EMH&T
Engineers, Surveyors, Planners, Scientists

MEMO

Date: July 2, 2014

To: The City of Dublin

From: Molly Shlaes, EI, MMS

Subject: Riviera Preliminary Stormwater and Floodplain Modeling Memo

Copies: Diane Marin

1.0 INTRODUCTION

The following memo summarizes the preliminary stormwater management plan and floodplain analysis for the Riviera site in Dublin, Ohio. The site is located west of Avery Road between Belvedere Green Boulevard and Glick Road. There are four proposed wet basins within the development site which will treat runoff from the site for quality and quantity control. The following provides the pre-developed and post-developed site details as well as all assumptions made to complete the preliminary stormwater analysis in accordance with City of Dublin stormwater management criteria. This analysis also includes a study of the floodplain for Tributary I-2 and the Unnamed Tributary of Tributary I-2.

2.0 STORMWATER MANAGEMENT

The proposed site is divided into four subareas which are located within Subareas 7860, 8040, 8050, 8060, 8070, 8330, and 8350 of the North Fork Indian Run Watershed as defined by the City of Dublin Stormwater Master Plan. The watershed sub-basins associated with the site development are delineated on Exhibit 2 in Appendix C. The pre-developed condition of the project area is predominantly open space area land use associated with Riviera Golf Club in Type "C" Soils.

The post-developed condition is single-family residential housing and open space. The total tributary area to the wet basins is approximately 130 acres. For all subareas, it was assumed that the runoff curve number is 83 (¼-acre lots) and each post-developed subarea is 38% impervious. The allowable release rates for the site based on the City of Dublin Stormwater Master Plan can be found in Table 1.

Table 1
Allowable Release Rates

Allowable Release Rates per Acre *North Fork Indian Run*

City of Dublin Subarea	1-year	2-year	5-year	10-year	25-year	50-year	100-year
7860	0.6	0.8	0.9	1.3	2.0	3.0	4.1
8040	0.1	0.2	0.2	0.3	0.4	0.6	0.8
8050	0.0	0.0	0.0	0.1	0.1	0.2	0.2
8060	0.0	0.0	0.1	0.1	0.2	0.3	0.5
8070	0.2	0.2	0.3	0.4	0.5	0.6	0.8
8330	0.2	0.2	0.3	0.4	0.5	0.6	0.8
8350	0.1	0.1	0.1	0.2	0.3	0.4	0.7

Post-Developed Area per Sub-Basin (acres)

City of Dublin Subarea	Post 01	Post 02	Post 03	Post 04	Total
7860	0.07	0	0	0	0.07
8040	41.74	0	2.76	9.73	54.23
8050	17.70	0	0	9.83	27.53
8060	0.01	0	0	0	0.01
8070	11.01	3.12	0	0	14.13
8330	0	6.03	3.50	0	9.53
8350	0	0	24.54	0	24.54
Total	70.53	9.15	30.80	19.56	130.04

Allowable Release Rates based on Post-Developed Area (cfs) *North Fork Indian Run*

Site Development Area	1-year	2-year	5-year	10-year	25-year	50-year	100-year
Post 01	6.42	10.61	11.72	18.79	24.11	35.40	46.03
Post 02	1.83	1.83	2.75	3.66	4.58	5.49	7.32
Post 03	3.43	3.71	4.06	7.14	10.22	13.57	22.19
Post 04	0.97	1.95	1.95	3.90	4.88	7.80	9.75
Total	12.65	18.09	20.46	33.49	43.78	62.27	85.29

The increase in runoff volume from the pre-developed to post-developed condition is conservatively assumed to be a 25-year critical storm. Based on the 25-year critical storm, the post-developed allowable release rates for the entire development can be found in Table 2.

The stormwater management basins will provide water quality and detain the runoff from the proposed site to the allowable release rates. Wet Basin A will provide approximately 15.5 acre-feet of storage in the 100-year event. Wet Basin B will provide approximately 2 acre-feet of storage in the 100-year event. Wet Basin C will provide approximately 7 acre-feet of storage in the 100-year event. Wet Basin D will provide approximately 4.5 acre-feet of storage in the 100-year event.

Table 2
Total Site Allowable Release Rates

Storm Event (yr)	Total Allowable Release Rates (cfs)	Preliminary Proposed Release Rates (cfs)
1	<12.65	2.42
2	<12.65	3.14
5	<12.65	4.93
10	<12.65	6.35
25	12.65	11.22
50	62.27	18.62
100	85.29	29.44

Wet Basins A, B, C, and D will be required to treat a water quality volume of 0.888, 0.115, 0.388, and 0.246 acre-feet, respectively, which will be drawn down over a minimum 24-hour period. Each basin provides adequate water quality volume and the required 24-hour drawdown. It should be noted that these estimated detention volumes and proposed release rates are preliminary and subject to be refined during the final site design process. The above stormwater management plan was designed to meet both the requirements of The City of Dublin and The Ohio EPA.

3.0 STREAM CORRIDOR PROTECTION ZONE

A Stream Corridor Protection Zone (SCPZ) was determined for both Tributary I-2 and the Unnamed Tributary through the development site. There are two criteria that determine the width of a SCPZ according to the City of Dublin's Codified Ordinances. The first criterion is that the SCPZ should be the width of the FEMA-designated floodway plus 20 feet. The second criterion is that in areas where a floodway has not been designated, the width should be drawn according to the drainage area. For this study, there is no FEMA-designated floodway, but a preliminary floodway was modeled along both waterways. For both Tributary I-2 and the Unnamed Tributary, a SCPZ was drawn to fit both criteria. Then, the two were combined so that the outer-most boundary was used in all cases. The SCPZ shown on Exhibit 1 depicts the combination of both SCPZ criteria.

Tributary I-2 has a tributary area of 455 acres at the downstream limit of the site, see StreamStats output, Appendix A. According to the City of Dublin requirements, a drainage area of 455 acres requires a SCPZ of 50 feet on each side of the channel. The Unnamed Tributary has a tributary area of 160 acres at the downstream side of the site, see StreamStats output, Appendix A. According to the City of Dublin requirements, a drainage area of 160 acres requires a SCPZ of 38 feet on each side of the channel.

4.0 FLOODPLAIN ANALYSIS

The USGS StreamStats method was used to estimate peak flood discharge rates for Tributary I-2 and the Unnamed Tributary. From StreamStats, the 100-year peak flood discharge rate for Tributary I-2 upstream of the confluence with the Unnamed Tributary is 262 cfs. The 100-year peak flood discharge rate for Tributary I-2 upstream of the Belvedere Green Boulevard bridge is 717 cfs. This peak flood discharge is consistent with previous Tributary I-2 flood studies. The 100-year peak flow rate for the Unnamed Tributary is 204 cfs. The US Army Corps of Engineers HEC-RAS computer program was used to model the flood profile through the site for both streams. Cross-section data was taken from 2007 Franklin County Auditor's topography and field topography dated 2013. The location of model cross-sections, computed floodway, and floodplain can be found on Exhibit 1 in Appendix C. In the proposed condition, each proposed roadway stream crossing was modeled to determine the width of the 3-sided box culverts. The impacts of these proposed structures can be found in the HEC-RAS output in Appendix B. The existing and proposed floodplain elevations for each cross-section are shown on Table 3. All elevations listed are based on the NAVD 88 datum. As with the stormwater management calculations, the floodplain analysis is subject to refinement during the final site design process.

Table 3
100-Year Floodplain Elevations

Unnamed Tributary

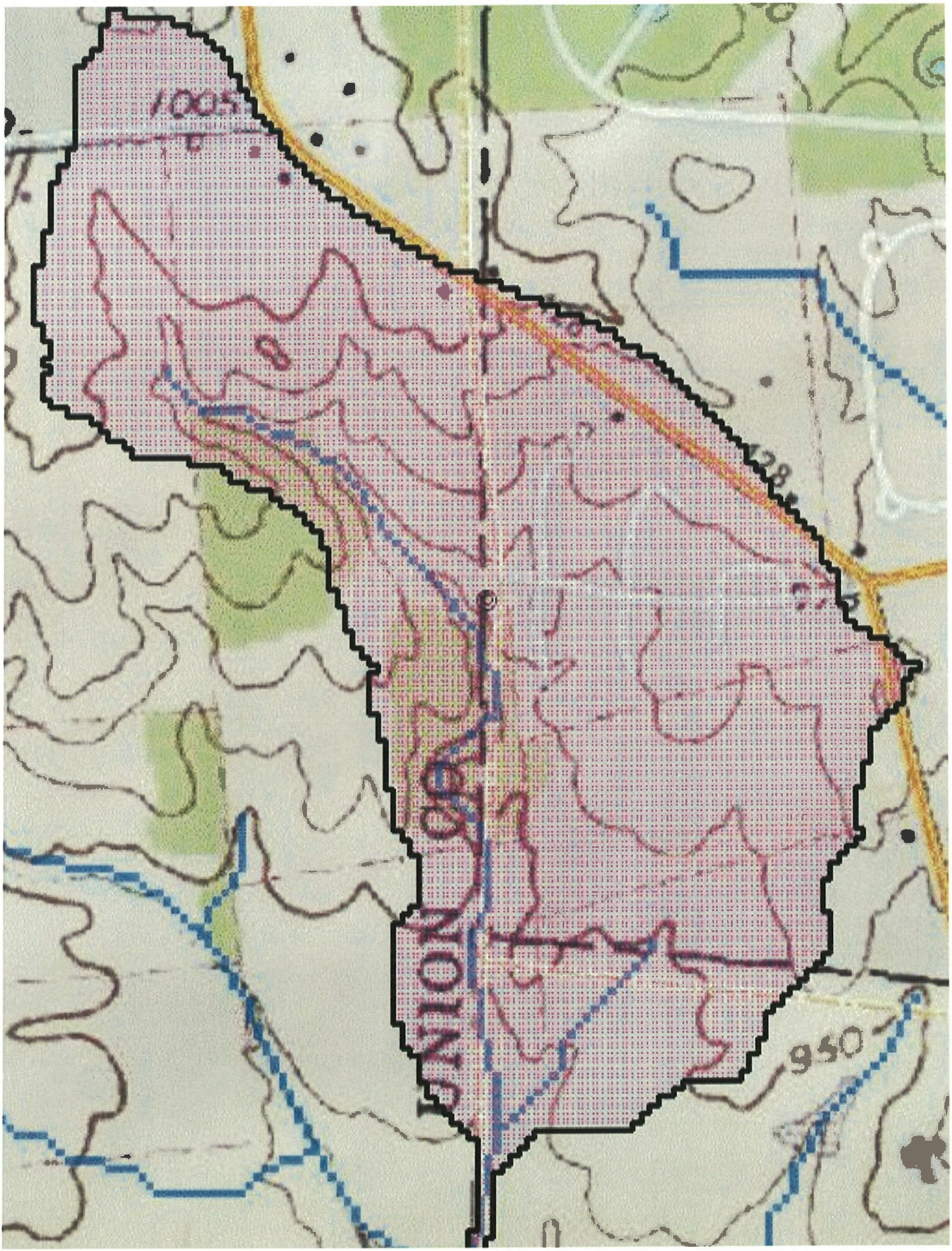
Cross-Section	Existing 100-Year Flood Elevation (feet)	Proposed 100-Year Flood Elevation (feet)
21	937.00	936.37
20	936.10	936.00
19.5	936.31	936.00
19	936.34	936.07
18	936.35	936.08
17	936.34	936.07
16	936.23	935.72
14	935.45	935.45
13	935.30	933.73
12	933.48	933.16
11	933.01	932.52
10	932.70	932.42
9	932.56	932.19
8	931.46	932.00
7.5	931.66	932.19
7	931.62	932.00
6.5	931.52	932.19
6	931.12	-
5	931.34	-
3	930.01	-
2.5	930.30	-
2	930.37	930.37
1	930.17	930.17

Tributary I-2

Cross-Section	Existing 100-Year Flood Elevation (feet)	Proposed 100-Year Flood Elevation (feet)
73	939.16	939.19
72	938.41	938.51
71	938.02	938.52
70	937.13	-
69	936.43	936.42
68	935.82	935.82
67	933.80	933.80
66	933.71	933.71
65	933.70	933.70
64	932.59	932.59
63	932.57	932.57
61	931.90	932.00
60	931.70	931.90
59	931.03	931.38
58	930.97	931.34
56	930.95	931.29
55	930.92	-
54	930.86	930.49
53	930.81	930.40
52	930.73	930.35
51	930.75	930.36
50	930.74	930.35
49	930.72	930.32
48	929.76	929.76
46	928.58	928.58
45	928.56	928.56
44	927.33	927.74
43	927.36	927.69
41	927.35	926.85
40	925.57	925.57
39	924.05	924.05
38	923.96	923.96
37	923.91	923.91
35	923.90	923.90
34	923.17	923.17
33	923.18	923.18

APPENDIX A:

StreamStats


1005
UNION
950

USGS
Ohio StreamStats

Streamstats Ungaged Site Report

Date: Tue Apr 22 2014 06:41:55 Mountain Daylight Time
Site Location: Ohio
NAD27 Latitude: 40.1395 (40 08 22)
NAD27 Longitude: -83.1703 (-83 10 13)
NAD83 Latitude: 40.1396 (40 08 23)
NAD83 Longitude: -83.1702 (-83 10 13)
Drainage Area: 0.26 mi2

Peak Flows Basin Characteristics			
100% Peak Flow Full Model (0.26 mi2)			
Parameter	**Value**	**Regression Equation Valid Range**	
		Min	**Max**
Drainage Area (square miles)	0.26	0.01	7422
Ohio Region C Indicator 1 if in C else 0 (dimensionless)	0	0	1
Ohio Region A Indicator 1 if in A else 0 (dimensionless)	1	0	1
Stream Slope 10 and 85 Longest Flow Path (feet per mi)	64.7	1.53	674
Percent Storage from NLCD (percent)	0	0	25.8

Low-Flow SIR 2012_5138 Basin Characteristics			
100% Low Flow Region A 2012 5138 (0.26 mi2)			
Parameter	**Value**	**Regression Equation Valid Range**	
		Min	**Max**
Drainage Area (square miles)	0.26 (below min value 1)	1	1250
Streamflow Variability Index (dimensionless)	0.778	0.24	1.12

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Probability of Zero Flow Basin Characteristics			
100% P zero Flow 2012 5138 (0.26 mi2)			
Parameter	**Value**	**Regression Equation Valid Range**	
		Min	**Max**
Drainage Area (square miles)	0.26 (below min value 1)	1	1250
Streamflow Variability Index (dimensionless)	0.778	0.24	1.12

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Mean and Percentile Basin Characteristics			
Y coordinate (latitude) of the centroid in decimal degrees=40.1468			
100% Low Flow LatLE 41.2 wri02 4068 (0.26 mi2)			
Parameter	**Value**	**Regression Equation Valid Range**	
		Min	**Max**
Drainage Area (square miles)	0.26	0.12	7422
Percent Forest (percent)	15.5	0	99.1
Percent Storage from NLCD (percent)	0	0	19
Mean Annual Precipitation (inches)	37	34	43.2
Streamflow Variability Index (dimensionless)	0.778	0.25	1.13
Latitude of Basin Centroid (decimal degrees)	40.1468	38.68	41.2
Longitude of Basin Centroid (decimal degrees)	83.1701	80.53	84.6

Peak Flows Streamflow Statistics					
Statistic	**Flow (ft^3/s)**	**Prediction Error (percent)**	**Equivalent years of record**	**90-Percent Prediction Interval**	
				Minimum	**Maximum**
PK2	43.1	37	2.1	20.9	89.2
PK5	80.7	35	3.3	40.4	161

PK10	109	34	4.4	54.3	218
PK25	146	35	5.9	71.3	301
PK50	175	37	6.8	82.7	369
PK100	204	38	7.5	93.4	445
PK500	274	42	8.6	115	650

Low-Flow SIR 2012_5138 Streamflow Statistics

Statistic	Flow (ft^3/s)	Standard Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
				Minimum	Maximum
D80	0.00828				
M1D10Y	0.000179				
M7D10Y	0.000337				
M30D10Y	0.000741				
M90D10Y	0.00154				

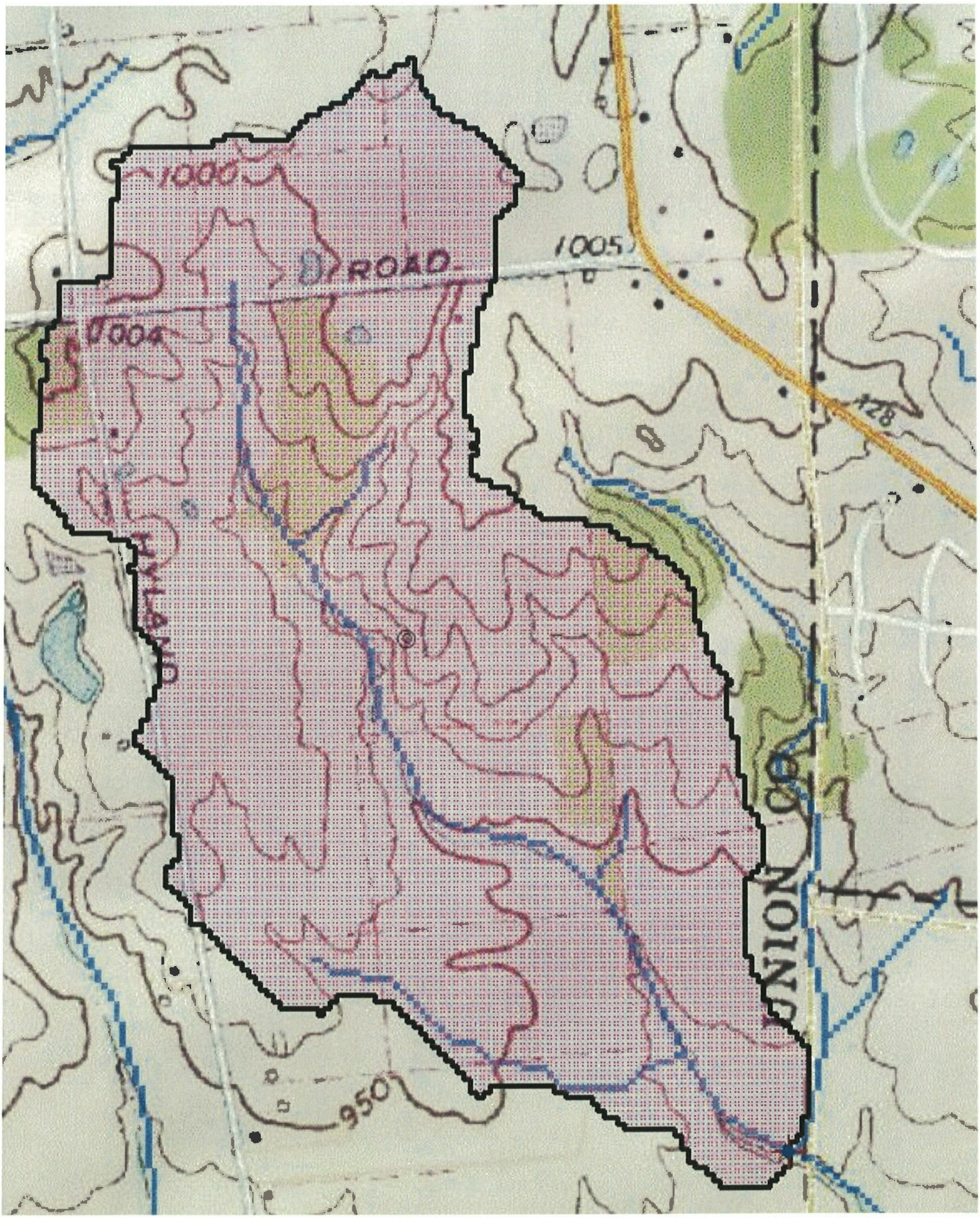
If one of the probabilities below is greater than 0.1, then it is recommended that zero (0) cubic feet per second be used for the corresponding low-flow statistic

Probability of Zero Flow Statistics

Statistic	Value	Standard Error (percent)
PROB_1DAY	0.23	
PROB_7DAY	0.13	
PROB_30DAY	0.00946	

Mean and Percentile Streamflow Statistics

Statistic	Flow (ft^3/s)	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
				Minimum	Maximum
Q1	0.33	17			
Q2	0.46	12			
Q3	0.5	14			
Q4	0.48	11			
Q5	0.31	20			
Q6	0.17	27			
Q7	0.0949	28			
Q8	0.0556	37			
Q9	0.0323	44			
QA	0.24	11			
Q10	0.0364	51			
Q11	0.11	38			
Q12	0.25	22			
QAH	0.00888	66			
FPS25	0.0257	29			
FPS50	0.0776	40			
FPS75	0.21	48			


1000
1005
ROAD
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128
HAYLAND
UNION
950

USGS Ohio StreamStats

Streamstats Ungaged Site Report

Date: Tue Apr 22 2014 06:44:16 Mountain Daylight Time
Site Location: Ohio
NAD27 Latitude: 40.1394 (40 08 22)
NAD27 Longitude: -83.1705 (-83 10 14)
NAD83 Latitude: 40.1395 (40 08 22)
NAD83 Longitude: -83.1705 (-83 10 14)
Drainage Area: 0.45 mi2

Peak Flows Basin Characteristics			
100% Peak Flow Full Model (0.45 mi2)			
Parameter	**Value**	**Regression Equation Valid Range**	
		Min	**Max**
Drainage Area (square miles)	0.45	0.01	7422
Ohio Region C Indicator 1 if in C else 0 (dimensionless)	0	0	1
Ohio Region A Indicator 1 if in A else 0 (dimensionless)	1	0	1
Stream Slope 10 and 85 Longest Flow Path (feet per mi)	47.8	1.53	674
Percent Storage from NLCD (percent)	0.38	0	25.8

Low-Flow SIR 2012_5138 Basin Characteristics			
100% Low Flow Region A 2012 5138 (0.45 mi2)			
Parameter	**Value**	**Regression Equation Valid Range**	
		Min	**Max**
Drainage Area (square miles)	0.45 (below min value 1)	1	1250
Streamflow Variability Index (dimensionless)	0.778	0.24	1.12

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Probability of Zero Flow Basin Characteristics			
100% P zero Flow 2012 5138 (0.45 mi2)			
Parameter	**Value**	**Regression Equation Valid Range**	
		Min	**Max**
Drainage Area (square miles)	0.45 (below min value 1)	1	1250
Streamflow Variability Index (dimensionless)	0.778	0.24	1.12

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Mean and Percentile Basin Characteristics			
Y coordinate (latitude) of the centroid in decimal degrees=40.1465			
100% Low Flow LatLE 41.2 wri02 4068 (0.45 mi2)			
Parameter	**Value**	**Regression Equation Valid Range**	
		Min	**Max**
Drainage Area (square miles)	0.45	0.12	7422
Percent Forest (percent)	22.2	0	99.1
Percent Storage from NLCD (percent)	0.38	0	19
Mean Annual Precipitation (inches)	37	34	43.2
Streamflow Variability Index (dimensionless)	0.778	0.25	1.13
Latitude of Basin Centroid (decimal degrees)	40.1466	38.68	41.2
Longitude of Basin Centroid (decimal degrees)	83.1777	80.53	84.6

Peak Flows Streamflow Statistics					
Statistic	**Flow (ft^3/s)**	**Prediction Error (percent)**	**Equivalent years of record**	**90-Percent Prediction Interval**	
				Minimum	**Maximum**
PK2	59.8	37	2.1	29.3	122
PK5	108	35	3.3	54.9	213

PK10	144	34	4.4	72.8	284
PK25	191	35	5.9	94.2	386
PK50	226	37	6.8	109	469
PK100	262	38	7.5	122	561
PK500	347	42	8.6	149	808

Low-Flow SIR 2012_5138 Streamflow Statistics

Statistic	Flow (ft^3/s)	Standard Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
				Minimum	Maximum
D80	0.0143				
M1D10Y	0.00031				
M7D10Y	0.000583				
M30D10Y	0.00128				
M90D10Y	0.00267				

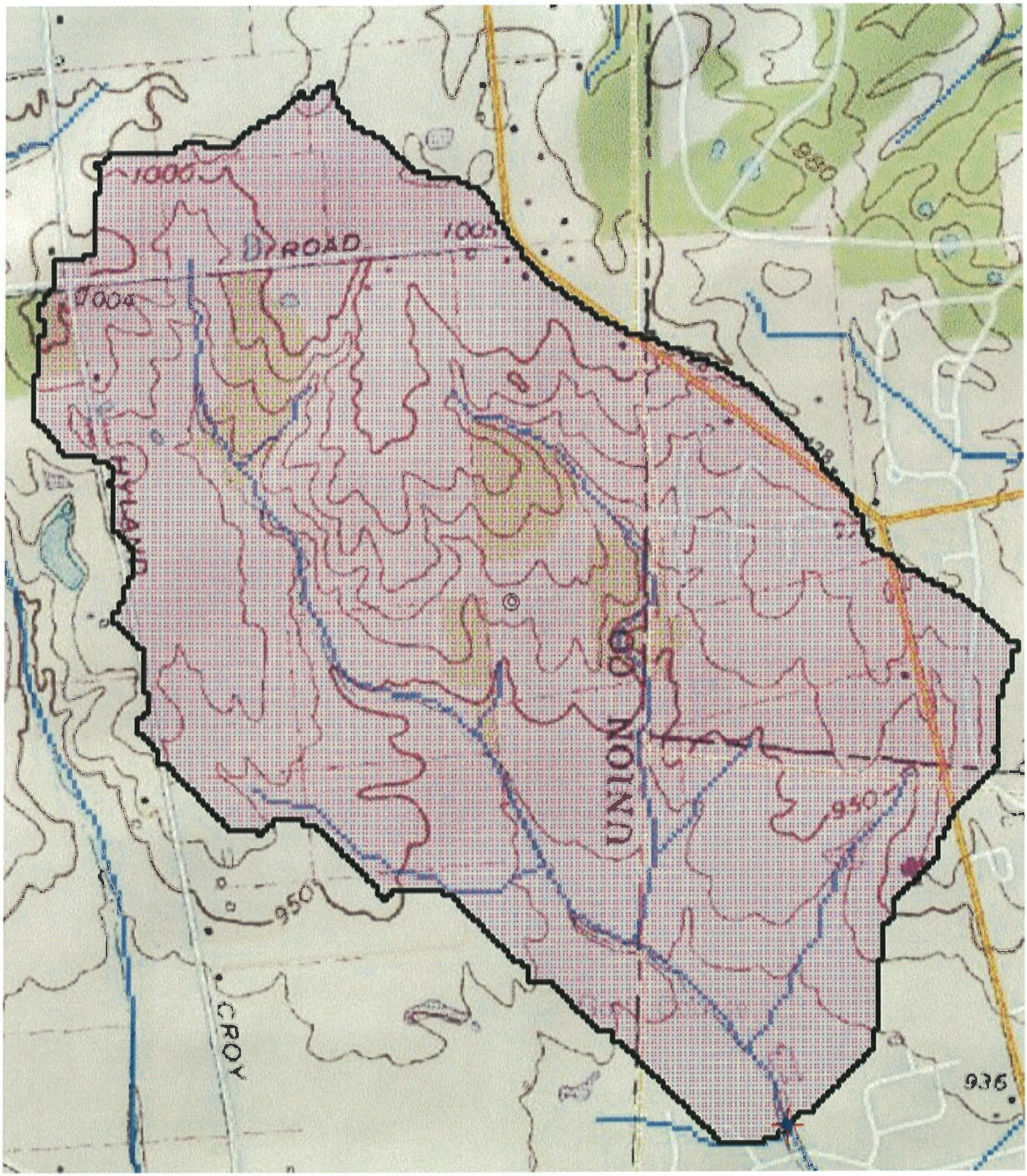
If one of the probabilities below is greater than 0.1, then it is recommended that zero (0) cubic feet per second be used for the corresponding low-flow statistic

Probability of Zero Flow Statistics

Statistic	Value	Standard Error (percent)
PROB_1DAY	0.23	
PROB_7DAY	0.13	
PROB_30DAY	0.00946	

Mean and Percentile Streamflow Statistics

Statistic	Flow (ft^3/s)	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
				Minimum	Maximum
Q1	0.59	17			
Q2	0.8	12			
Q3	0.87	14			
Q4	0.83	11			
Q5	0.54	20			
Q6	0.29	27			
Q7	0.16	28			
Q8	0.0967	37			
Q9	0.0588	44			
QA	0.43	11			
Q10	0.0644	51			
Q11	0.19	38			
Q12	0.44	22			
QAH	0.0181	66			
FPS25	0.0469	29			
FPS50	0.14	40			
FPS75	0.38	48			


1000
1005
D ROAD
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980
UNION
950
950
CROY
936

USGS
Ohio StreamStats

Streamstats Ungaged Site Report

Date: Tue Apr 22 2014 06:30:39 Mountain Daylight Time
Site Location: Ohio
NAD27 Latitude: 40.1363 (40 08 11)
NAD27 Longitude: -83.1667 (-83 10 00)
NAD83 Latitude: 40.1363 (40 08 11)
NAD83 Longitude: -83.1666 (-83 09 60)
Drainage Area: 0.88 mi2

Peak Flows Basin Characteristics			
100% Peak Flow Full Model (0.88 mi2)			
Parameter	**Value**	**Regression Equation Valid Range**	
		Min	**Max**
Drainage Area (square miles)	0.88	0.01	7422
Ohio Region C Indicator 1 if in C else 0 (dimensionless)	0	0	1
Ohio Region A Indicator 1 if in A else 0 (dimensionless)	1	0	1
Stream Slope 10 and 85 Longest Flow Path (feet per mi)	45.7	1.53	674
Percent Storage from NLCD (percent)	0.32	0	25.8

Low-Flow SIR 2012_5138 Basin Characteristics			
100% Low Flow Region A 2012 5138 (0.88 mi2)			
Parameter	**Value**	**Regression Equation Valid Range**	
		Min	**Max**
Drainage Area (square miles)	0.88 (below min value 1)	1	1250
Streamflow Variability Index (dimensionless)	0.780	0.24	1.12

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Probability of Zero Flow Basin Characteristics			
100% P zero Flow 2012 5138 (0.88 mi2)			
Parameter	**Value**	**Regression Equation Valid Range**	
		Min	**Max**
Drainage Area (square miles)	0.88 (below min value 1)	1	1250
Streamflow Variability Index (dimensionless)	0.780	0.24	1.12

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Mean and Percentile Basin Characteristics			
Y coordinate (latitude) of the centroid in decimal degrees=40.1455			
100% Low Flow LatLE 41.2 wri02 4068 (0.88 mi2)			
Parameter	**Value**	**Regression Equation Valid Range**	
		Min	**Max**
Drainage Area (square miles)	0.88	0.12	7422
Percent Forest (percent)	16.6	0	99.1
Percent Storage from NLCD (percent)	0.32	0	19
Mean Annual Precipitation (inches)	37	34	43.2
Streamflow Variability Index (dimensionless)	0.780	0.25	1.13
Latitude of Basin Centroid (decimal degrees)	40.1455	38.68	41.2
Longitude of Basin Centroid (decimal degrees)	83.1733	80.53	84.6

Peak Flows Streamflow Statistics					
Statistic	**Flow (ft^3/s)**	**Prediction Error (percent)**	**Equivalent years of record**	**90-Percent Prediction Interval**	
				Minimum	**Maximum**
PK2	101	37	2.1	50	204
PK5	181	35	3.3	92.9	352

PK10	240	34	4.4	123	469
PK25	318	35	5.9	159	636
PK50	376	37	6.8	183	772
PK100	436	38	7.5	206	922
PK500	578	42	8.6	252	1320

Low-Flow SIR 2012_5138 Streamflow Statistics

Statistic	Flow (ft^3/s)	Standard Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
				Minimum	Maximum
D80	0.0277				
M1D10Y	0.000576				
M7D10Y	0.0011				
M30D10Y	0.00246				
M90D10Y	0.00506				

If one of the probabilities below is greater than 0.1, then it is recommended that zero (0) cubic feet per second be used for the corresponding low-flow statistic

Probability of Zero Flow Statistics

Statistic	Value	Standard Error (percent)
PROB_1DAY	0.23	
PROB_7DAY	0.13	
PROB_30DAY	0.00969	

Mean and Percentile Streamflow Statistics

Statistic	Flow (ft^3/s)	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
				Minimum	Maximum
Q1	1.15	17			
Q2	1.53	12			
Q3	1.68	14			
Q4	1.59	11			
Q5	1.04	20			
Q6	0.57	27			
Q7	0.32	28			
Q8	0.19	37			
Q9	0.11	44			
QA	0.84	11			
Q10	0.13	51			
Q11	0.39	38			
Q12	0.85	22			
QAH	0.0348	66			
FPS25	0.0828	29			
FPS50	0.26	40			
FPS75	0.71	48			

APPENDIX B:

HEC-RAS Output

-Tributary 1-2
-Unnamed Tributary

Tributary I-2

HEC-RAS River: Tributary I-2 Reach: 1 Profile: 100-year

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	73	100-year	Trib I-2 Ex	262.00	935.86	939.16		939.24	0.001032	2.93	158.87	101.63	0.29
1	73	100-year	Trib I-2 Prop	262.00	935.86	939.19		939.27	0.000986	2.88	162.06	102.81	0.28
1	72	100-year	Trib I-2 Ex	262.00	934.99	938.41		938.87	0.005185	5.80	54.62	31.64	0.61
1	72	100-year	Trib I-2 Prop	262.00	934.99	938.51		938.93	0.004479	5.53	57.98	32.83	0.57
1	71	100-year	Trib I-2 Ex	262.00	934.67	938.02	937.53	938.59	0.006087	6.34	57.73	84.33	0.67
1	71	100-year	Trib I-2 Prop	262.00	934.67	938.52	937.54	938.72	0.002150	4.20	101.32	92.29	0.41
1	70	100-year	Trib I-2 Ex	262.00	934.23	937.13	937.13	937.95	0.011634	7.48	39.66	27.80	0.89
1	69	100-year	Trib I-2 Ex	262.00	933.92	936.43		936.68	0.006420	5.07	80.82	86.80	0.65
1	69	100-year	Trib I-2 Prop	262.00	933.92	936.42		936.71	0.006793	5.20	70.26	86.50	0.67
1	68	100-year	Trib I-2 Ex	262.00	933.52	935.82	935.82	936.21	0.009078	6.10	73.95	96.08	0.77
1	68	100-year	Trib I-2 Prop	262.00	933.52	935.82	935.82	936.21	0.009078	6.10	73.95	96.08	0.77
1	67	100-year	Trib I-2 Ex	262.00	932.53	933.80	933.80	934.21	0.019552	5.10	51.37	64.44	1.01
1	67	100-year	Trib I-2 Prop	262.00	932.53	933.80	933.80	934.21	0.019552	5.10	51.37	64.44	1.01
1	66	100-year	Trib I-2 Ex	262.00	931.82	933.71		933.75	0.000606	1.59	193.94	136.71	0.20
1	66	100-year	Trib I-2 Prop	262.00	931.82	933.71		933.75	0.000606	1.59	193.94	136.71	0.20
1	65	100-year	Trib I-2 Ex	262.00	929.92	933.70	931.52	933.72	0.000168	1.12	290.59	169.56	0.12
1	65	100-year	Trib I-2 Prop	262.00	929.92	933.70	931.52	933.72	0.000168	1.12	290.59	169.56	0.12
1	64.5			Culvert									
1	64	100-year	Trib I-2 Ex	262.00	929.91	932.59	932.59	933.20	0.009981	6.57	48.26	47.71	0.82
1	64	100-year	Trib I-2 Prop	262.00	929.91	932.59	932.59	933.20	0.009981	6.57	48.26	47.71	0.82
1	63	100-year	Trib I-2 Ex	262.00	928.97	932.57	930.99	932.60	0.000389	1.81	291.25	314.93	0.18
1	63	100-year	Trib I-2 Prop	262.00	928.97	932.57	930.99	932.60	0.000389	1.81	291.09	314.88	0.18
1	62			Inl Struct									
1	61	100-year	Trib I-2 Ex	262.00	927.97	931.90		932.04	0.001643	3.83	122.38	113.83	0.36
1	61	100-year	Trib I-2 Prop	262.00	927.97	932.00		932.17	0.001744	4.02	134.57	260.13	0.37
1	60	100-year	Trib I-2 Ex	262.00	927.53	931.70	930.39	931.89	0.001719	4.07	117.63	153.27	0.37
1	60	100-year	Trib I-2 Prop	262.00	927.53	931.90	930.39	932.04	0.001178	3.49	146.71	176.38	0.31
1	59.5			Bridge									
1	59	100-year	Trib I-2 Ex	262.00	927.53	931.03		931.16	0.001629	3.52	126.12	129.80	0.35
1	59	100-year	Trib I-2 Prop	262.00	927.53	931.38		931.44	0.000787	2.63	178.35	168.80	0.25
1	58	100-year	Trib I-2 Ex	262.00	927.40	930.97	930.26	931.03	0.001152	2.92	171.92	169.38	0.30
1	58	100-year	Trib I-2 Prop	262.00	927.40	931.34	930.26	931.38	0.000556	2.19	182.65	276.09	0.21
1	57			Inl Struct									
1	56	100-year	Trib I-2 Ex	262.00	926.91	930.95		931.02	0.001052	2.91	172.90	167.74	0.28
1	56	100-year	Trib I-2 Prop	262.00	926.91	931.29	930.18	931.37	0.000884	2.85	128.89	211.04	0.26
1	55	100-year	Trib I-2 Ex	262.00	926.76	930.92		930.98	0.000777	2.74	166.76	119.64	0.25
1	54	100-year	Trib I-2 Ex	262.00	926.73	930.86		930.94	0.000920	2.93	163.72	140.67	0.27
1	54	100-year	Trib I-2 Prop	262.00	926.73	930.49		930.70	0.002376	4.38	92.17	126.08	0.43
1	53	100-year	Trib I-2 Ex	262.00	926.59	930.81		930.85	0.000464	2.12	188.43	107.37	0.20
1	53	100-year	Trib I-2 Prop	262.00	926.59	930.40		930.49	0.000923	2.77	155.38	151.94	0.27
1	52	100-year	Trib I-2 Ex	262.00	926.49	930.73		930.80	0.000495	2.18	144.32	69.74	0.20
1	52	100-year	Trib I-2 Prop	262.00	926.49	930.35		930.40	0.000540	2.10	225.96	381.88	0.21
1	51	100-year	Trib I-2 Ex	262.00	926.32	930.75		930.75	0.000091	0.94	440.12	248.36	0.09
1	51	100-year	Trib I-2 Prop	262.00	926.32	930.36		930.37	0.000068	0.75	681.69	595.36	0.07
1	50	100-year	Trib I-2 Ex	262.00	926.12	930.74		930.74	0.000048	0.70	545.19	283.33	0.06
1	50	100-year	Trib I-2 Prop	262.00	926.12	930.35		930.36	0.000041	0.60	819.01	712.16	0.06
1	49	100-year	Trib I-2 Ex	262.00	926.12	930.72	929.43	930.74	0.000302	1.77	277.86	317.27	0.16
1	49	100-year	Trib I-2 Prop	262.00	926.12	930.32	929.43	930.35	0.000465	2.05	340.45	732.44	0.19
1	48.5			Bridge									
1	48	100-year	Trib I-2 Ex	262.00	925.70	929.76	927.23	929.76	0.000060	0.82	542.08	290.02	0.07
1	48	100-year	Trib I-2 Prop	262.00	925.70	929.76	927.23	929.76	0.000060	0.82	542.08	290.02	0.07
1	47			Inl Struct									
1	46	100-year	Trib I-2 Ex	262.00	923.76	928.58		928.59	0.000132	1.20	384.29	251.76	0.11
1	46	100-year	Trib I-2 Prop	262.00	923.76	928.58		928.59	0.000132	1.20	384.29	251.76	0.11

HEC-RAS River: Tributary I-2 Reach: 1 Profile: 100-year (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	45	100-year	Trib I-2 Ex	262.00	924.79	928.56	926.43	928.57	0.000116	1.02	417.14	562.66	0.10
1	45	100-year	Trib I-2 Prop	262.00	924.79	928.56	926.43	928.57	0.000116	1.02	417.14	562.66	0.10
1	44.5			Bridge									
1	44	100-year	Trib I-2 Ex	262.00	924.79	927.33		927.45	0.001824	3.03	125.20	423.00	0.36
1	44	100-year	Trib I-2 Prop	262.00	924.79	927.74		927.79	0.000656	2.04	195.30	439.31	0.22
1	43	100-year	Trib I-2 Ex	262.00	923.58	927.36	925.36	927.36	0.000066	0.78	698.31	937.87	0.07
1	43	100-year	Trib I-2 Prop	262.00	923.58	927.69	925.36	927.72	0.000231	1.56	230.10	1010.44	0.14
1	42			Inl Struct									
1	41	100-year	Trib I-2 Ex	262.00	923.58	927.35	925.70	927.35	0.000073	0.78	683.69	936.33	0.08
1	41	100-year	Trib I-2 Prop	262.00	923.58	926.85	925.70	927.00	0.001634	3.28	95.10	819.75	0.35
1	40.5			Bridge									
1	40	100-year	Trib I-2 Ex	262.00	924.04	925.57	925.57	926.16	0.017206	7.39	45.06	451.36	1.05
1	40	100-year	Trib I-2 Prop	262.00	924.04	925.57	925.57	926.16	0.017206	7.39	45.06	451.36	1.05
1	39	100-year	Trib I-2 Ex	262.00	921.77	924.05	923.96	924.46	0.008159	6.50	67.59	266.73	0.77
1	39	100-year	Trib I-2 Prop	262.00	921.77	924.05	923.96	924.46	0.008159	6.50	67.59	266.73	0.77
1	38	100-year	Trib I-2 Ex	262.00	921.16	923.96		924.10	0.002347	3.63	102.77	442.33	0.42
1	38	100-year	Trib I-2 Prop	262.00	921.16	923.96		924.10	0.002347	3.63	102.77	442.33	0.42
1	37	100-year	Trib I-2 Ex	262.00	920.12	923.91	921.92	923.96	0.000467	2.16	253.01	355.42	0.20
1	37	100-year	Trib I-2 Prop	262.00	920.12	923.91	921.92	923.96	0.000467	2.16	253.01	355.42	0.20
1	36			Inl Struct									
1	35	100-year	Trib I-2 Ex	262.00	919.92	923.90	921.85	923.95	0.000634	2.68	249.85	349.43	0.24
1	35	100-year	Trib I-2 Prop	262.00	919.92	923.90	921.85	923.95	0.000634	2.68	249.85	349.43	0.24
1	34.5			Bridge									
1	34	100-year	Trib I-2 Ex	262.00	918.24	923.17		923.25	0.000947	2.82	187.40	222.78	0.26
1	34	100-year	Trib I-2 Prop	262.00	918.24	923.17		923.25	0.000947	2.82	187.40	222.78	0.26
1	33	100-year	Trib I-2 Ex	262.00	917.93	923.18		923.19	0.000056	0.94	719.89	578.74	0.07
1	33	100-year	Trib I-2 Prop	262.00	917.93	923.18		923.19	0.000056	0.94	719.89	578.74	0.07
1	32	100-year	Trib I-2 Ex	717.00	917.19	923.14		923.15	0.000204	1.57	971.56	628.76	0.13
1	32	100-year	Trib I-2 Prop	717.00	917.19	923.14		923.15	0.000204	1.57	971.56	628.76	0.13
1	31	100-year	Trib I-2 Ex	717.00	916.96	922.85	920.94	923.10	0.001491	4.29	197.38	602.95	0.36
1	31	100-year	Trib I-2 Prop	717.00	916.96	922.85	920.94	923.10	0.001491	4.29	197.38	602.95	0.36
1	30.5			Bridge									
1	30	100-year	Trib I-2 Ex	717.00	916.60	921.46	920.76	922.03	0.005195	6.16	129.23	65.72	0.63
1	30	100-year	Trib I-2 Prop	717.00	916.60	921.46	920.76	922.03	0.005195	6.16	129.23	65.72	0.63
1	29	100-year	Trib I-2 Ex	717.00	916.29	921.17	920.41	921.57	0.003652	5.35	200.00	176.64	0.53
1	29	100-year	Trib I-2 Prop	717.00	916.29	921.17	920.41	921.57	0.003652	5.35	200.00	176.64	0.53
1	28	100-year	Trib I-2 Ex	717.00	915.66	919.92	919.81	920.58	0.007729	7.57	165.52	124.86	0.77
1	28	100-year	Trib I-2 Prop	717.00	915.66	919.92	919.81	920.58	0.007729	7.57	165.52	124.86	0.77
1	27	100-year	Trib I-2 Ex	717.00	915.11	919.80		919.95	0.001503	3.51	313.03	222.20	0.35
1	27	100-year	Trib I-2 Prop	717.00	915.11	919.80		919.95	0.001503	3.51	313.03	222.20	0.35
1	26	100-year	Trib I-2 Ex	717.00	914.83	919.64		919.80	0.002382	5.22	355.20	270.28	0.45
1	26	100-year	Trib I-2 Prop	717.00	914.83	919.64		919.80	0.002382	5.22	355.20	270.28	0.45
1	25	100-year	Trib I-2 Ex	717.00	914.40	918.77	918.77	919.34	0.005356	7.18	192.82	182.41	0.67
1	25	100-year	Trib I-2 Prop	717.00	914.40	918.77	918.77	919.34	0.005356	7.18	192.82	182.41	0.67
1	24	100-year	Trib I-2 Ex	717.00	914.00	918.72		918.89	0.001423	3.83	306.93	193.51	0.35
1	24	100-year	Trib I-2 Prop	717.00	914.00	918.72		918.89	0.001423	3.83	306.93	193.51	0.35
1	23	100-year	Trib I-2 Ex	717.00	913.73	918.59		918.73	0.001305	3.67	358.74	202.46	0.33
1	23	100-year	Trib I-2 Prop	717.00	913.73	918.59		918.73	0.001305	3.67	358.74	202.46	0.33
1	22	100-year	Trib I-2 Ex	717.00	913.47	918.44		918.59	0.001161	3.39	289.34	135.71	0.31
1	22	100-year	Trib I-2 Prop	717.00	913.47	918.44		918.59	0.001161	3.39	289.34	135.71	0.31
1	21	100-year	Trib I-2 Ex	717.00	913.28	918.22		918.46	0.002268	4.48	246.05	142.86	0.43
1	21	100-year	Trib I-2 Prop	717.00	913.28	918.22		918.46	0.002268	4.48	246.05	142.86	0.43
1	20	100-year	Trib I-2 Ex	717.00	913.08	918.09		918.29	0.001678	3.84	248.76	131.17	0.37
1	20	100-year	Trib I-2 Prop	717.00	913.08	918.09		918.29	0.001678	3.84	248.76	131.17	0.37

HEC-RAS River: Tributary I-2 Reach: 1 Profile: 100-year (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	19	100-year	Trib I-2 Ex	717.00	912.89	917.86		918.13	0.002323	4.33	216.98	122.14	0.43
1	19	100-year	Trib I-2 Prop	717.00	912.89	917.86		918.13	0.002323	4.33	216.98	122.14	0.43
1	18	100-year	Trib I-2 Ex	717.00	912.72	917.51		917.91	0.003714	5.34	181.60	120.80	0.54
1	18	100-year	Trib I-2 Prop	717.00	912.72	917.51		917.91	0.003714	5.34	181.60	120.80	0.54
1	17	100-year	Trib I-2 Ex	717.00	912.00	917.37	916.42	917.58	0.001743	4.69	284.61	158.17	0.39
1	17	100-year	Trib I-2 Prop	717.00	912.00	917.37	916.42	917.58	0.001743	4.69	284.61	158.17	0.39
1	16.5			Bridge									
1	16	100-year	Trib I-2 Ex	717.00	911.30	917.27	916.42	917.47	0.001932	4.85	259.00	149.55	0.39
1	16	100-year	Trib I-2 Prop	717.00	911.30	917.27	916.42	917.47	0.001932	4.85	259.00	149.55	0.39
1	15	100-year	Trib I-2 Ex	717.00	912.15	917.06		917.26	0.002295	5.00	245.37	143.41	0.44
1	15	100-year	Trib I-2 Prop	717.00	912.15	917.06		917.26	0.002295	5.00	245.37	143.41	0.44
1	14	100-year	Trib I-2 Ex	717.00	911.89	916.95		917.07	0.001262	3.78	309.82	160.09	0.33
1	14	100-year	Trib I-2 Prop	717.00	911.89	916.95		917.07	0.001262	3.78	309.82	160.09	0.33
1	13	100-year	Trib I-2 Ex	717.00	911.59	916.81		916.91	0.001125	3.49	306.17	134.20	0.31
1	13	100-year	Trib I-2 Prop	717.00	911.59	916.81		916.91	0.001125	3.49	306.17	134.20	0.31
1	12	100-year	Trib I-2 Ex	717.00	911.39	916.74		916.82	0.000821	3.42	348.33	142.37	0.27
1	12	100-year	Trib I-2 Prop	717.00	911.39	916.74		916.82	0.000821	3.42	348.33	142.37	0.27
1	11	100-year	Trib I-2 Ex	717.00	911.09	916.75		916.77	0.000134	1.45	849.24	319.95	0.11
1	11	100-year	Trib I-2 Prop	717.00	911.09	916.75		916.77	0.000134	1.45	849.24	319.95	0.11
1	10	100-year	Trib I-2 Ex	835.00	910.58	916.48		916.65	0.005858	5.46	310.83	126.69	0.42
1	10	100-year	Trib I-2 Prop	835.00	910.58	916.48		916.65	0.005858	5.46	310.83	126.69	0.42
1	9	100-year	Trib I-2 Ex	835.00	910.32	915.66		915.97	0.005983	5.63	269.83	130.33	0.47
1	9	100-year	Trib I-2 Prop	835.00	910.32	915.66		915.97	0.005983	5.63	269.83	130.33	0.47
1	8	100-year	Trib I-2 Ex	835.00	910.11	915.54		915.65	0.001800	3.10	396.98	140.61	0.26
1	8	100-year	Trib I-2 Prop	835.00	910.11	915.54		915.65	0.001800	3.10	396.98	140.61	0.26
1	7	100-year	Trib I-2 Ex	835.00	909.55	915.22		915.38	0.003002	4.57	347.71	120.13	0.35
1	7	100-year	Trib I-2 Prop	835.00	909.55	915.22		915.38	0.003002	4.57	347.71	120.13	0.35
1	6	100-year	Trib I-2 Ex	835.00	908.95	914.95		915.10	0.002909	4.49	360.27	123.83	0.34
1	6	100-year	Trib I-2 Prop	835.00	908.95	914.95		915.10	0.002909	4.49	360.27	123.83	0.34
1	5	100-year	Trib I-2 Ex	835.00	908.59	914.79		914.93	0.003131	4.58	357.23	117.84	0.34
1	5	100-year	Trib I-2 Prop	835.00	908.59	914.79		914.93	0.003131	4.58	357.23	117.84	0.34
1	4	100-year	Trib I-2 Ex	835.00	907.91	914.37	911.95	914.55	0.002232	3.97	333.79	116.23	0.30
1	4	100-year	Trib I-2 Prop	835.00	907.91	914.37	911.95	914.55	0.002232	3.97	333.79	116.23	0.30

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
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XXXXXXX  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: Tributary I-2
Project File : I-2.prj
Run Date and Time: 7/1/2014 10:40:05 AM

Project in English units

Project Description:
Project Name: North Fork Indian Run LOMR
Stream: Tributary I-2
Vertical
Datum: NAVD88
Model Version: HEC-RAS version 4.1.0
By: EMH&T

Revised:
September 2013
Revisions include updating cross-section geometry based on 2007 Franklin County auditors topography and field survey June 2013, adding cross-sections, adding bridges based on field survey, adding ineffective flow modeling at bridge locations

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PLAN DATA

Plan Title: Tributary I-2 Existing
Plan File : j:\20131358\Reports\Floodplain\HEC-RAS\I-2.p03

Geometry Title: Tributary I-2 Existing
Geometry File : j:\20131358\Reports\Floodplain\HEC-RAS\I-2.g03

Flow Title : Tributary I-2
Flow File : j:\20131358\Reports\Floodplain\HEC-RAS\I-2.f03

Plan Summary Information:

Number of:	Cross Sections =	65	Multiple Openings =	0
	Culverts =	1	Inline Structures =	5
	Bridges =	7	Lateral Structures =	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:     Subcritical Flow


*******************************************************************************

FLOW DATA

Flow Title: Tributary I-2
Flow File : j:\20131358\Reports\Floodplain\HEC-RAS\I-2.f03

Flow Data (cfs)
***************************************************************
* River           Reach           RS      *        100-year *
* Tributary I-2   1               73      *             262 *
* Tributary I-2   1               32      *             717 *
* Tributary I-2   1               26      *             717 *
* Tributary I-2   1               10      *             835 *
***************************************************************

Boundary Conditions
*******************************************************************************
********************
* River           Reach           Profile          *            Upstream
    Downstream    *
*******************************************************************************
********************
* Tributary I-2   1               100-year         *
Known WS = 914.37 *
*******************************************************************************
********************

*******************************************************************************

GEOMETRY DATA

Geometry Title: Tributary I-2 Existing
Geometry File : j:\20131358\Reports\Floodplain\HEC-RAS\I-2.g03

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 73

INPUT
Description:
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -297.66     948 -114.76     946  -93.47     944  -72.04     942  -53.54     940
  -33.14     938      -7 936.204      -2  935.86       0  935.86       2  935.86
       7 936.327   24.92     938   79.77     940  108.31     942  135.81     944
  499.74     946

Manning's n Values        num=       3
```

```
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 -297.66     .04      -7    .035       7     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -7       7           166.47  166.47  166.47             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*********************************************************************************
***********
* E.G. Elev (ft)         *  939.24  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.08  * Wt. n-Val.             *   0.040  *   0.035  *
  0.080  *
* W.S. Elev (ft)         *  939.16  * Reach Len. (ft)        *  166.47  *  166.47  *
 166.47  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   60.59  *   44.15  *
  54.13  *
* E.G. Slope (ft/ft)     *0.001032  * Area (sq ft)           *   60.59  *   44.15  *
  54.13  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   98.56  *  129.28  *
  34.16  *
* Top Width (ft)         *  101.63  * Top Width (ft)         *   37.95  *   14.00  *
  49.68  *
* Vel Total (ft/s)       *    1.65  * Avg. Vel. (ft/s)       *    1.63  *    2.93  *
   0.63  *
* Max Chl Dpth (ft)      *    3.30  * Hydr. Depth (ft)       *    1.60  *    3.15  *
   1.09  *
* Conv. Total (cfs)      *  8154.8  * Conv. (cfs)            *  3067.8  *  4023.7  *
 1063.3  *
* Length Wtd. (ft)       *  166.47  * Wetted Per. (ft)       *   38.07  *   14.03  *
  49.78  *
* Min Ch El (ft)         *  935.86  * Shear (lb/sq ft)       *    0.10  *    0.20  *
   0.07  *
* Alpha                  *    1.94  * Stream Power (lb/ft s) *  499.74  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.33  * Cum Volume (acre-ft)   *   21.84  *   12.87  *
  15.10  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   16.73  *    3.44  *
  11.31  *
*********************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 72

INPUT
Description:
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
  -41.05  941.06  -40.59     941  -32.98     940  -25.36     939  -17.82     938
  -10.44     937      -7 936.571   -2.43     936      -2  935.29       0  934.99
       2  934.99    4.27  934.99       7 936.667    9.17     938   16.89     940
   28.09     942   39.22     942   63.43     940  104.24     940  120.57     942
  165.95     944  302.78     946
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
  -41.05     .04      -7    .035       7     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -7       7             48.85   48.85   48.85             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*********************************************************************************
***********
* E.G. Elev (ft)         *  938.87  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.47  * Wt. n-Val.             *   0.040  *   0.035  *
  0.080  *
* W.S. Elev (ft)         *  938.41  * Reach Len. (ft)        *   48.85  *   48.85  *
  48.85  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   12.91  *   39.06  *
   2.65  *
* E.G. Slope (ft/ft)     *0.005185  * Area (sq ft)           *   12.91  *   39.06  *
   2.65  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   32.68  *  226.69  *
   2.62  *
* Top Width (ft)         *   31.64  * Top Width (ft)         *   13.90  *   14.00  *
   3.74  *
* Vel Total (ft/s)       *    4.80  * Avg. Vel. (ft/s)       *    2.53  *    5.80  *
   0.99  *
* Max Chl Dpth (ft)      *    3.42  * Hydr. Depth (ft)       *    0.93  *    2.79  *
   0.71  *
* Conv. Total (cfs)      *  3638.4  * Conv. (cfs)            *   453.9  *  3148.1  *
   36.4  *
* Length Wtd. (ft)       *   48.85  * Wetted Per. (ft)       *   14.02  *   14.93  *
   4.17  *
* Min Ch El (ft)         *  934.99  * Shear (lb/sq ft)       *    0.30  *    0.85  *
   0.21  *
* Alpha                  *    1.30  * Stream Power (lb/ft s) *  302.78  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.27  * Cum Volume (acre-ft)   *   21.70  *   12.71  *
  14.99  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   16.64  *    3.39  *
  11.21  *
*********************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 71

INPUT
Description:
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 -115.33   940.3 -101.31     940  -90.13     939  -79.12     938  -29.95     938
  -18.18     937   -10.5 936.199   -8.59     936      -2  934.67       0  934.67
       2  934.67       3 935.834    4.86     938       5 938.027   15.11     940
  108.36     940  115.49     942  123.75     944  181.07     946

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

```
*********************************************
 -115.33     .04   -10.5    .035       3     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -10.5       3             66.42   66.42   66.42             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*********************************************************************************
***********
* E.G. Elev (ft)         *  938.59  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *   0.040  *   0.035  *
  0.080  *
* W.S. Elev (ft)         *  938.02  * Reach Len. (ft)        *   66.42  *   66.42  *
  66.42  *
* Crit W.S. (ft)         *  937.53  * Flow Area (sq ft)      *   18.13  *   37.55  *
   2.06  *
* E.G. Slope (ft/ft)     *0.006087  * Area (sq ft)           *   18.13  *   37.55  *
   2.06  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   21.56  *  238.11  *
   2.33  *
* Top Width (ft)         *   84.33  * Top Width (ft)         *   68.86  *   13.50  *
   1.97  *
* Vel Total (ft/s)       *    4.54  * Avg. Vel. (ft/s)       *    1.19  *    6.34  *
   1.13  *
* Max Chl Dpth (ft)      *    3.35  * Hydr. Depth (ft)       *    0.26  *    2.78  *
   1.04  *
* Conv. Total (cfs)      *  3358.2  * Conv. (cfs)            *   276.3  *  3052.0  *
   29.9  *
* Length Wtd. (ft)       *   66.42  * Wetted Per. (ft)       *   68.94  *   14.18  *
   2.97  *
* Min Ch El (ft)         *  934.67  * Shear (lb/sq ft)       *    0.10  *    1.01  *
   0.26  *
* Alpha                  *    1.78  * Stream Power (lb/ft s) *  181.07  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.50  * Cum Volume (acre-ft)   *   21.68  *   12.67  *
  14.99  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   16.59  *    3.37  *
  11.21  *
*********************************************************************************
***********

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

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 70

INPUT
Description:
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 -104.36     940  -96.73     939  -89.11     938  -26.08     938  -18.04     937
   -7.85     936      -2  934.23       0  934.23       2  934.23       7 936.404
   10.67     938   18.87     940   36.89     940   47.34     938   111.8     938
  120.99     940  127.23     942   134.4     944   164.6     946
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 -104.36     .04   -7.85    .035       7     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -7.85       7              71.1    71.1    71.1             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*********************************************************************************
***********
* E.G. Elev (ft)         *  937.95  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.82  * Wt. n-Val.             *   0.040  *   0.035  *
  0.080  *
* W.S. Elev (ft)         *  937.13  * Reach Len. (ft)        *   71.10  *   71.10  *
  71.10  *
* Crit W.S. (ft)         *  937.13  * Flow Area (sq ft)      *    6.53  *   32.51  *
   0.61  *
* E.G. Slope (ft/ft)     *0.011634  * Area (sq ft)           *    6.53  *   32.51  *
   0.61  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   18.13  *  243.27  *
   0.59  *
* Top Width (ft)         *   27.80  * Top Width (ft)         *   11.27  *   14.85  *
   1.68  *
* Vel Total (ft/s)       *    6.61  * Avg. Vel. (ft/s)       *    2.78  *    7.48  *
   0.97  *
* Max Chl Dpth (ft)      *    2.90  * Hydr. Depth (ft)       *    0.58  *    2.19  *
   0.36  *
* Conv. Total (cfs)      *  2429.0  * Conv. (cfs)            *   168.1  *  2255.4  *
    5.5  *
* Length Wtd. (ft)       *   71.10  * Wetted Per. (ft)       *   11.32  *   15.56  *
   1.83  *
* Min Ch El (ft)         *  934.23  * Shear (lb/sq ft)       *    0.42  *    1.52  *
   0.24  *
* Alpha                  *    1.20  * Stream Power (lb/ft s) *  164.60  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.60  * Cum Volume (acre-ft)   *   21.66  *   12.62  *
  14.98  *
* C & E Loss (ft)        *    0.17  * Cum SA (acres)         *   16.53  *    3.35  *
  11.20  *
*********************************************************************************
***********

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

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 69
```

```
INPUT
Description:
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -101.52     939  -92.77     938  -83.25     937  -56.59     936    -6.5  935.01
   -5.98     935      -2  933.92    -.79  933.92     -.1  933.92       0  933.92
    .492  933.92    3.95     935     7.5 935.342   14.34     936   35.37     938
   43.23     938  132.61     938  148.43     940  156.27     942  164.71     944
  188.21     946

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -101.52     .04    -6.5    .035     7.5     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          -6.5     7.5             59.6    59.6    59.6             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  936.68  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.             *   0.040  *   0.035  *
  0.080  *
* W.S. Elev (ft)         *  936.43  * Reach Len. (ft)        *   59.60  *   59.60  *
  59.60  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   48.61  *   26.08  *
   6.13  *
* E.G. Slope (ft/ft)     *0.006420  * Area (sq ft)           *   48.61  *   26.08  *
   6.13  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *  123.72  *  132.25  *
   6.04  *
* Top Width (ft)         *   86.80  * Top Width (ft)         *   61.47  *   14.00  *
  11.33  *
* Vel Total (ft/s)       *    3.24  * Avg. Vel. (ft/s)       *    2.54  *    5.07  *
   0.99  *
* Max Chl Dpth (ft)      *    2.51  * Hydr. Depth (ft)       *    0.79  *    1.86  *
   0.54  *
* Conv. Total (cfs)      *  3269.8  * Conv. (cfs)            *  1544.0  *  1650.5  *
   75.4  *
* Length Wtd. (ft)       *   59.60  * Wetted Per. (ft)       *   61.49  *   14.33  *
  11.38  *
* Min Ch El (ft)         *  933.92  * Shear (lb/sq ft)       *    0.32  *    0.73  *
   0.22  *
* Alpha                  *    1.53  * Stream Power (lb/ft s) *  188.21  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.45  * Cum Volume (acre-ft)   *   21.61  *   12.57  *
  14.98  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   16.47  *    3.33  *
  11.19  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 68

INPUT
```

```
Description:
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -119.83     940 -112.27     939 -104.85     938  -97.79     937  -76.44     936
  -22.02     935   -3.22     935      -3 934.733    -2.7 934.369      -2  933.52
       0  933.52       2  933.52    6.13  934.04      11 934.411   31.85     936
   43.91     938   66.41     938  164.38     938  197.29     940  220.27     942
  243.57     944  271.67     946

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -119.83     .04      -3    .035      11     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -3      11            145.9   145.9   145.9             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  936.21  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.             *   0.040  *   0.035  *
  0.080  *
* W.S. Elev (ft)         *  935.82  * Reach Len. (ft)        *  145.90  *  145.90  *
 145.90  *
* Crit W.S. (ft)         *  935.82  * Flow Area (sq ft)      *   33.87  *   27.07  *
  13.01  *
* E.G. Slope (ft/ft)     *0.009078  * Area (sq ft)           *   33.87  *   27.07  *
  13.01  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   78.66  *  165.15  *
  18.19  *
* Top Width (ft)         *   96.08  * Top Width (ft)         *   63.60  *   14.00  *
  18.48  *
* Vel Total (ft/s)       *    3.54  * Avg. Vel. (ft/s)       *    2.32  *    6.10  *
   1.40  *
* Max Chl Dpth (ft)      *    2.30  * Hydr. Depth (ft)       *    0.53  *    1.93  *
   0.70  *
* Conv. Total (cfs)      *  2749.8  * Conv. (cfs)            *   825.6  *  1733.3  *
  190.9  *
* Length Wtd. (ft)       *  145.90  * Wetted Per. (ft)       *   63.74  *   14.62  *
  18.53  *
* Min Ch El (ft)         *  933.52  * Shear (lb/sq ft)       *    0.30  *    1.05  *
   0.40  *
* Alpha                  *    2.01  * Stream Power (lb/ft s) *  271.67  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    1.87  * Cum Volume (acre-ft)   *   21.56  *   12.53  *
  14.97  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   16.38  *    3.31  *
  11.17  *
*******************************************************************************
***********

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: Tributary I-2
REACH: 1 RS: 67

INPUT
Description:
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-366.41	939	-328.66	938	-289.63	937	-197.94	936	-102.9	935
-38.59	934	-21.03	933	-5.77	932.53	-2	932.53	0	932.53
2	932.53	6.21	932.53	32.96	934	91.37	936	99.57	936
127.53	936	150.91	938	182.63	940	200.79	940	211.51	938
252.84	938	330.11	940	359.97	942	389.76	944	418.29	946

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-366.41	.04	-38.59	.035	32.96	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-38.59	32.96	110.68	110.68	110.68	.1	.3

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	934.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.035	
W.S. Elev (ft)	933.80	Reach Len. (ft)	110.68	110.68	110.68
Crit W.S. (ft)	933.80	Flow Area (sq ft)		51.37	
E.G. Slope (ft/ft)	0.019552	Area (sq ft)		51.37	
Q Total (cfs)	262.00	Flow (cfs)		262.00	
Top Width (ft)	64.44	Top Width (ft)		64.44	
Vel Total (ft/s)	5.10	Avg. Vel. (ft/s)		5.10	
Max Chl Dpth (ft)	1.27	Hydr. Depth (ft)		0.80	
Conv. Total (cfs)	1873.7	Conv. (cfs)		1873.7	
Length Wtd. (ft)	110.68	Wetted Per. (ft)		64.50	
Min Ch El (ft)	932.53	Shear (lb/sq ft)		0.97	
Alpha	1.00	Stream Power (lb/ft s)	418.29	0.00	0.00
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	21.50	12.40	14.94
C & E Loss (ft)	0.11	Cum SA (acres)	16.28	3.17	

