

APPENDIX R

HEC-RAS MODEL FOR THE CALCULATION OF THE 100-YEAR WATER SURFACE PROFILE, ANTECEDENT MOISTURE CONDITION III

HEC-RAS Plan: AMH1100 River: Ditch A Reach: 5

Reach	River Sta	Q Total (cfs)	Min Chl El (ft)	W.S. Elev (ft)	Cut W.S. (ft)	Max Chl Dpth (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Sta W.S. Lft (ft)	Sta W.S. Rgt (ft)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
5	12674	645.00	3477.00	3478.49	3478.08	1.49	3478.59	0.003093	2.49	345.62	665.95	268.80	320.33	0.44
5	12674	645.00	3477.00	3478.49	3478.08	1.49	3478.59	0.003093	2.49	345.62	665.95	268.80	320.33	0.44
5	12674	645.00	3477.00	3478.49	3478.08	1.49	3478.59	0.003093	2.49	345.62	665.95	268.80	320.33	0.44
5	12674	645.00	3477.00	3478.49	3478.08	1.49	3478.59	0.003093	2.49	345.62	665.95	268.80	320.33	0.44
5	11337	645.00	3469.00	3470.53	3470.50	1.53	3470.97	0.013657	5.36	423.67	560.80	123.92	137.13	0.93
5	11337	645.00	3469.00	3470.53	3470.50	1.53	3470.97	0.013657	5.36	423.67	560.80	123.92	137.13	0.93
5	11337	645.00	3469.00	3470.53	3470.50	1.53	3470.97	0.013657	5.36	423.67	560.80	123.92	137.13	0.93
5	11337	645.00	3469.00	3470.53	3470.50	1.53	3470.97	0.013657	5.36	423.67	560.80	123.92	137.13	0.93
5	10937	645.00	3464.00	3465.93	3465.75	1.93	3466.26	0.010093	4.57	467.44	606.74	141.28	139.30	0.80
5	10937	645.00	3464.00	3465.93	3465.75	1.93	3466.26	0.010093	4.57	467.44	606.74	141.28	139.30	0.80
5	10937	645.00	3464.00	3465.93	3465.75	1.93	3466.26	0.010093	4.57	467.44	606.74	141.28	139.30	0.80
5	10937	645.00	3464.00	3465.93	3465.75	1.93	3466.26	0.010093	4.57	467.44	606.74	141.28	139.30	0.80
5	10288	645.00	3458.00	3457.07	3457.07	1.07	3457.30	0.019840	3.87	389.03	738.96	166.72	349.93	0.99
5	10288	645.00	3458.00	3457.07	3457.07	1.07	3457.30	0.019840	3.87	389.03	738.96	166.72	349.93	0.99
5	10288	645.00	3458.00	3457.07	3457.07	1.07	3457.30	0.019840	3.87	389.03	738.96	166.72	349.93	0.99
5	10288	645.00	3458.00	3457.07	3457.07	1.07	3457.30	0.019840	3.87	389.03	738.96	166.72	349.93	0.99
5	9690	817.00	3450.00	3451.66	3451.28	1.66	3451.78	0.004774	2.78	423.62	771.66	293.93	348.04	0.53
5	9690	817.00	3450.00	3451.66	3451.28	1.66	3451.78	0.004774	2.78	423.62	771.66	293.93	348.04	0.53
5	9690	817.00	3450.00	3451.66	3451.28	1.66	3451.78	0.004774	2.78	423.62	771.66	293.93	348.04	0.53
5	9690	817.00	3450.00	3451.66	3451.28	1.66	3451.78	0.004774	2.78	423.62	771.66	293.93	348.04	0.53
5	9009	817.00	3445.00	3446.62	3446.50	1.62	3446.87	0.012038	4.03	440.24	716.03	202.92	275.79	0.83
5	9009	817.00	3445.00	3446.62	3446.50	1.62	3446.87	0.012038	4.03	440.24	716.03	202.92	275.79	0.83
5	9009	817.00	3445.00	3446.62	3446.50	1.62	3446.87	0.012038	4.03	440.24	716.03	202.92	275.79	0.83
5	9009	817.00	3445.00	3446.62	3446.50	1.62	3446.87	0.012038	4.03	440.24	716.03	202.92	275.79	0.83
5	8130	817.00	3440.00	3441.75	3441.25	1.75	3441.84	0.003282	2.40	448.26	828.47	340.75	380.21	0.45
5	8130	817.00	3440.00	3441.75	3441.25	1.75	3441.84	0.003282	2.40	448.26	828.47	340.75	380.21	0.45
5	8130	817.00	3440.00	3441.75	3441.25	1.75	3441.84	0.003282	2.40	448.26	828.47	340.75	380.21	0.45
5	8130	817.00	3440.00	3441.75	3441.25	1.75	3441.84	0.003282	2.40	448.26	828.47	340.75	380.21	0.45
5	7717	817.00	3437.80	3438.79	3438.79	0.99	3439.10	0.019275	4.47	323.60	626.42	182.90	302.82	1.01
5	7717	817.00	3437.80	3438.79	3438.79	0.99	3439.10	0.019275	4.47	323.60	626.42	182.90	302.82	1.01
5	7717	817.00	3437.80	3438.79	3438.79	0.99	3439.10	0.019275	4.47	323.60	626.42	182.90	302.82	1.01
5	7717	817.00	3437.80	3438.79	3438.79	0.99	3439.10	0.019275	4.47	323.60	626.42	182.90	302.82	1.01
5	7253	966.00	3435.00	3436.53	3435.99	1.53	3436.59	0.001746	1.92	396.63	932.31	511.45	535.68	0.33
5	7253	966.00	3435.00	3436.53	3435.99	1.53	3436.59	0.001746	1.92	396.63	932.31	511.45	535.68	0.33
5	7253	966.00	3435.00	3436.53	3435.99	1.53	3436.59	0.001746	1.92	396.63	932.31	511.45	535.68	0.33
5	7253	966.00	3435.00	3436.53	3435.99	1.53	3436.59	0.001746	1.92	396.63	932.31	511.45	535.68	0.33
5	6343	1873.00	3430.00	3430.86	3430.86	0.86	3431.22	0.018047	4.82	754.77	1299.87	388.25	545.10	1.01
5	6343	1873.00	3430.00	3430.86	3430.86	0.86	3431.22	0.018047	4.82	754.77	1299.87	388.25	545.10	1.01
5	6343	1873.00	3430.00	3430.86	3430.86	0.86	3431.22	0.018047	4.82	754.77	1299.87	388.25	545.10	1.01
5	6343	1873.00	3430.00	3430.86	3430.86	0.86	3431.22	0.018047	4.82	754.77	1299.87	388.25	545.10	1.01
5	5363	1873.00	3425.00	3426.53	3425.93	1.53	3426.60	0.001798	2.13	690.84	1582.86	906.30	892.02	0.35
5	5363	1873.00	3425.00	3426.53	3425.93	1.53	3426.60	0.001798	2.13	690.84	1582.86	906.30	892.02	0.35
5	5363	1873.00	3425.00	3426.53	3425.93	1.53	3426.60	0.001798	2.13	690.84	1582.86	906.30	892.02	0.35
5	5363	1873.00	3425.00	3426.53	3425.93	1.53	3426.60	0.001798	2.13	690.84	1582.86	906.30	892.02	0.35
5	4221	2128.00	3420.00	3421.19	3421.19	1.19	3421.58	0.017043	5.00	504.75	1086.07	428.69	581.33	0.99
5	4221	2128.00	3420.00	3421.19	3421.19	1.19	3421.58	0.017043	5.00	504.75	1086.07	428.69	581.33	0.99
5	4221	2128.00	3420.00	3421.19	3421.19	1.19	3421.58	0.017043	5.00	504.75	1086.07	428.69	581.33	0.99
5	4221	2128.00	3420.00	3421.19	3421.19	1.19	3421.58	0.017043	5.00	504.75	1086.07	428.69	581.33	0.99
5	3489	2128.00	3416.00	3417.37	3416.82	2.37	3417.44	0.002273	2.30	-119.07	890.29	995.88	1009.36	0.38
5	3489	2128.00	3416.00	3417.37	3416.82	2.37	3417.44	0.002273	2.30	-119.07	890.29	995.88	1009.36	0.38
5	3489	2128.00	3416.00	3417.37	3416.82	2.37	3417.44	0.002273	2.30	-119.07	890.29	995.88	1009.36	0.38
5	3489	2128.00	3416.00	3417.37	3416.82	2.37	3417.44	0.002273	2.30	-119.07	890.29	995.88	1009.36	0.38
5	2889	2128.00	3413.80	3414.67	3414.67	0.87	3415.03	0.018086	4.64	174.17	814.20	446.36	640.02	1.00
5	2889	2128.00	3413.80	3414.67	3414.67	0.87	3415.03	0.018086	4.64	174.17	814.20	446.36	640.02	1.00
5	2889	2128.00	3413.80	3414.67	3414.67	0.87	3415.03	0.018086	4.64	174.17	814.20	446.36	640.02	1.00
5	2889	2128.00	3413.80	3414.67	3414.67	0.87	3415.03	0.018086	4.64	174.17	814.20	446.36	640.02	1.00
5	2774	2128.00	3409.00	3414.16	3412.71	5.16	3414.21	0.000414	2.61	-409.98	647.53	1505.18	1057.47	0.21
5	2774	2128.00	3409.00	3414.16	3412.71	5.16	3414.21	0.000414	2.61	-409.98	647.53	1505.18	1057.47	0.21
5	2774	2128.00	3409.00	3414.16	3412.71	5.16	3414.21	0.000414	2.61	-409.98	647.53	1505.18	1057.47	0.21
5	2774	2128.00	3409.00	3414.16	3412.71	5.16	3414.21	0.000414	2.61	-409.98	647.53	1505.18	1057.47	0.21
5	2773	Culvert												
5	2734	2128.00	3408.90	3412.71	3412.71	3.81	3412.94	0.002018	4.57	83.74	515.65	665.51	431.91	0.44
5	2734	2128.00	3408.90	3412.71	3412.71	3.81	3412.94	0.002018	4.57	83.74	515.65	665.51	431.91	0.44
5	2734	2128.00	3408.90	3412.71	3412.71	3.84	3412.96	0.001906	4.47	81.87	517.09	680.86	435.22	0.43
5	2734	2128.00	3408.90	3412.71	3412.71	3.84	3412.96	0.001906	4.47	81.87	517.09	680.86	435.22	0.43
5	1888	2155.00	3408.00	3409.38	3408.89	1.38	3409.46	0.003403	2.59	178.82	1027.41	831.55	846.59	0.46
5	1888	2155.00	3408.00	3409.38	3408.89	1.38	3409.46	0.003403	2.59	178.82	1027.41	831.55	846.59	0.46
5	1888	2155.00	3408.00	3409.38	3408.89	1.38	3409.46	0.003403	2.59	178.82	1027.41	831.55	846.59	0.46
5	1888	2155.00	3408.00	3409.38	3408.89	1.38	3409.46	0.003403	2.59	178.82	1027.41	831.55	846.59	0.46

HEC-RAS Plan: AM111 100 River Ditch A Reach: 5 (Continued)

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Ch W.S. (ft)	Max Chl Dpth (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Sta W.S. Lft (ft)	Sta W.S. Rgt (ft)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
5	1888	2155.00	3408.00	3408.89	3408.89	0.89	3409.23	0.018312	4.71	233.07	907.13	457.76	674.05	1.01
5	1888	2155.00	3408.00	3408.89	3408.89	0.89	3409.23	0.018312	4.71	233.07	907.13	457.76	674.05	1.01
5	1060	2248.00	3402.70	3404.50	3404.34	1.80	3404.81	0.010602	4.46	614.45	1141.44	501.30	526.98	0.81
5	1060	2248.00	3402.70	3405.00	3404.34	2.30	3405.12	0.003053	2.81	540.97	1206.00	799.30	665.03	0.45
5	1060	2248.00	3402.70	3406.00	3404.34	3.30	3406.03	0.000503	1.33	394.00	1523.00	1696.32	1129.00	0.19
5	1060	2248.00	3402.70	3407.00	3404.34	4.30	3407.01	0.000090	0.79	247.00	1523.00	2898.82	1276.00	0.09

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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
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  XXXXXX   XXXX      X  X      X  X      XXXXX
  
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PROJECT DATA

Project Title: WCS
 Project File : FloodPlain.prj
 Run Date and Time: 3/24/06 4:04:35 PM

Project in English units

PLAN DATA

Plan Title: Plan 36
 Plan File : D:\program files\WCS\FloodPlain.p36

 Geometry Title: PMPl-20-04SecRemoved
 Geometry File : D:\program files\WCS\FloodPlain.g04

 Flow Title : 100YrAMIII3-24-06ManyNOD
 Flow File : D:\program files\WCS\FloodPlain.f28

Plan Summary Information:

Number of: Cross Sections =	18	Multiple Openings =	0
Culverts =	1	Inline Weirs =	0
Bridges =	0		

Computational Information

Water surface calculation tolerance =	0.01
Critical depth calculation tolerance =	0.01
Maximum number of iterations =	20
Maximum difference tolerance =	0.3
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: 100YrAMIII3-24-06ManyNOD
 Flow File : D:\program files\WCS\FloodPlain.f28

HECRASAMII100

Flow Data (cfs)

River	Reach	RS	100 Yr.-WS3404.5	100 Yr.-WS3405	100 Yr.-WS3406
100 Yr.-WS3407					
Ditch A	5	12674	645	645	645
645					
Ditch A	5	9690	817	817	817
817					
Ditch A	5	7253	966	966	966
966					
Ditch A	5	6343	1873	1873	1873
1873					
Ditch A	5	4221	2128	2128	2128
2128					
Ditch A	5	1888	2155	2155	2155
2155					
Ditch A	5	1060	2248	2248	2248
2248					

Boundary Conditions

River stream	Reach	Profile	Upstream	Down
Ditch A	5	100 Yr.-WS3404.5	Critical	Known WS
= 3404.5				
Ditch A	5	100 Yr.-WS3405	Critical	Known
WS = 3405				
Ditch A	5	100 Yr.-WS3406	Critical	Known
WS = 3406				
Ditch A	5	100 Yr.-WS3407	Critical	Known
WS = 3407				

GEOMETRY DATA

Geometry Title: PMP1-20-04SecRemoved
 Geometry File : D:\program files\WCS\FloodPlain.g04

CROSS SECTION RIVER: Ditch A
 REACH: 5 RS: 12674

INPUT

Description: Sta. 12674

Station Elevation Data		num= 6							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	3482	380	3478	560	3477	635	3478	761	3480
964	3482								

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
100	.033	380	.033	635	.033

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	380	635		1206 1337	1433	.1	.3

CROSS SECTION OUTPUT

Profile #100 Yr.-WS3404.5

E.G. Elev (ft)	3478.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3478.49	Reach Len. (ft)	1206.00	1337.00	1433.00
Crit W.S. (ft)	3478.08	Flow Area (sq ft)	8.45	252.76	7.60
E.G. Slope (ft/ft)	0.003093	Area (sq ft)	8.45	252.76	7.60
Q Total (cfs)	645.00	Flow (cfs)	8.29	629.24	7.46
Top Width (ft)	320.33	Top Width (ft)	34.38	255.00	30.95
Vel Total (ft/s)	2.40	Avg. Vel. (ft/s)	0.98	2.49	0.98
Max Chl Dpth (ft)	1.49	Hydr. Depth (ft)	0.25	0.99	0.25
Conv. Total (cfs)	11597.5	Conv. (cfs)	149.1	11314.1	134.2
Length Wtd. (ft)	1336.52	Wetted Per. (ft)	34.39	255.01	30.95
Min Ch El (ft)	3477.00	Shear (lb/sq ft)	0.05	0.19	0.05
Alpha	1.05	Stream Power (lb/ft s)	0.05	0.48	0.05
Frctn Loss (ft)	7.59	Cum Volume (acre-ft)	17.03	103.92	2.70
C & E Loss (ft)	0.03	Cum SA (acres)	20.48	111.06	4.66

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 OUTPUT

Profile #100 Yr.-WS3405

E.G. Elev (ft)	3478.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3478.49	Reach Len. (ft)	1206.00	1337.00	1433.00
Crit W.S. (ft)	3478.08	Flow Area (sq ft)	8.45	252.76	7.60
E.G. Slope (ft/ft)	0.003093	Area (sq ft)	8.45	252.76	7.60
Q Total (cfs)	645.00	Flow (cfs)	8.29	629.24	7.46
Top Width (ft)	320.33	Top Width (ft)	34.38	255.00	30.95
Vel Total (ft/s)	2.40	Avg. Vel. (ft/s)	0.98	2.49	0.98
Max Chl Dpth (ft)	1.49	Hydr. Depth (ft)	0.25	0.99	0.25
Conv. Total (cfs)	11597.5	Conv. (cfs)	149.1	11314.1	134.2

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Length Wtd. (ft)	1336.52	Wetted Per. (ft)	34.39	255.01	30.95
Min Ch El (ft)	3477.00	Shear (lb/sq ft)	0.05	0.19	0.05
Alpha	1.05	Stream Power (lb/ft s)	0.05	0.48	0.05
Frctn Loss (ft)	7.59	Cum Volume (acre-ft)	17.03	101.73	2.70
C & E Loss (ft)	0.03	Cum SA (acres)	20.48	110.11	4.66

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 OUTPUT Profile #100 Yr.-WS3406

E.G. Elev (ft)	3478.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3478.49	Reach Len. (ft)	1206.00	1337.00	1433.00
Crit W.S. (ft)	3478.08	Flow Area (sq ft)	8.45	252.76	7.60
E.G. Slope (ft/ft)	0.003093	Area (sq ft)	8.45	252.76	7.60
Q Total (cfs)	645.00	Flow (cfs)	8.29	629.24	7.46
Top Width (ft)	320.33	Top Width (ft)	34.38	255.00	30.95
Vel Total (ft/s)	2.40	Avg. Vel. (ft/s)	0.98	2.49	0.98
Max Chl Dpth (ft)	1.49	Hydr. Depth (ft)	0.25	0.99	0.25
Conv. Total (cfs)	11597.5	Conv. (cfs)	149.1	11314.1	134.2
Length Wtd. (ft)	1336.52	Wetted Per. (ft)	34.39	255.01	30.95
Min Ch El (ft)	3477.00	Shear (lb/sq ft)	0.05	0.19	0.05
Alpha	1.05	Stream Power (lb/ft s)	0.05	0.48	0.05
Frctn Loss (ft)	7.59	Cum Volume (acre-ft)	17.11	108.13	2.74
C & E Loss (ft)	0.03	Cum SA (acres)	20.50	113.43	4.68

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 OUTPUT Profile #100 Yr.-WS3407

HECRASAMIIII100

E.G. Elev (ft)	3478.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3478.49	Reach Len. (ft)	1206.00	1337.00	1433.00
Crit W.S. (ft)	3478.08	Flow Area (sq ft)	8.45	252.76	7.60
E.G. Slope (ft/ft)	0.003093	Area (sq ft)	8.45	252.76	7.60
Q Total (cfs)	645.00	Flow (cfs)	8.29	629.24	7.46
Top Width (ft)	320.33	Top Width (ft)	34.38	255.00	30.95
Vel Total (ft/s)	2.40	Avg. Vel. (ft/s)	0.98	2.49	0.98
Max Chl Dpth (ft)	1.49	Hydr. Depth (ft)	0.25	0.99	0.25
Conv. Total (cfs)	11597.5	Conv. (cfs)	149.1	11314.1	134.2
Length Wtd. (ft)	1336.52	Wetted Per. (ft)	34.39	255.01	30.95
Min Ch El (ft)	3477.00	Shear (lb/sq ft)	0.05	0.19	0.05
Alpha	1.05	Stream Power (lb/ft s)	0.05	0.48	0.05
Frctn Loss (ft)	7.59	Cum Volume (acre-ft)	17.37	118.86	2.74
C & E Loss (ft)	0.03	Cum SA (acres)	21.02	113.43	4.68

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: Ditch A
REACH: 5 RS: 11337

INPUT

Description: Sta. 11337

Station Elevation Data		num= 8	
Sta	Elev	Sta	Elev
100	3477	315	3474
550	3470	591	3472

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
100	.033	435	.033
		550	.033

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	435	550		545 400	332	.1	.3

CROSS SECTION OUTPUT Profile #100 Yr.-WS3404.5

E.G. Elev (ft)	3470.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.033	0.033	0.033

HECRASAMIIII100

W.S. Elev (ft)	3470.53	Reach Len. (ft)	545.00	400.00	332.00
Crit W.S. (ft)	3470.50	Flow Area (sq ft)	2.98	118.09	2.85
E.G. Slope (ft/ft)	0.013657	Area (sq ft)	2.98	118.09	2.85
Q Total (cfs)	645.00	Flow (cfs)	6.45	632.40	6.15
Top Width (ft)	137.13	Top Width (ft)	11.33	115.00	10.80
Vel Total (ft/s)	5.21	Avg. Vel. (ft/s)	2.16	5.36	2.16
Max Chl Dpth (ft)	1.53	Hydr. Depth (ft)	0.26	1.03	0.26
Conv. Total (cfs)	5519.3	Conv. (cfs)	55.2	5411.5	52.6
Length Wtd. (ft)	400.40	Wetted Per. (ft)	11.34	115.02	10.81
Min Ch El (ft)	3469.00	Shear (lb/sq ft)	0.22	0.88	0.22
Alpha	1.04	Stream Power (lb/ft s)	0.48	4.69	0.48
Frctn Loss (ft)	4.67	Cum Volume (acre-ft)	16.87	98.23	2.53
C & E Loss (ft)	0.03	Cum SA (acres)	19.85	105.38	3.98

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 OUTPUT Profile #100 Yr.-WS3405

E.G. Elev (ft)	3470.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3470.53	Reach Len. (ft)	545.00	400.00	332.00
Crit W.S. (ft)	3470.50	Flow Area (sq ft)	2.98	118.09	2.85
E.G. Slope (ft/ft)	0.013657	Area (sq ft)	2.98	118.09	2.85
Q Total (cfs)	645.00	Flow (cfs)	6.45	632.40	6.15
Top Width (ft)	137.13	Top Width (ft)	11.33	115.00	10.80
Vel Total (ft/s)	5.21	Avg. Vel. (ft/s)	2.16	5.36	2.16
Max Chl Dpth (ft)	1.53	Hydr. Depth (ft)	0.26	1.03	0.26
Conv. Total (cfs)	5519.3	Conv. (cfs)	55.2	5411.5	52.6
Length Wtd. (ft)	400.40	Wetted Per. (ft)	11.34	115.02	10.81
Min Ch El (ft)	3469.00	Shear (lb/sq ft)	0.22	0.88	0.22
Alpha	1.04	Stream Power (lb/ft s)	0.48	4.69	0.48
Frctn Loss (ft)	4.67	Cum Volume (acre-ft)	16.87	96.04	2.53

		HECRASAMIIII100			
C & E Loss (ft)	0.03	Cum SA (acres)	19.85	104.43	3.98

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 OUTPUT Profile #100 Yr.-WS3406

E.G. Elev (ft)	3470.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3470.53	Reach Len. (ft)	545.00	400.00	332.00
Crit W.S. (ft)	3470.50	Flow Area (sq ft)	2.98	118.09	2.85
E.G. Slope (ft/ft)	0.013657	Area (sq ft)	2.98	118.09	2.85
Q Total (cfs)	645.00	Flow (cfs)	6.45	632.40	6.15
Top Width (ft)	137.13	Top Width (ft)	11.33	115.00	10.80
Vel Total (ft/s)	5.21	Avg. Vel. (ft/s)	2.16	5.36	2.16
Max Chl Dpth (ft)	1.53	Hydr. Depth (ft)	0.26	1.03	0.26
Conv. Total (cfs)	5519.3	Conv. (cfs)	55.2	5411.5	52.6
Length Wtd. (ft)	400.40	Wetted Per. (ft)	11.34	115.02	10.81
Min Ch El (ft)	3469.00	Shear (lb/sq ft)	0.22	0.88	0.22
Alpha	1.04	Stream Power (lb/ft s)	0.48	4.69	0.48
Frctn Loss (ft)	4.67	Cum Volume (acre-ft)	16.96	102.43	2.57
C & E Loss (ft)	0.03	Cum SA (acres)	19.87	107.75	3.99

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 OUTPUT Profile #100 Yr.-WS3407

E.G. Elev (ft)	3470.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3470.53	Reach Len. (ft)	545.00	400.00	332.00
Crit W.S. (ft)	3470.50	Flow Area (sq ft)	2.98	118.09	2.85
E.G. Slope (ft/ft)	0.013657	Area (sq ft)	2.98	118.09	2.85
Q Total (cfs)	645.00	Flow (cfs)	6.45	632.40	6.15
Top Width (ft)	137.13	Top Width (ft)	11.33	115.00	10.80

HECRASAMIII100

Vel Total (ft/s)	5.21	Avg. Vel. (ft/s)	2.16	5.36	2.16
Max Chl Dpth (ft)	1.53	Hydr. Depth (ft)	0.26	1.03	0.26
Conv. Total (cfs)	5519.3	Conv. (cfs)	55.2	5411.5	52.6
Length Wtd. (ft)	400.40	Wetted Per. (ft)	11.34	115.02	10.81
Min Ch El (ft)	3469.00	Shear (lb/sq ft)	0.22	0.88	0.22
Alpha	1.04	Stream Power (lb/ft s)	0.48	4.69	0.48
Frctn Loss (ft)	4.67	Cum Volume (acre-ft)	17.21	113.16	2.57
C & E Loss (ft)	0.03	Cum SA (acres)	20.38	107.75	3.99

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: Ditch A
REACH: 5 RS: 10937

INPUT

Description: Sta. 10937

Station Elevation Data		num= 9							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	3470	351	3468	428	3467	465	3466	536	3464
543	3464	609	3466	683	3468	811	3472		

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
100	.033	428	.033	609	.033

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
428	609	729 649	445	.1	.3

CROSS SECTION OUTPUT Profile #100 Yr.-WS3404.5

E.G. Elev (ft)	3466.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.		0.033	
W.S. Elev (ft)	3465.93	Reach Len. (ft)	729.00	649.00	445.00
Crit W.S. (ft)	3465.75	Flow Area (sq ft)		141.28	
E.G. Slope (ft/ft)	0.010093	Area (sq ft)		141.28	
Q Total (cfs)	645.00	Flow (cfs)		645.00	
Top Width (ft)	139.30	Top Width (ft)		139.30	
Vel Total (ft/s)	4.57	Avg. Vel. (ft/s)		4.57	
Max Chl Dpth (ft)	1.93	Hydr. Depth (ft)		1.01	
Conv. Total (cfs)	6420.1	Conv. (cfs)		6420.1	
Length Wtd. (ft)	649.00	Wetted Per. (ft)		139.36	

HECRASAMIII100

Min Ch El (ft)	3464.00	Shear (lb/sq ft)	0.64		
Alpha	1.00	Stream Power (lb/ft s)	2.92		
Frctn Loss (ft)	8.93	Cum Volume (acre-ft)	16.85	97.04	2.52
C & E Loss (ft)	0.03	Cum SA (acres)	19.78	104.21	3.93

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 OUTPUT Profile #100 Yr.-WS3405

E.G. Elev (ft)	3466.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.	0.033		
W.S. Elev (ft)	3465.93	Reach Len. (ft)	729.00	649.00	445.00
Crit W.S. (ft)	3465.75	Flow Area (sq ft)	141.28		
E.G. Slope (ft/ft)	0.010093	Area (sq ft)	141.28		
Q Total (cfs)	645.00	Flow (cfs)	645.00		
Top Width (ft)	139.30	Top Width (ft)	139.30		
Vel Total (ft/s)	4.57	Avg. Vel. (ft/s)	4.57		
Max Chl Dpth (ft)	1.93	Hydr. Depth (ft)	1.01		
Conv. Total (cfs)	6420.1	Conv. (cfs)	6420.1		
Length Wtd. (ft)	649.00	Wetted Per. (ft)	139.36		
Min Ch El (ft)	3464.00	Shear (lb/sq ft)	0.64		
Alpha	1.00	Stream Power (lb/ft s)	2.92		
Frctn Loss (ft)	8.93	Cum Volume (acre-ft)	16.85	94.85	2.52
C & E Loss (ft)	0.03	Cum SA (acres)	19.78	103.27	3.93

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 OUTPUT Profile #100 Yr.-WS3406

HECRASAMIIII100			Left OB	Channel	Right OB
E.G. Elev (ft)	3466.26	Element			
Vel Head (ft)	0.32	Wt. n-Val.		0.033	
W.S. Elev (ft)	3465.93	Reach Len. (ft)	729.00	649.00	445.00
Crit W.S. (ft)	3465.75	Flow Area (sq ft)		141.28	
E.G. Slope (ft/ft)	0.010093	Area (sq ft)		141.28	
Q Total (cfs)	645.00	Flow (cfs)		645.00	
Top Width (ft)	139.30	Top Width (ft)		139.30	
Vel Total (ft/s)	4.57	Avg. Vel. (ft/s)		4.57	
Max Chl Dpth (ft)	1.93	Hydr. Depth (ft)		1.01	
Conv. Total (cfs)	6420.1	Conv. (cfs)		6420.1	
Length Wtd. (ft)	649.00	Wetted Per. (ft)		139.36	
Min Ch El (ft)	3464.00	Shear (lb/sq ft)		0.64	
Alpha	1.00	Stream Power (lb/ft s)		2.92	
Frctn Loss (ft)	8.93	Cum Volume (acre-ft)	16.94	101.24	2.56
C & E Loss (ft)	0.03	Cum SA (acres)	19.80	106.58	3.95

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 OUTPUT Profile #100 Yr.-WS3407

HECRASAMIIII100			Left OB	Channel	Right OB
E.G. Elev (ft)	3466.26	Element			
Vel Head (ft)	0.32	Wt. n-Val.		0.033	
W.S. Elev (ft)	3465.93	Reach Len. (ft)	729.00	649.00	445.00
Crit W.S. (ft)	3465.75	Flow Area (sq ft)		141.28	
E.G. Slope (ft/ft)	0.010093	Area (sq ft)		141.28	
Q Total (cfs)	645.00	Flow (cfs)		645.00	
Top Width (ft)	139.30	Top Width (ft)		139.30	
Vel Total (ft/s)	4.57	Avg. Vel. (ft/s)		4.57	
Max Chl Dpth (ft)	1.93	Hydr. Depth (ft)		1.01	
Conv. Total (cfs)	6420.1	Conv. (cfs)		6420.1	
Length Wtd. (ft)	649.00	Wetted Per. (ft)		139.36	

		HECRASAMIII100			
Min Ch El (ft)	3464.00	Shear (lb/sq ft)		0.64	
Alpha	1.00	Stream Power (lb/ft s)		2.92	
Frctn Loss (ft)	8.93	Cum Volume (acre-ft)	17.19	111.97	2.56
C & E Loss (ft)	0.03	Cum SA (acres)	20.31	106.58	3.95

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: Ditch A
 REACH: 5 RS: 10288

INPUT

Description: Sta. 10288

Station Elevation Data		num=	12						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	3464	177	3462	238	3460	298	3458	493	3456
519	3456	662	3457	778	3457.1	857	3458	903	3460
947	3462	989	3464						

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
100	.033	298	.033	857	.033

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
298	857	552	598	.1	.3

CROSS SECTION OUTPUT Profile #100 Yr.-WS3404.5

E.G. Elev (ft)	3457.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.033	
W.S. Elev (ft)	3457.07	Reach Len. (ft)	552.00	598.00	633.00
Crit W.S. (ft)	3457.07	Flow Area (sq ft)		166.72	
E.G. Slope (ft/ft)	0.019840	Area (sq ft)		166.72	
Q Total (cfs)	645.00	Flow (cfs)		645.00	
Top Width (ft)	349.93	Top Width (ft)		349.93	
Vel Total (ft/s)	3.87	Avg. Vel. (ft/s)		3.87	
Max Chl Dpth (ft)	1.07	Hydr. Depth (ft)		0.48	
Conv. Total (cfs)	4579.2	Conv. (cfs)		4579.2	
Length Wtd. (ft)	598.00	Wetted Per. (ft)		349.94	
Min Ch El (ft)	3456.00	Shear (lb/sq ft)		0.59	
Alpha	1.00	Stream Power (lb/ft s)		2.28	

		HECRASAMIII100			
Frctn Loss (ft)	4.75	Cum Volume (acre-ft)	16.85	94.74	2.52
C & E Loss (ft)	0.03	Cum SA (acres)	19.78	100.57	3.93

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 OUTPUT Profile #100 Yr.-WS3405

E.G. Elev (ft)	3457.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.033	
W.S. Elev (ft)	3457.07	Reach Len. (ft)	552.00	598.00	633.00
Crit W.S. (ft)	3457.07	Flow Area (sq ft)		166.72	
E.G. Slope (ft/ft)	0.019840	Area (sq ft)		166.72	
Q Total (cfs)	645.00	Flow (cfs)		645.00	
Top Width (ft)	349.93	Top Width (ft)		349.93	
Vel Total (ft/s)	3.87	Avg. Vel. (ft/s)		3.87	
Max Chl Dpth (ft)	1.07	Hydr. Depth (ft)		0.48	
Conv. Total (cfs)	4579.2	Conv. (cfs)		4579.2	
Length Wtd. (ft)	598.00	Wetted Per. (ft)		349.94	
Min Ch El (ft)	3456.00	Shear (lb/sq ft)		0.59	
Alpha	1.00	Stream Power (lb/ft s)		2.28	
Frctn Loss (ft)	4.75	Cum Volume (acre-ft)	16.85	92.55	2.52
C & E Loss (ft)	0.03	Cum SA (acres)	19.78	99.62	3.93

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 OUTPUT Profile #100 Yr.-WS3406

E.G. Elev (ft)	3457.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.033	
W.S. Elev (ft)	3457.07	Reach Len. (ft)	552.00	598.00	633.00
Crit W.S. (ft)	3457.07	Flow Area (sq ft)		166.72	
E.G. Slope (ft/ft)	0.019840	Area (sq ft)		166.72	
Q Total (cfs)	645.00	Flow (cfs)		645.00	
Top Width (ft)	349.93	Top Width (ft)		349.93	
Vel Total (ft/s)	3.87	Avg. Vel. (ft/s)		3.87	
Max Chl Dpth (ft)	1.07	Hydr. Depth (ft)		0.48	
Conv. Total (cfs)	4579.2	Conv. (cfs)		4579.2	
Length Wtd. (ft)	598.00	Wetted Per. (ft)		349.94	
Min Ch El (ft)	3456.00	Shear (lb/sq ft)		0.59	
Alpha	1.00	Stream Power (lb/ft s)		2.28	
Frctn Loss (ft)	4.75	Cum Volume (acre-ft)	16.94	98.95	2.56
C & E Loss (ft)	0.03	Cum SA (acres)	19.80	102.94	3.95

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 OUTPUT

Profile #100 Yr.-WS3407

E.G. Elev (ft)	3457.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.033	
W.S. Elev (ft)	3457.07	Reach Len. (ft)	552.00	598.00	633.00
Crit W.S. (ft)	3457.07	Flow Area (sq ft)		166.72	
E.G. Slope (ft/ft)	0.019840	Area (sq ft)		166.72	
Q Total (cfs)	645.00	Flow (cfs)		645.00	
Top Width (ft)	349.93	Top Width (ft)		349.93	
Vel Total (ft/s)	3.87	Avg. Vel. (ft/s)		3.87	
Max Chl Dpth (ft)	1.07	Hydr. Depth (ft)		0.48	
Conv. Total (cfs)	4579.2	Conv. (cfs)		4579.2	
Length Wtd. (ft)	598.00	Wetted Per. (ft)		349.94	
Min Ch El (ft)	3456.00	Shear (lb/sq ft)		0.59	
Alpha	1.00	Stream Power (lb/ft s)		2.28	
Frctn Loss (ft)	4.75	Cum Volume (acre-ft)	17.19	109.68	2.56
C & E Loss (ft)	0.03	Cum SA (acres)	20.31	102.94	3.95

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: Ditch A

REACH: 5

RS: 9690

INPUT

Description: Sta. 9690

Station Elevation Data				num=	8				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	3454.5	202	3454	381	3452	632	3450	638	3450
799	3452	897	3454	1010	3458				

Manning's n Values

num=

3

Sta	n Val	Sta	n Val	Sta	n Val

HECRASAMIII100

100 .033 381 .033 799 .033

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	381	799		639 681	658	.1	.3

CROSS SECTION OUTPUT Profile #100 Yr.-WS3404.5

E.G. Elev (ft)	3451.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.033	
W.S. Elev (ft)	3451.66	Reach Len. (ft)	639.00	681.00	658.00
Crit W.S. (ft)	3451.28	Flow Area (sq ft)		293.93	
E.G. Slope (ft/ft)	0.004774	Area (sq ft)		293.93	
Q Total (cfs)	817.00	Flow (cfs)		817.00	
Top Width (ft)	348.04	Top Width (ft)		348.04	
Vel Total (ft/s)	2.78	Avg. Vel. (ft/s)		2.78	
Max Chl Dpth (ft)	1.66	Hydr. Depth (ft)		0.84	
Conv. Total (cfs)	11824.3	Conv. (cfs)		11824.3	
Length Wtd. (ft)	681.00	Wetted Per. (ft)		348.06	
Min Ch El (ft)	3450.00	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		0.70	
Frctn Loss (ft)	4.90	Cum Volume (acre-ft)	16.85	91.58	2.52
C & E Loss (ft)	0.01	Cum SA (acres)	19.78	95.78	3.93

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 OUTPUT Profile #100 Yr.-WS3405

E.G. Elev (ft)	3451.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.033	
W.S. Elev (ft)	3451.66	Reach Len. (ft)	639.00	681.00	658.00
Crit W.S. (ft)	3451.28	Flow Area (sq ft)		293.93	
E.G. Slope (ft/ft)	0.004774	Area (sq ft)		293.93	
Q Total (cfs)	817.00	Flow (cfs)		817.00	
Top Width (ft)	348.04	Top Width (ft)		348.04	

		HECRASAMIIII100			
Vel Total (ft/s)	2.78	Avg. Vel. (ft/s)		2.78	
Max Chl Dpth (ft)	1.66	Hydr. Depth (ft)		0.84	
Conv. Total (cfs)	11824.3	Conv. (cfs)		11824.3	
Length Wtd. (ft)	681.00	Wetted Per. (ft)		348.06	
Min Ch El (ft)	3450.00	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		0.70	
Frctn Loss (ft)	4.90	Cum Volume (acre-ft)	16.85	89.39	2.52
C & E Loss (ft)	0.01	Cum SA (acres)	19.78	94.83	3.93

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 OUTPUT Profile #100 Yr.-WS3406

E.G. Elev (ft)	3451.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.033	
W.S. Elev (ft)	3451.66	Reach Len. (ft)	639.00	681.00	658.00
Crit W.S. (ft)	3451.28	Flow Area (sq ft)		293.93	
E.G. Slope (ft/ft)	0.004774	Area (sq ft)		293.93	
Q Total (cfs)	817.00	Flow (cfs)		817.00	
Top Width (ft)	348.04	Top Width (ft)		348.04	
Vel Total (ft/s)	2.78	Avg. Vel. (ft/s)		2.78	
Max Chl Dpth (ft)	1.66	Hydr. Depth (ft)		0.84	
Conv. Total (cfs)	11824.3	Conv. (cfs)		11824.3	
Length Wtd. (ft)	681.00	Wetted Per. (ft)		348.06	
Min Ch El (ft)	3450.00	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		0.70	
Frctn Loss (ft)	4.90	Cum Volume (acre-ft)	16.94	95.79	2.56
C & E Loss (ft)	0.01	Cum SA (acres)	19.80	98.15	3.95

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.

HECRASAMIIII100

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 OUTPUT Profile #100 Yr.-WS3407

E.G. Elev (ft)	3451.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.033	
W.S. Elev (ft)	3451.66	Reach Len. (ft)	639.00	681.00	658.00
Crit W.S. (ft)	3451.28	Flow Area (sq ft)		293.93	
E.G. Slope (ft/ft)	0.004774	Area (sq ft)		293.93	
Q Total (cfs)	817.00	Flow (cfs)		817.00	
Top Width (ft)	348.04	Top Width (ft)		348.04	
Vel Total (ft/s)	2.78	Avg. Vel. (ft/s)		2.78	
Max Chl Dpth (ft)	1.66	Hydr. Depth (ft)		0.84	
Conv. Total (cfs)	11824.3	Conv. (cfs)		11824.3	
Length Wtd. (ft)	681.00	Wetted Per. (ft)		348.06	
Min Ch El (ft)	3450.00	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)		0.70	
Frctn Loss (ft)	4.90	Cum Volume (acre-ft)	17.19	106.52	2.56
C & E Loss (ft)	0.01	Cum SA (acres)	20.31	98.15	3.95

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: Ditch A
REACH: 5 RS: 9009

INPUT

Description: Sta. 9009

Station Elevation Data		num= 9							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	3452	203	3450	325	3448	492	3446	596	3445
637	3446	892	3448	1007	3450	1124	3452		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
100	.033	325	.033	892	.033

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
325	892	898	879	794	.1	.3

CROSS SECTION OUTPUT Profile #100 Yr.-WS3404.5

HECRASAMIIII100

E.G. Elev (ft)	3446.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.		0.033	
W.S. Elev (ft)	3446.62	Reach Len. (ft)	898.00	879.00	794.00
Crit W.S. (ft)	3446.50	Flow Area (sq ft)		202.92	
E.G. Slope (ft/ft)	0.012038	Area (sq ft)		202.92	
Q Total (cfs)	817.00	Flow (cfs)		817.00	
Top Width (ft)	275.79	Top Width (ft)		275.79	
Vel Total (ft/s)	4.03	Avg. Vel. (ft/s)		4.03	
Max Chl Dpth (ft)	1.62	Hydr. Depth (ft)		0.74	
Conv. Total (cfs)	7446.3	Conv. (cfs)		7446.3	
Length Wtd. (ft)	879.00	Wetted Per. (ft)		275.82	
Min Ch El (ft)	3445.00	Shear (lb/sq ft)		0.55	
Alpha	1.00	Stream Power (lb/ft s)		2.23	
Frctn Loss (ft)	4.98	Cum Volume (acre-ft)	16.85	87.70	2.52
C & E Loss (ft)	0.05	Cum SA (acres)	19.78	90.90	3.93

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 OUTPUT Profile #100 Yr.-WS3405

E.G. Elev (ft)	3446.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.		0.033	
W.S. Elev (ft)	3446.62	Reach Len. (ft)	898.00	879.00	794.00
Crit W.S. (ft)	3446.50	Flow Area (sq ft)		202.92	
E.G. Slope (ft/ft)	0.012038	Area (sq ft)		202.92	
Q Total (cfs)	817.00	Flow (cfs)		817.00	
Top Width (ft)	275.79	Top Width (ft)		275.79	
Vel Total (ft/s)	4.03	Avg. Vel. (ft/s)		4.03	
Max Chl Dpth (ft)	1.62	Hydr. Depth (ft)		0.74	
Conv. Total (cfs)	7446.3	Conv. (cfs)		7446.3	

		HECRASAMIIII100			
Length Wtd. (ft)	879.00	Wetted Per. (ft)		275.82	
Min Ch El (ft)	3445.00	Shear (lb/sq ft)		0.55	
Alpha	1.00	Stream Power (lb/ft s)		2.23	
Frctn Loss (ft)	4.98	Cum Volume (acre-ft)	16.85	85.51	2.52
C & E Loss (ft)	0.05	Cum SA (acres)	19.78	89.95	3.93

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 OUTPUT Profile #100 Yr.-WS3406

E.G. Elev (ft)	3446.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.		0.033	
W.S. Elev (ft)	3446.62	Reach Len. (ft)	898.00	879.00	794.00
Crit W.S. (ft)	3446.50	Flow Area (sq ft)		202.92	
E.G. Slope (ft/ft)	0.012038	Area (sq ft)		202.92	
Q Total (cfs)	817.00	Flow (cfs)		817.00	
Top Width (ft)	275.79	Top Width (ft)		275.79	
Vel Total (ft/s)	4.03	Avg. Vel. (ft/s)		4.03	
Max Chl Dpth (ft)	1.62	Hydr. Depth (ft)		0.74	
Conv. Total (cfs)	7446.3	Conv. (cfs)		7446.3	
Length Wtd. (ft)	879.00	Wetted Per. (ft)		275.82	
Min Ch El (ft)	3445.00	Shear (lb/sq ft)		0.55	
Alpha	1.00	Stream Power (lb/ft s)		2.23	
Frctn Loss (ft)	4.98	Cum Volume (acre-ft)	16.94	91.90	2.56
C & E Loss (ft)	0.05	Cum SA (acres)	19.80	93.27	3.95

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 OUTPUT Profile #100 Yr.-WS3407

HECRASAMIIII100

E.G. Elev (ft)	3446.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.		0.033	
W.S. Elev (ft)	3446.62	Reach Len. (ft)	898.00	879.00	794.00
Crit W.S. (ft)	3446.50	Flow Area (sq ft)		202.92	
E.G. Slope (ft/ft)	0.012038	Area (sq ft)		202.92	
Q Total (cfs)	817.00	Flow (cfs)		817.00	
Top Width (ft)	275.79	Top Width (ft)		275.79	
Vel Total (ft/s)	4.03	Avg. Vel. (ft/s)		4.03	
Max Chl Dpth (ft)	1.62	Hydr. Depth (ft)		0.74	
Conv. Total (cfs)	7446.3	Conv. (cfs)		7446.3	
Length Wtd. (ft)	879.00	Wetted Per. (ft)		275.82	
Min Ch El (ft)	3445.00	Shear (lb/sq ft)		0.55	
Alpha	1.00	Stream Power (lb/ft s)		2.23	
Frctn Loss (ft)	4.98	Cum Volume (acre-ft)	17.19	102.63	2.56
C & E Loss (ft)	0.05	Cum SA (acres)	20.31	93.27	3.95

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: Ditch A
REACH: 5 RS: 8130

INPUT

Description: Sta. 8130

Station Elevation Data				num=	8				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	3448	303	3444	419	3442	654	3440	663	3440
852	3442	995	3444	1104	3446				

Manning's n Values				num=	3				
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.033	419	.033	852	.033				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.	
	419	852		399	413	456	.1	.3

CROSS SECTION OUTPUT Profile #100 Yr.-WS3404.5

E.G. Elev (ft)	3441.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.033	

			HECRASAMIIII100		
W.S. Elev (ft)	3441.75	Reach Len. (ft)	399.00	413.00	456.00
Crit W.S. (ft)	3441.25	Flow Area (sq ft)		340.75	
E.G. Slope (ft/ft)	0.003282	Area (sq ft)		340.75	
Q Total (cfs)	817.00	Flow (cfs)		817.00	
Top Width (ft)	380.21	Top Width (ft)		380.21	
Vel Total (ft/s)	2.40	Avg. Vel. (ft/s)		2.40	
Max Chl Dpth (ft)	1.75	Hydr. Depth (ft)		0.90	
Conv. Total (cfs)	14261.8	Conv. (cfs)		14261.8	
Length Wtd. (ft)	413.00	Wetted Per. (ft)		380.22	
Min Ch El (ft)	3440.00	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)		0.44	
Frctn Loss (ft)	2.72	Cum Volume (acre-ft)	16.85	82.21	2.52
C & E Loss (ft)	0.02	Cum SA (acres)	19.78	84.28	3.93

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 OUTPUT Profile #100 Yr.-WS3405

E.G. Elev (ft)	3441.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.033	
W.S. Elev (ft)	3441.75	Reach Len. (ft)	399.00	413.00	456.00
Crit W.S. (ft)	3441.25	Flow Area (sq ft)		340.75	
E.G. Slope (ft/ft)	0.003282	Area (sq ft)		340.75	
Q Total (cfs)	817.00	Flow (cfs)		817.00	
Top Width (ft)	380.21	Top Width (ft)		380.21	
Vel Total (ft/s)	2.40	Avg. Vel. (ft/s)		2.40	
Max Chl Dpth (ft)	1.75	Hydr. Depth (ft)		0.90	
Conv. Total (cfs)	14261.8	Conv. (cfs)		14261.8	
Length Wtd. (ft)	413.00	Wetted Per. (ft)		380.22	
Min Ch El (ft)	3440.00	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)		0.44	

		HECRASAMIIII100			
Frctn Loss (ft)	2.72	Cum Volume (acre-ft)	16.85	80.02	2.52
C & E Loss (ft)	0.02	Cum SA (acres)	19.78	83.34	3.93

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 OUTPUT Profile #100 Yr.-WS3406

E.G. Elev (ft)	3441.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.033	
W.S. Elev (ft)	3441.75	Reach Len. (ft)	399.00	413.00	456.00
Crit W.S. (ft)	3441.25	Flow Area (sq ft)		340.75	
E.G. Slope (ft/ft)	0.003282	Area (sq ft)		340.75	
Q Total (cfs)	817.00	Flow (cfs)		817.00	
Top Width (ft)	380.21	Top Width (ft)		380.21	
Vel Total (ft/s)	2.40	Avg. Vel. (ft/s)		2.40	
Max Chl Dpth (ft)	1.75	Hydr. Depth (ft)		0.90	
Conv. Total (cfs)	14261.8	Conv. (cfs)		14261.8	
Length Wtd. (ft)	413.00	Wetted Per. (ft)		380.22	
Min Ch El (ft)	3440.00	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)		0.44	
Frctn Loss (ft)	2.72	Cum Volume (acre-ft)	16.94	86.42	2.56
C & E Loss (ft)	0.02	Cum SA (acres)	19.80	86.65	3.95

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 OUTPUT Profile #100 Yr.-WS3407

E.G. Elev (ft)	3441.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.033	
W.S. Elev (ft)	3441.75	Reach Len. (ft)	399.00	413.00	456.00

HECRASAMIIII100

Crit W.S. (ft)	3441.25	Flow Area (sq ft)	340.75		
E.G. Slope (ft/ft)	0.003282	Area (sq ft)	340.75		
Q Total (cfs)	817.00	Flow (cfs)	817.00		
Top Width (ft)	380.21	Top Width (ft)	380.21		
Vel Total (ft/s)	2.40	Avg. Vel. (ft/s)	2.40		
Max Chl Dpth (ft)	1.75	Hydr. Depth (ft)	0.90		
Conv. Total (cfs)	14261.8	Conv. (cfs)	14261.8		
Length Wtd. (ft)	413.00	Wetted Per. (ft)	380.22		
Min Ch El (ft)	3440.00	Shear (lb/sq ft)	0.18		
Alpha	1.00	Stream Power (lb/ft s)	0.44		
Frctn Loss (ft)	2.72	Cum Volume (acre-ft)	17.19	97.15	2.56
C & E Loss (ft)	0.02	Cum SA (acres)	20.31	86.65	3.95

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: Ditch A
REACH: 5 RS: 7717

INPUT

Description: Sta 7717

Station Elevation Data				num=	8						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev		
100	3442	233	3440	383	3438	492	3437.8	510	3438		
657	3439	747	3440	879	3442						

Manning's n Values				num=	3
Sta	n Val	Sta	n Val	Sta	n Val
100	.033	233	.033	747	.033

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	233	747		444 464	510	.1	.3

CROSS SECTION OUTPUT Profile #100 Yr.-WS3404.5

E.G. Elev (ft)	3439.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.033		
W.S. Elev (ft)	3438.79	Reach Len. (ft)	444.00	464.00	510.00
Crit W.S. (ft)	3438.79	Flow Area (sq ft)	182.90		
E.G. Slope (ft/ft)	0.019275	Area (sq ft)	182.90		

		HECRASAMIII100			
Q Total (cfs)	817.00	Flow (cfs)		817.00	
Top Width (ft)	302.82	Top Width (ft)		302.82	
Vel Total (ft/s)	4.47	Avg. Vel. (ft/s)		4.47	
Max Chl Dpth (ft)	0.99	Hydr. Depth (ft)		0.60	
Conv. Total (cfs)	5884.7	Conv. (cfs)		5884.7	
Length Wtd. (ft)	464.08	Wetted Per. (ft)		302.83	
Min Ch El (ft)	3437.80	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		3.25	
Frctn Loss (ft)	1.75	Cum Volume (acre-ft)	16.85	79.73	2.52
C & E Loss (ft)	0.08	Cum SA (acres)	19.78	81.05	3.93

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 OUTPUT Profile #100 Yr.-WS3405

E.G. Elev (ft)	3439.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.033	
W.S. Elev (ft)	3438.79	Reach Len. (ft)	444.00	464.00	510.00
Crit W.S. (ft)	3438.79	Flow Area (sq ft)		182.90	
E.G. Slope (ft/ft)	0.019275	Area (sq ft)		182.90	
Q Total (cfs)	817.00	Flow (cfs)		817.00	
Top Width (ft)	302.82	Top Width (ft)		302.82	
Vel Total (ft/s)	4.47	Avg. Vel. (ft/s)		4.47	
Max Chl Dpth (ft)	0.99	Hydr. Depth (ft)		0.60	
Conv. Total (cfs)	5884.7	Conv. (cfs)		5884.7	
Length Wtd. (ft)	464.08	Wetted Per. (ft)		302.83	

Min Ch El (ft)	3437.80	HECRASAMIII100 Shear (lb/sq ft)	0.73		
Alpha	1.00	Stream Power (lb/ft s)	3.25		
Frctn Loss (ft)	1.75	Cum Volume (acre-ft)	16.85	77.54	2.52
C & E Loss (ft)	0.08	Cum SA (acres)	19.78	80.10	3.93

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 OUTPUT Profile #100 Yr.-WS3406

E.G. Elev (ft)	3439.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.033	
W.S. Elev (ft)	3438.79	Reach Len. (ft)	444.00	464.00	510.00
Crit W.S. (ft)	3438.79	Flow Area (sq ft)		182.90	
E.G. Slope (ft/ft)	0.019275	Area (sq ft)		182.90	
Q Total (cfs)	817.00	Flow (cfs)		817.00	
Top Width (ft)	302.82	Top Width (ft)		302.82	
Vel Total (ft/s)	4.47	Avg. Vel. (ft/s)		4.47	
Max Chl Dpth (ft)	0.99	Hydr. Depth (ft)		0.60	
Conv. Total (cfs)	5884.7	Conv. (cfs)		5884.7	
Length Wtd. (ft)	464.08	Wetted Per. (ft)		302.83	
Min Ch El (ft)	3437.80	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		3.25	
Frctn Loss (ft)	1.75	Cum Volume (acre-ft)	16.94	83.94	2.56
C & E Loss (ft)	0.08	Cum SA (acres)	19.80	83.41	3.95

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 OUTPUT Profile #100 Yr.-WS3407

E.G. Elev (ft)	3439.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.033	
W.S. Elev (ft)	3438.79	Reach Len. (ft)	444.00	464.00	510.00
Crit W.S. (ft)	3438.79	Flow Area (sq ft)		182.90	
E.G. Slope (ft/ft)	0.019275	Area (sq ft)		182.90	
Q Total (cfs)	817.00	Flow (cfs)		817.00	
Top Width (ft)	302.82	Top Width (ft)		302.82	
Vel Total (ft/s)	4.47	Avg. Vel. (ft/s)		4.47	
Max Chl Dpth (ft)	0.99	Hydr. Depth (ft)		0.60	
Conv. Total (cfs)	5884.7	Conv. (cfs)		5884.7	
Length Wtd. (ft)	464.08	Wetted Per. (ft)		302.83	
Min Ch El (ft)	3437.80	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		3.25	
Frctn Loss (ft)	1.75	Cum Volume (acre-ft)	17.19	94.67	2.56
C & E Loss (ft)	0.08	Cum SA (acres)	20.31	83.41	3.95

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 i

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ndicates

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

CROSS SECTION RIVER: Ditch A
REACH: 5 RS: 7253

INPUT

Description: Sta. 7253

Station Elevation Data		num= 9							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	3438	109	3438.7	321	3438	424	3436	668	3435
906	3436	1005	3438	1200	3440	1365	3442		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
100	.033	424	.033	906	.033

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	424	906		756	910	.1	.3

CROSS SECTION OUTPUT Profile #100 Yr.-WS3404.5

E.G. Elev (ft)	3436.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3436.53	Reach Len. (ft)	756.00	910.00	980.00
Crit W.S. (ft)	3435.99	Flow Area (sq ft)	7.27	497.18	6.99
E.G. Slope (ft/ft)	0.001746	Area (sq ft)	7.27	497.18	6.99
Q Total (cfs)	966.00	Flow (cfs)	5.66	954.91	5.44
Top Width (ft)	535.68	Top Width (ft)	27.37	482.00	26.31
Vel Total (ft/s)	1.89	Avg. Vel. (ft/s)	0.78	1.92	0.78
Max Chl Dpth (ft)	1.53	Hydr. Depth (ft)	0.27	1.03	0.27
Conv. Total (cfs)	23119.9	Conv. (cfs)	135.4	22854.4	130.1
Length Wtd. (ft)	909.83	Wetted Per. (ft)	27.38	482.00	26.31
Min Ch El (ft)	3435.00	Shear (lb/sq ft)	0.03	0.11	0.03
Alpha	1.02	Stream Power (lb/ft s)	0.02	0.22	0.02
Frctn Loss (ft)	5.34	Cum Volume (acre-ft)	16.81	76.11	2.48
C & E Loss (ft)	0.03	Cum SA (acres)	19.64	76.87	3.78

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 OUTPUT Profile #100 Yr.-WS3405

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E.G. Elev (ft)	3436.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3436.53	Reach Len. (ft)	756.00	910.00	980.00
Crit W.S. (ft)	3435.99	Flow Area (sq ft)	7.27	497.18	6.99
E.G. Slope (ft/ft)	0.001746	Area (sq ft)	7.27	497.18	6.99
Q Total (cfs)	966.00	Flow (cfs)	5.66	954.91	5.44
Top Width (ft)	535.68	Top Width (ft)	27.37	482.00	26.31
Vel Total (ft/s)	1.89	Avg. Vel. (ft/s)	0.78	1.92	0.78
Max Chl Dpth (ft)	1.53	Hydr. Depth (ft)	0.27	1.03	0.27
Conv. Total (cfs)	23119.9	Conv. (cfs)	135.4	22854.4	130.1
Length Wtd. (ft)	909.83	Wetted Per. (ft)	27.38	482.00	26.31
Min Ch El (ft)	3435.00	Shear (lb/sq ft)	0.03	0.11	0.03
Alpha	1.02	Stream Power (lb/ft s)	0.02	0.22	0.02
Frctn Loss (ft)	5.34	Cum Volume (acre-ft)	16.81	73.92	2.48
C & E Loss (ft)	0.03	Cum SA (acres)	19.64	75.92	3.78

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 OUTPUT Profile #100 Yr.-WS3406

E.G. Elev (ft)	3436.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3436.53	Reach Len. (ft)	756.00	910.00	980.00
Crit W.S. (ft)	3435.99	Flow Area (sq ft)	7.27	497.18	6.99
E.G. Slope (ft/ft)	0.001746	Area (sq ft)	7.27	497.18	6.99
Q Total (cfs)	966.00	Flow (cfs)	5.66	954.91	5.44
Top Width (ft)	535.68	Top Width (ft)	27.37	482.00	26.31
Vel Total (ft/s)	1.89	Avg. Vel. (ft/s)	0.78	1.92	0.78
Max Chl Dpth (ft)	1.53	Hydr. Depth (ft)	0.27	1.03	0.27
Conv. Total (cfs)	23119.9	Conv. (cfs)	135.4	22854.4	130.1

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Length Wtd. (ft)	909.83	Wetted Per. (ft)	27.38	482.00	26.31
Min Ch El (ft)	3435.00	Shear (lb/sq ft)	0.03	0.11	0.03
Alpha	1.02	Stream Power (lb/ft s)	0.02	0.22	0.02
Frctn Loss (ft)	5.34	Cum Volume (acre-ft)	16.90	80.31	2.51
C & E Loss (ft)	0.03	Cum SA (acres)	19.66	79.23	3.80

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 OUTPUT Profile #100 Yr.-WS3407

E.G. Elev (ft)	3436.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3436.53	Reach Len. (ft)	756.00	910.00	980.00
Crit W.S. (ft)	3435.99	Flow Area (sq ft)	7.27	497.18	6.99
E.G. Slope (ft/ft)	0.001746	Area (sq ft)	7.27	497.18	6.99
Q Total (cfs)	966.00	Flow (cfs)	5.66	954.91	5.44
Top Width (ft)	535.68	Top Width (ft)	27.37	482.00	26.31
Vel Total (ft/s)	1.89	Avg. Vel. (ft/s)	0.78	1.92	0.78
Max Chl Dpth (ft)	1.53	Hydr. Depth (ft)	0.27	1.03	0.27
Conv. Total (cfs)	23119.9	Conv. (cfs)	135.4	22854.4	130.1
Length Wtd. (ft)	909.83	Wetted Per. (ft)	27.38	482.00	26.31
Min Ch El (ft)	3435.00	Shear (lb/sq ft)	0.03	0.11	0.03
Alpha	1.02	Stream Power (lb/ft s)	0.02	0.22	0.02
Frctn Loss (ft)	5.34	Cum Volume (acre-ft)	17.16	91.04	2.51
C & E Loss (ft)	0.03	Cum SA (acres)	20.17	79.23	3.80

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: Ditch A
REACH: 5 RS: 6343

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INPUT

Description: Sta. 6343

Station Elevation Data		num= 9	
Sta	Elev	Sta	Elev
100	3434	346	3433
981	3430	1273	3430

Manning's n Values

num= 3	
Sta	n Val
100	.033
663	.033

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	663	1320		767	980	1051	.1

CROSS SECTION OUTPUT Profile #100 Yr.-WS3404.5

E.G. Elev (ft)	3431.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.033	
W.S. Elev (ft)	3430.86	Reach Len. (ft)	767.00	980.00	1051.00
Crit W.S. (ft)	3430.86	Flow Area (sq ft)		388.25	
E.G. Slope (ft/ft)	0.018047	Area (sq ft)		388.25	
Q Total (cfs)	1873.00	Flow (cfs)		1873.00	
Top Width (ft)	545.10	Top Width (ft)		545.10	
Vel Total (ft/s)	4.82	Avg. Vel. (ft/s)		4.82	
Max Chl Dpth (ft)	0.86	Hydr. Depth (ft)		0.71	
Conv. Total (cfs)	13942.4	Conv. (cfs)		13942.4	
Length Wtd. (ft)	979.81	Wetted Per. (ft)		545.12	
Min Ch El (ft)	3430.00	Shear (lb/sq ft)		0.80	
Alpha	1.00	Stream Power (lb/ft s)		3.87	
Frctn Loss (ft)	4.07	Cum Volume (acre-ft)	16.75	66.86	2.40
C & E Loss (ft)	0.09	Cum SA (acres)	19.40	66.14	3.48

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 OUTPUT Profile #100 Yr.-WS3405

E.G. Elev (ft)	3431.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.033	
W.S. Elev (ft)	3430.86	Reach Len. (ft)	767.00	980.00	1051.00
Crit W.S. (ft)	3430.86	Flow Area (sq ft)		388.25	
E.G. Slope (ft/ft)	0.018047	Area (sq ft)		388.25	
Q Total (cfs)	1873.00	Flow (cfs)		1873.00	
Top Width (ft)	545.10	Top Width (ft)		545.10	
Vel Total (ft/s)	4.82	Avg. Vel. (ft/s)		4.82	
Max Chl Dpth (ft)	0.86	Hydr. Depth (ft)		0.71	
Conv. Total (cfs)	13942.4	Conv. (cfs)		13942.4	
Length Wtd. (ft)	979.81	Wetted Per. (ft)		545.12	
Min Ch El (ft)	3430.00	Shear (lb/sq ft)		0.80	
Alpha	1.00	Stream Power (lb/ft s)		3.87	
Frctn Loss (ft)	4.07	Cum Volume (acre-ft)	16.75	64.67	2.40
C & E Loss (ft)	0.09	Cum SA (acres)	19.40	65.19	3.48

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 OUTPUT Profile #100 Yr.-WS3406

E.G. Elev (ft)	3431.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.033	
W.S. Elev (ft)	3430.86	Reach Len. (ft)	767.00	980.00	1051.00

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Crit W.S. (ft)	3430.86	Flow Area (sq ft)		388.25	
E.G. Slope (ft/ft)	0.018047	Area (sq ft)		388.25	
Q Total (cfs)	1873.00	Flow (cfs)		1873.00	
Top Width (ft)	545.10	Top Width (ft)		545.10	
Vel Total (ft/s)	4.82	Avg. Vel. (ft/s)		4.82	
Max Chl Dpth (ft)	0.86	Hydr. Depth (ft)		0.71	
Conv. Total (cfs)	13942.4	Conv. (cfs)		13942.4	
Length Wtd. (ft)	979.81	Wetted Per. (ft)		545.12	
Min Ch El (ft)	3430.00	Shear (lb/sq ft)		0.80	
Alpha	1.00	Stream Power (lb/ft s)		3.87	
Frctn Loss (ft)	4.07	Cum Volume (acre-ft)	16.84	71.06	2.44
C & E Loss (ft)	0.09	Cum SA (acres)	19.42	68.50	3.50

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 OUTPUT Profile #100 Yr.-WS3407

E.G. Elev (ft)	3431.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.033	
W.S. Elev (ft)	3430.86	Reach Len. (ft)	767.00	980.00	1051.00
Crit W.S. (ft)	3430.86	Flow Area (sq ft)		388.25	
E.G. Slope (ft/ft)	0.018047	Area (sq ft)		388.25	
Q Total (cfs)	1873.00	Flow (cfs)		1873.00	
Top Width (ft)	545.10	Top Width (ft)		545.10	
Vel Total (ft/s)	4.82	Avg. Vel. (ft/s)		4.82	
Max Chl Dpth (ft)	0.86	Hydr. Depth (ft)		0.71	

		HECRASAMIII100			
Conv. Total (cfs)	13942.4	Conv. (cfs)	13942.4		
Length Wtd. (ft)	979.81	Wetted Per. (ft)	545.12		
Min Ch El (ft)	3430.00	Shear (lb/sq ft)	0.80		
Alpha	1.00	Stream Power (lb/ft s)	3.87		
Frctn Loss (ft)	4.07	Cum Volume (acre-ft)	17.09	81.79	2.44
C & E Loss (ft)	0.09	Cum SA (acres)	19.93	68.50	3.50

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: Ditch A
REACH: 5 RS: 5363

INPUT

Description: Sta. 5363

Station Elevation Data		num= 10							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	3432	282	3430	550	3428	742	3426	885	3425
1097	3425	1476	3426	1877	3428	1966	3428	2160	3430

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
100	.033	742	.033	1476	.033

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	742	1476		1199 1142	713	.1	.3

CROSS SECTION OUTPUT Profile #100 Yr.-WS3404.5

E.G. Elev (ft)	3426.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3426.53	Reach Len. (ft)	1199.00	1142.00	713.00
Crit W.S. (ft)	3425.93	Flow Area (sq ft)	13.63	864.19	28.48
E.G. Slope (ft/ft)	0.001798	Area (sq ft)	13.63	864.19	28.48
Q Total (cfs)	1873.00	Flow (cfs)	10.78	1839.71	22.51
Top Width (ft)	892.02	Top Width (ft)	51.16	734.00	106.86

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Vel Total (ft/s)	2.07	Avg. Vel. (ft/s)	0.79	2.13	0.79
Max Chl Dpth (ft)	1.53	Hydr. Depth (ft)	0.27	1.18	0.27
Conv. Total (cfs)	44172.8	Conv. (cfs)	254.2	43387.6	531.0
Length Wtd. (ft)	1139.81	Wetted Per. (ft)	51.17	734.00	106.86
Min Ch El (ft)	3425.00	Shear (lb/sq ft)	0.03	0.13	0.03
Alpha	1.04	Stream Power (lb/ft s)	0.02	0.28	0.02
Frctn Loss (ft)	4.99	Cum Volume (acre-ft)	16.63	52.77	2.06
C & E Loss (ft)	0.03	Cum SA (acres)	18.95	51.75	2.20

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 OUTPUT Profile #100 Yr.-WS3405

E.G. Elev (ft)	3426.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3426.53	Reach Len. (ft)	1199.00	1142.00	713.00
Crit W.S. (ft)	3425.93	Flow Area (sq ft)	13.63	864.19	28.48
E.G. Slope (ft/ft)	0.001798	Area (sq ft)	13.63	864.19	28.48
Q Total (cfs)	1873.00	Flow (cfs)	10.78	1839.71	22.51
Top Width (ft)	892.02	Top Width (ft)	51.16	734.00	106.86
Vel Total (ft/s)	2.07	Avg. Vel. (ft/s)	0.79	2.13	0.79
Max Chl Dpth (ft)	1.53	Hydr. Depth (ft)	0.27	1.18	0.27
Conv. Total (cfs)	44172.8	Conv. (cfs)	254.2	43387.6	531.0
Length Wtd. (ft)	1139.81	Wetted Per. (ft)	51.17	734.00	106.86
Min Ch El (ft)	3425.00	Shear (lb/sq ft)	0.03	0.13	0.03
Alpha	1.04	Stream Power (lb/ft s)	0.02	0.28	0.02
Frctn Loss (ft)	4.99	Cum Volume (acre-ft)	16.63	50.58	2.06
C & E Loss (ft)	0.03	Cum SA (acres)	18.95	50.80	2.20

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.

