COMUNE DI CASTIGLIONE CHIAVARESE
Provincia Di Genova
Regione Liguria

CAVA DI BASALTO DENOMINATA
“ACQUAFREDDA”

RELAZIONE IDRAULICA

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1. PREMESSA

La presente relazione idraulica è realizzata a corredo di un progetto per la sistemazione dell'area della Cava denominata "Acquafredda". La verifica è relativa alla ri-inalveazione del Rio Carmo in relazione alla sistemazione finale della Cava in oggetto.

Il Rio Carmo fa parte dell'Ambito 17 dei Piani di Bacino, trattasi di un'asta fluviale sottesa ad un bacino imbrifero modesto pari a 0.15 kmq.

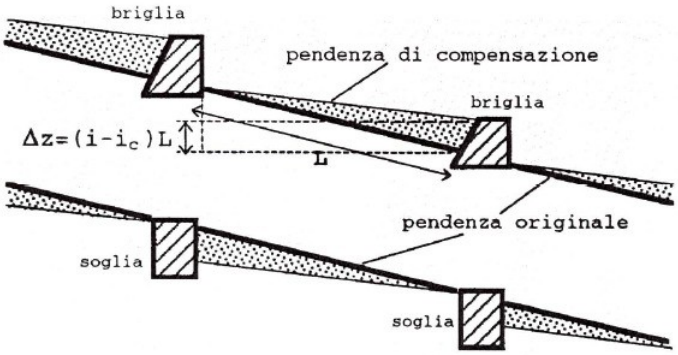
La verifica a seguire è condotta per un tratto significativo fino alla tombinatura presente sotto la strada provinciale.

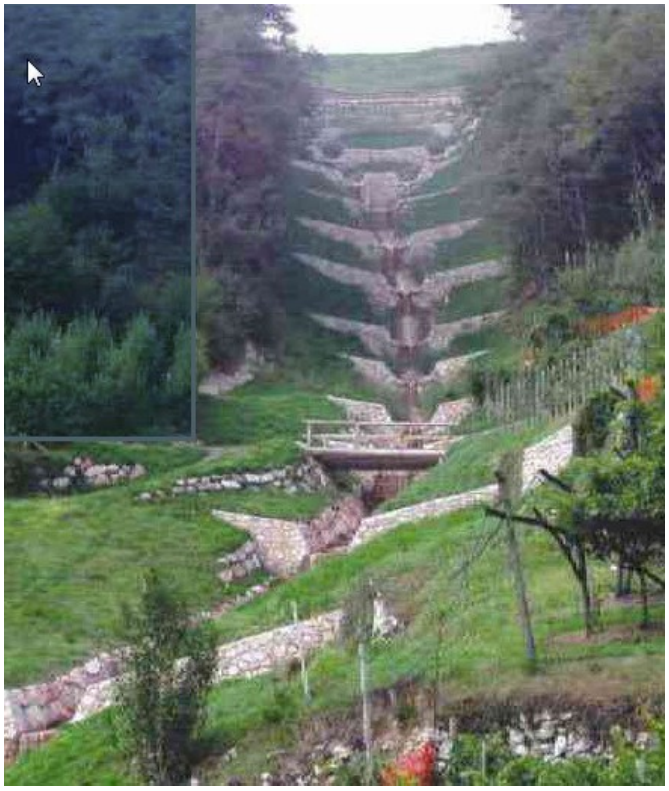
In considerazione della forte pendenza per limitarne gli effetti si è dovuto definire una sistemazione dell'alveo a "gradoni" mediante la realizzazione di strutture quali briglie/soglie. Tale impostazione del progetto consente di controllare in maniera efficace le velocità di scorrimento.

La ri-inalveazione del Rio Carmo presenta sostanzialmente la problematica relativa alle notevoli pendenze del versante ed alla conseguente aumento delle velocità di scorrimento. Per il contenimento di tale fenomeno si è condotta la progettazione della sistemazione idraulica del Rio optando per una sistemazione a gradoni costituiti da una serie di briglie/soglie con il duplice scopo sia di contenere la velocità di scorrimento sia di limitare il trasporto solido.

Le briglie saranno realizzate con blocchi di pietra di adeguate dimensioni e la cunetta ai piedi della briglia, onde evitare problemi di erosione dovuti al salto dell'acqua, sarà realizzata con blocchi di pietra di dimensioni minime pari ad almeno la larghezza della sezione idraulica, circa 1.7 m e lunghezza di almeno 1.5 m.

A seguire si riportano alcune immagini relative a sistemazioni idrauliche realizzate con l'impiego di tale tecnica.







2. VERIFICA IDRAULICA

Il calcolo idraulico è relativo allo studio del regime di massima piena del corso d'acqua naturale al fine di ricercare la massima altezza del pelo libero della sezione di deflusso in corrispondenza dell'intervento . La portata di massima piena assunta è quella fornita nell'allegato delle Norme

Rio Carmo:

$A_{Bacino\ totale}$: 0.15 Kmq

$Q_{rossola\ 200}$ = 0.15*40 = 6 mc/s

La modellazione in moto permanente monodimensionale è stata effettuata considerando come parametro di scabrezza del fondo alveo il seguente valore Manning n = 1/Ks = 0.035 per le porzioni di alveo con sponde e fondo naturali, n = 1/Ks = 0.025 per le sezioni terminali in calcestruzzo.

Sono state individuate sezioni nei punti considerati più significativi.

Segue verifica idraulica con relativo calcolo dei battenti idrici effettuata con il Software HEC – RAS, versione 4.1 del 2010.

3. METODOLOGIA DI CALCOLO

Le verifiche idrauliche sono state condotte con l'ausilio di un *software*[1] per il calcolo dell'andamento dei profili di rigurgito in moto permanente in alvei naturali o canali artificiali che consente anche la valutazione degli effetti sulla corrente dovuti all'interazione con i ponti, tombinature, briglie, stramazzi, ecc...

La determinazione del profilo teorico è ottenuta tramite l'applicazione del cosiddetto *Standard step method* che si basa sulla semplice equazione monodimensionale del contenuto energetico della corrente che ha la seguente espressione $H_2 - H_1 = h_f + h_e$ (oppure nella analoga espressione di bilancio energetico $Y_2 + Z_2 + \alpha V_2 / 2g = Y_1 + Z_1 + \alpha V_1 / 2g + h_e$), dove $H_1[m]$ ed $H_2[m]$ sono i carichi totali della corrente nelle sezioni di onte e di valle del tronco d'alveo considerato, $h_f[m]$ sono le perdite di carico dovute all'attrito del fondo e delle sponde mentre h_e *[m]* è un termine che tiene conto degli effetti dovuti alla non cilindricità della corrente.

In particolare h_f dipende principalmente dalla scabrezza del tratto d'alveo considerato ed è esprimibile come:

$h_f = j_f * L$, con j_f pendenza motrice nel tratto di lunghezza $L[m]$.

Il calcolo di j_f è effettuabile con diverse formulazioni in funzione della pendenza motrice J in corrispondenza delle sezioni di inizio e fine di ciascun tratto.

Il calcolo del termine J della singola sezione è effettuato mediante la:

$J = [Q/K]^2$ dove $Q[m^3/s]$ è la portata di calcolo e K è ricavabile attraverso la seguente espressione:

$K = 1/n * A * R^{2/3}$, dove $A^2[m]$ l'area della sezione liquida, $R[m]$ il raggio idraulico e $n[m^{-1/3}s]$ è il parametro rappresentativo della scabrezza, del fondo e delle sponde, di *Manning*.

Il termine h_e *(perdite di carico totali nel tratto considerato)* dipende invece dalla variazione del carico cinetico della corrente tra le sezioni 1 e 2 dovuta al cambio di geometria delle sezioni ed è a sua volta esprimibile come:
$h_e = \beta(\alpha_1.V_1^2/2g - \alpha_2.V_2^2/2g)$, dove β è un coefficiente di contrazione o espansione dipendente dalle condizioni geometriche del tratto considerato, V_1 e V_2*[m/s]* sono i valori delle velocità medie agli estremi del tronco e α_1 e α_2 sono i coefficienti correttivi dell'energia cinetica.

Il modello consente di suddividere la sezione in più zone in cui assegnare un valore diverso del parametro *n* di scabrezza; in particolare è possibile individuare tre zone principali: quella centrale dell'alveo inciso (*main channel)* e due zone laterali golenali (denominate *right and left overbanks)*.

Nella modellazione eseguita il parametro *n* si è mantenuto costante per tutta la sezione del corso d'acqua.

Nella verifica della tombinatura, il programma utilizza l'equazione FHWA per calcolare le perdite attraverso la struttura. L'analisi dei flussi attraverso le tombinature, che rappresentano un elemento di criticità, è complicato. Comunemente si usa il concetto di controllo all'imbocco *"Inlet control"* e controllo allo sbocco *"Outlet control"* . Le routines delle tombinature in HEC RAS calcolano il carico di energia a monte richiesto per il deflusso di un assegnato valore di portata attraverso il sottopasso relativamente alle condizioni controllate all'imbocco e allo sbocco. Quella delle due che richiede il maggior carico rappresenta la condizione di controllo. Partendo quindi da quel carico, il programma calcola il corrispondente livello di acqua.

4. RISULTATI

Il calcolo del profilo è stato effettuato nella configurazione di progetto.

Lungo l'asta del corso d'acqua sono state individuate una serie di sezioni trasversali, in funzione delle caratteristiche geometriche e morfologiche dell'alveo.

Ai fini del calcolo è stato assunto un valore di scabrezza di fondo equivalente *n* cautelativamente pari ad 0,035 che si è mantenuto costante per tutta la sezione.

Le verifiche sono state effettuate con il valore di portata 200 – ennale di 6 m^3/s, nell'ipotesi di sponde infinite qualora il livello di piena superi le quote di sommità arginali.

Il profilo di rigurgito è stato integrato per la sola condizione di regime in corrente veloce imponendo come condizione al contorno il passaggio del flusso per l'altezza critica a valle; a monte è stata imputata la pendenza del canale di monte.

La verifica non mette in evidenza particolari problematiche relative al livello di massima piena che rimane sempre entro i limiti di normativa sia per il ramo principale del Rio sia per i canaletti secondari. In relazione alla sistemazione finale dovrà essere posta particolare cura nella realizzazione delle briglie/soglie previste in quanto essenziale per limitare la velocità di scorrimento e scongiurare quindi i fenomeni erosivi legati a velocità di scorrimento elevate.

Il Tecnico

ALLEGATI:

- SEZIONI DI CALCOLO
- PROFILO LONGITUDINALE
- MODELLAZIONE
- ELABORATI DI CALCOLO

HEC-RAS Plan: Plan 04 Profile: PF 1

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Rio Carmo 7	q200	1.1	PF 1	6.00	117.00	117.67	118.02	118.85	0.094252	4.81	1.25	2.03	1.96
Rio Carmo 7	q200	1.09	PF 1	6.00	114.50	115.09	115.52	116.62	0.135973	5.48	1.10	2.00	2.36
Rio Carmo 7	q200	1.05	PF 1	6.00	110.00	110.45	111.02	113.22	0.317222	7.37	0.81	1.92	3.62
Rio Carmo 7	q200	1.04	PF 1	6.00	107.50	109.17	108.52	109.31	0.005851	1.70	3.53	2.53	0.46
Rio Carmo 7	q200	1.032		Inl Struct									
Rio Carmo 7	q200	1.03	PF 1	6.00	106.00	107.02	107.02	107.48	0.025937	3.00	2.00	2.21	1.01
Rio Carmo 7	q200	1.02	PF 1	6.00	102.25	102.66	103.27	106.02	0.420819	8.12	0.74	1.90	4.16
Rio Carmo 7	q200	1	PF 1	6.00	100.00	100.38	100.79	102.15	0.111020	5.90	1.02	2.70	3.07
Rio Carmo 7	q200	0.9	PF 1	6.00	98.08	98.43	98.87	100.49	0.139109	6.35	0.94	2.70	3.43
Rio Carmo 7	q200	0.8	PF 1	6.00	96.17	96.52	96.96	98.62	0.143630	6.42	0.93	2.70	3.48
Rio Carmo 7	q200	0.7	PF 1	6.00	94.25	94.60	95.04	96.71	0.145093	6.44	0.93	2.70	3.50
Rio Carmo 7	q200	0.6	PF 1	6.00	92.33	92.68	93.12	94.79	0.144949	6.44	0.93	2.70	3.50
Rio Carmo 7	q200	0.5	PF 1	6.00	90.42	90.77	91.21	92.88	0.144949	6.44	0.93	2.70	3.50
Rio Carmo 7	q200	0.4	PF 1	6.00	88.50	88.84	89.29	90.96	0.145741	6.45	0.93	2.70	3.51
Rio Carmo 6	q200	1.7	PF 1	5.62	132.50	133.05	133.48	134.60	0.145853	5.51	1.02	1.98	2.45
Rio Carmo 6	q200	1.6	PF 1	5.62	130.00	130.37	130.98	134.13	0.527056	8.59	0.65	1.88	4.65
Rio Carmo 6	q200	1.5	PF 1	5.62	126.00	126.53	126.98	128.25	0.170438	5.82	0.97	1.96	2.65
Rio Carmo 6	q200	1.45		Inl Struct									
Rio Carmo 6	q200	1.4	PF 1	5.62	124.50	125.48	125.48	125.92	0.025828	2.94	1.91	2.19	1.01
Rio Carmo 6	q200	1.3	PF 1	5.62	120.00	120.36	120.98	124.25	0.554245	8.74	0.64	1.88	4.77
Rio Carmo 6	q200	1.25		Inl Struct									
Rio Carmo 6	q200	1.2	PF 1	5.62	117.50	118.48	118.48	118.92	0.025822	2.94	1.91	2.19	1.01
Rio Carmo 5	q200	2.3	PF 1	5.32	144.50	145.45	145.45	145.88	0.025710	2.90	1.84	2.17	1.01
Rio Carmo 5	q200	2.2	PF 1	5.32	140.50	140.86	141.45	144.28	0.481223	8.19	0.65	1.88	4.45
Rio Carmo 5	q200	2.15		Inl Struct									
Rio Carmo 5	q200	2.1	PF 1	5.32	137.50	138.45	138.45	138.88	0.025721	2.90	1.84	2.17	1.01
Rio Carmo 5	q200	2.09	PF 1	5.32	134.00	134.39	134.95	137.35	0.390032	7.62	0.70	1.89	4.01
Rio Carmo 5	q200	2.08		Inl Struct									
Rio Carmo 5	q200	2	PF 1	5.32	132.50	133.45	133.45	133.88	0.025715	2.90	1.84	2.17	1.01
Rio Carmo 4	q200	3	PF 1	5.08	161.50	161.78	162.42	167.01	0.949826	10.13	0.50	1.84	6.20
Rio Carmo 4	q200	2.9	PF 1	5.08	157.00	157.48	157.92	159.20	0.184777	5.81	0.87	1.94	2.76
Rio Carmo 4	q200	2.85		Inl Struct									
Rio Carmo 4	q200	2.8	PF 1	5.08	154.50	155.42	155.42	155.84	0.025624	2.86	1.78	2.16	1.01
Rio Carmo 4	q200	2.7	PF 1	5.08	150.00	150.33	150.92	154.16	0.597647	8.68	0.59	1.86	4.94
Rio Carmo 4	q200	2.65		Inl Struct									
Rio Carmo 4	q200	2.6	PF 1	5.08	147.50	148.42	148.42	148.84	0.025635	2.86	1.78	2.16	1.01
Rio Carmo 4	q200	2.5	PF 1	5.08	146.00	146.49	146.92	148.16	0.178542	5.74	0.89	1.94	2.71

HEC-RAS Plan: Plan 04 Profile: PF 1 (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Rio Carmo 4	q200	2.45		Inl Struct									
Rio Carmo 4	q200	2.4	PF 1	5.08	144.00	145.82	144.92	145.91	0.003163	1.29	3.93	2.61	0.34
Rio Carmo 3	q200	10	PF 1	4.53	185.50	185.88	186.36	188.14	0.305795	6.66	0.68	1.89	3.55
Rio Carmo 3	q200	9	PF 1	4.53	181.00	181.43	181.86	183.19	0.212740	5.89	0.77	1.91	2.96
Rio Carmo 3	q200	8.5		Inl Struct									
Rio Carmo 3	q200	8	PF 1	4.53	179.50	180.36	180.36	180.75	0.025398	2.76	1.64	2.13	1.01
Rio Carmo 3	q200	7	PF 1	4.53	175.00	175.30	175.86	179.06	0.650574	8.60	0.53	1.85	5.14
Rio Carmo 3	q200	6.5		Inl Struct									
Rio Carmo 3	q200	6	PF 1	4.53	173.50	174.36	174.36	174.76	0.026543	2.80	1.62	2.05	1.01
Rio Carmo 3	q200	5	PF 1	4.53	169.00	169.30	169.85	173.04	0.644132	8.57	0.53	1.85	5.12
Rio Carmo 3	q200	4.5		Inl Struct									
Rio Carmo 3	q200	4	PF 1	4.53	167.50	168.36	168.36	168.75	0.025414	2.76	1.64	2.13	1.01
Rio Carmo 3	q200	3.5	PF 1	4.53	164.00	164.35	164.86	167.07	0.401941	7.31	0.62	1.87	4.06
Rio Carmo 3	q200	3.45		Inl Struct									
Rio Carmo 3	q200	3.3	PF 1	4.53	161.50	162.36	162.36	162.75	0.025409	2.76	1.64	2.13	1.01
Rio Carmo 2	q200	16	PF 1	3.96	199.00	199.49	199.79	200.49	0.106265	4.44	0.89	1.94	2.09
Rio Carmo 2	q200	15	PF 1	3.96	196.75	197.17	197.54	198.57	0.171020	5.24	0.76	1.91	2.66
Rio Carmo 2	q200	14	PF 1	3.96	194.18	194.59	194.97	196.05	0.182542	5.35	0.74	1.91	2.74
Rio Carmo 2	q200	13	PF 1	3.96	191.82	192.25	192.61	193.58	0.159421	5.11	0.77	1.91	2.56
Rio Carmo 2	q200	12	PF 1	3.96	189.45	189.87	190.24	191.25	0.168201	5.21	0.76	1.91	2.63
Rio Carmo 2	q200	11	PF 1	3.96	187.00	188.44	187.79	188.53	0.004009	1.34	2.96	2.42	0.39
Rio Carmo 2	q200	10.6		Inl Struct									
Rio Carmo 2	q200	10.5	PF 1	3.96	185.50	186.60		186.77	0.009194	1.83	2.16	2.25	0.60
Rio Carmo 1	q200	21	PF 1	3.52	216.75	217.06	217.48	219.18	0.354377	6.45	0.55	1.85	3.80
Rio Carmo 1	q200	20.6		Inl Struct									
Rio Carmo 1	q200	20.5	PF 1	3.52	213.50	214.23	214.23	214.56	0.025027	2.57	1.37	2.06	1.01
Rio Carmo 1	q200	20	PF 1	3.52	211.40	211.73	212.13	213.60	0.295648	6.07	0.58	1.86	3.48
Rio Carmo 1	q200	19	PF 1	3.52	208.80	209.20	209.53	210.42	0.155949	4.89	0.72	1.90	2.53
Rio Carmo 1	q200	18	PF 1	3.52	206.20	206.58	206.93	207.96	0.187788	5.21	0.68	1.89	2.78
Rio Carmo 1	q200	17	PF 1	3.52	203.60	203.98	204.33	205.33	0.180420	5.14	0.69	1.89	2.72
Rio Carmo 1	q200	16.5	PF 1	3.52	201.00	202.49	201.73	202.55	0.002867	1.14	3.08	2.44	0.33
Rio Carmo 1	q200	16.45		Inl Struct									
Rio Carmo 1	q200	16.4	PF 1	3.52	199.50	200.23	200.23	200.56	0.025026	2.57	1.37	2.06	1.01
Rio Carmo	q200	25	PF 1	2.68	238.00	238.61	238.61	238.90	0.024690	2.37	1.13	2.01	1.01
Rio Carmo	q200	24	PF 1	2.68	228.75	228.90	229.36	234.07	1.850688	10.08	0.27	1.78	8.31
Rio Carmo	q200	22	PF 1	2.68	223.00	223.31	223.61	224.54	0.205968	4.92	0.54	1.85	2.90
Rio Carmo	q200	21.5	PF 1	2.68	216.75	216.98	217.36	219.21	0.504408	6.62	0.41	1.82	4.47

Geom: carmo 2023 bis

Rio Carmo 7 q200 | Rio Carmo 6 q200 | Rio Carmo 5 q200 | Rio Carmo 4 q200 | Rio Carmo 3 q200 | Rio Carmo 2 q200 | Rio Carmo 1 q200 | Rio Carmo q200

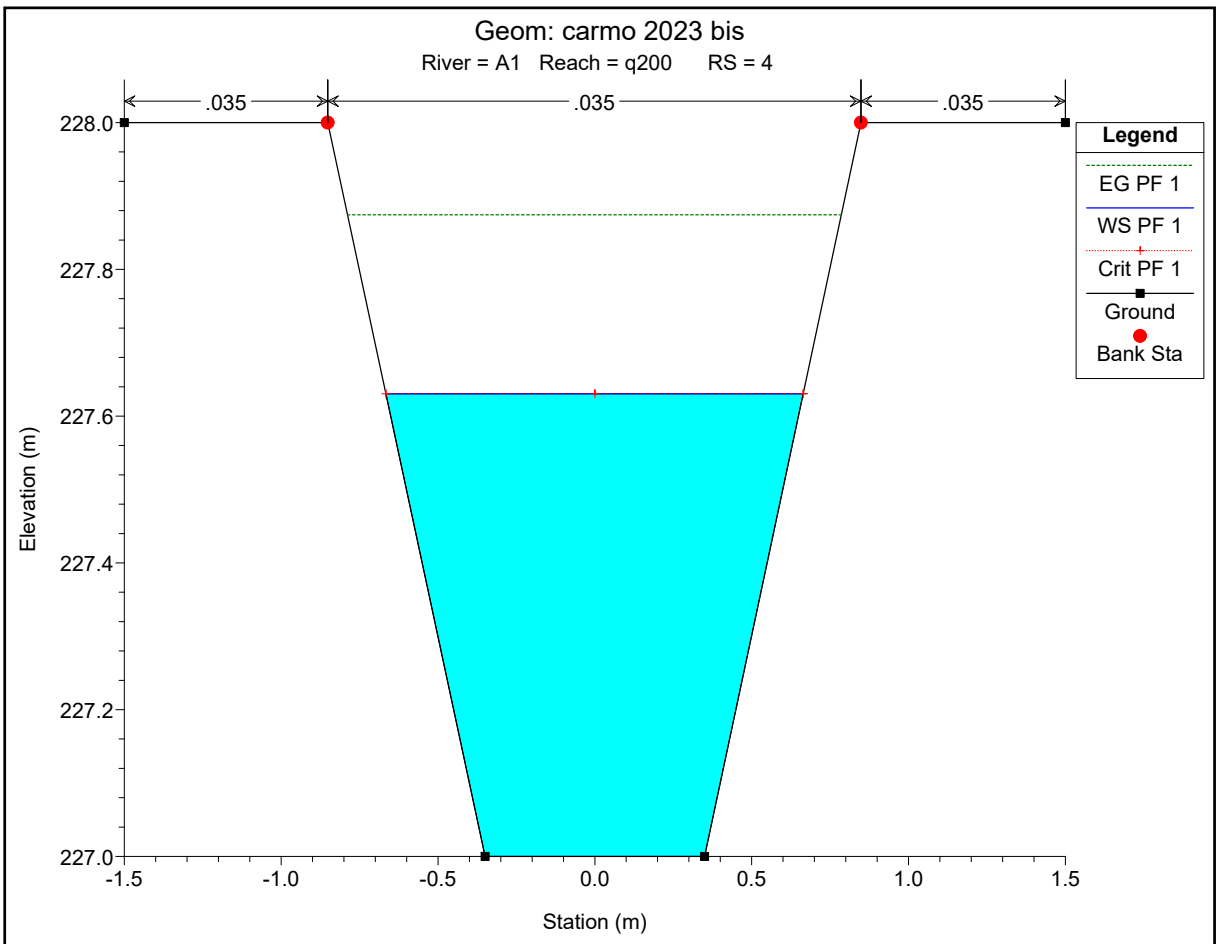
Legend
- EG PF 1
- Crit PF 1
- WS PF 1
- Ground

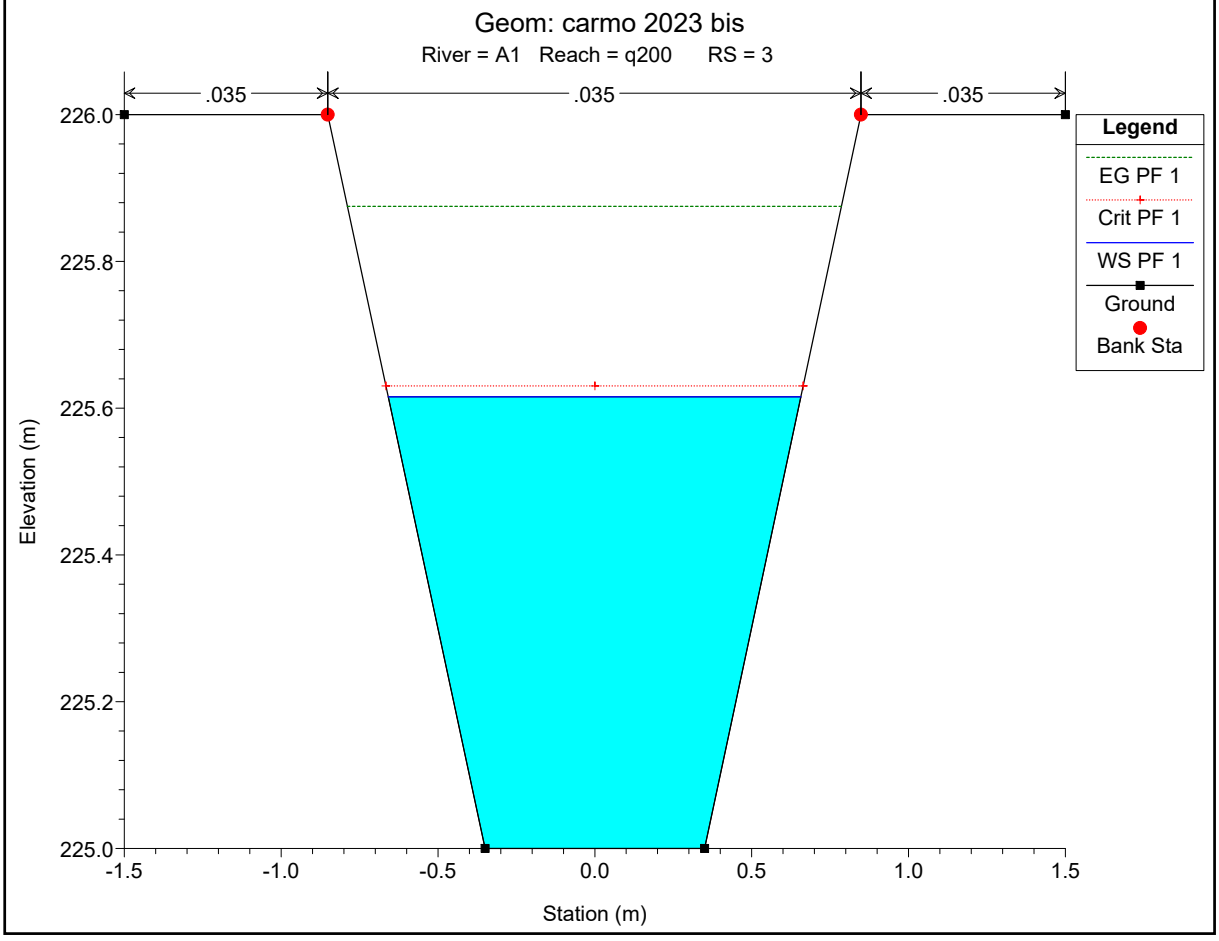
Elevation (m)

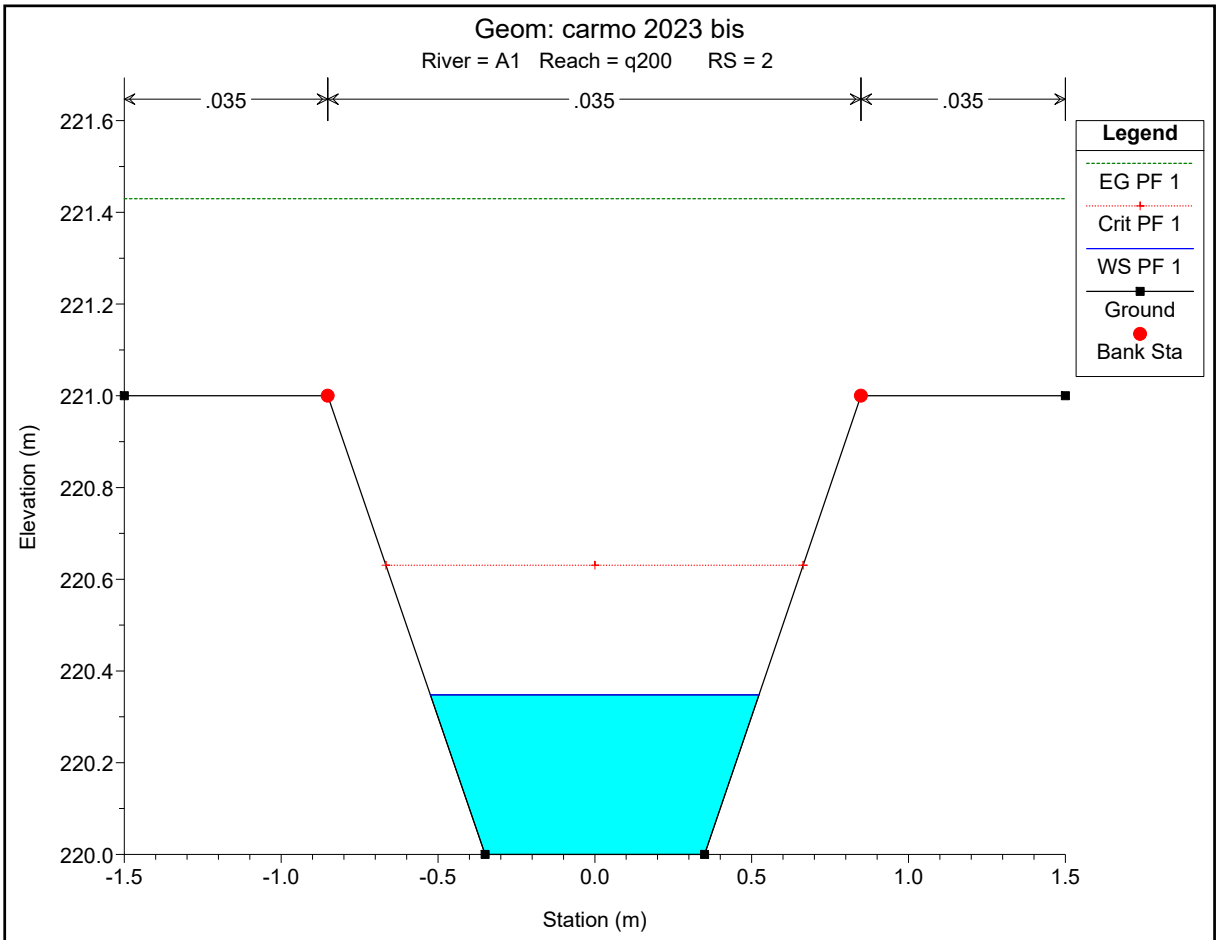
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160
140
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80

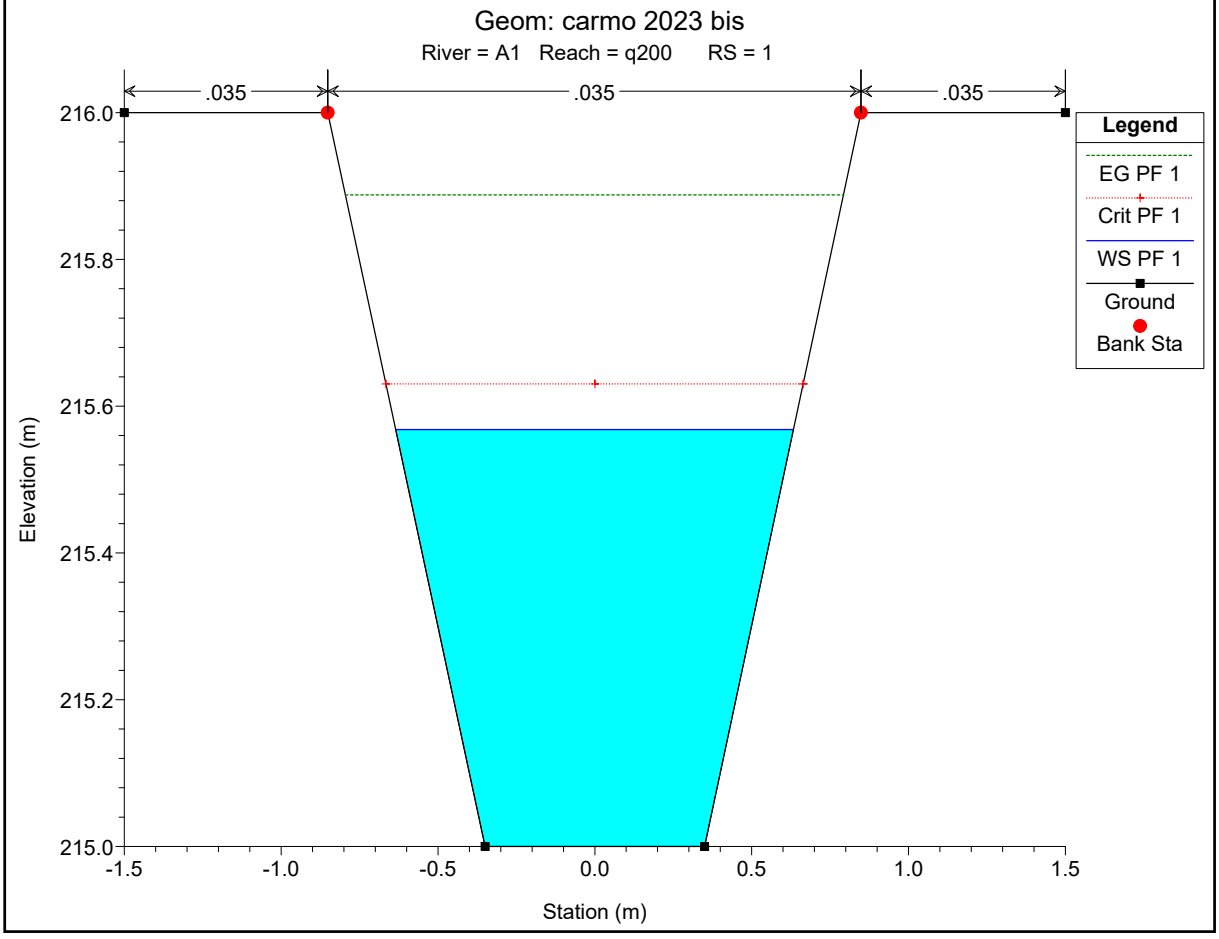
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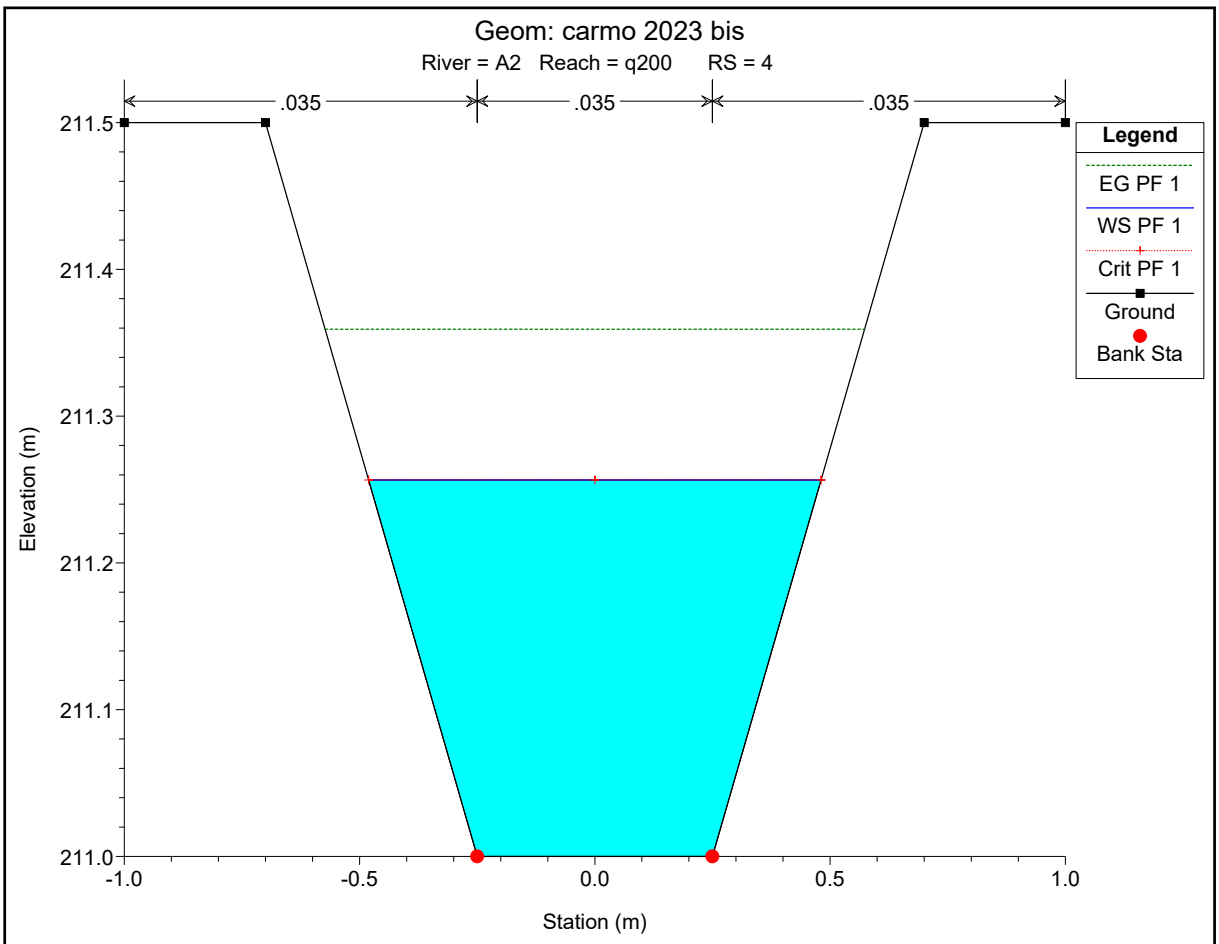
Main Channel Distance (m)

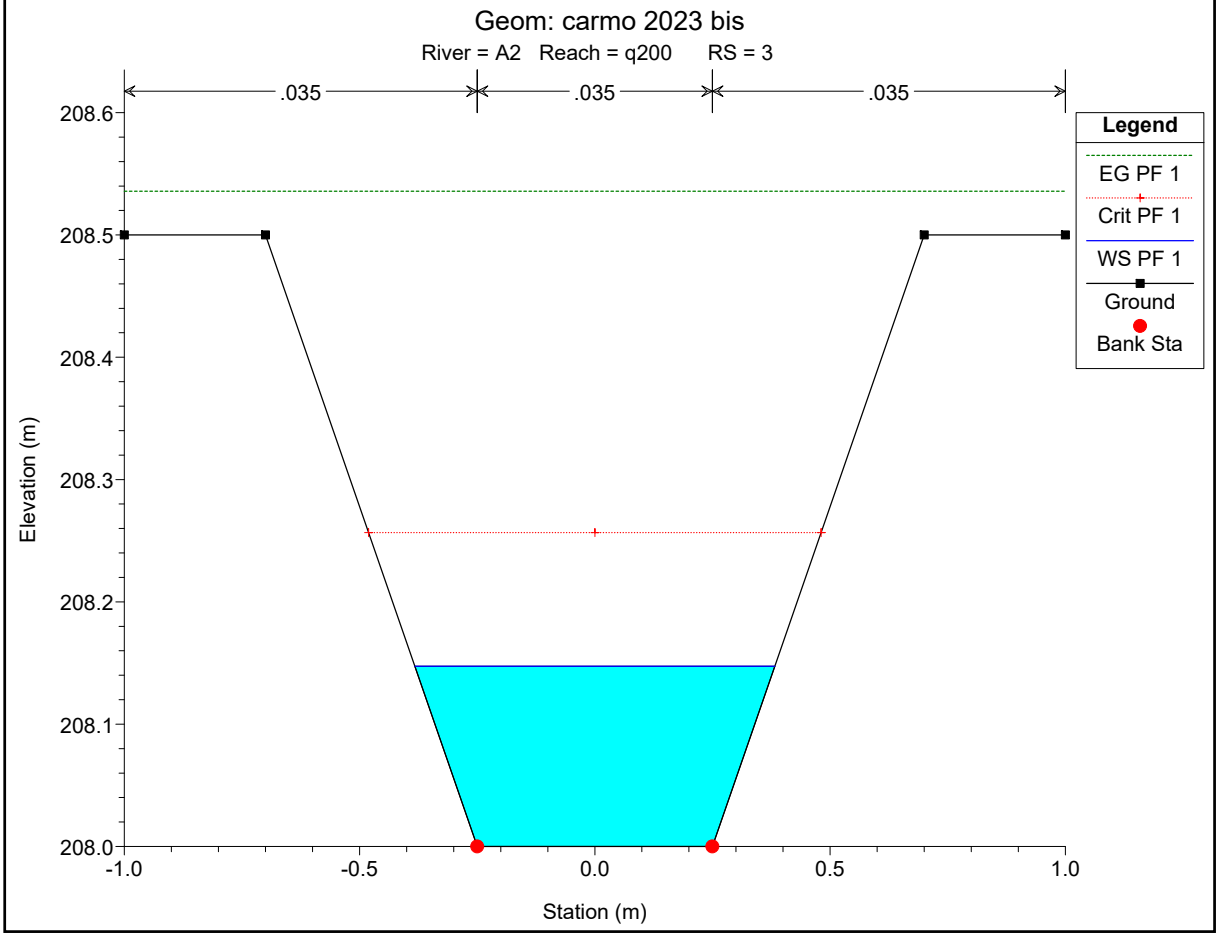

Geom: carmo 2023 bis
River = A1 Reach = q200 RS = 4
.035
.035
.035
228.0
227.8
227.6
227.4
227.2
227.0
Elevation (m)
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

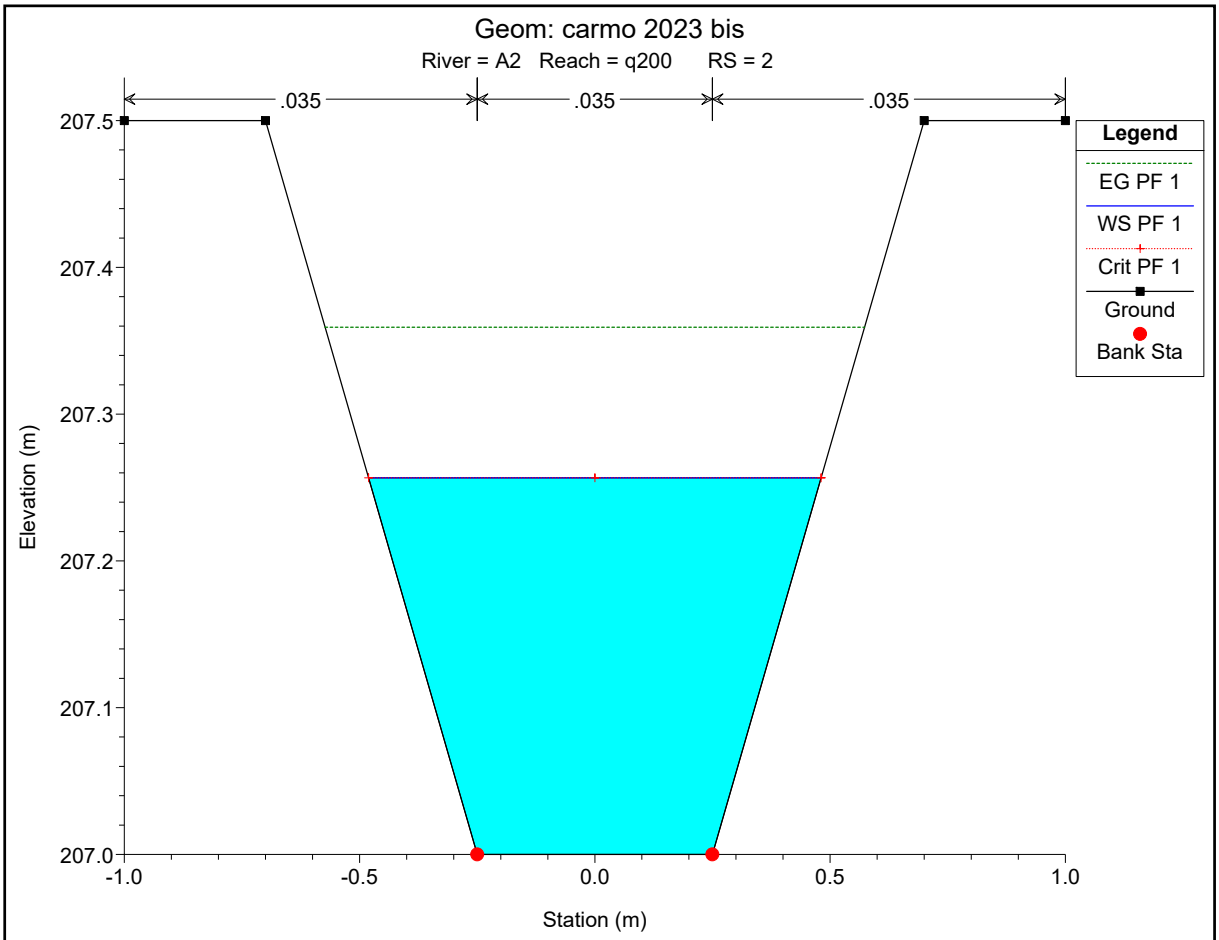

Geom: carmo 2023 bis
River = A1 Reach = q200 RS = 3
.035
.035
.035
226.0
225.8
225.6
225.4
225.2
225.0
Elevation (m)
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

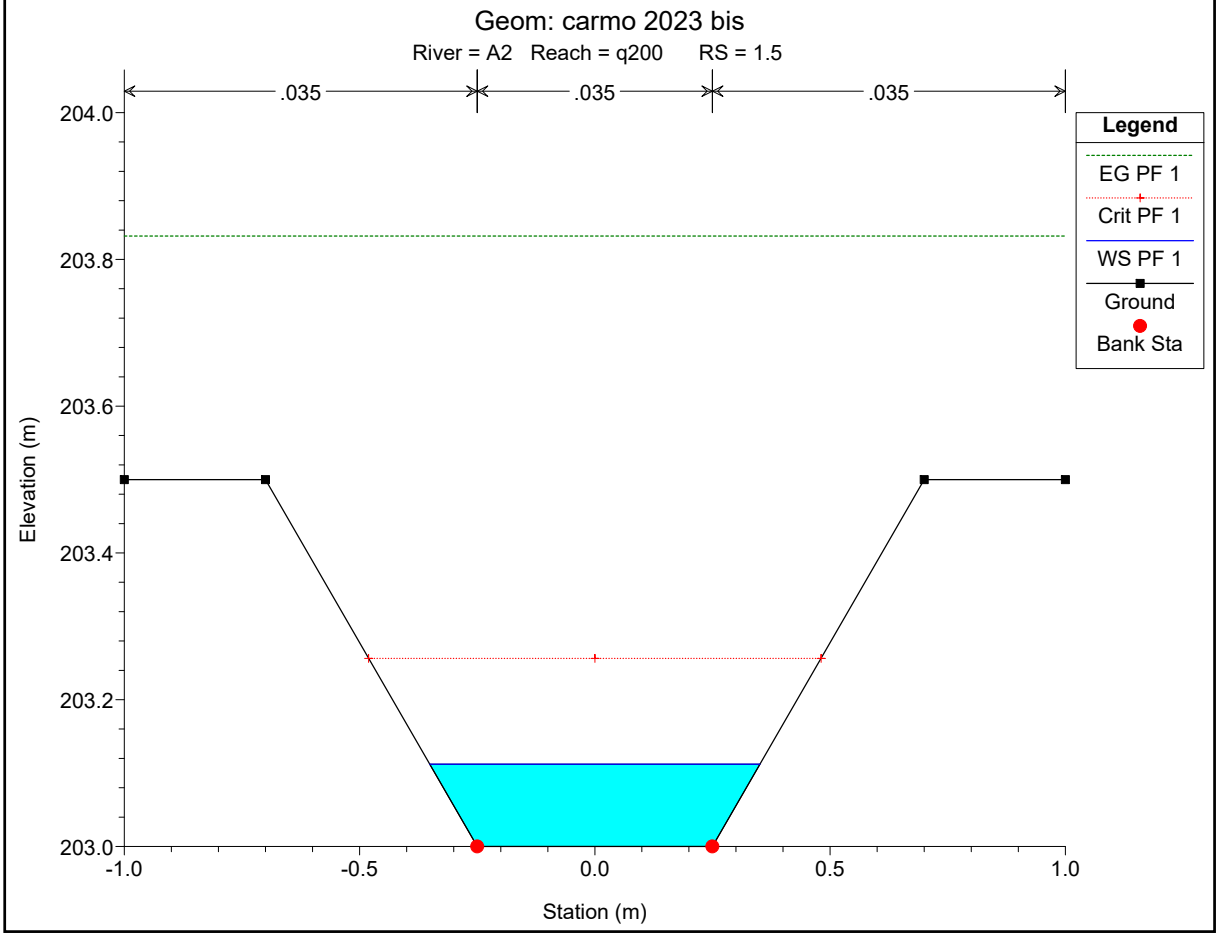

Geom: carmo 2023 bis
River = A1 Reach = q200 RS = 2
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
221.6
221.4
221.2
221.0
220.8
220.6
220.4
220.2
220.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5

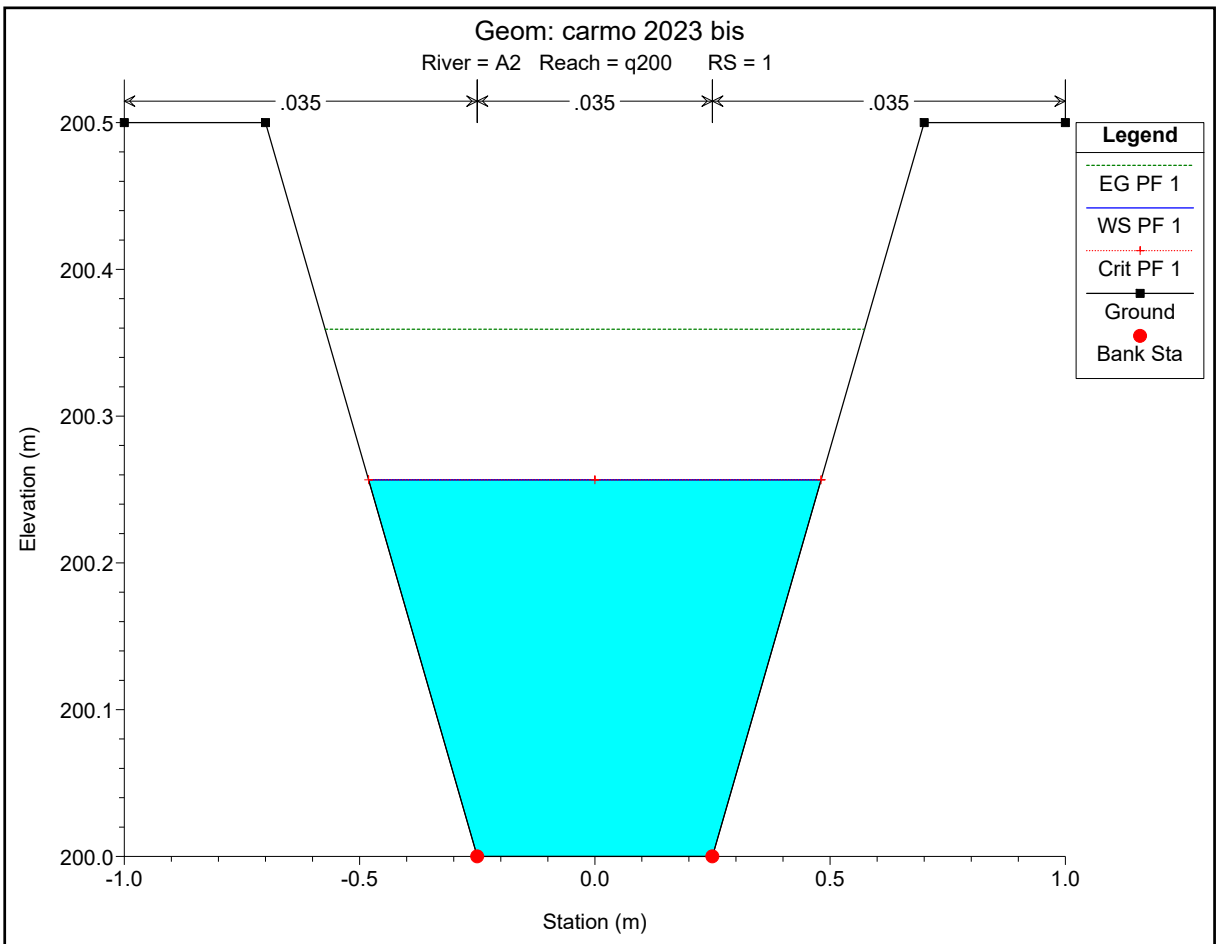

Geom: carmo 2023 bis
River = A1 Reach = q200 RS = 1
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
216.0
215.8
215.6
215.4
215.2
215.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5