```
  11.14  *
*******************************************************************************
***********

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: 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: Tributary I-2
REACH: 1                  RS: 66

INPUT
Description:
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -136.58     937  -116.7     936   -91.9     935  -59.13     934   -48.3     933
  -37.48     932  -35.36  931.82      -2  931.82       0  931.82       2  931.82
    23.7  931.82   29.61     932   68.85     933  118.71     936  289.23     938
  437.56     940  498.68     942  519.96     944  540.67     946

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -136.58     .04  -37.48    .035   29.61     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -37.48   29.61            76.03   76.03   76.03             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  933.75  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.03  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  933.71  * Reach Len. (ft)        *   76.03  *   76.03  *
  76.03  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   15.87  *  126.26  *
  51.81  *
* E.G. Slope (ft/ft)     *0.000606  * Area (sq ft)           *   15.87  *  126.26  *
  51.81  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   13.05  *  201.14  *
  47.81  *
* Top Width (ft)         *  136.71  * Top Width (ft)         *   18.54  *   67.09  *
  51.09  *
* Vel Total (ft/s)       *    1.35  * Avg. Vel. (ft/s)       *    0.82  *    1.59  *
   0.92  *
* Max Chl Dpth (ft)      *    1.89  * Hydr. Depth (ft)       *    0.86  *    1.88  *
   1.01  *
* Conv. Total (cfs)      * 10641.7  * Conv. (cfs)            *   530.1  *  8169.8  *
 1941.8  *
```

```
* Length Wtd. (ft)       *   76.03  * Wetted Per. (ft)       *   18.62  *   67.10  *
  51.12  *
* Min Ch El (ft)         *  931.82  * Shear (lb/sq ft)       *    0.03  *    0.07  *
   0.04  *
* Alpha                  *    1.17  * Stream Power (lb/ft s) *  540.67  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *   21.48  *   12.18  *
  14.88  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   16.25  *    3.01  *
  11.08  *
*******************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 65

INPUT
Description: Upstream Section of HW2 (24")
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -150.97     937  -126.8     936 -109.69     935  -58.74     934  -45.59     933
  -31.87     932   -27.4  931.73      -2  929.92       0  929.92       2  929.92
   39.24  931.81   46.87     932   83.57     933  127.95     934  155.98  934.81
  195.15     936  261.87     938  385.28     940  546.88     942

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -150.97     .04   -27.4    .035   39.24     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -27.4   39.24             64.59   64.59   64.59             .3       .5

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  933.72  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.02  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  933.70  * Reach Len. (ft)        *   64.59  *   64.59  *
  64.59  *
* Crit W.S. (ft)         *  931.52  * Flow Area (sq ft)      *   27.95  *  193.87  *
  68.78  *
* E.G. Slope (ft/ft)     *0.000168  * Area (sq ft)           *   27.95  *  193.87  *
  68.78  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   13.61  *  217.26  *
  31.13  *
* Top Width (ft)         *  169.56  * Top Width (ft)         *   27.42  *   66.64  *
  75.49  *
* Vel Total (ft/s)       *    0.90  * Avg. Vel. (ft/s)       *    0.49  *    1.12  *
   0.45  *
* Max Chl Dpth (ft)      *    3.78  * Hydr. Depth (ft)       *    1.02  *    2.91  *
   0.91  *
* Conv. Total (cfs)      * 20204.5  * Conv. (cfs)            *  1049.6  * 16754.4  *
```

```
 2400.5  *
* Length Wtd. (ft)       *   64.59  * Wetted Per. (ft)       *   27.50  *   66.75  *
  75.52  *
* Min Ch El (ft)         *  929.92  * Shear (lb/sq ft)       *    0.01  *    0.03  *
   0.01  *
* Alpha                  *    1.33  * Stream Power (lb/ft s) *  546.88  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   21.44  *   11.90  *
  14.77  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   16.21  *    2.89  *
  10.97  *
*******************************************************************************
***********

CULVERT


RIVER: Tributary I-2
REACH: 1                  RS: 64.5

INPUT
Description:
Distance from Upstream XS =    32.4
Deck/Roadway Width        =   17.51
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
***********************************************
    -100  932.91     900     100  932.91     900

Upstream Bridge Cross Section Data
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -150.97     937  -126.8     936 -109.69     935  -58.74     934  -45.59     933
  -31.87     932   -27.4  931.73      -2  929.92       0  929.92       2  929.92
   39.24  931.81   46.87     932   83.57     933  127.95     934  155.98  934.81
  195.15     936  261.87     938  385.28     940  546.88     942

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -150.97     .04   -27.4    .035   39.24     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -27.4   39.24              .3       .5

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
***********************************************
    -100  932.91     900     100  932.91     900

Downstream Bridge Cross Section Data
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -369.54     935  -253.5     934  -23.33     933  -12.73     932   -8.33  931.62
      -2  929.91       0  929.91       2  929.91    9.87  931.78   13.59     932
    39.4     933  118.43     934  133.95     935  177.11     936     187     937

Manning's n Values        num=       3
```

```
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 -369.54     .04   -8.33    .035    9.87     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -8.33    9.87             .3       .5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
24"             Circular       2
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
               32.4   17.51     .013     .013        1                   .5
      1
Upstream   Elevation =  929.92
           Centerline Station =  0
Downstream Elevation =  929.91
           Centerline Station =  0

CULVERT OUTPUT  Profile #100-year  Culv Group:  24"
**********************************************************************
* Q Culv Group (cfs)     *    9.48  * Culv Full Len (ft)     *   17.51  *
* # Barrels              *       1  * Culv Vel US (ft/s)     *    6.03  *
* Q Barrel (cfs)         *    9.48  * Culv Vel DS (ft/s)     *    6.03  *
* E.G. US. (ft)          *  933.72  * Culv Inv El Up (ft)    *  929.92  *
* W.S. US. (ft)          *  933.70  * Culv Inv El Dn (ft)    *  929.91  *
* E.G. DS (ft)           *  933.20  * Culv Frctn Ls (ft)     *    0.24  *
* W.S. DS (ft)           *  932.59  * Culv Exit Loss (ft)    *    0.00  *
* Delta EG (ft)          *    0.52  * Culv Entr Loss (ft)    *    0.28  *
* Delta WS (ft)          *    1.11  * Q Weir (cfs)           *  252.52  *
* E.G. IC (ft)           *  933.69  * Weir Sta Lft (ft)      *  -54.69  *
* E.G. OC (ft)           *  933.72  * Weir Sta Rgt (ft)      *  114.27  *
* Culvert Control        *  Outlet  * Weir Submerg           *    0.00  *
* Culv WS Inlet (ft)     *  931.92  * Weir Max Depth (ft)    *    0.78  *
* Culv WS Outlet (ft)    *  931.91  * Weir Avg Depth (ft)    *    0.68  *
* Culv Nml Depth (ft)    *          * Weir Flow Area (sq ft) *  114.55  *
* Culv Crt Depth (ft)    *    1.84  * Min El Weir Flow (ft)  *  932.92  *
**********************************************************************

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 64

INPUT
Description: Downstream Section of HW2 (24")
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -369.54     935  -253.5     934  -23.33     933  -12.73     932   -8.33  931.62
```

```
      -2  929.91       0  929.91       2  929.91    9.87  931.78   13.59     932
    39.4     933  118.43     934  133.95     935  177.11     936     187     937

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -369.54     .04   -8.33    .035    9.87     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -8.33    9.87             88.46   88.46   88.46             .3       .5

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  933.20  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.61  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  932.59  * Reach Len. (ft)        *   88.46  *   88.46  *
  88.46  *
* Crit W.S. (ft)         *  932.59  * Flow Area (sq ft)      *    5.25  *   35.96  *
   7.05  *
* E.G. Slope (ft/ft)     *0.009981  * Area (sq ft)           *    5.25  *   35.96  *
   7.05  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   12.14  *  236.31  *
  13.55  *
* Top Width (ft)         *   47.71  * Top Width (ft)         *   10.63  *   18.20  *
  18.88  *
* Vel Total (ft/s)       *    5.43  * Avg. Vel. (ft/s)       *    2.31  *    6.57  *
   1.92  *
* Max Chl Dpth (ft)      *    2.68  * Hydr. Depth (ft)       *    0.49  *    1.98  *
   0.37  *
* Conv. Total (cfs)      *  2622.5  * Conv. (cfs)            *   121.5  *  2365.3  *
  135.6  *
* Length Wtd. (ft)       *   88.46  * Wetted Per. (ft)       *   10.67  *   18.65  *
  18.90  *
* Min Ch El (ft)         *  929.91  * Shear (lb/sq ft)       *    0.31  *    1.20  *
   0.23  *
* Alpha                  *    1.34  * Stream Power (lb/ft s) *  187.00  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *   21.44  *   11.55  *
  14.77  *
* C & E Loss (ft)        *    0.29  * Cum SA (acres)         *   16.18  *    2.83  *
  10.90  *
*******************************************************************************
***********

Warning: The energy equation could not be balanced within the specified number of
iterations.  The program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may
indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance)
is less than 0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: 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: Tributary I-2
REACH: 1                  RS: 63

INPUT
Description: Upstream Section of W4
Station Elevation Data    num=      24
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
  -376.4     935 -273.71     934 -250.23     933 -224.62     932 -186.05     932
  -86.59     932  -16.83     931   -9.66     930   -4.33  929.33      -2  928.97
       0  928.97       2  928.97    6.48  929.35   12.78     930   24.08     931
   35.38     932   105.8     933   176.9     934  239.74     935  260.79     936
   274.5     937  280.82     938  286.93     939  293.04     940

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
  -376.4     .04   -9.66    .035   12.78     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -9.66   12.78             70.69   70.69   70.69             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  932.60  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.03  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  932.57  * Reach Len. (ft)        *   70.69  *   70.69  *
  70.69  *
* Crit W.S. (ft)         *  930.99  * Flow Area (sq ft)      *  172.79  *   71.41  *
  47.05  *
* E.G. Slope (ft/ft)     *0.000389  * Area (sq ft)           *  172.79  *   71.41  *
  47.05  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *  104.71  *  128.91  *
  28.38  *
* Top Width (ft)         *  314.93  * Top Width (ft)         *  229.61  *   22.44  *
  62.88  *
* Vel Total (ft/s)       *    0.90  * Avg. Vel. (ft/s)       *    0.61  *    1.81  *
   0.60  *
* Max Chl Dpth (ft)      *    3.60  * Hydr. Depth (ft)       *    0.75  *    3.18  *
   0.75  *
* Conv. Total (cfs)      * 13284.5  * Conv. (cfs)            *  5309.0  *  6536.5  *
 1439.0  *
* Length Wtd. (ft)       *   70.69  * Wetted Per. (ft)       *  229.70  *   22.56  *
  62.97  *
* Min Ch El (ft)         *  928.97  * Shear (lb/sq ft)       *    0.02  *    0.08  *
   0.02  *
* Alpha                  *    2.21  * Stream Power (lb/ft s) *  293.04  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   21.26  *   11.44  *
  14.72  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   15.94  *    2.79  *
  10.81  *
*******************************************************************************
***********

INLINE STRUCTURE


RIVER: Tributary I-2
```

```
REACH: 1                  RS: 62

INPUT
Description:
Distance from Upstream XS =   68.69
Deck/Roadway Width        =       2
Weir Coefficient          =     2.6
 Weir Embankment Coordinates    num =       10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
   -1000  932.19   -7.95  932.19   -7.95   932.2   -3.03   932.2   -3.03  929.77
    3.03  929.77    3.03   932.3    8.08   932.3    8.08  932.24    1000  932.24

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Weir crest shape                            = Broad Crested


INLINE STRUCTURE OUTPUT  Profile #100-year  Inl Struct:
*******************************************************************************
* E.G. Elev (ft)             *  932.60  * Q Gates (cfs)              *         *
* W.S. Elev (ft)             *  932.57  * Q Gate Group (cfs)         *    0.00 *
* Q Total (cfs)              *  262.00  * Gate Open Ht (ft)          *  931.90 *
* Q Weir (cfs)               *  262.00  * Gate #Open                 *         *
* Weir Flow Area (sq ft)     *  134.02  * Gate Area (sq ft)          *    1.00 *
* Weir Sta Lft (ft)          * -239.98  * Gate Submerg               *    0.00 *
* Weir Sta Rgt (ft)          *   77.62  * Gate Invert (ft)           *    0.00 *
* Weir Max Depth (ft)        *    2.83  * Gate Weir Coef             *   0.000 *
* Weir Avg Depth (ft)        *    0.42  *                            *         *
* Weir Coef (ft^1/2)         *   2.600  * Q Breach (cfs)             *         *
* Weir Submerg               *    0.21  * Breach Avg Velocity (ft/s) *         *
* Min El Weir Flow (ft)      *  929.78  * Breach Flow Area (sq ft)   *         *
* Wr Top Wdth (ft)           *  317.60  *                            *         *
*******************************************************************************

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 61

INPUT
Description: Downstream Section of W4
Station Elevation Data    num=      24
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -376.4     935 -273.71     934 -250.23     933 -224.62     932 -186.05     932
  -86.59     932  -16.83     931   -9.66     930   -4.33  929.33      -2  927.97
       0  927.97       2  927.97    6.48  929.35   12.78     930   24.08     931
   35.38     932   105.8     933   176.9     934  239.74     935  260.79     936
   274.5     937  280.82     938  286.93     939  293.04     940

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
  -376.4     .04   -4.33    .035    6.48     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -4.33    6.48             84.25   84.25   84.25             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
```

```
*******************************************************************************
***********
* E.G. Elev (ft)         *  932.04  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.14  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  931.90  * Reach Len. (ft)        *   84.25  *   84.25  *
  84.25  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   50.17  *   37.80  *
  34.40  *
* E.G. Slope (ft/ft)     *0.001643  * Area (sq ft)           *   50.17  *   37.80  *
  34.40  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   57.60  *  144.80  *
  59.60  *
* Top Width (ft)         *  113.83  * Top Width (ft)         *   75.26  *   10.81  *
  27.77  *
* Vel Total (ft/s)       *    2.14  * Avg. Vel. (ft/s)       *    1.15  *    3.83  *
   1.73  *
* Max Chl Dpth (ft)      *    3.93  * Hydr. Depth (ft)       *    0.67  *    3.50  *
   1.24  *
* Conv. Total (cfs)      *  6463.1  * Conv. (cfs)            *  1420.9  *  3572.0  *
 1470.2  *
* Length Wtd. (ft)       *   84.25  * Wetted Per. (ft)       *   75.37  *   11.39  *
  27.88  *
* Min Ch El (ft)         *  927.97  * Shear (lb/sq ft)       *    0.07  *    0.34  *
   0.13  *
* Alpha                  *    1.98  * Stream Power (lb/ft s) *  293.04  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   *   21.26  *   11.10  *
  14.72  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   15.69  *    2.76  *
  10.74  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 60

INPUT
Description: Upstream Section of B5
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -344.47     935 -219.95     934 -203.27     933 -108.12     932  -18.25     931
  -14.15     930   -8.66  929.33      -7     929   -2.72  927.53       0  927.53
       2  927.53    5.36     929    5.96  929.08    7.73     930    9.53     931
   99.19     932  137.87     933  161.18     933  174.59     934  195.96     934
  204.47     935  213.78     936

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -344.47     .04      -7    .035    5.96     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -7    5.96            49.43   49.43   49.43             .3       .5
Skew Angle = 41

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
```

```
***********
* E.G. Elev (ft)         *  931.89  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.19  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  931.70  * Reach Len. (ft)        *   16.11  *   16.11  *
  16.11  *
* Crit W.S. (ft)         *  930.39  * Flow Area (sq ft)      *   42.24  *   47.51  *
  27.88  *
* E.G. Slope (ft/ft)     *0.001719  * Area (sq ft)           *   42.24  *   47.51  *
  27.88  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   44.67  *  193.33  *
  24.00  *
* Top Width (ft)         *  153.27  * Top Width (ft)         *   74.07  *   12.96  *
  66.24  *
* Vel Total (ft/s)       *    2.23  * Avg. Vel. (ft/s)       *    1.06  *    4.07  *
   0.86  *
* Max Chl Dpth (ft)      *    4.17  * Hydr. Depth (ft)       *    0.57  *    3.67  *
   0.42  *
* Conv. Total (cfs)      *  6318.4  * Conv. (cfs)            *  1077.3  *  4662.3  *
  578.9  *
* Length Wtd. (ft)       *   16.11  * Wetted Per. (ft)       *   74.26  *   13.52  *
  66.73  *
* Min Ch El (ft)         *  927.53  * Shear (lb/sq ft)       *    0.06  *    0.38  *
   0.04  *
* Alpha                  *    2.52  * Stream Power (lb/ft s) *  213.78  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   21.17  *   11.02  *
  14.66  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   15.55  *    2.74  *
  10.65  *
*******************************************************************************
***********

BRIDGE


RIVER: Tributary I-2
REACH: 1                  RS: 59.5

INPUT
Description:
Distance from Upstream XS =   16.11
Deck/Roadway Width        =    8.38
Weir Coefficient          =     2.6
Bridge Deck/Roadway Skew  =      41
Upstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
-226.413   929.5     900 -12.747   931.9  930.34       0  931.94  930.47
  12.747  932.12  930.66  75.471   932.3     900 150.942     932     900

Upstream Bridge Cross Section Data
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -344.47     935 -219.95     934 -203.27     933 -108.12     932  -18.25     931
  -14.15     930   -8.66  929.33      -7     929   -2.72  927.53       0  927.53
       2  927.53    5.36     929    5.96  929.08    7.73     930    9.53     931
   99.19     932  137.87     933  161.18     933  174.59     934  195.96     934
  204.47     935  213.78     936
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -344.47     .04      -7    .035    5.96     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -7    5.96             .3       .5
Skew Angle = 41

Downstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
-226.413   929.5     900 -12.747   931.9  930.34       0  931.94  930.47
  12.747  932.12  930.66  75.471   932.3     900 150.942     932     900

Downstream Bridge Cross Section Data
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*************************************************************************
 -320.27     935  -196.9     934 -150.88     933  -94.57     932     -12     931
   -9.67     930   -7.76   929.2   -7.02     929   -2.13  927.53       0  927.53
     .48  927.53    2.12   927.6    7.71     928    8.99   929.3   27.38     930
  114.92     931  143.83     932  176.22     933  209.24     934  237.26     935
  255.38     936

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -320.27     .04   -7.02    .035    8.99     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -7.02    8.99             .3       .5
Skew Angle = 41

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

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

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

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

BRIDGE OUTPUT  Profile #100-year
```

```
*********************************************************************************
*********
* E.G. US. (ft)          *     931.89  * Element                *Inside BR US
*Inside BR DS *
* W.S. US. (ft)          *     931.70  * E.G. Elev (ft)         *     931.89  *
931.89  *
* Q Total (cfs)          *     262.00  * W.S. Elev (ft)         *     931.70  *
931.70  *
* Q Bridge (cfs)         *     236.30  * Crit W.S. (ft)         *     930.31  *
930.01  *
* Q Weir (cfs)           *      25.70  * Max Chl Dpth (ft)      *       4.17  *
 4.17  *
* Weir Sta Lft (ft)      *     -98.48  * Vel Total (ft/s)       *       4.39  *
 4.04  *
* Weir Sta Rgt (ft)      *     -13.40  * Flow Area (sq ft)      *      59.68  *
64.81  *
* Weir Submerg           *       0.00  * Froude # Chl           *       0.59  *
 0.47  *
* Weir Max Depth (ft)    *       0.48  * Specif Force (cu ft)   *     147.14  *
162.36  *
* Min El Weir Flow (ft)  *     931.48  * Hydr Depth (ft)        *       1.18  *
 1.66  *
* Min El Prs (ft)        *     930.60  * W.P. Total (ft)        *      98.12  *
91.52  *
* Delta EG (ft)          *       0.73  * Conv. Total (cfs)      *             *
       *
* Delta WS (ft)          *       0.67  * Top Width (ft)         *      50.42  *
39.07  *
* BR Open Area (sq ft)   *      39.45  * Frctn Loss (ft)        *             *
       *
* BR Open Vel (ft/s)     *       5.99  * C & E Loss (ft)        *             *
       *
* Coef of Q              *             * Shear Total (lb/sq ft) *             *
       *
* Br Sel Method          * Press/Weir  * Power Total (lb/ft s)  *    -344.47  *
-320.27  *
*********************************************************************************
*********

Note:    The downstream water surface is above the minimum elevation required for
orifice flow.  The orifice flow equation was
         used for pressure flow.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.
Note:    For the cross section inside the bridge at the upstream end, the water
surface and energy have been projected from
         the upstream cross section.  The selected bridge modeling method does not
compute answers inside the bridge.
Note:    For the cross section inside the bridge at the downstream end, the water
surface and energy have been projected from
         the downstream cross section.  The selected bridge modeling method does not
compute answers inside the bridge.

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 59

INPUT
Description: Downstream Section of B5
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
*******************************************************************************
 -320.27     935  -196.9     934 -150.88     933  -94.57     932     -12     931
   -9.67     930   -7.76   929.2   -7.02     929   -2.13  927.53       0  927.53
     .48  927.53    2.12   927.6    7.71     928    8.99   929.3   27.38     930
  114.92     931  143.83     932  176.22     933  209.24     934  237.26     935
  255.38     936

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -320.27     .04   -7.02    .035    8.99     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -7.02    8.99            68.22   68.22   68.22             .3       .5
Skew Angle = 41

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  931.16  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.13  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  931.03  * Reach Len. (ft)        *   68.22  *   68.22  *
  68.22  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    5.40  *   49.37  *
  71.34  *
* E.G. Slope (ft/ft)     *0.001629  * Area (sq ft)           *    5.40  *   49.37  *
  71.34  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *    6.50  *  173.70  *
  81.80  *
* Top Width (ft)         *  129.80  * Top Width (ft)         *    7.11  *   16.01  *
 106.68  *
* Vel Total (ft/s)       *    2.08  * Avg. Vel. (ft/s)       *    1.20  *    3.52  *
   1.15  *
* Max Chl Dpth (ft)      *    3.50  * Hydr. Depth (ft)       *    0.76  *    3.08  *
   0.67  *
* Conv. Total (cfs)      *  6490.7  * Conv. (cfs)            *   161.1  *  4303.1  *
 2026.5  *
* Length Wtd. (ft)       *   68.22  * Wetted Per. (ft)       *    7.50  *   16.79  *
 106.70  *
* Min Ch El (ft)         *  927.53  * Shear (lb/sq ft)       *    0.07  *    0.30  *
   0.07  *
* Alpha                  *    2.00  * Stream Power (lb/ft s) *  255.38  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *   21.16  *   10.97  *
  14.63  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   15.50  *    2.73  *
  10.60  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 58

INPUT
Description: Upstream Section of W3
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
```

```
 -175.35     934 -139.75     933 -107.32     932  -71.28     931  -38.31     930
   -8.73  929.35   -6.97     929      -2   927.4       0   927.4       2   927.4
    5.33     929    7.32  929.28   42.72     930  101.12     931   139.1     932
  149.76     933   156.3   933.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -175.35     .04   -6.97    .035    5.33     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -6.97    5.33             46.45   46.45   46.45             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  931.03  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.07  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  930.97  * Reach Len. (ft)        *   46.45  *   46.45  *
  46.45  *
* Crit W.S. (ft)         *  930.26  * Flow Area (sq ft)      *   56.78  *   37.23  *
  77.91  *
* E.G. Slope (ft/ft)     *0.001152  * Area (sq ft)           *   56.78  *   37.23  *
  77.91  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   66.60  *  108.67  *
  86.73  *
* Top Width (ft)         *  169.38  * Top Width (ft)         *   63.22  *   12.30  *
  93.86  *
* Vel Total (ft/s)       *    1.52  * Avg. Vel. (ft/s)       *    1.17  *    2.92  *
   1.11  *
* Max Chl Dpth (ft)      *    3.57  * Hydr. Depth (ft)       *    0.90  *    3.03  *
   0.83  *
* Conv. Total (cfs)      *  7719.7  * Conv. (cfs)            *  1962.4  *  3201.8  *
 2555.5  *
* Length Wtd. (ft)       *   46.45  * Wetted Per. (ft)       *   63.28  *   12.92  *
  93.89  *
* Min Ch El (ft)         *  927.40  * Shear (lb/sq ft)       *    0.06  *    0.21  *
   0.06  *
* Alpha                  *    1.85  * Stream Power (lb/ft s) *  156.30  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   21.11  *   10.90  *
  14.51  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   15.45  *    2.71  *
  10.45  *
*******************************************************************************
***********

INLINE STRUCTURE


RIVER: Tributary I-2
REACH: 1                  RS: 57

INPUT
Description:
Distance from Upstream XS =      44
Deck/Roadway Width        =       2
Weir Coefficient          =     2.6
 Weir Embankment Coordinates    num =        2
     Sta    Elev     Sta    Elev
*******************************
```

```
    -8.8  929.21     8.8  929.21

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Weir crest shape                            = Broad Crested


INLINE STRUCTURE OUTPUT  Profile #100-year  Inl Struct:
*******************************************************************************
* E.G. Elev (ft)             *  931.03  * Q Gates (cfs)              *         *
* W.S. Elev (ft)             *  930.97  * Q Gate Group (cfs)         *    0.00 *
* Q Total (cfs)              *  262.00  * Gate Open Ht (ft)          *  930.95 *
* Q Weir (cfs)               *  262.00  * Gate #Open                 *         *
* Weir Flow Area (sq ft)     *  167.51  * Gate Area (sq ft)          *    1.00 *
* Weir Sta Lft (ft)          *  -72.49  * Gate Submerg               *    0.00 *
* Weir Sta Rgt (ft)          *  102.40  * Gate Invert (ft)           *    0.00 *
* Weir Max Depth (ft)        *    1.82  * Gate Weir Coef             *   0.000 *
* Weir Avg Depth (ft)        *    0.96  *                            *         *
* Weir Coef (ft^1/2)         *   2.600  * Q Breach (cfs)             *         *
* Weir Submerg               *    0.96  * Breach Avg Velocity (ft/s) *         *
* Min El Weir Flow (ft)      *  929.22  * Breach Flow Area (sq ft)   *         *
* Wr Top Wdth (ft)           *  174.88  *                            *         *
*******************************************************************************

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 56

INPUT
Description: Downstream Section of W3
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -175.35     934 -139.75     933 -107.32     932  -71.28     931  -38.31     930
   -8.73  929.35   -6.97     929      -2  926.91       0  926.91       2  926.91
    5.33     929    7.32  929.28   42.72     930  101.12     931   139.1     932
  149.76     933   156.3   933.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -175.35     .04   -6.97    .035    5.33     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -6.97    5.33             38.95   38.95   38.95             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  931.02  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.07  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  930.95  * Reach Len. (ft)        *   38.95  *   38.95  *
  38.95  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   55.66  *   41.01  *
  76.24  *
* E.G. Slope (ft/ft)     *0.001052  * Area (sq ft)           *   55.66  *   41.01  *
  76.24  *
```

```
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   61.95  *  119.49  *
  80.56  *
* Top Width (ft)         *  167.74  * Top Width (ft)         *   62.63  *   12.30  *
  92.81  *
* Vel Total (ft/s)       *    1.52  * Avg. Vel. (ft/s)       *    1.11  *    2.91  *
   1.06  *
* Max Chl Dpth (ft)      *    4.04  * Hydr. Depth (ft)       *    0.89  *    3.33  *
   0.82  *
* Conv. Total (cfs)      *  8077.0  * Conv. (cfs)            *  1909.9  *  3683.7  *
 2483.4  *
* Length Wtd. (ft)       *   38.95  * Wetted Per. (ft)       *   62.69  *   13.32  *
  92.85  *
* Min Ch El (ft)         *  926.91  * Shear (lb/sq ft)       *    0.06  *    0.20  *
   0.05  *
* Alpha                  *    1.96  * Stream Power (lb/ft s) *  156.30  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *   21.11  *   10.72  *
  14.51  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   15.38  *    2.69  *
  10.35  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 55

INPUT
Description:
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -186.44     934  -144.1     933  -117.6     932  -95.32     931  -44.31     930
  -23.11     929   -6.18  928.24      -2  926.76       0  926.76       2  926.76
    6.41  928.24   13.27     929   21.27     930   29.23     931   38.27     932
   47.36     933   58.29     934

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -186.44     .04   -6.18    .035    6.41     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -6.18    6.41             48.4    48.4    48.4             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  930.98  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.07  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  930.92  * Reach Len. (ft)        *   48.40  *   48.40  *
  48.40  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   90.35  *   45.98  *
  30.43  *
* E.G. Slope (ft/ft)     *0.000777  * Area (sq ft)           *   90.35  *   45.98  *
  30.43  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   97.49  *  125.75  *
  38.75  *
* Top Width (ft)         *  119.64  * Top Width (ft)         *   84.89  *   12.59  *
```

```
  22.16  *
* Vel Total (ft/s)       *    1.57  * Avg. Vel. (ft/s)       *    1.08  *    2.74  *
   1.27  *
* Max Chl Dpth (ft)      *    4.16  * Hydr. Depth (ft)       *    1.06  *    3.65  *
   1.37  *
* Conv. Total (cfs)      *  9398.5  * Conv. (cfs)            *  3497.3  *  4511.0  *
 1390.2  *
* Length Wtd. (ft)       *   48.40  * Wetted Per. (ft)       *   84.94  *   13.09  *
  22.32  *
* Min Ch El (ft)         *  926.76  * Shear (lb/sq ft)       *    0.05  *    0.17  *
   0.07  *
* Alpha                  *    1.73  * Stream Power (lb/ft s) *   58.29  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *   21.04  *   10.68  *
  14.47  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   15.32  *    2.68  *
  10.30  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 54

INPUT
Description:
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -206.16     934 -163.34     933 -139.84     932 -116.86     931  -86.69     930
  -16.62     930  -10.42     929   -6.83   928.6      -2  926.73       0  926.73
       2  926.73    5.54  927.96    5.83     928   13.08     929   20.75     930
   29.02     931   39.12     932   48.66     933

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -206.16     .04   -6.83    .035    5.54     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -6.83    5.54           123.44  123.44  123.44             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  930.94  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.08  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  930.86  * Reach Len. (ft)        *  123.44  *  123.44  *
 123.44  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   87.73  *   44.45  *
  31.54  *
* E.G. Slope (ft/ft)     *0.000920  * Area (sq ft)           *   87.73  *   44.45  *
  31.54  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   87.12  *  130.43  *
  44.45  *
* Top Width (ft)         *  140.67  * Top Width (ft)         *  105.94  *   12.37  *
  22.36  *
* Vel Total (ft/s)       *    1.60  * Avg. Vel. (ft/s)       *    0.99  *    2.93  *
   1.41  *
```

```
* Max Chl Dpth (ft)      *    4.13  * Hydr. Depth (ft)       *    0.83  *    3.59  *
   1.41  *
* Conv. Total (cfs)      *  8636.2  * Conv. (cfs)            *  2871.6  *  4299.4  *
 1465.2  *
* Length Wtd. (ft)       *  123.44  * Wetted Per. (ft)       *  106.06  *   12.93  *
  22.55  *
* Min Ch El (ft)         *  926.73  * Shear (lb/sq ft)       *    0.05  *    0.20  *
   0.08  *
* Alpha                  *    1.93  * Stream Power (lb/ft s) *   48.66  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   20.94  *   10.63  *
  14.43  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   15.21  *    2.67  *
  10.27  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 53

INPUT
Description:
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -81.92     931  -72.37     930  -21.39     929   -8.61   928.1      -2  926.59
       0  926.59       2  926.59   10.02   928.2   15.02     929   22.32     930
   28.45     931   45.33     931   54.73     931   68.22     932   85.62     933

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -81.92     .04   -8.61    .035   10.02     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -8.61   10.02             99.2   110.1  126.17             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  930.85  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.05  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  930.81  * Reach Len. (ft)        *   99.20  *  110.10  *
 126.17  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   98.69  *   67.14  *
  22.60  *
* E.G. Slope (ft/ft)     *0.000464  * Area (sq ft)           *   98.69  *   67.14  *
  22.60  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   97.85  *  142.67  *
  21.48  *
* Top Width (ft)         *  107.37  * Top Width (ft)         *   71.48  *   18.63  *
  17.26  *
* Vel Total (ft/s)       *    1.39  * Avg. Vel. (ft/s)       *    0.99  *    2.12  *
   0.95  *
* Max Chl Dpth (ft)      *    4.22  * Hydr. Depth (ft)       *    1.38  *    3.60  *
   1.31  *
* Conv. Total (cfs)      * 12162.0  * Conv. (cfs)            *  4542.1  *  6622.7  *
  997.2  *
```

```
* Length Wtd. (ft)       *  108.45  * Wetted Per. (ft)       *   71.56  *   18.96  *
  17.45  *
* Min Ch El (ft)         *  926.59  * Shear (lb/sq ft)       *    0.04  *    0.10  *
   0.04  *
* Alpha                  *    1.50  * Stream Power (lb/ft s) *   85.62  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *   20.68  *   10.47  *
  14.35  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   14.96  *    2.63  *
  10.22  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 52

INPUT
Description:
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -51.32     931  -31.89     930  -16.46     929  -13.94  928.22      -2  926.49
       0  926.49       2  926.49   16.35  928.09   18.18     929   20.51     930
   24.74     931   32.73     932   40.72     933

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -51.32     .04  -13.94    .035   16.35     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -13.94   16.35           181.07  146.99  122.24             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  930.80  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.07  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  930.73  * Reach Len. (ft)        *  181.07  *  146.99  *
 122.24  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   29.59  *  106.71  *
   8.01  *
* E.G. Slope (ft/ft)     *0.000495  * Area (sq ft)           *   29.59  *  106.71  *
   8.01  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   23.04  *  232.20  *
   6.76  *
* Top Width (ft)         *   69.74  * Top Width (ft)         *   32.19  *   30.29  *
   7.26  *
* Vel Total (ft/s)       *    1.82  * Avg. Vel. (ft/s)       *    0.78  *    2.18  *
   0.84  *
* Max Chl Dpth (ft)      *    4.24  * Hydr. Depth (ft)       *    0.92  *    3.52  *
   1.10  *
* Conv. Total (cfs)      * 11780.0  * Conv. (cfs)            *  1035.8  * 10440.3  *
  304.0  *
* Length Wtd. (ft)       *  154.77  * Wetted Per. (ft)       *   32.36  *   30.50  *
   7.77  *
* Min Ch El (ft)         *  926.49  * Shear (lb/sq ft)       *    0.03  *    0.11  *
   0.03  *
```

```
* Alpha                    *    1.30  * Stream Power (lb/ft s) *   40.72  *    0.00  *
   0.00  *
* Frctn Loss (ft)          *    0.03  * Cum Volume (acre-ft)   *   20.53  *   10.25  *
  14.31  *
* C & E Loss (ft)          *    0.02  * Cum SA (acres)         *   14.84  *    2.56  *
  10.18  *
*******************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 51

INPUT
Description:
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -211.44     932 -163.11     930 -127.43     929  -57.92     929  -52.54     929
  -17.26   928.4      -2  926.32       0  926.32       2  926.32   17.28  928.25
   23.58     929   62.58     930    68.8     931   75.02     932   91.24     933

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -211.44     .04  -17.26    .035   17.28     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -17.26   17.28           139.54  139.54  139.54             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)           *  930.75  * Element                 *  Left OB *  Channel *
Right OB *
* Vel Head (ft)            *    0.01  * Wt. n-Val.              *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)           *  930.75  * Reach Len. (ft)         *  139.54  *  139.54  *
 139.54  *
* Crit W.S. (ft)           *          * Flow Area (sq ft)       *  254.16  *  122.27  *
  63.70  *
* E.G. Slope (ft/ft)       *0.000091  * Area (sq ft)            *  254.16  *  122.27  *
  63.70  *
* Q Total (cfs)            *  262.00  * Flow (cfs)              *  120.84  *  114.61  *
  26.55  *
* Top Width (ft)           *  248.36  * Top Width (ft)          *  163.88  *   34.54  *
  49.94  *
* Vel Total (ft/s)         *    0.60  * Avg. Vel. (ft/s)        *    0.48  *    0.94  *
   0.42  *
* Max Chl Dpth (ft)        *    4.43  * Hydr. Depth (ft)        *    1.55  *    3.54  *
   1.28  *
* Conv. Total (cfs)        * 27422.4  * Conv. (cfs)             * 12648.0  * 11995.7  *
 2778.6  *
* Length Wtd. (ft)         *  139.54  * Wetted Per. (ft)        *  163.92  *   34.80  *
  50.06  *
* Min Ch El (ft)           *  926.32  * Shear (lb/sq ft)        *    0.01  *    0.02  *
   0.01  *
```

```
* Alpha                    *    1.43  * Stream Power (lb/ft s) *   91.24  *    0.00  *
   0.00  *
* Frctn Loss (ft)          *    0.01  * Cum Volume (acre-ft)   *   19.94  *    9.87  *
  14.21  *
* C & E Loss (ft)          *    0.00  * Cum SA (acres)         *   14.43  *    2.45  *
  10.10  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 50

INPUT
Description:
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -267.52     932 -199.44     930 -164.77     929  -37.83     929  -23.79   928.2
      -2  926.12       0  926.12       2  926.12   34.83   928.1   39.25     929
   50.36     930   61.69     931   79.36     932   98.11     933  101.22  933.17

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -267.52     .04  -23.79    .035   34.83     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -23.79   34.83             38.2    38.2    38.2             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)           *  930.74  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)            *    0.01  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)           *  930.74  * Reach Len. (ft)        *   38.20  *   38.20  *
  38.20  *
* Crit W.S. (ft)           *          * Flow Area (sq ft)      *  303.05  *  215.61  *
  26.54  *
* E.G. Slope (ft/ft)       *0.000048  * Area (sq ft)           *  303.05  *  215.61  *
  26.54  *
* Q Total (cfs)            *  262.00  * Flow (cfs)             *  103.10  *  151.57  *
   7.32  *
* Top Width (ft)           *  283.33  * Top Width (ft)         *  200.81  *   58.62  *
  23.90  *
* Vel Total (ft/s)         *    0.48  * Avg. Vel. (ft/s)       *    0.34  *    0.70  *
   0.28  *
* Max Chl Dpth (ft)        *    4.62  * Hydr. Depth (ft)       *    1.51  *    3.68  *
   1.11  *
* Conv. Total (cfs)        * 37632.4  * Conv. (cfs)            * 14809.0  * 21771.4  *
 1052.0  *
* Length Wtd. (ft)         *   38.20  * Wetted Per. (ft)       *  200.86  *   58.78  *
  24.07  *
* Min Ch El (ft)           *  926.12  * Shear (lb/sq ft)       *    0.00  *    0.01  *
   0.00  *
* Alpha                    *    1.44  * Stream Power (lb/ft s) *  101.22  *    0.00  *
   0.00  *
* Frctn Loss (ft)          *    0.00  * Cum Volume (acre-ft)   *   19.05  *    9.32  *
  14.06  *
```

```
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   13.85  *    2.31  *
   9.98  *
*******************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 49

INPUT
Description: Upstream Section of B4
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -285.46     931 -216.53     930 -187.86     929  -151.6     929 -143.04     930
 -126.27     930  -24.48     929  -17.36     929   -7.43  928.31      -2  926.12
       0  926.12       2  926.12     6.4  927.73    9.03     928   10.56     929
   45.41     930   53.81     931   69.67     932   97.59     933

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -285.46     .04   -7.43    .035     6.4     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -7.43     6.4            15.76   15.76   15.76             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -285.46 -143.04               F

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  930.74  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.02  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  930.72  * Reach Len. (ft)        *    2.24  *    2.24  *
   2.24  *
* Crit W.S. (ft)         *  929.43  * Flow Area (sq ft)      *  168.39  *   54.07  *
  55.39  *
* E.G. Slope (ft/ft)     *0.000302  * Area (sq ft)           *  293.49  *   54.07  *
  55.39  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *  125.50  *   95.69  *
  40.82  *
* Top Width (ft)         *  317.27  * Top Width (ft)         *  258.42  *   13.83  *
  45.02  *
* Vel Total (ft/s)       *    0.94  * Avg. Vel. (ft/s)       *    0.75  *    1.77  *
   0.74  *
* Max Chl Dpth (ft)      *    4.60  * Hydr. Depth (ft)       *    1.24  *    3.91  *
   1.23  *
* Conv. Total (cfs)      * 15085.3  * Conv. (cfs)            *  7225.8  *  5509.4  *
 2350.1  *
* Length Wtd. (ft)       *    2.24  * Wetted Per. (ft)       *  135.64  *   14.54  *
  45.39  *
* Min Ch El (ft)         *  926.12  * Shear (lb/sq ft)       *    0.02  *    0.07  *
   0.02  *
```

```
* Alpha                  *    1.68  * Stream Power (lb/ft s) *   97.59  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   18.79  *    9.21  *
  14.03  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *   13.65  *    2.27  *
   9.95  *
*******************************************************************************
***********

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

BRIDGE


RIVER: Tributary I-2
REACH: 1                  RS: 48.5

INPUT
Description:
Distance from Upstream XS =    2.24
Deck/Roadway Width        =   11.94
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
    -120  929.85     900   -12.5  930.43  928.43       0  930.37  928.27
    12.5  930.35  928.19     100   930.2     900

Upstream Bridge Cross Section Data
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*************************************************************************
 -285.46     931 -216.53     930 -187.86     929  -151.6     929 -143.04     930
 -126.27     930  -24.48     929  -17.36     929   -7.43  928.31      -2  926.12
       0  926.12       2  926.12     6.4  927.73    9.03     928   10.56     929
   45.41     930   53.81     931   69.67     932   97.59     933

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -285.46     .04   -7.43    .035     6.4     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -7.43     6.4             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -285.46 -143.04               F

Downstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
    -300  929.85     900   -12.5  930.43  928.43       0  930.37  928.27
    12.5  930.35  928.19     100   930.2     900

Downstream Bridge Cross Section Data
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
*******************************************************************************
 -262.83     930 -242.23     929 -194.57     928   -49.8     928  -14.74     927
  -13.96     926  -13.77   925.7      -2   925.7       0   925.7       2   925.7
   12.39     926   16.12     927   22.35     928   27.49     929   33.65     930
   73.18     931   79.68     932

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -262.83     .04  -13.96    .035   12.39     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
        -13.96   12.39             .3       .5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #100-year
*******************************************************************************
*********
* E.G. US. (ft)          *     930.74  * Element                *Inside BR US
*Inside BR DS *
* W.S. US. (ft)          *     930.72  * E.G. Elev (ft)         *     930.69  *
929.86  *
* Q Total (cfs)          *     262.00  * W.S. Elev (ft)         *     930.50  *
929.66  *
* Q Bridge (cfs)         *     103.21  * Crit W.S. (ft)         *     930.50  *
927.21  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *       4.38  *
 3.96  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       3.21  *
 3.36  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *      81.72  *
78.06  *
* Weir Submerg           *             * Froude # Chl           *       0.29  *
 0.32  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *     105.66  *
231.16  *
* Min El Weir Flow (ft)  *     929.94  * Hydr Depth (ft)        *       0.42  *
       *
* Min El Prs (ft)        *     928.38  * W.P. Total (ft)        *     228.99  *
81.83  *
```

```
* Delta EG (ft)          *       0.97  * Conv. Total (cfs)      *     1701.2  *
3541.5  *
* Delta WS (ft)          *       0.96  * Top Width (ft)         *     300.82  *
       *
* BR Open Area (sq ft)   *      21.47  * Frctn Loss (ft)        *       0.12  *
 0.00  *
* BR Open Vel (ft/s)     *       4.81  * C & E Loss (ft)        *       0.00  *
 0.10  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.53  *
 0.33  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *    -285.46  *
-262.83  *
*******************************************************************************
*********

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.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.
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: Tributary I-2
REACH: 1                  RS: 48

INPUT
Description: Upstream Section of W2/Downstream Section of B4
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -262.83     930 -242.23     929 -194.57     928   -49.8     928  -14.74     927
  -13.96     926  -13.77   925.7      -2   925.7       0   925.7       2   925.7
   12.39     926   16.12     927   22.35     928   27.49     929   33.65     930
   73.18     931   79.68     932

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -262.83     .04  -13.96    .035   12.39     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -13.96   12.39            41.86   41.86   41.86             .3       .5

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  929.76  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.01  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
```

```
* W.S. Elev (ft)         *  929.76  * Reach Len. (ft)        *   41.86  *   41.86  *
  41.86  *
* Crit W.S. (ft)         *  927.23  * Flow Area (sq ft)      *  402.25  *  105.36  *
  34.47  *
* E.G. Slope (ft/ft)     *0.000060  * Area (sq ft)           *  402.25  *  105.36  *
  34.47  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *  161.07  *   86.77  *
  14.17  *
* Top Width (ft)         *  290.02  * Top Width (ft)         *  243.90  *   26.35  *
  19.77  *
* Vel Total (ft/s)       *    0.48  * Avg. Vel. (ft/s)       *    0.40  *    0.82  *
   0.41  *
* Max Chl Dpth (ft)      *    4.06  * Hydr. Depth (ft)       *    1.65  *    4.00  *
   1.74  *
* Conv. Total (cfs)      * 33880.6  * Conv. (cfs)            * 20828.5  * 11220.2  *
 1831.9  *
* Length Wtd. (ft)       *   41.86  * Wetted Per. (ft)       *  244.43  *   26.52  *
  20.14  *
* Min Ch El (ft)         *  925.70  * Shear (lb/sq ft)       *    0.01  *    0.01  *
   0.01  *
* Alpha                  *    1.42  * Stream Power (lb/ft s) *   79.68  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   18.75  *    9.19  *
  14.02  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   13.60  *    2.27  *
   9.94  *
*******************************************************************************
***********

INLINE STRUCTURE


RIVER: Tributary I-2
REACH: 1                  RS: 47

INPUT
Description:
Distance from Upstream XS =   39.86
Deck/Roadway Width        =       2
Weir Coefficient          =     2.6
 Weir Embankment Coordinates    num =       10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    -800  929.32   -4.85  929.32   -4.85  928.16    4.85  928.16    4.85  929.36
   12.47  929.36   12.47  929.36   19.12  929.36   19.12  929.25     800  929.25

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Weir crest shape                            = Broad Crested


INLINE STRUCTURE OUTPUT  Profile #100-year  Inl Struct:
*******************************************************************************
* E.G. Elev (ft)             *  929.76  * Q Gates (cfs)             *          *
* W.S. Elev (ft)             *  929.76  * Q Gate Group (cfs)        *    0.00  *
* Q Total (cfs)              *  262.00  * Gate Open Ht (ft)         *  928.58  *
* Q Weir (cfs)               *  262.00  * Gate #Open                *          *
* Weir Flow Area (sq ft)     *  137.54  * Gate Area (sq ft)         *    1.00  *
* Weir Sta Lft (ft)          * -257.97  * Gate Submerg              *    0.00  *
* Weir Sta Rgt (ft)          *   32.20  * Gate Invert (ft)           *    0.00  *
* Weir Max Depth (ft)        *    1.60  * Gate Weir Coef             *   0.000  *
```

```
* Weir Avg Depth (ft)        *    0.47  *                              *          *
* Weir Coef (ft^1/2)         *   2.600  * Q Breach (cfs)               *          *
* Weir Submerg               *    0.05  * Breach Avg Velocity (ft/s)   *          *
* Min El Weir Flow (ft)      *  928.17  * Breach Flow Area (sq ft)     *          *
* Wr Top Wdth (ft)           *  290.16  *                              *          *
*******************************************************************************

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 46

INPUT
Description: Downstream Section of W2
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -286.47     930 -202.12     928 -124.99     927  -14.74     927  -13.96     926
  -13.77   925.7      -2  923.76       0  923.76       2  923.76   12.39     926
   16.12     927   22.35     928   27.49     929   33.65     930   73.18     931
   79.68     932

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -286.47     .04  -13.96    .035   12.39     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -13.96   12.39           174.66  174.66  174.66             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  928.59  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.01  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  928.58  * Reach Len. (ft)        *  174.66  *  174.66  *
 174.66  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  265.51  *  103.47  *
  15.31  *
* E.G. Slope (ft/ft)     *0.000132  * Area (sq ft)           *  265.51  *  103.47  *
  15.31  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *  131.09  *  123.70  *
   7.21  *
* Top Width (ft)         *  251.76  * Top Width (ft)         *  212.48  *   26.35  *
  12.92  *
* Vel Total (ft/s)       *    0.68  * Avg. Vel. (ft/s)       *    0.49  *    1.20  *
   0.47  *
* Max Chl Dpth (ft)      *    4.82  * Hydr. Depth (ft)       *    1.25  *    3.93  *
   1.18  *
* Conv. Total (cfs)      * 22833.5  * Conv. (cfs)            * 11424.9  * 10780.6  *
  628.0  *
* Length Wtd. (ft)       *  174.66  * Wetted Per. (ft)       *  212.98  *   26.91  *
  13.19  *
* Min Ch El (ft)         *  923.76  * Shear (lb/sq ft)       *    0.01  *    0.03  *
   0.01  *
* Alpha                  *    1.73  * Stream Power (lb/ft s) *   79.68  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *   18.75  *    8.87  *
  14.02  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   13.38  *    2.25  *
```

```
   9.93  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 45

INPUT
Description: Upstream Section of B3
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -401.82     930 -373.56     929 -338.33     928 -305.44     927 -260.24     926
 -115.54     926  -75.36     927   -36.6     927  -18.22     926  -17.31  925.65
      -2  924.79       0  924.79       2  924.79   15.98  925.65   17.89     926
   22.16     927  200.45     928  208.08     929  214.91     930  222.99     931
  235.77     932

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -401.82     .04  -18.22    .035   17.89     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -18.22   17.89            49.93   49.93   49.93             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -401.82  -75.36               F

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  928.57  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.01  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  928.56  * Reach Len. (ft)        *   26.06  *   26.06  *
  26.06  *
* Crit W.S. (ft)         *  926.43  * Flow Area (sq ft)      *   98.17  *  120.52  *
 198.46  *
* E.G. Slope (ft/ft)     *0.000116  * Area (sq ft)           *  684.08  *  120.52  *
 198.46  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   56.39  *  122.89  *
  82.72  *
* Top Width (ft)         *  562.66  * Top Width (ft)         *  339.74  *   36.11  *
 186.81  *
* Vel Total (ft/s)       *    0.63  * Avg. Vel. (ft/s)       *    0.57  *    1.02  *
   0.42  *
* Max Chl Dpth (ft)      *    3.77  * Hydr. Depth (ft)       *    1.72  *    3.34  *
   1.06  *
* Conv. Total (cfs)      * 24296.8  * Conv. (cfs)            *  5229.4  * 11396.2  *
 7671.2  *
* Length Wtd. (ft)       *   26.06  * Wetted Per. (ft)       *   57.17  *   36.26  *
 186.97  *
* Min Ch El (ft)         *  924.79  * Shear (lb/sq ft)       *    0.01  *    0.02  *
   0.01  *
* Alpha                  *    1.56  * Stream Power (lb/ft s) *  235.77  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *   16.85  *    8.42  *
  13.60  *
```

```
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   12.27  *    2.12  *
   9.53  *
*******************************************************************************
***********

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.

BRIDGE


RIVER: Tributary I-2
REACH: 1                  RS: 44.5

INPUT
Description:
Distance from Upstream XS =   26.06
Deck/Roadway Width        =   10.08
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
    -600   927.8     900  -19.78  928.11  926.35       0  928.18  926.23
   19.78   928.1  926.36     150   927.5     900

Upstream Bridge Cross Section Data
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -401.82     930 -373.56     929 -338.33     928 -305.44     927 -260.24     926
 -115.54     926  -75.36     927   -36.6     927  -18.22     926  -17.31  925.65
      -2  924.79       0  924.79       2  924.79   15.98  925.65   17.89     926
   22.16     927  200.45     928  208.08     929  214.91     930  222.99     931
  235.77     932

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -401.82     .04  -18.22    .035   17.89     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
        -18.22   17.89             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -401.82  -75.36               F

Downstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
    -600   927.8     900  -19.78  928.11  926.35       0  928.18  926.23
   19.78   928.1  926.36     150   927.5     900

Downstream Bridge Cross Section Data
Station Elevation Data    num=      23
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -421.99     930 -391.37     929 -351.33     928 -318.69     927 -277.82     926
 -120.15     926  -77.41     927   -18.2     927  -17.28     926  -16.96  925.55
      -2  924.79       0  924.79       2  924.79   16.09  925.77   19.42     926
    26.8     927   77.31     927   90.95     927   98.41     928  106.21     929
```

```
  115.38     930  124.56     931  126.55  931.22

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -421.99     .04  -16.96    .035   16.09     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
        -16.96   16.09             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -421.99  -77.41               F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #100-year
*******************************************************************************
*********
* E.G. US. (ft)          *     928.57  * Element                *Inside BR US
*Inside BR DS *
* W.S. US. (ft)          *     928.56  * E.G. Elev (ft)         *     928.55  *
928.45  *
* Q Total (cfs)          *     262.00  * W.S. Elev (ft)         *     928.53  *
928.26  *
* Q Bridge (cfs)         *      50.49  * Crit W.S. (ft)         *     928.08  *
928.26  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *       3.74  *
 3.47  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       1.27  *
 3.30  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *     206.30  *
79.46  *
* Weir Submerg           *             * Froude # Chl           *       0.12  *
 0.33  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *     175.86  *
132.63  *
* Min El Weir Flow (ft)  *     927.76  * Hydr Depth (ft)        *       0.74  *
 0.45  *
* Min El Prs (ft)        *     926.36  * W.P. Total (ft)        *     363.78  *
254.92  *
* Delta EG (ft)          *       1.11  * Conv. Total (cfs)      *     5594.8  *
```

```
1554.6  *
* Delta WS (ft)          *       1.22  * Top Width (ft)         *     561.41  *
462.09  *
* BR Open Area (sq ft)   *      38.76  * Frctn Loss (ft)        *       0.05  *
 0.06  *
* BR Open Vel (ft/s)     *       1.30  * C & E Loss (ft)        *       0.05  *
 0.04  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.08  *
 0.55  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *    -401.82  *
-421.99  *
*******************************************************************************
*********

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance)
is less than 0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.
Warning: The energy equation could not be balanced within the specified number of
iterations.  The program used critical depth
         for the water surface and continued on with the calculations.
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.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 44

INPUT
Description: Downstream Section of B3
Station Elevation Data    num=      23
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -421.99     930 -391.37     929 -351.33     928 -318.69     927 -277.82     926
 -120.15     926  -77.41     927   -18.2     927  -17.28     926  -16.96  925.55
      -2  924.79       0  924.79       2  924.79   16.09  925.77   19.42     926
    26.8     927   77.31     927   90.95     927   98.41     928  106.21     929
  115.38     930  124.56     931  126.55  931.22

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -421.99     .04  -16.96    .035   16.09     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -16.96   16.09           179.31  179.31  179.31             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -421.99  -77.41               F

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
```

```
***********
* E.G. Elev (ft)         *  927.45  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.12  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  927.33  * Reach Len. (ft)        *  179.31  *  179.31  *
 179.31  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   20.99  *   71.46  *
  32.75  *
* E.G. Slope (ft/ft)     *0.001824  * Area (sq ft)           *  302.63  *   71.46  *
  32.75  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   16.32  *  216.40  *
  29.27  *
* Top Width (ft)         *  423.00  * Top Width (ft)         *  312.60  *   33.05  *
  77.34  *
* Vel Total (ft/s)       *    2.09  * Avg. Vel. (ft/s)       *    0.78  *    3.03  *
   0.89  *
* Max Chl Dpth (ft)      *    2.54  * Hydr. Depth (ft)       *    0.35  *    2.16  *
   0.42  *
* Conv. Total (cfs)      *  6135.1  * Conv. (cfs)            *   382.3  *  5067.4  *
  685.4  *
* Length Wtd. (ft)       *  179.31  * Wetted Per. (ft)       *   61.12  *   33.10  *
  77.44  *
* Min Ch El (ft)         *  924.79  * Shear (lb/sq ft)       *    0.04  *    0.25  *
   0.05  *
* Alpha                  *    1.76  * Stream Power (lb/ft s) *  126.55  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *   16.50  *    8.34  *
  13.47  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   11.88  *    2.08  *
   9.36  *
*******************************************************************************
***********

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

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 43

INPUT
Description: Upstream Section of W1
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -530.27     930 -488.74     929 -439.49     928 -393.25     927 -320.46     926
 -197.69     925 -100.37     925  -71.09     926  -14.03     926     -12 924.525
   -10.7  923.58      -2  923.58       0  923.58       2  923.58   14.47  924.82
   18.92     926  260.44     926  467.67     927  636.76     928  647.08     929
  658.22     930  670.01     931

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
 -530.27     .04     -12    .035   14.47     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           -12   14.47            23.86   23.86   23.86             .1       .3
Ineffective Flow     num=       1
```

```
   Sta L   Sta R    Elev  Permanent
 -530.27  -71.09               F

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  927.36  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  927.36  * Reach Len. (ft)        *   23.86  *   23.86  *
  23.86  *
* Crit W.S. (ft)         *  925.36  * Flow Area (sq ft)      *   81.70  *   91.64  *
 524.96  *
* E.G. Slope (ft/ft)     *0.000066  * Area (sq ft)           *  658.89  *   91.64  *
 524.96  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   30.34  *   71.44  *
 160.21  *
* Top Width (ft)         *  937.87  * Top Width (ft)         *  397.77  *   26.47  *
 513.63  *
* Vel Total (ft/s)       *    0.38  * Avg. Vel. (ft/s)       *    0.37  *    0.78  *
   0.31  *
* Max Chl Dpth (ft)      *    3.78  * Hydr. Depth (ft)       *    1.38  *    3.46  *
   1.02  *
* Conv. Total (cfs)      * 32352.0  * Conv. (cfs)            *  3746.8  *  8822.0  *
19783.2  *
* Length Wtd. (ft)       *   23.86  * Wetted Per. (ft)       *   59.57  *   26.84  *
 513.78  *
* Min Ch El (ft)         *  923.58  * Shear (lb/sq ft)       *    0.01  *    0.01  *
   0.00  *
* Alpha                  *    1.70  * Stream Power (lb/ft s) *  670.01  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   14.52  *    8.01  *
  12.32  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   10.42  *    1.96  *
   8.14  *
*******************************************************************************
***********

INLINE STRUCTURE


RIVER: Tributary I-2
REACH: 1                  RS: 42

INPUT
Description:
Distance from Upstream XS =   21.86
Deck/Roadway Width        =       2
Weir Coefficient          =     2.6
 Weir Embankment Coordinates    num =        8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
    -600     927    -7.6     927    -7.6  925.58       0  925.58       0  925.58
     7.6  925.58     7.6  926.97     600  926.97

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Weir crest shape                            = Broad Crested
```

```
INLINE STRUCTURE OUTPUT  Profile #100-year  Inl Struct:
*******************************************************************************
* E.G. Elev (ft)             *  927.36  * Q Gates (cfs)              *         *
* W.S. Elev (ft)             *  927.36  * Q Gate Group (cfs)         *    0.00 *
* Q Total (cfs)              *  262.00  * Gate Open Ht (ft)          *  927.35 *
* Q Weir (cfs)               *  262.00  * Gate #Open                 *         *
* Weir Flow Area (sq ft)     *  240.87  * Gate Area (sq ft)          *    1.00 *
* Weir Sta Lft (ft)          *  -71.09  * Gate Submerg               *    0.00 *
* Weir Sta Rgt (ft)          *  528.73  * Gate Invert (ft)           *    0.00 *
* Weir Max Depth (ft)        *    1.78  * Gate Weir Coef             *   0.000 *
* Weir Avg Depth (ft)        *    0.40  *                           *         *
* Weir Coef (ft^1/2)         *   2.600  * Q Breach (cfs)            *         *
* Weir Submerg               *    0.98  * Breach Avg Velocity (ft/s) *         *
* Min El Weir Flow (ft)      *  925.59  * Breach Flow Area (sq ft)   *         *
* Wr Top Wdth (ft)           *  599.82  *                           *         *
*******************************************************************************

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 41

INPUT
Description: Upstream Section of B2/Downstream Section of W1
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -530.27     930 -488.74     929 -439.49     928 -393.25     927 -320.46     926
 -197.69     925 -100.37     925  -71.09     926  -14.03     926   -10.7   925.3
      -2  923.58       0  923.58       2  923.58   14.47  924.82   18.92     926
  260.44     926  467.67     927  636.76     928  647.08     929  658.22     930
  670.01     931

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -530.27     .04   -10.7    .035   14.47     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -10.7   14.47            43.86   43.86   43.86             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -530.27  -71.09               F

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  927.35  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  927.35  * Reach Len. (ft)        *   14.87  *   14.87  *
  14.87  *
* Crit W.S. (ft)         *  925.70  * Flow Area (sq ft)      *   82.71  *   79.68  *
 521.30  *
* E.G. Slope (ft/ft)     *0.000073  * Area (sq ft)           *  657.48  *   79.68  *
 521.30  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   32.39  *   62.03  *
 167.57  *
* Top Width (ft)         *  936.33  * Top Width (ft)         *  398.74  *   25.17  *
 512.42  *
* Vel Total (ft/s)       *    0.38  * Avg. Vel. (ft/s)       *    0.39  *    0.78  *
```

```
   0.32  *
* Max Chl Dpth (ft)      *    3.77  * Hydr. Depth (ft)       *    1.37  *    3.17  *
   1.02  *
* Conv. Total (cfs)      * 30619.8  * Conv. (cfs)            *  3785.9  *  7249.6  *
19584.4  *
* Length Wtd. (ft)       *   14.87  * Wetted Per. (ft)       *   60.46  *   25.40  *
 512.58  *
* Min Ch El (ft)         *  923.58  * Shear (lb/sq ft)       *    0.01  *    0.01  *
   0.00  *
* Alpha                  *    1.56  * Stream Power (lb/ft s) *  670.01  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   14.52  *    7.62  *
  12.32  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   10.20  *    1.94  *
   7.86  *
*******************************************************************************
***********

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance)
is less than 0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.