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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 OUTPUT Profile #100 Yr.-WS3406

E.G. Elev (ft)	3426.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3426.53	Reach Len. (ft)	1199.00	1142.00	713.00
Crit W.S. (ft)	3425.93	Flow Area (sq ft)	13.63	864.19	28.48
E.G. Slope (ft/ft)	0.001798	Area (sq ft)	13.63	864.19	28.48
Q Total (cfs)	1873.00	Flow (cfs)	10.78	1839.71	22.51
Top Width (ft)	892.02	Top Width (ft)	51.16	734.00	106.86
Vel Total (ft/s)	2.07	Avg. Vel. (ft/s)	0.79	2.13	0.79
Max Chl Dpth (ft)	1.53	Hydr. Depth (ft)	0.27	1.18	0.27
Conv. Total (cfs)	44172.8	Conv. (cfs)	254.2	43387.6	531.0
Length Wtd. (ft)	1139.81	Wetted Per. (ft)	51.17	734.00	106.86
Min Ch El (ft)	3425.00	Shear (lb/sq ft)	0.03	0.13	0.03
Alpha	1.04	Stream Power (lb/ft s)	0.02	0.28	0.02
Frcn Loss (ft)	4.99	Cum Volume (acre-ft)	16.72	56.98	2.09
C & E Loss (ft)	0.03	Cum SA (acres)	18.97	54.12	2.21

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 OUTPUT Profile #100 Yr.-WS3407

E.G. Elev (ft)	3426.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3426.53	Reach Len. (ft)	1199.00	1142.00	713.00
Crit W.S. (ft)	3425.93	Flow Area (sq ft)	13.63	864.19	28.48
E.G. Slope (ft/ft)	0.001798	Area (sq ft)	13.63	864.19	28.48
Q Total (cfs)	1873.00	Flow (cfs)	10.78	1839.71	22.51
Top Width (ft)	892.02	Top Width (ft)	51.16	734.00	106.86

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Vel Total (ft/s)	2.07	Avg. Vel. (ft/s)	0.79	2.13	0.79
Max Chl Dpth (ft)	1.53	Hydr. Depth (ft)	0.27	1.18	0.27
Conv. Total (cfs)	44172.8	Conv. (cfs)	254.2	43387.6	531.0
Length Wtd. (ft)	1139.81	Wetted Per. (ft)	51.17	734.00	106.86
Min Ch El (ft)	3425.00	Shear (lb/sq ft)	0.03	0.13	0.03
Alpha	1.04	Stream Power (lb/ft s)	0.02	0.28	0.02
Frctn Loss (ft)	4.99	Cum Volume (acre-ft)	16.97	67.71	2.09
C & E Loss (ft)	0.03	Cum SA (acres)	19.48	54.12	2.21

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: Ditch A
 REACH: 5 RS: 4221

INPUT

Description: Sta. 4221

Station Elevation Data		num= 12							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	3423	341	3422	544	3421	640	3420	669	3420
753	3420.2	829	3420	837	3420	1030	3421	1320	3422
1407	3423	1497	3424						

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
100	.033	544	.033	1407	.033

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	544	1407		749 732	843	.1	.3

CROSS SECTION OUTPUT Profile #100 Yr.-WS3404.5

E.G. Elev (ft)	3421.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.	0.033	0.033	
W.S. Elev (ft)	3421.19	Reach Len. (ft)	749.00	732.00	843.00
Crit W.S. (ft)	3421.19	Flow Area (sq ft)	3.79	424.90	
E.G. Slope (ft/ft)	0.017043	Area (sq ft)	3.79	424.90	
Q Total (cfs)	2128.00	Flow (cfs)	4.70	2123.30	
Top Width (ft)	581.33	Top Width (ft)	39.25	542.07	
Vel Total (ft/s)	4.96	Avg. Vel. (ft/s)	1.24	5.00	
Max Chl Dpth (ft)	1.19	Hydr. Depth (ft)	0.10	0.78	

		HECRASAMIIII100			
Conv. Total (cfs)	16300.7	Conv. (cfs)	36.0	16264.7	
Length Wtd. (ft)	736.95	Wetted Per. (ft)	39.25	542.08	
Min Ch El (ft)	3420.00	Shear (lb/sq ft)	0.10	0.83	
Alpha	1.01	Stream Power (lb/ft s)	0.13	4.17	
Frctn Loss (ft)	3.60	Cum Volume (acre-ft)	16.39	35.87	1.82
C & E Loss (ft)	0.09	Cum SA (acres)	17.71	35.02	1.32

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 OUTPUT Profile #100 Yr.-WS3405

E.G. Elev (ft)	3421.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.	0.033	0.033	
W.S. Elev (ft)	3421.19	Reach Len. (ft)	749.00	732.00	843.00
Crit W.S. (ft)	3421.19	Flow Area (sq ft)	3.79	424.90	
E.G. Slope (ft/ft)	0.017043	Area (sq ft)	3.79	424.90	
Q Total (cfs)	2128.00	Flow (cfs)	4.70	2123.30	
Top Width (ft)	581.33	Top Width (ft)	39.25	542.07	
Vel Total (ft/s)	4.96	Avg. Vel. (ft/s)	1.24	5.00	
Max Chl Dpth (ft)	1.19	Hydr. Depth (ft)	0.10	0.78	
Conv. Total (cfs)	16300.7	Conv. (cfs)	36.0	16264.7	
Length Wtd. (ft)	736.95	Wetted Per. (ft)	39.25	542.08	
Min Ch El (ft)	3420.00	Shear (lb/sq ft)	0.10	0.83	
Alpha	1.01	Stream Power (lb/ft s)	0.13	4.17	
Frctn Loss (ft)	3.60	Cum Volume (acre-ft)	16.39	33.68	1.82
C & E Loss (ft)	0.09	Cum SA (acres)	17.71	34.07	1.32

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 OUTPUT Profile #100 Yr.-WS3406

E.G. Elev (ft)	3421.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.	0.033	0.033	
W.S. Elev (ft)	3421.19	Reach Len. (ft)	749.00	732.00	843.00
Crit W.S. (ft)	3421.19	Flow Area (sq ft)	3.79	424.90	
E.G. Slope (ft/ft)	0.017043	Area (sq ft)	3.79	424.90	
Q Total (cfs)	2128.00	Flow (cfs)	4.70	2123.30	
Top Width (ft)	581.33	Top Width (ft)	39.25	542.07	
Vel Total (ft/s)	4.96	Avg. Vel. (ft/s)	1.24	5.00	
Max Chl Dpth (ft)	1.19	Hydr. Depth (ft)	0.10	0.78	
Conv. Total (cfs)	16300.7	Conv. (cfs)	36.0	16264.7	
Length Wtd. (ft)	736.95	Wetted Per. (ft)	39.25	542.08	
Min Ch El (ft)	3420.00	Shear (lb/sq ft)	0.10	0.83	
Alpha	1.01	Stream Power (lb/ft s)	0.13	4.17	
Frctn Loss (ft)	3.60	Cum Volume (acre-ft)	16.48	40.08	1.86
C & E Loss (ft)	0.09	Cum SA (acres)	17.72	37.39	1.34

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

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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 OUTPUT Profile #100 Yr.-WS3407

E.G. Elev (ft)	3421.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.	0.033	0.033	
W.S. Elev (ft)	3421.19	Reach Len. (ft)	749.00	732.00	843.00
Crit W.S. (ft)	3421.19	Flow Area (sq ft)	3.79	424.90	
E.G. Slope (ft/ft)	0.017043	Area (sq ft)	3.79	424.90	
Q Total (cfs)	2128.00	Flow (cfs)	4.70	2123.30	
Top Width (ft)	581.33	Top Width (ft)	39.25	542.07	
Vel Total (ft/s)	4.96	Avg. Vel. (ft/s)	1.24	5.00	
Max Chl Dpth (ft)	1.19	Hydr. Depth (ft)	0.10	0.78	
Conv. Total (cfs)	16300.7	Conv. (cfs)	36.0	16264.7	
Length Wtd. (ft)	736.95	Wetted Per. (ft)	39.25	542.08	
Min Ch El (ft)	3420.00	Shear (lb/sq ft)	0.10	0.83	
Alpha	1.01	Stream Power (lb/ft s)	0.13	4.17	
Frctn Loss (ft)	3.60	Cum Volume (acre-ft)	16.73	50.81	1.86
C & E Loss (ft)	0.09	Cum SA (acres)	18.24	37.39	1.34

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: Ditch A
 REACH: 5 RS: 3489

INPUT

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Description: Sta. 3489

Station Elevation Data			num=	22					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-286	3420	-138	3418.5	-126	3418	-104	3416	-91	3415.5
-76	3416	-21	3417	100	3417	258	3416.5	299	3416
309	3415	318	3416	405	3416	422	3416	539	3416.4
581	3416.2	642	3416.4	744	3416	830	3416	918	3418
1068	3420	1159	3421						

Manning's n Values			num=	3	
Sta	n Val	Sta	n Val	Sta	n Val
-286	.033	539	.033	918	.033

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	539	918		464	500	457	.1
							.3

CROSS SECTION OUTPUT Profile #100 Yr.-WS3404.5

E.G. Elev (ft)	3417.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.033	0.033	
W.S. Elev (ft)	3417.37	Reach Len. (ft)	464.00	500.00	457.00
Crit W.S. (ft)	3416.82	Flow Area (sq ft)	607.17	388.72	
E.G. Slope (ft/ft)	0.002273	Area (sq ft)	607.17	388.72	
Q Total (cfs)	2128.00	Flow (cfs)	1235.19	892.81	
Top Width (ft)	1009.36	Top Width (ft)	658.07	351.29	
Vel Total (ft/s)	2.14	Avg. Vel. (ft/s)	2.03	2.30	
Max Chl Dpth (ft)	2.37	Hydr. Depth (ft)	0.92	1.11	
Conv. Total (cfs)	44630.1	Conv. (cfs)	25905.4	18724.6	
Length Wtd. (ft)	481.52	Wetted Per. (ft)	658.27	351.30	
Min Ch El (ft)	3416.00	Shear (lb/sq ft)	0.13	0.16	
Alpha	1.01	Stream Power (lb/ft s)	0.27	0.36	
Frctn Loss (ft)	2.39	Cum Volume (acre-ft)	11.14	29.04	1.82
C & E Loss (ft)	0.03	Cum SA (acres)	11.71	27.52	1.32

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 OUTPUT Profile #100 Yr.-WS3405

E.G. Elev (ft)	3417.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.033	0.033	

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W.S. Elev (ft)	3417.37	Reach Len. (ft)	464.00	500.00	457.00
Crit W.S. (ft)	3416.82	Flow Area (sq ft)	607.17	388.72	
E.G. Slope (ft/ft)	0.002273	Area (sq ft)	607.17	388.72	
Q Total (cfs)	2128.00	Flow (cfs)	1235.19	892.81	
Top Width (ft)	1009.36	Top Width (ft)	658.07	351.29	
Vel Total (ft/s)	2.14	Avg. Vel. (ft/s)	2.03	2.30	
Max Chl Dpth (ft)	2.37	Hydr. Depth (ft)	0.92	1.11	
Conv. Total (cfs)	44630.1	Conv. (cfs)	25905.4	18724.6	
Length Wtd. (ft)	481.52	Wetted Per. (ft)	658.27	351.30	
Min Ch El (ft)	3416.00	Shear (lb/sq ft)	0.13	0.16	
Alpha	1.01	Stream Power (lb/ft s)	0.27	0.36	
Frctn Loss (ft)	2.39	Cum Volume (acre-ft)	11.14	26.85	1.82
C & E Loss (ft)	0.03	Cum SA (acres)	11.71	26.57	1.32

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 OUTPUT Profile #100 Yr.-WS3406

E.G. Elev (ft)	3417.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.033	0.033	
W.S. Elev (ft)	3417.37	Reach Len. (ft)	464.00	500.00	457.00
Crit W.S. (ft)	3416.82	Flow Area (sq ft)	607.17	388.72	
E.G. Slope (ft/ft)	0.002273	Area (sq ft)	607.17	388.72	
Q Total (cfs)	2128.00	Flow (cfs)	1235.19	892.81	
Top Width (ft)	1009.36	Top Width (ft)	658.07	351.29	
Vel Total (ft/s)	2.14	Avg. Vel. (ft/s)	2.03	2.30	
Max Chl Dpth (ft)	2.37	Hydr. Depth (ft)	0.92	1.11	
Conv. Total (cfs)	44630.1	Conv. (cfs)	25905.4	18724.6	
Length Wtd. (ft)	481.52	Wetted Per. (ft)	658.27	351.30	
Min Ch El (ft)	3416.00	Shear (lb/sq ft)	0.13	0.16	
Alpha	1.01	Stream Power (lb/ft s)	0.27	0.36	

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Frctn Loss (ft)	2.39	Cum Volume (acre-ft)	11.22	33.24	1.86
C & E Loss (ft)	0.03	Cum SA (acres)	11.73	29.88	1.34

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 OUTPUT Profile #100 Yr.-WS3407

E.G. Elev (ft)	3417.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.033	0.033	
W.S. Elev (ft)	3417.37	Reach Len. (ft)	464.00	500.00	457.00
Crit W.S. (ft)	3416.82	Flow Area (sq ft)	607.17	388.72	
E.G. Slope (ft/ft)	0.002273	Area (sq ft)	607.17	388.72	
Q Total (cfs)	2128.00	Flow (cfs)	1235.19	892.81	
Top Width (ft)	1009.36	Top Width (ft)	658.07	351.29	
Vel Total (ft/s)	2.14	Avg. Vel. (ft/s)	2.03	2.30	
Max Chl Dpth (ft)	2.37	Hydr. Depth (ft)	0.92	1.11	
Conv. Total (cfs)	44630.1	Conv. (cfs)	25905.4	18724.6	
Length Wtd. (ft)	481.52	Wetted Per. (ft)	658.27	351.30	
Min Ch El (ft)	3416.00	Shear (lb/sq ft)	0.13	0.16	
Alpha	1.01	Stream Power (lb/ft s)	0.27	0.36	
Frctn Loss (ft)	2.39	Cum Volume (acre-ft)	11.48	43.97	1.86
C & E Loss (ft)	0.03	Cum SA (acres)	12.24	29.88	1.34

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: Ditch A
REACH: 5 RS: 2989

INPUT

Description: Sta. 2989

Station Elevation Data	num=	14
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		

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-31	3416	59	3414.8	170	3414.8	196	3414	436	3413.8
613	3414	651	3414	700	3414	747	3414	761	3414
841	3415.01	920	3416	976	3418	1067	3420		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-31	.033	436	.033	841	.033

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	436	841		317 215	172	.3	.5

CROSS SECTION OUTPUT Profile #100 Yr.-WS3404.5

E.G. Elev (ft)	3415.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.033	0.033	
W.S. Elev (ft)	3414.67	Reach Len. (ft)	317.00	215.00	172.00
Crit W.S. (ft)	3414.67	Flow Area (sq ft)	192.52	253.84	
E.G. Slope (ft/ft)	0.018086	Area (sq ft)	192.52	253.84	
Q Total (cfs)	2128.00	Flow (cfs)	949.67	1178.33	
Top Width (ft)	640.02	Top Width (ft)	261.83	378.20	
Vel Total (ft/s)	4.77	Avg. Vel. (ft/s)	4.93	4.64	
Max Chl Dpth (ft)	0.87	Hydr. Depth (ft)	0.74	0.67	
Conv. Total (cfs)	15823.5	Conv. (cfs)	7061.6	8761.9	
Length Wtd. (ft)	254.95	Wetted Per. (ft)	261.84	378.20	
Min Ch El (ft)	3413.80	Shear (lb/sq ft)	0.83	0.76	
Alpha	1.00	Stream Power (lb/ft s)	4.10	3.52	
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	6.88	25.35	1.82
C & E Loss (ft)	0.15	Cum SA (acres)	6.81	23.33	1.32

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: 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 OUTPUT Profile #100 Yr.-WS3405

E.G. Elev (ft)	3415.03	Element	Left OB	Channel	Right OB
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HECRASAMIII100

Vel Head (ft)	0.35	Wt. n-Val.	0.033	0.033	
W.S. Elev (ft)	3414.67	Reach Len. (ft)	317.00	215.00	172.00
Crit W.S. (ft)	3414.67	Flow Area (sq ft)	192.52	253.84	
E.G. Slope (ft/ft)	0.018086	Area (sq ft)	192.52	253.84	
Q Total (cfs)	2128.00	Flow (cfs)	949.67	1178.33	
Top Width (ft)	640.02	Top Width (ft)	261.83	378.20	
Vel Total (ft/s)	4.77	Avg. Vel. (ft/s)	4.93	4.64	
Max Chl Dpth (ft)	0.87	Hydr. Depth (ft)	0.74	0.67	
Conv. Total (cfs)	15823.5	Conv. (cfs)	7061.6	8761.9	
Length Wtd. (ft)	254.95	Wetted Per. (ft)	261.84	378.20	
Min Ch El (ft)	3413.80	Shear (lb/sq ft)	0.83	0.76	
Alpha	1.00	Stream Power (lb/ft s)	4.10	3.52	
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	6.88	23.16	1.82
C & E Loss (ft)	0.15	Cum SA (acres)	6.81	22.38	1.32

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: 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 OUTPUT Profile #100 Yr.-WS3406

E.G. Elev (ft)	3415.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.033	0.033	
W.S. Elev (ft)	3414.67	Reach Len. (ft)	317.00	215.00	172.00
Crit W.S. (ft)	3414.67	Flow Area (sq ft)	192.52	253.84	
E.G. Slope (ft/ft)	0.018086	Area (sq ft)	192.52	253.84	
Q Total (cfs)	2128.00	Flow (cfs)	949.67	1178.33	
Top Width (ft)	640.02	Top Width (ft)	261.83	378.20	
Vel Total (ft/s)	4.77	Avg. Vel. (ft/s)	4.93	4.64	

		HECRASAMIII100			
Max Chl Dpth (ft)	0.87	Hydr. Depth (ft)	0.74	0.67	
Conv. Total (cfs)	15823.5	Conv. (cfs)	7061.6	8761.9	
Length Wtd. (ft)	254.96	Wetted Per. (ft)	261.84	378.20	
Min Ch El (ft)	3413.80	Shear (lb/sq ft)	0.83	0.76	
Alpha	1.00	Stream Power (lb/ft s)	4.10	3.52	
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	6.97	29.55	1.86
C & E Loss (ft)	0.15	Cum SA (acres)	6.83	25.70	1.34

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: 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 OUTPUT Profile #100 Yr.-WS3407

E.G. Elev (ft)	3415.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.033	0.033	
W.S. Elev (ft)	3414.67	Reach Len. (ft)	317.00	215.00	172.00
Crit W.S. (ft)	3414.67	Flow Area (sq ft)	192.52	253.84	
E.G. Slope (ft/ft)	0.018086	Area (sq ft)	192.52	253.84	
Q Total (cfs)	2128.00	Flow (cfs)	949.67	1178.33	
Top Width (ft)	640.02	Top Width (ft)	261.83	378.20	
Vel Total (ft/s)	4.77	Avg. Vel. (ft/s)	4.93	4.64	
Max Chl Dpth (ft)	0.87	Hydr. Depth (ft)	0.74	0.67	
Conv. Total (cfs)	15823.5	Conv. (cfs)	7061.6	8761.9	
Length Wtd. (ft)	254.96	Wetted Per. (ft)	261.84	378.20	
Min Ch El (ft)	3413.80	Shear (lb/sq ft)	0.83	0.76	
Alpha	1.00	Stream Power (lb/ft s)	4.10	3.52	
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	7.22	40.28	1.86
C & E Loss (ft)	0.15	Cum SA (acres)	7.35	25.70	1.34

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: 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: Ditch A
 REACH: 5 RS: 2774

INPUT

Description: Sta. 2774 Upstream of culverts

Station Elevation Data		num= 18		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-453	3416	-437	3415	-405	3414	-289	3413.8	-13	3413.8
100	3413.8	175	3413.8	204	3412	261	3412	298	3411.2
402	3410.9	437	3410	469	3409	491	3409	511	3410
560	3412	641	3414	725	3416				

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
-453	.033	437	.033	511	.033

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	437	511		40	40	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-888	F		
888	F		

CROSS SECTION OUTPUT Profile #100 Yr.-WS3404.5

E.G. Elev (ft)	3414.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3414.16	Reach Len. (ft)	40.00	40.00	40.00
Crit W.S. (ft)	3412.71	Flow Area (sq ft)	901.05	355.47	248.66
E.G. Slope (ft/ft)	0.000414	Area (sq ft)	901.05	355.47	248.66
Q Total (cfs)	2128.00	Flow (cfs)	860.75	927.38	339.87
Top Width (ft)	1057.47	Top Width (ft)	846.96	74.00	136.51
Vel Total (ft/s)	1.41	Avg. Vel. (ft/s)	0.96	2.61	1.37
Max Chl Dpth (ft)	5.16	Hydr. Depth (ft)	1.06	4.80	1.82
Conv. Total (cfs)	104526.0	Conv. (cfs)	42279.5	45552.3	16694.2
Length Wtd. (ft)	40.00	Wetted Per. (ft)	847.04	74.04	136.58
Min Ch El (ft)	3409.00	Shear (lb/sq ft)	0.03	0.12	0.05

HECRASAMIII100

Alpha	1.82	Stream Power (lb/ft s)	0.03	0.32	0.06
Frctn Loss (ft)		Cum Volume (acre-ft)	2.90	23.84	1.33
C & E Loss (ft)		Cum SA (acres)	2.78	22.21	1.05

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 OUTPUT Profile #100 Yr.-WS3405

E.G. Elev (ft)	3414.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3414.16	Reach Len. (ft)	40.00	40.00	40.00
Crit W.S. (ft)	3412.71	Flow Area (sq ft)	901.05	355.47	248.66
E.G. Slope (ft/ft)	0.000414	Area (sq ft)	901.05	355.47	248.66
Q Total (cfs)	2128.00	Flow (cfs)	860.75	927.38	339.87
Top Width (ft)	1057.47	Top Width (ft)	846.96	74.00	136.51
Vel Total (ft/s)	1.41	Avg. Vel. (ft/s)	0.96	2.61	1.37
Max Chl Dpth (ft)	5.16	Hydr. Depth (ft)	1.06	4.80	1.82
Conv. Total (cfs)	104526.0	Conv. (cfs)	42279.5	45552.3	16694.2
Length Wtd. (ft)	40.00	Wetted Per. (ft)	847.04	74.04	136.58
Min Ch El (ft)	3409.00	Shear (lb/sq ft)	0.03	0.12	0.05
Alpha	1.82	Stream Power (lb/ft s)	0.03	0.32	0.06
Frctn Loss (ft)		Cum Volume (acre-ft)	2.90	21.66	1.33
C & E Loss (ft)		Cum SA (acres)	2.78	21.26	1.05

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 OUTPUT Profile #100 Yr.-WS3406

E.G. Elev (ft)	3414.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3414.16	Reach Len. (ft)	40.00	40.00	40.00
Crit W.S. (ft)	3412.71	Flow Area (sq ft)	901.47	355.51	248.73

		HECRASAMIIII100			
E.G. Slope (ft/ft)	0.000414	Area (sq ft)	901.47	355.51	248.73
Q Total (cfs)	2128.00	Flow (cfs)	861.02	927.14	339.84
Top Width (ft)	1057.51	Top Width (ft)	846.98	74.00	136.53
Vel Total (ft/s)	1.41	Avg. Vel. (ft/s)	0.96	2.61	1.37
Max Chl Dpth (ft)	5.16	Hydr. Depth (ft)	1.06	4.80	1.82
Conv. Total (cfs)	104571.3	Conv. (cfs)	42311.3	45560.1	16700.0
Length Wtd. (ft)	40.00	Wetted Per. (ft)	847.06	74.04	136.60
Min Ch El (ft)	3409.00	Shear (lb/sq ft)	0.03	0.12	0.05
Alpha	1.82	Stream Power (lb/ft s)	0.03	0.32	0.06
Frctn Loss (ft)		Cum Volume (acre-ft)	2.98	28.05	1.37
C & E Loss (ft)		Cum SA (acres)	2.80	24.58	1.07

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 OUTPUT Profile #100 Yr.-WS3407

E.G. Elev (ft)	3414.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3414.16	Reach Len. (ft)	40.00	40.00	40.00
Crit W.S. (ft)	3412.71	Flow Area (sq ft)	901.47	355.51	248.73
E.G. Slope (ft/ft)	0.000414	Area (sq ft)	901.47	355.51	248.73
Q Total (cfs)	2128.00	Flow (cfs)	861.02	927.14	339.84
Top Width (ft)	1057.51	Top Width (ft)	846.98	74.00	136.53
Vel Total (ft/s)	1.41	Avg. Vel. (ft/s)	0.96	2.61	1.37
Max Chl Dpth (ft)	5.16	Hydr. Depth (ft)	1.06	4.80	1.82
Conv. Total (cfs)	104571.3	Conv. (cfs)	42311.3	45560.1	16700.0
Length Wtd. (ft)	40.00	Wetted Per. (ft)	847.06	74.04	136.60
Min Ch El (ft)	3409.00	Shear (lb/sq ft)	0.03	0.12	0.05
Alpha	1.82	Stream Power (lb/ft s)	0.03	0.32	0.06
Frctn Loss (ft)		Cum Volume (acre-ft)	3.24	38.78	1.37
C & E Loss (ft)		Cum SA (acres)	3.31	24.58	1.07

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.

CULVERT RIVER: Ditch A
REACH: 5 RS: 2773

INPUT

Description:

Distance from Upstream XS = 8
Deck/Roadway Width = 24
Weir Coefficient = 3

Upstream Deck/Roadway Coordinates

num= 6														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
26	3413.8				100	3413.8				402	3412.7			
500	3412.8				600	3413.9				700	3415.7			

Upstream Bridge Cross Section Data

Station Elevation Data				num= 18							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-453	3416	-437	3415	-405	3414	-289	3413.8	-13	3413.8		
100	3413.8	175	3413.8	204	3412	261	3412	298	3411.2		
402	3410.9	437	3410	469	3409	491	3409	511	3410		
560	3412	641	3414	725	3416						

Manning's n Values

num= 3			
Sta	n Val	Sta	n Val
-453	.033	437	.033
		511	.033

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	437	511	.3	.5	

Ineffective Flow num= 2
Sta L Sta R Elev Permanent
-888 F
888 F

Downstream Deck/Roadway Coordinates

num= 6														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
26	3413.8				100	3413.8				402	3412.7			
500	3412.8				600	3413.9				700	3415.7			

Downstream Bridge Cross Section Data

Station Elevation Data				num= 17							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1721	3416	-1410	3414	26	3413.8	100	3412.4	155	3412		
299	3411.4	349	3410	387	3408.9	391.4	3408.9	395.8	3408.9		
400.2	3408.9	404.6	3408.9	409	3408.9	434	3410	487	3412		
568	3414	658	3416								

Manning's n Values

num= 3			
Sta	n Val	Sta	n Val
-1721	.033	349	.033
		434	.033

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	349	434	.3	.5	

Ineffective Flow num= 2
Sta L Sta R Elev Permanent
-888 F
888 F

Upstream Embankment side slope = 3 horiz. to 1.0 vertical
Downstream Embankment side slope = 3 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95

HECRASAMIIII100

Elevation at which weir flow begins = 3412.7
 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
 Culvert #1 Pipe Arch 1.833 2.43
 FHWA Chart # 34- 18 inch corner radius; Corrugated metal
 FHWA Scale # 1 - 90 Degree headwall
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length n Value Entrance Loss Coef Exit Loss Coef
 1 39 .024 .5 1

Number of Barrels = 6

Upstream Elevation = 3409

Centerline Stations

Sta.	Sta.	Sta.	Sta.	Sta.	Sta.
469	473.4	477.8	482.2	486.6	491

Downstream Elevation = 3408.9

Centerline Stations

Sta.	Sta.	Sta.	Sta.	Sta.	Sta.
387	391.4	395.8	400.2	404.6	409

CROSS SECTION RIVER: Ditch A
 REACH: 5 RS: 2734

INPUT

Description: Sta. 2734 Downstream of culverts

Station Elevation Data		num= 17		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1721	3416	-1410	3414	26	3413.8	100	3412.4	155	3412		
299	3411.4	349	3410	387	3408.9	391.4	3408.9	395.8	3408.9		
400.2	3408.9	404.6	3408.9	409	3408.9	434	3410	487	3412		
568	3414	658	3416								

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
-1721	.033	349	.033	434	.033

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	349	434		745	846	1015	
Ineffective Flow			num= 2				
Sta L	Sta R	Elev	Permanent				
-888	F						
888	F						

CROSS SECTION OUTPUT Profile #100 Yr.-WS3404.5

E.G. Elev (ft)	3412.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3412.71	Reach Len. (ft)	745.00	846.00	1015.00
Crit W.S. (ft)	3412.71	Flow Area (sq ft)	275.89	288.99	100.64
E.G. Slope (ft/ft)	0.002018	Area (sq ft)	275.89	288.99	100.64
Q Total (cfs)	2128.00	Flow (cfs)	572.81	1321.29	233.90
Top Width (ft)	431.91	Top Width (ft)	265.26	85.00	81.65
Vel Total (ft/s)	3.20	Avg. Vel. (ft/s)	2.08	4.57	2.32

HECRASAMIII100

Max Chl Dpth (ft)	3.81	Hydr. Depth (ft)	1.04	3.40	1.23
Conv. Total (cfs)	47371.8	Conv. (cfs)	12751.3	29413.6	5206.9
Length Wtd. (ft)	841.72	Wetted Per. (ft)	265.28	85.04	81.70
Min Ch El (ft)	3408.90	Shear (lb/sq ft)	0.13	0.43	0.16
Alpha	1.44	Stream Power (lb/ft s)	0.27	1.96	0.36
Frctn Loss (ft)	2.17	Cum Volume (acre-ft)	2.36	23.55	1.17
C & E Loss (ft)	0.06	Cum SA (acres)	2.27	22.14	0.95

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.

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 OUTPUT Profile #100 Yr.-WS3405

E.G. Elev (ft)	3412.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3412.71	Reach Len. (ft)	745.00	846.00	1015.00
Crit W.S. (ft)	3412.71	Flow Area (sq ft)	275.89	288.99	100.64
E.G. Slope (ft/ft)	0.002018	Area (sq ft)	275.89	288.99	100.64
Q Total (cfs)	2128.00	Flow (cfs)	572.81	1321.29	233.90
Top Width (ft)	431.91	Top Width (ft)	265.26	85.00	81.65
Vel Total (ft/s)	3.20	Avg. Vel. (ft/s)	2.08	4.57	2.32
Max Chl Dpth (ft)	3.81	Hydr. Depth (ft)	1.04	3.40	1.23
Conv. Total (cfs)	47371.8	Conv. (cfs)	12751.3	29413.6	5206.9
Length Wtd. (ft)	841.72	Wetted Per. (ft)	265.28	85.04	81.70
Min Ch El (ft)	3408.90	Shear (lb/sq ft)	0.13	0.43	0.16
Alpha	1.44	Stream Power (lb/ft s)	0.27	1.96	0.36
Frctn Loss (ft)	3.23	Cum Volume (acre-ft)	2.36	21.36	1.17

HECRASAMIIII100

C & E Loss (ft)	0.00	Cum SA (acres)	2.27	21.19	0.95
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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 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 OUTPUT Profile #100 Yr.-WS3406

E.G. Elev (ft)	3412.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3412.74	Reach Len. (ft)	745.00	846.00	1015.00
Crit W.S. (ft)	3412.71	Flow Area (sq ft)	285.31	292.00	103.55
E.G. Slope (ft/ft)	0.001906	Area (sq ft)	285.31	292.00	103.55
Q Total (cfs)	2128.00	Flow (cfs)	585.95	1306.41	235.64
Top Width (ft)	435.22	Top Width (ft)	267.13	85.00	83.09
Vel Total (ft/s)	3.13	Avg. Vel. (ft/s)	2.05	4.47	2.28
Max Chl Dpth (ft)	3.84	Hydr. Depth (ft)	1.07	3.44	1.25
Conv. Total (cfs)	48746.0	Conv. (cfs)	13422.4	29925.8	5397.8
Length Wtd. (ft)	841.48	Wetted Per. (ft)	267.15	85.04	83.14
Min Ch El (ft)	3408.90	Shear (lb/sq ft)	0.13	0.41	0.15
Alpha	1.44	Stream Power (lb/ft s)	0.26	1.83	0.34
Frctn Loss (ft)	3.69	Cum Volume (acre-ft)	2.44	27.75	1.21
C & E Loss (ft)	0.04	Cum SA (acres)	2.28	24.51	0.97

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.

HECRASAMIII100

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: 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 OUTPUT Profile #100 Yr.-WS3407

E.G. Elev (ft)	3412.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3412.74	Reach Len. (ft)	745.00	846.00	1015.00
Crit W.S. (ft)	3412.71	Flow Area (sq ft)	285.31	292.00	103.55
E.G. Slope (ft/ft)	0.001906	Area (sq ft)	285.31	292.00	103.55
Q Total (cfs)	2128.00	Flow (cfs)	585.95	1306.41	235.64
Top Width (ft)	435.22	Top Width (ft)	267.13	85.00	83.09
Vel Total (ft/s)	3.13	Avg. Vel. (ft/s)	2.05	4.47	2.28
Max Chl Dpth (ft)	3.84	Hydr. Depth (ft)	1.07	3.44	1.25
Conv. Total (cfs)	48746.0	Conv. (cfs)	13422.4	29925.8	5397.8
Length Wtd. (ft)	841.48	Wetted Per. (ft)	267.15	85.04	83.14
Min Ch El (ft)	3408.90	Shear (lb/sq ft)	0.13	0.41	0.15
Alpha	1.44	Stream Power (lb/ft s)	0.26	1.83	0.34
Frctn Loss (ft)	3.69	Cum Volume (acre-ft)	2.70	38.48	1.21
C & E Loss (ft)	0.04	Cum SA (acres)	2.80	24.51	0.97

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: 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: Ditch A
REACH: 5 RS: 1888

INPUT

Description: Sta. 1888

Station Elevation Data		num= 10		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-775	3412	-41	3410	81	3410	100	3410.2	110	3410
331	3408	532	3408	690	3408	1180	3410	1268	3412

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

-775 .033 100 .033 1180 .033

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
100 1180 305 828 980 .1 .3

CROSS SECTION OUTPUT Profile #100 Yr.-WS3404.5

E.G. Elev (ft)	3409.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.033	
W.S. Elev (ft)	3409.38	Reach Len. (ft)	305.00	828.00	980.00
Crit W.S. (ft)	3408.89	Flow Area (sq ft)		831.55	
E.G. Slope (ft/ft)	0.003403	Area (sq ft)		831.55	
Q Total (cfs)	2155.00	Flow (cfs)		2155.00	
Top Width (ft)	848.59	Top Width (ft)		848.59	
Vel Total (ft/s)	2.59	Avg. Vel. (ft/s)		2.59	
Max Chl Dpth (ft)	1.38	Hydr. Depth (ft)		0.98	
Conv. Total (cfs)	36939.4	Conv. (cfs)		36939.4	
Length Wtd. (ft)	828.00	Wetted Per. (ft)		848.60	
Min Ch El (ft)	3408.00	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)		0.54	
Frctn Loss (ft)	4.65	Cum Volume (acre-ft)		12.67	
C & E Loss (ft)	0.02	Cum SA (acres)		13.07	

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

CROSS SECTION OUTPUT Profile #100 Yr.-WS3405

E.G. Elev (ft)	3409.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.		0.033	
W.S. Elev (ft)	3409.05	Reach Len. (ft)	305.00	828.00	980.00
Crit W.S. (ft)	3408.89	Flow Area (sq ft)		570.28	
E.G. Slope (ft/ft)	0.009807	Area (sq ft)		570.28	
Q Total (cfs)	2155.00	Flow (cfs)		2155.00	

		HECRASAMIII100	
Top Width (ft)	730.99	Top Width (ft)	730.99
Vel Total (ft/s)	3.78	Avg. Vel. (ft/s)	3.78
Max Chl Dpth (ft)	1.05	Hydr. Depth (ft)	0.78
Conv. Total (cfs)	21761.0	Conv. (cfs)	21761.0
Length Wtd. (ft)	828.00	Wetted Per. (ft)	731.00
Min Ch El (ft)	3408.00	Shear (lb/sq ft)	0.48
Alpha	1.00	Stream Power (lb/ft s)	1.80
Frctn Loss (ft)	4.12	Cum Volume (acre-ft)	13.02
C & E Loss (ft)	0.03	Cum SA (acres)	13.27

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

CROSS SECTION OUTPUT Profile #100 Yr.-WS3406

E.G. Elev (ft)	3409.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.033	
W.S. Elev (ft)	3408.89	Reach Len. (ft)	305.00	828.00	980.00
Crit W.S. (ft)	3408.89	Flow Area (sq ft)		457.76	
E.G. Slope (ft/ft)	0.018312	Area (sq ft)		457.76	
Q Total (cfs)	2155.00	Flow (cfs)		2155.00	
Top Width (ft)	674.05	Top Width (ft)		674.05	
Vel Total (ft/s)	4.71	Avg. Vel. (ft/s)		4.71	
Max Chl Dpth (ft)	0.89	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	15925.1	Conv. (cfs)		15925.1	
Length Wtd. (ft)	828.00	Wetted Per. (ft)		674.06	
Min Ch El (ft)	3408.00	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)		3.65	
Frctn Loss (ft)	1.19	Cum Volume (acre-ft)		20.47	
C & E Loss (ft)	0.10	Cum SA (acres)		17.14	

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 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 OUTPUT Profile #100 Yr.-WS3407

E.G. Elev (ft)	3409.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.033	
W.S. Elev (ft)	3408.89	Reach Len. (ft)	305.00	828.00	980.00
Crit W.S. (ft)	3408.89	Flow Area (sq ft)		457.76	
E.G. Slope (ft/ft)	0.018312	Area (sq ft)		457.76	
Q Total (cfs)	2155.00	Flow (cfs)		2155.00	
Top Width (ft)	674.05	Top Width (ft)		674.05	
Vel Total (ft/s)	4.71	Avg. Vel. (ft/s)		4.71	
Max Chl Dpth (ft)	0.89	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	15925.1	Conv. (cfs)		15925.1	
Length Wtd. (ft)	825.65	Wetted Per. (ft)		674.06	
Min Ch El (ft)	3408.00	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)		3.65	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.26	31.20	
C & E Loss (ft)	0.10	Cum SA (acres)	0.51	17.14	

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 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

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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: Ditch A
REACH: 5 RS: 1060

INPUT

Description: Sta. 1060

Station Elevation Data		num= 6		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	3408	394	3406	879	3402.7	909	3402.7	1206	3405
1523	3406								

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.033	394	.033	1523	.033		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	394	1523		60	60	.1	.3

CROSS SECTION OUTPUT Profile #100 Yr.-WS3404.5

E.G. Elev (ft)	3404.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.033	
W.S. Elev (ft)	3404.50	Reach Len. (ft)			
Crit W.S. (ft)	3404.34	Flow Area (sq ft)		501.30	
E.G. Slope (ft/ft)	0.010602	Area (sq ft)		501.30	
Q Total (cfs)	2248.00	Flow (cfs)		2248.00	
Top Width (ft)	526.98	Top Width (ft)		526.98	
Vel Total (ft/s)	4.48	Avg. Vel. (ft/s)		4.48	
Max Chl Dpth (ft)	1.80	Hydr. Depth (ft)		0.95	
Conv. Total (cfs)	21832.6	Conv. (cfs)		21832.6	
Length Wtd. (ft)		Wetted Per. (ft)		527.00	
Min Ch El (ft)	3402.70	Shear (lb/sq ft)		0.63	
Alpha	1.00	Stream Power (lb/ft s)		2.82	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CROSS SECTION OUTPUT Profile #100 Yr.-WS3405

E.G. Elev (ft)	3405.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.033	

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W.S. Elev (ft)	3405.00	Reach Len. (ft)	
Crit W.S. (ft)	3404.34	Flow Area (sq ft)	799.30
E.G. Slope (ft/ft)	0.003053	Area (sq ft)	799.30
Q Total (cfs)	2248.00	Flow (cfs)	2248.00
Top Width (ft)	665.03	Top Width (ft)	665.03
Vel Total (ft/s)	2.81	Avg. Vel. (ft/s)	2.81
Max Chl Dpth (ft)	2.30	Hydr. Depth (ft)	1.20
Conv. Total (cfs)	40684.8	Conv. (cfs)	40684.8
Length Wtd. (ft)		Wetted Per. (ft)	665.05
Min Ch El (ft)	3402.70	Shear (lb/sq ft)	0.23
Alpha	1.00	Stream Power (lb/ft s)	0.64
Frctn Loss (ft)		Cum Volume (acre-ft)	
C & E Loss (ft)		Cum SA (acres)	

CROSS SECTION OUTPUT Profile #100 Yr.-WS3406

E.G. Elev (ft)	3406.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.033	
W.S. Elev (ft)	3406.00	Reach Len. (ft)			
Crit W.S. (ft)	3404.34	Flow Area (sq ft)		1696.32	
E.G. Slope (ft/ft)	0.000503	Area (sq ft)		1696.32	
Q Total (cfs)	2248.00	Flow (cfs)		2248.00	
Top Width (ft)	1129.00	Top Width (ft)		1129.00	
Vel Total (ft/s)	1.33	Avg. Vel. (ft/s)		1.33	
Max Chl Dpth (ft)	3.30	Hydr. Depth (ft)		1.50	
Conv. Total (cfs)	100198.1	Conv. (cfs)		100198.1	
Length Wtd. (ft)		Wetted Per. (ft)		1129.02	
Min Ch El (ft)	3402.70	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)		0.06	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

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

CROSS SECTION OUTPUT Profile #100 Yr.-WS3407

E.G. Elev (ft)	3407.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.033	0.033	
W.S. Elev (ft)	3407.00	Reach Len. (ft)			
Crit W.S. (ft)	3404.34	Flow Area (sq ft)	73.50	2825.32	
E.G. Slope (ft/ft)	0.000090	Area (sq ft)	73.50	2825.32	
Q Total (cfs)	2248.00	Flow (cfs)	19.82	2228.18	
Top Width (ft)	1276.00	Top Width (ft)	147.00	1129.00	
Vel Total (ft/s)	0.78	Avg. Vel. (ft/s)	0.27	0.79	
Max Chl Dpth (ft)	4.30	Hydr. Depth (ft)	0.50	2.50	
Conv. Total (cfs)	236437.3	Conv. (cfs)	2084.9	234352.5	
Length Wtd. (ft)		Wetted Per. (ft)	147.00	1130.02	
Min Ch El (ft)	3402.70	Shear (lb/sq ft)	0.00	0.01	
Alpha	1.03	Stream Power (lb/ft s)	0.00	0.01	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

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

SUMMARY OF MANNING'S N VALUES

River:Ditch A

Reach	River Sta.	n1	n2	n3
5	12674	.033	.033	.033
5	11337	.033	.033	.033
5	10937	.033	.033	.033
5	10288	.033	.033	.033
5	9690	.033	.033	.033
5	9009	.033	.033	.033
5	8130	.033	.033	.033
5	7717	.033	.033	.033
5	7253	.033	.033	.033
5	6343	.033	.033	.033
5	5363	.033	.033	.033
5	4221	.033	.033	.033
5	3489	.033	.033	.033
5	2989	.033	.033	.033

		HECRASAMIII100		
5	2774	.033	.033	.033
5	2773	Culvert		
5	2734	.033	.033	.033
5	1888	.033	.033	.033
5	1060	.033	.033	.033

SUMMARY OF REACH LENGTHS

River: Ditch A

Reach	River Sta.	Left	Channel	Right
5	12674	1206	1337	1433
5	11337	545	400	332
5	10937	729	649	445
5	10288	552	598	633
5	9690	639	681	658
5	9009	898	879	794
5	8130	399	413	456
5	7717	444	464	510
5	7253	756	910	980
5	6343	767	980	1051
5	5363	1199	1142	713
5	4221	749	732	843
5	3489	464	500	457
5	2989	317	215	172
5	2774	40	40	40
5	2773	Culvert		
5	2734	745	846	1015
5	1888	305	828	980
5	1060	60	60	60

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Ditch A

Reach	River Sta.	Contr.	Expan.
5	12674	.1	.3
5	11337	.1	.3
5	10937	.1	.3
5	10288	.1	.3
5	9690	.1	.3
5	9009	.1	.3
5	8130	.1	.3
5	7717	.1	.3
5	7253	.1	.3
5	6343	.1	.3
5	5363	.1	.3
5	4221	.1	.3
5	3489	.1	.3
5	2989	.3	.5
5	2774	.3	.5
5	2773	Culvert	
5	2734	.3	.5
5	1888	.1	.3
5	1060	.1	.3

Profile Output Table - Standard Table 1

Reach lope	Vel /ft)	Chnl (ft/s)	River Sta Flow Area (sq ft)	Q Total Top Width (ft)	Min Ch El Froude # Chl (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. S (ft)
5			12674	645.00	3477.00	3478.49	3478.08	3478.59	0.00
3093	2.49		268.80	320.33	0.44				
5			12674	645.00	3477.00	3478.49	3478.08	3478.59	0.00
3093	2.49		268.80	320.33	0.44				
5			12674	645.00	3477.00	3478.49	3478.08	3478.59	0.00
3093	2.49		268.80	320.33	0.44				
5			12674	645.00	3477.00	3478.49	3478.08	3478.59	0.00
3093	2.49		268.80	320.33	0.44				
5			11337	645.00	3469.00	3470.53	3470.50	3470.97	0.01
3657	5.36		123.92	137.13	0.93				
5			11337	645.00	3469.00	3470.53	3470.50	3470.97	0.01
3657	5.36		123.92	137.13	0.93				
5			11337	645.00	3469.00	3470.53	3470.50	3470.97	0.01
3657	5.36		123.92	137.13	0.93				
5			11337	645.00	3469.00	3470.53	3470.50	3470.97	0.01
3657	5.36		123.92	137.13	0.93				
5			10937	645.00	3464.00	3465.93	3465.75	3466.26	0.01
0093	4.57		141.28	139.30	0.80				
5			10937	645.00	3464.00	3465.93	3465.75	3466.26	0.01
0093	4.57		141.28	139.30	0.80				
5			10937	645.00	3464.00	3465.93	3465.75	3466.26	0.01
0093	4.57		141.28	139.30	0.80				
5			10937	645.00	3464.00	3465.93	3465.75	3466.26	0.01
0093	4.57		141.28	139.30	0.80				
5			10288	645.00	3456.00	3457.07	3457.07	3457.30	0.01
9840	3.87		166.72	349.93	0.99				
5			10288	645.00	3456.00	3457.07	3457.07	3457.30	0.01
9840	3.87		166.72	349.93	0.99				
5			10288	645.00	3456.00	3457.07	3457.07	3457.30	0.01
9840	3.87		166.72	349.93	0.99				
5			10288	645.00	3456.00	3457.07	3457.07	3457.30	0.01
9840	3.87		166.72	349.93	0.99				
5			9690	817.00	3450.00	3451.66	3451.28	3451.78	0.00
4774	2.78		293.93	348.04	0.53				
5			9690	817.00	3450.00	3451.66	3451.28	3451.78	0.00
4774	2.78		293.93	348.04	0.53				
5			9690	817.00	3450.00	3451.66	3451.28	3451.78	0.00
4774	2.78		293.93	348.04	0.53				
5			9690	817.00	3450.00	3451.66	3451.28	3451.78	0.00
4774	2.78		293.93	348.04	0.53				
5			9009	817.00	3445.00	3446.62	3446.50	3446.87	0.01
2038	4.03		202.92	275.79	0.83				
5			9009	817.00	3445.00	3446.62	3446.50	3446.87	0.01
2038	4.03		202.92	275.79	0.83				
5			9009	817.00	3445.00	3446.62	3446.50	3446.87	0.01
2038	4.03		202.92	275.79	0.83				

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5	9009	817.00	3445.00	3446.62	3446.50	3446.87	0.01
2038	4.03 202.92	275.79	0.83				
5	8130	817.00	3440.00	3441.75	3441.25	3441.84	0.00
3282	2.40 340.75	380.21	0.45				
5	8130	817.00	3440.00	3441.75	3441.25	3441.84	0.00
3282	2.40 340.75	380.21	0.45				
5	8130	817.00	3440.00	3441.75	3441.25	3441.84	0.00
3282	2.40 340.75	380.21	0.45				
5	8130	817.00	3440.00	3441.75	3441.25	3441.84	0.00
3282	2.40 340.75	380.21	0.45				
5	7717	817.00	3437.80	3438.79	3438.79	3439.10	0.01
9275	4.47 182.90	302.82	1.01				
5	7717	817.00	3437.80	3438.79	3438.79	3439.10	0.01
9275	4.47 182.90	302.82	1.01				
5	7717	817.00	3437.80	3438.79	3438.79	3439.10	0.01
9275	4.47 182.90	302.82	1.01				
5	7717	817.00	3437.80	3438.79	3438.79	3439.10	0.01
9275	4.47 182.90	302.82	1.01				
5	7253	966.00	3435.00	3436.53	3435.99	3436.59	0.00
1746	1.92 511.45	535.68	0.33				
5	7253	966.00	3435.00	3436.53	3435.99	3436.59	0.00
1746	1.92 511.45	535.68	0.33				
5	7253	966.00	3435.00	3436.53	3435.99	3436.59	0.00
1746	1.92 511.45	535.68	0.33				
5	7253	966.00	3435.00	3436.53	3435.99	3436.59	0.00
1746	1.92 511.45	535.68	0.33				
5	6343	1873.00	3430.00	3430.86	3430.86	3431.22	0.01
8047	4.82 388.25	545.10	1.01				
5	6343	1873.00	3430.00	3430.86	3430.86	3431.22	0.01
8047	4.82 388.25	545.10	1.01				
5	6343	1873.00	3430.00	3430.86	3430.86	3431.22	0.01
8047	4.82 388.25	545.10	1.01				
5	6343	1873.00	3430.00	3430.86	3430.86	3431.22	0.01
8047	4.82 388.25	545.10	1.01				
5	5363	1873.00	3425.00	3426.53	3425.93	3426.60	0.00
1798	2.13 906.30	892.02	0.35				
5	5363	1873.00	3425.00	3426.53	3425.93	3426.60	0.00
1798	2.13 906.30	892.02	0.35				
5	5363	1873.00	3425.00	3426.53	3425.93	3426.60	0.00
1798	2.13 906.30	892.02	0.35				
5	5363	1873.00	3425.00	3426.53	3425.93	3426.60	0.00
1798	2.13 906.30	892.02	0.35				
5	4221	2128.00	3420.00	3421.19	3421.19	3421.58	0.01
7043	5.00 428.69	581.33	0.99				
5	4221	2128.00	3420.00	3421.19	3421.19	3421.58	0.01
7043	5.00 428.69	581.33	0.99				
5	4221	2128.00	3420.00	3421.19	3421.19	3421.58	0.01
7043	5.00 428.69	581.33	0.99				
5	4221	2128.00	3420.00	3421.19	3421.19	3421.58	0.01
7043	5.00 428.69	581.33	0.99				
5	3489	2128.00	3416.00	3417.37	3416.82	3417.44	0.00