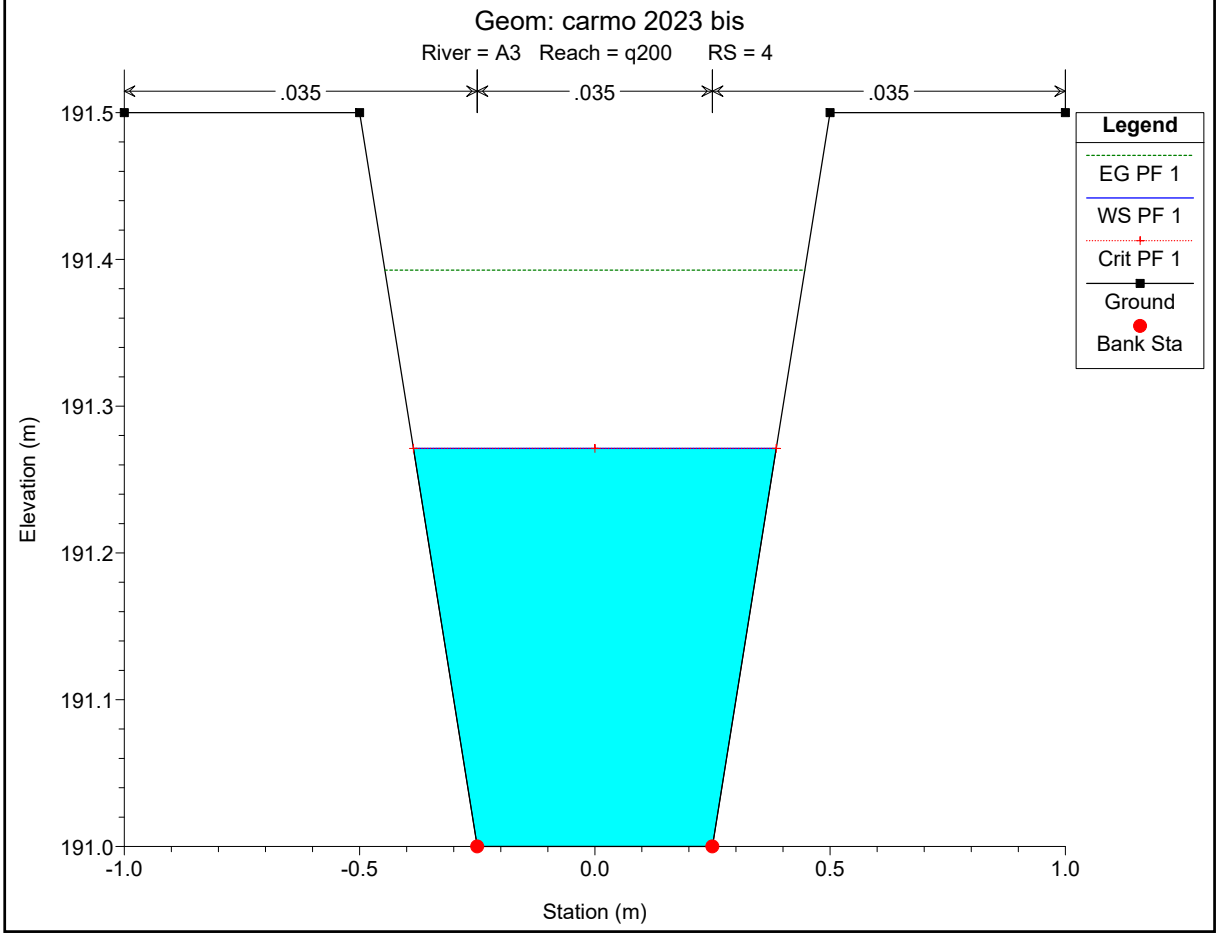

Geom: carmo 2023 bis
River = A2 Reach = q200 RS = 4
.035
.035
.035
211.5
211.4
211.3
211.2
211.1
211.0
Elevation (m)
-1.0
-0.5
0.0
0.5
1.0
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

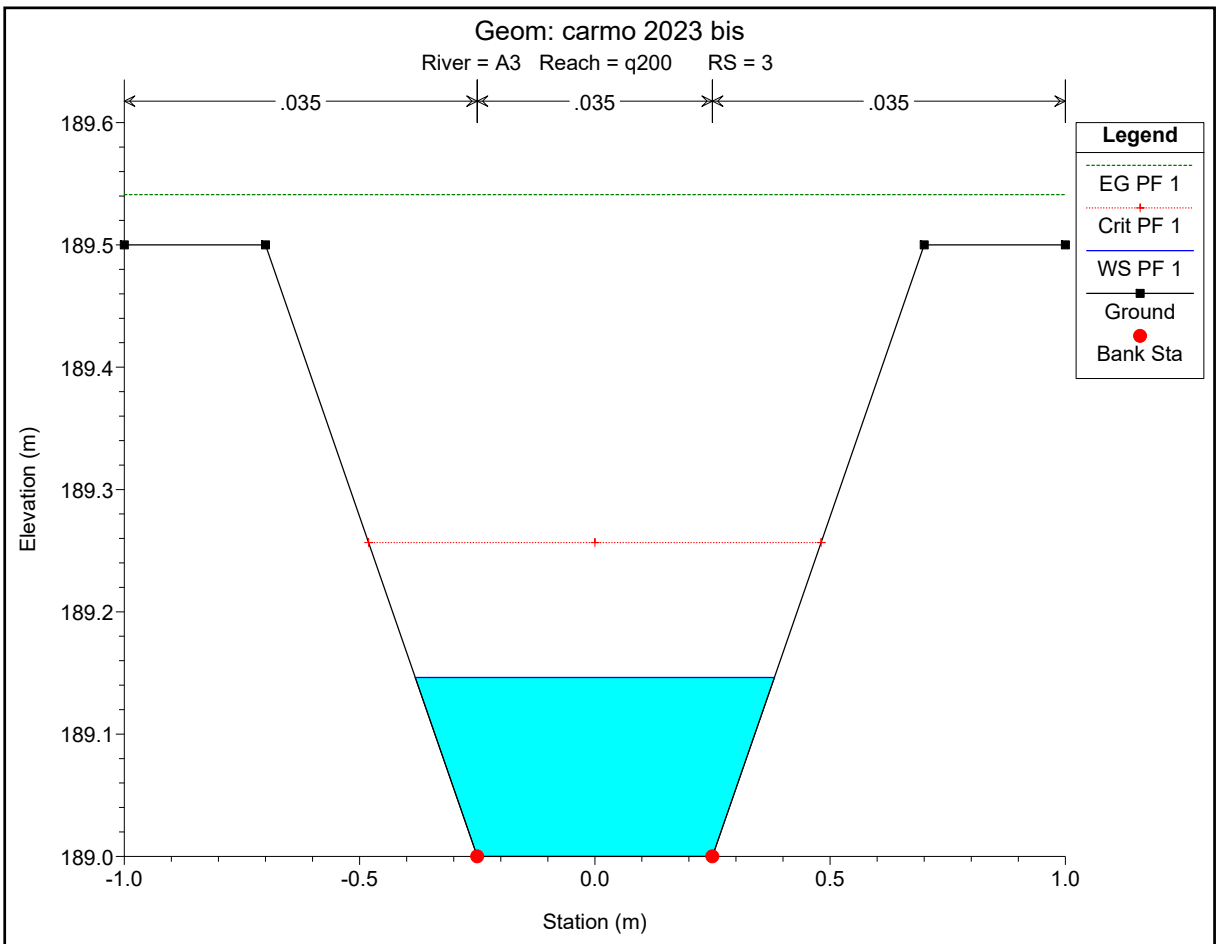

Geom: carmo 2023 bis
River = A2 Reach = q200 RS = 3
.035
.035
.035
208.6
208.5
208.4
208.3
208.2
208.1
208.0
Elevation (m)
-1.0
-0.5
0.0
0.5
1.0
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

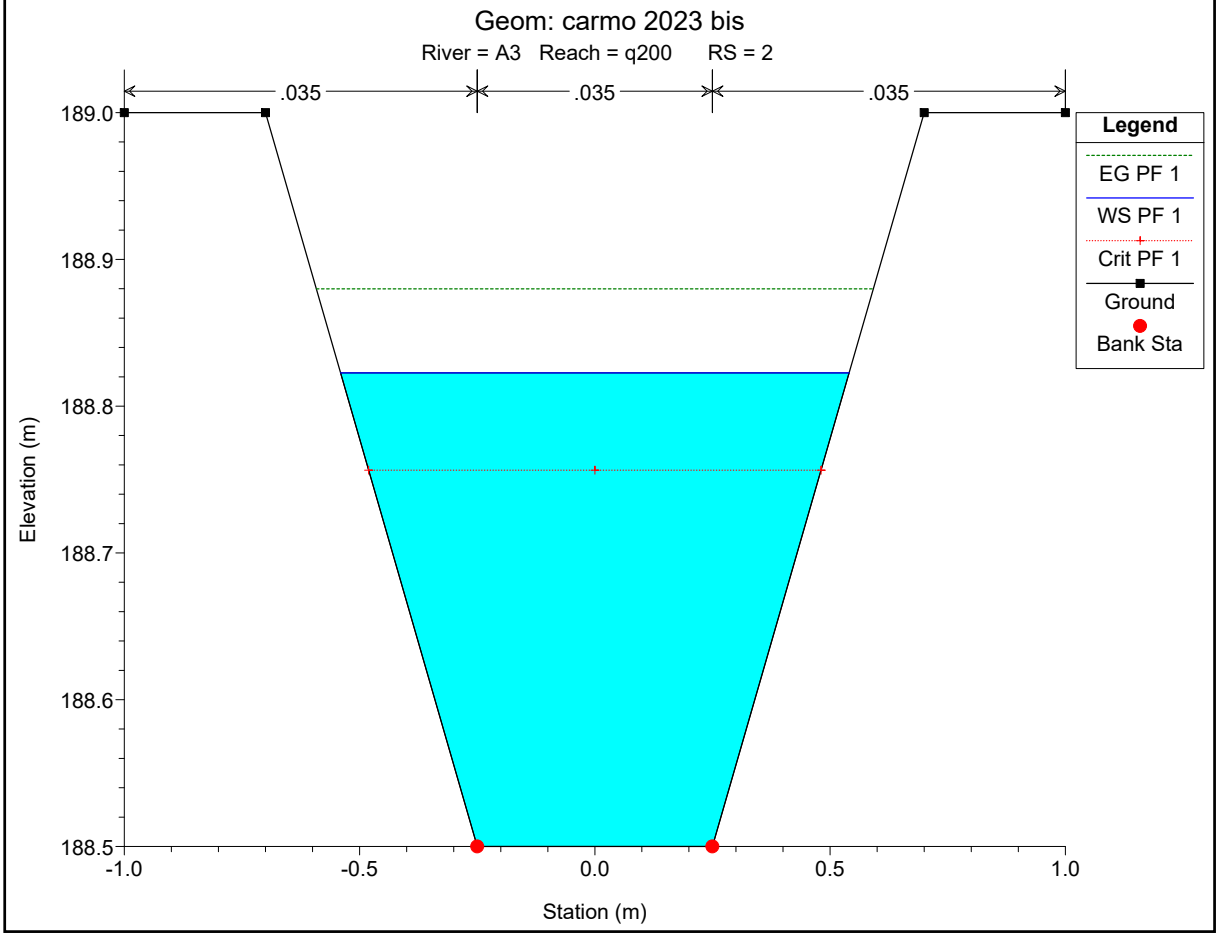

Geom: carmo 2023 bis
River = A2 Reach = q200 RS = 2
.035
.035
.035
207.5
207.4
207.3
207.2
207.1
207.0
Elevation (m)
-1.0
-0.5
0.0
0.5
1.0
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

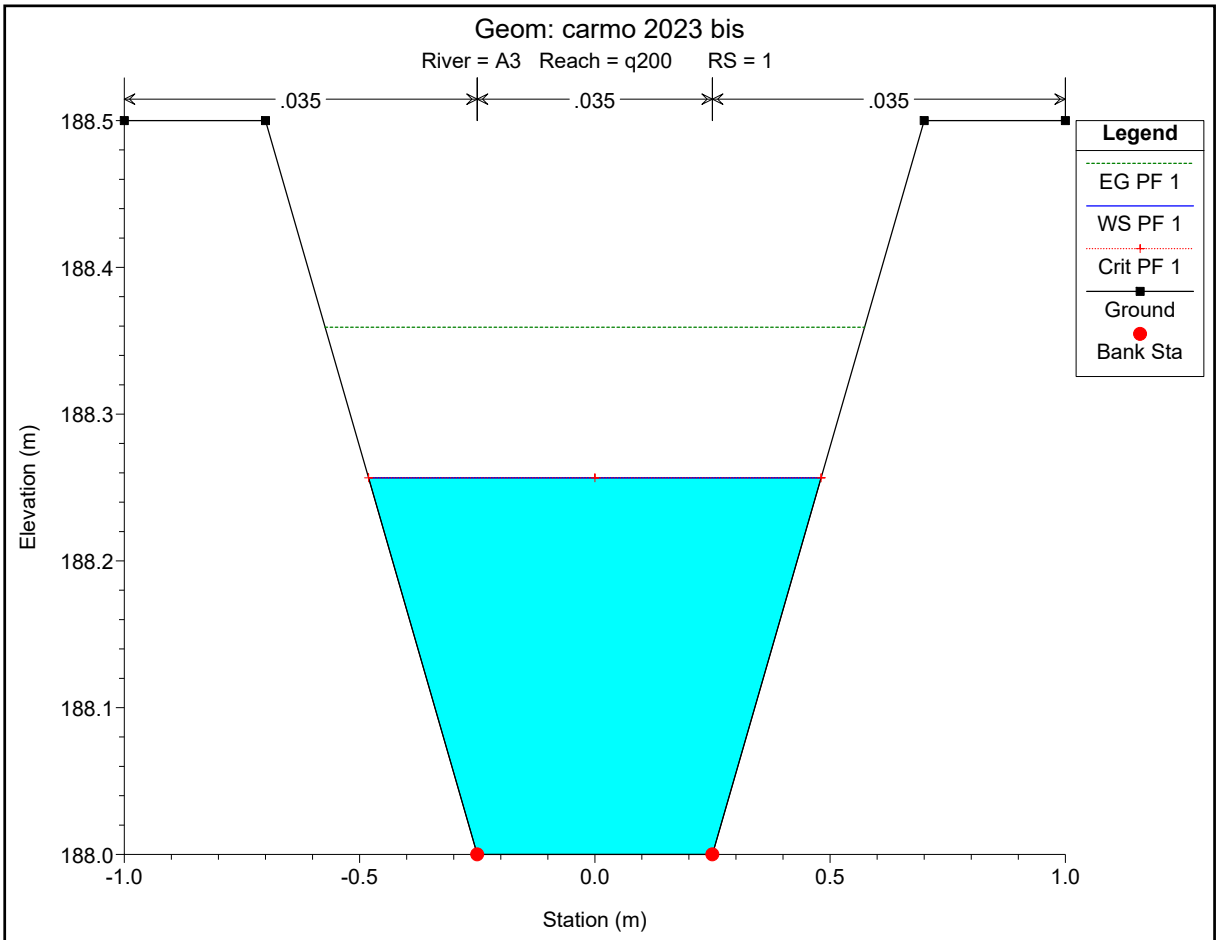

Geom: carmo 2023 bis
River = A2 Reach = q200 RS = 1.5
.035
.035
.035
204.0
203.8
203.6
203.4
203.2
203.0
Elevation (m)
-1.0
-0.5
0.0
0.5
1.0
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

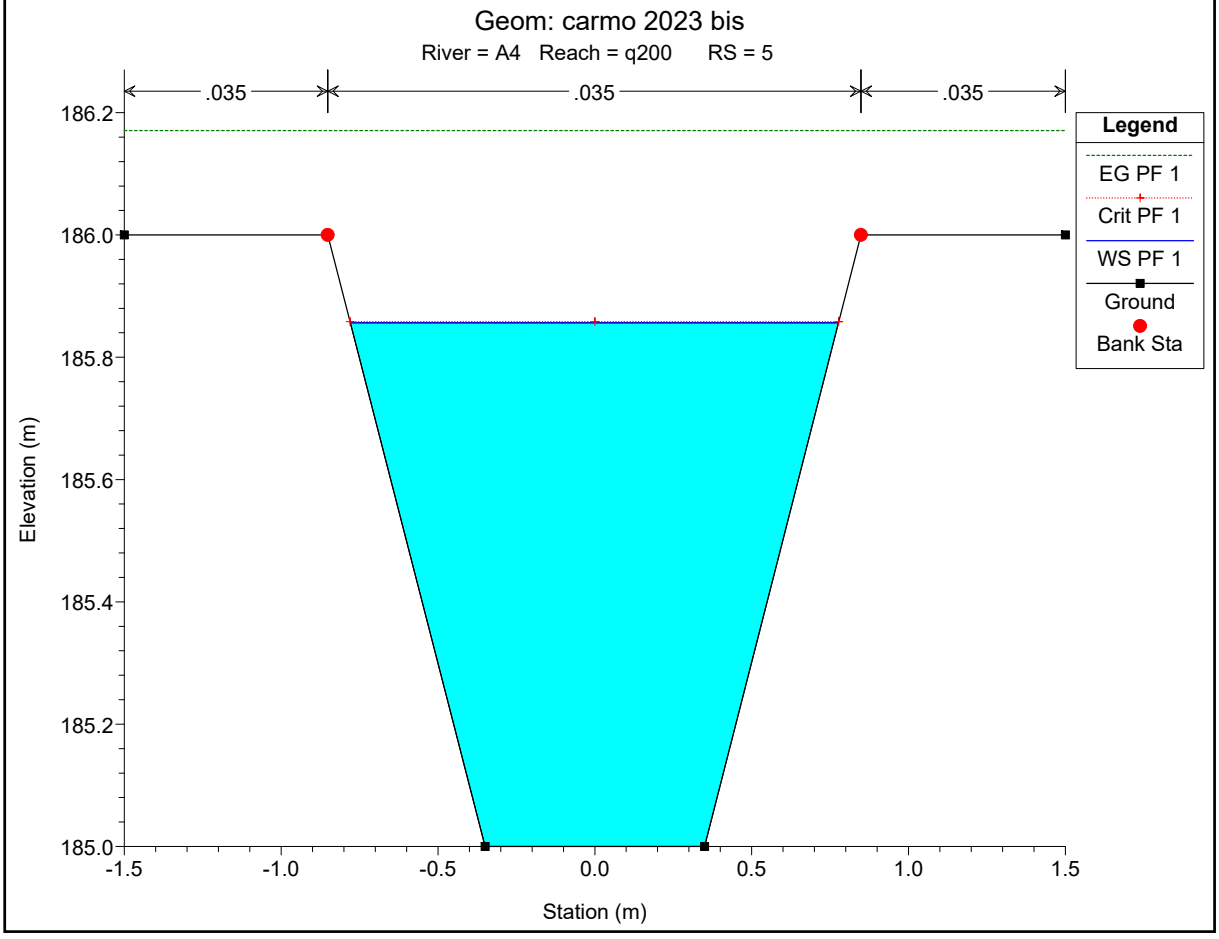

Geom: carmo 2023 bis
River = A2 Reach = q200 RS = 1
.035
.035
.035
200.5
200.4
200.3
200.2
200.1
200.0
Elevation (m)
-1.0
-0.5
0.0
0.5
1.0
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

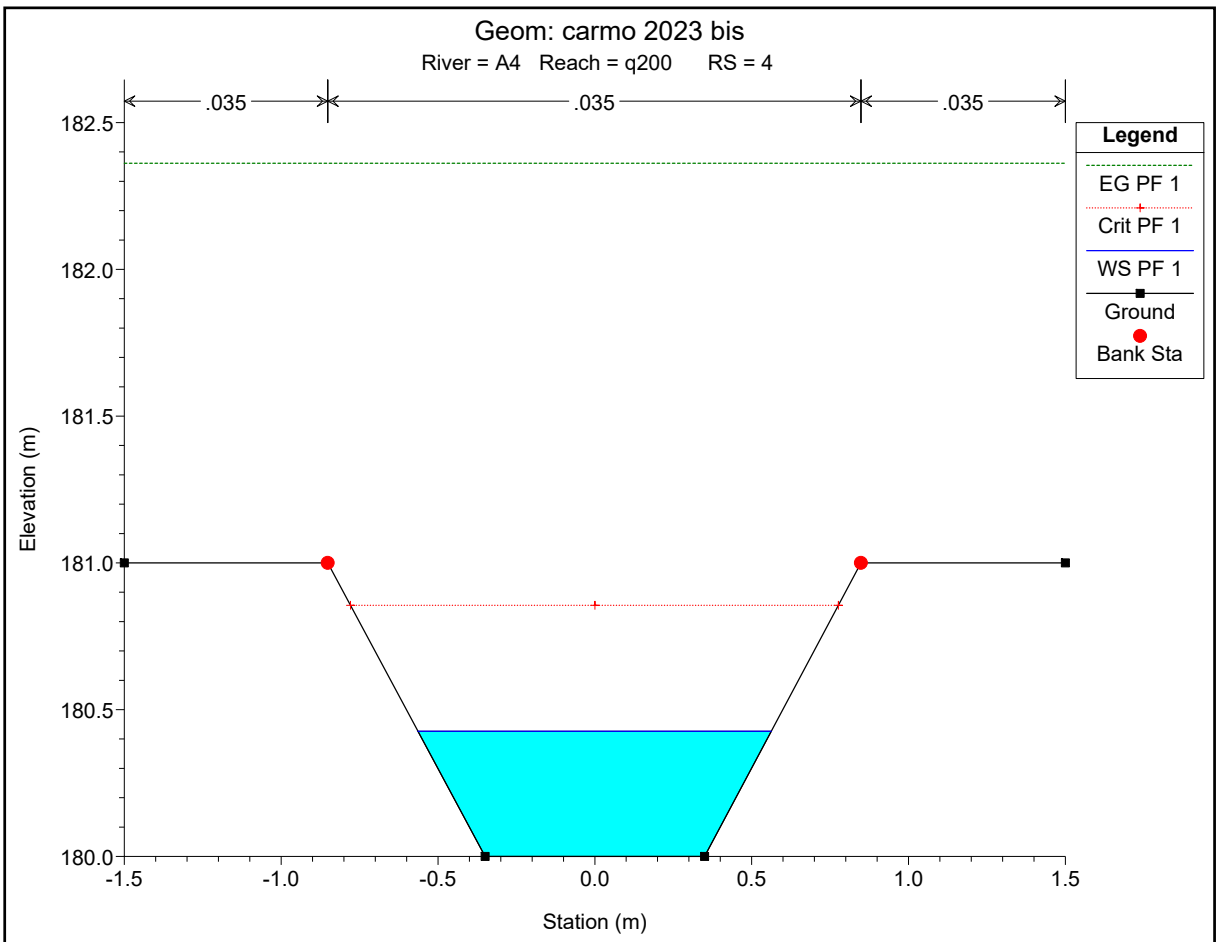

Geom: carmo 2023 bis
River = A3 Reach = q200 RS = 4
.035
.035
.035
191.5
191.4
191.3
191.2
191.1
191.0
Elevation (m)
-1.0
-0.5
0.0
0.5
1.0
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

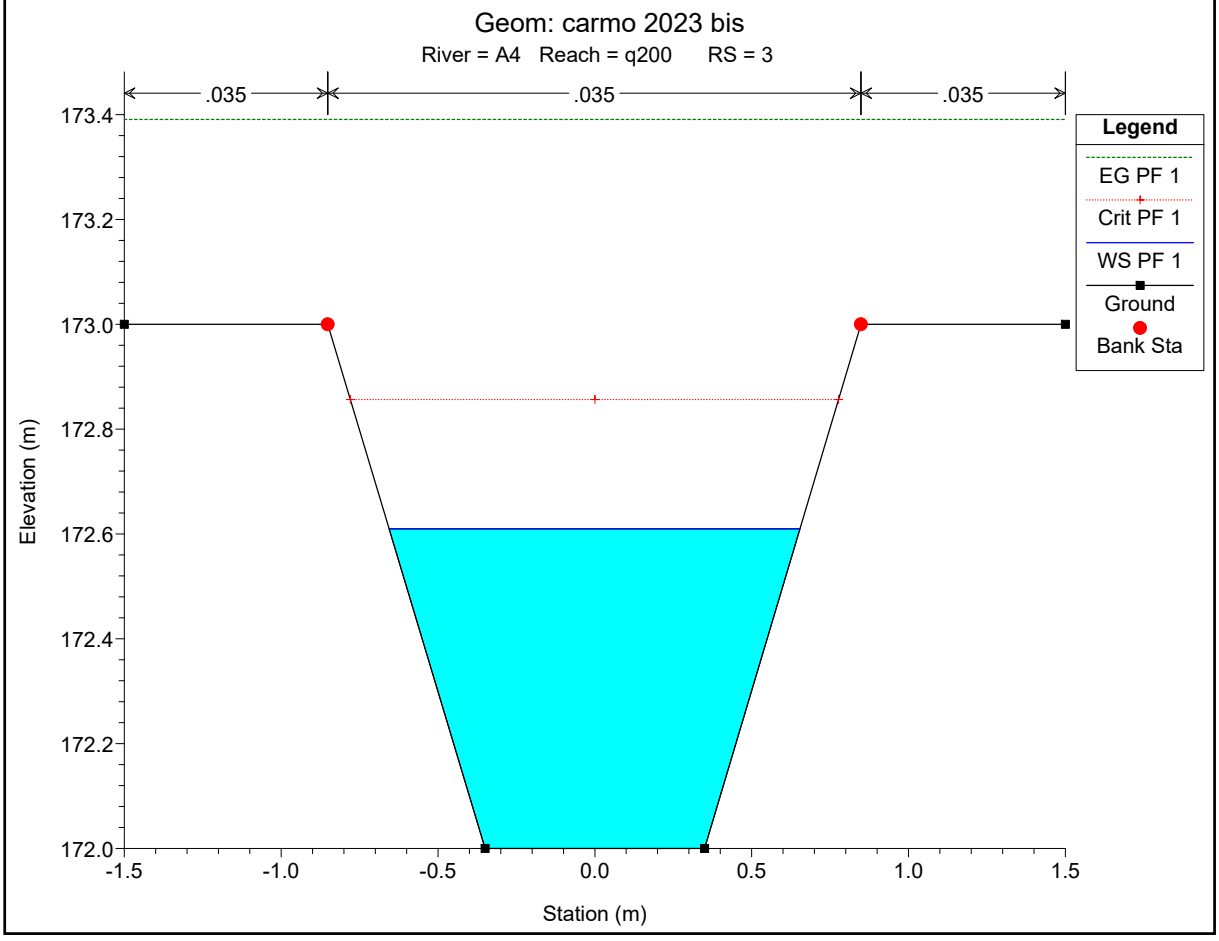

Geom: carmo 2023 bis
River = A3 Reach = q200 RS = 3
.035
.035
.035
189.6
189.5
189.4
189.3
189.2
189.1
189.0
Elevation (m)
-1.0
-0.5
0.0
0.5
1.0
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

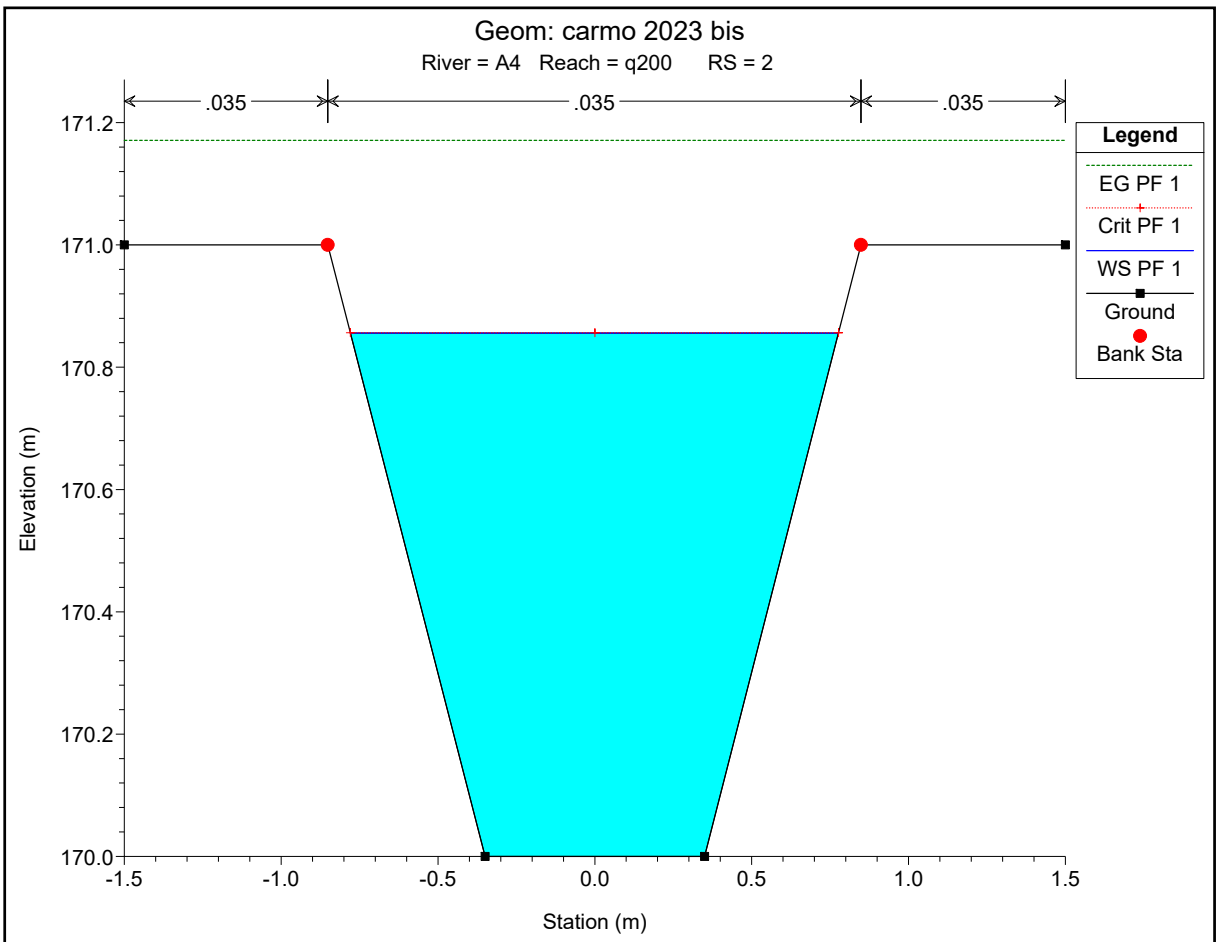

Geom: carmo 2023 bis
River = A3 Reach = q200 RS = 2
.035
.035
.035
189.0
188.9
188.8
188.7
188.6
188.5
Elevation (m)
-1.0
-0.5
0.0
0.5
1.0
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

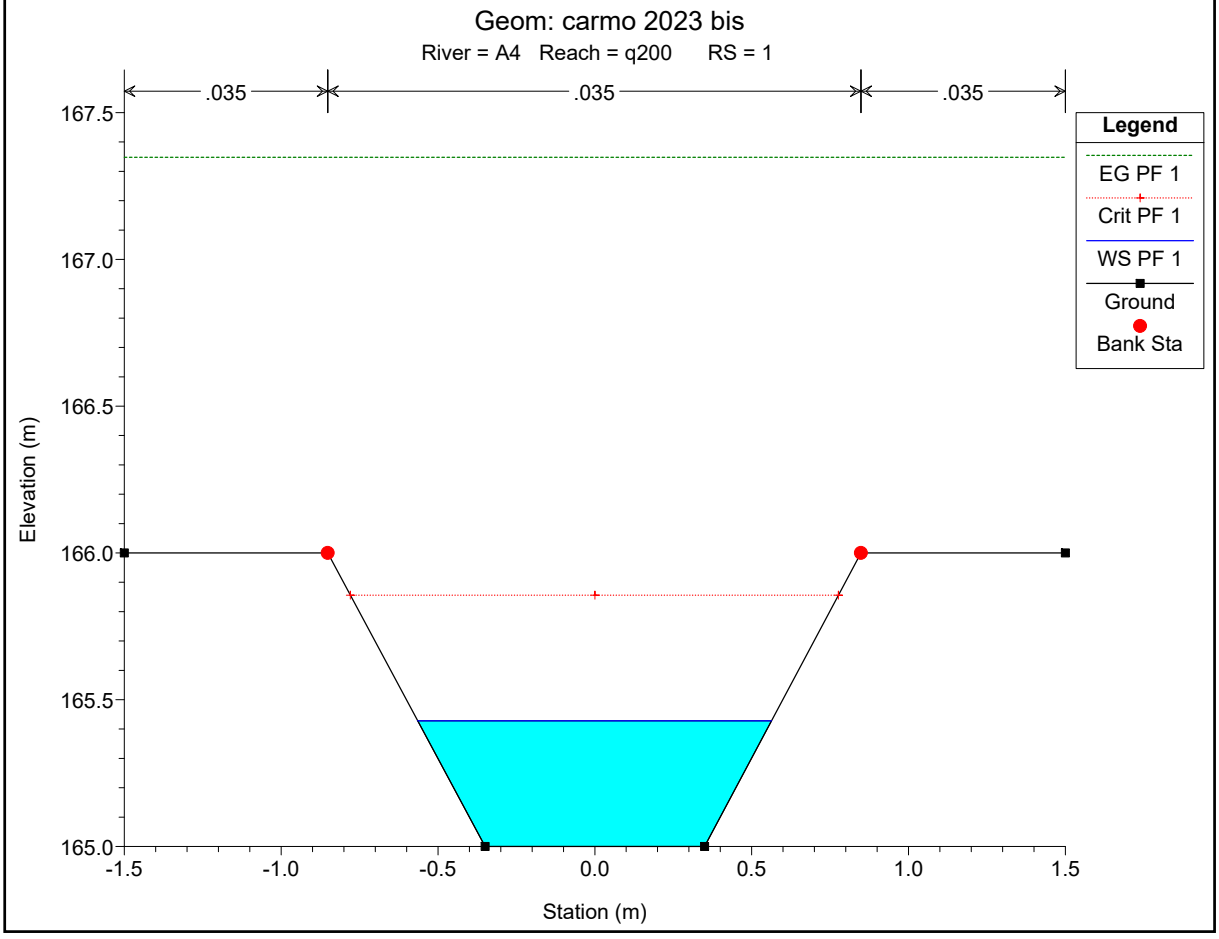

Geom: carmo 2023 bis
River = A3 Reach = q200 RS = 1
.035
.035
.035
188.5
188.4
188.3
188.2
188.1
188.0
Elevation (m)
-1.0
-0.5
0.0
0.5
1.0
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

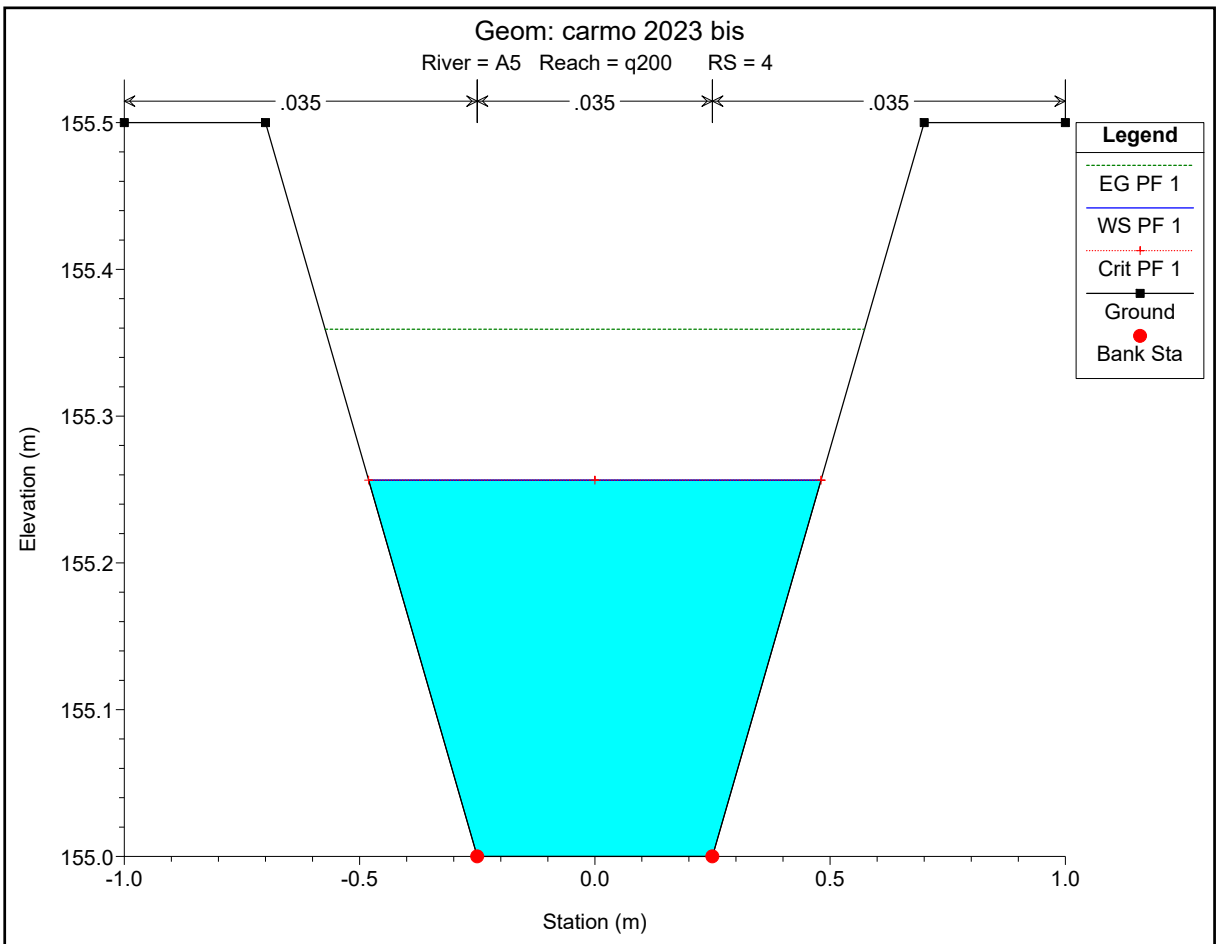

Geom: carmo 2023 bis
River = A4 Reach = q200 RS = 5
.035
.035
.035
186.2
186.0
185.8
185.6
185.4
185.2
185.0
Elevation (m)
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

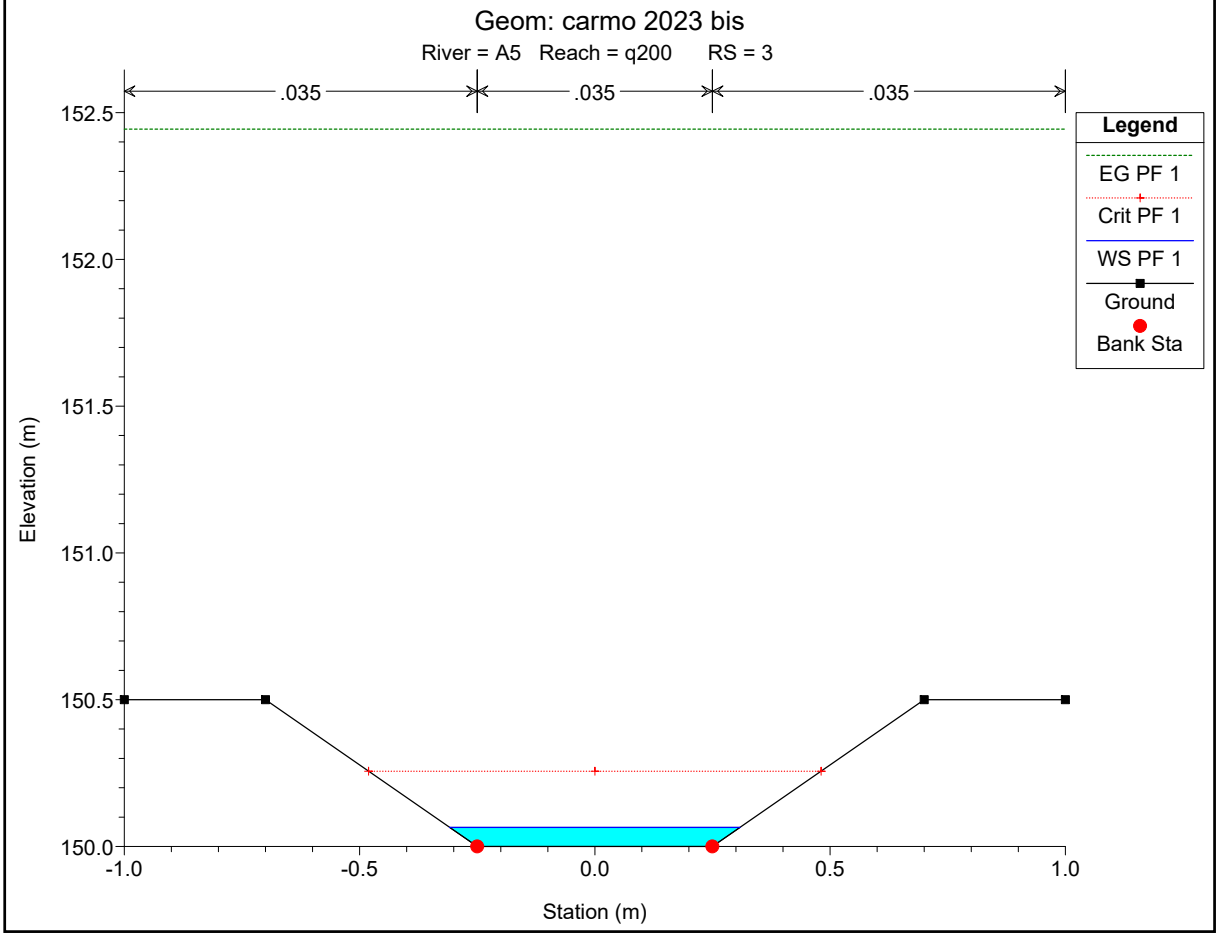

Geom: carmo 2023 bis
River = A4 Reach = q200 RS = 4
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
182.5
182.0
181.5
181.0
180.5
180.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
Station (m)

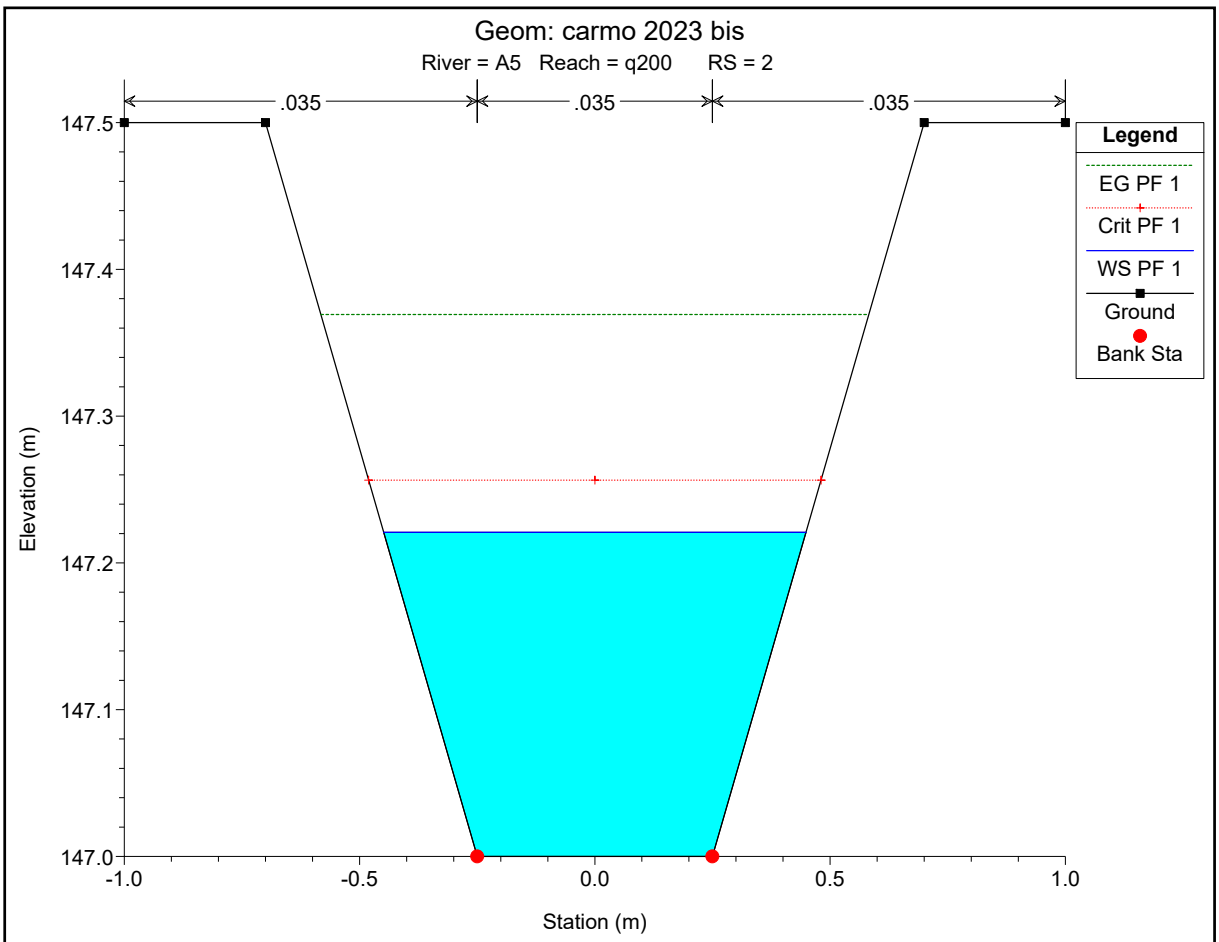

Geom: carmo 2023 bis
River = A4 Reach = q200 RS = 3
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
173.4
173.2
173.0
172.8
172.6
172.4
172.2
172.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
Station (m)

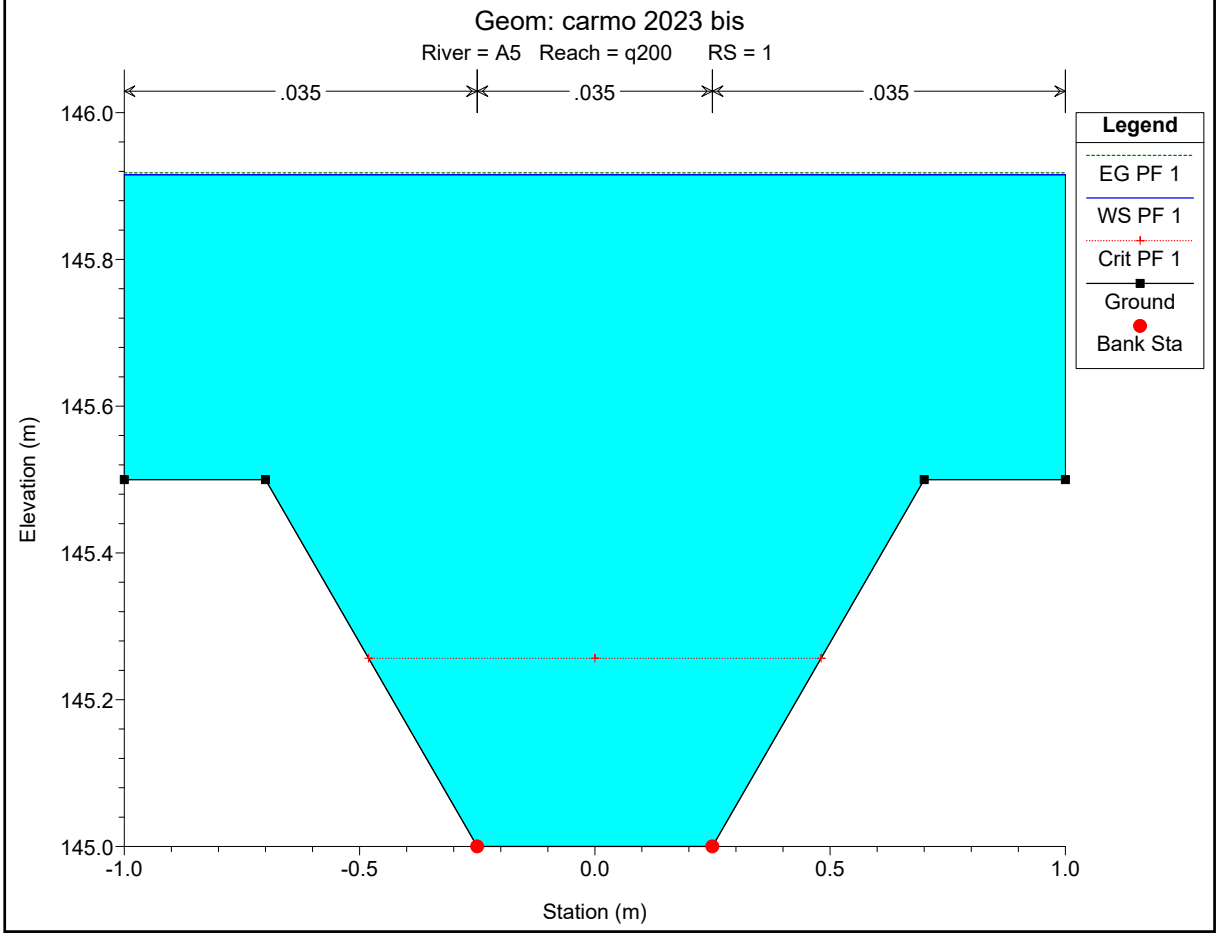

Geom: carmo 2023 bis
River = A4 Reach = q200 RS = 2
.035
.035
.035
171.2
171.0
170.8
170.6
170.4
170.2
170.0
Elevation (m)
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