BRIDGE


RIVER: Tributary I-2
REACH: 1                  RS: 40.5

INPUT
Description:
Distance from Upstream XS =   14.87
Deck/Roadway Width        =   10.02
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*******************************************************************
   -1000     926     900  -12.16  927.22  925.52       0  927.36  925.55
   12.16   927.3  925.49    1000     926     900

Upstream Bridge Cross Section Data
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -530.27     930 -488.74     929 -439.49     928 -393.25     927 -320.46     926
 -197.69     925 -100.37     925  -71.09     926  -14.03     926   -10.7   925.3
      -2  923.58       0  923.58       2  923.58   14.47  924.82   18.92     926
  260.44     926  467.67     927  636.76     928  647.08     929  658.22     930
  670.01     931

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -530.27     .04   -10.7    .035   14.47     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -10.7   14.47             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -530.27  -71.09               F
```

```
Downstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
**********************************************************************
   -1000     926     900  -12.16  927.22  925.52       0  927.36  925.55
   12.16   927.3  925.49     375     927     900

Downstream Bridge Cross Section Data
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -679.1     934 -669.98     933 -660.89     932 -652.14     931 -643.38     930
 -616.44     929 -555.22     928    -478     928 -452.88     929 -434.85     929
 -413.52     928 -397.61     927 -383.84     927 -374.38     928 -364.92     929
 -345.43     929 -313.49     928 -254.35     927 -234.55     926 -228.25     925
 -124.45     925  -37.97     926  -25.68     926  -19.47     925  -13.26  924.04
   -5.62  924.04      -2  924.04       0  924.04       2  924.04    4.17  924.04
    5.81  924.04   13.23     925   16.87     926   35.52     926   65.49     925
   105.3     925  137.31     924  235.64     924   300.2     925  308.43     926
  358.32     927  365.77     928  389.06     928  398.77     927  408.29     926
  436.81     926   725.7     927  735.06     928  744.16     929  750.43     930

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
  -679.1     .04   -5.62    .035    4.17     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -5.62    4.17             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  -679.1  -37.97     926       F
   35.52  750.43     926       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #100-year
*******************************************************************************
*********
* E.G. US. (ft)          *     927.35  * Element                *Inside BR US
*Inside BR DS *
```

```
* W.S. US. (ft)          *     927.35  * E.G. Elev (ft)         *     927.32  *
926.70  *
* Q Total (cfs)          *     262.00  * W.S. Elev (ft)         *     927.20  *
926.06  *
* Q Bridge (cfs)         *     125.26  * Crit W.S. (ft)         *     927.20  *
925.35  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *       3.62  *
 2.02  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       2.11  *
 5.97  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *     124.26  *
43.90  *
* Weir Submerg           *             * Froude # Chl           *       0.26  *
 0.80  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *     116.84  *
101.95  *
* Min El Weir Flow (ft)  *     926.77  * Hydr Depth (ft)        *       0.28  *
 0.97  *
* Min El Prs (ft)        *     925.55  * W.P. Total (ft)        *     504.82  *
116.93  *
* Delta EG (ft)          *       1.20  * Conv. Total (cfs)      *     2293.7  *
1179.7  *
* Delta WS (ft)          *       1.78  * Top Width (ft)         *     779.04  *
45.37  *
* BR Open Area (sq ft)   *      34.42  * Frctn Loss (ft)        *       0.23  *
 0.52  *
* BR Open Vel (ft/s)     *       3.64  * C & E Loss (ft)        *       0.16  *
 0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.20  *
 1.16  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *    -530.27  *
-679.10  *
*******************************************************************************
*********

Warning: The energy equation could not be balanced within the specified number of
iterations.  The program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may
indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance)
is less than 0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: 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.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance)
is less than 0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 40

INPUT
```

Description: Downstream Section of B2

Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-679.1	934	-669.98	933	-660.89	932	-652.14	931	-643.38	930
-616.44	929	-555.22	928	-478	928	-452.88	929	-434.85	929
-413.52	928	-397.61	927	-383.84	927	-374.38	928	-364.92	929
-345.43	929	-313.49	928	-254.35	927	-234.55	926	-228.25	925
-124.45	925	-37.97	926	-25.68	926	-19.47	925	-13.26	924.04
-5.62	924.04	-2	924.04	0	924.04	2	924.04	4.17	924.04
5.81	924.04	13.23	925	16.87	926	35.52	926	65.49	925
105.3	925	137.31	924	235.64	924	300.2	925	308.43	926
358.32	927	365.77	928	389.06	928	398.77	927	408.29	926
436.81	926	725.7	927	735.06	928	744.16	929	750.43	930

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-679.1	.04	-5.62	.035	4.17	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-5.62	4.17	124.17	124.17	124.17	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-679.1	-37.97	926	F
35.52	750.43	926	F

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	926.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.	0.040	0.035	0.040
W.S. Elev (ft)	925.57	Reach Len. (ft)	124.17	124.17	124.17
Crit W.S. (ft)	925.57	Flow Area (sq ft)	19.20	14.97	10.88
E.G. Slope (ft/ft)	0.017206	Area (sq ft)	93.31	14.97	297.27
Q Total (cfs)	262.00	Flow (cfs)	99.54	110.66	51.80
Top Width (ft)	451.36	Top Width (ft)	173.99	9.79	267.58
Vel Total (ft/s)	5.81	Avg. Vel. (ft/s)	5.18	7.39	4.76
Max Chl Dpth (ft)	1.57	Hydr. Depth (ft)	1.10	1.53	0.98
Conv. Total (cfs)	1997.4	Conv. (cfs)	758.9	843.6	394.9
Length Wtd. (ft)	124.17	Wetted Per. (ft)	17.50	9.79	11.27
Min Ch El (ft)	924.04	Shear (lb/sq ft)	1.18	1.64	1.04
Alpha	1.12	Stream Power (lb/ft s)	750.43	0.00	0.00
Frctn Loss (ft)	1.42	Cum Volume (acre-ft)	14.36	7.58	12.14
C & E Loss (ft)	0.09	Cum SA (acres)	9.99	1.94	7.58

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: Divided flow computed for this cross-section.
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Tributary I-2
REACH: 1 RS: 39

INPUT
Description:
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-163.99	925	-43.59	924	-17.31	923	-6.03	922.55	-5.49	922.13
-4.84	922	-2	921.77	0	921.77	2	921.77	5.48	922
6.8	922.34	8.69	922.96	9.29	923	23.21	924	28.75	924
52.17	923	65.44	922.43	67	920	197	920	198.59	922.3
207.53	923	216.57	924	231.8	925	246.34	926	310.63	927
317.74	927.06								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-163.99	.04	-4.84	.035	5.48	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-4.84	5.48	71.29	71.29	71.29	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
28.75	317.74		F

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	924.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.040	0.035	0.040
W.S. Elev (ft)	924.05	Reach Len. (ft)	71.29	71.29	71.29
Crit W.S. (ft)	923.96	Flow Area (sq ft)	31.13	22.79	13.67
E.G. Slope (ft/ft)	0.008159	Area (sq ft)	31.13	22.79	597.01
Q Total (cfs)	262.00	Flow (cfs)	81.99	148.01	32.00
Top Width (ft)	266.73	Top Width (ft)	44.58	10.32	

```
 211.83  *
* Vel Total (ft/s)       *    3.88  * Avg. Vel. (ft/s)       *    2.63  *    6.50  *
   2.34  *
* Max Chl Dpth (ft)      *    4.05  * Hydr. Depth (ft)       *    0.70  *    2.21  *
   0.59  *
* Conv. Total (cfs)      *  2900.5  * Conv. (cfs)            *   907.7  *  1638.6  *
  354.2  *
* Length Wtd. (ft)       *   71.29  * Wetted Per. (ft)       *   44.77  *   10.34  *
  23.45  *
* Min Ch El (ft)         *  921.77  * Shear (lb/sq ft)       *    0.35  *    1.12  *
   0.30  *
* Alpha                  *    1.78  * Stream Power (lb/ft s) *  317.74  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   *   14.18  *    7.53  *
  10.86  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *    9.68  *    1.91  *
   6.90  *
*******************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 38

INPUT
Description:
Station Elevation Data    num=      26
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -354.53     927 -336.01     926 -321.42     925 -297.49     924 -240.38     924
 -232.02     923 -231.38  922.36    -230     920     -51     920   -49.9   922.3
  -43.52     923  -17.24     923  -10.67  922.26      -2  921.16       0  921.16
       2  921.16     6.5   922.3   12.19     923    33.6     923   49.93  922.22
      51     920     175     920  176.97  922.32  179.63     923  203.21     924
  222.93     925

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -354.53     .04  -10.67    .035     6.5     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -10.67     6.5            121.3   121.3   121.3             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -354.53  -43.52               F
    33.6  222.93               F

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  924.10  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.14  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  923.96  * Reach Len. (ft)        *  121.30  *  121.30  *
 121.30  *
```

```
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   33.99  *   40.75  *
  28.03  *
* E.G. Slope (ft/ft)     *0.002347  * Area (sq ft)           *  762.92  *   40.75  *
 564.12  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   62.53  *  147.95  *
  51.53  *
* Top Width (ft)         *  442.33  * Top Width (ft)         *  229.38  *   17.17  *
 195.78  *
* Vel Total (ft/s)       *    2.55  * Avg. Vel. (ft/s)       *    1.84  *    3.63  *
   1.84  *
* Max Chl Dpth (ft)      *    3.96  * Hydr. Depth (ft)       *    1.03  *    2.37  *
   1.03  *
* Conv. Total (cfs)      *  5407.9  * Conv. (cfs)            *  1290.6  *  3053.7  *
 1063.6  *
* Length Wtd. (ft)       *  121.30  * Wetted Per. (ft)       *   32.89  *   17.38  *
  27.14  *
* Min Ch El (ft)         *  921.16  * Shear (lb/sq ft)       *    0.15  *    0.34  *
   0.15  *
* Alpha                  *    1.37  * Stream Power (lb/ft s) *  222.93  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *   13.54  *    7.48  *
   9.91  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    9.46  *    1.89  *
   6.57  *
*******************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 37

INPUT
Description: Upstream Section of W5
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -147.36     925  -89.31     924     -14     923  -11.71     922   -8.78     921
   -5.84  920.12   -3.34  920.12      -2  920.12       0  920.12       2  920.12
    9.28  920.12   12.93     921   15.53     922   18.13     923   29.93     923
  295.14     924  489.99     924  548.74     925

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -147.36     .04   -8.78    .035   12.93     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -8.78   12.93             17.95   17.95   17.95             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  923.96  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.05  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  923.91  * Reach Len. (ft)        *   17.95  *   17.95  *
```

```
  17.95  *
* Crit W.S. (ft)          *  921.92  * Flow Area (sq ft)      *   41.82  *   79.48  *
 131.71  *
* E.G. Slope (ft/ft)      *0.000467  * Area (sq ft)           *   41.82  *   79.48  *
 131.71  *
* Q Total (cfs)           *  262.00  * Flow (cfs)             *   22.85  *  171.97  *
  67.18  *
* Top Width (ft)          *  355.42  * Top Width (ft)         *   74.11  *   21.71  *
 259.60  *
* Vel Total (ft/s)        *    1.04  * Avg. Vel. (ft/s)       *    0.55  *    2.16  *
   0.51  *
* Max Chl Dpth (ft)       *    3.79  * Hydr. Depth (ft)       *    0.56  *    3.66  *
   0.51  *
* Conv. Total (cfs)       * 12125.7  * Conv. (cfs)            *  1057.3  *  7959.0  *
 3109.3  *
* Length Wtd. (ft)        *   17.95  * Wetted Per. (ft)       *   74.49  *   21.94  *
 259.97  *
* Min Ch El (ft)          *  920.12  * Shear (lb/sq ft)       *    0.02  *    0.11  *
   0.01  *
* Alpha                   *    2.95  * Stream Power (lb/ft s) *  548.74  *    0.00  *
   0.00  *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)   *   12.41  *    7.31  *
   8.95  *
* C & E Loss (ft)         *          * Cum SA (acres)         *    9.03  *    1.83  *
   5.93  *
*******************************************************************************
***********

INLINE STRUCTURE


RIVER: Tributary I-2
REACH: 1                  RS: 36

INPUT
Description:
Distance from Upstream XS =      15
Deck/Roadway Width        =       2
Weir Coefficient          =     2.6
 Weir Embankment Coordinates    num =        6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
     -30  923.16   -9.14  923.16   -9.14  922.32    9.14  922.32    9.14  923.22
     100  923.22

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Weir crest shape                            = Broad Crested


INLINE STRUCTURE OUTPUT  Profile #100-year  Inl Struct:
*******************************************************************************
* E.G. Elev (ft)             *  923.96  * Q Gates (cfs)             *          *
* W.S. Elev (ft)             *  923.91  * Q Gate Group (cfs)        *    0.00  *
* Q Total (cfs)              *  262.00  * Gate Open Ht (ft)         *  923.90  *
* Q Weir (cfs)               *  262.00  * Gate #Open                *          *
* Weir Flow Area (sq ft)     *  200.22  * Gate Area (sq ft)         *    1.00  *
* Weir Sta Lft (ft)          *  -86.59  * Gate Submerg              *    0.00  *
* Weir Sta Rgt (ft)          *  285.56  * Gate Invert (ft)          *    0.00  *
* Weir Max Depth (ft)        *    1.64  * Gate Weir Coef            *   0.000  *
* Weir Avg Depth (ft)        *    0.54  *                          *          *
```

```
* Weir Coef (ft^1/2)         *   2.600  * Q Breach (cfs)              *          *
* Weir Submerg               *    0.95  * Breach Avg Velocity (ft/s) *          *
* Min El Weir Flow (ft)      *  922.33  * Breach Flow Area (sq ft)   *          *
* Wr Top Wdth (ft)           *  372.15  *                            *          *
*******************************************************************************

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 35

INPUT
Description: Upstream Section of B1/Downstream Section of W5
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -147.36     925  -89.31     924     -14     923  -11.71     922   -8.78     921
   -5.84     920   -3.34  919.92      -2  919.92       0  919.92       2  919.92
     6.2 919.966    9.28     920   12.93     921   15.53     922   18.13     923
   29.93     923  295.14     924  489.99     924  548.74     925

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -147.36     .04   -5.84    .035     6.2     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -5.84     6.2             27.71   27.71   27.71             .3       .5
Skew Angle = 21

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  923.95  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.06  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  923.90  * Reach Len. (ft)        *    6.33  *    6.33  *
   6.33  *
* Crit W.S. (ft)         *  921.85  * Flow Area (sq ft)      *   50.52  *   47.69  *
 151.64  *
* E.G. Slope (ft/ft)     *0.000634  * Area (sq ft)           *   50.52  *   47.69  *
 151.64  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   35.91  *  127.62  *
  98.47  *
* Top Width (ft)         *  349.43  * Top Width (ft)         *   75.72  *   12.04  *
 261.66  *
* Vel Total (ft/s)       *    1.05  * Avg. Vel. (ft/s)       *    0.71  *    2.68  *
   0.65  *
* Max Chl Dpth (ft)      *    3.98  * Hydr. Depth (ft)       *    0.67  *    3.96  *
   0.58  *
* Conv. Total (cfs)      * 10404.4  * Conv. (cfs)            *  1426.0  *  5067.9  *
 3910.5  *
* Length Wtd. (ft)       *    6.33  * Wetted Per. (ft)       *   76.27  *   12.04  *
 262.17  *
* Min Ch El (ft)         *  919.92  * Shear (lb/sq ft)       *    0.03  *    0.16  *
   0.02  *
* Alpha                  *    3.38  * Stream Power (lb/ft s) *  548.74  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *   12.41  *    7.22  *
   8.95  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    9.00  *    1.82  *
```

```
   5.83  *
*******************************************************************************
***********

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.

BRIDGE


RIVER: Tributary I-2
REACH: 1                  RS: 34.5

INPUT
Description:
Distance from Upstream XS =    6.33
Deck/Roadway Width        =   12.04
Weir Coefficient          =     2.6
Bridge Deck/Roadway Skew  =      21
Upstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
-186.716  923.91  921.34 -18.177  923.35  921.34       0  923.58  921.35
  18.177  923.35  921.34  112.03  923.35  921.34

Upstream Bridge Cross Section Data
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -147.36     925  -89.31     924     -14     923  -11.71     922   -8.78     921
   -5.84     920   -3.34  919.92      -2  919.92       0  919.92       2  919.92
     6.2 919.966    9.28     920   12.93     921   15.53     922   18.13     923
   29.93     923  295.14     924  489.99     924  548.74     925

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
 -147.36     .04   -5.84    .035     6.2     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -5.84     6.2             .3       .5
Skew Angle = 21

Downstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
-186.716  923.56  921.34 -37.343  923.35  921.34 -18.177  923.35  921.34
       0  923.58  921.35  18.177  923.35  921.34  112.03  923.35  921.34
 186.716  923.35  921.34

Downstream Bridge Cross Section Data
Station Elevation Data    num=      23
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -458.48     925 -129.93     924  -78.69     924  -69.14     924  -53.73     923
  -38.32     922   -32.1     922  -17.37     923  -12.46     923   -9.68     922
   -6.68     921   -3.63     920      -2  918.24       0  918.24       2  918.24
    3.37     920    7.66     921   11.98     922  148.11     923  254.03     924
  277.64     924  289.67     926  370.97     927
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 -458.48     .04   -6.68    .035    7.66     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -6.68    7.66             .3       .5
Skew Angle = 21

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #100-year
*******************************************************************************
*********
* E.G. US. (ft)          *     923.95  * Element                *Inside BR US
*Inside BR DS *
* W.S. US. (ft)          *     923.90  * E.G. Elev (ft)         *     923.94  *
923.80  *
* Q Total (cfs)          *     262.00  * W.S. Elev (ft)         *     923.89  *
923.65  *
* Q Bridge (cfs)         *      60.03  * Crit W.S. (ft)         *     923.68  *
923.65  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *       3.97  *
 5.41  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       1.62  *
 2.60  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *     161.39  *
100.83  *
* Weir Submerg           *             * Froude # Chl           *       0.15  *
 0.23  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *     131.07  *
123.74  *
* Min El Weir Flow (ft)  *     923.36  * Hydr Depth (ft)        *       0.46  *
 0.36  *
* Min El Prs (ft)        *     921.35  * W.P. Total (ft)        *     396.27  *
316.80  *
* Delta EG (ft)          *       0.71  * Conv. Total (cfs)      *     3413.4  *
1974.1  *
* Delta WS (ft)          *       0.72  * Top Width (ft)         *     348.58  *
281.06  *
* BR Open Area (sq ft)   *      25.82  * Frctn Loss (ft)        *       0.11  *
```

```
 0.02  *
* BR Open Vel (ft/s)     *       2.33  * C & E Loss (ft)        *       0.03  *
 0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.15  *
 0.35  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *    -147.36  *
-458.48  *
*******************************************************************************
*********

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance)
is less than 0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.
Warning: The energy equation could not be balanced within the specified number of
iterations.  The program used critical depth
         for the water surface and continued on with the calculations.
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.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 34

INPUT
Description: Downstream Section of B1
Station Elevation Data    num=      23
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -458.48     925 -129.93     924  -78.69     924  -69.14     924  -53.73     923
  -38.32     922   -32.1     922  -17.37     923  -12.46     923   -9.68     922
   -6.68     921   -3.63     920      -2  918.24       0  918.24       2  918.24
    3.37     920    7.66     921   11.98     922  148.11     923  254.03     924
  277.64     924  289.67     926  370.97     927

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
 -458.48     .04   -6.68    .035    7.66     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -6.68    7.66           173.79  173.79  173.79             .3       .5
Skew Angle = 21

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  923.25  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.07  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  923.17  * Reach Len. (ft)        *  173.79  *  173.79  *
```

```
 173.79  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   35.53  *   51.51  *
 100.37  *
* E.G. Slope (ft/ft)     *0.000947  * Area (sq ft)           *   35.53  *   51.51  *
 100.37  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   32.29  *  145.23  *
  84.48  *
* Top Width (ft)         *  222.78  * Top Width (ft)         *   49.71  *   14.34  *
 158.73  *
* Vel Total (ft/s)       *    1.40  * Avg. Vel. (ft/s)       *    0.91  *    2.82  *
   0.84  *
* Max Chl Dpth (ft)      *    4.93  * Hydr. Depth (ft)       *    0.71  *    3.59  *
   0.63  *
* Conv. Total (cfs)      *  8514.0  * Conv. (cfs)            *  1049.4  *  4719.4  *
 2745.3  *
* Length Wtd. (ft)       *  173.79  * Wetted Per. (ft)       *   50.12  *   16.24  *
 158.85  *
* Min Ch El (ft)         *  918.24  * Shear (lb/sq ft)       *    0.04  *    0.19  *
   0.04  *
* Alpha                  *    2.42  * Stream Power (lb/ft s) *  370.97  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *   12.40  *    7.20  *
   8.89  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    8.96  *    1.82  *
   5.68  *
*******************************************************************************
***********

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.

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 33

INPUT
Description:
Station Elevation Data    num=      24
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -532.68   926.6 -455.96     926 -436.02     924 -387.47     922  -95.32   922.4
  -27.53     922  -17.86     920      -6 918.452      -2  917.93     -.5  917.93
      .5  917.93       2  917.93       6 918.238   28.86     920   59.42     922
  146.13     923   236.6     924  258.38     926  303.19     927  351.31     926
  418.69   924.8  531.04     926  633.57     928  685.37   928.4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -532.68     .04      -6    .035       6     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -6       6            248.24  248.24  248.24             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  923.19  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.             *   0.040  *   0.035  *
```

```
  0.040  *
* W.S. Elev (ft)         *  923.18  * Reach Len. (ft)        *  248.24  *  248.24  *
 248.24  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  438.36  *   61.36  *
 220.17  *
* E.G. Slope (ft/ft)     *0.000056  * Area (sq ft)           *  438.36  *   61.36  *
 220.17  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *  127.41  *   57.76  *
  76.83  *
* Top Width (ft)         *  578.74  * Top Width (ft)         *  410.16  *   12.00  *
 156.58  *
* Vel Total (ft/s)       *    0.36  * Avg. Vel. (ft/s)       *    0.29  *    0.94  *
   0.35  *
* Max Chl Dpth (ft)      *    5.25  * Hydr. Depth (ft)       *    1.07  *    5.11  *
   1.41  *
* Conv. Total (cfs)      * 34985.0  * Conv. (cfs)            * 17013.2  *  7712.6  *
10259.2  *
* Length Wtd. (ft)       *  248.24  * Wetted Per. (ft)       *  410.49  *   12.05  *
 156.72  *
* Min Ch El (ft)         *  917.93  * Shear (lb/sq ft)       *    0.00  *    0.02  *
   0.00  *
* Alpha                  *    2.05  * Stream Power (lb/ft s) *  685.37  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *   11.45  *    6.97  *
   8.25  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    8.04  *    1.76  *
   5.05  *
*******************************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 32

INPUT
Description: Upstream section of Belvedere Green Boulevard bridge
topography
             data from 2007 Franklin County auditors
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -750.64     926 -532.51     924 -460.85     922 -157.09     922 -147.48     922
   -7.56     920   -1.52     918       0  917.19    1.37     918   18.15     920
    94.6     922  151.74     924  205.74     926  224.27   926.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -750.64     .04   -7.56    .035   18.15    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -7.56   18.15             53.38   53.84   54.83             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************************
***********
* E.G. Elev (ft)         *  923.15  * Element                *  Left OB *  Channel *
```

```
Right OB *
* Vel Head (ft)          *    0.01  * Wt. n-Val.             *   0.040  *   0.035  *
  0.055  *
* W.S. Elev (ft)         *  923.14  * Reach Len. (ft)        *   53.38  *   53.84  *
  54.83  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  679.12  *  110.46  *
 181.98  *
* E.G. Slope (ft/ft)     *0.000204  * Area (sq ft)           *  679.12  *  110.46  *
 181.98  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  445.19  *  173.05  *
  98.76  *
* Top Width (ft)         *  628.76  * Top Width (ft)         *  494.08  *   25.71  *
 108.97  *
* Vel Total (ft/s)       *    0.74  * Avg. Vel. (ft/s)       *    0.66  *    1.57  *
   0.54  *
* Max Chl Dpth (ft)      *    5.95  * Hydr. Depth (ft)       *    1.37  *    4.30  *
   1.67  *
* Conv. Total (cfs)      * 50227.3  * Conv. (cfs)            * 31186.1  * 12122.5  *
 6918.6  *
* Length Wtd. (ft)       *   53.75  * Wetted Per. (ft)       *  494.11  *   26.58  *
 109.02  *
* Min Ch El (ft)         *  917.19  * Shear (lb/sq ft)       *    0.02  *    0.05  *
   0.02  *
* Alpha                  *    1.65  * Stream Power (lb/ft s) *  224.27  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *    8.27  *    6.48  *
   7.10  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    5.47  *    1.66  *
   4.30  *
*******************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 31

INPUT
Description: Downstream section of Belvedere Green Boulevard bridge
topography
             data from field survey June 2013
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -800.17     926 -554.45     924 -532.79     922 -202.64     922 -102.76     922
  -38.28  921.91  -14.41  921.06     -10 920.094   -2.13  918.37    -.72  917.49
       0  917.01    5.33  916.96    6.39  917.56     7.5  918.04   22.16  919.51
   23.59 920.001   30.17  922.25  120.27     924  196.06     926

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -800.17     .04     -10    .035   23.59    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           -10   23.59           127.91  127.45  126.72             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
```

```
 -800.17  -33.11  925.26       F
   34.64  196.06  924.78       F

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  923.10  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *   0.040  *   0.035  *
  0.055  *
* W.S. Elev (ft)         *  922.85  * Reach Len. (ft)        *   39.13  *   39.13  *
  39.13  *
* Crit W.S. (ft)         *  920.94  * Flow Area (sq ft)      *   37.23  *  146.34  *
  13.82  *
* E.G. Slope (ft/ft)     *0.001491  * Area (sq ft)           *  468.80  *  146.34  *
  20.55  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *   73.14  *  627.51  *
  16.36  *
* Top Width (ft)         *  602.95  * Top Width (ft)         *  531.98  *   33.59  *
  37.38  *
* Vel Total (ft/s)       *    3.63  * Avg. Vel. (ft/s)       *    1.96  *    4.29  *
   1.18  *
* Max Chl Dpth (ft)      *    5.89  * Hydr. Depth (ft)       *    1.61  *    4.36  *
   1.25  *
* Conv. Total (cfs)      * 18570.2  * Conv. (cfs)            *  1894.2  * 16252.4  *
  423.7  *
* Length Wtd. (ft)       *   39.13  * Wetted Per. (ft)       *   23.23  *   34.59  *
  11.42  *
* Min Ch El (ft)         *  916.96  * Shear (lb/sq ft)       *    0.15  *    0.39  *
   0.11  *
* Alpha                  *    1.25  * Stream Power (lb/ft s) *  196.06  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *    7.56  *    6.33  *
   6.97  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *    4.84  *    1.62  *
   4.20  *
*******************************************************************************
***********

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may
indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance)
is less than 0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.

BRIDGE


RIVER: Tributary I-2
REACH: 1                  RS: 30.5

INPUT
Description: Belvedere Green Boulevard bridge
topography data and bridge data
             from field survey June 2013
Distance from Upstream XS =   39.13
Deck/Roadway Width        =   53.48
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=      15
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
```

-800.17	925.26		-70.77	925.26		-60.49	925.45	
-50.56	925.6		-40.62	925.74		-30.15	925.84	921.49
-20.55	925.87	921.52	-10.3	925.88	921.53	-.45	925.84	921.49
8.94	925.71	921.36	18.16	925.61	921.26	28.5	925.42	921.07
39.74	925.1		50.56	924.78		172.61	924.78	

Upstream Bridge Cross Section Data
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-800.17	926	-554.45	924	-532.79	922	-202.64	922	-102.76	922
-38.28	921.91	-14.41	921.06	-10	920.094	-2.13	918.37	-.72	917.49
0	917.01	5.33	916.96	6.39	917.56	7.5	918.04	22.16	919.51
23.59	920.001	30.17	922.25	120.27	924	196.06	926		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-800.17	.04	-10	.03	23.59	.055

Bank Sta: Left	Right	Coeff Contr.	Expan.
-10	23.59	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-800.17	-33.11	925.26	F
34.64	196.06	924.78	F

Downstream Deck/Roadway Coordinates
num= 14

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-88.66	925.26		-48.77	925.26		-35.19	925.55	
-25.31	925.7	921.35	-15.15	925.82	921.47	-4.41	925.9	921.55
6.09	925.89	921.54	16.99	925.89	921.54	28.89	925.69	921.34
40.44	925.52	921.17	50.93	925.24	920.89	63.38	924.89	
73.67	924.55		600	924.78				

Downstream Bridge Cross Section Data
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-88.66	924	-39.98	923.16	-25.21	922.21	-17.95	922	-10.2	920
-1.58	918	-.34	917.7	0	916.6	1.4	917.02	5.46	917.02
8.72	917.39	10.82	917.95	20.5	919.43	28	920.08	39.06	921.04
115.33	924	172.61	924						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-88.66	.04	-10.2	.03	28	.085

Bank Sta: Left	Right	Coeff Contr.	Expan.
-10.2	28	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-88.66	-34.81	925.26	F
46.64	172.61	924.78	F

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins =

```
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #100-year
*******************************************************************************
*********
* E.G. US. (ft)          *     923.10  * Element                *Inside BR US
*Inside BR DS *
* W.S. US. (ft)          *     922.85  * E.G. Elev (ft)         *     922.92  *
922.27  *
* Q Total (cfs)          *     717.00  * W.S. Elev (ft)         *     922.12  *
921.70  *
* Q Bridge (cfs)         *     717.00  * Crit W.S. (ft)         *     920.95  *
920.75  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *       5.16  *
 5.10  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.76  *
 5.62  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *     106.10  *
127.49  *
* Weir Submerg           *             * Froude # Chl           *       0.56  *
 0.47  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *     394.12  *
358.80  *
* Min El Weir Flow (ft)  *     924.79  * Hydr Depth (ft)        *             *
       *
* Min El Prs (ft)        *     921.53  * W.P. Total (ft)        *     108.48  *
116.55  *
* Delta EG (ft)          *       1.07  * Conv. Total (cfs)      *     6204.7  *
7552.3  *
* Delta WS (ft)          *       1.39  * Top Width (ft)         *             *
       *
* BR Open Area (sq ft)   *     106.10  * Frctn Loss (ft)        *       0.58  *
 0.23  *
* BR Open Vel (ft/s)     *       6.76  * C & E Loss (ft)        *       0.07  *
 0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.82  *
 0.62  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *    -800.17  *
-88.66  *
*******************************************************************************
*********

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

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

CROSS SECTION

RIVER: Tributary I-2
REACH: 1 RS: 30

INPUT
Description: topography data from field survey June 2013
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-88.66	924	-39.98	923.16	-25.21	922.21	-17.95	922	-10.2	920
-1.58	918	-.34	917.7	0	916.6	1.4	917.02	5.46	917.02
8.72	917.39	10.82	917.95	20.5	919.43	28	920.08	39.06	921.04
115.33	924	172.61	924						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-88.66	.04	-10.2	.035	28	.085

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-10.2	28	95.68	95.65	96.41	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-88.66	-34.81	925.26	F
46.64	172.61	924.78	F

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	922.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.	0.040	0.035	0.085
W.S. Elev (ft)	921.46	Reach Len. (ft)	95.68	95.65	96.41
Crit W.S. (ft)	920.76	Flow Area (sq ft)	4.13	113.09	12.01
E.G. Slope (ft/ft)	0.005195	Area (sq ft)	4.13	113.09	12.22
Q Total (cfs)	717.00	Flow (cfs)	8.77	696.96	11.27
Top Width (ft)	65.72	Top Width (ft)	5.66	38.20	21.87
Vel Total (ft/s)	5.55	Avg. Vel. (ft/s)	2.12	6.16	0.94
Max Chl Dpth (ft)	4.86	Hydr. Depth (ft)	0.73	2.96	0.64
Conv. Total (cfs)	9947.4	Conv. (cfs)	121.6	9669.4	156.4
Length Wtd. (ft)	95.68	Wetted Per. (ft)	5.84	39.57	18.69
Min Ch El (ft)	916.60	Shear (lb/sq ft)	0.23	0.93	0.21
Alpha	1.20	Stream Power (lb/ft s)	172.61	0.00	0.00
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)	7.34	5.99	

```
   6.95  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *    4.60  *    1.59  *
   4.18  *
*******************************************************************************************
***********

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

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 29

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -162.06     924 -147.51     924 -101.94     922   -27.4     920  -18.67     918
       0  916.29     .97     918   10.59     920  173.01     922  233.41     924
  263.36   924.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -162.06     .04   -27.4    .035   10.59    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -27.4   10.59           186.09  186.72  188.57             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************************
***********
* E.G. Elev (ft)         *  921.57  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  921.17  * Reach Len. (ft)        *  186.09  *  186.72  *
 188.57  *
* Crit W.S. (ft)         *  920.41  * Flow Area (sq ft)      *   25.52  *  118.88  *
  55.61  *
* E.G. Slope (ft/ft)     *0.003652  * Area (sq ft)           *   25.52  *  118.88  *
  55.61  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *   40.07  *  635.84  *
  41.09  *
* Top Width (ft)         *  176.64  * Top Width (ft)         *   43.61  *   37.99  *
  95.03  *
* Vel Total (ft/s)       *    3.58  * Avg. Vel. (ft/s)       *    1.57  *    5.35  *
   0.74  *
* Max Chl Dpth (ft)      *    4.88  * Hydr. Depth (ft)       *    0.59  *    3.13  *
   0.59  *
* Conv. Total (cfs)      * 11864.3  * Conv. (cfs)            *   663.0  * 10521.3  *
  680.0  *
* Length Wtd. (ft)       *  186.83  * Wetted Per. (ft)       *   43.63  *   39.50  *
  95.04  *
* Min Ch El (ft)         *  916.29  * Shear (lb/sq ft)       *    0.13  *    0.69  *
   0.13  *
* Alpha                  *    1.99  * Stream Power (lb/ft s) *  263.36  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.96  * Cum Volume (acre-ft)   *    7.31  *    5.74  *
   6.87  *
```

```
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    4.54  *    1.51  *
   4.05  *
*******************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 28

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -190.95     924 -136.57     922   -50.9     920  -13.32     918    -.29     916
       0  915.66     .66     916    9.56     918   78.43     920  120.05   920.3
  137.42     920   521.6     920  631.27     922

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -190.95     .04  -13.32    .035    9.56    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -13.32    9.56           164.46  165.33  163.53             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  920.58  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  919.92  * Reach Len. (ft)        *  164.46  *  165.33  *
 163.53  *
* Crit W.S. (ft)         *  919.81  * Flow Area (sq ft)      *   34.49  *   67.83  *
  63.20  *
* E.G. Slope (ft/ft)     *0.007729  * Area (sq ft)           *   34.49  *   67.83  *
  63.20  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  109.35  *  513.29  *
  94.37  *
* Top Width (ft)         *  124.86  * Top Width (ft)         *   36.00  *   22.88  *
  65.98  *
* Vel Total (ft/s)       *    4.33  * Avg. Vel. (ft/s)       *    3.17  *    7.57  *
   1.49  *
* Max Chl Dpth (ft)      *    4.26  * Hydr. Depth (ft)       *    0.96  *    2.96  *
   0.96  *
* Conv. Total (cfs)      *  8155.9  * Conv. (cfs)            *  1243.8  *  5838.6  *
 1073.4  *
* Length Wtd. (ft)       *  165.02  * Wetted Per. (ft)       *   36.05  *   23.49  *
  66.00  *
* Min Ch El (ft)         *  915.66  * Shear (lb/sq ft)       *    0.46  *    1.39  *
   0.46  *
* Alpha                  *    2.28  * Stream Power (lb/ft s) *  631.27  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.48  * Cum Volume (acre-ft)   *    7.18  *    5.34  *
   6.62  *
```

```
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         *    4.37  *    1.38  *
   3.70  *
*******************************************************************************
***********

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

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 27

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -199.14     922 -128.89     920  -20.63     918   -5.76     916       0  915.11
    6.02     916   30.21     918  112.79     920  194.06     922

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -199.14     .04  -20.63    .035   30.21    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -20.63   30.21               79   79.58    79.8             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  919.95  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.15  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  919.80  * Reach Len. (ft)        *   79.00  *   79.58  *
  79.80  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   87.29  *  159.16  *
  66.58  *
* E.G. Slope (ft/ft)     *0.001503  * Area (sq ft)           *   87.29  *  159.16  *
  66.58  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  116.98  *  558.03  *
  41.99  *
* Top Width (ft)         *  222.20  * Top Width (ft)         *   97.21  *   50.84  *
  74.15  *
* Vel Total (ft/s)       *    2.29  * Avg. Vel. (ft/s)       *    1.34  *    3.51  *
   0.63  *
* Max Chl Dpth (ft)      *    4.69  * Hydr. Depth (ft)       *    0.90  *    3.13  *
   0.90  *
* Conv. Total (cfs)      * 18495.4  * Conv. (cfs)            *  3017.5  * 14394.7  *
 1083.1  *
* Length Wtd. (ft)       *   79.40  * Wetted Per. (ft)       *   97.23  *   51.19  *
  74.17  *
* Min Ch El (ft)         *  915.11  * Shear (lb/sq ft)       *    0.08  *    0.29  *
   0.08  *
* Alpha                  *    1.88  * Stream Power (lb/ft s) *  194.06  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   *    6.95  *    4.91  *
```

```
   6.37  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    4.12  *    1.24  *
   3.44  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 26

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -232.05     922 -156.78     920  -70.65     918  -25.64     918   -7.49     916
       0  914.83    1.45     916   19.68     918  152.99     920  172.47     922

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -232.05     .04   -7.49    .035    1.45    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -7.49    1.45           121.93  123.14  124.74             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  919.80  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.16  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  919.64  * Reach Len. (ft)        *  121.93  *  123.14  *
 124.74  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  179.66  *   37.77  *
 137.77  *
* E.G. Slope (ft/ft)     *0.002382  * Area (sq ft)           *  179.66  *   37.77  *
 137.77  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  396.16  *  197.18  *
 123.66  *
* Top Width (ft)         *  270.28  * Top Width (ft)         *  133.79  *    8.94  *
 127.55  *
* Vel Total (ft/s)       *    2.02  * Avg. Vel. (ft/s)       *    2.21  *    5.22  *
   0.90  *
* Max Chl Dpth (ft)      *    4.81  * Hydr. Depth (ft)       *    1.34  *    4.23  *
   1.08  *
* Conv. Total (cfs)      * 14692.4  * Conv. (cfs)            *  8117.9  *  4040.6  *
 2533.9  *
* Length Wtd. (ft)       *  122.86  * Wetted Per. (ft)       *  133.92  *    9.44  *
 127.67  *
* Min Ch El (ft)         *  914.83  * Shear (lb/sq ft)       *    0.20  *    0.59  *
   0.16  *
* Alpha                  *    2.53  * Stream Power (lb/ft s) *  172.47  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.42  * Cum Volume (acre-ft)   *    6.71  *    4.73  *
   6.19  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *    3.91  *    1.18  *
   3.25  *
*******************************************************************************
***********
```

```
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.

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 25

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 -233.49     922 -188.83     920  -78.37     918  -25.11     918  -15.34     918
   -6.82     916       0   914.4   12.43     916   30.83     918     111     920

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -233.49     .04   -6.82    .035   12.43    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -6.82   12.43           115.12  115.81  116.16             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  919.34  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  918.77  * Reach Len. (ft)        *  115.12  *  115.81  *
 116.16  *
* Crit W.S. (ft)         *  918.77  * Flow Area (sq ft)      *   79.77  *   68.69  *
  44.36  *
* E.G. Slope (ft/ft)     *0.005356  * Area (sq ft)           *   79.77  *   68.69  *
  44.36  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  170.72  *  493.39  *
  52.89  *
* Top Width (ft)         *  182.41  * Top Width (ft)         *  113.97  *   19.25  *
  49.19  *
* Vel Total (ft/s)       *    3.72  * Avg. Vel. (ft/s)       *    2.14  *    7.18  *
   1.19  *
* Max Chl Dpth (ft)      *    4.37  * Hydr. Depth (ft)       *    0.70  *    3.57  *
   0.90  *
* Conv. Total (cfs)      *  9797.6  * Conv. (cfs)            *  2332.8  *  6742.1  *
  722.7  *
* Length Wtd. (ft)       *  115.71  * Wetted Per. (ft)       *  114.21  *   19.54  *
  49.31  *
* Min Ch El (ft)         *  914.40  * Shear (lb/sq ft)       *    0.23  *    1.18  *
   0.30  *
* Alpha                  *    2.65  * Stream Power (lb/ft s) *  111.00  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   *    6.34  *    4.58  *
   5.93  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *    3.57  *    1.14  *
   3.00  *
*******************************************************************************
***********
```

```
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: Tributary I-2
REACH: 1                  RS: 24

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -183.28     920  -84.17     918  -48.61     918  -42.09     918  -17.17     916
       0     914    20.9     916   65.73     918   88.41     920

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -183.28     .04  -17.17    .035    20.9    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -17.17    20.9           111.92  114.11  114.69             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  918.89  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.18  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  918.72  * Reach Len. (ft)        *  111.92  *  114.11  *
 114.69  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   85.61  *  141.48  *
  79.84  *
* E.G. Slope (ft/ft)     *0.001423  * Area (sq ft)           *   85.61  *  141.48  *
  79.84  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  106.33  *  541.51  *
  69.16  *
* Top Width (ft)         *  193.51  * Top Width (ft)         *  102.49  *   38.07  *
  52.95  *
* Vel Total (ft/s)       *    2.34  * Avg. Vel. (ft/s)       *    1.24  *    3.83  *
   0.87  *
* Max Chl Dpth (ft)      *    4.72  * Hydr. Depth (ft)       *    0.84  *    3.72  *
   1.51  *
* Conv. Total (cfs)      * 19010.1  * Conv. (cfs)            *  2819.3  * 14357.1  *
 1833.7  *
* Length Wtd. (ft)       *  113.72  * Wetted Per. (ft)       *  102.58  *   38.28  *
  53.03  *
* Min Ch El (ft)         *  914.00  * Shear (lb/sq ft)       *    0.07  *    0.33  *
   0.13  *
* Alpha                  *    2.08  * Stream Power (lb/ft s) *   88.41  *    0.00  *
   0.00  *
```

```
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   *    6.13  *    4.30  *
   5.76  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    3.28  *    1.06  *
   2.86  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 23

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -155.19     920  -88.19     918  -15.08     916   -1.93     914       0  913.73
    2.04     914   15.24     916   92.24     918   99.78     920

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -155.19     .04  -15.08    .035   15.24    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -15.08   15.24           104.37  105.78  105.84             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  918.73  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.13  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  918.59  * Reach Len. (ft)        *  104.37  *  105.78  *
 105.84  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  122.18  *  113.39  *
 123.18  *
* E.G. Slope (ft/ft)     *0.001305  * Area (sq ft)           *  122.18  *  113.39  *
 123.18  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  196.76  *  415.93  *
 104.31  *
* Top Width (ft)         *  202.46  * Top Width (ft)         *   92.91  *   30.32  *
  79.23  *
* Vel Total (ft/s)       *    2.00  * Avg. Vel. (ft/s)       *    1.61  *    3.67  *
   0.85  *
* Max Chl Dpth (ft)      *    4.86  * Hydr. Depth (ft)       *    1.31  *    3.74  *
   1.55  *
* Conv. Total (cfs)      * 19846.3  * Conv. (cfs)            *  5446.4  * 11512.7  *
 2887.3  *
* Length Wtd. (ft)       *  105.53  * Wetted Per. (ft)       *   92.95  *   30.66  *
  79.33  *
* Min Ch El (ft)         *  913.73  * Shear (lb/sq ft)       *    0.11  *    0.30  *
   0.13  *
* Alpha                  *    2.16  * Stream Power (lb/ft s) *   99.78  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *    5.86  *    3.97  *
   5.49  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    3.03  *    0.97  *
   2.69  *
*******************************************************************************
```

```
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 22

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -123.69     922  -82.79     920  -55.54     918  -27.71     916   -3.76     914
       0  913.47    2.78     914   22.11     916   68.85     918   93.22     920
  120.02     921

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -123.69     .04  -27.71    .035   22.11    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -27.71   22.11             80.35   78.53    77.8             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  918.59  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.15  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  918.44  * Reach Len. (ft)        *   80.35  *   78.53  *
  77.80  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   41.35  *  179.58  *
  68.41  *
* E.G. Slope (ft/ft)     *0.001161  * Area (sq ft)           *   41.35  *  179.58  *
  68.41  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *   59.74  *  608.43  *
  48.83  *
* Top Width (ft)         *  135.71  * Top Width (ft)         *   33.81  *   49.82  *
  52.08  *
* Vel Total (ft/s)       *    2.48  * Avg. Vel. (ft/s)       *    1.44  *    3.39  *
   0.71  *
* Max Chl Dpth (ft)      *    4.97  * Hydr. Depth (ft)       *    1.22  *    3.60  *
   1.31  *
* Conv. Total (cfs)      * 21045.6  * Conv. (cfs)            *  1753.6  * 17858.8  *
 1433.3  *
* Length Wtd. (ft)       *   78.71  * Wetted Per. (ft)       *   33.89  *   50.09  *
  52.15  *
* Min Ch El (ft)         *  913.47  * Shear (lb/sq ft)       *    0.09  *    0.26  *
   0.10  *
* Alpha                  *    1.62  * Stream Power (lb/ft s) *  120.02  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *    5.66  *    3.61  *
   5.26  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.88  *    0.88  *
   2.53  *
*******************************************************************************
***********

CROSS SECTION
```

```
RIVER: Tributary I-2
REACH: 1                  RS: 21

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 -118.64     922  -89.17     920  -73.07     918  -19.68     916      -3     914
       0  913.28     .68     914   15.47     916    66.8     918   78.03     920
  122.01     921

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -118.64     .04  -19.68    .035   15.47    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -19.68   15.47            82.04   82.05   81.48             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  918.46  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.24  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  918.22  * Reach Len. (ft)        *   82.04  *   82.05  *
  81.48  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   65.24  *  118.13  *
  62.68  *
* E.G. Slope (ft/ft)     *0.002268  * Area (sq ft)           *   65.24  *  118.13  *
  62.68  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  129.02  *  529.35  *
  58.63  *
* Top Width (ft)         *  142.86  * Top Width (ft)         *   55.15  *   35.15  *
  52.56  *
* Vel Total (ft/s)       *    2.91  * Avg. Vel. (ft/s)       *    1.98  *    4.48  *
   0.94  *
* Max Chl Dpth (ft)      *    4.94  * Hydr. Depth (ft)       *    1.18  *    3.36  *
   1.19  *
* Conv. Total (cfs)      * 15057.1  * Conv. (cfs)            *  2709.5  * 11116.3  *
 1231.3  *
* Length Wtd. (ft)       *   82.01  * Wetted Per. (ft)       *   55.20  *   35.80  *
  52.61  *
* Min Ch El (ft)         *  913.28  * Shear (lb/sq ft)       *    0.17  *    0.47  *
   0.17  *
* Alpha                  *    1.84  * Stream Power (lb/ft s) *  122.01  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   *    5.56  *    3.34  *
   5.14  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.80  *    0.80  *
   2.44  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 20
```

```
INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -136.03     922  -82.73     920  -59.78     918  -21.97     916   -2.49     914
       0  913.08     4.9     914   26.55     916   69.64     918   86.18     920
  121.11     921

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -136.03     .04  -21.97    .035   26.55    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -21.97   26.55            80.71    79.6   79.04             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  918.29  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.20  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  918.09  * Reach Len. (ft)        *   80.71  *   79.60  *
  79.04  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   41.20  *  160.64  *
  46.93  *
* E.G. Slope (ft/ft)     *0.001678  * Area (sq ft)           *   41.20  *  160.64  *
  46.93  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *   65.14  *  616.71  *
  35.15  *
* Top Width (ft)         *  131.17  * Top Width (ft)         *   38.82  *   48.52  *
  43.82  *
* Vel Total (ft/s)       *    2.88  * Avg. Vel. (ft/s)       *    1.58  *    3.84  *
   0.75  *
* Max Chl Dpth (ft)      *    5.01  * Hydr. Depth (ft)       *    1.06  *    3.31  *
   1.07  *
* Conv. Total (cfs)      * 17506.0  * Conv. (cfs)            *  1590.5  * 15057.4  *
  858.1  *
* Length Wtd. (ft)       *   79.66  * Wetted Per. (ft)       *   38.88  *   48.96  *
  43.87  *
* Min Ch El (ft)         *  913.08  * Shear (lb/sq ft)       *    0.11  *    0.34  *
   0.11  *
* Alpha                  *    1.56  * Stream Power (lb/ft s) *  121.11  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   *    5.46  *    3.08  *
   5.04  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.71  *    0.72  *
   2.35  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 19

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
*******************************************************************************
 -146.15     920  -45.39     918   -15.8     916   -2.88     914       0  912.89
     4.9     914   31.35     916   82.25     918   97.59     920  145.64     921
   993.7     921

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -146.15     .04   -15.8    .035   31.35    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -15.8   31.35             69.19    68.6   67.05             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************************
***********
* E.G. Elev (ft)         *  918.13  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  917.86  * Reach Len. (ft)        *   69.19  *   68.60  *
  67.05  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   25.69  *  147.11  *
  44.18  *
* E.G. Slope (ft/ft)     *0.002323  * Area (sq ft)           *   25.69  *  147.11  *
  44.18  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *   43.81  *  637.70  *
  35.50  *
* Top Width (ft)         *  122.14  * Top Width (ft)         *   27.57  *   47.15  *
  47.42  *
* Vel Total (ft/s)       *    3.30  * Avg. Vel. (ft/s)       *    1.71  *    4.33  *
   0.80  *
* Max Chl Dpth (ft)      *    4.97  * Hydr. Depth (ft)       *    0.93  *    3.12  *
   0.93  *
* Conv. Total (cfs)      * 14875.8  * Conv. (cfs)            *   908.8  * 13230.5  *
  736.4  *
* Length Wtd. (ft)       *   68.56  * Wetted Per. (ft)       *   27.63  *   47.71  *
  47.46  *
* Min Ch El (ft)         *  912.89  * Shear (lb/sq ft)       *    0.13  *    0.45  *
   0.14  *
* Alpha                  *    1.55  * Stream Power (lb/ft s) *  993.70  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   *    5.40  *    2.80  *
   4.96  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.65  *    0.63  *
   2.26  *
*******************************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 18

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -145.25     920  -50.98     918  -13.85     916   -3.28     914   -1.31     914
       0  912.72   10.04     914   25.75     916    95.9     918  117.72     920
  158.35     921
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -145.25     .04  -13.85    .035   25.75    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -13.85   25.75           111.01  112.17  112.41             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  917.91  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  917.51  * Reach Len. (ft)        *  111.01  *  112.17  *
 112.41  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   21.27  *  120.13  *
  40.19  *
* E.G. Slope (ft/ft)     *0.003714  * Area (sq ft)           *   21.27  *  120.13  *
  40.19  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *   39.96  *  641.49  *
  35.55  *
* Top Width (ft)         *  120.80  * Top Width (ft)         *   28.10  *   39.60  *
  53.10  *
* Vel Total (ft/s)       *    3.95  * Avg. Vel. (ft/s)       *    1.88  *    5.34  *
   0.88  *
* Max Chl Dpth (ft)      *    4.79  * Hydr. Depth (ft)       *    0.76  *    3.03  *
   0.76  *
* Conv. Total (cfs)      * 11765.3  * Conv. (cfs)            *   655.7  * 10526.2  *
  583.4  *
* Length Wtd. (ft)       *  111.95  * Wetted Per. (ft)       *   28.15  *   40.52  *
  53.12  *
* Min Ch El (ft)         *  912.72  * Shear (lb/sq ft)       *    0.18  *    0.69  *
   0.18  *
* Alpha                  *    1.65  * Stream Power (lb/ft s) *  158.35  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.27  * Cum Volume (acre-ft)   *    5.36  *    2.59  *
   4.89  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *    2.60  *    0.57  *
   2.19  *
*******************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 17

INPUT
Description: Upstream section of pedestrian bridge
topography data from field
             survey June 2013
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -179.07     920 -100.23     918  -58.84     916  -11.94     915   -6.01     914
```

```
       0     912    2.86  912.18    3.37  912.08    3.42  912.08     4.4  912.39
    5.33   912.8    7.44  913.13   13.01     914   19.61  915.03   38.56     916
   85.88     918  165.57     918

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 -179.07     .04   -6.01    .035   13.01    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -6.01   13.01            33.51   29.83   31.61             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -179.07  -14.18  914.86       F
   18.25  165.57   914.8       F

CROSS SECTION OUTPUT  Profile #100-year
*****************************************************************************************
***********
* E.G. Elev (ft)         *  917.58  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.21  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  917.37  * Reach Len. (ft)        *   10.92  *   10.92  *
  10.92  *
* Crit W.S. (ft)         *  916.42  * Flow Area (sq ft)      *  124.15  *   84.26  *
  76.20  *
* E.G. Slope (ft/ft)     *0.001743  * Area (sq ft)           *  124.15  *   84.26  *
  76.20  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  255.30  *  395.06  *
  66.64  *
* Top Width (ft)         *  158.17  * Top Width (ft)         *   81.18  *   19.02  *
  57.97  *
* Vel Total (ft/s)       *    2.52  * Avg. Vel. (ft/s)       *    2.06  *    4.69  *
   0.87  *
* Max Chl Dpth (ft)      *    5.37  * Hydr. Depth (ft)       *    1.53  *    4.43  *
   1.31  *
* Conv. Total (cfs)      * 17174.0  * Conv. (cfs)            *  6115.1  *  9462.8  *
 1596.1  *
* Length Wtd. (ft)       *   10.92  * Wetted Per. (ft)       *   81.31  *   19.59  *
  58.10  *
* Min Ch El (ft)         *  912.00  * Shear (lb/sq ft)       *    0.17  *    0.47  *
   0.14  *
* Alpha                  *    2.16  * Stream Power (lb/ft s) *  165.57  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *    5.18  *    2.32  *
   4.74  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    2.46  *    0.49  *
   2.04  *
*****************************************************************************************
***********

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance)
is less than 0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.

BRIDGE


RIVER: Tributary I-2
REACH: 1                  RS: 16.5
```

```
INPUT
Description: pedestrian bridge
topography data and bridge data from field
             survey June 2013
Distance from Upstream XS =   10.92
Deck/Roadway Width        =    8.54
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       8
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
     -20  914.86  913.96   -5.78  914.86  913.96   -4.97   914.8   913.9
    -.05  914.82  913.92    5.01  914.81  913.91   10.26  914.85  913.95
   11.33   914.8   913.9      30   914.8   913.9

Upstream Bridge Cross Section Data
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -179.07     920 -100.23     918  -58.84     916  -11.94     915   -6.01     914
       0     912    2.86  912.18    3.37  912.08    3.42  912.08     4.4  912.39
    5.33   912.8    7.44  913.13   13.01     914   19.61  915.03   38.56     916
   85.88     918  165.57     918

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -179.07     .04   -6.01     .03   13.01    .085

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -6.01   13.01             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -179.07  -14.18  914.86       F
   18.25  165.57   914.8       F

Downstream  Deck/Roadway Coordinates
    num=       8
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
     -20  914.86  913.96   -5.78  914.86  913.96   -4.97   914.8   913.9
    -.05  914.82  913.92    5.01  914.81  913.91   10.26  914.85  913.95
   11.33   914.8   913.9      20   914.8   913.9

Downstream Bridge Cross Section Data
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -183.56     920  -97.39     918  -45.67     916  -12.42  914.86    -4.3 914.003
   -3.33   913.9   -1.19  912.58   -1.16  912.21       0   911.3    1.68  911.41
    5.57  911.91    5.59  912.27    8.32   913.9     9.4 914.008   20.88  915.17
   45.81     916   85.62     918  163.75     918

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -183.56     .04    -4.3     .03     9.4     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
          -4.3     9.4             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
```

```
 -183.56  -18.18  914.86       F
   22.93  163.75   914.8       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #100-year
*******************************************************************************
*********
* E.G. US. (ft)          *     917.58  * Element                *Inside BR US
*Inside BR DS *
* W.S. US. (ft)          *     917.37  * E.G. Elev (ft)         *     917.54  *
917.50  *
* Q Total (cfs)          *     717.00  * W.S. Elev (ft)         *     917.39  *
917.37  *
* Q Bridge (cfs)         *      32.90  * Crit W.S. (ft)         *     916.43  *
916.40  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *       5.39  *
 6.07  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       2.69  *
 2.80  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *     266.28  *
255.92  *
* Weir Submerg           *             * Froude # Chl           *       0.23  *
 0.20  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *     386.96  *
381.87  *
* Min El Weir Flow (ft)  *     914.81  * Hydr Depth (ft)        *       1.67  *
 1.66  *
* Min El Prs (ft)        *     913.96  * W.P. Total (ft)        *     196.21  *
180.33  *
* Delta EG (ft)          *       0.12  * Conv. Total (cfs)      *    11387.4  *
12840.2  *
* Delta WS (ft)          *       0.10  * Top Width (ft)         *     159.01  *
154.30  *
* BR Open Area (sq ft)   *      18.65  * Frctn Loss (ft)        *       0.03  *
 0.03  *
* BR Open Vel (ft/s)     *       1.76  * C & E Loss (ft)        *       0.01  *
 0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.34  *
 0.28  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *    -179.07  *
```

```
-183.56  *
*****************************************************************************
*********

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

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 16

INPUT
Description: Downstream section of pedestrian bridge
topography data from
             field survey June 2013
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 -183.56     920  -97.39     918  -45.67     916  -12.42  914.86    -4.3 914.003
   -3.33   913.9   -1.19  912.58   -1.16  912.21       0   911.3    1.68  911.41
    5.57  911.91    5.59  912.27    8.32   913.9     9.4 914.008   20.88  915.17
   45.81     916   85.62     918  163.75     918

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -183.56     .04    -4.3    .035     9.4     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          -4.3     9.4            94.69   96.26  101.86             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -183.56  -18.18  914.86       F
   22.93  163.75   914.8       F

CROSS SECTION OUTPUT  Profile #100-year
*****************************************************************************
***********
* E.G. Elev (ft)         *  917.47  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.20  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  917.27  * Reach Len. (ft)        *   94.69  *   96.26  *
 101.86  *
* Crit W.S. (ft)         *  916.42  * Flow Area (sq ft)      *  104.99  *   65.24  *
  88.76  *
* E.G. Slope (ft/ft)     *0.001932  * Area (sq ft)           *  104.99  *   65.24  *
  88.76  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  215.95  *  316.48  *
 184.57  *
* Top Width (ft)         *  149.55  * Top Width (ft)         *   74.18  *   13.70  *
  61.67  *
* Vel Total (ft/s)       *    2.77  * Avg. Vel. (ft/s)       *    2.06  *    4.85  *
   2.08  *
* Max Chl Dpth (ft)      *    5.97  * Hydr. Depth (ft)       *    1.42  *    4.76  *
   1.44  *
* Conv. Total (cfs)      * 16311.8  * Conv. (cfs)            *  4912.9  *  7199.9  *
 4199.0  *
* Length Wtd. (ft)       *   97.10  * Wetted Per. (ft)       *   74.27  *   15.57  *
```

```
  61.77  *
* Min Ch El (ft)         *  911.30  * Shear (lb/sq ft)       *    0.17  *    0.51  *
   0.17  *
* Alpha                  *    1.67  * Stream Power (lb/ft s) *  163.75  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   *    5.10  *    2.28  *
   4.69  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.41  *    0.48  *
   2.00  *
*******************************************************************************
***********

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

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 15

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -170.4     920 -120.53     918   -57.4     916   -9.13     914       0  912.15
    5.34     914   35.22     916   68.07     918   92.97     920   154.7   920.8

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -170.4     .04   -9.13    .035    5.34     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -9.13    5.34           103.65   103.4  101.83             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  917.26  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.20  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  917.06  * Reach Len. (ft)        *  103.65  *  103.40  *
 101.83  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  117.03  *   57.64  *
  70.70  *
* E.G. Slope (ft/ft)     *0.002295  * Area (sq ft)           *  117.03  *   57.64  *
  70.70  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  264.60  *  288.04  *
 164.35  *
* Top Width (ft)         *  143.41  * Top Width (ft)         *   81.67  *   14.47  *
  47.26  *
* Vel Total (ft/s)       *    2.92  * Avg. Vel. (ft/s)       *    2.26  *    5.00  *
   2.32  *
* Max Chl Dpth (ft)      *    4.91  * Hydr. Depth (ft)       *    1.43  *    3.98  *
   1.50  *
* Conv. Total (cfs)      * 14965.3  * Conv. (cfs)            *  5522.8  *  6012.0  *
 3430.4  *
* Length Wtd. (ft)       *  103.18  * Wetted Per. (ft)       *   81.73  *   14.97  *
  47.36  *
* Min Ch El (ft)         *  912.15  * Shear (lb/sq ft)       *    0.21  *    0.55  *
```

```
   0.21  *
* Alpha                  *    1.54  * Stream Power (lb/ft s) *  154.70  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)   *    4.86  *    2.14  *
   4.50  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    2.24  *    0.45  *
   1.88  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 14

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -171.03     920 -127.54     918  -87.11     916   -7.19     914   -1.08     912
       0  911.89     1.4     912   11.07     914   45.28     916   63.44     918
    82.8     920  142.54   920.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -171.03     .04   -7.19    .035   11.07     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -7.19   11.07           125.87  126.56  128.25             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  917.07  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.12  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  916.95  * Reach Len. (ft)        *  125.87  *  126.56  *
 128.25  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  164.54  *   74.66  *
  70.62  *
* E.G. Slope (ft/ft)     *0.001262  * Area (sq ft)           *  164.54  *   74.66  *
  70.62  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  304.54  *  282.52  *
 129.94  *
* Top Width (ft)         *  160.09  * Top Width (ft)         *   99.04  *   18.26  *
  42.80  *
* Vel Total (ft/s)       *    2.31  * Avg. Vel. (ft/s)       *    1.85  *    3.78  *
   1.84  *
* Max Chl Dpth (ft)      *    5.06  * Hydr. Depth (ft)       *    1.66  *    4.09  *
   1.65  *
* Conv. Total (cfs)      * 20179.8  * Conv. (cfs)            *  8571.1  *  7951.4  *
 3657.2  *
* Length Wtd. (ft)       *  126.37  * Wetted Per. (ft)       *   99.09  *   18.79  *
  42.91  *
* Min Ch El (ft)         *  911.89  * Shear (lb/sq ft)       *    0.13  *    0.31  *
   0.13  *
* Alpha                  *    1.44  * Stream Power (lb/ft s) *  142.54  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   *    4.52  *    1.99  *
```

```
   4.33  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.02  *    0.41  *
   1.77  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 13

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -179.04     920  -144.4     918  -95.93     916  -70.39     914  -47.67     914
  -10.38     914   -2.28     912    -.39     912       0  911.59    6.59     914
   14.21     916   25.51     918   73.35     920   100.7   920.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -179.04     .04  -10.38    .035    6.59     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -10.38    6.59             86.01   84.39   84.25             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  916.91  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.11  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  916.81  * Reach Len. (ft)        *   86.01  *   84.39  *
  84.25  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  222.30  *   68.28  *
  15.59  *
* E.G. Slope (ft/ft)     *0.001125  * Area (sq ft)           *  222.30  *   68.28  *
  15.59  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  456.31  *  238.19  *
  22.51  *
* Top Width (ft)         *  134.20  * Top Width (ft)         *  105.06  *   16.97  *
  12.17  *
* Vel Total (ft/s)       *    2.34  * Avg. Vel. (ft/s)       *    2.05  *    3.49  *
   1.44  *
* Max Chl Dpth (ft)      *    5.22  * Hydr. Depth (ft)       *    2.12  *    4.02  *
   1.28  *
* Conv. Total (cfs)      * 21372.8  * Conv. (cfs)            * 13602.0  *  7100.0  *
  670.9  *
* Length Wtd. (ft)       *   85.45  * Wetted Per. (ft)       *  105.16  *   17.82  *
  12.50  *
* Min Ch El (ft)         *  911.59  * Shear (lb/sq ft)       *    0.15  *    0.27  *
   0.09  *
* Alpha                  *    1.24  * Stream Power (lb/ft s) *  100.70  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *    3.96  *    1.78  *
   4.21  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    1.73  *    0.36  *
   1.69  *
*******************************************************************************
```

****

CROSS SECTION

RIVER: Tributary I-2
REACH: 1 RS: 12

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-191.87	922	-142.69	920	-120.33	918	-96.1	916	-53.04	914
-7.97	912	0	911.39	.07	912	6.26	914	25.4	916
57.51	918	209.42	920	229.18	920.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-191.87	.04	-7.97	.035	.07	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-7.97	.07	124.76	124.66	124.56	.1	.3

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	916.82	Element	Left OB	Channel / Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.040	0.035 / 0.040
W.S. Elev (ft)	916.74	Reach Len. (ft)	124.76	124.66 / 124.56
Crit W.S. (ft)		Flow Area (sq ft)	246.88	40.57 / 60.88
E.G. Slope (ft/ft)	0.000821	Area (sq ft)	246.88	40.57 / 60.88
Q Total (cfs)	717.00	Flow (cfs)	489.05	138.71 / 89.24
Top Width (ft)	142.37	Top Width (ft)	97.10	8.04 / 37.22
Vel Total (ft/s)	2.06	Avg. Vel. (ft/s)	1.98	3.42 / 1.47
Max Chl Dpth (ft)	5.35	Hydr. Depth (ft)	2.54	5.05 / 1.64
Conv. Total (cfs)	25025.9	Conv. (cfs)	17069.5	4841.6 / 3114.7
Length Wtd. (ft)	124.66	Wetted Per. (ft)	97.23	8.61 / 37.67
Min Ch El (ft)	911.39	Shear (lb/sq ft)	0.13	0.24 / 0.08
Alpha	1.23	Stream Power (lb/ft s)	229.18	0.00 / 0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	3.50	1.67 / 4.13
C & E Loss (ft)	0.02	Cum SA (acres)	1.53	0.33 / 1.64

****

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: Tributary I-2
REACH: 1 RS: 11

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-176.09	922.4	-145.71	922	-121.56	920	-99.25	918	-75.14	916
-43.53	914	-7.1	912	0	911.09	2	912	10.74	914
205.06	914	224.25	916	254.62	918	358.92	920		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-176.09	.04	-7.1	.035	2	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-7.1	2	214.49	210.75	212.18	.1	.3

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	916.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.040	0.035	0.040
W.S. Elev (ft)	916.75	Reach Len. (ft)	214.49	210.75	212.18
Crit W.S. (ft)		Flow Area (sq ft)	195.69	47.41	606.14
E.G. Slope (ft/ft)	0.000134	Area (sq ft)	195.69	47.41	606.14
Q Total (cfs)	717.00	Flow (cfs)	156.42	68.78	491.80
Top Width (ft)	319.95	Top Width (ft)	77.14	9.10	233.71
Vel Total (ft/s)	0.84	Avg. Vel. (ft/s)	0.80	1.45	0.81
Max Chl Dpth (ft)	5.66	Hydr. Depth (ft)	2.54	5.21	2.59
Conv. Total (cfs)	61903.9	Conv. (cfs)	13504.6	5938.3	42461.1
Length Wtd. (ft)	212.86	Wetted Per. (ft)	77.29	9.36	234.07
Min Ch El (ft)	911.09	Shear (lb/sq ft)	0.02	0.04	0.02
Alpha	1.11	Stream Power (lb/ft s)	358.92	0.00	0.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	2.87	1.55	3.18
C & E Loss (ft)	0.02	Cum SA (acres)	1.28	0.31	1.25

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.