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2273	2.30	995.88	1009.36	0.38				
5		3489	2128.00	3416.00	3417.37	3416.82	3417.44	0.00
2273	2.30	995.88	1009.36	0.38				
5		3489	2128.00	3416.00	3417.37	3416.82	3417.44	0.00
2273	2.30	995.88	1009.36	0.38				
5		3489	2128.00	3416.00	3417.37	3416.82	3417.44	0.00
2273	2.30	995.88	1009.36	0.38				
5		2989	2128.00	3413.80	3414.67	3414.67	3415.03	0.01
8086	4.64	446.36	640.02	1.00				
5		2989	2128.00	3413.80	3414.67	3414.67	3415.03	0.01
8086	4.64	446.36	640.02	1.00				
5		2989	2128.00	3413.80	3414.67	3414.67	3415.03	0.01
8086	4.64	446.36	640.02	1.00				
5		2989	2128.00	3413.80	3414.67	3414.67	3415.03	0.01
8086	4.64	446.36	640.02	1.00				
5		2774	2128.00	3409.00	3414.16	3412.71	3414.21	0.00
0414	2.61	1505.18	1057.47	0.21				
5		2774	2128.00	3409.00	3414.16	3412.71	3414.21	0.00
0414	2.61	1505.18	1057.47	0.21				
5		2774	2128.00	3409.00	3414.16	3412.71	3414.21	0.00
0414	2.61	1505.70	1057.51	0.21				
5		2774	2128.00	3409.00	3414.16	3412.71	3414.21	0.00
0414	2.61	1505.70	1057.51	0.21				
5		2773	Culvert					
5		2734	2128.00	3408.90	3412.71	3412.71	3412.94	0.00
2018	4.57	665.51	431.91	0.44				
5		2734	2128.00	3408.90	3412.71	3412.71	3412.94	0.00
2018	4.57	665.51	431.91	0.44				
5		2734	2128.00	3408.90	3412.74	3412.71	3412.96	0.00
1906	4.47	680.86	435.22	0.43				
5		2734	2128.00	3408.90	3412.74	3412.71	3412.96	0.00
1906	4.47	680.86	435.22	0.43				
5		1888	2155.00	3408.00	3409.38	3408.89	3409.48	0.00
3403	2.59	831.55	848.59	0.46				
5		1888	2155.00	3408.00	3409.05	3408.89	3409.27	0.00
9807	3.78	570.28	730.99	0.75				
5		1888	2155.00	3408.00	3408.89	3408.89	3409.23	0.01
8312	4.71	457.76	674.05	1.01				
5		1888	2155.00	3408.00	3408.89	3408.89	3409.23	0.01
8312	4.71	457.76	674.05	1.01				
5		1060	2248.00	3402.70	3404.50	3404.34	3404.81	0.01
0602	4.48	501.30	526.98	0.81				
5		1060	2248.00	3402.70	3405.00	3404.34	3405.12	0.00
3053	2.81	799.30	665.03	0.45				
5		1060	2248.00	3402.70	3406.00	3404.34	3406.03	0.00
0503	1.33	1696.32	1129.00	0.19				
5		1060	2248.00	3402.70	3407.00	3404.34	3407.01	0.00
0090	0.79	2898.82	1276.00	0.09				

Profile Output Table - Report Standard Table 1

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Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	Max Chl Dpth	E.G
Elev	E.G. Slope	Sta W.S. Lft	Sta W.S. Rgt	Flow Area	Top Width	Froude #	Chl
(ft)	(ft/ft)	(ft/s)	(cfs) (ft)	(ft)	(ft) (sq ft)	(ft)	(ft)
5	12674	645.00	3477.00	3478.49	3478.08	1.49	3
478.59	0.003093	2.49	345.62	665.95	268.80	320.33	0.44
5	12674	645.00	3477.00	3478.49	3478.08	1.49	3
478.59	0.003093	2.49	345.62	665.95	268.80	320.33	0.44
5	12674	645.00	3477.00	3478.49	3478.08	1.49	3
478.59	0.003093	2.49	345.62	665.95	268.80	320.33	0.44
5	12674	645.00	3477.00	3478.49	3478.08	1.49	3
478.59	0.003093	2.49	345.62	665.95	268.80	320.33	0.44
5	11337	645.00	3469.00	3470.53	3470.50	1.53	3
470.97	0.013657	5.36	423.67	560.80	123.92	137.13	0.93
5	11337	645.00	3469.00	3470.53	3470.50	1.53	3
470.97	0.013657	5.36	423.67	560.80	123.92	137.13	0.93
5	11337	645.00	3469.00	3470.53	3470.50	1.53	3
470.97	0.013657	5.36	423.67	560.80	123.92	137.13	0.93
5	11337	645.00	3469.00	3470.53	3470.50	1.53	3
470.97	0.013657	5.36	423.67	560.80	123.92	137.13	0.93
5	10937	645.00	3464.00	3465.93	3465.75	1.93	3
466.26	0.010093	4.57	467.44	606.74	141.28	139.30	0.80
5	10937	645.00	3464.00	3465.93	3465.75	1.93	3
466.26	0.010093	4.57	467.44	606.74	141.28	139.30	0.80
5	10937	645.00	3464.00	3465.93	3465.75	1.93	3
466.26	0.010093	4.57	467.44	606.74	141.28	139.30	0.80
5	10937	645.00	3464.00	3465.93	3465.75	1.93	3
466.26	0.010093	4.57	467.44	606.74	141.28	139.30	0.80
5	10288	645.00	3456.00	3457.07	3457.07	1.07	3
457.30	0.019840	3.87	389.03	738.96	166.72	349.93	0.99
5	10288	645.00	3456.00	3457.07	3457.07	1.07	3
457.30	0.019840	3.87	389.03	738.96	166.72	349.93	0.99
5	10288	645.00	3456.00	3457.07	3457.07	1.07	3
457.30	0.019840	3.87	389.03	738.96	166.72	349.93	0.99

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5	10288		645.00	3456.00	3457.07	3457.07	1.07	3
457.30	0.019840	3.87	389.03	738.96	166.72	349.93		0.99
5	9690		817.00	3450.00	3451.66	3451.28	1.66	3
451.78	0.004774	2.78	423.62	771.66	293.93	348.04		0.53
5	9690		817.00	3450.00	3451.66	3451.28	1.66	3
451.78	0.004774	2.78	423.62	771.66	293.93	348.04		0.53
5	9690		817.00	3450.00	3451.66	3451.28	1.66	3
451.78	0.004774	2.78	423.62	771.66	293.93	348.04		0.53
5	9690		817.00	3450.00	3451.66	3451.28	1.66	3
451.78	0.004774	2.78	423.62	771.66	293.93	348.04		0.53
5	9009		817.00	3445.00	3446.62	3446.50	1.62	3
446.87	0.012038	4.03	440.24	716.03	202.92	275.79		0.83
5	9009		817.00	3445.00	3446.62	3446.50	1.62	3
446.87	0.012038	4.03	440.24	716.03	202.92	275.79		0.83
5	9009		817.00	3445.00	3446.62	3446.50	1.62	3
446.87	0.012038	4.03	440.24	716.03	202.92	275.79		0.83
5	9009		817.00	3445.00	3446.62	3446.50	1.62	3
446.87	0.012038	4.03	440.24	716.03	202.92	275.79		0.83
5	8130		817.00	3440.00	3441.75	3441.25	1.75	3
441.84	0.003282	2.40	448.26	828.47	340.75	380.21		0.45
5	8130		817.00	3440.00	3441.75	3441.25	1.75	3
441.84	0.003282	2.40	448.26	828.47	340.75	380.21		0.45
5	8130		817.00	3440.00	3441.75	3441.25	1.75	3
441.84	0.003282	2.40	448.26	828.47	340.75	380.21		0.45
5	8130		817.00	3440.00	3441.75	3441.25	1.75	3
441.84	0.003282	2.40	448.26	828.47	340.75	380.21		0.45
5	7717		817.00	3437.80	3438.79	3438.79	0.99	3
439.10	0.019275	4.47	323.60	626.42	182.90	302.82		1.01
5	7717		817.00	3437.80	3438.79	3438.79	0.99	3
439.10	0.019275	4.47	323.60	626.42	182.90	302.82		1.01
5	7717		817.00	3437.80	3438.79	3438.79	0.99	3
439.10	0.019275	4.47	323.60	626.42	182.90	302.82		1.01
5	7717		817.00	3437.80	3438.79	3438.79	0.99	3
439.10	0.019275	4.47	323.60	626.42	182.90	302.82		1.01

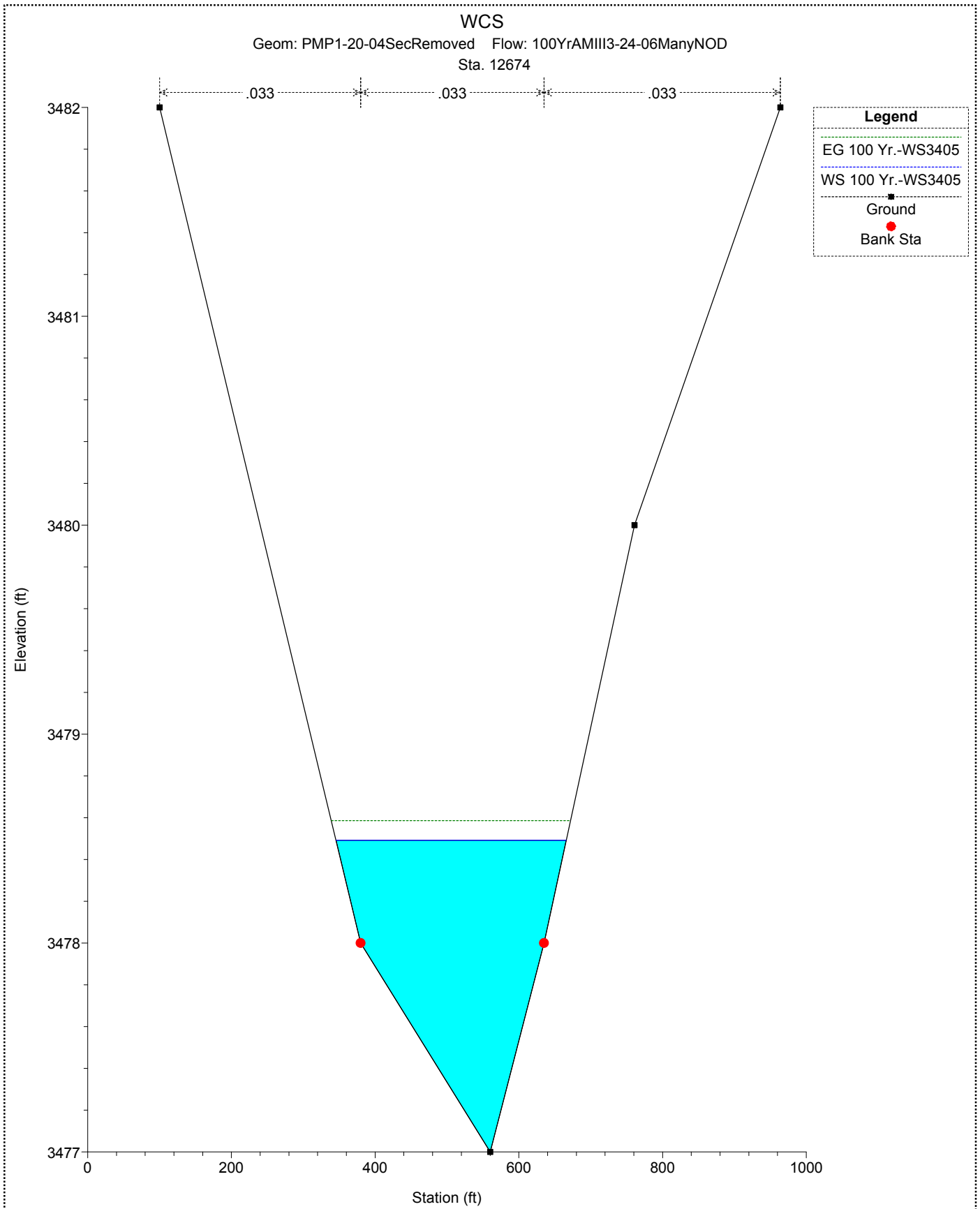
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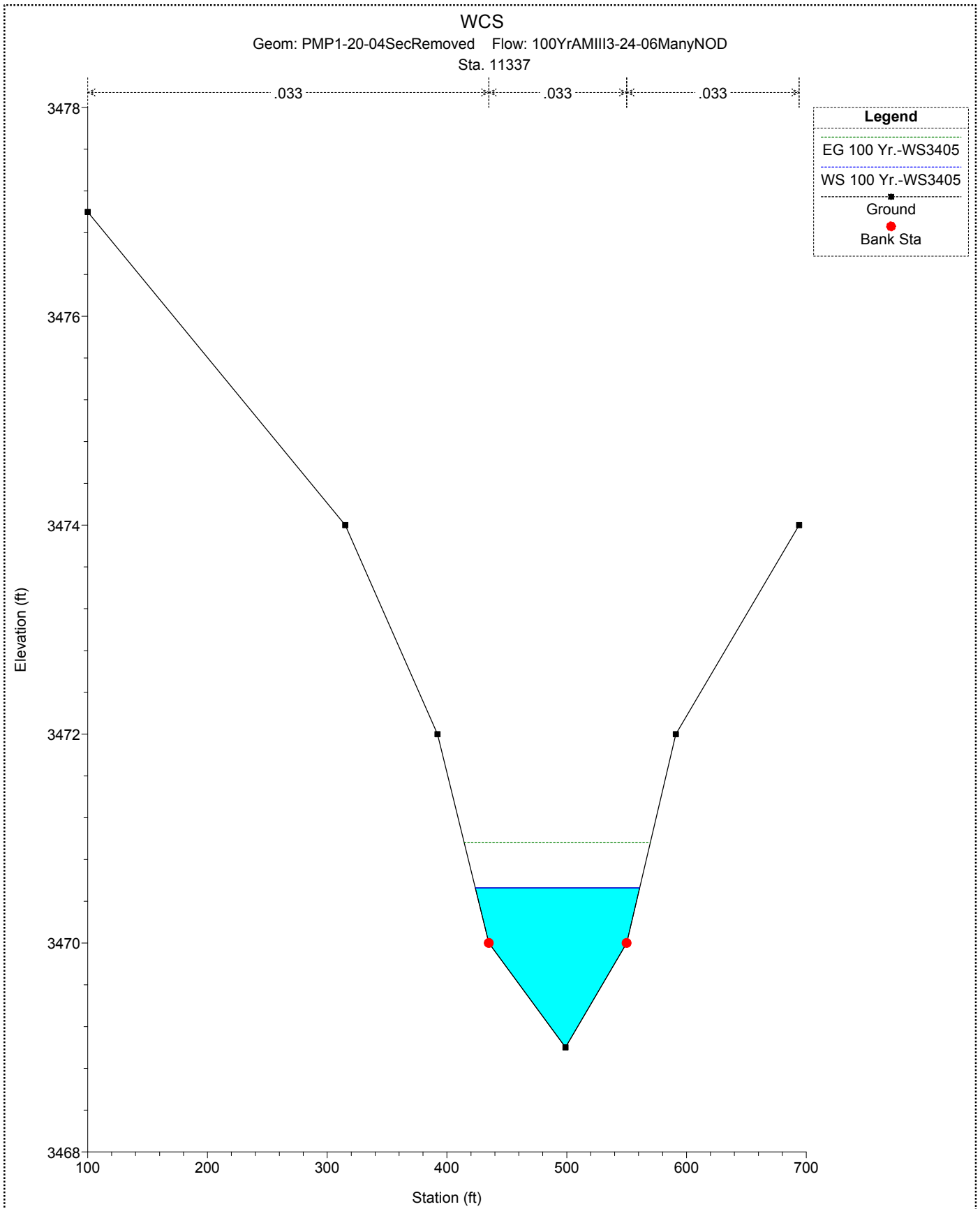
5	7253		966.00	3435.00	3436.53	3435.99	1.53	3
436.59	0.001746	1.92	396.63	932.31	511.45	535.68		0.33
5	7253		966.00	3435.00	3436.53	3435.99	1.53	3
436.59	0.001746	1.92	396.63	932.31	511.45	535.68		0.33
5	7253		966.00	3435.00	3436.53	3435.99	1.53	3
436.59	0.001746	1.92	396.63	932.31	511.45	535.68		0.33
5	7253		966.00	3435.00	3436.53	3435.99	1.53	3
436.59	0.001746	1.92	396.63	932.31	511.45	535.68		0.33
5	6343		1873.00	3430.00	3430.86	3430.86	0.86	3
431.22	0.018047	4.82	754.77	1299.87	388.25	545.10		1.01
5	6343		1873.00	3430.00	3430.86	3430.86	0.86	3
431.22	0.018047	4.82	754.77	1299.87	388.25	545.10		1.01
5	6343		1873.00	3430.00	3430.86	3430.86	0.86	3
431.22	0.018047	4.82	754.77	1299.87	388.25	545.10		1.01
5	6343		1873.00	3430.00	3430.86	3430.86	0.86	3
431.22	0.018047	4.82	754.77	1299.87	388.25	545.10		1.01
5	5363		1873.00	3425.00	3426.53	3425.93	1.53	3
426.60	0.001798	2.13	690.84	1582.86	906.30	892.02		0.35
5	5363		1873.00	3425.00	3426.53	3425.93	1.53	3
426.60	0.001798	2.13	690.84	1582.86	906.30	892.02		0.35
5	5363		1873.00	3425.00	3426.53	3425.93	1.53	3
426.60	0.001798	2.13	690.84	1582.86	906.30	892.02		0.35
5	5363		1873.00	3425.00	3426.53	3425.93	1.53	3
426.60	0.001798	2.13	690.84	1582.86	906.30	892.02		0.35
5	4221		2128.00	3420.00	3421.19	3421.19	1.19	3
421.58	0.017043	5.00	504.75	1086.07	428.69	581.33		0.99
5	4221		2128.00	3420.00	3421.19	3421.19	1.19	3
421.58	0.017043	5.00	504.75	1086.07	428.69	581.33		0.99
5	4221		2128.00	3420.00	3421.19	3421.19	1.19	3
421.58	0.017043	5.00	504.75	1086.07	428.69	581.33		0.99
5	4221		2128.00	3420.00	3421.19	3421.19	1.19	3
421.58	0.017043	5.00	504.75	1086.07	428.69	581.33		0.99
5	3489		2128.00	3416.00	3417.37	3416.82	2.37	3
417.44	0.002273	2.30	-119.07	890.29	995.88	1009.36		0.38

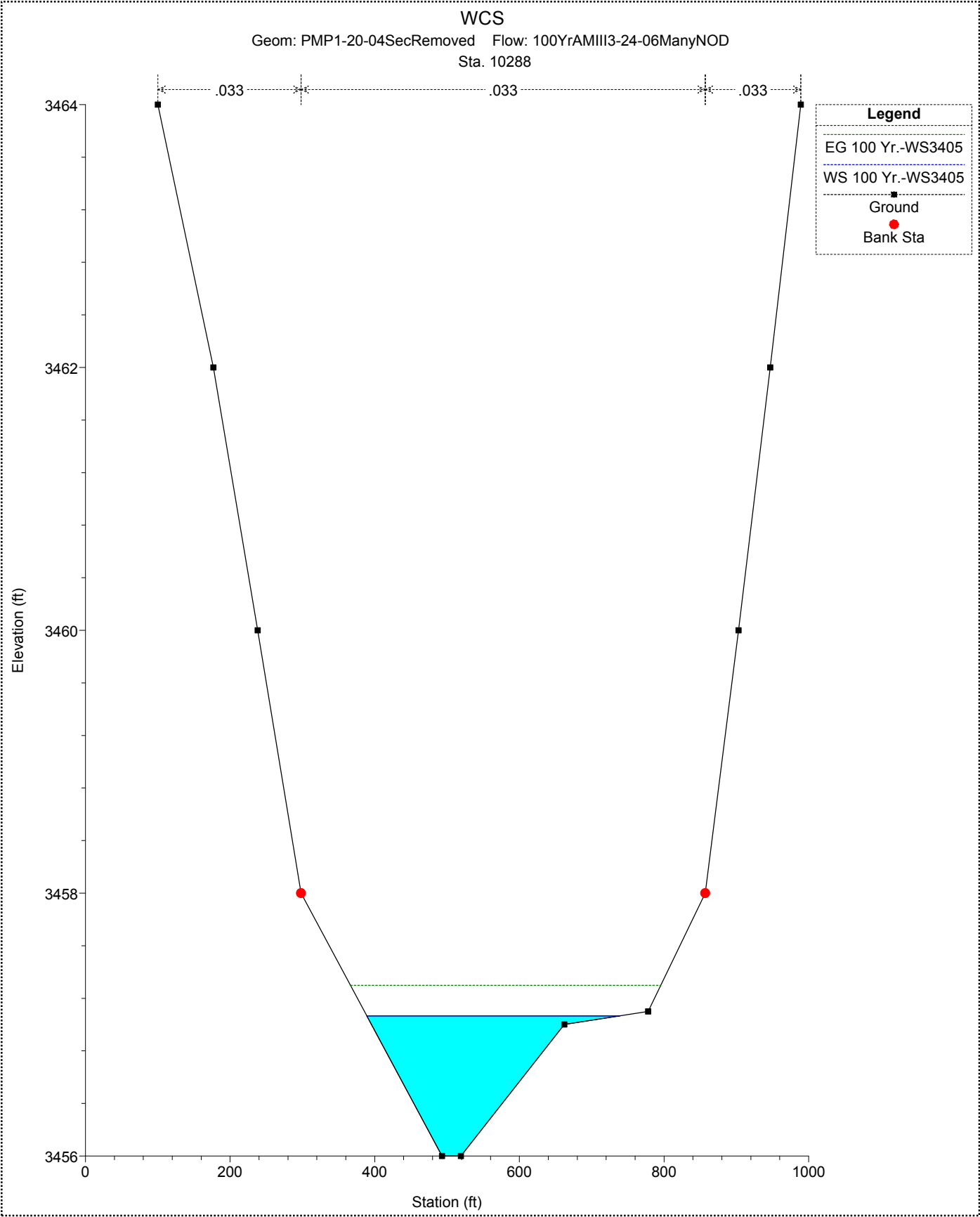
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5	3489		2128.00	3416.00	3417.37	3416.82	2.37	3	
417.44	0.002273	2.30	-119.07	890.29	995.88	1009.36		0.38	
5	3489		2128.00	3416.00	3417.37	3416.82	2.37	3	
417.44	0.002273	2.30	-119.07	890.29	995.88	1009.36		0.38	
5	3489		2128.00	3416.00	3417.37	3416.82	2.37	3	
417.44	0.002273	2.30	-119.07	890.29	995.88	1009.36		0.38	
5	2989		2128.00	3413.80	3414.67	3414.67	0.87	3	
415.03	0.018086	4.64	174.17	814.20	446.36	640.02		1.00	
5	2989		2128.00	3413.80	3414.67	3414.67	0.87	3	
415.03	0.018086	4.64	174.17	814.20	446.36	640.02		1.00	
5	2989		2128.00	3413.80	3414.67	3414.67	0.87	3	
415.03	0.018086	4.64	174.17	814.20	446.36	640.02		1.00	
5	2989		2128.00	3413.80	3414.67	3414.67	0.87	3	
415.03	0.018086	4.64	174.17	814.20	446.36	640.02		1.00	
5	2774		2128.00	3409.00	3414.16	3412.71	5.16	3	
414.21	0.000414	2.61	-409.96	647.51	1505.18	1057.47		0.21	
5	2774		2128.00	3409.00	3414.16	3412.71	5.16	3	
414.21	0.000414	2.61	-409.96	647.51	1505.18	1057.47		0.21	
5	2774		2128.00	3409.00	3414.16	3412.71	5.16	3	
414.21	0.000414	2.61	-409.98	647.53	1505.70	1057.51		0.21	
5	2774		2128.00	3409.00	3414.16	3412.71	5.16	3	
414.21	0.000414	2.61	-409.98	647.53	1505.70	1057.51		0.21	
5	2773		Culvert						
5	2734		2128.00	3408.90	3412.71	3412.71	3.81	3	
412.94	0.002018	4.57	83.74	515.65	665.51	431.91		0.44	
5	2734		2128.00	3408.90	3412.71	3412.71	3.81	3	
412.94	0.002018	4.57	83.74	515.65	665.51	431.91		0.44	
5	2734		2128.00	3408.90	3412.74	3412.71	3.84	3	
412.96	0.001906	4.47	81.87	517.09	680.86	435.22		0.43	
5	2734		2128.00	3408.90	3412.74	3412.71	3.84	3	
412.96	0.001906	4.47	81.87	517.09	680.86	435.22		0.43	
5	1888		2155.00	3408.00	3409.38	3408.89	1.38	3	
409.48	0.003403	2.59	178.82	1027.41	831.55	848.59		0.46	

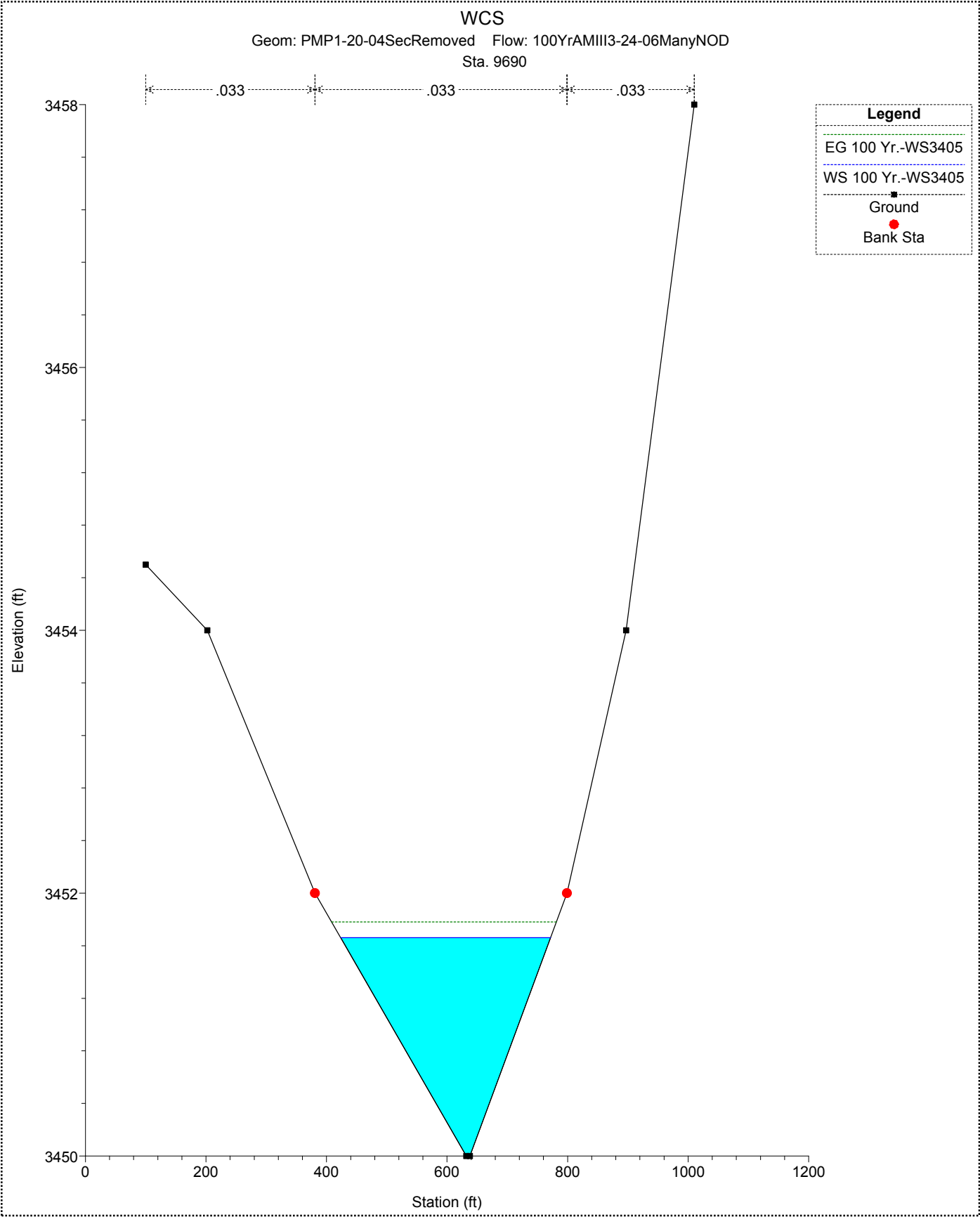
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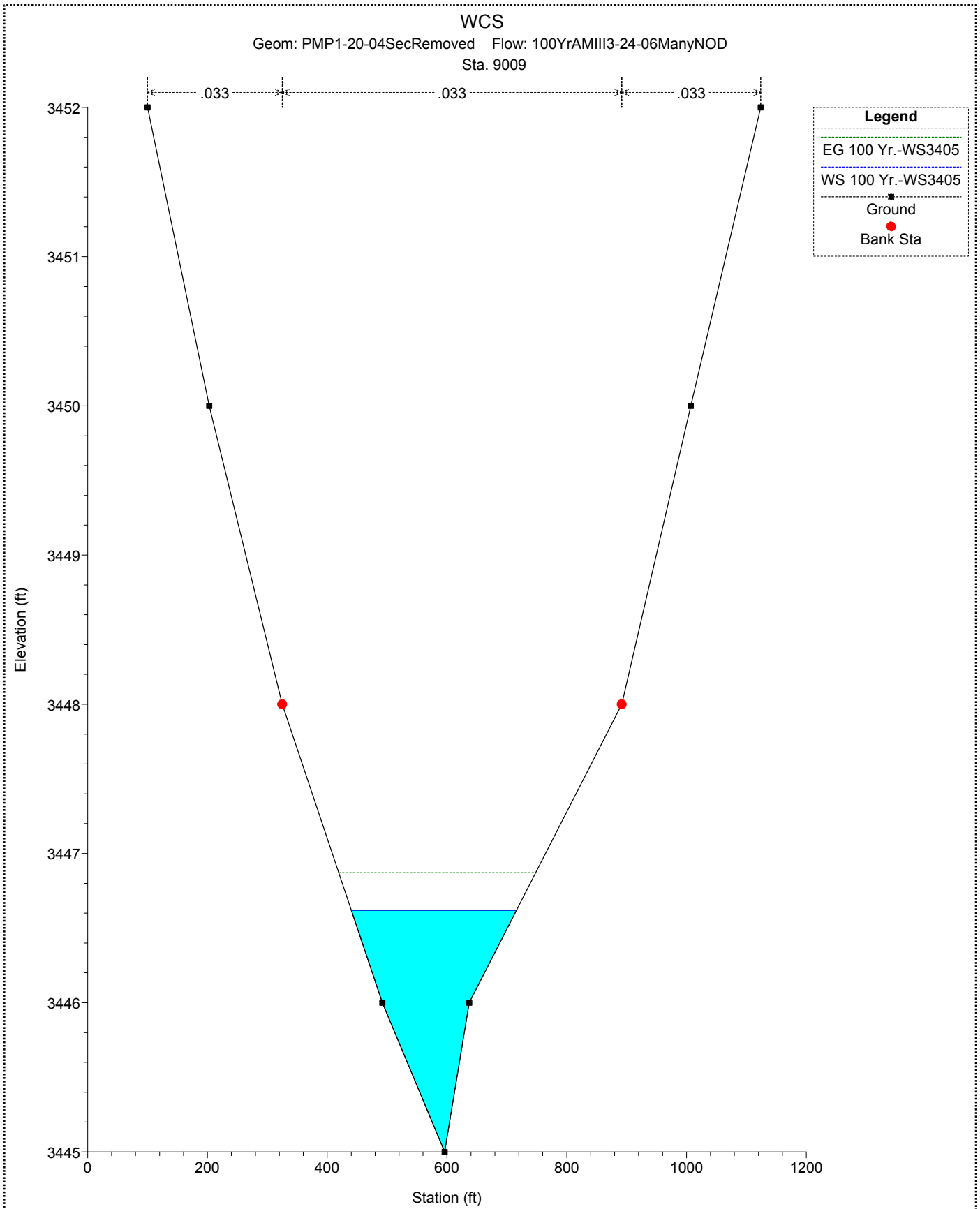
5	1888		2155.00	3408.00	3409.05	3408.89	1.05	3
409.27	0.009807	3.78	215.37	946.36	570.28	730.99	0.75	
5	1888		2155.00	3408.00	3408.89	3408.89	0.89	3
409.23	0.018312	4.71	233.07	907.13	457.76	674.05	1.01	
5	1888		2155.00	3408.00	3408.89	3408.89	0.89	3
409.23	0.018312	4.71	233.07	907.13	457.76	674.05	1.01	
5	1060		2248.00	3402.70	3404.50	3404.34	1.80	3
404.81	0.010602	4.48	614.45	1141.44	501.30	526.98	0.81	
5	1060		2248.00	3402.70	3405.00	3404.34	2.30	3
405.12	0.003053	2.81	540.97	1206.00	799.30	665.03	0.45	
5	1060		2248.00	3402.70	3406.00	3404.34	3.30	3
406.03	0.000503	1.33	394.00	1523.00	1696.32	1129.00	0.19	
5	1060		2248.00	3402.70	3407.00	3404.34	4.30	3
407.01	0.000090	0.79	247.00	1523.00	2898.82	1276.00	0.09	

