

**HYDRAULIC REPORT
VOLUME 2**

**ELGIN O'HARE - WEST BYPASS
P-91-443-06**

**IL 72 (TOUHY AVENUE), SN: 016-0974,
I-90 (JANE ADDAMS MEMORIAL TOLLWAY), SN: 016-9975 (ISTHA 535) EB,
SN: 016-9869 (ISTHA 536) WB,
AND ELMHURST ROAD, SN: 016-0677
OVER HIGGINS CREEK**

**I-90 (JANE ADDAMS MEMORIAL TOLLWAY)
OVER HIGGINS CREEK TRIBUTARY A**

**PROPOSED WEST BYPASS
OVER HIGGINS CREEK AND TOUHY AVENUE RESERVOIR (TAR) CELL 2**

COOK COUNTY, ILLINOIS

Prepared For:

Illinois Department of Transportation
201 West Center Court
Schaumburg, IL 60196-1096

Prepared By:

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CBBEL Project No. 07-0404

FINAL – REV. NOVEMBER 2012



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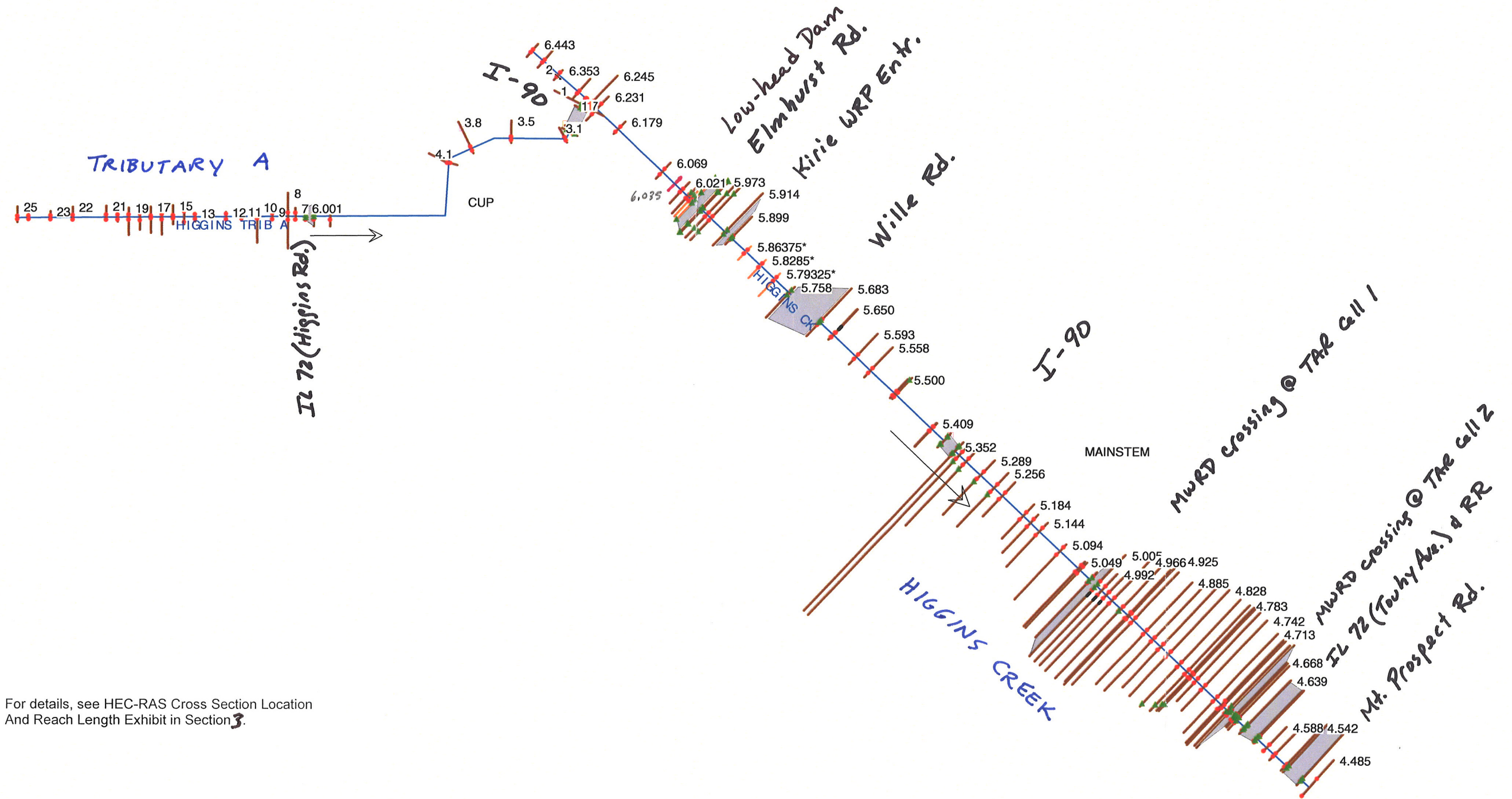
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SECTION 9

**MODIFIED EXISTING CONDITIONS ANALYSIS
– PERMIT AND DESIGN MODELS**

CROSS SECTION SCHEMATIC



For details, see HEC-RAS Cross Section Location And Reach Length Exhibit in Section 3.

None of the XS's are Geo-Referenced (• Geo-Ref user entered XS - Geo-Ref interpolated XS - Non Geo-Ref user entered XS - Non Geo-Ref interpolated XS)

MOD. EX. COND.

GEOMETRIC INPUT DATA

EXISTING CONDITIONS

(PERMIT)

HigginsCreek-Des.rep

HEC-RAS Version 4.0.0 March 2008
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
XXXXXXXX XXXX XXX XXXXXX XXXX
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: Higgins Creek Design & Permit Models
Project File : HigginsCreek-Des.prj
Run Date and Time: 5/11/2012 3:36:00 PM

Project in English units

Project Description:

EOWB Higgins Creek and Higgins Creek Trib. A CBBEL 05/2012
Proposed

Willow-Higgins Creek, Willow Creek, Higgins Creek, Cook County, Illinois

Existing and Proposed Conditions OMP with As-Built Flood Control Reservoir Conditions

10-, 50-, 100-, 500-, and 100-Year Floodway Storm

Event Flood Profiles

Christopher B. Burke Engineering, Ltd. 01/06

Updated for Final Willow Creek Relocation Alignment - OMP Project
Competition Phase for proposed conditions (short feeder culverts with open channels through future western bypass area) - by HNTB/APS Consulting, Inc. 03/2010.

PLAN DATA

Plan Title: Permit EX Higgins Survey+FIS 88

Plan File : I:\ETA\HEC-RAS for IDOT 050712\HigginsCreek-Des.p06

Geometry Title: Permit EX Higgins survey + FIS 88

Geometry File : I:\ETA\HEC-RAS for IDOT 050712\HigginsCreek-Des.g08

Flow Title : Higgins 06 Survey - FINAL WILLOW NAVD88

Flow File : I:\ETA\HEC-RAS for IDOT 050712\HigginsCreek-Des.f06

Plan Description:

Willow-Higgins Creek & Tributary A EOWB surveyed sections added to FIS/LOMR combined model. NAVD88

Plan Summary Information:

Number of: Cross Sections = 121 Multiple Openings = 0
Culverts = 8 Inline Structures = 0
Bridges = 2 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

HigginsCreek-Des.rep
 Friction Slope Method: Average Conveyance
 Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Higgins 06 Survey - FINAL WILLOW NAVD88
 Flow File : I:\ETA\HEC-RAS for IDOT 050712\HigginsCreek-Des.f06

Flow Data (cfs)

River	Reach	RS	10-YEAR	50-YEAR	100-YEAR
500-YEAR					
HIGGINS CK	2	6.443	275	400	461
548					
HIGGINS CK	2	6.404	275	400	461
548					
HIGGINS CK	MAINSTEM	6.245	562	810	911
1253					
HIGGINS CK	MAINSTEM	6.021	564	810	915
1258					
HIGGINS CK	MAINSTEM	5.972	645	1100	1320
1930					
HIGGINS CK	MAINSTEM	5.558	907	1394	1623
2270					
HIGGINS CK	MAINSTEM	5.045	571	750	1000
2000					
HIGGINS CK	MAINSTEM	4.966	700	920	1260
2140					
HIGGINS CK	MAINSTEM	4.683	424	445	460
600					
HIGGINS CK	MAINSTEM	4.664	444	485	700
1600					
HIGGINS CK	MAINSTEM	4.588	454	503	730
1666					
HIGGINS TRIB A	CUP	25	222	308	342
414					
HIGGINS TRIB A	CUP	12	224	310	344
416					
HIGGINS TRIB A	CUP	3.01	294	407	452
574					

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
HIGGINS CK	MAINSTEM	10-YEAR		Known WS = 644.36
HIGGINS CK	MAINSTEM	50-YEAR		Known WS = 646.04
HIGGINS CK	MAINSTEM	100-YEAR		Known WS = 646.62
HIGGINS CK	MAINSTEM	500-YEAR		Known WS = 649.57

GEOMETRY DATA

Geometry Title: Permit EX Higgins survey + FIS 88
 Geometry File : I:\ETA\HEC-RAS for IDOT 050712\HigginsCreek-Des.g08

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
HIGGINS CK	2		1
HIGGINS CK	MAINSTEM	1	
HIGGINS TRIB A	CUP		1

JUNCTION INFORMATION

Name: 1
 Description:
 Energy computation Method

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Length across Junction	River	Reach	Tributary	River	Reach	Length	Angle
HIGGINS CK	2		to HIGGINS CK	MAINSTEM		200	
HIGGINS TRIB A	CUP		to HIGGINS CK	MAINSTEM		108	

CROSS SECTION

RIVER: HIGGINS CK
 REACH: 2 RS: 6.443

INPUT
 Description: EOWB surveyed section D33. Shifted 195' right for comparison.

Station	Elevation	Data	num=	24	Sta	Elev	Sta	Elev	Sta	Elev
209.1	662.93	227.2	662.89	252	662.38	263.7	662.29	288.9	660.74	
304.7	657.79	318.9	655.76	323	655.03	330.3	653.3	340.5	652.09	
346.1	652.21	352.9	656.28	364.7	656.39	370.2	655.35	376.1	653.32	
378.5	652.8	379.9	653.8	381.7	655	386.1	655.76	395	656.4	
404.5	657.41	415.6	659.72	425.9	662.05	434.1	663.58			

Manning's n Values	num=	3			
Sta	n Val	Sta	n Val	Sta	n Val
209.1	.065	304.7	.065	352.9	.075

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	304.7	352.9		204	204		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: 2 RS: 6.404

INPUT
 Description: WH065

Station	Elevation	Data	num=	14	Sta	Elev	Sta	Elev	Sta	Elev
100	662.7	200	663.1	300	663.1	310	663.5	323	655.1	
325	654.6	333	652.8	336	652.6	347	654.5	350	655.1	
358	656.6	400	657.8	415	658.4	450	662.7			

Manning's n Values	num=	3			
Sta	n Val	Sta	n Val	Sta	n Val
100	.065	310	.065	358	.075

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	310	358		270	270		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: 2 RS: 6.353

INPUT
 Description: EOWB surveyed section D32. Shifted 135' left for comparison.

Station	Elevation	Data	num=	19	Sta	Elev	Sta	Elev	Sta	Elev
270	661	275.1	659.42	292	660.3	304.1	659.84	312.5	658.6	
321.1	654.67	321.8	654.16	324.1	654.04	327.3	654.04	328.8	652.29	
337.4	651.64	349.2	650.86	352.1	653.94	359.5	653.45	384.2	658.59	
402	659.13	428.5	660	436.5	661.69	445	663.04			

Manning's n Values	num=	3			
Sta	n Val	Sta	n Val	Sta	n Val
270	.065	312.5	.065	384.2	.075

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	312.5	384.2		350	350		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: 2 RS: 6.287

INPUT
 Description: From topo. Replaces copy of WH065 (6.404) adjusted for slope,

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modified to match current contours

Station Elevation Data		num= 18		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
202	664	202	658.5	234	658	273	658	289	657
304	656	314	655	323	654	332	653	340	651.6
350	650.9	360	653	364	654	373	657	380	658
414	659	430	660	441	662				

Manning's n Values

num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
202	.065	289	.065	373	.075

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

289	373	0	0	0	.1	.3
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CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 6.245

INPUT
Description: 6.246 6.249 WH064 ** HIGGINS CREEK**

Station Elevation Data		num= 11		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	670.82	82	670.72	82	658.62	180	655.72	210	653.72
330	653.72	340	651.02	370	651.02	390	657.72	450	659.72
500	663.72								

Manning's n Values

num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.07	330	.02	390	.07

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

330	390	75	75	75	.1	.3
-----	-----	----	----	----	----	----

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 6.231

INPUT
Description: EOWB surveyed section D31. Shifted 200' left. Overbanks extended per topo. Ignore tollway ditch on right side.

Station Elevation Data		num= 17		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-53	661	-53	658.5	-38	658	-22.9	657.52	1.8	657.11
25.8	656.17	42.6	655.35	43.2	654.26	46.1	653.52	52.1	652.86
59.9	652.55	166.5	652.14	167.5	653.23	173	656.08	189.3	658.68
250.2	659.87	255.1	662.77						

Manning's n Values

num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
-53	.07	42.6	.02	173	.07

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

42.6	173	274	274	274	.1	.3
------	-----	-----	-----	-----	----	----

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 6.179

INPUT
Description: EOWB surveyed section D30. Shifted 130' left. Overbanks extended per topo.

Station Elevation Data		num= 10		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1	661	1	659	19.9	658.19	43.5	657.86	68.3	657.46
71.8	654.65	81.4	652.73	123.5	651.56	135.2	660.96	159.9	660.85

Manning's n Values

num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
1	.07	68.3	.02	135.2	.07

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

68.3	135.2	575	575	575	.1	.3
------	-------	-----	-----	-----	----	----

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CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.069

INPUT
 Description: EOWB surveyed section D29. Overbanks extended per topo.

Station Elevation Data		num= 17		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-20	661	-20	659	0	658.73	14.3	658.52	39.6	657.71
62.3	656.55	78.2	652.76	85.6	651.76	122.6	650.55	130.6	652.46
132.1	657.63	138.7	658.04	153.1	657.77	164.2	657.23	168.3	658.17
175.8	660.46	186.3	664.42						

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-20	.07	62.3	.02	132.1	.07		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	62.3	132.1		180	180		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.035

INPUT
 Description: XS in pond upstream of dam

Station Elevation Data		num= 16		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	656.29	40	656.21	45.7	655.94	56	654.69	62	654.11
65.5	653.15	69	651.21	75	651.59	89.8	651.45	94.6	651.29
100.5	652.18	100.6	653.21	109	654.77	135	655.61	150	655.83
174	660.24								

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	56	.02	109	.045		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	56	109		6	6		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.034

INPUT
 Description: Upstream top of dam

Station Elevation Data		num= 18		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	656.29	40	656.21	45.7	655.94	56	654.69	62	654.11
63	654.1	74.5	653.3	82.8	653.13	89.5	652.95	89.5	651.94
94.6	651.79	94.6	652.94	99	653.05	100.3	653.21	109	654.74
135	655.61	150	655.88	174	660.24				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	74.5	.013	100.3	.045		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	74.5	100.3		7	7		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.033

INPUT
 Description: downstream top of dam

Station Elevation Data		num= 14		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	656.3	.1	654	47	653.04	62.3	653.26	70	653.51
89.3	652.78	89.5	651.61	94.6	651.61	94.8	652.62	100.6	652.72

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108 654.18 141 654.86 156 656.35 172 659.64
Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .045 70 .013 100.6 .045
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
70 100.6 1 1 1 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 6.032

INPUT

Description: creek downstream of dam
Station Elevation Data num= 14
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 656.3 .1 654 47 653.04 61.4 652.83 73 649.05
81.5 648.33 89.4 647.83 94.5 648.16 99 649.11 101.2 649.7
107 651.46 141 654.86 156 656.35 172 659.64

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .045 61.4 .029 107 .045
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
61.4 107 62 62 62 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 6.021

INPUT

Description: 6.022 6.026 ** HIGGINS CREEK** WH062, extended per topo.
Approach - Elmhurst Rd in WSP2
Station Elevation Data num= 19
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 670.72 82 670.72 82 658.62 84 658.42 96 652.12
99 650.12 108 649.42 120 650.12 124 652.12 124 654.12
128 655.22 132 656 150 656 157 655.02 164 654.12
166 654.12 191 659.52 245 660 270 661

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .04 84 .029 128 .04
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
84 128 80 80 80 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 6.006

INPUT

Description: EOWB surveyed section D28. Shifted 80' left for comparison purposes. Overbanks extended per topo.
Station Elevation Data num= 22
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
-55 661 -55 660 2.4 659.37 26.7 658.97 37.5 658.56
45.1 656.79 54.3 652.69 55.5 651.41 59 649.73 59.8 648.55
69.3 648.72 81.9 649.08 85.7 651.65 92.3 654.81 101.3 655.01
107.8 654.44 116 653.96 125.6 656.4 136.7 657.9 216 659
257 660 287 661

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
-55 .06 45.1 .035 92.3 .06
Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
45.1 92.3 35 35 35 .3 .5
Ineffective Flow num= 1
Sta L Sta R Elev Permanent

HigginsCreek-Des.rep

-55 26.7 661 T

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.9994*

INPUT

Description: Interpolated section, overbanks extended per topo.

Station Elevation Data		num= 25		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-28	661	-28	659	22	659	40	658	42.08	656.92
44.24	656.43	53.68	652.23	54.05	652.1	55.33	651.07	57.2	650.37
59.07	649.44	59.92	648.38	69.63	648.53	77.96	648.73	80.81	649.14
82.51	649.21	83.39	649.68	86.39	651.55	93.14	654.68	101.84	654.89
104	653	120	657	153	658	260	660	290	661

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
-28	.06	44.24	.035	93.14	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	44.24	93.14		23	23		.3	.5

Ineffective Flow		num= 1		Sta Elev		Permanent	
Sta L	Sta R	Elev	Permanent	Sta	Elev	Permanent	Permanent
-28	22	661	T				

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.9950

INPUT

Description: Interpolated section immediately U/S of Elmhurst Rd. Shifted 80.5' right to align with existing bridge geometry. Overbanks extended per topo.

Station Elevation Data		num= 27		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-150	660	-150	659	38	659	106.96	657.79	115.71	657.5
116.89	657.43	121.81	656.52	123.88	656.07	133.91	651.62	134.31	651.51
135.67	650.72	137.65	650.18	139.63	649.16	140.54	648.21	150.46	648.35
158.97	648.52	161.88	649.24	163.62	649.33	164.51	649.71	167.59	651.44
174.48	654.55	182.88	654.77	190	657	222	658	285	659
343	660	373	661						

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
-150	.06	123.88	.035	174.48	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	123.88	174.48		12	12		.3	.5

Ineffective Flow		num= 3		Sta Elev		Permanent	
Sta L	Sta R	Elev	Permanent	Sta	Elev	Permanent	Permanent
-150	38	660	T				
38	115	658.1	F				
195	380	658.2	F				

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.9928*

INPUT

Description: Interpolated section immediately U/S of Elmhurst Rd. Shifted 80.5' right to align with existing bridge geometry. Overbanks extended per topo.

Station Elevation Data		num= 27		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-150	660	-150	659	38	659	106.96	657.79	115.71	657.5
116.89	657.43	121.81	656.52	123.88	656.07	133.91	651.62	134.31	651.51
135.67	650.72	137.65	650.18	139.63	649.16	140.54	648.21	150.46	648.35
158.97	648.52	161.88	649.24	163.62	649.33	164.51	649.71	167.59	651.44
174.48	654.55	182.88	654.77	190	657	222	658	285	659
343	660	373	661						

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
-150	.06	123.88	.035	174.48	.06

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Sta n Val Sta n Val Sta n Val
 -150 .06 123.88 .035 174.48 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 123.88 174.48 105 105 105 .3 .5
 Ineffective Flow num= 3
 Sta L Sta R Elev Permanent
 -150 38 660 T
 38 128 658.1 F
 173 380 658.2 F

BRIDGE

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.981

INPUT

Description: 5.982 5.985 Elmhurst Road (Note: deck reduced from 85' to 70';
 matches existing conditions per survey and aerial photos, 2010.)

Distance from Upstream XS = 10
 Deck/Roadway width = 70
 Weir Coefficient = 2.7

Upstream Deck/Roadway Coordinates
 num= 15
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
 -224 658.66 -174 658.65 -74 658.58
 26 658.52 123 658.31 138 658.3
 138 658.6 655.92 163 658.6 655.85 163 658.3
 173 658.23 223 658.38 273 658.85
 323 659.65 373 661.15 473 664.09

Upstream Bridge Cross Section Data
 Station Elevation Data num= 27
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -150 660 -150 659 38 659 106.96 657.79 115.71 657.5
 116.89 657.43 121.81 656.52 123.88 656.07 133.91 651.62 134.31 651.51
 135.67 650.72 137.65 650.18 139.63 649.16 140.54 648.21 150.46 648.13
 158.97 648.52 161.88 649.24 163.62 649.33 164.51 649.71 167.59 651.44
 174.48 654.55 182.88 654.77 190 657 222 658 285 659
 343 660 370 661

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -150 .06 123.88 .035 174.48 .06

Bank Sta: Left Right Coeff Contr. Expan.
 123.88 174.48 .3 .5
 Ineffective Flow num= 3
 Sta L Sta R Elev Permanent
 -150 38 660 T
 38 128 658.1 F
 173 380 658.2 F

Downstream Deck/Roadway Coordinates
 num= 15
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
 -224 658.66 -174 658.65 -74 658.58
 26 658.52 123 658.31 138 658.3
 138 658.6 655.92 163 658.6 655.85 163 658.3
 173 658.23 223 658.38 273 658.85
 323 659.65 373 661.15 473 664.09

Downstream Bridge Cross Section Data
 Station Elevation Data num= 21
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -210 660 -210 659 -141 658 0 657 37 657
 106.6 656.01 114.2 655.84 119.5 655.32 121.3 654.98 133.1 649.77
 137.5 649.59 140.9 647.71 150.5 647.69 160.5 647.86 163.6 649.56
 166.4 649.78 177 654.15 184.5 654.42 194.5 654.23 429 655
 445 661

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -210 .06 121.3 .035 177 .06

Bank Sta: Left Right Coeff Contr. Expan.
 121.3 177 .3 .5
 Ineffective Flow num= 4

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Sta L	Sta R	Elev	Permanent
-210	-66	660	T
-66	132	657	F
169	337	657	F
337	445	661	T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins = 658.1
 Energy head used in spillway design = -.28
 Spillway height used in design = 0
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy
 Momentum Cd = 1.33
 W.S. Pro Method

W.S.Pro Data

Left Embankment
 El of the top of the embankment = 658
 El of the toe of the abutment = 656
 Right Embankment
 El of the top of the embankment = 659
 El of the toe of the abutment = 654
 Abtument Type = 4 Vert. abutments and sloping embankments with wingwalls
 Slope of abutments =
 Top with of embankment = 50
 Centroid station of bridge opening =
 Wing wall Type = Angular wing walls
 width = 10
 Angle = 45
 Radius =
 Guide Banks Type = No Guide Bank present
 Length =
 Offset =
 Angle =

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
 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

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.973

INPUT

Description: EOWB surveyed section D25, D/S of Elmhurst Road. Shifted 298' left. Then shifted 80.5' rt. to align with existing bridge geometry.

Station		Elevation Data		num= 20		Sta		Elev		Sta		Elev	
-210	660	-210	659	-141	658	0	657	37	657	133.1	649.77	166.4	649.78
106.6	656.01	114.2	655.84	119.5	655.32	121.3	654.98	133.1	649.77	166.4	649.78	166.4	649.78
137.5	649.59	140.9	647.71	160.5	647.86	163.6	649.56	166.4	649.78	166.4	649.78	166.4	649.78
177	654.15	184.5	654.42	194.5	654.23	429	655	445	661				

Manning's n Values		num= 3		Sta		n Val	
-210	.06	121.3	.035	177	.06		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	121.3	177		8	8	.3	.5

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Ineffective Flow num= 4
 Sta L Sta R Elev Permanent
 -210 -66 660 T
 -66 132 657 F
 169 337 657 F
 337 445 661 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.972

INPUT

Description: 5.969 5.976 ** HIGGINS CREEK** WH061, shifted 82' right for comparison purposes. Overbanks extended per topo.

Approach -

Wille Rd / Exit - Elmhurst Rd in WSP2

Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-210	660	-210	659	-182	658	-44	657	72	656
82	655.7	122	655.2	125	654.7	135	650	143	650
147	648	152	647.9	157	648	161	650	166	650
175	654.7	190	655	420	655	443	661		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-210	.06	122	.035	175	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 122 175 66 66 66 .3 .5

Ineffective Flow num= 4
 Sta L Sta R Elev Permanent
 -210 -72 660 T
 -72 130 657 F
 171 335 657 F
 335 443 661 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.959

INPUT

Description: EOWB surveyed section D24, shifted 320' left. Overbanks extended per topo.

Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-305	660	-300	659	-45.6	658	-13.4	657	-6.8	656.99
7.7	656.5	30.6	655.6	41.1	654.11	53	649.25	57.4	649.48
61.7	647.65	64.2	647.58	70	647.59	72.8	647.73	76.7	649.53
81.7	649.65	92.9	654.08	100	654.98	114.5	655.62	125	655.8
338	656	360	661						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-305	.06	41.1	.035	92.9	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 41.1 92.9 50 50 50 .1 .3

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -305 -200 660 T
 245 360 661 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.950

INPUT

Description: EOWB surveyed section D23. Overbanks extended per topo.

Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-370	660	-345	659	-313	659	-35	658	0	657.72
32.9	655.48	41	654.27	52.7	649.5	57.5	649.43	61.4	647.43
66.3	647.42	71.3	647.5	75.4	649.4	79.9	649.46	91.5	654.22

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107 655.76 124 656.24 308 656.25 325 657 346 661

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -370 .06 41 .035 91.5 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 41 91.5 189 189 189 .1 .3

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -370 -245 660 T
 240 346 661 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.914

INPUT

Description: EOWB surveyed section D22, upstream of MRWD entrance. Shifted 6' left. Shape revised per D23 template. Overbanks extended per topo.

Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-435	660	-430	659	-330	659	-262	658	-235	658
-196	659	-158	660	-67	660	-37	658	14.6	657.65
36.4	655.86	40	654.72	53.5	649.68	54	649.5	58.5	649.4
63	647.35	66	647.31	73	647.35	77	649.4	81.5	649.5
82.8	649.66	93.2	654.22	116.5	657.83	203	658	236	661

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -435 .06 40 .035 93.2 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 40 93.2 78 78 78 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -435 42.5 658 F
 94.5 236 660 F

CULVERT

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.911

INPUT

Description: MWRD Kirie Entrance, inverts and road profile per survey, culvert size approximated.

Distance from Upstream XS = 18
 Deck/Roadway width = 41
 Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates num= 13

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-230		658			-230		658			-200		658		
-100		658			-27		658			0		658.63		
59	659.5		40	661.65	59	661.65				77.8	661.65			
77.9	660		134.1	660.54						183	661			
236	661													

Upstream Bridge Cross Section Data

Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-435	660	-430	659	-330	659	-262	658	-235	658
-196	659	-158	660	-67	660	-37	658	14.6	657.65
36.4	655.86	40	654.72	53.5	649.68	54	649.5	58.5	649.4
63	647.35	66	647.31	73	647.35	77	649.4	81.5	649.5
82.8	649.66	93.2	654.22	116.5	657.83	203	658	236	661

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -435 .06 40 .035 93.2 .06

Bank Sta: Left Right Coeff Contr. Expan.
 40 93.2 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent

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-435 42.5 658 F
94.5 236 660 F

Downstream Deck/Roadway Coordinates

num= 12
Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
-230 660 -230 658 -200 658
-100 658 -27 658 0 658.63
59 659.5 59 661.65 77.8 661.65
77.9 660 134.1 660.54 183 661

Downstream Bridge Cross Section Data

Station Elevation Data num= 19
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
-208 660 -208 658 -170 658 -106 658 -49 658
0 658.24 41.4 654.75 43.2 654.41 54.5 649.5 59 649.4
63 647.35 66 647.3 73 647.35 77 649.4 81.5 649.5
93.4 654.22 116.9 659.17 132 660 150 661

Manning's n Values

num= 3
Sta n Val Sta n Val Sta n Val
-208 .06 43.2 .035 93.4 .06

Bank Sta: Left Right Coeff Contr. Expan.

43.2 93.4 .3 .5

Ineffective Flow

num= 2
Sta L Sta R Elev Permanent
-208 55.5 657.5 F
81.5 150 660 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 = 658
Energy head used in spillway design =
Spillway height used in design =
weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name Shape Rise Span
Culvert #1 Box 9 17
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG

Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
18 41 .012 .012 0 .4 1
Upstream Elevation = 647.3
Centerline Station = 68.4
Downstream Elevation = 647.3
Centerline Station = 68.4

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.899

INPUT

Description: EOWB surveyed section D21, downstream of MRWD entrance. Shape revised per D23 template. Overbanks extended per topo.

Station Elevation Data num= 19
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
-208 660 -208 658 -170 658 -106 658 -49 658
0 658.24 41.4 654.75 43.2 654.41 54.5 649.5 59 649.4
63 647.35 66 647.3 73 647.35 77 649.4 81.5 649.5
93.4 654.22 116.9 659.17 132 660 150 661

Manning's n Values

num= 3
Sta n Val Sta n Val Sta n Val
-208 .06 43.2 .035 93.4 .06

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

43.2 93.4 186 186 186 .3 .5

Ineffective Flow

num= 2
Sta L Sta R Elev Permanent
-208 55.5 657.5 F
81.5 150 660 F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.86375*

INPUT

Description: Interpolated XS
 Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1.25	658.68	3.13	657.92	18.04	656.86	36.71	655.53	39.43	655.17
42.19	654.82	44.08	654.44	51.8	650.93	55.06	649.49	55.66	649.3
59.25	649.22	60.27	649.06	62.98	647.69	64.37	647.15	67.45	647.1
73.01	647.16	74.3	647.31	77.28	648.83	78.22	649.2	82.09	649.29
82.62	649.36	85.73	650.68	94.28	654.25	95.94	654.45	109.62	655.56
133.8	656.76	173.93	658.83						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-1.25	.06	44.08	.035	94.28	.06

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

44.08	94.28	186	186	186	.3	.5
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CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.8285*

INPUT

Description: Interpolated XS
 Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-2.5	659.12	2.09	657.94	17.69	657.02	37.24	655.86	40.09	655.37
42.97	654.89	44.95	654.47	52.87	650.72	56.21	649.23	56.82	649.09
60.5	649.01	61.55	648.73	64.32	647.32	65.75	646.96	68.9	646.9
74.34	646.97	75.61	647.28	78.52	648.75	79.44	649.01	83.23	649.09
83.75	649.23	86.78	650.61	95.15	654.28	98	654.58	121.31	655.94
162.53	656.84	230.95	658.48						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-2.5	.06	44.95	.035	95.15	.06

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

44.95	95.15	186	186	186	.3	.5
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CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.79325*

INPUT

Description: Interpolated XS
 Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-3.75	659.56	1.04	657.97	17.35	657.19	37.77	656.2	40.74	655.56
43.76	654.96	45.83	654.5	53.93	650.52	57.35	648.96	57.98	648.89
61.75	648.81	62.82	648.39	65.66	646.96	67.12	646.76	70.35	646.7
75.67	646.79	76.91	647.24	79.76	648.68	80.66	648.81	84.36	648.9
84.87	649.09	87.84	650.54	96.03	654.31	100.05	654.7	133.01	656.32
191.26	656.92	287.98	658.14	290	660				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-3.75	.06	45.83	.035	96.03	.06

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

45.83	96.03	186	186	186	.3	.5
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CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.758

INPUT

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Description: EOWB surveyed section D20, replaces copy of WHO61 used as U/S culvert section. Shifted 17' rt. for comparison purposes. Shape revised per D23 template. Overbanks extended per topo.

Station Elevation Data num= 22									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-5	660	0	658	17	657.35	38.3	656.54	41.4	655.76
46.7	654.53	55	650.31	58.5	648.7	63	648.6	67	646.6
71.8	646.5	77	646.6	81	648.6	85.5	648.7	88.9	650.47
96.9	654.34	102.1	654.83	144.7	656.7	220	657	345	657.8
390	658	390	660						

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
-5	.06	46.7	.035	96.9	.06

Bank Sta: Left Right Lengths: Left Channel Right								Coeff Contr.	Expan.
46.7	96.9	395	395	395				.3	.5
Ineffective Flow num= 2									
Sta L	Sta R	Elev	Permanent						
-5	41.3	657	F						
102.3	390	657	F						

CULVERT

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.721

INPUT

Description: 5.722 5.725 wille Road culvert per survey, roadway per topo.

Deck data is suspect in WSP-2 model; suspect points deleted.

Distance from Upstream XS = 22
 Deck/Roadway width = 350
 weir Coefficient = 2.7

Upstream Deck/Roadway Coordinates

num= 10														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0		658			25		658		0	25		657		0
120		657		0	135		657		0	183		658		0
265		658		0	346		657.23		0	415		657.5		0
465		658		0										

Upstream Bridge Cross Section Data

Station Elevation Data num= 22									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-5	660	0	658	17	657.35	38.3	656.54	41.4	655.76
46.7	654.53	55	650.31	58.5	648.7	63	648.6	67	646.6
71.8	646.5	77	646.6	81	648.6	85.5	648.7	88.9	650.47
96.9	654.34	102.1	654.83	144.7	656.7	220	657	345	657.8
390	658	390	660						

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
-5	.06	46.7	.035	96.9	.06

Bank Sta: Left Right					Coeff Contr.	Expan.
46.7	96.9				.3	.5

Ineffective Flow num= 2					
Sta L	Sta R	Elev	Permanent		
-5	41.3	657	F		
102.3	390	657	F		

Downstream Deck/Roadway Coordinates

num= 11														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-350		658			-245		658		0	-245		657		0
-150		657		0	-135		657		0	-87		658		0
-5		658		0	76		657.23		0	145		657.5		0
151		658		0	275		658							

Downstream Bridge Cross Section Data

Station Elevation Data num= 19									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-340	658	-340	657	-85	656	45	655.56	56.1	654.92
61.8	653.43	70.7	649.72	74	648.4	78.5	648.3	82.5	646.3
89.9	646.23	97.5	646.3	101.5	648.3	106	648.4	109	649.7
117.5	653.6	129.3	655.64	151	657.23	275	658		

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Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
-340 .06 56.1 .035 129.3 .06

Bank Sta: Left Right Coeff Contr. Expan.
56.1 129.3 .3 .5
Ineffective Flow num= 2
Sta L Sta R Elev Permanent
-340 76 656 F
105 275 656 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 = .95
Elevation at which weir flow begins = 657
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
Culv # 1 Box 9 17
FHWA chart # 8 - flared wingwalls
FHWA Scale # 1 - wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
22 350 .012 .012 0 .4 1
Upstream Elevation = 646.5
Centerline Station = 71.8
Downstream Elevation = 646.5
Centerline Station = 90.5

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.683

INPUT

Description: EOWB surveyed section D19, replaces copy of WH056 used as D/S
culvert section. Shifted 45' rt. for comparison purposes. Shape
revised per D18 template. Overbanks extended per topo.

Station Elevation Data num= 19
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
-340 658 -340 657 -85 656 45 655.56 56.1 654.92
61.8 653.43 70.7 649.72 74 648.4 78.5 648.3 82.5 646.3
89.9 646.23 97.5 646.3 101.5 648.3 106 648.4 109 649.7
117.5 653.6 129.3 655.64 151 657.23 275 658

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
-340 .06 56.1 .035 129.3 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
56.1 129.3 172 172 172 .3 .5
Ineffective Flow num= 2
Sta L Sta R Elev Permanent
-340 76 656 F
105 275 656 F

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.650

INPUT

Description: EOWB surveyed section D18, shifted 20' rt. for comparison
purposes. Overbanks extended per topo.

Station Elevation Data num= 16
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
-240 657 -120 656 20 655.63 61.2 653.83 62.4 653.62
74.3 648.41 78.7 648.17 83.2 646.15 92.3 646.1 97 646.16
101.7 648.22 105.1 648.26 117.6 653.69 118.2 653.97 134 657.56
153 657.86

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

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.06

-240 .06 61.2 .035 118.2
 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 61.2 118.2 5 5 5 .1 .3
 Blocked Obstructions num= 1
 Sta L Sta R Elev
 -20 20 657.5

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.649

INPUT
 Description: 5.650 5.654 Exit - wille Rd. WH056 ** HIGGINS CREEK**
 Left

overbank adjusted per current topo.
 Station Elevation Data num= 14
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -240 657 -120 656 20 655.6 60 654.7 72 648.6
 79 648.6 83 646.6 90 646.5 98 646.6 102 648.6
 109 648.6 120 654.7 127 656.2 130 657.2

Manning's n Values num= 3
 Sta n Val Sta n Val
 -240 .06 60 .035 120 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 60 120 294 294 294 .1 .3
 Blocked Obstructions num= 1
 Sta L Sta R Elev
 -20 20 657.5

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.593

INPUT
 Description: EOWB surveyed section D17, shifted 984' rt. for comparison
 purposes. Overbanks extended per topo. Low point in berm between
 tollway ditch and Higgins Creek. Therefore ditch is effective for
 500-year flood.

Station Elevation Data num= 23
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 760 657 917 656 984.1 655.22 997 655.04 1010.4 654.99
 1019 654.58 1027.7 653.57 1040 647.96 1043.8 647.98 1048.9 645.88
 1053.3 645.87 1058 645.93 1063.8 645.88 1067.2 647.88 1072.4 647.93
 1084.1 653.61 1090.5 655.19 1099.5 655.58 1107.4 655.4 1120 653
 1126 653 1135 656 1155 660

Manning's n Values num= 3
 Sta n Val Sta n Val
 760 .06 1027.7 .035 1084.1 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1027.7 1084.1 188 188 188 .1 .3
 Right Levee Station= 1099.5 Elevation= 655.6

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.558

INPUT
 Description: 5.559 5.563 TAR35 ** HIGGINS CREEK**
 Both overbanks revised per
 current topo.

Station Elevation Data num= 20
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 756 657 918 656 1000 655.2 1025 653.9 1037 648.3
 1041 648.2 1045 646.3 1048 647.7 1052 646.3 1060 646.3
 1066 646.3 1070 647.7 1071 648.2 1075 648.3 1087 653.8
 1091 655.7 1102 656.4 1117 652 1119 652 1142 660.7

Manning's n Values num= 3

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Sta	n Val	Sta	n Val	Sta	n Val				
756	.06	1025	.035	1087	.06				
Bank Sta: Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.		
	1025		308	308	.1		.3		
Right Levee	Station=	1102	Elevation=	655.6					

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.500

INPUT

Description: EOWB surveyed section D16, shifted 991' rt. for comparison purposes. Both overbanks extended per topo.

Station Elevation Data	num=	27							
Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev
872 657	961 656	991 655.52	1009.6 654.78	1021.9 654.05	1026.3 647.62	1046.3 645.68	1061.2 645.54	1065.1 647.55	1115.5 658.12
1026.3 653.4	1030.7 651.44	1038.3 647.67	1042.4 647.62	1046.3 645.68	1061.2 645.54	1065.1 647.55	1102.4 657.91	1115.5 658.12	1154 651.5
1049.7 645.55	1054.2 645.58	1058.3 645.56	1061.2 645.54	1065.1 647.55	1102.4 657.91	1115.5 658.12	1154 651.5	1157 652	
1069.4 647.68	1081.5 653.65	1091.2 656.18	1102.4 657.91	1115.5 658.12	1154 651.5	1157 652			
1124 657	1139 655	1151 652	1154 651.5	1157 652					
1166 655	1190 660								

Manning's n Values	num=	3							
Sta n Val	Sta n Val	Sta n Val							
872 .06	1026.3 .035	1081.5 .06							

Bank Sta: Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.		
	1026.3		21	21	.1		.3		
Right Levee	Station=	1115.5	Elevation=	654.8					

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.496

INPUT

Description: 5.497 5.500 TAR34 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data	num=	23							
Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev
835 657	953 656	1000 655.3	1026 653.8	1038 647.9	1042 647.9	1043 647.6	1046 645.9	1053 645.9	1061 645.8
1042 647.9	1043 647.6	1046 645.9	1053 645.9	1061 645.8	1064 647.5	1065 647.8	1070 647.9	1081 653.8	1099 657.9
1106 658.3	1120 658	1138 655	1154 652	1157 651.2	1159 652	1173 655	1194 660		
1159 652	1173 655	1194 660							

Manning's n Values	num=	3							
Sta n Val	Sta n Val	Sta n Val							
835 .06	1026 .035	1081 .06							

Bank Sta: Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.		
	1026		458	458	.1		.3		
Ineffective Flow	num=	1							
Sta L Sta R Elev	Permanent								
835 870 657	T								
Right Levee	Station=	1106	Elevation=	654.7					

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.409

INPUT

Description: EOWB surveyed section D15, shifted 947' rt. for comparison purposes. Extended right per TAR 33.

Station Elevation Data	num=	26							
Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev
963.4 661.09	982.6 657.33	995 654.68	1008 653.19	1018.8 647.28	1023.7 647.24	1026.8 645.8	1028.6 645.05	1032.4 645.02	1037 645.06
1044.9 646.05	1047.1 647.15	1052.2 647.37	1063 653.58	1072.5 655.41	1088 656.77	1101.9 657.16	1113 656.43	1127 655	1148 652
1165 650	1169 649	1171 649	1176 650	1192 655					
1209 660									

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Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 963.4 .06 1008 .035 1063 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1008 1063 6 6 6 .1 .3
 Right Levee Station= 1101.9 Elevation= 653.9

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.408

INPUT
 Description: 5.409 5.413 Approach- NW Tollway TAR33 ** HIGGINS CREEK**

Left side modified to match current topography.

Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
960	661	980	657	1000	654.3	1007	653.6	1019	647.5
1024	647.3	1028	645.3	1036	645.3	1043	645.3	1047	647.3
1052	647.5	1064	653.8	1091	656.8	1120	655	1141	652
1159	650	1164	649	1166	649	1169	650	1184	655
1201	660								

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 960 .06 1007 .035 1064 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1007 1064 72.1 72.1 72.1 .3 .5
 Right Levee Station= 1091 Elevation= 653.9

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.394

INPUT
 Description: Interpolated from topo, 5.408, and 5.378, shifted 518' right to match bridge CL.
 5.409 5.413 Approach- NW Tollway TAR33 ** HIGGINS CREEK**

Left side modified to match current topography.

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1478	661	1498	657	1508	654.3	1512	652.5	1530.2	647.3
1534.4	645.3	1542.6	645.3	1553	645.5	1573.8	646.6	1596	652.5
1609	656.8	1782	657.7						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1478 .06 1512 .035 1596 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1512 1596 85.2 85.2 85.2 .3 .5

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.378

INPUT
 Description: 5.379 5.383 Upstream - NW Tollway ** HIGGINS CREEK** Cross section based on Approach section and WSP-2 bridge opening & girder data.

Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1458	659.7	1460	658.7	1463	657.7	1466	656.7	1469	655.7
1472	654.7	1484	653.7	1508	653.4	1512	652.5	1530.2	647.3
1534.4	645.3	1542.6	645.3	1553	645.5	1573.8	646.6	1596	652.5
1610	652.7	1620	655.7	1640	660.7				

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1458 .06 1508 .035 1596 .06

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Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1508 1596 5 5 5 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 1458 1503 660.2 F
 1606 1640 660.2 F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.377

INPUT

Description: EOWB surveyed section D14, shifted 1460' rt. for comparison purposes. New approach section to I-90 bridge.

Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1476.1	660.33	1485.6	660.3	1493	658.73	1499.1	657.95	1505.8	656.48
1512.2	654.84	1523.9	649.49	1529.8	647.34	1531.3	647.02	1534.9	644.79
1541.2	644.87	1554.5	645.36	1570.8	646	1577	646.51	1587.8	651.34
1596.3	654.96	1607	657.47	1618.3	660.02				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1476.1	.06	1512.2	.035	1596.3	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1512.2 1596.3 135 135 135 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 1476.1 1508 660.2 F
 1601 1618.3 660.2 F

BRIDGE

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.364

INPUT

Description: 5.365 5.369 Northwest Tollway per survey, including parapet walls.

Skew effects ignored due to low skew angle (<20 degrees)

Distance from Upstream XS = 5
 Deck/Roadway width = 125
 Weir Coefficient = 2.7
 Bridge Deck/Roadway Skew = 10.1

Upstream Deck/Roadway Coordinates num= 19

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
1000	659.82		1100	659.92		1200	660.02	
1300	660.12		1400	660.22		1489.5	663.55	
1500	663.55		1512.7	663.55		1512.7	663.55	657.4
1596.3	663.55	657.5	1596.3	663.55		1600	663.55	
1619.5	663.55		1700	660.52		1800	660.62	
1900	660.72		2000	660.82		2100	660.92	
2295	660.92							

Upstream Bridge Cross Section Data

Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1476.1	660.33	1485.6	660.3	1493	658.73	1499.1	657.95	1505.8	656.48
1512.2	654.84	1523.9	649.49	1529.8	647.34	1531.3	647.02	1534.9	644.79
1541.2	644.87	1554.5	645.36	1570.8	646	1577	646.51	1587.8	651.34
1596.3	654.96	1607	657.47	1618.3	660.02				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1476.1	.06	1512.2	.035	1596.3	.06

Bank Sta: Left Right Coeff Contr. Expan.
 1512.2 1596.3 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 1476.1 1508 660.2 F
 1601 1618.3 660.2 F

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Downstream Deck/Roadway Coordinates

num= 19				Sta Hi Cord Lo Cord				Sta Hi Cord Lo Cord			
1000	659.82			1100	659.92			1200	660.02		
1300	660.12			1400	660.22			1489.5	662.2		
1500	662.2			1512.7	662.2			1512.7	662.2	657.4	
1596.3	662.1	657.5		1596.3	662.1			1600	662.1		
1619	662.1			1700	660.52			1800	660.62		
1900	660.72			2000	660.82			2100	660.92		
3623.7	660.92										

Downstream Bridge Cross Section Data

Station Elevation Data num= 15											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1497.7	662.06	1505.5	656.1	1513.5	654.38	1523.8	650.43	1535	646		
1544.4	645.03	1556.1	645.65	1567.8	645.91	1576.9	646.12	1579.5	647		
1589	650.81	1596.4	654.06	1608.2	656.82	1622.3	659.35	1632.6	659.58		

Manning's n values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
1497.7	.075	1513.5	.06	1596.4	.075

Bank Sta: Left Right Coeff Contr. Expan.
 1513.5 1596.4 .3 .5

Ineffective Flow num= 2				
Sta L	Sta R	Elev	Permanent	
1497.7	1511.5	658.5	F	
1597.5	1632.6	658.5	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 = .95
 Elevation at which weir flow begins = 659.82
 Energy head used in spillway design = -.28
 Spillway height used in design = 0
 weir crest shape = Broad Crested

Number of Piers = 1

Pier Data

Pier Station	Upstream=	Downstream=	
1554.5	1554.5	1554.5	
Upstream num= 2			
width	Elev	width	Elev
2.9	645.32	2.9	660.42
Downstream num= 2			
width	Elev	width	Elev
2.9	645.32	2.9	660.42

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy			
Momentum	Cd =	1.2	
Yarnell	Kval =	.9	
W.S. Pro Method			

W.S.Pro Data

Left Embankment
 El of the top of the embankment = 660
 El of the toe of the abutment = 657
 Right Embankment
 El of the top of the embankment = 660
 El of the toe of the abutment = 655
 Abutment Type = 3 sloping abutments and sloping embankments
 Slope of abutments = 3
 Top with of embankment = 110
 Centroid station of bridge opening =
 wing wall Type = No wing walls present
 width =
 Angle =
 Radius =
 Guide Banks Type = No Guide Bank present
 Length =
 Offset =
 Angle =

Selected Low Flow Methods = Highest Energy Answer

High Flow Method

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Pressure and weir flow
 Submerged Inlet Cd =
 Submerged Inlet + Outlet Cd = .8
 Max Low Cord =

Additional Bridge Parameters
 Add Friction component to Momentum
 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

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.352

INPUT
 Description: EOWB surveyed section D13, shifted 1482' rt. for comparison
 purposes. New exit section from I-90 bridge.

Station Elevation Data num= 15									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1497.7	662.06	1505.5	656.1	1513.5	654.38	1523.8	650.43	1535	646
1544.4	645.03	1556.1	645.65	1567.8	645.91	1576.9	646.12	1579.5	647
1589	650.81	1596.4	654.06	1608.2	656.82	1622.3	659.35	1632.6	659.58

Manning's n values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
1497.7	.075	1513.5	.06	1596.4	.075

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1513.5	1596.4		5	5		.3	.5
Ineffective Flow num= 2								
Sta L	Sta R	Elev	Permanent					
1497.7	1511.5	658.5	F					
1597.5	1632.6	658.5	F					

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.351

INPUT
 Description: 5.352 5.355 Downstream - NW Tollway ** HIGGINS CREEK**
 Cross

Section based on Exit section and WSP-2 bridge opening & girder data.

Station Elevation Data num= 14									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1452.7	659.7	1512.7	655	1530.2	647.3	1534.4	645.3	1542.6	645.3
1553	645.5	1573.8	646.6	1575.8	646.7	1610.7	652.7	1623.7	653.7
1730.7	654.7	3510.7	655.7	3543.7	656.7	3623.7	657.7		

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
1452.7	.075	1512.7	.06	1623.7	.075

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1512.7	1623.7		55.8	55.8		.3	.5
Ineffective Flow num= 2								
Sta L	Sta R	Elev	Permanent					
1452.7	1510	658.5	F					
1599	3623.7	658.5	F					

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.340

INPUT
 Description: 5.341 5.345 Exit - NW Tollway TAR32 ** HIGGINS CREEK**

Station Elevation Data num= 15									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
940	659.7	1000	654.8	1007	654.1	1011	654	1029	647.2
1038	645.4	1055	645.3	1077	645.8	1082	647.1	1098	652
1111	652	1218	654.7	2998	655.7	3031	656.7	3111	657.7

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Manning's n Values num= 3
 Sta n Val Sta n Val
 940 .075 1011 .06 1098 .075

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1011 1098 37 37 37 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 1140 3111 656 F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.335

INPUT

Description: Copy of existing condition 5.340.
 5.341 5.345 Exit - NW Tollway

TAR32 ** HIGGINS CREEK**
 Station Elevation Data num= 15
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 1439 659.7 1499 654.8 1506 654.1 1510 654 1528 647.2
 1537 645.4 1554 645.3 1576 645.8 1581 647.1 1597 652
 1610 652 1717 654.7 3497 655.7 3530 656.7 3610 657.7

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1439 .075 1510 .06 1597 .075

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1510 1597 50 50 50 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 1645 3610 659 F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.324

INPUT

Description: EOWB surveyed section D12, shifted 1010' rt. for comparison
 purposes. Overbanks refined per topo.

Station Elevation Data num= 27
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 944 658 958 657 991 656 1009.4 655 1038.1 652.88
 1050 649.55 1056.4 646.73 1064.6 645.5 1079.3 645.86 1093.2 645.28
 1104.6 646.79 1112 649.85 1117.7 650.99 1123.5 651.36 1131.5 651.84
 1146.1 652.42 1170 655 1180 656 1230 656 1240 655
 1263 647 1265 647 1275 652 1315 653 1455 654
 1630 655 1900 656

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 944 .05 1038.1 .035 1117.7 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1038.1 1117.7 184 184 184 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 1180 1900 657 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.289

INPUT

Description: 5.290 5.293 TAR31 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 900 658.7 1000 655.3 1046 652.4 1069 646.7 1076 645.6
 1095 645.2 1115 645.6 1123 646.7 1139 652.3 1335 654
 1515 655 1600 656

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Manning's n Values num= 3
 Sta n Val Sta n Val
 900 .05 1046 .035 1139 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1046 1139 173 173 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 1180 1600 657 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.256

INPUT
 Description: EOWB surveyed section D11, shifted 970' rt. for comparison purposes. Overbanks refined per topo.

Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
900	658.7	970	656.21	987.6	655.92	1016.8	655.15	1045.7	652.92
1056.1	651.98	1062.5	651.33	1067.3	650.15	1074.3	647.24	1085	645.34
1097.9	645.11	1109.3	645.39	1118.7	645.59	1127.3	647.53	1136	650.72
1143	652.68	1146.2	653.01	1150	653.21	1153.5	653.52	1160	655
1283	655	1457	655	1590	656				

Manning's n Values num= 3
 Sta n Val Sta n Val
 900 .05 1045.7 .035 1143 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1045.7 1143 108 108 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 1185 1590 657 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.236

INPUT
 Description: 5.237 5.240 TAR30 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
920	658.7	1000	655.8	1053	652.5	1078	646.4	1083	645.6
1098	645.2	1118	645.5	1122	646.5	1140	653.9	1149	655
1190	656	1360	656						

Manning's n Values num= 3
 Sta n Val Sta n Val
 920 .05 1053 .035 1140 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1053 1140 272 272 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.184

INPUT
 Description: 5.185 5.189 TAR29 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
940	658	1000	655	1044	653.1	1068	646.3	1073	644.7
1090	644.5	1107	644.6	1113	646.3	1138	654.6	1153	654.9
1160	653.5	1370	653.5	1375	655.7	1378	656.7	1381	657.7

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val
 940 .05 1044 .035 1138 .05 1160 .03

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Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
1044	1138	95	95	95		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.166

INPUT
 Description: EOWB surveyed section D10, shifted 1000' rt. for comparison purposes. Overbanks refined per topo.

Station Elevation Data		num=		23					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
969	657.7	979	656.7	990	656.5	1011.7	654.64	1022.8	654.25
1029.1	653.45	1044.8	649.51	1054.7	646.45	1060	644.6	1070.5	644.48
1077.7	644.6	1087.1	644.58	1095.1	644.49	1097.7	645.11	1106.7	648.02
1124.9	653.51	1126.7	653.67	1130.9	653.8	1135.7	653.86	1145	653.5
1445	653.5	1455	655.7	1460	657.7				

Manning's n Values		num=		4			
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
969	.05	1029.1	.035	1124.9	.05	1145	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
1029.1	1124.9	117	117	117		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.144

INPUT
 Description: 5.145 5.149 TAR28 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data		num=		14					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
965	659	985	657	1000	656.5	1031	654	1057	646.3
1062	644.6	1079	644.4	1098	644.5	1103	646.3	1127	653.8
1137	653.5	1515	653.5	1525	655	1530	656		

Manning's n Values		num=		4			
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
965	.05	1031	.035	1127	.05	1137	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
1031	1127	266	266	266		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.094

INPUT
 Description: 5.095 5.098 TAR27 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data		num=		20					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
974	657.7	976	656.7	979	655.7	986	654.7	998	653.7
1000	653.6	1012	652.5	1016	651.7	1034	646.3	1040	644.5
1061	643.1	1079	644.4	1086	646.3	1109	653.6	1120	653.5
1650	653.5	1652	654.7	1655	655.7	1658	656.7	1680	657.7

Manning's n Values		num=		4			
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
974	.05	1012	.035	1109	.05	1120	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
1012	1109	237	237	237		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.049

INPUT

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Description: EOWB surveyed section D9, shifted 985' rt. for comparison purposes. Overbanks refined per topo.

Station Elevation Data num= 20									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
955	657.7	958	656.7	961	655.7	964	654.7	976	653.7
993.2	653.2	1001	652.15	1021.7	645.18	1027.6	643.91	1046.3	643.43
1062.4	643.8	1068.5	645.01	1087.3	652.26	1128.7	653.17	1133.5	653.5
1746	653.5	1752	654.7	1757	655.7	1762	656.7	1787	657.7

Manning's n Values num= 4							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
955	.05	1001	.035	1087.3	.05	1133.5	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1001	1087.3		22	22		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.045

INPUT
Description: 5.046 5.049 Approach - MWRD TAR26 ** HIGGINS CREEK** Overbanks refined per topo.

Station Elevation Data num= 22									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
950	659.7	952	658.7	955	657.7	958	656.7	961	655.7
964	654.7	976	653.7	1000	653.4	1004	652.5	1021	646.3
1028	644.5	1044	643.8	1066	644.3	1073	646.3	1088	652.5
1102	652.7	1110	653.5	1746	653.5	1752	654.7	1757	655.7
1762	656.7	1787	657.7						

Manning's n values num= 4							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
950	.05	1004	.035	1088	.05	1110	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1004	1088		130	130		.3	.5

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.020

INPUT
Description: 5.021 5.024 Immediately Upstream - MWRD ** HIGGINS CREEK** Cross Section copied from Approach section.

Overbanks refined per topo.

Station Elevation Data num= 22									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
950	659.7	952	658.7	955	657.7	958	656.7	961	655.7
964	654.7	976	653.7	1000	653.4	1004	652.5	1021	646.3
1028	644.5	1044	643.8	1066	644.3	1073	646.3	1088	652.5
1102	652.7	1110	653.5	1746	653.5	1752	654.7	1757	655.7
1762	656.7	1787	657.7						

Manning's n Values num= 4							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
950	.05	1004	.035	1088	.05	1110	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1004	1088		80	80		.3	.5

Ineffective Flow num= 2				
Sta L	Sta R	Elev	Permanent	
950	1022	653.3	F	
1071	1787	652.7	F	

CULVERT

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.012

INPUT
Description: 5.013 5.017 MWRD1 Cell 1 Crossing Deck realigned to match

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section stationing.

Distance from Upstream XS = 10
 Deck/Roadway width = 60
 Weir Coefficient = 2.7

Upstream Deck/Roadway Coordinates

num= 25											
Sta	Hi Cord	Lo Cord		Sta	Hi Cord	Lo Cord		Sta	Hi Cord	Lo Cord	
944	660.72			947	659.72			950	658.72		
953	657.72			956	656.72			959	654.72		
1000	653.82			1018	653.46			1046	652.64		
1062	652.61			1105.5	653.15			1130	654.42		
1325	652.72			1336	651.72			1348	650.72		
1355	650.22			1444	649.92			1454	650.72		
1465	651.72			1477	652.72			2120	653.72		
2140	654.72			2145	655.72			2220	656.72		
2370	657.72										

Upstream Bridge Cross Section Data

Station Elevation Data num= 22											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
950	659.7	952	658.7	955	657.7	958	656.7	961	655.7		
964	654.7	976	653.7	1000	653.4	1004	652.5	1021	646.3		
1028	644.5	1044	643.8	1066	644.3	1073	646.3	1088	652.5		
1102	652.7	1110	653.5	1746	653.5	1752	654.7	1757	655.7		
1762	656.7	1787	657.7								

Manning's n Values

num= 4							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
950	.05	1004	.035	1088	.05	1110	.03

Bank Sta: Left Right Coeff Contr. Expan.

1004 1088 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
950	1022	653.3	F
1071	1787	652.7	F

Downstream Deck/Roadway Coordinates

num= 26											
Sta	Hi Cord	Lo Cord		Sta	Hi Cord	Lo Cord		Sta	Hi Cord	Lo Cord	
663	660.72			944	660.72			947	659.72		
950	658.72			953	657.72			956	656.72		
959	654.72			1000	653.82			1038	653.46		
1066	652.64			1082	652.61			1125.5	653.15		
1130	654.42			1325	652.72			1336	651.72		
1348	650.72			1355	650.22			1444	649.92		
1454	650.72			1465	651.72			1477	652.72		
2120	653.72			2140	654.72			2145	655.72		
2220	656.72			2370	657.72						

Downstream Bridge Cross Section Data

Station Elevation Data num= 17											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
666	656.7	669	655.7	672	654.7	678	653.7	1000	653.4		
1003	652.8	1024	645.5	1030	644.5	1065	643.8	1090	643.8		
1096	645.5	1117	653	1126	653.5	1949	653.5	1956	654.7		
1963	655.7	1970	656.7								

Manning's n Values

num= 5											
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
666	.03	1000	.05	1003	.035	1117	.05	1126	.03		

Bank Sta: Left Right Coeff Contr. Expan.

1003 1117 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
666	1042	652	F
1090	1970	652	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
1145	1190	657

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins = 652.61
 Energy head used in spillway design =
 Spillway height used in design =
 weir crest shape = Broad Crested

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Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val
 844 .05 1003 .035 1117 .05 1190 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1003 1117 62 62 62 .1 .3

Blocked Obstructions num= 1
 Sta L Sta R Elev
 1135 1180 657

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.980

INPUT

Description: EOWB surveyed section D8, shifted 975' rt. for comparison purposes. Overbanks refined per topo.

Station Elevation Data num= 18
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 780 656 785 655 790 654 988.1 653.72 997.8 653.45
 1019.2 644.49 1027.1 643.75 1037.7 643.55 1047.2 643.76 1055 644.56
 1079.7 652.45 1089.1 653.47 1110.2 653.9 1150 653.9 1155 653.5
 1920 653.5 1933 655 1940 656

Manning's n Values num= 5
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 780 .03 988.1 .05 997.8 .035 1079.7 .05 1155 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 997.8 1079.7 73 73 73 .1 .3

Blocked Obstructions num= 1
 Sta L Sta R Elev
 1113 1143 656

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.966

INPUT

Description: 4.967 4.971 TAR24 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 17
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 537 656.7 601 655.7 617 654.7 630 654 1000 654
 1002 653.6 1018 645.6 1024 643.8 1038 643.4 1050 643.8
 1057 645.6 1079 652.7 1087 653.5 1927 653.5 1934 654.7
 1940 655.7 1945 656.7

Manning's n Values num= 5
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 537 .03 1000 .05 1002 .035 1079 .05 1087 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1002 1079 115 115 115 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.944

INPUT

Description: 4.945 4.949 TAR23 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 21
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 385 656.7 400 655.7 423 654.7 433 653.7 1000 653.3
 1003 652.8 1017 645.5 1023 643.2 1035 642.8 1048 643.3
 1054 645.5 1067 650 1084 650 1839 649.7 1843 650.7
 1847 651.7 1851 652.7 1882 653.7 1890 654.7 1898 655.7
 1925 656.7

Manning's n Values num= 5
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val

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385	.03	1000	.05	1003	.035	1067	.05	1084	.03
-----	-----	------	-----	------	------	------	-----	------	-----

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1003 1067 86 86 86 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 1067 1925 653.5 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.928

INPUT
 Description: EOWB surveyed section D7, shifted 980' rt. for comparison purposes. Overbanks refined per topo.

Station	Elevation	Data	num=	16					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
455	656	460	655	465	654	983.5	653.78	996.5	652.72
1001.2	652.61	1018	644.44	1023.5	642.73	1033.3	642.48	1043.6	642.77
1050.7	644.4	1078.9	653.3	1098.7	653.31	1866	654	1876	655
1886	656								

Manning's n Values	num=	5							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
455	.05	460	.03	1001.2	.035	1078.9	.05	1098.7	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1001.2 1078.9 14 14 14 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.925

INPUT
 Description: 4.926 4.930 TAR22 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station	Elevation	Data	num=	19					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
320	656.7	330	655.7	350	654.7	827	654.3	960	653.7
1000	652.7	1002	652.7	1017	645.5	1024	643.1	1036	643
1046	643.3	1054	645.5	1076	653	1082	653.1	1839	653.2
1856	653.7	1872	654.7	1886	655.7	1916	656.7		

Manning's n Values	num=	5							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
320	.05	330	.03	1002	.035	1076	.05	1082	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1002 1076 55 55 55 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.915

INPUT
 Description: 4.916 4.920 TAR21 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station	Elevation	Data	num=	12					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
415	655.5	420	654	954	654	972	648	1002	647
1014	643	1046	643	1070	651	1102	652	1690	653
1850	654	1860	655.5						

Manning's n Values	num=	4					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
415	.065	954	.065	1002	.04	1070	.065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1002 1070 159 159 159 .1 .3

CROSS SECTION

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RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.885

INPUT
 Description: 4.886 4.889 TAR20 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data		num=		13					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
420	655	425	654	987	653.9	1005	647.9	1034	646.9
1046	642.9	1080	642.9	1090	649	1110	650	1220	651
1395	652	1640	653	1730	655				

Manning's n Values		num=		4					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val		
420	.065	987	.065	1034	.04	1090	.065		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1034	1090		101	101		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.866

INPUT
 Description: 4.867 4.870 TAR19 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data		num=		13					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
395	655	400	654	1009	653.9	1027	647.9	1058	646.9
1071	642.4	1099	642.4	1110	649	1132	650	1215	651
1405	652	1617	653	1740	655				

Manning's n Values		num=		4					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val		
395	.065	1009	.065	1058	.04	1110	.065		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1058	1110		100	100		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.847

INPUT
 Description: 4.848 4.851 TAR18 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data		num=		14					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
260	655	265	654	985	653.9	1003	647.9	1034	646.9
1049	642	1073	642	1088	649	1110	650	1200	651
1370	652	1510	653	1550	654	1590	655		

Manning's n Values		num=		4					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val		
260	.065	985	.065	1034	.04	1110	.065		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1034	1110		101	101		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.828

INPUT
 Description: 4.829 4.832 TAR17 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data		num=		13					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
235	655	240	654	980	653.8	998	647.8	1029	646.8
1044	641.9	1068	641.9	1100	650	1215	651	1365	652
1495	653	1550	654	1600	655				

Manning's n Values		num=		4					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val		

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Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
235	.065	980	.065	1029	.04	1100	.065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1029 1100 139 139 139 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.801

INPUT
 Description: 4.802 4.806 TAR16 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station	Elevation	Data	num=	13					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
240	655	245	654	998	653.8	1016	647.8	1047	646.8
1060	642.5	1088	642.5	1110	650	1210	651	1360	652
1440	653	1565	654	1617	655				

Manning's n Values	num=	4					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
240	.065	998	.065	1047	.04	1110	.065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1047 1110 99 99 99 .1 .3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 1588 1617 655 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.783

INPUT
 Description: 4.784 4.787 TAR15 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station	Elevation	Data	num=	11					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
260	655	265	654	1038	653.8	1056	647.8	1087	646.8
1101	642	1127	642	1150	650	1225	651	1480	653
1620	655								

Manning's n Values	num=	4					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
260	.065	1038	.065	1087	.04	1150	.065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1087 1150 43 43 43 .1 .3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 1550 1620 655 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.774

INPUT
 Description: 4.775 4.779 TAR14 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station	Elevation	Data	num=	11					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
270	655	275	654	1058	653.7	1076	647.7	1107	646.7
1120	642.5	1148	642.5	1170	650	1230	651	1472	653
1595	655								

Manning's n Values	num=	4					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
270	.065	1058	.065	1107	.04	1170	.065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1107 1170 18 18 18 .1 .3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent

1522 1595 655 T

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.771

INPUT

Description: EOWB surveyed section D6, shifted 1100' rt. for comparison purposes. Overbanks refined per topo.

Station Elevation Data		num= 20		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
310	655	315	654	1099.1	653.91	1117.7	648.31	1124.3	647.86		
1146.1	647.02	1150.1	645.94	1152.4	642.96	1157	642.05	1186.9	642.52		
1191.5	642.96	1193.9	643.89	1203.3	648.97	1207.4	649.66	1217.5	649.9		
1227.5	650.03	1235	650.14	1270	651	1510	653	1620	655		

Manning's n Values		num= 4		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
310	.065	1099.1	.065	1146.1	.04	1203.3	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1146.1	1203.3		57	57		.1	.3

Ineffective Flow		num= 1		Sta Elev	
Sta L	Sta R	Elev	Permanent		
1540	1620	655	T		

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.760

INPUT

Description: 4.761 4.765 TAR13 ** HIGGINS CREEK**
Overbanks refined per topo.

Station Elevation Data		num= 11		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
320	655	325	654	1117	653.7	1135	647.7	1166	646.7		
1182	641.5	1204	641.5	1222	650	1270	651	1440	652		
1455	655										

Manning's n Values		num= 4		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
320	.065	1117	.065	1166	.04	1222	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1166	1222		95	95		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.742

INPUT

Description: 4.743 4.747 TAR12 ** HIGGINS CREEK**
Overbanks refined per topo.

Station Elevation Data		num= 12		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
340	655	344	654	1124	653.72	1142	647.72	1173	646.72		
1186	642.22	1214	642.22	1237	650	1270	651	1365	652		
1485	652	1500	655								

Manning's n Values		num= 4		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
340	.065	1124	.065	1173	.04	1237	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1173	1237		156	156		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.713

INPUT

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Description: 4.714 4.717 TAR11 ** HIGGINS CREEK**
Overbanks refined per topo.

Station Elevation Data		num= 12		Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Sta	Elev	Sta	Elev	1087	653.7	1105	647.7	1136	646.7		
325	655	330	654	1200	650	1240	651	1400	652		
1149	642.4	1177	642.4								
1595	654	1600	655								

Manning's n Values		num= 4		Sta	n Val	Sta	n Val	Sta	n Val
Sta	n Val	Sta	n Val	1136	.04	1200	.065		
325	.065	1087	.065						

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1136	1200		80	80		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.698

INPUT
Description: 4.699 4.702 TAR10 ** HIGGINS CREEK**
Extended left and right per D5.

Station Elevation Data		num= 11		Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Sta	Elev	Sta	Elev	1063	653.6	1081	647.6	1112	646.6		
295	655	300	654	1188	651	1378	652	1613	654		
1125	642.2	1153	642.2								
1618	655										

Manning's n Values		num= 4		Sta	n Val	Sta	n Val	Sta	n Val
Sta	n Val	Sta	n Val	1112	.04	1188	.065		
295	.065	1063	.065						

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1081	1188		20	20		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.694

INPUT
Description: EOWB surveyed section D5, shifted 1060' rt. for comparison purposes. Overbanks refined per topo.

Station Elevation Data		num= 21		Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Sta	Elev	Sta	Elev	1060	654	1064.2	653.1	1083.3	647.56		
295	655	300	654	1119.3	643.81	1126	641.6	1139.8	641.46		
1108.1	646.93	1116.8	645.63	1160.6	643.84	1167.7	648.16	1175.5	650.04		
1152.2	641.72	1157.8	645.74	1207.9	651	1390	652	1625	654		
1186.5	650.48	1186.8	650.56								
1630	655										

Manning's n Values		num= 4		Sta	n Val	Sta	n Val	Sta	n Val
Sta	n Val	Sta	n Val	1116.8	.04	1157.8	.065		
295	.065	1060	.065						

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1116.8	1157.8		57	57		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.683

INPUT
Description: 4.684 4.688 TAR9 ** HIGGINS CREEK**
Overbanks refined per topo.

Station Elevation Data		num= 10		Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
Sta	Elev	Sta	Elev	1046	653.6	1064	647.6	1095	646.6		
295	655	300	654	1171	651	1200	652	1582	655		
1115	639.9	1129	639.9								

Manning's n Values		num= 4		Sta	n Val	Sta	n Val	Sta	n Val
Sta	n Val	Sta	n Val	1095	.04	1171	.065		
295	.065	1046	.065						

HigginsCreek-Des.rep

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1095 1171 26 26 26 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 295 1079 651.72 F
 1150 1582 651.87 F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.678

INPUT
 Description: 4.679 4.683 Immediately Upstream - Touhy Ave Reservoir Control.
 Overbanks refined per topo.

Cross Section copied from Approach section. ** HIGGINS CREEK**

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
265	655	266	654	1046	653.6	1064	647.6	1095	646.6
1115	639.9	1129	639.9	1171	653.9	1192	653.9	1582	655

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
265	.065	1046	.065	1095	.04	1171	.065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1095 1171 55 55 55 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 265 1111 652.62 F
 1133 1582 652.62 F

CULVERT

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.673

INPUT
 Description: 4.674 4.677 MWRD TARCONT Cell 2 crossing per survey.
 Deck

realigned to match section stationing.

Distance from Upstream XS = 1
 Deck/Roadway width = 53
 Weir Coefficient = 2.7

Upstream Deck/Roadway Coordinates num= 7

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
1000	651.72		1070	651.72		1096	652.18	
1122	652.38		1142	652.26		1160	651.93	
1176	651.87							

Upstream Bridge Cross Section Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
265	655	266	654	1046	653.6	1064	647.6	1095	646.6
1115	639.9	1129	639.9	1171	653.9	1192	653.9	1582	655

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
265	.065	1046	.065	1095	.04	1171	.065

Bank Sta: Left Right Coeff Contr. Expan.
 1095 1171 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 265 1111 652.62 F
 1133 1582 652.62 F

Downstream Deck/Roadway Coordinates num= 7

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
1025	651.72		1095	651.72		1120	652.18	
1147	652.38		1167	652.26		1185	651.93	
1201	651.87							

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Downstream Bridge Cross Section Data

Station	Elevation	Data	num=	12	Sta	Elev	Sta	Elev	Sta	Elev
455	655	455	654	855	654	1071	653.6	1089	647.6	
1120	646.6	1139	640.2	1155	640.2	1196	653.9	1217	653.9	
1273.6	654.39	1275	655							

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
455	.065	1120	.04	1196	.065

Bank Sta: Left Right Coeff Contr. Expan.

Left	Right	Coeff	Contr.	Expan.
1120	1196		.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
455	1137	651.22	F
1157	1275	651.22	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 = .95
 Elevation at which weir flow begins = 651.72
 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

Culv # 1 Box 4 9

FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
1	53	.015	.015	0	.4	1	

Number of Barrels = 2
 Upstream Elevation = 642.71
 Centerline Stations
 Sta. Sta.
 1117 1127
 Downstream Elevation = 642.72
 Centerline Stations
 Sta. Sta.
 1142 1152

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.668

INPUT
 Description: 4.669 4.672 Immediately Downstream - (TARCONT)Touhy Ave
 Reservoir Control
 Cross Section copied from Exit section. **
 HIGGINS CREEK** Overbanks refined per topo.

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
455	655	455	654	855	654	1071	653.6	1089	647.6
1120	646.6	1139	640.2	1155	640.2	1196	653.9	1217	653.9
1273.6	654.39	1275	655						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
455	.065	1120	.04	1196	.065

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
1120	1196	19	19	19	.3	.5	

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
455	1137	651.22	F
1157	1275	651.22	F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.664

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INPUT

Description: 4.665 4.669 TAR8 ** HIGGINS CREEK**

Original WSP2 Approach -

Touhy Ave / Exit - TARCONT

Extended left and right per D4.

Station Elevation Data		num= 12							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
455	655	455	654	855	654	1071	653.6	1089	647.6
1120	646.6	1139	640.2	1155	640.2	1196	653.9	1217	653.9
1273.6	654.39	1275	655						

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
455	.065	1120	.04	1196	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1120	1196		27	27		.3	.5
Ineffective Flow	num= 2							
Sta L	Sta R	Elev	Permanent					
455	1132.5	651	F					
1161.5	1275	651	F					

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.659

INPUT

Description: EOWB surveyed section D4, shifted 1075' rt. for comparison purposes. Overbanks refined per topo.

Station Elevation Data		num= 21							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
455	655	455	654	855	654	905	653	965	652
1075	650.9	1090.2	650.55	1106.3	649.74	1113.4	648.29	1119.5	646.26
1120.8	643.56	1124.8	639.8	1168.3	638.42	1173.6	643.5	1176.4	645.87
1181.7	648.12	1190	650.46	1211.9	650.77	1219	650.79	1273.6	654.39
1275	655								

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
455	.065	1113.4	.04	1190	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1113.4	1190		103	103		.3	.5
Ineffective Flow	num= 2							
Sta L	Sta R	Elev	Permanent					
455	1125	651	F					
1169	1275	651	F					

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.639

INPUT

Description: 4.640 4.644 Immediately Upstream - Touhy Ave ** HIGGINS CREEK**
Cross Section copied from Approach section. Extended left and right to match surveyed section D3.

Station Elevation Data		num= 10							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
550	656	550	654	1071	653.6	1089	647.6	1120	646.6
1139	640.2	1155	640.2	1196	653.9	1217	653.9	1220	655

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
550	.065	1120	.04	1196	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1120	1196		1	1		.3	.5
Ineffective Flow	num= 2							
Sta L	Sta R	Elev	Permanent					
550	1122	652.52	F					
1172	1220	652.52	F					

CROSS SECTION

HigginsCreek-Des.rep

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.638

INPUT

Description: EOWB surveyed section D3, shifted 1057' rt. for comparison purposes. Extended left along RR, which controls OT.

Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
550	656	550	654	1070.9	653.78	1087	651.23	1100.1	648.26
1111.4	645.77	1121.5	644.69	1124.8	643.64	1129.8	642.35	1138.8	641.45
1152.9	640.8	1156.2	641.52	1160.7	641.61	1171.3	643.04	1172.8	647.27
1200.6	653.59	1206.8	654.39	1220	655				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
550	.065	1111.4	.04	1172.8	.065

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

Left	Right	Left	Right	Coeff	Expan.
1111.4	1172.8	143.4	143.4	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
550	1122	654.5	F
1172	1220	656	F

CULVERT

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.626

INPUT

Description: 4.627 4.630 TOUHY AVE (RR controls) per survey, topo, and plan set.

Deck realigned to match section stationing.

Distance from Upstream XS = 10
 Deck/Roadway width = 124.4
 weir Coefficient = 2.7

Upstream Deck/Roadway Coordinates num= 6

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
530		656			542		655			580		654.5		
815		655			1050		656			1250		656		

Upstream Bridge Cross Section Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
550	656	550	654	1070.9	653.78	1087	651.23	1100.1	648.26
1111.4	645.77	1121.5	644.69	1124.8	643.64	1129.8	642.35	1138.8	641.45
1152.9	640.8	1156.2	641.52	1160.7	641.61	1171.3	643.04	1172.8	647.27
1200.6	653.59	1206.8	654.39	1220	655				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
550	.065	1111.4	.04	1172.8	.065

Bank Sta: Left Right Coeff Contr. Expan.

Left	Right	Coeff	Expan.
1111.4	1172.8	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
550	1122	654.5	F
1172	1220	656	F

Downstream Deck/Roadway Coordinates num= 6

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
580		656			592		655			630		654.5		
865		655			1100		656			1300		656		

Downstream Bridge Cross Section Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
585	656	710	655	920	654	925	653	950	653
955	654	1000	655	1050	655	1104	651.3	1165	650.8
1185	643.1	1200	641.8	1213	641.8	1231	653.5	1240	655

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
585	.085	1165	.04	1231	.04

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Bank Sta: Left Right Coeff Contr. Expan.
 1165 1231 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 585 1184 652 F
 1219 1240 652 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 = .95
 Elevation at which weir flow begins = 654.5
 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
 Culv # 1 Box 8 13.5
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 2 - wingwall flared 90 or 15 deg.
 Solution Criteria = Highest U.S. EG

Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 10 124.4 .015 .015 0 .5 1

Number of Barrels = 2
 Upstream Elevation = 642.28
 Centerline Stations
 Sta. Sta.
 1140 1155
 Downstream Elevation = 642.52
 Centerline Stations
 Sta. Sta.
 1194 1209

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.612

INPUT

Description: 4.613 4.617 Immediately Downstream - Touhy Ave ** HIGGINS CREEK** Cross Section copied from Exit section. Extended left for RR, which controls OT.

Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
585	656	710	655	920	654	925	653	950	653
955	654	1000	655	1050	655	1104	651.3	1165	650.8
1185	643.1	1200	641.8	1213	641.8	1231	653.5	1240	655

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
585	.085	1165	.04	1231	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1165 1231 10 10 10 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 585 1184 652 F
 1219 1240 652 F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.611

INPUT

Description: EOWB surveyed section D2. Shifted 25' left for comparison purposes. Then shifted 1100' right. Extended left for RR, which controls OT.

Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
585	656	710	655	920	654	925	653	950	653
955	654	1000	655	1100	655	1118.2	651.33	1168	650.03
1176.3	648.04	1192.5	642.93	1197.9	642.42	1204.4	642.03	1218.5	642.24
1226	642.36	1248	650.08	1261	654.64				

Manning's n Values num= 3

HigginsCreek-Des.rep

Sta	n Val	Sta	n Val	Sta	n Val
585	.085	1168	.04	1248	.04

Bank Sta: Left 1168 Right 1248 Lengths: Left Channel 119 Right 119 Coeff Contr. .3 Expan. .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
585	1179	651	F
1235	1261	651	F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.588

INPUT
 Description: 4.589 4.592 Exit - Touhy Ave TAR7 ** HIGGINS CREEK** Extended left to allow roadway OT for 500-year flow. Shifted 1095' left for comparison purposes.

Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-156	655	-116	654	-106	652	-98	652	-78	654
-50	655	0	655	34	654	70	650.8	90	643.1
105	641.8	123	641.8	152	653.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-156	.085	70	.04	152	.04

Bank Sta: Left 70 Right 152 Lengths: Left Channel 98 Right 98 Coeff Contr. .1 Expan. .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.569

INPUT
 Description: EOWB surveyed section D1. Extended left to allow roadway OT for 500-year flow.

Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-275	654.5	-217	653	-214	652	-206	651.8	-198	652
-180	655	31.4	654.86	45.3	653.08	84.5	642.23	93	641.26
95	640	99.8	639.09	106.3	639.34	117.5	638.78	122.8	641.42
135.3	644.26	169.9	655.01						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-275	.04	84.5	.04	122.8	.04

Bank Sta: Left 84.5 Right 122.8 Lengths: Left Channel 144 Right 144 Coeff Contr. .1 Expan. .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.542

INPUT
 Description: 4.543 4.543 Approach - Mt Prospect Rd TAR6 Extended left to allow roadway OT for 500-year flow.

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-425	655	-425	653	-382	652	-366	652	-358	651.4
-335	655	0	655.4	45	639.1	80	639.1	125	655.4

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-425	.04	45	.04	80	.04

Bank Sta: Left 45 Right 80 Lengths: Left Channel 23 Right 23 Coeff Contr. .1 Expan. .3

CROSS SECTION

HigginsCreek-Des.rep

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.537

INPUT
 Description: 4.538 4.539 Immediately Upstream - Mt Prospect Rd
 Cross Section

copied from Approach section. Refined per topo for OT, 11/10.

Station Elevation Data		num= 13		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-485	655	-485	652.5	-457	652	-435	651.7	-423	652
-405	651.3	-395	652	-380	653	-355	655	0	655.4
45	639.1	80	639.1	125	655.4				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-485	.04	45	.04	80	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	45	80		174	174	.3	.5

Ineffective Flow		num= 2		Sta Elev		Permanent	
Sta L	Sta R	Elev	Permanent	Sta L	Sta R	Elev	Permanent
-485	46.5	651.3	F				
78.5	125	655.4	F				

CULVERT

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.521

INPUT
 Description: 4.522 4.522 Mt. Prospect Road
 Distance from Upstream XS = 10
 Deck/Roadway Width = 154
 weir Coefficient = 2.7

Upstream Deck/Roadway Coordinates		num= 8		Sta Hi Cord		Lo Cord		Sta Hi Cord		Lo Cord	
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-605	652.5		-586	652		-460	651				
-360	651		-265	652		0	658.5				
60	660		200	660							

Upstream Bridge Cross Section Data		num= 13		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-485	655	-485	652.5	-457	652	-435	651.7	-423	652
-405	651.3	-395	652	-380	653	-355	655	0	655.4
45	639.1	80	639.1	125	655.4				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-485	.04	45	.04	80	.04		

Bank Sta:	Left	Right	Coeff Contr.	Expan.
	45	80	.3	.5

Ineffective Flow		num= 2		Sta Elev		Permanent	
Sta L	Sta R	Elev	Permanent	Sta L	Sta R	Elev	Permanent
-485	46.5	651.3	F				
78.5	125	655.4	F				

Downstream Deck/Roadway Coordinates		num= 8		Sta Hi Cord		Lo Cord		Sta Hi Cord		Lo Cord	
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-605	652.5		-586	652		-460	651				
-360	651		-265	652		0	658.5				
60	660		200	660							

Downstream Bridge Cross Section Data		num= 11		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-564	653	-564	652	-478	650	-450	649.4	-150	649.4
-132	650	-100	653	0	652.8	45	637.5	80	637.5
125	652.8								

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-564	.04	45	.04	80	.04		

HigginsCreek-Des.rep

Bank Sta: Left Right Coeff Contr. Expan.
 45 80 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -564 46.5 649.4 F
 78.5 125 649.4 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 = .95
 Elevation at which weir flow begins = 651
 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
 Culv # 1 Box 8 12
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 10 154 .015 .015 0 .4 1
 Upstream Elevation = 638.6
 Centerline Station = 62.5
 Downstream Elevation = 637.09
 Centerline Station = 62.5

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.505

INPUT
 Description: 4.506 4.506 Immediately Downstream - Mt Prospect Rd
 Cross

Section copied from Exit section. Refined per topo for OT, 11/10.
 Station Elevation Data num= 11
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -564 653 -564 652 -478 650 -450 649.4 -150 649.4
 -132 650 -100 653 0 652.8 45 637.5 80 637.5
 125 652.8

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -564 .04 45 .04 80 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 45 80 103 103 103 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -564 46.5 649.4 F
 78.5 125 649.4 F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.485

INPUT
 Description: 4.486 4.486 Exit - Mt Prospect Rd TAR4 revised per current topo
 reflecting relocated Willow Creek.

Station Elevation Data num= 8
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 652 92 649 137 649 182 653 237 653
 295 637.5 394 637.5 452 653

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .075 237 .04 452 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 237 452 0 0 0 .1 .3

CROSS SECTION

HigginsCreek-Des.rep

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 25

INPUT

Description: River Mile or Station US5

Station Elevation Data		num= 10							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.22	11.547	671.72	80.829	670.72	84.293	669.72	92.376	667.72
103.923	667.72	113.161	669.72	121.244	670.72	132.791	671.72	138.564	672.22

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.055	84.293	.035	113.161	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	84.293	113.161		100	100		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 24

INPUT

Description: River Mile or Station US4

Station Elevation Data		num= 8							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	674.72	12	671.72	45	671.72	55	666.72	65	666.72
75	670.72	78	671.72	83	672.22				

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.055	45	.035	75	.055

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	45	75		200	200		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 23

INPUT

Description: River Mile or Station US3

Station Elevation Data		num= 9							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	674.72	9	671.72	19	671.72	30	672.72	39	671.72
50	667.72	65	667.72	75	670.72	78	671.72		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.055	39	.035	75	.055

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	39	75		200	200		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 22

INPUT

Description: River Mile or Station US2

Station Elevation Data		num= 7							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	674.72	60	673.72	75	669.72	80	664.72	105	664.72
116	670.72	120	671.72						

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.055	75	.035	116	.055

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	75	116		300	300		.1	.3

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CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 21

INPUT

Description: River Mile or Station US1

Station Elevation Data		num= 8							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	673.72	10	671.72	70	670.72	80	669.72	95	664.72
105	664.72	126	670.72	130	671.72				

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.055	80	.035	126	.055

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	80	126		100	100		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 20

INPUT

Description: River Mile or Station EGV8

Station Elevation Data		num= 9							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.72	8	671.72	40	670.72	72	669.72	87	664.72
95	664.72	117	668.72	120	669.72	134	670.72		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.055	72	.035	117	.055

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	72	117		100	100		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 19

INPUT

Description: River Mile or Station EGV7

Station Elevation Data		num= 12							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.72	8	671.72	38	670.72	61	669.72	77	667.72
89	665.72	92	664.42	94	664.72	107	667.72	160	668.72
180	669.72	245	670.72						

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.055	61	.035	107	.055

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	61	107		100	100		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 18

INPUT

Description: River Mile or Station EGV6

Station Elevation Data		num= 9							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
40	670.72	75	669.72	87	664.72	92	664.22	97	664.72
135	667.72	175	668.72	192	669.72	219	670.72		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
40	.04	75	.035	135	.055

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

75 135 100 HigginsCreek-Des.rep 100 100 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 17

INPUT

Description: River Mile or Station EGV5
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	673.72	12	670.72	81	669.72	92	664.12	100	664.12
104	664.72	119	666.72	135	667.72	159	668.72	215	669.72
235	670.72								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	81	.035	104	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
81 104 100 100 100 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 16

INPUT

Description: River Mile or Station EGV4
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.72	15	669.72	50	668.72	84	667.72	92	664.02
101	664.02	120	665.72	130	666.72	136	667.72	145	668.72
190	669.72	265	670.72						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	84	.035	130	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
84 130 100 100 100 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 15

INPUT

Description: River Mile or Station EGV3
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.22	12	669.72	15	668.72	90	667.72	101	663.72
107	663.72	118	667.72	124	668.72	139	669.72	169	670.72

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	90	.035	118	.055

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
90 118 100 100 100 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 14

INPUT

Description: River Mile or Station EGV2
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.22	15	669.72	18	668.72	78	667.72	90	663.72
102	663.72	112	667.72	129	672.72				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

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0 .055 15 .035 112 .055

Bank Sta: Left 15 Right 112 Lengths: Left Channel 100 Right 100 Coeff Contr. .1 Expan. .3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 13

INPUT

Description: River Mile or Station EGV1

Station Elevation Data num= 7
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 671.72 12 669.72 25 663.72 39 663.72 47 666.72
55 667.72 75 668.22

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .04 12 .035 55 .035

Bank Sta: Left 12 Right 55 Lengths: Left Channel 280 Right 280 Coeff Contr. .1 Expan. .3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 12

INPUT

Description: River Mile or Station 281C

Station Elevation Data num= 15
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 669.72 8 668.72 16 667.72 23 666.72 37 665.72
39 664.72 40 663.72 41 662.72 56 662.72 58 663.72
60 664.72 62 665.72 64 666.72 66 667.72 68 668.72

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .04 16 .035 66 .04

Bank Sta: Left 16 Right 66 Lengths: Left Channel 140 Right 140 Coeff Contr. .1 Expan. .3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 11

INPUT

Description: River Mile or Station 281CC

Station Elevation Data num= 12
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
955 672.72 975 671.72 980 670.72 983 669.72 992 664.72
994 663.72 1000 663.02 1005 663.72 1008 664.72 1018 669.72
1022 670.72 1028 671.72

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
955 .04 983 .035 1018 .04

Bank Sta: Left 983 Right 1018 Lengths: Left Channel 140 Right 140 Coeff Contr. .1 Expan. .3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 10

INPUT

Description: River Mile or Station 281B

Station Elevation Data num= 12
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
779 671.72 840 670.72 845 669.72 852 664.72 857 663.72
862 662.72 869 663.72 873 664.72 882 669.72 890 670.72

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1015 670.72 1100 670.92

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 779 .04 845 .035 882 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 845 882 138 138 138 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 9

INPUT
 Description: River Mile or Station 281BB
 Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
960	670.72	976	669.72	992	664.72	995	663.72	997	662.72
1000	662.22	1008	662.72	1010	663.72	1015	664.72	1030	669.72
1040	670.72								

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 960 .04 976 .035 1030 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 976 1030 140 140 140 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 8

INPUT
 Description: River Mile or Station 281
 Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
700	672.42	800	671.72	878	670.42	886	667.92	896	662.12
899	661.32	900	661.02	901	661.32	915	662.42	943	669.92
1000	669.52	1100	669.22	1200	669.22				

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 700 .035 878 .042 943 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 878 943 68 68 68 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 7

INPUT
 Description: River Mile or Station 281X
 Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
990	668.72	1026	667.72	1033	666.72	1042	665.72	1055	664.72
1058	663.72	1060	662.72	1070	661.02	1075	662.72	1080	663.72
1082	664.72	1085	665.72	1095	667.72	1102	668.72		

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 990 .04 1033 .04 1095 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1033 1095 91 91 91 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 6.001

INPUT

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Description: River Mile or Station 281X used just upstream of crossing.

Station	Elevation	Data	num=	14	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
990	668.72	1026	667.72	1033	666.72	1042	665.72	1055	664.72			
1058	663.72	1060	662.72	1070	661.02	1075	662.72	1080	663.72			
1082	664.72	1085	665.72	1095	667.72	1102	668.72					

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
990	.04	1033	.04	1095	.04

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
1033	1095	72.5	72.5	72.5	.3	.5	

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
990	1058	666.72	F
1082	1102	666.72	F

CULVERT

RIVER: HIGGINS TRIB A
REACH: CUP RS: 6

INPUT

Description: Culvert(s) @ 281A
Distance from Upstream XS = 1
Deck/Roadway Width = 70.5
weir Coefficient = 2.7
Upstream Deck/Roadway Coordinates

num=	4	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
		990	667.02	-.28	1090	666.72	-.28	1190	666.72	-.28						
		1290	666.92	-.28												

Upstream Bridge Cross Section Data

Station	Elevation	Data	num=	14	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
990	668.72	1026	667.72	1033	666.72	1042	665.72	1055	664.72			
1058	663.72	1060	662.72	1070	661.02	1075	662.72	1080	663.72			
1082	664.72	1085	665.72	1095	667.72	1102	668.72					

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
990	.04	1033	.04	1095	.04

Bank Sta: Left Right Coeff Contr. Expan.

