
0	482.823	2.352	482.654	2.368	481.936	4.214	480.204	5.617	479.825	
6.06	479.54	6.638	479.597	7.556	479.876	8.707	481.241	8.72	482.206	
11.695	482.422	14.709	482.5							

Manning's n	Values	num=	3	Sta	n Val	Sta	n Val
0	.038	2.352	.035	8.72	.038		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	2.352	8.72		23.1	23.1	23.1	.1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

	*	481.49	*	Element	*	Left OB	*	Channel	*	Right OB	*
* E.G. Elev (m)	*	481.49	*	Element	*	Left OB	*	Channel	*	Right OB	*
* Vel Head (m)	*	0.70	*	Wt. n-Val.	*		*	0.035	*		*
* W.S. Elev (m)	*	480.79	*	Reach Len. (m)	*	23.10	*	23.10	*	23.10	*
* Crit W.S. (m)	*	480.96	*	Flow Area (m2)	*		*	3.77	*		*
* E.G. Slope (m/m)	*	0.028340	*	Area (m2)	*		*	3.77	*		*
* Q Total (m3/s)	*	14.00	*	Flow (m3/s)	*		*	14.00	*		*
* Top Width (m)	*	4.73	*	Top Width (m)	*		*	4.73	*		*
* Vel Total (m/s)	*	3.71	*	Avg. Vel. (m/s)	*		*	3.71	*		*
* Max Chl Dpth (m)	*	1.25	*	Hydr. Depth (m)	*		*	0.80	*		*
* Conv. Total (m3/s)	*	83.2	*	Conv. (m3/s)	*		*	83.2	*		*
* Length Wtd. (m)	*	23.10	*	Wetted Per. (m)	*		*	5.56	*		*
* Min Ch El (m)	*	479.54	*	Shear (N/m2)	*		*	188.41	*		*
* Alpha	*	1.00	*	Stream Power (N/m s)	*		*	699.37	*		*
* Frctn Loss (m)	*	0.69	*	Cum Volume (1000 m3)	*		*	2.17	*		*
* C & E Loss (m)	*	0.01	*	Cum SA (1000 m2)	*		*	2.71	*		*

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
 REACH: 1 RS: 4

INPUT

Description: Sez. a monte del tratto intubato

Station	Elevation	Data	num=	5	Sta	Elev	Sta	Elev	Sta	Elev

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 0 480.9 .01 479.49 2.42 478.93 4.53 479 4.54 480.9

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 0 .035 4.54 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 4.54 128 128 128 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 .77 482 T
 3.77 4.54 482 T

CROSS SECTION OUTPUT Profile #Q Tr200

 * E.G. Elev (m) * 481.02 * Element * Left OB * Channel * Right OB *
 * Vel Head (m) * 0.78 * Wt. n-Val. * * 0.035 * *
 * W.S. Elev (m) * 480.24 * Reach Len. (m) * 128.00 * 128.00 * 128.00 *
 * Crit W.S. (m) * 480.35 * Flow Area (m2) * * 3.59 * *
 * E.G. Slope (m/m) * 0.014990 * Area (m2) * * 5.18 * *
 * Q Total (m3/s) * 14.00 * Flow (m3/s) * * 14.00 * *
 * Top Width (m) * 4.53 * Top Width (m) * * 4.53 * *
 * Vel Total (m/s) * 3.90 * Avg. Vel. (m/s) * * 3.90 * *
 * Max Chl Dpth (m) * 1.31 * Hydr. Depth (m) * * 1.20 * *
 * Conv. Total (m3/s) * 114.3 * Conv. (m3/s) * * 114.3 * *
 * Length Wtd. (m) * 128.00 * Wetted Per. (m) * * 3.04 * *
 * Min Ch El (m) * 478.93 * Shear (N/m2) * * 173.20 * *
 * Alpha * 1.00 * Stream Power (N/m s) * * 675.89 * *
 * Frctn Loss (m) * 0.46 * Cum Volume (1000 m3) * * 2.07 * *
 * C & E Loss (m) * 0.01 * Cum SA (1000 m2) * * 2.60 * *

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CULVERT

RIVER: FSSO ZAPPACENERE
 REACH: 1 RS: 3.7

INPUT
 Description: Tubo Acciaio Corrugato
 Distance from Upstream XS = 8.55
 Deck/Roadway Width = 118
 Weir Coefficient = 1.44
 Upstream Deck/Roadway Coordinates
 num= 2
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord

 0 482 4.54 482

Upstream Bridge Cross Section Data
 Station Elevation Data num= 5
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 480.9 .01 479.49 2.42 478.93 4.53 479 4.54 480.9

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 0 .035 4.54 .04

Bank Sta: Left Right Coeff Contr. Expan.
 0 4.54 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 .77 482 T
 3.77 4.54 482 T

Downstream Deck/Roadway Coordinates
 num= 2
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord

 0 481.7 3.7 481.7

Downstream Bridge Cross Section Data
 Station Elevation Data num= 4
 Sta Elev Sta Elev Sta Elev Sta Elev

 0 481.8 0 477.46 3.6 477.46 3.6 481.8

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .02 0 .02 3.6 .02

Bank Sta: Left Right Coeff Contr. Expan.
 0 3.6 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 .3 481.7 T
 3.3 3.6 481.7 T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name Shape Rise Span
 Tubo Acciaio Circular 3
 FHWA Chart # 2 - Corrugated Metal Pipe Culvert
 FHWA Scale # 1 - Headwall
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 8.55 118 .026 .026 0 .5 .5
 Upstream Elevation = 478.28
 Centerline Station = 2.265
 Downstream Elevation = 477.5
 Centerline Station = 1.8

CULVERT OUTPUT Profile #Q Tr200 Culv Group: Tubo Acciaio

 * Q Culv Group (m3/s) * 14.00 * Culv Full Len (m) * *
 * # Barrels * 1 * Culv Vel US (m/s) * 4.09 *
 * Q Barrel (m3/s) * 14.00 * Culv Vel DS (m/s) * 3.58 *
 * E.G. US. (m) * 481.02 * Culv Inv El Up (m) * 478.28 *
 * W.S. US. (m) * 480.24 * Culv Inv El Dn (m) * 477.50 *
 * E.G. DS (m) * 479.42 * Culv Frctn Ls (m) * 0.82 *
 * W.S. DS (m) * 478.76 * Culv Exit Loss (m) * 0.36 *
 * Delta EG (m) * 1.60 * Culv Entr Loss (m) * 0.42 *
 * Delta WS (m) * 1.48 * Q Weir (m3/s) * *
 * E.G. IC (m) * * Weir Sta Lft (m) * *
 * E.G. OC (m) * * Weir Sta Rgt (m) * *
 * Culvert Control * Inlet * Weir Submerg * *
 * Culv WS Inlet (m) * 479.74 * Weir Max Depth (m) * *
 * Culv WS Outlet (m) * 479.12 * Weir Avg Depth (m) * *
 * Culv Nml Depth (m) * 1.97 * Weir Flow Area (m2) * *
 * Culv Crt Depth (m) * 1.62 * Min El Weir Flow (m) * 482.00 *

Note: During supercritical analysis, the culvert direct step method went to critical depth. The program then assumed critical depth at the outlet.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
 REACH: 1 RS: 3.5

INPUT
 Description: Sez. aggiunta tratto in cls
 Station Elevation Data num= 4
 Sta Elev Sta Elev Sta Elev Sta Elev

 0 481.8 0 477.46 3.6 477.46 3.6 481.8

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .02 0 .02 3.6 .02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 3.6 15 15 15 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 .3 481.7 T
 3.3 3.6 481.7 T

CROSS SECTION OUTPUT Profile #Q Tr200

 * E.G. Elev (m) * 479.56 * Element * Left OB * Channel * Right OB *
 * Vel Head (m) * 1.09 * Wt. n-Val. * * 0.020 * *
 * W.S. Elev (m) * 478.47 * Reach Len. (m) * 15.00 * 15.00 * 15.00 *
 * Crit W.S. (m) * 478.76 * Flow Area (m2) * * 3.03 * *
 * E.G. Slope (m/m) * 0.008446 * Area (m2) * * 3.63 * *
 * Q Total (m3/s) * 14.00 * Flow (m3/s) * * 14.00 * *
 * Top Width (m) * 3.60 * Top Width (m) * * 3.60 * *
 * Vel Total (m/s) * 4.62 * Avg. Vel. (m/s) * * 4.62 * *
 * Max Chl Dpth (m) * 1.01 * Hydr. Depth (m) * * 1.01 * *

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* Conv. Total (m3/s) * 152.3 * Conv. (m3/s) * 152.3 *
* Length Wtd. (m) * 15.00 * Wetted Per. (m) * 3.00 *
* Min Ch El (m) * 477.46 * Shear (N/m2) * 83.60 *
* Alpha * 1.00 * Stream Power (N/m s) * 386.51 *
* Frctn Loss (m) * * Cum Volume (1000 m3) * 1.50 *
* C & E Loss (m) * * Cum SA (1000 m2) * 2.08 *
*****

```

CROSS SECTION

RIVER: FSSO ZAPPACENERE
REACH: 1 RS: 3.2

INPUT

Description: Sez. aggiunta fine tratto in cls

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	481.7	0	477.29	3.7	477.29	3.7	481.7

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	0	.02	3.7	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 3.7 23.75 23.75 23.75 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
* E.G. Elev (m) * 479.31 * Element * Left OB * Channel * Right OB *
* Vel Head (m) * 1.26 * Wt. n-Val. * * 0.020 * *
* W.S. Elev (m) * 478.05 * Reach Len. (m) * 23.75 * 23.75 * 23.75 *
* Crit W.S. (m) * 478.42 * Flow Area (m2) * * 2.81 * *
* E.G. Slope (m/m) * 0.022572 * Area (m2) * * 2.81 * *
* Q Total (m3/s) * 14.00 * Flow (m3/s) * * 14.00 * *
* Top Width (m) * 3.70 * Top Width (m) * * 3.70 * *
* Vel Total (m/s) * 4.98 * Avg. Vel. (m/s) * * 4.98 * *
* Max Chl Dpth (m) * 0.76 * Hydr. Depth (m) * * 0.76 * *
* Conv. Total (m3/s) * 93.2 * Conv. (m3/s) * * 93.2 * *
* Length Wtd. (m) * 23.75 * Wetted Per. (m) * * 5.22 * *
* Min Ch El (m) * 477.29 * Shear (N/m2) * * 119.30 * *
* Alpha * 1.00 * Stream Power (N/m s) * * 593.55 * *
* Frctn Loss (m) * 0.20 * Cum Volume (1000 m3) * * 1.46 * *
* C & E Loss (m) * 0.05 * Cum SA (1000 m2) * * 2.03 * *
*****

```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
REACH: 1 RS: 3.1*

INPUT

Description:

Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	481.518	2.352	481.349	3.606	477.539	4.551	477.266	4.85	477.015
6.7	477.015	7.048	479.269	8.436	479.536	9.566	480.901	11.275	481.117
14.29	481.195								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	2.352	.027	9.566	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
2.352 9.566 23.75 23.75 23.75 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
* E.G. Elev (m) * 478.98 * Element * Left OB * Channel * Right OB *
* Vel Head (m) * 0.58 * Wt. n-Val. * * 0.027 * *
* W.S. Elev (m) * 478.40 * Reach Len. (m) * 23.75 * 23.75 * 23.75 *
* Crit W.S. (m) * 478.40 * Flow Area (m2) * * 4.14 * *
* E.G. Slope (m/m) * 0.012273 * Area (m2) * * 4.14 * *
* Q Total (m3/s) * 14.00 * Flow (m3/s) * * 14.00 * *
* Top Width (m) * 3.59 * Top Width (m) * * 3.59 * *
* Vel Total (m/s) * 3.38 * Avg. Vel. (m/s) * * 3.38 * *
* Max Chl Dpth (m) * 1.38 * Hydr. Depth (m) * * 1.15 * *
* Conv. Total (m3/s) * 126.4 * Conv. (m3/s) * * 126.4 * *
*****

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* Length Wtd. (m)      * 23.75 * Wetted Per. (m)      * 5.52 *
* Min Ch El (m)      * 477.02 * Shear (N/m2)      * 90.15 *
* Alpha              * 1.00 * Stream Power (N/m s) * 305.06 *
* Frctn Loss (m)     * 0.31 * Cum Volume (1000 m3) * 1.37 *
* C & E Loss (m)     * 0.05 * Cum SA (1000 m2)   * 1.94 *
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for

additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical

depth, the calculated water surface came back below critical depth. This indicates that there

is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
REACH: 1 RS: 3

INPUT

Description:

```

Station Elevation Data      num=      10
Sta   Elev   Sta   Elev   Sta   Elev   Sta   Elev   Sta   Elev
*****
0 481.337  4.705 480.999  7.213 477.788  9.103 477.242  9.7 476.74
10.395 476.838 13.171 477.373 15.431 480.102 18.85 480.535 24.879 480.69

```

```

Manning's n Values      num=      3
Sta   n Val   Sta   n Val   Sta   n Val
*****
0 .04 4.705 .035 15.431 .04

```

```

Bank Sta: Left  Right  Lengths: Left Channel  Right  Coeff Contr.  Expan.
          4.705 15.431          15    15    15          .3    .5

```

```

Ineffective Flow      num=      2
Sta L   Sta R   Elev Permanent
0       7.2   481.19  T
13.2   24.879 481.19  T

```

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
* E.G. Elev (m)      * 478.52 * Element      * Left OB * Channel * Right OB *
* Vel Head (m)      * 0.70 * Wt. n-Val.   * 15.00 * 0.035 * 15.00 *
* W.S. Elev (m)     * 477.82 * Reach Len. (m) * 15.00 * 15.00 * 15.00 *
* Crit W.S. (m)     * 478.01 * Flow Area (m2) * 3.79 * 3.79 * 3.79 *
* E.G. Slope (m/m)  * 0.033288 * Area (m2)     * 3.86 * 3.86 * 3.86 *
* Q Total (m3/s)    * 14.00 * Flow (m3/s)   * 14.00 * 14.00 * 14.00 *
* Top Width (m)     * 6.35 * Top Width (m) * 6.35 * 6.35 * 6.35 *
* Vel Total (m/s)   * 3.70 * Avg. Vel. (m/s) * 3.70 * 3.70 * 3.70 *
* Max Chl Dpth (m) * 1.08 * Hydr. Depth (m) * 0.63 * 0.63 * 0.63 *
* Conv. Total (m3/s) * 76.7 * Conv. (m3/s)  * 76.7 * 76.7 * 76.7 *
* Length Wtd. (m)  * 15.00 * Wetted Per. (m) * 6.34 * 6.34 * 6.34 *
* Min Ch El (m)    * 476.74 * Shear (N/m2)  * 194.92 * 194.92 * 194.92 *
* Alpha            * 1.00 * Stream Power (N/m s) * 720.51 * 720.51 * 720.51 *
* Frctn Loss (m)   * 0.45 * Cum Volume (1000 m3) * 1.28 * 1.28 * 1.28 *
* C & E Loss (m)   * 0.01 * Cum SA (1000 m2) * 1.82 * 1.82 * 1.82 *
*****

```

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CULVERT

RIVER: FSSO ZAPPACENERE
REACH: 1 RS: 2.5

INPUT

Description: Ponte Via B. Croce

```

Distance from Upstream XS = 1
Deck/Roadway Width        = 13
Weir Coefficient          = 1.44

```

```

Upstream Deck/Roadway Coordinates
num= 2
Sta Hi Cord Lo Cord   Sta Hi Cord Lo Cord
*****
0 481.19          24.88 481.19

```

Upstream Bridge Cross Section Data
Station Elevation Data num= 10

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Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	481.337	4.705	480.999	7.213	477.788	9.103	477.242	9.7	476.74
10.395	476.838	13.171	477.373	15.431	480.102	18.85	480.535	24.879	480.69

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .04 4.705 .035 15.431 .04

Bank Sta: Left Right Coeff Contr. Expan.
 4.705 15.431 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 7.2 481.19 T
 13.2 24.879 481.19 T

Downstream Deck/Roadway Coordinates num= 2
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
 0 480.91 22.49 480.91

Downstream Bridge Cross Section Data
 Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	481.292	4.368	481.01	8.225	477.627	10.272	476.478	11.119	476.484
11.977	476.549	14.249	477.205	17.204	480.438	22.494	480.75		

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .04 4.368 .035 17.204 .04

Bank Sta: Left Right Coeff Contr. Expan.
 4.368 17.204 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 8.2 481.29 T
 14.2 22.494 481.29 T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name Shape Rise Span
 scat. Croce Box 3.7 6
 FHWA Chart # 58- Rectangular concrete
 FHWA Scale # 1 - Side tapered; Less favorable edges
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 1 13 .02 .03 0 .5 1
 Upstream Elevation = 476.74
 Centerline Station = 10.2
 Downstream Elevation = 476.48
 Centerline Station = 11.2

CULVERT OUTPUT Profile #Q Tr200 Culv Group: scat. Croce

 * Q Culv Group (m3/s) * 14.00 * Culv Full Len (m) * *
 * # Barrels * 1 * Culv Vel US (m/s) * 2.03 *
 * Q Barrel (m3/s) * 14.00 * Culv Vel DS (m/s) * 1.61 *
 * E.G. US. (m) * 478.52 * Culv Inv El Up (m) * 476.74 *
 * W.S. US. (m) * 477.82 * Culv Inv El Dn (m) * 476.48 *
 * E.G. DS (m) * 478.06 * Culv Frctn Ls (m) * 0.04 *
 * W.S. DS (m) * 477.65 * Culv Exit Loss (m) * 0.00 *
 * Delta EG (m) * 0.45 * Culv Entr Loss (m) * 0.11 *
 * Delta WS (m) * 0.17 * Q Weir (m3/s) * *
 * E.G. IC (m) * 478.20 * Weir Sta Lft (m) * *
 * E.G. OC (m) * 478.20 * Weir Sta Rgt (m) * *
 * Culvert Control * Outlet * Weir Submerg * *
 * Culv WS Inlet (m) * 477.89 * Weir Max Depth (m) * *
 * Culv WS Outlet (m) * 477.93 * Weir Avg Depth (m) * *
 * Culv Nml Depth (m) * 0.69 * Weir Flow Area (m2) * *
 * Culv Crt Depth (m) * 0.82 * Min El Weir Flow (m) * 481.19 *

Warning: During subcritical analysis, the water surface upstream of culvert went to critical depth.
 Note: During the supercritical calculations a hydraulic jump occurred at the inlet of (going into) the culvert.

CROSS SECTION

RIVER: Fsso ZAPPACENERE
 REACH: 1 RS: 2

INPUT

Description: Sez. aggiunta

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	481.292	4.368	481.01	8.225	477.627	10.272	476.478	11.119	476.484		
11.977	476.549	14.249	477.205	17.204	480.438	22.494	480.75				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	4.368	.035	17.204	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	4.368	17.204		20	20		.3	.5
Ineffective Flow	num= 2							
Sta L	Sta R	Elev	Permanent					
0	8.2	481.29	T					
14.2	22.494	481.29	T					

CROSS SECTION OUTPUT Profile #Q Tr200

* E.G. Elev (m)	* 478.06	* Element	* Left OB	* Channel	* Right OB
* Vel Head (m)	* 0.41	* Wt. n-Val.	* 0.035	* 0.035	* 0.035
* W.S. Elev (m)	* 477.65	* Reach Len. (m)	* 20.00	* 20.00	* 20.00
* Crit W.S. (m)	* 477.65	* Flow Area (m2)	* 4.94	* 4.94	* 4.94
* E.G. Slope (m/m)	* 0.013906	* Area (m2)	* 5.05	* 5.05	* 5.05
* Q Total (m3/s)	* 14.00	* Flow (m3/s)	* 14.00	* 14.00	* 14.00
* Top Width (m)	* 6.46	* Top Width (m)	* 6.46	* 6.46	* 6.46
* Vel Total (m/s)	* 2.83	* Avg. Vel. (m/s)	* 2.83	* 2.83	* 2.83
* Max Chl Dpth (m)	* 1.18	* Hydr. Depth (m)	* 0.82	* 0.82	* 0.82
* Conv. Total (m3/s)	* 118.7	* Conv. (m3/s)	* 118.7	* 118.7	* 118.7
* Length Wtd. (m)	* 20.00	* Wetted Per. (m)	* 6.40	* 6.40	* 6.40
* Min Ch El (m)	* 476.48	* Shear (N/m2)	* 105.22	* 105.22	* 105.22
* Alpha	* 1.00	* Stream Power (N/m s)	* 298.22	* 298.22	* 298.22
* Frctn Loss (m)	* 0.29	* Cum Volume (1000 m3)	* 1.21	* 1.21	* 1.21
* C & E LOSS (m)	* 0.01	* Cum SA (1000 m2)	* 1.73	* 1.73	* 1.73

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Fsso ZAPPACENERE
 REACH: 1 RS: 1

INPUT

Description: Sez. aggiunta

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	480.912	4.368	480.63	8.225	477.247	10.272	476.098	11.119	476.104		
11.977	476.169	14.249	476.825	17.204	480.058	22.494	480.37				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	4.368	.035	17.204	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	4.368	17.204		23.636	23.636		.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

* E.G. Elev (m)	* 477.69	* Element	* Left OB	* Channel	* Right OB
* Vel Head (m)	* 0.52	* Wt. n-Val.	* 0.035	* 0.035	* 0.035
* W.S. Elev (m)	* 477.17	* Reach Len. (m)	* 23.64	* 23.64	* 23.64
* Crit W.S. (m)	* 477.27	* Flow Area (m2)	* 4.40	* 4.40	* 4.40
* E.G. Slope (m/m)	* 0.021831	* Area (m2)	* 4.40	* 4.40	* 4.40
* Q Total (m3/s)	* 14.00	* Flow (m3/s)	* 14.00	* 14.00	* 14.00
* Top Width (m)	* 6.20	* Top Width (m)	* 6.20	* 6.20	* 6.20
* Vel Total (m/s)	* 3.18	* Avg. Vel. (m/s)	* 3.18	* 3.18	* 3.18
* Max Chl Dpth (m)	* 1.07	* Hydr. Depth (m)	* 0.71	* 0.71	* 0.71
* Conv. Total (m3/s)	* 94.8	* Conv. (m3/s)	* 94.8	* 94.8	* 94.8

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```

* Length Wtd. (m)      * 23.64 * Wetted Per. (m)      *      * 6.73 *
* Min Ch El (m)       * 476.10 * Shear (N/m2)         *      * 140.00 *
* Alpha               * 1.00 * Stream Power (N/m s) *      * 445.28 *
* Frctn Loss (m)      * 0.34 * Cum Volume (1000 m3) *      * 1.12 *
* C & E Loss (m)      * 0.03 * Cum SA (1000 m2)     *      * 1.60 *
*****

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fssso ZAPPACENERE
 REACH: 1 RS: .909090*

INPUT

Description:

Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	480.357	4.368	480.075	8.225	476.692	10.272	475.543	11.119	475.549
11.977	475.614	14.249	476.27	17.204	479.503	22.494	479.815		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	4.368	.035	17.204	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	4.368	17.204		23.636	23.636	23.636	.1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
* E.G. Elev (m)      * 477.14 * Element              * Left OB * Channel * Right OB *
* Vel Head (m)       * 0.55 * Wt. n-Val.           *      * 0.035 *
* W.S. Elev (m)      * 476.59 * Reach Len. (m)       * 23.64 * 23.64 * 23.64 *
* Crit W.S. (m)      * 476.72 * Flow Area (m2)       *      * 4.26 *
* E.G. Slope (m/m)   * 0.023965 * Area (m2)           *      * 4.26 *
* Q Total (m3/s)     * 14.00 * Flow (m3/s)         *      * 14.00 *
* Top Width (m)      * 6.14 * Top Width (m)        *      * 6.14 *
* Vel Total (m/s)    * 3.29 * Avg. Vel. (m/s)      *      * 3.29 *
* Max Chl Dpth (m)  * 1.05 * Hydr. Depth (m)     *      * 0.69 *
* Conv. Total (m3/s) * 90.4 * Conv. (m3/s)        *      * 90.4 *
* Length Wtd. (m)    * 23.64 * Wetted Per. (m)     *      * 6.65 *
* Min Ch El (m)      * 475.54 * Shear (N/m2)        *      * 150.49 *
* Alpha              * 1.00 * Stream Power (N/m s) *      * 494.51 *
* Frctn Loss (m)     * 0.54 * Cum Volume (1000 m3) *      * 1.01 *
* C & E Loss (m)     * 0.00 * Cum SA (1000 m2)    *      * 1.46 *
*****

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fssso ZAPPACENERE
 REACH: 1 RS: .818181*

INPUT

Description:

Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	479.803	4.368	479.521	8.225	476.138	10.272	474.989	11.119	474.995
11.977	475.06	14.249	475.716	17.204	478.949	22.494	479.261		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	4.368	.035	17.204	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	4.368	17.204		23.636	23.636	23.636	.1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
* E.G. Elev (m)      * 476.58 * Element              * Left OB * Channel * Right OB *
* Vel Head (m)       * 0.53 * Wt. n-Val.           *      * 0.035 *
* W.S. Elev (m)      * 476.05 * Reach Len. (m)       * 23.64 * 23.64 * 23.64 *
* Crit W.S. (m)      * 476.17 * Flow Area (m2)       *      * 4.32 *
* E.G. Slope (m/m)   * 0.022999 * Area (m2)           *      * 4.32 *
* Q Total (m3/s)     * 14.00 * Flow (m3/s)         *      * 14.00 *
* Top Width (m)      * 6.17 * Top Width (m)        *      * 6.17 *
* Vel Total (m/s)    * 3.24 * Avg. Vel. (m/s)      *      * 3.24 *
* Max Chl Dpth (m)  * 1.06 * Hydr. Depth (m)     *      * 0.70 *
* Conv. Total (m3/s) * 92.3 * Conv. (m3/s)        *      * 92.3 *
* Length Wtd. (m)    * 23.64 * Wetted Per. (m)     *      * 6.69 *
*****

```

```

                                zappacenera.rep
* Min Ch El (m)                * 474.99 * Shear (N/m2)                * 145.77 *
* Alpha                        * 1.00 * Stream Power (N/m s)        * 472.16 *
* Frctn Loss (m)              * 0.55 * Cum Volume (1000 m3)        * 0.91 *
* C & E Loss (m)              * 0.00 * Cum SA (1000 m2)            * 1.31 *
*****

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
 REACH: 1 RS: .727272*

INPUT

Description:

```

Station Elevation Data      num=      9
  Sta      Elev      Sta      Elev      Sta      Elev      Sta      Elev      Sta      Elev
*****
  0 479.248  4.368 478.966  8.225 475.583 10.272 474.434 11.119 474.44
11.977 474.505 14.249 475.161 17.204 478.394 22.494 478.706

```

```

Manning's n Values      num=      3
  Sta      n Val      Sta      n Val      Sta      n Val
*****
  0      .04      4.368      .035      17.204      .04

```

```

Bank Sta: Left  Right  Lengths: Left Channel  Right  Coeff Contr.  Expan.
         4.368 17.204          23.636 23.636 23.636          .1          .3

```

```

CROSS SECTION OUTPUT Profile #Q Tr200
*****
* E.G. Elev (m)                * 476.03 * Element                * Left OB * Channel * Right OB *
* Vel Head (m)                 * 0.54 * Wt. n-Val.              *          * 0.035 *          *
* W.S. Elev (m)                 * 475.49 * Reach Len. (m)          * 23.64 * 23.64 * 23.64 *
* Crit W.S. (m)                 * 475.61 * Flow Area (m2)          *          * 4.29 *          *
* E.G. Slope (m/m)              * 0.023521 * Area (m2)                *          * 4.29 *          *
* Q Total (m3/s)                 * 14.00 * Flow (m3/s)              *          * 14.00 *          *
* Top Width (m)                  * 6.15 * Top Width (m)            *          * 6.15 *          *
* Vel Total (m/s)                 * 3.26 * Avg. Vel. (m/s)          *          * 3.26 *          *
* Max Chl Dpth (m)               * 1.05 * Hydr. Depth (m)          *          * 0.70 *          *
* Conv. Total (m3/s)             * 91.3 * Conv. (m3/s)             *          * 91.3 *          *
* Length Wtd. (m)                 * 23.64 * Wetted Per. (m)          *          * 6.67 *          *
* Min Ch El (m)                  * 474.43 * Shear (N/m2)             *          * 148.33 *          *
* Alpha                          * 1.00 * Stream Power (N/m s)      *          * 484.22 *          *
* Frctn Loss (m)                 * 0.55 * Cum Volume (1000 m3)      *          * 0.81 *          *
* C & E Loss (m)                 * 0.00 * Cum SA (1000 m2)         *          * 1.16 *          *
*****

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
 REACH: 1 RS: .636363*

INPUT

Description:

```

Station Elevation Data      num=      9
  Sta      Elev      Sta      Elev      Sta      Elev      Sta      Elev      Sta      Elev
*****
  0 478.694  4.368 478.412  8.225 475.029 10.272 473.88 11.119 473.886
11.977 473.951 14.249 474.607 17.204 477.84 22.494 478.152

```

```

Manning's n Values      num=      3
  Sta      n Val      Sta      n Val      Sta      n Val
*****
  0      .04      4.368      .035      17.204      .04

```

```

Bank Sta: Left  Right  Lengths: Left Channel  Right  Coeff Contr.  Expan.
         4.368 17.204          23.636 23.636 23.636          .1          .3

```

```

CROSS SECTION OUTPUT Profile #Q Tr200
*****
* E.G. Elev (m)                * 475.48 * Element                * Left OB * Channel * Right OB *
* Vel Head (m)                 * 0.54 * Wt. n-Val.              *          * 0.035 *          *
* W.S. Elev (m)                 * 474.94 * Reach Len. (m)          * 23.64 * 23.64 * 23.64 *
* Crit W.S. (m)                 * 475.06 * Flow Area (m2)          *          * 4.30 *          *
* E.G. Slope (m/m)              * 0.023384 * Area (m2)                *          * 4.30 *          *
* Q Total (m3/s)                 * 14.00 * Flow (m3/s)              *          * 14.00 *          *
* Top Width (m)                  * 6.16 * Top Width (m)            *          * 6.16 *          *
* Vel Total (m/s)                 * 3.26 * Avg. Vel. (m/s)          *          * 3.26 *          *
* Max Chl Dpth (m)               * 1.06 * Hydr. Depth (m)          *          * 0.70 *          *
* Conv. Total (m3/s)             * 91.6 * Conv. (m3/s)             *          * 91.6 *          *
* Length Wtd. (m)                 * 23.64 * Wetted Per. (m)          *          * 6.67 *          *
* Min Ch El (m)                  * 473.88 * Shear (N/m2)             *          * 147.66 *          *
*****

```

```

                                zappacenera.rep
* Alpha                        * 1.00 * Stream Power (N/m s) *          * 481.06 *          *
* Frctn Loss (m)              * 0.55 * Cum Volume (1000 m3) *          * 0.71 *          *
* C & E Loss (m)              * 0.00 * Cum SA (1000 m2) *          * 1.02 *          *
*****

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
 REACH: 1 RS: .545454*

INPUT

Description:

```

Station Elevation Data      num= 9
  Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
*****
  0 478.139 4.368 477.857 8.225 474.474 10.272 473.325 11.119 473.331
 11.977 473.396 14.249 474.052 17.204 477.285 22.494 477.597

```

```

Manning's n Values      num= 3
  Sta n Val Sta n Val Sta n Val
*****
  0 .04 4.368 .035 17.204 .04

```

```

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
         4.368 17.204          23.636 23.636 23.636          .1 .3

```

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
* E.G. Elev (m) * 474.92 * Element * Left OB * Channel * Right OB *
* Vel Head (m) * 0.54 * Wt. n-Val. * * * 0.035 * *
* W.S. Elev (m) * 474.38 * Reach Len. (m) * 23.64 * 23.64 * 23.64 *
* Crit W.S. (m) * 474.50 * Flow Area (m2) * * * 4.29 * *
* E.G. Slope (m/m) * 0.023574 * Area (m2) * * * 4.29 * *
* Q Total (m3/s) * 14.00 * Flow (m3/s) * * * 14.00 * *
* Top Width (m) * 6.15 * Top Width (m) * * * 6.15 * *
* Vel Total (m/s) * 3.27 * Avg. Vel. (m/s) * * * 3.27 * *
* Max Chl Dpth (m) * 1.05 * Hydr. Depth (m) * * * 0.70 * *
* Conv. Total (m3/s) * 91.2 * Conv. (m3/s) * * * 91.2 * *
* Length Wtd. (m) * 23.64 * Wetted Per. (m) * * * 6.67 * *
* Min Ch El (m) * 473.33 * Shear (N/m2) * * * 148.59 * *
* Alpha * 1.00 * Stream Power (N/m s) * * * 485.46 * *
* Frctn Loss (m) * 0.55 * Cum Volume (1000 m3) * * * 0.61 * *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * * 0.87 * *
*****

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
 REACH: 1 RS: .454545*

INPUT

Description:

```

Station Elevation Data      num= 9
  Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
*****
  0 477.585 4.368 477.303 8.225 473.92 10.272 472.771 11.119 472.777
 11.977 472.842 14.249 473.498 17.204 476.731 22.494 477.043

```

```

Manning's n Values      num= 3
  Sta n Val Sta n Val Sta n Val
*****
  0 .04 4.368 .035 17.204 .04

```

```

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
         4.368 17.204          23.636 23.636 23.636          .1 .3

```

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
* E.G. Elev (m) * 474.37 * Element * Left OB * Channel * Right OB *
* Vel Head (m) * 0.54 * Wt. n-Val. * * * 0.035 * *
* W.S. Elev (m) * 473.83 * Reach Len. (m) * 23.64 * 23.64 * 23.64 *
* Crit W.S. (m) * 473.95 * Flow Area (m2) * * * 4.30 * *
* E.G. Slope (m/m) * 0.023407 * Area (m2) * * * 4.30 * *
* Q Total (m3/s) * 14.00 * Flow (m3/s) * * * 14.00 * *
* Top Width (m) * 6.16 * Top Width (m) * * * 6.16 * *
* Vel Total (m/s) * 3.26 * Avg. Vel. (m/s) * * * 3.26 * *
* Max Chl Dpth (m) * 1.06 * Hydr. Depth (m) * * * 0.70 * *
* Conv. Total (m3/s) * 91.5 * Conv. (m3/s) * * * 91.5 * *
* Length Wtd. (m) * 23.64 * Wetted Per. (m) * * * 6.67 * *
* Min Ch El (m) * 472.77 * Shear (N/m2) * * * 147.77 * *
* Alpha * 1.00 * Stream Power (N/m s) * * * 481.59 * *
*****

```

zappacenera.rep

* Frctn Loss (m) * 0.56 * Cum Volume (1000 m3) * 0.51 *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.73 *

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fssso ZAPPACENERE
REACH: 1 RS: .363636*

INPUT

Description:

Station Elevation Data num= 9
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 477.03 4.368 476.748 8.225 473.365 10.272 472.216 11.119 472.222
11.977 472.287 14.249 472.943 17.204 476.176 22.494 476.488

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .04 4.368 .035 17.204 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4.368 17.204 23.636 23.636 23.636 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200
* E.G. Elev (m) * 473.81 * Element * Left OB * Channel * Right OB *
* Vel Head (m) * 0.54 * Wt. n-Val. * 0.035 *
* W.S. Elev (m) * 473.27 * Reach Len. (m) * 23.64 * 23.64 * 23.64 *
* Crit W.S. (m) * 473.39 * Flow Area (m2) * 4.30 *
* E.G. Slope (m/m) * 0.023410 * Area (m2) * 4.30 *
* Q Total (m3/s) * 14.00 * Flow (m3/s) * 14.00 *
* Top Width (m) * 6.16 * Top Width (m) * 6.16 *
* Vel Total (m/s) * 3.26 * Avg. Vel. (m/s) * 3.26 *
* Max Chl Dpth (m) * 1.06 * Hydr. Depth (m) * 0.70 *
* Conv. Total (m3/s) * 91.5 * Conv. (m3/s) * 91.5 *
* Length Wtd. (m) * 23.64 * Wetted Per. (m) * 6.67 *
* Min Ch El (m) * 472.22 * Shear (N/m2) * 147.78 *
* Alpha * 1.00 * Stream Power (N/m s) * 481.65 *
* Frctn Loss (m) * 0.55 * Cum Volume (1000 m3) * 0.41 *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.58 *

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fssso ZAPPACENERE
REACH: 1 RS: .272727*

INPUT

Description:

Station Elevation Data num= 9
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 476.476 4.368 476.194 8.225 472.811 10.272 471.662 11.119 471.668
11.977 471.733 14.249 472.389 17.204 475.622 22.494 475.934

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .04 4.368 .035 17.204 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4.368 17.204 23.636 23.636 23.636 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200
* E.G. Elev (m) * 473.26 * Element * Left OB * Channel * Right OB *
* Vel Head (m) * 0.54 * Wt. n-Val. * 0.035 *
* W.S. Elev (m) * 472.72 * Reach Len. (m) * 23.64 * 23.64 * 23.64 *
* Crit W.S. (m) * 472.84 * Flow Area (m2) * 4.30 *
* E.G. Slope (m/m) * 0.023341 * Area (m2) * 4.30 *
* Q Total (m3/s) * 14.00 * Flow (m3/s) * 14.00 *
* Top Width (m) * 6.16 * Top Width (m) * 6.16 *
* Vel Total (m/s) * 3.26 * Avg. Vel. (m/s) * 3.26 *
* Max Chl Dpth (m) * 1.06 * Hydr. Depth (m) * 0.70 *
* Conv. Total (m3/s) * 91.6 * Conv. (m3/s) * 91.6 *
* Length Wtd. (m) * 23.64 * Wetted Per. (m) * 6.68 *
* Min Ch El (m) * 471.66 * Shear (N/m2) * 147.45 *
* Alpha * 1.00 * Stream Power (N/m s) * 480.06 *
* Frctn Loss (m) * 0.55 * Cum Volume (1000 m3) * 0.30 *

* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.44 *

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fsso ZAPPACENERE REACH: 1 RS: .181818*

INPUT

Description:

Station Elevation Data num= 9. Table with columns: Sta, Elev, Sta, Elev, Sta, Elev, Sta, Elev, Sta, Elev. Data rows: 0 475.921 4.368 475.639 8.225 472.256 10.272 471.107 11.119 471.113; 11.977 471.178 14.249 471.834 17.204 475.067 22.494 475.379

Manning's n Values num= 3. Table with columns: Sta, n Val, Sta, n Val, Sta, n Val. Data row: 0 .04 4.368 .035 17.204 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. Data row: 4.368 17.204 23.636 23.636 23.636 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200. Table with columns: E.G. Elev (m), Vel Head (m), W.S. Elev (m), Crit W.S. (m), E.G. Slope (m/m), Q Total (m3/s), Top Width (m), Vel Total (m/s), Max Chl Dpth (m), Conv. Total (m3/s), Length Wtd. (m), Min Ch El (m), Alpha, Frctn Loss (m), C & E Loss (m). Includes Element, Left OB, Channel, Right OB, Wt. n-Val., Reach Len. (m), Flow Area (m2), Area (m2), Flow (m3/s), Top Width (m), Avg. Vel. (m/s), Hydr. Depth (m), Conv. (m3/s), Wetted Per. (m), Shear (N/m2), Stream Power (N/m s), Cum Volume (1000 m3), Cum SA (1000 m2).

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fsso ZAPPACENERE REACH: 1 RS: .090909*

INPUT

Description:

Station Elevation Data num= 9. Table with columns: Sta, Elev, Sta, Elev, Sta, Elev, Sta, Elev, Sta, Elev. Data rows: 0 475.367 4.368 475.085 8.225 471.702 10.272 470.553 11.119 470.559; 11.977 470.624 14.249 471.28 17.204 474.513 22.494 474.825

Manning's n Values num= 3. Table with columns: Sta, n Val, Sta, n Val, Sta, n Val. Data row: 0 .04 4.368 .035 17.204 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. Data row: 4.368 17.204 23.636 23.636 23.636 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200. Table with columns: E.G. Elev (m), Vel Head (m), W.S. Elev (m), Crit W.S. (m), E.G. Slope (m/m), Q Total (m3/s), Top Width (m), Vel Total (m/s), Max Chl Dpth (m), Conv. Total (m3/s), Length Wtd. (m), Min Ch El (m), Alpha, Frctn Loss (m), C & E Loss (m). Includes Element, Left OB, Channel, Right OB, Wt. n-Val., Reach Len. (m), Flow Area (m2), Area (m2), Flow (m3/s), Top Width (m), Avg. Vel. (m/s), Hydr. Depth (m), Conv. (m3/s), Wetted Per. (m), Shear (N/m2), Stream Power (N/m s), Cum Volume (1000 m3), Cum SA (1000 m2).

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO ZAPPACENERE
REACH: 1 RS: 0

INPUT

Description: Sez. aggiunta

Station Elevation Data num= 9
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 474.812 4.368 474.53 8.225 471.147 10.272 469.998 11.119 470.004
11.977 470.069 14.249 470.725 17.204 473.958 22.494 474.27

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .04 4.368 .035 17.204 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4.368 17.204 0 0 0 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

* E.G. Elev (m) * 471.59 * Element * Left OB * Channel * Right OB *
* Vel Head (m) * 0.54 * Wt. n-Val. * * 0.035 * *
* W.S. Elev (m) * 471.05 * Reach Len. (m) * * * *
* Crit W.S. (m) * 471.17 * Flow Area (m2) * * 4.30 * *
* E.G. Slope (m/m) * 0.023405 * Area (m2) * * 4.30 * *
* Q Total (m3/s) * 14.00 * Flow (m3/s) * * 14.00 * *
* Top Width (m) * 6.16 * Top Width (m) * * 6.16 * *
* Vel Total (m/s) * 3.26 * Avg. Vel. (m/s) * * 3.26 * *
* Max Chl Dpth (m) * 1.06 * Hydr. Depth (m) * * 0.70 * *
* Conv. Total (m3/s) * 91.5 * Conv. (m3/s) * * 91.5 * *
* Length Wtd. (m) * * * Wetted Per. (m) * * 6.67 * *
* Min Ch El (m) * 470.00 * Shear (N/m2) * * 147.76 * *
* Alpha * 1.00 * Stream Power (N/m s) * * 481.55 * *
* Frctn Loss (m) * 0.55 * Cum Volume (1000 m3) * * * *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * * *

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

SUMMARY OF MANNING'S N VALUES

River:FSSO ZAPPACENERE

* Reach * River Sta. * n1 * n2 * n3 *
*1 * 6 * .04* .035* .04*
*1 * 5 * .04* .035* .04*
*1 * 4.75 *Bridge * * *
*1 * 4.5 * .04* .035* .04*
*1 * 4.375* * .038* .035* .038*
*1 * 4.25 * .04* .035* .04*
*1 * 4.125* * .038* .035* .038*
*1 * 4 * .04* .035* .04*
*1 * 3.7 *Culvert * * *
*1 * 3.5 * .02* .02* .02*
*1 * 3.2 * .02* .02* .02*
*1 * 3.1* * .03* .027* .03*
*1 * 3 * .04* .035* .04*
*1 * 2.5 *Culvert * * *
*1 * 2 * .04* .035* .04*
*1 * 1 * .04* .035* .04*
*1 * .909090* * .04* .035* .04*
*1 * .818181* * .04* .035* .04*
*1 * .727272* * .04* .035* .04*
*1 * .636363* * .04* .035* .04*
*1 * .545454* * .04* .035* .04*
*1 * .454545* * .04* .035* .04*
*1 * .363636* * .04* .035* .04*
*1 * .272727* * .04* .035* .04*
*1 * .181818* * .04* .035* .04*
*1 * .090909* * .04* .035* .04*
*1 * 0 * .04* .035* .04*

SUMMARY OF REACH LENGTHS

River: FSSO ZAPPACENERE

```

*****
*      Reach      *      River Sta.      *      Left      *      Channel      *      Right      *
*****
*1          *          6          *          9*          9*
*1          *          5          *          10*         10*
*1          *          4.75        *Bridge*          *          *
*1          *          4.5          *          18.35*        18.35*        18.35*
*1          *          4.375*        *          18.35*        18.35*        18.35*
*1          *          4.25          *          23.1*         23.1*         23.1*
*1          *          4.125*        *          23.1*        23.1*         23.1*
*1          *          4          *          128*         128*         128*
*1          *          3.7          *Culvert*          *          *
*1          *          3.5          *          15*          15*
*1          *          3.2          *          23.75*        23.75*        23.75*
*1          *          3.1*          *          23.75*        23.75*        23.75*
*1          *          3          *          15*          15*
*1          *          2.5          *Culvert*          *          *
*1          *          2          *          20*          20*
*1          *          1          *          23.636*        23.636*        23.636*
*1          *          .909090*        *          23.636*        23.636*        23.636*
*1          *          .818181*        *          23.636*        23.636*        23.636*
*1          *          .727272*        *          23.636*        23.636*        23.636*
*1          *          .636363*        *          23.636*        23.636*        23.636*
*1          *          .545454*        *          23.636*        23.636*        23.636*
*1          *          .454545*        *          23.636*        23.636*        23.636*
*1          *          .363636*        *          23.636*        23.636*        23.636*
*1          *          .272727*        *          23.636*        23.636*        23.636*
*1          *          .181818*        *          23.636*        23.636*        23.636*
*1          *          .090909*        *          23.636*        23.636*        23.636*
*1          *          0          *          0*           0*           0*
*****

```

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: FSSO ZAPPACENERE

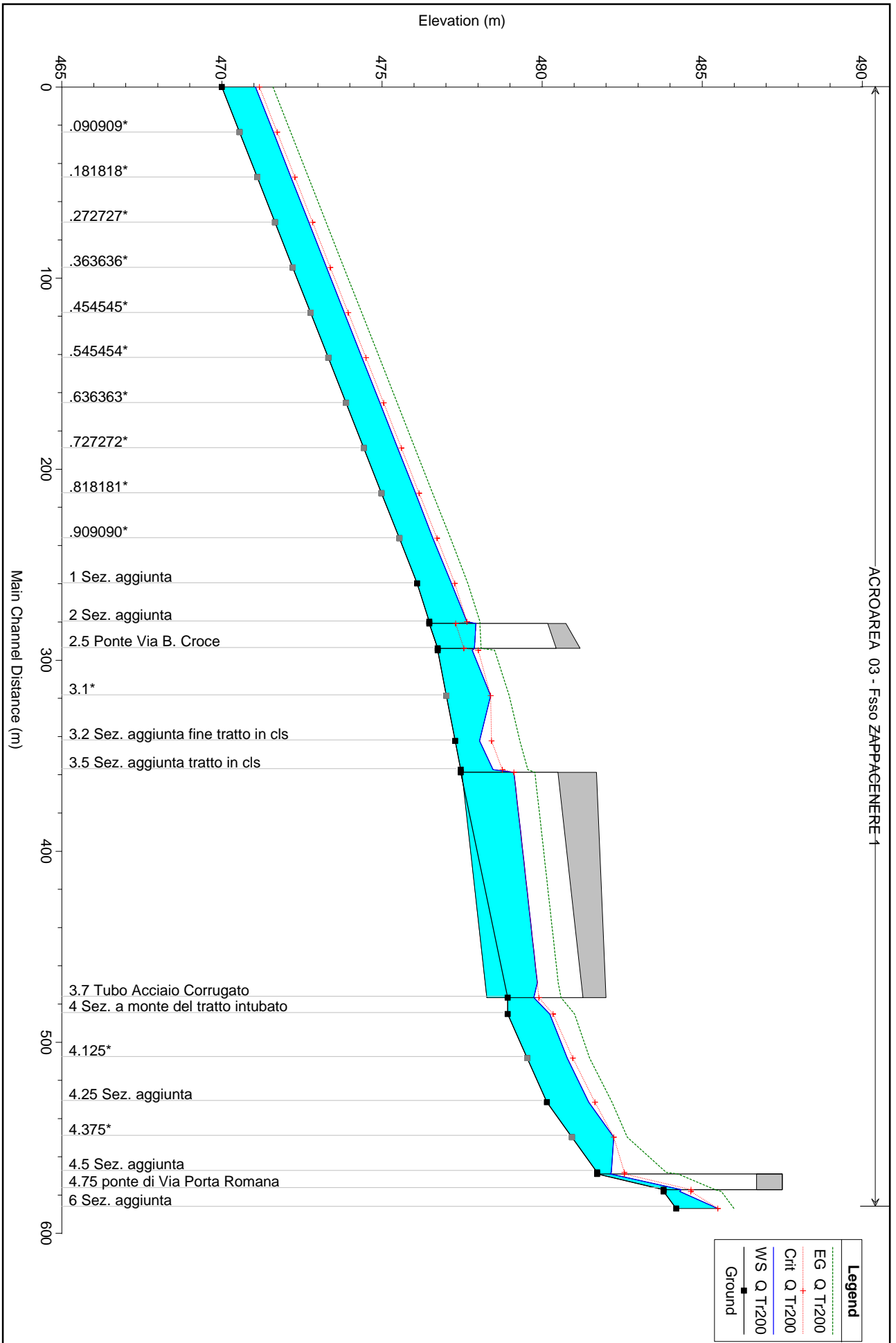
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*****
*      Reach      *      River Sta.      *      Contr.      *      Expan.      *
*****
*1          *          6          *          .1*          .3*
*1          *          5          *          .3*          .5*
*1          *          4.75        *Bridge*          *          *
*1          *          4.5          *          .3*          .5*
*1          *          4.375*        *          .3*          .5*
*1          *          4.25          *          .1*          .3*
*1          *          4.125*        *          .1*          .3*
*1          *          4          *          .3*          .5*
*1          *          3.7          *Culvert*          *          *
*1          *          3.5          *          .3*          .5*
*1          *          3.2          *          .1*          .3*
*1          *          3.1*          *          .1*          .3*
*1          *          3          *          .3*          .5*
*1          *          2.5          *Culvert*          *          *
*1          *          2          *          .3*          .5*
*1          *          1          *          .1*          .3*
*1          *          .909090**        .1*          .3*
*1          *          .818181**        .1*          .3*
*1          *          .727272**        .1*          .3*
*1          *          .636363**        .1*          .3*
*1          *          .545454**        .1*          .3*
*1          *          .454545**        .1*          .3*
*1          *          .363636**        .1*          .3*
*1          *          .272727**        .1*          .3*
*1          *          .181818**        .1*          .3*
*1          *          .090909**        .1*          .3*
*1          *          0          *          .1*          .3*
*****

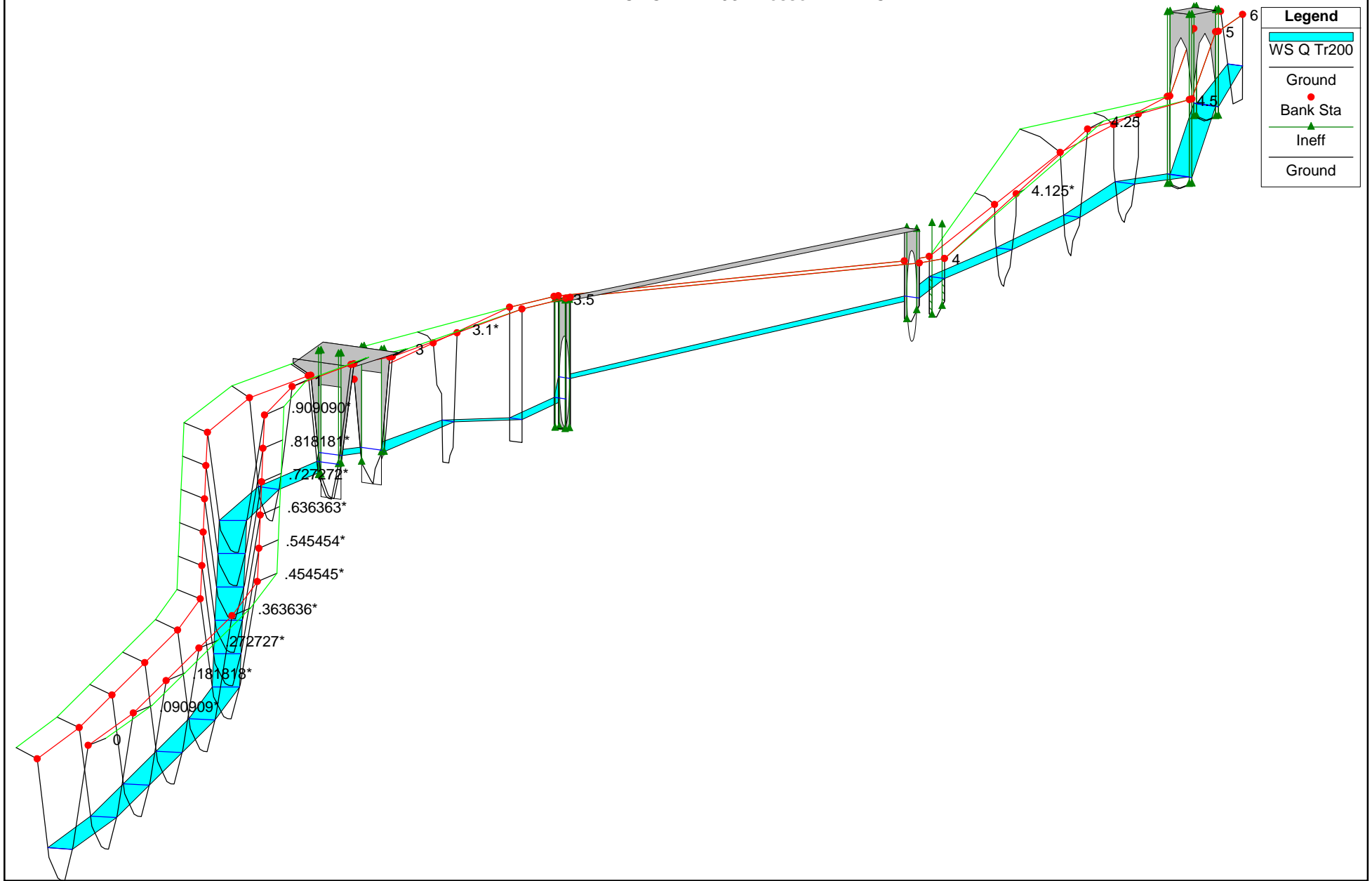
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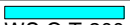
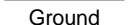


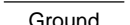
HEC-RAS Plan: Plan QTr200 River: Fssso ZAPPACENERE Reach: 1 Profile: Q Tr200

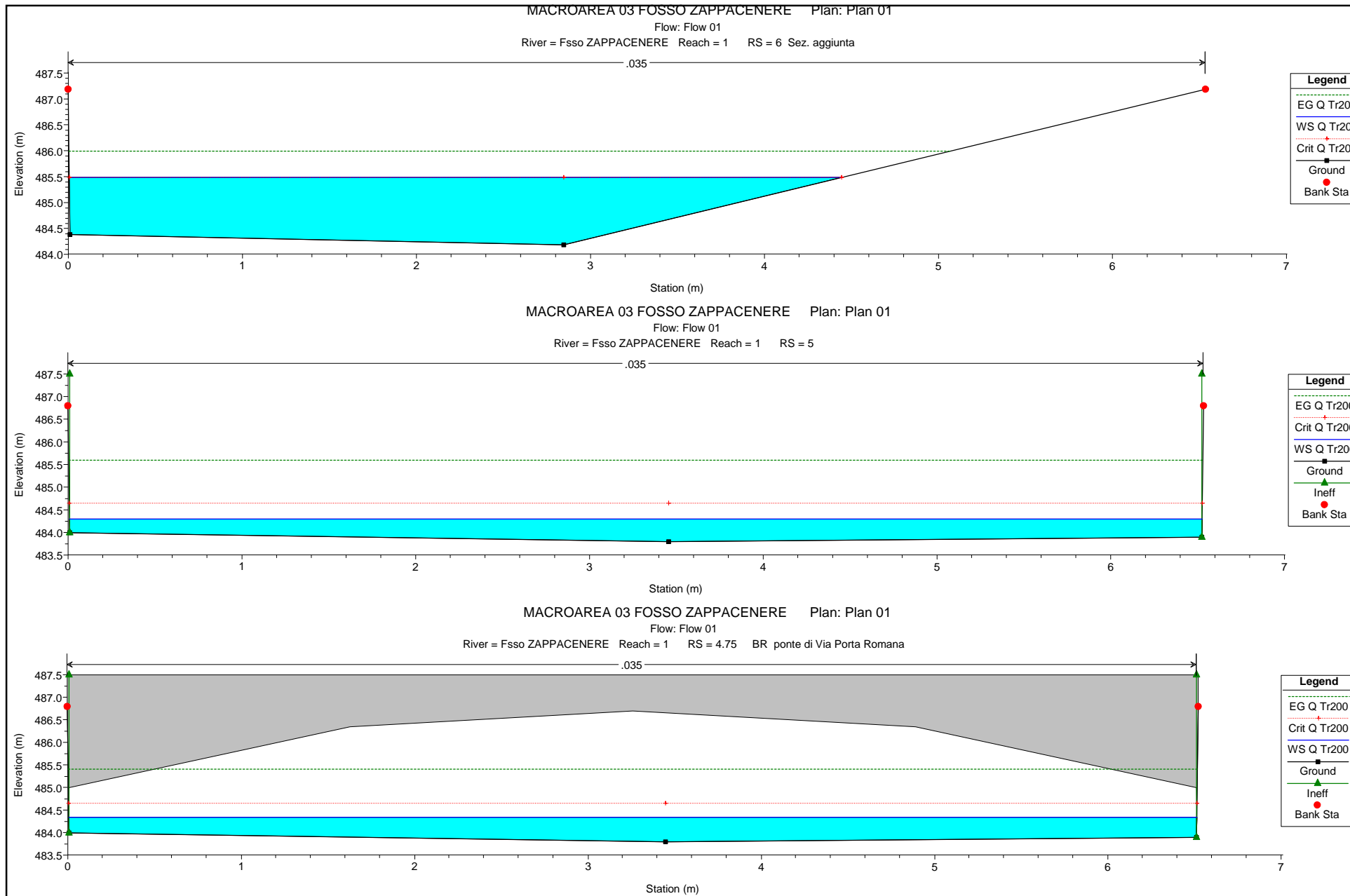
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
1	6	Q Tr200	14.00	484.19	485.49	485.49	485.99	0.018155	3.15	4.44	4.44	1.01
1	5	Q Tr200	14.00	483.80	484.30	484.65	485.60	0.097555	5.05	2.77	6.52	2.47
1	4.75		Bridge									
1	4.5	Q Tr200	14.00	481.72	482.17	482.57	483.88	0.155700	5.80	2.41	6.52	3.05
1	4.375*	Q Tr200	14.00	480.94	482.24	482.24	482.66	0.015087	2.88	4.86	5.75	1.00
1	4.25	Q Tr200	14.00	480.15	481.46	481.65	482.19	0.031392	3.77	3.71	4.84	1.37
1	4.125*	Q Tr200	14.00	479.54	480.79	480.96	481.49	0.028340	3.71	3.77	4.73	1.33
1	4	Q Tr200	14.00	478.93	480.24	480.35	481.02	0.014990	3.90	3.59	4.53	1.14
1	3.7		Culvert									
1	3.5	Q Tr200	14.00	477.46	478.47	478.76	479.56	0.008446	4.62	3.03	3.60	1.14
1	3.2	Q Tr200	14.00	477.29	478.05	478.42	479.31	0.022572	4.98	2.81	3.70	1.82
1	3.1*	Q Tr200	14.00	477.02	478.40	478.40	478.98	0.012273	3.38	4.14	3.59	1.01
1	3	Q Tr200	14.00	476.74	477.82	478.01	478.52	0.033288	3.70	3.79	6.35	1.49
1	2.5		Culvert									
1	2	Q Tr200	14.00	476.48	477.65	477.65	478.06	0.013906	2.83	4.94	6.46	1.00
1	1	Q Tr200	14.00	476.10	477.17	477.27	477.69	0.021831	3.18	4.40	6.20	1.21
1	.909090*	Q Tr200	14.00	475.54	476.59	476.72	477.14	0.023965	3.29	4.26	6.14	1.26
1	.818181*	Q Tr200	14.00	474.99	476.05	476.17	476.58	0.022999	3.24	4.32	6.17	1.24
1	.727272*	Q Tr200	14.00	474.43	475.49	475.61	476.03	0.023521	3.26	4.29	6.15	1.25
1	.636363*	Q Tr200	14.00	473.88	474.94	475.06	475.48	0.023384	3.26	4.30	6.16	1.24
1	.545454*	Q Tr200	14.00	473.33	474.38	474.50	474.92	0.023574	3.27	4.29	6.15	1.25
1	.454545*	Q Tr200	14.00	472.77	473.83	473.95	474.37	0.023407	3.26	4.30	6.16	1.25
1	.363636*	Q Tr200	14.00	472.22	473.27	473.39	473.81	0.023410	3.26	4.30	6.16	1.25
1	.272727*	Q Tr200	14.00	471.66	472.72	472.84	473.26	0.023341	3.26	4.30	6.16	1.24
1	.181818*	Q Tr200	14.00	471.11	472.16	472.28	472.70	0.023614	3.27	4.28	6.15	1.25
1	.090909*	Q Tr200	14.00	470.55	471.61	471.73	472.15	0.023406	3.26	4.30	6.16	1.25
1	0	Q Tr200	14.00	470.00	471.05	471.17	471.59	0.023405	3.26	4.30	6.16	1.25

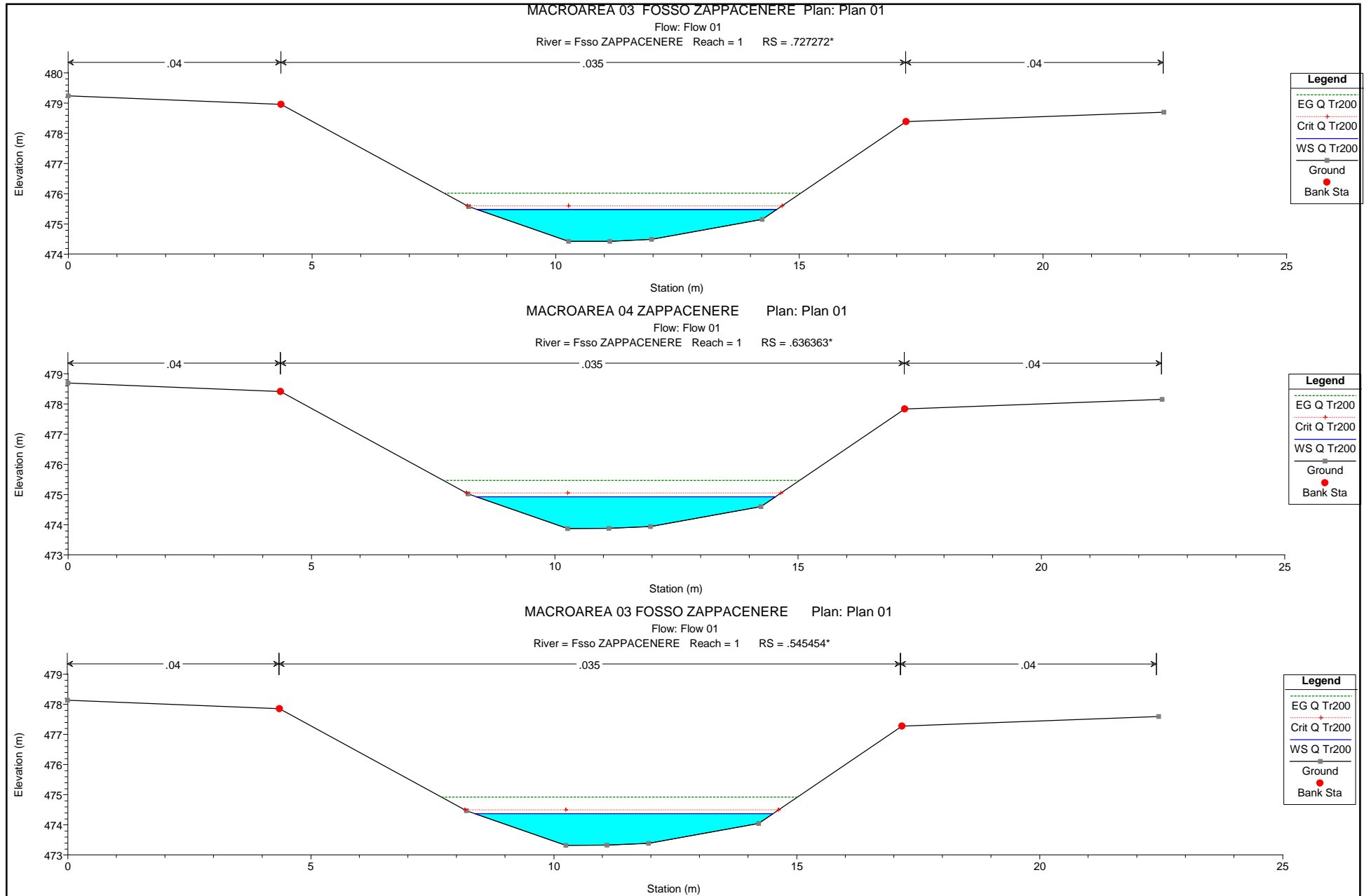


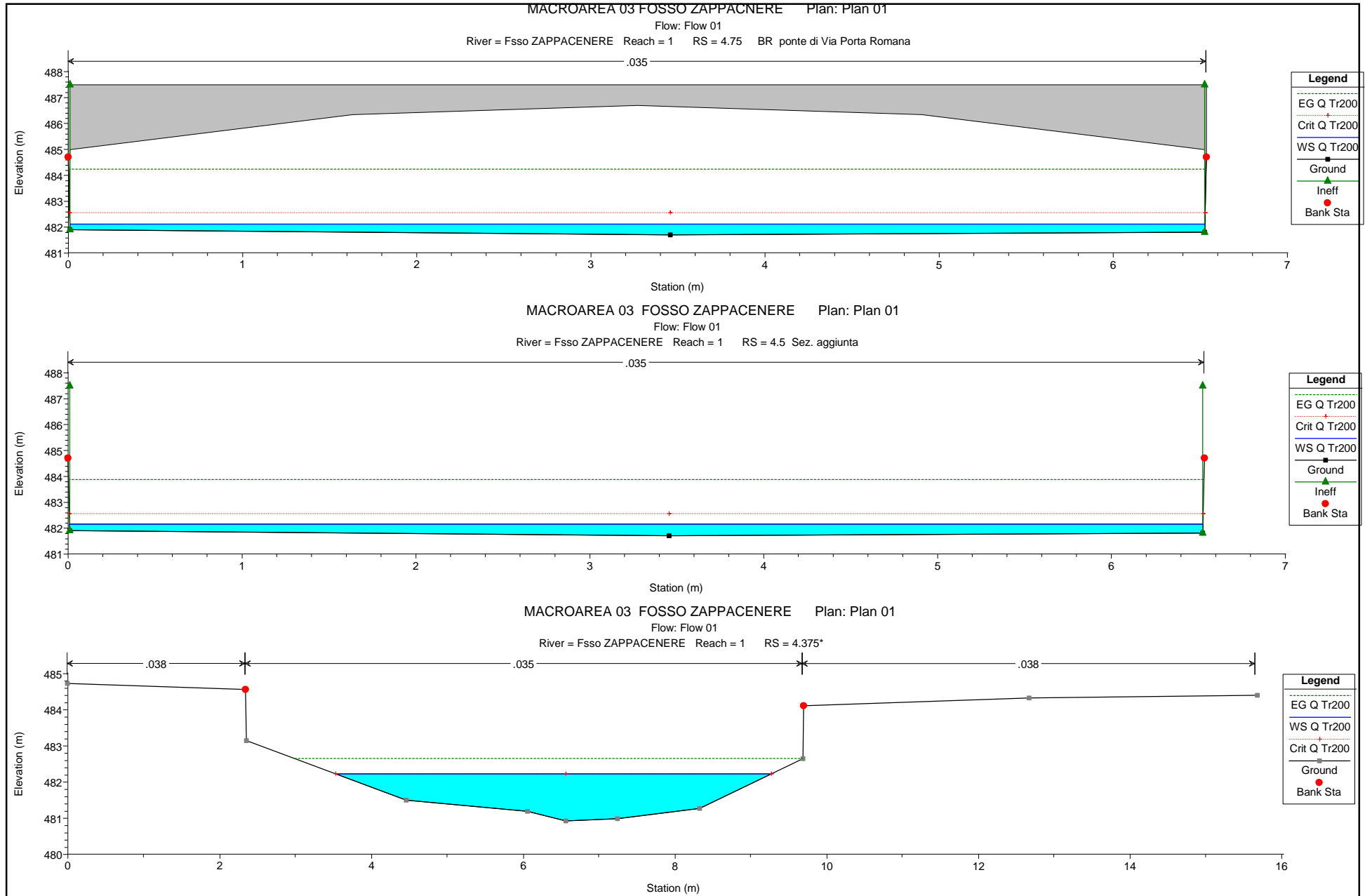
MACROAREA 03 - Fosso ZAPPACENERE

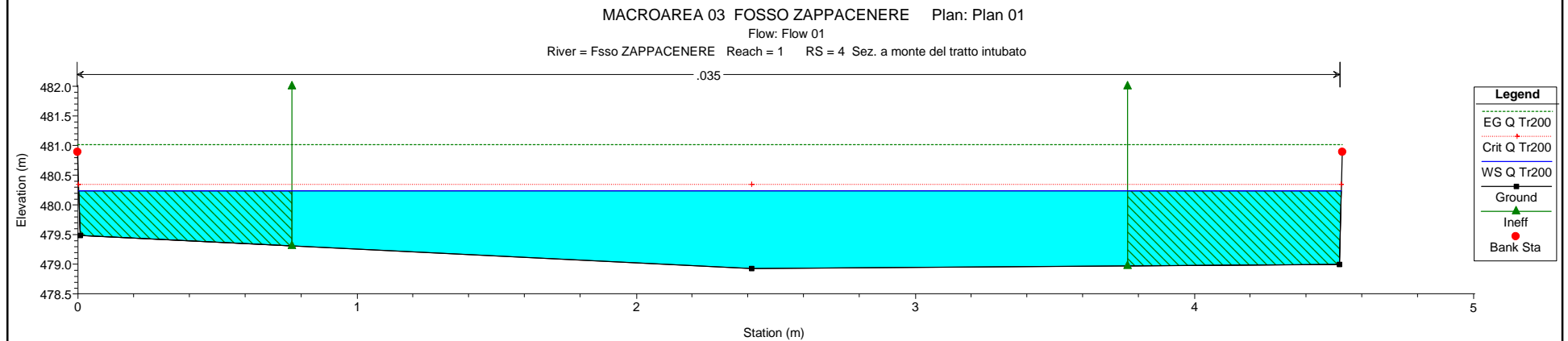
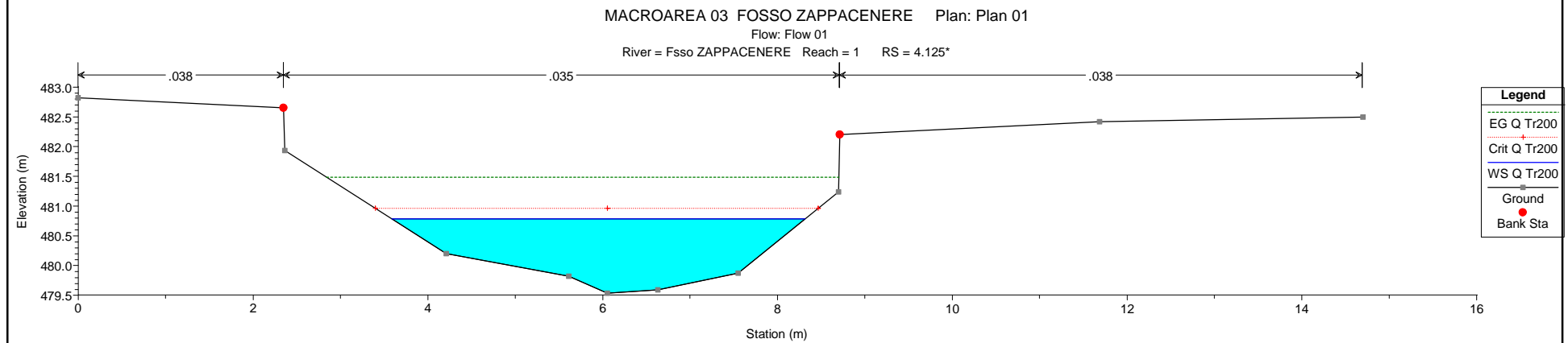
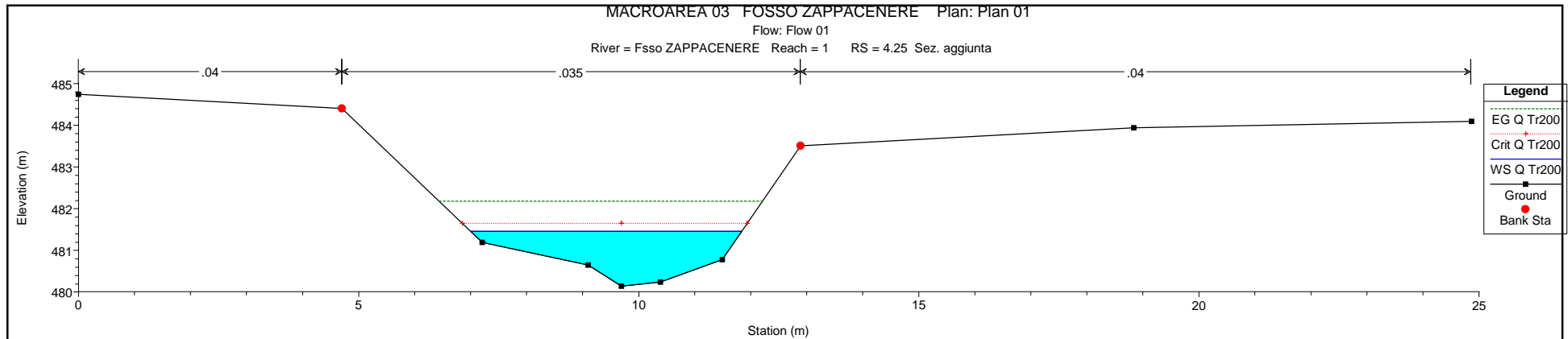


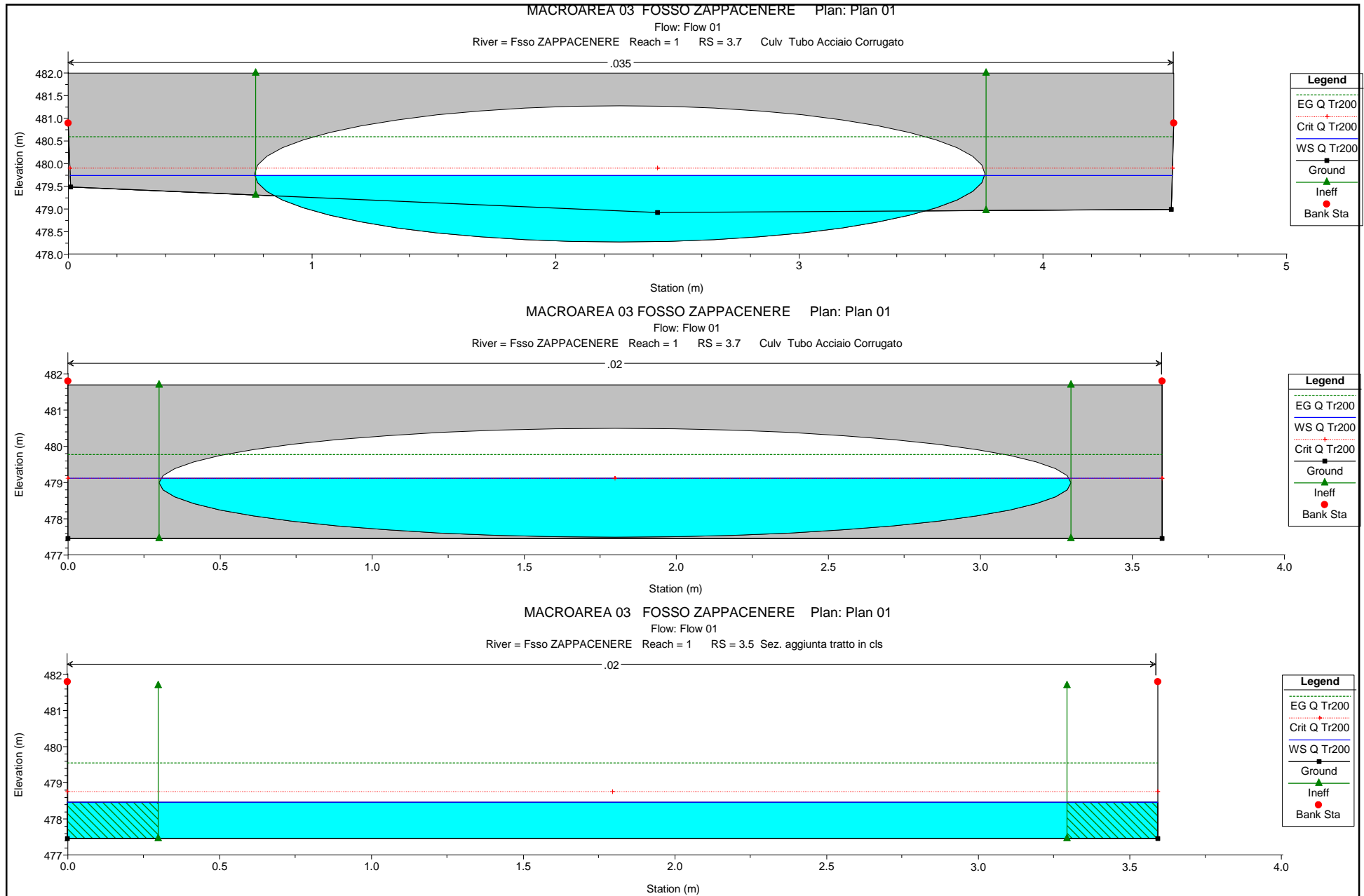
Legend	
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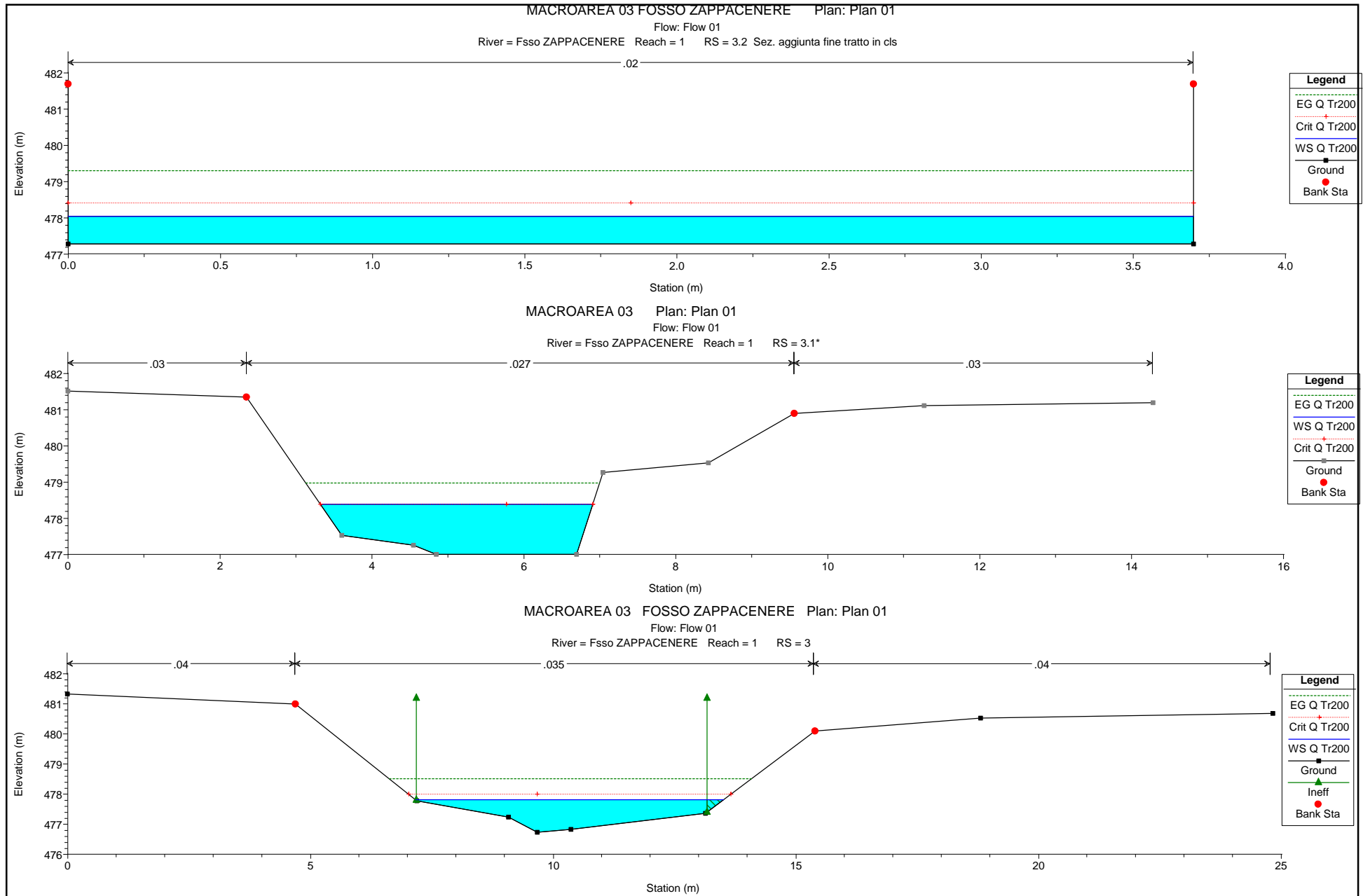


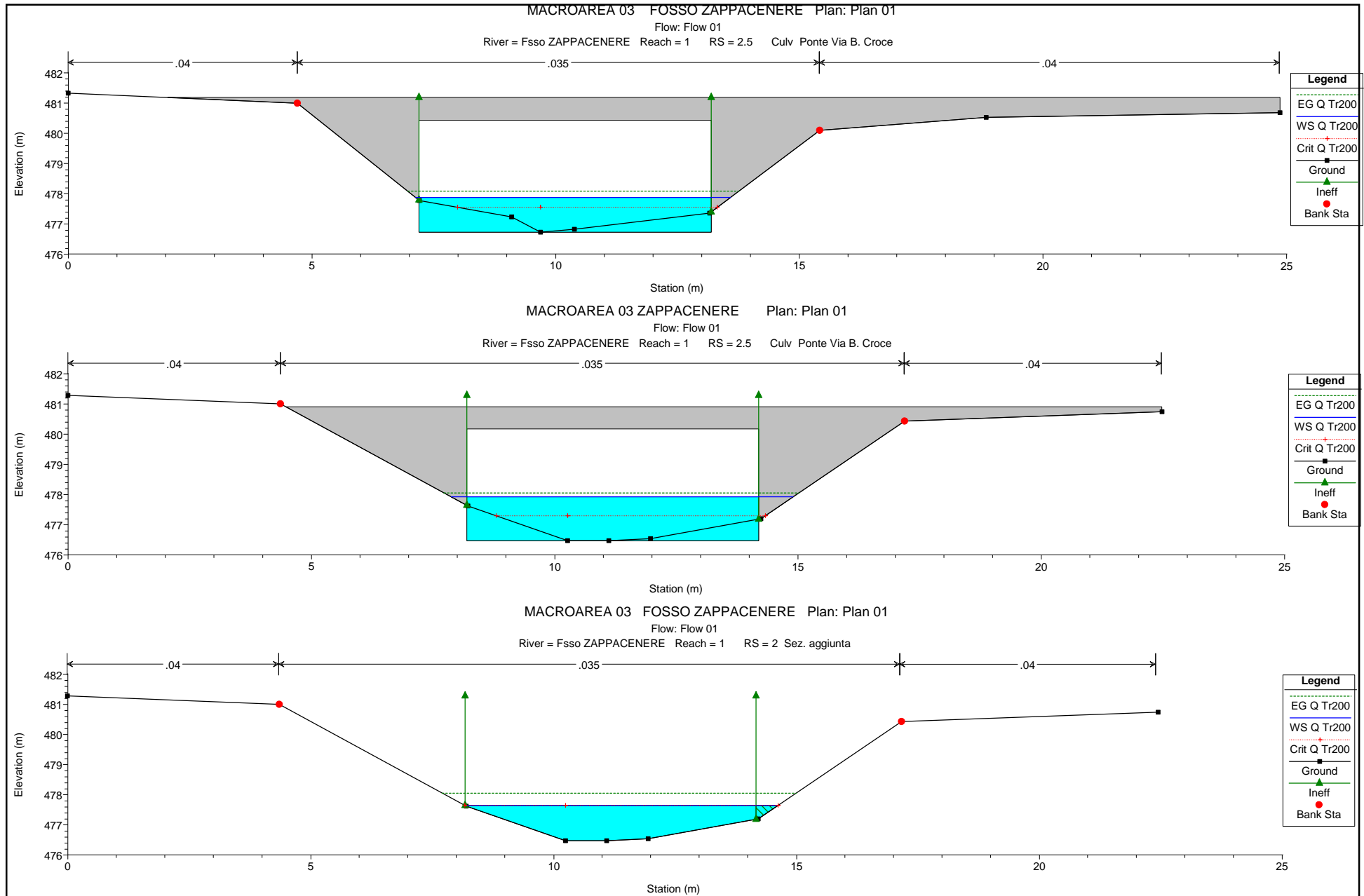


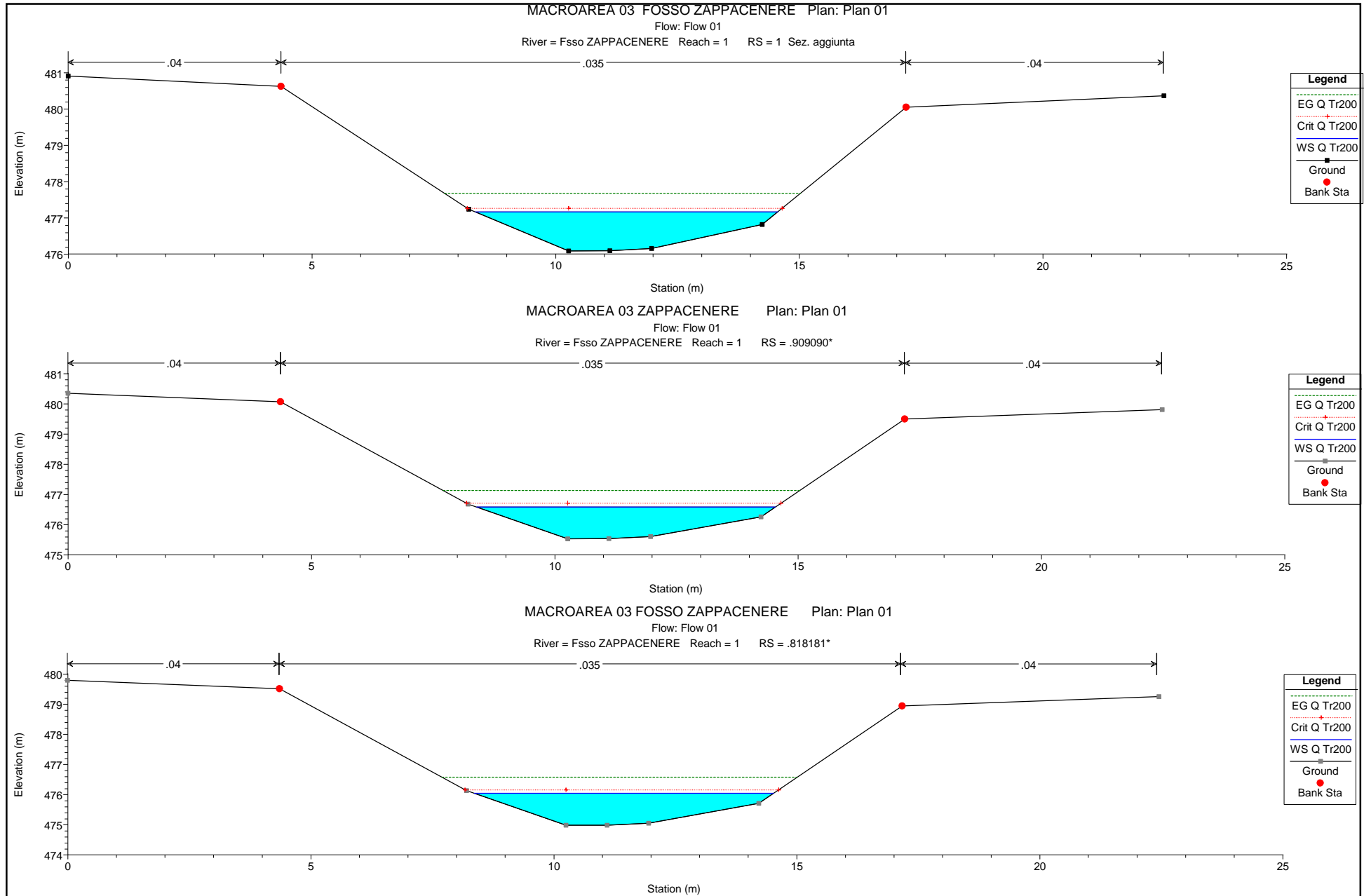


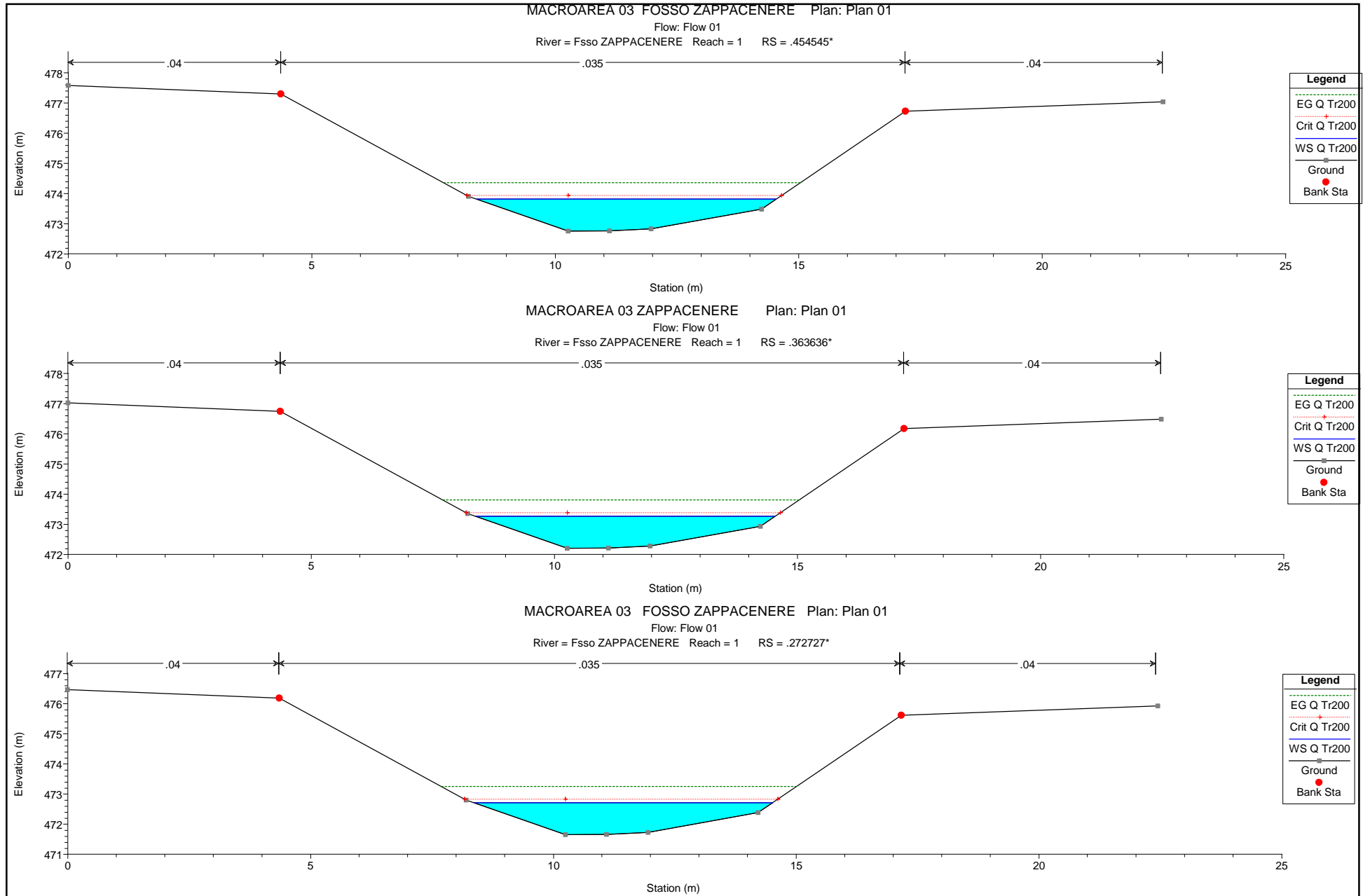


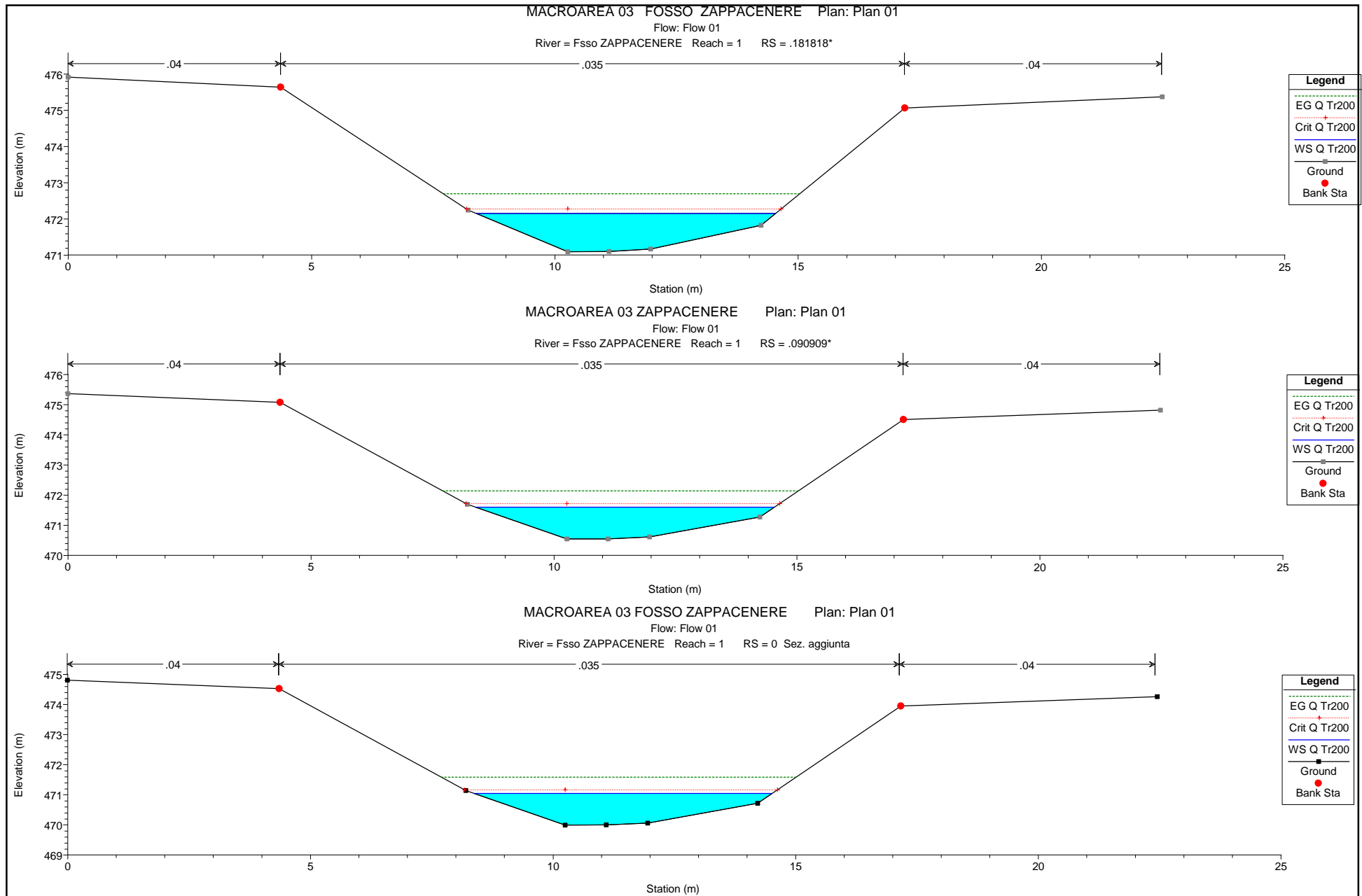












Abbadia50.rep

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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PROJECT DATA

Project Title: MACROAREA 06
Project File : Abbadia50.prj
Run Date and Time: 24/11/2006 16.34.09

Project in SI units

Project Description:

verifica MACROAREA 06 - FOSSO DELL'ABBADIA

FLOW DATA

Flow Title: Tr50
Flow File : n:\2006\06033\Integrazione\HEC_ABBADIA\HEC_Tr50\Abbadia50.f01

Flow Data (m3/s)

* River Reach RS * Q Tr50 *
* F.sso ABBADIA 1 3 * 11.4 *

Boundary Conditions

* River Reach Profile * Upstream
Downstream *

* F.sso ABBADIA 1 Q Tr50 * Critical
Normal S = 0.019 *

GEOMETRY DATA

Geometry Title: MACROAREA 06 - FOSSO DELL'ABBADIA
Geometry File : n:\2006\06033\Integrazione\HEC_ABBADIA\HEC_Tr50\Abbadia50.g01

CROSS SECTION

RIVER: F.sso ABBADIA
REACH: 1 RS: 3

INPUT

Description:

Station Elevation Data num= 9
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 444.83 16.52 442.94 32.12 440.96 40.86 439.75 42.66 439.17
43.5 438.96 44.59 439.22 48.04 440.41 56.28 443.03

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val

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 0 .04 40.86 .035 48.04 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 40.86 48.04 28.125 28.125 28.125 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 440.43 * Element * Left OB * Channel * Right OB
 * Vel Head (m) * 0.29 * wt. n-Val. * 0.040 * 0.035 *
 * W.S. Elev (m) * 440.13 * Reach Len. (m) * 28.13 * 28.13 * 28.13
 * Crit W.S. (m) * 440.13 * Flow Area (m2) * 0.53 * 4.45 *
 * E.G. Slope (m/m) *0.012644 * Area (m2) * 0.53 * 4.45 *
 * Q Total (m3/s) * 11.40 * Flow (m3/s) * 0.49 * 10.91 *
 * Top width (m) * 9.14 * Top width (m) * 2.76 * 6.38 *
 * Vel Total (m/s) * 2.29 * Avg. Vel. (m/s) * 0.93 * 2.45 *
 * Max Chl Dpth (m) * 1.17 * Hydr. Depth (m) * 0.19 * 0.70 *
 * Conv. Total (m3/s) * 101.4 * Conv. (m3/s) * 4.4 * 97.0 *
 * Length Wtd. (m) * 28.13 * wetted Per. (m) * 2.79 * 6.68 *
 * Min Ch El (m) * 438.96 * Shear (N/m2) * 23.49 * 82.65 *
 * Alpha * 1.10 * Stream Power (N/m s) * 21.78 * 202.64 *
 * Frctn Loss (m) * 0.36 * Cum Volume (1000 m3) * 0.02 * 1.94 * 0.00
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.13 * 3.80 * 0.03

 **

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: F.SSO ABBADIA
 REACH: 1 RS: 2.875*

INPUT

Description:

Station Elevation Data num= 16
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 444.158 16.452 442.589 19.842 442.228 23.147 441.78 27.183 441.135
 31.988 440.276 32.538 440.172 40.693 438.846 42.811 438.223 42.85 438.214
 43.8 437.956 44.812 438.186 46.223 438.649 48.014 439.44 51.719 441.07
 57.37 442.571

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 40.693 .035 48.014 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 40.693 48.014 28.125 28.125 28.125 .1 .3

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CROSS SECTION OUTPUT Profile #Q Tr50

```
*****
**
* E.G. Elev (m)      * 439.70 * Element          * Left OB * Channel * Right OB
* vel Head (m)      * 0.86  * wt. n-Val.      *          * 0.035 *
* W.S. Elev (m)     * 438.83 * Reach Len. (m)  * 28.13  * 28.13  * 28.13
* Crit W.S. (m)     * 439.11 * Flow Area (m2)  *          * 2.77  *
* E.G. Slope (m/m)  *0.060567 * Area (m2)       *          * 2.77  *
* Q Total (m3/s)    * 11.40 * Flow (m3/s)     *          * 11.40 *
* Top width (m)     * 5.91  * Top width (m)   *          * 5.91  *
* vel Total (m/s)   * 4.12  * Avg. vel. (m/s) *          * 4.12  *
* Max Chl Dpth (m) * 0.88  * Hydr. Depth (m) *          * 0.47  *
* Conv. Total (m3/s) * 46.3  * Conv. (m3/s)    *          * 46.3  *
* Length wtd. (m)  * 28.13 * Wetted Per. (m) *          * 6.17  *
* Min Ch El (m)    * 437.96 * Shear (N/m2)    *          * 266.39 *
* Alpha            * 1.00  * Stream Power (N/m s) *          * 1097.55 *
* Frctn Loss (m)   * 0.67  * Cum Volume (1000 m3) * 0.01 * 1.84 * 0.00
* C & E Loss (m)   * 0.06  * Cum SA (1000 m2) * 0.09 * 3.62 * 0.03
*****
**
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.sso ABBADIA
 REACH: 1 RS: 2.75*

INPUT

Description:

Station Elevation Data		num= 16	
Sta	Elev	Sta	Elev
0	443.485	16.385	442.237
31.857	439.591	32.404	439.46
44.1	436.952	45.033	437.153
58.46	442.112		

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.04	40.525	.035
		47.988	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	40.525	47.988		28.125	28.125		.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

```
*****
**
* E.G. Elev (m)      * 438.47 * Element          * Left OB * Channel * Right OB
* vel Head (m)      * 0.50  * wt. n-Val.      * 0.040  * 0.035 *
*****
```

Abbadia50.rep

```

*
* W.S. Elev (m)      * 437.97 * Reach Len. (m)    * 28.13 * 28.13 * 28.13
* Crit w.S. (m)     * 438.09 * Flow Area (m2)    * 0.00 * 3.63 *
* E.G. Slope (m/m)  *0.028223 * Area (m2)         * 0.00 * 3.63 *
* Q Total (m3/s)    * 11.40 * Flow (m3/s)       * 0.00 * 11.40 *
* Top width (m)     * 6.67 * Top width (m)     * 0.12 * 6.55 *
* Vel Total (m/s)   * 3.14 * Avg. Vel. (m/s)   * 0.21 * 3.14 *
* Max Chl Dpth (m) * 1.01 * Hydr. Depth (m)   * 0.01 * 0.55 *
* Conv. Total (m3/s) * 67.9 * Conv. (m3/s)      * 0.0 * 67.9 *
* Length Wtd. (m)  * 28.13 * Wetted Per. (m)   * 0.12 * 6.88 *
* Min Ch El (m)    * 436.95 * Shear (N/m2)      * 3.00 * 146.25 *
* Alpha            * 1.00 * Stream Power (N/m s) * 0.62 * 458.83 *
* Frctn Loss (m)   * 1.12 * Cum Volume (1000 m3) * 0.01 * 1.75 * 0.00
* C & E Loss (m)   * 0.11 * Cum SA (1000 m2)  * 0.09 * 3.45 * 0.03
*
*****
**

```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.SSO ABBADIA
 REACH: 1 RS: 2.625*

INPUT

Description:

Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	442.812	16.317	441.886	19.678	441.669	22.956	441.165	26.959	440.259
31.725	438.907	32.27	438.749	40.358	437.039	43.114	436.33	43.164	436.319
44.4	435.949	45.255	436.119	46.448	436.458	47.961	437.5	52.551	440.316
59.55	441.654								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	40.358	.035	47.961	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	40.358	47.961		28.125	28.125	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)      * 437.53 * Element           * Left OB * Channel * Right OB
* Vel Head (m)      * 0.63 * wt. n-Val.       *         * 0.035 *
* W.S. Elev (m)     * 436.90 * Reach Len. (m)   * 28.13 * 28.13 * 28.13
* Crit w.S. (m)     * 437.10 * Flow Area (m2)   *         * 3.24 *
* E.G. Slope (m/m)  *0.038533 * Area (m2)        *         * 3.24 *
*

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* Q Total (m3/s)      * 11.40 * Flow (m3/s)      *      * 11.40 *
* Top width (m)      * 6.21 * Top width (m)    *      * 6.21 *
* Vel Total (m/s)    * 3.51 * Avg. Vel. (m/s)  *      * 3.51 *
* Max Chl Dpth (m)  * 0.96 * Hydr. Depth (m)  *      * 0.52 *
* Conv. Total (m3/s) * 58.1 * Conv. (m3/s)     *      * 58.1 *
* Length wtd. (m)   * 28.13 * wetted Per. (m)  *      * 6.55 *
* Min Ch El (m)     * 435.95 * Shear (N/m2)     *      * 187.34 *
* Alpha              * 1.00 * Stream Power (N/m s) *      * 658.17 *
* Frctn Loss (m)    * 0.92 * Cum Volume (1000 m3) * 0.01 * 1.65 * 0.00
* C & E Loss (m)    * 0.01 * Cum SA (1000 m2)  * 0.09 * 3.27 * 0.03
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.sso ABBADIA
 REACH: 1 RS: 2.5*

INPUT

Description:

Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	442.14	16.249	441.535	19.597	441.389	22.861	440.858	26.848	439.821		
31.593	438.223	32.136	438.037	40.19	436.135	43.265	435.383	43.322	435.371		
44.7	434.945	45.477	435.085	46.561	435.362	47.935	436.53	52.967	439.939		
60.64	441.195										

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	40.19	.035	47.935	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	40.19	47.935		28.125	28.125	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)      * 436.51 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 0.57 * wt. n-Val.      *      * 0.035 *
* W.S. Elev (m)     * 435.93 * Reach Len. (m)  * 28.13 * 28.13 * 28.13
* Crit W.S. (m)     * 436.10 * Flow Area (m2)  *      * 3.40 *
* E.G. Slope (m/m)  *0.033454 * Area (m2)       *      * 3.40 *
* Q Total (m3/s)    * 11.40 * Flow (m3/s)     *      * 11.40 *
* Top width (m)     * 6.22 * Top width (m)   *      * 6.22 *
* Vel Total (m/s)   * 3.35 * Avg. vel. (m/s) *      * 3.35 *
* Max Chl Dpth (m) * 0.99 * Hydr. Depth (m) *      * 0.55 *
* Conv. Total (m3/s) * 62.3 * Conv. (m3/s)    *      * 62.3 *
* Length wtd. (m)  * 28.13 * wetted Per. (m) *      * 6.61 *
* Min Ch El (m)    * 434.95 * Shear (N/m2)    *      * 168.65 *
*

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* Alpha * 1.00 * Stream Power (N/m s) * 565.58 *
* Frctn Loss (m) * 1.01 * Cum Volume (1000 m3) * 0.01 * 1.56 * 0.00
* C & E Loss (m) * 0.02 * Cum SA (1000 m2) * 0.09 * 3.09 * 0.03
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.sso ABBADIA
 REACH: 1 RS: 2.375*

INPUT

Description:

Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	441.467	16.181	441.184	19.515	441.109	22.766	440.551	26.736	439.383
31.462	437.538	32.002	437.325	40.022	435.231	43.416	434.437	43.479	434.423
45	433.941	45.698	434.052	46.673	434.267	47.909	435.56	53.383	439.562
61.73	440.736								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	40.022	.035	47.909	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	40.022	47.909		28.125	28.125		.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m) * 435.54 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.60 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 434.93 * Reach Len. (m) * 28.13 * 28.13 * 28.13
* Crit W.S. (m) * 435.11 * Flow Area (m2) * * 3.31 *
* E.G. slope (m/m) *0.035429 * Area (m2) * * 3.31 *
* Q Total (m3/s) * 11.40 * Flow (m3/s) * * 11.40 *
* Top width (m) * 6.00 * Top width (m) * * 6.00 *
* vel Total (m/s) * 3.45 * Avg. vel. (m/s) * * 3.45 *
* Max chl Dpth (m) * 0.99 * Hydr. Depth (m) * * 0.55 *
* Conv. Total (m3/s) * 60.6 * Conv. (m3/s) * * 60.6 *
* Length wtd. (m) * 28.13 * wetted Per. (m) * * 6.45 *
* Min ch El (m) * 433.94 * Shear (N/m2) * * 178.14 *
* Alpha * 1.00 * Stream Power (N/m s) * * 613.70 *
* Frctn Loss (m) * 0.97 * Cum Volume (1000 m3) * 0.01 * 1.46 * 0.00
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.09 * 2.92 * 0.03
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

Abbadia50.rep

RIVER: F.Sso ABBADIA
 REACH: 1 RS: 2.25*

INPUT

Description:

Station Elevation Data		num=		16							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	440.795	16.114	440.832	19.433	440.829	22.671	440.244	26.624	438.946		
31.33	436.854	31.868	436.613	39.855	434.327	43.567	433.49	43.636	433.475		
45.3	432.938	45.92	433.018	46.785	433.171	47.882	434.59	53.798	439.184		
62.82	440.277										

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	39.855	.035	47.882	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	39.855	47.882		28.125	28.125	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

* E.G. Elev (m)	* 434.55	* Element	* Left OB	* Channel	* Right OB	
* vel Head (m)	* 0.60	* wt. n-Val.	* 0.035			
* W.S. Elev (m)	* 433.95	* Reach Len. (m)	* 28.13	* 28.13	* 28.13	
* Crit W.S. (m)	* 434.13	* Flow Area (m2)	* 3.32			
* E.G. Slope (m/m)	* 0.034664	* Area (m2)	* 3.32			
* Q Total (m3/s)	* 11.40	* Flow (m3/s)	* 11.40			
* Top width (m)	* 5.86	* Top width (m)	* 5.86			
* vel Total (m/s)	* 3.43	* Avg. vel. (m/s)	* 3.43			
* Max chl Dpth (m)	* 1.01	* Hydr. Depth (m)	* 0.57			
* Conv. Total (m3/s)	* 61.2	* Conv. (m3/s)	* 61.2			
* Length wtd. (m)	* 28.13	* wetted Per. (m)	* 6.40			
* Min ch El (m)	* 432.94	* Shear (N/m2)	* 176.27			
* Alpha	* 1.00	* Stream Power (N/m s)	* 605.20			
* Frctn Loss (m)	* 0.99	* Cum volume (1000 m3)	* 0.01	* 1.37	* 0.00	
* C & E Loss (m)	* 0.00	* Cum SA (1000 m2)	* 0.09	* 2.76	* 0.03	

**						

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.Sso ABBADIA
 REACH: 1 RS: 2.125*

INPUT

Description:

Station Elevation Data		num=		16							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	440.122	16.046	440.481	19.352	440.55	22.575	439.937	26.512	438.508		
31.198	436.17	31.734	435.902	39.688	433.424	43.719	432.544	43.793	432.528		
45.6	431.934	46.142	431.984	46.898	432.076	47.856	433.62	54.214	438.807		
63.91	439.819										

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Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 39.688 .035 47.856 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 39.688 47.856 28.125 28.125 28.125 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 433.58 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.60 * wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 432.97 * Reach Len. (m) * 28.13 * 28.13 * 28.13
 * Crit W.S. (m) * 433.15 * Flow Area (m2) * * 3.31 *
 * E.G. slope (m/m) *0.034662 * Area (m2) * * 3.31 *
 * Q Total (m3/s) * 11.40 * Flow (m3/s) * * 11.40 *
 * Top width (m) * 5.70 * Top width (m) * * 5.70 *
 * vel Total (m/s) * 3.44 * Avg. vel. (m/s) * * 3.44 *
 * Max chl Dpth (m) * 1.04 * Hydr. Depth (m) * * 0.58 *
 * Conv. Total (m3/s) * 61.2 * Conv. (m3/s) * * 61.2 *
 * Length wtd. (m) * 28.13 * wetted Per. (m) * * 6.35 *
 * Min Ch El (m) * 431.93 * Shear (N/m2) * * 177.08 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 609.87 *
 * Frctn Loss (m) * 0.97 * Cum volume (1000 m3) * 0.01 * 1.28 * 0.00
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.09 * 2.59 * 0.03
 *

 **

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.SSO ABBADIA
 REACH: 1 RS: 2

INPUT

Description:

Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 439.45 19.27 440.27 22.48 439.63 26.4 438.07 31.6 435.19
 39.52 432.52 43.95 431.58 45.9 430.93 47.01 430.98 47.83 432.65
 54.63 438.43 65 439.36

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 39.52 .035 47.83 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 39.52 47.83 22 22 22 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 432.61 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.60 * wt. n-Val. * * 0.035 *

Abbadia50.rep

```

*
* W.S. Elev (m)      * 432.01 * Reach Len. (m)    * 22.00 * 22.00 * 22.00
* Crit w.s. (m)     * 432.19 * Flow Area (m2)    *      * 3.32 *
* E.G. Slope (m/m)  *0.034449 * Area (m2)        *      * 3.32 *
* Q Total (m3/s)    * 11.40 * Flow (m3/s)       *      * 11.40 *
* Top width (m)     * 5.57 * Top width (m)     *      * 5.57 *
* Vel Total (m/s)   * 3.44 * Avg. Vel. (m/s)   *      * 3.44 *
* Max Chl Dpth (m) * 1.08 * Hydr. Depth (m)   *      * 0.60 *
* Conv. Total (m3/s) * 61.4 * Conv. (m3/s)      *      * 61.4 *
* Length wtd. (m)  * 22.00 * wetted Per. (m)   *      * 6.36 *
* Min Ch El (m)    * 430.93 * Shear (N/m2)     *      * 176.17 *
* Alpha            * 1.00 * Stream Power (N/m s) *      * 605.27 *
* Frctn Loss (m)   * 0.97 * Cum Volume (1000 m3) * 0.01 * 1.18 * 0.00
* C & E Loss (m)   * 0.00 * Cum SA (1000 m2)  * 0.09 * 2.43 * 0.03
*
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.sso ABBADIA
 REACH: 1 RS: 1.8

INPUT

Description: Sez. aggiunta

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	439.03	19.27	439.85	22.48	439.21	26.4	437.65	31.6	434.77
39.52	432.1	43.95	431.16	45.9	430.51	47.01	430.56	47.83	432.23
54.63	438.01	65	438.94						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	39.52	.035	47.83	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 39.52 47.83 13 13 13 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	43.19	440	T
48.65	65	440	T

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)      * 432.26 * Element           * Left OB * Channel * Right OB
* vel Head (m)      * 0.27 * wt. n-Val.        *      * 0.035 *
* W.S. Elev (m)     * 431.99 * Reach Len. (m)    * 2.00 * 2.00 * 2.00
* Crit w.s. (m)     * 431.75 * Flow Area (m2)    *      * 4.92 *
* E.G. Slope (m/m)  *0.007668 * Area (m2)        *      * 5.97 *
* Q Total (m3/s)    * 11.40 * Flow (m3/s)       *      * 11.40 *
* Top width (m)     * 7.66 * Top width (m)     *      * 7.66 *
*

```

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Abbadia50.rep
* Vel Total (m/s)      * 2.31 * Avg. Vel. (m/s)      * 2.31 *
* Max Chl Dpth (m)    * 1.48 * Hydr. Depth (m)      * 1.09 *
* Conv. Total (m3/s)  * 130.2 * Conv. (m3/s)        * 130.2 *
* Length wtd. (m)     * 2.00 * wetted Per. (m)     * 5.53 *
* Min Ch El (m)       * 430.51 * Shear (N/m2)        * 66.92 *
* Alpha               * 1.00 * Stream Power (N/m s) * 154.92 *
* Frctn Loss (m)      * 0.02 * Cum Volume (1000 m3) * 0.01 * 1.08 * 0.00
* C & E Loss (m)      * 0.05 * Cum SA (1000 m2)    * 0.09 * 2.29 * 0.03
*****
**

```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

BRIDGE

RIVER: F.sso ABBADIA
 REACH: 1 RS: 1.7

INPUT

Description: Ponte S.R. 219
 Distance from Upstream XS = 2
 Deck/Roadway width = 9
 Weir Coefficient = 1.44
 Upstream Deck/Roadway Coordinates

num= 9									
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	440	430	43.19	440	430	43.19	440	436.4	
44.43	440	438.55	45.67	440	438.88	46.91	440	438.55	
48.65	440	436.4	48.65	440	430	65	440	430	

Upstream Bridge Cross Section Data

Station Elevation Data num= 12									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	439.03	19.27	439.85	22.48	439.21	26.4	437.65	31.6	434.77
39.52	432.1	43.95	431.16	45.9	430.51	47.01	430.56	47.83	432.23
54.63	438.01	65	438.94						

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	39.52	.035	47.83	.04

Bank Sta: Left Right Coeff Contr. Expan.
 39.52 47.83 .3 .5

Ineffective Flow

num= 2			
Sta L	Sta R	Elev	Permanent
0	43.19	440	T
48.65	65	440	T

Downstream Deck/Roadway Coordinates

num= 9									
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	440	430	43.19	440	430	43.19	440	436.4	
44.43	440	438.55	45.67	440	438.88	46.91	440	438.55	
48.65	440	436.4	48.65	440	430	65	440	430	

Downstream Bridge Cross Section Data

Station Elevation Data num= 12

Abbadia50.rep

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	438.78	19.27	439.6	22.48	438.96	26.4	437.4	31.6	434.52
39.52	431.85	43.95	430.91	45.9	430.26	47.01	430.31	47.83	431.98
54.63	437.76	65	438.69						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .04 39.52 .035 47.83 .04

Bank Sta: Left Right Coeff Contr. Expan.
 39.52 47.83 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 43.19 440 T
 48.65 65 440 T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
 Energy
 Selected Low Flow Methods = Energy

High Flow Method
 Pressure and Weir flow
 Submerged Inlet Cd =
 Submerged Inlet + Outlet Cd = .8
 Max Low Cord =

Additional Bridge Parameters
 Add Friction component to Momentum
 Do not add weight component to Momentum
 Class B flow critical depth computations use critical depth
 inside the bridge at the upstream end
 Criteria to check for pressure flow = Upstream water surface

BRIDGE OUTPUT Profile #Q Tr50

*****		*****		*****		*****	
* E.G. US. (m)	*	432.26	*	Element	*Inside BR US	*Inside BR DS	*
* W.S. US. (m)	*	431.99	*	E.G. Elev (m)	* 432.19	* 432.02	*
* Q Total (m3/s)	*	11.40	*	w.s. Elev (m)	* 431.76	* 431.75	*
* Q Bridge (m3/s)	*	11.40	*	Crit W.S. (m)	* 431.75	* 431.50	*
* Q Weir (m3/s)	*		*	Max Chl Dpth (m)	* 1.25	* 1.49	*
* Weir Sta Lft (m)	*		*	Vel Total (m/s)	* 2.90	* 2.28	*
* Weir Sta Rgt (m)	*		*	Flow Area (m2)	* 3.92	* 5.00	*
* Weir Submerg	*		*	Froude # Ch1	* 0.98	* 0.69	*
* Weir Max Depth (m)	*		*	Specif Force (m3)	* 5.33	* 5.68	*
* Min El Weir Flow (m)	*	440.00	*	Hydr Depth (m)	* 0.89	* 1.10	*
* Min El Prs (m)	*	438.88	*	w.P. Total (m)	* 5.28	* 5.55	*
* Delta EG (m)	*	0.32	*	Conv. Total (m3/s)	* 92.0	* 133.0	*
* Delta WS (m)	*	0.49	*	Top width (m)	* 4.41	* 4.53	*
* BR Open Area (m2)	*	37.47	*	Frctn Loss (m)	* 0.09	* 0.02	*
* BR Open Vel (m/s)	*	2.90	*	C & E Loss (m)	* 0.08	* 0.05	*
* Coef of Q	*		*	Shear Total (N/m2)	* 111.91	* 64.80	*
* Br Sel Method	*	*Energy only	*	Power Total (N/m s)	* 325.06	* 147.89	*

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than

0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.sso ABBADIA
 REACH: 1 RS: 1.5

INPUT

Description: Sez. aggiunta

Station Elevation Data		num= 12									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	438.78	19.27	439.6	22.48	438.96	26.4	437.4	31.6	434.52		
39.52	431.85	43.95	430.91	45.9	430.26	47.01	430.31	47.83	431.98		
54.63	437.76	65	438.69								

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	39.52	.035	47.83	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	39.52	47.83		28.5	28.5	.3	.5
Ineffective Flow			num= 2				
Sta L	Sta R	Elev	Permanent				
0	43.19	440	T				
48.65	65	440	T				

CROSS SECTION OUTPUT Profile #Q Tr50

* E.G. Elev (m)	* 431.94	* Element	* Left OB	* Channel	* Right OB
* Vel Head (m)	* 0.44	* wt. n-Val.	* 0.035		
* W.S. Elev (m)	* 431.50	* Reach Len. (m)	* 28.50	* 28.50	* 28.50
* Crit W.S. (m)	* 431.50	* Flow Area (m2)	* 3.86		
* E.G. Slope (m/m)	* 0.016208	* Area (m2)	* 4.29		
* Q Total (m3/s)	* 11.40	* Flow (m3/s)	* 11.40		
* Top width (m)	* 6.41	* Top width (m)	* 6.41		
* Vel Total (m/s)	* 2.96	* Avg. Vel. (m/s)	* 2.96		
* Max Chl Dpth (m)	* 1.24	* Hydr. Depth (m)	* 0.88		
* Conv. Total (m3/s)	* 89.5	* Conv. (m3/s)	* 89.5		
* Length Wtd. (m)	* 28.50	* Wetted Per. (m)	* 5.27		
* Min Ch El (m)	* 430.26	* Shear (N/m2)	* 116.40		
* Alpha	* 1.00	* Stream Power (N/m s)	* 344.02		
* Frctn Loss (m)	* 0.45	* Cum Volume (1000 m3)	* 0.01	* 1.02	* 0.00
* C & E Loss (m)	* 0.06	* Cum SA (1000 m2)	* 0.09	* 2.23	* 0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

Abbadia50.rep

CROSS SECTION

RIVER: F.SSO ABBADIA
 REACH: 1 RS: 1.4375*

INPUT

Description:

Station Elevation Data		num= 16	
Sta	Elev	Sta	Elev
0	437.854	18.688	438.131
30.645	433.539	34.49	432.326
44.533	429.723	44.805	429.738
64.281	437.306		

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.04	38.326	.035
		47.413	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	38.326	47.413		28.5	28.5	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

**	E.G. Elev (m)	* 431.23	* Element	* Left OB	* Channel	* Right OB
**	vel Head (m)	* 0.61	* wt. n-Val.	* 0.035	*	*
**	w.s. Elev (m)	* 430.63	* Reach Len. (m)	* 28.50	* 28.50	* 28.50
**	Crit w.s. (m)	* 430.81	* Flow Area (m2)	* 3.30	*	*
**	E.G. slope (m/m)	*0.035798	* Area (m2)	* 3.30	*	*
**	Q Total (m3/s)	* 11.40	* Flow (m3/s)	* 11.40	*	*
**	Top width (m)	* 5.98	* Top width (m)	* 5.98	*	*
**	vel Total (m/s)	* 3.45	* Avg. vel. (m/s)	* 3.45	*	*
**	Max chl Dpth (m)	* 0.92	* Hydr. Depth (m)	* 0.55	*	*
**	Conv. Total (m3/s)	* 60.3	* Conv. (m3/s)	* 60.3	*	*
**	Length wtd. (m)	* 28.50	* wetted Per. (m)	* 6.48	*	*
**	Min ch El (m)	* 429.71	* Shear (N/m2)	* 179.01	*	*
**	Alpha	* 1.00	* Stream Power (N/m s)	* 617.65	*	*
**	Frctn Loss (m)	* 0.66	* Cum volume (1000 m3)	* 0.01	* 0.92	* 0.00
**	C & E Loss (m)	* 0.05	* Cum SA (1000 m2)	* 0.09	* 2.05	* 0.03
**	*****					
**	*****					

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.SSO ABBADIA
 REACH: 1 RS: 1.375*

Abbadia50.rep

INPUT

Description:

Station Elevation Data		num= 16		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	436.927	18.106	436.662	19.08	436.46	21.122	436.087	24.805	434.831
29.691	432.557	33.416	431.468	37.132	430.458	40.941	429.681	42.618	429.163
42.998	429.178	43.376	429.201	45.135	429.266	46.995	430.56	53.556	435.026
63.562	435.922								

Manning's n Values

num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	37.132	.035	46.995	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	37.132	46.995		28.5	28.5	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

* E.G. Elev (m)	* 430.46	* Element	* Left OB	* Channel	* Right OB
* Vel Head (m)	* 0.34	* wt. n-Val.	* 0.035		
* W.S. Elev (m)	* 430.12	* Reach Len. (m)	* 28.50	* 28.50	* 28.50
* Crit W.S. (m)	* 430.15	* Flow Area (m2)	* 4.41		
* E.G. Slope (m/m)	* 0.017890	* Area (m2)	* 4.41		
* Q Total (m3/s)	* 11.40	* Flow (m3/s)	* 11.40		
* Top width (m)	* 7.55	* Top width (m)	* 7.55		
* Vel Total (m/s)	* 2.58	* Avg. Vel. (m/s)	* 2.58		
* Max Chl Dpth (m)	* 0.95	* Hydr. Depth (m)	* 0.58		
* Conv. Total (m3/s)	* 85.2	* Conv. (m3/s)	* 85.2		
* Length wtd. (m)	* 28.50	* wetted Per. (m)	* 7.94		
* Min Ch El (m)	* 429.16	* Shear (N/m2)	* 97.48		
* Alpha	* 1.00	* Stream Power (N/m s)	* 251.77		
* Frctn Loss (m)	* 0.70	* Cum Volume (1000 m3)	* 0.01	* 0.81	* 0.00
* C & E Loss (m)	* 0.08	* Cum SA (1000 m2)	* 0.09	* 1.86	* 0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.SSO ABBADIA

REACH: 1 RS: 1.3125*

INPUT

Description:

Station Elevation Data		num= 16		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	436.001	17.524	435.194	18.467	434.993	20.443	434.651	24.008	433.547
28.736	431.576	32.341	430.61	35.939	429.761	39.437	429.067	40.976	428.614
41.464	428.633	41.946	428.664	44.198	428.745	46.578	429.85	53.02	433.659
62.844	434.539								

Manning's n Values

num= 3

Sta n Val Sta n Val Sta n Val

 0 .04 35.939 .035 46.578 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 35.939 46.578 28.5 28.5 28.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 429.83 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.43 * wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 429.40 * Reach Len. (m) * 28.50 * 28.50 * 28.50
 * Crit W.S. (m) * 429.51 * Flow Area (m2) * * 3.95 *
 * E.G. Slope (m/m) *0.026792 * Area (m2) * * 3.95 *
 * Q Total (m3/s) * 11.40 * Flow (m3/s) * * 11.40 *
 * Top width (m) * 7.88 * Top width (m) * * 7.88 *
 * vel Total (m/s) * 2.89 * Avg. vel. (m/s) * * 2.89 *
 * Max Chl Dpth (m) * 0.79 * Hydr. Depth (m) * * 0.50 *
 * Conv. Total (m3/s) * 69.6 * Conv. (m3/s) * * 69.6 *
 * Length wtd. (m) * 28.50 * wetted Per. (m) * * 8.13 *
 * Min Ch El (m) * 428.61 * Shear (N/m2) * * 127.53 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 368.37 *
 * Frctn Loss (m) * 0.62 * Cum Volume (1000 m3) * 0.01 * 0.69 * 0.00
 * C & E Loss (m) * 0.01 * Cum SA (1000 m2) * 0.09 * 1.64 * 0.03

 **

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.SSO ABBADIA
 REACH: 1 RS: 1.25*

INPUT

Description:

Station Elevation Data num= 16
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 435.075 16.942 433.725 17.854 433.527 19.764 433.215 23.21 432.262
 27.782 430.594 31.267 429.752 34.745 429.065 37.932 428.453 39.335 428.065
 39.929 428.089 40.517 428.128 43.26 428.223 46.16 429.14 52.483 432.291
 62.125 433.155

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 34.745 .035 46.16 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 34.745 46.16 28.5 28.5 28.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 429.16 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.30 * wt. n-Val. * * 0.035 *
 *

```

Abbadia50.rep
* W.S. Elev (m) * 428.86 * Reach Len. (m) * 28.50 * 28.50 * 28.50
* Crit W.S. (m) * 428.89 * Flow Area (m2) * * 4.71 *
* E.G. Slope (m/m) *0.018691 * Area (m2) * * 4.71 *
* Q Total (m3/s) * 11.40 * Flow (m3/s) * * 11.40 *
* Top width (m) * 9.47 * Top width (m) * * 9.47 *
* Vel Total (m/s) * 2.42 * Avg. Vel. (m/s) * * 2.42 *
* Max Chl Dpth (m) * 0.80 * Hydr. Depth (m) * * 0.50 *
* Conv. Total (m3/s) * 83.4 * Conv. (m3/s) * * 83.4 *
* Length wtd. (m) * 28.50 * Wetted Per. (m) * * 9.66 *
* Min Ch El (m) * 428.07 * Shear (N/m2) * * 89.36 *
* Alpha * 1.00 * Stream Power (N/m s) * * 216.22 *
* Frctn Loss (m) * 0.63 * Cum Volume (1000 m3) * 0.01 * 0.56 * 0.00
* C & E Loss (m) * 0.04 * Cum SA (1000 m2) * 0.09 * 1.39 * 0.03

```

**

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.sso ABBADIA
REACH: 1 RS: 1.1875*

INPUT

Description:

Station Elevation Data num= 16
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 434.149 16.36 432.256 17.24 432.06 19.085 431.778 22.413 430.978
 26.827 429.613 30.193 428.894 33.551 428.369 36.428 427.838 37.694 427.516
 38.394 427.544 39.088 427.591 42.323 427.701 45.743 428.43 51.946 430.924
 61.406 431.771

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 33.551 .035 45.743 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 33.551 45.743 28.5 28.5 28.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 428.55 * Element * Left OB * Channel * Right OB
 * Vel Head (m) * 0.33 * wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 428.22 * Reach Len. (m) * 28.50 * 28.50 * 28.50
 * Crit W.S. (m) * 428.29 * Flow Area (m2) * * 4.48 *
 * E.G. Slope (m/m) *0.024729 * Area (m2) * * 4.48 *
 * Q Total (m3/s) * 11.40 * Flow (m3/s) * * 11.40 *
 * Top width (m) * 10.37 * Top width (m) * * 10.37 *
 * Vel Total (m/s) * 2.55 * Avg. Vel. (m/s) * * 2.55 *
 * Max Chl Dpth (m) * 0.70 * Hydr. Depth (m) * * 0.43 *
 *


```

Abbadia50.rep
* Conv. Total (m3/s) * 72.5 * Conv. (m3/s) * * 72.5 *
* Length wtd. (m) * 28.50 * wetted Per. (m) * * 10.51 *
* Min Ch El (m) * 427.52 * Shear (N/m2) * * 103.39 *
* Alpha * 1.00 * Stream Power (N/m s) * * 263.13 *
* Frctn Loss (m) * 0.61 * Cum Volume (1000 m3) * 0.01 * 0.43 * 0.00
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.09 * 1.11 * 0.03
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.sso ABBADIA
 REACH: 1 RS: 1.125*

INPUT

Description:

Station		Elevation Data		num= 16		Sta		Elev		Sta		Elev	
0	433.223	15.778	430.787	16.627	430.593	18.406	430.342	21.615	429.694	25.873	428.631	29.119	428.036
36.859	426.999	37.659	427.054	41.385	427.179	45.325	427.72	51.409	429.557				
60.688	430.388												

Manning's n Values		num= 3		Sta		n Val	
0	.04	32.357	.035	45.325	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	32.357	45.325		28.5	28.5	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m) * 427.91 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.24 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 427.67 * Reach Len. (m) * 28.50 * 28.50 * 28.50
* Crit W.S. (m) * 427.69 * Flow Area (m2) * * 5.27 *
* E.G. Slope (m/m) *0.018606 * Area (m2) * 0.00 * 5.27 *
* Q Total (m3/s) * 11.40 * Flow (m3/s) * * 11.40 *
* Top width (m) * 12.64 * Top width (m) * 0.01 * 12.63 *
* vel Total (m/s) * 2.16 * Avg. vel. (m/s) * * 2.16 *
* Max Chl Dpth (m) * 0.71 * Hydr. Depth (m) * * 0.42 *
* Conv. Total (m3/s) * 83.6 * Conv. (m3/s) * * 83.6 *
* Length wtd. (m) * 28.50 * wetted Per. (m) * * 12.73 *
* Min Ch El (m) * 426.97 * Shear (N/m2) * * 75.49 *
* Alpha * 1.00 * Stream Power (N/m s) * * 163.35 *
* Frctn Loss (m) * 0.61 * Cum Volume (1000 m3) * 0.01 * 0.29 * 0.00
* C & E Loss (m) * 0.03 * Cum SA (1000 m2) * 0.09 * 0.78 * 0.03
*****
**