CROSS SECTION

RIVER: Tributary I-2
REACH: 1 RS: 10

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-187.05	922	-152.44	920	-120.7	918	-81.94	916	-63.94	914
-33.32	914	-6.82	912	0	910.58	.12	912	14.51	914
32.75	916	43.93	918	87.96	920	111.77	920		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-187.05	.085	-6.82	.055	.12	.085

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-6.82	.12	114.57	109.84	113.88	.1	.3

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	916.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.	0.085	0.055	0.085
W.S. Elev (ft)	916.48	Reach Len. (ft)	114.57	109.84	113.88
Crit W.S. (ft)		Flow Area (sq ft)	197.07	36.02	77.74
E.G. Slope (ft/ft)	0.005858	Area (sq ft)	197.07	36.02	77.74
Q Total (cfs)	835.00	Flow (cfs)	463.23	196.74	175.03
Top Width (ft)	126.69	Top Width (ft)	84.43	6.94	35.32
Vel Total (ft/s)	2.69	Avg. Vel. (ft/s)	2.35	5.46	2.25
Max Chl Dpth (ft)	5.90	Hydr. Depth (ft)	2.33	5.19	2.20
Conv. Total (cfs)	10910.1	Conv. (cfs)	6052.6	2570.6	2286.9
Length Wtd. (ft)	112.52	Wetted Per. (ft)	84.63	8.39	35.61
Min Ch El (ft)	910.58	Shear (lb/sq ft)	0.85	1.57	0.80
Alpha	1.55	Stream Power (lb/ft s)	111.77	0.00	0.00
Frctn Loss (ft)	0.67	Cum Volume (acre-ft)	1.90	1.35	1.51
C & E Loss (ft)	0.01	Cum SA (acres)	0.88	0.27	0.60

CROSS SECTION

```
RIVER: Tributary I-2
REACH: 1                  RS: 9

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
  -187.8     922 -163.94     920 -136.67     918 -112.04     916   -82.5     914
     -29     914  -13.74     912       0  910.32    5.67     912   15.47     914
   24.89     916   44.27     918   81.92     920  120.16     922

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -187.8    .085  -13.74    .055    5.67    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -13.74    5.67            86.59   88.52   90.32             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  915.97  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *   0.085  *   0.055  *
  0.085  *
* W.S. Elev (ft)         *  915.66  * Reach Len. (ft)        *   86.59  *   88.52  *
  90.32  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  149.88  *   87.37  *
  32.58  *
* E.G. Slope (ft/ft)     *0.005983  * Area (sq ft)           *  149.88  *   87.37  *
  32.58  *
* Q Total (cfs)          *  835.00  * Flow (cfs)             *  277.62  *  491.95  *
  65.43  *
* Top Width (ft)         *  130.33  * Top Width (ft)         *   93.30  *   19.41  *
  17.63  *
* Vel Total (ft/s)       *    3.09  * Avg. Vel. (ft/s)       *    1.85  *    5.63  *
   2.01  *
* Max Chl Dpth (ft)      *    5.34  * Hydr. Depth (ft)       *    1.61  *    4.50  *
   1.85  *
* Conv. Total (cfs)      * 10795.0  * Conv. (cfs)            *  3589.1  *  6359.9  *
  845.9  *
* Length Wtd. (ft)       *   88.03  * Wetted Per. (ft)       *   93.49  *   19.76  *
  18.00  *
* Min Ch El (ft)         *  910.32  * Shear (lb/sq ft)       *    0.60  *    1.65  *
   0.68  *
* Alpha                  *    2.10  * Stream Power (lb/ft s) *  120.16  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)   *    1.44  *    1.19  *
   1.37  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *    0.65  *    0.24  *
   0.53  *
*******************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 8

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 -206.94     922 -190.87     922 -165.97     920 -146.99     918 -127.81     916
 -103.89     914  -36.36     912        0  910.11     5.2     912   13.65     914
   19.72     916   25.83     918   38.32     920  102.08   920.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -206.94    .085  -36.36    .055     5.2    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -36.36     5.2           111.89  115.28  120.44             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  915.65  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.11  * Wt. n-Val.             *   0.085  *   0.055  *
  0.085  *
* W.S. Elev (ft)         *  915.54  * Reach Len. (ft)        *  111.89  *  115.28  *
 120.44  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  185.59  *  186.34  *
  25.04  *
* E.G. Slope (ft/ft)     *0.001800  * Area (sq ft)           *  185.59  *  186.34  *
  25.04  *
* Q Total (cfs)          *  835.00  * Flow (cfs)             *  229.83  *  577.26  *
  27.91  *
* Top Width (ft)         *  140.61  * Top Width (ft)         *   85.93  *   41.56  *
  13.12  *
* Vel Total (ft/s)       *    2.10  * Avg. Vel. (ft/s)       *    1.24  *    3.10  *
   1.11  *
* Max Chl Dpth (ft)      *    5.43  * Hydr. Depth (ft)       *    2.16  *    4.48  *
   1.91  *
* Conv. Total (cfs)      * 19680.1  * Conv. (cfs)            *  5416.9  * 13605.4  *
  657.7  *
* Length Wtd. (ft)       *  115.13  * Wetted Per. (ft)       *   86.03  *   41.94  *
  13.60  *
* Min Ch El (ft)         *  910.11  * Shear (lb/sq ft)       *    0.24  *    0.50  *
   0.21  *
* Alpha                  *    1.60  * Stream Power (lb/ft s) *  102.08  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)   *    1.11  *    0.91  *
   1.31  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.47  *    0.18  *
   0.50  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 7
```

```
INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -237.95     920 -107.87     920  -95.39     918  -80.87     916  -52.18     914
     -21     912   -4.02     910       0  909.55    9.79     910   31.37     912
   42.96     914   55.36     916    69.8     918   84.18     920  130.76     922
  145.77   922.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -237.95    .085   -4.02    .055    9.79    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -4.02    9.79             97.33   93.66   92.36             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  915.38  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.16  * Wt. n-Val.             *   0.085  *   0.055  *
  0.085  *
* W.S. Elev (ft)         *  915.22  * Reach Len. (ft)        *   97.33  *   93.66  *
  92.36  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  151.31  *   75.14  *
 121.26  *
* E.G. Slope (ft/ft)     *0.003002  * Area (sq ft)           *  151.31  *   75.14  *
 121.26  *
* Q Total (cfs)          *  835.00  * Flow (cfs)             *  252.42  *  343.54  *
 239.04  *
* Top Width (ft)         *  120.13  * Top Width (ft)         *   65.61  *   13.81  *
  40.71  *
* Vel Total (ft/s)       *    2.40  * Avg. Vel. (ft/s)       *    1.67  *    4.57  *
   1.97  *
* Max Chl Dpth (ft)      *    5.67  * Hydr. Depth (ft)       *    2.31  *    5.44  *
   2.98  *
* Conv. Total (cfs)      * 15239.2  * Conv. (cfs)            *  4606.7  *  6269.8  *
 4362.6  *
* Length Wtd. (ft)       *   94.10  * Wetted Per. (ft)       *   65.83  *   13.85  *
  41.07  *
* Min Ch El (ft)         *  909.55  * Shear (lb/sq ft)       *    0.43  *    1.02  *
   0.55  *
* Alpha                  *    1.83  * Stream Power (lb/ft s) *  145.77  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   *    0.68  *    0.57  *
   1.11  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.28  *    0.10  *
   0.42  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 6

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      15
```

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-204	920.9	-102.07	920	-71.03	918	-49.27	916	-34.49	914
-22.27	912	-6.43	910	0	908.95	6.64	910	37.56	912
75.44	914	90	916	103.23	918	126.01	920	187.04	920.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-204	.085	-6.43	.055	6.64	.085

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-6.43	6.64	58.51	55.24	53.63	.1	.3

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	915.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.	0.085	0.055	0.085
W.S. Elev (ft)	914.95	Reach Len. (ft)	58.51	55.24	53.63
Crit W.S. (ft)		Flow Area (sq ft)	89.64	71.53	199.10
E.G. Slope (ft/ft)	0.002909	Area (sq ft)	89.64	71.53	199.10
Q Total (cfs)	835.00	Flow (cfs)	156.98	320.91	357.10
Top Width (ft)	123.83	Top Width (ft)	35.06	13.07	75.70
Vel Total (ft/s)	2.32	Avg. Vel. (ft/s)	1.75	4.49	1.79
Max Chl Dpth (ft)	6.00	Hydr. Depth (ft)	2.56	5.47	2.63
Conv. Total (cfs)	15482.0	Conv. (cfs)	2910.7	5950.1	6621.1
Length Wtd. (ft)	55.15	Wetted Per. (ft)	35.41	13.24	75.88
Min Ch El (ft)	908.95	Shear (lb/sq ft)	0.46	0.98	0.48
Alpha	1.80	Stream Power (lb/ft s)	187.04	0.00	0.00
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	0.41	0.41	0.77
C & E Loss (ft)	0.00	Cum SA (acres)	0.16	0.07	0.30

CROSS SECTION

RIVER: Tributary I-2
REACH: 1 RS: 5

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-233.67	920.9	-136.68	920	-88.86	918	-47.93	916	-35.41	914
-25.46	912	-6.18	910	0	908.59	3.6	910	45.56	912

```
   73.49     914   83.59     916   92.25     918  110.95     920  166.42   920.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -233.67    .085   -6.18    .055     3.6    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -6.18     3.6           146.63  142.09  140.77             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  914.93  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.14  * Wt. n-Val.             *   0.085  *   0.055  *
  0.085  *
* W.S. Elev (ft)         *  914.79  * Reach Len. (ft)        *  146.63  *  142.09  *
 140.77  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   92.85  *   53.75  *
 210.63  *
* E.G. Slope (ft/ft)     *0.003131  * Area (sq ft)           *   92.85  *   53.75  *
 210.63  *
* Q Total (cfs)          *  835.00  * Flow (cfs)             *  175.57  *  245.93  *
 413.50  *
* Top Width (ft)         *  117.84  * Top Width (ft)         *   34.18  *    9.78  *
  73.88  *
* Vel Total (ft/s)       *    2.34  * Avg. Vel. (ft/s)       *    1.89  *    4.58  *
   1.96  *
* Max Chl Dpth (ft)      *    6.20  * Hydr. Depth (ft)       *    2.72  *    5.50  *
   2.85  *
* Conv. Total (cfs)      * 14923.5  * Conv. (cfs)            *  3137.9  *  4395.3  *
 7390.3  *
* Length Wtd. (ft)       *  142.42  * Wetted Per. (ft)       *   34.54  *   10.21  *
  74.08  *
* Min Ch El (ft)         *  908.59  * Shear (lb/sq ft)       *    0.53  *    1.03  *
   0.56  *
* Alpha                  *    1.62  * Stream Power (lb/ft s) *  166.42  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.37  * Cum Volume (acre-ft)   *    0.29  *    0.33  *
   0.52  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.12  *    0.06  *
   0.21  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 4

INPUT
Description: Upstream section of confluence with North Fork Indian
             Run
topography data from 2007 Franklin County auditors
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -265.88     918 -221.59     916  -64.33     916   -47.7     914  -32.24     912
  -15.67     910   -3.33     908       0  907.91    1.28     908   10.91     910
   32.79     912   57.15     914  102.06     916  120.31     918  134.01     920
  170.93   920.5
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 -265.88    .085  -15.67    .055   10.91    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -15.67   10.91                 0       0       0             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*********************************************************************************
***********
* E.G. Elev (ft)         *  914.55  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.18  * Wt. n-Val.             *   0.085  *   0.055  *
  0.085  *
* W.S. Elev (ft)         *  914.37  * Reach Len. (ft)        *          *          *
         *
* Crit W.S. (ft)         *  911.95  * Flow Area (sq ft)      *   77.59  *  147.55  *
 108.65  *
* E.G. Slope (ft/ft)     *0.002232  * Area (sq ft)           *   77.59  *  147.55  *
 108.65  *
* Q Total (cfs)          *  835.00  * Flow (cfs)             *  108.18  *  585.08  *
 141.74  *
* Top Width (ft)         *  116.23  * Top Width (ft)         *   35.11  *   26.58  *
  54.55  *
* Vel Total (ft/s)       *    2.50  * Avg. Vel. (ft/s)       *    1.39  *    3.97  *
   1.30  *
* Max Chl Dpth (ft)      *    6.46  * Hydr. Depth (ft)       *    2.21  *    5.55  *
   1.99  *
* Conv. Total (cfs)      * 17672.6  * Conv. (cfs)            *  2289.6  * 12383.0  *
 3000.0  *
* Length Wtd. (ft)       *          * Wetted Per. (ft)       *   35.38  *   26.95  *
  54.73  *
* Min Ch El (ft)         *  907.91  * Shear (lb/sq ft)       *    0.31  *    0.76  *
   0.28  *
* Alpha                  *    1.85  * Stream Power (lb/ft s) *  170.93  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          *          *
         *
* C & E Loss (ft)        *          * Cum SA (acres)         *          *          *
         *
*********************************************************************************
***********

*****************************************************************************

SUMMARY OF MANNING'S N VALUES

River:Tributary I-2
*****************************************************************
*     Reach      *   River Sta.   *   n1    *   n2    *   n3    *
*****************************************************************
*1               *    73          *      .04*     .035*      .08*
*1               *    72          *      .04*     .035*      .08*
*1               *    71          *      .04*     .035*      .08*
*1               *    70          *      .04*     .035*      .08*
*1               *    69          *      .04*     .035*      .08*
*1               *    68          *      .04*     .035*      .08*
*1               *    67          *      .04*     .035*      .08*
*1               *    66          *      .04*     .035*      .04*
*1               *    65          *      .04*     .035*      .04*
*1               *    64.5        *Culvert  *        *        *
```

```
*1                  *    64          *      .04*     .035*      .04*
*1                  *    63          *      .04*     .035*      .04*
*1                  *    62          *Inl Struct*        *        *
*1                  *    61          *      .04*     .035*      .04*
*1                  *    60          *      .04*     .035*      .04*
*1                  *    59.5        *Bridge   *        *        *
*1                  *    59          *      .04*     .035*      .04*
*1                  *    58          *      .04*     .035*      .04*
*1                  *    57          *Inl Struct*        *        *
*1                  *    56          *      .04*     .035*      .04*
*1                  *    55          *      .04*     .035*      .04*
*1                  *    54          *      .04*     .035*      .04*
*1                  *    53          *      .04*     .035*      .04*
*1                  *    52          *      .04*     .035*      .04*
*1                  *    51          *      .04*     .035*      .04*
*1                  *    50          *      .04*     .035*      .04*
*1                  *    49          *      .04*     .035*      .04*
*1                  *    48.5        *Bridge   *        *        *
*1                  *    48          *      .04*     .035*      .04*
*1                  *    47          *Inl Struct*        *        *
*1                  *    46          *      .04*     .035*      .04*
*1                  *    45          *      .04*     .035*      .04*
*1                  *    44.5        *Bridge   *        *        *
*1                  *    44          *      .04*     .035*      .04*
*1                  *    43          *      .04*     .035*      .04*
*1                  *    42          *Inl Struct*        *        *
*1                  *    41          *      .04*     .035*      .04*
*1                  *    40.5        *Bridge   *        *        *
*1                  *    40          *      .04*     .035*      .04*
*1                  *    39          *      .04*     .035*      .04*
*1                  *    38          *      .04*     .035*      .04*
*1                  *    37          *      .04*     .035*      .04*
*1                  *    36          *Inl Struct*        *        *
*1                  *    35          *      .04*     .035*      .04*
*1                  *    34.5        *Bridge   *        *        *
*1                  *    34          *      .04*     .035*      .04*
*1                  *    33          *      .04*     .035*      .04*
*1                  *    32          *      .04*     .035*     .055*
*1                  *    31          *      .04*     .035*     .055*
*1                  *    30.5        *Bridge   *        *        *
*1                  *    30          *      .04*     .035*     .085*
*1                  *    29          *      .04*     .035*     .085*
*1                  *    28          *      .04*     .035*     .085*
*1                  *    27          *      .04*     .035*     .085*
*1                  *    26          *      .04*     .035*     .085*
*1                  *    25          *      .04*     .035*     .085*
*1                  *    24          *      .04*     .035*     .085*
*1                  *    23          *      .04*     .035*     .085*
*1                  *    22          *      .04*     .035*     .085*
*1                  *    21          *      .04*     .035*     .085*
*1                  *    20          *      .04*     .035*     .085*
*1                  *    19          *      .04*     .035*     .085*
*1                  *    18          *      .04*     .035*     .085*
*1                  *    17          *      .04*     .035*     .085*
*1                  *    16.5        *Bridge   *        *        *
*1                  *    16          *      .04*     .035*      .04*
*1                  *    15          *      .04*     .035*      .04*
*1                  *    14          *      .04*     .035*      .04*
*1                  *    13          *      .04*     .035*      .04*
*1                  *    12          *      .04*     .035*      .04*
*1                  *    11          *      .04*     .035*      .04*
*1                  *    10          *     .085*     .055*     .085*
*1                  *    9           *     .085*     .055*     .085*
```

*1	* 8	* .085*	.055*	.085*
*1	* 7	* .085*	.055*	.085*
*1	* 6	* .085*	.055*	.085*
*1	* 5	* .085*	.055*	.085*
*1	* 4	* .085*	.055*	.085*

****

****

SUMMARY OF REACH LENGTHS

River: Tributary I-2

Reach	River Sta.	Left	Channel	Right
*1	* 73	* 166.47*	166.47*	166.47*
*1	* 72	* 48.85*	48.85*	48.85*
*1	* 71	* 66.42*	66.42*	66.42*
*1	* 70	* 71.1*	71.1*	71.1*
*1	* 69	* 59.6*	59.6*	59.6*
*1	* 68	* 145.9*	145.9*	145.9*
*1	* 67	* 110.68*	110.68*	110.68*
*1	* 66	* 76.03*	76.03*	76.03*
*1	* 65	* 64.59*	64.59*	64.59*
*1	* 64.5	*Culvert *	*	*
*1	* 64	* 88.46*	88.46*	88.46*
*1	* 63	* 70.69*	70.69*	70.69*
*1	* 62	*Inl Struct*	*	*
*1	* 61	* 84.25*	84.25*	84.25*
*1	* 60	* 49.43*	49.43*	49.43*
*1	* 59.5	*Bridge *	*	*
*1	* 59	* 68.22*	68.22*	68.22*
*1	* 58	* 46.45*	46.45*	46.45*
*1	* 57	*Inl Struct*	*	*
*1	* 56	* 38.95*	38.95*	38.95*
*1	* 55	* 48.4*	48.4*	48.4*
*1	* 54	* 123.44*	123.44*	123.44*
*1	* 53	* 99.2*	110.1*	126.17*
*1	* 52	* 181.07*	146.99*	122.24*
*1	* 51	* 139.54*	139.54*	139.54*
*1	* 50	* 38.2*	38.2*	38.2*
*1	* 49	* 15.76*	15.76*	15.76*
*1	* 48.5	*Bridge *	*	*
*1	* 48	* 41.86*	41.86*	41.86*
*1	* 47	*Inl Struct*	*	*
*1	* 46	* 174.66*	174.66*	174.66*
*1	* 45	* 49.93*	49.93*	49.93*
*1	* 44.5	*Bridge *	*	*
*1	* 44	* 179.31*	179.31*	179.31*
*1	* 43	* 23.86*	23.86*	23.86*
*1	* 42	*Inl Struct*	*	*
*1	* 41	* 43.86*	43.86*	43.86*
*1	* 40.5	*Bridge *	*	*
*1	* 40	* 124.17*	124.17*	124.17*
*1	* 39	* 71.29*	71.29*	71.29*
*1	* 38	* 121.3*	121.3*	121.3*
*1	* 37	* 17.95*	17.95*	17.95*
*1	* 36	*Inl Struct*	*	*
*1	* 35	* 27.71*	27.71*	27.71*
*1	* 34.5	*Bridge *	*	*
*1	* 34	* 173.79*	173.79*	173.79*
*1	* 33	* 248.24*	248.24*	248.24*
*1	* 32	* 53.38*	53.84*	54.83*

*1	*	31	* 127.91*	127.45*	126.72*
*1	*	30.5	*Bridge *	*	*
*1	*	30	* 95.68*	95.65*	96.41*
*1	*	29	* 186.09*	186.72*	188.57*
*1	*	28	* 164.46*	165.33*	163.53*
*1	*	27	* 79*	79.58*	79.8*
*1	*	26	* 121.93*	123.14*	124.74*
*1	*	25	* 115.12*	115.81*	116.16*
*1	*	24	* 111.92*	114.11*	114.69*
*1	*	23	* 104.37*	105.78*	105.84*
*1	*	22	* 80.35*	78.53*	77.8*
*1	*	21	* 82.04*	82.05*	81.48*
*1	*	20	* 80.71*	79.6*	79.04*
*1	*	19	* 69.19*	68.6*	67.05*
*1	*	18	* 111.01*	112.17*	112.41*
*1	*	17	* 33.51*	29.83*	31.61*
*1	*	16.5	*Bridge *	*	*
*1	*	16	* 94.69*	96.26*	101.86*
*1	*	15	* 103.65*	103.4*	101.83*
*1	*	14	* 125.87*	126.56*	128.25*
*1	*	13	* 86.01*	84.39*	84.25*
*1	*	12	* 124.76*	124.66*	124.56*
*1	*	11	* 214.49*	210.75*	212.18*
*1	*	10	* 114.57*	109.84*	113.88*
*1	*	9	* 86.59*	88.52*	90.32*
*1	*	8	* 111.89*	115.28*	120.44*
*1	*	7	* 97.33*	93.66*	92.36*
*1	*	6	* 58.51*	55.24*	53.63*
*1	*	5	* 146.63*	142.09*	140.77*
*1	*	4	* 0*	0*	0*

****

****

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Tributary I-2

Reach	River Sta.	Contr.	Expan.
*1	73	.1	.3
*1	72	.1	.3
*1	71	.1	.3
*1	70	.1	.3
*1	69	.1	.3
*1	68	.1	.3
*1	67	.1	.3
*1	66	.1	.3
*1	65	.3	.5
*1	64.5	*Culvert *	*
*1	64	.3	.5
*1	63	.1	.3
*1	62	*Inl Struct*	*
*1	61	.1	.3
*1	60	.3	.5
*1	59.5	*Bridge *	*
*1	59	.3	.5
*1	58	.1	.3
*1	57	*Inl Struct*	*
*1	56	.1	.3
*1	55	.1	.3
*1	54	.1	.3
*1	53	.1	.3

```
*1                *    52      *       .1*       .3*
*1                *    51      *       .1*       .3*
*1                *    50      *       .1*       .3*
*1                *    49      *       .3*       .5*
*1                *    48.5    *Bridge   *         *
*1                *    48      *       .3*       .5*
*1                *    47      *Inl Struct*         *
*1                *    46      *       .1*       .3*
*1                *    45      *       .3*       .5*
*1                *    44.5    *Bridge   *         *
*1                *    44      *       .3*       .5*
*1                *    43      *       .1*       .3*
*1                *    42      *Inl Struct*         *
*1                *    41      *       .3*       .5*
*1                *    40.5    *Bridge   *         *
*1                *    40      *       .3*       .5*
*1                *    39      *       .1*       .3*
*1                *    38      *       .1*       .3*
*1                *    37      *       .1*       .3*
*1                *    36      *Inl Struct*         *
*1                *    35      *       .3*       .5*
*1                *    34.5    *Bridge   *         *
*1                *    34      *       .3*       .5*
*1                *    33      *       .1*       .3*
*1                *    32      *       .1*       .3*
*1                *    31      *       .1*       .3*
*1                *    30.5    *Bridge   *         *
*1                *    30      *       .1*       .3*
*1                *    29      *       .1*       .3*
*1                *    28      *       .1*       .3*
*1                *    27      *       .1*       .3*
*1                *    26      *       .1*       .3*
*1                *    25      *       .1*       .3*
*1                *    24      *       .1*       .3*
*1                *    23      *       .1*       .3*
*1                *    22      *       .1*       .3*
*1                *    21      *       .1*       .3*
*1                *    20      *       .1*       .3*
*1                *    19      *       .1*       .3*
*1                *    18      *       .1*       .3*
*1                *    17      *       .1*       .3*
*1                *    16.5    *Bridge   *         *
*1                *    16      *       .1*       .3*
*1                *    15      *       .1*       .3*
*1                *    14      *       .1*       .3*
*1                *    13      *       .1*       .3*
*1                *    12      *       .1*       .3*
*1                *    11      *       .1*       .3*
*1                *    10      *       .1*       .3*
*1                *    9       *       .1*       .3*
*1                *    8       *       .1*       .3*
*1                *    7       *       .1*       .3*
*1                *    6       *       .1*       .3*
*1                *    5       *       .1*       .3*
*1                *    4       *       .1*       .3*
*****************************************************
```

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  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
```

****

PROJECT DATA
Project Title: Tributary I-2
Project File : I-2.prj
Run Date and Time: 7/1/2014 10:41:06 AM

Project in English units

Project Description:
Project Name: North Fork Indian Run LOMR
Stream: Tributary I-2
Vertical
Datum: NAVD88
Model Version: HEC-RAS version 4.1.0
By: EMH&T

Revised:
September 2013
Revisions include updating cross-section geometry based on 2007 Franklin County auditors topography and field survey June 2013, adding cross-sections, adding bridges based on field survey, adding ineffective flow modeling at bridge locations

****

PLAN DATA

Plan Title: Tributary I-2 Proposed
Plan File : j:\20131358\Reports\Floodplain\HEC-RAS\I-2.p04

Geometry Title: Tributary I-2 Proposed
Geometry File : j:\20131358\Reports\Floodplain\HEC-RAS\I-2.g04

Flow Title : Tributary I-2
Flow File : j:\20131358\Reports\Floodplain\HEC-RAS\I-2.f03

Plan Summary Information:

Number of:	Cross Sections =	63	Multiple Openings =	0
	Culverts =	1	Inline Structures =	5
	Bridges =	9	Lateral Structures =	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:     Subcritical Flow

Encroachment Data
   Equal Conveyance = True
   Left Offset      =        0
   Right Offset     =        0


*******************************************************************************

FLOW DATA

Flow Title: Tributary I-2
Flow File : j:\20131358\Reports\Floodplain\HEC-RAS\I-2.f03

Flow Data (cfs)
*************************************************************
* River           Reach           RS      *        100-year *
* Tributary I-2   1               73      *             262 *
* Tributary I-2   1               32      *             717 *
* Tributary I-2   1               26      *             717 *
* Tributary I-2   1               10      *             835 *
*************************************************************

Boundary Conditions
*******************************************************************************
********************
* River           Reach           Profile          *            Upstream
    Downstream    *
*******************************************************************************
********************
* Tributary I-2   1               100-year         *
Known WS = 914.37 *
*******************************************************************************
********************

*******************************************************************************

GEOMETRY DATA

Geometry Title: Tributary I-2 Proposed
Geometry File : j:\20131358\Reports\Floodplain\HEC-RAS\I-2.g04

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 73

INPUT
Description:
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -297.66     948 -114.76     946  -93.47     944  -72.04     942  -53.54     940
```

```
  -33.14     938      -7 936.204      -2  935.86       0  935.86       2  935.86
       7 936.327   24.92     938   79.77     940  108.31     942  135.81     944
  499.74     946

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -297.66     .04      -7    .035       7     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -7       7            166.47  166.47  166.47             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*********************************************************************************
***********
* E.G. Elev (ft)         *  939.27  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.08  * Wt. n-Val.             *   0.040  *   0.035  *
  0.080  *
* W.S. Elev (ft)         *  939.19  * Reach Len. (ft)        *  166.47  *  166.47  *
 166.47  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   61.78  *   44.58  *
  55.70  *
* E.G. Slope (ft/ft)     *0.000986  * Area (sq ft)           *   61.78  *   44.58  *
  55.70  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   98.95  *  128.44  *
  34.61  *
* Top Width (ft)         *  102.81  * Top Width (ft)         *   38.27  *   14.00  *
  50.54  *
* Vel Total (ft/s)       *    1.62  * Avg. Vel. (ft/s)       *    1.60  *    2.88  *
   0.62  *
* Max Chl Dpth (ft)      *    3.33  * Hydr. Depth (ft)       *    1.61  *    3.18  *
   1.10  *
* Conv. Total (cfs)      *  8344.2  * Conv. (cfs)            *  3151.3  *  4090.4  *
 1102.4  *
* Length Wtd. (ft)       *  166.47  * Wetted Per. (ft)       *   38.39  *   14.03  *
  50.64  *
* Min Ch El (ft)         *  935.86  * Shear (lb/sq ft)       *    0.10  *    0.20  *
   0.07  *
* Alpha                  *    1.95  * Stream Power (lb/ft s) *  499.74  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)   *   21.31  *   12.76  *
  17.35  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *   16.45  *    3.44  *
  14.40  *
*********************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 72

INPUT
Description:
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
```

```
  -41.05  941.06  -40.59     941  -32.98     940  -25.36     939  -17.82     938
  -10.44     937      -7 936.571   -2.43     936      -2  935.29       0  934.99
       2  934.99    4.27  934.99       7 936.667    9.17     938   16.89     940
   28.09     942   39.22     942   63.43     940  104.24     940  120.57     942
  165.95     944  302.78     946

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
  -41.05     .04      -7    .035       7     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -7       7             48.85   48.85   48.85             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*********************************************************************************
***********
* E.G. Elev (ft)         *  938.93  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.42  * Wt. n-Val.             *   0.040  *   0.035  *
  0.080  *
* W.S. Elev (ft)         *  938.51  * Reach Len. (ft)        *   48.85  *   48.85  *
  48.85  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   14.40  *   40.52  *
   3.06  *
* E.G. Slope (ft/ft)     *0.004479  * Area (sq ft)           *   14.40  *   40.52  *
   3.06  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   35.13  *  223.96  *
   2.91  *
* Top Width (ft)         *   32.83  * Top Width (ft)         *   14.68  *   14.00  *
   4.15  *
* Vel Total (ft/s)       *    4.52  * Avg. Vel. (ft/s)       *    2.44  *    5.53  *
   0.95  *
* Max Chl Dpth (ft)      *    3.52  * Hydr. Depth (ft)       *    0.98  *    2.89  *
   0.74  *
* Conv. Total (cfs)      *  3914.9  * Conv. (cfs)            *   524.9  *  3346.6  *
   43.5  *
* Length Wtd. (ft)       *   48.85  * Wetted Per. (ft)       *   14.81  *   14.93  *
   4.59  *
* Min Ch El (ft)         *  934.99  * Shear (lb/sq ft)       *    0.27  *    0.76  *
   0.19  *
* Alpha                  *    1.32  * Stream Power (lb/ft s) *  302.78  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   *   21.17  *   12.60  *
  17.23  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *   16.35  *    3.38  *
  14.29  *
*********************************************************************************
***********

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.

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 71

INPUT
Description:
Station Elevation Data    num=      19
```

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -115.33   940.3 -101.31     940  -90.13     939  -79.12     938  -29.95     938
  -18.18     937   -10.5 936.199   -8.59     936      -2  934.67       0  934.67
       2  934.67       3 935.834    4.86     938       5 938.027   15.11     940
  108.36     940  115.49     942  123.75     944  181.07     946

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -115.33     .04   -10.5    .035       3     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -10.5       3           137.52  137.52  137.52             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -115.33  -116.3               F
      43  181.07               F

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  938.72  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.20  * Wt. n-Val.             *   0.040  *   0.035  *
  0.080  *
* W.S. Elev (ft)         *  938.52  * Reach Len. (ft)        *   38.81  *   38.81  *
  38.81  *
* Crit W.S. (ft)         *  937.54  * Flow Area (sq ft)      *   53.45  *   44.21  *
   3.65  *
* E.G. Slope (ft/ft)     *0.002150  * Area (sq ft)           *   53.45  *   44.21  *
   3.65  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   73.85  *  185.77  *
   2.38  *
* Top Width (ft)         *   92.29  * Top Width (ft)         *   74.29  *   13.50  *
   4.50  *
* Vel Total (ft/s)       *    2.59  * Avg. Vel. (ft/s)       *    1.38  *    4.20  *
   0.65  *
* Max Chl Dpth (ft)      *    3.85  * Hydr. Depth (ft)       *    0.72  *    3.28  *
   0.81  *
* Conv. Total (cfs)      *  5650.9  * Conv. (cfs)            *  1592.7  *  4006.8  *
   51.4  *
* Length Wtd. (ft)       *   38.81  * Wetted Per. (ft)       *   74.40  *   14.18  *
   5.55  *
* Min Ch El (ft)         *  934.67  * Shear (lb/sq ft)       *    0.10  *    0.42  *
   0.09  *
* Alpha                  *    1.95  * Stream Power (lb/ft s) *  181.07  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)   *   21.13  *   12.55  *
  17.23  *
* C & E Loss (ft)        *    0.20  * Cum SA (acres)         *   16.30  *    3.37  *
  14.29  *
*******************************************************************************
***********

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

BRIDGE
```

```
RIVER: Tributary I-2
REACH: 1                  RS: 70.5

INPUT
Description:
Distance from Upstream XS =   38.81
Deck/Roadway Width        =      54
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
    -200     940             -18     940     938      17     940     938
     200     940

Upstream Bridge Cross Section Data
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*************************************************************************
 -115.33   940.3 -101.31     940  -90.13     939  -79.12     938  -29.95     938
  -18.18     937   -10.5 936.199   -8.59     936      -2  934.67       0  934.67
       2  934.67       3 935.834    4.86     938       5 938.027   15.11     940
  108.36     940  115.49     942  123.75     944  181.07     946

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -115.33     .04   -10.5    .035       3     .08

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -10.5       3             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -115.33  -116.3               F
      43  181.07               F

Downstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
    -200     940             -18     940     938      17     940     938
     200     940

Downstream Bridge Cross Section Data
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*************************************************************************
 -101.52     939  -92.77     938  -83.25     937  -56.59     936    -6.5  935.01
   -5.98     935      -2  933.92    -.79  933.92     -.1  933.92       0  933.92
    .492  933.92    3.95     935     7.5 935.342   14.34     936   35.37     938
   43.23     938  132.61     938  148.43     940  156.27     942  164.71     944
  188.21     946

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -101.52     .04    -6.5    .035     7.5     .08

Bank Sta: Left   Right    Coeff Contr.   Expan.
          -6.5     7.5             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
```

```
 -101.52     -43               F
      62  188.21               F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #100-year
*******************************************************************************
*********
* E.G. US. (ft)          *     938.72  * Element                *Inside BR US
*Inside BR DS *
* W.S. US. (ft)          *     938.52  * E.G. Elev (ft)         *     938.35  *
937.12  *
* Q Total (cfs)          *     262.00  * W.S. Elev (ft)         *     937.48  *
936.66  *
* Q Bridge (cfs)         *     262.00  * Crit W.S. (ft)         *     937.48  *
936.38  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *       2.81  *
 2.74  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.87  *
 4.72  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *      38.14  *
55.51  *
* Weir Submerg           *             * Froude # Chl           *       0.79  *
 0.58  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *      99.66  *
93.11  *
* Min El Weir Flow (ft)  *     940.01  * Hydr Depth (ft)        *       1.70  *
 1.57  *
* Min El Prs (ft)        *     938.00  * W.P. Total (ft)        *      24.48  *
37.61  *
* Delta EG (ft)          *       2.01  * Conv. Total (cfs)      *     2363.2  *
2960.3  *
* Delta WS (ft)          *       2.10  * Top Width (ft)         *      22.46  *
35.25  *
* BR Open Area (sq ft)   *      49.90  * Frctn Loss (ft)        *       0.52  *
 0.33  *
* BR Open Vel (ft/s)     *       6.87  * C & E Loss (ft)        *       0.21  *
 0.08  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.20  *
 0.72  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *    -115.33  *
```

```
-101.52  *
*****************************************************************************
*********

Note:    Momentum answer is not valid if the water surface is above the low chord or
if there is weir flow.  The momentum
         answer has been disregarded.
Warning: The energy equation could not be balanced within the specified number of
iterations.  The program used critical depth
         for the water surface and continued on with the calculations.
Warning: The energy loss was 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: Tributary I-2
REACH: 1                  RS: 69

INPUT
Description:
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 -101.52     939  -92.77     938  -83.25     937  -56.59     936    -6.5  935.01
   -5.98     935      -2  933.92    -.79  933.92     -.1  933.92       0  933.92
    .492  933.92    3.95     935     7.5 935.342   14.34     936   35.37     938
   43.23     938  132.61     938  148.43     940  156.27     942  164.71     944
  188.21     946

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -101.52     .04    -6.5    .035     7.5     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          -6.5     7.5             59.6    59.6    59.6             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -101.52     -43               F
      62  188.21               F

CROSS SECTION OUTPUT  Profile #100-year
*****************************************************************************
***********
* E.G. Elev (ft)         *  936.71  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.29  * Wt. n-Val.             *   0.040  *   0.035  *
  0.080  *
* W.S. Elev (ft)         *  936.42  * Reach Len. (ft)        *   59.60  *   59.60  *
  59.60  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   38.26  *   25.96  *
   6.04  *
* E.G. Slope (ft/ft)     *0.006793  * Area (sq ft)           *   48.12  *   25.96  *
   6.04  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *  120.86  *  135.05  *
   6.09  *
```

```
* Top Width (ft)          *   86.50  * Top Width (ft)          *   61.26  *   14.00  *
  11.25  *
* Vel Total (ft/s)        *    3.73  * Avg. Vel. (ft/s)        *    3.16  *    5.20  *
   1.01  *
* Max Chl Dpth (ft)       *    2.50  * Hydr. Depth (ft)        *    1.05  *    1.85  *
   0.54  *
* Conv. Total (cfs)       *  3178.9  * Conv. (cfs)             *  1466.5  *  1638.6  *
   73.9  *
* Length Wtd. (ft)        *   59.60  * Wetted Per. (ft)        *   36.51  *   14.33  *
  11.30  *
* Min Ch El (ft)          *  933.92  * Shear (lb/sq ft)        *    0.44  *    0.77  *
   0.23  *
* Alpha                   *    1.34  * Stream Power (lb/ft s) *  188.21  *    0.00  *
   0.00  *
* Frctn Loss (ft)         *    0.47  * Cum Volume (acre-ft)    *   21.05  *   12.45  *
  17.21  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)          *   16.22  *    3.32  *
  14.27  *
*******************************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 68

INPUT
Description:
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -119.83     940 -112.27     939 -104.85     938  -97.79     937  -76.44     936
  -22.02     935   -3.22     935      -3 934.733    -2.7 934.369      -2  933.52
       0  933.52       2  933.52    6.13  934.04      11 934.411   31.85     936
   43.91     938   66.41     938  164.38     938  197.29     940  220.27     942
  243.57     944  271.67     946

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -119.83     .04      -3    .035      11     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -3      11            145.9   145.9   145.9             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************************
***********
* E.G. Elev (ft)          *  936.21  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)           *    0.39  * Wt. n-Val.             *   0.040  *   0.035  *
  0.080  *
* W.S. Elev (ft)          *  935.82  * Reach Len. (ft)        *  145.90  *  145.90  *
 145.90  *
* Crit W.S. (ft)          *  935.82  * Flow Area (sq ft)      *   33.87  *   27.07  *
  13.01  *
* E.G. Slope (ft/ft)      *0.009078  * Area (sq ft)           *   33.87  *   27.07  *
  13.01  *
* Q Total (cfs)           *  262.00  * Flow (cfs)             *   78.66  *  165.15  *
  18.19  *
* Top Width (ft)          *   96.08  * Top Width (ft)         *   63.60  *   14.00  *
  18.48  *
```

```
* Vel Total (ft/s)       *    3.54  * Avg. Vel. (ft/s)       *    2.32  *    6.10  *
   1.40  *
* Max Chl Dpth (ft)      *    2.30  * Hydr. Depth (ft)       *    0.53  *    1.93  *
   0.70  *
* Conv. Total (cfs)      *  2749.8  * Conv. (cfs)            *   825.6  *  1733.3  *
  190.9  *
* Length Wtd. (ft)       *  145.90  * Wetted Per. (ft)       *   63.74  *   14.62  *
  18.53  *
* Min Ch El (ft)         *  933.52  * Shear (lb/sq ft)       *    0.30  *    1.05  *
   0.40  *
* Alpha                  *    2.01  * Stream Power (lb/ft s) *  271.67  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    1.87  * Cum Volume (acre-ft)   *   21.00  *   12.42  *
  17.20  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   16.13  *    3.30  *
  14.25  *
*******************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 67

INPUT
Description:
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -366.41     939 -328.66     938 -289.63     937 -197.94     936  -102.9     935
  -38.59     934  -21.03     933   -5.77  932.53      -2  932.53       0  932.53
       2  932.53    6.21  932.53   32.96     934   91.37     936   99.57     936
  127.53     936  150.91     938  182.63     940  200.79     940  211.51     938
  252.84     938  330.11     940  359.97     942  389.76     944  418.29     946

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -366.41     .04  -38.59    .035   32.96     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -38.59   32.96           110.68  110.68  110.68             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  934.21  * Element                *  Left OB *  Channel *
```

```
Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *          *   0.035  *
          *
* W.S. Elev (ft)         *  933.80  * Reach Len. (ft)        *  110.68  *  110.68  *
 110.68  *
* Crit W.S. (ft)         *  933.80  * Flow Area (sq ft)      *          *   51.37  *
          *
* E.G. Slope (ft/ft)     *0.019552  * Area (sq ft)           *          *   51.37  *
          *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *          *  262.00  *
          *
* Top Width (ft)         *   64.44  * Top Width (ft)         *          *   64.44  *
          *
* Vel Total (ft/s)       *    5.10  * Avg. Vel. (ft/s)       *          *    5.10  *
          *
* Max Chl Dpth (ft)      *    1.27  * Hydr. Depth (ft)       *          *    0.80  *
          *
* Conv. Total (cfs)      *  1873.7  * Conv. (cfs)            *          *  1873.7  *
          *
* Length Wtd. (ft)       *  110.68  * Wetted Per. (ft)       *          *   64.50  *
          *
* Min Ch El (ft)         *  932.53  * Shear (lb/sq ft)       *          *    0.97  *
          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *  418.29  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.19  * Cum Volume (acre-ft)   *   20.94  *   12.28  *
  17.18  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *   16.02  *    3.17  *
  14.22  *
*******************************************************************************
***********

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: Tributary I-2
REACH: 1                 RS: 66

INPUT
Description:
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -136.58     937  -116.7     936   -91.9     935  -59.13     934   -48.3     933
  -37.48     932  -35.36  931.82      -2  931.82       0  931.82       2  931.82
    23.7  931.82   29.61     932   68.85     933  118.71     936  289.23     938
  437.56     940  498.68     942  519.96     944  540.67     946

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

```
 -136.58     .04  -37.48    .035   29.61     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -37.48   29.61            76.03   76.03   76.03             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  933.75  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.03  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  933.71  * Reach Len. (ft)        *   76.03  *   76.03  *
  76.03  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   15.87  *  126.26  *
  51.81  *
* E.G. Slope (ft/ft)     *0.000606  * Area (sq ft)           *   15.87  *  126.26  *
  51.81  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   13.05  *  201.14  *
  47.81  *
* Top Width (ft)         *  136.71  * Top Width (ft)         *   18.54  *   67.09  *
  51.09  *
* Vel Total (ft/s)       *    1.35  * Avg. Vel. (ft/s)       *    0.82  *    1.59  *
   0.92  *
* Max Chl Dpth (ft)      *    1.89  * Hydr. Depth (ft)       *    0.86  *    1.88  *
   1.01  *
* Conv. Total (cfs)      * 10641.7  * Conv. (cfs)            *   530.1  *  8169.8  *
 1941.8  *
* Length Wtd. (ft)       *   76.03  * Wetted Per. (ft)       *   18.62  *   67.10  *
  51.12  *
* Min Ch El (ft)         *  931.82  * Shear (lb/sq ft)       *    0.03  *    0.07  *
   0.04  *
* Alpha                  *    1.17  * Stream Power (lb/ft s) *  540.67  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *   20.92  *   12.06  *
  17.11  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   16.00  *    3.01  *
  14.15  *
*******************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 65

INPUT
Description: Upstream Section of HW2 (24")
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -150.97     937  -126.8     936 -109.69     935  -58.74     934  -45.59     933
  -31.87     932   -27.4  931.73      -2  929.92       0  929.92       2  929.92
   39.24  931.81   46.87     932   83.57     933  127.95     934  155.98  934.81
  195.15     936  261.87     938  385.28     940  546.88     942

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

```
*********************************************
 -150.97     .04   -27.4    .035   39.24     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -27.4   39.24             64.59   64.59   64.59             .3       .5

CROSS SECTION OUTPUT  Profile #100-year
*****************************************************************************************
***********
* E.G. Elev (ft)         *  933.72  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.02  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  933.70  * Reach Len. (ft)        *   64.59  *   64.59  *
  64.59  *
* Crit W.S. (ft)         *  931.52  * Flow Area (sq ft)      *   27.95  *  193.87  *
  68.78  *
* E.G. Slope (ft/ft)     *0.000168  * Area (sq ft)           *   27.95  *  193.87  *
  68.78  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   13.61  *  217.26  *
  31.13  *
* Top Width (ft)         *  169.56  * Top Width (ft)         *   27.42  *   66.64  *
  75.49  *
* Vel Total (ft/s)       *    0.90  * Avg. Vel. (ft/s)       *    0.49  *    1.12  *
   0.45  *
* Max Chl Dpth (ft)      *    3.78  * Hydr. Depth (ft)       *    1.02  *    2.91  *
   0.91  *
* Conv. Total (cfs)      * 20204.5  * Conv. (cfs)            *  1049.6  * 16754.4  *
 2400.5  *
* Length Wtd. (ft)       *   64.59  * Wetted Per. (ft)       *   27.50  *   66.75  *
  75.52  *
* Min Ch El (ft)         *  929.92  * Shear (lb/sq ft)       *    0.01  *    0.03  *
   0.01  *
* Alpha                  *    1.33  * Stream Power (lb/ft s) *  546.88  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   20.88  *   11.78  *
  17.01  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   15.96  *    2.89  *
  14.04  *
*****************************************************************************************
***********

CULVERT


RIVER: Tributary I-2
REACH: 1                  RS: 64.5

INPUT
Description:
Distance from Upstream XS =    32.4
Deck/Roadway Width        =   17.51
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************
    -100  932.91     900     100  932.91     900

Upstream Bridge Cross Section Data
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
```

```
 -150.97     937  -126.8     936 -109.69     935  -58.74     934  -45.59     933
  -31.87     932   -27.4  931.73      -2  929.92       0  929.92       2  929.92
   39.24  931.81   46.87     932   83.57     933  127.95     934  155.98  934.81
  195.15     936  261.87     938  385.28     940  546.88     942

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -150.97     .04   -27.4    .035   39.24     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -27.4   39.24             .3       .5

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
***********************************************
    -100  932.91     900     100  932.91     900

Downstream Bridge Cross Section Data
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -369.54     935  -253.5     934  -23.33     933  -12.73     932   -8.33  931.62
      -2  929.91       0  929.91       2  929.91    9.87  931.78   13.59     932
    39.4     933  118.43     934  133.95     935  177.11     936     187     937

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -369.54     .04   -8.33    .035    9.87     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -8.33    9.87             .3       .5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
24"            Circular       2
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
               32.4   17.51     .013     .013        1                   .5
      1
Upstream   Elevation =  929.92
           Centerline Station =  0
Downstream Elevation =  929.91
           Centerline Station =  0

CULVERT OUTPUT  Profile #100-year  Culv Group:  24"
**********************************************************************
* Q Culv Group (cfs)     *    9.48  * Culv Full Len (ft)     *   17.51  *
* # Barrels              *       1  * Culv Vel US (ft/s)     *    6.03  *
```

```
* Q Barrel (cfs)         *    9.48  * Culv Vel DS (ft/s)     *    6.03  *
* E.G. US. (ft)          *  933.72  * Culv Inv El Up (ft)    *  929.92  *
* W.S. US. (ft)          *  933.70  * Culv Inv El Dn (ft)    *  929.91  *
* E.G. DS (ft)           *  933.20  * Culv Frctn Ls (ft)     *    0.24  *
* W.S. DS (ft)           *  932.59  * Culv Exit Loss (ft)    *    0.00  *
* Delta EG (ft)          *    0.52  * Culv Entr Loss (ft)    *    0.28  *
* Delta WS (ft)          *    1.11  * Q Weir (cfs)           *  252.52  *
* E.G. IC (ft)           *  933.69  * Weir Sta Lft (ft)      *  -54.69  *
* E.G. OC (ft)           *  933.72  * Weir Sta Rgt (ft)      *  114.27  *
* Culvert Control        *  Outlet  * Weir Submerg           *    0.00  *
* Culv WS Inlet (ft)     *  931.92  * Weir Max Depth (ft)    *    0.78  *
* Culv WS Outlet (ft)    *  931.91  * Weir Avg Depth (ft)    *    0.68  *
* Culv Nml Depth (ft)    *          * Weir Flow Area (sq ft) *  114.55  *
* Culv Crt Depth (ft)    *    1.84  * Min El Weir Flow (ft)  *  932.92  *
**********************************************************************

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 64

INPUT
Description: Downstream Section of HW2 (24")
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 -369.54     935  -253.5     934  -23.33     933  -12.73     932   -8.33  931.62
      -2  929.91       0  929.91       2  929.91    9.87  931.78   13.59     932
    39.4     933  118.43     934  133.95     935  177.11     936     187     937

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
 -369.54     .04   -8.33    .035    9.87     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -8.33    9.87             88.46   88.46   88.46              .3       .5

CROSS SECTION OUTPUT  Profile #100-year
**********************************************************************************
***********
* E.G. Elev (ft)         *  933.20  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.61  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  932.59  * Reach Len. (ft)        *   88.46  *   88.46  *
  88.46  *
* Crit W.S. (ft)         *  932.59  * Flow Area (sq ft)      *    5.25  *   35.96  *
   7.05  *
* E.G. Slope (ft/ft)     *0.009981  * Area (sq ft)           *    5.25  *   35.96  *
   7.05  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   12.14  *  236.31  *
  13.55  *
* Top Width (ft)         *   47.71  * Top Width (ft)         *   10.63  *   18.20  *
  18.88  *
* Vel Total (ft/s)       *    5.43  * Avg. Vel. (ft/s)       *    2.31  *    6.57  *
   1.92  *
* Max Chl Dpth (ft)      *    2.68  * Hydr. Depth (ft)       *    0.49  *    1.98  *
   0.37  *
* Conv. Total (cfs)      *  2622.5  * Conv. (cfs)            *   121.5  *  2365.3  *
  135.6  *
* Length Wtd. (ft)       *   88.46  * Wetted Per. (ft)       *   10.67  *   18.65  *
```

```
  18.90  *
* Min Ch El (ft)         *  929.91  * Shear (lb/sq ft)       *    0.31  *    1.20  *
   0.23  *
* Alpha                  *    1.34  * Stream Power (lb/ft s) *  187.00  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *   20.88  *   11.43  *
  17.01  *
* C & E Loss (ft)        *    0.29  * Cum SA (acres)         *   15.93  *    2.83  *
  13.97  *
*******************************************************************************
***********

Warning: The energy equation could not be balanced within the specified number of
iterations.  The program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may
indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance)
is less than 0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: 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: Tributary I-2
REACH: 1                  RS: 63

INPUT
Description: Upstream Section of W4
Station Elevation Data    num=      24
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -376.4     935 -273.71     934 -250.23     933 -224.62     932 -186.05     932
  -86.59     932  -16.83     931   -9.66     930   -4.33  929.33      -2  928.97
       0  928.97       2  928.97    6.48  929.35   12.78     930   24.08     931
   35.38     932   105.8     933   176.9     934  239.74     935  260.79     936
   274.5     937  280.82     938  286.93     939  293.04     940

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -376.4     .04   -9.66    .035   12.78     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -9.66   12.78             70.69   70.69   70.69             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  932.60  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.03  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  932.57  * Reach Len. (ft)        *   70.69  *   70.69  *
  70.69  *
* Crit W.S. (ft)         *  930.99  * Flow Area (sq ft)      *  172.67  *   71.40  *
  47.02  *
* E.G. Slope (ft/ft)     *0.000389  * Area (sq ft)           *  172.67  *   71.40  *
```

```
  47.02  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *  104.66  *  128.96  *
  28.38  *
* Top Width (ft)         *  314.88  * Top Width (ft)         *  229.60  *   22.44  *
  62.85  *
* Vel Total (ft/s)       *    0.90  * Avg. Vel. (ft/s)       *    0.61  *    1.81  *
   0.60  *
* Max Chl Dpth (ft)      *    3.60  * Hydr. Depth (ft)       *    0.75  *    3.18  *
   0.75  *
* Conv. Total (cfs)      * 13276.3  * Conv. (cfs)            *  5303.5  *  6534.8  *
 1438.0  *
* Length Wtd. (ft)       *   70.69  * Wetted Per. (ft)       *  229.68  *   22.56  *
  62.94  *
* Min Ch El (ft)         *  928.97  * Shear (lb/sq ft)       *    0.02  *    0.08  *
   0.02  *
* Alpha                  *    2.21  * Stream Power (lb/ft s) *  293.04  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   20.70  *   11.32  *
  16.95  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   15.69  *    2.78  *
  13.89  *
*******************************************************************************
***********

INLINE STRUCTURE


RIVER: Tributary I-2
REACH: 1                  RS: 62

INPUT
Description:
Distance from Upstream XS =   68.69
Deck/Roadway Width        =       2
Weir Coefficient          =     2.6
 Weir Embankment Coordinates    num =       10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
   -1000  932.19   -7.95  932.19   -7.95   932.2   -3.03   932.2   -3.03  929.77
    3.03  929.77    3.03   932.3    8.08   932.3    8.08  932.24    1000  932.24

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Weir crest shape                            = Broad Crested


INLINE STRUCTURE OUTPUT  Profile #100-year  Inl Struct:
*******************************************************************************
* E.G. Elev (ft)             *  932.60  * Q Gates (cfs)              *         *
* W.S. Elev (ft)             *  932.57  * Q Gate Group (cfs)         *    0.00 *
* Q Total (cfs)              *  262.00  * Gate Open Ht (ft)          *  932.00 *
* Q Weir (cfs)               *  262.00  * Gate #Open                 *         *
* Weir Flow Area (sq ft)     *  133.89  * Gate Area (sq ft)          *    1.00 *
* Weir Sta Lft (ft)          * -239.97  * Gate Submerg               *    0.00 *
* Weir Sta Rgt (ft)          *   77.59  * Gate Invert (ft)           *    0.00 *
* Weir Max Depth (ft)        *    2.83  * Gate Weir Coef             *   0.000 *
* Weir Avg Depth (ft)        *    0.42  *                           *         *
* Weir Coef (ft^1/2)         *   2.600  * Q Breach (cfs)             *         *
* Weir Submerg               *    0.22  * Breach Avg Velocity (ft/s) *         *
* Min El Weir Flow (ft)      *  929.78  * Breach Flow Area (sq ft)   *         *
* Wr Top Wdth (ft)           *  317.56  *                           *         *
```

```
*******************************************************************************

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 61

INPUT
Description: Downstream Section of W4
Station Elevation Data    num=      24
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -376.4     935 -273.71     934 -250.23     933 -224.62     932 -186.05     932
  -86.59     932  -16.83     931   -9.66     930   -4.33  929.33      -2  927.97
       0  927.97       2  927.97    6.48  929.35   12.78     930   24.08     931
   35.38     932   105.8     933   176.9     934  239.74     935  260.79     936
   274.5     937  280.82     938  286.93     939  293.04     940

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -376.4     .04   -4.33    .035    6.48     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -4.33    6.48            84.25   84.25   84.25             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  932.17  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.16  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  932.00  * Reach Len. (ft)        *   84.25  *   84.25  *
  84.25  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   58.38  *   38.90  *
  37.29  *
* E.G. Slope (ft/ft)     *0.001744  * Area (sq ft)           *   58.38  *   38.90  *
  37.29  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   37.34  *  156.45  *
  68.20  *
* Top Width (ft)         *  260.13  * Top Width (ft)         *  220.32  *   10.81  *
  28.99  *
* Vel Total (ft/s)       *    1.95  * Avg. Vel. (ft/s)       *    0.64  *    4.02  *
   1.83  *
* Max Chl Dpth (ft)      *    4.03  * Hydr. Depth (ft)       *    0.26  *    3.60  *
   1.29  *
* Conv. Total (cfs)      *  6274.6  * Conv. (cfs)            *   894.3  *  3746.9  *
 1633.4  *
* Length Wtd. (ft)       *   84.25  * Wetted Per. (ft)       *  220.44  *   11.39  *
  29.12  *
* Min Ch El (ft)         *  927.97  * Shear (lb/sq ft)       *    0.03  *    0.37  *
   0.14  *
* Alpha                  *    2.79  * Stream Power (lb/ft s) *  293.04  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *   20.70  *   10.98  *
  16.95  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   15.32  *    2.76  *
  13.82  *
*******************************************************************************
***********
```

CROSS SECTION

RIVER: Tributary I-2
REACH: 1 RS: 60

INPUT
Description: Upstream Section of B5
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-344.47	935	-219.95	934	-203.27	933	-108.12	932	-18.25	931
-14.15	930	-8.66	929.33	-7	929	-2.72	927.53	0	927.53
2	927.53	5.36	929	5.96	929.08	7.82	930	9.65	931
84.25	932	129.31	933	226.68	934	292.06	935	306.56	936

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-344.47	.04	-7	.035	5.96	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-7	5.96	49.43	49.43	49.43	.3	.5

Skew Angle = 41

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	932.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.	0.040	0.035	0.040
W.S. Elev (ft)	931.90	Reach Len. (ft)	16.11	16.11	16.11
Crit W.S. (ft)	930.39	Flow Area (sq ft)	59.20	50.15	37.36
E.G. Slope (ft/ft)	0.001178	Area (sq ft)	59.20	50.15	37.36
Q Total (cfs)	262.00	Flow (cfs)	56.02	175.09	30.89
Top Width (ft)	176.38	Top Width (ft)	92.38	12.96	71.04
Vel Total (ft/s)	1.79	Avg. Vel. (ft/s)	0.95	3.49	0.83
Max Chl Dpth (ft)	4.37	Hydr. Depth (ft)	0.64	3.87	0.53
Conv. Total (cfs)	7634.9	Conv. (cfs)	1632.4	5102.2	900.3
Length Wtd. (ft)	16.11	Wetted Per. (ft)	92.58	13.52	71.51
Min Ch El (ft)	927.53	Shear (lb/sq ft)	0.05	0.27	0.04
Alpha	2.64	Stream Power (lb/ft s)	306.56	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	20.59	10.89	16.88
C & E Loss (ft)		Cum SA (acres)	15.02	2.73	13.72

BRIDGE

```
RIVER: Tributary I-2
REACH: 1                  RS: 59.5

INPUT
Description:
Distance from Upstream XS =   16.11
Deck/Roadway Width        =    8.38
Weir Coefficient          =     2.6
Bridge Deck/Roadway Skew  =      41
Upstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
-226.413   929.5     900 -12.747   931.9  930.34       0  931.94  930.47
  12.747  932.12  930.66  75.471   932.3     900 150.942     932     900

Upstream Bridge Cross Section Data
Station Elevation Data    num=      20
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 -344.47     935 -219.95     934 -203.27     933 -108.12     932  -18.25     931
  -14.15     930   -8.66  929.33      -7     929   -2.72  927.53       0  927.53
       2  927.53    5.36     929    5.96  929.08    7.82     930    9.65     931
   84.25     932  129.31     933  226.68     934  292.06     935  306.56     936

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -344.47     .04      -7    .035    5.96     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -7    5.96             .3       .5
Skew Angle = 41

Downstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
-226.413   929.5     900 -12.747   931.9  930.34       0  931.94  930.47
  12.747  932.12  930.66  75.471   932.3     900 150.942     932     900

Downstream Bridge Cross Section Data
Station Elevation Data    num=      27
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 -320.27     935  -196.9     934 -150.88     933  -94.57     932     -12     931
   -9.67     930   -7.76   929.2   -7.02     929   -2.13  927.53       0  927.53
     .48  927.53    2.12   927.6    7.71     928    8.99   929.3   27.38     930
  114.92     931  143.83     932  176.22     933  209.24     934  237.26     935
  255.38     936  259.82     936  269.36     935   278.9     934  287.85     933
  303.77     933   363.5     934

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -320.27     .04   -7.02    .035    8.99     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -7.02    8.99             .3       .5
Skew Angle = 41

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
```

```
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

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

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

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

BRIDGE OUTPUT  Profile #100-year
*******************************************************************************
*********
* E.G. US. (ft)          *     932.04  * Element                *Inside BR US
*Inside BR DS *
* W.S. US. (ft)          *     931.90  * E.G. Elev (ft)         *     932.03  *
932.03  *
* Q Total (cfs)          *     262.00  * W.S. Elev (ft)         *     931.90  *
931.90  *
* Q Bridge (cfs)         *     207.43  * Crit W.S. (ft)         *     930.31  *
930.01  *
* Q Weir (cfs)           *      54.57  * Max Chl Dpth (ft)      *       4.37  *
 4.37  *
* Weir Sta Lft (ft)      *    -111.31  * Vel Total (ft/s)       *       3.52  *
 3.37  *
* Weir Sta Rgt (ft)      *       6.62  * Flow Area (sq ft)      *      74.50  *
77.65  *
* Weir Submerg           *       0.00  * Froude # Chl           *       0.48  *
 0.42  *
* Weir Max Depth (ft)    *       0.62  * Specif Force (cu ft)   *     148.06  *
169.28  *
* Min El Weir Flow (ft)  *     931.48  * Hydr Depth (ft)        *       0.85  *
 1.04  *
* Min El Prs (ft)        *     930.60  * W.P. Total (ft)        *     135.42  *
127.13  *
* Delta EG (ft)          *       0.60  * Conv. Total (cfs)      *             *
       *
* Delta WS (ft)          *       0.53  * Top Width (ft)         *      87.51  *
74.67  *
* BR Open Area (sq ft)   *      39.55  * Frctn Loss (ft)        *             *
       *
* BR Open Vel (ft/s)     *       5.24  * C & E Loss (ft)        *             *
       *
* Coef of Q              *             * Shear Total (lb/sq ft) *             *
       *
* Br Sel Method          * Press/Weir  * Power Total (lb/ft s)  *    -344.47  *
-320.27  *
```

```
*******************************************************************************
*********

Note:    The downstream water surface is above the minimum elevation required for
orifice flow.  The orifice flow equation was
         used for pressure flow.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.
Note:    For the cross section inside the bridge at the upstream end, the water
surface and energy have been projected from
         the upstream cross section.  The selected bridge modeling method does not
compute answers inside the bridge.
Note:    For the cross section inside the bridge at the downstream end, the water
surface and energy have been projected from
         the downstream cross section.  The selected bridge modeling method does not
compute answers inside the bridge.