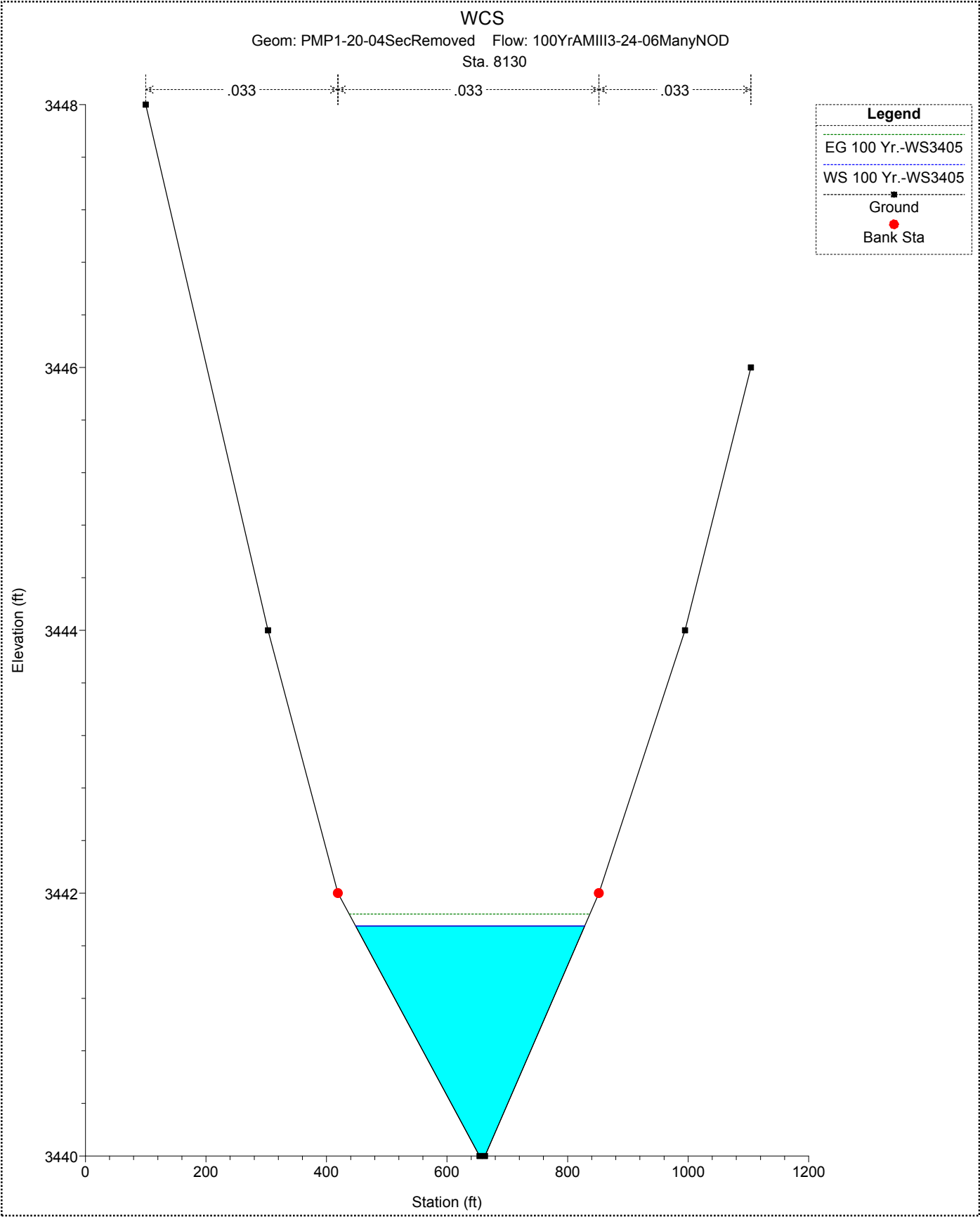


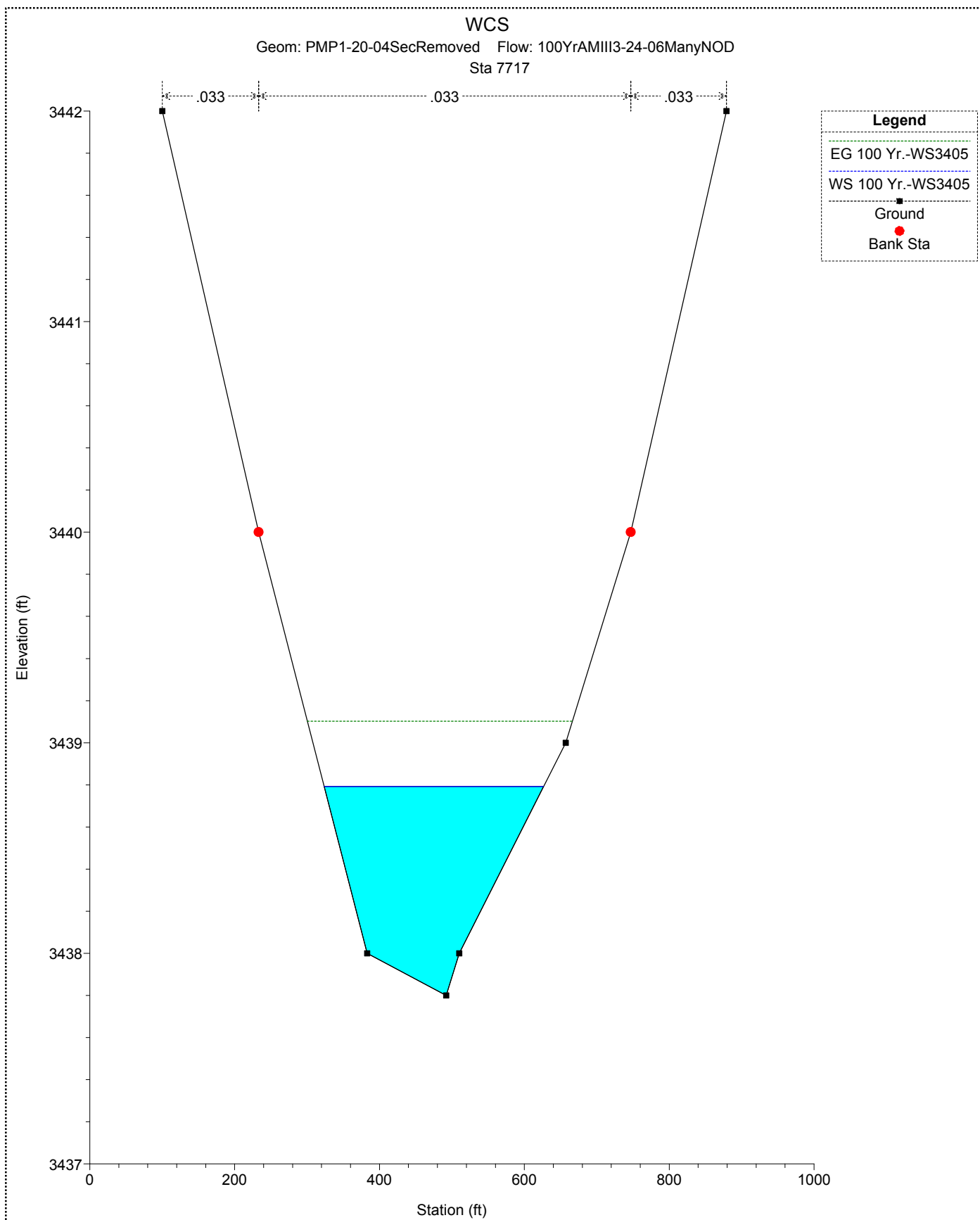


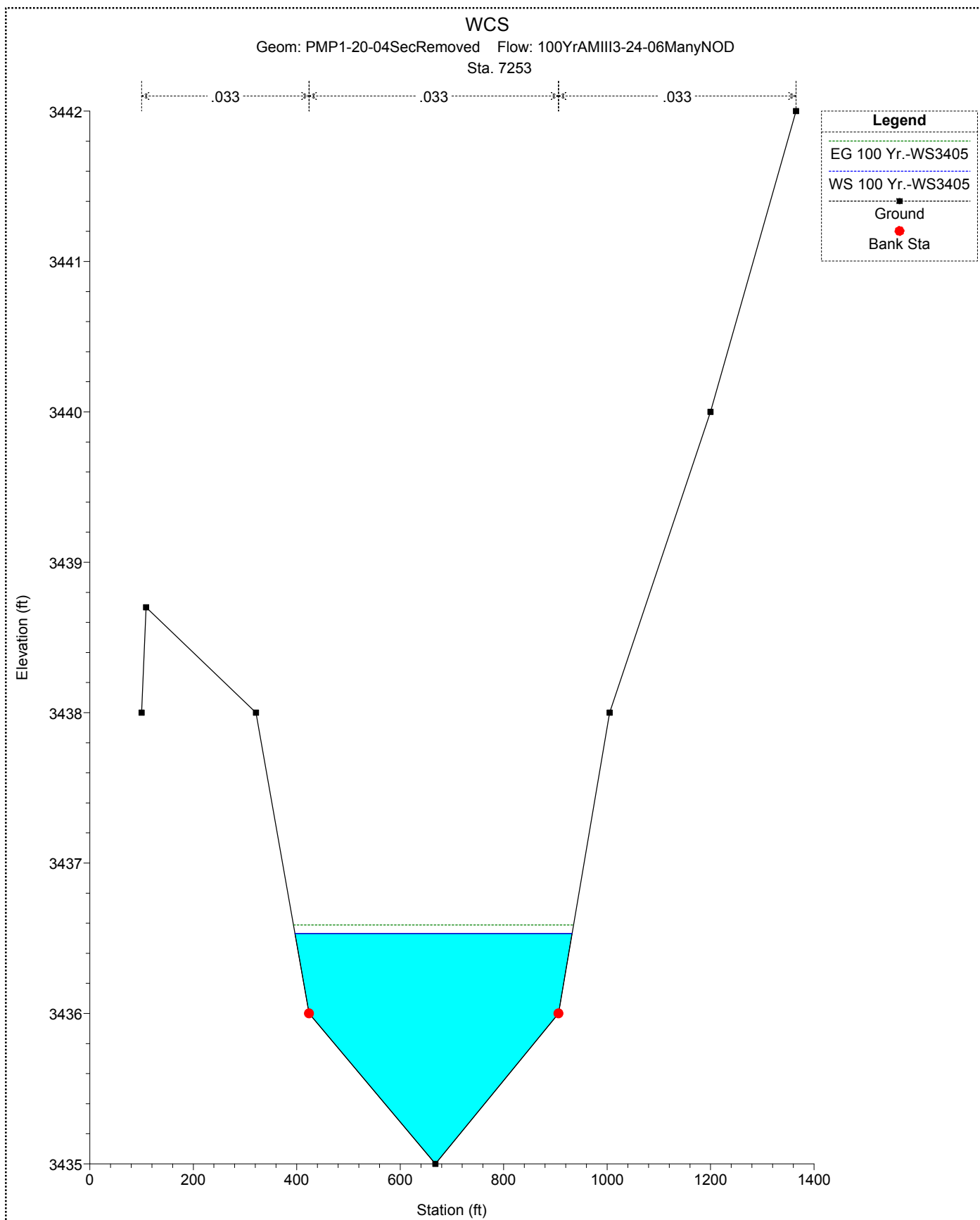


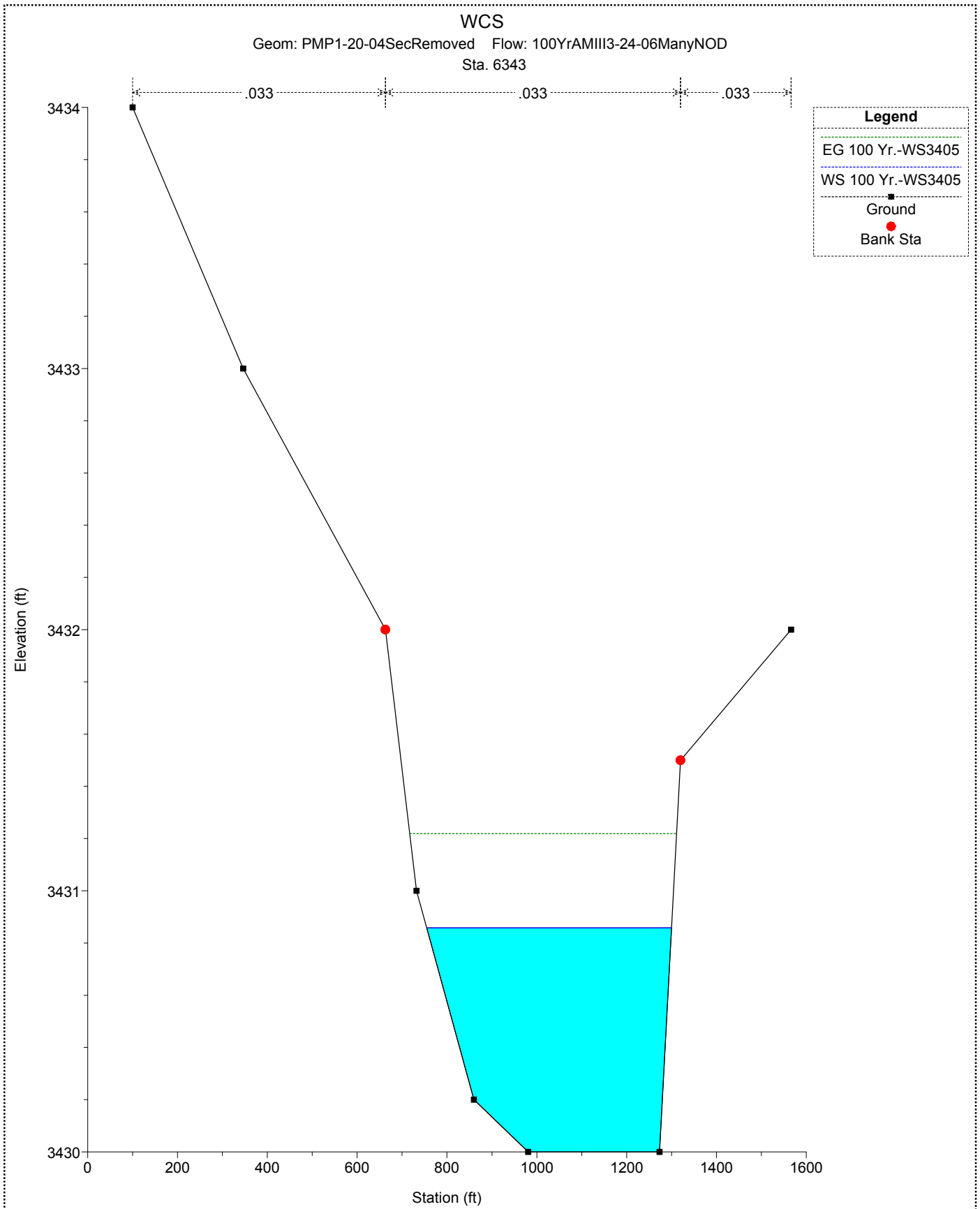


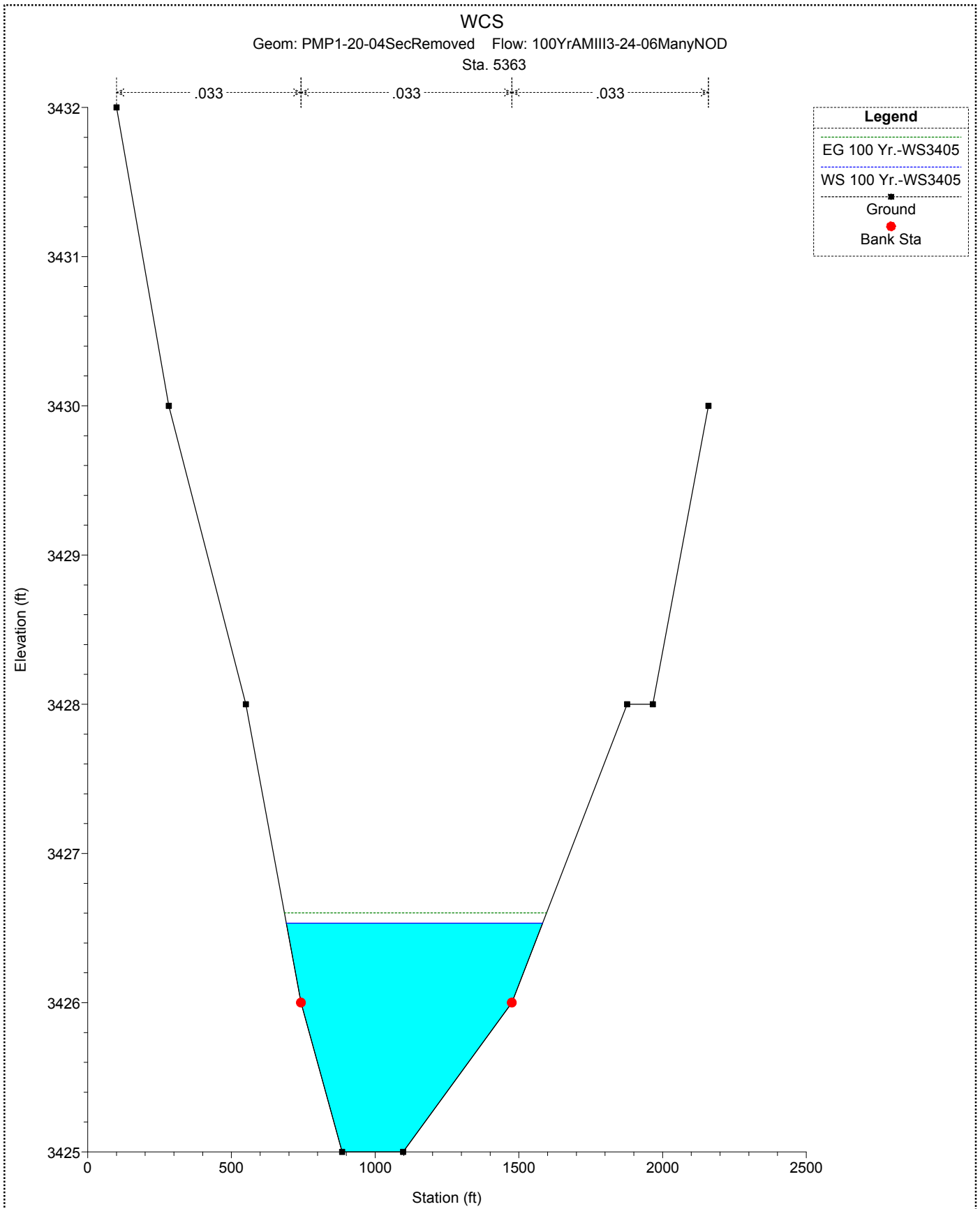


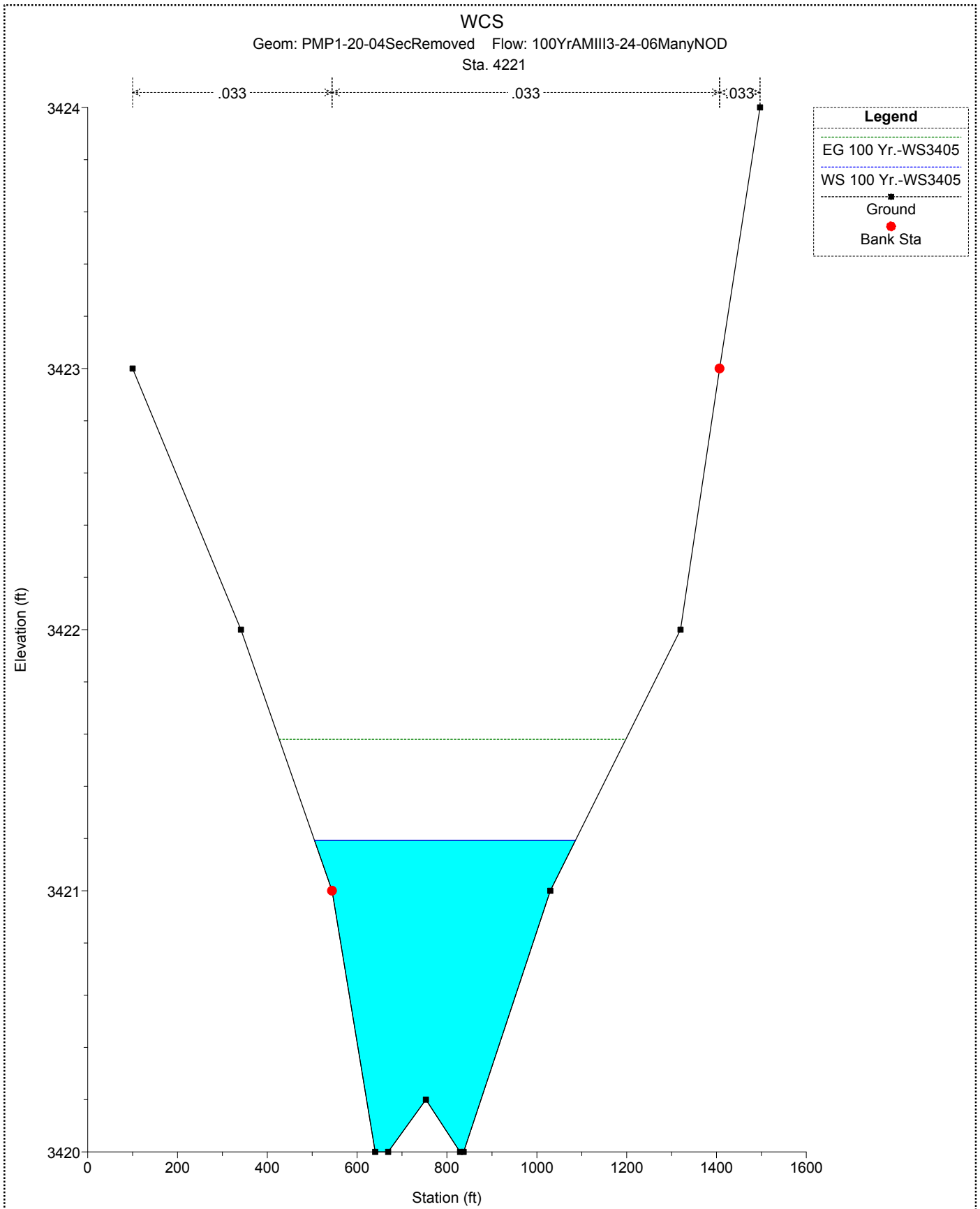


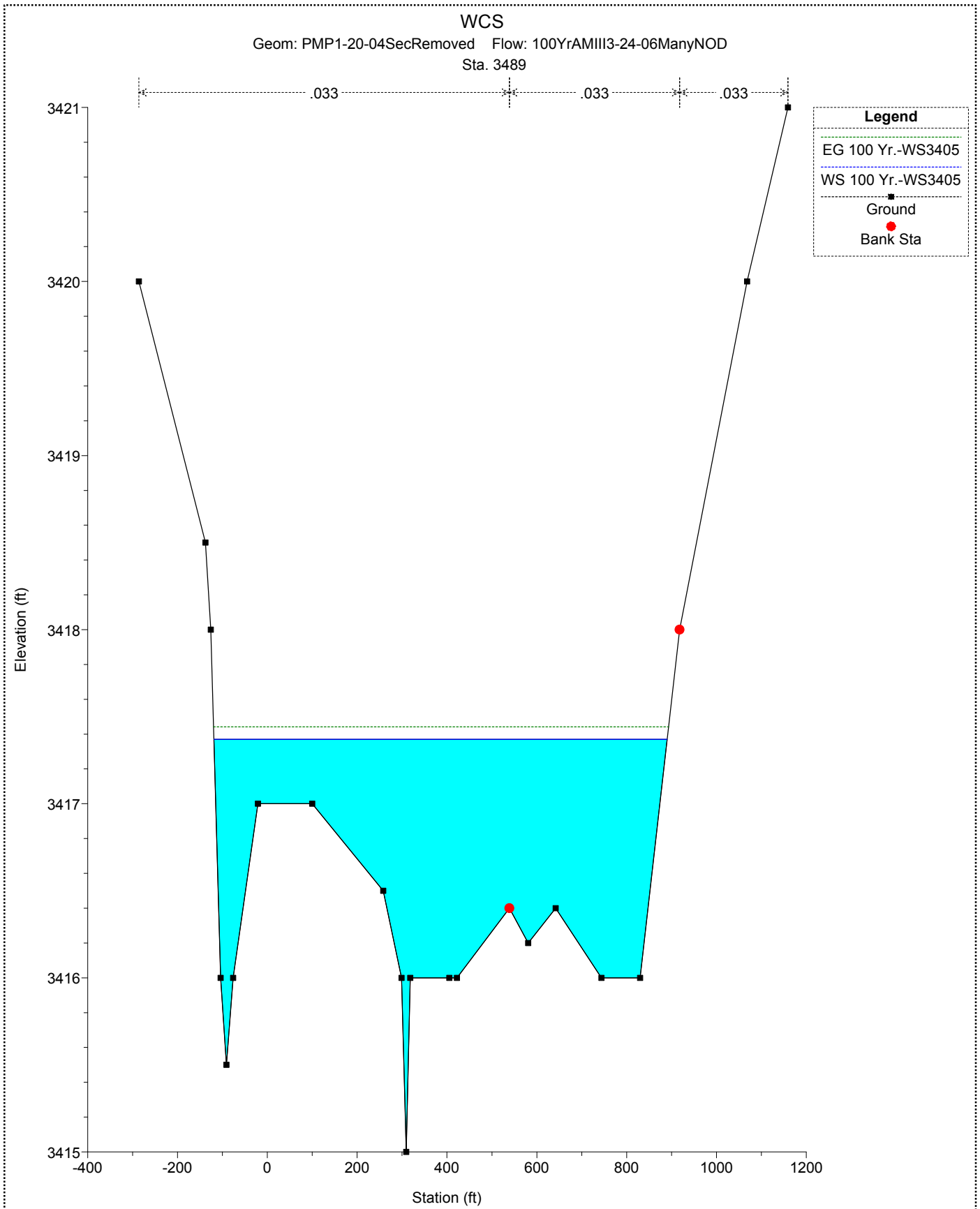


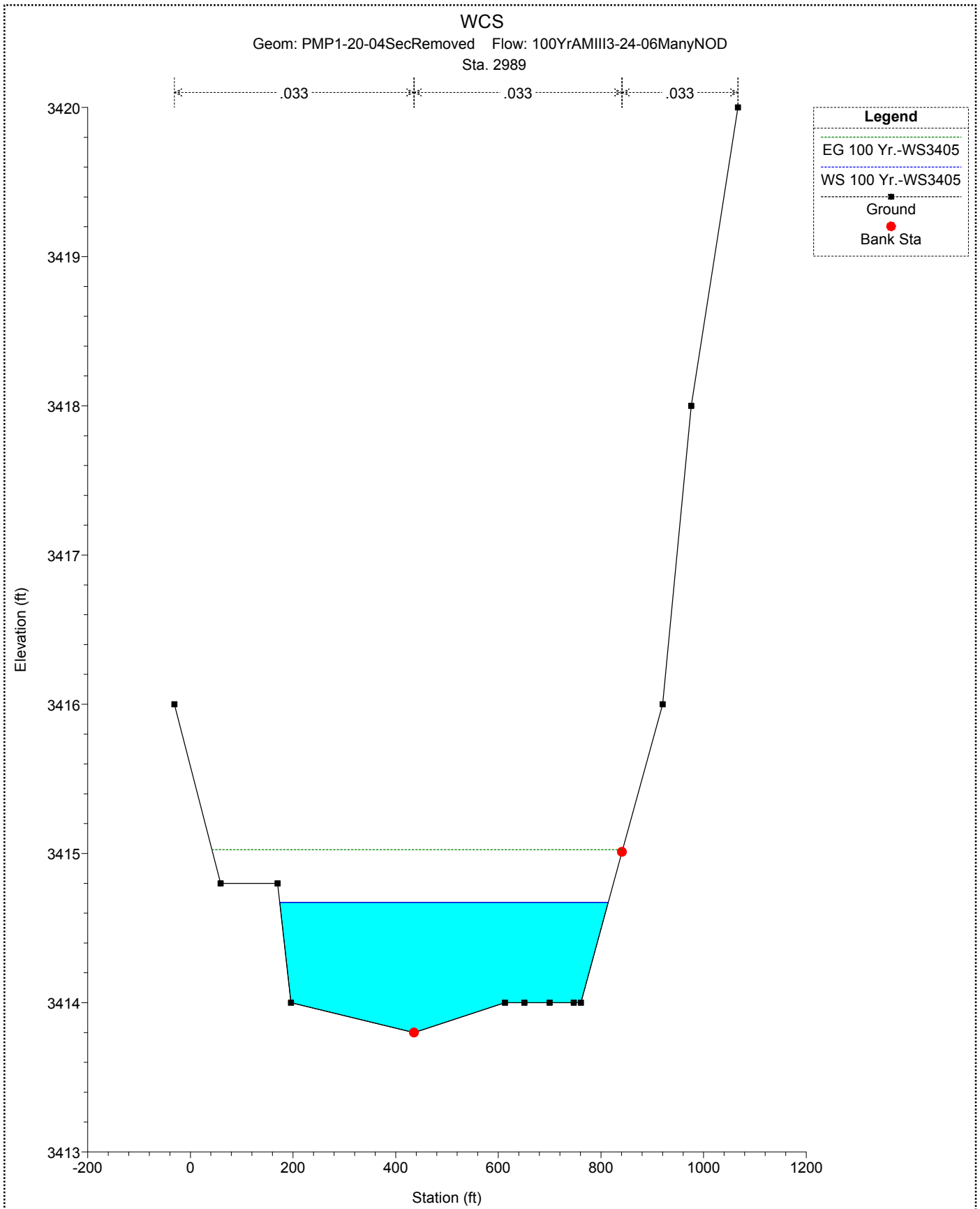


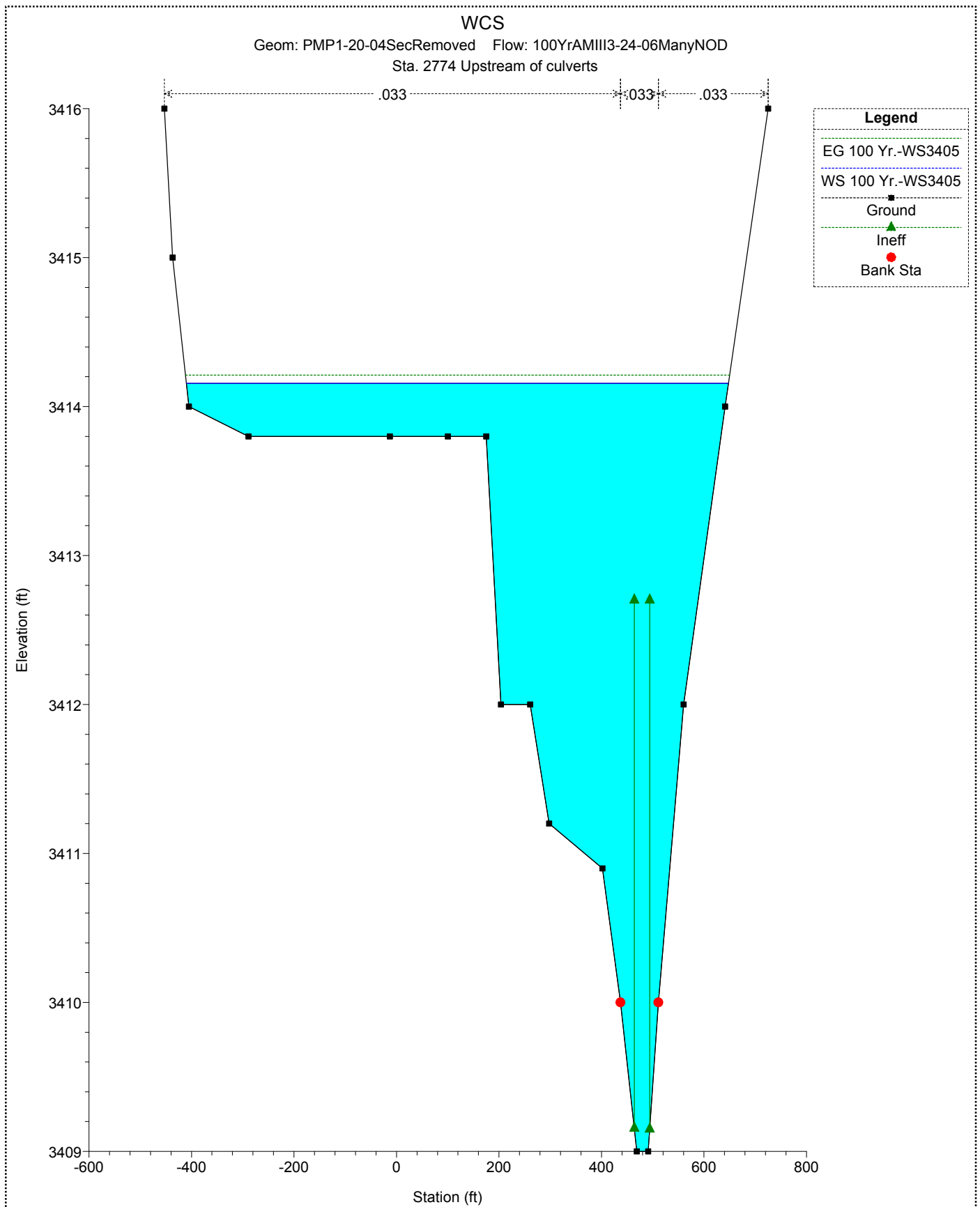


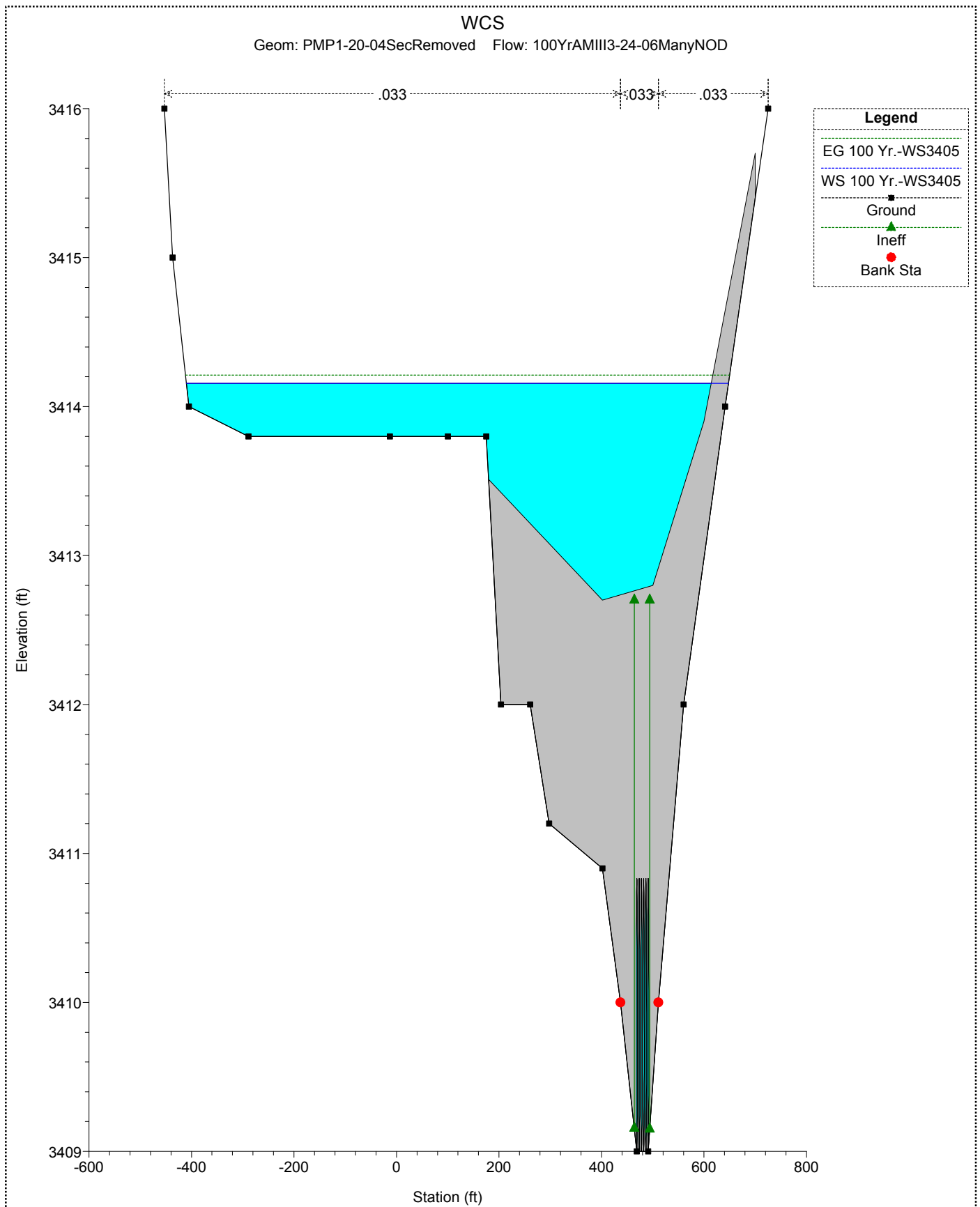


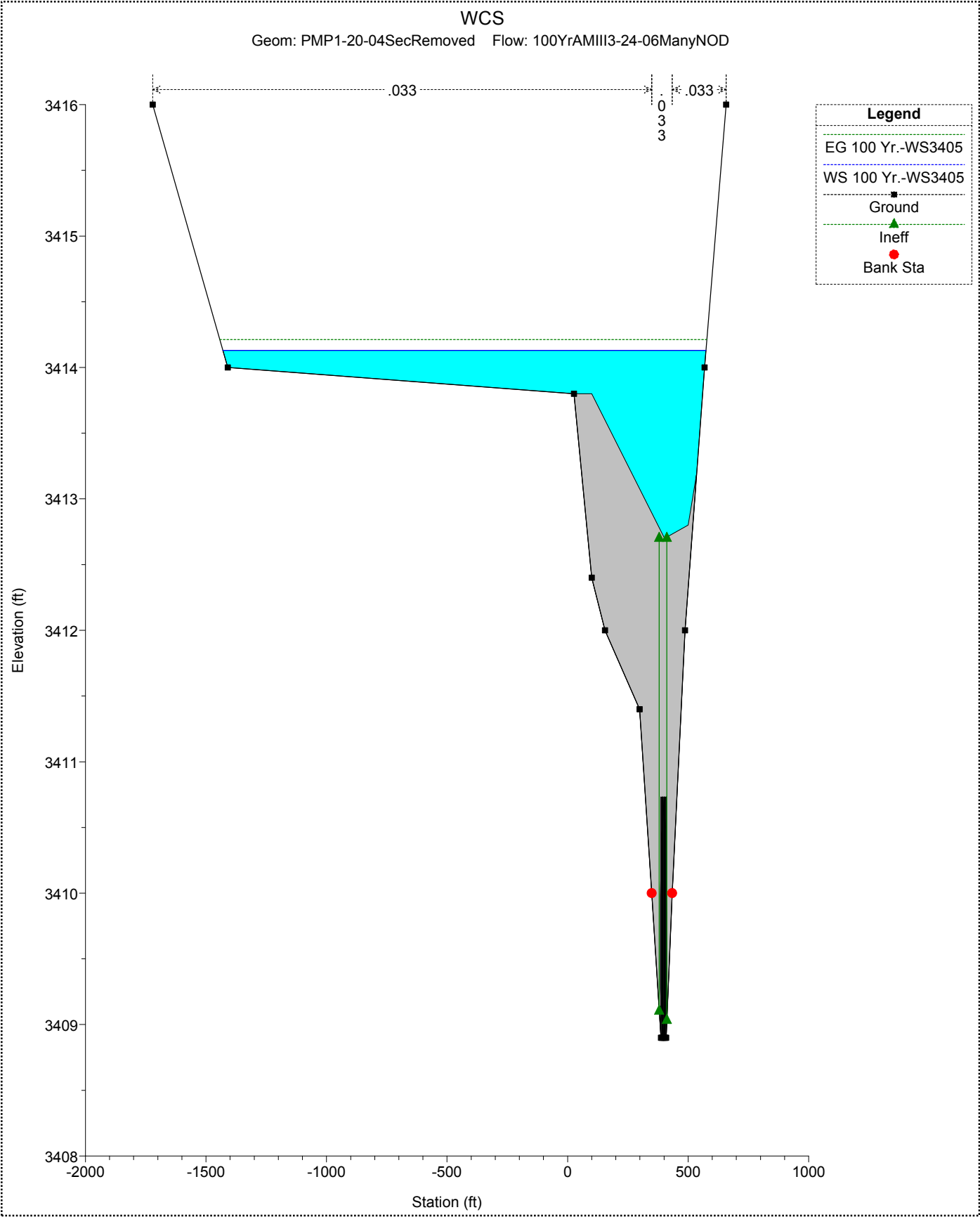


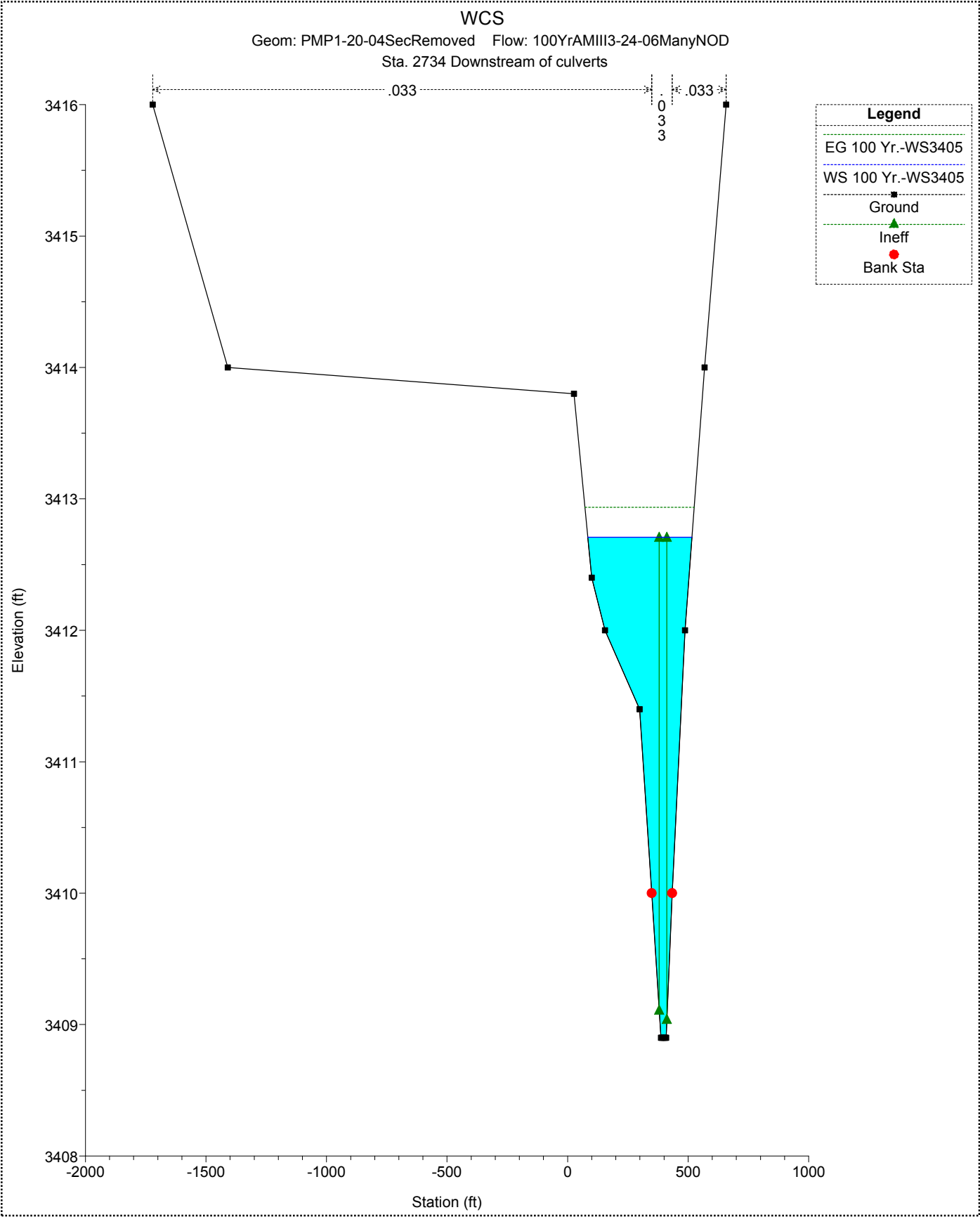


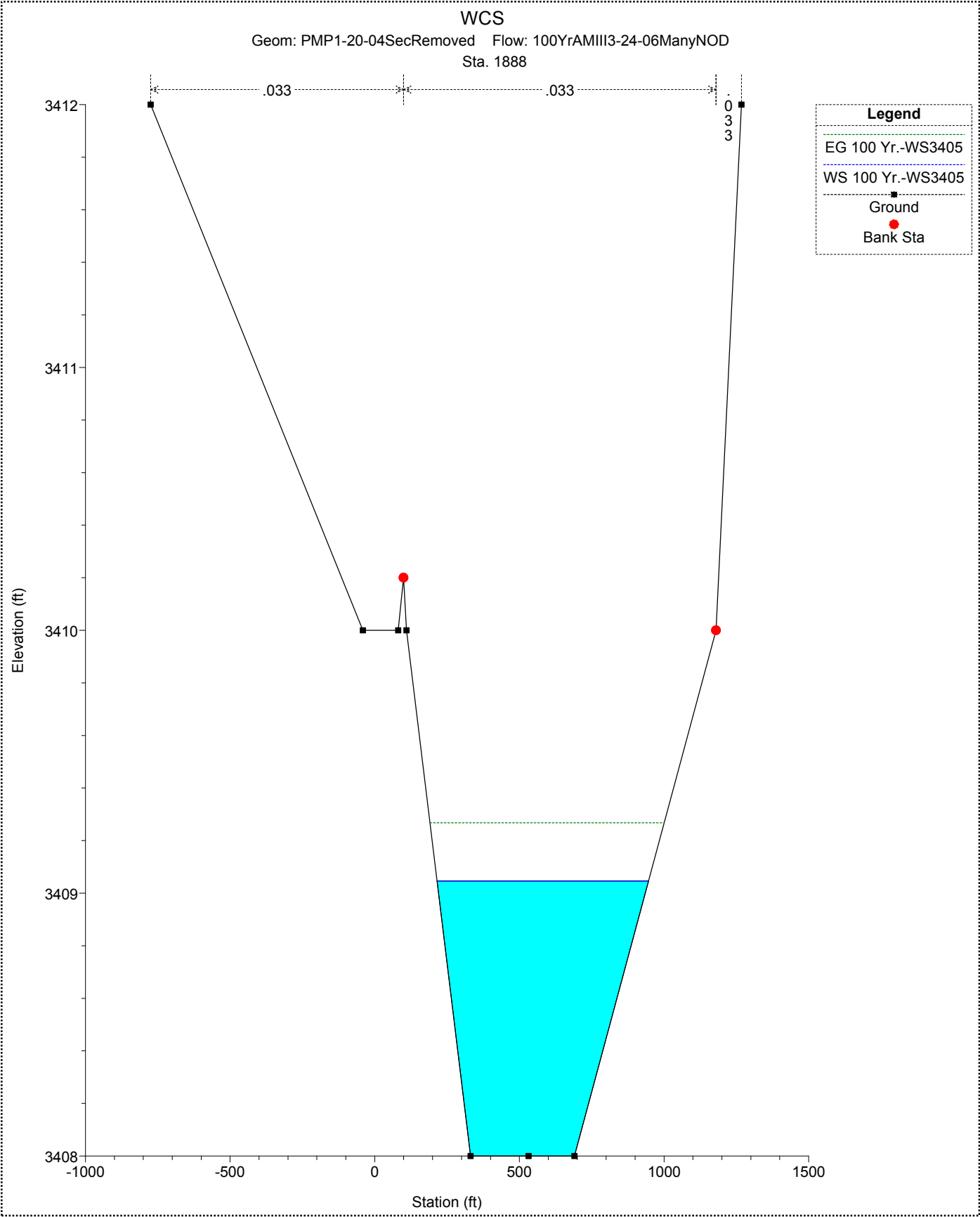


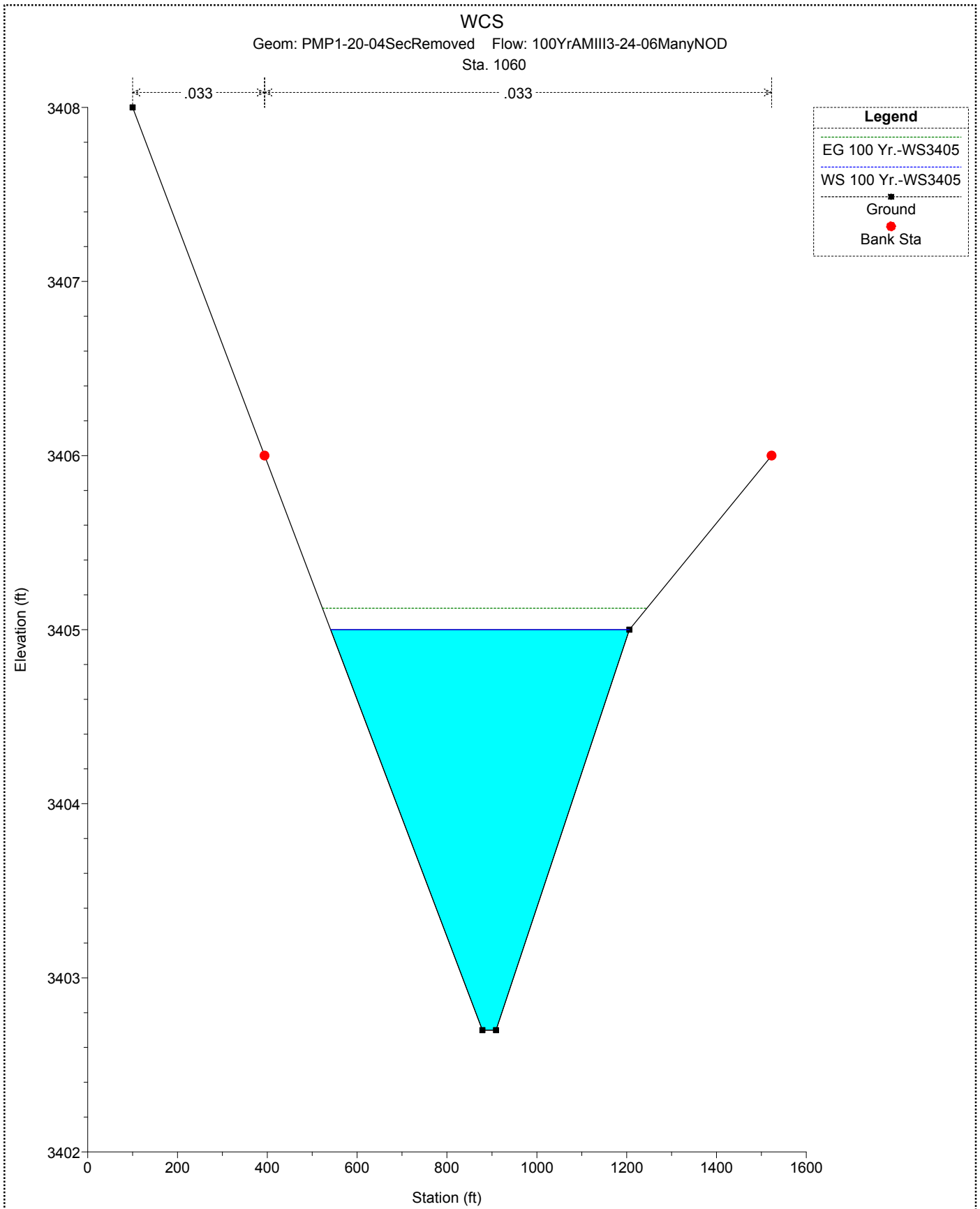












APPENDIX S

HEC-HMS MODEL FOR THE CALCULATION OF THE 500-YEAR PEAK DISCHARGES, ANTECEDENT MOISTURE CONDITION III

HMS * Summary of Results

Project : WCS

Run Name : 500 Yr AMIII

Start of Run : 01Dec00 0000 Basin Model : 100YrAMIII3/24/06NOD
 End of Run : 02Dec00 0000 Met. Model : Met 500 Year
 Execution Time : 29Mar06 1420 Control Specs : Control 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Volume (ac ft)	Drainage Area (sq mi)
Subbasin-4	1210.1	01 Dec 00 1231	190.85	0.490
Reach-2	1210.1	01 Dec 00 1246	190.21	0.490
Subbasin-2	1741.4	01 Dec 00 1258	390.34	1.063
playa	0.0	30 Nov 00 2400	0.0	1.063
Reach-1	0.0	30 Nov 00 2400	0.0	1.063
Subbasin-1A	975.62	01 Dec 00 1319	274.21	0.691
Reach-1A	975.62	01 Dec 00 1336	273.13	0.691
Subbasin-1B	703.08	01 Dec 00 1236	120.10	0.314
Junction-1A	1241.7	01 Dec 00 1318	393.23	1.005
Reach-1B	1241.7	01 Dec 00 1321	392.96	1.005
Subbasin-3	353.38	01 Dec 00 1236	60.672	0.156
Junction-1	1483.0	01 Dec 00 1252	453.63	2.224
Reach-3	1483.0	01 Dec 00 1309	451.82	2.224
Subbasin-5A	465.61	01 Dec 00 1230	71.094	0.192
Junction-2	2887.8	01 Dec 00 1250	713.12	2.906
Reach-4	2887.8	01 Dec 00 1311	709.60	2.906
Subbasin-5B	504.92	01 Dec 00 1245	97.675	0.265
Junction-3	3286.1	01 Dec 00 1309	807.28	3.171
Reach-5	3286.1	01 Dec 00 1323	804.57	3.171
Subbasin-6	211.72	01 Dec 00 1222	27.467	0.074
Junction-4	3326.9	01 Dec 00 1323	832.04	3.245
Reach-6	3326.9	01 Dec 00 1323	832.04	3.245
Subbasin-7	174.68	01 Dec 00 1257	38.870	0.104
Junction-5	3472.7	01 Dec 00 1322	870.91	3.349

Meteorologic Model Input

The screenshot shows a software window titled "HMS * Meteorologic Model". It has a menu bar with "File", "Edit", and "Help". The "Meteorologic Model" is set to "Met 500 Year". The "Description" field contains "500 Year, 24 Hour Storm". There is a "Subbasin List" button. Below these are two tabs: "Precipitation" (selected) and "Evapotranspiration". Under the "Precipitation" tab, the "Method" is set to "SCS Hypothetical Storm". The "Storm Selection" is set to "Type II". The "Storm Depth (in)" is set to "8.71". At the bottom are "OK", "Apply", and "Cancel" buttons. A status bar is at the very bottom.

HMS * Meteorologic Model

File Edit Help

Meteorologic Model: Met 500 Year Subbasin List

Description: 500 Year, 24 Hour Storm ...

Precipitation Evapotranspiration

Method : SCS Hypothetical Storm

Storm Selection: Type II

Storm Depth (in) : 8.71

OK Apply Cancel

HMS * Basin Model * SCS Curve Number

Sort Help

Basin Model ID: 100YrAMIII3/24/06NOD

Subbasin Name	SCS Curve Number	Initial Abstraction (in)	Imperviousness (%)
Subbasin-1A	91		0.0
Subbasin-2	86		0.0
Subbasin-3	89		0.0
Subbasin-4	89		0.0
Subbasin-5B	86		0.0
Subbasin-6	86		0.0
Subbasin-1B	88		0.0
Subbasin-5A	86		0.0
Subbasin-7	87		0.0

OK Apply Cancel

HMS * Basin Model * SCS UH

Sort Help

Basin Model ID: 100YrAMIII3/24/06NOD

Time Units : Minutes

Subbasin Name	SCS Lag (min)
Subbasin-1A	86
Subbasin-2	65
Subbasin-3	44
Subbasin-4	39
Subbasin-5B	53
Subbasin-6	30
Subbasin-1B	44
Subbasin-5A	38
Subbasin-7	64

OK Apply Cancel

HMS * Basin Model * Lag Routing

Help

Basin Model ID : 100YrAMIII3/24/06NOD

Interval : Minutes

Reach Name	Lag (min)
Reach-1	35
Reach-2	15
Reach-3	17
Reach-4	21
Reach-5	14
Reach-1A	17
Reach-1B	3
Reach-6	0

OK Apply Cancel

HMS - Basin Model - Reservoir Editor

Edit File Help

Reservoir Name:

Description: ...

Storage Outlet Spillway Overflow Dam Break

Method:

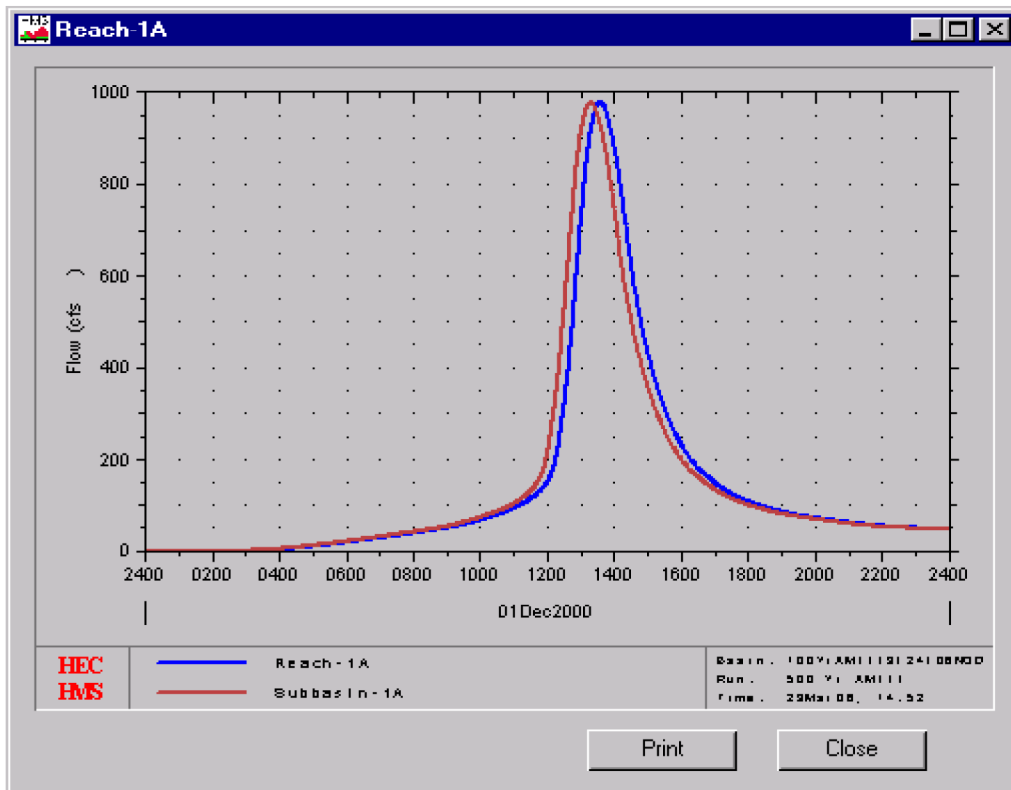
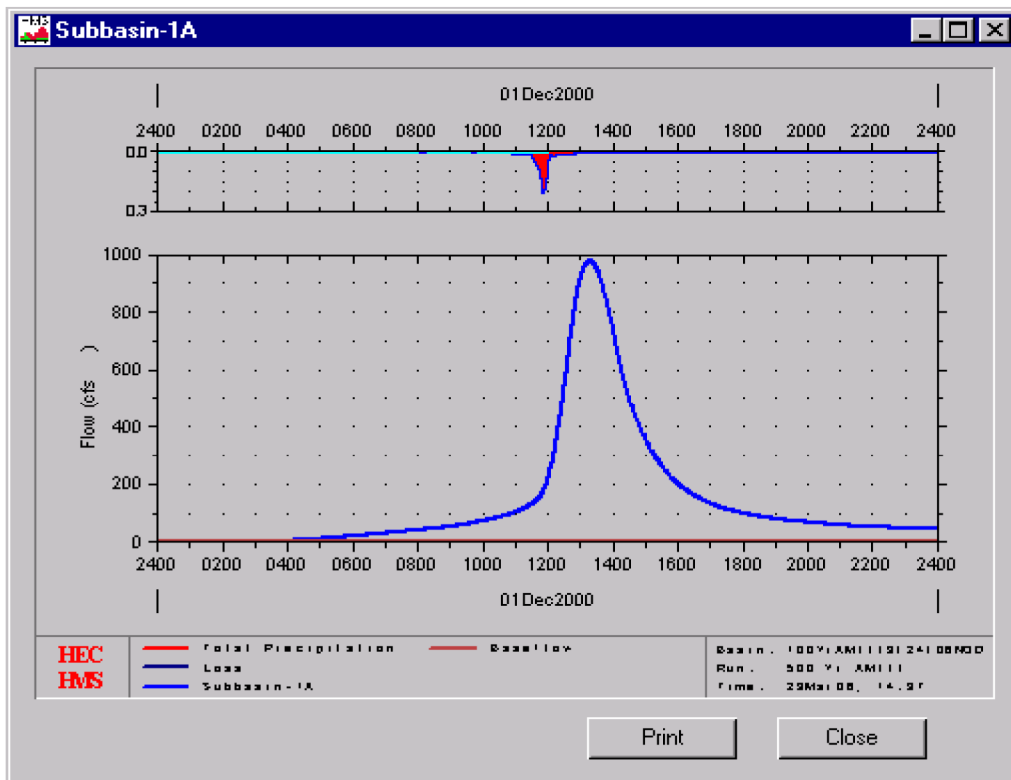
Initial

Elevation (ft)	Storage (acre-feet)	Outflow (cfs)
3478.0	0.0	0.0
3480.0	24.0	0.0
3482.0	61.0	0.0
3484.0	170.0	0.0
3486.0	457.0	0.0
3487.0	693.0	863.0
3488.0	928.0	2427.0

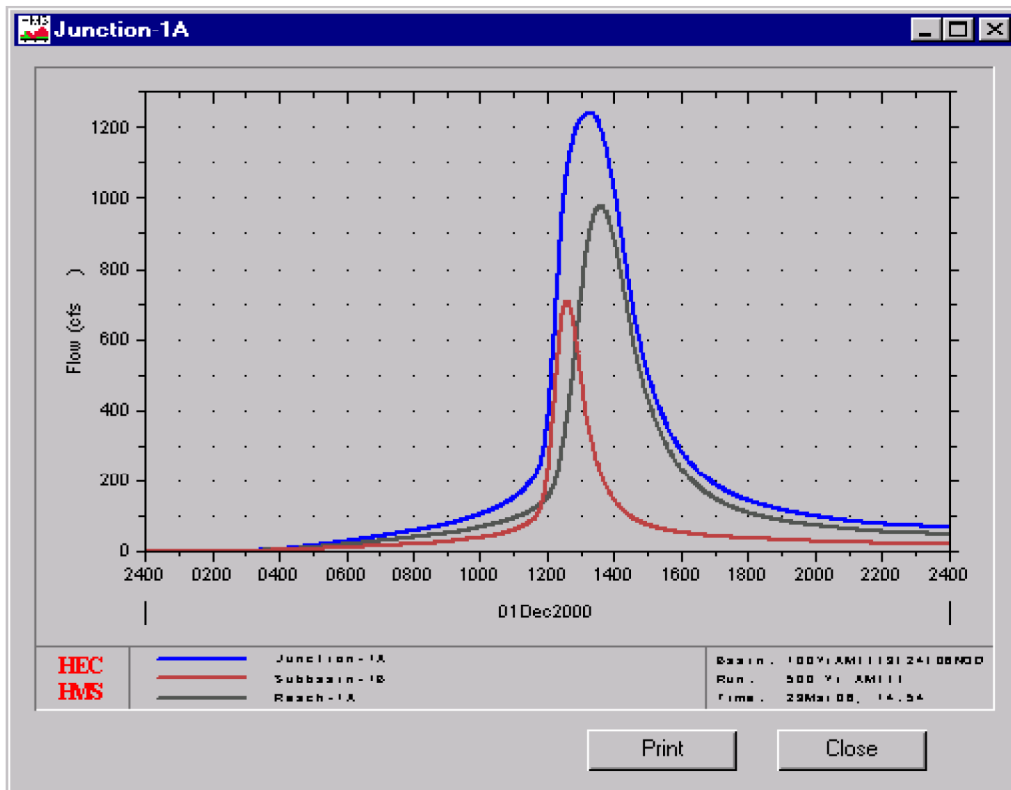
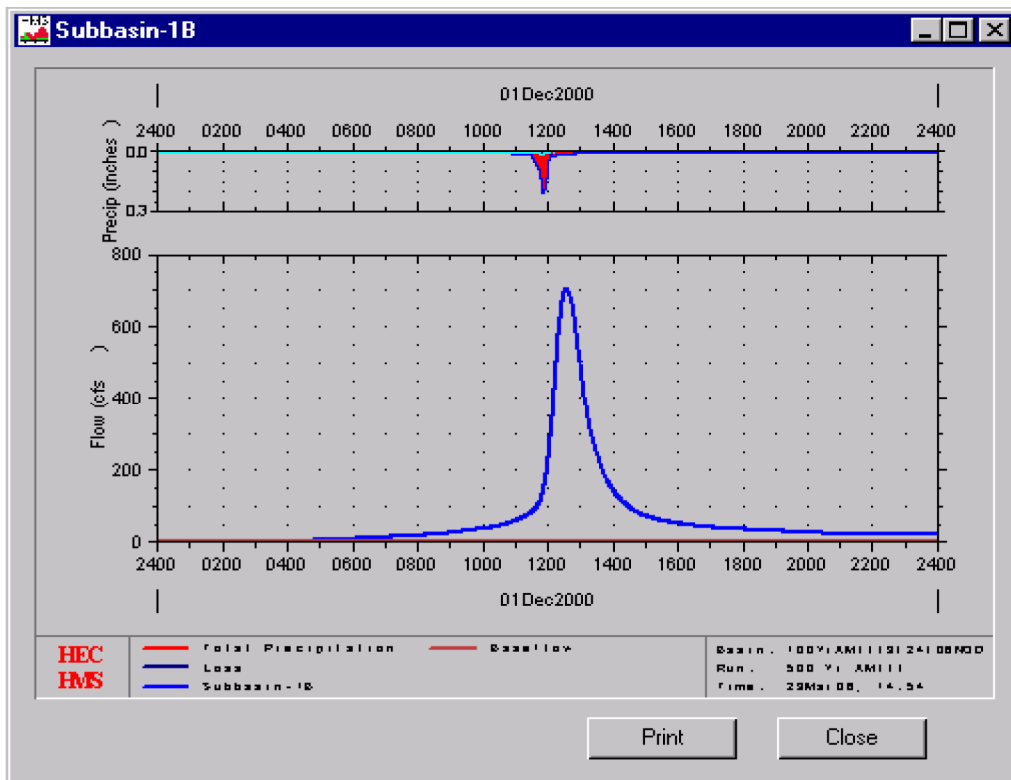
Graph

OK Apply Cancel

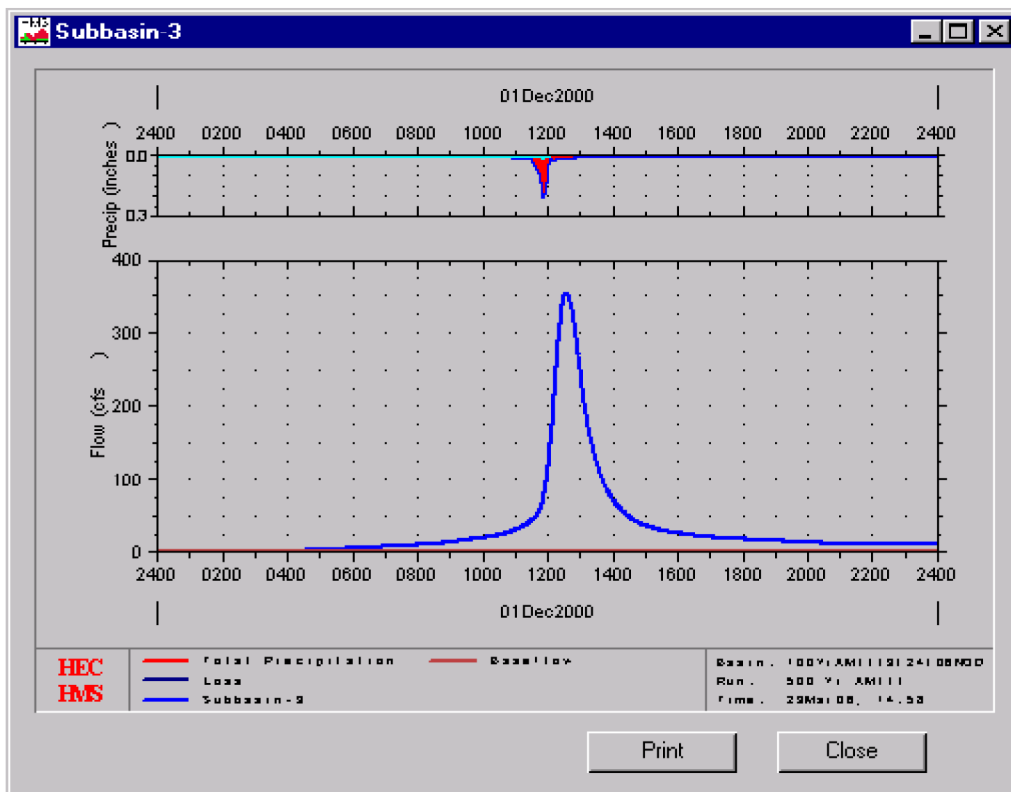
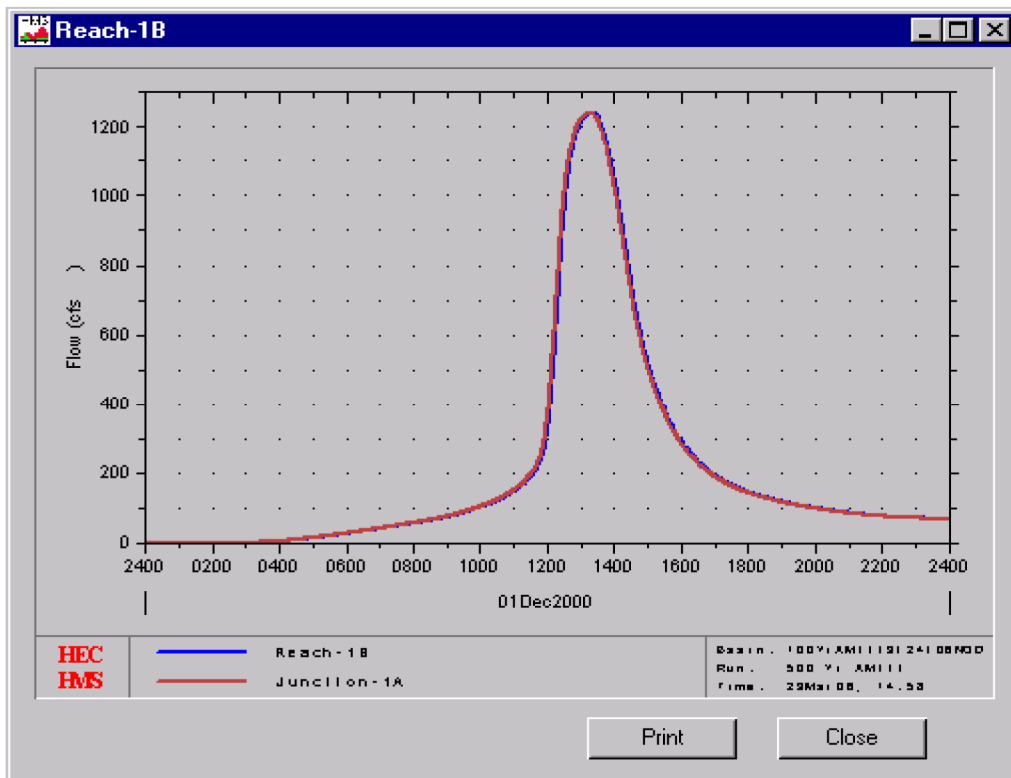
WCS FACILITY FLOOD PLAIN STUDY HYDROGRAPHS



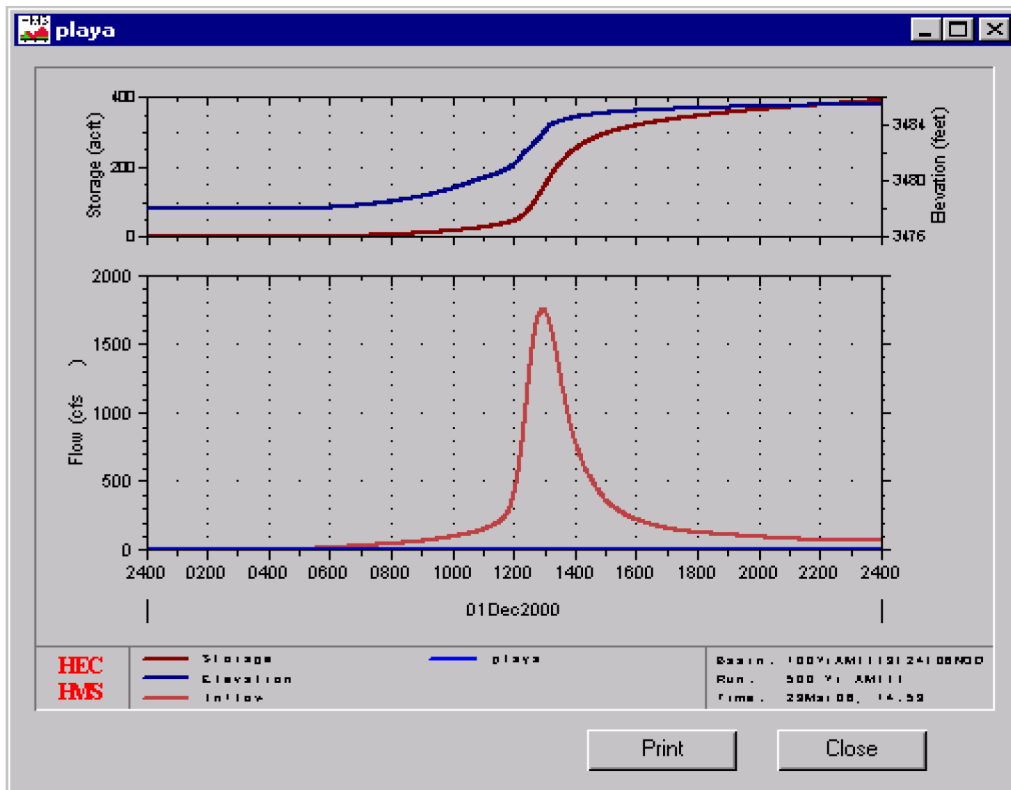
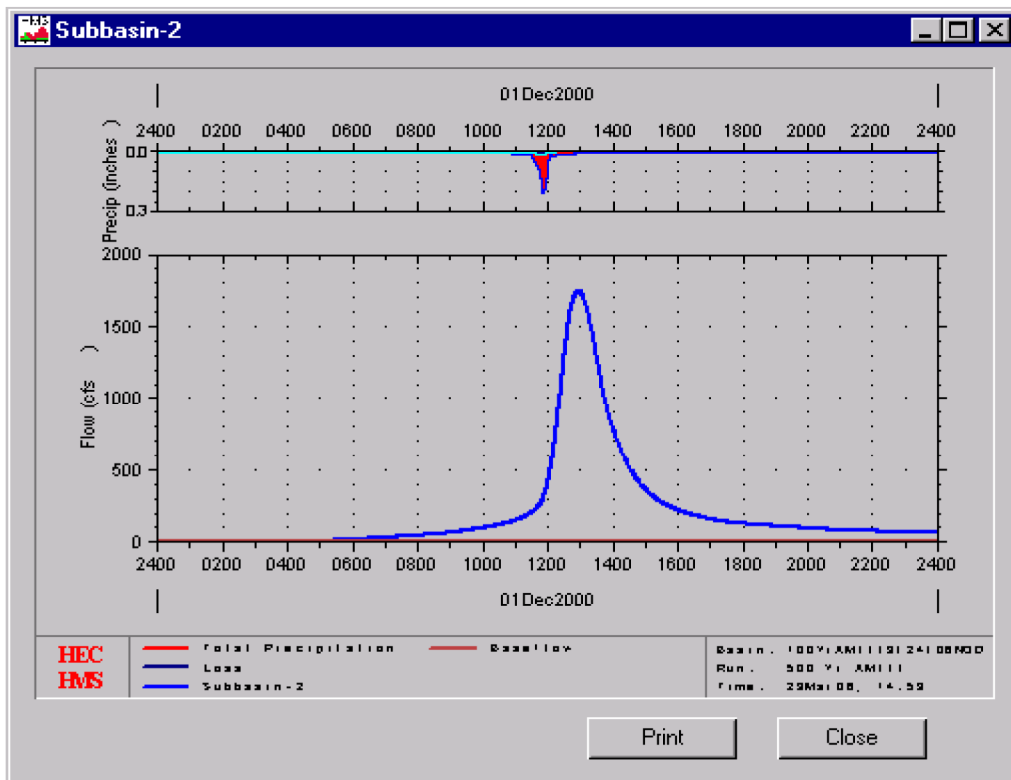
WCS FACILITY FLOOD PLAIN STUDY HYDROGRAPHS



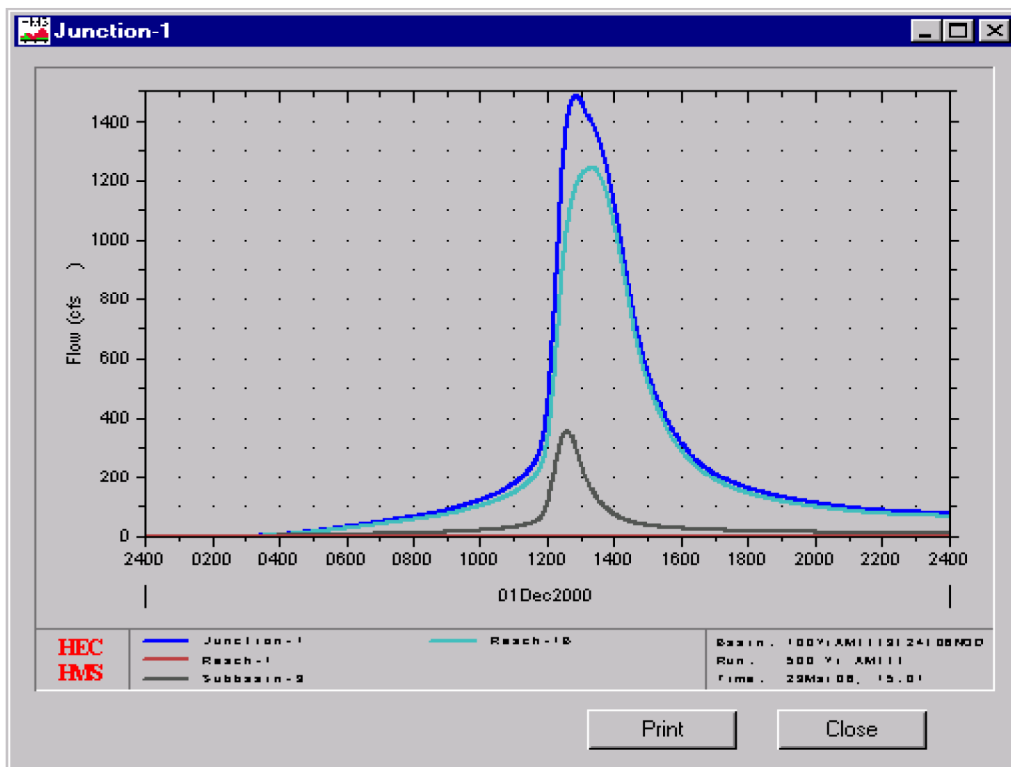
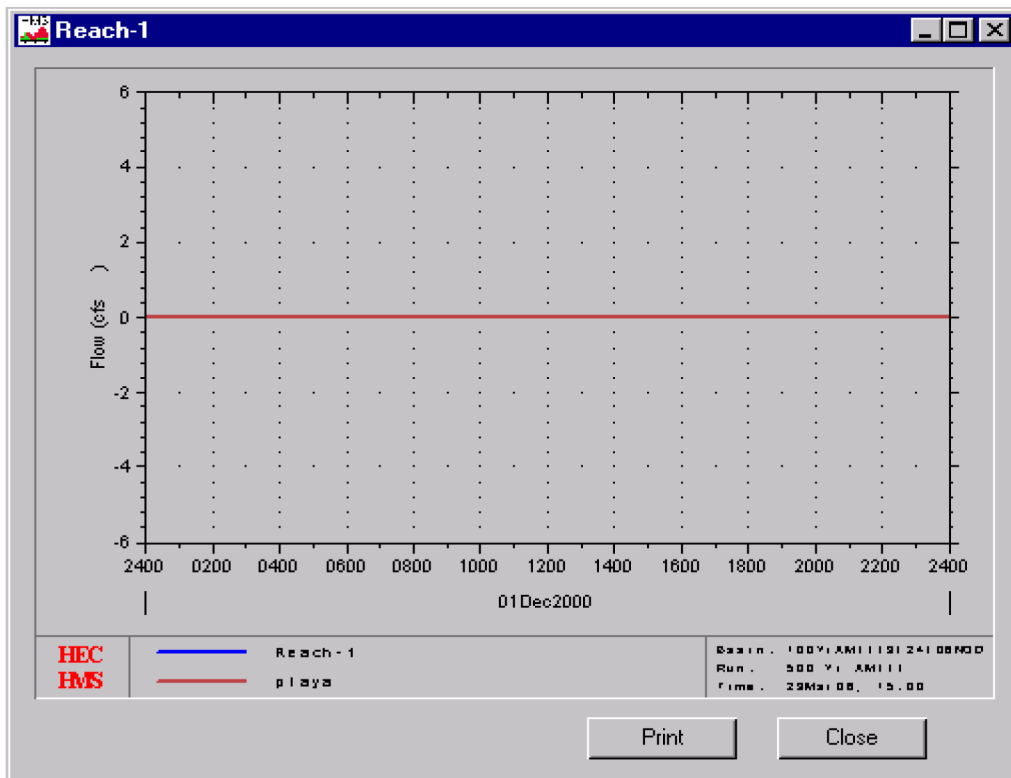
WCS FACILITY FLOOD PLAIN STUDY HYDROGRAPHS



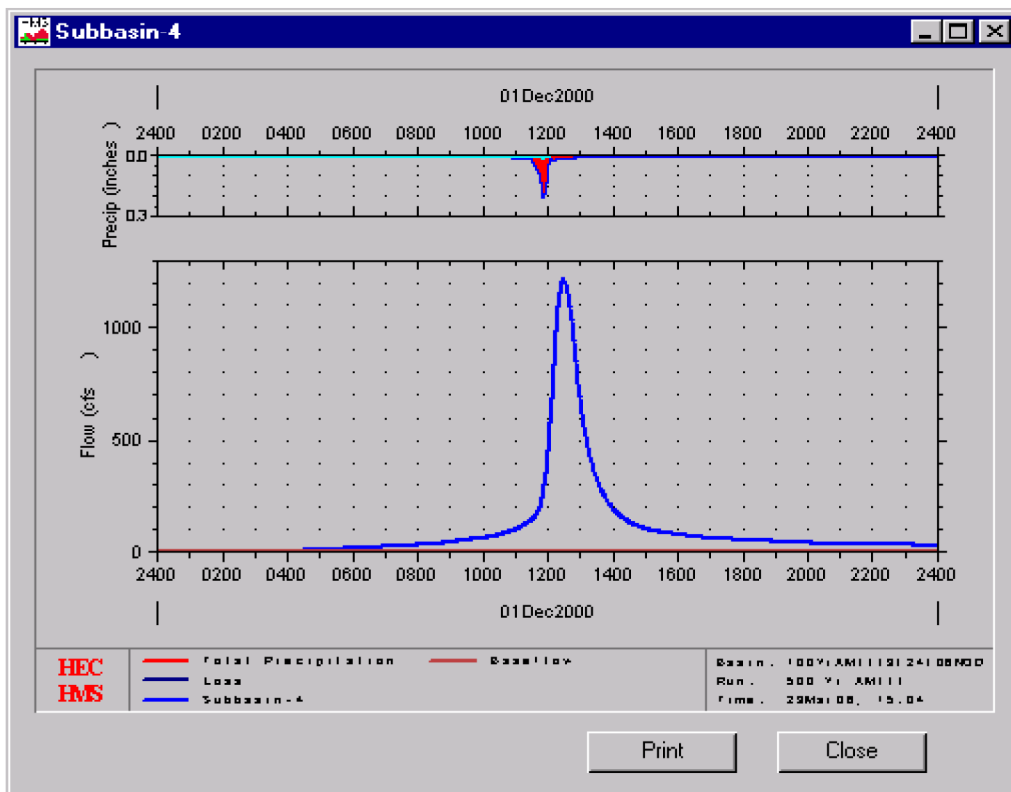
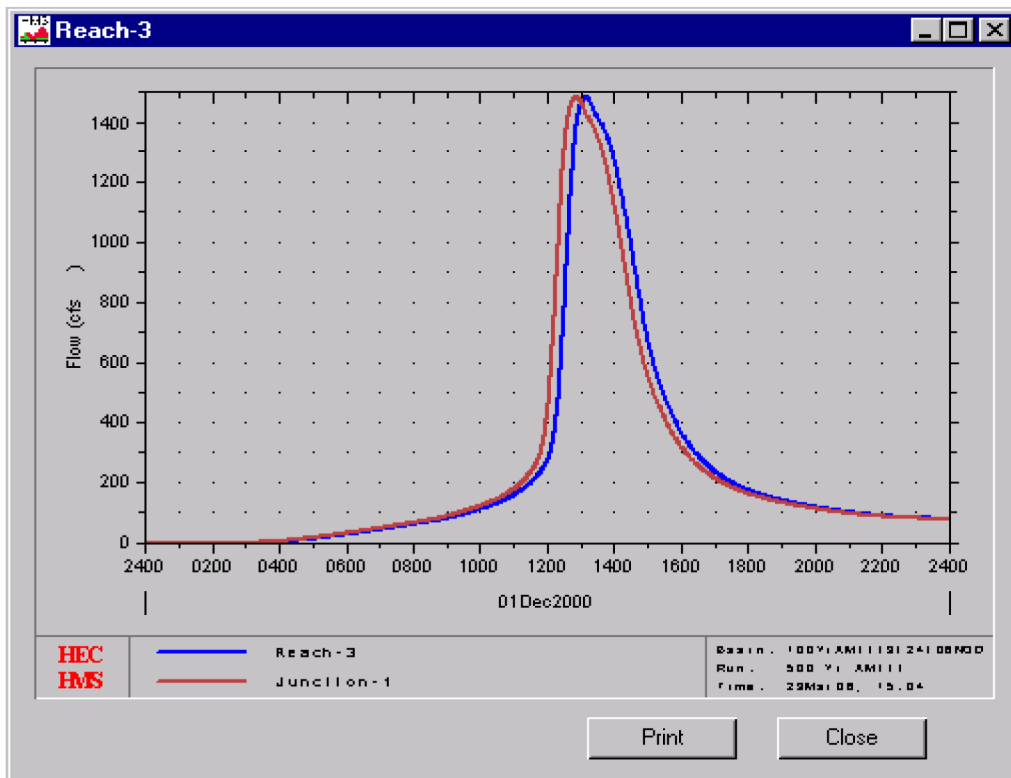
WCS FACILITY FLOOD PLAIN STUDY HYDROGRAPHS