Left	Right	Coeff	Contr.	Expan.
1033	1095	.3	.5	

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
990	1058	666.72	F
1082	1102	666.72	F

Downstream Deck/Roadway Coordinates

num=	4	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
		799	667.02	-.28	900	666.72	-.28	1000	666.72	-.28						
		1100	666.92	-.28												

Downstream Bridge Cross Section Data

Station	Elevation	Data	num=	12	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
799	675.72	800	670.42	878	669.12	886	666.62	896	660.82			
899	660.02	900	659.72	901	660.02	915	661.12	943	669.62			
1000	668.22	1001	675.72									

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
799	.04	878	.045	943	.04

Bank Sta: Left Right Coeff Contr. Expan.

Left	Right	Coeff	Contr.	Expan.
878	943	.3	.5	

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
799	896	666.72	F
919	1001	666.72	F

Upstream Embankment side slope = 3.362 horiz. to 1.0 vertical
Downstream Embankment side slope = 3.362 horiz. to 1.0 vertical

HigginsCreek-Des.rep

Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins = 666.72
 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
 Culv # 1 Box 4.85 15.8
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 1 70.5 .012 .012 0 .4 1
 Upstream Elevation = 660.72
 Centerline Station = 1070
 Downstream Elevation = 660.4
 Centerline Station = 907.9

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 5.999

INPUT

Description: River Mile or Station 281AA used just downstream of crossing.

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
799	675.72	800	670.42	878	669.12	886	666.62	896	660.82
899	660.02	900	659.72	901	660.02	915	661.12	943	669.62
1000	668.22	1001	675.72						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
799	.04	878	.045	943	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 878 943 149 149 149 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
799	896	666.72	F
919	1001	666.72	F

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 5

INPUT

Description: River Mile or Station 281AA. Reach lengths adjusted by -350' to match 2008 FIS profile length.

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
799	675.72	800	670.42	878	669.12	886	666.62	896	660.82
899	660.02	900	659.72	901	660.02	915	661.12	943	669.62
1000	668.22	1001	675.72						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
799	.04	878	.045	943	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 878 943 1505 1505 1505 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 4.1

INPUT

Description: EOWB surveyed section C7. Shifted 73' left for comparison. Uses n-values to match FIS XS 4.

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
61	671.59	95.5	659.27	161.9	656.84	245.5	655.81	253.3	652.52

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 259.1 651.98 263.5 652.16 265.9 654.01 273.7 655.63 292.5 655.71
 322.2 656.23 340.5 661.74

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 61 .045 245.5 .035 273.7 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 245.5 273.7 335 260 175 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 3.8

INPUT
 Description: EOWB surveyed section C6. Extended left using 1' topo.

Station Elevation Data num= 18
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -105 662 -71 657 -65 657 -35 660 -10 657
 0 656.18 27.6 656.11 51.9 656.07 75.8 655.37 106.8 654.87
 143.3 655.08 146.2 652.54 149.8 651.03 176 652.81 182.5 654.73
 192.7 658.58 202 662.51 210.2 662.67

Manning's n Values num= 3
 Sta n Val Sta n Val
 -105 .04 143.3 .035 182.5 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 143.3 182.5 460 380 340 .1 .3
 Left Levee Station= -35 Elevation= 660

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 3.5

INPUT
 Description: EOWB surveyed section C5. Extended left using 1' topo.

Station Elevation Data num= 16
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -52 662 -18 656 0 655.74 27.6 655 63.4 653.91
 93.2 654.36 96.1 652.27 101.3 651.09 115.2 651.3 117.5 652.15
 120.6 653.53 123.5 654.43 130.5 656.59 143.5 661.63 146.3 662.05
 148.8 662.11

Manning's n Values num= 3
 Sta n Val Sta n Val
 -52 .04 93.2 .035 123.5 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 93.2 123.5 490 490 490 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 3.1

INPUT
 Description: EOWB surveyed section C4. Extended left using 1' topo, skewed 30 deg. Shifted right 1730' for comparison to d/s.

Station Elevation Data num= 14
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 1675 661 1704 656 1730 655.13 1743.86 654.2 1759.53 653.27
 1773.56 653.95 1777.03 652.53 1786.12 651.27 1796.25 650.91 1801.53 652.61
 1805.34 653.79 1812.53 656.68 1821.71 660.42 1824.92 661.02

Manning's n Values num= 3
 Sta n Val Sta n Val
 1675 .04 1773.56 .035 1805.34 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1773.56 1805.34 55 55 55 .1 .3
 Skew Angle = 30

CROSS SECTION

HigginsCreek-Des.rep

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 3.01

INPUT

Description: Cross Section interpolated upstream of proposed culvert extension.
 overbanks corrected using 1' topo.

Station Elevation Data		num= 12		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1673	661	1707	656	1721	655	1775	654	1779	653		
1784	650.5	1792	650.5	1797	653	1800	654	1808	655		
1825	660	1837	662								

Manning's n Values		num= 3		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1673	.04	1775	.04	1800	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1775	1800		20	20		.3	.5

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 3

INPUT

Description: River Mile or Station 280. Overbanks corrected using 1' topo.

Station Elevation Data		num= 13		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1696	661	1730	656	1740	655	1766	654	1784	653.12		
1787	652.52	1794	652.12	1797	653.12	1802	655.32	1818	656		
1822	657	1843	661	1851	662						

Manning's n Values		num= 3		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1696	.04	1740	.04	1802	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1740	1802		34	34		.3	.5

Ineffective Flow		num= 2		Sta		Elev		Permanent	
Sta L	Sta R	Elev	Permanent	Sta	Elev	Sta	Elev	Sta	Elev
1696	1740	664	F						
1822	1851	664	F						

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 2.3

INPUT

Description: EOWB surveyed overbank section and channel upstream of culvert inverts. Shifted 1730' right for comparison to u/s and d/s.

Station Elevation Data		num= 17		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1730	661	1740.6	659	1748.9	658	1757.5	656.63	1762	654.92		
1772.6	655.13	1775.2	654.98	1776.2	653	1777.8	650.33	1781.3	650.25		
1786.8	650.5	1796.8	650.52	1799.5	650.55	1809.8	653.68	1820	654.24		
1838.2	658.1	1848.7	661								

Manning's n values		num= 3		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1730	.04	1775.2	.035	1809.8	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1775.2	1809.8		198.75	198.75		.3	.5

Ineffective Flow		num= 2		Sta		Elev		Permanent	
Sta L	Sta R	Elev	Permanent	Sta	Elev	Sta	Elev	Sta	Elev
1730	1771	663.62	F						
1806	1848.7	663.62	F						

CULVERT

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 2

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INPUT

Description: I-90 Culvert(s) @ 280A
 Distance from Upstream XS = 16
 Deck/Roadway width = 168.75
 Weir Coefficient = 2.7

Upstream Deck/Roadway Coordinates

num=	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
5	0	664.7		1694	663.5		1794	663.6	
	1894	663.7		2410	665.2				

Upstream Bridge Cross Section Data

Station	Elevation	Data	num=	Sta	Elev	Sta	Elev	Sta	Elev	
1730	661	1740.6	17	659	1748.9	658	1757.5	656.63	1762	654.92
1772.6	655.13	1775.2		654.98	1776.2	653	1777.8	650.33	1781.3	650.25
1786.8	650.5	1796.8		650.52	1799.5	650.55	1809.8	653.68	1820	654.24
1838.2	658.1	1848.7		661						

Manning's n Values

num=	Sta	n Val	Sta	n Val	Sta	n Val
3	1730	.04	1775.2	.035	1809.8	.04

Bank Sta: Left Right Coeff Contr. Expan.
 1775.2 1809.8 .3 .5

Ineffective Flow

num=	Sta L	Sta R	Elev	Permanent
2	1730	1771	663.62	F
	1806	1848.7	663.62	F

Downstream Deck/Roadway Coordinates

num=	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
5	0	664.7		1694	663.5		1794	663.6	
	1894	663.7		2410	665.2				

Downstream Bridge Cross Section Data

Station	Elevation	Data	num=	Sta	Elev	Sta	Elev	Sta	Elev	
1725	661	1752.1	12	656.33	1774.2	654.86	1776.8	653	1784.1	651.19
1787.7	650.37	1797.6		650.56	1801.3	651.19	1802.8	653	1809	655.49
1822	656.01	1847		661						

Manning's n Values

num=	Sta	n Val	Sta	n Val	Sta	n Val
3	1725	.05	1774.2	.05	1809	.05

Bank Sta: Left Right Coeff Contr. Expan.
 1774.2 1809 .3 .5

Ineffective Flow

num=	Sta L	Sta R	Elev	Permanent
2	1725	1779	663	F
	1804	1847	663	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 = .95
 Elevation at which weir flow begins = 663.52
 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
 Culv # 1 Box 5.75 9
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG

Culvert Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
16	168.75	.012	.012	0	.4	1

Number of Barrels = 2

Upstream Elevation = 650.38

Centerline Stations

Sta. Sta.
 1783.5 1793.5

Downstream Elevation = 650.16

Centerline Stations

Sta. Sta.

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1786.5 1796.5

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 1.7

INPUT

Description: EOWB surveyed overbank section C1 and channel from 1' topo and culvert inverts. Shifted 1733' right for comparison to u/s and d/s.

Station Elevation Data		num= 12		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1725	661	1752.1	656.33	1774.2	654.86	1776.8	653	1784.1	651.19
1787.7	650.37	1797.6	650.56	1801.3	651.19	1802.8	653	1809	655.49
1822	656.01	1847	661						

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1725	.05	1774.2	.05	1809	.05		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1774.2	1809		53	53		.3	.5
Ineffective Flow	num= 2							
Sta L	Sta R	Elev	Permanent					
1725	1779	663	F					
1804	1847	663	F					

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 1

INPUT

Description: Cross Section 1 from Tributary A LOMR '07 = WSP2 XS 280AA

Station Elevation Data		num= 13		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1499	665.72	1500	655.02	1600	654.82	1700	654.32	1777	655.02
1784	651.22	1787	650.62	1794	650.22	1797	651.22	1802	653.42
1900	653.32	2000	654.42	2001	665.72				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1499	.05	1777	.05	1802	.05		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1777	1802		0	0		.1	.3
Ineffective Flow	num= 2							
Sta L	Sta R	Elev	Permanent					
1499	1770	662.5	F					
1813	2001	662.5	F					

SUMMARY OF MANNING'S N VALUES

River:HIGGINS CK

Reach	River Sta.	n1	n2	n3	n4	n5
2	6.443	.065	.065	.075		
2	6.404	.065	.065	.075		
2	6.353	.065	.065	.075		
2	6.287	.065	.065	.075		
MAINSTEM	6.245	.07	.02	.07		
MAINSTEM	6.231	.07	.02	.07		
MAINSTEM	6.179	.07	.02	.07		
MAINSTEM	6.069	.07	.02	.07		
MAINSTEM	6.035	.045	.02	.045		
MAINSTEM	6.034	.045	.013	.045		
MAINSTEM	6.033	.045	.013	.045		
MAINSTEM	6.032	.045	.029	.045		
MAINSTEM	6.021	.04	.029	.04		
MAINSTEM	6.006	.06	.035	.06		
MAINSTEM	5.9994*	.06	.035	.06		
MAINSTEM	5.9950	.06	.035	.06		
MAINSTEM	5.9928*	.06	.035	.06		

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MAINSTEM	5.981				
MAINSTEM	5.973	Bridge	.06	.035	.06
MAINSTEM	5.972		.06	.035	.06
MAINSTEM	5.959		.06	.035	.06
MAINSTEM	5.950		.06	.035	.06
MAINSTEM	5.914		.06	.035	.06
MAINSTEM	5.911	Culvert			
MAINSTEM	5.899		.06	.035	.06
MAINSTEM	5.86375*		.06	.035	.06
MAINSTEM	5.8285*		.06	.035	.06
MAINSTEM	5.79325*		.06	.035	.06
MAINSTEM	5.758		.06	.035	.06
MAINSTEM	5.721	Culvert			
MAINSTEM	5.683		.06	.035	.06
MAINSTEM	5.650		.06	.035	.06
MAINSTEM	5.649		.06	.035	.06
MAINSTEM	5.593		.06	.035	.06
MAINSTEM	5.558		.06	.035	.06
MAINSTEM	5.500		.06	.035	.06
MAINSTEM	5.496		.06	.035	.06
MAINSTEM	5.409		.06	.035	.06
MAINSTEM	5.408		.06	.035	.06
MAINSTEM	5.394		.06	.035	.06
MAINSTEM	5.378		.06	.035	.06
MAINSTEM	5.377		.06	.035	.06
MAINSTEM	5.364	Bridge			
MAINSTEM	5.352		.075	.06	.075
MAINSTEM	5.351		.075	.06	.075
MAINSTEM	5.340		.075	.06	.075
MAINSTEM	5.335		.075	.06	.075
MAINSTEM	5.324		.05	.035	.05
MAINSTEM	5.289		.05	.035	.05
MAINSTEM	5.256		.05	.035	.05
MAINSTEM	5.236		.05	.035	.05
MAINSTEM	5.184		.05	.035	.05
MAINSTEM	5.166		.05	.035	.05
MAINSTEM	5.144		.05	.035	.05
MAINSTEM	5.094		.05	.035	.05
MAINSTEM	5.049		.05	.035	.05
MAINSTEM	5.045		.05	.035	.05
MAINSTEM	5.020		.05	.035	.05
MAINSTEM	5.012	Culvert			
MAINSTEM	5.005		.03	.05	.035
MAINSTEM	4.992		.05	.035	.05
MAINSTEM	4.980		.03	.05	.035
MAINSTEM	4.966		.03	.05	.035
MAINSTEM	4.944		.03	.05	.035
MAINSTEM	4.928		.05	.03	.035
MAINSTEM	4.925		.05	.03	.035
MAINSTEM	4.915		.065	.065	.04
MAINSTEM	4.885		.065	.065	.04
MAINSTEM	4.866		.065	.065	.04
MAINSTEM	4.847		.065	.065	.04
MAINSTEM	4.828		.065	.065	.04
MAINSTEM	4.801		.065	.065	.04
MAINSTEM	4.783		.065	.065	.04
MAINSTEM	4.774		.065	.065	.04
MAINSTEM	4.771		.065	.065	.04
MAINSTEM	4.760		.065	.065	.04
MAINSTEM	4.742		.065	.065	.04
MAINSTEM	4.713		.065	.065	.04
MAINSTEM	4.698		.065	.065	.04
MAINSTEM	4.694		.065	.065	.04
MAINSTEM	4.683		.065	.065	.04
MAINSTEM	4.678		.065	.065	.04
MAINSTEM	4.673	Culvert			
MAINSTEM	4.668		.065	.04	.065
MAINSTEM	4.664		.065	.04	.065
MAINSTEM	4.659		.065	.04	.065
MAINSTEM	4.639		.065	.04	.065
MAINSTEM	4.638		.065	.04	.065
MAINSTEM	4.626	Culvert			
MAINSTEM	4.612		.085	.04	.04
MAINSTEM	4.611		.085	.04	.04
MAINSTEM	4.588		.085	.04	.04
MAINSTEM	4.569		.04	.04	.04
MAINSTEM	4.542		.04	.04	.04
MAINSTEM	4.537		.04	.04	.04
MAINSTEM	4.521	Culvert			

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MAINSTEM	4.505	.04	.04	.04
MAINSTEM	4.485	.075	.04	.04

River:HIGGINS TRIB A

Reach	River Sta.	n1	n2	n3
CUP	25	.055	.035	.035
CUP	24	.055	.035	.055
CUP	23	.055	.035	.055
CUP	22	.055	.035	.055
CUP	21	.055	.035	.055
CUP	20	.055	.035	.055
CUP	19	.055	.035	.055
CUP	18	.04	.035	.055
CUP	17	.055	.035	.035
CUP	16	.055	.035	.035
CUP	15	.055	.035	.055
CUP	14	.055	.035	.055
CUP	13	.04	.035	.035
CUP	12	.04	.035	.04
CUP	11	.04	.035	.04
CUP	10	.04	.035	.04
CUP	9	.04	.035	.04
CUP	8	.035	.042	.04
CUP	7	.04	.04	.04
CUP	6.001	.04	.04	.04
CUP	6	Culvert		
CUP	5.999	.04	.045	.04
CUP	5	.04	.045	.04
CUP	4.1	.045	.035	.045
CUP	3.8	.04	.035	.04
CUP	3.5	.04	.035	.04
CUP	3.1	.04	.035	.04
CUP	3.01	.04	.04	.04
CUP	3	.04	.04	.04
CUP	2.3	.04	.035	.04
CUP	2	Culvert		
CUP	1.7	.05	.05	.05
CUP	1	.05	.05	.05

SUMMARY OF REACH LENGTHS

River: HIGGINS CK

Reach	River Sta.	Left	Channel	Right
2	6.443	204	204	204
2	6.404	270	270	270
2	6.353	350	350	350
2	6.287	0	0	0
MAINSTEM	6.245	75	75	75
MAINSTEM	6.231	274	274	274
MAINSTEM	6.179	575	575	575
MAINSTEM	6.069	180	180	180
MAINSTEM	6.035	6	6	6
MAINSTEM	6.034	7	7	7
MAINSTEM	6.033	1	1	1
MAINSTEM	6.032	62	62	62
MAINSTEM	6.021	80	80	80
MAINSTEM	6.006	35	35	35
MAINSTEM	5.9994*	23	23	23
MAINSTEM	5.9950	12	12	12
MAINSTEM	5.9928*	105	105	105
MAINSTEM	5.981	Bridge		
MAINSTEM	5.973	8	8	8
MAINSTEM	5.972	66	66	66
MAINSTEM	5.959	50	50	50
MAINSTEM	5.950	189	189	189
MAINSTEM	5.914	78	78	78
MAINSTEM	5.911	Culvert		
MAINSTEM	5.899	186	186	186
MAINSTEM	5.86375*	186	186	186
MAINSTEM	5.8285*	186	186	186
MAINSTEM	5.79325*	186	186	186

		HigginsCreek-Des.rep		
MAINSTEM	5.758	395	395	395
MAINSTEM	5.721	Culvert		
MAINSTEM	5.683	172	172	172
MAINSTEM	5.650	5	5	5
MAINSTEM	5.649	294	294	294
MAINSTEM	5.593	188	188	188
MAINSTEM	5.558	308	308	308
MAINSTEM	5.500	21	21	21
MAINSTEM	5.496	458	458	458
MAINSTEM	5.409	6	6	6
MAINSTEM	5.408	72.1	72.1	72.1
MAINSTEM	5.394	85.2	85.2	85.2
MAINSTEM	5.378	5	5	5
MAINSTEM	5.377	135	135	135
MAINSTEM	5.364	Bridge		
MAINSTEM	5.352	5	5	5
MAINSTEM	5.351	55.8	55.8	55.8
MAINSTEM	5.340	37	37	37
MAINSTEM	5.335	50	50	50
MAINSTEM	5.324	184	184	184
MAINSTEM	5.289	173	173	173
MAINSTEM	5.256	108	108	108
MAINSTEM	5.236	272	272	272
MAINSTEM	5.184	95	95	95
MAINSTEM	5.166	117	117	117
MAINSTEM	5.144	266	266	266
MAINSTEM	5.094	237	237	237
MAINSTEM	5.049	22	22	22
MAINSTEM	5.045	130	130	130
MAINSTEM	5.020	80	80	80
MAINSTEM	5.012	Culvert		
MAINSTEM	5.005	69	69	69
MAINSTEM	4.992	62	62	62
MAINSTEM	4.980	73	73	73
MAINSTEM	4.966	115	115	115
MAINSTEM	4.944	86	86	86
MAINSTEM	4.928	14	14	14
MAINSTEM	4.925	55	55	55
MAINSTEM	4.915	159	159	159
MAINSTEM	4.885	101	101	101
MAINSTEM	4.866	100	100	100
MAINSTEM	4.847	101	101	101
MAINSTEM	4.828	139	139	139
MAINSTEM	4.801	99	99	99
MAINSTEM	4.783	43	43	43
MAINSTEM	4.774	18	18	18
MAINSTEM	4.771	57	57	57
MAINSTEM	4.760	95	95	95
MAINSTEM	4.742	156	156	156
MAINSTEM	4.713	80	80	80
MAINSTEM	4.698	20	20	20
MAINSTEM	4.694	57	57	57
MAINSTEM	4.683	26	26	26
MAINSTEM	4.678	55	55	55
MAINSTEM	4.673	Culvert		
MAINSTEM	4.668	19	19	19
MAINSTEM	4.664	27	27	27
MAINSTEM	4.659	103	103	103
MAINSTEM	4.639	1	1	1
MAINSTEM	4.638	143.4	143.4	143.4
MAINSTEM	4.626	Culvert		
MAINSTEM	4.612	10	10	10
MAINSTEM	4.611	119	119	119
MAINSTEM	4.588	98	98	98
MAINSTEM	4.569	144	144	144
MAINSTEM	4.542	23	23	23
MAINSTEM	4.537	174	174	174
MAINSTEM	4.521	Culvert		
MAINSTEM	4.505	103	103	103
MAINSTEM	4.485	0	0	0

River: HIGGINS TRIB A

Reach	River Sta.	Left	Channel	Right
CUP	25	100	100	100
CUP	24	200	200	200
CUP	23	200	200	200

HigginsCreek-Des.rep				
CUP	22	300	300	300
CUP	21	100	100	100
CUP	20	100	100	100
CUP	19	100	100	100
CUP	18	100	100	100
CUP	17	100	100	100
CUP	16	100	100	100
CUP	15	100	100	100
CUP	14	100	100	100
CUP	13	280	280	280
CUP	12	140	140	140
CUP	11	140	140	140
CUP	10	138	138	138
CUP	9	140	140	140
CUP	8	68	68	68
CUP	7	91	91	91
CUP	6.001	72.5	72.5	72.5
CUP	6	Culvert		
CUP	5.999	149	149	149
CUP	5	1505	1505	1505
CUP	4.1	335	260	175
CUP	3.8	460	380	340
CUP	3.5	490	490	490
CUP	3.1	55	55	55
CUP	3.01	20	20	20
CUP	3	34	34	34
CUP	2.3	198.75	198.75	198.75
CUP	2	Culvert		
CUP	1.7	53	53	53
CUP	1	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: HIGGINS CK

Reach	River Sta.	Contr.	Expan.
2	6.443	.1	.3
2	6.404	.1	.3
2	6.353	.1	.3
2	6.287	.1	.3
MAINSTEM	6.245	.1	.3
MAINSTEM	6.231	.1	.3
MAINSTEM	6.179	.1	.3
MAINSTEM	6.069	.1	.3
MAINSTEM	6.035	.1	.3
MAINSTEM	6.034	.1	.3
MAINSTEM	6.033	.1	.3
MAINSTEM	6.032	.1	.3
MAINSTEM	6.021	.1	.3
MAINSTEM	6.006	.3	.5
MAINSTEM	5.9994*	.3	.5
MAINSTEM	5.9950	.3	.5
MAINSTEM	5.9928*	.3	.5
MAINSTEM	5.981	Bridge	
MAINSTEM	5.973	.3	.5
MAINSTEM	5.972	.3	.5
MAINSTEM	5.959	.1	.3
MAINSTEM	5.950	.1	.3
MAINSTEM	5.914	.3	.5
MAINSTEM	5.911	Culvert	
MAINSTEM	5.899	.3	.5
MAINSTEM	5.86375*	.3	.5
MAINSTEM	5.8285*	.3	.5
MAINSTEM	5.79325*	.3	.5
MAINSTEM	5.758	.3	.5
MAINSTEM	5.721	Culvert	
MAINSTEM	5.683	.3	.5
MAINSTEM	5.650	.1	.3
MAINSTEM	5.649	.1	.3
MAINSTEM	5.593	.1	.3
MAINSTEM	5.558	.1	.3
MAINSTEM	5.500	.1	.3
MAINSTEM	5.496	.1	.3
MAINSTEM	5.409	.1	.3
MAINSTEM	5.408	.3	.5

HigginsCreek-Des.rep

MAINSTEM	5.394	.3	.5
MAINSTEM	5.378	.3	.5
MAINSTEM	5.377	.3	.5
MAINSTEM	5.364	Bridge	.5
MAINSTEM	5.352	.3	.5
MAINSTEM	5.351	.3	.5
MAINSTEM	5.340	.1	.3
MAINSTEM	5.335	.1	.3
MAINSTEM	5.324	.1	.3
MAINSTEM	5.289	.1	.3
MAINSTEM	5.256	.1	.3
MAINSTEM	5.236	.1	.3
MAINSTEM	5.184	.1	.3
MAINSTEM	5.166	.1	.3
MAINSTEM	5.144	.1	.3
MAINSTEM	5.094	.1	.3
MAINSTEM	5.049	.1	.3
MAINSTEM	5.045	.3	.5
MAINSTEM	5.020	.3	.5
MAINSTEM	5.012	Culvert	.5
MAINSTEM	5.005	.3	.5
MAINSTEM	4.992	.1	.3
MAINSTEM	4.980	.1	.3
MAINSTEM	4.966	.1	.3
MAINSTEM	4.944	.1	.3
MAINSTEM	4.928	.1	.3
MAINSTEM	4.925	.1	.3
MAINSTEM	4.915	.1	.3
MAINSTEM	4.885	.1	.3
MAINSTEM	4.866	.1	.3
MAINSTEM	4.847	.1	.3
MAINSTEM	4.828	.1	.3
MAINSTEM	4.801	.1	.3
MAINSTEM	4.783	.1	.3
MAINSTEM	4.774	.1	.3
MAINSTEM	4.771	.1	.3
MAINSTEM	4.760	.1	.3
MAINSTEM	4.742	.1	.3
MAINSTEM	4.713	.1	.3
MAINSTEM	4.698	.1	.3
MAINSTEM	4.694	.1	.3
MAINSTEM	4.683	.3	.5
MAINSTEM	4.678	.3	.5
MAINSTEM	4.673	Culvert	.5
MAINSTEM	4.668	.3	.5
MAINSTEM	4.664	.3	.5
MAINSTEM	4.659	.3	.5
MAINSTEM	4.639	.3	.5
MAINSTEM	4.638	.3	.5
MAINSTEM	4.626	Culvert	.5
MAINSTEM	4.612	.3	.5
MAINSTEM	4.611	.3	.5
MAINSTEM	4.588	.1	.3
MAINSTEM	4.569	.1	.3
MAINSTEM	4.542	.1	.3
MAINSTEM	4.537	.3	.5
MAINSTEM	4.521	Culvert	.5
MAINSTEM	4.505	.3	.5
MAINSTEM	4.485	.1	.3

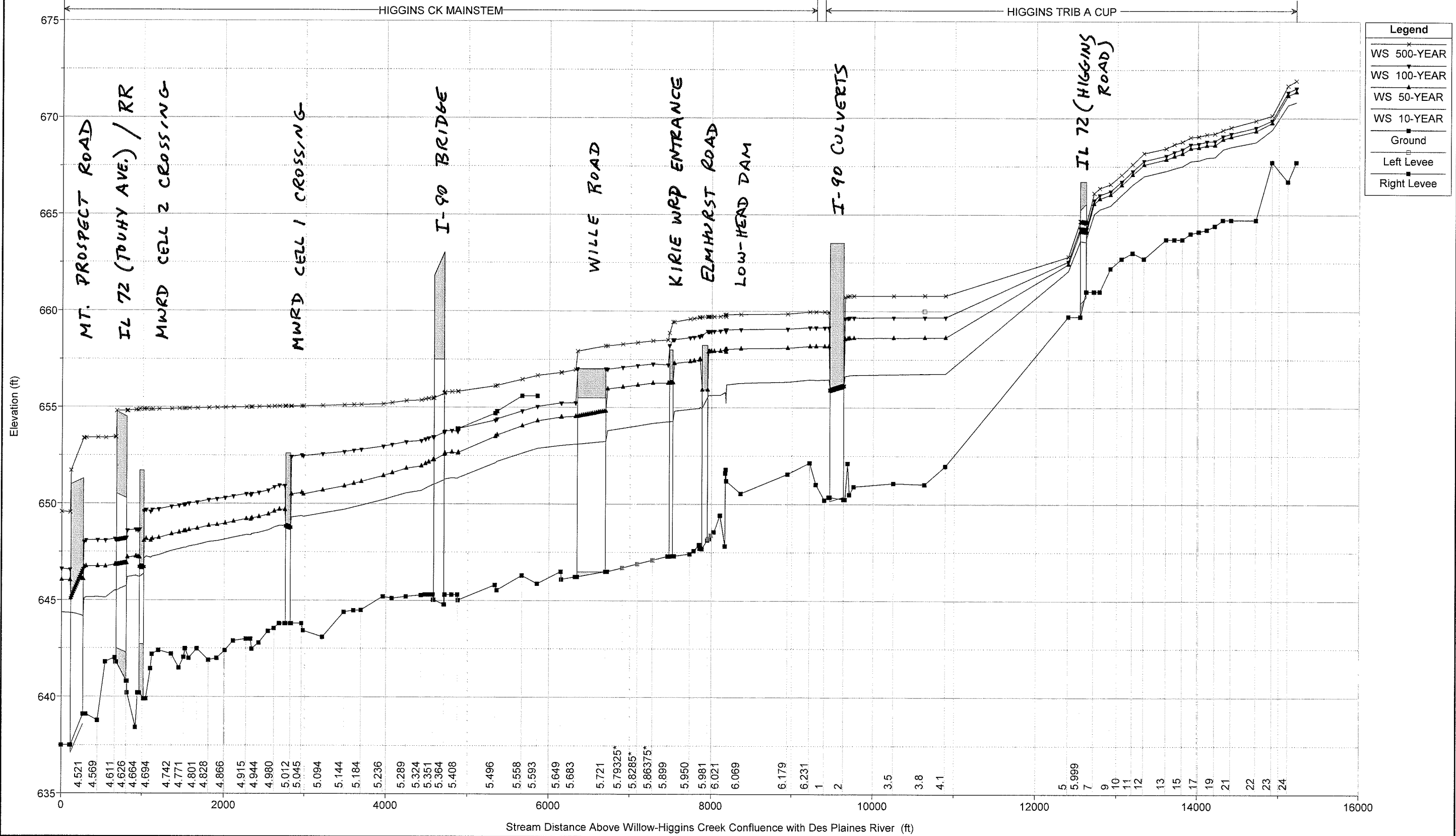
River: HIGGINS TRIB A

Reach	River Sta.	Contr.	Expan.
CUP	25	.1	.3
CUP	24	.1	.3
CUP	23	.1	.3
CUP	22	.1	.3
CUP	21	.1	.3
CUP	20	.1	.3
CUP	19	.1	.3
CUP	18	.1	.3
CUP	17	.1	.3
CUP	16	.1	.3
CUP	15	.1	.3
CUP	14	.1	.3
CUP	13	.1	.3
CUP	12	.1	.3

			HigginsCreek-Des.rep
CUP	11	.1	.3
CUP	10	.1	.3
CUP	9	.1	.3
CUP	8	.1	.3
CUP	7	.1	.3
CUP	6.001	.3	.5
CUP	6	Culvert	
CUP	5.999	.3	.5
CUP	5	.1	.3
CUP	4.1	.1	.3
CUP	3.8	.1	.3
CUP	3.5	.1	.3
CUP	3.1	.1	.3
CUP	3.01	.3	.5
CUP	3	.3	.5
CUP	2.3	.3	.5
CUP	2	Culvert	
CUP	1.7	.3	.5
CUP	1	.1	.3

MODIFIED EXISTING CONDITION

PERMIT MODEL RESULTS



Legend	
WS 500-YEAR	x
WS 100-YEAR	▼
WS 50-YEAR	▲
WS 10-YEAR	◻
Ground	■
Left Levee	□
Right Levee	■

PERMIT
 MOD. EX. PROFILES

PERMIT - EXISTING CONDITIONS

HEC-RAS Plan: Permit EXHigg 88 Profile: 10-YEAR

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	25	10-YEAR	222.00	667.72	670.82		670.95	0.001495	2.99	79.46	48.42	0.33
HIGGINS TRIB A	CUP	24	10-YEAR	222.00	666.72	670.67		670.81	0.001422	2.97	74.63	27.78	0.32
HIGGINS TRIB A	CUP	23	10-YEAR	222.00	667.72	669.39	669.39	670.07	0.016920	6.60	33.62	25.18	1.01
HIGGINS TRIB A	CUP	22	10-YEAR	222.00	664.72	668.76		668.81	0.000382	1.79	124.03	36.44	0.17
HIGGINS TRIB A	CUP	21	10-YEAR	222.00	664.72	668.51		668.61	0.001220	2.63	84.43	34.61	0.30
HIGGINS TRIB A	CUP	20	10-YEAR	222.00	664.72	668.38		668.48	0.001320	2.57	86.28	39.13	0.31
HIGGINS TRIB A	CUP	19	10-YEAR	222.00	664.42	667.98		668.24	0.004866	4.11	55.57	45.80	0.56
HIGGINS TRIB A	CUP	18	10-YEAR	222.00	664.22	667.95		668.01	0.000846	1.96	114.22	65.02	0.24
HIGGINS TRIB A	CUP	17	10-YEAR	222.00	664.12	667.82		667.91	0.001073	2.76	97.73	52.60	0.28
HIGGINS TRIB A	CUP	16	10-YEAR	222.00	664.02	667.77		667.83	0.000537	1.84	123.12	54.33	0.20
HIGGINS TRIB A	CUP	15	10-YEAR	222.00	663.72	667.52		667.71	0.002438	3.56	62.39	26.88	0.41
HIGGINS TRIB A	CUP	14	10-YEAR	222.00	663.72	667.40		667.52	0.001264	2.73	81.44	32.25	0.30
HIGGINS TRIB A	CUP	13	10-YEAR	222.00	663.72	667.27		667.38	0.001391	2.75	80.86	34.06	0.31
HIGGINS TRIB A	CUP	12	10-YEAR	224.00	662.72	667.00		667.07	0.000868	2.16	103.62	43.48	0.25
HIGGINS TRIB A	CUP	11	10-YEAR	224.00	663.02	666.55		666.83	0.003496	4.22	53.10	22.97	0.49
HIGGINS TRIB A	CUP	10	10-YEAR	224.00	662.72	666.03		666.31	0.003963	4.25	52.75	25.19	0.52
HIGGINS TRIB A	CUP	9	10-YEAR	224.00	662.22	665.48		665.75	0.004112	4.15	54.02	27.71	0.52
HIGGINS TRIB A	CUP	8	10-YEAR	224.00	661.02	665.28		665.37	0.001464	2.48	90.47	35.12	0.27
HIGGINS TRIB A	CUP	7	10-YEAR	224.00	661.02	665.03		665.22	0.003520	3.45	64.99	32.01	0.43
HIGGINS TRIB A	CUP	6.001	10-YEAR	224.00	661.02	663.78	663.78	664.51	0.021409	6.88	32.58	22.30	1.00
HIGGINS TRIB A	CUP	6	Culvert										
HIGGINS TRIB A	CUP	5.999	10-YEAR	224.00	659.72	663.63	662.11	663.80	0.002444	3.31	67.65	32.12	0.34
HIGGINS TRIB A	CUP	5	10-YEAR	224.00	659.72	662.08	662.08	662.78	0.027921	6.69	33.47	24.34	1.01
HIGGINS TRIB A	CUP	4.1	10-YEAR	224.00	651.98	656.77		656.81	0.000474	1.95	172.98	156.08	0.19
HIGGINS TRIB A	CUP	3.8	10-YEAR	224.00	651.03	656.75	653.12	656.76	0.000071	0.94	352.92	194.84	0.08
HIGGINS TRIB A	CUP	3.5	10-YEAR	224.00	651.09	656.73		656.74	0.000059	0.90	366.18	152.98	0.07
HIGGINS TRIB A	CUP	3.1	10-YEAR	224.00	650.91	656.69		656.71	0.000068	0.97	310.71	112.59	0.08
HIGGINS TRIB A	CUP	3.01	10-YEAR	294.00	650.50	656.68		656.70	0.000194	1.42	278.53	111.29	0.11
HIGGINS TRIB A	CUP	3	10-YEAR	294.00	652.12	656.65	654.55	656.69	0.000456	1.59	194.21	95.02	0.17
HIGGINS TRIB A	CUP	2.3	10-YEAR	294.00	650.25	656.64	652.15	656.68	0.000160	1.63	184.71	73.85	0.12
HIGGINS TRIB A	CUP	2	Culvert										
HIGGINS TRIB A	CUP	1.7	10-YEAR	294.00	650.37	656.46	652.65	656.53	0.000612	2.19	134.54	72.92	0.17
HIGGINS TRIB A	CUP	1	10-YEAR	294.00	650.22	656.44	653.02	656.49	0.000587	1.96	163.11	500.31	0.16
HIGGINS CK	MAINSTEM	6.245	10-YEAR	562.00	651.02	656.44		656.47	0.000081	1.77	632.97	230.36	0.15
HIGGINS CK	MAINSTEM	6.231	10-YEAR	562.00	652.14	656.45		656.46	0.000037	1.10	520.70	156.52	0.10
HIGGINS CK	MAINSTEM	6.179	10-YEAR	562.00	651.56	656.33		656.44	0.000228	2.58	217.55	59.73	0.24
HIGGINS CK	MAINSTEM	6.069	10-YEAR	562.00	650.55	656.27		656.33	0.000112	1.97	285.20	68.24	0.17
HIGGINS CK	MAINSTEM	6.035	10-YEAR	562.00	651.21	656.19		656.30	0.000240	2.72	242.68	111.48	0.25
HIGGINS CK	MAINSTEM	6.034	10-YEAR	562.00	651.79	655.24	655.24	656.21	0.001850	8.30	101.17	72.43	0.95
HIGGINS CK	MAINSTEM	6.033	10-YEAR	562.00	651.61	655.70		655.86	0.000327	4.05	306.71	149.38	0.42
HIGGINS CK	MAINSTEM	6.032	10-YEAR	562.00	647.83	655.79		655.82	0.000075	1.51	535.56	150.37	0.10
HIGGINS CK	MAINSTEM	6.021	10-YEAR	564.00	649.42	655.64		655.80	0.000626	3.22	188.35	61.34	0.27
HIGGINS CK	MAINSTEM	6.006	10-YEAR	564.00	648.55	655.65		655.74	0.000426	2.44	254.83	74.97	0.19
HIGGINS CK	MAINSTEM	5.9994*	10-YEAR	564.00	648.38	655.64		655.72	0.000361	2.29	265.95	68.53	0.18
HIGGINS CK	MAINSTEM	5.9950	10-YEAR	564.00	648.21	655.63	651.05	655.71	0.000313	2.17	267.84	60.78	0.17
HIGGINS CK	MAINSTEM	5.9928*	10-YEAR	564.00	648.21	655.63	651.05	655.70	0.000295	2.22	253.77	60.73	0.16
HIGGINS CK	MAINSTEM	5.981	Bridge										
HIGGINS CK	MAINSTEM	5.973	10-YEAR	564.00	647.71	655.02	650.47	655.11	0.000267	2.36	239.37	307.99	0.16
HIGGINS CK	MAINSTEM	5.972	10-YEAR	645.00	647.90	654.96	651.47	655.09	0.000548	2.94	219.38	64.45	0.22
HIGGINS CK	MAINSTEM	5.959	10-YEAR	645.00	647.58	654.95		655.04	0.000432	2.49	263.56	64.51	0.20
HIGGINS CK	MAINSTEM	5.950	10-YEAR	645.00	647.42	654.91		655.02	0.000484	2.60	251.42	61.77	0.21
HIGGINS CK	MAINSTEM	5.914	10-YEAR	645.00	647.31	654.83	650.92	654.93	0.000461	2.56	252.28	57.44	0.20
HIGGINS CK	MAINSTEM	5.911	Culvert										
HIGGINS CK	MAINSTEM	5.899	10-YEAR	645.00	647.30	654.27	650.97	654.54	0.000929	4.15	155.28	50.13	0.30
HIGGINS CK	MAINSTEM	5.86375*	10-YEAR	645.00	647.10	654.19		654.32	0.000727	2.96	217.90	49.49	0.25
HIGGINS CK	MAINSTEM	5.8285*	10-YEAR	645.00	646.90	654.05		654.19	0.000707	2.95	218.63	48.80	0.25
HIGGINS CK	MAINSTEM	5.79325*	10-YEAR	645.00	646.70	653.92		654.06	0.000687	2.94	219.72	48.19	0.24
HIGGINS CK	MAINSTEM	5.758	10-YEAR	645.00	646.50	653.80	650.19	653.93	0.000666	2.92	221.22	47.65	0.24
HIGGINS CK	MAINSTEM	5.721	Culvert										
HIGGINS CK	MAINSTEM	5.683	10-YEAR	645.00	646.23	653.10	649.46	653.30	0.000684	3.64	177.40	53.80	0.26
HIGGINS CK	MAINSTEM	5.650	10-YEAR	645.00	646.10	653.03		653.15	0.000589	2.72	238.94	52.34	0.23
HIGGINS CK	MAINSTEM	5.649	10-YEAR	645.00	646.50	653.03		653.14	0.000590	2.69	239.71	53.71	0.22
HIGGINS CK	MAINSTEM	5.593	10-YEAR	645.00	645.87	652.88	649.07	652.98	0.000502	2.57	251.02	53.38	0.21
HIGGINS CK	MAINSTEM	5.558	10-YEAR	907.00	646.30	652.63	649.69	652.83	0.001056	3.60	252.29	56.72	0.30
HIGGINS CK	MAINSTEM	5.500	10-YEAR	907.00	645.54	652.20	649.36	652.46	0.001354	4.08	222.19	49.56	0.34
HIGGINS CK	MAINSTEM	5.496	10-YEAR	907.00	645.80	652.13	649.63	652.42	0.001630	4.35	208.41	48.48	0.37
HIGGINS CK	MAINSTEM	5.409	10-YEAR	907.00	645.02	651.36	648.94	651.66	0.001681	4.42	205.19	47.80	0.38
HIGGINS CK	MAINSTEM	5.408	10-YEAR	907.00	645.30	651.33	649.07	651.65	0.001881	4.57	198.26	47.82	0.40
HIGGINS CK	MAINSTEM	5.394	10-YEAR	907.00	645.30	651.35		651.48	0.000716	2.89	313.79	75.62	0.25
HIGGINS CK	MAINSTEM	5.378	10-YEAR	907.00	645.30	651.28	648.17	651.41	0.000749	2.94	308.70	75.13	0.26
HIGGINS CK	MAINSTEM	5.377	10-YEAR	907.00	644.79	651.28	647.82	651.41	0.000613	2.87	316.30	67.67	0.23
HIGGINS CK	MAINSTEM	5.364	Bridge										
HIGGINS CK	MAINSTEM	5.352	10-YEAR	907.00	645.03	651.01	648.03	651.16	0.002419	3.15	287.69	67.15	0.27
HIGGINS CK	MAINSTEM	5.351	10-YEAR	907.00	645.30	651.00	648.12	651.14	0.002358	2.97	305.59	79.04	0.28
HIGGINS CK	MAINSTEM	5.340	10-YEAR	907.00	645.30	650.88	647.81	651.01	0.002029	2.87	316.24	75.11	0.25
HIGGINS CK	MAINSTEM	5.335	10-YEAR	907.00	645.30	650.80	647.82	650.94	0.002147	2.93	310.06	74.62	0.25
HIGGINS CK	MAINSTEM	5.324	10-YEAR	907.00	645.28	650.69		650.86	0.001031	3.32	273.20	90.24	0.30
HIGGINS CK	MAINSTEM	5.289	10-YEAR	907.00	645.20	650.56		650.69	0.000733	2.84	318.82	80.61	0.25
HIGGINS CK	MAINSTEM	5.256	10-YEAR	907.00	645.11	650.35		650.53	0.001052	3.37	268.76	68.53	0.30
HIGGINS CK	MAINSTEM	5.236	10-YEAR	907.00	645.20	650.21		650.40	0.001278	3.58	253.41	68.61	0.33
HIGGINS CK	MAINSTEM	5.184	10-YEAR	907.00	644.50	649.92		650.09	0.000997	3.32	273.45	68.67	0.29
HIGGINS CK	MAINSTEM	5.166	10-YEAR	907.00	644.48	649.82		649.99	0.000998	3.31	274.12	69.14	0.29
HIGGINS CK	MAINSTEM	5.144	10-YEAR	907.00	644.40	649.70		649.87	0.001050	3.37	268.78	68.35	0.30
HIGGINS CK	MAINSTEM	5.094	10-YEAR	907.00	643.10	649.50		649.63	0.000706	2.92	310.20	72.76	0.25

HEC-RAS Plan: Permit EXHigg 88 Profile: 10-YEAR (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	5.049	10-YEAR	907.00	643.43	649.33		649.47	0.000710	2.96	305.92	70.33	0.25
HIGGINS CK	MAINSTEM	5.045	10-YEAR	571.00	643.80	649.37		649.43	0.000355	2.03	281.12	67.84	0.18
HIGGINS CK	MAINSTEM	5.020	10-YEAR	571.00	643.80	649.29	645.94	649.38	0.000365	2.35	243.23	67.46	0.19
HIGGINS CK	MAINSTEM	5.012		Culvert									
HIGGINS CK	MAINSTEM	5.005	10-YEAR	571.00	643.80	648.86	645.55	648.95	0.000381	2.40	237.43	91.06	0.19
HIGGINS CK	MAINSTEM	4.992	10-YEAR	571.00	643.80	648.86		648.90	0.000204	1.53	372.22	91.10	0.13
HIGGINS CK	MAINSTEM	4.980	10-YEAR	571.00	643.55	648.77		648.87	0.000820	2.53	225.46	59.23	0.23
HIGGINS CK	MAINSTEM	4.966	10-YEAR	700.00	643.40	648.62		648.80	0.001152	3.42	204.88	54.41	0.31
HIGGINS CK	MAINSTEM	4.944	10-YEAR	700.00	642.80	648.50		648.68	0.001027	3.36	208.07	51.43	0.29
HIGGINS CK	MAINSTEM	4.928	10-YEAR	700.00	642.48	648.43		648.59	0.000897	3.18	220.15	53.69	0.28
HIGGINS CK	MAINSTEM	4.925	10-YEAR	700.00	643.00	648.38		648.57	0.001220	3.55	197.22	51.42	0.32
HIGGINS CK	MAINSTEM	4.915	10-YEAR	700.00	643.00	648.38		648.49	0.000773	2.67	283.08	91.30	0.23
HIGGINS CK	MAINSTEM	4.885	10-YEAR	700.00	642.90	648.25		648.37	0.000807	2.80	270.09	84.80	0.23
HIGGINS CK	MAINSTEM	4.866	10-YEAR	700.00	642.40	648.15		648.28	0.000862	2.94	257.26	82.33	0.24
HIGGINS CK	MAINSTEM	4.847	10-YEAR	700.00	642.00	648.07		648.19	0.000830	2.88	260.01	83.50	0.24
HIGGINS CK	MAINSTEM	4.828	10-YEAR	700.00	641.90	648.01		648.11	0.000658	2.50	297.78	94.80	0.21
HIGGINS CK	MAINSTEM	4.801	10-YEAR	700.00	642.50	647.86		648.00	0.000992	2.95	251.45	87.91	0.26
HIGGINS CK	MAINSTEM	4.783	10-YEAR	700.00	642.00	647.78		647.90	0.000853	2.83	260.38	86.95	0.24
HIGGINS CK	MAINSTEM	4.774	10-YEAR	700.00	642.50	647.71		647.86	0.001098	3.06	242.34	87.34	0.27
HIGGINS CK	MAINSTEM	4.771	10-YEAR	700.00	642.05	647.71		647.84	0.000853	2.85	251.40	72.78	0.24
HIGGINS CK	MAINSTEM	4.760	10-YEAR	700.00	641.50	647.65		647.78	0.000912	2.99	245.82	80.34	0.25
HIGGINS CK	MAINSTEM	4.742	10-YEAR	700.00	642.22	647.55		647.69	0.001045	3.01	242.08	82.54	0.26
HIGGINS CK	MAINSTEM	4.713	10-YEAR	700.00	642.40	647.33		647.50	0.001395	3.31	217.23	75.51	0.30
HIGGINS CK	MAINSTEM	4.698	10-YEAR	700.00	642.20	647.25		647.39	0.001184	2.97	235.84	81.29	0.31
HIGGINS CK	MAINSTEM	4.694	10-YEAR	700.00	641.46	647.19		647.36	0.001028	3.34	228.60	68.40	0.26
HIGGINS CK	MAINSTEM	4.683	10-YEAR	424.00	639.90	647.26	642.36	647.30	0.000198	1.51	285.97	82.31	0.12
HIGGINS CK	MAINSTEM	4.678	10-YEAR	424.00	639.90	647.15	642.40	647.26	0.000420	2.75	154.07	72.67	0.18
HIGGINS CK	MAINSTEM	4.673		Culvert									
HIGGINS CK	MAINSTEM	4.668	10-YEAR	424.00	640.20	646.20	642.68	646.40	0.000874	3.57	118.66	51.77	0.26
HIGGINS CK	MAINSTEM	4.664	10-YEAR	444.00	640.20	646.23	642.63	646.34	0.000584	2.76	160.58	51.92	0.21
HIGGINS CK	MAINSTEM	4.659	10-YEAR	444.00	638.42	646.26	640.56	646.30	0.000105	1.41	315.18	57.84	0.09
HIGGINS CK	MAINSTEM	4.639	10-YEAR	444.00	640.20	646.19	642.65	646.26	0.000568	2.19	202.35	51.69	0.19
HIGGINS CK	MAINSTEM	4.638	10-YEAR	444.00	640.80	646.19	643.18	646.26	0.000489	2.10	211.73	62.92	0.18
HIGGINS CK	MAINSTEM	4.626		Culvert									
HIGGINS CK	MAINSTEM	4.612	10-YEAR	444.00	641.80	645.48	644.06	645.76	0.002994	4.19	106.07	39.86	0.42
HIGGINS CK	MAINSTEM	4.611	10-YEAR	444.00	642.03	645.51	643.99	645.68	0.002290	3.34	132.93	50.65	0.36
HIGGINS CK	MAINSTEM	4.588	10-YEAR	454.00	641.80	645.12		645.35	0.003115	3.82	118.90	46.49	0.42
HIGGINS CK	MAINSTEM	4.589	10-YEAR	454.00	638.78	645.16		645.22	0.000352	2.05	244.72	64.29	0.16
HIGGINS CK	MAINSTEM	4.542	10-YEAR	454.00	639.10	645.14		645.18	0.000183	1.67	312.26	68.36	0.12
HIGGINS CK	MAINSTEM	4.537	10-YEAR	454.00	639.10	645.08	640.95	645.17	0.000376	2.37	191.38	68.02	0.17
HIGGINS CK	MAINSTEM	4.521		Culvert									
HIGGINS CK	MAINSTEM	4.505	10-YEAR	454.00	637.50	644.33	639.34	644.40	0.000241	2.08	218.68	75.20	0.14
HIGGINS CK	MAINSTEM	4.485	10-YEAR	454.00	637.50	644.36	638.36	644.36	0.000020	0.53	855.23	150.34	0.04

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/l)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	25	50-YEAR	308.00	667.72	671.35		671.51	0.001355	3.24	116.99	91.72	0.33
HIGGINS TRIB A	CUP	24	50-YEAR	308.00	666.72	671.17		671.35	0.001624	3.47	89.03	30.24	0.35
HIGGINS TRIB A	CUP	23	50-YEAR	308.00	667.72	669.75	669.75	670.55	0.015955	7.14	43.11	27.38	1.00
HIGGINS TRIB A	CUP	22	50-YEAR	308.00	664.72	669.33		669.40	0.000464	2.12	145.22	38.05	0.19
HIGGINS TRIB A	CUP	21	50-YEAR	308.00	664.72	669.03		669.17	0.001352	2.98	103.49	38.02	0.32
HIGGINS TRIB A	CUP	20	50-YEAR	308.00	664.72	668.90		669.03	0.001358	2.86	107.76	43.09	0.32
HIGGINS TRIB A	CUP	19	50-YEAR	308.00	664.42	668.60		668.82	0.003273	3.84	96.07	83.90	0.47
HIGGINS TRIB A	CUP	18	50-YEAR	308.00	664.22	668.59		668.65	0.000651	2.03	164.02	91.92	0.22
HIGGINS TRIB A	CUP	17	50-YEAR	308.00	664.12	668.47		668.57	0.000941	2.84	137.80	69.62	0.27
HIGGINS TRIB A	CUP	16	50-YEAR	308.00	664.02	668.43		668.49	0.000465	1.99	168.31	82.69	0.19
HIGGINS TRIB A	CUP	15	50-YEAR	308.00	663.72	668.17		668.39	0.002051	3.77	89.07	64.78	0.39
HIGGINS TRIB A	CUP	14	50-YEAR	308.00	663.72	668.03		668.17	0.001939	2.91	105.85	53.96	0.36
HIGGINS TRIB A	CUP	13	50-YEAR	308.00	663.72	667.86		668.00	0.001437	3.00	103.19	44.60	0.33
HIGGINS TRIB A	CUP	12	50-YEAR	310.00	662.72	667.59		667.67	0.000889	2.37	130.84	48.79	0.25
HIGGINS TRIB A	CUP	11	50-YEAR	310.00	663.02	667.08		667.42	0.003725	4.73	65.57	24.95	0.51
HIGGINS TRIB A	CUP	10	50-YEAR	310.00	662.72	666.54		666.89	0.003931	4.69	66.12	26.84	0.53
HIGGINS TRIB A	CUP	9	50-YEAR	310.00	662.22	666.04		666.34	0.003818	4.40	70.40	31.16	0.52
HIGGINS TRIB A	CUP	8	50-YEAR	310.00	661.02	665.83		665.95	0.001602	2.80	110.71	38.13	0.29
HIGGINS TRIB A	CUP	7	50-YEAR	310.00	661.02	665.58		665.78	0.003808	3.66	84.74	40.70	0.45
HIGGINS TRIB A	CUP	6.001	50-YEAR	310.00	661.02	664.15	664.15	665.04	0.020155	7.58	40.99	24.15	1.00
HIGGINS TRIB A	CUP	6	Culvert										
HIGGINS TRIB A	CUP	5.999	50-YEAR	310.00	659.72	664.15	662.48	664.38	0.002738	3.90	79.46	34.70	0.37
HIGGINS TRIB A	CUP	5	50-YEAR	310.00	659.72	662.43	662.43	663.27	0.026980	7.32	42.38	26.12	1.01
HIGGINS TRIB A	CUP	4.1	50-YEAR	310.00	651.98	658.64		658.64	0.000067	0.99	525.68	217.36	0.08
HIGGINS TRIB A	CUP	3.8	50-YEAR	310.00	651.03	658.63	653.42	658.63	0.000019	0.61	739.79	216.41	0.04
HIGGINS TRIB A	CUP	3.5	50-YEAR	310.00	651.09	658.62		658.63	0.000020	0.66	670.67	168.60	0.04
HIGGINS TRIB A	CUP	3.1	50-YEAR	310.00	650.91	658.61		658.61	0.000027	0.78	541.26	128.39	0.05
HIGGINS TRIB A	CUP	3.01	50-YEAR	407.00	650.50	658.60		658.61	0.000068	1.05	511.56	130.92	0.07
HIGGINS TRIB A	CUP	3	50-YEAR	407.00	652.12	658.58	654.85	658.61	0.000134	1.21	352.65	117.90	0.10
HIGGINS TRIB A	CUP	2.3	50-YEAR	407.00	650.25	658.55	652.54	658.60	0.000114	1.66	251.80	95.54	0.11
HIGGINS TRIB A	CUP	2	Culvert										
HIGGINS TRIB A	CUP	1.7	50-YEAR	407.00	650.37	658.18	653.07	658.28	0.000465	2.29	177.51	91.50	0.15
HIGGINS TRIB A	CUP	1	50-YEAR	407.00	650.22	658.18	653.66	658.22	0.000341	1.83	237.77	500.63	0.13
HIGGINS CK	MAINSTEM	6.245	50-YEAR	810.00	651.02	658.18		658.21	0.000048	1.64	1093.25	306.87	0.12
HIGGINS CK	MAINSTEM	6.231	50-YEAR	810.00	652.14	658.19		658.20	0.000022	1.08	854.84	229.76	0.08
HIGGINS CK	MAINSTEM	6.179	50-YEAR	810.00	651.56	658.09		658.18	0.000135	2.48	338.53	104.43	0.19
HIGGINS CK	MAINSTEM	6.069	50-YEAR	810.00	650.55	658.08		658.12	0.000072	1.97	443.61	139.06	0.14
HIGGINS CK	MAINSTEM	6.035	50-YEAR	810.00	651.21	658.03		658.10	0.000100	2.30	529.51	161.98	0.17
HIGGINS CK	MAINSTEM	6.034	50-YEAR	810.00	651.79	657.89		658.09	0.000181	4.28	452.95	161.06	0.34
HIGGINS CK	MAINSTEM	6.033	50-YEAR	810.00	651.61	657.97		658.05	0.000076	2.87	666.55	163.90	0.22
HIGGINS CK	MAINSTEM	6.032	50-YEAR	810.00	647.83	658.01		658.03	0.000042	1.38	886.95	164.08	0.08
HIGGINS CK	MAINSTEM	6.021	50-YEAR	810.00	649.42	657.93		658.02	0.000259	2.58	390.11	98.72	0.18
HIGGINS CK	MAINSTEM	6.006	50-YEAR	810.00	648.55	657.93		658.00	0.000226	2.22	447.17	98.38	0.15
HIGGINS CK	MAINSTEM	5.9994*	50-YEAR	810.00	648.38	657.92		657.99	0.000205	2.16	451.95	110.19	0.14
HIGGINS CK	MAINSTEM	5.9950	50-YEAR	810.00	648.21	657.92	651.68	657.98	0.000183	2.09	428.55	119.58	0.14
HIGGINS CK	MAINSTEM	5.9928*	50-YEAR	810.00	648.21	657.90	651.68	657.98	0.000197	2.28	355.91	117.67	0.14
HIGGINS CK	MAINSTEM	5.981	Bridge										
HIGGINS CK	MAINSTEM	5.973	50-YEAR	810.00	647.71	657.51	651.00	657.53	0.000072	1.35	1048.75	508.07	0.09
HIGGINS CK	MAINSTEM	5.972	50-YEAR	1100.00	647.90	657.48	652.42	657.52	0.000198	2.08	984.82	539.24	0.14
HIGGINS CK	MAINSTEM	5.959	50-YEAR	1100.00	647.58	657.42		657.50	0.000235	2.41	718.27	371.35	0.16
HIGGINS CK	MAINSTEM	5.950	50-YEAR	1100.00	647.42	657.39		657.49	0.000286	2.63	614.02	322.22	0.17
HIGGINS CK	MAINSTEM	5.914	50-YEAR	1100.00	647.31	657.29	651.92	657.42	0.000347	2.91	380.59	94.08	0.19
HIGGINS CK	MAINSTEM	5.911	Culvert										
HIGGINS CK	MAINSTEM	5.899	50-YEAR	1100.00	647.30	656.28	652.12	656.71	0.001030	5.31	207.35	79.85	0.33
HIGGINS CK	MAINSTEM	5.86375*	50-YEAR	1100.00	647.10	656.27		656.44	0.000563	3.35	360.94	97.60	0.23
HIGGINS CK	MAINSTEM	5.8285*	50-YEAR	1100.00	646.90	656.17		656.34	0.000557	3.34	359.95	99.57	0.23
HIGGINS CK	MAINSTEM	5.79325*	50-YEAR	1100.00	646.70	656.06		656.23	0.000549	3.32	357.60	89.40	0.23
HIGGINS CK	MAINSTEM	5.758	50-YEAR	1100.00	646.50	655.96	651.21	656.13	0.000548	3.32	340.59	87.24	0.23
HIGGINS CK	MAINSTEM	5.721	Culvert										
HIGGINS CK	MAINSTEM	5.683	50-YEAR	1100.00	646.23	654.54	650.51	654.93	0.000983	5.02	219.23	65.37	0.32
HIGGINS CK	MAINSTEM	5.650	50-YEAR	1100.00	646.10	654.50		654.68	0.000716	3.45	324.03	74.62	0.28
HIGGINS CK	MAINSTEM	5.649	50-YEAR	1100.00	646.50	654.50		654.68	0.000733	3.41	322.51	59.24	0.28
HIGGINS CK	MAINSTEM	5.593	50-YEAR	1100.00	645.87	654.30	650.02	654.48	0.000630	3.33	333.66	65.53	0.24
HIGGINS CK	MAINSTEM	5.558	50-YEAR	1394.00	646.30	654.04	650.53	654.31	0.001078	4.14	336.98	65.26	0.31
HIGGINS CK	MAINSTEM	5.500	50-YEAR	1394.00	645.54	653.57	650.31	653.92	0.001453	4.74	294.17	56.18	0.36
HIGGINS CK	MAINSTEM	5.496	50-YEAR	1394.00	645.80	653.49	650.56	653.88	0.001705	5.01	278.05	53.79	0.39
HIGGINS CK	MAINSTEM	5.409	50-YEAR	1394.00	645.02	652.66	649.85	653.07	0.001807	5.15	270.43	52.44	0.40
HIGGINS CK	MAINSTEM	5.408	50-YEAR	1394.00	645.30	652.63	649.95	653.06	0.001976	5.28	263.80	52.86	0.42
HIGGINS CK	MAINSTEM	5.394	50-YEAR	1394.00	645.30	652.68		652.85	0.000732	3.31	421.04	84.94	0.28
HIGGINS CK	MAINSTEM	5.378	50-YEAR	1394.00	645.30	652.61	648.91	652.78	0.000773	3.36	415.54	92.16	0.27
HIGGINS CK	MAINSTEM	5.377	50-YEAR	1394.00	644.79	652.60	648.57	652.78	0.000688	3.40	409.66	73.66	0.25
HIGGINS CK	MAINSTEM	5.364	Bridge										
HIGGINS CK	MAINSTEM	5.352	50-YEAR	1394.00	645.03	652.28	648.77	652.49	0.002621	3.70	377.23	73.37	0.29
HIGGINS CK	MAINSTEM	5.351	50-YEAR	1394.00	645.30	652.28	648.86	652.47	0.002272	3.43	406.29	89.39	0.27
HIGGINS CK	MAINSTEM	5.340	50-YEAR	1394.00	645.30	652.16	648.50	652.34	0.002152	3.34	419.75	101.62	0.28
HIGGINS CK	MAINSTEM	5.335	50-YEAR	1394.00	645.30	652.07	648.51	652.25	0.002275	3.40	410.88	97.86	0.27
HIGGINS CK	MAINSTEM	5.324	50-YEAR	1394.00	645.28	651.95		652.18	0.001014	3.79	374.27	119.13	0.30
HIGGINS CK	MAINSTEM	5.289	50-YEAR	1394.00	645.20	651.83		652.00	0.000753	3.26	427.08	89.39	0.26
HIGGINS CK	MAINSTEM	5.256	50-YEAR	1394.00	645.11	651.80		651.84	0.001140	3.87	360.16	79.33	0.32
HIGGINS CK	MAINSTEM	5.236	50-YEAR	1394.00	645.20	651.45		651.70	0.001274	4.06	343.71	76.72	0.34
HIGGINS CK	MAINSTEM	5.184	50-YEAR	1394.00	644.50	651.15		651.38	0.001066	3.84	362.96	76.73	0.31
HIGGINS CK	MAINSTEM	5.166	50-YEAR	1394.00	644.48	651.05		651.28	0.001077	3.83	364.27	78.08	0.31
HIGGINS CK	MAINSTEM	5.144	50-YEAR	1394.00	644.40	650.91		651.15	0.001124	3.91	356.47	76.32	0.32
HIGGINS CK	MAINSTEM	5.094	50-YEAR	1394.00	643.10	650.69		650.88	0.000810	3.47	401.49	80.49	0.27

HEC-RAS Plan: Permit EXHggg 88 Profile: 50-YEAR (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
HIGGINS CK	MAINSTEM	5.049	50-YEAR	1394.00	643.43	650.49		650.68	0.000835	3.57	391.02	76.77	0.28
HIGGINS CK	MAINSTEM	5.045	50-YEAR	750.00	643.80	650.57		650.63	0.000287	2.05	366.15	74.03	0.16
HIGGINS CK	MAINSTEM	5.020	50-YEAR	750.00	643.80	650.49	646.26	650.59	0.000307	2.49	301.79	73.62	0.18
HIGGINS CK	MAINSTEM	5.012											
HIGGINS CK	MAINSTEM	5.005	50-YEAR	750.00	643.80	649.68	645.88	649.80	0.000393	2.71	277.05	95.74	0.20
HIGGINS CK	MAINSTEM	4.992	50-YEAR	750.00	643.80	649.70		649.74	0.000201	1.67	450.18	95.83	0.14
HIGGINS CK	MAINSTEM	4.960	50-YEAR	750.00	643.55	649.60		649.71	0.000603	2.72	276.21	63.78	0.23
HIGGINS CK	MAINSTEM	4.956	50-YEAR	920.00	643.40	649.44		649.64	0.001123	3.67	250.80	58.56	0.31
HIGGINS CK	MAINSTEM	4.944	50-YEAR	920.00	642.80	649.31		649.52	0.001046	3.66	251.30	55.32	0.30
HIGGINS CK	MAINSTEM	4.928	50-YEAR	920.00	642.48	649.24		649.43	0.000923	3.47	265.34	57.92	0.29
HIGGINS CK	MAINSTEM	4.925	50-YEAR	920.00	643.00	649.18		649.41	0.001210	3.83	240.37	55.47	0.32
HIGGINS CK	MAINSTEM	4.915	50-YEAR	920.00	643.00	649.21		649.33	0.000733	2.85	360.23	96.24	0.23
HIGGINS CK	MAINSTEM	4.885	50-YEAR	920.00	642.90	649.07		649.21	0.000772	3.01	341.66	89.94	0.23
HIGGINS CK	MAINSTEM	4.866	50-YEAR	920.00	642.40	648.97		649.12	0.000839	3.17	326.81	86.18	0.24
HIGGINS CK	MAINSTEM	4.847	50-YEAR	920.00	642.00	648.90		649.04	0.000811	3.11	330.92	87.76	0.24
HIGGINS CK	MAINSTEM	4.828	50-YEAR	920.00	641.90	648.85		648.96	0.000636	2.68	379.28	100.60	0.21
HIGGINS CK	MAINSTEM	4.801	50-YEAR	920.00	642.50	648.70		648.85	0.000913	3.12	321.40	92.90	0.25
HIGGINS CK	MAINSTEM	4.783	50-YEAR	920.00	642.00	648.62		648.76	0.000808	3.02	336.40	92.51	0.24
HIGGINS CK	MAINSTEM	4.774	50-YEAR	920.00	642.50	648.57		648.72	0.000987	3.21	318.89	92.39	0.26
HIGGINS CK	MAINSTEM	4.771	50-YEAR	920.00	642.05	648.56		648.70	0.000828	3.09	319.84	85.65	0.24
HIGGINS CK	MAINSTEM	4.760	50-YEAR	920.00	641.50	648.50		648.65	0.000877	3.22	317.24	86.21	0.25
HIGGINS CK	MAINSTEM	4.742	50-YEAR	920.00	642.22	648.41		648.56	0.000949	3.17	319.03	92.39	0.26
HIGGINS CK	MAINSTEM	4.713	50-YEAR	920.00	642.40	648.22		648.40	0.001193	3.42	293.90	91.17	0.28
HIGGINS CK	MAINSTEM	4.698	50-YEAR	920.00	642.20	648.17		648.29	0.000999	2.88	320.32	97.43	0.28
HIGGINS CK	MAINSTEM	4.694	50-YEAR	920.00	641.46	648.08		648.27	0.000966	3.61	300.15	86.04	0.26
HIGGINS CK	MAINSTEM	4.683	50-YEAR	445.00	639.90	648.17	642.46	648.20	0.000123	1.33	350.51	98.00	0.10
HIGGINS CK	MAINSTEM	4.678	50-YEAR	445.00	639.90	648.07	642.48	648.17	0.000307	2.55	174.36	90.91	0.16
HIGGINS CK	MAINSTEM	4.673											
HIGGINS CK	MAINSTEM	4.668	50-YEAR	445.00	640.20	647.21	642.75	647.37	0.000571	3.21	138.78	74.75	0.21
HIGGINS CK	MAINSTEM	4.664	50-YEAR	485.00	640.20	647.23	642.75	647.33	0.000401	2.56	189.57	75.43	0.18
HIGGINS CK	MAINSTEM	4.659	50-YEAR	485.00	638.42	647.26	640.66	647.29	0.000081	1.35	358.91	63.17	0.08
HIGGINS CK	MAINSTEM	4.639	50-YEAR	485.00	640.20	647.21	642.77	647.26	0.000320	1.91	253.36	74.77	0.15
HIGGINS CK	MAINSTEM	4.638	50-YEAR	485.00	640.80	647.21	643.27	647.26	0.000284	1.85	262.69	67.90	0.14
HIGGINS CK	MAINSTEM	4.626											
HIGGINS CK	MAINSTEM	4.612	50-YEAR	485.00	641.80	646.82	644.18	646.97	0.001076	3.18	152.69	45.38	0.27
HIGGINS CK	MAINSTEM	4.611	50-YEAR	485.00	642.03	646.84	644.10	646.93	0.000739	2.38	203.42	58.68	0.22
HIGGINS CK	MAINSTEM	4.588	50-YEAR	503.00	641.80	646.74		646.84	0.000839	2.51	200.59	54.69	0.23
HIGGINS CK	MAINSTEM	4.569	50-YEAR	503.00	638.78	646.75		646.79	0.000154	1.62	355.56	75.15	0.11
HIGGINS CK	MAINSTEM	4.542	50-YEAR	503.00	639.10	646.74		646.77	0.000091	1.38	428.73	77.20	0.09
HIGGINS CK	MAINSTEM	4.537	50-YEAR	503.00	639.10	646.69	641.08	646.76	0.000208	2.07	242.98	76.93	0.13
HIGGINS CK	MAINSTEM	4.521											
HIGGINS CK	MAINSTEM	4.505	50-YEAR	503.00	637.50	646.02	639.48	646.07	0.000142	1.85	272.57	85.11	0.11
HIGGINS CK	MAINSTEM	4.485	50-YEAR	503.00	637.50	646.04	638.42	646.04	0.000011	0.45	1118.36	162.91	0.03

HEC-RAS Plan: Permit EXHigg 88 Profile: 100-YEAR

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	25	100-YEAR	342.00	667.72	671.55		671.70	0.001280	3.28	136.23	107.35	0.32
HIGGINS TRIB A	CUP	24	100-YEAR	342.00	666.72	671.34		671.55	0.001691	3.64	94.35	31.11	0.36
HIGGINS TRIB A	CUP	23	100-YEAR	342.00	667.72	669.88	669.88	670.72	0.015736	7.34	46.62	28.15	1.00
HIGGINS TRIB A	CUP	22	100-YEAR	342.00	664.72	669.52		669.59	0.000497	2.24	152.47	38.59	0.20
HIGGINS TRIB A	CUP	21	100-YEAR	342.00	664.72	669.20		669.35	0.001410	3.11	110.11	39.13	0.33
HIGGINS TRIB A	CUP	20	100-YEAR	342.00	664.72	669.07		669.21	0.001369	2.97	115.15	44.11	0.32
HIGGINS TRIB A	CUP	19	100-YEAR	342.00	664.42	668.82		669.01	0.002846	3.72	115.10	93.68	0.45
HIGGINS TRIB A	CUP	18	100-YEAR	342.00	664.22	668.79		668.86	0.000614	2.06	183.95	99.03	0.22
HIGGINS TRIB A	CUP	17	100-YEAR	342.00	664.12	668.69		668.78	0.000907	2.86	153.22	75.15	0.27
HIGGINS TRIB A	CUP	16	100-YEAR	342.00	664.02	668.65		668.71	0.000453	2.04	186.89	91.84	0.19
HIGGINS TRIB A	CUP	15	100-YEAR	342.00	663.72	668.39		668.61	0.001912	3.82	105.06	82.39	0.38
HIGGINS TRIB A	CUP	14	100-YEAR	342.00	663.72	668.25		668.38	0.002168	2.88	119.03	67.70	0.38
HIGGINS TRIB A	CUP	13	100-YEAR	342.00	663.72	668.06		668.21	0.001403	3.08	112.87	52.97	0.32
HIGGINS TRIB A	CUP	12	100-YEAR	344.00	662.72	667.79		667.88	0.000881	2.44	141.05	50.70	0.26
HIGGINS TRIB A	CUP	11	100-YEAR	344.00	663.02	667.26		667.63	0.003798	4.90	70.20	25.65	0.52
HIGGINS TRIB A	CUP	10	100-YEAR	344.00	662.72	666.72		667.09	0.003948	4.85	70.96	27.41	0.53
HIGGINS TRIB A	CUP	9	100-YEAR	344.00	662.22	666.23		666.54	0.003758	4.50	76.42	32.34	0.52
HIGGINS TRIB A	CUP	8	100-YEAR	344.00	661.02	666.02		666.15	0.001656	2.92	117.95	39.16	0.30
HIGGINS TRIB A	CUP	7	100-YEAR	344.00	661.02	665.77		665.98	0.003807	3.71	92.70	43.63	0.45
HIGGINS TRIB A	CUP	6.001	100-YEAR	344.00	661.02	664.28	664.28	665.23	0.019887	7.83	43.91	24.81	1.00
HIGGINS TRIB A	CUP	6											
HIGGINS TRIB A	CUP	5.999	100-YEAR	344.00	659.72	664.32	662.59	664.58	0.002869	4.12	83.40	35.56	0.38
HIGGINS TRIB A	CUP	5	100-YEAR	344.00	659.72	662.58	662.58	663.44	0.025809	7.45	46.19	26.84	1.00
HIGGINS TRIB A	CUP	4.1	100-YEAR	344.00	651.98	659.68		659.69	0.000029	0.75	788.32	239.33	0.05
HIGGINS TRIB A	CUP	3.8	100-YEAR	344.00	651.03	659.68	653.52	659.68	0.000011	0.51	973.07	227.65	0.03
HIGGINS TRIB A	CUP	3.5	100-YEAR	344.00	651.09	659.68		659.68	0.000012	0.57	852.95	177.29	0.04
HIGGINS TRIB A	CUP	3.1	100-YEAR	344.00	650.91	659.67		659.67	0.000018	0.69	681.81	137.12	0.04
HIGGINS TRIB A	CUP	3.01	100-YEAR	452.00	650.50	659.66		659.67	0.000041	0.91	656.26	141.74	0.06
HIGGINS TRIB A	CUP	3	100-YEAR	452.00	652.12	659.65	654.95	659.67	0.000080	1.07	439.91	130.72	0.08
HIGGINS TRIB A	CUP	2.3	100-YEAR	452.00	650.25	659.62	652.67	659.66	0.000090	1.61	289.01	106.36	0.10
HIGGINS TRIB A	CUP	2											
HIGGINS TRIB A	CUP	1.7	100-YEAR	452.00	650.37	659.14	653.20	659.22	0.000376	2.24	201.59	101.91	0.14
HIGGINS TRIB A	CUP	1	100-YEAR	452.00	650.22	659.14	653.83	659.19	0.000249	1.72	279.44	500.80	0.11
HIGGINS CK	MAINSTEM	6.245	100-YEAR	911.00	651.02	659.15		659.18	0.000033	1.50	1416.98	350.94	0.10
HIGGINS CK	MAINSTEM	6.231	100-YEAR	911.00	652.14	659.16		659.17	0.000016	1.02	1093.44	266.63	0.07
HIGGINS CK	MAINSTEM	6.179	100-YEAR	911.00	651.56	659.07		659.16	0.000095	2.30	458.09	131.85	0.17
HIGGINS CK	MAINSTEM	6.069	100-YEAR	911.00	650.55	659.06		659.11	0.000052	1.86	605.14	191.20	0.13
HIGGINS CK	MAINSTEM	6.035	100-YEAR	911.00	651.21	659.04		659.10	0.000065	2.06	696.37	167.49	0.14
HIGGINS CK	MAINSTEM	6.034	100-YEAR	911.00	651.79	658.96		659.09	0.000100	3.61	628.46	166.95	0.28
HIGGINS CK	MAINSTEM	6.033	100-YEAR	911.00	651.61	659.01		659.07	0.000049	2.60	838.44	168.92	0.18
HIGGINS CK	MAINSTEM	6.032	100-YEAR	911.00	647.83	659.04		659.06	0.000033	1.31	1057.58	169.07	0.07
HIGGINS CK	MAINSTEM	6.021	100-YEAR	915.00	649.42	658.98		659.05	0.000176	2.33	497.37	106.48	0.15
HIGGINS CK	MAINSTEM	6.006	100-YEAR	915.00	648.55	658.97		659.03	0.000178	2.16	592.41	186.68	0.13
HIGGINS CK	MAINSTEM	5.9994*	100-YEAR	915.00	648.38	658.96		659.02	0.000156	2.07	602.68	181.76	0.13
HIGGINS CK	MAINSTEM	5.9950	100-YEAR	915.00	648.21	658.96	651.92	659.02	0.000140	2.00	627.77	242.16	0.12
HIGGINS CK	MAINSTEM	5.9928*	100-YEAR	915.00	648.21	658.96	651.92	659.02	0.000140	2.00	627.35	241.95	0.12
HIGGINS CK	MAINSTEM	5.981											
HIGGINS CK	MAINSTEM	5.973	100-YEAR	915.00	647.71	658.71	651.22	658.73	0.000040	1.11	1532.75	629.19	0.07
HIGGINS CK	MAINSTEM	5.972	100-YEAR	1320.00	647.90	658.69	652.80	658.72	0.000110	1.73	1479.98	635.56	0.11
HIGGINS CK	MAINSTEM	5.959	100-YEAR	1320.00	647.58	658.65		658.70	0.000155	2.16	1122.43	560.59	0.13
HIGGINS CK	MAINSTEM	5.950	100-YEAR	1320.00	647.42	658.63		658.69	0.000190	2.37	990.54	542.35	0.14
HIGGINS CK	MAINSTEM	5.914	100-YEAR	1320.00	647.31	658.53	652.32	658.65	0.000275	2.82	573.17	337.12	0.17
HIGGINS CK	MAINSTEM	5.911											
HIGGINS CK	MAINSTEM	5.899	100-YEAR	1320.00	647.30	657.22	652.62	657.72	0.001022	5.69	231.88	95.52	0.34
HIGGINS CK	MAINSTEM	5.86375*	100-YEAR	1320.00	647.10	657.26		657.43	0.000472	3.37	474.47	131.14	0.22
HIGGINS CK	MAINSTEM	5.8285*	100-YEAR	1320.00	646.90	657.18		657.34	0.000461	3.35	492.31	161.52	0.22
HIGGINS CK	MAINSTEM	5.79325*	100-YEAR	1320.00	646.70	657.09		657.26	0.000460	3.35	491.00	185.16	0.22
HIGGINS CK	MAINSTEM	5.758	100-YEAR	1320.00	646.50	656.99	651.64	657.17	0.000478	3.42	403.20	190.11	0.22
HIGGINS CK	MAINSTEM	5.721											
HIGGINS CK	MAINSTEM	5.683	100-YEAR	1320.00	646.23	655.25	650.99	655.72	0.001050	5.51	239.73	76.55	0.34
HIGGINS CK	MAINSTEM	5.650	100-YEAR	1320.00	646.10	655.24		655.44	0.000671	3.63	386.59	94.78	0.25
HIGGINS CK	MAINSTEM	5.649	100-YEAR	1320.00	646.50	655.23		655.43	0.000699	3.59	373.69	86.25	0.26
HIGGINS CK	MAINSTEM	5.593	100-YEAR	1320.00	645.87	655.05	650.41	655.24	0.000605	3.53	387.79	93.58	0.24
HIGGINS CK	MAINSTEM	5.558	100-YEAR	1623.00	646.30	654.82	650.87	655.09	0.000933	4.21	393.84	81.77	0.30
HIGGINS CK	MAINSTEM	5.500	100-YEAR	1623.00	645.54	654.41	650.69	654.76	0.001213	4.76	345.39	68.48	0.34
HIGGINS CK	MAINSTEM	5.498	100-YEAR	1623.00	645.80	654.34	650.93	654.73	0.001422	5.00	327.85	66.69	0.36
HIGGINS CK	MAINSTEM	5.409	100-YEAR	1623.00	645.02	653.90	650.23	654.15	0.000972	4.24	475.84	116.67	0.30
HIGGINS CK	MAINSTEM	5.408	100-YEAR	1623.00	645.30	653.74	650.35	654.13	0.001481	4.99	325.13	58.32	0.37
HIGGINS CK	MAINSTEM	5.394	100-YEAR	1623.00	645.30	653.80		653.96	0.000505	3.15	519.64	90.83	0.22
HIGGINS CK	MAINSTEM	5.378	100-YEAR	1623.00	645.30	653.76	649.24	653.91	0.000534	3.14	528.28	130.22	0.23
HIGGINS CK	MAINSTEM	5.377	100-YEAR	1623.00	644.79	653.74	648.88	653.90	0.000541	3.27	496.37	78.82	0.23
HIGGINS CK	MAINSTEM	5.364											
HIGGINS CK	MAINSTEM	5.352	100-YEAR	1623.00	645.03	653.47	649.08	653.66	0.001922	3.47	468.36	79.21	0.25
HIGGINS CK	MAINSTEM	5.351	100-YEAR	1623.00	645.30	653.48	649.16	653.64	0.001577	3.22	503.76	104.66	0.23
HIGGINS CK	MAINSTEM	5.340	100-YEAR	1623.00	645.30	653.41	648.81	653.55	0.001397	3.04	569.85	154.15	0.22
HIGGINS CK	MAINSTEM	5.335	100-YEAR	1623.00	645.30	653.35	648.79	653.49	0.001440	3.07	565.85	151.81	0.22
HIGGINS CK	MAINSTEM	5.324	100-YEAR	1623.00	645.28	653.27		653.45	0.000609	3.37	516.93	229.64	0.24
HIGGINS CK	MAINSTEM	5.289	100-YEAR	1623.00	645.20	653.21		653.34	0.000443	2.90	589.11	210.64	0.21
HIGGINS CK	MAINSTEM	5.256	100-YEAR	1623.00	645.11	653.07		653.24	0.000719	3.30	492.12	103.54	0.26
HIGGINS CK	MAINSTEM	5.236	100-YEAR	1623.00	645.20	652.97		653.16	0.000708	3.47	469.64	92.34	0.26
HIGGINS CK	MAINSTEM	5.184	100-YEAR	1623.00	644.50	652.81		652.98	0.000596	3.25	499.54	87.80	0.24
HIGGINS CK	MAINSTEM	5.166	100-YEAR	1623.00	644.48	652.76		652.92	0.000586	3.19	508.52	90.57	0.24
HIGGINS CK	MAINSTEM	5.144	100-YEAR	1623.00	644.40	652.69		652.85	0.000589	3.23	502.44	88.00	0.24
HIGGINS CK	MAINSTEM	5.094	100-YEAR	1623.00	643.10	652.58		652.71	0.000432	2.87	565.30	94.62	0.21
HIGGINS CK	MAINSTEM	5.049	100-YEAR	1623.00	643.43	652.47		652.60	0.000416	2.93	555.47	98.31	0.20
HIGGINS CK	MAINSTEM	5.045	100-YEAR	1000.00	643.80	652.52		652.58	0.000188	1.92	520.33	85.34	0.14
HIGGINS CK	MAINSTEM	5.020	100-YEAR	1000.00	643.80	652.44	646.67	652.54	0.000218	2.52	397.28	83.68	0.16

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
HIGGINS TRIB A	CUP	25	500-YEAR	414.00	667.72	671.93		672.07	0.001102	3.28	182.38	128.59	0.30
HIGGINS TRIB A	CUP	24	500-YEAR	414.00	666.72	671.68		671.92	0.001823	3.98	105.10	32.79	0.38
HIGGINS TRIB A	CUP	23	500-YEAR	414.00	667.72	670.13	670.13	671.05	0.015353	7.69	53.82	29.66	1.01
HIGGINS TRIB A	CUP	22	500-YEAR	414.00	664.72	669.87		669.97	0.000563	2.49	166.38	40.01	0.21
HIGGINS TRIB A	CUP	21	500-YEAR	414.00	664.72	669.52		669.70	0.001635	3.37	122.90	41.20	0.34
HIGGINS TRIB A	CUP	20	500-YEAR	414.00	664.72	669.38		669.54	0.001423	3.22	129.20	45.98	0.33
HIGGINS TRIB A	CUP	19	500-YEAR	414.00	664.42	669.20		669.37	0.002286	3.55	152.81	104.35	0.41
HIGGINS TRIB A	CUP	18	500-YEAR	414.00	664.22	669.17		669.23	0.000575	2.14	222.11	106.24	0.21
HIGGINS TRIB A	CUP	17	500-YEAR	414.00	664.12	669.06		669.16	0.000933	3.03	184.61	95.52	0.27
HIGGINS TRIB A	CUP	16	500-YEAR	414.00	664.02	668.92		669.09	0.000455	2.19	225.27	118.61	0.20
HIGGINS TRIB A	CUP	15	500-YEAR	414.00	663.72	668.77		668.99	0.001710	3.90	142.32	109.96	0.37
HIGGINS TRIB A	CUP	14	500-YEAR	414.00	663.72	668.65		668.77	0.002186	2.76	151.10	93.00	0.38
HIGGINS TRIB A	CUP	13	500-YEAR	414.00	663.72	668.44		668.60	0.001333	3.23	135.01	60.22	0.32
HIGGINS TRIB A	CUP	12	500-YEAR	416.00	662.72	668.19		668.29	0.000830	2.58	161.89	54.66	0.25
HIGGINS TRIB A	CUP	11	500-YEAR	416.00	663.02	667.61		668.04	0.003931	5.23	79.59	27.00	0.54
HIGGINS TRIB A	CUP	10	500-YEAR	416.00	662.72	667.07		667.48	0.004005	5.16	80.59	28.51	0.54
HIGGINS TRIB A	CUP	9	500-YEAR	416.00	662.22	666.59		666.93	0.003696	4.70	88.44	34.56	0.52
HIGGINS TRIB A	CUP	8	500-YEAR	416.00	661.02	666.37		666.53	0.001774	3.15	132.09	41.08	0.31
HIGGINS TRIB A	CUP	7	500-YEAR	416.00	661.02	666.12		666.35	0.003711	3.81	109.28	48.66	0.45
HIGGINS TRIB A	CUP	6.001	500-YEAR	416.00	661.02	664.56	664.56	665.62	0.019005	8.25	50.40	26.19	1.00
HIGGINS TRIB A	CUP	6											
HIGGINS TRIB A	CUP	5.999	500-YEAR	416.00	659.72	664.67	662.85	664.99	0.003081	4.55	91.50	37.33	0.40
HIGGINS TRIB A	CUP	5	500-YEAR	416.00	659.72	662.82	662.82	663.78	0.025535	7.86	52.91	28.07	1.01
HIGGINS TRIB A	CUP	4.1	500-YEAR	416.00	651.98	660.80		660.81	0.000018	0.65	1040.24	246.19	0.04
HIGGINS TRIB A	CUP	3.8	500-YEAR	416.00	651.03	660.80	653.74	660.80	0.000007	0.46	1373.42	294.82	0.03
HIGGINS TRIB A	CUP	3.5	500-YEAR	416.00	651.09	660.80		660.80	0.000010	0.55	1057.09	186.54	0.03
HIGGINS TRIB A	CUP	3.1	500-YEAR	416.00	650.91	660.79		660.79	0.000014	0.68	841.31	147.47	0.04
HIGGINS TRIB A	CUP	3.01	500-YEAR	574.00	660.50	660.78		660.79	0.000036	0.92	822.75	155.24	0.05
HIGGINS TRIB A	CUP	3	500-YEAR	574.00	652.12	660.77	655.16	660.79	0.000069	1.12	531.90	144.24	0.07
HIGGINS TRIB A	CUP	2.3	500-YEAR	574.00	650.25	660.73	653.00	660.78	0.000096	1.80	327.90	116.28	0.10
HIGGINS TRIB A	CUP	2											
HIGGINS TRIB A	CUP	1.7	500-YEAR	574.00	650.37	659.95	653.62	660.05	0.000441	2.59	221.74	110.63	0.15
HIGGINS TRIB A	CUP	1	500-YEAR	574.00	650.22	659.96	654.21	660.01	0.000273	1.93	314.34	500.95	0.12
HIGGINS CK	MAINSTEM	6.245	500-YEAR	1253.00	651.02	659.96		660.00	0.000039	1.76	1711.84	371.06	0.11
HIGGINS CK	MAINSTEM	6.231	500-YEAR	1253.00	652.14	659.97		659.99	0.000019	1.23	1327.07	303.37	0.08
HIGGINS CK	MAINSTEM	6.179	500-YEAR	1253.00	651.56	659.86		659.97	0.000118	2.75	561.69	132.83	0.19
HIGGINS CK	MAINSTEM	6.069	500-YEAR	1253.00	650.55	659.84		659.91	0.000066	2.24	755.33	193.75	0.14
HIGGINS CK	MAINSTEM	6.035	500-YEAR	1253.00	651.21	659.82		659.90	0.000078	2.44	828.72	171.74	0.16
HIGGINS CK	MAINSTEM	6.034	500-YEAR	1253.00	651.79	659.72		659.89	0.000116	4.21	756.77	171.13	0.28
HIGGINS CK	MAINSTEM	6.033	500-YEAR	1253.00	651.61	659.78		659.86	0.000061	3.13	969.57	172.00	0.21
HIGGINS CK	MAINSTEM	6.032	500-YEAR	1253.00	647.83	659.62		659.84	0.000045	1.61	1190.79	172.00	0.09
HIGGINS CK	MAINSTEM	6.021	500-YEAR	1258.00	649.42	659.72		659.83	0.000238	2.90	590.41	131.83	0.18
HIGGINS CK	MAINSTEM	6.006	500-YEAR	1258.00	648.55	659.72		659.81	0.000225	2.57	745.41	274.74	0.15
HIGGINS CK	MAINSTEM	5.9994*	500-YEAR	1258.00	648.38	659.71		659.80	0.000202	2.49	754.70	272.61	0.15
HIGGINS CK	MAINSTEM	5.9950	500-YEAR	1258.00	648.21	659.71	652.64	659.79	0.000175	2.37	828.18	476.29	0.14
HIGGINS CK	MAINSTEM	5.9928*	500-YEAR	1258.00	648.21	659.71	652.64	659.79	0.000176	2.37	827.53	476.16	0.14
HIGGINS CK	MAINSTEM	5.981											
HIGGINS CK	MAINSTEM	5.973	500-YEAR	1258.00	647.71	659.69	651.85	659.70	0.000043	1.23	1925.49	651.50	0.07
HIGGINS CK	MAINSTEM	5.972	500-YEAR	1930.00	647.90	659.66	653.71	659.70	0.000125	1.98	1874.26	647.87	0.12
HIGGINS CK	MAINSTEM	5.959	500-YEAR	1930.00	647.58	659.62		659.68	0.000172	2.45	1552.39	656.99	0.14
HIGGINS CK	MAINSTEM	5.950	500-YEAR	1930.00	647.42	659.59		659.67	0.000206	2.65	1456.93	698.40	0.15
HIGGINS CK	MAINSTEM	5.914	500-YEAR	1930.00	647.31	659.44	653.32	659.61	0.000363	3.47	864.84	530.30	0.20
HIGGINS CK	MAINSTEM	5.911											
HIGGINS CK	MAINSTEM	5.899	500-YEAR	1930.00	647.30	658.50	653.85	658.90	0.000854	5.22	536.11	321.72	0.31
HIGGINS CK	MAINSTEM	5.86375*	500-YEAR	1930.00	647.10	658.46		658.69	0.000545	4.01	654.59	166.76	0.24
HIGGINS CK	MAINSTEM	5.8285*	500-YEAR	1930.00	646.90	658.37		658.58	0.000516	3.91	725.64	225.93	0.23
HIGGINS CK	MAINSTEM	5.79325*	500-YEAR	1930.00	646.70	658.28		658.48	0.000500	3.85	780.85	288.02	0.23
HIGGINS CK	MAINSTEM	5.758	500-YEAR	1930.00	646.50	658.19	652.70	658.39	0.000496	3.84	832.10	390.47	0.23
HIGGINS CK	MAINSTEM	5.721											
HIGGINS CK	MAINSTEM	5.683	500-YEAR	1930.00	646.23	656.96	652.15	657.14	0.000572	3.55	803.76	477.30	0.24
HIGGINS CK	MAINSTEM	5.650	500-YEAR	1930.00	646.10	656.81		657.03	0.000589	3.94	686.79	307.77	0.25
HIGGINS CK	MAINSTEM	5.649	500-YEAR	1930.00	646.50	656.80		657.03	0.000612	3.92	670.78	305.41	0.25
HIGGINS CK	MAINSTEM	5.593	500-YEAR	1930.00	645.87	656.66	651.39	656.86	0.000512	3.76	756.30	324.59	0.23
HIGGINS CK	MAINSTEM	5.558	500-YEAR	2270.00	646.30	656.46	651.74	656.73	0.000730	4.35	701.91	287.00	0.27
HIGGINS CK	MAINSTEM	5.500	500-YEAR	2270.00	645.54	656.14	651.67	656.48	0.000900	4.84	599.94	183.39	0.30
HIGGINS CK	MAINSTEM	5.496	500-YEAR	2270.00	645.80	656.11	651.88	656.46	0.000972	4.92	604.19	197.78	0.31
HIGGINS CK	MAINSTEM	5.409	500-YEAR	2270.00	645.02	655.83	651.16	656.06	0.000667	4.21	744.16	163.54	0.26
HIGGINS CK	MAINSTEM	5.408	500-YEAR	2270.00	645.30	655.82	651.31	656.05	0.000708	4.24	739.17	173.37	0.27
HIGGINS CK	MAINSTEM	5.394	500-YEAR	2270.00	645.30	655.82		655.98	0.000377	3.29	715.01	103.64	0.20
HIGGINS CK	MAINSTEM	5.378	500-YEAR	2270.00	645.30	655.79	650.01	655.95	0.000376	3.21	737.46	151.62	0.20
HIGGINS CK	MAINSTEM	5.377	500-YEAR	2270.00	644.79	655.75	649.68	655.94	0.000441	3.42	665.96	91.06	0.21
HIGGINS CK	MAINSTEM	5.364											
HIGGINS CK	MAINSTEM	5.352	500-YEAR	2270.00	645.03	655.49	649.84	655.69	0.001454	3.58	637.48	94.20	0.23
HIGGINS CK	MAINSTEM	5.351	500-YEAR	2270.00	645.30	655.50	649.92	655.67	0.001230	3.36	676.46	1644.31	0.21
HIGGINS CK	MAINSTEM	5.340	500-YEAR	2270.00	645.30	655.46	649.54	655.59	0.000931	2.98	849.75	1581.74	0.19
HIGGINS CK	MAINSTEM	5.335	500-YEAR	2270.00	645.30	655.43	649.53	655.56	0.000931	2.97	860.53	1521.91	0.19
HIGGINS CK	MAINSTEM	5.324	500-YEAR	2270.00	645.28	655.37		655.52	0.000385	3.28	821.41	664.50	0.20
HIGGINS CK	MAINSTEM	5.269	500-YEAR	2270.00	645.20	655.34		655.45	0.000276	2.81	937.66	544.84	0.17
HIGGINS CK	MAINSTEM	5.256	500-YEAR	2270.00	645.11	655.24		655.39	0.000412	3.18	771.65	475.02	0.21
HIGGINS CK	MAINSTEM	5.238	500-YEAR	2270.00	645.20	655.17		655.34	0.000443	3.38	722.06	145.77	0.22
HIGGINS CK	MAINSTEM	5.184	500-YEAR	2270.00	644.50	655.14		655.23	0.000263	2.61	1120.12	376.45	0.17
HIGGINS CK	MAINSTEM	5.166	500-YEAR	2270.00	644.48	655.13		655.20	0.000218	2.39	1272.30	446.36	0.15
HIGGINS CK	MAINSTEM	5.144	500-YEAR	2270.00	644.40	655.11		655.17	0.000202	2.29	1368.21	508.27	0.15
HIGGINS CK	MAINSTEM	5.094	500-YEAR	2270.00	643.10	655.08		655.12	0.000134	1.98	1698.65	689.76	0.12
HIGGINS CK	MAINSTEM	5.049	500-YEAR	2270.00	643.43	655.05		655.09	0.000116	1.94	1893.15	790.80	0.11
HIGGINS CK	MAINSTEM	5.045	500-YEAR	2000.00	643.80	655.05		655.09	0.000101	1.77	1831.65	790.82	0.11
HIGGINS CK	MAINSTEM	5.020	500-YEAR	2000.00	643.80	655.04	648.05						

HEC-RAS Plan: Permit EXHigg 88 Profile: 500-YEAR (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	5.012		Culvert									
HIGGINS CK	MAINSTEM	5.005	500-YEAR	2000.00	643.80	655.05	647.68	655.07	0.000045	1.21	2754.29	1242.50	0.07
HIGGINS CK	MAINSTEM	4.992	500-YEAR	2000.00	643.80	655.04		655.06	0.000055	1.34	2396.09	1063.50	0.08
HIGGINS CK	MAINSTEM	4.980	500-YEAR	2000.00	643.55	655.03		655.06	0.000089	1.62	2185.36	1118.36	0.10
HIGGINS CK	MAINSTEM	4.966	500-YEAR	2140.00	643.40	655.02		655.05	0.000100	1.70	2338.56	1324.10	0.10
HIGGINS CK	MAINSTEM	4.944	500-YEAR	2140.00	642.80	655.02		655.04	0.000075	1.59	2721.81	1476.82	0.09
HIGGINS CK	MAINSTEM	4.928	500-YEAR	2140.00	642.48	655.00		655.03	0.000100	1.74	2358.26	1416.01	0.10
HIGGINS CK	MAINSTEM	4.925	500-YEAR	2140.00	643.00	655.00		655.03	0.000083	1.58	2543.61	1532.33	0.09
HIGGINS CK	MAINSTEM	4.915	500-YEAR	2140.00	643.00	655.00		655.02	0.000089	1.62	3351.36	1439.98	0.09
HIGGINS CK	MAINSTEM	4.895	500-YEAR	2140.00	642.90	654.99		655.01	0.000080	1.61	3411.91	1309.31	0.09
HIGGINS CK	MAINSTEM	4.866	500-YEAR	2140.00	642.40	654.98		655.00	0.000088	1.70	3320.26	1343.36	0.09
HIGGINS CK	MAINSTEM	4.847	500-YEAR	2140.00	642.00	654.97		654.99	0.000088	1.55	3188.56	1328.54	0.09
HIGGINS CK	MAINSTEM	4.828	500-YEAR	2140.00	641.90	654.96		654.98	0.000076	1.55	3313.37	1362.73	0.08
HIGGINS CK	MAINSTEM	4.801	500-YEAR	2140.00	642.50	654.94		654.97	0.000092	1.69	3126.31	1373.78	0.09
HIGGINS CK	MAINSTEM	4.783	500-YEAR	2140.00	642.00	654.93		654.96	0.000093	1.73	2980.15	1354.89	0.09
HIGGINS CK	MAINSTEM	4.774	500-YEAR	2140.00	642.50	654.93		654.95	0.000100	1.77	2883.22	1320.10	0.10
HIGGINS CK	MAINSTEM	4.771	500-YEAR	2140.00	642.05	654.92		654.95	0.000104	1.86	2757.66	1305.23	0.10
HIGGINS CK	MAINSTEM	4.760	500-YEAR	2140.00	641.50	654.91		654.95	0.000112	1.92	2604.25	1134.12	0.10
HIGGINS CK	MAINSTEM	4.742	500-YEAR	2140.00	642.22	654.90		654.94	0.000105	1.83	2659.96	1159.13	0.10
HIGGINS CK	MAINSTEM	4.713	500-YEAR	2140.00	642.40	654.89		654.92	0.000102	1.78	2874.38	1273.89	0.10
HIGGINS CK	MAINSTEM	4.696	500-YEAR	2140.00	642.20	654.89		654.91	0.000089	1.44	3019.14	1321.86	0.08
HIGGINS CK	MAINSTEM	4.694	500-YEAR	2140.00	641.46	654.87		654.91	0.000112	2.06	2888.62	1333.71	0.10
HIGGINS CK	MAINSTEM	4.683	500-YEAR	600.00	639.90	654.89	642.91	654.89	0.000008	0.50	2604.22	1272.57	0.03
HIGGINS CK	MAINSTEM	4.678	500-YEAR	600.00	639.90	654.89	642.99	654.89	0.000011	0.56	2141.56	1277.74	0.03
HIGGINS CK	MAINSTEM	4.673		Culvert									
HIGGINS CK	MAINSTEM	4.668	500-YEAR	600.00	640.20	654.89	643.30	654.89	0.000014	0.64	1744.95	819.74	0.04
HIGGINS CK	MAINSTEM	4.664	500-YEAR	1600.00	640.20	654.84	645.24	654.88	0.000106	1.74	1707.77	819.63	0.10
HIGGINS CK	MAINSTEM	4.659	500-YEAR	1600.00	638.42	654.85	642.55	654.87	0.000046	1.30	2332.45	819.65	0.06
HIGGINS CK	MAINSTEM	4.639	500-YEAR	1600.00	640.20	654.82	645.18	654.86	0.000106	1.74	1635.06	669.50	0.10
HIGGINS CK	MAINSTEM	4.638	500-YEAR	1600.00	640.80	654.80	645.13	654.85	0.000099	1.92	1410.48	665.72	0.10
HIGGINS CK	MAINSTEM	4.626		Culvert									
HIGGINS CK	MAINSTEM	4.612	500-YEAR	1600.00	641.80	653.44	646.48	653.55	0.000353	2.74	741.89	187.58	0.17
HIGGINS CK	MAINSTEM	4.611	500-YEAR	1600.00	642.03	653.46	646.05	653.53	0.000197	2.17	878.22	179.58	0.13
HIGGINS CK	MAINSTEM	4.588	500-YEAR	1666.00	641.80	653.40		653.49	0.000282	2.46	732.88	140.03	0.15
HIGGINS CK	MAINSTEM	4.569	500-YEAR	1666.00	638.78	653.42		653.47	0.000101	2.07	1044.68	165.64	0.10
HIGGINS CK	MAINSTEM	4.542	500-YEAR	1666.00	639.10	653.41		653.45	0.000079	1.94	1154.17	193.84	0.09
HIGGINS CK	MAINSTEM	4.537	500-YEAR	1666.00	639.10	653.37	643.49	653.44	0.000126	2.46	904.72	223.46	0.11
HIGGINS CK	MAINSTEM	4.521		Culvert									
HIGGINS CK	MAINSTEM	4.505	500-YEAR	1666.00	637.50	649.55	641.88	649.62	0.000156	2.44	894.56	417.36	0.12
HIGGINS CK	MAINSTEM	4.485	500-YEAR	1666.00	637.50	649.57	639.50	649.56	0.000035	0.96	1772.54	258.22	0.06

**MODIFIED EXISTING CONDITION
DESIGN MODEL INPUT CHANGES
FROM PERMIT MODEL**

EXISTING CONDITIONS

(DESIGN)

HigginsCreek-Des.rep

MANNING'S N-VALUES

HEC-RAS Version 4.0.0 March 2008
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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PROJECT DATA
Project Title: Higgins Creek Design & Permit Models
Project File : HigginsCreek-Des.prj
Run Date and Time: 5/11/2012 3:36:00 PM

Project in English units

Project Description:
EOWB Higgins Creek and Higgins Creek Trib. A CBBEL 05/2012
Proposed

Willow-Higgins Creek, Willow Creek, Higgins Creek, Cook County,
Illinois
Existing and Proposed Conditions OMP with As-Built Flood Control
Reservoir Conditions
10-, 50-, 100-, 500-, and 100-Year Floodway Storm
Event Flood Profiles
Christopher B. Burke Engineering, Ltd. 01/06

Updated for Final Willow Creek Relocation Alignment - OMP Project
Competition Phase for proposed conditions (short feeder culverts with open
channels through future western bypass area) - by HNTB/APS Consulting, Inc.
03/2010.