```

Abbadia50.rep

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.sso ABBADIA
 REACH: 1 RS: 1.0625*

INPUT

Description:

Station Elevation Data		num= 16	
Sta	Elev	Sta	Elev
0	432.296	15.195	429.318
24.918	427.65	28.044	427.178
35.325	426.455	36.229	426.517
59.969	429.004		

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.04	31.164	.035
		44.908	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	31.164	44.908		28.5	28.5	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

*	E.G. Elev (m)	*	427.31	*	Element	*
*	vel Head (m)	*	0.26	*	wt. n-Val.	*
*	w.s. Elev (m)	*	427.04	*	Reach Len. (m)	*
*	Crit w.s. (m)	*	427.10	*	Flow Area (m2)	*
*	E.G. slope (m/m)	*	0.024405	*	Area (m2)	*
*	Q Total (m3/s)	*	11.40	*	Flow (m3/s)	*
*	Top width (m)	*	14.96	*	Top width (m)	*
*	vel Total (m/s)	*	2.26	*	Avg. vel. (m/s)	*
*	Max chl Dpth (m)	*	0.62	*	Hydr. Depth (m)	*
*	Conv. Total (m3/s)	*	73.0	*	Conv. (m3/s)	*
*	Length wtd. (m)	*	28.50	*	wetted Per. (m)	*
*	Min ch El (m)	*	426.42	*	Shear (N/m2)	*
*	Alpha	*	1.01	*	Stream Power (N/m s)	*
*	Frctn Loss (m)	*	0.60	*	Cum volume (1000 m3)	*
*	C & E Loss (m)	*	0.00	*	Cum SA (1000 m2)	*

**						

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.sso ABBADIA
 REACH: 1 RS: 1

INPUT

Description:

Station Elevation Data		num= 9	
------------------------	--	--------	--

Abbadia50.rep

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	431.37	15.4	427.66	26.97	426.32	29.97	426.28	32.77	425.87
33.79	425.91	34.8	425.98	44.49	426.3	59.25	427.62		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	29.97	.035	44.49	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

29.97	44.49	0	0	0	.1	.3
-------	-------	---	---	---	----	----

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)          * 426.66 * Element          * Left OB * Channel * Right OB
* vel Head (m)          * 0.20 * wt. n-Val.      * 0.040 * 0.035 * 0.040
* W.S. Elev (m)        * 426.46 * Reach Len. (m)  *          *          *
* Crit W.S. (m)        * 426.49 * Flow Area (m2)  * 0.56 * 5.27 * 0.14
* E.G. slope (m/m)     *0.019922 * Area (m2)      * 0.56 * 5.27 * 0.14
* Q Total (m3/s)       * 11.40 * Flow (m3/s)    * 0.52 * 10.79 * 0.09
* Top width (m)        * 20.50 * Top width (m)   * 4.20 * 14.52 * 1.78
* vel Total (m/s)      * 1.91 * Avg. vel. (m/s) * 0.92 * 2.05 * 0.65
* Max chl Dpth (m)     * 0.59 * Hydr. Depth (m) * 0.13 * 0.36 * 0.08
* Conv. Total (m3/s)   * 80.8 * Conv. (m3/s)   * 3.7 * 76.5 * 0.7
* Length wtd. (m)     *          * wetted Per. (m) * 4.21 * 14.56 * 1.79
* Min ch El (m)       * 425.87 * Shear (N/m2)   * 26.04 * 70.71 * 15.49
* Alpha                * 1.10 * Stream Power (N/m s) * 23.98 * 144.81 * 10.09
* Frctn Loss (m)      * 0.63 * Cum volume (1000 m3) *          *          *
* C & E Loss (m)      * 0.02 * Cum SA (1000 m2) *          *          *
**
*****

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

SUMMARY OF MANNING'S N VALUES

River:F.sso ABBADIA

```

*****
* Reach          * River Sta. * n1 * n2 * n3 *
*****
*1              * 3          * .04* .035* .04*
*1              * 2.875*    * .04* .035* .04*
*1              * 2.75*     * .04* .035* .04*
*1              * 2.625*    * .04* .035* .04*
*1              * 2.5*      * .04* .035* .04*
*1              * 2.375*    * .04* .035* .04*
*1              * 2.25*     * .04* .035* .04*
*1              * 2.125*    * .04* .035* .04*
*1              * 2         * .04* .035* .04*
*1              * 1.8       * .04* .035* .04*
*1              * 1.7       * Bridge *          *
*1              * 1.5       * .04* .035* .04*
*1              * 1.4375*   * .04* .035* .04*
*1              * 1.375*    * .04* .035* .04*
*1              * 1.3125*   * .04* .035* .04*
*1              * 1.25*     * .04* .035* .04*
*1              * 1.1875*   * .04* .035* .04*

```

```
*1      *    1.125*    *    .04*    .035*    .04*
*1      *    1.0625*   *    .04*    .035*    .04*
*1      *    1      *    .04*    .035*    .04*
*****
```

SUMMARY OF REACH LENGTHS

River: F.sso ABBADIA

```
*****
* Reach      * River Sta. * Left * Channel * Right *
*****
*1      *    3      * 28.125* 28.125* 28.125*
*1      *    2.875* * 28.125* 28.125* 28.125*
*1      *    2.75*  * 28.125* 28.125* 28.125*
*1      *    2.625* * 28.125* 28.125* 28.125*
*1      *    2.5*   * 28.125* 28.125* 28.125*
*1      *    2.375* * 28.125* 28.125* 28.125*
*1      *    2.25*  * 28.125* 28.125* 28.125*
*1      *    2.125* * 28.125* 28.125* 28.125*
*1      *    2      *    22*    22*    22*
*1      *    1.8    *    13*    13*    13*
*1      *    1.7    * Bridge *    *    *
*1      *    1.5    * 28.5*   28.5*   28.5*
*1      *    1.4375* * 28.5*   28.5*   28.5*
*1      *    1.375*  * 28.5*   28.5*   28.5*
*1      *    1.3125* * 28.5*   28.5*   28.5*
*1      *    1.25*   * 28.5*   28.5*   28.5*
*1      *    1.1875* * 28.5*   28.5*   28.5*
*1      *    1.125*  * 28.5*   28.5*   28.5*
*1      *    1.0625* * 28.5*   28.5*   28.5*
*1      *    1      *    0*    0*    0*
*****
```

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: F.sso ABBADIA

```
*****
* Reach      * River Sta. * Contr. * Expan. *
*****
*1      *    3      * .1*    .3*
*1      *    2.875* * .1*    .3*
*1      *    2.75*  * .1*    .3*
*1      *    2.625* * .1*    .3*
*1      *    2.5*   * .1*    .3*
*1      *    2.375* * .1*    .3*
*1      *    2.25*  * .1*    .3*
*1      *    2.125* * .1*    .3*
*1      *    2      * .1*    .3*
*1      *    1.8    * .3*    .5*
*1      *    1.7    * Bridge *    *
*1      *    1.5    * .3*    .5*
*1      *    1.4375* * .1*    .3*
*1      *    1.375*  * .1*    .3*
*1      *    1.3125* * .1*    .3*
*1      *    1.25*   * .1*    .3*
*1      *    1.1875* * .1*    .3*
*1      *    1.125*  * .1*    .3*
*1      *    1.0625* * .1*    .3*
*1      *    1      * .1*    .3*
*****
```

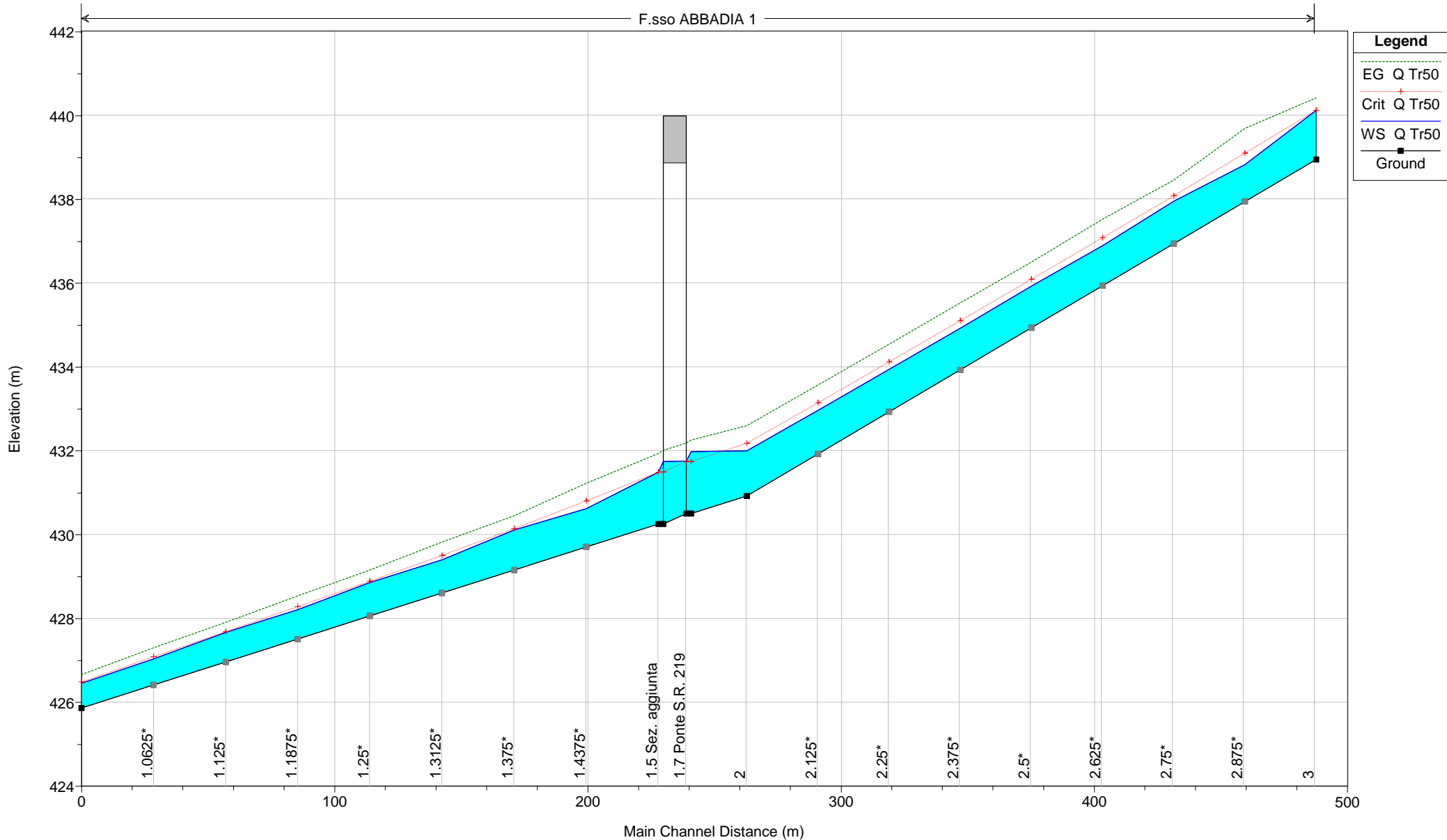
HEC-RAS Plan: plan Tr50 River: F.sso ABBADIA Reach: 1 Profile: Q Tr50

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
1	3	Q Tr50	11.40	438.96	440.13	440.13	440.43	0.012644	2.45	4.98	9.14	0.94
1	2.875*	Q Tr50	11.40	437.96	438.83	439.11	439.70	0.060567	4.12	2.77	5.91	1.92
1	2.75*	Q Tr50	11.40	436.95	437.97	438.09	438.47	0.028223	3.14	3.63	6.67	1.34
1	2.625*	Q Tr50	11.40	435.95	436.90	437.10	437.53	0.038533	3.51	3.24	6.21	1.55
1	2.5*	Q Tr50	11.40	434.95	435.93	436.10	436.51	0.033454	3.35	3.40	6.22	1.45
1	2.375*	Q Tr50	11.40	433.94	434.93	435.11	435.54	0.035429	3.45	3.31	6.00	1.48
1	2.25*	Q Tr50	11.40	432.94	433.95	434.13	434.55	0.034664	3.43	3.32	5.86	1.46
1	2.125*	Q Tr50	11.40	431.93	432.97	433.15	433.58	0.034662	3.44	3.31	5.70	1.44
1	2	Q Tr50	11.40	430.93	432.01	432.19	432.61	0.034449	3.44	3.32	5.57	1.42
1	1.8	Q Tr50	11.40	430.51	431.99	431.75	432.26	0.007668	2.31	4.92	7.66	0.71
1	1.7		Bridge									
1	1.5	Q Tr50	11.40	430.26	431.50	431.50	431.94	0.016208	2.96	3.86	6.41	1.01
1	1.4375*	Q Tr50	11.40	429.71	430.63	430.81	431.23	0.035798	3.45	3.30	5.98	1.48
1	1.375*	Q Tr50	11.40	429.16	430.12	430.15	430.46	0.017890	2.58	4.41	7.55	1.08
1	1.3125*	Q Tr50	11.40	428.61	429.40	429.51	429.83	0.026792	2.89	3.95	7.88	1.30
1	1.25*	Q Tr50	11.40	428.07	428.86	428.89	429.16	0.018691	2.42	4.71	9.47	1.10
1	1.1875*	Q Tr50	11.40	427.52	428.22	428.29	428.55	0.024729	2.55	4.48	10.37	1.24
1	1.125*	Q Tr50	11.40	426.97	427.67	427.69	427.91	0.018606	2.16	5.27	12.64	1.07
1	1.0625*	Q Tr50	11.40	426.42	427.04	427.10	427.31	0.024405	2.27	5.05	14.96	1.20
1	1	Q Tr50	11.40	425.87	426.46	426.49	426.66	0.019922	2.05	5.97	20.50	1.09

MACROAREA 06 FOSSO DELL'ABBADIA Plan: Plan 02

Flow: Tr50

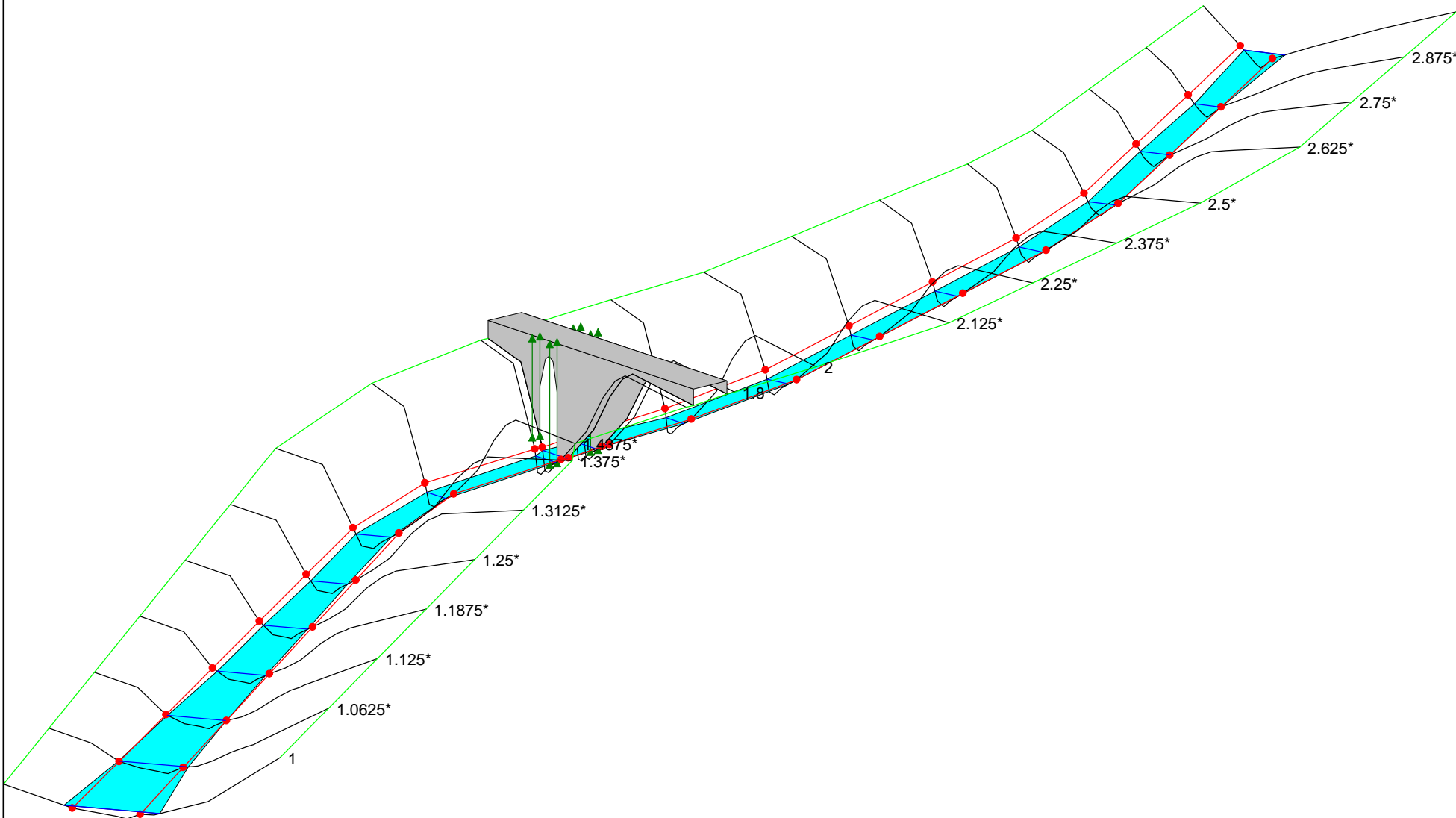
F.sso ABBADIA 1

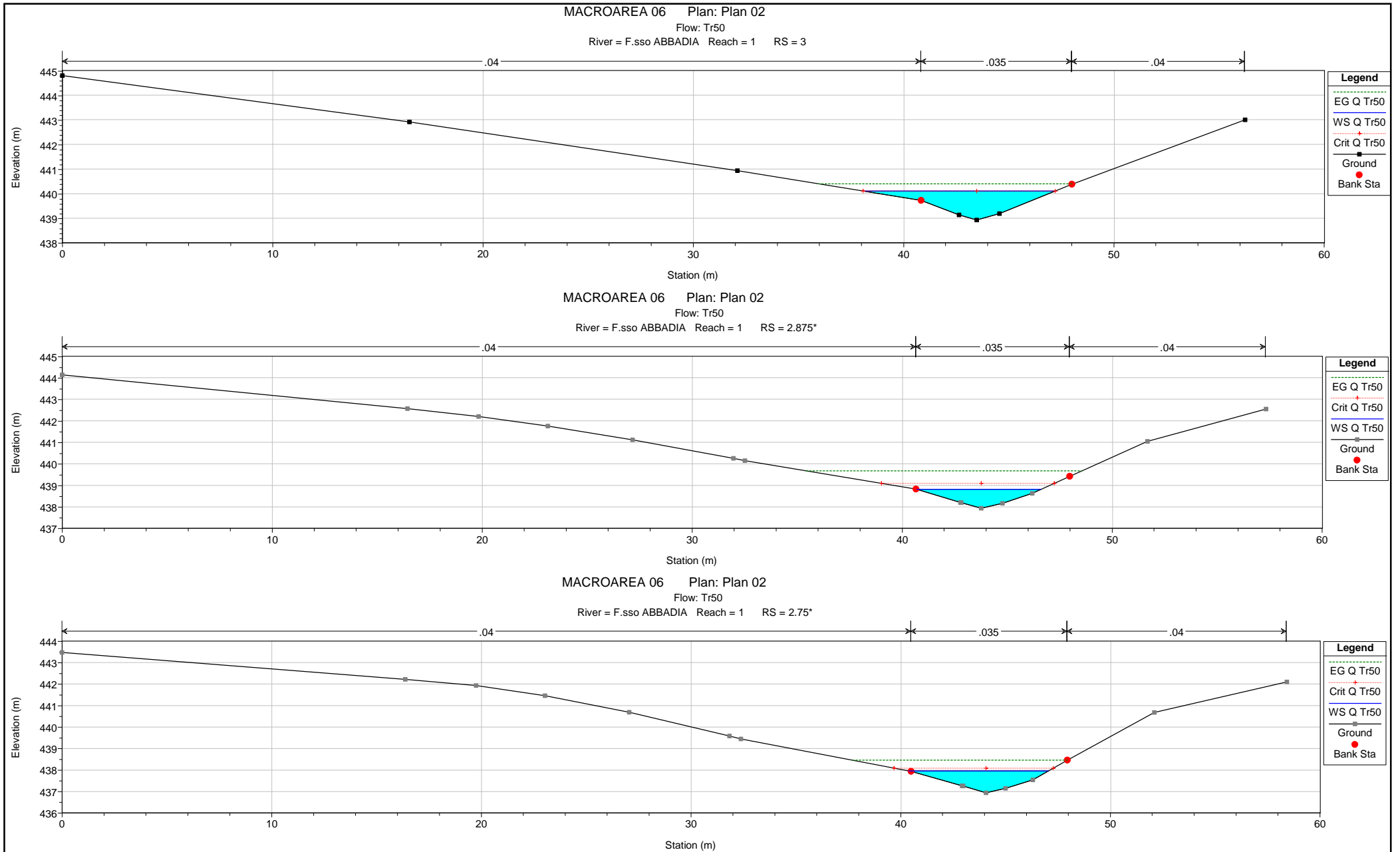


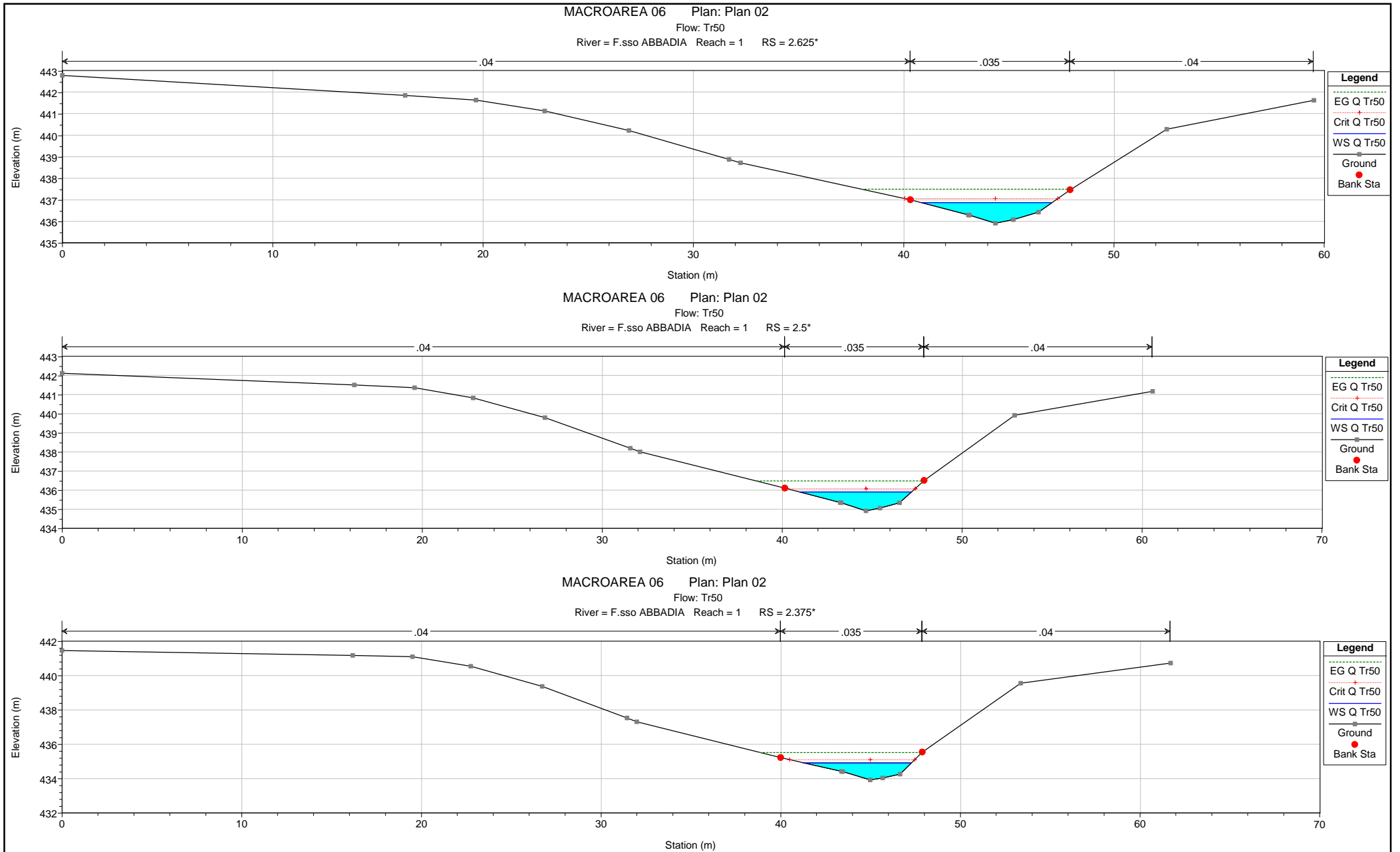
MACROAREA 06 Plan: Plan 02
Flow: Tr50 FOSSO DELL'ABBADIA

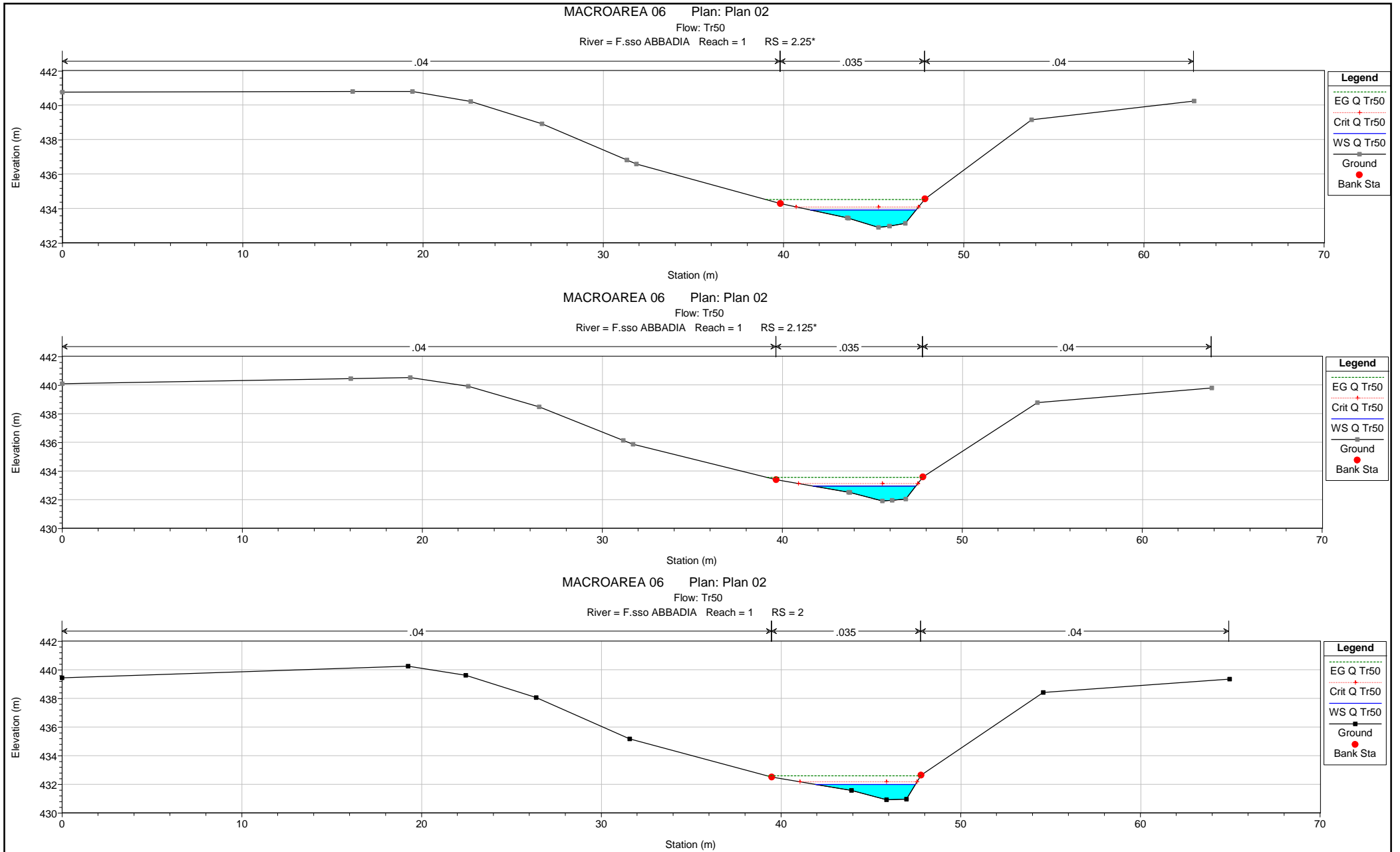
Legend

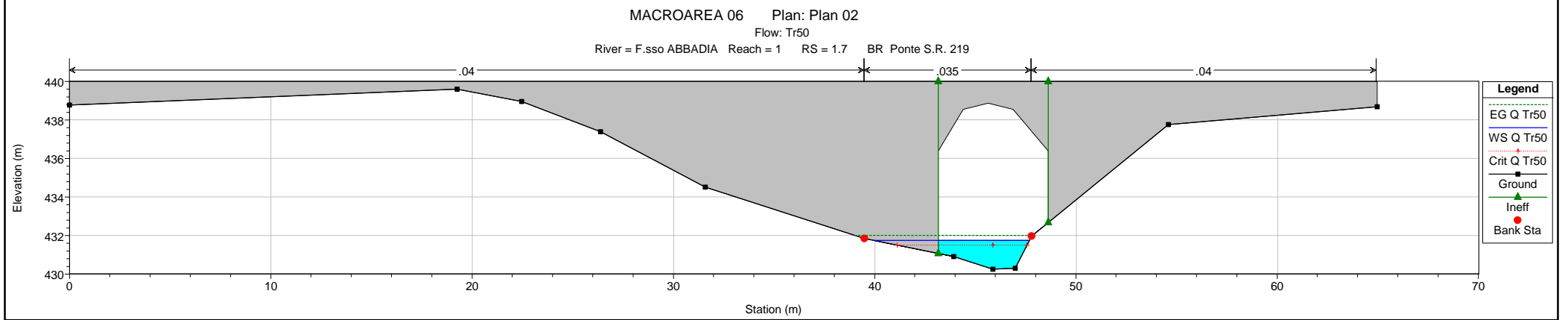
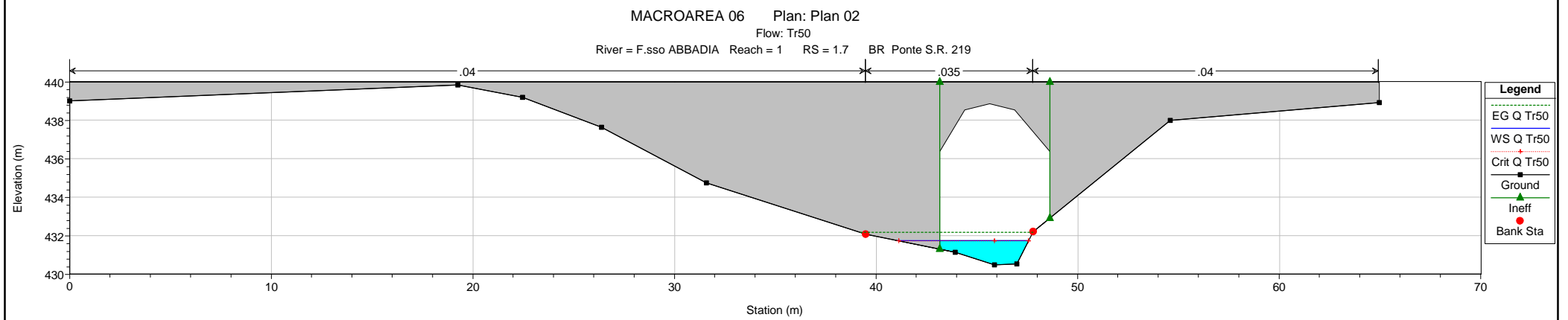
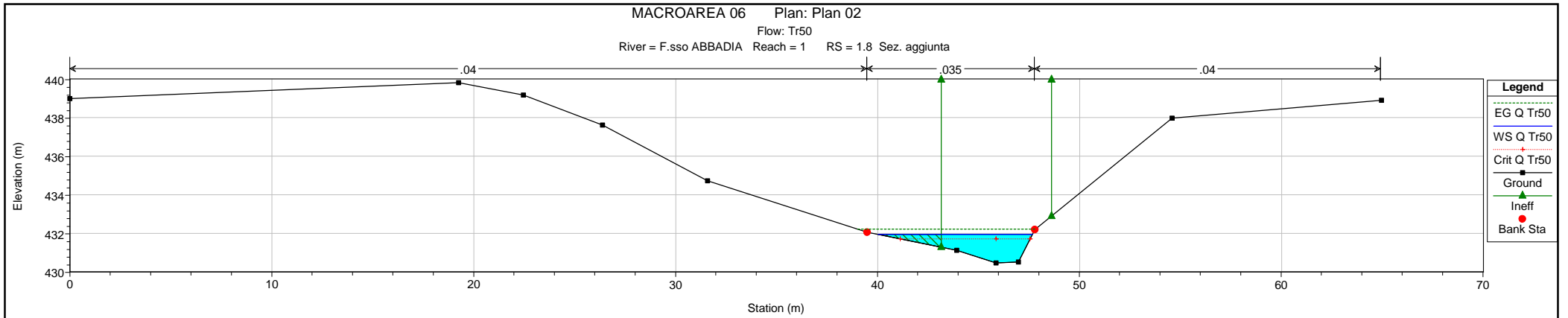
- WS Q Tr50
- Ground
- Bank Sta
- Ground
- Ineff

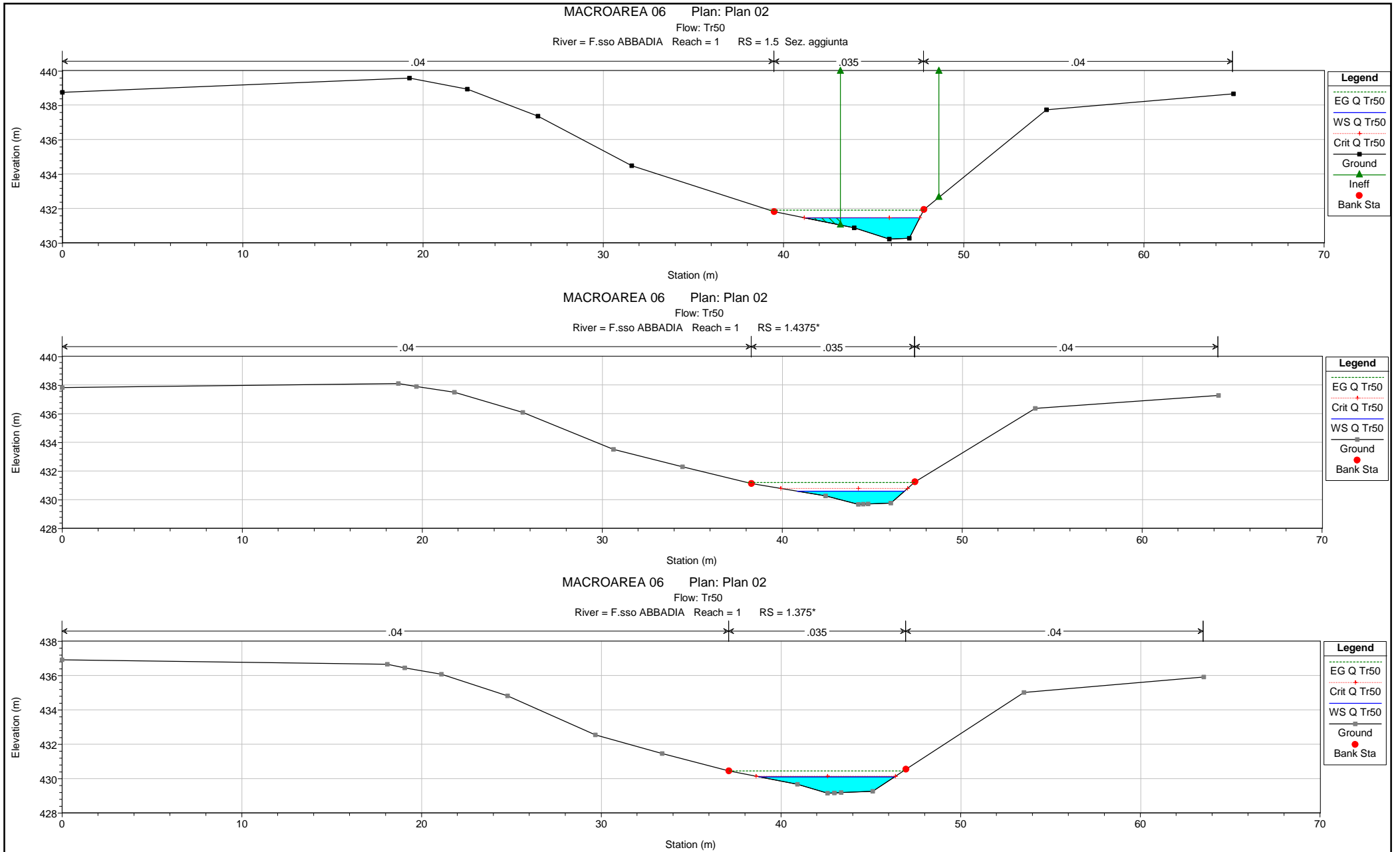


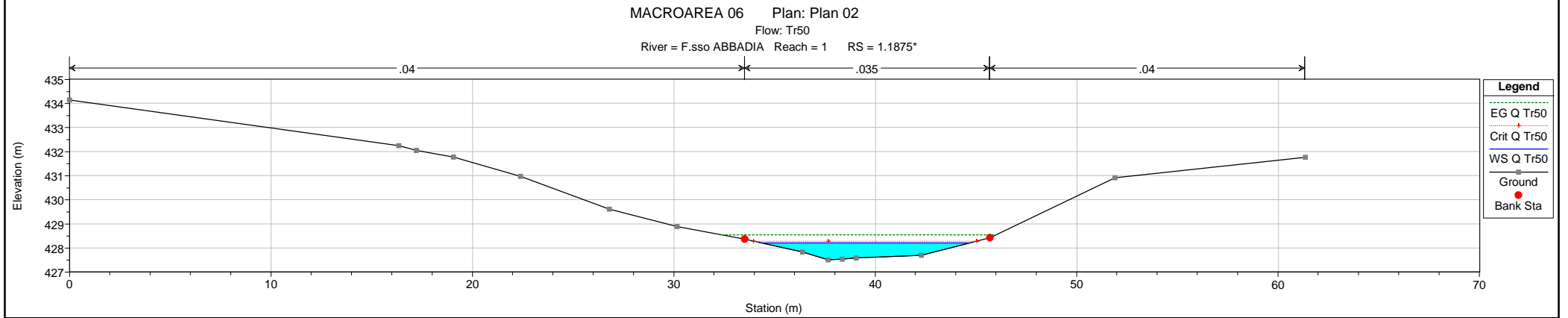
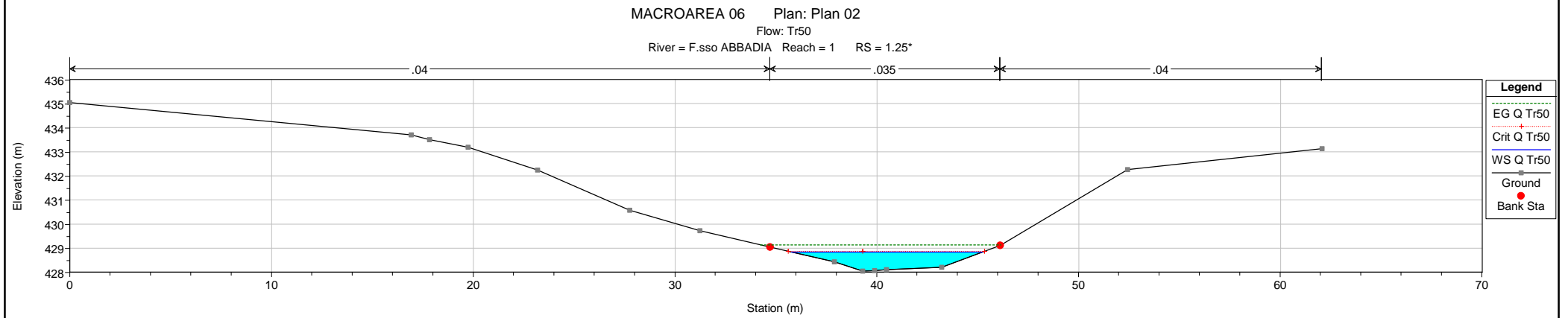
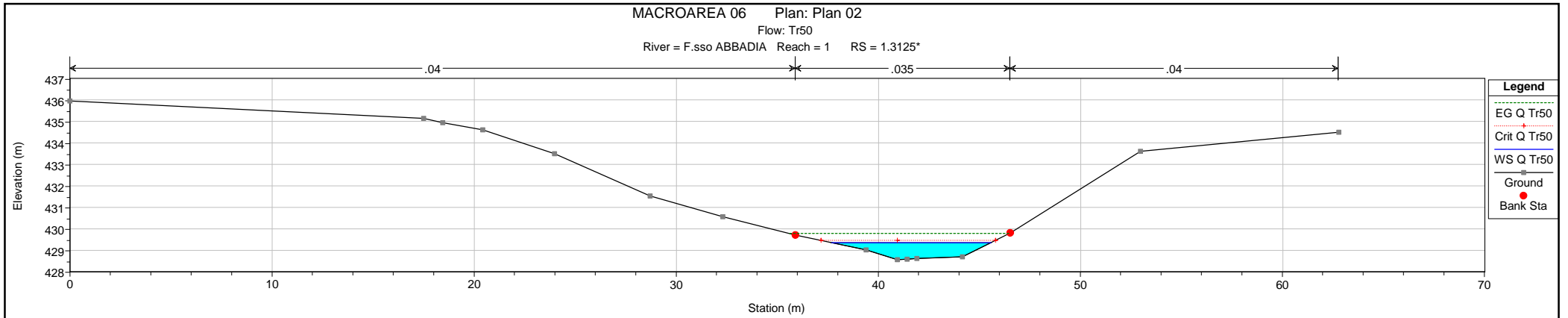


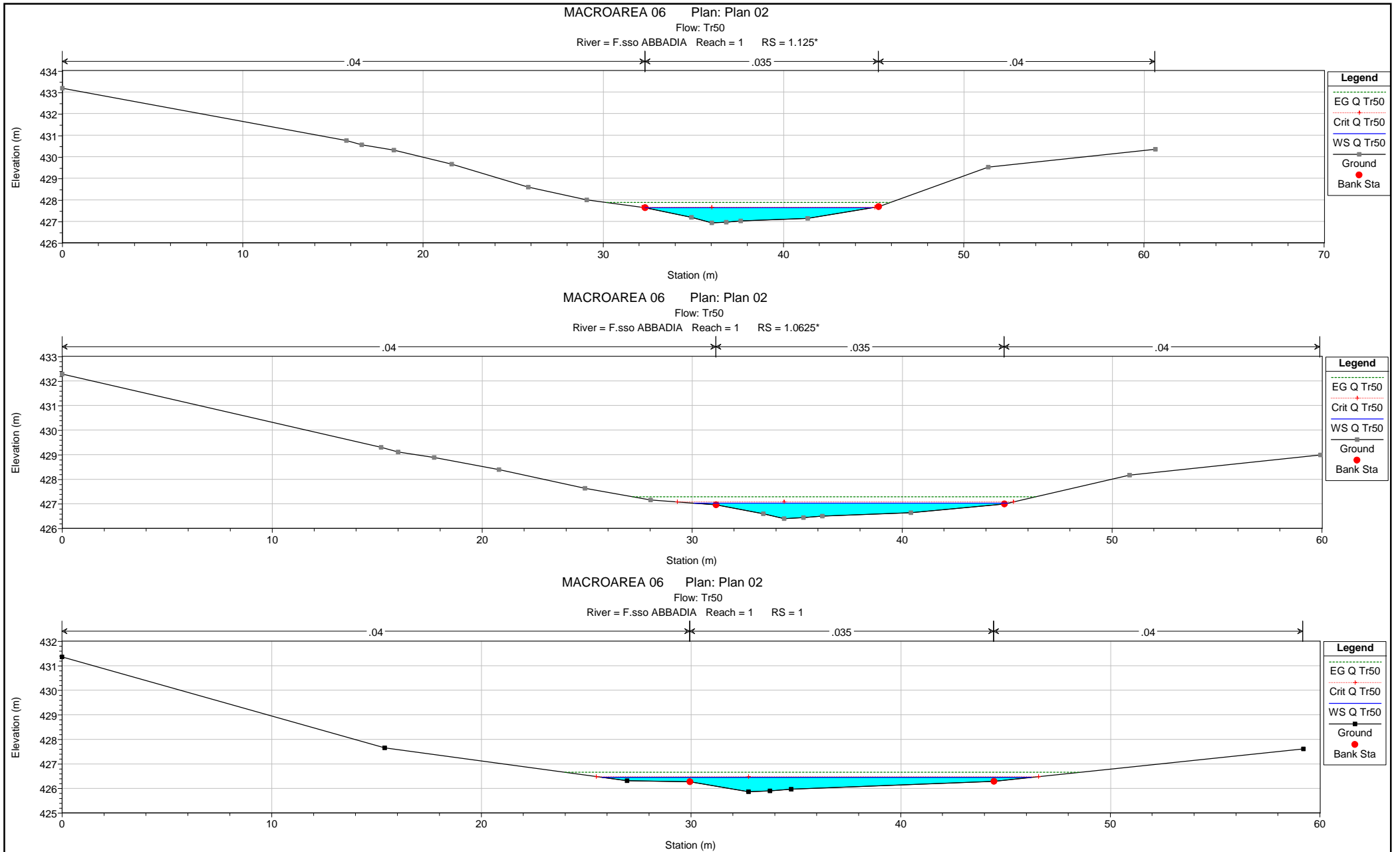












ABBADIA.rep

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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PROJECT DATA

Project Title: MACROAREA 06
Project File : ABBADIA.prj
Run Date and Time: 23/10/2006 10.09.49

Project in SI units

Project Description:
verifica MACROAREA 06 - FOSSO DELL'ABBADIA

FLOW DATA

Flow Title: Tr200
Flow File : n:\2006\06033\Integrazione\HEC_ABBADIA\ABBADIA.f01

Flow Data (m3/s)

* River Reach RS * Q Tr200 *
* F.sso ABBADIA 1 3 * 16 *

Boundary Conditions

* River Reach Profile * Upstream
Downstream *

* F.sso ABBADIA 1 Q Tr200 * Critical
Normal S = 0.019 *

GEOMETRY DATA

Geometry Title: MACROAREA 06 - FOSSO DELL'ABBADIA
Geometry File : n:\2006\06033\Integrazione\HEC_ABBADIA\ABBADIA.g01

CROSS SECTION

RIVER: F.sso ABBADIA
REACH: 1 RS: 3

INPUT

Description:

Table with 12 columns: Station, Elev, Sta, Elev, num=, Sta, Elev, Sta, Elev, Sta, Elev. It contains two rows of elevation data for stations 0, 43.5, 16.52, 44.59, 32.12, 48.04, 40.86, 56.28, 42.66.

Manning's n Values
num= 3
Sta n Val Sta n Val Sta n Val

```
*****
0      .04  40.86  .035  48.04  .04
Bank Sta: Left   Right   Lengths: Left Channel  Right   Coeff Contr.  Expan.
          40.86  48.04          28.125 28.125 28.125          .1      .3
```

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m)      * 440.63 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 0.32  * wt. n-Val.      * 0.040  * 0.035  *
* W.S. Elev (m)     * 440.31 * Reach Len. (m)  * 28.13  * 28.13  * 28.13
* Crit w.S. (m)     * 440.31 * Flow Area (m2)  * 1.14   * 5.65   *
* E.G. Slope (m/m)  *0.011517 * Area (m2)       * 1.14   * 5.65   *
* Q Total (m3/s)    * 16.00 * Flow (m3/s)     * 1.31   * 14.69  *
* Top width (m)     * 10.96 * Top width (m)   * 4.07   * 6.90   *
* Vel Total (m/s)   * 2.36  * Avg. Vel. (m/s) * 1.15   * 2.60   *
* Max Chl Dpth (m) * 1.35  * Hydr. Depth (m) * 0.28   * 0.82   *
* Conv. Total (m3/s) * 149.1 * Conv. (m3/s)    * 12.2   * 136.9  *
* Length wtd. (m)   * 28.13 * wetted Per. (m) * 4.10   * 7.23   *
* Min Ch El (m)     * 438.96 * Shear (N/m2)    * 31.49  * 88.24  *
* Alpha             * 1.14  * Stream Power (N/m s) * 36.06 * 229.50 *
* Frctn Loss (m)    * 0.33  * Cum Volume (1000 m3) * 0.04 * 2.46 * 0.01
* C & E Loss (m)    * 0.00  * Cum SA (1000 m2) * 0.26 * 4.13 * 0.06
*****
**
```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: F.SSO ABBADIA
 REACH: 1 RS: 2.875*

INPUT

Description:

```
Station Elevation Data num= 16
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
*****
0 444.158 16.452 442.589 19.842 442.228 23.147 441.78 27.183 441.135
31.988 440.276 32.538 440.172 40.693 438.846 42.811 438.223 42.85 438.214
43.8 437.956 44.812 438.186 46.223 438.649 48.014 439.44 51.719 441.07
57.37 442.571
```

```
Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
*****
0 .04 40.693 .035 48.014 .04
```

```
Bank Sta: Left   Right   Lengths: Left Channel  Right   Coeff Contr.  Expan.
          40.693 48.014          28.125 28.125 28.125          .1      .3
```


ABBADIA.rep

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m)          * 439.96 * Element          * Left OB * Channel * Right OB
* vel Head (m)          * 0.99 * wt. n-Val.      * 0.040 * 0.035 *
* W.S. Elev (m)         * 438.97 * Reach Len. (m)  * 28.13 * 28.13 * 28.13
* Crit W.S. (m)         * 439.30 * Flow Area (m2)  * 0.05 * 3.61 *
* E.G. Slope (m/m)      *0.052862 * Area (m2)       * 0.05 * 3.61 *
* Q Total (m3/s)        * 16.00 * Flow (m3/s)     * 0.04 * 15.96 *
* Top width (m)         * 7.04 * Top width (m)   * 0.78 * 6.26 *
* vel Total (m/s)       * 4.37 * Avg. vel. (m/s) * 0.90 * 4.42 *
* Max Chl Dpth (m)     * 1.02 * Hydr. Depth (m) * 0.06 * 0.58 *
* Conv. Total (m3/s)    * 69.6 * Conv. (m3/s)    * 0.2 * 69.4 *
* Length wtd. (m)      * 28.13 * wetted Per. (m) * 0.79 * 6.56 *
* Min Ch El (m)        * 437.96 * Shear (N/m2)   * 32.36 * 285.72 *
* Alpha                * 1.02 * Stream Power (N/m s) * 29.28 * 1261.74 *
* Frctn Loss (m)       * 0.60 * Cum Volume (1000 m3) * 0.02 * 2.33 * 0.01
* C & E Loss (m)       * 0.07 * Cum SA (1000 m2) * 0.19 * 3.94 * 0.06
*****
**
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.sso ABBADIA
 REACH: 1 RS: 2.75*

INPUT

Description:

Station Elevation Data		num= 16	
Sta	Elev	Sta	Elev
0	443.485	16.385	442.237
31.857	439.591	32.404	439.46
44.1	436.952	45.033	437.153
58.46	442.112		

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.04	40.525	.035
		47.988	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	40.525	47.988		28.125	28.125		.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m)          * 438.75 * Element          * Left OB * Channel * Right OB
* vel Head (m)          * 0.67 * wt. n-Val.      * 0.040 * 0.035 *
*****
```

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```

*
* W.S. Elev (m) * 438.08 * Reach Len. (m) * 28.13 * 28.13 * 28.13
* Crit w.S. (m) * 438.29 * Flow Area (m2) * 0.05 * 4.39 *
* E.G. Slope (m/m) *0.030905 * Area (m2) * 0.05 * 4.39 *
* Q Total (m3/s) * 16.00 * Flow (m3/s) * 0.04 * 15.96 *
* Top width (m) * 7.48 * Top width (m) * 0.72 * 6.76 *
* Vel Total (m/s) * 3.61 * Avg. Vel. (m/s) * 0.72 * 3.64 *
* Max Chl Dpth (m) * 1.13 * Hydr. Depth (m) * 0.07 * 0.65 *
* Conv. Total (m3/s) * 91.0 * Conv. (m3/s) * 0.2 * 90.8 *
* Length wtd. (m) * 28.13 * Wetted Per. (m) * 0.74 * 7.11 *
* Min Ch El (m) * 436.95 * Shear (N/m2) * 20.12 * 186.97 *
* Alpha * 1.02 * Stream Power (N/m s) * 14.50 * 680.59 *
* Frctn Loss (m) * 1.12 * Cum Volume (1000 m3) * 0.02 * 2.22 * 0.01
* C & E Loss (m) * 0.10 * Cum SA (1000 m2) * 0.17 * 3.76 * 0.06

```

**

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.SSO ABBADIA
REACH: 1 RS: 2.625*

INPUT

Description:

Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	442.812	16.317	441.886	19.678	441.669	22.956	441.165	26.959	440.259
31.725	438.907	32.27	438.749	40.358	437.039	43.114	436.33	43.164	436.319
44.4	435.949	45.255	436.119	46.448	436.458	47.961	437.5	52.551	440.316
59.55	441.654								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	40.358	.035	47.961	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
40.358 47.961 28.125 28.125 28.125 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
* E.G. Elev (m) * 437.79 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.74 * wt. n-Val. * 0.000 * 0.035 *
* W.S. Elev (m) * 437.05 * Reach Len. (m) * 28.13 * 28.13 * 28.13
* Crit w.S. (m) * 437.27 * Flow Area (m2) * 0.00 * 4.20 *
* E.G. Slope (m/m) *0.037530 * Area (m2) * 0.00 * 4.20 *
* Q Total (m3/s) * 16.00 * Flow (m3/s) * 0.00 * 16.00 *
* Top width (m) * 6.99 * Top width (m) * 0.04 * 6.95 *

```

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* Vel Total (m/s)      * 3.81 * Avg. Vel. (m/s)      * 0.13 * 3.81 *
* Max Chl Dpth (m)    * 1.10 * Hydr. Depth (m)      * 0.00 * 0.60 *
* Conv. Total (m3/s)  * 82.6 * Conv. (m3/s)         * 0.0 * 82.6 *
* Length wtd. (m)     * 28.13 * wetted Per. (m)      * 0.05 * 7.34 *
* Min Ch El (m)       * 435.95 * Shear (N/m2)         *      * 210.41 *
* Alpha                * 1.00 * Stream Power (N/m s) *      * 802.25 *
* Frctn Loss (m)      * 0.96 * Cum Volume (1000 m3) * 0.02 * 2.10 * 0.01
* C & E Loss (m)      * 0.01 * Cum SA (1000 m2)     * 0.16 * 3.57 * 0.06
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.sso ABBADIA
 REACH: 1 RS: 2.5*

INPUT

Description:

Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	442.14	16.249	441.535	19.597	441.389	22.861	440.858	26.848	439.821		
31.593	438.223	32.136	438.037	40.19	436.135	43.265	435.383	43.322	435.371		
44.7	434.945	45.477	435.085	46.561	435.362	47.935	436.53	52.967	439.939		
60.64	441.195										

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	40.19	.035	47.935	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	40.19	47.935		28.125	28.125	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m)      * 436.77 * Element                * Left OB * Channel * Right OB
* Vel Head (m)       * 0.69 * wt. n-Val.            *      * 0.035 *
* W.S. Elev (m)      * 436.08 * Reach Len. (m)        * 28.13 * 28.13 * 28.13
* Crit W.S. (m)      * 436.28 * Flow Area (m2)        *      * 4.34 *
* E.G. Slope (m/m)   *0.034080 * Area (m2)             *      * 4.34 *
* Q Total (m3/s)     * 16.00 * Flow (m3/s)           *      * 16.00 *
* Top width (m)      * 6.97 * Top width (m)         *      * 6.97 *
* Vel Total (m/s)    * 3.69 * Avg. vel. (m/s)       *      * 3.69 *
* Max Chl Dpth (m)   * 1.13 * Hydr. Depth (m)       *      * 0.62 *
* Conv. Total (m3/s) * 86.7 * Conv. (m3/s)          *      * 86.7 *
* Length wtd. (m)    * 28.13 * wetted Per. (m)       *      * 7.43 *
* Min Ch El (m)      * 434.95 * Shear (N/m2)          *      * 195.18 *
* Alpha              * 1.00 * Stream Power (N/m s)   *      * 719.28 *
* Frctn Loss (m)     * 1.01 * Cum Volume (1000 m3)  * 0.02 * 1.98 * 0.01
*

```

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```
* C & E Loss (m)      *    0.01 * Cum SA (1000 m2)      *    0.16 *    3.37 *    0.06
*
*****
**
```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.sso ABBADIA
 REACH: 1 RS: 2.375*

INPUT

Description:

```
Station Elevation Data      num=      16
  Sta      Elev      Sta      Elev      Sta      Elev      Sta      Elev      Sta      Elev
*****
  0 441.467 16.181 441.184 19.515 441.109 22.766 440.551 26.736 439.383
31.462 437.538 32.002 437.325 40.022 435.231 43.416 434.437 43.479 434.423
  45 433.941 45.698 434.052 46.673 434.267 47.909 435.56 53.383 439.562
61.73 440.736
```

```
Manning's n Values      num=      3
  Sta      n Val      Sta      n Val      Sta      n Val
*****
  0      .04 40.022      .035 47.909      .04
```

```
Bank Sta: Left   Right   Lengths: Left Channel   Right   Coeff Contr.   Expan.
         40.022 47.909          28.125 28.125 28.125          .1      .3
```

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m)      * 435.80 * Element      * Left OB * Channel * Right OB
* vel Head (m)      * 0.71 * wt. n-Val.      *      * 0.035 *
* W.S. Elev (m)      * 435.08 * Reach Len. (m) * 28.13 * 28.13 * 28.13
* Crit W.S. (m)      * 435.30 * Flow Area (m2) *      * 4.28 *
* E.G. slope (m/m)   *0.035162 * Area (m2)      *      * 4.28 *
* Q Total (m3/s)     * 16.00 * Flow (m3/s)     *      * 16.00 *
* Top width (m)      * 6.79 * Top width (m)   *      * 6.79 *
* vel Total (m/s)    * 3.74 * Avg. vel. (m/s) *      * 3.74 *
* Max chl Dpth (m)   * 1.14 * Hydr. Depth (m) *      * 0.63 *
* Conv. Total (m3/s) * 85.3 * Conv. (m3/s)    *      * 85.3 *
* Length wtd. (m)    * 28.13 * wetted Per. (m) *      * 7.33 *
* Min ch El (m)      * 433.94 * Shear (N/m2)   *      * 201.26 *
* Alpha              * 1.00 * Stream Power (N/m s) *      * 753.05 *
* Frctn Loss (m)     * 0.97 * Cum Volume (1000 m3) * 0.02 * 1.86 * 0.01
* C & E Loss (m)     * 0.00 * Cum SA (1000 m2) * 0.16 * 3.18 * 0.06
*
*****
**
```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.sso ABBADIA
 REACH: 1 RS: 2.25*

INPUT

Description:

Station Elevation Data		num= 16		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	440.795	16.114	440.832	19.433	440.829	22.671	440.244	26.624	438.946		
31.33	436.854	31.868	436.613	39.855	434.327	43.567	433.49	43.636	433.475		
45.3	432.938	45.92	433.018	46.785	433.171	47.882	434.59	53.798	439.184		
62.82	440.277										

Manning's n Values

num= 3		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	39.855	.035	47.882	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	39.855	47.882		28.125	28.125	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

**	*****					
* E.G. Elev (m)	* 434.81	* Element	* Left OB	* Channel	* Right OB	
* vel Head (m)	* 0.71	* wt. n-Val.	* 0.035			
* W.S. Elev (m)	* 434.11	* Reach Len. (m)	* 28.13	* 28.13	* 28.13	
* Crit W.S. (m)	* 434.32	* Flow Area (m2)	* 4.29			
* E.G. Slope (m/m)	* 0.034558	* Area (m2)	* 4.29			
* Q Total (m3/s)	* 16.00	* Flow (m3/s)	* 16.00			
* Top width (m)	* 6.67	* Top width (m)	* 6.67			
* vel Total (m/s)	* 3.73	* Avg. vel. (m/s)	* 3.73			
* Max Chl Dpth (m)	* 1.17	* Hydr. Depth (m)	* 0.64			
* Conv. Total (m3/s)	* 86.1	* Conv. (m3/s)	* 86.1			
* Length wtd. (m)	* 28.13	* wetted Per. (m)	* 7.31			
* Min ch El (m)	* 432.94	* Shear (N/m2)	* 199.17			
* Alpha	* 1.00	* Stream Power (N/m s)	* 742.25			
* Frctn Loss (m)	* 0.98	* Cum volume (1000 m3)	* 0.02	* 1.74	* 0.01	
* C & E Loss (m)	* 0.00	* Cum SA (1000 m2)	* 0.16	* 2.99	* 0.06	
**	*****					

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.sso ABBADIA

REACH: 1

RS: 2.125*

INPUT

Description:

Station Elevation Data		num= 16		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	440.122	16.046	440.481	19.352	440.55	22.575	439.937	26.512	438.508		
31.198	436.17	31.734	435.902	39.688	433.424	43.719	432.544	43.793	432.528		
45.6	431.934	46.142	431.984	46.898	432.076	47.856	433.62	54.214	438.807		
63.91	439.819										

Manning's n Values

num= 3		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val

0 .04 39.688 .035 47.856 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 39.688 47.856 28.125 28.125 28.125 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m) * 433.84 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.71 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 433.13 * Reach Len. (m) * 28.13 * 28.13 * 28.13
* Crit W.S. (m) * 433.35 * Flow Area (m2) * * 4.29 *
* E.G. slope (m/m) *0.034586 * Area (m2) * * 4.29 *
* Q Total (m3/s) * 16.00 * Flow (m3/s) * * 16.00 *
* Top width (m) * 6.54 * Top width (m) * * 6.54 *
* vel Total (m/s) * 3.73 * Avg. vel. (m/s) * * 3.73 *
* Max chl Dpth (m) * 1.20 * Hydr. Depth (m) * * 0.66 *
* Conv. Total (m3/s) * 86.0 * Conv. (m3/s) * * 86.0 *
* Length wtd. (m) * 28.13 * wetted Per. (m) * * 7.29 *
* Min Ch El (m) * 431.93 * Shear (N/m2) * * 199.49 *
* Alpha * 1.00 * Stream Power (N/m s) * * 744.15 *
* Frctn Loss (m) * 0.97 * Cum volume (1000 m3) * 0.02 * 1.62 * 0.01
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.16 * 2.80 * 0.06
*****
**
```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.SSO ABBADIA
 REACH: 1 RS: 2

INPUT

Description:

Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 439.45 19.27 440.27 22.48 439.63 26.4 438.07 31.6 435.19
 39.52 432.52 43.95 431.58 45.9 430.93 47.01 430.98 47.83 432.65
 54.63 438.43 65 439.36

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 39.52 .035 47.83 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 39.52 47.83 22 22 22 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m) * 432.87 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.70 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 432.17 * Reach Len. (m) * 22.00 * 22.00 * 22.00
* Crit W.S. (m) * 432.39 * Flow Area (m2) * * 4.31 *
*****
```

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*
* E.G. Slope (m/m)      *0.034276 * Area (m2)           *           * 4.31 *
*
* Q Total (m3/s)       * 16.00 * Flow (m3/s)         *           * 16.00 *
*
* Top width (m)        * 6.44 * Top width (m)       *           * 6.44 *
*
* Vel Total (m/s)      * 3.71 * Avg. Vel. (m/s)     *           * 3.71 *
*
* Max Chl Dpth (m)    * 1.24 * Hydr. Depth (m)     *           * 0.67 *
*
* Conv. Total (m3/s)   * 86.4 * Conv. (m3/s)        *           * 86.4 *
*
* Length Wtd. (m)     * 22.00 * Wetted Per. (m)     *           * 7.35 *
*
* Min Ch El (m)       * 430.93 * Shear (N/m2)       *           * 197.36 *
*
* Alpha               * 1.00 * Stream Power (N/m s) *           * 732.05 *
*
* Frctn Loss (m)      * 0.97 * Cum Volume (1000 m3) * 0.02 * 1.50 * 0.01
*
* C & E Loss (m)      * 0.00 * Cum SA (1000 m2)   * 0.16 * 2.62 * 0.06
*
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.sso ABBADIA
 REACH: 1 RS: 1.8

INPUT

Description: Sez. aggiunta

```

Station Elevation Data num= 12
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
*****
0 439.03 19.27 439.85 22.48 439.21 26.4 437.65 31.6 434.77
39.52 432.1 43.95 431.16 45.9 430.51 47.01 430.56 47.83 432.23
54.63 438.01 65 438.94

```

```

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
*****
0 .04 39.52 .035 47.83 .04

```

```

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
39.52 47.83 13 13 13 .3 .5
Ineffective Flow num= 2
Sta L Sta R Elev Permanent
0 43.19 440 T
48.65 65 440 T

```

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m)      * 432.59 * Element           * Left OB * Channel * Right OB
*
* Vel Head (m)       * 0.35 * wt. n-Val.        *           * 0.035 * 0.000
*
* W.S. Elev (m)      * 432.24 * Reach Len. (m)    * 2.00 * 2.00 * 2.00
*
* Crit W.S. (m)      * 431.98 * Flow Area (m2)    *           * 6.09 * 0.00
*
* E.G. Slope (m/m)   *0.007941 * Area (m2)         * 0.03 * 8.03 * 0.00
*
* Q Total (m3/s)     * 16.00 * Flow (m3/s)       *           * 16.00 * 0.00
*
* Top width (m)      * 8.74 * Top width (m)     * 0.42 * 8.31 * 0.01
*
* Vel Total (m/s)    * 2.63 * Avg. vel. (m/s)   *           * 2.63 * 0.06
*
* Max Chl Dpth (m)   * 1.73 * Hydr. Depth (m)   *           * 1.31 * 0.01
*

```

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```
* Conv. Total (m3/s) * 179.5 * Conv. (m3/s) * 179.5 * 0.0
* Length wtd. (m) * 2.00 * wetted Per. (m) * 5.80 * 0.02
* Min Ch El (m) * 430.51 * Shear (N/m2) * 81.68 *
* Alpha * 1.00 * Stream Power (N/m s) * 214.67 *
* Frctn Loss (m) * 0.02 * Cum Volume (1000 m3) * 0.02 * 1.36 * 0.01
* C & E Loss (m) * 0.04 * Cum SA (1000 m2) * 0.16 * 2.46 * 0.06
```

**

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

BRIDGE

RIVER: F.sso ABBADIA

REACH: 1

RS: 1.7

INPUT

Description: Ponte S.R. 219

Distance from Upstream XS = 2

Deck/Roadway width = 9

Weir Coefficient = 1.44

Upstream Deck/Roadway Coordinates

num= 9

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	440	430	43.19	440	430	43.19	440	436.4						
44.43	440	438.55	45.67	440	438.88	46.91	440	438.55						
48.65	440	436.4	48.65	440	430	65	440	430						

Upstream Bridge Cross Section Data

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	439.03	19.27	439.85	22.48	439.21	26.4	437.65	31.6	434.77
39.52	432.1	43.95	431.16	45.9	430.51	47.01	430.56	47.83	432.23
54.63	438.01	65	438.94						

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	39.52	.035	47.83	.04

Bank Sta: Left Right Coeff Contr. Expan.
39.52 47.83 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	43.19	440	T
48.65	65	440	T

Downstream Deck/Roadway Coordinates

num= 9

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	440	430	43.19	440	430	43.19	440	436.4						
44.43	440	438.55	45.67	440	438.88	46.91	440	438.55						
48.65	440	436.4	48.65	440	430	65	440	430						

Downstream Bridge Cross Section Data

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	438.78	19.27	439.6	22.48	438.96	26.4	437.4	31.6	434.52
39.52	431.85	43.95	430.91	45.9	430.26	47.01	430.31	47.83	431.98
54.63	437.76	65	438.69						

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	39.52	.035	47.83	.04

Bank Sta: Left Right Coeff Contr. Expan.
 39.52 47.83 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 43.19 440 T
 48.65 65 440 T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
 Energy
 Selected Low Flow Methods = Energy

High Flow Method
 Pressure and Weir flow
 Submerged Inlet Cd =
 Submerged Inlet + Outlet Cd = .8
 Max Low Cord =

Additional Bridge Parameters
 Add Friction component to Momentum
 Do not add weight component to Momentum
 Class B flow critical depth computations use critical depth
 inside the bridge at the upstream end
 Criteria to check for pressure flow = Upstream water surface

BRIDGE OUTPUT Profile #Q Tr200

* E.G. US. (m)	*	432.59	* Element	*Inside BR US	*Inside BR DS *
* W.S. US. (m)	*	432.24	* E.G. Elev (m)	* 432.53	* 432.36 *
* Q Total (m3/s)	*	16.00	* W.S. Elev (m)	* 432.03	* 432.03 *
* Q Bridge (m3/s)	*	16.00	* Crit W.S. (m)	* 431.97	* 431.72 *
* Q Weir (m3/s)	*		* Max Chl Dpth (m)	* 1.52	* 1.77 *
* Weir Sta Lft (m)	*		* Vel Total (m/s)	* 3.12	* 2.56 *
* Weir Sta Rgt (m)	*		* Flow Area (m2)	* 5.13	* 6.26 *
* Weir Submerg	*		* Froude # Chl	* 0.94	* 0.70 *
* Weir Max Depth (m)	*		* Specif Force (m3)	* 8.26	* 8.74 *
* Min El Weir Flow (m)	*	440.00	* Hydr Depth (m)	* 1.13	* 1.33 *
* Min El Prs (m)	*	438.88	* W.P. Total (m)	* 5.58	* 5.88 *
* Delta EG (m)	*	0.32	* Conv. Total (m3/s)	* 138.5	* 187.8 *
* Delta WS (m)	*	0.51	* Top width (m)	* 4.54	* 4.70 *
* BR Open Area (m2)	*	37.47	* Frctn Loss (m)	* 0.09	* 0.02 *
* BR Open Vel (m/s)	*	3.12	* C & E Loss (m)	* 0.08	* 0.06 *
* Coef of Q	*		* Shear Total (N/m2)	* 120.17	* 75.75 *
* Br Sel Method	*Energy only		* Power Total (N/m s)	* 374.77	* 193.74 *

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.sso ABBADIA
 REACH: 1 RS: 1.5

INPUT

Description: Sez. aggiunta
 Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 438.78 19.27 439.6 22.48 438.96 26.4 437.4 31.6 434.52

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39.52	431.85	43.95	430.91	45.9	430.26	47.01	430.31	47.83	431.98
54.63	437.76	65	438.69						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	39.52	.035	47.83	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	39.52	47.83		28.5	28.5	.3	.5
Ineffective Flow	num= 2						
Sta L	Sta R	Elev	Permanent				
0	43.19	440	T				
48.65	65	440	T				

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m) * 432.27 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.55 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 431.73 * Reach Len. (m) * 28.50 * 28.50 * 28.50
* Crit W.S. (m) * 431.73 * Flow Area (m2) * * 4.87 *
* E.G. Slope (m/m) *0.015578 * Area (m2) * * 5.88 *
* Q Total (m3/s) * 16.00 * Flow (m3/s) * * 16.00 *
* Top width (m) * 7.60 * Top width (m) * * 7.60 *
* vel Total (m/s) * 3.28 * Avg. Vel. (m/s) * * 3.28 *
* Max Chl Dpth (m) * 1.47 * Hydr. Depth (m) * * 1.08 *
* Conv. Total (m3/s) * 128.2 * Conv. (m3/s) * * 128.2 *
* Length wtd. (m) * 28.50 * wetted Per. (m) * * 5.52 *
* Min Ch El (m) * 430.26 * Shear (N/m2) * * 134.89 *
* Alpha * 1.00 * Stream Power (N/m s) * * 442.71 *
* Frctn Loss (m) * 0.44 * Cum volume (1000 m3) * 0.02 * 1.29 * 0.01
* C & E Loss (m) * 0.09 * Cum SA (1000 m2) * 0.16 * 2.39 * 0.06
*****
**
```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: F.sso ABBADIA
 REACH: 1 RS: 1.4375*

INPUT

Description:
 Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

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0	437.854	18.688	438.131	19.694	437.927	21.801	437.524	25.603	436.116
30.645	433.539	34.49	432.326	38.326	431.154	42.446	430.296	44.259	429.711
44.533	429.723	44.805	429.738	46.073	429.788	47.413	431.27	54.093	436.393
64.281	437.306								

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 38.326 .035 47.413 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 38.326 47.413 28.5 28.5 28.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

 **
 * E.G. Elev (m) * 431.53 * Element * Left OB * Channel * Right OB
 * Vel Head (m) * 0.78 * wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 430.75 * Reach Len. (m) * 28.50 * 28.50 * 28.50
 * Crit W.S. (m) * 431.00 * Flow Area (m2) * * 4.09 *
 * E.G. Slope (m/m) *0.040193 * Area (m2) * * 4.09 *
 * Q Total (m3/s) * 16.00 * Flow (m3/s) * * 16.00 *
 * Top width (m) * 6.69 * Top width (m) * * 6.69 *
 * Vel Total (m/s) * 3.91 * Avg. Vel. (m/s) * * 3.91 *
 * Max Chl Dpth (m) * 1.04 * Hydr. Depth (m) * * 0.61 *
 * Conv. Total (m3/s) * 79.8 * Conv. (m3/s) * * 79.8 *
 * Length wtd. (m) * 28.50 * Wetted Per. (m) * * 7.26 *
 * Min Ch El (m) * 429.71 * Shear (N/m2) * * 222.25 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 868.90 *
 * Frctn Loss (m) * 0.67 * Cum volume (1000 m3) * 0.02 * 1.14 * 0.01
 * C & E Loss (m) * 0.07 * Cum SA (1000 m2) * 0.16 * 2.19 * 0.06
 *

 **

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.SSO ABBADIA
 REACH: 1 RS: 1.375*

INPUT

Description:

Station Elevation Data num= 16
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 436.927 18.106 436.662 19.08 436.46 21.122 436.087 24.805 434.831
 29.691 432.557 33.416 431.468 37.132 430.458 40.941 429.681 42.618 429.163
 42.998 429.178 43.376 429.201 45.135 429.266 46.995 430.56 53.556 435.026
 63.562 435.922

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 37.132 .035 46.995 .04
 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 37.132 46.995 28.5 28.5 28.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

 **
 * E.G. Elev (m) * 430.68 * Element * Left OB * Channel * Right OB
 * Vel Head (m) * 0.41 * wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 430.27 * Reach Len. (m) * 28.50 * 28.50 * 28.50
 * Crit W.S. (m) * 430.32 * Flow Area (m2) * * 5.65 *
 * E.G. Slope (m/m) *0.018188 * Area (m2) * * 5.65 *
 * Q Total (m3/s) * 16.00 * Flow (m3/s) * * 16.00 *
 * Top width (m) * 8.53 * Top width (m) * * 8.53 *
 * Vel Total (m/s) * 2.83 * Avg. Vel. (m/s) * * 2.83 *
 * Max Chl Dpth (m) * 1.11 * Hydr. Depth (m) * * 0.66 *
 * Conv. Total (m3/s) * 118.6 * Conv. (m3/s) * * 118.6 *
 * Length Wtd. (m) * 28.50 * wetted Per. (m) * * 8.99 *
 * Min Ch El (m) * 429.16 * Shear (N/m2) * * 112.24 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 317.59 *
 * Frctn Loss (m) * 0.74 * Cum Volume (1000 m3) * 0.02 * 1.00 * 0.01
 * C & E Loss (m) * 0.11 * Cum SA (1000 m2) * 0.16 * 1.97 * 0.06

 **

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.SSO ABBADIA
 REACH: 1 RS: 1.3125*

INPUT

Description:

Station Elevation Data num= 16
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 436.001 17.524 435.194 18.467 434.993 20.443 434.651 24.008 433.547
 28.736 431.576 32.341 430.61 35.939 429.761 39.437 429.067 40.976 428.614
 41.464 428.633 41.946 428.664 44.198 428.745 46.578 429.85 53.02 433.659
 62.844 434.539

Manning's n Values

num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 35.939 .035 46.578 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 35.939 46.578 28.5 28.5 28.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

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```

*****
**
* E.G. Elev (m) * 430.05 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.51 * Wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 429.54 * Reach Len. (m) * 28.50 * 28.50 * 28.50
* Crit W.S. (m) * 429.67 * Flow Area (m2) * * 5.08 *
* E.G. Slope (m/m) *0.026598 * Area (m2) * * 5.08 *
* Q Total (m3/s) * 16.00 * Flow (m3/s) * * 16.00 *
* Top width (m) * 8.86 * Top width (m) * * 8.86 *
* Vel Total (m/s) * 3.15 * Avg. Vel. (m/s) * * 3.15 *
* Max Chl Dpth (m) * 0.93 * Hydr. Depth (m) * * 0.57 *
* Conv. Total (m3/s) * 98.1 * Conv. (m3/s) * * 98.1 *
* Length wtd. (m) * 28.50 * Wetted Per. (m) * * 9.15 *
* Min Ch El (m) * 428.61 * Shear (N/m2) * * 144.87 *
* Alpha * 1.00 * Stream Power (N/m s) * * 456.13 *
* Frctn Loss (m) * 0.62 * Cum Volume (1000 m3) * 0.02 * 0.85 * 0.01
* C & E Loss (m) * 0.01 * Cum SA (1000 m2) * 0.16 * 1.72 * 0.06
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.sso ABBADIA
 REACH: 1 RS: 1.25*

INPUT

Description:

Station		Elevation Data		num= 16		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	435.075	16.942	433.725	17.854	433.527	19.764	433.215	23.21	432.262				
27.782	430.594	31.267	429.752	34.745	429.065	37.932	428.453	39.335	428.065				
39.929	428.089	40.517	428.128	43.26	428.223	46.16	429.14	52.483	432.291				
62.125	433.155												

Manning's n Values		num= 3		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	34.745	.035	46.16	.04		

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	34.745	46.16		28.5	28.5	28.5		.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m) * 429.36 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.37 * Wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 428.98 * Reach Len. (m) * 28.50 * 28.50 * 28.50
* Crit W.S. (m) * 429.04 * Flow Area (m2) * * 5.90 *
* E.G. Slope (m/m) *0.019889 * Area (m2) * * 5.90 *
* Q Total (m3/s) * 16.00 * Flow (m3/s) * * 16.00 *
**

```

```

* Top width (m) * 10.47 * Top width (m) * 10.47 *
* Vel Total (m/s) * 2.71 * Avg. Vel. (m/s) * 2.71 *
* Max Chl Dpth (m) * 0.92 * Hydr. Depth (m) * 0.56 *
* Conv. Total (m3/s) * 113.5 * Conv. (m3/s) * 113.5 *
* Length wtd. (m) * 28.50 * wetted Per. (m) * 10.69 *
* Min Ch El (m) * 428.07 * Shear (N/m2) * 107.65 *
* Alpha * 1.00 * Stream Power (N/m s) * 291.85 *
* Frctn Loss (m) * 0.65 * Cum Volume (1000 m3) * 0.02 * 0.69 * 0.01
* C & E Loss (m) * 0.04 * Cum SA (1000 m2) * 0.16 * 1.45 * 0.06
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.sso ABBADIA
REACH: 1 RS: 1.1875*

INPUT

Description:

Station		Elevation		Data		num= 16			
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	434.149	16.36	432.256	17.24	432.06	19.085	431.778	22.413	430.978
26.827	429.613	30.193	428.894	33.551	428.369	36.428	427.838	37.694	427.516
38.394	427.544	39.088	427.591	42.323	427.701	45.743	428.43	51.946	430.924
61.406	431.771								

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	33.551	.035	45.743	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	33.551	45.743		28.5	28.5	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m) * 428.73 * Element * Left OB * Channel * Right OB
*
* Vel Head (m) * 0.39 * wt. n-Val. * * 0.035 *
*
* W.S. Elev (m) * 428.33 * Reach Len. (m) * 28.50 * 28.50 * 28.50
*
* Crit W.S. (m) * 428.42 * Flow Area (m2) * * 5.76 *
*
* E.G. Slope (m/m) *0.024384 * Area (m2) * * 5.76 *
*
* Q Total (m3/s) * 16.00 * Flow (m3/s) * * 16.00 *
*
* Top width (m) * 11.55 * Top width (m) * * 11.55 *
*
* Vel Total (m/s) * 2.78 * Avg. vel. (m/s) * * 2.78 *
*
* Max Chl Dpth (m) * 0.82 * Hydr. Depth (m) * * 0.50 *
*
* Conv. Total (m3/s) * 102.5 * Conv. (m3/s) * * 102.5 *
*
* Length wtd. (m) * 28.50 * wetted Per. (m) * * 11.71 *
*
* Min Ch El (m) * 427.52 * Shear (N/m2) * * 117.57 *
*
* Alpha * 1.00 * Stream Power (N/m s) * * 326.78 *
*

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* Frctn Loss (m)      * 0.63 * Cum Volume (1000 m3) * 0.02 * 0.53 * 0.01
* C & E Loss (m)     * 0.00 * Cum SA (1000 m2) * 0.16 * 1.13 * 0.06
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.sso ABBADIA
 REACH: 1 RS: 1.125*

INPUT

Description:

Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	433.223	15.778	430.787	16.627	430.593	18.406	430.342	21.615	429.694
25.873	428.631	29.119	428.036	32.357	427.672	34.923	427.224	36.053	426.967
36.859	426.999	37.659	427.054	41.385	427.179	45.325	427.72	51.409	429.557
60.688	430.388								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	32.357	.035	45.325	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	32.357	45.325		28.5	28.5	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m)      * 428.08 * Element          * Left OB * Channel * Right OB
* vel Head (m)       * 0.32  * wt. n-Val.       * 0.040  * 0.035  * 0.040
* W.S. Elev (m)      * 427.76 * Reach Len. (m)   * 28.50  * 28.50  * 28.50
* Crit W.S. (m)      * 427.81 * Flow Area (m2)   * 0.04   * 6.40   * 0.00
* E.G. Slope (m/m)   *0.019807 * Area (m2)        * 0.04   * 6.40   * 0.00
* Q Total (m3/s)     * 16.00 * Flow (m3/s)      * 0.02   * 15.98  * 0.00
* Top width (m)      * 13.90 * Top width (m)    * 0.79   * 12.97  * 0.14
* vel Total (m/s)    * 2.48  * Avg. vel. (m/s)  * 0.44   * 2.50   * 0.26
* Max chl Dpth (m)   * 0.79  * Hydr. Depth (m)  * 0.04   * 0.49   * 0.02
* Conv. Total (m3/s) * 113.7 * Conv. (m3/s)     * 0.1    * 113.6  * 0.0
* Length wtd. (m)    * 28.50 * wetted Per. (m)  * 0.80   * 13.08  * 0.14
* Min ch El (m)      * 426.97 * Shear (N/m2)     * 8.61   * 95.07  * 3.82
* Alpha              * 1.01  * Stream Power (N/m s) * 3.80  * 237.40 * 0.98
* Frctn Loss (m)     * 0.62  * Cum Volume (1000 m3) * 0.02  * 0.36  * 0.01
* C & E Loss (m)     * 0.02  * Cum SA (1000 m2) * 0.15  * 0.78  * 0.05
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.sso ABBADIA
 REACH: 1 RS: 1.0625*

INPUT

Description:

Station Elevation Data		num= 16		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	432.296	15.195	429.318	16.013	429.127	17.727	428.906	20.818	428.409
24.918	427.65	28.044	427.178	31.164	426.976	33.419	426.61	34.411	426.419
35.325	426.455	36.229	426.517	40.448	426.657	44.908	427.01	50.872	428.19
59.969	429.004								

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	31.164	.035	44.908	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	31.164	44.908		28.5	28.5		.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

* E.G. Elev (m)	* 427.46	* Element	* Left OB	* Channel	* Right OB	
* vel Head (m)	* 0.33	* wt. n-Val.	* 0.040	* 0.035	* 0.040	
* W.S. Elev (m)	* 427.13	* Reach Len. (m)	* 28.50	* 28.50	* 28.50	
* Crit W.S. (m)	* 427.21	* Flow Area (m2)	* 0.18	* 6.17	* 0.04	
* E.G. slope (m/m)	* 0.023651	* Area (m2)	* 0.18	* 6.17	* 0.04	
* Q Total (m3/s)	* 16.00	* Flow (m3/s)	* 0.12	* 15.86	* 0.02	
* Top width (m)	* 16.69	* Top width (m)	* 2.35	* 13.74	* 0.60	
* vel Total (m/s)	* 2.51	* Avg. vel. (m/s)	* 0.69	* 2.57	* 0.58	
* Max chl Dpth (m)	* 0.71	* Hydr. Depth (m)	* 0.08	* 0.45	* 0.06	
* Conv. Total (m3/s)	* 104.0	* Conv. (m3/s)	* 0.8	* 103.1	* 0.1	
* Length wtd. (m)	* 28.50	* wetted Per. (m)	* 2.35	* 13.81	* 0.61	
* Min ch El (m)	* 426.42	* Shear (N/m2)	* 17.59	* 103.67	* 13.44	
* Alpha	* 1.04	* Stream Power (N/m s)	* 12.12	* 266.29	* 7.74	
* Frctn Loss (m)	* 0.62	* Cum volume (1000 m3)	* 0.01	* 0.18	* 0.00	
* C & E Loss (m)	* 0.00	* Cum SA (1000 m2)	* 0.10	* 0.40	* 0.04	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: F.sso ABBADIA
 REACH: 1 RS: 1

INPUT

Description:

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	431.37	15.4	427.66	26.97	426.32	29.97	426.28	32.77	425.87
33.79	425.91	34.8	425.98	44.49	426.3	59.25	427.62		

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val

0 .04 29.97 .035 44.49 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
29.97 44.49 0 0 0 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

Table with 7 columns: Parameter, Value, Unit, Parameter, Value, Unit, Parameter. Rows include E.G. Elev (m), Vel Head (m), W.S. Elev (m), Crit W.S. (m), E.G. slope (m/m), Q Total (m3/s), Top width (m), Vel Total (m/s), Max Chl Dpth (m), Conv. Total (m3/s), Length wtd. (m), Min Ch El (m), Alpha, Frctn Loss (m), C & E Loss (m).

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

SUMMARY OF MANNING'S N VALUES

River:F.sso ABBADIA

Table with 7 columns: Reach, River Sta., n1, n2, n3. Rows list Manning's N values for various reaches, including a 'Bridge' entry.

SUMMARY OF REACH LENGTHS

ABBADIA.rep

River: F.sso ABBADIA

```

*****
*      Reach      *      River Sta.      *      Left      *      Channel      *      Right      *
*****
*1      *          *          3          *          28.125*      *          28.125*      *          28.125*
*1      *          *          2.875*      *          28.125*      *          28.125*      *          28.125*
*1      *          *          2.75*      *          28.125*      *          28.125*      *          28.125*
*1      *          *          2.625*      *          28.125*      *          28.125*      *          28.125*
*1      *          *          2.5*      *          28.125*      *          28.125*      *          28.125*
*1      *          *          2.375*      *          28.125*      *          28.125*      *          28.125*
*1      *          *          2.25*      *          28.125*      *          28.125*      *          28.125*
*1      *          *          2.125*      *          28.125*      *          28.125*      *          28.125*
*1      *          *          2          *          22*          *          22*          *          22*
*1      *          *          1.8          *          13*          *          13*          *          13*
*1      *          *          1.7          *          *          *          *          *          *
*1      *          *          1.5          *          28.5*          *          28.5*          *          28.5*
*1      *          *          1.4375*      *          28.5*          *          28.5*          *          28.5*
*1      *          *          1.375*      *          28.5*          *          28.5*          *          28.5*
*1      *          *          1.3125*      *          28.5*          *          28.5*          *          28.5*
*1      *          *          1.25*      *          28.5*          *          28.5*          *          28.5*
*1      *          *          1.1875*      *          28.5*          *          28.5*          *          28.5*
*1      *          *          1.125*      *          28.5*          *          28.5*          *          28.5*
*1      *          *          1.0625*      *          28.5*          *          28.5*          *          28.5*
*1      *          *          1          *          0*          *          0*          *          0*
*****

```

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: F.sso ABBADIA

```

*****
*      Reach      *      River Sta.      *      Contr.      *      Expan.      *
*****
*1      *          *          3          *          .1*          *          .3*
*1      *          *          2.875*      *          .1*          *          .3*
*1      *          *          2.75*      *          .1*          *          .3*
*1      *          *          2.625*      *          .1*          *          .3*
*1      *          *          2.5*      *          .1*          *          .3*
*1      *          *          2.375*      *          .1*          *          .3*
*1      *          *          2.25*      *          .1*          *          .3*
*1      *          *          2.125*      *          .1*          *          .3*
*1      *          *          2          *          .1*          *          .3*
*1      *          *          1.8          *          .3*          *          .5*
*1      *          *          1.7          *          *          *          *
*1      *          *          1.5          *          .3*          *          .5*
*1      *          *          1.4375*      *          .1*          *          .3*
*1      *          *          1.375*      *          .1*          *          .3*
*1      *          *          1.3125*      *          .1*          *          .3*
*1      *          *          1.25*      *          .1*          *          .3*
*1      *          *          1.1875*      *          .1*          *          .3*
*1      *          *          1.125*      *          .1*          *          .3*
*1      *          *          1.0625*      *          .1*          *          .3*
*1      *          *          1          *          .1*          *          .3*
*****

```

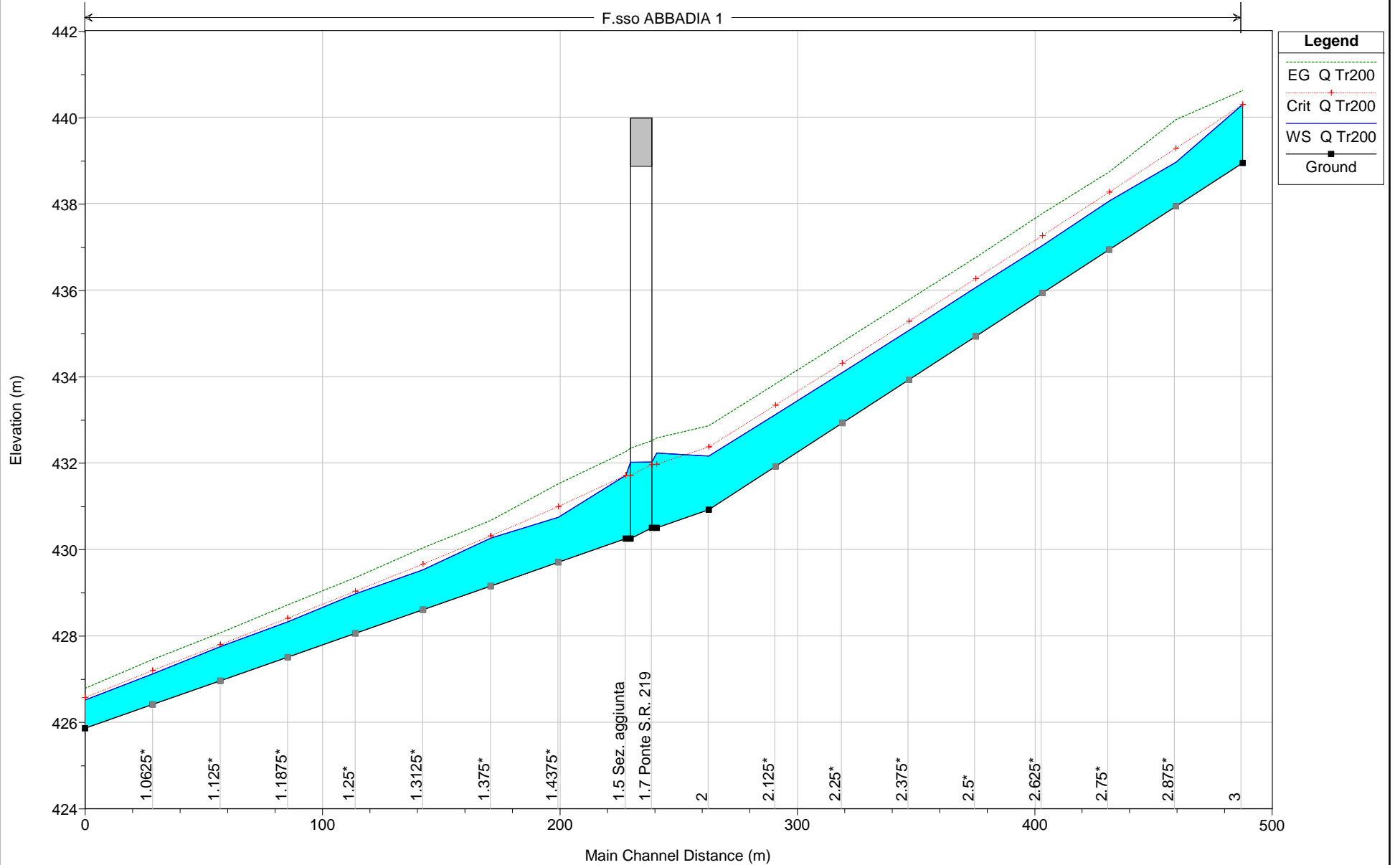
HEC-RAS Plan: plan Tr200 River: F.sso ABBADIA Reach: 1 Profile: Q Tr200

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
1	3	Q Tr200	16.00	438.96	440.31	440.31	440.63	0.011517	2.60	6.79	10.96	0.92
1	2.875*	Q Tr200	16.00	437.96	438.97	439.30	439.96	0.052862	4.42	3.66	7.04	1.86
1	2.75*	Q Tr200	16.00	436.95	438.08	438.29	438.75	0.030905	3.64	4.43	7.48	1.44
1	2.625*	Q Tr200	16.00	435.95	437.05	437.27	437.79	0.037530	3.81	4.20	6.99	1.57
1	2.5*	Q Tr200	16.00	434.95	436.08	436.28	436.77	0.034080	3.69	4.34	6.97	1.49
1	2.375*	Q Tr200	16.00	433.94	435.08	435.30	435.80	0.035162	3.74	4.28	6.79	1.51
1	2.25*	Q Tr200	16.00	432.94	434.11	434.32	434.81	0.034558	3.73	4.29	6.67	1.48
1	2.125*	Q Tr200	16.00	431.93	433.13	433.35	433.84	0.034586	3.73	4.29	6.54	1.47
1	2	Q Tr200	16.00	430.93	432.17	432.39	432.87	0.034276	3.71	4.31	6.44	1.45
1	1.8	Q Tr200	16.00	430.51	432.24	431.98	432.59	0.007941	2.63	6.09	8.74	0.73
1	1.7		Bridge									
1	1.5	Q Tr200	16.00	430.26	431.73	431.73	432.27	0.015578	3.28	4.87	7.60	1.01
1	1.4375*	Q Tr200	16.00	429.71	430.75	431.00	431.53	0.040193	3.91	4.09	6.69	1.60
1	1.375*	Q Tr200	16.00	429.16	430.27	430.32	430.68	0.018188	2.83	5.65	8.53	1.11
1	1.3125*	Q Tr200	16.00	428.61	429.54	429.67	430.05	0.026598	3.15	5.08	8.86	1.33
1	1.25*	Q Tr200	16.00	428.07	428.98	429.04	429.36	0.019889	2.71	5.90	10.47	1.15
1	1.1875*	Q Tr200	16.00	427.52	428.33	428.42	428.73	0.024384	2.78	5.76	11.55	1.26
1	1.125*	Q Tr200	16.00	426.97	427.76	427.81	428.08	0.019807	2.50	6.44	13.90	1.13
1	1.0625*	Q Tr200	16.00	426.42	427.13	427.21	427.46	0.023651	2.57	6.39	16.69	1.22
1	1	Q Tr200	16.00	425.87	426.52	426.58	426.80	0.021753	2.38	7.32	21.77	1.17

MACROAREA 06 FOSSO DELL'ABBADIA Plan: Plan 02

Flow: Tr200

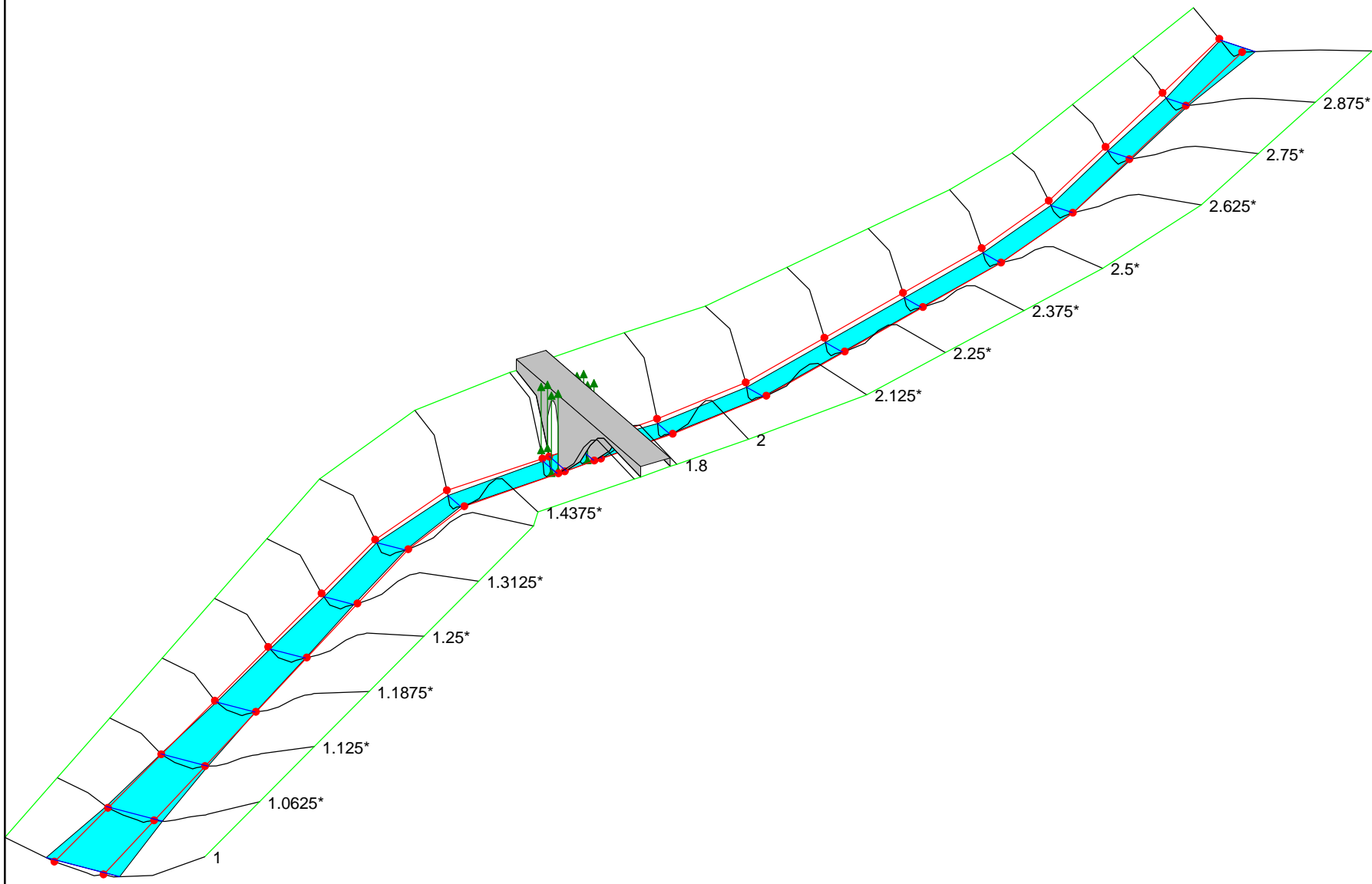
F.sso ABBADIA 1

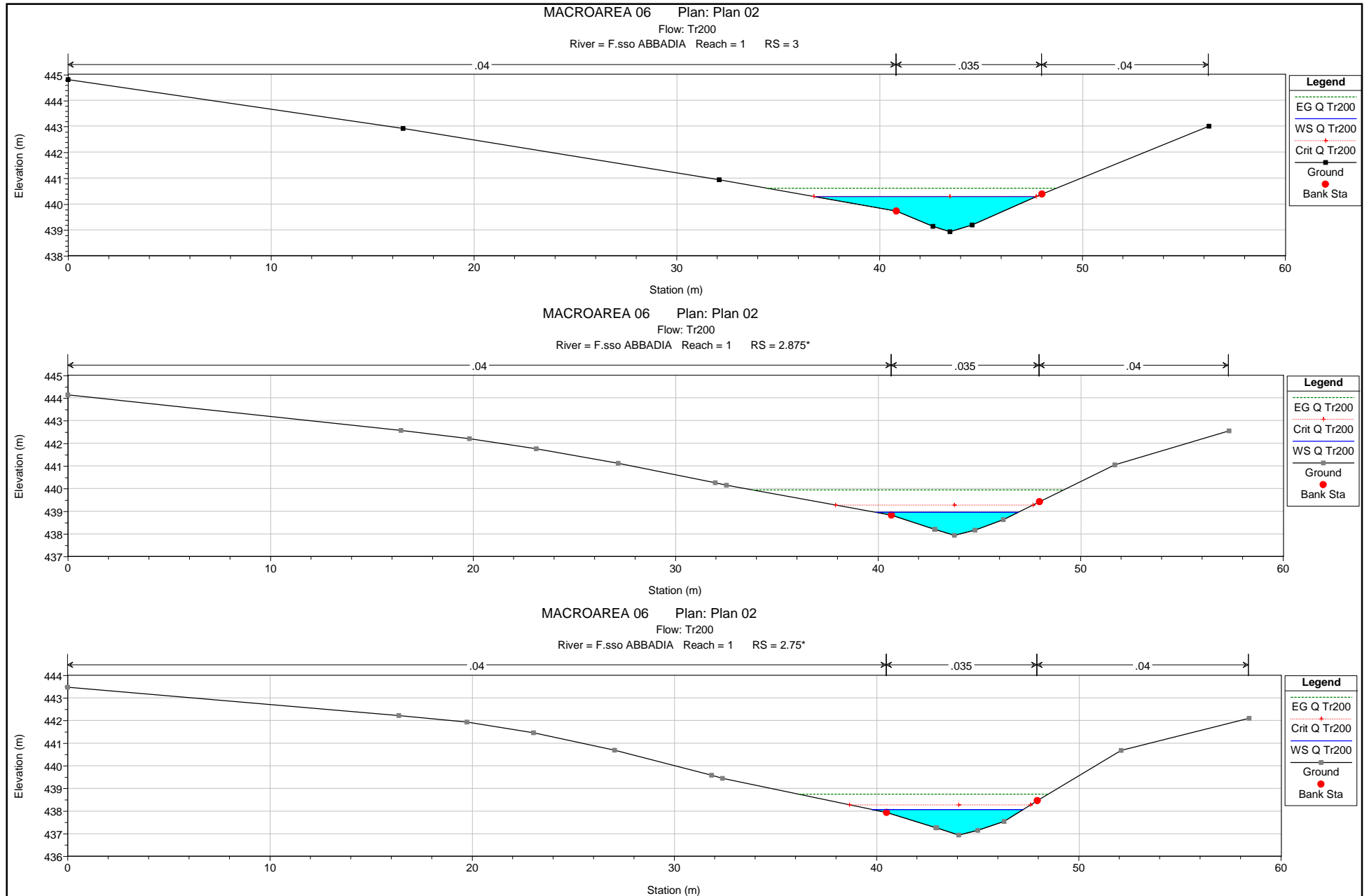


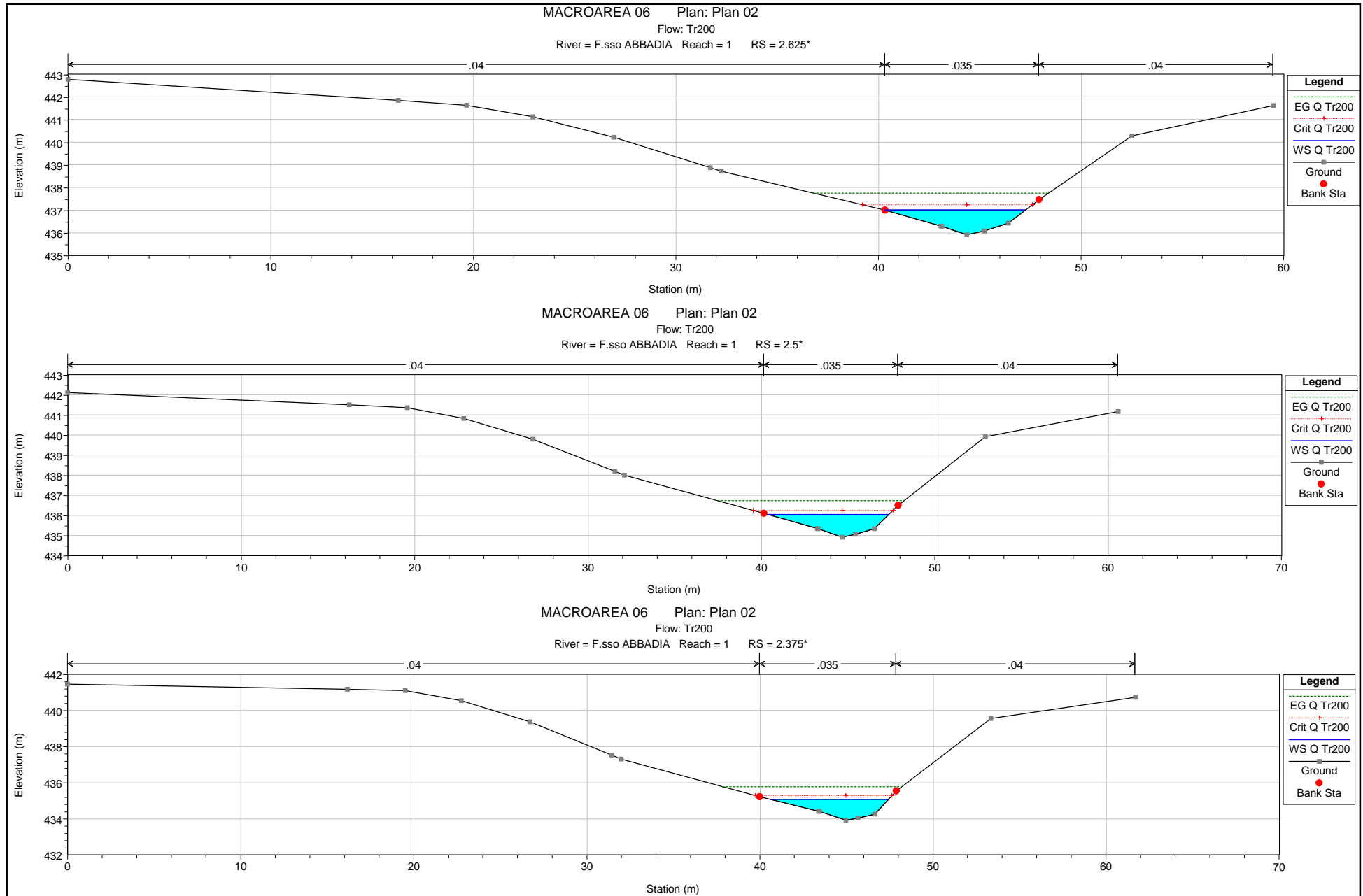
MACROAREA 06 Plan: Plan 02
Flow: Tr200 FOSSO DELL'ABBADIA

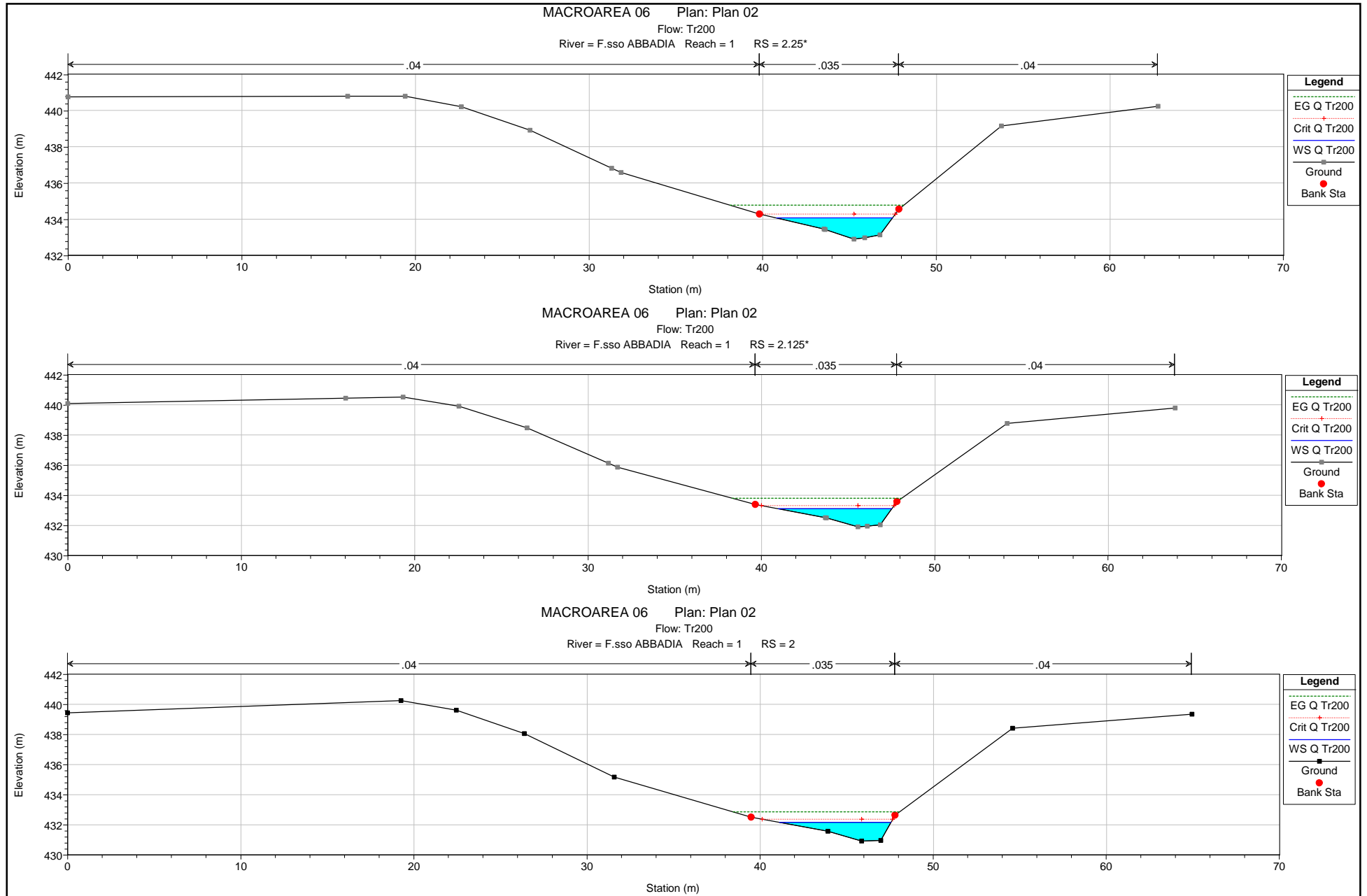
Legend

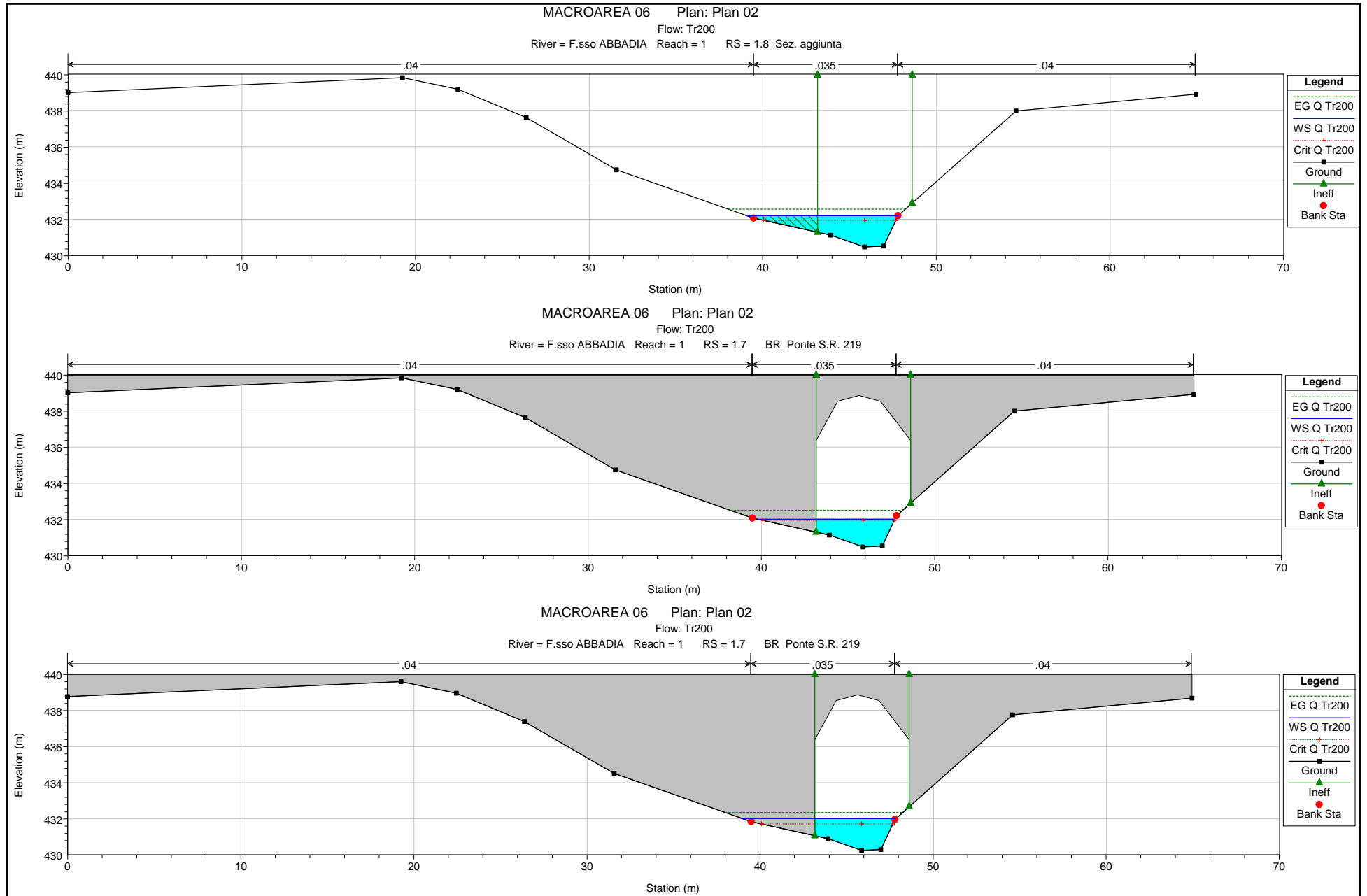
- WS Q Tr200
- Ground
- Bank Sta
- Ground
- Ineff

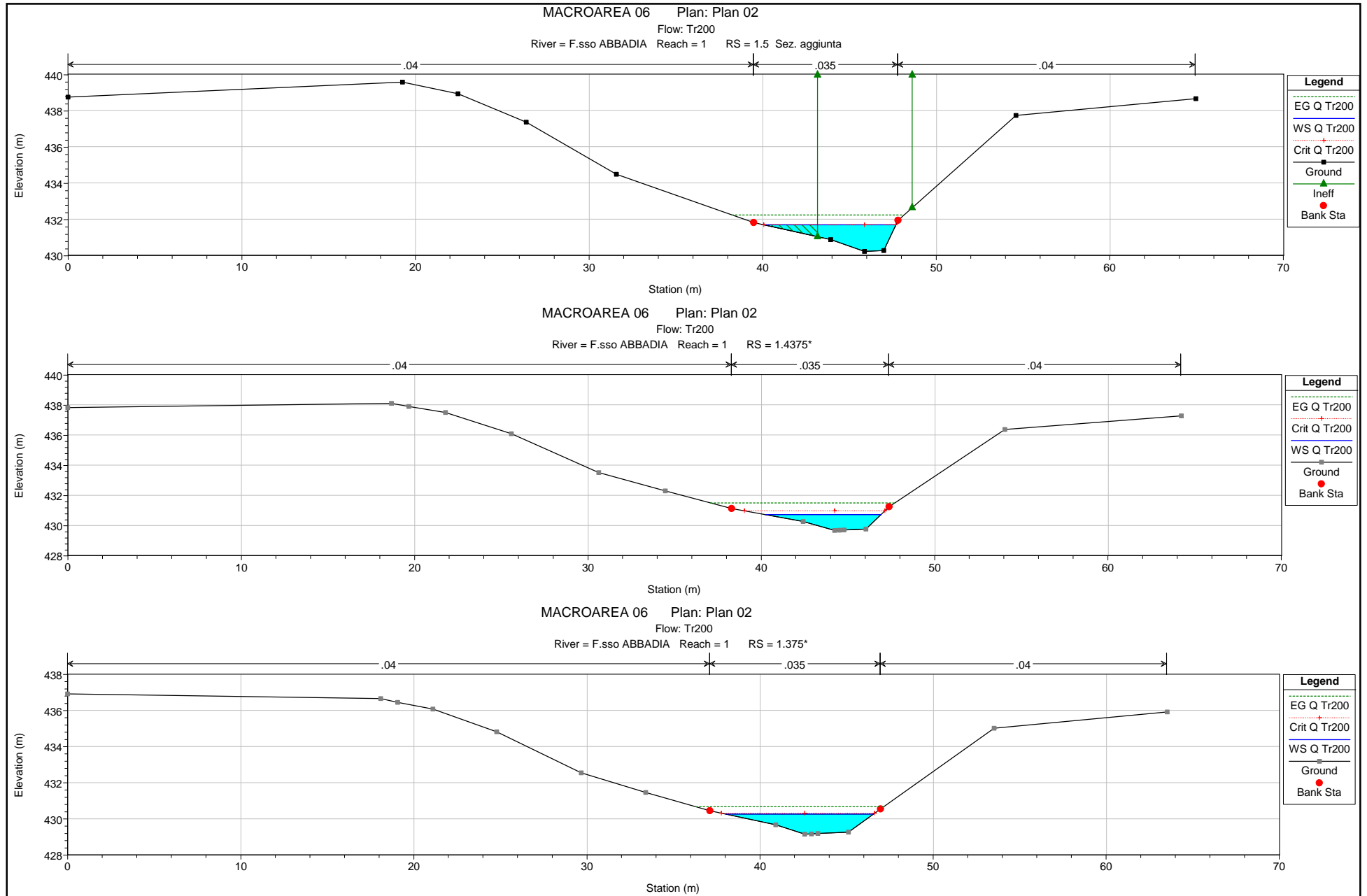


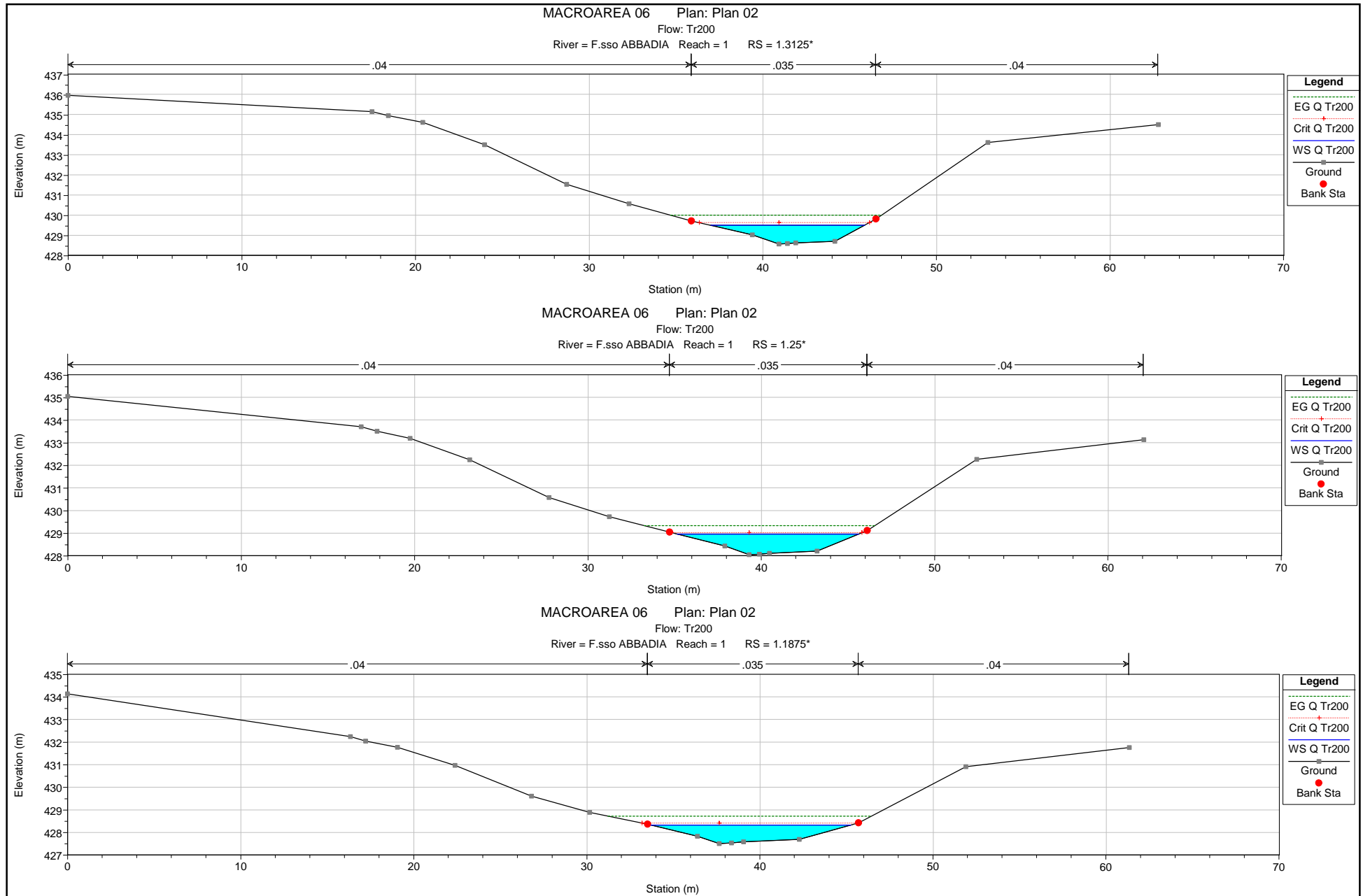


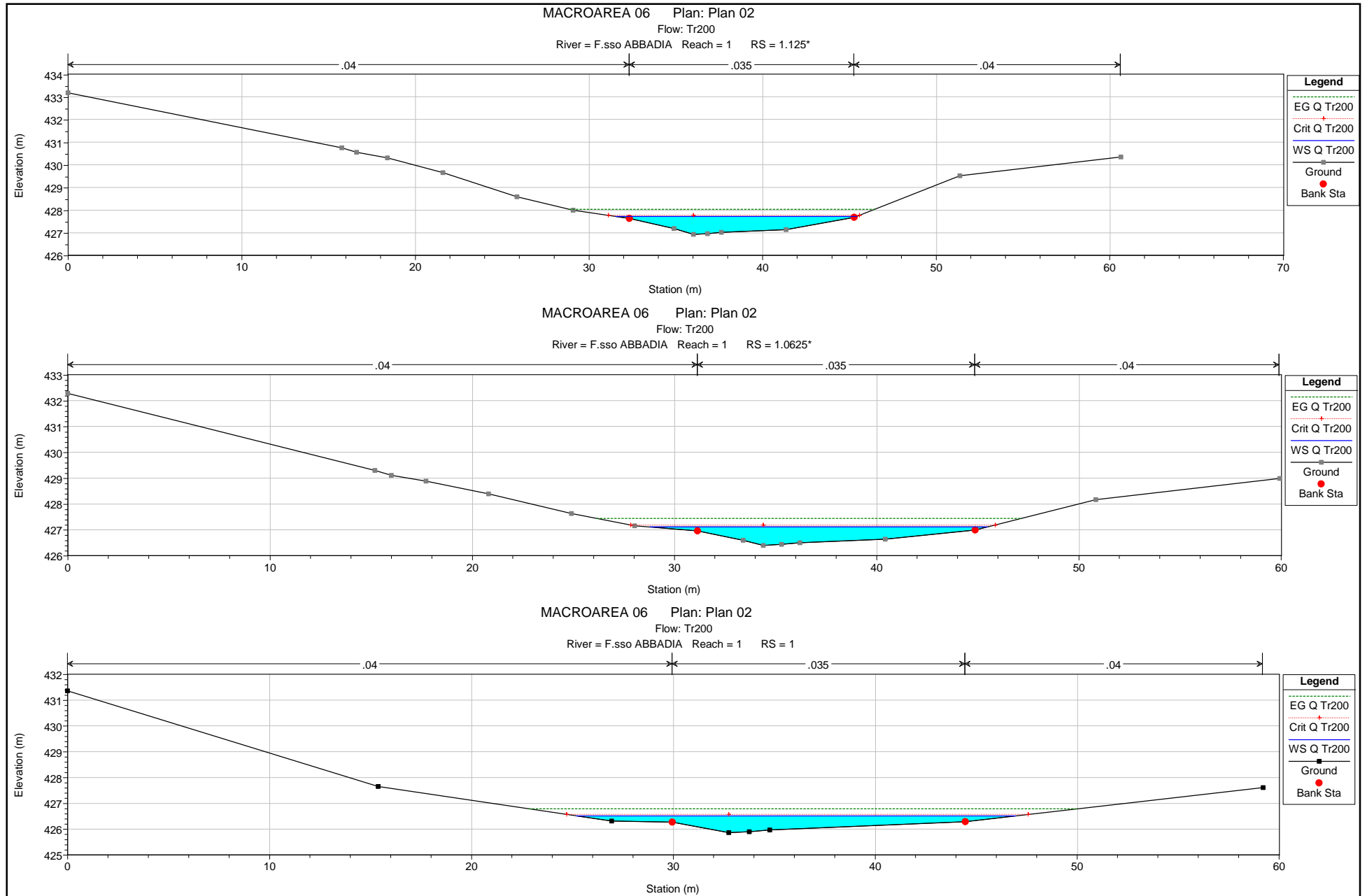












Padule50.rep

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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PROJECT DATA
Project Title: MACROAREA 06
Project File : Padule50.prj
Run Date and Time: 24/11/2006 17.30.41

Project in SI units

Project Description:
verifica MACROAREA 06 FOSSO DI PADULE

FLOW DATA

Flow Title: FlowTr50
Flow File : n:\2006\06033\Integrazione\HEC_PADULE\HEC_Tr50\Padule50.f03

Flow Data (m3/s)

* River Reach RS * Q Tr50 *
* Fosso PADULE 1 5 * 8.2 *

Boundary Conditions

* River Reach Profile * Upstream
Downstream *

* Fosso PADULE 1 Q Tr50 * Critical
Normal S = 0.028 *

GEOMETRY DATA

Geometry Title: Fosso PADULE
Geometry File : n:\2006\06033\Integrazione\HEC_PADULE\HEC_Tr50\Padule50.g01

CROSS SECTION

RIVER: Fosso PADULE
REACH: 1 RS: 5

INPUT

Description:
Station Elevation Data num= 7
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

0 464.92 15.95 464.74 19.69 461.89 20.33 461.06 21.15 461.13
25.89 467.29 38.33 468.38

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val

 0 .04 15.95 .035 25.89 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 15.95 25.89 29.5 29.5 29.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 462.94 * Element * Left OB * Channel * Right OB
 * Vel Head (m) * 0.42 * wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 462.52 * Reach Len. (m) * 29.50 * 29.50 * 29.50
 * Crit W.S. (m) * 462.52 * Flow Area (m2) * * 2.84 *
 * E.G. Slope (m/m) *0.019773 * Area (m2) * * 2.84 *
 * Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
 * Top width (m) * 3.36 * Top width (m) * * 3.36 *
 * Vel Total (m/s) * 2.89 * Avg. Vel. (m/s) * * 2.89 *
 * Max Chl Dpth (m) * 1.46 * Hydr. Depth (m) * * 0.85 *
 * Conv. Total (m3/s) * 58.3 * Conv. (m3/s) * * 58.3 *
 * Length Wtd. (m) * 29.50 * wetted Per. (m) * * 4.66 *
 * Min Ch El (m) * 461.06 * Shear (N/m2) * * 118.10 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 340.91 *
 * Frctn Loss (m) * 0.58 * Cum Volume (1000 m3) * * 1.66 *
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 2.13 *
 *

 **

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: FOSSO PADULE
 REACH: 1 RS: 4.875*

INPUT

Description:

Station Elevation Data num= 8
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 463.838 14.539 463.679 18.071 460.889 18.675 460.112 19.454 460.189
 21.176 462.282 23.96 465.863 35.78 466.8

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 14.539 .035 23.96 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 14.539 23.96 29.5 29.5 29.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

Padule50.rep

```

*****
**
* E.G. Elev (m)      * 462.10 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 0.74  * wt. n-Val.      *         * 0.035  *
* W.S. Elev (m)     * 461.35 * Reach Len. (m)   * 29.50  * 29.50  * 29.50
* Crit W.S. (m)     * 461.57 * Flow Area (m2)   *         * 2.15   *
* E.G. Slope (m/m)  *0.041263 * Area (m2)        *         * 2.15   *
* Q Total (m3/s)    * 8.20  * Flow (m3/s)      *         * 8.20   *
* Top width (m)     * 2.93  * Top width (m)    *         * 2.93   *
* Vel Total (m/s)   * 3.82  * Avg. Vel. (m/s)  *         * 3.82   *
* Max Chl Dpth (m) * 1.24  * Hydr. Depth (m)  *         * 0.73   *
* Conv. Total (m3/s) * 40.4  * Conv. (m3/s)     *         * 40.4   *
* Length wtd. (m)  * 29.50 * Wetted Per. (m)  *         * 4.03   *
* Min Ch El (m)    * 460.11 * Shear (N/m2)     *         * 215.91 *
* Alpha            * 1.00  * Stream Power (N/m s) *         * 824.33 *
* Frctn Loss (m)   * 0.81  * Cum Volume (1000 m3) *         * 1.58   *
* C & E Loss (m)   * 0.03  * Cum SA (1000 m2)  *         * 2.03   *
*****
**