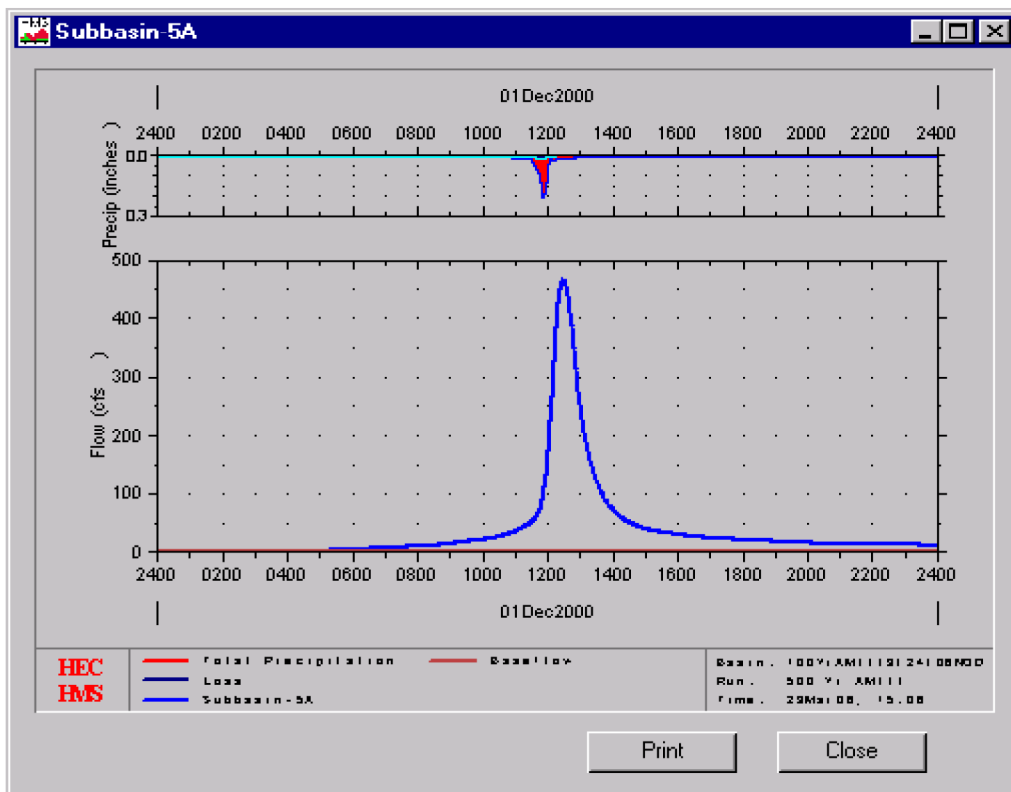
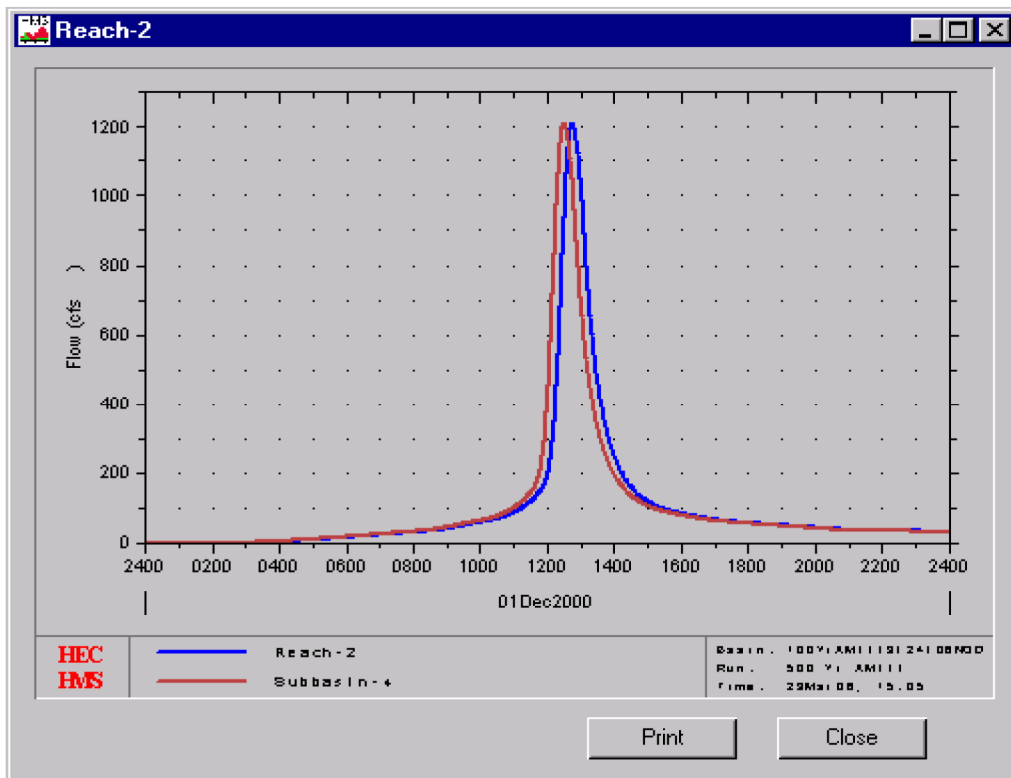
WCS FACILITY FLOOD PLAIN STUDY HYDROGRAPHS



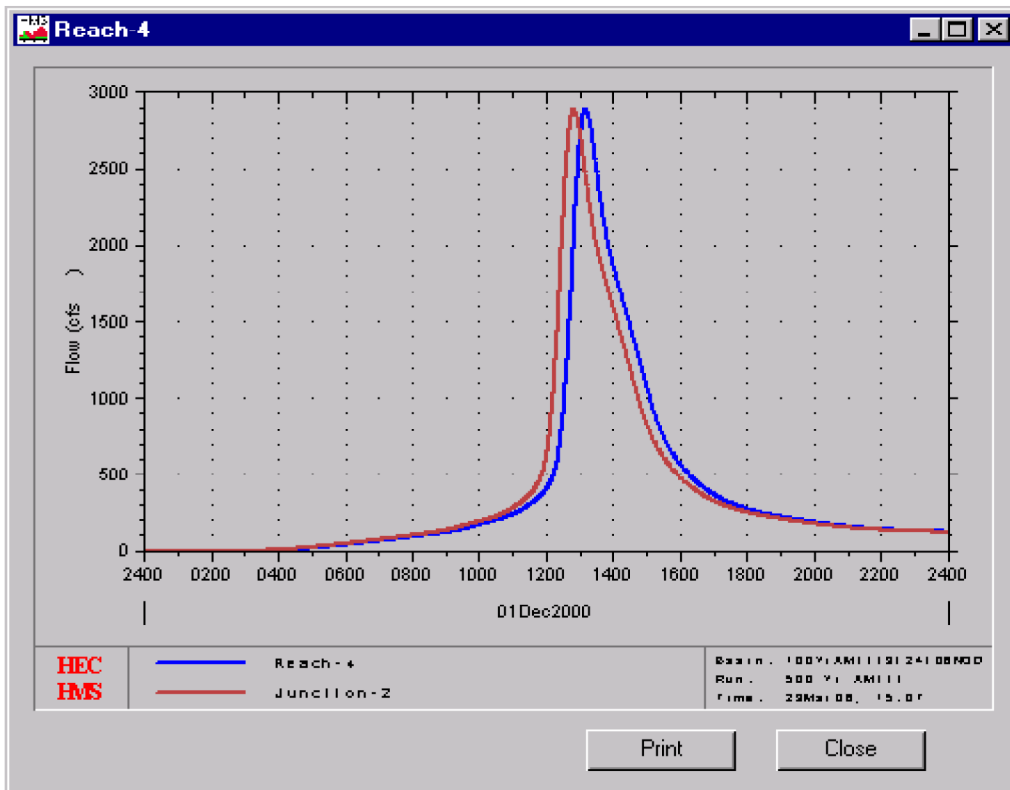
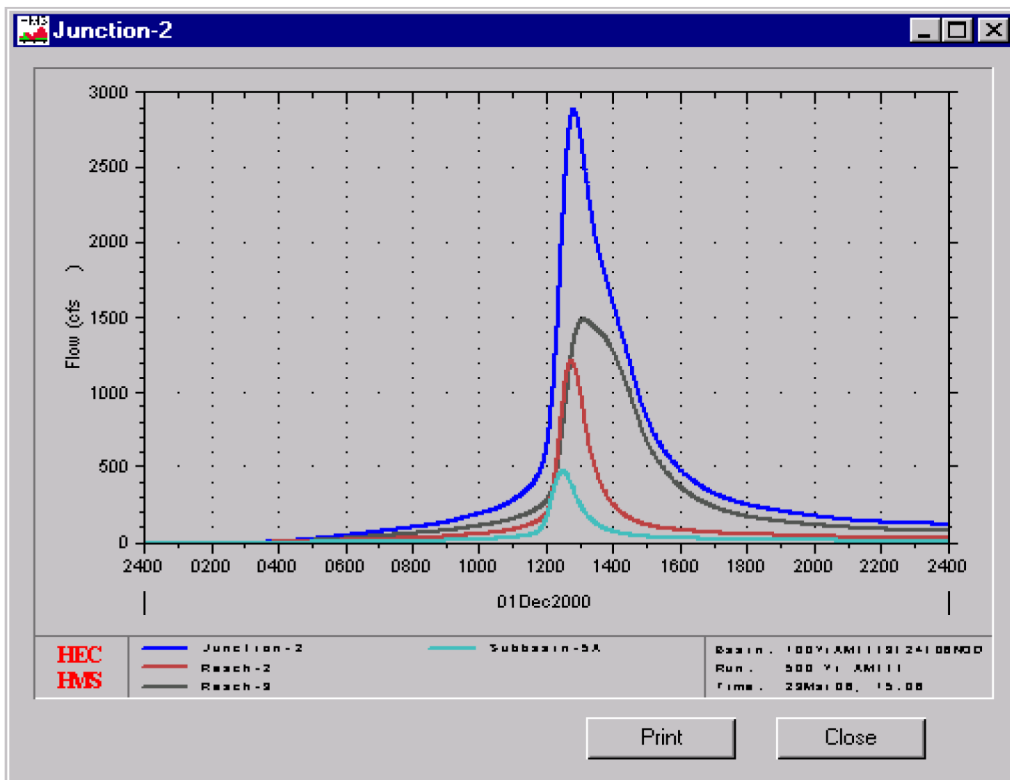
WCS FACILITY FLOOD PLAIN STUDY HYDROGRAPHS



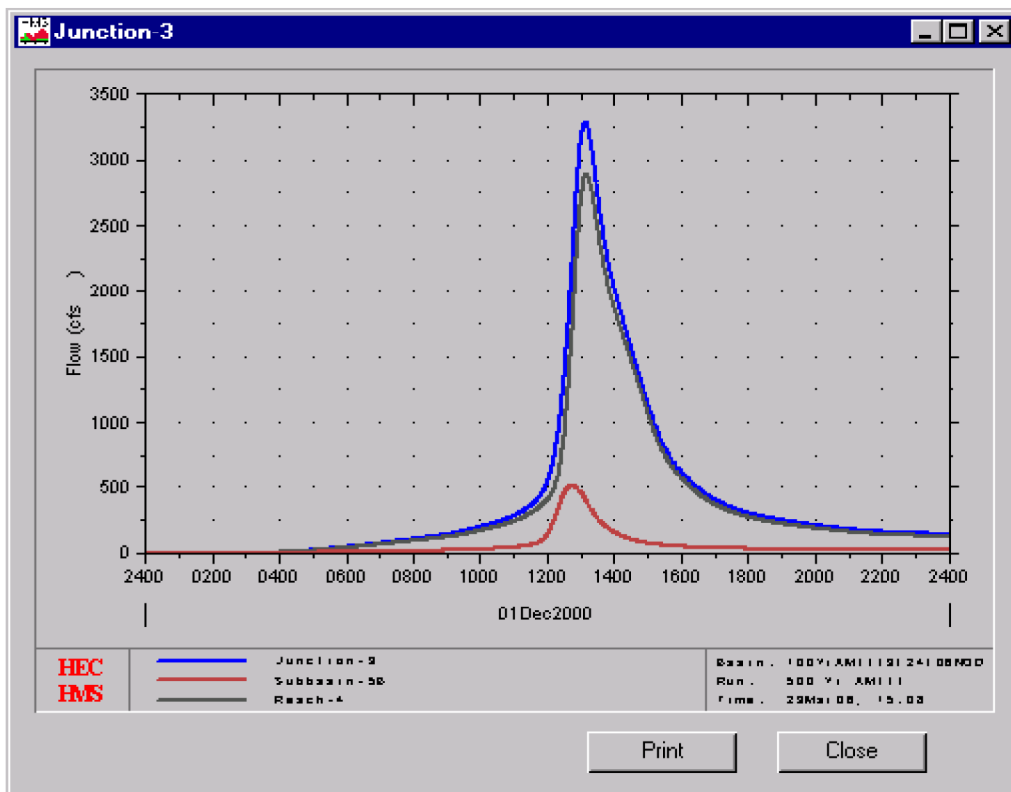
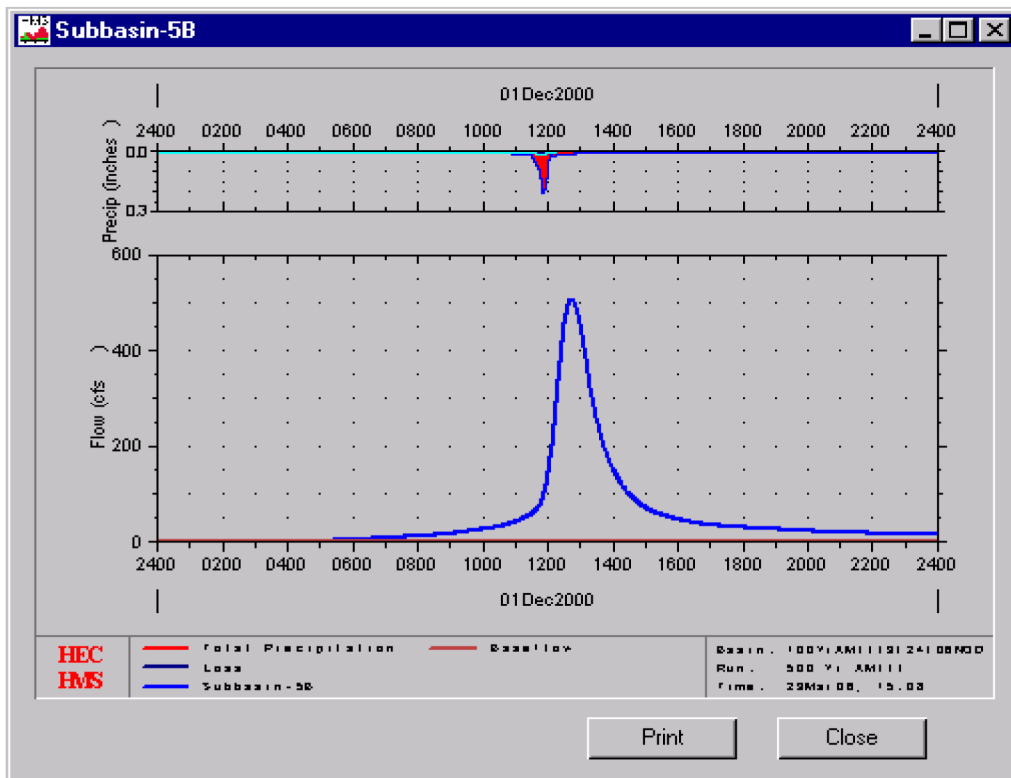
WCS FACILITY FLOOD PLAIN STUDY HYDROGRAPHS



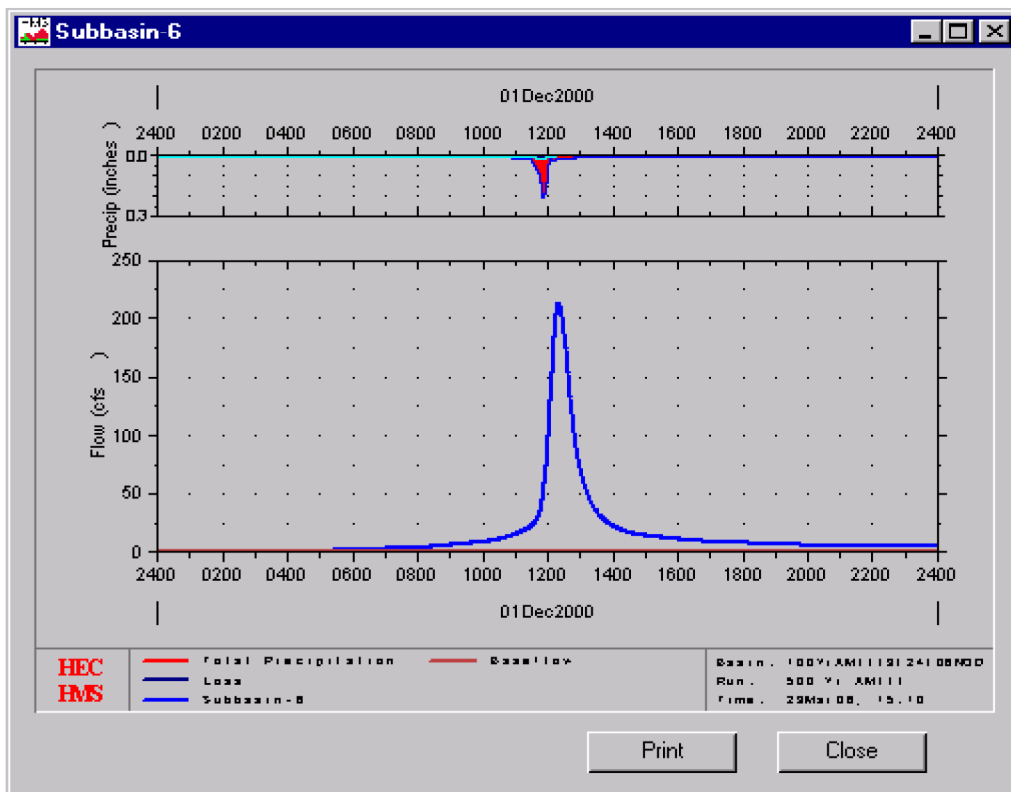
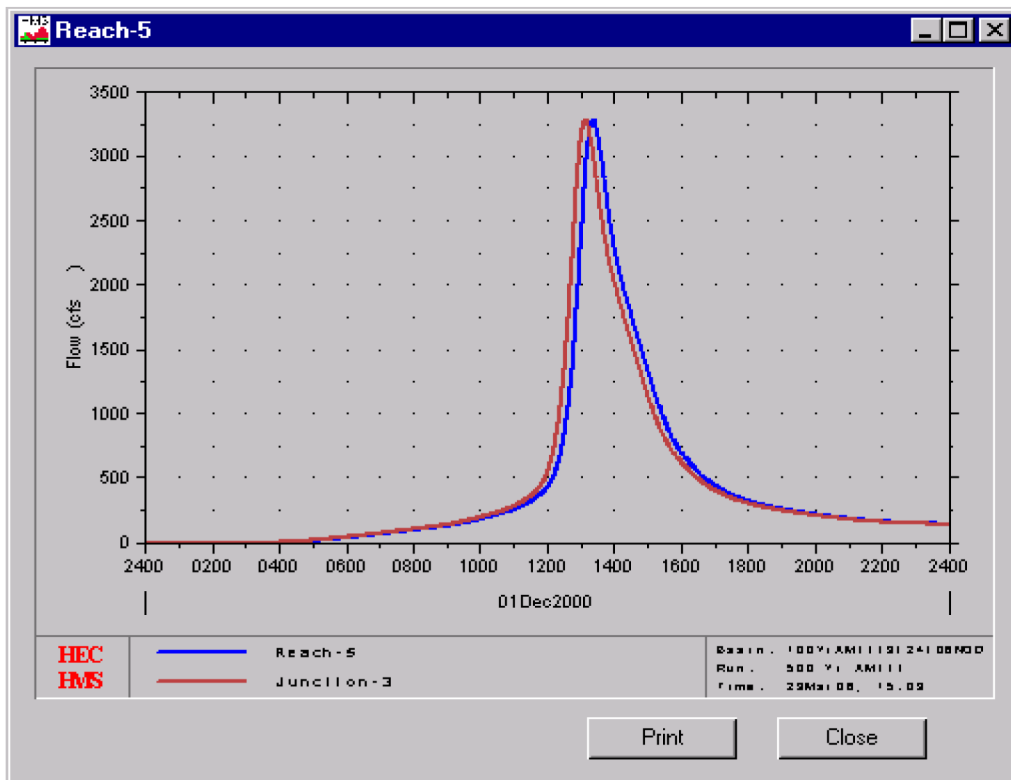
WCS FACILITY FLOOD PLAIN STUDY HYDROGRAPHS



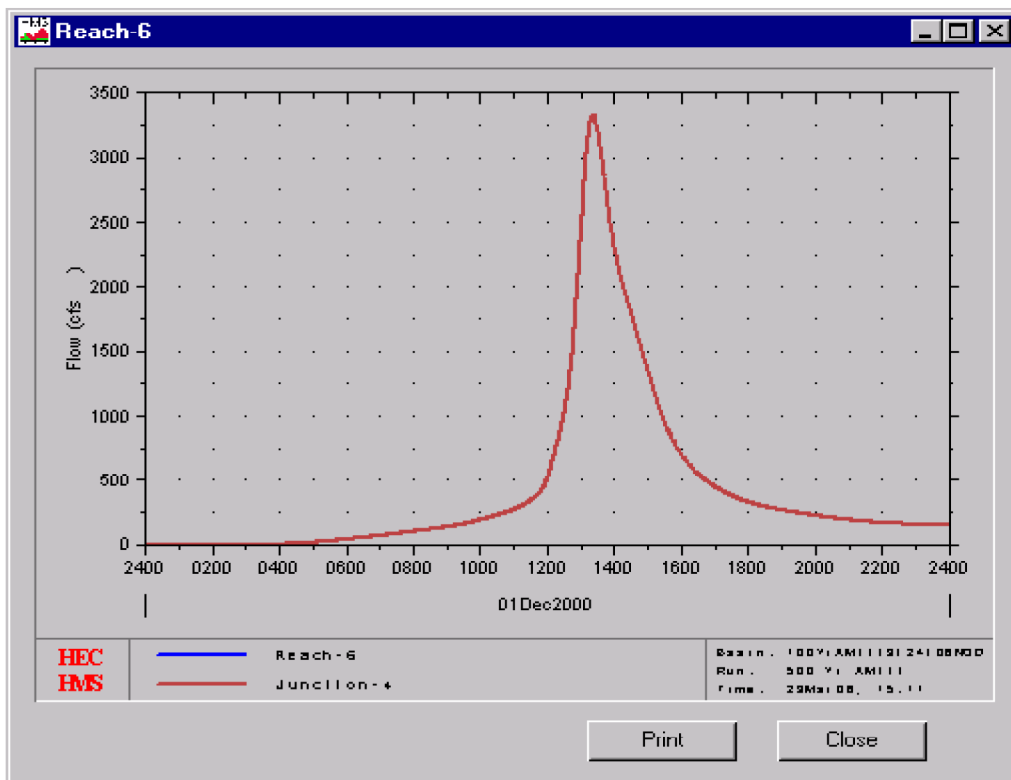
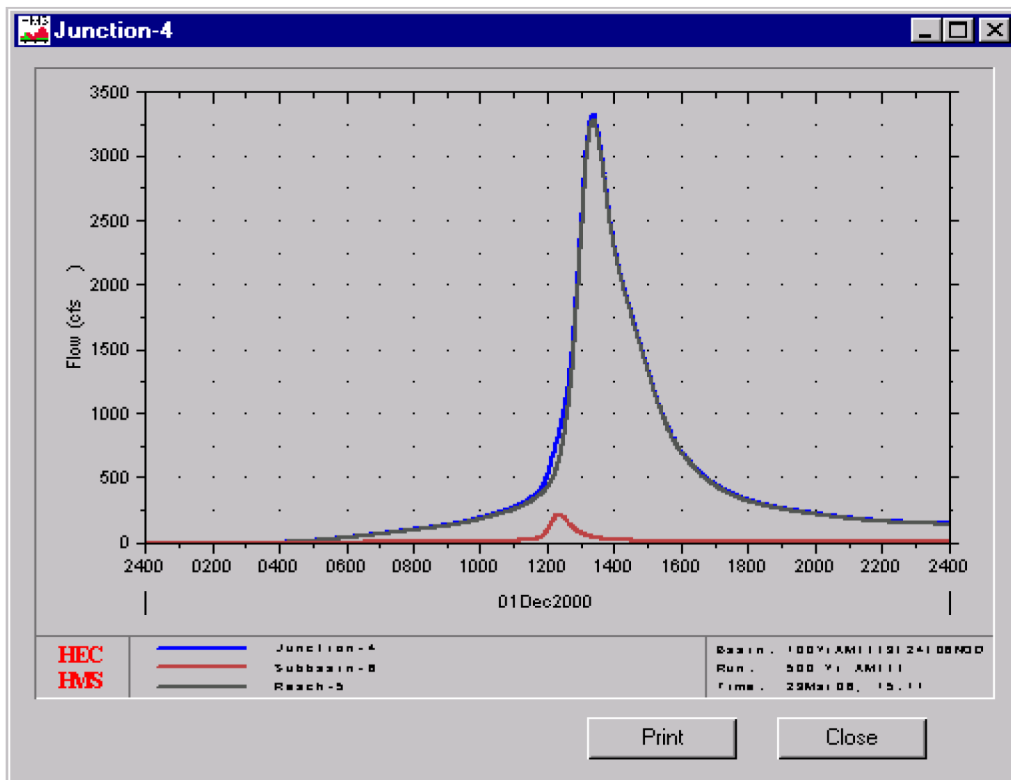
WCS FACILITY FLOOD PLAIN STUDY HYDROGRAPHS



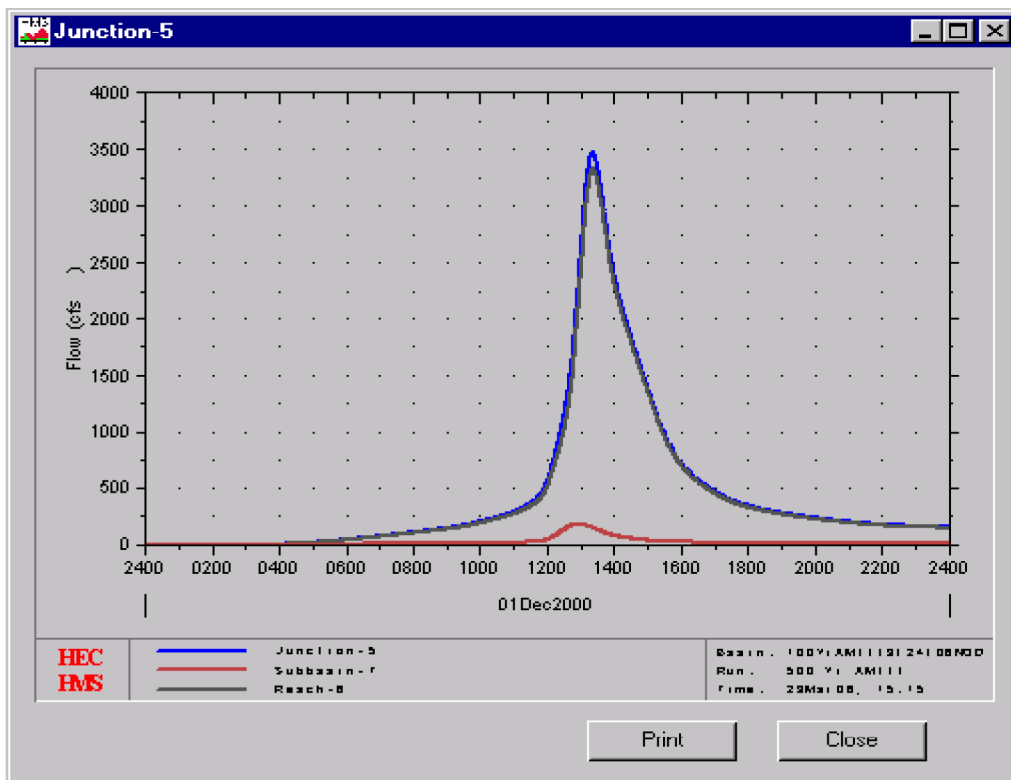
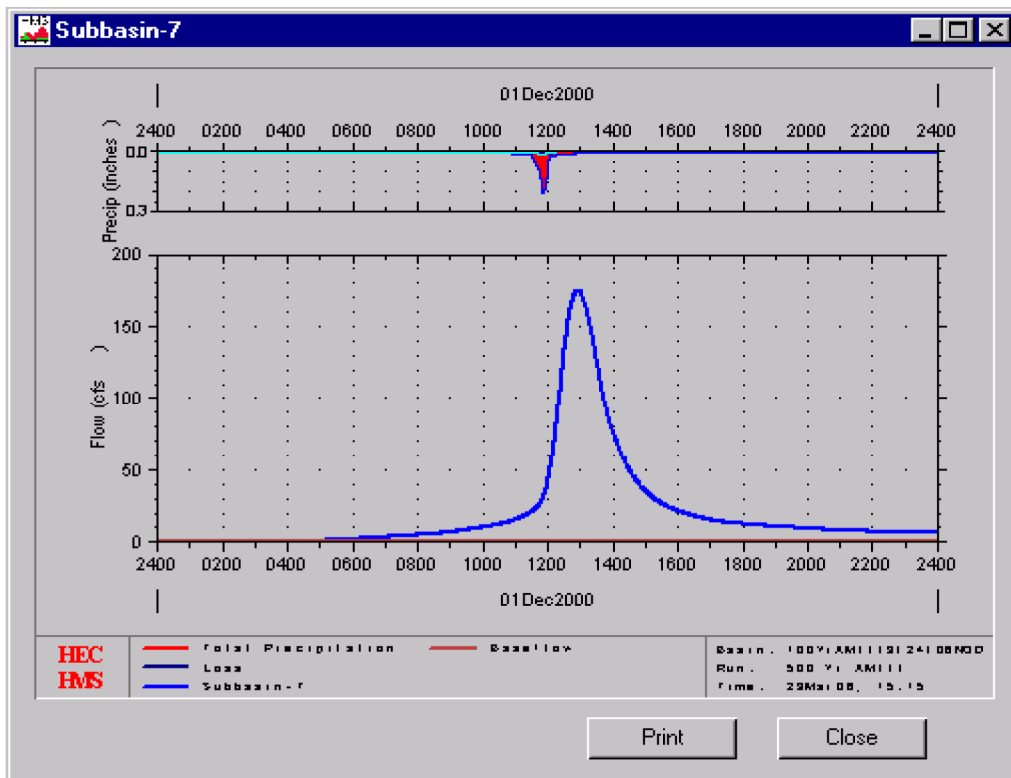
WCS FACILITY FLOOD PLAIN STUDY HYDROGRAPHS



WCS FACILITY FLOOD PLAIN STUDY HYDROGRAPHS



WCS FACILITY FLOOD PLAIN STUDY HYDROGRAPHS



APPENDIX T

HEC-HMS MODEL FOR THE CALCULATION OF THE PMP PEAK DISCHARGE, ANTECEDENT MOISTURE CONDITION III

HMS * Summary of Results

Project : WCS

Run Name : PMP Dist A AMIII

Start of Run : 01Dec00 0000 Basin Model : 100YrAMIII3/24/06NOD

End of Run : 05Dec00 0000 Met. Model : PMP Dist. A NOD

Execution Time : 30Mar06 0838 Control Specs : Control PMP

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Volume (ac ft)	Drainage Area (sq mi)
Subbasin-4	1314.7	03 Dec 00 0600	1020.6	0.490
Reach-2	1314.7	03 Dec 00 0615	1020.6	0.490
Subbasin-2	2846.6	03 Dec 00 0600	2188.9	1.063
playa	2519.0	03 Dec 00 0644	1731.9	1.063
Reach-1	2519.0	03 Dec 00 0719	1731.9	1.063
Subbasin-1A	1849.8	03 Dec 00 0603	1449.7	0.691
Reach-1A	1849.8	03 Dec 00 0620	1449.7	0.691
Subbasin-1B	842.09	03 Dec 00 0600	651.59	0.314
Junction-1A	2689.0	03 Dec 00 0602	2101.3	1.005
Reach-1B	2689.0	03 Dec 00 0605	2101.3	1.005
Subbasin-3	418.53	03 Dec 00 0600	324.93	0.156
Junction-1	5399.3	03 Dec 00 0619	4158.1	2.224
Reach-3	5399.3	03 Dec 00 0636	4158.1	2.224
Subbasin-5A	514.51	03 Dec 00 0600	395.37	0.192
Junction-2	7143.7	03 Dec 00 0620	5574.0	2.906
Reach-4	7143.7	03 Dec 00 0641	5574.0	2.906
Subbasin-5B	709.89	03 Dec 00 0600	545.69	0.265
Junction-3	7765.5	03 Dec 00 0631	6119.7	3.171
Reach-5	7765.5	03 Dec 00 0645	6119.7	3.171
Subbasin-6	198.33	03 Dec 00 0600	152.38	0.074
Junction-4	7864.0	03 Dec 00 0638	6272.1	3.245
Reach-6	7864.0	03 Dec 00 0638	6272.1	3.245
Subbasin-7	278.66	03 Dec 00 0600	214.99	0.104
Junction-5	8123.7	03 Dec 00 0633	6487.1	3.349

File: StorageNOD11.xls

PLAYA ELEVATION, STORAGE, OUTFLOW

ELEVATION AND STORAGE

Elev	Area S.F.	Elev. Change	Ave S.F.	Storage C.F.	Total Storage C.F.	AC.-FT.
3478	402,878			0	0	
		2	517,775	1,035,550		
3480	632,672				1,035,550	24
		2	811,325	1,622,649		
3482	989,977				2,658,199	61
		2	2,375,467	4,750,934		
3484	3,760,957				7,409,133	170
		2	6,247,780	12,495,559		
3486	8,734,602				19,904,692	457
		2	10,261,979	20,523,958		
3488	11,789,356				40,428,650	928
		2	13,334,447	26,668,893		
3,490	14,879,537				67,097,543	1,540

OUTFLOW

WEIR EQUATION

$$Q = C * L * H^{3/2}$$

WHERE:

Q= FLOW, CFS

C= WEIR COEFFICIENT

L= HORIZONTAL LENGTH, FT

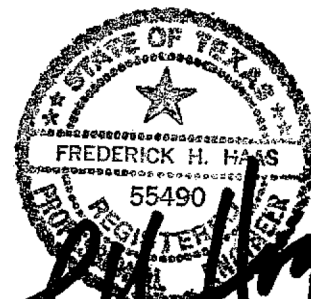
H= HEAD ON WEIR, FT

ASSUME TOP OF PLAYA IS ELEVATION 3486

LENGTH OF 3486 CONTOUR IS 241 FT.

ELEV FT	HEAD FT	Cw	Q CU FT/SEC
3,486.5	0.5	3.58	305
3,487.0	1.0	3.58	863
3,487.5	1.5	3.58	1,585
3,488.0	2.0	3.56	2,427
3,490.0	4.0	3.62	6,979

NOTE: Cw IS FROM WATER-RESOURCES ENGINEERING, LINSLEY AND FRANZINI



Handwritten signature and date: 3/31/06

Meteorologic Model Input

HMS - Meteorologic Model

File Edit Help

Meteorologic Model: PMP Distribution A Subbasin List

Description: PMP with Distribution per figure in HMR 51 ...

Precipitation Evapotranspiration

Method : User Hyetograph

Subbasin	"Gage" ID
Subbasin-1A	PMP Distribution A
Subbasin-2	PMP Distribution A
Subbasin-3	PMP Distribution A
Subbasin-4	PMP Distribution A
Subbasin-6	PMP Distribution A
Subbasin-1B	PMP Distribution A
Subbasin-7	PMP Distribution A
Subbasin-5B	PMP Distribution A
Subbasin-5A	PMP Distribution A

OK Apply Cancel

HMS * Basin Model * SCS Curve Number

Sort Help

Basin Model ID: 100YrAMIII3/24/06NOD

Subbasin Name	SCS Curve Number	Initial Abstraction (in)	Imperviousness (%)
Subbasin-1A	91		0.0
Subbasin-2	86		0.0
Subbasin-3	89		0.0
Subbasin-4	89		0.0
Subbasin-5B	86		0.0
Subbasin-6	86		0.0
Subbasin-1B	88		0.0
Subbasin-5A	86		0.0
Subbasin-7	87		0.0

OK Apply Cancel

HMS * Basin Model * SCS UH

Sort Help

Basin Model ID: 100YrAMIII3/24/06NOD

Time Units : Minutes

Subbasin Name	SCS Lag (min)
Subbasin-1A	86
Subbasin-2	65
Subbasin-3	44
Subbasin-4	39
Subbasin-5B	53
Subbasin-6	30
Subbasin-1B	44
Subbasin-5A	38
Subbasin-7	64

OK Apply Cancel

HMS * Basin Model * Lag Routing

Help

Basin Model ID : 100YrAMIII3/24/06NOD

Interval : Minutes

Reach Name	Lag (min)
Reach-1	35
Reach-2	15
Reach-3	17
Reach-4	21
Reach-5	14
Reach-1A	17
Reach-1B	3
Reach-6	0

OK Apply Cancel

HMS * Basin Model * Reservoir Editor

Edit File Help

Reservoir Name:

Description:

Storage Outlet Spillway Overflow Dam Break

Method:

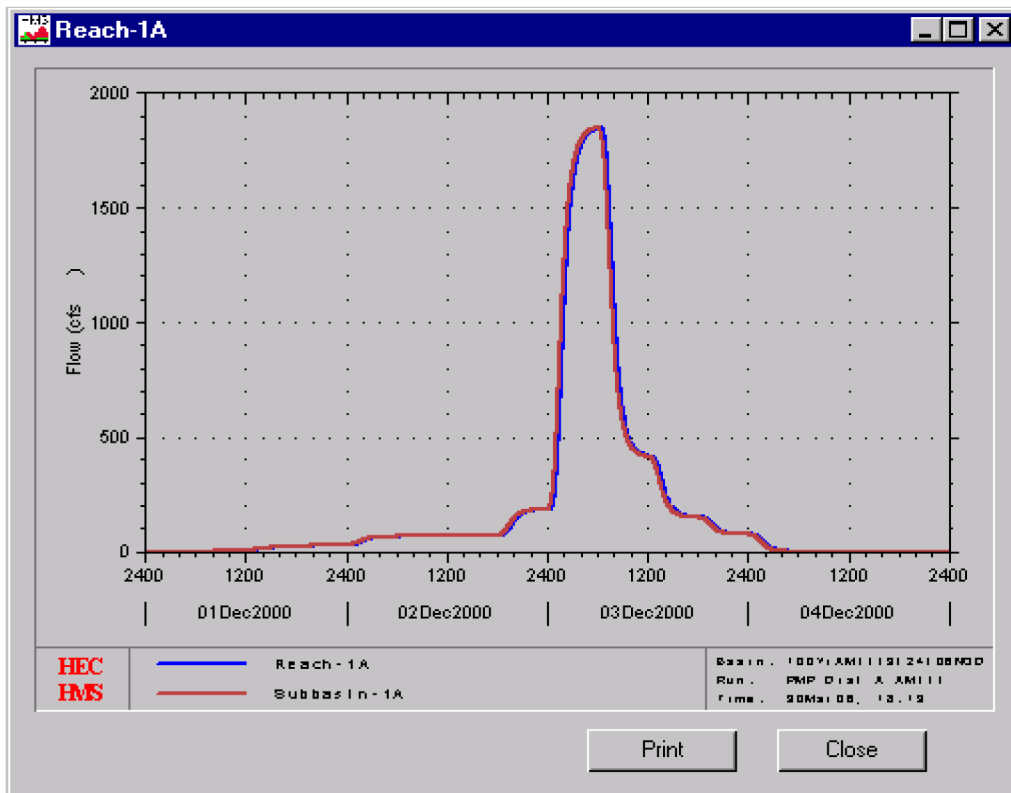
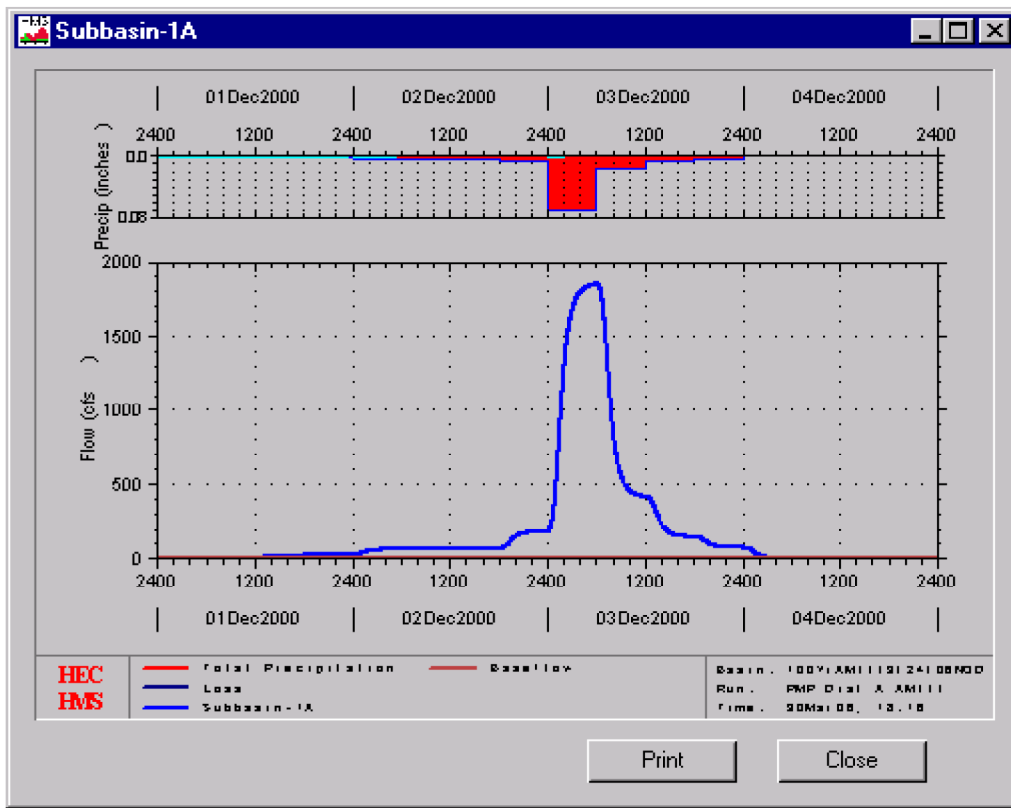
Initial

Elevation (ft)	Storage (acre-feet)	Outflow (cfs)
3478.0	0.0	0.0
3480.0	24.0	0.0
3482.0	61.0	0.0
3484.0	170.0	0.0
3486.0	457.0	0.0
3487.0	693.0	863.0
3488.0	928.0	2427.0
3490.0	1540.0	6979.0

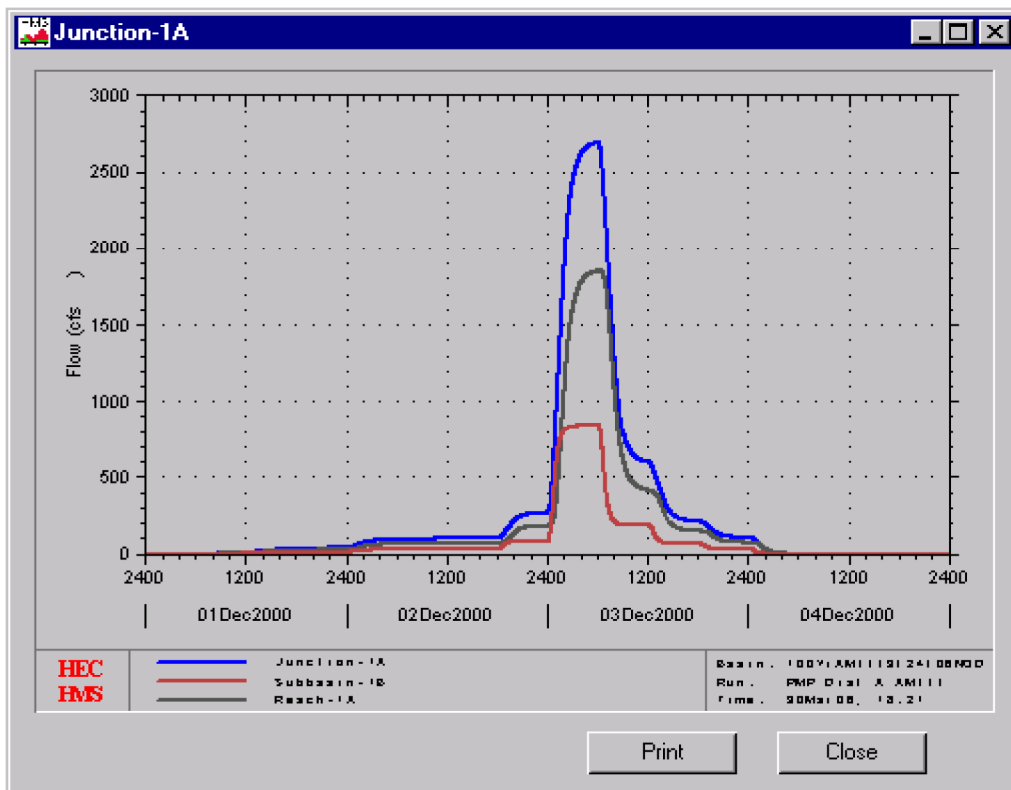
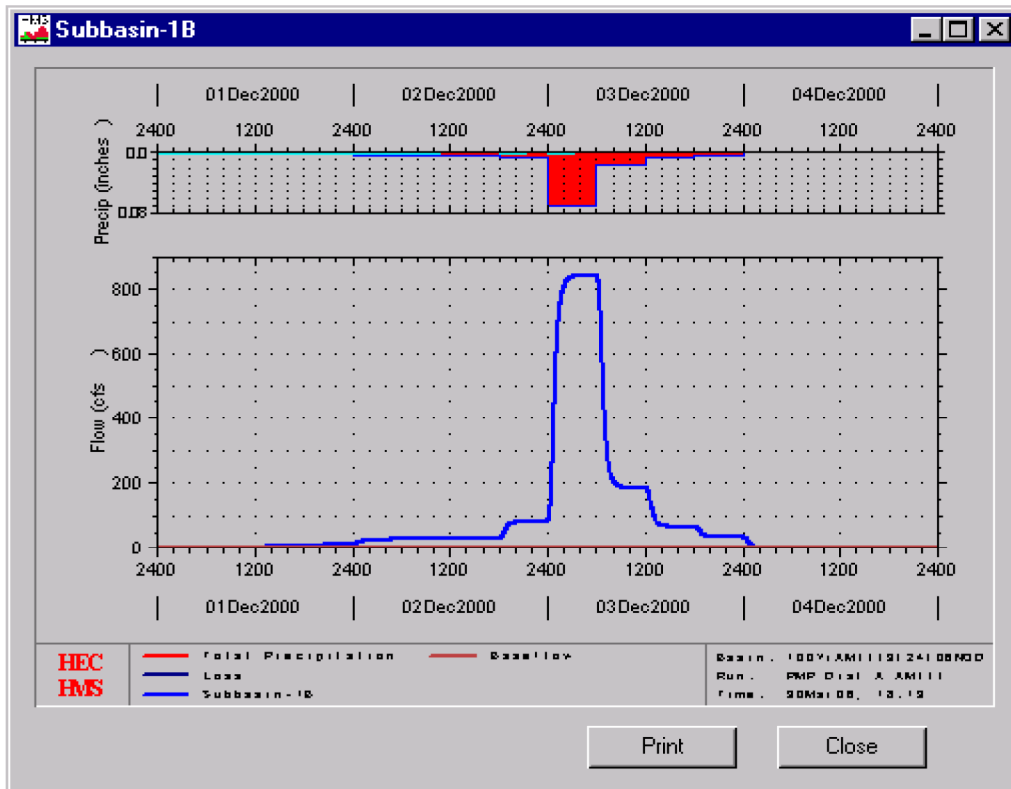
Graph

OK Apply Cancel

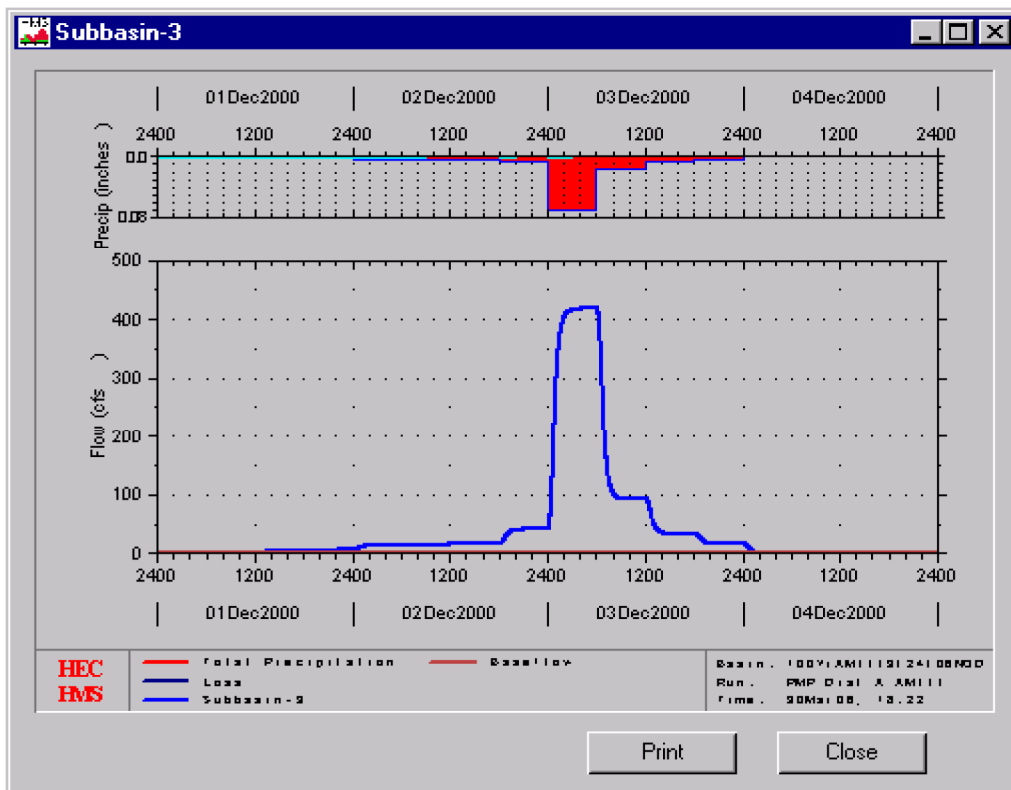
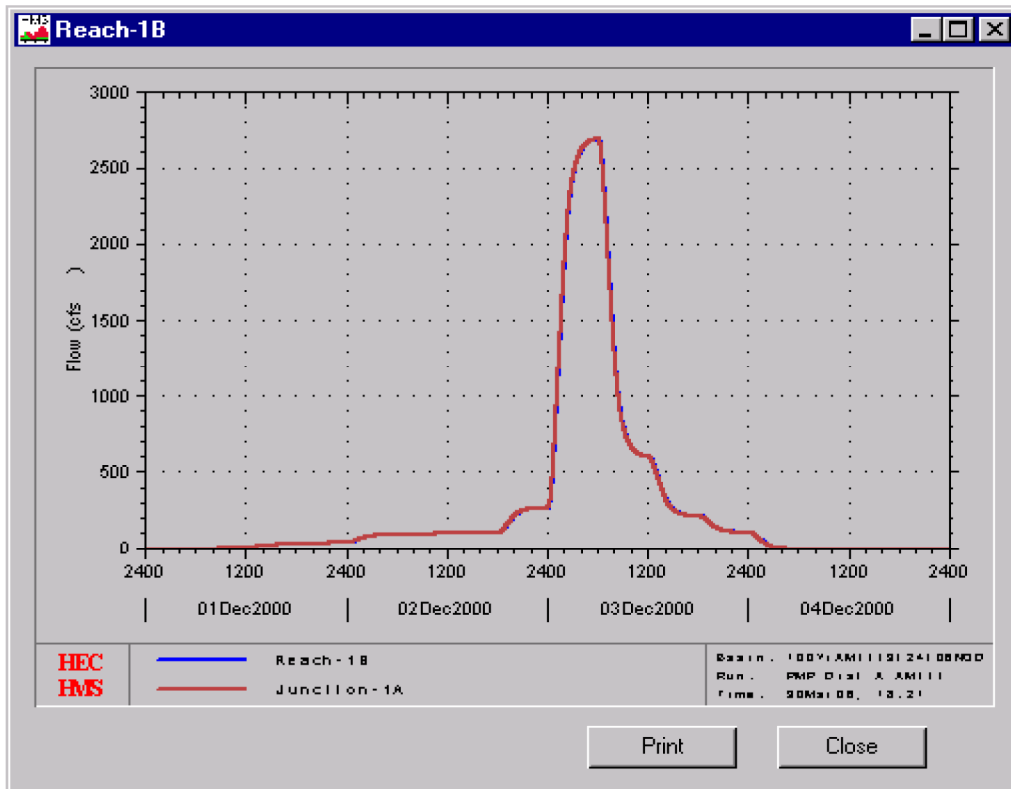
WCS FACILITY FLOOD PLAIN STUDY HYDROGRAPHS



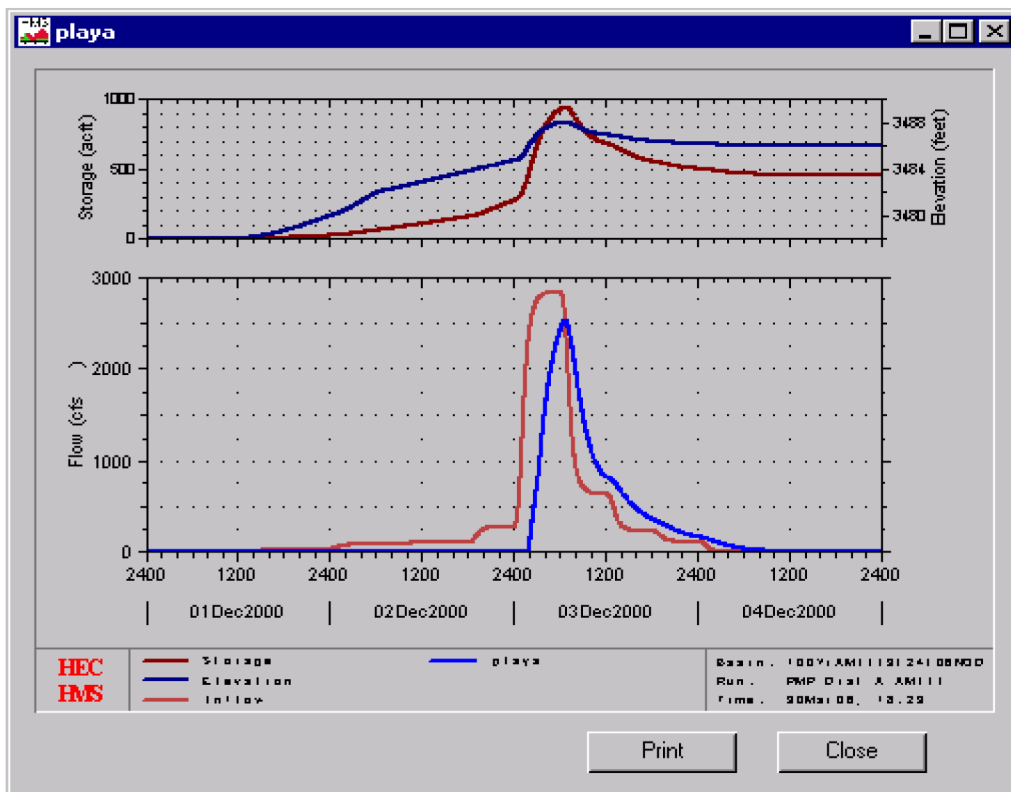
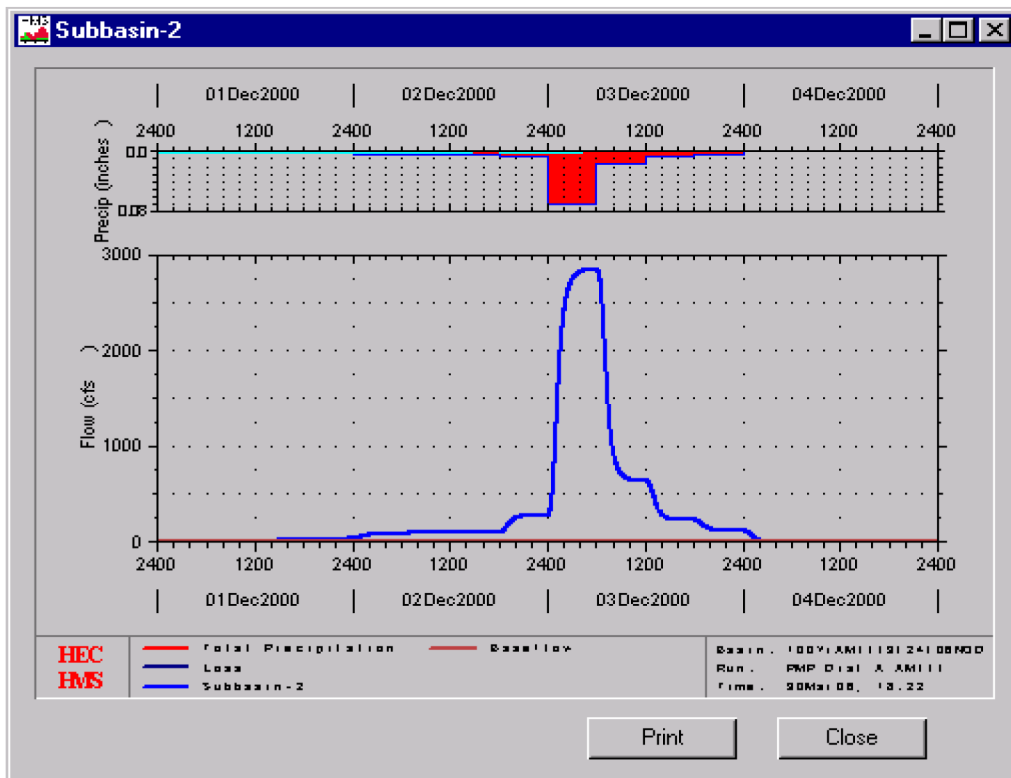
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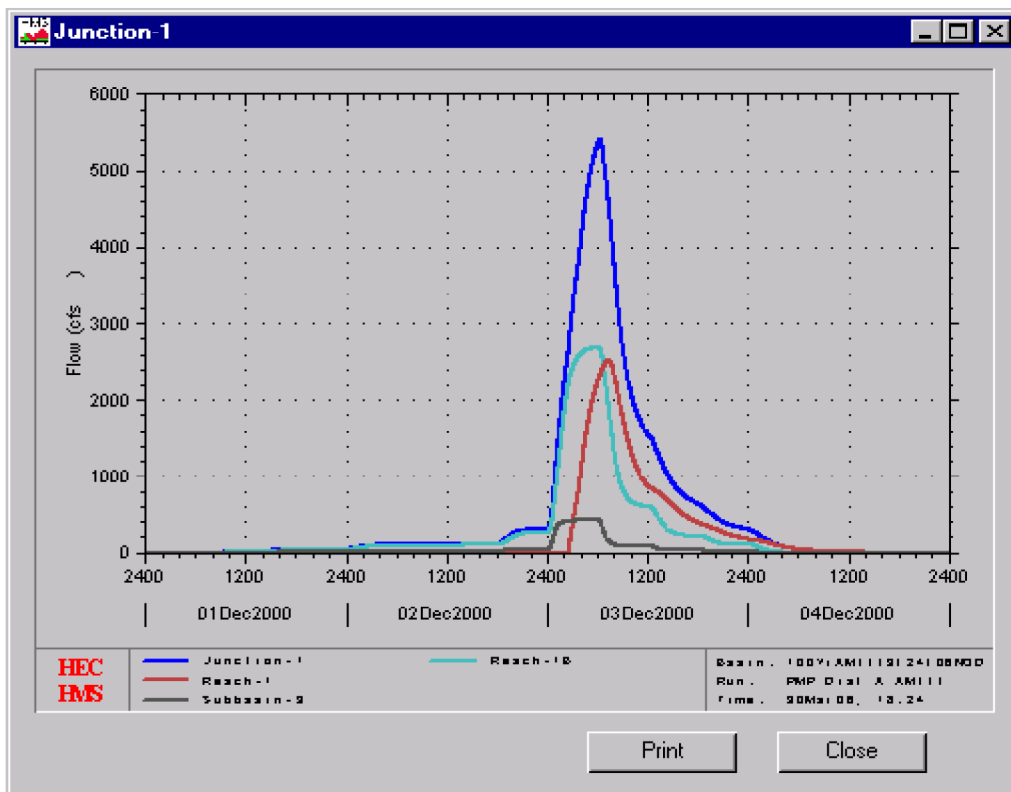
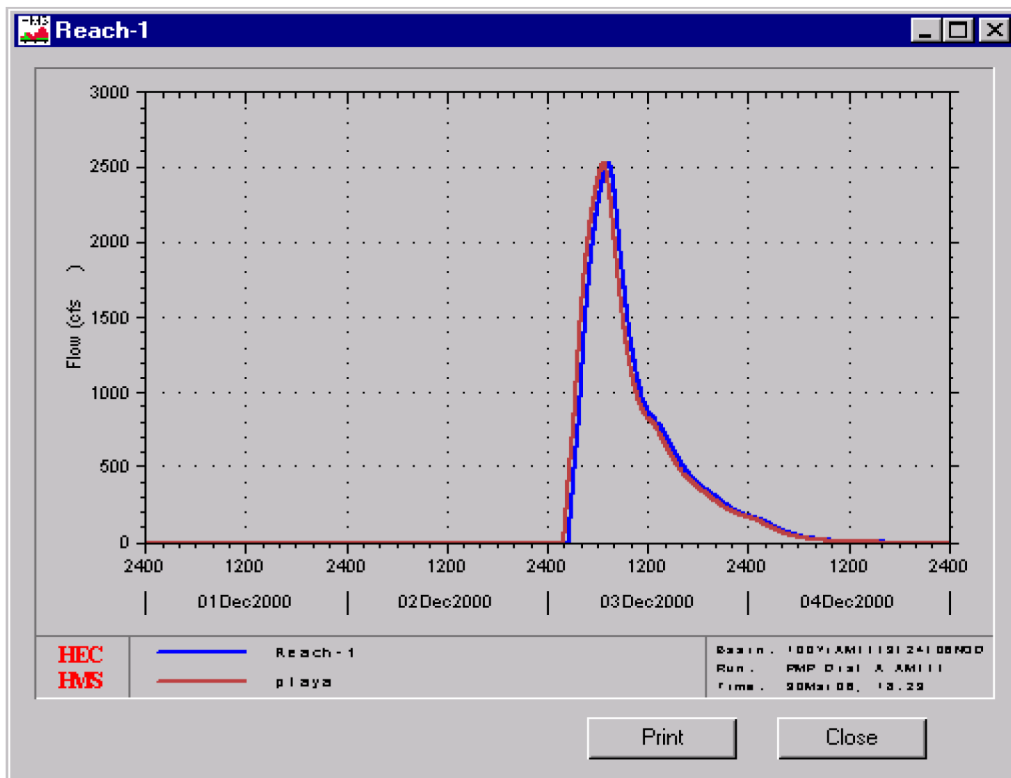
WCS FACILITY FLOOD PLAIN STUDY HYDROGRAPHS