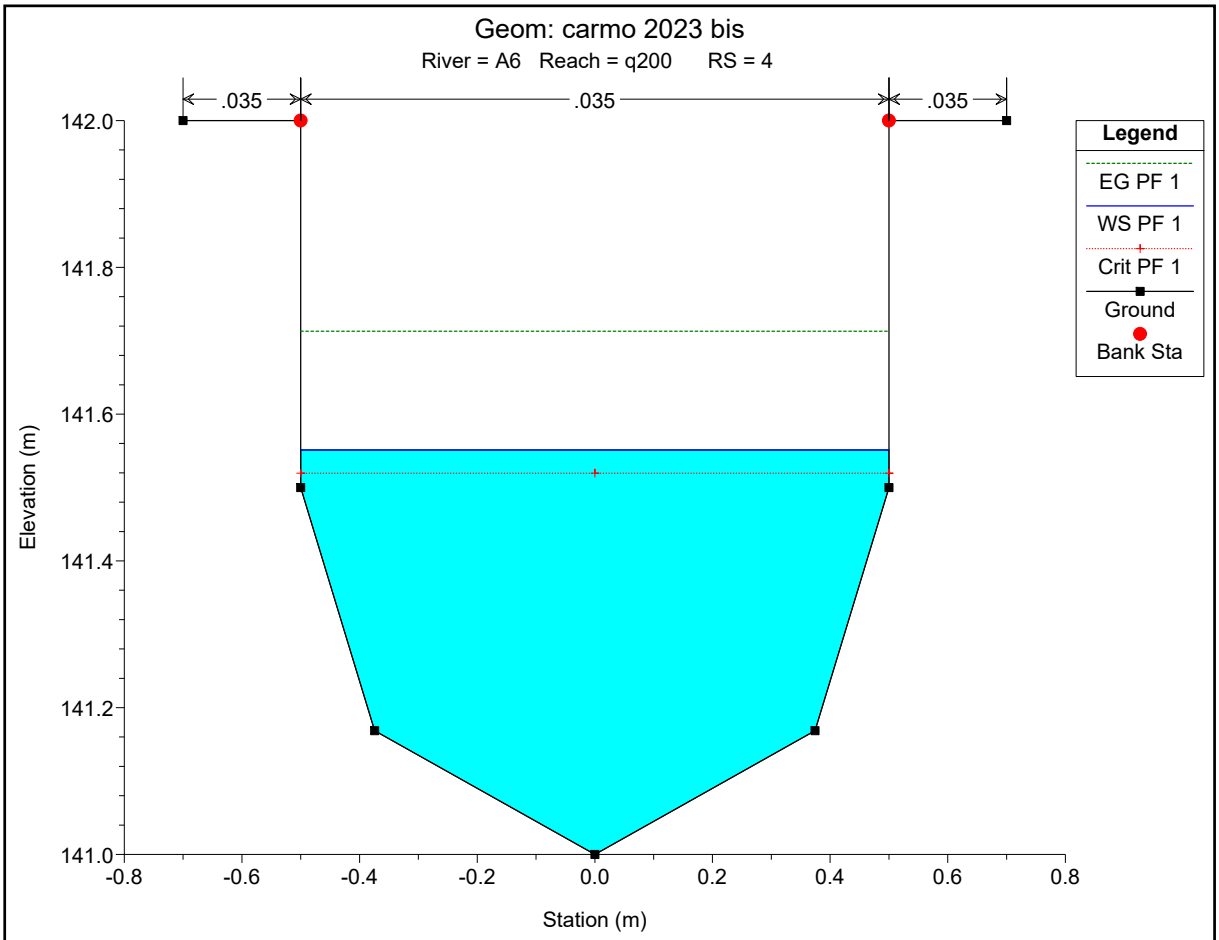

Geom: carmo 2023 bis
River = A4 Reach = q200 RS = 1
.035
.035
.035
167.5
167.0
166.5
166.0
165.5
165.0
Elevation (m)
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

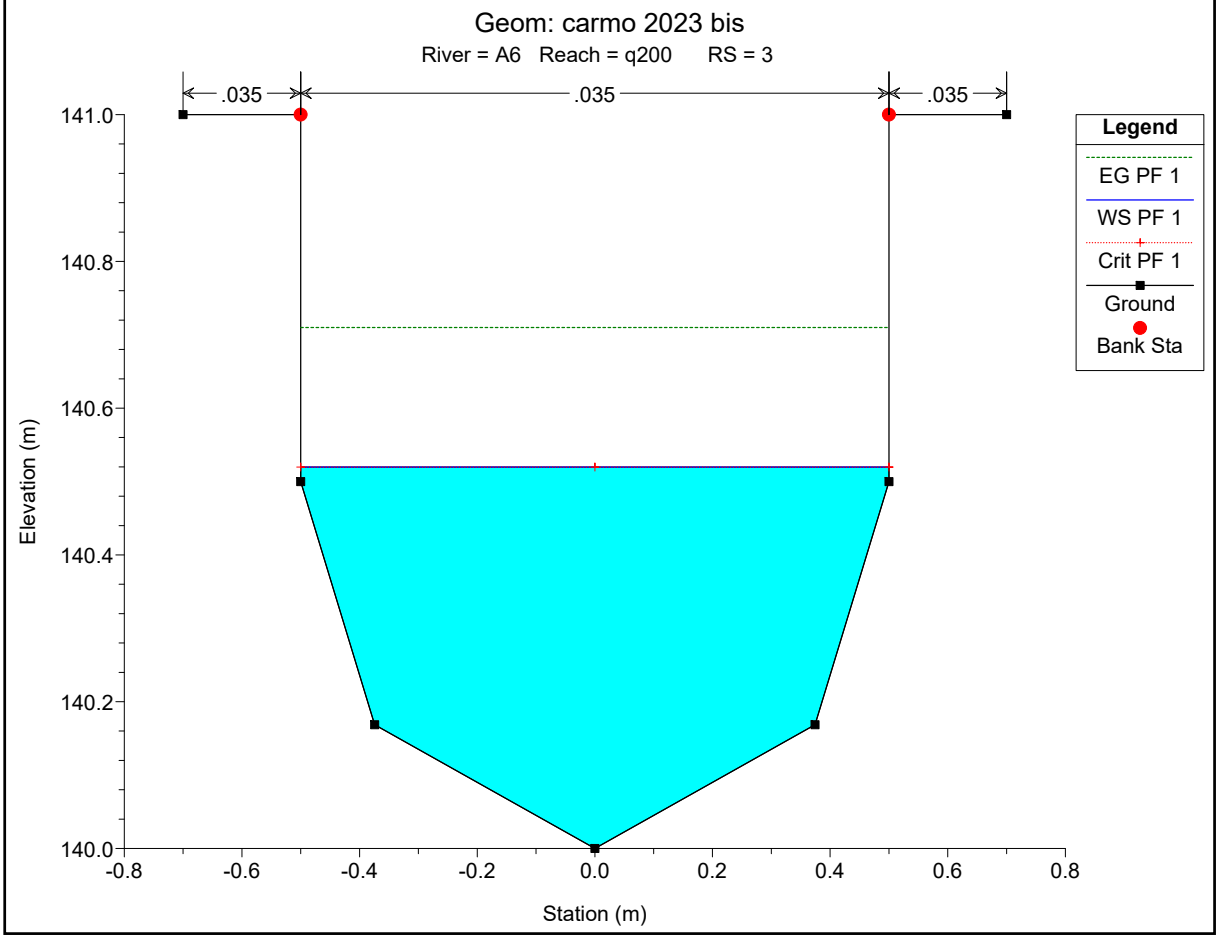

Geom: carmo 2023 bis
River = A5 Reach = q200 RS = 4
.035
.035
.035
155.5
155.4
155.3
155.2
155.1
155.0
Elevation (m)
-1.0
-0.5
0.0
0.5
1.0
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

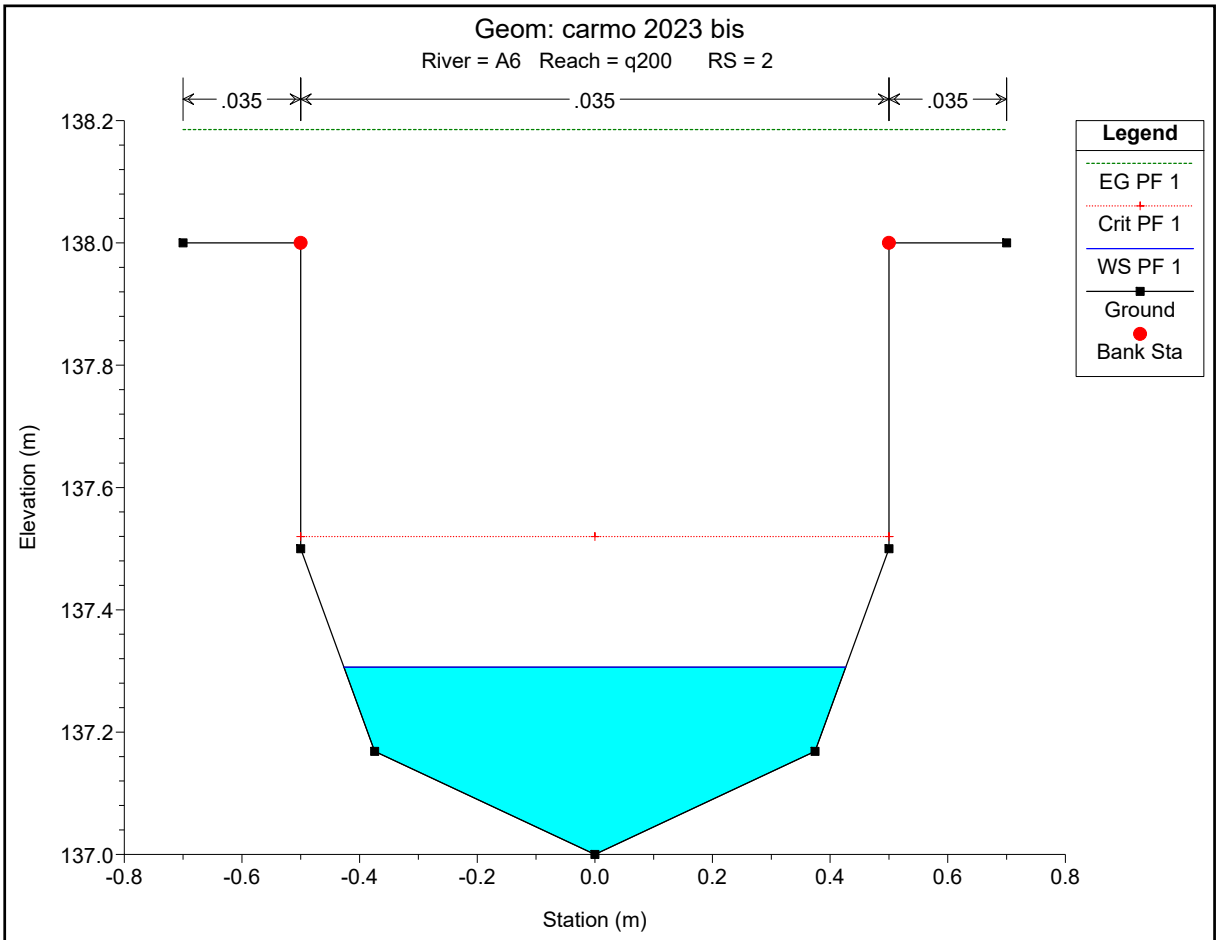

Geom: carmo 2023 bis
River = A5 Reach = q200 RS = 3
.035
.035
.035
152.5
152.0
151.5
151.0
150.5
150.0
Elevation (m)
-1.0
-0.5
0.0
0.5
1.0
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

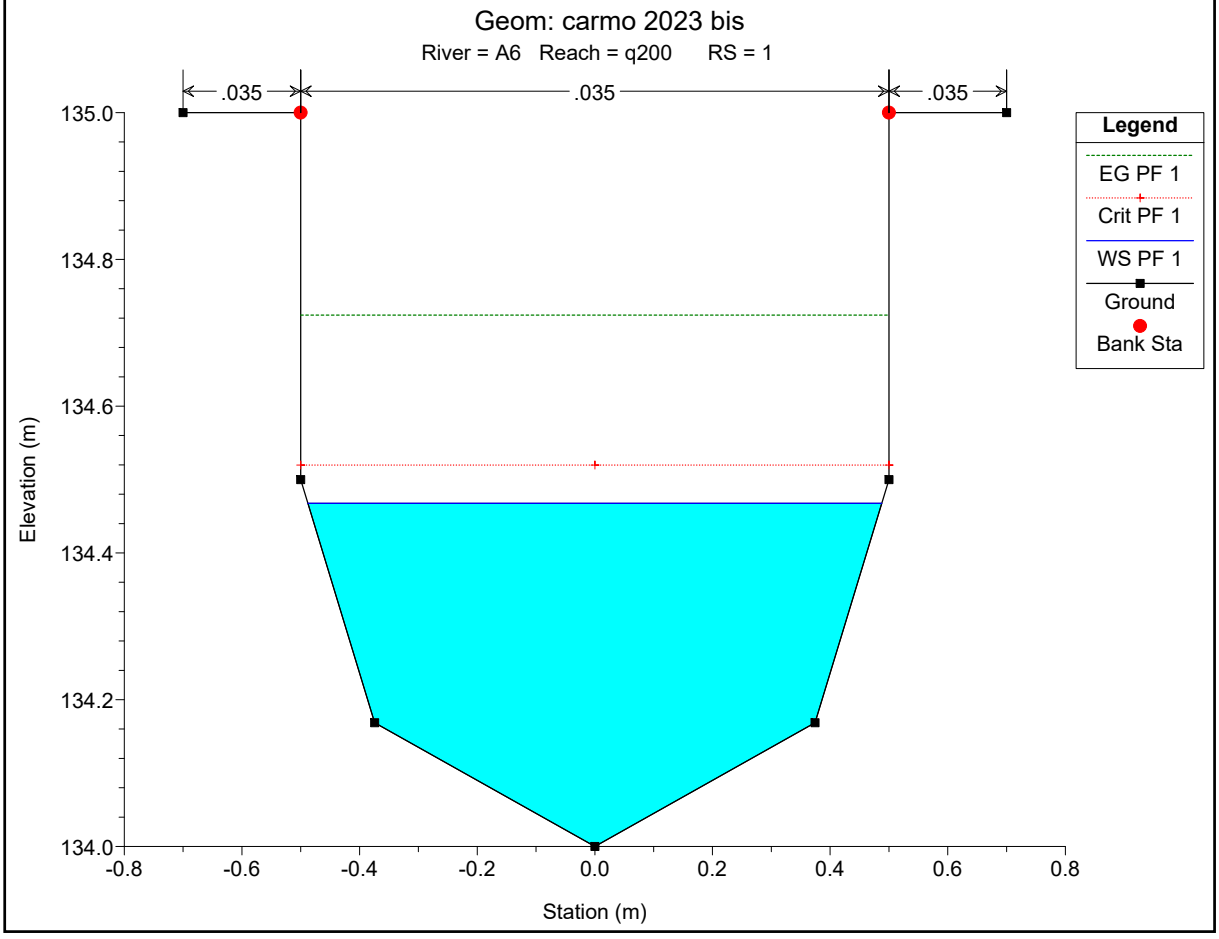

Geom: carmo 2023 bis
River = A5 Reach = q200 RS = 2
.035
.035
.035
147.5
147.4
147.3
147.2
147.1
147.0
Elevation (m)
-1.0
-0.5
0.0
0.5
1.0
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

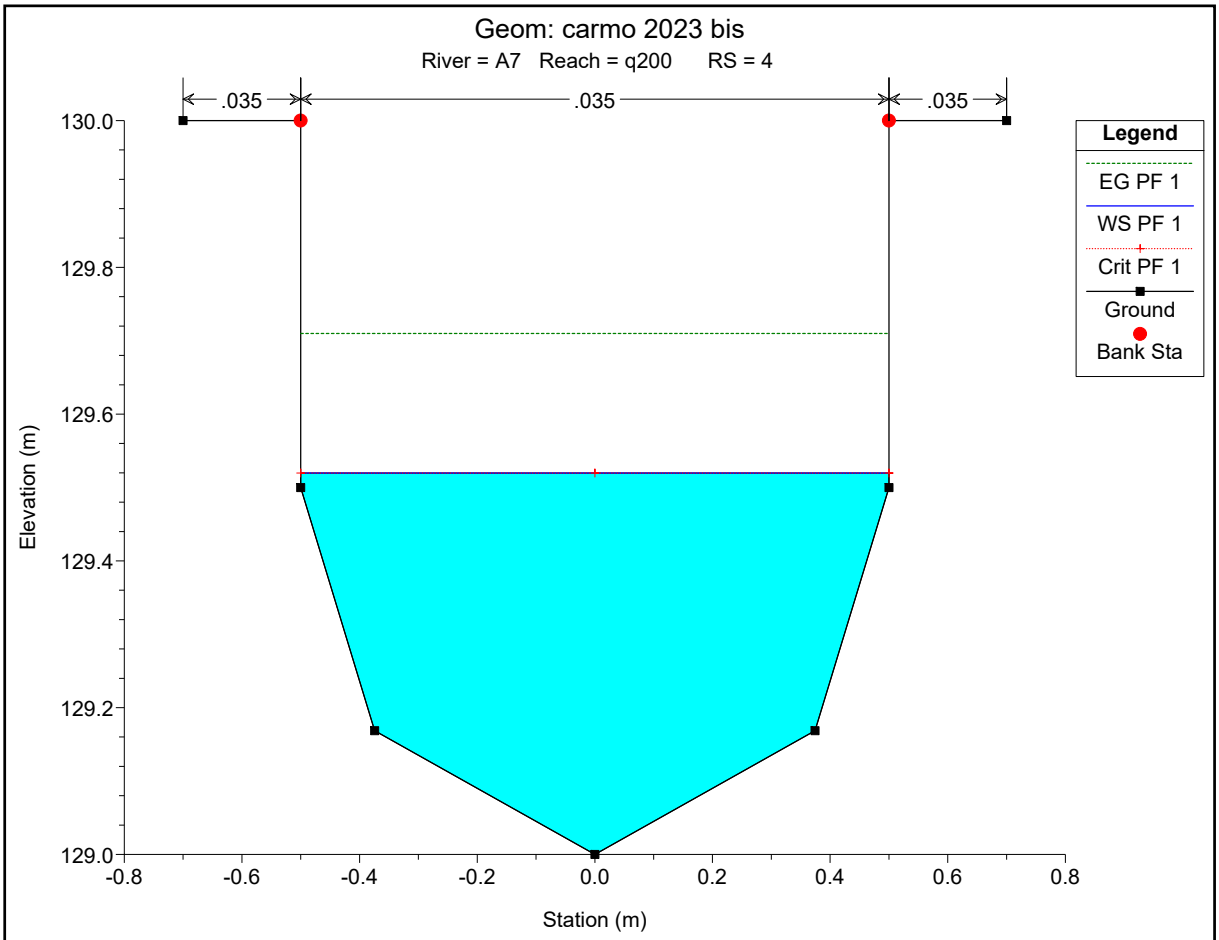

Geom: carmo 2023 bis
River = A5 Reach = q200 RS = 1
.035
.035
.035
146.0
145.8
145.6
145.4
145.2
145.0
Elevation (m)
-1.0
-0.5
0.0
0.5
1.0
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

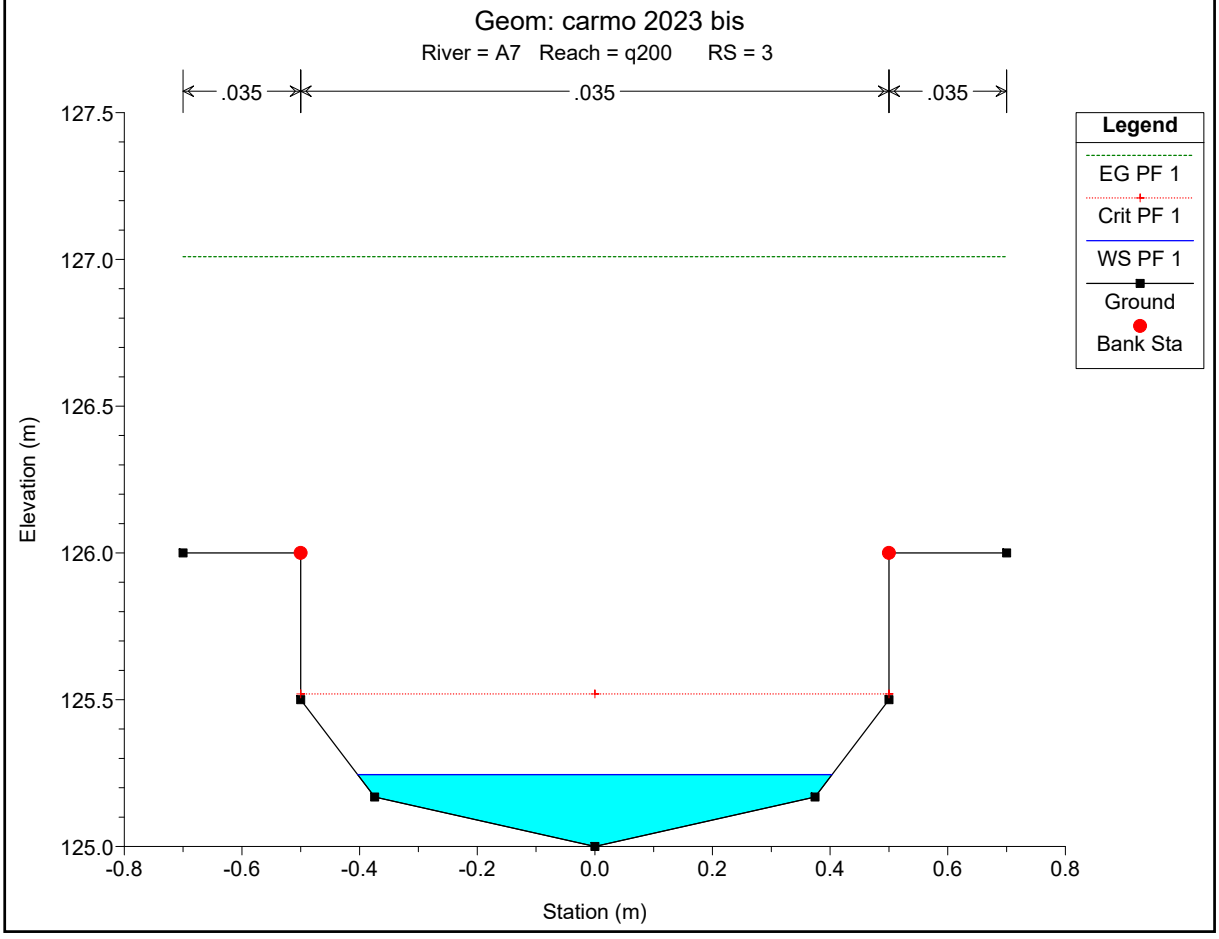

Geom: carmo 2023 bis
River = A6 Reach = q200 RS = 4
.035
.035
.035
142.0
141.8
141.6
141.4
141.2
141.0
Elevation (m)
-0.8
-0.6
-0.4
-0.2
0.0
0.2
0.4
0.6
0.8
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

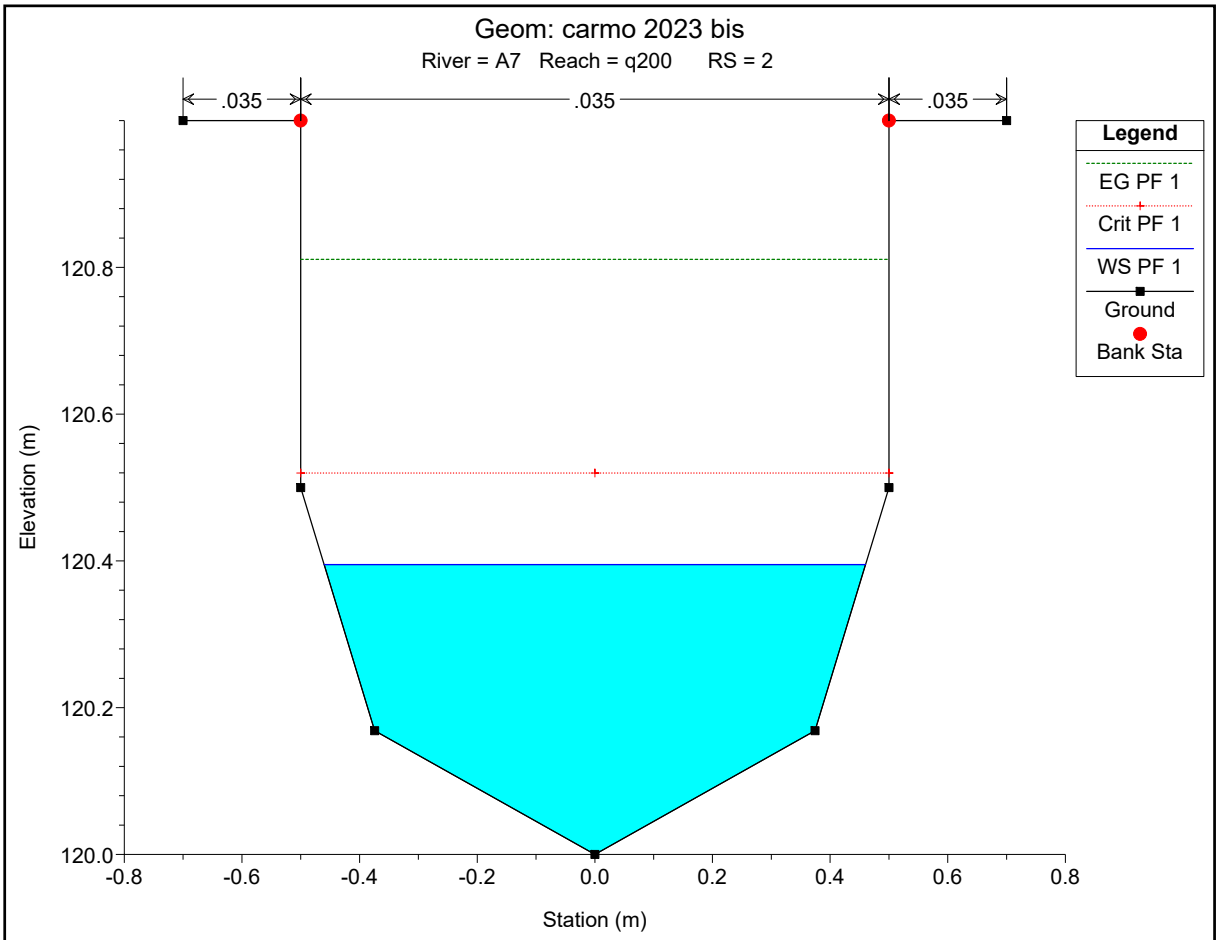

Geom: carmo 2023 bis
River = A6 Reach = q200 RS = 3
.035
.035
.035
141.0
140.8
140.6
140.4
140.2
140.0
Elevation (m)
-0.8
-0.6
-0.4
-0.2
0.0
0.2
0.4
0.6
0.8
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

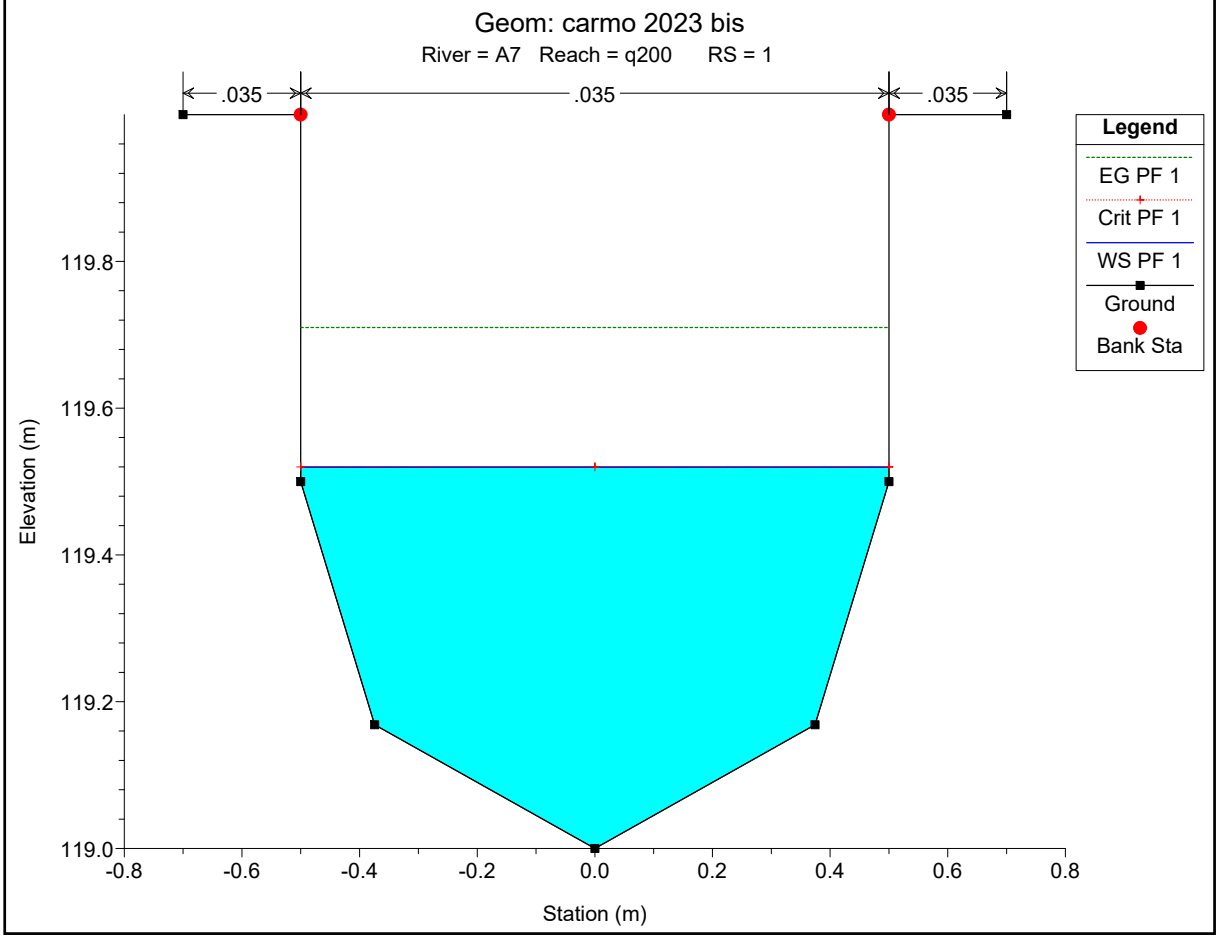

Geom: carmo 2023 bis
River = A6 Reach = q200 RS = 2
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
138.2
138.0
137.8
137.6
137.4
137.2
137.0
-0.8
-0.6
-0.4
-0.2
0.0
0.2
0.4
0.6
0.8
Station (m)

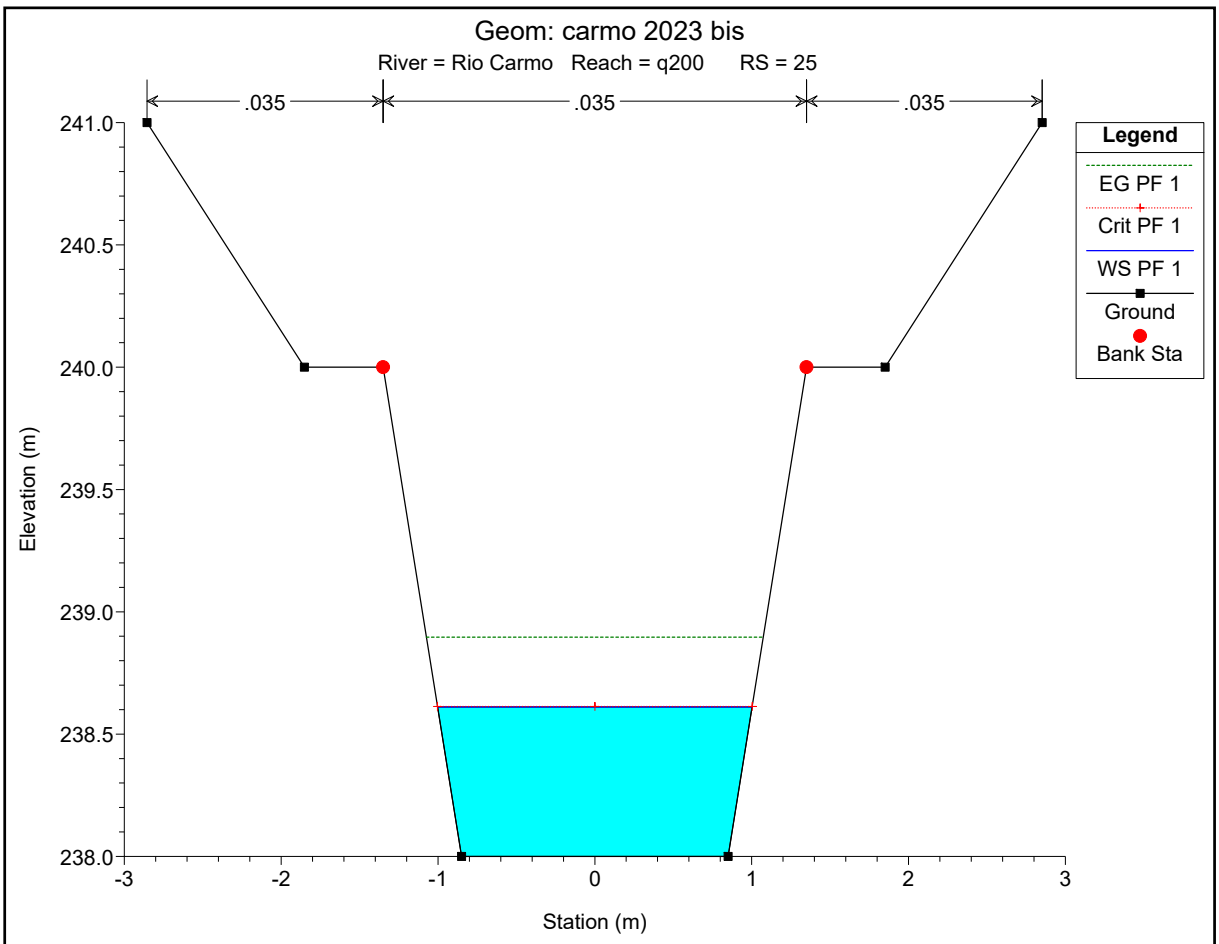

Geom: carmo 2023 bis
River = A6 Reach = q200 RS = 1
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
135.0
134.8
134.6
134.4
134.2
134.0
-0.8
-0.6
-0.4
-0.2
0.0
0.2
0.4
0.6
0.8
Station (m)

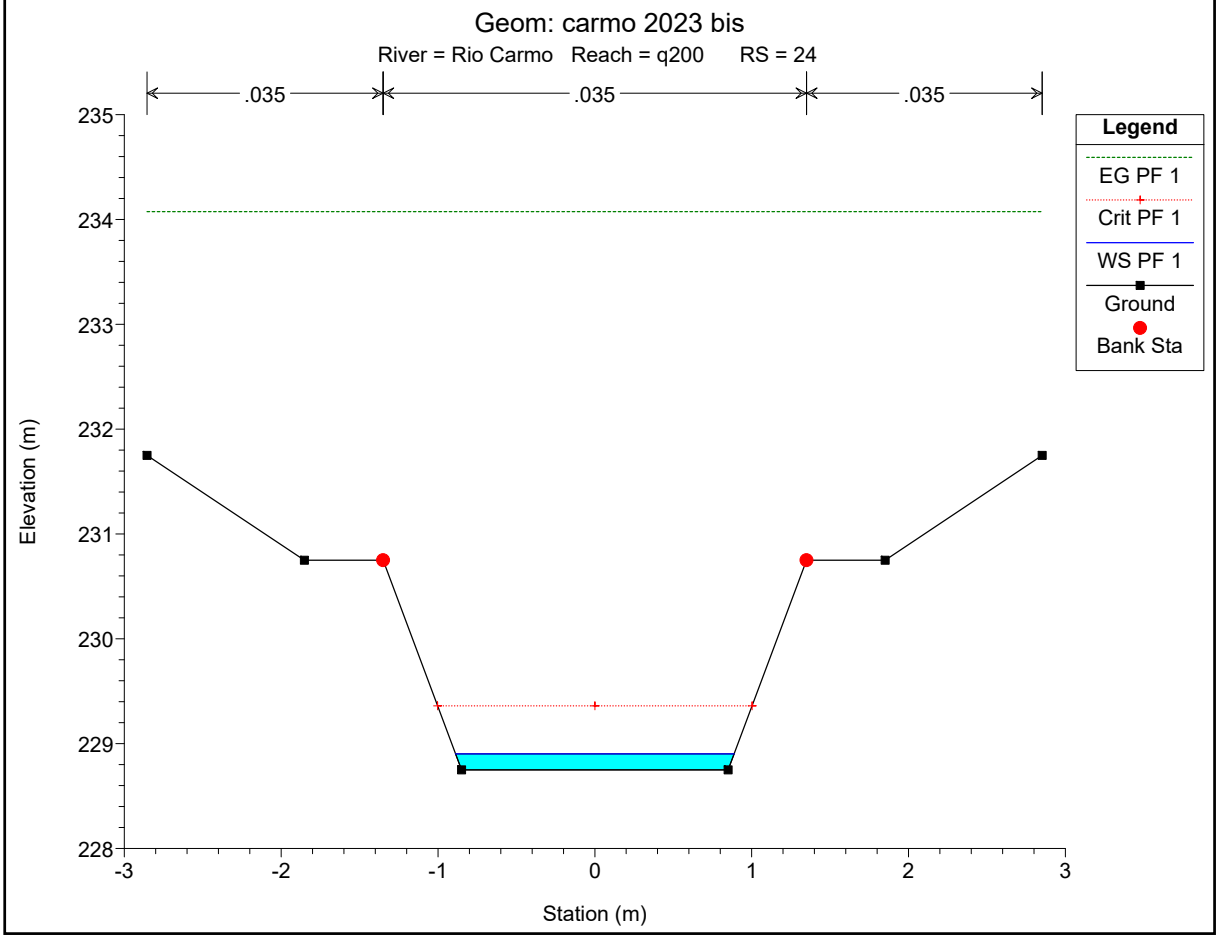

Geom: carmo 2023 bis
River = A7 Reach = q200 RS = 4
.035
.035
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
130.0
129.8
129.6
129.4
129.2
129.0
-0.8
-0.6
-0.4
-0.2
0.0
0.2
0.4
0.6
0.8
Station (m)

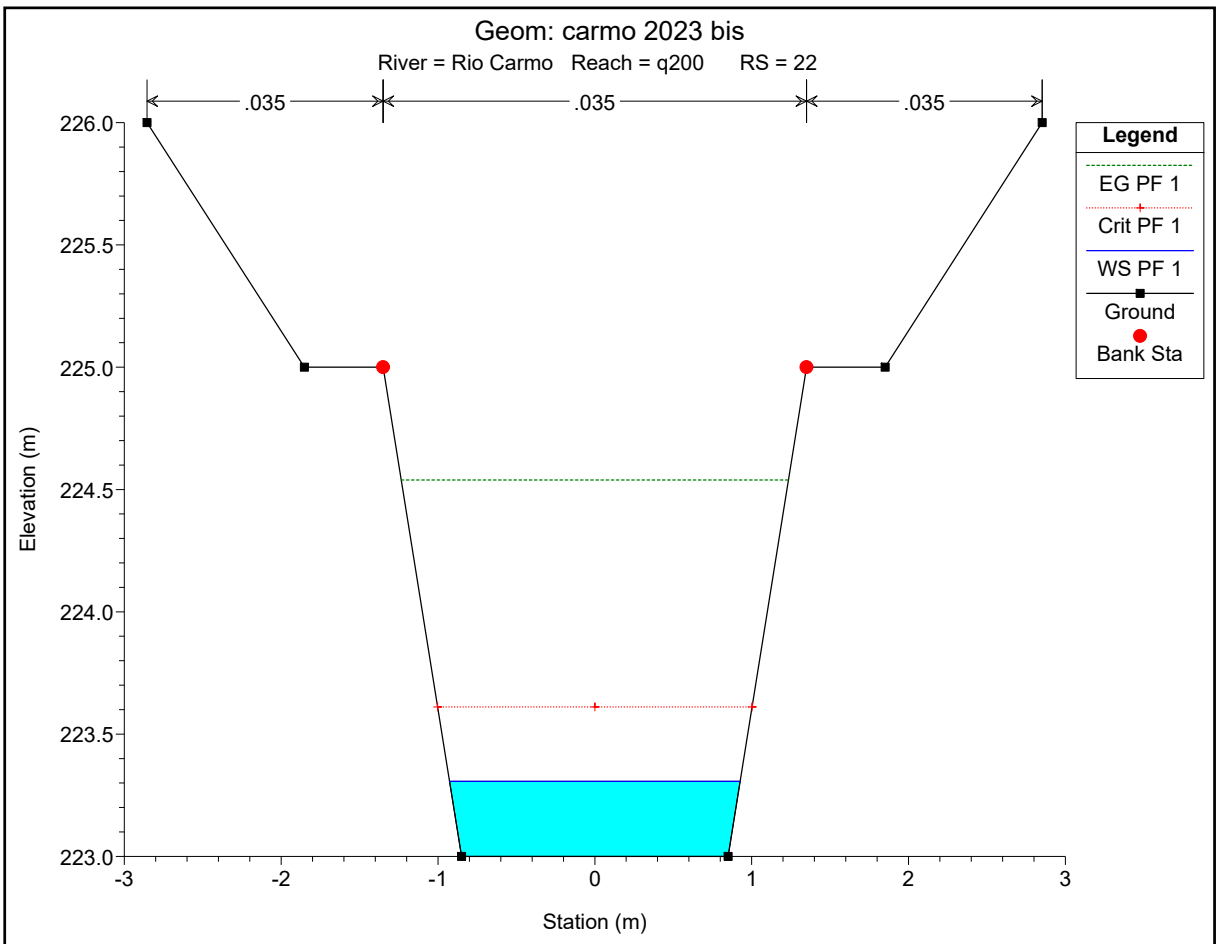

Geom: carmo 2023 bis
River = A7 Reach = q200 RS = 3
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
127.5
127.0
126.5
126.0
125.5
125.0
-0.8
-0.6
-0.4
-0.2
0.0
0.2
0.4
0.6
0.8
Station (m)

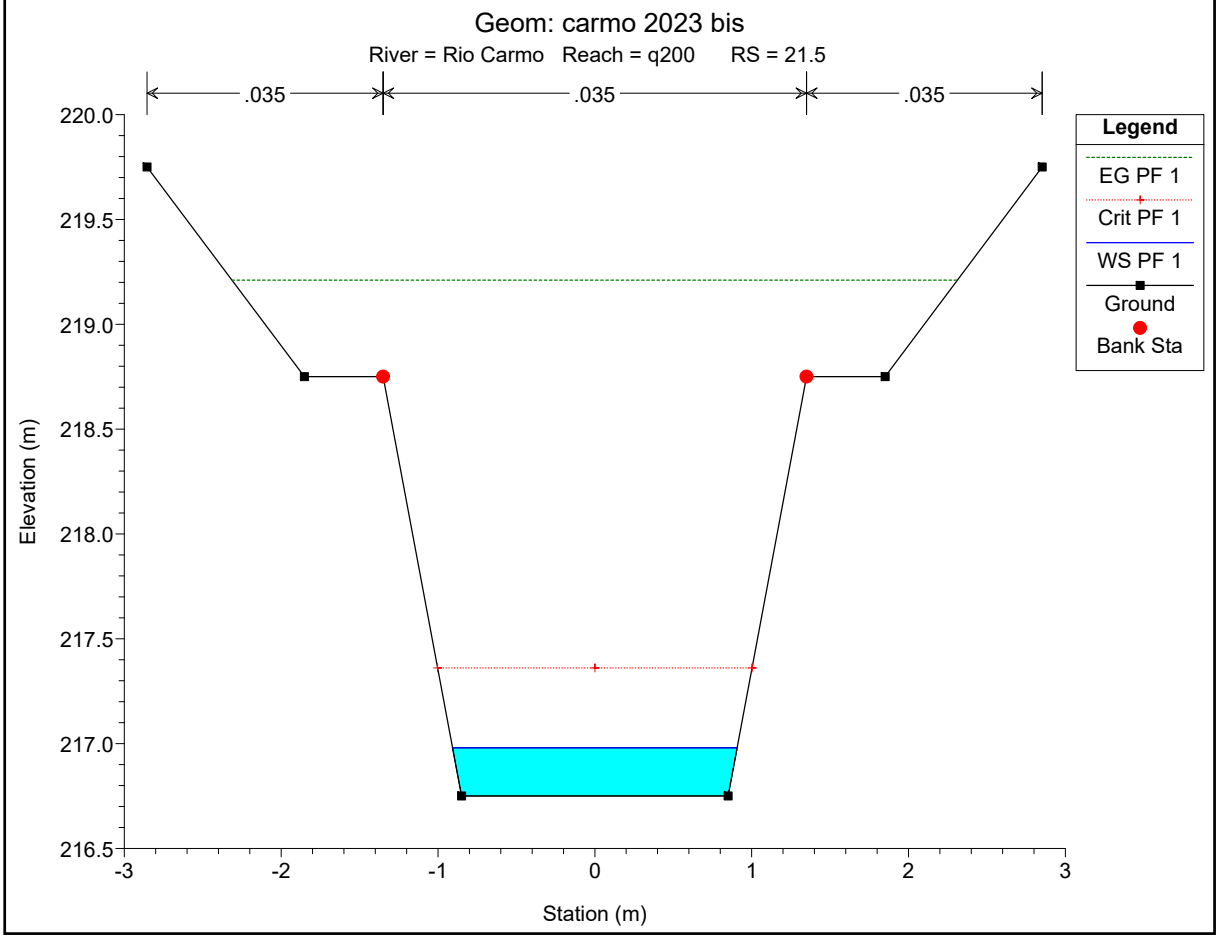

Geom: carmo 2023 bis
River = A7 Reach = q200 RS = 2
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
120.8
120.6
120.4
120.2
120.0
-0.8
-0.6
-0.4
-0.2
0.0
0.2
0.4
0.6
0.8
Station (m)

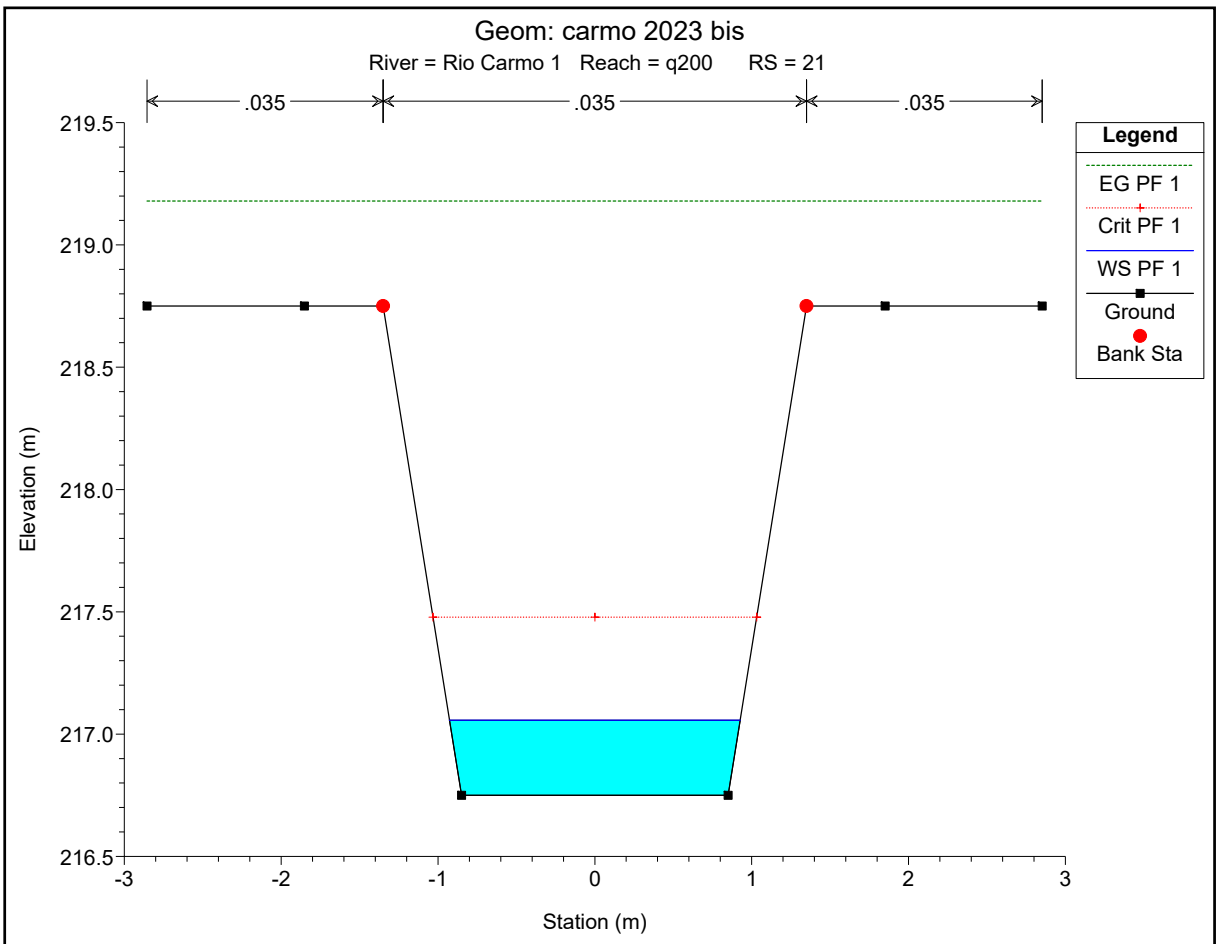

Geom: carmo 2023 bis
River = A7 Reach = q200 RS = 1
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
119.8
119.6
119.4
119.2
119.0
-0.8
-0.6
-0.4
-0.2
0.0
0.2
0.4
0.6
0.8
Station (m)

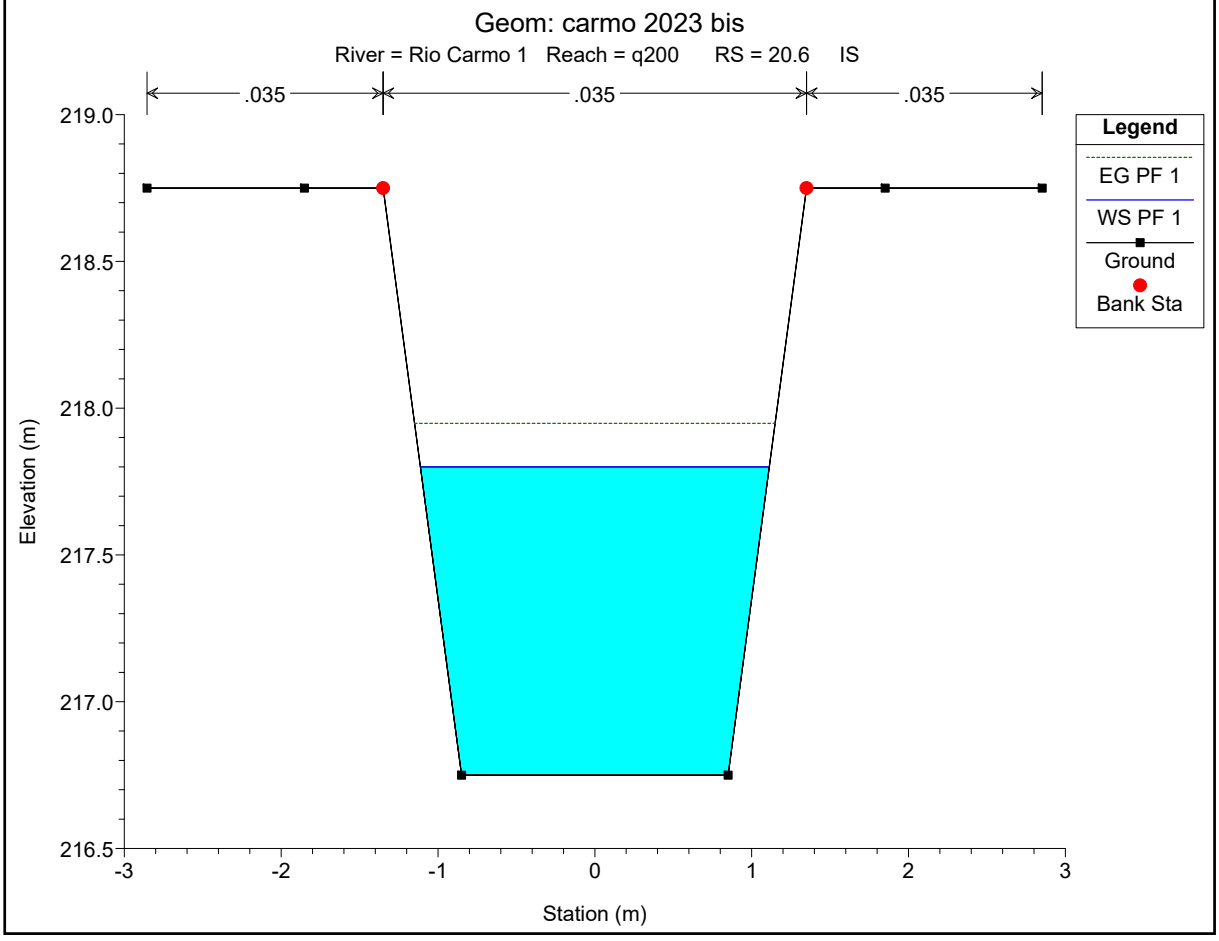

Geom: carmo 2023 bis
River = Rio Carmo Reach = q200 RS = 25
.035
.035
.035
241.0
240.5
240.0
239.5
239.0
238.5
238.0
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