```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 4.75*

INPUT

Description:

Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.755	13.127	462.617	16.451	459.889	17.02	459.165	17.759	459.248
19.391	461.08	22.03	464.435	33.23	465.22				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	13.127	.035	22.03	.04

Bank	Sta: Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	13.127	22.03		29.5	29.5		.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)      * 461.06 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 0.53  * wt. n-Val.      *         * 0.035  *
* W.S. Elev (m)     * 460.53 * Reach Len. (m)   * 29.50  * 29.50  * 29.50
* Crit W.S. (m)     * 460.63 * Flow Area (m2)   *         * 2.53   *
*****

```

Padule50.rep

```

*
* E.G. Slope (m/m)      *0.026811 * Area (m2)          *          * 2.53 *
*
* Q Total (m3/s)       * 8.20 * Flow (m3/s)        *          * 8.20 *
*
* Top width (m)        * 3.23 * Top width (m)       *          * 3.23 *
*
* Vel Total (m/s)      * 3.24 * Avg. Vel. (m/s)     *          * 3.24 *
*
* Max Chl Dpth (m)    * 1.36 * Hydr. Depth (m)    *          * 0.78 *
*
* Conv. Total (m3/s)   * 50.1 * Conv. (m3/s)        *          * 50.1 *
*
* Length Wtd. (m)     * 29.50 * Wetted Per. (m)    *          * 4.39 *
*
* Min Ch El (m)       * 459.17 * Shear (N/m2)       *          * 151.52 *
*
* Alpha               * 1.00 * Stream Power (N/m s) *          * 490.92 *
*
* Frctn Loss (m)      * 0.97 * Cum Volume (1000 m3) *          * 1.52 *
*
* C & E Loss (m)      * 0.06 * Cum SA (1000 m2)   *          * 1.94 *
*

```

**

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
REACH: 1 RS: 4.625*

INPUT

Description:

Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	461.673	11.716	461.556	14.832	458.888	15.365	458.217	16.063	458.307
17.606	459.879	20.1	463.008	30.68	463.64				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	11.716	.035	20.1	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	11.716	20.1		29.5	29.5	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)      * 460.15 * Element          * Left OB * Channel * Right OB
*
* Vel Head (m)       * 0.65 * wt. n-Val.       *          * 0.035 *
*
* W.S. Elev (m)      * 459.50 * Reach Len. (m)   * 29.50 * 29.50 * 29.50
*
* Crit w.s. (m)      * 459.68 * Flow Area (m2)    *          * 2.29 *
*
* E.G. Slope (m/m)   *0.034976 * Area (m2)         *          * 2.29 *
*
* Q Total (m3/s)     * 8.20 * Flow (m3/s)       *          * 8.20 *
*
* Top width (m)      * 3.12 * Top width (m)     *          * 3.12 *
*
* Vel Total (m/s)    * 3.58 * Avg. vel. (m/s)   *          * 3.58 *
*
* Max Chl Dpth (m)   * 1.28 * Hydr. Depth (m)   *          * 0.73 *
*
* Conv. Total (m3/s) * 43.8 * Conv. (m3/s)      *          * 43.8 *
*

```



```

Padule50.rep
* Length wtd. (m) * 29.50 * wetted Per. (m) * * 4.18 *
* Min Ch El (m) * 458.22 * Shear (N/m2) * * 188.08 *
* Alpha * 1.00 * Stream Power (N/m s) * * 673.29 *
* Frctn Loss (m) * 0.90 * Cum Volume (1000 m3) * * 1.44 *
* C & E Loss (m) * 0.01 * Cum SA (1000 m2) * * 1.85 *
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 4.5*

INPUT

Description:

```

Station Elevation Data num= 8
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
*****
0 460.59 10.305 460.495 13.212 457.887 13.71 457.27 14.368 457.366
15.821 458.677 18.17 461.58 28.13 462.06

```

```

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
*****
0 .04 10.305 .035 18.17 .04

```

```

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
10.305 18.17 29.5 29.5 29.5 .1 .3

```

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m) * 459.17 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.59 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 458.58 * Reach Len. (m) * 29.50 * 29.50 * 29.50
* Crit W.S. (m) * 458.72 * Flow Area (m2) * * 2.41 *
* E.G. Slope (m/m) *0.030726 * Area (m2) * * 2.41 *
* Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
* Top width (m) * 3.27 * Top width (m) * * 3.27 *
* Vel Total (m/s) * 3.40 * Avg. Vel. (m/s) * * 3.40 *
* Max Chl Dpth (m) * 1.31 * Hydr. Depth (m) * * 0.74 *
* Conv. Total (m3/s) * 46.8 * Conv. (m3/s) * * 46.8 *
* Length wtd. (m) * 29.50 * wetted Per. (m) * * 4.30 *
* Min Ch El (m) * 457.27 * Shear (N/m2) * * 168.70 *
* Alpha * 1.00 * Stream Power (N/m s) * * 573.95 *
* Frctn Loss (m) * 0.97 * Cum Volume (1000 m3) * * 1.37 *
* C & E Loss (m) * 0.02 * Cum SA (1000 m2) * * 1.76 *
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Padule50.rep

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 4.375*

INPUT

Description:

Station Elevation Data num= 8
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 459.508 8.894 459.434 11.593 456.887 12.055 456.323 12.672 456.425
 14.035 457.475 16.24 460.152 25.58 460.48

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 8.894 .035 16.24 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 8.894 16.24 29.5 29.5 29.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 458.22 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.63 * wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 457.59 * Reach Len. (m) * 29.50 * 29.50 * 29.50
 * Crit W.S. (m) * 457.75 * Flow Area (m2) * * 2.33 *
 * E.G. Slope (m/m) *0.033599 * Area (m2) * * 2.33 *
 * Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
 * Top width (m) * 3.27 * Top width (m) * * 3.27 *
 * vel Total (m/s) * 3.52 * Avg. vel. (m/s) * * 3.52 *
 * Max chl Dpth (m) * 1.26 * Hydr. Depth (m) * * 0.71 *
 * Conv. Total (m3/s) * 44.7 * Conv. (m3/s) * * 44.7 *
 * Length wtd. (m) * 29.50 * wetted Per. (m) * * 4.24 *
 * Min ch El (m) * 456.32 * Shear (N/m2) * * 181.32 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 637.68 *
 * Frctn Loss (m) * 0.95 * Cum volume (1000 m3) * * 1.30 *
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 1.66 *

 **

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 4.25*

INPUT

Description:

Station Elevation Data num= 8
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 458.425 7.483 458.372 9.974 455.886 10.4 455.375 10.977 455.484
 12.25 456.273 14.31 458.725 23.03 458.9

Manning's n Values num= 3

Sta n Val Sta n Val Sta n Val

 0 .04 7.483 .035 14.31 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 7.483 14.31 29.5 29.5 29.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 457.23 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.62 * wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 456.61 * Reach Len. (m) * 29.50 * 29.50 * 29.50
 * Crit W.S. (m) * 456.77 * Flow Area (m2) * * 2.35 *
 * E.G. Slope (m/m) *0.032741 * Area (m2) * * 2.35 *
 * Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
 * Top width (m) * 3.29 * Top width (m) * * 3.29 *
 * vel Total (m/s) * 3.50 * Avg. vel. (m/s) * * 3.50 *
 * Max Chl Dpth (m) * 1.24 * Hydr. Depth (m) * * 0.71 *
 * Conv. Total (m3/s) * 45.3 * Conv. (m3/s) * * 45.3 *
 * Length wtd. (m) * 29.50 * wetted Per. (m) * * 4.22 *
 * Min Ch El (m) * 455.37 * Shear (N/m2) * * 178.48 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 623.84 *
 * Frctn Loss (m) * 0.98 * Cum Volume (1000 m3) * * 1.24 *
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 1.56 *

 **

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FOSSO PADULE
 REACH: 1 RS: 4.125*

INPUT

Description:

Station Elevation Data num= 8
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 457.342 6.071 457.311 8.354 454.885 8.745 454.428 9.281 454.543
 10.465 455.072 12.38 457.297 20.48 457.32

Manning's n Values

num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 6.071 .035 12.38 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 6.071 12.38 29.5 29.5 29.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 456.25 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.64 * wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 455.62 * Reach Len. (m) * 29.50 * 29.50 * 29.50
 *

```

Padule50.rep
* Crit W.S. (m) * 455.79 * Flow Area (m2) * * 2.32 *
* E.G. Slope (m/m) *0.033547 * Area (m2) * * 2.32 *
* Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
* Top width (m) * 3.27 * Top width (m) * * 3.27 *
* Vel Total (m/s) * 3.54 * Avg. Vel. (m/s) * * 3.54 *
* Max Chl Dpth (m) * 1.19 * Hydr. Depth (m) * * 0.71 *
* Conv. Total (m3/s) * 44.8 * Conv. (m3/s) * * 44.8 *
* Length wtd. (m) * 29.50 * Wetted Per. (m) * * 4.17 *
* Min Ch El (m) * 454.43 * Shear (N/m2) * * 182.91 *
* Alpha * 1.00 * Stream Power (N/m s) * * 647.19 *
* Frctn Loss (m) * 0.98 * Cum Volume (1000 m3) * * 1.17 *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 1.47 *
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
REACH: 1

RS: 4

INPUT

Description:

Station Elevation Data num= 6
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

0 456.26 4.66 456.25 7.09 453.48 8.68 453.87 10.45 455.87
17.93 455.74

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val

0 .04 4.66 .035 10.45 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4.66 10.45 23 23 23 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m) * 455.26 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.64 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 454.61 * Reach Len. (m) * 23.00 * 23.00 * 23.00
* Crit W.S. (m) * 454.79 * Flow Area (m2) * * 2.30 *
* E.G. Slope (m/m) *0.033877 * Area (m2) * * 2.30 *
* Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
* Top width (m) * 3.24 * Top width (m) * * 3.24 *
* Vel Total (m/s) * 3.56 * Avg. Vel. (m/s) * * 3.56 *
* Max Chl Dpth (m) * 1.13 * Hydr. Depth (m) * * 0.71 *
* Conv. Total (m3/s) * 44.6 * Conv. (m3/s) * * 44.6 *
* Length wtd. (m) * 23.00 * Wetted Per. (m) * * 4.14 *
**

```

```

Padule50.rep
* Min Ch El (m) * 453.48 * Shear (N/m2) * * 184.88 *
* Alpha * 1.00 * Stream Power (N/m s) * * 657.78 *
* Frctn Loss (m) * 0.99 * Cum Volume (1000 m3) * * 1.10 *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 1.37 *
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 3.875*

INPUT

Description:

Station Elevation Data num= 7
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 455.228 3.495 455.22 5.32 452.88 5.993 452.88 7.186 453.575
 8.515 455.522 14.125 455.425

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .036 3.495 .032 8.515 .036

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 3.495 8.515 23 23 23 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m) * 454.63 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.51 * wt. n-Val. * * 0.032 *
* W.S. Elev (m) * 454.11 * Reach Len. (m) * 23.00 * 23.00 * 23.00
* Crit W.S. (m) * 454.19 * Flow Area (m2) * * 2.58 *
* E.G. slope (m/m) *0.020240 * Area (m2) * * 2.58 *
* Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
* Top width (m) * 3.20 * Top width (m) * * 3.20 *
* vel Total (m/s) * 3.18 * Avg. vel. (m/s) * * 3.18 *
* Max chl Dpth (m) * 1.23 * Hydr. Depth (m) * * 0.81 *
* Conv. Total (m3/s) * 57.6 * Conv. (m3/s) * * 57.6 *
* Length wtd. (m) * 23.00 * wetted Per. (m) * * 4.27 *
* Min Ch El (m) * 452.88 * Shear (N/m2) * * 119.93 *
* Alpha * 1.00 * Stream Power (N/m s) * * 381.10 *
* Frctn Loss (m) * 0.59 * Cum Volume (1000 m3) * * 1.04 *
* C & E Loss (m) * 0.04 * Cum SA (1000 m2) * * 1.30 *
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

Padule50.rep

RIVER: Fosso PADULE
 REACH: 1 RS: 3.75*

INPUT

Description:

Station Elevation Data		num= 7		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	454.195	2.33	454.19	3.55	452.28	4.895	452.28	5.692	453.279
6.58	455.175	10.32	455.11						

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.032	2.33	.03	6.58	.032		

Bank Sta: Left 2.33 Right 6.58 Lengths: Left Channel 23 Right 23 Coeff Contr. .1 Expan. .3

CROSS SECTION OUTPUT Profile #Q Tr50

**	* E.G. Elev (m)	* 454.05	* Element	* Left OB	* Channel	* Right OB
* *	* vel Head (m)	* 0.74	* wt. n-Val.	* *	* 0.030	* *
* *	* W.S. Elev (m)	* 453.31	* Reach Len. (m)	* 23.00	* 23.00	* 23.00
* *	* Crit W.S. (m)	* 453.51	* Flow Area (m2)	* *	* 2.15	* *
* *	* E.G. slope (m/m)	* 0.028946	* Area (m2)	* *	* 2.15	* *
* *	* Q Total (m3/s)	* 8.20	* Flow (m3/s)	* *	* 8.20	* *
* *	* Top width (m)	* 2.81	* Top width (m)	* *	* 2.81	* *
* *	* vel Total (m/s)	* 3.82	* Avg. vel. (m/s)	* *	* 3.82	* *
* *	* Max chl Dpth (m)	* 1.03	* Hydr. Depth (m)	* *	* 0.76	* *
* *	* Conv. Total (m3/s)	* 48.2	* Conv. (m3/s)	* *	* 48.2	* *
* *	* Length wtd. (m)	* 23.00	* wetted Per. (m)	* *	* 3.88	* *
* *	* Min ch El (m)	* 452.28	* Shear (N/m2)	* *	* 157.04	* *
* *	* Alpha	* 1.00	* Stream Power (N/m s)	* *	* 600.22	* *
* *	* Frctn Loss (m)	* 0.55	* Cum volume (1000 m3)	* *	* 0.99	* *
* *	* C & E Loss (m)	* 0.02	* Cum SA (1000 m2)	* *	* 1.23	* *
* *	*****					
* *	**					

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 3.625*

INPUT

Description:

Station Elevation Data		num= 7		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	453.163	1.165	453.16	1.78	451.68	3.798	451.68	4.199	452.984
4.645	454.828	6.515	454.795						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .029 1.165 .027 4.645 .029

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1.165 4.645 23 23 23 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 453.38 * Element * Left OB * Channel * Right OB
 * Vel Head (m) * 0.84 * wt. n-Val. * * 0.027 *
 * W.S. Elev (m) * 452.55 * Reach Len. (m) * 23.00 * 23.00 * 23.00
 * Crit W.S. (m) * 452.79 * Flow Area (m2) * * 2.03 *
 * E.G. Slope (m/m) *0.028313 * Area (m2) * * 2.03 *
 * Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
 * Top width (m) * 2.65 * Top width (m) * * 2.65 *
 * Vel Total (m/s) * 4.05 * Avg. Vel. (m/s) * * 4.05 *
 * Max Chl Dpth (m) * 0.87 * Hydr. Depth (m) * * 0.77 *
 * Conv. Total (m3/s) * 48.7 * Conv. (m3/s) * * 48.7 *
 * Length wtd. (m) * 23.00 * wetted Per. (m) * * 3.87 *
 * Min Ch El (m) * 451.68 * Shear (N/m2) * * 145.41 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 588.76 *
 * Frctn Loss (m) * 0.66 * Cum Volume (1000 m3) * * 0.94 *
 * C & E Loss (m) * 0.01 * Cum SA (1000 m2) * * 1.16 *

 **

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 3.5

INPUT

Description:

Station Elevation Data num= 4
 Sta Elev Sta Elev Sta Elev Sta Elev

 0 452.13 .01 451.08 2.7 451.08 2.71 454.48

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .025 0 .025 2.71 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 2.71 28 28 28 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 452.70 * Element * Left OB * Channel * Right OB
 * Vel Head (m) * 0.90 * wt. n-Val. * * 0.025 *
 * W.S. Elev (m) * 451.80 * Reach Len. (m) * 28.00 * 28.00 * 28.00
 *

```

Padule50.rep
* Crit W.S. (m) * 452.06 * Flow Area (m2) * * 1.95 *
* E.G. Slope (m/m) *0.030110 * Area (m2) * * 1.95 *
* Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
* Top width (m) * 2.70 * Top width (m) * * 2.70 *
* Vel Total (m/s) * 4.20 * Avg. Vel. (m/s) * * 4.20 *
* Max Chl Dpth (m) * 0.72 * Hydr. Depth (m) * * 0.72 *
* Conv. Total (m3/s) * 47.3 * Conv. (m3/s) * * 47.3 *
* Length wtd. (m) * 28.00 * wetted Per. (m) * * 4.14 *
* Min Ch El (m) * 451.08 * Shear (N/m2) * * 139.19 *
* Alpha * 1.00 * Stream Power (N/m s) * * 585.17 *
* Frctn Loss (m) * 0.67 * Cum Volume (1000 m3) * * 0.89 *
* C & E Loss (m) * 0.01 * Cum SA (1000 m2) * * 1.10 *
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
REACH: 1

RS: 3.4*

INPUT

Description:

Station Elevation Data num= 4
Sta Elev Sta Elev Sta Elev Sta Elev

0 450.974 .01 449.924 2.7 449.924 2.71 453.324

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val

0 .025 0 .025 2.71 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 2.71 28 28 28 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m) * 451.70 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 1.12 * wt. n-Val. * * 0.025 *
* W.S. Elev (m) * 450.57 * Reach Len. (m) * 28.00 * 28.00 * 28.00
* Crit W.S. (m) * 450.90 * Flow Area (m2) * * 1.75 *
* E.G. Slope (m/m) *0.041506 * Area (m2) * * 1.75 *
* Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
* Top width (m) * 2.70 * Top width (m) * * 2.70 *
* Vel Total (m/s) * 4.70 * Avg. Vel. (m/s) * * 4.70 *
* Max Chl Dpth (m) * 0.65 * Hydr. Depth (m) * * 0.65 *
* Conv. Total (m3/s) * 40.2 * Conv. (m3/s) * * 40.2 *
* Length wtd. (m) * 28.00 * wetted Per. (m) * * 3.99 *
* Min Ch El (m) * 449.92 * Shear (N/m2) * * 178.22 *

```


Padule50.rep

```

*
* Alpha          *      1.00 * Stream Power (N/m s) *          * 837.46 *
*
* Frctn Loss (m) *      0.98 * Cum Volume (1000 m3) *          * 0.84 *
*
* C & E Loss (m) *      0.02 * Cum SA (1000 m2)    *          * 1.03 *
*
*****
**

```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
REACH: 1 RS: 3.3*

INPUT

Description:

Station Elevation Data num= 4

Sta Elev Sta Elev Sta Elev Sta Elev

0 449.818 .01 448.768 2.7 448.768 2.71 452.168

Manning's n Values num= 3

Sta n Val Sta n Val Sta n Val

0 .025 0 .025 2.71 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 2.71 28 28 28 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m) * 450.54 * Element * Left OB * Channel * Right OB
*
* Vel Head (m) * 1.12 * wt. n-Val. * * 0.025 *
*
* W.S. Elev (m) * 449.42 * Reach Len. (m) * 28.00 * 28.00 * 28.00
*
* Crit W.S. (m) * 449.75 * Flow Area (m2) * * 1.75 *
*
* E.G. Slope (m/m) *0.041189 * Area (m2) * * 1.75 *
*
* Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
*
* Top width (m) * 2.70 * Top width (m) * * 2.70 *
*
* Vel Total (m/s) * 4.69 * Avg. Vel. (m/s) * * 4.69 *
*
* Max Chl Dpth (m) * 0.65 * Hydr. Depth (m) * * 0.65 *
*
* Conv. Total (m3/s) * 40.4 * Conv. (m3/s) * * 40.4 *
*
* Length Wtd. (m) * 28.00 * wetted Per. (m) * * 3.99 *
*
* Min Ch El (m) * 448.77 * Shear (N/m2) * * 177.18 *
*
* Alpha * 1.00 * Stream Power (N/m s) * * 830.35 *
*
* Frctn Loss (m) * 1.16 * Cum Volume (1000 m3) * * 0.79 *
*
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 0.95 *
*
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 3.2*

INPUT

Description:

Station Elevation Data num= 4
 Sta Elev Sta Elev Sta Elev Sta Elev

 0 448.662 .01 447.612 2.7 447.612 2.71 451.012

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .025 0 .025 2.71 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 2.71 28 28 28 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 449.38 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 1.12 * wt. n-Val. * * 0.025 *
 * W.S. Elev (m) * 448.26 * Reach Len. (m) * 28.00 * 28.00 * 28.00
 * Crit W.S. (m) * 448.59 * Flow Area (m2) * * 1.75 *
 * E.G. Slope (m/m) *0.041189 * Area (m2) * * 1.75 *
 * Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
 * Top width (m) * 2.70 * Top width (m) * * 2.70 *
 * vel Total (m/s) * 4.69 * Avg. vel. (m/s) * * 4.69 *
 * Max chl Dpth (m) * 0.65 * Hydr. Depth (m) * * 0.65 *
 * Conv. Total (m3/s) * 40.4 * Conv. (m3/s) * * 40.4 *
 * Length wtd. (m) * 28.00 * wetted Per. (m) * * 3.99 *
 * Min ch El (m) * 447.61 * Shear (N/m2) * * 177.18 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 830.35 *
 * Frctn Loss (m) * 1.15 * Cum volume (1000 m3) * * 0.74 *
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 0.88 *
 *

 **

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 3.1*

INPUT

Description:

Station Elevation Data num= 4
 Sta Elev Sta Elev Sta Elev Sta Elev

 0 447.506 .01 446.456 2.7 446.456 2.71 449.856

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .025 0 .025 2.71 .025

Padule50.rep

Bank Sta: Left 0 Right 2.71 Lengths: Left Channel 28 Right 28 Coeff Contr. .1 Expan. .3

CROSS SECTION OUTPUT Profile #Q Tr50

```
*****
**
* E.G. Elev (m) * 448.23 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 1.12 * wt. n-Val. * * 0.025 *
* W.S. Elev (m) * 447.10 * Reach Len. (m) * 28.00 * 28.00 * 28.00
* Crit W.S. (m) * 447.43 * Flow Area (m2) * * 1.75 *
* E.G. Slope (m/m) *0.041320 * Area (m2) * * 1.75 *
* Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
* Top width (m) * 2.70 * Top width (m) * * 2.70 *
* Vel Total (m/s) * 4.69 * Avg. Vel. (m/s) * * 4.69 *
* Max Chl Dpth (m) * 0.65 * Hydr. Depth (m) * * 0.65 *
* Conv. Total (m3/s) * 40.3 * Conv. (m3/s) * * 40.3 *
* Length wtd. (m) * 28.00 * wetted Per. (m) * * 3.99 *
* Min Ch El (m) * 446.46 * Shear (N/m2) * * 177.61 *
* Alpha * 1.00 * Stream Power (N/m s) * * 833.28 *
* Frctn Loss (m) * 1.16 * Cum Volume (1000 m3) * * 0.70 *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 0.80 *
*****
**
```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
REACH: 1

RS: 3

INPUT

Description:

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	446.35	.01	445.3	2.7	445.3	2.71	448.7

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	2.71	.025

Bank Sta: Left 0 Right 2.71 Lengths: Left Channel 22 Right 22 Coeff Contr. .1 Expan. .3

CROSS SECTION OUTPUT Profile #Q Tr50

```
*****
**
* E.G. Elev (m) * 447.07 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 1.12 * wt. n-Val. * * 0.025 *
* W.S. Elev (m) * 445.95 * Reach Len. (m) * 22.00 * 22.00 * 22.00
* Crit W.S. (m) * 446.28 * Flow Area (m2) * * 1.75 *
* E.G. Slope (m/m) *0.041279 * Area (m2) * * 1.75 *
**
```

```

Padule50.rep
* Q Total (m3/s)      * 8.20 * Flow (m3/s)      *      * 8.20 *
* Top width (m)      * 2.70 * Top width (m)      *      * 2.70 *
* Vel Total (m/s)    * 4.69 * Avg. Vel. (m/s)    *      * 4.69 *
* Max Chl Dpth (m)  * 0.65 * Hydr. Depth (m)    *      * 0.65 *
* Conv. Total (m3/s) * 40.4 * Conv. (m3/s)       *      * 40.4 *
* Length wtd. (m)   * 22.00 * wetted Per. (m)    *      * 3.99 *
* Min Ch El (m)     * 445.30 * Shear (N/m2)       *      * 177.47 *
* Alpha             * 1.00 * Stream Power (N/m s) *      * 832.35 *
* Frctn Loss (m)    * 1.16 * Cum Volume (1000 m3) *      * 0.65 *
* C & E Loss (m)    * 0.00 * Cum SA (1000 m2)   *      * 0.72 *
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 2.5*

INPUT

Description:

Station Elevation Data num= 4
 Sta Elev Sta Elev Sta Elev Sta Elev

 0 446.725 .01 445.05 2.475 445.05 2.485 447.9

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .025 0 .025 2.485 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 2.485 22 22 22 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)      * 446.69 * Element           * Left OB * Channel * Right OB
* Vel Head (m)      * 0.33 * wt. n-Val.        *      * 0.025 *
* W.S. Elev (m)     * 446.36 * Reach Len. (m)    * 22.00 * 22.00 * 22.00
* Crit W.S. (m)     * 446.09 * Flow Area (m2)    *      * 3.25 *
* E.G. Slope (m/m)  *0.007269 * Area (m2)         *      * 3.25 *
* Q Total (m3/s)    * 8.20 * Flow (m3/s)       *      * 8.20 *
* Top width (m)     * 2.48 * Top width (m)      *      * 2.48 *
* Vel Total (m/s)   * 2.53 * Avg. Vel. (m/s)   *      * 2.53 *
* Max Chl Dpth (m) * 1.31 * Hydr. Depth (m)   *      * 1.31 *
* Conv. Total (m3/s) * 96.2 * Conv. (m3/s)      *      * 96.2 *
* Length wtd. (m)   * 22.00 * wetted Per. (m)   *      * 5.09 *
* Min Ch El (m)     * 445.05 * Shear (N/m2)      *      * 45.44 *
* Alpha             * 1.00 * Stream Power (N/m s) *      * 114.79 *
* Frctn Loss (m)    * 0.20 * Cum Volume (1000 m3) *      * 0.59 *

```

Padule50.rep

```
*
* C & E Loss (m)      * 0.01 * Cum SA (1000 m2) * * 0.67 *
*
*****
**
```

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 2

INPUT

Description:

Station Elevation Data num= 4
 Sta Elev Sta Elev Sta Elev Sta Elev

 0 447.1 .01 444.8 2.25 444.8 2.26 447.1

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .025 0 .025 2.26 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 2.26 27 27 27 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 0 447.1 F
 2.26 2.26 447.1 F

CROSS SECTION OUTPUT Profile #Q Tr50

```
*****
**
* E.G. Elev (m)      * 446.47 * Element * Left OB * Channel * Right OB
*
* Vel Head (m)      * 0.46 * wt. n-Val. * * 0.025 *
*
* W.S. Elev (m)     * 446.01 * Reach Len. (m) * 1.00 * 1.00 * 1.00
*
* Crit W.S. (m)     * 445.91 * Flow Area (m2) * * 2.72 *
*
* E.G. Slope (m/m)  *0.011629 * Area (m2) * * 2.72 *
*
* Q Total (m3/s)    * 8.20 * Flow (m3/s) * * 8.20 *
*
* Top width (m)     * 2.25 * Top width (m) * * 2.25 *
*
* Vel Total (m/s)   * 3.01 * Avg. Vel. (m/s) * * 3.01 *
*
* Max Chl Dpth (m) * 1.21 * Hydr. Depth (m) * * 1.21 *
*
* Conv. Total (m3/s) * 76.0 * Conv. (m3/s) * * 76.0 *
*
* Length wtd. (m)   * 1.00 * wetted Per. (m) * * 4.66 *
*
* Min Ch El (m)     * 444.80 * Shear (N/m2) * * 66.55 *
*
* Alpha             * 1.00 * Stream Power (N/m s) * * 200.46 *
*
* Frctn Loss (m)    * * Cum Volume (1000 m3) * * 0.53 *
*
* C & E Loss (m)    * * Cum SA (1000 m2) * * 0.62 *
*
*****
**
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE

RIVER: Fosso PADULE

REACH: 1 RS: 1.95

INPUT

Description: Attraversamento S.R. 219
 Distance from Upstream XS = 1
 Deck/Roadway width = 25
 Weir Coefficient = 1.44
 Upstream Deck/Roadway Coordinates

num= 4														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0		447.5		444	.01		447.5		447.1	2.25		447.5		447.1
2.26		447.5		444										

Upstream Bridge Cross Section Data

Station Elevation Data num= 4							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	447.1	.01	444.8	2.25	444.8	2.26	447.1

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	2.26	.025

Bank Sta: Left Right Coeff Contr. Expan.
 0 2.26 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 0 447.1 F
 2.26 2.26 447.1 F

Downstream Deck/Roadway Coordinates

num= 9									
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0		448		443	1.1		448		443
1.99		448		447	2.98		448		447.5
4.8		448		446	4.9		448		443
							5		448
									443

Downstream Bridge Cross Section Data

Station Elevation Data num= 4							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	448	.1	444.01	4.9	444.01	5	448

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	5	.025

Bank Sta: Left Right Coeff Contr. Expan.
 0 5 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 1.12 448 T
 4.9 5 448 T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy
 Selected Low Flow Methods = Energy

High Flow Method

Pressure and Weir flow
 Submerged Inlet Cd =
 Submerged Inlet + Outlet Cd = .8
 Max Low Cord =

Additional Bridge Parameters

Add Friction component to Momentum
 Do not add weight component to Momentum
 Class B flow critical depth computations use critical depth
 inside the bridge at the upstream end
 Criteria to check for pressure flow = Upstream water surface

BRIDGE OUTPUT Profile #Q Tr50

```

*****
* E.G. US. (m) * 446.47 * Element *Inside BR US *Inside BR DS *
* W.S. US. (m) * 446.01 * E.G. Elev (m) * 446.46 * 445.19 *
* Q Total (m3/s) * 8.20 * W.S. Elev (m) * 445.91 * 444.80 *
* Q Bridge (m3/s) * 8.20 * Crit W.S. (m) * 445.91 * 444.80 *
* Q Weir (m3/s) * * * Max Chl Dpth (m) * 1.11 * 0.79 *
* Weir Sta Lft (m) * * * Vel Total (m/s) * 3.28 * 2.78 *
* Weir Sta Rgt (m) * * * Flow Area (m2) * 2.50 * 2.95 *
* Weir Submerg * * * Froude # chl * 0.99 * 1.00 *
* Weir Max Depth (m) * * * Specif Force (m3) * 4.13 * 3.49 *
* Min El Weir Flow (m) * 448.00 * Hydr Depth (m) * 1.11 * 0.79 *
* Min El Prs (m) * 447.10 * W.P. Total (m) * 4.47 * 4.54 *
* Delta EG (m) * 1.29 * Conv. Total (m3/s) * 67.9 * 88.4 *
* Delta WS (m) * 1.25 * Top width (m) * 2.25 * 3.73 *
* BR Open Area (m2) * 5.16 * Frctn Loss (m) * * *
* BR Open Vel (m/s) * 3.28 * C & E Loss (m) * * *
* Coef of Q * * * Shear Total (N/m2) * 80.12 * 54.77 *
* Br Sel Method * Momentum * Power Total (N/m s) * 262.96 * 152.37 *
*****
    
```

Note: The momentum method has computed a class B profile.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 1.9

INPUT

Description:

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	448	.1	444.01	4.9	444.01	5	448

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	5	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	5		15	15	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	1.12	448	T
4.9	5	448	T

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m) * 445.19 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.42 * wt. n-Val. * * 0.025 *
* W.S. Elev (m) * 444.76 * Reach Len. (m) * 15.00 * 15.00 * 15.00
* Crit W.S. (m) * 444.79 * Flow Area (m2) * * 2.85 *
* E.G. Slope (m/m) * 0.007514 * Area (m2) * * 3.64 *
* Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
* Top width (m) * 4.84 * Top width (m) * * 4.84 *
* vel Total (m/s) * 2.87 * Avg. Vel. (m/s) * * 2.87 *
* Max Chl Dpth (m) * 0.75 * Hydr. Depth (m) * * 0.75 *
*****
    
```

Padule50.rep

```

*
* Conv. Total (m3/s) * 94.6 * Conv. (m3/s) * * 94.6 *
* Length wtd. (m) * 15.00 * Wetted Per. (m) * * 3.78 *
* Min Ch El (m) * 444.01 * Shear (N/m2) * * 55.62 *
* Alpha * 1.00 * Stream Power (N/m s) * * 159.86 *
* Frctn Loss (m) * * * Cum Volume (1000 m3) * * 0.45 *
* C & E Loss (m) * * * Cum SA (1000 m2) * * 0.53 *

```

**

CROSS SECTION

RIVER: Fosso PADULE
REACH: 1 RS: 1.8

INPUT

Description:

Station Elevation Data num= 5
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 445.6 .05 443.58 2.2 443.58 3.9 444.68 4 445.58

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .025 0 .025 4 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 4 27 27 27 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 .05 446 T
 3.9 4 446 T

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 445.03 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.25 * wt. n-Val. * * 0.025 *
 * W.S. Elev (m) * 444.78 * Reach Len. (m) * 1.00 * 1.00 * 1.00
 * Crit W.S. (m) * 444.58 * Flow Area (m2) * * 3.68 *
 * E.G. slope (m/m) *0.003678 * Area (m2) * * 3.70 *
 * Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
 * Top width (m) * 3.89 * Top width (m) * * 3.89 *
 * vel Total (m/s) * 2.23 * Avg. vel. (m/s) * * 2.23 *
 * Max Chl Dpth (m) * 1.20 * Hydr. Depth (m) * * 0.96 *
 * Conv. Total (m3/s) * 135.2 * Conv. (m3/s) * * 135.2 *
 * Length wtd. (m) * 1.00 * Wetted Per. (m) * * 4.17 *
 * Min Ch El (m) * 443.58 * Shear (N/m2) * * 31.77 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 70.83 *
 * Frctn Loss (m) * 0.01 * Cum Volume (1000 m3) * * 0.40 *
 * C & E Loss (m) * 0.04 * Cum SA (1000 m2) * * 0.47 *
 *

 **

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is

Padule50.rep

less than

0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

BRIDGE

RIVER: Fosso PADULE

REACH: 1 RS: 1.75

INPUT

Description: COPERTURA FOSSO AFFIANCO CHIESA PADULE

Distance from Upstream XS = 1

Deck/Roadway width = 25

Weir Coefficient = 1.44

Upstream Deck/Roadway Coordinates

num= 4

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0		446		440	.05		446		445.6	3.9		446		445.6
4		446		440										

Upstream Bridge Cross Section Data

Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	445.6	.05	443.58	2.2	443.58	3.9	444.68	4	445.58

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	4	.025

Bank Sta: Left 0 Right 4 Coeff Contr. .3 Expan. .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 .05 446 T
 3.9 4 446 T

Downstream Deck/Roadway Coordinates

num= 4

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0		445.9		440	.05		445.9		444.6	2.5		445.9		444.6
2.55		445.9		440										

Downstream Bridge Cross Section Data

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	446	.05	442.79	2.5	442.79	2.55	446

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	2.55	.025

Bank Sta: Left 0 Right 2.55 Coeff Contr. .3 Expan. .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 .05 446 T
 2.5 2.55 446 T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy
Selected Low Flow Methods = Energy

High Flow Method
Pressure and Weir flow
Submerged Inlet Cd =
Submerged Inlet + Outlet Cd = .8
Max Low Cord =

Additional Bridge Parameters
Add Friction component to Momentum
Do not add weight component to Momentum
Class B flow critical depth computations use critical depth
inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream water surface

BRIDGE OUTPUT Profile #Q Tr50

```

*****
* E.G. US. (m) * 445.03 * Element *Inside BR US *Inside BR DS *
* W.S. US. (m) * 444.78 * E.G. Elev (m) * 444.98 * 444.53 *
* Q Total (m3/s) * 8.20 * W.S. Elev (m) * 444.58 * 443.55 *
* Q Bridge (m3/s) * 8.20 * Crit w.S. (m) * 444.58 * 443.84 *
* Q Weir (m3/s) * * Max Chl Dpth (m) * 1.00 * 0.76 *
* Weir Sta Lft (m) * * Vel Total (m/s) * 2.80 * 4.39 *
* Weir Sta Rgt (m) * * Flow Area (m2) * 2.92 * 1.87 *
* Weir Submerg * * Froude # Chl * 1.01 * 1.61 *
* Weir Max Depth (m) * * Specif Force (m3) * 3.68 * 4.38 *
* Min El Weir Flow (m) * 446.00 * Hydr Depth (m) * 0.79 * 0.76 *
* Min El Prs (m) * 445.60 * W.P. Total (m) * 3.99 * 2.45 *
* Delta EG (m) * 0.59 * Conv. Total (m3/s) * 95.1 * 62.3 *
* Delta WS (m) * 1.15 * Top Width (m) * 3.71 * 2.47 *
* BR Open Area (m2) * 4.43 * Frctn Loss (m) * 0.12 * 0.27 *
* BR Open Vel (m/s) * 4.39 * C & E Loss (m) * 0.02 * 0.17 *
* Coef of Q * * Shear Total (N/m2) * 53.44 * 129.44 *
* Br Sel Method *Energy only * Power Total (N/m s) * 149.82 * 568.54 *
*****
    
```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: The energy method has computed a class B profile.

CROSS SECTION

RIVER: Fosso PADULE
REACH: 1 RS: 1.7

INPUT

Description:

Station Elevation Data		num= 4		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	446	.05	442.79	2.5	442.79	2.55	446

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .025 0 .025 2.55 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 2.55 25.833 25.833 25.833 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 .05 446 T
 2.5 2.55 446 T

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 444.36 * Element * Left OB * Channel * Right OB
 * Vel Head (m) * 0.53 * wt. n-Val. * * 0.025 *
 * W.S. Elev (m) * 443.83 * Reach Len. (m) * 25.83 * 25.83 * 25.83
 * Crit W.S. (m) * 443.83 * Flow Area (m2) * * 2.55 *
 * E.G. Slope (m/m) *0.006121 * Area (m2) * * 2.57 *
 * Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
 * Top width (m) * 2.48 * Top width (m) * * 2.48 *
 * Vel Total (m/s) * 3.21 * Avg. Vel. (m/s) * * 3.21 *
 * Max Chl Dpth (m) * 1.04 * Hydr. Depth (m) * * 1.04 *
 * Conv. Total (m3/s) * 104.8 * Conv. (m3/s) * * 104.8 *
 * Length wtd. (m) * 25.83 * wetted Per. (m) * * 2.45 *
 * Min Ch El (m) * 442.79 * Shear (N/m2) * * 62.50 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 200.91 *
 * Frctn Loss (m) * 0.24 * Cum Volume (1000 m3) * * 0.33 *
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 0.39 *
 *

 **

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 1.58333*

INPUT

Description:

Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 444.67 1.025 444.712 1.422 444.957 1.637 444.957 1.834 443.128
 1.978 441.978 4.02 441.978 4.121 442.627 4.455 444.945 4.938 444.923

5.073 444.63 5.86 444.642

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .027 1.637 .027 4.455 .027

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1.637 4.455 25.833 25.833 25.833 .1 .3
 Left Levee Station= 1.637 Elevation= 444.957
 Right Levee Station= 4.455 Elevation= 444.945

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 443.87 * Element * Left OB * Channel * Right OB
 * Vel Head (m) * 1.06 * wt. n-Val. * * 0.027 *
 * W.S. Elev (m) * 442.81 * Reach Len. (m) * 25.83 * 25.83 * 25.83
 * Crit W.S. (m) * 443.13 * Flow Area (m2) * * 1.80 *
 * E.G. Slope (m/m) *0.039932 * Area (m2) * * 1.80 *
 * Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
 * Top width (m) * 2.27 * Top width (m) * * 2.27 *
 * Vel Total (m/s) * 4.56 * Avg. Vel. (m/s) * * 4.56 *
 * Max Chl Dpth (m) * 0.83 * Hydr. Depth (m) * * 0.79 *
 * Conv. Total (m3/s) * 41.0 * Conv. (m3/s) * * 41.0 *
 * Length wtd. (m) * 25.83 * wetted Per. (m) * * 3.73 *
 * Min Ch El (m) * 441.98 * Shear (N/m2) * * 189.17 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 861.94 *
 * Frctn Loss (m) * 0.33 * Cum Volume (1000 m3) * * 0.28 *
 * C & E Loss (m) * 0.16 * Cum SA (1000 m2) * * 0.32 *
 *

 **

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

Note: Program found supercritical flow starting at this cross section.

CROSS SECTION

RIVER: Fosso PADULE

REACH: 1 RS: 1.46666*

INPUT

Description:

Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 443.34 2.05 443.423 2.843 443.913 3.273 443.913 3.639 442.11
 3.907 441.167 5.54 441.167 5.731 441.715 6.36 443.89 7.327 443.847
 7.597 443.26 9.17 443.283

Padule50.rep

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .03 3.273 .028 6.36 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 3.273 6.36 25.833 25.833 25.833 .1 .3
 Left Levee Station= 3.273 Elevation= 443.913
 Right Levee Station= 6.36 Elevation= 443.89

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 442.99 * Element * Left OB * Channel * Right OB
 * Vel Head (m) * 0.70 * wt. n-Val. * * 0.028 *
 * W.S. Elev (m) * 442.29 * Reach Len. (m) * 25.83 * 25.83 * 25.83
 * Crit W.S. (m) * 442.42 * Flow Area (m2) * * 2.21 *
 * E.G. Slope (m/m) *0.023451 * Area (m2) * * 2.21 *
 * Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
 * Top width (m) * 2.29 * Top width (m) * * 2.29 *
 * Vel Total (m/s) * 3.71 * Avg. Vel. (m/s) * * 3.71 *
 * Max Chl Dpth (m) * 1.12 * Hydr. Depth (m) * * 0.97 *
 * Conv. Total (m3/s) * 53.5 * Conv. (m3/s) * * 53.5 *
 * Length Wtd. (m) * 25.83 * wetted Per. (m) * * 3.97 *
 * Min Ch El (m) * 441.17 * Shear (N/m2) * * 128.25 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 475.22 *
 * Frctn Loss (m) * 0.78 * Cum Volume (1000 m3) * * 0.22 *
 * C & E Loss (m) * 0.11 * Cum SA (1000 m2) * * 0.26 *
 *

 **

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 1.35*

INPUT

Description:

Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 442.01 3.075 442.135 4.265 442.87 4.91 442.87 5.444 441.093
 5.835 440.355 7.06 440.355 7.341 440.804 8.265 442.835 9.715 442.77
 10.12 441.89 12.48 441.925

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .032 4.91 .03 8.265 .032

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 4.91 8.265 25.833 25.833 25.833 .1 .3

Padule50.rep
 Left Levee Station= 4.91 Elevation= 442.87
 Right Levee Station= 8.265 Elevation= 442.835

CROSS SECTION OUTPUT Profile #Q Tr50

```
*****
**
* E.G. Elev (m) * 442.28 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.79 * wt. n-Val. * * 0.030 *
* W.S. Elev (m) * 441.49 * Reach Len. (m) * 25.83 * 25.83 * 25.83
* Crit W.S. (m) * 441.69 * Flow Area (m2) * * 2.08 *
* E.G. Slope (m/m) *0.030895 * Area (m2) * * 2.08 *
* Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
* Top width (m) * 2.33 * Top width (m) * * 2.33 *
* vel Total (m/s) * 3.95 * Avg. Vel. (m/s) * * 3.95 *
* Max Chl Dpth (m) * 1.14 * Hydr. Depth (m) * * 0.89 *
* Conv. Total (m3/s) * 46.7 * Conv. (m3/s) * * 46.7 *
* Length wtd. (m) * 25.83 * wetted Per. (m) * * 3.76 *
* Min Ch El (m) * 440.35 * Shear (N/m2) * * 167.46 *
* Alpha * 1.00 * Stream Power (N/m s) * * 660.83 *
* Frctn Loss (m) * 0.69 * Cum Volume (1000 m3) * * 0.17 *
* C & E Loss (m) * 0.01 * Cum SA (1000 m2) * * 0.21 *
*****
**
```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 1.23333*

INPUT

Description:

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	440.68	4.1	440.847	5.687	441.827	6.547	441.827	7.25	440.075
7.763	439.543	8.58	439.543	8.951	439.893	10.17	441.78	12.103	441.693
12.643	440.52	15.79	440.567						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	6.547	.032	10.17	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	6.547	10.17		25.833	25.833	.1	.3
Left Levee	Station=	6.547		Elevation=	441.827		
Right Levee	Station=	10.17		Elevation=	441.78		

CROSS SECTION OUTPUT Profile #Q Tr50

```
*****
**
* E.G. Elev (m) * 441.47 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.72 * wt. n-Val. * * 0.032 *
**
```

```

Padule50.rep
* W.S. Elev (m) * 440.75 * Reach Len. (m) * 25.83 * 25.83 * 25.83
* Crit W.S. (m) * 440.93 * Flow Area (m2) * * 2.19 *
* E.G. Slope (m/m) *0.030235 * Area (m2) * * 2.19 *
* Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
* Top width (m) * 2.53 * Top width (m) * * 2.53 *
* Vel Total (m/s) * 3.75 * Avg. Vel. (m/s) * * 3.75 *
* Max Chl Dpth (m) * 1.21 * Hydr. Depth (m) * * 0.87 *
* Conv. Total (m3/s) * 47.2 * Conv. (m3/s) * * 47.2 *
* Length wtd. (m) * 25.83 * Wetted Per. (m) * * 3.82 *
* Min Ch El (m) * 439.54 * Shear (N/m2) * * 169.81 *
* Alpha * 1.00 * Stream Power (N/m s) * * 636.34 *
* Frctn Loss (m) * 0.79 * Cum Volume (1000 m3) * * 0.11 *
* C & E Loss (m) * 0.02 * Cum SA (1000 m2) * * 0.14 *
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Fosso PADULE
REACH: 1 RS: 1.11666*

INPUT

Description:

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	439.35	5.125	439.558	7.108	440.783	8.183	440.783	9.055	439.058
9.692	438.732	10.1	438.732	10.56	438.981	12.075	440.725	14.492	440.617
15.167	439.15	19.1	439.208						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.038	8.183	.033	12.075	.038

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	8.183	12.075	25.833	25.833	25.833	.1	.3
Left Levee	Station=	8.183	Elevation=	440.783			
Right Levee	Station=	12.075	Elevation=	440.725			

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m) * 440.64 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.74 * wt. n-Val. * * 0.033 *
* W.S. Elev (m) * 439.90 * Reach Len. (m) * 25.83 * 25.83 * 25.83
* Crit W.S. (m) * 440.11 * Flow Area (m2) * * 2.16 *
* E.G. Slope (m/m) *0.033779 * Area (m2) * * 2.16 *
* Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
* Top width (m) * 2.74 * Top width (m) * * 2.74 *
*

```

```

Padule50.rep
* Vel Total (m/s) * 3.80 * Avg. Vel. (m/s) * * 3.80 *
* Max Chl Dpth (m) * 1.17 * Hydr. Depth (m) * * 0.79 *
* Conv. Total (m3/s) * 44.6 * Conv. (m3/s) * * 44.6 *
* Length wtd. (m) * 25.83 * wetted Per. (m) * * 3.82 *
* Min Ch El (m) * 438.73 * Shear (N/m2) * * 186.98 *
* Alpha * 1.00 * Stream Power (N/m s) * * 711.26 *
* Frctn Loss (m) * 0.82 * Cum Volume (1000 m3) * * 0.06 *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 0.07 *
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Fosso PADULE
REACH: 1 RS: 1

INPUT

Description:

Station Elevation Data num= 11

Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 438.02 6.15 438.27 8.53 439.74 9.82 439.74 10.86 438.04
11.62 437.92 12.17 438.07 13.98 439.67 16.88 439.54 17.69 437.78
22.41 437.85

Manning's n Values num= 3

Sta n Val Sta n Val Sta n Val
0 .04 9.82 .035 13.98 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
9.82 13.98 0 0 .1 .3
Left Levee Station= 9.82 Elevation= 439.74
Right Levee Station= 13.98 Elevation= 439.67

CROSS SECTION OUTPUT Profile #Q Tr50

**
* E.G. Elev (m) * 439.73 * Element * Left OB * Channel * Right OB
* * * * *
* Vel Head (m) * 0.68 * wt. n-Val. * * 0.035 *
* * * * *
* W.S. Elev (m) * 439.05 * Reach Len. (m) * * *
* * * * *
* Crit W.S. (m) * 439.24 * Flow Area (m2) * * 2.24 *
* * * * *
* E.G. Slope (m/m) *0.035481 * Area (m2) * * 2.24 *
* * * * *
* Q Total (m3/s) * 8.20 * Flow (m3/s) * * 8.20 *
* * * * *
* Top width (m) * 3.03 * Top width (m) * * 3.03 *
* * * * *
* Vel Total (m/s) * 3.66 * Avg. vel. (m/s) * * 3.66 *
* * * * *
* Max Chl Dpth (m) * 1.27 * Hydr. Depth (m) * * 0.74 *
* * * * *
* Conv. Total (m3/s) * 43.5 * Conv. (m3/s) * * 43.5 *
* * * * *
* Length wtd. (m) * * * wetted Per. (m) * * 4.00 *
* * * * *
* Min Ch El (m) * 437.92 * Shear (N/m2) * * 195.10 *
*

Padule50.rep

```

* Alpha * 1.00 * Stream Power (N/m s) * 713.99 *
* Frctn Loss (m) * 0.89 * Cum Volume (1000 m3) * *
* C & E Loss (m) * 0.02 * Cum SA (1000 m2) * *
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

SUMMARY OF MANNING'S N VALUES

River: Fosso PADULE

```

*****
* Reach * River Sta. * n1 * n2 * n3 *
*****
*1 * 5 * .04 * .035 * .04 *
*1 * 4.875 * .04 * .035 * .04 *
*1 * 4.75 * .04 * .035 * .04 *
*1 * 4.625 * .04 * .035 * .04 *
*1 * 4.5 * .04 * .035 * .04 *
*1 * 4.375 * .04 * .035 * .04 *
*1 * 4.25 * .04 * .035 * .04 *
*1 * 4.125 * .04 * .035 * .04 *
*1 * 4 * .04 * .035 * .04 *
*1 * 3.875 * .036 * .032 * .036 *
*1 * 3.75 * .032 * .03 * .032 *
*1 * 3.625 * .029 * .027 * .029 *
*1 * 3.5 * .025 * .025 * .025 *
*1 * 3.4 * .025 * .025 * .025 *
*1 * 3.3 * .025 * .025 * .025 *
*1 * 3.2 * .025 * .025 * .025 *
*1 * 3.1 * .025 * .025 * .025 *
*1 * 3 * .025 * .025 * .025 *
*1 * 2.5 * .025 * .025 * .025 *
*1 * 2 * .025 * .025 * .025 *
*1 * 1.95 * *Bridge * * *
*1 * 1.9 * .025 * .025 * .025 *
*1 * 1.8 * .025 * .025 * .025 *
*1 * 1.75 * *Bridge * * *
*1 * 1.7 * .025 * .025 * .025 *
*1 * 1.58333 * .027 * .027 * .027 *
*1 * 1.46666 * .03 * .028 * .03 *
*1 * 1.35 * .032 * .03 * .032 *
*1 * 1.23333 * .035 * .032 * .035 *
*1 * 1.11666 * .038 * .033 * .038 *
*1 * 1 * .04 * .035 * .04 *
*****

```

SUMMARY OF REACH LENGTHS

River: Fosso PADULE

```

*****
* Reach * River Sta. * Left * Channel * Right *
*****
*1 * 5 * 29.5 * 29.5 * 29.5 *
*1 * 4.875 * 29.5 * 29.5 * 29.5 *
*1 * 4.75 * 29.5 * 29.5 * 29.5 *
*1 * 4.625 * 29.5 * 29.5 * 29.5 *
*1 * 4.5 * 29.5 * 29.5 * 29.5 *
*1 * 4.375 * 29.5 * 29.5 * 29.5 *
*1 * 4.25 * 29.5 * 29.5 * 29.5 *
*1 * 4.125 * 29.5 * 29.5 * 29.5 *
*1 * 4 * 23 * 23 * 23 *
*1 * 3.875 * 23 * 23 * 23 *
*1 * 3.75 * 23 * 23 * 23 *
*1 * 3.625 * 23 * 23 * 23 *
*1 * 3.5 * 28 * 28 * 28 *

```

Padule50.rep

*1	*	3.4*	*	28*	28*	28*
*1	*	3.3*	*	28*	28*	28*
*1	*	3.2*	*	28*	28*	28*
*1	*	3.1*	*	28*	28*	28*
*1	*	3	*	22*	22*	22*
*1	*	2.5*	*	22*	22*	22*
*1	*	2	*	27*	27*	27*
*1	*	1.95	*Bridge	*	*	*
*1	*	1.9	*	15*	15*	15*
*1	*	1.8	*	27*	27*	27*
*1	*	1.75	*Bridge	*	*	*
*1	*	1.7	*	25.833*	25.833*	25.833*
*1	*	1.58333*	*	25.833*	25.833*	25.833*
*1	*	1.46666*	*	25.833*	25.833*	25.833*
*1	*	1.35*	*	25.833*	25.833*	25.833*
*1	*	1.23333*	*	25.833*	25.833*	25.833*
*1	*	1.11666*	*	25.833*	25.833*	25.833*
*1	*	1	*	0*	0*	0*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Fosso PADULE

* Reach	* River Sta.	* Contr.	* Expan.
1	5	.1	.3*
1	4.875	.1*	.3*
1	4.75	.1*	.3*
1	4.625	.1*	.3*
1	4.5	.1*	.3*
1	4.375	.1*	.3*
1	4.25	.1*	.3*
1	4.125	.1*	.3*
1	4	.1	.3*
1	3.875	.1*	.3*
1	3.75	.1*	.3*
1	3.625	.1*	.3*
1	3.5	.1	.3*
1	3.4	.1*	.3*
1	3.3	.1*	.3*
1	3.2	.1*	.3*
1	3.1	.1*	.3*
1	3	.1	.3*
1	2.5	.1*	.3*
1	2	.3	.5*
*1	1.95	*Bridge	*
1	1.9	.3	.5*
1	1.8	.3	.5*
*1	1.75	*Bridge	*
1	1.7	.3	.5*
*1	1.58333**	.1*	.3*
*1	1.46666**	.1*	.3*
1	1.35	.1*	.3*
*1	1.23333**	.1*	.3*
*1	1.11666**	.1*	.3*
1	1	.1	.3*

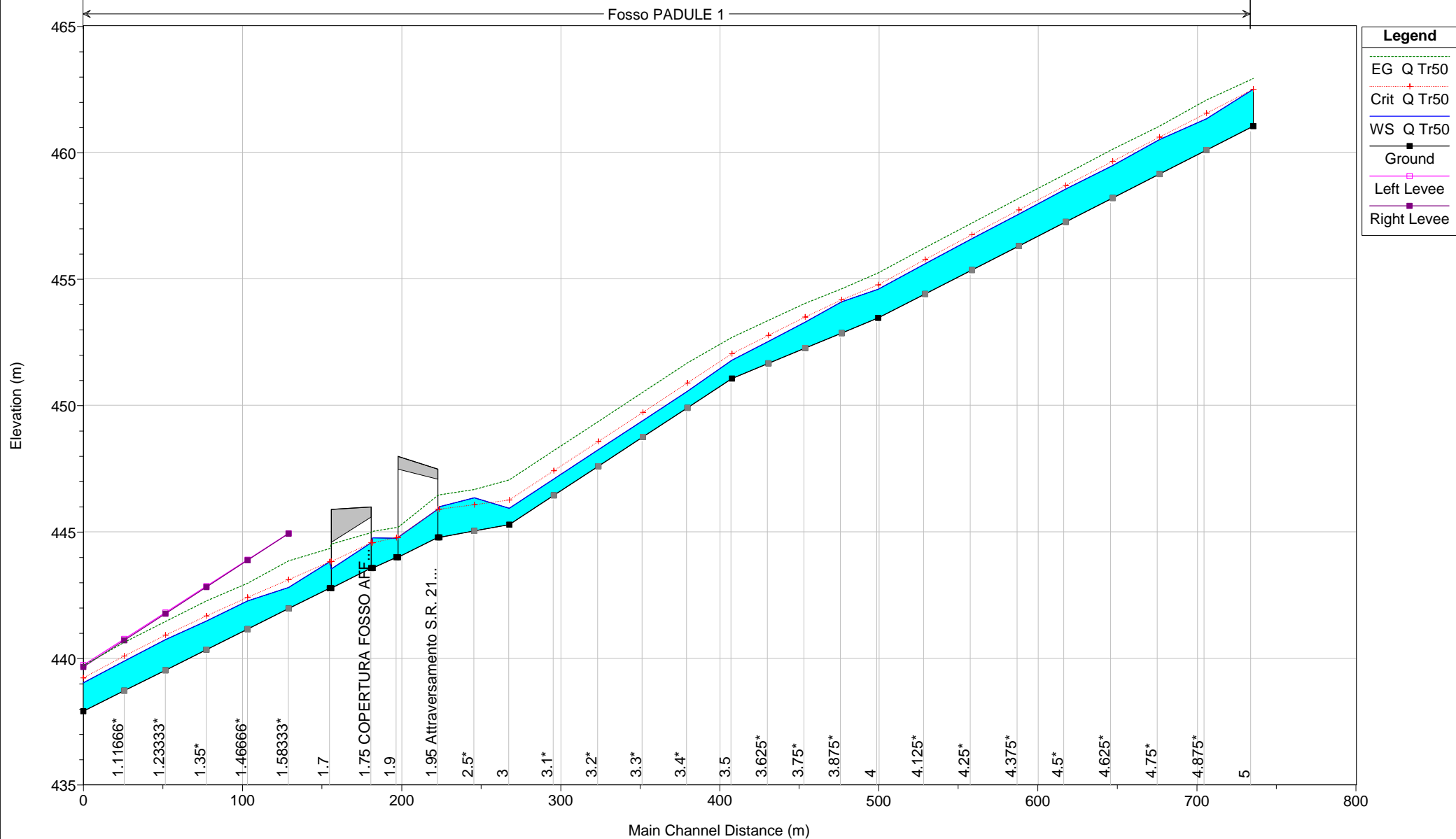
HEC-RAS Plan: Plan Tr50 River: Fosso PADULE Reach: 1 Profile: Q Tr50

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
1	5	Q Tr50	8.20	461.06	462.52	462.52	462.94	0.019773	2.89	2.84	3.36	1.00
1	4.875*	Q Tr50	8.20	460.11	461.35	461.57	462.10	0.041263	3.82	2.15	2.93	1.42
1	4.75*	Q Tr50	8.20	459.17	460.53	460.63	461.06	0.026811	3.24	2.53	3.23	1.17
1	4.625*	Q Tr50	8.20	458.22	459.50	459.68	460.15	0.034976	3.58	2.29	3.12	1.33
1	4.5*	Q Tr50	8.20	457.27	458.58	458.72	459.17	0.030726	3.40	2.41	3.27	1.27
1	4.375*	Q Tr50	8.20	456.32	457.59	457.75	458.22	0.033599	3.52	2.33	3.27	1.33
1	4.25*	Q Tr50	8.20	455.37	456.61	456.77	457.23	0.032741	3.50	2.35	3.29	1.32
1	4.125*	Q Tr50	8.20	454.43	455.62	455.79	456.25	0.033547	3.54	2.32	3.27	1.34
1	4	Q Tr50	8.20	453.48	454.61	454.79	455.26	0.033877	3.56	2.30	3.24	1.35
1	3.875*	Q Tr50	8.20	452.88	454.11	454.19	454.63	0.020240	3.18	2.58	3.20	1.13
1	3.75*	Q Tr50	8.20	452.28	453.31	453.51	454.05	0.028946	3.82	2.15	2.81	1.40
1	3.625*	Q Tr50	8.20	451.68	452.55	452.79	453.38	0.028313	4.05	2.03	2.65	1.48
1	3.5	Q Tr50	8.20	451.08	451.80	452.06	452.70	0.030110	4.20	1.95	2.70	1.58
1	3.4*	Q Tr50	8.20	449.92	450.57	450.90	451.70	0.041506	4.70	1.75	2.70	1.87
1	3.3*	Q Tr50	8.20	448.77	449.42	449.75	450.54	0.041189	4.69	1.75	2.70	1.86
1	3.2*	Q Tr50	8.20	447.61	448.26	448.59	449.38	0.041189	4.69	1.75	2.70	1.86
1	3.1*	Q Tr50	8.20	446.46	447.10	447.43	448.23	0.041320	4.69	1.75	2.70	1.86
1	3	Q Tr50	8.20	445.30	445.95	446.28	447.07	0.041279	4.69	1.75	2.70	1.86
1	2.5*	Q Tr50	8.20	445.05	446.36	446.09	446.69	0.007269	2.53	3.25	2.48	0.70
1	2	Q Tr50	8.20	444.80	446.01	445.91	446.47	0.011629	3.01	2.72	2.25	0.87
1	1.95		Bridge									
1	1.9	Q Tr50	8.20	444.01	444.76	444.79	445.19	0.007514	2.87	2.85	4.84	1.06
1	1.8	Q Tr50	8.20	443.58	444.78	444.58	445.03	0.003678	2.23	3.68	3.89	0.73
1	1.75		Bridge									
1	1.7	Q Tr50	8.20	442.79	443.83	443.83	444.36	0.006121	3.21	2.55	2.48	1.01
1	1.58333*	Q Tr50	8.20	441.98	442.81	443.13	443.87	0.039932	4.56	1.80	2.27	1.63
1	1.46666*	Q Tr50	8.20	441.17	442.29	442.42	442.99	0.023451	3.71	2.21	2.29	1.20
1	1.35*	Q Tr50	8.20	440.35	441.49	441.69	442.28	0.030895	3.95	2.08	2.33	1.33
1	1.23333*	Q Tr50	8.20	439.54	440.75	440.93	441.47	0.030235	3.75	2.19	2.53	1.29
1	1.11666*	Q Tr50	8.20	438.73	439.90	440.11	440.64	0.033779	3.80	2.16	2.74	1.37
1	1	Q Tr50	8.20	437.92	439.05	439.24	439.73	0.035481	3.66	2.24	3.03	1.36

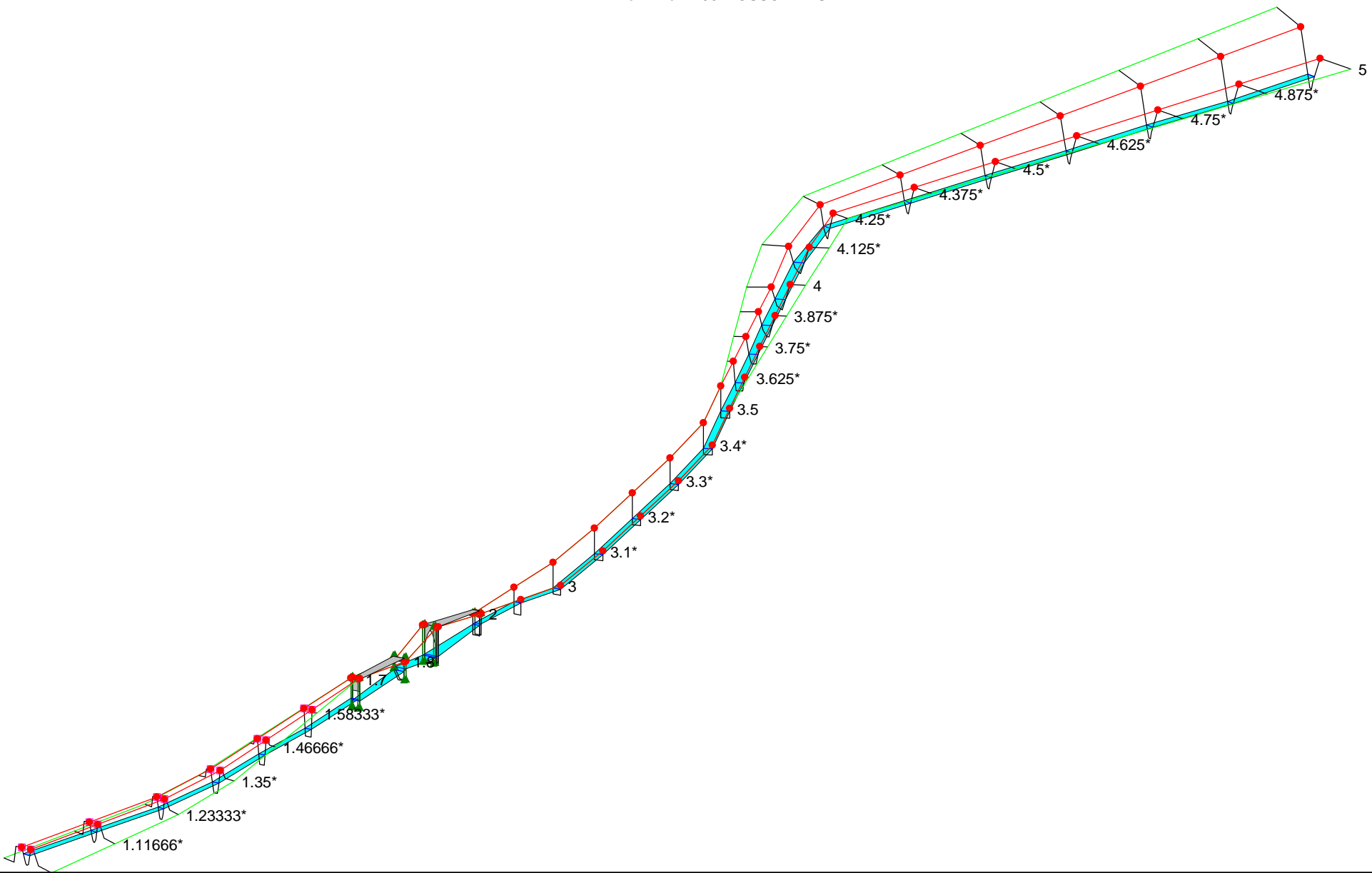
MACROAREA 06 FOSSO PADULE Plan: Plan Tr50

Flow: FlowTr50

Fosso PADULE 1



MACROAREA 06 Plan: Plan Tr50
 Flow: FlowTr50 FOSSO PADULE



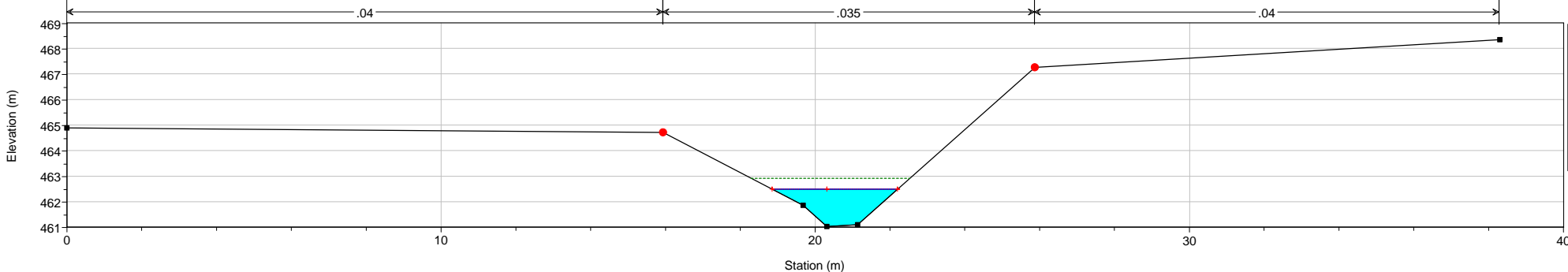
Legend

- WS Q Tr50
- Ground
- Bank Sta
- Ground
- Ineff
- Levee

MACROAREA 06 Plan: Plan Tr50

Flow: FlowTr50

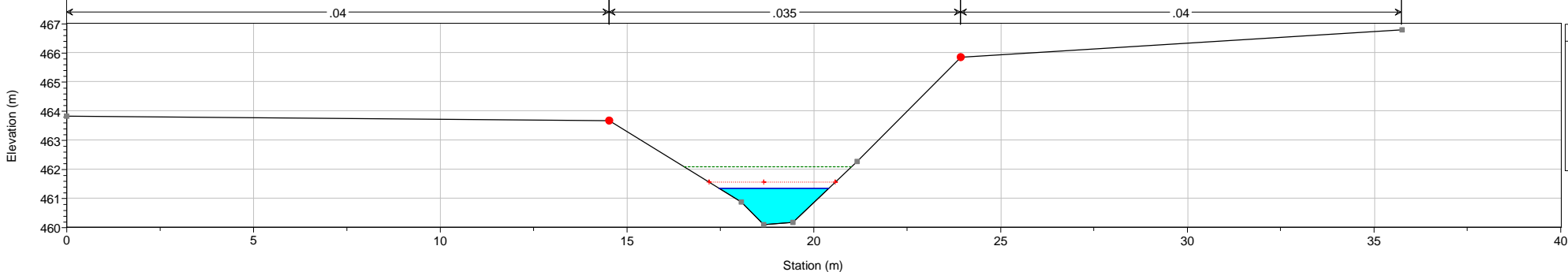
River = Fosso PADULE Reach = 1 RS = 5



MACROAREA 06 Plan: Plan Tr50

Flow: FlowTr50

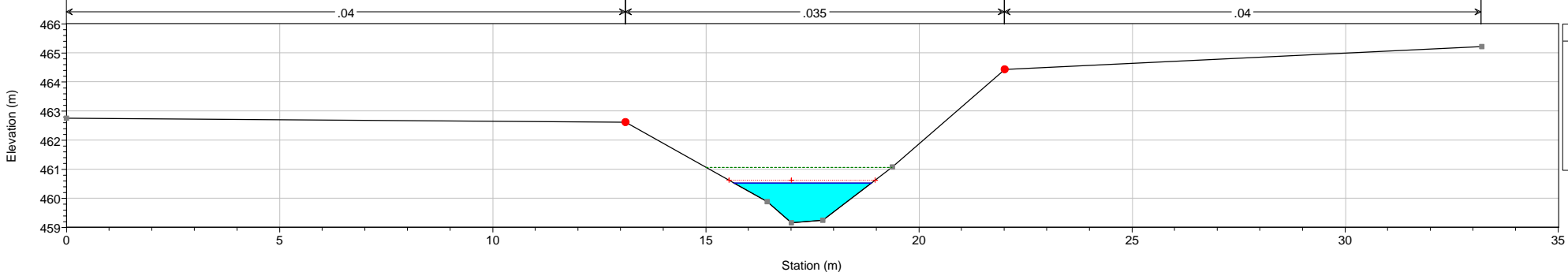
River = Fosso PADULE Reach = 1 RS = 4.875*

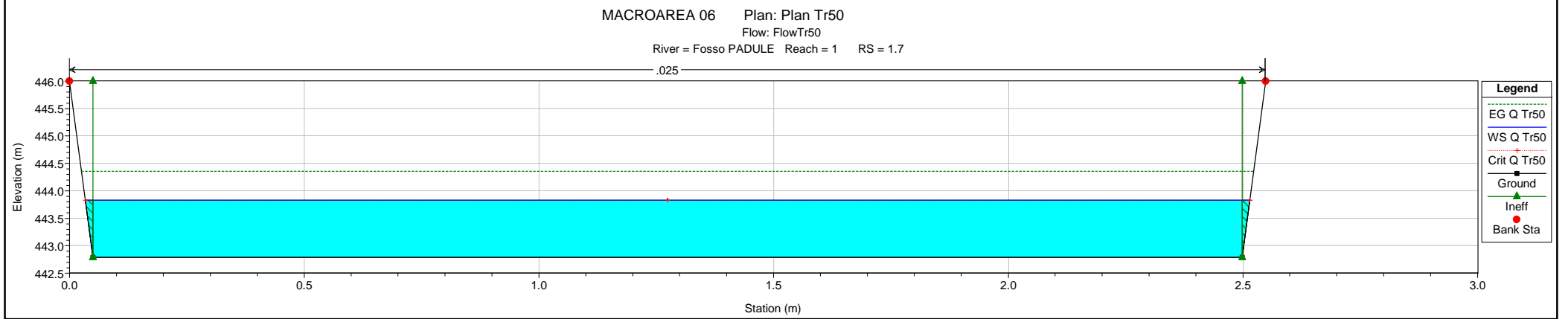
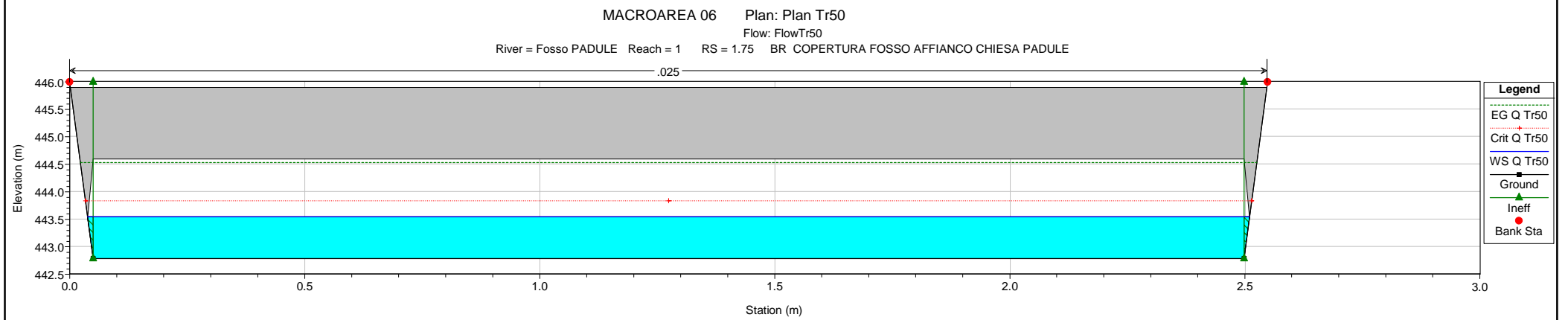
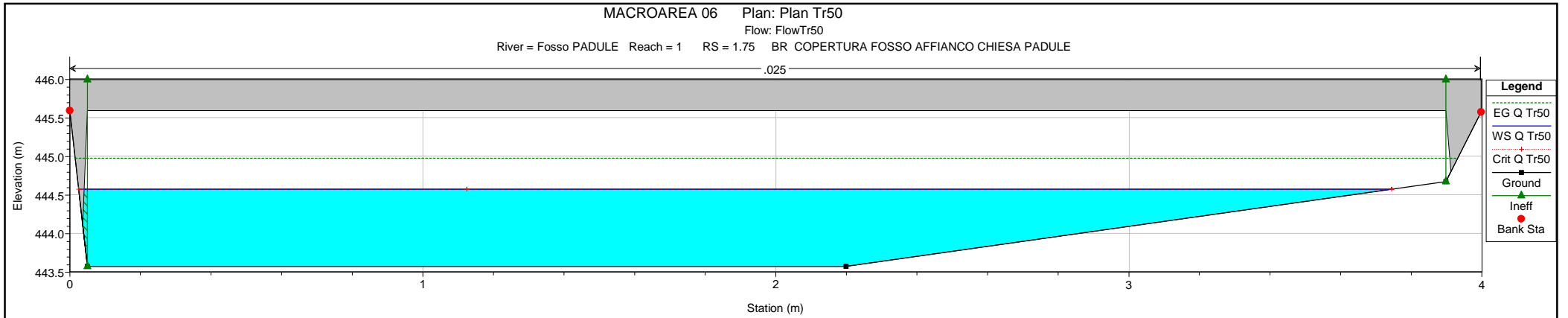


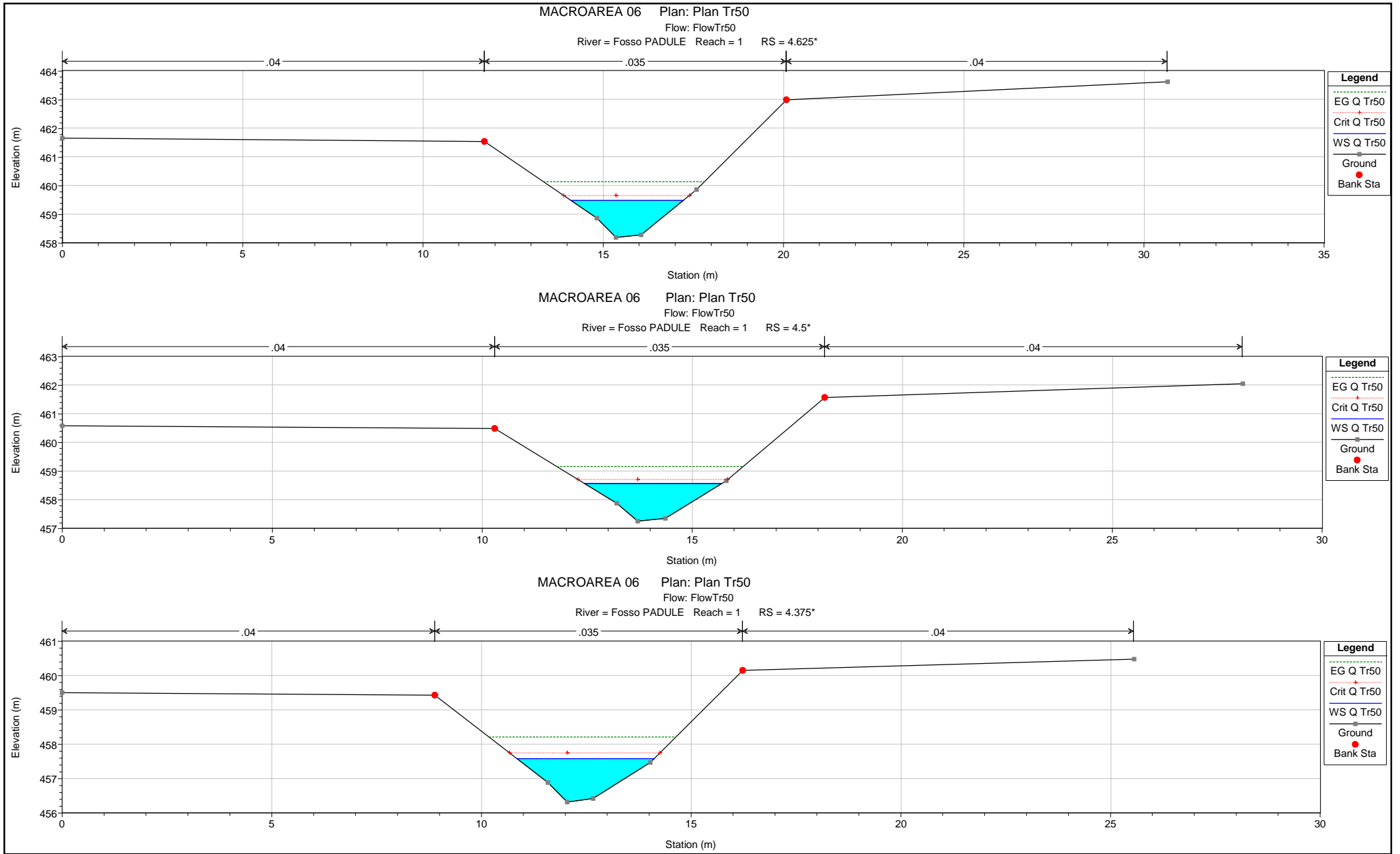
MACROAREA 06 Plan: Plan Tr50

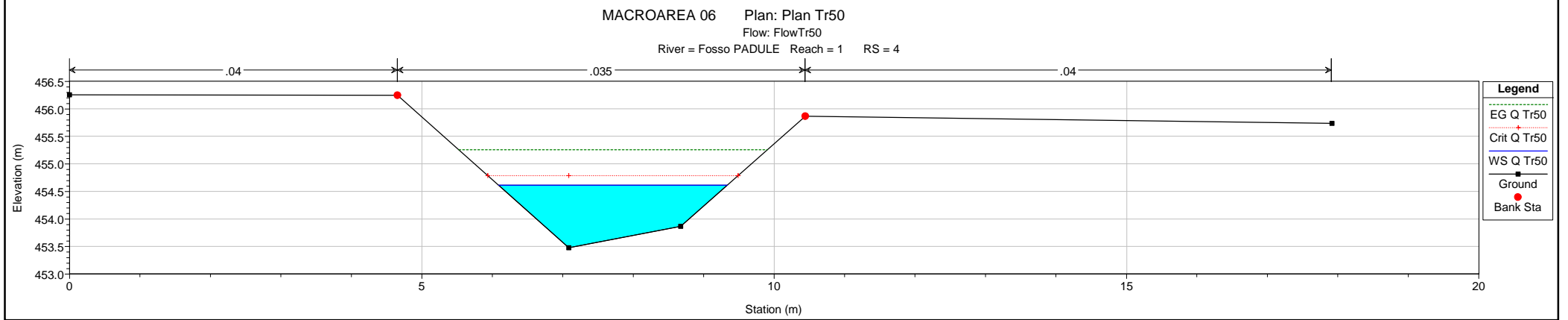
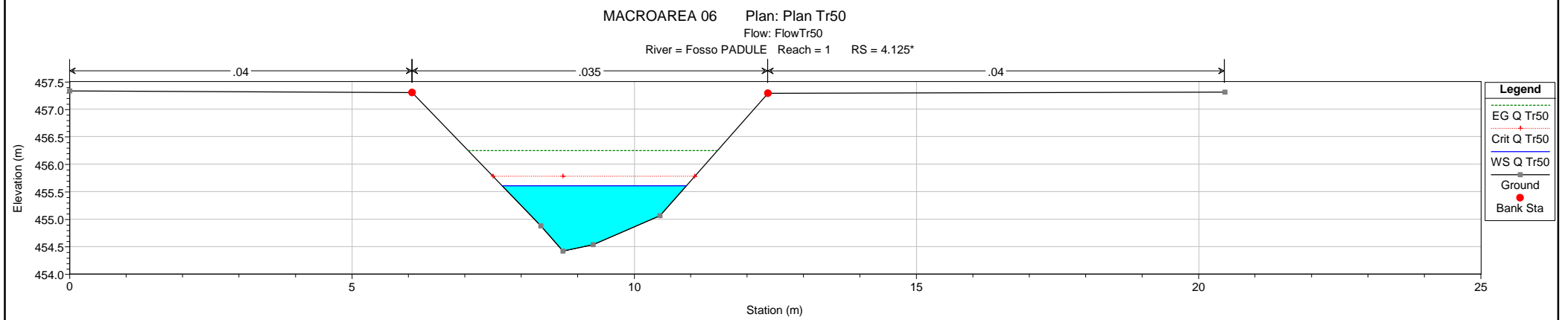
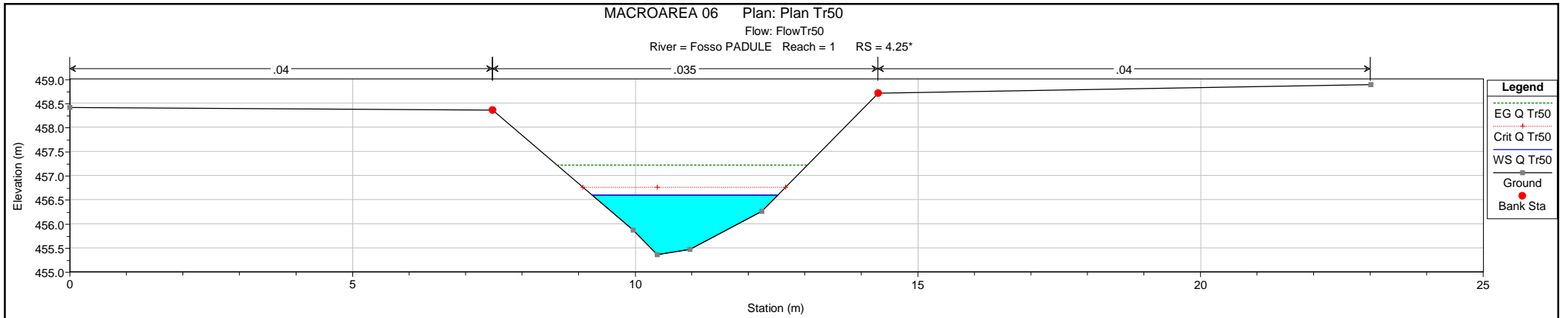
Flow: FlowTr50

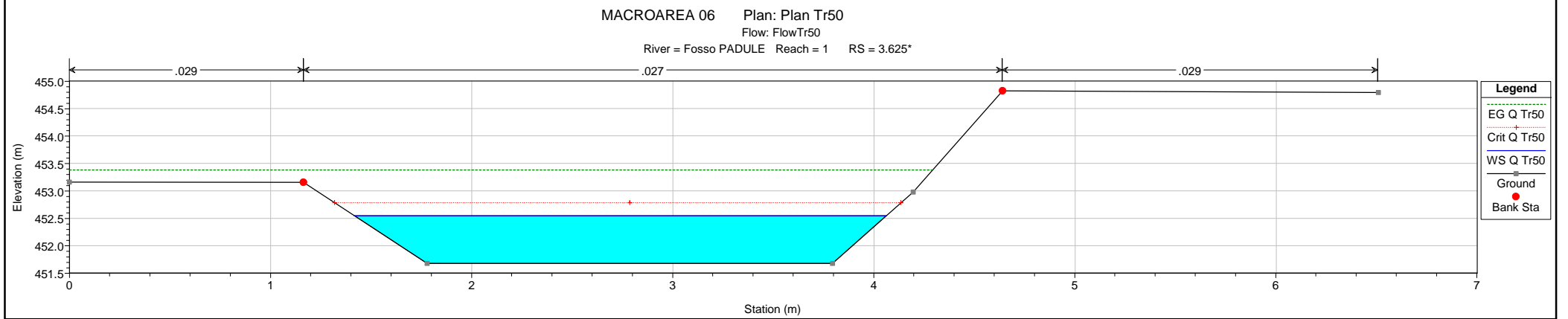
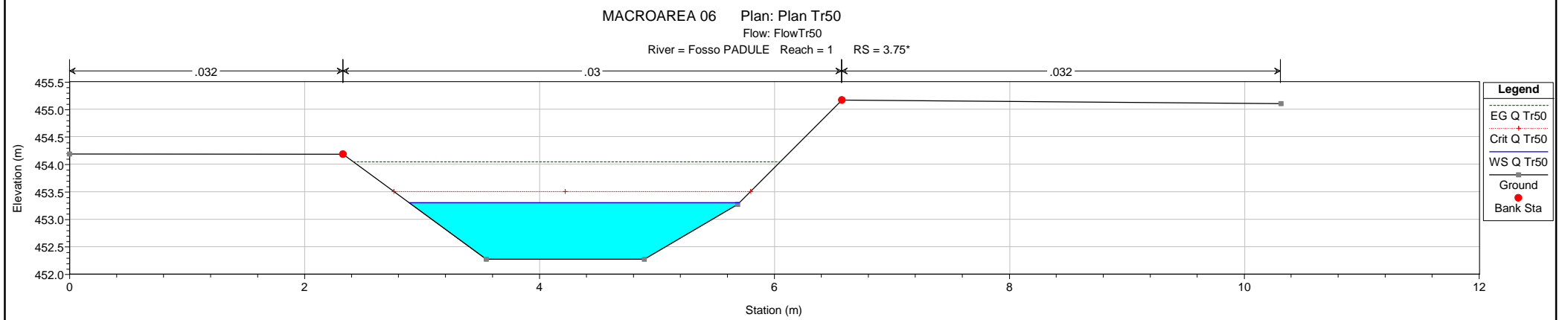
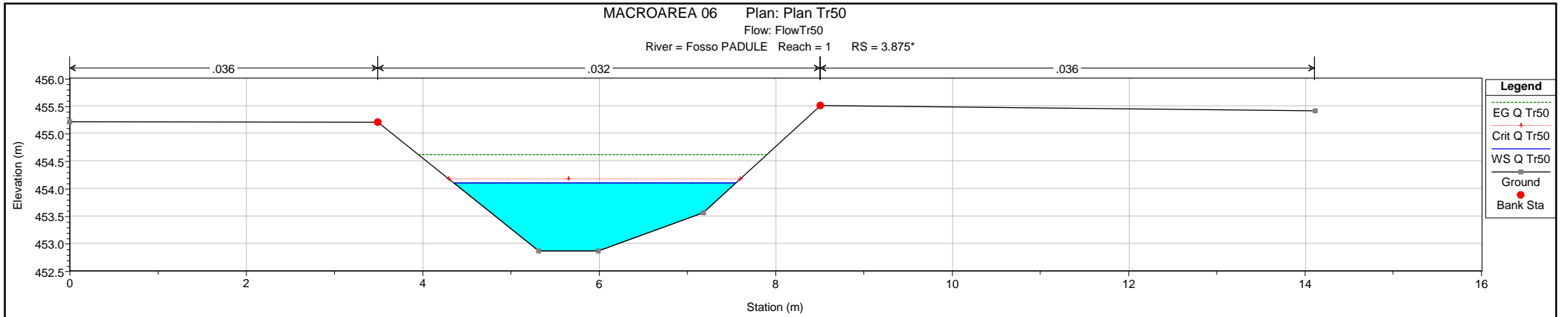
River = Fosso PADULE Reach = 1 RS = 4.75*



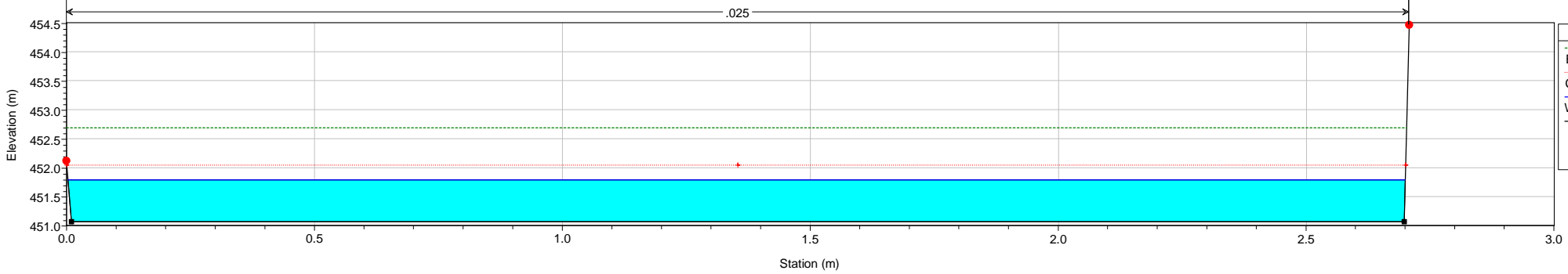








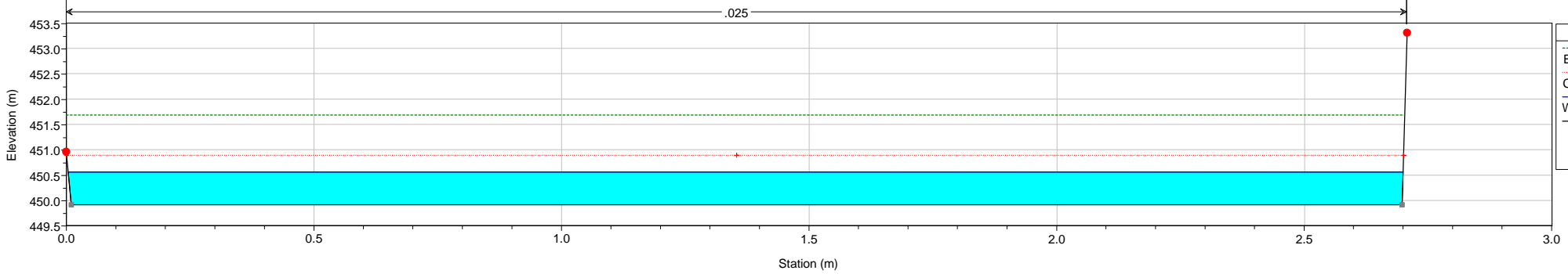
MACROAREA 06 Plan: Plan Tr50
Flow: FlowTr50
River = Fosso PADULE Reach = 1 RS = 3.5



Legend

- EG Q Tr50
- Crit Q Tr50
- WS Q Tr50
- Ground
- Bank Sta

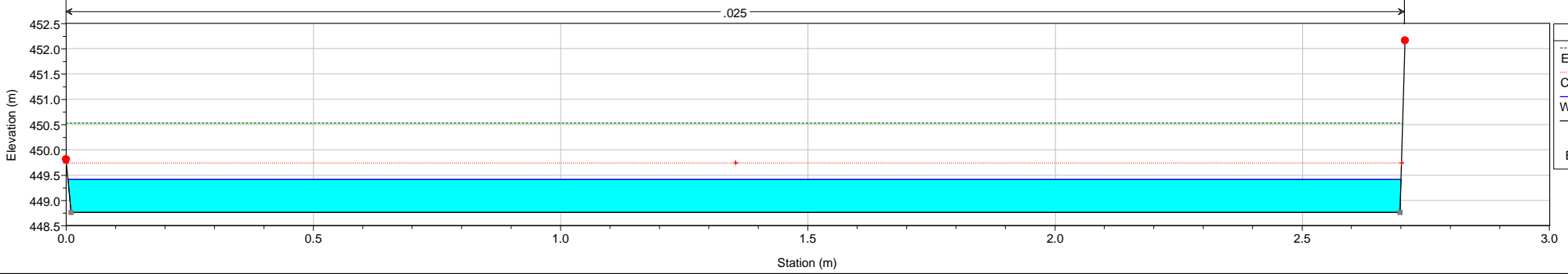
MACROAREA 06 Plan: Plan Tr50
Flow: FlowTr50
River = Fosso PADULE Reach = 1 RS = 3.4*



Legend

- EG Q Tr50
- Crit Q Tr50
- WS Q Tr50
- Ground
- Bank Sta

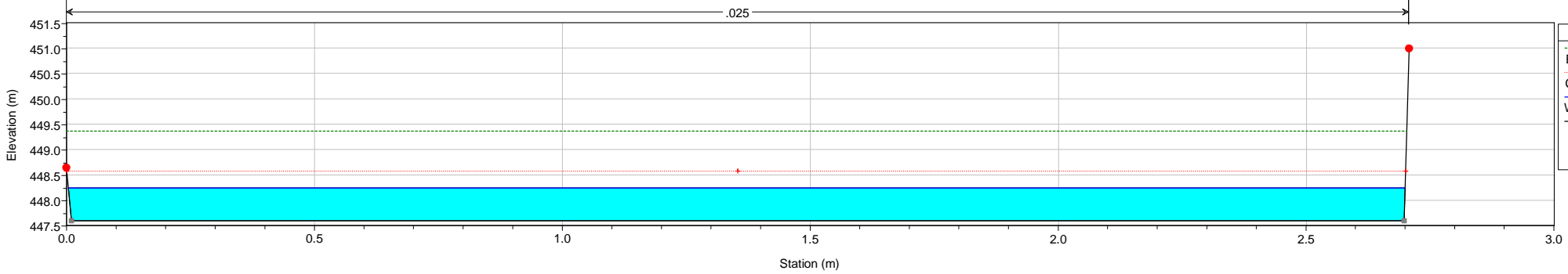
MACROAREA 06 Plan: Plan Tr50
Flow: FlowTr50
River = Fosso PADULE Reach = 1 RS = 3.3*



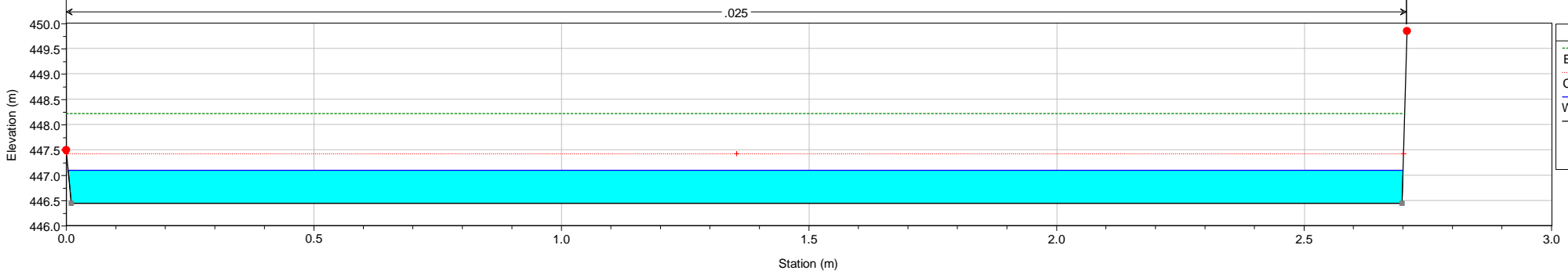
Legend

- EG Q Tr50
- Crit Q Tr50
- WS Q Tr50
- Ground
- Bank Sta

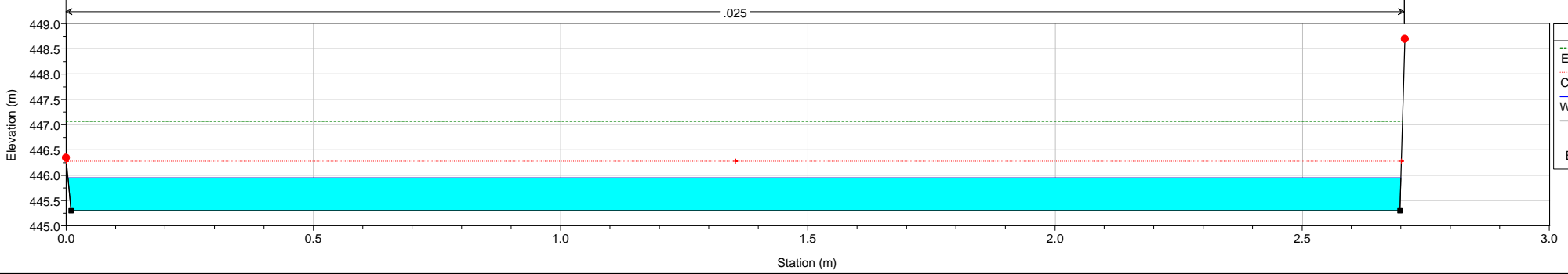
MACROAREA 06 Plan: Plan Tr50
 Flow: FlowTr50
 River = Fosso PADULE Reach = 1 RS = 3.2*



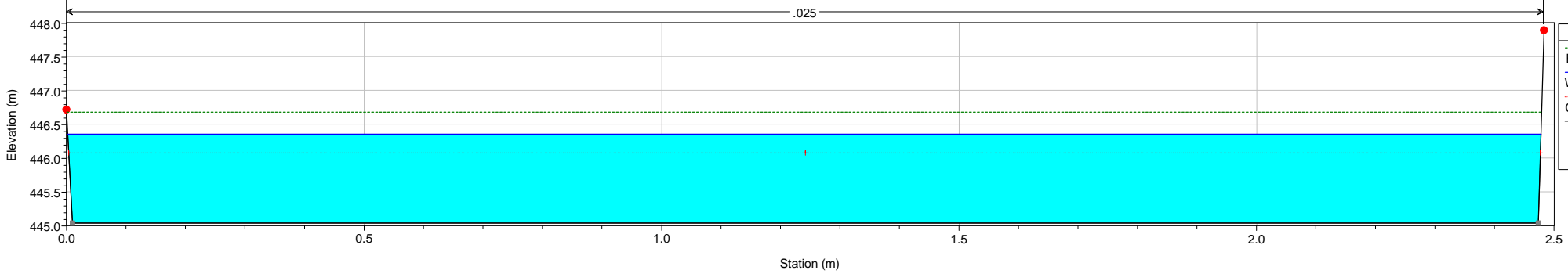
MACROAREA 06 Plan: Plan Tr50
 Flow: FlowTr50
 River = Fosso PADULE Reach = 1 RS = 3.1*



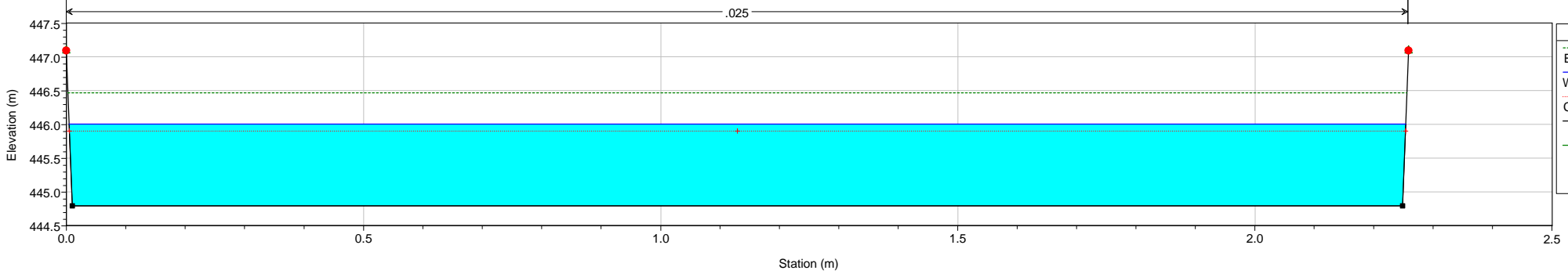
MACROAREA 06 Plan: Plan Tr50
 Flow: FlowTr50
 River = Fosso PADULE Reach = 1 RS = 3



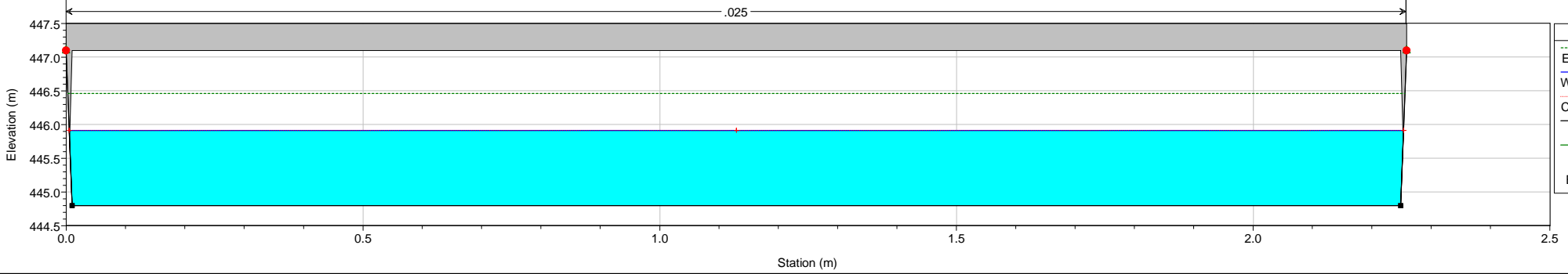
MACROAREA 06 Plan: Plan Tr50
 Flow: FlowTr50
 River = Fosso PADULE Reach = 1 RS = 2.5*

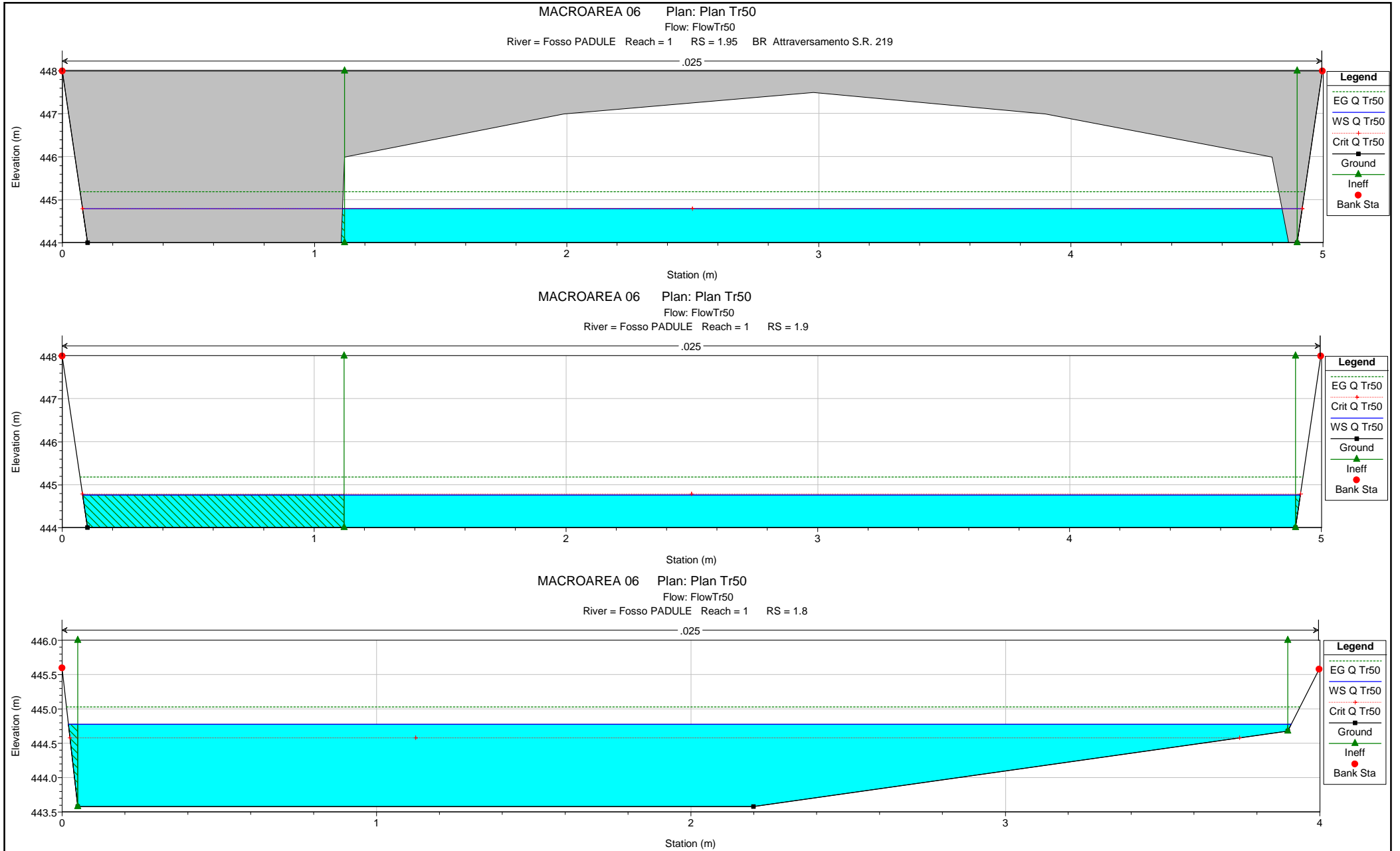


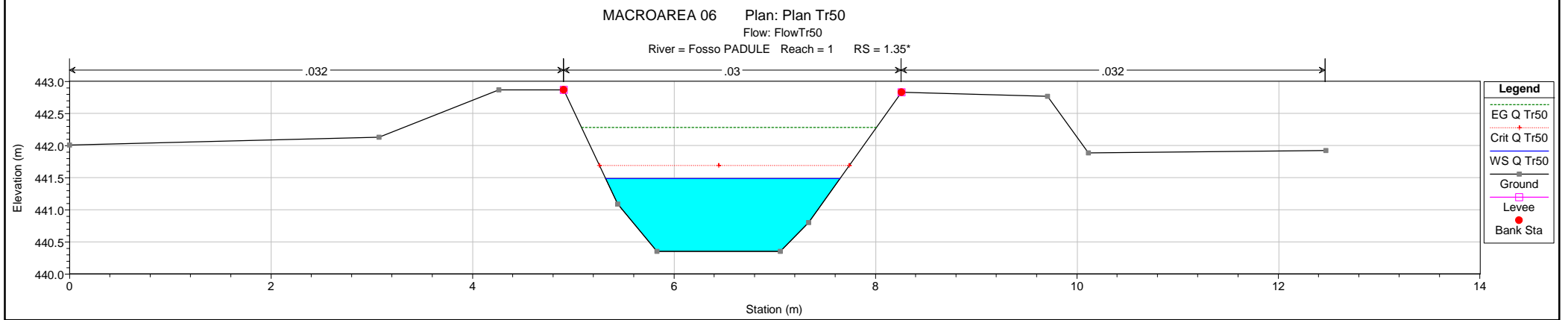
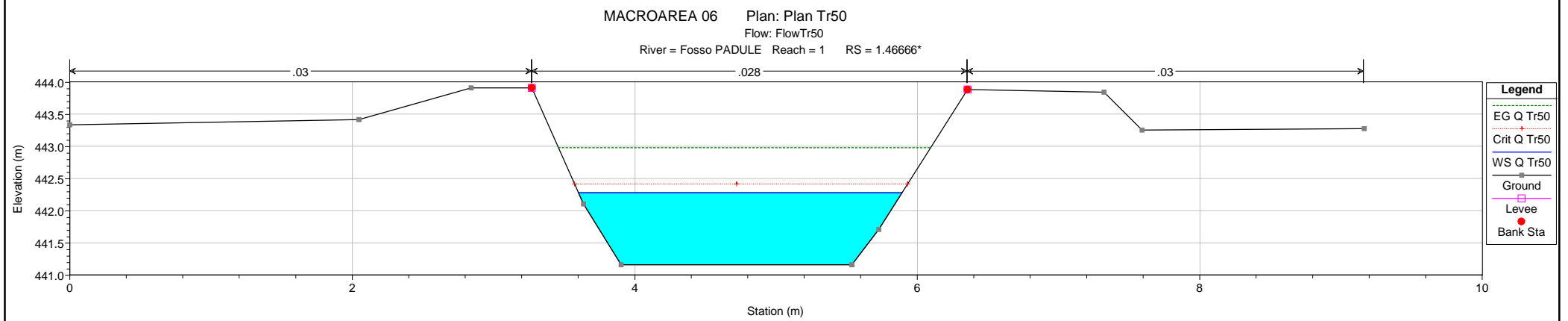
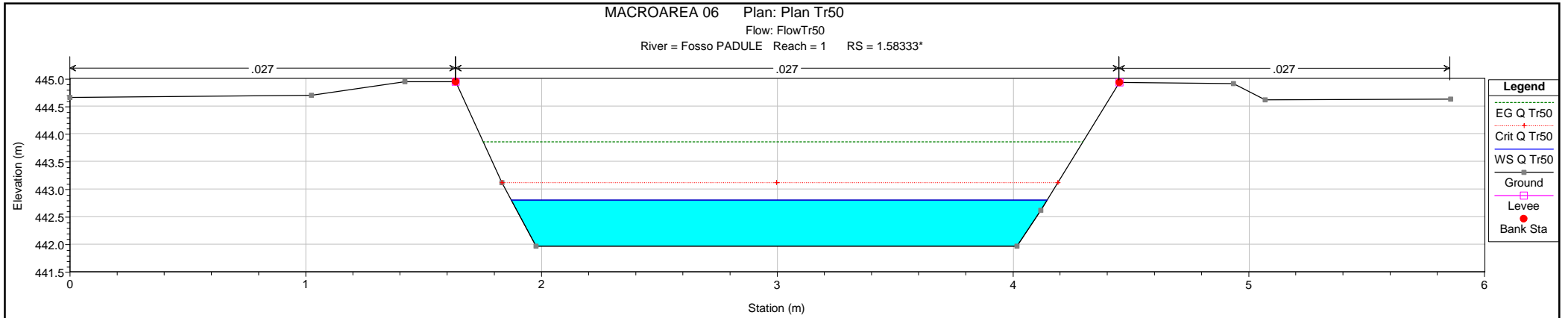
MACROAREA 06 Plan: Plan Tr50
 Flow: FlowTr50
 River = Fosso PADULE Reach = 1 RS = 2

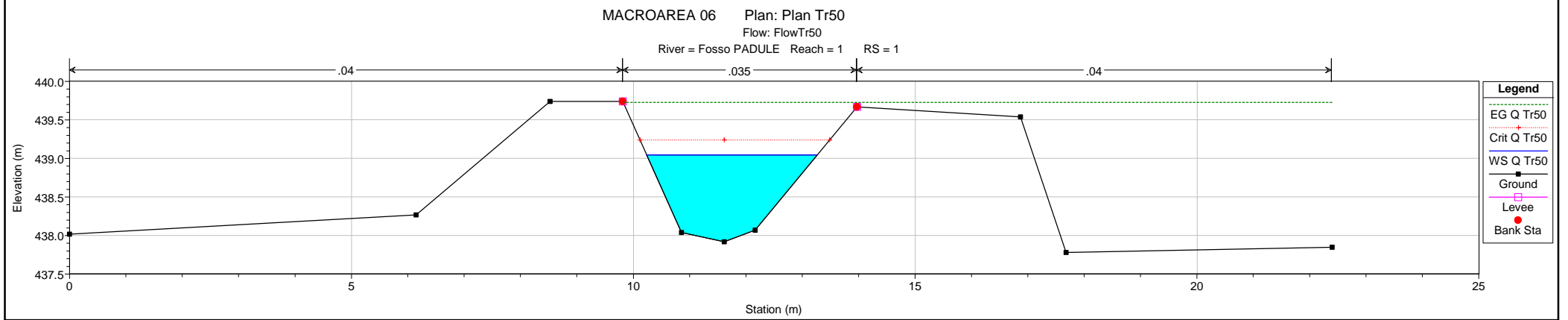
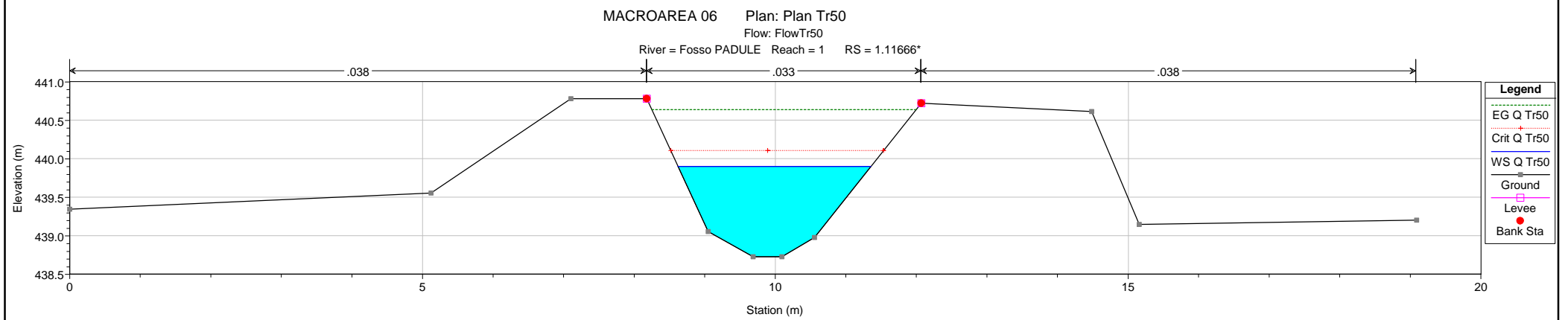
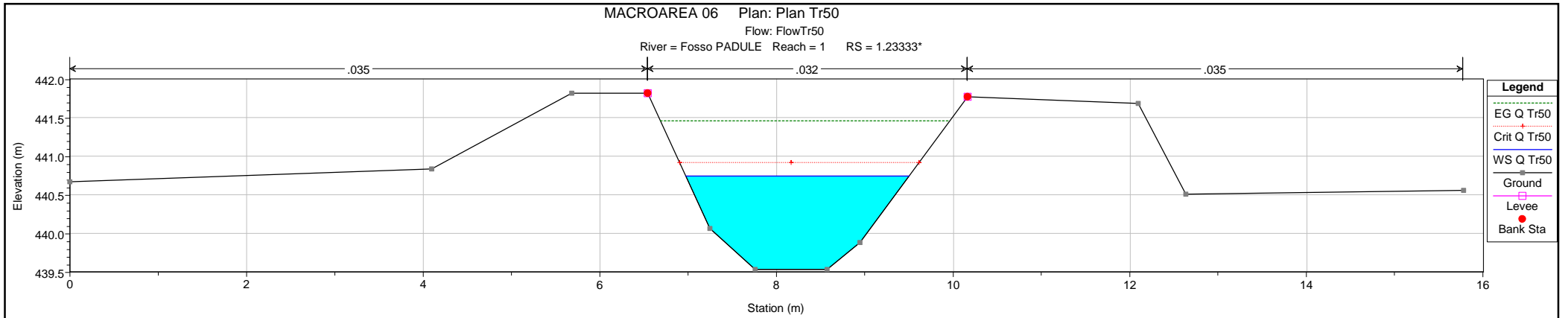


MACROAREA 06 Plan: Plan Tr50
 Flow: FlowTr50
 River = Fosso PADULE Reach = 1 RS = 1.95 BR Attraversamento S.R. 219









PADULE.rep

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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PROJECT DATA

Project Title: MACROAREA 06 FOSSO PADULE
Project File : PADULE.prj
Run Date and Time: 22/10/2006 0.53.48

Project in SI units

Project Description:
verifica MACROAREA 06

FLOW DATA

Flow Title: Tr200
Flow File : C:\Lavoro\PRG\Integrazione\HEC_PADULE\PADULE.f03

Flow Data (m3/s)

* River Reach RS * Q Tr200 *
* Fosso PADULE 1 5 * 11.5 *

Boundary Conditions

* River Reach Profile * Upstream
Downstream *

* Fosso PADULE 1 Q Tr200 * Critical
Normal s = 0.028 *

GEOMETRY DATA

Geometry Title: Fosso PADULE
Geometry File : C:\Lavoro\PRG\Integrazione\HEC_PADULE\PADULE.g01

CROSS SECTION

RIVER: Fosso PADULE
REACH: 1 RS: 5

INPUT

Description:

Table with 10 columns: Station, Elevation, Data, num=, Sta, Elev, Sta, Elev, Sta, Elev. Row 1: 0, 464.92, 15.95, 464.74, 19.69, 461.89, 20.33, 461.06, 21.15, 461.13. Row 2: 25.89, 467.29, 38.33, 468.38.