SUMMARY OF MANNING'S N VALUES

River:HIGGINS CK

Table with 7 columns: Reach, River Sta., n1, n2, n3, n4, n5. Rows list reach names like MAINSTEM and specific river station numbers with corresponding Manning's N values.

HigginsCreek-Des.rep

MAINSTEM	5.86375*	.045	.015	.045		
MAINSTEM	5.8285*	.045	.015	.045		
MAINSTEM	5.79325*	.045	.015	.045		
MAINSTEM	5.758	.045	.015	.045		
MAINSTEM	5.721					
MAINSTEM	5.683	Culvert	.045	.015	.045	
MAINSTEM	5.650		.045	.015	.045	
MAINSTEM	5.649		.045	.015	.045	
MAINSTEM	5.593		.045	.015	.045	
MAINSTEM	5.558		.045	.015	.045	
MAINSTEM	5.500		.045	.015	.045	
MAINSTEM	5.496		.05	.015	.05	
MAINSTEM	5.409		.06	.015	.06	
MAINSTEM	5.408		.06	.015	.06	
MAINSTEM	5.394		.06	.035	.06	
MAINSTEM	5.378		.06	.045	.06	
MAINSTEM	5.377		.06	.045	.06	
MAINSTEM	5.364	Bridge				
MAINSTEM	5.352		.06	.035	.06	
MAINSTEM	5.351		.06	.035	.06	
MAINSTEM	5.340		.06	.035	.06	
MAINSTEM	5.335		.06	.035	.06	
MAINSTEM	5.324		.05	.025	.05	
MAINSTEM	5.289		.05	.025	.05	
MAINSTEM	5.256		.05	.025	.05	
MAINSTEM	5.236		.05	.025	.05	
MAINSTEM	5.184		.05	.025	.05	.02
MAINSTEM	5.166		.05	.025	.05	.02
MAINSTEM	5.144		.05	.025	.05	.02
MAINSTEM	5.094		.05	.025	.05	.02
MAINSTEM	5.049		.05	.025	.05	.02
MAINSTEM	5.045		.05	.025	.05	.02
MAINSTEM	5.020		.05	.025	.05	.02
MAINSTEM	5.012	Culvert				
MAINSTEM	5.005		.03	.05	.025	.05
MAINSTEM	4.992		.05	.025	.05	.02
MAINSTEM	4.980		.03	.05	.025	.05
MAINSTEM	4.966		.02	.05	.025	.05
MAINSTEM	4.944		.02	.05	.025	.05
MAINSTEM	4.928		.05	.02	.035	.05
MAINSTEM	4.925		.05	.02	.035	.05
MAINSTEM	4.915		.02	.065	.04	.065
MAINSTEM	4.885		.02	.065	.04	.065
MAINSTEM	4.866		.02	.065	.04	.065
MAINSTEM	4.847		.02	.065	.04	.065
MAINSTEM	4.828		.02	.065	.04	.065
MAINSTEM	4.801		.02	.065	.04	.065
MAINSTEM	4.783		.02	.065	.04	.065
MAINSTEM	4.774		.02	.065	.04	.065
MAINSTEM	4.771		.02	.065	.04	.065
MAINSTEM	4.760		.02	.065	.04	.065
MAINSTEM	4.742		.02	.065	.04	.065
MAINSTEM	4.713		.02	.065	.04	.065
MAINSTEM	4.698		.02	.065	.04	.065
MAINSTEM	4.694		.02	.065	.04	.065
MAINSTEM	4.683		.02	.065	.04	.065
MAINSTEM	4.678		.02	.065	.04	.065
MAINSTEM	4.673	Culvert				
MAINSTEM	4.668		.065	.04	.065	
MAINSTEM	4.664		.065	.04	.065	
MAINSTEM	4.659		.065	.04	.065	
MAINSTEM	4.639		.065	.04	.065	
MAINSTEM	4.638		.065	.04	.065	
MAINSTEM	4.626	Culvert				
MAINSTEM	4.612		.04	.033	.04	
MAINSTEM	4.611		.04	.033	.04	
MAINSTEM	4.588		.04	.033	.04	
MAINSTEM	4.569		.04	.033	.04	
MAINSTEM	4.542		.04	.033	.04	
MAINSTEM	4.537		.04	.033	.04	
MAINSTEM	4.521	Culvert				
MAINSTEM	4.505		.04	.033	.04	
MAINSTEM	4.485		.04	.033	.04	

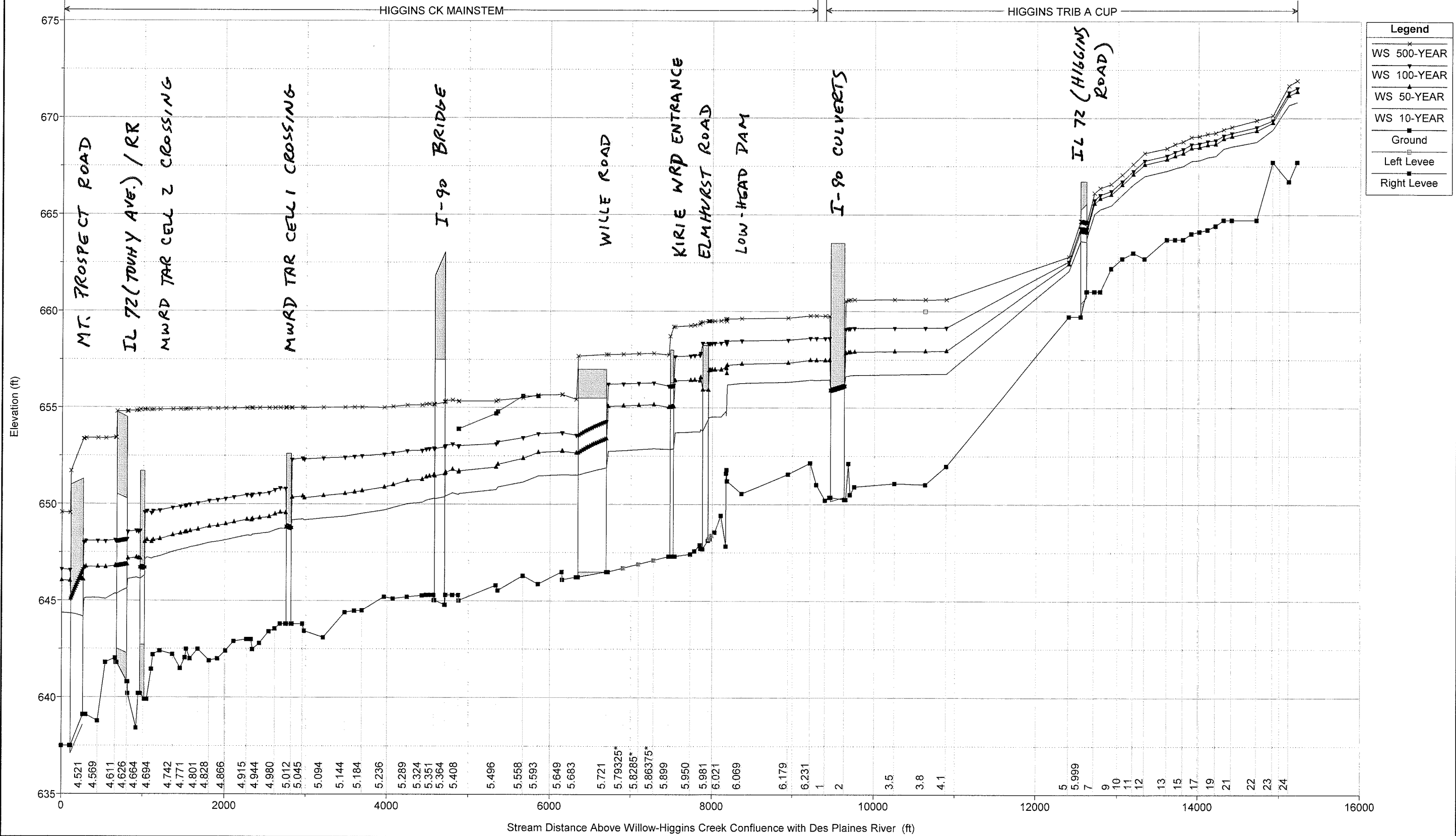
River:HIGGINS TRIB A

Reach River Sta. n1 n2 n3

HigginsCreek-Des.rep				
CUP	25	.055	.035	.035
CUP	24	.055	.035	.055
CUP	23	.055	.035	.055
CUP	22	.055	.035	.055
CUP	21	.055	.035	.055
CUP	20	.055	.035	.055
CUP	19	.055	.035	.055
CUP	18	.04	.04	.055
CUP	17	.055	.035	.035
CUP	16	.055	.035	.035
CUP	15	.055	.035	.055
CUP	14	.055	.035	.055
CUP	13	.04	.035	.035
CUP	12	.04	.035	.04
CUP	11	.04	.035	.04
CUP	10	.04	.035	.04
CUP	9	.04	.035	.04
CUP	8	.035	.042	.04
CUP	7	.04	.04	.04
CUP	6.001	.04	.04	.04
CUP	6	Culvert		
CUP	5.999	.04	.045	.04
CUP	5	.04	.045	.04
CUP	4.1	.045	.035	.045
CUP	3.8	.04	.035	.04
CUP	3.5	.04	.035	.04
CUP	3.1	.04	.035	.04
CUP	3.01	.04	.04	.04
CUP	3	.04	.04	.04
CUP	2.3	.04	.035	.04
CUP	2	Culvert		
CUP	1.7	.05	.05	.05
CUP	1	.05	.05	.05

MODIFIED EXISTING CONDITION

DESIGN MODEL RESULTS



DESIGN
 MODIFIED EXISTING PROFILES

DESIGN - EXISTING CONDITIONS

HEC-RAS Plan: Design EX-Higg 88 Profile: 10-YEAR

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	25	10-YEAR	222.00	667.72	670.82		670.95	0.001495	2.99	79.46	48.42	0.33
HIGGINS TRIB A	CUP	24	10-YEAR	222.00	666.72	670.67		670.81	0.001422	2.97	74.63	27.78	0.32
HIGGINS TRIB A	CUP	23	10-YEAR	222.00	667.72	669.39	669.39	670.07	0.016922	6.60	33.62	25.18	1.01
HIGGINS TRIB A	CUP	22	10-YEAR	222.00	664.72	668.77		668.82	0.000377	1.78	124.59	36.48	0.17
HIGGINS TRIB A	CUP	21	10-YEAR	222.00	664.72	668.53		668.63	0.001193	2.61	85.12	34.74	0.29
HIGGINS TRIB A	CUP	20	10-YEAR	222.00	664.72	668.41		668.51	0.001283	2.55	87.20	39.33	0.30
HIGGINS TRIB A	CUP	19	10-YEAR	222.00	664.42	668.03		668.27	0.004462	3.98	57.94	48.86	0.54
HIGGINS TRIB A	CUP	18	10-YEAR	222.00	664.22	667.97		668.02	0.001081	1.95	115.11	65.60	0.24
HIGGINS TRIB A	CUP	17	10-YEAR	222.00	664.12	667.82		667.91	0.001073	2.76	97.73	52.60	0.28
HIGGINS TRIB A	CUP	16	10-YEAR	222.00	664.02	667.77		667.83	0.000537	1.84	123.12	54.33	0.20
HIGGINS TRIB A	CUP	15	10-YEAR	222.00	663.72	667.52		667.71	0.002438	3.56	62.39	26.88	0.41
HIGGINS TRIB A	CUP	14	10-YEAR	222.00	663.72	667.40		667.52	0.001264	2.73	81.44	32.25	0.30
HIGGINS TRIB A	CUP	13	10-YEAR	222.00	663.72	667.27		667.38	0.001391	2.75	80.86	34.06	0.31
HIGGINS TRIB A	CUP	12	10-YEAR	224.00	667.72	667.00		667.07	0.000868	2.16	103.62	43.48	0.25
HIGGINS TRIB A	CUP	11	10-YEAR	224.00	663.02	666.55		666.83	0.003496	4.22	53.10	22.97	0.49
HIGGINS TRIB A	CUP	10	10-YEAR	224.00	662.72	666.03		666.31	0.003963	4.25	52.75	25.19	0.52
HIGGINS TRIB A	CUP	9	10-YEAR	224.00	662.22	665.48		665.75	0.004112	4.15	54.02	27.71	0.52
HIGGINS TRIB A	CUP	8	10-YEAR	224.00	661.02	665.28		665.37	0.001464	2.48	90.47	35.12	0.27
HIGGINS TRIB A	CUP	7	10-YEAR	224.00	661.02	665.03		665.22	0.003520	3.45	64.99	32.01	0.43
HIGGINS TRIB A	CUP	6.001	10-YEAR	224.00	661.02	663.78	663.78	664.51	0.021409	6.88	32.58	22.30	1.00
HIGGINS TRIB A	CUP	6	Culvert										
HIGGINS TRIB A	CUP	5.999	10-YEAR	224.00	659.72	663.63	662.11	663.80	0.002443	3.31	67.66	32.13	0.34
HIGGINS TRIB A	CUP	5	10-YEAR	224.00	659.72	662.08	662.08	662.78	0.027950	6.69	33.46	24.34	1.01
HIGGINS TRIB A	CUP	4.1	10-YEAR	224.00	651.98	656.77		656.81	0.000475	1.95	172.82	155.99	0.19
HIGGINS TRIB A	CUP	3.8	10-YEAR	224.00	651.03	656.75	653.12	656.76	0.000071	0.94	352.72	194.83	0.08
HIGGINS TRIB A	CUP	3.5	10-YEAR	224.00	651.09	656.73		656.74	0.000059	0.90	366.01	152.97	0.07
HIGGINS TRIB A	CUP	3.1	10-YEAR	224.00	650.91	656.69		656.70	0.000068	0.97	310.58	112.58	0.08
HIGGINS TRIB A	CUP	3.01	10-YEAR	294.00	650.50	656.67		656.70	0.000194	1.43	278.40	111.28	0.11
HIGGINS TRIB A	CUP	3	10-YEAR	294.00	652.12	656.65	654.55	656.69	0.000457	1.59	194.12	95.00	0.17
HIGGINS TRIB A	CUP	2.3	10-YEAR	294.00	650.25	656.64	652.15	656.68	0.000160	1.63	184.67	73.84	0.12
HIGGINS TRIB A	CUP	2	Culvert										
HIGGINS TRIB A	CUP	1.7	10-YEAR	294.00	650.37	656.46	652.65	656.53	0.000612	2.19	134.51	72.90	0.17
HIGGINS TRIB A	CUP	1	10-YEAR	294.00	650.22	656.44	653.02	656.49	0.000588	1.96	163.05	500.31	0.16
HIGGINS CK	MAINSTEM	6.245	10-YEAR	562.00	651.02	656.43		656.47	0.000081	1.77	632.67	230.31	0.15
HIGGINS CK	MAINSTEM	6.231	10-YEAR	562.00	652.14	656.44		656.46	0.000037	1.10	520.51	156.48	0.10
HIGGINS CK	MAINSTEM	6.179	10-YEAR	562.00	651.56	656.33		656.43	0.000228	2.58	217.47	59.73	0.24
HIGGINS CK	MAINSTEM	6.069	10-YEAR	562.00	650.55	656.27		656.33	0.000112	1.97	285.10	68.24	0.17
HIGGINS CK	MAINSTEM	6.035	10-YEAR	562.00	651.21	656.19		656.30	0.000240	2.73	242.51	111.44	0.25
HIGGINS CK	MAINSTEM	6.034	10-YEAR	562.00	651.79	655.25	655.25	656.21	0.001816	8.25	102.05	72.89	0.94
HIGGINS CK	MAINSTEM	6.033	10-YEAR	562.00	651.61	654.60	654.60	655.25	0.002069	7.44	150.70	128.39	0.97
HIGGINS CK	MAINSTEM	6.032	10-YEAR	562.00	647.83	654.82		654.87	0.000153	1.94	394.22	140.55	0.15
HIGGINS CK	MAINSTEM	6.021	10-YEAR	564.00	649.42	654.54		654.83	0.001386	4.34	131.74	41.26	0.39
HIGGINS CK	MAINSTEM	6.006	10-YEAR	564.00	648.55	654.54		654.70	0.000907	3.18	180.29	53.21	0.27
HIGGINS CK	MAINSTEM	5.9994*	10-YEAR	564.00	648.38	654.52		654.66	0.000761	2.96	195.72	52.10	0.25
HIGGINS CK	MAINSTEM	5.9950	10-YEAR	564.00	648.21	654.51	651.05	654.63	0.000645	2.76	204.30	47.01	0.23

HEC-RAS Plan: Design EXHigg 88 Profile: 10-YEAR (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Cntl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Ctl
HIGGINS CK	MAINSTEM	5.9928*	10-YEAR	584.00	648.21	654.51	651.05	654.62	0.000617	2.77	203.36	46.97	0.23
HIGGINS CK	MAINSTEM	5.981	10-YEAR	Bridge									
HIGGINS CK	MAINSTEM	5.973	10-YEAR	584.00	647.71	653.88	650.47	654.01	0.000094	2.86	197.00	52.55	0.22
HIGGINS CK	MAINSTEM	5.972	10-YEAR	645.00	647.90	653.75	651.47	653.98	0.000236	3.80	169.92	46.17	0.33
HIGGINS CK	MAINSTEM	5.959	10-YEAR	645.00	647.58	653.77	653.77	653.93	0.000187	3.27	197.40	50.17	0.29
HIGGINS CK	MAINSTEM	5.950	10-YEAR	645.00	647.42	653.74	653.74	653.92	0.000205	3.41	189.07	48.03	0.30
HIGGINS CK	MAINSTEM	5.914	10-YEAR	645.00	647.31	653.71	650.92	653.88	0.000189	3.30	195.46	49.34	0.29
HIGGINS CK	MAINSTEM	5.911	Culvert										
HIGGINS CK	MAINSTEM	5.899	10-YEAR	645.00	647.30	652.85	650.97	653.31	0.000423	5.46	118.22	43.14	0.45
HIGGINS CK	MAINSTEM	5.86375*	10-YEAR	645.00	647.10	652.88	653.14	653.14	0.000333	4.11	157.08	43.48	0.38
HIGGINS CK	MAINSTEM	5.8285*	10-YEAR	645.00	646.90	652.83	653.07	653.07	0.000300	3.98	162.09	43.42	0.36
HIGGINS CK	MAINSTEM	5.79325*	10-YEAR	645.00	646.70	652.78	653.01	653.01	0.000270	3.85	167.42	43.38	0.35
HIGGINS CK	MAINSTEM	5.758	10-YEAR	645.00	646.50	652.74	650.19	652.96	0.000243	3.73	173.10	43.38	0.33
HIGGINS CK	MAINSTEM	5.721	Culvert										
HIGGINS CK	MAINSTEM	5.683	10-YEAR	645.00	646.23	651.51	649.46	651.89	0.000341	4.90	131.50	46.55	0.41
HIGGINS CK	MAINSTEM	5.650	10-YEAR	645.00	646.10	651.52	651.52	651.77	0.000308	3.95	163.18	45.42	0.37
HIGGINS CK	MAINSTEM	5.649	10-YEAR	645.00	646.50	651.52	651.52	651.76	0.000334	3.96	162.90	48.01	0.38
HIGGINS CK	MAINSTEM	5.593	10-YEAR	645.00	645.87	651.47	649.07	651.67	0.000236	3.58	180.07	47.39	0.32
HIGGINS CK	MAINSTEM	5.558	10-YEAR	907.00	646.30	651.15	649.69	651.57	0.000577	5.24	173.02	50.32	0.50
HIGGINS CK	MAINSTEM	5.500	10-YEAR	907.00	645.54	650.89	649.36	651.38	0.000619	5.64	160.94	44.10	0.52
HIGGINS CK	MAINSTEM	5.496	10-YEAR	907.00	645.80	650.75	649.63	651.36	0.000843	6.24	145.36	43.12	0.60
HIGGINS CK	MAINSTEM	5.409	10-YEAR	907.00	645.02	650.55	648.94	651.00	0.000555	5.42	167.45	44.89	0.49
HIGGINS CK	MAINSTEM	5.408	10-YEAR	907.00	645.30	650.49	649.07	650.99	0.000644	5.68	159.68	44.59	0.53
HIGGINS CK	MAINSTEM	5.394	10-YEAR	907.00	645.30	650.58	650.58	650.78	0.001235	3.51	258.29	70.09	0.32
HIGGINS CK	MAINSTEM	5.378	10-YEAR	907.00	645.30	650.42	648.17	650.63	0.002320	3.67	248.86	68.89	0.34
HIGGINS CK	MAINSTEM	5.377	10-YEAR	907.00	644.79	650.42	647.82	650.61	0.001798	3.49	259.82	63.88	0.31
HIGGINS CK	MAINSTEM	5.364	Bridge										
HIGGINS CK	MAINSTEM	5.352	10-YEAR	907.00	645.03	650.30	648.03	650.52	0.001366	3.75	241.56	63.60	0.34
HIGGINS CK	MAINSTEM	5.351	10-YEAR	907.00	645.30	650.30	648.12	650.50	0.001413	3.59	252.52	73.37	0.34
HIGGINS CK	MAINSTEM	5.340	10-YEAR	907.00	645.30	650.24	647.81	650.42	0.001097	3.37	269.38	71.33	0.31
HIGGINS CK	MAINSTEM	5.335	10-YEAR	907.00	645.30	650.20	647.82	650.38	0.001136	3.41	266.17	71.06	0.31
HIGGINS CK	MAINSTEM	5.324	10-YEAR	907.00	645.28	650.09	645.28	650.33	0.000811	3.90	232.77	82.20	0.36
HIGGINS CK	MAINSTEM	5.289	10-YEAR	907.00	645.20	650.01	650.01	650.18	0.000568	3.29	275.78	76.84	0.31
HIGGINS CK	MAINSTEM	5.256	10-YEAR	907.00	645.11	649.82	650.06	650.06	0.000807	3.89	233.36	65.48	0.36
HIGGINS CK	MAINSTEM	5.236	10-YEAR	907.00	645.20	649.69	649.96	649.96	0.000988	4.14	219.20	65.27	0.40
HIGGINS CK	MAINSTEM	5.184	10-YEAR	907.00	644.50	649.51	649.51	649.72	0.000686	3.69	245.94	66.00	0.34
HIGGINS CK	MAINSTEM	5.166	10-YEAR	907.00	644.48	649.45	649.45	649.66	0.000668	3.65	248.67	66.44	0.33
HIGGINS CK	MAINSTEM	5.144	10-YEAR	907.00	644.40	649.37	649.37	649.58	0.000684	3.68	246.48	66.17	0.34
HIGGINS CK	MAINSTEM	5.094	10-YEAR	907.00	643.10	649.27	649.42	649.42	0.000421	3.09	293.42	71.25	0.27
HIGGINS CK	MAINSTEM	5.049	10-YEAR	907.00	643.43	649.17	649.32	649.32	0.000402	3.08	294.91	69.45	0.26
HIGGINS CK	MAINSTEM	5.045	10-YEAR	571.00	643.80	649.22	649.29	649.29	0.000201	2.11	271.09	67.07	0.18
HIGGINS CK	MAINSTEM	5.020	10-YEAR	571.00	643.80	649.17	645.94	649.26	0.000203	2.41	236.97	66.80	0.19
HIGGINS CK	MAINSTEM	5.012	Culvert										
HIGGINS CK	MAINSTEM	5.005	10-YEAR	571.00	643.80	648.72	645.55	648.82	0.000213	2.47	230.92	90.28	0.20
HIGGINS CK	MAINSTEM	4.992	10-YEAR	571.00	643.80	648.74	643.80	648.78	0.000114	1.58	360.78	90.38	0.14

HEC-RAS Plan: Design EX-Higg 88 Profile: 10-YEAR (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froutde # Chl
HIGGINS CK	MAINSTEM	4.980	10-YEAR	571.00	643.55	648.65		648.76	0.000347	2.62	218.27	58.55	0.24
HIGGINS CK	MAINSTEM	4.966	10-YEAR	700.00	643.40	648.52		648.72	0.000633	3.51	199.57	53.91	0.32
HIGGINS CK	MAINSTEM	4.944	10-YEAR	700.00	642.80	648.47		648.65	0.000537	3.39	206.25	51.26	0.30
HIGGINS CK	MAINSTEM	4.928	10-YEAR	700.00	642.48	648.42		648.58	0.000903	3.19	219.61	53.63	0.28
HIGGINS CK	MAINSTEM	4.925	10-YEAR	700.00	643.00	648.36		648.56	0.001229	3.56	196.68	51.37	0.32
HIGGINS CK	MAINSTEM	4.915	10-YEAR	700.00	643.00	648.37		648.48	0.000780	2.68	282.10	91.24	0.23
HIGGINS CK	MAINSTEM	4.885	10-YEAR	700.00	642.90	648.23		648.35	0.000815	2.80	269.08	84.75	0.23
HIGGINS CK	MAINSTEM	4.866	10-YEAR	700.00	642.40	648.14		648.27	0.000870	2.95	256.20	82.27	0.24
HIGGINS CK	MAINSTEM	4.847	10-YEAR	700.00	642.00	648.05		648.18	0.000838	2.89	258.87	83.43	0.24
HIGGINS CK	MAINSTEM	4.828	10-YEAR	700.00	641.90	648.00		648.10	0.000665	2.51	296.42	94.70	0.21
HIGGINS CK	MAINSTEM	4.801	10-YEAR	700.00	642.50	647.85		647.98	0.001005	2.97	250.02	87.82	0.28
HIGGINS CK	MAINSTEM	4.783	10-YEAR	700.00	642.00	647.76		647.89	0.000864	2.84	258.87	86.36	0.24
HIGGINS CK	MAINSTEM	4.774	10-YEAR	700.00	642.50	647.70		647.84	0.001115	3.07	240.72	87.12	0.27
HIGGINS CK	MAINSTEM	4.771	10-YEAR	700.00	642.05	647.69		647.82	0.000865	2.86	250.07	87.27	0.24
HIGGINS CK	MAINSTEM	4.760	10-YEAR	700.00	641.50	647.63		647.77	0.000924	3.01	244.27	79.70	0.25
HIGGINS CK	MAINSTEM	4.742	10-YEAR	700.00	642.22	647.53		647.67	0.001062	3.02	240.34	81.82	0.26
HIGGINS CK	MAINSTEM	4.713	10-YEAR	700.00	642.40	647.31		647.48	0.001426	3.33	215.31	74.63	0.30
HIGGINS CK	MAINSTEM	4.698	10-YEAR	700.00	642.20	647.22		647.36	0.001212	3.00	233.57	80.31	0.31
HIGGINS CK	MAINSTEM	4.694	10-YEAR	700.00	641.46	647.17		647.34	0.001049	3.36	226.69	67.24	0.27
HIGGINS CK	MAINSTEM	4.683	10-YEAR	424.00	639.90	647.23	642.36	647.27	0.000202	1.52	284.02	81.36	0.12
HIGGINS CK	MAINSTEM	4.678	10-YEAR	424.00	639.90	647.12	642.40	647.24	0.000426	2.76	153.44	71.71	0.18
HIGGINS CK	MAINSTEM	4.673	Culvert										
HIGGINS CK	MAINSTEM	4.668	10-YEAR	424.00	640.20	646.13	642.68	646.33	0.000909	3.62	117.28	51.36	0.26
HIGGINS CK	MAINSTEM	4.664	10-YEAR	444.00	640.20	646.16	642.63	646.28	0.000609	2.80	158.59	51.51	0.21
HIGGINS CK	MAINSTEM	4.659	10-YEAR	444.00	638.42	646.20	640.56	646.23	0.000108	1.42	312.20	57.64	0.09
HIGGINS CK	MAINSTEM	4.639	10-YEAR	444.00	640.20	646.11	642.65	646.19	0.000603	2.23	198.78	51.26	0.20
HIGGINS CK	MAINSTEM	4.638	10-YEAR	444.00	640.80	646.12	643.18	646.19	0.000518	2.13	208.17	62.57	0.18
HIGGINS CK	MAINSTEM	4.626	Culvert										
HIGGINS CK	MAINSTEM	4.612	10-YEAR	444.00	641.80	645.34	644.06	645.64	0.002367	4.39	101.11	39.27	0.45
HIGGINS CK	MAINSTEM	4.611	10-YEAR	444.00	642.03	645.37	643.99	645.57	0.001813	3.52	126.20	49.84	0.39
HIGGINS CK	MAINSTEM	4.588	10-YEAR	454.00	641.80	645.08		645.32	0.002223	3.88	117.00	46.28	0.43
HIGGINS CK	MAINSTEM	4.569	10-YEAR	454.00	638.78	645.15		645.21	0.000251	2.10	243.70	64.18	0.16
HIGGINS CK	MAINSTEM	4.542	10-YEAR	454.00	639.10	645.14		645.18	0.000135	1.74	311.83	68.33	0.12
HIGGINS CK	MAINSTEM	4.537	10-YEAR	454.00	639.10	645.08	640.95	645.17	0.000256	2.37	191.35	68.02	0.17
HIGGINS CK	MAINSTEM	4.521	Culvert										
HIGGINS CK	MAINSTEM	4.505	10-YEAR	454.00	637.50	644.33	639.34	644.40	0.000164	2.08	218.63	75.19	0.14
HIGGINS CK	MAINSTEM	4.485	10-YEAR	454.00	637.50	644.36	638.36	644.36	0.000014	0.53	855.23	150.34	0.04

HEC-RAS Plan: Design EXHgg 88 Profile: 50-YEAR

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel/Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	25	50-YEAR	308.00	667.72	671.35		671.51	0.001355	3.24	116.99	91.72	0.33
HIGGINS TRIB A	CUP	24	50-YEAR	308.00	666.72	671.17		671.35	0.001624	3.47	89.03	30.24	0.35
HIGGINS TRIB A	CUP	23	50-YEAR	308.00	667.72	669.75	669.75	670.55	0.015965	7.14	43.11	27.38	1.00
HIGGINS TRIB A	CUP	22	50-YEAR	308.00	664.72	669.34		669.41	0.000460	2.11	145.72	38.09	0.19
HIGGINS TRIB A	CUP	21	50-YEAR	308.00	664.72	669.05		669.18	0.001329	2.96	104.15	38.13	0.32
HIGGINS TRIB A	CUP	20	50-YEAR	308.00	664.72	668.92		669.05	0.001325	2.84	108.64	43.22	0.31
HIGGINS TRIB A	CUP	19	50-YEAR	308.00	664.42	668.64		668.85	0.003073	3.75	99.36	86.26	0.46
HIGGINS TRIB A	CUP	18	50-YEAR	308.00	664.22	668.60		668.66	0.000832	2.01	165.14	92.44	0.22
HIGGINS TRIB A	CUP	17	50-YEAR	308.00	664.12	668.47		668.57	0.000941	2.84	137.80	69.62	0.27
HIGGINS TRIB A	CUP	16	50-YEAR	308.00	664.02	668.43		668.49	0.000465	1.99	168.31	82.69	0.19
HIGGINS TRIB A	CUP	15	50-YEAR	308.00	663.72	668.17		668.39	0.002051	3.77	89.07	64.78	0.39
HIGGINS TRIB A	CUP	14	50-YEAR	308.00	663.72	668.03		668.17	0.001939	2.91	105.85	53.96	0.36
HIGGINS TRIB A	CUP	13	50-YEAR	308.00	663.72	667.86		668.00	0.001437	3.00	103.19	44.60	0.33
HIGGINS TRIB A	CUP	12	50-YEAR	310.00	662.72	667.59		667.67	0.000889	2.37	130.84	48.79	0.25
HIGGINS TRIB A	CUP	11	50-YEAR	310.00	663.02	667.08		667.42	0.003725	4.73	65.57	24.95	0.51
HIGGINS TRIB A	CUP	10	50-YEAR	310.00	662.72	666.54		666.89	0.003931	4.69	66.12	26.84	0.53
HIGGINS TRIB A	CUP	9	50-YEAR	310.00	662.22	666.04		666.34	0.003818	4.40	70.40	31.16	0.52
HIGGINS TRIB A	CUP	8	50-YEAR	310.00	661.02	665.83		665.95	0.001602	2.80	110.71	38.13	0.29
HIGGINS TRIB A	CUP	7	50-YEAR	310.00	661.02	665.58		665.78	0.003808	3.66	84.74	40.70	0.45
HIGGINS TRIB A	CUP	6.001	50-YEAR	310.00	661.02	664.15	664.15	665.04	0.020155	7.58	40.89	24.15	1.00
HIGGINS TRIB A	CUP	6		Culvert									
HIGGINS TRIB A	CUP	5.999	50-YEAR	310.00	659.72	664.15	662.48	664.38	0.002738	3.90	79.46	34.70	0.37
HIGGINS TRIB A	CUP	5	50-YEAR	310.00	659.72	662.43	662.43	663.27	0.026880	7.32	42.38	26.12	1.01
HIGGINS TRIB A	CUP	4.1	50-YEAR	310.00	651.98	657.94		657.96	0.000150	1.35	382.69	196.17	0.11
HIGGINS TRIB A	CUP	3.8	50-YEAR	310.00	651.03	657.93	653.42	657.94	0.000036	0.78	591.86	208.78	0.06
HIGGINS TRIB A	CUP	3.5	50-YEAR	310.00	651.09	657.92		657.93	0.000035	0.80	554.35	162.81	0.06
HIGGINS TRIB A	CUP	3.1	50-YEAR	310.00	650.91	657.90		657.91	0.000046	0.93	452.06	122.52	0.07
HIGGINS TRIB A	CUP	3.01	50-YEAR	407.00	650.50	657.88		657.90	0.000118	1.29	420.46	123.61	0.09
HIGGINS TRIB A	CUP	3	50-YEAR	407.00	652.12	657.86	654.85	657.89	0.000242	1.46	293.41	109.19	0.13
HIGGINS TRIB A	CUP	2.3	50-YEAR	407.00	650.25	657.83	652.54	657.88	0.000160	1.84	226.42	86.95	0.12
HIGGINS TRIB A	CUP	2		Culvert									
HIGGINS TRIB A	CUP	1.7	50-YEAR	407.00	650.37	657.46	653.07	657.57	0.000663	2.55	159.63	83.77	0.18
HIGGINS TRIB A	CUP	1	50-YEAR	407.00	650.22	657.45	653.66	657.52	0.000534	2.12	206.65	500.50	0.16
HIGGINS CK	MAINSTEM	6.245	50-YEAR	810.00	651.02	657.45		657.50	0.000079	1.94	885.99	267.73	0.15
HIGGINS CK	MAINSTEM	6.231	50-YEAR	810.00	652.14	657.46		657.49	0.000035	1.26	698.30	201.03	0.10
HIGGINS CK	MAINSTEM	6.179	50-YEAR	810.00	651.56	657.32		657.46	0.000223	2.91	278.02	62.20	0.24
HIGGINS CK	MAINSTEM	6.069	50-YEAR	810.00	650.55	657.27		657.35	0.000117	2.28	359.34	84.71	0.18
HIGGINS CK	MAINSTEM	6.035	50-YEAR	810.00	651.21	657.20		657.32	0.000193	2.87	397.46	157.48	0.23
HIGGINS CK	MAINSTEM	6.034	50-YEAR	810.00	651.79	656.79		657.28	0.000549	6.32	278.81	154.99	0.56
HIGGINS CK	MAINSTEM	6.033	50-YEAR	810.00	651.61	657.04		657.17	0.000159	3.64	515.84	159.37	0.31
HIGGINS CK	MAINSTEM	6.032	50-YEAR	810.00	647.83	657.11		657.14	0.000068	1.63	740.60	159.69	0.10
HIGGINS CK	MAINSTEM	6.021	50-YEAR	810.00	649.42	656.97		657.12	0.000492	3.27	297.79	92.41	0.25
HIGGINS CK	MAINSTEM	6.006	50-YEAR	810.00	648.55	656.97		657.07	0.000390	2.64	359.74	85.45	0.19
HIGGINS CK	MAINSTEM	5.9994*	50-YEAR	810.00	648.38	656.96		657.05	0.000337	2.52	362.08	77.82	0.18
HIGGINS CK	MAINSTEM	5.9950	50-YEAR	810.00	648.21	656.95	651.68	657.04	0.000299	2.44	353.65	70.37	0.17

HEC-RAS Plan: Design EX-Higg 88 Profile: 50-YEAR (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	5.9928*	50-YEAR	810.00	648.21	656.93	651.66	657.04	0.000304	2.59	312.53	70.19	0.17
HIGGINS CK	MAINSTEM	5.981	Bridge										
HIGGINS CK	MAINSTEM	5.973	50-YEAR	810.00	647.71	656.57	651.00	656.69	0.000049	2.73	296.72	366.22	0.17
HIGGINS CK	MAINSTEM	5.972	50-YEAR	1100.00	647.90	656.41	652.42	656.65	0.000132	3.94	278.88	400.89	0.27
HIGGINS CK	MAINSTEM	5.959	50-YEAR	1100.00	647.58	656.44	656.60	656.60	0.000093	3.21	439.38	330.84	0.22
HIGGINS CK	MAINSTEM	5.950	50-YEAR	1100.00	647.42	656.42	656.59	656.59	0.000104	3.37	383.90	292.78	0.23
HIGGINS CK	MAINSTEM	5.914	50-YEAR	1100.00	647.31	656.40	651.92	656.57	0.000098	3.31	334.38	77.53	0.23
HIGGINS CK	MAINSTEM	5.911	Culvert										
HIGGINS CK	MAINSTEM	5.899	50-YEAR	1100.00	647.30	655.03	652.12	655.64	0.000333	6.29	174.95	59.15	0.43
HIGGINS CK	MAINSTEM	5.86375*	50-YEAR	1100.00	647.10	655.16	655.42	655.42	0.000202	4.12	272.41	65.12	0.32
HIGGINS CK	MAINSTEM	5.8285*	50-YEAR	1100.00	646.90	655.13	655.38	655.38	0.000189	4.04	277.82	65.81	0.31
HIGGINS CK	MAINSTEM	5.79325*	50-YEAR	1100.00	646.70	655.10	655.34	655.34	0.000177	3.95	282.90	65.07	0.30
HIGGINS CK	MAINSTEM	5.758	50-YEAR	1100.00	646.50	655.07	651.21	655.30	0.000166	3.87	287.42	63.21	0.29
HIGGINS CK	MAINSTEM	5.721	Culvert										
HIGGINS CK	MAINSTEM	5.683	50-YEAR	1100.00	646.23	652.66	650.51	653.35	0.000468	6.68	164.70	51.79	0.49
HIGGINS CK	MAINSTEM	5.650	50-YEAR	1100.00	646.10	652.74	650.51	653.12	0.000378	4.96	221.92	51.01	0.42
HIGGINS CK	MAINSTEM	5.649	50-YEAR	1100.00	646.50	652.75	650.51	653.12	0.000381	4.90	224.52	52.63	0.42
HIGGINS CK	MAINSTEM	5.593	50-YEAR	1100.00	645.87	652.68	650.02	653.00	0.000302	4.57	240.53	52.53	0.38
HIGGINS CK	MAINSTEM	5.558	50-YEAR	1394.00	646.30	652.37	652.91	652.91	0.000542	5.86	237.92	55.62	0.50
HIGGINS CK	MAINSTEM	5.500	50-YEAR	1394.00	645.54	652.06	650.31	652.71	0.000640	6.47	215.51	48.98	0.54
HIGGINS CK	MAINSTEM	5.496	50-YEAR	1394.00	645.80	651.92	650.56	652.69	0.000815	7.03	198.31	47.66	0.61
HIGGINS CK	MAINSTEM	5.409	50-YEAR	1394.00	645.02	651.72	649.85	652.33	0.000579	6.27	222.42	49.06	0.52
HIGGINS CK	MAINSTEM	5.408	50-YEAR	1394.00	645.30	651.66	649.95	652.32	0.000653	6.50	214.45	49.11	0.55
HIGGINS CK	MAINSTEM	5.394	50-YEAR	1394.00	645.30	651.80	651.80	652.05	0.001256	3.99	349.02	78.93	0.33
HIGGINS CK	MAINSTEM	5.378	50-YEAR	1394.00	645.30	651.63	648.91	651.90	0.002312	4.15	335.85	77.71	0.35
HIGGINS CK	MAINSTEM	5.377	50-YEAR	1394.00	644.79	651.63	648.57	651.89	0.001939	4.10	340.14	69.25	0.33
HIGGINS CK	MAINSTEM	5.364	Bridge										
HIGGINS CK	MAINSTEM	5.352	50-YEAR	1394.00	645.03	651.49	648.77	651.78	0.001421	4.35	320.65	69.50	0.36
HIGGINS CK	MAINSTEM	5.351	50-YEAR	1394.00	645.30	651.50	648.86	651.75	0.001300	4.05	344.34	83.07	0.34
HIGGINS CK	MAINSTEM	5.340	50-YEAR	1394.00	645.30	651.44	648.50	651.68	0.001133	3.88	359.08	78.41	0.32
HIGGINS CK	MAINSTEM	5.335	50-YEAR	1394.00	645.30	651.40	648.51	651.63	0.001167	3.92	355.36	78.13	0.32
HIGGINS CK	MAINSTEM	5.324	50-YEAR	1394.00	645.28	651.28	651.28	651.58	0.000820	4.41	316.50	101.22	0.38
HIGGINS CK	MAINSTEM	5.289	50-YEAR	1394.00	645.20	651.21	651.21	651.43	0.000565	3.74	372.79	85.10	0.31
HIGGINS CK	MAINSTEM	5.256	50-YEAR	1394.00	645.11	651.00	651.30	651.30	0.000821	4.43	314.38	73.15	0.38
HIGGINS CK	MAINSTEM	5.236	50-YEAR	1394.00	645.20	650.87	651.21	651.21	0.000949	4.64	300.59	72.96	0.40
HIGGINS CK	MAINSTEM	5.184	50-YEAR	1394.00	644.50	650.69	650.97	650.97	0.000721	4.25	328.01	73.69	0.35
HIGGINS CK	MAINSTEM	5.166	50-YEAR	1394.00	644.48	650.62	650.90	650.90	0.000712	4.21	328.01	74.95	0.35
HIGGINS CK	MAINSTEM	5.144	50-YEAR	1394.00	644.40	650.53	650.81	650.81	0.000723	4.25	328.07	73.83	0.36
HIGGINS CK	MAINSTEM	5.094	50-YEAR	1394.00	643.10	650.43	650.64	650.64	0.000481	3.67	380.28	78.76	0.29
HIGGINS CK	MAINSTEM	5.049	50-YEAR	1394.00	643.43	650.31	650.52	650.52	0.000470	3.69	377.57	75.78	0.29
HIGGINS CK	MAINSTEM	5.045	50-YEAR	750.00	643.80	650.40	650.47	650.47	0.000161	2.12	354.06	73.18	0.17
HIGGINS CK	MAINSTEM	5.020	50-YEAR	750.00	643.80	650.34	646.26	650.44	0.000170	2.55	294.56	72.86	0.18
HIGGINS CK	MAINSTEM	5.012	Culvert										
HIGGINS CK	MAINSTEM	5.005	50-YEAR	750.00	643.80	649.54	645.88	649.66	0.000218	2.78	270.20	94.93	0.21
HIGGINS CK	MAINSTEM	4.992	50-YEAR	750.00	643.80	649.57	649.61	649.61	0.000111	1.71	437.53	95.08	0.14

HCC-RAS Plan: Design EXHgg 88 Profile: 50-YEAR (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	4.980	50-YEAR	750.00	643.55	649.47		649.59	0.000335	2.80	268.06	63.07	0.24
HIGGINS CK	MAINSTEM	4.966	50-YEAR	920.00	643.40	649.33		649.55	0.000615	3.76	244.63	58.02	0.32
HIGGINS CK	MAINSTEM	4.944	50-YEAR	920.00	642.80	649.27		649.48	0.000548	3.70	248.91	55.11	0.31
HIGGINS CK	MAINSTEM	4.928	50-YEAR	920.00	642.48	649.22		649.41	0.000933	3.48	264.32	57.83	0.29
HIGGINS CK	MAINSTEM	4.925	50-YEAR	920.00	643.00	649.16		649.39	0.001225	3.84	239.36	55.38	0.33
HIGGINS CK	MAINSTEM	4.915	50-YEAR	920.00	643.00	649.19		649.31	0.000743	2.86	358.46	96.13	0.23
HIGGINS CK	MAINSTEM	4.885	50-YEAR	920.00	642.90	649.05		649.19	0.000783	3.03	339.85	89.47	0.23
HIGGINS CK	MAINSTEM	4.866	50-YEAR	920.00	642.40	648.95		649.10	0.000851	3.19	324.95	86.08	0.24
HIGGINS CK	MAINSTEM	4.847	50-YEAR	920.00	642.00	648.87		649.02	0.000823	3.13	328.93	87.64	0.24
HIGGINS CK	MAINSTEM	4.828	50-YEAR	920.00	641.90	648.83		648.93	0.000646	2.69	376.91	100.43	0.21
HIGGINS CK	MAINSTEM	4.801	50-YEAR	920.00	642.50	648.68		648.82	0.000930	3.14	324.97	92.74	0.25
HIGGINS CK	MAINSTEM	4.783	50-YEAR	920.00	642.00	648.60		648.73	0.000824	3.04	333.85	92.35	0.24
HIGGINS CK	MAINSTEM	4.774	50-YEAR	920.00	642.50	648.54		648.69	0.001007	3.23	316.22	92.22	0.26
HIGGINS CK	MAINSTEM	4.771	50-YEAR	920.00	642.05	648.53		648.67	0.000843	3.11	317.37	85.50	0.24
HIGGINS CK	MAINSTEM	4.760	50-YEAR	920.00	641.50	648.47		648.62	0.000894	3.24	314.63	86.05	0.25
HIGGINS CK	MAINSTEM	4.742	50-YEAR	920.00	642.22	648.38		648.53	0.000971	3.19	316.05	92.19	0.26
HIGGINS CK	MAINSTEM	4.713	50-YEAR	920.00	642.40	648.18		648.36	0.001227	3.45	290.46	90.94	0.29
HIGGINS CK	MAINSTEM	4.698	50-YEAR	920.00	642.20	648.13		648.26	0.001029	2.91	316.44	97.15	0.28
HIGGINS CK	MAINSTEM	4.694	50-YEAR	920.00	641.46	648.04		648.23	0.000993	3.65	296.61	85.83	0.27
HIGGINS CK	MAINSTEM	4.683	50-YEAR	445.00	639.90	648.13	642.46	648.16	0.000126	1.34	347.72	97.73	0.10
HIGGINS CK	MAINSTEM	4.678	50-YEAR	445.00	639.90	648.03	642.48	648.13	0.000312	2.57	173.47	90.67	0.16
HIGGINS CK	MAINSTEM	4.673	Culvert										
HIGGINS CK	MAINSTEM	4.668	50-YEAR	445.00	640.20	647.17	642.75	647.33	0.000582	3.22	137.99	73.42	0.22
HIGGINS CK	MAINSTEM	4.664	50-YEAR	485.00	640.20	647.19	642.75	647.29	0.000409	2.57	188.44	74.10	0.18
HIGGINS CK	MAINSTEM	4.659	50-YEAR	485.00	638.42	647.22	640.66	647.25	0.000083	1.36	357.20	62.96	0.08
HIGGINS CK	MAINSTEM	4.639	50-YEAR	485.00	640.20	647.17	642.77	647.22	0.000329	1.93	251.37	73.41	0.15
HIGGINS CK	MAINSTEM	4.638	50-YEAR	485.00	640.80	647.17	643.27	647.22	0.000292	1.86	260.70	67.71	0.14
HIGGINS CK	MAINSTEM	4.626	Culvert										
HIGGINS CK	MAINSTEM	4.612	50-YEAR	485.00	641.80	646.77	644.18	646.93	0.000761	3.21	150.96	45.17	0.27
HIGGINS CK	MAINSTEM	4.611	50-YEAR	485.00	642.03	646.80	644.10	646.89	0.000523	2.41	200.88	58.41	0.22
HIGGINS CK	MAINSTEM	4.588	50-YEAR	503.00	641.80	646.72		646.82	0.000578	2.52	199.71	54.61	0.23
HIGGINS CK	MAINSTEM	4.569	50-YEAR	503.00	638.78	646.74		646.78	0.000112	1.67	354.91	75.09	0.11
HIGGINS CK	MAINSTEM	4.542	50-YEAR	503.00	639.10	646.74		646.77	0.000069	1.45	428.40	77.17	0.09
HIGGINS CK	MAINSTEM	4.537	50-YEAR	503.00	639.10	646.69	641.08	646.76	0.000142	2.07	242.95	76.92	0.13
HIGGINS CK	MAINSTEM	4.521	Culvert										
HIGGINS CK	MAINSTEM	4.505	50-YEAR	503.00	637.50	646.02	639.48	646.07	0.000097	1.85	272.54	85.10	0.11
HIGGINS CK	MAINSTEM	4.485	50-YEAR	503.00	637.50	646.04	638.42	646.04	0.000008	0.45	1118.36	162.91	0.03

HEC-RAS Plan: Design EXH88 88 Profile: 100-YEAR

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	25	100-YEAR	342.00	667.72	671.55		671.70	0.001280	3.28	136.23	107.35	0.32
HIGGINS TRIB A	CUP	24	100-YEAR	342.00	666.72	671.34		671.55	0.001691	3.64	94.35	31.11	0.36
HIGGINS TRIB A	CUP	23	100-YEAR	342.00	667.72	669.88	669.88	670.72	0.015736	7.34	46.82	28.15	1.00
HIGGINS TRIB A	CUP	22	100-YEAR	342.00	664.72	669.53		669.61	0.000492	2.24	152.96	38.62	0.20
HIGGINS TRIB A	CUP	21	100-YEAR	342.00	664.72	669.22		669.37	0.001388	3.09	110.77	39.24	0.32
HIGGINS TRIB A	CUP	20	100-YEAR	342.00	664.72	669.09		669.23	0.001338	2.95	116.02	44.23	0.32
HIGGINS TRIB A	CUP	19	100-YEAR	342.00	664.42	668.85		669.04	0.002686	3.64	118.42	94.67	0.43
HIGGINS TRIB A	CUP	18	100-YEAR	342.00	664.22	668.81		668.87	0.000783	2.04	185.13	99.26	0.22
HIGGINS TRIB A	CUP	17	100-YEAR	342.00	664.12	668.69		668.78	0.000907	2.86	153.22	75.15	0.27
HIGGINS TRIB A	CUP	16	100-YEAR	342.00	664.02	668.65		668.71	0.000453	2.04	186.89	91.84	0.19
HIGGINS TRIB A	CUP	15	100-YEAR	342.00	663.72	668.39		668.61	0.001912	3.82	105.06	82.39	0.38
HIGGINS TRIB A	CUP	14	100-YEAR	342.00	663.72	668.25		668.38	0.002168	2.88	119.03	67.70	0.38
HIGGINS TRIB A	CUP	13	100-YEAR	342.00	663.72	668.06		668.21	0.001403	3.08	112.87	52.97	0.32
HIGGINS TRIB A	CUP	12	100-YEAR	344.00	662.72	667.79		667.88	0.000881	2.44	141.05	50.70	0.26
HIGGINS TRIB A	CUP	11	100-YEAR	344.00	663.02	667.26		667.63	0.003798	4.90	70.20	25.65	0.52
HIGGINS TRIB A	CUP	10	100-YEAR	344.00	662.72	666.72		667.09	0.003948	4.85	70.96	27.41	0.53
HIGGINS TRIB A	CUP	9	100-YEAR	344.00	662.22	666.23		666.54	0.003758	4.50	76.42	32.34	0.52
HIGGINS TRIB A	CUP	8	100-YEAR	344.00	661.02	666.02		666.15	0.001656	2.92	117.95	39.16	0.30
HIGGINS TRIB A	CUP	7	100-YEAR	344.00	661.02	665.77		665.98	0.003807	3.71	92.70	43.63	0.45
HIGGINS TRIB A	CUP	6.001	100-YEAR	344.00	661.02	664.28	664.28	665.23	0.019887	7.83	43.91	24.81	1.00
HIGGINS TRIB A	CUP	6	Culvert										
HIGGINS TRIB A	CUP	5.999	100-YEAR	344.00	659.72	664.32	662.59	664.58	0.002869	4.12	83.40	35.56	0.38
HIGGINS TRIB A	CUP	5	100-YEAR	344.00	659.72	662.58	662.58	663.44	0.025809	7.45	46.19	26.84	1.00
HIGGINS TRIB A	CUP	4.1	100-YEAR	344.00	651.98	659.15		659.16	0.000049	0.91	641.59	233.13	0.07
HIGGINS TRIB A	CUP	3.8	100-YEAR	344.00	651.03	659.15	653.52	659.15	0.000016	0.59	852.75	221.92	0.04
HIGGINS TRIB A	CUP	3.5	100-YEAR	344.00	651.09	659.14		659.14	0.000017	0.64	758.87	172.86	0.04
HIGGINS TRIB A	CUP	3.1	100-YEAR	344.00	650.91	659.13		659.13	0.000024	0.77	608.89	132.66	0.05
HIGGINS TRIB A	CUP	3.01	100-YEAR	452.00	650.50	659.12		659.13	0.000058	1.03	580.87	136.21	0.07
HIGGINS TRIB A	CUP	3	100-YEAR	452.00	652.12	659.10	654.95	659.12	0.000114	1.20	395.21	124.15	0.09
HIGGINS TRIB A	CUP	2.3	100-YEAR	452.00	650.25	659.07	652.67	659.11	0.000112	1.72	269.82	101.47	0.11
HIGGINS TRIB A	CUP	2	Culvert										
HIGGINS TRIB A	CUP	1.7	100-YEAR	452.00	650.37	658.60	653.20	658.69	0.000474	2.40	188.03	96.05	0.15
HIGGINS TRIB A	CUP	1	100-YEAR	452.00	650.22	658.60	653.83	658.65	0.000331	1.89	255.98	500.70	0.13
HIGGINS CK	MAINSTEM	6.245	100-YEAR	911.00	651.02	658.60		658.64	0.000047	1.69	1229.43	333.98	0.12
HIGGINS CK	MAINSTEM	6.231	100-YEAR	911.00	652.14	658.61		658.63	0.000021	1.13	955.59	241.86	0.08
HIGGINS CK	MAINSTEM	6.179	100-YEAR	911.00	651.56	658.51		658.61	0.000131	2.57	386.36	119.66	0.19
HIGGINS CK	MAINSTEM	6.069	100-YEAR	911.00	650.55	658.48		658.54	0.000072	2.05	505.36	153.74	0.14
HIGGINS CK	MAINSTEM	6.035	100-YEAR	911.00	651.21	658.46		658.53	0.000094	2.34	599.13	164.30	0.17
HIGGINS CK	MAINSTEM	6.034	100-YEAR	911.00	651.79	658.33		658.52	0.000159	4.24	524.26	163.48	0.32
HIGGINS CK	MAINSTEM	6.033	100-YEAR	911.00	651.61	658.40		658.48	0.000071	2.93	737.51	165.99	0.22
HIGGINS CK	MAINSTEM	6.032	100-YEAR	911.00	647.83	658.44		658.47	0.000043	1.44	958.09	166.18	0.08
HIGGINS CK	MAINSTEM	6.021	100-YEAR	915.00	649.42	658.36		658.45	0.000255	2.64	433.12	101.53	0.18
HIGGINS CK	MAINSTEM	6.006	100-YEAR	915.00	648.55	658.35		658.43	0.000240	2.38	495.69	130.74	0.15
HIGGINS CK	MAINSTEM	5.9994*	100-YEAR	915.00	648.38	658.34		658.42	0.000212	2.29	504.08	137.62	0.15
HIGGINS CK	MAINSTEM	5.9950	100-YEAR	915.00	648.21	658.34	651.92	658.41	0.000192	2.23	494.98	146.50	0.14
HIGGINS CK	MAINSTEM	5.9928*	100-YEAR	915.00	648.21	658.34	651.92	658.41	0.000192	2.23	500.48	167.61	0.14

HCC-RAS Plan: Design EX-Higg 88 Profile: 100-YEAR (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Cmn (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	5.981		Bridge									
HIGGINS CK	MAINSTEM	5.973	100-YEAR	915.00	647.71	657.83	651.22	657.88	0.000024	1.86	902.25	554.18	0.12
HIGGINS CK	MAINSTEM	5.972	100-YEAR	1320.00	647.90	657.73	652.80	657.86	0.000076	3.08	873.90	574.76	0.20
HIGGINS CK	MAINSTEM	5.959	100-YEAR	1320.00	647.58	657.71		657.85	0.000067	3.07	697.89	381.95	0.19
HIGGINS CK	MAINSTEM	5.950	100-YEAR	1320.00	647.42	657.69		657.85	0.000075	3.23	613.03	328.22	0.21
HIGGINS CK	MAINSTEM	5.914	100-YEAR	1320.00	647.31	657.66	652.32	657.83	0.000079	3.34	399.51	101.77	0.21
HIGGINS CK	MAINSTEM	5.911		Culvert									
HIGGINS CK	MAINSTEM	5.899	100-YEAR	1320.00	647.30	656.12	652.62	656.78	0.000291	6.49	203.38	77.32	0.41
HIGGINS CK	MAINSTEM	5.86375*	100-YEAR	1320.00	647.10	656.29		656.54	0.000150	4.04	362.56	98.16	0.28
HIGGINS CK	MAINSTEM	5.8285*	100-YEAR	1320.00	646.90	656.26		656.51	0.000142	3.97	369.99	105.70	0.27
HIGGINS CK	MAINSTEM	5.79325*	100-YEAR	1320.00	646.70	656.24		656.48	0.000134	3.89	374.00	94.55	0.27
HIGGINS CK	MAINSTEM	5.758	100-YEAR	1320.00	646.50	656.22	651.64	656.45	0.000128	3.84	356.50	94.22	0.26
HIGGINS CK	MAINSTEM	5.721		Culvert									
HIGGINS CK	MAINSTEM	5.683	100-YEAR	1320.00	646.23	653.57	650.99	654.31	0.000410	6.90	191.27	56.19	0.47
HIGGINS CK	MAINSTEM	5.650	100-YEAR	1320.00	646.10	653.70		654.06	0.000307	4.83	273.02	55.69	0.38
HIGGINS CK	MAINSTEM	5.649	100-YEAR	1320.00	646.50	653.71		654.06	0.000300	4.77	276.86	56.25	0.38
HIGGINS CK	MAINSTEM	5.593	100-YEAR	1320.00	645.87	653.65	650.41	653.97	0.000247	4.49	293.80	57.31	0.35
HIGGINS CK	MAINSTEM	5.558	100-YEAR	1623.00	646.30	653.44	650.87	653.90	0.000389	5.41	299.74	60.23	0.43
HIGGINS CK	MAINSTEM	5.500	100-YEAR	1623.00	645.54	653.22	650.69	653.76	0.000430	5.90	275.06	53.93	0.46
HIGGINS CK	MAINSTEM	5.496	100-YEAR	1623.00	645.80	653.14	650.93	653.74	0.000517	6.26	259.20	52.41	0.50
HIGGINS CK	MAINSTEM	5.409	100-YEAR	1623.00	645.02	653.02	650.23	653.51	0.000371	5.61	289.45	53.72	0.43
HIGGINS CK	MAINSTEM	5.408	100-YEAR	1623.00	645.30	653.00	650.35	653.50	0.000402	5.73	283.43	54.28	0.44
HIGGINS CK	MAINSTEM	5.394	100-YEAR	1623.00	645.30	653.11		653.31	0.000752	3.55	458.44	87.22	0.27
HIGGINS CK	MAINSTEM	5.378	100-YEAR	1623.00	645.30	653.02	649.24	653.22	0.001354	3.60	454.87	101.39	0.28
HIGGINS CK	MAINSTEM	5.377	100-YEAR	1623.00	644.79	653.00	648.88	653.21	0.001261	3.69	439.62	75.48	0.27
HIGGINS CK	MAINSTEM	5.364		Bridge									
HIGGINS CK	MAINSTEM	5.352	100-YEAR	1623.00	645.03	652.89	649.08	653.12	0.000873	3.84	422.99	76.36	0.29
HIGGINS CK	MAINSTEM	5.351	100-YEAR	1623.00	645.30	652.90	649.16	653.10	0.000729	3.56	456.48	95.87	0.26
HIGGINS CK	MAINSTEM	5.340	100-YEAR	1623.00	645.30	652.87	648.81	653.05	0.000650	3.38	502.27	131.67	0.25
HIGGINS CK	MAINSTEM	5.335	100-YEAR	1623.00	645.30	652.85	648.79	653.03	0.000660	3.40	499.26	130.58	0.25
HIGGINS CK	MAINSTEM	5.324	100-YEAR	1623.00	645.28	652.78		653.00	0.000424	3.72	460.23	171.02	0.28
HIGGINS CK	MAINSTEM	5.289	100-YEAR	1623.00	645.20	652.76		652.91	0.000299	3.16	524.75	151.72	0.24
HIGGINS CK	MAINSTEM	5.256	100-YEAR	1623.00	645.11	652.65		652.85	0.000469	3.60	450.43	94.13	0.29
HIGGINS CK	MAINSTEM	5.236	100-YEAR	1623.00	645.20	652.58		652.80	0.000454	3.73	434.73	85.06	0.29
HIGGINS CK	MAINSTEM	5.184	100-YEAR	1623.00	644.50	652.49		652.68	0.000356	3.44	471.92	85.51	0.26
HIGGINS CK	MAINSTEM	5.166	100-YEAR	1623.00	644.48	652.47		652.64	0.000346	3.37	482.13	88.41	0.25
HIGGINS CK	MAINSTEM	5.144	100-YEAR	1623.00	644.40	652.42		652.60	0.000342	3.39	479.43	86.27	0.25
HIGGINS CK	MAINSTEM	5.094	100-YEAR	1623.00	643.10	652.38		652.51	0.000242	2.97	546.44	92.52	0.22
HIGGINS CK	MAINSTEM	5.049	100-YEAR	1623.00	643.43	652.32		652.46	0.000230	3.00	540.89	90.12	0.21
HIGGINS CK	MAINSTEM	5.045	100-YEAR	1000.00	643.80	652.37		652.43	0.000103	1.97	507.84	83.32	0.14
HIGGINS CK	MAINSTEM	5.020	100-YEAR	1000.00	643.80	652.30	646.67	652.40	0.000118	2.56	390.53	82.97	0.16
HIGGINS CK	MAINSTEM	5.012		Culvert									
HIGGINS CK	MAINSTEM	5.005	100-YEAR	1000.00	643.80	650.80	646.30	650.94	0.000198	3.03	330.51	102.06	0.20
HIGGINS CK	MAINSTEM	4.992	100-YEAR	1000.00	643.80	650.83		650.88	0.000095	1.78	562.58	102.28	0.13
HIGGINS CK	MAINSTEM	4.980	100-YEAR	1000.00	643.55	650.74		650.87	0.000276	2.84	352.55	70.08	0.22
HIGGINS CK	MAINSTEM	4.966	100-YEAR	1260.00	643.40	650.59		650.83	0.000635	3.92	321.62	64.43	0.31

HEC-RAS Plan: Design EXHigg 88 Profile: 100-YEAR (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Ctl
HIGGINS CK	MAINSTEM	4.944	100-YEAR	1260.00	642.80	650.53		650.77	0.000488	3.92	321.79	834.96	0.30
HIGGINS CK	MAINSTEM	4.928	100-YEAR	1260.00	642.48	650.49		650.70	0.000862	3.69	341.87	64.45	0.28
HIGGINS CK	MAINSTEM	4.925	100-YEAR	1260.00	643.00	650.44		650.69	0.001082	4.01	313.87	61.76	0.31
HIGGINS CK	MAINSTEM	4.915	100-YEAR	1260.00	643.00	650.48		650.61	0.000626	2.97	487.52	103.87	0.22
HIGGINS CK	MAINSTEM	4.885	100-YEAR	1260.00	642.90	650.36		650.50	0.000634	3.16	482.48	151.96	0.22
HIGGINS CK	MAINSTEM	4.866	100-YEAR	1260.00	642.40	650.28		650.44	0.000668	3.32	462.08	135.18	0.23
HIGGINS CK	MAINSTEM	4.847	100-YEAR	1260.00	642.00	650.22		650.35	0.000870	3.08	467.54	133.34	0.25
HIGGINS CK	MAINSTEM	4.828	100-YEAR	1260.00	641.90	650.17		650.28	0.000536	2.77	519.23	128.07	0.20
HIGGINS CK	MAINSTEM	4.801	100-YEAR	1260.00	642.50	650.04		650.19	0.000730	3.17	457.27	104.87	0.23
HIGGINS CK	MAINSTEM	4.783	100-YEAR	1260.00	642.00	649.98		650.12	0.000666	3.09	467.05	100.47	0.22
HIGGINS CK	MAINSTEM	4.774	100-YEAR	1260.00	642.50	649.93		650.08	0.000766	3.22	450.87	100.51	0.24
HIGGINS CK	MAINSTEM	4.771	100-YEAR	1260.00	642.05	649.92		650.07	0.000670	3.22	444.31	106.50	0.22
HIGGINS CK	MAINSTEM	4.760	100-YEAR	1260.00	641.50	649.87		650.03	0.000728	3.31	440.65	93.24	0.23
HIGGINS CK	MAINSTEM	4.742	100-YEAR	1260.00	642.22	649.81		649.96	0.000733	3.18	454.02	100.71	0.23
HIGGINS CK	MAINSTEM	4.713	100-YEAR	1260.00	642.40	649.67		649.83	0.000849	3.33	432.67	99.92	0.25
HIGGINS CK	MAINSTEM	4.698	100-YEAR	1260.00	642.20	649.64		649.76	0.000705	2.70	471.93	107.74	0.22
HIGGINS CK	MAINSTEM	4.694	100-YEAR	1260.00	641.46	649.54		649.73	0.000756	3.71	434.22	96.98	0.24
HIGGINS CK	MAINSTEM	4.683	100-YEAR	460.00	639.90	649.65	642.50	649.67	0.000061	1.08	455.56	108.03	0.07
HIGGINS CK	MAINSTEM	4.678	100-YEAR	460.00	639.90	649.57	642.53	649.65	0.000184	2.22	207.39	99.92	0.13
HIGGINS CK	MAINSTEM	4.673	Culvert										
HIGGINS CK	MAINSTEM	4.668	100-YEAR	460.00	640.20	648.62	642.80	648.73	0.000329	2.75	166.98	94.24	0.17
HIGGINS CK	MAINSTEM	4.664	100-YEAR	700.00	640.20	648.57	643.32	648.72	0.000447	3.06	228.63	93.97	0.19
HIGGINS CK	MAINSTEM	4.659	100-YEAR	700.00	638.42	648.62	641.09	648.66	0.000101	1.67	418.76	71.68	0.10
HIGGINS CK	MAINSTEM	4.639	100-YEAR	700.00	640.20	648.56	643.36	648.64	0.000303	2.18	321.16	93.91	0.15
HIGGINS CK	MAINSTEM	4.638	100-YEAR	700.00	640.80	648.56	643.71	648.63	0.000276	2.12	330.50	79.73	0.15
HIGGINS CK	MAINSTEM	4.626	Culvert										
HIGGINS CK	MAINSTEM	4.612	100-YEAR	700.00	641.80	648.09	644.71	648.29	0.000650	3.55	197.24	50.64	0.26
HIGGINS CK	MAINSTEM	4.611	100-YEAR	700.00	642.03	648.13	644.57	648.23	0.000392	2.54	275.47	66.54	0.20
HIGGINS CK	MAINSTEM	4.588	100-YEAR	730.00	641.80	648.07		648.18	0.000475	2.62	278.18	61.47	0.22
HIGGINS CK	MAINSTEM	4.569	100-YEAR	730.00	638.78	648.09		648.14	0.000116	1.92	462.58	84.32	0.12
HIGGINS CK	MAINSTEM	4.542	100-YEAR	730.00	639.10	648.09		648.13	0.000078	1.71	537.64	84.63	0.10
HIGGINS CK	MAINSTEM	4.537	100-YEAR	730.00	639.10	648.01	641.63	648.12	0.000175	2.56	285.26	84.22	0.15
HIGGINS CK	MAINSTEM	4.521	Culvert										
HIGGINS CK	MAINSTEM	4.505	100-YEAR	730.00	637.50	646.58	640.02	646.68	0.000165	2.51	290.46	88.39	0.15
HIGGINS CK	MAINSTEM	4.485	100-YEAR	730.00	637.50	646.62	638.67	646.63	0.000013	0.60	1214.11	167.25	0.04

HEC-RAS Plan: Design EXHigg 88 Profile: 500-YEAR

River	Reach	River Sta	Profile	Q Total (cfs)	Min Chl El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	25	500-YEAR	414.00	667.72	671.93		672.07	0.001102	3.28	182.38	128.59	0.30
HIGGINS TRIB A	CUP	24	500-YEAR	414.00	666.72	671.68		671.92	0.001823	3.98	105.10	32.79	0.38
HIGGINS TRIB A	CUP	23	500-YEAR	414.00	667.72	670.13	670.13	671.05	0.015353	7.69	53.82	29.66	1.01
HIGGINS TRIB A	CUP	22	500-YEAR	414.00	664.72	669.88		669.98	0.000558	2.48	166.89	40.08	0.21
HIGGINS TRIB A	CUP	21	500-YEAR	414.00	664.72	669.54		669.71	0.001512	3.35	123.62	41.32	0.34
HIGGINS TRIB A	CUP	20	500-YEAR	414.00	664.72	669.40		669.56	0.001393	3.20	130.12	46.10	0.33
HIGGINS TRIB A	CUP	19	500-YEAR	414.00	664.22	669.23		669.39	0.002184	3.49	156.02	105.21	0.40
HIGGINS TRIB A	CUP	18	500-YEAR	414.00	664.22	669.18		669.24	0.000728	2.12	223.42	106.48	0.21
HIGGINS TRIB A	CUP	17	500-YEAR	414.00	664.12	669.06		669.16	0.000933	3.03	184.61	95.52	0.27
HIGGINS TRIB A	CUP	16	500-YEAR	414.00	664.02	669.02		669.09	0.000455	2.19	225.27	118.61	0.20
HIGGINS TRIB A	CUP	15	500-YEAR	414.00	663.72	668.77		668.99	0.001710	3.90	142.32	109.96	0.37
HIGGINS TRIB A	CUP	14	500-YEAR	414.00	663.72	668.65		668.77	0.002186	2.76	151.10	93.00	0.38
HIGGINS TRIB A	CUP	13	500-YEAR	414.00	663.72	668.44		668.60	0.001333	3.23	135.01	60.22	0.32
HIGGINS TRIB A	CUP	12	500-YEAR	416.00	662.72	668.19		668.29	0.000830	2.58	161.89	54.66	0.25
HIGGINS TRIB A	CUP	11	500-YEAR	416.00	663.02	667.61		668.04	0.003931	5.23	79.59	27.00	0.54
HIGGINS TRIB A	CUP	10	500-YEAR	416.00	662.72	667.07		667.48	0.004005	5.16	80.59	28.51	0.54
HIGGINS TRIB A	CUP	9	500-YEAR	416.00	662.22	666.59		666.93	0.003696	4.70	88.44	34.56	0.52
HIGGINS TRIB A	CUP	8	500-YEAR	416.00	661.02	666.37		666.53	0.001774	3.15	132.09	41.08	0.31
HIGGINS TRIB A	CUP	7	500-YEAR	416.00	661.02	666.12		666.35	0.003711	3.81	109.28	48.66	0.45
HIGGINS TRIB A	CUP	6.001	500-YEAR	416.00	661.02	664.56	664.56	665.62	0.019005	8.25	50.40	26.19	1.00
HIGGINS TRIB A	CUP	6		Culvert									
HIGGINS TRIB A	CUP	5.999	500-YEAR	416.00	659.72	664.67	662.85	664.99	0.003081	4.55	91.50	37.33	0.40
HIGGINS TRIB A	CUP	5	500-YEAR	416.00	659.72	662.82	662.82	663.78	0.025535	7.86	52.91	28.07	1.01
HIGGINS TRIB A	CUP	4.1	500-YEAR	416.00	651.98	660.61		660.61	0.000020	0.68	991.94	244.99	0.05
HIGGINS TRIB A	CUP	3.8	500-YEAR	416.00	651.03	660.61	653.74	660.61	0.000008	0.48	1315.53	293.01	0.03
HIGGINS TRIB A	CUP	3.5	500-YEAR	416.00	651.09	660.60		660.60	0.000011	0.57	1020.42	184.91	0.03
HIGGINS TRIB A	CUP	3.1	500-YEAR	416.00	650.91	660.59		660.60	0.000016	0.70	812.30	145.26	0.04
HIGGINS TRIB A	CUP	3.01	500-YEAR	574.00	650.50	660.59		660.60	0.000040	0.95	792.16	152.70	0.06
HIGGINS TRIB A	CUP	3	500-YEAR	574.00	652.12	660.57	655.16	660.59	0.000077	1.16	515.54	141.83	0.08
HIGGINS TRIB A	CUP	2.3	500-YEAR	574.00	650.25	660.53	653.00	660.58	0.000103	1.84	320.87	114.49	0.10
HIGGINS TRIB A	CUP	2		Culvert									
HIGGINS TRIB A	CUP	1.7	500-YEAR	574.00	650.37	659.75	653.62	659.86	0.000476	2.65	216.77	108.48	0.16
HIGGINS TRIB A	CUP	1	500-YEAR	574.00	650.22	659.76	654.21	659.81	0.000299	1.99	305.76	500.91	0.12
HIGGINS CK	MAINSTEM	6.245	500-YEAR	1253.00	651.02	659.76		659.80	0.000043	1.83	1637.81	368.56	0.12
HIGGINS CK	MAINSTEM	6.231	500-YEAR	1253.00	652.14	659.77		659.79	0.000021	1.27	1266.82	298.06	0.08
HIGGINS CK	MAINSTEM	6.179	500-YEAR	1253.00	651.56	659.65		659.77	0.000131	2.86	533.97	132.57	0.20
HIGGINS CK	MAINSTEM	6.069	500-YEAR	1253.00	650.55	659.62		659.70	0.000073	2.32	714.27	193.06	0.15
HIGGINS CK	MAINSTEM	6.035	500-YEAR	1253.00	651.21	659.61		659.68	0.000088	2.54	792.05	170.57	0.17
HIGGINS CK	MAINSTEM	6.034	500-YEAR	1253.00	651.79	659.49		659.68	0.000133	4.41	717.86	169.87	0.30
HIGGINS CK	MAINSTEM	6.033	500-YEAR	1253.00	651.61	659.56		659.65	0.000068	3.25	931.77	171.59	0.22
HIGGINS CK	MAINSTEM	6.032	500-YEAR	1253.00	647.83	659.60		659.63	0.000049	1.66	1153.59	171.80	0.09
HIGGINS CK	MAINSTEM	6.021	500-YEAR	1258.00	649.42	659.51		659.62	0.000246	2.90	554.83	108.95	0.19
HIGGINS CK	MAINSTEM	6.006	500-YEAR	1258.00	648.55	659.50		659.59	0.000253	2.68	697.89	245.43	0.16
HIGGINS CK	MAINSTEM	5.9994*	500-YEAR	1258.00	648.38	659.49		659.58	0.000226	2.59	706.54	260.72	0.15
HIGGINS CK	MAINSTEM	5.9950	500-YEAR	1258.00	648.21	659.49	652.64	659.58	0.000201	2.50	789.25	528.29	0.15
HIGGINS CK	MAINSTEM	5.9928*	500-YEAR	1258.00	648.21	659.49	652.64	659.57	0.000197	2.47	817.29	528.23	0.15

HEC-RAS Plan: Design EXHigg 88 Profile: 500-YEAR (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Chl El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	5.981		Bridge									
HIGGINS CK	MAINSTEM	5.973	500-YEAR	1288.00	647.71	659.43	651.85	659.48	0.000020	1.91	1588.64	650.81	0.11
HIGGINS CK	MAINSTEM	5.972	500-YEAR	1930.00	647.90	659.33	653.71	659.45	0.000062	3.20	1584.87	646.80	0.19
HIGGINS CK	MAINSTEM	5.959	500-YEAR	1930.00	647.58	659.28		659.44	0.000066	3.45	1263.38	653.82	0.20
HIGGINS CK	MAINSTEM	5.950	500-YEAR	1930.00	647.42	659.25		659.43	0.000075	3.64	1175.66	688.10	0.21
HIGGINS CK	MAINSTEM	5.914	500-YEAR	1930.00	647.31	659.19	653.32	659.41	0.000084	3.84	786.52	513.29	0.22
HIGGINS CK	MAINSTEM	5.911		Culvert									
HIGGINS CK	MAINSTEM	5.899	500-YEAR	1930.00	647.30	657.74	653.85	658.27	0.000227	5.93	377.73	104.17	0.36
HIGGINS CK	MAINSTEM	5.86375*	500-YEAR	1930.00	647.10	657.81		658.13	0.000148	4.62	551.99	149.61	0.29
HIGGINS CK	MAINSTEM	5.8285*	500-YEAR	1930.00	646.90	657.80		658.10	0.000139	4.52	603.51	197.84	0.28
HIGGINS CK	MAINSTEM	5.79325*	500-YEAR	1930.00	646.70	657.78		658.07	0.000133	4.45	641.76	253.93	0.27
HIGGINS CK	MAINSTEM	5.758	500-YEAR	1930.00	646.50	657.75	652.70	658.04	0.000128	4.40	670.77	331.37	0.27
HIGGINS CK	MAINSTEM	5.721		Culvert									
HIGGINS CK	MAINSTEM	5.683	500-YEAR	1930.00	646.23	655.43	652.15	656.39	0.000383	7.87	245.12	80.85	0.48
HIGGINS CK	MAINSTEM	5.650	500-YEAR	1930.00	646.10	655.68		656.05	0.000210	4.95	430.82	105.71	0.34
HIGGINS CK	MAINSTEM	5.648	500-YEAR	1930.00	646.50	655.68		656.05	0.000216	4.89	416.85	104.57	0.34
HIGGINS CK	MAINSTEM	5.593	500-YEAR	1930.00	645.87	655.65	651.39	655.98	0.000172	4.65	507.35	187.03	0.31
HIGGINS CK	MAINSTEM	5.558	500-YEAR	2270.00	646.30	655.50	651.74	655.93	0.000235	5.29	485.53	121.39	0.36
HIGGINS CK	MAINSTEM	5.500	500-YEAR	2270.00	645.54	655.38	651.67	655.85	0.000253	5.60	485.58	125.28	0.37
HIGGINS CK	MAINSTEM	5.496	500-YEAR	2270.00	645.80	655.34	651.88	655.84	0.000286	5.80	479.45	128.64	0.39
HIGGINS CK	MAINSTEM	5.409	500-YEAR	2270.00	645.02	655.33	651.16	655.70	0.000191	5.04	666.58	149.50	0.32
HIGGINS CK	MAINSTEM	5.408	500-YEAR	2270.00	645.30	655.33	651.31	655.69	0.000202	5.06	658.12	155.68	0.33
HIGGINS CK	MAINSTEM	5.394	500-YEAR	2270.00	645.30	655.40		655.58	0.000452	3.48	671.99	100.81	0.22
HIGGINS CK	MAINSTEM	5.378	500-YEAR	2270.00	645.30	655.35	650.01	655.53	0.000750	3.39	692.46	148.80	0.22
HIGGINS CK	MAINSTEM	5.377	500-YEAR	2270.00	644.79	655.31	649.88	655.51	0.000885	3.63	626.29	87.43	0.23
HIGGINS CK	MAINSTEM	5.364		Bridge									
HIGGINS CK	MAINSTEM	5.352	500-YEAR	2270.00	645.03	655.18	649.84	655.39	0.000570	3.73	610.34	91.39	0.24
HIGGINS CK	MAINSTEM	5.351	500-YEAR	2270.00	645.30	655.19	649.92	655.38	0.000479	3.50	648.88	1088.56	0.22
HIGGINS CK	MAINSTEM	5.340	500-YEAR	2270.00	645.30	655.18	649.54	655.33	0.000377	3.18	809.20	1085.44	0.20
HIGGINS CK	MAINSTEM	5.335	500-YEAR	2270.00	645.30	655.17	649.53	655.32	0.000375	3.16	821.54	1062.58	0.20
HIGGINS CK	MAINSTEM	5.324	500-YEAR	2270.00	645.28	655.12		655.30	0.000231	3.48	780.15	588.57	0.22
HIGGINS CK	MAINSTEM	5.289	500-YEAR	2270.00	645.20	655.12		655.25	0.000182	2.96	899.02	522.55	0.19
HIGGINS CK	MAINSTEM	5.256	500-YEAR	2270.00	645.11	655.05		655.21	0.000233	3.29	739.88	445.35	0.22
HIGGINS CK	MAINSTEM	5.236	500-YEAR	2270.00	645.20	655.00		655.19	0.000247	3.48	698.41	136.20	0.23
HIGGINS CK	MAINSTEM	5.184	500-YEAR	2270.00	644.50	655.01		655.11	0.000145	2.68	1074.08	373.72	0.17
HIGGINS CK	MAINSTEM	5.166	500-YEAR	2270.00	644.48	655.01		655.09	0.000119	2.45	1222.76	444.56	0.16
HIGGINS CK	MAINSTEM	5.144	500-YEAR	2270.00	644.40	655.01		655.07	0.000109	2.33	1317.94	506.54	0.15
HIGGINS CK	MAINSTEM	5.094	500-YEAR	2270.00	643.10	655.00		655.05	0.000071	2.01	1646.52	668.99	0.12
HIGGINS CK	MAINSTEM	5.049	500-YEAR	2270.00	643.43	654.99		655.03	0.000062	1.97	1842.44	790.29	0.11
HIGGINS CK	MAINSTEM	5.045	500-YEAR	2000.00	643.80	654.99		655.02	0.000053	1.78	1782.19	790.32	0.12
HIGGINS CK	MAINSTEM	5.020	500-YEAR	2000.00	643.80	654.98	648.05	655.02	0.000053	1.79	1776.60	790.26	0.11
HIGGINS CK	MAINSTEM	5.012		Culvert									
HIGGINS CK	MAINSTEM	5.005	500-YEAR	2000.00	643.80	654.99	647.68	655.01	0.000025	1.26	2683.32	1241.93	0.07
HIGGINS CK	MAINSTEM	4.992	500-YEAR	2000.00	643.80	654.99		655.01	0.000029	1.35	2338.67	1062.01	0.08
HIGGINS CK	MAINSTEM	4.980	500-YEAR	2000.00	643.55	654.98		655.00	0.000048	1.66	2125.65	1117.68	0.10
HIGGINS CK	MAINSTEM	4.966	500-YEAR	2140.00	643.40	654.97		655.00	0.000051	1.70	2274.17	1323.03	0.10

HEC-RAS Plan: Design EX-higg 88 Profile: 500-YEAR (Continued)

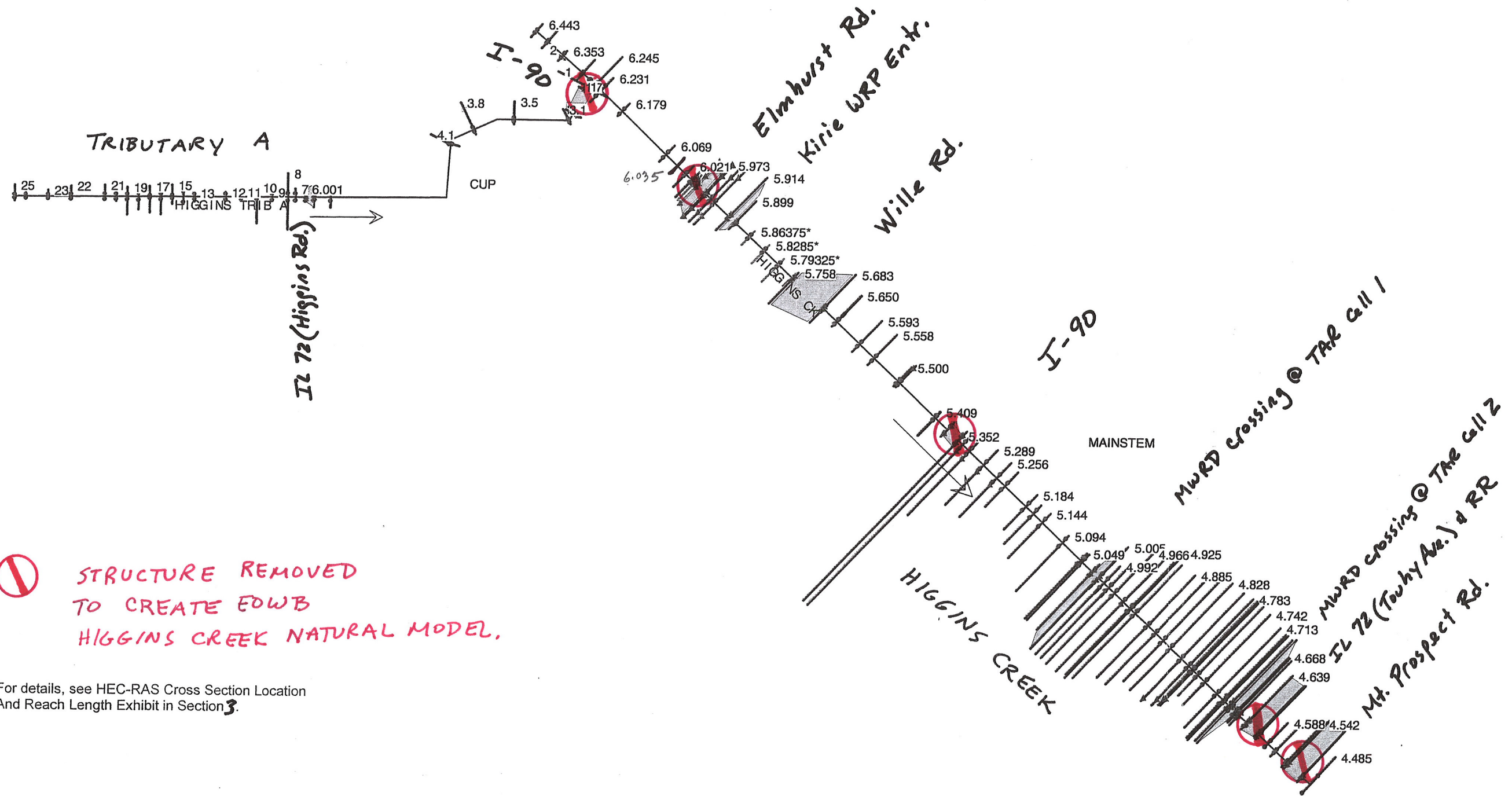
River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	4.944	500-YEAR	2140.00	642.80	654.97		654.99	0.000038	1.57	2657.48	1475.47	0.09
HIGGINS CK	MAINSTEM	4.928	500-YEAR	2140.00	642.48	654.97		654.99	0.000070	1.46	2313.75	1415.54	0.09
HIGGINS CK	MAINSTEM	4.925	500-YEAR	2140.00	643.00	654.98		654.99	0.000055	1.28	2493.50	1531.22	0.08
HIGGINS CK	MAINSTEM	4.915	500-YEAR	2140.00	643.00	654.98		654.98	0.000073	1.47	3303.47	1439.65	0.08
HIGGINS CK	MAINSTEM	4.885	500-YEAR	2140.00	642.90	654.96		654.97	0.000065	1.45	3371.41	1307.77	0.08
HIGGINS CK	MAINSTEM	4.866	500-YEAR	2140.00	642.40	654.95		654.96	0.000070	1.51	3282.66	1341.49	0.08
HIGGINS CK	MAINSTEM	4.847	500-YEAR	2140.00	642.00	654.94		654.96	0.000067	1.34	3154.35	1327.38	0.08
HIGGINS CK	MAINSTEM	4.828	500-YEAR	2140.00	641.90	654.94		654.95	0.000057	1.34	3281.77	1361.46	0.07
HIGGINS CK	MAINSTEM	4.801	500-YEAR	2140.00	642.50	654.93		654.94	0.000073	1.44	3101.47	1372.72	0.08
HIGGINS CK	MAINSTEM	4.783	500-YEAR	2140.00	642.00	654.92		654.94	0.000067	1.47	2961.10	1353.78	0.08
HIGGINS CK	MAINSTEM	4.774	500-YEAR	2140.00	642.50	654.91		654.93	0.000069	1.47	2867.95	1319.29	0.08
HIGGINS CK	MAINSTEM	4.771	500-YEAR	2140.00	642.05	654.91		654.93	0.000076	1.58	2743.85	1304.55	0.08
HIGGINS CK	MAINSTEM	4.760	500-YEAR	2140.00	641.50	654.91		654.93	0.000076	1.58	2596.22	1134.05	0.08
HIGGINS CK	MAINSTEM	4.742	500-YEAR	2140.00	642.22	654.90		654.92	0.000073	1.52	2654.44	1159.09	0.08
HIGGINS CK	MAINSTEM	4.713	500-YEAR	2140.00	642.40	654.89		654.91	0.000071	1.49	2873.21	1273.88	0.08
HIGGINS CK	MAINSTEM	4.698	500-YEAR	2140.00	642.20	654.89		654.90	0.000062	1.20	3019.05	1321.86	0.07
HIGGINS CK	MAINSTEM	4.694	500-YEAR	2140.00	641.46	654.87		654.90	0.000084	1.78	2872.53	1333.74	0.09
HIGGINS CK	MAINSTEM	4.683	500-YEAR	600.00	639.90	654.89	642.91	654.89	0.000005	0.42	2600.42	1272.17	0.02
HIGGINS CK	MAINSTEM	4.678	500-YEAR	600.00	639.90	654.89	642.99	654.89	0.000007	0.45	2138.75	1276.96	0.02
HIGGINS CK	MAINSTEM	4.673	500-YEAR	Culvert									
HIGGINS CK	MAINSTEM	4.668	500-YEAR	600.00	640.20	654.88	643.30	654.89	0.000014	0.64	1741.69	819.73	0.04
HIGGINS CK	MAINSTEM	4.664	500-YEAR	1600.00	640.20	654.84	645.24	654.88	0.000106	1.74	1704.37	819.62	0.10
HIGGINS CK	MAINSTEM	4.659	500-YEAR	1600.00	638.42	654.84	642.55	654.87	0.000046	1.30	2329.05	819.64	0.06
HIGGINS CK	MAINSTEM	4.639	500-YEAR	1600.00	640.20	654.81	645.18	654.85	0.000106	1.74	1632.20	669.49	0.10
HIGGINS CK	MAINSTEM	4.638	500-YEAR	1600.00	640.80	654.80	645.13	654.85	0.000099	1.92	1407.78	665.62	0.10
HIGGINS CK	MAINSTEM	4.626	500-YEAR	Culvert									
HIGGINS CK	MAINSTEM	4.612	500-YEAR	1600.00	641.80	653.43	646.48	653.53	0.000221	2.62	740.36	187.40	0.16
HIGGINS CK	MAINSTEM	4.611	500-YEAR	1600.00	642.03	653.45	646.05	653.51	0.000127	2.11	876.51	179.41	0.13
HIGGINS CK	MAINSTEM	4.588	500-YEAR	1666.00	641.80	653.40		653.49	0.000189	2.44	732.33	139.92	0.15
HIGGINS CK	MAINSTEM	4.569	500-YEAR	1666.00	638.78	653.41		653.47	0.000078	2.21	1043.66	165.30	0.11
HIGGINS CK	MAINSTEM	4.542	500-YEAR	1666.00	639.10	653.41		653.45	0.000062	2.09	1153.56	193.80	0.10
HIGGINS CK	MAINSTEM	4.537	500-YEAR	1666.00	639.10	653.37	643.49	653.45	0.000096	2.59	903.63	223.36	0.12
HIGGINS CK	MAINSTEM	4.521	500-YEAR	Culvert									
HIGGINS CK	MAINSTEM	4.505	500-YEAR	1666.00	637.50	649.54	641.88	649.62	0.000122	2.61	891.69	416.79	0.13
HIGGINS CK	MAINSTEM	4.485	500-YEAR	1666.00	637.50	649.57	639.50	649.56	0.000024	0.96	1772.54	256.22	0.06

TAB 10

SECTION 10

**NATURAL CONDITIONS ANALYSIS
– PERMIT AND DESIGN MODELS**

CROSS SECTION SCHEMATIC



⊘ STRUCTURE REMOVED TO CREATE EDWB HIGGINS CREEK NATURAL MODEL.