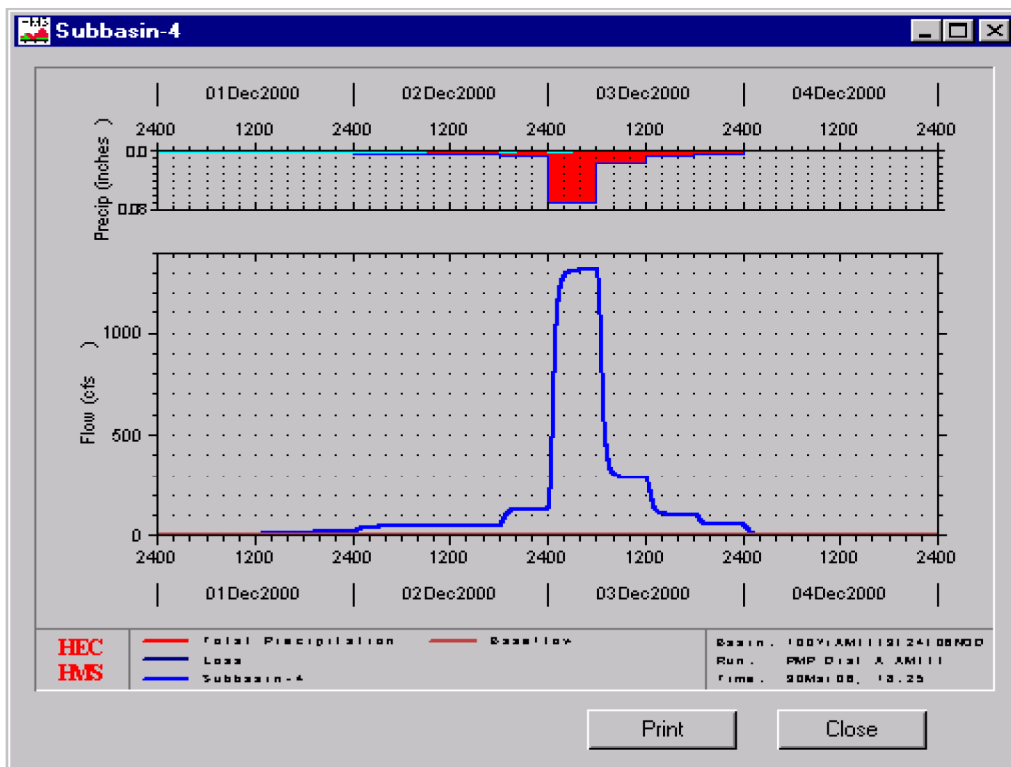
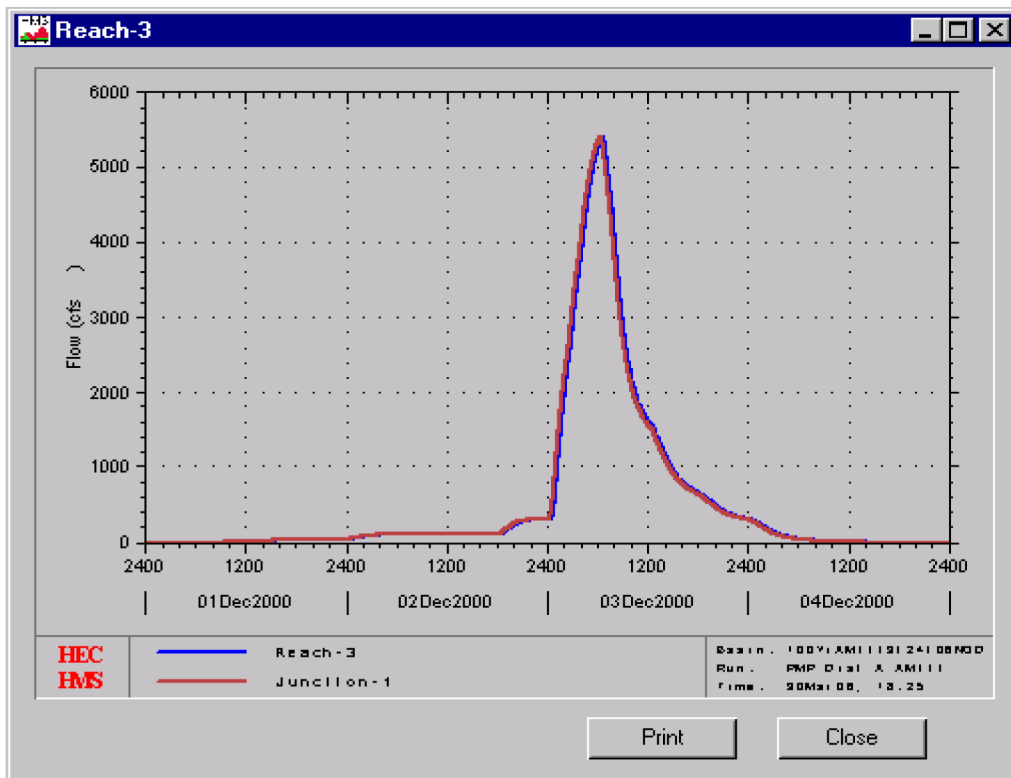
WCS FACILITY FLOOD PLAIN STUDY HYDROGRAPHS



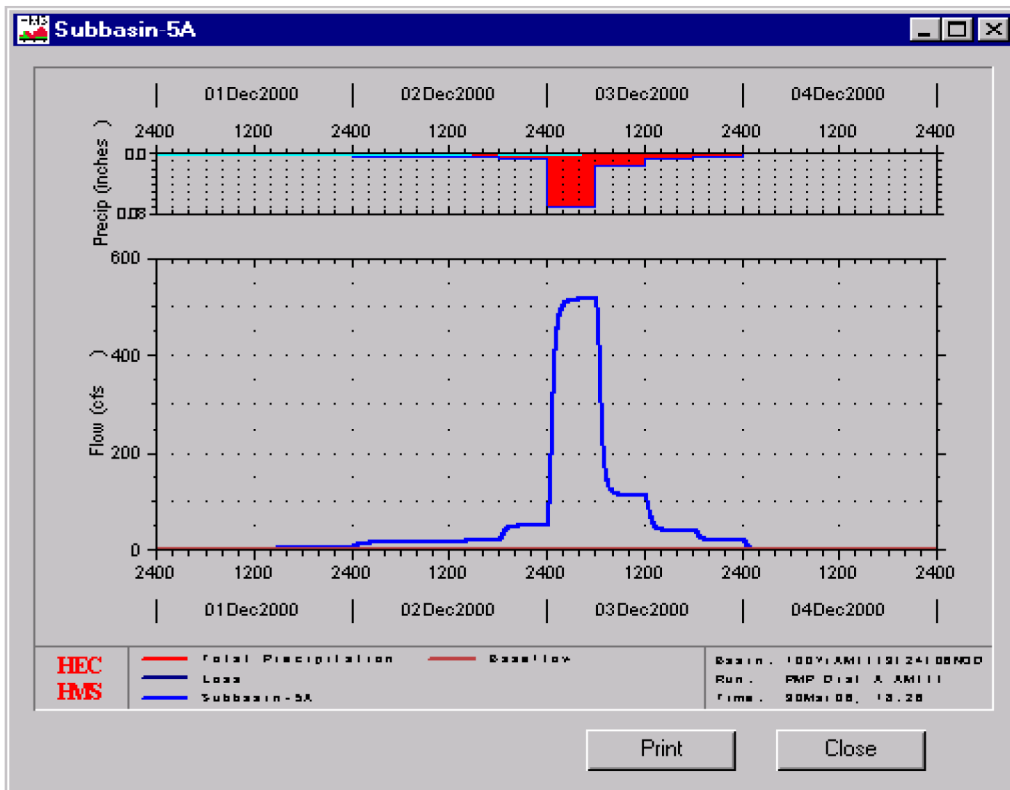
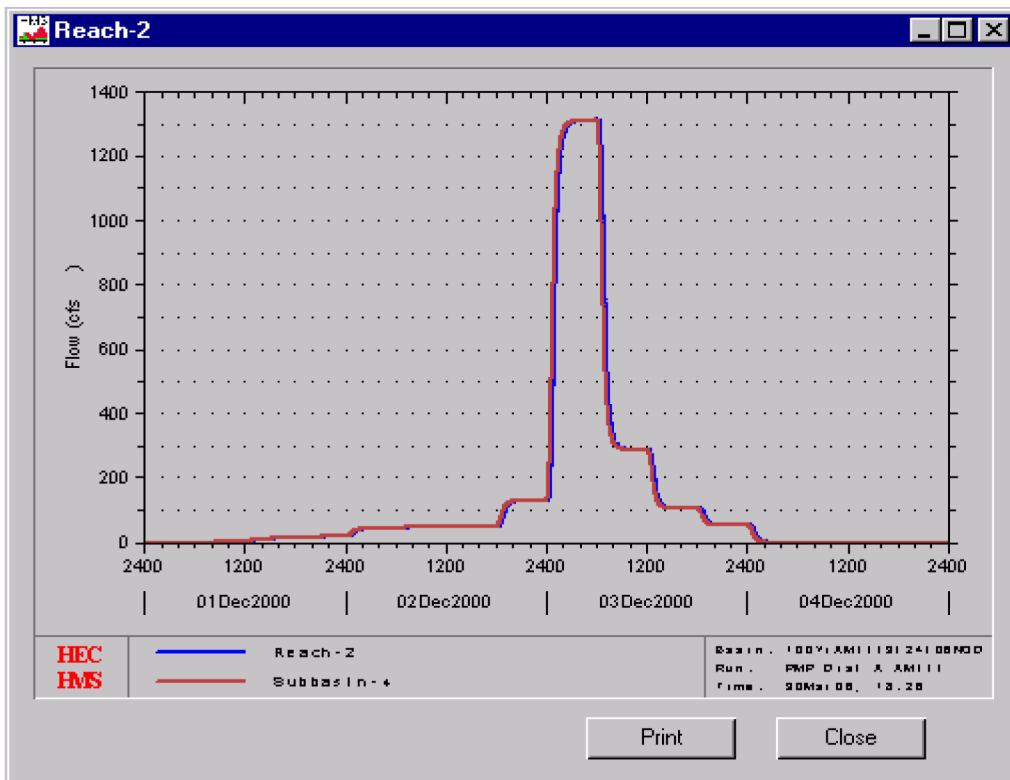
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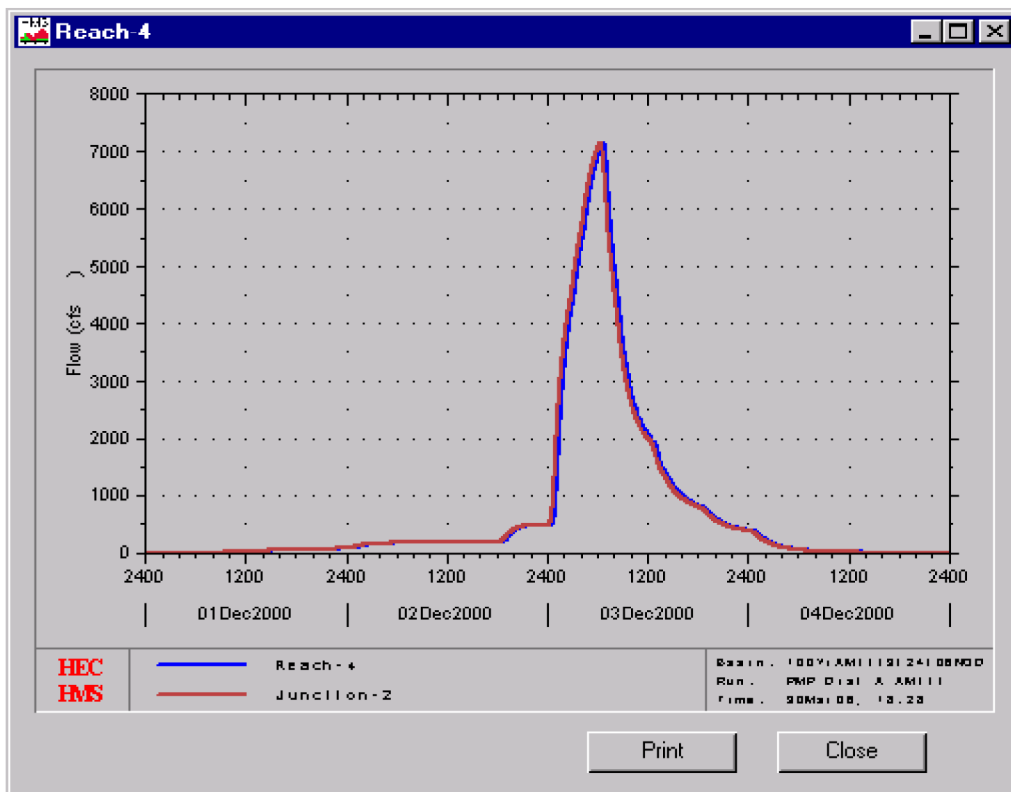
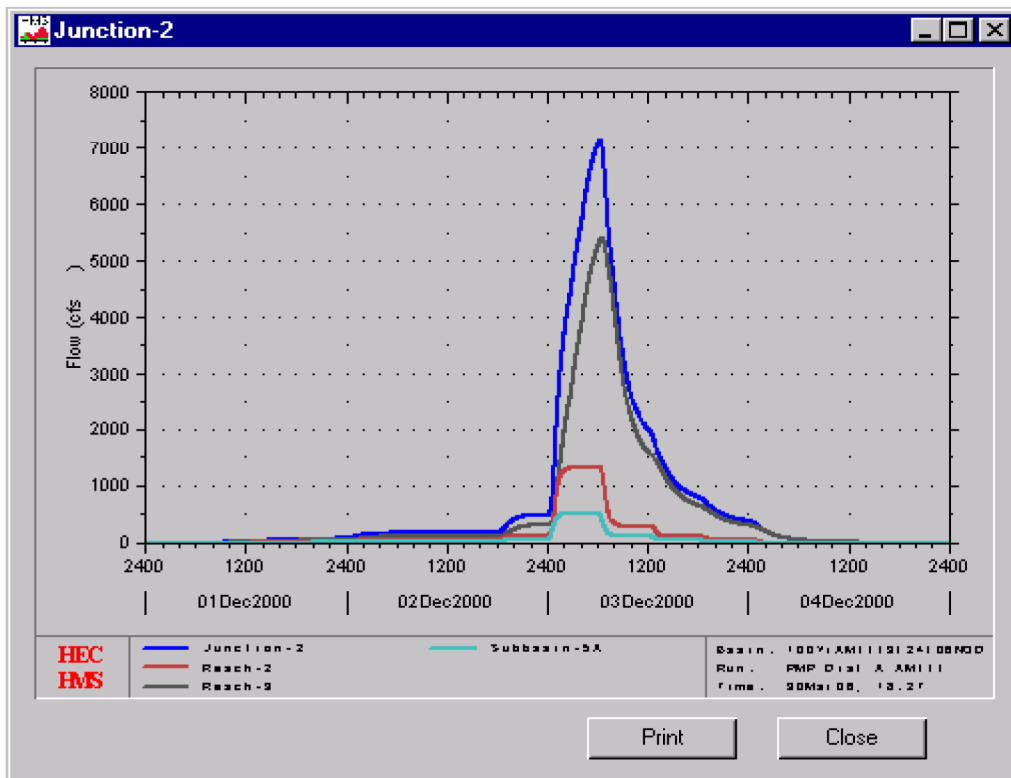
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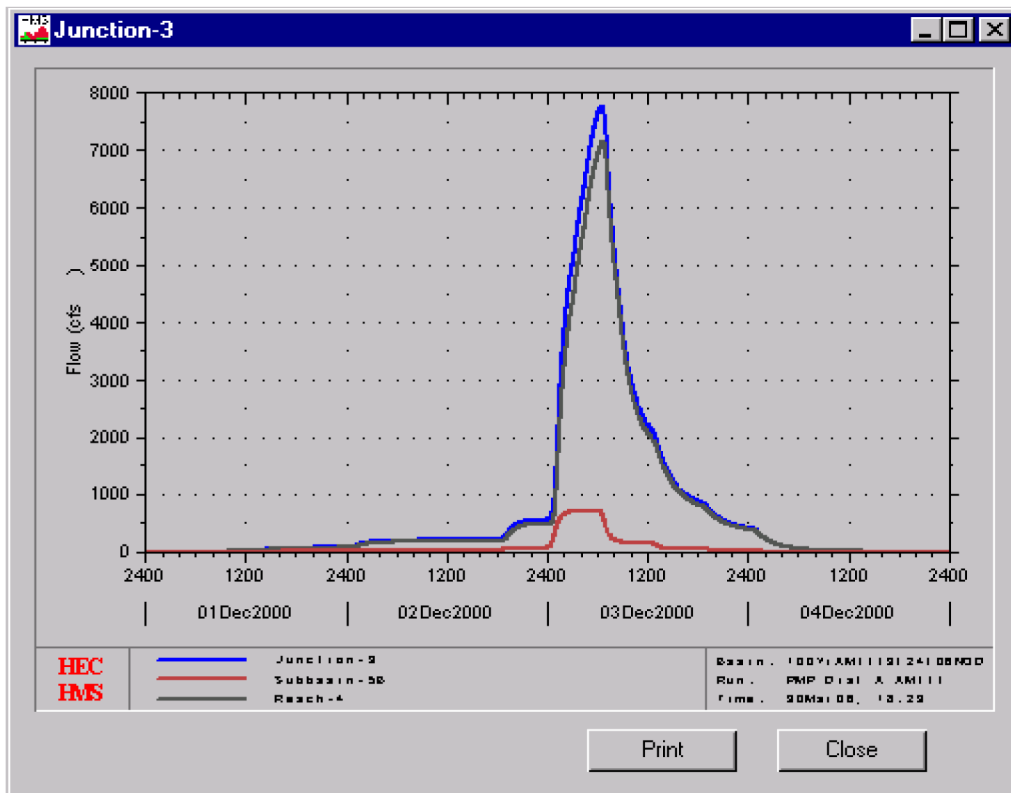
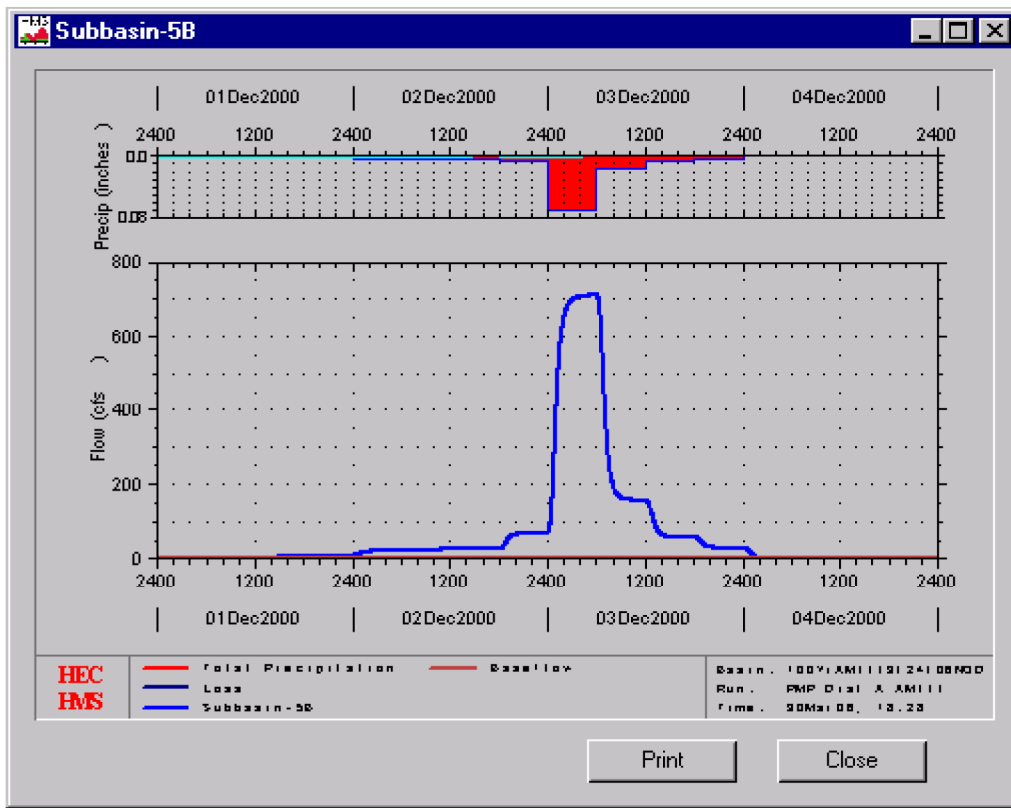
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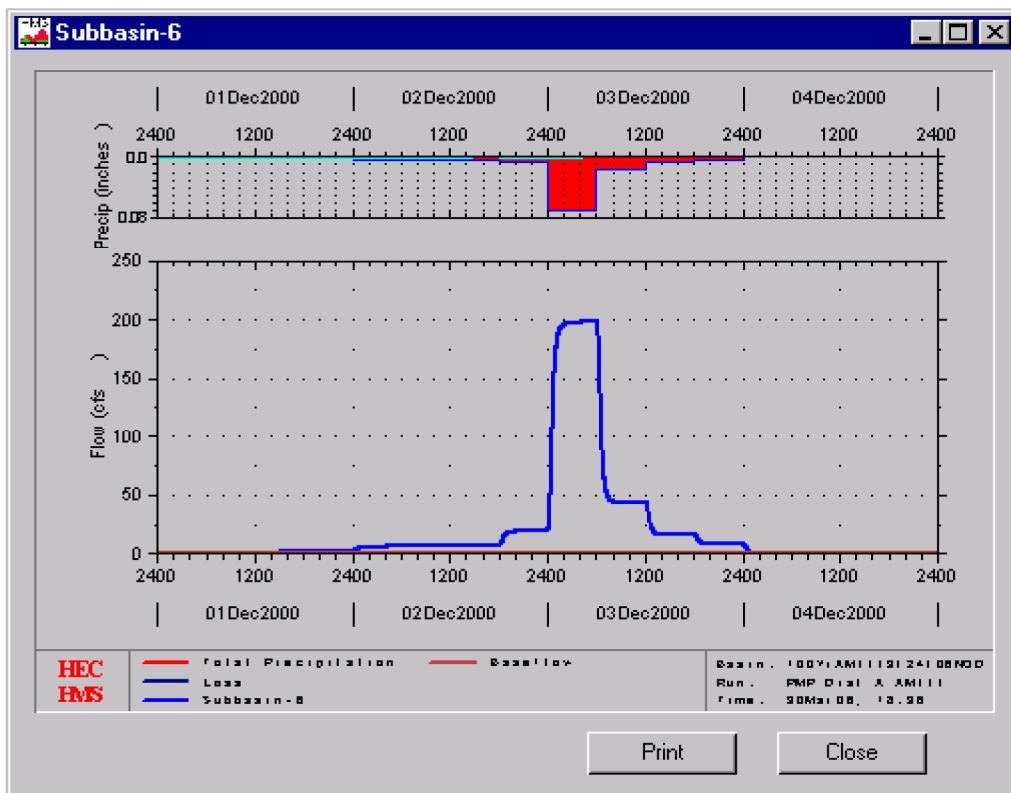
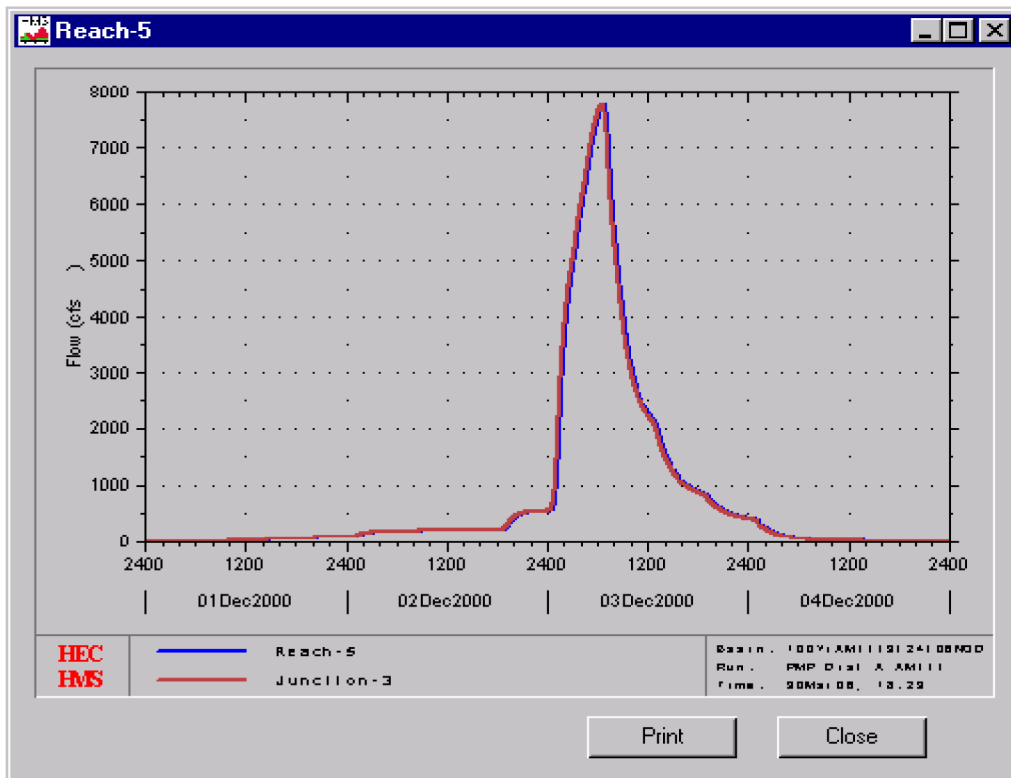
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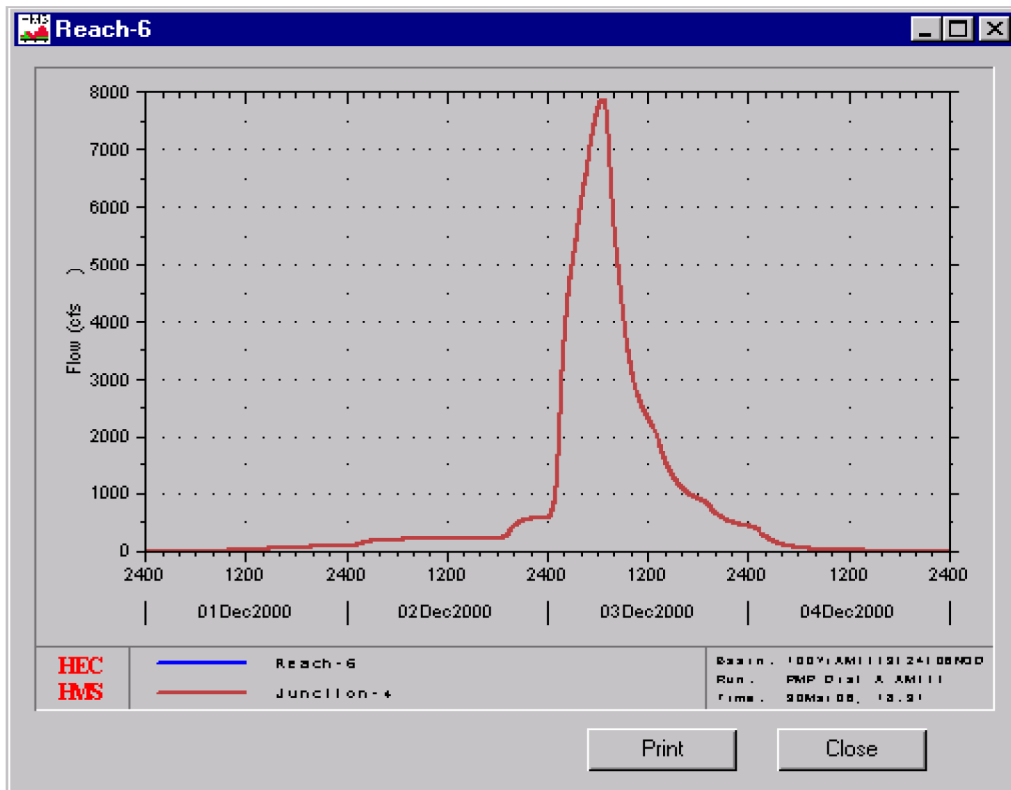
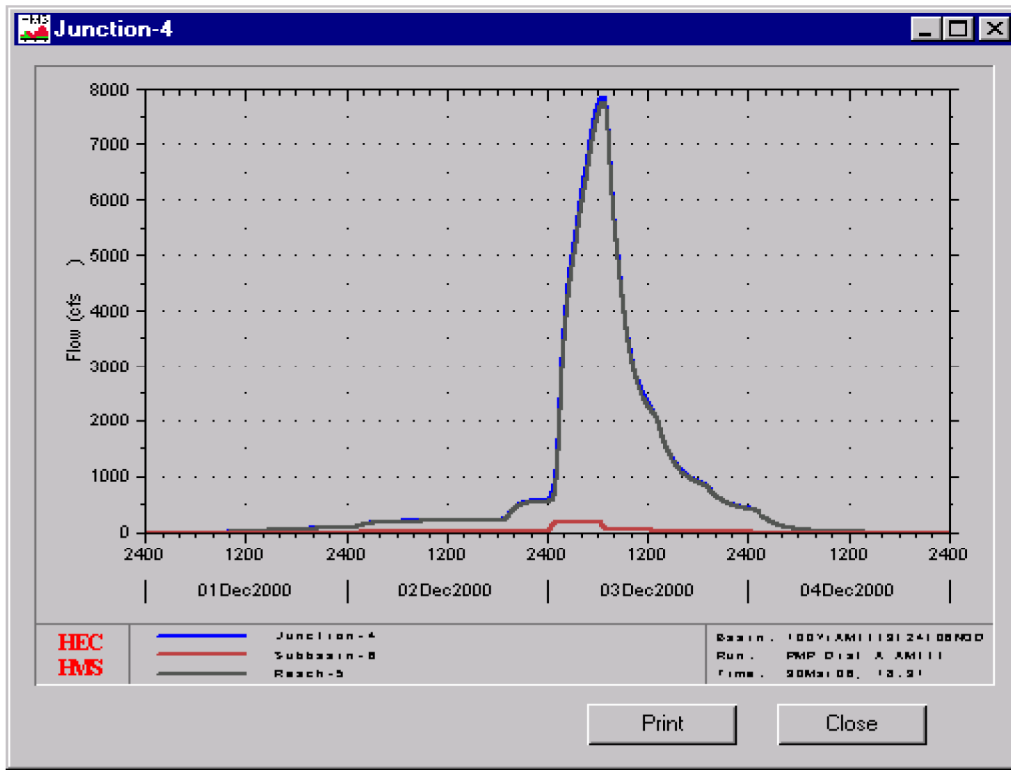
WCS FACILITY FLOOD PLAIN STUDY HYDROGRAPHS



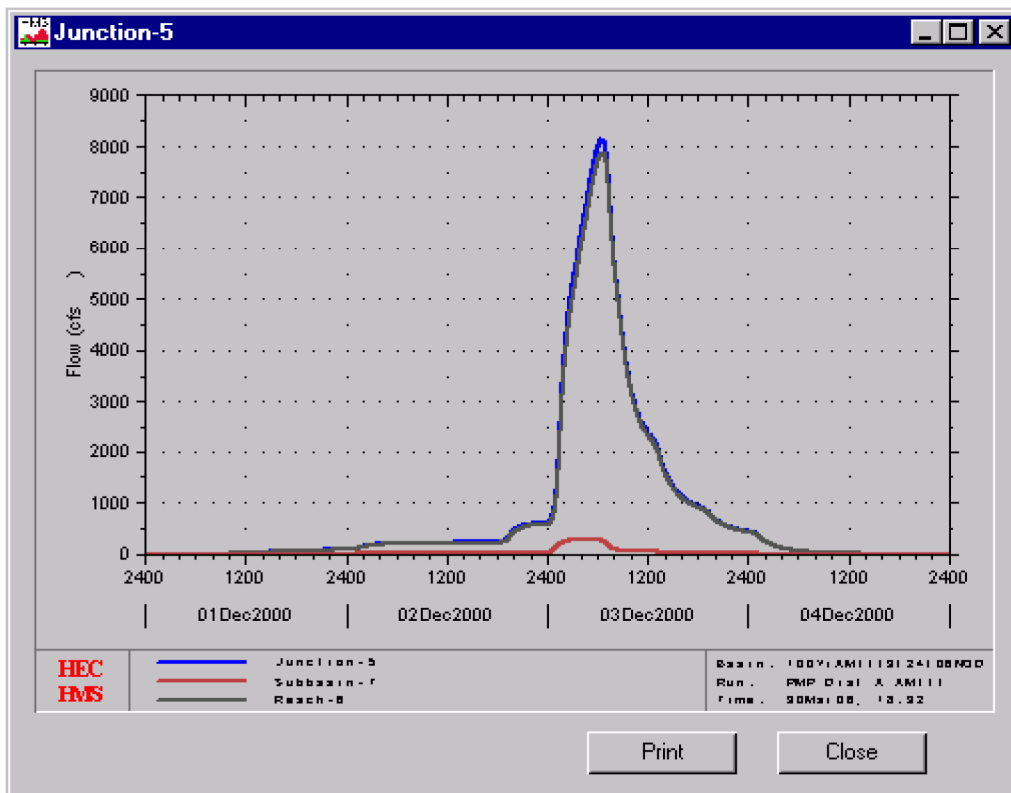
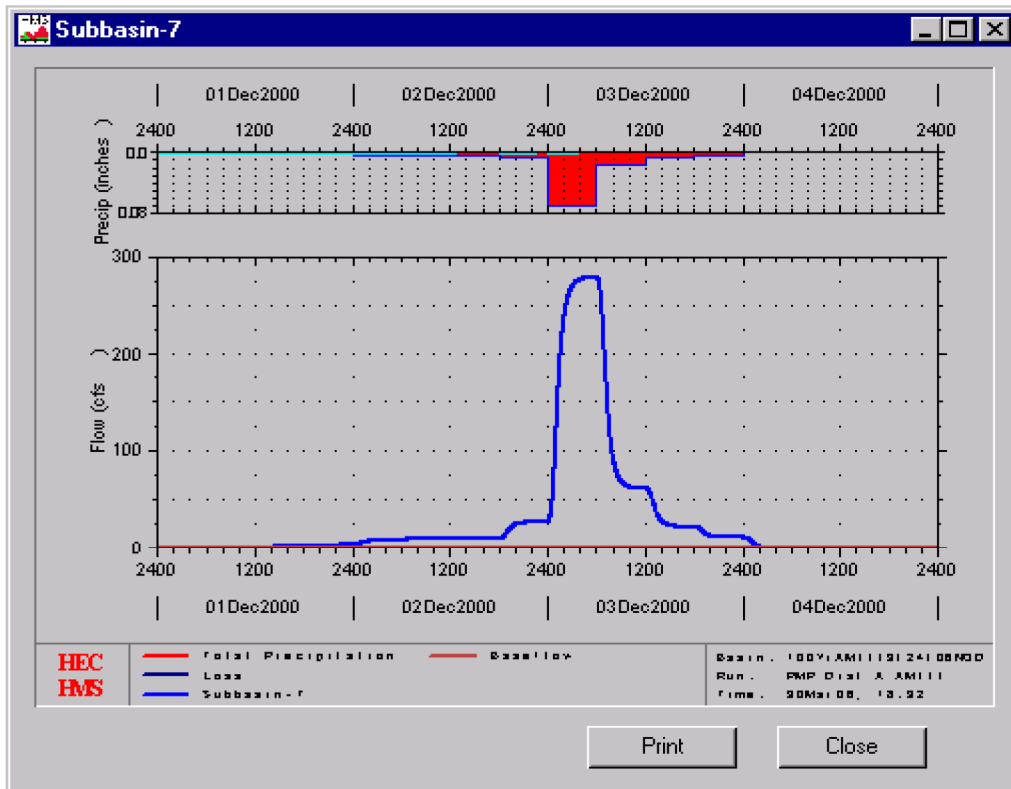
WCS FACILITY FLOOD PLAIN STUDY HYDROGRAPHS



WCS FACILITY FLOOD PLAIN STUDY HYDROGRAPHS



WCS FACILITY FLOOD PLAIN STUDY HYDROGRAPHS



APPENDIX U

HEC-RAS MODEL FOR THE CALCULATION OF THE 500-YEAR AND PMP WATER SURFACE PROFILES ANTECEDENT MOISTURE CONDITION III

HEC-RAS Plan: PMP AMIII River: Ditch A Reach: 5

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev. (ft)	Chl W.S. (ft)	Max Chl Dpth (ft)	E.G. Elev. (ft)	E.G. Slope (ft/m)	Vel Chnl (ft/s)	Sta W.S. Lft (ft)	Sta W.S. Rgt (ft)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
5	12674	976.00	3477.00	3478.76	3478.27	1.75	3478.88	0.003056	2.90	327.16	682.56	357.89	355.40	0.46
5	12674	1850.00	3477.00	3479.26	3478.68	2.26	3479.45	0.003167	3.69	291.95	714.24	553.45	422.29	0.49
5	11337	976.00	3469.00	3470.81	3470.81	1.81	3471.39	0.013220	6.21	417.53	566.66	164.80	149.13	0.95
5	11337	1850.00	3469.00	3471.47	3471.46	2.47	3472.26	0.010885	7.39	403.34	560.18	272.36	176.84	0.93
5	10937	976.00	3464.00	3466.24	3466.08	2.24	3466.66	0.010235	5.21	455.99	618.01	188.24	162.01	0.83
5	10937	1850.00	3464.00	3466.72	3466.72	2.72	3467.45	0.013153	6.91	438.39	635.61	273.71	197.22	0.98
5	10288	976.00	3456.00	3457.22	3457.22	1.22	3457.51	0.020477	4.31	374.31	788.29	226.46	413.97	1.03
5	10288	1850.00	3456.00	3457.57	3457.53	1.57	3457.93	0.015410	4.82	339.97	819.21	363.60	479.25	0.95
5	9690	1242.00	3450.00	3451.93	3451.51	1.93	3452.09	0.004989	3.13	389.43	793.60	396.40	404.17	0.56
5	9690	2689.00	3450.00	3452.40	3452.06	2.40	3452.72	0.006338	4.52	345.06	818.68	603.04	473.62	0.67
5	9009	1242.00	3445.00	3446.90	3446.75	1.90	3447.19	0.011195	4.31	416.94	751.61	288.10	334.67	0.82
5	9009	2689.00	3445.00	3447.65	3447.65	2.65	3447.96	0.007751	4.51	354.62	846.77	596.64	492.15	0.72
5	8130	1242.00	3440.00	3442.03	3441.49	2.03	3442.15	0.003422	2.73	417.16	854.27	455.81	437.11	0.47
5	8130	2689.00	3440.00	3442.50	3442.03	2.50	3442.75	0.004647	4.06	390.07	887.68	674.08	497.59	0.58
5	7717	1242.00	3437.80	3439.01	3439.01	1.21	3439.36	0.018011	4.88	307.16	657.99	254.54	350.81	1.01
5	7717	2689.00	3437.80	3439.74	3439.74	1.94	3440.11	0.009311	4.84	252.35	723.77	555.05	471.42	0.79
5	7253	1483.00	3435.00	3436.81	3436.16	1.81	3436.89	0.001806	2.29	382.26	946.12	664.66	563.87	0.35
5	7253	5989.00	3435.00	3437.84	3437.06	2.84	3438.13	0.003105	4.42	329.17	997.14	1299.73	667.97	0.51
5	6343	2888.00	3430.00	3431.11	3431.11	1.11	3431.57	0.016513	5.44	724.42	1307.78	531.26	583.36	1.00
5	6343	7144.00	3430.00	3431.94	3431.94	1.94	3432.64	0.012039	6.76	667.41	1534.53	1091.24	867.12	0.94
5	5383	2888.00	3425.00	3426.84	3426.14	1.84	3426.94	0.001969	2.54	660.98	1645.22	1198.09	984.24	0.37
5	5383	7144.00	3425.00	3427.72	3426.80	2.72	3427.91	0.002096	3.65	577.26	1820.07	2169.17	1242.61	0.42
5	4221	3286.00	3420.00	3421.49	3421.49	1.49	3421.94	0.015261	5.39	444.14	1172.66	624.24	728.53	0.97
5	4221	7766.00	3420.00	3422.20	3422.20	2.20	3422.82	0.013358	6.51	293.64	1337.10	1256.74	1043.48	0.97
5	3489	3286.00	3416.00	3417.66	3417.07	2.66	3417.76	0.002329	2.66	-122.29	903.15	1293.45	1025.44	0.40
5	3489	7766.00	3416.00	3418.44	3417.60	3.44	3418.65	0.002671	3.78	-136.55	950.96	2110.92	1087.51	0.46
5	2980	3286.00	3413.80	3414.95	3414.95	1.15	3415.36	0.016461	5.40	47.78	836.22	645.74	788.45	1.00
5	2980	7766.00	3413.80	3415.68	3415.59	1.88	3416.28	0.011352	6.62	-6.70	894.15	1259.21	900.85	0.92
5	2774	3286.00	3409.00	3414.41	3412.71	5.41	3414.50	0.000645	3.37	-418.02	658.08	1773.70	1076.10	0.26
5	2774	7766.00	3409.00	3415.12	3413.54	6.12	3415.31	0.001303	5.22	-438.85	687.85	2554.66	1126.70	0.38
5	2773	Culvert												
5	2734	3286.00	3408.90	3412.71	3412.71	3.81	3413.25	0.004812	7.06	83.74	515.65	665.51	431.91	0.67
5	2734	7766.00	3408.90	3414.37	3414.37	5.47	3414.83	0.003331	7.66	-1467.17	584.55	2185.05	2051.72	0.60
5	1888	3327.00	3408.00	3409.80	3409.14	1.80	3409.92	0.002775	2.72	131.77	1131.73	1225.09	999.96	0.43
5	1888	7864.00	3408.00	3410.59	3409.82	2.59	3410.80	0.002839	3.70	-259.09	1206.15	2224.23	1465.23	0.47
5	1060	3473.00	3402.70	3404.67	3404.67	1.97	3405.20	0.016121	5.85	589.80	1163.09	593.57	573.29	1.01
5	1060	8124.00	3402.70	3405.55	3405.55	2.85	3406.22	0.014413	6.58	460.16	1360.29	1235.07	920.12	1.00

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HEC-RAS Version 3.0.1 Mar 2001
 U.S. Army Corp of Engineers
 Hydrologic Engineering Center
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X      X  XXXXXX  XXXX      XXXX      XX      XXXX
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X      X  X      X      X      X  X      X  X      X
X      X  XXXXXX  XXXX      X      X      X  X      XXXXX
  
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PROJECT DATA

Project Title: WCS
 Project File : FloodPlain.prj
 Run Date and Time: 3/30/06 9:32:01 AM

Project in English units

PLAN DATA

Plan Title: Plan 38
 Plan File : D:\program files\WCS\FloodPlain.p38

Geometry Title: PMP1-20-04SecRemoved
 Geometry File : D:\program files\WCS\FloodPlain.g04

Flow Title : pmp NOD AMIII
 Flow File : D:\program files\WCS\FloodPlain.f30

Plan Summary Information:

Number of:	Cross Sections =	18	Multitple Openings =	0
	Culverts =	1	Inline Weirs =	0
	Bridges =	0		

Computational Information

Water surface calculation tolerance =	0.01
Critical depth calculaton tolerance =	0.01
Maximum number of iterations =	20
Maximum difference tolerance =	0.3
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: pmp NOD AMIII
 Flow File : D:\program files\WCS\FloodPlain.f30

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Flow Data (cfs)

River	Reach	RS	PF 2	PF 3
Ditch A	5	12674	976	1850
Ditch A	5	9690	1242	2689
Ditch A	5	7253	1483	5399
Ditch A	5	6343	2888	7144
Ditch A	5	4221	3286	7766
Ditch A	5	1888	3327	7864
Ditch A	5	1060	3473	8124

Boundary Conditions

River stream	Reach	Profile	Upstream	Down
Ditch A ritical	5	PF 2	Critical	Cr

GEOMETRY DATA

Geometry Title: PMPl-20-04SecRemoved
 Geometry File : D:\program files\WCS\FloodPlain.g04

CROSS SECTION RIVER: Ditch A
 REACH: 5 RS: 12674

INPUT

Description: Sta. 12674

Station Elevation Data		num=	6						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	3482	380	3478	560	3477	635	3478	761	3480
964	3482								

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
100	.033	380	.033	635	.033

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	380	635		1206 1337	1433	.1	.3

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	3478.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3478.76	Reach Len. (ft)	1206.00	1337.00	1433.00
Crit W.S. (ft)	3478.27	Flow Area (sq ft)	19.94	320.00	17.95
E.G. Slope (ft/ft)	0.003056	Area (sq ft)	19.94	320.00	17.95
Q Total (cfs)	976.00	Flow (cfs)	25.93	926.74	23.34
Top Width (ft)	355.40	Top Width (ft)	52.84	255.00	47.56

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Vel Total (ft/s)	2.73	Avg. Vel. (ft/s)	1.30	2.90	1.30
Max Chl Dpth (ft)	1.75	Hydr. Depth (ft)	0.38	1.25	0.38
Conv. Total (cfs)	17654.0	Conv. (cfs)	469.0	16762.9	422.1
Length Wtd. (ft)	1336.00	Wetted Per. (ft)	52.85	255.01	47.56
Min Ch El (ft)	3477.00	Shear (lb/sq ft)	0.07	0.24	0.07
Alpha	1.08	Stream Power (lb/ft s)	0.09	0.69	0.09
Frctn Loss (ft)	7.45	Cum Volume (acre-ft)	22.71	137.88	4.08
C & E Loss (ft)	0.05	Cum SA (acres)	24.33	121.69	6.69

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.

CROSS SECTION OUTPUT Profile #PF 3

E.G. Elev (ft)	3479.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3479.26	Reach Len. (ft)	1206.00	1337.00	1433.00
Crit W.S. (ft)	3478.68	Flow Area (sq ft)	55.37	448.24	49.84
E.G. Slope (ft/ft)	0.003167	Area (sq ft)	55.37	448.24	49.84
Q Total (cfs)	1850.00	Flow (cfs)	102.99	1654.32	92.69
Top Width (ft)	422.29	Top Width (ft)	88.05	255.00	79.24
Vel Total (ft/s)	3.34	Avg. Vel. (ft/s)	1.86	3.69	1.86
Max Chl Dpth (ft)	2.26	Hydr. Depth (ft)	0.63	1.76	0.63
Conv. Total (cfs)	32873.9	Conv. (cfs)	1830.1	29396.7	1647.1
Length Wtd. (ft)	1334.81	Wetted Per. (ft)	88.06	255.01	79.25
Min Ch El (ft)	3477.00	Shear (lb/sq ft)	0.12	0.35	0.12
Alpha	1.12	Stream Power (lb/ft s)	0.23	1.28	0.23
Frctn Loss (ft)	7.14	Cum Volume (acre-ft)	54.74	234.96	14.97
C & E Loss (ft)	0.06	Cum SA (acres)	51.06	137.20	20.21

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 RIVER: Ditch A
REACH: 5 RS: 11337

INPUT

Description: Sta. 11337

Station Elevation Data		num= 8	
Sta	Elev	Sta	Elev
100	3477	315	3474
550	3470	591	3472

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
100	.033	435	.033
		550	.033

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	435	550		545	400	332	.1 .3

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	3471.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3470.81	Reach Len. (ft)	545.00	400.00	332.00
Crit W.S. (ft)	3470.81	Flow Area (sq ft)	7.10	150.94	6.77
E.G. Slope (ft/ft)	0.013220	Area (sq ft)	7.10	150.94	6.77
Q Total (cfs)	976.00	Flow (cfs)	20.14	936.66	19.20
Top Width (ft)	149.13	Top Width (ft)	17.47	115.00	16.66
Vel Total (ft/s)	5.92	Avg. Vel. (ft/s)	2.84	6.21	2.84
Max Chl Dpth (ft)	1.81	Hydr. Depth (ft)	0.41	1.31	0.41
Conv. Total (cfs)	8488.6	Conv. (cfs)	175.2	8146.4	167.0
Length Wtd. (ft)	400.78	Wetted Per. (ft)	17.49	115.02	16.68
Min Ch El (ft)	3469.00	Shear (lb/sq ft)	0.33	1.08	0.33
Alpha	1.06	Stream Power (lb/ft s)	0.95	6.72	0.95
Frctn Loss (ft)	4.64	Cum Volume (acre-ft)	22.34	130.65	3.67
C & E Loss (ft)	0.05	Cum SA (acres)	23.35	116.01	5.64

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

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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 OUTPUT Profile #PF 3

E.G. Elev (ft)	3472.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.79	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3471.47	Reach Len. (ft)	545.00	400.00	332.00
Crit W.S. (ft)	3471.46	Flow Area (sq ft)	23.31	226.83	22.22
E.G. Slope (ft/ft)	0.010885	Area (sq ft)	23.31	226.83	22.22
Q Total (cfs)	1850.00	Flow (cfs)	89.20	1675.75	85.05
Top Width (ft)	176.84	Top Width (ft)	31.66	115.00	30.18
Vel Total (ft/s)	6.79	Avg. Vel. (ft/s)	3.83	7.39	3.83
Max Chl Dpth (ft)	2.47	Hydr. Depth (ft)	0.74	1.97	0.74
Conv. Total (cfs)	17732.1	Conv. (cfs)	855.0	16061.9	815.2
Length Wtd. (ft)	401.47	Wetted Per. (ft)	31.69	115.02	30.22
Min Ch El (ft)	3469.00	Shear (lb/sq ft)	0.50	1.34	0.50
Alpha	1.10	Stream Power (lb/ft s)	1.91	9.90	1.91
Frctn Loss (ft)	4.79	Cum Volume (acre-ft)	53.65	224.60	13.78
C & E Loss (ft)	0.02	Cum SA (acres)	49.40	131.52	18.41

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: Ditch A
REACH: 5 RS: 10937

INPUT

Description: Sta. 10937

Station Elevation Data		num= 9							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	3470	351	3468	428	3467	465	3466	536	3464
543	3464	609	3466	683	3468	811	3472		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
100	.033	428	.033	609	.033

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Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
428	609	729	649	445	.1	.3

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	3466.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.033	0.033
W.S. Elev (ft)	3466.24	Reach Len. (ft)	729.00	649.00	445.00
Crit W.S. (ft)	3466.08	Flow Area (sq ft)		187.15	1.10
E.G. Slope (ft/ft)	0.010235	Area (sq ft)		187.15	1.10
Q Total (cfs)	976.00	Flow (cfs)		974.77	1.23
Top Width (ft)	162.01	Top Width (ft)		153.01	9.01
Vel Total (ft/s)	5.18	Avg. Vel. (ft/s)		5.21	1.12
Max Chl Dpth (ft)	2.24	Hydr. Depth (ft)		1.22	0.12
Conv. Total (cfs)	9647.4	Conv. (cfs)		9635.2	12.1
Length Wtd. (ft)	648.87	Wetted Per. (ft)		153.07	9.01
Min Ch El (ft)	3464.00	Shear (lb/sq ft)		0.78	0.08
Alpha	1.01	Stream Power (lb/ft s)		4.07	0.09
Frctn Loss (ft)	9.12	Cum Volume (acre-ft)	22.29	129.10	3.64
C & E Loss (ft)	0.04	Cum SA (acres)	23.25	114.78	5.54

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 OUTPUT Profile #PF 3

E.G. Elev (ft)	3467.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.		0.033	0.033
W.S. Elev (ft)	3466.72	Reach Len. (ft)	729.00	649.00	445.00
Crit W.S. (ft)	3466.72	Flow Area (sq ft)		264.14	9.57
E.G. Slope (ft/ft)	0.013153	Area (sq ft)		264.14	9.57
Q Total (cfs)	1850.00	Flow (cfs)		1825.01	24.99
Top Width (ft)	197.22	Top Width (ft)		170.61	26.61
Vel Total (ft/s)	6.76	Avg. Vel. (ft/s)		6.91	2.61

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Max Chl Dpth (ft)	2.72	Hydr. Depth (ft)	1.55	0.36
Conv. Total (cfs)	16130.8	Conv. (cfs)	15913.0	217.9
Length Wtd. (ft)	647.62	Wetted Per. (ft)	170.68	26.62
Min Ch El (ft)	3464.00	Shear (lb/sq ft)	1.27	0.30
Alpha	1.03	Stream Power (lb/ft s)	8.78	0.77
Frctn Loss (ft)	9.21	Cum Volume (acre-ft)	53.50	222.35
C & E Loss (ft)	0.11	Cum SA (acres)	49.20	130.21
			18.19	

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: Ditch A
 REACH: 5 RS: 10288

INPUT

Description: Sta. 10288

Station Elevation Data		num= 12							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	3464	177	3462	238	3460	298	3458	493	3456
519	3456	662	3457	778	3457.1	857	3458	903	3460
947	3462	989	3464						

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
100	.033	298	.033	857	.033

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	298	857		552 598	633	.1	.3

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	3457.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.033	
W.S. Elev (ft)	3457.22	Reach Len. (ft)	552.00	598.00	633.00
Crit W.S. (ft)	3457.22	Flow Area (sq ft)		226.46	
E.G. Slope (ft/ft)	0.020477	Area (sq ft)		226.46	
Q Total (cfs)	976.00	Flow (cfs)		976.00	

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Top Width (ft)	413.97	Top Width (ft)		413.97	
Vel Total (ft/s)	4.31	Avg. Vel. (ft/s)		4.31	
Max Chl Dpth (ft)	1.22	Hydr. Depth (ft)		0.55	
Conv. Total (cfs)	6820.4	Conv. (cfs)		6820.4	
Length Wtd. (ft)	598.00	Wetted Per. (ft)		413.98	
Min Ch El (ft)	3456.00	Shear (lb/sq ft)		0.70	
Alpha	1.00	Stream Power (lb/ft s)		3.01	
Frctn Loss (ft)	4.93	Cum Volume (acre-ft)	22.29	126.01	3.64
C & E Loss (ft)	0.04	Cum SA (acres)	23.25	110.56	5.49

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 OUTPUT Profile #PF 3

E.G. Elev (ft)	3457.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.033	
W.S. Elev (ft)	3457.57	Reach Len. (ft)	552.00	598.00	633.00
Crit W.S. (ft)	3457.53	Flow Area (sq ft)		383.80	
E.G. Slope (ft/ft)	0.015410	Area (sq ft)		383.80	
Q Total (cfs)	1850.00	Flow (cfs)		1850.00	
Top Width (ft)	479.25	Top Width (ft)		479.25	
Vel Total (ft/s)	4.82	Avg. Vel. (ft/s)		4.82	
Max Chl Dpth (ft)	1.57	Hydr. Depth (ft)		0.80	
Conv. Total (cfs)	14902.9	Conv. (cfs)		14902.9	
Length Wtd. (ft)	597.95	Wetted Per. (ft)		479.26	
Min Ch El (ft)	3456.00	Shear (lb/sq ft)		0.77	

Alpha	1.00	FloodPlain.rep Stream Power (lb/ft s)	3.71
Frctn Loss (ft)	5.20	Cum Volume (acre-ft)	53.50 217.52 13.61
C & E Loss (ft)	0.01	Cum SA (acres)	49.20 125.36 18.06

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: Ditch A
REACH: 5 RS: 9690

INPUT

Description: Sta. 9690

Station Elevation Data		num= 8	
Sta	Elev	Sta	Elev
100	3454.5	202	3454
799	3452	897	3454
		1010	3458

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
100	.033	381	.033
		799	.033

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	381	799		639 681	658	.1	.3

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	3452.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.033	
W.S. Elev (ft)	3451.93	Reach Len. (ft)	639.00	681.00	658.00
Crit W.S. (ft)	3451.51	Flow Area (sq ft)		396.40	
E.G. Slope (ft/ft)	0.004969	Area (sq ft)		396.40	
Q Total (cfs)	1242.00	Flow (cfs)		1242.00	
Top Width (ft)	404.17	Top Width (ft)		404.17	
Vel Total (ft/s)	3.13	Avg. Vel. (ft/s)		3.13	
Max Chl Dpth (ft)	1.93	Hydr. Depth (ft)		0.98	
Conv. Total (cfs)	17619.0	Conv. (cfs)		17619.0	
Length Wtd. (ft)	681.00	Wetted Per. (ft)		404.19	
Min Ch El (ft)	3450.00	Shear (lb/sq ft)		0.30	
Alpha	1.00	Stream Power (lb/ft s)		0.95	
Frctn Loss (ft)	4.88	Cum Volume (acre-ft)	22.29	121.74	3.64
C & E Loss (ft)	0.01	Cum SA (acres)	23.25	104.94	5.49

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 OUTPUT Profile #PF 3

E.G. Elev (ft)	3452.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3452.40	Reach Len. (ft)	639.00	681.00	658.00
Crit W.S. (ft)	3452.06	Flow Area (sq ft)	7.22	591.87	3.95
E.G. Slope (ft/ft)	0.006338	Area (sq ft)	7.22	591.87	3.95
Q Total (cfs)	2689.00	Flow (cfs)	8.87	2675.27	4.86
Top Width (ft)	473.62	Top Width (ft)	35.94	418.00	19.68
Vel Total (ft/s)	4.46	Avg. Vel. (ft/s)	1.23	4.52	1.23
Max Chl Dpth (ft)	2.40	Hydr. Depth (ft)	0.20	1.42	0.20
Conv. Total (cfs)	33777.0	Conv. (cfs)	111.4	33604.5	61.0
Length Wtd. (ft)	680.91	Wetted Per. (ft)	35.95	418.02	19.68
Min Ch El (ft)	3450.00	Shear (lb/sq ft)	0.08	0.56	0.08
Alpha	1.02	Stream Power (lb/ft s)	0.10	2.53	0.10
Frctn Loss (ft)	4.76	Cum Volume (acre-ft)	53.46	210.83	13.59
C & E Loss (ft)	0.00	Cum SA (acres)	48.97	119.21	17.91

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: Ditch A
REACH: 5 RS: 9009

INPUT

Description: Sta. 9009

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	3452	203	3450	325	3448	492	3446	596	3445
637	3446	892	3448	1007	3450	1124	3452		

Sta	n Val	Sta	n Val	Sta	n Val
100	.033	325	.033	892	.033

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Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
325	892	898	879	794	.1	.3

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	3447.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.033	
W.S. Elev (ft)	3446.90	Reach Len. (ft)	898.00	879.00	794.00
Crit W.S. (ft)	3446.75	Flow Area (sq ft)		288.10	
E.G. Slope (ft/ft)	0.011195	Area (sq ft)		288.10	
Q Total (cfs)	1242.00	Flow (cfs)		1242.00	
Top Width (ft)	334.67	Top Width (ft)		334.67	
Vel Total (ft/s)	4.31	Avg. Vel. (ft/s)		4.31	
Max Chl Dpth (ft)	1.90	Hydr. Depth (ft)		0.86	
Conv. Total (cfs)	11738.3	Conv. (cfs)		11738.3	
Length Wtd. (ft)	879.00	Wetted Per. (ft)		334.70	
Min Ch El (ft)	3445.00	Shear (lb/sq ft)		0.60	
Alpha	1.00	Stream Power (lb/ft s)		2.59	
Frctn Loss (ft)	4.99	Cum Volume (acre-ft)	22.29	116.39	3.64
C & E Loss (ft)	0.05	Cum SA (acres)	23.25	99.17	5.49

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 OUTPUT Profile #PF 3

E.G. Elev (ft)	3447.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.		0.033	
W.S. Elev (ft)	3447.65	Reach Len. (ft)	898.00	879.00	794.00
Crit W.S. (ft)		Flow Area (sq ft)		596.64	
E.G. Slope (ft/ft)	0.007751	Area (sq ft)		596.64	
Q Total (cfs)	2689.00	Flow (cfs)		2689.00	
Top Width (ft)	492.15	Top Width (ft)		492.15	
Vel Total (ft/s)	4.51	Avg. Vel. (ft/s)		4.51	