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Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 15.95 .035 25.89 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 15.95 25.89 29.5 29.5 29.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

 **
 * E.G. Elev (m) * 463.25 * Element * Left OB * Channel * Right OB
 * Vel Head (m) * 0.49 * wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 462.76 * Reach Len. (m) * 29.50 * 29.50 * 29.50
 * Crit w.s. (m) * 462.76 * Flow Area (m2) * * 3.71 *
 * E.G. Slope (m/m) *0.019260 * Area (m2) * * 3.71 *
 * Q Total (m3/s) * 11.50 * Flow (m3/s) * * 11.50 *
 * Top width (m) * 3.86 * Top width (m) * * 3.86 *
 * Vel Total (m/s) * 3.10 * Avg. Vel. (m/s) * * 3.10 *
 * Max Chl Dpth (m) * 1.70 * Hydr. Depth (m) * * 0.96 *
 * Conv. Total (m3/s) * 82.9 * Conv. (m3/s) * * 82.9 *
 * Length wtd. (m) * 29.50 * wetted Per. (m) * * 5.37 *
 * Min Ch El (m) * 461.06 * Shear (N/m2) * * 130.58 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 404.83 *
 * Frctn Loss (m) * 0.56 * Cum Volume (1000 m3) * * 2.12 *
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 2.27 *

 **

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 4.875*

INPUT

Description:
 Station Elevation Data num= 8
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 463.838 14.539 463.679 18.071 460.889 18.675 460.112 19.454 460.189
 21.176 462.282 23.96 465.863 35.78 466.8

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

0 .04 14.539 .035 23.96 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 14.539 23.96 29.5 29.5 29.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m) * 462.42 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.86 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 461.56 * Reach Len. (m) * 29.50 * 29.50 * 29.50
* Crit W.S. (m) * 461.82 * Flow Area (m2) * * 2.81 *
* E.G. Slope (m/m) *0.040166 * Area (m2) * * 2.81 *
* Q Total (m3/s) * 11.50 * Flow (m3/s) * * 11.50 *
* Top width (m) * 3.37 * Top width (m) * * 3.37 *
* Vel Total (m/s) * 4.10 * Avg. Vel. (m/s) * * 4.10 *
* Max Chl Dpth (m) * 1.45 * Hydr. Depth (m) * * 0.83 *
* Conv. Total (m3/s) * 57.4 * Conv. (m3/s) * * 57.4 *
* Length wtd. (m) * 29.50 * wetted Per. (m) * * 4.63 *
* Min Ch El (m) * 460.11 * Shear (N/m2) * * 238.53 *
* Alpha * 1.00 * Stream Power (N/m s) * * 977.67 *
* Frctn Loss (m) * 0.79 * Cum Volume (1000 m3) * * 2.03 *
* C & E Loss (m) * 0.04 * Cum SA (1000 m2) * * 2.17 *
*****
**
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 4.75*

INPUT

Description:
 Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.755	13.127	462.617	16.451	459.889	17.02	459.165	17.759	459.248
19.391	461.08	22.03	464.435	33.23	465.22				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	13.127	.035	22.03	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 13.127 22.03 29.5 29.5 29.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

PADULE.rep

```

*****
**
* E.G. Elev (m)      * 461.38 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 0.65  * wt. n-Val.      *         * 0.035  *
* W.S. Elev (m)     * 460.73 * Reach Len. (m)  * 29.50  * 29.50  * 29.50
* Crit w.S. (m)     * 460.87 * Flow Area (m2)  *         * 3.23   *
* E.G. Slope (m/m)  * 0.027715 * Area (m2)      *         * 3.23   *
* Q Total (m3/s)    * 11.50  * Flow (m3/s)     *         * 11.50  *
* Top width (m)     * 3.66  * Top width (m)   *         * 3.66   *
* Vel Total (m/s)   * 3.56  * Avg. Vel. (m/s) *         * 3.56   *
* Max Chl Dpth (m) * 1.57  * Hydr. Depth (m) *         * 0.88   *
* Conv. Total (m3/s) * 69.1  * Conv. (m3/s)    *         * 69.1   *
* Length wtd. (m)  * 29.50 * wetted Per. (m) *         * 4.98   *
* Min Ch El (m)    * 459.17 * Shear (N/m2)   *         * 176.13 *
* Alpha            * 1.00  * Stream Power (N/m s) *         * 627.36 *
* Frctn Loss (m)   * 0.98  * Cum Volume (1000 m3) *         * 1.94   *
* C & E Loss (m)   * 0.06  * Cum SA (1000 m2) *         * 2.06   *
**
*****

```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
REACH: 1 RS: 4.625*

INPUT

Description:

Station	Elevation	Data	num=	8	Sta	Elev	Sta	Elev	Sta	Elev
0	461.673	11.716	461.556	14.832	458.888	15.365	458.217	16.063	458.307	
17.606	459.879	20.1	463.008	30.68	463.64					

Manning's n	Values	num=	3	Sta	n Val	Sta	n Val
0	.04	11.716	.035	20.1	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	11.716	20.1		29.5	29.5	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m)      * 460.46 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 0.75  * wt. n-Val.      *         * 0.035  *
* W.S. Elev (m)     * 459.71 * Reach Len. (m)  * 29.50  * 29.50  * 29.50
* Crit w.S. (m)     * 459.92 * Flow Area (m2)  *         * 2.99   *
**

```

```

          PADULE.rep
* E.G. Slope (m/m)      *0.034054 * Area (m2)          *          * 2.99 *
* Q Total (m3/s)       * 11.50  * Flow (m3/s)         *          * 11.50 *
* Top width (m)        * 3.57  * Top width (m)       *          * 3.57 *
* Vel Total (m/s)      * 3.85  * Avg. Vel. (m/s)    *          * 3.85 *
* Max Chl Dpth (m)    * 1.49  * Hydr. Depth (m)    *          * 0.84 *
* Conv. Total (m3/s)   * 62.3  * Conv. (m3/s)       *          * 62.3 *
* Length wtd. (m)     * 29.50 * wetted Per. (m)    *          * 4.79 *
* Min Ch El (m)       * 458.22 * Shear (N/m2)       *          * 208.30 *
* Alpha                * 1.00  * Stream Power (N/m s) *          * 801.76 *
* Frctn Loss (m)      * 0.90  * Cum Volume (1000 m3) *          * 1.85 *
* C & E Loss (m)      * 0.01  * Cum SA (1000 m2)   *          * 1.96 *
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 4.5*

INPUT

Description:

Station Elevation Data		num= 8		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	460.59	10.305	460.495	13.212	457.887	13.71	457.27	14.368	457.366
15.821	458.677	18.17	461.58	28.13	462.06				

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	10.305	.035	18.17	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	10.305	18.17		29.5	29.5	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m)        * 459.48 * Element          * Left OB * Channel * Right OB
* vel Head (m)         * 0.71  * wt. n-Val.      *          * 0.035 *
* W.S. Elev (m)        * 458.77 * Reach Len. (m)  * 29.50 * 29.50 * 29.50
* Crit W.S. (m)        * 458.95 * Flow Area (m2)  *          * 3.07 *
* E.G. Slope (m/m)     *0.031608 * Area (m2)       *          * 3.07 *
* Q Total (m3/s)       * 11.50 * Flow (m3/s)     *          * 11.50 *
* Top width (m)        * 3.67  * Top width (m)   *          * 3.67 *
* vel Total (m/s)      * 3.74  * Avg. Vel. (m/s) *          * 3.74 *
* Max Chl Dpth (m)    * 1.50  * Hydr. Depth (m) *          * 0.84 *
* Conv. Total (m3/s)   * 64.7  * Conv. (m3/s)    *          * 64.7 *
* Length wtd. (m)     * 29.50 * wetted Per. (m) *          * 4.85 *

```

PADULE.rep

```
*
* Min Ch El (m)      * 457.27 * Shear (N/m2)      *          * 196.12 *
* Alpha             * 1.00 * Stream Power (N/m s) *          * 734.25 *
* Frctn Loss (m)    * 0.97 * Cum volume (1000 m3) *          * 1.76 *
* C & E Loss (m)    * 0.01 * Cum SA (1000 m2)    *          * 1.85 *
```

**

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
REACH: 1

RS: 4.375*

INPUT

Description:

Station	Elevation	Data	num=	8	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	459.508	8.894	459.434	11.593	456.887	12.055	456.323	12.672	456.425			
14.035	457.475	16.24	460.152	25.58	460.48							

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	8.894	.035	16.24	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	8.894	16.24		29.5	29.5	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m)      * 458.53 * Element          * Left OB * Channel * Right OB
* vel Head (m)      * 0.74 * wt. n-Val.      *          * 0.035 *
* W.S. Elev (m)     * 457.78 * Reach Len. (m)  * 29.50 * 29.50 * 29.50
* Crit W.S. (m)     * 457.98 * Flow Area (m2)  *          * 3.01 *
* E.G. Slope (m/m)  * 0.033107 * Area (m2)       *          * 3.01 *
* Q Total (m3/s)    * 11.50 * Flow (m3/s)     *          * 11.50 *
* Top width (m)     * 3.64 * Top width (m)   *          * 3.64 *
* vel Total (m/s)   * 3.82 * Avg. vel. (m/s) *          * 3.82 *
* Max Chl Dpth (m) * 1.46 * Hydr. Depth (m) *          * 0.83 *
* Conv. Total (m3/s) * 63.2 * Conv. (m3/s)    *          * 63.2 *
* Length wtd. (m)   * 29.50 * wetted Per. (m) *          * 4.78 *
* Min Ch El (m)     * 456.32 * Shear (N/m2)    *          * 204.57 *
* Alpha             * 1.00 * Stream Power (N/m s) *          * 781.64 *
* Frctn Loss (m)    * 0.95 * Cum volume (1000 m3) *          * 1.67 *
* C & E Loss (m)    * 0.00 * Cum SA (1000 m2) *          * 1.74 *
```

**

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and

previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 4.25*

INPUT

Description:

Station Elevation Data		num= 8		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	458.425	7.483	458.372	9.974	455.886	10.4	455.375	10.977	455.484
12.25	456.273	14.31	458.725	23.03	458.9				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	7.483	.035	14.31	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	7.483	14.31		29.5	29.5		.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m) * 457.55 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.75 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 456.80 * Reach Len. (m) * 29.50 * 29.50 * 29.50
* Crit w.s. (m) * 457.00 * Flow Area (m2) * * 3.00 *
* E.G. Slope (m/m) *0.033050 * Area (m2) * * 3.00 *
* Q Total (m3/s) * 11.50 * Flow (m3/s) * * 11.50 *
* Top width (m) * 3.64 * Top width (m) * * 3.64 *
* vel Total (m/s) * 3.83 * Avg. vel. (m/s) * * 3.83 *
* Max chl Dpth (m) * 1.43 * Hydr. Depth (m) * * 0.83 *
* Conv. Total (m3/s) * 63.3 * Conv. (m3/s) * * 63.3 *
* Length wtd. (m) * 29.50 * wetted Per. (m) * * 4.74 *
* Min ch El (m) * 455.37 * Shear (N/m2) * * 205.40 *
* Alpha * 1.00 * Stream Power (N/m s) * * 787.14 *
* Frctn Loss (m) * 0.98 * Cum volume (1000 m3) * * 1.58 *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 1.63 *
*****
**
```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 4.125*

INPUT

Description:

Station Elevation Data		num= 8		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

PADULE.rep

 0 457.342 6.071 457.311 8.354 454.885 8.745 454.428 9.281 454.543
 10.465 455.072 12.38 457.297 20.48 457.32

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 6.071 .035 12.38 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 6.071 12.38 29.5 29.5 29.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

 **
 * E.G. Elev (m) * 456.57 * Element * Left OB * Channel * Right OB
 * Vel Head (m) * 0.76 * wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 455.81 * Reach Len. (m) * 29.50 * 29.50 * 29.50
 * Crit W.S. (m) * 456.02 * Flow Area (m2) * * 2.98 *
 * E.G. Slope (m/m) *0.033382 * Area (m2) * * 2.98 *
 * Q Total (m3/s) * 11.50 * Flow (m3/s) * * 11.50 *
 * Top width (m) * 3.61 * Top width (m) * * 3.61 *
 * Vel Total (m/s) * 3.86 * Avg. Vel. (m/s) * * 3.86 *
 * Max Chl Dpth (m) * 1.38 * Hydr. Depth (m) * * 0.82 *
 * Conv. Total (m3/s) * 62.9 * Conv. (m3/s) * * 62.9 *
 * Length wtd. (m) * 29.50 * Wetted Per. (m) * * 4.69 *
 * Min Ch El (m) * 454.43 * Shear (N/m2) * * 208.13 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 803.34 *
 * Frctn Loss (m) * 0.98 * Cum volume (1000 m3) * * 1.49 *
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 1.53 *
 *

 **

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 4

INPUT

Description:
 Station Elevation Data num= 6
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 456.26 4.66 456.25 7.09 453.48 8.68 453.87 10.45 455.87
 17.93 455.74

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 4.66 .035 10.45 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 4.66 10.45 23 23 23 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

PADULE.rep

```

*****
**
* E.G. Elev (m)      * 455.57 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 0.77  * wt. n-Val.      *         * 0.035  *
* W.S. Elev (m)     * 454.81 * Reach Len. (m)   * 23.00  * 23.00  * 23.00
* Crit w.S. (m)     * 455.01 * Flow Area (m2)   *         * 2.96   *
* E.G. Slope (m/m)  * 0.033686 * Area (m2)        *         * 2.96   *
* Q Total (m3/s)    * 11.50  * Flow (m3/s)      *         * 11.50  *
* Top width (m)     * 3.58  * Top width (m)    *         * 3.58   *
* Vel Total (m/s)   * 3.88  * Avg. Vel. (m/s)  *         * 3.88   *
* Max Chl Dpth (m) * 1.33  * Hydr. Depth (m)  *         * 0.83   *
* Conv. Total (m3/s) * 62.7  * Conv. (m3/s)     *         * 62.7   *
* Length wtd. (m)  * 23.00 * wetted Per. (m)  *         * 4.66   *
* Min Ch El (m)    * 453.48 * Shear (N/m2)     *         * 210.28 *
* Alpha            * 1.00  * Stream Power (N/m s) *         * 815.95 *
* Frctn Loss (m)   * 0.99  * Cum Volume (1000 m3) *         * 1.40   *
* C & E Loss (m)   * 0.00  * Cum SA (1000 m2)  *         * 1.42   *
**
*****

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 3.875*

INPUT

Description:

Station		Elevation Data		num= 7		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	455.228	3.495	455.22	5.32	452.88	5.993	452.88	7.186	453.575
8.515	455.522	14.125	455.425						

Manning's n Values		num= 3		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.036	3.495	.032	8.515	.036		

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	3.495	8.515		23	23	23		.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m)      * 454.94 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 0.60  * wt. n-Val.      *         * 0.032  *
* W.S. Elev (m)     * 454.34 * Reach Len. (m)   * 23.00  * 23.00  * 23.00
* Crit w.S. (m)     * 454.43 * Flow Area (m2)   *         * 3.35   *
* E.G. Slope (m/m)  * 0.019722 * Area (m2)        *         * 3.35   *
* Q Total (m3/s)    * 11.50  * Flow (m3/s)      *         * 11.50  *
**

```

PADULE.rep

```

*
* Top width (m) * 3.53 * Top width (m) * * 3.53 *
* Vel Total (m/s) * 3.43 * Avg. Vel. (m/s) * * 3.43 *
* Max Chl Dpth (m) * 1.46 * Hydr. Depth (m) * * 0.95 *
* Conv. Total (m3/s) * 81.9 * Conv. (m3/s) * * 81.9 *
* Length wtd. (m) * 23.00 * wetted Per. (m) * * 4.84 *
* Min Ch El (m) * 452.88 * Shear (N/m2) * * 133.89 *
* Alpha * 1.00 * Stream Power (N/m s) * * 459.83 *
* Frctn Loss (m) * 0.58 * Cum Volume (1000 m3) * * 1.33 *
* C & E Loss (m) * 0.05 * Cum SA (1000 m2) * * 1.34 *

```

**

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
REACH: 1 RS: 3.75*

INPUT

Description:

Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	454.195	2.33	454.19	3.55	452.28	4.895	452.28	5.692	453.279
6.58	455.175	10.32	455.11						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.032	2.33	.03	6.58	.032

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
2.33 6.58 23 23 23 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

```

* E.G. Elev (m) * 454.39 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.85 * wt. n-Val. * * 0.030 *
* W.S. Elev (m) * 453.54 * Reach Len. (m) * 23.00 * 23.00 * 23.00
* Crit W.S. (m) * 453.76 * Flow Area (m2) * * 2.81 *
* E.G. Slope (m/m) *0.027318 * Area (m2) * * 2.81 *
* Q Total (m3/s) * 11.50 * Flow (m3/s) * * 11.50 *
* Top width (m) * 3.06 * Top width (m) * * 3.06 *
* vel Total (m/s) * 4.09 * Avg. Vel. (m/s) * * 4.09 *
* Max Chl Dpth (m) * 1.26 * Hydr. Depth (m) * * 0.92 *
* Conv. Total (m3/s) * 69.6 * Conv. (m3/s) * * 69.6 *
* Length wtd. (m) * 23.00 * wetted Per. (m) * * 4.40 *

```

PADULE.rep

```
*
* Min Ch El (m)          * 452.28 * Shear (N/m2)          *          * 171.31 *
* Alpha                  * 1.00 * Stream Power (N/m s) *          * 700.56 *
* Frctn Loss (m)        * 0.53 * Cum Volume (1000 m3) *          * 1.26 *
* C & E Loss (m)        * 0.03 * Cum SA (1000 m2)    *          * 1.26 *
```

**

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for

additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE

REACH: 1

RS: 3.625*

INPUT

Description:

```
Station Elevation Data      num=      7
Sta   Elev   Sta   Elev   Sta   Elev   Sta   Elev   Sta   Elev
*****
0 453.163  1.165 453.16  1.78 451.68  3.798 451.68  4.199 452.984
4.645 454.828  6.515 454.795
```

Manning's n Values

num=

3

```
Sta   n Val   Sta   n Val   Sta   n Val
*****
0     .029   1.165   .027   4.645   .029
```

```
Bank Sta: Left   Right   Lengths: Left Channel   Right   Coeff Contr.   Expan.
          1.165   4.645          23      23          23          .1          .3
```

CROSS SECTION OUTPUT Profile #Q Tr200

```
**
* E.G. Elev (m)          * 453.75 * Element          * Left OB * Channel * Right OB
* vel Head (m)          * 0.98 * wt. n-Val.      *          * 0.027 *
* W.S. Elev (m)         * 452.77 * Reach Len. (m)  * 23.00 * 23.00 * 23.00
* Crit w.s. (m)         * 453.04 * Flow Area (m2)  *          * 2.62 *
* E.G. Slope (m/m)      *0.027349 * Area (m2)       *          * 2.62 *
* Q Total (m3/s)        * 11.50 * Flow (m3/s)     *          * 11.50 *
* Top width (m)         * 2.80 * Top width (m)   *          * 2.80 *
* vel Total (m/s)       * 4.38 * Avg. vel. (m/s) *          * 4.38 *
* Max chl Dpth (m)     * 1.09 * Hydr. Depth (m) *          * 0.94 *
* Conv. Total (m3/s)    * 69.5 * Conv. (m3/s)    *          * 69.5 *
* Length wtd. (m)       * 23.00 * wetted Per. (m) *          * 4.33 *
* Min Ch El (m)         * 451.68 * Shear (N/m2)   *          * 162.34 *
* Alpha                  * 1.00 * Stream Power (N/m s) *          * 711.53 *
* Frctn Loss (m)        * 0.63 * Cum Volume (1000 m3) *          * 1.20 *
* C & E Loss (m)        * 0.01 * Cum SA (1000 m2) *          * 1.20 *
```

**

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 3.5

INPUT

Description:

Station Elevation Data num= 4
 Sta Elev Sta Elev Sta Elev Sta Elev

 0 452.13 .01 451.08 2.7 451.08 2.71 454.48

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .025 0 .025 2.71 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 2.71 28 28 28 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

 **
 * E.G. Elev (m) * 453.09 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 1.08 * wt. n-Val. * * 0.025 *
 * W.S. Elev (m) * 452.01 * Reach Len. (m) * 28.00 * 28.00 * 28.00
 * Crit w.s. (m) * 452.30 * Flow Area (m2) * * 2.50 *
 * E.G. Slope (m/m) *0.029324 * Area (m2) * * 2.50 *
 * Q Total (m3/s) * 11.50 * Flow (m3/s) * * 11.50 *
 * Top width (m) * 2.70 * Top width (m) * * 2.70 *
 * vel Total (m/s) * 4.60 * Avg. vel. (m/s) * * 4.60 *
 * Max chl Dpth (m) * 0.93 * Hydr. Depth (m) * * 0.93 *
 * Conv. Total (m3/s) * 67.2 * Conv. (m3/s) * * 67.2 *
 * Length wtd. (m) * 28.00 * wetted Per. (m) * * 4.55 *
 * Min ch El (m) * 451.08 * Shear (N/m2) * * 158.21 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 727.60 *
 * Frctn Loss (m) * 0.65 * Cum volume (1000 m3) * * 1.14 *
 * C & E Loss (m) * 0.01 * Cum SA (1000 m2) * * 1.13 *

 **

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 3.4*

INPUT

Description:

PADULE.rep

Station Elevation Data num= 4
 Sta Elev Sta Elev Sta Elev Sta Elev

 0 450.974 .01 449.924 2.7 449.924 2.71 453.324

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .025 0 .025 2.71 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 2.71 28 28 28 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

 **
 * E.G. Elev (m) * 452.10 * Element * Left OB * Channel * Right OB
 * Vel Head (m) * 1.35 * wt. n-Val. * * 0.025 *
 * W.S. Elev (m) * 450.75 * Reach Len. (m) * 28.00 * 28.00 * 28.00
 * Crit w.s. (m) * 451.15 * Flow Area (m2) * * 2.23 *
 * E.G. Slope (m/m) *0.040206 * Area (m2) * * 2.23 *
 * Q Total (m3/s) * 11.50 * Flow (m3/s) * * 11.50 *
 * Top width (m) * 2.70 * Top width (m) * * 2.70 *
 * Vel Total (m/s) * 5.15 * Avg. Vel. (m/s) * * 5.15 *
 * Max Chl Dpth (m) * 0.83 * Hydr. Depth (m) * * 0.83 *
 * Conv. Total (m3/s) * 57.4 * Conv. (m3/s) * * 57.4 *
 * Length wtd. (m) * 28.00 * wetted Per. (m) * * 4.35 *
 * Min Ch El (m) * 449.92 * Shear (N/m2) * * 202.63 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 1042.74 *
 * Frctn Loss (m) * 0.96 * Cum Volume (1000 m3) * * 1.07 *
 * C & E Loss (m) * 0.03 * Cum SA (1000 m2) * * 1.06 *

 **

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 3.3*

INPUT

Description:
 Station Elevation Data num= 4
 Sta Elev Sta Elev Sta Elev Sta Elev

 0 449.818 .01 448.768 2.7 448.768 2.71 452.168

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .025 0 .025 2.71 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

0 2.71 28 28 28 .1 .3
 PADULE.rep

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m)      * 450.96 * Element          * Left OB * Channel * Right OB
* vel Head (m)      * 1.37 * wt. n-Val.      *         * 0.025 *
* W.S. Elev (m)     * 449.59 * Reach Len. (m)  * 28.00 * 28.00 * 28.00
* Crit W.S. (m)     * 449.99 * Flow Area (m2)  *         * 2.22 *
* E.G. Slope (m/m)  *0.041129 * Area (m2)       *         * 2.22 *
* Q Total (m3/s)    * 11.50 * Flow (m3/s)     *         * 11.50 *
* Top width (m)     * 2.70 * Top width (m)   *         * 2.70 *
* vel Total (m/s)   * 5.19 * Avg. vel. (m/s) *         * 5.19 *
* Max Chl Dpth (m) * 0.82 * Hydr. Depth (m) *         * 0.82 *
* Conv. Total (m3/s) * 56.7 * Conv. (m3/s)    *         * 56.7 *
* Length wtd. (m)  * 28.00 * wetted Per. (m) *         * 4.34 *
* Min Ch El (m)    * 448.77 * Shear (N/m2)   *         * 206.26 *
* Alpha            * 1.00 * Stream Power (N/m s) *         * 1069.96 *
* Frctn Loss (m)   * 1.14 * Cum Volume (1000 m3) *         * 1.01 *
* C & E Loss (m)   * 0.00 * Cum SA (1000 m2) *         * 0.98 *
**
*****
```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 3.2*

INPUT

Description:

Station Elevation Data num= 4
 Sta Elev Sta Elev Sta Elev Sta Elev

 0 448.662 .01 447.612 2.7 447.612 2.71 451.012

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .025 0 .025 2.71 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 2.71 28 28 28 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m)      * 449.81 * Element          * Left OB * Channel * Right OB
* vel Head (m)      * 1.37 * wt. n-Val.      *         * 0.025 *
* W.S. Elev (m)     * 448.43 * Reach Len. (m)  * 28.00 * 28.00 * 28.00
* Crit W.S. (m)     * 448.84 * Flow Area (m2)  *         * 2.21 *
* E.G. Slope (m/m)  *0.041251 * Area (m2)       *         * 2.21 *
**
*****
```

PADULE.rep

```

*
* Q Total (m3/s)      * 11.50 * Flow (m3/s)      *      * 11.50 *
* Top width (m)      * 2.70 * Top width (m)    *      * 2.70 *
* Vel Total (m/s)    * 5.19 * Avg. Vel. (m/s)  *      * 5.19 *
* Max chl Dpth (m)   * 0.82 * Hydr. Depth (m)  *      * 0.82 *
* Conv. Total (m3/s) * 56.6 * Conv. (m3/s)     *      * 56.6 *
* Length wtd. (m)    * 28.00 * wetted Per. (m)  *      * 4.33 *
* Min ch El (m)      * 447.61 * Shear (N/m2)     *      * 206.73 *
* Alpha              * 1.00 * Stream Power (N/m s) *      * 1073.54 *
* Frctn Loss (m)     * 1.15 * Cum Volume (1000 m3) *      * 0.95 *
* C & E Loss (m)     * 0.00 * Cum SA (1000 m2)  *      * 0.91 *

```

**

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
REACH: 1

RS: 3.1*

INPUT

Description:

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	447.506	.01	446.456	2.7	446.456	2.71	449.856

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	2.71	.025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

0	2.71	28	28	28	.1	.3
---	------	----	----	----	----	----

CROSS SECTION OUTPUT Profile #Q Tr200

```

**
* E.G. Elev (m)      * 448.65 * Element          * Left OB * Channel * Right OB
* vel Head (m)       * 1.37 * wt. n-Val.      *      * 0.025 *
* W.S. Elev (m)      * 447.28 * Reach Len. (m)  * 28.00 * 28.00 * 28.00
* Crit W.S. (m)      * 447.68 * Flow Area (m2)  *      * 2.21 *
* E.G. Slope (m/m)   * 0.041288 * Area (m2)       *      * 2.21 *
* Q Total (m3/s)     * 11.50 * Flow (m3/s)     *      * 11.50 *
* Top width (m)      * 2.70 * Top width (m)   *      * 2.70 *
* Vel Total (m/s)    * 5.19 * Avg. Vel. (m/s) *      * 5.19 *
* Max chl Dpth (m)   * 0.82 * Hydr. Depth (m) *      * 0.82 *
* Conv. Total (m3/s) * 56.6 * Conv. (m3/s)    *      * 56.6 *
* Length wtd. (m)    * 28.00 * wetted Per. (m) *      * 4.33 *
* Min ch El (m)      * 446.46 * Shear (N/m2)    *      * 206.87 *

```

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```

*
* Alpha          * 1.00 * Stream Power (N/m s) *          * 1074.64 *
* Frctn Loss (m) * 1.16 * Cum Volume (1000 m3) *          * 0.89 *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) *          * 0.83 *
*
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 3

INPUT

Description:

Station Elevation Data num= 4
 Sta Elev Sta Elev Sta Elev Sta Elev

 0 446.35 .01 445.3 2.7 445.3 2.71 448.7

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .025 0 .025 2.71 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 2.71 22 22 22 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m) * 447.49 * Element * Left OB * Channel * Right OB
* vel Head (m) * 1.37 * wt. n-Val. * * 0.025 *
* W.S. Elev (m) * 446.12 * Reach Len. (m) * 22.00 * 22.00 * 22.00
* Crit w.S. (m) * 446.53 * Flow Area (m2) * * 2.22 *
* E.G. Slope (m/m) *0.041209 * Area (m2) * * 2.22 *
* Q Total (m3/s) * 11.50 * Flow (m3/s) * * 11.50 *
* Top width (m) * 2.70 * Top width (m) * * 2.70 *
* vel Total (m/s) * 5.19 * Avg. vel. (m/s) * * 5.19 *
* Max chl Dpth (m) * 0.82 * Hydr. Depth (m) * * 0.82 *
* Conv. Total (m3/s) * 56.7 * Conv. (m3/s) * * 56.7 *
* Length wtd. (m) * 22.00 * wetted Per. (m) * * 4.33 *
* Min ch El (m) * 445.30 * Shear (N/m2) * * 206.57 *
* Alpha * 1.00 * Stream Power (N/m s) * * 1072.30 *
* Frctn Loss (m) * 1.15 * Cum Volume (1000 m3) * * 0.82 *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 0.75 *
*
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 2.5*

INPUT

Description:

Station Elevation Data num= 4
 Sta Elev Sta Elev Sta Elev Sta Elev

 0 446.725 .01 445.05 2.475 445.05 2.485 447.9

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .025 0 .025 2.485 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 2.485 22 22 22 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

 **
 * E.G. Elev (m) * 447.13 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.39 * wt. n-Val. * * 0.025 *
 * W.S. Elev (m) * 446.74 * Reach Len. (m) * 22.00 * 22.00 * 22.00
 * Crit w.s. (m) * 446.35 * Flow Area (m2) * * 4.18 *
 * E.G. Slope (m/m) *0.007387 * Area (m2) * * 4.18 *
 * Q Total (m3/s) * 11.50 * Flow (m3/s) * * 11.50 *
 * Top width (m) * 2.48 * Top width (m) * * 2.48 *
 * vel Total (m/s) * 2.75 * Avg. vel. (m/s) * * 2.75 *
 * Max chl Dpth (m) * 1.69 * Hydr. Depth (m) * * 1.69 *
 * Conv. Total (m3/s) * 133.8 * Conv. (m3/s) * * 133.8 *
 * Length wtd. (m) * 22.00 * wetted Per. (m) * * 5.85 *
 * Min ch El (m) * 445.05 * Shear (N/m2) * * 51.81 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 142.46 *
 * Frctn Loss (m) * 0.21 * Cum Volume (1000 m3) * * 0.75 *
 * C & E Loss (m) * 0.02 * Cum SA (1000 m2) * * 0.70 *

 **

Warning: The cross-section end points had to be extended vertically for the computed water surface.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 2

INPUT

Description:

Station Elevation Data num= 4
 Sta Elev Sta Elev Sta Elev Sta Elev

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 0 447.1 .01 444.8 2.25 444.8 2.26 447.1

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .025 0 .025 2.26 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 2.26 27 27 27 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 0 447.1 F
 2.26 2.26 447.1 F

CROSS SECTION OUTPUT Profile #Q Tr200

 **
 * E.G. Elev (m) * 446.90 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.58 * wt. n-Val. * * 0.025 *
 * W.S. Elev (m) * 446.31 * Reach Len. (m) * 1.00 * 1.00 * 1.00
 * Crit w.S. (m) * 446.19 * Flow Area (m2) * * 3.40 *
 * E.G. Slope (m/m) *0.012848 * Area (m2) * * 3.40 *
 * Q Total (m3/s) * 11.50 * Flow (m3/s) * * 11.50 *
 * Top width (m) * 2.25 * Top width (m) * * 2.25 *
 * vel Total (m/s) * 3.39 * Avg. Vel. (m/s) * * 3.39 *
 * Max Chl Dpth (m) * 1.51 * Hydr. Depth (m) * * 1.51 *
 * Conv. Total (m3/s) * 101.5 * Conv. (m3/s) * * 101.5 *
 * Length wtd. (m) * 1.00 * wetted Per. (m) * * 5.26 *
 * Min Ch El (m) * 444.80 * Shear (N/m2) * * 81.30 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 275.25 *
 * Frctn Loss (m) * * Cum Volume (1000 m3) * * 0.67 *
 * C & E Loss (m) * * Cum SA (1000 m2) * * 0.65 *
 *

 **

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE

RIVER: Fosso PADULE
 REACH: 1 RS: 1.95

INPUT

Description: Attraversamento S.R. 219
 Distance from Upstream XS = 1
 Deck/Roadway width = 25
 Weir Coefficient = 1.44
 Upstream Deck/Roadway Coordinates

num= 4
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord

 0 447.5 444 .01 447.5 447.1 2.25 447.5 447.1
 2.26 447.5 444

Upstream Bridge Cross Section Data
 Station Elevation Data num= 4

PADULE.rep

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	447.1	.01	444.8	2.25	444.8	2.26	447.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	2.26	.025

Bank Sta: Left Right Coeff Contr. Expan.

0	2.26		.3	.5
---	------	--	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	0	447.1	F
2.26	2.26	447.1	F

Downstream Deck/Roadway Coordinates num= 9

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0		448		443	1.1		448		443	1.12		448		446
1.99		448		447	2.98		448		447.5	3.9		448		447
4.8		448		446	4.9		448		443	5		448		443

Downstream Bridge Cross Section Data

Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	448	.1	444.01	4.9	444.01	5	448

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	5	.025

Bank Sta: Left Right Coeff Contr. Expan.

0	5		.3	.5
---	---	--	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	1.12	448	T
4.9	5	448	T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy
 Selected Low Flow Methods = Energy

High Flow Method

Pressure and weir flow
 Submerged Inlet Cd =
 Submerged Inlet + Outlet Cd = .8
 Max Low Cord =

Additional Bridge Parameters

Add Friction component to Momentum
 Do not add weight component to Momentum
 Class B flow critical depth computations use critical depth
 inside the bridge at the upstream end
 Criteria to check for pressure flow = Upstream water surface

BRIDGE OUTPUT Profile #Q Tr200

* E.G. US. (m)	*	446.90	* Element	* Inside BR US	* Inside BR DS *
* W.S. US. (m)	*	446.31	* E.G. Elev (m)	* 446.88	* 445.50 *
* Q Total (m3/s)	*	11.50	* W.S. Elev (m)	* 446.19	* 444.97 *
* Q Bridge (m3/s)	*	11.50	* Crit W.S. (m)	* 446.19	* 445.00 *

```

          PADULE.rep
* Q Weir (m3/s)          *          * Max Ch1 Dpth (m)      *          * 1.39 *          * 0.96 *
* Weir Sta Lft (m)     *          * Vel Total (m/s)       *          * 3.68 *          * 3.21 *
* Weir Sta Rgt (m)     *          * Flow Area (m2)        *          * 3.13 *          * 3.58 *
* Weir Submerg         *          * Froude # Ch1         *          * 1.00 *          * 1.05 *
* Weir Max Depth (m)   *          * Specif Force (m3)    *          * 6.49 *          * 5.48 *
* Min El Weir Flow (m) *          * Hydr Depth (m)       *          * 1.39 *          * 0.96 *
* Min El Prs (m)       *          * W.P. Total (m)       *          * 5.02 *          * 4.71 *
* Delta EG (m)         *          * Conv. Total (m3/s)   *          * 91.1 *          * 119.4 *
* Delta WS (m)         *          * Top width (m)        *          * 2.25 *          * 3.72 *
* BR Open Area (m2)    *          * Frctn Loss (m)       *          *          *          *          *
* BR Open Vel (m/s)    *          * C & E Loss (m)       *          *          *          *          *
* Coef of Q            *          * Shear Total (N/m2)   *          * 97.21 *          * 69.26 *
* Br Sel Method        *          * Power Total (N/m s)  *          * 357.71 *          * 222.43 *
*****

```

Note: The momentum method has computed a class B profile.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Fosso PADULE
REACH: 1

RS: 1.9

INPUT

Description:

Station Elevation Data num= 4
Sta Elev Sta Elev Sta Elev Sta Elev

0 448 .1 444.01 4.9 444.01 5 448

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val

0 .025 0 .025 5 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 5 15 15 15 .3 .5
Ineffective Flow num= 2
Sta L Sta R Elev Permanent
0 1.12 448 T
4.9 5 448 T

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m)          * 445.49 * Element              * Left OB * Channel * Right OB
* vel Head (m)          * 0.56  * wt. n-Val.           *          * 0.025 *
* W.S. Elev (m)         * 444.93 * Reach Len. (m)       * 15.00 * 15.00 * 15.00
* Crit w.s. (m)         * 444.99 * Flow Area (m2)       *          * 3.48 *
* E.G. Slope (m/m)      *0.007595 * Area (m2)            *          * 4.44 *
* Q Total (m3/s)        * 11.50 * Flow (m3/s)          *          * 11.50 *
* Top width (m)         * 4.85  * Top width (m)        *          * 4.85 *
* vel Total (m/s)       * 3.30  * Avg. Vel. (m/s)     *          * 3.30 *
* Max ch1 Dpth (m)     * 0.92  * Hydr. Depth (m)     *          * 0.92 *
* Conv. Total (m3/s)    * 132.0 * Conv. (m3/s)         *          * 132.0 *
* Length wtd. (m)      * 15.00 * wetted Per. (m)     *          * 3.78 *
* Min ch El (m)        * 444.01 * Shear (N/m2)        *          * 68.64 *
* Alpha                 * 1.00  * Stream Power (N/m s) *          * 226.62 *
* Frctn Loss (m)       *          * Cum Volume (1000 m3) *          * 0.58 *

```

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*
 * C & E Loss (m) * * Cum SA (1000 m2) * * 0.56 *
 *

 **

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 1.8

INPUT

Description:

Station Elevation Data num= 5
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 445.6 .05 443.58 2.2 443.58 3.9 444.68 4 445.58

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .025 0 .025 4 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 4 27 27 27 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 .05 446 T
 3.9 4 446 T

CROSS SECTION OUTPUT Profile #Q Tr200

 **
 * E.G. Elev (m) * 445.33 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.33 * wt. n-Val. * * 0.025 *
 * W.S. Elev (m) * 444.99 * Reach Len. (m) * 1.00 * 1.00 * 1.00
 * Crit w.s. (m) * 444.79 * Flow Area (m2) * * 4.51 *
 * E.G. Slope (m/m) *0.003677 * Area (m2) * * 4.54 *
 * Q Total (m3/s) * 11.50 * Flow (m3/s) * * 11.50 *
 * Top width (m) * 3.92 * Top width (m) * * 3.92 *
 * vel Total (m/s) * 2.55 * Avg. vel. (m/s) * * 2.55 *
 * Max chl Dpth (m) * 1.41 * Hydr. Depth (m) * * 1.17 *
 * Conv. Total (m3/s) * 189.6 * Conv. (m3/s) * * 189.6 *
 * Length wtd. (m) * 1.00 * wetted Per. (m) * * 4.17 *
 * Min ch El (m) * 443.58 * Shear (N/m2) * * 38.92 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 99.33 *
 * Frctn Loss (m) * 0.00 * Cum Volume (1000 m3) * * 0.51 *
 * C & E Loss (m) * 0.04 * Cum SA (1000 m2) * * 0.50 *
 *

 **

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

BRIDGE

RIVER: Fosso PADULE
 REACH: 1 RS: 1.75

INPUT

Description: COPERTURA FOSSO AFFIANCO CHIESA PADULE

Distance from Upstream XS = 1

Deck/Roadway width = 25

Weir Coefficient = 1.44

Upstream Deck/Roadway Coordinates

num= 4														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0		446		440	.05		446		445.6	3.9		446		445.6
4		446		440										

Upstream Bridge Cross Section Data

Station Elevation Data		num= 5							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	445.6	.05	443.58	2.2	443.58	3.9	444.68	4	445.58

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	4	.025

Bank Sta: Left Right Coeff Contr. Expan.

Left	Right	Coeff	Contr.	Expan.
0	4		.3	.5

Ineffective Flow

num= 2			
Sta L	Sta R	Elev	Permanent
0	.05	446	T
3.9	4	446	T

Downstream Deck/Roadway Coordinates

num= 4														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0		445.9		440	.05		445.9		444.6	2.5		445.9		444.6
2.55		445.9		440										

Downstream Bridge Cross Section Data

Station Elevation Data		num= 4					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	446	.05	442.79	2.5	442.79	2.55	446

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	2.55	.025

Bank Sta: Left Right Coeff Contr. Expan.

Left	Right	Coeff	Contr.	Expan.
0	2.55		.3	.5

Ineffective Flow

num= 2			
Sta L	Sta R	Elev	Permanent
0	.05	446	T
2.5	2.55	446	T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy
 Selected Low Flow Methods = Energy

High Flow Method

Pressure and weir flow
 Submerged Inlet Cd =
 Submerged Inlet + Outlet Cd = .8
 Max Low Cord =

Additional Bridge Parameters

Add Friction component to Momentum
 Do not add weight component to Momentum
 Class B flow critical depth computations use critical depth
 inside the bridge at the upstream end
 Criteria to check for pressure flow = Upstream water surface

BRIDGE OUTPUT Profile #Q Tr200

* E.G. US. (m) * 445.33 * Element *Inside BR US *Inside BR DS *									
* W.S. US. (m)	*	444.99	*	E.G. Elev (m)	*	445.28	*	444.88	*
* Q Total (m3/s)	*	11.50	*	W.S. Elev (m)	*	444.80	*	443.82	*
* Q Bridge (m3/s)	*	11.50	*	Crit W.S. (m)	*	444.80	*	444.10	*
* Q Weir (m3/s)	*		*	Max Chl Dpth (m)	*	1.22	*	1.03	*
* Weir Sta Lft (m)	*		*	Vel Total (m/s)	*	3.07	*	4.55	*
* Weir Sta Rgt (m)	*		*	Flow Area (m2)	*	3.75	*	2.53	*
* Weir Submerg	*		*	Froude # Chl	*	0.99	*	1.43	*
* Weir Max Depth (m)	*		*	Specif Force (m3)	*	5.65	*	6.64	*
* Min El Weir Flow (m)	*	446.00	*	Hydr Depth (m)	*	0.97	*	1.03	*
* Min El Prs (m)	*	445.60	*	W.P. Total (m)	*	4.17	*	2.45	*
* Delta EG (m)	*	0.45	*	Conv. Total (m3/s)	*	139.4	*	103.1	*
* Delta WS (m)	*	1.17	*	Top width (m)	*	3.88	*	2.47	*
* BR Open Area (m2)	*	4.43	*	Frctn Loss (m)	*	0.11	*	0.22	*
* BR Open Vel (m/s)	*	4.55	*	C & E Loss (m)	*	0.02	*	0.17	*
* Coef of Q	*		*	Shear Total (N/m2)	*	59.87	*	125.86	*
* Br Sel Method	*	Energy only	*	Power Total (N/m s)	*	183.79	*	573.21	*

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Note: The energy method has computed a class B profile.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1

RS: 1.7

INPUT

Description:

Station Elevation Data num= 4							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	446	.05	442.79	2.5	442.79	2.55	446

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.025	0	.025	2.55	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	2.55		25.833	25.833	.3	.5

Ineffective Flow num= 2			
Sta L	Sta R	Elev	Permanent

0 .05 446 T
2.5 2.55 446 T

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m)      * 444.75 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 0.66  * wt. n-Val.      *          * 0.025  *
* W.S. Elev (m)     * 444.10 * Reach Len. (m)  * 25.83  * 25.83  * 25.83
* Crit w.S. (m)     * 444.10 * Flow Area (m2)  *          * 3.20   *
* E.G. Slope (m/m)  * 0.005660 * Area (m2)      *          * 3.23   *
* Q Total (m3/s)    * 11.50  * Flow (m3/s)     *          * 11.50  *
* Top width (m)     * 2.49   * Top width (m)   *          * 2.49   *
* Vel Total (m/s)   * 3.59   * Avg. Vel. (m/s) *          * 3.59   *
* Max Chl Dpth (m) * 1.31   * Hydr. Depth (m) *          * 1.31   *
* Conv. Total (m3/s) * 152.9  * Conv. (m3/s)    *          * 152.9  *
* Length wtd. (m)  * 25.83  * wetted Per. (m) *          * 2.45   *
* Min Ch El (m)    * 442.79 * Shear (N/m2)   *          * 72.47  *
* Alpha            * 1.00   * Stream Power (N/m s) *          * 260.52 *
* Frctn Loss (m)   * 0.23   * Cum Volume (1000 m3) *          * 0.43   *
* C & E Loss (m)   * 0.00   * Cum SA (1000 m2) *          * 0.41   *
**
*****
```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 1.58333*

INPUT

Description:

Station	Elevation	Data	num=	12	Sta	Elev	Sta	Elev	Sta	Elev
0	444.67	1.025	444.712	1.422	444.957	1.637	444.957	1.834	443.128	
1.978	441.978	4.02	441.978	4.121	442.627	4.455	444.945	4.938	444.923	
5.073	444.63	5.86	444.642							

Manning's n	Values	num=	3	Sta	n Val
0	.027	1.637	.027	4.455	.027

PADULE.rep

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1.637 4.455 25.833 25.833 25.833 .1 .3
 Left Levee Station= 1.637 Elevation= 444.957
 Right Levee Station= 4.455 Elevation= 444.945

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m) * 444.28 * Element * Left OB * Channel * Right OB
* vel Head (m) * 1.23 * wt. n-Val. * * 0.027 *
* W.S. Elev (m) * 443.05 * Reach Len. (m) * 25.83 * 25.83 * 25.83
* Crit W.S. (m) * 443.41 * Flow Area (m2) * * 2.34 *
* E.G. Slope (m/m) *0.038383 * Area (m2) * * 2.34 *
* Q Total (m3/s) * 11.50 * Flow (m3/s) * * 11.50 *
* Top width (m) * 2.34 * Top width (m) * * 2.34 *
* vel Total (m/s) * 4.91 * Avg. vel. (m/s) * * 4.91 *
* Max Chl Dpth (m) * 1.07 * Hydr. Depth (m) * * 1.00 *
* Conv. Total (m3/s) * 58.7 * Conv. (m3/s) * * 58.7 *
* Length wtd. (m) * 25.83 * wetted Per. (m) * * 4.20 *
* Min Ch El (m) * 441.98 * Shear (N/m2) * * 209.79 *
* Alpha * 1.00 * Stream Power (N/m s) * * 1030.98 *
* Frctn Loss (m) * 0.31 * Cum volume (1000 m3) * * 0.35 *
* C & E Loss (m) * 0.17 * Cum SA (1000 m2) * * 0.35 *
*****
**
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

Note: Program found supercritical flow starting at this cross section.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 1.46666*

INPUT

Description:

Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 443.34 2.05 443.423 2.843 443.913 3.273 443.913 3.639 442.11
 3.907 441.167 5.54 441.167 5.731 441.715 6.36 443.89 7.327 443.847
 7.597 443.26 9.17 443.283

Manning's n values num= 3
 Sta n Val Sta n Val Sta n Val

0 .03 3.273 .028 6.36 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 3.273 6.36 25.833 25.833 25.833 .1 .3
 Left Levee Station= 3.273 Elevation= 443.913
 Right Levee Station= 6.36 Elevation= 443.89

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m) * 443.39 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.83 * wt. n-Val. * * 0.028 *
* W.S. Elev (m) * 442.55 * Reach Len. (m) * 25.83 * 25.83 * 25.83
* Crit w.S. (m) * 442.71 * Flow Area (m2) * * 2.84 *
* E.G. Slope (m/m) *0.023830 * Area (m2) * * 2.84 *
* Q Total (m3/s) * 11.50 * Flow (m3/s) * * 11.50 *
* Top width (m) * 2.42 * Top width (m) * * 2.42 *
* Vel Total (m/s) * 4.05 * Avg. Vel. (m/s) * * 4.05 *
* Max Chl Dpth (m) * 1.39 * Hydr. Depth (m) * * 1.17 *
* Conv. Total (m3/s) * 74.5 * Conv. (m3/s) * * 74.5 *
* Length wtd. (m) * 25.83 * wetted Per. (m) * * 4.52 *
* Min Ch El (m) * 441.17 * Shear (N/m2) * * 146.99 *
* Alpha * 1.00 * Stream Power (N/m s) * * 594.89 *
* Frctn Loss (m) * 0.77 * Cum Volume (1000 m3) * * 0.29 *
* C & E Loss (m) * 0.12 * Cum SA (1000 m2) * * 0.29 *
*****
**
    
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for

additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Fosso PADULE

REACH: 1

RS: 1.35*

INPUT

Description:

Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 442.01 3.075 442.135 4.265 442.87 4.91 442.87 5.444 441.093
 5.835 440.355 7.06 440.355 7.341 440.804 8.265 442.835 9.715 442.77
 10.12 441.89 12.48 441.925

Manning's n values num= 3

Sta n Val Sta n Val Sta n Val

 0 .032 4.91 .03 8.265 .032

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 4.91 8.265 25.833 25.833 25.833 .1 .3

Left Levee Station= 4.91 PADULE.rep
 Right Levee Station= 8.265 Elevation= 442.87
 Elevation= 442.835

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m) * 442.68 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.94 * wt. n-Val. * * 0.030 *
* W.S. Elev (m) * 441.74 * Reach Len. (m) * 25.83 * 25.83 * 25.83
* Crit w.S. (m) * 441.98 * Flow Area (m2) * * 2.68 *
* E.G. Slope (m/m) *0.031028 * Area (m2) * * 2.68 *
* Q Total (m3/s) * 11.50 * Flow (m3/s) * * 11.50 *
* Top width (m) * 2.52 * Top width (m) * * 2.52 *
* Vel Total (m/s) * 4.29 * Avg. Vel. (m/s) * * 4.29 *
* Max Chl Dpth (m) * 1.38 * Hydr. Depth (m) * * 1.07 *
* Conv. Total (m3/s) * 65.3 * Conv. (m3/s) * * 65.3 *
* Length wtd. (m) * 25.83 * wetted Per. (m) * * 4.29 *
* Min Ch El (m) * 440.35 * Shear (N/m2) * * 190.02 *
* Alpha * 1.00 * Stream Power (N/m s) * * 815.19 *
* Frctn Loss (m) * 0.70 * Cum Volume (1000 m3) * * 0.21 *
* C & E Loss (m) * 0.01 * Cum SA (1000 m2) * * 0.23 *
**
*****
```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous section. This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Fosso PADULE
 REACH: 1 RS: 1.23333*

INPUT

Description:

Station	Elevation	Data	num=	12	Sta	Elev	Sta	Elev	Sta	Elev
0	440.68	4.1	440.847	5.687	441.827	6.547	441.827	7.25	440.075	
7.763	439.543	8.58	439.543	8.951	439.893	10.17	441.78	12.103	441.693	
12.643	440.52	15.79	440.567							

Manning's n	Values	num=	3	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	6.547	.032	10.17	.035				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	6.547	10.17	25.833	25.833	25.833	.1	.3
Left Levee	Station=	6.547	Elevation=	441.827			
Right Levee	Station=	10.17	Elevation=	441.78			

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m) * 441.85 * Element * Left OB * Channel * Right OB
```

PADULE.rep

```

*
* Vel Head (m) * 0.87 * wt. n-Val. * * 0.032 *
* W.S. Elev (m) * 440.98 * Reach Len. (m) * 25.83 * 25.83 * 25.83
* Crit W.S. (m) * 441.20 * Flow Area (m2) * * 2.78 *
* E.G. Slope (m/m) *0.031578 * Area (m2) * * 2.78 *
* Q Total (m3/s) * 11.50 * Flow (m3/s) * * 11.50 *
* Top Width (m) * 2.76 * Top Width (m) * * 2.76 *
* Vel Total (m/s) * 4.13 * Avg. Vel. (m/s) * * 4.13 *
* Max Chl Dpth (m) * 1.43 * Hydr. Depth (m) * * 1.01 *
* Conv. Total (m3/s) * 64.7 * Conv. (m3/s) * * 64.7 *
* Length wtd. (m) * 25.83 * Wetted Per. (m) * * 4.33 *
* Min Ch El (m) * 439.54 * Shear (N/m2) * * 198.95 *
* Alpha * 1.00 * Stream Power (N/m s) * * 822.61 *
* Frctn Loss (m) * 0.81 * Cum Volume (1000 m3) * * 0.14 *
* C & E Loss (m) * 0.02 * Cum SA (1000 m2) * * 0.16 *

```

**

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: FOSSO PADULE
REACH: 1 RS: 1.11666*

INPUT

Description:

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	439.35	5.125	439.558	7.108	440.783	8.183	440.783	9.055	439.058		
9.692	438.732	10.1	438.732	10.56	438.981	12.075	440.725	14.492	440.617		
15.167	439.15	19.1	439.208								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.038	8.183	.033	12.075	.038

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	8.183	12.075		25.833	25.833	.1	.3
Left Levee		Station=	8.183	Elevation=	440.783		
Right Levee		Station=	12.075	Elevation=	440.725		

CROSS SECTION OUTPUT Profile #Q Tr200

**

```

* E.G. Elev (m) * 441.00 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.88 * wt. n-Val. * * 0.033 *
* W.S. Elev (m) * 440.12 * Reach Len. (m) * 25.83 * 25.83 * 25.83
* Crit W.S. (m) * 440.37 * Flow Area (m2) * * 2.77 *

```

```

          PADULE.rep
* E.G. Slope (m/m)      *0.034197 * Area (m2)          *          * 2.77 *
* Q Total (m3/s)       * 11.50 * Flow (m3/s)         *          * 11.50 *
* Top width (m)        * 3.03 * Top width (m)       *          * 3.03 *
* Vel Total (m/s)      * 4.15 * Avg. Vel. (m/s)    *          * 4.15 *
* Max Chl Dpth (m)    * 1.39 * Hydr. Depth (m)    *          * 0.91 *
* Conv. Total (m3/s)   * 62.2 * Conv. (m3/s)        *          * 62.2 *
* Length wtd. (m)     * 25.83 * Wetted Per. (m)    *          * 4.34 *
* Min Ch El (m)       * 438.73 * Shear (N/m2)       *          * 213.98 *
* Alpha                * 1.00 * Stream Power (N/m s) *          * 888.75 *
* Frctn Loss (m)      * 0.85 * Cum Volume (1000 m3) *          * 0.07 *
* C & E Loss (m)      * 0.00 * Cum SA (1000 m2)   *          * 0.08 *

```

**

Warning: The cross section had to be extended vertically during the critical depth calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Fosso PADULE
REACH: 1 RS: 1

INPUT

Description:

Station		Elevation Data		num= 11		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	438.02	6.15	438.27	8.53	439.74	9.82	439.74	10.86	438.04
11.62	437.92	12.17	438.07	13.98	439.67	16.88	439.54	17.69	437.78
22.41	437.85								

Manning's n Values		num= 3		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	9.82	.035	13.98	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	9.82	13.98		0	0		.1	.3
Left Levee		Station=	9.82	Elevation=	439.74			
Right Levee		Station=	13.98	Elevation=	439.67			

CROSS SECTION OUTPUT Profile #Q Tr200

```

**
* E.G. Elev (m)      * 440.07 * Element          * Left OB * Channel * Right OB
*
* vel Head (m)       * 0.83 * wt. n-Val.       *          * 0.035 *
*
* W.S. Elev (m)      * 439.24 * Reach Len. (m)   *          *          *
*
* Crit w.s. (m)      * 439.48 * Flow Area (m2)   *          * 2.85 *
*
* E.G. Slope (m/m)   *0.036604 * Area (m2)        *          * 2.85 *
*
* Q Total (m3/s)     * 11.50 * Flow (m3/s)       *          * 11.50 *
*
* Top width (m)      * 3.37 * Top width (m)     *          * 3.37 *

```

PADULE.rep

```

*
* Vel Total (m/s)      * 4.03 * Avg. Vel. (m/s)      *      * 4.03 *
* Max Chl Dpth (m)    * 1.46 * Hydr. Depth (m)      *      * 0.85 *
* Conv. Total (m3/s)  * 60.1 * Conv. (m3/s)         *      * 60.1 *
* Length Wtd. (m)     *      * Wetted Per. (m)      *      * 4.51 *
* Min Ch El (m)       * 437.92 * Shear (N/m2)        *      * 227.15 *
* Alpha               * 1.00 * Stream Power (N/m s) *      * 915.19 *
* Frctn Loss (m)      * 0.91 * Cum Volume (1000 m3) *      *      *
* C & E Loss (m)      * 0.02 * Cum SA (1000 m2)    *      *      *
*

```

**

Warning: The cross section had to be extended vertically during the critical depth calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

SUMMARY OF MANNING'S N VALUES

River:Fosso PADULE

```

*****
* Reach * River Sta. * n1 * n2 * n3 *
*****
*1 * 5 * .04* .035* .04*
*1 * 4.875* * .04* .035* .04*
*1 * 4.75* * .04* .035* .04*
*1 * 4.625* * .04* .035* .04*
*1 * 4.5* * .04* .035* .04*
*1 * 4.375* * .04* .035* .04*
*1 * 4.25* * .04* .035* .04*
*1 * 4.125* * .04* .035* .04*
*1 * 4 * .04* .035* .04*
*1 * 3.875* * .036* .032* .036*
*1 * 3.75* * .032* .03 * .032*
*1 * 3.625* * .029* .027* .029*
*1 * 3.5 * .025* .025* .025*
*1 * 3.4* * .025* .025* .025*
*1 * 3.3* * .025* .025* .025*
*1 * 3.2* * .025* .025* .025*
*1 * 3.1* * .025* .025* .025*
*1 * 3 * .025* .025* .025*
*1 * 2.5* * .025* .025* .025*
*1 * 2 * .025* .025* .025*
*1 * 1.95 * *Bridge * * *
*1 * 1.9 * * .025* .025* .025*
*1 * 1.8 * * .025* .025* .025*
*1 * 1.75 * *Bridge * * *
*1 * 1.7 * * .025* .025* .025*
*1 * 1.58333* * .027* .027* .027*
*1 * 1.46666* * .03* .028* .03*
*1 * 1.35* * .032* .03* .032*
*1 * 1.23333* * .035* .032* .035*
*1 * 1.11666* * .038* .033* .038*
*1 * 1 * .04* .035* .04*
*****

```

SUMMARY OF REACH LENGTHS

River: Fosso PADULE

PADULE.rep

* Reach	* River Sta.	* Left	* Channel	* Right
1	5	29.5	29.5*	29.5*
1	4.875	29.5*	29.5*	29.5*
1	4.75	29.5*	29.5*	29.5*
1	4.625	29.5*	29.5*	29.5*
1	4.5	29.5*	29.5*	29.5*
1	4.375	29.5*	29.5*	29.5*
1	4.25	29.5*	29.5*	29.5*
1	4.125	29.5*	29.5*	29.5*
1	4	23	23*	23*
1	3.875	23*	23*	23*
1	3.75	23*	23*	23*
1	3.625	23*	23*	23*
1	3.5	28	28*	28*
1	3.4	28*	28*	28*
1	3.3	28*	28*	28*
1	3.2	28*	28*	28*
1	3.1	28*	28*	28*
1	3	22	22*	22*
1	2.5	22*	22*	22*
1	2	27	27*	27*
*1	1.95	*Bridge	*	*
1	1.9	15	15*	15*
1	1.8	27	27*	27*
*1	1.75	*Bridge	*	*
1	1.7	25.833	25.833*	25.833*
1	1.58333	25.833*	25.833*	25.833*
1	1.46666	25.833*	25.833*	25.833*
1	1.35	25.833*	25.833*	25.833*
1	1.23333	25.833*	25.833*	25.833*
1	1.11666	25.833*	25.833*	25.833*
1	1	0	0*	0*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Fosso PADULE

* Reach	* River Sta.	* Contr.	* Expan.
1	5	.1	.3*
1	4.875	.1*	.3*
1	4.75	.1*	.3*
1	4.625	.1*	.3*
1	4.5	.1*	.3*
1	4.375	.1*	.3*
1	4.25	.1*	.3*
1	4.125	.1*	.3*
1	4	.1	.3*
1	3.875	.1*	.3*
1	3.75	.1*	.3*
1	3.625	.1*	.3*
1	3.5	.1	.3*
1	3.4	.1*	.3*
1	3.3	.1*	.3*
1	3.2	.1*	.3*
1	3.1	.1*	.3*
1	3	.1	.3*
1	2.5	.1*	.3*
1	2	.3	.5*
*1	1.95	*Bridge	*
1	1.9	.3	.5*
1	1.8	.3	.5*
*1	1.75	*Bridge	*
1	1.7	.3	.5*
*1	1.58333**	.1*	.3*
*1	1.46666**	.1*	.3*
1	1.35	.1*	.3*
*1	1.23333**	.1*	.3*
*1	1.11666**	.1*	.3*
1	1	.1	.3*

PADULE.rep

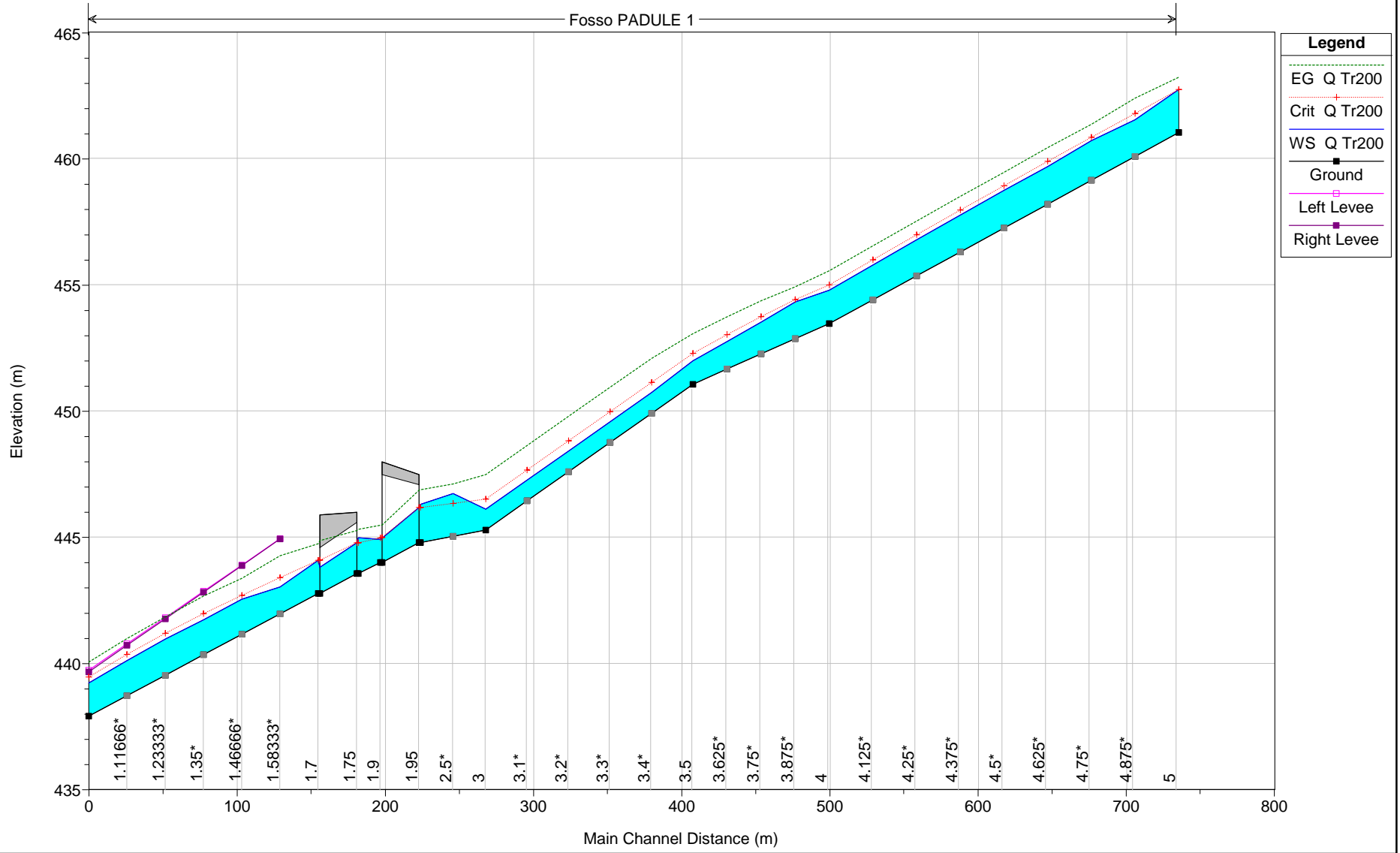
HEC-RAS Plan: Plan Tr200 River: Fosso PADULE Reach: 1 Profile: Q Tr200

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
1	5	Q Tr200	11.50	461.06	462.76	462.76	463.25	0.019260	3.10	3.71	3.86	1.01
1	4.875*	Q Tr200	11.50	460.11	461.56	461.82	462.42	0.040166	4.10	2.81	3.37	1.43
1	4.75*	Q Tr200	11.50	459.17	460.73	460.87	461.38	0.027715	3.56	3.23	3.66	1.21
1	4.625*	Q Tr200	11.50	458.22	459.71	459.92	460.46	0.034054	3.85	2.99	3.57	1.34
1	4.5*	Q Tr200	11.50	457.27	458.77	458.95	459.48	0.031608	3.74	3.07	3.67	1.31
1	4.375*	Q Tr200	11.50	456.32	457.78	457.98	458.53	0.033107	3.82	3.01	3.64	1.34
1	4.25*	Q Tr200	11.50	455.37	456.80	457.00	457.55	0.033050	3.83	3.00	3.64	1.35
1	4.125*	Q Tr200	11.50	454.43	455.81	456.02	456.57	0.033382	3.86	2.98	3.61	1.36
1	4	Q Tr200	11.50	453.48	454.81	455.01	455.57	0.033686	3.88	2.96	3.58	1.36
1	3.875*	Q Tr200	11.50	452.88	454.34	454.43	454.94	0.019722	3.43	3.35	3.53	1.13
1	3.75*	Q Tr200	11.50	452.28	453.54	453.76	454.39	0.027318	4.09	2.81	3.06	1.36
1	3.625*	Q Tr200	11.50	451.68	452.77	453.04	453.75	0.027349	4.38	2.62	2.80	1.45
1	3.5	Q Tr200	11.50	451.08	452.01	452.30	453.09	0.029324	4.60	2.50	2.70	1.53
1	3.4*	Q Tr200	11.50	449.92	450.75	451.15	452.10	0.040206	5.15	2.23	2.70	1.81
1	3.3*	Q Tr200	11.50	448.77	449.59	449.99	450.96	0.041129	5.19	2.22	2.70	1.83
1	3.2*	Q Tr200	11.50	447.61	448.43	448.84	449.81	0.041251	5.19	2.21	2.70	1.83
1	3.1*	Q Tr200	11.50	446.46	447.28	447.68	448.65	0.041288	5.19	2.21	2.70	1.83
1	3	Q Tr200	11.50	445.30	446.12	446.53	447.49	0.041209	5.19	2.22	2.70	1.83
1	2.5*	Q Tr200	11.50	445.05	446.74	446.35	447.13	0.007387	2.75	4.18	2.48	0.68
1	2	Q Tr200	11.50	444.80	446.31	446.19	446.90	0.012848	3.39	3.40	2.25	0.88
1	1.95		Bridge									
1	1.9	Q Tr200	11.50	444.01	444.93	444.99	445.49	0.007595	3.30	3.48	4.85	1.10
1	1.8	Q Tr200	11.50	443.58	444.99	444.79	445.33	0.003677	2.55	4.51	3.92	0.75
1	1.75		Bridge									
1	1.7	Q Tr200	11.50	442.79	444.10	444.10	444.75	0.005660	3.59	3.20	2.49	1.00
1	1.58333*	Q Tr200	11.50	441.98	443.05	443.41	444.28	0.038383	4.91	2.34	2.34	1.57
1	1.46666*	Q Tr200	11.50	441.17	442.55	442.71	443.39	0.023830	4.05	2.84	2.42	1.19
1	1.35*	Q Tr200	11.50	440.35	441.74	441.98	442.68	0.031028	4.29	2.68	2.52	1.33
1	1.23333*	Q Tr200	11.50	439.54	440.98	441.20	441.85	0.031578	4.13	2.78	2.76	1.32
1	1.11666*	Q Tr200	11.50	438.73	440.12	440.37	441.00	0.034197	4.15	2.77	3.03	1.39
1	1	Q Tr200	11.50	437.92	439.24	439.48	440.07	0.036604	4.03	2.85	3.37	1.40

MACROAREA 06 Plan: Plan Tr200

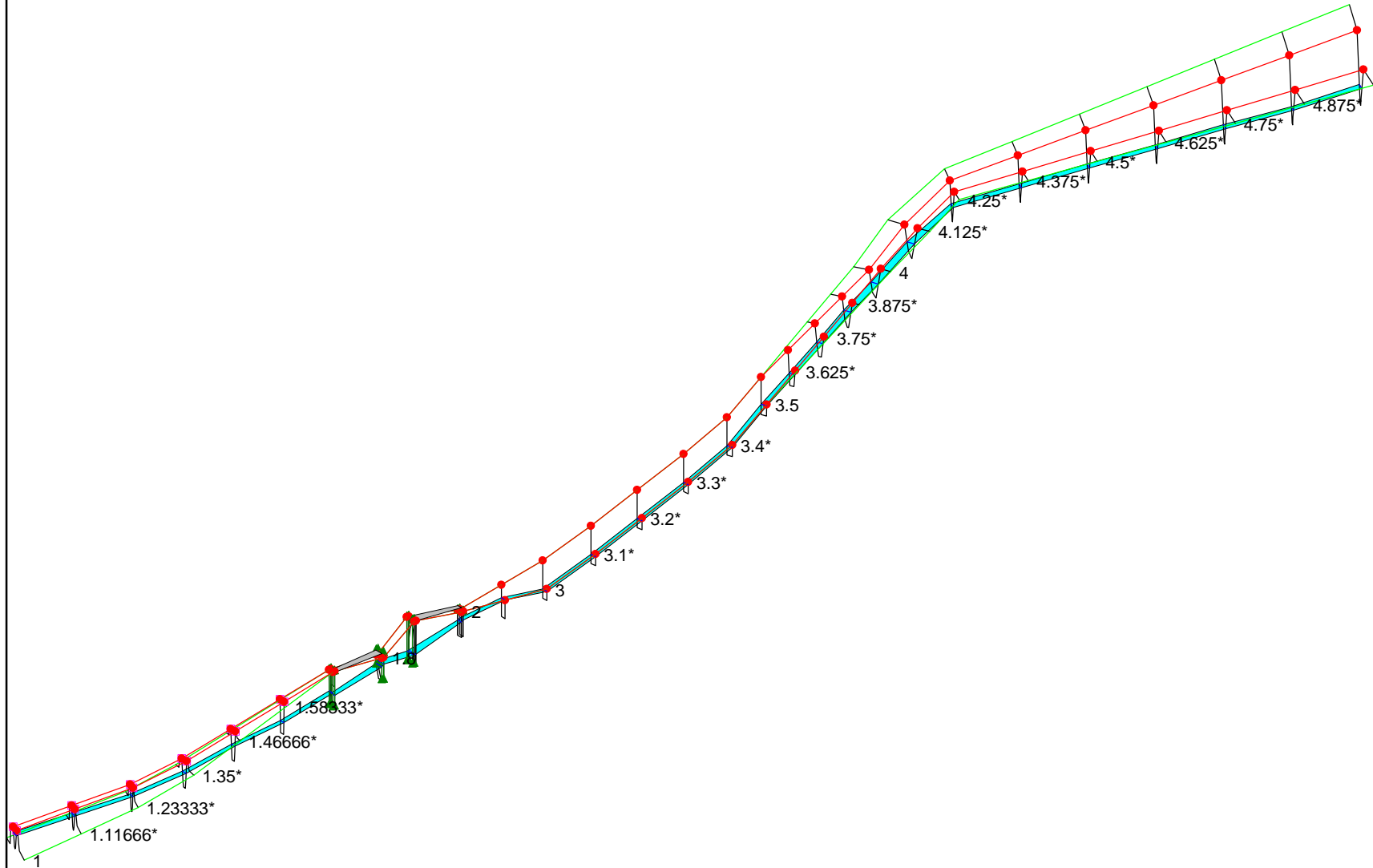
Flow: Tr200

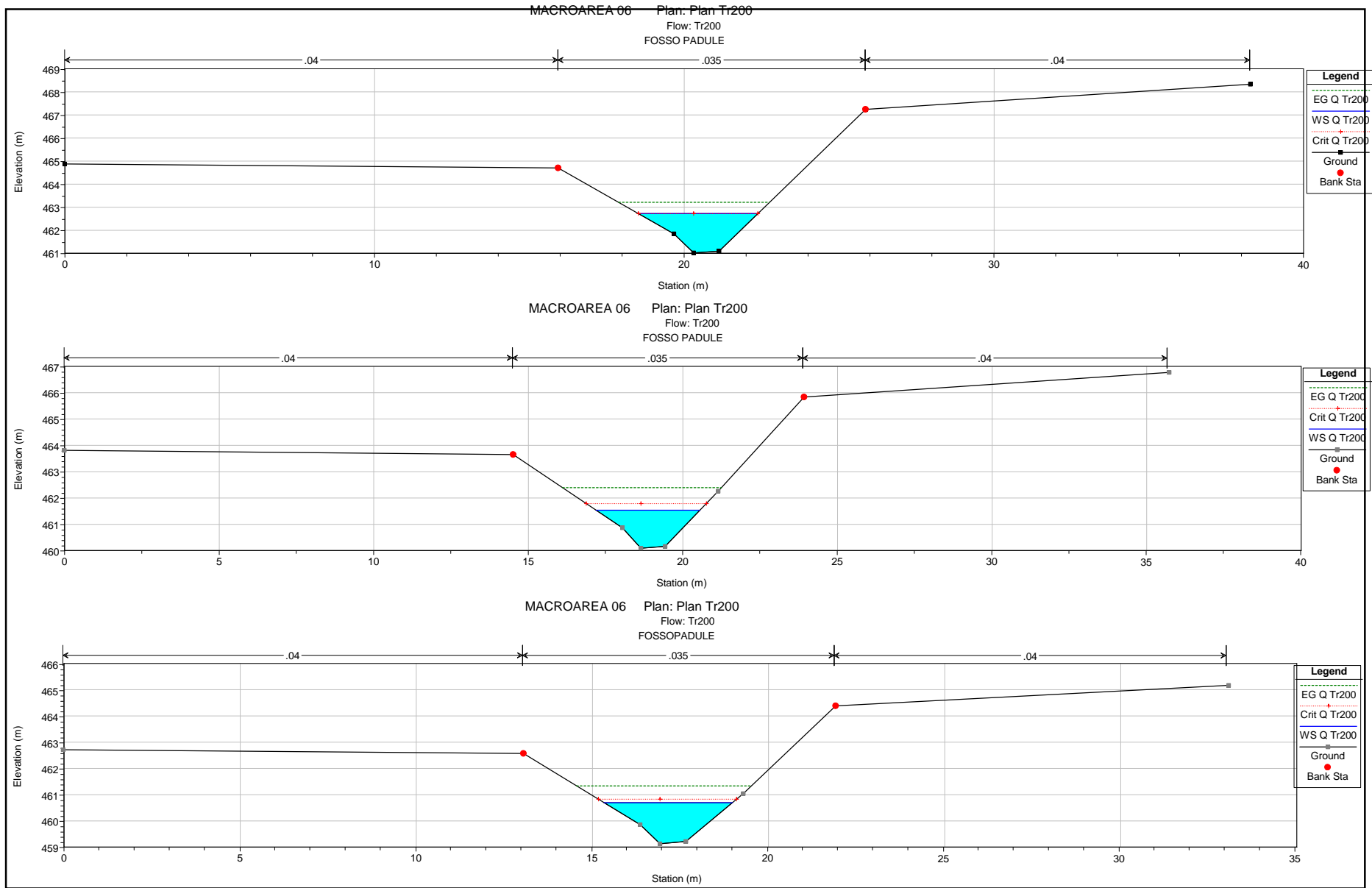
Fosso PADULE 1

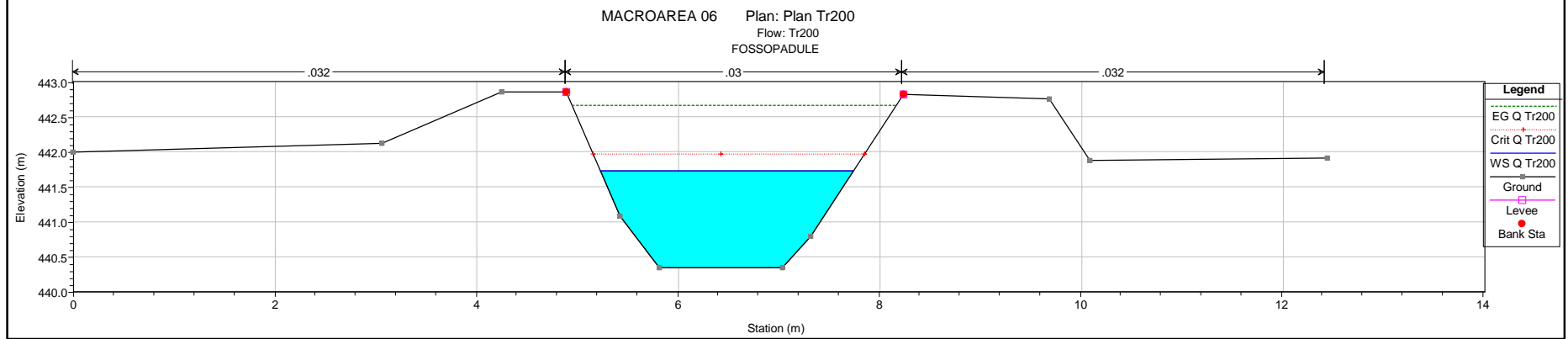
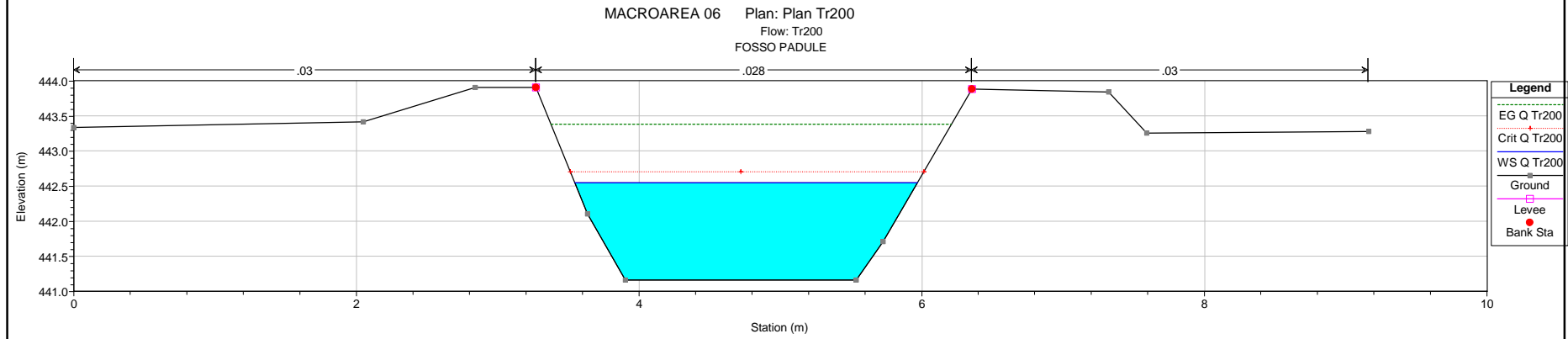
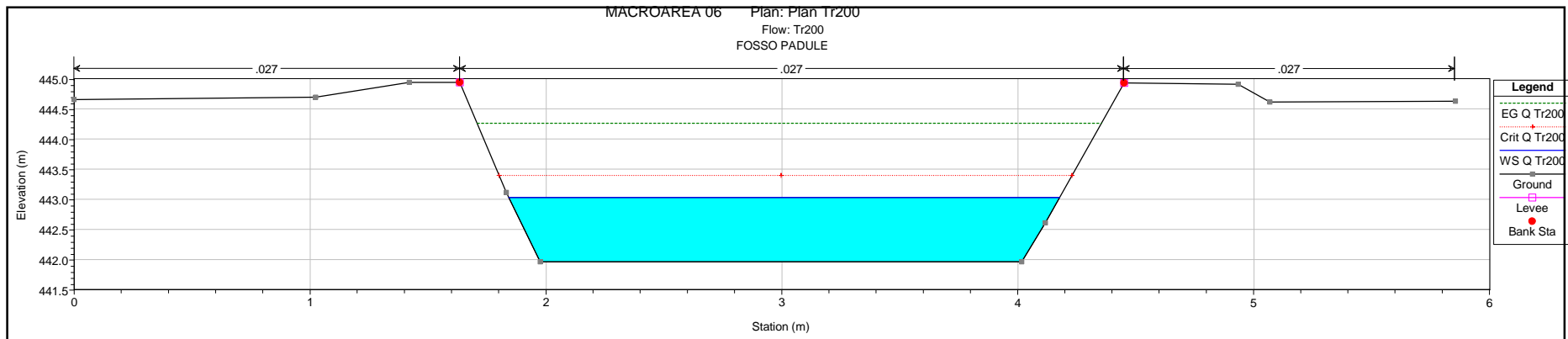


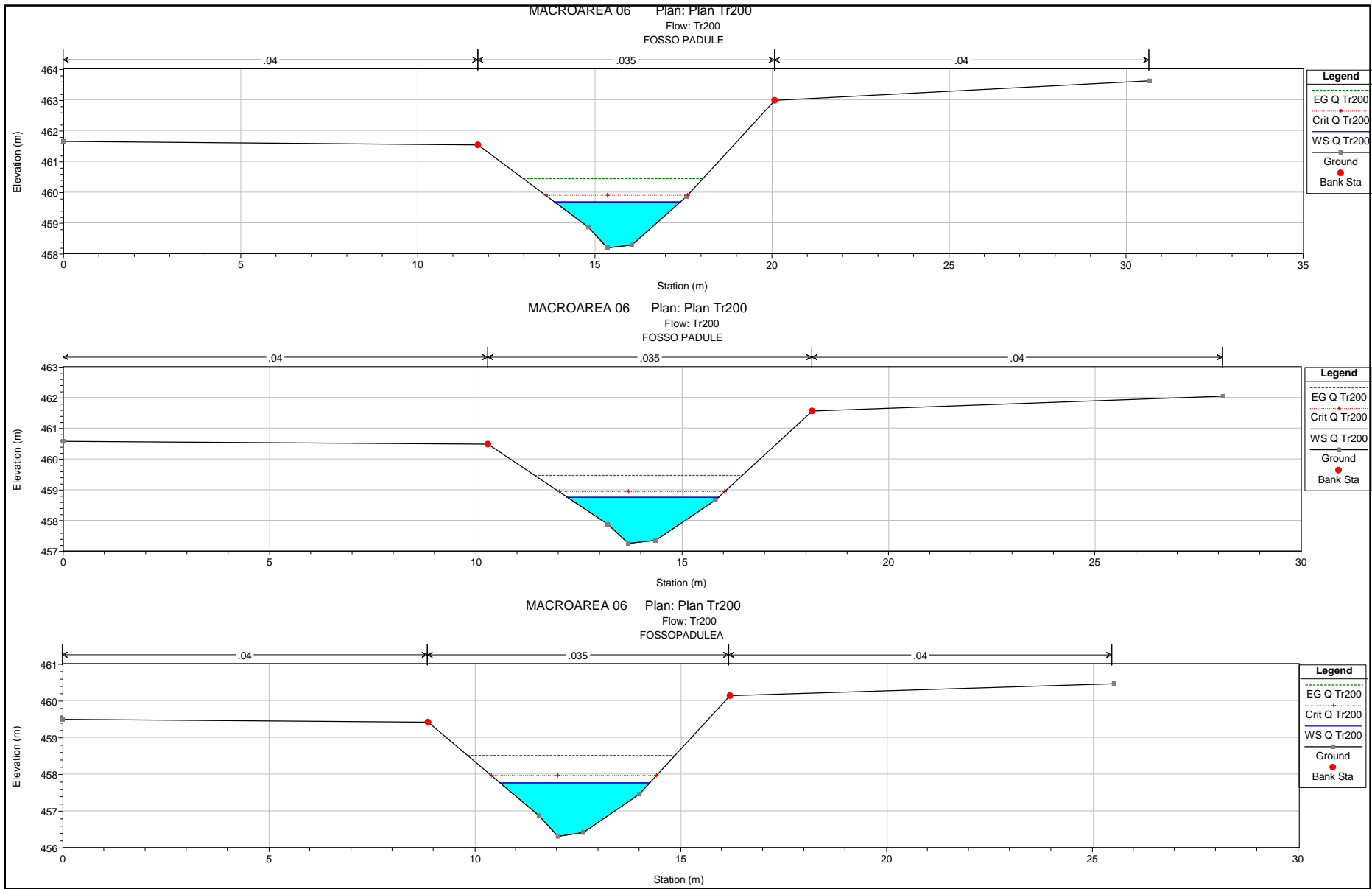
MACROAREA 06 Plan: Plan Tr200
 Flow: Tr200 FOSSO PADULE

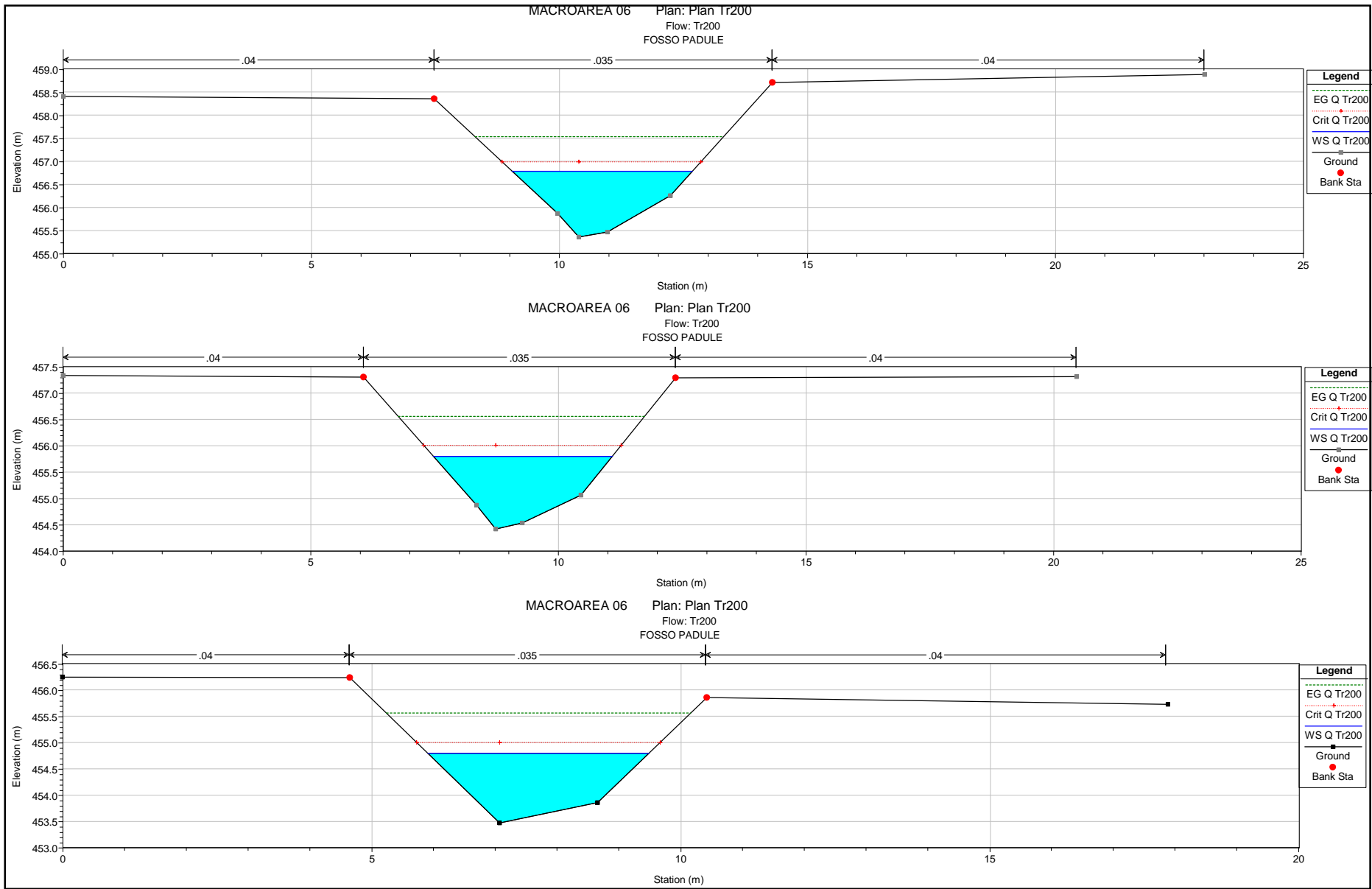
Legend	
	WS Q Tr200
	Ground
	Bank Sta
	Ground
	Ineff
	Levee

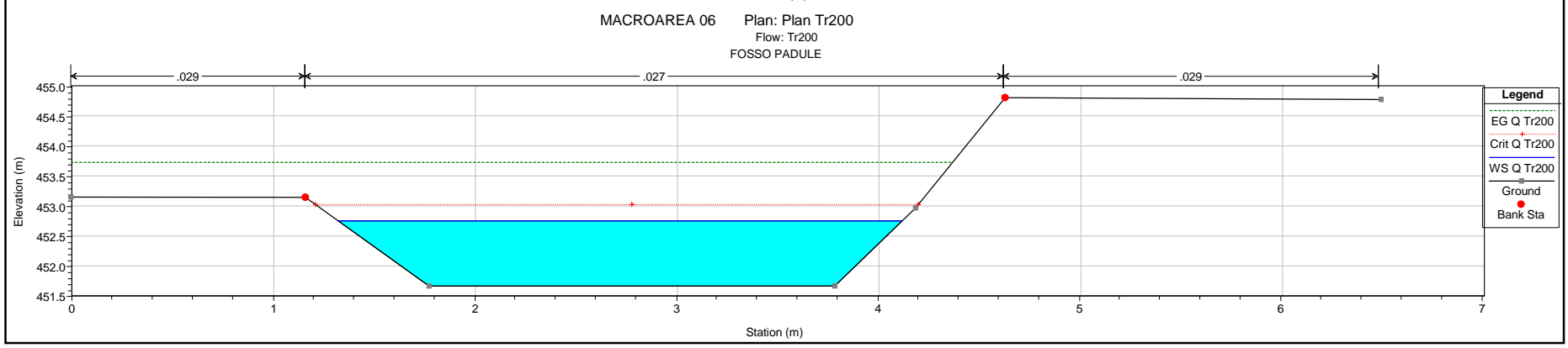
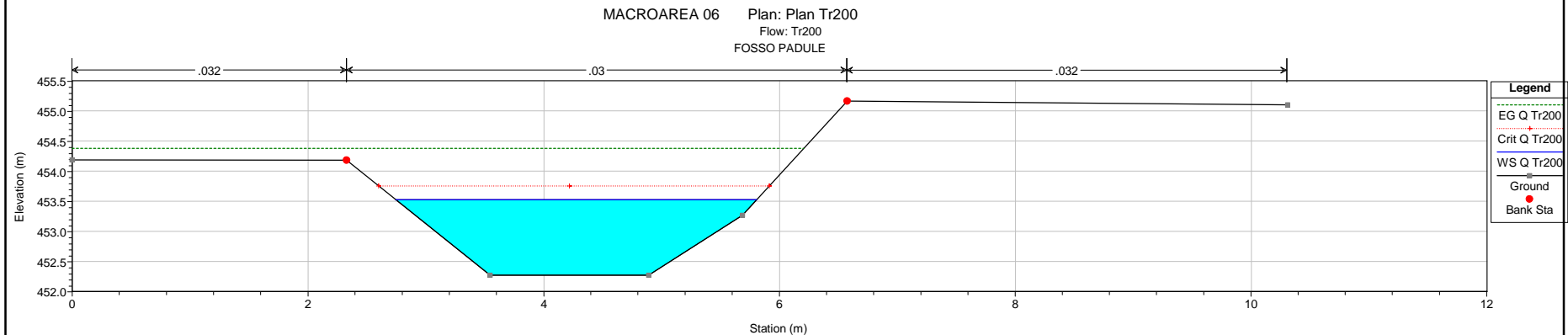
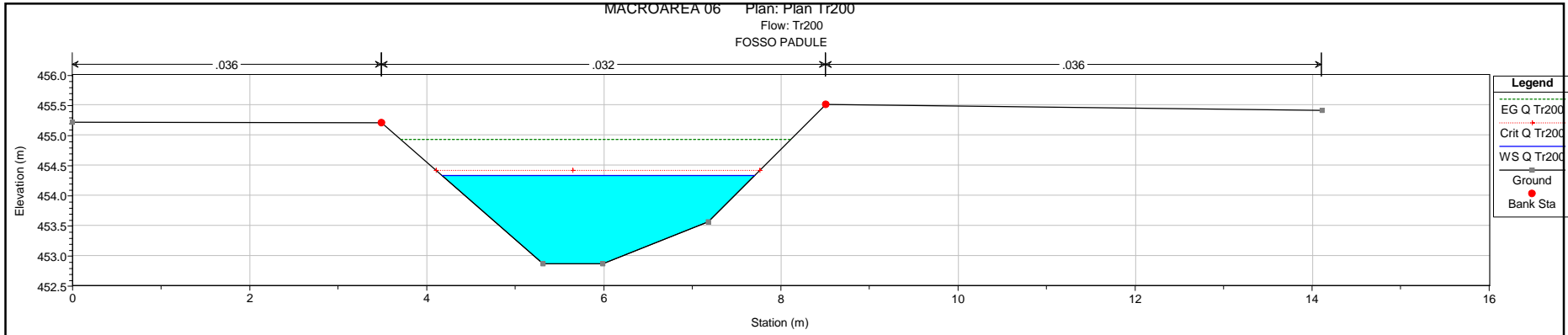


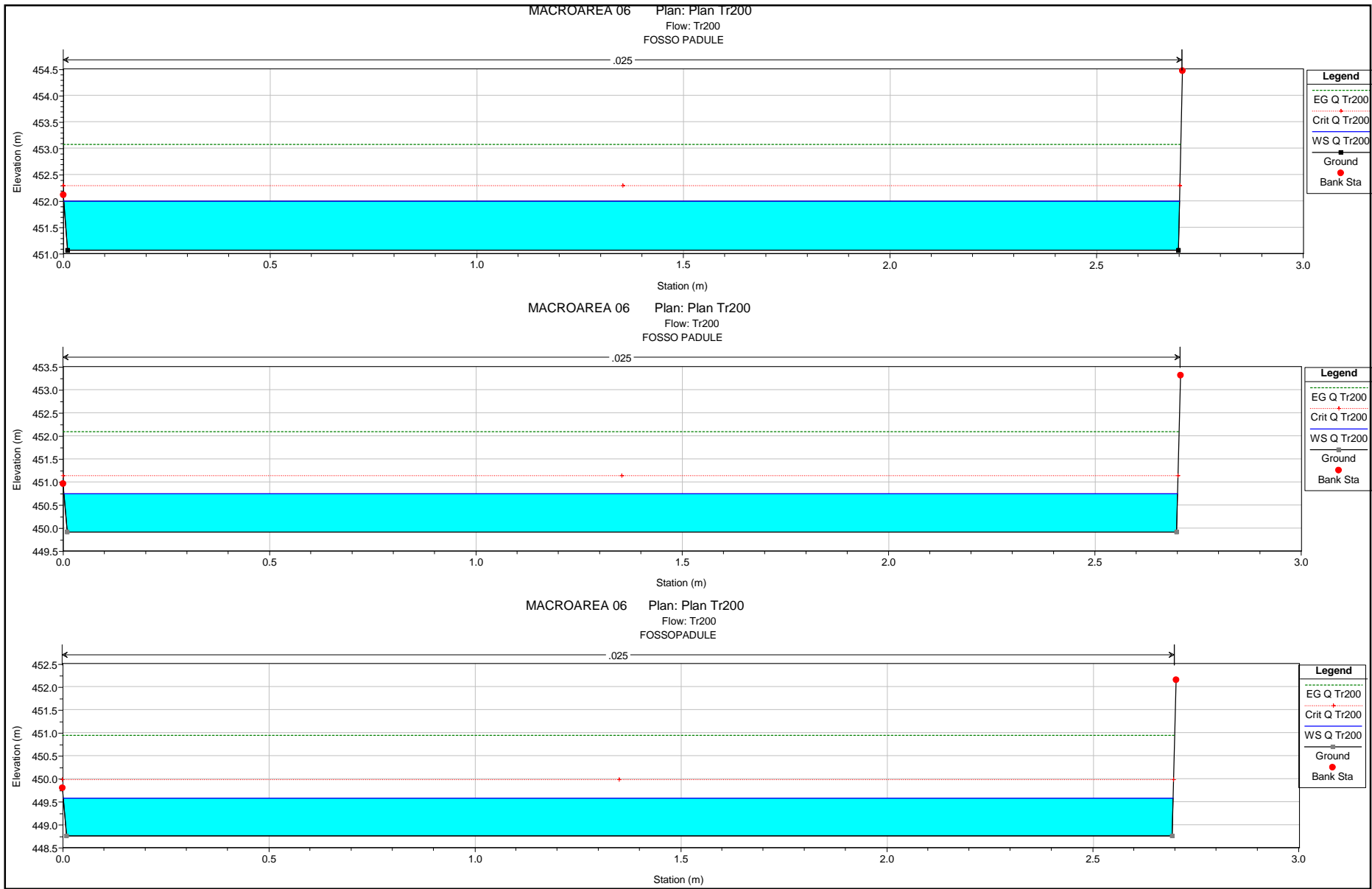


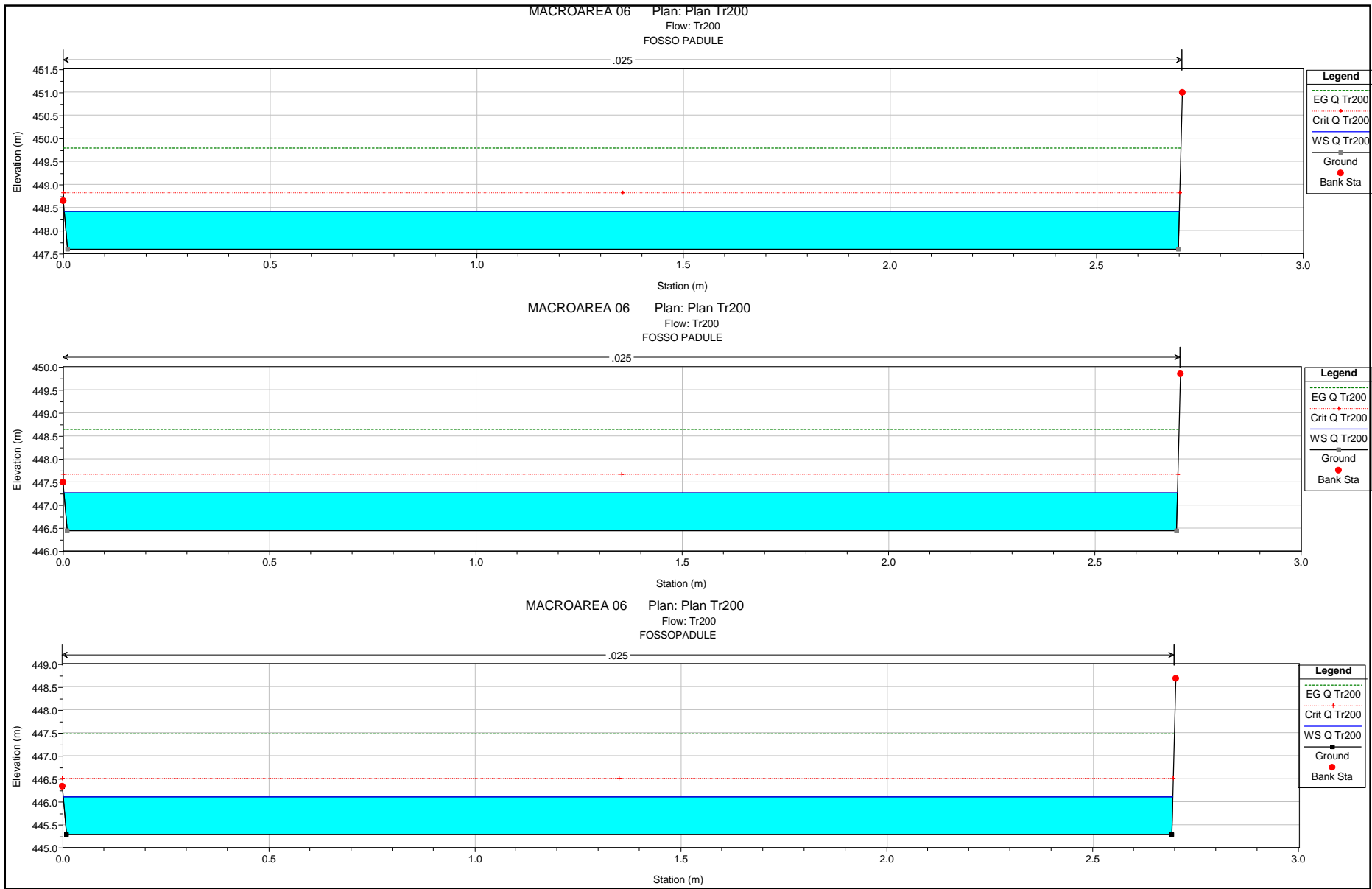


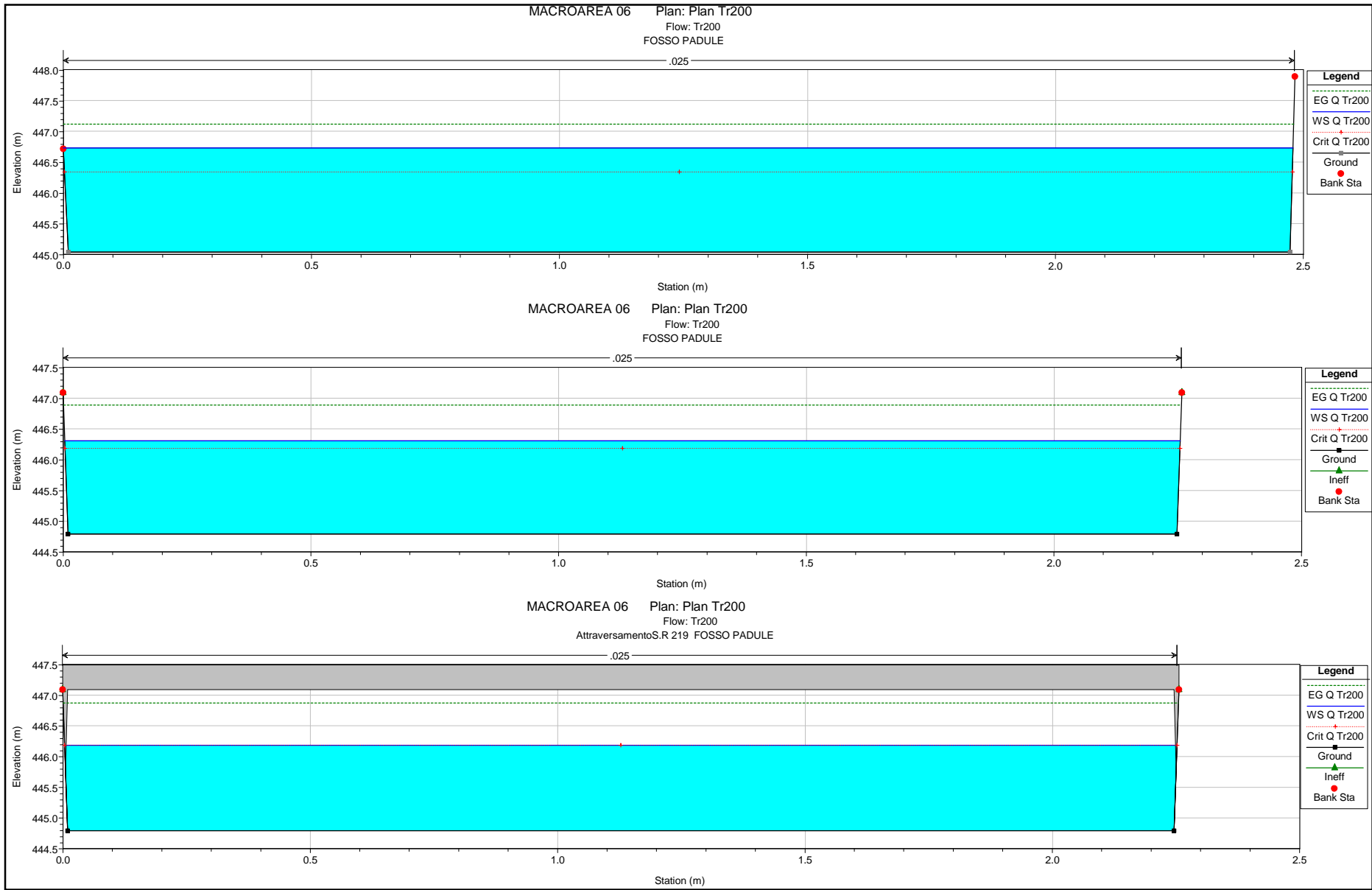


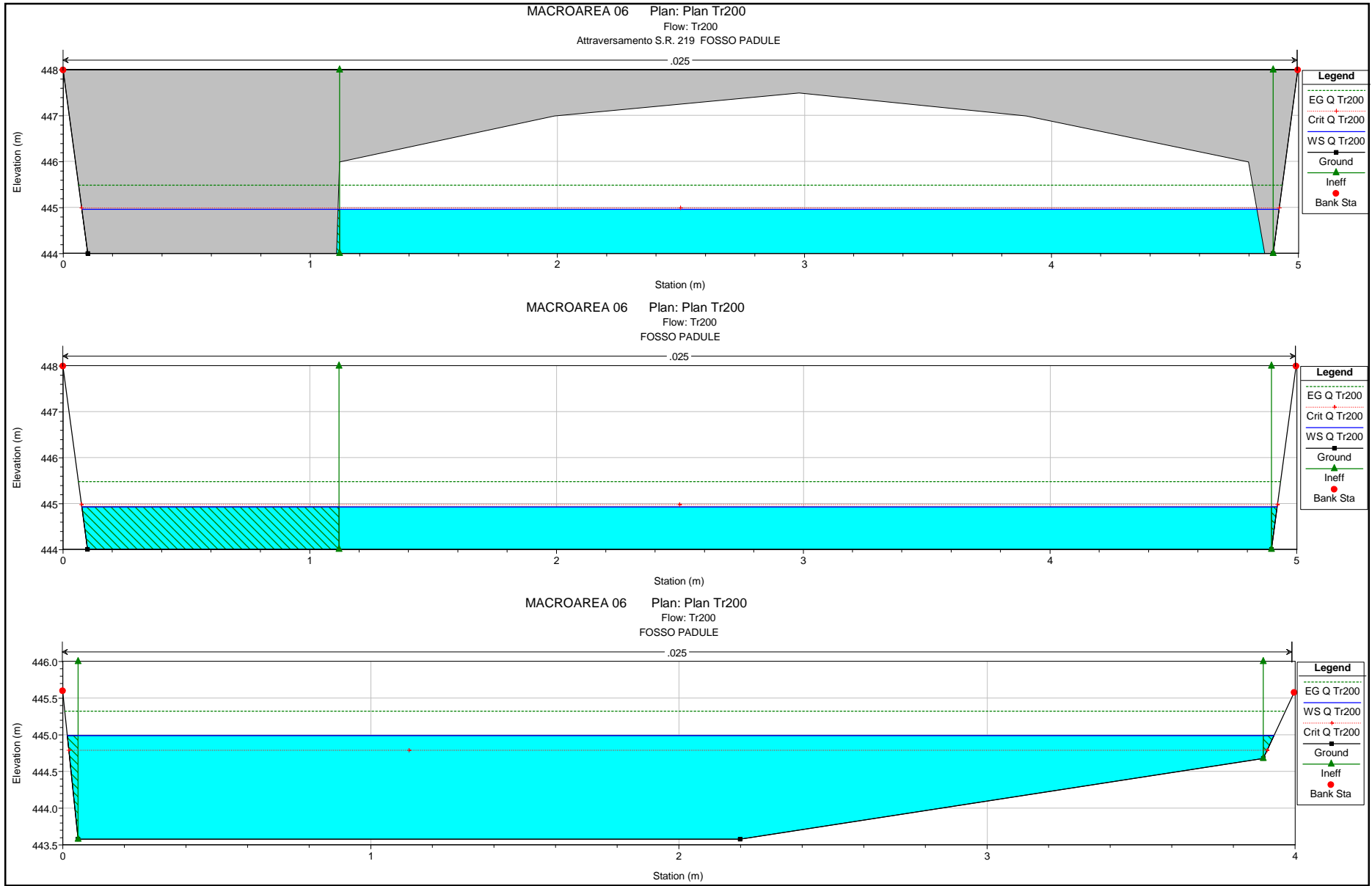


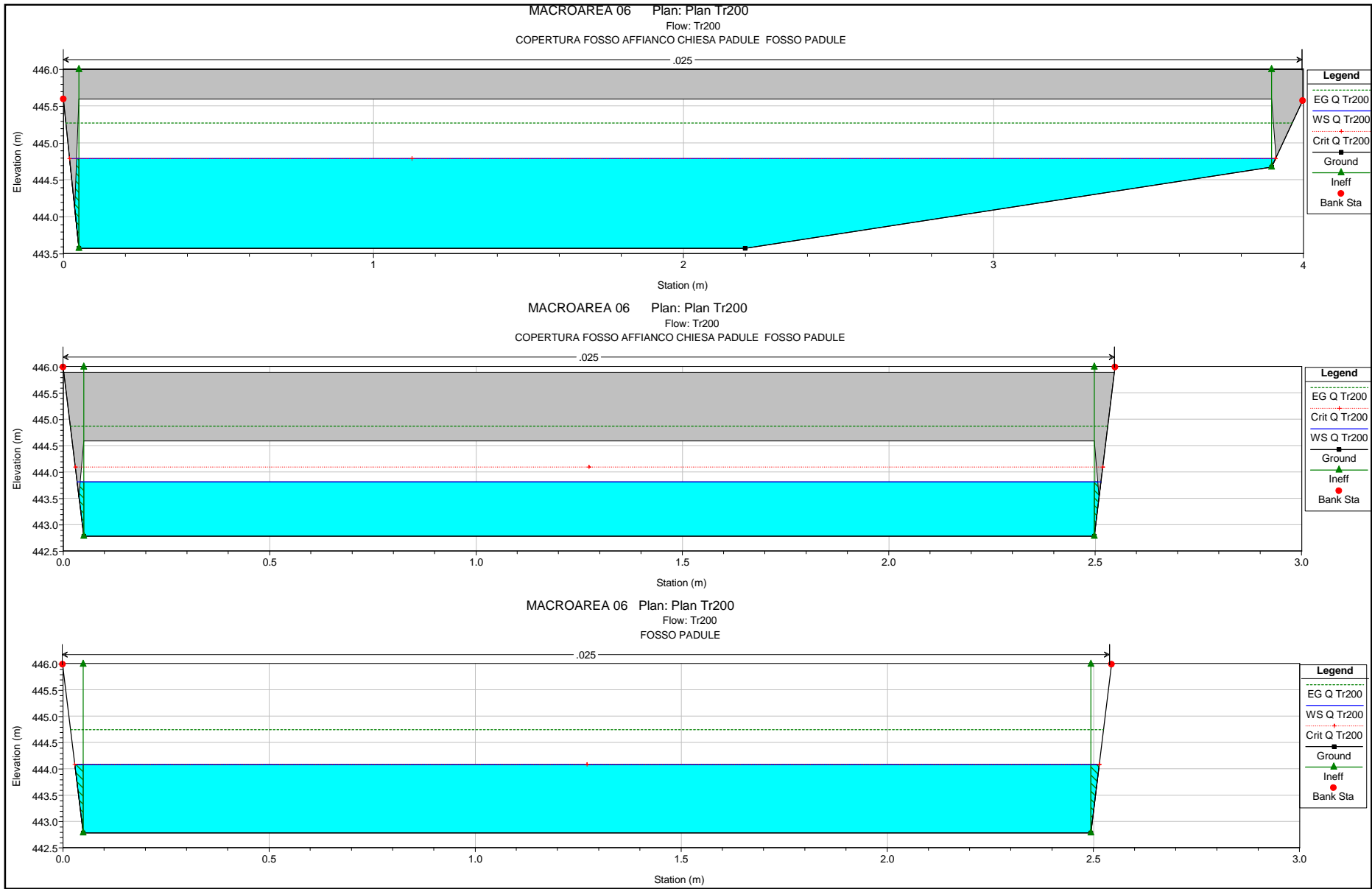


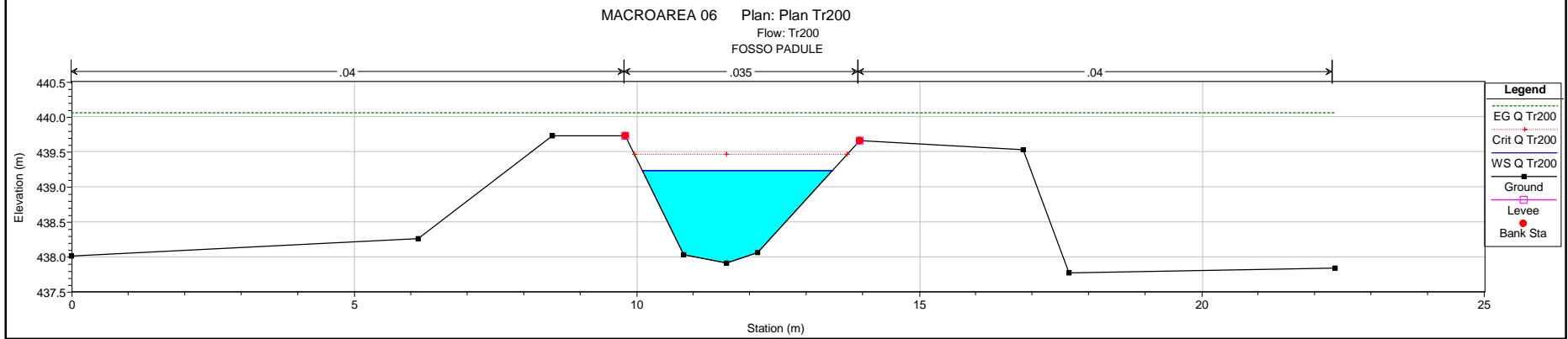
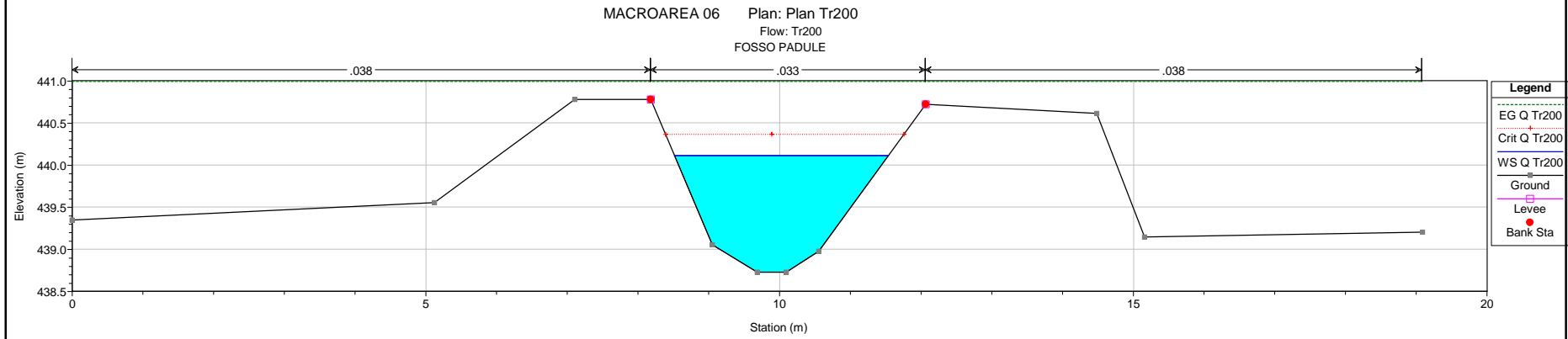
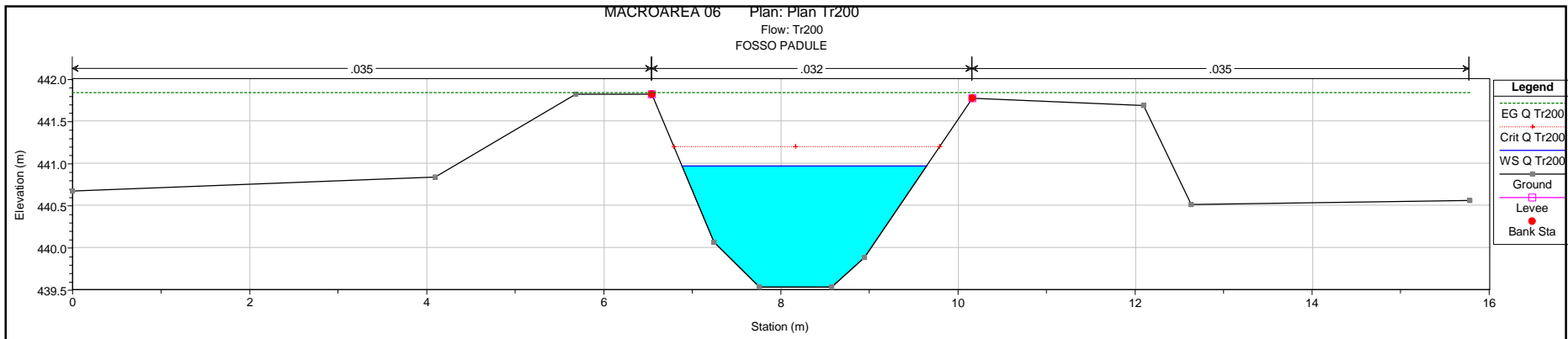












DellaFerma50.rep

HEC-RAS Version 3.1.3 May 2005
 U.S. Army Corp of Engineers
 Hydrologic Engineering Center
 609 Second Street
 Davis, California

```

X      X  XXXXXX      XXXX      XXXX      XX      XXXX
X      X  X          X      X      X      X      X
X      X  X          X          X      X      X      X
XXXXXXXX XXXX      X          XXX XXXX XXXXXXX XXXX
X      X  X          X          X      X      X      X
X      X  X          X      X      X      X      X
X      X  XXXXXX      XXXX      X      X      X      XXXXX
    
```

PROJECT DATA

Project Title: MACROAREA 08 - FOSSO DELLA FERMA SPADA
 Project File : DellaFerma50.prj
 Run Date and Time: 24/11/2006 17.43.14

Project in SI units

Project Description:
 verifica MACROAREA 09

FLOW DATA

Flow Title: Flow 50
 Flow File : n:\2006\06033\Integrazione\HEC_FERMA\Sez aggiunte\HEC_Tr50\DellaFerma50.f01

Flow Data (m3/s)

```

*****
* River      Reach      RS      *      Q Tr50 *
* Fso Della FERMA1      5      *      9.9 *
*****
    
```

Boundary Conditions

```

*****
*****
* River      Reach      Profile      *      Upstream
Downstream *
*****
* Fso Della FERMA1      Q Tr50      *      Critical
Normal S = 0.054 *
*****
*****
    
```

GEOMETRY DATA

Geometry Title: MACROAREA 08 FOSSO DELLA FERMA SPADA
 Geometry File : n:\2006\06033\Integrazione\HEC_FERMA\Sez aggiunte\HEC_Tr50\DellaFerma50.g01

CROSS SECTION

RIVER: Fso Della FERMA
 REACH: 1 RS: 5

INPUT

Description: Sez. aggiunta

Station	Elevation	Data	num=	8	Sta	Elev	Sta	Elev	Sta	Elev
0	439.8	11.57	438.71	14.56	437.12	16.06	435.98	17.33	436.06	
19.54	436.27	22.95	438.53	38.02	439.17					

Manning's n values num= 3

Sta n Val Sta n Val Sta n Val

 0 .04 11.57 .035 22.95 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 11.57 22.95 20 20 20 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 437.28 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.34 * wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 436.94 * Reach Len. (m) * 20.00 * 20.00 * 20.00
 * Crit W.S. (m) * 436.94 * Flow Area (m2) * * 3.84 *
 * E.G. Slope (m/m) *0.015744 * Area (m2) * * 3.84 *
 * Q Total (m3/s) * 9.90 * Flow (m3/s) * * 9.90 *
 * Top width (m) * 5.76 * Top width (m) * * 5.76 *
 * vel Total (m/s) * 2.58 * Avg. vel. (m/s) * * 2.58 *
 * Max Chl Dpth (m) * 0.96 * Hydr. Depth (m) * * 0.67 *
 * Conv. Total (m3/s) * 78.9 * Conv. (m3/s) * * 78.9 *
 * Length wtd. (m) * 20.00 * wetted Per. (m) * * 6.30 *
 * Min Ch El (m) * 435.98 * Shear (N/m2) * * 94.12 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 242.58 *
 * Frctn Loss (m) * 0.31 * Cum Volume (1000 m3) * * 0.42 *
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 0.81 *

 **

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: FSSO DELLA FERMA
 REACH: 1 RS: 4.5*

INPUT

Description:

Station Elevation Data num= 8
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 436.09 11.57 435 14.56 433.41 16.06 432.27 17.33 432.35
 19.54 432.56 22.95 434.82 38.02 435.46

Manning's n Values

num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 11.57 .035 22.95 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 11.57 22.95 20 20 20 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

```
*****
**
* E.G. Elev (m)      * 436.08 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 3.37  * wt. n-Val.      *         * 0.035  *
* W.S. Elev (m)     * 432.71 * Reach Len. (m)  * 20.00  * 20.00  * 20.00
* Crit W.S. (m)     * 433.23 * Flow Area (m2)  *         * 1.22   *
* E.G. Slope (m/m)  *0.462152 * Area (m2)       *         * 1.22   *
* Q Total (m3/s)    * 9.90  * Flow (m3/s)     *         * 9.90   *
* Top width (m)     * 4.29  * Top width (m)   *         * 4.29   *
* Vel Total (m/s)   * 8.13  * Avg. Vel. (m/s) *         * 8.13   *
* Max Ch1 Dpth (m) * 0.44  * Hydr. Depth (m) *         * 0.28   *
* Conv. Total (m3/s) * 14.6  * Conv. (m3/s)    *         * 14.6   *
* Length wtd. (m)   * 20.00 * wetted Per. (m) *         * 4.49   *
* Min Ch El (m)     * 432.27 * Shear (N/m2)    *         * 1228.02 *
* Alpha             * 1.00  * Stream Power (N/m s) *         * 9987.80 *
* Frctn Loss (m)   * 0.90  * Cum Volume (1000 m3) *         * 0.36   *
* C & E Loss (m)   * 0.30  * Cum SA (1000 m2) *         * 0.71   *
*****
**
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO DELLA FERMA
 REACH: 1 RS: 4

INPUT

Description:

Station		Elevation Data		num= 8		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	432.38	11.57	431.29	14.56	429.7	16.06	428.56	17.33	428.64				
19.54	428.85	22.95	431.11	38.02	431.75								

Manning's n Values

Sta		n Val		num= 3		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	11.57	.035	22.95	.04				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	11.57	22.95		23.5	23.5	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

```
*****
**
* E.G. Elev (m)      * 430.71 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 1.58  * wt. n-Val.      *         * 0.035  *
* W.S. Elev (m)     * 429.13 * Reach Len. (m)  * 23.50  * 23.50  * 23.50
**
```

```

DellaFerma50.rep
* Crit w.s. (m) * 429.52 * Flow Area (m2) * * 1.78 *
* E.G. Slope (m/m) *0.148329 * Area (m2) * * 1.78 *
* Q Total (m3/s) * 9.90 * Flow (m3/s) * * 9.90 *
* Top width (m) * 4.64 * Top width (m) * * 4.64 *
* vel Total (m/s) * 5.57 * Avg. vel. (m/s) * * 5.57 *
* Max Chl Dpth (m) * 0.57 * Hydr. Depth (m) * * 0.38 *
* Conv. Total (m3/s) * 25.7 * Conv. (m3/s) * * 25.7 *
* Length wtd. (m) * 23.50 * wetted Per. (m) * * 4.93 *
* Min Ch El (m) * 428.56 * Shear (N/m2) * * 524.46 *
* Alpha * 1.00 * Stream Power (N/m s) * * 2923.48 *
* Frctn Loss (m) * 4.84 * Cum Volume (1000 m3) * * 0.33 *
* C & E Loss (m) * 0.54 * Cum SA (1000 m2) * * 0.62 *
*****
**

```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fssso Della FERMA
 REACH: 1 RS: 3.5*

INPUT

Description:

```

Station Elevation Data num= 13
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
*****
0 427.73 8.77 426.895 12.056 425.349 12.576 425.233 13.867 424.829
13.983 424.395 14.485 424.2 15.146 424.314 15.406 424.505 15.5 424.576
17.008 424.971 19.48 426.585 28.555 426.97

```

```

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
*****
0 .04 8.77 .035 19.48 .04

```

```

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
8.77 19.48 23.5 23.5 23.5 .1 .3

```

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m) * 426.91 * Element * Left OB * Channel * Right OB
* vel Head (m) * 1.87 * wt. n-Val. * * 0.035 *
* w.s. Elev (m) * 425.04 * Reach Len. (m) * 23.50 * 23.50 * 23.50
* Crit w.s. (m) * 425.50 * Flow Area (m2) * * 1.63 *
* E.G. Slope (m/m) *0.173746 * Area (m2) * * 1.63 *
* Q Total (m3/s) * 9.90 * Flow (m3/s) * * 9.90 *
* Top width (m) * 3.93 * Top width (m) * * 3.93 *
*

```

DellaFerma50.rep

* Vel Total (m/s)	* 6.06	* Avg. Vel. (m/s)	* 6.06
* Max Chl Dpth (m)	* 0.84	* Hydr. Depth (m)	* 0.42
* Conv. Total (m3/s)	* 23.8	* Conv. (m3/s)	* 23.8
* Length wtd. (m)	* 23.50	* wetted Per. (m)	* 4.50
* Min Ch El (m)	* 424.20	* Shear (N/m2)	* 618.65
* Alpha	* 1.00	* Stream Power (N/m s)	* 3749.82
* Frctn Loss (m)	* 3.77	* Cum Volume (1000 m3)	* 0.29
* C & E Loss (m)	* 0.03	* Cum SA (1000 m2)	* 0.52

**

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fssso Della FERMA
REACH: 1 RS: 3

INPUT

Description:

Station Elevation Data	num=	10
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		

0 423.08 5.97 422.5 9.96 420.78 12.16 420.73 12.3 419.93		
12.91 419.84 13.32 420.01 13.54 420.5 16.01 422.06 19.09 422.19		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		

0 .04 5.97 .035 16.01 .04		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
5.97	16.01	17	17	17	.1	.3	

CROSS SECTION OUTPUT Profile #Q Tr50

**

* E.G. Elev (m)	* 422.55	* Element	* Left OB	* Channel	* Right OB
* Vel Head (m)	* 1.64	* wt. n-Val.	* 0.035		
* W.S. Elev (m)	* 420.91	* Reach Len. (m)	* 17.00	* 17.00	* 17.00
* Crit W.S. (m)	* 421.31	* Flow Area (m2)	* 1.74		
* E.G. Slope (m/m)	*0.192104	* Area (m2)	* 1.74		
* Q Total (m3/s)	* 9.90	* Flow (m3/s)	* 9.90		
* Top width (m)	* 4.53	* Top width (m)	* 4.53		
* Vel Total (m/s)	* 5.68	* Avg. Vel. (m/s)	* 5.68		
* Max Chl Dpth (m)	* 1.07	* Hydr. Depth (m)	* 0.38		
* Conv. Total (m3/s)	* 22.6	* Conv. (m3/s)	* 22.6		
* Length wtd. (m)	* 17.00	* wetted Per. (m)	* 5.70		
* Min Ch El (m)	* 419.84	* Shear (N/m2)	* 575.75		
* Alpha	* 1.00	* Stream Power (N/m s)	* 3271.36		
* Frctn Loss (m)	* 4.29	* Cum Volume (1000 m3)	* 0.26		

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```
*
* C & E Loss (m)      *    0.07 * Cum SA (1000 m2)      *          *    0.42 *
*
*****
**
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for

additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO DELLA FERMA
 REACH: 1 RS: 2.5*

INPUT

Description:

Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	423.495	5.605	423.125	6.691	422.419	8.789	420.383	9.4	420.07
10.413	419.768	11.193	419.719	11.492	419.711	11.625	419.309	12.205	419.255
12.542	419.476	12.722	419.794	14.75	421.395	17.17	421.46	17.17	422.695

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	5.605	.035	14.75	.04

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
	5.605	14.75	17	17	17	.1		.3

CROSS SECTION OUTPUT Profile #Q Tr50

```
*****
**
* E.G. Elev (m)      * 421.03 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 0.62  * wt. n-Val.      *          * 0.035 *
* W.S. Elev (m)     * 420.41 * Reach Len. (m)  * 17.00  * 17.00  * 17.00
* Crit W.S. (m)     * 420.58 * Flow Area (m2)  *          * 2.84  *
* E.G. Slope (m/m)  *0.036994 * Area (m2)       *          * 2.84  *
* Q Total (m3/s)    * 9.90  * Flow (m3/s)     *          * 9.90  *
* Top width (m)     * 4.74  * Top width (m)   *          * 4.74  *
* Vel Total (m/s)   * 3.48  * Avg. Vel. (m/s) *          * 3.48  *
* Max Chl Dpth (m) * 1.15  * Hydr. Depth (m) *          * 0.60  *
* Conv. Total (m3/s) * 51.5  * Conv. (m3/s)    *          * 51.5  *
* Length wtd. (m)  * 17.00 * wetted Per. (m) *          * 5.63  *
* Min Ch El (m)    * 419.26 * Shear (N/m2)    *          * 183.10 *
* Alpha            * 1.00  * Stream Power (N/m s) *          * 637.87 *
* Frctn Loss (m)   * 1.22  * Cum Volume (1000 m3) *          * 0.22  *
* C & E Loss (m)   * 0.31  * Cum SA (1000 m2) *          * 0.34  *
*
*****
**
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for

additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than

0.7 or greater than 1.4. This may indicate the need for additional cross

sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fssso Della FERMA
 REACH: 1 RS: 2

INPUT

Description:

Station	Elevation	Data	num=	10	Sta	Elev	Sta	Elev	Sta	Elev
0	423.91	5.24	423.75	6.27	422.83	8.26	419.71	9.8	418.78	
10.54	418.7	11.5	418.67	13.49	420.73	15.25	420.73	15.25	423.2	

Manning's n	Values	num=	3	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	5.24	.035	13.49	.04				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	5.24	13.49	10	10	10	.3	.5

Ineffective Flow	num=	2	Sta L	Sta R	Elev	Permanent
0	8.26	424.13	T			
13.49	15.25	424.13	T			

CROSS SECTION OUTPUT Profile #Q Tr50

** E.G. Elev (m)	* 420.37	* Element	* Left OB	* Channel	* Right OB
* vel Head (m)	* 0.74	* wt. n-Val.	* 0.035		
* W.S. Elev (m)	* 419.63	* Reach Len. (m)	* 1.00	* 1.00	* 1.00
* Crit W.S. (m)	* 419.84	* Flow Area (m2)	* 2.59		
* E.G. Slope (m/m)	*0.039144	* Area (m2)	* 2.59		
* Q Total (m3/s)	* 9.90	* Flow (m3/s)	* 9.90		
* Top width (m)	* 4.02	* Top width (m)	* 4.02		
* vel Total (m/s)	* 3.82	* Avg. vel. (m/s)	* 3.82		
* Max chl Dpth (m)	* 0.96	* Hydr. Depth (m)	* 0.64		
* Conv. Total (m3/s)	* 50.0	* Conv. (m3/s)	* 50.0		
* Length wtd. (m)	* 1.00	* wetted Per. (m)	* 4.67		
* Min ch El (m)	* 418.67	* Shear (N/m2)	* 213.10		
* Alpha	* 1.00	* Stream Power (N/m s)	* 813.68		
* Frctn Loss (m)	* 0.65	* Cum Volume (1000 m3)	* 0.17		
* C & E Loss (m)	* 0.01	* Cum SA (1000 m2)	* 0.27		

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

BRIDGE

RIVER: Fssso Della FERMA
 REACH: 1 RS: 1.75

INPUT

Description: Attraversamento S.R. 219
 Distance from Upstream XS = 1
 Deck/Roadway width = 8
 Weir Coefficient = 1.44
 Upstream Deck/Roadway Coordinates

num= 9

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	424.13		418		8.26	424.13				8.27	424.13			422
9.57	424.13		422.7		10.87	424.13			423	12.17	424.13			422.7
13.47	424.13		422		13.48	424.13				15.25	424.13			418

Upstream Bridge Cross Section Data

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	423.91	5.24	423.75	6.27	422.83	8.26	419.71	9.8	418.78
10.54	418.7	11.5	418.67	13.49	420.73	15.25	420.73	15.25	423.2

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	5.24	.035	13.49	.04

Bank Sta: Left Right Coeff Contr. Expan.
 5.24 13.49 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 8.26 424.13 T
 13.49 15.25 424.13 T

Downstream Deck/Roadway Coordinates

num= 9

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	424.13		418		8.26	424.13				8.27	424.13			422
9.57	424.13		422.7		10.87	424.13			423	12.17	424.13			422.7
13.47	424.13		422		13.48	424.13				15.25	424.13			418

Downstream Bridge Cross Section Data

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	423.48	5.24	423.32	6.27	422.4	8.26	419.28	9.8	418.35
10.54	418.27	11.5	418.24	13.49	420.3	15.25	420.3	15.25	422.77

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	5.24	.035	13.49	.04

Bank Sta: Left Right Coeff Contr. Expan.
 5.24 13.49 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 8.26 424.13 T
 13.49 15.25 424.13 T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy
 Selected Low Flow Methods = Energy

High Flow Method

Pressure and Weir flow
 Submerged Inlet Cd =
 Submerged Inlet + Outlet Cd = .8
 Max Low Cord =

Additional Bridge Parameters

Add Friction component to Momentum
 Do not add weight component to Momentum
 Class B flow critical depth computations use critical depth
 inside the bridge at the upstream end
 Criteria to check for pressure flow = Upstream water surface

BRIDGE OUTPUT Profile #Q Tr50

```

*****
* E.G. US. (m) * 420.37 * Element *Inside BR US *Inside BR DS *
* W.S. US. (m) * 419.63 * E.G. Elev (m) * 420.36 * 419.99 *
* Q Total (m3/s) * 9.90 * W.S. Elev (m) * 419.63 * 419.16 *
* Q Bridge (m3/s) * 9.90 * Crit W.S. (m) * 419.85 * 419.42 *
* Q Weir (m3/s) * * Max Chl Dpth (m) * 0.96 * 0.92 *
* Weir Sta Lft (m) * * Vel Total (m/s) * 3.77 * 4.04 *
* Weir Sta Rgt (m) * * Flow Area (m2) * 2.63 * 2.45 *
* Weir Submerg * * Froude # Chl * 1.49 * 1.64 *
* Weir Max Depth (m) * * Specif Force (m3) * 4.85 * 5.01 *
* Min El Weir Flow (m) * 424.13 * Hydr Depth (m) * 0.65 * 0.62 *
* Min El Prs (m) * 423.00 * W.P. Total (m) * 4.70 * 4.55 *
* Delta EG (m) * 420.37 * Conv. Total (m3/s) * 51.0 * 46.3 *
* Delta WS (m) * 0.43 * Top width (m) * 4.05 * 3.93 *
* BR Open Area (m2) * 17.49 * Frctn Loss (m) * 0.02 * 0.33 *
* BR Open Vel (m/s) * 4.04 * C & E Loss (m) * 0.17 * 0.03 *
* Coef of Q * * Shear Total (N/m2) * 206.88 * 241.60 *
* Br Sel Method *Energy only * Power Total (N/m s) * 779.28 * 977.16 *
*****
    
```

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
 Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO DELLA FERMA
 REACH: 1 RS: 1.5

INPUT

Description:

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	423.48	5.24	423.32	6.27	422.4	8.26	419.28	9.8	418.35
10.54	418.27	11.5	418.24	13.49	420.3	15.25	420.3	15.25	422.77

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	5.24	.035	13.49	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	5.24	13.49		23.333	23.333	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	8.26	424.13	T
13.49	15.25	424.13	T

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m) * 419.94 * Element * Left OB * Channel * Right OB
*
* vel Head (m) * 0.74 * wt. n-Val. * * 0.035 *
*
* W.S. Elev (m) * 419.20 * Reach Len. (m) * 23.33 * 23.33 * 23.33
*
* Crit W.S. (m) * 419.41 * Flow Area (m2) * * 2.60 *
*
* E.G. Slope (m/m) *0.038691 * Area (m2) * * 2.60 *
*****
    
```

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```

*
* Q Total (m3/s)      * 9.90 * Flow (m3/s)      *      * 9.90 *
* Top width (m)      * 4.03 * Top width (m)    *      * 4.03 *
* Vel Total (m/s)    * 3.80 * Avg. Vel. (m/s)  *      * 3.80 *
* Max Chl Dpth (m)   * 0.96 * Hydr. Depth (m)  *      * 0.65 *
* Conv. Total (m3/s) * 50.3 * Conv. (m3/s)     *      * 50.3 *
* Length wtd. (m)    * 23.33 * Wetted Per. (m)  *      * 4.68 *
* Min Ch El (m)      * 418.24 * Shear (N/m2)     *      * 211.13 *
* Alpha              * 1.00 * Stream Power (N/m s) *      * 802.73 *
* Frctn Loss (m)     * 0.03 * Cum Volume (1000 m3) *      * 0.17 *
* C & E Loss (m)     * 0.22 * Cum SA (1000 m2)  *      * 0.26 *

```

**

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

CROSS SECTION

RIVER: FSSO DELLA FERMA
REACH: 1 RS: 1.33333*

INPUT

Description:

Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	422.607	8.38	422.193	9.526	421.29	11.741	418.65	13.455	417.597
14.208	417.358	14.278	417.279	14.457	417.087	15.347	416.98	15.87	417.264
18.933	419.913	20.107	419.913	20.107	421.56				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	8.38	.035	18.933	.038

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
8.38 18.933 23.333 23.333 23.333 .3 .5

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)      * 418.88 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 0.87  * wt. n-Val.      *      * 0.035 *
* W.S. Elev (m)     * 418.01 * Reach Len. (m)  * 23.33 * 23.33 * 23.33
* Crit W.S. (m)     * 418.29 * Flow Area (m2)  *      * 2.40 *
* E.G. Slope (m/m)  * 0.049465 * Area (m2)      *      * 2.40 *
* Q Total (m3/s)    * 9.90  * Flow (m3/s)     *      * 9.90 *
* Top width (m)     * 3.96  * Top width (m)   *      * 3.96 *
* Vel Total (m/s)   * 4.13  * Avg. vel. (m/s) *      * 4.13 *
* Max Chl Dpth (m) * 1.03  * Hydr. Depth (m) *      * 0.61 *
* Conv. Total (m3/s) * 44.5  * Conv. (m3/s)    *      * 44.5 *
* Length wtd. (m)   * 23.33 * Wetted Per. (m) *      * 4.59 *
*

```



```

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* Min Ch El (m) * 416.98 * Shear (N/m2) * 253.80 *
* Alpha * 1.00 * Stream Power (N/m s) * 1047.17 *
* Frctn Loss (m) * 1.02 * Cum Volume (1000 m3) * 0.11 *
* C & E Loss (m) * 0.04 * Cum SA (1000 m2) * 0.17 *
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fssso Della FERMA
 REACH: 1 RS: 1.16666*

INPUT

Description:

Station	Elevation	Data	num=	13	Station	Elevation	Station	Elevation	Station	Elevation
0	421.733	11.52	421.067	12.783	420.18	15.222	418.021	17.11	416.844	
17.939	416.439	18.017	416.288	18.214	415.908	19.193	415.72	19.95	415.987	
24.377	419.527	24.963	419.527	24.963	420.35					

Manning's n	Values	num=	3	Station	n Val	Station	n Val
0	.04	11.52	.035	24.377	.037		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	11.52	24.377		23.333	23.333	.3	.5

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m) * 417.69 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.91 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 416.79 * Reach Len. (m) * 23.33 * 23.33 * 23.33
* Crit W.S. (m) * 417.08 * Flow Area (m2) * * 2.35 *
* E.G. Slope (m/m) *0.051449 * Area (m2) * * 2.35 *
* Q Total (m3/s) * 9.90 * Flow (m3/s) * * 9.90 *
* Top width (m) * 3.72 * Top width (m) * * 3.72 *
* Vel Total (m/s) * 4.22 * Avg. Vel. (m/s) * * 4.22 *
* Max Chl Dpth (m) * 1.07 * Hydr. Depth (m) * * 0.63 *
* Conv. Total (m3/s) * 43.6 * Conv. (m3/s) * * 43.6 *
* Length wtd. (m) * 23.33 * wetted Per. (m) * * 4.47 *
* Min Ch El (m) * 415.72 * Shear (N/m2) * * 265.08 *
* Alpha * 1.00 * Stream Power (N/m s) * * 1118.57 *
* Frctn Loss (m) * 1.18 * Cum Volume (1000 m3) * * 0.05 *
* C & E Loss (m) * 0.01 * Cum SA (1000 m2) * * 0.08 *
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO DELLA FERMA
 REACH: 1 RS: 1

INPUT

Description:

Station Elevation Data		num= 7		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	420.86	14.66	419.94	21.67	415.52	21.97	414.73	23.04	414.46
24.03	414.71	29.82	419.14						

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	14.66	.035	29.82	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	14.66	29.82		0	0	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)          * 416.44 * Element          * Left OB * Channel * Right OB
* Vel Head (m)          * 0.99 * wt. n-Val.      *         * 0.035 *
* W.S. Elev (m)        * 415.46 * Reach Len. (m)  *         *         *
* Crit w.s. (m)        * 415.78 * Flow Area (m2)  *         * 2.25 *
* E.G. Slope (m/m)     * 0.053511 * Area (m2)       *         * 2.25 *
* Q Total (m3/s)       * 9.90 * Flow (m3/s)     *         * 9.90 *
* Top width (m)        * 3.31 * Top width (m)   *         * 3.31 *
* Vel Total (m/s)      * 4.41 * Avg. Vel. (m/s) *         * 4.41 *
* Max Chl Dpth (m)    * 1.00 * Hydr. Depth (m) *         * 0.68 *
* Conv. Total (m3/s)  * 42.8 * Conv. (m3/s)    *         * 42.8 *
* Length wtd. (m)     *         * wetted Per. (m) *         * 4.13 *
* Min Ch El (m)       * 414.46 * Shear (N/m2)   *         * 285.60 *
* Alpha                * 1.00 * Stream Power (N/m s) *         * 1258.29 *
* Frctn Loss (m)      * 1.22 * Cum Volume (1000 m3) *         *         *
* C & E Loss (m)      * 0.02 * Cum SA (1000 m2) *         *         *
**
*****
    