For details, see HEC-RAS Cross Section Location And Reach Length Exhibit in Section 3.

one of the XS's are Geo-Referenced (- Geo-Ref user entered XS - Geo-Ref interpolated XS - Non Geo-Ref user entered XS - Non Geo-Ref interpolated XS)

NATURAL COND.

G-EOMETRIC INPUT DATA
 NATURAL CONDITIONS
 (PERMIT)

HigginsCreek-Des.rep

HEC-RAS Version 4.0.0 March 2008
 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
XXXXXXXX XXXX     XXX      XXXX     XXXXXX     XXXX
X      X  X        X      X      X      X      X
X      X  X        X      X      X      X      X
X      X  XXXXXX   XXXX     X      X      X      XXXXX
  
```

PROJECT DATA

Project Title: Higgins Creek Design & Permit Models
 Project File : HigginsCreek-Des.prj
 Run Date and Time: 5/11/2012 3:36:00 PM

Project in English units

Project Description:

EOWB Higgins Creek and Higgins Creek Trib. A CBBEL 05/2012
 Proposed

Willow-Higgins Creek, Willow Creek, Higgins Creek, Cook County,
 Illinois
 Existing and Proposed Conditions OMP with As-Built Flood Control
 Reservoir Conditions
 10-, 50-, 100-, 500-, and 100-Year Floodway Storm
 Event Flood Profiles
 Christopher B. Burke Engineering, Ltd. 01/06

Updated for Final Willow Creek Relocation Alignment - OMP Project
 Competition Phase for proposed conditions (short feeder culverts with open
 channels through future western bypass area) - by HNTB/APS Consulting, Inc.
 03/2010.

PLAN DATA

Plan Title: Permit Nat -5 Str.- NAVD88
 Plan File : I:\ETA\HEC-RAS for IDOT 050712\HigginsCreek-Des.p08

Geometry Title: Permit Nat -5 Str. - NAVD88
 Geometry File : I:\ETA\HEC-RAS for IDOT 050712\HigginsCreek-Des.g22

Flow Title : Higgins 06 Survey - FINAL WILLOW NAVD88
 Flow File : I:\ETA\HEC-RAS for IDOT 050712\HigginsCreek-Des.f06

Plan Description:

Higgins Creek "Natural Condition" with FIS LOMR n-values. Five structures out:
 I-90 over Higgins Creek & Trib. A, Elmhurst Road, Touhy Avenue, and Mt.
 Prospect Road over Higgins Creek.

Plan Summary Information:

Number of:	Cross Sections = 110	Multiple Openings = 0
	Culverts = 5	Inline Structures = 0
	Bridges = 0	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

HigginsCreek-Des.rep

Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Higgins 06 Survey - FINAL WILLOW NAVD88
Flow File : I:\ETA\HEC-RAS for IDOT 050712\HigginsCreek-Des.f06

Flow Data (cfs)

River	Reach	RS	10-YEAR	50-YEAR	100-YEAR
500-YEAR					
HIGGINS CK	2	6.443	275	400	461
548					
HIGGINS CK	2	6.404	275	400	461
548					
HIGGINS CK	MAINSTEM	6.245	562	810	911
1253					
HIGGINS CK	MAINSTEM	6.021	564	810	915
1258					
HIGGINS CK	MAINSTEM	5.972	645	1100	1320
1930					
HIGGINS CK	MAINSTEM	5.558	907	1394	1623
2270					
HIGGINS CK	MAINSTEM	5.045	571	750	1000
2000					
HIGGINS CK	MAINSTEM	4.966	700	920	1260
2140					
HIGGINS CK	MAINSTEM	4.683	424	445	460
600					
HIGGINS CK	MAINSTEM	4.664	444	485	700
1600					
HIGGINS CK	MAINSTEM	4.588	454	503	730
1666					
HIGGINS TRIB A	CUP	25	222	308	342
414					
HIGGINS TRIB A	CUP	12	224	310	344
416					
HIGGINS TRIB A	CUP	3.01	294	407	452
574					

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
HIGGINS CK	MAINSTEM	10-YEAR		Known WS = 644.36
HIGGINS CK	MAINSTEM	50-YEAR		Known WS = 646.04
HIGGINS CK	MAINSTEM	100-YEAR		Known WS = 646.62
HIGGINS CK	MAINSTEM	500-YEAR		Known WS = 649.57

GEOMETRY DATA

Geometry Title: Permit Nat -5 Str. - NAVD88
Geometry File : I:\ETA\HEC-RAS for IDOT 050712\HigginsCreek-Des.g22

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
HIGGINS CK	2		1
HIGGINS CK	MAINSTEM	1	
HIGGINS TRIB A	CUP		1

JUNCTION INFORMATION

Name: 1
Description:
Energy computation Method

HigginsCreek-Des.rep

Length across Junction		Tributary		Reach	Length	Angle
River	Reach	River				
HIGGINS CK	2	to HIGGINS CK		MAINSTEM	200	
HIGGINS TRIB A	CUP	to HIGGINS CK		MAINSTEM	108	

CROSS SECTION

RIVER: HIGGINS CK
 REACH: 2 RS: 6.443

INPUT
 Description: EOWB surveyed section D33. Shifted 195' right for comparison.

Station	Elevation	Data	num=	24						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
209.1	662.93	227.2	662.89	252	662.38	263.7	662.29	288.9	660.74	
304.7	657.79	318.9	655.76	323	655.03	330.3	653.3	340.5	652.09	
346.1	652.21	352.9	656.28	364.7	656.39	370.2	655.35	376.1	653.32	
378.5	652.8	379.9	653.8	381.7	655	386.1	655.76	395	656.4	
404.5	657.41	415.6	659.72	425.9	662.05	434.1	663.58			

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
209.1 .065	304.7 .065	352.9 .075

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff	Contr.	Expan.
304.7	352.9	204	204	.1		.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: 2 RS: 6.404

INPUT
 Description: WH065

Station	Elevation	Data	num=	14					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	662.7	200	663.1	300	663.1	310	663.5	323	655.1
325	654.6	333	652.8	336	652.6	347	654.5	350	655.1
358	656.6	400	657.8	415	658.4	450	662.7		

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
100 .065	310 .065	358 .075

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff	Contr.	Expan.
310	358	270	270	.1		.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: 2 RS: 6.353

INPUT
 Description: EOWB surveyed section D32. Shifted 135' left for comparison.

Station	Elevation	Data	num=	19					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
270	661	275.1	659.42	292	660.3	304.1	659.84	312.5	658.6
321.1	654.67	321.8	654.16	324.1	654.04	327.3	654.04	328.8	652.29
337.4	651.64	349.2	650.86	352.1	653.94	359.5	653.45	384.2	658.59
402	659.13	428.5	660	436.5	661.69	445	663.04		

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
270 .065	312.5 .065	384.2 .075

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff	Contr.	Expan.
312.5	384.2	350	350	.1		.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: 2 RS: 6.287

INPUT

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Description: From topo. Replaces copy of WHO65 (6.404) adjusted for slope, modified to match current contours

Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
202	664	202	658.5	234	658	273	658	289	657
304	656	314	655	323	654	332	653	340	651.6
350	650.9	360	653	364	654	373	657	380	658
414	659	430	660	441	662				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
202	.065	289	.065	373	.075

Bank Sta: Left 289 Right 373 Lengths: Left Channel 0 Right 0 Coeff Contr. .1 Expan. .3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 6.245

INPUT
Description: 6.246 6.249 WH064 ** HIGGINS CREEK**

Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	670.82	82	670.72	82	658.62	180	655.72	210	653.72
330	653.72	340	651.02	370	651.02	390	657.72	450	659.72
500	663.72								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.07	330	.02	390	.07

Bank Sta: Left 330 Right 390 Lengths: Left Channel 75 Right 75 Coeff Contr. .1 Expan. .3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 6.231

INPUT
Description: EOWB surveyed section D31. Shifted 200' left. Overbanks extended per topo. Ignore tollway ditch on right side.

Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-53	661	-53	658.5	-38	658	-22.9	657.52	1.8	657.11
25.8	656.17	42.6	655.35	43.2	654.26	46.1	653.52	52.1	652.86
59.9	652.55	166.5	652.14	167.5	653.23	173	656.08	189.3	658.68
250.2	659.87	255.1	662.77						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-53	.07	42.6	.02	173	.07

Bank Sta: Left 42.6 Right 173 Lengths: Left Channel 274 Right 274 Coeff Contr. .1 Expan. .3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 6.179

INPUT
Description: EOWB surveyed section D30. Shifted 130' left. Overbanks extended per topo.

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1	661	1	659	19.9	658.19	43.5	657.86	68.3	657.46
71.8	654.65	81.4	652.73	123.5	651.56	135.2	660.96	159.9	660.85

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1	.07	68.3	.02	135.2	.07

Bank Sta: Left 1 Right 68.3 Lengths: Left Channel 135.2 Right 135.2 Coeff Contr. .1 Expan. .3

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68.3 135.2 575 575 575 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 6.069

INPUT
Description: EOWB surveyed section D29. Overbanks extended per topo.

Station Elevation Data		num= 17		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-20	661	-20	659	0	658.73	14.3	658.52	39.6	657.71
62.3	656.55	78.2	652.76	85.6	651.76	122.6	650.55	130.6	652.46
132.1	657.63	138.7	658.04	153.1	657.77	164.2	657.23	168.3	658.17
175.8	660.46	186.3	664.42						

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
-20	.07	62.3	.02	132.1	.07

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	62.3	132.1		180	180		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 6.035

INPUT
Description: XS in pond upstream of dam

Station Elevation Data		num= 16		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	656.29	40	656.21	45.7	655.94	56	654.69	62	654.11
65.5	653.15	69	651.21	75	651.59	89.8	651.45	94.6	651.29
100.5	652.18	100.6	653.21	109	654.77	135	655.61	150	655.83
174	660.24								

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	56	.02	109	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	56	109		6	6		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 6.034

INPUT
Description: Upstream top of dam

Station Elevation Data		num= 18		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	656.29	40	656.21	45.7	655.94	56	654.69	62	654.11
63	654.1	74.5	653.3	82.8	653.13	89.5	652.95	89.5	651.94
94.6	651.79	94.6	652.94	99	653.05	100.3	653.21	109	654.74
135	655.61	150	655.88	174	660.24				

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	74.5	.013	100.3	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	74.5	100.3		7	7		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 6.033

INPUT
Description: downstream top of dam

Station Elevation Data		num= 14		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	656.3	.1	654	47	653.04	62.3	653.26	70	653.51

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 89.3 652.78 89.5 651.61 94.6 651.61 94.8 652.62 100.6 652.72
 108 654.18 141 654.86 156 656.35 172 659.64

Manning's n Values num= 3
 Sta n Val Sta n Val
 0 .045 70 .013 100.6 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 70 100.6 1 1 1 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.032

INPUT

Description: creek downstream of dam

Station Elevation Data num= 14
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 656.3 .1 654 47 653.04 61.4 652.83 73 649.05
 81.5 648.33 89.4 647.83 94.5 648.16 99 649.11 101.2 649.7
 107 651.46 141 654.86 156 656.35 172 659.64

Manning's n Values num= 3
 Sta n Val Sta n Val
 0 .045 61.4 .029 107 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 61.4 107 62 62 62 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.021

INPUT

Description: 6.022 6.026 ** HIGGINS CREEK** WH062, extended per topo.

Approach - Elmhurst Rd in WSP2

Station Elevation Data num= 19
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 670.72 82 670.72 82 658.62 84 658.42 96 652.12
 99 650.12 108 649.42 120 650.12 124 652.12 124 654.12
 128 655.22 132 656 150 656 157 655.02 164 654.12
 166 654.12 191 659.52 245 660 270 661

Manning's n Values num= 3
 Sta n Val Sta n Val
 0 .04 84 .029 128 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 84 128 80 80 80 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.006

INPUT

Description: EOWB surveyed section D28. Shifted 80' left for comparison purposes. Overbanks extended per topo.

Station Elevation Data num= 22
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -55 661 -55 660 2.4 659.37 26.7 658.97 37.5 658.56
 45.1 656.79 54.3 652.69 55.5 651.41 59 649.73 59.8 648.55
 69.3 648.72 81.9 649.08 85.7 651.65 92.3 654.81 101.3 655.01
 107.8 654.44 116 653.96 125.6 656.4 136.7 657.9 216 659
 257 660 287 661

Manning's n Values num= 3
 Sta n Val Sta n Val
 -55 .06 45.1 .035 92.3 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 45.1 92.3 35 35 35 .3 .5

Ineffective Flow num= 1

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Sta L Sta R Elev Permanent
-55 26.7 661 T

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.9994*

INPUT

Description: Interpolated section. Overbanks extended per topo.

Station Elevation Data		num= 25		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-28	661	-28	659	22	659	40	658	42.08	656.92		
44.24	656.43	53.68	652.23	54.05	652.1	55.33	651.07	57.2	650.37		
59.07	649.44	59.92	648.38	69.63	648.53	77.96	648.73	80.81	649.14		
82.51	649.21	83.39	649.68	86.39	651.55	93.14	654.68	101.84	654.89		
104	653	120	657	153	658	260	660	290	661		

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-28	.06	44.24	.035	93.14	.06		

Bank Sta: Left 44.24 Right 93.14 Lengths: Left Channel 23 Right 23 Coeff Contr. .3 Expan. .5

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
-28 22 661 T

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.9950

INPUT

Description: Interpolated section immediately U/S of Elmhurst Rd. Shifted 80.5' right to align with existing bridge geometry. Overbanks extended per topo.

Station Elevation Data		num= 27		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-150	660	-150	659	38	659	106.96	657.79	115.71	657.5		
116.89	657.43	121.81	656.52	123.88	656.07	133.91	651.62	134.31	651.51		
135.67	650.72	137.65	650.18	139.63	649.16	140.54	648.21	150.46	648.35		
158.97	648.52	161.88	649.24	163.62	649.33	164.51	649.71	167.59	651.44		
174.48	654.55	182.88	654.77	190	657	222	658	285	659		
343	660	373	661								

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-150	.06	123.88	.035	174.48	.06		

Bank Sta: Left 123.88 Right 174.48 Lengths: Left Channel 125 Right 125 Coeff Contr. .3 Expan. .5

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
-150 38 660 T

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.972

INPUT

Description: 5.969 5.976 ** HIGGINS CREEK** WH061, shifted 82' right for comparison purposes. Overbanks extended per topo.

Approach -

wille Rd / Exit - Elmhurst Rd in WSP2

Station Elevation Data		num= 19		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-210	660	-210	659	-182	658	-44	657	72	656		
82	655.7	122	655.2	125	654.7	135	650	143	650		
147	648	152	647.9	157	648	161	650	166	650		
175	654.7	190	655	420	655	443	661				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-210	.06	122	.035	175	.06		

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Bank Sta: Left 122 Right 175 Lengths: Left 66 Channel 66 Right 66 Coeff Contr. .1 Expan. .3
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -210 -72 660 T
 335 443 661 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.959

INPUT

Description: EOWB surveyed section D24, shifted 320' left. Overbanks extended per topo.

Station Elevation Data num= 22
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -305 660 -300 659 -45.6 658 -13.4 657 -6.8 656.99
 7.7 656.5 30.6 655.6 41.1 654.11 53 649.25 57.4 649.48
 61.7 647.65 64.2 647.58 70 647.59 72.8 647.73 76.7 649.53
 81.7 649.65 92.9 654.08 100 654.98 114.5 655.62 125 655.8
 338 656 360 661

Manning's n Values num= 3
 Sta n Val Sta n Val
 -305 .06 41.1 .035 92.9 .06

Bank Sta: Left 41.1 Right 92.9 Lengths: Left 50 Channel 50 Right 50 Coeff Contr. .1 Expan. .3
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -305 -200 660 T
 245 360 661 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.950

INPUT

Description: EOWB surveyed section D23. Overbanks extended per topo.

Station Elevation Data num= 20
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -370 660 -345 659 -313 659 -35 658 0 657.72
 32.9 655.48 41 654.27 52.7 649.5 57.5 649.43 61.4 647.43
 66.3 647.42 71.3 647.5 75.4 649.4 79.9 649.46 91.5 654.22
 107 655.76 124 656.24 308 656.25 325 657 346 661

Manning's n Values num= 3
 Sta n Val Sta n Val
 -370 .06 41 .035 91.5 .06

Bank Sta: Left 41 Right 91.5 Lengths: Left 189 Channel 189 Right 189 Coeff Contr. .1 Expan. .3
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -370 -245 660 T
 240 346 661 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.914

INPUT

Description: EOWB surveyed section D22, upstream of MRWD entrance. Shifted 6' left. Shape revised per D23 template. Overbanks extended per topo.

Station Elevation Data num= 25
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -435 660 -430 659 -330 659 -262 658 -235 658
 -196 659 -158 660 -67 660 -37 658 14.6 657.65
 36.4 655.86 40 654.72 53.5 649.68 54 649.5 58.5 649.4
 63 647.35 66 647.31 73 647.35 77 649.4 81.5 649.5
 82.8 649.66 93.2 654.22 116.5 657.83 203 658 236 661

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Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -435 .06 40 .035 93.2 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 40 93.2 78 78 78 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -435 42.5 658 F
 94.5 236 660 F

CULVERT

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.911

INPUT
 Description: MWRD Kirie Entrance, inverts and road profile per survey, culvert size approximated.

Distance from Upstream XS = 18
 Deck/Roadway width = 41
 Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates
 num= 13

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-230		658			-230		658			-200		658		
-100		658			-27		658			0		658.63		
59		659.5			59		661.65			77.8		661.65		
77.9		660			134.1		660.54			183		661		
236		661												

Upstream Bridge Cross Section Data
 Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-435	660	-430	659	-330	659	-262	658	-235	658
-196	659	-158	660	-67	660	-37	658	14.6	657.65
36.4	655.86	40	654.72	53.5	649.68	54	649.5	58.5	649.4
63	647.35	66	647.31	73	647.35	77	649.4	81.5	649.5
82.8	649.66	93.2	654.22	116.5	657.83	203	658	236	661

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -435 .06 40 .035 93.2 .06

Bank Sta: Left Right Coeff Contr. Expan.
 40 93.2 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -435 42.5 658 F
 94.5 236 660 F

Downstream Deck/Roadway Coordinates
 num= 12

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-230		660			-230		658			-200		658		
-100		658			-27		658			0		658.63		
59		659.5			59		661.65			77.8		661.65		
77.9		660			134.1		660.54			183		661		

Downstream Bridge Cross Section Data
 Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-208	660	-208	658	-170	658	-106	658	-49	658
0	658.24	41.4	654.75	43.2	654.41	54.5	649.5	59	649.4
63	647.35	66	647.3	73	647.35	77	649.4	81.5	649.5
93.4	654.22	116.9	659.17	132	660	150	661		

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -208 .06 43.2 .035 93.4 .06

Bank Sta: Left Right Coeff Contr. Expan.
 43.2 93.4 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -208 55.5 657.5 F
 81.5 150 660 F

HigginsCreek-Des.rep

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 = 658
 Energy head used in spillway design =
 Spillway height used in design =
 weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name Shape Rise Span
 Culvert #1 Box 9 17
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 18 41 .012 .012 0 .4 1
 Upstream Elevation = 647.3
 Centerline Station = 68.4
 Downstream Elevation = 647.3
 Centerline Station = 68.4

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.899

INPUT
 Description: EOWB surveyed section D21, downstream of MRWD entrance. Shape revised per D23 template. Overbanks extended per topo.

Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-208	660	-208	658	-170	658	-106	658	-49	658
0	658.24	41.4	654.75	43.2	654.41	54.5	649.5	59	649.4
63	647.35	66	647.3	73	647.35	77	649.4	81.5	649.5
93.4	654.22	116.9	659.17	132	660	150	661		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-208	.06	43.2	.035	93.4	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 43.2 93.4 186 186 186 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-208	55.5	657.5	F
81.5	150	660	F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.86375*

INPUT
 Description: Interpolated XS

Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1.25	658.68	3.13	657.92	18.04	656.86	36.71	655.53	39.43	655.17
42.19	654.82	44.08	654.44	51.8	650.93	55.06	649.49	55.66	649.3
59.25	649.22	60.27	649.06	62.98	647.69	64.37	647.15	67.45	647.1
73.01	647.16	74.3	647.31	77.28	648.83	78.22	649.2	82.09	649.29
82.62	649.36	85.73	650.68	94.28	654.25	95.94	654.45	109.62	655.56
133.8	656.76	173.93	658.83						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-1.25	.06	44.08	.035	94.28	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 44.08 94.28 186 186 186 .3 .5

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.8285*

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INPUT

Description: Interpolated XS

Station Elevation Data		num= 27		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-2.5	659.12	2.09	657.94	17.69	657.02	37.24	655.86	40.09	655.37
42.97	654.89	44.95	654.47	52.87	650.72	56.21	649.23	56.82	649.09
60.5	649.01	61.55	648.73	64.32	647.32	65.75	646.96	68.9	646.9
74.34	646.97	75.61	647.28	78.52	648.75	79.44	649.01	83.23	649.09
83.75	649.23	86.78	650.61	95.15	654.28	98	654.58	121.31	655.94
162.53	656.84	230.95	658.48						

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
-2.5	.06	44.95	.035	95.15	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	44.95	95.15		186	186	.3	.5

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.79325*

INPUT

Description: Interpolated XS

Station Elevation Data		num= 28		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-3.75	659.56	1.04	657.97	17.35	657.19	37.77	656.2	40.74	655.56
43.76	654.96	45.83	654.5	53.93	650.52	57.35	648.96	57.98	648.89
61.75	648.81	62.82	648.39	65.66	646.96	67.12	646.76	70.35	646.7
75.67	646.79	76.91	647.24	79.76	648.68	80.66	648.81	84.36	648.9
84.87	649.09	87.84	650.54	96.03	654.31	100.05	654.7	133.01	656.32
191.26	656.92	287.98	658.14	290	660				

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
-3.75	.06	45.83	.035	96.03	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	45.83	96.03		186	186	.3	.5

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.758

INPUT

Description: EOWB surveyed section D20, replaces copy of WHO61 used as U/S culvert section. Shifted 17' rt. for comparison purposes. Shape revised per D23 template. Overbanks extended per topo.

Station Elevation Data		num= 22		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-5	660	0	658	17	657.35	38.3	656.54	41.4	655.76
46.7	654.53	55	650.31	58.5	648.7	63	648.6	67	646.6
71.8	646.5	77	646.6	81	648.6	85.5	648.7	88.9	650.47
96.9	654.34	102.1	654.83	144.7	656.7	220	657	345	657.8
390	658	390	660						

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
-5	.06	46.7	.035	96.9	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	46.7	96.9		395	395	.3	.5

Ineffective Flow		num= 2		Permanent	
Sta L	Sta R	Elev			
-5	41.3	657	F		
102.3	390	657	F		

CULVERT

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.721

INPUT

Description: 5.722 5.725 wille Road culvert per survey, roadway per

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topo.

Deck data is suspect in WSP-2 model; suspect points deleted.

Distance from Upstream XS = 22
 Deck/Roadway width = 350
 Weir Coefficient = 2.7

Upstream Deck/Roadway Coordinates

num= 10														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0		658			25		658		0	25		657		0
120		657		0	135		657		0	183		658		0
265		658		0	346		657.23		0	415		657.5		0
465		658		0										

Upstream Bridge Cross Section Data

Station Elevation Data num= 22									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-5	660	0	658	17	657.35	38.3	656.54	41.4	655.76
46.7	654.53	55	650.31	58.5	648.7	63	648.6	67	646.6
71.8	646.5	77	646.6	81	648.6	85.5	648.7	88.9	650.47
96.9	654.34	102.1	654.83	144.7	656.7	220	657	345	657.8
390	658	390	660						

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
-5	.06	46.7	.035	96.9	.06

Bank Sta: Left Right Coeff Contr. Expan.
 46.7 96.9 .3 .5

Ineffective Flow

num= 2			
Sta L	Sta R	Elev	Permanent
-5	41.3	657	F
102.3	390	657	F

Downstream Deck/Roadway Coordinates

num= 11														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-350		658			-245		658		0	-245		657		0
-150		657		0	-135		657		0	-87		658		0
-5		658		0	76		657.23		0	145		657.5		0
151		658		0	275		658							

Downstream Bridge Cross Section Data

Station Elevation Data num= 19									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-340	658	-340	657	-85	656	45	655.56	56.1	654.92
61.8	653.43	70.7	649.72	74	648.4	78.5	648.3	82.5	646.3
89.9	646.23	97.5	646.3	101.5	648.3	106	648.4	109	649.7
117.5	653.6	129.3	655.64	151	657.23	275	658		

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
-340	.06	56.1	.035	129.3	.06

Bank Sta: Left Right Coeff Contr. Expan.
 56.1 129.3 .3 .5

Ineffective Flow

num= 2			
Sta L	Sta R	Elev	Permanent
-340	76	656	F
105	275	656	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 = .95
 Elevation at which weir flow begins = 657
 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
 Culv # 1 Box 9 17
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
1	22	350	.012	.012	0	.4	1

Upstream Elevation = 646.5
 Centerline Station = 71.8

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Downstream Elevation = 646.5
Centerline Station = 90.5

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.683

INPUT

Description: EOWB surveyed section D19, replaces copy of WHO56 used as D/S culvert section. Shifted 45' rt. for comparison purposes. Shape revised per D18 template. Overbanks extended per topo.

Station Elevation Data		num= 19		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-340	658	-340	657	-85	656	45	655.56	56.1	654.92
61.8	653.43	70.7	649.72	74	648.4	78.5	648.3	82.5	646.3
89.9	646.23	97.5	646.3	101.5	648.3	106	648.4	109	649.7
117.5	653.6	129.3	655.64	151	657.23	275	658		

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
-340	.06	56.1	.035	129.3	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	56.1	129.3		172	172		.3	.5
Ineffective Flow	num= 2		Permanent					
Sta L	Sta R	Elev						
-340	76	656	F					
105	275	656	F					

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.650

INPUT

Description: EOWB surveyed section D18, shifted 20' rt. for comparison purposes. Overbanks extended per topo.

Station Elevation Data		num= 16		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-240	657	-120	656	20	655.63	61.2	653.83	62.4	653.62
74.3	648.41	78.7	648.17	83.2	646.15	92.3	646.1	97	646.16
101.7	648.22	105.1	648.26	117.6	653.69	118.2	653.97	134	657.56
153	657.86								

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
-240	.06	61.2	.035	118.2	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	61.2	118.2		5	5		.1	.3
Blocked Obstructions	num= 1							
Sta L	Sta R	Elev						
-20	20	657.5						

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.649

INPUT

Description: 5.650 5.654 Exit - Wille Rd. WHO56 ** HIGGINS CREEK**
Left

overbank adjusted per current topo.

Station Elevation Data		num= 14		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-240	657	-120	656	20	655.6	60	654.7	72	648.6
79	648.6	83	646.6	90	646.5	98	646.6	102	648.6
109	648.6	120	654.7	127	656.2	130	657.2		

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
-240	.06	60	.035	120	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	60	120		294	294		.1	.3

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Blocked Obstructions num= 1
 Sta L Sta R Elev
 -20 20 657.5

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.593

INPUT

Description: EOWB surveyed section D17, shifted 984' rt. for comparison purposes. Overbanks extended per topo. Low point in berm between tollway ditch and Higgins Creek. Therefore ditch is effective for 500-year flood.

Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
760	657	917	656	984.1	655.22	997	655.04	1010.4	654.99
1019	654.58	1027.7	653.57	1040	647.96	1043.8	647.98	1048.9	645.88
1053.3	645.87	1058	645.93	1063.8	645.88	1067.2	647.88	1072.4	647.93
1084.1	653.61	1090.5	655.19	1099.5	655.58	1107.4	655.4	1120	653
1126	653	1135	656	1155	660				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
760	.06	1027.7	.035	1084.1	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1027.7 1084.1 188 188 188 .1 .3
 Right Levee Station= 1099.5 Elevation= 655.6

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.558

INPUT

Description: 5.559 5.563 TAR35 ** HIGGINS CREEK**
 Both overbanks revised per current topo.

Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
756	657	918	656	1000	655.2	1025	653.9	1037	648.3
1041	648.2	1045	646.3	1048	647.7	1052	646.3	1060	646.3
1066	646.3	1070	647.7	1071	648.2	1075	648.3	1087	653.8
1091	655.7	1102	656.4	1117	652	1119	652	1142	660.7

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
756	.06	1025	.035	1087	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1025 1087 308 308 308 .1 .3
 Right Levee Station= 1102 Elevation= 655.6

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.500

INPUT

Description: EOWB surveyed section D16, shifted 991' rt. for comparison purposes. Both overbanks extended per topo.

Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
872	657	961	656	991	655.52	1009.6	654.78	1021.9	654.05
1026.3	653.4	1030.7	651.44	1038.3	647.67	1042.4	647.62	1046.3	645.68
1049.7	645.55	1054.2	645.58	1058.3	645.56	1061.2	645.54	1065.1	647.55
1069.4	647.68	1081.5	653.65	1091.2	656.18	1102.4	657.91	1115.5	658.12
1124	657	1139	655	1151	652	1154	651.5	1157	652
1166	655	1190	660						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
872	.06	1026.3	.035	1081.5	.06

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

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1026.3 1081.5 21 21 21 .1 .3
 Right Levee Station= 1115.5 Elevation= 654.8

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.496

INPUT
 Description: 5.497 5.500 TAR34 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data		num=		23	
Sta	Elev	Sta	Elev	Sta	Elev
835	657	953	656	1000	655.3
1042	647.9	1043	647.6	1046	645.9
1064	647.5	1065	647.8	1070	647.9
1106	658.3	1120	658	1138	655
1159	652	1173	655	1194	660

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
835	.06	1026	.035	1081	.06

Bank Sta: Left 1026 Right 1081 Lengths: Left Channel 458 Right 458 Coeff Contr. .1 Expan. .3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 835 870 657 T
 Right Levee Station= 1106 Elevation= 654.7

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.409

INPUT
 Description: EOWB surveyed section D15, shifted 947' rt. for comparison purposes. Extended right per TAR 33.

Station Elevation Data		num=		26	
Sta	Elev	Sta	Elev	Sta	Elev
963.4	661.09	982.6	657.33	995	654.68
1023.7	647.24	1026.8	645.8	1028.6	645.05
1044.9	646.05	1047.1	647.15	1052.2	647.37
1088	656.77	1101.9	657.16	1113	656.43
1165	650	1169	649	1171	649
1209	660			1176	650

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
963.4	.06	1008	.035	1063	.06

Bank Sta: Left 1008 Right 1063 Lengths: Left Channel 6 Right 6 Coeff Contr. .1 Expan. .3

Right Levee Station= 1101.9 Elevation= 653.9

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.408

INPUT
 Description: 5.409 5.413 Approach- NW Tollway TAR33 ** HIGGINS CREEK**

Left side modified to match current topography.

Station Elevation Data		num=		21	
Sta	Elev	Sta	Elev	Sta	Elev
960	661	980	657	1000	654.3
1024	647.3	1028	645.3	1036	645.3
1052	647.5	1064	653.8	1091	656.8
1159	650	1164	649	1166	649
1201	660			1169	650

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
960	.06	1007	.035	1064	.06

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Bank Sta: Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
1007	1064		72.1	72.1		.3	.5
Right Levee	Station=	1091	Elevation=	653.9			

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.394

INPUT

Description: Interpolated from topo, 5.408, and 5.378, shifted 518' right to match bridge CL.

5.409 5.413 Approach- NW Tollway TAR33 **

HIGGINS CREEK**

Left side modified to match current topography.

Station	Elevation	Data	num=	12					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1478	661	1498	657	1508	654.3	1512	652.5	1530.2	647.3
1534.4	645.3	1542.6	645.3	1553	645.5	1573.8	646.6	1596	652.5
1609	656.8	1782	657.7						

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
1478	.06	1512	.035	1596	.06

Bank Sta: Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
1512	1596		323	323		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.335

INPUT

Description: Copy of existing condition 5.340.

5.341 5.345 Exit - NW Tollway

TAR32 ** HIGGINS CREEK**

Station	Elevation	Data	num=	15					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1439	659.7	1499	654.8	1506	654.1	1510	654	1528	647.2
1537	645.4	1554	645.3	1576	645.8	1581	647.1	1597	652
1610	652	1717	654.7	3497	655.7	3530	656.7	3610	657.7

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
1439	.075	1510	.06	1597	.075

Bank Sta: Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
1510	1597		50	50		.1	.3

Ineffective Flow	num=	1
Sta L	Sta R	Elev
1645	3610	659
		F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.324

INPUT

Description: EOWB surveyed section D12, shifted 1010' rt. for comparison purposes. Overbanks refined per topo.

Station	Elevation	Data	num=	27					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
944	658	958	657	991	656	1009.4	655	1038.1	652.88
1050	649.55	1056.4	646.73	1064.6	645.5	1079.3	645.86	1093.2	645.28
1104.6	646.79	1112	649.85	1117.7	650.99	1123.5	651.36	1131.5	651.84
1146.1	652.42	1170	655	1180	656	1230	656	1240	655
1263	647	1265	647	1275	652	1315	653	1455	654
1630	655	1900	656						

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
944	.05	1038.1	.035	1117.7	.05

Bank Sta: Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
1038.1	1117.7		184	184		.1	.3

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Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 1180 1900 657 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.289

INPUT
 Description: 5.290 5.293 TAR31 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
900	658.7	1000	655.3	1046	652.4	1069	646.7	1076	645.6
1095	645.2	1115	645.6	1123	646.7	1139	652.3	1335	654
1515	655	1600	656						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
900	.05	1046	.035	1139	.05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1046 1139 173 173 173 .1 .3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 1180 1600 657 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.256

INPUT
 Description: EOWB surveyed section D11, shifted 970' rt. for comparison purposes. Overbanks refined per topo.

Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
900	658.7	970	656.21	987.6	655.92	1016.8	655.15	1045.7	652.92
1056.1	651.98	1062.5	651.33	1067.3	650.15	1074.3	647.24	1085	645.34
1097.9	645.11	1109.3	645.39	1118.7	645.59	1127.3	647.53	1136	650.72
1143	652.68	1146.2	653.01	1150	653.21	1153.5	653.52	1160	655
1283	655	1457	655	1590	656				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
900	.05	1045.7	.035	1143	.05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1045.7 1143 108 108 108 .1 .3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 1185 1590 657 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.236

INPUT
 Description: 5.237 5.240 TAR30 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
920	658.7	1000	655.8	1053	652.5	1078	646.4	1083	645.6
1098	645.2	1118	645.5	1122	646.5	1140	653.9	1149	655
1190	656	1360	656						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
920	.05	1053	.035	1140	.05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1053 1140 272 272 272 .1 .3

CROSS SECTION

HigginsCreek-Des.rep

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.184

INPUT
 Description: 5.185 5.189 TAR29 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data		num= 15		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
940	658	1000	655	1044	653.1	1068	646.3	1073	644.7
1090	644.5	1107	644.6	1113	646.3	1138	654.6	1153	654.9
1160	653.5	1370	653.5	1375	655.7	1378	656.7	1381	657.7

Manning's n Values		num= 4		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
940	.05	1044	.035	1138	.05	1160	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1044	1138		95	95		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.166

INPUT
 Description: EOWB surveyed section D10, shifted 1000' rt. for comparison
 purposes. Overbanks refined per topo.

Station Elevation Data		num= 23		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
969	657.7	979	656.7	990	656.5	1011.7	654.64	1022.8	654.25
1029.1	653.45	1044.8	649.51	1054.7	646.45	1060	644.6	1070.5	644.48
1077.7	644.6	1087.1	644.58	1095.1	644.49	1097.7	645.11	1106.7	648.02
1124.9	653.51	1126.7	653.67	1130.9	653.8	1135.7	653.86	1145	653.5
1445	653.5	1455	655.7	1460	657.7				

Manning's n Values		num= 4		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
969	.05	1029.1	.035	1124.9	.05	1145	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1029.1	1124.9		117	117		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.144

INPUT
 Description: 5.145 5.149 TAR28 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data		num= 14		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
965	659	985	657	1000	656.5	1031	654	1057	646.3
1062	644.6	1079	644.4	1098	644.5	1103	646.3	1127	653.8
1137	653.5	1515	653.5	1525	655	1530	656		

Manning's n Values		num= 4		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
965	.05	1031	.035	1127	.05	1137	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1031	1127		266	266		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.094

INPUT
 Description: 5.095 5.098 TAR27 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data		num= 20		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
974	657.7	976	656.7	979	655.7	986	654.7	998	653.7

HigginsCreek-Des.rep									
1000	653.6	1012	652.5	1016	651.7	1034	646.3	1040	644.5
1061	643.1	1079	644.4	1086	646.3	1109	653.6	1120	653.5
1650	653.5	1652	654.7	1655	655.7	1658	656.7	1680	657.7

Manning's n Values		num=		4	
Sta	n Val	Sta	n Val	Sta	n Val
974	.05	1012	.035	1109	.05
				1120	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1012	1109		237	237		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.049

INPUT
Description: EOWB surveyed section D9, shifted 985' rt. for comparison purposes. overbanks refined per topo.

Station Elevation Data num= 20									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
955	657.7	958	656.7	961	655.7	964	654.7	976	653.7
993.2	653.2	1001	652.15	1021.7	645.18	1027.6	643.91	1046.3	643.43
1062.4	643.8	1068.5	645.01	1087.3	652.26	1128.7	653.17	1133.5	653.5
1746	653.5	1752	654.7	1757	655.7	1762	656.7	1787	657.7

Manning's n Values		num=		4	
Sta	n Val	Sta	n Val	Sta	n Val
955	.05	1001	.035	1087.3	.05
				1133.5	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1001	1087.3		22	22		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.045

INPUT
Description: 5.046 5.049 Approach - MWRD TAR26 ** HIGGINS CREEK** Overbanks refined per topo.

Station Elevation Data num= 22									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
950	659.7	952	658.7	955	657.7	958	656.7	961	655.7
964	654.7	976	653.7	1000	653.4	1004	652.5	1021	646.3
1028	644.5	1044	643.8	1066	644.3	1073	646.3	1088	652.5
1102	652.7	1110	653.5	1746	653.5	1752	654.7	1757	655.7
1762	656.7	1787	657.7						

Manning's n Values		num=		4	
Sta	n Val	Sta	n Val	Sta	n Val
950	.05	1004	.035	1088	.05
				1110	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1004	1088		130	130		.3	.5

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.020

INPUT
Description: 5.021 5.024 Immediately Upstream - MWRD ** HIGGINS CREEK** Cross Section copied from Approach section. overbanks refined per topo.

Station Elevation Data num= 22									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
950	659.7	952	658.7	955	657.7	958	656.7	961	655.7
964	654.7	976	653.7	1000	653.4	1004	652.5	1021	646.3
1028	644.5	1044	643.8	1066	644.3	1073	646.3	1088	652.5
1102	652.7	1110	653.5	1746	653.5	1752	654.7	1757	655.7
1762	656.7	1787	657.7						

Manning's n Values		num=		4	
Sta	n Val	Sta	n Val	Sta	n Val

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950 .05 1004 .035 1088 .05 1110 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1004 1088 80 80 80 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 950 1022 653.3 F
 1071 1787 652.7 F

CULVERT

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.012

INPUT
 Description: 5.013 5.017 MWRD1 Cell 1 Crossing
 Deck realigned to match section stationing.
 Distance from Upstream XS = 10
 Deck/Roadway width = 60
 weir Coefficient = 2.7

Upstream Deck/Roadway Coordinates
 num= 25

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
944	660.72		947	659.72		950	658.72	
953	657.72		956	656.72		959	654.72	
1000	653.82		1018	653.46		1046	652.64	
1062	652.61		1105.5	653.15		1130	654.42	
1325	652.72		1336	651.72		1348	650.72	
1355	650.22		1444	649.92		1454	650.72	
1465	651.72		1477	652.72		2120	653.72	
2140	654.72		2145	655.72		2220	656.72	
2370	657.72							

Upstream Bridge Cross Section Data

Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
950	659.7	952	658.7	955	657.7	958	656.7	961	655.7
964	654.7	976	653.7	1000	653.4	1004	652.5	1021	646.3
1028	644.5	1044	643.8	1066	644.3	1073	646.3	1088	652.5
1102	652.7	1110	653.5	1746	653.5	1752	654.7	1757	655.7
1762	656.7	1787	657.7						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
950	.05	1004	.035	1088	.05	1110	.03

Bank Sta: Left Right Coeff Contr. Expan.
 1004 1088 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 950 1022 653.3 F
 1071 1787 652.7 F

Downstream Deck/Roadway Coordinates

num= 26

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
663	660.72		944	660.72		947	659.72	
950	658.72		953	657.72		956	656.72	
959	654.72		1000	653.82		1038	653.46	
1066	652.64		1082	652.61		1125.5	653.15	
1130	654.42		1325	652.72		1336	651.72	
1348	650.72		1355	650.22		1444	649.92	
1454	650.72		1465	651.72		1477	652.72	
2120	653.72		2140	654.72		2145	655.72	
2220	656.72		2370	657.72				

Downstream Bridge Cross Section Data

Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
666	656.7	669	655.7	672	654.7	678	653.7	1000	653.4
1003	652.8	1024	645.5	1030	644.5	1065	643.8	1090	643.8
1096	645.5	1117	653	1126	653.5	1949	653.5	1956	654.7
1963	655.7	1970	656.7						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
666	.03	1000	.05	1003	.035	1117	.05	1126	.03

HigginsCreek-Des.rep

Bank Sta: Left Right Coeff Contr. Expan.
 1003 1117 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 666 1042 652 F
 1090 1970 652 F
 Blocked Obstructions num= 1
 Sta L Sta R Elev
 1145 1190 657

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins = 652.61
 Energy head used in spillway design =
 Spillway height used in design =
 weir crest shape = Broad Crested

Number of Culverts = 2

Culvert Name Shape Rise Span
 Culv # 1 Box 5 7
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 10 60 .015 .015 0 .4 1
 Upstream Elevation = 643.77
 Centerline Station = 1036
 Downstream Elevation = 643.84
 Centerline Station = 1056

Culvert Name Shape Rise Span
 Culv # 2 Box 5 9
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 10 60 .015 .015 0 .4 1

Number of Barrels = 2
 Upstream Elevation = 643.77
 Centerline Stations
 Sta. Sta.
 1045 1055
 Downstream Elevation = 643.84
 Centerline Stations
 Sta. Sta.
 1065 1075

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.005

INPUT

Description: 5.006 5.009 Immediately Downstream - MWRD ** HIGGINS CREEK**
 Cross Section copied from Exit section. Overbanks refined per topo.

Station Elevation Data num= 17
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 666 656.7 669 655.7 672 654.7 678 653.7 1000 653.4
 1003 652.8 1024 645.5 1030 644.5 1065 643.8 1090 643.8
 1096 645.5 1117 653 1126 653.5 1949 653.5 1956 654.7
 1963 655.7 1970 656.7

Manning's n Values num= 5
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 666 .03 1000 .05 1003 .035 1117 .05 1126 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1003 1117 69 69 69 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 666 1042 652 F
 1090 1970 652 F
 Blocked Obstructions num= 1
 Sta L Sta R Elev

HigginsCreek-Des.rep

1145 1190 657

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.992

INPUT
Description: 4.993 4.996 Exit - MWRD TAR25 ** HIGGINS CREEK**
Overbanks

refined per topo.									
Station Elevation Data num= 19									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
844	657	850	655	920	654	1000	653.4	1003	652.8
1024	645.5	1030	644.5	1065	643.8	1090	643.8	1096	645.5
1117	653	1126	653.5	1130	653.9	1185	653.9	1190	653.5
1949	653.5	1956	654.7	1963	655.7	1970	656.7		

Manning's n Values num= 4									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
844	.05	1003	.035	1117	.05	1190	.03		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.									
Blocked Obstructions num= 1									
Sta L	Sta R	Elev							
1003	1117		62	62	62		.1	.3	
1135	1180	657							

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.980

INPUT
Description: EOWB surveyed section D8, shifted 975' rt. for comparison purposes. overbanks refined per topo.

Station Elevation Data num= 18									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
780	656	785	655	790	654	988.1	653.72	997.8	653.45
1019.2	644.49	1027.1	643.75	1037.7	643.55	1047.2	643.76	1055	644.56
1079.7	652.45	1089.1	653.47	1110.2	653.9	1150	653.9	1155	653.5
1920	653.5	1933	655	1940	656				

Manning's n Values num= 5									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
780	.03	988.1	.05	997.8	.035	1079.7	.05	1155	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.									
Blocked Obstructions num= 1									
Sta L	Sta R	Elev							
997.8	1079.7		73	73	73		.1	.3	
1113	1143	656							

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.966

INPUT
Description: 4.967 4.971 TAR24 ** HIGGINS CREEK**
Overbanks refined per topo.

Station Elevation Data num= 17									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
537	656.7	601	655.7	617	654.7	630	654	1000	654
1002	653.6	1018	645.6	1024	643.8	1038	643.4	1050	643.8
1057	645.6	1079	652.7	1087	653.5	1927	653.5	1934	654.7
1940	655.7	1945	656.7						

Manning's n Values num= 5									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
537	.03	1000	.05	1002	.035	1079	.05	1087	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.									
Blocked Obstructions num= 1									
Sta L	Sta R	Elev							
1002	1079		115	115	115		.1	.3	

CROSS SECTION

HigginsCreek-Des.rep

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.944

INPUT
 Description: 4.945 4.949 TAR23 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data		num= 21		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
385	656.7	400	655.7	423	654.7	433	653.7	1000	653.3		
1003	652.8	1017	645.5	1023	643.2	1035	642.8	1048	643.3		
1054	645.5	1067	650	1084	650	1839	649.7	1843	650.7		
1847	651.7	1851	652.7	1882	653.7	1890	654.7	1898	655.7		
1925	656.7										

Manning's n Values		num= 5		Sta		n Val		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
385	.03	1000	.05	1003	.035	1067	.05	1084	.03		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1003	1067		86	86		.1	.3
Ineffective Flow			num=	1				
Sta L	Sta R	Elev	Permanent					
1067	1925	653.5	T					

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.928

INPUT
 Description: EOWB surveyed section D7, shifted 980' rt. for comparison purposes. Overbanks refined per topo.

Station Elevation Data		num= 16		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
455	656	460	655	465	654	983.5	653.78	996.5	652.72		
1001.2	652.61	1018	644.44	1023.5	642.73	1033.3	642.48	1043.6	642.77		
1050.7	644.4	1078.9	653.3	1098.7	653.31	1866	654	1876	655		
1886	656										

Manning's n Values		num= 5		Sta		n Val		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
455	.05	460	.03	1001.2	.035	1078.9	.05	1098.7	.03		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1001.2	1078.9		14	14		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.925

INPUT
 Description: 4.926 4.930 TAR22 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data		num= 19		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
320	656.7	330	655.7	350	654.7	827	654.3	960	653.7		
1000	652.7	1002	652.7	1017	645.5	1024	643.1	1036	643		
1046	643.3	1054	645.5	1076	653	1082	653.1	1839	653.2		
1856	653.7	1872	654.7	1886	655.7	1916	656.7				

Manning's n Values		num= 5		Sta		n Val		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
320	.05	330	.03	1002	.035	1076	.05	1082	.03		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1002	1076		55	55		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.915

INPUT

HigginsCreek-Des.rep

Description: 4.916 4.920 TAR21 ** HIGGINS CREEK**
 Overbanks refined per topo.
 Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
415	655.5	420	654	954	654	972	648	1002	647
1014	643	1046	643	1070	651	1102	652	1690	653
1850	654	1860	655.5						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
415	.065	954	.065	1002	.04	1070	.065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1002 1070 159 159 159 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.885

INPUT
 Description: 4.886 4.889 TAR20 ** HIGGINS CREEK**
 Overbanks refined per topo.
 Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
420	655	425	654	987	653.9	1005	647.9	1034	646.9
1046	642.9	1080	642.9	1090	649	1110	650	1220	651
1395	652	1640	653	1730	655				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
420	.065	987	.065	1034	.04	1090	.065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1034 1090 101 101 101 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.866

INPUT
 Description: 4.867 4.870 TAR19 ** HIGGINS CREEK**
 Overbanks refined per topo.
 Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
395	655	400	654	1009	653.9	1027	647.9	1058	646.9
1071	642.4	1099	642.4	1110	649	1132	650	1215	651
1405	652	1617	653	1740	655				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
395	.065	1009	.065	1058	.04	1110	.065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1058 1110 100 100 100 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.847

INPUT
 Description: 4.848 4.851 TAR18 ** HIGGINS CREEK**
 Overbanks refined per topo.
 Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
260	655	265	654	985	653.9	1003	647.9	1034	646.9
1049	642	1073	642	1088	649	1110	650	1200	651
1370	652	1510	653	1550	654	1590	655		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
260	.065	985	.065	1034	.04	1110	.065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1034 1110 100 100 100 .1 .3

HigginsCreek-Des.rep

1034 1110 101 101 101 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.828

INPUT
Description: 4.829 4.832 TAR17 ** HIGGINS CREEK**

Overbanks refined per topo.

Station Elevation Data		num= 13		Sta	Elev	Sta	Elev	Sta	Elev
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
235	655	240	654	980	653.8	998	647.8	1029	646.8
1044	641.9	1068	641.9	1100	650	1215	651	1365	652
1495	653	1550	654	1600	655				

Manning's n Values		num= 4		Sta	n Val	Sta	n Val
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
235	.065	980	.065	1029	.04	1100	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1029	1100		139	139		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.801

INPUT
Description: 4.802 4.806 TAR16 ** HIGGINS CREEK**

Overbanks refined per topo.

Station Elevation Data		num= 13		Sta	Elev	Sta	Elev	Sta	Elev
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
240	655	245	654	998	653.8	1016	647.8	1047	646.8
1060	642.5	1088	642.5	1110	650	1210	651	1360	652
1440	653	1565	654	1617	655				

Manning's n Values		num= 4		Sta	n Val	Sta	n Val
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
240	.065	998	.065	1047	.04	1110	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1047	1110		99	99		.1	.3

Ineffective Flow	num= 1
Sta L Sta R Elev Permanent	
1588 1617 655 T	

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.783

INPUT
Description: 4.784 4.787 TAR15 ** HIGGINS CREEK**

Overbanks refined per topo.

Station Elevation Data		num= 11		Sta	Elev	Sta	Elev	Sta	Elev
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
260	655	265	654	1038	653.8	1056	647.8	1087	646.8
1101	642	1127	642	1150	650	1225	651	1480	653
1620	655								

Manning's n Values		num= 4		Sta	n Val	Sta	n Val
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
260	.065	1038	.065	1087	.04	1150	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1087	1150		43	43		.1	.3

Ineffective Flow	num= 1
Sta L Sta R Elev Permanent	
1550 1620 655 T	

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.774

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INPUT

Description: 4.775 4.779 TAR14 ** HIGGINS CREEK**

Overbanks refined per topo.

Station	Elevation	Data	num=	11						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
270	655	275	654	1058	653.7	1076	647.7	1107	646.7	
1120	642.5	1148	642.5	1170	650	1230	651	1472	653	
1595	655									

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
270	.065	1058	.065	1170	.04	1170	.065

Bank Sta: Left 1107 Right 1170 Lengths: Left Channel 18 Right 18 Coeff Contr. .1 Expan. .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
1522 1595 655 T

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.771

INPUT

Description: EOWB surveyed section D6, shifted 1100' rt. for comparison purposes. Overbanks refined per topo.

Station	Elevation	Data	num=	20						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
310	655	315	654	1099.1	653.91	1117.7	648.31	1124.3	647.86	
1146.1	647.02	1150.1	645.94	1152.4	642.96	1157	642.05	1186.9	642.52	
1191.5	642.96	1193.9	643.89	1203.3	648.97	1207.4	649.66	1217.5	649.9	
1227.5	650.03	1235	650.14	1270	651	1510	653	1620	655	

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
310	.065	1099.1	.065	1146.1	.04	1203.3	.065

Bank Sta: Left 1146.1 Right 1203.3 Lengths: Left Channel 57 Right 57 Coeff Contr. .1 Expan. .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
1540 1620 655 T

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.760

INPUT

Description: 4.761 4.765 TAR13 ** HIGGINS CREEK**

Overbanks refined per topo.

Station	Elevation	Data	num=	11						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
320	655	325	654	1117	653.7	1135	647.7	1166	646.7	
1182	641.5	1204	641.5	1222	650	1270	651	1440	652	
1455	655									

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
320	.065	1117	.065	1166	.04	1222	.065

Bank Sta: Left 1166 Right 1222 Lengths: Left Channel 95 Right 95 Coeff Contr. .1 Expan. .3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.742

INPUT

Description: 4.743 4.747 TAR12 ** HIGGINS CREEK**

Overbanks refined per topo.

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

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 340 655 344 654 1124 653.72 1142 647.72 1173 646.72
 1186 642.22 1214 642.22 1237 650 1270 651 1365 652
 1485 652 1500 655

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 340 .065 1124 .065 1173 .04 1237 .065
 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1173 1237 156 156 156 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.713

INPUT
 Description: 4.714 4.717 TAR11 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 325 655 330 654 1087 653.7 1105 647.7 1136 646.7
 1149 642.4 1177 642.4 1200 650 1240 651 1400 652
 1595 654 1600 655

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 325 .065 1087 .065 1136 .04 1200 .065
 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1136 1200 80 80 80 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.698

INPUT
 Description: 4.699 4.702 TAR10 ** HIGGINS CREEK**
 Extended left and right per D5.

Station Elevation Data num= 11
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 295 655 300 654 1063 653.6 1081 647.6 1112 646.6
 1125 642.2 1153 642.2 1188 651 1378 652 1613 654
 1618 655

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 295 .065 1063 .065 1112 .04 1188 .065
 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1081 1188 20 20 20 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.694

INPUT
 Description: EOWB surveyed section D5, shifted 1060' rt. for comparison
 purposes. Overbanks refined per topo.

Station Elevation Data num= 21
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 295 655 300 654 1060 654 1064.2 653.1 1083.3 647.56
 1108.1 646.93 1116.8 645.63 1119.3 643.81 1126 641.6 1139.8 641.46
 1152.2 641.72 1157.8 645.74 1160.6 643.84 1167.7 648.16 1175.5 650.04
 1186.5 650.48 1186.8 650.56 1207.9 651 1390 652 1625 654
 1630 655

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 295 .065 1060 .065 1116.8 .04 1157.8 .065
 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1116.8 1157.8 57 57 57 .1 .3

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CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.683

INPUT

Description: 4.684 4.688 TAR9 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
295	655	300	654	1046	653.6	1064	647.6	1095	646.6
1115	639.9	1129	639.9	1171	651	1200	652	1582	655

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
295	.065	1046	.065	1095	.04	1171	.065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1095 1171 26 26 26 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
295	1079	651.72	F
1150	1582	651.87	F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.678

INPUT

Description: 4.679 4.683 Immediately Upstream - Touhy Ave Reservoir Control.
 Overbanks refined per topo.

Cross Section copied from Approach section. ** HIGGINS CREEK**

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
265	655	266	654	1046	653.6	1064	647.6	1095	646.6
1115	639.9	1129	639.9	1171	653.9	1192	653.9	1582	655

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
265	.065	1046	.065	1095	.04	1171	.065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1095 1171 55 55 55 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
265	1111	652.62	F
1133	1582	652.62	F

CULVERT

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.673

INPUT

Description: 4.674 4.677 MWRD TARCONT Cell 2 crossing per survey.

Deck

realigned to match section stationing.

Distance from upstream XS = 1
 Deck/Roadway width = 53
 weir Coefficient = 2.7

Upstream Deck/Roadway Coordinates num= 7

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
1000	651.72		1070	651.72		1096	652.18	
1122	652.38		1142	652.26		1160	651.93	
1176	651.87							

Upstream Bridge Cross Section Data

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
265	655	266	654	1046	653.6	1064	647.6	1095	646.6
1115	639.9	1129	639.9	1171	653.9	1192	653.9	1582	655

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Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 265 .065 1046 .065 1095 .04 1171 .065

Bank Sta: Left Right Coeff Contr. Expan.
 1095 1171 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 265 1111 652.62 F
 1133 1582 652.62 F

Downstream Deck/Roadway Coordinates num= 7
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
 1025 651.72 1095 651.72 1120 652.18
 1147 652.38 1167 652.26 1185 651.93
 1201 651.87

Downstream Bridge Cross Section Data num= 12
 Station Elevation Data
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 455 655 455 654 855 654 1071 653.6 1089 647.6
 1120 646.6 1139 640.2 1155 640.2 1196 653.9 1217 653.9
 1273.6 654.39 1275 655

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 455 .065 1120 .04 1196 .065

Bank Sta: Left Right Coeff Contr. Expan.
 1120 1196 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 455 1137 651.22 F
 1157 1275 651.22 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 = .95
 Elevation at which weir flow begins = 651.72
 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
 Culv # 1 Box 4 9
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 1 53 .015 .015 0 .4 1

Number of Barrels = 2
 Upstream Elevation = 642.71

Centerline Stations
 Sta. Sta.
 1117 1127

Downstream Elevation = 642.72

Centerline Stations
 Sta. Sta.
 1142 1152

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.668

INPUT

Description: 4.669 4.672 Immediately Downstream - (TARCONT)Touhy Ave
 Reservoir Control

Cross section copied from Exit section. **
 HIGGINS CREEK** Overbanks refined per topo.

Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 455 655 455 654 855 654 1071 653.6 1089 647.6
 1120 646.6 1139 640.2 1155 640.2 1196 653.9 1217 653.9
 1273.6 654.39 1275 655

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Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 455 .065 1120 .04 1196 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1120 1196 19 19 19 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 455 1137 651.22 F
 1157 1275 651.22 F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.664

INPUT
 Description: 4.665 4.669 TAR8 ** HIGGINS CREEK**
 Original WSP2 Approach -
 Touhy Ave / Exit - TARCONT
 Extended left and right per D4.

Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 455 655 455 654 855 654 1071 653.6 1089 647.6
 1120 646.6 1139 640.2 1155 640.2 1196 653.9 1217 653.9
 1273.6 654.39 1275 655

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 455 .065 1120 .04 1196 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1120 1196 27 27 27 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 455 1132.5 651 F
 1161.5 1275 651 F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.659

INPUT
 Description: EOWB surveyed section D4, shifted 1075' rt. for comparison
 purposes. Overbanks refined per topo.

Station Elevation Data num= 21
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 455 655 455 654 855 654 905 653 965 652
 1075 650.9 1090.2 650.55 1106.3 649.74 1113.4 648.29 1119.5 646.26
 1120.8 643.56 1124.8 639.8 1168.3 638.42 1173.6 643.5 1176.4 645.87
 1181.7 648.12 1190 650.46 1211.9 650.77 1219 650.79 1273.6 654.39
 1275 655

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 455 .065 1113.4 .04 1190 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1113.4 1190 103 103 103 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 455 1125 651 F
 1169 1275 651 F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.639

INPUT
 Description: 4.640 4.644 Immediately Upstream - Touhy Ave ** HIGGINS CREEK**
 Cross Section copied from Approach section. Extended left and
 right to match surveyed section D3.

Station Elevation Data num= 10

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Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
550	656	550	654	1071	653.6	1089	647.6	1120	646.6
1139	640.2	1155	640.2	1196	653.9	1217	653.9	1220	655

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
550	.065	1120	.04	1196	.065

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

1120	1196	1	1	1	.1	.3
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CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.638

INPUT

Description: EOWB surveyed section D3, shifted 1057' rt. for comparison purposes. Extended left along RR, which controls OT.

Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
550	656	550	654	1070.9	653.78	1087	651.23	1100.1	648.26
1111.4	645.77	1121.5	644.69	1124.8	643.64	1129.8	642.35	1138.8	641.45
1152.9	640.8	1156.2	641.52	1160.7	641.61	1171.3	643.04	1172.8	647.27
1200.6	653.59	1206.8	654.39	1220	655				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
550	.065	1111.4	.04	1172.8	.065

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

1111.4	1172.8	153.4	153.4	153.4	.1	.3
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CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.611

INPUT

Description: EOWB surveyed section D2. Shifted 25' left for comparison purposes. Then shifted 1100' right. Extended left for RR, which controls OT.

Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
585	656	710	655	920	654	925	653	950	653
955	654	1000	655	1100	655	1118.2	651.33	1168	650.03
1176.3	648.04	1192.5	642.93	1197.9	642.42	1204.4	642.03	1218.5	642.24
1226	642.36	1248	650.08	1261	654.64				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
585	.085	1168	.04	1248	.04

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

1168	1248	119	119	119	.1	.3
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CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.588

INPUT

Description: 4.589 4.592 Exit - Touhy Ave TAR7 ** HIGGINS CREEK** Extended left to allow roadway OT for 500-year flow. Shifted 1095' left for comparison purposes.

Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-156	655	-116	654	-106	652	-98	652	-78	654
-50	655	0	655	34	654	70	650.8	90	643.1
105	641.8	123	641.8	152	653.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-156	.085	70	.04	152	.04

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

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70 152 98 98 98 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.569

INPUT
Description: EOWB surveyed section D1. Extended left to allow roadway OT for 500-year flow.

Station Elevation Data		num= 17		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-275	654.5	-217	653	-214	652	-206	651.8	-198	652
-180	655	31.4	654.86	45.3	653.08	84.5	642.23	93	641.26
95	640	99.8	639.09	106.3	639.34	117.5	638.78	122.8	641.42
135.3	644.26	169.9	655.01						

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-275	.04	84.5	.04	122.8	.04		

Bank Sta: Left 84.5 Right 122.8 Lengths: Left Channel 144 Right 144 Coeff Contr. .1 Expan. .3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.542

INPUT
Description: 4.543 4.543 Approach - Mt Prospect Rd TAR6
Extended left to allow roadway OT for 500-year flow.

Station Elevation Data		num= 10		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-425	655	-425	653	-382	652	-366	652	-358	651.4
-335	655	0	655.4	45	639.1	80	639.1	125	655.4

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-425	.04	45	.04	80	.04		

Bank Sta: Left 45 Right 80 Lengths: Left Channel 23 Right 23 Coeff Contr. .1 Expan. .3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.537

INPUT
Description: 4.538 4.539 Immediately Upstream - Mt Prospect Rd
Cross Section copied from Approach section. Refined per topo for OT, 11/10.

Station Elevation Data		num= 13		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-485	655	-485	652.5	-457	652	-435	651.7	-423	652
-405	651.3	-395	652	-380	653	-355	655	0	655.4
45	639.1	80	639.1	125	655.4				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-485	.04	45	.04	80	.04		

Bank Sta: Left 45 Right 80 Lengths: Left Channel 174 Right 174 Coeff Contr. .1 Expan. .3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.505

INPUT
Description: 4.506 4.506 Immediately Downstream - Mt Prospect Rd
Cross

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Section copied from Exit section. Refined per topo for OT, 11/10.

Station Elevation Data		num= 11		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-564	653	-564	652	-478	650	-450	649.4	-150	649.4
-132	650	-100	653	0	652.8	45	637.5	80	637.5
125	652.8								

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-564	.04	45	.04	80	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	45	80		103	103		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.485

INPUT
Description: 4.486 4.486 Exit - Mt Prospect Rd TAR4 revised per current topo
reflecting relocated Willow Creek.

Station Elevation Data		num= 8		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	652	92	649	137	649	182	653	237	653
295	637.5	394	637.5	452	653				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.075	237	.04	452	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	237	452		0	0		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 25

INPUT
Description: River Mile or Station US5

Station Elevation Data		num= 10		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.22	11.547	671.72	80.829	670.72	84.293	669.72	92.376	667.72
103.923	667.72	113.161	669.72	121.244	670.72	132.791	671.72	138.564	672.22

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.055	84.293	.035	113.161	.035		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	84.293	113.161		100	100		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 24

INPUT
Description: River Mile or Station US4

Station Elevation Data		num= 8		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	674.72	12	671.72	45	671.72	55	666.72	65	666.72
75	670.72	78	671.72	83	672.22				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.055	45	.035	75	.055		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	45	75		200	200		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A

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REACH: CUP RS: 23

INPUT

Description: River Mile or Station US3

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	674.72	9	671.72	19	671.72	30	672.72	39	671.72
50	667.72	65	667.72	75	670.72	78	671.72		

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.055	39	.035	75	.055

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	39	75		200	200		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 22

INPUT

Description: River Mile or Station US2

Station Elevation Data		num= 7		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	674.72	60	673.72	75	669.72	80	664.72	105	664.72
116	670.72	120	671.72						

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.055	75	.035	116	.055

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	75	116		300	300		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 21

INPUT

Description: River Mile or Station US1

Station Elevation Data		num= 8		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	673.72	10	671.72	70	670.72	80	669.72	95	664.72
105	664.72	126	670.72	130	671.72				

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.055	80	.035	126	.055

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	80	126		100	100		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 20

INPUT

Description: River Mile or Station EGV8

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.72	8	671.72	40	670.72	72	669.72	87	664.72
95	664.72	117	668.72	120	669.72	134	670.72		

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.055	72	.035	117	.055

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	72	117		100	100		.1	.3

CROSS SECTION

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RIVER: HIGGINS TRIB A
 REACH: CUP RS: 19

INPUT

Description: River Mile or Station EGV7

Station Elevation Data		num= 12		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.72	8	671.72	38	670.72	61	669.72	77	667.72
89	665.72	92	664.42	94	664.72	107	667.72	160	668.72
180	669.72	245	670.72						

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.055	61	.035	107	.055

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	61	107		100	100		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 18

INPUT

Description: River Mile or Station EGV6

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
40	670.72	75	669.72	87	664.72	92	664.22	97	664.72
135	667.72	175	668.72	192	669.72	219	670.72		

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
40	.04	75	.035	135	.055

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	75	135		100	100		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 17

INPUT

Description: River Mile or Station EGV5

Station Elevation Data		num= 11		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	673.72	12	670.72	81	669.72	92	664.12	100	664.12
104	664.72	119	666.72	135	667.72	159	668.72	215	669.72
235	670.72								

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.055	81	.035	104	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	81	104		100	100		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 16

INPUT

Description: River Mile or Station EGV4

Station Elevation Data		num= 12		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.72	15	669.72	50	668.72	84	667.72	92	664.02
101	664.02	120	665.72	130	666.72	136	667.72	145	668.72
190	669.72	265	670.72						

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.055	84	.035	130	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	84	130		100	100		.1	.3

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CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 15

INPUT

Description: River Mile or Station EGV3

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.22	12	669.72	15	668.72	90	667.72	101	663.72
107	663.72	118	667.72	124	668.72	139	669.72	169	670.72

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	90	.035	118	.055

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
90	118	100	100	100	.1	.3	

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 14

INPUT

Description: River Mile or Station EGV2

Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.22	15	669.72	18	668.72	78	667.72	90	663.72
102	663.72	112	667.72	129	672.72				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	15	.035	112	.055

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
15	112	100	100	100	.1	.3	

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 13

INPUT

Description: River Mile or Station EGV1

Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	671.72	12	669.72	25	663.72	39	663.72	47	666.72
55	667.72	75	668.22						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	12	.035	55	.035

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
12	55	280	280	280	.1	.3	

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 12

INPUT

Description: River Mile or Station 281C

Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	669.72	8	668.72	16	667.72	23	666.72	37	665.72
39	664.72	40	663.72	41	662.72	56	662.72	58	663.72
60	664.72	62	665.72	64	666.72	66	667.72	68	668.72

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	16	.035	66	.04

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Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 16 66 140 140 140 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 11

INPUT

Description: River Mile or Station 281CC
 Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
955	672.72	975	671.72	980	670.72	983	669.72	992	664.72
994	663.72	1000	663.02	1005	663.72	1008	664.72	1018	669.72
1022	670.72	1028	671.72						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
955	.04	983	.035	1018	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 983 1018 140 140 140 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 10

INPUT

Description: River Mile or Station 281B
 Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
779	671.72	840	670.72	845	669.72	852	664.72	857	663.72
862	662.72	869	663.72	873	664.72	882	669.72	890	670.72
1015	670.72	1100	670.92						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
779	.04	845	.035	882	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 845 882 138 138 138 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 9

INPUT

Description: River Mile or Station 281BB
 Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
960	670.72	976	669.72	992	664.72	995	663.72	997	662.72
1000	662.22	1008	662.72	1010	663.72	1015	664.72	1030	669.72
1040	670.72								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
960	.04	976	.035	1030	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 976 1030 140 140 140 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 8

INPUT

Description: River Mile or Station 281
 Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
700	672.42	800	671.72	878	670.42	886	667.92	896	662.12
899	661.32	900	661.02	901	661.32	915	662.42	943	669.92
1000	669.52	1100	669.22	1200	669.22				

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Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 700 .035 878 .042 943 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 878 943 68 68 68 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 7

INPUT

Description: River Mile or Station 281X

Station Elevation Data num= 14
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 990 668.72 1026 667.72 1033 666.72 1042 665.72 1055 664.72
 1058 663.72 1060 662.72 1070 661.02 1075 662.72 1080 663.72
 1082 664.72 1085 665.72 1095 667.72 1102 668.72

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 990 .04 1033 .04 1095 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1033 1095 91 91 91 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 6.001

INPUT

Description: River Mile or Station 281X used just upstream of crossing.

Station Elevation Data num= 14
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 990 668.72 1026 667.72 1033 666.72 1042 665.72 1055 664.72
 1058 663.72 1060 662.72 1070 661.02 1075 662.72 1080 663.72
 1082 664.72 1085 665.72 1095 667.72 1102 668.72

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 990 .04 1033 .04 1095 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1033 1095 72.5 72.5 72.5 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 990 1058 666.72 F
 1082 1102 666.72 F

CULVERT

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 6

INPUT

Description: Culvert(s) @ 281A
 Distance from Upstream XS = 1
 Deck/Roadway width = 70.5
 weir Coefficient = 2.7
 Upstream Deck/Roadway Coordinates

num= 4
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
 990 667.02 -.28 1090 666.72 -.28 1190 666.72 -.28
 1290 666.92 -.28

Upstream Bridge Cross Section Data

Station Elevation Data num= 14
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 990 668.72 1026 667.72 1033 666.72 1042 665.72 1055 664.72
 1058 663.72 1060 662.72 1070 661.02 1075 662.72 1080 663.72
 1082 664.72 1085 665.72 1095 667.72 1102 668.72

Manning's n Values num= 3

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Sta n Val Sta n Val Sta n Val
 990 .04 1033 .04 1095 .04

Bank Sta: Left Right Coeff Contr. Expan.
 1033 1095 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 990 1058 666.72 F
 1082 1102 666.72 F

Downstream Deck/Roadway Coordinates
 num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
799	667.02	-.28	900	666.72	-.28	1000	666.72	-.28
1100	666.92	-.28						

Downstream Bridge Cross Section Data

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
799	675.72	800	670.42	878	669.12	886	666.62	896	660.82
899	660.02	900	659.72	901	660.02	915	661.12	943	669.62
1000	668.22	1001	675.72						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 799 .04 878 .045 943 .04

Bank Sta: Left Right Coeff Contr. Expan.
 878 943 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 799 896 666.72 F
 919 1001 666.72 F

Upstream Embankment side slope = 3.362 horiz. to 1.0 vertical
 Downstream Embankment side slope = 3.362 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins = 666.72
 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
 Culv # 1 Box 4.85 15.8

FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - wingwall flared 30 to 75 deg.

Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
1	70.5	.012	.012	.012	0	.4	1

Upstream Elevation = 660.72
 Centerline Station = 1070

Downstream Elevation = 660.4
 Centerline Station = 907.9

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 5.999

INPUT

Description: River Mile or Station 281AA used just downstream of crossing.

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
799	675.72	800	670.42	878	669.12	886	666.62	896	660.82
899	660.02	900	659.72	901	660.02	915	661.12	943	669.62
1000	668.22	1001	675.72						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 799 .04 878 .045 943 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 878 943 149 149 149 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 799 896 666.72 F

919 1001 666.72 F

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 5

INPUT

Description: River Mile or Station 281AA. Reach lengths adjusted by -350' to match 2008 FIS profile length.

Station Elevation Data		num= 12							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
799	675.72	800	670.42	878	669.12	886	666.62	896	660.82
899	660.02	900	659.72	901	660.02	915	661.12	943	669.62
1000	668.22	1001	675.72						

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
799	.04	878	.045	943	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	878	943		1505	1505		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 4.1

INPUT

Description: EOWB surveyed section C7. Shifted 73' left for comparison. Uses n-values to match FIS XS 4.

Station Elevation Data		num= 12							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
61	671.59	95.5	659.27	161.9	656.84	245.5	655.81	253.3	652.52
259.1	651.98	263.5	652.16	265.9	654.01	273.7	655.63	292.5	655.71
322.2	656.23	340.5	661.74						

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
61	.045	245.5	.035	273.7	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	245.5	273.7		335	260		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 3.8

INPUT

Description: EOWB surveyed section C6. Extended left using 1' topo.

Station Elevation Data		num= 18							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-105	662	-71	657	-65	657	-35	660	-10	657
0	656.18	27.6	656.11	51.9	656.07	75.8	655.37	106.8	654.87
143.3	655.08	146.2	652.54	149.8	651.03	176	652.81	182.5	654.73
192.7	658.58	202	662.51	210.2	662.67				

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
-105	.04	143.3	.035	182.5	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	143.3	182.5		460	380		.1	.3
Left Levee		Station=	-35	Elevation=	660			

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 3.5

INPUT

Description: EOWB surveyed section C5. Extended left using 1' topo.

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

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-52	662	-18	656	0	655.74	27.6	655	63.4	653.91	
93.2	654.36	96.1	652.27	101.3	651.09	115.2	651.3	117.5	652.15	
120.6	653.53	123.5	654.43	130.5	656.59	143.5	661.63	146.3	662.05	
148.8	662.11									

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -52 .04 93.2 .035 123.5 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 93.2 123.5 490 490 490 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 3.1

INPUT

Description: EOWB surveyed section C4. Extended left using 1' topo, skewed 30 deg. Shifted right 1730' for comparison to d/s.

Station Elevation Data num= 14											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1675	661	1704	656	1730	655.13	1743.86	654.2	1759.53	653.27		
1773.56	653.95	1777.03	652.53	1786.12	651.27	1796.25	650.91	1801.53	652.61		
1805.34	653.79	1812.53	656.68	1821.71	660.42	1824.92	661.02				

Manning's n Values num= 3
 Sta n Val Sta n Val
 1675 .04 1773.56 .035 1805.34 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1773.56 1805.34 55 55 55 .1 .3

Skew Angle = 30

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 3.01

INPUT

Description: Cross section interpolated upstream of proposed culvert extension. Overbanks corrected using 1' topo.

Station Elevation Data num= 12											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1673	661	1707	656	1721	655	1775	654	1779	653		
1784	650.5	1792	650.5	1797	653	1800	654	1808	655		
1825	660	1837	662								

Manning's n Values num= 3
 Sta n Val Sta n Val
 1673 .04 1775 .04 1800 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1775 1800 305.75 305.75 305.75 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 1

INPUT

Description: Cross Section 1 from Tributary A LOMR '07 = WSP2 XS 280AA

Station Elevation Data num= 13											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1499	665.72	1500	655.02	1600	654.82	1700	654.32	1777	655.02		
1784	651.22	1787	650.62	1794	650.22	1797	651.22	1802	653.42		
1900	653.32	2000	654.42	2001	665.72						

Manning's n Values num= 3
 Sta n Val Sta n Val
 1499 .05 1777 .05 1802 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1777 1802 0 0 0 .1 .3

HigginsCreek-Des.rep

SUMMARY OF MANNING'S N VALUES

River:HIGGINS CK

Reach	River Sta.	n1	n2	n3	n4	n5
2	6.443	.065	.065	.075		
2	6.404	.065	.065	.075		
2	6.353	.065	.065	.075		
2	6.287	.065	.065	.075		
MAINSTEM	6.245	.07	.02	.07		
MAINSTEM	6.231	.07	.02	.07		
MAINSTEM	6.179	.07	.02	.07		
MAINSTEM	6.069	.07	.02	.07		
MAINSTEM	6.035	.045	.02	.045		
MAINSTEM	6.034	.045	.013	.045		
MAINSTEM	6.033	.045	.013	.045		
MAINSTEM	6.032	.045	.029	.045		
MAINSTEM	6.021	.04	.029	.04		
MAINSTEM	6.006	.06	.035	.06		
MAINSTEM	5.9994*	.06	.035	.06		
MAINSTEM	5.9950	.06	.035	.06		
MAINSTEM	5.972	.06	.035	.06		
MAINSTEM	5.959	.06	.035	.06		
MAINSTEM	5.950	.06	.035	.06		
MAINSTEM	5.914	.06	.035	.06		
MAINSTEM	5.911	Culvert				
MAINSTEM	5.899	.06	.035	.06		
MAINSTEM	5.86375*	.06	.035	.06		
MAINSTEM	5.8285*	.06	.035	.06		
MAINSTEM	5.79325*	.06	.035	.06		
MAINSTEM	5.758	.06	.035	.06		
MAINSTEM	5.721	Culvert				
MAINSTEM	5.683	.06	.035	.06		
MAINSTEM	5.650	.06	.035	.06		
MAINSTEM	5.649	.06	.035	.06		
MAINSTEM	5.593	.06	.035	.06		
MAINSTEM	5.558	.06	.035	.06		
MAINSTEM	5.500	.06	.035	.06		
MAINSTEM	5.496	.06	.035	.06		
MAINSTEM	5.409	.06	.035	.06		
MAINSTEM	5.408	.06	.035	.06		
MAINSTEM	5.394	.06	.035	.06		
MAINSTEM	5.335	.075	.06	.075		
MAINSTEM	5.324	.05	.035	.05		
MAINSTEM	5.289	.05	.035	.05		
MAINSTEM	5.256	.05	.035	.05		
MAINSTEM	5.236	.05	.035	.05		
MAINSTEM	5.184	.05	.035	.05	.03	
MAINSTEM	5.166	.05	.035	.05	.03	
MAINSTEM	5.144	.05	.035	.05	.03	
MAINSTEM	5.094	.05	.035	.05	.03	
MAINSTEM	5.049	.05	.035	.05	.03	
MAINSTEM	5.045	.05	.035	.05	.03	
MAINSTEM	5.020	.05	.035	.05	.03	
MAINSTEM	5.012	Culvert				
MAINSTEM	5.005	.03	.05	.035	.05	.03
MAINSTEM	4.992	.05	.035	.05	.03	
MAINSTEM	4.980	.03	.05	.035	.05	.03
MAINSTEM	4.966	.03	.05	.035	.05	.03
MAINSTEM	4.944	.03	.05	.035	.05	.03
MAINSTEM	4.928	.05	.03	.035	.05	.03
MAINSTEM	4.925	.05	.03	.035	.05	.03
MAINSTEM	4.915	.065	.065	.04	.065	
MAINSTEM	4.885	.065	.065	.04	.065	
MAINSTEM	4.866	.065	.065	.04	.065	
MAINSTEM	4.847	.065	.065	.04	.065	
MAINSTEM	4.828	.065	.065	.04	.065	
MAINSTEM	4.801	.065	.065	.04	.065	
MAINSTEM	4.783	.065	.065	.04	.065	
MAINSTEM	4.774	.065	.065	.04	.065	
MAINSTEM	4.771	.065	.065	.04	.065	
MAINSTEM	4.760	.065	.065	.04	.065	
MAINSTEM	4.742	.065	.065	.04	.065	
MAINSTEM	4.713	.065	.065	.04	.065	
MAINSTEM	4.698	.065	.065	.04	.065	
MAINSTEM	4.694	.065	.065	.04	.065	
MAINSTEM	4.683	.065	.065	.04	.065	

		HigginsCreek-Des.rep			
MAINSTEM	4.678	.065	.065	.04	.065
MAINSTEM	4.673	Culvert			
MAINSTEM	4.668	.065	.04	.065	
MAINSTEM	4.664	.065	.04	.065	
MAINSTEM	4.659	.065	.04	.065	
MAINSTEM	4.639	.065	.04	.065	
MAINSTEM	4.638	.065	.04	.065	
MAINSTEM	4.611	.085	.04	.04	
MAINSTEM	4.588	.085	.04	.04	
MAINSTEM	4.569	.04	.04	.04	
MAINSTEM	4.542	.04	.04	.04	
MAINSTEM	4.537	.04	.04	.04	
MAINSTEM	4.505	.04	.04	.04	
MAINSTEM	4.485	.075	.04	.04	

River:HIGGINS TRIB A

Reach	River Sta.	n1	n2	n3
CUP	25	.055	.035	.035
CUP	24	.055	.035	.055
CUP	23	.055	.035	.055
CUP	22	.055	.035	.055
CUP	21	.055	.035	.055
CUP	20	.055	.035	.055
CUP	19	.055	.035	.055
CUP	18	.04	.035	.055
CUP	17	.055	.035	.035
CUP	16	.055	.035	.035
CUP	15	.055	.035	.055
CUP	14	.055	.035	.055
CUP	13	.04	.035	.035
CUP	12	.04	.035	.04
CUP	11	.04	.035	.04
CUP	10	.04	.035	.04
CUP	9	.04	.035	.04
CUP	8	.035	.042	.04
CUP	7	.04	.04	.04
CUP	6.001	.04	.04	.04
CUP	6	Culvert		
CUP	5.999	.04	.045	.04
CUP	5	.04	.045	.04
CUP	4.1	.045	.035	.045
CUP	3.8	.04	.035	.04
CUP	3.5	.04	.035	.04
CUP	3.1	.04	.035	.04
CUP	3.01	.04	.04	.04
CUP	1	.05	.05	.05

SUMMARY OF REACH LENGTHS

River: HIGGINS CK

Reach	River Sta.	Left	Channel	Right
2	6.443	204	204	204
2	6.404	270	270	270
2	6.353	350	350	350
2	6.287	0	0	0
MAINSTEM	6.245	75	75	75
MAINSTEM	6.231	274	274	274
MAINSTEM	6.179	575	575	575
MAINSTEM	6.069	180	180	180
MAINSTEM	6.035	6	6	6
MAINSTEM	6.034	7	7	7
MAINSTEM	6.033	1	1	1
MAINSTEM	6.032	62	62	62
MAINSTEM	6.021	80	80	80
MAINSTEM	6.006	35	35	35
MAINSTEM	5.9994*	23	23	23
MAINSTEM	5.9950	125	125	125
MAINSTEM	5.972	66	66	66
MAINSTEM	5.959	50	50	50
MAINSTEM	5.950	189	189	189
MAINSTEM	5.914	78	78	78

HigginsCreek-Des.rep

MAINSTEM	5.911	Culvert		
MAINSTEM	5.899	186	186	186
MAINSTEM	5.86375*	186	186	186
MAINSTEM	5.8285*	186	186	186
MAINSTEM	5.79325*	186	186	186
MAINSTEM	5.758	395	395	395
MAINSTEM	5.721	Culvert		
MAINSTEM	5.683	172	172	172
MAINSTEM	5.650	5	5	5
MAINSTEM	5.649	294	294	294
MAINSTEM	5.593	188	188	188
MAINSTEM	5.558	308	308	308
MAINSTEM	5.500	21	21	21
MAINSTEM	5.496	458	458	458
MAINSTEM	5.409	6	6	6
MAINSTEM	5.408	72.1	72.1	72.1
MAINSTEM	5.394	323	323	323
MAINSTEM	5.335	50	50	50
MAINSTEM	5.324	184	184	184
MAINSTEM	5.289	173	173	173
MAINSTEM	5.256	108	108	108
MAINSTEM	5.236	272	272	272
MAINSTEM	5.184	95	95	95
MAINSTEM	5.166	117	117	117
MAINSTEM	5.144	266	266	266
MAINSTEM	5.094	237	237	237
MAINSTEM	5.049	22	22	22
MAINSTEM	5.045	130	130	130
MAINSTEM	5.020	80	80	80
MAINSTEM	5.012	Culvert		
MAINSTEM	5.005	69	69	69
MAINSTEM	4.992	62	62	62
MAINSTEM	4.980	73	73	73
MAINSTEM	4.966	115	115	115
MAINSTEM	4.944	86	86	86
MAINSTEM	4.928	14	14	14
MAINSTEM	4.925	55	55	55
MAINSTEM	4.915	159	159	159
MAINSTEM	4.885	101	101	101
MAINSTEM	4.866	100	100	100
MAINSTEM	4.847	101	101	101
MAINSTEM	4.828	139	139	139
MAINSTEM	4.801	99	99	99
MAINSTEM	4.783	43	43	43
MAINSTEM	4.774	18	18	18
MAINSTEM	4.771	57	57	57
MAINSTEM	4.760	95	95	95
MAINSTEM	4.742	156	156	156
MAINSTEM	4.713	80	80	80
MAINSTEM	4.698	20	20	20
MAINSTEM	4.694	57	57	57
MAINSTEM	4.683	26	26	26
MAINSTEM	4.678	55	55	55
MAINSTEM	4.673	Culvert		
MAINSTEM	4.668	19	19	19
MAINSTEM	4.664	27	27	27
MAINSTEM	4.659	103	103	103
MAINSTEM	4.639	1	1	1
MAINSTEM	4.638	153.4	153.4	153.4
MAINSTEM	4.611	119	119	119
MAINSTEM	4.588	98	98	98
MAINSTEM	4.569	144	144	144
MAINSTEM	4.542	23	23	23
MAINSTEM	4.537	174	174	174
MAINSTEM	4.505	103	103	103
MAINSTEM	4.485	0	0	0

River: HIGGINS TRIB A

Reach	River Sta.	Left	Channel	Right
CUP	25	100	100	100
CUP	24	200	200	200
CUP	23	200	200	200
CUP	22	300	300	300
CUP	21	100	100	100
CUP	20	100	100	100
CUP	19	100	100	100

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CUP	18	100	100	100
CUP	17	100	100	100
CUP	16	100	100	100
CUP	15	100	100	100
CUP	14	100	100	100
CUP	13	280	280	280
CUP	12	140	140	140
CUP	11	140	140	140
CUP	10	138	138	138
CUP	9	140	140	140
CUP	8	68	68	68
CUP	7	91	91	91
CUP	6.001	72.5	72.5	72.5
CUP	6	Culvert		
CUP	5.999	149	149	149
CUP	5	1505	1505	1505
CUP	4.1	335	260	175
CUP	3.8	460	380	340
CUP	3.5	490	490	490
CUP	3.1	55	55	55
CUP	3.01	305.75	305.75	305.75
CUP	1	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: HIGGINS CK

Reach	River Sta.	Contr.	Expan.
2	6.443	.1	.3
2	6.404	.1	.3
2	6.353	.1	.3
2	6.287	.1	.3
MAINSTEM	6.245	.1	.3
MAINSTEM	6.231	.1	.3
MAINSTEM	6.179	.1	.3
MAINSTEM	6.069	.1	.3
MAINSTEM	6.035	.1	.3
MAINSTEM	6.034	.1	.3
MAINSTEM	6.033	.1	.3
MAINSTEM	6.032	.1	.3
MAINSTEM	6.021	.1	.3
MAINSTEM	6.006	.3	.5
MAINSTEM	5.9994*	.3	.5
MAINSTEM	5.9950	.3	.5
MAINSTEM	5.972	.1	.3
MAINSTEM	5.959	.1	.3
MAINSTEM	5.950	.1	.3
MAINSTEM	5.914	.3	.5
MAINSTEM	5.911	Culvert	
MAINSTEM	5.899	.3	.5
MAINSTEM	5.86375*	.3	.5
MAINSTEM	5.8285*	.3	.5
MAINSTEM	5.79325*	.3	.5
MAINSTEM	5.758	.3	.5
MAINSTEM	5.721	Culvert	
MAINSTEM	5.683	.3	.5
MAINSTEM	5.650	.1	.3
MAINSTEM	5.649	.1	.3
MAINSTEM	5.593	.1	.3
MAINSTEM	5.558	.1	.3
MAINSTEM	5.500	.1	.3
MAINSTEM	5.496	.1	.3
MAINSTEM	5.409	.1	.3
MAINSTEM	5.408	.3	.5
MAINSTEM	5.394	.1	.3
MAINSTEM	5.335	.1	.3
MAINSTEM	5.324	.1	.3
MAINSTEM	5.289	.1	.3
MAINSTEM	5.256	.1	.3
MAINSTEM	5.236	.1	.3
MAINSTEM	5.184	.1	.3
MAINSTEM	5.166	.1	.3
MAINSTEM	5.144	.1	.3
MAINSTEM	5.094	.1	.3
MAINSTEM	5.049	.1	.3

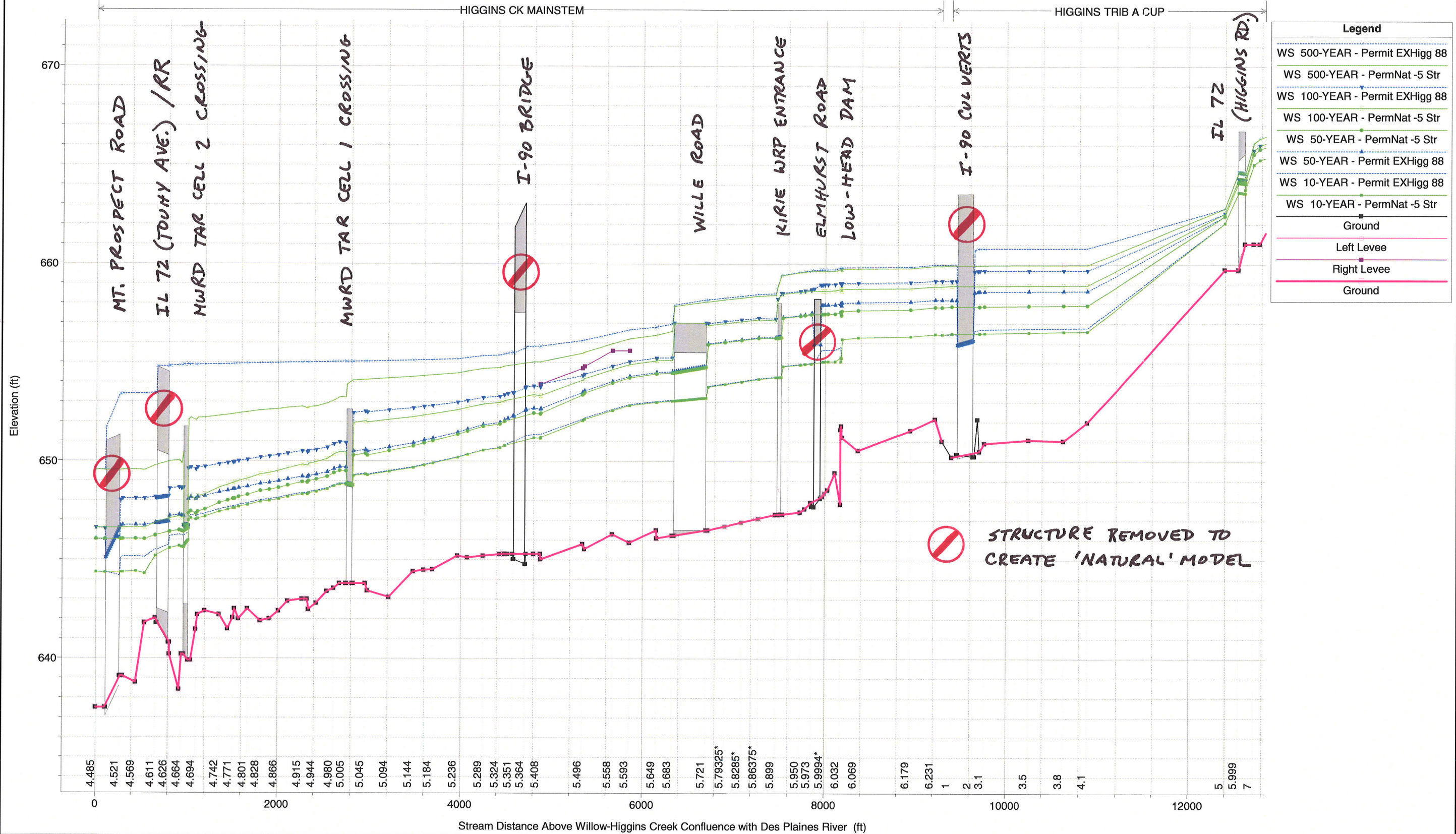
HigginsCreek-Des.rep

MAINSTEM	5.045	.3	.5
MAINSTEM	5.020	.3	.5
MAINSTEM	5.012	Culvert	
MAINSTEM	5.005	.3	.5
MAINSTEM	4.992	.1	.3
MAINSTEM	4.980	.1	.3
MAINSTEM	4.966	.1	.3
MAINSTEM	4.944	.1	.3
MAINSTEM	4.928	.1	.3
MAINSTEM	4.925	.1	.3
MAINSTEM	4.915	.1	.3
MAINSTEM	4.885	.1	.3
MAINSTEM	4.866	.1	.3
MAINSTEM	4.847	.1	.3
MAINSTEM	4.828	.1	.3
MAINSTEM	4.801	.1	.3
MAINSTEM	4.783	.1	.3
MAINSTEM	4.774	.1	.3
MAINSTEM	4.771	.1	.3
MAINSTEM	4.760	.1	.3
MAINSTEM	4.742	.1	.3
MAINSTEM	4.713	.1	.3
MAINSTEM	4.698	.1	.3
MAINSTEM	4.694	.1	.3
MAINSTEM	4.683	.3	.5
MAINSTEM	4.678	.3	.5
MAINSTEM	4.673	Culvert	
MAINSTEM	4.668	.3	.5