Max Chl Dpth (ft)	2.65	FloodPlain.rep Hydr. Depth (ft)	1.21
Conv. Total (cfs)	30543.4	Conv. (cfs)	30543.4
Length Wtd. (ft)	878.86	Wetted Per. (ft)	492.18
Min Ch El (ft)	3445.00	Shear (lb/sq ft)	0.59
Alpha	1.00	Stream Power (lb/ft s)	2.64
Frctn Loss (ft)	5.19	Cum Volume (acre-ft)	53.40 201.54 13.56
C & E Loss (ft)	0.02	Cum SA (acres)	48.71 112.09 17.77

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: Ditch A
REACH: 5 RS: 8130

INPUT

Description: Sta. 8130

Station Elevation Data		num=	8						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	3448	303	3444	419	3442	654	3440	663	3440
852	3442	995	3444	1104	3446				

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
100	.033	419	.033	852	.033

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	419	852		399 413	456	.1	.3

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	3442.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3442.03	Reach Len. (ft)	399.00	413.00	456.00
Crit W.S. (ft)	3441.49	Flow Area (sq ft)	0.03	455.74	0.04
E.G. Slope (ft/ft)	0.003422	Area (sq ft)	0.03	455.74	0.04
Q Total (cfs)	1242.00	Flow (cfs)	0.00	1241.99	0.01
Top Width (ft)	437.11	Top Width (ft)	1.84	433.00	2.27
Vel Total (ft/s)	2.72	Avg. Vel. (ft/s)	0.17	2.73	0.17
Max Chl Dpth (ft)	2.03	Hydr. Depth (ft)	0.02	1.05	0.02
Conv. Total (cfs)	21233.1	Conv. (cfs)	0.1	21232.9	0.1
Length Wtd. (ft)	413.00	Wetted Per. (ft)	1.84	433.02	2.27
Min Ch El (ft)	3440.00	Shear (lb/sq ft)	0.00	0.22	0.00

Alpha	1.00	FloodPlain.rep Stream Power (lb/ft s)	0.00	0.61	0.00
Frctn Loss (ft)	2.74	Cum Volume (acre-ft)	22.29	108.88	3.63
C & E Loss (ft)	0.03	Cum SA (acres)	23.23	91.42	5.47

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 OUTPUT Profile #PF 3

E.G. Elev (ft)	3442.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3442.50	Reach Len. (ft)	399.00	413.00	456.00
Crit W.S. (ft)	3442.03	Flow Area (sq ft)	7.21	657.97	8.89
E.G. Slope (ft/ft)	0.004647	Area (sq ft)	7.21	657.97	8.89
Q Total (cfs)	2689.00	Flow (cfs)	8.77	2669.41	10.82
Top Width (ft)	497.59	Top Width (ft)	28.93	433.00	35.66
Vel Total (ft/s)	3.99	Avg. Vel. (ft/s)	1.22	4.06	1.22
Max Chl Dpth (ft)	2.50	Hydr. Depth (ft)	0.25	1.52	0.25
Conv. Total (cfs)	39445.5	Conv. (cfs)	128.7	39158.1	158.7
Length Wtd. (ft)	413.06	Wetted Per. (ft)	28.93	433.02	35.67
Min Ch El (ft)	3440.00	Shear (lb/sq ft)	0.07	0.44	0.07
Alpha	1.03	Stream Power (lb/ft s)	0.09	1.79	0.09
Frctn Loss (ft)	2.64	Cum Volume (acre-ft)	53.33	188.88	13.47
C & E Loss (ft)	0.01	Cum SA (acres)	48.41	102.76	17.44

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: Ditch A
REACH: 5 RS: 7717

INPUT
Description: Sta 7717
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	3442	233	3440	383	3438	492	3437.8	510	3438
657	3439	747	3440	879	3442				

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Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.033	233	.033	747	.033

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	233	747		444 464	510	.1	.3

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	3439.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.		0.033	
W.S. Elev (ft)	3439.01	Reach Len. (ft)	444.00	464.00	510.00
Crit W.S. (ft)	3439.01	Flow Area (sq ft)		254.54	
E.G. Slope (ft/ft)	0.018011	Area (sq ft)		254.54	
Q Total (cfs)	1242.00	Flow (cfs)		1242.00	
Top Width (ft)	350.81	Top Width (ft)		350.81	
Vel Total (ft/s)	4.88	Avg. Vel. (ft/s)		4.88	
Max Chl Dpth (ft)	1.21	Hydr. Depth (ft)		0.73	
Conv. Total (cfs)	9254.5	Conv. (cfs)		9254.5	
Length Wtd. (ft)	464.16	Wetted Per. (ft)		350.82	
Min Ch El (ft)	3437.80	Shear (lb/sq ft)		0.82	
Alpha	1.00	Stream Power (lb/ft s)		3.98	
Frctn Loss (ft)	1.77	Cum Volume (acre-ft)	22.29	105.52	3.63
C & E Loss (ft)	0.09	Cum SA (acres)	23.22	87.70	5.46

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 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 OUTPUT Profile #PF 3

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E.G. Elev (ft)	3440.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.033	
W.S. Elev (ft)	3439.74	Reach Len. (ft)	444.00	464.00	510.00
Crit W.S. (ft)		Flow Area (sq ft)		555.05	
E.G. Slope (ft/ft)	0.009311	Area (sq ft)		555.05	
Q Total (cfs)	2689.00	Flow (cfs)		2689.00	
Top Width (ft)	471.42	Top Width (ft)		471.42	
Vel Total (ft/s)	4.84	Avg. Vel. (ft/s)		4.84	
Max Chl Dpth (ft)	1.94	Hydr. Depth (ft)		1.18	
Conv. Total (cfs)	27866.5	Conv. (cfs)		27866.5	
Length Wtd. (ft)	464.62	Wetted Per. (ft)		471.44	
Min Ch El (ft)	3437.80	Shear (lb/sq ft)		0.68	
Alpha	1.00	Stream Power (lb/ft s)		3.32	
Frctn Loss (ft)	1.95	Cum Volume (acre-ft)	53.30	183.13	13.43
C & E Loss (ft)	0.02	Cum SA (acres)	48.28	98.47	17.25

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: Ditch A
 REACH: 5 RS: 7253

INPUT

Description: Sta. 7253

Station Elevation Data		num=	9						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	3438	109	3438.7	321	3438	424	3436	668	3435
906	3436	1005	3438	1200	3440	1365	3442		

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
100	.033	424	.033	906	.033

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
424	906	756	910	.1	.3

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	3436.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.033	0.033	0.033

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W.S. Elev (ft)	3436.81	Reach Len. (ft)	756.00	910.00	980.00
Crit W.S. (ft)	3436.16	Flow Area (sq ft)	16.92	631.68	16.26
E.G. Slope (ft/ft)	0.001808	Area (sq ft)	16.92	631.68	16.26
Q Total (cfs)	1483.00	Flow (cfs)	17.73	1448.22	17.05
Top Width (ft)	563.87	Top Width (ft)	41.74	482.00	40.12
Vel Total (ft/s)	2.23	Avg. Vel. (ft/s)	1.05	2.29	1.05
Max Chl Dpth (ft)	1.81	Hydr. Depth (ft)	0.41	1.31	0.41
Conv. Total (cfs)	34880.8	Conv. (cfs)	417.1	34062.8	400.9
Length Wtd. (ft)	909.65	Wetted Per. (ft)	41.75	482.00	40.13
Min Ch El (ft)	3435.00	Shear (lb/sq ft)	0.05	0.15	0.05
Alpha	1.04	Stream Power (lb/ft s)	0.05	0.34	0.05
Frctn Loss (ft)	5.28	Cum Volume (acre-ft)	22.21	100.80	3.54
C & E Loss (ft)	0.04	Cum SA (acres)	23.01	83.27	5.22

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 OUTPUT Profile #PF 3

E.G. Elev (ft)	3438.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3437.84	Reach Len. (ft)	756.00	910.00	980.00
Crit W.S. (ft)	3437.06	Flow Area (sq ft)	87.30	1128.51	83.91
E.G. Slope (ft/ft)	0.003105	Area (sq ft)	87.30	1128.51	83.91
Q Total (cfs)	5399.00	Flow (cfs)	207.28	4992.50	199.22
Top Width (ft)	667.97	Top Width (ft)	94.83	482.00	91.14
Vel Total (ft/s)	4.15	Avg. Vel. (ft/s)	2.37	4.42	2.37
Max Chl Dpth (ft)	2.84	Hydr. Depth (ft)	0.92	2.34	0.92
Conv. Total (cfs)	96891.5	Conv. (cfs)	3719.8	89596.3	3575.3
Length Wtd. (ft)	909.03	Wetted Per. (ft)	94.85	482.00	91.16
Min Ch El (ft)	3435.00	Shear (lb/sq ft)	0.18	0.45	0.18
Alpha	1.07	Stream Power (lb/ft s)	0.42	2.01	0.42

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Frctn Loss (ft)	5.45	Cum Volume (acre-ft)	52.85	174.16	12.94
C & E Loss (ft)	0.04	Cum SA (acres)	47.79	93.39	16.72

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: Ditch A
REACH: 5 RS: 6343

INPUT

Description: Sta. 6343

Station Elevation Data		num= 9							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	3434	346	3433	663	3432	732	3431	860	3430.2
981	3430	1273	3430	1320	3431.5	1566	3432		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
100	.033	663	.033	1320	.033

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
663	1320	767 980	1051	.1	.3

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	3431.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.		0.033	
W.S. Elev (ft)	3431.11	Reach Len. (ft)	767.00	980.00	1051.00
Crit W.S. (ft)	3431.11	Flow Area (sq ft)		531.26	
E.G. Slope (ft/ft)	0.016513	Area (sq ft)		531.26	
Q Total (cfs)	2888.00	Flow (cfs)		2888.00	
Top Width (ft)	583.36	Top Width (ft)		583.36	
Vel Total (ft/s)	5.44	Avg. Vel. (ft/s)		5.44	
Max Chl Dpth (ft)	1.11	Hydr. Depth (ft)		0.91	
Conv. Total (cfs)	22474.4	Conv. (cfs)		22474.4	
Length Wtd. (ft)	979.58	Wetted Per. (ft)		583.38	
Min Ch El (ft)	3430.00	Shear (lb/sq ft)		0.94	
Alpha	1.00	Stream Power (lb/ft s)		5.10	
Frctn Loss (ft)	4.10	Cum Volume (acre-ft)	22.06	88.65	3.36
C & E Loss (ft)	0.11	Cum SA (acres)	22.64	72.14	4.77

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 OUTPUT Profile #PF 3

E.G. Elev (ft)	3432.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.70	Wt. n-Val.		0.033	0.033
W.S. Elev (ft)	3431.94	Reach Len. (ft)	767.00	980.00	1051.00
Crit W.S. (ft)	3431.94	Flow Area (sq ft)		1044.47	46.77
E.G. Slope (ft/ft)	0.012039	Area (sq ft)		1044.47	46.77
Q Total (cfs)	7144.00	Flow (cfs)		7060.30	83.70
Top Width (ft)	867.12	Top Width (ft)		652.59	214.53
Vel Total (ft/s)	6.55	Avg. Vel. (ft/s)		6.76	1.79
Max Chl Dpth (ft)	1.94	Hydr. Depth (ft)		1.60	0.22
Conv. Total (cfs)	65111.0	Conv. (cfs)		64348.1	762.9
Length Wtd. (ft)	979.22	Wetted Per. (ft)		652.62	214.53
Min Ch El (ft)	3430.00	Shear (lb/sq ft)		1.20	0.16
Alpha	1.05	Stream Power (lb/ft s)		8.13	0.29
Frctn Loss (ft)	4.09	Cum Volume (acre-ft)	52.09	151.46	11.47
C & E Loss (ft)	0.15	Cum SA (acres)	46.97	81.54	13.28

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 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: Ditch A
REACH: 5 RS: 5363

INPUT

Description: Sta. 5363

Station Elevation Data

num=

10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	3432	282	3430	550	3428	742	3426	885	3425
1097	3425	1476	3426	1877	3428	1966	3428	2160	3430

Manning's n Values

num=

3

Sta	n Val	Sta	n Val	Sta	n Val
100	.033	742	.033	1476	.033

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	742	1476		1199 1142	713	.1	.3

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	3426.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3426.84	Reach Len. (ft)	1199.00	1142.00	713.00
Crit W.S. (ft)	3426.14	Flow Area (sq ft)	34.19	1092.49	71.41
E.G. Slope (ft/ft)	0.001869	Area (sq ft)	34.19	1092.49	71.41
Q Total (cfs)	2888.00	Flow (cfs)	37.45	2772.35	78.21
Top Width (ft)	984.24	Top Width (ft)	81.02	734.00	169.22
Vel Total (ft/s)	2.41	Avg. Vel. (ft/s)	1.10	2.54	1.10
Max Chl Dpth (ft)	1.84	Hydr. Depth (ft)	0.42	1.49	0.42
Conv. Total (cfs)	66802.9	Conv. (cfs)	866.1	64127.7	1809.0
Length Wtd. (ft)	1137.41	Wetted Per. (ft)	81.03	734.00	169.22
Min Ch El (ft)	3425.00	Shear (lb/sq ft)	0.05	0.17	0.05
Alpha	1.07	Stream Power (lb/ft s)	0.05	0.44	0.05
Frctn Loss (ft)	4.97	Cum Volume (acre-ft)	21.76	70.38	2.50
C & E Loss (ft)	0.03	Cum SA (acres)	21.93	57.32	2.73

FloodPlain.rep

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 OUTPUT Profile #PF 3

E.G. Elev (ft)	3427.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3427.72	Reach Len. (ft)	1199.00	1142.00	713.00
Crit W.S. (ft)	3426.80	Flow Area (sq ft)	141.35	1732.59	295.22
E.G. Slope (ft/ft)	0.002096	Area (sq ft)	141.35	1732.59	295.22
Q Total (cfs)	7144.00	Flow (cfs)	263.09	6331.42	549.49
Top Width (ft)	1242.81	Top Width (ft)	164.74	734.00	344.07
Vel Total (ft/s)	3.29	Avg. Vel. (ft/s)	1.86	3.65	1.86
Max Chl Dpth (ft)	2.72	Hydr. Depth (ft)	0.86	2.36	0.86
Conv. Total (cfs)	156056.6	Conv. (cfs)	5747.0	138306.4	12003.2
Length Wtd. (ft)	1129.22	Wetted Per. (ft)	164.75	734.00	344.08
Min Ch El (ft)	3425.00	Shear (lb/sq ft)	0.11	0.31	0.11
Alpha	1.13	Stream Power (lb/ft s)	0.21	1.13	0.21
Frctn Loss (ft)	5.04	Cum Volume (acre-ft)	50.85	120.22	7.34
C & E Loss (ft)	0.04	Cum SA (acres)	45.52	65.94	6.54

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: Ditch A
REACH: 5 RS: 4221

INPUT

Description: Sta. 4221

Station	Elevation	Data	num=	12	Sta	Elev	Sta	Elev	Sta	Elev
100	3423	341	3422	544	3421	640	3420	669	3420	
753	3420.2	829	3420	837	3420	1030	3421	1320	3422	
1407	3423	1497	3424							

Manning's n	Values	num=	3	Sta	n Val
100	.033	544	.033	1407	.033

FloodPlain.rep

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
544	1407	749	732	843	.1	.3

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	3421.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.033	0.033	
W.S. Elev (ft)	3421.49	Reach Len. (ft)	749.00	732.00	843.00
Crit W.S. (ft)	3421.49	Flow Area (sq ft)	24.56	599.68	
E.G. Slope (ft/ft)	0.015261	Area (sq ft)	24.56	599.68	
Q Total (cfs)	3286.00	Flow (cfs)	53.64	3232.36	
Top Width (ft)	728.53	Top Width (ft)	99.86	628.66	
Vel Total (ft/s)	5.26	Avg. Vel. (ft/s)	2.18	5.39	
Max Chl Dpth (ft)	1.49	Hydr. Depth (ft)	0.25	0.95	
Conv. Total (cfs)	26599.8	Conv. (cfs)	434.2	26165.6	
Length Wtd. (ft)	737.24	Wetted Per. (ft)	99.87	628.67	
Min Ch El (ft)	3420.00	Shear (lb/sq ft)	0.23	0.91	
Alpha	1.03	Stream Power (lb/ft s)	0.51	4.90	
Frctn Loss (ft)	3.55	Cum Volume (acre-ft)	20.95	48.20	1.91
C & E Loss (ft)	0.10	Cum SA (acres)	19.44	39.46	1.35

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 OUTPUT Profile #PF 3

E.G. Elev (ft)	3422.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.	0.033	0.033	
W.S. Elev (ft)	3422.20	Reach Len. (ft)	749.00	732.00	843.00

		FloodPlain.rep			
Crit W.S. (ft)	3422.20	Flow Area (sq ft)	146.05	1110.69	
E.G. Slope (ft/ft)	0.013358	Area (sq ft)	146.05	1110.69	
Q Total (cfs)	7766.00	Flow (cfs)	530.65	7235.35	
Top Width (ft)	1043.46	Top Width (ft)	250.36	793.10	
Vel Total (ft/s)	6.18	Avg. Vel. (ft/s)	3.63	6.51	
Max Chl Dpth (ft)	2.20	Hydr. Depth (ft)	0.58	1.40	
Conv. Total (cfs)	67192.6	Conv. (cfs)	4591.3	62601.3	
Length Wtd. (ft)	737.87	Wetted Per. (ft)	250.37	793.11	
Min Ch El (ft)	3420.00	Shear (lb/sq ft)	0.49	1.17	
Alpha	1.06	Stream Power (lb/ft s)	1.77	7.61	
Frctn Loss (ft)	3.76	Cum Volume (acre-ft)	46.89	82.95	4.92
C & E Loss (ft)	0.12	Cum SA (acres)	39.81	45.93	3.73

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.

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: Ditch A
REACH: 5 RS: 3489

INPUT

Description: Sta. 3489

Station Elevation Data				num=	22				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-286	3420	-138	3418.5	-126	3418	-104	3416	-91	3415.5
-76	3416	-21	3417	100	3417	258	3416.5	299	3416
309	3415	318	3416	405	3416	422	3416	539	3416.4
581	3416.2	642	3416.4	744	3416	830	3416	918	3418
1068	3420	1159	3421						

Manning's n Values				num=	3				
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-286	.033	539	.033	918	.033				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	539	918		464	500	457	.1 .3

CROSS SECTION OUTPUT

Profile #PF 2

E.G. Elev (ft)	3417.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.033	0.033	
W.S. Elev (ft)	3417.66	Reach Len. (ft)	464.00	500.00	457.00
Crit W.S. (ft)	3417.07	Flow Area (sq ft)	800.11	493.34	
E.G. Slope (ft/ft)	0.002329	Area (sq ft)	800.11	493.34	
Q Total (cfs)	3286.00	Flow (cfs)	1973.59	1312.41	
Top Width (ft)	1025.44	Top Width (ft)	661.29	364.15	
Vel Total (ft/s)	2.54	Avg. Vel. (ft/s)	2.47	2.66	
Max Chl Dpth (ft)	2.66	Hydr. Depth (ft)	1.21	1.35	
Conv. Total (cfs)	68095.7	Conv. (cfs)	40898.7	27197.0	
Length Wtd. (ft)	481.91	Wetted Per. (ft)	661.50	364.17	
Min Ch El (ft)	3416.00	Shear (lb/sq ft)	0.18	0.20	
Alpha	1.00	Stream Power (lb/ft s)	0.43	0.52	
Frctn Loss (ft)	2.37	Cum Volume (acre-ft)	13.86	39.02	1.91
C & E Loss (ft)	0.03	Cum SA (acres)	12.90	31.12	1.35

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 OUTPUT

Profile #PF 3

E.G. Elev (ft)	3418.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3418.44	Reach Len. (ft)	464.00	500.00	457.00
Crit W.S. (ft)	3417.60	Flow Area (sq ft)	1318.41	785.27	7.24
E.G. Slope (ft/ft)	0.002671	Area (sq ft)	1318.41	785.27	7.24
Q Total (cfs)	7766.00	Flow (cfs)	4790.13	2969.74	6.14
Top Width (ft)	1087.51	Top Width (ft)	675.55	379.00	32.96
Vel Total (ft/s)	3.68	Avg. Vel. (ft/s)	3.63	3.78	0.85
Max Chl Dpth (ft)	3.44	Hydr. Depth (ft)	1.95	2.07	0.22
Conv. Total (cfs)	150271.6	Conv. (cfs)	92688.7	57464.2	118.7

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Length Wtd. (ft)	480.92	Wetted Per. (ft)	675.78	379.02	32.96
Min Ch El (ft)	3416.00	Shear (lb/sq ft)	0.33	0.35	0.04
Alpha	1.01	Stream Power (lb/ft s)	1.18	1.31	0.03
Frctn Loss (ft)	2.33	Cum Volume (acre-ft)	34.30	67.02	4.85
C & E Loss (ft)	0.04	Cum SA (acres)	31.85	36.08	3.41

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: Ditch A
REACH: 5 RS: 2989

INPUT

Description: Sta. 2989

Station Elevation Data		num=	14								
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-31	3416	59	3414.8	170	3414.8	196	3414	436	3413.8		
613	3414	651	3414	700	3414	747	3414	761	3414		
841	3415.01	920	3416	976	3418	1067	3420				

Manning's n Values		num=	3						
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-31	.033	436	.033	841	.033				

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
436	841	317	215	.3	.5

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	3415.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.033	0.033	
W.S. Elev (ft)	3414.95	Reach Len. (ft)	317.00	215.00	172.00
Crit W.S. (ft)	3414.95	Flow Area (sq ft)	283.67	362.07	
E.G. Slope (ft/ft)	0.016461	Area (sq ft)	283.67	362.07	
Q Total (cfs)	3286.00	Flow (cfs)	1329.43	1956.57	
Top Width (ft)	788.45	Top Width (ft)	388.22	400.22	
Vel Total (ft/s)	5.09	Avg. Vel. (ft/s)	4.69	5.40	
Max Chl Dpth (ft)	1.15	Hydr. Depth (ft)	0.73	0.90	
Conv. Total (cfs)	25611.5	Conv. (cfs)	10361.7	15249.8	
Length Wtd. (ft)	255.96	Wetted Per. (ft)	388.24	400.23	
Min Ch El (ft)	3413.80	Shear (lb/sq ft)	0.75	0.93	

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Alpha	1.01	Stream Power (lb/ft s)	3.52	5.02	
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)	8.09	34.11	1.91
C & E Loss (ft)	0.16	Cum SA (acres)	7.31	26.73	1.35

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.

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 OUTPUT Profile #PF 3

E.G. Elev (ft)	3416.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3415.68	Reach Len. (ft)	317.00	215.00	172.00
Crit W.S. (ft)	3415.59	Flow Area (sq ft)	585.43	656.09	17.70
E.G. Slope (ft/ft)	0.011352	Area (sq ft)	585.43	656.09	17.70
Q Total (cfs)	7766.00	Flow (cfs)	3383.66	4341.55	40.79
Top Width (ft)	900.85	Top Width (ft)	442.70	405.00	53.15
Vel Total (ft/s)	6.17	Avg. Vel. (ft/s)	5.78	6.62	2.30
Max Chl Dpth (ft)	1.88	Hydr. Depth (ft)	1.32	1.62	0.33
Conv. Total (cfs)	72888.6	Conv. (cfs)	31757.7	40748.1	382.9
Length Wtd. (ft)	263.06	Wetted Per. (ft)	442.72	405.01	53.15
Min Ch El (ft)	3413.80	Shear (lb/sq ft)	0.94	1.15	0.24
Alpha	1.03	Stream Power (lb/ft s)	5.42	7.60	0.54
Frctn Loss (ft)	0.76	Cum Volume (acre-ft)	24.16	58.75	4.72
C & E Loss (ft)	0.20	Cum SA (acres)	25.89	31.58	2.96

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: Ditch A
 REACH: 5 RS: 2774

INPUT

Description: Sta. 2774 Upstream of culverts

Station Elevation Data		num= 18							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-453	3416	-437	3415	-405	3414	-289	3413.8	-13	3413.8
100	3413.8	175	3413.8	204	3412	261	3412	298	3411.2
402	3410.9	437	3410	469	3409	491	3409	511	3410
560	3412	641	3414	725	3416				

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
-453	.033	437	.033	511	.033

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	437	511		40	40		
Ineffective Flow			num= 2				
Sta L	Sta R	Elev	Permanent				
-888	F						
888	F						

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	3414.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3414.41	Reach Len. (ft)	40.00	40.00	40.00
Crit W.S. (ft)	3412.71	Flow Area (sq ft)	1115.26	374.10	284.35
E.G. Slope (ft/ft)	0.000645	Area (sq ft)	1115.26	374.10	284.35
Q Total (cfs)	3286.00	Flow (cfs)	1522.17	1259.45	504.38
Top Width (ft)	1076.10	Top Width (ft)	855.02	74.00	147.08
Vel Total (ft/s)	1.85	Avg. Vel. (ft/s)	1.36	3.37	1.77
Max Chl Dpth (ft)	5.41	Hydr. Depth (ft)	1.30	5.06	1.93
Conv. Total (cfs)	129409.2	Conv. (cfs)	59946.0	49599.6	19863.6
Length Wtd. (ft)	40.00	Wetted Per. (ft)	855.10	74.04	147.15
Min Ch El (ft)	3409.00	Shear (lb/sq ft)	0.05	0.20	0.08
Alpha	1.66	Stream Power (lb/ft s)	0.07	0.68	0.14
Frctn Loss (ft)		Cum Volume (acre-ft)	3.00	32.29	1.35
C & E Loss (ft)		Cum SA (acres)	2.78	25.56	1.06

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 OUTPUT Profile #PF 3

E.G. Elev (ft)	3415.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3415.12	Reach Len. (ft)	40.00	40.00	40.00
Crit W.S. (ft)	3413.54	Flow Area (sq ft)	1729.17	426.55	399.14
E.G. Slope (ft/ft)	0.001303	Area (sq ft)	1729.17	426.55	399.14
Q Total (cfs)	7766.00	Flow (cfs)	4422.39	2227.79	1115.82
Top Width (ft)	1126.70	Top Width (ft)	875.85	74.00	176.85
Vel Total (ft/s)	3.04	Avg. Vel. (ft/s)	2.56	5.22	2.80
Max Chl Dpth (ft)	6.12	Hydr. Depth (ft)	1.97	5.76	2.26
Conv. Total (cfs)	215162.4	Conv. (cfs)	122525.4	61722.5	30914.5
Length Wtd. (ft)	40.00	Wetted Per. (ft)	875.94	74.04	176.93
Min Ch El (ft)	3409.00	Shear (lb/sq ft)	0.16	0.47	0.18
Alpha	1.37	Stream Power (lb/ft s)	0.41	2.45	0.51
Frctn Loss (ft)		Cum Volume (acre-ft)	15.74	56.08	3.90
C & E Loss (ft)		Cum SA (acres)	21.09	30.40	2.50

CULVERT RIVER: Ditch A
 REACH: 5 RS: 2773

INPUT

Description:

Distance from Upstream XS = 8

Deck/Roadway Width = 24

Weir Coefficient = 3

Upstream Deck/Roadway Coordinates

num= 6														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
26	3413.8				100	3413.8				402	3412.7			
500	3412.8				600	3413.9				700	3415.7			

Upstream Bridge Cross Section Data

Station Elevation Data num= 18									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-453	3416	-437	3415	-405	3414	-289	3413.8	-13	3413.8
100	3413.8	175	3413.8	204	3412	261	3412	298	3411.2
402	3410.9	437	3410	469	3409	491	3409	511	3410
560	3412	641	3414	725	3416				

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
-453	.033	437	.033	511	.033

Bank Sta: Left Right Coeff Contr. Expan.

437 511 .3 .5

Ineffective Flow num= 2

Sta L Sta R Elev Permanent
 -888 F
 888 F

Downstream Deck/Roadway Coordinates

num= 6

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
26	3413.8				100	3413.8				402	3412.7			
500	3412.8				600	3413.9				700	3415.7			

Downstream Bridge Cross Section Data

Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1721	3416	-1410	3414	26	3413.8	100	3412.4	155	3412
299	3411.4	349	3410	387	3408.9	391.4	3408.9	395.8	3408.9
400.2	3408.9	404.6	3408.9	409	3408.9	434	3410	487	3412
568	3414	658	3416						

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-1721	.033	349	.033	434	.033

Bank Sta: Left Right Coeff Contr. Expan.
 349 434 .3 .5

Ineffective Flow num= 2

Sta L Sta R Elev Permanent
 -888 F
 888 F

Upstream Embankment side slope = 3 horiz. to 1.0 vertical
 Downstream Embankment side slope = 3 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins = 3412.7
 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

Culvert #1 Pipe Arch 1.833 2.43

FHWA Chart # 34- 18 inch corner radius; Corrugated metal

FHWA Scale # 1 - 90 Degree headwall

Solution Criteria = Highest U.S. EG

Culvert Upstrm Dist	Length	n Value	Entrance Loss Coef	Exit Loss Coef
1	39	.024	.5	1

Number of Barrels = 6

Upstream Elevation = 3409

Centerline Stations

Sta.	Sta.	Sta.	Sta.	Sta.	Sta.
469	473.4	477.8	482.2	486.6	491

Downstream Elevation = 3408.9

Centerline Stations

Sta.	Sta.	Sta.	Sta.	Sta.	Sta.
387	391.4	395.8	400.2	404.6	409

CROSS SECTION

RIVER: Ditch A

REACH: 5

RS: 2734

INPUT

Description: Sta. 2734 Downstream of culverts

Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1721	3416	-1410	3414	26	3413.8	100	3412.4	155	3412
299	3411.4	349	3410	387	3408.9	391.4	3408.9	395.8	3408.9

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400.2	3408.9	404.6	3408.9	409	3408.9	434	3410	487	3412
568	3414	658	3416						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-1721	.033	349	.033	434	.033

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

349	434	745	846	1015	.3	.5
-----	-----	-----	-----	------	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-888	F		
888	F		

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	3413.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3412.71	Reach Len. (ft)	745.00	846.00	1015.00
Crit W.S. (ft)	3412.71	Flow Area (sq ft)	275.89	288.99	100.64
E.G. Slope (ft/ft)	0.004812	Area (sq ft)	275.89	288.99	100.64
Q Total (cfs)	3286.00	Flow (cfs)	884.51	2040.31	361.18
Top Width (ft)	431.91	Top Width (ft)	265.26	85.00	81.65
Vel Total (ft/s)	4.94	Avg. Vel. (ft/s)	3.21	7.06	3.59
Max Chl Dpth (ft)	3.81	Hydr. Depth (ft)	1.04	3.40	1.23
Conv. Total (cfs)	47371.8	Conv. (cfs)	12751.3	29413.6	5206.9
Length Wtd. (ft)	841.72	Wetted Per. (ft)	265.28	85.04	81.70
Min Ch El (ft)	3408.90	Shear (lb/sq ft)	0.31	1.02	0.37
Alpha	1.44	Stream Power (lb/ft s)	1.00	7.21	1.33
Frctn Loss (ft)	3.01	Cum Volume (acre-ft)	2.36	31.99	1.17
C & E Loss (ft)	0.22	Cum SA (acres)	2.27	25.49	0.95

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.

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 OUTPUT Profile #PF 3

E.G. Elev (ft)	3414.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3414.37	Reach Len. (ft)	745.00	846.00	1015.00
Crit W.S. (ft)	3414.37	Flow Area (sq ft)	1462.63	430.11	292.31
E.G. Slope (ft/ft)	0.003331	Area (sq ft)	1462.63	430.11	292.31
Q Total (cfs)	7766.00	Flow (cfs)	3290.35	3293.62	1182.03
Top Width (ft)	2051.72	Top Width (ft)	1816.17	85.00	150.55
Vel Total (ft/s)	3.55	Avg. Vel. (ft/s)	2.25	7.66	4.04
Max Chl Dpth (ft)	5.47	Hydr. Depth (ft)	0.81	5.06	1.94
Conv. Total (cfs)	134550.1	Conv. (cfs)	57007.1	57063.8	20479.3
Length Wtd. (ft)		Wetted Per. (ft)	1816.21	85.04	150.61
Min Ch El (ft)	3408.90	Shear (lb/sq ft)	0.17	1.05	0.40
Alpha	2.34	Stream Power (lb/ft s)	0.38	8.06	1.63
Frctn Loss (ft)		Cum Volume (acre-ft)	14.28	55.69	3.58
C & E Loss (ft)		Cum SA (acres)	19.86	30.32	2.35

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.

CROSS SECTION RIVER: Ditch A
REACH: 5 RS: 1888

INPUT

Description: Sta. 1888

Station Elevation Data		num= 10							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-775	3412	-41	3410	81	3410	100	3410.2	110	3410
331	3408	532	3408	690	3408	1180	3410	1268	3412

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-775	.033	100	.033	1180	.033

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
100	1180	305	828	980	.1	.3

CROSS SECTION OUTPUT Profile #PF 2

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E.G. Elev (ft)	3409.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.033	
W.S. Elev (ft)	3409.80	Reach Len. (ft)	305.00	828.00	980.00
Crit W.S. (ft)	3409.14	Flow Area (sq ft)		1225.09	
E.G. Slope (ft/ft)	0.002775	Area (sq ft)		1225.09	
Q Total (cfs)	3327.00	Flow (cfs)		3327.00	
Top Width (ft)	999.96	Top Width (ft)		999.96	
Vel Total (ft/s)	2.72	Avg. Vel. (ft/s)		2.72	
Max Chl Dpth (ft)	1.80	Hydr. Depth (ft)		1.23	
Conv. Total (cfs)	63158.9	Conv. (cfs)		63158.9	
Length Wtd. (ft)	828.00	Wetted Per. (ft)		999.97	
Min Ch El (ft)	3408.00	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)		0.58	
Frctn Loss (ft)	4.67	Cum Volume (acre-ft)		17.28	
C & E Loss (ft)	0.04	Cum SA (acres)		14.95	

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

CROSS SECTION OUTPUT Profile #PF 3

E.G. Elev (ft)	3410.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.	0.033	0.033	0.033
W.S. Elev (ft)	3410.59	Reach Len. (ft)	305.00	828.00	980.00
Crit W.S. (ft)	3409.82	Flow Area (sq ft)	146.69	2069.78	7.77
E.G. Slope (ft/ft)	0.002839	Area (sq ft)	146.69	2069.78	7.77
Q Total (cfs)	7864.00	Flow (cfs)	193.76	7661.94	8.30
Top Width (ft)	1465.23	Top Width (ft)	359.09	1080.00	26.15
Vel Total (ft/s)	3.54	Avg. Vel. (ft/s)	1.32	3.70	1.07
Max Chl Dpth (ft)	2.59	Hydr. Depth (ft)	0.41	1.92	0.30

Conv. Total (cfs)	147583.8	FloodPlain.rep Conv. (cfs)	3636.3	143791.8	155.7
Length Wtd. (ft)	821.74	Wetted Per. (ft)	359.09	1080.02	26.15
Min Ch El (ft)	3408.00	Shear (lb/sq ft)	0.07	0.34	0.05
Alpha	1.07	Stream Power (lb/ft s)	0.10	1.26	0.06
Frctn Loss (ft)	4.53	Cum Volume (acre-ft)	0.51	31.41	0.09
C & E Loss (ft)	0.05	Cum SA (acres)	1.26	19.01	0.29

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

CROSS SECTION RIVER: Ditch A
REACH: 5 RS: 1060

INPUT

Description: Sta. 1060

Station Elevation Data		num= 6							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	3408	394	3406	879	3402.7	909	3402.7	1206	3405
1523	3406								

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
100	.033	394	.033	1523	.033

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	394	1523		60 60	60	.1	.3

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	3405.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.		0.033	
W.S. Elev (ft)	3404.67	Reach Len. (ft)			
Crit W.S. (ft)	3404.67	Flow Area (sq ft)		593.57	
E.G. Slope (ft/ft)	0.016121	Area (sq ft)		593.57	
Q Total (cfs)	3473.00	Flow (cfs)		3473.00	
Top Width (ft)	573.29	Top Width (ft)		573.29	
Vel Total (ft/s)	5.85	Avg. Vel. (ft/s)		5.85	
Max Chl Dpth (ft)	1.97	Hydr. Depth (ft)		1.04	
Conv. Total (cfs)	27353.4	Conv. (cfs)		27353.4	
Length Wtd. (ft)		Wetted Per. (ft)		573.31	

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Min Ch El (ft)	3402.70	Shear (lb/sq ft)	1.04
Alpha	1.00	Stream Power (lb/ft s)	6.10
Frctn Loss (ft)		Cum Volume (acre-ft)	
C & E Loss (ft)		Cum SA (acres)	

CROSS SECTION OUTPUT Profile #PF 3

E.G. Elev (ft)		Element	Left OB	Channel	Right OB
Vel Head (ft)	0.67	Wt. n-Val.		0.033	
W.S. Elev (ft)	3405.55	Reach Len. (ft)			
Crit W.S. (ft)	3405.55	Flow Area (sq ft)		1235.07	
E.G. Slope (ft/ft)	0.014413	Area (sq ft)		1235.07	
Q Total (cfs)	8124.00	Flow (cfs)		8124.00	
Top Width (ft)	920.12	Top Width (ft)		920.12	
Vel Total (ft/s)	6.58	Avg. Vel. (ft/s)		6.58	
Max Chl Dpth (ft)	2.85	Hydr. Depth (ft)		1.34	
Conv. Total (cfs)	67669.9	Conv. (cfs)		67669.9	
Length Wtd. (ft)		Wetted Per. (ft)		920.14	
Min Ch El (ft)	3402.70	Shear (lb/sq ft)		1.21	
Alpha	1.00	Stream Power (lb/ft s)		7.94	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

SUMMARY OF MANNING'S N VALUES

River:Ditch A

Reach	River Sta.	n1	n2	n3
5	12674	.033	.033	.033
5	11337	.033	.033	.033
5	10937	.033	.033	.033
5	10288	.033	.033	.033
5	9690	.033	.033	.033
5	9009	.033	.033	.033
5	8130	.033	.033	.033
5	7717	.033	.033	.033
5	7253	.033	.033	.033

		FloodPlain.rep		
5	6343	.033	.033	.033
5	5363	.033	.033	.033
5	4221	.033	.033	.033
5	3489	.033	.033	.033
5	2989	.033	.033	.033
5	2774	.033	.033	.033
5	2773	Culvert		
5	2734	.033	.033	.033
5	1888	.033	.033	.033
5	1060	.033	.033	.033

SUMMARY OF REACH LENGTHS

River: Ditch A

Reach	River Sta.	Left	Channel	Right
5	12674	1206	1337	1433
5	11337	545	400	332
5	10937	729	649	445
5	10288	552	598	633
5	9690	639	681	658
5	9009	898	879	794
5	8130	399	413	456
5	7717	444	464	510
5	7253	756	910	980
5	6343	767	980	1051
5	5363	1199	1142	713
5	4221	749	732	843
5	3489	464	500	457
5	2989	317	215	172
5	2774	40	40	40
5	2773	Culvert		
5	2734	745	846	1015
5	1888	305	828	980
5	1060	60	60	60

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Ditch A

Reach	River Sta.	Contr.	Expan.
5	12674	.1	.3
5	11337	.1	.3
5	10937	.1	.3
5	10288	.1	.3
5	9690	.1	.3
5	9009	.1	.3
5	8130	.1	.3
5	7717	.1	.3
5	7253	.1	.3
5	6343	.1	.3
5	5363	.1	.3
5	4221	.1	.3
5	3489	.1	.3
5	2989	.3	.5
5	2774	.3	.5
5	2773	Culvert	

FloodPlain.rep

5	2734	.3	.5
5	1888	.1	.3
5	1060	.1	.3

Profile Output Table - Standard Table 1

Reach lope	Vel Chnl (ft/s)	River Sta Flow Area (sq ft)	Q Total Top Width (cfs) (ft)	Min Ch El Froude # Chl (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. S (ft)
5		12674	976.00	3477.00	3478.76	3478.27	3478.88	0.00
3056	2.90	357.89	355.40	0.46				
5		12674	1850.00	3477.00	3479.26	3478.68	3479.45	0.00
3167	3.69	553.45	422.29	0.49				
5		11337	976.00	3469.00	3470.81	3470.81	3471.39	0.01
3220	6.21	164.80	149.13	0.95				
5		11337	1850.00	3469.00	3471.47	3471.46	3472.26	0.01
0885	7.39	272.36	176.84	0.93				
5		10937	976.00	3464.00	3466.24	3466.08	3466.66	0.01
0235	5.21	188.24	162.01	0.83				
5		10937	1850.00	3464.00	3466.72	3466.72	3467.45	0.01
3153	6.91	273.71	197.22	0.98				
5		10288	976.00	3456.00	3457.22	3457.22	3457.51	0.02
0477	4.31	226.46	413.97	1.03				
5		10288	1850.00	3456.00	3457.57	3457.53	3457.93	0.01
5410	4.82	383.80	479.25	0.95				
5		9690	1242.00	3450.00	3451.93	3451.51	3452.09	0.00
4969	3.13	396.40	404.17	0.56				
5		9690	2689.00	3450.00	3452.40	3452.06	3452.72	0.00
6338	4.52	603.04	473.62	0.67				
5		9009	1242.00	3445.00	3446.90	3446.75	3447.19	0.01
1195	4.31	288.10	334.67	0.82				
5		9009	2689.00	3445.00	3447.65		3447.96	0.00
7751	4.51	596.64	492.15	0.72				
5		8130	1242.00	3440.00	3442.03	3441.49	3442.15	0.00
3422	2.73	455.81	437.11	0.47				
5		8130	2689.00	3440.00	3442.50	3442.03	3442.75	0.00
4647	4.06	674.08	497.59	0.58				
5		7717	1242.00	3437.80	3439.01	3439.01	3439.38	0.01
8011	4.88	254.54	350.81	1.01				
5		7717	2689.00	3437.80	3439.74		3440.11	0.00
9311	4.84	555.05	471.42	0.79				
5		7253	1483.00	3435.00	3436.81	3436.16	3436.89	0.00
1808	2.29	664.86	563.87	0.35				
5		7253	5399.00	3435.00	3437.84	3437.06	3438.13	0.00

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3105	4.42	1299.73	667.97	0.51				
5		6343	2888.00	3430.00	3431.11	3431.11	3431.57	0.01
6513	5.44	531.26	583.36	1.00				
5		6343	7144.00	3430.00	3431.94	3431.94	3432.64	0.01
2039	6.76	1091.24	867.12	0.94				
5		5363	2888.00	3425.00	3426.84	3426.14	3426.94	0.00
1869	2.54	1198.09	984.24	0.37				
5		5363	7144.00	3425.00	3427.72	3426.80	3427.91	0.00
2096	3.65	2169.17	1242.81	0.42				
5		4221	3286.00	3420.00	3421.49	3421.49	3421.94	0.01
5261	5.39	624.24	728.53	0.97				
5		4221	7766.00	3420.00	3422.20	3422.20	3422.82	0.01
3358	6.51	1256.74	1043.46	0.97				
5		3489	3286.00	3416.00	3417.66	3417.07	3417.76	0.00
2329	2.66	1293.45	1025.44	0.40				
5		3489	7766.00	3416.00	3418.44	3417.60	3418.65	0.00
2671	3.78	2110.92	1087.51	0.46				
5		2989	3286.00	3413.80	3414.95	3414.95	3415.36	0.01
6461	5.40	645.74	788.45	1.00				
5		2989	7766.00	3413.80	3415.68	3415.59	3416.28	0.01
1352	6.62	1259.21	900.85	0.92				
5		2774	3286.00	3409.00	3414.41	3412.71	3414.50	0.00
0645	3.37	1773.70	1076.10	0.26				
5		2774	7766.00	3409.00	3415.12	3413.54	3415.31	0.00
1303	5.22	2554.86	1126.70	0.38				
5		2773	Culvert					
5		2734	3286.00	3408.90	3412.71	3412.71	3413.25	0.00
4812	7.06	665.51	431.91	0.67				
5		2734	7766.00	3408.90	3414.37	3414.37	3414.83	0.00
3331	7.66	2185.05	2051.72	0.60				
5		1888	3327.00	3408.00	3409.80	3409.14	3409.92	0.00
2775	2.72	1225.09	999.96	0.43				
5		1888	7864.00	3408.00	3410.59	3409.82	3410.80	0.00
2839	3.70	2224.23	1465.23	0.47				
5		1060	3473.00	3402.70	3404.67	3404.67	3405.20	0.01
6121	5.85	593.57	573.29	1.01				
5		1060	8124.00	3402.70	3405.55	3405.55	3406.22	0.01
4413	6.58	1235.07	920.12	1.00				

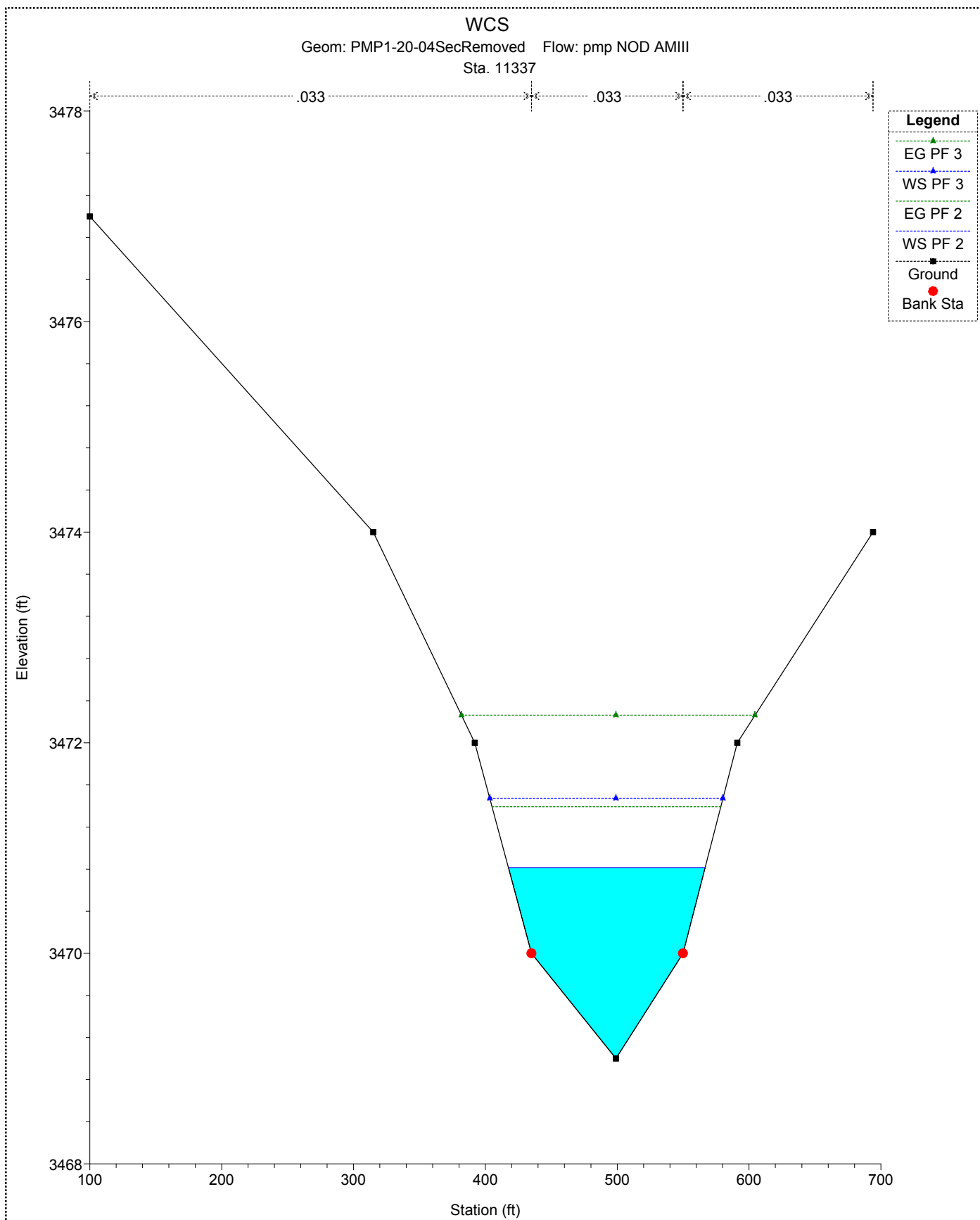
Profile Output Table - Report Standard Table 1

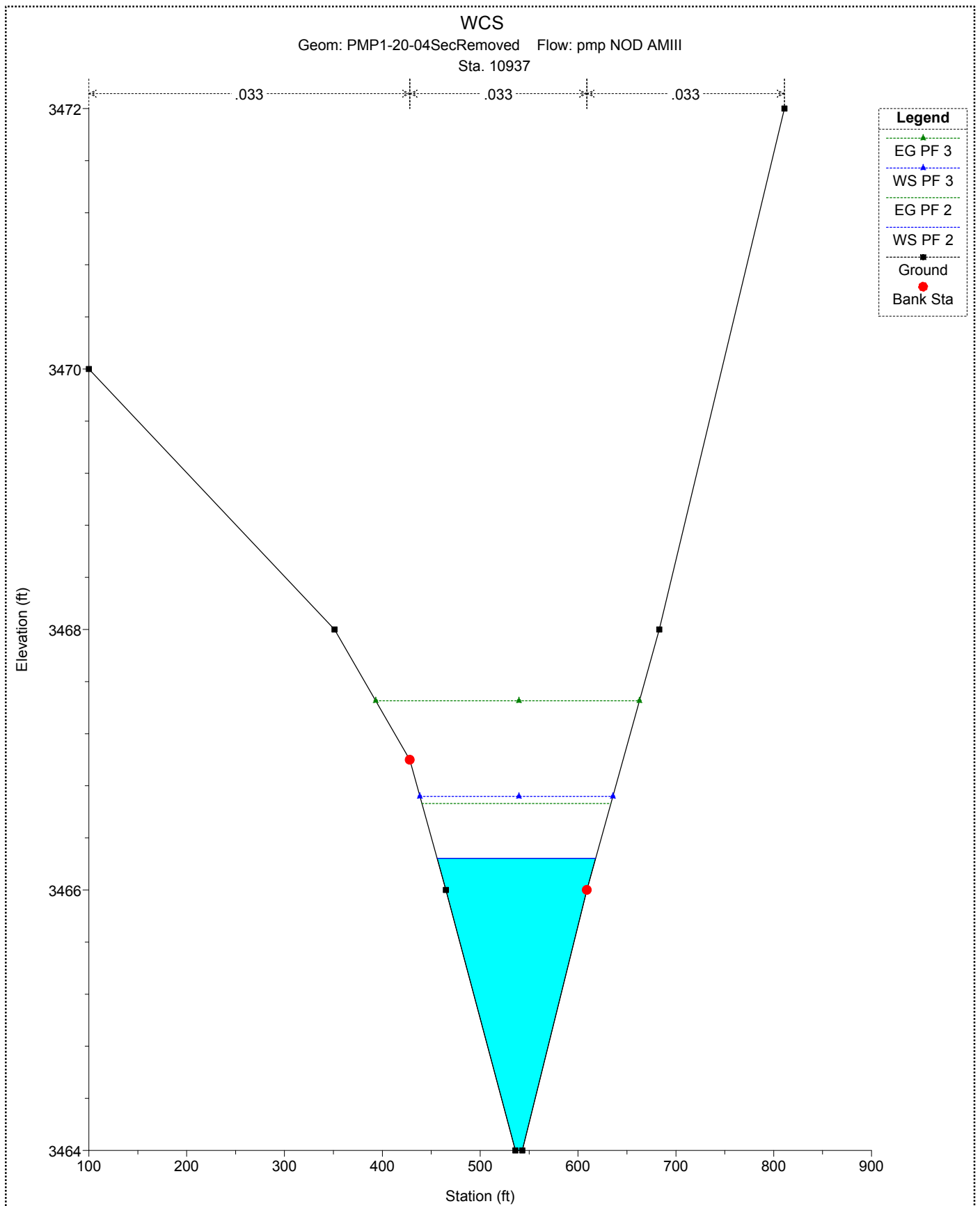
FloodPlain.rep

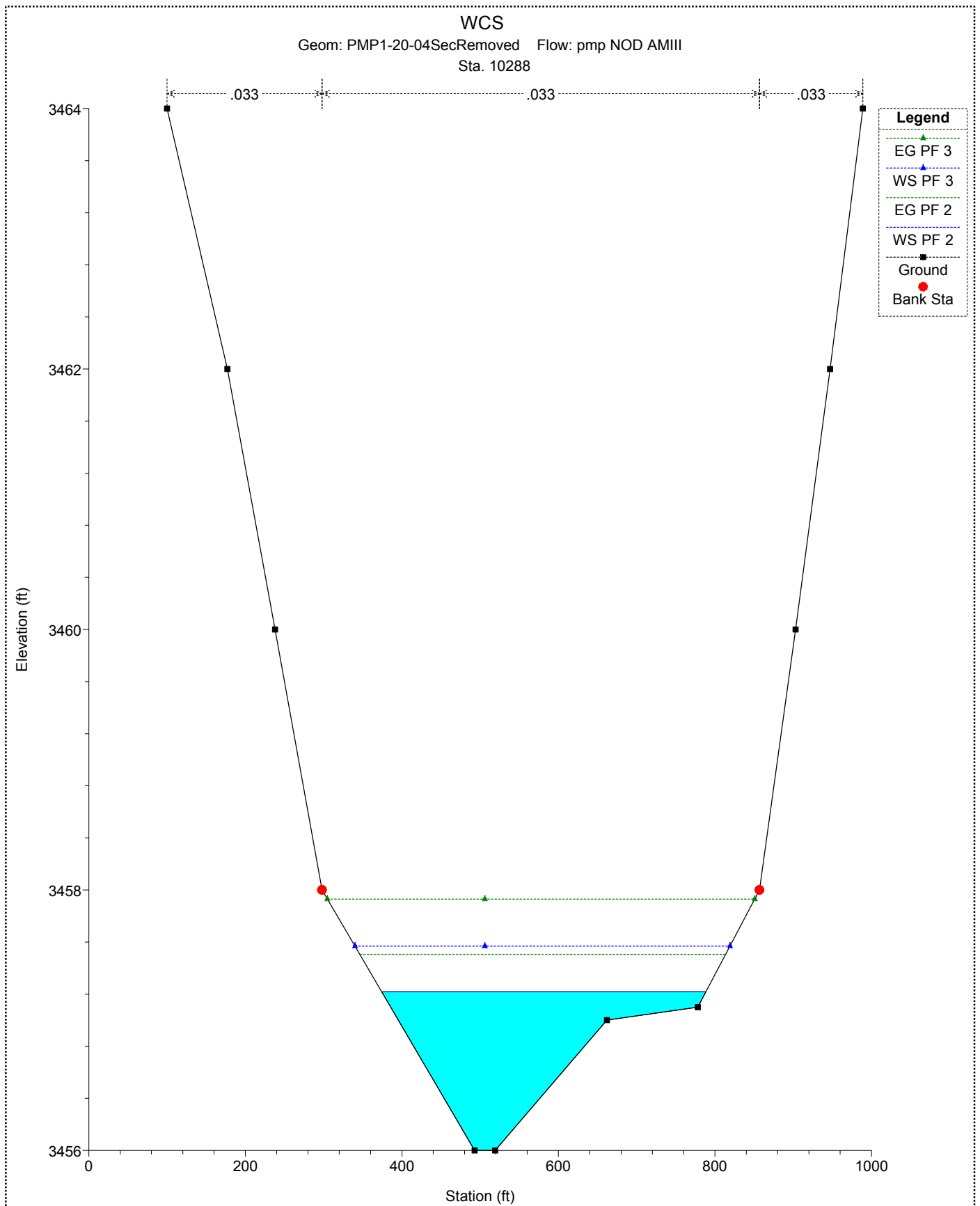
Reach	River Sta		Q Total	Min Ch El	W.S.	Elev	Crit W.S.	Max Chl	Dpth	E.G							
Elev	E.G.	Slope	Vel	Chnl	Sta	W.S.	Lft	Sta	W.S.	Rgt	Flow	Area	Top	Width	Froude	#	Chl
(ft)	(ft/ft)	(ft/s)	(cfs)	(ft)	(ft)	(ft)	(sq ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
5	12674		976.00	3477.00	3478.76	3478.27		1.75	3								
478.88	0.003056	2.90	327.16		682.56	357.89	355.40		0.46								
5	12674		1850.00	3477.00	3479.26	3478.68		2.26	3								
479.45	0.003167	3.69	291.95		714.24	553.45	422.29		0.49								
5	11337		976.00	3469.00	3470.81	3470.81		1.81	3								
471.39	0.013220	6.21	417.53		566.66	164.80	149.13		0.95								
5	11337		1850.00	3469.00	3471.47	3471.46		2.47	3								
472.26	0.010885	7.39	403.34		580.18	272.36	176.84		0.93								
5	10937		976.00	3464.00	3466.24	3466.08		2.24	3								
466.66	0.010235	5.21	455.99		618.01	188.24	162.01		0.83								
5	10937		1850.00	3464.00	3466.72	3466.72		2.72	3								
467.45	0.013153	6.91	438.39		635.61	273.71	197.22		0.98								
5	10288		976.00	3456.00	3457.22	3457.22		1.22	3								
457.51	0.020477	4.31	374.31		788.29	226.46	413.97		1.03								
5	10288		1850.00	3456.00	3457.57	3457.53		1.57	3								
457.93	0.015410	4.82	339.97		819.21	383.80	479.25		0.95								
5	9690		1242.00	3450.00	3451.93	3451.51		1.93	3								
452.09	0.004969	3.13	389.43		793.60	396.40	404.17		0.56								
5	9690		2689.00	3450.00	3452.40	3452.06		2.40	3								
452.72	0.006338	4.52	345.06		818.68	603.04	473.62		0.67								
5	9009		1242.00	3445.00	3446.90	3446.75		1.90	3								
447.19	0.011195	4.31	416.94		751.61	288.10	334.67		0.82								
5	9009		2689.00	3445.00	3447.65			2.65	3								
447.96	0.007751	4.51	354.62		846.77	596.64	492.15		0.72								
5	8130		1242.00	3440.00	3442.03	3441.49		2.03	3								