```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

SUMMARY OF MANNING'S N VALUES

River: FSSO DELLA FERMA

Reach	River Sta.	n1	n2	n3
1	5	.04	.035*	.04*
1	4.5	.04*	.035*	.04*
1	4	.04	.035*	.04*
1	3.5	.04*	.035*	.04*
1	3	.04	.035*	.04*
1	2.5	.04*	.035*	.04*
1	2	.04	.035*	.04*
*1	1.75	*Bridge	*	*

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*1	*	1.5	*	.04*	.035*	.04*
*1	*	1.33333*	*	.04*	.035*	.038*
*1	*	1.16666*	*	.04*	.035*	.037*
*1	*	1	*	.04*	.035*	.04*

SUMMARY OF REACH LENGTHS

River: Fssso Della FERMA

* Reach	* River Sta.	* Left	* Channel	* Right
1	5	20	20*	20*
1	4.5	20*	20*	20*
1	4	23.5	23.5*	23.5*
1	3.5	23.5*	23.5*	23.5*
1	3	17	17*	17*
1	2.5	17*	17*	17*
1	2	10	10*	10*
*1	1.75	*Bridge	*	*
1	1.5	23.333	23.333*	23.333*
1	1.33333	23.333*	23.333*	23.333*
1	1.16666	23.333*	23.333*	23.333*
1	1	0	0*	0*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Fssso Della FERMA

* Reach	* River Sta.	* Contr.	* Expan.
1	5	.1	.3*
1	4.5	.1*	.3*
1	4	.1	.3*
1	3.5	.1*	.3*
1	3	.1	.3*
1	2.5	.1*	.3*
1	2	.3	.5*
*1	1.75	*Bridge	*
1	1.5	.3	.5*
1	1.33333	.3*	.5*
1	1.16666	.3*	.5*
1	1	.1	.3*

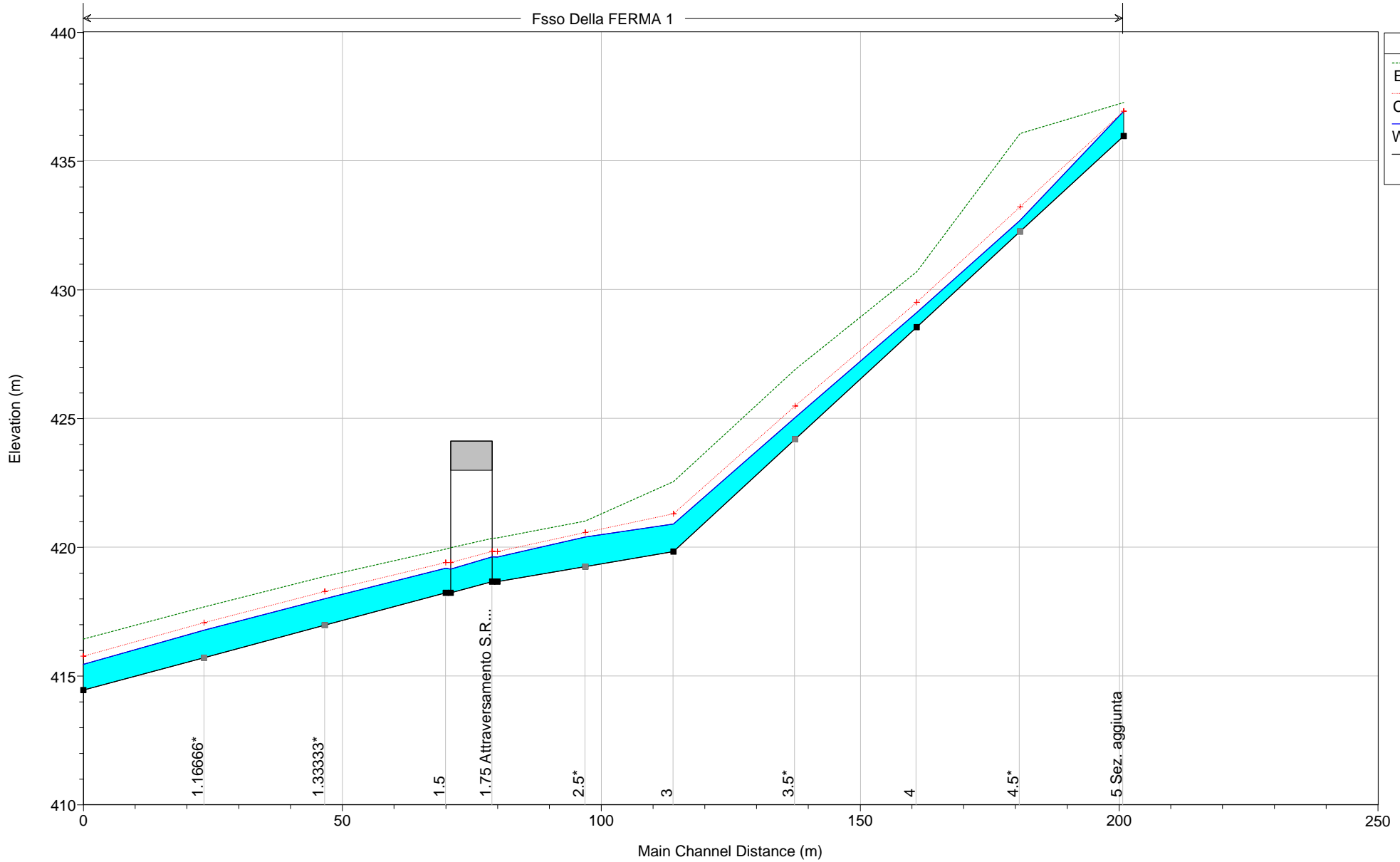
HEC-RAS Plan: Plan Tr50 River: Fssso Della FERMA Reach: 1 Profile: Q Tr50

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
1	5	Q Tr50	9.90	435.98	436.94	436.94	437.28	0.015744	2.58	3.84	5.76	1.01
1	4.5*	Q Tr50	9.90	432.27	432.71	433.23	436.08	0.462152	8.13	1.22	4.29	4.87
1	4	Q Tr50	9.90	428.56	429.13	429.52	430.71	0.148329	5.57	1.78	4.64	2.88
1	3.5*	Q Tr50	9.90	424.20	425.04	425.50	426.91	0.173746	6.06	1.63	3.93	3.00
1	3	Q Tr50	9.90	419.84	420.91	421.31	422.55	0.192104	5.68	1.74	4.53	2.92
1	2.5*	Q Tr50	9.90	419.26	420.41	420.58	421.03	0.036994	3.48	2.84	4.74	1.44
1	2	Q Tr50	9.90	418.67	419.63	419.84	420.37	0.039144	3.82	2.59	4.02	1.52
1	1.75		Bridge									
1	1.5	Q Tr50	9.90	418.24	419.20	419.41	419.94	0.038691	3.80	2.60	4.03	1.51
1	1.33333*	Q Tr50	9.90	416.98	418.01	418.29	418.88	0.049465	4.13	2.40	3.96	1.69
1	1.16666*	Q Tr50	9.90	415.72	416.79	417.08	417.69	0.051449	4.22	2.35	3.72	1.70
1	1	Q Tr50	9.90	414.46	415.46	415.78	416.44	0.053511	4.41	2.25	3.31	1.71

MACROAREA 08 Plan: Plan Tr50

Flow: Flow 50

Fsso Della FERMA 1



Legend


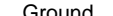



EG Q Tr50

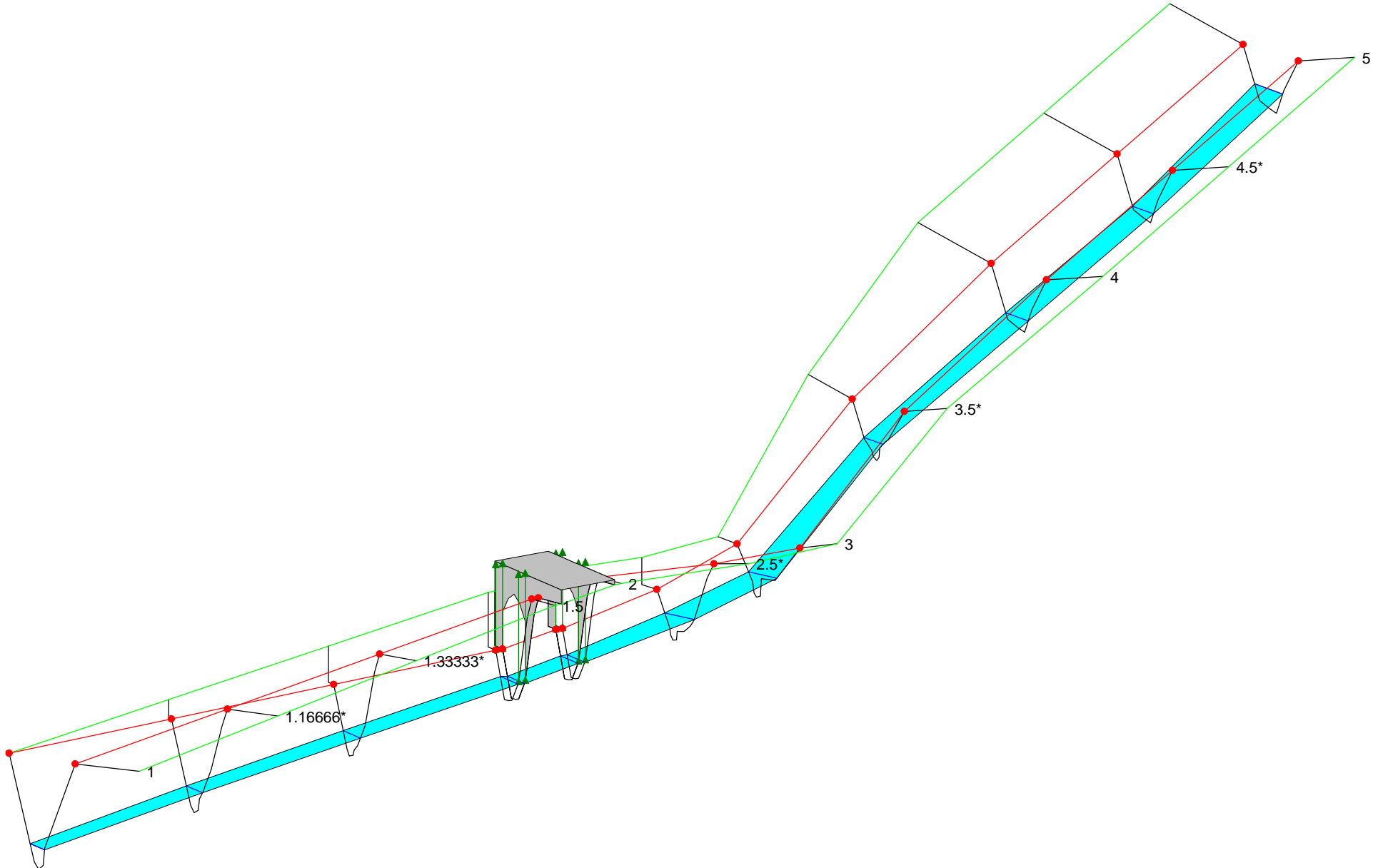
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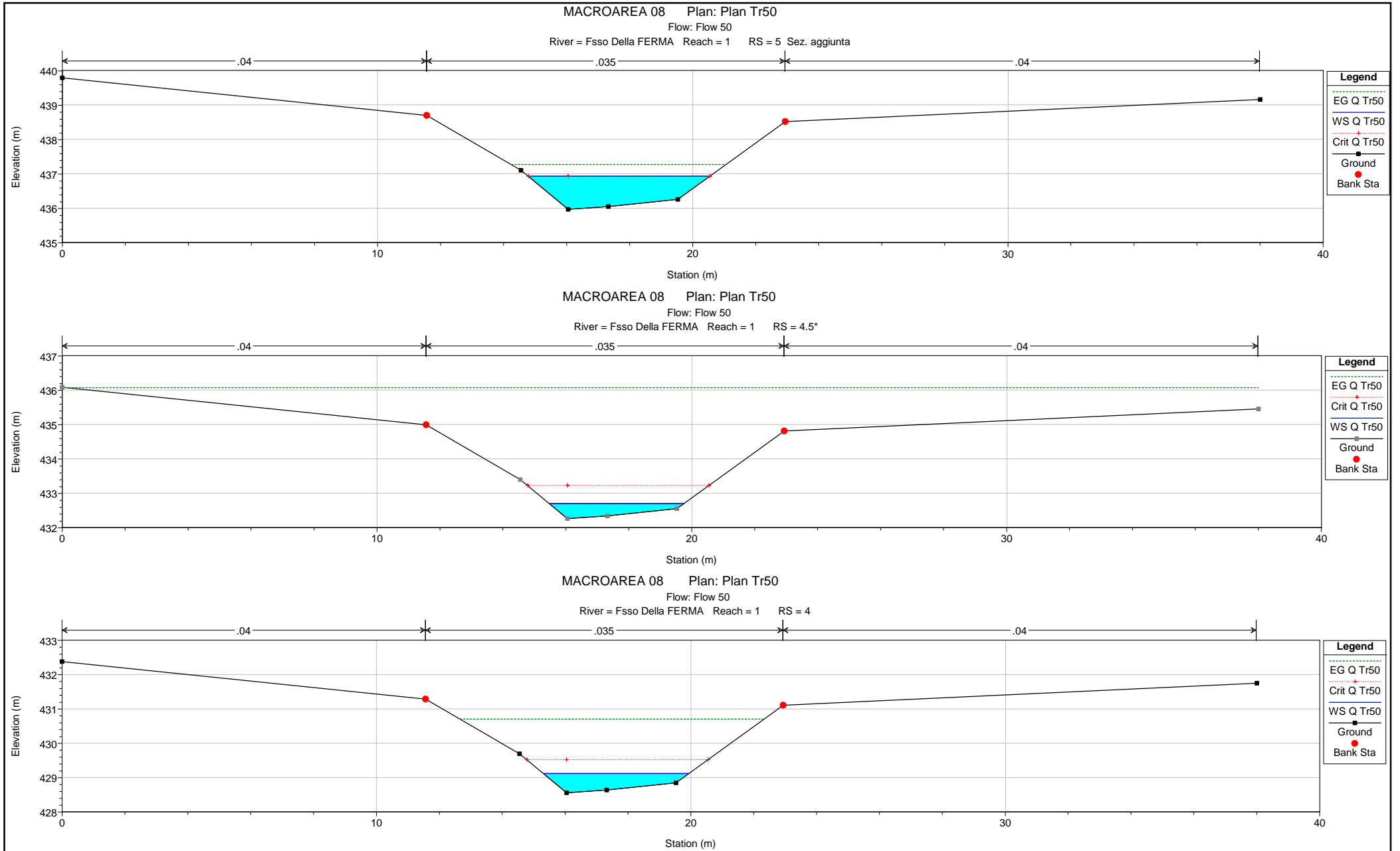
WS Q Tr50

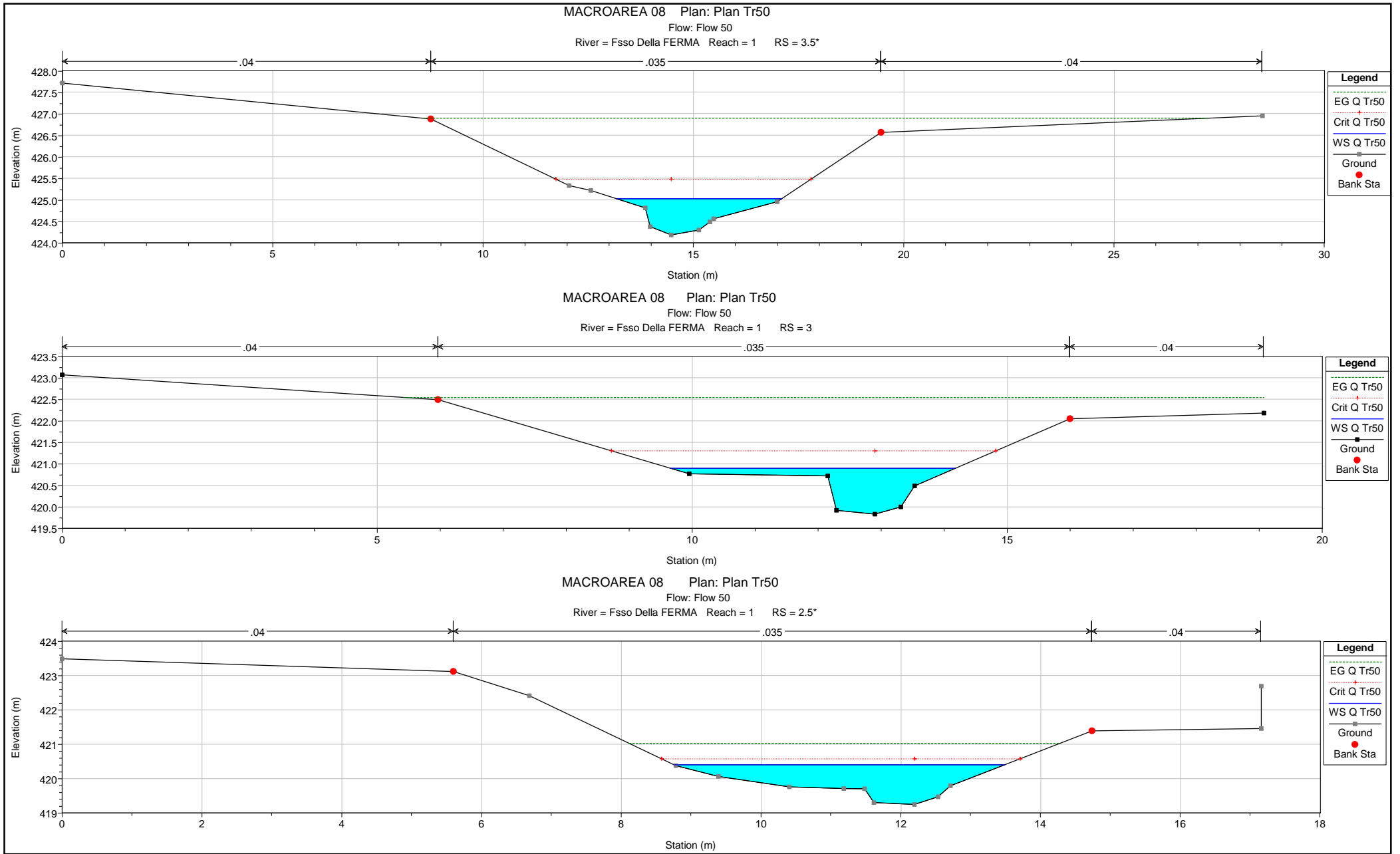
Ground

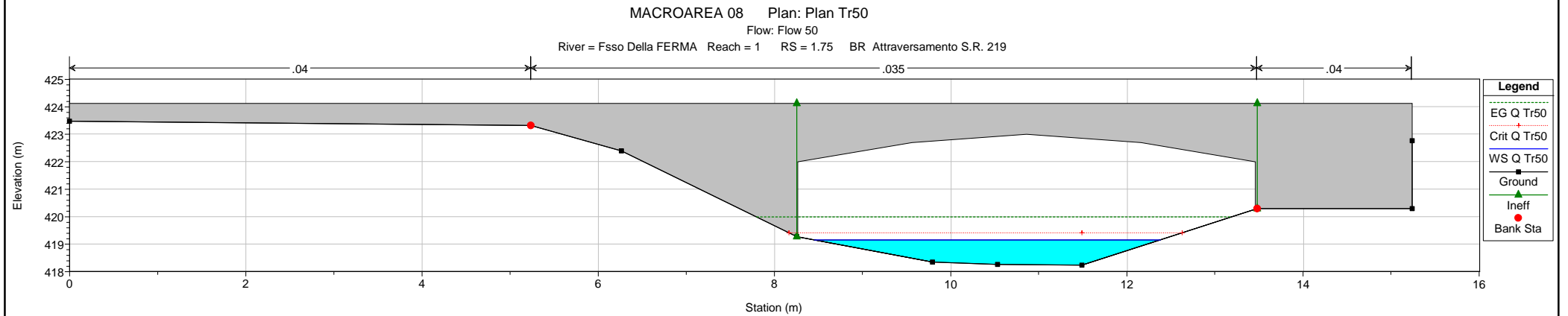
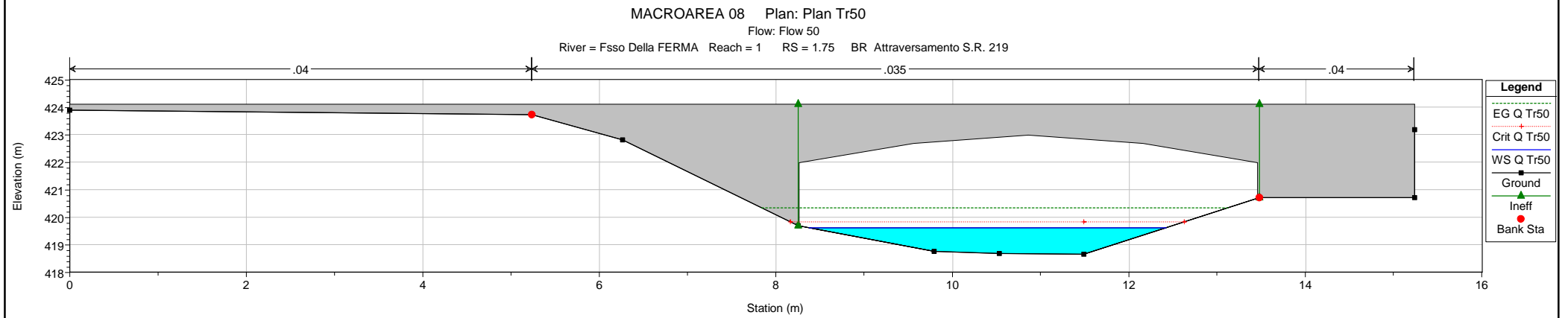
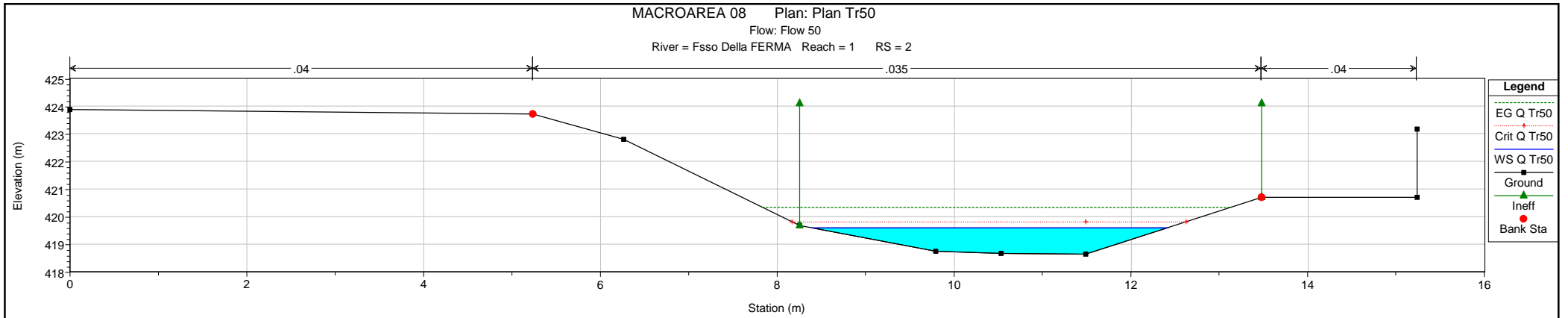
MACROAREA 08 Plan: Plan Tr50
Flow: Flow 50 DELLA FERMA

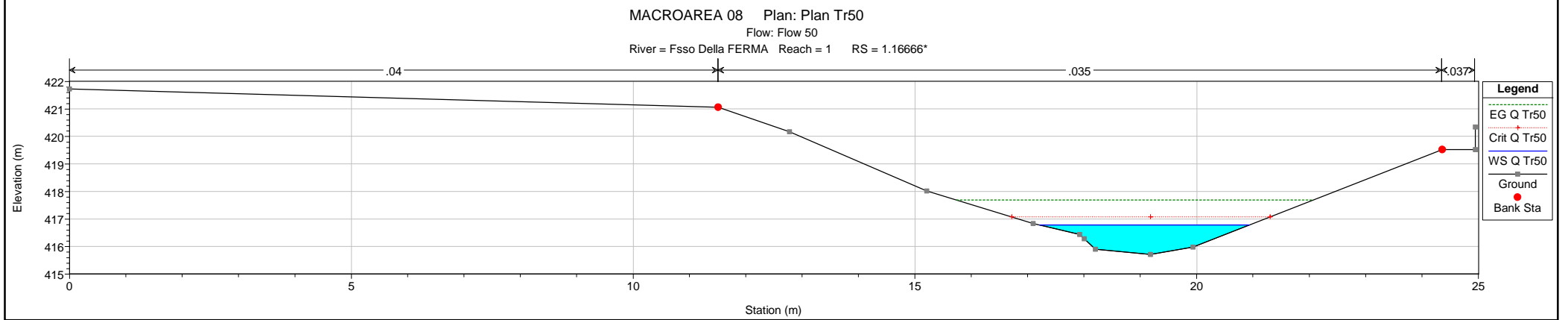
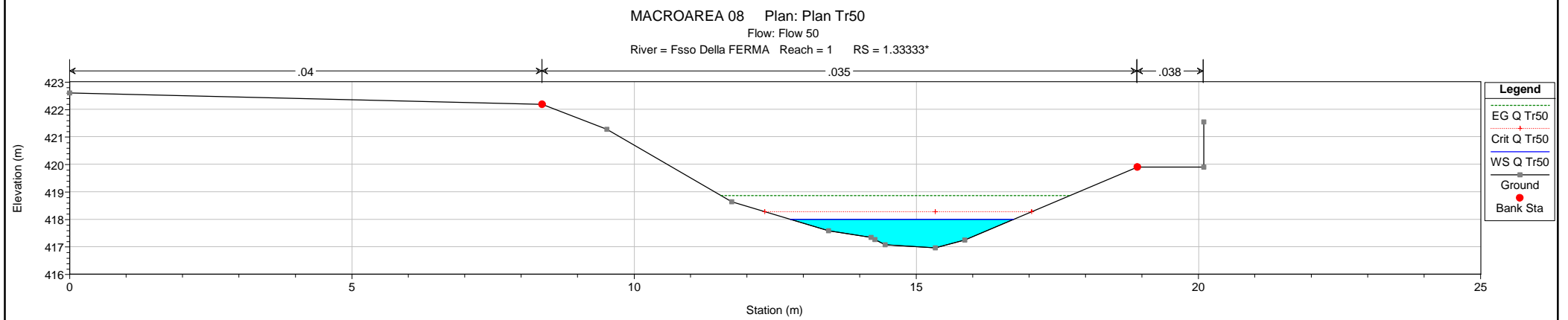
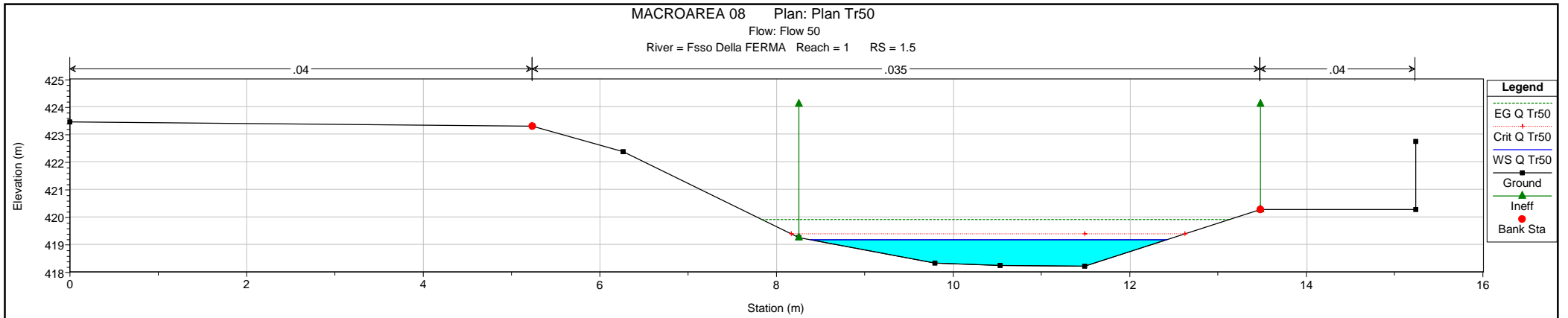
Legend	
	WS Q Tr50
	Ground
	Bank Sta
	Ground
	Ineff







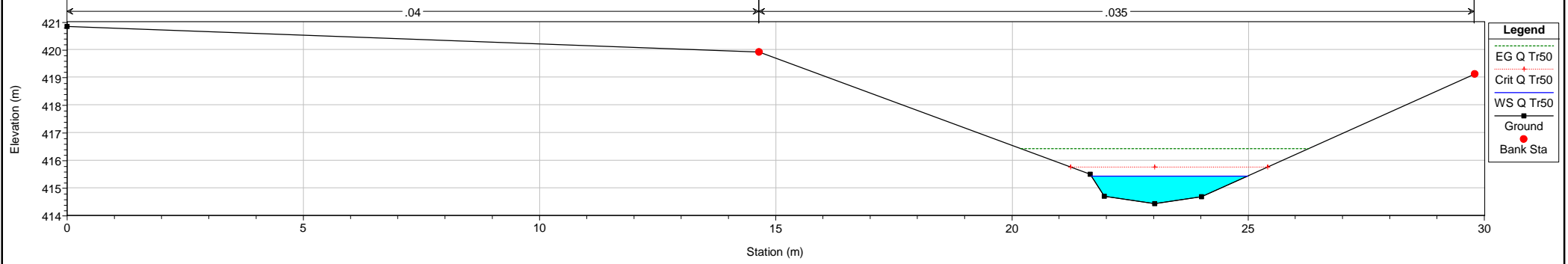




MACROAREA 08 Plan: Plan Tr50

Flow: Flow 50

River = Fso Della FERMA Reach = 1 RS = 1



FOSSODELLAFERMA.rep

HEC-RAS Version 3.1.3 May 2005
 U.S. Army Corp of Engineers
 Hydrologic Engineering Center
 609 Second Street
 Davis, California

```

X      X  XXXXXX      XXXX      XXXX      XX      XXXX
X      X  X          X      X      X      X      X
X      X  X          X          X      X      X      X
XXXXXXXX XXXX      X          XXX XXXX XXXXXXX XXXX
X      X  X          X          X      X      X      X
X      X  X          X      X      X      X      X
X      X  XXXXXX      XXXX      X      X      X      XXXXX
    
```

PROJECT DATA
 Project Title: MACROAREA 08 - FOSSO DELLA FERMA SPADA
 Project File : FOSSODELLAFERMA.prj
 Run Date and Time: 21/11/2006 9.11.00

Project in SI units

Project Description:
 verifica MACROAREA 08 - FOSSO DELLA FERMA

FLOW DATA

Flow Title: Flow 01
 Flow File : n:\2006\06033\Integrazione\HEC_FERMA\Sez aggiunte\FOSSODELLAFERMA.f01

Flow Data (m3/s)

```

*****
* River      Reach      RS      *      Q Tr200 *
* Fso Della FERMA1      5      *      13.9 *
*****
    
```

Boundary Conditions

```

*****
*****
* River      Reach      Profile      *      Upstream
Downstream *
*****
* Fso Della FERMA1      Q Tr200      *      Critical
Normal S = 0.054 *
*****
*****
    
```

GEOMETRY DATA

Geometry Title: MACROAREA 08 FOSSO DELLA FERMA SPADA
 Geometry File : n:\2006\06033\Integrazione\HEC_FERMA\Sez aggiunte\FOSSODELLAFERMA.g01

CROSS SECTION

RIVER: Fso Della FERMA
 REACH: 1 RS: 5

INPUT

Description: Sez. aggiunta

```

Station Elevation Data      num=      8
Sta      Elev      Sta      Elev      Sta      Elev      Sta      Elev
*****
0      439.8      11.57      438.71      14.56      437.12      16.06      435.98      17.33      436.06
19.54      436.27      22.95      438.53      38.02      439.17
    
```

```

Manning's n Values      num=      3
Sta      n Val      Sta      n Val      Sta      n Val
    
```

 0 .04 11.57 .035 22.95 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 11.57 22.95 20 20 20 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

 **
 * E.G. Elev (m) * 437.53 * Element * Left OB * Channel * Right OB
 * Vel Head (m) * 0.39 * wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 437.13 * Reach Len. (m) * 20.00 * 20.00 * 20.00
 * Crit w.S. (m) * 437.13 * Flow Area (m2) * * 4.99 *
 * E.G. Slope (m/m) *0.014810 * Area (m2) * * 4.99 *
 * Q Total (m3/s) * 13.90 * Flow (m3/s) * * 13.90 *
 * Top width (m) * 6.31 * Top width (m) * * 6.31 *
 * Vel Total (m/s) * 2.78 * Avg. Vel. (m/s) * * 2.78 *
 * Max Chl Dpth (m) * 1.15 * Hydr. Depth (m) * * 0.79 *
 * Conv. Total (m3/s) * 114.2 * Conv. (m3/s) * * 114.2 *
 * Length wtd. (m) * 20.00 * wetted Per. (m) * * 6.97 *
 * Min Ch El (m) * 435.98 * Shear (N/m2) * * 104.06 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 289.71 *
 * Frctn Loss (m) * 0.30 * Cum Volume (1000 m3) * * 0.53 *
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 0.89 *
 *

 **

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Fssso Della FERMA
 REACH: 1 RS: 4.5*

INPUT

Description:

Station Elevation Data num= 8
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 436.09 11.57 435 14.56 433.41 16.06 432.27 17.33 432.35
 19.54 432.56 22.95 434.82 38.02 435.46

Manning's n Values num= 3

Sta n Val Sta n Val Sta n Val

 0 .04 11.57 .035 22.95 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 11.57 22.95 20 20 20 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

FOSSODELLAFERMA.rep

```

*****
**
* E.G. Elev (m)      * 436.39 * Element          * Left OB * Channel * Right OB
* vel Head (m)      * 3.58  * wt. n-Val.      *         * 0.035  *
* W.S. Elev (m)     * 432.81 * Reach Len. (m)  * 20.00  * 20.00  * 20.00
* Crit W.S. (m)     * 433.42 * Flow Area (m2)  *         * 1.66   *
* E.G. Slope (m/m)  *0.358921 * Area (m2)       *         * 1.66   *
* Q Total (m3/s)    * 13.90  * Flow (m3/s)     *         * 13.90  *
* Top width (m)     * 4.57  * Top width (m)   *         * 4.57   *
* vel Total (m/s)   * 8.38  * Avg. vel. (m/s) *         * 8.38   *
* Max Chl Dpth (m) * 0.54  * Hydr. Depth (m) *         * 0.36   *
* Conv. Total (m3/s) * 23.2  * Conv. (m3/s)    *         * 23.2   *
* Length wtd. (m)  * 20.00 * Wetted Per. (m) *         * 4.84   *
* Min Ch El (m)    * 432.27 * Shear (N/m2)    *         * 1206.47 *
* Alpha            * 1.00  * Stream Power (N/m s) *         * 10114.62 *
* Frctn Loss (m)   * 0.82  * Cum Volume (1000 m3) *         * 0.46   *
* C & E Loss (m)   * 0.32  * Cum SA (1000 m2) *         * 0.78   *
*****
**

```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO DELLA FERMA
 REACH: 1 RS: 4

INPUT

Description:

Station Elevation Data		num= 8	
Sta	Elev	Sta	Elev
0	432.38	11.57	431.29
19.54	428.85	22.95	431.11
		14.56	429.7
		38.02	431.75
		16.06	428.56
		17.33	428.64

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.04	11.57	.035
		22.95	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	11.57	22.95		23.5	23.5	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m)      * 431.30 * Element          * Left OB * Channel * Right OB
* vel Head (m)      * 2.10  * wt. n-Val.      *         * 0.035  *
* W.S. Elev (m)     * 429.21 * Reach Len. (m)  * 23.50  * 23.50  * 23.50
* Crit W.S. (m)     * 429.71 * Flow Area (m2)  *         * 2.17   *
*****

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FOSSODELLAFERMA.rep

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*
* E.G. Slope (m/m)      *0.162381 * Area (m2)          *          * 2.17 *
*
* Q Total (m3/s)       * 13.90 * Flow (m3/s)        *          * 13.90 *
*
* Top width (m)        * 4.87 * Top width (m)      *          * 4.87 *
*
* Vel Total (m/s)      * 6.41 * Avg. Vel. (m/s)    *          * 6.41 *
*
* Max Chl Dpth (m)     * 0.65 * Hydr. Depth (m)    *          * 0.44 *
*
* Conv. Total (m3/s)   * 34.5 * Conv. (m3/s)       *          * 34.5 *
*
* Length wtd. (m)      * 23.50 * wetted Per. (m)    *          * 5.21 *
*
* Min Ch El (m)        * 428.56 * Shear (N/m2)       *          * 662.24 *
*
* Alpha                * 1.00 * Stream Power (N/m s) *          * 4248.08 *
*
* Frctn Loss (m)       * 4.64 * Cum Volume (1000 m3) *          * 0.43 *
*
* C & E Loss (m)       * 0.45 * Cum SA (1000 m2)   *          * 0.69 *
*

```

**

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fssso Della FERMA
REACH: 1 RS: 3.5*

INPUT

Description:

```

Station Elevation Data num= 13
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
*****
0 427.73 8.77 426.895 12.056 425.349 12.576 425.233 13.867 424.829
13.983 424.395 14.485 424.2 15.146 424.314 15.406 424.505 15.5 424.576
17.008 424.971 19.48 426.585 28.555 426.97

```

```

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
*****
0 .04 8.77 .035 19.48 .04

```

```

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
8.77 19.48 23.5 23.5 23.5 .1 .3

```

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m)      * 427.37 * Element          * Left OB * Channel * Right OB
*
* Vel Head (m)       * 2.21 * wt. n-Val.       *          * 0.035 *
*
* W.S. Elev (m)      * 425.15 * Reach Len. (m)   * 23.50 * 23.50 * 23.50
*
* Crit w.s. (m)      * 425.68 * Flow Area (m2)   *          * 2.11 *
*
* E.G. Slope (m/m)   *0.171946 * Area (m2)        *          * 2.11 *
*
* Q Total (m3/s)     * 13.90 * Flow (m3/s)      *          * 13.90 *
*
* Top width (m)      * 4.46 * Top width (m)    *          * 4.46 *
*
* Vel Total (m/s)    * 6.59 * Avg. Vel. (m/s)  *          * 6.59 *

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FOSSODELLAFERMA.rep

```

*
* Max Chl Dpth (m) * 0.95 * Hydr. Depth (m) * * 0.47 *
*
* Conv. Total (m3/s) * 33.5 * Conv. (m3/s) * * 33.5 *
*
* Length Wtd. (m) * 23.50 * Wetted Per. (m) * * 5.09 *
*
* Min Ch El (m) * 424.20 * Shear (N/m2) * * 699.38 *
*
* Alpha * 1.00 * Stream Power (N/m s) * * 4608.35 *
*
* Frctn Loss (m) * 3.93 * Cum Volume (1000 m3) * * 0.38 *
*
* C & E Loss (m) * 0.01 * Cum SA (1000 m2) * * 0.58 *

```

**

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO DELLA FERMA
REACH: 1 RS: 3

INPUT

Description:

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	423.08	5.97	422.5	9.96	420.78	12.16	420.73	12.3	419.93
12.91	419.84	13.32	420.01	13.54	420.5	16.01	422.06	19.09	422.19

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	5.97	.035	16.01	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
5.97 16.01 17 17 17 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m) * 423.04 * Element * Left OB * Channel * Right OB
*
* Vel Head (m) * 2.04 * wt. n-Val. * * 0.035 *
*
* W.S. Elev (m) * 421.01 * Reach Len. (m) * 17.00 * 17.00 * 17.00
*
* Crit W.S. (m) * 421.50 * Flow Area (m2) * * 2.20 *
*
* E.G. Slope (m/m) *0.192362 * Area (m2) * * 2.20 *
*
* Q Total (m3/s) * 13.90 * Flow (m3/s) * * 13.90 *
*
* Top width (m) * 4.90 * Top width (m) * * 4.90 *
*
* Vel Total (m/s) * 6.33 * Avg. Vel. (m/s) * * 6.33 *
*
* Max Chl Dpth (m) * 1.17 * Hydr. Depth (m) * * 0.45 *
*
* Conv. Total (m3/s) * 31.7 * Conv. (m3/s) * * 31.7 *
*
* Length Wtd. (m) * 17.00 * Wetted Per. (m) * * 6.13 *
*
* Min Ch El (m) * 419.84 * Shear (N/m2) * * 676.65 *
*
* Alpha * 1.00 * Stream Power (N/m s) * * 4280.64 *
*
* Frctn Loss (m) * 4.27 * Cum Volume (1000 m3) * * 0.33 *
*
* C & E Loss (m) * 0.05 * Cum SA (1000 m2) * * 0.47 *
*

```

**

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fssso Della FERMA
 REACH: 1 RS: 2.5*

INPUT

Description:

Station Elevation Data		num= 15		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	423.495	5.605	423.125	6.691	422.419	8.789	420.383	9.4	420.07
10.413	419.768	11.193	419.719	11.492	419.711	11.625	419.309	12.205	419.255
12.542	419.476	12.722	419.794	14.75	421.395	17.17	421.46	17.17	422.695

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	5.605	.035	14.75	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	5.605	14.75		17	17	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

**	*****					
* E.G. Elev (m)	* 421.36	* Element	* Left OB	* Channel	* Right OB	
* Vel Head (m)	* 0.83	* wt. n-Val.	* 0.035			
* W.S. Elev (m)	* 420.53	* Reach Len. (m)	* 17.00	* 17.00	* 17.00	
* Crit W.S. (m)	* 420.78	* Flow Area (m2)	* 3.45			
* E.G. Slope (m/m)	*0.041695	* Area (m2)	* 3.45			
* Q Total (m3/s)	* 13.90	* Flow (m3/s)	* 13.90			
* Top width (m)	* 5.03	* Top width (m)	* 5.03			
* Vel Total (m/s)	* 4.03	* Avg. Vel. (m/s)	* 4.03			
* Max Chl Dpth (m)	* 1.28	* Hydr. Depth (m)	* 0.69			
* Conv. Total (m3/s)	* 68.1	* Conv. (m3/s)	* 68.1			
* Length wtd. (m)	* 17.00	* wetted Per. (m)	* 6.01			
* Min Ch El (m)	* 419.26	* Shear (N/m2)	* 234.69			
* Alpha	* 1.00	* Stream Power (N/m s)	* 945.68			
* Frctn Loss (m)	* 1.32	* Cum Volume (1000 m3)	* 0.28			
* C & E Loss (m)	* 0.36	* Cum SA (1000 m2)	* 0.38			
**	*****					

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fssso Della FERMA
 REACH: 1 RS: 2

INPUT

Description:

Station Elevation Data		num= 10		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	423.91	5.24	423.75	6.27	422.83	8.26	419.71	9.8	418.78
10.54	418.7	11.5	418.67	13.49	420.73	15.25	420.73	15.25	423.2

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	5.24	.035	13.49	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	5.24	13.49		10	10	.3	.5
Ineffective Flow	num= 2						
Sta L	Sta R	Elev	Permanent				
0	8.26	424.13	T				
13.49	15.25	424.13	T				

CROSS SECTION OUTPUT Profile #Q Tr200

**	*****				
* E.G. Elev (m)	* 420.69	* Element	* Left OB	* Channel	* Right OB
* vel Head (m)	* 0.88	* wt. n-Val.	* 0.035	*	
* W.S. Elev (m)	* 419.80	* Reach Len. (m)	* 1.00	* 1.00	* 1.00
* Crit W.S. (m)	* 420.06	* Flow Area (m2)	* 3.34	*	
* E.G. Slope (m/m)	*0.037079	* Area (m2)	* 3.34	*	
* Q Total (m3/s)	* 13.90	* Flow (m3/s)	* 13.90	*	
* Top width (m)	* 4.39	* Top width (m)	* 4.39	*	
* vel Total (m/s)	* 4.16	* Avg. vel. (m/s)	* 4.16	*	
* Max chl Dpth (m)	* 1.13	* Hydr. Depth (m)	* 0.77	*	
* Conv. Total (m3/s)	* 72.2	* Conv. (m3/s)	* 72.2	*	
* Length wtd. (m)	* 1.00	* wetted Per. (m)	* 5.08	*	
* Min ch El (m)	* 418.67	* Shear (N/m2)	* 239.14	*	
* Alpha	* 1.00	* Stream Power (N/m s)	* 995.00	*	
* Frctn Loss (m)	* 0.67	* Cum volume (1000 m3)	* 0.22	*	
* C & E Loss (m)	* 0.01	* Cum SA (1000 m2)	* 0.30	*	
**	*****				

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

BRIDGE

RIVER: Fssso Della FERMA
 REACH: 1 RS: 1.75

INPUT

Description: Attraversamento S.R. 219
 Distance from Upstream XS = 1
 Deck/Roadway width = 8
 Weir Coefficient = 1.44

Upstream Deck/Roadway Coordinates

num= 9									
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	424.13		418		8.26	424.13		8.27	424.13
9.57	424.13		422.7		10.87	424.13		423	12.17
13.47	424.13		422		13.48	424.13		15.25	424.13

Upstream Bridge Cross Section Data

Station Elevation Data num= 10									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	423.91	5.24	423.75	6.27	422.83	8.26	419.71	9.8	418.78
10.54	418.7	11.5	418.67	13.49	420.73	15.25	420.73	15.25	423.2

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	5.24	.035	13.49	.04

Bank Sta: Left Right Coeff Contr. Expan.
 5.24 13.49 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 8.26 424.13 T
 13.49 15.25 424.13 T

Downstream Deck/Roadway Coordinates

num= 9									
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	424.13		418		8.26	424.13		8.27	424.13
9.57	424.13		422.7		10.87	424.13		423	12.17
13.47	424.13		422		13.48	424.13		15.25	424.13

Downstream Bridge Cross Section Data

Station Elevation Data num= 10									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	423.48	5.24	423.32	6.27	422.4	8.26	419.28	9.8	418.35
10.54	418.27	11.5	418.24	13.49	420.3	15.25	420.3	15.25	422.77

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	5.24	.035	13.49	.04

Bank Sta: Left Right Coeff Contr. Expan.
 5.24 13.49 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 8.26 424.13 T
 13.49 15.25 424.13 T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy
 Selected Low Flow Methods = Energy

High Flow Method

Pressure and Weir flow
 Submerged Inlet Cd =
 Submerged Inlet + Outlet Cd = .8
 Max Low Cord =

Additional Bridge Parameters

Add Friction component to Momentum
 Do not add weight component to Momentum
 Class B flow critical depth computations use critical depth

inside the bridge at the upstream end
 Criteria to check for pressure flow = Upstream water surface

BRIDGE OUTPUT Profile #Q Tr200

```

*****
* E.G. US. (m) * 420.69 * Element *Inside BR US *Inside BR DS *
* W.S. US. (m) * 419.80 * E.G. Elev (m) * 420.67 * 420.31 *
* Q Total (m3/s) * 13.90 * W.S. Elev (m) * 419.81 * 419.33 *
* Q Bridge (m3/s) * 13.90 * Crit W.S. (m) * 420.06 * 419.63 *
* Q Weir (m3/s) * * Max Chl Dpth (m) * 1.14 * 1.09 *
* Weir Sta Lft (m) * * Vel Total (m/s) * 4.11 * 4.39 *
* Weir Sta Rgt (m) * * Flow Area (m2) * 3.38 * 3.17 *
* Weir Submerg * * Froude # Chl * 1.73 * 1.93 *
* Weir Max Depth (m) * * Specif Force (m3) * 7.40 * 7.63 *
* Min El Weir Flow (m) * 424.13 * Hydr Depth (m) * 0.78 * 0.74 *
* Min El Prs (m) * 423.00 * W.P. Total (m) * 5.20 * 5.06 *
* Delta EG (m) * 420.69 * Conv. Total (m3/s) * 72.5 * 66.2 *
* Delta WS (m) * 0.41 * Top width (m) * 4.33 * 4.29 *
* BR Open Area (m2) * 17.49 * Frctn Loss (m) * 0.02 * 0.32 *
* BR Open Vel (m/s) * 4.39 * C & E Loss (m) * 0.20 * 0.04 *
* Coef of Q * * Shear Total (N/m2) * 234.45 * 270.54 *
* Br Sel Method *Energy only * Power Total (N/m s) * 963.95 * 1187.58 *
*****
  
```

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
 Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO DELLA FERMA
 REACH: 1 RS: 1.5

INPUT

Description:

Station Elevation Data		num= 10	
Sta	Elev	Sta	Elev
0	423.48	5.24	423.32
10.54	418.27	11.5	418.24

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.04	5.24	.035
		13.49	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	5.24	13.49		23.333	23.333	.3	.5

Ineffective Flow		num= 2	
Sta L	Sta R	Elev	Permanent
0	8.26	424.13	T
13.49	15.25	424.13	T

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
* E.G. Elev (m) * 420.23 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.84 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 419.39 * Reach Len. (m) * 23.33 * 23.33 * 23.33
* Crit W.S. (m) * 419.62 * Flow Area (m2) * * 3.42 *
* E.G. Slope (m/m) *0.034526 * Area (m2) * * 3.42 *
* Q Total (m3/s) * 13.90 * Flow (m3/s) * * 13.90 *
* Top width (m) * 4.42 * Top width (m) * * 4.42 *
*****
  
```

FOSSODELLAFERMA.rep

```

*
* Vel Total (m/s)      * 4.06 * Avg. Vel. (m/s)      *      * 4.06 *
* Max Chl Dpth (m)    * 1.15 * Hydr. Depth (m)     *      * 0.79 *
* Conv. Total (m3/s)  * 74.8 * Conv. (m3/s)        *      * 74.8 *
* Length Wtd. (m)     * 23.33 * Wetted Per. (m)     *      * 5.11 *
* Min Ch El (m)       * 418.24 * Shear (N/m2)        *      * 226.81 *
* Alpha                * 1.00 * Stream Power (N/m s) *      * 921.86 *
* Frctn Loss (m)      * 0.02 * Cum Volume (1000 m3) *      * 0.22 *
* C & E Loss (m)      * 0.24 * Cum SA (1000 m2)    *      * 0.30 *

```

**

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fssso Della FERMA
REACH: 1 RS: 1.33333*

INPUT

Description:

Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	422.607	8.38	422.193	9.526	421.29	11.741	418.65	13.455	417.597
14.208	417.358	14.278	417.279	14.457	417.087	15.347	416.98	15.87	417.264
18.933	419.913	20.107	419.913	20.107	421.56				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	8.38	.035	18.933	.038

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
8.38 18.933 23.333 23.333 23.333 .3 .5

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m)      * 419.22 * Element          * Left OB * Channel * Right OB
* Vel Head (m)       * 1.04 * wt. n-Val.      *      * 0.035 *
* W.S. Elev (m)      * 418.17 * Reach Len. (m)  * 23.33 * 23.33 * 23.33
* Crit W.S. (m)      * 418.50 * Flow Area (m2)  *      * 3.07 *
* E.G. Slope (m/m)   * 0.049767 * Area (m2)       *      * 3.07 *
* Q Total (m3/s)     * 13.90 * Flow (m3/s)     *      * 13.90 *
* Top width (m)      * 4.40 * Top width (m)   *      * 4.40 *
* Vel Total (m/s)    * 4.52 * Avg. Vel. (m/s) *      * 4.52 *
* Max Chl Dpth (m)   * 1.19 * Hydr. Depth (m) *      * 0.70 *
* Conv. Total (m3/s) * 62.3 * Conv. (m3/s)    *      * 62.3 *
* Length Wtd. (m)    * 23.33 * Wetted Per. (m) *      * 5.14 *
* Min Ch El (m)      * 416.98 * Shear (N/m2)    *      * 291.77 *

```

FOSSODELLAFERMA.rep

```

*
* Alpha * 1.00 * Stream Power (N/m s) * * 1319.76 *
*
* Frctn Loss (m) * 0.96 * Cum Volume (1000 m3) * * 0.14 *
*
* C & E Loss (m) * 0.06 * Cum SA (1000 m2) * * 0.19 *
*
*****
**

```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: FSSO DELLA FERMA
REACH: 1 RS: 1.16666*

INPUT

Description:

Station Elevation Data num= 13

Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 421.733 11.52 421.067 12.783 420.18 15.222 418.021 17.11 416.844
17.939 416.439 18.017 416.288 18.214 415.908 19.193 415.72 19.95 415.987
24.377 419.527 24.963 419.527 24.963 420.35

Manning's n Values num= 3

Sta n Val Sta n Val Sta n Val
0 .04 11.52 .035 24.377 .037

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
11.52 24.377 23.333 23.333 23.333 .3 .5

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m) * 418.03 * Element * Left OB * Channel * Right OB
*
* Vel Head (m) * 1.07 * wt. n-Val. * * 0.035 *
*
* W.S. Elev (m) * 416.96 * Reach Len. (m) * 23.33 * 23.33 * 23.33
*
* Crit W.S. (m) * 417.30 * Flow Area (m2) * * 3.03 *
*
* E.G. Slope (m/m) *0.051317 * Area (m2) * * 3.03 *
*
* Q Total (m3/s) * 13.90 * Flow (m3/s) * * 13.90 *
*
* Top width (m) * 4.24 * Top width (m) * * 4.24 *
*
* Vel Total (m/s) * 4.58 * Avg. Vel. (m/s) * * 4.58 *
*
* Max Chl Dpth (m) * 1.24 * Hydr. Depth (m) * * 0.72 *
*
* Conv. Total (m3/s) * 61.4 * Conv. (m3/s) * * 61.4 *
*
* Length Wtd. (m) * 23.33 * Wetted Per. (m) * * 5.09 *
*
* Min Ch El (m) * 415.72 * Shear (N/m2) * * 299.87 *
*
* Alpha * 1.00 * Stream Power (N/m s) * * 1374.36 *
*
* Frctn Loss (m) * 1.18 * Cum Volume (1000 m3) * * 0.07 *
*
* C & E Loss (m) * 0.01 * Cum SA (1000 m2) * * 0.09 *
*
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fsso Della FERMA
 REACH: 1 RS: 1

INPUT

Description:

Station Elevation Data		num= 7		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	420.86	14.66	419.94	21.67	415.52	21.97	414.73	23.04	414.46
24.03	414.71	29.82	419.14						

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	14.66	.035	29.82	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	14.66	29.82		0	0		.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

* E.G. Elev (m)	* 416.79	* Element	* Left OB	* Channel	* Right OB
* vel Head (m)	* 1.14	* wt. n-Val.	* 0.035		
* W.S. Elev (m)	* 415.65	* Reach Len. (m)			
* Crit W.S. (m)	* 416.02	* Flow Area (m2)	* 2.93		
* E.G. Slope (m/m)	*0.052502	* Area (m2)	* 2.93		
* Q Total (m3/s)	* 13.90	* Flow (m3/s)	* 13.90		
* Top width (m)	* 3.80	* Top width (m)	* 3.80		
* vel Total (m/s)	* 4.74	* Avg. Vel. (m/s)	* 4.74		
* Max Chl Dpth (m)	* 1.19	* Hydr. Depth (m)	* 0.77		
* Conv. Total (m3/s)	* 60.7	* Conv. (m3/s)	* 60.7		
* Length wtd. (m)		* wetted Per. (m)	* 4.76		
* Min Ch El (m)	* 414.46	* Shear (N/m2)	* 317.13		
* Alpha	* 1.00	* Stream Power (N/m s)	* 1502.98		
* Frctn Loss (m)	* 1.21	* Cum Volume (1000 m3)			
* C & E Loss (m)	* 0.02	* Cum SA (1000 m2)			

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

SUMMARY OF MANNING'S N VALUES

River:Fosso Della FERMA

Reach	River Sta.	n1	n2	n3
*1	* 5	* .04*	* .035*	* .04*
*1	* 4.5*	* .04*	* .035*	* .04*
*1	* 4	* .04*	* .035*	* .04*
*1	* 3.5*	* .04*	* .035*	* .04*
*1	* 3	* .04*	* .035*	* .04*
*1	* 2.5*	* .04*	* .035*	* .04*

FOSSODELLAFERMA.rep

*1	*	2	*	.04*	.035*	.04*
*1	*	1.75	*Bridge	*	*	*
*1	*	1.5	*	.04*	.035*	.04*
*1	*	1.33333*	*	.04*	.035*	.038*
*1	*	1.16666*	*	.04*	.035*	.037*
*1	*	1	*	.04*	.035*	.04*

SUMMARY OF REACH LENGTHS

River: Fsso Della FERMA

* Reach	* River Sta.	* Left	* Channel	* Right
1	5	20	20*	20*
1	4.5	20*	20*	20*
1	4	23.5	23.5*	23.5*
1	3.5	23.5*	23.5*	23.5*
1	3	17	17*	17*
1	2.5	17*	17*	17*
1	2	10	10*	10*
*1	1.75	*Bridge	*	*
1	1.5	23.333	23.333*	23.333*
1	1.33333	23.333*	23.333*	23.333*
1	1.16666	23.333*	23.333*	23.333*
1	1	0	0*	0*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Fsso Della FERMA

* Reach	* River Sta.	* Contr.	* Expan.
1	5	.1	.3*
1	4.5	.1*	.3*
1	4	.1	.3*
1	3.5	.1*	.3*
1	3	.1	.3*
1	2.5	.1*	.3*
1	2	.3	.5*
*1	1.75	*Bridge	*
1	1.5	.3	.5*
1	1.33333	.3*	.5*
*1	1.16666**	.3*	.5*
1	1	.1	.3*

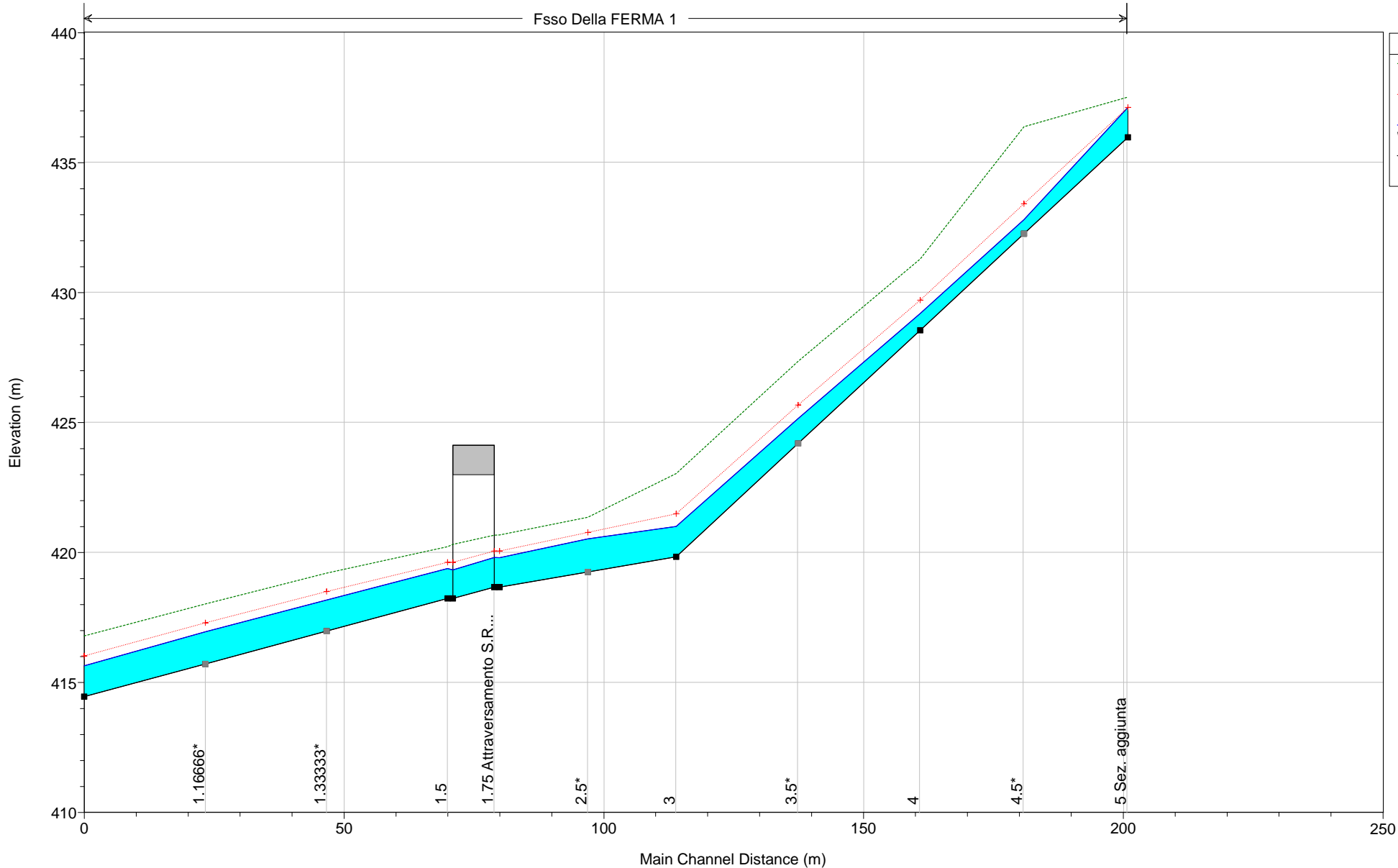
HEC-RAS Plan: Plan Tr200 River: Fssso Della FERMA Reach: 1 Profile: Q Tr200

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
1	5	Q Tr200	13.90	435.98	437.13	437.13	437.53	0.014810	2.78	4.99	6.31	1.00
1	4.5*	Q Tr200	13.90	432.27	432.81	433.42	436.39	0.358921	8.38	1.66	4.57	4.44
1	4	Q Tr200	13.90	428.56	429.21	429.71	431.30	0.162381	6.41	2.17	4.87	3.07
1	3.5*	Q Tr200	13.90	424.20	425.15	425.68	427.37	0.171946	6.59	2.11	4.46	3.06
1	3	Q Tr200	13.90	419.84	421.01	421.50	423.04	0.192362	6.33	2.20	4.90	3.02
1	2.5*	Q Tr200	13.90	419.26	420.53	420.78	421.36	0.041695	4.03	3.45	5.03	1.55
1	2	Q Tr200	13.90	418.67	419.80	420.06	420.69	0.037079	4.16	3.34	4.39	1.51
1	1.75		Bridge									
1	1.5	Q Tr200	13.90	418.24	419.39	419.62	420.23	0.034526	4.06	3.42	4.42	1.46
1	1.33333*	Q Tr200	13.90	416.98	418.17	418.50	419.22	0.049767	4.52	3.07	4.40	1.73
1	1.16666*	Q Tr200	13.90	415.72	416.96	417.30	418.03	0.051317	4.58	3.03	4.24	1.73
1	1	Q Tr200	13.90	414.46	415.65	416.02	416.79	0.052502	4.74	2.93	3.80	1.72

MACROAREA 08 Plan: Plan Tr200

Flow: Flow 01



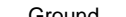

Fsso Della FERMA 1

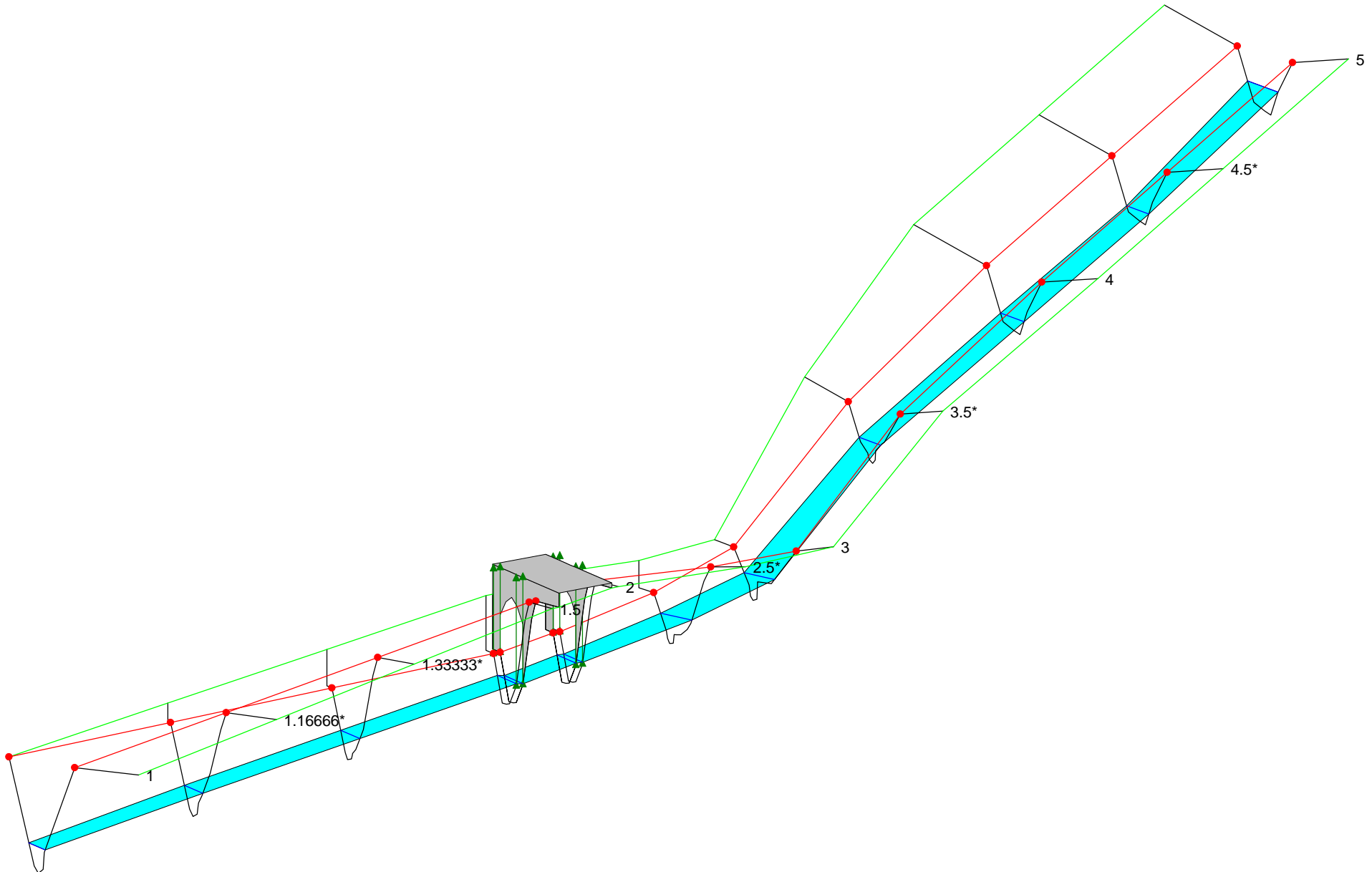


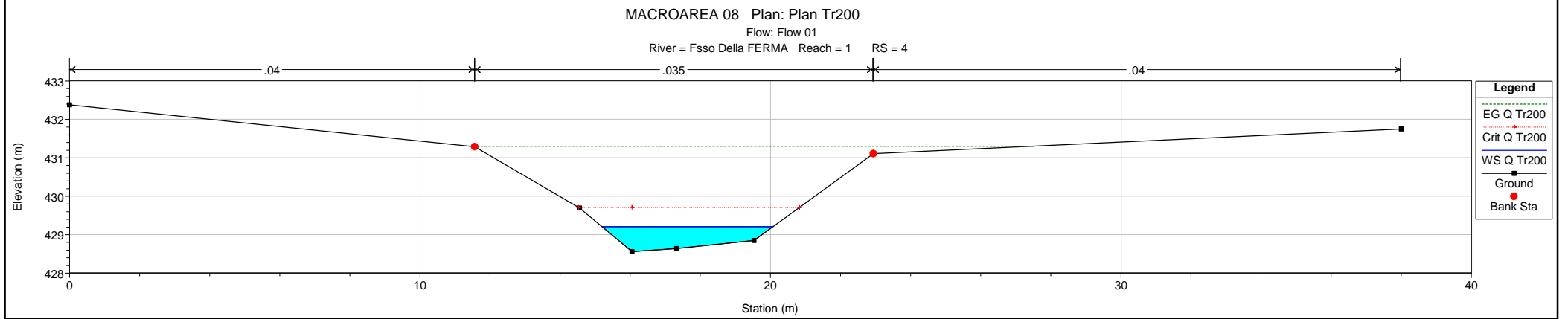
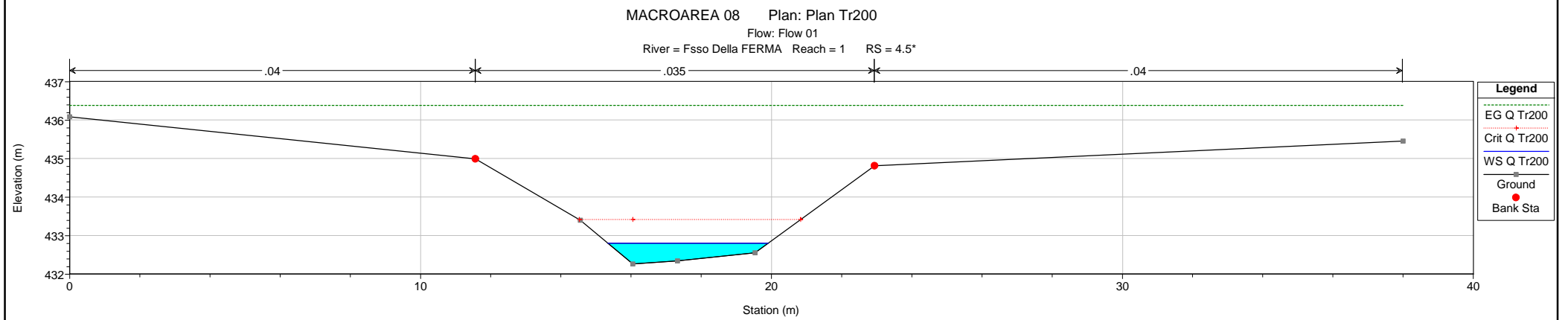
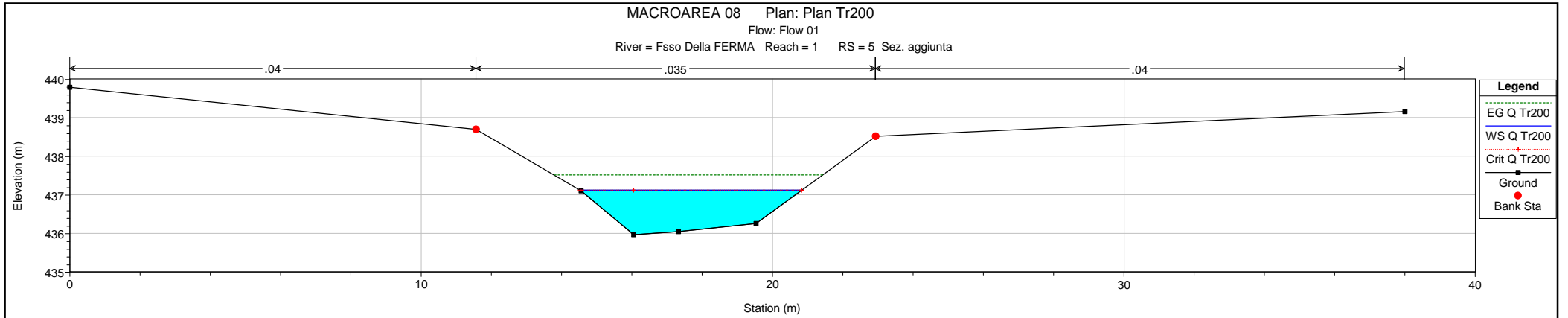
Legend

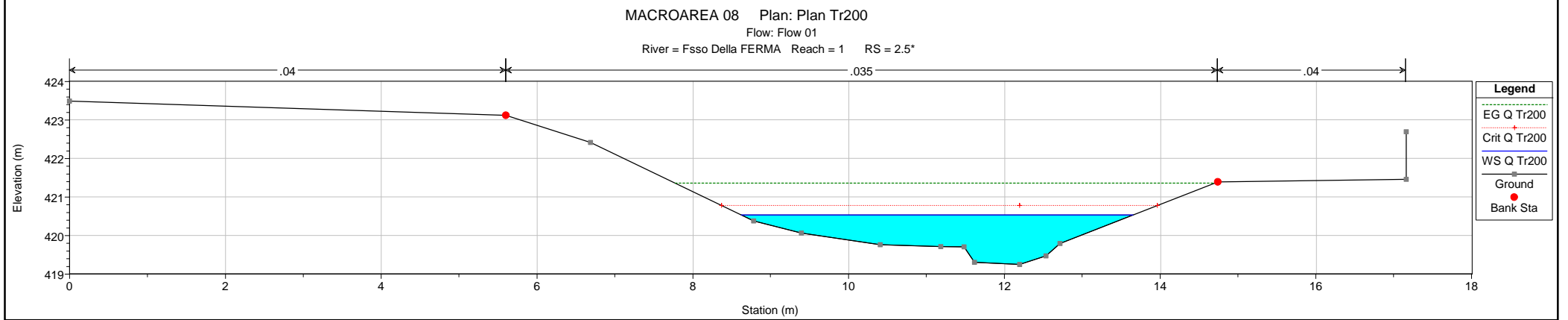
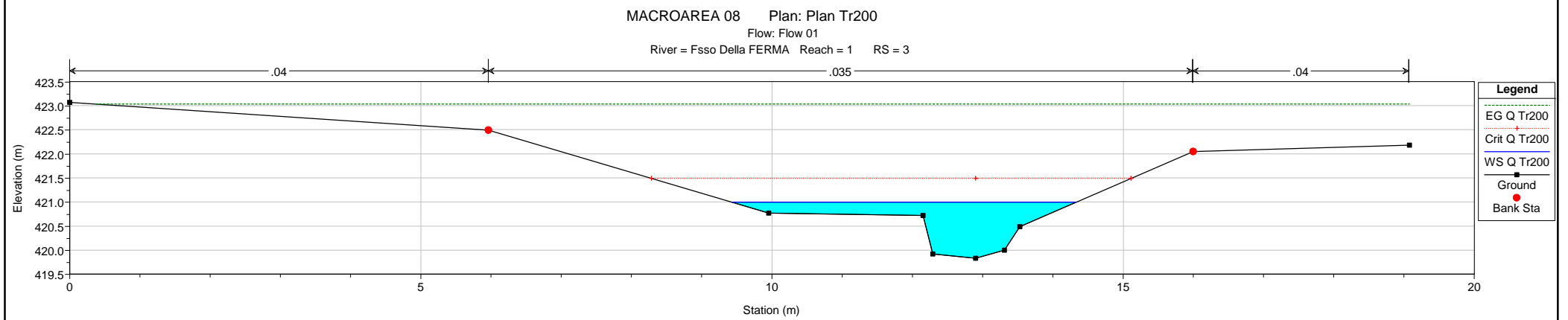
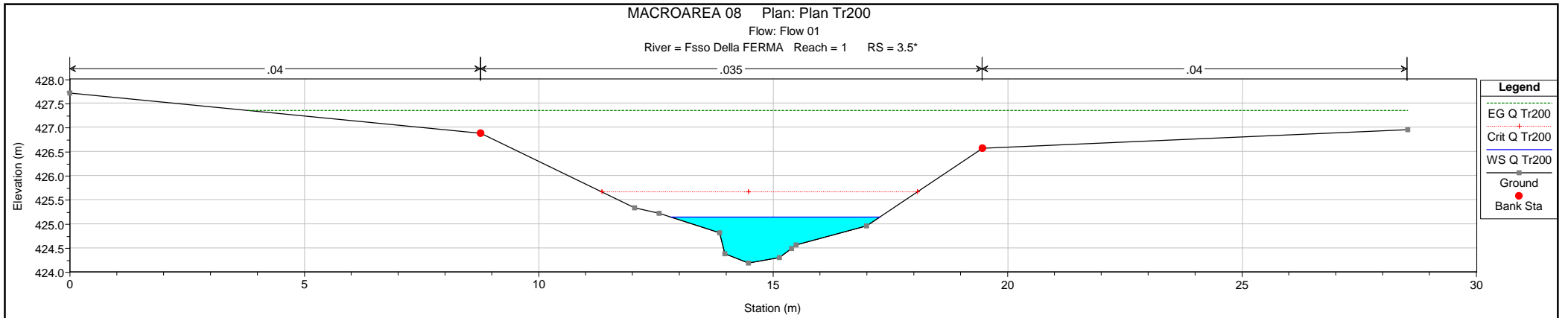
- EG Q Tr200 (Green dashed line)
- Crit Q Tr200 (Red dotted line with '+' markers)
- WS Q Tr200 (Blue solid line)
- Ground (Black solid line with square markers)

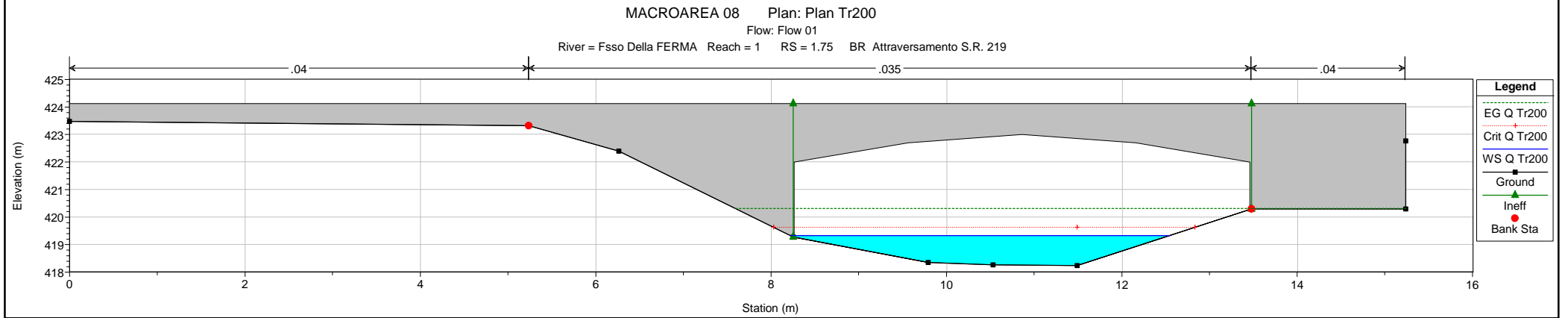
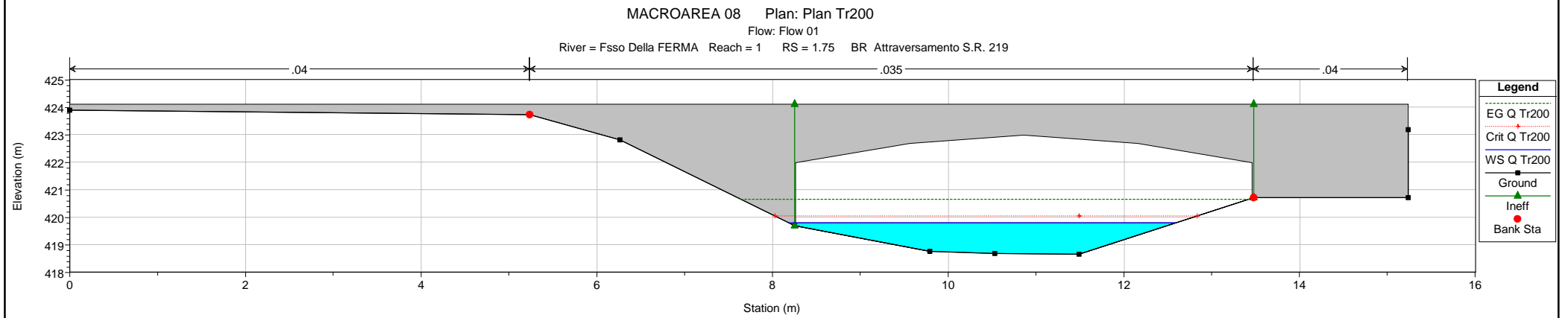
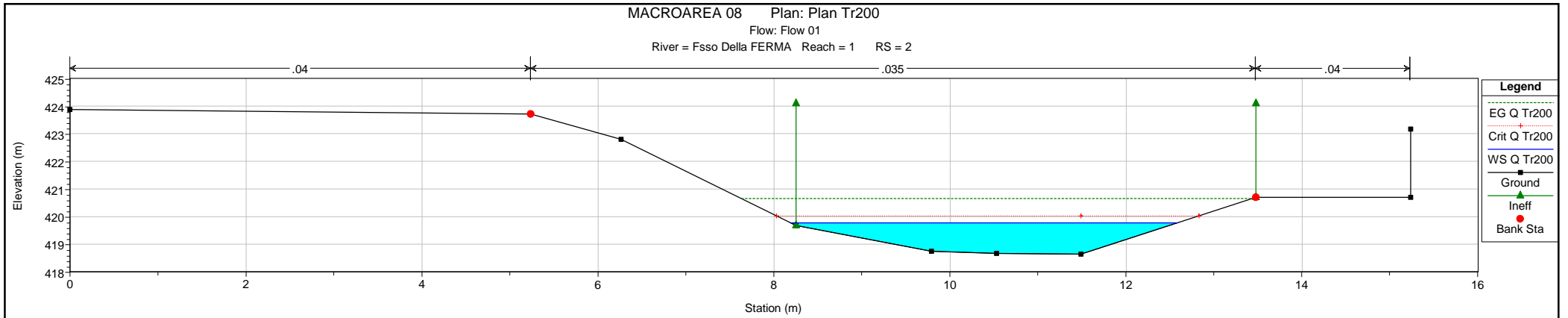
MACROAREA 08 Plan: Plan Tr200
Flow: Flow 01 FOSSO DELLA FERMA

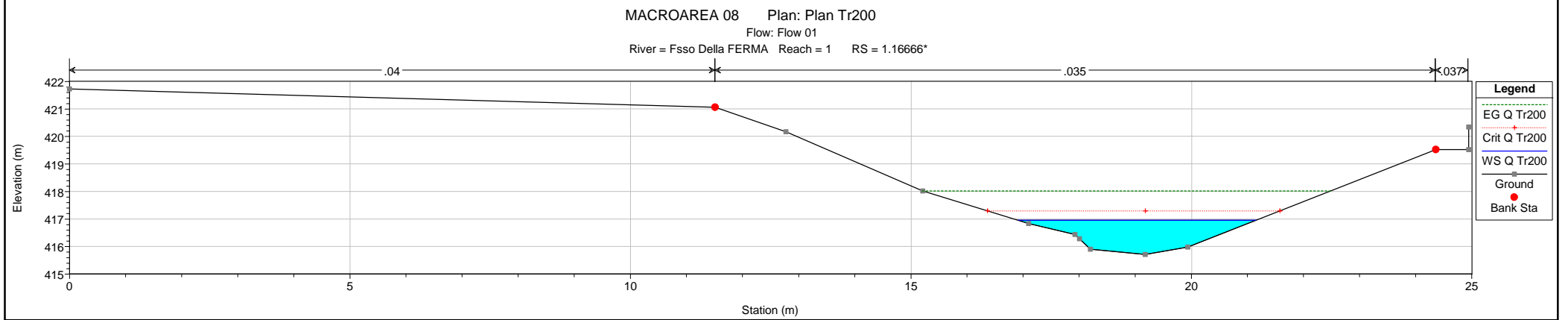
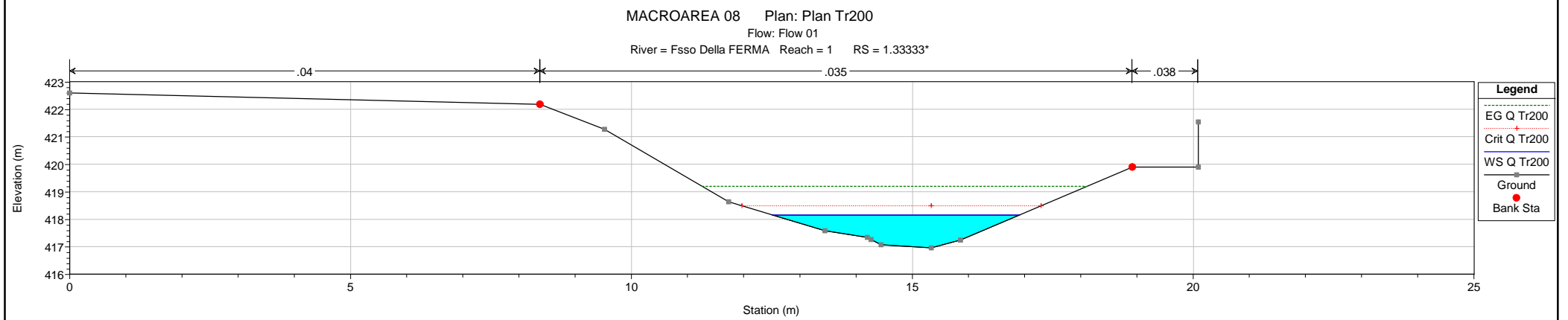
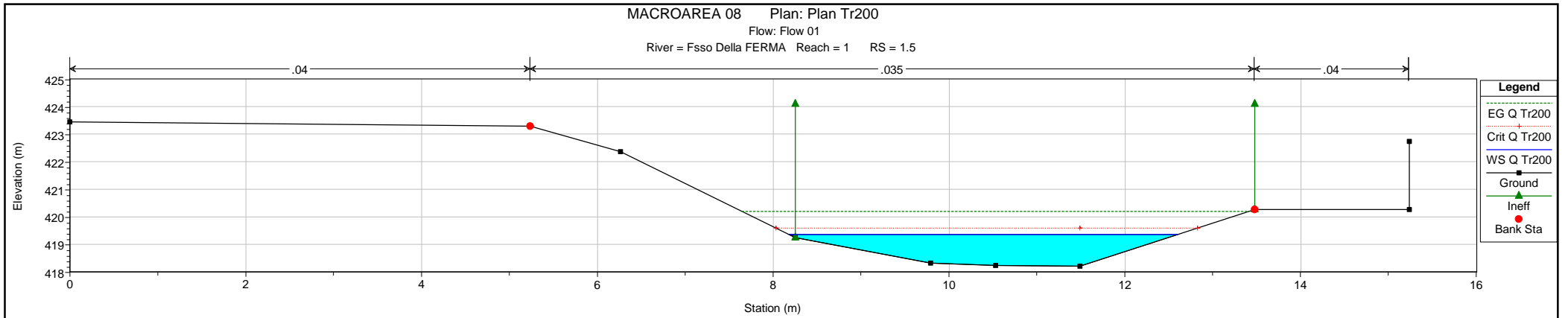
Legend	
	WS Q Tr200
	Bank Sta
	Ground
	Ineff

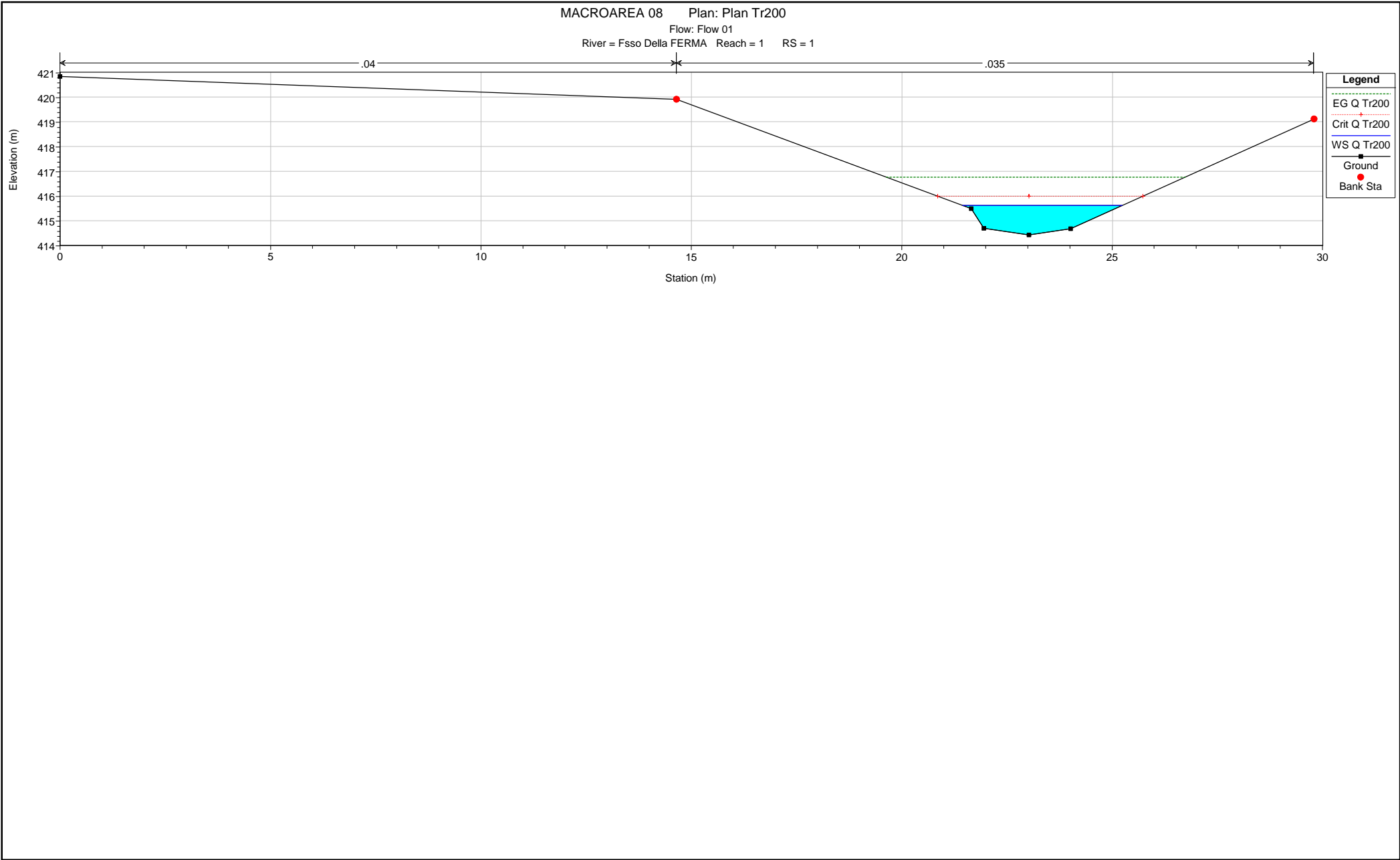












Gualdesi50.rep

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X      X  XXXXXX      XXXX      XXXX      XX      XXXX
X      X  X          X      X      X      X      X
X      X  X          X          X      X      X      X
XXXXXXXX XXXX      X          XXX XXXX      XXXXXX      XXXX
X      X  X          X          X      X      X      X
X      X  X          X      X      X      X      X
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PROJECT DATA

Project Title: MACROAREA 09 FOSSO GUALDESI-MIGLIAIOLO
Project File : Gualdesi50.prj
Run Date and Time: 24/11/2006 17.48.33

Project in SI units

Project Description:

verifica MACROAREA 10 FOSSO GUALDESI - MIGLIAIOLO

FLOW DATA

Flow Title: Flow Tr50

Flow File : n:\2006\06033\Integrazione\HEC_GUALDESI\HEC_Tr50\Gualdesi50.f01

Flow Data (m3/s)

```
*****
* River      Reach      RS      *      Q Tr50 *
* Fosso GUALDESI 1      5      *      13 *
*****
```

Boundary Conditions

```
*****
*****
* River      Reach      Profile      *      Upstream
Downstream *
*****
* Fosso GUALDESI 1      Q Tr50      *      Critical
Normal S = 0.096 *
*****
*****
```

GEOMETRY DATA

Geometry Title: FOSSO GUALDESI

Geometry File : n:\2006\06033\Integrazione\HEC_GUALDESI\HEC_Tr50\Gualdesi50.g01

CROSS SECTION

RIVER: Fosso GUALDESI

REACH: 1 RS: 5

INPUT

Description:

```
Station Elevation Data      num=      8
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
*****
0 410.77 6.91 410.63 15.2 410.27 19.18 407.69 20.69 407.22
21.8 407.59 23.02 409.15 29.21 413.48
*****
```

Manning's n Values

```
num=      3
Sta n Val Sta n Val Sta n Val
```

Gualdesi50.rep

 0 .04 15.2 .035 23.02 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 15.2 23.02 17.5 17.5 17.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 409.41 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.14 * wt. n-Val. * * 0.035 * 0.040
 * W.S. Elev (m) * 409.27 * Reach Len. (m) * 17.50 * 17.50 * 17.50
 * Crit w.S. (m) * 408.66 * Flow Area (m2) * * 7.84 * 0.01
 * E.G. Slope (m/m) *0.003249 * Area (m2) * * 7.84 * 0.01
 * Q Total (m3/s) * 13.00 * Flow (m3/s) * * 13.00 * 0.00
 * Top width (m) * 6.45 * Top width (m) * * 6.28 * 0.17
 * vel Total (m/s) * 1.66 * Avg. Vel. (m/s) * * 1.66 * 0.19
 * Max Chl Dpth (m) * 2.05 * Hydr. Depth (m) * * 1.25 * 0.06
 * Conv. Total (m3/s) * 228.1 * Conv. (m3/s) * * 228.0 * 0.0
 * Length wtd. (m) * 17.50 * wetted Per. (m) * * 7.64 * 0.21
 * Min Ch El (m) * 407.22 * Shear (N/m2) * * 32.71 * 1.58
 * Alpha * 1.00 * Stream Power (N/m s) * * 54.21 * 0.31
 * Frctn Loss (m) * 0.06 * Cum Volume (1000 m3) * * 1.11 * 0.00
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 1.06 * 0.00

 **

CROSS SECTION

RIVER: Fosso GUALDESI
 REACH: 1 RS: 4.83333*

INPUT

Description:

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	411.492	6.349	410.989	13.965	410.225	17.982	407.651	18.198	407.573
19.507	407.197	20.236	407.416	20.75	407.666	22.117	409.292	28.372	413.922

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	13.965	.035	22.117	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 13.965 22.117 17.5 17.5 17.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 409.35 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.14 * wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 409.22 * Reach Len. (m) * 17.50 * 17.50 * 17.50
 * Crit w.S. (m) * * Flow Area (m2) * * 7.92 *
 * E.G. Slope (m/m) *0.003265 * Area (m2) * * 7.92 *
 * Q Total (m3/s) * 13.00 * Flow (m3/s) * * 13.00 *

Gualdesi50.rep

```

*
* Top width (m) * 6.51 * Top width (m) * * 6.51 *
* Vel Total (m/s) * 1.64 * Avg. Vel. (m/s) * * 1.64 *
* Max Chl Dpth (m) * 2.02 * Hydr. Depth (m) * * 1.22 *
* Conv. Total (m3/s) * 227.5 * Conv. (m3/s) * * 227.5 *
* Length Wtd. (m) * 17.50 * Wetted Per. (m) * * 7.85 *
* Min Ch El (m) * 407.20 * Shear (N/m2) * * 32.29 *
* Alpha * 1.00 * Stream Power (N/m s) * * 53.02 *
* Frctn Loss (m) * 0.06 * Cum Volume (1000 m3) * * 0.97 *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 0.95 *

```

**

CROSS SECTION

RIVER: Fosso GUALDESI
REACH: 1 RS: 4.66666*

INPUT

Description:

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	412.213	5.787	411.347	12.73	410.18	16.785	407.612	17.002	407.522
18.323	407.173	19.131	407.395	19.7	407.742	21.213	409.434	27.533	414.363

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	12.73	.035	21.213	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
12.73 21.213 17.5 17.5 17.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m) * 409.30 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.14 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 409.16 * Reach Len. (m) * 17.50 * 17.50 * 17.50
* Crit W.S. (m) * * * Flow Area (m2) * * 7.95 *
* E.G. Slope (m/m) *0.003246 * Area (m2) * * 7.95 *
* Q Total (m3/s) * 13.00 * Flow (m3/s) * * 13.00 *
* Top width (m) * 6.63 * Top width (m) * * 6.63 *
* Vel Total (m/s) * 1.63 * Avg. Vel. (m/s) * * 1.63 *
* Max Chl Dpth (m) * 1.99 * Hydr. Depth (m) * * 1.20 *
* Conv. Total (m3/s) * 228.2 * Conv. (m3/s) * * 228.2 *
* Length Wtd. (m) * 17.50 * Wetted Per. (m) * * 7.90 *
* Min Ch El (m) * 407.17 * Shear (N/m2) * * 32.03 *
* Alpha * 1.00 * Stream Power (N/m s) * * 52.37 *
* Frctn Loss (m) * 0.06 * Cum Volume (1000 m3) * * 0.83 *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 0.84 *

```

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**

CROSS SECTION

RIVER: Fosso GUALDESI
 REACH: 1 RS: 4.5*

INPUT

Description:

Station Elevation Data		num= 10		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	412.935	5.226	411.706	11.495	410.135	15.587	407.573	15.807	407.472
17.14	407.15	18.025	407.373	18.65	407.818	20.31	409.576	26.695	414.805

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	11.495	.035	20.31	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	11.495	20.31		17.5	17.5		.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)          * 409.24 * Element          * Left OB * Channel * Right OB
* vel Head (m)          * 0.14 * wt. n-Val.      *         * 0.035 *
* W.S. Elev (m)        * 409.10 * Reach Len. (m)  * 17.50 * 17.50 * 17.50
* Crit W.S. (m)        *         * Flow Area (m2)  *         * 7.96 *
* E.G. Slope (m/m)     *0.003261 * Area (m2)       *         * 7.96 *
* Q Total (m3/s)       * 13.00 * Flow (m3/s)     *         * 13.00 *
* Top width (m)        * 6.72 * Top width (m)   *         * 6.72 *
* vel Total (m/s)      * 1.63 * Avg. Vel. (m/s) *         * 1.63 *
* Max Chl Dpth (m)    * 1.95 * Hydr. Depth (m) *         * 1.18 *
* Conv. Total (m3/s)  * 227.7 * Conv. (m3/s)    *         * 227.7 *
* Length wtd. (m)     * 17.50 * wetted Per. (m) *         * 7.94 *
* Min Ch El (m)       * 407.15 * Shear (N/m2)   *         * 32.03 *
* Alpha                * 1.00 * Stream Power (N/m s) *         * 52.33 *
* Frctn Loss (m)      * 0.06 * Cum Volume (1000 m3) *         * 0.69 *
* C & E Loss (m)      * 0.00 * Cum SA (1000 m2) *         * 0.72 *
*****
**
    
```

CROSS SECTION

RIVER: Fosso GUALDESI
 REACH: 1 RS: 4.33333*

INPUT

Description:

Station Elevation Data		num= 10		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	413.657	4.664	412.064	10.26	410.09	14.39	407.534	14.611	407.421
15.957	407.127	16.92	407.352	17.6	407.894	19.407	409.718	25.857	415.247

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	10.26	.035	19.407	.04		

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Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 10.26 19.407 17.5 17.5 17.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

```
*****
**
* E.G. Elev (m) * 409.18 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.14 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 409.04 * Reach Len. (m) * 17.50 * 17.50 * 17.50
* Crit W.S. (m) * * Flow Area (m2) * * 7.93 *
* E.G. Slope (m/m) *0.003311 * Area (m2) * * 7.93 *
* Q Total (m3/s) * 13.00 * Flow (m3/s) * * 13.00 *
* Top width (m) * 6.79 * Top width (m) * * 6.79 *
* Vel Total (m/s) * 1.64 * Avg. Vel. (m/s) * * 1.64 *
* Max Chl Dpth (m) * 1.92 * Hydr. Depth (m) * * 1.17 *
* Conv. Total (m3/s) * 225.9 * Conv. (m3/s) * * 225.9 *
* Length wtd. (m) * 17.50 * wetted Per. (m) * * 7.97 *
* Min Ch El (m) * 407.13 * Shear (N/m2) * * 32.30 *
* Alpha * 1.00 * Stream Power (N/m s) * * 52.93 *
* Frctn Loss (m) * 0.06 * Cum Volume (1000 m3) * * 0.55 *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 0.60 *
**
*****
```

CROSS SECTION

RIVER: Fosso GUALDESI
 REACH: 1 RS: 4.16666*

INPUT

Description:

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	414.378	4.103	412.423	9.025	410.045	13.192	407.495	13.416	407.371
14.773	407.103	15.815	407.331	16.55	407.97	18.503	409.86	25.018	415.688

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	9.025	.035	18.503	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 9.025 18.503 17.5 17.5 17.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

```
*****
**
* E.G. Elev (m) * 409.12 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.14 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 408.98 * Reach Len. (m) * 17.50 * 17.50 * 17.50
* Crit W.S. (m) * * Flow Area (m2) * * 7.88 *
* E.G. Slope (m/m) *0.003393 * Area (m2) * * 7.88 *
* Q Total (m3/s) * 13.00 * Flow (m3/s) * * 13.00 *
* Top width (m) * 6.84 * Top width (m) * * 6.84 *
**
*****
```

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```

*
* Vel Total (m/s)      * 1.65 * Avg. Vel. (m/s)      *      * 1.65 *
* Max Chl Dpth (m)    * 1.88 * Hydr. Depth (m)     *      * 1.15 *
* Conv. Total (m3/s)  * 223.2 * Conv. (m3/s)        *      * 223.2 *
* Length Wtd. (m)     * 17.50 * Wetted Per. (m)     *      * 7.99 *
* Min Ch El (m)       * 407.10 * Shear (N/m2)        *      * 32.82 *
* Alpha                * 1.00 * Stream Power (N/m s) *      * 54.14 *
* Frctn Loss (m)      * 0.06 * Cum Volume (1000 m3) *      * 0.42 *
* C & E Loss (m)      * 0.00 * Cum SA (1000 m2)    *      * 0.48 *

```

**

CROSS SECTION

RIVER: Fosso GUALDESI
REACH: 1 RS: 4

INPUT

Description:

Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	415.1	7.79	410	12.22	407.32	13.59	407.08	14.71	407.31
17.6	410.002	24.18	416.13						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	7.79	.035	17.6	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
7.79 17.6 8 8 8 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)      * 409.06 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 0.14 * wt. n-Val.      *      * 0.035 *
* W.S. Elev (m)     * 408.92 * Reach Len. (m)  * 8.00 * 8.00 * 8.00
* Crit W.S. (m)     *      * Flow Area (m2)  *      * 7.80 *
* E.G. Slope (m/m)  * 0.003517 * Area (m2)       *      * 7.80 *
* Q Total (m3/s)    * 13.00 * Flow (m3/s)     *      * 13.00 *
* Top width (m)     * 6.86 * Top width (m)   *      * 6.86 *
* Vel Total (m/s)   * 1.67 * Avg. Vel. (m/s) *      * 1.67 *
* Max Chl Dpth (m) * 1.84 * Hydr. Depth (m) *      * 1.14 *
* Conv. Total (m3/s) * 219.2 * Conv. (m3/s)    *      * 219.2 *
* Length Wtd. (m)  * 8.00 * Wetted Per. (m) *      * 7.99 *
* Min Ch El (m)    * 407.08 * Shear (N/m2)    *      * 33.66 *
* Alpha            * 1.00 * Stream Power (N/m s) *      * 56.13 *
* Frctn Loss (m)   * 0.04 * Cum Volume (1000 m3) *      * 0.28 *
* C & E Loss (m)   * 0.01 * Cum SA (1000 m2) *      * 0.36 *
*****
**

```

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso GUALDESI
REACH: 1 RS: 3

INPUT

Description:

Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	409.77	.01	407.93	1.27	407.12	2.11	407.08	3.79	407.15
3.88	409.77								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.035	3.88	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
0	3.88	10	10	10	.3	.5	

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m) * 409.01 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.26 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 408.74 * Reach Len. (m) * 1.00 * 1.00 * 1.00
* Crit W.S. (m) * 408.31 * Flow Area (m2) * * 5.70 *
* E.G. Slope (m/m) *0.007478 * Area (m2) * * 5.70 *
* Q Total (m3/s) * 13.00 * Flow (m3/s) * * 13.00 *
* Top width (m) * 3.84 * Top width (m) * * 3.84 *
* vel Total (m/s) * 2.28 * Avg. vel. (m/s) * * 2.28 *
* Max chl Dpth (m) * 1.66 * Hydr. Depth (m) * * 1.49 *
* Conv. Total (m3/s) * 150.3 * Conv. (m3/s) * * 150.3 *
* Length wtd. (m) * 1.00 * wetted Per. (m) * * 6.43 *
* Min ch El (m) * 407.08 * Shear (N/m2) * * 65.02 *
* Alpha * 1.00 * Stream Power (N/m s) * * 148.25 *
* Frctn Loss (m) * 0.01 * Cum volume (1000 m3) * * 0.22 *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 0.32 *
**
*****

```

BRIDGE

RIVER: Fosso GUALDESI
REACH: 1 RS: 2.5

INPUT

Description: Tombino su S.R. 219

Distance from Upstream XS = 1
 Deck/Roadway width = 8
 Weir Coefficient = 1.44
 Upstream Deck/Roadway Coordinates

num= 6

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord

Gualdesi50.rep

0 416.4 410 .01 416.4 409.78 .99 416.4 411.4
 1.99 416.4 412.08 2.98 416.4 411.4 3.88 416.4 409.78

Upstream Bridge Cross Section Data

Station Elevation Data num= 6
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 409.77 .01 407.93 1.27 407.12 2.11 407.08 3.79 407.15
 3.88 409.77

Manning's n Values

num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 0 .035 3.88 .04

Bank Sta: Left Right Coeff Contr. Expan.
 0 3.88 .3 .5

Downstream Deck/Roadway Coordinates

num= 6
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord

 0 416.4 410 .01 416.4 409.78 .99 416.4 411.4
 1.99 416.4 412.08 2.98 416.4 411.4 3.88 416.4 409.78

Downstream Bridge Cross Section Data

Station Elevation Data num= 6
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 409.77 .01 407.93 1.27 407.12 2.11 407.08 3.79 407.15
 3.88 409.77

Manning's n Values

num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 0 .035 3.88 .04

Bank Sta: Left Right Coeff Contr. Expan.
 0 3.88 .3 .5

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy
 Selected Low Flow Methods = Energy

High Flow Method

Pressure and Weir flow
 Submerged Inlet Cd =
 Submerged Inlet + Outlet Cd = .8
 Max Low Cord =

Additional Bridge Parameters

Add Friction component to Momentum
 Do not add weight component to Momentum
 Class B flow critical depth computations use critical depth
 inside the bridge at the upstream end
 Criteria to check for pressure flow = Upstream water surface

BRIDGE OUTPUT Profile #Q Tr50

 * E.G. US. (m) * 409.01 * Element *Inside BR US *Inside BR DS *
 * W.S. US. (m) * 408.74 * E.G. Elev (m) * 409.00 * 408.91 *
 * Q Total (m3/s) * 13.00 * W.S. Elev (m) * 408.73 * 408.57 *
 * Q Bridge (m3/s) * 13.00 * Crit W.S. (m) * 408.31 * 408.31 *
 * Q Weir (m3/s) * * Max Chl Dpth (m) * 1.65 * 1.49 *
 * weir Sta Lft (m) * * Vel Total (m/s) * 2.30 * 2.59 *
 * weir Sta Rgt (m) * * Flow Area (m2) * 5.66 * 5.02 *
 * weir Submerg * * Froude # Chl * 0.60 * 0.72 *
 * weir Max Depth (m) * * Specif Force (m3) * 7.34 * 6.84 *

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* Min El Weir Flow (m) *	416.40	* Hydr Depth (m) *	1.47	* 1.31 *
* Min El Prs (m) *	412.08	* W.P. Total (m) *	6.41	* 6.07 *
* Delta EG (m) *	0.17	* Conv. Total (m3/s) *	148.7	* 126.1 *
* Delta WS (m) *	0.43	* Top width (m) *	3.84	* 3.83 *
* BR Open Area (m2) *	15.12	* Frctn Loss (m) *	0.07	* 0.01 *
* BR Open Vel (m/s) *	2.59	* C & E Loss (m) *	0.02	* 0.06 *
* Coef of Q *		* Shear Total (N/m2) *	66.16	* 86.03 *
* Br Sel Method	*Energy only	* Power Total (N/m s) *	152.06	* 222.98 *

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso GUALDESI
 REACH: 1 RS: 2

INPUT

Description: Sez. aggiunta

Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	409.77	.01	407.93	1.27	407.12	2.11	407.08	3.79	407.15
3.88	409.77								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.035	3.88	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
0	3.88	16.5	16.5	16.5	.3	.5	

CROSS SECTION OUTPUT Profile #Q Tr50

* E.G. Elev (m) *	408.84	* Element *	Left OB	* Channel *	Right OB
* Vel Head (m) *	0.53	* wt. n-Val. *		* 0.035 *	
* W.S. Elev (m) *	408.31	* Reach Len. (m) *	16.50	* 16.50 *	16.50
* Crit W.S. (m) *	408.31	* Flow Area (m2) *		* 4.04 *	
* E.G. Slope (m/m) *	0.019482	* Area (m2) *		* 4.04 *	
* Q Total (m3/s) *	13.00	* Flow (m3/s) *		* 13.00 *	
* Top width (m) *	3.82	* Top width (m) *		* 3.82 *	
* Vel Total (m/s) *	3.22	* Avg. Vel. (m/s) *		* 3.22 *	
* Max Chl Dpth (m) *	1.23	* Hydr. Depth (m) *		* 1.06 *	
* Conv. Total (m3/s) *	93.1	* Conv. (m3/s) *		* 93.1 *	
* Length wtd. (m) *	16.50	* wetted Per. (m) *		* 5.56 *	
* Min Ch El (m) *	407.08	* Shear (N/m2) *		* 138.67 *	
* Alpha *	1.00	* Stream Power (N/m s) *		* 446.66 *	
* Frctn Loss (m) *	0.29	* Cum Volume (1000 m3) *		* 0.17 *	
* C & E Loss (m) *	0.07	* Cum SA (1000 m2) *		* 0.28 *	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

Warning: section. This may indicate the need for additional cross sections. During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Fosso GUALDESI
 REACH: 1 RS: 1.75*

INPUT

Description:

Station	Elevation	Data	num=	9	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	409.185	.02	407.797	2.551	406.14	4.237	405.41	5.222	405.515			
5.528	405.739	8.376	407.065	8.597	409.13	13.457	409.408					

Manning's n	Values	num=	3	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.036	8.597	.036				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
0	8.597	16.5	16.5	16.5	.1	.3	

CROSS SECTION OUTPUT Profile #Q Tr50

** E.G. Elev (m)	* 407.89	* Element	* Left OB	* Channel	* Right OB
* vel Head (m)	* 1.58	* wt. n-Val.	* 0.036		
* W.S. Elev (m)	* 406.31	* Reach Len. (m)	* 16.50	* 16.50	* 16.50
* Crit W.S. (m)	* 406.76	* Flow Area (m2)	* 2.34		
* E.G. Slope (m/m)	*0.107281	* Area (m2)	* 2.34		
* Q Total (m3/s)	* 13.00	* Flow (m3/s)	* 13.00		
* Top width (m)	* 4.48	* Top width (m)	* 4.48		
* vel Total (m/s)	* 5.56	* Avg. vel. (m/s)	* 5.56		
* Max chl Dpth (m)	* 0.90	* Hydr. Depth (m)	* 0.52		
* Conv. Total (m3/s)	* 39.7	* Conv. (m3/s)	* 39.7		
* Length wtd. (m)	* 16.50	* wetted Per. (m)	* 4.89		
* Min ch El (m)	* 405.41	* Shear (N/m2)	* 502.98		
* Alpha	* 1.00	* Stream Power (N/m s)	* 2798.01		
* Frctn Loss (m)	* 0.63	* Cum Volume (1000 m3)	* 0.12		
* C & E Loss (m)	* 0.31	* Cum SA (1000 m2)	* 0.21		

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

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RIVER: Fosso GUALDESI
 REACH: 1 RS: 1.5*

INPUT

Description:

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	408.6	.03	407.663	3.831	405.159	6.365	403.74	7.935	403.933
8.422	404.376	12.962	406.979	13.315	408.49	23.035	409.045		

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.038	13.315	.038		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	0	13.315		16.5	16.5		.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)          * 406.14 * Element          * Left OB * Channel * Right OB
* Vel Head (m)           * 1.46 * wt. n-Val.      *         * 0.038 *
* W.S. Elev (m)          * 404.68 * Reach Len. (m)  * 16.50 * 16.50 * 16.50
* Crit w.s. (m)          * 405.11 * Flow Area (m2)  *         * 2.43 *
* E.G. Slope (m/m)       *0.101386 * Area (m2)       *         * 2.43 *
* Q Total (m3/s)         * 13.00 * Flow (m3/s)     *         * 13.00 *
* Top width (m)          * 4.25 * Top width (m)   *         * 4.25 *
* Vel Total (m/s)        * 5.35 * Avg. Vel. (m/s) *         * 5.35 *
* Max Chl Dpth (m)       * 0.94 * Hydr. Depth (m) *         * 0.57 *
* Conv. Total (m3/s)     * 40.8 * Conv. (m3/s)    *         * 40.8 *
* Length wtd. (m)        * 16.50 * wetted Per. (m) *         * 4.75 *
* Min Ch El (m)          * 403.74 * Shear (N/m2)   *         * 507.76 *
* Alpha                  * 1.00 * Stream Power (N/m s) *         * 2718.41 *
* Frctn Loss (m)         * 1.72 * Cum Volume (1000 m3) *         * 0.08 *
* C & E Loss (m)         * 0.03 * Cum SA (1000 m2) *         * 0.14 *
**
*****
    
```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso GUALDESI
 REACH: 1 RS: 1.25*

INPUT

Description:

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	408.015	.04	407.53	5.112	404.179	8.493	402.07	10.647	402.352
11.316	403.013	17.547	406.894	18.032	407.85	32.612	408.682		

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.039	18.032	.039		

Gualdesi50.rep

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 18.032 16.5 16.5 16.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

```
*****
**
* E.G. Elev (m) * 404.42 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 1.47 * wt. n-Val. * * 0.039 *
* W.S. Elev (m) * 402.96 * Reach Len. (m) * 16.50 * 16.50 * 16.50
* Crit w.S. (m) * 403.40 * Flow Area (m2) * * 2.42 *
* E.G. Slope (m/m) *0.106085 * Area (m2) * * 2.42 *
* Q Total (m3/s) * 13.00 * Flow (m3/s) * * 13.00 *
* Top width (m) * 4.19 * Top width (m) * * 4.19 *
* Vel Total (m/s) * 5.36 * Avg. Vel. (m/s) * * 5.36 *
* Max Chl Dpth (m) * 0.89 * Hydr. Depth (m) * * 0.58 *
* Conv. Total (m3/s) * 39.9 * Conv. (m3/s) * * 39.9 *
* Length wtd. (m) * 16.50 * wetted Per. (m) * * 4.71 *
* Min Ch El (m) * 402.07 * Shear (N/m2) * * 535.39 *
* Alpha * 1.00 * Stream Power (N/m s) * * 2871.44 *
* Frctn Loss (m) * 1.71 * Cum Volume (1000 m3) * * 0.04 *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 0.07 *
*****
**
```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso GUALDESI
 REACH: 1 RS: 1

INPUT

Description:

Station Elevation Data num= 6
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 407.43 10.62 400.4 13.36 400.77 14.21 401.65 22.75 407.21
 42.19 408.32

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 0 .035 22.75 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 22.75 0 0 0 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

```
*****
**
* E.G. Elev (m) * 402.75 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 1.52 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 401.23 * Reach Len. (m) * * *
* Crit w.S. (m) * 401.67 * Flow Area (m2) * * 2.38 *
* E.G. Slope (m/m) *0.096154 * Area (m2) * * 2.38 *
*****
```

Gualdesi50.rep

```

*
* Q Total (m3/s)      * 13.00 * Flow (m3/s)      *      * 13.00 *
*
* Top width (m)      * 4.43 * Top width (m)    *      * 4.43 *
*
* Vel Total (m/s)    * 5.47 * Avg. Vel. (m/s)  *      * 5.47 *
*
* Max Chl Dpth (m)   * 0.83 * Hydr. Depth (m)  *      * 0.54 *
*
* Conv. Total (m3/s) * 41.9 * Conv. (m3/s)     *      * 41.9 *
*
* Length Wtd. (m)    *      * Wetted Per. (m)   *      * 4.90 *
*
* Min Ch El (m)      * 400.40 * Shear (N/m2)     *      * 457.47 *
*
* Alpha              * 1.00 * Stream Power (N/m s) *      * 2502.47 *
*
* Frctn Loss (m)     * 1.67 * Cum Volume (1000 m3) *      *      *
*
* C & E Loss (m)     * 0.01 * Cum SA (1000 m2)   *      *      *
*

```

**

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

SUMMARY OF MANNING'S N VALUES

River: Fosso GUALDESI

```

*****
* Reach * River Sta. * n1 * n2 * n3 *
*****
*1 * 5 * .04 * .035 * .04 *
*1 * 4.83333 * .04 * .035 * .04 *
*1 * 4.66666 * .04 * .035 * .04 *
*1 * 4.5 * .04 * .035 * .04 *
*1 * 4.33333 * .04 * .035 * .04 *
*1 * 4.16666 * .04 * .035 * .04 *
*1 * 4 * .04 * .035 * .04 *
*1 * 3 * .04 * .035 * .04 *
*1 * 2.5 * Bridge * * *
*1 * 2 * * .04 * .035 * .04 *
*1 * 1.75 * * .035 * .036 * .036 *
*1 * 1.5 * * .035 * .038 * .038 *
*1 * 1.25 * * .035 * .039 * .039 *
*1 * 1 * * .04 * .035 * .04 *
*****

```

SUMMARY OF REACH LENGTHS

River: Fosso GUALDESI

```

*****
* Reach * River Sta. * Left * Channel * Right *
*****
*1 * 5 * 17.5 * 17.5 * 17.5 *
*1 * 4.83333 * 17.5 * 17.5 * 17.5 *
*1 * 4.66666 * 17.5 * 17.5 * 17.5 *
*1 * 4.5 * 17.5 * 17.5 * 17.5 *
*1 * 4.33333 * 17.5 * 17.5 * 17.5 *
*1 * 4.16666 * 17.5 * 17.5 * 17.5 *
*1 * 4 * 8 * 8 * 8 *
*1 * 3 * 10 * 10 * 10 *
*1 * 2.5 * Bridge * * *
*1 * 2 * 16.5 * 16.5 * 16.5 *
*1 * 1.75 * 16.5 * 16.5 * 16.5 *
*1 * 1.5 * 16.5 * 16.5 * 16.5 *
*1 * 1.25 * 16.5 * 16.5 * 16.5 *
*1 * 1 * 0 * 0 * 0 *
*****

```

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
 River: Fosso GUALDESI