MAINSTEM	4.664	.3	.5
MAINSTEM	4.659	.3	.5
MAINSTEM	4.639	.1	.3
MAINSTEM	4.638	.1	.3
MAINSTEM	4.611	.1	.3
MAINSTEM	4.588	.1	.3
MAINSTEM	4.569	.1	.3
MAINSTEM	4.542	.1	.3
MAINSTEM	4.537	.1	.3
MAINSTEM	4.505	.1	.3
MAINSTEM	4.485	.1	.3

River: HIGGINS TRIB A

Reach	River Sta.	Contr.	Expan.
CUP	25	.1	.3
CUP	24	.1	.3
CUP	23	.1	.3
CUP	22	.1	.3
CUP	21	.1	.3
CUP	20	.1	.3
CUP	19	.1	.3
CUP	18	.1	.3
CUP	17	.1	.3
CUP	16	.1	.3
CUP	15	.1	.3
CUP	14	.1	.3
CUP	13	.1	.3
CUP	12	.1	.3
CUP	11	.1	.3
CUP	10	.1	.3
CUP	9	.1	.3
CUP	8	.1	.3
CUP	7	.1	.3
CUP	6.001	.3	.5
CUP	6	Culvert	
CUP	5.999	.3	.5
CUP	5	.1	.3
CUP	4.1	.1	.3
CUP	3.8	.1	.3
CUP	3.5	.1	.3
CUP	3.1	.1	.3
CUP	3.01	.1	.3
CUP	1	.1	.3

NATURAL CONDITION
PERMIT MODEL RESULTS



PERMIT
 MOD. EX. VS. 'NATURAL' PROFILES

PERMIT - NATURAL CONDITIONS

HEC-RAS Plan: PermNat -5 Str Profile: 10-YEAR

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	25	10-YEAR	222.00	667.72	670.82		670.95	0.001495	2.99	79.46	48.42	0.33
HIGGINS TRIB A	CUP	24	10-YEAR	222.00	666.72	670.87		670.81	0.001422	2.97	74.63	27.78	0.32
HIGGINS TRIB A	CUP	23	10-YEAR	222.00	667.72	669.39	669.39	670.07	0.016920	6.60	33.62	25.18	1.01
HIGGINS TRIB A	CUP	22	10-YEAR	222.00	664.72	668.76		668.81	0.000382	1.79	124.03	36.44	0.17
HIGGINS TRIB A	CUP	21	10-YEAR	222.00	664.72	668.51		668.61	0.001220	2.63	84.43	34.61	0.30
HIGGINS TRIB A	CUP	20	10-YEAR	222.00	664.72	668.38		668.48	0.001320	2.57	86.28	39.13	0.31
HIGGINS TRIB A	CUP	19	10-YEAR	222.00	664.42	667.98		668.24	0.004866	4.11	55.57	45.80	0.56
HIGGINS TRIB A	CUP	18	10-YEAR	222.00	664.22	667.95		668.01	0.000846	1.96	114.22	65.02	0.24
HIGGINS TRIB A	CUP	17	10-YEAR	222.00	664.12	667.82		667.91	0.001073	2.76	97.73	52.60	0.28
HIGGINS TRIB A	CUP	16	10-YEAR	222.00	664.02	667.77		667.83	0.000537	1.84	123.12	54.33	0.20
HIGGINS TRIB A	CUP	15	10-YEAR	222.00	663.72	667.52		667.71	0.002438	3.56	62.39	26.88	0.41
HIGGINS TRIB A	CUP	14	10-YEAR	222.00	663.72	667.40		667.52	0.001284	2.73	81.44	32.25	0.30
HIGGINS TRIB A	CUP	13	10-YEAR	222.00	663.72	667.27		667.38	0.001391	2.75	80.86	34.06	0.31
HIGGINS TRIB A	CUP	12	10-YEAR	224.00	662.72	667.00		667.07	0.000868	2.16	103.62	43.48	0.25
HIGGINS TRIB A	CUP	11	10-YEAR	224.00	662.02	666.55		666.83	0.003496	4.22	53.10	22.97	0.49
HIGGINS TRIB A	CUP	10	10-YEAR	224.00	662.72	666.03		666.31	0.003963	4.25	52.75	25.19	0.52
HIGGINS TRIB A	CUP	9	10-YEAR	224.00	662.22	665.48		665.75	0.004112	4.15	54.02	27.71	0.52
HIGGINS TRIB A	CUP	8	10-YEAR	224.00	661.02	665.28		665.37	0.001464	2.48	90.47	35.12	0.27
HIGGINS TRIB A	CUP	7	10-YEAR	224.00	661.02	665.03		665.22	0.003520	3.45	64.99	32.01	0.43
HIGGINS TRIB A	CUP	6.001	10-YEAR	224.00	661.02	663.78	663.78	664.51	0.021409	6.88	32.58	22.30	1.00
HIGGINS TRIB A	CUP	6		Culvert									
HIGGINS TRIB A	CUP	5.999	10-YEAR	224.00	659.72	663.64	662.11	663.81	0.002435	3.31	67.73	32.14	0.34
HIGGINS TRIB A	CUP	5	10-YEAR	224.00	659.72	662.08	662.08	662.78	0.027921	6.69	33.47	24.34	1.01
HIGGINS TRIB A	CUP	4.1	10-YEAR	224.00	651.98	656.59		656.65	0.000643	2.19	146.75	141.17	0.22
HIGGINS TRIB A	CUP	3.8	10-YEAR	224.00	651.03	656.57	653.12	656.59	0.000091	1.03	318.28	192.19	0.09
HIGGINS TRIB A	CUP	3.5	10-YEAR	224.00	651.09	656.54		656.55	0.000073	0.97	338.02	151.42	0.08
HIGGINS TRIB A	CUP	3.1	10-YEAR	224.00	650.91	656.50		656.51	0.000082	1.04	289.22	111.00	0.09
HIGGINS TRIB A	CUP	3.01	10-YEAR	294.00	650.50	656.48		656.51	0.000242	1.55	256.85	109.28	0.13
HIGGINS TRIB A	CUP	1	10-YEAR	294.00	650.22	656.48		656.48	0.000021	0.37	1173.89	500.32	0.03
HIGGINS CK	MAINSTEM	6.245	10-YEAR	562.00	651.02	656.44		656.47	0.000081	1.77	632.97	230.36	0.15
HIGGINS CK	MAINSTEM	6.231	10-YEAR	562.00	652.14	656.45		656.46	0.000037	1.10	520.70	156.52	0.10
HIGGINS CK	MAINSTEM	6.179	10-YEAR	562.00	651.56	656.33		656.44	0.000228	2.58	217.55	59.73	0.24
HIGGINS CK	MAINSTEM	6.069	10-YEAR	562.00	650.55	656.27		656.33	0.000112	1.97	285.20	68.24	0.17
HIGGINS CK	MAINSTEM	6.035	10-YEAR	562.00	651.21	656.19		656.30	0.000240	2.72	242.68	111.48	0.25
HIGGINS CK	MAINSTEM	6.034	10-YEAR	562.00	651.79	655.24	655.24	656.21	0.001850	8.30	101.17	72.43	0.95
HIGGINS CK	MAINSTEM	6.033	10-YEAR	562.00	651.61	655.06		655.40	0.000850	5.55	214.48	143.00	0.65
HIGGINS CK	MAINSTEM	6.032	10-YEAR	562.00	647.83	655.27		655.31	0.000108	1.72	458.67	145.11	0.12
HIGGINS CK	MAINSTEM	6.021	10-YEAR	564.00	649.42	655.06		655.28	0.000968	3.76	155.89	50.66	0.33
HIGGINS CK	MAINSTEM	6.006	10-YEAR	564.00	648.55	655.07		655.19	0.000636	2.81	212.27	71.38	0.23
HIGGINS CK	MAINSTEM	5.9994*	10-YEAR	564.00	648.38	655.05		655.16	0.000531	2.61	226.91	64.88	0.21
HIGGINS CK	MAINSTEM	5.9950	10-YEAR	564.00	648.21	655.05		655.14	0.000451	2.45	233.13	57.58	0.20
HIGGINS CK	MAINSTEM	5.972	10-YEAR	645.00	647.90	654.95		655.07	0.000630	2.79	232.78	63.72	0.23
HIGGINS CK	MAINSTEM	5.959	10-YEAR	645.00	647.58	654.93		655.02	0.000437	2.50	262.42	64.24	0.20
HIGGINS CK	MAINSTEM	5.950	10-YEAR	645.00	647.42	654.89		655.00	0.000490	2.61	250.31	61.47	0.21
HIGGINS CK	MAINSTEM	5.914	10-YEAR	645.00	647.31	654.81	650.92	654.91	0.000467	2.57	251.28	57.26	0.20
HIGGINS CK	MAINSTEM	5.911		Culvert									
HIGGINS CK	MAINSTEM	5.899	10-YEAR	645.00	647.30	654.25	650.97	654.52	0.000941	4.17	154.68	49.97	0.30
HIGGINS CK	MAINSTEM	5.86375*	10-YEAR	645.00	647.10	654.16		654.30	0.000738	2.98	216.68	49.38	0.25
HIGGINS CK	MAINSTEM	5.8285*	10-YEAR	645.00	646.90	654.03		654.16	0.000719	2.97	217.31	48.68	0.25
HIGGINS CK	MAINSTEM	5.79325*	10-YEAR	645.00	646.70	653.90		654.03	0.000700	2.95	218.31	48.07	0.24
HIGGINS CK	MAINSTEM	5.758	10-YEAR	645.00	646.50	653.77	650.19	653.90	0.000679	2.94	219.72	47.52	0.24
HIGGINS CK	MAINSTEM	5.721		Culvert									
HIGGINS CK	MAINSTEM	5.683	10-YEAR	645.00	646.23	653.06	649.46	653.26	0.000700	3.66	176.23	53.61	0.26
HIGGINS CK	MAINSTEM	5.650	10-YEAR	645.00	646.10	652.99		653.11	0.000605	2.75	234.69	52.15	0.23
HIGGINS CK	MAINSTEM	5.649	10-YEAR	645.00	646.50	652.99		653.10	0.000607	2.72	237.40	53.54	0.23
HIGGINS CK	MAINSTEM	5.593	10-YEAR	645.00	645.87	652.83	649.07	652.94	0.000517	2.60	248.49	53.17	0.21
HIGGINS CK	MAINSTEM	5.558	10-YEAR	907.00	646.30	652.57	649.69	652.78	0.001094	3.64	249.15	56.48	0.31
HIGGINS CK	MAINSTEM	5.500	10-YEAR	907.00	645.54	652.12	649.36	652.39	0.001420	4.15	218.48	49.24	0.35
HIGGINS CK	MAINSTEM	5.496	10-YEAR	907.00	645.80	652.05	649.63	652.35	0.001718	4.43	204.59	48.18	0.38
HIGGINS CK	MAINSTEM	5.409	10-YEAR	907.00	645.02	651.21	648.94	651.53	0.001865	4.58	197.90	47.25	0.39
HIGGINS CK	MAINSTEM	5.408	10-YEAR	907.00	645.30	651.17	649.07	651.52	0.002104	4.76	190.65	47.20	0.42
HIGGINS CK	MAINSTEM	5.394	10-YEAR	907.00	645.30	651.18		651.32	0.000799	3.01	301.67	74.45	0.28
HIGGINS CK	MAINSTEM	5.335	10-YEAR	907.00	645.30	650.79	647.82	650.92	0.002166	2.93	309.13	74.55	0.25
HIGGINS CK	MAINSTEM	5.324	10-YEAR	907.00	645.28	650.67		650.85	0.001041	3.33	272.25	90.05	0.30
HIGGINS CK	MAINSTEM	5.289	10-YEAR	907.00	645.20	650.55		650.67	0.000741	2.86	317.60	80.51	0.25
HIGGINS CK	MAINSTEM	5.256	10-YEAR	907.00	645.11	650.34		650.52	0.001065	3.39	267.57	68.41	0.30
HIGGINS CK	MAINSTEM	5.236	10-YEAR	907.00	645.20	650.19		650.39	0.001298	3.60	252.05	68.48	0.33
HIGGINS CK	MAINSTEM	5.184	10-YEAR	907.00	644.50	649.89		650.07	0.001015	3.34	271.74	68.51	0.30
HIGGINS CK	MAINSTEM	5.166	10-YEAR	907.00	644.48	649.80		649.97	0.001017	3.33	272.27	68.94	0.30
HIGGINS CK	MAINSTEM	5.144	10-YEAR	907.00	644.40	649.67		649.85	0.001072	3.40	266.76	68.15	0.30
HIGGINS CK	MAINSTEM	5.094	10-YEAR	907.00	643.10	649.47		649.60	0.000722	2.95	307.71	72.54	0.25
HIGGINS CK	MAINSTEM	5.049	10-YEAR	907.00	643.43	649.29		649.43	0.000728	2.99	303.19	70.11	0.25
HIGGINS CK	MAINSTEM	5.045	10-YEAR	571.00	643.80	649.33		649.40	0.000365	2.05	278.53	67.64	0.18
HIGGINS CK	MAINSTEM	5.020	10-YEAR	571.00	643.80	649.25	645.94	649.34	0.000375	2.37	241.28	67.25	0.19
HIGGINS CK	MAINSTEM	5.012		Culvert									
HIGGINS CK	MAINSTEM	5.005	10-YEAR	571.00	643.80	648.81	645.55	648.91	0.000392	2.43	235.42	90.82	0.19
HIGGINS CK	MAINSTEM	4.992	10-YEAR	571.00	643.80	648.82		648.86	0.000211	1.55	368.39	90.86	0.14
HIGGINS CK	MAINSTEM	4.980	10-YEAR	571.00	643.55	648.73		648.83	0.000642	2.56	222.82	58.98	0.23
HIGGINS CK	MAINSTEM	4.966	10-YEAR	700.00	643.40	648.57		648.76	0.001196	3.46	202.20	54.16	0.32
HIGGINS CK	MAINSTEM	4.944	10-YEAR	700.00	642.80	648.45		648.63	0.001066	3.41	205.29	51.17	0.30
HIGGINS CK	MAINSTEM	4.928	10-YEAR	700.00	642.48	648.38		648.54	0.000933	3.22	217.09	53.39	0.28
HIGGINS CK	MAINSTEM	4.925	10-YEAR	700.00	643.00	648.32		648.52	0.001275	3.61	194.16	51.13	0.33
HIGGINS CK	MAINSTEM	4.915	10-YEAR	700.00	643.00	648.32		648.44	0.000811	2.71	277.57	90.94	0.23
HIGGINS CK	MAINSTEM	4.885	10-YEAR	700.00	642.90	648.18		648.30	0.000850	2.84	264.37	84.49	0.24

HEC-RAS Plan: PermNat -5 Str Profile: 10-YEAR (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	4.866	10-YEAR	700.00	642.40	648.08		648.21	0.000910	2.99	251.25	81.98	0.25
HIGGINS CK	MAINSTEM	4.847	10-YEAR	700.00	642.00	647.99		648.12	0.000878	2.94	253.51	83.10	0.24
HIGGINS CK	MAINSTEM	4.828	10-YEAR	700.00	641.90	647.93		648.03	0.000699	2.56	290.03	94.23	0.22
HIGGINS CK	MAINSTEM	4.801	10-YEAR	700.00	642.50	647.77		647.91	0.001088	3.03	243.32	86.48	0.27
HIGGINS CK	MAINSTEM	4.783	10-YEAR	700.00	642.00	647.68		647.81	0.000918	2.90	251.90	83.58	0.25
HIGGINS CK	MAINSTEM	4.774	10-YEAR	700.00	642.50	647.61		647.76	0.001196	3.15	233.28	84.17	0.28
HIGGINS CK	MAINSTEM	4.771	10-YEAR	700.00	642.05	647.61		647.74	0.000921	2.92	243.91	69.86	0.25
HIGGINS CK	MAINSTEM	4.760	10-YEAR	700.00	641.50	647.54		647.68	0.000987	3.07	237.13	76.68	0.28
HIGGINS CK	MAINSTEM	4.742	10-YEAR	700.00	642.22	647.43		647.58	0.001149	3.10	232.34	78.43	0.27
HIGGINS CK	MAINSTEM	4.713	10-YEAR	700.00	642.40	647.18		647.37	0.001582	3.45	206.38	70.44	0.32
HIGGINS CK	MAINSTEM	4.698	10-YEAR	700.00	642.20	647.09		647.24	0.001359	3.14	222.98	75.56	0.32
HIGGINS CK	MAINSTEM	4.694	10-YEAR	700.00	641.46	647.03		647.21	0.001156	3.47	217.96	61.69	0.28
HIGGINS CK	MAINSTEM	4.683	10-YEAR	424.00	639.90	647.10	642.36	647.14	0.000221	1.56	274.65	76.77	0.12
HIGGINS CK	MAINSTEM	4.678	10-YEAR	424.00	639.90	646.98	642.40	647.11	0.000455	2.82	150.45	67.08	0.19
HIGGINS CK	MAINSTEM	4.673			Culvert								
HIGGINS CK	MAINSTEM	4.668	10-YEAR	424.00	640.20	645.82	642.68	645.86	0.001234	3.96	107.00	48.29	0.30
HIGGINS CK	MAINSTEM	4.664	10-YEAR	444.00	640.20	645.85	642.63	645.79	0.000845	3.09	143.75	48.46	0.24
HIGGINS CK	MAINSTEM	4.659	10-YEAR	444.00	638.42	645.69	640.56	645.73	0.000139	1.53	290.08	56.42	0.11
HIGGINS CK	MAINSTEM	4.639	10-YEAR	444.00	640.20	645.58		645.68	0.000921	2.58	172.23	48.06	0.24
HIGGINS CK	MAINSTEM	4.638	10-YEAR	444.00	640.80	645.59		645.68	0.000945	2.39	185.92	59.09	0.24
HIGGINS CK	MAINSTEM	4.611	10-YEAR	444.00	642.03	645.19		645.42	0.003300	3.79	117.26	48.75	0.43
HIGGINS CK	MAINSTEM	4.588	10-YEAR	454.00	641.80	644.29		644.77	0.009403	5.54	82.00	42.27	0.70
HIGGINS CK	MAINSTEM	4.569	10-YEAR	454.00	638.78	644.40		644.49	0.000639	2.49	197.90	59.11	0.21
HIGGINS CK	MAINSTEM	4.542	10-YEAR	454.00	639.10	644.37		644.42	0.000306	1.97	260.96	64.08	0.15
HIGGINS CK	MAINSTEM	4.537	10-YEAR	454.00	639.10	644.36		644.41	0.000308	1.97	260.50	64.04	0.15
HIGGINS CK	MAINSTEM	4.505	10-YEAR	454.00	637.50	644.35		644.37	0.000110	1.40	377.70	75.29	0.09
HIGGINS CK	MAINSTEM	4.485	10-YEAR	454.00	637.50	644.36	638.36	644.36	0.000020	0.53	855.23	150.34	0.04

HEC-RAS Plan: PermNat -5 Str Profile: 50-YEAR

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	25	50-YEAR	308.00	667.72	671.35		671.51	0.001355	3.24	116.99	91.72	0.33
HIGGINS TRIB A	CUP	24	50-YEAR	308.00	666.72	671.17		671.35	0.001624	3.47	89.03	30.24	0.35
HIGGINS TRIB A	CUP	23	50-YEAR	308.00	667.72	669.75	669.75	670.55	0.015955	7.14	43.11	27.38	1.00
HIGGINS TRIB A	CUP	22	50-YEAR	308.00	664.72	669.33		669.40	0.000464	2.12	145.22	38.05	0.19
HIGGINS TRIB A	CUP	21	50-YEAR	308.00	664.72	669.03		669.17	0.001352	2.98	103.49	38.02	0.32
HIGGINS TRIB A	CUP	20	50-YEAR	308.00	664.72	668.90		669.03	0.001358	2.86	107.76	43.09	0.32
HIGGINS TRIB A	CUP	19	50-YEAR	308.00	664.42	668.60		668.82	0.003273	3.84	96.07	83.90	0.47
HIGGINS TRIB A	CUP	18	50-YEAR	308.00	664.22	668.59		668.65	0.000651	2.03	164.02	91.92	0.22
HIGGINS TRIB A	CUP	17	50-YEAR	308.00	664.12	668.47		668.57	0.000941	2.84	137.80	69.62	0.27
HIGGINS TRIB A	CUP	16	50-YEAR	308.00	664.02	668.43		668.49	0.000485	1.99	168.31	82.89	0.19
HIGGINS TRIB A	CUP	15	50-YEAR	308.00	663.72	668.17		668.39	0.002051	3.77	89.07	64.78	0.39
HIGGINS TRIB A	CUP	14	50-YEAR	308.00	663.72	668.03		668.17	0.001939	2.91	105.85	53.96	0.36
HIGGINS TRIB A	CUP	13	50-YEAR	308.00	663.72	667.86		668.00	0.001437	3.00	103.19	44.60	0.33
HIGGINS TRIB A	CUP	12	50-YEAR	310.00	662.72	667.59		667.67	0.000889	2.37	130.84	48.79	0.25
HIGGINS TRIB A	CUP	11	50-YEAR	310.00	663.02	667.08		667.42	0.003725	4.73	65.57	24.95	0.51
HIGGINS TRIB A	CUP	10	50-YEAR	310.00	662.72	666.54		666.89	0.003931	4.69	66.12	26.84	0.53
HIGGINS TRIB A	CUP	9	50-YEAR	310.00	662.22	666.04		666.34	0.003818	4.40	70.40	31.16	0.52
HIGGINS TRIB A	CUP	8	50-YEAR	310.00	661.02	665.83		665.95	0.001602	2.80	110.71	38.13	0.29
HIGGINS TRIB A	CUP	7	50-YEAR	310.00	661.02	665.58		665.78	0.003808	3.66	84.74	40.70	0.45
HIGGINS TRIB A	CUP	6,001	50-YEAR	310.00	661.02	664.15	664.15	665.04	0.020155	7.58	40.89	24.15	1.00
HIGGINS TRIB A	CUP	6	Culvert										
HIGGINS TRIB A	CUP	5,999	50-YEAR	310.00	659.72	664.15	662.48	664.38	0.002738	3.90	79.46	34.70	0.37
HIGGINS TRIB A	CUP	5	50-YEAR	310.00	659.72	662.43	662.43	663.27	0.026880	7.32	42.38	26.12	1.01
HIGGINS TRIB A	CUP	4,1	50-YEAR	310.00	651.98	657.91		657.92	0.000158	1.38	375.02	194.97	0.12
HIGGINS TRIB A	CUP	3,8	50-YEAR	310.00	651.03	657.90	653.42	657.90	0.000037	0.79	583.61	208.34	0.06
HIGGINS TRIB A	CUP	3,5	50-YEAR	310.00	651.09	657.88		657.89	0.000036	0.81	547.85	162.48	0.06
HIGGINS TRIB A	CUP	3,1	50-YEAR	310.00	650.91	657.86		657.87	0.000047	0.94	447.09	122.18	0.07
HIGGINS TRIB A	CUP	3,01	50-YEAR	407.00	650.50	657.84		657.86	0.000122	1.31	415.39	123.20	0.09
HIGGINS TRIB A	CUP	1	50-YEAR	407.00	650.22	657.85		657.85	0.000009	0.29	1857.57	500.57	0.02
HIGGINS CK	MAINSTEM	6,245	50-YEAR	810.00	651.02	657.81		657.84	0.000062	1.78	983.19	283.07	0.13
HIGGINS CK	MAINSTEM	6,231	50-YEAR	810.00	652.14	657.81		657.83	0.000027	1.17	771.98	216.00	0.09
HIGGINS CK	MAINSTEM	6,179	50-YEAR	810.00	651.56	657.70		657.81	0.000173	2.69	303.20	77.59	0.22
HIGGINS CK	MAINSTEM	6,069	50-YEAR	810.00	650.55	657.66		657.73	0.000092	2.12	395.62	102.52	0.16
HIGGINS CK	MAINSTEM	6,035	50-YEAR	810.00	651.21	657.62		657.70	0.000138	2.56	462.64	159.72	0.20
HIGGINS CK	MAINSTEM	6,034	50-YEAR	810.00	651.79	657.40		657.68	0.000287	5.02	374.17	158.34	0.42
HIGGINS CK	MAINSTEM	6,033	50-YEAR	810.00	651.61	657.53		657.62	0.000106	3.19	594.08	161.74	0.26
HIGGINS CK	MAINSTEM	6,032	50-YEAR	810.00	647.83	657.58		657.60	0.000052	1.49	816.14	161.97	0.09
HIGGINS CK	MAINSTEM	6,021	50-YEAR	810.00	649.42	657.47		657.59	0.000347	2.88	345.54	95.72	0.21
HIGGINS CK	MAINSTEM	6,006	50-YEAR	810.00	648.55	657.47		657.55	0.000289	2.40	404.26	91.34	0.17
HIGGINS CK	MAINSTEM	5,9994*	50-YEAR	810.00	648.38	657.46		657.54	0.000260	2.33	405.18	94.20	0.16
HIGGINS CK	MAINSTEM	5,9950	50-YEAR	810.00	648.21	657.46		657.54	0.000233	2.26	393.33	88.21	0.15
HIGGINS CK	MAINSTEM	5,972	50-YEAR	1100.00	647.90	657.44		657.49	0.000204	2.10	971.85	534.72	0.14
HIGGINS CK	MAINSTEM	5,959	50-YEAR	1100.00	647.58	657.40		657.48	0.000240	2.43	711.09	370.38	0.16
HIGGINS CK	MAINSTEM	5,950	50-YEAR	1100.00	647.42	657.36		657.46	0.000291	2.64	607.68	321.69	0.17
HIGGINS CK	MAINSTEM	5,914	50-YEAR	1100.00	647.31	657.27	651.92	657.40	0.000351	2.92	379.17	93.58	0.19
HIGGINS CK	MAINSTEM	5,911	Culvert										
HIGGINS CK	MAINSTEM	5,899	50-YEAR	1100.00	647.30	656.24	652.12	656.68	0.001044	5.33	206.51	79.32	0.33
HIGGINS CK	MAINSTEM	5,86375*	50-YEAR	1100.00	647.10	656.24		656.41	0.000574	3.37	357.63	96.43	0.24
HIGGINS CK	MAINSTEM	5,8285*	50-YEAR	1100.00	646.90	656.13		656.30	0.000568	3.36	356.39	97.31	0.23
HIGGINS CK	MAINSTEM	5,79325*	50-YEAR	1100.00	646.70	656.03		656.20	0.000561	3.34	354.19	88.44	0.23
HIGGINS CK	MAINSTEM	5,758	50-YEAR	1100.00	646.50	655.92	651.21	656.09	0.000560	3.34	338.11	86.16	0.23
HIGGINS CK	MAINSTEM	5,721	Culvert										
HIGGINS CK	MAINSTEM	5,683	50-YEAR	1100.00	646.23	654.47	650.51	654.87	0.001011	5.06	217.39	64.76	0.33
HIGGINS CK	MAINSTEM	5,650	50-YEAR	1100.00	646.10	654.43		654.62	0.000747	3.49	319.02	72.76	0.28
HIGGINS CK	MAINSTEM	5,649	50-YEAR	1100.00	646.50	654.43		654.61	0.000760	3.45	318.49	58.98	0.28
HIGGINS CK	MAINSTEM	5,593	50-YEAR	1100.00	645.87	654.23	650.02	654.40	0.000658	3.37	328.70	64.57	0.25
HIGGINS CK	MAINSTEM	5,558	50-YEAR	1394.00	646.30	653.95	650.53	654.23	0.001139	4.21	331.27	63.37	0.32
HIGGINS CK	MAINSTEM	5,500	50-YEAR	1394.00	645.54	653.45	650.31	653.81	0.001559	4.85	287.40	55.11	0.37
HIGGINS CK	MAINSTEM	5,496	50-YEAR	1394.00	645.80	653.36	650.56	653.77	0.001829	5.14	271.20	53.29	0.40
HIGGINS CK	MAINSTEM	5,409	50-YEAR	1394.00	645.02	652.43	649.85	652.88	0.002059	5.40	258.25	51.60	0.43
HIGGINS CK	MAINSTEM	5,408	50-YEAR	1394.00	645.30	652.39	649.95	652.86	0.002273	5.55	251.06	51.92	0.44
HIGGINS CK	MAINSTEM	5,394	50-YEAR	1394.00	645.30	652.44		652.62	0.000857	3.48	400.56	83.54	0.28
HIGGINS CK	MAINSTEM	5,335	50-YEAR	1394.00	645.30	652.01	648.51	652.19	0.002375	3.45	404.31	94.98	0.27
HIGGINS CK	MAINSTEM	5,324	50-YEAR	1394.00	645.28	651.88		652.11	0.001064	3.85	367.47	116.65	0.31
HIGGINS CK	MAINSTEM	5,289	50-YEAR	1394.00	645.20	651.75		651.93	0.000790	3.32	419.88	88.83	0.27
HIGGINS CK	MAINSTEM	5,256	50-YEAR	1394.00	645.11	651.51		651.75	0.001195	3.95	352.83	78.09	0.33
HIGGINS CK	MAINSTEM	5,236	50-YEAR	1394.00	645.20	651.34		651.61	0.001361	4.15	335.77	76.05	0.35
HIGGINS CK	MAINSTEM	5,184	50-YEAR	1394.00	644.50	651.02		651.26	0.001150	3.95	353.20	75.89	0.32
HIGGINS CK	MAINSTEM	5,166	50-YEAR	1394.00	644.48	650.91		651.15	0.001168	3.94	353.65	77.08	0.32
HIGGINS CK	MAINSTEM	5,144	50-YEAR	1394.00	644.40	650.76		651.01	0.001232	4.04	344.98	75.32	0.33
HIGGINS CK	MAINSTEM	5,094	50-YEAR	1394.00	643.10	650.52		650.72	0.000894	3.60	387.49	79.35	0.29
HIGGINS CK	MAINSTEM	5,049	50-YEAR	1394.00	643.43	650.29		650.50	0.000934	3.71	375.80	75.65	0.29
HIGGINS CK	MAINSTEM	5,045	50-YEAR	750.00	643.80	650.37		650.45	0.000321	2.13	351.93	73.03	0.17
HIGGINS CK	MAINSTEM	5,020	50-YEAR	750.00	643.80	650.29	646.26	650.39	0.000343	2.57	292.02	72.59	0.19
HIGGINS CK	MAINSTEM	5,012	Culvert										
HIGGINS CK	MAINSTEM	5,005	50-YEAR	750.00	643.80	649.49	645.88	649.61	0.000440	2.80	267.80	94.85	0.21
HIGGINS CK	MAINSTEM	4,992	50-YEAR	750.00	643.80	649.51		649.55	0.000227	1.74	431.81	94.74	0.14
HIGGINS CK	MAINSTEM	4,980	50-YEAR	750.00	643.55	649.40		649.52	0.000690	2.85	263.31	62.66	0.24
HIGGINS CK	MAINSTEM	4,966	50-YEAR	920.00	643.40	649.21		649.44	0.001307	3.87	237.64	57.40	0.34
HIGGINS CK	MAINSTEM	4,944	50-YEAR	920.00	642.80	649.06		649.30	0.001221	3.87	237.72	54.13	0.33
HIGGINS CK	MAINSTEM	4,928	50-YEAR	920.00	642.48	648.98		649.19	0.001084	3.67	250.37	56.55	0.31
HIGGINS CK	MAINSTEM	4,925	50-YEAR	920.00	643.00	648.91		649.17	0.001449	4.08	225.40	54.10	0.35
HIGGINS CK	MAINSTEM	4,915	50-YEAR	920.00	643.00	648.93		649.07	0.000898	3.05	334.03	94.59	0.25
HIGGINS CK	MAINSTEM	4,885	50-YEAR	920.00	642.90	648.77		648.92	0.000954	3.23	314.78	87.21	0.28

HEC-RAS Plan: PermNat-5 Str Profile: 50-YEAR (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	4.866	50-YEAR	920.00	642.40	648.64		648.82	0.001046	3.42	298.65	84.64	0.27
HIGGINS CK	MAINSTEM	4.847	50-YEAR	920.00	642.00	648.54		648.72	0.001024	3.37	300.40	85.95	0.27
HIGGINS CK	MAINSTEM	4.828	50-YEAR	920.00	641.90	648.48		648.61	0.000814	2.93	342.80	98.04	0.24
HIGGINS CK	MAINSTEM	4.801	50-YEAR	920.00	642.50	648.29		648.47	0.001234	3.47	289.25	90.43	0.29
HIGGINS CK	MAINSTEM	4.783	50-YEAR	920.00	642.00	648.18		648.35	0.001099	3.36	295.78	89.89	0.27
HIGGINS CK	MAINSTEM	4.774	50-YEAR	920.00	642.50	648.10		648.29	0.001401	3.62	275.99	89.60	0.31
HIGGINS CK	MAINSTEM	4.771	50-YEAR	920.00	642.05	648.09		648.27	0.001133	3.43	280.37	80.67	0.28
HIGGINS CK	MAINSTEM	4.760	50-YEAR	920.00	641.50	648.00		648.20	0.001226	3.61	274.94	83.66	0.29
HIGGINS CK	MAINSTEM	4.742	50-YEAR	920.00	642.22	647.87		648.07	0.001412	3.64	269.71	89.15	0.31
HIGGINS CK	MAINSTEM	4.713	50-YEAR	920.00	642.40	647.55		647.80	0.002020	4.09	234.22	82.81	0.36
HIGGINS CK	MAINSTEM	4.698	50-YEAR	920.00	642.20	647.43		647.64	0.001769	3.67	250.90	87.53	0.38
HIGGINS CK	MAINSTEM	4.694	50-YEAR	920.00	641.46	647.32		647.60	0.001622	4.27	237.73	73.67	0.33
HIGGINS CK	MAINSTEM	4.683	50-YEAR	445.00	639.90	647.45	642.46	647.49	0.000192	1.53	299.75	89.07	0.12
HIGGINS CK	MAINSTEM	4.678	50-YEAR	445.00	639.90	647.33	642.48	647.46	0.000424	2.81	158.21	79.07	0.18
HIGGINS CK	MAINSTEM	4.673		Culvert									
HIGGINS CK	MAINSTEM	4.668	50-YEAR	445.00	640.20	646.42	642.75	646.62	0.000852	3.62	123.08	53.09	0.26
HIGGINS CK	MAINSTEM	4.664	50-YEAR	485.00	640.20	646.44	642.75	646.57	0.000613	2.91	166.88	53.22	0.21
HIGGINS CK	MAINSTEM	4.659	50-YEAR	485.00	638.42	646.49	640.66	646.52	0.000113	1.49	324.90	59.03	0.10
HIGGINS CK	MAINSTEM	4.639	50-YEAR	485.00	640.20	646.40		646.48	0.000609	2.27	213.98	52.98	0.20
HIGGINS CK	MAINSTEM	4.638	50-YEAR	485.00	640.80	646.41		646.48	0.000537	2.05	237.09	64.02	0.18
HIGGINS CK	MAINSTEM	4.611	50-YEAR	485.00	642.03	646.22		646.35	0.001327	2.84	170.75	54.96	0.28
HIGGINS CK	MAINSTEM	4.588	50-YEAR	503.00	641.80	646.03		646.18	0.001517	3.08	163.23	51.10	0.30
HIGGINS CK	MAINSTEM	4.569	50-YEAR	503.00	638.78	646.05		646.10	0.000235	1.86	304.76	70.38	0.13
HIGGINS CK	MAINSTEM	4.542	50-YEAR	503.00	639.10	646.04		646.07	0.000133	1.56	375.85	73.32	0.10
HIGGINS CK	MAINSTEM	4.537	50-YEAR	503.00	639.10	646.04		646.07	0.000133	1.56	375.63	73.30	0.10
HIGGINS CK	MAINSTEM	4.505	50-YEAR	503.00	637.50	646.03		646.05	0.000057	1.17	512.75	85.19	0.07
HIGGINS CK	MAINSTEM	4.485	50-YEAR	503.00	637.50	646.04	638.42	646.04	0.000011	0.45	1118.36	162.91	0.03

River	Reach	River Sta	Profile	Q.Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chrl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	25	100-YEAR	342.00	667.72	671.55		671.70	0.001280	3.28	136.23	107.35	0.32
HIGGINS TRIB A	CUP	24	100-YEAR	342.00	666.72	671.34		671.55	0.001691	3.64	94.35	31.11	0.36
HIGGINS TRIB A	CUP	23	100-YEAR	342.00	667.72	669.88	669.88	670.72	0.015736	7.34	46.62	28.15	1.00
HIGGINS TRIB A	CUP	22	100-YEAR	342.00	664.72	669.52		669.59	0.000497	2.24	152.47	38.59	0.20
HIGGINS TRIB A	CUP	21	100-YEAR	342.00	664.72	669.20		669.35	0.001410	3.11	110.11	39.13	0.33
HIGGINS TRIB A	CUP	20	100-YEAR	342.00	664.72	669.07		669.21	0.001369	2.97	115.15	44.11	0.32
HIGGINS TRIB A	CUP	19	100-YEAR	342.00	664.42	668.82		669.01	0.002846	3.72	115.10	93.68	0.45
HIGGINS TRIB A	CUP	18	100-YEAR	342.00	664.22	668.79		668.86	0.000614	2.06	183.95	99.03	0.22
HIGGINS TRIB A	CUP	17	100-YEAR	342.00	664.12	668.69		668.78	0.000907	2.86	153.22	75.15	0.27
HIGGINS TRIB A	CUP	16	100-YEAR	342.00	664.02	668.65		668.71	0.000453	2.04	186.89	91.84	0.19
HIGGINS TRIB A	CUP	15	100-YEAR	342.00	663.72	668.39		668.61	0.001912	3.82	105.06	82.39	0.38
HIGGINS TRIB A	CUP	14	100-YEAR	342.00	663.72	668.25		668.38	0.002168	2.88	119.03	67.70	0.38
HIGGINS TRIB A	CUP	13	100-YEAR	342.00	663.72	668.06		668.21	0.001403	3.08	112.87	52.97	0.32
HIGGINS TRIB A	CUP	12	100-YEAR	344.00	662.72	667.79		667.88	0.000881	2.44	141.05	50.70	0.26
HIGGINS TRIB A	CUP	11	100-YEAR	344.00	663.02	667.26		667.63	0.003798	4.90	70.20	25.65	0.52
HIGGINS TRIB A	CUP	10	100-YEAR	344.00	662.72	666.72		667.09	0.003948	4.85	70.96	27.41	0.53
HIGGINS TRIB A	CUP	9	100-YEAR	344.00	662.22	666.23		666.54	0.003758	4.50	76.42	32.34	0.52
HIGGINS TRIB A	CUP	8	100-YEAR	344.00	661.02	666.02		666.15	0.001656	2.92	117.95	39.16	0.30
HIGGINS TRIB A	CUP	7	100-YEAR	344.00	661.02	665.77		665.98	0.003807	3.71	92.70	43.63	0.45
HIGGINS TRIB A	CUP	6.001	100-YEAR	344.00	661.02	664.28	664.28	665.23	0.019887	7.83	43.91	24.81	1.00
HIGGINS TRIB A	CUP	6	Culvert										
HIGGINS TRIB A	CUP	5.999	100-YEAR	344.00	659.72	664.32	662.59	664.58	0.002869	4.12	83.40	35.56	0.38
HIGGINS TRIB A	CUP	5	100-YEAR	344.00	659.72	662.58	662.58	663.44	0.025809	7.45	46.19	26.84	1.00
HIGGINS TRIB A	CUP	4.1	100-YEAR	344.00	651.98	658.93		658.94	0.000061	0.98	590.47	226.31	0.07
HIGGINS TRIB A	CUP	3.8	100-YEAR	344.00	651.03	658.92	653.52	658.93	0.000019	0.62	803.44	219.53	0.04
HIGGINS TRIB A	CUP	3.5	100-YEAR	344.00	651.09	658.91		658.92	0.000020	0.68	720.25	171.00	0.05
HIGGINS TRIB A	CUP	3.1	100-YEAR	344.00	650.91	658.90		658.91	0.000028	0.81	579.06	130.79	0.05
HIGGINS TRIB A	CUP	3.01	100-YEAR	452.00	650.50	658.89		658.90	0.000068	1.09	550.15	133.89	0.07
HIGGINS TRIB A	CUP	1	100-YEAR	452.00	650.22	658.90		658.90	0.000005	0.24	2382.10	500.76	0.02
HIGGINS CK	MAINSTEM	6.245	100-YEAR	911.00	651.02	658.86		658.89	0.000039	1.60	1317.37	342.32	0.11
HIGGINS CK	MAINSTEM	6.231	100-YEAR	911.00	652.14	658.87		658.89	0.000018	1.08	1019.20	251.98	0.08
HIGGINS CK	MAINSTEM	6.179	100-YEAR	911.00	651.56	658.78		658.87	0.000112	2.44	419.56	126.30	0.18
HIGGINS CK	MAINSTEM	6.069	100-YEAR	911.00	650.55	658.75		658.81	0.000062	1.96	549.91	171.98	0.13
HIGGINS CK	MAINSTEM	6.035	100-YEAR	911.00	651.21	658.74		658.80	0.000078	2.20	645.41	165.83	0.15
HIGGINS CK	MAINSTEM	6.034	100-YEAR	911.00	651.79	658.63		658.79	0.000126	3.92	574.42	165.16	0.29
HIGGINS CK	MAINSTEM	6.033	100-YEAR	911.00	651.61	658.69		658.76	0.000059	2.77	785.79	167.40	0.20
HIGGINS CK	MAINSTEM	6.032	100-YEAR	911.00	647.83	658.73		658.75	0.000038	1.38	1005.61	167.56	0.08
HIGGINS CK	MAINSTEM	6.021	100-YEAR	915.00	649.42	658.66		658.74	0.000212	2.48	463.68	105.01	0.17
HIGGINS CK	MAINSTEM	6.006	100-YEAR	915.00	648.55	658.65		658.72	0.000209	2.27	537.78	155.22	0.14
HIGGINS CK	MAINSTEM	5.9994*	100-YEAR	915.00	648.38	658.64		658.71	0.000183	2.18	548.11	158.85	0.14
HIGGINS CK	MAINSTEM	5.9950	100-YEAR	915.00	648.21	658.64		658.70	0.000166	2.12	556.18	203.61	0.13
HIGGINS CK	MAINSTEM	5.972	100-YEAR	1320.00	647.90	658.64		658.67	0.000114	1.75	1458.57	633.89	0.11
HIGGINS CK	MAINSTEM	5.959	100-YEAR	1320.00	647.58	658.60		658.66	0.000160	2.19	1100.82	548.02	0.13
HIGGINS CK	MAINSTEM	5.950	100-YEAR	1320.00	647.42	658.58		658.65	0.000196	2.40	968.82	528.43	0.14
HIGGINS CK	MAINSTEM	5.914	100-YEAR	1320.00	647.31	658.48	652.32	658.60	0.000282	2.85	562.09	330.42	0.17
HIGGINS CK	MAINSTEM	5.911	Culvert										
HIGGINS CK	MAINSTEM	5.899	100-YEAR	1320.00	647.30	657.14	652.62	657.65	0.001054	5.75	229.73	94.15	0.34
HIGGINS CK	MAINSTEM	5.86375*	100-YEAR	1320.00	647.10	657.18		657.35	0.000494	3.42	463.36	128.27	0.22
HIGGINS CK	MAINSTEM	5.8285*	100-YEAR	1320.00	646.90	657.09		657.26	0.000484	3.40	478.00	156.24	0.22
HIGGINS CK	MAINSTEM	5.79325*	100-YEAR	1320.00	646.70	656.99		657.17	0.000484	3.41	473.85	175.66	0.22
HIGGINS CK	MAINSTEM	5.758	100-YEAR	1320.00	646.50	656.89	651.64	657.07	0.000499	3.46	397.26	163.11	0.22
HIGGINS CK	MAINSTEM	5.721	Culvert										
HIGGINS CK	MAINSTEM	5.683	100-YEAR	1320.00	646.23	655.12	650.99	655.60	0.001106	5.59	236.04	73.61	0.35
HIGGINS CK	MAINSTEM	5.650	100-YEAR	1320.00	646.10	655.10		655.31	0.000723	3.71	374.09	91.10	0.26
HIGGINS CK	MAINSTEM	5.649	100-YEAR	1320.00	646.50	655.10		655.31	0.000754	3.68	362.55	79.66	0.27
HIGGINS CK	MAINSTEM	5.593	100-YEAR	1320.00	645.87	654.90	650.41	655.10	0.000553	3.61	375.60	77.03	0.25
HIGGINS CK	MAINSTEM	5.558	100-YEAR	1623.00	646.30	654.65	650.87	654.94	0.001025	4.33	380.28	78.15	0.31
HIGGINS CK	MAINSTEM	5.500	100-YEAR	1623.00	645.54	654.19	650.69	654.57	0.001370	4.94	330.94	63.97	0.36
HIGGINS CK	MAINSTEM	5.496	100-YEAR	1623.00	645.80	654.11	650.93	654.53	0.001623	5.20	313.03	61.75	0.38
HIGGINS CK	MAINSTEM	5.409	100-YEAR	1623.00	645.02	653.33	650.23	653.77	0.001713	5.30	306.31	55.78	0.39
HIGGINS CK	MAINSTEM	5.408	100-YEAR	1623.00	645.30	653.30	650.35	653.75	0.001863	5.41	300.18	55.46	0.41
HIGGINS CK	MAINSTEM	5.394	100-YEAR	1623.00	645.30	653.36		653.54	0.000647	3.39	480.50	88.54	0.25
HIGGINS CK	MAINSTEM	5.335	100-YEAR	1623.00	645.30	653.06	648.79	653.22	0.001708	3.25	526.70	139.36	0.24
HIGGINS CK	MAINSTEM	5.324	100-YEAR	1623.00	645.28	652.97		653.16	0.000737	3.58	480.68	182.02	0.27
HIGGINS CK	MAINSTEM	5.289	100-YEAR	1623.00	645.20	652.88		653.03	0.000541	3.09	542.24	168.02	0.23
HIGGINS CK	MAINSTEM	5.256	100-YEAR	1623.00	645.11	652.71		652.91	0.000887	3.55	456.82	95.32	0.29
HIGGINS CK	MAINSTEM	5.236	100-YEAR	1623.00	645.20	652.60		652.81	0.000881	3.72	436.20	85.38	0.29
HIGGINS CK	MAINSTEM	5.184	100-YEAR	1623.00	644.50	652.40		652.59	0.000733	3.50	463.60	84.88	0.26
HIGGINS CK	MAINSTEM	5.165	100-YEAR	1623.00	644.48	652.33		652.52	0.000726	3.45	470.25	87.43	0.26
HIGGINS CK	MAINSTEM	5.144	100-YEAR	1623.00	644.40	652.24		652.43	0.000735	3.50	463.70	85.06	0.26
HIGGINS CK	MAINSTEM	5.094	100-YEAR	1623.00	643.10	652.10		652.25	0.000537	3.11	521.33	90.28	0.23
HIGGINS CK	MAINSTEM	5.049	100-YEAR	1623.00	643.43	651.97		652.12	0.000535	3.18	510.69	85.00	0.23
HIGGINS CK	MAINSTEM	5.045	100-YEAR	1000.00	643.80	652.02		652.09	0.000238	2.09	479.17	81.53	0.15
HIGGINS CK	MAINSTEM	5.020	100-YEAR	1000.00	643.80	651.93	646.67	652.04	0.000271	2.69	372.39	81.06	0.17
HIGGINS CK	MAINSTEM	5.012	Culvert										
HIGGINS CK	MAINSTEM	5.005	100-YEAR	1000.00	643.80	650.44	646.30	650.59	0.000464	3.19	313.24	100.02	0.22
HIGGINS CK	MAINSTEM	4.992	100-YEAR	1000.00	643.80	650.47		650.52	0.000227	1.90	525.33	100.19	0.15
HIGGINS CK	MAINSTEM	4.980	100-YEAR	1000.00	643.55	650.34		650.49	0.000678	3.08	325.13	67.88	0.25
HIGGINS CK	MAINSTEM	4.966	100-YEAR	1260.00	643.40	650.11		650.40	0.001378	4.32	291.74	62.02	0.35
HIGGINS CK	MAINSTEM	4.944	100-YEAR	1260.00	642.80	649.95		650.25	0.001350	4.38	287.49	684.27	0.35
HIGGINS CK	MAINSTEM	4.928	100-YEAR	1260.00	642.48	649.86		650.13	0.001212	4.17	301.99	61.13	0.33
HIGGINS CK	MAINSTEM	4.925	100-YEAR	1260.00	643.00	649.78		650.10	0.001575	4.60	274.13	58.45	0.37
HIGGINS CK	MAINSTEM	4.915	100-YEAR	1260.00	643.00	649.82		649.99	0.000923	3.40	420.59	99.93	0.26
HIGGINS CK	MAINSTEM	4.885	100-YEAR	1260.00	642.90	649.64		649.84	0.000986	3.65	396.68	103.05	0.27
HIGGINS CK	MAINSTEM	4.866	100-YEAR	1260.00	642.40	649.51		649.73	0.001101	3.87	376.27	99.03	0.28
HIGGINS CK	MAINSTEM	4.847	100-YEAR	1260.00	642.00	649.40		649.61	0.001283	3.78	377.24	98.24	0.30
HIGGINS CK	MAINSTEM	4.828	100-YEAR	1260.00	641.90	649.33		649.49	0.000882	3.30	42		

HEC-RAS Plan: PermNat -5 Str Profile: 100-YEAR (Continued)

River	Reach	River Sta	Profile	Q. Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	4.801	100-YEAR	1260.00	642.50	649.11		649.33	0.001297	3.88	365.84	95.32	0.30
HIGGINS CK	MAINSTEM	4.783	100-YEAR	1260.00	642.00	648.99		649.21	0.001192	3.80	371.00	94.68	0.29
HIGGINS CK	MAINSTEM	4.774	100-YEAR	1260.00	642.50	648.91		649.15	0.001460	4.04	350.71	94.42	0.32
HIGGINS CK	MAINSTEM	4.771	100-YEAR	1260.00	642.05	648.89		649.12	0.001258	3.94	348.54	87.37	0.30
HIGGINS CK	MAINSTEM	4.760	100-YEAR	1260.00	641.50	648.79		649.05	0.001362	4.13	342.97	87.72	0.31
HIGGINS CK	MAINSTEM	4.742	100-YEAR	1260.00	642.22	648.66		648.91	0.001502	4.09	341.97	93.85	0.32
HIGGINS CK	MAINSTEM	4.713	100-YEAR	1260.00	642.40	648.31		648.63	0.002088	4.57	302.47	91.73	0.38
HIGGINS CK	MAINSTEM	4.698	100-YEAR	1260.00	642.20	648.21		648.45	0.001808	3.88	325.06	97.77	0.37
HIGGINS CK	MAINSTEM	4.694	100-YEAR	1260.00	641.46	648.03		648.40	0.001869	5.00	296.18	85.81	0.37
HIGGINS CK	MAINSTEM	4.683	100-YEAR	460.00	639.90	648.23	642.50	648.26	0.000127	1.36	355.05	98.43	0.10
HIGGINS CK	MAINSTEM	4.678	100-YEAR	460.00	639.90	648.13	642.53	648.23	0.000320	2.62	175.64	91.28	0.16
HIGGINS CK	MAINSTEM	4.673	Culvert										
HIGGINS CK	MAINSTEM	4.868	100-YEAR	460.00	640.20	647.20	642.80	647.37	0.000611	3.32	138.73	74.67	0.22
HIGGINS CK	MAINSTEM	4.664	100-YEAR	700.00	640.20	647.13	643.32	647.35	0.000878	3.75	186.72	72.09	0.26
HIGGINS CK	MAINSTEM	4.659	100-YEAR	700.00	638.42	647.20	641.09	647.26	0.000174	1.97	356.23	62.84	0.12
HIGGINS CK	MAINSTEM	4.639	100-YEAR	700.00	640.20	647.09		647.21	0.000791	2.78	254.83	70.68	0.23
HIGGINS CK	MAINSTEM	4.638	100-YEAR	700.00	640.80	647.10		647.20	0.000654	2.51	282.27	67.38	0.21
HIGGINS CK	MAINSTEM	4.611	100-YEAR	700.00	642.03	646.86		647.04	0.001594	3.38	207.14	58.81	0.32
HIGGINS CK	MAINSTEM	4.588	100-YEAR	730.00	641.80	646.61		646.83	0.001960	3.77	193.44	54.02	0.35
HIGGINS CK	MAINSTEM	4.569	100-YEAR	730.00	638.78	646.64		646.72	0.000347	2.40	347.09	74.38	0.16
HIGGINS CK	MAINSTEM	4.542	100-YEAR	730.00	639.10	646.62		646.67	0.000205	2.04	419.16	76.51	0.13
HIGGINS CK	MAINSTEM	4.537	100-YEAR	730.00	639.10	646.61		646.67	0.000206	2.04	418.79	76.48	0.13
HIGGINS CK	MAINSTEM	4.505	100-YEAR	730.00	637.50	646.61		646.64	0.000093	1.56	562.62	88.57	0.09
HIGGINS CK	MAINSTEM	4.485	100-YEAR	730.00	637.50	646.62	638.67	646.63	0.000019	0.60	1214.11	167.25	0.04

HEC-RAS Plan: PermNat -5 Str Profile: 500-YEAR

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chi
HIGGINS TRIB A	CUP	25	500-YEAR	414.00	667.72	671.93		672.07	0.001102	3.28	182.38	128.59	0.30
HIGGINS TRIB A	CUP	24	500-YEAR	414.00	666.72	671.68		671.92	0.001823	3.98	105.10	32.79	0.38
HIGGINS TRIB A	CUP	23	500-YEAR	414.00	667.72	670.13	670.13	671.05	0.015353	7.69	53.82	29.66	1.01
HIGGINS TRIB A	CUP	22	500-YEAR	414.00	664.72	669.87		669.97	0.000563	2.49	166.38	40.01	0.21
HIGGINS TRIB A	CUP	21	500-YEAR	414.00	664.72	669.52		669.70	0.001535	3.37	122.90	41.20	0.34
HIGGINS TRIB A	CUP	20	500-YEAR	414.00	664.72	669.38		669.54	0.001423	3.22	129.20	45.98	0.33
HIGGINS TRIB A	CUP	19	500-YEAR	414.00	664.42	669.20		669.37	0.002288	3.55	152.81	104.35	0.41
HIGGINS TRIB A	CUP	18	500-YEAR	414.00	664.22	669.17		669.23	0.000575	2.14	222.11	106.24	0.21
HIGGINS TRIB A	CUP	17	500-YEAR	414.00	664.12	669.06		669.16	0.000933	3.03	184.61	95.52	0.27
HIGGINS TRIB A	CUP	16	500-YEAR	414.00	664.02	669.02		669.09	0.000455	2.19	225.27	118.61	0.20
HIGGINS TRIB A	CUP	15	500-YEAR	414.00	663.72	668.77		668.99	0.001710	3.90	142.32	109.96	0.37
HIGGINS TRIB A	CUP	14	500-YEAR	414.00	663.72	668.65		668.77	0.002186	2.76	151.10	93.00	0.38
HIGGINS TRIB A	CUP	13	500-YEAR	414.00	663.72	668.44		668.60	0.001333	3.23	135.01	60.22	0.32
HIGGINS TRIB A	CUP	12	500-YEAR	418.00	662.72	668.19		668.29	0.000830	2.58	161.89	54.66	0.25
HIGGINS TRIB A	CUP	11	500-YEAR	418.00	663.02	667.61		668.04	0.003931	5.23	79.59	27.00	0.54
HIGGINS TRIB A	CUP	10	500-YEAR	416.00	662.72	667.07		667.48	0.004005	5.16	80.59	28.51	0.54
HIGGINS TRIB A	CUP	9	500-YEAR	416.00	662.22	666.59		666.93	0.003696	4.70	88.44	34.56	0.52
HIGGINS TRIB A	CUP	8	500-YEAR	416.00	661.02	666.37		666.53	0.001774	3.15	132.09	41.08	0.31
HIGGINS TRIB A	CUP	7	500-YEAR	416.00	661.02	666.12		666.35	0.003711	3.81	109.28	48.66	0.45
HIGGINS TRIB A	CUP	6.001	500-YEAR	416.00	661.02	664.56	664.56	665.62	0.019005	8.25	50.40	26.19	1.00
HIGGINS TRIB A	CUP	6	Culvert										
HIGGINS TRIB A	CUP	5.999	500-YEAR	416.00	659.72	664.67	662.85	664.99	0.003081	4.55	91.49	37.33	0.40
HIGGINS TRIB A	CUP	5	500-YEAR	416.00	659.72	662.82	662.82	663.78	0.025535	7.86	52.91	28.07	1.01
HIGGINS TRIB A	CUP	4.1	500-YEAR	416.00	651.98	659.96		659.97	0.000034	0.82	835.08	241.03	0.06
HIGGINS TRIB A	CUP	3.8	500-YEAR	416.00	651.03	659.96	653.74	659.96	0.000013	0.58	1036.59	230.61	0.04
HIGGINS TRIB A	CUP	3.5	500-YEAR	416.00	651.09	659.95		659.96	0.000015	0.65	902.16	179.56	0.04
HIGGINS TRIB A	CUP	3.1	500-YEAR	416.00	650.91	659.94		659.95	0.000022	0.79	719.80	139.38	0.05
HIGGINS TRIB A	CUP	3.01	500-YEAR	574.00	650.50	659.93		659.94	0.000057	1.09	694.98	144.50	0.07
HIGGINS TRIB A	CUP	1	500-YEAR	574.00	650.22	659.94		659.94	0.000004	0.24	2903.46	500.95	0.01
HIGGINS CK	MAINSTEM	6.245	500-YEAR	1253.00	651.02	659.90		659.93	0.000040	1.78	1687.75	370.25	0.11
HIGGINS CK	MAINSTEM	6.231	500-YEAR	1253.00	652.14	659.90		659.93	0.000020	1.25	1307.40	303.26	0.08
HIGGINS CK	MAINSTEM	6.179	500-YEAR	1253.00	651.86	659.79		659.91	0.000122	2.79	552.68	132.74	0.19
HIGGINS CK	MAINSTEM	6.069	500-YEAR	1253.00	650.55	659.77		659.84	0.000068	2.27	741.99	193.53	0.15
HIGGINS CK	MAINSTEM	6.035	500-YEAR	1253.00	651.21	659.75		659.83	0.000081	2.47	816.81	171.36	0.16
HIGGINS CK	MAINSTEM	6.034	500-YEAR	1253.00	651.79	659.64		659.82	0.000121	4.27	744.17	170.72	0.29
HIGGINS CK	MAINSTEM	6.033	500-YEAR	1253.00	651.61	659.70		659.79	0.000063	3.17	957.32	172.00	0.21
HIGGINS CK	MAINSTEM	6.032	500-YEAR	1253.00	647.83	659.75		659.77	0.000046	1.63	1178.72	172.00	0.09
HIGGINS CK	MAINSTEM	6.021	500-YEAR	1258.00	649.42	659.65		659.76	0.000242	2.90	571.51	124.00	0.18
HIGGINS CK	MAINSTEM	6.006	500-YEAR	1258.00	648.55	659.65		659.74	0.000233	2.61	729.76	265.22	0.16
HIGGINS CK	MAINSTEM	5.9994*	500-YEAR	1258.00	648.38	659.64		659.73	0.000209	2.52	738.79	268.76	0.16
HIGGINS CK	MAINSTEM	5.9950	500-YEAR	1258.00	648.21	659.64		659.72	0.000183	2.40	807.48	472.10	0.14
HIGGINS CK	MAINSTEM	5.972	500-YEAR	1930.00	647.90	659.64		659.68	0.000126	1.99	1866.94	647.80	0.12
HIGGINS CK	MAINSTEM	5.959	500-YEAR	1930.00	647.58	659.60		659.67	0.000174	2.46	1546.74	656.87	0.14
HIGGINS CK	MAINSTEM	5.950	500-YEAR	1930.00	647.42	659.58		659.65	0.000208	2.66	1450.63	698.01	0.15
HIGGINS CK	MAINSTEM	5.914	500-YEAR	1930.00	647.31	659.43	653.32	659.59	0.000366	3.48	859.09	529.32	0.20
HIGGINS CK	MAINSTEM	5.911	Culvert										
HIGGINS CK	MAINSTEM	5.899	500-YEAR	1930.00	647.30	658.41	653.85	658.83	0.000899	5.32	511.57	321.31	0.31
HIGGINS CK	MAINSTEM	5.86375*	500-YEAR	1930.00	647.10	658.38		658.61	0.000568	4.07	640.55	164.63	0.25
HIGGINS CK	MAINSTEM	5.8285*	500-YEAR	1930.00	646.90	658.28		658.50	0.000542	3.98	705.51	221.83	0.24
HIGGINS CK	MAINSTEM	5.79325*	500-YEAR	1930.00	646.70	658.18		658.40	0.000531	3.94	753.05	287.63	0.24
HIGGINS CK	MAINSTEM	5.758	500-YEAR	1930.00	646.50	658.08	652.70	658.30	0.000534	3.95	790.43	390.20	0.24
HIGGINS CK	MAINSTEM	5.721	Culvert										
HIGGINS CK	MAINSTEM	5.683	500-YEAR	1930.00	646.23	656.59	652.15	656.81	0.000745	3.91	643.59	376.51	0.27
HIGGINS CK	MAINSTEM	5.650	500-YEAR	1930.00	646.10	656.40		656.67	0.000750	4.29	571.14	256.81	0.28
HIGGINS CK	MAINSTEM	5.649	500-YEAR	1930.00	646.50	656.39		656.67	0.000782	4.27	555.77	254.91	0.28
HIGGINS CK	MAINSTEM	5.593	500-YEAR	1930.00	645.87	656.20	651.39	656.45	0.000666	4.12	624.86	250.54	0.26
HIGGINS CK	MAINSTEM	5.558	500-YEAR	2270.00	646.30	655.95	651.74	656.29	0.000951	4.75	579.91	198.17	0.31
HIGGINS CK	MAINSTEM	5.500	500-YEAR	2270.00	645.54	655.53	651.67	655.95	0.001227	5.35	504.24	131.47	0.35
HIGGINS CK	MAINSTEM	5.496	500-YEAR	2270.00	645.80	655.48	651.88	655.92	0.001387	5.51	498.17	140.03	0.37
HIGGINS CK	MAINSTEM	5.409	500-YEAR	2270.00	645.02	655.04	651.16	655.35	0.000994	4.80	624.15	142.81	0.31
HIGGINS CK	MAINSTEM	5.408	500-YEAR	2270.00	645.30	655.03	651.31	655.34	0.001060	4.83	613.67	145.06	0.32
HIGGINS CK	MAINSTEM	5.394	500-YEAR	2270.00	645.30	655.03		655.24	0.000533	3.65	635.69	99.36	0.24
HIGGINS CK	MAINSTEM	5.335	500-YEAR	2270.00	645.30	654.81	649.53	654.97	0.001266	3.29	768.12	417.18	0.21
HIGGINS CK	MAINSTEM	5.324	500-YEAR	2270.00	645.28	654.73		654.93	0.000528	3.63	718.17	497.11	0.24
HIGGINS CK	MAINSTEM	5.289	500-YEAR	2270.00	645.20	654.69		654.83	0.000381	3.12	823.33	448.80	0.20
HIGGINS CK	MAINSTEM	5.256	500-YEAR	2270.00	645.11	654.55		654.75	0.000583	3.53	670.41	133.50	0.24
HIGGINS CK	MAINSTEM	5.236	500-YEAR	2270.00	645.20	654.46		654.68	0.000628	3.77	628.12	123.02	0.25
HIGGINS CK	MAINSTEM	5.184	500-YEAR	2270.00	644.50	654.36		654.51	0.000470	3.26	840.95	338.63	0.22
HIGGINS CK	MAINSTEM	5.166	500-YEAR	2270.00	644.48	654.33		654.46	0.000426	3.11	921.37	428.13	0.21
HIGGINS CK	MAINSTEM	5.144	500-YEAR	2270.00	644.40	654.28		654.41	0.000430	3.09	953.31	492.64	0.21
HIGGINS CK	MAINSTEM	5.094	500-YEAR	2270.00	643.10	654.20		654.31	0.000307	2.78	1116.01	659.17	0.18
HIGGINS CK	MAINSTEM	5.049	500-YEAR	2270.00	643.43	654.13		654.24	0.000290	2.85	1167.49	778.24	0.18
HIGGINS CK	MAINSTEM	5.045	500-YEAR	2000.00	643.80	654.13		654.23	0.000264	2.65	1106.57	778.30	0.17
HIGGINS CK	MAINSTEM	5.020	500-YEAR	2000.00	643.80	654.09	648.05	654.19	0.000275	2.70	1075.70	777.63	0.17
HIGGINS CK	MAINSTEM	5.012	Culvert										
HIGGINS CK	MAINSTEM	5.005	500-YEAR	2000.00	643.80	653.25	647.68	653.35	0.000239	2.42	827.58	120.86	0.16
HIGGINS CK	MAINSTEM	4.992	500-YEAR	2000.00	643.80	653.24		653.33	0.000241	2.43	825.48	120.46	0.16
HIGGINS CK	MAINSTEM	4.980	500-YEAR	2000.00	643.55	653.07		653.29	0.000676	3.77	532.07	86.72	0.26
HIGGINS CK	MAINSTEM	4.965	500-YEAR	2140.00	643.40	652.92		653.23	0.000954	4.40	486.30	77.89	0.31
HIGGINS CK	MAINSTEM	4.944	500-YEAR	2140.00	642.80	652.78		653.11	0.000920	4.64	460.90	850.43	0.30
HIGGINS CK	MAINSTEM	4.928	500-YEAR	2140.00	642.48	652.74		653.02	0.000878	4.28	500.00	80.83	0.29
HIGGINS CK	MAINSTEM	4.925	500-YEAR	2140.00	643.00	652.67		653.00	0.001062	4.61	464.69	72.99	0.32
HIGGINS CK	MAINSTEM	4.915	500-YEAR	2140.00	643.00	652.76		652.91	0.000523	3.33	945.93	591.49	0.21
HIGGINS CK	MAINSTEM	4.885	500-YEAR	2140.00	642.90	652.70		652.83	0.000434	3.22	1260.77	576.84	0.19
HIGGINS CK	MAINSTEM	4.866	500-YEAR	2140.00	642.40	652.64		652.78	0.000484	3.42	1169.41	527.75	0.20
HIGGINS CK	MAINSTEM	4.847	500-YEAR	2140.00	642.00	652.61		652.72	0.000483	3.00	1151.54	466.53	0.20
HIGGINS CK	MAINSTEM	4.828	500-YEAR	2140.00	641.90	65							

HEC-RAS Plan: PermNat -5 Str Profile: 500-YEAR (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chi
HIGGINS CK	MAINSTEM	4.801	500-YEAR	2140.00	642.50	652.48		652.62	0.000478	3.24	1067.87	396.84	0.20
HIGGINS CK	MAINSTEM	4.783	500-YEAR	2140.00	642.00	652.43		652.57	0.000478	3.29	997.09	364.97	0.20
HIGGINS CK	MAINSTEM	4.774	500-YEAR	2140.00	642.50	652.40		652.55	0.000533	3.40	939.36	336.97	0.21
HIGGINS CK	MAINSTEM	4.771	500-YEAR	2140.00	642.05	652.37		652.54	0.000517	3.50	930.18	330.66	0.21
HIGGINS CK	MAINSTEM	4.760	500-YEAR	2140.00	641.50	652.34		652.51	0.000547	3.57	911.97	320.62	0.21
HIGGINS CK	MAINSTEM	4.742	500-YEAR	2140.00	642.22	652.29		652.45	0.000541	3.44	884.15	358.18	0.21
HIGGINS CK	MAINSTEM	4.713	500-YEAR	2140.00	642.40	652.20		652.36	0.000577	3.50	879.76	328.18	0.22
HIGGINS CK	MAINSTEM	4.698	500-YEAR	2140.00	642.20	652.19		652.31	0.000502	2.81	899.27	333.10	0.19
HIGGINS CK	MAINSTEM	4.694	500-YEAR	2140.00	641.46	652.06		652.29	0.000655	4.21	844.34	329.63	0.24
HIGGINS CK	MAINSTEM	4.683	500-YEAR	600.00	639.90	652.20	642.91	652.21	0.000032	0.84	847.47	175.33	0.05
HIGGINS CK	MAINSTEM	4.678	500-YEAR	600.00	639.90	652.11	642.99	652.19	0.000141	2.28	263.21	115.14	0.12
HIGGINS CK	MAINSTEM	4.673	Culvert										
HIGGINS CK	MAINSTEM	4.668	500-YEAR	600.00	640.20	650.44	643.30	650.57	0.000291	2.95	203.36	105.14	0.16
HIGGINS CK	MAINSTEM	4.664	500-YEAR	1600.00	640.20	649.87	645.24	650.43	0.001408	6.01	266.14	101.73	0.35
HIGGINS CK	MAINSTEM	4.659	500-YEAR	1600.00	638.42	650.04	642.55	650.22	0.000332	3.32	481.49	88.27	0.18
HIGGINS CK	MAINSTEM	4.639	500-YEAR	1600.00	640.20	649.99		650.16	0.000753	3.49	523.09	102.45	0.24
HIGGINS CK	MAINSTEM	4.638	500-YEAR	1600.00	640.80	649.99		650.16	0.000627	3.41	511.91	92.28	0.22
HIGGINS CK	MAINSTEM	4.611	500-YEAR	1600.00	642.03	649.78		650.02	0.001302	3.94	405.75	78.11	0.30
HIGGINS CK	MAINSTEM	4.588	500-YEAR	1666.00	641.80	649.54		649.84	0.001596	4.46	373.44	68.89	0.34
HIGGINS CK	MAINSTEM	4.569	500-YEAR	1666.00	638.78	649.58		649.72	0.000417	3.36	595.35	94.47	0.19
HIGGINS CK	MAINSTEM	4.542	500-YEAR	1666.00	639.10	649.55		649.66	0.000293	3.04	667.28	92.70	0.17
HIGGINS CK	MAINSTEM	4.537	500-YEAR	1666.00	639.10	649.54		649.66	0.000294	3.04	666.64	92.66	0.17
HIGGINS CK	MAINSTEM	4.505	500-YEAR	1666.00	637.50	649.54		649.61	0.000157	2.44	889.98	416.45	0.12
HIGGINS CK	MAINSTEM	4.485	500-YEAR	1666.00	637.50	649.57	639.50	649.58	0.000035	0.96	1772.54	258.22	0.06

NATURAL CONDITION
DESIGN MODEL INPUT CHANGES
FROM PERMIT MODEL

NATURAL CONDITIONS
(DESIGN)
MANNING'S N-VALUES

HigginsCreek-Des.rep

HEC-RAS Version 4.0.0 March 2008
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
XXXXXXXX XXXX   XXX   XXXX   XXXXXX   XXXX
X   X   X       X   X   X   X   X
X   X   X       X   X   X   X   X
X   X   XXXXXX   XXXX   X   X   X   X   XXXXX

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PROJECT DATA
Project Title: Higgins Creek Design & Permit Models
Project File : HigginsCreek-Des.prj
Run Date and Time: 5/11/2012 3:36:00 PM

Project in English units

Project Description:
EOWB Higgins Creek and Higgins Creek Trib. A CBEL 05/2012
Proposed

Willow-Higgins Creek, Willow Creek, Higgins Creek, Cook County, Illinois
Existing and Proposed Conditions OMP with As-Built Flood Control Reservoir Conditions
10-, 50-, 100-, 500-, and 100-Year Floodway Storm Event Flood Profiles
Christopher B. Burke Engineering, Ltd. 01/06

Updated for Final Willow Creek Relocation Alignment - OMP Project Competition Phase for proposed conditions (short feeder culverts with open channels through future western bypass area) - by HNTB/APS Consulting, Inc. 03/2010.

SUMMARY OF MANNING'S N VALUES

River:HIGGINS CK

Reach	River Sta.	n1	n2	n3	n4	n5
2	6.443	.065	.065	.075		
2	6.404	.065	.065	.075		
2	6.353	.065	.065	.075		
2	6.287	.065	.065	.075		
MAINSTEM	6.245	.07	.02	.07		
MAINSTEM	6.231	.07	.02	.07		
MAINSTEM	6.179	.07	.02	.07		
MAINSTEM	6.069	.07	.02	.07		
MAINSTEM	6.035	.045	.02	.045		
MAINSTEM	6.034	.045	.013	.045		
MAINSTEM	6.033	.045	.013	.045		
MAINSTEM	6.032	.045	.029	.045		
MAINSTEM	6.021	.04	.029	.04		
MAINSTEM	6.006	.06	.035	.06		
MAINSTEM	5.9994*	.06	.035	.06		
MAINSTEM	5.9950	.06	.035	.06		
MAINSTEM	5.972	.06	.015	.06		
MAINSTEM	5.959	.06	.015	.06		
MAINSTEM	5.950	.06	.015	.06		
MAINSTEM	5.914	.06	.015	.06		
MAINSTEM	5.911	Culvert				
MAINSTEM	5.899	.045	.015	.045		
MAINSTEM	5.86375*	.045	.015	.045		
MAINSTEM	5.8285*	.045	.015	.045		
MAINSTEM	5.79325*	.045	.015	.045		

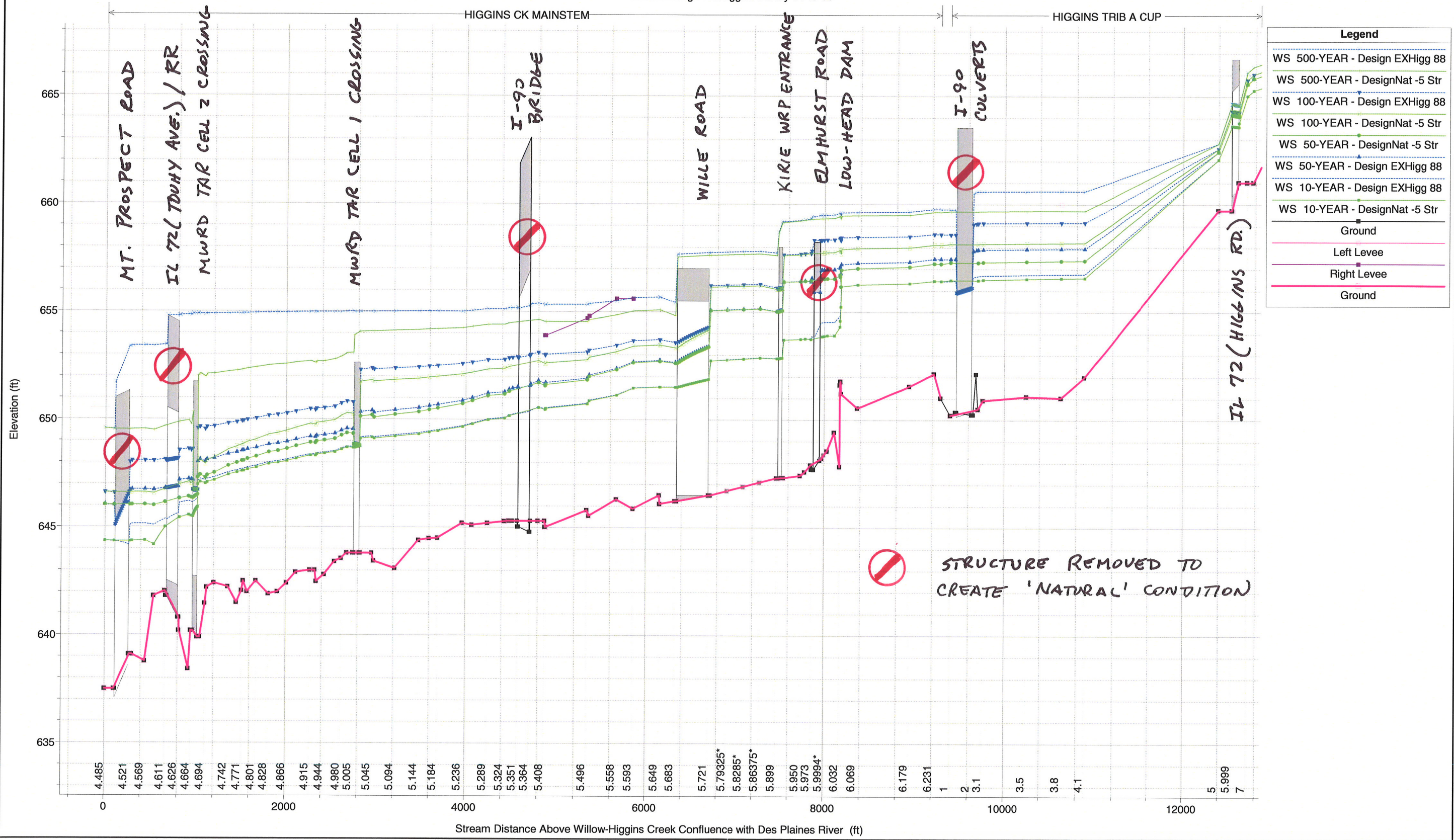
HigginsCreek-Des.rep					
		.045	.015	.045	
MAINSTEM	5.758				
MAINSTEM	5.721	Culvert			
MAINSTEM	5.683	.045	.015	.045	
MAINSTEM	5.650	.045	.015	.045	
MAINSTEM	5.649	.045	.015	.045	
MAINSTEM	5.593	.045	.015	.045	
MAINSTEM	5.558	.045	.015	.045	
MAINSTEM	5.500	.045	.015	.045	
MAINSTEM	5.496	.05	.015	.05	
MAINSTEM	5.409	.06	.015	.06	
MAINSTEM	5.408	.06	.015	.06	
MAINSTEM	5.394	.06	.035	.06	
MAINSTEM	5.335	.06	.035	.06	
MAINSTEM	5.324	.05	.025	.05	
MAINSTEM	5.289	.05	.025	.05	
MAINSTEM	5.256	.05	.025	.05	
MAINSTEM	5.236	.05	.025	.05	
MAINSTEM	5.184	.05	.025	.05	.03
MAINSTEM	5.166	.05	.025	.05	.03
MAINSTEM	5.144	.05	.025	.05	.03
MAINSTEM	5.094	.05	.025	.05	.03
MAINSTEM	5.049	.05	.025	.05	.03
MAINSTEM	5.045	.05	.025	.05	.03
MAINSTEM	5.020	.05	.025	.05	.03
MAINSTEM	5.012	Culvert			
MAINSTEM	5.005	.03	.05	.025	.05 .03
MAINSTEM	4.992	.05	.025	.05	.03
MAINSTEM	4.980	.03	.05	.025	.05 .02
MAINSTEM	4.966	.02	.05	.025	.05 .02
MAINSTEM	4.944	.02	.05	.025	.05 .02
MAINSTEM	4.928	.05	.02	.035	.05 .02
MAINSTEM	4.925	.05	.02	.035	.05 .02
MAINSTEM	4.915	.02	.065	.04	.065
MAINSTEM	4.885	.02	.065	.04	.065
MAINSTEM	4.866	.02	.065	.04	.065
MAINSTEM	4.847	.02	.065	.04	.065
MAINSTEM	4.828	.02	.065	.04	.065
MAINSTEM	4.801	.02	.065	.04	.065
MAINSTEM	4.783	.02	.065	.04	.065
MAINSTEM	4.774	.02	.065	.04	.065
MAINSTEM	4.771	.02	.065	.04	.065
MAINSTEM	4.760	.02	.065	.04	.065
MAINSTEM	4.742	.02	.065	.04	.065
MAINSTEM	4.713	.02	.065	.04	.065
MAINSTEM	4.698	.02	.065	.04	.065
MAINSTEM	4.694	.02	.065	.04	.065
MAINSTEM	4.683	.02	.065	.04	.065
MAINSTEM	4.678	.02	.065	.04	.065
MAINSTEM	4.673	Culvert			
MAINSTEM	4.668	.065	.04	.065	
MAINSTEM	4.664	.065	.04	.065	
MAINSTEM	4.659	.065	.04	.065	
MAINSTEM	4.639	.065	.04	.065	
MAINSTEM	4.638	.065	.04	.065	
MAINSTEM	4.611	.04	.033	.04	
MAINSTEM	4.588	.04	.033	.04	
MAINSTEM	4.569	.04	.033	.04	
MAINSTEM	4.542	.04	.033	.04	
MAINSTEM	4.537	.04	.033	.04	
MAINSTEM	4.505	.04	.033	.04	
MAINSTEM	4.485	.04	.033	.04	

River:HIGGINS TRIB A

Reach	River Sta.	n1	n2	n3
CUP	25	.055	.035	.035
CUP	24	.055	.035	.055
CUP	23	.055	.035	.055
CUP	22	.055	.035	.055
CUP	21	.055	.035	.055
CUP	20	.055	.035	.055
CUP	19	.055	.035	.055
CUP	18	.04	.04	.055
CUP	17	.055	.035	.035
CUP	16	.055	.035	.035
CUP	15	.055	.035	.055
CUP	14	.055	.035	.055

		HigginsCreek-Des.rep		
CUP	13	.04	.035	.035
CUP	12	.04	.035	.04
CUP	11	.04	.035	.04
CUP	10	.04	.035	.04
CUP	9	.04	.035	.04
CUP	8	.035	.042	.04
CUP	7	.04	.04	.04
CUP	6.001	.04	.04	.04
CUP	6			
		Culvert		
CUP	5.999	.04	.045	.04
CUP	5	.04	.045	.04
CUP	4.1	.045	.035	.045
CUP	3.8	.04	.035	.04
CUP	3.5	.04	.035	.04
CUP	3.1	.04	.035	.04
CUP	3.01	.04	.04	.04
CUP	1	.05	.05	.05

NATURAL CONDITION
DESIGN MODEL RESULTS



DESIGN
 MOD. EX. VS. 'NATURAL' PROFILES

DESIGN - NATURAL CONDITIONS

HEC-RAS Plan: DesignNat -5 Str Profile: 10-YEAR

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	25	10-YEAR	222.00	667.72	670.82		670.95	0.001495	2.99	79.46	48.42	0.33
HIGGINS TRIB A	CUP	24	10-YEAR	222.00	666.72	670.87		670.81	0.001422	2.97	74.63	27.78	0.32
HIGGINS TRIB A	CUP	23	10-YEAR	222.00	667.72	669.39	669.39	670.07	0.016922	6.60	33.62	25.18	1.01
HIGGINS TRIB A	CUP	22	10-YEAR	222.00	664.72	668.77		668.82	0.000377	1.78	124.59	36.48	0.17
HIGGINS TRIB A	CUP	21	10-YEAR	222.00	664.72	668.53		668.63	0.001193	2.61	85.12	34.74	0.29
HIGGINS TRIB A	CUP	20	10-YEAR	222.00	664.72	668.41		668.51	0.001283	2.55	87.20	39.33	0.30
HIGGINS TRIB A	CUP	19	10-YEAR	222.00	664.42	668.03		668.27	0.004462	3.98	57.94	48.86	0.54
HIGGINS TRIB A	CUP	18	10-YEAR	222.00	664.22	667.97		668.02	0.001081	1.95	115.11	65.60	0.24
HIGGINS TRIB A	CUP	17	10-YEAR	222.00	664.12	667.82		667.91	0.001073	2.76	97.73	52.60	0.28
HIGGINS TRIB A	CUP	16	10-YEAR	222.00	664.02	667.77		667.83	0.000537	1.84	123.12	54.33	0.20
HIGGINS TRIB A	CUP	15	10-YEAR	222.00	663.72	667.52		667.71	0.002438	3.56	62.39	26.88	0.41
HIGGINS TRIB A	CUP	14	10-YEAR	222.00	663.72	667.40		667.52	0.001264	2.73	81.44	32.25	0.30
HIGGINS TRIB A	CUP	13	10-YEAR	222.00	663.72	667.27		667.38	0.001391	2.75	80.86	34.06	0.31
HIGGINS TRIB A	CUP	12	10-YEAR	224.00	662.72	667.00		667.07	0.000868	2.16	103.62	43.48	0.25
HIGGINS TRIB A	CUP	11	10-YEAR	224.00	663.02	666.55		666.83	0.003496	4.22	53.10	22.97	0.49
HIGGINS TRIB A	CUP	10	10-YEAR	224.00	662.72	666.03		666.31	0.003963	4.25	52.75	25.19	0.52
HIGGINS TRIB A	CUP	9	10-YEAR	224.00	662.22	665.48		665.75	0.004112	4.15	54.02	27.71	0.52
HIGGINS TRIB A	CUP	8	10-YEAR	224.00	661.02	665.28		665.37	0.001464	2.48	90.47	35.12	0.27
HIGGINS TRIB A	CUP	7	10-YEAR	224.00	661.02	665.03		665.22	0.003520	3.45	64.99	32.01	0.43
HIGGINS TRIB A	CUP	6,001	10-YEAR	224.00	661.02	663.78	663.78	664.51	0.021409	6.88	32.58	22.30	1.00
HIGGINS TRIB A	CUP	6											
HIGGINS TRIB A	CUP	5,999	10-YEAR	224.00	659.72	663.84	662.11	663.81	0.002434	3.31	67.73	32.14	0.34
HIGGINS TRIB A	CUP	5	10-YEAR	224.00	659.72	662.08	662.08	662.78	0.027950	6.89	33.46	24.34	1.01
HIGGINS TRIB A	CUP	4.1	10-YEAR	224.00	651.98	656.59		656.65	0.000644	2.19	146.59	141.07	0.22
HIGGINS TRIB A	CUP	3.8	10-YEAR	224.00	651.03	656.57	653.12	656.59	0.000091	1.03	318.07	192.17	0.09
HIGGINS TRIB A	CUP	3.5	10-YEAR	224.00	651.09	656.54		656.55	0.000074	0.98	337.85	151.41	0.08
HIGGINS TRIB A	CUP	3.1	10-YEAR	224.00	650.91	656.50		656.51	0.000082	1.04	289.08	110.99	0.09
HIGGINS TRIB A	CUP	3.01	10-YEAR	294.00	650.50	656.48		656.50	0.000242	1.55	256.72	109.27	0.13
HIGGINS TRIB A	CUP	1	10-YEAR	294.00	650.22	656.48		656.48	0.000021	0.37	1173.28	500.32	0.03
HIGGINS CK	MAINSTEM	6,245	10-YEAR	562.00	651.02	656.43		656.47	0.000081	1.77	632.67	230.31	0.15
HIGGINS CK	MAINSTEM	6,231	10-YEAR	562.00	652.14	656.44		656.46	0.000037	1.10	520.51	156.48	0.10
HIGGINS CK	MAINSTEM	6,179	10-YEAR	562.00	651.56	656.33		656.43	0.000226	2.58	217.47	59.73	0.24
HIGGINS CK	MAINSTEM	6,069	10-YEAR	562.00	650.55	656.27		656.33	0.000112	1.97	285.10	68.24	0.17
HIGGINS CK	MAINSTEM	6,035	10-YEAR	562.00	651.21	656.19		656.30	0.000240	2.73	242.51	111.44	0.25
HIGGINS CK	MAINSTEM	6,034	10-YEAR	562.00	651.79	655.25	655.25	656.21	0.001816	8.25	102.05	72.89	0.94
HIGGINS CK	MAINSTEM	6,033	10-YEAR	562.00	651.61	654.60	654.60	655.25	0.002069	7.44	150.70	128.39	0.97
HIGGINS CK	MAINSTEM	6,032	10-YEAR	562.00	647.83	654.32		654.39	0.000233	2.24	325.12	135.52	0.18
HIGGINS CK	MAINSTEM	6,021	10-YEAR	564.00	649.42	653.91		654.32	0.002181	5.14	109.64	31.42	0.49
HIGGINS CK	MAINSTEM	6,006	10-YEAR	564.00	648.55	653.91		654.13	0.001388	3.72	151.55	38.87	0.33
HIGGINS CK	MAINSTEM	5,999.4	10-YEAR	564.00	648.38	653.88		654.07	0.001180	3.47	164.34	45.99	0.31
HIGGINS CK	MAINSTEM	5,995.0	10-YEAR	564.00	648.21	653.87		654.03	0.000992	3.22	174.94	44.13	0.29
HIGGINS CK	MAINSTEM	5,972	10-YEAR	645.00	647.90	653.74		653.96	0.000263	3.73	172.89	46.13	0.34
HIGGINS CK	MAINSTEM	5,959	10-YEAR	645.00	647.58	653.76		653.93	0.000187	3.27	197.26	50.15	0.29
HIGGINS CK	MAINSTEM	5,950	10-YEAR	645.00	647.42	653.74		653.92	0.000205	3.41	188.93	48.02	0.30
HIGGINS CK	MAINSTEM	5,914	10-YEAR	645.00	647.31	653.71	650.92	653.88	0.000190	3.30	195.31	49.33	0.29
HIGGINS CK	MAINSTEM	5,911											
HIGGINS CK	MAINSTEM	5,899	10-YEAR	645.00	647.30	652.84	650.97	653.31	0.000425	5.46	118.10	43.12	0.45
HIGGINS CK	MAINSTEM	5,86375*	10-YEAR	645.00	647.10	652.87		653.14	0.000334	4.11	156.89	43.46	0.38
HIGGINS CK	MAINSTEM	5,8285*	10-YEAR	645.00	646.90	652.82		653.07	0.000301	3.98	161.89	43.40	0.36
HIGGINS CK	MAINSTEM	5,79325*	10-YEAR	645.00	646.70	652.78		653.01	0.000271	3.86	167.22	43.37	0.35
HIGGINS CK	MAINSTEM	5,758	10-YEAR	645.00	646.50	652.74	650.19	652.95	0.000244	3.73	172.89	43.36	0.33
HIGGINS CK	MAINSTEM	5,721											
HIGGINS CK	MAINSTEM	5,683	10-YEAR	645.00	646.23	651.50	649.46	651.88	0.000343	4.92	131.22	46.51	0.41
HIGGINS CK	MAINSTEM	5,650	10-YEAR	645.00	646.10	651.51		651.76	0.000311	3.96	162.72	45.38	0.37
HIGGINS CK	MAINSTEM	5,649	10-YEAR	645.00	646.50	651.51		651.76	0.000337	3.97	162.41	47.97	0.38
HIGGINS CK	MAINSTEM	5,593	10-YEAR	645.00	645.87	651.46	649.07	651.66	0.000238	3.59	179.56	47.34	0.33
HIGGINS CK	MAINSTEM	5,558	10-YEAR	907.00	646.30	651.13	649.69	651.56	0.000584	5.26	172.32	50.26	0.50
HIGGINS CK	MAINSTEM	5,500	10-YEAR	907.00	645.54	650.87	649.36	651.37	0.000628	5.66	160.16	44.02	0.52
HIGGINS CK	MAINSTEM	5,496	10-YEAR	907.00	645.80	650.73	649.63	651.34	0.000858	6.28	144.45	43.03	0.60
HIGGINS CK	MAINSTEM	5,409	10-YEAR	907.00	645.02	650.52	648.94	650.98	0.000567	5.46	166.26	44.80	0.50
HIGGINS CK	MAINSTEM	5,408	10-YEAR	907.00	645.30	650.46	649.07	650.97	0.000658	5.73	158.42	44.48	0.53
HIGGINS CK	MAINSTEM	5,394	10-YEAR	907.00	645.30	650.56		650.75	0.001261	3.54	256.41	69.89	0.33
HIGGINS CK	MAINSTEM	5,335	10-YEAR	907.00	645.30	650.18	647.82	650.36	0.001157	3.43	264.47	70.92	0.31
HIGGINS CK	MAINSTEM	5,324	10-YEAR	907.00	645.28	650.06		650.30	0.000827	3.93	231.07	81.85	0.37
HIGGINS CK	MAINSTEM	5,289	10-YEAR	907.00	645.20	649.99		650.16	0.000581	3.31	273.61	76.65	0.31
HIGGINS CK	MAINSTEM	5,258	10-YEAR	907.00	645.11	649.79		650.03	0.000829	3.92	231.18	65.31	0.37
HIGGINS CK	MAINSTEM	5,236	10-YEAR	907.00	645.20	649.66		649.93	0.001021	4.19	216.72	65.02	0.40
HIGGINS CK	MAINSTEM	5,184	10-YEAR	907.00	644.50	649.47		649.68	0.000710	3.73	242.98	65.71	0.34
HIGGINS CK	MAINSTEM	5,166	10-YEAR	907.00	644.48	649.40		649.61	0.000692	3.69	245.53	66.13	0.34
HIGGINS CK	MAINSTEM	5,144	10-YEAR	907.00	644.40	649.32		649.53	0.000711	3.73	243.14	65.83	0.34
HIGGINS CK	MAINSTEM	5,094	10-YEAR	907.00	643.10	649.21		649.37	0.000438	3.13	289.52	70.90	0.27
HIGGINS CK	MAINSTEM	5,049	10-YEAR	907.00	643.43	649.11		649.27	0.000418	3.12	290.83	69.13	0.27
HIGGINS CK	MAINSTEM	5,045	10-YEAR	571.00	643.80	649.16		649.23	0.000210	2.14	267.24	66.78	0.19
HIGGINS CK	MAINSTEM	5,020	10-YEAR	571.00	643.80	649.11	645.94	649.20	0.000212	2.44	234.08	66.49	0.20
HIGGINS CK	MAINSTEM	5,012											
HIGGINS CK	MAINSTEM	5,005	10-YEAR	571.00	643.80	648.88	645.55	648.78	0.000219	2.49	228.91	90.05	0.20
HIGGINS CK	MAINSTEM	4,992	10-YEAR	571.00	643.80	648.70		648.74	0.000118	1.60	357.01	90.15	0.14
HIGGINS CK	MAINSTEM	4,980	10-YEAR	571.00	643.55	648.61		648.72	0.000359	2.65	215.70	58.31	0.24
HIGGINS CK	MAINSTEM	4,966	10-YEAR	700.00	643.40	648.48		648.67	0.000657	3.55	196.99	53.67	0.33
HIGGINS CK	MAINSTEM	4,944	10-YEAR	700.00	642.80	648.42		648.60	0.000556	3.44	203.70	51.02	0.30
HIGGINS CK	MAINSTEM	4,928	10-YEAR	700.00	642.48	648.37		648.53	0.000936	3.23	216.84	53.36	0.28
HIGGINS CK	MAINSTEM	4,925	10-YEAR	700.00	643.00	648.31		648.51	0.001279	3.61	193.91	51.10	0.33
HIGGINS CK	MAINSTEM	4,915	10-YEAR	700.00	643.00	648.32		648.43	0.000814	2.72	277.12	90.91	0.23
HIGGINS CK	MAINSTEM	4,885	10-YEAR	700.00	642.90	648.17		648.30	0.000854	2.85	263.89	84.46	0.24

HEC-RAS Plan: DesignNat -5 Str Profile: 10-YEAR (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E. G. Elev (ft)	E. G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Wdth (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	4.866	10-YEAR	700.00	642.40	648.07		648.21	0.000914	3.00	250.75	81.96	0.25
HIGGINS CK	MAINSTEM	4.847	10-YEAR	700.00	642.00	647.98		648.12	0.000883	2.94	252.98	83.07	0.24
HIGGINS CK	MAINSTEM	4.828	10-YEAR	700.00	641.90	647.93		648.03	0.000702	2.56	289.41	94.18	0.22
HIGGINS CK	MAINSTEM	4.801	10-YEAR	700.00	642.50	647.76		647.90	0.001075	3.04	242.68	86.23	0.27
HIGGINS CK	MAINSTEM	4.783	10-YEAR	700.00	642.00	647.67		647.80	0.000924	2.90	251.23	83.31	0.25
HIGGINS CK	MAINSTEM	4.774	10-YEAR	700.00	642.50	647.60		647.75	0.001205	3.16	232.56	83.88	0.28
HIGGINS CK	MAINSTEM	4.771	10-YEAR	700.00	642.05	647.60		647.73	0.000927	2.92	243.31	69.62	0.25
HIGGINS CK	MAINSTEM	4.760	10-YEAR	700.00	641.50	647.53		647.67	0.000994	3.08	236.44	76.38	0.26
HIGGINS CK	MAINSTEM	4.742	10-YEAR	700.00	642.22	647.42		647.57	0.001159	3.11	231.56	78.09	0.28
HIGGINS CK	MAINSTEM	4.713	10-YEAR	700.00	642.40	647.17		647.36	0.001599	3.46	205.50	70.02	0.32
HIGGINS CK	MAINSTEM	4.698	10-YEAR	700.00	642.20	647.07		647.23	0.001375	3.15	221.93	75.07	0.32
HIGGINS CK	MAINSTEM	4.694	10-YEAR	700.00	641.46	647.02		647.20	0.001188	3.48	217.10	61.12	0.28
HIGGINS CK	MAINSTEM	4.683	10-YEAR	424.00	639.90	647.09	642.36	647.13	0.000223	1.57	273.70	76.30	0.12
HIGGINS CK	MAINSTEM	4.678	10-YEAR	424.00	639.90	646.97	642.40	647.09	0.000458	2.82	150.14	66.60	0.19
HIGGINS CK	MAINSTEM	4.673			Culvert								
HIGGINS CK	MAINSTEM	4.668	10-YEAR	424.00	640.20	645.48	642.68	645.74	0.001346	4.07	104.24	47.47	0.31
HIGGINS CK	MAINSTEM	4.664	10-YEAR	444.00	640.20	645.51	642.63	645.67	0.000928	3.18	139.77	47.65	0.26
HIGGINS CK	MAINSTEM	4.659	10-YEAR	444.00	638.42	645.56	640.56	645.60	0.000148	1.56	284.15	58.20	0.11
HIGGINS CK	MAINSTEM	4.639	10-YEAR	444.00	640.20	645.43		645.54	0.001031	2.69	165.24	47.18	0.25
HIGGINS CK	MAINSTEM	4.638	10-YEAR	444.00	640.80	645.44		645.54	0.001070	2.50	177.36	57.66	0.25
HIGGINS CK	MAINSTEM	4.611	10-YEAR	444.00	642.03	645.01		645.27	0.002840	4.10	108.24	47.62	0.48
HIGGINS CK	MAINSTEM	4.588	10-YEAR	454.00	641.80	644.18		644.72	0.007594	5.86	77.47	41.72	0.76
HIGGINS CK	MAINSTEM	4.589	10-YEAR	454.00	638.78	644.37		644.47	0.000457	2.54	196.10	58.90	0.21
HIGGINS CK	MAINSTEM	4.542	10-YEAR	454.00	639.10	644.35		644.41	0.000226	2.05	260.09	64.01	0.16
HIGGINS CK	MAINSTEM	4.537	10-YEAR	454.00	639.10	644.35		644.41	0.000227	2.05	259.75	63.98	0.16
HIGGINS CK	MAINSTEM	4.505	10-YEAR	454.00	637.50	644.35		644.37	0.000082	1.47	377.49	75.27	0.10
HIGGINS CK	MAINSTEM	4.485	10-YEAR	454.00	637.50	644.36	638.36	644.36	0.000014	0.53	855.23	150.34	0.04

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Val Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	25	50-YEAR	308.00	667.72	671.35		671.51	0.001356	3.24	116.97	91.70	0.33
HIGGINS TRIB A	CUP	24	50-YEAR	308.00	666.72	671.17		671.35	0.001624	3.47	89.02	30.24	0.35
HIGGINS TRIB A	CUP	23	50-YEAR	308.00	667.72	669.76	669.76	670.55	0.015923	7.14	43.14	27.38	1.00
HIGGINS TRIB A	CUP	22	50-YEAR	308.00	664.72	669.34		669.41	0.000460	2.11	145.72	38.09	0.19
HIGGINS TRIB A	CUP	21	50-YEAR	308.00	664.72	669.05		669.18	0.001329	2.96	104.15	38.13	0.32
HIGGINS TRIB A	CUP	20	50-YEAR	308.00	664.72	668.92		669.05	0.001325	2.84	108.64	43.22	0.31
HIGGINS TRIB A	CUP	19	50-YEAR	308.00	664.42	668.84		668.85	0.003073	3.75	99.36	86.26	0.46
HIGGINS TRIB A	CUP	18	50-YEAR	308.00	664.22	668.60		668.66	0.000832	2.01	165.14	92.44	0.22
HIGGINS TRIB A	CUP	17	50-YEAR	308.00	664.12	668.47		668.57	0.000941	2.84	137.80	89.82	0.27
HIGGINS TRIB A	CUP	16	50-YEAR	308.00	664.02	668.43		668.49	0.000465	1.99	168.31	82.69	0.19
HIGGINS TRIB A	CUP	15	50-YEAR	308.00	663.72	668.17		668.39	0.002051	3.77	89.07	64.78	0.39
HIGGINS TRIB A	CUP	14	50-YEAR	308.00	663.72	668.03		668.17	0.001939	2.91	105.85	53.96	0.38
HIGGINS TRIB A	CUP	13	50-YEAR	308.00	663.72	667.86		668.00	0.001437	3.00	103.19	44.60	0.33
HIGGINS TRIB A	CUP	12	50-YEAR	310.00	662.72	667.59		667.67	0.000889	2.37	130.84	48.79	0.25
HIGGINS TRIB A	CUP	11	50-YEAR	310.00	663.02	667.08		667.42	0.003725	4.73	65.57	24.95	0.51
HIGGINS TRIB A	CUP	10	50-YEAR	310.00	662.72	666.54		666.89	0.003931	4.69	68.12	26.84	0.53
HIGGINS TRIB A	CUP	9	50-YEAR	310.00	662.22	666.04		666.34	0.003818	4.40	70.40	31.16	0.52
HIGGINS TRIB A	CUP	8	50-YEAR	310.00	661.02	665.83		665.95	0.001602	2.80	110.71	38.13	0.29
HIGGINS TRIB A	CUP	7	50-YEAR	310.00	661.02	665.58		665.78	0.003808	3.66	84.74	40.70	0.45
HIGGINS TRIB A	CUP	6.001	50-YEAR	310.00	661.02	664.15	664.15	665.04	0.020155	7.58	40.89	24.15	1.00
HIGGINS TRIB A	CUP	6	Culvert										
HIGGINS TRIB A	CUP	5.999	50-YEAR	310.00	659.72	664.15	662.48	664.38	0.002739	3.90	79.45	34.70	0.37
HIGGINS TRIB A	CUP	5	50-YEAR	310.00	659.72	662.44	662.44	663.27	0.026572	7.29	42.55	26.15	1.01
HIGGINS TRIB A	CUP	4.1	50-YEAR	310.00	651.98	657.39		657.42	0.000327	1.82	278.06	179.08	0.16
HIGGINS TRIB A	CUP	3.8	50-YEAR	310.00	651.03	657.37	653.42	657.38	0.000064	0.97	476.91	202.59	0.08
HIGGINS TRIB A	CUP	3.5	50-YEAR	310.00	651.09	657.35		657.36	0.000059	0.97	462.30	158.08	0.07
HIGGINS TRIB A	CUP	3.1	50-YEAR	310.00	650.91	657.31		657.32	0.000073	1.10	381.53	117.67	0.08
HIGGINS TRIB A	CUP	3.01	50-YEAR	407.00	650.50	657.29		657.31	0.000200	1.56	348.71	117.54	0.12
HIGGINS TRIB A	CUP	1	50-YEAR	407.00	650.22	657.29		657.30	0.000016	0.36	1580.73	500.47	0.03
HIGGINS CK	MAINSTEM	6.245	50-YEAR	810.00	651.02	657.24		657.29	0.000092	2.05	829.40	259.84	0.16
HIGGINS CK	MAINSTEM	6.231	50-YEAR	810.00	652.14	657.25		657.28	0.000041	1.31	657.01	186.87	0.11
HIGGINS CK	MAINSTEM	6.179	50-YEAR	810.00	651.56	657.09		657.24	0.000262	3.07	263.81	61.63	0.26
HIGGINS CK	MAINSTEM	6.069	50-YEAR	810.00	650.55	657.03		657.12	0.000137	2.40	339.72	78.97	0.19
HIGGINS CK	MAINSTEM	6.035	50-YEAR	810.00	651.21	656.94		657.08	0.000243	3.10	356.45	156.06	0.26
HIGGINS CK	MAINSTEM	6.034	50-YEAR	810.00	651.79	656.18	655.93	657.01	0.001088	7.95	188.52	111.02	0.77
HIGGINS CK	MAINSTEM	6.033	50-YEAR	810.00	651.61	656.64		656.81	0.000231	4.11	452.57	157.42	0.37
HIGGINS CK	MAINSTEM	6.032	50-YEAR	810.00	647.83	656.73		656.77	0.000085	1.76	680.66	157.85	0.11
HIGGINS CK	MAINSTEM	6.021	50-YEAR	810.00	649.42	656.54		656.74	0.000668	3.67	259.39	89.65	0.29
HIGGINS CK	MAINSTEM	6.006	50-YEAR	810.00	648.55	656.55		656.67	0.000499	2.87	325.12	81.07	0.21
HIGGINS CK	MAINSTEM	5.9994*	50-YEAR	810.00	648.38	656.54		656.65	0.000433	2.73	330.22	74.40	0.20
HIGGINS CK	MAINSTEM	5.9950	50-YEAR	810.00	648.21	656.53		656.64	0.000380	2.62	324.89	66.77	0.19
HIGGINS CK	MAINSTEM	5.972	50-YEAR	1100.00	647.90	656.45		656.60	0.000110	3.25	603.46	405.99	0.24
HIGGINS CK	MAINSTEM	5.959	50-YEAR	1100.00	647.58	656.44		656.60	0.000092	3.20	469.11	330.72	0.22
HIGGINS CK	MAINSTEM	5.950	50-YEAR	1100.00	647.42	656.41		656.59	0.000104	3.37	391.32	292.55	0.23
HIGGINS CK	MAINSTEM	5.914	50-YEAR	1100.00	647.31	656.40	651.92	656.57	0.000098	3.32	334.05	77.41	0.23
HIGGINS CK	MAINSTEM	5.911	Culvert										
HIGGINS CK	MAINSTEM	5.899	50-YEAR	1100.00	647.30	655.02	652.12	655.64	0.000335	6.30	174.69	58.99	0.43
HIGGINS CK	MAINSTEM	5.86375*	50-YEAR	1100.00	647.10	655.15		655.41	0.000203	4.13	271.79	64.92	0.32
HIGGINS CK	MAINSTEM	5.8285*	50-YEAR	1100.00	646.90	655.12		655.37	0.000190	4.04	277.18	65.58	0.31
HIGGINS CK	MAINSTEM	5.79325*	50-YEAR	1100.00	646.70	655.09		655.33	0.000178	3.96	282.25	64.81	0.30
HIGGINS CK	MAINSTEM	5.758	50-YEAR	1100.00	646.50	655.06	651.21	655.29	0.000167	3.87	286.83	62.94	0.29
HIGGINS CK	MAINSTEM	5.721	Culvert										
HIGGINS CK	MAINSTEM	5.683	50-YEAR	1100.00	646.23	652.62	650.51	653.32	0.000479	6.73	163.56	51.61	0.50
HIGGINS CK	MAINSTEM	5.650	50-YEAR	1100.00	646.10	652.70		653.09	0.000388	5.00	219.89	50.83	0.42
HIGGINS CK	MAINSTEM	5.649	50-YEAR	1100.00	646.50	652.71		653.09	0.000391	4.95	222.43	52.48	0.42
HIGGINS CK	MAINSTEM	5.593	50-YEAR	1100.00	645.87	652.64	650.02	652.97	0.000310	4.62	238.35	52.36	0.38
HIGGINS CK	MAINSTEM	5.558	50-YEAR	1394.00	646.30	652.32	650.53	652.87	0.000561	5.93	235.05	55.39	0.51
HIGGINS CK	MAINSTEM	5.500	50-YEAR	1394.00	645.54	652.00	650.31	652.67	0.000668	6.57	212.26	48.70	0.55
HIGGINS CK	MAINSTEM	5.496	50-YEAR	1394.00	645.80	651.84	650.56	652.64	0.000860	7.16	194.62	47.36	0.62
HIGGINS CK	MAINSTEM	5.409	50-YEAR	1394.00	645.02	651.62	649.85	652.26	0.000614	6.40	217.85	48.73	0.53
HIGGINS CK	MAINSTEM	5.408	50-YEAR	1394.00	645.30	651.56	649.95	652.25	0.000696	6.65	209.62	48.73	0.57
HIGGINS CK	MAINSTEM	5.394	50-YEAR	1394.00	645.30	651.71		651.97	0.001333	4.08	341.72	78.28	0.34
HIGGINS CK	MAINSTEM	5.335	50-YEAR	1394.00	645.30	651.30	648.51	651.55	0.001239	4.01	347.99	77.57	0.33
HIGGINS CK	MAINSTEM	5.324	50-YEAR	1394.00	645.28	651.17		651.49	0.000883	4.52	308.48	98.72	0.39
HIGGINS CK	MAINSTEM	5.289	50-YEAR	1394.00	645.20	651.10		651.33	0.000608	3.84	363.43	84.34	0.33
HIGGINS CK	MAINSTEM	5.256	50-YEAR	1394.00	645.11	650.87		651.19	0.000891	4.57	305.07	72.17	0.39
HIGGINS CK	MAINSTEM	5.236	50-YEAR	1394.00	645.20	650.73		651.09	0.001048	4.80	290.22	72.03	0.42
HIGGINS CK	MAINSTEM	5.184	50-YEAR	1394.00	644.50	650.52		650.82	0.000801	4.41	315.89	72.60	0.37
HIGGINS CK	MAINSTEM	5.166	50-YEAR	1394.00	644.48	650.45		650.74	0.000794	4.38	318.58	73.68	0.37
HIGGINS CK	MAINSTEM	5.144	50-YEAR	1394.00	644.40	650.35		650.65	0.000815	4.43	314.41	72.61	0.38
HIGGINS CK	MAINSTEM	5.094	50-YEAR	1394.00	643.10	650.23		650.45	0.000541	3.82	364.54	77.45	0.31
HIGGINS CK	MAINSTEM	5.049	50-YEAR	1394.00	643.43	650.09		650.33	0.000533	3.86	361.23	74.58	0.31
HIGGINS CK	MAINSTEM	5.045	50-YEAR	750.00	643.80	650.19		650.27	0.000183	2.21	338.88	72.10	0.18
HIGGINS CK	MAINSTEM	5.020	50-YEAR	750.00	643.80	650.13	646.26	650.24	0.000192	2.64	284.11	71.76	0.19
HIGGINS CK	MAINSTEM	5.012	Culvert										
HIGGINS CK	MAINSTEM	5.005	50-YEAR	750.00	643.80	649.33	645.88	649.46	0.000247	2.88	260.33	93.76	0.22
HIGGINS CK	MAINSTEM	4.992	50-YEAR	750.00	643.80	649.36		649.41	0.000127	1.79	418.19	93.92	0.15
HIGGINS CK	MAINSTEM	4.980	50-YEAR	750.00	643.55	649.28		649.39	0.000387	2.95	254.55	61.88	0.28
HIGGINS CK	MAINSTEM	4.968	50-YEAR	920.00	643.40	649.09		649.34	0.000722	3.98	231.10	56.82	0.35
HIGGINS CK	MAINSTEM	4.944	50-YEAR	920.00	642.80	649.02		649.26	0.000640	3.91	235.50	53.93	0.33
HIGGINS CK	MAINSTEM	4.928	50-YEAR	920.00	642.48	648.97		649.18	0.001091	3.68	249.78	56.50	0.31
HIGGINS CK	MAINSTEM	4.925	50-YEAR	920.00	643.00	648.90		649.16	0.001459	4.09	224.81	54.05	0.35
HIGGINS CK	MAINSTEM	4.915	50-YEAR	920.00	643.00	648.92		649.06	0.000895	3.06	332.98	94.52	0.25
HIGGINS CK	MAINSTEM	4.885	50-YEAR	920.00	642.90	648.75		648.91	0.000962	3.24	313.69	87.16	0.26

HEC-RAS Plan: DesignNat -5 Str Profile: 50-YEAR (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	4.866	50-YEAR	920.00	642.40	648.63		648.81	0.001056	3.43	297.49	84.58	0.27
HIGGINS CK	MAINSTEM	4.847	50-YEAR	920.00	642.00	648.53		648.70	0.001034	3.39	299.13	85.88	0.27
HIGGINS CK	MAINSTEM	4.828	50-YEAR	920.00	641.90	648.47		648.60	0.000823	2.94	341.28	97.94	0.24
HIGGINS CK	MAINSTEM	4.801	50-YEAR	920.00	642.50	648.27		648.45	0.001251	3.48	287.61	90.32	0.29
HIGGINS CK	MAINSTEM	4.783	50-YEAR	920.00	642.00	648.16		648.33	0.001115	3.38	294.01	89.78	0.28
HIGGINS CK	MAINSTEM	4.774	50-YEAR	920.00	642.50	648.07		648.28	0.001424	3.64	274.10	89.47	0.31
HIGGINS CK	MAINSTEM	4.771	50-YEAR	920.00	642.05	648.06		648.25	0.001150	3.45	278.67	80.32	0.28
HIGGINS CK	MAINSTEM	4.760	50-YEAR	920.00	641.50	647.98		648.18	0.001245	3.63	273.05	83.54	0.29
HIGGINS CK	MAINSTEM	4.742	50-YEAR	920.00	642.22	647.84		648.05	0.001439	3.66	267.50	89.00	0.31
HIGGINS CK	MAINSTEM	4.713	50-YEAR	920.00	642.40	647.51		647.78	0.002075	4.13	231.51	81.69	0.37
HIGGINS CK	MAINSTEM	4.698	50-YEAR	920.00	642.20	647.39		647.61	0.001823	3.72	247.62	86.21	0.39
HIGGINS CK	MAINSTEM	4.694	50-YEAR	920.00	641.46	647.28		647.56	0.001666	4.31	234.95	72.11	0.34
HIGGINS CK	MAINSTEM	4.683	50-YEAR	445.00	639.90	647.42	642.46	647.46	0.000196	1.54	297.20	87.82	0.12
HIGGINS CK	MAINSTEM	4.678	50-YEAR	445.00	639.90	647.30	642.48	647.42	0.000431	2.83	157.39	77.80	0.19
HIGGINS CK	MAINSTEM	4.673			Culvert								
HIGGINS CK	MAINSTEM	4.668	50-YEAR	445.00	640.20	646.34	642.75	646.55	0.000891	3.66	121.44	52.60	0.26
HIGGINS CK	MAINSTEM	4.664	50-YEAR	485.00	640.20	646.36	642.75	646.50	0.000643	2.95	164.51	52.73	0.22
HIGGINS CK	MAINSTEM	4.659	50-YEAR	485.00	638.42	646.40	640.66	646.44	0.000118	1.51	321.36	58.60	0.10
HIGGINS CK	MAINSTEM	4.639	50-YEAR	485.00	640.20	646.32		646.40	0.000644	2.31	209.51	52.48	0.20
HIGGINS CK	MAINSTEM	4.638	50-YEAR	485.00	640.80	646.33		646.40	0.000577	2.10	231.70	63.60	0.19
HIGGINS CK	MAINSTEM	4.611	50-YEAR	485.00	642.03	646.15		646.28	0.000973	2.91	166.40	54.48	0.29
HIGGINS CK	MAINSTEM	4.588	50-YEAR	503.00	641.80	646.00		646.15	0.001058	3.11	161.86	50.96	0.31
HIGGINS CK	MAINSTEM	4.569	50-YEAR	503.00	638.78	646.04		646.09	0.000170	1.91	303.80	70.29	0.14
HIGGINS CK	MAINSTEM	4.542	50-YEAR	503.00	639.10	646.03		646.07	0.000099	1.63	375.34	73.28	0.11
HIGGINS CK	MAINSTEM	4.537	50-YEAR	503.00	639.10	646.03		646.07	0.000099	1.63	375.17	73.27	0.11
HIGGINS CK	MAINSTEM	4.505	50-YEAR	503.00	637.50	646.03		646.05	0.000043	1.24	512.58	85.18	0.07
HIGGINS CK	MAINSTEM	4.485	50-YEAR	503.00	637.50	646.04	638.42	646.04	0.000008	0.45	1118.36	162.91	0.03

River	Reach	River Sta	Profile	Q.Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	25	100-YEAR	342.00	667.72	671.55		671.70	0.001280	3.28	136.23	107.35	0.32
HIGGINS TRIB A	CUP	24	100-YEAR	342.00	666.72	671.34		671.55	0.001691	3.64	94.35	31.11	0.36
HIGGINS TRIB A	CUP	23	100-YEAR	342.00	667.72	669.88	669.88	670.72	0.015736	7.34	46.82	28.15	1.00
HIGGINS TRIB A	CUP	22	100-YEAR	342.00	664.72	669.53		669.61	0.000492	2.24	152.96	38.62	0.20
HIGGINS TRIB A	CUP	21	100-YEAR	342.00	664.72	669.22		669.37	0.001388	3.09	110.77	39.24	0.32
HIGGINS TRIB A	CUP	20	100-YEAR	342.00	664.72	669.09		669.23	0.001338	2.95	116.02	44.23	0.32
HIGGINS TRIB A	CUP	19	100-YEAR	342.00	664.42	668.85		669.04	0.002686	3.64	118.42	94.67	0.43
HIGGINS TRIB A	CUP	18	100-YEAR	342.00	664.22	668.81		668.87	0.000783	2.04	185.13	99.26	0.22
HIGGINS TRIB A	CUP	17	100-YEAR	342.00	664.12	668.69		668.78	0.000907	2.86	153.22	75.15	0.27
HIGGINS TRIB A	CUP	16	100-YEAR	342.00	664.02	668.65		668.71	0.000453	2.04	186.89	91.84	0.19
HIGGINS TRIB A	CUP	15	100-YEAR	342.00	663.72	668.39		668.61	0.001912	3.82	105.06	82.39	0.38
HIGGINS TRIB A	CUP	14	100-YEAR	342.00	663.72	668.25		668.38	0.002168	2.88	119.03	67.70	0.38
HIGGINS TRIB A	CUP	13	100-YEAR	342.00	663.72	668.06		668.21	0.001403	3.08	112.87	52.97	0.32
HIGGINS TRIB A	CUP	12	100-YEAR	344.00	662.72	667.79		667.88	0.000881	2.44	141.05	50.70	0.26
HIGGINS TRIB A	CUP	11	100-YEAR	344.00	663.02	667.26		667.63	0.003798	4.90	70.20	25.65	0.52
HIGGINS TRIB A	CUP	10	100-YEAR	344.00	662.72	666.72		667.09	0.003948	4.85	70.96	27.41	0.53
HIGGINS TRIB A	CUP	9	100-YEAR	344.00	662.22	666.23		666.54	0.003758	4.50	76.42	32.34	0.52
HIGGINS TRIB A	CUP	8	100-YEAR	344.00	661.02	666.02		666.15	0.001656	2.92	117.95	39.16	0.30
HIGGINS TRIB A	CUP	7	100-YEAR	344.00	661.02	665.77		665.98	0.003807	3.71	92.70	43.63	0.45
HIGGINS TRIB A	CUP	6.001	100-YEAR	344.00	661.02	664.28	664.28	665.23	0.019867	7.83	43.91	24.81	1.00
HIGGINS TRIB A	CUP	6		Culvert									
HIGGINS TRIB A	CUP	5.999	100-YEAR	344.00	659.72	664.32	662.59	664.58	0.002862	4.12	83.46	35.57	0.38
HIGGINS TRIB A	CUP	5	100-YEAR	344.00	659.72	662.58	662.58	663.44	0.025809	7.45	46.19	26.84	1.00
HIGGINS TRIB A	CUP	4.1	100-YEAR	344.00	651.98	658.21		658.23	0.000132	1.32	436.83	204.45	0.11
HIGGINS TRIB A	CUP	3.8	100-YEAR	344.00	651.03	658.21	653.52	658.21	0.000034	0.78	648.72	211.76	0.06
HIGGINS TRIB A	CUP	3.5	100-YEAR	344.00	651.09	658.19		658.20	0.000035	0.82	598.71	165.04	0.06
HIGGINS TRIB A	CUP	3.1	100-YEAR	344.00	650.91	658.17		658.18	0.000046	0.96	485.49	124.75	0.07
HIGGINS TRIB A	CUP	3.01	100-YEAR	452.00	650.50	658.15		658.17	0.000117	1.32	454.22	126.37	0.09
HIGGINS TRIB A	CUP	1	100-YEAR	452.00	650.22	658.16		658.16	0.000009	0.29	2013.64	500.62	0.02
HIGGINS CK	MAINSTEM	6.245	100-YEAR	911.00	651.02	658.11		658.15	0.000064	1.87	1073.49	302.74	0.14
HIGGINS CK	MAINSTEM	6.231	100-YEAR	911.00	652.14	658.12		658.15	0.000028	1.23	840.47	227.48	0.09
HIGGINS CK	MAINSTEM	6.179	100-YEAR	911.00	651.56	657.99		658.12	0.000181	2.84	329.05	97.60	0.22
HIGGINS CK	MAINSTEM	6.069	100-YEAR	911.00	650.55	657.95		658.03	0.000097	2.26	429.43	129.21	0.17
HIGGINS CK	MAINSTEM	6.035	100-YEAR	911.00	651.21	657.91		658.01	0.000139	2.66	510.60	161.34	0.20
HIGGINS CK	MAINSTEM	6.034	100-YEAR	911.00	651.79	657.70		657.99	0.000272	5.11	422.73	160.02	0.41
HIGGINS CK	MAINSTEM	6.033	100-YEAR	911.00	651.61	657.83		657.93	0.000106	3.34	642.77	163.19	0.28
HIGGINS CK	MAINSTEM	6.032	100-YEAR	911.00	647.83	657.88		657.91	0.000057	1.58	865.41	163.44	0.10
HIGGINS CK	MAINSTEM	6.021	100-YEAR	915.00	649.42	657.77		657.89	0.000366	3.03	374.01	97.65	0.22
HIGGINS CK	MAINSTEM	6.006	100-YEAR	915.00	648.55	657.76		657.86	0.000314	2.57	431.42	94.75	0.17
HIGGINS CK	MAINSTEM	5.9994*	100-YEAR	915.00	648.38	657.75		657.85	0.000285	2.51	434.02	104.35	0.17
HIGGINS CK	MAINSTEM	5.9950	100-YEAR	915.00	648.21	657.75		657.84	0.000257	2.44	421.37	105.67	0.16
HIGGINS CK	MAINSTEM	5.972	100-YEAR	1320.00	647.90	657.72		657.82	0.000066	2.86	1082.12	573.15	0.19
HIGGINS CK	MAINSTEM	5.959	100-YEAR	1320.00	647.58	657.68		657.81	0.000065	3.02	789.92	380.84	0.19
HIGGINS CK	MAINSTEM	5.950	100-YEAR	1320.00	647.42	657.66		657.81	0.000074	3.20	677.47	327.56	0.20
HIGGINS CK	MAINSTEM	5.914	100-YEAR	1320.00	647.31	657.62	652.32	657.79	0.000080	3.35	397.42	100.12	0.21
HIGGINS CK	MAINSTEM	5.911		Culvert									
HIGGINS CK	MAINSTEM	5.899	100-YEAR	1320.00	647.30	656.06	652.62	656.72	0.000299	6.54	201.74	76.27	0.41
HIGGINS CK	MAINSTEM	5.86375*	100-YEAR	1320.00	647.10	656.22		656.48	0.000155	4.08	356.58	96.06	0.28
HIGGINS CK	MAINSTEM	5.8285*	100-YEAR	1320.00	646.90	656.20		656.45	0.000146	4.01	363.52	101.79	0.28
HIGGINS CK	MAINSTEM	5.79325*	100-YEAR	1320.00	646.70	656.18		656.42	0.000138	3.93	368.11	92.29	0.27
HIGGINS CK	MAINSTEM	5.758	100-YEAR	1320.00	646.50	656.16	651.64	656.39	0.000132	3.88	352.61	92.52	0.26
HIGGINS CK	MAINSTEM	5.721		Culvert									
HIGGINS CK	MAINSTEM	5.683	100-YEAR	1320.00	646.23	653.33	650.99	654.13	0.000465	7.17	184.17	54.87	0.50
HIGGINS CK	MAINSTEM	5.650	100-YEAR	1320.00	646.10	653.46		653.86	0.000351	5.08	259.88	54.30	0.41
HIGGINS CK	MAINSTEM	5.649	100-YEAR	1320.00	646.50	653.46		653.85	0.000346	5.01	263.33	55.34	0.40
HIGGINS CK	MAINSTEM	5.593	100-YEAR	1320.00	645.87	653.40	650.41	653.75	0.000285	4.72	279.65	55.61	0.37
HIGGINS CK	MAINSTEM	5.558	100-YEAR	1623.00	646.30	653.15	650.87	653.66	0.000449	5.74	282.54	58.98	0.46
HIGGINS CK	MAINSTEM	5.500	100-YEAR	1623.00	645.54	652.88	650.69	653.50	0.000530	6.31	257.21	52.49	0.50
HIGGINS CK	MAINSTEM	5.496	100-YEAR	1623.00	645.80	652.78	650.93	653.48	0.000638	6.75	240.59	51.01	0.55
HIGGINS CK	MAINSTEM	5.409	100-YEAR	1623.00	645.02	652.63	650.23	653.19	0.000459	6.04	268.59	52.31	0.47
HIGGINS CK	MAINSTEM	5.408	100-YEAR	1623.00	645.30	652.59	650.35	653.19	0.000503	6.20	261.79	52.71	0.49
HIGGINS CK	MAINSTEM	5.394	100-YEAR	1623.00	645.30	652.73		652.95	0.000961	3.82	425.14	85.19	0.30
HIGGINS CK	MAINSTEM	5.335	100-YEAR	1623.00	645.30	652.45	648.79	652.66	0.000834	3.67	450.68	113.76	0.28
HIGGINS CK	MAINSTEM	5.324	100-YEAR	1623.00	645.28	652.37		652.62	0.000543	4.05	415.25	147.08	0.32
HIGGINS CK	MAINSTEM	5.289	100-YEAR	1623.00	645.20	652.33		652.52	0.000391	3.43	472.64	96.65	0.27
HIGGINS CK	MAINSTEM	5.256	100-YEAR	1623.00	645.11	652.18		652.43	0.000588	3.97	408.57	87.38	0.32
HIGGINS CK	MAINSTEM	5.236	100-YEAR	1623.00	645.20	652.10		652.36	0.000595	4.11	395.31	81.00	0.33
HIGGINS CK	MAINSTEM	5.184	100-YEAR	1623.00	644.50	651.99		652.21	0.000462	3.78	429.57	82.21	0.29
HIGGINS CK	MAINSTEM	5.166	100-YEAR	1623.00	644.48	651.95		652.16	0.000451	3.71	437.58	84.65	0.29
HIGGINS CK	MAINSTEM	5.144	100-YEAR	1623.00	644.40	651.89		652.11	0.000448	3.73	434.74	82.79	0.29
HIGGINS CK	MAINSTEM	5.094	100-YEAR	1623.00	643.10	651.83		652.00	0.000310	3.26	497.31	88.09	0.24
HIGGINS CK	MAINSTEM	5.049	100-YEAR	1623.00	643.43	651.78		651.92	0.000301	3.29	492.91	83.82	0.24
HIGGINS CK	MAINSTEM	5.045	100-YEAR	1000.00	643.80	651.82		651.89	0.000134	2.16	462.77	80.48	0.18
HIGGINS CK	MAINSTEM	5.020	100-YEAR	1000.00	643.80	651.74	646.67	651.86	0.000150	2.75	363.13	80.08	0.16
HIGGINS CK	MAINSTEM	5.012		Culvert									
HIGGINS CK	MAINSTEM	5.005	100-YEAR	1000.00	643.80	650.25	646.30	650.42	0.000260	3.28	304.45	98.98	0.23
HIGGINS CK	MAINSTEM	4.992	100-YEAR	1000.00	643.80	650.29		650.35	0.000127	1.97	508.29	99.22	0.15
HIGGINS CK	MAINSTEM	4.980	100-YEAR	1000.00	643.55	650.17		650.33	0.000382	3.19	313.76	66.95	0.26
HIGGINS CK	MAINSTEM	4.966	100-YEAR	1260.00	643.40	649.97		650.28	0.000767	4.46	282.73	61.27	0.37
HIGGINS CK	MAINSTEM	4.944	100-YEAR	1260.00	642.80	649.89		650.19	0.000714	4.44	283.81	524.57	0.35
HIGGINS CK	MAINSTEM	4.928	100-YEAR	1260.00	642.48	649.83		650.10	0.001232	4.20	300.20	60.98	0.33
HIGGINS CK	MAINSTEM	4.925	100-YEAR	1260.00	643.00	649.74		650.08	0.001604	4.63	272.33	58.29	0.38
HIGGINS CK	MAINSTEM	4.915	100-YEAR	1260.00	643.00	649.79		649.96	0.000941	3.42	417.52	99.75	0.26
HIGGINS CK	MAINSTEM	4.885	100-YEAR	1260.00	642.90	649.61		649.80	0.001008	3.68	393.12	102.25	0.27
HIGGINS CK	MAINSTEM	4.866	100-YEAR	1260.00	642.40	649.47		649.69	0.001128	3.90	372.53	98.09	0.29
HIGGINS CK	MAINSTEM	4.847	100-YEAR	1260.00	642.00	649.36		649.57	0.001300	3.82	373.26	97.22	0.30
HIGGINS CK	MAINSTEM	4.828	100-YEAR	1260.00	641.90	649.28		649.45	0.000905	3.33	423.70	10	

HEC-RAS Plan: DesignNat -5 Str Profile: 100-YEAR (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev. (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	4.801	100-YEAR	1260.00	642.50	649.06		649.29	0.001340	3.92	361.21	95.03	0.31
HIGGINS CK	MAINSTEM	4.783	100-YEAR	1260.00	642.00	648.94		649.16	0.001233	3.84	366.01	94.37	0.30
HIGGINS CK	MAINSTEM	4.774	100-YEAR	1260.00	642.50	648.85		649.10	0.001517	4.10	345.38	94.08	0.33
HIGGINS CK	MAINSTEM	4.771	100-YEAR	1260.00	642.05	648.83		649.07	0.001303	3.99	343.59	87.07	0.30
HIGGINS CK	MAINSTEM	4.760	100-YEAR	1260.00	641.50	648.73		648.99	0.001415	4.18	337.63	87.41	0.32
HIGGINS CK	MAINSTEM	4.742	100-YEAR	1260.00	642.22	648.59		648.85	0.001572	4.15	335.62	93.45	0.33
HIGGINS CK	MAINSTEM	4.713	100-YEAR	1260.00	642.40	648.22		648.55	0.002234	4.68	294.08	91.18	0.39
HIGGINS CK	MAINSTEM	4.698	100-YEAR	1260.00	642.20	648.11		648.36	0.001950	4.00	315.09	97.05	0.39
HIGGINS CK	MAINSTEM	4.694	100-YEAR	1260.00	641.46	647.92		648.31	0.002013	5.12	286.68	85.24	0.38
HIGGINS CK	MAINSTEM	4.683	100-YEAR	460.00	639.90	648.13	642.50	648.16	0.000134	1.38	347.94	97.75	0.10
HIGGINS CK	MAINSTEM	4.678	100-YEAR	460.00	639.90	648.02	642.53	648.13	0.000334	2.65	173.38	90.64	0.17
HIGGINS CK	MAINSTEM	4.673		Culvert									
HIGGINS CK	MAINSTEM	4.668	100-YEAR	460.00	640.20	647.10	642.80	647.28	0.000641	3.36	136.73	71.27	0.23
HIGGINS CK	MAINSTEM	4.664	100-YEAR	700.00	640.20	647.02	643.32	647.25	0.000927	3.81	183.72	68.57	0.27
HIGGINS CK	MAINSTEM	4.659	100-YEAR	700.00	638.42	647.10	641.09	647.16	0.000181	1.99	351.79	62.30	0.12
HIGGINS CK	MAINSTEM	4.639	100-YEAR	700.00	640.20	646.98		647.10	0.000852	2.85	247.33	66.97	0.24
HIGGINS CK	MAINSTEM	4.638	100-YEAR	700.00	640.80	646.99		647.10	0.000708	2.57	275.01	66.85	0.22
HIGGINS CK	MAINSTEM	4.611	100-YEAR	700.00	642.03	646.76		646.95	0.001182	3.48	201.01	58.18	0.33
HIGGINS CK	MAINSTEM	4.588	100-YEAR	730.00	641.80	646.57		646.79	0.001378	3.82	191.28	53.82	0.36
HIGGINS CK	MAINSTEM	4.569	100-YEAR	730.00	638.78	646.62		646.70	0.000253	2.48	345.47	74.23	0.17
HIGGINS CK	MAINSTEM	4.542	100-YEAR	730.00	639.10	646.61		646.67	0.000154	2.15	418.26	76.44	0.14
HIGGINS CK	MAINSTEM	4.537	100-YEAR	730.00	639.10	646.60		646.66	0.000155	2.15	417.99	76.43	0.14
HIGGINS CK	MAINSTEM	4.505	100-YEAR	730.00	637.50	646.60		646.64	0.000071	1.66	562.32	88.55	0.10
HIGGINS CK	MAINSTEM	4.485	100-YEAR	730.00	637.50	646.62	638.67	646.63	0.000013	0.60	1214.11	167.25	0.04

River	Reach	River Sta	Profile	Q.Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chrl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	25	500-YEAR	414.00	667.72	671.93		672.07	0.001102	3.28	182.38	128.59	0.30
HIGGINS TRIB A	CUP	24	500-YEAR	414.00	666.72	671.68		671.92	0.001823	3.98	105.10	32.79	0.38
HIGGINS TRIB A	CUP	23	500-YEAR	414.00	667.72	670.13	670.13	671.05	0.015353	7.69	53.82	29.66	1.01
HIGGINS TRIB A	CUP	22	500-YEAR	414.00	664.72	669.88		669.98	0.000558	2.48	166.89	40.08	0.21
HIGGINS TRIB A	CUP	21	500-YEAR	414.00	664.72	669.54		669.71	0.001512	3.35	123.82	41.32	0.34
HIGGINS TRIB A	CUP	20	500-YEAR	414.00	664.72	669.40		669.56	0.001393	3.20	130.12	46.10	0.33
HIGGINS TRIB A	CUP	19	500-YEAR	414.00	664.42	669.23		669.39	0.002184	3.49	156.02	105.21	0.40
HIGGINS TRIB A	CUP	18	500-YEAR	414.00	664.22	669.18		669.24	0.000728	2.12	223.42	106.48	0.21
HIGGINS TRIB A	CUP	17	500-YEAR	414.00	664.12	669.06		669.16	0.000933	3.03	184.61	95.52	0.27
HIGGINS TRIB A	CUP	16	500-YEAR	414.00	664.02	669.02		669.09	0.000455	2.19	225.27	118.61	0.20
HIGGINS TRIB A	CUP	15	500-YEAR	414.00	663.72	668.77		668.99	0.001710	3.90	142.32	109.96	0.37
HIGGINS TRIB A	CUP	14	500-YEAR	414.00	663.72	668.65		668.77	0.002186	2.76	151.10	93.00	0.38
HIGGINS TRIB A	CUP	13	500-YEAR	414.00	663.72	668.44		668.60	0.001333	3.23	135.01	60.22	0.32
HIGGINS TRIB A	CUP	12	500-YEAR	416.00	662.72	668.19		668.29	0.000830	2.58	161.89	54.66	0.25
HIGGINS TRIB A	CUP	11	500-YEAR	416.00	663.02	667.61		668.04	0.003931	5.23	79.59	27.00	0.54
HIGGINS TRIB A	CUP	10	500-YEAR	416.00	662.72	667.07		667.48	0.004005	5.16	80.59	28.51	0.54
HIGGINS TRIB A	CUP	9	500-YEAR	416.00	662.22	666.59		666.93	0.003696	4.70	88.44	34.56	0.52
HIGGINS TRIB A	CUP	8	500-YEAR	416.00	661.02	666.37		666.53	0.001774	3.15	132.09	41.08	0.31
HIGGINS TRIB A	CUP	7	500-YEAR	416.00	661.02	666.12		666.35	0.003711	3.81	109.28	48.66	0.45
HIGGINS TRIB A	CUP	6.001	500-YEAR	416.00	661.02	664.56	664.56	665.62	0.019005	8.25	50.40	26.19	1.00
HIGGINS TRIB A	CUP	6			Culvert								
HIGGINS TRIB A	CUP	5.999	500-YEAR	416.00	659.72	664.67	662.65	664.99	0.003081	4.55	91.49	37.33	0.40
HIGGINS TRIB A	CUP	5	500-YEAR	416.00	659.72	662.82	662.82	663.78	0.025535	7.86	52.91	28.07	1.01
HIGGINS TRIB A	CUP	4.1	500-YEAR	416.00	651.98	659.70		659.71	0.000042	0.90	772.03	239.43	0.06
HIGGINS TRIB A	CUP	3.8	500-YEAR	416.00	651.03	659.70	653.74	659.70	0.000016	0.61	976.26	227.80	0.04
HIGGINS TRIB A	CUP	3.5	500-YEAR	416.00	651.09	659.69		659.69	0.000018	0.68	854.99	177.38	0.04
HIGGINS TRIB A	CUP	3.1	500-YEAR	416.00	650.91	659.67		659.68	0.000026	0.83	682.82	137.19	0.05
HIGGINS TRIB A	CUP	3.01	500-YEAR	416.00	650.50	659.66		659.68	0.000067	1.15	656.75	141.78	0.07
HIGGINS TRIB A	CUP	1	500-YEAR	574.00	650.22	659.67		659.67	0.000005	0.26	2769.89	500.90	0.02
HIGGINS CK	MAINSTEM	6.245	500-YEAR	1253.00	651.02	659.63		659.66	0.000047	1.88	1587.83	365.25	0.12
HIGGINS CK	MAINSTEM	6.231	500-YEAR	1253.00	652.14	659.63		659.66	0.000023	1.30	1226.87	291.12	0.09
HIGGINS CK	MAINSTEM	6.179	500-YEAR	1253.00	651.56	659.51		659.64	0.000141	2.93	515.05	132.39	0.20
HIGGINS CK	MAINSTEM	6.069	500-YEAR	1253.00	650.55	659.48		659.56	0.000079	2.38	686.23	192.58	0.16
HIGGINS CK	MAINSTEM	6.035	500-YEAR	1253.00	651.21	659.46		659.55	0.000095	2.61	767.01	169.77	0.17
HIGGINS CK	MAINSTEM	6.034	500-YEAR	1253.00	651.79	659.33		659.53	0.000147	4.57	691.04	169.00	0.32
HIGGINS CK	MAINSTEM	6.033	500-YEAR	1253.00	651.61	659.40		659.50	0.000074	3.33	905.84	170.85	0.23
HIGGINS CK	MAINSTEM	6.032	500-YEAR	1253.00	647.83	659.45		659.48	0.000052	1.70	1128.09	171.08	0.09
HIGGINS CK	MAINSTEM	6.021	500-YEAR	1258.00	649.42	659.35		659.47	0.000268	2.98	538.00	108.23	0.19
HIGGINS CK	MAINSTEM	6.006	500-YEAR	1258.00	648.55	659.34		659.44	0.000275	2.76	665.46	225.62	0.17
HIGGINS CK	MAINSTEM	5.999*	500-YEAR	1258.00	648.38	659.33		659.43	0.000245	2.66	674.04	252.30	0.16
HIGGINS CK	MAINSTEM	5.9950	500-YEAR	1258.00	648.21	659.33		659.42	0.000216	2.56	722.51	454.18	0.15
HIGGINS CK	MAINSTEM	5.972	500-YEAR	1930.00	647.90	659.31		659.41	0.000054	2.98	1731.55	646.53	0.18
HIGGINS CK	MAINSTEM	5.959	500-YEAR	1930.00	647.58	659.26		659.40	0.000061	3.31	1394.75	653.66	0.19
HIGGINS CK	MAINSTEM	5.950	500-YEAR	1930.00	647.42	659.23		659.40	0.000070	3.52	1282.93	687.55	0.20
HIGGINS CK	MAINSTEM	5.914	500-YEAR	1930.00	647.31	659.15	653.32	659.38	0.000086	3.86	750.43	510.45	0.23
HIGGINS CK	MAINSTEM	5.911			Culvert								
HIGGINS CK	MAINSTEM	5.899	500-YEAR	1930.00	647.30	657.62	653.85	658.17	0.000239	6.02	368.48	102.12	0.37
HIGGINS CK	MAINSTEM	5.86375*	500-YEAR	1930.00	647.10	657.69		658.02	0.000157	4.71	533.87	145.50	0.30
HIGGINS CK	MAINSTEM	5.8285*	500-YEAR	1930.00	646.90	657.67		657.99	0.000148	4.61	579.30	190.52	0.29
HIGGINS CK	MAINSTEM	5.79325*	500-YEAR	1930.00	646.70	657.65		657.96	0.000141	4.55	610.43	241.26	0.28
HIGGINS CK	MAINSTEM	5.758	500-YEAR	1930.00	646.50	657.63	652.70	657.93	0.000136	4.50	629.68	307.93	0.28
HIGGINS CK	MAINSTEM	5.721			Culvert								
HIGGINS CK	MAINSTEM	5.683	500-YEAR	1930.00	646.23	654.82	652.15	655.94	0.000491	8.48	227.49	68.10	0.53
HIGGINS CK	MAINSTEM	5.650	500-YEAR	1930.00	646.10	655.09		655.55	0.000288	5.46	372.77	90.71	0.39
HIGGINS CK	MAINSTEM	5.649	500-YEAR	1930.00	646.50	655.09		655.54	0.000297	5.39	362.01	79.33	0.39
HIGGINS CK	MAINSTEM	5.593	500-YEAR	1930.00	645.87	655.04	651.39	655.46	0.000239	5.18	387.00	92.94	0.36
HIGGINS CK	MAINSTEM	5.558	500-YEAR	2270.00	646.30	654.86	651.74	655.39	0.000328	5.85	397.47	82.71	0.41
HIGGINS CK	MAINSTEM	5.500	500-YEAR	2270.00	645.54	654.63	651.67	655.27	0.000387	6.43	361.27	73.12	0.45
HIGGINS CK	MAINSTEM	5.496	500-YEAR	2270.00	645.80	654.55	651.88	655.25	0.000455	6.75	342.12	71.25	0.48
HIGGINS CK	MAINSTEM	5.409	500-YEAR	2270.00	645.02	654.55	651.16	655.02	0.000282	5.69	556.67	132.33	0.38
HIGGINS CK	MAINSTEM	5.408	500-YEAR	2270.00	645.30	654.54	651.31	655.02	0.000302	5.73	545.99	131.86	0.40
HIGGINS CK	MAINSTEM	5.394	500-YEAR	2270.00	645.30	654.63		654.87	0.000643	3.87	597.13	95.69	0.26
HIGGINS CK	MAINSTEM	5.335	500-YEAR	2270.00	645.30	654.48	649.53	654.66	0.000531	3.54	719.72	205.92	0.23
HIGGINS CK	MAINSTEM	5.324	500-YEAR	2270.00	645.28	654.41		654.64	0.000329	3.89	669.59	432.49	0.26
HIGGINS CK	MAINSTEM	5.289	500-YEAR	2270.00	645.20	654.40		654.57	0.000231	3.31	776.01	393.64	0.22
HIGGINS CK	MAINSTEM	5.258	500-YEAR	2270.00	645.11	654.31		654.52	0.000341	3.69	638.08	129.23	0.26
HIGGINS CK	MAINSTEM	5.236	500-YEAR	2270.00	645.20	654.24		654.48	0.000360	3.91	601.88	117.74	0.27
HIGGINS CK	MAINSTEM	5.184	500-YEAR	2270.00	644.50	654.19		654.37	0.000279	3.47	786.19	333.17	0.24
HIGGINS CK	MAINSTEM	5.166	500-YEAR	2270.00	644.48	654.18		654.34	0.000257	3.33	859.21	424.74	0.23
HIGGINS CK	MAINSTEM	5.144	500-YEAR	2270.00	644.40	654.15		654.31	0.000260	3.32	891.16	490.23	0.23
HIGGINS CK	MAINSTEM	5.094	500-YEAR	2270.00	643.10	654.12		654.24	0.000179	2.95	1062.62	658.06	0.19
HIGGINS CK	MAINSTEM	5.049	500-YEAR	2270.00	643.43	654.08		654.20	0.000166	3.00	1128.37	777.39	0.19
HIGGINS CK	MAINSTEM	5.045	500-YEAR	2000.00	643.80	654.08		654.20	0.000151	2.80	1071.01	777.53	0.18
HIGGINS CK	MAINSTEM	5.020	500-YEAR	2000.00	643.80	654.06	648.05	654.18	0.000154	2.82	1053.83	777.15	0.18
HIGGINS CK	MAINSTEM	5.012			Culvert								
HIGGINS CK	MAINSTEM	5.005	500-YEAR	2000.00	643.80	653.08	647.68	653.18	0.000132	2.48	806.80	116.83	0.16
HIGGINS CK	MAINSTEM	4.992	500-YEAR	2000.00	643.80	653.07		653.17	0.000133	2.48	805.67	116.61	0.16
HIGGINS CK	MAINSTEM	4.980	500-YEAR	2000.00	643.55	652.91		653.14	0.000373	3.87	517.95	84.81	0.27
HIGGINS CK	MAINSTEM	4.966	500-YEAR	2140.00	643.40	652.78		653.10	0.000521	4.50	475.44	76.20	0.32
HIGGINS CK	MAINSTEM	4.944	500-YEAR	2140.00	642.80	652.69		653.04	0.000487	4.70	455.46	847.78	0.31
HIGGINS CK	MAINSTEM	4.928	500-YEAR	2140.00	642.48	652.68		652.97	0.000903	4.32	495.08	78.53	0.30
HIGGINS CK	MAINSTEM	4.925	500-YEAR	2140.00	643.00	652.61		652.95	0.001091	4.65	460.08	72.68	0.33
HIGGINS CK	MAINSTEM	4.915	500-YEAR	2140.00	643.00	652.70		652.85	0.000544	3.38	909.51	553.90	0.21
HIGGINS CK	MAINSTEM	4.885	500-YEAR	2140.00	642.90	652.64		652.77	0.000454	3.27	1222.74	560.25	0.19
HIGGINS CK	MAINSTEM	4.866	500-YEAR	2140.00	642.40	652.57		652.71	0.000507	3.48	1132.99	512.69	0.21
HIGGINS CK	MAINSTEM	4.847	500-YEAR	2140.00	642.00	652.54		652.66	0.000508	3.06	1118.58	456.32	0.20
HIGGINS CK	MAINSTEM	4.828	500-YEAR	2140.00	641.90	652.50		652.61	0.000383	2.92	1176.92	446.12	0.18

HEC-RAS Plan: DesignNat -5 Str Profile: 500-YEAR (Continued)

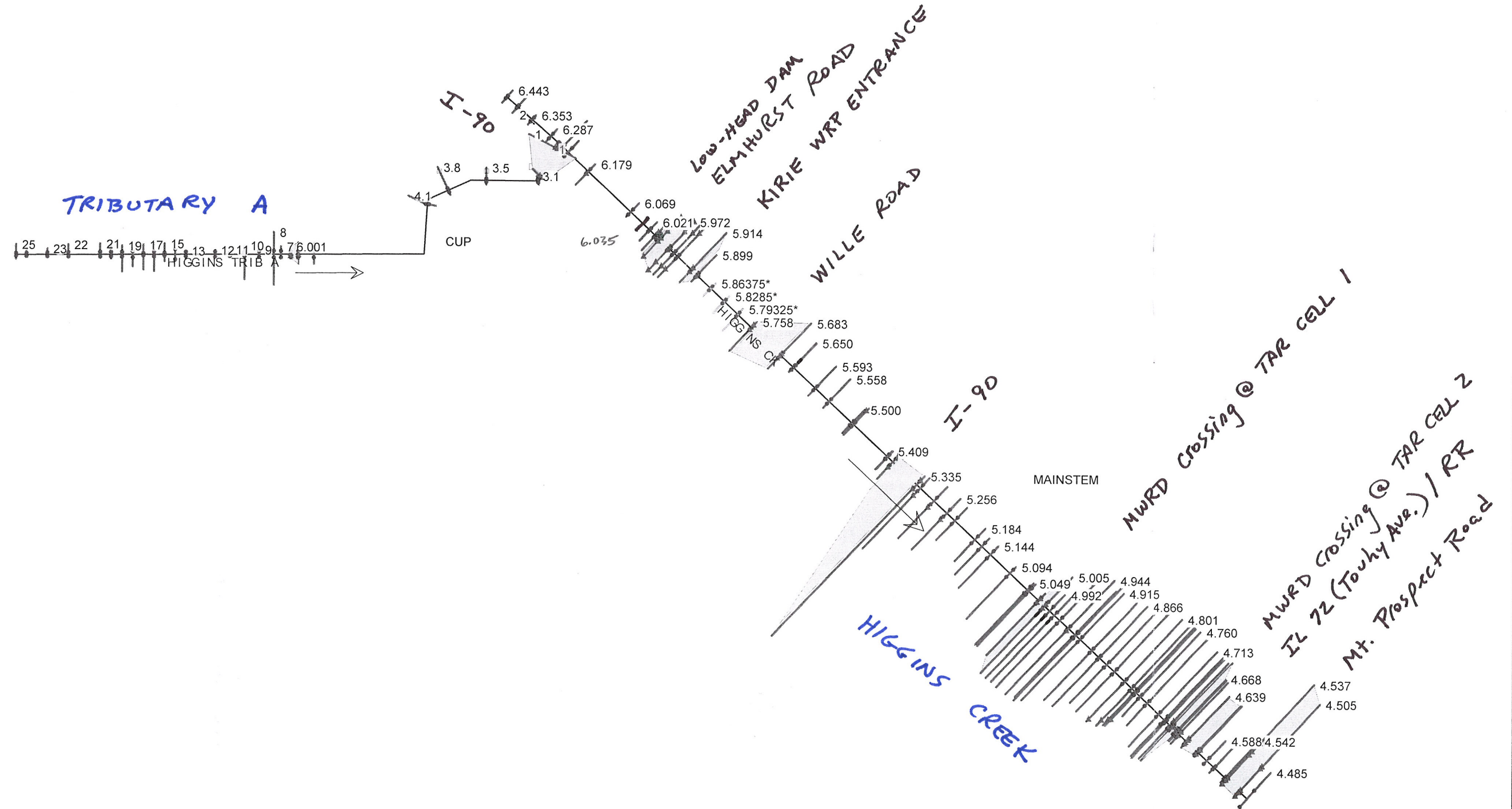
River	Reach	River Sta	Profile	Q Total (cfs)	Mini Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	4.801	500-YEAR	2140.00	642.50	652.41		652.55	0.000502	3.30	1037.41	390.42	0.20
HIGGINS CK	MAINSTEM	4.783	500-YEAR	2140.00	642.00	652.35		652.50	0.000500	3.34	968.55	354.61	0.20
HIGGINS CK	MAINSTEM	4.774	500-YEAR	2140.00	642.50	652.31		652.47	0.000558	3.46	912.40	326.89	0.21
HIGGINS CK	MAINSTEM	4.771	500-YEAR	2140.00	642.05	652.29		652.46	0.000540	3.56	903.45	320.53	0.21
HIGGINS CK	MAINSTEM	4.760	500-YEAR	2140.00	641.50	652.26		652.43	0.000575	3.64	884.78	319.94	0.22
HIGGINS CK	MAINSTEM	4.742	500-YEAR	2140.00	642.22	652.20		652.37	0.000569	3.51	852.89	357.48	0.22
HIGGINS CK	MAINSTEM	4.713	500-YEAR	2140.00	642.40	652.11		652.28	0.000608	3.56	849.94	318.92	0.22
HIGGINS CK	MAINSTEM	4.698	500-YEAR	2140.00	642.20	652.10		652.22	0.000529	2.86	868.89	321.92	0.19
HIGGINS CK	MAINSTEM	4.694	500-YEAR	2140.00	641.46	651.96		652.20	0.000691	4.29	811.97	315.11	0.24
HIGGINS CK	MAINSTEM	4.683	500-YEAR	600.00	639.90	652.11	642.91	652.12	0.000033	0.85	831.71	163.19	0.05
HIGGINS CK	MAINSTEM	4.678	500-YEAR	600.00	639.90	652.01	642.99	652.09	0.000145	2.30	261.13	114.58	0.12
HIGGINS CK	MAINSTEM	4.673	Culvert										
HIGGINS CK	MAINSTEM	4.668	500-YEAR	600.00	640.20	650.34	643.30	650.48	0.000300	2.98	201.50	104.58	0.17
HIGGINS CK	MAINSTEM	4.664	500-YEAR	1600.00	640.20	649.76	645.24	650.33	0.001464	6.08	263.01	101.08	0.36
HIGGINS CK	MAINSTEM	4.659	500-YEAR	1600.00	638.42	649.94	642.55	650.12	0.000343	3.35	476.94	85.85	0.18
HIGGINS CK	MAINSTEM	4.639	500-YEAR	1600.00	640.20	649.88		650.06	0.000795	3.57	511.72	101.78	0.25
HIGGINS CK	MAINSTEM	4.638	500-YEAR	1600.00	640.80	649.88		650.06	0.000661	3.46	501.79	91.30	0.23
HIGGINS CK	MAINSTEM	4.611	500-YEAR	1600.00	642.03	649.68		649.93	0.000934	4.02	397.95	77.40	0.31
HIGGINS CK	MAINSTEM	4.588	500-YEAR	1666.00	641.80	649.49		649.80	0.001112	4.50	370.30	68.65	0.34
HIGGINS CK	MAINSTEM	4.569	500-YEAR	1666.00	638.78	649.54		649.70	0.000316	3.54	592.13	94.23	0.20
HIGGINS CK	MAINSTEM	4.542	500-YEAR	1666.00	639.10	649.53		649.66	0.000227	3.24	665.32	92.59	0.18
HIGGINS CK	MAINSTEM	4.537	500-YEAR	1666.00	639.10	649.52		649.65	0.000227	3.24	664.82	92.56	0.18
HIGGINS CK	MAINSTEM	4.505	500-YEAR	1666.00	637.50	649.53		649.61	0.000123	2.62	886.25	415.71	0.13
HIGGINS CK	MAINSTEM	4.485	500-YEAR	1666.00	637.50	649.57	639.50	649.58	0.000024	0.96	1772.54	258.22	0.06

TAB 11

SECTION 11

**PROPOSED CONDITIONS ANALYSIS
– PERMIT AND DESIGN MODELS**

CROSS SECTION SCHEMATIC



None of the XS's are Geo-Referenced (- Geo-Ref user entered XS - Geo-Ref interpolated XS - Non Geo-Ref user entered XS - Non Geo-Ref interpolated XS)

PROPOSED CONDITION

PERMIT PROP. COND. ELMHURST RD. w/ BOX CULVERTS

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