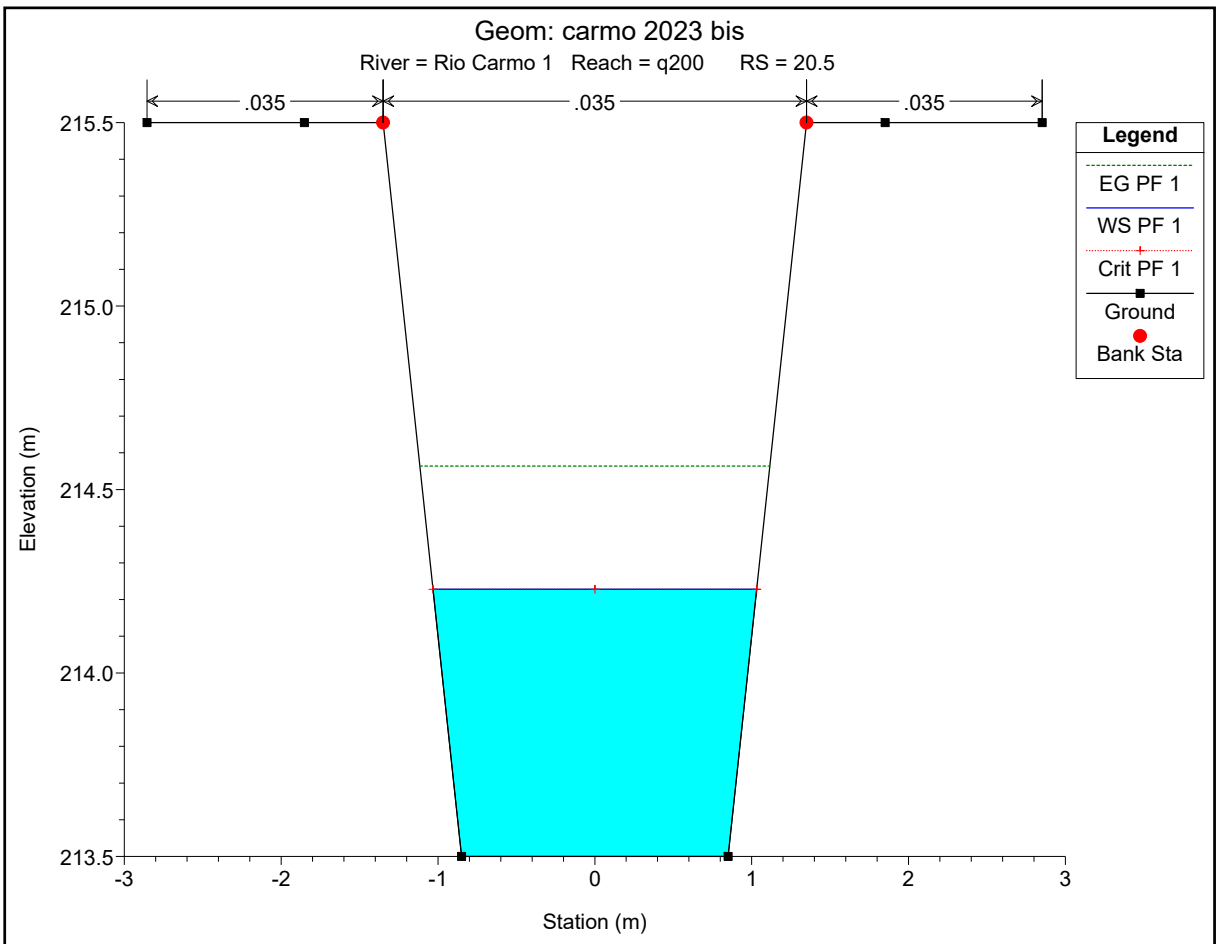

Geom: carmo 2023 bis
River = Rio Carmo Reach = q200 RS = 24
.035
.035
.035
235
234
233
232
231
230
229
228
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

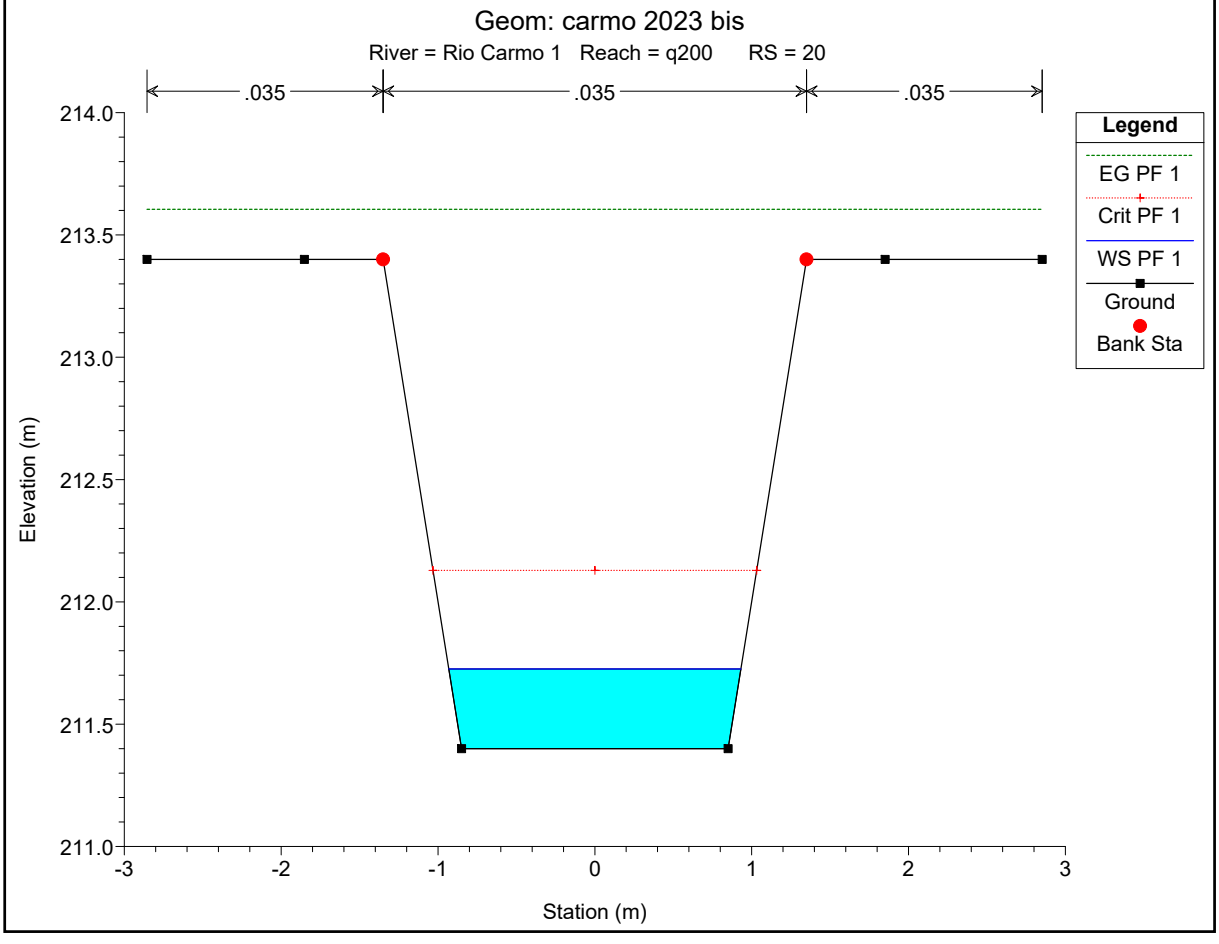

Geom: carmo 2023 bis
River = Rio Carmo Reach = q200 RS = 22
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
226.0
225.5
225.0
224.5
224.0
223.5
223.0
-3
-2
-1
0
1
2
3

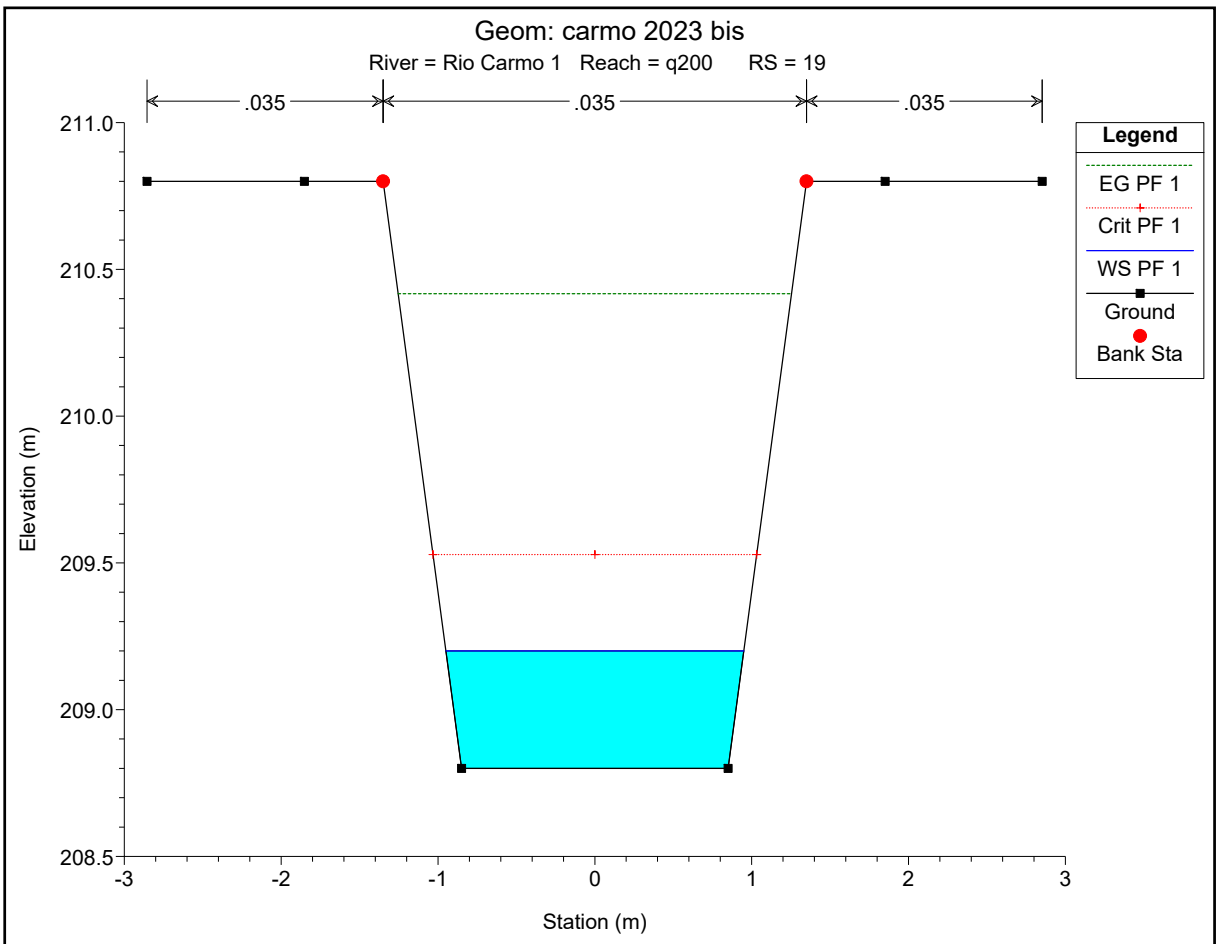

Geom: carmo 2023 bis
River = Rio Carmo Reach = q200 RS = 21.5
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
220.0
219.5
219.0
218.5
218.0
217.5
217.0
216.5
-3
-2
-1
0
1
2
3

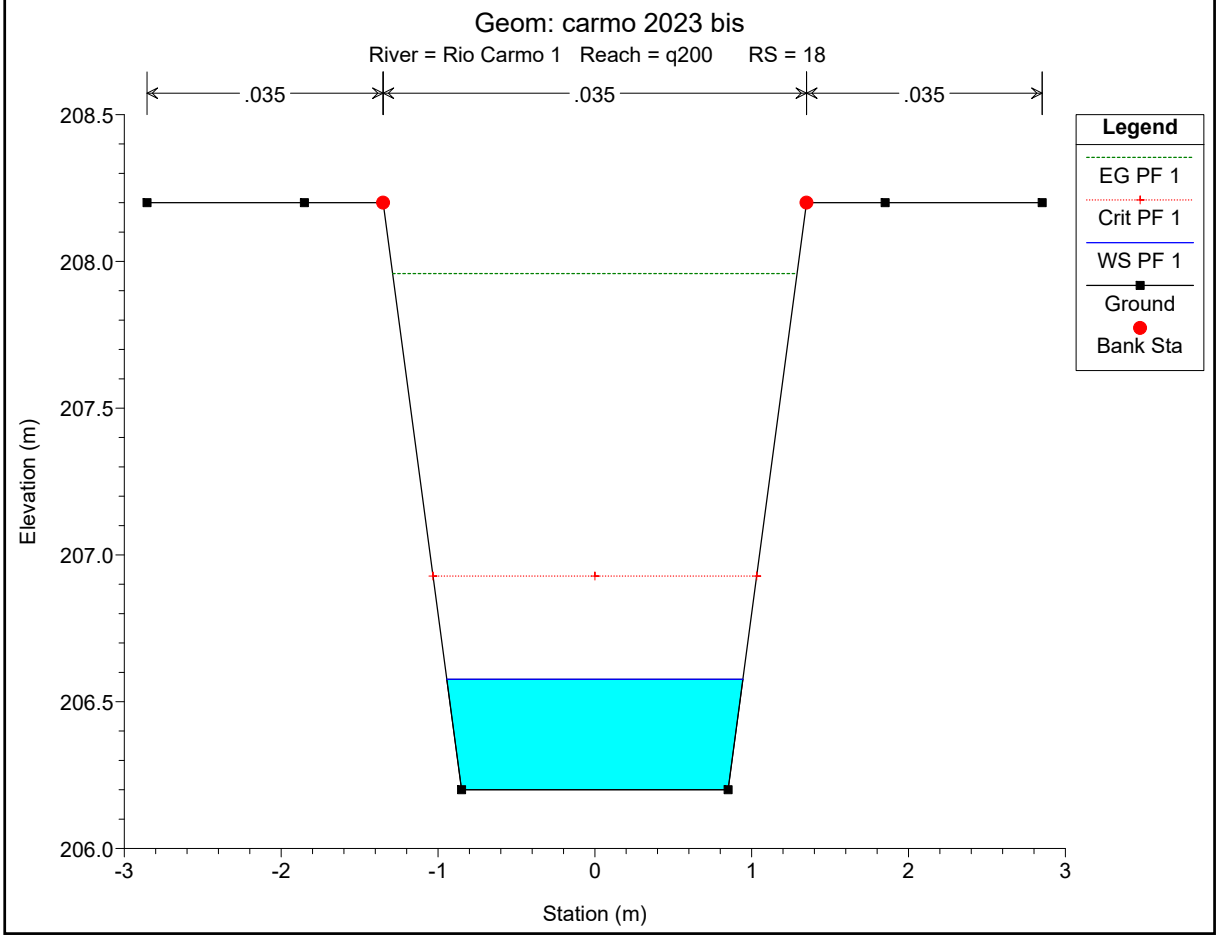

Geom: carmo 2023 bis
River = Rio Carmo 1 Reach = q200 RS = 21
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
219.5
219.0
218.5
218.0
217.5
217.0
216.5
-3
-2
-1
0
1
2
3
Station (m)

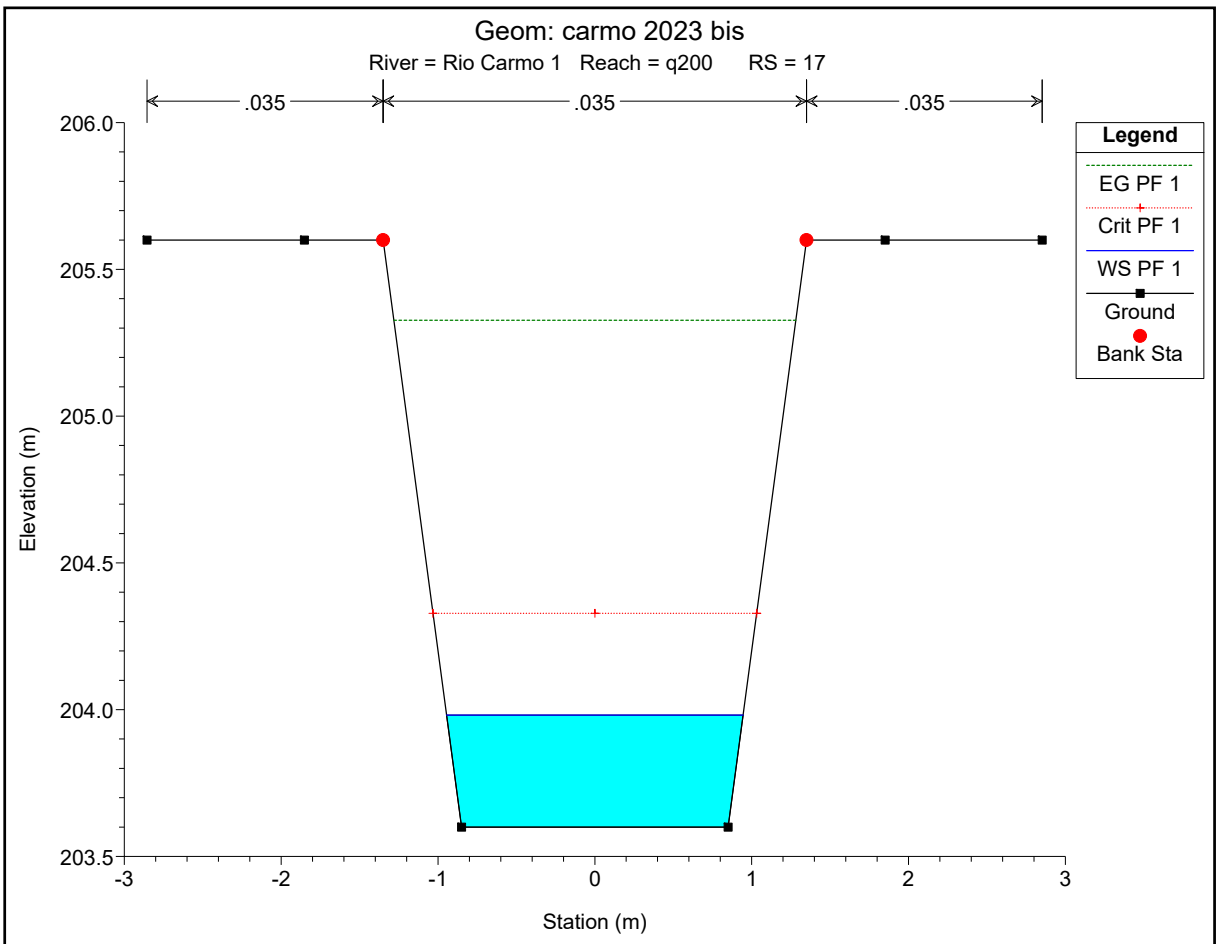

Geom: carmo 2023 bis
River = Rio Carmo 1 Reach = q200 RS = 20.6 IS
.035
.035
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
219.0
218.5
218.0
217.5
217.0
216.5
-3
-2
-1
0
1
2
3
Station (m)

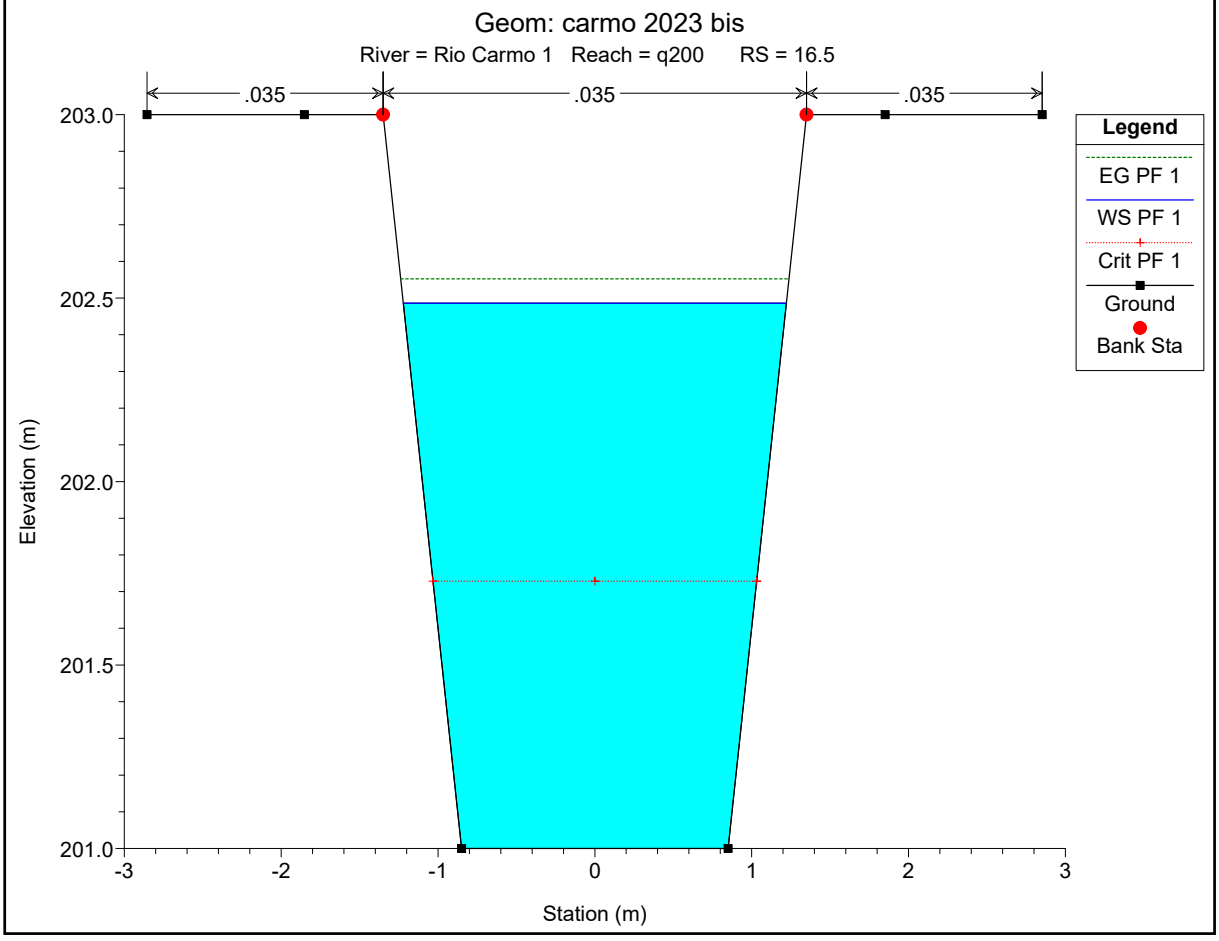

Geom: carmo 2023 bis
River = Rio Carmo 1 Reach = q200 RS = 20.5
.035
.035
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
215.5
215.0
214.5
214.0
213.5
-3
-2
-1
0
1
2
3

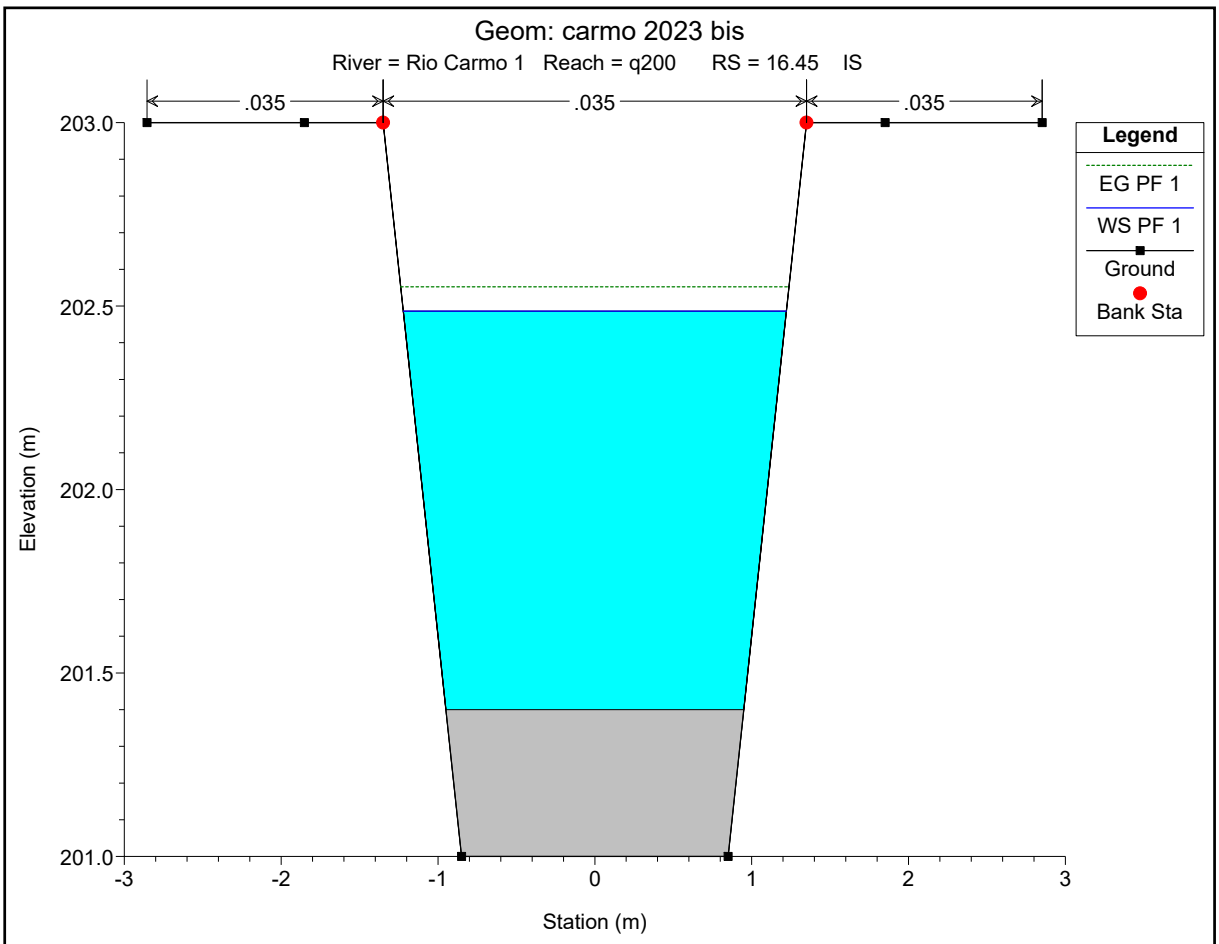

Geom: carmo 2023 bis
River = Rio Carmo 1 Reach = q200 RS = 20
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
214.0
213.5
213.0
212.5
212.0
211.5
211.0
-3
-2
-1
0
1
2
3

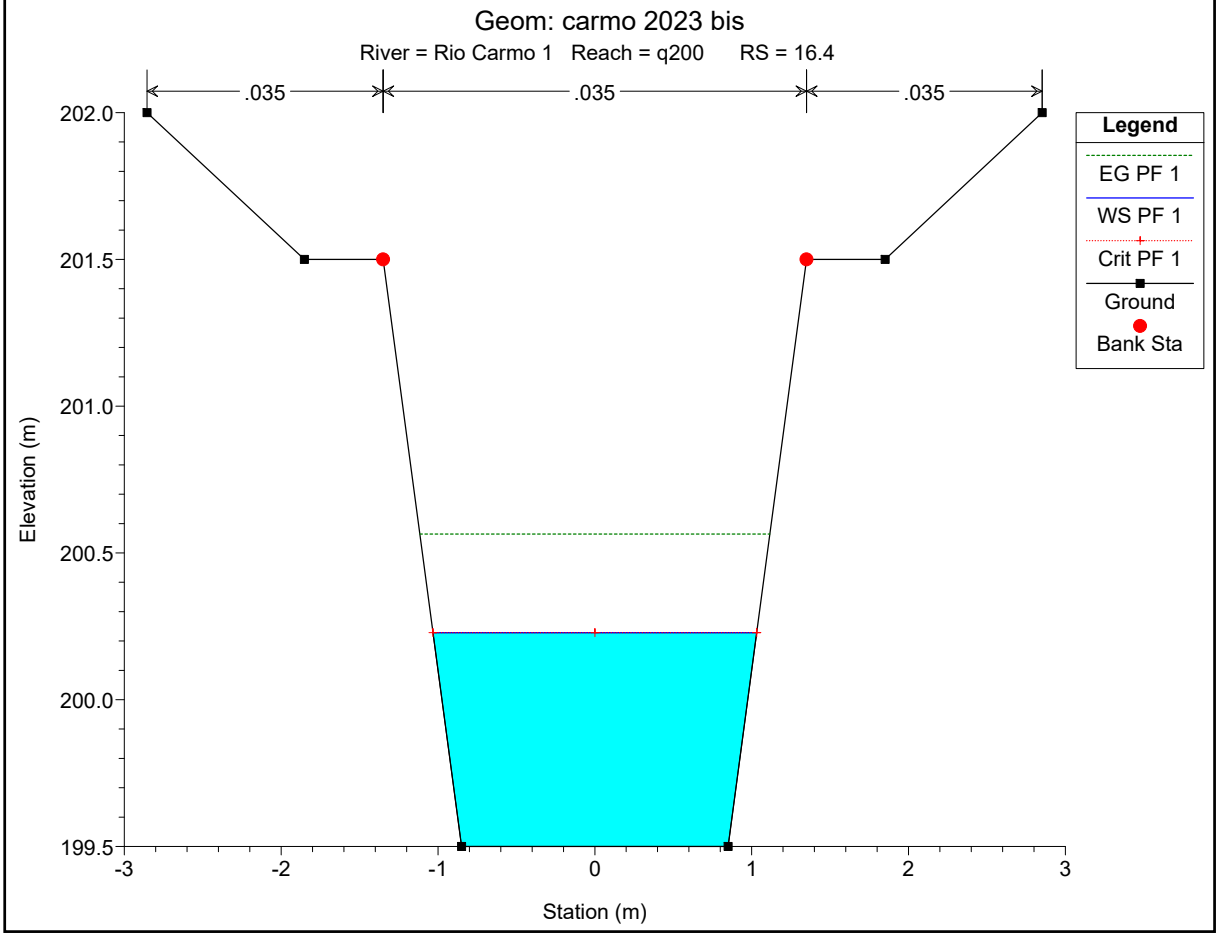

Geom: carmo 2023 bis
River = Rio Carmo 1 Reach = q200 RS = 19
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
211.0
210.5
210.0
209.5
209.0
208.5
-3
-2
-1
0
1
2
3
Station (m)

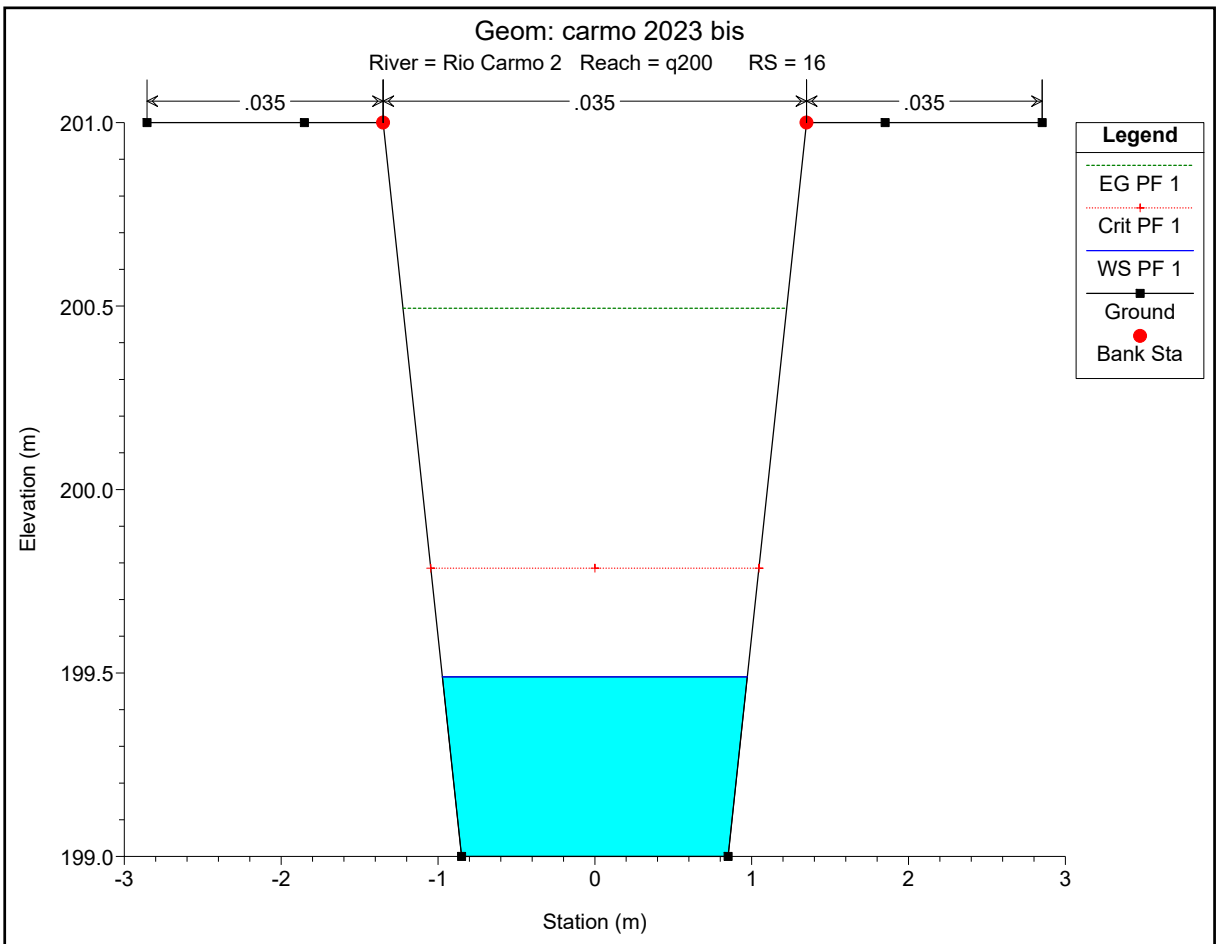

Geom: carmo 2023 bis
River = Rio Carmo 1 Reach = q200 RS = 18
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
208.5
208.0
207.5
207.0
206.5
206.0
-3
-2
-1
0
1
2
3
Station (m)

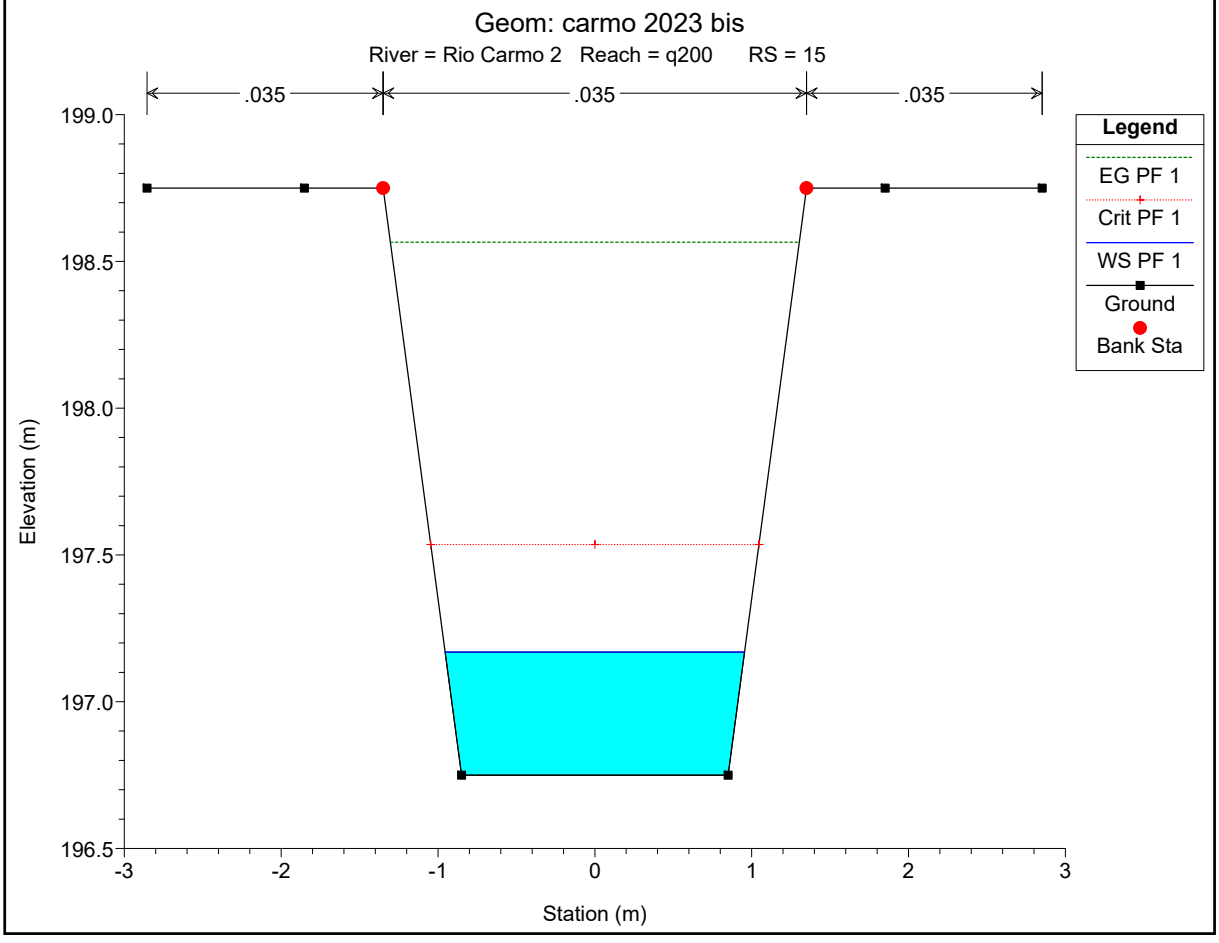

Geom: carmo 2023 bis
River = Rio Carmo 1 Reach = q200 RS = 17
.035
.035
.035
206.0
205.5
205.0
204.5
204.0
203.5
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

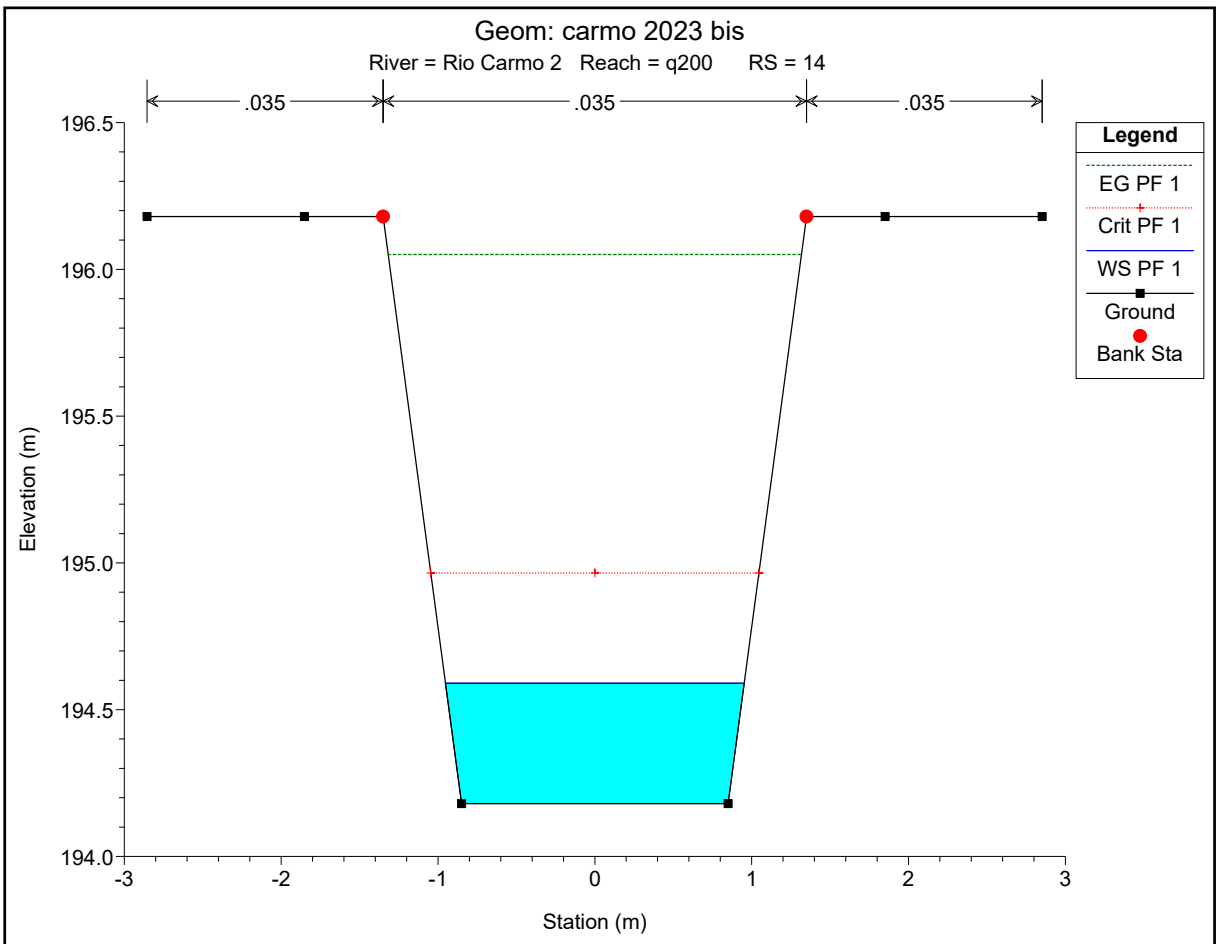

Geom: carmo 2023 bis
River = Rio Carmo 1 Reach = q200 RS = 16.5
.035
.035
.035
203.0
202.5
202.0
201.5
201.0
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

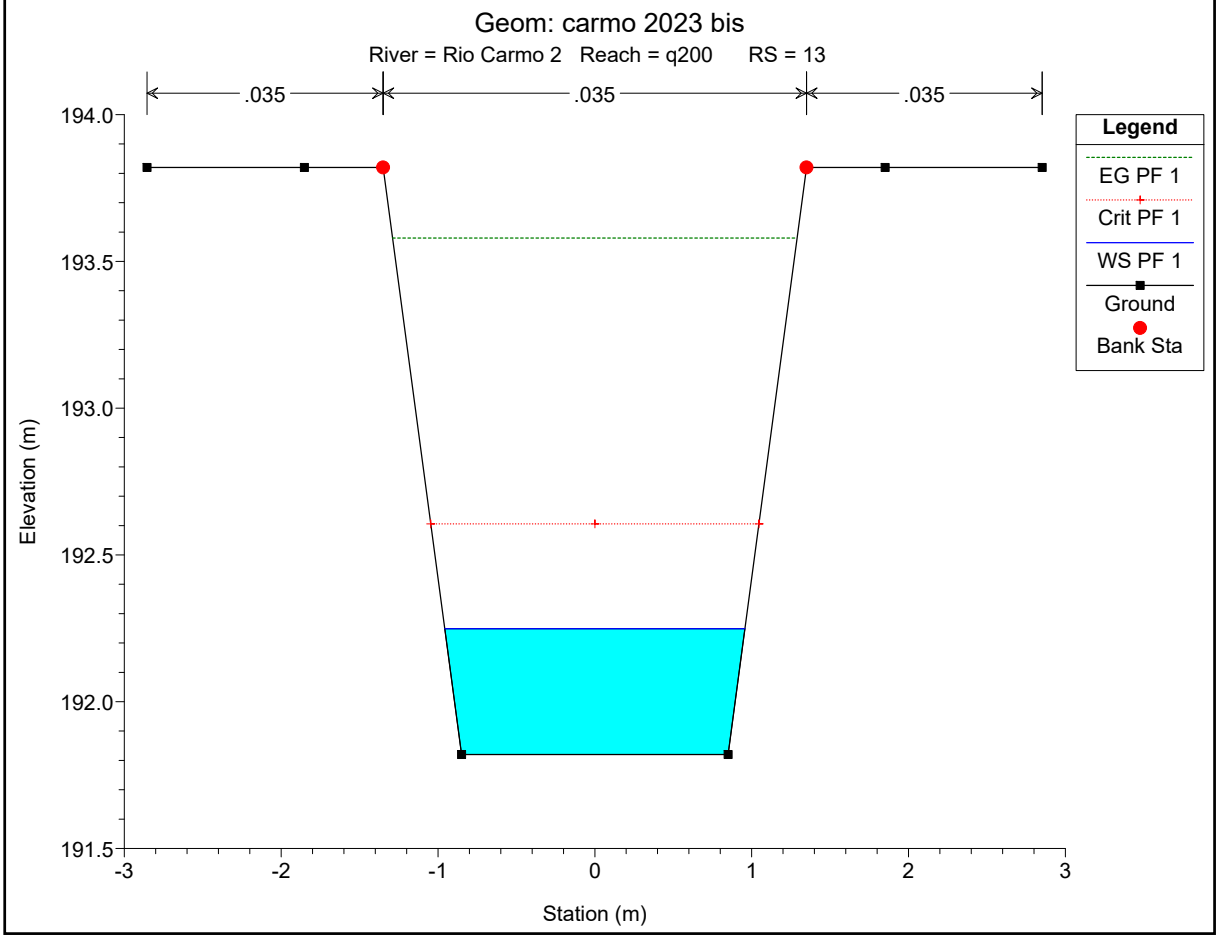

Geom: carmo 2023 bis
River = Rio Carmo 1 Reach = q200 RS = 16.45 IS
.035
.035
.035
203.0
202.5
202.0
201.5
201.0
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

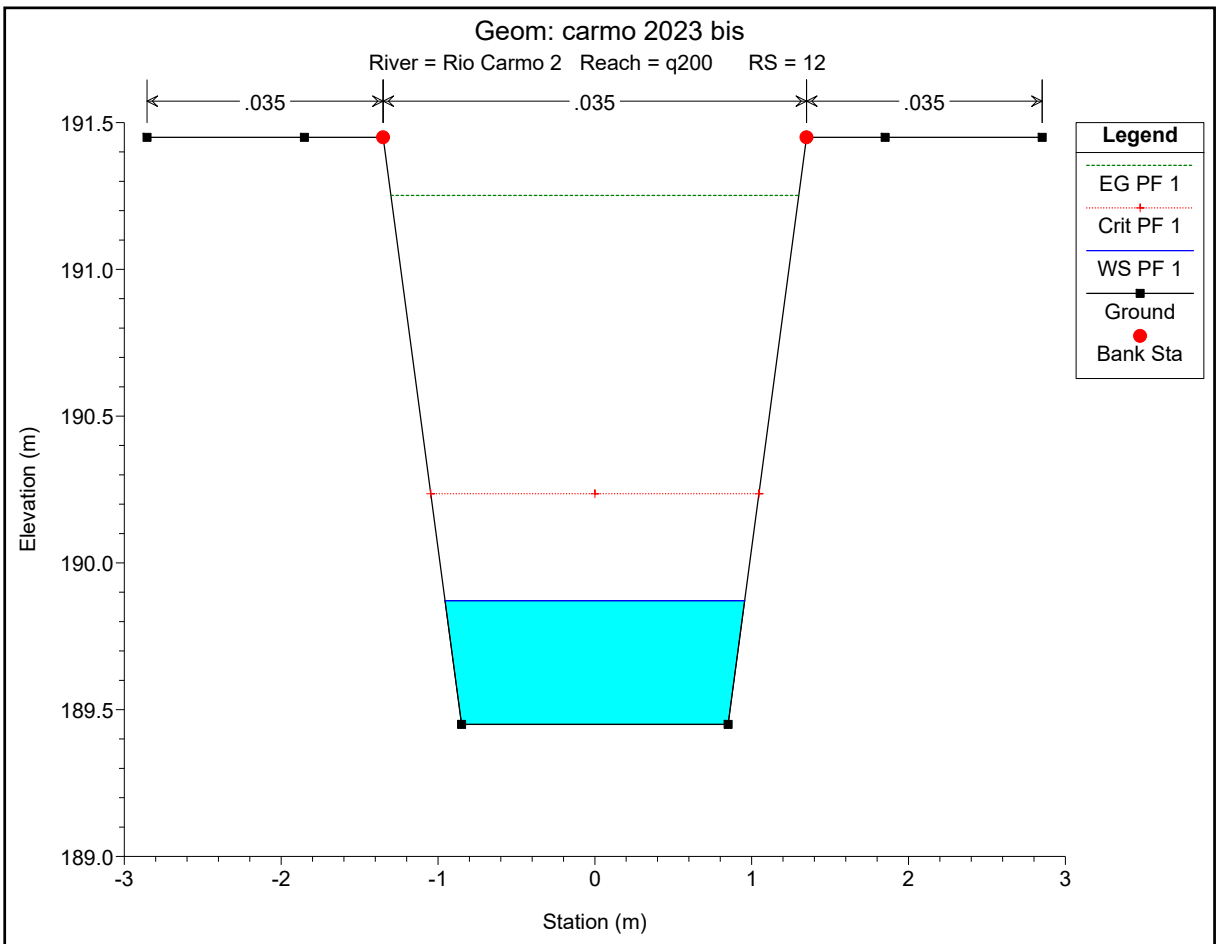

Geom: carmo 2023 bis
River = Rio Carmo 1 Reach = q200 RS = 16.4
.035
.035
.035
202.0
201.5
201.0
200.5
200.0
199.5
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

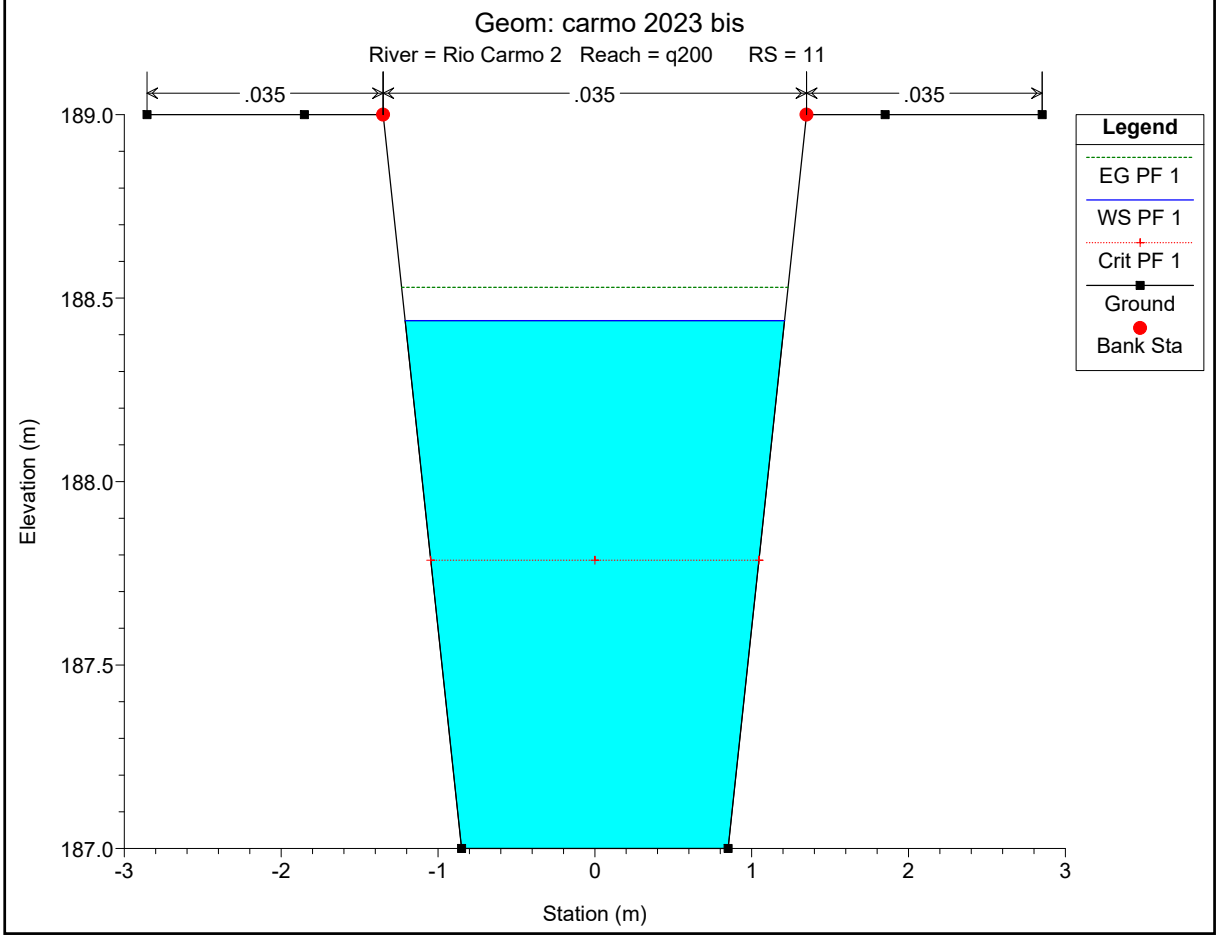

Geom: carmo 2023 bis
River = Rio Carmo 2 Reach = q200 RS = 16
.035
.035
.035
201.0
200.5
200.0
199.5
199.0
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