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 59

INPUT
Description: Downstream Section of B5
Station Elevation Data    num=      27
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -320.27     935  -196.9     934 -150.88     933  -94.57     932     -12     931
   -9.67     930   -7.76   929.2   -7.02     929   -2.13  927.53       0  927.53
     .48  927.53    2.12   927.6    7.71     928    8.99   929.3   27.38     930
  114.92     931  143.83     932  176.22     933  209.24     934  237.26     935
  255.38     936  259.82     936  269.36     935   278.9     934  287.85     933
  303.77     933   363.5     934

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -320.27     .04   -7.02    .035    8.99     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -7.02    8.99            68.22   68.22   68.22             .3       .5
Skew Angle = 41

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  931.44  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.07  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  931.38  * Reach Len. (ft)        *   68.22  *   68.22  *
  68.22  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   12.94  *   54.97  *
 110.43  *
* E.G. Slope (ft/ft)     *0.000787  * Area (sq ft)           *   12.94  *   54.97  *
 110.43  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *    6.77  *  144.39  *
 110.85  *
* Top Width (ft)         *  168.80  * Top Width (ft)         *   36.00  *   16.01  *
 116.79  *
* Vel Total (ft/s)       *    1.47  * Avg. Vel. (ft/s)       *    0.52  *    2.63  *
   1.00  *
```

```
* Max Chl Dpth (ft)      *    3.85  * Hydr. Depth (ft)       *    0.36  *    3.43  *
   0.95  *
* Conv. Total (cfs)      *  9339.8  * Conv. (cfs)            *   241.3  *  5147.1  *
 3951.4  *
* Length Wtd. (ft)       *   68.22  * Wetted Per. (ft)       *   36.39  *   16.79  *
 116.82  *
* Min Ch El (ft)         *  927.53  * Shear (lb/sq ft)       *    0.02  *    0.16  *
   0.05  *
* Alpha                  *    1.96  * Stream Power (lb/ft s) *  363.50  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *   20.56  *   10.84  *
  16.84  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   14.94  *    2.73  *
  13.67  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 58

INPUT
Description: Upstream Section of W3
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -175.35     934 -139.75     933 -107.32     932  -71.28     931  -38.31     930
   -8.73  929.35   -6.97     929      -2   927.4       0   927.4       2   927.4
    5.33     929    7.32  929.28   46.05     930   95.89     931  377.15     932
  455.45     933  496.57     934

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -175.35     .04   -6.97    .035    5.33     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -6.97    5.33            30.03   30.03   30.03             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -175.35  -51.63               F
   47.61  496.57               F

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  931.38  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.04  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  931.34  * Reach Len. (ft)        *   30.03  *   30.03  *
  30.03  *
* Crit W.S. (ft)         *  930.26  * Flow Area (sq ft)      *   68.37  *   41.86  *
  72.42  *
* E.G. Slope (ft/ft)     *0.000556  * Area (sq ft)           *   83.09  *   41.86  *
 128.95  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   79.47  *   91.77  *
  90.76  *
* Top Width (ft)         *  276.09  * Top Width (ft)         *   76.68  *   12.30  *
 187.11  *
* Vel Total (ft/s)       *    1.43  * Avg. Vel. (ft/s)       *    1.16  *    2.19  *
```

```
   1.25  *
* Max Chl Dpth (ft)      *    3.94  * Hydr. Depth (ft)       *    1.53  *    3.40  *
   1.71  *
* Conv. Total (cfs)      * 11113.1  * Conv. (cfs)            *  3370.9  *  3892.4  *
 3849.9  *
* Length Wtd. (ft)       *   30.03  * Wetted Per. (ft)       *   44.71  *   12.92  *
  42.31  *
* Min Ch El (ft)         *  927.40  * Shear (lb/sq ft)       *    0.05  *    0.11  *
   0.06  *
* Alpha                  *    1.28  * Stream Power (lb/ft s) *  496.57  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   20.48  *   10.77  *
  16.65  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   14.85  *    2.71  *
  13.43  *
*******************************************************************************
***********

INLINE STRUCTURE


RIVER: Tributary I-2
REACH: 1                  RS: 57

INPUT
Description:
Distance from Upstream XS =      10
Deck/Roadway Width        =       2
Weir Coefficient          =     2.6
 Weir Embankment Coordinates    num =        2
     Sta    Elev     Sta    Elev
******************************
    -8.8  929.21     8.8  929.21

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Weir crest shape                            = Broad Crested


INLINE STRUCTURE OUTPUT  Profile #100-year  Inl Struct:
*******************************************************************************
* E.G. Elev (ft)             *  931.38  * Q Gates (cfs)              *          *
* W.S. Elev (ft)             *  931.34  * Q Gate Group (cfs)         *    0.00  *
* Q Total (cfs)              *  262.00  * Gate Open Ht (ft)          *  931.29  *
* Q Weir (cfs)               *  262.00  * Gate #Open                 *          *
* Weir Flow Area (sq ft)     *  170.82  * Gate Area (sq ft)          *    1.00  *
* Weir Sta Lft (ft)          *  -51.63  * Gate Submerg               *    0.00  *
* Weir Sta Rgt (ft)          *   47.61  * Gate Invert (ft)           *    0.00  *
* Weir Max Depth (ft)        *    2.17  * Gate Weir Coef             *   0.000  *
* Weir Avg Depth (ft)        *    1.72  *                           *          *
* Weir Coef (ft^1/2)         *   2.600  * Q Breach (cfs)            *          *
* Weir Submerg               *    0.99  * Breach Avg Velocity (ft/s) *          *
* Min El Weir Flow (ft)      *  929.22  * Breach Flow Area (sq ft)   *          *
* Wr Top Wdth (ft)           *   99.24  *                           *          *
*******************************************************************************

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 56
```

```
INPUT
Description:
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -175.35     934 -139.75     933 -107.32     932  -71.28     931  -38.31     930
   -8.73  929.35   -6.97     929      -2  926.91       0  926.91       2  926.91
    5.33     929    7.32  929.28   33.49     930  117.36     931  158.43     932
  168.97     933  174.07  933.62  181.78     933  191.88     932  408.22     932
  496.01     933   534.6     934

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -175.35     .04   -6.97    .035    5.33     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -6.97    5.33           103.77  103.77  103.77             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -175.35  -34.69               F
   25.97   534.6               F

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  931.37  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.08  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  931.29  * Reach Len. (ft)        *   37.53  *   37.53  *
  37.53  *
* Crit W.S. (ft)         *  930.18  * Flow Area (sq ft)      *   46.70  *   45.21  *
  36.99  *
* E.G. Slope (ft/ft)     *0.000884  * Area (sq ft)           *   79.10  *   45.21  *
 115.51  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   72.94  *  128.84  *
  60.22  *
* Top Width (ft)         *  211.04  * Top Width (ft)         *   74.78  *   12.30  *
 123.96  *
* Vel Total (ft/s)       *    2.03  * Avg. Vel. (ft/s)       *    1.56  *    2.85  *
   1.63  *
* Max Chl Dpth (ft)      *    4.38  * Hydr. Depth (ft)       *    1.68  *    3.68  *
   1.79  *
* Conv. Total (cfs)      *  8812.9  * Conv. (cfs)            *  2453.4  *  4333.8  *
 2025.7  *
* Length Wtd. (ft)       *   37.53  * Wetted Per. (ft)       *   27.76  *   13.32  *
  20.67  *
* Min Ch El (ft)         *  926.91  * Shear (lb/sq ft)       *    0.09  *    0.19  *
   0.10  *
* Alpha                  *    1.28  * Stream Power (lb/ft s) *  534.60  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *   20.48  *   10.62  *
  16.65  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *   14.80  *    2.70  *
  13.33  *
*******************************************************************************
***********

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.
```

BRIDGE

RIVER: Tributary I-2
REACH: 1 RS: 55

INPUT
Description:
Distance from Upstream XS = 37.53
Deck/Roadway Width = 50.03
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 4

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
-200	933	-10	933	931	10	933	931
200	933						

Upstream Bridge Cross Section Data
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-175.35	934	-139.75	933	-107.32	932	-71.28	931	-38.31	930
-8.73	929.35	-6.97	929	-2	926.91	0	926.91	2	926.91
5.33	929	7.32	929.28	33.49	930	117.36	931	158.43	932
168.97	933	174.07	933.62	181.78	933	191.88	932	408.22	932
496.01	933	534.6	934						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-175.35	.04	-6.97	.035	5.33	.04

Bank Sta: Left Right Coeff Contr. Expan.
-6.97 5.33 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-175.35	-34.69		F
25.97	534.6		F

Downstream Deck/Roadway Coordinates
num= 4

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
-200	933	-10	933	931	10	933	931
200	933						

Downstream Bridge Cross Section Data
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-206.16	934	-163.34	933	-139.84	932	-116.86	931	-86.69	930
-16.62	930	-10.42	929	-6.83	928.6	-2	926.73	0	926.73
2	926.73	5.54	927.96	5.83	928	13.08	929	20.75	930
29.02	931	39.12	932	48.66	933	87.65	933	95.42	932
105.96	931	154.78	931	350.86	931	377.33	931	400.42	932
405.17	932.21								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-206.16	.04	-6.83	.035	5.54	.04

```
Bank Sta: Left   Right    Coeff Contr.   Expan.
         -6.83    5.54             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -206.16  -50.87               F
    32.2  405.17               F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #100-year
*******************************************************************************
*********
* E.G. US. (ft)          *     931.37  * Element                *Inside BR US
*Inside BR DS *
* W.S. US. (ft)          *     931.29  * E.G. Elev (ft)         *     931.16  *
930.85  *
* Q Total (cfs)          *     262.00  * W.S. Elev (ft)         *     930.60  *
930.43  *
* Q Bridge (cfs)         *     262.00  * Crit W.S. (ft)         *     930.07  *
929.55  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *       3.69  *
 3.70  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       5.54  *
 4.82  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *      47.30  *
54.40  *
* Weir Submerg           *             * Froude # Chl           *       0.55  *
 0.48  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *     113.05  *
120.59  *
* Min El Weir Flow (ft)  *     933.01  * Hydr Depth (ft)        *       2.36  *
 2.70  *
* Min El Prs (ft)        *     931.00  * W.P. Total (ft)        *      23.86  *
24.35  *
* Delta EG (ft)          *       0.67  * Conv. Total (cfs)      *     3455.1  *
4167.5  *
* Delta WS (ft)          *       0.81  * Top Width (ft)         *      20.08  *
20.11  *
* BR Open Area (sq ft)   *      55.40  * Frctn Loss (ft)        *       0.24  *
 0.05  *
```

```
* BR Open Vel (ft/s)     *       5.54  * C & E Loss (ft)        *       0.07  *
 0.10  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.71  *
 0.55  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *    -175.35  *
-206.16  *
*******************************************************************************
*********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 54

INPUT
Description:
Station Elevation Data    num=      26
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -206.16     934 -163.34     933 -139.84     932 -116.86     931  -86.69     930
  -16.62     930  -10.42     929   -6.83   928.6      -2  926.73       0  926.73
       2  926.73    5.54  927.96    5.83     928   13.08     929   20.75     930
   29.02     931   39.12     932   48.66     933   87.65     933   95.42     932
  105.96     931  154.78     931  350.86     931  377.33     931  400.42     932
  405.17  932.21

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -206.16     .04   -6.83    .035    5.54     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -6.83    5.54           123.44  123.44  123.44             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -206.16  -50.87                F
    32.2  405.17                F

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  930.70  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.21  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  930.49  * Reach Len. (ft)        *  123.44  *  123.44  *
 123.44  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   28.77  *   39.76  *
  23.65  *
* E.G. Slope (ft/ft)     *0.002376  * Area (sq ft)           *   49.69  *   39.76  *
  23.65  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   39.15  *  173.98  *
  48.87  *
* Top Width (ft)         *  126.08  * Top Width (ft)         *   94.49  *   12.37  *
  19.22  *
* Vel Total (ft/s)       *    2.84  * Avg. Vel. (ft/s)       *    1.36  *    4.38  *
   2.07  *
* Max Chl Dpth (ft)      *    3.76  * Hydr. Depth (ft)       *    0.65  *    3.21  *
   1.23  *
* Conv. Total (cfs)      *  5375.4  * Conv. (cfs)            *   803.3  *  3569.5  *
 1002.7  *
* Length Wtd. (ft)       *  123.44  * Wetted Per. (ft)       *   44.14  *   12.93  *
```

```
  19.39  *
* Min Ch El (ft)         *  926.73  * Shear (lb/sq ft)       *    0.10  *    0.46  *
   0.18  *
* Alpha                  *    1.71  * Stream Power (lb/ft s) *  405.17  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)   *   20.43  *   10.53  *
  16.58  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *   14.74  *    2.67  *
  13.26  *
*******************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 53

INPUT
Description:
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -81.92     931  -72.37     930  -21.39     929   -8.61   928.1      -2  926.59
       0  926.59       2  926.59   10.02   928.2   14.67     929   20.96     930
  156.27     931   202.8   931.9

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -81.92     .04   -8.61    .035   10.02     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -8.61   10.02             99.2   110.1  126.17             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  930.49  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.08  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  930.40  * Reach Len. (ft)        *   99.20  *  110.10  *
 126.17  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   70.60  *   59.62  *
  25.16  *
* E.G. Slope (ft/ft)     *0.000923  * Area (sq ft)           *   70.60  *   59.62  *
  25.16  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   81.97  *  165.08  *
  14.95  *
* Top Width (ft)         *  151.94  * Top Width (ft)         *   67.62  *   18.63  *
  65.69  *
* Vel Total (ft/s)       *    1.69  * Avg. Vel. (ft/s)       *    1.16  *    2.77  *
   0.59  *
* Max Chl Dpth (ft)      *    3.81  * Hydr. Depth (ft)       *    1.04  *    3.20  *
   0.38  *
* Conv. Total (cfs)      *  8622.1  * Conv. (cfs)            *  2697.4  *  5432.6  *
  492.1  *
* Length Wtd. (ft)       *  110.07  * Wetted Per. (ft)       *   67.69  *   18.96  *
```

```
  65.84  *
* Min Ch El (ft)         *  926.59  * Shear (lb/sq ft)       *    0.06  *    0.18  *
   0.02  *
* Alpha                  *    1.85  * Stream Power (lb/ft s) *  202.80  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *   20.26  *   10.39  *
  16.52  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   14.52  *    2.62  *
  13.14  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 52

INPUT
Description:
Station Elevation Data    num=      20
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -51.32     931  -31.89     930  -16.46     929  -13.94  928.22      -2  926.49
       0  926.49       2  926.49   16.35  928.09   18.18     929   20.51     930
   24.74     931   32.73     932   40.72     933   50.72     933   60.19     932
   70.24     931  130.44     930  422.33     930  446.44     931  468.86   931.9

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -51.32     .04  -13.94    .035   16.35     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -13.94   16.35           181.07  146.99  122.24             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  930.40  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.05  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  930.35  * Reach Len. (ft)        *  181.07  *  146.99  *
 122.24  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   18.64  *   95.06  *
 112.26  *
* E.G. Slope (ft/ft)     *0.000540  * Area (sq ft)           *   18.64  *   95.06  *
 112.26  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   13.28  *  200.05  *
  48.67  *
* Top Width (ft)         *  381.88  * Top Width (ft)         *   24.71  *   30.29  *
 326.87  *
* Vel Total (ft/s)       *    1.16  * Avg. Vel. (ft/s)       *    0.71  *    2.10  *
   0.43  *
* Max Chl Dpth (ft)      *    3.86  * Hydr. Depth (ft)       *    0.75  *    3.14  *
   0.34  *
* Conv. Total (cfs)      * 11275.8  * Conv. (cfs)            *   571.5  *  8609.7  *
 2094.6  *
* Length Wtd. (ft)       *  144.75  * Wetted Per. (ft)       *   24.87  *   30.50  *
 327.34  *
* Min Ch El (ft)         *  926.49  * Shear (lb/sq ft)       *    0.03  *    0.11  *
   0.01  *
```

```
* Alpha                  *    2.56  * Stream Power (lb/ft s) *  468.86  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *   20.16  *   10.19  *
  16.32  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   14.41  *    2.56  *
  12.57  *
*******************************************************************************
***********

Warning: Divided flow computed for this cross-section.
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: Tributary I-2
REACH: 1                  RS: 51

INPUT
Description:
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -211.44     932 -163.11     930 -127.43     929  -57.92     929  -52.54     929
  -17.26   928.4      -2  926.32       0  926.32       2  926.32   17.28  928.25
   22.29     929   57.91     930   62.48     931   67.55     932    89.6     932
  127.58     931  180.38     930  195.96     929  301.17     929  506.36     930
   558.7     931  575.77   931.9

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -211.44     .04  -17.26    .035   17.28     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -17.26   17.28           139.54  139.54  139.54             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  930.37  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  930.36  * Reach Len. (ft)        *  139.54  *  139.54  *
 139.54  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  192.85  *  108.97  *
 379.87  *
* E.G. Slope (ft/ft)     *0.000068  * Area (sq ft)           *  192.85  *  108.97  *
 379.87  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   68.63  *   81.85  *
 111.52  *
* Top Width (ft)         *  595.36  * Top Width (ft)         *  154.58  *   34.54  *
 406.24  *
* Vel Total (ft/s)       *    0.38  * Avg. Vel. (ft/s)       *    0.36  *    0.75  *
   0.29  *
* Max Chl Dpth (ft)      *    4.04  * Hydr. Depth (ft)       *    1.25  *    3.15  *
   0.94  *
* Conv. Total (cfs)      * 31693.4  * Conv. (cfs)            *  8301.5  *  9901.0  *
13490.8  *
* Length Wtd. (ft)       *  139.54  * Wetted Per. (ft)       *  154.61  *   34.80  *
```

```
 406.39  *
* Min Ch El (ft)         *  926.32  * Shear (lb/sq ft)       *    0.01  *    0.01  *
   0.00  *
* Alpha                  *    1.67  * Stream Power (lb/ft s) *  575.77  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *   19.72  *    9.85  *
  15.63  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   14.04  *    2.45  *
  11.54  *
*******************************************************************************
***********

Warning: Divided flow computed for this cross-section.

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 50

INPUT
Description:
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -267.52     932 -199.44     930 -164.77     929  -37.83     929  -23.79   928.2
      -2  926.12       0  926.12       2  926.12   34.83   928.1   39.25     929
    50.8     930   62.23     931   80.47     932  103.52     933  130.05     932
  150.38     931  166.11     930  207.16     929  256.13     929  572.85     930
  667.26     931  762.33     932

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -267.52     .04  -23.79    .035   34.83     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -23.79   34.83             38.2    38.2    38.2             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  930.36  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  930.35  * Reach Len. (ft)        *   38.20  *   38.20  *
  38.20  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  228.36  *  193.07  *
 397.58  *
* E.G. Slope (ft/ft)     *0.000041  * Area (sq ft)           *  228.36  *  193.07  *
 397.58  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   61.67  *  115.56  *
  84.78  *
* Top Width (ft)         *  712.16  * Top Width (ft)         *  187.72  *   58.62  *
 465.82  *
* Vel Total (ft/s)       *    0.32  * Avg. Vel. (ft/s)       *    0.27  *    0.60  *
   0.21  *
* Max Chl Dpth (ft)      *    4.23  * Hydr. Depth (ft)       *    1.22  *    3.29  *
   0.85  *
* Conv. Total (cfs)      * 41065.7  * Conv. (cfs)            *  9665.5  * 18112.3  *
13288.0  *
* Length Wtd. (ft)       *   38.20  * Wetted Per. (ft)       *  187.76  *   58.78  *
```

```
 466.00  *
* Min Ch El (ft)         *  926.12  * Shear (lb/sq ft)       *    0.00  *    0.01  *
   0.00  *
* Alpha                  *    1.86  * Stream Power (lb/ft s) *  762.33  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   19.04  *    9.37  *
  14.38  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   13.49  *    2.30  *
  10.15  *
*******************************************************************************
***********

Warning: Divided flow computed for this cross-section.
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: Tributary I-2
REACH: 1                  RS: 49

INPUT
Description: Upstream Section of B4
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -285.46     931 -216.53     930 -187.86     929  -151.6     929 -143.04     930
 -126.27     930  -24.48     929  -17.36     929   -7.43  928.31      -2  926.12
       0  926.12       2  926.12     6.4  927.73    9.03     928   10.56     929
   45.41     930   53.81     931   69.67     932  109.03     933  143.88     932
  154.81     931  165.74     930  576.13     930  673.92     931  772.02     932

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -285.46     .04   -7.43    .035     6.4     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -7.43     6.4            15.76   15.76   15.76             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -285.46 -143.04               F

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  930.35  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.03  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  930.32  * Reach Len. (ft)        *    2.24  *    2.24  *
   2.24  *
* Crit W.S. (ft)         *  929.43  * Flow Area (sq ft)      *  115.18  *   48.64  *
 176.63  *
* E.G. Slope (ft/ft)     *0.000465  * Area (sq ft)           *  197.39  *   48.64  *
 176.63  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   82.73  *   99.60  *
  79.67  *
* Top Width (ft)         *  732.44  * Top Width (ft)         *  231.37  *   13.83  *
 487.24  *
* Vel Total (ft/s)       *    0.77  * Avg. Vel. (ft/s)       *    0.72  *    2.05  *
```

```
   0.45  *
* Max Chl Dpth (ft)      *    4.20  * Hydr. Depth (ft)       *    0.85  *    3.52  *
   0.36  *
* Conv. Total (cfs)      * 12150.8  * Conv. (cfs)            *  3836.9  *  4618.9  *
 3694.9  *
* Length Wtd. (ft)       *    2.24  * Wetted Per. (ft)       *  135.64  *   14.54  *
 487.60  *
* Min Ch El (ft)         *  926.12  * Shear (lb/sq ft)       *    0.02  *    0.10  *
   0.01  *
* Alpha                  *    3.07  * Stream Power (lb/ft s) *  772.02  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.00  * Cum Volume (acre-ft)   *   18.86  *    9.26  *
  14.13  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   13.31  *    2.27  *
   9.73  *
*******************************************************************************
***********

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

BRIDGE


RIVER: Tributary I-2
REACH: 1                  RS: 48.5

INPUT
Description:
Distance from Upstream XS =    2.24
Deck/Roadway Width        =   11.94
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
    -120  929.85     900   -12.5  930.43  928.43       0  930.37  928.27
    12.5  930.35  928.19     100   930.2     900

Upstream Bridge Cross Section Data
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -285.46     931 -216.53     930 -187.86     929  -151.6     929 -143.04     930
 -126.27     930  -24.48     929  -17.36     929   -7.43  928.31      -2  926.12
       0  926.12       2  926.12     6.4  927.73    9.03     928   10.56     929
   45.41     930   53.81     931   69.67     932  109.03     933  143.88     932
  154.81     931  165.74     930  576.13     930  673.92     931  772.02     932

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -285.46     .04   -7.43    .035     6.4     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -7.43     6.4             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -285.46 -143.04               F
```

```
Downstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
    -300  929.85     900   -12.5  930.43  928.43       0  930.37  928.27
    12.5  930.35  928.19     100   930.2     900

Downstream Bridge Cross Section Data
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
***********************************************************************************
 -262.83     930 -242.23     929 -194.57     928   -49.8     928  -14.74     927
  -13.96     926  -13.77   925.7      -2   925.7       0   925.7       2   925.7
   12.39     926   16.12     927   22.35     928   27.49     929   33.65     930
   73.18     931   79.68     932

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -262.83     .04  -13.96    .035   12.39     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
        -13.96   12.39             .3       .5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #100-year
*********************************************************************************
*********
* E.G. US. (ft)          *     930.35  * Element                *Inside BR US
*Inside BR DS *
* W.S. US. (ft)          *     930.32  * E.G. Elev (ft)         *     930.33  *
929.86  *
* Q Total (cfs)          *     262.00  * W.S. Elev (ft)         *     930.24  *
929.66  *
* Q Bridge (cfs)         *      79.04  * Crit W.S. (ft)         *     930.24  *
927.21  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *       4.12  *
 3.96  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       1.86  *
```

```
 3.36  *
* Weir Sta Rgt (ft)      *            * Flow Area (sq ft)      *     140.90  *
78.06  *
* Weir Submerg           *            * Froude # Chl           *       0.21  *
 0.32  *
* Weir Max Depth (ft)    *            * Specif Force (cu ft)   *      92.31  *
231.16  *
* Min El Weir Flow (ft)  *     929.94  * Hydr Depth (ft)        *       0.27  *
       *
* Min El Prs (ft)        *     928.38  * W.P. Total (ft)        *     567.15  *
81.83  *
* Delta EG (ft)          *       0.59  * Conv. Total (cfs)      *     2352.9  *
3541.5  *
* Delta WS (ft)          *       0.56  * Top Width (ft)         *     620.65  *
       *
* BR Open Area (sq ft)   *      21.47  * Frctn Loss (ft)        *       0.09  *
 0.00  *
* BR Open Vel (ft/s)     *       3.68  * C & E Loss (ft)        *       0.03  *
 0.10  *
* Coef of Q              *            * Shear Total (lb/sq ft) *       0.19  *
 0.33  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *    -285.46  *
-262.83  *
*******************************************************************************
*********

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.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.
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: Tributary I-2
REACH: 1                  RS: 48

INPUT
Description: Upstream Section of W2/Downstream Section of B4
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -262.83     930 -242.23     929 -194.57     928   -49.8     928  -14.74     927
  -13.96     926  -13.77   925.7      -2   925.7       0   925.7       2   925.7
   12.39     926   16.12     927   22.35     928   27.49     929   33.65     930
   73.18     931   79.68     932

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -262.83     .04  -13.96    .035   12.39     .04
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -13.96   12.39             41.86   41.86   41.86             .3       .5

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  929.76  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.01  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  929.76  * Reach Len. (ft)        *   41.86  *   41.86  *
  41.86  *
* Crit W.S. (ft)         *  927.23  * Flow Area (sq ft)      *  402.25  *  105.36  *
  34.47  *
* E.G. Slope (ft/ft)     *0.000060  * Area (sq ft)           *  402.25  *  105.36  *
  34.47  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *  161.07  *   86.77  *
  14.17  *
* Top Width (ft)         *  290.02  * Top Width (ft)         *  243.90  *   26.35  *
  19.77  *
* Vel Total (ft/s)       *    0.48  * Avg. Vel. (ft/s)       *    0.40  *    0.82  *
   0.41  *
* Max Chl Dpth (ft)      *    4.06  * Hydr. Depth (ft)       *    1.65  *    4.00  *
   1.74  *
* Conv. Total (cfs)      * 33880.6  * Conv. (cfs)            * 20828.5  * 11220.2  *
 1831.9  *
* Length Wtd. (ft)       *   41.86  * Wetted Per. (ft)       *  244.43  *   26.52  *
  20.14  *
* Min Ch El (ft)         *  925.70  * Shear (lb/sq ft)       *    0.01  *    0.01  *
   0.01  *
* Alpha                  *    1.42  * Stream Power (lb/ft s) *   79.68  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   18.83  *    9.24  *
  14.11  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   13.26  *    2.27  *
   9.65  *
*******************************************************************************
***********

INLINE STRUCTURE


RIVER: Tributary I-2
REACH: 1                  RS: 47

INPUT
Description:
Distance from Upstream XS =   39.86
Deck/Roadway Width        =       2
Weir Coefficient          =     2.6
 Weir Embankment Coordinates    num =       10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    -800  929.32   -4.85  929.32   -4.85  928.16    4.85  928.16    4.85  929.36
   12.47  929.36   12.47  929.36   19.12  929.36   19.12  929.25     800  929.25

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Weir crest shape                            = Broad Crested
```

```
INLINE STRUCTURE OUTPUT  Profile #100-year  Inl Struct:
*******************************************************************************
* E.G. Elev (ft)             *  929.76  * Q Gates (cfs)              *         *
* W.S. Elev (ft)             *  929.76  * Q Gate Group (cfs)         *    0.00 *
* Q Total (cfs)              *  262.00  * Gate Open Ht (ft)          *  928.58 *
* Q Weir (cfs)               *  262.00  * Gate #Open                 *         *
* Weir Flow Area (sq ft)     *  137.54  * Gate Area (sq ft)          *    1.00 *
* Weir Sta Lft (ft)          * -257.97  * Gate Submerg               *    0.00 *
* Weir Sta Rgt (ft)          *   32.20  * Gate Invert (ft)           *    0.00 *
* Weir Max Depth (ft)        *    1.60  * Gate Weir Coef             *   0.000 *
* Weir Avg Depth (ft)        *    0.47  *                            *         *
* Weir Coef (ft^1/2)         *   2.600  * Q Breach (cfs)             *         *
* Weir Submerg               *    0.05  * Breach Avg Velocity (ft/s) *         *
* Min El Weir Flow (ft)      *  928.17  * Breach Flow Area (sq ft)   *         *
* Wr Top Wdth (ft)           *  290.16  *                            *         *
*******************************************************************************

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 46

INPUT
Description: Downstream Section of W2
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -286.47     930 -202.12     928 -124.99     927  -14.74     927  -13.96     926
  -13.77   925.7      -2  923.76       0  923.76       2  923.76   12.39     926
   16.12     927   22.35     928   27.49     929   33.65     930   73.18     931
   79.68     932

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -286.47     .04  -13.96    .035   12.39     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -13.96   12.39           174.66  174.66  174.66             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  928.59  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.01  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  928.58  * Reach Len. (ft)        *  174.66  *  174.66  *
 174.66  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  265.51  *  103.47  *
  15.31  *
* E.G. Slope (ft/ft)     *0.000132  * Area (sq ft)           *  265.51  *  103.47  *
  15.31  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *  131.09  *  123.70  *
   7.21  *
* Top Width (ft)         *  251.76  * Top Width (ft)         *  212.48  *   26.35  *
  12.92  *
* Vel Total (ft/s)       *    0.68  * Avg. Vel. (ft/s)       *    0.49  *    1.20  *
   0.47  *
* Max Chl Dpth (ft)      *    4.82  * Hydr. Depth (ft)       *    1.25  *    3.93  *
   1.18  *
```

```
* Conv. Total (cfs)      * 22833.5  * Conv. (cfs)            * 11424.9  * 10780.6  *
  628.0  *
* Length Wtd. (ft)       *  174.66  * Wetted Per. (ft)       *  212.98  *   26.91  *
  13.19  *
* Min Ch El (ft)         *  923.76  * Shear (lb/sq ft)       *    0.01  *    0.03  *
   0.01  *
* Alpha                  *    1.73  * Stream Power (lb/ft s) *   79.68  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *   18.83  *    8.93  *
  14.11  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   13.05  *    2.25  *
   9.63  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 45

INPUT
Description: Upstream Section of B3
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -401.82     930 -373.56     929 -338.33     928 -305.44     927 -260.24     926
 -115.54     926  -75.36     927   -36.6     927  -18.22     926  -17.31  925.65
      -2  924.79       0  924.79       2  924.79   15.98  925.65   17.89     926
   22.16     927  200.45     928  208.08     929  214.91     930  222.99     931
  235.77     932

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -401.82     .04  -18.22    .035   17.89     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -18.22   17.89            49.93   49.93   49.93             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -401.82  -75.36               F

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  928.57  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.01  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  928.56  * Reach Len. (ft)        *   26.06  *   26.06  *
  26.06  *
* Crit W.S. (ft)         *  926.43  * Flow Area (sq ft)      *   98.17  *  120.52  *
 198.46  *
* E.G. Slope (ft/ft)     *0.000116  * Area (sq ft)           *  684.08  *  120.52  *
 198.46  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   56.39  *  122.89  *
  82.72  *
* Top Width (ft)         *  562.66  * Top Width (ft)         *  339.74  *   36.11  *
 186.81  *
* Vel Total (ft/s)       *    0.63  * Avg. Vel. (ft/s)       *    0.57  *    1.02  *
   0.42  *
* Max Chl Dpth (ft)      *    3.77  * Hydr. Depth (ft)       *    1.72  *    3.34  *
```

```
   1.06  *
* Conv. Total (cfs)      * 24296.8  * Conv. (cfs)            *  5229.4  * 11396.2  *
 7671.2  *
* Length Wtd. (ft)       *   26.06  * Wetted Per. (ft)       *   57.17  *   36.26  *
 186.97  *
* Min Ch El (ft)         *  924.79  * Shear (lb/sq ft)       *    0.01  *    0.02  *
   0.01  *
* Alpha                  *    1.56  * Stream Power (lb/ft s) *  235.77  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *   16.92  *    8.48  *
  13.68  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   11.94  *    2.12  *
   9.23  *
*******************************************************************************
***********

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.

BRIDGE


RIVER: Tributary I-2
REACH: 1                  RS: 44.5

INPUT
Description:
Distance from Upstream XS =   26.06
Deck/Roadway Width        =   10.08
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
    -600   927.8     900  -19.78  928.11  926.35       0  928.18  926.23
   19.78   928.1  926.36     150   927.5     900

Upstream Bridge Cross Section Data
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -401.82     930 -373.56     929 -338.33     928 -305.44     927 -260.24     926
 -115.54     926  -75.36     927   -36.6     927  -18.22     926  -17.31  925.65
      -2  924.79       0  924.79       2  924.79   15.98  925.65   17.89     926
   22.16     927  200.45     928  208.08     929  214.91     930  222.99     931
  235.77     932

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -401.82     .04  -18.22    .035   17.89     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
        -18.22   17.89             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -401.82  -75.36               F

Downstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
```

```
    -600   927.8     900  -19.78  928.11  926.35       0  928.18  926.23
   19.78   928.1  926.36     150   927.5     900

Downstream Bridge Cross Section Data
Station Elevation Data    num=      23
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 -421.99     930 -391.37     929 -351.33     928 -318.69     927 -277.82     926
 -120.15     926  -77.41     927   -18.2     927  -17.28     926  -16.96  925.55
      -2  924.79       0  924.79       2  924.79   16.09  925.77   19.42     926
    26.8     927   77.31     927   90.95     927   98.41     928  106.21     929
  115.38     930  124.56     931  126.55  931.22

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -421.99     .04  -16.96    .035   16.09     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
        -16.96   16.09             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -421.99  -77.41               F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #100-year
*******************************************************************************
*********
* E.G. US. (ft)          *     928.57  * Element                *Inside BR US
*Inside BR DS *
* W.S. US. (ft)          *     928.56  * E.G. Elev (ft)         *     928.55  *
928.45  *
* Q Total (cfs)          *     262.00  * W.S. Elev (ft)         *     928.53  *
928.26  *
* Q Bridge (cfs)         *      50.49  * Crit W.S. (ft)         *     928.08  *
928.26  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *       3.74  *
 3.47  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       1.27  *
 3.30  *
```

```
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *     206.30  *
79.46  *
* Weir Submerg           *             * Froude # Chl           *       0.12  *
 0.33  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *     175.86  *
132.63  *
* Min El Weir Flow (ft)  *     927.76  * Hydr Depth (ft)        *       0.74  *
 0.45  *
* Min El Prs (ft)        *     926.36  * W.P. Total (ft)        *     363.78  *
254.92  *
* Delta EG (ft)          *       0.78  * Conv. Total (cfs)      *     5594.8  *
1554.6  *
* Delta WS (ft)          *       0.82  * Top Width (ft)         *     561.41  *
462.09  *
* BR Open Area (sq ft)   *      38.76  * Frctn Loss (ft)        *       0.05  *
 0.03  *
* BR Open Vel (ft/s)     *       1.30  * C & E Loss (ft)        *       0.05  *
 0.07  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.08  *
 0.55  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *    -401.82  *
-421.99  *
*******************************************************************************
*********

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance)
is less than 0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.
Warning: The energy equation could not be balanced within the specified number of
iterations.  The program used critical depth
         for the water surface and continued on with the calculations.
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.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 44

INPUT
Description: Downstream Section of B3
Station Elevation Data    num=      23
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -421.99     930 -391.37     929 -351.33     928 -318.69     927 -277.82     926
 -120.15     926  -77.41     927   -18.2     927  -17.28     926  -16.96  925.55
      -2  924.79       0  924.79       2  924.79   16.09  925.77   19.42     926
    26.8     927   77.31     927   90.95     927   98.41     928  106.21     929
  115.38     930  124.56     931  126.55  931.22

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

```
**********************************************
 -421.99     .04  -16.96    .035   16.09     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -16.96   16.09           151.44  151.44  151.44             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -421.99  -77.41               F

CROSS SECTION OUTPUT  Profile #100-year
*********************************************************************************
***********
* E.G. Elev (ft)         *  927.79  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.05  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  927.74  * Reach Len. (ft)        *  151.44  *  151.44  *
 151.44  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   45.57  *   84.90  *
  64.83  *
* E.G. Slope (ft/ft)     *0.000656  * Area (sq ft)           *  432.48  *   84.90  *
  64.83  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   35.65  *  172.97  *
  53.38  *
* Top Width (ft)         *  439.31  * Top Width (ft)         *  325.88  *   33.05  *
  80.38  *
* Vel Total (ft/s)       *    1.34  * Avg. Vel. (ft/s)       *    0.78  *    2.04  *
   0.82  *
* Max Chl Dpth (ft)      *    2.95  * Hydr. Depth (ft)       *    0.75  *    2.57  *
   0.81  *
* Conv. Total (cfs)      * 10230.2  * Conv. (cfs)            *  1392.1  *  6753.8  *
 2084.4  *
* Length Wtd. (ft)       *  151.44  * Wetted Per. (ft)       *   61.12  *   33.10  *
  80.50  *
* Min Ch El (ft)         *  924.79  * Shear (lb/sq ft)       *    0.03  *    0.11  *
   0.03  *
* Alpha                  *    1.65  * Stream Power (lb/ft s) *  126.55  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *   16.56  *    8.40  *
  13.55  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   11.55  *    2.08  *
   9.06  *
*********************************************************************************
***********

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.

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 43

INPUT
Description: Upstream Section of W1
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 -530.27     930 -488.74     929 -439.49     928 -393.25     927 -320.46     926
 -197.69     925 -100.37     925  -71.09     926  -14.03     926     -12 924.525
   -10.7  923.58      -2  923.58       0  923.58       2  923.58   14.47  924.82
```

```
   18.92     926  260.44     926  467.67     927  636.76     928  647.08     929
  658.22     930  670.01     931

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -530.27     .04     -12    .035   14.47     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           -12   14.47            23.85   23.85   23.85             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -530.27  -71.09               F
    29.4  670.01               F

CROSS SECTION OUTPUT  Profile #100-year
*****************************************************************************************
***********
* E.G. Elev (ft)         *  927.72  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.03  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  927.69  * Reach Len. (ft)        *   23.85  *   23.85  *
  23.85  *
* Crit W.S. (ft)         *  925.36  * Flow Area (sq ft)      *  101.62  *  100.56  *
  27.92  *
* E.G. Slope (ft/ft)     *0.000231  * Area (sq ft)           *  795.58  *  100.56  *
 707.68  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   81.84  *  156.41  *
  23.75  *
* Top Width (ft)         * 1010.44  * Top Width (ft)         *  413.36  *   26.47  *
 570.62  *
* Vel Total (ft/s)       *    1.14  * Avg. Vel. (ft/s)       *    0.81  *    1.56  *
   0.85  *
* Max Chl Dpth (ft)      *    4.11  * Hydr. Depth (ft)       *    1.72  *    3.80  *
   1.87  *
* Conv. Total (cfs)      * 17252.7  * Conv. (cfs)            *  5389.5  * 10299.4  *
 1563.8  *
* Length Wtd. (ft)       *   23.85  * Wetted Per. (ft)       *   59.57  *   26.84  *
  15.08  *
* Min Ch El (ft)         *  923.58  * Shear (lb/sq ft)       *    0.02  *    0.05  *
   0.03  *
* Alpha                  *    1.32  * Stream Power (lb/ft s) *  670.01  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   14.43  *    8.07  *
  12.20  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   10.27  *    1.98  *
   7.93  *
*****************************************************************************************
***********

INLINE STRUCTURE


RIVER: Tributary I-2
REACH: 1                  RS: 42

INPUT
Description:
Distance from Upstream XS =       1
Deck/Roadway Width        =       2
Weir Coefficient          =     2.6
 Weir Embankment Coordinates    num =        8
```

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
    -600     927    -7.6     927    -7.6  925.58       0  925.58       0  925.58
     7.6  925.58     7.6  926.97     600  926.97

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Weir crest shape                            = Broad Crested


INLINE STRUCTURE OUTPUT  Profile #100-year  Inl Struct:
*****************************************************************************
* E.G. Elev (ft)             *  927.72  * Q Gates (cfs)              *         *
* W.S. Elev (ft)             *  927.69  * Q Gate Group (cfs)         *    0.00 *
* Q Total (cfs)              *  262.00  * Gate Open Ht (ft)          *  926.85 *
* Q Weir (cfs)               *  262.00  * Gate #Open                 *         *
* Weir Flow Area (sq ft)     *   94.69  * Gate Area (sq ft)          *    1.00 *
* Weir Sta Lft (ft)          *  -71.09  * Gate Submerg               *    0.00 *
* Weir Sta Rgt (ft)          *   29.40  * Gate Invert (ft)           *    0.00 *
* Weir Max Depth (ft)        *    2.14  * Gate Weir Coef             *   0.000 *
* Weir Avg Depth (ft)        *    0.94  *                            *         *
* Weir Coef (ft^1/2)         *   2.600  * Q Breach (cfs)             *         *
* Weir Submerg               *    0.28  * Breach Avg Velocity (ft/s) *         *
* Min El Weir Flow (ft)      *  925.59  * Breach Flow Area (sq ft)   *         *
* Wr Top Wdth (ft)           *  100.49  *                            *         *
*****************************************************************************

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 41

INPUT
Description:
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 -530.27     930 -488.74     929 -439.49     928 -393.25     927 -320.46     926
 -197.69     925 -100.37     925  -71.09     926  -14.03     926   -10.7   925.3
      -2  923.58       0  923.58       2  923.58   14.47  924.82   18.92     926
  260.44     926  467.67     927  636.76     928  647.08     929  658.22     930
  670.01     931

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -530.27     .04   -10.7    .035   14.47     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -10.7   14.47             71.74   71.74   71.74             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -530.27  -29.51               F
   23.96  670.01               F

CROSS SECTION OUTPUT  Profile #100-year
*****************************************************************************
***********
* E.G. Elev (ft)         *  927.00  * Element                *  Left OB *  Channel *
Right OB *
```

```
* Vel Head (ft)          *    0.15  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  926.85  * Reach Len. (ft)        *    8.93  *    8.93  *
   8.93  *
* Crit W.S. (ft)         *  925.70  * Flow Area (sq ft)      *   17.21  *   67.17  *
  10.72  *
* E.G. Slope (ft/ft)     *0.001634  * Area (sq ft)           *  465.20  *   67.17  *
 287.81  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   24.29  *  220.43  *
  17.27  *
* Top Width (ft)         *  819.75  * Top Width (ft)         *  371.85  *   25.17  *
 422.73  *
* Vel Total (ft/s)       *    2.76  * Avg. Vel. (ft/s)       *    1.41  *    3.28  *
   1.61  *
* Max Chl Dpth (ft)      *    3.27  * Hydr. Depth (ft)       *    0.91  *    2.67  *
   1.13  *
* Conv. Total (cfs)      *  6481.3  * Conv. (cfs)            *   601.0  *  5453.0  *
  427.3  *
* Length Wtd. (ft)       *    8.93  * Wetted Per. (ft)       *   18.88  *   25.40  *
   9.64  *
* Min Ch El (ft)         *  923.58  * Shear (lb/sq ft)       *    0.09  *    0.27  *
   0.11  *
* Alpha                  *    1.24  * Stream Power (lb/ft s) *  670.01  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   14.43  *    7.64  *
  12.20  *
* C & E Loss (ft)        *          * Cum SA (acres)         *   10.05  *    1.96  *
   7.66  *
*******************************************************************************
***********

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.

BRIDGE


RIVER: Tributary I-2
REACH: 1                  RS: 40.5

INPUT
Description:
Distance from Upstream XS =    8.93
Deck/Roadway Width        =   54.55
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
   -1000     929             -10     929     927      10     929     927
    1000     929

Upstream Bridge Cross Section Data
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************
 -530.27     930 -488.74     929 -439.49     928 -393.25     927 -320.46     926
 -197.69     925 -100.37     925  -71.09     926  -14.03     926   -10.7   925.3
      -2  923.58       0  923.58       2  923.58   14.47  924.82   18.92     926
  260.44     926  467.67     927  636.76     928  647.08     929  658.22     930
  670.01     931
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 -530.27     .04   -10.7    .035   14.47     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -10.7   14.47             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -530.27  -29.51               F
   23.96  670.01               F

Downstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
   -1000     929             -10     929     927      10     929     927
    1000     929

Downstream Bridge Cross Section Data
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -679.1     934 -669.98     933 -660.89     932 -652.14     931 -643.38     930
 -616.44     929 -555.22     928    -478     928 -452.88     929 -434.85     929
 -413.52     928 -397.61     927 -383.84     927 -374.38     928 -364.92     929
 -345.43     929 -313.49     928 -254.35     927 -234.55     926 -228.25     925
 -124.45     925  -37.97     926  -25.68     926  -19.47     925  -13.26  924.04
   -5.62  924.04      -2  924.04       0  924.04       2  924.04    4.17  924.04
    5.81  924.04   13.23     925   16.87     926   35.52     926   65.49     925
   105.3     925  137.31     924  235.64     924   300.2     925  308.43     926
  358.32     927  365.77     928  389.06     928  398.77     927  408.29     926
  436.81     926   725.7     927  735.06     928  744.16     929  750.43     930

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
  -679.1     .04   -5.62    .035    4.17     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -5.62    4.17             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  -679.1  -37.97     926       F
   35.52  750.43     926       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only
```

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

BRIDGE OUTPUT  Profile #100-year
*******************************************************************************
*********
* E.G. US. (ft)          *     927.00  * Element                *Inside BR US
*Inside BR DS *
* W.S. US. (ft)          *     926.85  * E.G. Elev (ft)         *     927.03  *
926.66  *
* Q Total (cfs)          *     262.00  * W.S. Elev (ft)         *     926.67  *
925.77  *
* Q Bridge (cfs)         *     262.00  * Crit W.S. (ft)         *     925.76  *
925.77  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *       3.09  *
 1.73  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.78  *
 7.21  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *      54.76  *
36.33  *
* Weir Submerg           *             * Froude # Chl           *       0.48  *
 1.02  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *     112.36  *
91.31  *
* Min El Weir Flow (ft)  *     929.01  * Hydr Depth (ft)        *       2.69  *
 1.71  *
* Min El Prs (ft)        *     927.00  * W.P. Total (ft)        *      26.30  *
25.84  *
* Delta EG (ft)          *       0.84  * Conv. Total (cfs)      *     3837.0  *
1853.6  *
* Delta WS (ft)          *       1.28  * Top Width (ft)         *      20.34  *
21.26  *
* BR Open Area (sq ft)   *      61.36  * Frctn Loss (ft)        *             *
       *
* BR Open Vel (ft/s)     *       7.21  * C & E Loss (ft)        *             *
       *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.61  *
 1.75  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *    -530.27  *
-679.10  *
*******************************************************************************
*********

Warning: The flow regime calculated by the momentum equation shows class B flow.
For the best solution, this profile should be
         run as a mixed flow problem.
Warning: For the final momentum answer at the bridge, the upstream energy was
computed lower than the energy inside of the
         bridge deck.  This is not physically possible.  Please review your bridge
data and results for reasonableness.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may
indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance)
is less than 0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy equation could not be balanced within the specified number of
iterations.  The program used critical depth
         for the water surface and continued on with the calculations.
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Tributary I-2
REACH: 1 RS: 40

INPUT
Description: Downstream Section of B2
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-679.1	934	-669.98	933	-660.89	932	-652.14	931	-643.38	930
-616.44	929	-555.22	928	-478	928	-452.88	929	-434.85	929
-413.52	928	-397.61	927	-383.84	927	-374.38	928	-364.92	929
-345.43	929	-313.49	928	-254.35	927	-234.55	926	-228.25	925
-124.45	925	-37.97	926	-25.68	926	-19.47	925	-13.26	924.04
-5.62	924.04	-2	924.04	0	924.04	2	924.04	4.17	924.04
5.81	924.04	13.23	925	16.87	926	35.52	926	65.49	925
105.3	925	137.31	924	235.64	924	300.2	925	308.43	926
358.32	927	365.77	928	389.06	928	398.77	927	408.29	926
436.81	926	725.7	927	735.06	928	744.16	929	750.43	930

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-679.1	.04	-5.62	.035	4.17	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-5.62	4.17	124.17	124.17	124.17	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-679.1	-37.97	926	F
35.52	750.43	926	F

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	926.16	Element	Left OB	Channel / Right OB
Vel Head (ft)	0.59	Wt. n-Val.	0.040	0.035 / 0.040
W.S. Elev (ft)	925.57	Reach Len. (ft)	124.17	124.17 / 124.17
Crit W.S. (ft)	925.57	Flow Area (sq ft)	19.20	14.97 / 10.88
E.G. Slope (ft/ft)	0.017206	Area (sq ft)	93.31	14.97 / 297.27
Q Total (cfs)	262.00	Flow (cfs)	99.54	110.66 / 51.80
Top Width (ft)	451.36	Top Width (ft)	173.99	9.79 / 267.58
Vel Total (ft/s)	5.81	Avg. Vel. (ft/s)	5.18	7.39 / 4.76
Max Chl Dpth (ft)	1.57	Hydr. Depth (ft)	1.10	1.53 / 0.98
Conv. Total (cfs)	1997.4	Conv. (cfs)	758.9	843.6 /

```
  394.9  *
* Length Wtd. (ft)       *  124.17  * Wetted Per. (ft)       *   17.50  *    9.79  *
  11.27  *
* Min Ch El (ft)         *  924.04  * Shear (lb/sq ft)       *    1.18  *    1.64  *
   1.04  *
* Alpha                  *    1.12  * Stream Power (lb/ft s) *  750.43  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    1.42  * Cum Volume (acre-ft)   *   14.36  *    7.58  *
  12.14  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *    9.99  *    1.94  *
   7.58  *
*******************************************************************************
***********

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: Divided flow computed for this cross-section.
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.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 39

INPUT
Description:
Station Elevation Data    num=      26
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -163.99     925  -43.59     924  -17.31     923   -6.03  922.55   -5.49  922.13
   -4.84     922      -2  921.77       0  921.77       2  921.77    5.48     922
     6.8  922.34    8.69  922.96    9.29     923   23.21     924   28.75     924
   52.17     923   65.44  922.43      67     920     197     920  198.59   922.3
  207.53     923  216.57     924   231.8     925  246.34     926  310.63     927
  317.74  927.06

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -163.99     .04   -4.84    .035    5.48     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -4.84    5.48            71.29   71.29   71.29             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
   28.75  317.74               F

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
```

```
***********
* E.G. Elev (ft)         *  924.46  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.41  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  924.05  * Reach Len. (ft)        *   71.29  *   71.29  *
  71.29  *
* Crit W.S. (ft)         *  923.96  * Flow Area (sq ft)      *   31.13  *   22.79  *
  13.67  *
* E.G. Slope (ft/ft)     *0.008159  * Area (sq ft)           *   31.13  *   22.79  *
 597.01  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   81.99  *  148.01  *
  32.00  *
* Top Width (ft)         *  266.73  * Top Width (ft)         *   44.58  *   10.32  *
 211.83  *
* Vel Total (ft/s)       *    3.88  * Avg. Vel. (ft/s)       *    2.63  *    6.50  *
   2.34  *
* Max Chl Dpth (ft)      *    4.05  * Hydr. Depth (ft)       *    0.70  *    2.21  *
   0.59  *
* Conv. Total (cfs)      *  2900.5  * Conv. (cfs)            *   907.7  *  1638.6  *
  354.2  *
* Length Wtd. (ft)       *   71.29  * Wetted Per. (ft)       *   44.77  *   10.34  *
  23.45  *
* Min Ch El (ft)         *  921.77  * Shear (lb/sq ft)       *    0.35  *    1.12  *
   0.30  *
* Alpha                  *    1.78  * Stream Power (lb/ft s) *  317.74  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   *   14.18  *    7.53  *
  10.86  *
* C & E Loss (ft)        *    0.08  * Cum SA (acres)         *    9.68  *    1.91  *
   6.90  *
*******************************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 38

INPUT
Description:
Station Elevation Data    num=      26
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -354.53     927 -336.01     926 -321.42     925 -297.49     924 -240.38     924
 -232.02     923 -231.38  922.36    -230     920     -51     920   -49.9   922.3
  -43.52     923  -17.24     923  -10.67  922.26      -2  921.16       0  921.16
       2  921.16     6.5   922.3   12.19     923    33.6     923   49.93  922.22
      51     920     175     920  176.97  922.32  179.63     923  203.21     924
  222.93     925

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -354.53     .04  -10.67    .035     6.5     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -10.67     6.5            121.3   121.3   121.3             .1       .3
```

```
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -354.53  -43.52               F
    33.6  222.93               F

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  924.10  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.14  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  923.96  * Reach Len. (ft)        *  121.30  *  121.30  *
 121.30  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   33.99  *   40.75  *
  28.03  *
* E.G. Slope (ft/ft)     *0.002347  * Area (sq ft)           *  762.92  *   40.75  *
 564.12  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   62.53  *  147.95  *
  51.53  *
* Top Width (ft)         *  442.33  * Top Width (ft)         *  229.38  *   17.17  *
 195.78  *
* Vel Total (ft/s)       *    2.55  * Avg. Vel. (ft/s)       *    1.84  *    3.63  *
   1.84  *
* Max Chl Dpth (ft)      *    3.96  * Hydr. Depth (ft)       *    1.03  *    2.37  *
   1.03  *
* Conv. Total (cfs)      *  5407.9  * Conv. (cfs)            *  1290.6  *  3053.7  *
 1063.6  *
* Length Wtd. (ft)       *  121.30  * Wetted Per. (ft)       *   32.89  *   17.38  *
  27.14  *
* Min Ch El (ft)         *  921.16  * Shear (lb/sq ft)       *    0.15  *    0.34  *
   0.15  *
* Alpha                  *    1.37  * Stream Power (lb/ft s) *  222.93  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *   13.54  *    7.48  *
   9.91  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    9.46  *    1.89  *
   6.57  *
*******************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 37

INPUT
Description: Upstream Section of W5
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -147.36     925  -89.31     924     -14     923  -11.71     922   -8.78     921
   -5.84  920.12   -3.34  920.12      -2  920.12       0  920.12       2  920.12
    9.28  920.12   12.93     921   15.53     922   18.13     923   29.93     923
  295.14     924  489.99     924  548.74     925

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

```
**********************************************
 -147.36     .04   -8.78    .035   12.93     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -8.78   12.93            17.95   17.95   17.95             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  923.96  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.05  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  923.91  * Reach Len. (ft)        *   17.95  *   17.95  *
  17.95  *
* Crit W.S. (ft)         *  921.92  * Flow Area (sq ft)      *   41.82  *   79.48  *
 131.71  *
* E.G. Slope (ft/ft)     *0.000467  * Area (sq ft)           *   41.82  *   79.48  *
 131.71  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   22.85  *  171.97  *
  67.18  *
* Top Width (ft)         *  355.42  * Top Width (ft)         *   74.11  *   21.71  *
 259.60  *
* Vel Total (ft/s)       *    1.04  * Avg. Vel. (ft/s)       *    0.55  *    2.16  *
   0.51  *
* Max Chl Dpth (ft)      *    3.79  * Hydr. Depth (ft)       *    0.56  *    3.66  *
   0.51  *
* Conv. Total (cfs)      * 12125.7  * Conv. (cfs)            *  1057.3  *  7959.0  *
 3109.3  *
* Length Wtd. (ft)       *   17.95  * Wetted Per. (ft)       *   74.49  *   21.94  *
 259.97  *
* Min Ch El (ft)         *  920.12  * Shear (lb/sq ft)       *    0.02  *    0.11  *
   0.01  *
* Alpha                  *    2.95  * Stream Power (lb/ft s) *  548.74  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *   12.41  *    7.31  *
   8.95  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    9.03  *    1.83  *
   5.93  *
*******************************************************************************
***********

INLINE STRUCTURE


RIVER: Tributary I-2
REACH: 1                  RS: 36

INPUT
Description:
Distance from Upstream XS =      15
Deck/Roadway Width        =       2
Weir Coefficient          =     2.6
 Weir Embankment Coordinates    num =        6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
     -30  923.16   -9.14  923.16   -9.14  922.32    9.14  922.32    9.14  923.22
     100  923.22

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
```

Weir crest shape = Broad Crested

INLINE STRUCTURE OUTPUT Profile #100-year Inl Struct:

E.G. Elev (ft)	923.96	Q Gates (cfs)	
W.S. Elev (ft)	923.91	Q Gate Group (cfs)	0.00
Q Total (cfs)	262.00	Gate Open Ht (ft)	923.90
Q Weir (cfs)	262.00	Gate #Open	
Weir Flow Area (sq ft)	200.22	Gate Area (sq ft)	1.00
Weir Sta Lft (ft)	-86.59	Gate Submerg	0.00
Weir Sta Rgt (ft)	285.56	Gate Invert (ft)	0.00
Weir Max Depth (ft)	1.64	Gate Weir Coef	0.000
Weir Avg Depth (ft)	0.54		
Weir Coef (ft^1/2)	2.600	Q Breach (cfs)	
Weir Submerg	0.95	Breach Avg Velocity (ft/s)	
Min El Weir Flow (ft)	922.33	Breach Flow Area (sq ft)	
Wr Top Wdth (ft)	372.15		

CROSS SECTION

RIVER: Tributary I-2
REACH: 1 RS: 35

INPUT
Description: Upstream Section of B1/Downstream Section of W5
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-147.36	925	-89.31	924	-14	923	-11.71	922	-8.78	921
-5.84	920	-3.34	919.92	-2	919.92	0	919.92	2	919.92
6.2	919.966	9.28	920	12.93	921	15.53	922	18.13	923
29.93	923	295.14	924	489.99	924	548.74	925		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-147.36	.04	-5.84	.035	6.2	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-5.84	6.2	27.71	27.71	27.71	.3	.5

Skew Angle = 21

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	923.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.040	0.035	0.040
W.S. Elev (ft)	923.90	Reach Len. (ft)	6.33	6.33	6.33
Crit W.S. (ft)	921.85	Flow Area (sq ft)	50.52	47.69	151.64
E.G. Slope (ft/ft)	0.000634	Area (sq ft)	50.52	47.69	151.64
Q Total (cfs)	262.00	Flow (cfs)	35.91	127.62	98.47
Top Width (ft)	349.43	Top Width (ft)	75.72	12.04	261.66
Vel Total (ft/s)	1.05	Avg. Vel. (ft/s)	0.71	2.68	

```
   0.65  *
* Max Chl Dpth (ft)      *    3.98  * Hydr. Depth (ft)       *    0.67  *    3.96  *
   0.58  *
* Conv. Total (cfs)      * 10404.4  * Conv. (cfs)            *  1426.0  *  5067.9  *
 3910.5  *
* Length Wtd. (ft)       *    6.33  * Wetted Per. (ft)       *   76.27  *   12.04  *
 262.17  *
* Min Ch El (ft)         *  919.92  * Shear (lb/sq ft)       *    0.03  *    0.16  *
   0.02  *
* Alpha                  *    3.38  * Stream Power (lb/ft s) *  548.74  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *   12.41  *    7.22  *
   8.95  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    9.00  *    1.82  *
   5.83  *
*******************************************************************************
***********

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.

BRIDGE


RIVER: Tributary I-2
REACH: 1                  RS: 34.5

INPUT
Description:
Distance from Upstream XS =    6.33
Deck/Roadway Width        =   12.04
Weir Coefficient          =     2.6
Bridge Deck/Roadway Skew  =      21
Upstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
-186.716  923.91  921.34 -18.177  923.35  921.34       0  923.58  921.35
  18.177  923.35  921.34  112.03  923.35  921.34

Upstream Bridge Cross Section Data
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -147.36     925  -89.31     924     -14     923  -11.71     922   -8.78     921
   -5.84     920   -3.34  919.92      -2  919.92       0  919.92       2  919.92
     6.2 919.966    9.28     920   12.93     921   15.53     922   18.13     923
   29.93     923  295.14     924  489.99     924  548.74     925

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -147.36     .04   -5.84    .035     6.2     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -5.84     6.2              .3       .5
Skew Angle = 21

Downstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
```

```
-186.716  923.56  921.34 -37.343  923.35  921.34 -18.177  923.35  921.34
       0  923.58  921.35  18.177  923.35  921.34  112.03  923.35  921.34
 186.716  923.35  921.34

Downstream Bridge Cross Section Data
Station Elevation Data    num=      23
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -458.48     925 -129.93     924  -78.69     924  -69.14     924  -53.73     923
  -38.32     922   -32.1     922  -17.37     923  -12.46     923   -9.68     922
   -6.68     921   -3.63     920      -2  918.24       0  918.24       2  918.24
    3.37     920    7.66     921   11.98     922  148.11     923  254.03     924
  277.64     924  289.67     926  370.97     927

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -458.48     .04   -6.68    .035    7.66     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -6.68    7.66             .3       .5
Skew Angle = 21

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #100-year
*******************************************************************************
*********
* E.G. US. (ft)          *     923.95  * Element                *Inside BR US
*Inside BR DS *
* W.S. US. (ft)          *     923.90  * E.G. Elev (ft)         *     923.94  *
923.80  *
* Q Total (cfs)          *     262.00  * W.S. Elev (ft)         *     923.89  *
923.65  *
* Q Bridge (cfs)         *      60.03  * Crit W.S. (ft)         *     923.68  *
923.65  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *       3.97  *
 5.41  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       1.62  *
 2.60  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *     161.39  *
```

```
100.83  *
* Weir Submerg           *             * Froude # Chl           *       0.15  *
 0.23  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *     131.07  *
123.74  *
* Min El Weir Flow (ft)  *     923.36  * Hydr Depth (ft)        *       0.46  *
 0.36  *
* Min El Prs (ft)        *     921.35  * W.P. Total (ft)        *     396.27  *
316.80  *
* Delta EG (ft)          *       0.71  * Conv. Total (cfs)      *     3413.4  *
1974.1  *
* Delta WS (ft)          *       0.72  * Top Width (ft)         *     348.58  *
281.06  *
* BR Open Area (sq ft)   *      25.82  * Frctn Loss (ft)        *       0.11  *
 0.02  *
* BR Open Vel (ft/s)     *       2.33  * C & E Loss (ft)        *       0.03  *
 0.03  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.15  *
 0.35  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *    -147.36  *
-458.48  *
*******************************************************************************
*********

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance)
is less than 0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.
Warning: The energy equation could not be balanced within the specified number of
iterations.  The program used critical depth
         for the water surface and continued on with the calculations.
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.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 34

INPUT
Description: Downstream Section of B1
Station Elevation Data    num=      23
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -458.48     925 -129.93     924  -78.69     924  -69.14     924  -53.73     923
  -38.32     922   -32.1     922  -17.37     923  -12.46     923   -9.68     922
   -6.68     921   -3.63     920      -2  918.24       0  918.24       2  918.24
    3.37     920    7.66     921   11.98     922  148.11     923  254.03     924
  277.64     924  289.67     926  370.97     927

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

```
 -458.48     .04   -6.68    .035    7.66     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -6.68    7.66           173.79  173.79  173.79             .3       .5
Skew Angle = 21

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  923.25  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.07  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  923.17  * Reach Len. (ft)        *  173.79  *  173.79  *
 173.79  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   35.53  *   51.51  *
 100.37  *
* E.G. Slope (ft/ft)     *0.000947  * Area (sq ft)           *   35.53  *   51.51  *
 100.37  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *   32.29  *  145.23  *
  84.48  *
* Top Width (ft)         *  222.78  * Top Width (ft)         *   49.71  *   14.34  *
 158.73  *
* Vel Total (ft/s)       *    1.40  * Avg. Vel. (ft/s)       *    0.91  *    2.82  *
   0.84  *
* Max Chl Dpth (ft)      *    4.93  * Hydr. Depth (ft)       *    0.71  *    3.59  *
   0.63  *
* Conv. Total (cfs)      *  8514.0  * Conv. (cfs)            *  1049.4  *  4719.4  *
 2745.3  *
* Length Wtd. (ft)       *  173.79  * Wetted Per. (ft)       *   50.12  *   16.24  *
 158.85  *
* Min Ch El (ft)         *  918.24  * Shear (lb/sq ft)       *    0.04  *    0.19  *
   0.04  *
* Alpha                  *    2.42  * Stream Power (lb/ft s) *  370.97  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *   12.40  *    7.20  *
   8.89  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    8.96  *    1.82  *
   5.68  *
*******************************************************************************
***********

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.