```

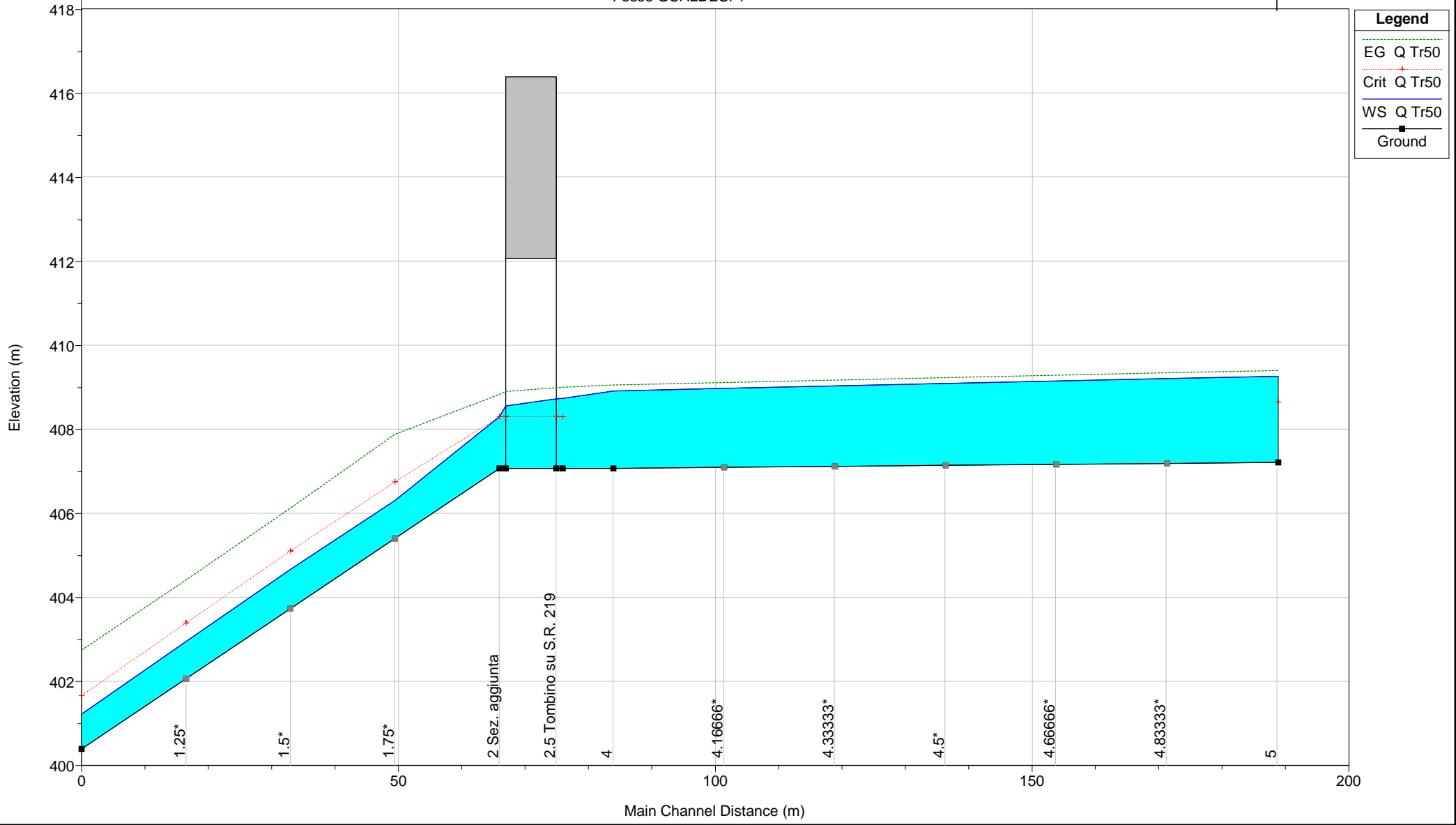
*****
*      Reach      *      River Sta.    *      Contr.    *      Expan.    *
*****
*1              *      5              *      .1*        *      .3*
*1              *      4.83333**      *      .1*        *      .3*
*1              *      4.66666**      *      .1*        *      .3*
*1              *      4.5*           *      .1*        *      .3*
*1              *      4.33333**      *      .1*        *      .3*
*1              *      4.16666**      *      .1*        *      .3*
*1              *      4              *      .1*        *      .3*
*1              *      3              *      .3*        *      .5*
*1              *      2.5           *      *Bridge      *      *
*1              *      2              *      .3*        *      .5*
*1              *      1.75*         *      .1*        *      .3*
*1              *      1.5*         *      .1*        *      .3*
*1              *      1.25*         *      .1*        *      .3*
*1              *      1              *      .1*        *      .3*
*****
  
```

HEC-RAS Plan: Tr50 River: Fosso GUALDESI Reach: 1 Profile: Q Tr50

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
1	5	Q Tr50	13.00	407.22	409.27	408.66	409.41	0.003249	1.66	7.85	6.45	0.47
1	4.833333*	Q Tr50	13.00	407.20	409.22		409.35	0.003265	1.64	7.92	6.51	0.48
1	4.666666*	Q Tr50	13.00	407.17	409.16		409.30	0.003246	1.63	7.95	6.63	0.48
1	4.5*	Q Tr50	13.00	407.15	409.10		409.24	0.003261	1.63	7.96	6.72	0.48
1	4.333333*	Q Tr50	13.00	407.13	409.04		409.18	0.003311	1.64	7.93	6.79	0.48
1	4.166666*	Q Tr50	13.00	407.10	408.98		409.12	0.003393	1.65	7.88	6.84	0.49
1	4	Q Tr50	13.00	407.08	408.92		409.06	0.003517	1.67	7.80	6.86	0.50
1	3	Q Tr50	13.00	407.08	408.74	408.31	409.01	0.007478	2.28	5.70	3.84	0.60
1	2.5		Bridge									
1	2	Q Tr50	13.00	407.08	408.31	408.31	408.84	0.019482	3.22	4.04	3.82	1.00
1	1.75*	Q Tr50	13.00	405.41	406.31	406.76	407.89	0.107281	5.56	2.34	4.48	2.46
1	1.5*	Q Tr50	13.00	403.74	404.68	405.11	406.14	0.101386	5.35	2.43	4.25	2.26
1	1.25*	Q Tr50	13.00	402.07	402.96	403.40	404.42	0.106085	5.36	2.42	4.19	2.25
1	1	Q Tr50	13.00	400.40	401.23	401.67	402.75	0.096154	5.47	2.38	4.43	2.38

MACROAREA 09 Plan: Tr50
Flow: Flow Tr50

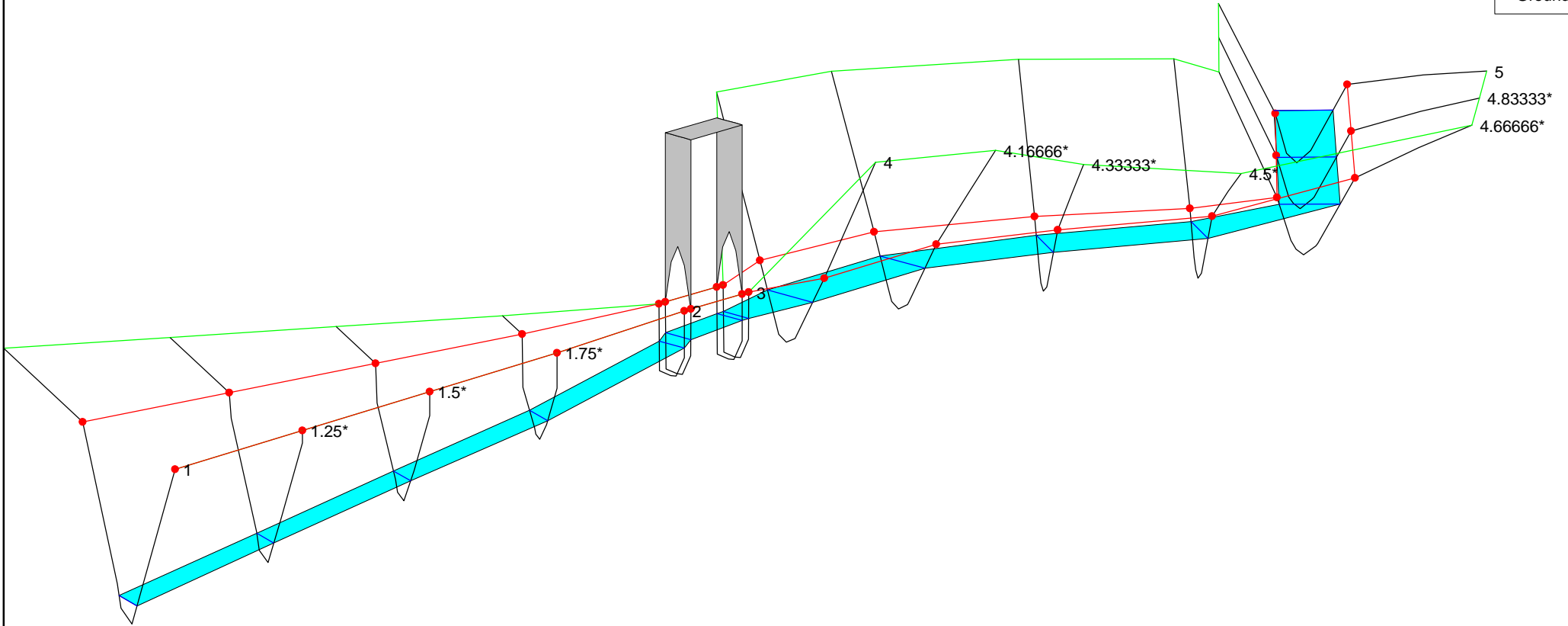
Fosso GUALDESI 1



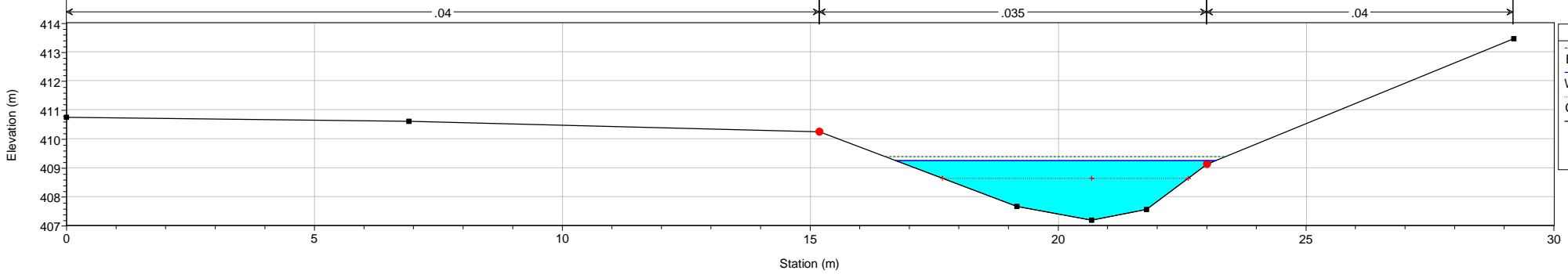
Tr50
Flow: Flow Tr50 FOSSO GUALDESI

Legend

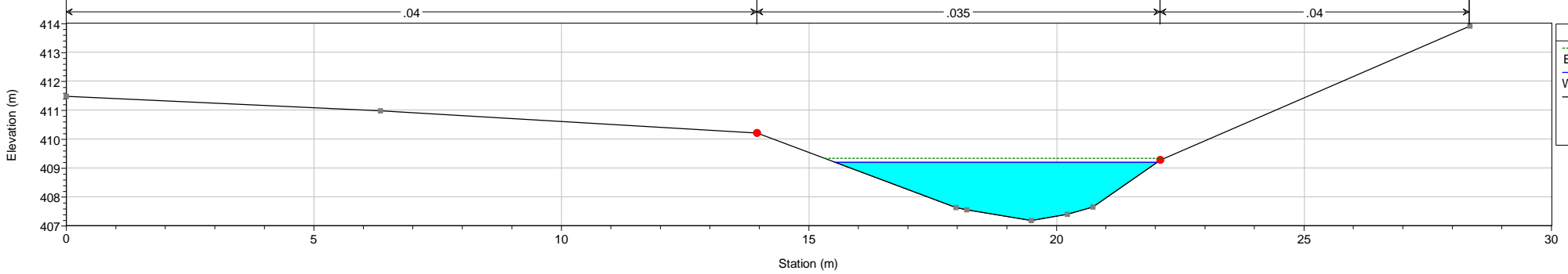
- WS Q Tr50
- Ground
- Bank Sta
- Ground



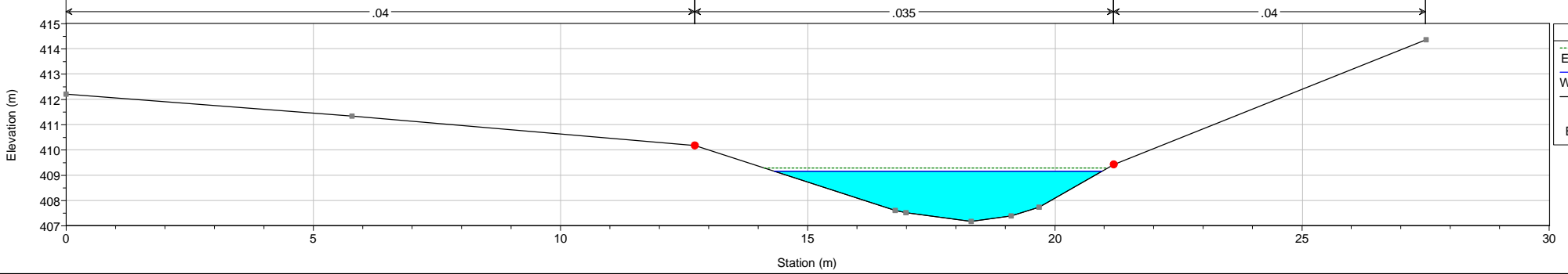
MACROAREA 09 Plan: Tr50
 Flow: Flow Tr50
 River = Fosso GUALDESI Reach = 1 RS = 5



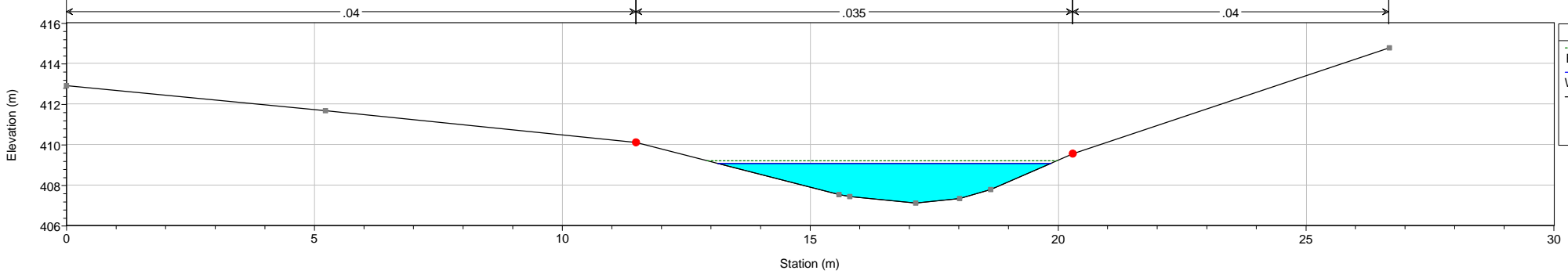
MACROAREA 09 Plan: Tr50
 Flow: Flow Tr50
 River = Fosso GUALDESI Reach = 1 RS = 4.83333*



MACROAREA 09 Plan: Tr50
 Flow: Flow Tr50
 River = Fosso GUALDESI Reach = 1 RS = 4.66666*

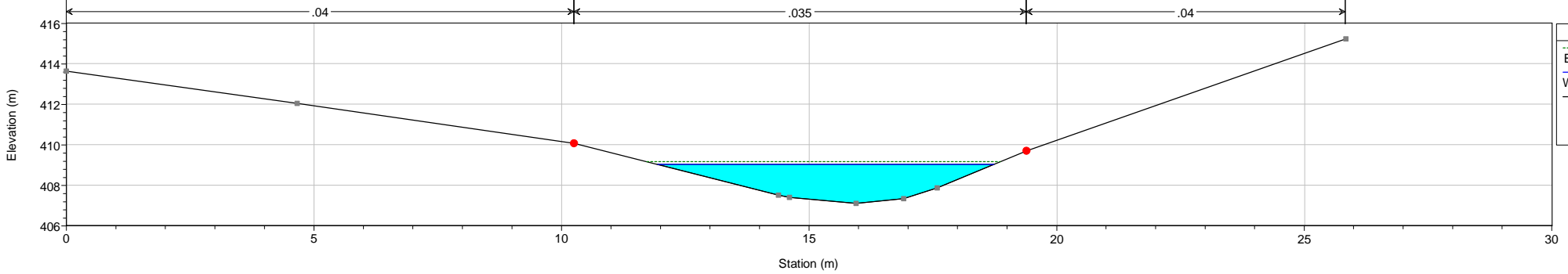


MACROAREA 09 Plan: Tr50
 Flow: Flow Tr50
 River = Fosso GUALDESI Reach = 1 RS = 4.5*



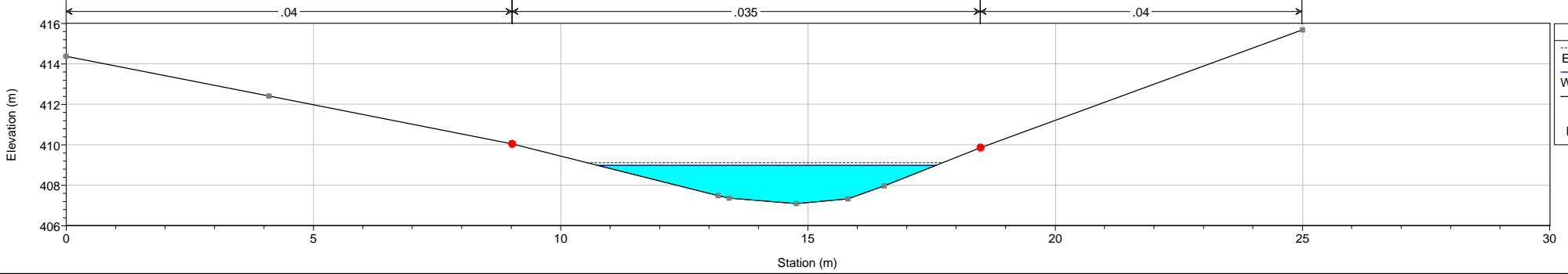
Legend
 EG Q Tr50
 WS Q Tr50
 Ground
 Bank Sta

MACROAREA 09 Plan: Tr50
 Flow: Flow Tr50
 River = Fosso GUALDESI Reach = 1 RS = 4.33333*



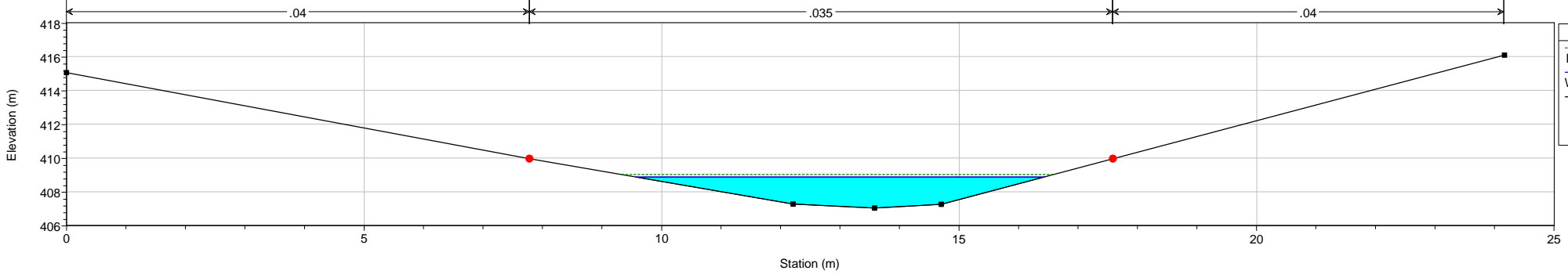
Legend
 EG Q Tr50
 WS Q Tr50
 Ground
 Bank Sta

MACROAREA 09 Plan: Tr50
 Flow: Flow Tr50
 River = Fosso GUALDESI Reach = 1 RS = 4.16666*

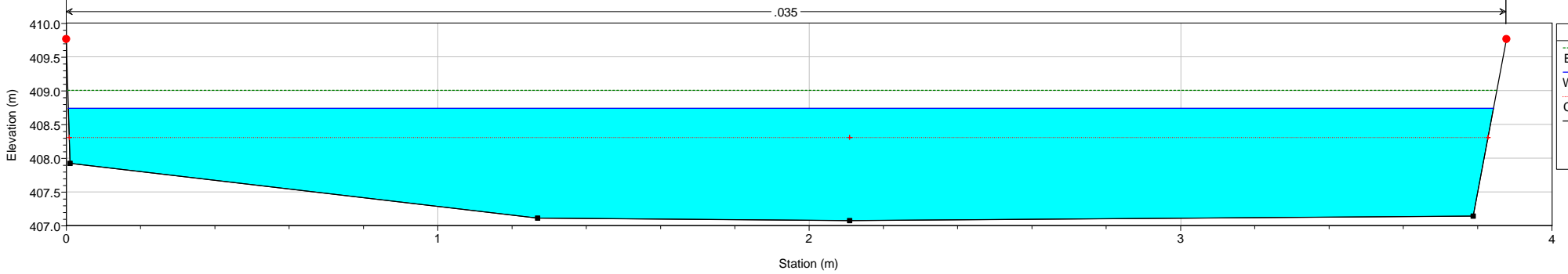


Legend
 EG Q Tr50
 WS Q Tr50
 Ground
 Bank Sta

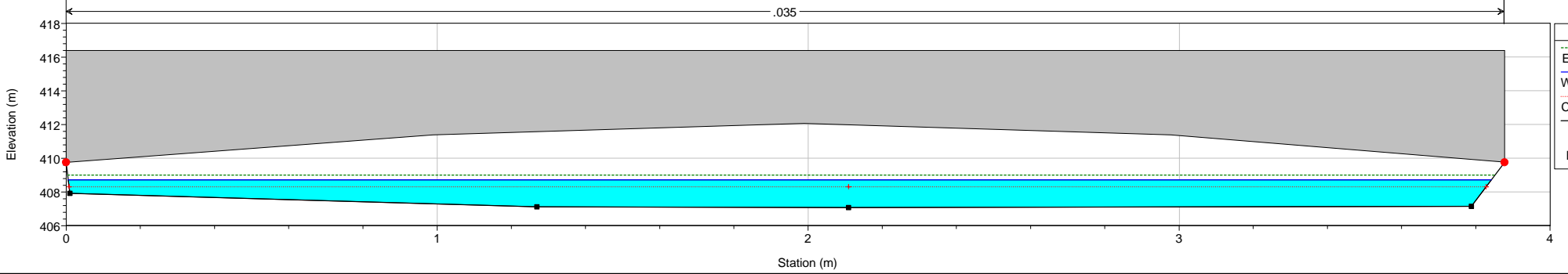
MACROAREA 09 Plan: Tr50
 Flow: Flow Tr50
 River = Fosso GUALDESI Reach = 1 RS = 4



MACROAREA 09 Plan: Tr50
 Flow: Flow Tr50
 River = Fosso GUALDESI Reach = 1 RS = 3



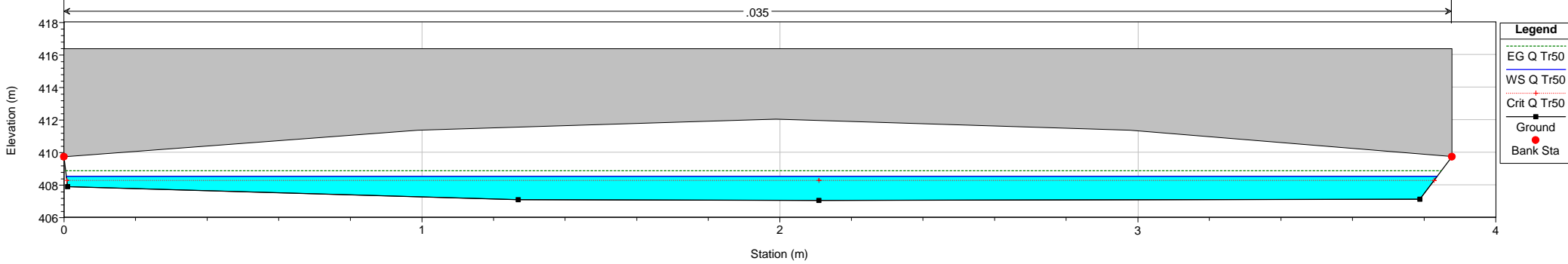
MACROAREA 09 Plan: Tr50
 Flow: Flow Tr50
 River = Fosso GUALDESI Reach = 1 RS = 2.5 BR Tombino su S.R. 219



MACROAREA 09 Plan: Tr50

Flow: Flow Tr50

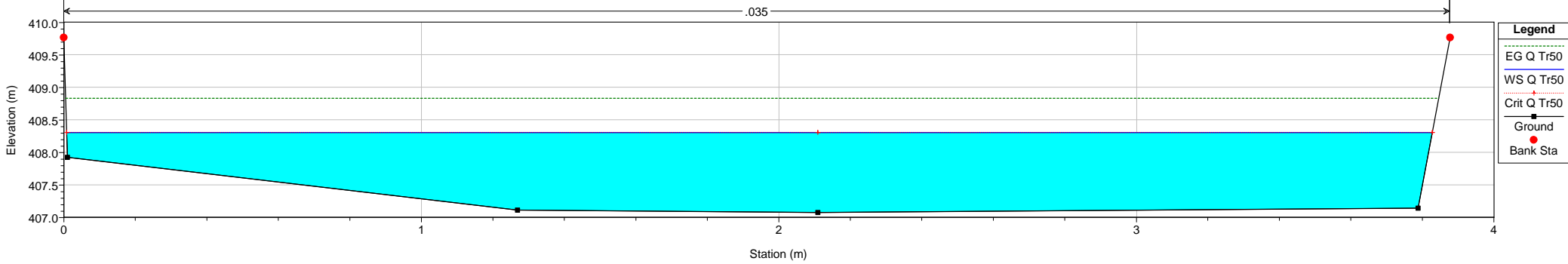
River = Fosso GUALDESI Reach = 1 RS = 2.5 BR Tombino su S.R. 219



MACROAREA 09 Plan: Tr50

Flow: Flow Tr50

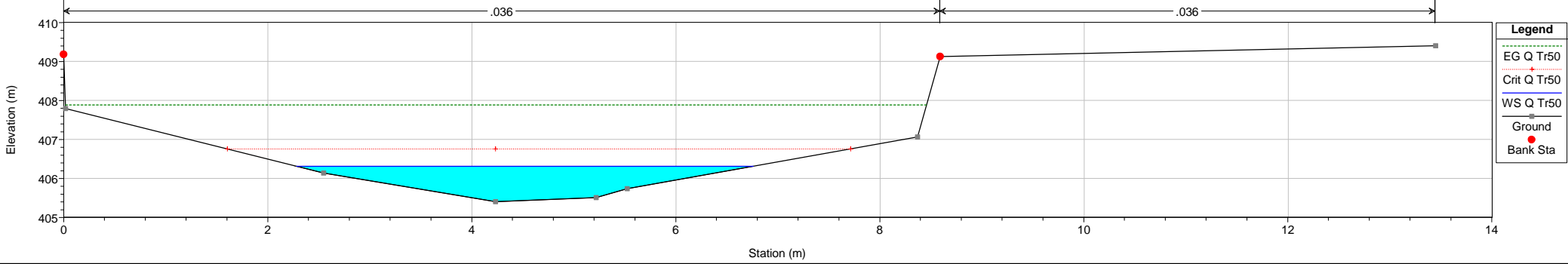
River = Fosso GUALDESI Reach = 1 RS = 2 Sez. aggiunta



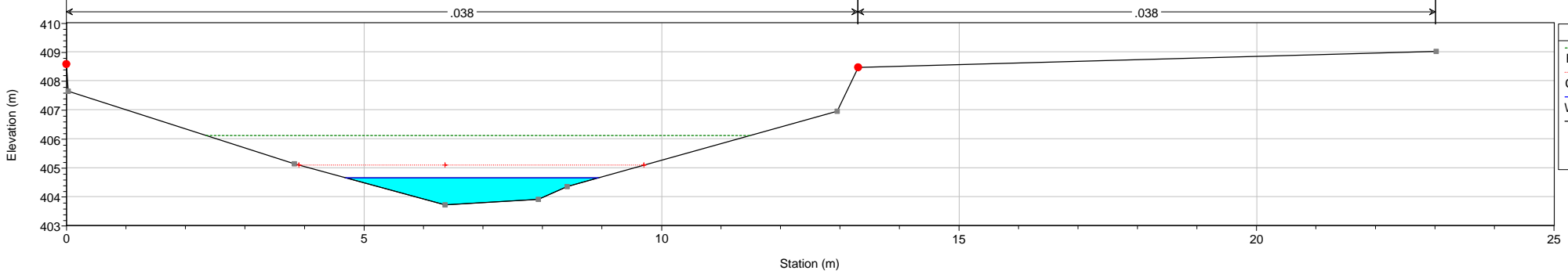
MACROAREA 09 Plan: Tr50

Flow: Flow Tr50

River = Fosso GUALDESI Reach = 1 RS = 1.75*

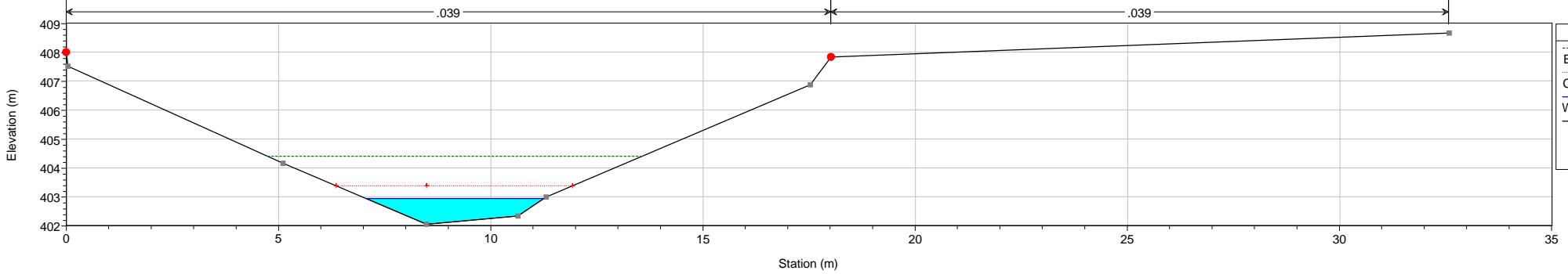


MACROAREA 09 Plan: Tr50
 Flow: Flow Tr50
 River = Fosso GUALDESI Reach = 1 RS = 1.5°



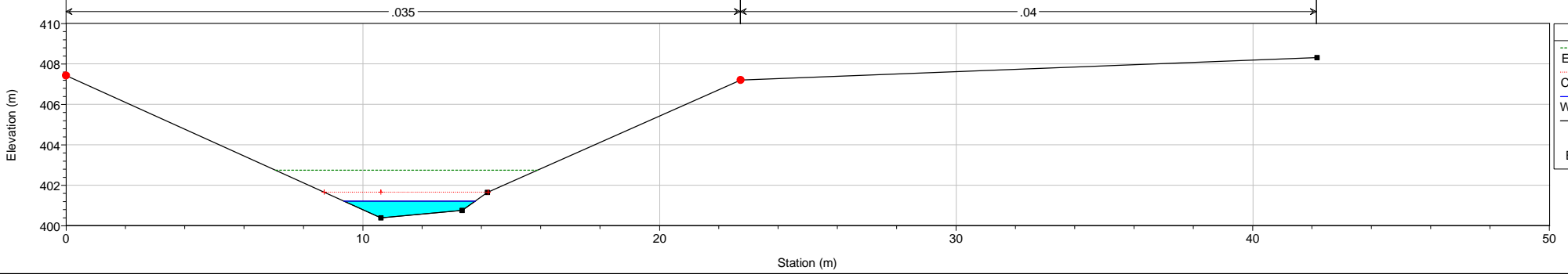
Legend
 EG Q Tr50
 Crit Q Tr50
 WS Q Tr50
 Ground
 Bank Sta

MACROAREA 09 Plan: Tr50
 Flow: Flow Tr50
 River = Fosso GUALDESI Reach = 1 RS = 1.25°



Legend
 EG Q Tr50
 Crit Q Tr50
 WS Q Tr50
 Ground
 Bank Sta

MACROAREA 09 Plan: Tr50
 Flow: Flow Tr50
 River = Fosso GUALDESI Reach = 1 RS = 1



Legend
 EG Q Tr50
 Crit Q Tr50
 WS Q Tr50
 Ground
 Bank Sta

GUALDESI.rep

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X      X  XXXXXX      XXXX      XXXX      XX      XXXX
X      X  X          X      X      X      X      X
X      X  X          X          X      X      X      X
XXXXXXXX XXXX      X          XXX XXXX      XXXXXX      XXXX
X      X  X          X          X      X      X      X
X      X  X          X      X      X      X      X
X      X  XXXXXX      XXXX      X      X      X      XXXXXX
```

PROJECT DATA

Project Title: MACROAREA 09 - FOSSO GUALDESI MIGLIAIOLO
Project File : GUALDESI.prj
Run Date and Time: 23/10/2006 10.23.46

Project in SI units

Project Description:

verifica MACROAREA 10 FOSSO GUALDESI - MIGLIAIOLO

FLOW DATA

Flow Title: Tr200
Flow File : n:\2006\06033\Integrazione\HEC_GUALDESI\GUALDESI.f01

Flow Data (m3/s)

* River Reach RS * Q Tr200 *
* Fosso GUALDESI 1 5 * 17.7 *

Boundary Conditions

* River Reach Profile * Upstream
Downstream *

* Fosso GUALDESI 1 Q Tr200 * Critical
Normal S = 0.096 *

GEOMETRY DATA

Geometry Title: FOSSO GUALDESI
Geometry File : n:\2006\06033\Integrazione\HEC_GUALDESI\GUALDESI.g01

CROSS SECTION

RIVER: Fosso GUALDESI
REACH: 1 RS: 5

INPUT

Description:

Station Elevation Data		num= 8							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	410.77	6.91	410.63	15.2	410.27	19.18	407.69	20.69	407.22
21.8	407.59	23.02	409.15	29.21	413.48				

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val

GUALDESI.rep

0 .04 15.2 .035 23.02 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 15.2 23.02 17.5 17.5 17.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

* E.G. Elev (m)	* 409.76	* Element	* Left OB	* Channel	* Right OB
* vel Head (m)	* 0.16	* wt. n-Val.	* 0.035	* 0.040	
* W.S. Elev (m)	* 409.60	* Reach Len. (m)	* 17.50	* 17.50	* 17.50
* Crit W.S. (m)	* 408.89	* Flow Area (m2)	* 9.99	* 0.14	
* E.G. Slope (m/m)	* 0.002957	* Area (m2)	* 9.99	* 0.14	
* Q Total (m3/s)	* 17.70	* Flow (m3/s)	* 17.64	* 0.06	
* Top width (m)	* 7.43	* Top width (m)	* 6.79	* 0.64	
* vel Total (m/s)	* 1.75	* Avg. Vel. (m/s)	* 1.77	* 0.44	
* Max Chl Dpth (m)	* 2.38	* Hydr. Depth (m)	* 1.47	* 0.22	
* Conv. Total (m3/s)	* 325.5	* Conv. (m3/s)	* 324.3	* 1.2	
* Length wtd. (m)	* 17.50	* wetted Per. (m)	* 8.24	* 0.78	
* Min Ch El (m)	* 407.22	* Shear (N/m2)	* 35.14	* 5.34	
* Alpha	* 1.02	* Stream Power (N/m s)	* 62.04	* 2.35	
* Frctn Loss (m)	* 0.05	* Cum Volume (1000 m3)	* 1.45	* 0.00	
* C & E Loss (m)	* 0.00	* Cum SA (1000 m2)	* 1.18	* 0.01	

CROSS SECTION

RIVER: Fosso GUALDESI
 REACH: 1 RS: 4.83333*

INPUT

Description:

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	411.492	6.349	410.989	13.965	410.225	17.982	407.651	18.198	407.573
19.507	407.197	20.236	407.416	20.75	407.666	22.117	409.292	28.372	413.922

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	13.965	.035	22.117	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 13.965 22.117 17.5 17.5 17.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

* E.G. Elev (m)	* 409.71	* Element	* Left OB	* Channel	* Right OB
* vel Head (m)	* 0.15	* wt. n-Val.	* 0.035	* 0.040	
* W.S. Elev (m)	* 409.55	* Reach Len. (m)	* 17.50	* 17.50	* 17.50
* Crit W.S. (m)	*	* Flow Area (m2)	* 10.21	* 0.05	
* E.G. Slope (m/m)	* 0.002907	* Area (m2)	* 10.21	* 0.05	
* Q Total (m3/s)	* 17.70	* Flow (m3/s)	* 17.69	* 0.01	

GUALDESI.rep

```

*
* Top width (m) * 7.45 * Top width (m) * * 7.10 * 0.35
* Vel Total (m/s) * 1.73 * Avg. Vel. (m/s) * * 1.73 * 0.30
* Max Chl Dpth (m) * 2.36 * Hydr. Depth (m) * * 1.44 * 0.13
* Conv. Total (m3/s) * 328.3 * Conv. (m3/s) * * 328.0 * 0.3
* Length Wtd. (m) * 17.50 * Wetted Per. (m) * * 8.57 * 0.44
* Min Ch El (m) * 407.20 * Shear (N/m2) * * 33.97 * 2.98
* Alpha * 1.01 * Stream Power (N/m s) * * 58.82 * 0.89
* Frctn Loss (m) * 0.05 * Cum Volume (1000 m3) * * 1.27 * 0.00
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 1.06 * 0.00

```

**

CROSS SECTION

RIVER: Fosso GUALDESI
REACH: 1 RS: 4.66666*

INPUT

Description:

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	412.213	5.787	411.347	12.73	410.18	16.785	407.612	17.002	407.522
18.323	407.173	19.131	407.395	19.7	407.742	21.213	409.434	27.533	414.363

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	12.73	.035	21.213	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
12.73 21.213 17.5 17.5 17.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m) * 409.65 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.15 * wt. n-Val. * * 0.035 * 0.040
* W.S. Elev (m) * 409.50 * Reach Len. (m) * 17.50 * 17.50 * 17.50
* Crit W.S. (m) * * * Flow Area (m2) * * 10.38 * 0.00
* E.G. Slope (m/m) *0.002908 * Area (m2) * * 10.38 * 0.00
* Q Total (m3/s) * 17.70 * Flow (m3/s) * * 17.70 * 0.00
* Top width (m) * 7.51 * Top width (m) * * 7.42 * 0.09
* Vel Total (m/s) * 1.70 * Avg. Vel. (m/s) * * 1.71 * 0.12
* Max Chl Dpth (m) * 2.33 * Hydr. Depth (m) * * 1.40 * 0.04
* Conv. Total (m3/s) * 328.3 * Conv. (m3/s) * * 328.2 * 0.0
* Length Wtd. (m) * 17.50 * Wetted Per. (m) * * 8.91 * 0.11
* Min Ch El (m) * 407.17 * Shear (N/m2) * * 33.21 * 0.79
* Alpha * 1.00 * Stream Power (N/m s) * * 56.63 * 0.10
* Frctn Loss (m) * 0.05 * Cum Volume (1000 m3) * * 1.09 * 0.00
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 0.93 * 0.00

```

GUALDESI.rep

**

CROSS SECTION

RIVER: Fosso GUALDESI
 REACH: 1 RS: 4.5*

INPUT

Description:

Station Elevation Data num= 10
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 412.935 5.226 411.706 11.495 410.135 15.587 407.573 15.807 407.472
 17.14 407.15 18.025 407.373 18.65 407.818 20.31 409.576 26.695 414.805

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 11.495 .035 20.31 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 11.495 20.31 17.5 17.5 17.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

 **
 * E.G. Elev (m) * 409.60 * Element * Left OB * Channel * Right OB
 * Vel Head (m) * 0.15 * wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 409.46 * Reach Len. (m) * 17.50 * 17.50 * 17.50
 * Crit W.S. (m) * * Flow Area (m2) * * 10.48 *
 * E.G. Slope (m/m) *0.002887 * Area (m2) * * 10.48 *
 * Q Total (m3/s) * 17.70 * Flow (m3/s) * * 17.70 *
 * Top width (m) * 7.62 * Top width (m) * * 7.62 *
 * Vel Total (m/s) * 1.69 * Avg. Vel. (m/s) * * 1.69 *
 * Max Chl Dpth (m) * 2.31 * Hydr. Depth (m) * * 1.38 *
 * Conv. Total (m3/s) * 329.4 * Conv. (m3/s) * * 329.4 *
 * Length wtd. (m) * 17.50 * wetted Per. (m) * * 9.09 *
 * Min Ch El (m) * 407.15 * Shear (N/m2) * * 32.65 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 55.12 *
 * Frctn Loss (m) * 0.05 * Cum Volume (1000 m3) * * 0.91 *
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 0.80 *
 *

 **

CROSS SECTION

RIVER: Fosso GUALDESI
 REACH: 1 RS: 4.33333*

INPUT

Description:

Station Elevation Data num= 10
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 413.657 4.664 412.064 10.26 410.09 14.39 407.534 14.611 407.421
 15.957 407.127 16.92 407.352 17.6 407.894 19.407 409.718 25.857 415.247

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 10.26 .035 19.407 .04

GUALDESI.rep

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 10.26 19.407 17.5 17.5 17.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m) * 409.55 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.14 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 409.41 * Reach Len. (m) * 17.50 * 17.50 * 17.50
* Crit w.S. (m) * * * Flow Area (m2) * * 10.56 *
* E.G. Slope (m/m) *0.002848 * Area (m2) * * 10.56 *
* Q Total (m3/s) * 17.70 * Flow (m3/s) * * 17.70 *
* Top width (m) * 7.73 * Top width (m) * * 7.73 *
* Vel Total (m/s) * 1.68 * Avg. Vel. (m/s) * * 1.68 *
* Max Chl Dpth (m) * 2.28 * Hydr. Depth (m) * * 1.37 *
* Conv. Total (m3/s) * 331.7 * Conv. (m3/s) * * 331.7 *
* Length wtd. (m) * 17.50 * wetted Per. (m) * * 9.17 *
* Min Ch El (m) * 407.13 * Shear (N/m2) * * 32.17 *
* Alpha * 1.00 * Stream Power (N/m s) * * 53.90 *
* Frctn Loss (m) * 0.05 * Cum Volume (1000 m3) * * 0.72 *
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 0.67 *
**
*****
```

CROSS SECTION

RIVER: Fosso GUALDESI
 REACH: 1 RS: 4.16666*

INPUT

Description:

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	414.378	4.103	412.423	9.025	410.045	13.192	407.495	13.416	407.371
14.773	407.103	15.815	407.331	16.55	407.97	18.503	409.86	25.018	415.688

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	9.025	.035	18.503	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 9.025 18.503 17.5 17.5 17.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m) * 409.50 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.14 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 409.36 * Reach Len. (m) * 17.50 * 17.50 * 17.50
* Crit w.S. (m) * * * Flow Area (m2) * * 10.63 *
* E.G. Slope (m/m) *0.002821 * Area (m2) * * 10.63 *
* Q Total (m3/s) * 17.70 * Flow (m3/s) * * 17.70 *
* Top width (m) * 7.84 * Top width (m) * * 7.84 *
**
*****
```

GUALDESI.rep

```

*
* Vel Total (m/s)      * 1.67 * Avg. Vel. (m/s)      *      * 1.67 *
* Max Chl Dpth (m)    * 2.26 * Hydr. Depth (m)     *      * 1.36 *
* Conv. Total (m3/s)  * 333.3 * Conv. (m3/s)        *      * 333.3 *
* Length Wtd. (m)     * 17.50 * Wetted Per. (m)     *      * 9.25 *
* Min Ch El (m)       * 407.10 * Shear (N/m2)        *      * 31.80 *
* Alpha                * 1.00 * Stream Power (N/m s) *      * 52.96 *
* Frctn Loss (m)      * 0.05 * Cum Volume (1000 m3) *      * 0.54 *
* C & E Loss (m)      * 0.00 * Cum SA (1000 m2)    *      * 0.53 *

```

**

CROSS SECTION

RIVER: Fosso GUALDESI
REACH: 1 RS: 4

INPUT

Description:

Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	415.1	7.79	410	12.22	407.32	13.59	407.08	14.71	407.31
17.6	410.002	24.18	416.13						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	7.79	.035	17.6	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
7.79 17.6 8 8 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m)      * 409.45 * Element          * Left OB * Channel * Right OB
* Vel Head (m)       * 0.14  * wt. n-Val.      *      * 0.035 *
* W.S. Elev (m)      * 409.31 * Reach Len. (m)  * 8.00 * 8.00 * 8.00
* Crit W.S. (m)      *      * Flow Area (m2)  *      * 10.68 *
* E.G. Slope (m/m)   * 0.002803 * Area (m2)       *      * 10.68 *
* Q Total (m3/s)     * 17.70 * Flow (m3/s)     *      * 17.70 *
* Top width (m)      * 7.93  * Top width (m)   *      * 7.93 *
* Vel Total (m/s)    * 1.66  * Avg. Vel. (m/s) *      * 1.66 *
* Max Chl Dpth (m)   * 2.23  * Hydr. Depth (m) *      * 1.35 *
* Conv. Total (m3/s) * 334.3 * Conv. (m3/s)    *      * 334.3 *
* Length Wtd. (m)    * 8.00  * Wetted Per. (m) *      * 9.31 *
* Min Ch El (m)      * 407.08 * Shear (N/m2)    *      * 31.52 *
* Alpha              * 1.00  * Stream Power (N/m s) *      * 52.23 *
* Frctn Loss (m)     * 0.04  * Cum Volume (1000 m3) *      * 0.35 *
* C & E Loss (m)     * 0.02  * Cum SA (1000 m2) *      * 0.39 *

```

**

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso GUALDESI
 REACH: 1 RS: 3

INPUT

Description:

Station Elevation Data		num= 6		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	409.77	.01	407.93	1.27	407.12	2.11	407.08	3.79	407.15
3.88	409.77								

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.035	3.88	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	3.88		10	10	.3	.5

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m)          * 409.40 * Element          * Left OB * Channel * Right OB
* Vel Head (m)          * 0.33 * wt. n-Val.      *         * 0.035 *
* W.S. Elev (m)        * 409.06 * Reach Len. (m)  * 1.00 * 1.00 * 1.00
* Crit W.S. (m)        * 408.55 * Flow Area (m2)  *         * 6.92 *
* E.G. Slope (m/m)     * 0.008235 * Area (m2)       *         * 6.92 *
* Q Total (m3/s)       * 17.70 * Flow (m3/s)     *         * 17.70 *
* Top width (m)        * 3.85 * Top width (m)   *         * 3.85 *
* Vel Total (m/s)      * 2.56 * Avg. Vel. (m/s) *         * 2.56 *
* Max Chl Dpth (m)    * 1.98 * Hydr. Depth (m) *         * 1.80 *
* Conv. Total (m3/s)  * 195.0 * Conv. (m3/s)    *         * 195.0 *
* Length Wtd. (m)     * 1.00 * wetted Per. (m) *         * 7.06 *
* Min Ch El (m)       * 407.08 * Shear (N/m2)   *         * 79.12 *
* Alpha                * 1.00 * Stream Power (N/m s) *         * 202.34 *
* Frctn Loss (m)      * 0.01 * Cum Volume (1000 m3) *         * 0.28 *
* C & E Loss (m)      * 0.00 * Cum SA (1000 m2) *         * 0.35 *
**
*****
```

BRIDGE

RIVER: Fosso GUALDESI
 REACH: 1 RS: 2.5

INPUT

Description: Tombino su S.R. 219
 Distance from Upstream XS = 1
 Deck/Roadway width = 8
 Weir Coefficient = 1.44
 Upstream Deck/Roadway Coordinates

GUALDESI.rep

```

num= 6
Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
*****
0 416.4 410 .01 416.4 409.78 .99 416.4 411.4
1.99 416.4 412.08 2.98 416.4 411.4 3.88 416.4 409.78
    
```

Upstream Bridge Cross Section Data

```

Station Elevation Data num= 6
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
*****
0 409.77 .01 407.93 1.27 407.12 2.11 407.08 3.79 407.15
3.88 409.77
    
```

Manning's n Values

```

num= 3
Sta n Val Sta n Val Sta n Val
*****
0 .04 0 .035 3.88 .04
    
```

```

Bank Sta: Left Right Coeff Contr. Expan.
0 3.88 .3 .5
    
```

Downstream Deck/Roadway Coordinates

```

num= 6
Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
*****
0 416.4 410 .01 416.4 409.78 .99 416.4 411.4
1.99 416.4 412.08 2.98 416.4 411.4 3.88 416.4 409.78
    
```

Downstream Bridge Cross Section Data

```

Station Elevation Data num= 6
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
*****
0 409.77 .01 407.93 1.27 407.12 2.11 407.08 3.79 407.15
3.88 409.77
    
```

Manning's n Values

```

num= 3
Sta n Val Sta n Val Sta n Val
*****
0 .04 0 .035 3.88 .04
    
```

```

Bank Sta: Left Right Coeff Contr. Expan.
0 3.88 .3 .5
    
```

```

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins =
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested
    
```

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

```

Energy
Selected Low Flow Methods = Energy
    
```

High Flow Method

```

Pressure and weir flow
Submerged Inlet Cd =
Submerged Inlet + Outlet Cd = .8
Max Low Cord =
    
```

Additional Bridge Parameters

```

Add Friction component to Momentum
Do not add weight component to Momentum
Class B flow critical depth computations use critical depth
inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream water surface
    
```

BRIDGE OUTPUT Profile #Q Tr200

```

*****
* E.G. US. (m) * 409.40 * Element *Inside BR US *Inside BR DS *
* W.S. US. (m) * 409.06 * E.G. Elev (m) * 409.39 * 409.28 *
* Q Total (m3/s) * 17.70 * W.S. Elev (m) * 409.05 * 408.86 *
* Q Bridge (m3/s) * 17.70 * Crit W.S. (m) * 408.55 * 408.55 *
* Q Weir (m3/s) * * Max Chl Dpth (m) * 1.97 * 1.78 *
* Weir Sta Lft (m) * * vel Total (m/s) * 2.58 * 2.88 *
    
```

```

GUALDESI.rep
* Weir Sta Rgt (m) * * * 6.87 * 6.14 *
* Weir Submerg * * * 0.62 * 0.73 *
* Weir Max Depth (m) * * * 10.91 * 10.24 *
* Min El Weir Flow (m) * 416.40 * Hydr Depth (m) * 1.78 * 1.60 *
* Min El Prs (m) * 412.08 * W.P. Total (m) * 7.04 * 6.66 *
* Delta EG (m) * 0.19 * Conv. Total (m3/s) * 193.0 * 166.3 *
* Delta WS (m) * 0.51 * Top Width (m) * 3.85 * 3.84 *
* BR Open Area (m2) * 15.12 * Frctn Loss (m) * 0.08 * 0.01 *
* BR Open Vel (m/s) * 2.88 * C & E Loss (m) * 0.03 * 0.07 *
* Coef of Q * * * Shear Total (N/m2) * 80.49 * 102.47 *
* Br Sel Method *Energy only * Power Total (N/m s) * 207.50 * 295.26 *
*****

```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso GUALDESI
 REACH: 1 RS: 2

INPUT

Description: Sez. aggiunta
 Station Elevation Data num= 6
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 409.77 .01 407.93 1.27 407.12 2.11 407.08 3.79 407.15
 3.88 409.77

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 0 .035 3.88 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 3.88 16.5 16.5 16.5 .3 .5

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m) * 409.20 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.65 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 408.55 * Reach Len. (m) * 16.50 * 16.50 * 16.50
* Crit W.S. (m) * 408.55 * Flow Area (m2) * * 4.96 *
* E.G. Slope (m/m) *0.020310 * Area (m2) * * 4.96 *
* Q Total (m3/s) * 17.70 * Flow (m3/s) * * 17.70 *
* Top width (m) * 3.83 * Top width (m) * * 3.83 *
* vel Total (m/s) * 3.57 * Avg. vel. (m/s) * * 3.57 *
* Max chl Dpth (m) * 1.47 * Hydr. Depth (m) * * 1.29 *
* Conv. Total (m3/s) * 124.2 * Conv. (m3/s) * * 124.2 *
* Length wtd. (m) * 16.50 * wetted Per. (m) * * 6.04 *
* Min ch El (m) * 407.08 * Shear (N/m2) * * 163.45 *
* Alpha * 1.00 * Stream Power (N/m s) * * 583.35 *
* Frctn Loss (m) * 0.29 * Cum volume (1000 m3) * * 0.22 *
* C & E Loss (m) * 0.10 * Cum SA (1000 m2) * * 0.31 *
*****
**

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the

calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Fosso GUALDESI
 REACH: 1 RS: 1.75*

INPUT

Description:

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	409.185	.02	407.797	2.551	406.14	4.237	405.41	5.222	405.515
5.528	405.739	8.376	407.065	8.597	409.13	13.457	409.408		

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.036	8.597	.036

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	8.597		16.5	16.5	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

**	*****					
* E.G. Elev (m)	* 408.23	* Element	* Left OB	* Channel	* Right OB	
* vel Head (m)	* 1.77	* wt. n-Val.	* 0.036			
* W.S. Elev (m)	* 406.45	* Reach Len. (m)	* 16.50	* 16.50	* 16.50	
* Crit W.S. (m)	* 406.96	* Flow Area (m2)	* 3.00			
* E.G. Slope (m/m)	* 0.100438	* Area (m2)	* 3.00			
* Q Total (m3/s)	* 17.70	* Flow (m3/s)	* 17.70			
* Top width (m)	* 4.99	* Top width (m)	* 4.99			
* vel Total (m/s)	* 5.90	* Avg. vel. (m/s)	* 5.90			
* Max Chl Dpth (m)	* 1.04	* Hydr. Depth (m)	* 0.60			
* Conv. Total (m3/s)	* 55.9	* Conv. (m3/s)	* 55.9			
* Length wtd. (m)	* 16.50	* wetted Per. (m)	* 5.48			
* Min ch El (m)	* 405.41	* Shear (N/m2)	* 539.86			
* Alpha	* 1.00	* Stream Power (N/m s)	* 3183.03			
* Frctn Loss (m)	* 0.64	* Cum Volume (1000 m3)	* 0.15			
* C & E Loss (m)	* 0.34	* Cum SA (1000 m2)	* 0.23			
**	*****					

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso GUALDESI
 REACH: 1 RS: 1.5*

INPUT

Description:

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	408.6	.03	407.663	3.831	405.159	6.365	403.74	7.935	403.933		
8.422	404.376	12.962	406.979	13.315	408.49	23.035	409.045				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.038	13.315	.038		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	13.315		16.5	16.5	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

* E.G. Elev (m)	* 406.54	* Element	* Left OB	* Channel	* Right OB
* vel Head (m)	* 1.72	* wt. n-Val.	*	* 0.038	*
* w.s. Elev (m)	* 404.81	* Reach Len. (m)	* 16.50	* 16.50	* 16.50
* Crit w.s. (m)	* 405.32	* Flow Area (m2)	*	* 3.04	*
* E.G. Slope (m/m)	* 0.102677	* Area (m2)	*	* 3.04	*
* Q Total (m3/s)	* 17.70	* Flow (m3/s)	*	* 17.70	*
* Top width (m)	* 4.73	* Top width (m)	*	* 4.73	*
* vel Total (m/s)	* 5.82	* Avg. Vel. (m/s)	*	* 5.82	*
* Max Chl Dpth (m)	* 1.07	* Hydr. Depth (m)	*	* 0.64	*
* Conv. Total (m3/s)	* 55.2	* Conv. (m3/s)	*	* 55.2	*
* Length wtd. (m)	* 16.50	* wetted Per. (m)	*	* 5.31	*
* Min Ch El (m)	* 403.74	* Shear (N/m2)	*	* 576.96	*
* Alpha	* 1.00	* Stream Power (N/m s)	*	* 3356.41	*
* Frctn Loss (m)	* 1.68	* Cum Volume (1000 m3)	*	* 0.10	*
* C & E Loss (m)	* 0.01	* Cum SA (1000 m2)	*	* 0.15	*

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso GUALDESI
 REACH: 1 RS: 1.25*

INPUT

Description:

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	408.015	.04	407.53	5.112	404.179	8.493	402.07	10.647	402.352		

11.316 403.013 17.547 406.894 18.032 407.85 32.612 408.682

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .035 0 .039 18.032 .039

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 18.032 16.5 16.5 16.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

 **
 * E.G. Elev (m) * 404.82 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 1.72 * wt. n-Val. * * 0.039 *
 * W.S. Elev (m) * 403.10 * Reach Len. (m) * 16.50 * 16.50 * 16.50
 * Crit W.S. (m) * 403.61 * Flow Area (m2) * * 3.05 *
 * E.G. Slope (m/m) *0.105332 * Area (m2) * * 3.05 *
 * Q Total (m3/s) * 17.70 * Flow (m3/s) * * 17.70 *
 * Top width (m) * 4.61 * Top width (m) * * 4.61 *
 * vel Total (m/s) * 5.81 * Avg. Vel. (m/s) * * 5.81 *
 * Max Chl Dpth (m) * 1.03 * Hydr. Depth (m) * * 0.66 *
 * Conv. Total (m3/s) * 54.5 * Conv. (m3/s) * * 54.5 *
 * Length wtd. (m) * 16.50 * wetted Per. (m) * * 5.22 *
 * Min Ch El (m) * 402.07 * Shear (N/m2) * * 602.77 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 3502.87 *
 * Frctn Loss (m) * 1.72 * Cum Volume (1000 m3) * * 0.05 *
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 0.08 *
 *

 **

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso GUALDESI
 REACH: 1 RS: 1

INPUT

Description:

Station Elevation Data num= 6
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 407.43 10.62 400.4 13.36 400.77 14.21 401.65 22.75 407.21
 42.19 408.32

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 0 .035 22.75 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 0 22.75 0 0 0 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

 **
 * E.G. Elev (m) * 403.17 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 1.81 * wt. n-Val. * * 0.035 *
 *

GUALDESI.rep

```

*
* W.S. Elev (m)      * 401.36 * Reach Len. (m)    *          *          *
* Crit w.S. (m)     * 401.88 * Flow Area (m2)   *          * 2.97 *
* E.G. Slope (m/m)  * 0.094493 * Area (m2)        *          * 2.97 *
* Q Total (m3/s)    * 17.70 * Flow (m3/s)      *          * 17.70 *
* Top width (m)     * 4.75 * Top width (m)    *          * 4.75 *
* Vel Total (m/s)   * 5.96 * Avg. Vel. (m/s)  *          * 5.96 *
* Max Chl Dpth (m) * 0.96 * Hydr. Depth (m) *          * 0.63 *
* Conv. Total (m3/s) * 57.6 * Conv. (m3/s)     *          * 57.6 *
* Length Wtd. (m)  *          * Wetted Per. (m) *          * 5.31 *
* Min Ch El (m)    * 400.40 * Shear (N/m2)    *          * 518.03 *
* Alpha            * 1.00 * Stream Power (N/m s) *          * 3087.53 *
* Frctn Loss (m)   * 1.64 * Cum Volume (1000 m3) *          *          *
* C & E Loss (m)   * 0.01 * Cum SA (1000 m2) *          *          *

```

**

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

SUMMARY OF MANNING'S N VALUES

River: Fosso GUALDESI

```

*****
* Reach * River Sta. * n1 * n2 * n3 *
*****
*1 * 5 * .04 * .035 * .04 *
*1 * 4.83333 * .04 * .035 * .04 *
*1 * 4.66666 * .04 * .035 * .04 *
*1 * 4.5 * .04 * .035 * .04 *
*1 * 4.33333 * .04 * .035 * .04 *
*1 * 4.16666 * .04 * .035 * .04 *
*1 * 4 * .04 * .035 * .04 *
*1 * 3 * .04 * .035 * .04 *
*1 * 2.5 * Bridge * * *
*1 * 2 * .04 * .035 * .04 *
*1 * 1.75 * .035 * .036 * .036 *
*1 * 1.5 * .035 * .038 * .038 *
*1 * 1.25 * .035 * .039 * .039 *
*1 * 1 * .04 * .035 * .04 *
*****

```

SUMMARY OF REACH LENGTHS

River: Fosso GUALDESI

```

*****
* Reach * River Sta. * Left * Channel * Right *
*****
*1 * 5 * 17.5 * 17.5 * 17.5 *
*1 * 4.83333 * 17.5 * 17.5 * 17.5 *
*1 * 4.66666 * 17.5 * 17.5 * 17.5 *
*1 * 4.5 * 17.5 * 17.5 * 17.5 *
*1 * 4.33333 * 17.5 * 17.5 * 17.5 *
*1 * 4.16666 * 17.5 * 17.5 * 17.5 *
*1 * 4 * 8 * 8 * 8 *
*1 * 3 * 10 * 10 * 10 *
*1 * 2.5 * Bridge * * *
*1 * 2 * 16.5 * 16.5 * 16.5 *
*1 * 1.75 * 16.5 * 16.5 * 16.5 *
*1 * 1.5 * 16.5 * 16.5 * 16.5 *

```

GUALDESI.rep

```
*1          * 1.25*          * 16.5* 16.5* 16.5*
*1          * 1          * 0* 0* 0*
*****
```

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
 River: Fosso GUALDESI

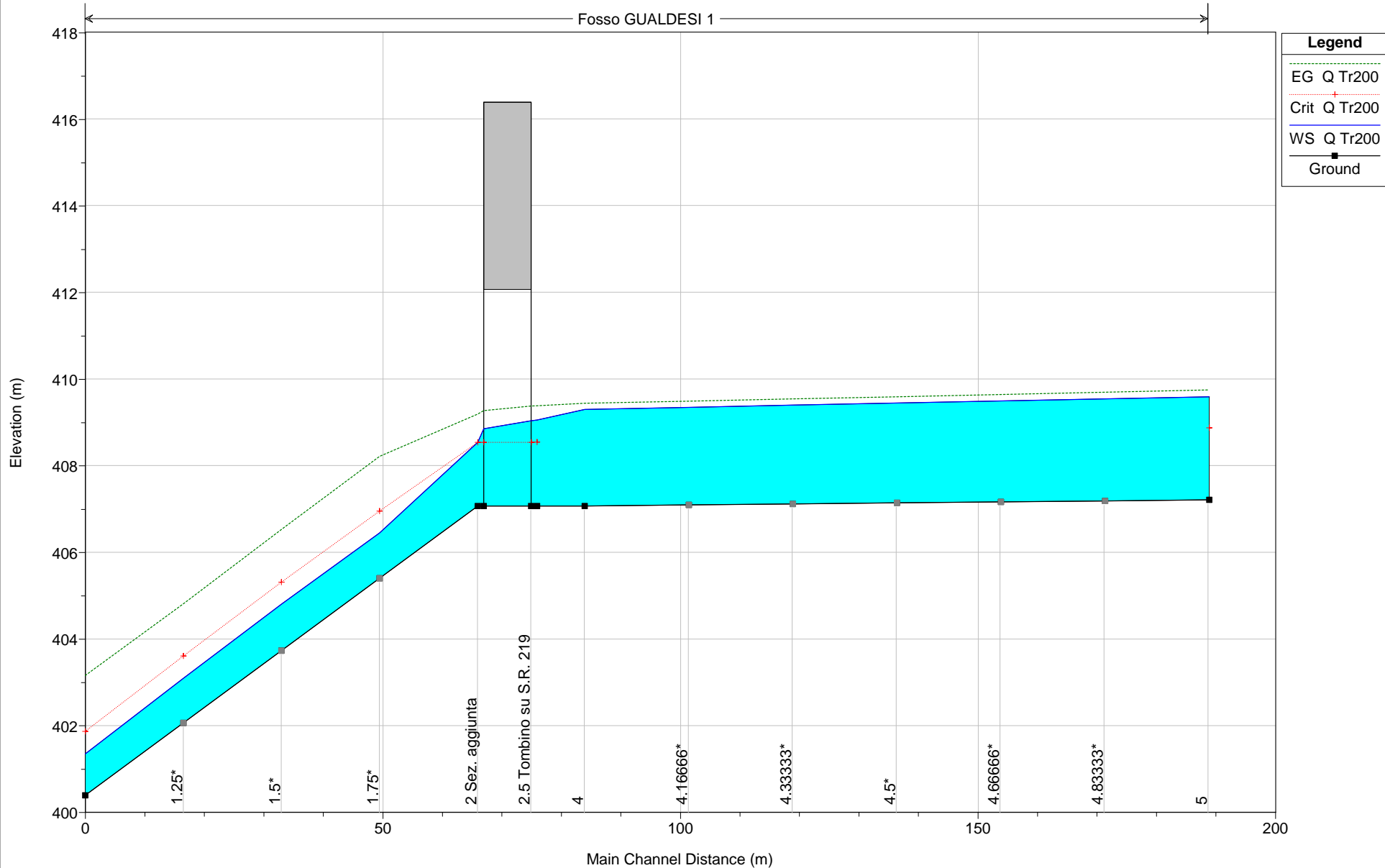
```
*****
* Reach * River Sta. * Contr. * Expan. *
*****
*1 * 5 * .1* .3*
*1 * 4.83333** * .1* .3*
*1 * 4.66666** * .1* .3*
*1 * 4.5* * .1* .3*
*1 * 4.33333** * .1* .3*
*1 * 4.16666** * .1* .3*
*1 * 4 * .1* .3*
*1 * 3 * .3* .5*
*1 * 2.5 *Bridge* * *
*1 * 2 * .3* .5*
*1 * 1.75* * .1* .3*
*1 * 1.5* * .1* .3*
*1 * 1.25* * .1* .3*
*1 * 1 * .1* .3*
*****
```

HEC-RAS Plan: Tr200 River: Fosso GUALDESI Reach: 1 Profile: Q Tr200

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
1	5	Q Tr200	17.70	407.22	409.60	408.89	409.76	0.002957	1.77	10.13	7.43	0.46
1	4.83333*	Q Tr200	17.70	407.20	409.55		409.71	0.002907	1.73	10.26	7.45	0.46
1	4.66666*	Q Tr200	17.70	407.17	409.50		409.65	0.002908	1.71	10.38	7.51	0.46
1	4.5*	Q Tr200	17.70	407.15	409.46		409.60	0.002887	1.69	10.48	7.62	0.46
1	4.33333*	Q Tr200	17.70	407.13	409.41		409.55	0.002848	1.68	10.56	7.73	0.46
1	4.16666*	Q Tr200	17.70	407.10	409.36		409.50	0.002821	1.67	10.63	7.84	0.46
1	4	Q Tr200	17.70	407.08	409.31		409.45	0.002803	1.66	10.68	7.93	0.46
1	3	Q Tr200	17.70	407.08	409.06	408.55	409.40	0.008235	2.56	6.92	3.85	0.61
1	2.5		Bridge									
1	2	Q Tr200	17.70	407.08	408.55	408.55	409.20	0.020310	3.57	4.96	3.83	1.00
1	1.75*	Q Tr200	17.70	405.41	406.45	406.96	408.23	0.100438	5.90	3.00	4.99	2.43
1	1.5*	Q Tr200	17.70	403.74	404.81	405.32	406.54	0.102677	5.82	3.04	4.73	2.32
1	1.25*	Q Tr200	17.70	402.07	403.10	403.61	404.82	0.105332	5.81	3.05	4.61	2.28
1	1	Q Tr200	17.70	400.40	401.36	401.88	403.17	0.094493	5.96	2.97	4.75	2.41


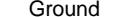

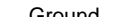
MACROAREA 09 Plan: Tr200
Flow: Tr200

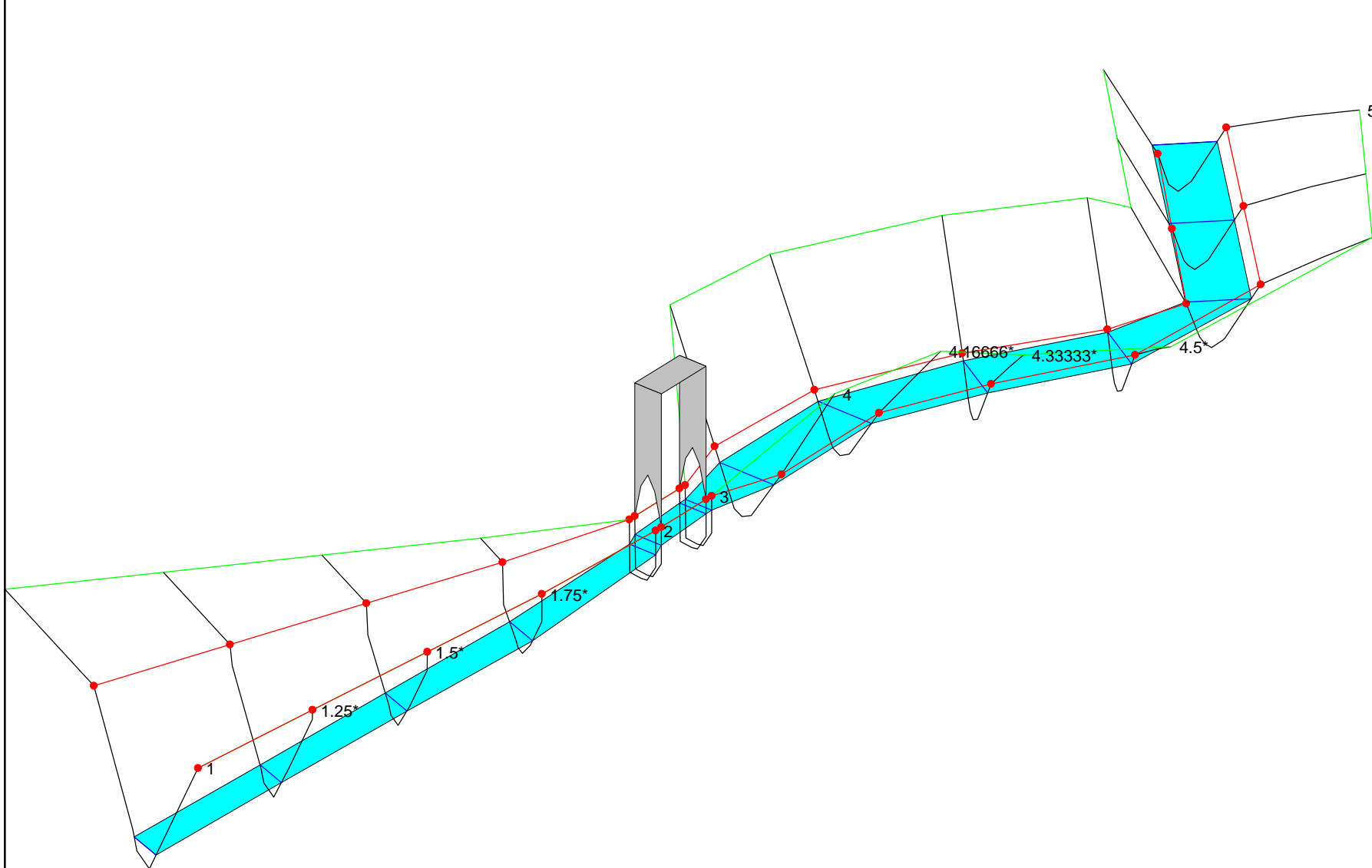
Fosso GUALDESI 1

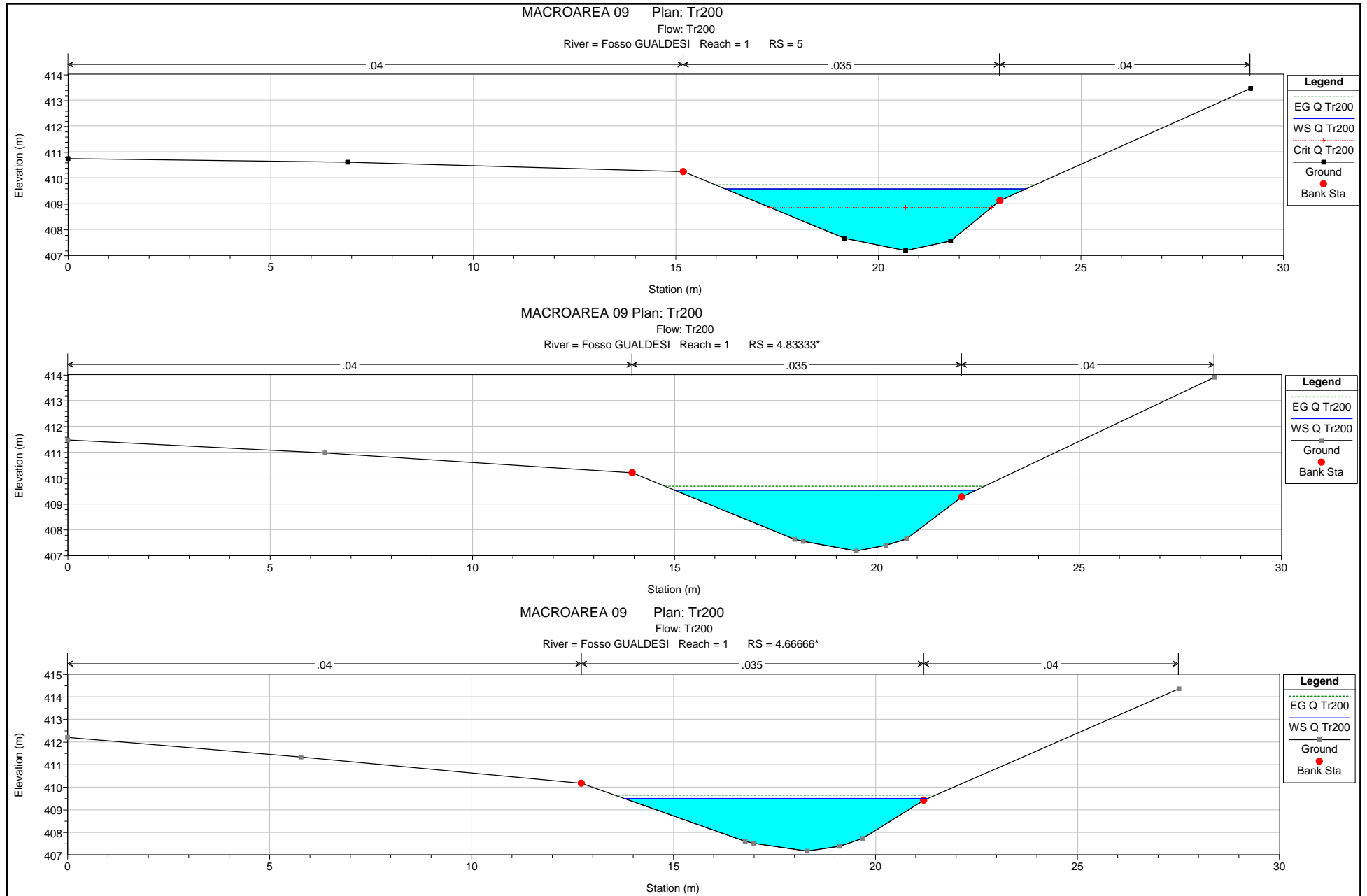


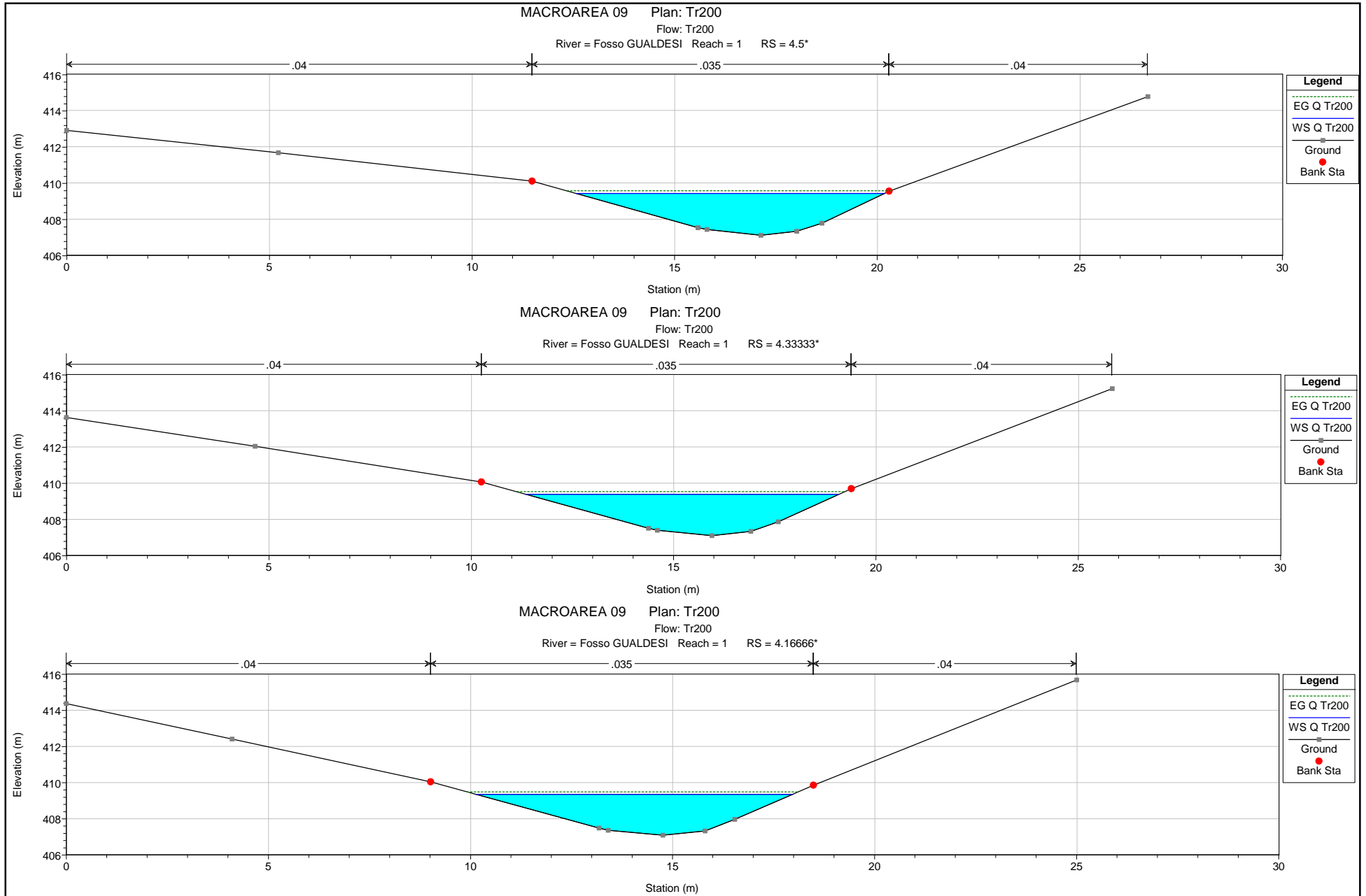
Legend	
EG Q Tr200	--- (green dashed line)
Crit Q Tr200	--- (red dotted line with crosses)
WS Q Tr200	— (blue solid line)
Ground	— (black solid line with squares)

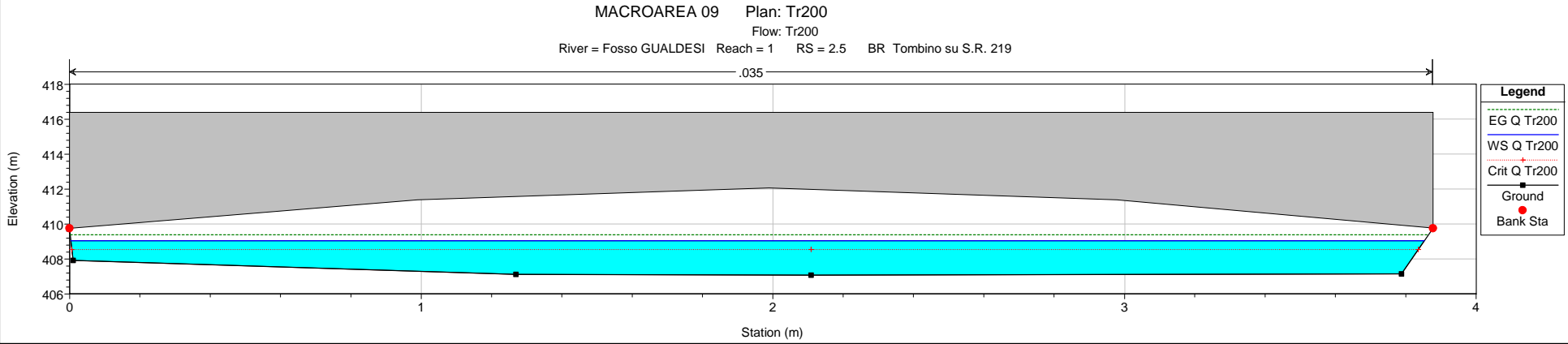
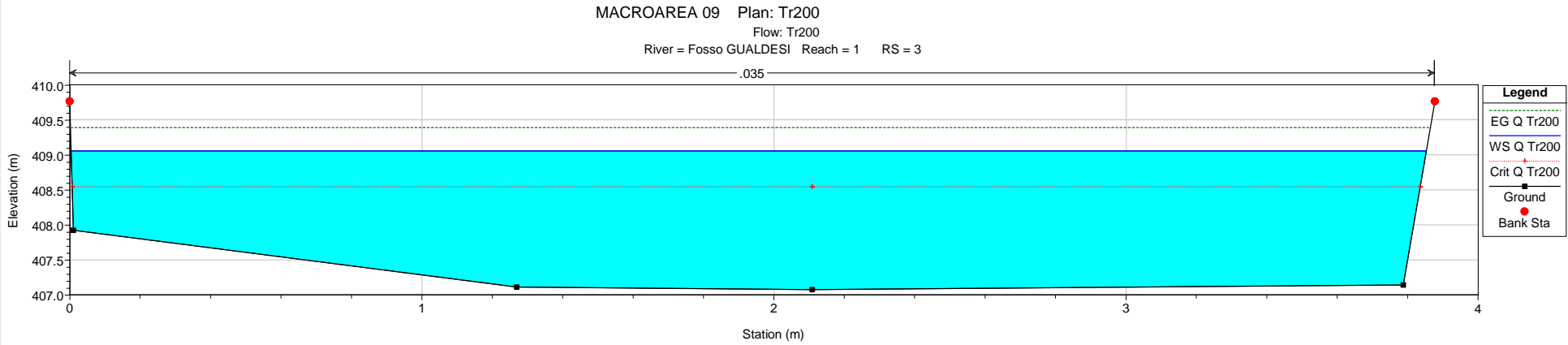
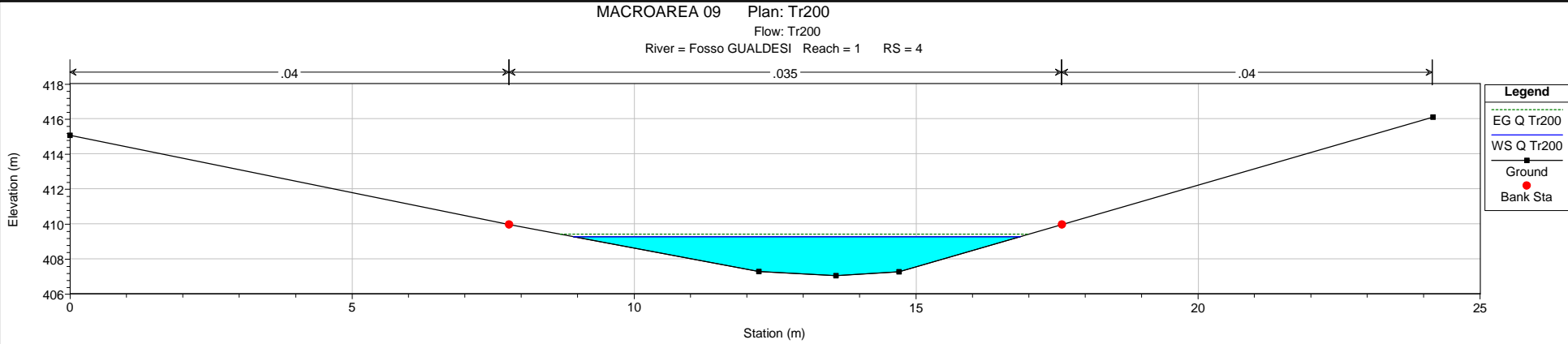
MACROAREA 09 Plan: Tr200
Flow: Tr200 FOSSO GUALDESI

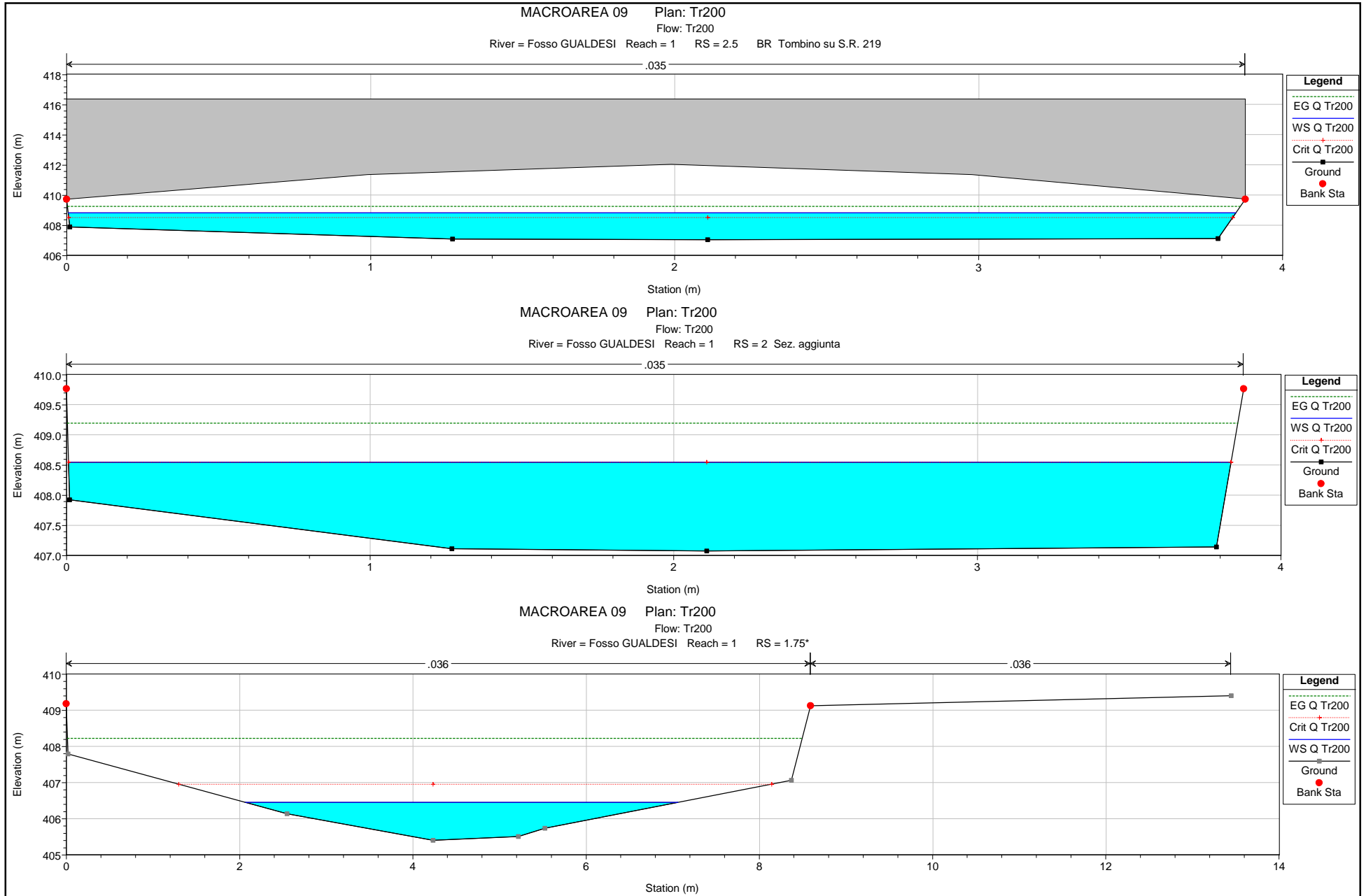
Legend	
	WS Q Tr200
	Ground
	Bank Sta
	Ground

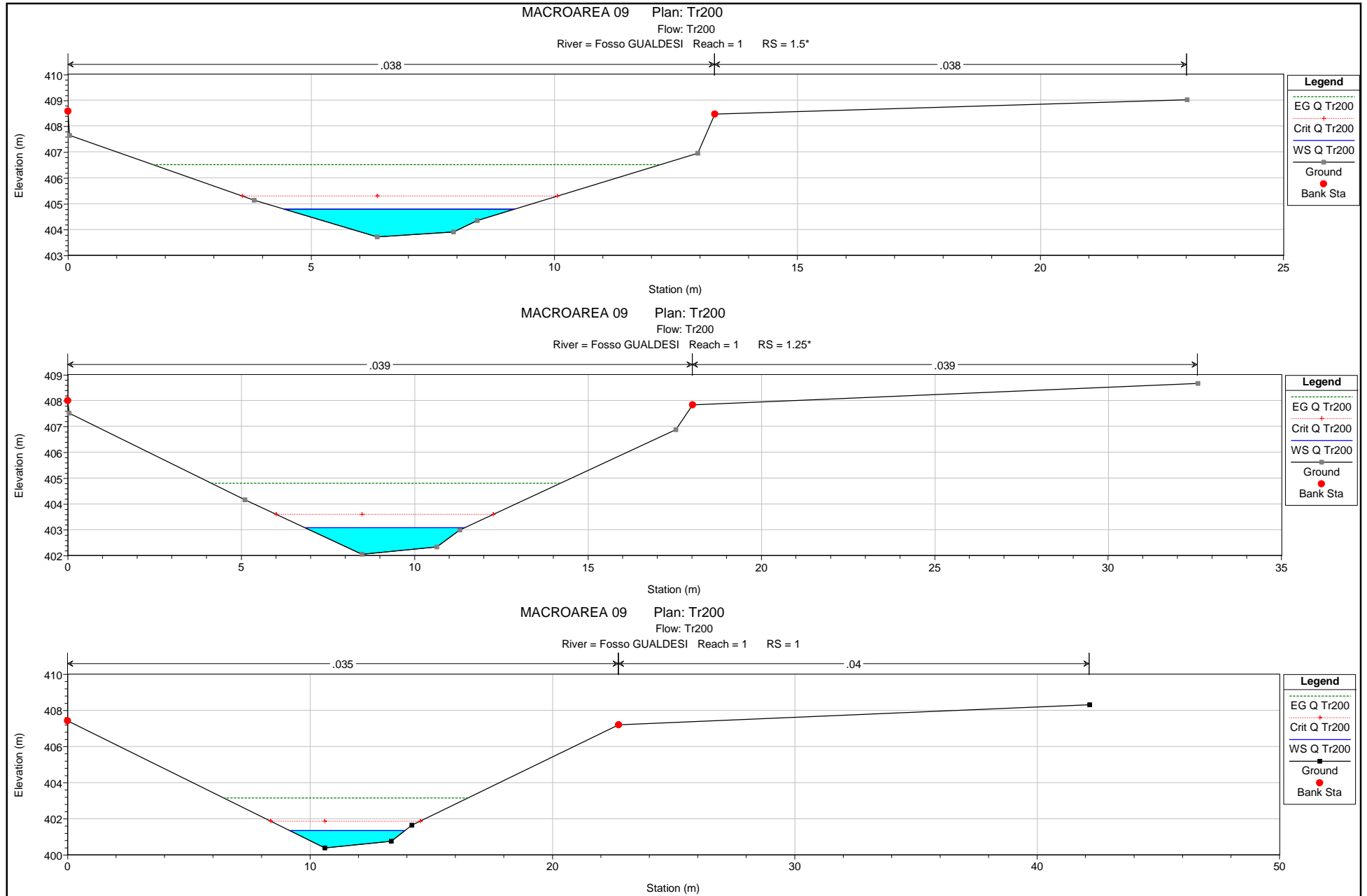












Scalette50.rep

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X      X  XXXXXX   XXXX      XXXX      XX      XXXX
X      X  X      X  X      X  X      X  X      X
X      X  X      X  X      X  X      X  X      X
XXXXXXXX XXXX     X      XXX  XXXX     XXXXXX     XXXX
X      X  X      X  X      X  X      X  X      X
X      X  X      X  X      X  X      X  X      X
X      X  XXXXXX   XXXX     X  X      X  X      XXXXX
```

PROJECT DATA

Project Title: MACROAREA 09 - FOSSO SCALETTE S.ANGELO
Project File : Scalette50.prj
Run Date and Time: 27/11/2006 6.43.25

Project in SI units

Project Description:

verifica PRG GUBBIO MACROAREA 09 - FOSSO SCALETTE - FOSSO SCALETTE S.ANGELO

PLAN DATA

Plan Title: Plan 01

Plan File : C:\LAVORO\PRG\Integrazione\HEC_SCALETTE\Sez aggiunte\Hec_Tr50\Scalette50.p01

Geometry Title: Geom 01

Geometry File : C:\LAVORO\PRG\Integrazione\HEC_SCALETTE\Sez
aggiunte\Hec_Tr50\Scalette50.g01

Flow Title : Flow Tr50

Flow File : C:\LAVORO\PRG\Integrazione\HEC_SCALETTE\Sez
aggiunte\Hec_Tr50\Scalette50.f01

Plan Summary Information:

Number of:	Cross Sections =	13	Multiple Openings =	0
	Culverts =	0	Inline Structures =	0
	Bridges =	1	Lateral Structures =	0

Computational Information

Water surface calculation tolerance =	0.003
Critical depth calculation tolerance =	0.003
Maximum number of iterations =	20
Maximum difference tolerance =	0.1
Flow tolerance factor =	0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: Flow Tr50

Flow File : C:\LAVORO\PRG\Integrazione\HEC_SCALETTE\Sez aggiunte\Hec_Tr50\Scalette50.f01

Flow Data (m3/s)

```
*****
* River      Reach      RS      *      Q Tr50 *
* Fosso Scalette 1      4      *      9.9  *
```

Scalette50.rep

Boundary Conditions

 * River Reach Profile * Upstream
 Downstream *

 * Fosso Scalette 1 Q Tr50 * Critical
 Normal S = 0.036 *

GEOMETRY DATA

Geometry Title: Geom 01
 Geometry File : C:\LAVORO\PRG\Integrazione\HEC_SCALETTE\Sez
 aggiunte\Hec_Tr50\Scalette50.g01

CROSS SECTION

RIVER: Fosso Scalette
 REACH: 1 RS: 4

INPUT

Description: Sez. aggiunta
 Station Elevation Data num= 9
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 431.77 14.83 430.7 28.42 429.63 29.44 428.58 29.89 428.58
 30.33 428.55 30.91 428.96 38.88 429.89 58.32 431.42

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 28.42 .035 38.88 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 28.42 38.88 23.333 23.333 23.333 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 429.95 * Element * Left OB * Channel * Right OB
 *
 * vel Head (m) * 0.25 * wt. n-Val. * 0.040 * 0.035 *
 *
 * W.S. Elev (m) * 429.70 * Reach Len. (m) * 23.33 * 23.33 * 23.33
 *
 * Crit w.s. (m) * 429.70 * Flow Area (m2) * 0.03 * 4.48 *
 *
 * E.G. Slope (m/m) *0.016113 * Area (m2) * 0.03 * 4.48 *
 *
 * Q Total (m3/s) * 9.90 * Flow (m3/s) * 0.01 * 9.89 *
 *
 * Top width (m) * 9.66 * Top width (m) * 0.85 * 8.81 *
 *
 * vel Total (m/s) * 2.20 * Avg. vel. (m/s) * 0.33 * 2.21 *
 *
 * Max chl Dpth (m) * 1.15 * Hydr. Depth (m) * 0.03 * 0.51 *
 *
 * Conv. Total (m3/s) * 78.0 * Conv. (m3/s) * 0.1 * 77.9 *
 *
 * Length wtd. (m) * 23.33 * wetted Per. (m) * 0.85 * 9.42 *
 *
 * Min ch El (m) * 428.55 * Shear (N/m2) * 5.28 * 75.09 *
 *
 * Alpha * 1.01 * Stream Power (N/m s) * 1.74 * 165.83 *
 *
 * Frctn Loss (m) * 0.38 * Cum volume (1000 m3) * 0.00 * 0.88 * 0.11
 *

Scalette50.rep
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.01 * 1.57 * 0.46

 **

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Fosso Scalette
 REACH: 1 RS: 3.66666*

INPUT

Description:

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	430.913	14.83	429.843	28.42	428.773	29.44	427.723	29.89	427.723
30.33	427.693	30.91	428.103	38.88	429.033	58.32	430.563		

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	28.42	.035	38.88	.04

Bank Sta:	Left	Right	Lengths:			Left Channel	Right	Coeff Contr.	Expan.
	28.42	38.88	23.333	23.333	23.333		.1	.3	

CROSS SECTION OUTPUT Profile #Q Tr50

* E.G. Elev (m)	* 429.27	* Element	* Left OB	* Channel	* Right OB
* vel Head (m)	* 0.64	* wt. n-Val.	* 0.035		
* W.S. Elev (m)	* 428.62	* Reach Len. (m)	* 23.33	* 23.33	* 23.33
* Crit w.s. (m)	* 428.84	* Flow Area (m2)	* 2.79		
* E.G. Slope (m/m)	* 0.056358	* Area (m2)	* 2.79		
* Q Total (m3/s)	* 9.90	* Flow (m3/s)	* 9.90		
* Top width (m)	* 6.81	* Top width (m)	* 6.81		
* vel Total (m/s)	* 3.55	* Avg. vel. (m/s)	* 3.55		
* Max Chl Dpth (m)	* 0.93	* Hydr. Depth (m)	* 0.41		
* Conv. Total (m3/s)	* 41.7	* Conv. (m3/s)	* 41.7		
* Length wtd. (m)	* 23.33	* wetted Per. (m)	* 7.35		
* Min ch El (m)	* 427.69	* Shear (N/m2)	* 209.49		
* Alpha	* 1.00	* Stream Power (N/m s)	* 744.24		
* Frctn Loss (m)	* 0.64	* Cum volume (1000 m3)	* 0.00	* 0.79	* 0.11
* C & E Loss (m)	* 0.04	* Cum SA (1000 m2)	* 0.00	* 1.38	* 0.46

 **

Scalette50.rep

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso Scalette

REACH: 1 RS: 3.33333*

INPUT

Description:

Station		Elevation Data		num= 9		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	430.057	14.83	428.987	28.42	427.917	29.44	426.867	29.89	426.867				
30.33	426.837	30.91	427.247	38.88	428.177	58.32	429.707						

Manning's n Values

Sta		n Val		num= 3		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	28.42	.035	38.88	.04				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	28.42	38.88		23.333	23.333	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

* E.G. Elev (m)	* 428.27	* Element	* Left OB	* Channel	* Right OB
* vel Head (m)	* 0.39	* wt. n-Val.	* 0.035		
* W.S. Elev (m)	* 427.88	* Reach Len. (m)	* 23.33	* 23.33	* 23.33
* Crit W.S. (m)	* 427.98	* Flow Area (m2)	* 3.58		
* E.G. Slope (m/m)	* 0.029456	* Area (m2)	* 3.58		
* Q Total (m3/s)	* 9.90	* Flow (m3/s)	* 9.90		
* Top width (m)	* 7.84	* Top width (m)	* 7.84		
* vel Total (m/s)	* 2.77	* Avg. vel. (m/s)	* 2.77		
* Max Chl Dpth (m)	* 1.04	* Hydr. Depth (m)	* 0.46		
* Conv. Total (m3/s)	* 57.7	* Conv. (m3/s)	* 57.7		
* Length wtd. (m)	* 23.33	* wetted Per. (m)	* 8.43		
* Min Ch El (m)	* 426.84	* Shear (N/m2)	* 122.51		
* Alpha	* 1.00	* Stream Power (N/m s)	* 339.11		
* Frctn Loss (m)	* 0.93	* Cum volume (1000 m3)	* 0.00	* 0.72	* 0.11
* C & E Loss (m)	* 0.08	* Cum SA (1000 m2)	* 0.00	* 1.21	* 0.46

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

Scalette50.rep
 section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso Scalette
 REACH: 1 RS: 3

INPUT

Description:

Station		Elevation		Data		num= 9		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	429.2	14.83	428.13	28.42	427.06	29.44	426.01	29.89	426.01		
30.33	425.98	30.91	426.39	38.88	427.32	58.32	428.85				

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	28.42	.035	38.88	.04

Bank Sta:	Left	Right	Lengths:		Left Channel	Right	Coeff Contr.	Expan.
	28.42	38.88	25.667	25.667	25.667		.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

```
*****
**
* E.G. Elev (m) * 427.46 * Element * Left OB * Channel * Right OB
*
* vel Head (m) * 0.49 * wt. n-Val. * * 0.035 *
*
* W.S. Elev (m) * 426.97 * Reach Len. (m) * 25.67 * 25.67 * 25.67
*
* Crit W.S. (m) * 427.13 * Flow Area (m2) * * 3.18 *
*
* E.G. Slope (m/m) *0.040012 * Area (m2) * * 3.18 *
*
* Q Total (m3/s) * 9.90 * Flow (m3/s) * * 9.90 *
*
* Top width (m) * 7.34 * Top width (m) * * 7.34 *
*
* vel Total (m/s) * 3.11 * Avg. vel. (m/s) * * 3.11 *
*
* Max chl Dpth (m) * 0.99 * Hydr. Depth (m) * * 0.43 *
*
* Conv. Total (m3/s) * 49.5 * Conv. (m3/s) * * 49.5 *
*
* Length wtd. (m) * 25.67 * wetted Per. (m) * * 7.91 *
*
* Min ch El (m) * 425.98 * Shear (N/m2) * * 157.77 *
*
* Alpha * 1.00 * Stream Power (N/m s) * * 491.19 *
*
* Frctn Loss (m) * 0.80 * Cum volume (1000 m3) * 0.00 * 0.64 * 0.11
*
* C & E Loss (m) * 0.01 * Cum SA (1000 m2) * 0.00 * 1.04 * 0.46
*
*****
**
```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso Scalette
 REACH: 1 RS: 2.66666*

INPUT

Description:

Station		Elevation		Data		num= 14		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

Scalette50.rep

0	428.257	10.945	427.674	15.237	427.363	24.748	426.634	29.2	426.28
30.24	425.203	30.366	425.157	30.698	425.114	31.147	425.037	31.571	425.32
33.494	425.571	37.407	426.22	51.146	427.195	59.583	427.943		

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 29.2 .035 37.407 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 29.2 37.407 25.667 25.667 25.667 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 426.50 * Element * Left OB * Channel * Right OB
 * Vel Head (m) * 0.49 * wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 426.02 * Reach Len. (m) * 25.67 * 25.67 * 25.67
 * Crit W.S. (m) * 426.16 * Flow Area (m2) * * 3.21 *
 * E.G. Slope (m/m) *0.034619 * Area (m2) * * 3.21 *
 * Q Total (m3/s) * 9.90 * Flow (m3/s) * * 9.90 *
 * Top width (m) * 6.74 * Top width (m) * * 6.74 *
 * Vel Total (m/s) * 3.09 * Avg. vel. (m/s) * * 3.09 *
 * Max Chl Dpth (m) * 0.98 * Hydr. Depth (m) * * 0.48 *
 * Conv. Total (m3/s) * 53.2 * Conv. (m3/s) * * 53.2 *
 * Length wtd. (m) * 25.67 * Wetted Per. (m) * * 7.24 *
 * Min ch El (m) * 425.04 * Shear (N/m2) * * 150.28 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 464.01 *
 * Frctn Loss (m) * 0.95 * Cum volume (1000 m3) * 0.00 * 0.56 * 0.11
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.00 * 0.86 * 0.46

 **

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso Scalette
 REACH: 1 RS: 2.33333*

INPUT

Description:

Station Elevation Data num= 14
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 427.313 11.238 426.917 15.644 426.597 25.409 425.867 29.98 425.5
 31.039 424.395 31.168 424.303 31.506 424.218 31.963 424.093 32.233 424.251
 33.452 424.445 35.933 425.12 51.368 426.123 60.847 427.037

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 29.98 .035 35.933 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 29.98 35.933 25.667 25.667 25.667 .1 .3

Scalette50.rep

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)      * 425.64 * Element           * Left OB * Channel * Right OB
* Vel Head (m)      * 0.54  * wt. n-Val.       *         * 0.035  *
* W.S. Elev (m)     * 425.11 * Reach Len. (m)   * 25.67  * 25.67  * 25.67
* Crit W.S. (m)     * 425.27 * Flow Area (m2)   *         * 3.05   *
* E.G. Slope (m/m)  *0.032041 * Area (m2)        *         * 3.05   *
* Q Total (m3/s)    * 9.90  * Flow (m3/s)      *         * 9.90   *
* Top width (m)     * 5.53  * Top width (m)    *         * 5.53   *
* Vel Total (m/s)   * 3.24  * Avg. Vel. (m/s)  *         * 3.24   *
* Max Chl Dpth (m) * 1.02  * Hydr. Depth (m)  *         * 0.55   *
* Conv. Total (m3/s) * 55.3  * Conv. (m3/s)     *         * 55.3   *
* Length wtd. (m)  * 25.67 * wetted Per. (m)  *         * 6.04   *
* Min Ch El (m)    * 424.09 * Shear (N/m2)     *         * 158.71 *
* Alpha            * 1.00  * Stream Power (N/m s) *         * 514.81 *
* Frctn Loss (m)   * 0.85  * Cum Volume (1000 m3) * 0.00  * 0.48  * 0.11
* C & E Loss (m)   * 0.01  * Cum SA (1000 m2)  * 0.00  * 0.70  * 0.46
**
*****

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso Scalette

REACH: 1 RS: 2

INPUT

Description:

Station		Elevation Data		num= 10		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	426.37	11.53	426.16	26.07	425.1	30.76	424.72	31.97	423.45		
32.78	423.15	33.41	423.32	34.46	424.02	51.59	425.05	62.11	426.13		

Manning's n values

Sta		n Val		num= 3		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	30.76	.035	34.46	.04				

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	30.76	34.46		22.5	22.5	22.5		.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)      * 424.89 * Element           * Left OB * Channel * Right OB
* Vel Head (m)      * 0.57  * wt. n-Val.       *         * 0.035  * 0.040
* W.S. Elev (m)     * 424.33 * Reach Len. (m)   * 22.50  * 22.50  * 22.50
* Crit W.S. (m)     * 424.52 * Flow Area (m2)   *         * 2.58   * 0.79
* E.G. Slope (m/m)  *0.026556 * Area (m2)        *         * 2.58   * 0.79
**

```

```

Scalette50.rep
* Q Total (m3/s) * 9.90 * Flow (m3/s) * * 8.98 * 0.92
* Top width (m) * 8.45 * Top width (m) * * 3.33 * 5.12
* Vel Total (m/s) * 2.94 * Avg. Vel. (m/s) * * 3.48 * 1.17
* Max Chl Dpth (m) * 1.18 * Hydr. Depth (m) * * 0.78 * 0.15
* Conv. Total (m3/s) * 60.8 * Conv. (m3/s) * * 55.1 * 5.7
* Length wtd. (m) * 22.50 * wetted Per. (m) * * 3.99 * 5.13
* Min Ch El (m) * 423.15 * Shear (N/m2) * * 168.32 * 40.02
* Alpha * 1.29 * Stream Power (N/m s) * * 585.84 * 46.78
* Frctn Loss (m) * 0.75 * Cum Volume (1000 m3) * 0.00 * 0.41 * 0.10
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.00 * 0.58 * 0.39
*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso Scalette
 REACH: 1 RS: 1.85*

INPUT

Description:

Station		Elevation Data		num= 10		Sta		Elev		Sta		Elev	
0	425.55	11.53	425.34	26.07	424.28	30.76	423.9	31.97	422.63	32.78	422.33	33.41	422.5
32.78	422.33	33.41	422.5	34.46	423.2	51.59	424.23	62.11	425.31				

Manning's n Values		num= 3		Sta		n Val	
0	.04	30.76	.035	34.46	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	30.76	34.46		22.5	22.5	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m) * 424.18 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.74 * wt. n-Val. * * 0.035 * 0.040
* w.s. Elev (m) * 423.45 * Reach Len. (m) * 22.50 * 22.50 * 22.50
* Crit w.s. (m) * 423.70 * Flow Area (m2) * * 2.38 * 0.51
* E.G. Slope (m/m) *0.036273 * Area (m2) * * 2.38 * 0.51
* Q Total (m3/s) * 9.90 * Flow (m3/s) * * 9.30 * 0.60
* Top width (m) * 7.38 * Top width (m) * * 3.27 * 4.11
* vel Total (m/s) * 3.43 * Avg. Vel. (m/s) * * 3.91 * 1.18
* Max chl Dpth (m) * 1.12 * Hydr. Depth (m) * * 0.73 * 0.12
* Conv. Total (m3/s) * 52.0 * Conv. (m3/s) * * 48.8 * 3.1
* Length wtd. (m) * 22.50 * wetted Per. (m) * * 3.91 * 4.12
* Min Ch El (m) * 422.33 * Shear (N/m2) * * 216.60 * 43.87

```

Scalette50.rep

```

*
* Alpha          * 1.23 * Stream Power (N/m s) *          * 846.73 * 51.75
* Frctn Loss (m) * 0.69 * Cum Volume (1000 m3) * 0.00 * 0.35 * 0.08
* C & E Loss (m) * 0.02 * Cum SA (1000 m2) * 0.00 * 0.51 * 0.29
*
*****
**

```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso Scalette
 REACH: 1 RS: 1.7

INPUT

Description: Sez. aggiunta

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	424.73	11.53	424.52	26.07	423.46	30.76	423.08	31.97	421.81
32.78	421.51	33.41	421.68	34.46	422.38	51.59	423.41	62.11	424.49

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	30.76	.035	34.46	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

30.76	34.46	34	34	34	.3	.5
-------	-------	----	----	----	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	31.03	425.22	T
34.53	62.11	425.22	T

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)          * 423.41 * Element          * Left OB * Channel * Right OB
* vel Head (m)          * 0.31  * wt. n-Val.      *          * 0.035  * 0.040
* W.S. Elev (m)        * 423.10 * Reach Len. (m)  * 1.00   * 1.00   * 1.00
* Crit w.s. (m)        * 422.88 * Flow Area (m2)  *          * 3.99   * 0.05
* E.G. Slope (m/m)     *0.007802 * Area (m2)      * 0.00   * 4.03   * 4.31
* Q Total (m3/s)       * 9.90  * Flow (m3/s)     *          * 9.81   * 0.09
* Top width (m)        * 15.92 * Top width (m)   * 0.25   * 3.70   * 11.98
* vel Total (m/s)      * 2.45  * Avg. vel. (m/s) *          * 2.46   * 1.77
* Max chl Dpth (m)     * 1.59  * Hydr. Depth (m) *          * 1.16   * 0.72
* Conv. Total (m3/s)   * 112.1 * Conv. (m3/s)    *          * 111.1  * 1.0
* Length wtd. (m)      * 1.00  * wetted Per. (m) *          * 4.14   * 0.07
* Min ch El (m)        * 421.51 * Shear (N/m2)   *          * 73.66  * 54.83
* Alpha                * 1.00  * Stream Power (N/m s) *          * 181.26 * 96.97
* Frctn Loss (m)      * 0.01  * Cum Volume (1000 m3) * 0.00 * 0.28 * 0.03
* C & E Loss (m)      * 0.05  * Cum SA (1000 m2) * 0.00 * 0.43 * 0.11

```

Scalette50.rep

*

**

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

BRIDGE

RIVER: Fosso Scalette

REACH: 1 RS: 1.6

INPUT

Description: Attraversamento S.R. 219

Distance from Upstream XS = 1

Deck/Roadway width = 32

Weir Coefficient = 1.44

Upstream Deck/Roadway Coordinates

num= 9

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	428.5		424		31.03	428.5				31.03	428.5	426.25		
31.905	428.5	427.76			32.78	428.5	428			33.655	428.5	427.76		
34.53	428.5	426.25			34.53	428.5				62.11	428.5			

Upstream Bridge Cross Section Data

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	424.73	11.53	424.52	26.07	423.46	30.76	423.08	31.97	421.81
32.78	421.51	33.41	421.68	34.46	422.38	51.59	423.41	62.11	424.49

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	30.76	.035	34.46	.04

Bank Sta: Left Right Coeff Contr. Expan.

30.76 34.46 .3 .5

Ineffective Flow

Sta L	Sta R	Elev	Permanent
0	31.03	425.22	T
34.53	62.11	425.22	T

Downstream Deck/Roadway Coordinates

num= 9

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	428.5		424		31.03	428.5				31.03	428.5	426.25		
31.905	428.5	427.76			32.78	428.5	428			33.655	428.5	427.76		
34.53	428.5	426.25			34.53	428.5				62.11	428.5			

Downstream Bridge Cross Section Data

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	423.49	11.53	423.28	26.07	422.22	30.76	421.84	31.97	420.57
32.78	420.27	33.41	420.44	34.46	421.14	51.59	422.17	62.11	423.25

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	30.76	.035	34.46	.04

Bank Sta: Left Right Coeff Contr. Expan.

30.76 34.46 .3 .5

Ineffective Flow

Sta L	Sta R	Elev	Permanent
0	31.03	425.22	T
34.53	62.11	425.22	T

Sta L	Sta R	Elev	Permanent
0	31.03	425.22	T
34.53	62.11	425.22	T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy

Selected Low Flow Methods = Energy

High Flow Method

Pressure and weir flow

Submerged Inlet Cd =

Submerged Inlet + Outlet Cd = .8

Max Low Cord =

Additional Bridge Parameters

Add Friction component to Momentum

Do not add weight component to Momentum

Class B flow critical depth computations use critical depth

inside the bridge at the upstream end

Criteria to check for pressure flow = Upstream water surface

BRIDGE OUTPUT Profile #Q Tr50

```

*****
* E.G. US. (m) * 423.41 * Element *Inside BR US *Inside BR DS *
* W.S. US. (m) * 423.10 * E.G. Elev (m) * 423.35 * 422.35 *
* Q Total (m3/s) * 9.90 * W.S. Elev (m) * 422.88 * 421.33 *
* Q Bridge (m3/s) * 9.90 * Crit W.S. (m) * 422.88 * 421.65 *
* Q weir (m3/s) * * Max Chl Dpth (m) * 1.37 * 1.06 *
* Weir Sta Lft (m) * * Vel Total (m/s) * 3.02 * 4.47 *
* Weir Sta Rgt (m) * * Flow Area (m2) * 3.28 * 2.22 *
* Weir Submerg * * Froude # Chl * 0.99 * 1.80 *
* Weir Max Depth (m) * * Specif Force (m3) * 4.79 * 5.41 *
* Min El Weir Flow (m) * 428.50 * Hydr Depth (m) * 0.94 * 0.67 *
* Min El Prs (m) * 428.00 * W.P. Total (m) * 4.21 * 3.90 *
* Delta EG (m) * 1.22 * Conv. Total (m3/s) * 79.5 * 43.6 *
* Delta WS (m) * 1.65 * Top width (m) * 3.50 * 3.29 *
* BR Open Area (m2) * 19.24 * Frctn Loss (m) * 0.34 * 0.83 *
* BR Open Vel (m/s) * 4.47 * C & E Loss (m) * 0.08 * 0.17 *
* Coef of Q * * Shear Total (N/m2) * 118.59 * 286.74 *
* Br Sel Method *Energy only * Power Total (N/m s) * 357.54 * 1280.71 *
*****
    
```

Warning: The energy equation could not be balanced within the specified number of iterations. The

program used critical depth for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for

additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical

depth, the calculated water surface came back below critical depth. This indicates that there

is not a valid subcritical answer. The program defaulted to critical depth.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for

additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than

0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and

Scalette50.rep

previous cross section. This may indicate the need for additional cross sections.
 Note: The energy method has computed a class B profile.

CROSS SECTION

RIVER: Fosso Scalette
 REACH: 1 RS: 1.5

INPUT

Description: Sez. aggiunta
 Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	423.49	11.53	423.28	26.07	422.22	30.76	421.84	31.97	420.57		
32.78	420.27	33.41	420.44	34.46	421.14	51.59	422.17	62.11	423.25		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	30.76	.035	34.46	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 30.76 34.46 22.667 22.667 22.667 .3 .5
 Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	31.03	425.22	T
34.53	62.11	425.22	T

CROSS SECTION OUTPUT Profile #Q Tr50

```
*****
**
* E.G. Elev (m) * 422.11 * Element * Left OB * Channel * Right OB
*
* vel Head (m) * 0.47 * wt. n-Val. * * 0.035 * 0.040
*
* W.S. Elev (m) * 421.64 * Reach Len. (m) * 22.67 * 22.67 * 22.67
*
* Crit W.S. (m) * 421.64 * Flow Area (m2) * * 3.22 * 0.03
*
* E.G. Slope (m/m) *0.015963 * Area (m2) * * 3.22 * 2.05
*
* Q Total (m3/s) * 9.90 * Flow (m3/s) * * 9.83 * 0.07
*
* Top width (m) * 11.77 * Top width (m) * * 3.51 * 8.26
*
* vel Total (m/s) * 3.04 * Avg. vel. (m/s) * * 3.05 * 1.97
*
* Max chl Dpth (m) * 1.37 * Hydr. Depth (m) * * 0.94 * 0.49
*
* Conv. Total (m3/s) * 78.4 * Conv. (m3/s) * * 77.8 * 0.5
*
* Length wtd. (m) * 22.67 * wetted Per. (m) * * 4.14 * 0.07
*
* Min ch El (m) * 420.27 * Shear (N/m2) * * 121.74 * 77.26
*
* Alpha * 1.00 * Stream Power (N/m s) * * 371.63 * 152.41
*
* Frctn Loss (m) * 0.36 * Cum volume (1000 m3) * * 0.19 * 0.02
*
* C & E Loss (m) * 0.06 * Cum SA (1000 m2) * * 0.32 * 0.09
*
*****
**
```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical

Scalette50.rep

depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Fosso Scalette
 REACH: 1 RS: 1.33333*

INPUT

Description:

Station		Elevation Data		num= 15		Sta		Elev		Sta		Elev	
0	424.427	9.19	423.767	20.779	422.405	24.517	421.94	27.364	420.146	28.354	419.713	29.158	419.525
30.63	419.7	32.897	421.373	39.965	421.712	47.247	422.092	56.06	422.85				

Manning's n Values		num= 3		Sta		n Val	
0	.04	24.517	.035	32.897	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	24.517	32.897		22.667	22.667	.3	.5

CROSS SECTION OUTPUT Profile #Q Tr50

* E.G. Elev (m)	* 421.29	* Element	* Left OB	* Channel	* Right OB
* vel Head (m)	* 1.02	* wt. n-Val.	* 0.035		
* W.S. Elev (m)	* 420.27	* Reach Len. (m)	* 22.67	* 22.67	* 22.67
* Crit w.s. (m)	* 420.59	* Flow Area (m2)	* 2.21		
* E.G. Slope (m/m)	* 0.066461	* Area (m2)	* 2.21		
* Q Total (m3/s)	* 9.90	* Flow (m3/s)	* 9.90		
* Top width (m)	* 4.24	* Top width (m)	* 4.24		
* vel Total (m/s)	* 4.48	* Avg. vel. (m/s)	* 4.48		
* Max chl Dpth (m)	* 0.83	* Hydr. Depth (m)	* 0.52		
* Conv. Total (m3/s)	* 38.4	* Conv. (m3/s)	* 38.4		
* Length wtd. (m)	* 22.67	* wetted Per. (m)	* 4.65		
* Min ch El (m)	* 419.44	* Shear (N/m2)	* 309.40		
* Alpha	* 1.00	* Stream Power (N/m s)	* 1386.87		
* Frctn Loss (m)	* 0.65	* Cum Volume (1000 m3)	* 0.12		
* C & E Loss (m)	* 0.17	* Cum SA (1000 m2)	* 0.23		

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

Scalette50.rep

RIVER: Fosso Scalette
 REACH: 1 RS: 1.16666*

INPUT

Description:

Station Elevation Data		num= 15		Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	425.363	6.85	424.254	15.487	422.59	18.273	422.04	22.758	419.722		
24.317	419.011	25.584	418.763	25.76	418.603	26.331	418.632	27.494	418.704		
27.85	418.96	31.333	421.607	37.032	421.776	42.904	422.013	50.01	422.45		

Manning's n Values		num= 3		Sta	n Val	Sta	n Val	Sta	n Val
0	.04	18.273	.035	31.333	.04				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	18.273	31.333		22.667	22.667	.3	.5

CROSS SECTION OUTPUT Profile #Q Tr50

**	* E.G. Elev (m)	* 420.05	* Element	* Left OB	* Channel	* Right OB
**	* vel Head (m)	* 0.57	* wt. n-Val.	* 0.035		
**	* W.S. Elev (m)	* 419.48	* Reach Len. (m)	* 22.67	* 22.67	* 22.67
**	* Crit W.S. (m)	* 419.64	* Flow Area (m2)	* 2.96		
**	* E.G. Slope (m/m)	* 0.032623	* Area (m2)	* 2.96		
**	* Q Total (m3/s)	* 9.90	* Flow (m3/s)	* 9.90		
**	* Top Width (m)	* 5.23	* Top Width (m)	* 5.23		
**	* vel Total (m/s)	* 3.34	* Avg. vel. (m/s)	* 3.34		
**	* Max Chl Dpth (m)	* 0.87	* Hydr. Depth (m)	* 0.57		
**	* Conv. Total (m3/s)	* 54.8	* Conv. (m3/s)	* 54.8		
**	* Length wtd. (m)	* 22.67	* wetted Per. (m)	* 5.68		
**	* Min ch El (m)	* 418.60	* Shear (N/m2)	* 166.78		
**	* Alpha	* 1.00	* Stream Power (N/m s)	* 557.50		
**	* Frctn Loss (m)	* 1.02	* Cum volume (1000 m3)	* 0.06		
**	* C & E Loss (m)	* 0.23	* Cum SA (1000 m2)	* 0.12		
**						

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso Scalette
 REACH: 1 RS: 1

INPUT

Description:

Station Elevation Data		num= 10		Sta	Elev	Sta	Elev	Sta	Elev
------------------------	--	---------	--	-----	------	-----	------	-----	------

Scalette50.rep

 0 426.3 12.03 422.14 20.28 418.31 22.01 418 22.25 417.77
 23.02 417.79 24.59 417.85 29.77 421.84 34.1 421.84 43.96 422.05

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 12.03 .035 29.77 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 12.03 29.77 0 0 0 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 419.17 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.65 * wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 418.52 * Reach Len. (m) * * *
 * Crit W.S. (m) * 418.72 * Flow Area (m2) * * 2.77 *
 * E.G. Slope (m/m) *0.044041 * Area (m2) * * 2.77 *
 * Q Total (m3/s) * 9.90 * Flow (m3/s) * * 9.90 *
 * Top width (m) * 5.62 * Top width (m) * * 5.62 *
 * vel Total (m/s) * 3.58 * Avg. vel. (m/s) * * 3.58 *
 * Max Chl Dpth (m) * 0.75 * Hydr. Depth (m) * * 0.49 *
 * Conv. Total (m3/s) * 47.2 * Conv. (m3/s) * * 47.2 *
 * Length wtd. (m) * * Wetted Per. (m) * * 6.01 *
 * Min ch El (m) * 417.77 * Shear (N/m2) * * 198.90 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 711.22 *
 * Frctn Loss (m) * 0.85 * Cum volume (1000 m3) * * *
 * C & E Loss (m) * 0.02 * Cum SA (1000 m2) * * *

 **

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

SUMMARY OF MANNING'S N VALUES

River:Fosso Scalette

 * Reach * River Sta. * n1 * n2 * n3 *

 *1 * 4 * .04* .035* .04*
 *1 * 3.66666* * .04* .035* .04*
 *1 * 3.33333* * .04* .035* .04*
 *1 * 3 * .04* .035* .04*
 *1 * 2.66666* * .04* .035* .04*
 *1 * 2.33333* * .04* .035* .04*
 *1 * 2 * .04* .035* .04*
 *1 * 1.85* * .04* .035* .04*
 *1 * 1.7 * .04* .035* .04*
 *1 * 1.6 *Bridge * * *
 *1 * 1.5 * .04* .035* .04*
 *1 * 1.33333* * .04* .035* .04*
 *1 * 1.16666* * .04* .035* .04*
 *1 * 1 * .04* .035* .04*

Scalette50.rep

SUMMARY OF REACH LENGTHS

River: Fosso Scalette

```
*****
* Reach * River Sta. * Left * Channel * Right *
*****
*1 * 4 * 23.333* 23.333* 23.333*
*1 * 3.66666* * 23.333* 23.333* 23.333*
*1 * 3.33333* * 23.333* 23.333* 23.333*
*1 * 3 * * 25.667* 25.667* 25.667*
*1 * 2.66666* * 25.667* 25.667* 25.667*
*1 * 2.33333* * 25.667* 25.667* 25.667*
*1 * 2 * * 22.5* 22.5* 22.5*
*1 * 1.85* * 22.5* 22.5* 22.5*
*1 * 1.7 * * 34* 34* 34*
*1 * 1.6 *Bridge * *
*1 * 1.5 * 22.667* 22.667* 22.667*
*1 * 1.33333* * 22.667* 22.667* 22.667*
*1 * 1.16666* * 22.667* 22.667* 22.667*
*1 * 1 * * 0* 0* 0*
*****
```

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Fosso Scalette

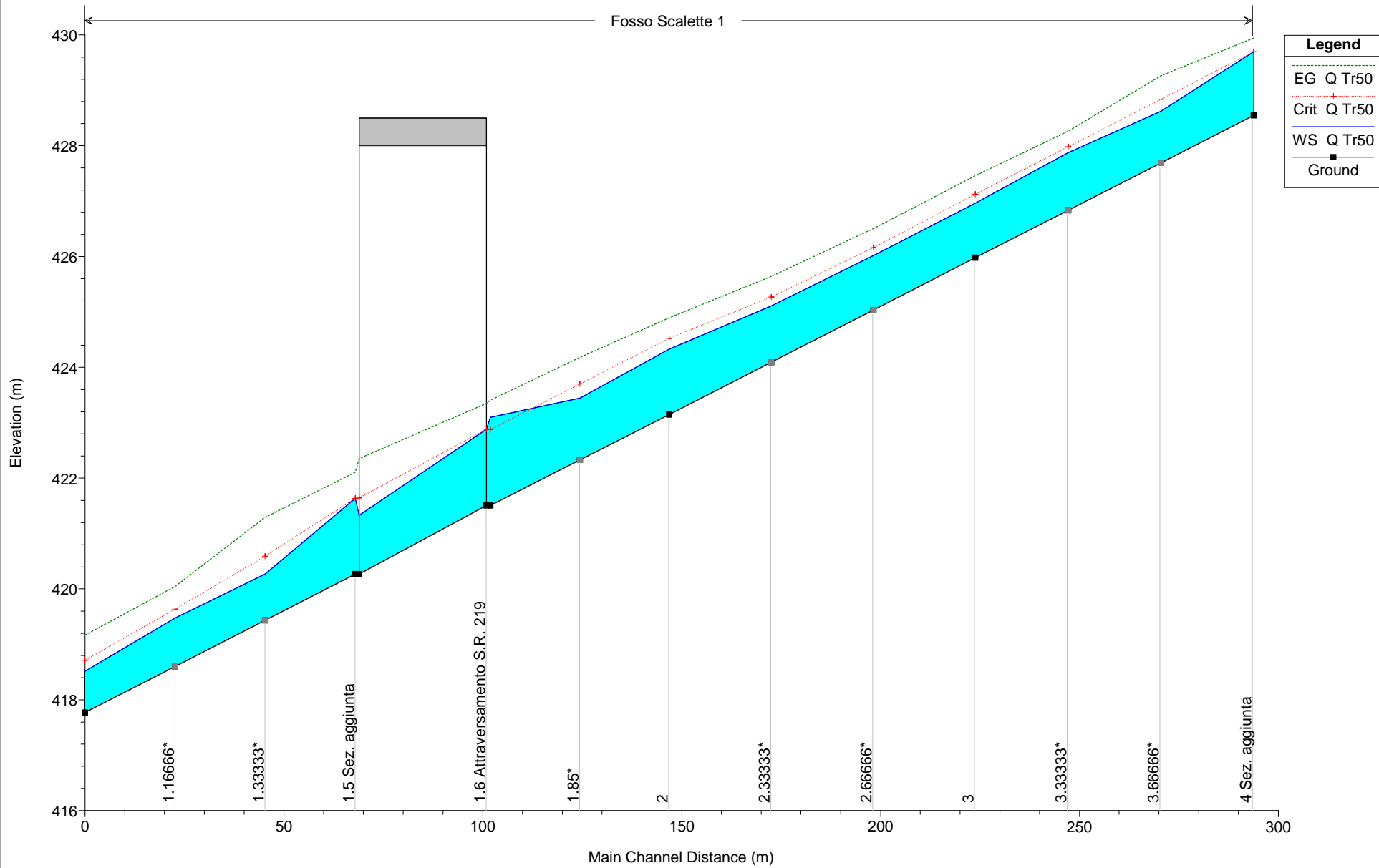
```
*****
* Reach * River Sta. * Contr. * Expan. *
*****
*1 * 4 * .1* .3*
*1 * 3.66666** * .1* .3*
*1 * 3.33333** * .1* .3*
*1 * 3 * * .1* .3*
*1 * 2.66666** * .1* .3*
*1 * 2.33333** * .1* .3*
*1 * 2 * * .1* .3*
*1 * 1.85* * .1* .3*
*1 * 1.7 * * .3* .5*
*1 * 1.6 *Bridge * *
*1 * 1.5 * * .3* .5*
*1 * 1.33333** * .3* .5*
*1 * 1.16666** * .3* .5*
*1 * 1 * * .1* .3*
*****
```

HEC-RAS Plan: Plan Tr50 River: Fosso Scalette Reach: 1 Profile: Q Tr50

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
1	4	Q Tr50	9.90	428.55	429.70	429.70	429.95	0.016113	2.21	4.51	9.66	0.99
1	3.66666*	Q Tr50	9.90	427.69	428.62	428.84	429.27	0.056358	3.55	2.79	6.81	1.77
1	3.33333*	Q Tr50	9.90	426.84	427.88	427.98	428.27	0.029456	2.77	3.58	7.84	1.31
1	3	Q Tr50	9.90	425.98	426.97	427.13	427.46	0.040012	3.11	3.18	7.34	1.51
1	2.66666*	Q Tr50	9.90	425.04	426.02	426.16	426.50	0.034619	3.09	3.21	6.74	1.43
1	2.33333*	Q Tr50	9.90	424.09	425.11	425.27	425.64	0.032041	3.24	3.05	5.53	1.39
1	2	Q Tr50	9.90	423.15	424.33	424.52	424.89	0.026556	3.48	3.37	8.45	1.26
1	1.85*	Q Tr50	9.90	422.33	423.45	423.70	424.18	0.036273	3.91	2.89	7.38	1.46
1	1.7	Q Tr50	9.90	421.51	423.10	422.88	423.41	0.007802	2.46	4.04	15.92	0.73
1	1.6		Bridge									
1	1.5	Q Tr50	9.90	420.27	421.64	421.64	422.11	0.015963	3.05	3.26	11.77	1.01
1	1.33333*	Q Tr50	9.90	419.44	420.27	420.59	421.29	0.066461	4.48	2.21	4.24	1.98
1	1.16666*	Q Tr50	9.90	418.60	419.48	419.64	420.05	0.032623	3.34	2.96	5.23	1.42
1	1	Q Tr50	9.90	417.77	418.52	418.72	419.17	0.044041	3.58	2.77	5.62	1.63

MACROAREA 09 Plan: Plan 01
Flow: Flow Tr50

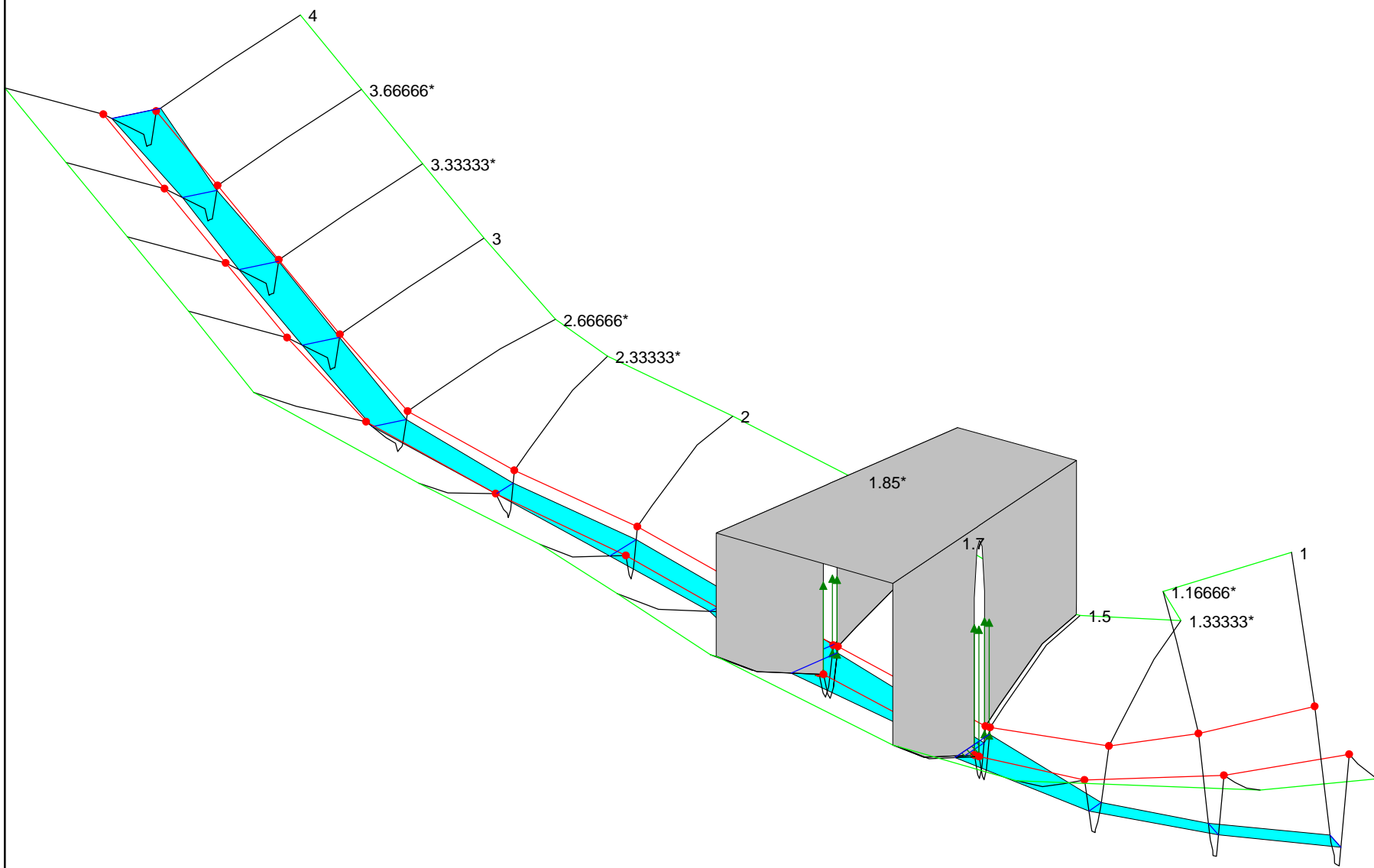
Fosso Scalette 1

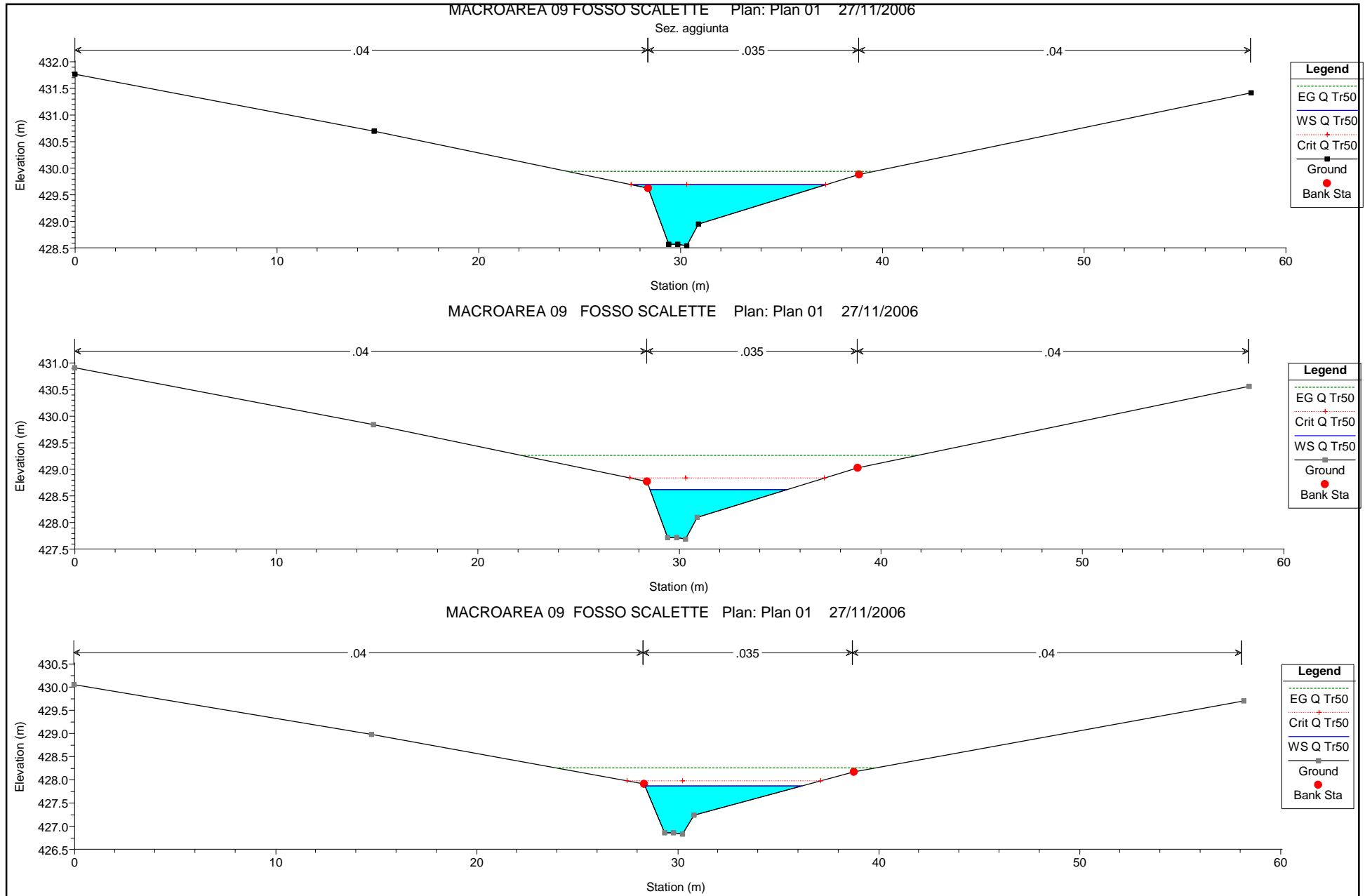


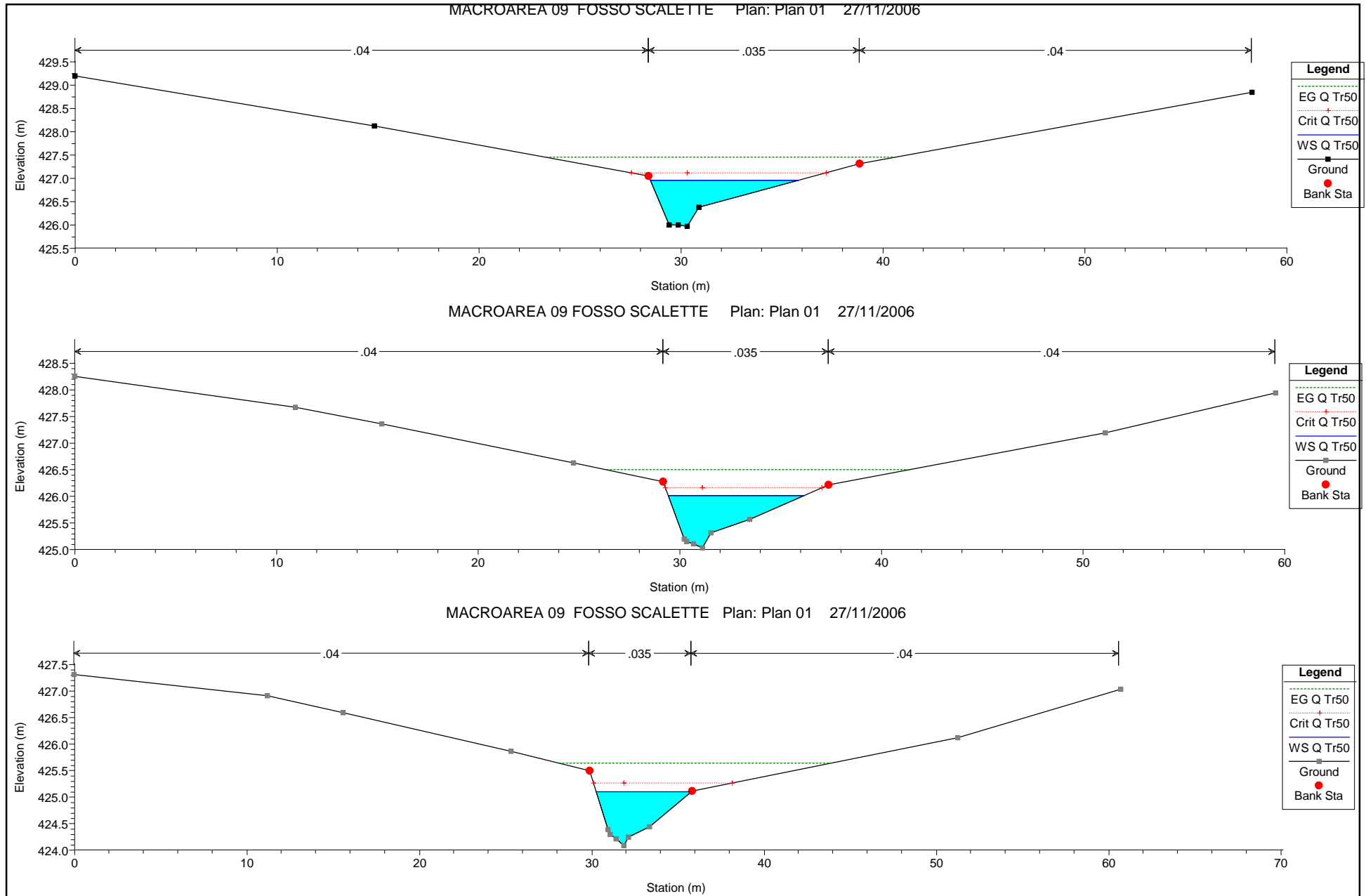
MACROAREA 09 Plan: Plan 01
Flow: Flow Tr50 FOSSO SCALETTE

Legend

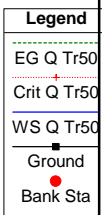
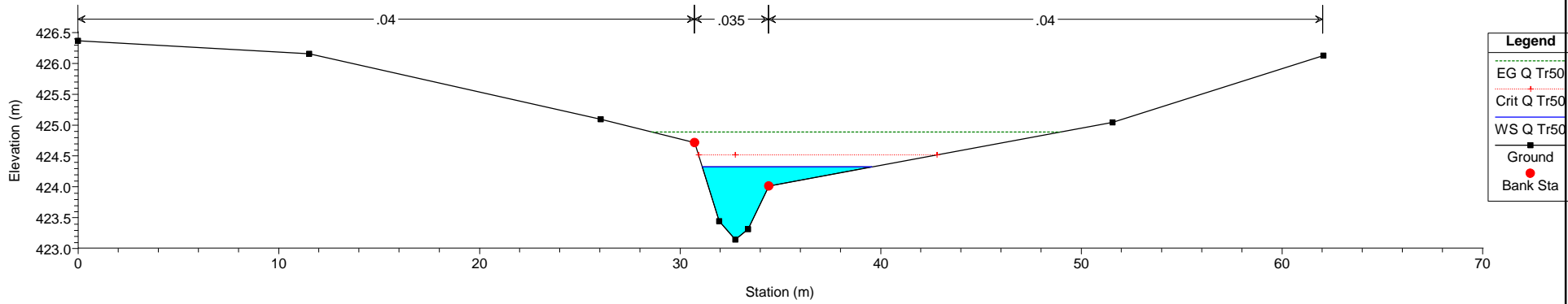
- WS Q Tr50
- Ground
- Bank Sta
- Ground
- Ineff



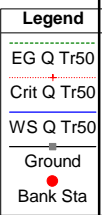
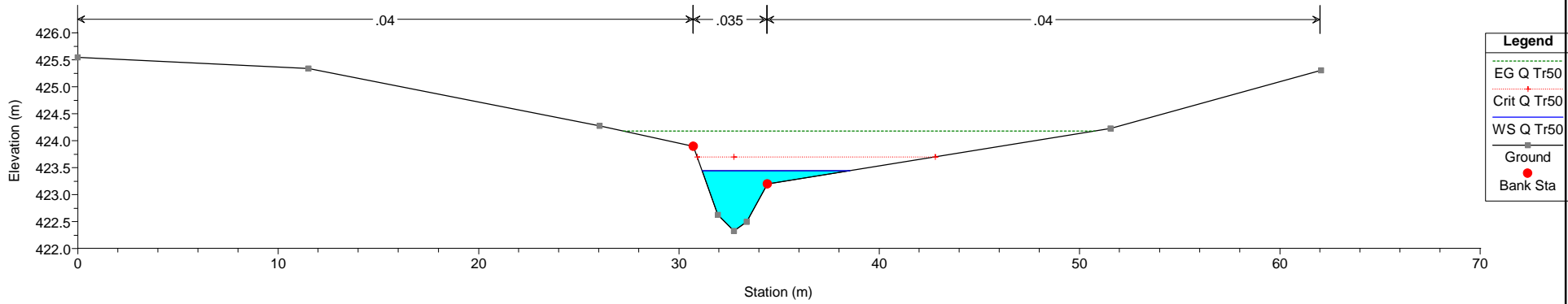




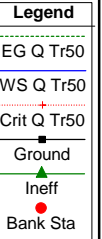
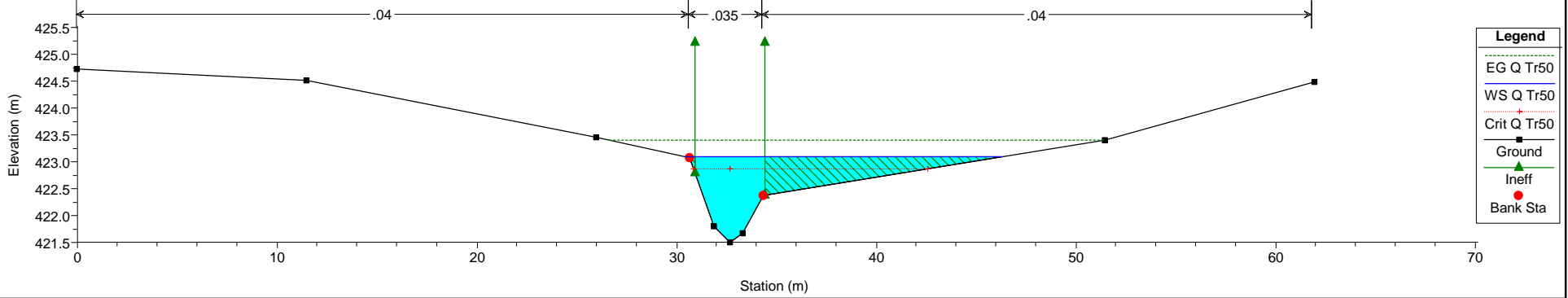
MACROAREA 09 FOSSO SCALETTE Plan: Plan 01 27/11/2006

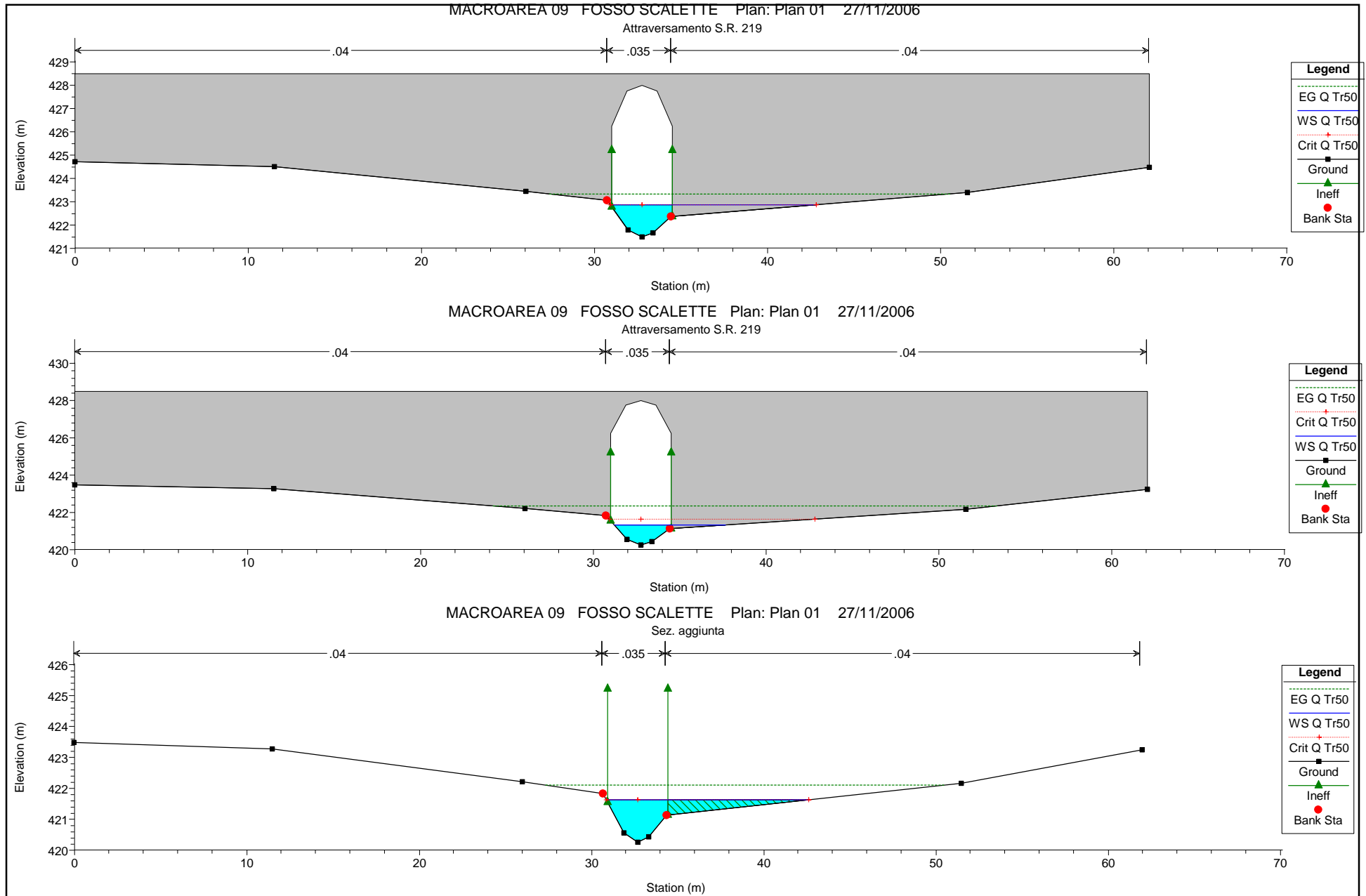


MACROAREA 09 FOSSO SCALETTE Plan: Plan 01 27/11/2006

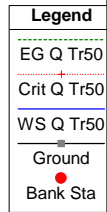
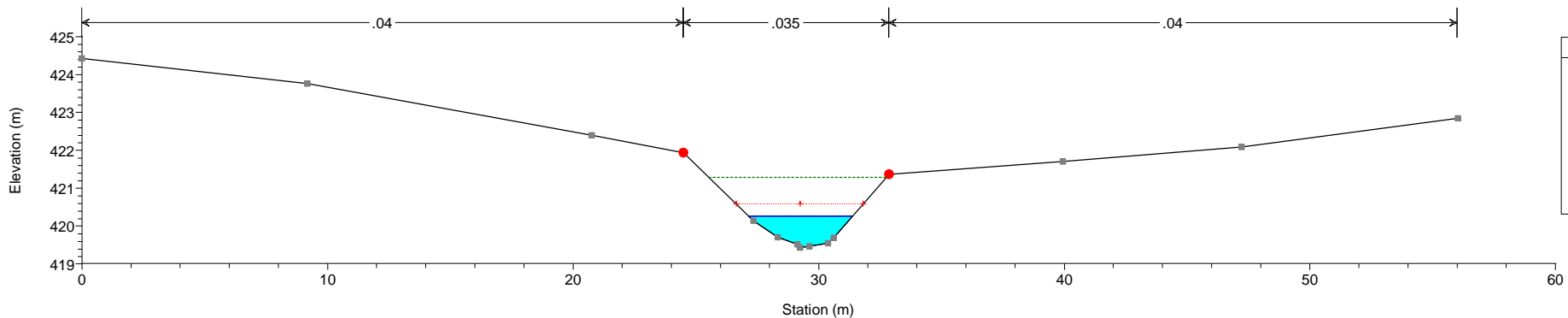


MACROAREA 09 FOSSO SCALETTE Plan: Plan 01 27/11/2006
Sez. aggiunta

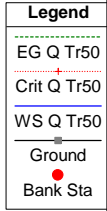
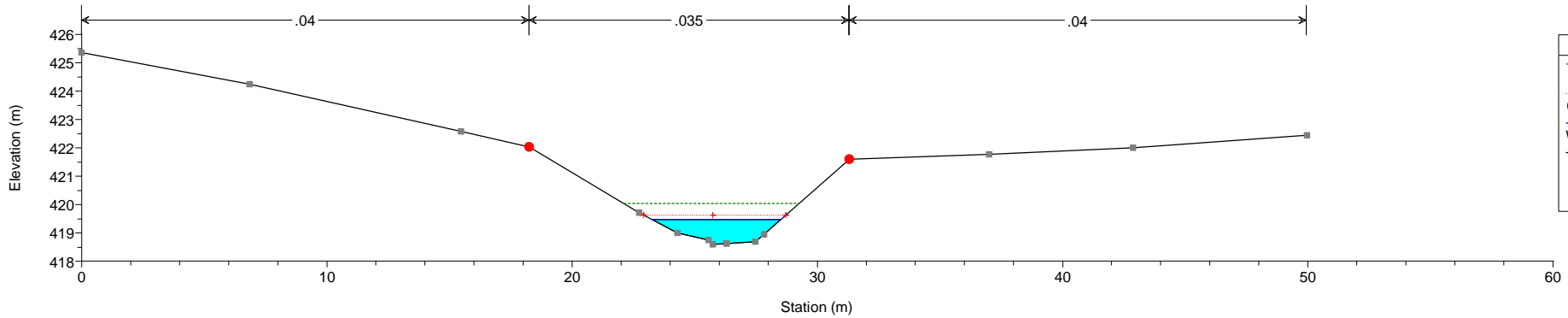




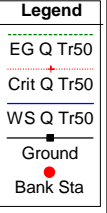
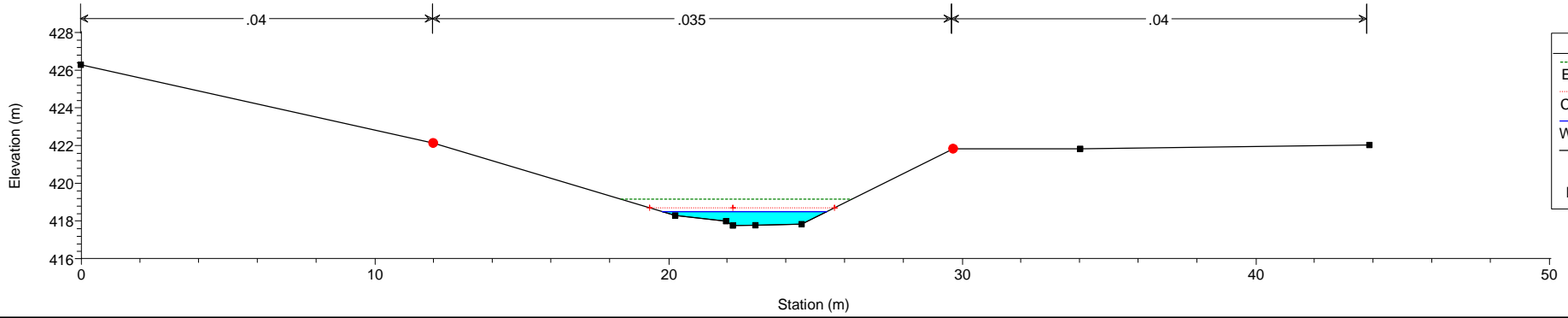
MACROAREA 09 FOSSO SCALETTE Plan: Plan 01 27/11/2006



MACROAREA 09 FOSSO SCALETTE Plan: Plan 01 27/11/2006



MACROAREA 09 FOSSO SCALETTE Plan: Plan 01 27/11/2006



scalette.rep

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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PROJECT DATA

Project Title: MACROAREA 09 FOSSO SCALETTE
Project File : scalette.prj
Run Date and Time: 21/11/2006 11.44.31

Project in SI units

Project Description:

verifica PRG GUBBIO MACROAREA 09 - FOSSO SCALETTE

FLOW DATA

Flow Title: Tr200

Flow File : n:\2006\06033\Integrazione\HEC_SCALETTE\Sez aggiunte\scalette.f01

Flow Data (m3/s)

* River Reach RS * Q Tr200 *
* Fosso Scalette 1 4 * 13.8 *

Boundary Conditions

* River Reach Profile * Upstream
Downstream *

* Fosso Scalette 1 Q Tr200 * Critical
Normal S = 0.036 *

GEOMETRY DATA

Geometry Title: Geom 01

Geometry File : n:\2006\06033\Integrazione\HEC_SCALETTE\Sez aggiunte\scalette.g01

CROSS SECTION

RIVER: Fosso Scalette

REACH: 1 RS: 4

INPUT

Description: Sez. aggiunta

Table with 12 columns: Station, Elev, Sta, Elev, num=, Sta, Elev, Sta, Elev, Sta, Elev. Data rows include values like 0, 30.33, 14.83, 30.91, 430.7, 428.96, 28.42, 38.88, 429.63, 429.89, 29.44, 58.32, 428.58, 431.42, 29.89, 428.58.