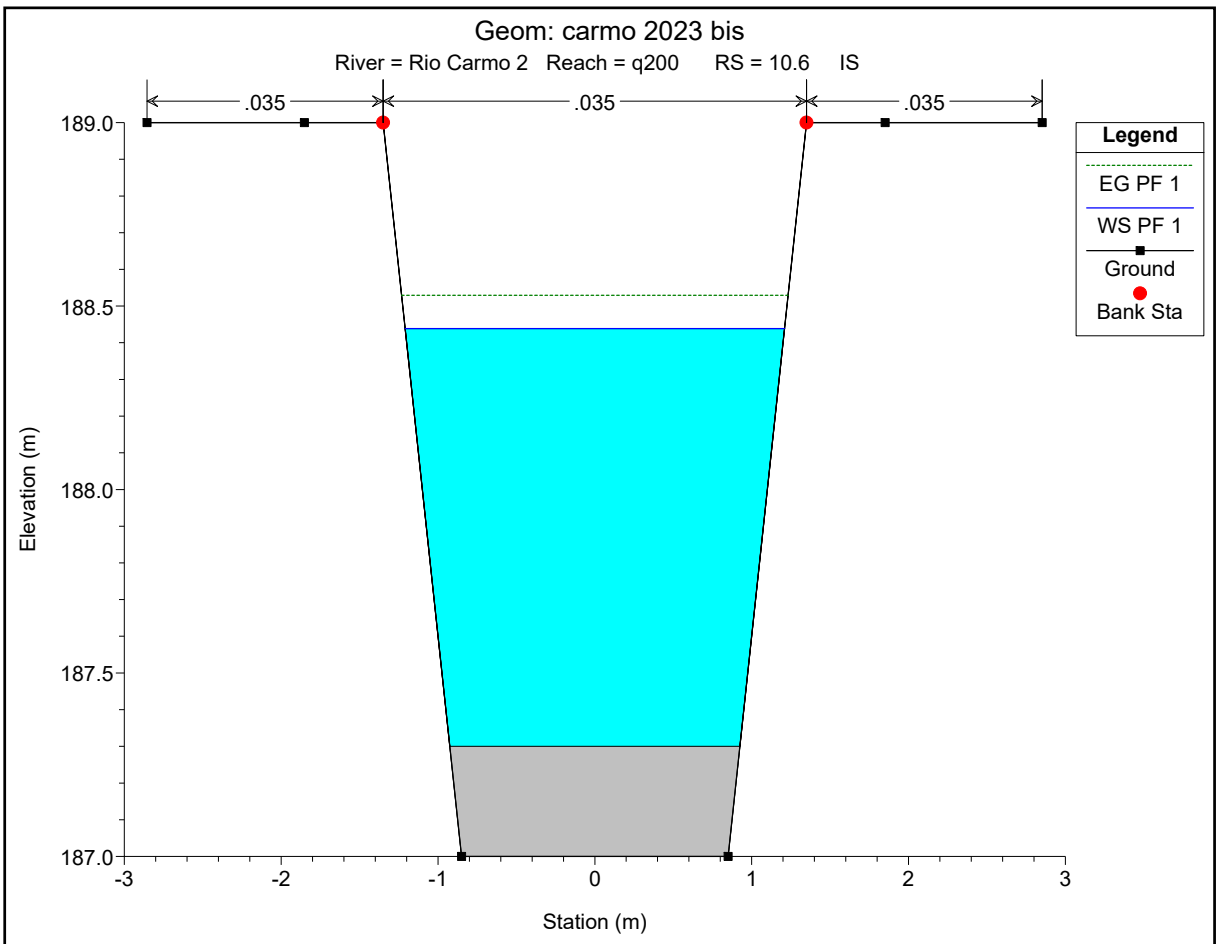

Geom: carmo 2023 bis
River = Rio Carmo 2 Reach = q200 RS = 15
.035
.035
.035
199.0
198.5
198.0
197.5
197.0
196.5
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

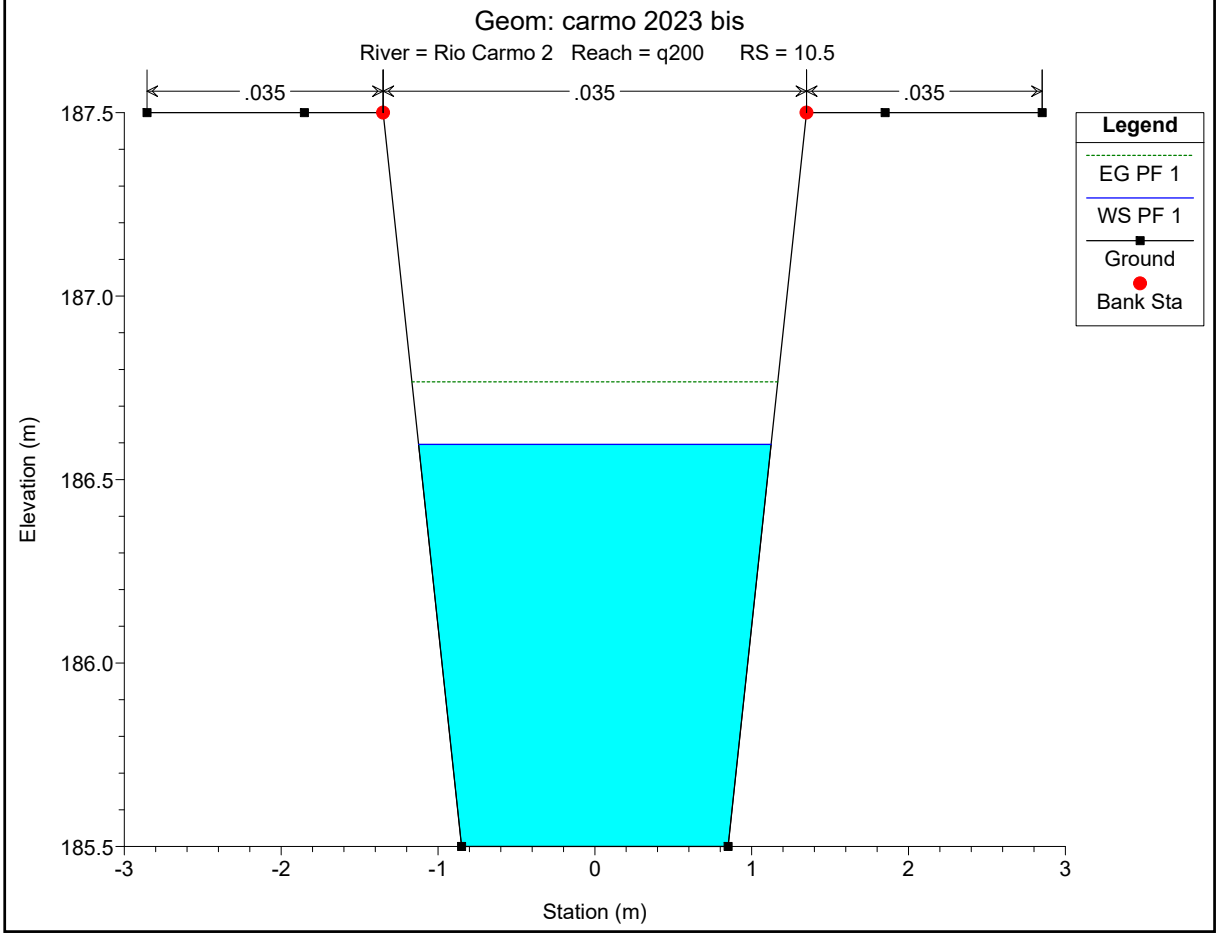

Geom: carmo 2023 bis
River = Rio Carmo 2 Reach = q200 RS = 14
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
196.5
196.0
195.5
195.0
194.5
194.0
-3
-2
-1
0
1
2
3
Station (m)

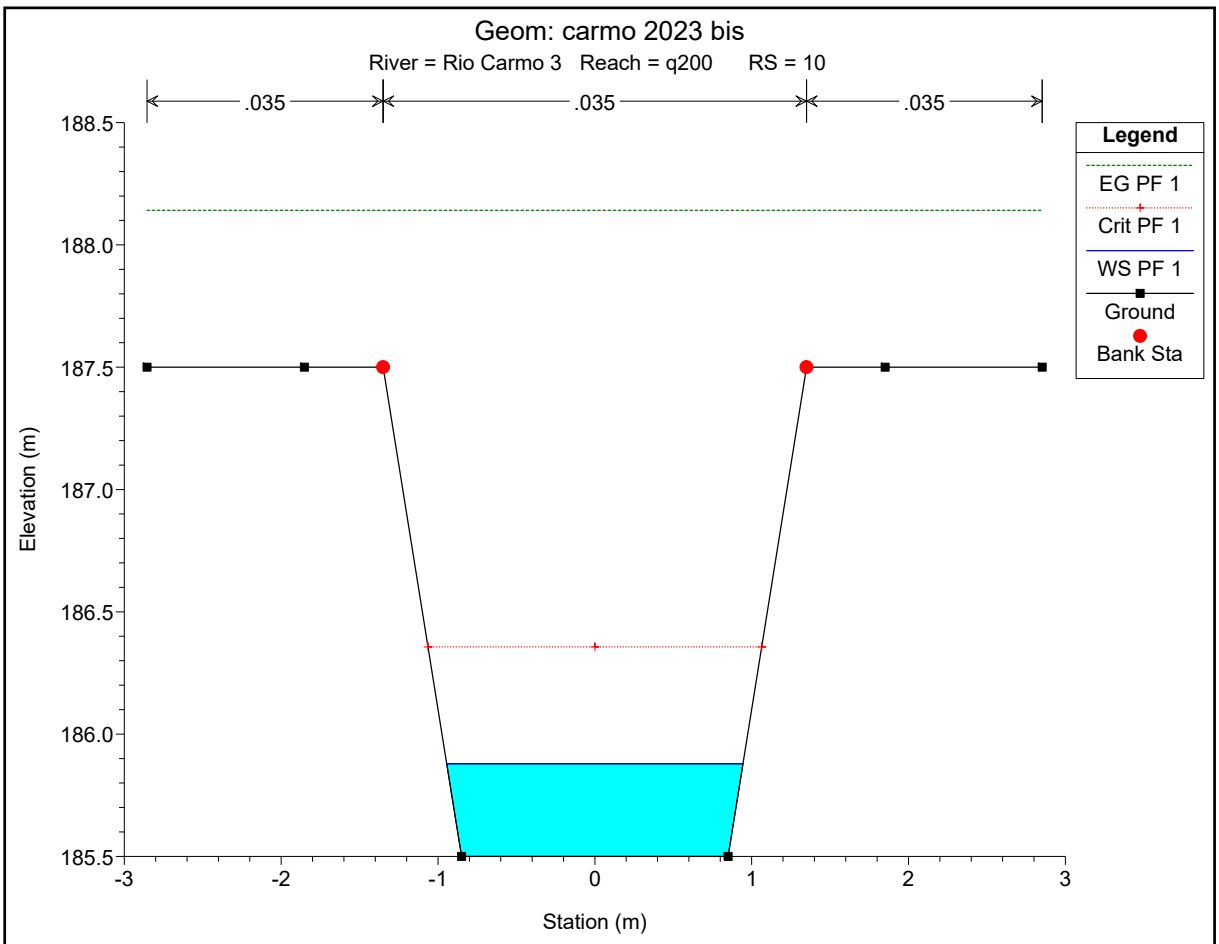

Geom: carmo 2023 bis
River = Rio Carmo 2 Reach = q200 RS = 13
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
194.0
193.5
193.0
192.5
192.0
191.5
-3
-2
-1
0
1
2
3
Station (m)

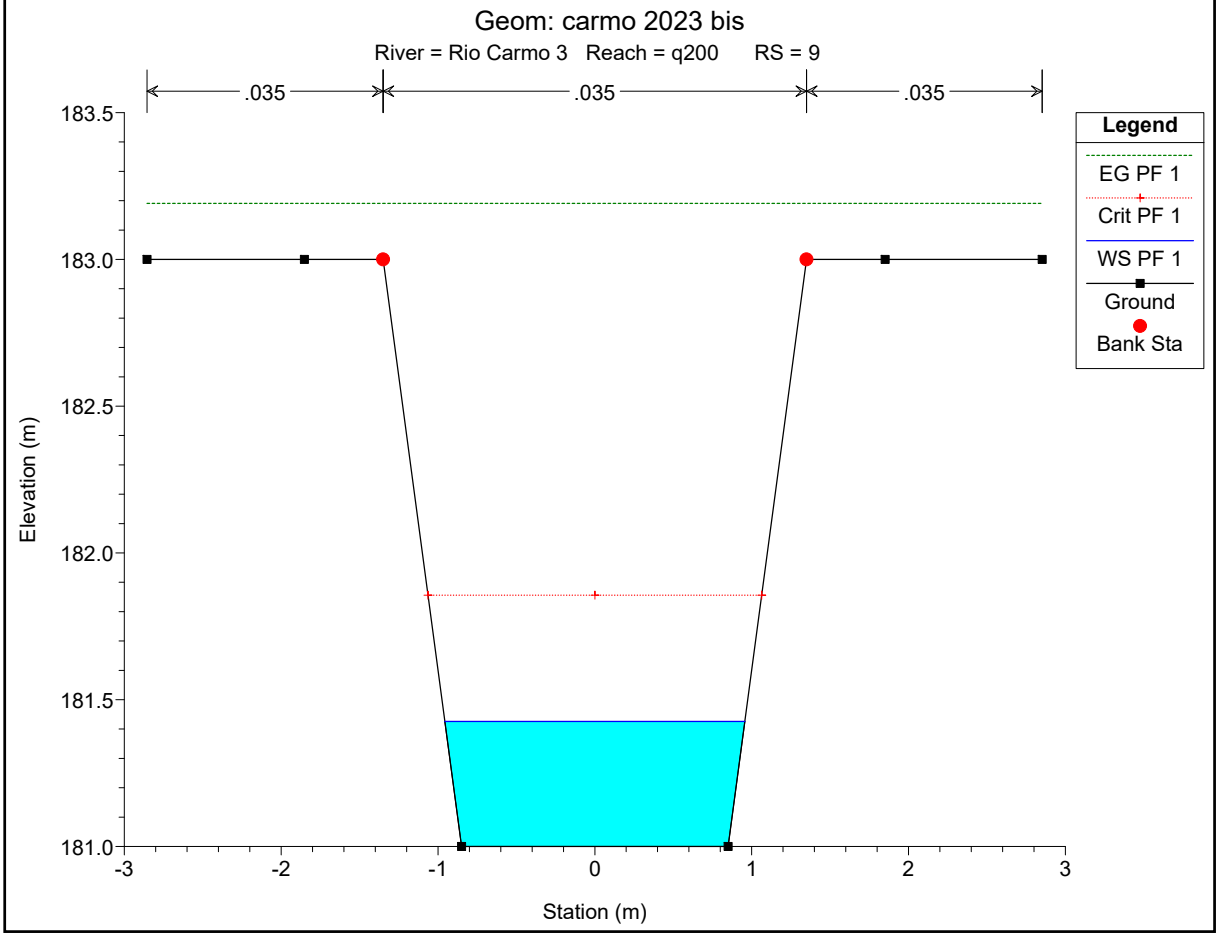

Geom: carmo 2023 bis
River = Rio Carmo 2 Reach = q200 RS = 12
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
191.5
191.0
190.5
190.0
189.5
189.0
-3
-2
-1
0
1
2
3
Station (m)

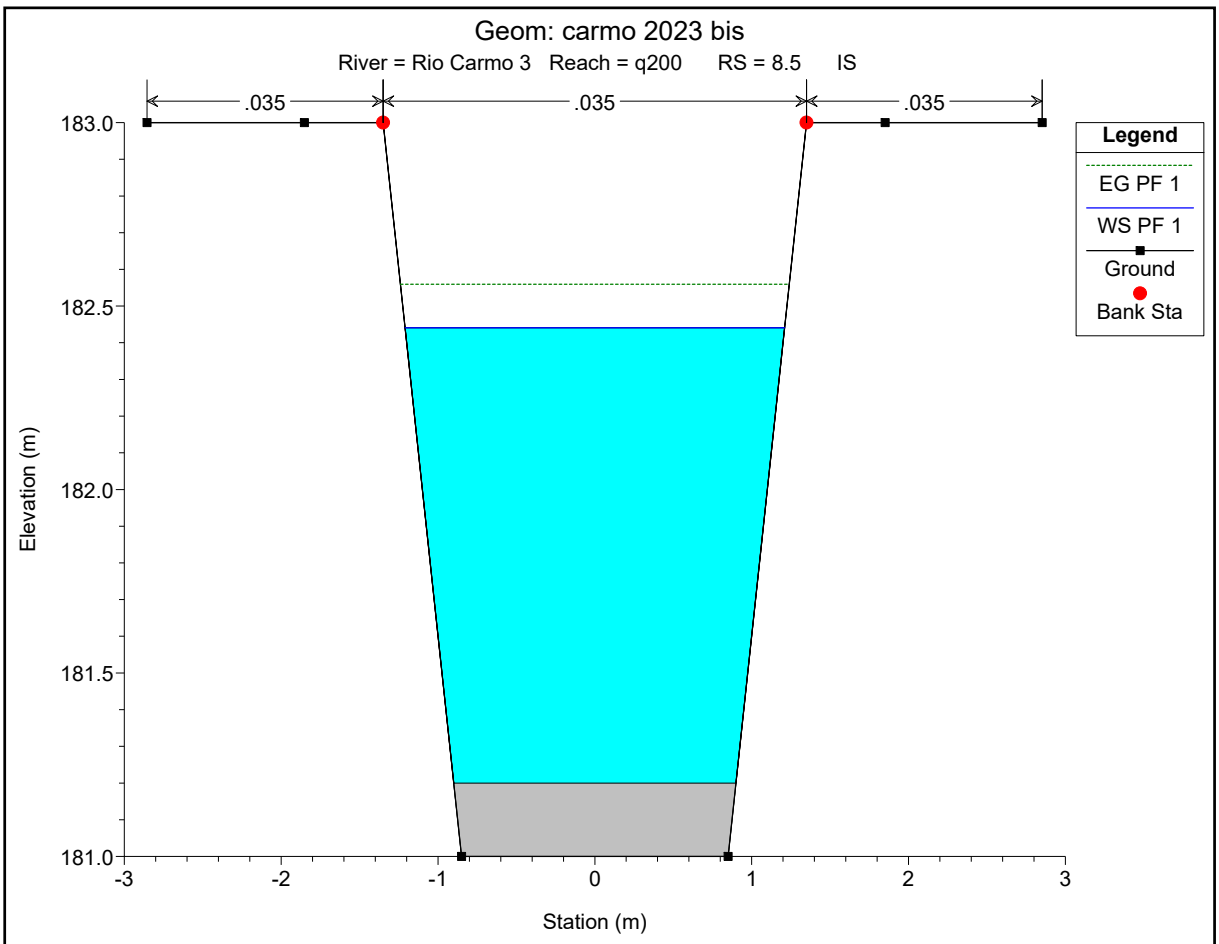

Geom: carmo 2023 bis
River = Rio Carmo 2 Reach = q200 RS = 11
.035
.035
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
189.0
188.5
188.0
187.5
187.0
-3
-2
-1
0
1
2
3
Station (m)

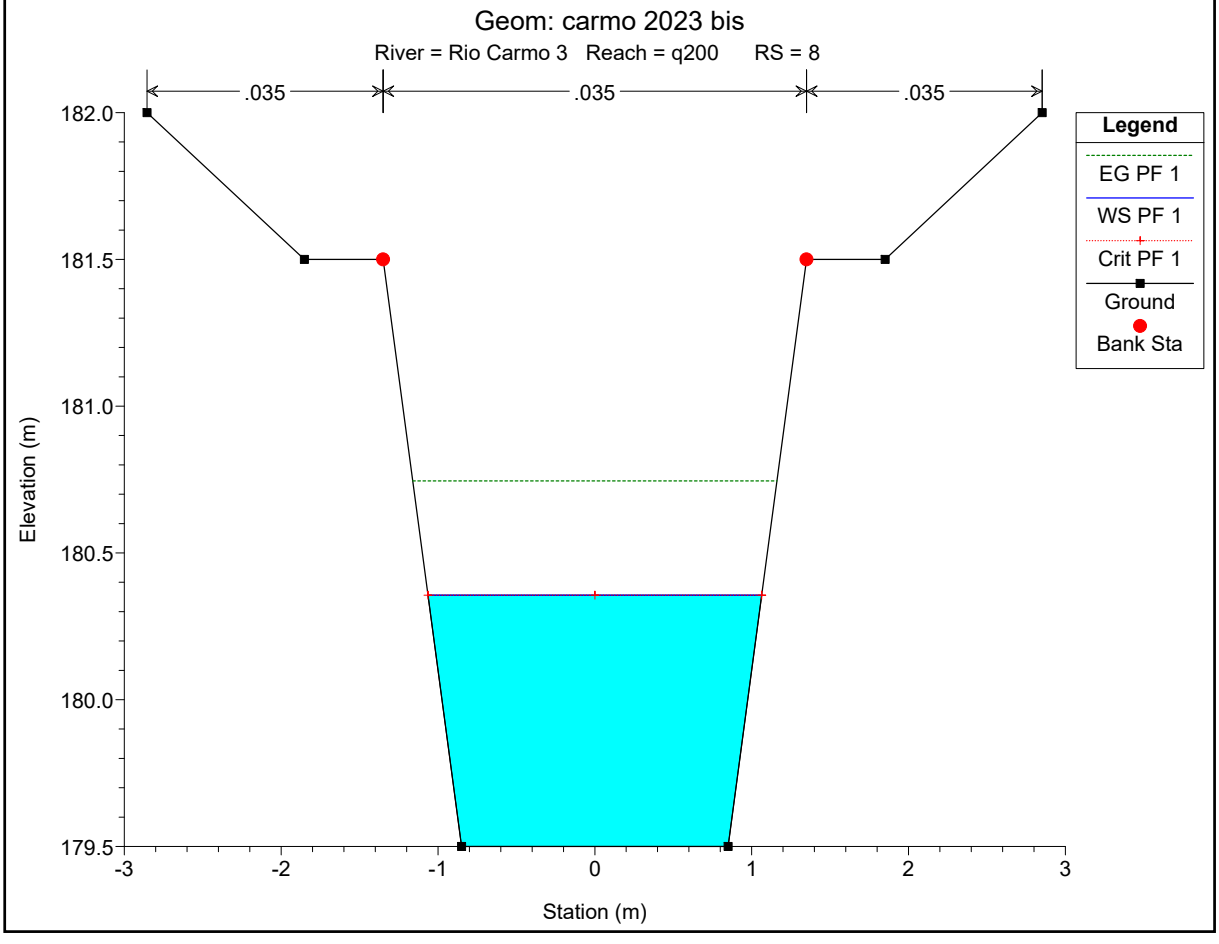

Geom: carmo 2023 bis
River = Rio Carmo 2 Reach = q200 RS = 10.6 IS
.035
.035
.035
189.0
188.5
188.0
187.5
187.0
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

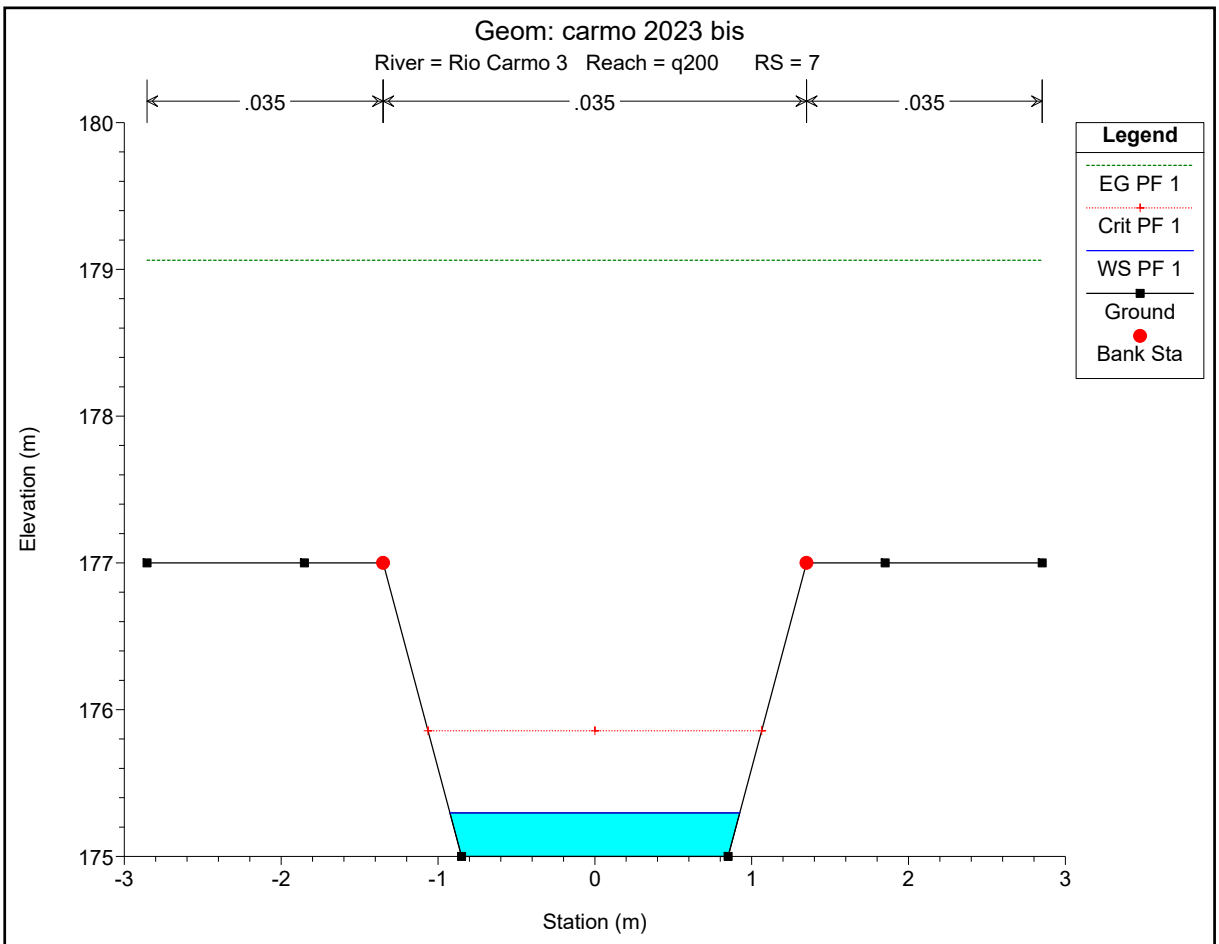

Geom: carmo 2023 bis
River = Rio Carmo 2 Reach = q200 RS = 10.5
.035
.035
.035
187.5
187.0
186.5
186.0
185.5
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

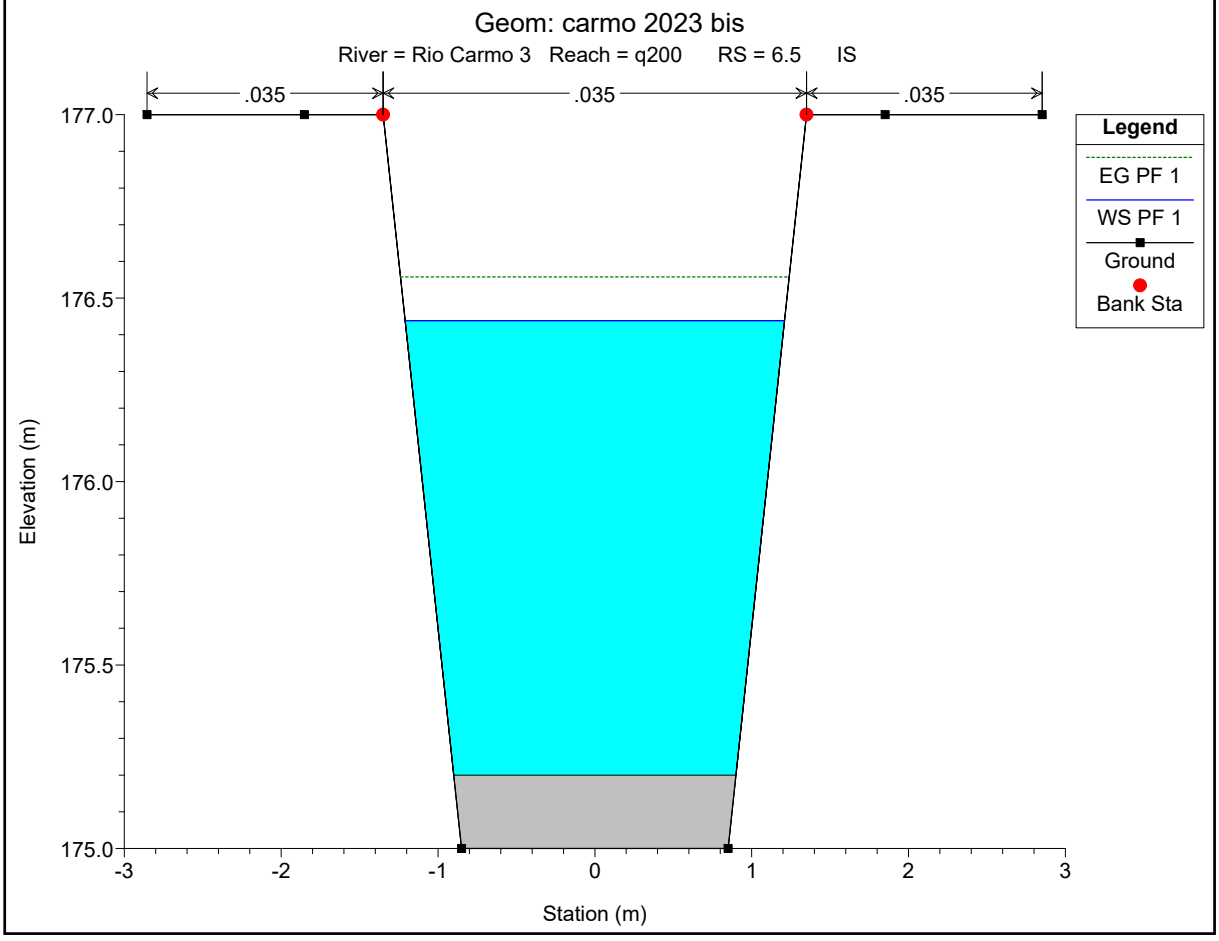

Geom: carmo 2023 bis
River = Rio Carmo 3 Reach = q200 RS = 10
.035
.035
.035
188.5
188.0
187.5
187.0
186.5
186.0
185.5
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

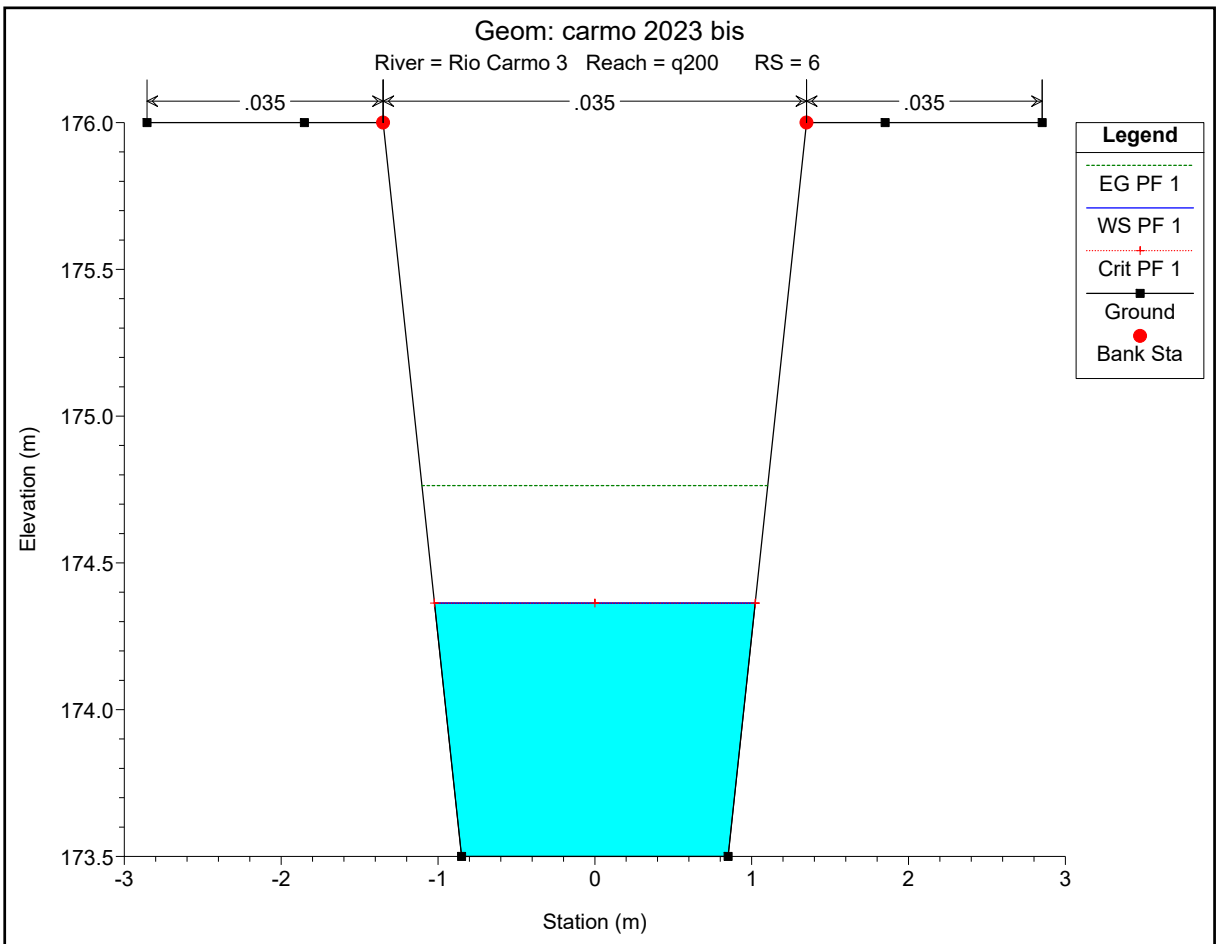

Geom: carmo 2023 bis
River = Rio Carmo 3 Reach = q200 RS = 9
.035
.035
.035
183.5
183.0
182.5
182.0
181.5
181.0
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

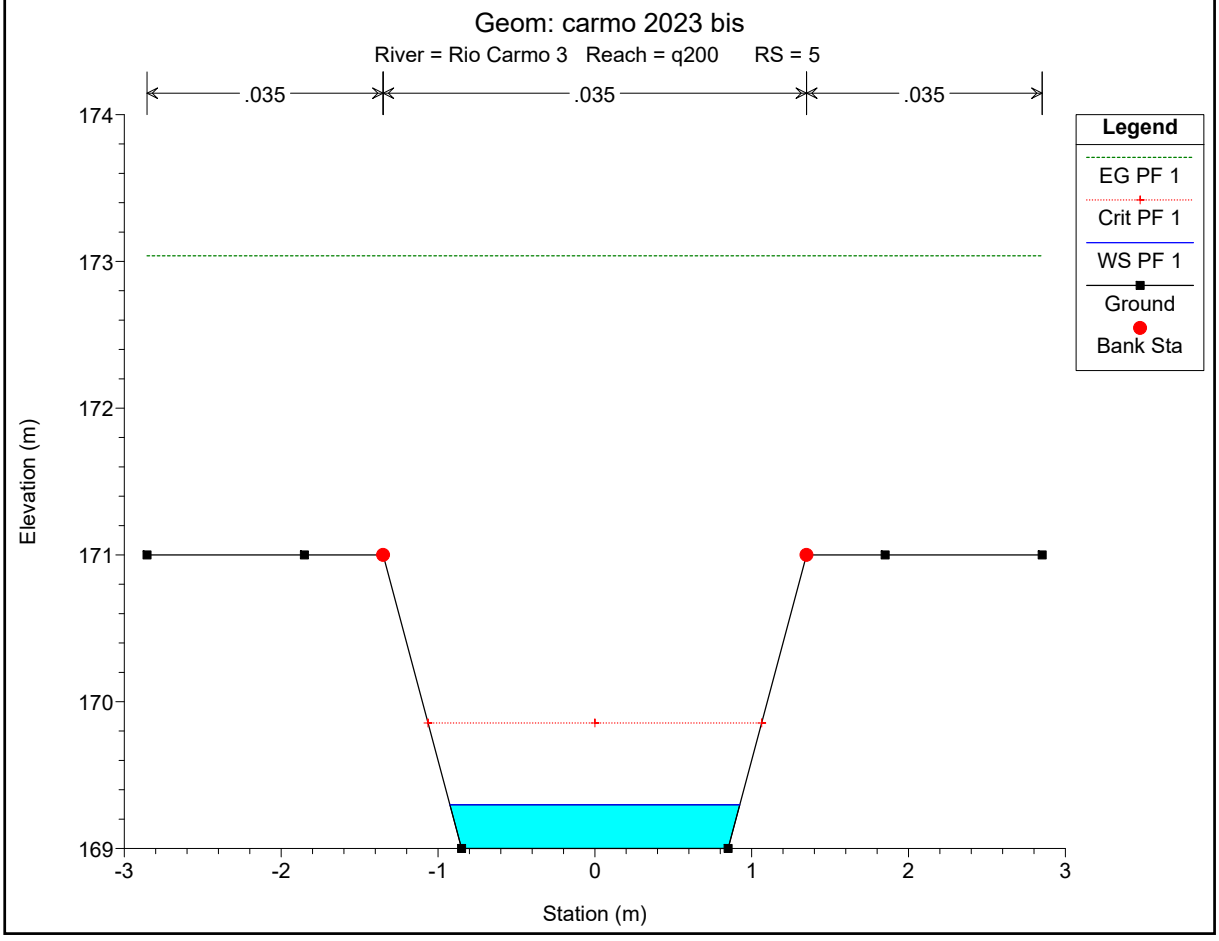

Geom: carmo 2023 bis
River = Rio Carmo 3 Reach = q200 RS = 8.5 IS
.035
.035
.035
183.0
182.5
182.0
181.5
181.0
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

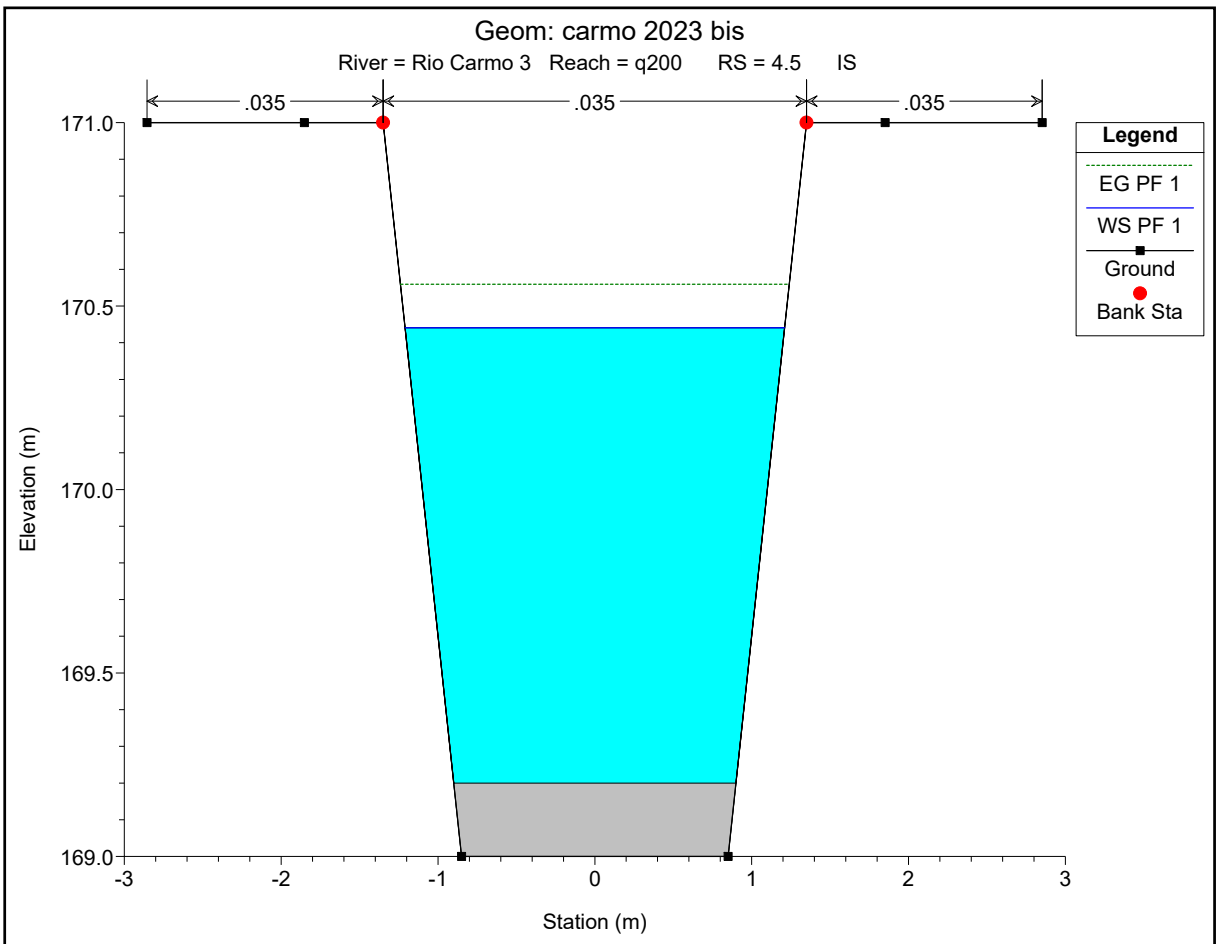

Geom: carmo 2023 bis
River = Rio Carmo 3 Reach = q200 RS = 8
.035
.035
.035
182.0
181.5
181.0
180.5
180.0
179.5
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

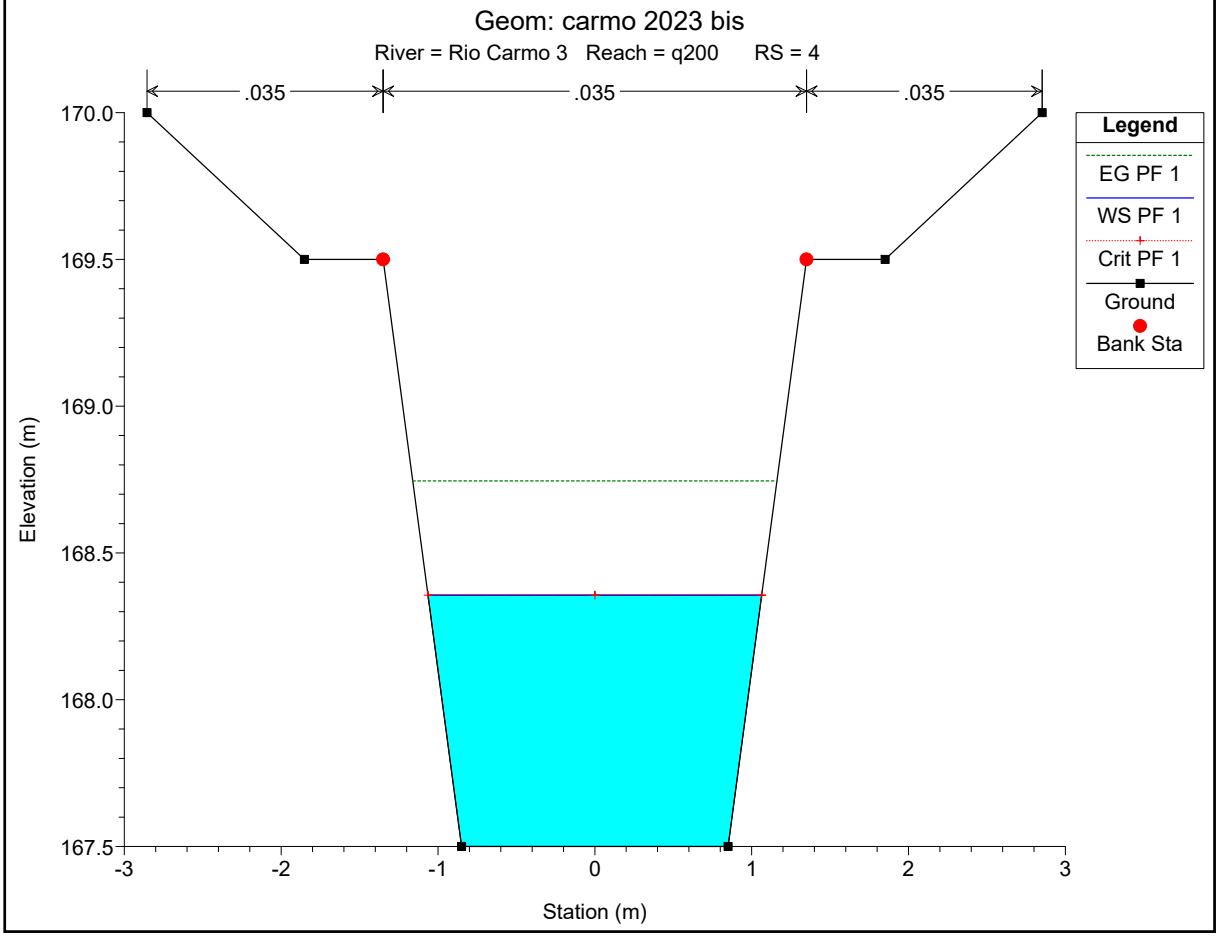

Geom: carmo 2023 bis
River = Rio Carmo 3 Reach = q200 RS = 7
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
180
179
178
177
176
175
-3
-2
-1
0
1
2
3

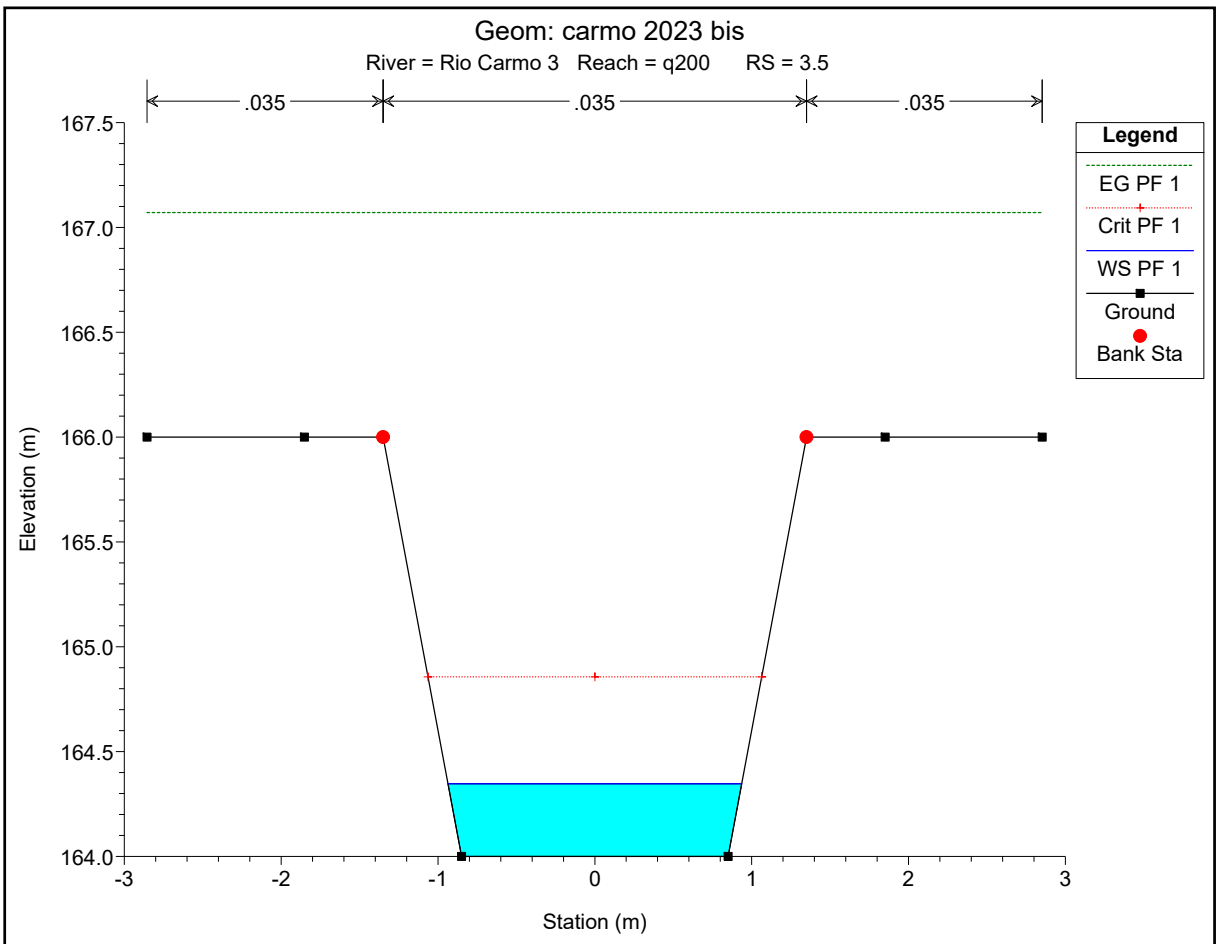

Geom: carmo 2023 bis
River = Rio Carmo 3 Reach = q200 RS = 6.5 IS
.035
.035
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
177.0
176.5
176.0
175.5
175.0
-3
-2
-1
0
1
2
3