```

PROJECT DATA

Project Title: Higgins Creek Design & Permit Models
Project File : HigginsCreek-Des.prj
Run Date and Time: 7/10/2012 10:52:07 PM

Project in English units

Project Description:

EOWB Higgins Creek and Higgins Creek Trib. A CBBEL 05/2012
Proposed

Willow-Higgins Creek, Willow Creek, Higgins Creek, Cook County,
Illinois
Existing and Proposed Conditions OMP with As-Built Flood Control
Reservoir Conditions
10-, 50-, 100-, 500-, and 100-Year Floodway Storm
Event Flood Profiles
Christopher B. Burke Engineering, Ltd. 01/06

Updated for Final Willow Creek Relocation Alignment - OMP Project
Competition Phase for proposed conditions (short feeder culverts with open
channels through future western bypass area) - by HNTB/APS Consulting, Inc.
03/2010.

PLAN DATA

Plan Title: Permit PR Elm Boxes 070912
Plan File : n:\Idot\070404\Drain\Higgins Creek HR & HEC-RAS\Working Models\HEC-RAS for IDOT
071112\HigginsCreek-Des.p12

Geometry Title: Permit Prop Elm Boxes 0712
Geometry File : n:\Idot\070404\Drain\Higgins Creek HR & HEC-RAS\Working Models\HEC-RAS for IDOT
071112\HigginsCreek-Des.g04

Flow Title : Higgins 06 Survey - FINAL WILLOW NAVD88
Flow File : n:\Idot\070404\Drain\Higgins Creek HR & HEC-RAS\Working Models\HEC-RAS for IDOT
071112\HigginsCreek-Des.f06

Plan Description:

Higgins Creek "Proposed Condition" with FIS LOMR n-values. New structures for
I-90 over Higgins Creek & Trib. A, and Elmhurst Road (mult RCBCs), and Mt.
Prospect Road over Higgins Creek.

Plan Summary Information:

Number of:	Cross Sections = 111	Multiple Openings = 1
	Culverts = 8	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: Higgins 06 Survey - FINAL WILLOW NAVD88
 Flow File : n:\Idot\070404\Drain\Higgins Creek HR & HEC-RAS\Working Models\HEC-RAS for IDOT
 071112\HigginsCreek-Des.f06

Flow Data (cfs)

River	Reach	RS	10-YEAR	50-YEAR	100-YEAR	500-YEAR
HIGGINS CK	2	6.443	275	400	461	548
HIGGINS CK	2	6.404	275	400	461	548
HIGGINS CK	MAINSTEM	6.245	562	810	911	1253
HIGGINS CK	MAINSTEM	6.021	564	810	915	1258
HIGGINS CK	MAINSTEM	5.972	645	1100	1320	1930
HIGGINS CK	MAINSTEM	5.558	907	1394	1623	2270
HIGGINS CK	MAINSTEM	5.045	571	750	1000	2000
HIGGINS CK	MAINSTEM	4.966	700	920	1260	2140
HIGGINS CK	MAINSTEM	4.683	424	445	460	600
HIGGINS CK	MAINSTEM	4.664	444	485	700	1600
HIGGINS CK	MAINSTEM	4.588	454	503	730	1666
HIGGINS TRIB A	CUP	25	222	308	342	414
HIGGINS TRIB A	CUP	12	224	310	344	416
HIGGINS TRIB A	CUP	3.01	294	407	452	574

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
HIGGINS CK	MAINSTEM	10-YEAR		Known WS = 644.36
HIGGINS CK	MAINSTEM	50-YEAR		Known WS = 646.04
HIGGINS CK	MAINSTEM	100-YEAR		Known WS = 646.62
HIGGINS CK	MAINSTEM	500-YEAR		Known WS = 649.57

GEOMETRY DATA

Geometry Title: Permit Prop Elm Boxes 0712
 Geometry File : n:\Idot\070404\Drain\Higgins Creek HR & HEC-RAS\Working Models\HEC-RAS for IDOT
 071112\HigginsCreek-Des.g04

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
HIGGINS CK	2		1
HIGGINS CK	MAINSTEM	1	
HIGGINS TRIB A	CUP		1

JUNCTION INFORMATION

Name: 1
 Description:
 Energy computation Method

Length across Junction		Tributary		Length	Angle
River	Reach	River	Reach		
HIGGINS CK	2	to HIGGINS CK	MAINSTEM	218	
HIGGINS TRIB A	CUP	to HIGGINS CK	MAINSTEM	30	

CROSS SECTION

RIVER: HIGGINS CK
 REACH: 2 RS: 6.443

INPUT

Description: Proposed condition. EOWB surveyed section D33. Shifted 195' right for comparison.

Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
209.1	662.93	227.2	662.89	252	662.38	263.7	662.29	288.9	660.74

304.7	657.79	318.9	655.76	323	655.03	330.3	653.3	340.5	652.09
346.1	652.21	352.9	656.28	364.7	656.39	370.2	655.35	376.1	653.32
378.5	652.8	378.5	662	425.9	662.05	434.1	663.58		

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 209.1 .065 304.7 .065 352.9 .075

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 304.7 352.9 204 204 204 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: 2 RS: 6.404

INPUT
 Description: Proposed condition. WH065
 Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	662.7	200	663.1	300	663.1	310	663.5	323	655.1
325	654.6	333	652.8	336	652.6	347	654.5	350	655.1
358	656.6	400	657.8	400	662	450	662.7		

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 100 .065 310 .065 358 .075

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 310 358 270 270 270 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: 2 RS: 6.353

INPUT
 Description: Proposed condition. EOWB surveyed section D32. Shifted 135' left for comparison.
 Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
270	661	275.1	659.42	292	660.3	304.1	659.84	312.5	658.6
321.1	654.67	321.8	654.16	324.1	654.04	327.3	654.04	328.8	652.29
337.4	651.64	349.2	650.86	352.1	653.94	359.5	653.45	384.2	658.59
402	659.13	402	662	445	663.04				

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 270 .065 312.5 .065 384.2 .075

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 312.5 384.2 350 350 350 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: 2 RS: 6.287

INPUT
 Description: Proposed condition. From topo. Replaces copy of WHO65 (6.404) adjusted for slope, modified to match current contours
 Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
202	664	202	658.5	234	658	273	658	289	657
304	656	314	655	323	654	332	653	340	651.6
350	650.9	360	653	364	654	373	657	380	658
380	662	441	662						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 202 .065 289 .065 373 .075

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 289 373 0 0 0 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.245

INPUT

Description: Proposed condition. 6.246 6.249 WHO64 ** HIGGINS CREEK**

Station Elevation Data num= 10									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	670.82	82	670.72	82	658.62	180	655.72	210	653.72
330	653.72	340	651.02	370	651.02	370	663	500	663.72

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.07	330	.02	370	.07

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	330	370		75	75	.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.231

INPUT

Description: Proposed condition. EOWB surveyed section D31. Shifted 200' left. Overbanks extended per topo. Ignore tollway ditch on right side.

Station Elevation Data num= 14									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-53	661	-53	658.5	-38	658	-22.9	657.52	1.8	657.11
25.8	656.17	42.6	655.35	43.2	654.26	46.1	653.52	52.1	652.86
59.9	652.55	155	652.15	155	662	255.1	662.77		

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
-53	.07	42.6	.02	155	.07

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	42.6	155		274	274	.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.179

INPUT

Description: Proposed condition with compensatory basin. EOWB surveyed section D30. Shifted 130' left. Overbanks extended per topo.

Station Elevation Data num= 14									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1	661	1	659	19.9	658.19	43.5	657.86	68.3	657.46
71.8	654.65	81.4	652.73	123.5	651.56	131	657.5	167.6	657.5
175	655	260	655	275	660	278	661		

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
1	.07	68.3	.02	131	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	68.3	131		575	575	.1	.3

Ineffective Flow num= 1			
Sta L	Sta R	Elev	Permanent
131	278	657.5	T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.069

INPUT

Description: EOWB surveyed section D29. Overbanks extended per topo.

Station Elevation Data num= 17									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-20	661	-20	659	0	658.73	14.3	658.52	39.6	657.71
62.3	656.55	78.2	652.76	85.6	651.76	122.6	650.55	130.6	652.46
132.1	657.63	138.7	658.04	153.1	657.77	164.2	657.23	168.3	658.17
175.8	660.46	186.3	664.42						

Manning's n Values num= 3					

Sta	n Val	Sta	n Val	Sta	n Val
-20	.07	62.3	.02	132.1	.07

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	62.3	132.1		180	180	180		.1	.3
Blocked Obstructions	num=		1						
Sta L	Sta R	Elev							
160	186.3	665							

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.035

INPUT

Description: XS in pond upstream of dam with proposed Elmhurst Road widening.

Station Elevation Data	num=		15							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	656.29	40	656.21	45.7	655.94	56	654.69	62	654.11	
65.5	653.15	69	651.21	75	651.59	89.8	651.45	94.6	651.29	
100.5	652.18	100.6	653.21	109	654.77	130	655.44	150	660.44	

Manning's n Values	num=		3		
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	56	.02	109	.045

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	56	109		6	6	6		.1	.3
Ineffective Flow	num=		1						
Sta L	Sta R	Elev	Permanent						
0	40	670	T						

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.034

INPUT

Description: Upstream top of dam with proposed Elmhurst Road widening.

Station Elevation Data	num=		17								
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev		
0	656.29	40	656.21	45.7	655.94	56	654.69	62	654.11		
63	654.1	74.5	653.3	82.8	653.13	89.5	652.95	89.5	651.94		
94.6	651.79	94.6	652.94	99	653.05	100.3	653.21	109	654.74		
130	655.44	150	660.44								

Manning's n Values	num=		3		
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	74.5	.013	100.3	.045

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	74.5	100.3		7	7	7		.1	.3
Ineffective Flow	num=		1						
Sta L	Sta R	Elev	Permanent						
0	40	670	T						

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.033

INPUT

Description: downstream top of dam with proposed Elmhurst Road widening.

Station Elevation Data	num=		13							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	670	.1	654	47	653.04	62.3	653.26	70	653.51	
89.3	652.78	89.5	651.61	94.6	651.61	94.8	652.62	100.6	652.72	
108	654.18	127	654.6	151	660.6					

Manning's n Values	num=		3		
Sta	n Val	Sta	n Val	Sta	n Val
0	.045	70	.013	100.6	.045

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	70	100.6		1	1	1		.1	.3
Ineffective Flow	num=		1						
Sta L	Sta R	Elev	Permanent						
0	47	670	T						

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.032

INPUT

Description: creek downstream of dam with proposed Elmhurst Road widening.

Station Elevation Data		num= 13		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	670	.1	654	47	653.04	61.4	652.83	73	649.05
81.5	648.33	89.4	647.83	94.5	648.16	99	649.11	101.2	649.7
107	651.46	122	653	150	660				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	61.4	.029	107	.045		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	61.4	107		62	62		.1	.3

Ineffective Flow		num= 1		Sta L Sta R Elev Permanent	
0	47	670	T		

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.021

INPUT

Description: Proposed condition 040912. 6.022 6.026 ** HIGGINS CREEK**
 WH062, extended per topo.

Approach - Elmhurst Rd in WSP2

Station Elevation Data		num= 14		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	670.72	82	670.72	82	658.62	84	658.42	96	652.12
99	650.12	108	649.42	120	650.12	124	652.12	124	654.12
128	655.22	132	656	145	656	165	661		

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.04	84	.029	128	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	84	128		80	80		.1	.3

Ineffective Flow		num= 1		Sta L Sta R Elev Permanent	
145	165	661	T		

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.006

INPUT

Description: Proposed condition 040912. EOWB surveyed section D28. Shifted
 80' left for comparison purposes. Overbanks extended per topo.

Station Elevation Data		num= 17		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-55	661	-55	660	2.4	659.37	26.7	658.97	37.5	658.56
45.1	656.79	54.3	652.69	55.5	651.41	59	649.73	59.8	648.55
69.3	648.72	81.9	649.08	85.7	651.65	92.3	654.81	101.3	655.01
110	659	267	661						

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-55	.06	45.1	.035	92.3	.06		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	45.1	92.3		35	35		.3	.5

Ineffective Flow		num= 2		Sta L Sta R Elev Permanent	
-55	26.7	661	T		
102	267	661	T		

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.9994*

INPUT

Description: Interpolated section proposed 040912. Overbanks extended per topo.

Station Elevation Data		num= 23							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-28	661	-28	659	22	659	40	658	42.08	656.92
44.24	656.43	53.68	652.23	54.05	652.1	55.33	651.07	57.2	650.37
59.07	649.44	59.92	648.38	69.63	648.53	77.96	648.73	80.81	649.14
82.51	649.21	83.39	649.68	86.39	651.55	93.14	654.68	101.84	654.89
110	659	260	660	290	661				

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
-28	.06	44.24	.035	93.14	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	44.24	93.14		35	23	20	.3 .5

Ineffective Flow		num= 2	
Sta L	Sta R	Elev	Permanent
-28	22	661	T
90	290	661	T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.9950

INPUT

Description: Interpolated section w/ proposed wall 040912 immediately U/S of Elmhurst Rd. Shifted 80.5' right to align with existing bridge geometry. Overbanks extended per topo.

Station Elevation Data		num= 25							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-215	660	-215	659	85	659	106.96	657.79	115.71	657.5
116.89	657.43	121.81	656.52	123.88	656.07	133.91	651.62	134.31	651.51
135.67	650.72	137.65	650.18	139.63	649.16	140.54	648.21	150.46	648.35
158.97	648.52	161.88	649.24	163.62	649.33	164.51	649.71	167.59	651.44
174	654.55	182.88	654.77	190	657	190	661	373	661

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
-215	.06	123.88	.035	174	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	123.88	174		130	125	120	.3 .5

Ineffective Flow		num= 3	
Sta L	Sta R	Elev	Permanent
-215	-70	660	T
-70	123	658.61	F
181	380	660	F

CULVERT

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.981

INPUT

Description: 5.982 5.985 Elmhurst Road Proposed RCBCs; CH2M profile, existing structure LC raised, extended, and widened to the south.

Distance from Upstream XS = 4
 Deck/Roadway Width = 114
 Weir Coefficient = 2.7

Upstream Deck/Roadway Coordinates		num= 15						
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-224	658.66	-174	658.65	-74	658.61			
26	659.05	123	659.54	136	659.61			
136	662	170	662	190	662			
190	659.88	223	660.08	273	660.61			
323	661.44	373	664	473	667.7			

Upstream Bridge Cross Section Data		num= 25							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-215	660	-215	659	85	659	106.96	657.79	115.71	657.5
116.89	657.43	121.81	656.52	123.88	656.07	133.91	651.62	134.31	651.51
135.67	650.72	137.65	650.18	139.63	649.16	140.54	648.21	150.46	648.35

158.97 648.52 161.88 649.24 163.62 649.33 164.51 649.71 167.59 651.44
 174 654.55 182.88 654.77 190 657 190 661 373 661

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -215 .06 123.88 .035 174 .06

Bank Sta: Left Right Coeff Contr. Expan.
 123.88 174 .3 .5

Ineffective Flow num= 3
 Sta L Sta R Elev Permanent
 -215 -70 660 T
 -70 123 658.61 F
 181 380 660 F

Downstream Deck/Roadway Coordinates

num= 14
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
 -224 658.66 -174 658.65 -74 658.61
 26 659.05 123 659.54 136 659.61
 136 662 170 662 170 659.78
 223 660.08 273 660.61 323 661.44
 373 664 473 667.7

Downstream Bridge Cross Section Data

Station Elevation Data num= 19
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -210 660 -210 659 -182 658 -44 657 72 656
 82 655.7 122 655.2 125 654.7 135 650 143 650
 147 648 152 647.9 157 648 161 650 166 650
 175 654.7 190 655 420 655 443 661

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -210 .06 122 .035 175 .06

Bank Sta: Left Right Coeff Contr. Expan.
 122 175 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -210 123 658 F
 181 443 660 T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins = 658.61
 Energy head used in spillway design = -.28
 Spillway height used in design = 0
 Weir crest shape = Broad Crested

Number of Culverts = 2

Culvert Name Shape Rise Span
 Elm Wing 2 Box 6 12
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 4 114 .013 .013 0 .5 1

Number of Barrels = 2
 Upstream Elevation = 650.2

Centerline Stations
 Sta. Sta.
 131 173

Downstream Elevation = 649.9

Centerline Stations
 Sta. Sta.
 131 173

Culvert Name Shape Rise Span
 Elm Center 2 Box 9 12
 FHWA Chart # 10- 90 degree headwall; Chamfered or beveled inlet
 FHWA Scale # 1 - Inlet edges chamfered 3/4 inch
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 4 114 .013 .035 1 .5 1

Number of Barrels = 2
 Upstream Elevation = 647.2

Centerline Stations
 Sta. Sta.

145 159
 Downstream Elevation = 646.9
 Centerline Stations
 Sta. Sta.
 145 159

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.972

INPUT
 Description: 5.969 5.976 ** HIGGINS CREEK** WH061, shifted 82' right for
 comparison purposes. Overbanks extended per topo. Approach -
 Wille Rd / Exit - Elmhurst Rd in WSP2

Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-210	660	-210	659	-182	658	-44	657	72	656
82	655.7	122	655.2	125	654.7	135	650	143	650
147	648	152	647.9	157	648	161	650	166	650
175	654.7	190	655	420	655	443	661		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-210	.06	122	.035	175	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 122 175 66 66 66 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-210	123	658	F
181	443	660	T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.959

INPUT
 Description: EOWB surveyed section D24, shifted 320' left. Overbanks extended
 per topo.

Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-305	660	-300	659	-45.6	658	-13.4	657	-6.8	656.99
7.7	656.5	30.6	655.6	41.1	654.11	53	649.25	57.4	649.48
61.7	647.65	64.2	647.58	70	647.59	72.8	647.73	76.7	649.53
81.7	649.65	92.9	654.08	100	654.98	114.5	655.62	125	655.8
338	656	360	661						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-305	.06	41.1	.035	92.9	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 41.1 92.9 50 50 50 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
105	360	660	T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.950

INPUT
 Description: EOWB surveyed section D23. Overbanks extended per topo.

Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-370	660	-345	659	-313	659	-35	658	0	657.72
32.9	655.48	41	654.27	52.7	649.5	57.5	649.43	61.4	647.43
66.3	647.42	71.3	647.5	75.4	649.4	79.9	649.46	91.5	654.22
107	655.76	124	656.24	308	656.25	325	657	346	661

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-370	.06	41	.035	91.5	.06

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

41 91.5 189 189 189 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 120 346 660 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.914

INPUT

Description: EOWB surveyed section D22, upstream of MRWD entrance. Shifted 6' left. Shape revised per D23 template. Overbanks extended per topo.

Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-435	660	-430	659	-330	659	-262	658	-235	658
-196	659	-158	660	-67	660	-37	658	14.6	657.65
36.4	655.86	40	654.72	53.5	649.68	54	649.5	58.5	649.4
63	647.35	66	647.31	73	647.35	77	649.4	81.5	649.5
82.8	649.66	93.2	654.22	116.5	657.83	203	658	236	661

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-435	.06	40	.035	93.2	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 40 93.2 78 78 78 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -435 42.5 658 F
 94.5 236 660 F

CULVERT

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.911

INPUT

Description: MWRD Kirie Entrance, inverts and road profile per survey, culvert size approximated.

Distance from Upstream XS = 18
 Deck/Roadway Width = 41
 Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates num= 13

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-230	658				-230	658				-200	658			
-100	658				-27	658				0	658.63			
59	659.5				59	661.65				77.8	661.65			
77.9	660				134.1	660.54				183	661			
236	661													

Upstream Bridge Cross Section Data
 Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-435	660	-430	659	-330	659	-262	658	-235	658
-196	659	-158	660	-67	660	-37	658	14.6	657.65
36.4	655.86	40	654.72	53.5	649.68	54	649.5	58.5	649.4
63	647.35	66	647.31	73	647.35	77	649.4	81.5	649.5
82.8	649.66	93.2	654.22	116.5	657.83	203	658	236	661

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-435	.06	40	.035	93.2	.06

Bank Sta: Left Right Coeff Contr. Expan.
 40 93.2 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -435 42.5 658 F
 94.5 236 660 F

Downstream Deck/Roadway Coordinates num= 12

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-230	660				-230	658				-200	658			
-100	658				-27	658				0	658.63			
59	659.5				59	661.65				77.8	661.65			
77.9	660				134.1	660.54				183	661			

Downstream Bridge Cross Section Data

Station Elevation Data num= 19									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-208	660	-208	658	-170	658	-106	658	-49	658
0	658.24	41.4	654.75	43.2	654.41	54.5	649.5	59	649.4
63	647.35	66	647.3	73	647.35	77	649.4	81.5	649.5
93.4	654.22	116.9	659.17	132	660	150	661		

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
-208	.06	43.2	.035	93.4	.06

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	43.2	93.4		.3	.5

Ineffective Flow num= 2				
Sta L	Sta R	Elev	Permanent	
-208	55.5	657.5	F	
81.5	150	660	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 = 658
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span						
Culvert #1	Box	9	17						
FHWA Chart # 8 - flared wingwalls									
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.									
Solution Criteria = Highest U.S. EG									
Culvert Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef			
18	41	.012	.012	0	.4	1			
Upstream Elevation =	647.3								
Centerline Station =	68.4								
Downstream Elevation =	647.3								
Centerline Station =	68.4								

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.899

INPUT

Description: EOWB surveyed section D21, downstream of MRWD entrance. Shape revised per D23 template. Overbanks extended per topo.

Station Elevation Data num= 19									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-208	660	-208	658	-170	658	-106	658	-49	658
0	658.24	41.4	654.75	43.2	654.41	54.5	649.5	59	649.4
63	647.35	66	647.3	73	647.35	77	649.4	81.5	649.5
93.4	654.22	116.9	659.17	132	660	150	661		

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
-208	.06	43.2	.035	93.4	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	43.2	93.4		186	186		.3	.5

Ineffective Flow num= 2				
Sta L	Sta R	Elev	Permanent	
-208	55.5	657.5	F	
81.5	150	660	F	

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.86375*

INPUT

Description: Interpolated XS

Station Elevation Data num= 27									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1.25	658.68	3.13	657.92	18.04	656.86	36.71	655.53	39.43	655.17
42.19	654.82	44.08	654.44	51.8	650.93	55.06	649.49	55.66	649.3

59.25	649.22	60.27	649.06	62.98	647.69	64.37	647.15	67.45	647.1
73.01	647.16	74.3	647.31	77.28	648.83	78.22	649.2	82.09	649.29
82.62	649.36	85.73	650.68	94.28	654.25	95.94	654.45	109.62	655.56
133.8	656.76	173.93	658.83						

Manning's n Values num= 3
 Sta n Val Sta n Val
 -1.25 .06 44.08 .035 94.28 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 44.08 94.28 186 186 186 .3 .5

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.8285*

INPUT

Description: Interpolated XS

Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-2.5	659.12	2.09	657.94	17.69	657.02	37.24	655.86	40.09	655.37
42.97	654.89	44.95	654.47	52.87	650.72	56.21	649.23	56.82	649.09
60.5	649.01	61.55	648.73	64.32	647.32	65.75	646.96	68.9	646.9
74.34	646.97	75.61	647.28	78.52	648.75	79.44	649.01	83.23	649.09
83.75	649.23	86.78	650.61	95.15	654.28	98	654.58	121.31	655.94
162.53	656.84	230.95	658.48						

Manning's n Values num= 3
 Sta n Val Sta n Val
 -2.5 .06 44.95 .035 95.15 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 44.95 95.15 186 186 186 .3 .5

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.79325*

INPUT

Description: Interpolated XS

Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-3.75	659.56	1.04	657.97	17.35	657.19	37.77	656.2	40.74	655.56
43.76	654.96	45.83	654.5	53.93	650.52	57.35	648.96	57.98	648.89
61.75	648.81	62.82	648.39	65.66	646.96	67.12	646.76	70.35	646.7
75.67	646.79	76.91	647.24	79.76	648.68	80.66	648.81	84.36	648.9
84.87	649.09	87.84	650.54	96.03	654.31	100.05	654.7	133.01	656.32
191.26	656.92	287.98	658.14	290	660				

Manning's n Values num= 3
 Sta n Val Sta n Val
 -3.75 .06 45.83 .035 96.03 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 45.83 96.03 186 186 186 .3 .5

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.758

INPUT

Description: EOWB surveyed section D20, replaces copy of WH061 used as U/S
 culvert section. Shifted 17' rt. for comparison purposes. Shape
 revised per D23 template. Overbanks extended per topo.

Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-5	660	0	658	17	657.35	38.3	656.54	41.4	655.76
46.7	654.53	55	650.31	58.5	648.7	63	648.6	67	646.6
71.8	646.5	77	646.6	81	648.6	85.5	648.7	88.9	650.47
96.9	654.34	102.1	654.83	144.7	656.7	220	657	345	657.8
390	658	390	660						

Manning's n Values num= 3
 Sta n Val Sta n Val
 -5 .06 46.7 .035 96.9 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 46.7 96.9 395 395 395 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -5 41.3 657 F
 102.3 390 657 F

CULVERT

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.721

INPUT
 Description: 5.722 5.725 Wille Road culvert per survey, roadway per topo.

Deck data is suspect in WSP-2 model; suspect points deleted.

Distance from Upstream XS = 22
 Deck/Roadway Width = 350
 Weir Coefficient = 2.7

Upstream Deck/Roadway Coordinates
 num= 10

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	658				25	658				25	657			0
120	657	0			135	657	0			183	658			0
265	658	0			346	657.23	0			415	657.5			0
465	658	0												

Upstream Bridge Cross Section Data
 Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-5	660	0	658	17	657.35	38.3	656.54	41.4	655.76
46.7	654.53	55	650.31	58.5	648.7	63	648.6	67	646.6
71.8	646.5	77	646.6	81	648.6	85.5	648.7	88.9	650.47
96.9	654.34	102.1	654.83	144.7	656.7	220	657	345	657.8
390	658	390	660						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-5	.06	46.7	.035	96.9	.06

Bank Sta: Left Right Coeff Contr. Expan.
 46.7 96.9 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -5 41.3 657 F
 102.3 390 657 F

Downstream Deck/Roadway Coordinates
 num= 11

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-350	658				-245	658				-245	657			0
-150	657	0			-135	657	0			-87	658			0
-5	658	0			76	657.23	0			145	657.5			0
151	658	0			275	658								

Downstream Bridge Cross Section Data
 Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-340	658	-340	657	-85	656	45	655.56	56.1	654.92
61.8	653.43	70.7	649.72	74	648.4	78.5	648.3	82.5	646.3
89.9	646.23	97.5	646.3	101.5	648.3	106	648.4	109	649.7
117.5	653.6	129.3	655.64	151	657.23	275	658		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-340	.06	56.1	.035	129.3	.06

Bank Sta: Left Right Coeff Contr. Expan.
 56.1 129.3 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -340 76 656 F
 105 275 656 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 = .95
 Elevation at which weir flow begins = 657
 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
 Culv # 1 Box 9 17
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 22 350 .012 .012 0 .4 1
 Upstream Elevation = 646.5
 Centerline Station = 71.8
 Downstream Elevation = 646.5
 Centerline Station = 90.5

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.683

INPUT
 Description: EOWB surveyed section D19, replaces copy of WHO56 used as D/S
 culvert section. Shifted 45' rt. for comparison purposes. Shape
 revised per D18 template. Overbanks extended per topo.

Station Elevation Data		num=		19					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-340	658	-340	657	-85	656	45	655.56	56.1	654.92
61.8	653.43	70.7	649.72	74	648.4	78.5	648.3	82.5	646.3
89.9	646.23	97.5	646.3	101.5	648.3	106	648.4	109	649.7
117.5	653.6	129.3	655.64	151	657.23	275	658		

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
-340	.06	56.1	.035	129.3	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	56.1	129.3		172	172	.3	.5

Ineffective Flow		num=		2	
Sta L	Sta R	Elev	Permanent	F	F
-340	76	656	F		
105	275	656	F		

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.650

INPUT
 Description: EOWB surveyed section D18, shifted 20' rt. for comparison
 purposes. Overbanks extended per topo.

Station Elevation Data		num=		16					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-240	657	-120	656	20	655.63	61.2	653.83	62.4	653.62
74.3	648.41	78.7	648.17	83.2	646.15	92.3	646.1	97	646.16
101.7	648.22	105.1	648.26	117.6	653.69	118.2	653.97	134	657.56
153	657.86								

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
-240	.06	61.2	.035	118.2	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	61.2	118.2		5	5	.1	.3

Blocked Obstructions		num=		1	
Sta L	Sta R	Elev			
-20	20	657.5			

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.649

INPUT
 Description: 5.650 5.654 Exit - Wille Rd. WHO56 ** HIGGINS CREEK**
 Left
 overbank adjusted per current topo.

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-240	657	-120	656	20	655.6	60	654.7	72	648.6
79	648.6	83	646.6	90	646.5	98	646.6	102	648.6
109	648.6	120	654.7	127	656.2	130	657.2		

Manning's n Values					
Sta	n Val	Sta	n Val	Sta	n Val
-240	.06	60	.035	120	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	60	120		294	294		.1	.3

Blocked Obstructions			
Sta L	Sta R	Elev	num=
-20	20	657.5	1

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.593

INPUT
 Description: EOWB surveyed section D17, shifted 984' rt. for comparison purposes. Overbanks extended per topo.

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
760	657	917	656	984.1	655.22	997	655.04	1010.4	654.99
1019	654.58	1027.7	653.57	1040	647.96	1043.8	647.98	1048.9	645.88
1053.3	645.87	1058	645.93	1063.8	645.88	1067.2	647.88	1072.4	647.93
1084.1	653.61	1090.5	655.19	1090.5	660	1155	660		

Manning's n Values					
Sta	n Val	Sta	n Val	Sta	n Val
760	.06	1027.7	.035	1084.1	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1027.7	1084.1		188	188		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.558

INPUT
 Description: 5.559 5.563 TAR35 ** HIGGINS CREEK**
 Left overbank revised per current topo.

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
756	657	918	656	1000	655.2	1025	653.9	1037	648.3
1041	648.2	1045	646.3	1048	647.7	1052	646.3	1060	646.3
1066	646.3	1070	647.7	1071	648.2	1075	648.3	1087	653.8
1091	655.7	1102	656.4	1102	660.7	1142	660.7		

Manning's n Values					
Sta	n Val	Sta	n Val	Sta	n Val
756	.06	1025	.035	1087	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1025	1087		308	308		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.500

INPUT
 Description: EOWB surveyed section D16, shifted 991' rt. for comparison purposes. Left overbank extended per topo.

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
872	657	961	656	991	655.52	1009.6	654.78	1021.9	654.05
1026.3	653.4	1030.7	651.44	1038.3	647.67	1042.4	647.62	1046.3	645.68
1049.7	645.55	1054.2	645.58	1058.3	645.56	1061.2	645.54	1065.1	647.55
1069.4	647.68	1081.5	653.65	1091.2	656.18	1102.4	657.91	1115.5	658.12
1125	658.3	1125	660	1190	660				

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

Sta	n Val	Sta	n Val	Sta	n Val
872	.06	1026.3	.035	1081.5	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1026.3	1081.5		21	21		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.496

INPUT
 Description: 5.497 5.500 TAR34 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data	num=	19
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
835 657 953 656 1000 655.3 1026 653.8 1038 647.9		
1042 647.9 1043 647.6 1046 645.9 1053 645.9 1061 645.8		
1064 647.5 1065 647.8 1070 647.9 1081 653.8 1099 657.9		
1106 658.3 1116 658.5 1116 660 1194 660		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
835 .06 1026 .035 1081 .06		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1026	1081		458	458		.1	.3

Ineffective Flow	num=	1
Sta L Sta R Elev Permanent		
835 870 657 T		

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.409

INPUT
 Description: EOWB surveyed section D15, shifted 947' rt. for comparison purposes. Extended right per TAR 33.

Station Elevation Data	num=	20
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
963.4 661.09 982.6 657.33 995 654.68 1008 653.19 1018.8 647.28		
1023.7 647.24 1026.8 645.8 1028.6 645.05 1032.4 645.02 1037 645.06		
1044.9 646.05 1047.1 647.15 1052.2 647.37 1063 653.58 1072.5 655.41		
1088 656.77 1101.9 657.16 1127 657.66 1127 660 1209 660		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
963.4 .06 1008 .035 1063 .06		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1008	1063		6	6		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.408

INPUT
 Description: 5.409 5.413 Approach- NW Tollway TAR33 ** HIGGINS CREEK**

Left side modified to match current topography.

Station Elevation Data	num=	16
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
960 661 980 657 1000 654.3 1007 653.6 1019 647.5		
1024 647.3 1028 645.3 1036 645.3 1043 645.3 1047 647.3		
1052 647.5 1064 653.8 1091 656.8 1136 657.7 1136 660		
1201 660		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
960 .06 1007 .035 1064 .06		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1007	1064		72.1	72.1		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.394

INPUT

Description: Copy of 5.408, shifted 518' right to match bridge CL.
5.409

5.413 Approach- NW Tollway TAR33 ** HIGGINS CREEK**

Left side

modified to match current topography.

Station Elevation Data		num= 12							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1478	661	1498	657	1508	654.3	1512	652.5	1530.2	647.3
1534.4	645.3	1542.6	645.3	1553	645.5	1573.8	646.6	1596	652.5
1609	656.8	1782	657.7						

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
1478	.06	1512	.035	1596	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1512	1596	323	323	323	.3	.5

Ineffective Flow		num= 2	
Sta L	Sta R	Elev	Permanent
1478	1482	665	F
1626	1782	665	F

BRIDGE

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.364

INPUT

Description: I-90 Proposed Bridge including continuous median barrier. Uses same internal XS as existing bridge.

5.365 5.369 Northwest Tollway per survey, including parapet walls.

Skew effects ignored due to low skew angle (<20 degrees)

Distance from Upstream XS = 22
Deck/Roadway Width = 276
Weir Coefficient = 2.7
Bridge Deck/Roadway Skew = 10.1

Upstream Deck/Roadway Coordinates		num= 15						
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
1354.5	665		1454.5	665		1512.7	665	
1512.7	665	656.87	1596.3	665	656.94	1596.3	665	
1654.5	664.7		1754.5	664.2		1854.5	663.7	
2054.5	662.8		2254.5	663		2454.5	663.6	
2654.5	664.3		2854.5	665		3700	665	

Upstream Bridge Cross Section Data		num= 17							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1485.6	660.3	1493	658.73	1499.1	657.95	1505.8	656.48	1512.2	654.84
1523.9	649.49	1529.8	647.34	1531.3	647.02	1534.9	645.3	1541.2	645.3
1554.5	645.36	1570.8	646	1577	646.51	1587.8	651.34	1596.3	654.96
1607	657.47	1618.3	660.02						

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
1485.6	.06	1512.2	.035	1596.3	.06

Bank Sta:	Left	Right	Coeff Contr.	Expan.
	1512.2	1596.3	.3	.5

Ineffective Flow		num= 2	
Sta L	Sta R	Elev	Permanent
1485.6	1482	665	F
1626	1618.3	665	F

Downstream Deck/Roadway Coordinates		num= 15						
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
1354.5	665		1454.5	665		1512.7	665	
1512.7	665	656.87	1596.3	665	656.94	1596.3	665	
1654.5	664.7		1754.5	664.2		1854.5	663.7	
2054.5	662.8		2254.5	663		2454.5	663.6	
2654.5	664.3		2854.5	665		3700	665	

Downstream Bridge Cross Section Data

Station Elevation Data num= 14
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 1497.7 662.06 1505.5 656.1 1513.5 654.38 1523.8 650.43 1535 646
 1544.4 645.3 1556.1 645.65 1567.8 645.91 1576.9 646.12 1579.5 647
 1589 650.81 1596.4 654.06 1608.2 656.82 1622.3 659.35

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1497.7 .075 1513.5 .06 1596.4 .075

Bank Sta: Left Right Coeff Contr. Expan.
 1513.5 1596.4 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 1497.7 1498.5 659 F
 1614.5 1622.3 659 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 = .95
 Elevation at which weir flow begins = 662.8
 Energy head used in spillway design = -.28
 Spillway height used in design = 0
 Weir crest shape = Broad Crested

Number of Piers = 1

Pier Data
 Pier Station Upstream= 1554.5 Downstream= 1554.5
 Upstream num= 2
 Width Elev Width Elev
 2.9 645 2.9 660
 Downstream num= 2
 Width Elev Width Elev
 2.9 645 2.9 660

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
 Energy
 Momentum Cd = 1.2
 Yarnell KVal = .9
 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
 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

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.335

INPUT
 Description: Copy of existing condition 5.340.
 5.341 5.345 Exit - NW Tollway
 TAR32 ** HIGGINS CREEK**

Station Elevation Data num= 14
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 1439 659.7 1510 659.7 1510 654 1528 647.2 1537 645.4
 1554 645.3 1576 645.8 1581 647.1 1597 652 1610 652
 1717 654.7 3497 655.7 3530 656.7 3610 657.7

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1439 .075 1510 .06 1597 .075

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1510 1597 50 50 50 .3 .5
 Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1439	1498.5	659	F
1614.5	3610	659	F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.324

INPUT

Description: EOWB surveyed section D12, shifted 1010' rt. for comparison purposes. Overbanks refined per topo.

Station Elevation Data		num= 26							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
944	658	1016.4	658	1016.4	654.5	1038.1	652.88	1050	649.55
1056.4	646.73	1064.6	645.5	1079.3	645.86	1093.2	645.28	1104.6	646.79
1112	649.85	1117.7	650.99	1123.5	651.36	1131.5	651.84	1146.1	652.42
1170	655	1180	656	1230	656	1240	655	1263	647
1265	647	1275	652	1315	653	1455	654	1630	655
1900	656								

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
944	.05	1038.1	.035	1117.7	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1038.1	1117.7		184	184	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1180	1900	657	T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.289

INPUT

Description: 5.290 5.293 TAR31 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data		num= 14							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
900	658.7	969	658.7	969	656.3	1000	655.3	1046	652.4
1069	646.7	1076	645.6	1095	645.2	1115	645.6	1123	646.7
1139	652.3	1335	654	1515	655	1600	656		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
900	.05	1046	.035	1139	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1046	1139		173	173	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1180	1600	657	T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.256

INPUT

Description: EOWB surveyed section D11, shifted 970' rt. for comparison purposes. Overbanks refined per topo.

Station Elevation Data		num= 25							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
900	658.7	965	658.7	965	656.3	970	656.21	987.6	655.92
1016.8	655.15	1045.7	652.92	1056.1	651.98	1062.5	651.33	1067.3	650.15
1074.3	647.24	1085	645.34	1097.9	645.11	1109.3	645.39	1118.7	645.59
1127.3	647.53	1136	650.72	1143	652.68	1146.2	653.01	1150	653.21
1153.5	653.52	1160	655	1283	655	1457	655	1590	656

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
900	.05	1045.7	.035	1143	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1045.7	1143		108	108	.1	.3

Ineffective Flow num= 1

Sta L Sta R Elev Permanent
1185 1590 657 T

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.236

INPUT
Description: 5.237 5.240 TAR30 ** HIGGINS CREEK**
Overbanks refined per topo.

Station Elevation Data num= 12
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
920 658.7 1000 655.8 1053 652.5 1078 646.4 1083 645.6
1098 645.2 1118 645.5 1122 646.5 1140 653.9 1149 655
1190 656 1360 656

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
920 .05 1053 .035 1140 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1053 1140 272 272 272 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.184

INPUT
Description: 5.185 5.189 TAR29 ** HIGGINS CREEK**
Overbanks refined per topo.

Station Elevation Data num= 15
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
940 658 1000 655 1044 653.1 1068 646.3 1073 644.7
1090 644.5 1107 644.6 1113 646.3 1138 654.6 1153 654.9
1160 653.5 1370 653.5 1375 655.7 1378 656.7 1381 657.7

Manning's n Values num= 4
Sta n Val Sta n Val Sta n Val Sta n Val
940 .05 1044 .035 1138 .05 1160 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1044 1138 95 95 95 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.166

INPUT
Description: EOWB surveyed section D10, shifted 1000' rt. for comparison
purposes. Overbanks refined per topo.

Station Elevation Data num= 23
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
969 657.7 979 656.7 990 656.5 1011.7 654.64 1022.8 654.25
1029.1 653.45 1044.8 649.51 1054.7 646.45 1060 644.6 1070.5 644.48
1077.7 644.6 1087.1 644.58 1095.1 644.49 1097.7 645.11 1106.7 648.02
1124.9 653.51 1126.7 653.67 1130.9 653.8 1135.7 653.86 1145 653.5
1445 653.5 1455 655.7 1460 657.7

Manning's n Values num= 4
Sta n Val Sta n Val Sta n Val Sta n Val
969 .05 1029.1 .035 1124.9 .05 1145 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1029.1 1124.9 117 117 117 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.144

INPUT
Description: 5.145 5.149 TAR28 ** HIGGINS CREEK**
Overbanks refined per topo.

Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
965	659	985	657	1000	656.5	1031	654	1057	646.3
1062	644.6	1079	644.4	1098	644.5	1103	646.3	1127	653.8
1137	653.5	1515	653.5	1525	655	1530	656		

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 965 .05 1031 .035 1127 .05 1137 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1031 1127 266 266 266 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.094

INPUT
 Description: 5.095 5.098 TAR27 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
974	657.7	976	656.7	979	655.7	986	654.7	998	653.7
1000	653.6	1012	652.5	1016	651.7	1034	646.3	1040	644.5
1061	643.1	1079	644.4	1086	646.3	1109	653.6	1120	653.5
1650	653.5	1652	654.7	1655	655.7	1658	656.7	1680	657.7

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 974 .05 1012 .035 1109 .05 1120 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1012 1109 237 237 237 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.049

INPUT
 Description: EOWB surveyed section D9, shifted 985' rt. for comparison
 purposes. Overbanks refined per topo.

Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
955	657.7	958	656.7	961	655.7	964	654.7	976	653.7
993.2	653.2	1001	652.15	1021.7	645.18	1027.6	643.91	1046.3	643.43
1062.4	643.8	1068.5	645.01	1087.3	652.26	1128.7	653.17	1133.5	653.5
1746	653.5	1752	654.7	1757	655.7	1762	656.7	1787	657.7

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 955 .05 1001 .035 1087.3 .05 1133.5 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1001 1087.3 22 22 22 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.045

INPUT
 Description: 5.046 5.049 Approach - MWRD TAR26 ** HIGGINS CREEK** Overbanks
 refined per topo.

Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
950	659.7	952	658.7	955	657.7	958	656.7	961	655.7
964	654.7	976	653.7	1000	653.4	1004	652.5	1021	646.3
1028	644.5	1044	643.8	1066	644.3	1073	646.3	1088	652.5
1102	652.7	1110	653.5	1746	653.5	1752	654.7	1757	655.7
1762	656.7	1787	657.7						

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 950 .05 1004 .035 1088 .05 1110 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1004 1088 130 130 130 .3 .5

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.020

INPUT

Description: 5.021 5.024 Immediately Upstream - MWRD ** HIGGINS CREEK**

Cross Section copied from Approach section.

Overbanks refined per
 topo.

Station Elevation Data		num= 22							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
950	659.7	952	658.7	955	657.7	958	656.7	961	655.7
964	654.7	976	653.7	1000	653.4	1004	652.5	1021	646.3
1028	644.5	1044	643.8	1066	644.3	1073	646.3	1088	652.5
1102	652.7	1110	653.5	1746	653.5	1752	654.7	1757	655.7
1762	656.7	1787	657.7						

Manning's n Values		num= 4					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
950	.05	1004	.035	1088	.05	1110	.03

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	1004	1088		80	80	80		.3	.5

Ineffective Flow		num= 2			
Sta L	Sta R	Elev	Permanent		
950	1022	653.3	F		
1071	1787	652.7	F		

CULVERT

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.012

INPUT

Description: 5.013 5.017 MWRD1 Cell 1 Crossing

Deck realigned to match
 section stationing.

Distance from Upstream XS = 10

Deck/Roadway Width = 60

Weir Coefficient = 2.7

Upstream Deck/Roadway Coordinates

num= 25									
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta
944	660.72		947	659.72		950	658.72		
953	657.72		956	656.72		959	654.72		
1000	653.82		1018	653.46		1046	652.64		
1062	652.61		1105.5	653.15		1130	654.42		
1325	652.72		1336	651.72		1348	650.72		
1355	650.22		1444	649.92		1454	650.72		
1465	651.72		1477	652.72		2120	653.72		
2140	654.72		2145	655.72		2220	656.72		
2370	657.72								

Upstream Bridge Cross Section Data

Station Elevation Data		num= 22							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
950	659.7	952	658.7	955	657.7	958	656.7	961	655.7
964	654.7	976	653.7	1000	653.4	1004	652.5	1021	646.3
1028	644.5	1044	643.8	1066	644.3	1073	646.3	1088	652.5
1102	652.7	1110	653.5	1746	653.5	1752	654.7	1757	655.7
1762	656.7	1787	657.7						

Manning's n Values		num= 4					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
950	.05	1004	.035	1088	.05	1110	.03

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	1004	1088		.3	.5

Ineffective Flow		num= 2			
Sta L	Sta R	Elev	Permanent		
950	1022	653.3	F		
1071	1787	652.7	F		

Downstream Deck/Roadway Coordinates

num= 26									
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta
663	660.72		944	660.72		947	659.72		

950	658.72	953	657.72	956	656.72
959	654.72	1000	653.82	1038	653.46
1066	652.64	1082	652.61	1125.5	653.15
1130	654.42	1325	652.72	1336	651.72
1348	650.72	1355	650.22	1444	649.92
1454	650.72	1465	651.72	1477	652.72
2120	653.72	2140	654.72	2145	655.72
2220	656.72	2370	657.72		

Downstream Bridge Cross Section Data

Station Elevation Data num= 17									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
666	656.7	669	655.7	672	654.7	678	653.7	1000	653.4
1003	652.8	1024	645.5	1030	644.5	1065	643.8	1090	643.8
1096	645.5	1117	653	1126	653.5	1949	653.5	1956	654.7
1963	655.7	1970	656.7						

Manning's n Values num= 5									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
666	.03	1000	.05	1003	.035	1117	.05	1126	.03

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	1003	1117		.3	.5
Ineffective Flow	num= 2				
Sta L	Sta R	Elev	Permanent		
666	1042	652	F		
1090	1970	652	F		
Blocked Obstructions	num= 1				
Sta L	Sta R	Elev			
1145	1190	657			

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 652.61
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Culverts = 2

Culvert Name	Shape	Rise	Span						
Culv # 1	Box	5	7						
FHWA Chart # 8 - flared wingwalls									
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.									
Solution Criteria = Highest U.S. EG									
Culvert Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss	Coef	Exit Loss	Coef	
10	60	.015	.015	0	.4		1		
Upstream Elevation =	643.77								
Centerline Station =	1036								
Downstream Elevation =	643.84								
Centerline Station =	1056								

Culvert Name	Shape	Rise	Span						
Culv # 2	Box	5	9						
FHWA Chart # 8 - flared wingwalls									
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.									
Solution Criteria = Highest U.S. EG									
Culvert Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss	Coef	Exit Loss	Coef	
10	60	.015	.015	0	.4		1		
Number of Barrels =	2								
Upstream Elevation =	643.77								
Centerline Stations									
Sta.	Sta.								
1045	1055								
Downstream Elevation =	643.84								
Centerline Stations									
Sta.	Sta.								
1065	1075								

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.005

INPUT
Description: 5.006 5.009 Immediately Downstream - MWRD ** HIGGINS CREEK**
Cross Section copied from Exit section. Overbanks refined per topo.

Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
666	656.7	669	655.7	672	654.7	678	653.7	1000	653.4
1003	652.8	1024	645.5	1030	644.5	1065	643.8	1090	643.8
1096	645.5	1117	653	1126	653.5	1949	653.5	1956	654.7
1963	655.7	1970	656.7						

Manning's n Values num= 5
 Sta n Val Sta n Val Sta n Val Sta n Val
 666 .03 1000 .05 1003 .035 1117 .05 1126 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1003 1117 69 69 69 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 666 1042 652 F
 1090 1970 652 F

Blocked Obstructions num= 1
 Sta L Sta R Elev
 1145 1190 657

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.992

INPUT
 Description: 4.993 4.996 Exit - MWRD TAR25 ** HIGGINS CREEK**
 Overbanks

refined per topo.

Station	Elevation	Data	num=	19						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
844	657	850	655	920	654	1000	653.4	1003	652.8	
1024	645.5	1030	644.5	1065	643.8	1090	643.8	1096	645.5	
1117	653	1126	653.5	1130	653.9	1185	653.9	1190	653.5	
1949	653.5	1956	654.7	1963	655.7	1970	656.7			

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 844 .05 1003 .035 1117 .05 1190 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1003 1117 62 62 62 .1 .3

Blocked Obstructions num= 1
 Sta L Sta R Elev
 1135 1180 657

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.980

INPUT
 Description: EOWB surveyed section D8, shifted 975' rt. for comparison
 purposes. Overbanks refined per topo.

Station	Elevation	Data	num=	18						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
780	656	785	655	790	654	988.1	653.72	997.8	653.45	
1019.2	644.49	1027.1	643.75	1037.7	643.55	1047.2	643.76	1055	644.56	
1079.7	652.45	1089.1	653.47	1110.2	653.9	1150	653.9	1155	653.5	
1920	653.5	1933	655	1940	656					

Manning's n Values num= 5
 Sta n Val Sta n Val Sta n Val Sta n Val
 780 .03 988.1 .05 997.8 .035 1079.7 .05 1155 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 997.8 1079.7 73 73 73 .1 .3

Blocked Obstructions num= 1
 Sta L Sta R Elev
 1113 1143 656

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.966

INPUT
 Description: 4.967 4.971 TAR24 ** HIGGINS CREEK**

Overbanks refined per topo.

Station Elevation Data num= 17									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
537	656.7	601	655.7	617	654.7	630	654	1000	654
1002	653.6	1018	645.6	1024	643.8	1038	643.4	1050	643.8
1057	645.6	1079	652.7	1087	653.5	1927	653.5	1934	654.7
1940	655.7	1945	656.7						

Manning's n Values num= 5									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
537	.03	1000	.05	1002	.035	1079	.05	1087	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1002	1079		115 115	115		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.944

INPUT
Description: 4.945 4.949 TAR23 ** HIGGINS CREEK**
Overbanks refined per topo.

Station Elevation Data num= 21									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
385	656.7	400	655.7	423	654.7	433	653.7	1000	653.3
1003	652.8	1017	645.5	1023	643.2	1035	642.8	1048	643.3
1054	645.5	1067	650	1084	650	1839	649.7	1843	650.7
1847	651.7	1851	652.7	1882	653.7	1890	654.7	1898	655.7
1925	656.7								

Manning's n Values num= 5									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
385	.03	1000	.05	1003	.035	1067	.05	1084	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1003	1067		86 86	86		.1	.3

Ineffective Flow num= 1				
Sta L	Sta R	Elev	Permanent	
1067	1925	653.5	T	

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.928

INPUT
Description: EOWB surveyed section D7, shifted 980' rt. for comparison purposes. Overbanks refined per topo.

Station Elevation Data num= 16									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
455	656	460	655	465	654	983.5	653.78	996.5	652.72
1001.2	652.61	1018	644.44	1023.5	642.73	1033.3	642.48	1043.6	642.77
1050.7	644.4	1078.9	653.3	1098.7	653.31	1866	654	1876	655
1886	656								

Manning's n Values num= 5									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
455	.05	460	.03	1001.2	.035	1078.9	.05	1098.7	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1001.2	1078.9		14 14	14		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.925

INPUT
Description: 4.926 4.930 TAR22 ** HIGGINS CREEK**
Overbanks refined per topo.

Station Elevation Data num= 19									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
320	656.7	330	655.7	350	654.7	827	654.3	960	653.7
1000	652.7	1002	652.7	1017	645.5	1024	643.1	1036	643
1046	643.3	1054	645.5	1076	653	1082	653.1	1839	653.2
1856	653.7	1872	654.7	1886	655.7	1916	656.7		

Manning's n Values num= 5
 Sta n Val Sta n Val Sta n Val Sta n Val
 320 .05 330 .03 1002 .035 1076 .05 1082 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1002 1076 55 55 55 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.915

INPUT
 Description: 4.916 4.920 TAR21 ** HIGGINS CREEK**
 Overbanks refined per topo.
 Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 415 655.5 420 654 954 654 972 648 1002 647
 1014 643 1046 643 1070 651 1102 652 1690 653
 1850 654 1860 655.5

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 415 .065 954 .065 1002 .04 1070 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1002 1070 159 159 159 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.885

INPUT
 Description: 4.886 4.889 TAR20 ** HIGGINS CREEK**
 Overbanks refined per topo.
 Station Elevation Data num= 13
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 420 655 425 654 987 653.9 1005 647.9 1034 646.9
 1046 642.9 1080 642.9 1090 649 1110 650 1220 651
 1395 652 1640 653 1730 655

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 420 .065 987 .065 1034 .04 1090 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1034 1090 101 101 101 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.866

INPUT
 Description: 4.867 4.870 TAR19 ** HIGGINS CREEK**
 Overbanks refined per topo.
 Station Elevation Data num= 13
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 395 655 400 654 1009 653.9 1027 647.9 1058 646.9
 1071 642.4 1099 642.4 1110 649 1132 650 1215 651
 1405 652 1617 653 1740 655

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 395 .065 1009 .065 1058 .04 1110 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1058 1110 100 100 100 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.847

INPUT
 Description: 4.848 4.851 TAR18 ** HIGGINS CREEK**

Overbanks refined per topo.
 Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
260	655	265	654	985	653.9	1003	647.9	1034	646.9
1049	642	1073	642	1088	649	1110	650	1200	651
1370	652	1510	653	1550	654	1590	655		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
260	.065	985	.065	1034	.04	1110	.065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1034 1110 101 101 101 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.828

INPUT
 Description: 4.829 4.832 TAR17 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
235	655	240	654	980	653.8	998	647.8	1029	646.8
1044	641.9	1068	641.9	1100	650	1215	651	1365	652
1495	653	1550	654	1600	655				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
235	.065	980	.065	1029	.04	1100	.065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1029 1100 139 139 139 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.801

INPUT
 Description: 4.802 4.806 TAR16 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
240	655	245	654	998	653.8	1016	647.8	1047	646.8
1060	642.5	1088	642.5	1110	650	1210	651	1360	652
1440	653	1565	654	1617	655				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
240	.065	998	.065	1047	.04	1110	.065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1047 1110 99 99 99 .1 .3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 1588 1617 655 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.783

INPUT
 Description: 4.784 4.787 TAR15 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
260	655	265	654	1038	653.8	1056	647.8	1087	646.8
1101	642	1127	642	1150	650	1225	651	1480	653
1620	655								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
260	.065	1038	.065	1087	.04	1150	.065

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

1087 1150 43 43 43 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 1550 1620 655 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.774

INPUT

Description: 4.775 4.779 TAR14 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 11
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 270 655 275 654 1058 653.7 1076 647.7 1107 646.7
 1120 642.5 1148 642.5 1170 650 1230 651 1472 653
 1595 655

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 270 .065 1058 .065 1107 .04 1170 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1107 1170 18 18 18 .1 .3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 1522 1595 655 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.771

INPUT

Description: EOWB surveyed section D6, shifted 1100' rt. for comparison
 purposes. Overbanks refined per topo.

Station Elevation Data num= 20
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 310 655 315 654 1099.1 653.91 1117.7 648.31 1124.3 647.86
 1146.1 647.02 1150.1 645.94 1152.4 642.96 1157 642.05 1186.9 642.52
 1191.5 642.96 1193.9 643.89 1203.3 648.97 1207.4 649.66 1217.5 649.9
 1227.5 650.03 1235 650.14 1270 651 1510 653 1620 655

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 310 .065 1099.1 .065 1146.1 .04 1203.3 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1146.1 1203.3 57 57 57 .1 .3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 1540 1620 655 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.760

INPUT

Description: 4.761 4.765 TAR13 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 11
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 320 655 325 654 1117 653.7 1135 647.7 1166 646.7
 1182 641.5 1204 641.5 1222 650 1270 651 1440 652
 1455 655

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 320 .065 1117 .065 1166 .04 1222 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1166 1222 95 95 95 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.742

INPUT
Description: 4.743 4.747 TAR12 ** HIGGINS CREEK**
Overbanks refined per topo.

Station Elevation Data		num=		12							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
340	655	344	654	1124	653.72	1142	647.72	1173	646.72		
1186	642.22	1214	642.22	1237	650	1270	651	1365	652		
1485	652	1500	655								

Manning's n Values		num=		4							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
340	.065	1124	.065	1173	.04	1237	.065				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1173	1237		156	156		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.713

INPUT
Description: 4.714 4.717 TAR11 ** HIGGINS CREEK**
Overbanks refined per topo.

Station Elevation Data		num=		12							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
325	655	330	654	1087	653.7	1105	647.7	1136	646.7		
1149	642.4	1177	642.4	1200	650	1240	651	1400	652		
1595	654	1600	655								

Manning's n Values		num=		4							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
325	.065	1087	.065	1136	.04	1200	.065				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1136	1200		80	80		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.698

INPUT
Description: 4.699 4.702 TAR10 ** HIGGINS CREEK**
Extended left and right
per D5.

Station Elevation Data		num=		11							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
295	655	300	654	1063	653.6	1081	647.6	1112	646.6		
1125	642.2	1153	642.2	1188	651	1378	652	1613	654		
1618	655										

Manning's n Values		num=		4							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
295	.065	1063	.065	1112	.04	1188	.065				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1081	1188		20	20		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.694

INPUT
Description: EOWB surveyed section D5, shifted 1060' rt. for comparison
purposes. Overbanks refined per topo.

Station Elevation Data		num=		21							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
295	655	300	654	1060	654	1064.2	653.1	1083.3	647.56		
1108.1	646.93	1116.8	645.63	1119.3	643.81	1126	641.6	1139.8	641.46		
1152.2	641.72	1157.8	645.74	1160.6	643.84	1167.7	648.16	1175.5	650.04		
1186.5	650.48	1186.8	650.56	1207.9	651	1390	652	1625	654		
1630	655										

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 295 .065 1060 .065 1116.8 .04 1157.8 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1116.8 1157.8 57 57 57 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.683

INPUT
 Description: 4.684 4.688 TAR9 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 10
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 295 655 300 654 1046 653.6 1064 647.6 1095 646.6
 1115 639.9 1129 639.9 1171 651 1200 652 1582 655

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 295 .065 1046 .065 1095 .04 1171 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1095 1171 26 26 26 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 295 1079 651.72 F
 1150 1582 651.87 F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.678

INPUT
 Description: 4.679 4.683 Immediately Upstream - Touhy Ave Reservoir Control.
 Overbanks refined per topo.

Cross Section copied from Approach section. ** HIGGINS CREEK**
 Station Elevation Data num= 10
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 265 655 266 654 1046 653.6 1064 647.6 1095 646.6
 1115 639.9 1129 639.9 1171 653.9 1192 653.9 1582 655

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 265 .065 1046 .065 1095 .04 1171 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1095 1171 55 55 55 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 265 1111 652.62 F
 1133 1582 652.62 F

CULVERT

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.673

INPUT
 Description: 4.674 4.677 MWRD TARCONT Cell 2 crossing per survey.
 Deck

realigned to match section stationing.
 Distance from Upstream XS = 1
 Deck/Roadway Width = 53
 Weir Coefficient = 2.7
 Upstream Deck/Roadway Coordinates
 num= 7
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
 1000 651.72 1070 651.72 1096 652.18
 1122 652.38 1142 652.26 1160 651.93
 1176 651.87

Upstream Bridge Cross Section Data
 Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
265	655	266	654	1046	653.6	1064	647.6	1095	646.6
1115	639.9	1129	639.9	1171	653.9	1192	653.9	1582	655

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 265 .065 1046 .065 1095 .04 1171 .065

Bank Sta: Left Right Coeff Contr. Expan.
 1095 1171 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 265 1111 652.62 F
 1133 1582 652.62 F

Downstream Deck/Roadway Coordinates num= 7
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
 1025 651.72 1095 651.72 1120 652.18
 1147 652.38 1167 652.26 1185 651.93
 1201 651.87

Downstream Bridge Cross Section Data Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 455 655 455 654 855 654 1071 653.6 1089 647.6
 1120 646.6 1139 640.2 1155 640.2 1196 653.9 1217 653.9
 1273.6 654.39 1275 655

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 455 .065 1120 .04 1196 .065

Bank Sta: Left Right Coeff Contr. Expan.
 1120 1196 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 455 1137 651.22 F
 1157 1275 651.22 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 = .95
 Elevation at which weir flow begins = 651.72
 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
 Culv # 1 Box 4 9
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 1 53 .015 .015 0 .4 1

Number of Barrels = 2
 Upstream Elevation = 642.71
 Centerline Stations
 Sta. Sta.
 1117 1127
 Downstream Elevation = 642.72
 Centerline Stations
 Sta. Sta.
 1142 1152

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.668

INPUT
 Description: 4.669 4.672 Immediately Downstream - (TARCONT) Touhy Ave
 Reservoir Control
 Cross Section copied from Exit section. **
 HIGGINS CREEK** Overbanks refined per topo.

Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 455 655 455 654 855 654 1071 653.6 1089 647.6

1120	646.6	1139	640.2	1155	640.2	1196	653.9	1217	653.9
1273.6	654.39	1275	655						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 455 .065 1120 .04 1196 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1120 1196 19 19 19 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 455 1137 651.22 F
 1157 1275 651.22 F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.664

INPUT
 Description: 4.665 4.669 TAR8 ** HIGGINS CREEK**
 Original WSP2 Approach -
 Touhy Ave / Exit - TARCONT

Extended left and right per D4.
 Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
455	655	455	654	855	654	1071	653.6	1089	647.6
1120	646.6	1139	640.2	1155	640.2	1196	653.9	1217	653.9
1273.6	654.39	1275	655						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 455 .065 1120 .04 1196 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1120 1196 27 27 27 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 455 1132.5 651 F
 1161.5 1275 651 F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.659

INPUT
 Description: EOWB surveyed section D4, shifted 1075' rt. for comparison purposes. Overbanks refined per topo.

Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
455	655	455	654	855	654	905	653	965	652
1075	650.9	1090.2	650.55	1106.3	649.74	1113.4	648.29	1119.5	646.26
1120.8	643.56	1124.8	639.8	1168.3	638.42	1173.6	643.5	1176.4	645.87
1181.7	648.12	1190	650.46	1211.9	650.77	1219	650.79	1273.6	654.39
1275	655								

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 455 .065 1113.4 .04 1190 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1113.4 1190 103 103 103 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 455 1125 651 F
 1169 1275 651 F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.639

INPUT
 Description: 4.640 4.644 Immediately Upstream - Touhy Ave ** HIGGINS CREEK**
 Cross Section copied from Approach section. Extended left and right to match surveyed section D3.

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
550	656	550	654	1071	653.6	1089	647.6	1120	646.6
1139	640.2	1155	640.2	1196	653.9	1217	653.9	1220	655

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 550 .065 1120 .04 1196 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1120 1196 1 1 1 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 550 1122 652.52 F
 1172 1220 652.52 F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.638

INPUT

Description: EOWB surveyed section D3, shifted 1057' rt. for comparison purposes. Extended left along RR, which controls OT.

Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
550	656	550	654	1070.9	653.78	1087	651.23	1100.1	648.26
1111.4	645.77	1121.5	644.69	1124.8	643.64	1129.8	642.35	1138.8	641.45
1152.9	640.8	1156.2	641.52	1160.7	641.61	1171.3	643.04	1172.8	647.27
1200.6	653.59	1206.8	654.39	1220	655				

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 550 .065 1111.4 .04 1172.8 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1111.4 1172.8 143.4 143.4 143.4 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 550 1122 654.5 F
 1172 1220 656 F

CULVERT

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.626

INPUT

Description: 4.627 4.630 TOUHY AVE (RR controls) per survey, topo, and plan set.

Deck realigned to match section stationing.

Distance from Upstream XS = 10
 Deck/Roadway Width = 124.4
 Weir Coefficient = 2.7

Upstream Deck/Roadway Coordinates

num= 6

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
530		656			542		655			580		654.5		
815		655			1050		656			1250		656		

Upstream Bridge Cross Section Data

Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
550	656	550	654	1070.9	653.78	1087	651.23	1100.1	648.26
1111.4	645.77	1121.5	644.69	1124.8	643.64	1129.8	642.35	1138.8	641.45
1152.9	640.8	1156.2	641.52	1160.7	641.61	1171.3	643.04	1172.8	647.27
1200.6	653.59	1206.8	654.39	1220	655				

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 550 .065 1111.4 .04 1172.8 .065

Bank Sta: Left Right Coeff Contr. Expan.
 1111.4 1172.8 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 550 1122 654.5 F
 1172 1220 656 F

Downstream Deck/Roadway Coordinates

num= 6
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
 580 656 592 655 630 654.5
 865 655 1100 656 1300 656

Downstream Bridge Cross Section Data

Station Elevation Data num= 15
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 585 656 710 655 920 654 925 653 950 653
 955 654 1000 655 1050 655 1104 651.3 1165 650.8
 1185 643.1 1200 641.8 1213 641.8 1231 653.5 1240 655

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 585 .085 1165 .04 1231 .04

Bank Sta: Left Right Coeff Contr. Expan.
 1165 1231 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 585 1184 652 F
 1219 1240 652 F

Blocked Obstructions num= 1
 Sta L Sta R Elev
 945 1097 656

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins = 654.5
 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
 Culv # 1 Box 8 13.5
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 2 - Wingwall flared 90 or 15 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 10 124.4 .015 .015 0 .5 1

Number of Barrels = 2
 Upstream Elevation = 642.28

Centerline Stations
 Sta. Sta.
 1140 1155
 Downstream Elevation = 642.52
 Centerline Stations
 Sta. Sta.
 1194 1209

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.612

INPUT

Description: 4.613 4.617 Immediately Downstream - Touhy Ave ** HIGGINS CREEK** Cross Section copied from Exit section. Extended left for RR, which controls OT.

Station Elevation Data num= 15
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 585 656 710 655 920 654 925 653 950 653
 955 654 1000 655 1050 655 1104 651.3 1165 650.8
 1185 643.1 1200 641.8 1213 641.8 1231 653.5 1240 655

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 585 .085 1165 .04 1231 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1165 1231 10 10 10 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 585 1184 652 F
 1219 1240 652 F

Blocked Obstructions num= 1
 Sta L Sta R Elev

945 1097 656

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.611

INPUT

Description: EOWB surveyed section D2. Shifted 25' left for comparison purposes. Then shifted 1100' right. Extended left for RR, which controls OT.

Station Elevation Data		num=		18					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
585	656	710	655	920	654	925	653	950	653
955	654	1000	655	1100	655	1118.2	651.33	1168	650.03
1176.3	648.04	1192.5	642.93	1197.9	642.42	1204.4	642.03	1218.5	642.24
1226	642.36	1248	650.08	1261	654.64				

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
585	.085	1168	.04	1248	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1168	1248		119	119	.3	.5

Ineffective Flow		num=		2	
Sta L	Sta R	Elev	Permanent		
585	1179	651	F		
1235	1261	651	F		

Blocked Obstructions		num=		1	
Sta L	Sta R	Elev			
961	1100	656			

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.588

INPUT

Description: 4.589 4.592 Exit - Touhy Ave TAR7 ** HIGGINS CREEK** Extended left to allow roadway OT for 500-year flow. Shifted 1095' left for comparison purposes.

Station Elevation Data		num=		13					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-156	655	-116	654	-106	652	-98	652	-78	654
-50	655	0	655	34	654	70	650.8	90	643.1
105	641.8	123	641.8	152	653.5				

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
-156	.085	70	.04	152	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	70	152		98	98	.1	.3

Blocked Obstructions		num=		1	
Sta L	Sta R	Elev			
-156	-114	656			

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.569

INPUT

Description: EOWB surveyed section D1. Extended left to allow roadway OT for 500-year flow.

Station Elevation Data		num=		17					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-275	654.5	-217	653	-214	652	-206	651.8	-198	652
-180	655	31.4	654.86	45.3	653.08	84.5	642.23	93	641.26
95	640	99.8	639.09	106.3	639.34	117.5	638.78	122.8	641.42
135.3	644.26	169.9	655.01						

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
-275	.04	84.5	.04	122.8	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	84.5	122.8		144	144	.1	.3

Blocked Obstructions num= 1
 Sta L Sta R Elev
 -275 -217 656

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.542

INPUT
 Description: 4.543 4.543 Approach - Mt Prospect Rd TAR6
 Extended left to

allow roadway OT for 500-year flow.
 Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-425	655	-425	653	-382	652	-366	652	-358	651.4
-335	655	0	655.4	45	639.1	80	639.1	125	655.4

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-425	.04	45	.04	80	.04

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

45	80	23	23	23	.1	.3
----	----	----	----	----	----	----

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.537

INPUT
 Description: 4.538 4.539 Immediately Upstream - Mt Prospect Rd
 Cross Section

copied from Approach section. Extended left to allow roadway OT
 for 500-year flow.
 Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1200	652	-1040	652	-775	653	-502	655	-415	655
-400	653	-359	652	-313	651	-299	649	-286	648
-270	649	-248	654	-142	655	-120	655	-86	652
-53	652	-30	654	0	655.4	45	639.1	80	639.1
125	655.4								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-1200	.04	45	.04	80	.04

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

45	80	174	174	174	.3	.5
----	----	-----	-----	-----	----	----

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
-1200	-307	656	F
-265	46.5	656	F
76.5	125	656	F

MULTIPLE OPENING

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.521

INPUT
 Description: 4.522 4.522 Mt. Prospect Road - PROPOSED 12/11
 Distance from Upstream XS = 10
 Deck/Roadway Width = 154
 Weir Coefficient = 2.7

Upstream Deck/Roadway Coordinates num= 8

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-1200	656.03		-1100	656.61		-722	653.98	
-422	655.97		-222	657.64		-22	659.31	
78	660.15		200	660				

Upstream Bridge Cross Section Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1200	652	-1040	652	-775	653	-502	655	-415	655
-400	653	-359	652	-313	651	-299	649	-286	648
-270	649	-248	654	-142	655	-120	655	-86	652

-53 652 -30 654 0 655.4 45 639.1 80 639.1
125 655.4

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
-1200 .04 45 .04 80 .04

Bank Sta: Left Right Coeff Contr. Expan.
45 80 .3 .5

Ineffective Flow num= 3
Sta L Sta R Elev Permanent
-1200 -307 656 F
-265 46.5 656 F
76.5 125 656 F

Downstream Deck/Roadway Coordinates
num= 8
Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
-1200 656.03 -1100 656.61 -722 653.98
-422 655.97 -222 657.64 -22 659.31
78 660.15 200 660

Downstream Bridge Cross Section Data
Station Elevation Data num= 19
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
-1100 650 -800 650 -735 651 -674 654 -633 655
-582 655 -475 654 -375 652 -288 650 -269 649
-252 648 -235 649 -162 654 -125 654 -100 653
0 652.8 45 637.5 80 637.5 125 652.8

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
-1100 .04 45 .04 80 .04

Bank Sta: Left Right Coeff Contr. Expan.
45 80 .3 .5

Ineffective Flow num= 3
Sta L Sta R Elev Permanent
-1100 -265 653 F
-239 46.5 653 F
78.5 125 653 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 = .95
Elevation at which weir flow begins = 654
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

Number of Culverts = 2

Culvert Name Shape Rise Span
MtProsp 36" Box 3.5 10
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
10 154 .012 .012 0 .4 1

Number of Barrels = 2
Upstream Elevation = 648.1
Centerline Stations

Sta. Sta.
 -292 -280
 Downstream Elevation = 648
 Centerline Stations
 Sta. Sta.
 -258 -246

Culvert Name Shape Rise Span
 MtProsp Higg Box 8 12
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 10 154 .015 .015 0 .4 1
 Upstream Elevation = 638.6
 Centerline Station = 62.5
 Downstream Elevation = 637.09
 Centerline Station = 62.5

Multiple Opening Stagnation Limits

Opening Type	Upstream		Downstream	
	Sta. Left	Sta. Right	Sta. Left	Sta. Right
Culvert Group	-1200	-120	-1100	-125
Culvert Group	-248	125	-235	125

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.505

INPUT
 Description: 4.506 4.506 Immediately Downstream - RELOCATED Mt Prospect Rd

Cross Section copied from Exit section. Extended left to allow roadway OT for 500-year flow.

Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1100	650	-800	650	-735	651	-674	654	-633	655
-582	655	-475	654	-375	652	-288	650	-269	649
-252	648	-235	649	-162	654	-125	654	-100	653
0	652.8	45	637.5	80	637.5	125	652.8		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-1100	.04	45	.04	80	.04

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

45	80	103	103	103	.3	.5
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Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
-1100	-265	653	F
-239	46.5	653	F
78.5	125	653	F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.485

INPUT
 Description: 4.486 4.486 Exit - Mt Prospect Rd TAR4 revised per current topo reflecting relocated Willow Creek.

Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	652	92	649	118	648	144	649	160	650
190	652	217	653	237	653	295	637.5	394	637.5
452	653								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.075	237	.04	452	.04

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

237	452	0	0	0	.1	.3
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CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 25

INPUT

Description: River Mile or Station US5
 Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.22	11.547	671.72	80.829	670.72	84.293	669.72	92.376	667.72
103.923	667.72	113.161	669.72	121.244	670.72	132.791	671.72	138.564	672.22

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	84.293	.035	113.161	.035

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

84.293	113.161	100	100	100	.1	.3
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CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 24

INPUT

Description: River Mile or Station US4
 Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	674.72	12	671.72	45	671.72	55	666.72	65	666.72
75	670.72	78	671.72	83	672.22				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	45	.035	75	.055

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

45	75	200	200	200	.1	.3
----	----	-----	-----	-----	----	----

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 23

INPUT

Description: River Mile or Station US3
 Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	674.72	9	671.72	19	671.72	30	672.72	39	671.72
50	667.72	65	667.72	75	670.72	78	671.72		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	39	.035	75	.055

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

39	75	200	200	200	.1	.3
----	----	-----	-----	-----	----	----

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 22

INPUT

Description: River Mile or Station US2
 Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	674.72	60	673.72	75	669.72	80	664.72	105	664.72
116	670.72	120	671.72						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	75	.035	116	.055

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

75	116	300	300	300	.1	.3
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CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 21

INPUT

Description: River Mile or Station US1

Station Elevation Data num= 8
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 673.72 10 671.72 70 670.72 80 669.72 95 664.72
105 664.72 126 670.72 130 671.72

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .055 80 .035 126 .055

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
80 126 100 100 100 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 20

INPUT

Description: River Mile or Station EGV8

Station Elevation Data num= 9
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 672.72 8 671.72 40 670.72 72 669.72 87 664.72
95 664.72 117 668.72 120 669.72 134 670.72

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .055 72 .035 117 .055

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
72 117 100 100 100 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 19

INPUT

Description: River Mile or Station EGV7

Station Elevation Data num= 12
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 672.72 8 671.72 38 670.72 61 669.72 77 667.72
89 665.72 92 664.42 94 664.72 107 667.72 160 668.72
180 669.72 245 670.72

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .055 61 .035 107 .055

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
61 107 100 100 100 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 18

INPUT

Description: River Mile or Station EGV6

Station Elevation Data num= 9
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
40 670.72 75 669.72 87 664.72 92 664.22 97 664.72
135 667.72 175 668.72 192 669.72 219 670.72

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
40 .04 75 .035 135 .055

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
75 135 100 100 100 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 17

INPUT

Description: River Mile or Station EGV5

Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	673.72	12	670.72	81	669.72	92	664.12	100	664.12
104	664.72	119	666.72	135	667.72	159	668.72	215	669.72
235	670.72								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	81	.035	104	.035

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

81	104	100	100	100	.1	.3
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CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 16

INPUT

Description: River Mile or Station EGV4

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.72	15	669.72	50	668.72	84	667.72	92	664.02
101	664.02	120	665.72	130	666.72	136	667.72	145	668.72
190	669.72	265	670.72						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	84	.035	130	.035

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

84	130	100	100	100	.1	.3
----	-----	-----	-----	-----	----	----

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 15

INPUT

Description: River Mile or Station EGV3

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.22	12	669.72	15	668.72	90	667.72	101	663.72
107	663.72	118	667.72	124	668.72	139	669.72	169	670.72

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	90	.035	118	.055

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

90	118	100	100	100	.1	.3
----	-----	-----	-----	-----	----	----

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 14

INPUT

Description: River Mile or Station EGV2

Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.22	15	669.72	18	668.72	78	667.72	90	663.72
102	663.72	112	667.72	129	672.72				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	15	.035	112	.055

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

15	112	100	100	100	.1	.3
----	-----	-----	-----	-----	----	----

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 13

INPUT

Description: River Mile or Station EGV1
Station Elevation Data num= 7
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 671.72 12 669.72 25 663.72 39 663.72 47 666.72
55 667.72 75 668.22

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .04 12 .035 55 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
12 55 280 280 280 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 12

INPUT

Description: River Mile or Station 281C
Station Elevation Data num= 15
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 669.72 8 668.72 16 667.72 23 666.72 37 665.72
39 664.72 40 663.72 41 662.72 56 662.72 58 663.72
60 664.72 62 665.72 64 666.72 66 667.72 68 668.72

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .04 16 .035 66 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
16 66 140 140 140 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 11

INPUT

Description: River Mile or Station 281CC
Station Elevation Data num= 12
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
955 672.72 975 671.72 980 670.72 983 669.72 992 664.72
994 663.72 1000 663.02 1005 663.72 1008 664.72 1018 669.72
1022 670.72 1028 671.72

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
955 .04 983 .035 1018 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
983 1018 140 140 140 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 10

INPUT

Description: River Mile or Station 281B
Station Elevation Data num= 12
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
779 671.72 840 670.72 845 669.72 852 664.72 857 663.72
862 662.72 869 663.72 873 664.72 882 669.72 890 670.72
1015 670.72 1100 670.92

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
779 .04 845 .035 882 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
882 1100 140 140 140 .1 .3

845 882 138 138 138 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 9

INPUT

Description: River Mile or Station 281BB

Station	Elevation	Data	num=	11					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
960	670.72	976	669.72	992	664.72	995	663.72	997	662.72
1000	662.22	1008	662.72	1010	663.72	1015	664.72	1030	669.72
1040	670.72								

Manning's n	Values	num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
960	.04	976	.035	1030	.04

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	976	1030		140	140	140		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 8

INPUT

Description: River Mile or Station 281

Station	Elevation	Data	num=	13					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
700	672.42	800	671.72	878	670.42	886	667.92	896	662.12
899	661.32	900	661.02	901	661.32	915	662.42	943	669.92
1000	669.52	1100	669.22	1200	669.22				

Manning's n	Values	num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
700	.035	878	.042	943	.04

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	878	943		68	68	68		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 7

INPUT

Description: River Mile or Station 281X

Station	Elevation	Data	num=	14					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
990	668.72	1026	667.72	1033	666.72	1042	665.72	1055	664.72
1058	663.72	1060	662.72	1070	661.02	1075	662.72	1080	663.72
1082	664.72	1085	665.72	1095	667.72	1102	668.72		

Manning's n	Values	num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
990	.04	1033	.04	1095	.04

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	1033	1095		91	91	91		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 6.001

INPUT

Description: River Mile or Station 281X used just upstream of crossing.

Station	Elevation	Data	num=	14					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
990	668.72	1026	667.72	1033	666.72	1042	665.72	1055	664.72
1058	663.72	1060	662.72	1070	661.02	1075	662.72	1080	663.72
1082	664.72	1085	665.72	1095	667.72	1102	668.72		

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

990 .04 1033 .04 1095 .04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
1033	1095	72.5	72.5	72.5	.3	.5	
Ineffective Flow	num=	2					
Sta L	Sta R	Elev	Permanent				
990	1058	666.72	F				
1082	1102	666.72	F				

CULVERT

RIVER: HIGGINS TRIB A
REACH: CUP RS: 6

INPUT

Description: Culvert(s) @ 281A
Distance from Upstream XS = 1
Deck/Roadway Width = 70.5
Weir Coefficient = 2.7

Upstream Deck/Roadway Coordinates	num=	4							
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	
990	667.02	-.28	1090	666.72	-.28	1190	666.72	-.28	
1290	666.92	-.28							

Upstream Bridge Cross Section Data

Station Elevation Data	num=	14							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
990	668.72	1026	667.72	1033	666.72	1042	665.72	1055	664.72
1058	663.72	1060	662.72	1070	661.02	1075	662.72	1080	663.72
1082	664.72	1085	665.72	1095	667.72	1102	668.72		

Manning's n Values	num=	3			
Sta	n Val	Sta	n Val	Sta	n Val
990	.04	1033	.04	1095	.04

Bank Sta: Left	Right	Coeff	Contr.	Expan.
1033	1095	.3	.5	
Ineffective Flow	num=	2		
Sta L	Sta R	Elev	Permanent	
990	1058	666.72	F	
1082	1102	666.72	F	

Downstream Deck/Roadway Coordinates	num=	4							
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	
799	667.02	-.28	900	666.72	-.28	1000	666.72	-.28	
1100	666.92	-.28							

Downstream Bridge Cross Section Data

Station Elevation Data	num=	12							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
799	675.72	800	670.42	878	669.12	886	666.62	896	660.82
899	660.02	900	659.72	901	660.02	915	661.12	943	669.62
1000	668.22	1001	675.72						

Manning's n Values	num=	3			
Sta	n Val	Sta	n Val	Sta	n Val
799	.04	878	.045	943	.04

Bank Sta: Left	Right	Coeff	Contr.	Expan.
878	943	.3	.5	
Ineffective Flow	num=	2		
Sta L	Sta R	Elev	Permanent	
799	896	666.72	F	
919	1001	666.72	F	

Upstream Embankment side slope = 3.362 horiz. to 1.0 vertical
Downstream Embankment side slope = 3.362 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 666.72
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
Culv # 1	Box	4.85	15.8
FHWA Chart # 8 - flared wingwalls			

FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 1 70.5 .012 .012 0 .4 1
 Upstream Elevation = 660.72
 Centerline Station = 1070
 Downstream Elevation = 660.4
 Centerline Station = 907.9

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 5.999

INPUT

Description: River Mile or Station 281AA used just downstream of crossing.

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
799	675.72	800	670.42	878	669.12	886	666.62	896	660.82
899	660.02	900	659.72	901	660.02	915	661.12	943	669.62
1000	668.22	1001	675.72						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
799	.04	878	.045	943	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 878 943 149 149 149 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
799	896	666.72	F
919	1001	666.72	F

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 5

INPUT

Description: River Mile or Station 281AA. Reach lengths adjusted by -350' to match 2008 FIS profile length.

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
799	675.72	800	670.42	878	669.12	886	666.62	896	660.82
899	660.02	900	659.72	901	660.02	915	661.12	943	669.62
1000	668.22	1001	675.72						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
799	.04	878	.045	943	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 878 943 1505 1505 1505 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 4.1

INPUT

Description: EOWB surveyed section C7. Shifted 73' left for comparison. Uses n-values to match FIS XS 4.

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
61	671.59	95.5	659.27	161.9	656.84	245.5	655.81	253.3	652.52
259.1	651.98	263.5	652.16	265.9	654.01	273.7	655.63	292.5	655.71
322.2	656.23	340.5	661.74						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
61	.045	245.5	.035	273.7	.045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 245.5 273.7 335 260 175 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 3.8

INPUT

Description: Proposed condition. EOWB surveyed section C6. Extended left using 1' topo.

Station Elevation Data		num= 18		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-80	662	-54	657	-48	657	-36	660	-10	657		
0	656.18	27.6	656.11	51.9	656.07	75.8	655.37	106.8	654.87		
143.3	655.08	146.2	652.54	149.8	651.03	176	652.81	182.5	654.73		
192.7	658.58	202	662.51	210.2	662.67						

Manning's n Values		num= 3		Sta n Val		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-80	.04	143.3	.035	182.5	.04				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	143.3	182.5		460	380	340	
Left Levee		Station=		-36	Elevation=	660	
						.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 3.5

INPUT

Description: Proposed condition. EOWB surveyed section C5. Extended left using 1' topo.

Station Elevation Data		num= 17		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-12	662	12	654	16	654	20	655.2	27.6	655		
63.4	653.91	93.2	654.36	96.1	652.27	101.3	651.09	115.2	651.3		
117.5	652.15	120.6	653.53	123.5	654.43	130.5	656.59	143.5	661.63		
146.3	662.05	148.8	662.11								

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-12	.04	93.2	.035	123.5	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	93.2	123.5		490	490	490	
Left Levee		Station=		20	Elevation=	655.2	
						.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 3.1

INPUT

Description: Proposed condition. EOWB surveyed section C4. Extended left using 1' topo, skewed 30 deg. Shifted right 1730' for comparison to d/s.

Station Elevation Data		num= 12		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1740	661	1765.5	652.5	1769.5	652.5	1773.56	653.95	1777.03	652.53		
1786.12	651.27	1796.25	650.91	1801.53	652.61	1805.34	653.79	1812.53	656.68		
1821.71	660.42	1824.92	661.02								

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1740	.04	1773.56	.035	1805.34	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1773.56	1805.34		50	50	50	
Skew Angle =							
						.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 3.01

INPUT

Description: Cross Section interpolated upstream of proposed culvert extension. Overbanks corrected using 1' topo.

Station Elevation Data		num= 12		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1673	661	1707	656	1721	655	1775	654	1779	653		

1784	650.5	1792	650.5	1797	653	1800	654	1808	655
1825	660	1837	662						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1673 .04 1775 .04 1800 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1775 1800 330 330 330 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 1673 1770 664 F
 1806 1837 664 F

CULVERT

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 2

INPUT

Description: Culvert(s) @ 280A
 Distance from Upstream XS = 30
 Deck/Roadway Width = 295
 Weir Coefficient = 2.7
 Upstream Deck/Roadway Coordinates

num= 5											
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	664.7		1694	663.5		1794	663.6				
1894	663.7		2410	665.2							

Upstream Bridge Cross Section Data

Station Elevation Data num= 12									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1673	661	1707	656	1721	655	1775	654	1779	653
1784	650.5	1792	650.5	1797	653	1800	654	1808	655
1825	660	1837	662						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1673 .04 1775 .04 1800 .04

Bank Sta: Left Right Coeff Contr. Expan.
 1775 1800 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 1673 1770 664 F
 1806 1837 664 F

Downstream Deck/Roadway Coordinates

num= 5											
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	664.7		1694	663.5		1794	663.6				
1894	663.7		2410	665.2							

Downstream Bridge Cross Section Data

Station Elevation Data num= 13									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1499	665.72	1500	655.02	1600	654.82	1700	654.32	1777	655.02
1784	651.22	1787	650.62	1794	650.22	1797	651.22	1802	653.42
1900	653.32	2000	654.42	2001	665.72				

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1499 .05 1777 .05 1802 .05

Bank Sta: Left Right Coeff Contr. Expan.
 1777 1802 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 1499 1776 662.5 F
 1804 2001 662.5 F

Upstream Embankment side slope = 2 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins = 663.52
 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
 Culv # 1 Box 9 12
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 5 320 .013 .03 1 .4 1
 Number of Barrels = 2
 Upstream Elevation = 649.5
 Centerline Stations
 Sta. Sta.
 1781 1795
 Downstream Elevation = 649
 Centerline Stations
 Sta. Sta.
 1783 1797

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 1

INPUT

Description: Cross Section 1 from Tributary A LOMR '07 = WSP2 XS 280AA

Station Elevation Data num= 13
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 1499 665.72 1500 655.02 1600 654.82 1700 654.32 1777 655.02
 1784 651.22 1787 650.62 1794 650.22 1797 651.22 1802 653.42
 1900 653.32 2000 654.42 2001 665.72

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1499 .05 1777 .05 1802 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1777 1802 0 0 0 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 1499 1776 662.5 F
 1804 2001 662.5 F

SUMMARY OF MANNING'S N VALUES

River:HIGGINS CK

Reach	River Sta.	n1	n2	n3	n4	n5
2	6.443	.065	.065	.075		
2	6.404	.065	.065	.075		
2	6.353	.065	.065	.075		
2	6.287	.065	.065	.075		
MAINSTEM	6.245	.07	.02	.07		
MAINSTEM	6.231	.07	.02	.07		
MAINSTEM	6.179	.07	.02	.045		
MAINSTEM	6.069	.07	.02	.07		
MAINSTEM	6.035	.045	.02	.045		
MAINSTEM	6.034	.045	.013	.045		
MAINSTEM	6.033	.045	.013	.045		
MAINSTEM	6.032	.045	.029	.045		
MAINSTEM	6.021	.04	.029	.04		
MAINSTEM	6.006	.06	.035	.06		
MAINSTEM	5.9994*	.06	.035	.06		
MAINSTEM	5.9950	.06	.035	.06		
MAINSTEM	5.981	Culvert				
MAINSTEM	5.972	.06	.035	.06		
MAINSTEM	5.959	.06	.035	.06		
MAINSTEM	5.950	.06	.035	.06		
MAINSTEM	5.914	.06	.035	.06		
MAINSTEM	5.911	Culvert				
MAINSTEM	5.899	.06	.035	.06		
MAINSTEM	5.86375*	.06	.035	.06		
MAINSTEM	5.8285*	.06	.035	.06		
MAINSTEM	5.79325*	.06	.035	.06		
MAINSTEM	5.758	.06	.035	.06		
MAINSTEM	5.721	Culvert				
MAINSTEM	5.683	.06	.035	.06		

MAINSTEM	5.650	.06	.035	.06		
MAINSTEM	5.649	.06	.035	.06		
MAINSTEM	5.593	.06	.035	.06		
MAINSTEM	5.558	.06	.035	.06		
MAINSTEM	5.500	.06	.035	.06		
MAINSTEM	5.496	.06	.035	.06		
MAINSTEM	5.409	.06	.035	.06		
MAINSTEM	5.408	.06	.035	.06		
MAINSTEM	5.394	.06	.035	.06		
MAINSTEM	5.364					
		Bridge				
MAINSTEM	5.335	.075	.06	.075		
MAINSTEM	5.324	.05	.035	.05		
MAINSTEM	5.289	.05	.035	.05		
MAINSTEM	5.256	.05	.035	.05		
MAINSTEM	5.236	.05	.035	.05		
MAINSTEM	5.184	.05	.035	.05	.03	
MAINSTEM	5.166	.05	.035	.05	.03	
MAINSTEM	5.144	.05	.035	.05	.03	
MAINSTEM	5.094	.05	.035	.05	.03	
MAINSTEM	5.049	.05	.035	.05	.03	
MAINSTEM	5.045	.05	.035	.05	.03	
MAINSTEM	5.020	.05	.035	.05	.03	
MAINSTEM	5.012					
		Culvert				
MAINSTEM	5.005	.03	.05	.035	.05	.03
MAINSTEM	4.992	.05	.035	.05	.03	
MAINSTEM	4.980	.03	.05	.035	.05	.03
MAINSTEM	4.966	.03	.05	.035	.05	.03
MAINSTEM	4.944	.03	.05	.035	.05	.03
MAINSTEM	4.928	.05	.03	.035	.05	.03
MAINSTEM	4.925	.05	.03	.035	.05	.03
MAINSTEM	4.915	.065	.065	.04	.065	
MAINSTEM	4.885	.065	.065	.04	.065	
MAINSTEM	4.866	.065	.065	.04	.065	
MAINSTEM	4.847	.065	.065	.04	.065	
MAINSTEM	4.828	.065	.065	.04	.065	
MAINSTEM	4.801	.065	.065	.04	.065	
MAINSTEM	4.783	.065	.065	.04	.065	
MAINSTEM	4.774	.065	.065	.04	.065	
MAINSTEM	4.771	.065	.065	.04	.065	
MAINSTEM	4.760	.065	.065	.04	.065	
MAINSTEM	4.742	.065	.065	.04	.065	
MAINSTEM	4.713	.065	.065	.04	.065	
MAINSTEM	4.698	.065	.065	.04	.065	
MAINSTEM	4.694	.065	.065	.04	.065	
MAINSTEM	4.683	.065	.065	.04	.065	
MAINSTEM	4.678	.065	.065	.04	.065	
MAINSTEM	4.673					
		Culvert				
MAINSTEM	4.668	.065	.04	.065		
MAINSTEM	4.664	.065	.04	.065		
MAINSTEM	4.659	.065	.04	.065		
MAINSTEM	4.639	.065	.04	.065		
MAINSTEM	4.638	.065	.04	.065		
MAINSTEM	4.626					
		Culvert				
MAINSTEM	4.612	.085	.04	.04		
MAINSTEM	4.611	.085	.04	.04		
MAINSTEM	4.588	.085	.04	.04		
MAINSTEM	4.569	.04	.04	.04		
MAINSTEM	4.542	.04	.04	.04		
MAINSTEM	4.537	.04	.04	.04		
MAINSTEM	4.521					
		Mult Open				
MAINSTEM	4.505	.04	.04	.04		
MAINSTEM	4.485	.075	.04	.04		

River:HIGGINS TRIB A

Reach	River Sta.	n1	n2	n3
CUP	25	.055	.035	.035
CUP	24	.055	.035	.055
CUP	23	.055	.035	.055
CUP	22	.055	.035	.055
CUP	21	.055	.035	.055
CUP	20	.055	.035	.055
CUP	19	.055	.035	.055
CUP	18	.04	.035	.055
CUP	17	.055	.035	.035
CUP	16	.055	.035	.035
CUP	15	.055	.035	.055
CUP	14	.055	.035	.055
CUP	13	.04	.035	.035

CUP	12	.04	.035	.04
CUP	11	.04	.035	.04
CUP	10	.04	.035	.04
CUP	9	.04	.035	.04
CUP	8	.035	.042	.04
CUP	7	.04	.04	.04
CUP	6.001	.04	.04	.04
CUP	6	Culvert		
CUP	5.999	.04	.045	.04
CUP	5	.04	.045	.04
CUP	4.1	.045	.035	.045
CUP	3.8	.04	.035	.04
CUP	3.5	.04	.035	.04
CUP	3.1	.04	.035	.04
CUP	3.01	.04	.04	.04
CUP	2	Culvert		
CUP	1	.05	.05	.05

SUMMARY OF REACH LENGTHS

River: HIGGINS CK

Reach	River Sta.	Left	Channel	Right
2	6.443	204	204	204
2	6.404	270	270	270
2	6.353	350	350	350
2	6.287	0	0	0
MAINSTEM	6.245	75	75	75
MAINSTEM	6.231	274	274	274
MAINSTEM	6.179	575	575	575
MAINSTEM	6.069	180	180	180
MAINSTEM	6.035	6	6	6
MAINSTEM	6.034	7	7	7
MAINSTEM	6.033	1	1	1
MAINSTEM	6.032	62	62	62
MAINSTEM	6.021	80	80	80
MAINSTEM	6.006	35	35	35
MAINSTEM	5.9994*	35	23	20
MAINSTEM	5.9950	130	125	120
MAINSTEM	5.981	Culvert		
MAINSTEM	5.972	66	66	66
MAINSTEM	5.959	50	50	50
MAINSTEM	5.950	189	189	189
MAINSTEM	5.914	78	78	78
MAINSTEM	5.911	Culvert		
MAINSTEM	5.899	186	186	186
MAINSTEM	5.86375*	186	186	186
MAINSTEM	5.8285*	186	186	186
MAINSTEM	5.79325*	186	186	186
MAINSTEM	5.758	395	395	395
MAINSTEM	5.721	Culvert		
MAINSTEM	5.683	172	172	172
MAINSTEM	5.650	5	5	5
MAINSTEM	5.649	294	294	294
MAINSTEM	5.593	188	188	188
MAINSTEM	5.558	308	308	308
MAINSTEM	5.500	21	21	21
MAINSTEM	5.496	458	458	458
MAINSTEM	5.409	6	6	6
MAINSTEM	5.408	72.1	72.1	72.1
MAINSTEM	5.394	323	323	323
MAINSTEM	5.364	Bridge		
MAINSTEM	5.335	50	50	50
MAINSTEM	5.324	184	184	184
MAINSTEM	5.289	173	173	173
MAINSTEM	5.256	108	108	108
MAINSTEM	5.236	272	272	272
MAINSTEM	5.184	95	95	95
MAINSTEM	5.166	117	117	117
MAINSTEM	5.144	266	266	266
MAINSTEM	5.094	237	237	237
MAINSTEM	5.049	22	22	22
MAINSTEM	5.045	130	130	130
MAINSTEM	5.020	80	80	80
MAINSTEM	5.012	Culvert		
MAINSTEM	5.005	69	69	69
MAINSTEM	4.992	62	62	62

MAINSTEM	4.980	73	73	73
MAINSTEM	4.966	115	115	115
MAINSTEM	4.944	86	86	86
MAINSTEM	4.928	14	14	14
MAINSTEM	4.925	55	55	55
MAINSTEM	4.915	159	159	159
MAINSTEM	4.885	101	101	101
MAINSTEM	4.866	100	100	100
MAINSTEM	4.847	101	101	101
MAINSTEM	4.828	139	139	139
MAINSTEM	4.801	99	99	99
MAINSTEM	4.783	43	43	43
MAINSTEM	4.774	18	18	18
MAINSTEM	4.771	57	57	57
MAINSTEM	4.760	95	95	95
MAINSTEM	4.742	156	156	156
MAINSTEM	4.713	80	80	80
MAINSTEM	4.698	20	20	20
MAINSTEM	4.694	57	57	57
MAINSTEM	4.683	26	26	26
MAINSTEM	4.678	55	55	55
MAINSTEM	4.673	Culvert		
MAINSTEM	4.668	19	19	19
MAINSTEM	4.664	27	27	27
MAINSTEM	4.659	103	103	103
MAINSTEM	4.639	1	1	1
MAINSTEM	4.638	143.4	143.4	143.4
MAINSTEM	4.626	Culvert		
MAINSTEM	4.612	10	10	10
MAINSTEM	4.611	119	119	119
MAINSTEM	4.588	98	98	98
MAINSTEM	4.569	144	144	144
MAINSTEM	4.542	23	23	23
MAINSTEM	4.537	174	174	174
MAINSTEM	4.521	Mult Open		
MAINSTEM	4.505	103	103	103
MAINSTEM	4.485	0	0	0

River: HIGGINS TRIB A

Reach	River Sta.	Left	Channel	Right
CUP	25	100	100	100
CUP	24	200	200	200
CUP	23	200	200	200
CUP	22	300	300	300
CUP	21	100	100	100
CUP	20	100	100	100
CUP	19	100	100	100
CUP	18	100	100	100
CUP	17	100	100	100
CUP	16	100	100	100
CUP	15	100	100	100
CUP	14	100	100	100
CUP	13	280	280	280
CUP	12	140	140	140
CUP	11	140	140	140
CUP	10	138	138	138
CUP	9	140	140	140
CUP	8	68	68	68
CUP	7	91	91	91
CUP	6.001	72.5	72.5	72.5
CUP	6	Culvert		
CUP	5.999	149	149	149
CUP	5	1505	1505	1505
CUP	4.1	335	260	175
CUP	3.8	460	380	340
CUP	3.5	490	490	490
CUP	3.1	50	50	50
CUP	3.01	330	330	330
CUP	2	Culvert		
CUP	1	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: HIGGINS CK

Reach	River Sta.	Contr.	Expan.
2	6.443	.1	.3
2	6.404	.1	.3
2	6.353	.1	.3
2	6.287	.1	.3
MAINSTEM	6.245	.1	.3
MAINSTEM	6.231	.1	.3
MAINSTEM	6.179	.1	.3
MAINSTEM	6.069	.1	.3
MAINSTEM	6.035	.1	.3
MAINSTEM	6.034	.1	.3
MAINSTEM	6.033	.1	.3
MAINSTEM	6.032	.1	.3
MAINSTEM	6.021	.1	.3
MAINSTEM	6.006	.3	.5
MAINSTEM	5.9994*	.3	.5
MAINSTEM	5.9950	.3	.5
MAINSTEM	5.981	Culvert	
MAINSTEM	5.972	.3	.5
MAINSTEM	5.959	.1	.3
MAINSTEM	5.950	.1	.3
MAINSTEM	5.914	.3	.5
MAINSTEM	5.911	Culvert	
MAINSTEM	5.899	.3	.5
MAINSTEM	5.86375*	.3	.5
MAINSTEM	5.8285*	.3	.5
MAINSTEM	5.79325*	.3	.5
MAINSTEM	5.758	.3	.5
MAINSTEM	5.721	Culvert	
MAINSTEM	5.683	.3	.5
MAINSTEM	5.650	.1	.3
MAINSTEM	5.649	.1	.3
MAINSTEM	5.593	.1	.3
MAINSTEM	5.558	.1	.3
MAINSTEM	5.500	.1	.3
MAINSTEM	5.496	.1	.3
MAINSTEM	5.409	.1	.3
MAINSTEM	5.408	.1	.3
MAINSTEM	5.394	.3	.5
MAINSTEM	5.364	Bridge	
MAINSTEM	5.335	.3	.5
MAINSTEM	5.324	.1	.3
MAINSTEM	5.289	.1	.3
MAINSTEM	5.256	.1	.3
MAINSTEM	5.236	.1	.3
MAINSTEM	5.184	.1	.3
MAINSTEM	5.166	.1	.3
MAINSTEM	5.144	.1	.3
MAINSTEM	5.094	.1	.3
MAINSTEM	5.049	.1	.3
MAINSTEM	5.045	.3	.5
MAINSTEM	5.020	.3	.5
MAINSTEM	5.012	Culvert	
MAINSTEM	5.005	.3	.5
MAINSTEM	4.992	.1	.3
MAINSTEM	4.980	.1	.3
MAINSTEM	4.966	.1	.3
MAINSTEM	4.944	.1	.3
MAINSTEM	4.928	.1	.3
MAINSTEM	4.925	.1	.3
MAINSTEM	4.915	.1	.3
MAINSTEM	4.885	.1	.3
MAINSTEM	4.866	.1	.3
MAINSTEM	4.847	.1	.3
MAINSTEM	4.828	.1	.3
MAINSTEM	4.801	.1	.3
MAINSTEM	4.783	.1	.3
MAINSTEM	4.774	.1	.3
MAINSTEM	4.771	.1	.3
MAINSTEM	4.760	.1	.3
MAINSTEM	4.742	.1	.3
MAINSTEM	4.713	.1	.3
MAINSTEM	4.698	.1	.3
MAINSTEM	4.694	.1	.3
MAINSTEM	4.683	.3	.5
MAINSTEM	4.678	.3	.5
MAINSTEM	4.673	Culvert	
MAINSTEM	4.668	.3	.5
MAINSTEM	4.664	.3	.5
MAINSTEM	4.659	.3	.5

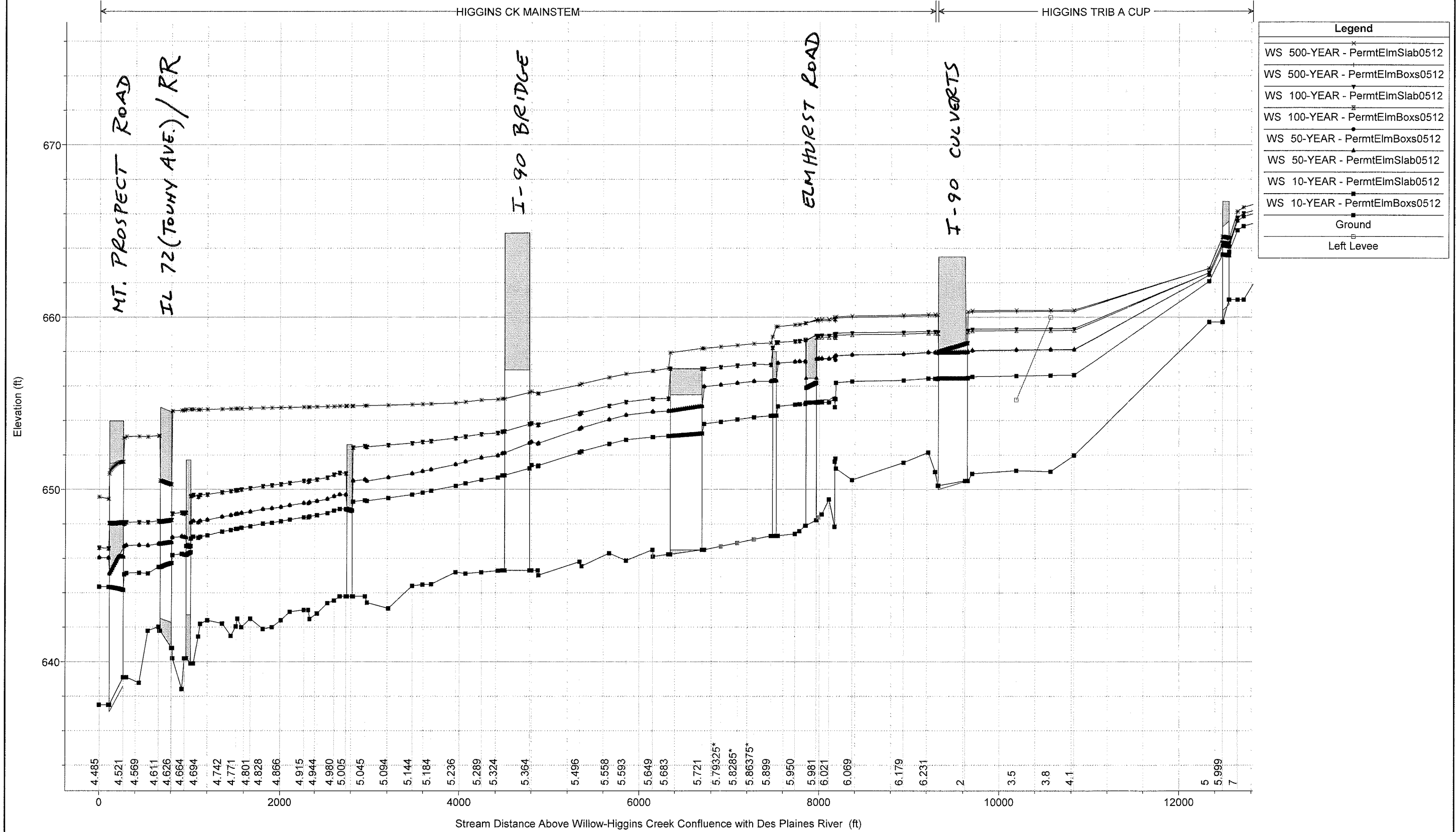
MAINSTEM	4.639	.3	.5
MAINSTEM	4.638	.3	.5
MAINSTEM	4.626	Culvert	
MAINSTEM	4.612	.3	.5
MAINSTEM	4.611	.3	.5
MAINSTEM	4.588	.1	.3
MAINSTEM	4.569	.1	.3
MAINSTEM	4.542	.1	.3
MAINSTEM	4.537	.3	.5
MAINSTEM	4.521	Mult Open	
MAINSTEM	4.505	.3	.5
MAINSTEM	4.485	.1	.3

River: HIGGINS TRIB A

Reach	River Sta.	Contr.	Expan.
CUP	25	.1	.3
CUP	24	.1	.3
CUP	23	.1	.3
CUP	22	.1	.3
CUP	21	.1	.3
CUP	20	.1	.3
CUP	19	.1	.3
CUP	18	.1	.3
CUP	17	.1	.3
CUP	16	.1	.3
CUP	15	.1	.3
CUP	14	.1	.3
CUP	13	.1	.3
CUP	12	.1	.3
CUP	11	.1	.3
CUP	10	.1	.3
CUP	9	.1	.3
CUP	8	.1	.3
CUP	7	.1	.3
CUP	6.001	.3	.5
CUP	6	Culvert	
CUP	5.999	.3	.5
CUP	5	.1	.3
CUP	4.1	.1	.3
CUP	3.8	.1	.3
CUP	3.5	.1	.3
CUP	3.1	.1	.3
CUP	3.01	.3	.5
CUP	2	Culvert	
CUP	1	.3	.5