Manning's n Values

num= 3
Sta n Val Sta n Val Sta n Val

scalette.rep

```
*****
0      .04  28.42  .035  38.88  .04
Bank Sta: Left   Right   Lengths: Left Channel   Right   Coeff Contr.   Expan.
          28.42  38.88          23.333  23.333  23.333          .1          .3
```

CROSS SECTION OUTPUT Profile #Q Tr200

```
*****
**
* E.G. Elev (m)      * 430.11 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 0.27  * wt. n-Val.      * 0.040  * 0.035  *
* W.S. Elev (m)     * 429.85 * Reach Len. (m)  * 23.33  * 23.33  * 23.33
* Crit w.S. (m)     * 429.85 * Flow Area (m2)  * 0.30   * 5.91   *
* E.G. Slope (m/m)  * 0.014335 * Area (m2)      * 0.30   * 5.91   *
* Q Total (m3/s)    * 13.80  * Flow (m3/s)    * 0.21   * 13.59  *
* Top width (m)     * 12.88  * Top width (m)  * 2.78   * 10.11  *
* Vel Total (m/s)   * 2.22   * Avg. Vel. (m/s) * 0.68   * 2.30   *
* Max Chl Dpth (m) * 1.30   * Hydr. Depth (m) * 0.11   * 0.59   *
* Conv. Total (m3/s) * 115.3  * Conv. (m3/s)   * 1.7    * 113.5  *
* Length wtd. (m)  * 23.33  * wetted Per. (m) * 2.79   * 10.73  *
* Min Ch El (m)    * 428.55 * Shear (N/m2)   * 15.32  * 77.44  *
* Alpha            * 1.06   * Stream Power (N/m s) * 10.47  * 178.03  *
* Frctn Loss (m)   * 0.33   * Cum Volume (1000 m3) * 0.01   * 1.11   * 0.22
* C & E Loss (m)   * 0.00   * Cum SA (1000 m2) * 0.11   * 1.72   * 0.70
*****
**
```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Fosso Scalette
 REACH: 1 RS: 3.66666*

INPUT

Description:

```
Station Elevation Data num= 9
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
*****
0 430.913 14.83 429.843 28.42 428.773 29.44 427.723 29.89 427.723
30.33 427.693 30.91 428.103 38.88 429.033 58.32 430.563
```

Manning's n Values

```
num= 3
Sta n Val Sta n Val Sta n Val
*****
0 .04 28.42 .035 38.88 .04
```

```
Bank Sta: Left   Right   Lengths: Left Channel   Right   Coeff Contr.   Expan.
          28.42  38.88          23.333  23.333  23.333          .1          .3
```

CROSS SECTION OUTPUT Profile #Q Tr200

scalette.rep

```

*****
**
* E.G. Elev (m) * 429.48 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.74 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 428.74 * Reach Len. (m) * 23.33 * 23.33 * 23.33
* Crit W.S. (m) * 428.99 * Flow Area (m2) * * 3.62 *
* E.G. Slope (m/m) *0.055429 * Area (m2) * * 3.62 *
* Q Total (m3/s) * 13.80 * Flow (m3/s) * * 13.80 *
* Top width (m) * 7.89 * Top width (m) * * 7.89 *
* vel Total (m/s) * 3.81 * Avg. Vel. (m/s) * * 3.81 *
* Max Chl Dpth (m) * 1.04 * Hydr. Depth (m) * * 0.46 *
* Conv. Total (m3/s) * 58.6 * Conv. (m3/s) * * 58.6 *
* Length wtd. (m) * 23.33 * Wetted Per. (m) * * 8.49 *
* Min Ch El (m) * 427.69 * Shear (N/m2) * * 231.85 *
* Alpha * 1.00 * Stream Power (N/m s) * * 883.71 *
* Frctn Loss (m) * 0.59 * Cum Volume (1000 m3) * 0.01 * 1.00 * 0.22
* C & E Loss (m) * 0.05 * Cum SA (1000 m2) * 0.08 * 1.51 * 0.70
*****
**

```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso Scalette
 REACH: 1 RS: 3.33333*

INPUT

Description:

Station Elevation Data		num= 9	
Sta	Elev	Sta	Elev
0	430.057	14.83	428.987
30.33	426.837	30.91	427.247
28.42	427.917	38.88	428.177
29.44	426.867	58.32	429.707
29.89	426.867		

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.04	28.42	.035
38.88	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	28.42	38.88	23.333	23.333	23.333	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m) * 428.46 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.47 * wt. n-Val. * 0.040 * 0.035 *
* W.S. Elev (m) * 427.99 * Reach Len. (m) * 23.33 * 23.33 * 23.33
* Crit W.S. (m) * 428.14 * Flow Area (m2) * 0.03 * 4.53 *

```

scalette.rep

```

*
* E.G. Slope (m/m)      *0.030325 * Area (m2)           * 0.03 * 4.53 *
*
* Q Total (m3/s)       * 13.80 * Flow (m3/s)         * 0.02 * 13.78 *
*
* Top width (m)        * 9.78 * Top width (m)       * 0.93 * 8.86 *
*
* Vel Total (m/s)      * 3.02 * Avg. Vel. (m/s)    * 0.48 * 3.04 *
*
* Max Chl Dpth (m)    * 1.15 * Hydr. Depth (m)    * 0.04 * 0.51 *
*
* Conv. Total (m3/s)   * 79.2 * Conv. (m3/s)        * 0.1 * 79.2 *
*
* Length Wtd. (m)     * 23.33 * Wetted Per. (m)    * 0.93 * 9.48 *
*
* Min Ch El (m)       * 426.84 * Shear (N/m2)       * 10.81 * 142.20 *
*
* Alpha               * 1.01 * Stream Power (N/m s) * 5.16 * 432.62 *
*
* Frctn Loss (m)      * 0.94 * Cum Volume (1000 m3) * 0.01 * 0.90 * 0.22
*
* C & E Loss (m)      * 0.08 * Cum SA (1000 m2)   * 0.07 * 1.31 * 0.70
*
*****
**

```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso Scalette
 REACH: 1 RS: 3

INPUT

Description:

Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	429.2	14.83	428.13	28.42	427.06	29.44	426.01	29.89	426.01
30.33	425.98	30.91	426.39	38.88	427.32	58.32	428.85		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	28.42	.035	38.88	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	28.42	38.88		25.667	25.667	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m)        * 427.65 * Element           * Left OB * Channel * Right OB
*
* Vel Head (m)         * 0.57 * wt. n-Val.        * 0.040 * 0.035 *
*
* W.S. Elev (m)        * 427.09 * Reach Len. (m)    * 25.67 * 25.67 * 25.67
*
* Crit W.S. (m)        * 427.28 * Flow Area (m2)    * 0.00 * 4.14 *
*
* E.G. Slope (m/m)     *0.038843 * Area (m2)         * 0.00 * 4.14 *
*
* Q Total (m3/s)       * 13.80 * Flow (m3/s)        * 0.00 * 13.80 *
*
* Top width (m)        * 8.82 * Top width (m)      * 0.35 * 8.47 *
*
* Vel Total (m/s)      * 3.33 * Avg. vel. (m/s)   * 0.28 * 3.33 *
*
* Max Chl Dpth (m)     * 1.11 * Hydr. Depth (m)   * 0.01 * 0.49 *
*
* Conv. Total (m3/s)   * 70.0 * Conv. (m3/s)       * 0.0 * 70.0 *
*

```



```

          scalette.rep
* Length wtd. (m)      * 25.67 * wetted Per. (m)      * 0.35 * 9.08 *
* Min Ch El (m)      * 425.98 * Shear (N/m2)      * 5.28 * 173.55 *
* Alpha              * 1.00 * Stream Power (N/m s) * 1.50 * 578.63 *
* Frctn Loss (m)     * 0.80 * Cum Volume (1000 m3) * 0.01 * 0.80 * 0.22
* C & E Loss (m)     * 0.01 * Cum SA (1000 m2)   * 0.05 * 1.11 * 0.70

```

**

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso Scalette
REACH: 1 RS: 2.66666*

INPUT

Description:

Station Elevation Data num= 14
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 428.257 10.945 427.674 15.237 427.363 24.748 426.634 29.2 426.28
 30.24 425.203 30.366 425.157 30.698 425.114 31.147 425.037 31.571 425.32
 33.494 425.571 37.407 426.22 51.146 427.195 59.583 427.943

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 29.2 .035 37.407 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 29.2 37.407 25.667 25.667 25.667 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

 **
 * E.G. Elev (m) * 426.72 * Element * Left OB * Channel * Right OB
 * Vel Head (m) * 0.57 * wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 426.15 * Reach Len. (m) * 25.67 * 25.67 * 25.67
 * Crit W.S. (m) * 426.32 * Flow Area (m2) * * 4.12 *
 * E.G. Slope (m/m) *0.034441 * Area (m2) * * 4.12 *
 * Q Total (m3/s) * 13.80 * Flow (m3/s) * * 13.80 *
 * Top width (m) * 7.63 * Top width (m) * * 7.63 *
 * Vel Total (m/s) * 3.35 * Avg. Vel. (m/s) * * 3.35 *
 * Max Chl Dpth (m) * 1.11 * Hydr. Depth (m) * * 0.54 *
 * Conv. Total (m3/s) * 74.4 * Conv. (m3/s) * * 74.4 *
 * Length wtd. (m) * 25.67 * wetted Per. (m) * * 8.19 *
 * Min Ch El (m) * 425.04 * Shear (N/m2) * * 169.71 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 568.76 *
 * Frctn Loss (m) * 0.94 * Cum Volume (1000 m3) * 0.01 * 0.69 * 0.22
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.05 * 0.91 * 0.70

 **

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso Scalette
 REACH: 1 RS: 2.33333*

INPUT

Description:

Station Elevation Data		num= 14		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	427.313	11.238	426.917	15.644	426.597	25.409	425.867	29.98	425.5
31.039	424.395	31.168	424.303	31.506	424.218	31.963	424.093	32.233	424.251
33.452	424.445	35.933	425.12	51.368	426.123	60.847	427.037		

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	29.98	.035	35.933	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	29.98	35.933		25.667	25.667	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr200

**	E.G. Elev (m)	* 425.89	* Element	* Left OB	* Channel	* Right OB
**	vel Head (m)	* 0.64	* wt. n-Val.	* 0.035	* 0.040	
**	w.s. Elev (m)	* 425.25	* Reach Len. (m)	* 25.67	* 25.67	* 25.67
**	Crit w.s. (m)	* 425.47	* Flow Area (m2)	* 3.86	* 0.13	
**	E.G. slope (m/m)	*0.029718	* Area (m2)	* 3.86	* 0.13	
**	Q Total (m3/s)	* 13.80	* Flow (m3/s)	* 13.71	* 0.09	
**	Top width (m)	* 7.72	* Top width (m)	* 5.71	* 2.01	
**	vel Total (m/s)	* 3.46	* Avg. vel. (m/s)	* 3.56	* 0.70	
**	Max chl Dpth (m)	* 1.16	* Hydr. Depth (m)	* 0.67	* 0.07	
**	Conv. Total (m3/s)	* 80.1	* Conv. (m3/s)	* 79.5	* 0.5	
**	Length wtd. (m)	* 25.67	* wetted Per. (m)	* 6.28	* 2.01	
**	Min ch El (m)	* 424.09	* Shear (N/m2)	* 178.77	* 18.98	
**	Alpha	* 1.05	* Stream Power (N/m s)	* 635.72	* 13.24	
**	Frctn Loss (m)	* 0.82	* Cum volume (1000 m3)	* 0.01	* 0.59	* 0.22
**	C & E Loss (m)	* 0.01	* Cum SA (1000 m2)	* 0.05	* 0.74	* 0.68
**	*****					
**	*****					

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso Scalette
 REACH: 1 RS: 2

INPUT

Description:

Station Elevation Data		num= 10		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	426.37	11.53	426.16	26.07	425.1	30.76	424.72	31.97	423.45
32.78	423.15	33.41	423.32	34.46	424.02	51.59	425.05	62.11	426.13

scalette.rep

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 30.76 .035 34.46 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 30.76 34.46 22.5 22.5 22.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

 **
 * E.G. Elev (m) * 425.12 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.68 * wt. n-Val. * * 0.035 * 0.040
 * W.S. Elev (m) * 424.44 * Reach Len. (m) * 22.50 * 22.50 * 22.50
 * Crit W.S. (m) * 424.67 * Flow Area (m2) * * 2.95 * 1.44
 * E.G. slope (m/m) *0.029897 * Area (m2) * * 2.95 * 1.44
 * Q Total (m3/s) * 13.80 * Flow (m3/s) * * 11.61 * 2.19
 * Top width (m) * 10.36 * Top width (m) * * 3.43 * 6.93
 * vel Total (m/s) * 3.14 * Avg. vel. (m/s) * * 3.94 * 1.52
 * Max chl Dpth (m) * 1.29 * Hydr. Depth (m) * * 0.86 * 0.21
 * Conv. Total (m3/s) * 79.8 * Conv. (m3/s) * * 67.1 * 12.7
 * Length wtd. (m) * 22.50 * wetted Per. (m) * * 4.14 * 6.95
 * Min Ch El (m) * 423.15 * Shear (N/m2) * * 208.65 * 60.99
 * Alpha * 1.36 * Stream Power (N/m s) * * 821.66 * 92.57
 * Frctn Loss (m) * 0.77 * Cum volume (1000 m3) * 0.01 * 0.50 * 0.19
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.05 * 0.62 * 0.56
 *

 **

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso Scalette
 REACH: 1 RS: 1.85*

INPUT

Description:

Station Elevation Data num= 10
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 425.55 11.53 425.34 26.07 424.28 30.76 423.9 31.97 422.63
 32.78 422.33 33.41 422.5 34.46 423.2 51.59 424.23 62.11 425.31

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 30.76 .035 34.46 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 30.76 34.46 22.5 22.5 22.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

 **
 * E.G. Elev (m) * 424.38 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.79 * wt. n-Val. * * 0.035 * 0.040
 *

```

scalette.rep
* W.S. Elev (m) * 423.58 * Reach Len. (m) * 22.50 * 22.50 * 22.50
* Crit W.S. (m) * 423.85 * Flow Area (m2) * * 2.83 * 1.22
* E.G. Slope (m/m) *0.035378 * Area (m2) * * 2.83 * 1.22
* Q Total (m3/s) * 13.80 * Flow (m3/s) * * 11.90 * 1.90
* Top width (m) * 9.76 * Top width (m) * * 3.40 * 6.37
* Vel Total (m/s) * 3.41 * Avg. Vel. (m/s) * * 4.20 * 1.56
* Max Chl Dpth (m) * 1.25 * Hydr. Depth (m) * * 0.83 * 0.19
* Conv. Total (m3/s) * 73.4 * Conv. (m3/s) * * 63.3 * 10.1
* Length wtd. (m) * 22.50 * Wetted Per. (m) * * 4.09 * 6.38
* Min Ch El (m) * 422.33 * Shear (N/m2) * * 239.91 * 66.28
* Alpha * 1.34 * Stream Power (N/m s) * * 1008.19 * 103.38
* Frctn Loss (m) * 0.73 * Cum Volume (1000 m3) * 0.01 * 0.44 * 0.16
* C & E Loss (m) * 0.01 * Cum SA (1000 m2) * 0.05 * 0.54 * 0.41

```

```

*****
**

```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso Scalette
 REACH: 1 RS: 1.7

INPUT

Description: Sez. aggiunta
 Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	424.73	11.53	424.52	26.07	423.46	30.76	423.08	31.97	421.81
32.78	421.51	33.41	421.68	34.46	422.38	51.59	423.41	62.11	424.49

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	30.76	.035	34.46	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 30.76 34.46 34 34 34 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 31.03 425.22 T
 34.53 62.11 425.22 T

CROSS SECTION OUTPUT Profile #Q Tr200

```

*****
**
* E.G. Elev (m) * 423.76 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.39 * wt. n-Val. * * 0.035 * 0.040
* W.S. Elev (m) * 423.38 * Reach Len. (m) * 1.00 * 1.00 * 1.00
* Crit W.S. (m) * 423.11 * Flow Area (m2) * * 4.94 * 0.07
* E.G. Slope (m/m) *0.007404 * Area (m2) * 0.55 * 5.06 * 8.27
* Q Total (m3/s) * 13.80 * Flow (m3/s) * * 13.65 * 0.15
* Top width (m) * 23.96 * Top width (m) * 3.67 * 3.70 * 16.59
* Vel Total (m/s) * 2.76 * Avg. vel. (m/s) * * 2.76 * 2.14

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scalette.rep

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* Max Chl Dpth (m) * 1.87 * Hydr. Depth (m) * * 1.44 * 1.00
* Conv. Total (m3/s) * 160.4 * Conv. (m3/s) * * 158.6 * 1.7
* Length wtd. (m) * 1.00 * Wetted Per. (m) * * 4.14 * 0.07
* Min Ch El (m) * 421.51 * Shear (N/m2) * * 86.58 * 72.13
* Alpha * 1.00 * Stream Power (N/m s) * * 239.34 * 154.48
* Frctn Loss (m) * 0.01 * Cum Volume (1000 m3) * 0.00 * 0.35 * 0.06
* C & E Loss (m) * 0.06 * Cum SA (1000 m2) * 0.01 * 0.46 * 0.15

```

**

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

BRIDGE

RIVER: Fosso Scalette

REACH: 1 RS: 1.6

INPUT

Description: Attraversamento S.R. 219

Distance from Upstream XS = 1

Deck/Roadway width = 32

Weir Coefficient = 1.44

Upstream Deck/Roadway Coordinates

num= 9

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	428.5	424	31.03	428.5	31.03	428.5	426.25							
31.905	428.5	427.76	32.78	428.5	428	33.655	428.5	427.76						
34.53	428.5	426.25	34.53	428.5	62.11	428.5								

Upstream Bridge Cross Section Data

Station Elevation Data

num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	424.73	11.53	424.52	26.07	423.46	30.76	423.08	31.97	421.81
32.78	421.51	33.41	421.68	34.46	422.38	51.59	423.41	62.11	424.49

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	30.76	.035	34.46	.04

Bank Sta: Left Right Coeff Contr. Expan.
30.76 34.46 .3 .5

Ineffective Flow

num= 2

Sta L	Sta R	Elev	Permanent
0	31.03	425.22	T
34.53	62.11	425.22	T

Downstream Deck/Roadway Coordinates

num= 9

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	428.5	424	31.03	428.5	31.03	428.5	426.25							
31.905	428.5	427.76	32.78	428.5	428	33.655	428.5	427.76						
34.53	428.5	426.25	34.53	428.5	62.11	428.5								

Downstream Bridge Cross Section Data

Station Elevation Data

num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	423.49	11.53	423.28	26.07	422.22	30.76	421.84	31.97	420.57
32.78	420.27	33.41	420.44	34.46	421.14	51.59	422.17	62.11	423.25

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	30.76	.035	34.46	.04

 0 .04 30.76 .035 34.46 .04

Bank Sta: Left Right Coeff Contr. Expan.
 30.76 34.46 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 31.03 425.22 T
 34.53 62.11 425.22 T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
 Energy
 Selected Low Flow Methods = Energy

High Flow Method
 Pressure and Weir flow
 Submerged Inlet Cd =
 Submerged Inlet + Outlet Cd = .8
 Max Low Cord =

Additional Bridge Parameters
 Add Friction component to Momentum
 Do not add weight component to Momentum
 Class B flow critical depth computations use critical depth
 inside the bridge at the upstream end
 Criteria to check for pressure flow = Upstream water surface

BRIDGE OUTPUT Profile #Q Tr200

	*		*	*Inside BR US	*Inside BR DS
* E.G. US. (m)	*	423.76	* Element		
* W.S. US. (m)	*	423.38	* E.G. Elev (m)	* 423.70	* 422.73
* Q Total (m3/s)	*	13.80	* W.S. Elev (m)	* 423.12	* 421.52
* Q Bridge (m3/s)	*	13.80	* Crit W.S. (m)	* 423.12	* 421.88
* Q Weir (m3/s)	*		* Max Chl Dpth (m)	* 1.61	* 1.24
* Weir Sta Lft (m)	*		* Vel Total (m/s)	* 3.37	* 4.88
* Weir Sta Rgt (m)	*		* Flow Area (m2)	* 4.09	* 2.83
* Weir Submerg	*		* Froude # Chl	* 0.99	* 1.73
* Weir Max Depth (m)	*		* Specif Force (m3)	* 7.34	* 8.22
* Min El Weir Flow (m)	*	428.50	* Hydr Depth (m)	* 1.17	* 0.82
* Min El Prs (m)	*	428.00	* W.P. Total (m)	* 4.21	* 4.15
* Delta EG (m)	*	1.22	* Conv. Total (m3/s)	* 114.7	* 62.7
* Delta WS (m)	*	1.73	* Top width (m)	* 3.50	* 3.46
* BR Open Area (m2)	*	19.24	* Frctn Loss (m)	* 0.32	* 0.77
* BR Open Vel (m/s)	*	4.88	* C & E Loss (m)	* 0.10	* 0.19
* Coef of Q	*		* Shear Total (N/m2)	* 137.93	* 323.65
* Br Sel Method	*	*Energy only	* Power Total (N/m s)	* 464.87	* 1578.01

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than

0.7 or greater than 1.4. This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
 Note: The energy method has computed a class B profile.

CROSS SECTION

RIVER: Fosso Scalette
 REACH: 1 RS: 1.5

INPUT

Description: Sez. aggiunta

Station Elevation Data		num= 10		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	423.49	11.53	423.28	26.07	422.22	30.76	421.84	31.97	420.57
32.78	420.27	33.41	420.44	34.46	421.14	51.59	422.17	62.11	423.25

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	30.76	.035	34.46	.04

Bank Sta:	Left	Right	Lengths:		Left Channel	Right	Coeff Contr.	Expan.
	30.76	34.46	22.667	22.667	22.667		.3	.5
Ineffective Flow	num= 2							
	Sta L	Sta R	Elev	Permanent				
	0	31.03	425.22	T				
	34.53	62.11	425.22	T				

CROSS SECTION OUTPUT Profile #Q Tr200

**	* E.G. Elev (m)	* 422.46	* Element	* Left OB	* Channel	* Right OB
* *	* vel Head (m)	* 0.58	* wt. n-Val.	* 0.035	* 0.040	
* *	* W.S. Elev (m)	* 421.87	* Reach Len. (m)	* 22.67	* 22.67	* 22.67
* *	* Crit W.S. (m)	* 421.87	* Flow Area (m2)	* 4.03	* 0.05	
* *	* E.G. slope (m/m)	* 0.014643	* Area (m2)	* 0.01	* 4.08	* 4.46
* *	* Q Total (m3/s)	* 13.80	* Flow (m3/s)	* 13.68	* 0.12	
* *	* Top width (m)	* 16.27	* Top width (m)	* 0.40	* 3.70	* 12.18
* *	* vel Total (m/s)	* 3.38	* Avg. vel. (m/s)	* 3.39	* 2.45	
* *	* Max chl Dpth (m)	* 1.60	* Hydr. Depth (m)	* 1.17	* 0.73	
* *	* Conv. Total (m3/s)	* 114.0	* Conv. (m3/s)	* 113.0	* 1.0	
* *	* Length wtd. (m)	* 22.67	* wetted Per. (m)	* 4.14	* 0.07	
* *	* Min ch El (m)	* 420.27	* Shear (N/m2)	* 139.69	* 104.64	
* *	* Alpha	* 1.00	* Stream Power (N/m s)	* 474.18	* 256.35	
* *	* Frctn Loss (m)	* 0.34	* Cum Volume (1000 m3)	* 0.00	* 0.23	* 0.05
* *	* C & E Loss (m)	* 0.08	* Cum SA (1000 m2)	* 0.00	* 0.34	* 0.14
* *	*****					
* *	*****					

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

scalette.rep

Warning: section. This may indicate the need for additional cross sections. During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Fosso Scalette
 REACH: 1 RS: 1.33333*

INPUT

Description:

Station Elevation Data		num= 15		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	424.427	9.19	423.767	20.779	422.405	24.517	421.94	27.364	420.146		
28.354	419.713	29.158	419.525	29.27	419.437	29.641	419.474	30.399	419.557		
30.63	419.7	32.897	421.373	39.965	421.712	47.247	422.092	56.06	422.85		

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	24.517	.035	32.897	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	24.517	32.897		22.667	22.667	.3	.5

CROSS SECTION OUTPUT Profile #Q Tr200

* E.G. Elev (m)	* 421.64	* Element	* Left OB	* Channel	* Right OB
* Vel Head (m)	* 1.24	* wt. n-Val.	* 0.035		
* W.S. Elev (m)	* 420.40	* Reach Len. (m)	* 22.67	* 22.67	* 22.67
* Crit W.S. (m)	* 420.79	* Flow Area (m2)	* 2.80		
* E.G. Slope (m/m)	* 0.066808	* Area (m2)	* 2.80		
* Q Total (m3/s)	* 13.80	* Flow (m3/s)	* 13.80		
* Top width (m)	* 4.63	* Top width (m)	* 4.63		
* Vel Total (m/s)	* 4.93	* Avg. Vel. (m/s)	* 4.93		
* Max Chl Dpth (m)	* 0.97	* Hydr. Depth (m)	* 0.60		
* Conv. Total (m3/s)	* 53.4	* Conv. (m3/s)	* 53.4		
* Length Wtd. (m)	* 22.67	* Wetted Per. (m)	* 5.13		
* Min Ch El (m)	* 419.44	* Shear (N/m2)	* 357.62		
* Alpha	* 1.00	* Stream Power (N/m s)	* 1763.97		
* Frctn Loss (m)	* 0.62	* Cum Volume (1000 m3)	* 0.16		
* C & E Loss (m)	* 0.20	* Cum SA (1000 m2)	* 0.25		

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

scalette.rep

RIVER: Fosso Scalette
 REACH: 1 RS: 1.16666*

INPUT

Description:

Station Elevation Data		num= 15		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	425.363	6.85	424.254	15.487	422.59	18.273	422.04	22.758	419.722
24.317	419.011	25.584	418.763	25.76	418.603	26.331	418.632	27.494	418.704
27.85	418.96	31.333	421.607	37.032	421.776	42.904	422.013	50.01	422.45

Manning's n Values

num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	18.273	.035	31.333	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	18.273	31.333		22.667	22.667	.3	.5

CROSS SECTION OUTPUT Profile #Q Tr200

* E.G. Elev (m)	* 420.32	* Element	* Left OB	* Channel	* Right OB
* Vel Head (m)	* 0.71	* wt. n-Val.	* 0.035		
* W.S. Elev (m)	* 419.61	* Reach Len. (m)	* 22.67	* 22.67	* 22.67
* Crit W.S. (m)	* 419.82	* Flow Area (m2)		* 3.69	
* E.G. Slope (m/m)	* 0.034409	* Area (m2)		* 3.69	
* Q Total (m3/s)	* 13.80	* Flow (m3/s)		* 13.80	
* Top width (m)	* 5.70	* Top width (m)		* 5.70	
* Vel Total (m/s)	* 3.74	* Avg. Vel. (m/s)		* 3.74	
* Max Chl Dpth (m)	* 1.01	* Hydr. Depth (m)		* 0.65	
* Conv. Total (m3/s)	* 74.4	* Conv. (m3/s)		* 74.4	
* Length Wtd. (m)	* 22.67	* wetted Per. (m)		* 6.22	
* Min Ch El (m)	* 418.60	* Shear (N/m2)		* 200.08	
* Alpha	* 1.00	* Stream Power (N/m s)		* 748.46	
* Frctn Loss (m)	* 1.06	* Cum Volume (1000 m3)		* 0.08	
* C & E Loss (m)	* 0.26	* Cum SA (1000 m2)		* 0.13	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
 Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Fosso Scalette
 REACH: 1 RS: 1

INPUT

Description:

Station Elevation Data		num= 10		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	426.3	12.03	422.14	20.28	418.31	22.01	418	22.25	417.77
23.02	417.79	24.59	417.85	29.77	421.84	34.1	421.84	43.96	422.05

scalette.rep

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 12.03 .035 29.77 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 12.03 29.77 0 0 0 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr200

 **
 * E.G. Elev (m) * 419.43 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.79 * wt. n-Val. * * 0.035 *
 * W.S. Elev (m) * 418.64 * Reach Len. (m) * * *
 * Crit W.S. (m) * 418.89 * Flow Area (m2) * * 3.51 *
 * E.G. slope (m/m) *0.043191 * Area (m2) * * 3.51 *
 * Q Total (m3/s) * 13.80 * Flow (m3/s) * * 13.80 *
 * Top width (m) * 6.06 * Top width (m) * * 6.06 *
 * vel Total (m/s) * 3.93 * Avg. vel. (m/s) * * 3.93 *
 * Max chl Dpth (m) * 0.87 * Hydr. Depth (m) * * 0.58 *
 * Conv. Total (m3/s) * 66.4 * Conv. (m3/s) * * 66.4 *
 * Length wtd. (m) * * wetted Per. (m) * * 6.52 *
 * Min Ch El (m) * 417.77 * Shear (N/m2) * * 228.04 *
 * Alpha * 1.00 * Stream Power (N/m s) * * 896.11 *
 * Frctn Loss (m) * 0.87 * Cum volume (1000 m3) * * *
 * C & E Loss (m) * 0.02 * Cum SA (1000 m2) * * *
 *

 **

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

SUMMARY OF MANNING'S N VALUES

River:Fosso Scalette

 * Reach * River Sta. * n1 * n2 * n3 *

 *1 * 4 * .04* .035* .04*
 *1 * 3.66666* * .04* .035* .04*
 *1 * 3.33333* * .04* .035* .04*
 *1 * 3 * * .04* .035* .04*
 *1 * 2.66666* * .04* .035* .04*
 *1 * 2.33333* * .04* .035* .04*
 *1 * 2 * * .04* .035* .04*
 *1 * 1.85* * .04* .035* .04*
 *1 * 1.7 * * .04* .035* .04*
 *1 * 1.6 *Bridge * * *
 *1 * 1.5 * * .04* .035* .04*
 *1 * 1.33333* * .04* .035* .04*
 *1 * 1.16666* * .04* .035* .04*
 *1 * 1 * * .04* .035* .04*

SUMMARY OF REACH LENGTHS

River: Fosso Scalette

scalette.rep

```

*****
* Reach * River Sta. * Left * Channel * Right *
*****
*1 * 4 * 23.333* 23.333* 23.333*
*1 * 3.66666* * 23.333* 23.333* 23.333*
*1 * 3.33333* * 23.333* 23.333* 23.333*
*1 * 3 * * 25.667* 25.667* 25.667*
*1 * 2.66666* * 25.667* 25.667* 25.667*
*1 * 2.33333* * 25.667* 25.667* 25.667*
*1 * 2 * * 22.5* 22.5* 22.5*
*1 * 1.85* * 22.5* 22.5* 22.5*
*1 * 1.7 * * 34* 34* 34*
*1 * 1.6 * *Bridge* * *
*1 * 1.5 * * 22.667* 22.667* 22.667*
*1 * 1.33333* * 22.667* 22.667* 22.667*
*1 * 1.16666* * 22.667* 22.667* 22.667*
*1 * 1 * * 0* 0* 0*
*****

```

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Fosso Scalette

```

*****
* Reach * River Sta. * Contr. * Expan. *
*****
*1 * 4 * .1* .3*
*1 * 3.66666** * .1* .3*
*1 * 3.33333** * .1* .3*
*1 * 3 * * .1* .3*
*1 * 2.66666** * .1* .3*
*1 * 2.33333** * .1* .3*
*1 * 2 * * .1* .3*
*1 * 1.85* * .1* .3*
*1 * 1.7 * * .3* .5*
*1 * 1.6 * *Bridge* * *
*1 * 1.5 * * .3* .5*
*1 * 1.33333** * .3* .5*
*1 * 1.16666** * .3* .5*
*1 * 1 * * .1* .3*
*****

```

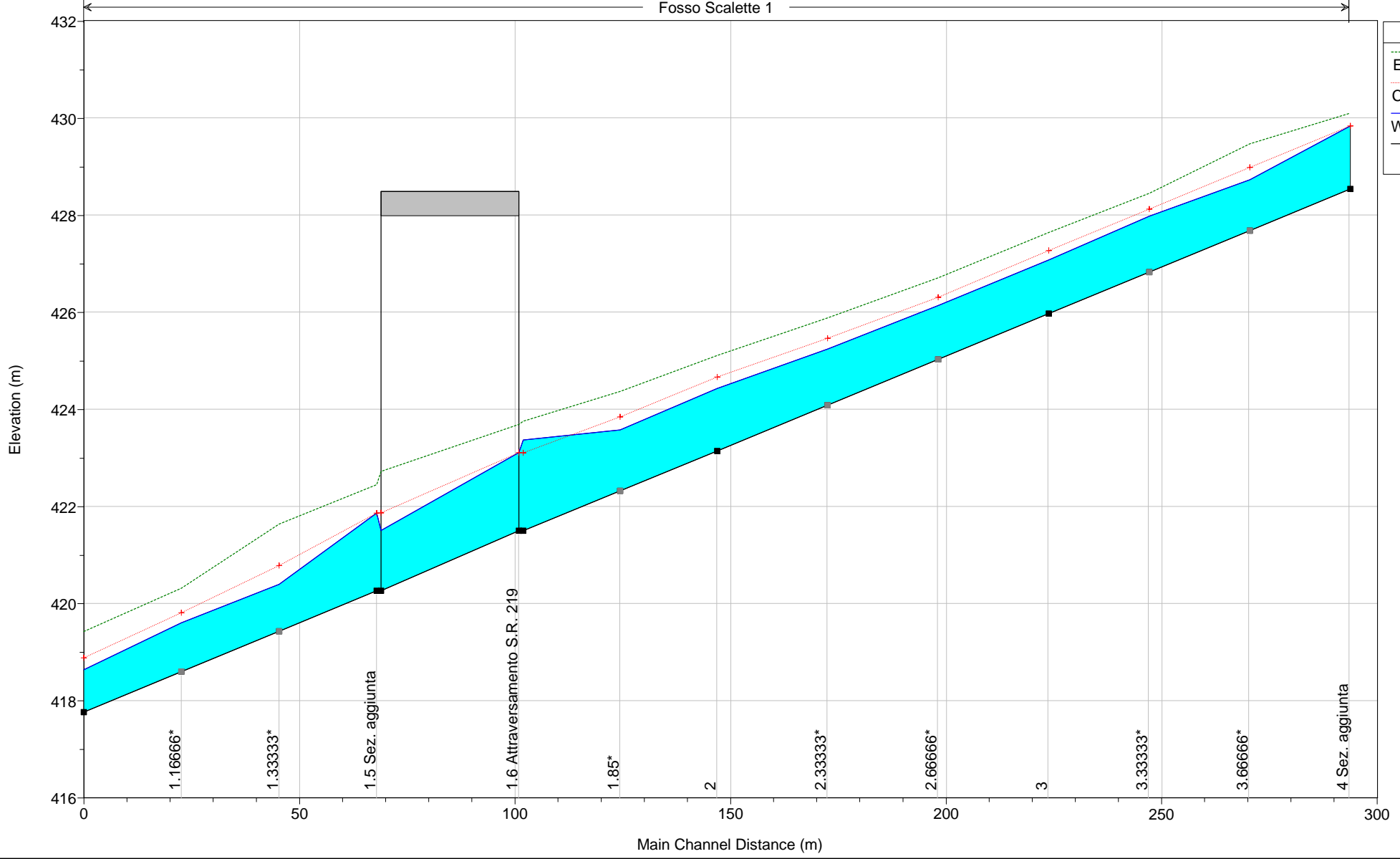
HEC-RAS Plan: Plan Tr200 River: Fosso Scalette Reach: 1 Profile: Q Tr200

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
1	4	Q Tr200	13.80	428.55	429.85	429.85	430.11	0.014335	2.30	6.22	12.88	0.96
1	3.66666*	Q Tr200	13.80	427.69	428.74	428.99	429.48	0.055429	3.81	3.62	7.89	1.80
1	3.33333*	Q Tr200	13.80	426.84	427.99	428.14	428.46	0.030325	3.04	4.56	9.78	1.36
1	3	Q Tr200	13.80	425.98	427.09	427.28	427.65	0.038843	3.33	4.14	8.82	1.52
1	2.66666*	Q Tr200	13.80	425.04	426.15	426.32	426.72	0.034441	3.35	4.12	7.63	1.46
1	2.33333*	Q Tr200	13.80	424.09	425.25	425.47	425.89	0.029718	3.56	3.99	7.72	1.38
1	2	Q Tr200	13.80	423.15	424.44	424.67	425.12	0.029897	3.94	4.39	10.36	1.36
1	1.85*	Q Tr200	13.80	422.33	423.58	423.85	424.38	0.035378	4.20	4.05	9.76	1.47
1	1.7	Q Tr200	13.80	421.51	423.38	423.11	423.76	0.007404	2.76	5.01	23.96	0.74
1	1.6		Bridge									
1	1.5	Q Tr200	13.80	420.27	421.87	421.87	422.46	0.014643	3.39	4.08	16.27	1.00
1	1.33333*	Q Tr200	13.80	419.44	420.40	420.79	421.64	0.066808	4.93	2.80	4.63	2.03
1	1.16666*	Q Tr200	13.80	418.60	419.61	419.82	420.32	0.034409	3.74	3.69	5.70	1.48
1	1	Q Tr200	13.80	417.77	418.64	418.89	419.43	0.043191	3.93	3.51	6.06	1.65

MACROAREA 09 FOSSO SCALETTE Plan: Plan 01

Flow: Tr200

Fosso Scalette 1



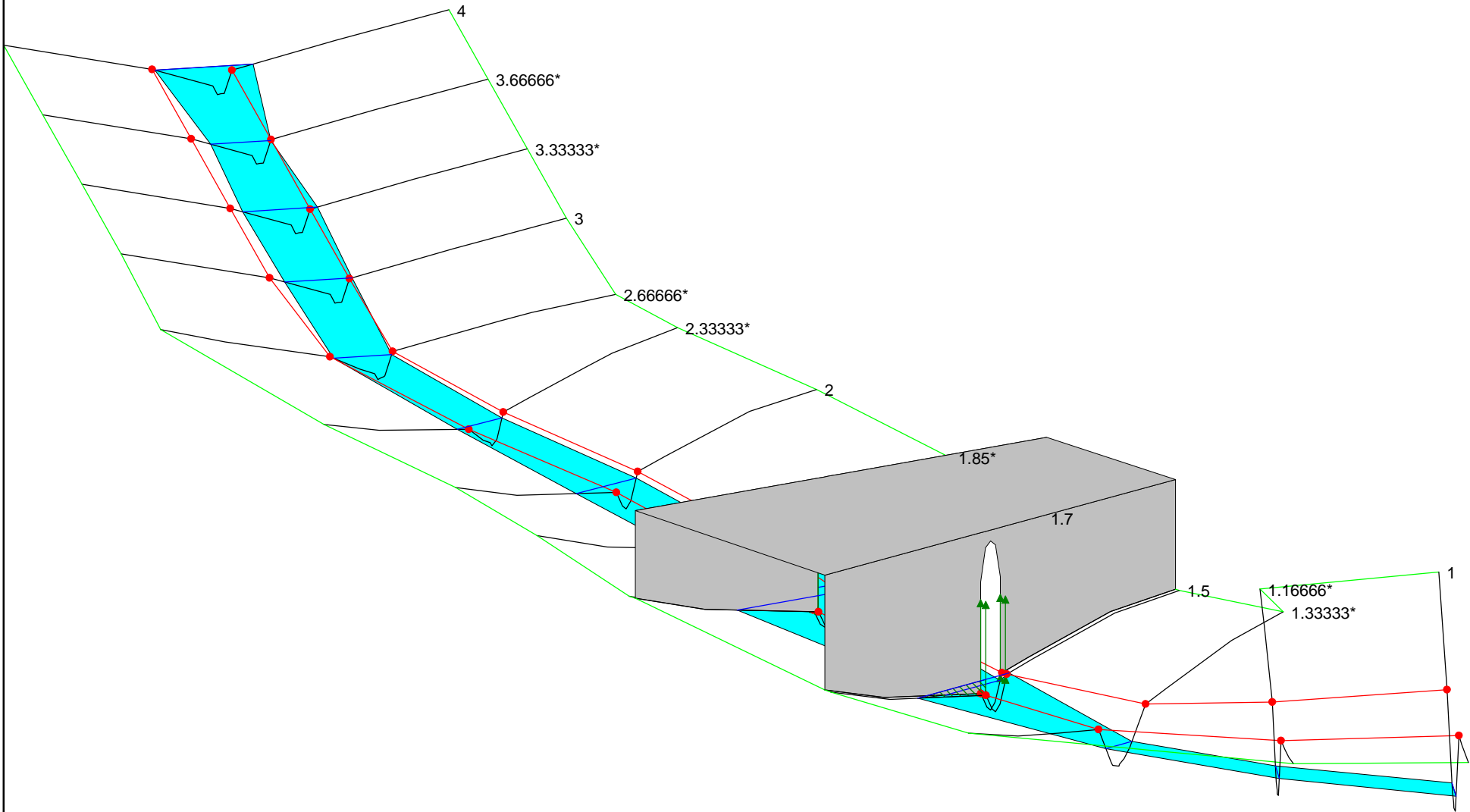
Legend

- EG Q Tr200 (dotted green line)
- Crit Q Tr200 (dotted red line with +)
- WS Q Tr200 (solid blue line)
- Ground (solid black line with square)

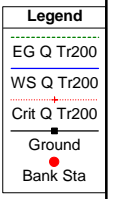
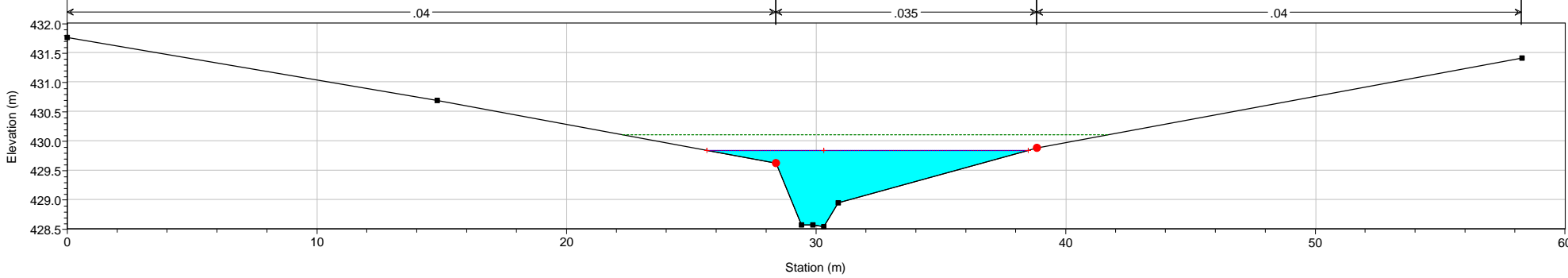
MACROAREA 09 Plan: Plan 01
Flow: Tr200 FOSSO SCALETTE

Legend

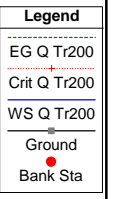
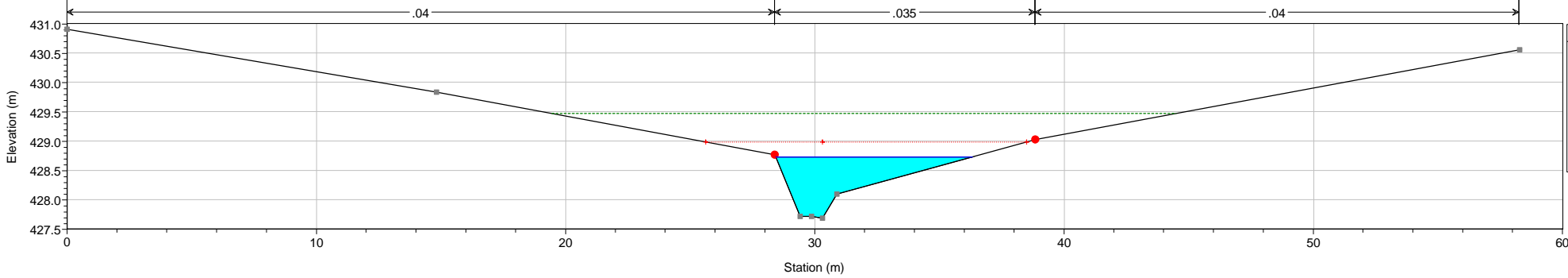
- WS Q Tr200
- Ground
- Bank Sta
- Ground
- Ineff



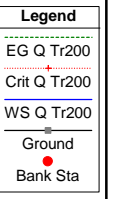
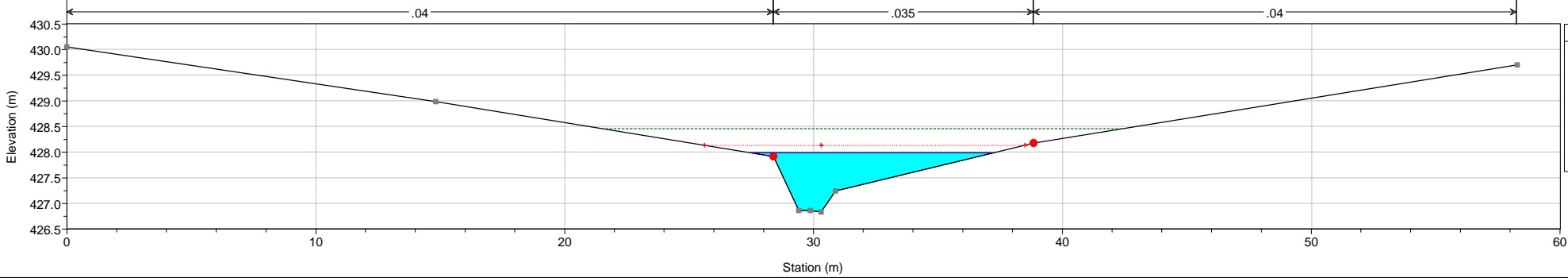
MACROAREA 09 Plan: Plan 01
 Flow: Tr200
 River = Fosso Scalette Reach = 1 RS = 4 Sez. aggiunta



MACROAREA 09 Plan: Plan 01
 Flow: Tr200
 River = Fosso Scalette Reach = 1 RS = 3.66666*

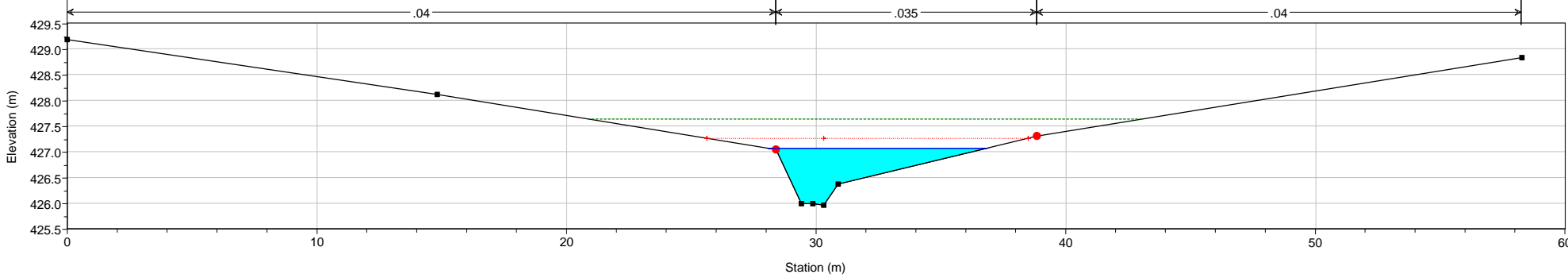


MACROAREA 09 Plan: Plan 01
 Flow: Tr200
 River = Fosso Scalette Reach = 1 RS = 3.33333*



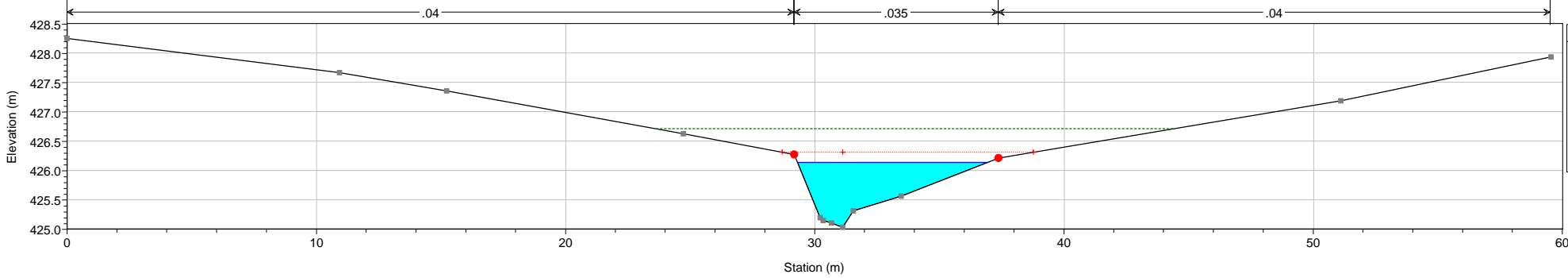
MACROAREA 09 Plan: Plan 01

Flow: Tr200
River = Fosso Scalette Reach = 1 RS = 3



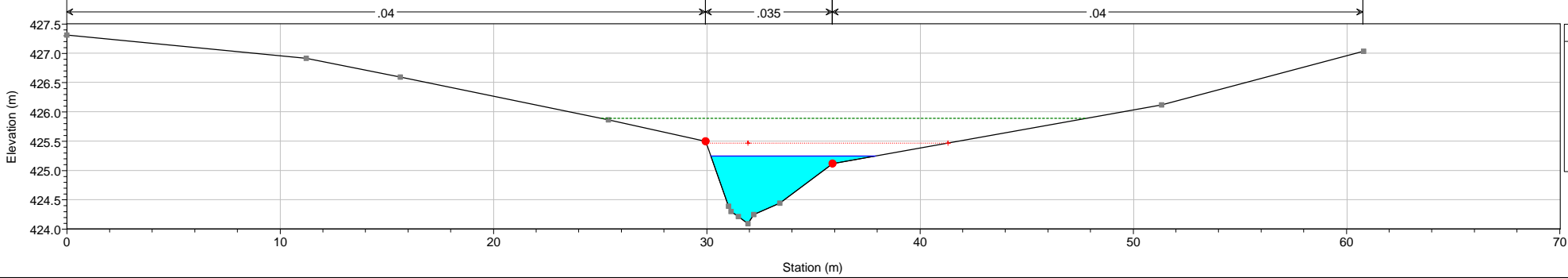
MACROAREA 09 Plan: Plan 01

Flow: Tr200
River = Fosso Scalette Reach = 1 RS = 2.66666*



MACROAREA 09 Plan: Plan 01

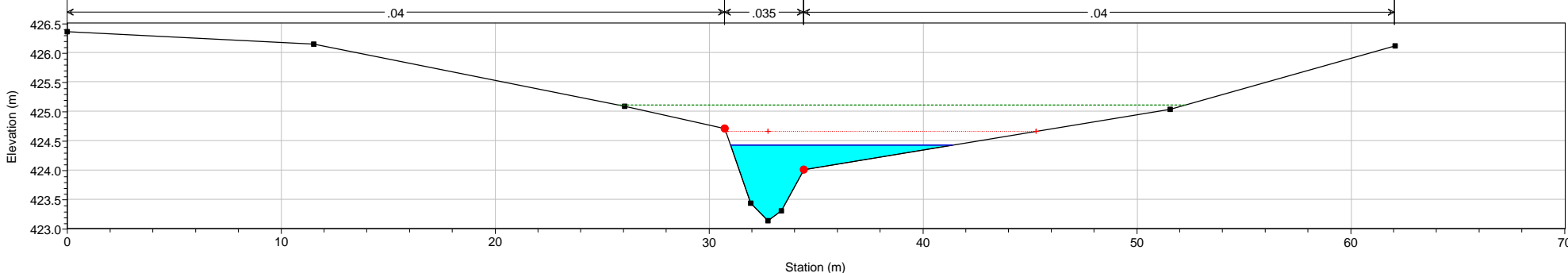
Flow: Tr200
River = Fosso Scalette Reach = 1 RS = 2.33333*



MACROAREA 09 Plan: Plan 01

Flow: Tr200

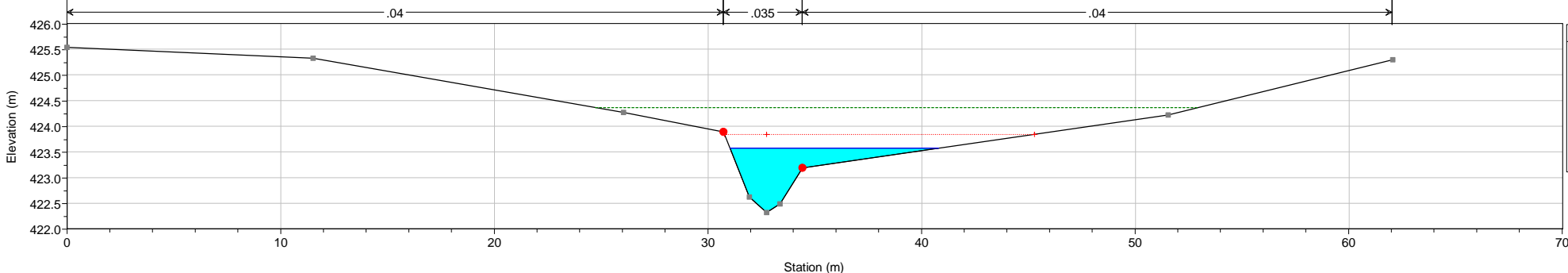
River = Fosso Scalette Reach = 1 RS = 2



MACROAREA 09 Plan: Plan 01

Flow: Tr200

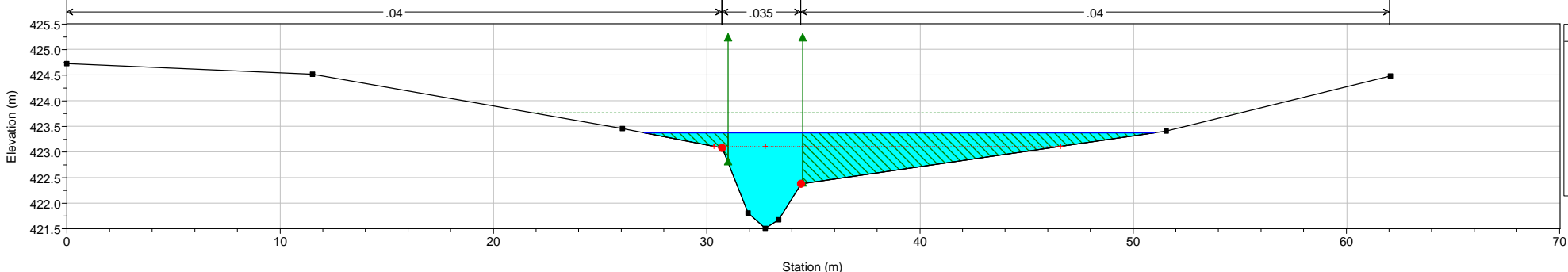
River = Fosso Scalette Reach = 1 RS = 1.85*

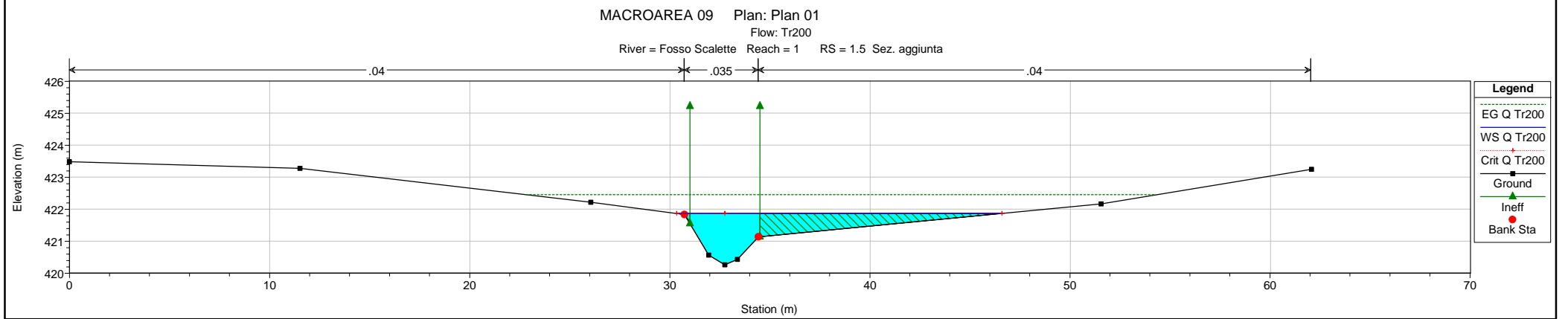
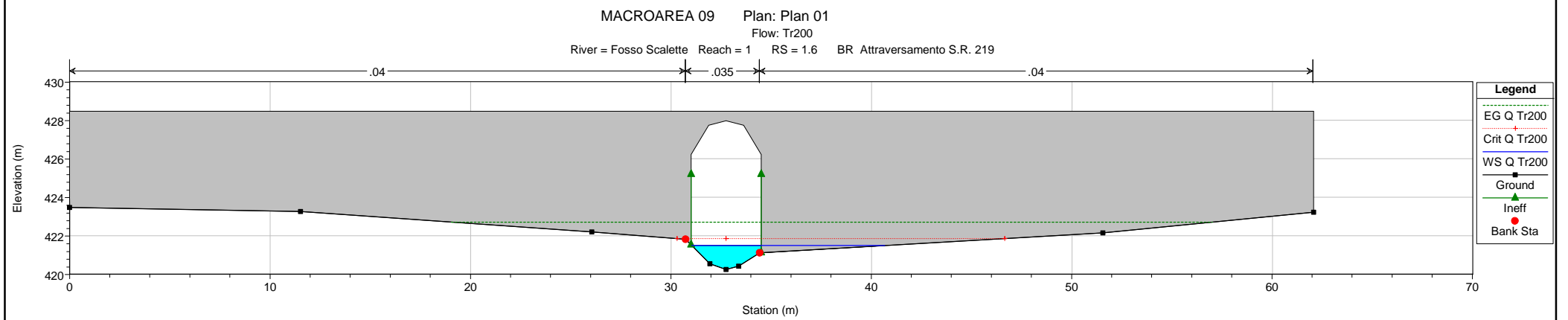
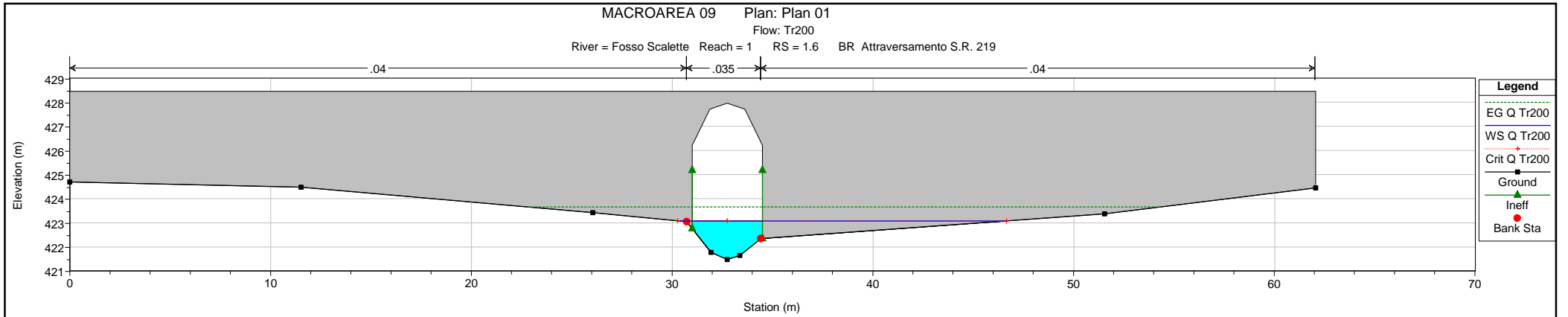


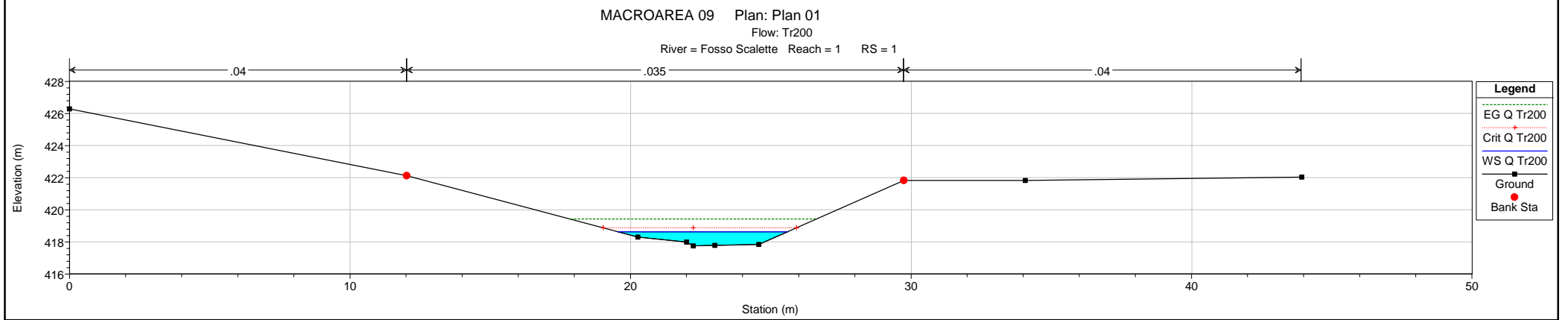
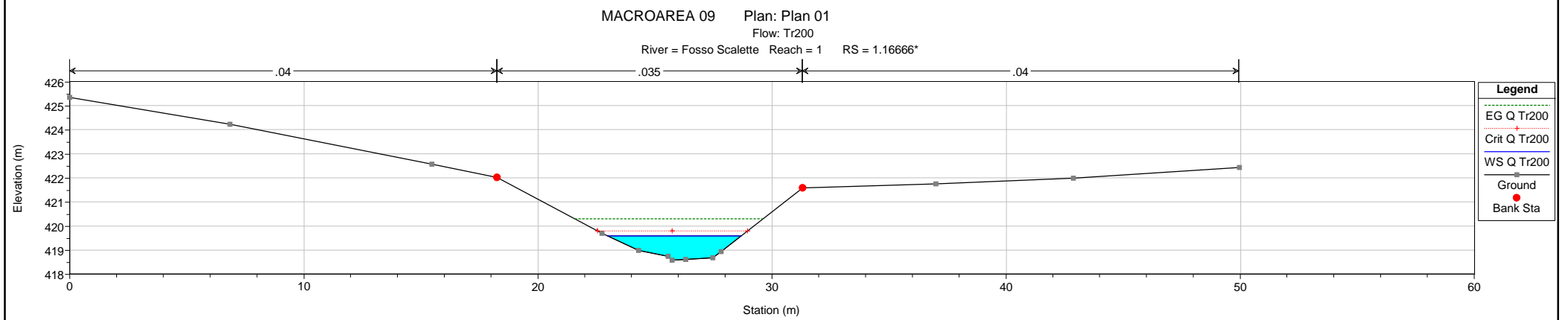
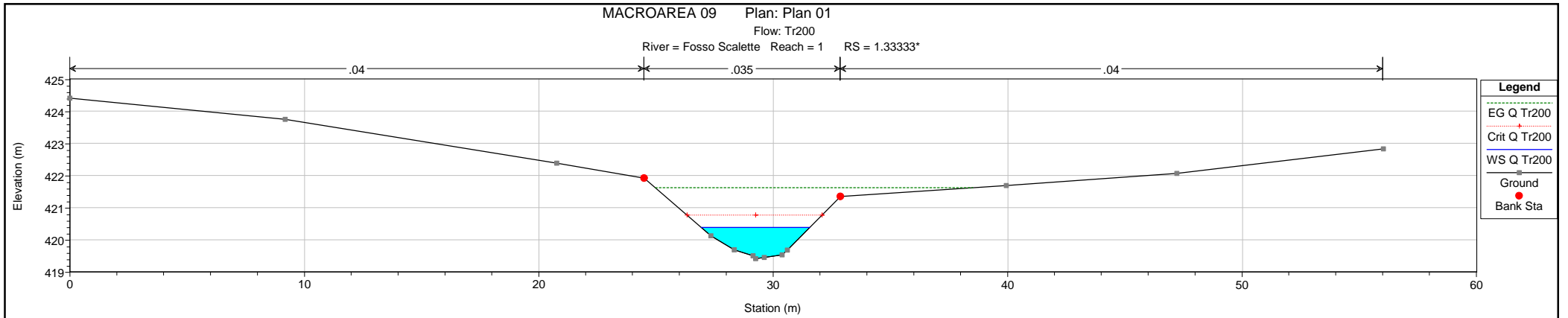
MACROAREA 09 Plan: Plan 01

Flow: Tr200

River = Fosso Scalette Reach = 1 RS = 1.7 Sez. aggiunta







BURANO.rep

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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PROJECT DATA

Project Title: MACROAREA am19 TORRENTE BURANO
Project File : BURANO.prj
Run Date and Time: 19/05/2006 16.46.41

Project in SI units

Project Description:

verifica PRG GUBBIO MACROAREA am19

FLOW DATA

Flow Title: Q50
Flow File : n:\2006\06033\varie\HEC_BURANO\BURANO.f02

Flow Data (m3/s)

* River Reach RS * Q Tr50 *
* FOSSO BURANO 1 5 * 71.2 *

Boundary Conditions

* River Reach Profile * Upstream
Downstream *

* FOSSO BURANO 1 Q Tr50 * Critical
Normal s = 0.0043 *

GEOMETRY DATA

Geometry Title: Geom 01
Geometry File : n:\2006\06033\varie\HEC_BURANO\BURANO.g01

CROSS SECTION

RIVER: FOSSO BURANO
REACH: 1 RS: 5

INPUT

Description:

Station Elevation Data num= 15
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 468 78 463.83 91.85 463.96 99.88 461.63 103.7 461.48
105.93 461.49 106.89 461.81 108.64 461.99 109.48 461.71 112.28 461.66
115.32 461.75 116.76 462.45 122.48 463.06 133.86 465.73 141.52 467.71

Manning's n values num= 3

Sta n Val Sta n Val Sta n Val

 0 .04 91.85 .035 122.48 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 91.85 122.48 15.5 15.5 15.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 463.79 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.12 * wt. n-Val. * * 0.035 * 0.040
 * W.S. Elev (m) * 463.67 * Reach Len. (m) * 15.50 * 15.50 * 15.50
 * Crit W.S. (m) * 462.88 * Flow Area (m2) * * 45.77 * 0.80
 * E.G. Slope (m/m) *0.001688 * Area (m2) * * 45.77 * 0.80
 * Q Total (m3/s) * 71.20 * Flow (m3/s) * * 70.83 * 0.37
 * Top width (m) * 32.24 * Top width (m) * * 29.64 * 2.61
 * vel Total (m/s) * 1.53 * Avg. vel. (m/s) * * 1.55 * 0.46
 * Max Chl Dpth (m) * 2.19 * Hydr. Depth (m) * * 1.54 * 0.31
 * Conv. Total (m3/s) * 1733.1 * Conv. (m3/s) * * 1724.2 * 8.9
 * Length wtd. (m) * 15.50 * wetted Per. (m) * * 30.23 * 2.68
 * Min Ch El (m) * 461.48 * Shear (N/m2) * * 25.06 * 4.93
 * Alpha * 1.02 * Stream Power (N/m s) * * 38.78 * 2.26
 * Frctn Loss (m) * 0.03 * Cum Volume (1000 m3) * 0.18 * 7.89 * 2.65
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.53 * 4.01 * 3.52

 **

CROSS SECTION

RIVER: FOSSO BURANO
 REACH: 1 RS: 4.75*

INPUT

Description:
 Station Elevation Data num= 19
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 466.95 42.327 464.74 61.784 463.701 72.755 463.767 80.045 461.498
 80.607 461.439 81.413 461.336 83.512 461.23 85.36 461.259 86.156 461.508
 87.606 461.66 88.302 461.459 90.623 461.448 93.142 461.545 94.335 462.084
 95.467 462.207 99.075 463.385 109.603 465.528 116.69 467.107

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 72.755 .035 99.075 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 72.755 99.075 15.5 15.5 15.5 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 463.76 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.14 * wt. n-Val. * * 0.035 * 0.040
 * W.S. Elev (m) * 463.63 * Reach Len. (m) * 15.50 * 15.50 * 15.50
 * Crit W.S. (m) * * Flow Area (m2) * * 43.01 * 0.14
 *

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* E.G. Slope (m/m) *0.001766 * Area (m2) * * 43.01 * 0.14
* Q Total (m3/s) * 71.20 * Flow (m3/s) * * 71.16 * 0.04
* Top width (m) * 27.04 * Top width (m) * * 25.86 * 1.18
* Vel Total (m/s) * 1.65 * Avg. Vel. (m/s) * * 1.65 * 0.25
* Max Chl Dpth (m) * 2.39 * Hydr. Depth (m) * * 1.66 * 0.12
* Conv. Total (m3/s) * 1694.2 * Conv. (m3/s) * * 1693.3 * 0.8
* Length wtd. (m) * 15.50 * Wetted Per. (m) * * 26.59 * 1.20
* Min Ch El (m) * 461.23 * Shear (N/m2) * * 28.02 * 2.04
* Alpha * 1.01 * Stream Power (N/m s) * * 46.36 * 0.51
* Frctn Loss (m) * 0.03 * Cum Volume (1000 m3) * 0.18 * 7.20 * 2.64
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.53 * 3.58 * 3.49

```

**

CROSS SECTION

RIVER: FOSSO BURANO
REACH: 1 RS: 4.5*

INPUT

Description:

Station Elevation Data		num= 19		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	465.9	31.218	464.337	45.569	463.571	53.66	463.575	60.209	461.366
60.715	461.273	61.439	461.1	63.325	460.98	64.791	461.028	65.422	461.207
66.572	461.331	67.124	461.207	68.965	461.237	70.963	461.341	71.91	461.719
72.808	461.818	75.67	463.71	85.347	465.326	91.86	466.505		

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	53.66	.035	75.67	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	53.66	75.67		15.5	15.5	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
* E.G. Elev (m) * 463.73 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.17 * wt. n-Val. * * 0.035 *
* W.S. Elev (m) * 463.56 * Reach Len. (m) * 15.50 * 15.50 * 15.50
* Crit W.S. (m) * * * Flow Area (m2) * * 38.54 *
* E.G. Slope (m/m) *0.002073 * Area (m2) * * 38.54 *
* Q Total (m3/s) * 71.20 * Flow (m3/s) * * 71.20 *
* Top width (m) * 21.73 * Top width (m) * * 21.73 *
* Vel Total (m/s) * 1.85 * Avg. Vel. (m/s) * * 1.85 *
* Max Chl Dpth (m) * 2.58 * Hydr. Depth (m) * * 1.77 *
* Conv. Total (m3/s) * 1563.8 * Conv. (m3/s) * * 1563.8 *
* Length wtd. (m) * 15.50 * Wetted Per. (m) * * 22.77 *
* Min Ch El (m) * 460.98 * Shear (N/m2) * * 34.41 *
* Alpha * 1.00 * Stream Power (N/m s) * * 63.57 *
*

```

BURANO.rep

* Frctn Loss (m) * 0.04 * Cum Volume (1000 m3) * 0.18 * 6.57 * 2.64
 * C & E Loss (m) * 0.01 * Cum SA (1000 m2) * 0.53 * 3.21 * 3.48

 **

CROSS SECTION

RIVER: FOSSO BURANO
 REACH: 1 RS: 4.25*

INPUT

Description:

Station Elevation Data		num= 19		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
0	464.85	20.109	463.933	29.353	463.442	34.565	463.383	40.374	461.233		
40.822	461.106	41.464	460.865	43.138	460.73	44.221	460.797	44.688	460.905		
45.538	461.001	45.947	460.956	47.308	461.025	48.785	461.136	49.485	461.353		
50.149	461.429	52.265	464.035	61.09	465.124	67.03	465.902				

Manning's n Values		num= 3		Sta n Val	
0	.04	34.565	.035	52.265	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	34.565	52.265		15.5	15.5	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 463.69 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.25 * wt. n-Val. * 0.040 * 0.035 *
 * W.S. Elev (m) * 463.44 * Reach Len. (m) * 15.50 * 15.50 * 15.50
 * Crit W.S. (m) * * Flow Area (m2) * 0.12 * 32.09 *
 * E.G. Slope (m/m) *0.002930 * Area (m2) * 0.12 * 32.09 *
 * Q Total (m3/s) * 71.20 * Flow (m3/s) * 0.01 * 71.19 *
 * Top width (m) * 21.80 * Top width (m) * 4.59 * 17.21 *
 * vel Total (m/s) * 2.21 * Avg. vel. (m/s) * 0.12 * 2.22 *
 * Max chl Dpth (m) * 2.71 * Hydr. Depth (m) * 0.03 * 1.86 *
 * Conv. Total (m3/s) * 1315.3 * Conv. (m3/s) * 0.3 * 1315.0 *
 * Length wtd. (m) * 15.50 * wetted Per. (m) * 4.59 * 18.69 *
 * Min ch El (m) * 460.73 * Shear (N/m2) * 0.75 * 49.36 *
 * Alpha * 1.01 * Stream Power (N/m s) * 0.09 * 109.48 *
 * Frctn Loss (m) * 0.08 * Cum Volume (1000 m3) * 0.18 * 6.02 * 2.64
 * C & E Loss (m) * 0.05 * Cum SA (1000 m2) * 0.49 * 2.91 * 3.48

 **

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

BURANO.rep

RIVER: FOSSO BURANO

REACH: 1

RS: 4

INPUT

Description:

Station Elevation Data		num= 9	
Sta	Elev	Sta	Elev
0	463.8	9	463.53
22.95	460.48	27.49	461.04

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.04	15.47	.035
		28.86	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	15.47	28.86		17	17	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)          * 463.55 * Element          * Left OB * Channel * Right OB
* vel Head (m)          * 0.76 * wt. n-Val.      *          * 0.035 *
* W.S. Elev (m)         * 462.80 * Reach Len. (m)  * 17.00 * 17.00 * 17.00
* Crit W.S. (m)         * 462.77 * Flow Area (m2)  *          * 18.49 *
* E.G. Slope (m/m)      *0.011895 * Area (m2)       *          * 18.49 *
* Q Total (m3/s)        * 71.20 * Flow (m3/s)     *          * 71.20 *
* Top width (m)         * 11.80 * Top width (m)   *          * 11.80 *
* vel Total (m/s)       * 3.85 * Avg. vel. (m/s) *          * 3.85 *
* Max Chl Dpth (m)     * 2.32 * Hydr. Depth (m) *          * 1.57 *
* Conv. Total (m3/s)    * 652.8 * Conv. (m3/s)    *          * 652.8 *
* Length wtd. (m)      * 17.00 * wetted Per. (m) *          * 13.46 *
* Min ch El (m)        * 460.48 * Shear (N/m2)    *          * 160.21 *
* Alpha                 * 1.00 * Stream Power (N/m s) *          * 616.83 *
* Frctn Loss (m)       * 0.20 * Cum volume (1000 m3) * 0.18 * 5.63 * 2.64
* C & E Loss (m)       * 0.01 * Cum SA (1000 m2) * 0.46 * 2.69 * 3.48
*****
**

```

CROSS SECTION

RIVER: FOSSO BURANO

REACH: 1

RS: 3.8*

INPUT

Description:

Station Elevation Data		num= 12	
Sta	Elev	Sta	Elev
0	463.52	6.19	463.344
19.737	460.773	20.097	460.639
27.108	463.386	40.196	467.264

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.04	14.542	.035
		27.108	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	14.542	27.108		17	17	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)      * 463.35 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 0.73  * wt. n-Val.      *         * 0.035  *
* W.S. Elev (m)     * 462.62 * Reach Len. (m)  * 17.00  * 17.00  * 17.00
* Crit W.S. (m)     * 462.55 * Flow Area (m2)  *         * 18.76  *
* E.G. Slope (m/m)  *0.011193 * Area (m2)       *         * 18.76  *
* Q Total (m3/s)    * 71.20  * Flow (m3/s)     *         * 71.20  *
* Top width (m)     * 11.57  * Top width (m)   *         * 11.57  *
* Vel Total (m/s)   * 3.80   * Avg. Vel. (m/s) *         * 3.80   *
* Max Chl Dpth (m) * 2.44   * Hydr. Depth (m) *         * 1.62   *
* Conv. Total (m3/s) * 673.0  * Conv. (m3/s)    *         * 673.0  *
* Length wtd. (m)  * 17.00  * wetted Per. (m) *         * 13.33  *
* Min Ch El (m)    * 460.17 * Shear (N/m2)    *         * 154.46 *
* Alpha            * 1.00   * Stream Power (N/m s) *         * 586.29 *
* Frctn Loss (m)   * 0.19   * Cum Volume (1000 m3) * 0.18  * 5.32  * 2.64
* C & E Loss (m)   * 0.00   * Cum SA (1000 m2)  * 0.46  * 2.49  * 3.48
*****
**

```

CROSS SECTION

RIVER: FOSSO BURANO

REACH: 1

RS: 3.6*

INPUT

Description:

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	463.24	5.795	463.085	7.92	462.982	13.614	462.618	16.68	461.246
18.898	460.459	19.264	460.338	19.843	460.098	21.354	459.868	24.428	460.37
25.356	462.412	38.192	469.228						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	13.614	.035	25.356	.04

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	13.614	25.356		17	17	17		.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)      * 463.15 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 0.76  * wt. n-Val.      *         * 0.035  *
* W.S. Elev (m)     * 462.39 * Reach Len. (m)  * 17.00  * 17.00  * 17.00
* Crit W.S. (m)     * 462.34 * Flow Area (m2)  *         * 18.38  *
* E.G. Slope (m/m)  *0.011615 * Area (m2)       *         * 18.38  *
* Q Total (m3/s)    * 71.20  * Flow (m3/s)     *         * 71.20  *
* Top width (m)     * 11.22  * Top width (m)   *         * 11.22  *
* Vel Total (m/s)   * 3.87   * Avg. Vel. (m/s) *         * 3.87   *
**

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BURANO.rep

```

* Max Chl Dpth (m) * 2.52 * Hydr. Depth (m) * * 1.64 *
* Conv. Total (m3/s) * 660.6 * Conv. (m3/s) * * 660.6 *
* Length wtd. (m) * 17.00 * wetted Per. (m) * * 13.02 *
* Min Ch El (m) * 459.87 * Shear (N/m2) * * 160.77 *
* Alpha * 1.00 * Stream Power (N/m s) * * 622.90 *
* Frctn Loss (m) * 0.18 * Cum Volume (1000 m3) * 0.18 * 5.00 * 2.64
* C & E Loss (m) * 0.01 * Cum SA (1000 m2) * 0.46 * 2.29 * 3.48
*****
**

```

CROSS SECTION

RIVER: FOSSO BURANO
REACH: 1 RS: 3.4*

INPUT

Description:

```

Station Elevation Data num= 12
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
*****
0 462.96 5.4 462.827 7.38 462.708 12.686 462.332 15.803 460.884
18.059 460.146 18.431 460.037 19.02 459.832 20.556 459.562 22.897 460.035
23.604 461.438 36.188 471.192

```

```

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
*****
0 .04 12.686 .035 23.604 .04

```

```

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
12.686 23.604 17 17 17 .1 .3

```

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m) * 462.96 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.74 * wt. n-Val. * * 0.035 * 0.040
* W.S. Elev (m) * 462.22 * Reach Len. (m) * 17.00 * 17.00 * 17.00
* Crit W.S. (m) * 462.14 * Flow Area (m2) * * 18.46 * 0.39
* E.G. Slope (m/m) *0.010209 * Area (m2) * * 18.46 * 0.39
* Q Total (m3/s) * 71.20 * Flow (m3/s) * * 70.75 * 0.45
* Top width (m) * 11.67 * Top width (m) * * 10.67 * 1.00
* Vel Total (m/s) * 3.78 * Avg. Vel. (m/s) * * 3.83 * 1.15
* Max Chl Dpth (m) * 2.65 * Hydr. Depth (m) * * 1.73 * 0.39
* Conv. Total (m3/s) * 704.7 * Conv. (m3/s) * * 700.2 * 4.5
* Length wtd. (m) * 17.00 * wetted Per. (m) * * 12.07 * 1.27
* Min Ch El (m) * 459.56 * Shear (N/m2) * * 153.16 * 30.79
* Alpha * 1.02 * Stream Power (N/m s) * * 587.05 * 35.45
* Frctn Loss (m) * 0.15 * Cum Volume (1000 m3) * 0.18 * 4.69 * 2.64
* C & E Loss (m) * 0.02 * Cum SA (1000 m2) * 0.46 * 2.11 * 3.47
*****
**

```

CROSS SECTION

BURANO.rep

RIVER: FOSSO BURANO
 REACH: 1 RS: 3.2*

INPUT

Description:

Station Elevation Data		num= 12		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.68	5.005	462.568	6.84	462.434	11.758	462.046	14.927	460.522
17.219	459.833	17.598	459.736	18.197	459.566	19.758	459.256	21.367	459.7
21.852	460.464	34.184	473.156						

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	11.758	.035	21.852	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	11.758	21.852		17	17	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

**	* E.G. Elev (m)	* 462.78	* Element	* Left OB	* Channel	* Right OB
* vel Head (m)	* 0.66	* wt. n-Val.	* 0.040	* 0.035	* 0.040	
* w.s. Elev (m)	* 462.12	* Reach Len. (m)	* 17.00	* 17.00	* 17.00	
* Crit w.s. (m)	* 461.94	* Flow Area (m2)	* 0.03	* 18.93	* 1.33	
* E.G. slope (m/m)	*0.008010	* Area (m2)	* 0.03	* 18.93	* 1.33	
* Q Total (m3/s)	* 71.20	* Flow (m3/s)	* 0.01	* 69.13	* 2.06	
* Top width (m)	* 12.63	* Top width (m)	* 0.93	* 10.09	* 1.61	
* vel Total (m/s)	* 3.51	* Avg. vel. (m/s)	* 0.25	* 3.65	* 1.55	
* Max chl Dpth (m)	* 2.86	* Hydr. Depth (m)	* 0.04	* 1.88	* 0.83	
* Conv. Total (m3/s)	* 795.6	* Conv. (m3/s)	* 0.1	* 772.4	* 23.1	
* Length wtd. (m)	* 17.00	* wetted Per. (m)	* 0.93	* 11.09	* 2.31	
* Min ch El (m)	* 459.26	* Shear (N/m2)	* 2.87	* 134.07	* 45.30	
* Alpha	* 1.06	* Stream Power (N/m s)	* 0.71	* 489.63	* 70.23	
* Frctn Loss (m)	* 0.12	* Cum volume (1000 m3)	* 0.17	* 4.37	* 2.63	
* C & E Loss (m)	* 0.02	* Cum SA (1000 m2)	* 0.45	* 1.93	* 3.45	
**						

CROSS SECTION

RIVER: FOSSO BURANO
 REACH: 1 RS: 3

INPUT

Description:

Station Elevation Data		num= 8		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.44	6.10001	462.31	10.83	461.76	14.05	460.16	16.38	459.52
18.96	458.95	20.1	459.49	32.18	475.12				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	10.83	.035	20.1	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	10.83	20.1		17.857	17.857	.1	.3

BURANO.rep

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)      * 462.64 * Element          * Left OB * Channel * Right OB
* vel Head (m)      * 0.58  * wt. n-Val.      * 0.040  * 0.035  * 0.040
* W.S. Elev (m)     * 462.06 * Reach Len. (m)  * 17.86  * 17.86  * 17.86
* Crit W.S. (m)     *        * Flow Area (m2)  * 0.50   * 19.21  * 2.55
* E.G. Slope (m/m)  *0.006117 * Area (m2)      * 0.50   * 19.21  * 2.55
* Q Total (m3/s)    * 71.20 * Flow (m3/s)     * 0.27   * 66.69  * 4.23
* Top width (m)     * 14.61 * Top width (m)   * 3.35   * 9.27   * 1.98
* vel Total (m/s)   * 3.20  * Avg. Vel. (m/s) * 0.55   * 3.47   * 1.66
* Max Chl Dpth (m) * 3.11  * Hydr. Depth (m) * 0.15   * 2.07   * 1.28
* Conv. Total (m3/s) * 910.4 * Conv. (m3/s)    * 3.5    * 852.8  * 54.1
* Length wtd. (m)  * 17.86 * Wetted Per. (m) * 3.36   * 9.92   * 3.24
* Min Ch El (m)    * 458.95 * Shear (N/m2)   * 8.85   * 116.19 * 47.07
* Alpha            * 1.12  * Stream Power (N/m s) * 4.83  * 403.46 * 78.30
* Frctn Loss (m)   * 0.10  * Cum Volume (1000 m3) * 0.17  * 4.05  * 2.59
* C & E Loss (m)   * 0.02  * Cum SA (1000 m2) * 0.41  * 1.77  * 3.42
*****
**

```

CROSS SECTION

RIVER: FOSSO BURANO
 REACH: 1 RS: 2.85714*

INPUT

Description:

Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.389	5.339	462.328	8.94	462.103	10.26	462.014	11.491	461.714
12.541	461.58	15.325	460.105	17.339	459.482	19.569	458.91	21.272	459.406
21.371	459.583	23.41	461.039	26.429	462.979	41.869	474.389		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	12.541	.035	21.371	.04

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
	12.541	21.371	17.857	17.857	17.857	.1		.3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)      * 462.52 * Element          * Left OB * Channel * Right OB
* vel Head (m)      * 0.52  * wt. n-Val.      * 0.040  * 0.035  * 0.040
* W.S. Elev (m)     * 462.00 * Reach Len. (m)  * 17.86  * 17.86  * 17.86
* Crit W.S. (m)     *        * Flow Area (m2)  * 0.53   * 18.98  * 4.15
* E.G. Slope (m/m)  *0.005450 * Area (m2)      * 0.53   * 18.98  * 4.15
* Q Total (m3/s)    * 71.20 * Flow (m3/s)     * 0.37   * 63.32  * 7.51
* Top width (m)     * 14.57 * Top width (m)   * 2.21   * 8.83   * 3.53
* vel Total (m/s)   * 3.01  * Avg. Vel. (m/s) * 0.70   * 3.34   * 1.81

```

BURANO.rep

```

*
* Max Chl Dpth (m) * 3.09 * Hydr. Depth (m) * 0.24 * 2.15 * 1.18
*
* Conv. Total (m3/s) * 964.5 * Conv. (m3/s) * 5.1 * 857.7 * 101.7
*
* Length Wtd. (m) * 17.86 * Wetted Per. (m) * 2.25 * 9.54 * 4.28
*
* Min Ch El (m) * 458.91 * Shear (N/m2) * 12.59 * 106.34 * 51.86
*
* Alpha * 1.13 * Stream Power (N/m s) * 8.87 * 354.83 * 93.82
*
* Frctn Loss (m) * 0.09 * Cum Volume (1000 m3) * 0.16 * 3.70 * 2.53
*
* C & E Loss (m) * 0.01 * Cum SA (1000 m2) * 0.36 * 1.60 * 3.37
*

```

**

CROSS SECTION

RIVER: FOSSO BURANO
REACH: 1

RS: 2.71428*

INPUT

Description:

```

Station Elevation Data num= 14
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
*****
0 462.377 6.067 462.345 10.16 462.171 11.66 462.093 13.059 461.589
14.253 461.4 16.599 460.05 18.297 459.443 20.177 458.87 22.506 459.351
22.643 459.676 25.518 461.034 29.778 462.611 51.557 473.657

```

Manning's n Values num= 3

```

Sta n Val Sta n Val Sta n Val
*****
0 .04 14.253 .035 22.643 .04

```

```

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
14.253 22.643 17.857 17.857 17.857 .1 .3

```

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m) * 462.41 * Element * Left OB * Channel * Right OB
*
* vel Head (m) * 0.49 * wt. n-Val. * 0.040 * 0.035 * 0.040
*
* W.S. Elev (m) * 461.93 * Reach Len. (m) * 17.86 * 17.86 * 17.86
*
* Crit W.S. (m) * * Flow Area (m2) * 0.68 * 18.62 * 5.60
*
* E.G. slope (m/m) *0.005107 * Area (m2) * 0.68 * 18.62 * 5.60
*
* Q Total (m3/s) * 71.20 * Flow (m3/s) * 0.55 * 60.83 * 9.82
*
* Top width (m) * 15.81 * Top width (m) * 2.13 * 8.39 * 5.29
*
* vel Total (m/s) * 2.86 * Avg. vel. (m/s) * 0.81 * 3.27 * 1.75
*
* Max Chl Dpth (m) * 3.06 * Hydr. Depth (m) * 0.32 * 2.22 * 1.06
*
* Conv. Total (m3/s) * 996.3 * Conv. (m3/s) * 7.7 * 851.2 * 137.5
*
* Length Wtd. (m) * 17.86 * Wetted Per. (m) * 2.21 * 9.21 * 5.75
*
* Min Ch El (m) * 458.87 * Shear (N/m2) * 15.33 * 101.32 * 48.74
*
* Alpha * 1.17 * Stream Power (N/m s) * 12.44 * 330.90 * 85.51
*
* Frctn Loss (m) * 0.09 * Cum Volume (1000 m3) * 0.15 * 3.37 * 2.45
*
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.33 * 1.45 * 3.29
*
*****
**

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CROSS SECTION

BURANO.rep

RIVER: FOSSO BURANO
 REACH: 1 RS: 2.57142*

INPUT

Description:

Station Elevation Data		num= 14		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.366	6.796	462.363	11.38	462.239	13.06	462.172	14.628	461.463		
15.964	461.22	17.874	459.995	19.256	459.405	20.786	458.83	23.741	459.297		
23.914	459.769	27.626	461.03	33.126	462.242	61.246	472.926				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	15.964	.035	23.914	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	15.964	23.914		17.857	17.857	.1	.3

CROSS SECTION OUTPUT Profile #Q Tr50

* E.G. Elev (m)	* 462.32	* Element	* Left OB	* Channel	* Right OB
* vel Head (m)	* 0.47	* wt. n-Val.	* 0.040	* 0.035	* 0.040
* W.S. Elev (m)	* 461.85	* Reach Len. (m)	* 17.86	* 17.86	* 17.86
* Crit W.S. (m)		* Flow Area (m2)	* 0.84	* 18.14	* 6.89
* E.G. Slope (m/m)	* 0.005037	* Area (m2)	* 0.84	* 18.14	* 6.89
* Q Total (m3/s)	* 71.20	* Flow (m3/s)	* 0.76	* 59.11	* 11.33
* Top width (m)	* 17.55	* Top width (m)	* 2.19	* 7.95	* 7.42
* vel Total (m/s)	* 2.75	* Avg. Vel. (m/s)	* 0.91	* 3.26	* 1.64
* Max Chl Dpth (m)	* 3.02	* Hydr. Depth (m)	* 0.38	* 2.28	* 0.93
* Conv. Total (m3/s)	* 1003.2	* Conv. (m3/s)	* 10.7	* 832.9	* 159.6
* Length wtd. (m)	* 17.86	* wetted Per. (m)	* 2.29	* 8.90	* 7.72
* Min Ch El (m)	* 458.83	* Shear (N/m2)	* 18.09	* 100.65	* 44.09
* Alpha	* 1.22	* Stream Power (N/m s)	* 16.43	* 328.04	* 72.51
* Frctn Loss (m)	* 0.09	* Cum Volume (1000 m3)	* 0.14	* 3.04	* 2.33
* C & E Loss (m)	* 0.00	* Cum SA (1000 m2)	* 0.29	* 1.31	* 3.18

CROSS SECTION

RIVER: FOSSO BURANO
 REACH: 1 RS: 2.42857*

INPUT

Description:

Station Elevation Data		num= 14		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.354	7.524	462.381	12.6	462.306	14.46	462.252	16.196	461.337		
17.676	461.04	19.149	459.94	20.214	459.366	21.394	458.79	24.976	459.243		
25.186	459.861	29.735	461.025	36.475	461.874	70.934	472.194				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	17.676	.035	25.186	.04		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 17.676 25.186 17.857 17.857 17.857 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

```
*****
**
* E.G. Elev (m) * 462.23 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.48 * wt. n-Val. * 0.040 * 0.035 * 0.040
* W.S. Elev (m) * 461.75 * Reach Len. (m) * 17.86 * 17.86 * 17.86
* Crit W.S. (m) * * Flow Area (m2) * 0.99 * 17.49 * 8.03
* E.G. Slope (m/m) *0.005253 * Area (m2) * 0.99 * 17.49 * 8.03
* Q Total (m3/s) * 71.20 * Flow (m3/s) * 1.00 * 58.03 * 12.17
* Top width (m) * 20.07 * Top width (m) * 2.26 * 7.51 * 10.30
* vel Total (m/s) * 2.69 * Avg. Vel. (m/s) * 1.01 * 3.32 * 1.52
* Max Chl Dpth (m) * 2.96 * Hydr. Depth (m) * 0.44 * 2.33 * 0.78
* Conv. Total (m3/s) * 982.4 * Conv. (m3/s) * 13.8 * 800.7 * 167.9
* Length wtd. (m) * 17.86 * Wetted Per. (m) * 2.39 * 8.62 * 10.49
* Min Ch El (m) * 458.79 * Shear (N/m2) * 21.34 * 104.47 * 39.41
* Alpha * 1.30 * Stream Power (N/m s) * 21.48 * 346.60 * 59.74
* Frctn Loss (m) * 0.10 * Cum Volume (1000 m3) * 0.12 * 2.72 * 2.20
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.25 * 1.17 * 3.02
**
*****
```

CROSS SECTION

RIVER: FOSSO BURANO
 REACH: 1 RS: 2.28571*

INPUT

Description:

Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.343	8.253	462.398	13.82	462.374	15.86	462.331	17.764	461.211
19.387	460.86	20.423	459.885	21.173	459.328	22.003	458.75	26.211	459.189
26.457	459.954	31.843	461.02	39.823	461.506	80.623	471.463		

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	19.387	.035	26.457	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 19.387 26.457 17.857 17.857 17.857 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

```
*****
**
* E.G. Elev (m) * 462.13 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.47 * wt. n-Val. * 0.040 * 0.035 * 0.040
* W.S. Elev (m) * 461.66 * Reach Len. (m) * 17.86 * 17.86 * 17.86
* Crit W.S. (m) * * Flow Area (m2) * 1.18 * 16.86 * 9.49
* E.G. Slope (m/m) *0.005432 * Area (m2) * 1.18 * 16.86 * 9.49
* Q Total (m3/s) * 71.20 * Flow (m3/s) * 1.30 * 56.49 * 13.41
* Top width (m) * 23.43 * Top width (m) * 2.38 * 7.07 * 13.98
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*
* Vel Total (m/s)      * 2.59 * Avg. Vel. (m/s)      * 1.10 * 3.35 * 1.41
* Max Chl Dpth (m)    * 2.91 * Hydr. Depth (m)     * 0.49 * 2.38 * 0.68
* Conv. Total (m3/s)  * 966.0 * Conv. (m3/s)        * 17.6 * 766.4 * 182.0
* Length Wtd. (m)     * 17.86 * Wetted Per. (m)     * 2.54 * 8.40 * 14.12
* Min Ch El (m)       * 458.75 * Shear (N/m2)        * 24.69 * 106.90 * 35.79
* Alpha                * 1.39 * Stream Power (N/m s) * 27.25 * 358.12 * 50.60
* Frctn Loss (m)      * 0.09 * Cum Volume (1000 m3) * 0.10 * 2.42 * 2.04
* C & E Loss (m)      * 0.02 * Cum SA (1000 m2)    * 0.21 * 1.04 * 2.80

```

**

CROSS SECTION

RIVER: FOSSO BURANO
REACH: 1 RS: 2.14285*

INPUT

Description:

Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.331	8.981	462.416	15.04	462.442	17.26	462.411	19.332	461.086
21.099	460.68	21.698	459.83	22.131	459.289	22.611	458.71	27.445	459.134
27.729	460.047	33.952	461.015	43.172	461.138	90.311	470.731		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	21.099	.035	27.729	.04

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
	21.099	27.729	17.857	17.857	17.857	.1		.3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)      * 462.02 * Element              * Left OB * Channel * Right OB
* Vel Head (m)       * 0.41 * wt. n-Val.          * 0.040 * 0.035 * 0.040
* W.S. Elev (m)      * 461.61 * Reach Len. (m)      * 17.86 * 17.86 * 17.86
* Crit W.S. (m)      *      * Flow Area (m2)       * 1.49 * 16.49 * 12.11
* E.G. Slope (m/m)   *0.005035 * Area (m2)           * 1.49 * 16.49 * 12.11
* Q Total (m3/s)     * 71.20 * Flow (m3/s)         * 1.74 * 52.88 * 16.58
* Top width (m)      * 26.95 * Top width (m)        * 2.58 * 6.63 * 17.74
* Vel Total (m/s)    * 2.37 * Avg. Vel. (m/s)     * 1.17 * 3.21 * 1.37
* Max Chl Dpth (m)   * 2.90 * Hydr. Depth (m)     * 0.58 * 2.49 * 0.68
* Conv. Total (m3/s) * 1003.4 * Conv. (m3/s)        * 24.6 * 745.2 * 233.6
* Length Wtd. (m)    * 17.86 * Wetted Per. (m)     * 2.78 * 8.29 * 17.87
* Min Ch El (m)      * 458.71 * Shear (N/m2)        * 26.47 * 98.19 * 33.47
* Alpha              * 1.45 * Stream Power (N/m s) * 30.98 * 314.82 * 45.82
* Frctn Loss (m)     * 0.08 * Cum Volume (1000 m3) * 0.08 * 2.12 * 1.85
* C & E Loss (m)     * 0.03 * Cum SA (1000 m2)    * 0.16 * 0.91 * 2.52
*
*****
**

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CROSS SECTION

RIVER: FOSSO BURANO
 REACH: 1 RS: 2

INPUT

Description:

Station Elevation Data		num= 11		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.32	16.26	462.51	18.66	462.49	20.9	460.96	22.81	460.5
23.22	458.67	28.68	459.08	29	460.14	36.06	461.01	46.52	460.77
100	470								

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	22.81	.035	29	.04

Bank Sta: Left 22.81 Right 29 Lengths: Left Channel 20 Right 20 Coeff Contr. .1 Expan. .3

CROSS SECTION OUTPUT Profile #Q Tr50

* E.G. Elev (m)	* 461.90	* Element	* Left OB	* Channel	* Right OB	
* Vel Head (m)	* 0.31	* wt. n-Val.	* 0.040	* 0.035	* 0.040	
* W.S. Elev (m)	* 461.60	* Reach Len. (m)	* 20.00	* 20.00	* 20.00	
* Crit W.S. (m)	*	* Flow Area (m2)	* 1.96	* 16.33	* 16.62	
* E.G. Slope (m/m)	*0.004192	* Area (m2)	* 1.96	* 16.33	* 16.62	
* Q Total (m3/s)	* 71.20	* Flow (m3/s)	* 2.33	* 46.85	* 22.02	
* Top width (m)	* 31.35	* Top width (m)	* 2.84	* 6.19	* 22.32	
* Vel Total (m/s)	* 2.04	* Avg. Vel. (m/s)	* 1.19	* 2.87	* 1.32	
* Max Chl Dpth (m)	* 2.93	* Hydr. Depth (m)	* 0.69	* 2.64	* 0.74	
* Conv. Total (m3/s)	* 1099.6	* Conv. (m3/s)	* 36.0	* 723.5	* 340.1	
* Length wtd. (m)	* 20.00	* wetted Per. (m)	* 3.10	* 8.46	* 22.45	
* Min Ch El (m)	* 458.67	* Shear (N/m2)	* 25.98	* 79.38	* 30.44	
* Alpha	* 1.44	* Stream Power (N/m s)	* 30.97	* 227.70	* 40.33	
* Frctn Loss (m)	* 0.08	* Cum Volume (1000 m3)	* 0.05	* 1.82	* 1.60	
* C & E Loss (m)	* 0.00	* Cum SA (1000 m2)	* 0.11	* 0.80	* 2.16	

CROSS SECTION

RIVER: FOSSO BURANO
 REACH: 1 RS: 1.8*

INPUT

Description:

Station Elevation Data		num= 16		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.234	15.668	462.417	17.981	462.406	19.153	461.743	20.139	461.183
21.98	460.812	22.589	459.787	23.109	459.082	23.22	458.586	28.68	458.994
29	460.054	35.543	460.86	39.323	460.849	45.237	460.713	54.618	462.082
94.8	470								

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val

 0 .04 21.98 .035 29 .04
 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 21.98 29 20 20 20 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 461.82 * Element * Left OB * Channel * Right OB
 * Vel Head (m) * 0.31 * wt. n-Val. * 0.040 * 0.035 * 0.040
 * W.S. Elev (m) * 461.51 * Reach Len. (m) * 20.00 * 20.00 * 20.00
 * Crit w.S. (m) * * Flow Area (m2) * 1.05 * 17.63 * 15.95
 * E.G. Slope (m/m) *0.004062 * Area (m2) * 1.05 * 17.63 * 15.95
 * Q Total (m3/s) * 71.20 * Flow (m3/s) * 0.92 * 49.67 * 20.60
 * Top width (m) * 31.17 * Top width (m) * 2.42 * 7.02 * 21.73
 * Vel Total (m/s) * 2.06 * Avg. Vel. (m/s) * 0.88 * 2.82 * 1.29
 * Max Chl Dpth (m) * 2.93 * Hydr. Depth (m) * 0.43 * 2.51 * 0.73
 * Conv. Total (m3/s) * 1117.2 * Conv. (m3/s) * 14.5 * 779.4 * 323.3
 * Length wtd. (m) * 20.00 * wetted Per. (m) * 2.55 * 9.16 * 21.84
 * Min Ch El (m) * 458.59 * Shear (N/m2) * 16.38 * 76.67 * 29.09
 * Alpha * 1.43 * Stream Power (N/m s) * 14.43 * 216.03 * 37.58
 * Frctn Loss (m) * 0.08 * Cum Volume (1000 m3) * 0.02 * 1.49 * 1.27
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.06 * 0.67 * 1.72

 **

CROSS SECTION

RIVER: FOSSO BURANO
 REACH: 1 RS: 1.6*

INPUT

Description:

Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.148	15.077	462.324	17.302	462.321	18.43	461.828	19.379	461.405
21.15	461.124	22.167	459.973	23.034	459.329	23.22	458.502	28.68	458.908
29	459.968	35.026	460.711	38.507	460.782	43.954	460.657	52.594	461.646
89.6	470								

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	21.15	.035	29	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 21.15 29 20 20 20 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 461.74 * Element * Left OB * Channel * Right OB
 * Vel Head (m) * 0.30 * wt. n-Val. * 0.040 * 0.035 * 0.040
 * W.S. Elev (m) * 461.43 * Reach Len. (m) * 20.00 * 20.00 * 20.00
 * Crit w.S. (m) * * Flow Area (m2) * 0.30 * 18.45 * 15.50
 * E.G. Slope (m/m) *0.004180 * Area (m2) * 0.30 * 18.45 * 15.50

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*
* Q Total (m3/s)      * 71.20 * Flow (m3/s)        * 0.14 * 51.11 * 19.95
*
* Top width (m)      * 31.42 * Top width (m)      * 1.83 * 7.85 * 21.74
*
* Vel Total (m/s)    * 2.08 * Avg. Vel. (m/s)    * 0.48 * 2.77 * 1.29
*
* Max Chl Dpth (m)  * 2.93 * Hydr. Depth (m)    * 0.16 * 2.35 * 0.71
*
* Conv. Total (m3/s) * 1101.3 * Conv. (m3/s)       * 2.2 * 790.5 * 308.6
*
* Length wtd. (m)   * 20.00 * wetted Per. (m)    * 1.86 * 10.05 * 21.83
*
* Min Ch El (m)     * 458.50 * Shear (N/m2)       * 6.60 * 75.28 * 29.12
*
* Alpha              * 1.38 * Stream Power (N/m s) * 3.16 * 208.54 * 37.47
*
* Frctn Loss (m)    * 0.08 * Cum Volume (1000 m3) * 0.00 * 1.12 * 0.95
*
* C & E Loss (m)    * 0.00 * Cum SA (1000 m2)    * 0.02 * 0.52 * 1.28
*

```

**

CROSS SECTION

RIVER: FOSSO BURANO
REACH: 1

RS: 1.4*

INPUT

Description:

Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.062	14.485	462.231	16.623	462.237	17.706	461.912	18.619	461.628		
20.32	461.436	21.745	460.158	22.959	459.576	23.22	458.418	28.68	458.822		
29	459.882	34.509	460.561	37.692	460.715	42.671	460.6	50.569	461.211		
84.4	470										