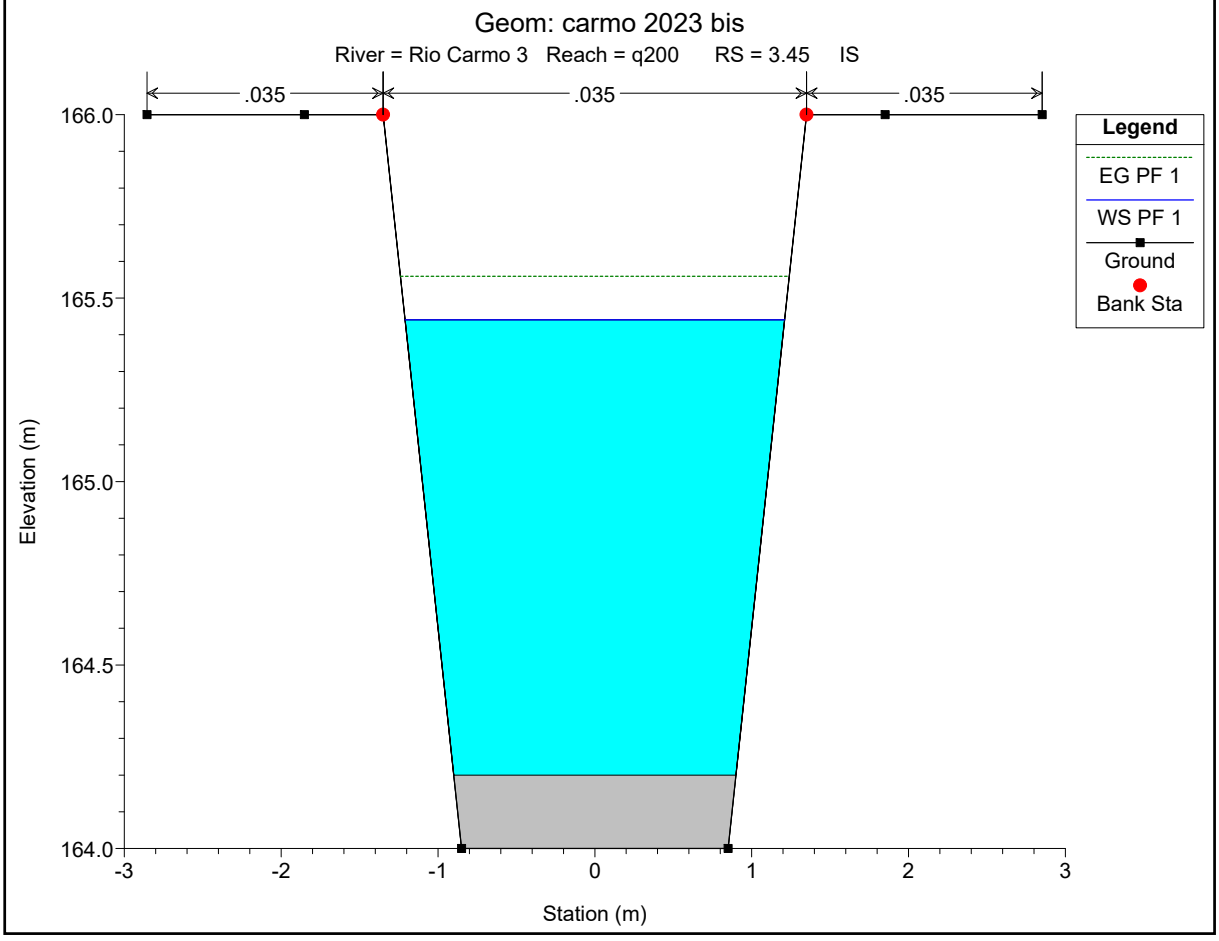

Geom: carmo 2023 bis
River = Rio Carmo 3 Reach = q200 RS = 6
.035
.035
.035
176.0
175.5
175.0
174.5
174.0
173.5
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

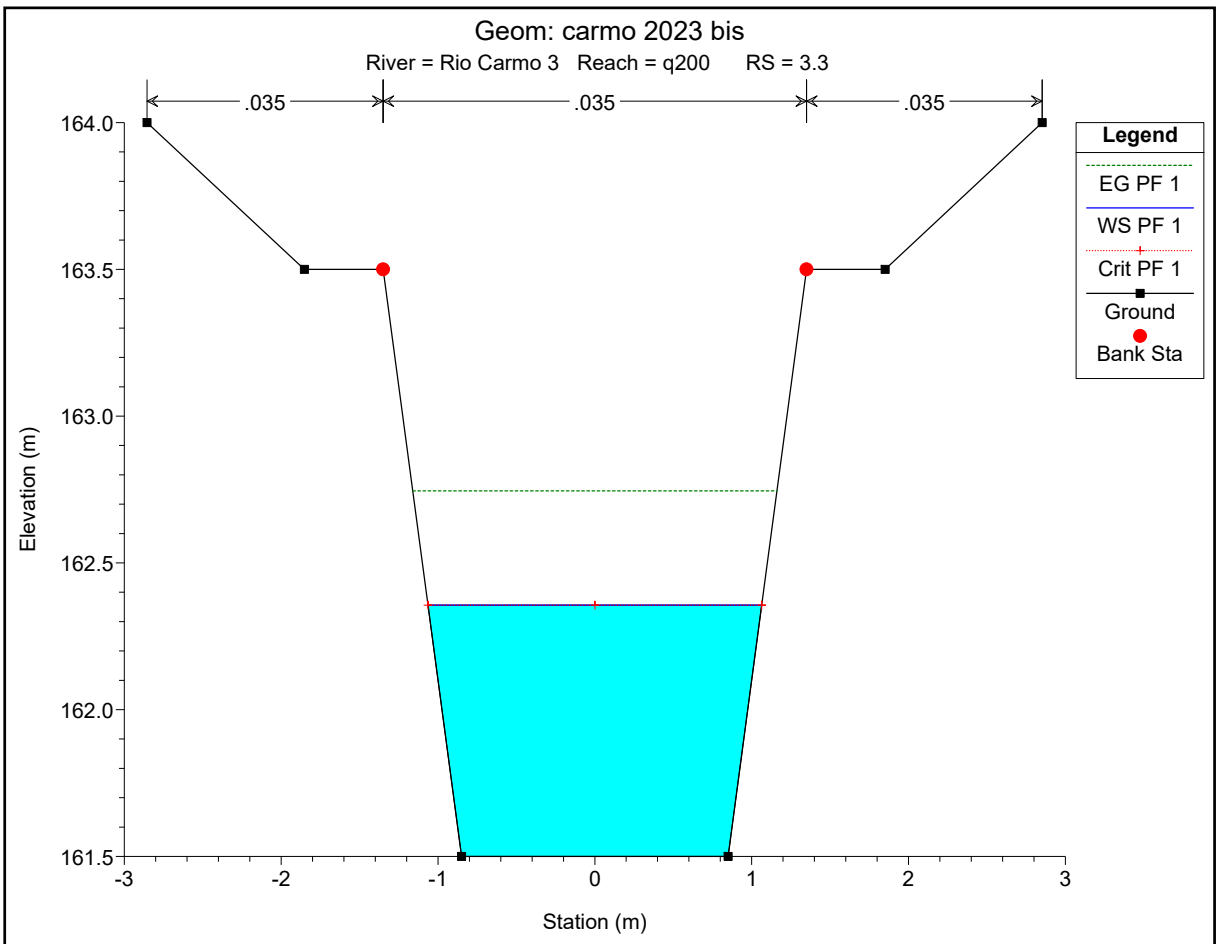

Geom: carmo 2023 bis
River = Rio Carmo 3 Reach = q200 RS = 5
.035
.035
.035
174
173
172
171
170
169
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

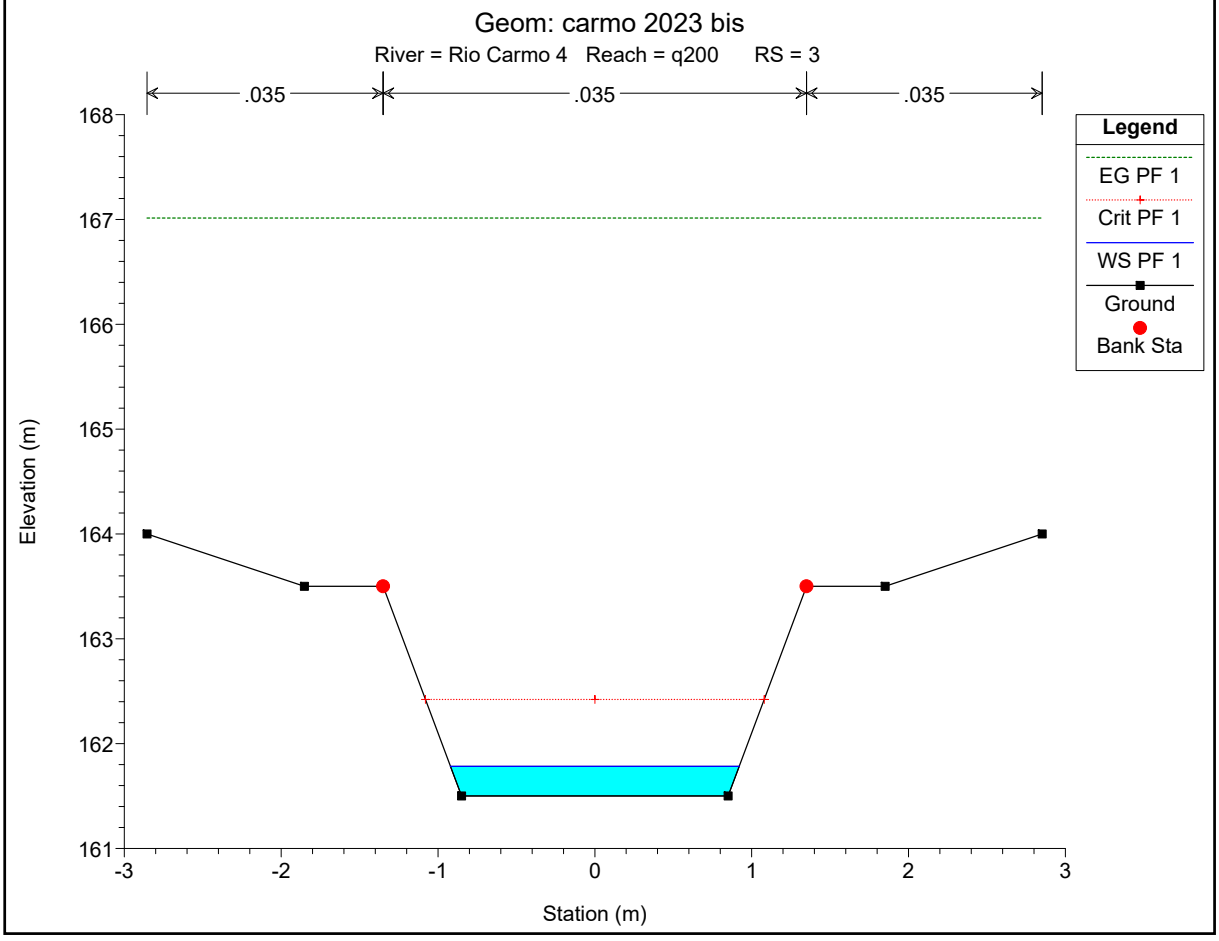

Geom: carmo 2023 bis
River = Rio Carmo 3 Reach = q200 RS = 4.5 IS
.035
.035
.035
171.0
170.5
170.0
169.5
169.0
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

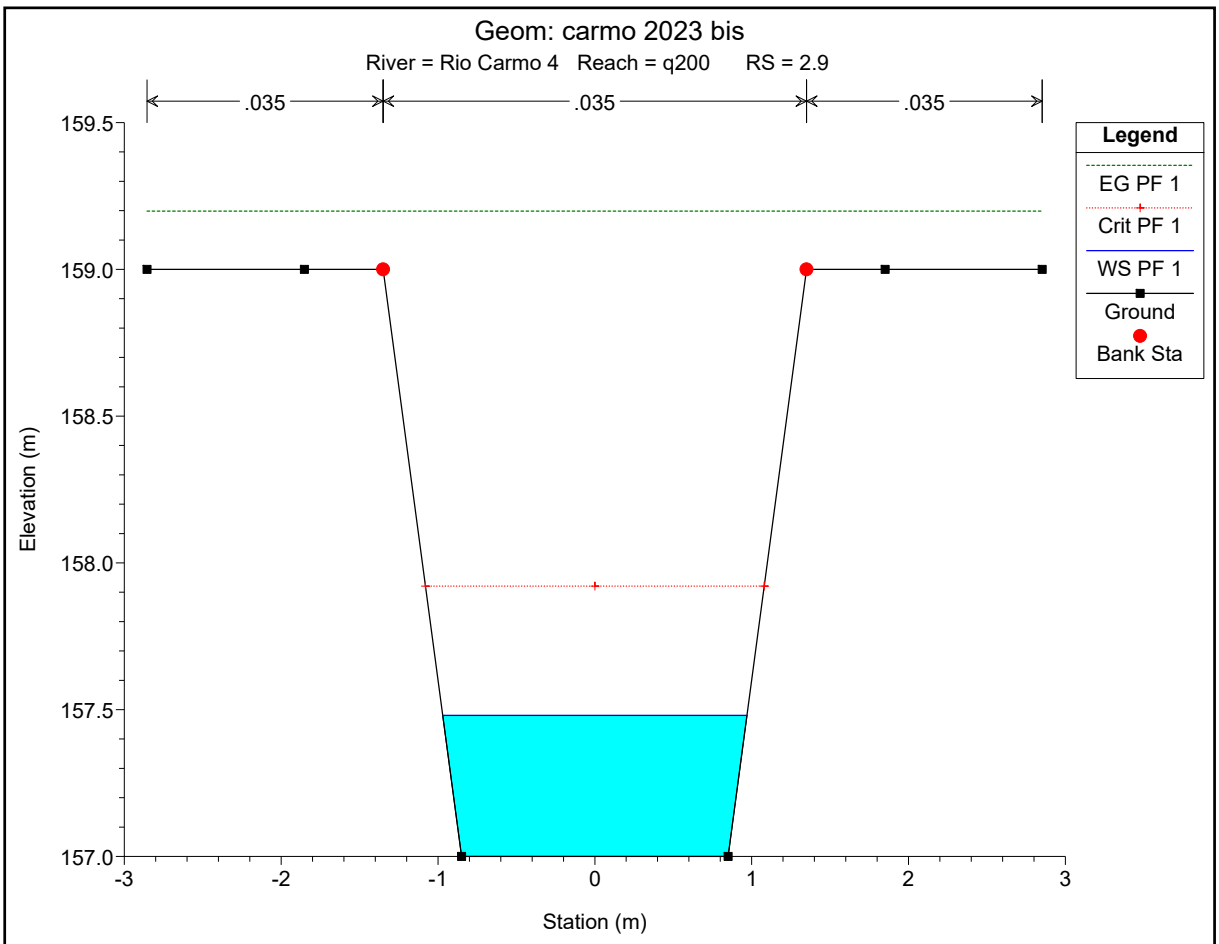

Geom: carmo 2023 bis
River = Rio Carmo 3 Reach = q200 RS = 4
.035
.035
.035
170.0
169.5
169.0
168.5
168.0
167.5
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

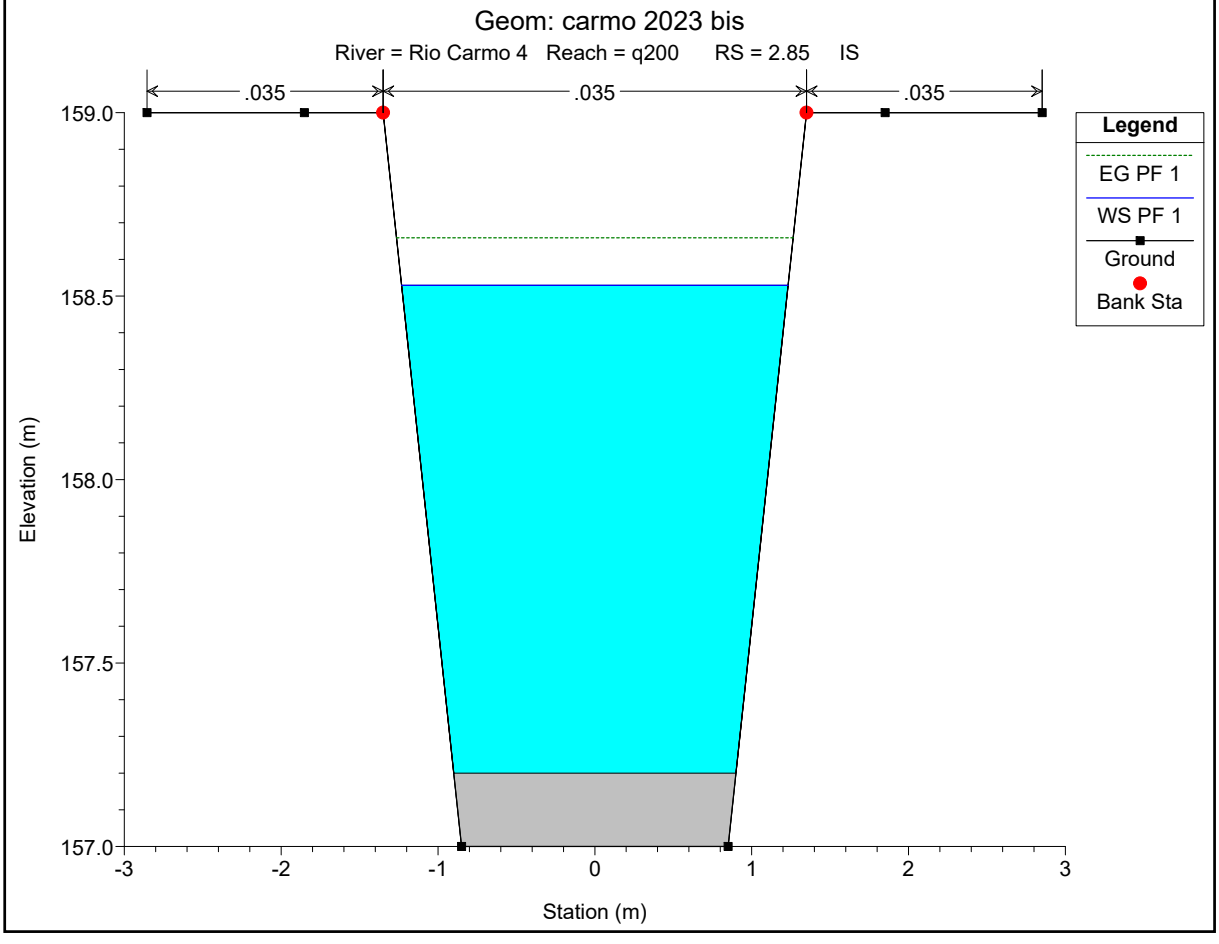

Geom: carmo 2023 bis
River = Rio Carmo 3 Reach = q200 RS = 3.5
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

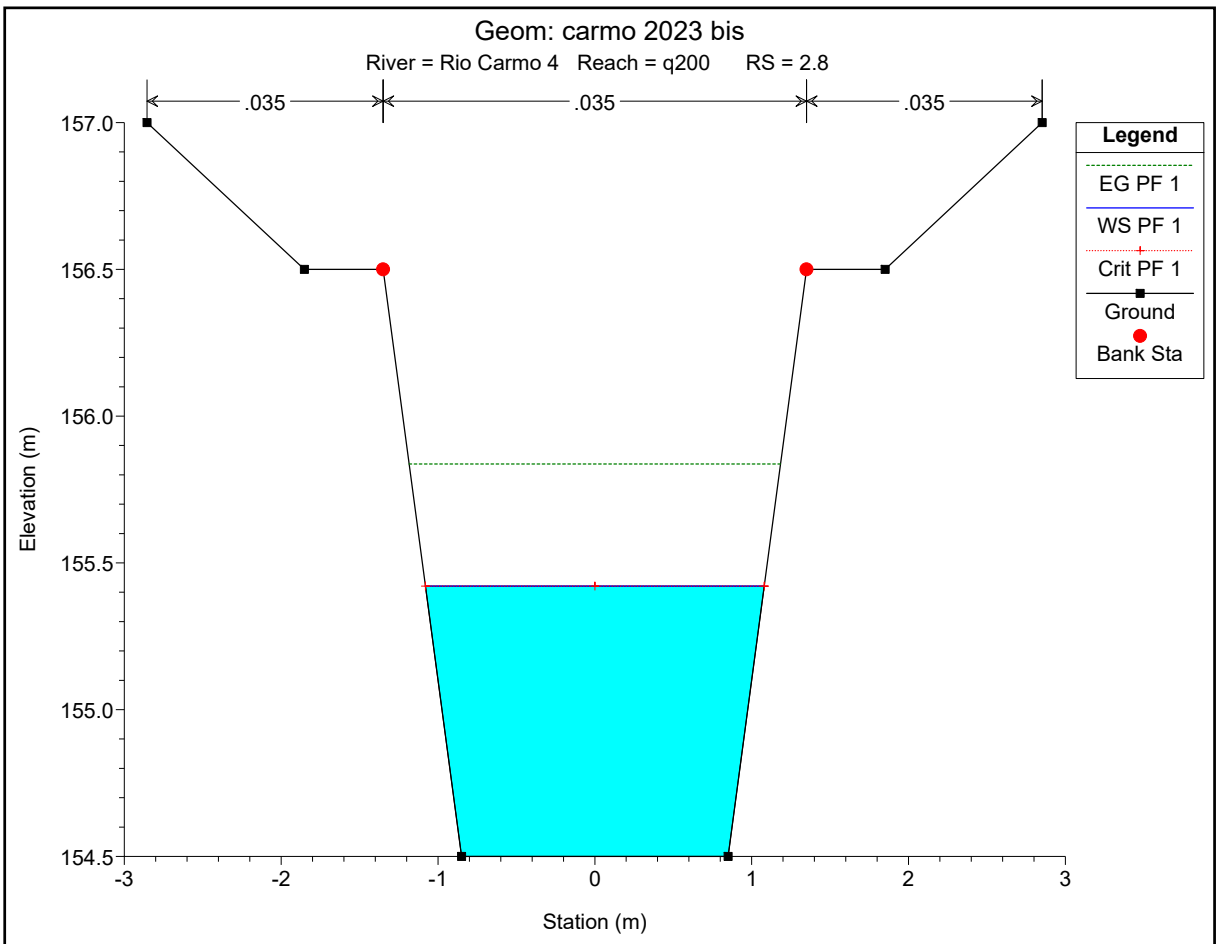

Geom: carmo 2023 bis
River = Rio Carmo 3 Reach = q200 RS = 3.45 IS
.035
.035
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

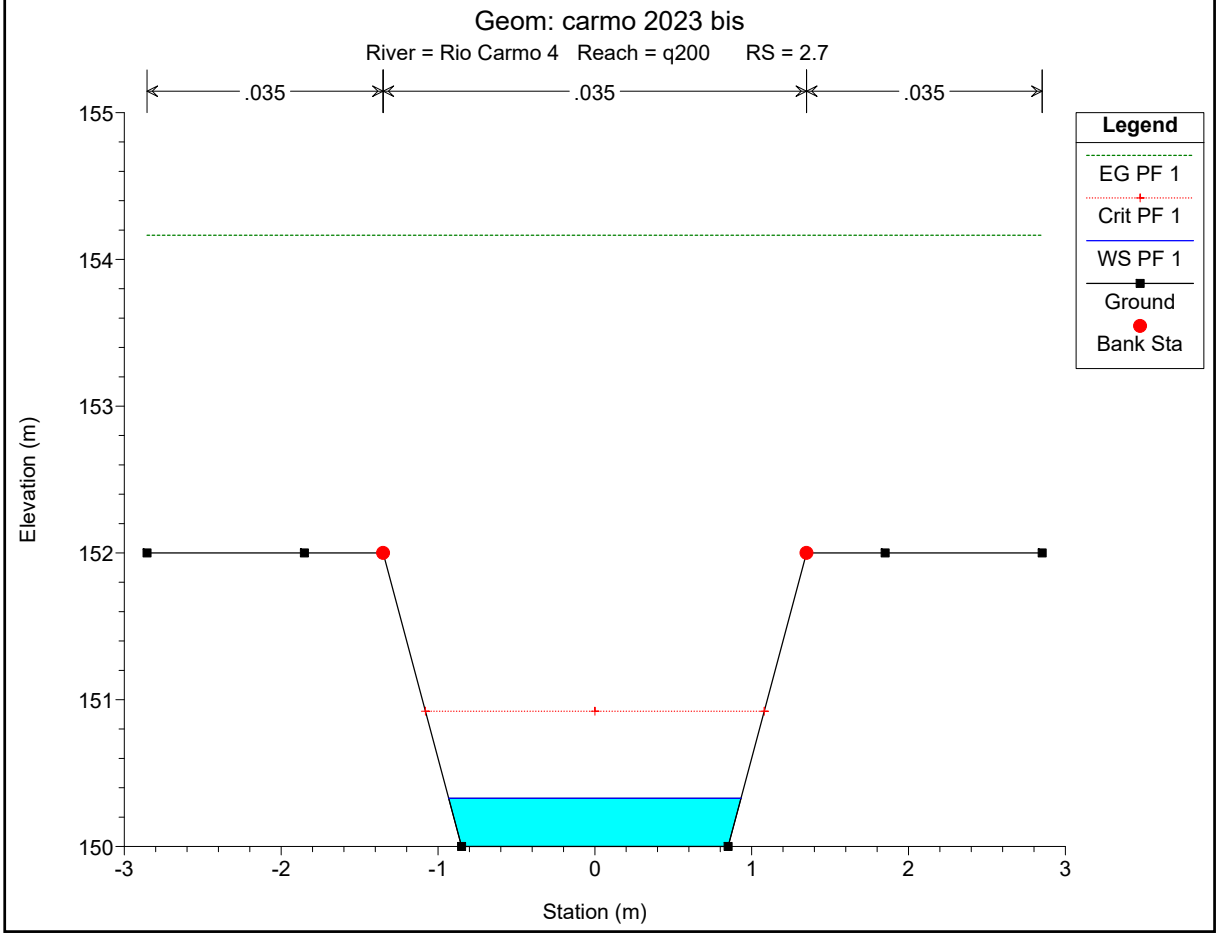

Geom: carmo 2023 bis
River = Rio Carmo 3 Reach = q200 RS = 3.3
.035
.035
.035
164.0
163.5
163.0
162.5
162.0
161.5
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

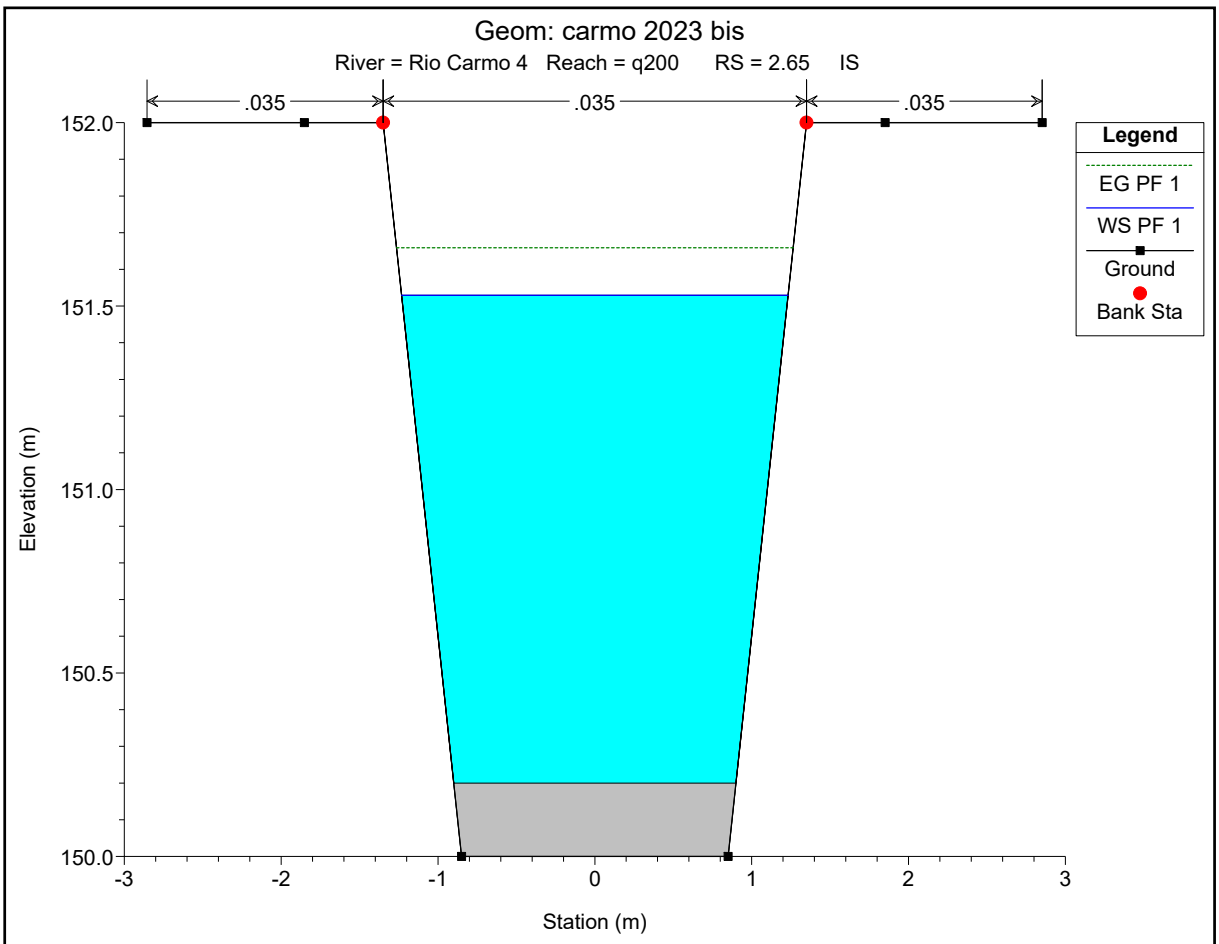

Geom: carmo 2023 bis
River = Rio Carmo 4 Reach = q200 RS = 3
.035
.035
.035
168
167
166
165
164
163
162
161
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

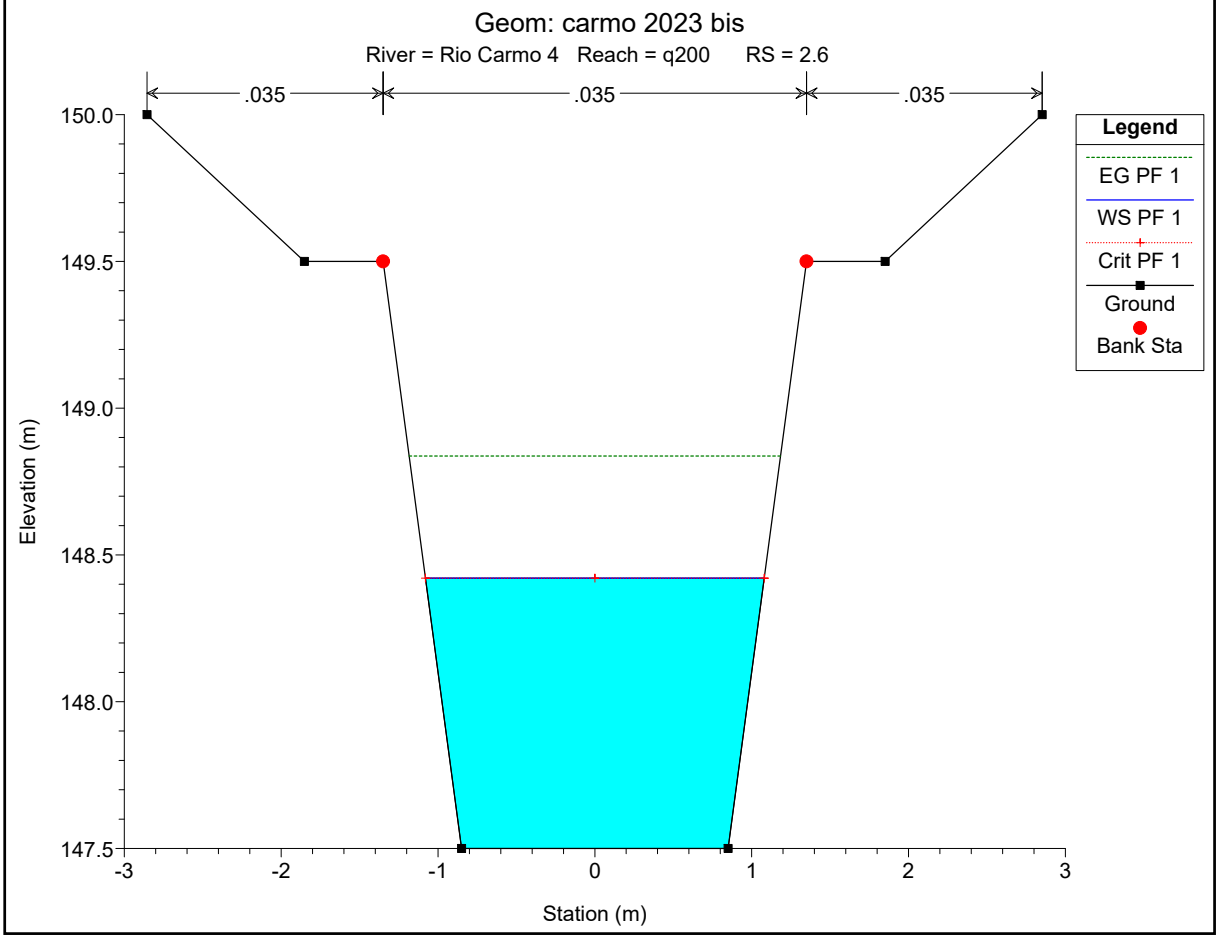

Geom: carmo 2023 bis
River = Rio Carmo 4 Reach = q200 RS = 2.9
.035
.035
.035
159.5
159.0
158.5
158.0
157.5
157.0
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

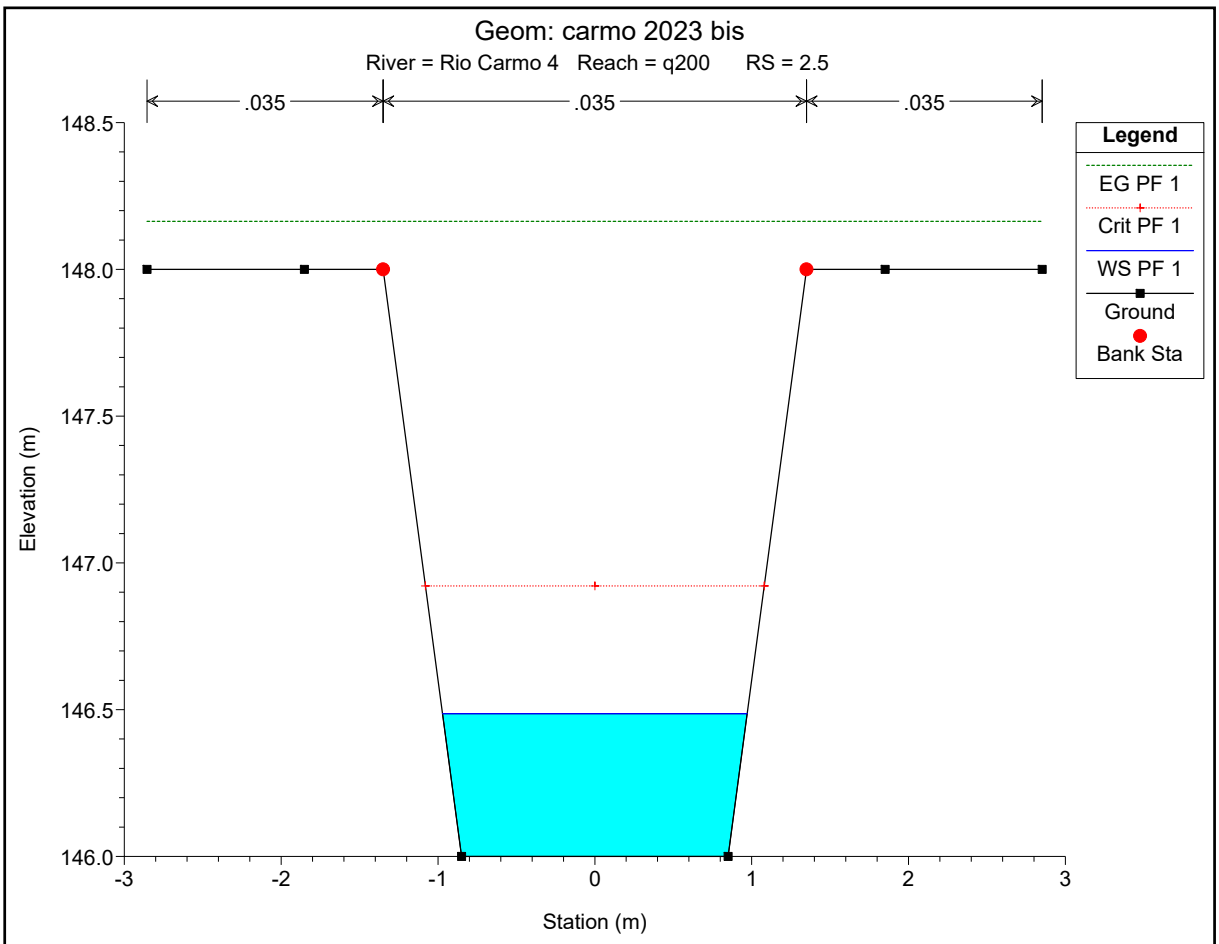

Geom: carmo 2023 bis
River = Rio Carmo 4 Reach = q200 RS = 2.85 IS
.035
.035
.035
159.0
158.5
158.0
157.5
157.0
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

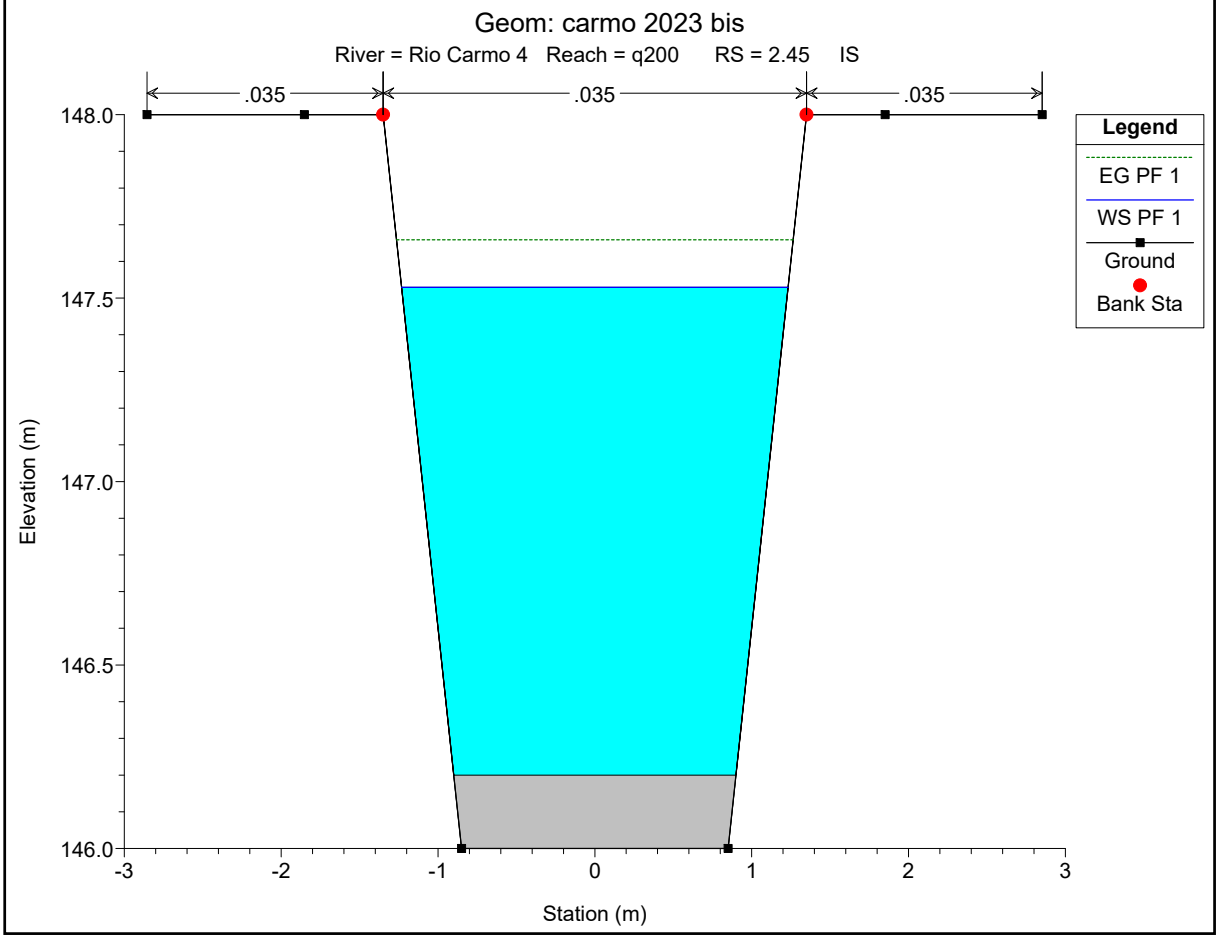

Geom: carmo 2023 bis
River = Rio Carmo 4 Reach = q200 RS = 2.8
.035
.035
.035
157.0
156.5
156.0
155.5
155.0
154.5
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

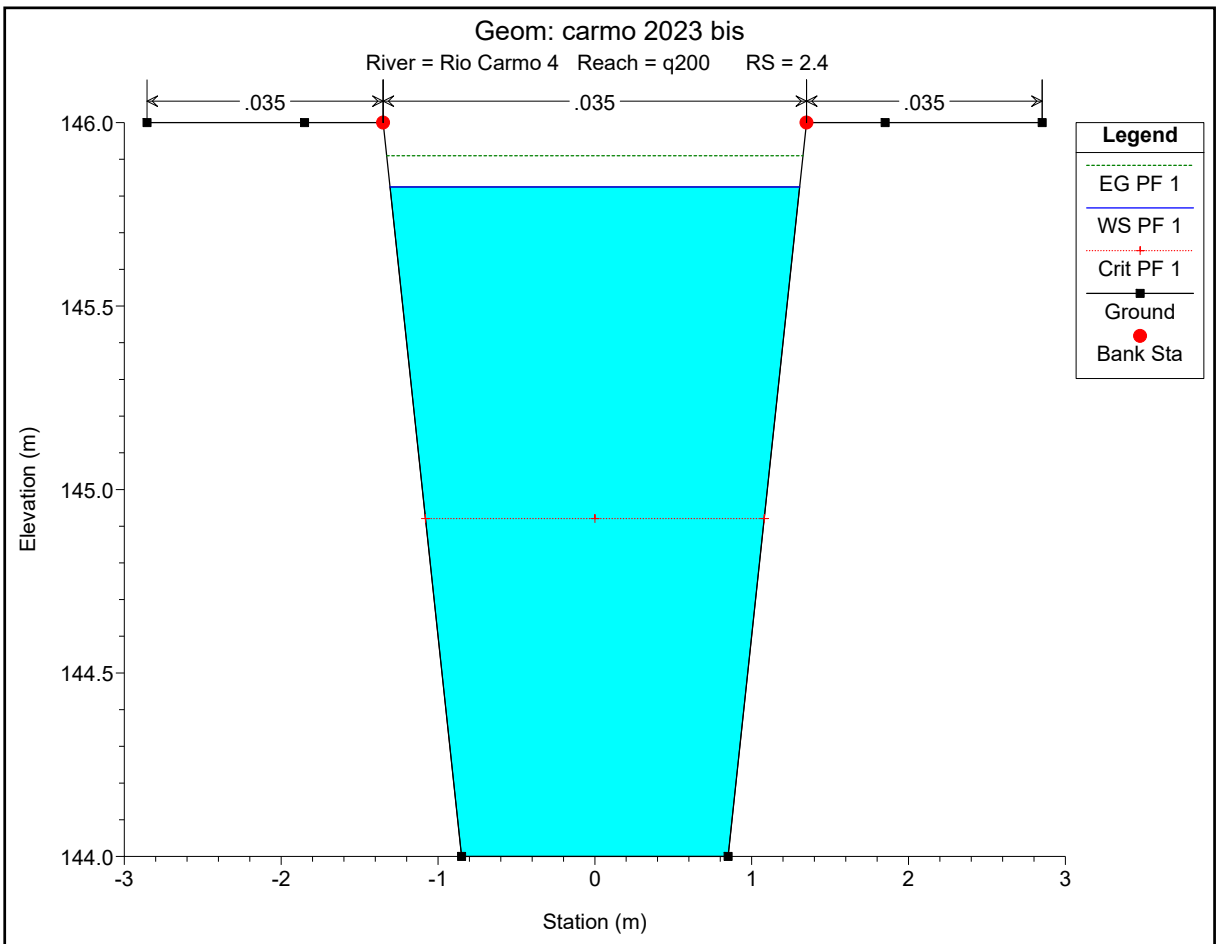

Geom: carmo 2023 bis
River = Rio Carmo 4 Reach = q200 RS = 2.7
.035
.035
.035
155
154
153
152
151
150
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

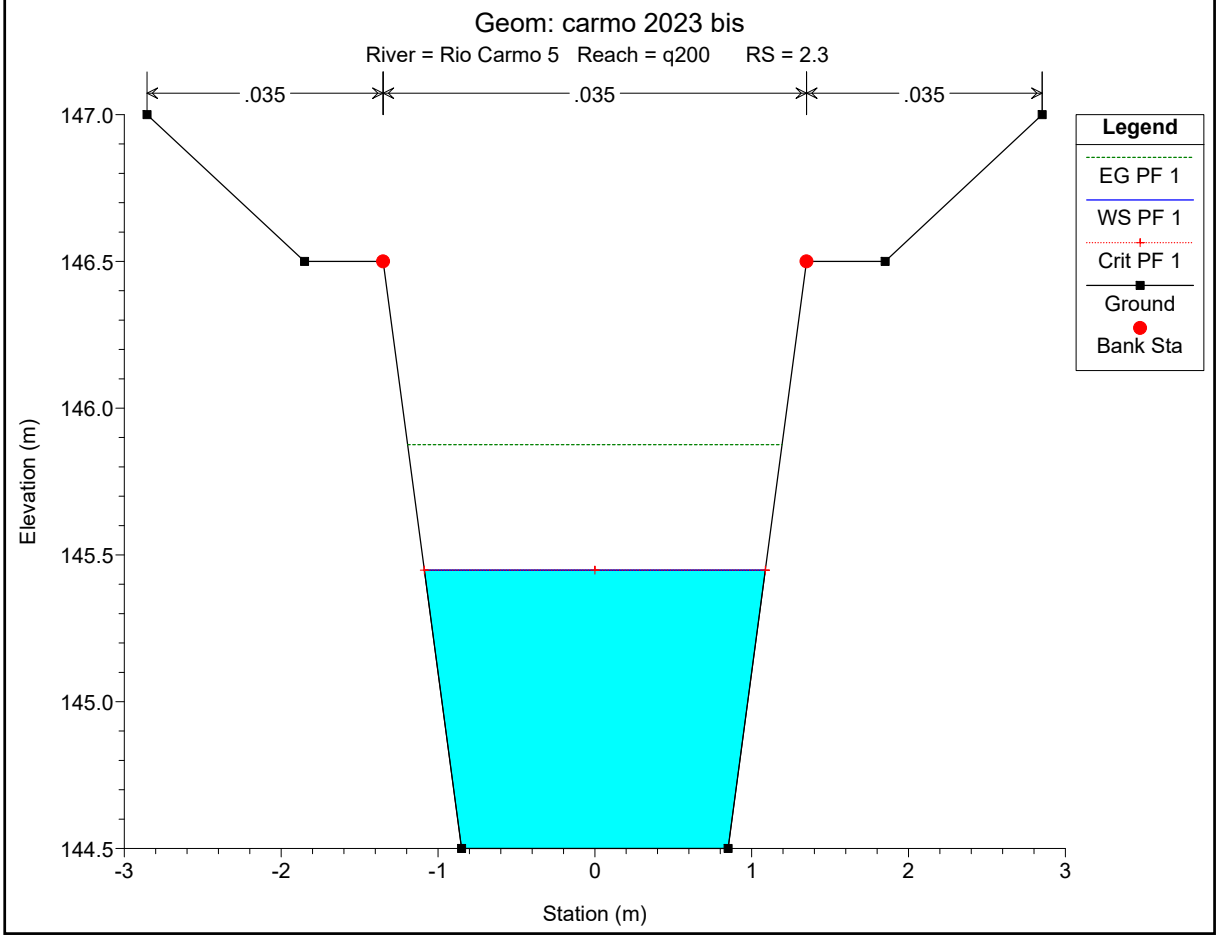

Geom: carmo 2023 bis
River = Rio Carmo 4 Reach = q200 RS = 2.65 IS
.035
.035
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
152.0
151.5
151.0
150.5
150.0
-3
-2
-1
0
1
2
3

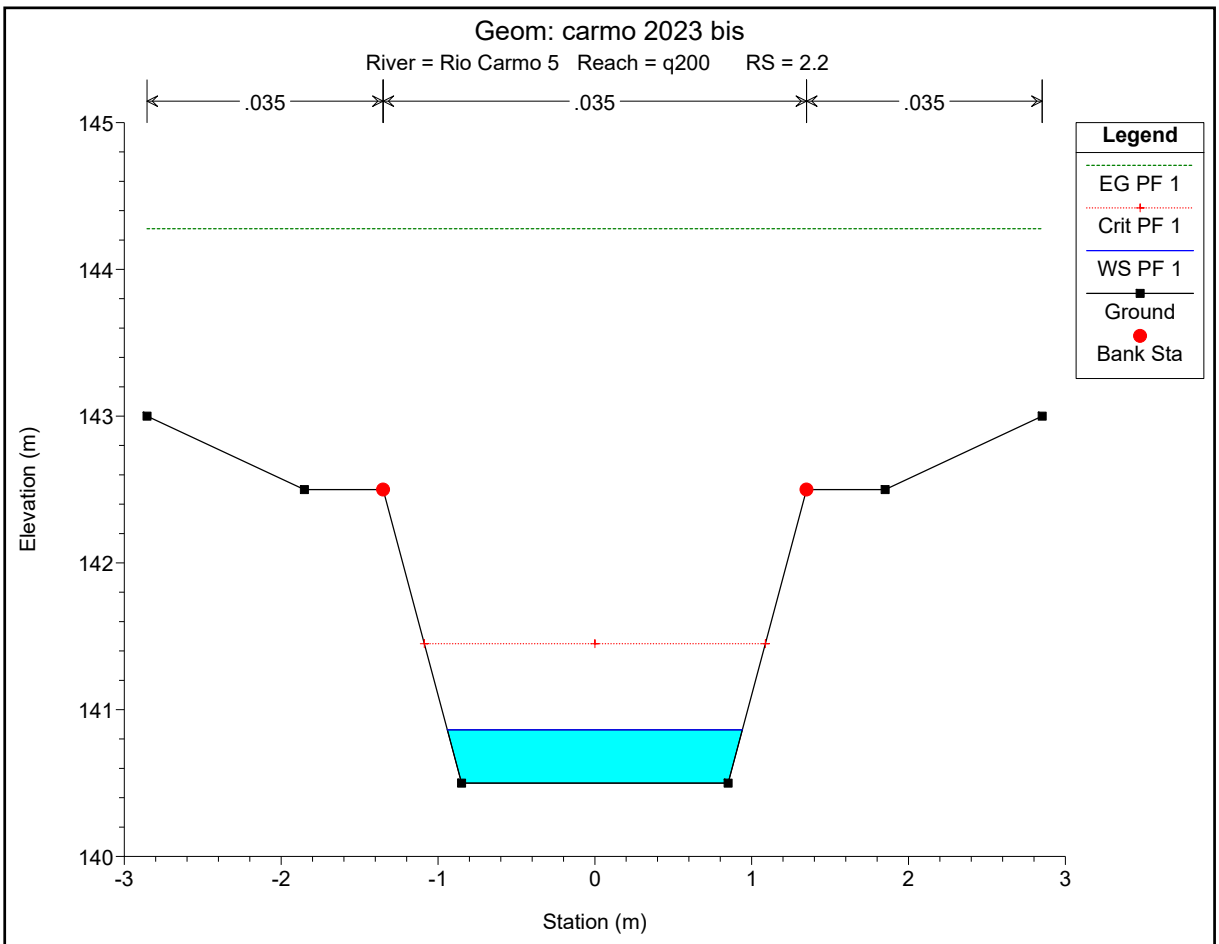

Geom: carmo 2023 bis
River = Rio Carmo 4 Reach = q200 RS = 2.6
.035
.035
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
150.0
149.5
149.0
148.5
148.0
147.5
-3
-2
-1
0
1
2
3