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 33

INPUT
Description:
Station Elevation Data    num=      24
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -532.68   926.6 -455.96     926 -436.02     924 -387.47     922  -95.32   922.4
  -27.53     922  -17.86     920      -6 918.452      -2  917.93     -.5  917.93
      .5  917.93       2  917.93       6 918.238   28.86     920   59.42     922
  146.13     923   236.6     924  258.38     926  303.19     927  351.31     926
  418.69   924.8  531.04     926  633.57     928  685.37   928.4
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 -532.68     .04      -6    .035       6     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -6       6           248.24  248.24  248.24             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*********************************************************************************
***********
* E.G. Elev (ft)         *  923.19  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.00  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  923.18  * Reach Len. (ft)        *  248.24  *  248.24  *
 248.24  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  438.36  *   61.36  *
 220.17  *
* E.G. Slope (ft/ft)     *0.000056  * Area (sq ft)           *  438.36  *   61.36  *
 220.17  *
* Q Total (cfs)          *  262.00  * Flow (cfs)             *  127.41  *   57.76  *
  76.83  *
* Top Width (ft)         *  578.74  * Top Width (ft)         *  410.16  *   12.00  *
 156.58  *
* Vel Total (ft/s)       *    0.36  * Avg. Vel. (ft/s)       *    0.29  *    0.94  *
   0.35  *
* Max Chl Dpth (ft)      *    5.25  * Hydr. Depth (ft)       *    1.07  *    5.11  *
   1.41  *
* Conv. Total (cfs)      * 34985.0  * Conv. (cfs)            * 17013.2  *  7712.6  *
10259.2  *
* Length Wtd. (ft)       *  248.24  * Wetted Per. (ft)       *  410.49  *   12.05  *
 156.72  *
* Min Ch El (ft)         *  917.93  * Shear (lb/sq ft)       *    0.00  *    0.02  *
   0.00  *
* Alpha                  *    2.05  * Stream Power (lb/ft s) *  685.37  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *   11.45  *    6.97  *
   8.25  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    8.04  *    1.76  *
   5.05  *
*********************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 32

INPUT
Description: Upstream section of Belvedere Green Boulevard bridge
topography
             data from 2007 Franklin County auditors
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 -750.64     926 -532.51     924 -460.85     922 -157.09     922 -147.48     922
   -7.56     920   -1.52     918       0  917.19    1.37     918   18.15     920
```

```
    94.6     922  151.74     924  205.74     926  224.27   926.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -750.64     .04   -7.56    .035   18.15    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -7.56   18.15             53.38   53.84   54.83             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  923.15  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.01  * Wt. n-Val.             *   0.040  *   0.035  *
  0.055  *
* W.S. Elev (ft)         *  923.14  * Reach Len. (ft)        *   53.38  *   53.84  *
  54.83  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  679.12  *  110.46  *
 181.98  *
* E.G. Slope (ft/ft)     *0.000204  * Area (sq ft)           *  679.12  *  110.46  *
 181.98  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  445.19  *  173.05  *
  98.76  *
* Top Width (ft)         *  628.76  * Top Width (ft)         *  494.08  *   25.71  *
 108.97  *
* Vel Total (ft/s)       *    0.74  * Avg. Vel. (ft/s)       *    0.66  *    1.57  *
   0.54  *
* Max Chl Dpth (ft)      *    5.95  * Hydr. Depth (ft)       *    1.37  *    4.30  *
   1.67  *
* Conv. Total (cfs)      * 50227.3  * Conv. (cfs)            * 31186.1  * 12122.5  *
 6918.6  *
* Length Wtd. (ft)       *   53.75  * Wetted Per. (ft)       *  494.11  *   26.58  *
 109.02  *
* Min Ch El (ft)         *  917.19  * Shear (lb/sq ft)       *    0.02  *    0.05  *
   0.02  *
* Alpha                  *    1.65  * Stream Power (lb/ft s) *  224.27  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *    8.27  *    6.48  *
   7.10  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    5.47  *    1.66  *
   4.30  *
*******************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 31

INPUT
Description: Downstream section of Belvedere Green Boulevard bridge
topography
             data from field survey June 2013
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
```

```
 -800.17     926 -554.45     924 -532.79     922 -202.64     922 -102.76     922
  -38.28  921.91  -14.41  921.06     -10 920.094   -2.13  918.37    -.72  917.49
       0  917.01    5.33  916.96    6.39  917.56     7.5  918.04   22.16  919.51
   23.59 920.001   30.17  922.25  120.27     924  196.06     926

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 -800.17     .04     -10    .035   23.59    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           -10   23.59           127.91  127.45  126.72             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -800.17  -33.11  925.26       F
   34.64  196.06  924.78       F

CROSS SECTION OUTPUT  Profile #100-year
*****************************************************************************************
***********
* E.G. Elev (ft)         *  923.10  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *   0.040  *   0.035  *
  0.055  *
* W.S. Elev (ft)         *  922.85  * Reach Len. (ft)        *   39.13  *   39.13  *
  39.13  *
* Crit W.S. (ft)         *  920.94  * Flow Area (sq ft)      *   37.23  *  146.34  *
  13.82  *
* E.G. Slope (ft/ft)     *0.001491  * Area (sq ft)           *  468.80  *  146.34  *
  20.55  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *   73.14  *  627.51  *
  16.36  *
* Top Width (ft)         *  602.95  * Top Width (ft)         *  531.98  *   33.59  *
  37.38  *
* Vel Total (ft/s)       *    3.63  * Avg. Vel. (ft/s)       *    1.96  *    4.29  *
   1.18  *
* Max Chl Dpth (ft)      *    5.89  * Hydr. Depth (ft)       *    1.61  *    4.36  *
   1.25  *
* Conv. Total (cfs)      * 18570.2  * Conv. (cfs)            *  1894.2  * 16252.4  *
  423.7  *
* Length Wtd. (ft)       *   39.13  * Wetted Per. (ft)       *   23.23  *   34.59  *
  11.42  *
* Min Ch El (ft)         *  916.96  * Shear (lb/sq ft)       *    0.15  *    0.39  *
   0.11  *
* Alpha                  *    1.25  * Stream Power (lb/ft s) *  196.06  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *    7.56  *    6.33  *
   6.97  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *    4.84  *    1.62  *
   4.20  *
*****************************************************************************************
***********

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may
indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance)
is less than 0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.

BRIDGE
```

```
RIVER: Tributary I-2
REACH: 1                  RS: 30.5

INPUT
Description: Belvedere Green Boulevard bridge
topography data and bridge data
             from field survey June 2013
Distance from Upstream XS =   39.13
Deck/Roadway Width        =   53.48
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=      15
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
 -800.17  925.26          -70.77  925.26          -60.49  925.45
  -50.56   925.6          -40.62  925.74          -30.15  925.84  921.49
  -20.55  925.87  921.52   -10.3  925.88  921.53    -.45  925.84  921.49
    8.94  925.71  921.36   18.16  925.61  921.26    28.5  925.42  921.07
   39.74   925.1           50.56  924.78          172.61  924.78

Upstream Bridge Cross Section Data
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -800.17     926 -554.45     924 -532.79     922 -202.64     922 -102.76     922
  -38.28  921.91  -14.41  921.06     -10 920.094   -2.13  918.37    -.72  917.49
       0  917.01    5.33  916.96    6.39  917.56     7.5  918.04   22.16  919.51
   23.59 920.001   30.17  922.25  120.27     924  196.06     926

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -800.17     .04     -10     .03   23.59    .055

Bank Sta: Left   Right    Coeff Contr.   Expan.
           -10   23.59             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -800.17  -33.11  925.26       F
   34.64  196.06  924.78       F

Downstream  Deck/Roadway Coordinates
    num=      14
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
  -88.66  925.26          -48.77  925.26          -35.19  925.55
  -25.31   925.7  921.35  -15.15  925.82  921.47   -4.41   925.9  921.55
    6.09  925.89  921.54   16.99  925.89  921.54   28.89  925.69  921.34
   40.44  925.52  921.17   50.93  925.24  920.89   63.38  924.89
   73.67  924.55             600  924.78

Downstream Bridge Cross Section Data
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -88.66     924  -39.98  923.16  -25.21  922.21  -17.95     922   -10.2     920
   -1.58     918    -.34   917.7       0   916.6     1.4  917.02    5.46  917.02
    8.72  917.39   10.82  917.95    20.5  919.43      28  920.08   39.06  921.04
  115.33     924  172.61     924

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

```
*********************************************
  -88.66     .04   -10.2     .03      28    .085

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -10.2      28            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  -88.66  -34.81  925.26       F
   46.64  172.61  924.78       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #100-year
*******************************************************************************
*********
* E.G. US. (ft)          *     923.10  * Element                *Inside BR US
*Inside BR DS *
* W.S. US. (ft)          *     922.85  * E.G. Elev (ft)         *     922.92  *
922.27  *
* Q Total (cfs)          *     717.00  * W.S. Elev (ft)         *     922.12  *
921.70  *
* Q Bridge (cfs)         *     717.00  * Crit W.S. (ft)         *     920.95  *
920.75  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *       5.16  *
 5.10  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.76  *
 5.62  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *     106.10  *
127.49  *
* Weir Submerg           *             * Froude # Chl           *       0.56  *
 0.47  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *     394.12  *
358.80  *
* Min El Weir Flow (ft)  *     924.79  * Hydr Depth (ft)        *             *
       *
* Min El Prs (ft)        *     921.53  * W.P. Total (ft)        *     108.48  *
116.55  *
* Delta EG (ft)          *       1.07  * Conv. Total (cfs)      *     6204.7  *
7552.3  *
* Delta WS (ft)          *       1.39  * Top Width (ft)         *             *
       *
```

```
* BR Open Area (sq ft)   *     106.10  * Frctn Loss (ft)        *       0.58  *
 0.23  *
* BR Open Vel (ft/s)     *       6.76  * C & E Loss (ft)        *       0.07  *
 0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.82  *
 0.62  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *    -800.17  *
-88.66  *
*******************************************************************************
*********

Note:    Momentum answer is not valid if the water surface is above the low chord or
if there is weir flow.  The momentum
         answer has been disregarded.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 30

INPUT
Description: topography data from field survey June 2013
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -88.66     924  -39.98  923.16  -25.21  922.21  -17.95     922   -10.2     920
   -1.58     918    -.34   917.7       0   916.6     1.4  917.02    5.46  917.02
    8.72  917.39   10.82  917.95    20.5  919.43      28  920.08   39.06  921.04
  115.33     924  172.61     924

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -88.66     .04   -10.2    .035      28    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -10.2      28            95.68   95.65   96.41             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  -88.66  -34.81  925.26       F
   46.64  172.61  924.78       F

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  922.03  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  921.46  * Reach Len. (ft)        *   95.68  *   95.65  *
  96.41  *
* Crit W.S. (ft)         *  920.76  * Flow Area (sq ft)      *    4.13  *  113.09  *
  12.01  *
* E.G. Slope (ft/ft)     *0.005195  * Area (sq ft)           *    4.13  *  113.09  *
  12.22  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *    8.77  *  696.96  *
  11.27  *
* Top Width (ft)         *   65.72  * Top Width (ft)         *    5.66  *   38.20  *
```

```
  21.87  *
* Vel Total (ft/s)       *    5.55  * Avg. Vel. (ft/s)       *    2.12  *    6.16  *
   0.94  *
* Max Chl Dpth (ft)      *    4.86  * Hydr. Depth (ft)       *    0.73  *    2.96  *
   0.64  *
* Conv. Total (cfs)      *  9947.4  * Conv. (cfs)            *   121.6  *  9669.4  *
  156.4  *
* Length Wtd. (ft)       *   95.68  * Wetted Per. (ft)       *    5.84  *   39.57  *
  18.69  *
* Min Ch El (ft)         *  916.60  * Shear (lb/sq ft)       *    0.23  *    0.93  *
   0.21  *
* Alpha                  *    1.20  * Stream Power (lb/ft s) *  172.61  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.41  * Cum Volume (acre-ft)   *    7.34  *    5.99  *
   6.95  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *    4.60  *    1.59  *
   4.18  *
*******************************************************************************
***********

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

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 29

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -162.06     924 -147.51     924 -101.94     922   -27.4     920  -18.67     918
       0  916.29     .97     918   10.59     920  173.01     922  233.41     924
  263.36   924.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -162.06     .04   -27.4    .035   10.59    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -27.4   10.59           186.09  186.72  188.57             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  921.57  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  921.17  * Reach Len. (ft)        *  186.09  *  186.72  *
 188.57  *
* Crit W.S. (ft)         *  920.41  * Flow Area (sq ft)      *   25.52  *  118.88  *
  55.61  *
* E.G. Slope (ft/ft)     *0.003652  * Area (sq ft)           *   25.52  *  118.88  *
  55.61  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *   40.07  *  635.84  *
  41.09  *
* Top Width (ft)         *  176.64  * Top Width (ft)         *   43.61  *   37.99  *
  95.03  *
```

```
* Vel Total (ft/s)       *    3.58  * Avg. Vel. (ft/s)       *    1.57  *    5.35  *
   0.74  *
* Max Chl Dpth (ft)      *    4.88  * Hydr. Depth (ft)       *    0.59  *    3.13  *
   0.59  *
* Conv. Total (cfs)      * 11864.3  * Conv. (cfs)            *   663.0  * 10521.3  *
  680.0  *
* Length Wtd. (ft)       *  186.83  * Wetted Per. (ft)       *   43.63  *   39.50  *
  95.04  *
* Min Ch El (ft)         *  916.29  * Shear (lb/sq ft)       *    0.13  *    0.69  *
   0.13  *
* Alpha                  *    1.99  * Stream Power (lb/ft s) *  263.36  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.96  * Cum Volume (acre-ft)   *    7.31  *    5.74  *
   6.87  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    4.54  *    1.51  *
   4.05  *
*******************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 28

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -190.95     924 -136.57     922   -50.9     920  -13.32     918    -.29     916
       0  915.66     .66     916    9.56     918   78.43     920  120.05   920.3
  137.42     920   521.6     920  631.27     922

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -190.95     .04  -13.32    .035    9.56    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -13.32    9.56           164.46  165.33  163.53             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  920.58  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.66  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  919.92  * Reach Len. (ft)        *  164.46  *  165.33  *
 163.53  *
* Crit W.S. (ft)         *  919.81  * Flow Area (sq ft)      *   34.49  *   67.83  *
  63.20  *
* E.G. Slope (ft/ft)     *0.007729  * Area (sq ft)           *   34.49  *   67.83  *
  63.20  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  109.35  *  513.29  *
  94.37  *
* Top Width (ft)         *  124.86  * Top Width (ft)         *   36.00  *   22.88  *
  65.98  *
```

```
* Vel Total (ft/s)       *    4.33  * Avg. Vel. (ft/s)       *    3.17  *    7.57  *
   1.49  *
* Max Chl Dpth (ft)      *    4.26  * Hydr. Depth (ft)       *    0.96  *    2.96  *
   0.96  *
* Conv. Total (cfs)      *  8155.9  * Conv. (cfs)            *  1243.8  *  5838.6  *
 1073.4  *
* Length Wtd. (ft)       *  165.02  * Wetted Per. (ft)       *   36.05  *   23.49  *
  66.00  *
* Min Ch El (ft)         *  915.66  * Shear (lb/sq ft)       *    0.46  *    1.39  *
   0.46  *
* Alpha                  *    2.28  * Stream Power (lb/ft s) *  631.27  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.48  * Cum Volume (acre-ft)   *    7.18  *    5.34  *
   6.62  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         *    4.37  *    1.38  *
   3.70  *
*******************************************************************************
***********

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

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 27

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -199.14     922 -128.89     920  -20.63     918   -5.76     916       0  915.11
    6.02     916   30.21     918  112.79     920  194.06     922

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -199.14     .04  -20.63    .035   30.21    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -20.63   30.21               79   79.58    79.8             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  919.95  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.15  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  919.80  * Reach Len. (ft)        *   79.00  *   79.58  *
  79.80  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   87.29  *  159.16  *
  66.58  *
* E.G. Slope (ft/ft)     *0.001503  * Area (sq ft)           *   87.29  *  159.16  *
  66.58  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  116.98  *  558.03  *
  41.99  *
* Top Width (ft)         *  222.20  * Top Width (ft)         *   97.21  *   50.84  *
```

```
  74.15  *
* Vel Total (ft/s)       *    2.29  * Avg. Vel. (ft/s)       *    1.34  *    3.51  *
   0.63  *
* Max Chl Dpth (ft)      *    4.69  * Hydr. Depth (ft)       *    0.90  *    3.13  *
   0.90  *
* Conv. Total (cfs)      * 18495.4  * Conv. (cfs)            *  3017.5  * 14394.7  *
 1083.1  *
* Length Wtd. (ft)       *   79.40  * Wetted Per. (ft)       *   97.23  *   51.19  *
  74.17  *
* Min Ch El (ft)         *  915.11  * Shear (lb/sq ft)       *    0.08  *    0.29  *
   0.08  *
* Alpha                  *    1.88  * Stream Power (lb/ft s) *  194.06  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   *    6.95  *    4.91  *
   6.37  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    4.12  *    1.24  *
   3.44  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 26

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -232.05     922 -156.78     920  -70.65     918  -25.64     918   -7.49     916
       0  914.83    1.45     916   19.68     918  152.99     920  172.47     922

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -232.05     .04   -7.49    .035    1.45    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -7.49    1.45           121.93  123.14  124.74             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  919.80  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.16  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  919.64  * Reach Len. (ft)        *  121.93  *  123.14  *
 124.74  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  179.66  *   37.77  *
 137.77  *
* E.G. Slope (ft/ft)     *0.002382  * Area (sq ft)           *  179.66  *   37.77  *
 137.77  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  396.16  *  197.18  *
 123.66  *
* Top Width (ft)         *  270.28  * Top Width (ft)         *  133.79  *    8.94  *
 127.55  *
* Vel Total (ft/s)       *    2.02  * Avg. Vel. (ft/s)       *    2.21  *    5.22  *
   0.90  *
* Max Chl Dpth (ft)      *    4.81  * Hydr. Depth (ft)       *    1.34  *    4.23  *
   1.08  *
```

```
* Conv. Total (cfs)      * 14692.4  * Conv. (cfs)            *  8117.9  *  4040.6  *
 2533.9  *
* Length Wtd. (ft)       *  122.86  * Wetted Per. (ft)       *  133.92  *    9.44  *
 127.67  *
* Min Ch El (ft)         *  914.83  * Shear (lb/sq ft)       *    0.20  *    0.59  *
   0.16  *
* Alpha                  *    2.53  * Stream Power (lb/ft s) *  172.47  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.42  * Cum Volume (acre-ft)   *    6.71  *    4.73  *
   6.19  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *    3.91  *    1.18  *
   3.25  *
*******************************************************************************
***********

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.

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 25

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -233.49     922 -188.83     920  -78.37     918  -25.11     918  -15.34     918
   -6.82     916       0   914.4   12.43     916   30.83     918     111     920

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -233.49     .04   -6.82    .035   12.43    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -6.82   12.43           115.12  115.81  116.16             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  919.34  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.57  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  918.77  * Reach Len. (ft)        *  115.12  *  115.81  *
 116.16  *
* Crit W.S. (ft)         *  918.77  * Flow Area (sq ft)      *   79.77  *   68.69  *
  44.36  *
* E.G. Slope (ft/ft)     *0.005356  * Area (sq ft)           *   79.77  *   68.69  *
  44.36  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  170.72  *  493.39  *
  52.89  *
* Top Width (ft)         *  182.41  * Top Width (ft)         *  113.97  *   19.25  *
  49.19  *
* Vel Total (ft/s)       *    3.72  * Avg. Vel. (ft/s)       *    2.14  *    7.18  *
   1.19  *
* Max Chl Dpth (ft)      *    4.37  * Hydr. Depth (ft)       *    0.70  *    3.57  *
   0.90  *
* Conv. Total (cfs)      *  9797.6  * Conv. (cfs)            *  2332.8  *  6742.1  *
```

```
  722.7  *
* Length Wtd. (ft)       *  115.71  * Wetted Per. (ft)       *  114.21  *   19.54  *
  49.31  *
* Min Ch El (ft)         *  914.40  * Shear (lb/sq ft)       *    0.23  *    1.18  *
   0.30  *
* Alpha                  *    2.65  * Stream Power (lb/ft s) *  111.00  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   *    6.34  *    4.58  *
   5.93  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *    3.57  *    1.14  *
   3.00  *
*******************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 24

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -183.28     920  -84.17     918  -48.61     918  -42.09     918  -17.17     916
       0     914    20.9     916   65.73     918   88.41     920

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -183.28     .04  -17.17    .035    20.9    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -17.17    20.9           111.92  114.11  114.69             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  918.89  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.18  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  918.72  * Reach Len. (ft)        *  111.92  *  114.11  *
 114.69  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   85.61  *  141.48  *
  79.84  *
* E.G. Slope (ft/ft)     *0.001423  * Area (sq ft)           *   85.61  *  141.48  *
  79.84  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  106.33  *  541.51  *
  69.16  *
```

```
* Top Width (ft)          *  193.51  * Top Width (ft)          *  102.49  *   38.07  *
  52.95  *
* Vel Total (ft/s)        *    2.34  * Avg. Vel. (ft/s)        *    1.24  *    3.83  *
   0.87  *
* Max Chl Dpth (ft)       *    4.72  * Hydr. Depth (ft)        *    0.84  *    3.72  *
   1.51  *
* Conv. Total (cfs)       * 19010.1  * Conv. (cfs)             *  2819.3  * 14357.1  *
 1833.7  *
* Length Wtd. (ft)        *  113.72  * Wetted Per. (ft)        *  102.58  *   38.28  *
  53.03  *
* Min Ch El (ft)          *  914.00  * Shear (lb/sq ft)        *    0.07  *    0.33  *
   0.13  *
* Alpha                   *    2.08  * Stream Power (lb/ft s) *   88.41  *    0.00  *
   0.00  *
* Frctn Loss (ft)         *    0.15  * Cum Volume (acre-ft)    *    6.13  *    4.30  *
   5.76  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *    3.28  *    1.06  *
   2.86  *
*******************************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 23

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -155.19     920  -88.19     918  -15.08     916   -1.93     914       0  913.73
    2.04     914   15.24     916   92.24     918   99.78     920

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -155.19     .04  -15.08    .035   15.24    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -15.08   15.24           104.37  105.78  105.84             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************************
***********
* E.G. Elev (ft)          *  918.73  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)           *    0.13  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)          *  918.59  * Reach Len. (ft)        *  104.37  *  105.78  *
 105.84  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *  122.18  *  113.39  *
 123.18  *
* E.G. Slope (ft/ft)      *0.001305  * Area (sq ft)           *  122.18  *  113.39  *
 123.18  *
* Q Total (cfs)           *  717.00  * Flow (cfs)             *  196.76  *  415.93  *
 104.31  *
* Top Width (ft)          *  202.46  * Top Width (ft)         *   92.91  *   30.32  *
  79.23  *
* Vel Total (ft/s)        *    2.00  * Avg. Vel. (ft/s)       *    1.61  *    3.67  *
   0.85  *
* Max Chl Dpth (ft)       *    4.86  * Hydr. Depth (ft)       *    1.31  *    3.74  *
```

```
   1.55  *
* Conv. Total (cfs)      * 19846.3  * Conv. (cfs)            *  5446.4  * 11512.7  *
 2887.3  *
* Length Wtd. (ft)       *  105.53  * Wetted Per. (ft)       *   92.95  *   30.66  *
  79.33  *
* Min Ch El (ft)         *  913.73  * Shear (lb/sq ft)       *    0.11  *    0.30  *
   0.13  *
* Alpha                  *    2.16  * Stream Power (lb/ft s) *   99.78  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *    5.86  *    3.97  *
   5.49  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    3.03  *    0.97  *
   2.69  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 22

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -123.69     922  -82.79     920  -55.54     918  -27.71     916   -3.76     914
       0  913.47    2.78     914   22.11     916   68.85     918   93.22     920
  120.02     921

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -123.69     .04  -27.71    .035   22.11    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -27.71   22.11             80.35   78.53    77.8             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  918.59  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.15  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  918.44  * Reach Len. (ft)        *   80.35  *   78.53  *
  77.80  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   41.35  *  179.58  *
  68.41  *
* E.G. Slope (ft/ft)     *0.001161  * Area (sq ft)           *   41.35  *  179.58  *
  68.41  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *   59.74  *  608.43  *
  48.83  *
* Top Width (ft)         *  135.71  * Top Width (ft)         *   33.81  *   49.82  *
  52.08  *
* Vel Total (ft/s)       *    2.48  * Avg. Vel. (ft/s)       *    1.44  *    3.39  *
   0.71  *
* Max Chl Dpth (ft)      *    4.97  * Hydr. Depth (ft)       *    1.22  *    3.60  *
   1.31  *
* Conv. Total (cfs)      * 21045.6  * Conv. (cfs)            *  1753.6  * 17858.8  *
 1433.3  *
* Length Wtd. (ft)       *   78.71  * Wetted Per. (ft)       *   33.89  *   50.09  *
```

```
  52.15  *
* Min Ch El (ft)         *  913.47  * Shear (lb/sq ft)       *    0.09  *    0.26  *
   0.10  *
* Alpha                  *    1.62  * Stream Power (lb/ft s) *  120.02  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.12  * Cum Volume (acre-ft)   *    5.66  *    3.61  *
   5.26  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.88  *    0.88  *
   2.53  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 21

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -118.64     922  -89.17     920  -73.07     918  -19.68     916      -3     914
       0  913.28     .68     914   15.47     916    66.8     918   78.03     920
  122.01     921

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -118.64     .04  -19.68    .035   15.47    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -19.68   15.47            82.04   82.05   81.48             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  918.46  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.24  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  918.22  * Reach Len. (ft)        *   82.04  *   82.05  *
  81.48  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   65.24  *  118.13  *
  62.68  *
* E.G. Slope (ft/ft)     *0.002268  * Area (sq ft)           *   65.24  *  118.13  *
  62.68  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  129.02  *  529.35  *
  58.63  *
* Top Width (ft)         *  142.86  * Top Width (ft)         *   55.15  *   35.15  *
  52.56  *
* Vel Total (ft/s)       *    2.91  * Avg. Vel. (ft/s)       *    1.98  *    4.48  *
   0.94  *
* Max Chl Dpth (ft)      *    4.94  * Hydr. Depth (ft)       *    1.18  *    3.36  *
   1.19  *
* Conv. Total (cfs)      * 15057.1  * Conv. (cfs)            *  2709.5  * 11116.3  *
 1231.3  *
* Length Wtd. (ft)       *   82.01  * Wetted Per. (ft)       *   55.20  *   35.80  *
  52.61  *
* Min Ch El (ft)         *  913.28  * Shear (lb/sq ft)       *    0.17  *    0.47  *
   0.17  *
* Alpha                  *    1.84  * Stream Power (lb/ft s) *  122.01  *    0.00  *
```

```
   0.00  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   *    5.56  *    3.34  *
   5.14  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.80  *    0.80  *
   2.44  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 20

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -136.03     922  -82.73     920  -59.78     918  -21.97     916   -2.49     914
       0  913.08     4.9     914   26.55     916   69.64     918   86.18     920
  121.11     921

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -136.03     .04  -21.97    .035   26.55    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -21.97   26.55             80.71    79.6   79.04             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  918.29  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.20  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  918.09  * Reach Len. (ft)        *   80.71  *   79.60  *
  79.04  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   41.20  *  160.64  *
  46.93  *
* E.G. Slope (ft/ft)     *0.001678  * Area (sq ft)           *   41.20  *  160.64  *
  46.93  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *   65.14  *  616.71  *
  35.15  *
* Top Width (ft)         *  131.17  * Top Width (ft)         *   38.82  *   48.52  *
  43.82  *
* Vel Total (ft/s)       *    2.88  * Avg. Vel. (ft/s)       *    1.58  *    3.84  *
   0.75  *
* Max Chl Dpth (ft)      *    5.01  * Hydr. Depth (ft)       *    1.06  *    3.31  *
   1.07  *
* Conv. Total (cfs)      * 17506.0  * Conv. (cfs)            *  1590.5  * 15057.4  *
  858.1  *
* Length Wtd. (ft)       *   79.66  * Wetted Per. (ft)       *   38.88  *   48.96  *
  43.87  *
* Min Ch El (ft)         *  913.08  * Shear (lb/sq ft)       *    0.11  *    0.34  *
   0.11  *
* Alpha                  *    1.56  * Stream Power (lb/ft s) *  121.11  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   *    5.46  *    3.08  *
   5.04  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.71  *    0.72  *
```

```
   2.35  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 19

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -146.15     920  -45.39     918   -15.8     916   -2.88     914       0  912.89
     4.9     914   31.35     916   82.25     918   97.59     920  145.64     921
   993.7     921

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -146.15     .04   -15.8    .035   31.35    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -15.8   31.35            69.19    68.6   67.05             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  918.13  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.26  * Wt. n-Val.             *   0.040  *   0.035  *
  0.085  *
* W.S. Elev (ft)         *  917.86  * Reach Len. (ft)        *   69.19  *   68.60  *
  67.05  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   25.69  *  147.11  *
  44.18  *
* E.G. Slope (ft/ft)     *0.002323  * Area (sq ft)           *   25.69  *  147.11  *
  44.18  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *   43.81  *  637.70  *
  35.50  *
* Top Width (ft)         *  122.14  * Top Width (ft)         *   27.57  *   47.15  *
  47.42  *
* Vel Total (ft/s)       *    3.30  * Avg. Vel. (ft/s)       *    1.71  *    4.33  *
   0.80  *
* Max Chl Dpth (ft)      *    4.97  * Hydr. Depth (ft)       *    0.93  *    3.12  *
   0.93  *
* Conv. Total (cfs)      * 14875.8  * Conv. (cfs)            *   908.8  * 13230.5  *
  736.4  *
* Length Wtd. (ft)       *   68.56  * Wetted Per. (ft)       *   27.63  *   47.71  *
  47.46  *
* Min Ch El (ft)         *  912.89  * Shear (lb/sq ft)       *    0.13  *    0.45  *
   0.14  *
* Alpha                  *    1.55  * Stream Power (lb/ft s) *  993.70  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   *    5.40  *    2.80  *
   4.96  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    2.65  *    0.63  *
   2.26  *
*******************************************************************************
***********
```

CROSS SECTION

RIVER: Tributary I-2
REACH: 1 RS: 18

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-145.25	920	-50.98	918	-13.85	916	-3.28	914	-1.31	914
0	912.72	10.04	914	25.75	916	95.9	918	117.72	920
158.35	921								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-145.25	.04	-13.85	.035	25.75	.085

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-13.85	25.75	111.01	112.17	112.41	.1	.3

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	917.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.	0.040	0.035	0.085
W.S. Elev (ft)	917.51	Reach Len. (ft)	111.01	112.17	112.41
Crit W.S. (ft)		Flow Area (sq ft)	21.27	120.13	40.19
E.G. Slope (ft/ft)	0.003714	Area (sq ft)	21.27	120.13	40.19
Q Total (cfs)	717.00	Flow (cfs)	39.96	641.49	35.55
Top Width (ft)	120.80	Top Width (ft)	28.10	39.60	53.10
Vel Total (ft/s)	3.95	Avg. Vel. (ft/s)	1.88	5.34	0.88
Max Chl Dpth (ft)	4.79	Hydr. Depth (ft)	0.76	3.03	0.76
Conv. Total (cfs)	11765.3	Conv. (cfs)	655.7	10526.2	583.4
Length Wtd. (ft)	111.95	Wetted Per. (ft)	28.15	40.52	53.12
Min Ch El (ft)	912.72	Shear (lb/sq ft)	0.18	0.69	0.18
Alpha	1.65	Stream Power (lb/ft s)	158.35	0.00	0.00
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	5.36	2.59	4.89
C & E Loss (ft)	0.06	Cum SA (acres)	2.60	0.57	2.19

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: Tributary I-2
REACH: 1 RS: 17

INPUT
Description: Upstream section of pedestrian bridge
topography data from field
survey June 2013
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-179.07	920	-100.23	918	-58.84	916	-11.94	915	-6.01	914
0	912	2.86	912.18	3.37	912.08	3.42	912.08	4.4	912.39
5.33	912.8	7.44	913.13	13.01	914	19.61	915.03	38.56	916
85.88	918	165.57	918						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-179.07	.04	-6.01	.035	13.01	.085

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-6.01	13.01	33.51	29.83	31.61	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-179.07	-14.18	914.86	F
18.25	165.57	914.8	F

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	917.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.	0.040	0.035	0.085
W.S. Elev (ft)	917.37	Reach Len. (ft)	10.92	10.92	10.92
Crit W.S. (ft)	916.42	Flow Area (sq ft)	124.15	84.26	76.20
E.G. Slope (ft/ft)	0.001743	Area (sq ft)	124.15	84.26	76.20
Q Total (cfs)	717.00	Flow (cfs)	255.30	395.06	66.64
Top Width (ft)	158.17	Top Width (ft)	81.18	19.02	57.97
Vel Total (ft/s)	2.52	Avg. Vel. (ft/s)	2.06	4.69	0.87
Max Chl Dpth (ft)	5.37	Hydr. Depth (ft)	1.53	4.43	1.31
Conv. Total (cfs)	17174.0	Conv. (cfs)	6115.1	9462.8	1596.1
Length Wtd. (ft)	10.92	Wetted Per. (ft)	81.31	19.59	58.10
Min Ch El (ft)	912.00	Shear (lb/sq ft)	0.17	0.47	0.14
Alpha	2.16	Stream Power (lb/ft s)	165.57	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	5.18	2.32	4.74
C & E Loss (ft)	0.02	Cum SA (acres)	2.46	0.49	2.04

```
*******************************************************************************
***********

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance)
is less than 0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.

BRIDGE


RIVER: Tributary I-2
REACH: 1                  RS: 16.5

INPUT
Description: pedestrian bridge
topography data and bridge data from field
             survey June 2013
Distance from Upstream XS =   10.92
Deck/Roadway Width        =    8.54
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       8
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
***********************************************************************
     -20  914.86  913.96   -5.78  914.86  913.96   -4.97   914.8   913.9
    -.05  914.82  913.92    5.01  914.81  913.91   10.26  914.85  913.95
   11.33   914.8   913.9      30   914.8   913.9

Upstream Bridge Cross Section Data
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -179.07     920 -100.23     918  -58.84     916  -11.94     915   -6.01     914
       0     912    2.86  912.18    3.37  912.08    3.42  912.08     4.4  912.39
    5.33   912.8    7.44  913.13   13.01     914   19.61  915.03   38.56     916
   85.88     918  165.57     918

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
 -179.07     .04   -6.01     .03   13.01    .085

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -6.01   13.01             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -179.07  -14.18  914.86       F
   18.25  165.57   914.8       F

Downstream  Deck/Roadway Coordinates
    num=       8
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
***********************************************************************
     -20  914.86  913.96   -5.78  914.86  913.96   -4.97   914.8   913.9
    -.05  914.82  913.92    5.01  914.81  913.91   10.26  914.85  913.95
   11.33   914.8   913.9      20   914.8   913.9

Downstream Bridge Cross Section Data
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
```

```
 -183.56     920  -97.39     918  -45.67     916  -12.42  914.86    -4.3 914.003
   -3.33   913.9   -1.19  912.58   -1.16  912.21       0   911.3    1.68  911.41
    5.57  911.91    5.59  912.27    8.32   913.9     9.4 914.008   20.88  915.17
   45.81     916   85.62     918  163.75     918

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 -183.56     .04    -4.3     .03     9.4     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
          -4.3     9.4             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -183.56  -18.18  914.86       F
   22.93  163.75   914.8       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #100-year
*******************************************************************************
*********
* E.G. US. (ft)          *     917.58  * Element                *Inside BR US
*Inside BR DS *
* W.S. US. (ft)          *     917.37  * E.G. Elev (ft)         *     917.54  *
917.50  *
* Q Total (cfs)          *     717.00  * W.S. Elev (ft)         *     917.39  *
917.37  *
* Q Bridge (cfs)         *      32.90  * Crit W.S. (ft)         *     916.43  *
916.40  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *       5.39  *
 6.07  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       2.69  *
 2.80  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *     266.28  *
255.92  *
* Weir Submerg           *             * Froude # Chl           *       0.23  *
 0.20  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *     386.96  *
381.87  *
* Min El Weir Flow (ft)  *     914.81  * Hydr Depth (ft)        *       1.67  *
```

```
 1.66  *
* Min El Prs (ft)        *     913.96  * W.P. Total (ft)        *     196.21  *
180.33  *
* Delta EG (ft)          *       0.12  * Conv. Total (cfs)      *    11387.4  *
12840.2  *
* Delta WS (ft)          *       0.10  * Top Width (ft)         *     159.01  *
154.30  *
* BR Open Area (sq ft)   *      18.65  * Frctn Loss (ft)        *       0.03  *
 0.03  *
* BR Open Vel (ft/s)     *       1.76  * C & E Loss (ft)        *       0.01  *
 0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.34  *
 0.28  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *    -179.07  *
-183.56  *
*******************************************************************************
*********

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

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 16

INPUT
Description: Downstream section of pedestrian bridge
topography data from
             field survey June 2013
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -183.56     920  -97.39     918  -45.67     916  -12.42  914.86    -4.3 914.003
   -3.33   913.9   -1.19  912.58   -1.16  912.21       0   911.3    1.68  911.41
    5.57  911.91    5.59  912.27    8.32   913.9     9.4 914.008   20.88  915.17
   45.81     916   85.62     918  163.75     918

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -183.56     .04    -4.3    .035     9.4     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          -4.3     9.4            94.69   96.26  101.86             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -183.56  -18.18  914.86       F
   22.93  163.75   914.8       F

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  917.47  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.20  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  917.27  * Reach Len. (ft)        *   94.69  *   96.26  *
 101.86  *
* Crit W.S. (ft)         *  916.42  * Flow Area (sq ft)      *  104.99  *   65.24  *
```

```
  88.76  *
* E.G. Slope (ft/ft)     *0.001932  * Area (sq ft)           *  104.99  *   65.24  *
  88.76  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  215.95  *  316.48  *
 184.57  *
* Top Width (ft)         *  149.55  * Top Width (ft)         *   74.18  *   13.70  *
  61.67  *
* Vel Total (ft/s)       *    2.77  * Avg. Vel. (ft/s)       *    2.06  *    4.85  *
   2.08  *
* Max Chl Dpth (ft)      *    5.97  * Hydr. Depth (ft)       *    1.42  *    4.76  *
   1.44  *
* Conv. Total (cfs)      * 16311.8  * Conv. (cfs)            *  4912.9  *  7199.9  *
 4199.0  *
* Length Wtd. (ft)       *   97.10  * Wetted Per. (ft)       *   74.27  *   15.57  *
  61.77  *
* Min Ch El (ft)         *  911.30  * Shear (lb/sq ft)       *    0.17  *    0.51  *
   0.17  *
* Alpha                  *    1.67  * Stream Power (lb/ft s) *  163.75  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   *    5.10  *    2.28  *
   4.69  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.41  *    0.48  *
   2.00  *
*******************************************************************************
***********

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

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 15

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -170.4     920 -120.53     918   -57.4     916   -9.13     914       0  912.15
    5.34     914   35.22     916   68.07     918   92.97     920   154.7   920.8

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -170.4     .04   -9.13    .035    5.34     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -9.13    5.34            103.65   103.4  101.83             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  917.26  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.20  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  917.06  * Reach Len. (ft)        *  103.65  *  103.40  *
 101.83  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  117.03  *   57.64  *
  70.70  *
* E.G. Slope (ft/ft)     *0.002295  * Area (sq ft)           *  117.03  *   57.64  *
```

```
  70.70  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  264.60  *  288.04  *
 164.35  *
* Top Width (ft)         *  143.41  * Top Width (ft)         *   81.67  *   14.47  *
  47.26  *
* Vel Total (ft/s)       *    2.92  * Avg. Vel. (ft/s)       *    2.26  *    5.00  *
   2.32  *
* Max Chl Dpth (ft)      *    4.91  * Hydr. Depth (ft)       *    1.43  *    3.98  *
   1.50  *
* Conv. Total (cfs)      * 14965.3  * Conv. (cfs)            *  5522.8  *  6012.0  *
 3430.4  *
* Length Wtd. (ft)       *  103.18  * Wetted Per. (ft)       *   81.73  *   14.97  *
  47.36  *
* Min Ch El (ft)         *  912.15  * Shear (lb/sq ft)       *    0.21  *    0.55  *
   0.21  *
* Alpha                  *    1.54  * Stream Power (lb/ft s) *  154.70  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)   *    4.86  *    2.14  *
   4.50  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    2.24  *    0.45  *
   1.88  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 14

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -171.03     920 -127.54     918  -87.11     916   -7.19     914   -1.08     912
       0  911.89     1.4     912   11.07     914   45.28     916   63.44     918
    82.8     920  142.54   920.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -171.03     .04   -7.19    .035   11.07     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -7.19   11.07           125.87  126.56  128.25             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  917.07  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.12  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  916.95  * Reach Len. (ft)        *  125.87  *  126.56  *
 128.25  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  164.54  *   74.66  *
  70.62  *
* E.G. Slope (ft/ft)     *0.001262  * Area (sq ft)           *  164.54  *   74.66  *
  70.62  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  304.54  *  282.52  *
 129.94  *
* Top Width (ft)         *  160.09  * Top Width (ft)         *   99.04  *   18.26  *
```

```
  42.80  *
* Vel Total (ft/s)       *    2.31  * Avg. Vel. (ft/s)       *    1.85  *    3.78  *
   1.84  *
* Max Chl Dpth (ft)      *    5.06  * Hydr. Depth (ft)       *    1.66  *    4.09  *
   1.65  *
* Conv. Total (cfs)      * 20179.8  * Conv. (cfs)            *  8571.1  *  7951.4  *
 3657.2  *
* Length Wtd. (ft)       *  126.37  * Wetted Per. (ft)       *   99.09  *   18.79  *
  42.91  *
* Min Ch El (ft)         *  911.89  * Shear (lb/sq ft)       *    0.13  *    0.31  *
   0.13  *
* Alpha                  *    1.44  * Stream Power (lb/ft s) *  142.54  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   *    4.52  *    1.99  *
   4.33  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    2.02  *    0.41  *
   1.77  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 13

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -179.04     920  -144.4     918  -95.93     916  -70.39     914  -47.67     914
  -10.38     914   -2.28     912    -.39     912       0  911.59    6.59     914
   14.21     916   25.51     918   73.35     920   100.7   920.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -179.04     .04  -10.38    .035    6.59     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -10.38    6.59             86.01   84.39   84.25             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  916.91  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.11  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  916.81  * Reach Len. (ft)        *   86.01  *   84.39  *
  84.25  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  222.30  *   68.28  *
  15.59  *
* E.G. Slope (ft/ft)     *0.001125  * Area (sq ft)           *  222.30  *   68.28  *
  15.59  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  456.31  *  238.19  *
  22.51  *
* Top Width (ft)         *  134.20  * Top Width (ft)         *  105.06  *   16.97  *
  12.17  *
* Vel Total (ft/s)       *    2.34  * Avg. Vel. (ft/s)       *    2.05  *    3.49  *
   1.44  *
* Max Chl Dpth (ft)      *    5.22  * Hydr. Depth (ft)       *    2.12  *    4.02  *
```

```
   1.28  *
* Conv. Total (cfs)      * 21372.8  * Conv. (cfs)            * 13602.0  *  7100.0  *
  670.9  *
* Length Wtd. (ft)       *   85.45  * Wetted Per. (ft)       *  105.16  *   17.82  *
  12.50  *
* Min Ch El (ft)         *  911.59  * Shear (lb/sq ft)       *    0.15  *    0.27  *
   0.09  *
* Alpha                  *    1.24  * Stream Power (lb/ft s) *  100.70  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)   *    3.96  *    1.78  *
   4.21  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    1.73  *    0.36  *
   1.69  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 12

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -191.87     922 -142.69     920 -120.33     918   -96.1     916  -53.04     914
   -7.97     912       0  911.39     .07     912    6.26     914    25.4     916
   57.51     918  209.42     920  229.18   920.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -191.87     .04   -7.97    .035     .07     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -7.97     .07           124.76  124.66  124.56             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  916.82  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.08  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  916.74  * Reach Len. (ft)        *  124.76  *  124.66  *
 124.56  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  246.88  *   40.57  *
  60.88  *
* E.G. Slope (ft/ft)     *0.000821  * Area (sq ft)           *  246.88  *   40.57  *
  60.88  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  489.05  *  138.71  *
  89.24  *
* Top Width (ft)         *  142.37  * Top Width (ft)         *   97.10  *    8.04  *
  37.22  *
* Vel Total (ft/s)       *    2.06  * Avg. Vel. (ft/s)       *    1.98  *    3.42  *
   1.47  *
* Max Chl Dpth (ft)      *    5.35  * Hydr. Depth (ft)       *    2.54  *    5.05  *
   1.64  *
* Conv. Total (cfs)      * 25025.9  * Conv. (cfs)            * 17069.5  *  4841.6  *
 3114.7  *
* Length Wtd. (ft)       *  124.66  * Wetted Per. (ft)       *   97.23  *    8.61  *
```

```
  37.67  *
* Min Ch El (ft)         *  911.39  * Shear (lb/sq ft)       *    0.13  *    0.24  *
   0.08  *
* Alpha                  *    1.23  * Stream Power (lb/ft s) *  229.18  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *    3.50  *    1.67  *
   4.13  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    1.53  *    0.33  *
   1.64  *
*******************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 11

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -176.09   922.4 -145.71     922 -121.56     920  -99.25     918  -75.14     916
  -43.53     914    -7.1     912       0  911.09       2     912   10.74     914
  205.06     914  224.25     916  254.62     918  358.92     920

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -176.09     .04    -7.1    .035       2     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          -7.1       2            214.49  210.75  212.18             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  916.77  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.01  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  916.75  * Reach Len. (ft)        *  214.49  *  210.75  *
 212.18  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  195.69  *   47.41  *
 606.14  *
* E.G. Slope (ft/ft)     *0.000134  * Area (sq ft)           *  195.69  *   47.41  *
 606.14  *
* Q Total (cfs)          *  717.00  * Flow (cfs)             *  156.42  *   68.78  *
 491.80  *
* Top Width (ft)         *  319.95  * Top Width (ft)         *   77.14  *    9.10  *
 233.71  *
* Vel Total (ft/s)       *    0.84  * Avg. Vel. (ft/s)       *    0.80  *    1.45  *
   0.81  *
* Max Chl Dpth (ft)      *    5.66  * Hydr. Depth (ft)       *    2.54  *    5.21  *
   2.59  *
* Conv. Total (cfs)      * 61903.9  * Conv. (cfs)            * 13504.6  *  5938.3  *
42461.1  *
* Length Wtd. (ft)       *  212.86  * Wetted Per. (ft)       *   77.29  *    9.36  *
```

```
 234.07  *
* Min Ch El (ft)         *  911.09  * Shear (lb/sq ft)       *    0.02  *    0.04  *
   0.02  *
* Alpha                  *    1.11  * Stream Power (lb/ft s) *  358.92  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *    2.87  *    1.55  *
   3.18  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    1.28  *    0.31  *
   1.25  *
*******************************************************************************
***********

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.

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 10

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -187.05     922 -152.44     920  -120.7     918  -81.94     916  -63.94     914
  -33.32     914   -6.82     912       0  910.58     .12     912   14.51     914
   32.75     916   43.93     918   87.96     920  111.77     920

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -187.05    .085   -6.82    .055     .12    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -6.82     .12           114.57  109.84  113.88             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  916.65  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.17  * Wt. n-Val.             *   0.085  *   0.055  *
  0.085  *
* W.S. Elev (ft)         *  916.48  * Reach Len. (ft)        *  114.57  *  109.84  *
 113.88  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  197.07  *   36.02  *
  77.74  *
* E.G. Slope (ft/ft)     *0.005858  * Area (sq ft)           *  197.07  *   36.02  *
  77.74  *
* Q Total (cfs)          *  835.00  * Flow (cfs)             *  463.23  *  196.74  *
 175.03  *
* Top Width (ft)         *  126.69  * Top Width (ft)         *   84.43  *    6.94  *
  35.32  *
* Vel Total (ft/s)       *    2.69  * Avg. Vel. (ft/s)       *    2.35  *    5.46  *
   2.25  *
* Max Chl Dpth (ft)      *    5.90  * Hydr. Depth (ft)       *    2.33  *    5.19  *
   2.20  *
* Conv. Total (cfs)      * 10910.1  * Conv. (cfs)            *  6052.6  *  2570.6  *
 2286.9  *
* Length Wtd. (ft)       *  112.52  * Wetted Per. (ft)       *   84.63  *    8.39  *
```

```
  35.61  *
* Min Ch El (ft)         *  910.58  * Shear (lb/sq ft)       *    0.85  *    1.57  *
   0.80  *
* Alpha                  *    1.55  * Stream Power (lb/ft s) *  111.77  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.67  * Cum Volume (acre-ft)   *    1.90  *    1.35  *
   1.51  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.88  *    0.27  *
   0.60  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 9

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -187.8     922 -163.94     920 -136.67     918 -112.04     916   -82.5     914
     -29     914  -13.74     912       0  910.32    5.67     912   15.47     914
   24.89     916   44.27     918   81.92     920  120.16     922

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -187.8    .085  -13.74    .055    5.67    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -13.74    5.67             86.59   88.52   90.32             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  915.97  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *   0.085  *   0.055  *
  0.085  *
* W.S. Elev (ft)         *  915.66  * Reach Len. (ft)        *   86.59  *   88.52  *
  90.32  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  149.88  *   87.37  *
  32.58  *
* E.G. Slope (ft/ft)     *0.005983  * Area (sq ft)           *  149.88  *   87.37  *
  32.58  *
* Q Total (cfs)          *  835.00  * Flow (cfs)             *  277.62  *  491.95  *
  65.43  *
* Top Width (ft)         *  130.33  * Top Width (ft)         *   93.30  *   19.41  *
  17.63  *
* Vel Total (ft/s)       *    3.09  * Avg. Vel. (ft/s)       *    1.85  *    5.63  *
   2.01  *
* Max Chl Dpth (ft)      *    5.34  * Hydr. Depth (ft)       *    1.61  *    4.50  *
   1.85  *
* Conv. Total (cfs)      * 10795.0  * Conv. (cfs)            *  3589.1  *  6359.9  *
  845.9  *
* Length Wtd. (ft)       *   88.03  * Wetted Per. (ft)       *   93.49  *   19.76  *
  18.00  *
* Min Ch El (ft)         *  910.32  * Shear (lb/sq ft)       *    0.60  *    1.65  *
   0.68  *
* Alpha                  *    2.10  * Stream Power (lb/ft s) *  120.16  *    0.00  *
```

```
   0.00  *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)   *    1.44  *    1.19  *
   1.37  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *    0.65  *    0.24  *
   0.53  *
*******************************************************************************
***********

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: Tributary I-2
REACH: 1                  RS: 8

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -206.94     922 -190.87     922 -165.97     920 -146.99     918 -127.81     916
 -103.89     914  -36.36     912        0  910.11     5.2     912   13.65     914
   19.72     916   25.83     918   38.32     920  102.08   920.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -206.94    .085  -36.36    .055     5.2    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -36.36     5.2           111.89  115.28  120.44             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  915.65  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.11  * Wt. n-Val.             *   0.085  *   0.055  *
  0.085  *
* W.S. Elev (ft)         *  915.54  * Reach Len. (ft)        *  111.89  *  115.28  *
 120.44  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  185.59  *  186.34  *
  25.04  *
* E.G. Slope (ft/ft)     *0.001800  * Area (sq ft)           *  185.59  *  186.34  *
  25.04  *
* Q Total (cfs)          *  835.00  * Flow (cfs)             *  229.83  *  577.26  *
  27.91  *
* Top Width (ft)         *  140.61  * Top Width (ft)         *   85.93  *   41.56  *
  13.12  *
* Vel Total (ft/s)       *    2.10  * Avg. Vel. (ft/s)       *    1.24  *    3.10  *
   1.11  *
* Max Chl Dpth (ft)      *    5.43  * Hydr. Depth (ft)       *    2.16  *    4.48  *
   1.91  *
* Conv. Total (cfs)      * 19680.1  * Conv. (cfs)            *  5416.9  * 13605.4  *
  657.7  *
* Length Wtd. (ft)       *  115.13  * Wetted Per. (ft)       *   86.03  *   41.94  *
  13.60  *
* Min Ch El (ft)         *  910.11  * Shear (lb/sq ft)       *    0.24  *    0.50  *
   0.21  *
* Alpha                  *    1.60  * Stream Power (lb/ft s) *  102.08  *    0.00  *
```

```
   0.00  *
* Frctn Loss (ft)        *    0.26  * Cum Volume (acre-ft)   *    1.11  *    0.91  *
   1.31  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.47  *    0.18  *
   0.50  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 7

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -237.95     920 -107.87     920  -95.39     918  -80.87     916  -52.18     914
     -21     912   -4.02     910       0  909.55    9.79     910   31.37     912
   42.96     914   55.36     916    69.8     918   84.18     920  130.76     922
  145.77   922.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -237.95    .085   -4.02    .055    9.79    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -4.02    9.79             97.33   93.66   92.36             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  915.38  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.16  * Wt. n-Val.             *   0.085  *   0.055  *
  0.085  *
* W.S. Elev (ft)         *  915.22  * Reach Len. (ft)        *   97.33  *   93.66  *
  92.36  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *  151.31  *   75.14  *
 121.26  *
* E.G. Slope (ft/ft)     *0.003002  * Area (sq ft)           *  151.31  *   75.14  *
 121.26  *
* Q Total (cfs)          *  835.00  * Flow (cfs)             *  252.42  *  343.54  *
 239.04  *
* Top Width (ft)         *  120.13  * Top Width (ft)         *   65.61  *   13.81  *
  40.71  *
* Vel Total (ft/s)       *    2.40  * Avg. Vel. (ft/s)       *    1.67  *    4.57  *
   1.97  *
* Max Chl Dpth (ft)      *    5.67  * Hydr. Depth (ft)       *    2.31  *    5.44  *
   2.98  *
* Conv. Total (cfs)      * 15239.2  * Conv. (cfs)            *  4606.7  *  6269.8  *
 4362.6  *
* Length Wtd. (ft)       *   94.10  * Wetted Per. (ft)       *   65.83  *   13.85  *
  41.07  *
* Min Ch El (ft)         *  909.55  * Shear (lb/sq ft)       *    0.43  *    1.02  *
   0.55  *
* Alpha                  *    1.83  * Stream Power (lb/ft s) *  145.77  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   *    0.68  *    0.57  *
   1.11  *
```

```
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.28  *    0.10  *
   0.42  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary I-2
REACH: 1                  RS: 6

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    -204   920.9 -102.07     920  -71.03     918  -49.27     916  -34.49     914
  -22.27     912   -6.43     910       0  908.95    6.64     910   37.56     912
   75.44     914      90     916  103.23     918  126.01     920  187.04   920.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
    -204    .085   -6.43    .055    6.64    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -6.43    6.64            58.51   55.24   53.63             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  915.10  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.15  * Wt. n-Val.             *   0.085  *   0.055  *
  0.085  *
* W.S. Elev (ft)         *  914.95  * Reach Len. (ft)        *   58.51  *   55.24  *
  53.63  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   89.64  *   71.53  *
 199.10  *
* E.G. Slope (ft/ft)     *0.002909  * Area (sq ft)           *   89.64  *   71.53  *
 199.10  *
* Q Total (cfs)          *  835.00  * Flow (cfs)             *  156.98  *  320.91  *
 357.10  *
* Top Width (ft)         *  123.83  * Top Width (ft)         *   35.06  *   13.07  *
  75.70  *
* Vel Total (ft/s)       *    2.32  * Avg. Vel. (ft/s)       *    1.75  *    4.49  *
   1.79  *
* Max Chl Dpth (ft)      *    6.00  * Hydr. Depth (ft)       *    2.56  *    5.47  *
   2.63  *
* Conv. Total (cfs)      * 15482.0  * Conv. (cfs)            *  2910.7  *  5950.1  *
 6621.1  *
* Length Wtd. (ft)       *   55.15  * Wetted Per. (ft)       *   35.41  *   13.24  *
  75.88  *
* Min Ch El (ft)         *  908.95  * Shear (lb/sq ft)       *    0.46  *    0.98  *
   0.48  *
* Alpha                  *    1.80  * Stream Power (lb/ft s) *  187.04  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)   *    0.41  *    0.41  *
   0.77  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.16  *    0.07  *
   0.30  *
*******************************************************************************
***********
```

CROSS SECTION

RIVER: Tributary I-2
REACH: 1 RS: 5

INPUT
Description: topography data from 2007 Franklin County auditors
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-233.67	920.9	-136.68	920	-88.86	918	-47.93	916	-35.41	914
-25.46	912	-6.18	910	0	908.59	3.6	910	45.56	912
73.49	914	83.59	916	92.25	918	110.95	920	166.42	920.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-233.67	.085	-6.18	.055	3.6	.085

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-6.18	3.6	146.63	142.09	140.77	.1	.3

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	914.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.	0.085	0.055	0.085
W.S. Elev (ft)	914.79	Reach Len. (ft)	146.63	142.09	140.77
Crit W.S. (ft)		Flow Area (sq ft)	92.85	53.75	210.63
E.G. Slope (ft/ft)	0.003131	Area (sq ft)	92.85	53.75	210.63
Q Total (cfs)	835.00	Flow (cfs)	175.57	245.93	413.50
Top Width (ft)	117.84	Top Width (ft)	34.18	9.78	73.88
Vel Total (ft/s)	2.34	Avg. Vel. (ft/s)	1.89	4.58	1.96
Max Chl Dpth (ft)	6.20	Hydr. Depth (ft)	2.72	5.50	2.85
Conv. Total (cfs)	14923.5	Conv. (cfs)	3137.9	4395.3	7390.3
Length Wtd. (ft)	142.42	Wetted Per. (ft)	34.54	10.21	74.08
Min Ch El (ft)	908.59	Shear (lb/sq ft)	0.53	1.03	0.56
Alpha	1.62	Stream Power (lb/ft s)	166.42	0.00	0.00
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	0.29	0.33	0.52
C & E Loss (ft)	0.00	Cum SA (acres)	0.12	0.06	0.21

CROSS SECTION

RIVER: Tributary I-2
REACH: 1 RS: 4

INPUT
Description: Upstream section of confluence with North Fork Indian Run
topography data from 2007 Franklin County auditors
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-265.88	918	-221.59	916	-64.33	916	-47.7	914	-32.24	912
-15.67	910	-3.33	908	0	907.91	1.28	908	10.91	910
32.79	912	57.15	914	102.06	916	120.31	918	134.01	920
170.93	920.5								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-265.88	.085	-15.67	.055	10.91	.085

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-15.67	10.91	0	0	0	.1	.3

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	914.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.085	0.055	0.085
W.S. Elev (ft)	914.37	Reach Len. (ft)			
Crit W.S. (ft)	911.95	Flow Area (sq ft)	77.59	147.55	108.65
E.G. Slope (ft/ft)	0.002232	Area (sq ft)	77.59	147.55	108.65
Q Total (cfs)	835.00	Flow (cfs)	108.18	585.08	141.74
Top Width (ft)	116.23	Top Width (ft)	35.11	26.58	54.55
Vel Total (ft/s)	2.50	Avg. Vel. (ft/s)	1.39	3.97	1.30
Max Chl Dpth (ft)	6.46	Hydr. Depth (ft)	2.21	5.55	1.99
Conv. Total (cfs)	17672.6	Conv. (cfs)	2289.6	12383.0	3000.0
Length Wtd. (ft)		Wetted Per. (ft)	35.38	26.95	54.73
Min Ch El (ft)	907.91	Shear (lb/sq ft)	0.31	0.76	0.28
Alpha	1.85	Stream Power (lb/ft s)	170.93	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

SUMMARY OF MANNING'S N VALUES

River:Tributary I-2

Reach	River Sta.	n1	n2	n3
1	73	.04	.035	.08
1	72	.04	.035	.08
1	71	.04	.035	.08
1	70.5	Bridge		
1	69	.04	.035	.08
1	68	.04	.035	.08
1	67	.04	.035	.08
1	66	.04	.035	.04
1	65	.04	.035	.04
1	64.5	Culvert		
1	64	.04	.035	.04
1	63	.04	.035	.04
1	62	Inl Struct		
1	61	.04	.035	.04
1	60	.04	.035	.04
1	59.5	Bridge		
1	59	.04	.035	.04
1	58	.04	.035	.04
1	57	Inl Struct		
1	56	.04	.035	.04
1	55	Bridge		
1	54	.04	.035	.04
1	53	.04	.035	.04
1	52	.04	.035	.04
1	51	.04	.035	.04
1	50	.04	.035	.04
1	49	.04	.035	.04
1	48.5	Bridge		
1	48	.04	.035	.04
1	47	Inl Struct		
1	46	.04	.035	.04
1	45	.04	.035	.04
1	44.5	Bridge		
1	44	.04	.035	.04
1	43	.04	.035	.04
1	42	Inl Struct		
1	41	.04	.035	.04
1	40.5	Bridge		
1	40	.04	.035	.04
1	39	.04	.035	.04
1	38	.04	.035	.04
1	37	.04	.035	.04
1	36	Inl Struct		
1	35	.04	.035	.04
1	34.5	Bridge		
1	34	.04	.035	.04
1	33	.04	.035	.04
1	32	.04	.035	.055
1	31	.04	.035	.055
1	30.5	Bridge		
1	30	.04	.035	.085
1	29	.04	.035	.085
1	28	.04	.035	.085
1	27	.04	.035	.085
1	26	.04	.035	.085
1	25	.04	.035	.085
1	24	.04	.035	.085
1	23	.04	.035	.085
1	22	.04	.035	.085

*1	*	21	* .04*	.035*	.085*
*1	*	20	* .04*	.035*	.085*
*1	*	19	* .04*	.035*	.085*
*1	*	18	* .04*	.035*	.085*
*1	*	17	* .04*	.035*	.085*
*1	*	16.5	*Bridge *	*	*
*1	*	16	* .04*	.035*	.04*
*1	*	15	* .04*	.035*	.04*
*1	*	14	* .04*	.035*	.04*
*1	*	13	* .04*	.035*	.04*
*1	*	12	* .04*	.035*	.04*
*1	*	11	* .04*	.035*	.04*
*1	*	10	* .085*	.055*	.085*
*1	*	9	* .085*	.055*	.085*
*1	*	8	* .085*	.055*	.085*
*1	*	7	* .085*	.055*	.085*
*1	*	6	* .085*	.055*	.085*
*1	*	5	* .085*	.055*	.085*
*1	*	4	* .085*	.055*	.085*