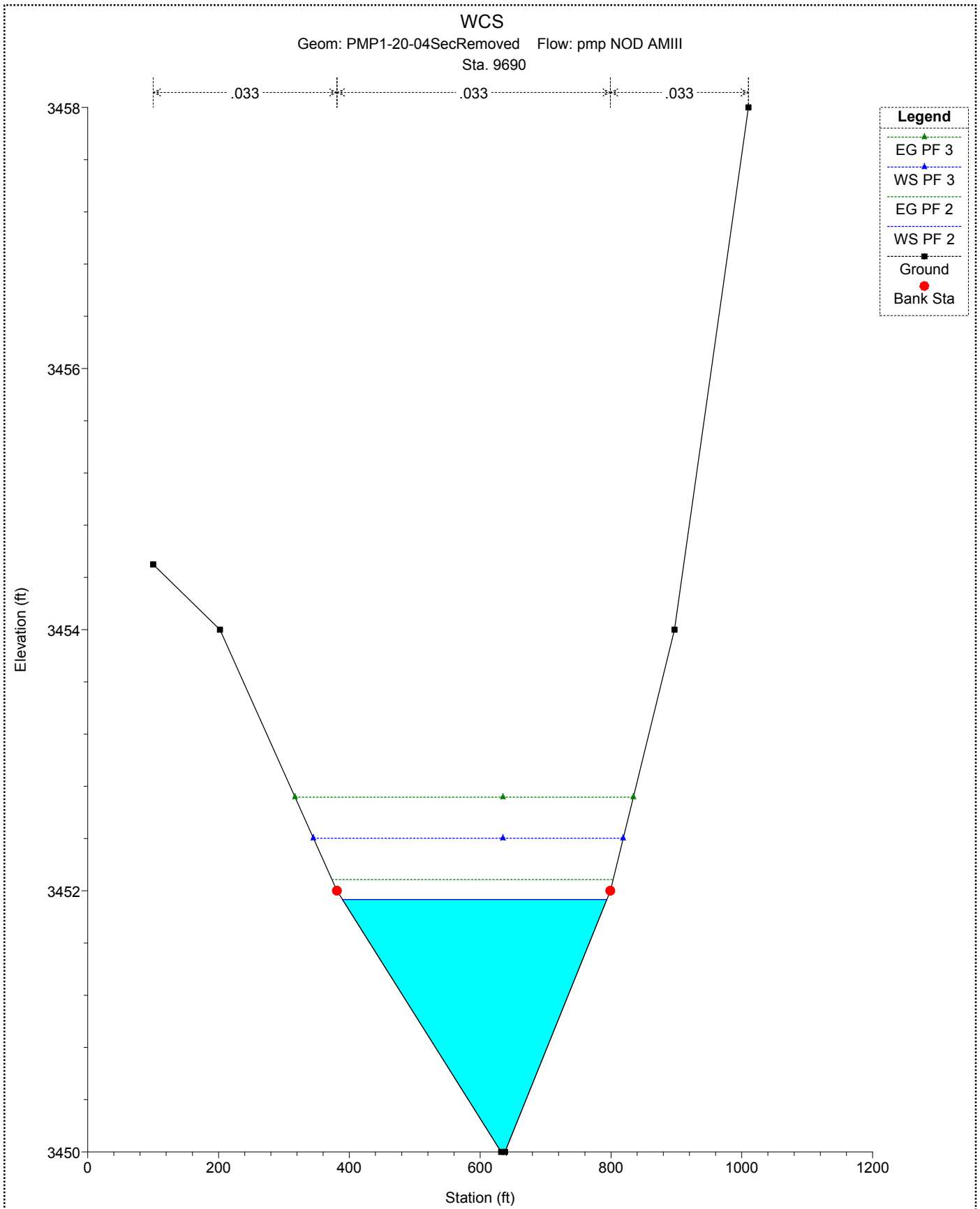
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442.15	0.003422	2.73	417.16	854.27	455.81	437.11		0.47	
5	8130		2689.00	3440.00	3442.50	3442.03		2.50	3
442.75	0.004647	4.06	390.07	887.66	674.08	497.59		0.58	
5	7717		1242.00	3437.80	3439.01	3439.01		1.21	3
439.38	0.018011	4.88	307.18	657.99	254.54	350.81		1.01	
5	7717		2689.00	3437.80	3439.74			1.94	3
440.11	0.009311	4.84	252.35	723.77	555.05	471.42		0.79	
5	7253		1483.00	3435.00	3436.81	3436.16		1.81	3
436.89	0.001808	2.29	382.26	946.12	664.86	563.87		0.35	
5	7253		5399.00	3435.00	3437.84	3437.06		2.84	3
438.13	0.003105	4.42	329.17	997.14	1299.73	667.97		0.51	
5	6343		2888.00	3430.00	3431.11	3431.11		1.11	3
431.57	0.016513	5.44	724.42	1307.78	531.26	583.36		1.00	
5	6343		7144.00	3430.00	3431.94	3431.94		1.94	3
432.64	0.012039	6.76	667.41	1534.53	1091.24	867.12		0.94	
5	5363		2888.00	3425.00	3426.84	3426.14		1.84	3
426.94	0.001869	2.54	660.98	1645.22	1198.09	984.24		0.37	
5	5363		7144.00	3425.00	3427.72	3426.80		2.72	3
427.91	0.002096	3.65	577.26	1820.07	2169.17	1242.81		0.42	
5	4221		3286.00	3420.00	3421.49	3421.49		1.49	3
421.94	0.015261	5.39	444.14	1172.66	624.24	728.53		0.97	
5	4221		7766.00	3420.00	3422.20	3422.20		2.20	3
422.82	0.013358	6.51	293.64	1337.10	1256.74	1043.46		0.97	
5	3489		3286.00	3416.00	3417.66	3417.07		2.66	3
417.76	0.002329	2.66	-122.29	903.15	1293.45	1025.44		0.40	
5	3489		7766.00	3416.00	3418.44	3417.60		3.44	3
418.65	0.002671	3.78	-136.55	950.96	2110.92	1087.51		0.46	
5	2989		3286.00	3413.80	3414.95	3414.95		1.15	3
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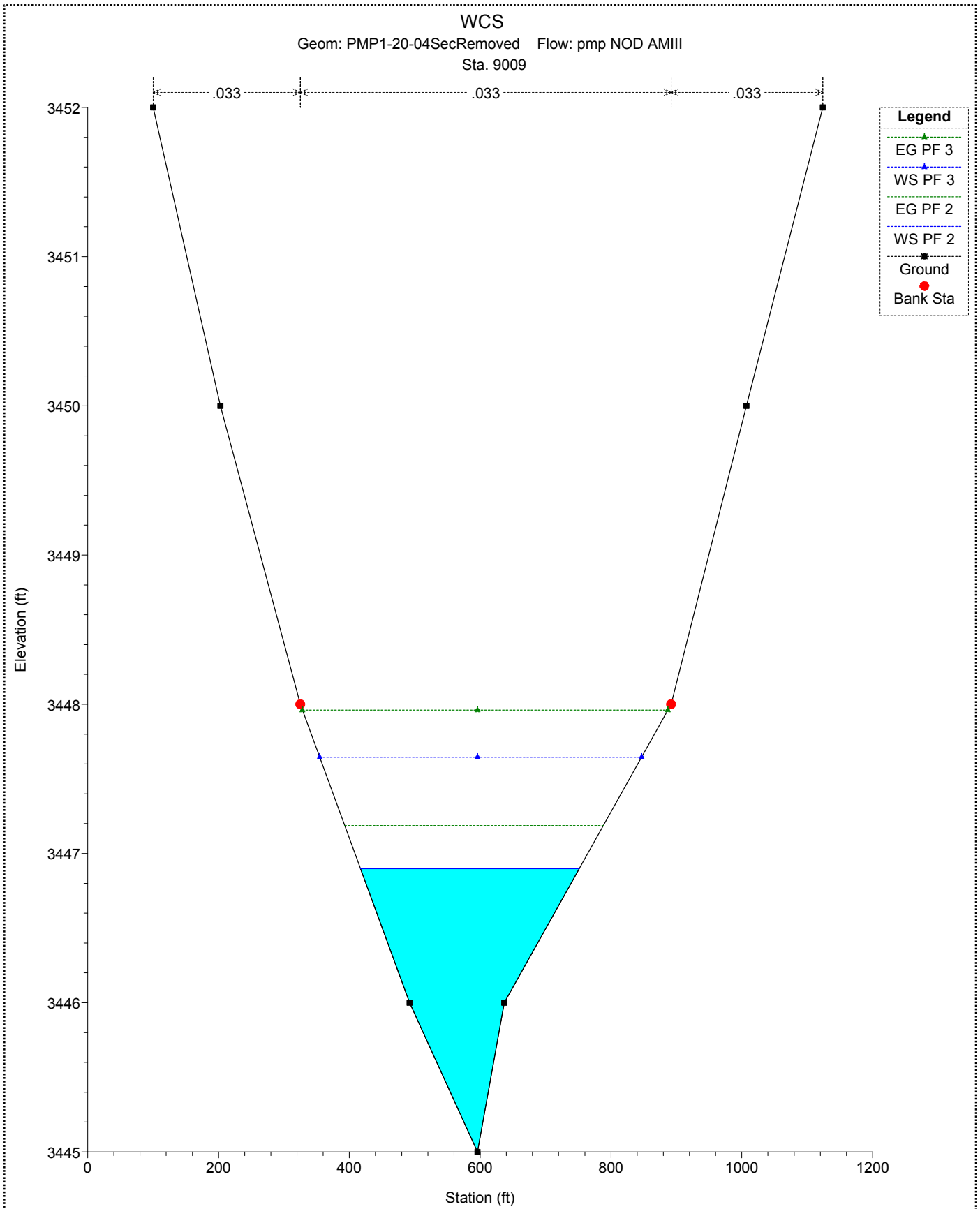
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5	2774		3286.00	3409.00	3414.41	3412.71	5.41	3	
414.50	0.000645	3.37	-418.02	658.08	1773.70	1076.10		0.26	
5	2774		7766.00	3409.00	3415.12	3413.54	6.12	3	
415.31	0.001303	5.22	-438.85	687.85	2554.86	1126.70		0.38	
5	2773		Culvert						
5	2734		3286.00	3408.90	3412.71	3412.71	3.81	3	
413.25	0.004812	7.06	83.74	515.65	665.51	431.91		0.67	
5	2734		7766.00	3408.90	3414.37	3414.37	5.47	3	
414.83	0.003331	7.66	-1467.17	584.55	2185.05	2051.72		0.60	
5	1888		3327.00	3408.00	3409.80	3409.14	1.80	3	
409.92	0.002775	2.72	131.77	1131.73	1225.09	999.96		0.43	
5	1888		7864.00	3408.00	3410.59	3409.82	2.59	3	
410.80	0.002839	3.70	-259.09	1206.15	2224.23	1465.23		0.47	
5	1060		3473.00	3402.70	3404.67	3404.67	1.97	3	
405.20	0.016121	5.85	589.80	1163.09	593.57	573.29		1.01	
5	1060		8124.00	3402.70	3405.55	3405.55	2.85	3	
406.22	0.014413	6.58	460.16	1380.29	1235.07	920.12		1.00	

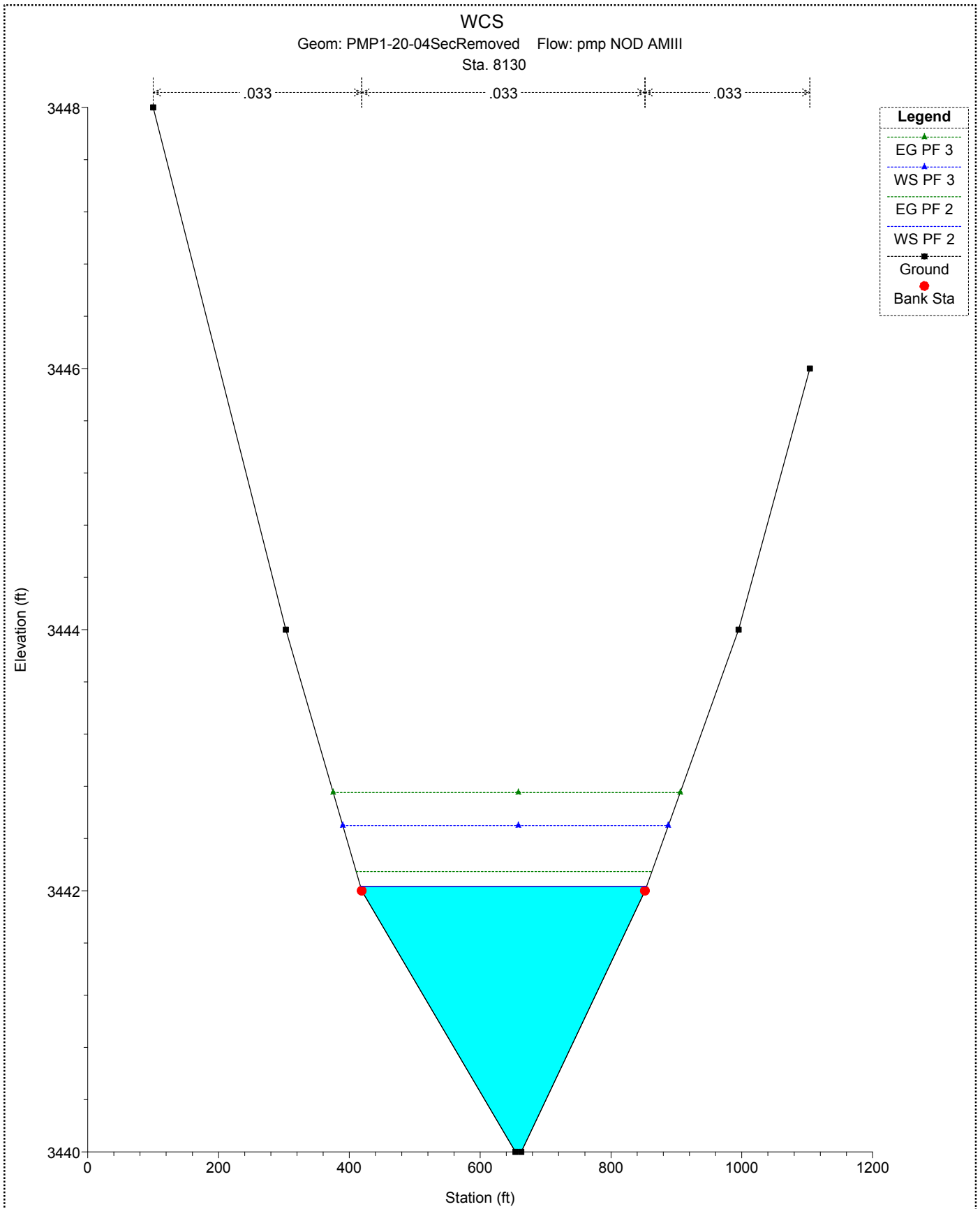


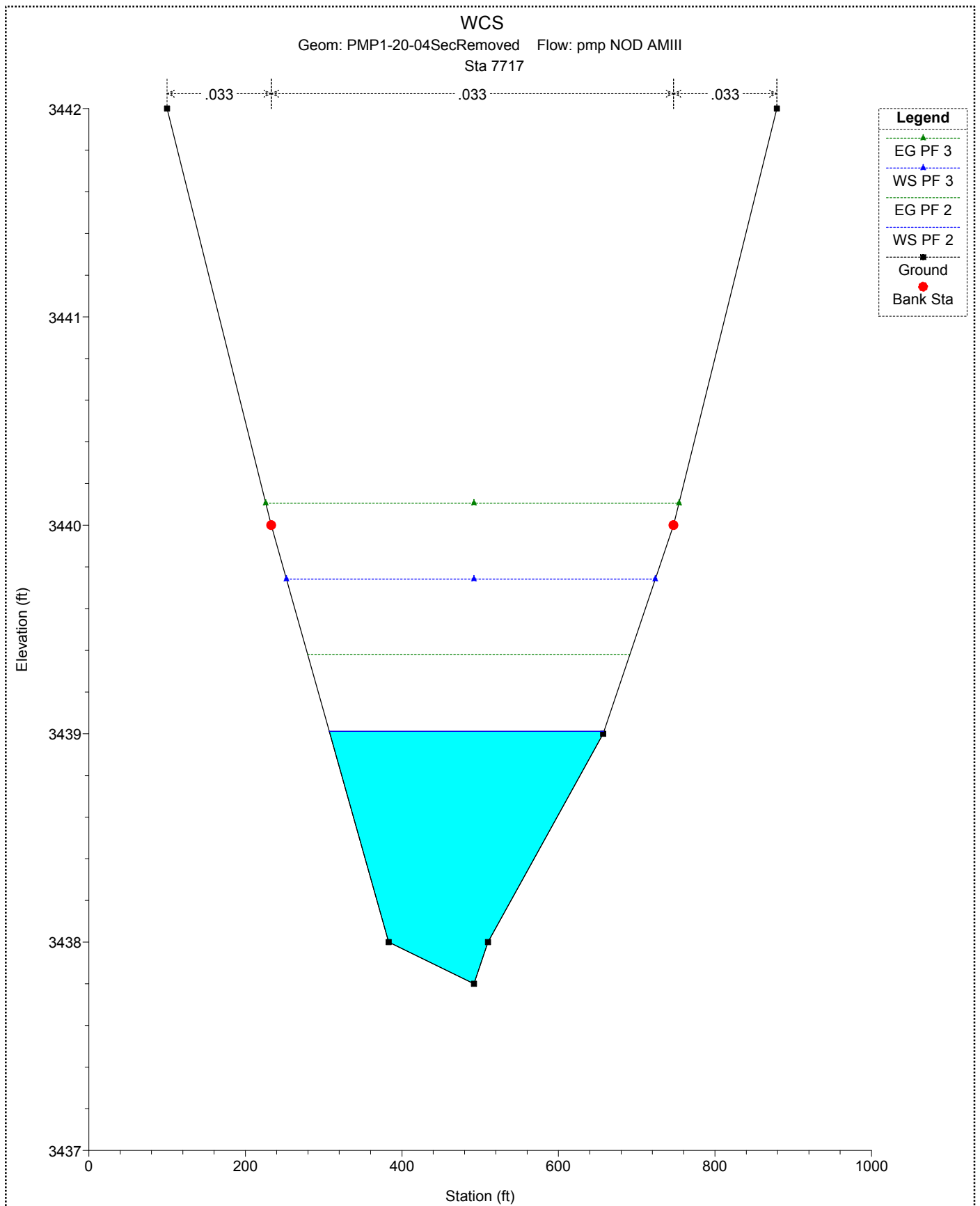


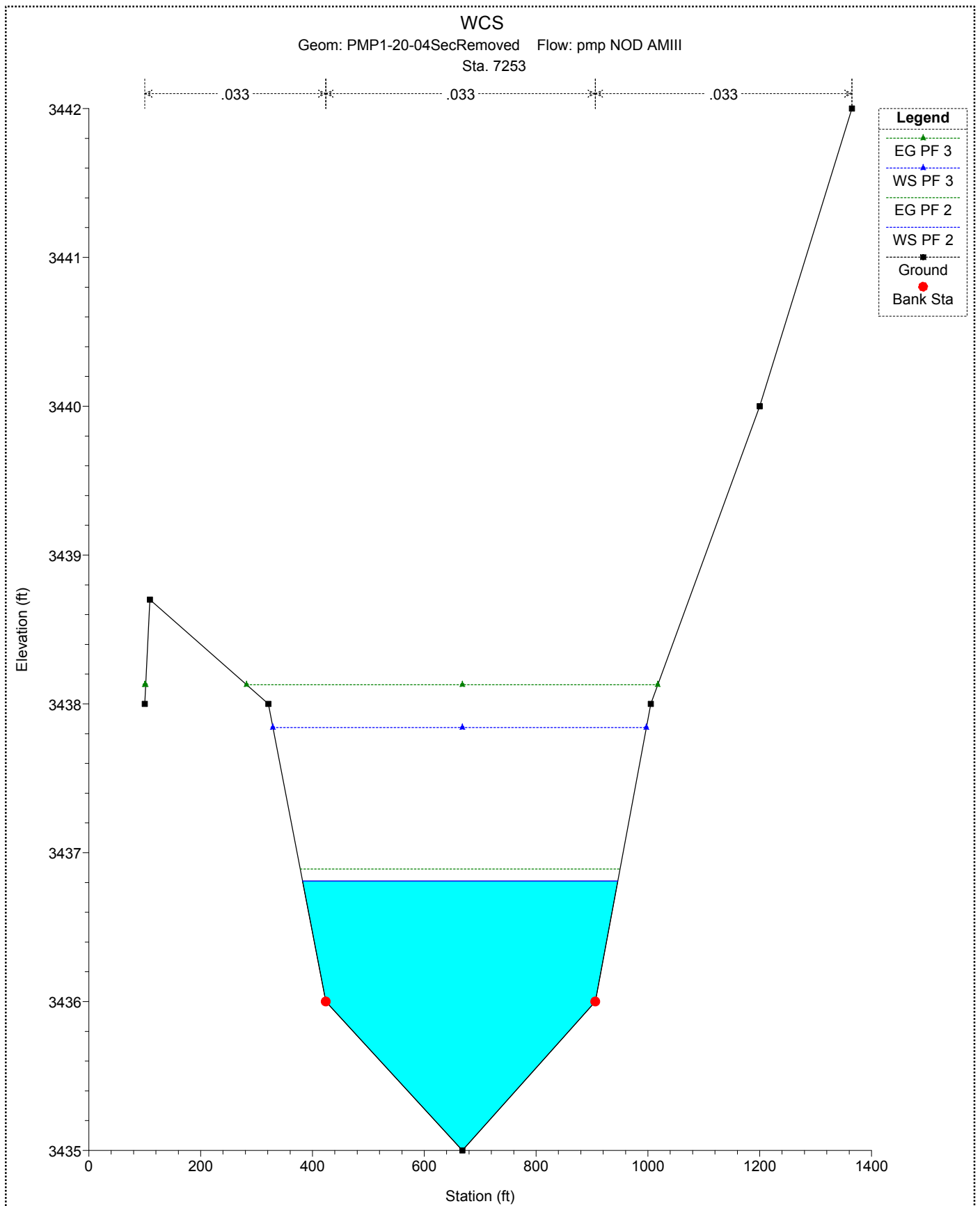


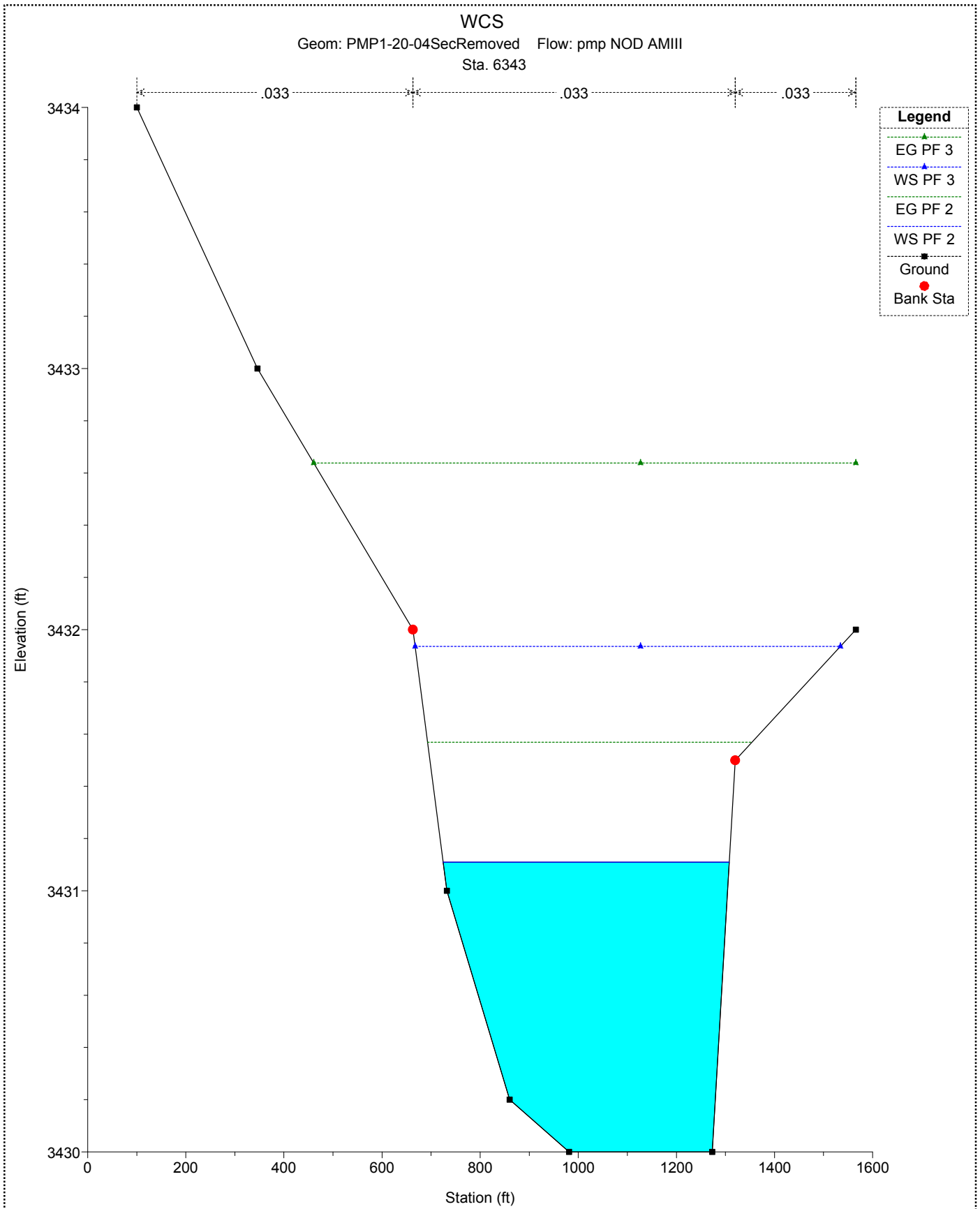


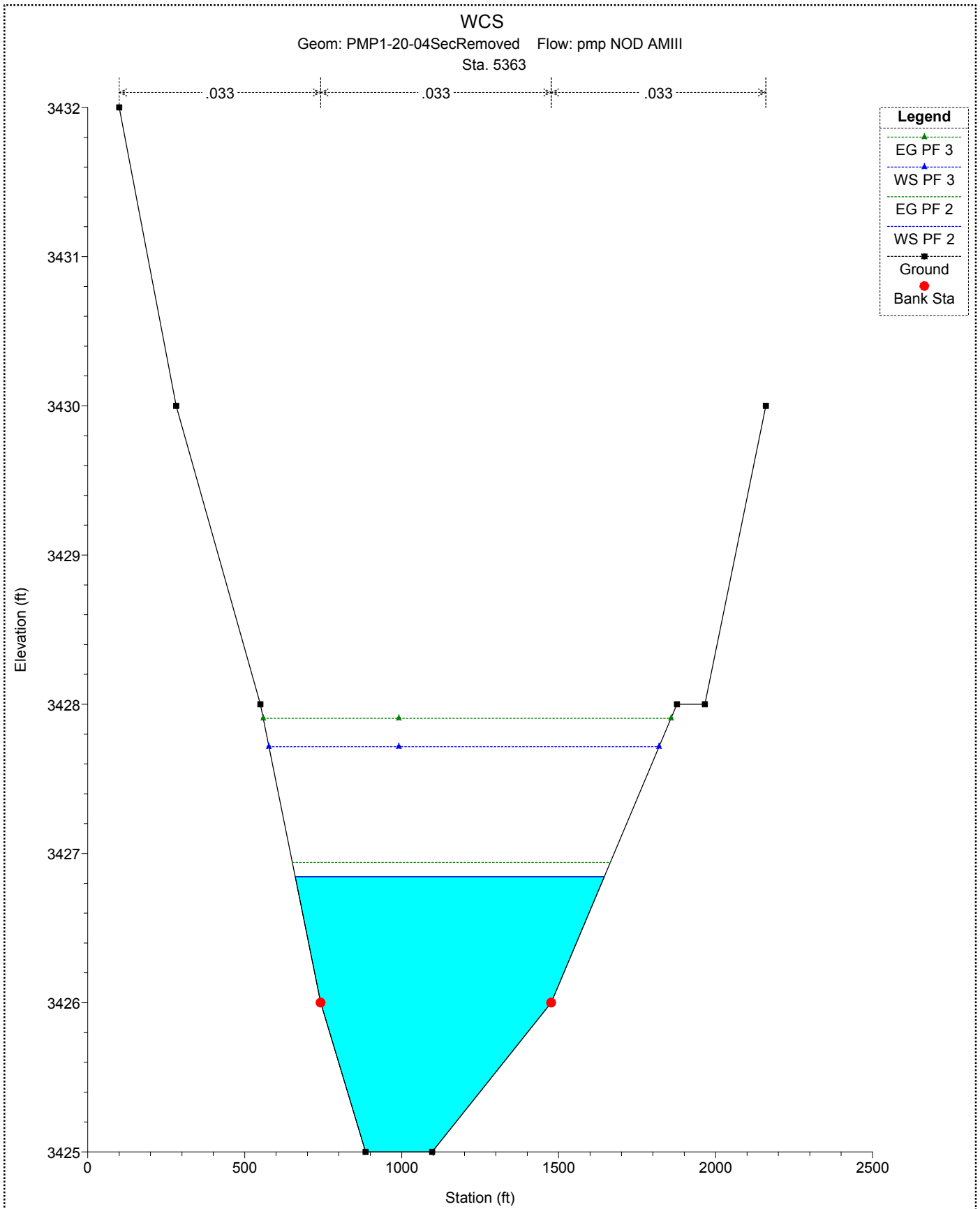


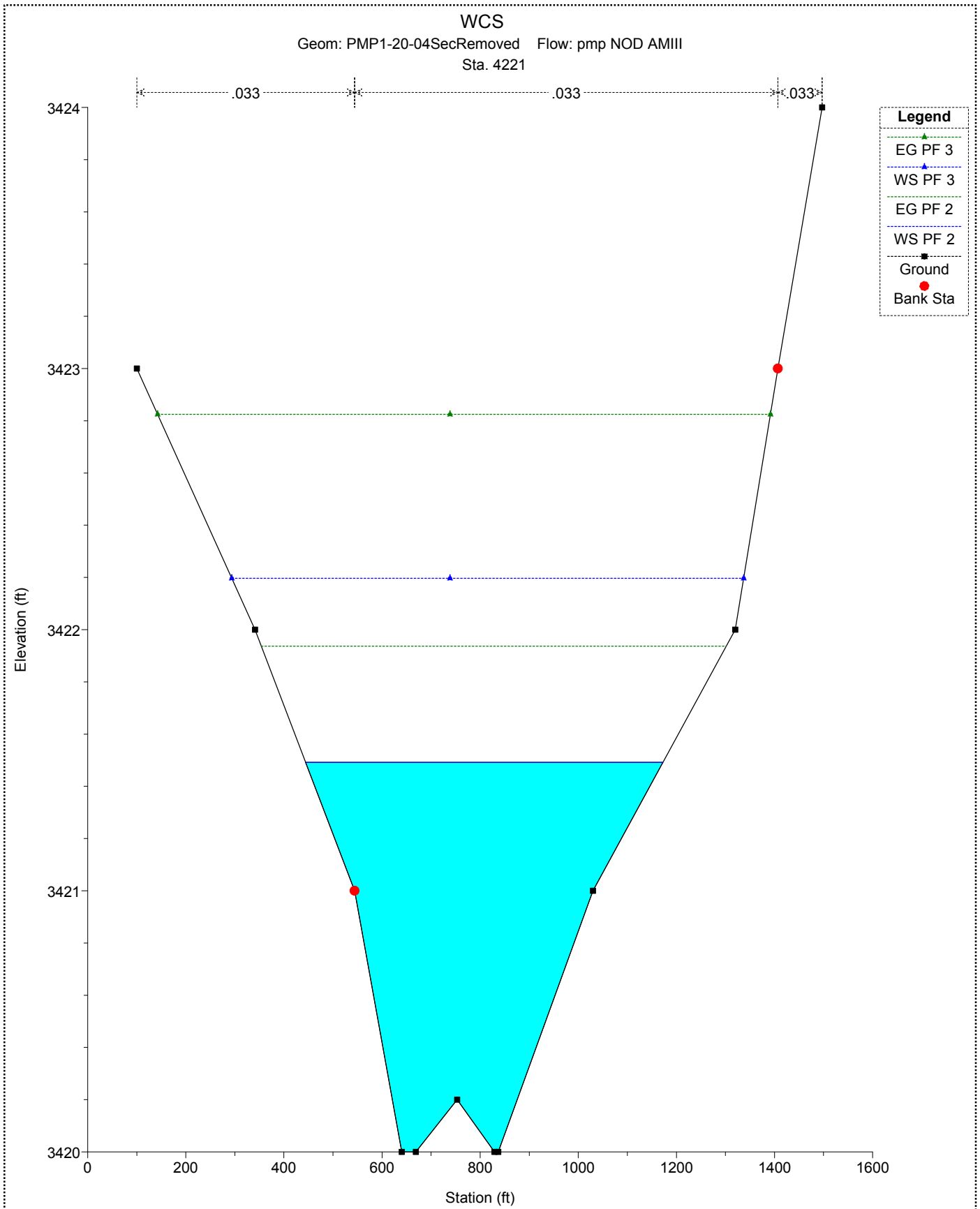


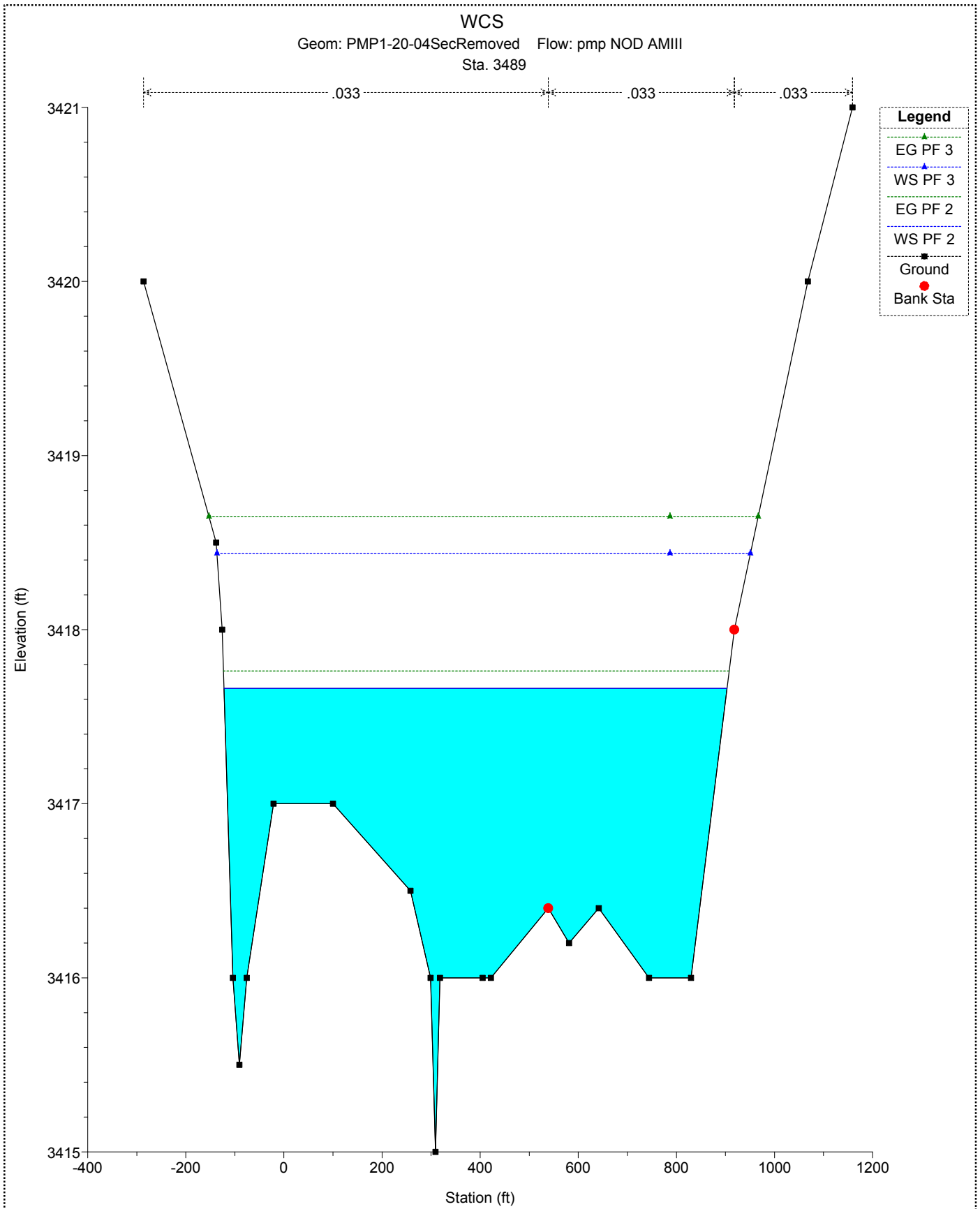


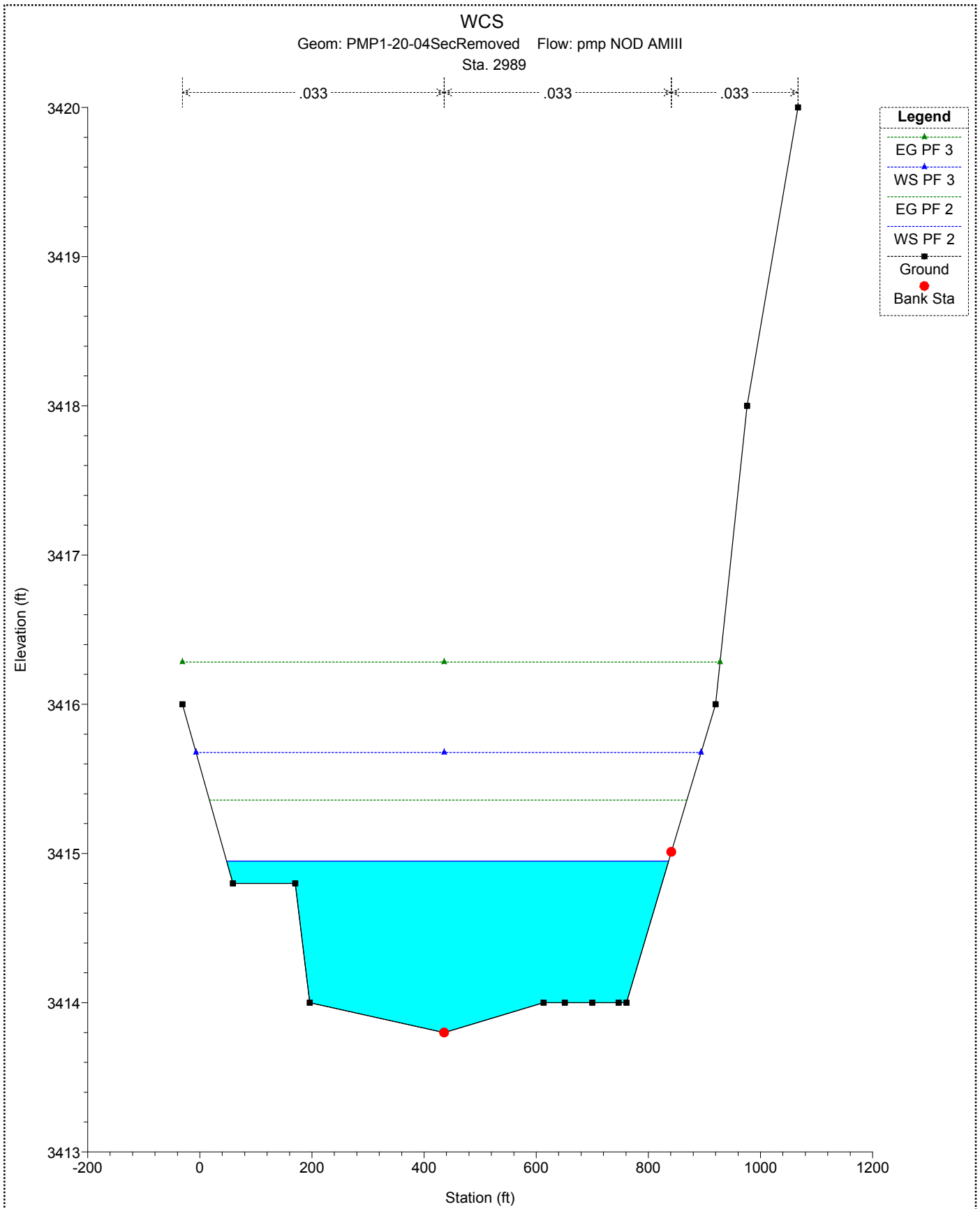


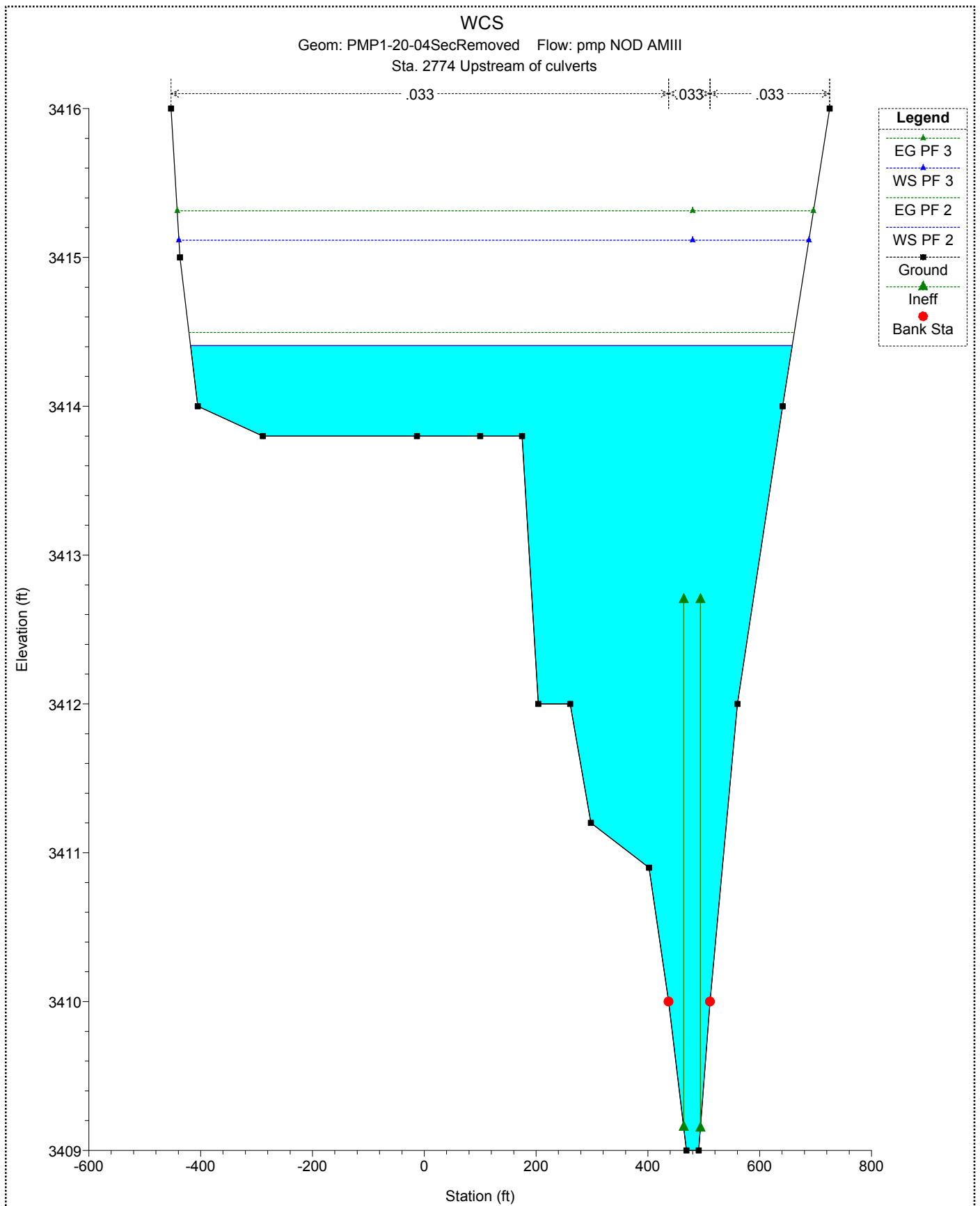


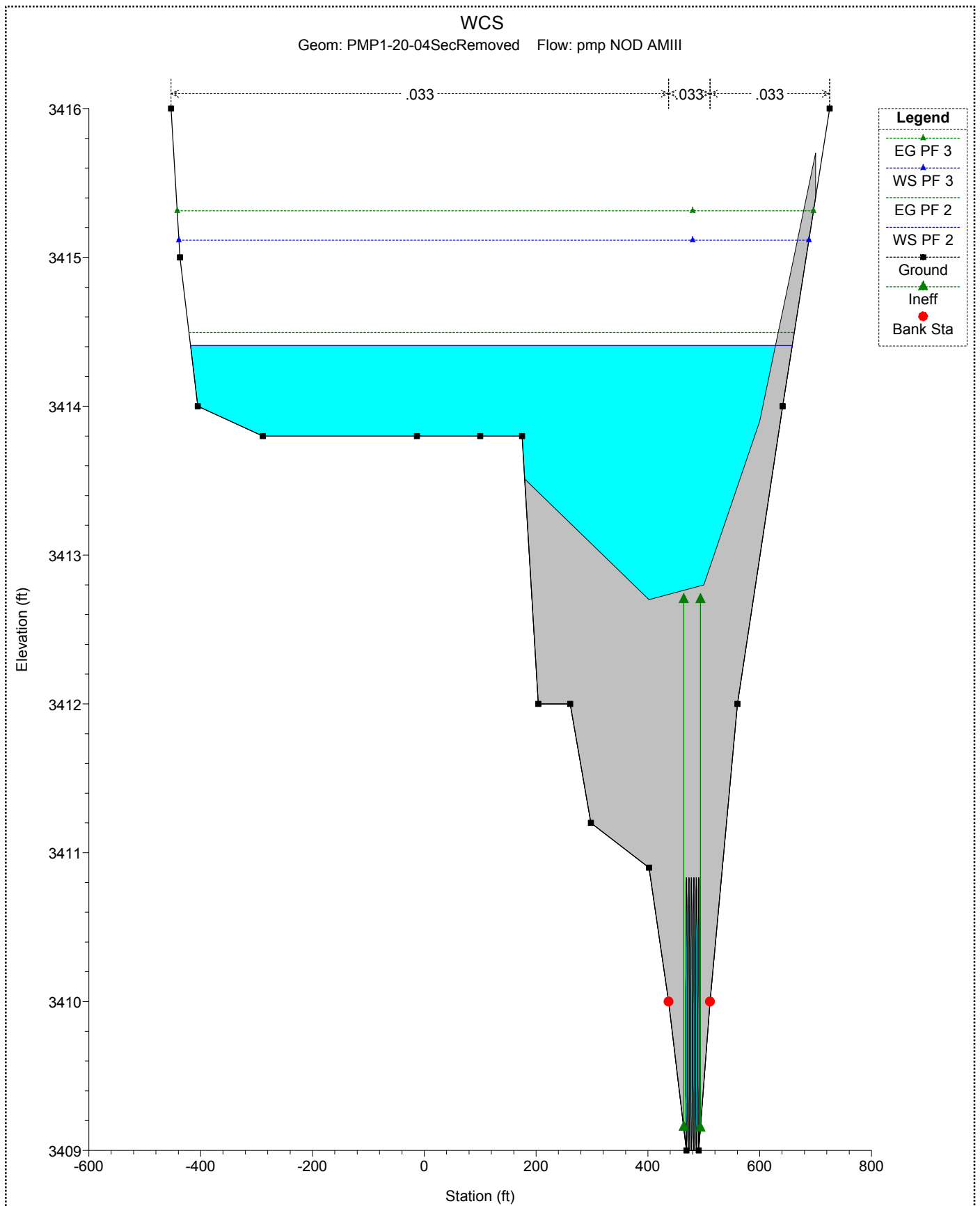


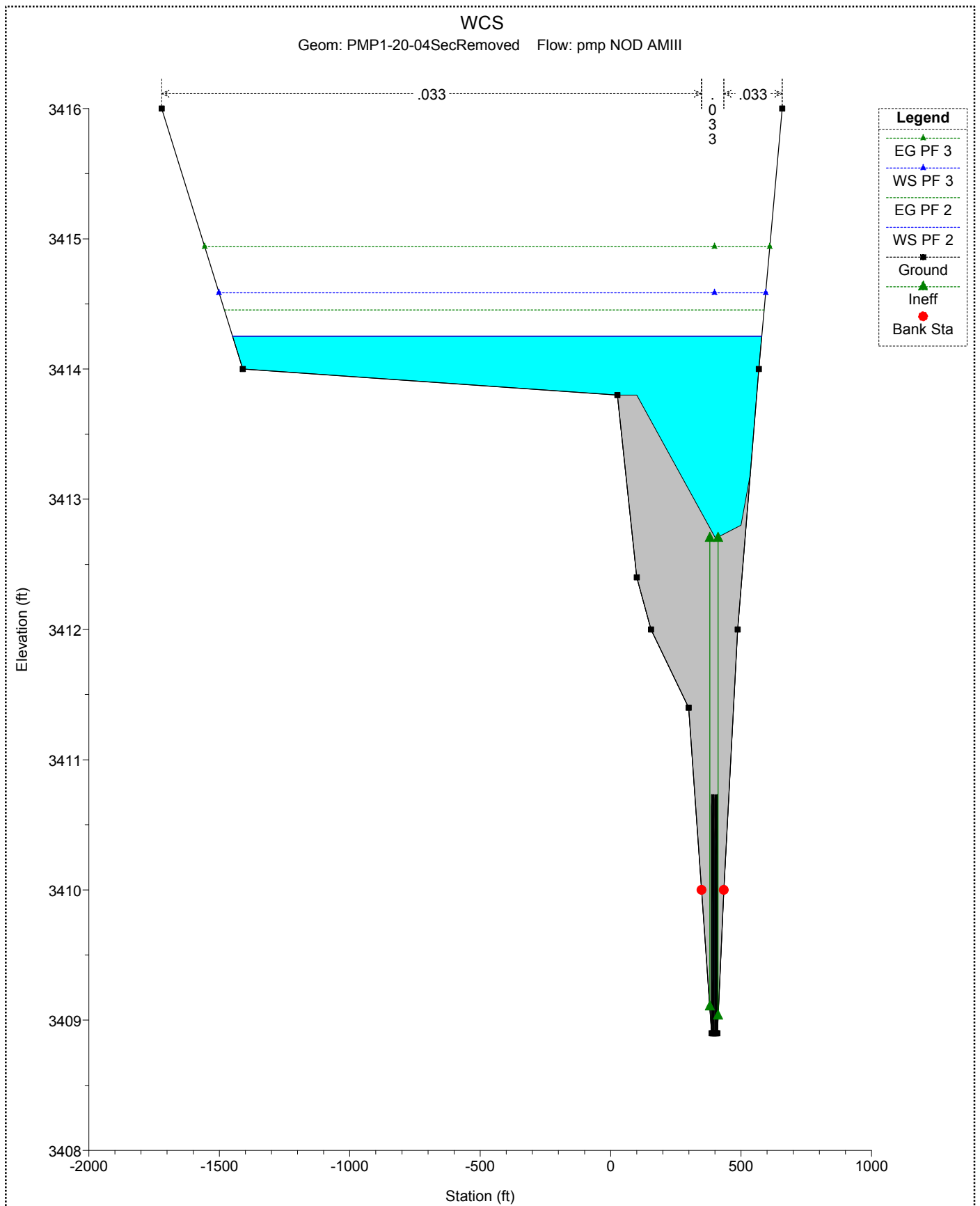


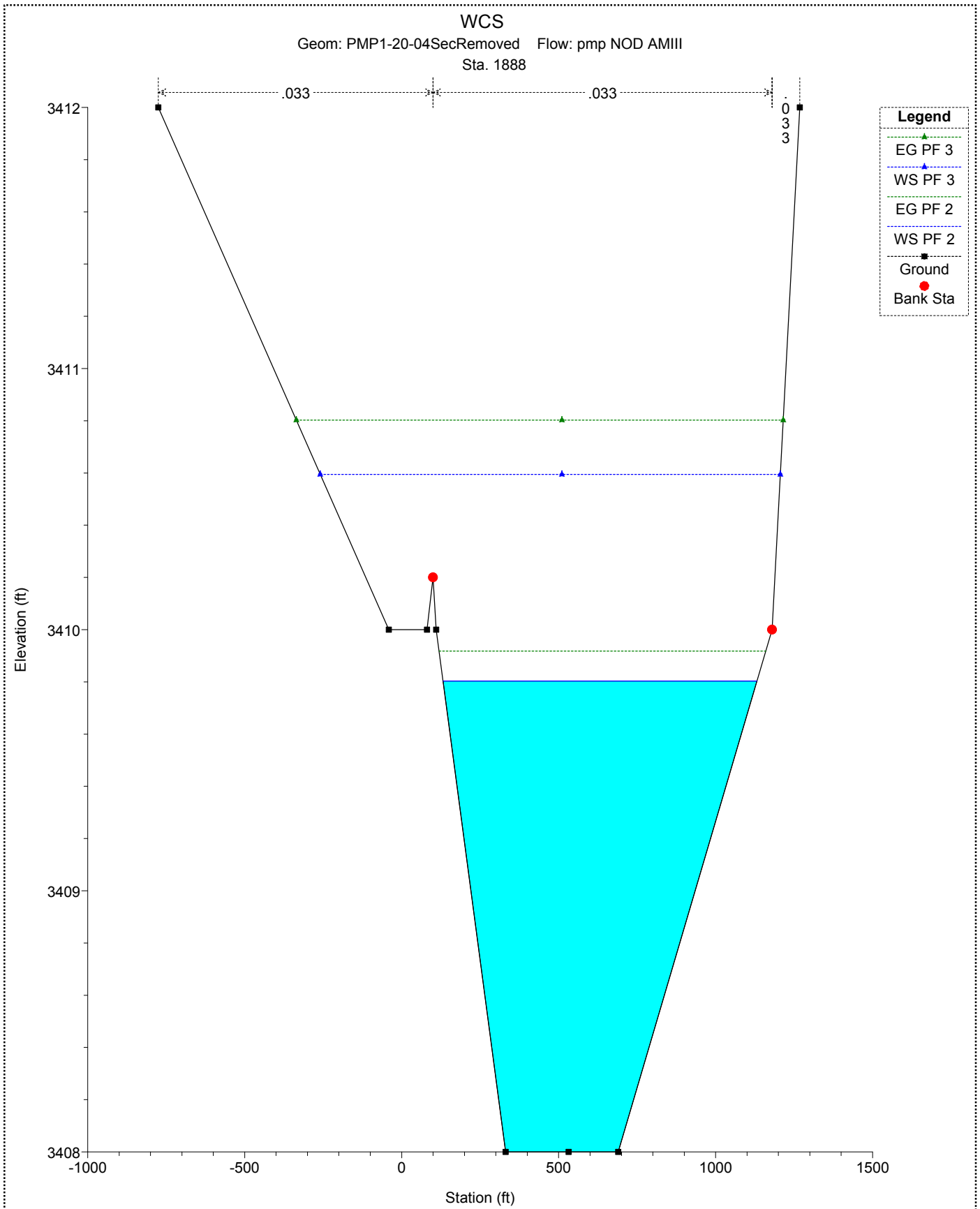


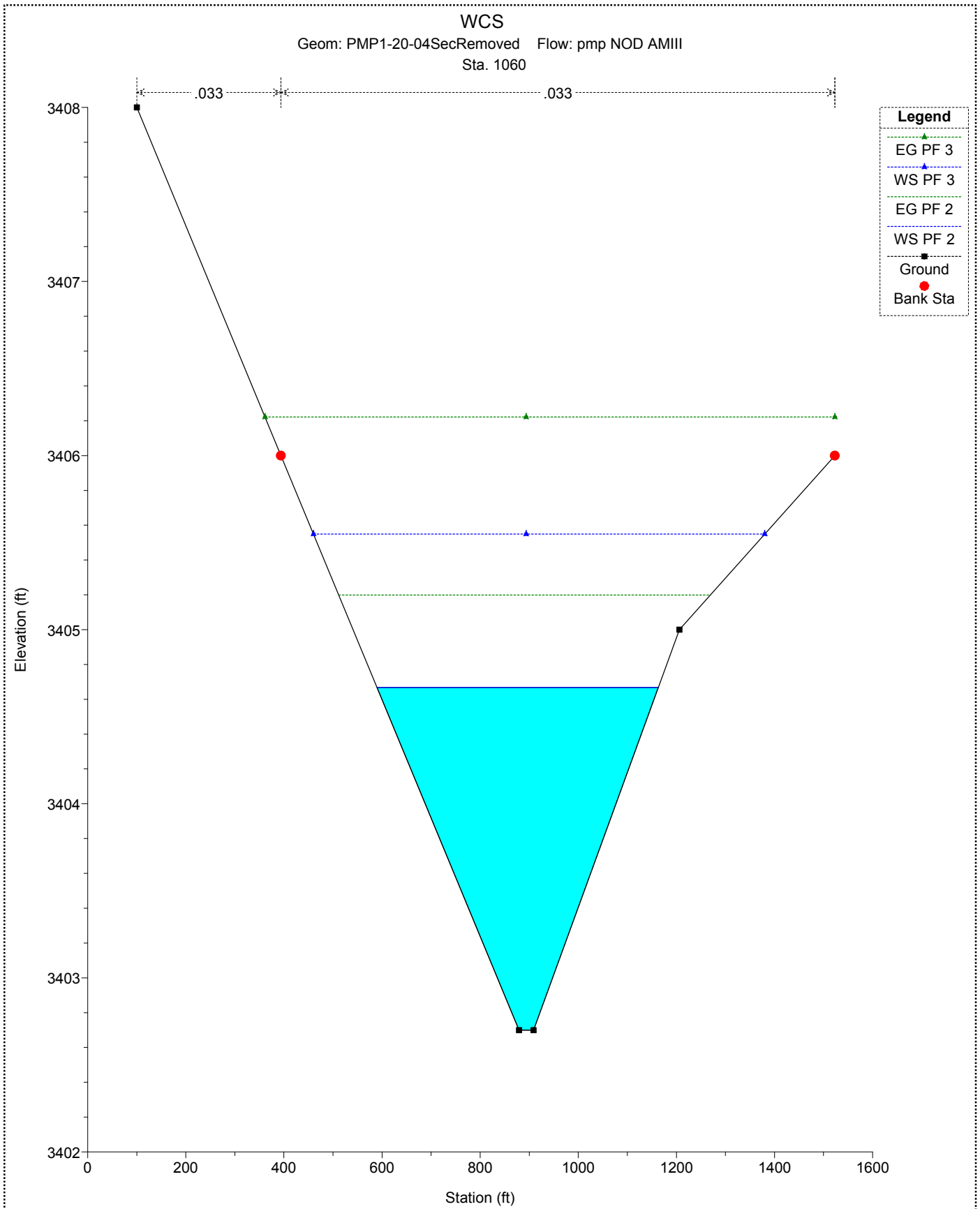














APPENDIX B SOIL STUDY



United States
Department of
Agriculture

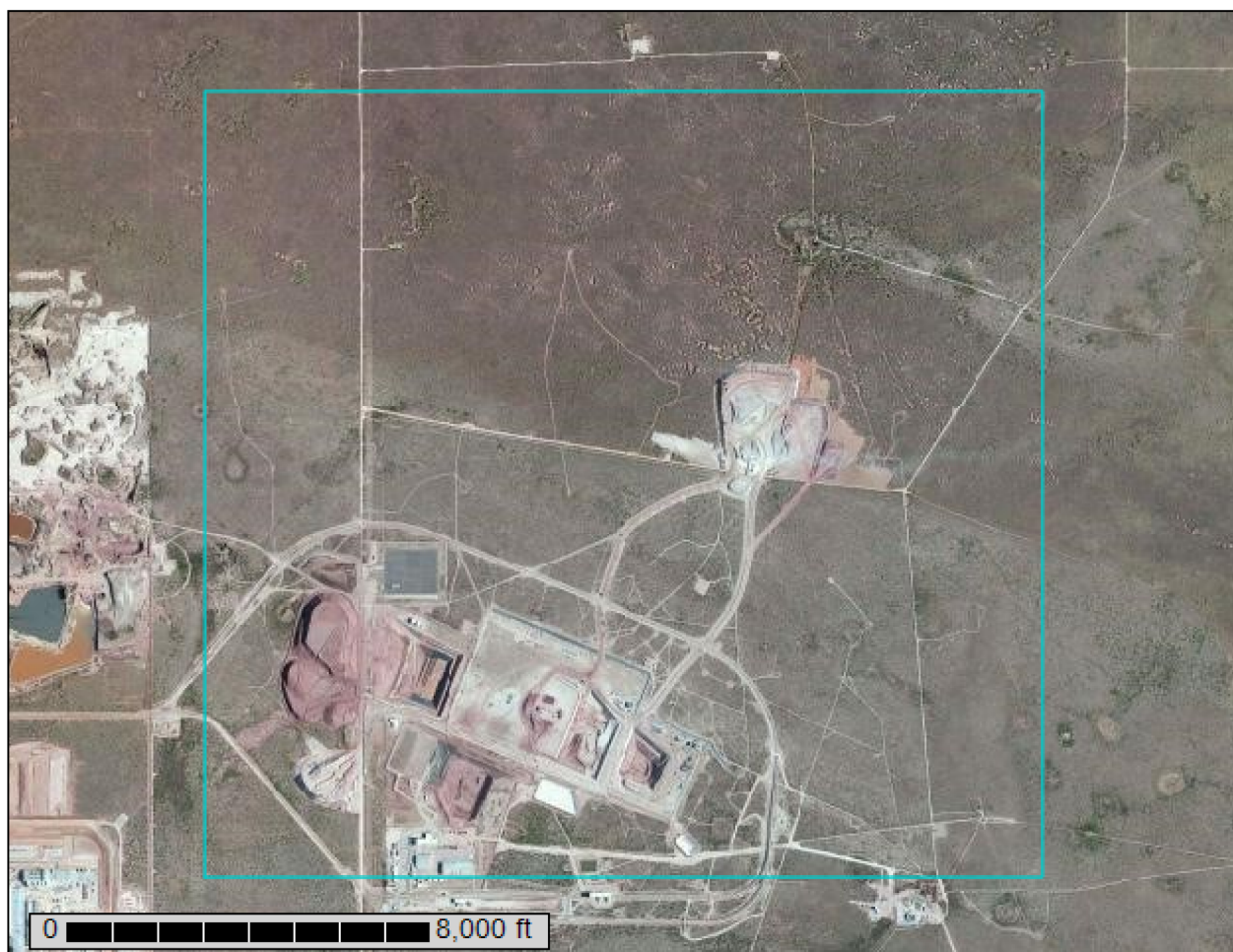
NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Andrews County, Texas, and Lea County, New Mexico**

WCS



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<http://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map
Index Sheet



Map Scale: 1:26,400 if printed on B landscape (17" x 11") sheet.

0 350 700 1400 2100 Meters

0 1000 2000 4000 6000 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84