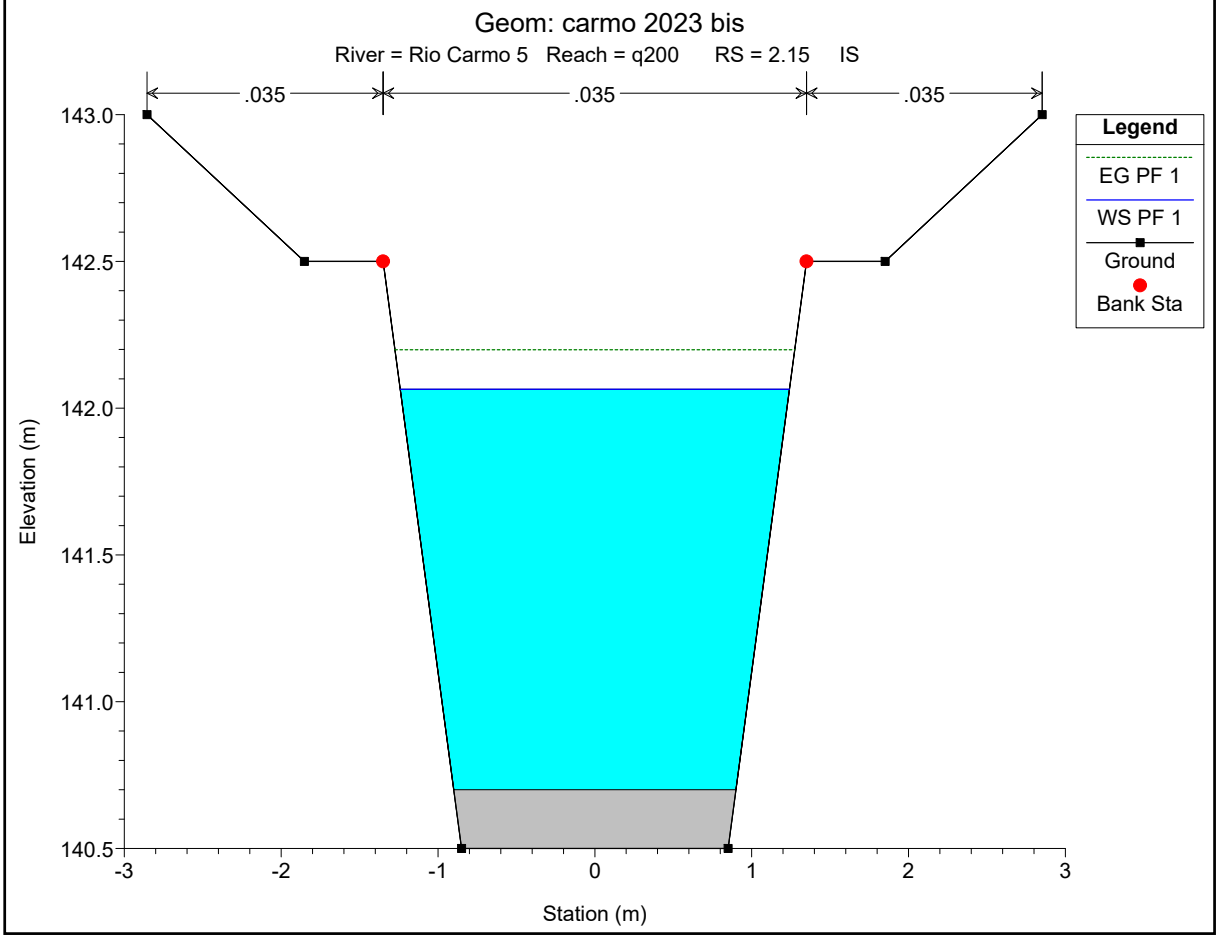

Geom: carmo 2023 bis
River = Rio Carmo 4 Reach = q200 RS = 2.5
.035
.035
.035
148.5
148.0
147.5
147.0
146.5
146.0
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

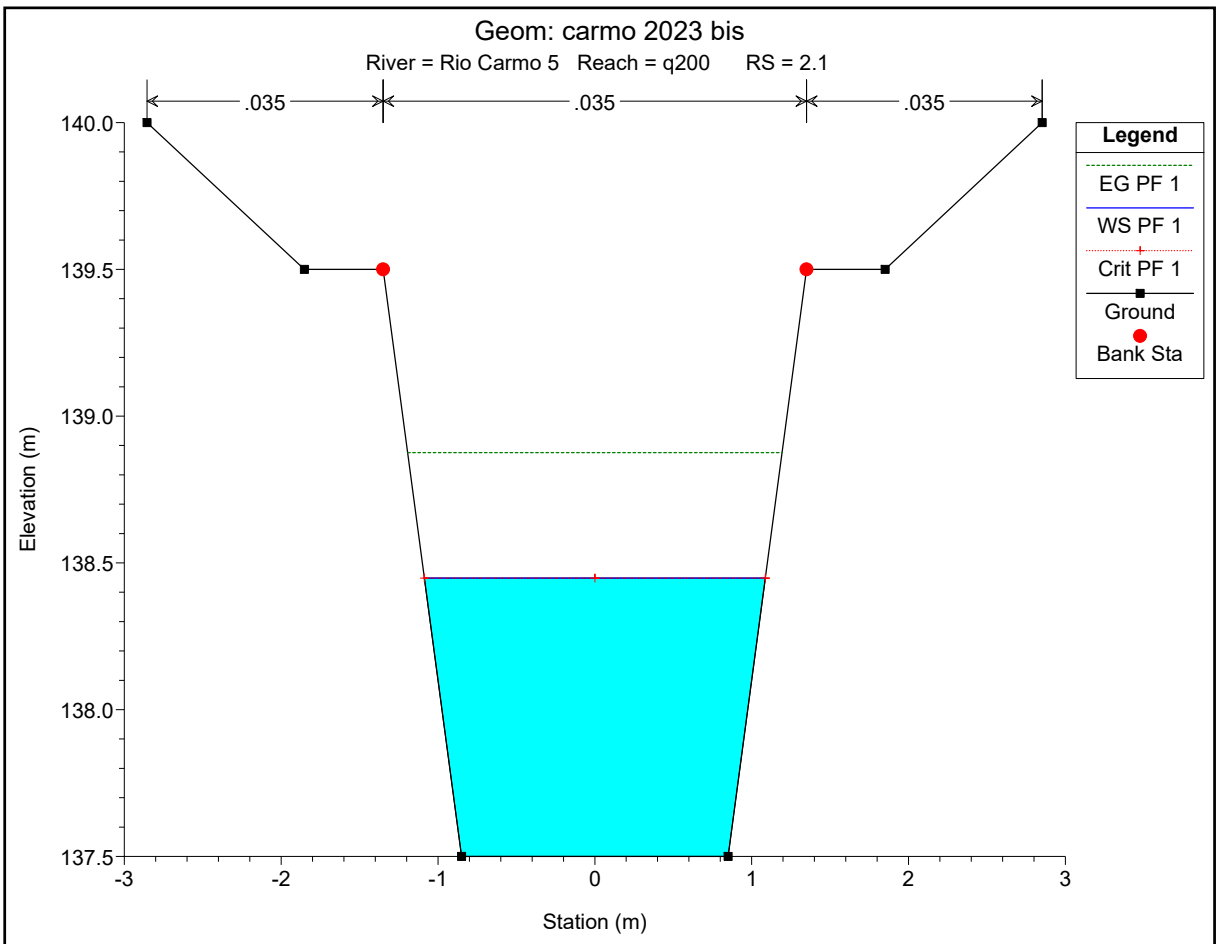

Geom: carmo 2023 bis
River = Rio Carmo 4 Reach = q200 RS = 2.45 IS
.035
.035
.035
148.0
147.5
147.0
146.5
146.0
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

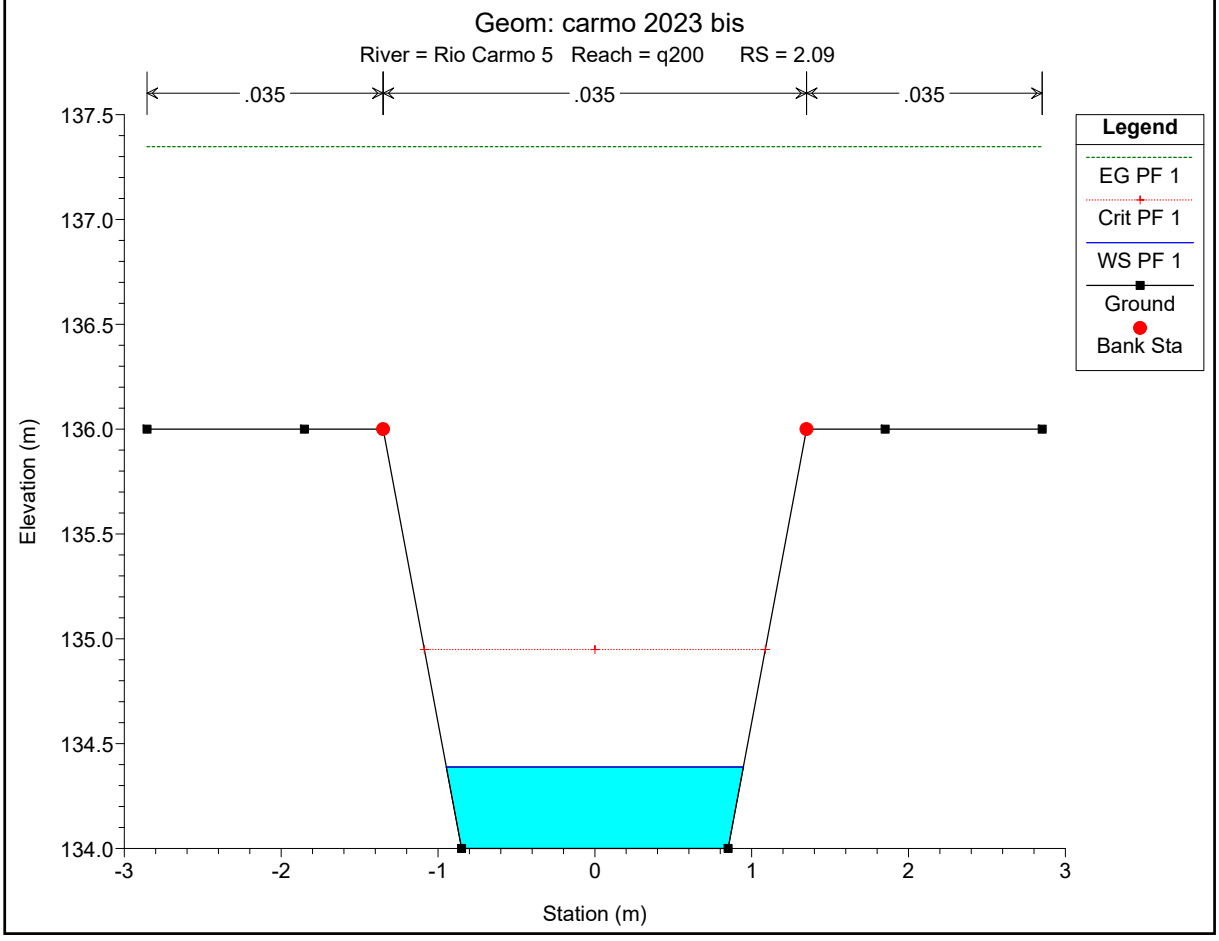

Geom: carmo 2023 bis
River = Rio Carmo 4 Reach = q200 RS = 2.4
.035
.035
.035
146.0
145.5
145.0
144.5
144.0
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

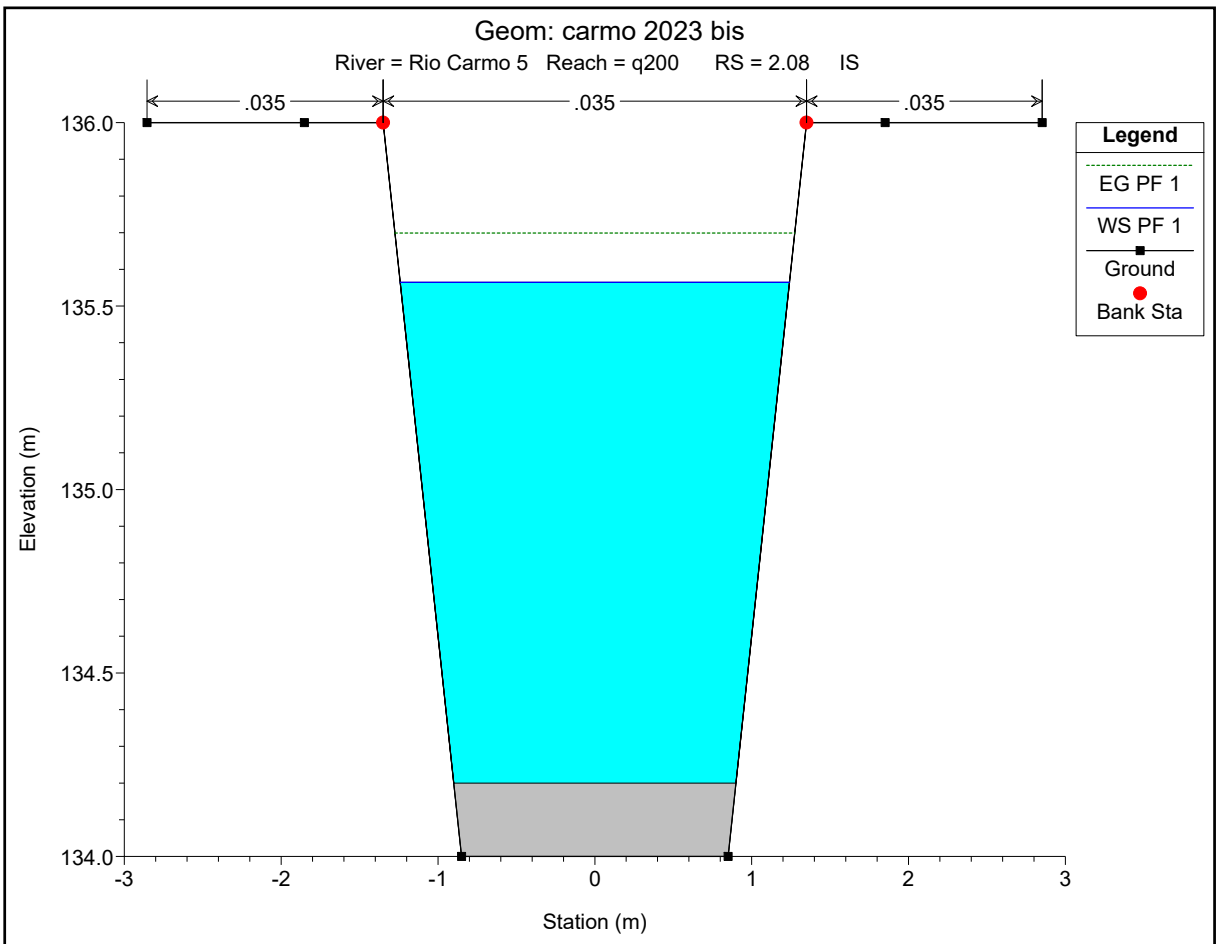

Geom: carmo 2023 bis
River = Rio Carmo 5 Reach = q200 RS = 2.3
.035
.035
.035
147.0
146.5
146.0
145.5
145.0
144.5
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

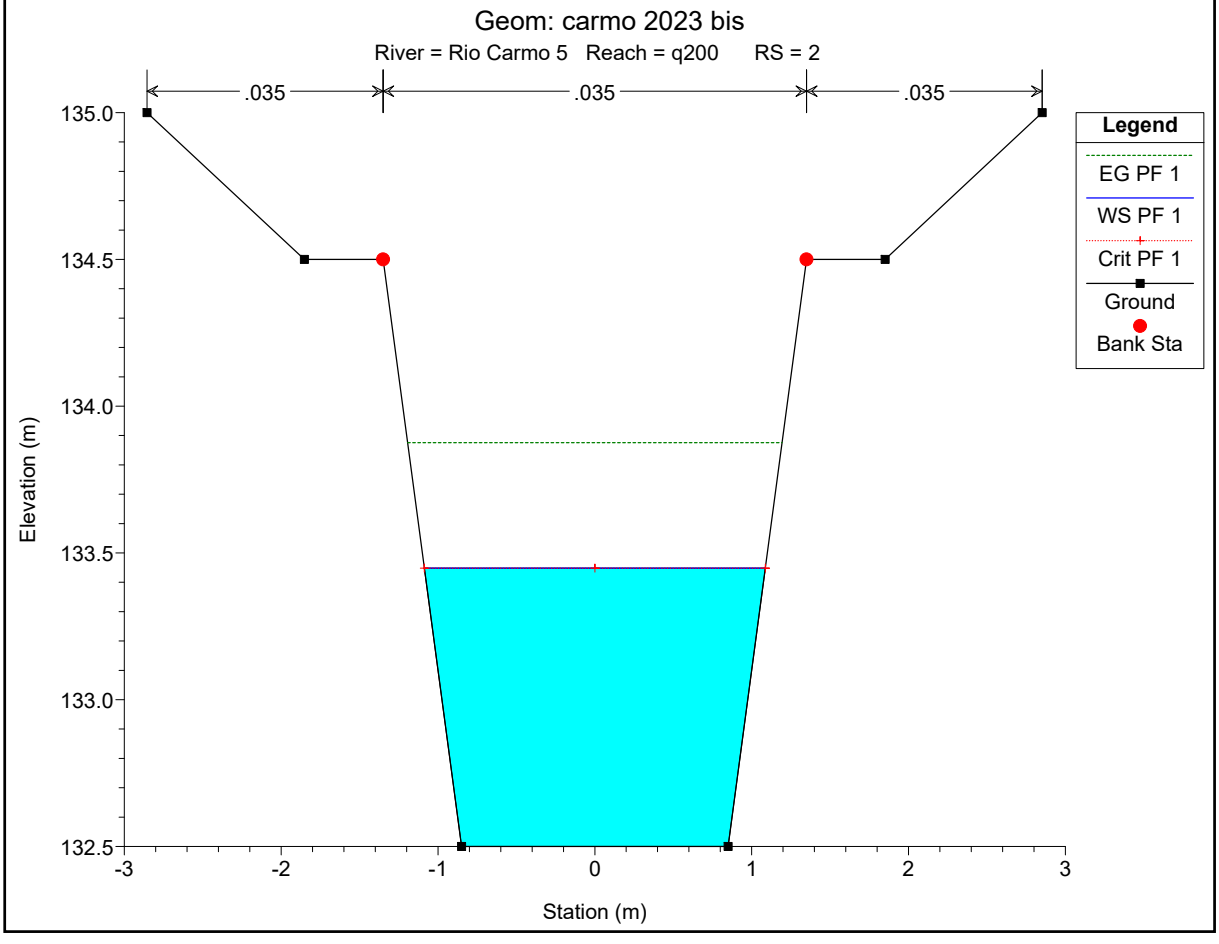

Geom: carmo 2023 bis
River = Rio Carmo 5 Reach = q200 RS = 2.2
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
145
144
143
142
141
140
-3
-2
-1
0
1
2
3

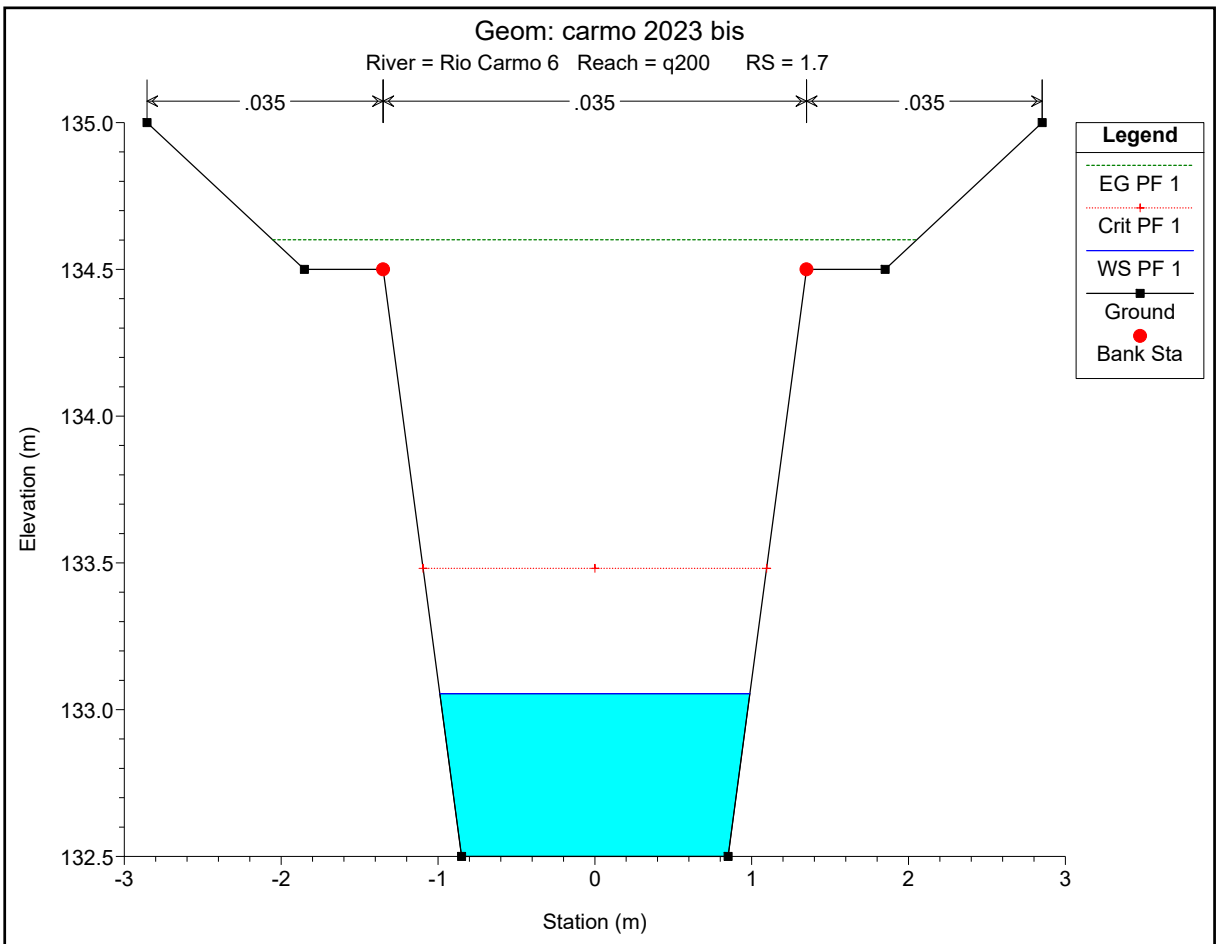

Geom: carmo 2023 bis
River = Rio Carmo 5 Reach = q200 RS = 2.15 IS
.035
.035
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
143.0
142.5
142.0
141.5
141.0
140.5
-3
-2
-1
0
1
2
3

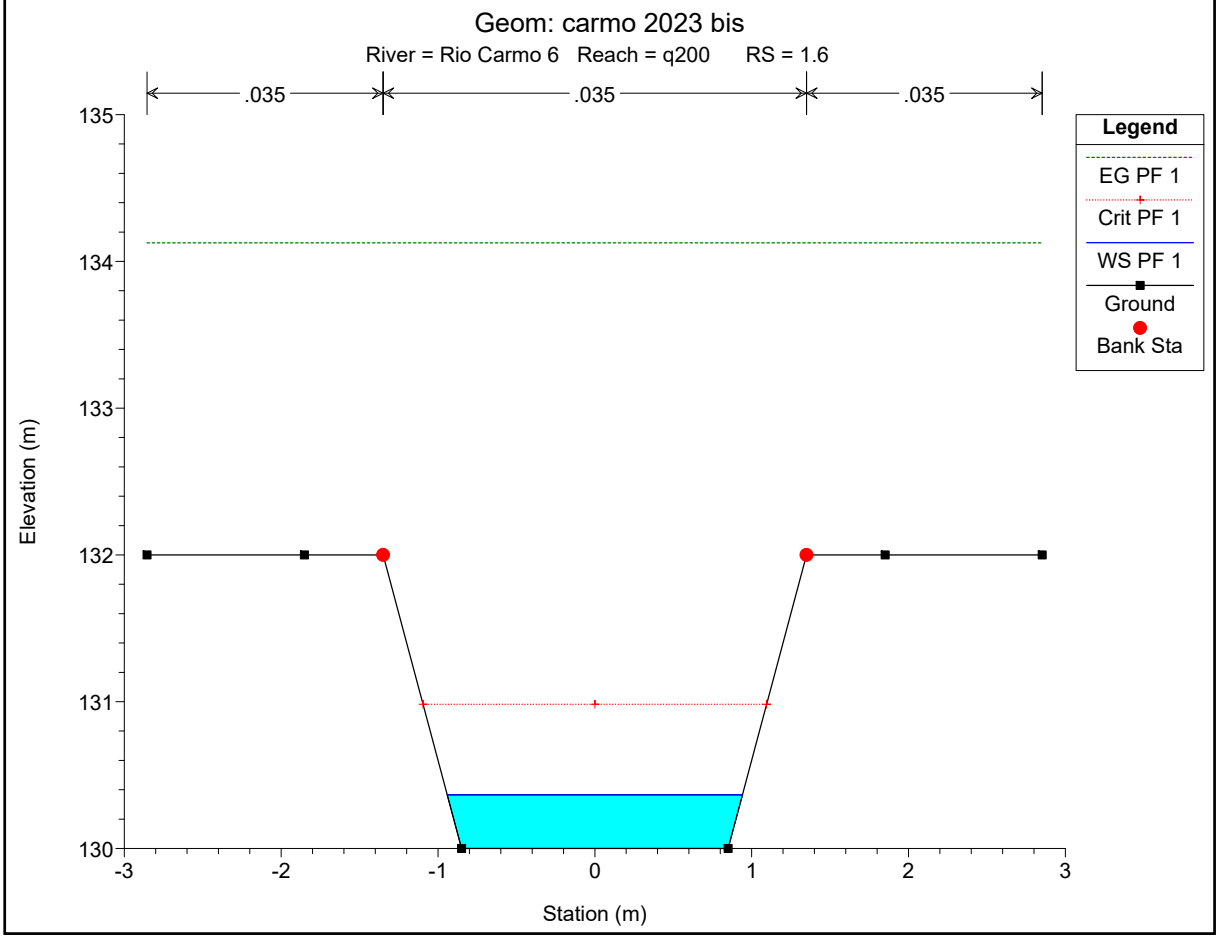

Geom: carmo 2023 bis
River = Rio Carmo 5 Reach = q200 RS = 2.1
.035
.035
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
140.0
139.5
139.0
138.5
138.0
137.5
-3
-2
-1
0
1
2
3

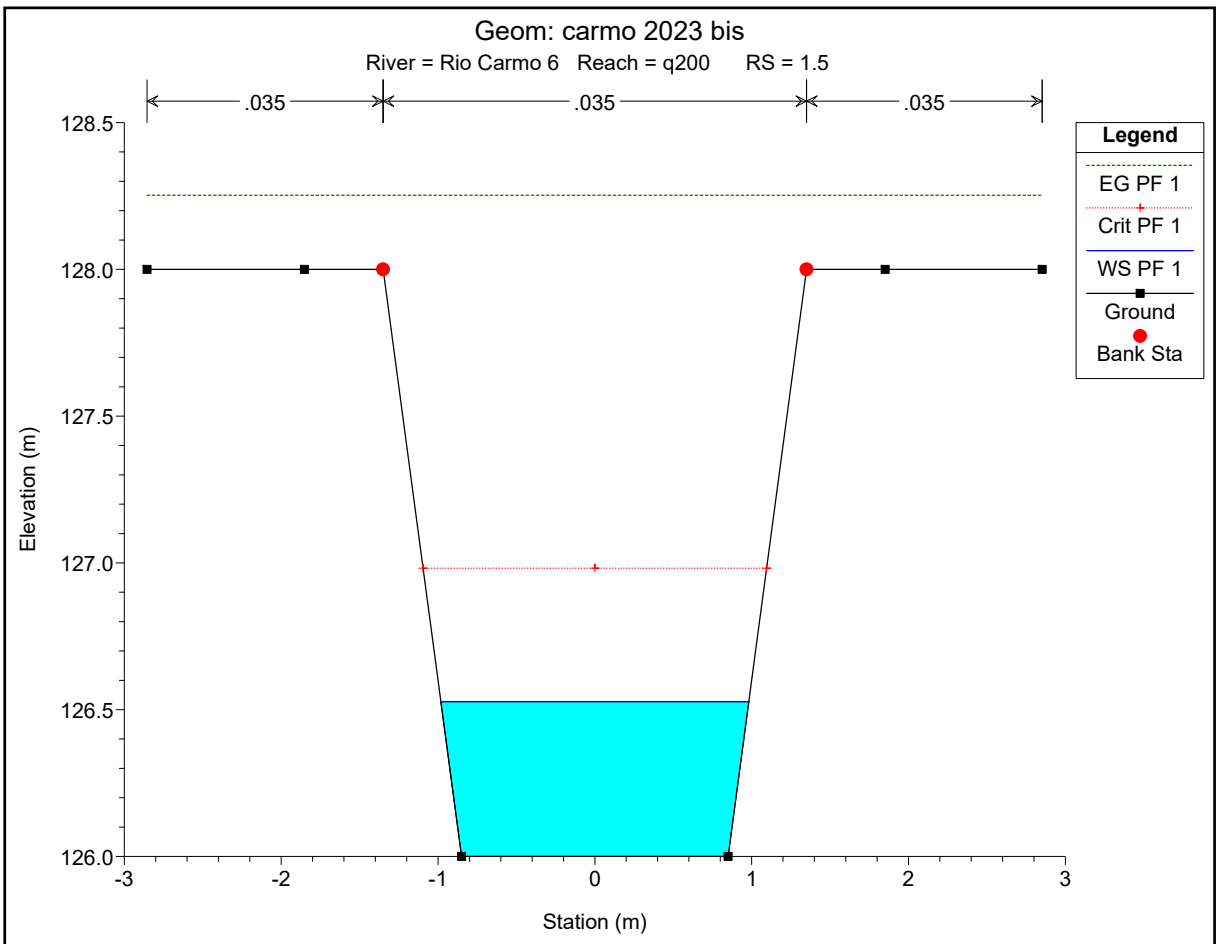

Geom: carmo 2023 bis
River = Rio Carmo 5 Reach = q200 RS = 2.09
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
137.5
137.0
136.5
136.0
135.5
135.0
134.5
134.0
-3
-2
-1
0
1
2
3

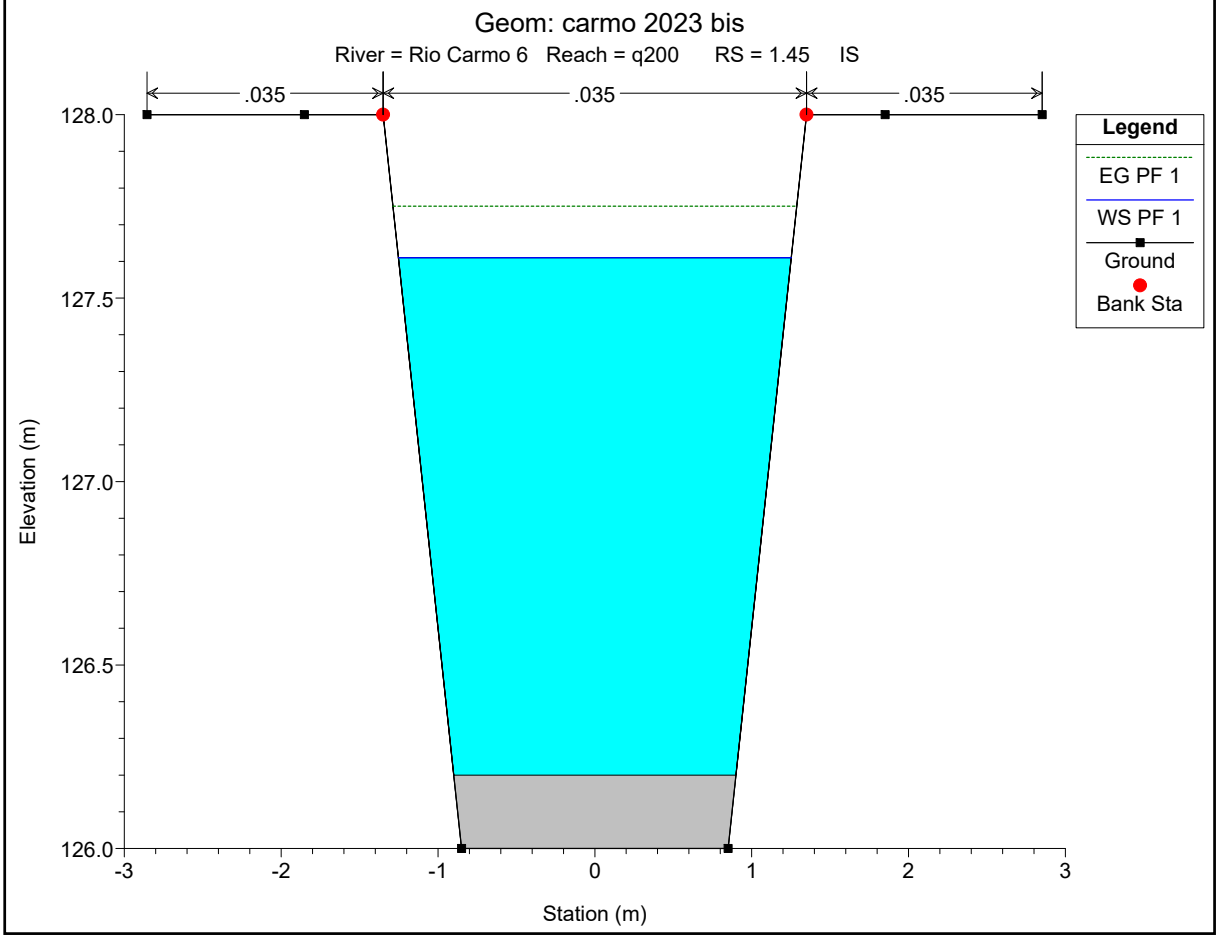

Geom: carmo 2023 bis
River = Rio Carmo 5 Reach = q200 RS = 2.08 IS
.035
.035
.035
136.0
135.5
135.0
134.5
134.0
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

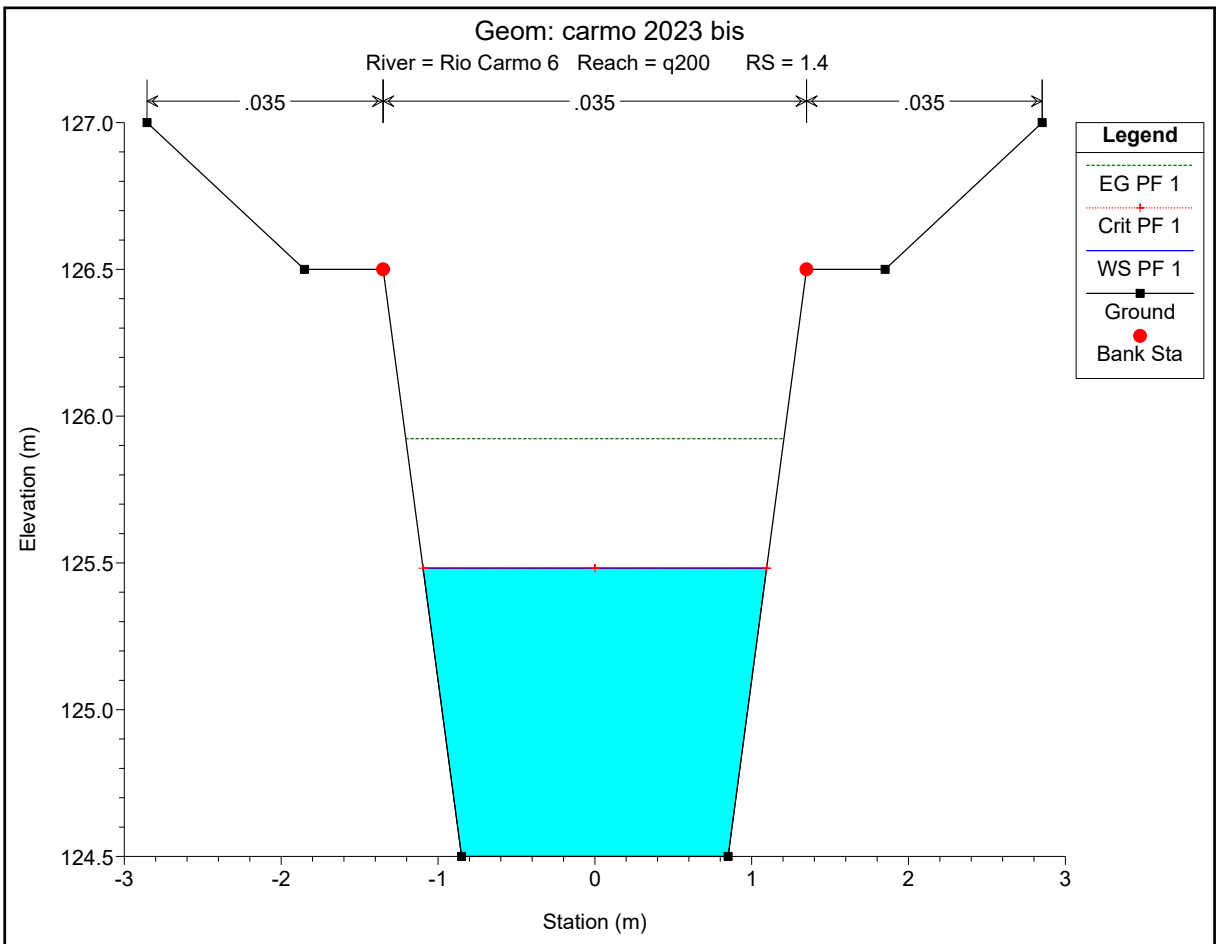

Geom: carmo 2023 bis
River = Rio Carmo 5 Reach = q200 RS = 2
.035
.035
.035
135.0
134.5
134.0
133.5
133.0
132.5
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

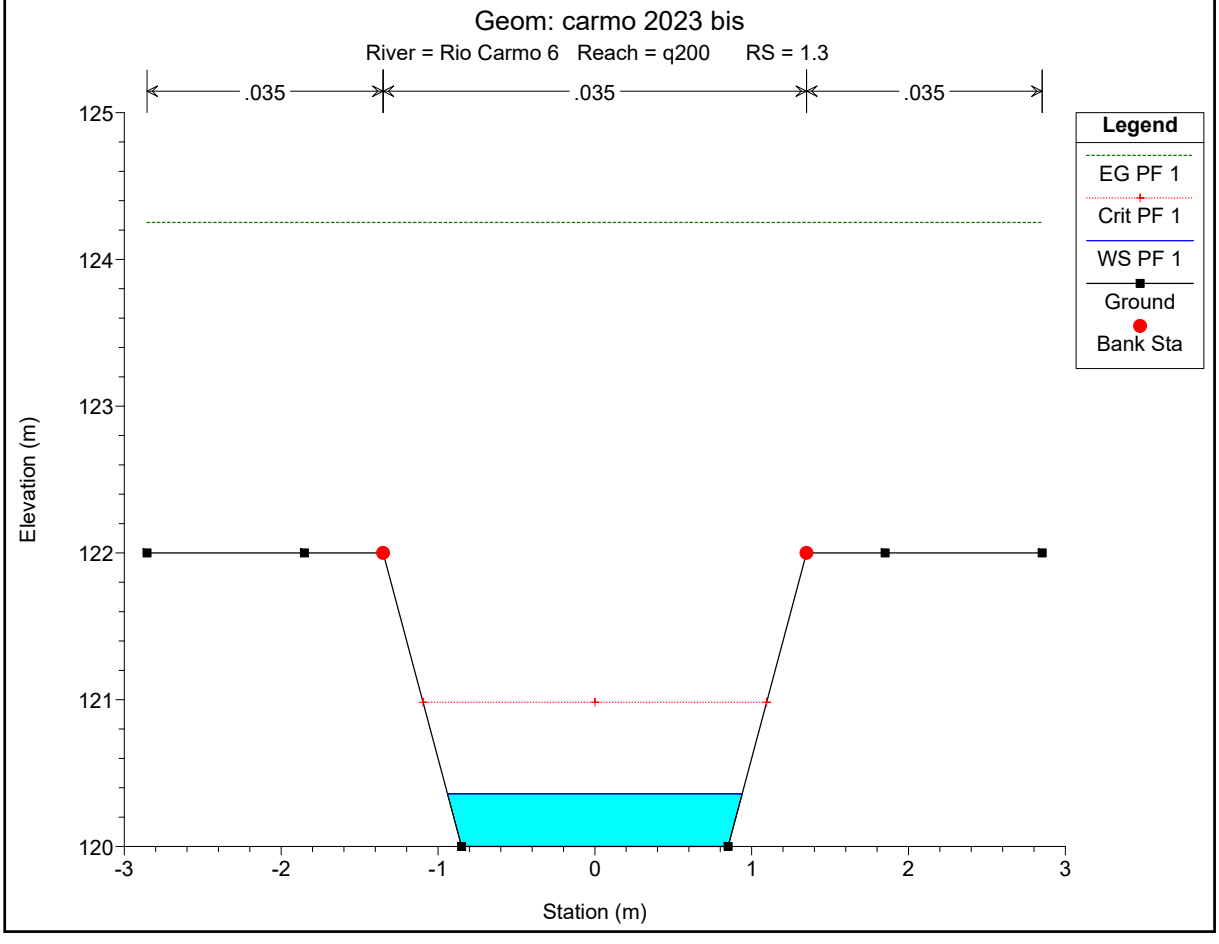

Geom: carmo 2023 bis
River = Rio Carmo 6 Reach = q200 RS = 1.7
.035
.035
.035
135.0
134.5
134.0
133.5
133.0
132.5
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

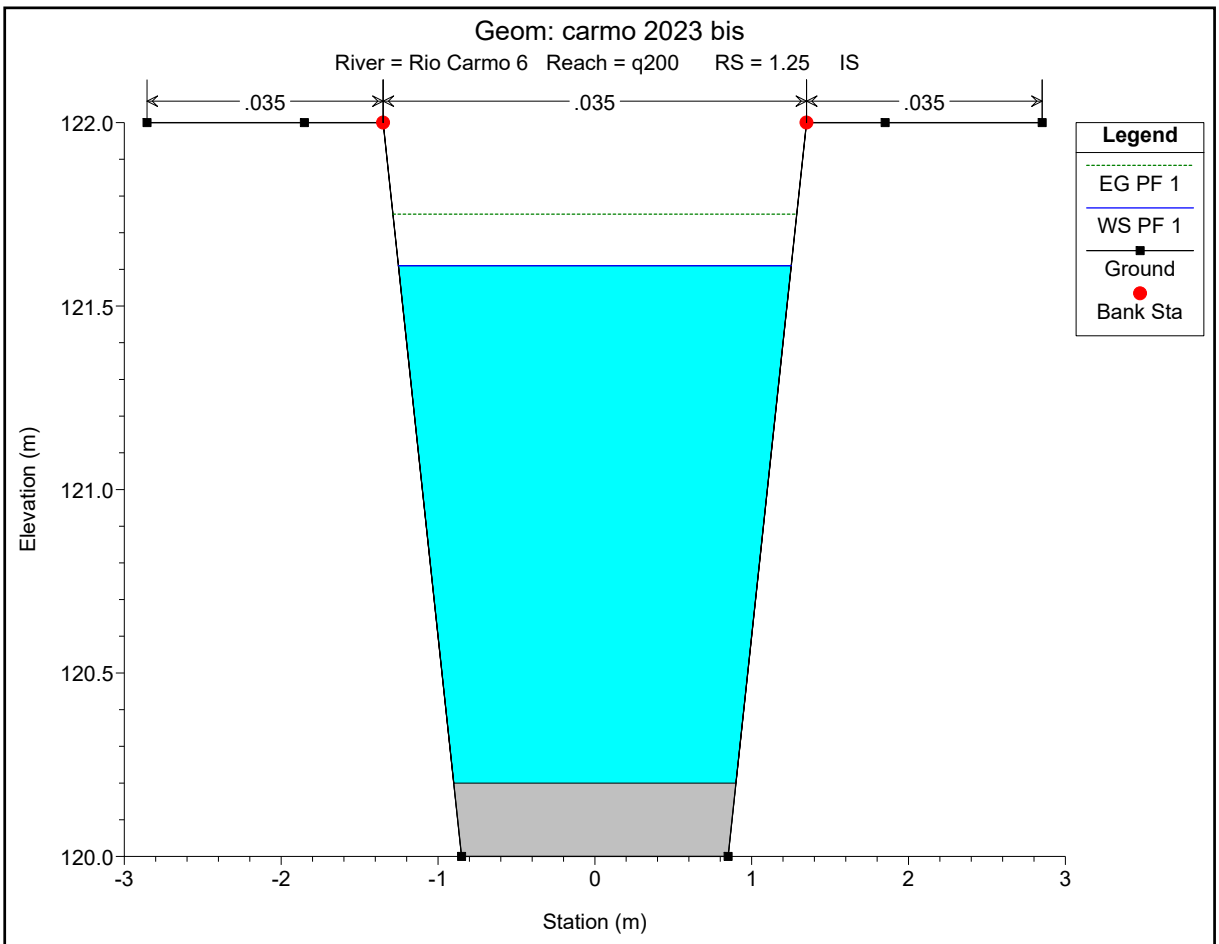

Geom: carmo 2023 bis
River = Rio Carmo 6 Reach = q200 RS = 1.6
.035
.035
.035
135
134
133
132
131
130
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

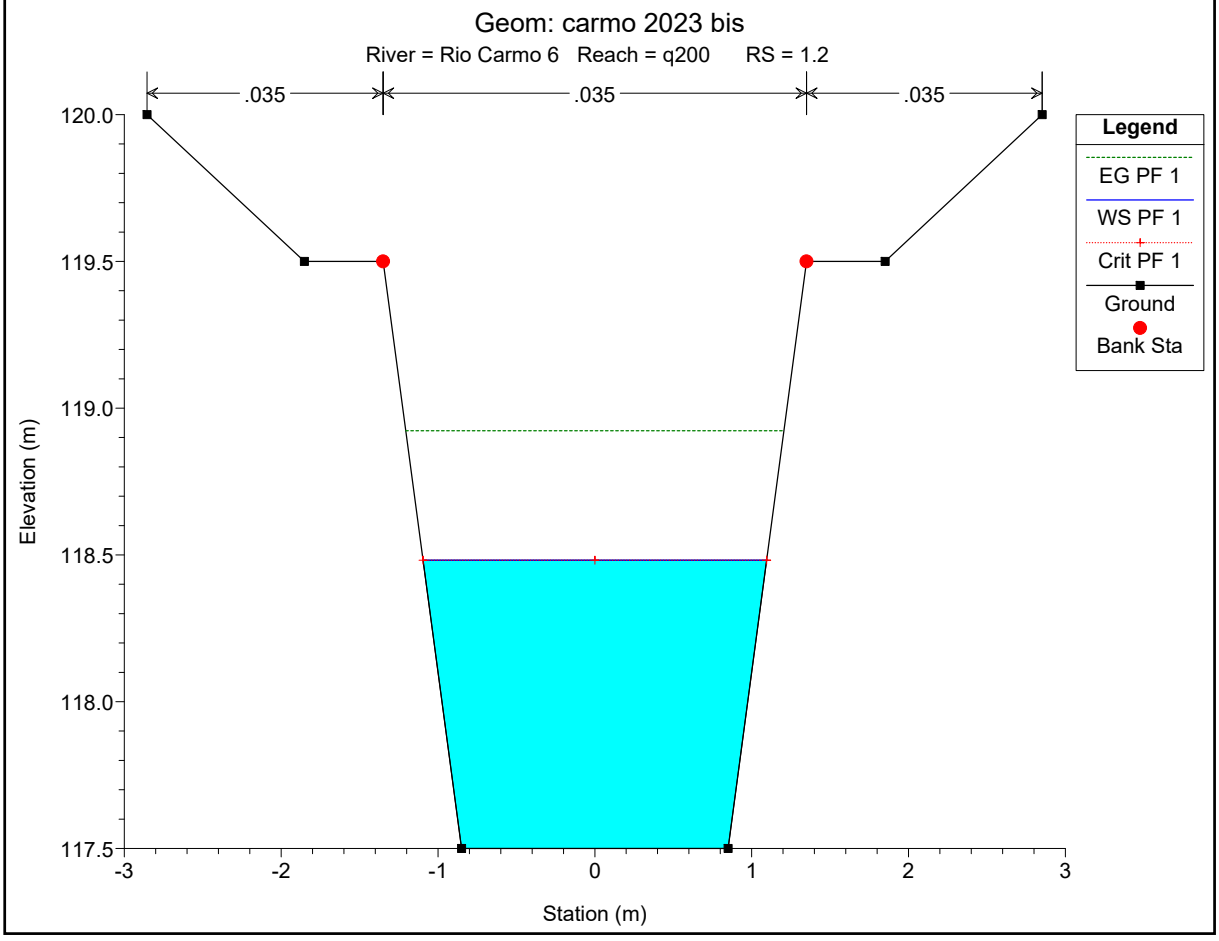

Geom: carmo 2023 bis
River = Rio Carmo 6 Reach = q200 RS = 1.5
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
128.5
128.0
127.5
127.0
126.5
126.0
-3
-2
-1
0
1
2
3

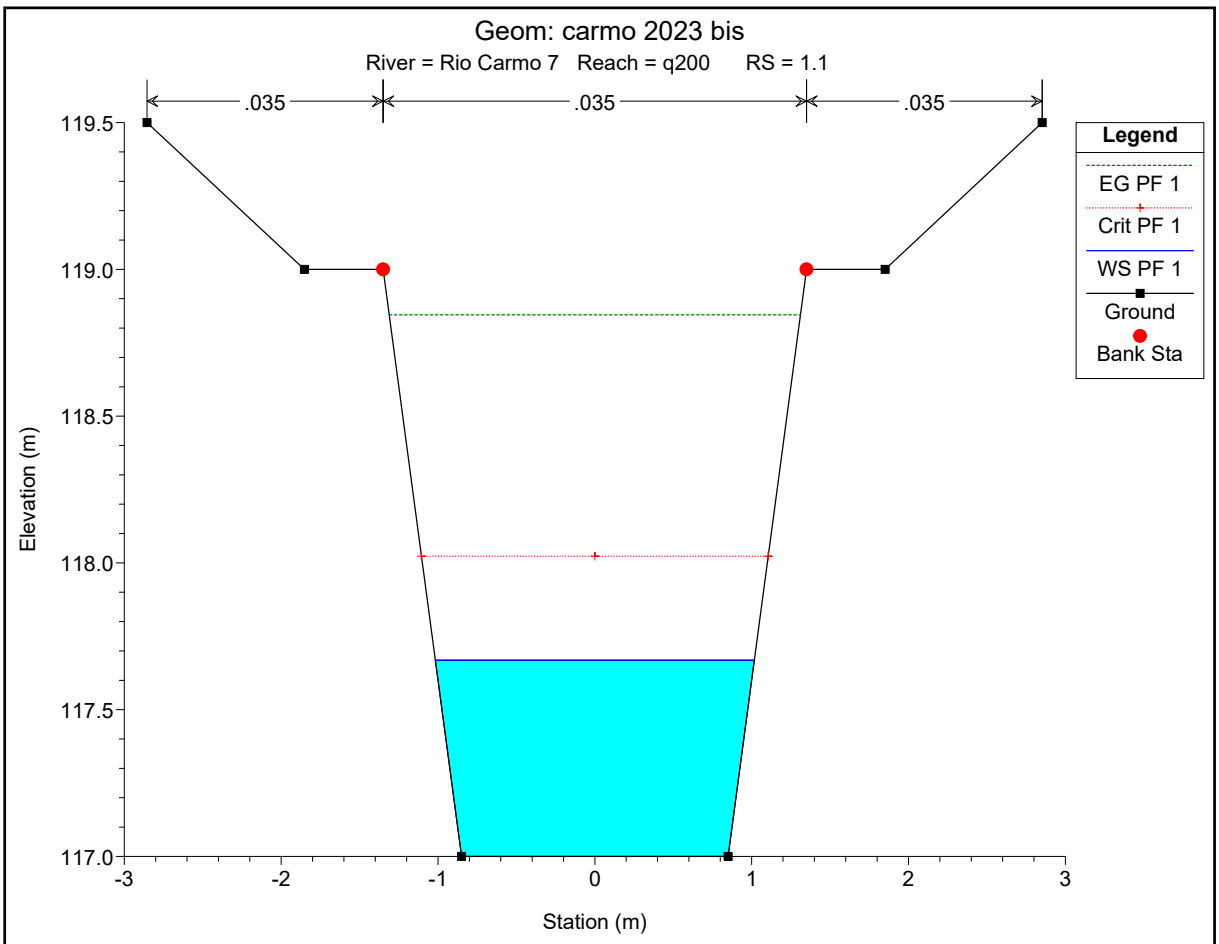

Geom: carmo 2023 bis
River = Rio Carmo 6 Reach = q200 RS = 1.45 IS
.035
.035
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
128.0
127.5
127.0
126.5
126.0
-3
-2
-1
0
1
2
3