SUMMARY OF REACH LENGTHS

River: Tributary I-2

* Reach	*	River Sta.	* Left	* Channel	* Right *
*1	*	73	* 166.47*	166.47*	166.47*
*1	*	72	* 48.85*	48.85*	48.85*
*1	*	71	* 137.52*	137.52*	137.52*
*1	*	70.5	*Bridge *	*	*
*1	*	69	* 59.6*	59.6*	59.6*
*1	*	68	* 145.9*	145.9*	145.9*
*1	*	67	* 110.68*	110.68*	110.68*
*1	*	66	* 76.03*	76.03*	76.03*
*1	*	65	* 64.59*	64.59*	64.59*
*1	*	64.5	*Culvert *	*	*
*1	*	64	* 88.46*	88.46*	88.46*
*1	*	63	* 70.69*	70.69*	70.69*
*1	*	62	*Inl Struct*	*	*
*1	*	61	* 84.25*	84.25*	84.25*
*1	*	60	* 49.43*	49.43*	49.43*
*1	*	59.5	*Bridge *	*	*
*1	*	59	* 68.22*	68.22*	68.22*
*1	*	58	* 30.03*	30.03*	30.03*
*1	*	57	*Inl Struct*	*	*
*1	*	56	* 103.77*	103.77*	103.77*
*1	*	55	*Bridge *	*	*
*1	*	54	* 123.44*	123.44*	123.44*
*1	*	53	* 99.2*	110.1*	126.17*
*1	*	52	* 181.07*	146.99*	122.24*
*1	*	51	* 139.54*	139.54*	139.54*
*1	*	50	* 38.2*	38.2*	38.2*
*1	*	49	* 15.76*	15.76*	15.76*
*1	*	48.5	*Bridge *	*	*
*1	*	48	* 41.86*	41.86*	41.86*
*1	*	47	*Inl Struct*	*	*
*1	*	46	* 174.66*	174.66*	174.66*
*1	*	45	* 49.93*	49.93*	49.93*
*1	*	44.5	*Bridge *	*	*
*1	*	44	* 151.44*	151.44*	151.44*

```
*1              *    43          *    23.85*    23.85*    23.85*
*1              *    42          *Inl Struct*         *         *
*1              *    41          *    71.74*    71.74*    71.74*
*1              *    40.5        *Bridge   *         *         *
*1              *    40          *   124.17*   124.17*   124.17*
*1              *    39          *    71.29*    71.29*    71.29*
*1              *    38          *    121.3*    121.3*    121.3*
*1              *    37          *    17.95*    17.95*    17.95*
*1              *    36          *Inl Struct*         *         *
*1              *    35          *    27.71*    27.71*    27.71*
*1              *    34.5        *Bridge   *         *         *
*1              *    34          *   173.79*   173.79*   173.79*
*1              *    33          *   248.24*   248.24*   248.24*
*1              *    32          *    53.38*    53.84*    54.83*
*1              *    31          *   127.91*   127.45*   126.72*
*1              *    30.5        *Bridge   *         *         *
*1              *    30          *    95.68*    95.65*    96.41*
*1              *    29          *   186.09*   186.72*   188.57*
*1              *    28          *   164.46*   165.33*   163.53*
*1              *    27          *       79*    79.58*     79.8*
*1              *    26          *   121.93*   123.14*   124.74*
*1              *    25          *   115.12*   115.81*   116.16*
*1              *    24          *   111.92*   114.11*   114.69*
*1              *    23          *   104.37*   105.78*   105.84*
*1              *    22          *    80.35*    78.53*     77.8*
*1              *    21          *    82.04*    82.05*    81.48*
*1              *    20          *    80.71*     79.6*    79.04*
*1              *    19          *    69.19*     68.6*    67.05*
*1              *    18          *   111.01*   112.17*   112.41*
*1              *    17          *    33.51*    29.83*    31.61*
*1              *    16.5        *Bridge   *         *         *
*1              *    16          *    94.69*    96.26*   101.86*
*1              *    15          *   103.65*    103.4*   101.83*
*1              *    14          *   125.87*   126.56*   128.25*
*1              *    13          *    86.01*    84.39*    84.25*
*1              *    12          *   124.76*   124.66*   124.56*
*1              *    11          *   214.49*   210.75*   212.18*
*1              *    10          *   114.57*   109.84*   113.88*
*1              *    9           *    86.59*    88.52*    90.32*
*1              *    8           *   111.89*   115.28*   120.44*
*1              *    7           *    97.33*    93.66*    92.36*
*1              *    6           *    58.51*    55.24*    53.63*
*1              *    5           *   146.63*   142.09*   140.77*
*1              *    4           *        0*        0*        0*
*****************************************************************

*******************************************************************************

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Tributary I-2

*****************************************************
*     Reach      *   River Sta.   * Contr.  * Expan.  *
*****************************************************
*1              *    73      *       .1*       .3*
*1              *    72      *       .1*       .3*
*1              *    71      *       .3*       .5*
*1              *    70.5    *Bridge   *         *
*1              *    69      *       .3*       .5*
*1              *    68      *       .1*       .3*
*1              *    67      *       .1*       .3*
*1              *    66      *       .1*       .3*
*1              *    65      *       .3*       .5*
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*1                *    64.5    *Culvert  *          *
*1                *    64      *       .3*       .5*
*1                *    63      *       .1*       .3*
*1                *    62      *Inl Struct*         *
*1                *    61      *       .1*       .3*
*1                *    60      *       .3*       .5*
*1                *    59.5    *Bridge   *          *
*1                *    59      *       .3*       .5*
*1                *    58      *       .3*       .5*
*1                *    57      *Inl Struct*         *
*1                *    56      *       .3*       .5*
*1                *    55      *Bridge   *          *
*1                *    54      *       .1*       .3*
*1                *    53      *       .1*       .3*
*1                *    52      *       .1*       .3*
*1                *    51      *       .1*       .3*
*1                *    50      *       .1*       .3*
*1                *    49      *       .3*       .5*
*1                *    48.5    *Bridge   *          *
*1                *    48      *       .3*       .5*
*1                *    47      *Inl Struct*         *
*1                *    46      *       .1*       .3*
*1                *    45      *       .3*       .5*
*1                *    44.5    *Bridge   *          *
*1                *    44      *       .3*       .5*
*1                *    43      *       .3*       .5*
*1                *    42      *Inl Struct*         *
*1                *    41      *       .3*       .5*
*1                *    40.5    *Bridge   *          *
*1                *    40      *       .3*       .5*
*1                *    39      *       .1*       .3*
*1                *    38      *       .1*       .3*
*1                *    37      *       .1*       .3*
*1                *    36      *Inl Struct*         *
*1                *    35      *       .3*       .5*
*1                *    34.5    *Bridge   *          *
*1                *    34      *       .3*       .5*
*1                *    33      *       .1*       .3*
*1                *    32      *       .1*       .3*
*1                *    31      *       .1*       .3*
*1                *    30.5    *Bridge   *          *
*1                *    30      *       .1*       .3*
*1                *    29      *       .1*       .3*
*1                *    28      *       .1*       .3*
*1                *    27      *       .1*       .3*
*1                *    26      *       .1*       .3*
*1                *    25      *       .1*       .3*
*1                *    24      *       .1*       .3*
*1                *    23      *       .1*       .3*
*1                *    22      *       .1*       .3*
*1                *    21      *       .1*       .3*
*1                *    20      *       .1*       .3*
*1                *    19      *       .1*       .3*
*1                *    18      *       .1*       .3*
*1                *    17      *       .1*       .3*
*1                *    16.5    *Bridge   *          *
*1                *    16      *       .1*       .3*
*1                *    15      *       .1*       .3*
*1                *    14      *       .1*       .3*
*1                *    13      *       .1*       .3*
*1                *    12      *       .1*       .3*
*1                *    11      *       .1*       .3*
*1                *    10      *       .1*       .3*
```

```
*1              *    9       *       .1*       .3*
*1              *    8       *       .1*       .3*
*1              *    7       *       .1*       .3*
*1              *    6       *       .1*       .3*
*1              *    5       *       .1*       .3*
*1              *    4       *       .1*       .3*
*****************************************************
```

Unnamed Tributary

HEC-RAS River: Tributary Reach: 1 Profile: 100-year

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	21	100-year	Unnamed Trib Ex	204.00	933.82	937.00	935.96	937.28	0.002660	4.58	55.63	31.60	0.46
1	21	100-year	UnnamedTribProp	204.00	933.82	936.37	935.96	936.93	0.006708	6.24	37.97	24.67	0.71
1	20.5			Bridge									
1	20	100-year	Unnamed Trib Ex	204.00	933.80	936.10	936.00	936.75	0.010173	6.70	34.37	25.26	0.83
1	20	100-year	UnnamedTribProp	204.00	933.80	936.00	936.00	936.75	0.012334	7.14	31.89	24.18	0.91
1	19.5	100-year	Unnamed Trib Ex	204.00	933.80	936.31		936.46	0.001861	3.31	73.16	44.73	0.37
1	19.5	100-year	UnnamedTribProp	204.00	933.80	936.00		936.22	0.003154	3.93	59.88	40.08	0.48
1	19	100-year	Unnamed Trib Ex	204.00	933.70	936.34		936.37	0.000390	1.50	153.23	86.42	0.17
1	19	100-year	UnnamedTribProp	204.00	933.70	936.07		936.12	0.000606	1.73	130.74	80.64	0.21
1	18	100-year	Unnamed Trib Ex	204.00	933.50	936.35		936.36	0.000103	0.86	269.09	147.45	0.09
1	18	100-year	UnnamedTribProp	204.00	933.50	936.08		936.09	0.000149	0.97	232.55	124.99	0.11
1	17	100-year	Unnamed Trib Ex	204.00	933.20	936.34		936.35	0.000085	0.74	319.31	225.22	0.08
1	17	100-year	UnnamedTribProp	204.00	933.20	936.07		936.08	0.000131	0.86	260.09	211.86	0.10
1	16	100-year	Unnamed Trib Ex	204.00	933.02	936.23	935.47	936.33	0.001363	3.19	113.16	118.60	0.33
1	16	100-year	UnnamedTribProp	204.00	933.02	935.72	935.47	936.03	0.004278	4.99	63.02	79.32	0.56
1	15			Inl Struct									
1	14	100-year	Unnamed Trib Ex	204.00	932.97	935.45	935.45	935.97	0.007604	6.21	44.86	57.59	0.73
1	14	100-year	UnnamedTribProp	204.00	932.97	935.45	935.45	935.97	0.007610	6.21	44.84	57.57	0.73
1	13	100-year	Unnamed Trib Ex	204.00	930.26	935.30	933.73	935.45	0.001555	3.83	87.07	59.30	0.31
1	13	100-year	UnnamedTribProp	204.00	930.26	933.73	933.73	934.52	0.011376	7.88	32.70	20.46	0.79
1	12.5			Culvert									
1	12	100-year	Unnamed Trib Ex	204.00	929.95	933.48		934.07	0.006245	6.34	35.82	21.00	0.66
1	12	100-year	UnnamedTribProp	204.00	929.95	933.16	932.89	933.96	0.009552	7.27	29.94	16.71	0.80
1	11	100-year	Unnamed Trib Ex	204.00	929.26	933.01	931.58	933.25	0.001961	4.24	64.88	79.94	0.40
1	11	100-year	UnnamedTribProp	204.00	929.26	932.52		932.82	0.003027	4.77	51.44	25.45	0.48
1	10.5			Bridge									
1	10	100-year	Unnamed Trib Ex	204.00	929.26	932.70		932.92	0.002357	4.44	63.97	34.34	0.43
1	10	100-year	UnnamedTribProp	204.00	929.26	932.42		932.72	0.003536	5.12	54.67	32.01	0.52
1	9	100-year	Unnamed Trib Ex	204.00	928.59	932.56	931.32	932.78	0.001947	4.23	65.74	36.52	0.39
1	9	100-year	UnnamedTribProp	204.00	928.59	932.19		932.50	0.003118	4.97	53.25	30.26	0.49
1	8.5			Bridge									
1	8	100-year	Unnamed Trib Ex	204.00	928.59	931.46	931.38	932.20	0.009305	7.40	34.31	24.72	0.82
1	8	100-year	UnnamedTribProp	204.00	928.59	932.00	931.38	932.38	0.004029	5.53	49.90	33.26	0.55
1	7.5	100-year	Unnamed Trib Ex	204.00	928.59	931.66		931.82	0.002465	4.01	85.40	83.15	0.43
1	7.5	100-year	UnnamedTribProp	204.00	928.59	932.19		932.26	0.000917	2.76	140.02	130.67	0.27
1	7	100-year	Unnamed Trib Ex	204.00	928.55	931.62		931.79	0.002519	4.07	84.11	83.31	0.43
1	7	100-year	UnnamedTribProp	204.00	928.55	932.19	930.99	932.25	0.000875	2.72	141.69	130.56	0.26
1	6.5	100-year	Unnamed Trib Ex	204.00	928.60	931.52	930.97	931.74	0.003200	4.47	78.08	94.25	0.49
1	6	100-year	Unnamed Trib Ex	204.00	928.60	931.12	930.98	931.66	0.008241	6.41	44.37	52.02	0.76
1	5	100-year	Unnamed Trib Ex	204.00	928.57	931.34	930.71	931.48	0.002083	3.73	97.59	116.37	0.40
1	4			Inl Struct									
1	3	100-year	Unnamed Trib Ex	204.00	927.57	930.01	929.98	931.09	0.015689	8.97	27.80	19.52	1.05
1	2.5	100-year	Unnamed Trib Ex	204.00	927.57	930.30	929.91	930.83	0.006464	6.14	42.02	43.37	0.69
1	2	100-year	Unnamed Trib Ex	204.00	927.20	930.37		930.55	0.001989	3.81	69.92	40.92	0.40
1	2	100-year	UnnamedTribProp	204.00	927.20	930.37		930.55	0.001989	3.81	69.92	40.92	0.40
1	1	100-year	Unnamed Trib Ex	204.00	927.00	930.17	929.43	930.24	0.001161	2.80	132.88	133.63	0.30
1	1	100-year	UnnamedTribProp	204.00	927.00	930.17	929.43	930.24	0.001161	2.80	132.88	133.63	0.30

Tributary.rep

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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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
XXXXXXX  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
```

****

PROJECT DATA
Project Title: Unnamed Tributary
Project File : Tributary.prj
Run Date and Time: 7/1/2014 10:43:44 AM

Project in English units

****

PLAN DATA

Plan Title: Unnamed Tributary Existing
Plan File : j:\20131358\Reports\Floodplain\HEC-RAS\Tributary.p02

Geometry Title: Unnamed Tributary Existing
Geometry File : j:\20131358\Reports\Floodplain\HEC-RAS\Tributary.g02

Flow Title : Unnamed Tributary
Flow File : j:\20131358\Reports\Floodplain\HEC-RAS\Tributary.f01

Plan Summary Information:

Number of:	Cross Sections	= 23	Multiple Openings	=	0
	Culverts	= 1	Inline Structures	=	2
	Bridges	= 3	Lateral Structures	=	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: Subcritical Flow

****

FLOW DATA

Flow Title: Unnamed Tributary

Flow File : j:\20131358\Reports\Floodplain\HEC-RAS\Tributary.f01

Flow Data (cfs)

River	Reach	RS	100-year
Tributary	1	21	204

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Tributary	1	100-year	Normal S = 0.00116	

GEOMETRY DATA

Geometry Title: Unnamed Tributary Existing
Geometry File : j:\20131358\Reports\Floodplain\HEC-RAS\Tributary.g02

CROSS SECTION

RIVER: Tributary
REACH: 1 RS: 21

INPUT
Description: Upstream Section of B8
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-103.03	941.9	-60.93	941	-52.84	940	-45.59	939	-29.04	938
-20.35	937	-13.54	936	-11.79	936	-11.38	936	-10.25	935
-9.36	934.21	-2	933.82	0	933.82	2	933.82	3	934.21
3.5	935	7.04	936	11.27	937	15.76	938	103.61	938
142.13	939								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-103.03	.04	-9.36	.035	3	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-9.36	3	18.4	18.4	18.4	.3	.5

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	937.28	Element	Left OB	Channel / Right OB
Vel Head (ft)	0.28	Wt. n-Val.	0.040	0.035 / 0.040
W.S. Elev (ft)	937.00	Reach Len. (ft)	4.33	4.33 / 4.33
Crit W.S. (ft)	935.96	Flow Area (sq ft)	9.37	37.65 / 8.61

```
* E.G. Slope (ft/ft)     *0.002660  * Area (sq ft)           *    9.37  *   37.65  *
   8.61  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *   15.46  *  172.48  *
  16.06  *
* Top Width (ft)         *   31.60  * Top Width (ft)         *   10.98  *   12.36  *
   8.26  *
* Vel Total (ft/s)       *    3.67  * Avg. Vel. (ft/s)       *    1.65  *    4.58  *
   1.87  *
* Max Chl Dpth (ft)      *    3.18  * Hydr. Depth (ft)       *    0.85  *    3.05  *
   1.04  *
* Conv. Total (cfs)      *  3955.1  * Conv. (cfs)            *   299.7  *  3343.9  *
  311.5  *
* Length Wtd. (ft)       *    4.33  * Wetted Per. (ft)       *   11.73  *   12.44  *
   8.95  *
* Min Ch El (ft)         *  933.82  * Shear (lb/sq ft)       *    0.13  *    0.50  *
   0.16  *
* Alpha                  *    1.36  * Stream Power (lb/ft s) *  142.13  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *    0.44  *    1.54  *
   0.40  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *    0.63  *    0.51  *
   0.63  *
*******************************************************************************
***********

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.

BRIDGE


RIVER: Tributary
REACH: 1                  RS: 20.5

INPUT
Description:
Distance from Upstream XS =    4.33
Deck/Roadway Width        =    7.81
Weir Coefficient          =     2.6
Bridge Pier Skew          =      19
Upstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
     -40   937.7     900     -25  937.78  935.97      25  938.16   936.3
     400     938     900

Upstream Bridge Cross Section Data
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -103.03   941.9  -60.93     941  -52.84     940  -45.59     939  -29.04     938
  -20.35     937  -13.54     936  -11.79     936  -11.38     936  -10.25     935
   -9.36  934.21      -2  933.82       0  933.82       2  933.82       3  934.21
     3.5     935    7.04     936   11.27     937   15.76     938  103.61     938
  142.13     939

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -103.03     .04   -9.36    .035       3     .04
```

```
Bank Sta: Left   Right    Coeff Contr.   Expan.
         -9.36       3             .3       .5

Downstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
     -40   937.7     900     -25  937.78  935.97      25  938.16   936.3
     400     938     900

Downstream Bridge Cross Section Data
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -108.22  941.64  -58.15     941   -50.4     940  -42.72     939  -35.47     938
  -27.93     937  -24.33     937  -13.26     937   -9.76     936   -6.28     935
   -3.16  934.16      -2   933.8       0   933.8       2   933.8       5   933.8
    6.19  934.07     7.6     935   14.39     936    21.7     937  118.75     938
  153.06     939

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -108.22     .04   -6.28    .035     7.6     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -6.28     7.6             .3       .5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #100-year
*******************************************************************************
*********
* E.G. US. (ft)          *     937.28  * Element                *Inside BR US
*Inside BR DS *
* W.S. US. (ft)          *     937.00  * E.G. Elev (ft)         *     937.12  *
936.86  *
* Q Total (cfs)          *     204.00  * W.S. Elev (ft)         *     936.37  *
936.25  *
* Q Bridge (cfs)         *     204.00  * Crit W.S. (ft)         *     935.99  *
936.01  *
```

```
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *       2.55  *
 2.45  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.37  *
 5.72  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *      32.00  *
35.67  *
* Weir Submerg           *             * Froude # Chl           *       0.77  *
 0.71  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *      83.19  *
75.95  *
* Min El Weir Flow (ft)  *     937.78  * Hydr Depth (ft)        *             *
       *
* Min El Prs (ft)        *     936.19  * W.P. Total (ft)        *      44.70  *
53.03  *
* Delta EG (ft)          *       0.53  * Conv. Total (cfs)      *     1274.9  *
1339.9  *
* Delta WS (ft)          *       0.90  * Top Width (ft)         *             *
       *
* BR Open Area (sq ft)   *      32.00  * Frctn Loss (ft)        *       0.19  *
 0.09  *
* BR Open Vel (ft/s)     *       6.37  * C & E Loss (ft)        *       0.07  *
 0.01  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.14  *
 0.97  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *    -103.03  *
-108.22  *
*******************************************************************************
*********

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

CROSS SECTION


RIVER: Tributary
REACH: 1                  RS: 20

INPUT
Description: Downstream Section of B8
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -108.22  941.64  -58.15     941   -50.4     940  -42.72     939  -35.47     938
  -27.93     937  -24.33     937  -13.26     937   -9.76     936   -6.28     935
   -3.16  934.16      -2   933.8       0   933.8       2   933.8       5   933.8
    6.19  934.07     7.6     935   14.39     936    21.7     937  118.75     938
  153.06     939

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -108.22     .04   -6.28    .035     7.6     .04

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

```
         -6.28     7.6                10      10      10              .3       .5

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  936.75  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  936.10  * Reach Len. (ft)        *   10.00  *   10.00  *
  10.00  *
* Crit W.S. (ft)         *  936.00  * Flow Area (sq ft)      *    2.12  *   28.12  *
   4.13  *
* E.G. Slope (ft/ft)     *0.010173  * Area (sq ft)           *    2.12  *   28.12  *
   4.13  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *    5.19  *  188.52  *
  10.29  *
* Top Width (ft)         *   25.26  * Top Width (ft)         *    3.84  *   13.88  *
   7.54  *
* Vel Total (ft/s)       *    5.94  * Avg. Vel. (ft/s)       *    2.45  *    6.70  *
   2.49  *
* Max Chl Dpth (ft)      *    2.30  * Hydr. Depth (ft)       *    0.55  *    2.03  *
   0.55  *
* Conv. Total (cfs)      *  2022.6  * Conv. (cfs)            *    51.4  *  1869.1  *
  102.0  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *    3.99  *   14.36  *
   7.62  *
* Min Ch El (ft)         *  933.80  * Shear (lb/sq ft)       *    0.34  *    1.24  *
   0.34  *
* Alpha                  *    1.19  * Stream Power (lb/ft s) *  153.06  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *    0.44  *    1.53  *
   0.40  *
* C & E Loss (ft)        *    0.25  * Cum SA (acres)         *    0.62  *    0.51  *
   0.63  *
*******************************************************************************
***********

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

CROSS SECTION


RIVER: Tributary
REACH: 1                  RS: 19.5

INPUT
Description: Downstream Section of B8
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -62.25     941  -53.87     940  -46.62     939   -25.2     938   -17.6     937
  -12.72     936   -8.89     935   -7.31     934      -2   933.8       0   933.8
       2   933.8   14.26     934   17.57     935   27.34     936   37.31     937
  122.73     938   155.7     939

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

```
  -62.25     .04   -7.31    .035   14.26     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -7.31   14.26            41.98   41.98   41.98             .3       .5

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  936.46  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.15  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  936.31  * Reach Len. (ft)        *   41.98  *   41.98  *
  41.98  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    6.23  *   52.48  *
  14.46  *
* E.G. Slope (ft/ft)     *0.001861  * Area (sq ft)           *    6.23  *   52.48  *
  14.46  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *    8.90  *  173.83  *
  21.27  *
* Top Width (ft)         *   44.73  * Top Width (ft)         *    6.94  *   21.57  *
  16.22  *
* Vel Total (ft/s)       *    2.79  * Avg. Vel. (ft/s)       *    1.43  *    3.31  *
   1.47  *
* Max Chl Dpth (ft)      *    2.51  * Hydr. Depth (ft)       *    0.90  *    2.43  *
   0.89  *
* Conv. Total (cfs)      *  4729.1  * Conv. (cfs)            *   206.3  *  4029.7  *
  493.1  *
* Length Wtd. (ft)       *   41.98  * Wetted Per. (ft)       *    7.39  *   21.58  *
  16.43  *
* Min Ch El (ft)         *  933.80  * Shear (lb/sq ft)       *    0.10  *    0.28  *
   0.10  *
* Alpha                  *    1.24  * Stream Power (lb/ft s) *  155.70  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *    0.44  *    1.52  *
   0.40  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *    0.62  *    0.50  *
   0.63  *
*******************************************************************************
***********

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: Tributary
REACH: 1                  RS: 19

INPUT
Description:
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -102.57     941  -89.37     940  -74.01     939  -57.93     938  -38.95     937
  -30.38     936  -24.78     935  -22.86  934.17      -2   933.7       0   933.7
       2   933.7   27.94  934.28   33.25     935   48.69     936   61.57     937
   130.8     938  161.88     939

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

```
*************************************************
 -102.57     .04  -22.86    .035   27.94     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -22.86   27.94                57    55.6   65.27             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*****************************************************************************************
***********
* E.G. Elev (ft)         *  936.37  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.03  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  936.34  * Reach Len. (ft)        *   57.00  *   55.60  *
  65.27  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    8.60  *  121.82  *
  22.81  *
* E.G. Slope (ft/ft)     *0.000390  * Area (sq ft)           *    8.60  *  121.82  *
  22.81  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *    5.44  *  182.93  *
  15.63  *
* Top Width (ft)         *   86.42  * Top Width (ft)         *   10.46  *   50.80  *
  25.16  *
* Vel Total (ft/s)       *    1.33  * Avg. Vel. (ft/s)       *    0.63  *    1.50  *
   0.69  *
* Max Chl Dpth (ft)      *    2.64  * Hydr. Depth (ft)       *    0.82  *    2.40  *
   0.91  *
* Conv. Total (cfs)      * 10331.5  * Conv. (cfs)            *   275.4  *  9264.5  *
  791.5  *
* Length Wtd. (ft)       *   56.33  * Wetted Per. (ft)       *   10.74  *   50.81  *
  25.26  *
* Min Ch El (ft)         *  933.70  * Shear (lb/sq ft)       *    0.02  *    0.06  *
   0.02  *
* Alpha                  *    1.17  * Stream Power (lb/ft s) *  161.88  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *    0.43  *    1.43  *
   0.38  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.61  *    0.47  *
   0.61  *
*****************************************************************************************
***********

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: Tributary
REACH: 1                  RS: 18

INPUT
Description:
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 -234.17     940 -216.89     939 -186.76     938 -157.94     937 -109.95     937
  -99.84     937  -40.49     936  -35.53     935     -33  934.04     -31   933.5
      -2   933.5       0   933.5       2   933.5      42   933.5    43.9  934.22
   53.65     935   77.87     936  102.24     937  126.61     938  136.43     939
  153.33     940
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 -234.17     .04     -33    .035    43.9     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           -33    43.9            60.52   56.69   58.17             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*****************************************************************************************
***********
* E.G. Elev (ft)         *  936.36  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.01  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  936.35  * Reach Len. (ft)        *   60.52  *   56.69  *
  58.17  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   12.41  *  217.75  *
  38.94  *
* E.G. Slope (ft/ft)     *0.000103  * Area (sq ft)           *   12.41  *  217.75  *
  38.94  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *    2.69  *  187.46  *
  13.85  *
* Top Width (ft)         *  147.45  * Top Width (ft)         *   28.11  *   76.90  *
  42.44  *
* Vel Total (ft/s)       *    0.76  * Avg. Vel. (ft/s)       *    0.22  *    0.86  *
   0.36  *
* Max Chl Dpth (ft)      *    2.85  * Hydr. Depth (ft)       *    0.44  *    2.83  *
   0.92  *
* Conv. Total (cfs)      * 20099.9  * Conv. (cfs)            *   265.5  * 18469.9  *
 1364.5  *
* Length Wtd. (ft)       *   56.86  * Wetted Per. (ft)       *   28.39  *   77.10  *
  42.50  *
* Min Ch El (ft)         *  933.50  * Shear (lb/sq ft)       *    0.00  *    0.02  *
   0.01  *
* Alpha                  *    1.20  * Stream Power (lb/ft s) *  153.33  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *    0.42  *    1.22  *
   0.34  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.59  *    0.39  *
   0.56  *
*****************************************************************************************
***********

CROSS SECTION


RIVER: Tributary
REACH: 1                  RS: 17

INPUT
Description:
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 -195.41     940 -178.47     939 -166.07     938  -153.8     937 -129.09     936
  -87.73     936  -54.18     936  -46.69     935  -43.69  934.23      -2   933.2
       0   933.2       2   933.2   52.79  934.29    55.9     935   79.17     936
  103.76     937  134.32     938

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

```
 -195.41     .04  -43.69    .035   52.79     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -43.69   52.79            71.45   71.45   71.45             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  936.35  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.01  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  936.34  * Reach Len. (ft)        *   71.45  *   71.45  *
  71.45  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   38.74  *  254.19  *
  26.38  *
* E.G. Slope (ft/ft)     *0.000085  * Area (sq ft)           *   38.74  *  254.19  *
  26.38  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *    7.32  *  189.21  *
   7.47  *
* Top Width (ft)         *  225.22  * Top Width (ft)         *   93.90  *   96.48  *
  34.84  *
* Vel Total (ft/s)       *    0.64  * Avg. Vel. (ft/s)       *    0.19  *    0.74  *
   0.28  *
* Max Chl Dpth (ft)      *    3.14  * Hydr. Depth (ft)       *    0.41  *    2.63  *
   0.76  *
* Conv. Total (cfs)      * 22191.2  * Conv. (cfs)            *   796.7  * 20582.0  *
  812.4  *
* Length Wtd. (ft)       *   71.45  * Wetted Per. (ft)       *   94.07  *   96.50  *
  34.95  *
* Min Ch El (ft)         *  933.20  * Shear (lb/sq ft)       *    0.00  *    0.01  *
   0.00  *
* Alpha                  *    1.27  * Stream Power (lb/ft s) *  134.32  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *    0.38  *    0.91  *
   0.29  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.50  *    0.28  *
   0.51  *
*******************************************************************************
***********

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: Tributary
REACH: 1                  RS: 16

INPUT
Description: Upstream Section of W7
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -136.49     940 -126.57     939  -66.34     938  -60.03     937  -53.71     936
   -9.74     935    -4.8     934   -2.22  933.02      -2  933.02       0  933.02
       2  933.02     4.1  933.02    4.52  933.02    8.02     934    11.7     935
   48.05     936  116.41     937  167.31     938

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

```
**********************************************
 -136.49     .04    -4.8    .035    8.02     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          -4.8    8.02             6.63    6.63    6.63             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*********************************************************************************
***********
* E.G. Elev (ft)         *  936.33  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.10  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  936.23  * Reach Len. (ft)        *    6.63  *    6.63  *
   6.63  *
* Crit W.S. (ft)         *  935.47  * Flow Area (sq ft)      *   40.58  *   38.11  *
  34.46  *
* E.G. Slope (ft/ft)     *0.001363  * Area (sq ft)           *   40.58  *   38.11  *
  34.46  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *   48.13  *  121.52  *
  34.35  *
* Top Width (ft)         *  118.60  * Top Width (ft)         *   50.33  *   12.82  *
  55.44  *
* Vel Total (ft/s)       *    1.80  * Avg. Vel. (ft/s)       *    1.19  *    3.19  *
   1.00  *
* Max Chl Dpth (ft)      *    3.21  * Hydr. Depth (ft)       *    0.81  *    2.97  *
   0.62  *
* Conv. Total (cfs)      *  5526.4  * Conv. (cfs)            *  1303.7  *  3292.1  *
  930.6  *
* Length Wtd. (ft)       *    6.63  * Wetted Per. (ft)       *   50.46  *   13.13  *
  55.59  *
* Min Ch El (ft)         *  933.02  * Shear (lb/sq ft)       *    0.07  *    0.25  *
   0.05  *
* Alpha                  *    2.02  * Stream Power (lb/ft s) *  167.31  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    0.32  *    0.67  *
   0.24  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    0.39  *    0.19  *
   0.43  *
*********************************************************************************
***********

INLINE STRUCTURE


RIVER: Tributary
REACH: 1                  RS: 15

INPUT
Description:
Distance from Upstream XS =    3.31
Deck/Roadway Width        =       2
Weir Coefficient          =     2.6
 Weir Embankment Coordinates    num =       10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
    -100  935.72   -8.68  935.72   -8.68  935.15   -2.95  935.15   -2.95  934.47
    2.95  934.47    2.95  935.12    7.91  935.12    7.91  935.34     100  935.34

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
```

Weir crest shape = Broad Crested

INLINE STRUCTURE OUTPUT Profile #100-year Inl Struct:

E.G. Elev (ft)	936.33	Q Gates (cfs)	
W.S. Elev (ft)	936.23	Q Gate Group (cfs)	0.00
Q Total (cfs)	204.00	Gate Open Ht (ft)	935.45
Q Weir (cfs)	204.00	Gate #Open	
Weir Flow Area (sq ft)	85.02	Gate Area (sq ft)	1.00
Weir Sta Lft (ft)	-55.78	Gate Submerg	0.00
Weir Sta Rgt (ft)	70.42	Gate Invert (ft)	0.00
Weir Max Depth (ft)	1.86	Gate Weir Coef	0.000
Weir Avg Depth (ft)	0.67		
Weir Coef (ft^1/2)	2.600	Q Breach (cfs)	
Weir Submerg	0.17	Breach Avg Velocity (ft/s)	
Min El Weir Flow (ft)	934.48	Breach Flow Area (sq ft)	
Wr Top Wdth (ft)	126.20		

CROSS SECTION

RIVER: Tributary
REACH: 1 RS: 14

INPUT
Description: Downstream Section of W7
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-136.49	940	-126.57	939	-66.34	938	-60.03	937	-53.71	936
-9.74	935	-4.8	934	-2.22	933.02	-2	932.97	0	932.97
2	932.97	4.1	932.97	4.52	933	8.02	934	11.7	935
48.05	936	116.41	937	167.31	938				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-136.49	.04	-4.8	.035	8.02	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-4.8	8.02	42.49	42.49	42.49	.1	.3

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	935.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.	0.040	0.035	0.040
W.S. Elev (ft)	935.45	Reach Len. (ft)	42.49	42.49	42.49
Crit W.S. (ft)	935.45	Flow Area (sq ft)	9.15	28.54	7.18
E.G. Slope (ft/ft)	0.007604	Area (sq ft)	9.15	28.54	7.18
Q Total (cfs)	204.00	Flow (cfs)	15.23	177.10	11.68
Top Width (ft)	57.59	Top Width (ft)	24.73	12.82	20.04
Vel Total (ft/s)	4.55	Avg. Vel. (ft/s)	1.66	6.21	1.63

```
* Max Chl Dpth (ft)      *    2.48  * Hydr. Depth (ft)       *    0.37  *    2.23  *
   0.36  *
* Conv. Total (cfs)      *  2339.4  * Conv. (cfs)            *   174.6  *  2030.9  *
  133.9  *
* Length Wtd. (ft)       *   42.49  * Wetted Per. (ft)       *   24.84  *   13.15  *
  20.18  *
* Min Ch El (ft)         *  932.97  * Shear (lb/sq ft)       *    0.17  *    1.03  *
   0.17  *
* Alpha                  *    1.63  * Stream Power (lb/ft s) *  167.31  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)   *    0.32  *    0.66  *
   0.24  *
* C & E Loss (ft)        *    0.11  * Cum SA (acres)         *    0.38  *    0.18  *
   0.43  *
*******************************************************************************
***********

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: Tributary
REACH: 1                  RS: 13

INPUT
Description: Upstream Section of HW1
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -126.77     940 -120.95     939  -55.96     938  -48.28     937  -41.77     936
  -25.67     935   -6.74     934    -4.6     933      -3  932.28      -2  930.26
       0  930.26       2  930.26    3.42   932.2   11.98     933   15.17     934
   18.35     935   52.68     936 138.387     937  185.49     938

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -126.77     .04      -3    .035    3.42     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -3    3.42            41.16   41.16   41.16             .3       .5

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  935.45  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.15  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  935.30  * Reach Len. (ft)        *   41.16  *   41.16  *
  41.16  *
* Crit W.S. (ft)         *  933.73  * Flow Area (sq ft)      *   24.06  *   29.99  *
```

```
  33.02  *
* E.G. Slope (ft/ft)     *0.001555  * Area (sq ft)           *   24.06  *   29.99  *
  33.02  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *   31.88  *  114.93  *
  57.19  *
* Top Width (ft)         *   59.30  * Top Width (ft)         *   27.55  *    6.42  *
  25.33  *
* Vel Total (ft/s)       *    2.34  * Avg. Vel. (ft/s)       *    1.33  *    3.83  *
   1.73  *
* Max Chl Dpth (ft)      *    5.04  * Hydr. Depth (ft)       *    0.87  *    4.67  *
   1.30  *
* Conv. Total (cfs)      *  5173.3  * Conv. (cfs)            *   808.5  *  2914.5  *
 1450.3  *
* Length Wtd. (ft)       *   41.16  * Wetted Per. (ft)       *   27.96  *    8.66  *
  25.68  *
* Min Ch El (ft)         *  930.26  * Shear (lb/sq ft)       *    0.08  *    0.34  *
   0.12  *
* Alpha                  *    1.71  * Stream Power (lb/ft s) *  185.49  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    0.30  *    0.63  *
   0.22  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    0.36  *    0.17  *
   0.40  *
*******************************************************************************
***********

CULVERT


RIVER: Tributary
REACH: 1                  RS: 12.5

INPUT
Description:
Distance from Upstream XS =   19.65
Deck/Roadway Width        =      15
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
**********************************************
    -100   934.5     900     100   934.5     900

Upstream Bridge Cross Section Data
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 -126.77     940 -120.95     939  -55.96     938  -48.28     937  -41.77     936
  -25.67     935   -6.74     934    -4.6     933      -3  932.28      -2  930.26
       0  930.26       2  930.26    3.42   932.2   11.98     933   15.17     934
   18.35     935   52.68     936 138.387     937  185.49     938

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 -126.77     .04      -3    .035    3.42     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -3    3.42             .3       .5

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

```
*********************************************
    -100   934.5     900     100   934.5     900

Downstream Bridge Cross Section Data
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -138.38     940 -128.35     939 -117.64     938 -105.71     937  -87.79     936
  -60.71     935   -9.18     934   -7.14     933   -5.58  932.28   -4.93     932
      -2  929.95       0  929.95       2  929.95    5.69     932    6.38   932.6
    7.32     933   19.04     934   23.88     935  136.34     936  201.51     937
  231.74     938  258.56     939

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -138.38     .04   -4.93    .035    5.69     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -4.93    5.69             .3       .5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
48"             Circular       4
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
              19.65      15     .013     .013        0                   .5
      1
Upstream   Elevation =  930.24
           Centerline Station =  0
Downstream Elevation =  929.95
           Centerline Station =  0

CULVERT OUTPUT  Profile #100-year  Culv Group:  48"
*********************************************************************
* Q Culv Group (cfs)     *   98.75  * Culv Full Len (ft)     *         *
* # Barrels              *       1  * Culv Vel US (ft/s)     *    9.73  *
* Q Barrel (cfs)         *   98.75  * Culv Vel DS (ft/s)     *    8.42  *
* E.G. US. (ft)          *  935.46  * Culv Inv El Up (ft)    *  930.24  *
* W.S. US. (ft)          *  935.30  * Culv Inv El Dn (ft)    *  929.95  *
* E.G. DS (ft)           *  934.07  * Culv Frctn Ls (ft)     *    0.14  *
* W.S. DS (ft)           *  933.48  * Culv Exit Loss (ft)    *    0.50  *
* Delta EG (ft)          *    1.38  * Culv Entr Loss (ft)    *    0.74  *
* Delta WS (ft)          *    1.83  * Q Weir (cfs)           *  105.25  *
* E.G. IC (ft)           *  935.43  * Weir Sta Lft (ft)      *  -33.14  *
* E.G. OC (ft)           *  935.46  * Weir Sta Rgt (ft)      *   34.28  *
* Culvert Control        *  Outlet  * Weir Submerg           *    0.00  *
* Culv WS Inlet (ft)     *  933.25  * Weir Max Depth (ft)    *    0.96  *
* Culv WS Outlet (ft)    *  933.48  * Weir Avg Depth (ft)    *    0.67  *
* Culv Nml Depth (ft)    *    1.99  * Weir Flow Area (sq ft) *   45.10  *
* Culv Crt Depth (ft)    *    3.01  * Min El Weir Flow (ft)  *  934.51  *
```

```
*********************************************************************

Note:    During the supercritical calculations a hydraulic jump occurred inside of
the culvert.

CROSS SECTION


RIVER: Tributary
REACH: 1                  RS: 12

INPUT
Description: Downstream Section of HW1
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -138.38     940 -128.35     939 -117.64     938 -105.71     937  -87.79     936
  -60.71     935   -9.18     934   -7.14     933   -5.58  932.28   -4.93     932
      -2  929.95       0  929.95       2  929.95    5.69     932    6.38   932.6
    7.32     933   19.04     934   23.88     935  136.34     936  201.51     937
  231.74     938  258.56     939

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -138.38     .04   -4.93    .035    5.69     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -4.93    5.69            200.44  200.44  200.44             .3       .5

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  934.07  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  933.48  * Reach Len. (ft)        *  200.44  *  200.44  *
 200.44  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    2.40  *   30.65  *
   2.77  *
* E.G. Slope (ft/ft)     *0.006245  * Area (sq ft)           *    2.40  *   30.65  *
   2.77  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *    5.48  *  194.35  *
   4.17  *
* Top Width (ft)         *   21.00  * Top Width (ft)         *    3.18  *   10.62  *
   7.20  *
* Vel Total (ft/s)       *    5.69  * Avg. Vel. (ft/s)       *    2.28  *    6.34  *
   1.51  *
* Max Chl Dpth (ft)      *    3.53  * Hydr. Depth (ft)       *    0.76  *    2.89  *
   0.38  *
* Conv. Total (cfs)      *  2581.5  * Conv. (cfs)            *    69.3  *  2459.4  *
   52.8  *
* Length Wtd. (ft)       *  200.44  * Wetted Per. (ft)       *    3.51  *   11.80  *
   7.53  *
* Min Ch El (ft)         *  929.95  * Shear (lb/sq ft)       *    0.27  *    1.01  *
   0.14  *
* Alpha                  *    1.19  * Stream Power (lb/ft s) *  258.56  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.65  * Cum Volume (acre-ft)   *    0.30  *    0.54  *
   0.22  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         *    0.34  *    0.17  *
   0.39  *
```

****

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: Tributary
REACH: 1 RS: 11

INPUT
Description: Upstream Section of B7
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-51.05	935	-27.11	934	-13.89	933	-10.49	932	-7.09	931
-5.15	930.09	-3.03	930	-2	929.26	0	929.26	2	929.26
5.36	929.46	6.67	930	9.27	931	11.86	932	14.46	933
65.52	933	152.61	934	212.39	935				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-51.05	.04	-5.15	.035	6.67	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-5.15	6.67	30.2	30.2	30.2	.3	.5

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	933.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.	0.040	0.035	0.040
W.S. Elev (ft)	933.01	Reach Len. (ft)	4.80	4.80	4.80
Crit W.S. (ft)	931.58	Flow Area (sq ft)	11.61	41.27	12.00
E.G. Slope (ft/ft)	0.001961	Area (sq ft)	11.61	41.27	12.00
Q Total (cfs)	204.00	Flow (cfs)	22.14	175.11	6.76
Top Width (ft)	79.94	Top Width (ft)	8.81	11.82	59.31
Vel Total (ft/s)	3.14	Avg. Vel. (ft/s)	1.91	4.24	0.56
Max Chl Dpth (ft)	3.75	Hydr. Depth (ft)	1.32	3.49	0.20
Conv. Total (cfs)	4606.9	Conv. (cfs)	499.9	3954.4	152.6
Length Wtd. (ft)	4.80	Wetted Per. (ft)	9.30	12.17	59.86
Min Ch El (ft)	929.26	Shear (lb/sq ft)	0.15	0.42	0.02
Alpha	1.60	Stream Power (lb/ft s)	212.39	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.27	0.38	0.19
C & E Loss (ft)	0.04	Cum SA (acres)	0.31	0.11	

```
   0.24  *
*****************************************************************************************
***********

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.

BRIDGE


RIVER: Tributary
REACH: 1                  RS: 10.5

INPUT
Description:
Distance from Upstream XS =     4.8
Deck/Roadway Width        =   10.09
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
***********************************************************************
     -30   933.5     900  -17.71   933.8  931.96       0  934.11  932.22
   17.71  934.38  932.61     400   934.3     900

Upstream Bridge Cross Section Data
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -51.05     935  -27.11     934  -13.89     933  -10.49     932   -7.09     931
   -5.15  930.09   -3.03     930      -2  929.26       0  929.26       2  929.26
    5.36  929.46    6.67     930    9.27     931   11.86     932   14.46     933
   65.52     933  152.61     934  212.39     935

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -51.05     .04   -5.15    .035    6.67     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -5.15    6.67             .3       .5

Downstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
***********************************************************************
     -30   933.5     900  -17.71   933.8  931.96       0  934.11  932.22
   17.71  934.38  932.61     400   934.3     900

Downstream Bridge Cross Section Data
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -45.22     935  -30.49     934  -16.61     933  -12.86     932   -8.83     931
   -4.75     930      -2  929.26       0  929.26       2  929.26    3.84     930
    9.84     931   15.62     932    20.2     933  167.48     934  225.75     935

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -45.22     .04   -4.75    .035    3.84     .04
```

```
Bank Sta: Left   Right    Coeff Contr.   Expan.
         -4.75    3.84             .3       .5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #100-year
*******************************************************************************
*********
* E.G. US. (ft)          *     933.25  * Element                *Inside BR US
*Inside BR DS *
* W.S. US. (ft)          *     933.01  * E.G. Elev (ft)         *     933.18  *
933.05  *
* Q Total (cfs)          *     204.00  * W.S. Elev (ft)         *     932.79  *
932.71  *
* Q Bridge (cfs)         *     204.00  * Crit W.S. (ft)         *     931.58  *
931.76  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *       3.53  *
 3.45  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       4.52  *
 4.05  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *      45.09  *
50.39  *
* Weir Submerg           *             * Froude # Chl           *       0.47  *
 0.45  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *     109.11  *
103.96  *
* Min El Weir Flow (ft)  *     933.69  * Hydr Depth (ft)        *             *
       *
* Min El Prs (ft)        *     932.51  * W.P. Total (ft)        *      48.96  *
63.10  *
* Delta EG (ft)          *       0.33  * Conv. Total (cfs)      *     1978.0  *
1931.2  *
* Delta WS (ft)          *       0.30  * Top Width (ft)         *             *
       *
* BR Open Area (sq ft)   *      45.09  * Frctn Loss (ft)        *       0.11  *
 0.07  *
* BR Open Vel (ft/s)     *       4.52  * C & E Loss (ft)        *       0.02  *
 0.06  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       0.61  *
 0.56  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *     -51.05  *
```

```
-45.22  *
*********************************************************************************
*********

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.

CROSS SECTION


RIVER: Tributary
REACH: 1                  RS: 10

INPUT
Description: Downstream Section of B7
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
  -45.22     935  -30.49     934  -16.61     933  -12.86     932   -8.83     931
   -4.75     930      -2  929.26       0  929.26       2  929.26    3.84     930
    9.84     931   15.62     932    20.2     933  167.48     934  225.75     935

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -45.22     .04   -4.75    .035    3.84     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -4.75    3.84            64.59   64.59   64.59             .3       .5

CROSS SECTION OUTPUT  Profile #100-year
*********************************************************************************
***********
* E.G. Elev (ft)         *  932.92  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.22  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  932.70  * Reach Len. (ft)        *   64.59  *   64.59  *
  64.59  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   14.77  *   27.88  *
  21.32  *
* E.G. Slope (ft/ft)     *0.002357  * Area (sq ft)           *   14.77  *   27.88  *
  21.32  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *   32.26  *  123.69  *
  48.06  *
* Top Width (ft)         *   34.34  * Top Width (ft)         *   10.75  *    8.59  *
  15.00  *
* Vel Total (ft/s)       *    3.19  * Avg. Vel. (ft/s)       *    2.18  *    4.44  *
   2.25  *
* Max Chl Dpth (ft)      *    3.44  * Hydr. Depth (ft)       *    1.37  *    3.25  *
   1.42  *
* Conv. Total (cfs)      *  4202.3  * Conv. (cfs)            *   664.5  *  2547.8  *
  989.9  *
* Length Wtd. (ft)       *   64.59  * Wetted Per. (ft)       *   11.08  *    8.83  *
  15.25  *
* Min Ch El (ft)         *  929.26  * Shear (lb/sq ft)       *    0.20  *    0.46  *
   0.21  *
* Alpha                  *    1.36  * Stream Power (lb/ft s) *  225.75  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   *    0.26  *    0.36  *
   0.18  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.31  *    0.11  *
```

```
   0.23  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary
REACH: 1                  RS: 9

INPUT
Description: Upstream Section of B6
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -77.25     935  -49.15     934  -22.48     933  -14.98     932  -10.65     931
   -6.32     930   -5.46   929.8      -2  928.59       0  928.59       2  928.59
    4.52     930    7.94     931   12.14     932   21.36     933   30.97     933
  193.03     933

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -77.25     .04   -5.46    .035    4.52     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -5.46    4.52             32.25   32.25   32.25             .3       .5

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  932.78  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.22  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  932.56  * Reach Len. (ft)        *   14.05  *   14.05  *
  14.05  *
* Crit W.S. (ft)         *  931.32  * Flow Area (sq ft)      *   17.00  *   35.77  *
  12.97  *
* E.G. Slope (ft/ft)     *0.001947  * Area (sq ft)           *   17.00  *   35.77  *
  12.97  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *   31.68  *  151.20  *
  21.12  *
* Top Width (ft)         *   36.52  * Top Width (ft)         *   13.74  *    9.98  *
  12.80  *
* Vel Total (ft/s)       *    3.10  * Avg. Vel. (ft/s)       *    1.86  *    4.23  *
   1.63  *
* Max Chl Dpth (ft)      *    3.97  * Hydr. Depth (ft)       *    1.24  *    3.58  *
   1.01  *
* Conv. Total (cfs)      *  4623.5  * Conv. (cfs)            *   718.0  *  3426.8  *
  478.7  *
* Length Wtd. (ft)       *   14.05  * Wetted Per. (ft)       *   14.02  *   10.55  *
  13.09  *
* Min Ch El (ft)         *  928.59  * Shear (lb/sq ft)       *    0.15  *    0.41  *
   0.12  *
* Alpha                  *    1.46  * Stream Power (lb/ft s) *  193.03  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.07  * Cum Volume (acre-ft)   *    0.24  *    0.31  *
   0.15  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         *    0.29  *    0.10  *
   0.21  *
*******************************************************************************
***********
```

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

BRIDGE

RIVER: Tributary
REACH: 1 RS: 8.5

INPUT
Description:
Distance from Upstream XS = 14.05
Deck/Roadway Width = 10
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 5

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-200	932	900	-17.58	933.08	931.41	0	933.37	931.35
17.58	933.51	931.9	600	930	900			

Upstream Bridge Cross Section Data
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-77.25	935	-49.15	934	-22.48	933	-14.98	932	-10.65	931
-6.32	930	-5.46	929.8	-2	928.59	0	928.59	2	928.59
4.52	930	7.94	931	12.14	932	21.36	933	30.97	933
193.03	933								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-77.25	.04	-5.46	.035	4.52	.04

Bank Sta: Left	Right	Coeff Contr.	Expan.
-5.46	4.52	.3	.5

Downstream Deck/Roadway Coordinates
num= 5

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-200	932	900	-17.58	933.08	931.41	0	933.37	931.35
17.58	933.51	931.9	600	930	900			

Downstream Bridge Cross Section Data
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-62.1	935	-53.47	934	-34.54	933	-15.14	932	-9.85	931
-5.65	930	-4.6	929.72	-2	928.59	0	928.59	2	928.59
4.59	929.72	5.54	930	7.55	931	18.14	932	28.38	932
79.09	932	194.02	933						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-62.1	.04	-4.6	.035	4.59	.04

```
Bank Sta: Left   Right    Coeff Contr.   Expan.
          -4.6    4.59             .3       .5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #100-year
*******************************************************************************
*********
* E.G. US. (ft)          *     932.78  * Element                *Inside BR US
*Inside BR DS *
* W.S. US. (ft)          *     932.56  * E.G. Elev (ft)         *     932.56  *
932.32  *
* Q Total (cfs)          *     204.00  * W.S. Elev (ft)         *     931.83  *
931.59  *
* Q Bridge (cfs)         *     204.00  * Crit W.S. (ft)         *     931.34  *
931.36  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *       3.24  *
 3.00  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       6.02  *
 6.00  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *      33.88  *
33.99  *
* Weir Submerg           *             * Froude # Chl           *       0.67  *
 0.70  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *      91.56  *
83.05  *
* Min El Weir Flow (ft)  *     933.01  * Hydr Depth (ft)        *             *
 5.55  *
* Min El Prs (ft)        *     931.69  * W.P. Total (ft)        *      47.35  *
46.28  *
* Delta EG (ft)          *       0.58  * Conv. Total (cfs)      *     1321.7  *
1327.8  *
* Delta WS (ft)          *       1.10  * Top Width (ft)         *             *
 6.12  *
* BR Open Area (sq ft)   *      33.88  * Frctn Loss (ft)        *       0.24  *
 0.12  *
* BR Open Vel (ft/s)     *       6.02  * C & E Loss (ft)        *       0.00  *
 0.00  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.06  *
 1.08  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *     -77.25  *
```

```
-62.10  *
*********************************************************************************
*********

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

CROSS SECTION


RIVER: Tributary
REACH: 1                  RS: 8

INPUT
Description: Downstream Section of B6
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
   -62.1     935  -53.47     934  -34.54     933  -15.14     932   -9.85     931
   -5.65     930    -4.6  929.72      -2  928.59       0  928.59       2  928.59
    4.59  929.72    5.54     930    7.55     931   18.14     932   28.38     932
   79.09     932  194.02     933

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
   -62.1     .04    -4.6    .035    4.59     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          -4.6    4.59            20.94   20.94   20.94             .3       .5

CROSS SECTION OUTPUT  Profile #100-year
*********************************************************************************
***********
* E.G. Elev (ft)         *  932.20  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.74  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  931.46  * Reach Len. (ft)        *   20.94  *   20.94  *
  20.94  *
* Crit W.S. (ft)         *  931.38  * Flow Area (sq ft)      *    6.28  *   23.45  *
   4.58  *
* E.G. Slope (ft/ft)     *0.009305  * Area (sq ft)           *    6.28  *   23.45  *
   4.58  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *   19.33  *  173.49  *
  11.18  *
* Top Width (ft)         *   24.72  * Top Width (ft)         *    7.69  *    9.19  *
   7.84  *
* Vel Total (ft/s)       *    5.95  * Avg. Vel. (ft/s)       *    3.08  *    7.40  *
   2.44  *
* Max Chl Dpth (ft)      *    2.87  * Hydr. Depth (ft)       *    0.82  *    2.55  *
   0.58  *
* Conv. Total (cfs)      *  2114.8  * Conv. (cfs)            *   200.4  *  1798.5  *
  115.9  *
* Length Wtd. (ft)       *   20.94  * Wetted Per. (ft)       *    7.89  *    9.66  *
```

```
   8.14  *
* Min Ch El (ft)         *  928.59  * Shear (lb/sq ft)       *    0.46  *    1.41  *
   0.33  *
* Alpha                  *    1.35  * Stream Power (lb/ft s) *  194.02  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *    0.23  *    0.29  *
   0.15  *
* C & E Loss (ft)        *    0.29  * Cum SA (acres)         *    0.29  *    0.10  *
   0.21  *
*******************************************************************************
***********

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

CROSS SECTION


RIVER: Tributary
REACH: 1                  RS: 7.5

INPUT
Description:
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -92.74     935  -69.63     934  -48.15     933  -23.48     932  -10.41     931
   -6.54     930   -5.15  929.72      -2  928.59       0  928.59       2  928.59
    5.46  929.72   13.06     930   32.59     931   80.37     932   193.6     933

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -92.74     .04   -5.15    .035    5.46     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -5.15    5.46            10.94   10.94   10.94             .3       .5

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  931.82  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.16  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  931.66  * Reach Len. (ft)        *   10.94  *   10.94  *
  10.94  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    9.84  *   28.84  *
  46.73  *
* E.G. Slope (ft/ft)     *0.002465  * Area (sq ft)           *    9.84  *   28.84  *
  46.73  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *   14.29  *  115.66  *
  74.05  *
* Top Width (ft)         *   83.15  * Top Width (ft)         *   13.88  *   10.61  *
  58.66  *
* Vel Total (ft/s)       *    2.39  * Avg. Vel. (ft/s)       *    1.45  *    4.01  *
   1.58  *
* Max Chl Dpth (ft)      *    3.07  * Hydr. Depth (ft)       *    0.71  *    2.72  *
   0.80  *
* Conv. Total (cfs)      *  4108.7  * Conv. (cfs)            *   287.9  *  2329.5  *
```

```
 1491.3  *
* Length Wtd. (ft)       *   10.94  * Wetted Per. (ft)       *   14.06  *   10.99  *
  58.70  *
* Min Ch El (ft)         *  928.59  * Shear (lb/sq ft)       *    0.11  *    0.40  *
   0.12  *
* Alpha                  *    1.78  * Stream Power (lb/ft s) *  193.60  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *    0.23  *    0.28  *
   0.13  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.28  *    0.09  *
   0.19  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary
REACH: 1                  RS: 7

INPUT
Description:
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -92.74     935  -69.63     934  -48.15     933  -23.48     932  -10.41     931
   -6.54     930   -5.15  929.65      -2  928.55       0  928.55       2  928.55
    5.62  929.65    8.17     930    36.8     931   81.81     932  193.26     933

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -92.74     .04   -5.15    .035    5.62     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -5.15    5.62             17.26   17.26   17.26             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  931.79  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.17  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  931.62  * Reach Len. (ft)        *   17.26  *   17.26  *
  17.26  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    9.36  *   29.36  *
  45.39  *
* E.G. Slope (ft/ft)     *0.002519  * Area (sq ft)           *    9.36  *   29.36  *
  45.39  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *   13.62  *  119.49  *
  70.88  *
* Top Width (ft)         *   83.31  * Top Width (ft)         *   13.38  *   10.77  *
  59.16  *
* Vel Total (ft/s)       *    2.43  * Avg. Vel. (ft/s)       *    1.46  *    4.07  *
   1.56  *
* Max Chl Dpth (ft)      *    3.07  * Hydr. Depth (ft)       *    0.70  *    2.73  *
   0.77  *
* Conv. Total (cfs)      *  4064.5  * Conv. (cfs)            *   271.5  *  2380.8  *
 1412.3  *
* Length Wtd. (ft)       *   17.26  * Wetted Per. (ft)       *   13.58  *   11.12  *
  59.21  *
* Min Ch El (ft)         *  928.55  * Shear (lb/sq ft)       *    0.11  *    0.42  *
```

```
   0.12  *
* Alpha                  *    1.82  * Stream Power (lb/ft s) *  193.26  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *    0.23  *    0.27  *
   0.12  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.28  *    0.09  *
   0.17  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary
REACH: 1                  RS: 6.5

INPUT
Description:
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
   -95.7     935  -79.68     934  -58.39     933  -32.12     932  -11.06     931
   -7.35     930   -5.64   929.6      -2   928.6       0   928.6       2   928.6
    5.87   929.6    7.11     930   32.73     931  108.39     932  193.66     933

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
   -95.7     .04   -5.64    .035    5.87     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -5.64    5.87               10      10      10             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  931.74  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.21  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  931.52  * Reach Len. (ft)        *   10.00  *   10.00  *
  10.00  *
* Crit W.S. (ft)         *  930.97  * Flow Area (sq ft)      *    9.60  *   29.87  *
  38.60  *
* E.G. Slope (ft/ft)     *0.003200  * Area (sq ft)           *    9.60  *   29.87  *
  38.60  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *   14.01  *  133.49  *
  56.51  *
* Top Width (ft)         *   94.25  * Top Width (ft)         *   16.41  *   11.51  *
  66.33  *
* Vel Total (ft/s)       *    2.61  * Avg. Vel. (ft/s)       *    1.46  *    4.47  *
   1.46  *
* Max Chl Dpth (ft)      *    2.92  * Hydr. Depth (ft)       *    0.59  *    2.60  *
   0.58  *
* Conv. Total (cfs)      *  3606.0  * Conv. (cfs)            *   247.6  *  2359.6  *
  998.8  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *   16.60  *   11.77  *
  66.42  *
* Min Ch El (ft)         *  928.60  * Shear (lb/sq ft)       *    0.12  *    0.51  *
   0.12  *
* Alpha                  *    2.02  * Stream Power (lb/ft s) *  193.66  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *    0.22  *    0.26  *
```

```
   0.11  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    0.28  *    0.08  *
   0.15  *
*******************************************************************************************
***********

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: Tributary
REACH: 1                  RS: 6

INPUT
Description:
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -95.87     935  -80.99     934  -58.59     933  -33.53     932  -11.01     931
    -7.8     930   -5.91   929.6      -2   928.6       0   928.6       2   928.6
    6.01   929.6    7.38     930   25.08     931   133.5     932   192.6     933

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -95.87     .04   -5.91    .035    6.01     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -5.91    6.01             16.4    16.4    16.4             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************************
***********
* E.G. Elev (ft)         *  931.66  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  931.12  * Reach Len. (ft)        *   16.40  *   16.40  *
  16.40  *
* Crit W.S. (ft)         *  930.98  * Flow Area (sq ft)      *    4.66  *   26.10  *
  13.62  *
* E.G. Slope (ft/ft)     *0.008241  * Area (sq ft)           *    4.66  *   26.10  *
  13.62  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *   10.93  *  167.28  *
  25.79  *
* Top Width (ft)         *   52.02  * Top Width (ft)         *    7.84  *   11.92  *
  32.26  *
* Vel Total (ft/s)       *    4.60  * Avg. Vel. (ft/s)       *    2.35  *    6.41  *
   1.89  *
* Max Chl Dpth (ft)      *    2.52  * Hydr. Depth (ft)       *    0.59  *    2.19  *
   0.42  *
* Conv. Total (cfs)      *  2247.2  * Conv. (cfs)            *   120.4  *  1842.7  *
  284.1  *
* Length Wtd. (ft)       *   16.40  * Wetted Per. (ft)       *    8.04  *   12.17  *
  32.34  *
* Min Ch El (ft)         *  928.60  * Shear (lb/sq ft)       *    0.30  *    1.10  *
   0.22  *
* Alpha                  *    1.63  * Stream Power (lb/ft s) *  192.60  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *    0.22  *    0.25  *
```

```
   0.10  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *    0.27  *    0.08  *
   0.14  *
*******************************************************************************************
***********

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: Tributary
REACH: 1                  RS: 5

INPUT
Description: Upstream Section of W6
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -97.71     935     -80     934  -65.03     933  -40.88     932  -17.18     931
   -9.91     930   -7.08     929   -4.73  928.57    -3.4  928.57      -2  928.57
       0  928.57       2  928.57    3.62  928.57     5.4     929    8.87     930
   55.46     931  161.85     932  198.43     933

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -97.71     .04   -7.08    .035     5.4     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -7.08     5.4            20.06   20.06   20.06             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************************
***********
* E.G. Elev (ft)         *  931.48  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.14  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  931.34  * Reach Len. (ft)        *   20.06  *   20.06  *
  20.06  *
* Crit W.S. (ft)         *  930.71  * Flow Area (sq ft)      *   12.61  *   33.63  *
  51.34  *
* E.G. Slope (ft/ft)     *0.002083  * Area (sq ft)           *   12.61  *   33.63  *
  51.34  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *   16.68  *  125.60  *
  61.72  *
* Top Width (ft)         *  116.37  * Top Width (ft)         *   18.07  *   12.48  *
  85.83  *
* Vel Total (ft/s)       *    2.09  * Avg. Vel. (ft/s)       *    1.32  *    3.73  *
   1.20  *
* Max Chl Dpth (ft)      *    2.77  * Hydr. Depth (ft)       *    0.70  *    2.70  *
   0.60  *
* Conv. Total (cfs)      *  4470.0  * Conv. (cfs)            *   365.5  *  2752.1  *
 1352.4  *
* Length Wtd. (ft)       *   20.06  * Wetted Per. (ft)       *   18.31  *   12.57  *
  85.98  *
* Min Ch El (ft)         *  928.57  * Shear (lb/sq ft)       *    0.09  *    0.35  *
   0.08  *
* Alpha                  *    2.10  * Stream Power (lb/ft s) *  198.43  *    0.00  *
   0.00  *
```

```
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    0.22  *    0.24  *
   0.09  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    0.27  *    0.08  *
   0.12  *
*******************************************************************************
***********