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	20.32	.035	29	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 20.32 29 20 20 20 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

```

*****
**
* E.G. Elev (m)      * 461.65 * Element            * Left OB * Channel * Right OB
*
* Vel Head (m)      * 0.29 * wt. n-Val.         *          * 0.035 * 0.040
*
* W.S. Elev (m)     * 461.36 * Reach Len. (m)     * 20.00 * 20.00 * 20.00
*
* Crit W.S. (m)     *          * Flow Area (m2)     *          * 18.83 * 15.67
*
* E.G. Slope (m/m)  * 0.004313 * Area (m2)          *          * 18.83 * 15.67
*
* Q Total (m3/s)    * 71.20 * Flow (m3/s)        *          * 50.81 * 20.39
*
* Top width (m)     * 30.73 * Top width (m)      *          * 8.59 * 22.14
*
* Vel Total (m/s)   * 2.06 * Avg. Vel. (m/s)    *          * 2.70 * 1.30
*
* Max Chl Dpth (m) * 2.94 * Hydr. Depth (m)    *          * 2.19 * 0.71
*
* Conv. Total (m3/s) * 1084.2 * Conv. (m3/s)       *          * 773.7 * 310.5
*
* Length wtd. (m)   * 20.00 * wetted Per. (m)    *          * 10.91 * 22.23
*
* Min Ch El (m)     * 458.42 * Shear (N/m2)       *          * 72.96 * 29.83
*
* Alpha              * 1.33 * Stream Power (N/m s) *          * 196.91 * 38.80
*
* Frctn Loss (m)    * 0.09 * Cum Volume (1000 m3) *          * 0.75 * 0.64
*

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*
 * C & E Loss (m) * 0.01 * Cum SA (1000 m2) * * 0.36 * 0.85
 *

 **

CROSS SECTION

RIVER: FOSSO BURANO
 REACH: 1 RS: 1.2*

INPUT

Description:

Station Elevation Data num= 16
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 461.976 13.893 462.138 15.944 462.153 16.983 461.996 17.858 461.85
 19.49 461.748 21.322 460.344 22.885 459.823 23.22 458.334 28.68 458.736
 29 459.796 33.992 460.411 36.876 460.647 41.387 460.544 48.545 460.775
 79.2 470

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 19.49 .035 29 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 19.49 29 20 20 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 461.56 * Element * Left OB * Channel * Right OB
 *
 * vel Head (m) * 0.27 * wt. n-Val. * * 0.035 * 0.040
 *
 * W.S. Elev (m) * 461.29 * Reach Len. (m) * 20.00 * 20.00 * 20.00
 *
 * Crit W.S. (m) * * Flow Area (m2) * * 18.86 * 16.12
 *
 * E.G. Slope (m/m) * 0.004250 * Area (m2) * * 18.86 * 16.12
 *
 * Q Total (m3/s) * 71.20 * Flow (m3/s) * * 49.43 * 21.77
 *
 * Top width (m) * 30.15 * Top width (m) * * 8.91 * 21.24
 *
 * vel Total (m/s) * 2.04 * Avg. Vel. (m/s) * * 2.62 * 1.35
 *
 * Max Chl Dpth (m) * 2.95 * Hydr. Depth (m) * * 2.12 * 0.76
 *
 * Conv. Total (m3/s) * 1092.1 * Conv. (m3/s) * * 758.3 * 333.9
 *
 * Length wtd. (m) * 20.00 * wetted Per. (m) * * 11.30 * 21.37
 *
 * Min Ch El (m) * 458.33 * Shear (N/m2) * * 69.55 * 31.44
 *
 * Alpha * 1.29 * Stream Power (N/m s) * * 182.26 * 42.45
 *
 * Frctn Loss (m) * 0.09 * Cum Volume (1000 m3) * * 0.37 * 0.33
 *
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 0.18 * 0.41
 *

 **

CROSS SECTION

RIVER: FOSSO BURANO
 REACH: 1 RS: 1

INPUT

Description: Sez. aggiunta

Station Elevation Data num= 11
 Sta Elev Sta Elev Sta Elev Sta Elev

 0 461.89 16.26 462.08 18.66 462.06 20.9 460.53 22.81 460.07

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23.22 458.25 28.68 458.65 29 459.71 36.06 460.58 46.52 460.34
 74 470

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 18.66 .035 29 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 18.66 29 0 0 0 .1 .3

CROSS SECTION OUTPUT Profile #Q Tr50

 **
 * E.G. Elev (m) * 461.47 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.26 * wt. n-Val. * * 0.035 * 0.040
 * W.S. Elev (m) * 461.21 * Reach Len. (m) * * *
 * Crit W.S. (m) * 460.94 * Flow Area (m2) * * 18.62 * 16.40
 * E.G. Slope (m/m) *0.004302 * Area (m2) * * 18.62 * 16.40
 * Q Total (m3/s) * 71.20 * Flow (m3/s) * * 47.79 * 23.41
 * Top width (m) * 29.08 * Top width (m) * * 9.09 * 19.99
 * vel Total (m/s) * 2.03 * Avg. vel. (m/s) * * 2.57 * 1.43
 * Max chl Dpth (m) * 2.96 * Hydr. Depth (m) * * 2.05 * 0.82
 * Conv. Total (m3/s) * 1085.6 * Conv. (m3/s) * * 728.6 * 357.0
 * Length wtd. (m) * * * Wetted Per. (m) * * 11.61 * 20.19
 * Min Ch El (m) * 458.25 * Shear (N/m2) * * 67.62 * 34.26
 * Alpha * 1.23 * Stream Power (N/m s) * * 173.57 * 48.91
 * Frctn Loss (m) * * * Cum volume (1000 m3) * * *
 * C & E Loss (m) * * * Cum SA (1000 m2) * * *

 **

SUMMARY OF MANNING'S N VALUES

River:FOSSO BURANO

 * Reach * River Sta. * n1 * n2 * n3 *

 *1 * 5 * .04* .035* .04*
 *1 * 4.75* * .04* .035* .04*
 *1 * 4.5* * .04* .035* .04*
 *1 * 4.25* * .04* .035* .04*
 *1 * 4 * .04* .035* .04*
 *1 * 3.8* * .04* .035* .04*
 *1 * 3.6* * .04* .035* .04*
 *1 * 3.4* * .04* .035* .04*
 *1 * 3.2* * .04* .035* .04*
 *1 * 3 * .04* .035* .04*
 *1 * 2.85714* * .04* .035* .04*
 *1 * 2.71428* * .04* .035* .04*
 *1 * 2.57142* * .04* .035* .04*
 *1 * 2.42857* * .04* .035* .04*
 *1 * 2.28571* * .04* .035* .04*
 *1 * 2.14285* * .04* .035* .04*
 *1 * 2 * .04* .035* .04*
 *1 * 1.8* * .04* .035* .04*
 *1 * 1.6* * .04* .035* .04*
 *1 * 1.4* * .04* .035* .04*
 *1 * 1.2* * .04* .035* .04*
 *1 * 1 * .04* .035* .04*

SUMMARY OF REACH LENGTHS

River: FOSSO BURANO

* Reach	* River Sta.	* Left	* Channel	* Right
*1	* 5	* 15.5*	* 15.5*	* 15.5*
*1	* 4.75*	* 15.5*	* 15.5*	* 15.5*
*1	* 4.5*	* 15.5*	* 15.5*	* 15.5*
*1	* 4.25*	* 15.5*	* 15.5*	* 15.5*
*1	* 4	* 17*	* 17*	* 17*
*1	* 3.8*	* 17*	* 17*	* 17*
*1	* 3.6*	* 17*	* 17*	* 17*
*1	* 3.4*	* 17*	* 17*	* 17*
*1	* 3.2*	* 17*	* 17*	* 17*
*1	* 3	* 17.857*	* 17.857*	* 17.857*
*1	* 2.85714*	* 17.857*	* 17.857*	* 17.857*
*1	* 2.71428*	* 17.857*	* 17.857*	* 17.857*
*1	* 2.57142*	* 17.857*	* 17.857*	* 17.857*
*1	* 2.42857*	* 17.857*	* 17.857*	* 17.857*
*1	* 2.28571*	* 17.857*	* 17.857*	* 17.857*
*1	* 2.14285*	* 17.857*	* 17.857*	* 17.857*
*1	* 2	* 20*	* 20*	* 20*
*1	* 1.8*	* 20*	* 20*	* 20*
*1	* 1.6*	* 20*	* 20*	* 20*
*1	* 1.4*	* 20*	* 20*	* 20*
*1	* 1.2*	* 20*	* 20*	* 20*
*1	* 1	* 0*	* 0*	* 0*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: FOSSO BURANO

* Reach	* River Sta.	* Contr.	* Expan.
*1	* 5	* .1*	* .3*
*1	* 4.75*	* .1*	* .3*
*1	* 4.5*	* .1*	* .3*
*1	* 4.25*	* .1*	* .3*
*1	* 4	* .1*	* .3*
*1	* 3.8*	* .1*	* .3*
*1	* 3.6*	* .1*	* .3*
*1	* 3.4*	* .1*	* .3*
*1	* 3.2*	* .1*	* .3*
*1	* 3	* .1*	* .3*
*1	* 2.85714**	* .1*	* .3*
*1	* 2.71428**	* .1*	* .3*
*1	* 2.57142**	* .1*	* .3*
*1	* 2.42857**	* .1*	* .3*
*1	* 2.28571**	* .1*	* .3*
*1	* 2.14285**	* .1*	* .3*
*1	* 2	* .1*	* .3*
*1	* 1.8*	* .1*	* .3*
*1	* 1.6*	* .1*	* .3*
*1	* 1.4*	* .1*	* .3*
*1	* 1.2*	* .1*	* .3*
*1	* 1	* .1*	* .3*

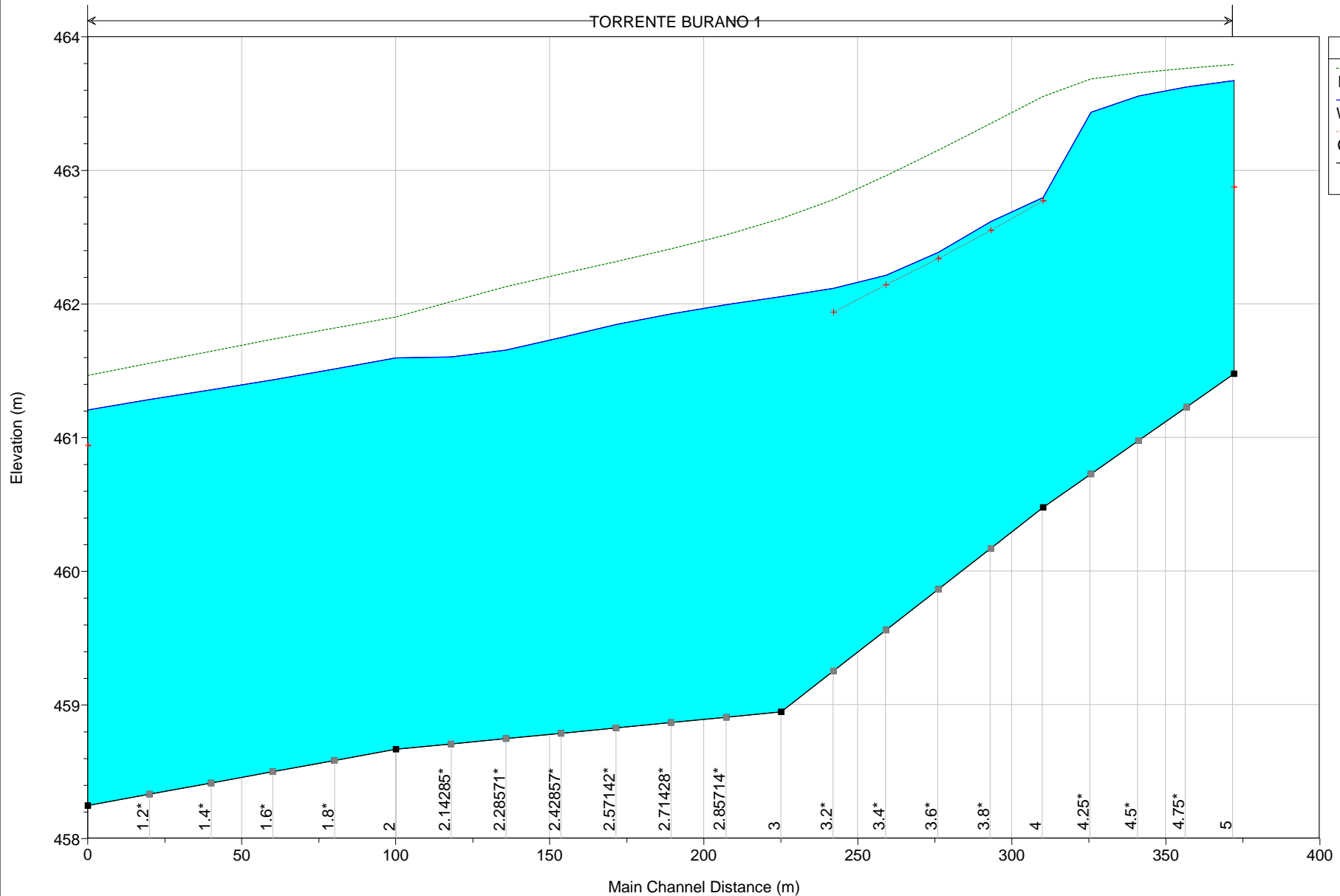
HEC-RAS Plan: Plan 02 River: FOSSO BURANO Reach: 1 Profile: Q Tr50

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
1	5	Q Tr50	71.20	461.48	463.67	462.88	463.79	0.001688	1.55	46.57	32.24	0.40
1	4.75*	Q Tr50	71.20	461.23	463.63		463.76	0.001766	1.65	43.15	27.04	0.41
1	4.5*	Q Tr50	71.20	460.98	463.56		463.73	0.002073	1.85	38.54	21.73	0.44
1	4.25*	Q Tr50	71.20	460.73	463.44		463.69	0.002930	2.22	32.21	21.80	0.52
1	4	Q Tr50	71.20	460.48	462.80	462.77	463.55	0.011895	3.85	18.49	11.80	0.98
1	3.8*	Q Tr50	71.20	460.17	462.62	462.55	463.35	0.011193	3.80	18.76	11.57	0.95
1	3.6*	Q Tr50	71.20	459.87	462.39	462.34	463.15	0.011615	3.87	18.38	11.22	0.97
1	3.4*	Q Tr50	71.20	459.56	462.22	462.14	462.96	0.010209	3.83	18.85	11.67	0.93
1	3.2*	Q Tr50	71.20	459.26	462.12	461.94	462.78	0.008010	3.65	20.29	12.63	0.85
1	3	Q Tr50	71.20	458.95	462.06		462.64	0.006117	3.47	22.25	14.61	0.77
1	2.85714*	Q Tr50	71.20	458.91	462.00		462.52	0.005450	3.34	23.66	14.57	0.73
1	2.71428*	Q Tr50	71.20	458.87	461.93		462.41	0.005107	3.27	24.90	15.81	0.70
1	2.57142*	Q Tr50	71.20	458.83	461.85		462.32	0.005037	3.26	25.86	17.55	0.69
1	2.42857*	Q Tr50	71.20	458.79	461.75		462.23	0.005253	3.32	26.51	20.07	0.69
1	2.28571*	Q Tr50	71.20	458.75	461.66		462.13	0.005432	3.35	27.53	23.43	0.69
1	2.14285*	Q Tr50	71.20	458.71	461.61		462.02	0.005035	3.21	30.09	26.95	0.65
1	2	Q Tr50	71.20	458.67	461.60		461.90	0.004192	2.87	34.91	31.35	0.56
1	1.8*	Q Tr50	71.20	458.59	461.51		461.82	0.004062	2.82	34.62	31.17	0.57
1	1.6*	Q Tr50	71.20	458.50	461.43		461.74	0.004180	2.77	34.25	31.42	0.58
1	1.4*	Q Tr50	71.20	458.42	461.36		461.65	0.004313	2.70	34.50	30.73	0.58
1	1.2*	Q Tr50	71.20	458.33	461.29		461.56	0.004250	2.62	34.98	30.15	0.57
1	1	Q Tr50	71.20	458.25	461.21	460.94	461.47	0.004302	2.57	35.02	29.08	0.57

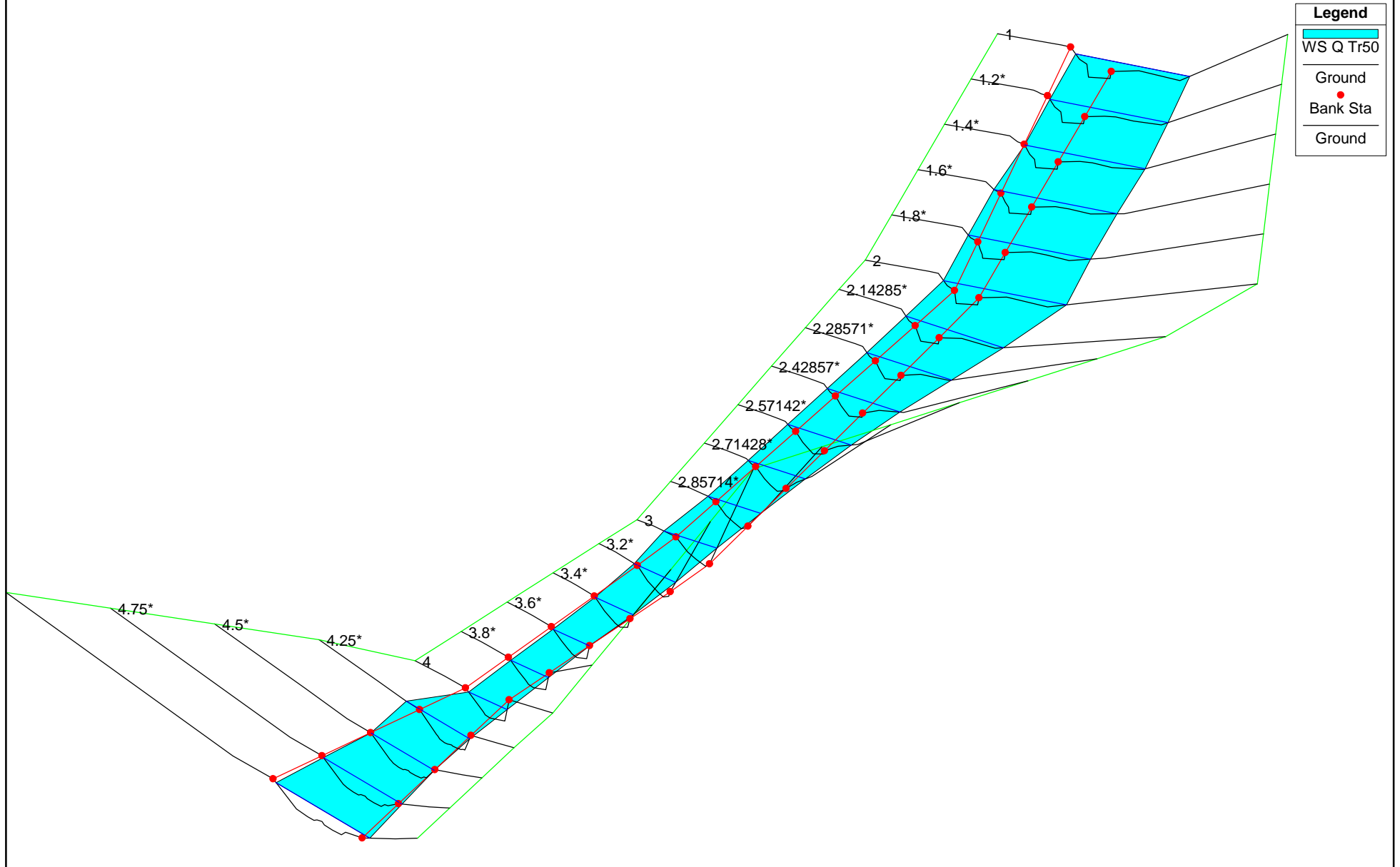
MACROAREA am19 Plan: Plan 04

Flow: Q50

TORRENTE BURANO 1

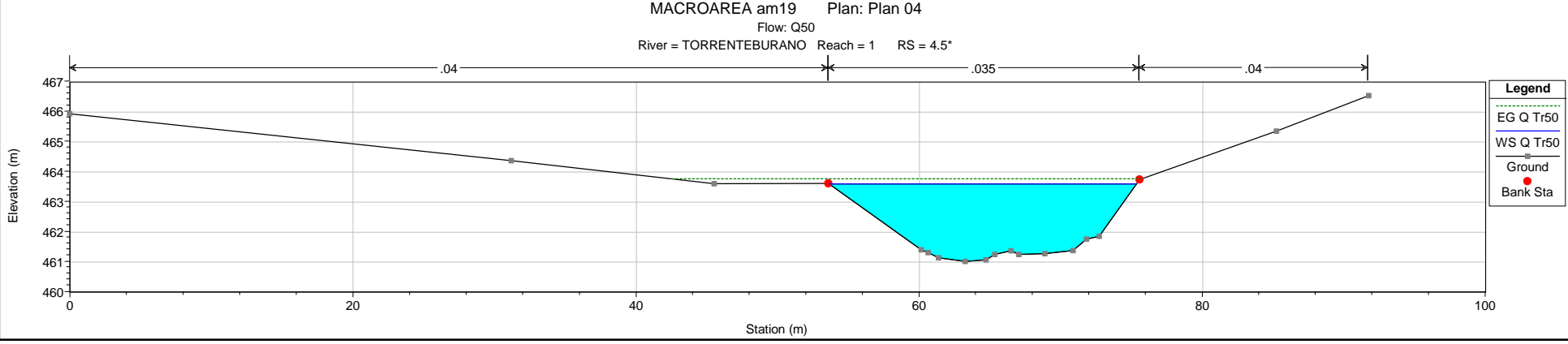
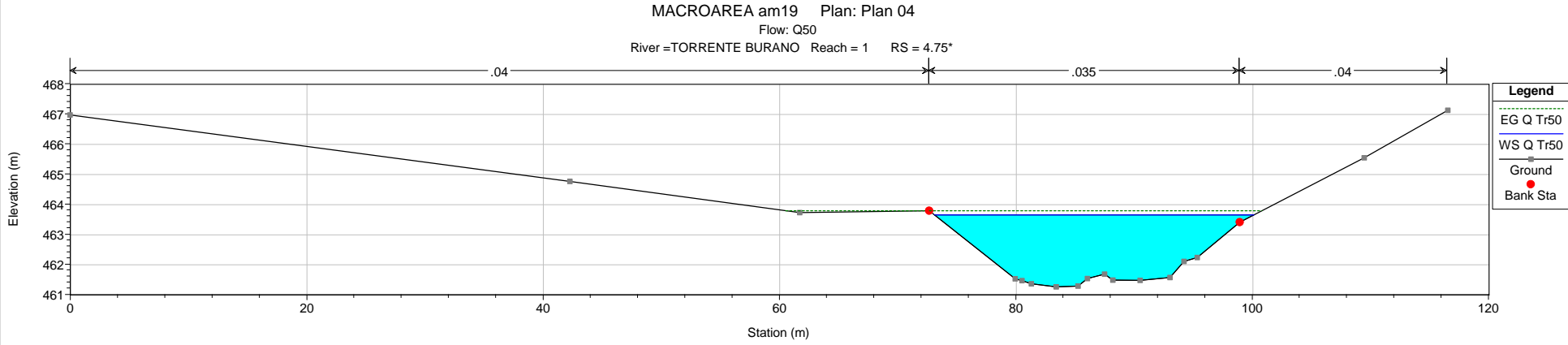
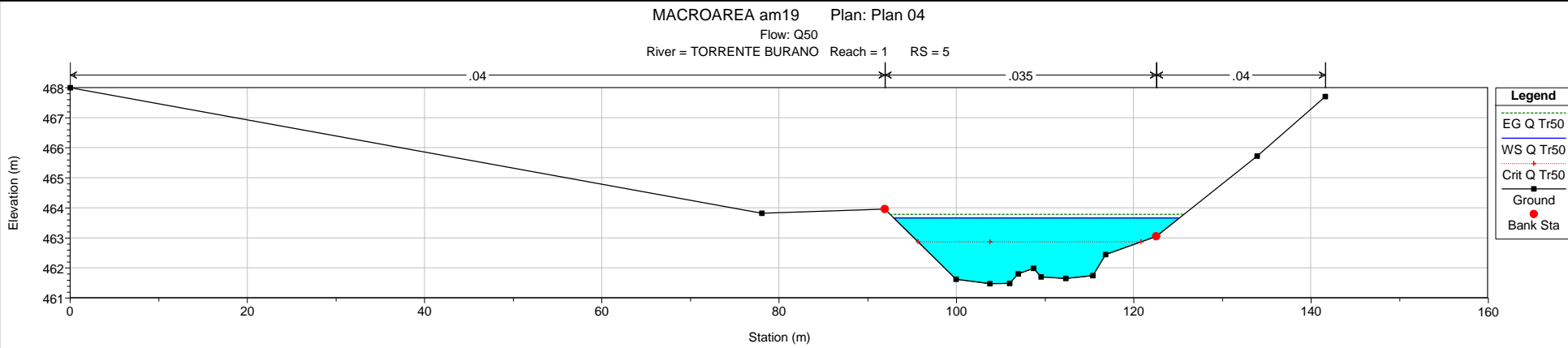


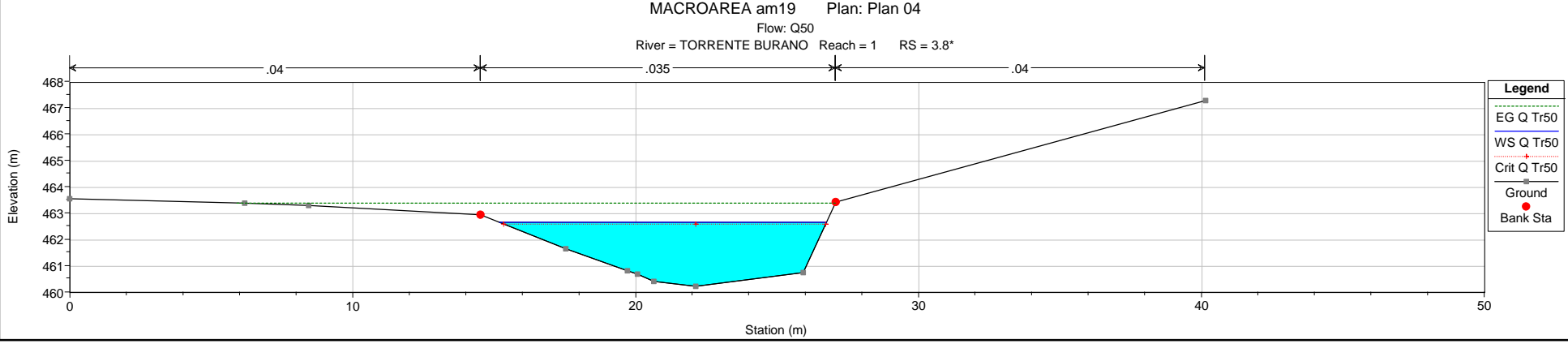
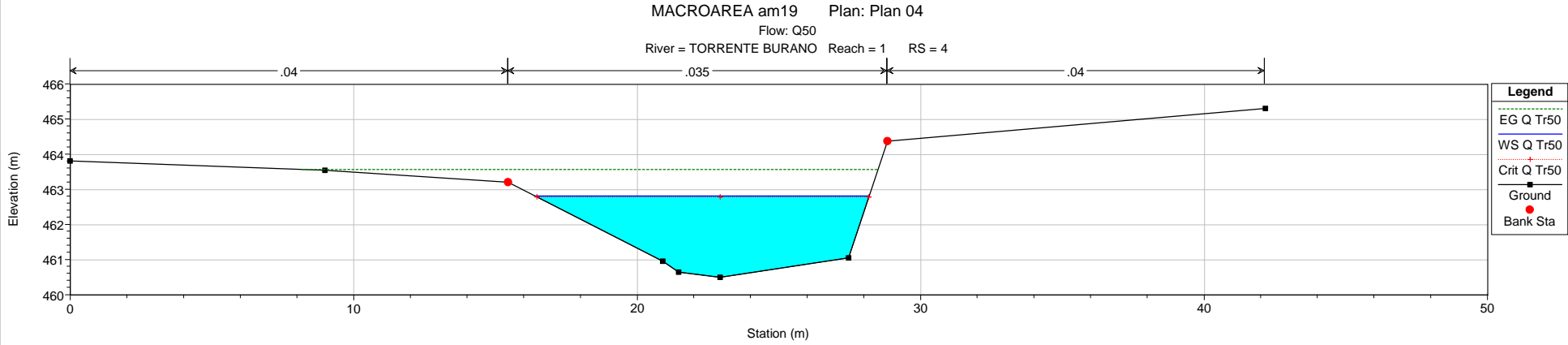
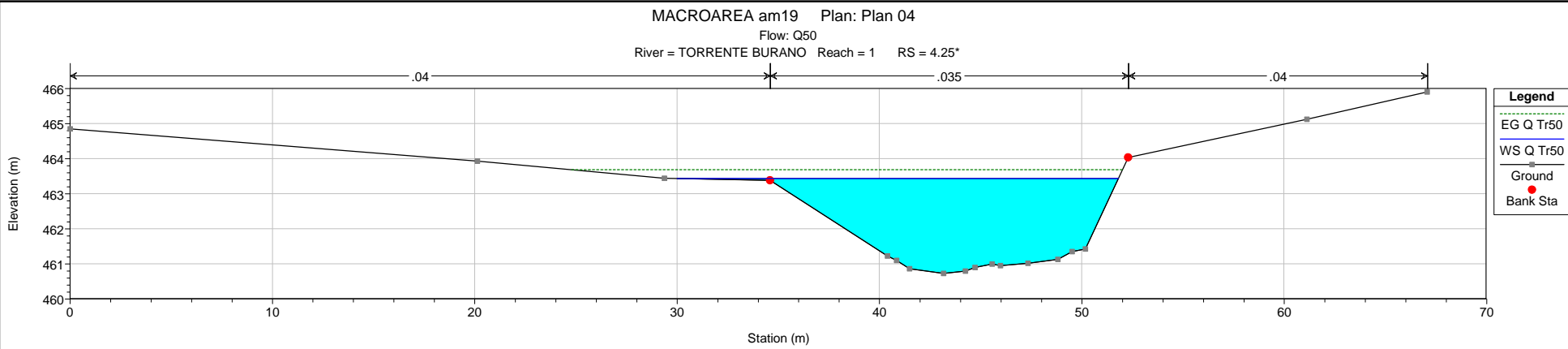
MACROAREA am19 Plan: Plan 04
Flow: Q50 TORRENTE BURANO

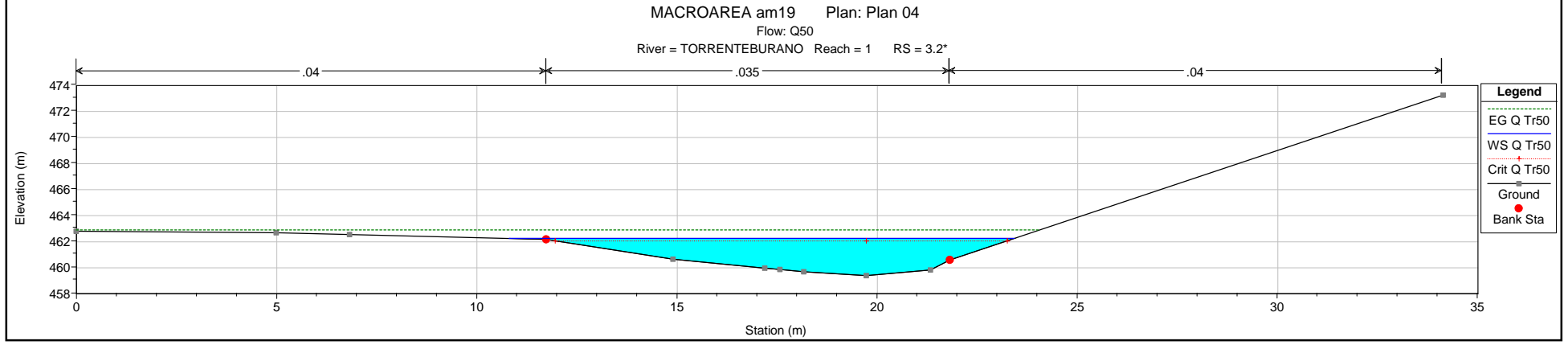
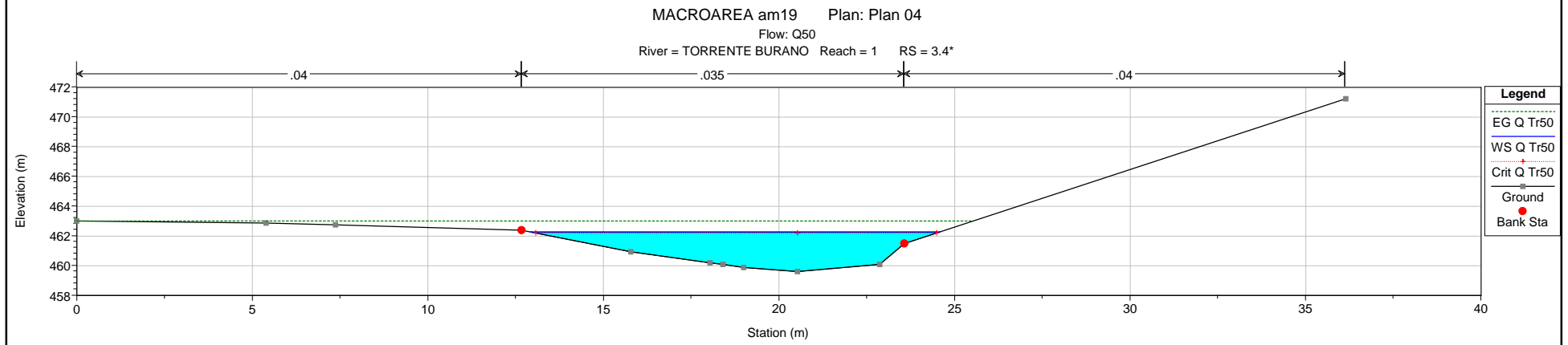
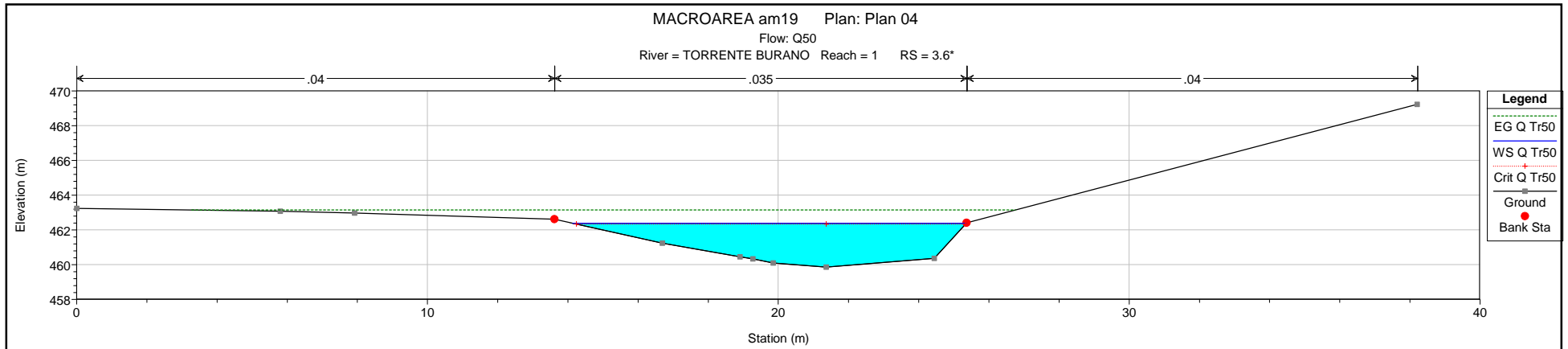


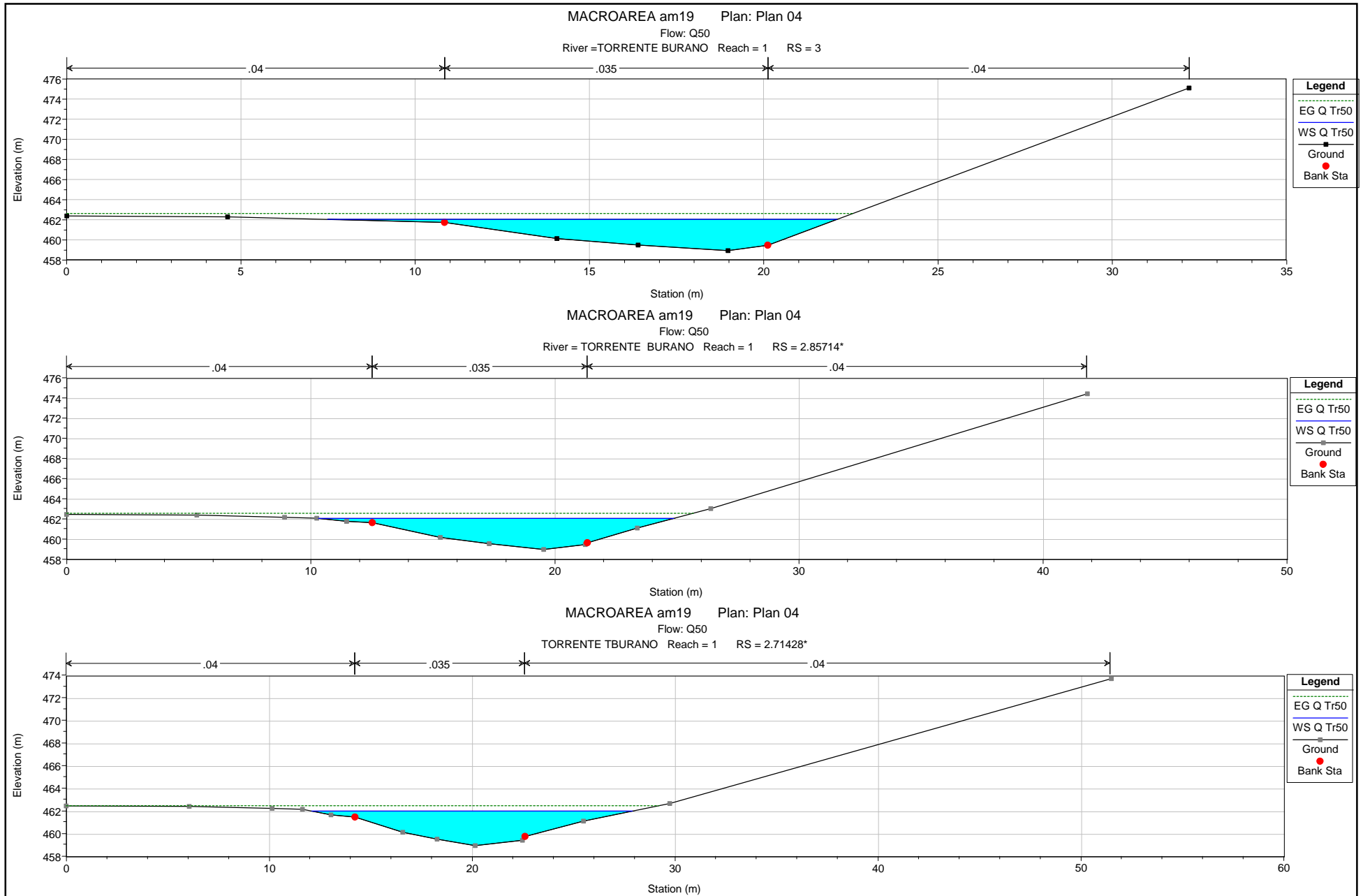
Legend

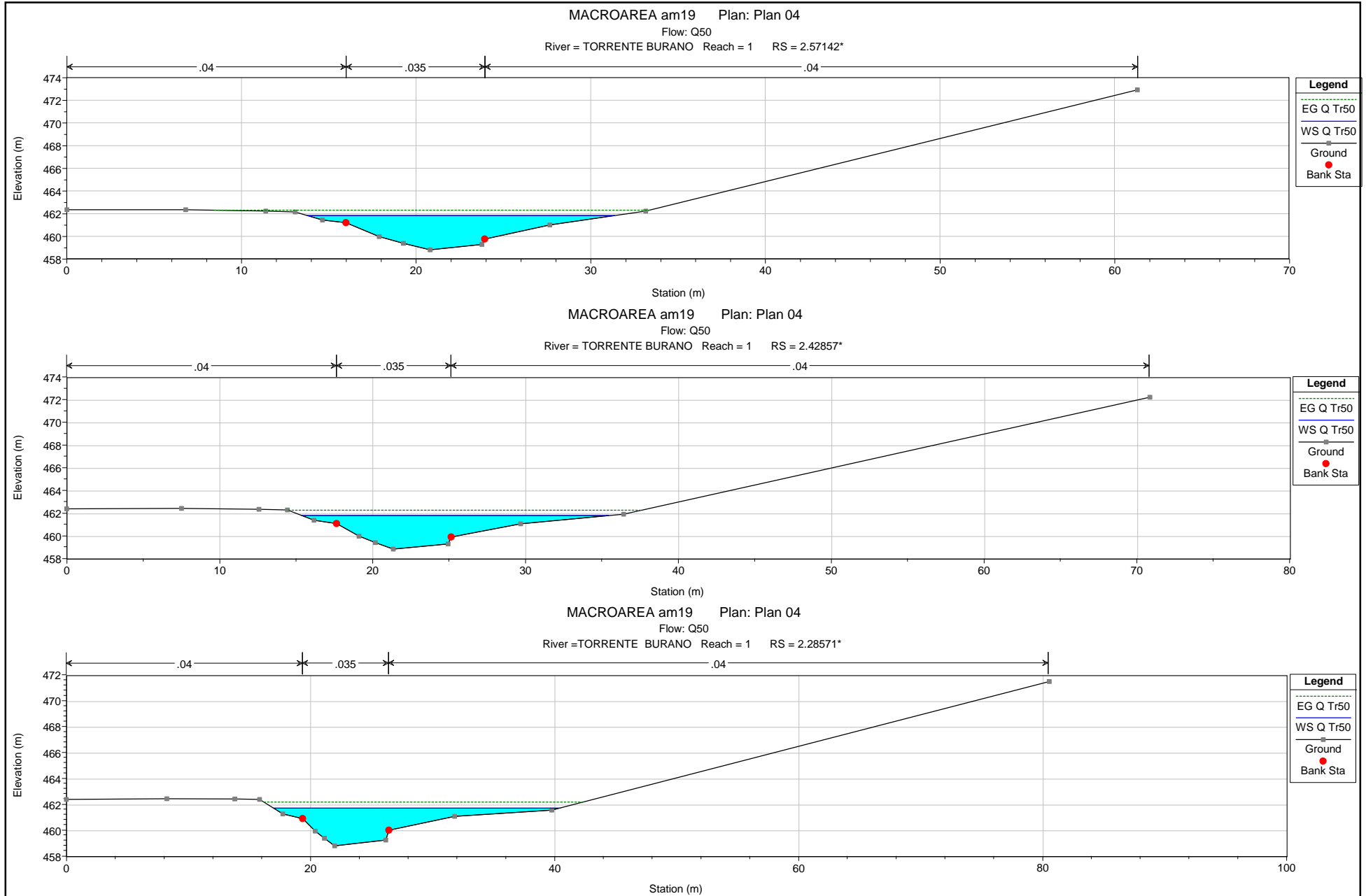
- WS Q Tr50
- Ground
- Bank Sta
- Ground

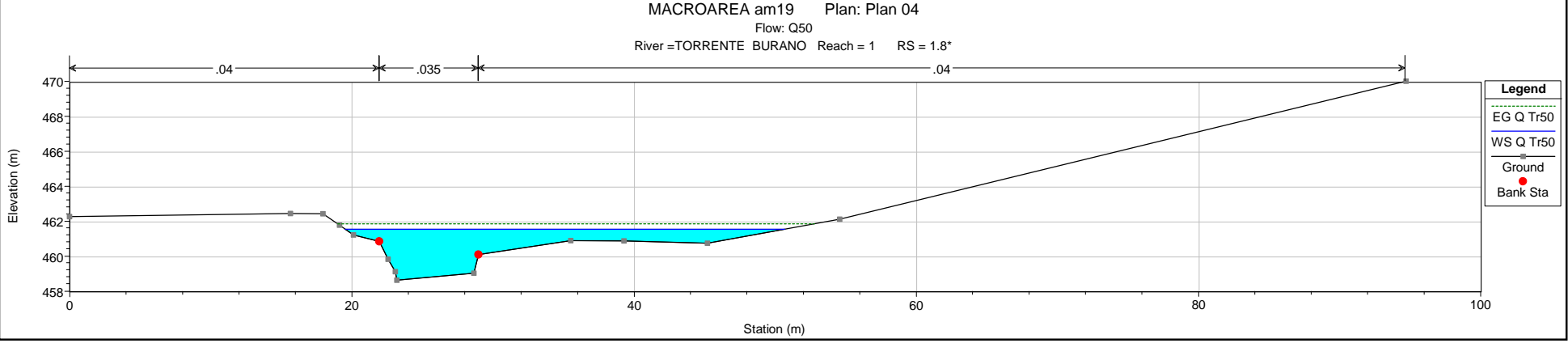
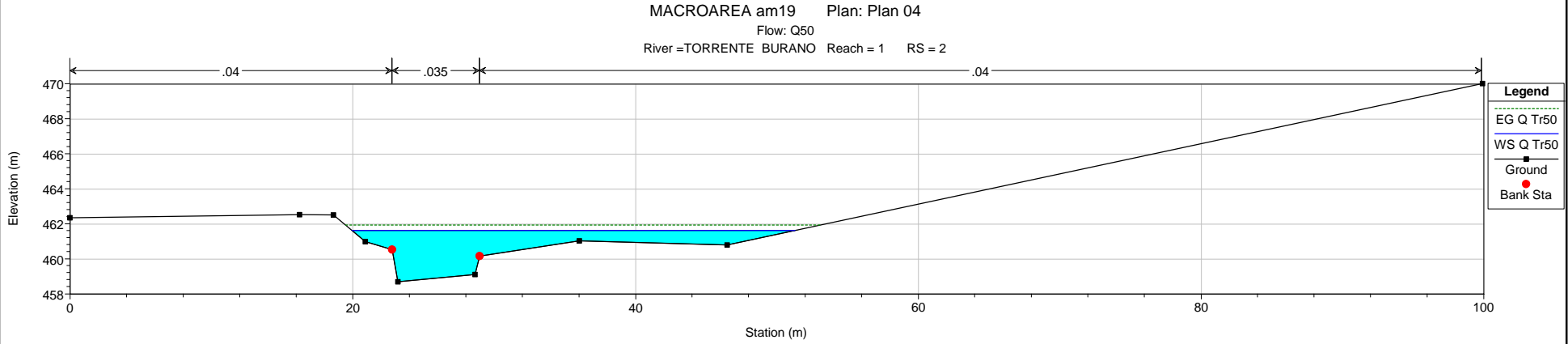
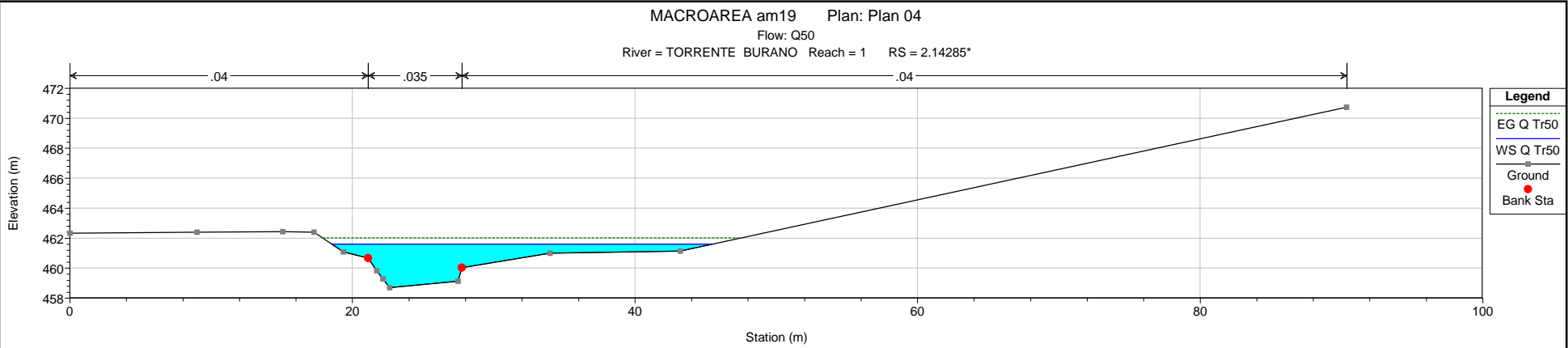


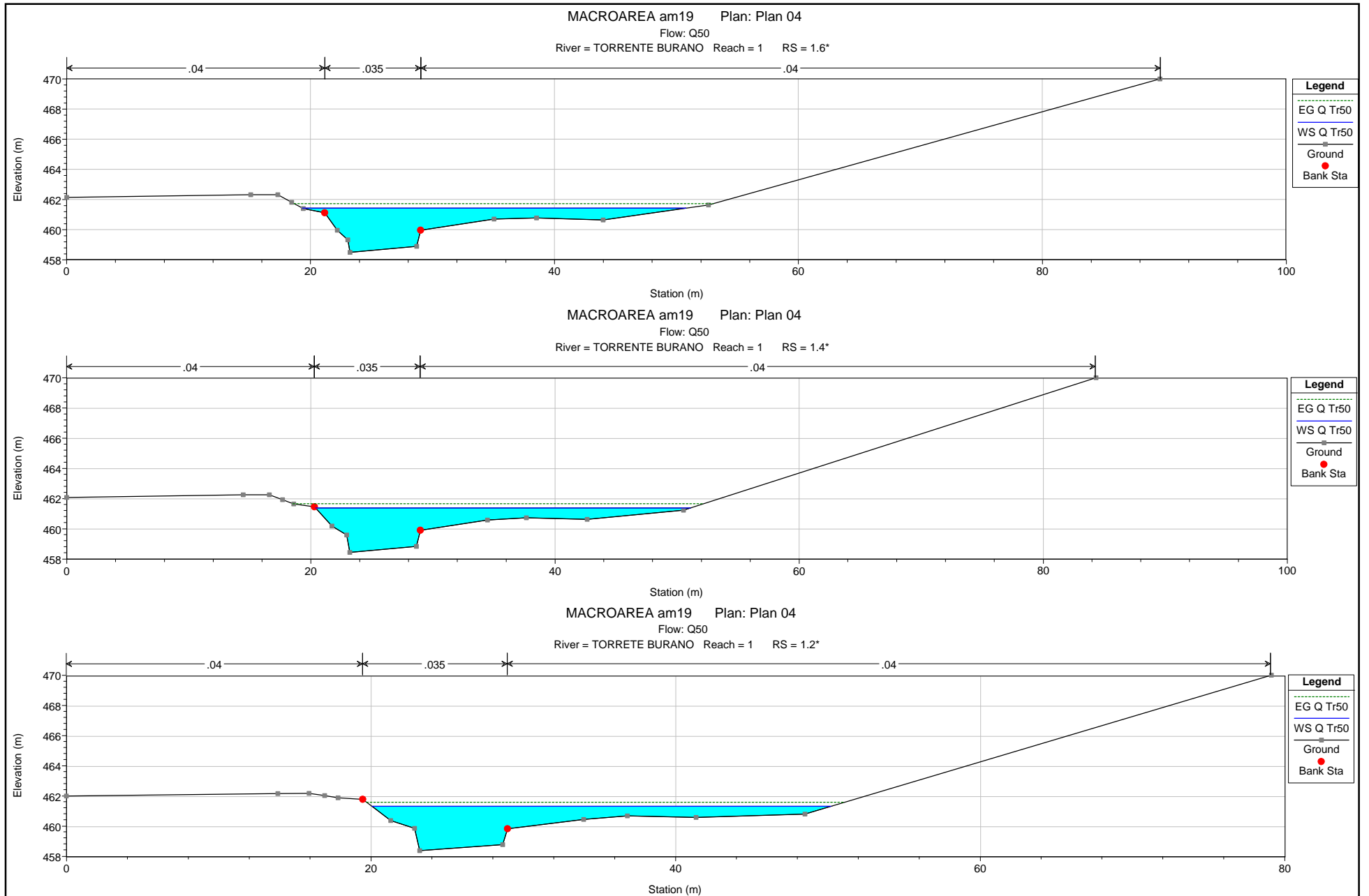








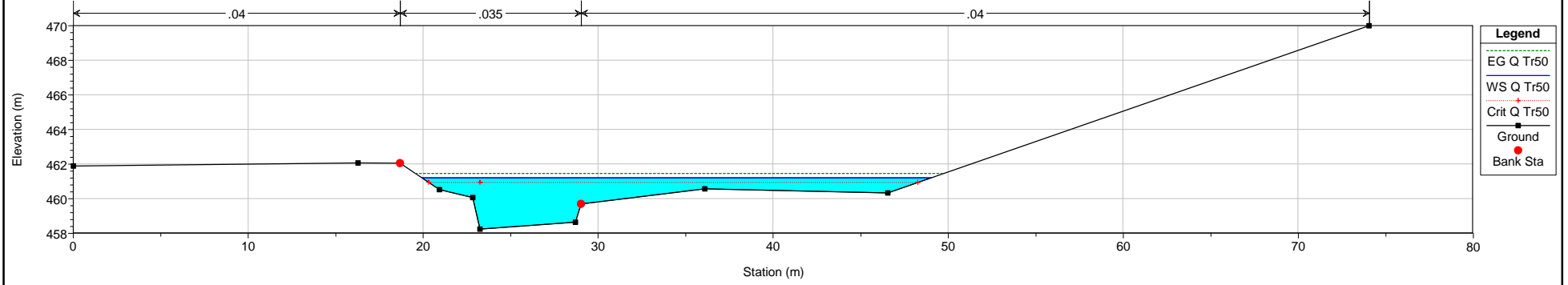




MACROAREA am19 Plan: Plan 04

Flow: Q50

River = TORRENTE BURANO Reach = 1 RS = 1 Sez. aggiunta



BURANO.rep

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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PROJECT DATA

Project Title: MACROAREA am19 TORRENTE BURANO
Project File : BURANO.prj
Run Date and Time: 05/04/2006 13.07.23

Project in SI units

Project Description:
verifica PRG GUBBIO MACROAREA am19

FLOW DATA

Flow Title: Q200
Flow File : C:\COMMESSE\PRG_GUBBIO\PRG_Idraulica\HEC_BURANO\BURANO.f01

Flow Data (m3/s)

* River Reach RS * PF T200 *
* FOSSO BURANO 1 5 * 99 *

Boundary Conditions

* River Reach Profile * Upstream
Downstream *

* FOSSO BURANO 1 PF T200 * Critical
Normal S = 0.0043 *

GEOMETRY DATA

Geometry Title: Geom 01
Geometry File : C:\COMMESSE\PRG_GUBBIO\PRG_Idraulica\HEC_BURANO\BURANO.g01

CROSS SECTION

RIVER: FOSSO BURANO
REACH: 1 RS: 5

INPUT

Description:

Station Elevation Data num= 15
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 468 78 463.83 91.85 463.96 99.88 461.63 103.7 461.48
105.93 461.49 106.89 461.81 108.64 461.99 109.48 461.71 112.28 461.66
115.32 461.75 116.76 462.45 122.48 463.06 133.86 465.73 141.52 467.71

Manning's n values num= 3

Sta n Val Sta n Val Sta n Val

 0 .04 91.85 .035 122.48 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 91.85 122.48 15.5 15.5 15.5 .1 .3

CROSS SECTION OUTPUT Profile #PF T200

 **
 * E.G. Elev (m) * 464.32 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.12 * wt. n-Val. * 0.040 * 0.035 * 0.040
 * W.S. Elev (m) * 464.21 * Reach Len. (m) * 15.50 * 15.50 * 15.50
 * Crit W.S. (m) * 463.13 * Flow Area (m2) * 5.66 * 62.03 * 2.80
 * E.G. Slope (m/m) *0.001162 * Area (m2) * 5.66 * 62.03 * 2.80
 * Q Total (m3/s) * 99.00 * Flow (m3/s) * 2.02 * 95.36 * 1.62
 * Top width (m) * 56.43 * Top width (m) * 20.91 * 30.63 * 4.89
 * vel Total (m/s) * 1.40 * Avg. vel. (m/s) * 0.36 * 1.54 * 0.58
 * Max Chl Dpth (m) * 2.73 * Hydr. Depth (m) * 0.27 * 2.02 * 0.57
 * Conv. Total (m3/s) * 2904.6 * Conv. (m3/s) * 59.1 * 2797.9 * 47.5
 * Length wtd. (m) * 15.50 * wetted Per. (m) * 20.92 * 31.27 * 5.02
 * Min Ch El (m) * 461.48 * Shear (N/m2) * 3.08 * 22.60 * 6.36
 * Alpha * 1.16 * Stream Power (N/m s) * 1.10 * 34.75 * 3.68
 * Frctn Loss (m) * 0.02 * Cum Volume (1000 m3) * 0.70 * 9.46 * 3.80
 * C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 1.95 * 4.10 * 3.93

 **

CROSS SECTION

RIVER: FOSSO BURANO
 REACH: 1 RS: 4.75*

INPUT

Description:

Station Elevation Data num= 19
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 0 466.95 42.327 464.74 61.784 463.701 72.755 463.767 80.045 461.498
 80.607 461.439 81.413 461.336 83.512 461.23 85.36 461.259 86.156 461.508
 87.606 461.66 88.302 461.459 90.623 461.448 93.142 461.545 94.335 462.084
 95.467 462.207 99.075 463.385 109.603 465.528 116.69 467.107

Manning's n Values

num= 3
 Sta n Val Sta n Val Sta n Val

 0 .04 72.755 .035 99.075 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 72.755 99.075 15.5 15.5 15.5 .1 .3

CROSS SECTION OUTPUT Profile #PF T200

 **
 * E.G. Elev (m) * 464.30 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.14 * wt. n-Val. * 0.040 * 0.035 * 0.040
 * W.S. Elev (m) * 464.17 * Reach Len. (m) * 15.50 * 15.50 * 15.50
 * Crit W.S. (m) * * Flow Area (m2) * 6.76 * 57.21 * 1.50
 *

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BURANO.rep
* E.G. Slope (m/m) *0.001255 * Area (m2) * 6.76 * 57.21 * 1.50
* Q Total (m3/s) * 99.00 * Flow (m3/s) * 2.94 * 95.36 * 0.70
* Top width (m) * 49.83 * Top width (m) * 19.68 * 26.32 * 3.84
* Vel Total (m/s) * 1.51 * Avg. Vel. (m/s) * 0.43 * 1.67 * 0.47
* Max Chl Dpth (m) * 2.94 * Hydr. Depth (m) * 0.34 * 2.17 * 0.39
* Conv. Total (m3/s) * 2795.1 * Conv. (m3/s) * 82.9 * 2692.5 * 19.7
* Length wtd. (m) * 15.50 * Wetted Per. (m) * 19.69 * 27.06 * 3.92
* Min Ch El (m) * 461.23 * Shear (N/m2) * 4.23 * 26.01 * 4.71
* Alpha * 1.17 * Stream Power (N/m s) * 1.83 * 43.35 * 2.20
* Frctn Loss (m) * 0.02 * Cum Volume (1000 m3) * 0.61 * 8.54 * 3.77
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 1.63 * 3.66 * 3.86

```

**

CROSS SECTION

RIVER: FOSSO BURANO
REACH: 1 RS: 4.5*

INPUT

Description:

Station Elevation Data		num= 19	
Sta	Elev	Sta	Elev
0	465.9	31.218	464.337
60.715	461.273	61.439	461.1
66.572	461.331	67.124	461.207
72.808	461.818	75.67	463.71

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.04	53.66	.035
75.67			.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	53.66	75.67		15.5	15.5		.1	.3

CROSS SECTION OUTPUT Profile #PF T200

```

*****
* E.G. Elev (m) * 464.28 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.17 * wt. n-Val. * 0.040 * 0.035 * 0.040
* W.S. Elev (m) * 464.10 * Reach Len. (m) * 15.50 * 15.50 * 15.50
* Crit W.S. (m) * * Flow Area (m2) * 6.93 * 50.51 * 0.46
* E.G. Slope (m/m) *0.001535 * Area (m2) * 6.93 * 50.51 * 0.46
* Q Total (m3/s) * 99.00 * Flow (m3/s) * 3.58 * 95.27 * 0.15
* Top width (m) * 42.40 * Top width (m) * 18.05 * 22.01 * 2.35
* Vel Total (m/s) * 1.71 * Avg. Vel. (m/s) * 0.52 * 1.89 * 0.33
* Max Chl Dpth (m) * 3.12 * Hydr. Depth (m) * 0.38 * 2.30 * 0.20
* Conv. Total (m3/s) * 2526.7 * Conv. (m3/s) * 91.4 * 2431.4 * 3.9
* Length wtd. (m) * 15.50 * Wetted Per. (m) * 18.06 * 23.10 * 2.38
* Min Ch El (m) * 460.98 * Shear (N/m2) * 5.77 * 32.92 * 2.91
* Alpha * 1.17 * Stream Power (N/m s) * 2.99 * 62.09 * 0.95
*

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BURANO.rep

* Frctn Loss (m) * 0.03 * Cum Volume (1000 m3) * 0.50 * 7.70 * 3.76
 * C & E Loss (m) * 0.01 * Cum SA (1000 m2) * 1.34 * 3.28 * 3.82

 **

CROSS SECTION

RIVER: FOSSO BURANO
 REACH: 1 RS: 4.25*

INPUT

Description:

Station Elevation Data		num= 19		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
0	464.85	20.109	463.933	29.353	463.442	34.565	463.383	40.374	461.233		
40.822	461.106	41.464	460.865	43.138	460.73	44.221	460.797	44.688	460.905		
45.538	461.001	45.947	460.956	47.308	461.025	48.785	461.136	49.485	461.353		
50.149	461.429	52.265	464.035	61.09	465.124	67.03	465.902				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
0	.04	34.565	.035	52.265	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	34.565	52.265		15.5	15.5	.1	.3

CROSS SECTION OUTPUT Profile #PF T200

 **
 * E.G. Elev (m) * 464.24 * Element * Left OB * Channel * Right OB
 * vel Head (m) * 0.26 * wt. n-Val. * 0.040 * 0.035 *
 * W.S. Elev (m) * 463.98 * Reach Len. (m) * 15.50 * 15.50 * 15.50
 * Crit W.S. (m) * * Flow Area (m2) * 5.68 * 41.59 *
 * E.G. Slope (m/m) *0.002334 * Area (m2) * 5.68 * 41.59 *
 * Q Total (m3/s) * 99.00 * Flow (m3/s) * 3.52 * 95.48 *
 * Top width (m) * 33.14 * Top width (m) * 15.48 * 17.66 *
 * vel Total (m/s) * 2.09 * Avg. vel. (m/s) * 0.62 * 2.30 *
 * Max chl Dpth (m) * 3.25 * Hydr. Depth (m) * 0.37 * 2.36 *
 * Conv. Total (m3/s) * 2049.3 * Conv. (m3/s) * 72.8 * 1976.6 *
 * Length wtd. (m) * 15.50 * wetted Per. (m) * 15.50 * 19.39 *
 * Min ch El (m) * 460.73 * Shear (N/m2) * 8.39 * 49.10 *
 * Alpha * 1.16 * Stream Power (N/m s) * 5.19 * 112.71 *
 * Frctn Loss (m) * 0.07 * Cum Volume (1000 m3) * 0.40 * 6.99 * 3.75
 * C & E Loss (m) * 0.06 * Cum SA (1000 m2) * 1.08 * 2.97 * 3.80

 **

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

BURANO.rep

RIVER: FOSSO BURANO

REACH: 1

RS: 4

INPUT

Description:

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	463.8	9	463.53	15.47	463.19	20.93	460.94	21.49	460.63
22.95	460.48	27.49	461.04	28.86	464.36	42.2	465.3		

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	15.47	.035	28.86	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	15.47	28.86		17	17	.1	.3

CROSS SECTION OUTPUT Profile #PF T200

* E.G. Elev (m)	* 464.11	* Element	* Left OB	* Channel	* Right OB
* vel Head (m)	* 0.89	* wt. n-Val.	* 0.040	* 0.035	*
* W.S. Elev (m)	* 463.22	* Reach Len. (m)	* 17.00	* 17.00	* 17.00
* Crit W.S. (m)	* 463.19	* Flow Area (m2)	* 0.01	* 23.69	*
* E.G. Slope (m/m)	*0.011574	* Area (m2)	* 0.01	* 23.69	*
* Q Total (m3/s)	* 99.00	* Flow (m3/s)	* 0.00	* 99.00	*
* Top width (m)	* 13.46	* Top width (m)	* 0.54	* 12.92	*
* vel Total (m/s)	* 4.18	* Avg. vel. (m/s)	* 0.16	* 4.18	*
* Max Chl Dpth (m)	* 2.74	* Hydr. Depth (m)	* 0.01	* 1.83	*
* Conv. Total (m3/s)	* 920.2	* Conv. (m3/s)	* 0.0	* 920.2	*
* Length wtd. (m)	* 17.00	* wetted Per. (m)	* 0.54	* 14.94	*
* Min ch El (m)	* 460.48	* Shear (N/m2)	* 1.62	* 179.92	*
* Alpha	* 1.00	* Stream Power (N/m s)	* 0.26	* 751.90	*
* Frctn Loss (m)	* 0.19	* Cum volume (1000 m3)	* 0.36	* 6.48	* 3.75
* C & E Loss (m)	* 0.00	* Cum SA (1000 m2)	* 0.96	* 2.74	* 3.80

CROSS SECTION

RIVER: FOSSO BURANO

REACH: 1

RS: 3.8*

INPUT

Description:

Station Elevation Data		num= 12		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	463.52	6.19	463.344	8.46	463.256	14.542	462.904	17.556	461.607
19.737	460.773	20.097	460.639	20.667	460.364	22.152	460.174	25.959	460.705
27.108	463.386	40.196	467.264						

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	14.542	.035	27.108	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	14.542	27.108		17	17	.1	.3

CROSS SECTION OUTPUT Profile #PF T200

```

*****
**
* E.G. Elev (m)      * 463.91 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 0.89  * wt. n-Val.      * 0.040  * 0.035  *
* W.S. Elev (m)     * 463.02 * Reach Len. (m)  * 17.00  * 17.00  * 17.00
* Crit W.S. (m)     * 462.99 * Flow Area (m2)  * 0.12   * 23.62  *
* E.G. Slope (m/m)  *0.011217 * Area (m2)       * 0.12   * 23.62  *
* Q Total (m3/s)    * 99.00  * Flow (m3/s)     * 0.05   * 98.95  *
* Top width (m)     * 14.40  * Top width (m)   * 2.00   * 12.41  *
* Vel Total (m/s)   * 4.17   * Avg. Vel. (m/s) * 0.40   * 4.19   *
* Max Chl Dpth (m) * 2.85   * Hydr. Depth (m) * 0.06   * 1.90   *
* Conv. Total (m3/s) * 934.8  * Conv. (m3/s)    * 0.4    * 934.3  *
* Length wtd. (m)  * 17.00  * wetted Per. (m) * 2.00   * 14.49  *
* Min Ch El (m)    * 460.17 * Shear (N/m2)    * 6.34   * 179.24 *
* Alpha            * 1.01   * Stream Power (N/m s) * 2.51  * 751.08 *
* Frctn Loss (m)   * 0.19   * Cum Volume (1000 m3) * 0.36  * 6.08  * 3.75
* C & E Loss (m)   * 0.00   * Cum SA (1000 m2) * 0.93  * 2.52  * 3.80
*****
**

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CROSS SECTION

RIVER: FOSSO BURANO

REACH: 1 RS: 3.6*

INPUT

Description:

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	463.24	5.795	463.085	7.92	462.982	13.614	462.618	16.68	461.246
18.898	460.459	19.264	460.338	19.843	460.098	21.354	459.868	24.428	460.37
25.356	462.412	38.192	469.228						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	13.614	.035	25.356	.04

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	13.614	25.356		17	17	17		.1	.3

CROSS SECTION OUTPUT Profile #PF T200

```

*****
**
* E.G. Elev (m)      * 463.72 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 0.92  * wt. n-Val.      * 0.040  * 0.035  * 0.040
* W.S. Elev (m)     * 462.81 * Reach Len. (m)  * 17.00  * 17.00  * 17.00
* Crit W.S. (m)     * 462.81 * Flow Area (m2)  * 0.28   * 23.24  * 0.15
* E.G. Slope (m/m)  *0.010841 * Area (m2)       * 0.28   * 23.24  * 0.15
* Q Total (m3/s)    * 99.00  * Flow (m3/s)     * 0.15   * 98.73  * 0.12
* Top width (m)     * 15.43  * Top width (m)   * 2.95   * 11.74  * 0.74
* Vel Total (m/s)   * 4.18   * Avg. Vel. (m/s) * 0.54   * 4.25   * 0.81
**

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BURANO.rep

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* Max Chl Dpth (m) * 2.94 * Hydr. Depth (m) * 0.09 * 1.98 * 0.20
* Conv. Total (m3/s) * 950.8 * Conv. (m3/s) * 1.4 * 948.2 * 1.1
* Length wtd. (m) * 17.00 * Wetted Per. (m) * 2.95 * 13.61 * 0.84
* Min Ch El (m) * 459.87 * Shear (N/m2) * 9.99 * 181.49 * 18.51
* Alpha * 1.03 * Stream Power (N/m s) * 5.37 * 771.19 * 15.02
* Frctn Loss (m) * 0.17 * Cum Volume (1000 m3) * 0.36 * 5.68 * 3.75
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.89 * 2.32 * 3.79

```

**

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: FOSSO BURANO
REACH: 1 RS: 3.4*

INPUT

Description:

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.96	5.4	462.827	7.38	462.708	12.686	462.332	15.803	460.884
18.059	460.146	18.431	460.037	19.02	459.832	20.556	459.562	22.897	460.035
23.604	461.438	36.188	471.192						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	12.686	.035	23.604	.04

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
	12.686	23.604	17	17	17	.1		.3

CROSS SECTION OUTPUT Profile #PF T200

**

```

* E.G. Elev (m) * 463.53 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.99 * wt. n-Val. * 0.040 * 0.035 * 0.040
* W.S. Elev (m) * 462.54 * Reach Len. (m) * 17.00 * 17.00 * 17.00
* Crit W.S. (m) * 462.63 * Flow Area (m2) * 0.32 * 22.03 * 0.79
* E.G. Slope (m/m) *0.011108 * Area (m2) * 0.32 * 22.03 * 0.79
* Q Total (m3/s) * 99.00 * Flow (m3/s) * 0.19 * 97.61 * 1.20
* Top width (m) * 15.35 * Top width (m) * 3.00 * 10.92 * 1.43
* Vel Total (m/s) * 4.28 * Avg. vel. (m/s) * 0.59 * 4.43 * 1.52
* Max Chl Dpth (m) * 2.98 * Hydr. Depth (m) * 0.11 * 2.02 * 0.55
* Conv. Total (m3/s) * 939.3 * Conv. (m3/s) * 1.8 * 926.2 * 11.4
* Length wtd. (m) * 17.00 * wetted Per. (m) * 3.01 * 12.34 * 1.81
* Min Ch El (m) * 459.56 * Shear (N/m2) * 11.55 * 194.45 * 47.64

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BURANO.rep

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* Alpha * 1.06 * Stream Power (N/m s) * 6.82 * 861.64 * 72.32
* Frctn Loss (m) * 0.19 * Cum Volume (1000 m3) * 0.35 * 5.30 * 3.74
* C & E Loss (m) * 0.01 * Cum SA (1000 m2) * 0.84 * 2.12 * 3.77

```

**

Note: Program found supercritical flow starting at this cross section.

CROSS SECTION

RIVER: FOSSO BURANO
REACH: 1 RS: 3.2*

INPUT

Description:

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.68	5.005	462.568	6.84	462.434	11.758	462.046	14.927	460.522
17.219	459.833	17.598	459.736	18.197	459.566	19.758	459.256	21.367	459.7
21.852	460.464	34.184	473.156						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	11.758	.035	21.852	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	11.758	21.852		17	17	.1	.3

CROSS SECTION OUTPUT Profile #PF T200

* E.G. Elev (m)	* 463.34	* Element	* Left OB	* Channel	* Right OB
* vel Head (m)	* 1.02	* wt. n-Val.	* 0.040	* 0.035	* 0.040
* w.s. Elev (m)	* 462.32	* Reach Len. (m)	* 17.00	* 17.00	* 17.00
* Crit w.s. (m)	* 462.43	* Flow Area (m2)	* 0.48	* 20.98	* 1.68
* E.G. Slope (m/m)	* 0.010833	* Area (m2)	* 0.48	* 20.98	* 1.68
* Q Total (m3/s)	* 99.00	* Flow (m3/s)	* 0.34	* 95.40	* 3.27
* Top width (m)	* 15.40	* Top width (m)	* 3.50	* 10.09	* 1.81
* vel Total (m/s)	* 4.28	* Avg. Vel. (m/s)	* 0.69	* 4.55	* 1.95
* Max Chl Dpth (m)	* 3.07	* Hydr. Depth (m)	* 0.14	* 2.08	* 0.93
* Conv. Total (m3/s)	* 951.2	* Conv. (m3/s)	* 3.2	* 916.6	* 31.4
* Length wtd. (m)	* 17.00	* wetted Per. (m)	* 3.51	* 11.09	* 2.59
* Min Ch El (m)	* 459.26	* Shear (N/m2)	* 14.62	* 200.93	* 68.78
* Alpha	* 1.10	* Stream Power (N/m s)	* 10.14	* 913.88	* 133.93
* Frctn Loss (m)	* 0.19	* Cum Volume (1000 m3)	* 0.34	* 4.93	* 3.72
* C & E Loss (m)	* 0.00	* Cum SA (1000 m2)	* 0.79	* 1.95	* 3.75

**

CROSS SECTION

RIVER: FOSSO BURANO
REACH: 1 RS: 3

INPUT

Description:

Station Elevation Data		num= 8		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.44	610001	462.31	10.83	461.76	14.05	460.16	16.38	459.52
18.96	458.95	20.1	459.49	32.18	475.12				

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	10.83	.035	20.1	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	10.83	20.1		17.857	17.857	.1	.3

CROSS SECTION OUTPUT Profile #PF T200

* E.G. Elev (m)	* 463.17	* Element	* Left OB	* Channel	* Right OB
* vel Head (m)	* 0.82	* wt. n-Val.	* 0.040	* 0.035	* 0.040
* W.S. Elev (m)	* 462.35	* Reach Len. (m)	* 17.86	* 17.86	* 17.86
* Crit W.S. (m)	* 462.25	* Flow Area (m2)	* 2.01	* 21.94	* 3.16
* E.G. Slope (m/m)	* 0.007330	* Area (m2)	* 2.01	* 21.94	* 3.16
* Q Total (m3/s)	* 99.00	* Flow (m3/s)	* 1.66	* 91.14	* 6.19
* Top width (m)	* 19.82	* Top width (m)	* 8.34	* 9.27	* 2.21
* vel Total (m/s)	* 3.65	* Avg. Vel. (m/s)	* 0.83	* 4.15	* 1.96
* Max Chl Dpth (m)	* 3.40	* Hydr. Depth (m)	* 0.24	* 2.37	* 1.43
* Conv. Total (m3/s)	* 1156.3	* Conv. (m3/s)	* 19.4	* 1064.5	* 72.4
* Length wtd. (m)	* 17.86	* wetted Per. (m)	* 8.36	* 9.92	* 3.62
* Min Ch El (m)	* 458.95	* Shear (N/m2)	* 17.28	* 159.06	* 62.89
* Alpha	* 1.21	* Stream Power (N/m s)	* 14.30	* 660.73	* 123.14
* Frctn Loss (m)	* 0.12	* Cum Volume (1000 m3)	* 0.32	* 4.57	* 3.68
* C & E Loss (m)	* 0.02	* Cum SA (1000 m2)	* 0.69	* 1.78	* 3.71

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: FOSSO BURANO
 REACH: 1 RS: 2.85714*

INPUT

Description:

Station Elevation Data		num= 14		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.389	5.339	462.328	8.94	462.103	10.26	462.014	11.491	461.714
12.541	461.58	15.325	460.105	17.339	459.482	19.569	458.91	21.272	459.406
21.371	459.583	23.41	461.039	26.429	462.979	41.869	474.389		

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	12.541	.035	21.371	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	12.541	21.371		17.857	17.857	.1	.3

CROSS SECTION OUTPUT Profile #PF T200

BURANO.rep

```

**
* E.G. Elev (m)      * 463.02 * Element           * Left OB * Channel * Right OB
* Vel Head (m)      * 0.74  * wt. n-Val.       * 0.040  * 0.035  * 0.040
* W.S. Elev (m)     * 462.28 * Reach Len. (m)   * 17.86  * 17.86  * 17.86
* Crit w.S. (m)     * 462.07 * Flow Area (m2)   * 1.74   * 21.50  * 5.22
* E.G. Slope (m/m)  *0.006666 * Area (m2)        * 1.74   * 21.50  * 5.22
* Q Total (m3/s)    * 99.00  * Flow (m3/s)      * 1.47   * 86.26  * 11.27
* Top width (m)     * 19.28  * Top width (m)    * 6.48   * 8.83   * 3.97
* Vel Total (m/s)   * 3.48   * Avg. Vel. (m/s)  * 0.84   * 4.01   * 2.16
* Max Chl Dpth (m) * 3.37   * Hydr. Depth (m) * 0.27   * 2.44   * 1.31
* Conv. Total (m3/s) * 1212.5 * Conv. (m3/s)     * 18.0   * 1056.5 * 138.1
* Length wtd. (m)  * 17.86  * wetted Per. (m) * 6.53   * 9.54   * 4.81
* Min Ch El (m)    * 458.91 * Shear (N/m2)     * 17.39  * 147.40 * 71.06
* Alpha            * 1.20   * Stream Power (N/m s) * 14.68 * 591.26 * 153.34
* Frctn Loss (m)   * 0.12   * Cum Volume (1000 m3) * 0.29 * 4.18 * 3.61
* C & E Loss (m)   * 0.01   * Cum SA (1000 m2) * 0.55 * 1.62 * 3.66
*
*****
**

```

CROSS SECTION

RIVER: FOSSO BURANO
 REACH: 1 RS: 2.71428*

INPUT

Description:

Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.377	6.067	462.345	10.16	462.171	11.66	462.093	13.059	461.589
14.253	461.4	16.599	460.05	18.297	459.443	20.177	458.87	22.506	459.351
22.643	459.676	25.518	461.034	29.778	462.611	51.557	473.657		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	14.253	.035	22.643	.04

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
	14.253	22.643	17.857	17.857	17.857	.1		.3

CROSS SECTION OUTPUT Profile #PF T200

```

*****
**
* E.G. Elev (m)      * 462.90 * Element           * Left OB * Channel * Right OB
* Vel Head (m)      * 0.70  * wt. n-Val.       * 0.040  * 0.035  * 0.040
* W.S. Elev (m)     * 462.19 * Reach Len. (m)   * 17.86  * 17.86  * 17.86
* Crit w.S. (m)     * 461.99 * Flow Area (m2)   * 1.42   * 20.85  * 7.09
* E.G. Slope (m/m)  *0.006470 * Area (m2)        * 1.42   * 20.85  * 7.09
* Q Total (m3/s)    * 99.00  * Flow (m3/s)      * 1.29   * 82.62  * 15.10
* Top width (m)     * 18.99  * Top width (m)    * 4.60   * 8.39   * 6.00
* Vel Total (m/s)   * 3.37   * Avg. Vel. (m/s)  * 0.91   * 3.96   * 2.13
* Max Chl Dpth (m) * 3.32   * Hydr. Depth (m) * 0.31   * 2.48   * 1.18
*

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BURANO.rep

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* Conv. Total (m3/s) * 1230.8 * Conv. (m3/s) * 16.0 * 1027.1 * 187.7
* Length wtd. (m) * 17.86 * wetted Per. (m) * 4.70 * 9.21 * 6.52
* Min Ch El (m) * 458.87 * Shear (N/m2) * 19.17 * 143.67 * 69.08
* Alpha * 1.21 * Stream Power (N/m s) * 17.36 * 569.36 * 147.00
* Frctn Loss (m) * 0.11 * Cum Volume (1000 m3) * 0.26 * 3.80 * 3.50
* C & E Loss (m) * 0.01 * Cum SA (1000 m2) * 0.45 * 1.47 * 3.57

```

**

CROSS SECTION

RIVER: FOSSO BURANO
REACH: 1 RS: 2.57142*

INPUT

Description:

Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.366	6.796	462.363	11.38	462.239	13.06	462.172	14.628	461.463
15.964	461.22	17.874	459.995	19.256	459.405	20.786	458.83	23.741	459.297
23.914	459.769	27.626	461.03	33.126	462.242	61.246	472.926		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	15.964	.035	23.914	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	15.964	23.914		17.857	17.857	.1	.3

CROSS SECTION OUTPUT Profile #PF T200

```

* E.G. Elev (m) * 462.77 * Element * Left OB * Channel * Right OB
* vel Head (m) * 0.67 * wt. n-Val. * 0.040 * 0.035 * 0.040
* W.S. Elev (m) * 462.10 * Reach Len. (m) * 17.86 * 17.86 * 17.86
* Crit W.S. (m) * * Flow Area (m2) * 1.46 * 20.15 * 8.91
* E.G. Slope (m/m) *0.006384 * Area (m2) * 1.46 * 20.15 * 8.91
* Q Total (m3/s) * 99.00 * Flow (m3/s) * 1.85 * 79.32 * 17.83
* Top width (m) * 19.27 * Top width (m) * 2.75 * 7.95 * 8.57
* vel Total (m/s) * 3.24 * Avg. Vel. (m/s) * 1.26 * 3.94 * 2.00
* Max Chl Dpth (m) * 3.27 * Hydr. Depth (m) * 0.53 * 2.53 * 1.04
* Conv. Total (m3/s) * 1239.1 * Conv. (m3/s) * 23.2 * 992.7 * 223.2
* Length wtd. (m) * 17.86 * wetted Per. (m) * 2.91 * 8.90 * 8.89
* Min Ch El (m) * 458.83 * Shear (N/m2) * 31.54 * 141.74 * 62.74
* Alpha * 1.25 * Stream Power (N/m s) * 39.88 * 557.90 * 125.49
* Frctn Loss (m) * 0.12 * Cum Volume (1000 m3) * 0.24 * 3.44 * 3.35
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.39 * 1.32 * 3.44

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**

CROSS SECTION

RIVER: FOSSO BURANO

REACH: 1 RS: 2.42857*

INPUT

Description:

Station Elevation Data		num= 14		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.354	7.524	462.381	12.6	462.306	14.46	462.252	16.196	461.337		
17.676	461.04	19.149	459.94	20.214	459.366	21.394	458.79	24.976	459.243		
25.186	459.861	29.735	461.025	36.475	461.874	70.934	472.194				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	17.676	.035	25.186	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	17.676	25.186		17.857	17.857	17.857	.1 .3

CROSS SECTION OUTPUT Profile #PF T200

E.G. Elev (m)	* 462.65	* Element	* Left OB	* Channel	* Right OB
Vel Head (m)	* 0.66	* wt. n-Val.	* 0.040	* 0.035	* 0.040
W.S. Elev (m)	* 461.99	* Reach Len. (m)	* 17.86	* 17.86	* 17.86
Crit W.S. (m)	*	* Flow Area (m2)	* 1.60	* 19.33	* 10.75
E.G. Slope (m/m)	*0.006546	* Area (m2)	* 1.60	* 19.33	* 10.75
Q Total (m3/s)	* 99.00	* Flow (m3/s)	* 2.17	* 76.51	* 20.32
Top width (m)	* 21.93	* Top width (m)	* 2.73	* 7.51	* 11.69
Vel Total (m/s)	* 3.12	* Avg. Vel. (m/s)	* 1.36	* 3.96	* 1.89
Max Chl Dpth (m)	* 3.20	* Hydr. Depth (m)	* 0.59	* 2.57	* 0.92
Conv. Total (m3/s)	* 1223.7	* Conv. (m3/s)	* 26.8	* 945.7	* 251.1
Length wtd. (m)	* 17.86	* wetted Per. (m)	* 2.92	* 8.62	* 11.91
Min Ch El (m)	* 458.79	* Shear (N/m2)	* 35.23	* 143.85	* 57.96
Alpha	* 1.32	* Stream Power (N/m s)	* 47.76	* 569.45	* 109.52
Frctn Loss (m)	* 0.11	* Cum Volume (1000 m3)	* 0.21	* 3.08	* 3.18
C & E Loss (m)	* 0.02	* Cum SA (1000 m2)	* 0.34	* 1.18	* 3.26

CROSS SECTION

RIVER: FOSSO BURANO
 REACH: 1 RS: 2.28571*

INPUT

Description:

Station Elevation Data		num= 14		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.343	8.253	462.398	13.82	462.374	15.86	462.331	17.764	461.211		
19.387	460.86	20.423	459.885	21.173	459.328	22.003	458.75	26.211	459.189		
26.457	459.954	31.843	461.02	39.823	461.506	80.623	471.463				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	19.387	.035	26.457	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	19.387	26.457		17.857	17.857	17.857	.1 .3

CROSS SECTION OUTPUT Profile #PF T200

```
*****
**
* E.G. Elev (m)      * 462.52 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 0.59  * wt. n-Val.      * 0.040  * 0.035  * 0.040
* W.S. Elev (m)     * 461.92 * Reach Len. (m)  * 17.86  * 17.86  * 17.86
* Crit W.S. (m)     *        * Flow Area (m2)  * 1.87   * 18.75  * 13.37
* E.G. Slope (m/m)  *0.006227 * Area (m2)       * 1.87   * 18.75  * 13.37
* Q Total (m3/s)    * 99.00 * Flow (m3/s)     * 2.66   * 72.18  * 24.16
* Top width (m)     * 24.98 * Top width (m)   * 2.83   * 7.07   * 15.08
* Vel Total (m/s)   * 2.91  * Avg. Vel. (m/s) * 1.42   * 3.85   * 1.81
* Max Chl Dpth (m) * 3.17  * Hydr. Depth (m) * 0.66   * 2.65   * 0.89
* Conv. Total (m3/s) * 1254.6 * Conv. (m3/s)    * 33.7   * 914.7  * 306.2
* Length wtd. (m)  * 17.86 * wetted Per. (m) * 3.07   * 8.40   * 15.25
* Min Ch El (m)    * 458.75 * Shear (N/m2)    * 37.31  * 136.25 * 53.54
* Alpha            * 1.37  * Stream Power (N/m s) * 53.00  * 524.51 * 96.75
* Frctn Loss (m)   * 0.10  * Cum Volume (1000 m3) * 0.18   * 2.74   * 2.96
* C & E Loss (m)   * 0.04  * Cum SA (1000 m2) * 0.29   * 1.05   * 3.02
*****
**
```

CROSS SECTION

RIVER: FOSSO BURANO

REACH: 1

RS: 2.14285*

INPUT

Description:

Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.331	8.981	462.416	15.04	462.442	17.26	462.411	19.332	461.086
21.099	460.68	21.698	459.83	22.131	459.289	22.611	458.71	27.445	459.134
27.729	460.047	33.952	461.015	43.172	461.138	90.311	470.731		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	21.099	.035	27.729	.04

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	21.099	27.729		17.857	17.857	17.857		.1	.3

CROSS SECTION OUTPUT Profile #PF T200

```
*****
**
* E.G. Elev (m)      * 462.38 * Element          * Left OB * Channel * Right OB
* Vel Head (m)      * 0.47  * wt. n-Val.      * 0.040  * 0.035  * 0.040
* W.S. Elev (m)     * 461.91 * Reach Len. (m)  * 17.86  * 17.86  * 17.86
* Crit W.S. (m)     *        * Flow Area (m2)  * 2.33   * 18.48  * 17.65
* E.G. Slope (m/m)  *0.005285 * Area (m2)       * 2.33   * 18.48  * 17.65
* Q Total (m3/s)    * 99.00 * Flow (m3/s)     * 3.34   * 65.50  * 30.16
* Top width (m)     * 28.90 * Top width (m)   * 3.05   * 6.63   * 19.22
* Vel Total (m/s)   * 2.57  * Avg. Vel. (m/s) * 1.43   * 3.54   * 1.71
**
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```

* Max Chl Dpth (m) * 3.20 * Hydr. Depth (m) * 0.77 * 2.79 * 0.92
* Conv. Total (m3/s) * 1361.8 * Conv. (m3/s) * 46.0 * 900.9 * 414.9
* Length wtd. (m) * 17.86 * Wetted Per. (m) * 3.34 * 8.29 * 19.37
* Min Ch El (m) * 458.71 * Shear (N/m2) * 36.26 * 115.49 * 47.23
* Alpha * 1.40 * Stream Power (N/m s) * 51.94 * 409.25 * 80.70
* Frctn Loss (m) * 0.08 * Cum Volume (1000 m3) * 0.14 * 2.41 * 2.68
* C & E Loss (m) * 0.04 * Cum SA (1000 m2) * 0.24 * 0.93 * 2.71

```

**

CROSS SECTION

RIVER: FOSSO BURANO
REACH: 1 RS: 2

INPUT

Description:

Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.32	16.26	462.51	18.66	462.49	20.9	460.96	22.81	460.5
23.22	458.67	28.68	459.08	29	460.14	36.06	461.01	46.52	460.77
100	470								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	22.81	.035	29	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
22.81 29 20 20 20 .1 .3

CROSS SECTION OUTPUT Profile #PF T200

**

```

* E.G. Elev (m) * 462.25 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.33 * wt. n-Val. * 0.040 * 0.035 * 0.040
* W.S. Elev (m) * 461.92 * Reach Len. (m) * 20.00 * 20.00 * 20.00
* Crit W.S. (m) * * Flow Area (m2) * 2.96 * 18.34 * 24.17
* E.G. Slope (m/m) *0.004116 * Area (m2) * 2.96 * 18.34 * 24.17
* Q Total (m3/s) * 99.00 * Flow (m3/s) * 4.11 * 56.32 * 38.57
* Top width (m) * 33.71 * Top width (m) * 3.32 * 6.19 * 24.20
* Vel Total (m/s) * 2.18 * Avg. Vel. (m/s) * 1.39 * 3.07 * 1.60
* Max Chl Dpth (m) * 3.25 * Hydr. Depth (m) * 0.89 * 2.96 * 1.00
* Conv. Total (m3/s) * 1543.1 * Conv. (m3/s) * 64.0 * 877.9 * 601.3
* Length wtd. (m) * 20.00 * wetted Per. (m) * 3.67 * 8.46 * 24.35
* Min Ch El (m) * 458.67 * Shear (N/m2) * 32.51 * 87.52 * 40.06
* Alpha * 1.36 * Stream Power (N/m s) * 45.13 * 268.77 * 63.93
* Frctn Loss (m) * 0.08 * Cum Volume (1000 m3) * 0.09 * 2.08 * 2.31
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 0.18 * 0.82 * 2.32

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**

CROSS SECTION

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RIVER: FOSSO BURANO
 REACH: 1 RS: 1.8*

INPUT

Description:

Station Elevation Data		num= 16		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.234	15.668	462.417	17.981	462.406	19.153	461.743	20.139	461.183
21.98	460.812	22.589	459.787	23.109	459.082	23.22	458.586	28.68	458.994
29	460.054	35.543	460.86	39.323	460.849	45.237	460.713	54.618	462.082
94.8	470								

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	21.98	.035	29	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	21.98	29		20	20	.1	.3

CROSS SECTION OUTPUT Profile #PF T200

* E.G. Elev (m)	* 462.17	* Element	* Left OB	* Channel	* Right OB
* vel Head (m)	* 0.34	* wt. n-Val.	* 0.040	* 0.035	* 0.040
* W.S. Elev (m)	* 461.83	* Reach Len. (m)	* 20.00	* 20.00	* 20.00
* Crit W.S. (m)		* Flow Area (m2)	* 1.90	* 19.84	* 23.13
* E.G. Slope (m/m)	* 0.004098	* Area (m2)	* 1.90	* 19.84	* 23.13
* Q Total (m3/s)	* 99.00	* Flow (m3/s)	* 2.15	* 60.75	* 36.09
* Top width (m)	* 33.88	* Top width (m)	* 2.98	* 7.02	* 23.89
* vel Total (m/s)	* 2.21	* Avg. Vel. (m/s)	* 1.13	* 3.06	* 1.56
* Max Chl Dpth (m)	* 3.24	* Hydr. Depth (m)	* 0.64	* 2.83	* 0.97
* Conv. Total (m3/s)	* 1546.4	* Conv. (m3/s)	* 33.6	* 949.0	* 563.8
* Length wtd. (m)	* 20.00	* wetted Per. (m)	* 3.19	* 9.16	* 24.02
* Min Ch El (m)	* 458.59	* Shear (N/m2)	* 23.94	* 87.06	* 38.70
* Alpha	* 1.37	* Stream Power (N/m s)	* 27.13	* 266.60	* 60.40
* Frctn Loss (m)	* 0.08	* Cum Volume (1000 m3)	* 0.04	* 1.70	* 1.84
* C & E Loss (m)	* 0.00	* Cum SA (1000 m2)	* 0.12	* 0.68	* 1.84

CROSS SECTION

RIVER: FOSSO BURANO
 REACH: 1 RS: 1.6*

INPUT

Description:

Station Elevation Data		num= 16		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.148	15.077	462.324	17.302	462.321	18.43	461.828	19.379	461.405
21.15	461.124	22.167	459.973	23.034	459.329	23.22	458.502	28.68	458.908
29	459.968	35.026	460.711	38.507	460.782	43.954	460.657	52.594	461.646
89.6	470								

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	21.15	.035	29	.04

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Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 21.15 29 20 20 20 .1 .3

CROSS SECTION OUTPUT Profile #PF T200

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*****
**
* E.G. Elev (m) * 462.08 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.34 * wt. n-Val. * 0.040 * 0.035 * 0.040
* W.S. Elev (m) * 461.75 * Reach Len. (m) * 20.00 * 20.00 * 20.00
* Crit W.S. (m) * * Flow Area (m2) * 0.99 * 20.92 * 22.75
* E.G. Slope (m/m) *0.004166 * Area (m2) * 0.99 * 20.92 * 22.75
* Q Total (m3/s) * 99.00 * Flow (m3/s) * 0.83 * 62.90 * 35.27
* Top width (m) * 34.44 * Top width (m) * 2.54 * 7.85 * 24.05
* Vel Total (m/s) * 2.22 * Avg. Vel. (m/s) * 0.84 * 3.01 * 1.55
* Max Chl Dpth (m) * 3.25 * Hydr. Depth (m) * 0.39 * 2.66 * 0.95
* Conv. Total (m3/s) * 1533.8 * Conv. (m3/s) * 12.8 * 974.5 * 546.5
* Length wtd. (m) * 20.00 * wetted Per. (m) * 2.64 * 10.05 * 24.16
* Min Ch El (m) * 458.50 * Shear (N/m2) * 15.32 * 85.07 * 38.47
* Alpha * 1.34 * Stream Power (N/m s) * 12.85 * 255.80 * 59.64
* Frctn Loss (m) * 0.08 * Cum Volume (1000 m3) * 0.01 * 1.29 * 1.38
* C & E Loss (m) * 0.01 * Cum SA (1000 m2) * 0.06 * 0.53 * 1.36
**
*****
```

CROSS SECTION

RIVER: FOSSO BURANO
 REACH: 1 RS: 1.4*

INPUT

Description:

Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	462.062	14.485	462.231	16.623	462.237	17.706	461.912	18.619	461.628
20.32	461.436	21.745	460.158	22.959	459.576	23.22	458.418	28.68	458.822
29	459.882	34.509	460.561	37.692	460.715	42.671	460.6	50.569	461.211
84.4	470								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	20.32	.035	29	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 20.32 29 20 20 20 .1 .3

CROSS SECTION OUTPUT Profile #PF T200

```
*****
**
* E.G. Elev (m) * 461.99 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.31 * wt. n-Val. * 0.040 * 0.035 * 0.040
* W.S. Elev (m) * 461.68 * Reach Len. (m) * 20.00 * 20.00 * 20.00
* Crit W.S. (m) * * Flow Area (m2) * 0.26 * 21.61 * 22.98
* E.G. Slope (m/m) *0.004163 * Area (m2) * 0.26 * 21.61 * 22.98
* Q Total (m3/s) * 99.00 * Flow (m3/s) * 0.11 * 62.38 * 36.52
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*
* Top width (m) * 33.92 * Top width (m) * 1.87 * 8.68 * 23.37
* Vel Total (m/s) * 2.21 * Avg. Vel. (m/s) * 0.43 * 2.89 * 1.59
* Max Chl Dpth (m) * 3.26 * Hydr. Depth (m) * 0.14 * 2.49 * 0.98
* Conv. Total (m3/s) * 1534.4 * Conv. (m3/s) * 1.7 * 966.8 * 566.0
* Length wtd. (m) * 20.00 * wetted Per. (m) * 1.89 * 11.03 * 23.50
* Min Ch El (m) * 458.42 * Shear (N/m2) * 5.53 * 79.98 * 39.91
* Alpha * 1.27 * Stream Power (N/m s) * 2.36 * 230.87 * 63.42
* Frctn Loss (m) * 0.08 * Cum Volume (1000 m3) * 0.00 * 0.87 * 0.92
* C & E Loss (m) * 0.01 * Cum SA (1000 m2) * 0.02 * 0.37 * 0.89

```

CROSS SECTION

RIVER: FOSSO BURANO
 REACH: 1 RS: 1.2*

INPUT

Description:

Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	461.976	13.893	462.138	15.944	462.153	16.983	461.996	17.858	461.85
19.49	461.748	21.322	460.344	22.885	459.823	23.22	458.334	28.68	458.736
29	459.796	33.992	460.411	36.876	460.647	41.387	460.544	48.545	460.775
79.2	470								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	19.49	.035	29	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

19.49	29	20	20	20	.1	.3
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CROSS SECTION OUTPUT Profile #PF T200

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*****
**
* E.G. Elev (m) * 461.91 * Element * Left OB * Channel * Right OB
* Vel Head (m) * 0.30 * wt. n-Val. * * 0.035 * 0.040
* W.S. Elev (m) * 461.61 * Reach Len. (m) * 20.00 * 20.00 * 20.00
* Crit w.s. (m) * * Flow Area (m2) * * 21.81 * 23.17
* E.G. Slope (m/m) *0.004200 * Area (m2) * * 21.81 * 23.17
* Q Total (m3/s) * 99.00 * Flow (m3/s) * * 60.72 * 38.28
* Top width (m) * 31.65 * Top width (m) * * 9.33 * 22.32
* Vel Total (m/s) * 2.20 * Avg. Vel. (m/s) * * 2.78 * 1.65
* Max Chl Dpth (m) * 3.28 * Hydr. Depth (m) * * 2.34 * 1.04
* Conv. Total (m3/s) * 1527.6 * Conv. (m3/s) * * 936.9 * 590.7
* Length wtd. (m) * 20.00 * wetted Per. (m) * * 11.84 * 22.49
* Min Ch El (m) * 458.33 * Shear (N/m2) * * 75.91 * 42.42
* Alpha * 1.20 * Stream Power (N/m s) * * 211.29 * 70.10
* Frctn Loss (m) * 0.09 * Cum Volume (1000 m3) * * 0.43 * 0.46
* C & E Loss (m) * 0.00 * Cum SA (1000 m2) * * 0.19 * 0.43

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CROSS SECTION

RIVER: FOSSO BURANO
 REACH: 1 RS: 1

INPUT

Description:

Station Elevation Data		num= 11		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	461.89	16.26	462.08	18.66	462.06	20.9	460.53	22.81	460.07
23.22	458.25	28.68	458.65	29	459.71	36.06	460.58	46.52	460.34
74	470								

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	18.66	.035	29	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	18.66	29		0	0	.1	.3

CROSS SECTION OUTPUT Profile #PF T200

* E.G. Elev (m)	* 461.82	* Element	* Left OB	* Channel	* Right OB	
* vel Head (m)	* 0.29	* wt. n-Val.	* 0.035	* 0.040		
* W.S. Elev (m)	* 461.53	* Reach Len. (m)				
* Crit W.S. (m)	* 461.19	* Flow Area (m2)	* 21.59	* 22.93		
* E.G. Slope (m/m)	* 0.004307	* Area (m2)	* 21.59	* 22.93		
* Q Total (m3/s)	* 99.00	* Flow (m3/s)	* 59.32	* 39.68		
* Top width (m)	* 30.46	* Top width (m)	* 9.56	* 20.90		
* vel Total (m/s)	* 2.22	* Avg. vel. (m/s)	* 2.75	* 1.73		
* Max chl Dpth (m)	* 3.28	* Hydr. Depth (m)	* 2.26	* 1.10		
* Conv. Total (m3/s)	* 1508.4	* Conv. (m3/s)	* 903.8	* 604.7		
* Length wtd. (m)		* wetted Per. (m)	* 12.18	* 21.16		
* Min ch El (m)	* 458.25	* Shear (N/m2)	* 74.89	* 45.77		
* Alpha	* 1.16	* Stream Power (N/m s)	* 205.71	* 79.23		
* Frctn Loss (m)		* Cum volume (1000 m3)				
* C & E Loss (m)		* Cum SA (1000 m2)				

**						

SUMMARY OF MANNING'S N VALUES

River:FOSSO BURANO

* Reach	* River Sta.	* n1	* n2	* n3
*1	* 5	* .04*	* .035*	* .04*
*1	* 4.75*	* .04*	* .035*	* .04*
*1	* 4.5*	* .04*	* .035*	* .04*
*1	* 4.25*	* .04*	* .035*	* .04*
*1	* 4	* .04*	* .035*	* .04*
*1	* 3.8*	* .04*	* .035*	* .04*
*1	* 3.6*	* .04*	* .035*	* .04*

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*1	*	3.4*	*	.04*	.035*	.04*
*1	*	3.2*	*	.04*	.035*	.04*
*1	*	3	*	.04*	.035*	.04*
*1	*	2.85714*	*	.04*	.035*	.04*
*1	*	2.71428*	*	.04*	.035*	.04*
*1	*	2.57142*	*	.04*	.035*	.04*
*1	*	2.42857*	*	.04*	.035*	.04*
*1	*	2.28571*	*	.04*	.035*	.04*
*1	*	2.14285*	*	.04*	.035*	.04*
*1	*	2	*	.04*	.035*	.04*
*1	*	1.8*	*	.04*	.035*	.04*
*1	*	1.6*	*	.04*	.035*	.04*
*1	*	1.4*	*	.04*	.035*	.04*
*1	*	1.2*	*	.04*	.035*	.04*
*1	*	1	*	.04*	.035*	.04*

SUMMARY OF REACH LENGTHS

River: FOSSO BURANO

* Reach	* River Sta.	* Left	* Channel	* Right
1	5	15.5	15.5*	15.5*
1	4.75	15.5*	15.5*	15.5*
1	4.5	15.5*	15.5*	15.5*
1	4.25	15.5*	15.5*	15.5*
1	4	17	17*	17*
1	3.8	17*	17*	17*
1	3.6	17*	17*	17*
1	3.4	17*	17*	17*
1	3.2	17*	17*	17*
1	3	17.857	17.857*	17.857*
1	2.85714	17.857*	17.857*	17.857*
1	2.71428	17.857*	17.857*	17.857*
1	2.57142	17.857*	17.857*	17.857*
1	2.42857	17.857*	17.857*	17.857*
1	2.28571	17.857*	17.857*	17.857*
1	2.14285	17.857*	17.857*	17.857*
1	2	20	20*	20*
1	1.8	20*	20*	20*
1	1.6	20*	20*	20*
1	1.4	20*	20*	20*
1	1.2	20*	20*	20*
1	1	0	0*	0*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: FOSSO BURANO

* Reach	* River Sta.	* Contr.	* Expan.
1	5	.1	.3*
1	4.75	.1*	.3*
1	4.5	.1*	.3*
1	4.25	.1*	.3*
1	4	.1	.3*
1	3.8	.1*	.3*
1	3.6	.1*	.3*
1	3.4	.1*	.3*
1	3.2	.1*	.3*
1	3	.1	.3*
*1	2.85714**	.1*	.3*
*1	2.71428**	.1*	.3*
*1	2.57142**	.1*	.3*
*1	2.42857**	.1*	.3*
*1	2.28571**	.1*	.3*
*1	2.14285**	.1*	.3*
1	2	.1	.3*
1	1.8	.1*	.3*
1	1.6	.1*	.3*
1	1.4	.1*	.3*
1	1.2	.1*	.3*

*1 * 1 * .1* .3*

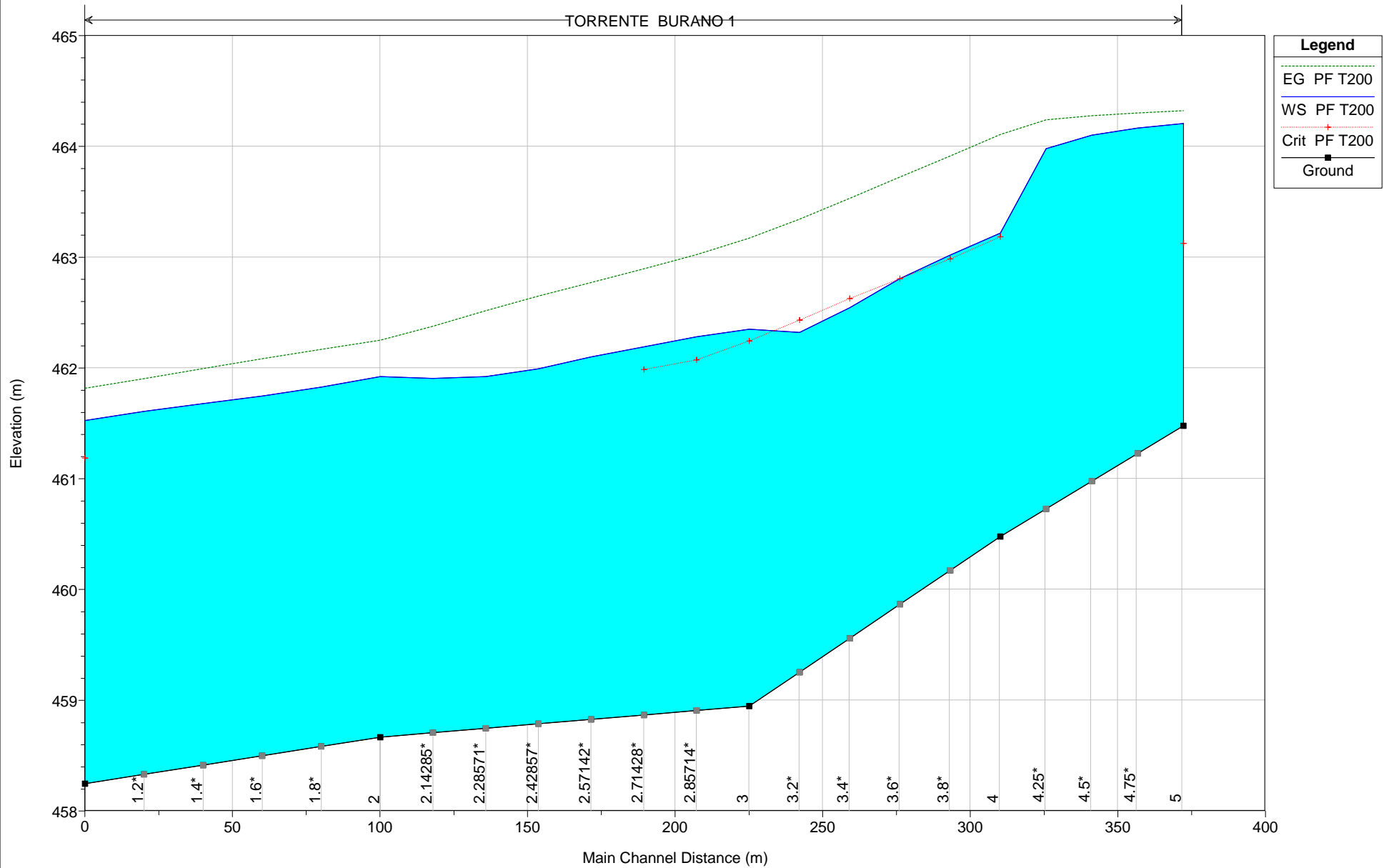
HEC-RAS Plan: Plan 01 River: FOSSO BURANO Reach: 1 Profile: PF T200

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
1	5	PF T200	99.00	461.48	464.21	463.13	464.32	0.001162	1.54	70.49	56.43	0.34
1	4.75*	PF T200	99.00	461.23	464.17		464.30	0.001255	1.67	65.47	49.83	0.36
1	4.5*	PF T200	99.00	460.98	464.10		464.28	0.001535	1.89	57.90	42.40	0.40
1	4.25*	PF T200	99.00	460.73	463.98		464.24	0.002334	2.30	47.27	33.14	0.48
1	4	PF T200	99.00	460.48	463.22	463.19	464.11	0.011574	4.18	23.70	13.46	0.99
1	3.8*	PF T200	99.00	460.17	463.02	462.99	463.91	0.011217	4.19	23.73	14.40	0.97
1	3.6*	PF T200	99.00	459.87	462.81	462.81	463.72	0.010841	4.25	23.66	15.43	0.96
1	3.4*	PF T200	99.00	459.56	462.54	462.63	463.53	0.011108	4.43	23.14	15.35	1.00
1	3.2*	PF T200	99.00	459.26	462.32	462.43	463.34	0.010833	4.55	23.14	15.40	1.01
1	3	PF T200	99.00	458.95	462.35	462.25	463.17	0.007330	4.15	27.12	19.82	0.86
1	2.85714*	PF T200	99.00	458.91	462.28	462.07	463.02	0.006666	4.01	28.47	19.28	0.82
1	2.71428*	PF T200	99.00	458.87	462.19	461.99	462.90	0.006470	3.96	29.36	18.99	0.80
1	2.57142*	PF T200	99.00	458.83	462.10		462.77	0.006384	3.94	30.53	19.27	0.79
1	2.42857*	PF T200	99.00	458.79	461.99		462.65	0.006546	3.96	31.68	21.93	0.79
1	2.28571*	PF T200	99.00	458.75	461.92		462.52	0.006227	3.85	33.99	24.98	0.75
1	2.14285*	PF T200	99.00	458.71	461.91		462.38	0.005285	3.54	38.47	28.90	0.68
1	2	PF T200	99.00	458.67	461.92		462.25	0.004116	3.07	45.47	33.71	0.57
1	1.8*	PF T200	99.00	458.59	461.83		462.17	0.004098	3.06	44.87	33.88	0.58
1	1.6*	PF T200	99.00	458.50	461.75		462.08	0.004166	3.01	44.66	34.44	0.59
1	1.4*	PF T200	99.00	458.42	461.68		461.99	0.004163	2.89	44.85	33.92	0.58
1	1.2*	PF T200	99.00	458.33	461.61		461.91	0.004200	2.78	44.98	31.65	0.58
1	1	PF T200	99.00	458.25	461.53	461.19	461.82	0.004307	2.75	44.52	30.46	0.58

MACROAREA am19 Plan: Plan 01

Flow: Q200

TORRENTE BURANO 1

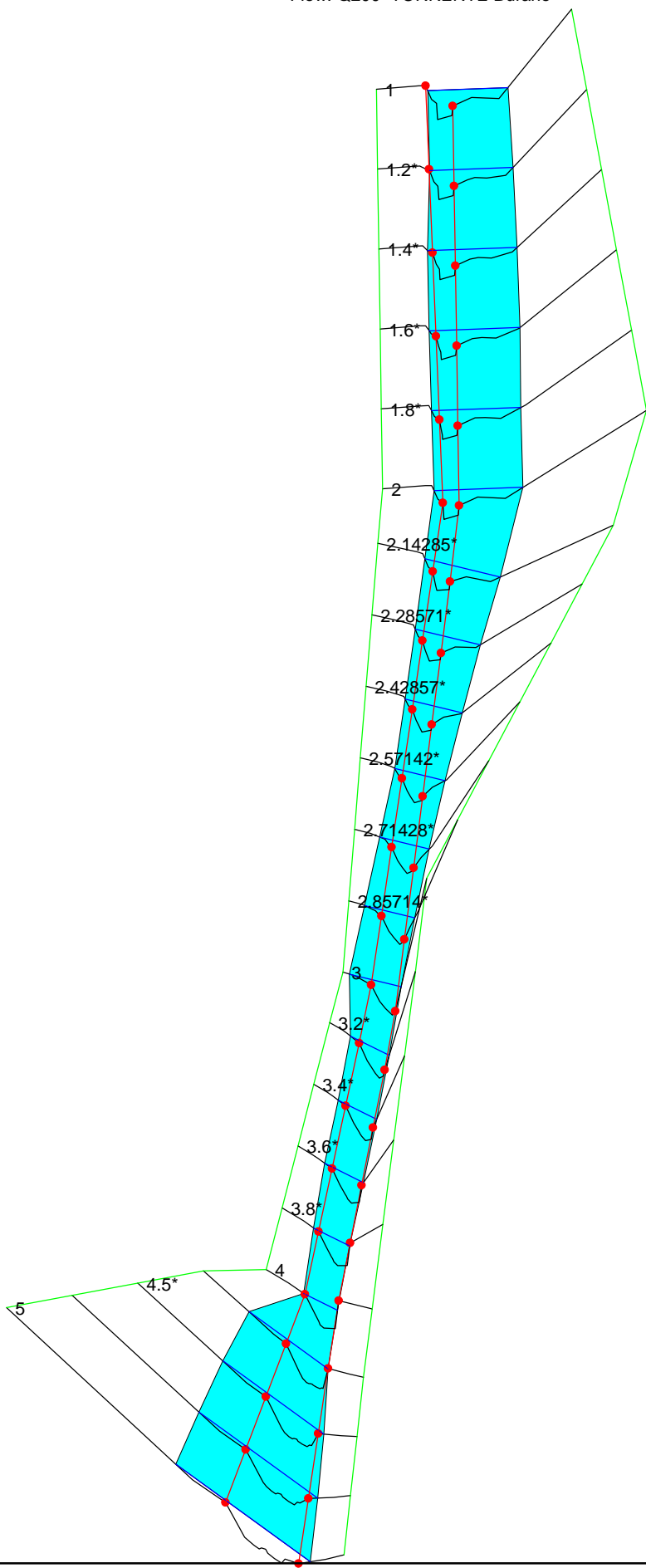


MACROAREA am19 Plan: Plan 01

Flow: Q200 TORRENTE Burano

Legend

- WS PF T200
- Ground
- Bank Sta
- Ground



1

1.2*

1.4*

1.6*

1.8*

2

2.14285*

2.28571*

2.42857*

2.57142*

2.71428*

2.85714*

3

3.2*

3.4*

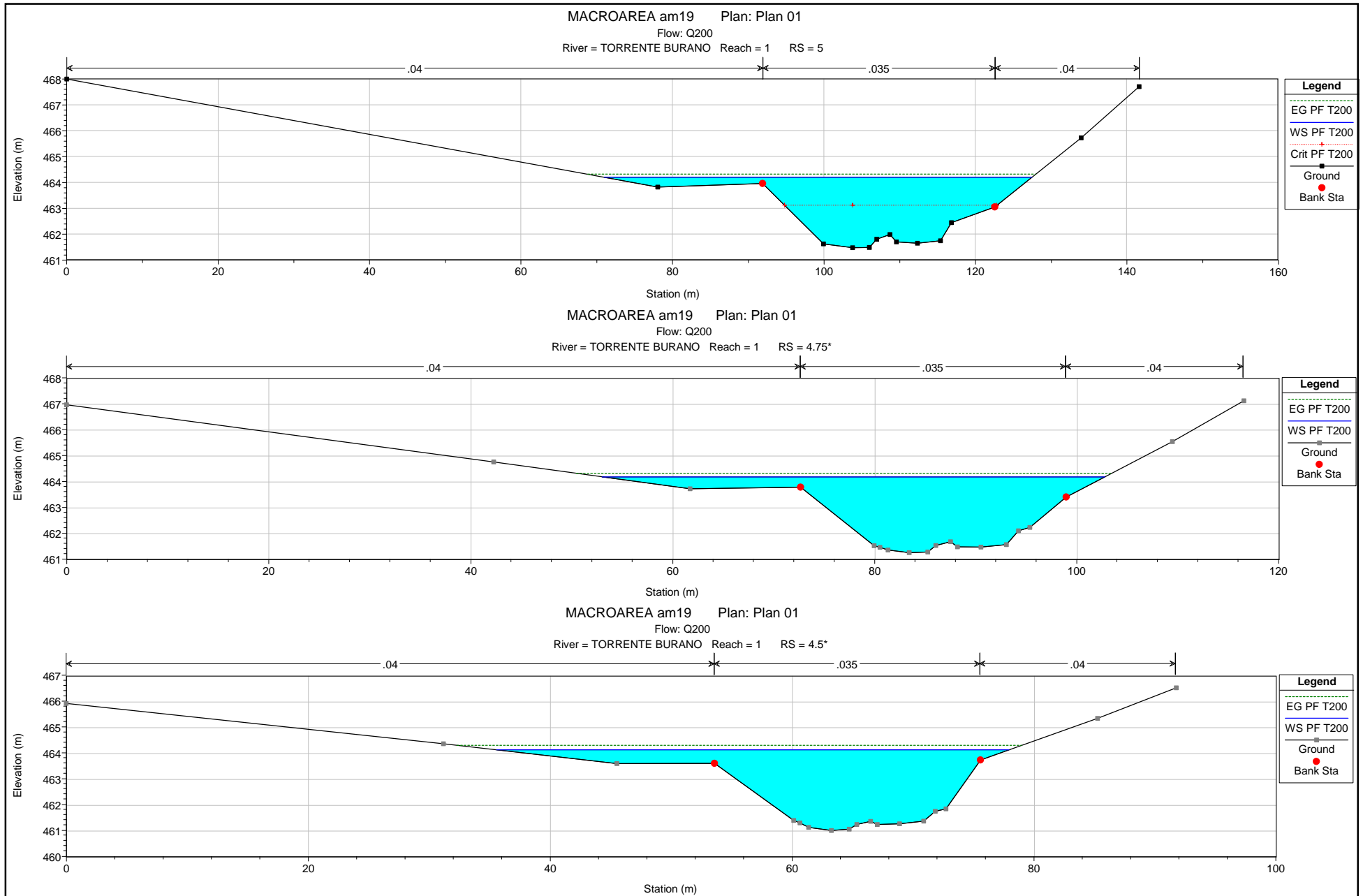
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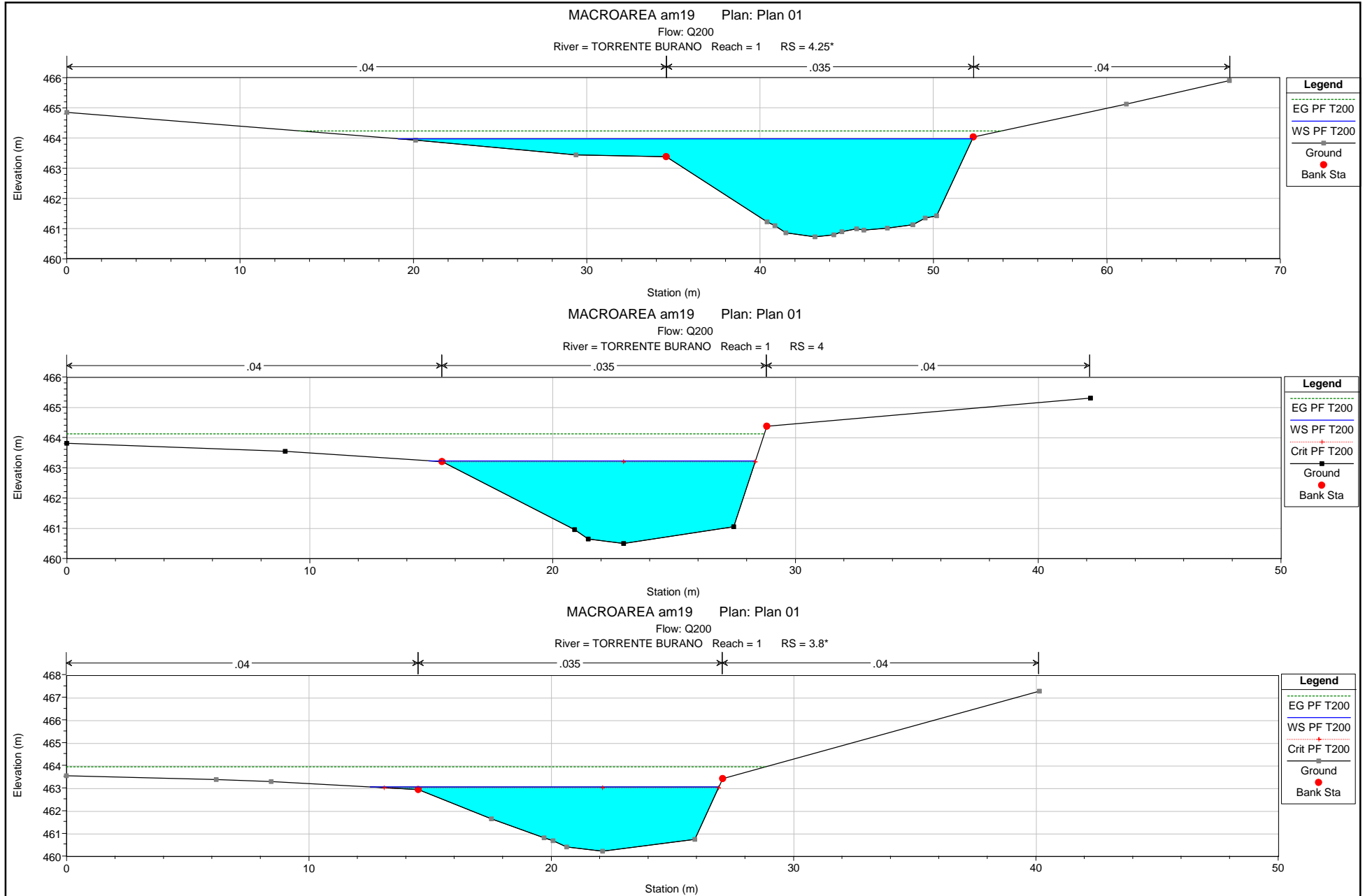
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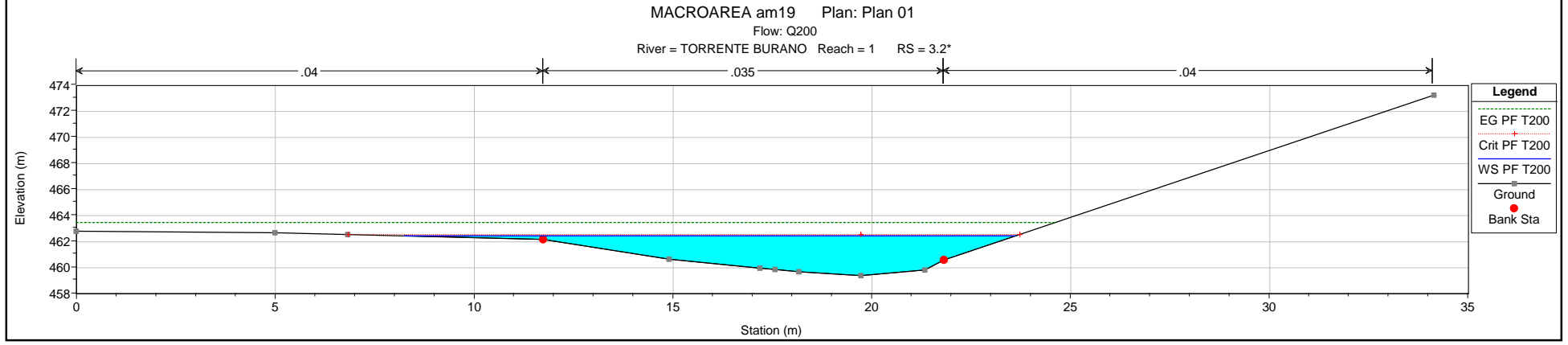
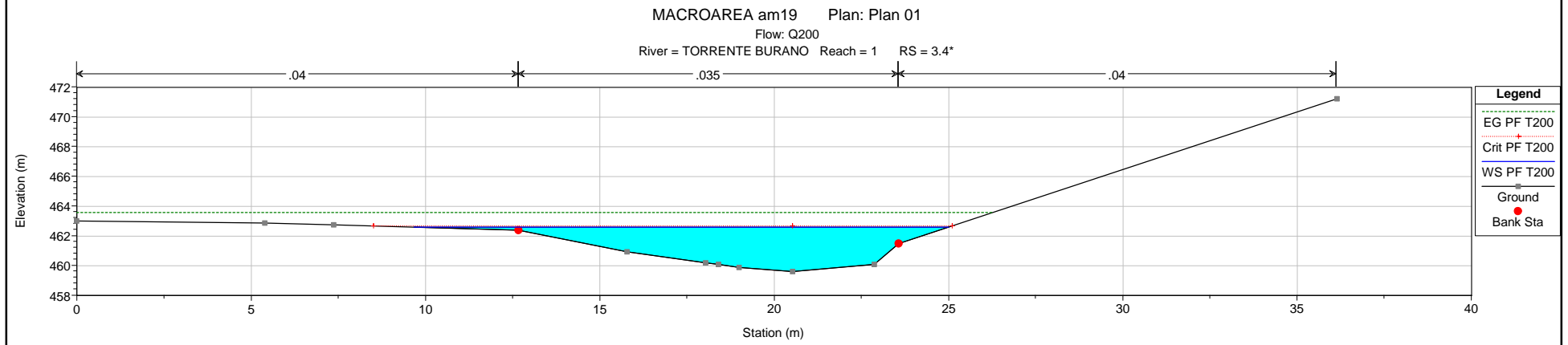
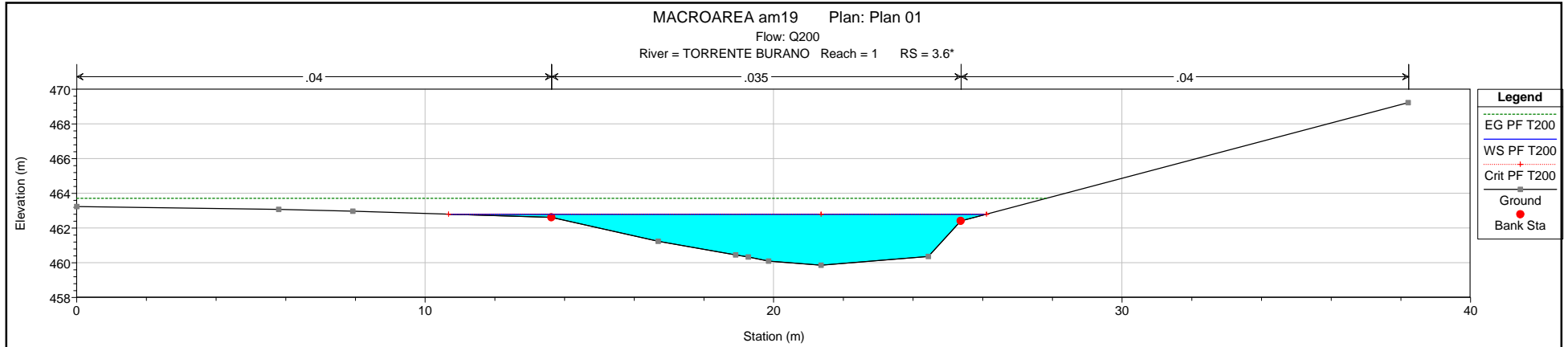
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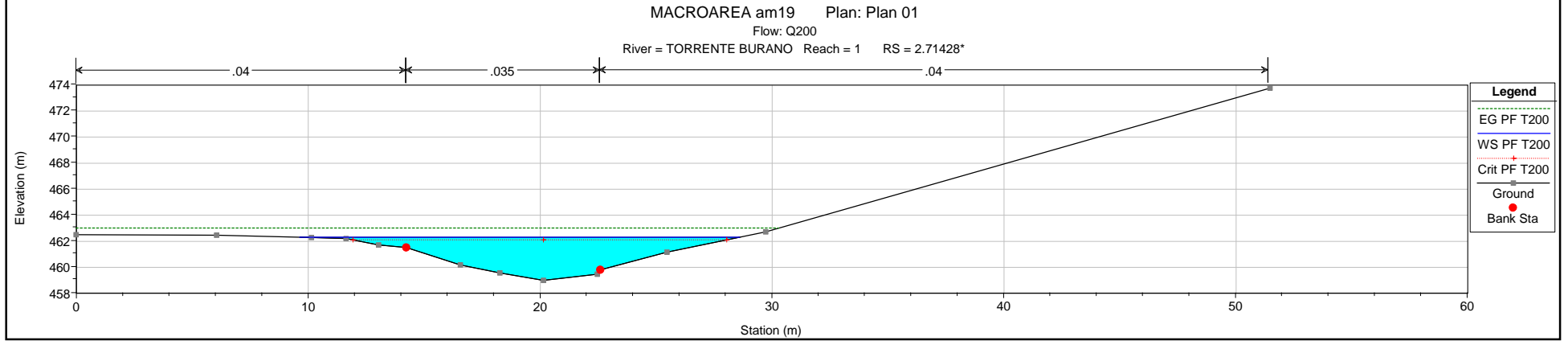
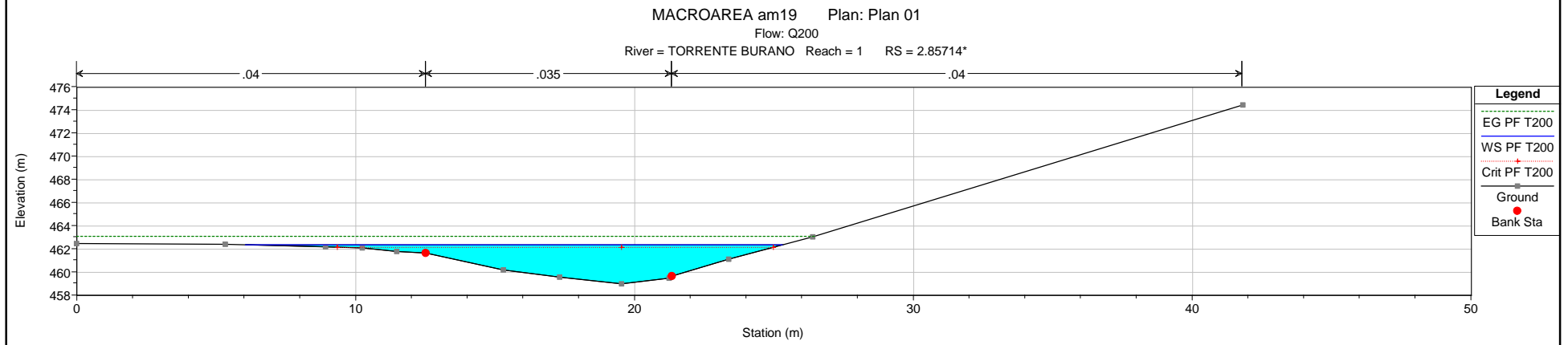
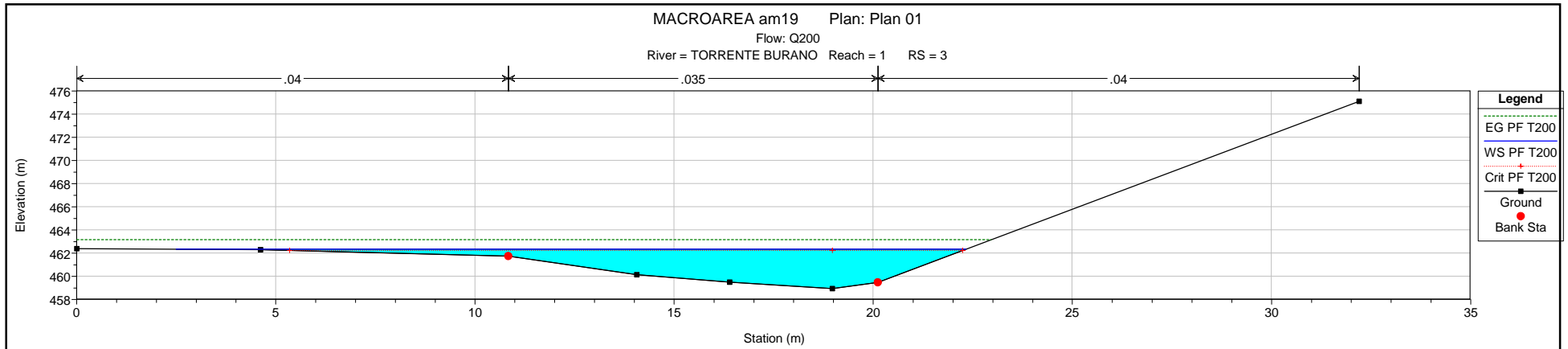
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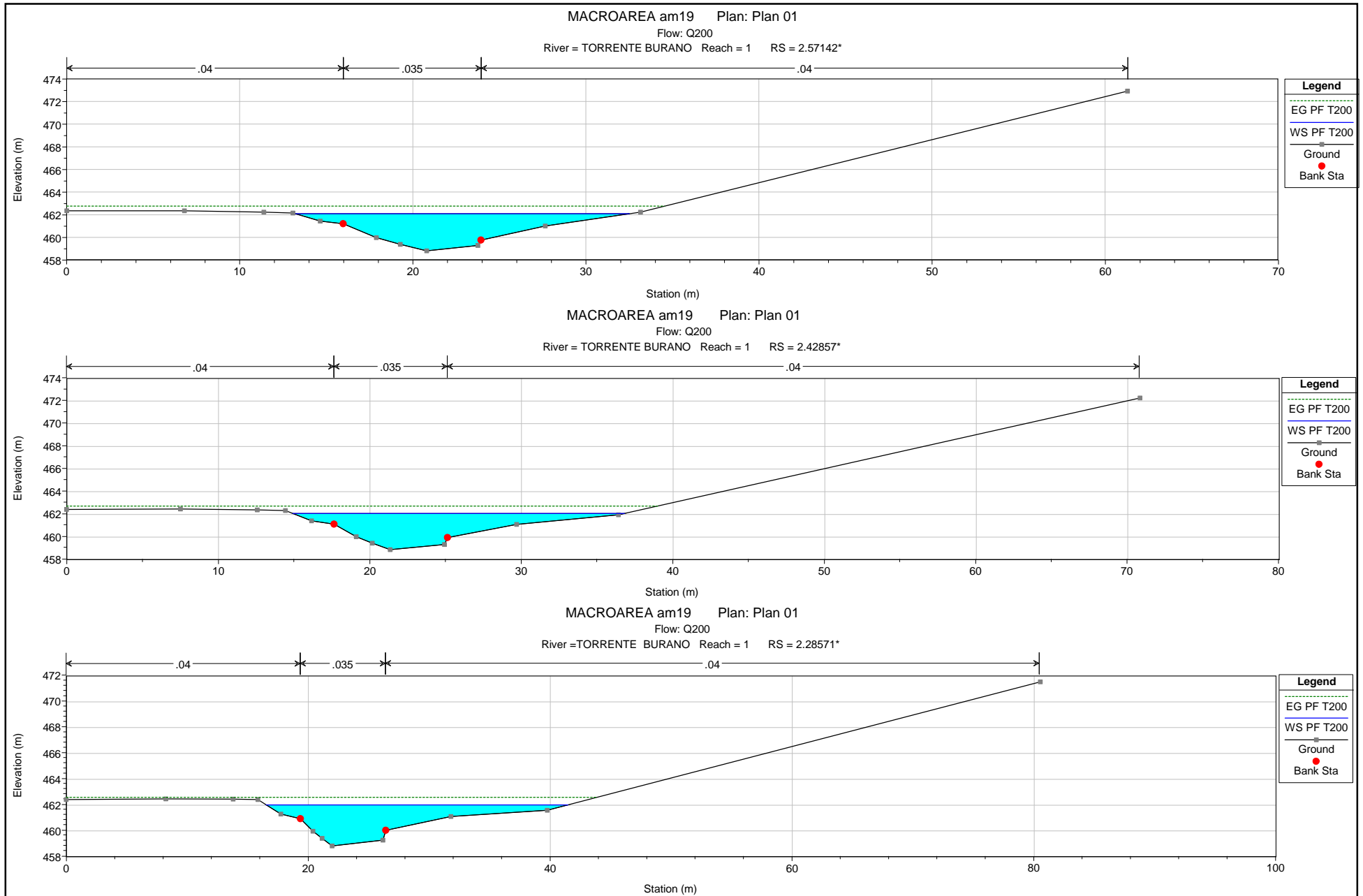
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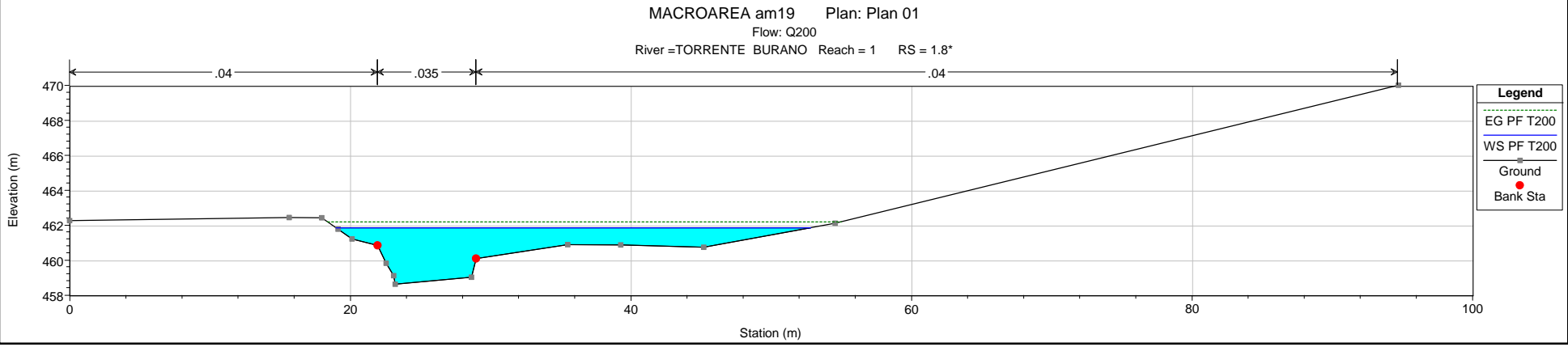
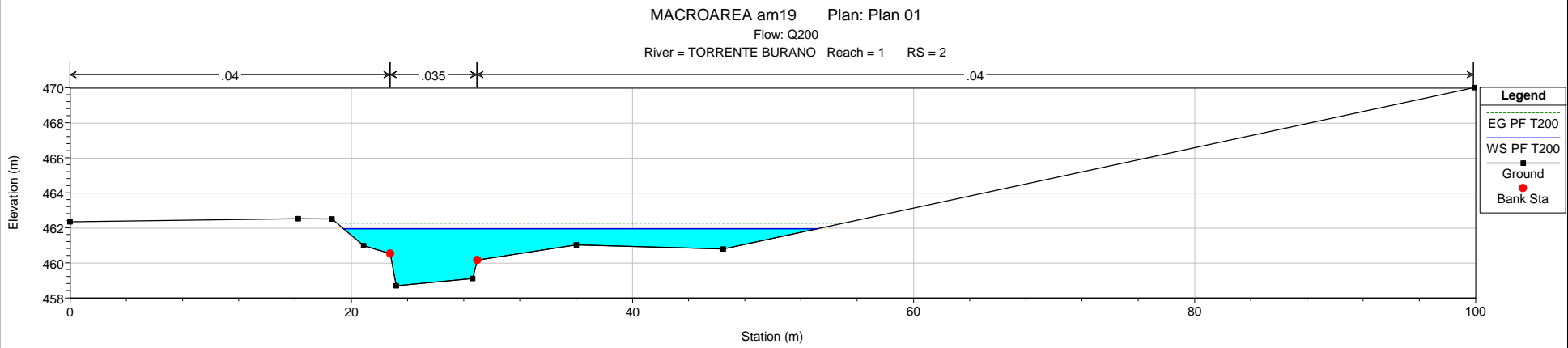
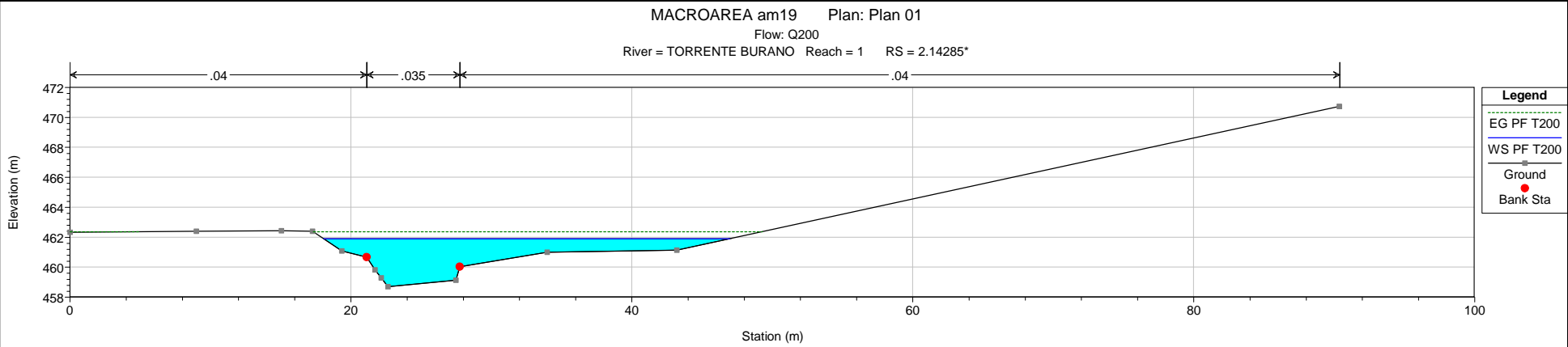


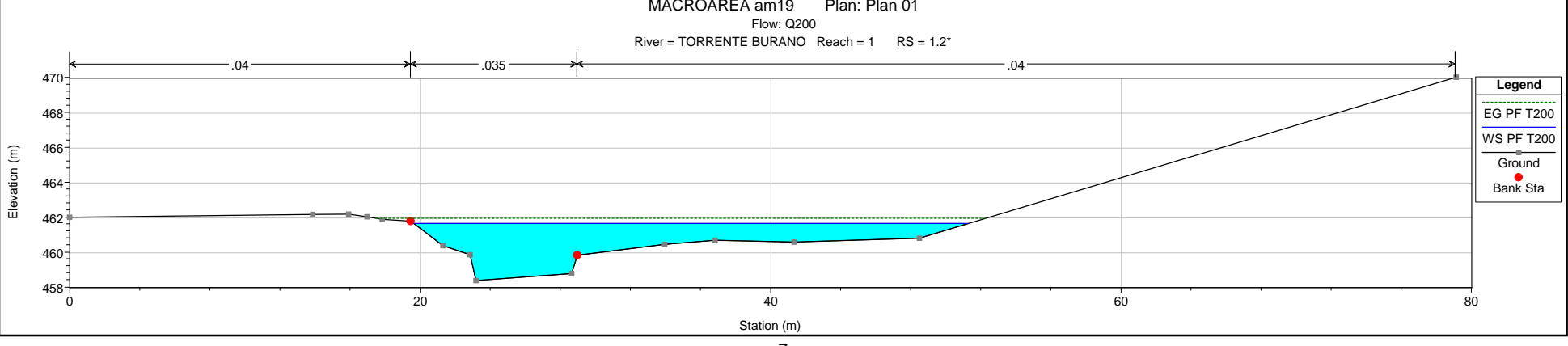
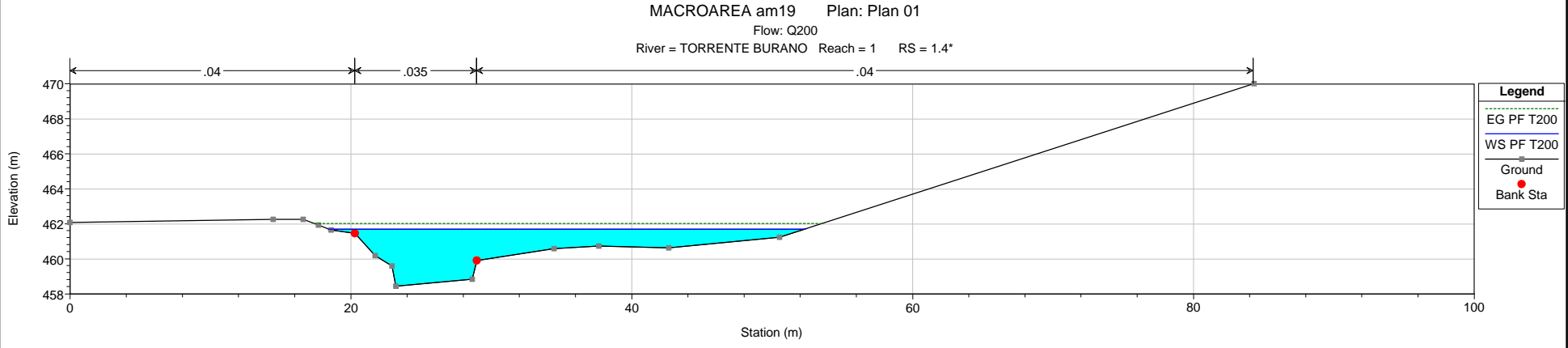
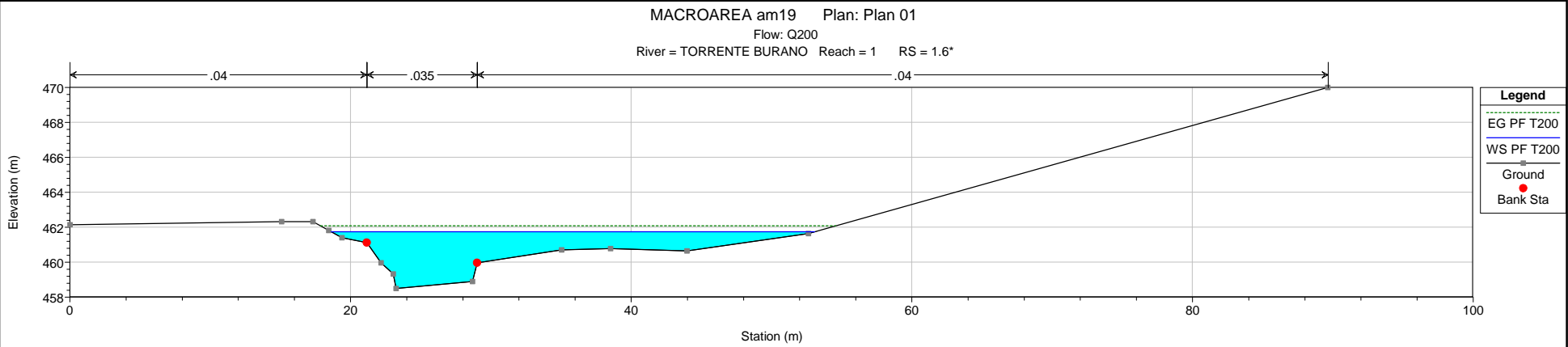












MACROAREA am19 Plan: Plan 01

Flow: Q200

River =TORRENTE BURANO Reach = 1 RS = 1 Sez. aggiunta