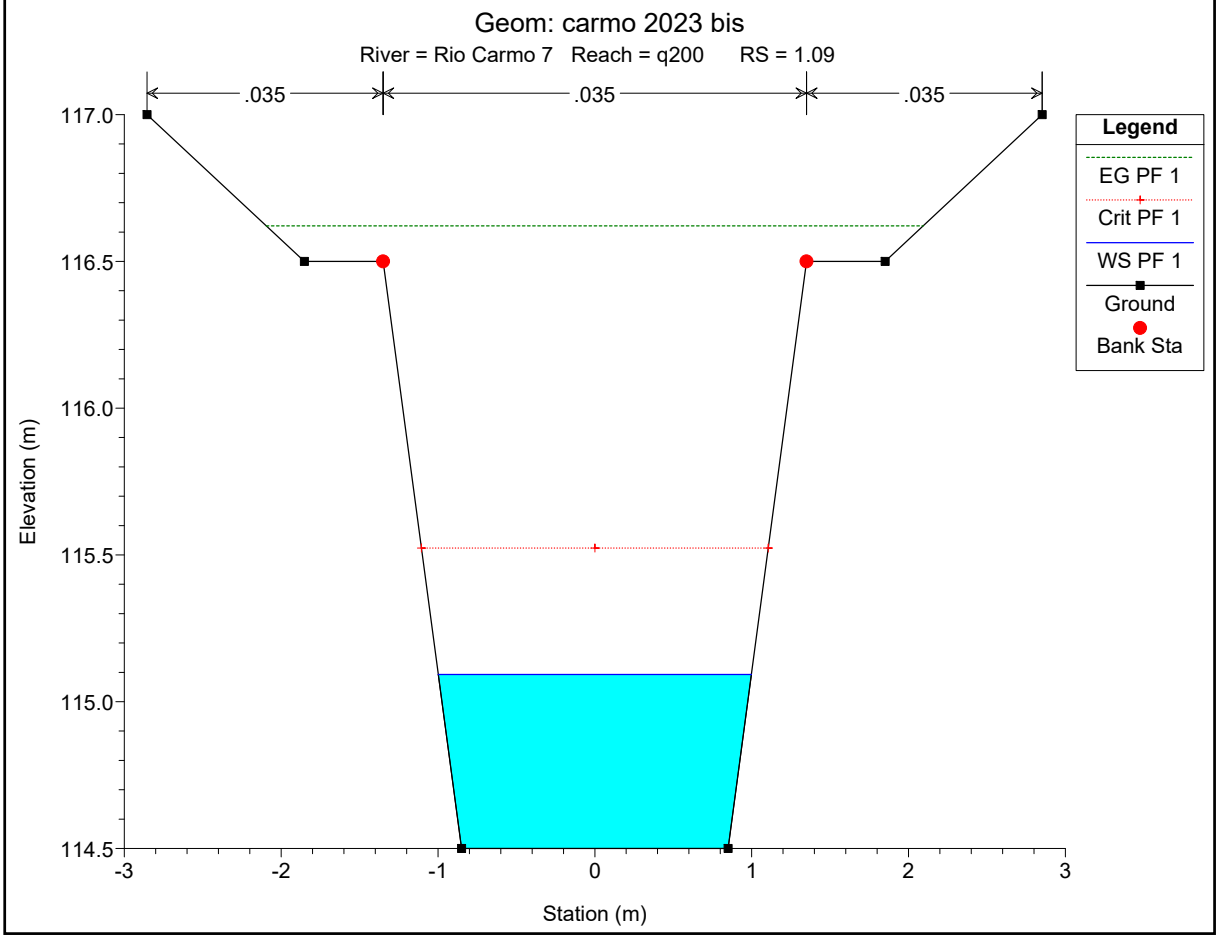

Geom: carmo 2023 bis
River = Rio Carmo 6 Reach = q200 RS = 1.4
.035
.035
.035
127.0
126.5
126.0
125.5
125.0
124.5
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

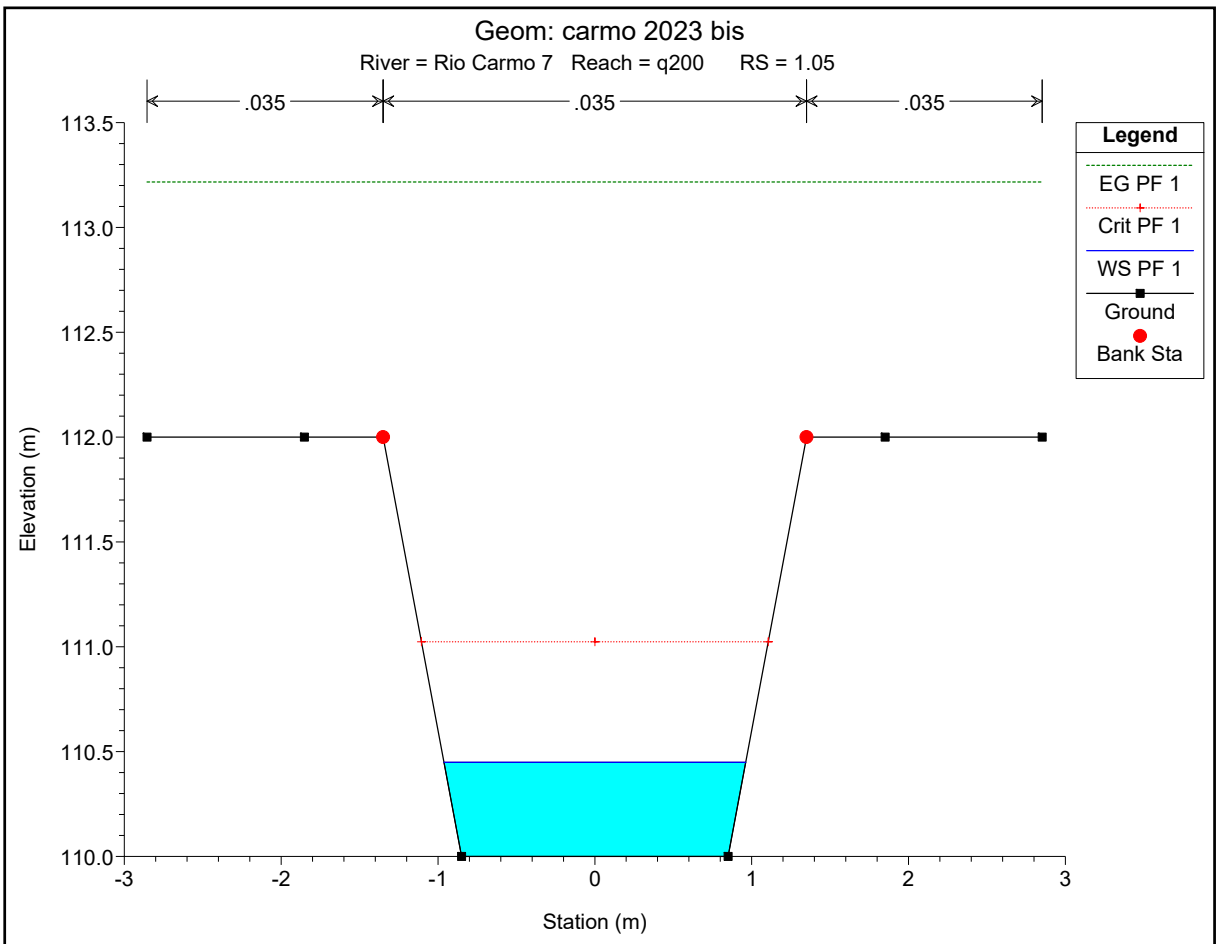

Geom: carmo 2023 bis
River = Rio Carmo 6 Reach = q200 RS = 1.3
.035
.035
.035
125
124
123
122
121
120
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

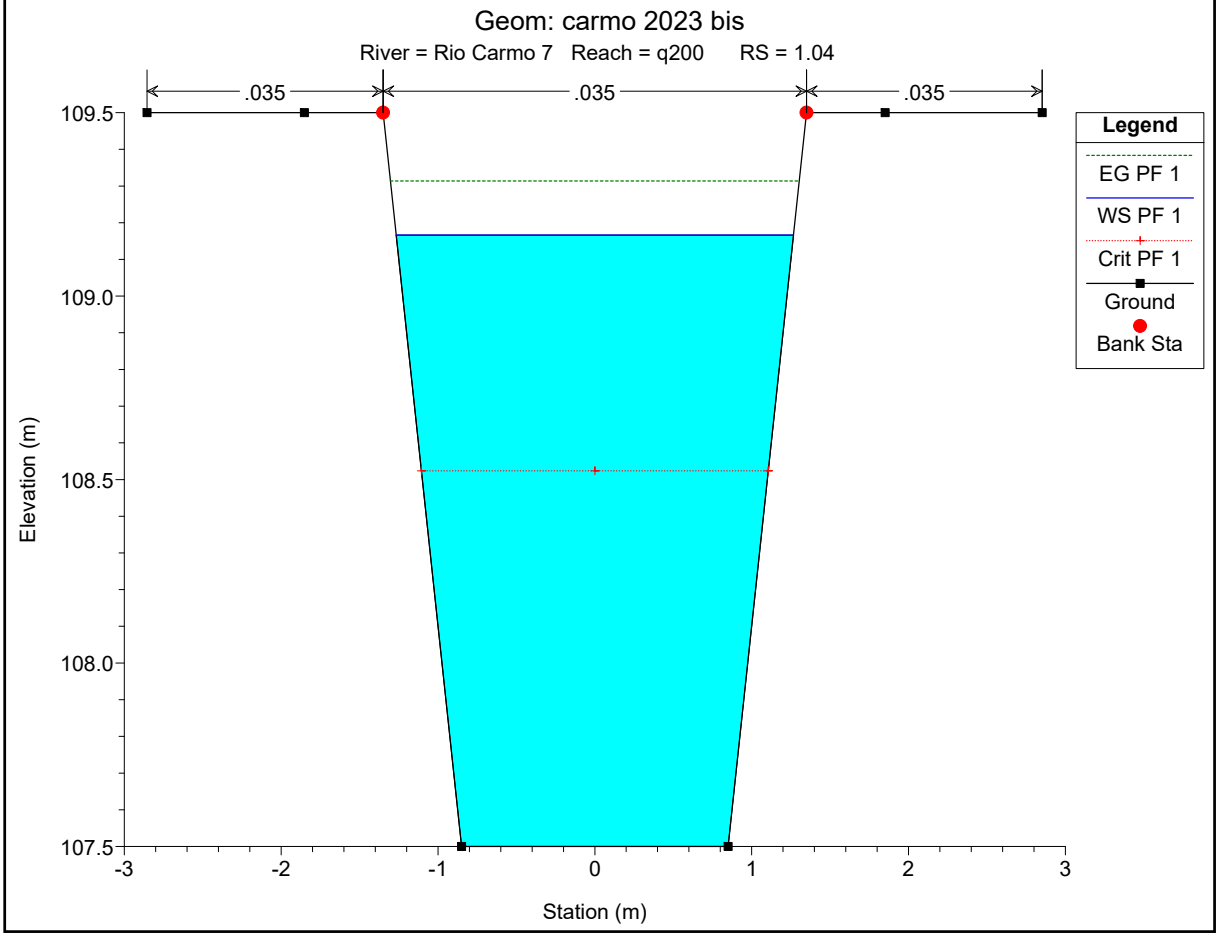

Geom: carmo 2023 bis
River = Rio Carmo 6 Reach = q200 RS = 1.25 IS
.035
.035
.035
122.0
121.5
121.0
120.5
120.0
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

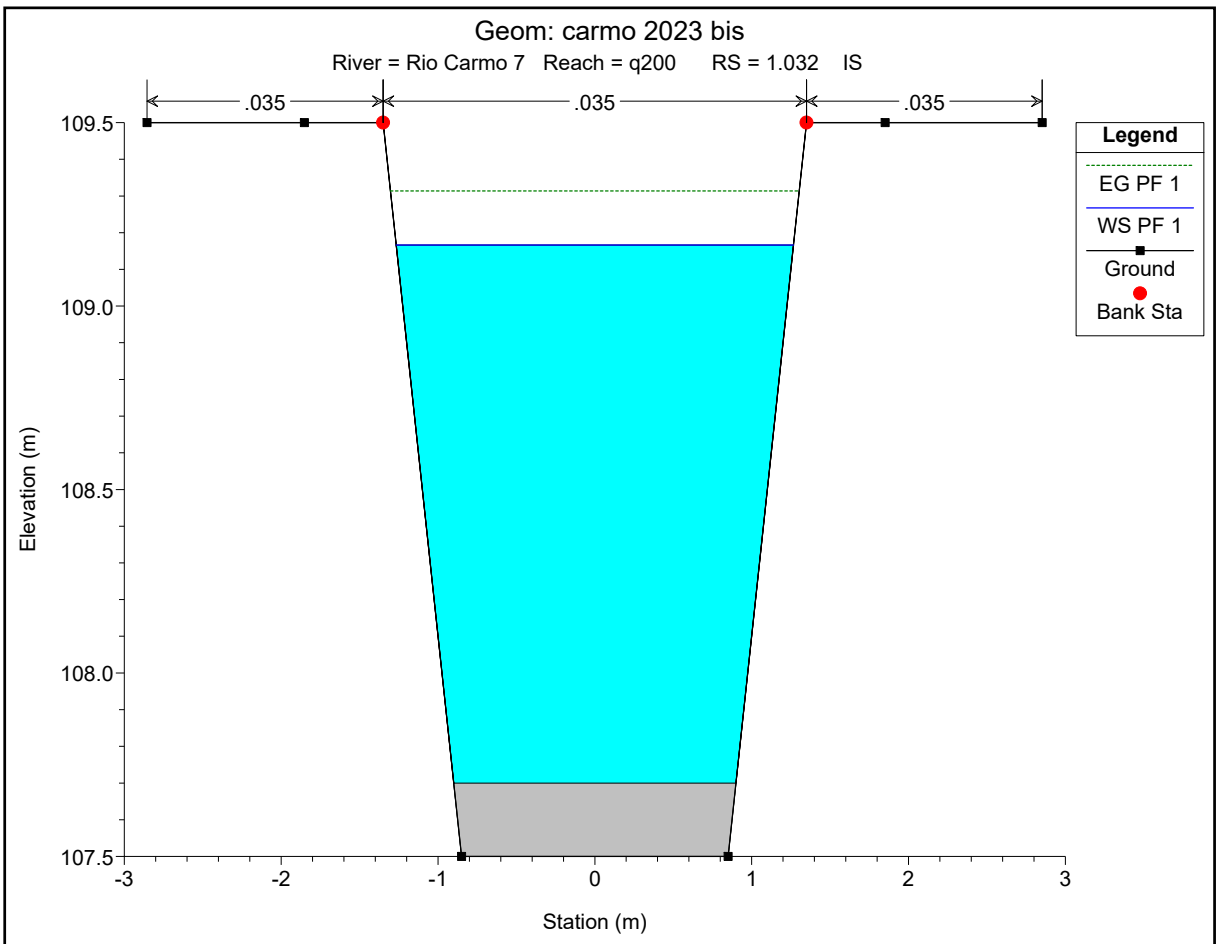

Geom: carmo 2023 bis
River = Rio Carmo 6 Reach = q200 RS = 1.2
.035
.035
.035
120.0
119.5
119.0
118.5
118.0
117.5
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

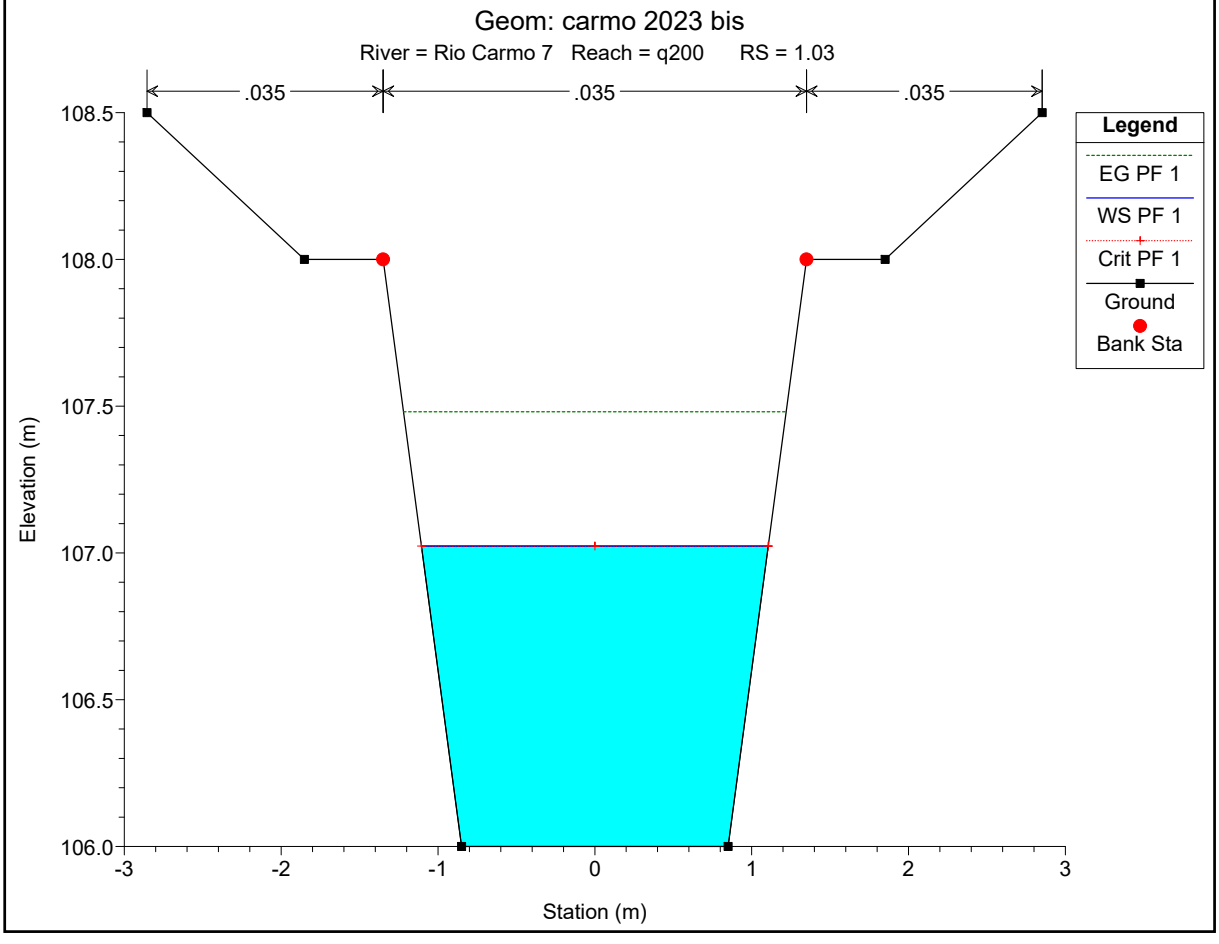

Geom: carmo 2023 bis
River = Rio Carmo 7 Reach = q200 RS = 1.1
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
119.5
119.0
118.5
118.0
117.5
117.0
-3
-2
-1
0
1
2
3

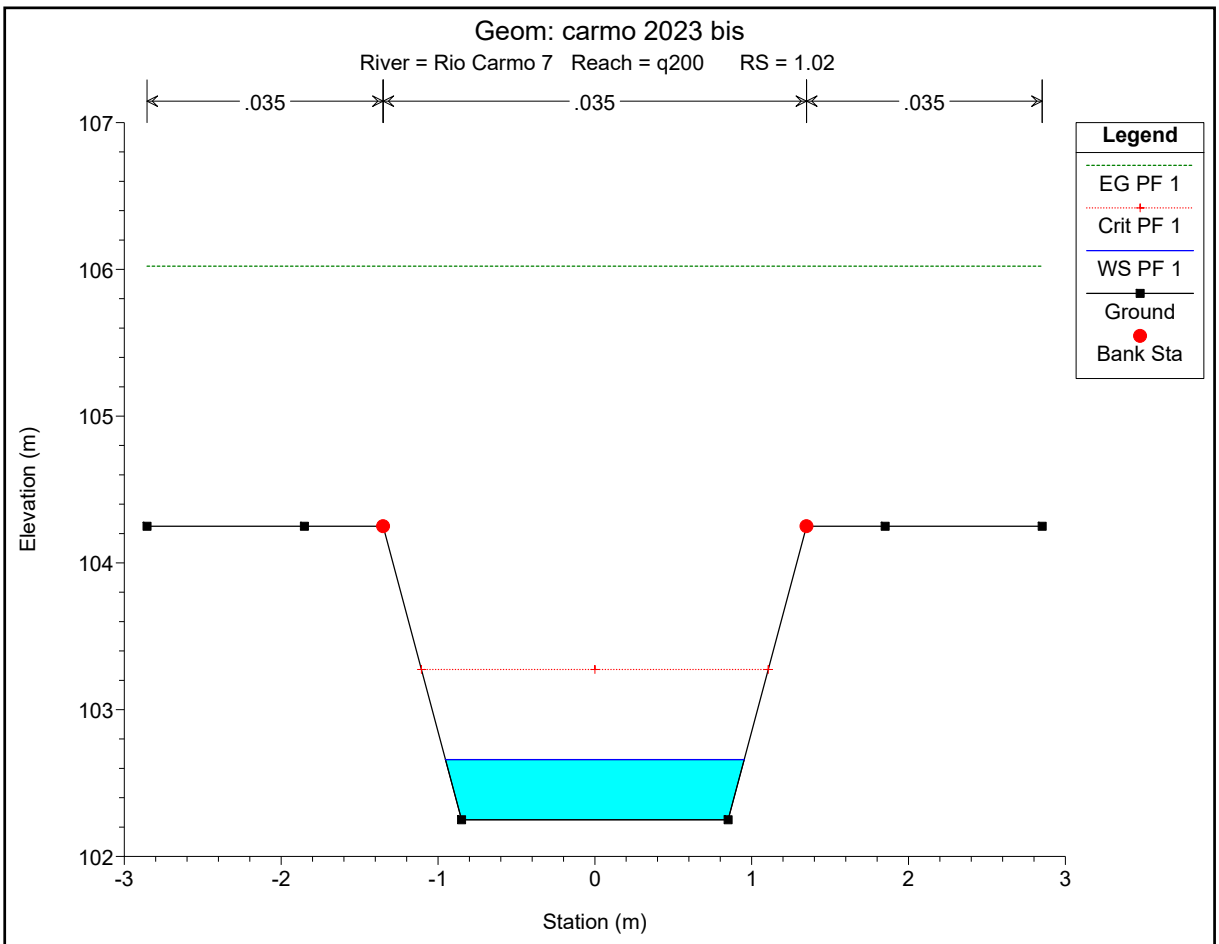

Geom: carmo 2023 bis
River = Rio Carmo 7 Reach = q200 RS = 1.09
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
117.0
116.5
116.0
115.5
115.0
114.5
-3
-2
-1
0
1
2
3

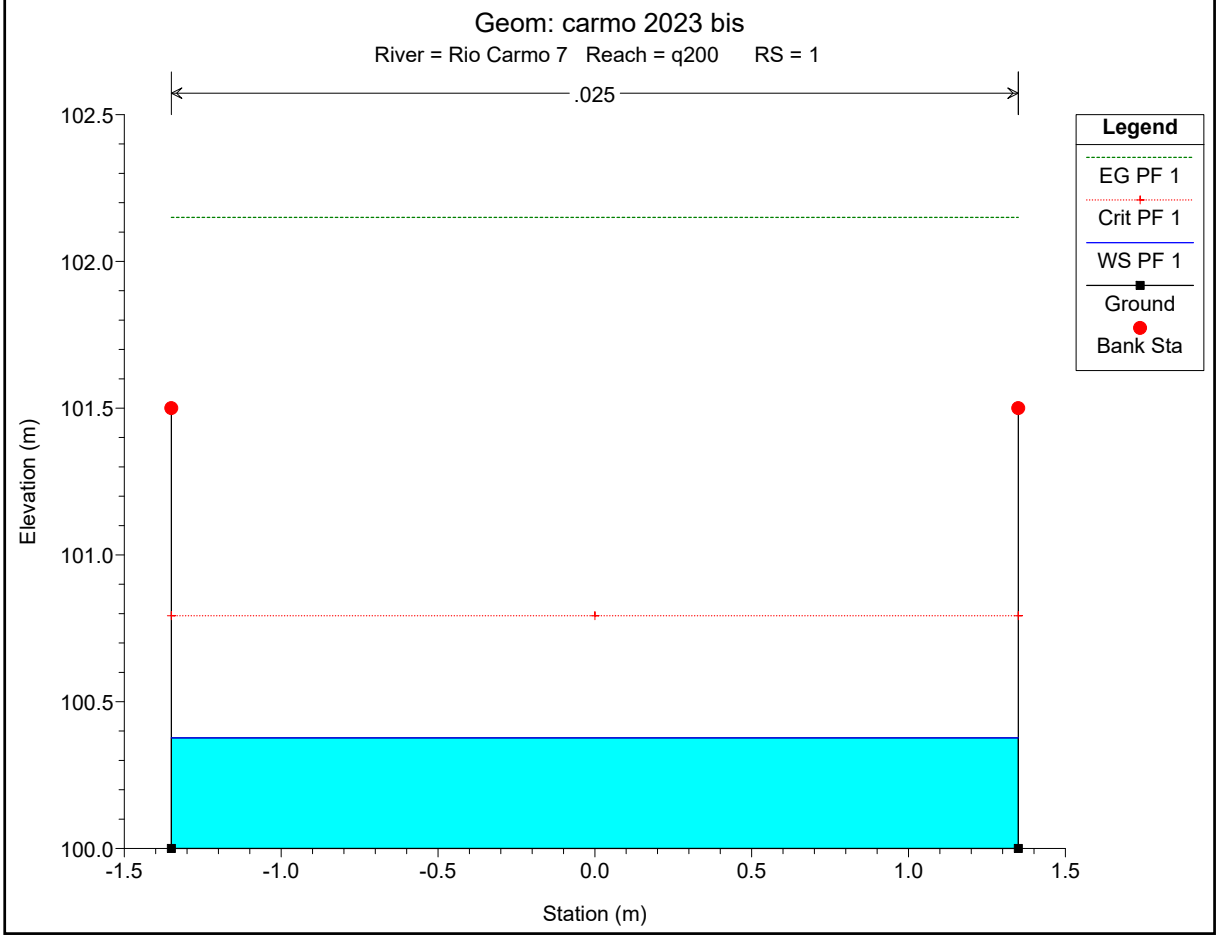

Geom: carmo 2023 bis
River = Rio Carmo 7 Reach = q200 RS = 1.05
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
113.5
113.0
112.5
112.0
111.5
111.0
110.5
110.0
-3
-2
-1
0
1
2
3

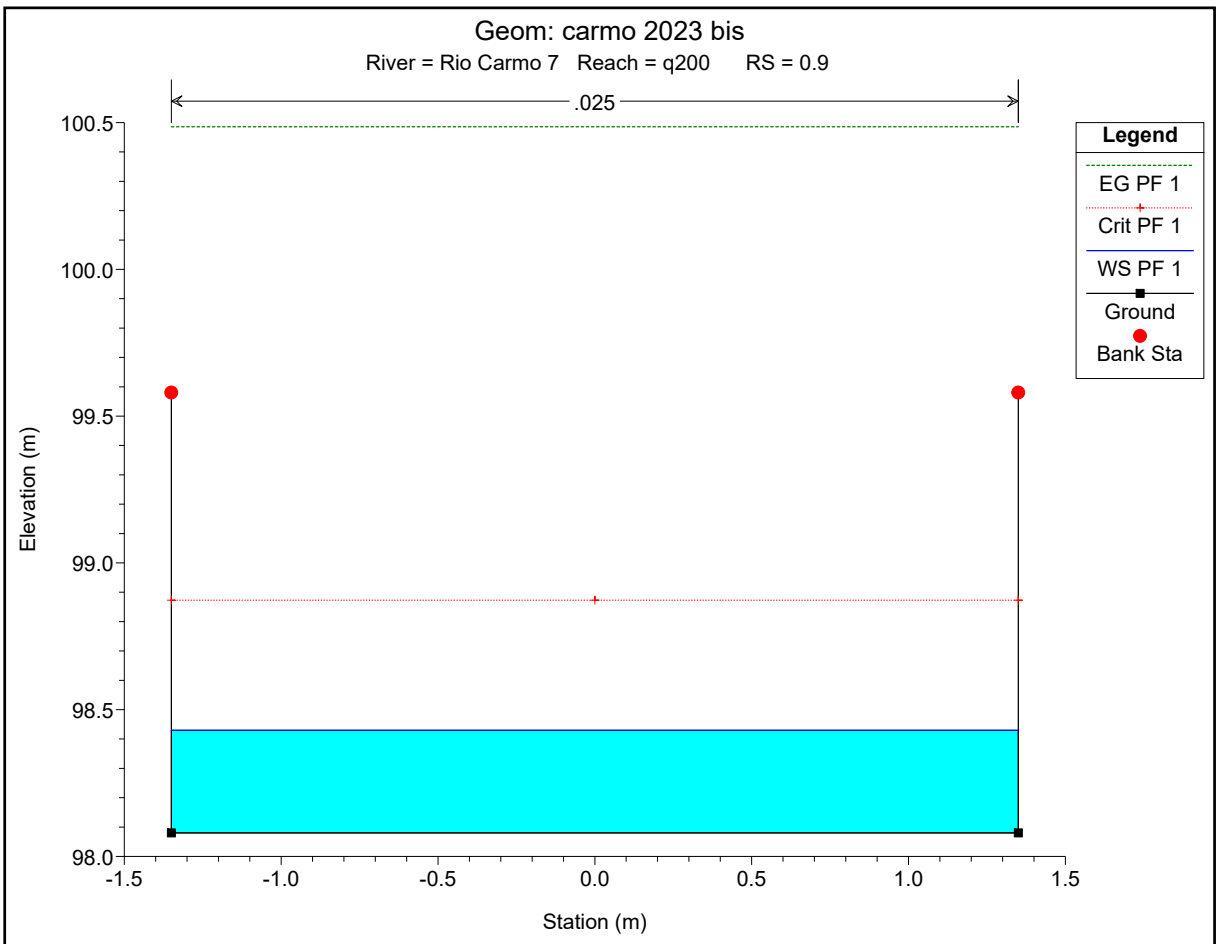

Geom: carmo 2023 bis
River = Rio Carmo 7 Reach = q200 RS = 1.04
.035
.035
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
109.5
109.0
108.5
108.0
107.5
-3
-2
-1
0
1
2
3

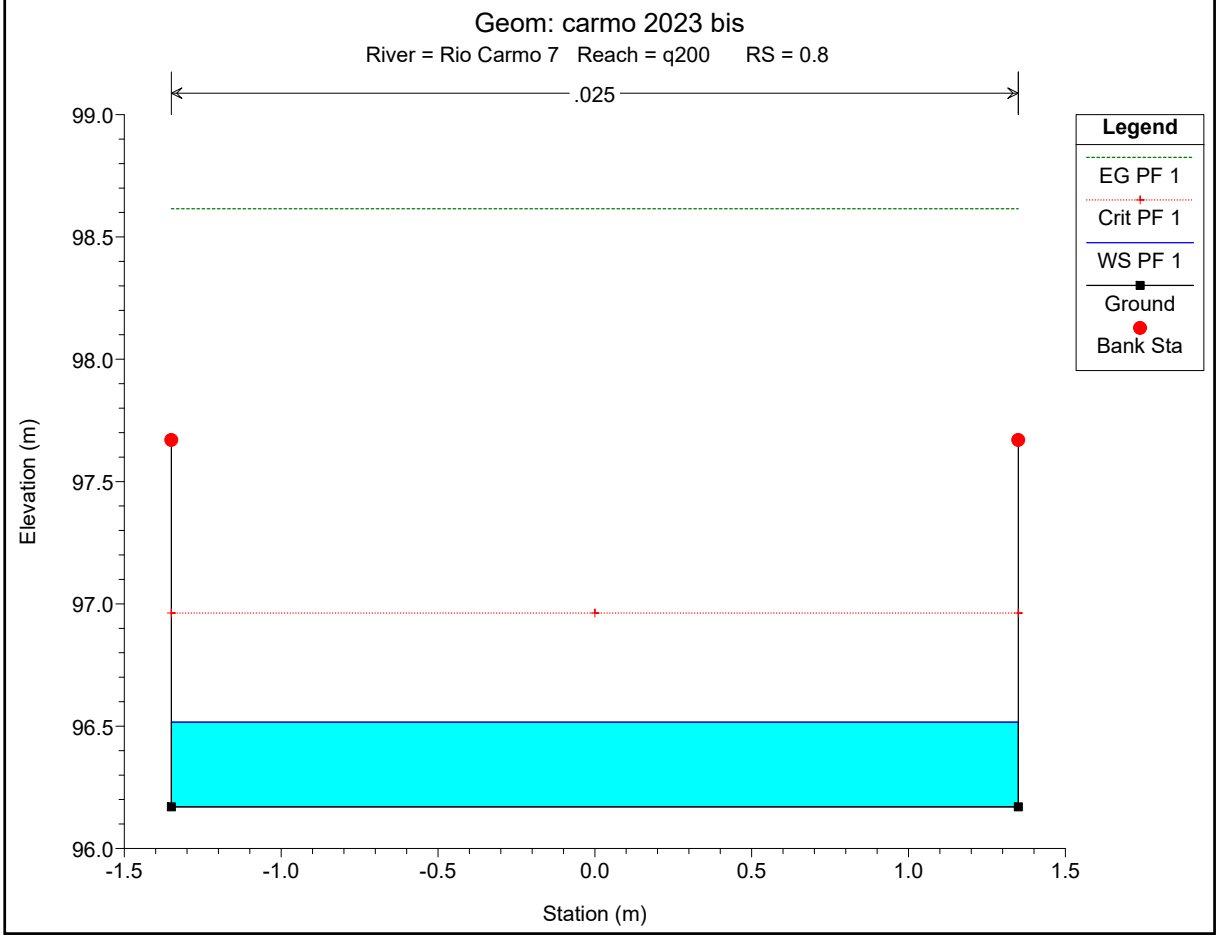

Geom: carmo 2023 bis
River = Rio Carmo 7 Reach = q200 RS = 1.032 IS
.035
.035
.035
109.5
109.0
108.5
108.0
107.5
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

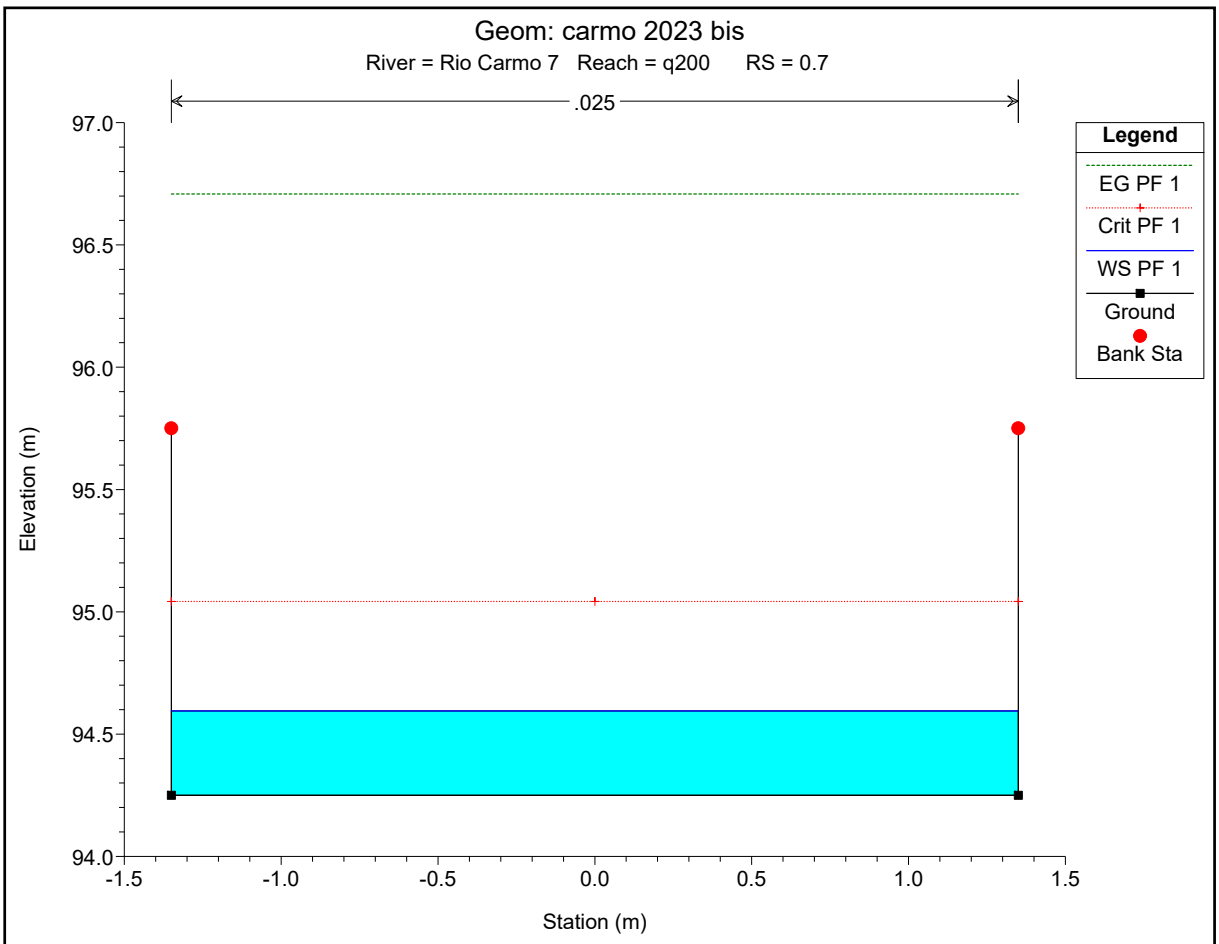

Geom: carmo 2023 bis
River = Rio Carmo 7 Reach = q200 RS = 1.03
.035
.035
.035
108.5
108.0
107.5
107.0
106.5
106.0
Elevation (m)
-3
-2
-1
0
1
2
3
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

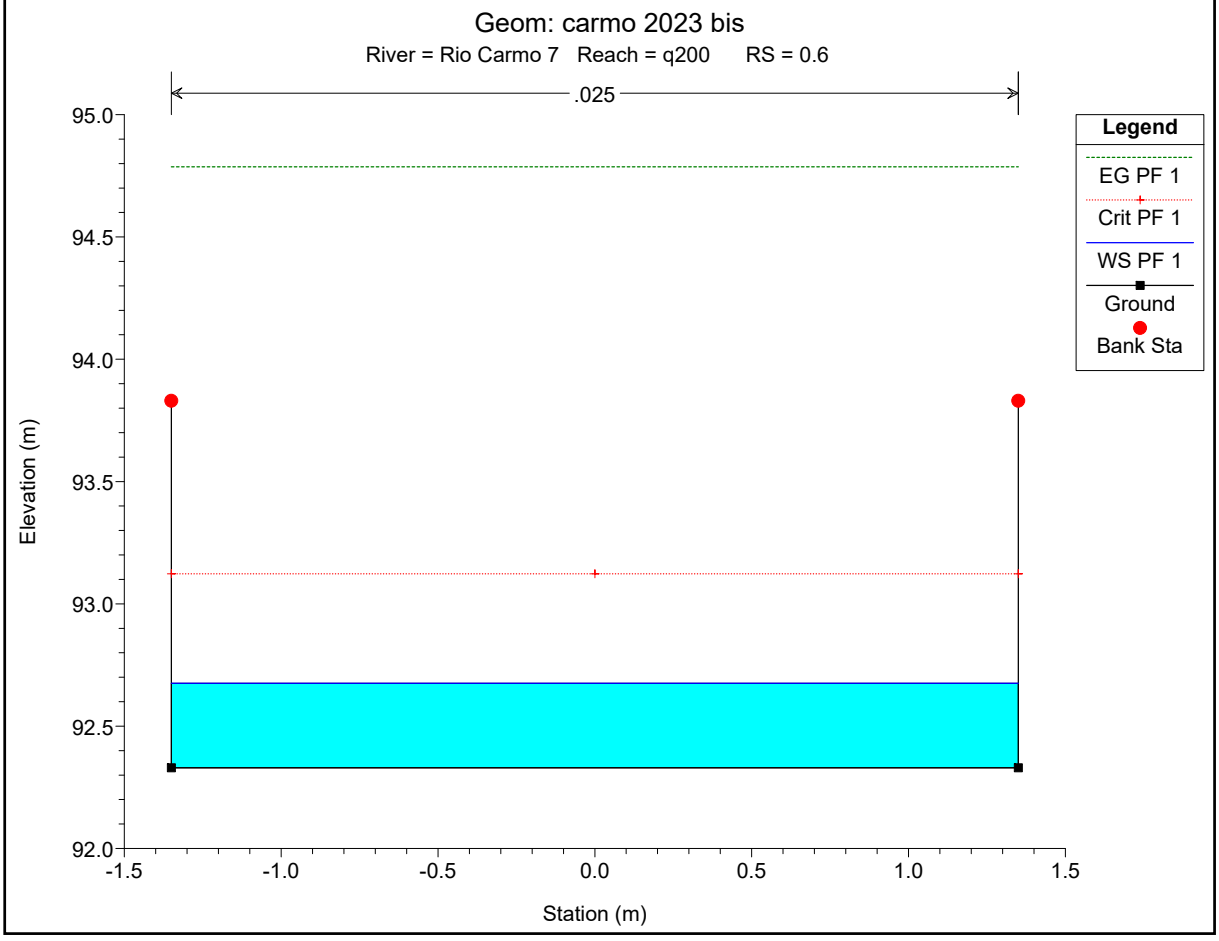

Geom: carmo 2023 bis
River = Rio Carmo 7 Reach = q200 RS = 1.02
.035
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
107
106
105
104
103
102
-3
-2
-1
0
1
2
3

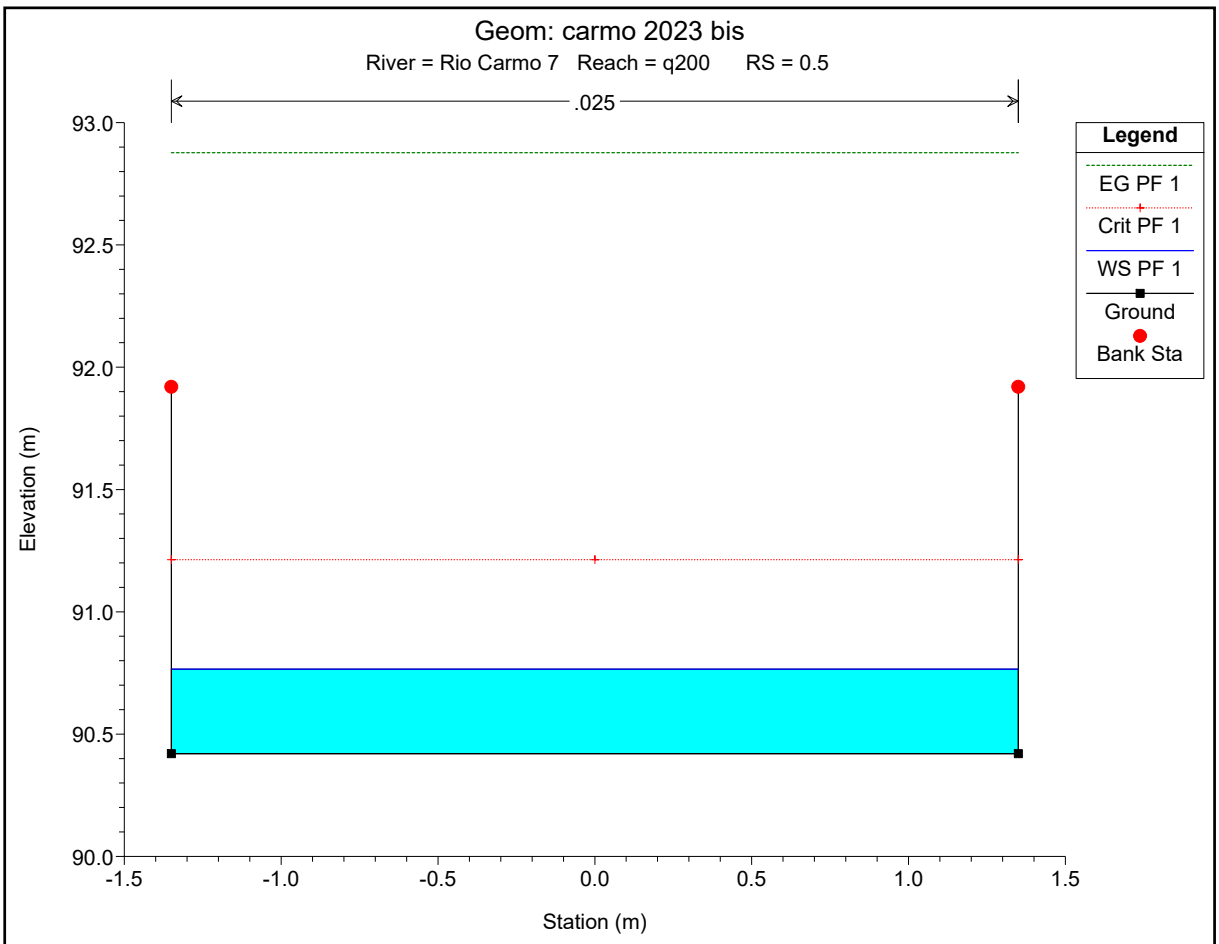

Geom: carmo 2023 bis
River = Rio Carmo 7 Reach = q200 RS = 1
.025
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
102.5
102.0
101.5
101.0
100.5
100.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5

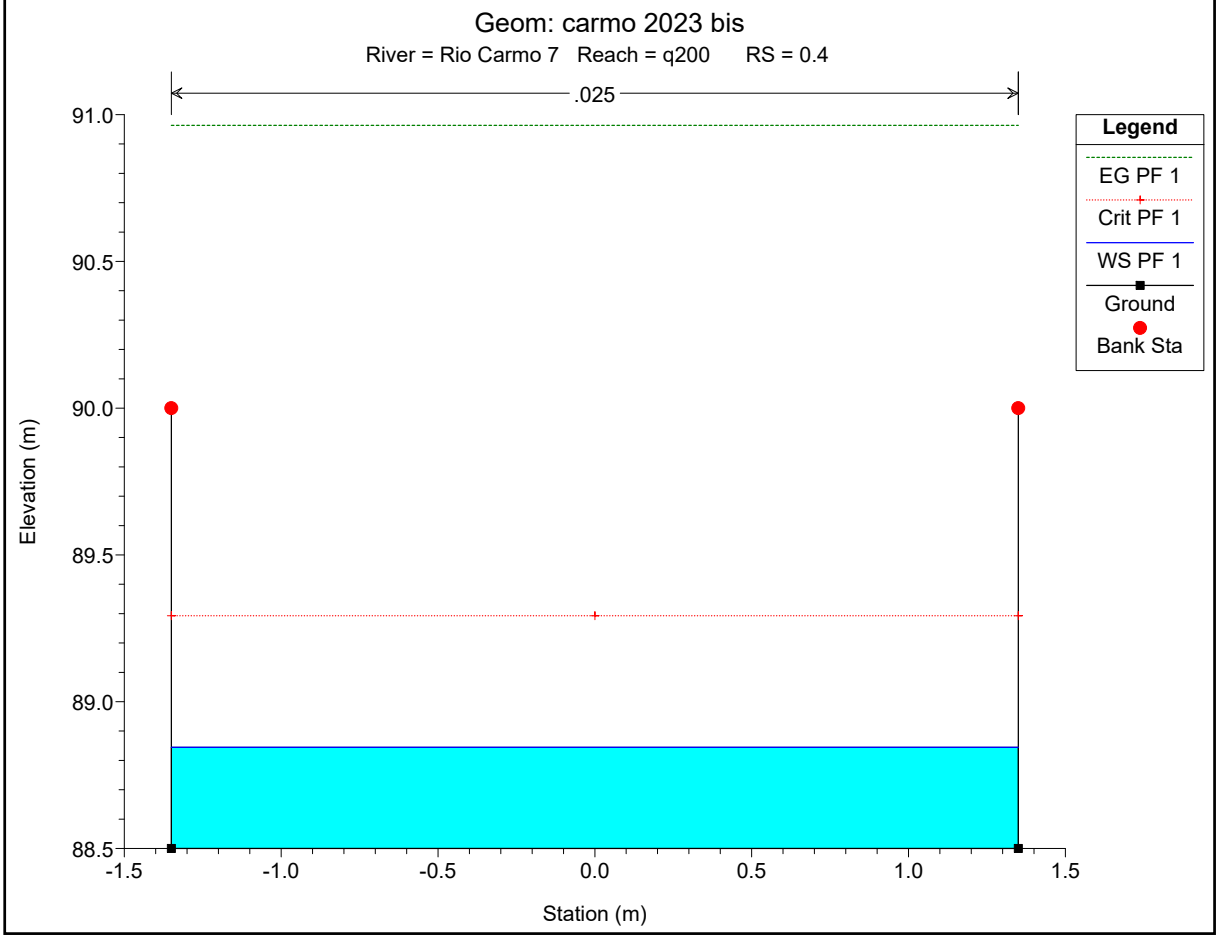

Geom: carmo 2023 bis
River = Rio Carmo 7 Reach = q200 RS = 0.9
.025
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
100.5
100.0
99.5
99.0
98.5
98.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5


Geom: carmo 2023 bis
River = Rio Carmo 7 Reach = q200 RS = 0.8
.025
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
99.0
98.5
98.0
97.5
97.0
96.5
96.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5


Geom: carmo 2023 bis
River = Rio Carmo 7 Reach = q200 RS = 0.7
.025
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
97.0
96.5
96.0
95.5
95.0
94.5
94.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5


Geom: carmo 2023 bis
River = Rio Carmo 7 Reach = q200 RS = 0.6
.025
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
95.0
94.5
94.0
93.5
93.0
92.5
92.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5

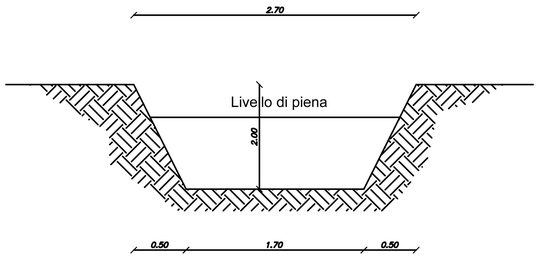

Geom: carmo 2023 bis
River = Rio Carmo 7 Reach = q200 RS = 0.5
.025
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
93.0
92.5
92.0
91.5
91.0
90.5
90.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5


Geom: carmo 2023 bis
River = Rio Carmo 7 Reach = q200 RS = 0.4
.025
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
91.0
90.5
90.0
89.5
89.0
88.5
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5



Sezione Tipo

SCALA 1:25

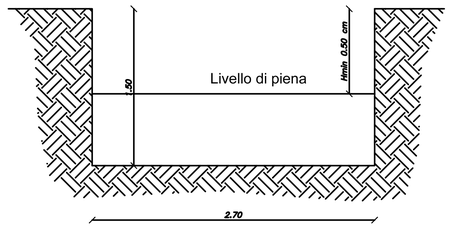


Sezioni:

Per tutte le sezioni del tratto principale

Sezione tratto terminale

SCALA 1:25

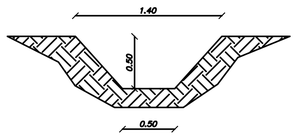


Sezioni:

0.4,0.5,0.6,0.7,0.8,0.9,1

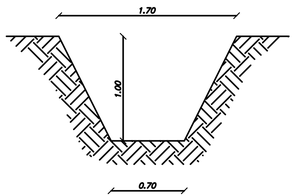
Sezione Tratto A2, A3, A5

SCALA 1:25



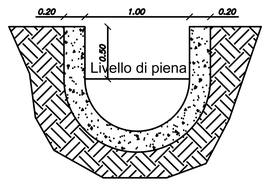
Sezione Tratto A1, A4

SCALA 1:25



Sezione Tratti A6-A7

SCALA 1:25



COMUNE DI CASTIGLIONE CHIAVARESE

PROVINCIA DI GENOVA

REGIONE LIGURIA

CAVA DI BASALTO DENOMINATA "ACQUAFREDDA"

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Ubicazione	

Identificativi Catastali	

Ingegnere Walter RONCONE

Ingegnere Fabio CORTESE

SEZIONI IDRAULICHE

Geometra Francesco Maria DE BERNARDI

Oggetto	- Sezioni

Geometra Paolo MARANO

Il Committente:	TAVOLA: **2**

Scala : 1/50 - 1/25	File :
Data : Giugno 2023	Aggiornamenti :

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