INLINE STRUCTURE


RIVER: Tributary
REACH: 1                  RS: 4

INPUT
Description:
Distance from Upstream XS =    9.79
Deck/Roadway Width        =       2
Weir Coefficient          =     2.6
 Weir Embankment Coordinates    num =       10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    -100  931.02   -7.11  931.02   -7.11  929.91   -4.71  929.91   -4.71  929.57
    4.71  929.57    4.71  930.44    8.87  930.44    8.87  930.58     200  930.58

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Weir crest shape                            = Broad Crested


INLINE STRUCTURE OUTPUT  Profile #100-year  Inl Struct:
*******************************************************************************
* E.G. Elev (ft)             *  931.48  * Q Gates (cfs)              *         *
* W.S. Elev (ft)             *  931.34  * Q Gate Group (cfs)         *    0.00 *
* Q Total (cfs)              *  204.00  * Gate Open Ht (ft)          *  930.01 *
* Q Weir (cfs)               *  204.00  * Gate #Open                 *         *
* Weir Flow Area (sq ft)     *   83.32  * Gate Area (sq ft)          *    1.00 *
* Weir Sta Lft (ft)          *  -28.52  * Gate Submerg               *    0.00 *
* Weir Sta Rgt (ft)          *  106.37  * Gate Invert (ft)           *    0.00 *
* Weir Max Depth (ft)        *    1.91  * Gate Weir Coef             *   0.000 *
* Weir Avg Depth (ft)        *    0.62  *                            *         *
* Weir Coef (ft^1/2)         *   2.600  * Q Breach (cfs)             *         *
* Weir Submerg               *    0.08  * Breach Avg Velocity (ft/s) *         *
* Min El Weir Flow (ft)      *  929.58  * Breach Flow Area (sq ft)   *         *
* Wr Top Wdth (ft)           *  134.89  *                            *         *
*******************************************************************************

CROSS SECTION


RIVER: Tributary
REACH: 1                  RS: 3

INPUT
Description: Downstream Section of W6
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -97.71     935     -80     934  -65.03     933  -40.88     932  -17.18     931
   -9.91     930   -7.08     929   -4.73  928.22    -3.4     928      -2  927.57
       0  927.57       2  927.57    3.62  928.28     5.4     929    8.87     930
   55.46     931  161.85     932  198.43     933
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -97.71     .04   -4.73    .035    3.62     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -4.73    3.62               10      10      10             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*********************************************************************************
***********
* E.G. Elev (ft)         *  931.09  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    1.08  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  930.01  * Reach Len. (ft)        *   10.00  *   10.00  *
  10.00  *
* Crit W.S. (ft)         *  929.98  * Flow Area (sq ft)      *    4.75  *   18.81  *
   4.23  *
* E.G. Slope (ft/ft)     *0.015689  * Area (sq ft)           *    4.75  *   18.81  *
   4.23  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *   19.88  *  168.81  *
  15.31  *
* Top Width (ft)         *   19.52  * Top Width (ft)         *    5.28  *    8.35  *
   5.89  *
* Vel Total (ft/s)       *    7.34  * Avg. Vel. (ft/s)       *    4.18  *    8.97  *
   3.62  *
* Max Chl Dpth (ft)      *    2.44  * Hydr. Depth (ft)       *    0.90  *    2.25  *
   0.72  *
* Conv. Total (cfs)      *  1628.6  * Conv. (cfs)            *   158.7  *  1347.7  *
  122.2  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *    5.58  *    8.58  *
   6.17  *
* Min Ch El (ft)         *  927.57  * Shear (lb/sq ft)       *    0.83  *    2.15  *
   0.67  *
* Alpha                  *    1.29  * Stream Power (lb/ft s) *  198.43  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.10  * Cum Volume (acre-ft)   *    0.22  *    0.20  *
   0.09  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         *    0.26  *    0.07  *
   0.10  *
*********************************************************************************
***********

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

CROSS SECTION


RIVER: Tributary
REACH: 1                  RS: 2.5

INPUT
Description:
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
  -96.66     935  -80.24     934  -65.39     933  -47.42     932  -24.94     931
```

```
  -13.44     930   -9.31     929   -7.49  928.22    -3.4     928      -2  927.57
       0  927.57       2  927.57    4.53  928.28    4.55     929    8.13     930
    68.8     931  110.46     931  162.46     932  210.09     933

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -96.66     .04   -7.49    .035    4.53     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -7.49    4.53             53.82   53.82   53.82             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  930.83  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  930.30  * Reach Len. (ft)        *   53.82  *   53.82  *
  53.82  *
* Crit W.S. (ft)         *  929.91  * Flow Area (sq ft)      *    6.92  *   29.43  *
   5.67  *
* E.G. Slope (ft/ft)     *0.006464  * Area (sq ft)           *    6.92  *   29.43  *
   5.67  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *   16.47  *  180.82  *
   6.71  *
* Top Width (ft)         *   43.37  * Top Width (ft)         *    9.42  *   12.02  *
  21.93  *
* Vel Total (ft/s)       *    4.85  * Avg. Vel. (ft/s)       *    2.38  *    6.14  *
   1.18  *
* Max Chl Dpth (ft)      *    2.73  * Hydr. Depth (ft)       *    0.73  *    2.45  *
   0.26  *
* Conv. Total (cfs)      *  2537.3  * Conv. (cfs)            *   204.9  *  2249.0  *
   83.4  *
* Length Wtd. (ft)       *   53.82  * Wetted Per. (ft)       *    9.72  *   12.19  *
  22.77  *
* Min Ch El (ft)         *  927.57  * Shear (lb/sq ft)       *    0.29  *    0.97  *
   0.10  *
* Alpha                  *    1.44  * Stream Power (lb/ft s) *  210.09  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.18  * Cum Volume (acre-ft)   *    0.22  *    0.20  *
   0.09  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *    0.26  *    0.07  *
   0.09  *
*******************************************************************************
***********

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: Tributary
REACH: 1                  RS: 2

INPUT
Description:
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
```

```
  -85.49     935   -72.8     934  -59.81     933  -42.86     932  -33.81     931
  -24.76     930  -15.72     929   -8.49     928      -2   927.2       0   927.2
       2   927.2    5.17     928    7.95     929   11.51     930   15.08     931
   18.64     932

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -85.49     .04   -8.49    .035    5.17     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -8.49    5.17           184.86  184.86  184.86             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  930.55  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.18  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  930.37  * Reach Len. (ft)        *  184.86  *  184.86  *
 184.86  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   21.97  *   39.42  *
   8.53  *
* E.G. Slope (ft/ft)     *0.001989  * Area (sq ft)           *   21.97  *   39.42  *
   8.53  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *   39.09  *  150.19  *
  14.72  *
* Top Width (ft)         *   40.92  * Top Width (ft)         *   19.60  *   13.66  *
   7.66  *
* Vel Total (ft/s)       *    2.92  * Avg. Vel. (ft/s)       *    1.78  *    3.81  *
   1.73  *
* Max Chl Dpth (ft)      *    3.17  * Hydr. Depth (ft)       *    1.12  *    2.89  *
   1.11  *
* Conv. Total (cfs)      *  4574.1  * Conv. (cfs)            *   876.5  *  3367.5  *
  330.1  *
* Length Wtd. (ft)       *  184.86  * Wetted Per. (ft)       *   19.75  *   13.81  *
   8.02  *
* Min Ch El (ft)         *  927.20  * Shear (lb/sq ft)       *    0.14  *    0.35  *
   0.13  *
* Alpha                  *    1.35  * Stream Power (lb/ft s) *   18.64  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)   *    0.20  *    0.15  *
   0.08  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    0.24  *    0.05  *
   0.07  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary
REACH: 1                  RS: 1

INPUT
Description:
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -197.71     935 -180.63     934 -163.45     933 -145.52     932 -125.89     931
  -94.47     930  -18.41     929   -5.16  928.29      -2     927       0     927
       2     927    6.61  928.12   18.76     929   31.56     930   44.36     931
```

```
   57.22     932

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 -197.71     .04   -5.16    .035    6.61     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -5.16    6.61                0       0       0             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*********************************************************************************
***********
* E.G. Elev (ft)         *  930.24  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.07  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  930.17  * Reach Len. (ft)        *          *          *
         *
* Crit W.S. (ft)         *  929.43  * Flow Area (sq ft)      *   71.80  *   32.71  *
  28.37  *
* E.G. Slope (ft/ft)     *0.001161  * Area (sq ft)           *   71.80  *   32.71  *
  28.37  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *   75.54  *   91.55  *
  36.91  *
* Top Width (ft)         *  133.63  * Top Width (ft)         *   94.71  *   11.77  *
  27.15  *
* Vel Total (ft/s)       *    1.54  * Avg. Vel. (ft/s)       *    1.05  *    2.80  *
   1.30  *
* Max Chl Dpth (ft)      *    3.17  * Hydr. Depth (ft)       *    0.76  *    2.78  *
   1.05  *
* Conv. Total (cfs)      *  5987.3  * Conv. (cfs)            *  2217.0  *  2686.8  *
 1083.4  *
* Length Wtd. (ft)       *          * Wetted Per. (ft)       *   94.74  *   12.16  *
  27.23  *
* Min Ch El (ft)         *  927.00  * Shear (lb/sq ft)       *    0.05  *    0.20  *
   0.08  *
* Alpha                  *    1.80  * Stream Power (lb/ft s) *   57.22  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *          *          *
         *
* C & E Loss (ft)        *          * Cum SA (acres)         *          *          *
         *
*********************************************************************************
***********

*****************************************************************************

SUMMARY OF MANNING'S N VALUES

River:Tributary
*****************************************************************
*     Reach      *   River Sta.   *   n1    *   n2    *   n3    *
*****************************************************************
*1               *    21          *      .04*     .035*      .04*
*1               *    20.5        *Bridge   *        *        *
*1               *    20          *      .04*     .035*      .04*
*1               *    19.5        *      .04*     .035*      .04*
*1               *    19          *      .04*     .035*      .04*
*1               *    18          *      .04*     .035*      .04*
*1               *    17          *      .04*     .035*      .04*
*1               *    16          *      .04*     .035*      .04*
*1               *    15          *Inl Struct*        *        *
```

*1	* 14	* .04*	.035*	.04*
*1	* 13	* .04*	.035*	.04*
*1	* 12.5	*Culvert *	*	*
*1	* 12	* .04*	.035*	.04*
*1	* 11	* .04*	.035*	.04*
*1	* 10.5	*Bridge *	*	*
*1	* 10	* .04*	.035*	.04*
*1	* 9	* .04*	.035*	.04*
*1	* 8.5	*Bridge *	*	*
*1	* 8	* .04*	.035*	.04*
*1	* 7.5	* .04*	.035*	.04*
*1	* 7	* .04*	.035*	.04*
*1	* 6.5	* .04*	.035*	.04*
*1	* 6	* .04*	.035*	.04*
*1	* 5	* .04*	.035*	.04*
*1	* 4	*Inl Struct*	*	*
*1	* 3	* .04*	.035*	.04*
*1	* 2.5	* .04*	.035*	.04*
*1	* 2	* .04*	.035*	.04*
*1	* 1	* .04*	.035*	.04*

SUMMARY OF REACH LENGTHS

River: Tributary

Reach	River Sta.	Left	Channel	Right
*1	* 21	* 18.4*	18.4*	18.4*
*1	* 20.5	*Bridge *	*	*
*1	* 20	* 10*	10*	10*
*1	* 19.5	* 41.98*	41.98*	41.98*
*1	* 19	* 57*	55.6*	65.27*
*1	* 18	* 60.52*	56.69*	58.17*
*1	* 17	* 71.45*	71.45*	71.45*
*1	* 16	* 6.63*	6.63*	6.63*
*1	* 15	*Inl Struct*	*	*
*1	* 14	* 42.49*	42.49*	42.49*
*1	* 13	* 41.16*	41.16*	41.16*
*1	* 12.5	*Culvert *	*	*
*1	* 12	* 200.44*	200.44*	200.44*
*1	* 11	* 30.2*	30.2*	30.2*
*1	* 10.5	*Bridge *	*	*
*1	* 10	* 64.59*	64.59*	64.59*
*1	* 9	* 32.25*	32.25*	32.25*
*1	* 8.5	*Bridge *	*	*
*1	* 8	* 20.94*	20.94*	20.94*
*1	* 7.5	* 10.94*	10.94*	10.94*
*1	* 7	* 17.26*	17.26*	17.26*
*1	* 6.5	* 10*	10*	10*
*1	* 6	* 16.4*	16.4*	16.4*
*1	* 5	* 20.06*	20.06*	20.06*
*1	* 4	*Inl Struct*	*	*
*1	* 3	* 10*	10*	10*
*1	* 2.5	* 53.82*	53.82*	53.82*
*1	* 2	* 184.86*	184.86*	184.86*
*1	* 1	* 0*	0*	0*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Tributary

Reach	River Sta.	Contr.	Expan.
1	21	.3	.5
1	20.5	Bridge	
1	20	.3	.5
1	19.5	.3	.5
1	19	.1	.3
1	18	.1	.3
1	17	.1	.3
1	16	.1	.3
1	15	Inl Struct	
1	14	.1	.3
1	13	.3	.5
1	12.5	Culvert	
1	12	.3	.5
1	11	.3	.5
1	10.5	Bridge	
1	10	.3	.5
1	9	.3	.5
1	8.5	Bridge	
1	8	.3	.5
1	7.5	.3	.5
1	7	.1	.3
1	6.5	.1	.3
1	6	.1	.3
1	5	.1	.3
1	4	Inl Struct	
1	3	.1	.3
1	2.5	.1	.3
1	2	.1	.3
1	1	.1	.3

Tributary.rep

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  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
```

****

PROJECT DATA
Project Title: Unnamed Tributary
Project File : Tributary.prj
Run Date and Time: 7/1/2014 10:42:50 AM

Project in English units

****

PLAN DATA

Plan Title: Unnamed Tributary Proposed
Plan File : j:\20131358\Reports\Floodplain\HEC-RAS\Tributary.p03

Geometry Title: Unnamed Tributary Proposed
Geometry File : j:\20131358\Reports\Floodplain\HEC-RAS\Tributary.g03

Flow Title : Unnamed Tributary
Flow File : j:\20131358\Reports\Floodplain\HEC-RAS\Tributary.f01

Plan Summary Information:

Number of:	Cross Sections	= 18	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 1	Lateral Structures	=	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: Subcritical Flow

****

FLOW DATA

Flow Title: Unnamed Tributary

Flow File : j:\20131358\Reports\Floodplain\HEC-RAS\Tributary.f01

Flow Data (cfs)

River	Reach	RS	100-year
Tributary	1	21	204

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Tributary	1	100-year	Normal S = 0.00116	

GEOMETRY DATA

Geometry Title: Unnamed Tributary Proposed
Geometry File : j:\20131358\Reports\Floodplain\HEC-RAS\Tributary.g03

CROSS SECTION

RIVER: Tributary
REACH: 1 RS: 21

INPUT
Description: Upstream Section of B8
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-103.03	941.9	-60.93	941	-52.84	940	-45.59	939	-29.04	938
-20.35	937	-13.54	936	-11.79	936	-11.38	936	-10.25	935
-9.36	934.21	-2	933.82	0	933.82	2	933.82	3	934.21
3.5	935	7.04	936	11.27	937	15.76	938	103.61	938
142.13	939								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-103.03	.04	-9.36	.035	3	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-9.36	3	18.4	18.4	18.4	.1	.3

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	936.93	Element	Left OB	Channel / Right OB
Vel Head (ft)	0.56	Wt. n-Val.	0.040	0.035 / 0.040
W.S. Elev (ft)	936.37	Reach Len. (ft)	18.40	18.40 / 18.40
Crit W.S. (ft)	935.96	Flow Area (sq ft)	3.82	29.90 / 4.26

```
* E.G. Slope (ft/ft)     *0.006708  * Area (sq ft)           *    3.82  *   29.90  *
   4.26  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *    7.48  *  186.47  *
  10.05  *
* Top Width (ft)         *   24.67  * Top Width (ft)         *    6.70  *   12.36  *
   5.61  *
* Vel Total (ft/s)       *    5.37  * Avg. Vel. (ft/s)       *    1.96  *    6.24  *
   2.36  *
* Max Chl Dpth (ft)      *    2.55  * Hydr. Depth (ft)       *    0.57  *    2.42  *
   0.76  *
* Conv. Total (cfs)      *  2490.7  * Conv. (cfs)            *    91.4  *  2276.6  *
  122.7  *
* Length Wtd. (ft)       *   18.40  * Wetted Per. (ft)       *    7.41  *   12.44  *
   6.22  *
* Min Ch El (ft)         *  933.82  * Shear (lb/sq ft)       *    0.22  *    1.01  *
   0.29  *
* Alpha                  *    1.25  * Stream Power (lb/ft s) *  142.13  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.16  * Cum Volume (acre-ft)   *    0.35  *    1.32  *
   0.37  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *    0.54  *    0.52  *
   0.43  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary
REACH: 1                  RS: 20

INPUT
Description: Downstream Section of B8
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 -108.22  941.64  -58.15     941   -50.4     940  -42.72     939  -35.47     938
  -27.93     937  -24.33     937  -13.26     937   -9.76     936   -6.28     935
   -3.16  934.16      -2   933.8       0   933.8       2   933.8       5   933.8
    6.19  934.07     7.6     935   14.39     936    21.7     937  118.75     938
  153.06     939

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -108.22     .04   -6.28    .035     7.6     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -6.28     7.6               10      10      10             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  936.75  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.75  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  936.00  * Reach Len. (ft)        *   10.00  *   10.00  *
  10.00  *
* Crit W.S. (ft)         *  936.00  * Flow Area (sq ft)      *    1.75  *   26.73  *
   3.41  *
* E.G. Slope (ft/ft)     *0.012334  * Area (sq ft)           *    1.75  *   26.73  *
   3.41  *
```

```
* Q Total (cfs)          *  204.00  * Flow (cfs)             *    4.43  *  190.75  *
   8.82  *
* Top Width (ft)         *   24.18  * Top Width (ft)         *    3.49  *   13.88  *
   6.81  *
* Vel Total (ft/s)       *    6.40  * Avg. Vel. (ft/s)       *    2.54  *    7.14  *
   2.58  *
* Max Chl Dpth (ft)      *    2.20  * Hydr. Depth (ft)       *    0.50  *    1.93  *
   0.50  *
* Conv. Total (cfs)      *  1836.9  * Conv. (cfs)            *    39.9  *  1717.6  *
   79.4  *
* Length Wtd. (ft)       *   10.00  * Wetted Per. (ft)       *    3.63  *   14.36  *
   6.88  *
* Min Ch El (ft)         *  933.80  * Shear (lb/sq ft)       *    0.37  *    1.43  *
   0.38  *
* Alpha                  *    1.17  * Stream Power (lb/ft s) *  153.06  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.06  * Cum Volume (acre-ft)   *    0.35  *    1.31  *
   0.37  *
* C & E Loss (ft)        *    0.16  * Cum SA (acres)         *    0.54  *    0.52  *
   0.43  *
*******************************************************************************
***********

Warning: The energy equation could not be balanced within the specified number of
iterations.  The program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may
indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance)
is less than 0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: 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: Tributary
REACH: 1                  RS: 19.5

INPUT
Description: Downstream Section of B8
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -62.25     941  -53.87     940  -46.62     939   -25.2     938   -17.6     937
  -12.72     936   -8.89     935   -7.31     934      -2   933.8       0   933.8
       2   933.8   14.26     934   17.57     935   27.34     936   37.31     937
  122.73     938   155.7     939

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -62.25     .04   -7.31    .035   14.26     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -7.31   14.26            41.98   41.98   41.98             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
```

```
***********
* E.G. Elev (ft)         *  936.22  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.22  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  936.00  * Reach Len. (ft)        *   41.98  *   41.98  *
  41.98  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *    4.29  *   45.72  *
   9.86  *
* E.G. Slope (ft/ft)     *0.003154  * Area (sq ft)           *    4.29  *   45.72  *
   9.86  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *    7.29  *  179.84  *
  16.87  *
* Top Width (ft)         *   40.08  * Top Width (ft)         *    5.42  *   21.57  *
  13.09  *
* Vel Total (ft/s)       *    3.41  * Avg. Vel. (ft/s)       *    1.70  *    3.93  *
   1.71  *
* Max Chl Dpth (ft)      *    2.20  * Hydr. Depth (ft)       *    0.79  *    2.12  *
   0.75  *
* Conv. Total (cfs)      *  3632.7  * Conv. (cfs)            *   129.9  *  3202.4  *
  300.4  *
* Length Wtd. (ft)       *   41.98  * Wetted Per. (ft)       *    5.83  *   21.58  *
  13.29  *
* Min Ch El (ft)         *  933.80  * Shear (lb/sq ft)       *    0.14  *    0.42  *
   0.15  *
* Alpha                  *    1.20  * Stream Power (lb/ft s) *  155.70  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)   *    0.35  *    1.30  *
   0.36  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *    0.54  *    0.51  *
   0.43  *
*******************************************************************************
***********

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: Tributary
REACH: 1                  RS: 19

INPUT
Description:
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -102.57     941  -89.37     940  -74.01     939  -57.93     938  -38.95     937
  -30.38     936  -24.78     935  -22.86  934.17      -2   933.7       0   933.7
       2   933.7   27.94  934.28   33.25     935   48.69     936   61.57     937
   130.8     938  161.88     939

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -102.57     .04  -22.86    .035   27.94     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -22.86   27.94               57    55.6   65.27             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
```

```
*******************************************************************************
***********
* E.G. Elev (ft)          *  936.12  * Element                 *  Left OB *  Channel *
Right OB *
* Vel Head (ft)           *    0.04  * Wt. n-Val.              *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)          *  936.07  * Reach Len. (ft)         *   57.00  *   55.60  *
  65.27  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)       *    6.09  *  108.14  *
  16.50  *
* E.G. Slope (ft/ft)      *0.000606  * Area (sq ft)            *    6.09  *  108.14  *
  16.50  *
* Q Total (cfs)           *  204.00  * Flow (cfs)              *    4.49  *  186.97  *
  12.54  *
* Top Width (ft)          *   80.64  * Top Width (ft)          *    8.15  *   50.80  *
  21.70  *
* Vel Total (ft/s)        *    1.56  * Avg. Vel. (ft/s)        *    0.74  *    1.73  *
   0.76  *
* Max Chl Dpth (ft)       *    2.37  * Hydr. Depth (ft)        *    0.75  *    2.13  *
   0.76  *
* Conv. Total (cfs)       *  8288.6  * Conv. (cfs)             *   182.5  *  7596.7  *
  509.4  *
* Length Wtd. (ft)        *   56.18  * Wetted Per. (ft)        *    8.41  *   50.81  *
  21.78  *
* Min Ch El (ft)          *  933.70  * Shear (lb/sq ft)        *    0.03  *    0.08  *
   0.03  *
* Alpha                   *    1.14  * Stream Power (lb/ft s) *  161.88  *    0.00  *
   0.00  *
* Frctn Loss (ft)         *    0.01  * Cum Volume (acre-ft)    *    0.34  *    1.23  *
   0.35  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *    0.54  *    0.48  *
   0.41  *
*******************************************************************************
***********

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.

CROSS SECTION


RIVER: Tributary
REACH: 1                  RS: 18

INPUT
Description:
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -234.17     940 -216.89     939 -186.76     938 -157.94     937 -109.95     937
  -99.84     937  -40.49     936  -35.53     935     -33  934.04     -31   933.5
      -2   933.5       0   933.5       2   933.5      42   933.5    43.9  934.22
   53.65     935   77.87     936  102.24     937  126.61     938  136.43     939
  153.33     940

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -234.17     .04     -33    .035    43.9     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           -33    43.9            60.52   56.69   58.17             .1       .3
```

CROSS SECTION OUTPUT Profile #100-year
****
****

E.G. Elev (ft)	936.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.040	0.035	0.040
W.S. Elev (ft)	936.08	Reach Len. (ft)	60.52	56.69	58.17
Crit W.S. (ft)		Flow Area (sq ft)	7.00	197.11	28.43
E.G. Slope (ft/ft)	0.000149	Area (sq ft)	7.00	197.11	28.43
Q Total (cfs)	204.00	Flow (cfs)	2.16	190.83	11.01
Top Width (ft)	124.99	Top Width (ft)	12.19	76.90	35.90
Vel Total (ft/s)	0.88	Avg. Vel. (ft/s)	0.31	0.97	0.39
Max Chl Dpth (ft)	2.58	Hydr. Depth (ft)	0.57	2.56	0.79
Conv. Total (cfs)	16726.3	Conv. (cfs)	177.1	15646.1	903.0
Length Wtd. (ft)	56.79	Wetted Per. (ft)	12.46	77.10	35.95
Min Ch El (ft)	933.50	Shear (lb/sq ft)	0.01	0.02	0.01
Alpha	1.15	Stream Power (lb/ft s)	153.33	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.34	1.04	0.32
C & E Loss (ft)	0.00	Cum SA (acres)	0.52	0.40	0.37

****
****

CROSS SECTION

RIVER: Tributary
REACH: 1 RS: 17

INPUT
Description:
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-195.41	940	-178.47	939	-166.07	938	-153.8	937	-129.09	936
-87.73	936	-54.18	936	-46.69	935	-43.69	934.23	-2	933.2
0	933.2	2	933.2	52.79	934.29	55.9	935	79.17	936
103.76	937	134.32	938						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-195.41	.04	-43.69	.035	52.79	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-43.69	52.79	71.45	71.45	71.45	.1	.3

CROSS SECTION OUTPUT Profile #100-year
****

```
***********
* E.G. Elev (ft)         *  936.08  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.01  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  936.07  * Reach Len. (ft)        *   71.45  *   71.45  *
  71.45  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   14.21  *  228.04  *
  17.84  *
* E.G. Slope (ft/ft)     *0.000131  * Area (sq ft)           *   14.21  *  228.04  *
  17.84  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *    1.80  *  196.62  *
   5.58  *
* Top Width (ft)         *  211.86  * Top Width (ft)         *   87.21  *   96.48  *
  28.18  *
* Vel Total (ft/s)       *    0.78  * Avg. Vel. (ft/s)       *    0.13  *    0.86  *
   0.31  *
* Max Chl Dpth (ft)      *    2.87  * Hydr. Depth (ft)       *    0.16  *    2.36  *
   0.63  *
* Conv. Total (cfs)      * 17820.7  * Conv. (cfs)            *   157.2  * 17176.0  *
  487.6  *
* Length Wtd. (ft)       *   71.45  * Wetted Per. (ft)       *   87.37  *   96.50  *
  28.28  *
* Min Ch El (ft)         *  933.20  * Shear (lb/sq ft)       *    0.00  *    0.02  *
   0.01  *
* Alpha                  *    1.17  * Stream Power (lb/ft s) *  134.32  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.03  * Cum Volume (acre-ft)   *    0.32  *    0.76  *
   0.29  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    0.45  *    0.28  *
   0.32  *
*******************************************************************************
***********

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.

CROSS SECTION


RIVER: Tributary
REACH: 1                  RS: 16

INPUT
Description: Upstream Section of W7
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -136.49     940 -126.57     939  -66.34     938  -60.03     937  -53.71     936
   -9.74     935    -4.8     934   -2.22  933.02      -2  933.02       0  933.02
       2  933.02     4.1  933.02    4.52  933.02    8.02     934    11.7     935
   48.05     936  116.41     937  167.31     938

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -136.49     .04    -4.8    .035    8.02     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          -4.8    8.02             6.63    6.63    6.63             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
```

```
*******************************************************************************
***********
* E.G. Elev (ft)          *  936.03  * Element                 *  Left OB *  Channel *
Right OB *
* Vel Head (ft)           *    0.31  * Wt. n-Val.              *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)          *  935.72  * Reach Len. (ft)         *    6.63  *    6.63  *
   6.63  *
* Crit W.S. (ft)          *  935.47  * Flow Area (sq ft)       *   17.45  *   31.64  *
  13.93  *
* E.G. Slope (ft/ft)      *0.004278  * Area (sq ft)            *   17.45  *   31.64  *
  13.93  *
* Q Total (cfs)           *  204.00  * Flow (cfs)              *   25.81  *  157.91  *
  20.29  *
* Top Width (ft)          *   79.32  * Top Width (ft)          *   36.63  *   12.82  *
  29.88  *
* Vel Total (ft/s)        *    3.24  * Avg. Vel. (ft/s)        *    1.48  *    4.99  *
   1.46  *
* Max Chl Dpth (ft)       *    2.70  * Hydr. Depth (ft)        *    0.48  *    2.47  *
   0.47  *
* Conv. Total (cfs)       *  3119.0  * Conv. (cfs)             *   394.5  *  2414.2  *
  310.2  *
* Length Wtd. (ft)        *    6.63  * Wetted Per. (ft)        *   36.74  *   13.13  *
  30.02  *
* Min Ch El (ft)          *  933.02  * Shear (lb/sq ft)        *    0.13  *    0.64  *
   0.12  *
* Alpha                   *    1.89  * Stream Power (lb/ft s) *  167.31  *    0.00  *
   0.00  *
* Frctn Loss (ft)         *    0.04  * Cum Volume (acre-ft)    *    0.30  *    0.55  *
   0.26  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)          *    0.35  *    0.19  *
   0.28  *
*******************************************************************************
***********
```

CROSS SECTION

RIVER: Tributary
REACH: 1 RS: 14

INPUT
Description: Downstream Section of W7
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-136.49	940	-126.57	939	-66.34	938	-60.03	937	-53.71	936
-9.74	935	-4.8	934	-2.22	933.02	-2	932.97	0	932.97
2	932.97	4.1	932.97	4.52	933	8.02	934	11.7	935
48.05	936	116.41	937	167.31	938				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-136.49	.04	-4.8	.035	8.02	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-4.8	8.02	42.49	42.49	42.49	.1	.3

CROSS SECTION OUTPUT Profile #100-year

```
*******************************************************************************
***********
* E.G. Elev (ft)          *  935.97  * Element                 *  Left OB *  Channel *
```

```
Right OB *
* Vel Head (ft)          *    0.53  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  935.45  * Reach Len. (ft)        *   42.49  *   42.49  *
  42.49  *
* Crit W.S. (ft)         *  935.45  * Flow Area (sq ft)      *    9.14  *   28.53  *
   7.17  *
* E.G. Slope (ft/ft)     *0.007610  * Area (sq ft)           *    9.14  *   28.53  *
   7.17  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *   15.21  *  177.12  *
  11.67  *
* Top Width (ft)         *   57.57  * Top Width (ft)         *   24.72  *   12.82  *
  20.03  *
* Vel Total (ft/s)       *    4.55  * Avg. Vel. (ft/s)       *    1.66  *    6.21  *
   1.63  *
* Max Chl Dpth (ft)      *    2.48  * Hydr. Depth (ft)       *    0.37  *    2.23  *
   0.36  *
* Conv. Total (cfs)      *  2338.5  * Conv. (cfs)            *   174.4  *  2030.4  *
  133.7  *
* Length Wtd. (ft)       *   42.49  * Wetted Per. (ft)       *   24.82  *   13.15  *
  20.17  *
* Min Ch El (ft)         *  932.97  * Shear (lb/sq ft)       *    0.17  *    1.03  *
   0.17  *
* Alpha                  *    1.63  * Stream Power (lb/ft s) *  167.31  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.39  * Cum Volume (acre-ft)   *    0.29  *    0.54  *
   0.26  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    0.35  *    0.19  *
   0.27  *
*******************************************************************************
***********

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

CROSS SECTION


RIVER: Tributary
REACH: 1                 RS: 13

INPUT
Description: Upstream Section of HW1
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -126.77     940 -120.95     939  -55.96     938  -48.28     937  -41.77     936
  -25.67     935   -6.74     934    -4.6     933      -3  932.28      -2  930.26
       0  930.26       2  930.26    3.42   932.2   11.98     933   15.17     934
   18.35     935   52.68     936 138.387     937  185.49     938

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

```
 -126.77     .04      -3    .035    3.42     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -3    3.42            41.16   41.16   41.16             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  934.52  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.79  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  933.73  * Reach Len. (ft)        *   41.16  *   41.16  *
  41.16  *
* Crit W.S. (ft)         *  933.73  * Flow Area (sq ft)      *    2.31  *   19.88  *
  10.51  *
* E.G. Slope (ft/ft)     *0.011376  * Area (sq ft)           *    2.31  *   19.88  *
  10.51  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *    6.97  *  156.71  *
  40.32  *
* Top Width (ft)         *   20.46  * Top Width (ft)         *    3.16  *    6.42  *
  10.89  *
* Vel Total (ft/s)       *    6.24  * Avg. Vel. (ft/s)       *    3.02  *    7.88  *
   3.84  *
* Max Chl Dpth (ft)      *    3.47  * Hydr. Depth (ft)       *    0.73  *    3.10  *
   0.97  *
* Conv. Total (cfs)      *  1912.7  * Conv. (cfs)            *    65.4  *  1469.3  *
  378.0  *
* Length Wtd. (ft)       *   41.16  * Wetted Per. (ft)       *    3.48  *    8.66  *
  11.03  *
* Min Ch El (ft)         *  930.26  * Shear (lb/sq ft)       *    0.47  *    1.63  *
   0.68  *
* Alpha                  *    1.31  * Stream Power (lb/ft s) *  185.49  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.43  * Cum Volume (acre-ft)   *    0.29  *    0.52  *
   0.25  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.33  *    0.18  *
   0.26  *
*******************************************************************************
***********

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: 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: Tributary
REACH: 1                  RS: 12

INPUT
Description: Downstream Section of HW1
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -138.38     940 -128.35     939 -117.64     938 -105.71     937  -87.79     936
  -60.71     935   -9.18     934   -7.14     933   -5.58  932.28   -4.93     932
```

```
      -2  929.95       0  929.95       2  929.95    5.69     932    6.38   932.6
    7.32     933   19.04     934   23.88     935  136.34     936  201.51     937
  231.74     938  258.56     939

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 -138.38     .04   -4.93    .035    5.69     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -4.93    5.69           200.44  200.44  200.44             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  933.96  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.80  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  933.16  * Reach Len. (ft)        *  200.44  *  200.44  *
 200.44  *
* Crit W.S. (ft)         *  932.89  * Flow Area (sq ft)      *    1.51  *   27.34  *
   1.09  *
* E.G. Slope (ft/ft)     *0.009552  * Area (sq ft)           *    1.51  *   27.34  *
   1.09  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *    3.63  *  198.66  *
   1.71  *
* Top Width (ft)         *   16.71  * Top Width (ft)         *    2.54  *   10.62  *
   3.54  *
* Vel Total (ft/s)       *    6.81  * Avg. Vel. (ft/s)       *    2.41  *    7.27  *
   1.57  *
* Max Chl Dpth (ft)      *    3.21  * Hydr. Depth (ft)       *    0.59  *    2.57  *
   0.31  *
* Conv. Total (cfs)      *  2087.3  * Conv. (cfs)            *    37.1  *  2032.6  *
   17.5  *
* Length Wtd. (ft)       *  200.44  * Wetted Per. (ft)       *    2.80  *   11.80  *
   3.86  *
* Min Ch El (ft)         *  929.95  * Shear (lb/sq ft)       *    0.32  *    1.38  *
   0.17  *
* Alpha                  *    1.11  * Stream Power (lb/ft s) *  258.56  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.99  * Cum Volume (acre-ft)   *    0.29  *    0.50  *
   0.24  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         *    0.33  *    0.17  *
   0.25  *
*******************************************************************************
***********

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: Tributary
REACH: 1                  RS: 11

INPUT
Description: Upstream Section of B7
```

Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-51.05	935	-27.11	934	-13.89	933	-10.49	932	-7.09	931
-5.15	930.09	-3.03	930	-2	929.26	0	929.26	2	929.26
5.36	929.46	6.67	930	9.27	931	11.86	932	14.46	933
65.52	933	152.61	934	212.39	935				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-51.05	.04	-5.15	.035	6.67	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-5.15	6.67	30.2	30.2	30.2	.1	.3

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	932.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.040	0.035	0.040
W.S. Elev (ft)	932.52	Reach Len. (ft)	30.20	30.20	30.20
Crit W.S. (ft)		Flow Area (sq ft)	7.73	35.49	8.22
E.G. Slope (ft/ft)	0.003027	Area (sq ft)	7.73	35.49	8.22
Q Total (cfs)	204.00	Flow (cfs)	16.11	169.19	18.70
Top Width (ft)	25.45	Top Width (ft)	7.10	11.82	6.53
Vel Total (ft/s)	3.97	Avg. Vel. (ft/s)	2.08	4.77	2.28
Max Chl Dpth (ft)	3.26	Hydr. Depth (ft)	1.09	3.00	1.26
Conv. Total (cfs)	3707.8	Conv. (cfs)	292.7	3075.2	339.9
Length Wtd. (ft)	30.20	Wetted Per. (ft)	7.52	12.17	7.00
Min Ch El (ft)	929.26	Shear (lb/sq ft)	0.19	0.55	0.22
Alpha	1.25	Stream Power (lb/ft s)	212.39	0.00	0.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.26	0.35	0.22
C & E Loss (ft)	0.00	Cum SA (acres)	0.31	0.12	0.23

CROSS SECTION

RIVER: Tributary
REACH: 1 RS: 10

INPUT
Description: Downstream Section of B7
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

```
  -45.22     935  -30.49     934  -16.61     933  -12.86     932   -8.83     931
   -4.75     930      -2  929.26       0  929.26       2  929.26    3.84     930
    9.84     931   15.62     932    20.2     933  167.48     934  225.75     935

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -45.22     .04   -4.75    .035    3.84     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -4.75    3.84             64.59   64.59   64.59             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  932.72  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.30  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  932.42  * Reach Len. (ft)        *   64.59  *   64.59  *
  64.59  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   11.91  *   25.48  *
  17.29  *
* E.G. Slope (ft/ft)     *0.003536  * Area (sq ft)           *   11.91  *   25.48  *
  17.29  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *   29.55  *  130.34  *
  44.10  *
* Top Width (ft)         *   32.01  * Top Width (ft)         *    9.70  *    8.59  *
  13.72  *
* Vel Total (ft/s)       *    3.73  * Avg. Vel. (ft/s)       *    2.48  *    5.12  *
   2.55  *
* Max Chl Dpth (ft)      *    3.16  * Hydr. Depth (ft)       *    1.23  *    2.97  *
   1.26  *
* Conv. Total (cfs)      *  3430.5  * Conv. (cfs)            *   497.0  *  2191.9  *
  741.7  *
* Length Wtd. (ft)       *   64.59  * Wetted Per. (ft)       *   10.00  *    8.83  *
  13.93  *
* Min Ch El (ft)         *  929.26  * Shear (lb/sq ft)       *    0.26  *    0.64  *
   0.27  *
* Alpha                  *    1.37  * Stream Power (lb/ft s) *  225.75  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.21  * Cum Volume (acre-ft)   *    0.26  *    0.33  *
   0.21  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.30  *    0.12  *
   0.22  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary
REACH: 1                  RS: 9

INPUT
Description: Upstream Section of B6
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
***********************************************************************************
  -77.25     935  -49.15     934  -22.48     933  -14.98     932  -10.65     931
   -6.32     930   -5.46   929.8      -2  928.59       0  928.59       2  928.59
    4.52     930    7.94     931   12.14     932   21.36     933   30.97     933
  193.03     933
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
  -77.25     .04   -5.46    .035    4.52     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -5.46    4.52             32.25   32.25   32.25             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*********************************************************************************
***********
* E.G. Elev (ft)         *  932.50  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.31  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  932.19  * Reach Len. (ft)        *   32.25  *   32.25  *
  32.25  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   12.39  *   32.04  *
   8.82  *
* E.G. Slope (ft/ft)     *0.003118  * Area (sq ft)           *   12.39  *   32.04  *
   8.82  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *   27.49  *  159.23  *
  17.28  *
* Top Width (ft)         *   30.26  * Top Width (ft)         *   10.93  *    9.98  *
   9.35  *
* Vel Total (ft/s)       *    3.83  * Avg. Vel. (ft/s)       *    2.22  *    4.97  *
   1.96  *
* Max Chl Dpth (ft)      *    3.60  * Hydr. Depth (ft)       *    1.13  *    3.21  *
   0.94  *
* Conv. Total (cfs)      *  3653.3  * Conv. (cfs)            *   492.3  *  2851.6  *
  309.4  *
* Length Wtd. (ft)       *   32.25  * Wetted Per. (ft)       *   11.19  *   10.55  *
   9.62  *
* Min Ch El (ft)         *  928.59  * Shear (lb/sq ft)       *    0.22  *    0.59  *
   0.18  *
* Alpha                  *    1.38  * Stream Power (lb/ft s) *  193.03  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.11  * Cum Volume (acre-ft)   *    0.24  *    0.29  *
   0.19  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.29  *    0.10  *
   0.20  *
*********************************************************************************
***********

CROSS SECTION


RIVER: Tributary
REACH: 1                  RS: 8

INPUT
Description: Downstream Section of B6
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**************************************************************************
   -62.1     935  -53.47     934  -34.54     933  -15.14     932   -9.85     931
   -5.65     930    -4.6  929.72      -2  928.59       0  928.59       2  928.59
    4.59  929.72    5.54     930    7.55     931   18.14     932   28.38     932
   79.09     932  194.02     933

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

```
**********************************************
   -62.1     .04    -4.6    .035    4.59     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          -4.6    4.59             20.94   20.94   20.94             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*********************************************************************************
***********
* E.G. Elev (ft)         *  932.38  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  932.00  * Reach Len. (ft)        *   20.94  *   20.94  *
  20.94  *
* Crit W.S. (ft)         *  931.38  * Flow Area (sq ft)      *   11.18  *   28.39  *
  10.33  *
* E.G. Slope (ft/ft)     *0.004029  * Area (sq ft)           *   11.18  *   28.39  *
  10.33  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *   27.00  *  156.99  *
  20.01  *
* Top Width (ft)         *   33.26  * Top Width (ft)         *   10.53  *    9.19  *
  13.54  *
* Vel Total (ft/s)       *    4.09  * Avg. Vel. (ft/s)       *    2.42  *    5.53  *
   1.94  *
* Max Chl Dpth (ft)      *    3.41  * Hydr. Depth (ft)       *    1.06  *    3.09  *
   0.76  *
* Conv. Total (cfs)      *  3214.0  * Conv. (cfs)            *   425.4  *  2473.4  *
  315.2  *
* Length Wtd. (ft)       *   20.94  * Wetted Per. (ft)       *   10.78  *    9.66  *
  13.86  *
* Min Ch El (ft)         *  928.59  * Shear (lb/sq ft)       *    0.26  *    0.74  *
   0.19  *
* Alpha                  *    1.48  * Stream Power (lb/ft s) *  194.02  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)   *    0.23  *    0.26  *
   0.19  *
* C & E Loss (ft)        *    0.10  * Cum SA (acres)         *    0.28  *    0.10  *
   0.20  *
*********************************************************************************
***********

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.

CROSS SECTION


RIVER: Tributary
REACH: 1                  RS: 7.5

INPUT
Description:
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
  -92.74     935  -69.63     934  -48.15     933  -23.48     932  -10.41     931
   -6.54     930   -5.15  929.72      -2  928.59       0  928.59       2  928.59
    5.46  929.72   13.06     930   32.59     931   80.37     932   193.6     933

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

```
*********************************************
  -92.74     .04   -5.15    .035    5.46     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -5.15    5.46            10.94   10.94   10.94             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  932.26  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.06  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  932.19  * Reach Len. (ft)        *   10.94  *   10.94  *
  10.94  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *   19.35  *   34.51  *
  86.16  *
* E.G. Slope (ft/ft)     *0.000917  * Area (sq ft)           *   19.35  *   34.51  *
  86.16  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *   19.22  *   95.18  *
  89.60  *
* Top Width (ft)         *  130.67  * Top Width (ft)         *   23.13  *   10.61  *
  96.94  *
* Vel Total (ft/s)       *    1.46  * Avg. Vel. (ft/s)       *    0.99  *    2.76  *
   1.04  *
* Max Chl Dpth (ft)      *    3.60  * Hydr. Depth (ft)       *    0.84  *    3.25  *
   0.89  *
* Conv. Total (cfs)      *  6734.9  * Conv. (cfs)            *   634.4  *  3142.3  *
 2958.2  *
* Length Wtd. (ft)       *   10.94  * Wetted Per. (ft)       *   23.33  *   10.99  *
  96.98  *
* Min Ch El (ft)         *  928.59  * Shear (lb/sq ft)       *    0.05  *    0.18  *
   0.05  *
* Alpha                  *    1.94  * Stream Power (lb/ft s) *  193.60  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *    0.22  *    0.25  *
   0.16  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.27  *    0.09  *
   0.17  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Tributary
REACH: 1                  RS: 7

INPUT
Description:
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -92.74     935  -69.63     934  -48.15     933  -23.48     932  -10.41     931
   -6.54     930   -5.15  929.65      -2  928.55       0  928.55       2  928.55
    5.62  929.65    8.17     930    36.8     931   81.81     932  193.26     933

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
  -92.74     .04   -5.15    .035    5.62     .04

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

```
         -5.15    5.62           127.54  127.54  127.54             .1       .3

CROSS SECTION OUTPUT  Profile #100-year
*******************************************************************************
***********
* E.G. Elev (ft)         *  932.25  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.06  * Wt. n-Val.             *   0.040  *   0.035  *
  0.040  *
* W.S. Elev (ft)         *  932.19  * Reach Len. (ft)        *   62.04  *   62.04  *
  62.04  *
* Crit W.S. (ft)         *  930.99  * Flow Area (sq ft)      *   19.19  *   35.43  *
  87.06  *
* E.G. Slope (ft/ft)     *0.000875  * Area (sq ft)           *   19.19  *   35.43  *
  87.06  *
* Q Total (cfs)          *  204.00  * Flow (cfs)             *   18.62  *   96.34  *
  89.04  *
* Top Width (ft)         *  130.56  * Top Width (ft)         *   22.91  *   10.77  *
  96.88  *
* Vel Total (ft/s)       *    1.44  * Avg. Vel. (ft/s)       *    0.97  *    2.72  *
   1.02  *
* Max Chl Dpth (ft)      *    3.64  * Hydr. Depth (ft)       *    0.84  *    3.29  *
   0.90  *
* Conv. Total (cfs)      *  6897.7  * Conv. (cfs)            *   629.6  *  3257.3  *
 3010.7  *
* Length Wtd. (ft)       *   62.04  * Wetted Per. (ft)       *   23.12  *   11.12  *
  96.94  *
* Min Ch El (ft)         *  928.55  * Shear (lb/sq ft)       *    0.05  *    0.17  *
   0.05  *
* Alpha                  *    1.95  * Stream Power (lb/ft s) *  193.26  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.14  * Cum Volume (acre-ft)   *    0.22  *    0.24  *
   0.14  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *    0.27  *    0.09  *
   0.14  *
*******************************************************************************
***********

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.

BRIDGE


RIVER: Tributary
REACH: 1                  RS: 5.5

INPUT
Description:
Distance from Upstream XS =   62.04
Deck/Roadway Width        =   64.97
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*******************************************************************************
    -100   933.5              -9   933.5   931.5       6   933.5   931.5
     200   933.5

Upstream Bridge Cross Section Data
```

```
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -92.74     935  -69.63     934  -48.15     933  -23.48     932  -10.41     931
   -6.54     930   -5.15  929.65      -2  928.55       0  928.55       2  928.55
    5.62  929.65    8.17     930    36.8     931   81.81     932  193.26     933

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -92.74     .04   -5.15    .035    5.62     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -5.15    5.62             .1       .3

Downstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*******************************************************************************
    -100   933.5              -9   933.5   931.5       6   933.5   931.5
     200   933.5

Downstream Bridge Cross Section Data
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  -85.49     935   -72.8     934  -59.81     933  -42.86     932  -33.81     931
  -24.76     930  -15.72     929   -8.49     928      -2   927.2       0   927.2
       2   927.2    5.17     928    7.95     929   11.51     930   15.08     931
   18.64     932

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  -85.49     .04   -8.49    .035    5.17     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -8.49    5.17             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only

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

BRIDGE OUTPUT Profile #100-year

```
*********************************************************************************
*********
* E.G. US. (ft)          *     932.25  * Element                *Inside BR US
*Inside BR DS *
* W.S. US. (ft)          *     932.19  * E.G. Elev (ft)         *     932.02  *
930.63  *
* Q Total (cfs)          *     204.00  * W.S. Elev (ft)         *     931.08  *
930.19  *
* Q Bridge (cfs)         *     204.00  * Crit W.S. (ft)         *     931.08  *
929.35  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *       2.53  *
 2.99  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       7.31  *
 5.04  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *      27.90  *
40.46  *
* Weir Submerg           *             * Froude # Chl           *       0.86  *
 0.54  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *      77.60  *
87.49  *
* Min El Weir Flow (ft)  *     933.51  * Hydr Depth (ft)        *       1.85  *
 2.66  *
* Min El Prs (ft)        *     931.50  * W.P. Total (ft)        *      17.50  *
19.59  *
* Delta EG (ft)          *       1.70  * Conv. Total (cfs)      *     1782.0  *
3124.6  *
* Delta WS (ft)          *       1.82  * Top Width (ft)         *      15.06  *
15.19  *
* BR Open Area (sq ft)   *      34.15  * Frctn Loss (ft)        *       0.45  *
 0.00  *
* BR Open Vel (ft/s)     *       7.31  * C & E Loss (ft)        *       0.15  *
 0.08  *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.30  *
 0.55  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *     -92.74  *
-85.49  *
*********************************************************************************
*********

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 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.
Note:    Multiple critical depths were found at this location.  The critical depth
with the lowest, valid, water surface was used.
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: Tributary
REACH: 1 RS: 2

INPUT
Description:
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-85.49	935	-72.8	934	-59.81	933	-42.86	932	-33.81	931
-24.76	930	-15.72	929	-8.49	928	-2	927.2	0	927.2
2	927.2	5.17	928	7.95	929	11.51	930	15.08	931
18.64	932								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-85.49	.04	-8.49	.035	5.17	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-8.49	5.17	184.86	184.86	184.86	.1	.3

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	930.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.040	0.035	0.040
W.S. Elev (ft)	930.37	Reach Len. (ft)	184.86	184.86	184.86
Crit W.S. (ft)		Flow Area (sq ft)	21.97	39.42	8.53
E.G. Slope (ft/ft)	0.001989	Area (sq ft)	21.97	39.42	8.53
Q Total (cfs)	204.00	Flow (cfs)	39.09	150.19	14.72
Top Width (ft)	40.92	Top Width (ft)	19.60	13.66	7.66
Vel Total (ft/s)	2.92	Avg. Vel. (ft/s)	1.78	3.81	1.73
Max Chl Dpth (ft)	3.17	Hydr. Depth (ft)	1.12	2.89	1.11
Conv. Total (cfs)	4574.1	Conv. (cfs)	876.5	3367.5	330.1
Length Wtd. (ft)	184.86	Wetted Per. (ft)	19.75	13.81	8.02
Min Ch El (ft)	927.20	Shear (lb/sq ft)	0.14	0.35	0.13
Alpha	1.35	Stream Power (lb/ft s)	18.64	0.00	0.00
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	0.20	0.15	0.08
C & E Loss (ft)	0.03	Cum SA (acres)	0.24	0.05	0.07

CROSS SECTION

RIVER: Tributary

REACH: 1 RS: 1

INPUT
Description:
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-197.71	935	-180.63	934	-163.45	933	-145.52	932	-125.89	931
-94.47	930	-18.41	929	-5.16	928.29	-2	927	0	927
2	927	6.61	928.12	18.76	929	31.56	930	44.36	931
57.22	932								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-197.71	.04	-5.16	.035	6.61	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-5.16	6.61	0	0	0	.1	.3

CROSS SECTION OUTPUT Profile #100-year

E.G. Elev (ft)	930.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.040	0.035	0.040
W.S. Elev (ft)	930.17	Reach Len. (ft)			
Crit W.S. (ft)	929.43	Flow Area (sq ft)	71.80	32.71	28.37
E.G. Slope (ft/ft)	0.001161	Area (sq ft)	71.80	32.71	28.37
Q Total (cfs)	204.00	Flow (cfs)	75.54	91.55	36.91
Top Width (ft)	133.63	Top Width (ft)	94.71	11.77	27.15
Vel Total (ft/s)	1.54	Avg. Vel. (ft/s)	1.05	2.80	1.30
Max Chl Dpth (ft)	3.17	Hydr. Depth (ft)	0.76	2.78	1.05
Conv. Total (cfs)	5987.3	Conv. (cfs)	2217.0	2686.8	1083.4
Length Wtd. (ft)		Wetted Per. (ft)	94.74	12.16	27.23
Min Ch El (ft)	927.00	Shear (lb/sq ft)	0.05	0.20	0.08
Alpha	1.80	Stream Power (lb/ft s)	57.22	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

SUMMARY OF MANNING'S N VALUES

River:Tributary

Reach	River Sta.	n1	n2	n3

*1	* 21	* .04*	.035*	.04*
*1	* 20	* .04*	.035*	.04*
*1	* 19.5	* .04*	.035*	.04*
*1	* 19	* .04*	.035*	.04*
*1	* 18	* .04*	.035*	.04*
*1	* 17	* .04*	.035*	.04*
*1	* 16	* .04*	.035*	.04*
*1	* 14	* .04*	.035*	.04*
*1	* 13	* .04*	.035*	.04*
*1	* 12	* .04*	.035*	.04*
*1	* 11	* .04*	.035*	.04*
*1	* 10	* .04*	.035*	.04*
*1	* 9	* .04*	.035*	.04*
*1	* 8	* .04*	.035*	.04*
*1	* 7.5	* .04*	.035*	.04*
*1	* 7	* .04*	.035*	.04*
*1	* 5.5	*Bridge *	*	*
*1	* 2	* .04*	.035*	.04*
*1	* 1	* .04*	.035*	.04*

SUMMARY OF REACH LENGTHS

River: Tributary

Reach	River Sta.	Left	Channel	Right
*1	* 21	* 18.4*	18.4*	18.4*
*1	* 20	* 10*	10*	10*
*1	* 19.5	* 41.98*	41.98*	41.98*
*1	* 19	* 57*	55.6*	65.27*
*1	* 18	* 60.52*	56.69*	58.17*
*1	* 17	* 71.45*	71.45*	71.45*
*1	* 16	* 6.63*	6.63*	6.63*
*1	* 14	* 42.49*	42.49*	42.49*
*1	* 13	* 41.16*	41.16*	41.16*
*1	* 12	* 200.44*	200.44*	200.44*
*1	* 11	* 30.2*	30.2*	30.2*
*1	* 10	* 64.59*	64.59*	64.59*
*1	* 9	* 32.25*	32.25*	32.25*
*1	* 8	* 20.94*	20.94*	20.94*
*1	* 7.5	* 10.94*	10.94*	10.94*
*1	* 7	* 127.54*	127.54*	127.54*
*1	* 5.5	*Bridge *	*	*
*1	* 2	* 184.86*	184.86*	184.86*
*1	* 1	* 0*	0*	0*

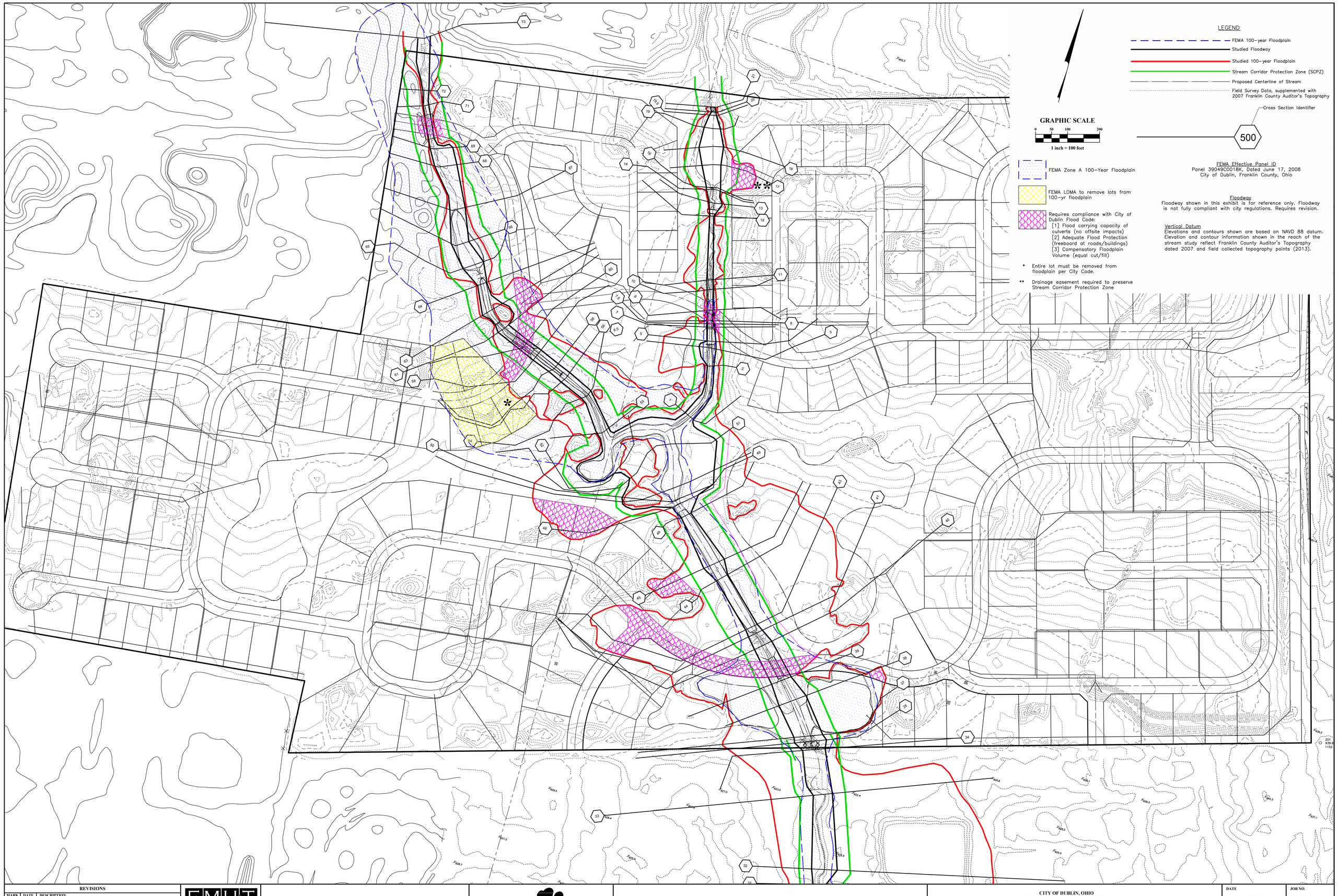
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Tributary

Reach	River Sta.	Contr.	Expan.
*1	* 21	* .1*	.3*
*1	* 20	* .1*	.3*
*1	* 19.5	* .1*	.3*
*1	* 19	* .1*	.3*

```
*1              *    18      *       .1*       .3*
*1              *    17      *       .1*       .3*
*1              *    16      *       .1*       .3*
*1              *    14      *       .1*       .3*
*1              *    13      *       .1*       .3*
*1              *    12      *       .1*       .3*
*1              *    11      *       .1*       .3*
*1              *    10      *       .1*       .3*
*1              *    9       *       .1*       .3*
*1              *    8       *       .1*       .3*
*1              *    7.5     *       .1*       .3*
*1              *    7       *       .1*       .3*
*1              *    5.5     *Bridge   *         *
*1              *    2       *       .1*       .3*
*1              *    1       *       .1*       .3*
*****************************************************
```

APPENDIX C:

Exhibits

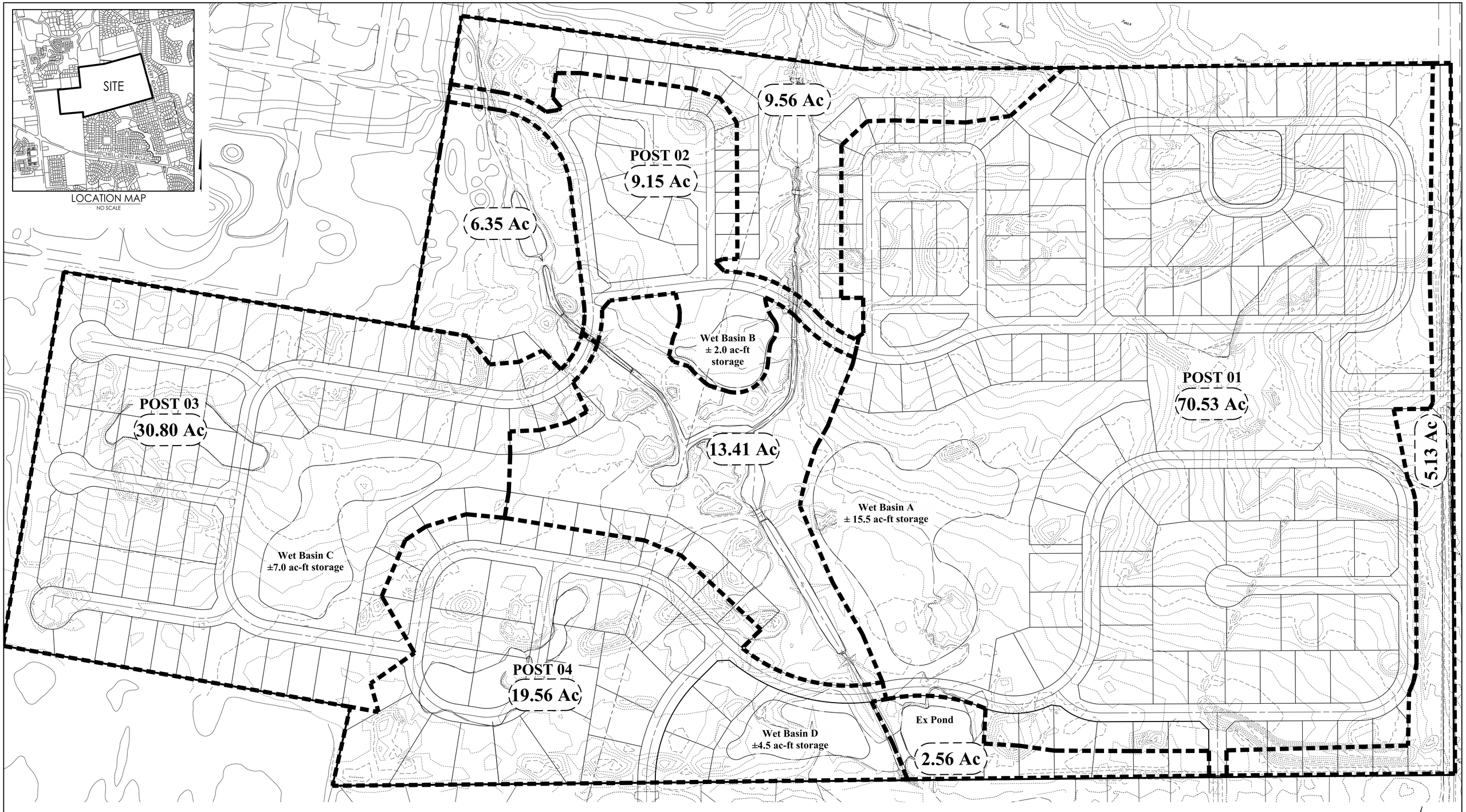


REVISIONS		
MARK	DATE	DESCRIPTION

EMH&T
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
emht.com

CITY OF DUBLIN, OHIO
FLOODPLAIN WORKMAP
FOR
RIVIERA GOLF CLUB
EXISTING CONDITIONS WORKMAP

DATE	JOB NO.
July 2014	2013-1358
SCALE	**SHEET**
1" = 100'	Exhibit 1



Post 001
Area= 70.53 Acres
RCN= 83
TC= 0.25 hrs

Post 002
Area= 9.15 Acres
RCN= 83
TC= 0.25 hrs

Post 003
Area= 30.80 Acres
RCN= 83
TC= 0.25 hrs

Post 004
Area= 19.56 Acres
RCN= 83
TC= 0.25 hrs

GRAPHIC SCALE

0 50 100 200

1 inch = 100 feet

REVISIONS		
MARK	DATE	DESCRIPTION

EMH&T
Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers • Surveyors • Planners • Scientists
5500 New Albany Road, Columbus, OH 43054
Phone: 614.775.4500 Toll Free: 888.775.3648
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CITY OF DUBLIN, OHIO
FLOODPLAIN WORKMAP
FOR
RIVIERA GOLF CLUB
POST DEVELOPMENT CONDITIONS WORKMAP

DATE	JOB NO.
July 2014	2013-1358
SCALE	**SHEET**
1" = 100'	Exhibit 2