PROPOSED CONDITION

PERMIT MODEL RESULTS



PERMIT
 PROP. PROFILES

PERMIT PROP. COND,
ELMHURST ROAD w/ BOX CULVERTS

HEC-RAS Plan: PermiElimBoxes0712

River	Reach	River Sta	Profile	Q. Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	25	10-YEAR	222.00	667.72	670.82		670.95	0.001495	2.99	79.46	48.43	0.33
HIGGINS TRIB A	CUP	25	50-YEAR	308.00	667.72	671.35		671.51	0.001355	3.24	116.99	91.72	0.33
HIGGINS TRIB A	CUP	25	100-YEAR	342.00	667.72	671.55		671.70	0.001280	3.28	136.23	107.35	0.32
HIGGINS TRIB A	CUP	25	500-YEAR	414.00	667.72	671.93		672.07	0.001102	3.28	182.40	128.60	0.30
HIGGINS TRIB A	CUP	24	10-YEAR	222.00	666.72	670.67		670.81	0.001422	2.97	74.64	27.78	0.32
HIGGINS TRIB A	CUP	24	50-YEAR	308.00	666.72	671.17		671.35	0.001624	3.47	89.03	30.24	0.35
HIGGINS TRIB A	CUP	24	100-YEAR	342.00	666.72	671.34		671.55	0.001691	3.64	94.35	31.11	0.36
HIGGINS TRIB A	CUP	24	500-YEAR	414.00	666.72	671.88		671.92	0.001823	3.98	105.10	32.79	0.38
HIGGINS TRIB A	CUP	23	10-YEAR	222.00	667.72	669.39	669.39	670.07	0.016922	6.60	33.62	25.18	1.01
HIGGINS TRIB A	CUP	23	50-YEAR	308.00	667.72	669.75	669.75	670.55	0.015955	7.14	43.11	27.38	1.00
HIGGINS TRIB A	CUP	23	100-YEAR	342.00	667.72	669.88	669.88	670.72	0.015736	7.34	46.62	28.15	1.00
HIGGINS TRIB A	CUP	23	500-YEAR	414.00	667.72	670.13	670.13	671.05	0.015365	7.69	53.81	29.66	1.01
HIGGINS TRIB A	CUP	22	10-YEAR	222.00	664.72	668.76		668.81	0.000382	1.79	124.03	36.44	0.17
HIGGINS TRIB A	CUP	22	50-YEAR	308.00	664.72	669.33		669.40	0.000464	2.12	145.22	38.05	0.19
HIGGINS TRIB A	CUP	22	100-YEAR	342.00	664.72	669.52		669.59	0.000497	2.24	152.47	38.59	0.20
HIGGINS TRIB A	CUP	22	500-YEAR	414.00	664.72	669.87		669.97	0.000563	2.49	166.38	40.01	0.21
HIGGINS TRIB A	CUP	21	10-YEAR	222.00	664.72	668.51		668.61	0.001220	2.63	84.43	34.61	0.30
HIGGINS TRIB A	CUP	21	50-YEAR	308.00	664.72	669.03		669.17	0.001352	2.98	103.49	38.02	0.32
HIGGINS TRIB A	CUP	21	100-YEAR	342.00	664.72	669.20		669.35	0.001410	3.11	110.11	39.13	0.33
HIGGINS TRIB A	CUP	21	500-YEAR	414.00	664.72	669.52		669.70	0.001535	3.37	122.90	41.20	0.34
HIGGINS TRIB A	CUP	20	10-YEAR	222.00	664.72	668.38		668.48	0.001320	2.57	86.28	39.13	0.31
HIGGINS TRIB A	CUP	20	50-YEAR	308.00	664.72	668.90		669.03	0.001358	2.86	107.76	43.09	0.32
HIGGINS TRIB A	CUP	20	100-YEAR	342.00	664.72	669.07		669.21	0.001369	2.97	115.15	44.11	0.32
HIGGINS TRIB A	CUP	20	500-YEAR	414.00	664.72	669.38		669.54	0.001423	3.22	129.20	45.98	0.33
HIGGINS TRIB A	CUP	19	10-YEAR	222.00	664.42	667.98		668.24	0.004866	4.11	55.57	45.80	0.56
HIGGINS TRIB A	CUP	19	50-YEAR	308.00	664.42	668.60		668.82	0.003273	3.84	96.07	83.90	0.47
HIGGINS TRIB A	CUP	19	100-YEAR	342.00	664.42	668.82		669.01	0.002946	3.72	115.10	93.68	0.45
HIGGINS TRIB A	CUP	19	500-YEAR	414.00	664.42	669.20		669.37	0.002286	3.55	152.81	104.35	0.41
HIGGINS TRIB A	CUP	18	10-YEAR	222.00	664.22	667.95		668.01	0.000846	1.96	114.22	65.02	0.24
HIGGINS TRIB A	CUP	18	50-YEAR	308.00	664.22	668.59		668.65	0.000651	2.03	164.02	91.92	0.22
HIGGINS TRIB A	CUP	18	100-YEAR	342.00	664.22	668.79		668.86	0.000614	2.06	183.95	99.03	0.22
HIGGINS TRIB A	CUP	18	500-YEAR	414.00	664.22	669.17		669.23	0.000575	2.14	222.11	106.24	0.21
HIGGINS TRIB A	CUP	17	10-YEAR	222.00	664.12	667.82		667.91	0.001073	2.76	97.73	52.60	0.28
HIGGINS TRIB A	CUP	17	50-YEAR	308.00	664.12	668.47		668.57	0.000941	2.84	137.80	69.62	0.27
HIGGINS TRIB A	CUP	17	100-YEAR	342.00	664.12	668.69		668.78	0.000907	2.86	153.22	75.15	0.27
HIGGINS TRIB A	CUP	17	500-YEAR	414.00	664.12	669.06		669.16	0.000933	3.03	184.61	95.52	0.27
HIGGINS TRIB A	CUP	16	10-YEAR	222.00	664.02	667.77		667.83	0.000537	1.84	123.12	54.33	0.20

HEC-RAS Plan: PermiElimBoxes0712 (Continued)

River	Reach	River Sta	Profile	Q. Total (cfs)	Min Ch El (ft)	W.S. Elev. (ft)	Crit W.S. (ft)	E.G. Elev. (ft)	E.G. Slope (ft/ft)	Vel Cntl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	16	50-YEAR	308.00	664.02	668.43		668.49	0.000465	1.99	168.31	82.69	0.19
HIGGINS TRIB A	CUP	16	100-YEAR	342.00	664.02	668.65		668.71	0.000453	2.04	186.89	91.84	0.19
HIGGINS TRIB A	CUP	16	500-YEAR	414.00	664.02	669.02		669.09	0.000455	2.19	225.27	118.61	0.20
HIGGINS TRIB A	CUP	15	10-YEAR	222.00	663.72	667.52		667.71	0.002438	3.56	62.39	26.88	0.41
HIGGINS TRIB A	CUP	15	50-YEAR	308.00	663.72	668.17		668.39	0.002051	3.77	89.07	64.78	0.39
HIGGINS TRIB A	CUP	15	100-YEAR	342.00	663.72	668.39		668.61	0.001912	3.82	105.06	82.39	0.38
HIGGINS TRIB A	CUP	15	500-YEAR	414.00	663.72	668.77		668.99	0.001710	3.90	142.32	109.96	0.37
HIGGINS TRIB A	CUP	14	10-YEAR	222.00	663.72	667.40		667.52	0.001264	2.73	81.44	32.25	0.30
HIGGINS TRIB A	CUP	14	50-YEAR	308.00	663.72	668.03		668.17	0.001939	2.91	105.85	53.96	0.36
HIGGINS TRIB A	CUP	14	100-YEAR	342.00	663.72	668.25		668.38	0.002168	2.88	119.03	67.70	0.38
HIGGINS TRIB A	CUP	14	500-YEAR	414.00	663.72	668.65		668.77	0.002186	2.76	151.10	93.00	0.38
HIGGINS TRIB A	CUP	13	10-YEAR	222.00	663.72	667.27		667.38	0.001391	2.75	80.86	34.06	0.31
HIGGINS TRIB A	CUP	13	50-YEAR	308.00	663.72	667.86		668.00	0.001437	3.00	103.19	44.60	0.33
HIGGINS TRIB A	CUP	13	100-YEAR	342.00	663.72	668.06		668.21	0.001403	3.08	112.87	52.97	0.32
HIGGINS TRIB A	CUP	13	500-YEAR	414.00	663.72	668.44		668.60	0.001333	3.23	135.01	60.22	0.32
HIGGINS TRIB A	CUP	12	10-YEAR	224.00	662.72	667.00		667.07	0.000868	2.16	103.62	43.48	0.25
HIGGINS TRIB A	CUP	12	50-YEAR	310.00	662.72	667.59		667.67	0.000889	2.37	130.84	48.79	0.25
HIGGINS TRIB A	CUP	12	100-YEAR	344.00	662.72	667.79		667.88	0.000881	2.44	141.05	50.70	0.26
HIGGINS TRIB A	CUP	12	500-YEAR	416.00	662.72	668.19		668.29	0.000830	2.58	161.89	54.66	0.25
HIGGINS TRIB A	CUP	11	10-YEAR	224.00	663.02	666.55		666.63	0.003496	4.22	53.10	22.97	0.49
HIGGINS TRIB A	CUP	11	50-YEAR	310.00	663.02	667.08		667.42	0.003725	4.73	65.57	24.95	0.51
HIGGINS TRIB A	CUP	11	100-YEAR	344.00	663.02	667.26		667.63	0.003798	4.90	70.20	25.65	0.52
HIGGINS TRIB A	CUP	11	500-YEAR	416.00	663.02	667.61		668.04	0.003931	5.23	79.59	27.00	0.54
HIGGINS TRIB A	CUP	10	10-YEAR	224.00	662.72	666.03		666.31	0.003963	4.25	52.75	25.19	0.52
HIGGINS TRIB A	CUP	10	50-YEAR	310.00	662.72	666.54		666.89	0.003931	4.69	66.12	26.84	0.53
HIGGINS TRIB A	CUP	10	100-YEAR	344.00	662.72	666.72		667.09	0.003948	4.85	70.96	27.41	0.53
HIGGINS TRIB A	CUP	10	500-YEAR	416.00	662.72	667.07		667.48	0.004005	5.16	80.59	28.51	0.54
HIGGINS TRIB A	CUP	9	10-YEAR	224.00	662.22	665.48		665.75	0.004112	4.15	54.02	27.71	0.52
HIGGINS TRIB A	CUP	9	50-YEAR	310.00	662.22	666.04		666.34	0.003818	4.40	70.40	31.16	0.52
HIGGINS TRIB A	CUP	9	100-YEAR	344.00	662.22	666.23		666.54	0.003758	4.50	76.42	32.34	0.52
HIGGINS TRIB A	CUP	9	500-YEAR	416.00	662.22	666.59		666.93	0.003696	4.70	88.44	34.56	0.52
HIGGINS TRIB A	CUP	8	10-YEAR	224.00	661.02	665.28		665.37	0.001464	2.48	90.47	35.12	0.27
HIGGINS TRIB A	CUP	8	50-YEAR	310.00	661.02	665.83		665.95	0.001602	2.80	110.71	38.13	0.29
HIGGINS TRIB A	CUP	8	100-YEAR	344.00	661.02	666.02		666.15	0.001656	2.92	117.95	39.16	0.30
HIGGINS TRIB A	CUP	8	500-YEAR	416.00	661.02	666.37		666.53	0.001774	3.15	132.09	41.08	0.31
HIGGINS TRIB A	CUP	7	10-YEAR	224.00	661.02	665.03		665.22	0.003520	3.45	64.99	32.01	0.43
HIGGINS TRIB A	CUP	7	50-YEAR	310.00	661.02	665.58		665.78	0.003808	3.66	84.74	40.70	0.45

HEC-RAS Plan: PermiElimBoxes0712 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Critl W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Cntl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	1	10-YEAR	294.00	650.22	656.42	653.02	656.50	0.000859	2.36	126.56	500.31	0.19
HIGGINS TRIB A	CUP	1	50-YEAR	407.00	650.22	657.91	653.54	658.40	0.000644	2.45	168.40	500.58	0.17
HIGGINS TRIB A	CUP	1	100-YEAR	452.00	650.22	659.05	653.70	659.13	0.000449	2.29	200.12	500.79	0.15
HIGGINS TRIB A	CUP	1	500-YEAR	574.00	650.22	660.05	654.12	660.15	0.000467	2.54	228.38	500.97	0.15
HIGGINS CK		6.443	10-YEAR	275.00	652.09	657.56		657.59	0.001014	1.53	200.96	72.18	0.15
HIGGINS CK		6.443	50-YEAR	400.00	652.09	658.66		658.69	0.000749	1.58	283.87	78.45	0.14
HIGGINS CK		6.443	100-YEAR	461.00	652.09	659.50		659.53	0.000516	1.48	351.90	82.96	0.12
HIGGINS CK		6.443	500-YEAR	548.00	652.09	660.41		660.44	0.000402	1.46	429.34	87.82	0.11
HIGGINS CK		6.404	10-YEAR	275.00	652.60	657.13		657.24	0.003469	2.59	110.12	56.77	0.28
HIGGINS CK		6.404	50-YEAR	400.00	652.60	658.39		658.46	0.001754	2.29	204.40	82.09	0.21
HIGGINS CK		6.404	100-YEAR	461.00	652.60	659.34		659.39	0.000968	1.92	282.92	83.56	0.16
HIGGINS CK		6.404	500-YEAR	548.00	652.60	660.29		660.33	0.000669	1.77	363.12	85.03	0.13
HIGGINS CK		6.353	10-YEAR	275.00	650.86	656.78		656.81	0.000817	1.40	195.89	59.04	0.14
HIGGINS CK		6.353	50-YEAR	400.00	650.86	658.16		658.19	0.000614	1.41	283.72	68.66	0.12
HIGGINS CK		6.353	100-YEAR	461.00	650.86	659.20		659.22	0.000398	1.29	364.59	93.53	0.10
HIGGINS CK		6.353	500-YEAR	548.00	650.86	660.19		660.21	0.000294	1.25	468.43	124.23	0.09
HIGGINS CK		6.287	10-YEAR	275.00	650.90	656.49		656.52	0.000854	1.31	209.33	74.88	0.14
HIGGINS CK		6.287	50-YEAR	400.00	650.90	657.98		658.01	0.000445	1.19	343.29	106.61	0.11
HIGGINS CK		6.287	100-YEAR	461.00	650.90	659.10		659.12	0.000220	0.99	533.30	178.00	0.08
HIGGINS CK		6.287	500-YEAR	548.00	650.90	660.13		660.14	0.000141	0.90	715.72	178.00	0.06
HIGGINS CK	MAINSTEM	6.245	10-YEAR	562.00	651.02	656.43		656.48	0.000106	2.07	588.00	214.01	0.16
HIGGINS CK	MAINSTEM	6.245	50-YEAR	810.00	651.02	657.93		657.98	0.000078	2.06	947.48	264.75	0.14
HIGGINS CK	MAINSTEM	6.245	100-YEAR	911.00	651.02	659.07		659.10	0.000050	1.81	1266.26	288.00	0.11
HIGGINS CK	MAINSTEM	6.245	500-YEAR	1253.00	651.02	660.08		660.12	0.000055	2.03	1558.86	288.00	0.12
HIGGINS CK	MAINSTEM	6.231	10-YEAR	562.00	652.15	656.44		656.47	0.000048	1.26	458.71	136.17	0.11
HIGGINS CK	MAINSTEM	6.231	50-YEAR	810.00	652.15	657.94		657.97	0.000034	1.30	700.88	191.16	0.10
HIGGINS CK	MAINSTEM	6.231	100-YEAR	911.00	652.15	659.07		659.09	0.000023	1.19	931.29	208.00	0.08
HIGGINS CK	MAINSTEM	6.231	500-YEAR	1253.00	652.15	660.09		660.11	0.000026	1.39	1142.32	208.00	0.09
HIGGINS CK	MAINSTEM	6.179	10-YEAR	562.00	651.56	656.33		656.43	0.000227	2.58	217.73	152.75	0.24
HIGGINS CK	MAINSTEM	6.179	50-YEAR	810.00	651.56	657.84		657.94	0.000152	2.58	361.87	223.82	0.20
HIGGINS CK	MAINSTEM	6.179	100-YEAR	911.00	651.56	659.01		659.08	0.000079	2.13	659.56	271.04	0.15
HIGGINS CK	MAINSTEM	6.179	500-YEAR	1253.00	651.56	660.03		660.10	0.000075	2.30	936.49	274.09	0.15
HIGGINS CK	MAINSTEM	6.069	10-YEAR	562.00	650.55	656.27		656.33	0.000112	1.97	285.17	68.24	0.17
HIGGINS CK	MAINSTEM	6.069	50-YEAR	810.00	650.55	657.80		657.87	0.000084	2.06	408.53	106.75	0.15
HIGGINS CK	MAINSTEM	6.069	100-YEAR	911.00	650.55	658.98		659.04	0.000055	1.89	578.19	178.79	0.13
HIGGINS CK	MAINSTEM	6.069	500-YEAR	1253.00	650.55	659.99		660.06	0.000062	2.20	758.98	180.00	0.14

HEC-RAS Plan: PermiElmBoxes0712 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	6.035	10-YEAR	582.00	651.21	656.19		656.30	0.000242	2.74	233.02	92.47	0.25
HIGGINS CK	MAINSTEM	6.035	50-YEAR	810.00	651.21	657.75		657.85	0.000141	2.64	382.95	139.22	0.20
HIGGINS CK	MAINSTEM	6.035	100-YEAR	911.00	651.21	658.95		659.02	0.000085	2.34	505.12	144.03	0.16
HIGGINS CK	MAINSTEM	6.035	500-YEAR	1253.00	651.21	659.94		660.04	0.000095	2.72	610.58	148.01	0.17
HIGGINS CK	MAINSTEM	6.034	10-YEAR	582.00	651.79	655.24	655.24	656.21	0.001835	8.28	101.58	72.70	0.94
HIGGINS CK	MAINSTEM	6.034	50-YEAR	810.00	651.79	657.51		657.82	0.000287	5.11	306.88	138.28	0.42
HIGGINS CK	MAINSTEM	6.034	100-YEAR	911.00	651.79	658.81		659.01	0.000140	4.21	438.07	143.49	0.30
HIGGINS CK	MAINSTEM	6.034	500-YEAR	1253.00	651.79	659.78		660.03	0.000150	4.81	539.72	147.34	0.32
HIGGINS CK	MAINSTEM	6.033	10-YEAR	582.00	651.61	654.78	654.78	655.57	0.001994	7.77	113.71	127.61	0.97
HIGGINS CK	MAINSTEM	6.033	50-YEAR	810.00	651.61	657.59		657.79	0.000170	4.09	356.63	138.88	0.33
HIGGINS CK	MAINSTEM	6.033	100-YEAR	911.00	651.61	658.85		658.99	0.000094	3.55	475.58	143.93	0.25
HIGGINS CK	MAINSTEM	6.033	500-YEAR	1253.00	651.61	659.82		660.01	0.000105	4.14	571.19	147.80	0.28
HIGGINS CK	MAINSTEM	6.032	10-YEAR	582.00	647.83	655.26		655.31	0.000128	1.87	359.05	130.96	0.14
HIGGINS CK	MAINSTEM	6.032	50-YEAR	810.00	647.83	657.70		657.74	0.000072	1.76	575.54	140.72	0.11
HIGGINS CK	MAINSTEM	6.032	100-YEAR	911.00	647.83	658.92		658.96	0.000054	1.68	693.55	145.63	0.10
HIGGINS CK	MAINSTEM	6.032	500-YEAR	1253.00	647.83	659.91		659.97	0.000071	2.04	793.14	149.59	0.11
HIGGINS CK	MAINSTEM	6.021	10-YEAR	584.00	649.42	655.05		655.28	0.000891	3.80	148.28	36.98	0.33
HIGGINS CK	MAINSTEM	6.021	50-YEAR	810.00	649.42	657.57		657.72	0.000405	3.13	277.26	65.68	0.23
HIGGINS CK	MAINSTEM	6.021	100-YEAR	915.00	649.42	658.83		658.95	0.000263	2.81	353.92	74.32	0.19
HIGGINS CK	MAINSTEM	6.021	500-YEAR	1258.00	649.42	659.79		659.95	0.000310	3.33	414.23	78.15	0.21
HIGGINS CK	MAINSTEM	6.006	10-YEAR	584.00	648.55	655.06		655.18	0.000849	2.83	200.29	52.43	0.23
HIGGINS CK	MAINSTEM	6.006	50-YEAR	810.00	648.55	657.58		657.68	0.000309	2.51	341.65	65.20	0.17
HIGGINS CK	MAINSTEM	6.006	100-YEAR	915.00	648.55	658.84		658.92	0.000216	2.35	421.46	79.38	0.15
HIGGINS CK	MAINSTEM	6.006	500-YEAR	1258.00	648.55	659.79		659.91	0.000270	2.84	493.42	208.53	0.17
HIGGINS CK	MAINSTEM	5.9994*	10-YEAR	584.00	648.38	655.05		655.16	0.000522	2.69	209.99	54.80	0.21
HIGGINS CK	MAINSTEM	5.9994*	50-YEAR	810.00	648.38	657.57		657.67	0.000281	2.50	325.58	66.33	0.17
HIGGINS CK	MAINSTEM	5.9994*	100-YEAR	915.00	648.38	658.82		658.91	0.000207	2.39	394.04	84.40	0.15
HIGGINS CK	MAINSTEM	5.9994*	500-YEAR	1258.00	648.38	659.77		659.90	0.000267	2.92	458.30	253.37	0.17
HIGGINS CK	MAINSTEM	5.9950	10-YEAR	584.00	648.21	655.04	651.05	655.14	0.000454	2.46	231.43	57.56	0.20
HIGGINS CK	MAINSTEM	5.9950	50-YEAR	810.00	648.21	657.57	651.67	657.65	0.000223	2.24	375.93	76.48	0.15
HIGGINS CK	MAINSTEM	5.9950	100-YEAR	915.00	648.21	658.83	651.92	658.89	0.000159	2.11	482.36	101.85	0.13
HIGGINS CK	MAINSTEM	5.9950	500-YEAR	1258.00	648.21	659.79	652.63	659.87	0.000191	2.48	695.79	405.00	0.14
HIGGINS CK	MAINSTEM	5.981	Culvert										
HIGGINS CK	MAINSTEM	5.972	10-YEAR	645.00	647.90	654.97	651.46	655.08	0.000620	2.77	233.88	65.17	0.23
HIGGINS CK	MAINSTEM	5.972	50-YEAR	1100.00	647.90	657.44	652.41	657.57	0.000410	3.01	376.80	533.41	0.20
HIGGINS CK	MAINSTEM	5.972	100-YEAR	1320.00	647.90	658.68	652.82	658.74	0.000200	2.33	1032.06	635.13	0.14
HIGGINS CK	MAINSTEM	5.972	500-YEAR	1930.00	647.90	659.65	653.76	659.72	0.000218	2.62	1410.67	647.83	0.15

HEC-RAS Plan: PermtElmBoxes0712 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	5.959	10-YEAR	645.00	647.58	654.95		655.04	0.000431	2.49	263.79	64.56	0.20
HIGGINS CK	MAINSTEM	5.959	50-YEAR	1100.00	647.58	657.43		657.54	0.000293	2.69	493.39	371.48	0.17
HIGGINS CK	MAINSTEM	5.959	100-YEAR	1320.00	647.58	658.62		658.72	0.000237	2.67	715.91	552.40	0.16
HIGGINS CK	MAINSTEM	5.959	500-YEAR	1930.00	647.58	659.56		659.68	0.000288	3.15	1081.37	656.51	0.18
HIGGINS CK	MAINSTEM	5.950	10-YEAR	645.00	647.42	654.92		655.02	0.000483	2.60	251.65	61.84	0.21
HIGGINS CK	MAINSTEM	5.950	50-YEAR	1100.00	647.42	657.41		657.52	0.000318	2.77	477.81	322.53	0.18
HIGGINS CK	MAINSTEM	5.950	100-YEAR	1320.00	647.42	658.60		658.71	0.000254	2.74	696.46	535.40	0.16
HIGGINS CK	MAINSTEM	5.950	500-YEAR	1930.00	647.42	659.55		659.68	0.000303	3.21	1104.99	697.03	0.18
HIGGINS CK	MAINSTEM	5.914	10-YEAR	645.00	647.31	654.83	650.92	654.93	0.000460	2.56	252.49	57.48	0.20
HIGGINS CK	MAINSTEM	5.914	50-YEAR	1100.00	647.31	657.33	651.92	657.46	0.000342	2.90	382.27	94.69	0.19
HIGGINS CK	MAINSTEM	5.914	100-YEAR	1320.00	647.31	658.54	652.32	658.66	0.000274	2.82	575.20	338.33	0.17
HIGGINS CK	MAINSTEM	5.914	500-YEAR	1930.00	647.31	659.44	653.32	659.61	0.000363	3.47	865.55	530.42	0.20
HIGGINS CK	MAINSTEM	5.911		Culvert									
HIGGINS CK	MAINSTEM	5.899	10-YEAR	645.00	647.30	654.28	650.97	654.54	0.000926	4.15	155.39	50.17	0.30
HIGGINS CK	MAINSTEM	5.899	50-YEAR	1100.00	647.30	656.28	652.12	656.71	0.001029	5.30	207.41	79.89	0.33
HIGGINS CK	MAINSTEM	5.899	100-YEAR	1320.00	647.30	657.23	652.62	657.74	0.001016	5.68	232.27	95.77	0.34
HIGGINS CK	MAINSTEM	5.899	500-YEAR	1930.00	647.30	658.50	653.85	658.90	0.000852	5.22	537.49	321.74	0.30
HIGGINS CK	MAINSTEM	5.86375*	10-YEAR	645.00	647.10	654.19		654.33	0.000725	2.96	218.14	49.51	0.25
HIGGINS CK	MAINSTEM	5.86375*	50-YEAR	1100.00	647.10	656.27		656.44	0.000563	3.35	361.17	97.68	0.23
HIGGINS CK	MAINSTEM	5.86375*	100-YEAR	1320.00	647.10	657.28		657.44	0.000468	3.36	476.54	131.66	0.22
HIGGINS CK	MAINSTEM	5.86375*	500-YEAR	1930.00	647.10	658.47		658.69	0.000544	4.00	655.36	166.88	0.24
HIGGINS CK	MAINSTEM	5.8285*	10-YEAR	645.00	646.90	654.06		654.19	0.000705	2.95	218.88	48.83	0.25
HIGGINS CK	MAINSTEM	5.8285*	50-YEAR	1100.00	646.90	656.17		656.34	0.000556	3.34	360.20	99.73	0.23
HIGGINS CK	MAINSTEM	5.8285*	100-YEAR	1320.00	646.90	657.19		657.36	0.000457	3.34	495.00	162.50	0.21
HIGGINS CK	MAINSTEM	5.8285*	500-YEAR	1930.00	646.90	658.37		658.58	0.000515	3.91	726.74	226.15	0.23
HIGGINS CK	MAINSTEM	5.79325*	10-YEAR	645.00	646.70	653.93		654.06	0.000685	2.93	219.99	48.21	0.24
HIGGINS CK	MAINSTEM	5.79325*	50-YEAR	1100.00	646.70	656.07		656.24	0.000548	3.32	357.83	89.46	0.23
HIGGINS CK	MAINSTEM	5.79325*	100-YEAR	1320.00	646.70	657.11		657.27	0.000455	3.34	494.26	186.91	0.21
HIGGINS CK	MAINSTEM	5.79325*	500-YEAR	1930.00	646.70	658.28		658.49	0.000499	3.85	782.34	288.04	0.23
HIGGINS CK	MAINSTEM	5.758	10-YEAR	645.00	646.50	653.81	650.19	653.94	0.000664	2.91	221.52	47.67	0.24
HIGGINS CK	MAINSTEM	5.758	50-YEAR	1100.00	646.50	655.96	651.21	656.13	0.000548	3.32	340.75	87.32	0.23
HIGGINS CK	MAINSTEM	5.758	100-YEAR	1320.00	646.50	657.02	651.64	657.19	0.000460	3.36	475.78	196.60	0.21
HIGGINS CK	MAINSTEM	5.758	500-YEAR	1930.00	646.50	658.19	652.70	658.39	0.000495	3.84	834.29	390.48	0.23
HIGGINS CK	MAINSTEM	5.721		Culvert									
HIGGINS CK	MAINSTEM	5.683	10-YEAR	645.00	646.23	653.10	649.46	653.31	0.000681	3.63	177.63	53.84	0.26

HEC-RAS Plan: PermiElimBoxes0712 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Cnl
HIGGINS CK	MAINSTEM	5.683	50-YEAR	1100.00	646.23	654.54	650.51	654.93	0.000981	5.01	219.35	65.41	0.32
HIGGINS CK	MAINSTEM	5.683	100-YEAR	1320.00	646.23	655.27	650.99	655.74	0.001039	5.49	240.49	77.16	0.34
HIGGINS CK	MAINSTEM	5.683	500-YEAR	1930.00	646.23	657.03	652.15	657.20	0.000544	3.49	836.91	488.26	0.23
HIGGINS CK	MAINSTEM	5.650	10-YEAR	645.00	646.10	653.04		653.15	0.000586	2.72	237.37	52.38	0.22
HIGGINS CK	MAINSTEM	5.650	50-YEAR	1100.00	646.10	654.50		654.69	0.000715	3.45	324.35	74.73	0.26
HIGGINS CK	MAINSTEM	5.650	100-YEAR	1320.00	646.10	655.26		655.46	0.000660	3.61	389.23	95.53	0.25
HIGGINS CK	MAINSTEM	5.650	500-YEAR	1930.00	646.10	656.88		657.10	0.000564	3.88	709.51	316.82	0.24
HIGGINS CK	MAINSTEM	5.649	10-YEAR	645.00	646.50	653.04		653.15	0.000587	2.69	240.15	53.74	0.22
HIGGINS CK	MAINSTEM	5.649	50-YEAR	1100.00	646.50	654.50		654.68	0.000732	3.41	322.76	59.25	0.26
HIGGINS CK	MAINSTEM	5.649	100-YEAR	1320.00	646.50	655.26		655.46	0.000688	3.58	376.11	87.62	0.25
HIGGINS CK	MAINSTEM	5.649	500-YEAR	1930.00	646.50	656.88		657.09	0.000585	3.85	693.40	314.39	0.24
HIGGINS CK	MAINSTEM	5.593	10-YEAR	645.00	645.87	652.89		652.99	0.000499	2.56	251.51	53.41	0.21
HIGGINS CK	MAINSTEM	5.593	50-YEAR	1100.00	645.87	654.31		654.48	0.000628	3.32	333.98	65.59	0.24
HIGGINS CK	MAINSTEM	5.593	100-YEAR	1320.00	645.87	655.08		655.27	0.000595	3.51	390.71	95.91	0.24
HIGGINS CK	MAINSTEM	5.593	500-YEAR	1930.00	645.87	656.70		656.93	0.000546	3.89	675.13	284.04	0.24
HIGGINS CK	MAINSTEM	5.558	10-YEAR	907.00	646.30	652.64		652.84	0.001048	3.59	252.90	56.77	0.30
HIGGINS CK	MAINSTEM	5.558	50-YEAR	1394.00	646.30	654.05		654.31	0.001074	4.14	337.35	65.38	0.31
HIGGINS CK	MAINSTEM	5.558	100-YEAR	1623.00	646.30	654.85		655.12	0.000915	4.18	396.70	82.51	0.30
HIGGINS CK	MAINSTEM	5.558	500-YEAR	2270.00	646.30	656.50		656.80	0.000762	4.46	643.44	264.78	0.28
HIGGINS CK	MAINSTEM	5.500	10-YEAR	907.00	645.54	652.21		652.47	0.001342	4.07	222.89	49.62	0.34
HIGGINS CK	MAINSTEM	5.500	50-YEAR	1394.00	645.54	653.58		653.92	0.001447	4.73	294.60	56.24	0.36
HIGGINS CK	MAINSTEM	5.500	100-YEAR	1623.00	645.54	654.45		654.80	0.001184	4.73	348.40	69.38	0.33
HIGGINS CK	MAINSTEM	5.500	500-YEAR	2270.00	645.54	656.12		656.52	0.001001	5.10	508.18	141.05	0.32
HIGGINS CK	MAINSTEM	5.496	10-YEAR	907.00	645.80	652.14		652.44	0.001614	4.34	209.14	48.54	0.37
HIGGINS CK	MAINSTEM	5.496	50-YEAR	1394.00	645.80	653.50		653.89	0.001697	5.01	278.48	53.82	0.39
HIGGINS CK	MAINSTEM	5.496	100-YEAR	1623.00	645.80	654.38		654.77	0.001386	4.96	330.71	67.68	0.36
HIGGINS CK	MAINSTEM	5.496	500-YEAR	2270.00	645.80	656.07		656.49	0.001131	5.29	490.37	146.03	0.34
HIGGINS CK	MAINSTEM	5.409	10-YEAR	907.00	645.02	651.39		651.69	0.001650	4.39	206.51	47.89	0.37
HIGGINS CK	MAINSTEM	5.409	50-YEAR	1394.00	645.02	652.68		653.09	0.001793	5.14	271.20	52.49	0.40
HIGGINS CK	MAINSTEM	5.409	100-YEAR	1623.00	645.02	653.76		654.14	0.001351	4.92	331.41	60.92	0.35
HIGGINS CK	MAINSTEM	5.409	500-YEAR	2270.00	645.02	655.57		655.99	0.001069	5.22	462.90	83.50	0.33
HIGGINS CK	MAINSTEM	5.408	10-YEAR	907.00	645.30	651.36		651.68	0.001845	4.54	199.62	47.93	0.39
HIGGINS CK	MAINSTEM	5.408	50-YEAR	1394.00	645.30	652.64		653.08	0.001959	5.27	264.60	52.92	0.42
HIGGINS CK	MAINSTEM	5.408	100-YEAR	1623.00	645.30	653.74		654.13	0.001483	5.00	325.00	58.29	0.37
HIGGINS CK	MAINSTEM	5.408	500-YEAR	2270.00	645.30	655.56		655.98	0.001130	5.24	459.71	89.17	0.34
HIGGINS CK	MAINSTEM	5.394	10-YEAR	907.00	645.30	651.42	648.17	651.54	0.000683	2.84	319.12	76.13	0.24
HIGGINS CK	MAINSTEM	5.394	50-YEAR	1394.00	645.30	652.75	648.93	652.92	0.000698	3.26	427.16	85.32	0.26

HEC-RAS Plan: PermiElmBoxes0712 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	5.394	100-YEAR	1623.00	645.30	653.85	649.23	654.00	0.000492	3.12	523.93	91.07	0.22
HIGGINS CK	MAINSTEM	5.394	500-YEAR	2270.00	645.30	655.69	650.01	655.86	0.000398	3.34	701.88	102.79	0.21
HIGGINS CK	MAINSTEM	5.364	Bridge										
HIGGINS CK	MAINSTEM	5.335	10-YEAR	907.00	645.30	650.81	647.81	650.94	0.002135	2.92	310.68	74.67	0.25
HIGGINS CK	MAINSTEM	5.335	50-YEAR	1394.00	645.30	652.08	648.51	652.26	0.002262	3.39	411.80	98.26	0.27
HIGGINS CK	MAINSTEM	5.335	100-YEAR	1623.00	645.30	653.35	648.79	653.50	0.001469	3.10	539.91	151.83	0.22
HIGGINS CK	MAINSTEM	5.335	500-YEAR	2270.00	645.30	655.27	649.53	655.42	0.001133	3.20	739.49	1215.31	0.20
HIGGINS CK	MAINSTEM	5.324	10-YEAR	907.00	645.28	650.69		650.86	0.001031	3.32	273.21	90.24	0.30
HIGGINS CK	MAINSTEM	5.324	50-YEAR	1394.00	645.28	651.95		652.18	0.001014	3.79	374.28	119.14	0.30
HIGGINS CK	MAINSTEM	5.324	100-YEAR	1623.00	645.28	653.27		653.45	0.000609	3.37	516.93	229.59	0.24
HIGGINS CK	MAINSTEM	5.324	500-YEAR	2270.00	645.28	655.22		655.39	0.000412	3.35	792.93	608.75	0.21
HIGGINS CK	MAINSTEM	5.289	10-YEAR	907.00	645.20	650.56		650.69	0.000733	2.84	318.63	80.61	0.25
HIGGINS CK	MAINSTEM	5.289	50-YEAR	1394.00	645.20	651.83		652.00	0.000753	3.26	427.09	89.39	0.26
HIGGINS CK	MAINSTEM	5.289	100-YEAR	1623.00	645.20	653.21		653.34	0.000443	2.90	589.12	210.65	0.21
HIGGINS CK	MAINSTEM	5.289	500-YEAR	2270.00	645.20	655.19		655.31	0.000297	2.87	911.13	529.42	0.18
HIGGINS CK	MAINSTEM	5.256	10-YEAR	907.00	645.11	650.35		650.53	0.001051	3.37	268.77	68.53	0.30
HIGGINS CK	MAINSTEM	5.256	50-YEAR	1394.00	645.11	651.60		651.84	0.001140	3.87	360.17	79.34	0.32
HIGGINS CK	MAINSTEM	5.256	100-YEAR	1623.00	645.11	653.07		653.24	0.000719	3.30	492.12	103.54	0.26
HIGGINS CK	MAINSTEM	5.256	500-YEAR	2270.00	645.11	655.08		655.24	0.000446	3.25	745.48	450.24	0.22
HIGGINS CK	MAINSTEM	5.236	10-YEAR	907.00	645.20	650.21		650.40	0.001278	3.58	253.42	68.61	0.33
HIGGINS CK	MAINSTEM	5.236	50-YEAR	1394.00	645.20	651.45		651.70	0.001274	4.06	343.73	76.73	0.34
HIGGINS CK	MAINSTEM	5.236	100-YEAR	1623.00	645.20	652.97		653.16	0.000708	3.47	469.66	92.35	0.26
HIGGINS CK	MAINSTEM	5.236	500-YEAR	2270.00	645.20	655.01		655.19	0.000478	3.46	689.56	136.68	0.22
HIGGINS CK	MAINSTEM	5.184	10-YEAR	907.00	644.50	649.92		650.09	0.000997	3.32	273.46	68.68	0.29
HIGGINS CK	MAINSTEM	5.184	50-YEAR	1394.00	644.50	651.15		651.38	0.001066	3.84	362.97	76.73	0.31
HIGGINS CK	MAINSTEM	5.184	100-YEAR	1623.00	644.50	652.81		652.98	0.000596	3.25	499.56	87.60	0.24
HIGGINS CK	MAINSTEM	5.184	500-YEAR	2270.00	644.50	654.97		655.07	0.000299	2.74	1056.14	372.54	0.18
HIGGINS CK	MAINSTEM	5.166	10-YEAR	907.00	644.48	649.83		650.00	0.000698	3.31	274.13	69.14	0.29
HIGGINS CK	MAINSTEM	5.166	50-YEAR	1394.00	644.48	651.05		651.28	0.001077	3.83	364.27	78.08	0.31
HIGGINS CK	MAINSTEM	5.166	100-YEAR	1623.00	644.48	652.76		652.92	0.000586	3.19	508.55	90.57	0.24
HIGGINS CK	MAINSTEM	5.166	500-YEAR	2270.00	644.48	654.95		655.03	0.000251	2.53	1194.98	443.54	0.16
HIGGINS CK	MAINSTEM	5.144	10-YEAR	907.00	644.40	649.70		649.88	0.001050	3.37	268.79	68.35	0.30
HIGGINS CK	MAINSTEM	5.144	50-YEAR	1394.00	644.40	650.91		651.15	0.001124	3.91	356.48	76.32	0.32
HIGGINS CK	MAINSTEM	5.144	100-YEAR	1623.00	644.40	652.69		652.85	0.000589	3.23	502.47	88.01	0.24
HIGGINS CK	MAINSTEM	5.144	500-YEAR	2270.00	644.40	654.93		655.00	0.000237	2.44	1278.15	505.06	0.16
HIGGINS CK	MAINSTEM	5.094	10-YEAR	907.00	643.10	649.50		649.64	0.000706	2.92	310.21	72.76	0.25

HEC-RAS Plan: PermiElimBoxes0712 (Continued)

River	Reach	River Sta	Profile	Q, Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	5.094	50-YEAR	1394.00	643.10	650.69		650.88	0.000810	3.47	401.50	80.49	0.27
HIGGINS CK	MAINSTEM	5.094	100-YEAR	1623.00	643.10	652.58		652.71	0.000431	2.87	565.33	94.63	0.21
HIGGINS CK	MAINSTEM	5.094	500-YEAR	2270.00	643.10	654.89		654.95	0.000159	2.13	1575.45	867.92	0.13
HIGGINS CK	MAINSTEM	5.049	10-YEAR	907.00	643.43	649.33		649.47	0.000710	2.96	305.93	70.33	0.25
HIGGINS CK	MAINSTEM	5.049	50-YEAR	1394.00	643.43	650.49		650.68	0.000835	3.56	391.03	76.77	0.28
HIGGINS CK	MAINSTEM	5.049	100-YEAR	1623.00	643.43	652.47		652.61	0.000416	2.93	555.50	98.33	0.20
HIGGINS CK	MAINSTEM	5.049	500-YEAR	2270.00	643.43	654.86		654.91	0.000140	2.10	1742.95	789.28	0.12
HIGGINS CK	MAINSTEM	5.045	10-YEAR	571.00	643.80	649.37		649.43	0.000355	2.03	281.13	67.84	0.18
HIGGINS CK	MAINSTEM	5.045	50-YEAR	750.00	643.80	650.57		650.63	0.000287	2.05	366.17	74.03	0.16
HIGGINS CK	MAINSTEM	5.045	100-YEAR	1000.00	643.80	652.52		652.58	0.000188	1.92	520.36	85.37	0.14
HIGGINS CK	MAINSTEM	5.045	500-YEAR	2000.00	643.80	654.86		654.90	0.000122	1.92	1681.73	789.30	0.12
HIGGINS CK	MAINSTEM	5.020	10-YEAR	571.00	643.80	649.29	645.94	649.38	0.000365	2.35	243.24	67.46	0.19
HIGGINS CK	MAINSTEM	5.020	50-YEAR	750.00	643.80	650.49	646.26	650.59	0.000307	2.49	301.80	73.62	0.18
HIGGINS CK	MAINSTEM	5.020	100-YEAR	1000.00	643.80	652.44	646.67	652.54	0.000218	2.52	397.30	83.68	0.16
HIGGINS CK	MAINSTEM	5.020	500-YEAR	2000.00	643.80	654.85	648.05	654.89	0.000124	1.93	1668.68	789.17	0.12
HIGGINS CK	MAINSTEM	5.012		Culvert									
HIGGINS CK	MAINSTEM	5.005	10-YEAR	571.00	643.80	648.86	645.55	648.95	0.000381	2.40	237.44	91.06	0.19
HIGGINS CK	MAINSTEM	5.005	50-YEAR	750.00	643.80	649.68	645.88	649.80	0.000393	2.71	277.06	95.74	0.20
HIGGINS CK	MAINSTEM	5.005	100-YEAR	1000.00	643.80	650.93	646.30	651.07	0.000364	2.97	336.98	102.83	0.20
HIGGINS CK	MAINSTEM	5.005	500-YEAR	2000.00	643.80	654.85	647.68	654.87	0.000055	1.33	2503.48	1240.48	0.08
HIGGINS CK	MAINSTEM	4.992	10-YEAR	571.00	643.80	648.86		648.90	0.000204	1.53	372.24	91.10	0.13
HIGGINS CK	MAINSTEM	4.992	50-YEAR	750.00	643.80	649.70		649.74	0.000201	1.67	450.19	95.83	0.14
HIGGINS CK	MAINSTEM	4.992	100-YEAR	1000.00	643.80	650.96		651.01	0.000174	1.74	575.46	102.99	0.13
HIGGINS CK	MAINSTEM	4.992	500-YEAR	2000.00	643.80	654.84		654.86	0.000067	1.46	2180.78	1050.50	0.09
HIGGINS CK	MAINSTEM	4.980	10-YEAR	571.00	643.55	648.77		648.87	0.000620	2.53	225.47	59.23	0.23
HIGGINS CK	MAINSTEM	4.980	50-YEAR	750.00	643.55	649.60		649.71	0.000502	2.72	276.22	63.78	0.23
HIGGINS CK	MAINSTEM	4.980	100-YEAR	1000.00	643.55	650.86		650.98	0.000506	2.77	361.12	70.75	0.22
HIGGINS CK	MAINSTEM	4.980	500-YEAR	2000.00	643.55	654.82		654.86	0.000116	1.82	1952.27	1115.56	0.11
HIGGINS CK	MAINSTEM	4.966	10-YEAR	700.00	643.40	648.62		648.80	0.001152	3.42	204.89	54.41	0.31
HIGGINS CK	MAINSTEM	4.966	50-YEAR	920.00	643.40	649.44		649.64	0.001123	3.67	250.81	58.56	0.30
HIGGINS CK	MAINSTEM	4.966	100-YEAR	1260.00	643.40	650.69		650.82	0.000992	3.84	328.22	64.95	0.30
HIGGINS CK	MAINSTEM	4.966	500-YEAR	2140.00	643.40	654.81		654.85	0.000134	1.94	2056.93	1319.41	0.12
HIGGINS CK	MAINSTEM	4.944	10-YEAR	700.00	642.80	648.50		648.68	0.001027	3.36	208.08	51.43	0.29
HIGGINS CK	MAINSTEM	4.944	50-YEAR	920.00	642.80	649.31		649.52	0.001046	3.66	251.31	55.32	0.30
HIGGINS CK	MAINSTEM	4.944	100-YEAR	1260.00	642.80	650.57		650.81	0.000932	3.88	324.42	85.22	0.29
HIGGINS CK	MAINSTEM	4.944	500-YEAR	2140.00	642.80	654.80		654.83	0.000102	1.82	2404.70	1470.15	0.11

HEC-RAS Plat: PermtElimBoxes0712 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	4.928	10-YEAR	700.00	642.48	648.43		648.59	0.000897	3.18	220.16	53.69	0.28
HIGGINS CK	MAINSTEM	4.928	50-YEAR	920.00	642.48	649.24		649.43	0.000923	3.47	265.35	57.92	0.29
HIGGINS CK	MAINSTEM	4.928	100-YEAR	1260.00	642.48	650.51		650.72	0.000853	3.67	343.20	64.56	0.28
HIGGINS CK	MAINSTEM	4.928	500-YEAR	2140.00	642.48	654.78		654.82	0.000137	2.00	2043.52	1412.67	0.12
HIGGINS CK	MAINSTEM	4.925	10-YEAR	700.00	643.00	648.38		648.57	0.001220	3.55	197.24	51.43	0.32
HIGGINS CK	MAINSTEM	4.925	50-YEAR	920.00	643.00	649.18		649.41	0.001210	3.83	240.38	55.48	0.32
HIGGINS CK	MAINSTEM	4.925	100-YEAR	1260.00	643.00	650.48		650.71	0.001070	4.00	315.18	61.87	0.31
HIGGINS CK	MAINSTEM	4.925	500-YEAR	2140.00	643.00	654.78		654.81	0.000113	1.81	2206.81	1524.84	0.11
HIGGINS CK	MAINSTEM	4.915	10-YEAR	700.00	643.00	648.38		648.49	0.000773	2.67	283.10	91.30	0.23
HIGGINS CK	MAINSTEM	4.915	50-YEAR	920.00	643.00	649.21		649.33	0.000733	2.85	360.24	96.24	0.23
HIGGINS CK	MAINSTEM	4.915	100-YEAR	1260.00	643.00	650.50		650.62	0.000619	2.95	489.71	104.00	0.21
HIGGINS CK	MAINSTEM	4.915	500-YEAR	2140.00	643.00	654.78		654.81	0.000107	1.75	3036.26	1437.79	0.10
HIGGINS CK	MAINSTEM	4.885	10-YEAR	700.00	642.90	648.25		648.37	0.000807	2.80	270.11	84.80	0.23
HIGGINS CK	MAINSTEM	4.885	50-YEAR	920.00	642.90	649.07		649.21	0.000772	3.01	341.68	89.94	0.23
HIGGINS CK	MAINSTEM	4.885	100-YEAR	1260.00	642.90	650.38		650.52	0.000625	3.15	485.95	154.52	0.22
HIGGINS CK	MAINSTEM	4.885	500-YEAR	2140.00	642.90	654.77		654.79	0.000095	1.73	3124.00	1298.27	0.09
HIGGINS CK	MAINSTEM	4.866	10-YEAR	700.00	642.40	648.15		648.28	0.000862	2.94	257.27	82.33	0.24
HIGGINS CK	MAINSTEM	4.866	50-YEAR	920.00	642.40	648.97		649.12	0.000839	3.17	326.83	86.18	0.24
HIGGINS CK	MAINSTEM	4.866	100-YEAR	1260.00	642.40	650.30		650.46	0.000678	3.31	465.31	137.22	0.23
HIGGINS CK	MAINSTEM	4.866	500-YEAR	2140.00	642.40	654.75		654.78	0.000105	1.84	3022.16	1328.52	0.10
HIGGINS CK	MAINSTEM	4.847	10-YEAR	700.00	642.00	648.07		648.19	0.000829	2.88	260.03	83.50	0.24
HIGGINS CK	MAINSTEM	4.847	50-YEAR	920.00	642.00	648.90		649.04	0.000811	3.11	330.94	87.76	0.24
HIGGINS CK	MAINSTEM	4.847	100-YEAR	1260.00	642.00	650.24		650.38	0.000854	3.07	470.91	135.67	0.24
HIGGINS CK	MAINSTEM	4.847	500-YEAR	2140.00	642.00	654.74		654.77	0.000105	1.66	2891.45	1318.44	0.10
HIGGINS CK	MAINSTEM	4.828	10-YEAR	700.00	641.90	648.01		648.11	0.000657	2.50	297.60	94.80	0.21
HIGGINS CK	MAINSTEM	4.828	50-YEAR	920.00	641.90	648.85		648.96	0.000636	2.68	379.31	100.60	0.21
HIGGINS CK	MAINSTEM	4.828	100-YEAR	1260.00	641.90	650.19		650.30	0.000528	2.76	522.58	131.11	0.20
HIGGINS CK	MAINSTEM	4.828	500-YEAR	2140.00	641.90	654.73		654.76	0.000090	1.66	3006.86	1350.31	0.09
HIGGINS CK	MAINSTEM	4.801	10-YEAR	700.00	642.50	647.86		648.00	0.000892	2.95	251.48	87.91	0.26
HIGGINS CK	MAINSTEM	4.801	50-YEAR	920.00	642.50	648.70		648.85	0.000913	3.12	327.43	92.90	0.25
HIGGINS CK	MAINSTEM	4.801	100-YEAR	1260.00	642.50	650.07		650.21	0.000718	3.15	460.23	107.74	0.23
HIGGINS CK	MAINSTEM	4.801	500-YEAR	2140.00	642.50	654.71		654.74	0.000111	1.83	2816.66	1360.67	0.10
HIGGINS CK	MAINSTEM	4.783	10-YEAR	700.00	642.00	647.78		647.90	0.000852	2.83	260.41	86.96	0.24
HIGGINS CK	MAINSTEM	4.783	50-YEAR	920.00	642.00	648.62		648.76	0.000808	3.02	336.44	92.51	0.24
HIGGINS CK	MAINSTEM	4.783	100-YEAR	1260.00	642.00	650.01		650.14	0.000655	3.07	469.97	101.07	0.22
HIGGINS CK	MAINSTEM	4.783	500-YEAR	2140.00	642.00	654.70		654.73	0.000112	1.87	2680.93	1337.48	0.10
HIGGINS CK	MAINSTEM	4.774	10-YEAR	700.00	642.50	647.72		647.86	0.001098	3.06	242.96	87.34	0.27

HEC-RAS Plan: PermtElmBoxes0712 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	4.668	10-YEAR	424.00	640.20	646.20	642.68	646.40	0.000874	3.57	118.67	51.77	0.26
HIGGINS CK	MAINSTEM	4.668	50-YEAR	445.00	640.20	647.21	642.75	647.37	0.000571	3.21	138.79	74.77	0.21
HIGGINS CK	MAINSTEM	4.668	100-YEAR	460.00	640.20	648.65	642.80	648.77	0.000325	2.74	167.69	94.45	0.17
HIGGINS CK	MAINSTEM	4.668	500-YEAR	600.00	640.20	654.64	643.30	654.65	0.000017	0.69	1544.78	819.18	0.04
HIGGINS CK	MAINSTEM	4.664	10-YEAR	444.00	640.20	646.23	642.63	646.35	0.000584	2.76	160.60	51.93	0.21
HIGGINS CK	MAINSTEM	4.664	50-YEAR	485.00	640.20	647.23	642.75	647.33	0.000401	2.56	189.59	75.45	0.18
HIGGINS CK	MAINSTEM	4.664	100-YEAR	700.00	640.20	648.61	643.32	648.75	0.000440	3.05	229.68	94.19	0.19
HIGGINS CK	MAINSTEM	4.664	500-YEAR	1600.00	640.20	654.59	645.24	654.63	0.000126	1.87	1499.99	819.05	0.10
HIGGINS CK	MAINSTEM	4.659	10-YEAR	444.00	638.42	646.26	640.56	646.30	0.000105	1.41	315.20	57.84	0.09
HIGGINS CK	MAINSTEM	4.659	50-YEAR	485.00	638.42	647.26	640.66	647.29	0.000081	1.35	358.94	63.17	0.08
HIGGINS CK	MAINSTEM	4.659	100-YEAR	700.00	638.42	648.65	641.09	648.70	0.000100	1.67	420.34	71.98	0.09
HIGGINS CK	MAINSTEM	4.659	500-YEAR	1600.00	638.42	654.60	642.55	654.62	0.000053	1.38	2126.26	819.07	0.07
HIGGINS CK	MAINSTEM	4.639	10-YEAR	444.00	640.20	646.19	642.65	646.26	0.000568	2.19	202.37	51.69	0.19
HIGGINS CK	MAINSTEM	4.639	50-YEAR	485.00	640.20	647.21	642.77	647.26	0.000320	1.91	253.40	74.79	0.15
HIGGINS CK	MAINSTEM	4.639	100-YEAR	700.00	640.20	648.60	643.36	648.67	0.000297	2.17	323.00	94.13	0.15
HIGGINS CK	MAINSTEM	4.639	500-YEAR	1600.00	640.20	654.56	645.18	654.61	0.000125	1.86	1462.51	668.80	0.10
HIGGINS CK	MAINSTEM	4.638	10-YEAR	444.00	640.80	646.19	643.18	646.26	0.000469	2.10	211.75	62.92	0.18
HIGGINS CK	MAINSTEM	4.638	50-YEAR	485.00	640.80	647.21	643.27	647.26	0.000284	1.85	262.73	67.91	0.14
HIGGINS CK	MAINSTEM	4.638	100-YEAR	700.00	640.80	648.60	643.71	648.67	0.000271	2.11	332.33	80.06	0.14
HIGGINS CK	MAINSTEM	4.638	500-YEAR	1600.00	640.80	654.54	645.13	654.60	0.000113	2.03	1249.66	660.12	0.10
HIGGINS CK	MAINSTEM	4.626	Culvert										
HIGGINS CK	MAINSTEM	4.612	10-YEAR	444.00	641.80	645.49	644.06	645.76	0.002991	4.18	106.10	39.87	0.42
HIGGINS CK	MAINSTEM	4.612	50-YEAR	485.00	641.80	646.82	644.18	646.98	0.001075	3.18	152.73	45.38	0.27
HIGGINS CK	MAINSTEM	4.612	100-YEAR	700.00	641.80	648.14	644.71	648.33	0.000930	3.52	198.80	50.83	0.26
HIGGINS CK	MAINSTEM	4.612	500-YEAR	1600.00	641.80	653.11	646.48	653.24	0.000408	2.88	668.01	153.98	0.18
HIGGINS CK	MAINSTEM	4.611	10-YEAR	444.00	642.03	645.51	643.99	645.68	0.002288	3.34	132.97	50.65	0.36
HIGGINS CK	MAINSTEM	4.611	50-YEAR	485.00	642.03	646.84	644.10	646.93	0.000739	2.38	203.47	58.69	0.22
HIGGINS CK	MAINSTEM	4.611	100-YEAR	700.00	642.03	648.18	644.57	648.27	0.000560	2.52	277.80	66.84	0.20
HIGGINS CK	MAINSTEM	4.611	500-YEAR	1600.00	642.03	653.13	646.05	653.21	0.000227	2.27	820.75	173.79	0.14
HIGGINS CK	MAINSTEM	4.588	10-YEAR	454.00	641.80	645.12	645.12	645.35	0.003110	3.82	118.96	46.50	0.42
HIGGINS CK	MAINSTEM	4.588	50-YEAR	503.00	641.80	646.74	646.84	646.84	0.000838	2.51	200.65	54.69	0.23
HIGGINS CK	MAINSTEM	4.588	100-YEAR	730.00	641.80	648.09	648.09	648.20	0.000691	2.81	279.28	61.56	0.22
HIGGINS CK	MAINSTEM	4.588	500-YEAR	1666.00	641.80	653.07	645.07	653.17	0.000322	2.57	688.01	130.50	0.16
HIGGINS CK	MAINSTEM	4.569	10-YEAR	454.00	638.78	645.16	645.16	645.22	0.000352	2.05	244.81	64.30	0.16
HIGGINS CK	MAINSTEM	4.569	50-YEAR	503.00	638.78	646.75	646.75	646.79	0.000154	1.82	355.65	75.16	0.11
HIGGINS CK	MAINSTEM	4.569	100-YEAR	730.00	638.78	648.11	648.11	648.15	0.000157	1.85	463.63	84.41	0.11
HIGGINS CK	MAINSTEM	4.569	500-YEAR	1666.00	638.78	653.09	645.09	653.14	0.000112	2.14	992.88	143.96	0.10

HEC-RAS Plan: PermtElmBoxes0712 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	4.542	10-YEAR	454.00	639.10	645.14	641.02	645.18	0.000183	1.67	312.35	68.37	0.12
HIGGINS CK	MAINSTEM	4.542	50-YEAR	503.00	639.10	646.74	641.17	646.77	0.000091	1.38	428.82	77.20	0.09
HIGGINS CK	MAINSTEM	4.542	100-YEAR	730.00	639.10	648.10	641.74	648.13	0.000102	1.62	538.30	84.67	0.10
HIGGINS CK	MAINSTEM	4.542	500-YEAR	1666.00	639.10	653.08	643.68	653.12	0.000088	2.02	1090.55	189.89	0.10
HIGGINS CK	MAINSTEM	4.537	10-YEAR	454.00	639.10	645.07	641.02	645.17	0.000430	2.54	179.04	67.95	0.18
HIGGINS CK	MAINSTEM	4.537	50-YEAR	503.00	639.10	646.68	641.17	646.76	0.000238	2.21	227.51	76.87	0.14
HIGGINS CK	MAINSTEM	4.537	100-YEAR	730.00	639.10	648.00	641.74	648.12	0.000294	2.73	267.04	84.19	0.16
HIGGINS CK	MAINSTEM	4.537	500-YEAR	1666.00	639.10	652.95	643.68	653.11	0.000249	3.38	588.71	724.28	0.16
HIGGINS CK	MAINSTEM	4.521		Mult Open									
HIGGINS CK	MAINSTEM	4.505	10-YEAR	454.00	637.50	644.33	639.34	644.40	0.000241	2.08	218.68	75.20	0.14
HIGGINS CK	MAINSTEM	4.505	50-YEAR	503.00	637.50	646.02	639.48	646.07	0.000142	1.85	272.57	85.11	0.11
HIGGINS CK	MAINSTEM	4.505	100-YEAR	730.00	637.50	646.58	640.03	646.68	0.000242	2.51	290.51	88.40	0.15
HIGGINS CK	MAINSTEM	4.505	500-YEAR	1666.00	637.50	649.44	641.88	649.73	0.000490	4.30	409.85	154.20	0.22
HIGGINS CK	MAINSTEM	4.485	10-YEAR	454.00	637.50	644.36	638.36	644.36	0.000020	0.53	855.23	150.34	0.04
HIGGINS CK	MAINSTEM	4.485	50-YEAR	503.00	637.50	646.04	638.42	646.04	0.000011	0.45	1118.36	162.91	0.03
HIGGINS CK	MAINSTEM	4.485	100-YEAR	730.00	637.50	646.62	638.67	646.63	0.000019	0.60	1214.11	167.25	0.04
HIGGINS CK	MAINSTEM	4.485	500-YEAR	1666.00	637.50	649.57	639.50	649.58	0.000035	0.95	1803.30	267.93	0.06

PERMIT PROP. COND.
ELMHURST ROAD W/ SLAB BRIDGE

HEC-RAS Plan: PermtElmSlab0712

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	25	10-YEAR	222.00	667.72	670.82		670.95	0.001495	2.99	79.46	48.43	0.33
HIGGINS TRIB A	CUP	25	50-YEAR	308.00	667.72	671.35		671.51	0.001355	3.24	116.99	91.72	0.33
HIGGINS TRIB A	CUP	25	100-YEAR	342.00	667.72	671.55		671.70	0.001280	3.28	136.23	107.35	0.32
HIGGINS TRIB A	CUP	25	500-YEAR	414.00	667.72	671.93		672.07	0.001102	3.28	182.38	128.59	0.30
HIGGINS TRIB A	CUP	24	10-YEAR	222.00	666.72	670.67		670.81	0.001422	2.97	74.64	27.78	0.32
HIGGINS TRIB A	CUP	24	50-YEAR	308.00	666.72	671.17		671.35	0.001624	3.47	89.03	30.24	0.35
HIGGINS TRIB A	CUP	24	100-YEAR	342.00	666.72	671.34		671.55	0.001691	3.64	94.35	31.11	0.36
HIGGINS TRIB A	CUP	24	500-YEAR	414.00	666.72	671.68		671.92	0.001823	3.98	105.10	32.79	0.38
HIGGINS TRIB A	CUP	23	10-YEAR	222.00	667.72	669.39	669.39	670.07	0.016922	6.60	33.62	25.18	1.01
HIGGINS TRIB A	CUP	23	50-YEAR	308.00	667.72	669.75	669.75	670.55	0.015955	7.14	43.11	27.38	1.00
HIGGINS TRIB A	CUP	23	100-YEAR	342.00	667.72	669.88	669.88	670.72	0.015736	7.34	46.62	28.15	1.00
HIGGINS TRIB A	CUP	23	500-YEAR	414.00	667.72	670.13	670.13	671.05	0.015353	7.69	53.82	29.66	1.01
HIGGINS TRIB A	CUP	22	10-YEAR	222.00	664.72	668.76		668.81	0.000382	1.79	124.03	36.44	0.17
HIGGINS TRIB A	CUP	22	50-YEAR	308.00	664.72	669.33		669.40	0.000464	2.12	145.22	38.05	0.19
HIGGINS TRIB A	CUP	22	100-YEAR	342.00	664.72	669.52		669.59	0.000497	2.24	152.47	38.59	0.20
HIGGINS TRIB A	CUP	22	500-YEAR	414.00	664.72	669.87		669.97	0.000563	2.49	166.38	40.01	0.21
HIGGINS TRIB A	CUP	21	10-YEAR	222.00	664.72	668.51		668.61	0.001220	2.63	84.43	34.61	0.30
HIGGINS TRIB A	CUP	21	50-YEAR	308.00	664.72	669.03		669.17	0.001352	2.98	103.49	36.02	0.32
HIGGINS TRIB A	CUP	21	100-YEAR	342.00	664.72	669.20		669.35	0.001410	3.11	110.11	39.13	0.33
HIGGINS TRIB A	CUP	21	500-YEAR	414.00	664.72	669.52		669.70	0.001535	3.37	122.90	41.20	0.34
HIGGINS TRIB A	CUP	20	10-YEAR	222.00	664.72	668.38		668.48	0.001320	2.57	86.28	39.13	0.31
HIGGINS TRIB A	CUP	20	50-YEAR	308.00	664.72	668.90		669.03	0.001358	2.86	107.76	43.09	0.32
HIGGINS TRIB A	CUP	20	100-YEAR	342.00	664.72	669.07		669.21	0.001369	2.97	115.15	44.11	0.32
HIGGINS TRIB A	CUP	20	500-YEAR	414.00	664.72	669.38		669.54	0.001423	3.22	129.20	45.98	0.33
HIGGINS TRIB A	CUP	19	10-YEAR	222.00	664.42	667.98		668.24	0.004866	4.11	55.57	45.80	0.56
HIGGINS TRIB A	CUP	19	50-YEAR	308.00	664.42	668.60		668.82	0.003273	3.84	96.07	83.90	0.47
HIGGINS TRIB A	CUP	19	100-YEAR	342.00	664.42	668.82		669.01	0.002846	3.72	115.10	93.68	0.45
HIGGINS TRIB A	CUP	19	500-YEAR	414.00	664.42	669.20		669.37	0.002286	3.55	152.81	104.35	0.41
HIGGINS TRIB A	CUP	18	10-YEAR	222.00	664.22	667.95		668.01	0.000846	1.96	114.22	65.02	0.24
HIGGINS TRIB A	CUP	18	50-YEAR	308.00	664.22	668.59		668.65	0.000651	2.03	164.02	91.92	0.22
HIGGINS TRIB A	CUP	18	100-YEAR	342.00	664.22	668.79		668.86	0.000614	2.06	183.95	99.03	0.22
HIGGINS TRIB A	CUP	18	500-YEAR	414.00	664.22	669.17		669.23	0.000575	2.14	222.11	106.24	0.21
HIGGINS TRIB A	CUP	17	10-YEAR	222.00	664.12	667.82		667.91	0.001073	2.76	97.73	52.60	0.28
HIGGINS TRIB A	CUP	17	50-YEAR	308.00	664.12	668.47		668.57	0.000941	2.84	137.80	69.62	0.27
HIGGINS TRIB A	CUP	17	100-YEAR	342.00	664.12	668.69		668.78	0.000907	2.86	153.22	75.15	0.27
HIGGINS TRIB A	CUP	17	500-YEAR	414.00	664.12	669.06		669.16	0.000933	3.03	184.61	95.52	0.27
HIGGINS TRIB A	CUP	16	10-YEAR	222.00	664.02	667.77		667.83	0.000537	1.84	123.12	54.33	0.20

HEC-RAS Plan: PermtElnSlab0712 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	16	50-YEAR	308.00	664.02	668.43		668.49	0.000465	1.99	168.31	82.69	0.19
HIGGINS TRIB A	CUP	16	100-YEAR	342.00	664.02	668.65		668.71	0.000453	2.04	186.89	91.84	0.19
HIGGINS TRIB A	CUP	16	500-YEAR	414.00	664.02	669.02		669.09	0.000455	2.19	225.27	118.61	0.20
HIGGINS TRIB A	CUP	15	10-YEAR	222.00	663.72	667.52		667.71	0.002438	3.56	62.39	26.88	0.41
HIGGINS TRIB A	CUP	15	50-YEAR	308.00	663.72	668.17		668.39	0.002051	3.77	89.07	64.78	0.39
HIGGINS TRIB A	CUP	15	100-YEAR	342.00	663.72	668.39		668.61	0.001912	3.82	105.06	82.39	0.38
HIGGINS TRIB A	CUP	15	500-YEAR	414.00	663.72	668.77		668.99	0.001710	3.90	142.32	109.96	0.37
HIGGINS TRIB A	CUP	14	10-YEAR	222.00	663.72	667.40		667.52	0.001264	2.73	81.44	32.25	0.30
HIGGINS TRIB A	CUP	14	50-YEAR	308.00	663.72	668.03		668.17	0.001939	2.91	105.85	53.96	0.36
HIGGINS TRIB A	CUP	14	100-YEAR	342.00	663.72	668.25		668.38	0.002168	2.88	119.03	67.70	0.38
HIGGINS TRIB A	CUP	14	500-YEAR	414.00	663.72	668.65		668.77	0.002186	2.76	151.10	93.00	0.38
HIGGINS TRIB A	CUP	13	10-YEAR	222.00	663.72	667.27		667.38	0.001391	2.75	80.86	34.06	0.31
HIGGINS TRIB A	CUP	13	50-YEAR	308.00	663.72	667.86		668.00	0.001437	3.00	103.19	44.60	0.33
HIGGINS TRIB A	CUP	13	100-YEAR	342.00	663.72	668.06		668.21	0.001403	3.08	112.87	52.97	0.32
HIGGINS TRIB A	CUP	13	500-YEAR	414.00	663.72	668.44		668.60	0.001333	3.23	135.01	60.22	0.32
HIGGINS TRIB A	CUP	12	10-YEAR	224.00	662.72	667.00		667.07	0.000868	2.16	103.62	43.48	0.25
HIGGINS TRIB A	CUP	12	50-YEAR	310.00	662.72	667.59		667.67	0.000889	2.37	130.84	48.79	0.25
HIGGINS TRIB A	CUP	12	100-YEAR	344.00	662.72	667.79		667.88	0.000881	2.44	141.05	50.70	0.26
HIGGINS TRIB A	CUP	12	500-YEAR	416.00	662.72	668.19		668.29	0.000830	2.58	161.89	54.66	0.25
HIGGINS TRIB A	CUP	11	10-YEAR	224.00	663.02	666.55		666.83	0.003496	4.22	53.10	22.97	0.49
HIGGINS TRIB A	CUP	11	50-YEAR	310.00	663.02	667.08		667.42	0.003725	4.73	65.57	24.95	0.51
HIGGINS TRIB A	CUP	11	100-YEAR	344.00	663.02	667.26		667.63	0.003798	4.90	70.20	25.65	0.52
HIGGINS TRIB A	CUP	11	500-YEAR	416.00	663.02	667.61		668.04	0.003931	5.23	79.59	27.00	0.54
HIGGINS TRIB A	CUP	10	10-YEAR	224.00	662.72	666.03		666.31	0.003963	4.25	52.75	25.19	0.52
HIGGINS TRIB A	CUP	10	50-YEAR	310.00	662.72	666.54		666.89	0.003931	4.89	66.12	26.84	0.53
HIGGINS TRIB A	CUP	10	100-YEAR	344.00	662.72	666.72		667.09	0.003948	4.85	70.96	27.41	0.53
HIGGINS TRIB A	CUP	10	500-YEAR	416.00	662.72	667.07		667.48	0.004005	5.16	80.59	28.51	0.54
HIGGINS TRIB A	CUP	9	10-YEAR	224.00	662.22	665.48		665.75	0.004112	4.15	54.02	27.71	0.52
HIGGINS TRIB A	CUP	9	50-YEAR	310.00	662.22	666.04		666.34	0.003818	4.40	70.40	31.16	0.52
HIGGINS TRIB A	CUP	9	100-YEAR	344.00	662.22	666.23		666.54	0.003758	4.50	76.42	32.34	0.52
HIGGINS TRIB A	CUP	9	500-YEAR	416.00	662.22	666.59		666.93	0.003696	4.70	88.44	34.56	0.52
HIGGINS TRIB A	CUP	8	10-YEAR	224.00	661.02	665.28		665.37	0.001464	2.48	90.47	35.12	0.27
HIGGINS TRIB A	CUP	8	50-YEAR	310.00	661.02	665.83		665.95	0.001602	2.80	110.71	38.13	0.29
HIGGINS TRIB A	CUP	8	100-YEAR	344.00	661.02	666.02		666.15	0.001656	2.92	117.95	39.16	0.30
HIGGINS TRIB A	CUP	8	500-YEAR	416.00	661.02	666.37		666.53	0.001774	3.15	132.09	41.08	0.31
HIGGINS TRIB A	CUP	7	10-YEAR	224.00	661.02	665.03		665.22	0.003520	3.45	64.99	32.01	0.43
HIGGINS TRIB A	CUP	7	50-YEAR	310.00	661.02	665.58		665.78	0.003808	3.66	84.74	40.70	0.45

HEC-RAS Plan: PerrntElmSlab0712 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	1	10-YEAR	294.00	650.22	656.42	653.02	656.50	0.000859	2.36	126.56	500.31	0.19
HIGGINS TRIB A	CUP	1	50-YEAR	407.00	650.22	657.93	653.54	658.02	0.000638	2.45	168.84	500.58	0.17
HIGGINS TRIB A	CUP	1	100-YEAR	452.00	650.22	659.16	653.70	659.23	0.000426	2.25	203.24	500.81	0.14
HIGGINS TRIB A	CUP	1	500-YEAR	574.00	650.22	660.13	654.12	660.22	0.000454	2.52	230.41	500.98	0.15
HIGGINS CK	2	6.443	10-YEAR	275.00	652.09	657.56		657.59	0.001014	1.53	200.96	72.18	0.15
HIGGINS CK	2	6.443	50-YEAR	400.00	652.09	658.67		658.70	0.000743	1.58	284.54	78.49	0.14
HIGGINS CK	2	6.443	100-YEAR	461.00	652.09	659.58		659.61	0.000487	1.46	368.64	83.40	0.11
HIGGINS CK	2	6.443	500-YEAR	548.00	652.09	660.47		660.49	0.000388	1.45	434.52	88.13	0.10
HIGGINS CK	2	6.404	10-YEAR	275.00	652.60	657.13		657.24	0.003469	2.59	110.12	56.77	0.28
HIGGINS CK	2	6.404	50-YEAR	400.00	652.60	658.40		658.47	0.001734	2.28	205.31	82.11	0.20
HIGGINS CK	2	6.404	100-YEAR	461.00	652.60	659.43		659.48	0.000898	1.87	290.58	83.70	0.15
HIGGINS CK	2	6.404	500-YEAR	548.00	652.60	660.35		660.39	0.000641	1.74	368.53	85.13	0.13
HIGGINS CK	2	6.353	10-YEAR	275.00	650.86	656.78		656.81	0.000817	1.40	195.89	59.04	0.14
HIGGINS CK	2	6.353	50-YEAR	400.00	650.86	658.17		658.20	0.000609	1.41	284.64	66.75	0.12
HIGGINS CK	2	6.353	100-YEAR	461.00	650.86	659.30		659.32	0.000371	1.26	374.13	94.22	0.10
HIGGINS CK	2	6.353	500-YEAR	548.00	650.86	660.25		660.28	0.000282	1.23	476.98	127.55	0.09
HIGGINS CK	2	6.287	10-YEAR	275.00	650.90	656.49		656.52	0.000854	1.31	209.33	74.88	0.14
HIGGINS CK	2	6.287	50-YEAR	400.00	650.90	658.00		658.02	0.000439	1.19	344.93	106.96	0.11
HIGGINS CK	2	6.287	100-YEAR	461.00	650.90	659.21		659.23	0.000200	0.96	552.81	178.00	0.07
HIGGINS CK	2	6.287	500-YEAR	548.00	650.90	660.20		660.21	0.000134	0.88	728.32	178.00	0.06
HIGGINS CK	MAINSTEM	6.245	10-YEAR	562.00	651.02	656.43		656.48	0.000106	2.07	588.00	214.01	0.16
HIGGINS CK	MAINSTEM	6.245	50-YEAR	810.00	651.02	657.95		657.99	0.000077	2.05	951.68	265.29	0.14
HIGGINS CK	MAINSTEM	6.245	100-YEAR	911.00	651.02	659.18		659.21	0.000047	1.76	1298.39	288.00	0.11
HIGGINS CK	MAINSTEM	6.245	500-YEAR	1253.00	651.02	660.15		660.19	0.000053	2.00	1579.64	288.00	0.12
HIGGINS CK	MAINSTEM	6.231	10-YEAR	562.00	652.15	656.44		656.47	0.000048	1.26	458.71	136.17	0.11
HIGGINS CK	MAINSTEM	6.231	50-YEAR	810.00	652.15	657.96		657.98	0.000034	1.30	703.90	191.65	0.10
HIGGINS CK	MAINSTEM	6.231	100-YEAR	911.00	652.15	659.18		659.20	0.000021	1.17	954.39	208.00	0.08
HIGGINS CK	MAINSTEM	6.231	500-YEAR	1253.00	652.15	660.16		660.19	0.000025	1.38	1157.26	208.00	0.09
HIGGINS CK	MAINSTEM	6.179	10-YEAR	562.00	651.56	656.33		656.43	0.000227	2.58	217.73	152.75	0.24
HIGGINS CK	MAINSTEM	6.179	50-YEAR	810.00	651.56	657.86		657.96	0.000150	2.56	365.65	224.92	0.20
HIGGINS CK	MAINSTEM	6.179	100-YEAR	911.00	651.56	659.13		659.19	0.000072	2.07	690.67	271.39	0.15
HIGGINS CK	MAINSTEM	6.179	500-YEAR	1253.00	651.56	660.11		660.17	0.000071	2.26	956.87	274.32	0.15
HIGGINS CK	MAINSTEM	6.069	10-YEAR	562.00	650.55	656.27		656.33	0.000112	1.97	285.17	68.24	0.17
HIGGINS CK	MAINSTEM	6.069	50-YEAR	810.00	650.55	657.82		657.88	0.000083	2.06	410.38	108.48	0.15
HIGGINS CK	MAINSTEM	6.069	100-YEAR	911.00	650.55	659.10		659.15	0.000051	1.85	599.17	180.00	0.12
HIGGINS CK	MAINSTEM	6.069	500-YEAR	1253.00	650.55	660.06		660.13	0.000060	2.18	772.49	180.00	0.14

HEC-RAS Plan: PermIEImSlab0712 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	6.035	10-YEAR	562.00	651.21	656.19		656.30	0.000242	2.74	233.02	92.47	0.25
HIGGINS CK	MAINSTEM	6.035	50-YEAR	810.00	651.21	657.76		657.86	0.000140	2.63	384.72	139.29	0.20
HIGGINS CK	MAINSTEM	6.035	100-YEAR	911.00	651.21	659.07		659.14	0.000079	2.29	517.48	144.51	0.16
HIGGINS CK	MAINSTEM	6.035	500-YEAR	1253.00	651.21	660.02		660.12	0.000092	2.69	618.84	148.32	0.17
HIGGINS CK	MAINSTEM	6.034	10-YEAR	562.00	651.79	655.24	655.24	656.21	0.001835	8.28	101.58	72.70	0.94
HIGGINS CK	MAINSTEM	6.034	50-YEAR	810.00	651.79	657.53		657.84	0.000282	5.08	308.99	138.37	0.41
HIGGINS CK	MAINSTEM	6.034	100-YEAR	911.00	651.79	658.94		659.13	0.000129	4.10	451.26	144.00	0.29
HIGGINS CK	MAINSTEM	6.034	500-YEAR	1253.00	651.79	659.86		660.10	0.000143	4.74	548.55	147.67	0.32
HIGGINS CK	MAINSTEM	6.033	10-YEAR	562.00	651.61	655.00	654.76	655.61	0.001358	6.87	131.53	128.49	0.81
HIGGINS CK	MAINSTEM	6.033	50-YEAR	810.00	651.61	657.61		657.80	0.000168	4.07	358.48	138.96	0.33
HIGGINS CK	MAINSTEM	6.033	100-YEAR	911.00	651.61	658.97		659.11	0.000088	3.47	487.65	144.42	0.25
HIGGINS CK	MAINSTEM	6.033	500-YEAR	1253.00	651.61	659.90		660.08	0.000101	4.09	579.30	148.12	0.27
HIGGINS CK	MAINSTEM	6.032	10-YEAR	562.00	647.83	655.39		655.44	0.000118	1.82	369.87	131.48	0.13
HIGGINS CK	MAINSTEM	6.032	50-YEAR	810.00	647.83	657.72		657.76	0.000072	1.76	577.32	140.79	0.11
HIGGINS CK	MAINSTEM	6.032	100-YEAR	911.00	647.83	659.04		659.08	0.000052	1.65	705.45	146.11	0.09
HIGGINS CK	MAINSTEM	6.032	500-YEAR	1253.00	647.83	659.99		660.04	0.000069	2.02	801.11	149.90	0.11
HIGGINS CK	MAINSTEM	6.021	10-YEAR	564.00	649.42	655.20		655.41	0.000905	3.67	153.66	37.78	0.32
HIGGINS CK	MAINSTEM	6.021	50-YEAR	810.00	649.42	657.59		657.74	0.000401	3.12	278.45	65.80	0.23
HIGGINS CK	MAINSTEM	6.021	100-YEAR	915.00	649.42	658.96		659.07	0.000247	2.75	361.79	74.82	0.18
HIGGINS CK	MAINSTEM	6.021	500-YEAR	1258.00	649.42	659.87		660.03	0.000299	3.29	419.33	78.48	0.21
HIGGINS CK	MAINSTEM	6.006	10-YEAR	564.00	648.55	655.20		655.32	0.000590	2.75	207.90	53.07	0.22
HIGGINS CK	MAINSTEM	6.006	50-YEAR	810.00	648.55	657.60		657.70	0.000306	2.50	342.86	65.33	0.17
HIGGINS CK	MAINSTEM	6.006	100-YEAR	915.00	648.55	658.96		659.04	0.000204	2.31	430.60	82.94	0.14
HIGGINS CK	MAINSTEM	6.006	500-YEAR	1258.00	648.55	659.87		659.99	0.000262	2.81	499.51	222.25	0.17
HIGGINS CK	MAINSTEM	5.9994*	10-YEAR	564.00	648.38	655.19	651.21	655.30	0.000478	2.61	216.21	55.41	0.20
HIGGINS CK	MAINSTEM	5.9994*	50-YEAR	810.00	648.38	657.59	651.85	657.69	0.000278	2.50	326.58	66.40	0.17
HIGGINS CK	MAINSTEM	5.9994*	100-YEAR	915.00	648.38	658.94		659.03	0.000196	2.36	402.26	86.99	0.14
HIGGINS CK	MAINSTEM	5.9994*	500-YEAR	1258.00	648.38	659.85		659.98	0.000258	2.90	463.82	265.54	0.17
HIGGINS CK	MAINSTEM	5.9950	10-YEAR	564.00	648.21	655.18	651.05	655.29	0.000386	2.58	218.37	58.32	0.19
HIGGINS CK	MAINSTEM	5.9950	50-YEAR	810.00	648.21	657.57	651.66	657.68	0.000250	2.62	309.07	76.38	0.16
HIGGINS CK	MAINSTEM	5.9950	100-YEAR	915.00	648.21	658.95	651.90	659.02	0.000163	2.18	453.74	104.04	0.13
HIGGINS CK	MAINSTEM	5.9950	500-YEAR	1258.00	648.21	659.86	652.59	659.95	0.000189	2.58	666.54	405.00	0.15
HIGGINS CK	MAINSTEM	5.981	Bridge										
HIGGINS CK	MAINSTEM	5.972	10-YEAR	645.00	647.90	654.95	651.45	655.11	0.000597	3.11	207.14	64.26	0.24
HIGGINS CK	MAINSTEM	5.972	50-YEAR	1100.00	647.90	657.40	652.41	657.61	0.000504	3.66	300.16	528.75	0.23
HIGGINS CK	MAINSTEM	5.972	100-YEAR	1320.00	647.90	658.67	652.82	658.74	0.000213	2.45	990.84	634.84	0.15
HIGGINS CK	MAINSTEM	5.972	500-YEAR	1930.00	647.90	659.64	653.82	659.72	0.000232	2.75	1360.41	647.79	0.16

HEC-RAS Plan: PermiElmSlab0712 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	5.959	10-YEAR	645.00	647.58	654.95		655.04	0.000431	2.49	263.79	64.56	0.20
HIGGINS CK	MAINSTEM	5.959	50-YEAR	1100.00	647.58	657.43		657.54	0.000293	2.69	493.39	371.48	0.17
HIGGINS CK	MAINSTEM	5.959	100-YEAR	1320.00	647.58	658.82		658.72	0.000237	2.67	715.91	552.40	0.16
HIGGINS CK	MAINSTEM	5.959	500-YEAR	1930.00	647.58	659.56		659.69	0.000288	3.15	1081.37	656.51	0.18
HIGGINS CK	MAINSTEM	5.950	10-YEAR	645.00	647.42	654.92		655.02	0.000483	2.60	251.65	61.84	0.21
HIGGINS CK	MAINSTEM	5.950	50-YEAR	1100.00	647.42	657.41		657.52	0.000318	2.77	477.81	322.53	0.18
HIGGINS CK	MAINSTEM	5.950	100-YEAR	1320.00	647.42	658.60		658.71	0.000254	2.74	696.46	535.40	0.16
HIGGINS CK	MAINSTEM	5.950	500-YEAR	1930.00	647.42	659.55		659.68	0.000303	3.21	1104.99	697.03	0.18
HIGGINS CK	MAINSTEM	5.914	10-YEAR	645.00	647.31	654.83	650.92	654.93	0.000460	2.56	252.49	57.48	0.20
HIGGINS CK	MAINSTEM	5.914	50-YEAR	1100.00	647.31	657.33	651.92	657.46	0.000342	2.90	382.27	94.69	0.19
HIGGINS CK	MAINSTEM	5.914	100-YEAR	1320.00	647.31	658.54	652.32	658.66	0.000274	2.82	575.20	338.33	0.17
HIGGINS CK	MAINSTEM	5.914	500-YEAR	1930.00	647.31	659.44	653.85	659.61	0.000363	3.47	865.55	530.42	0.20
HIGGINS CK	MAINSTEM	5.911		Culvert									
HIGGINS CK	MAINSTEM	5.899	10-YEAR	645.00	647.30	654.28	650.97	654.54	0.000926	4.15	155.39	50.17	0.30
HIGGINS CK	MAINSTEM	5.899	50-YEAR	1100.00	647.30	656.28	652.12	656.71	0.001029	5.30	207.41	79.89	0.33
HIGGINS CK	MAINSTEM	5.899	100-YEAR	1320.00	647.30	657.23	652.62	657.74	0.001016	5.68	232.27	95.77	0.34
HIGGINS CK	MAINSTEM	5.899	500-YEAR	1930.00	647.30	658.50	653.85	658.90	0.000852	5.22	537.49	321.74	0.30
HIGGINS CK	MAINSTEM	5.86375*	10-YEAR	645.00	647.10	654.19		654.33	0.000725	2.96	218.14	49.51	0.25
HIGGINS CK	MAINSTEM	5.86375*	50-YEAR	1100.00	647.10	656.27		656.44	0.000563	3.35	361.17	97.68	0.23
HIGGINS CK	MAINSTEM	5.86375*	100-YEAR	1320.00	647.10	657.26		657.44	0.000468	3.36	476.54	131.66	0.22
HIGGINS CK	MAINSTEM	5.86375*	500-YEAR	1930.00	647.10	658.47		658.69	0.000544	4.00	655.36	166.88	0.24
HIGGINS CK	MAINSTEM	5.8285*	10-YEAR	645.00	646.90	654.06		654.19	0.000705	2.95	218.88	48.83	0.25
HIGGINS CK	MAINSTEM	5.8285*	50-YEAR	1100.00	646.90	656.17		656.34	0.000556	3.34	360.20	99.73	0.23
HIGGINS CK	MAINSTEM	5.8285*	100-YEAR	1320.00	646.90	657.19		657.36	0.000457	3.34	495.00	162.50	0.21
HIGGINS CK	MAINSTEM	5.8285*	500-YEAR	1930.00	646.90	658.37		658.58	0.000515	3.91	726.74	226.15	0.23
HIGGINS CK	MAINSTEM	5.79325*	10-YEAR	645.00	646.70	653.93		654.06	0.000685	2.93	219.99	48.21	0.24
HIGGINS CK	MAINSTEM	5.79325*	50-YEAR	1100.00	646.70	656.07		656.24	0.000548	3.32	357.83	89.46	0.23
HIGGINS CK	MAINSTEM	5.79325*	100-YEAR	1320.00	646.70	657.11		657.27	0.000455	3.34	494.26	186.91	0.21
HIGGINS CK	MAINSTEM	5.79325*	500-YEAR	1930.00	646.70	658.28		658.49	0.000499	3.85	782.34	288.04	0.23
HIGGINS CK	MAINSTEM	5.758	10-YEAR	645.00	646.50	653.81	650.19	653.94	0.000664	2.91	221.52	47.67	0.24
HIGGINS CK	MAINSTEM	5.758	50-YEAR	1100.00	646.50	655.96	651.21	656.13	0.000548	3.32	340.75	87.32	0.23
HIGGINS CK	MAINSTEM	5.758	100-YEAR	1320.00	646.50	657.02	651.64	657.19	0.000460	3.36	475.78	196.60	0.21
HIGGINS CK	MAINSTEM	5.758	500-YEAR	1930.00	646.50	658.19	652.70	658.39	0.000495	3.84	834.29	390.48	0.23
HIGGINS CK	MAINSTEM	5.721		Culvert									
HIGGINS CK	MAINSTEM	5.683	10-YEAR	645.00	646.23	653.10	649.46	653.31	0.000681	3.63	177.63	53.84	0.26

HEC-RAS Plan: PermiElmSlab0712 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Cnl
HIGGINS CK	MAINSTEM	5.683	50-YEAR	1100.00	646.23	654.54	650.51	654.93	0.000981	5.01	219.35	65.41	0.32
HIGGINS CK	MAINSTEM	5.683	100-YEAR	1320.00	646.23	655.27	650.99	655.74	0.001039	5.49	240.49	77.16	0.34
HIGGINS CK	MAINSTEM	5.683	500-YEAR	1930.00	646.23	657.03	652.15	657.20	0.000544	3.49	836.91	488.26	0.23
HIGGINS CK	MAINSTEM	5.650	10-YEAR	645.00	646.10	653.04		653.15	0.000586	2.72	237.37	52.38	0.22
HIGGINS CK	MAINSTEM	5.650	50-YEAR	1100.00	646.10	654.50		654.69	0.000715	3.45	324.35	74.73	0.26
HIGGINS CK	MAINSTEM	5.650	100-YEAR	1320.00	646.10	655.26		655.46	0.000660	3.61	389.23	95.53	0.25
HIGGINS CK	MAINSTEM	5.650	500-YEAR	1930.00	646.10	656.88		657.10	0.000564	3.88	709.51	316.82	0.24
HIGGINS CK	MAINSTEM	5.649	10-YEAR	645.00	646.50	653.04		653.15	0.000587	2.69	240.15	53.74	0.22
HIGGINS CK	MAINSTEM	5.649	50-YEAR	1100.00	646.50	654.50		654.68	0.000732	3.41	322.76	59.25	0.26
HIGGINS CK	MAINSTEM	5.649	100-YEAR	1320.00	646.50	655.26		655.46	0.000688	3.58	376.11	87.62	0.25
HIGGINS CK	MAINSTEM	5.649	500-YEAR	1930.00	646.50	656.88		657.09	0.000585	3.85	693.40	314.39	0.24
HIGGINS CK	MAINSTEM	5.593	10-YEAR	645.00	645.87	652.89		652.99	0.000499	2.56	251.51	53.41	0.21
HIGGINS CK	MAINSTEM	5.593	50-YEAR	1100.00	645.87	654.31		654.48	0.000628	3.32	333.98	65.59	0.24
HIGGINS CK	MAINSTEM	5.593	100-YEAR	1320.00	645.87	655.08		655.27	0.000595	3.51	390.71	95.91	0.24
HIGGINS CK	MAINSTEM	5.593	500-YEAR	1930.00	645.87	656.70		656.93	0.000546	3.89	675.13	284.04	0.24
HIGGINS CK	MAINSTEM	5.558	10-YEAR	907.00	646.30	652.84		652.84	0.001048	3.59	252.90	56.77	0.30
HIGGINS CK	MAINSTEM	5.558	50-YEAR	1394.00	646.30	654.05		654.31	0.001074	4.14	337.35	65.38	0.31
HIGGINS CK	MAINSTEM	5.558	100-YEAR	1623.00	646.30	654.85		655.12	0.000915	4.18	396.70	82.51	0.30
HIGGINS CK	MAINSTEM	5.558	500-YEAR	2270.00	646.30	656.50		656.80	0.000762	4.46	643.44	264.78	0.28
HIGGINS CK	MAINSTEM	5.500	10-YEAR	907.00	645.54	652.21		652.47	0.001342	4.07	222.89	49.62	0.34
HIGGINS CK	MAINSTEM	5.500	50-YEAR	1394.00	645.54	653.58		653.92	0.001447	4.73	294.60	56.24	0.36
HIGGINS CK	MAINSTEM	5.500	100-YEAR	1623.00	645.54	654.45		654.80	0.001184	4.73	348.40	69.38	0.33
HIGGINS CK	MAINSTEM	5.500	500-YEAR	2270.00	645.54	656.12		656.52	0.001001	5.10	508.18	141.05	0.32
HIGGINS CK	MAINSTEM	5.496	10-YEAR	907.00	645.80	652.14		652.44	0.001614	4.34	209.14	48.54	0.37
HIGGINS CK	MAINSTEM	5.496	50-YEAR	1394.00	645.80	653.50		653.89	0.001697	5.01	278.48	53.82	0.39
HIGGINS CK	MAINSTEM	5.496	100-YEAR	1623.00	645.80	654.38		654.77	0.001386	4.96	330.71	67.68	0.36
HIGGINS CK	MAINSTEM	5.496	500-YEAR	2270.00	645.80	656.07		656.49	0.001131	5.29	490.37	146.03	0.34
HIGGINS CK	MAINSTEM	5.409	10-YEAR	907.00	645.02	651.39		651.69	0.001650	4.39	206.51	47.89	0.37
HIGGINS CK	MAINSTEM	5.409	50-YEAR	1394.00	645.02	652.68		653.09	0.001793	5.14	271.20	52.49	0.40
HIGGINS CK	MAINSTEM	5.409	100-YEAR	1623.00	645.02	653.76		654.14	0.001351	4.92	331.41	60.92	0.35
HIGGINS CK	MAINSTEM	5.409	500-YEAR	2270.00	645.02	655.57		655.99	0.001069	5.22	462.90	83.50	0.33
HIGGINS CK	MAINSTEM	5.408	10-YEAR	907.00	645.30	651.36		651.68	0.001845	4.54	199.62	47.93	0.39
HIGGINS CK	MAINSTEM	5.408	50-YEAR	1394.00	645.30	652.64		653.08	0.001959	5.27	264.60	52.92	0.42
HIGGINS CK	MAINSTEM	5.408	100-YEAR	1623.00	645.30	653.74		654.13	0.001483	5.00	325.00	58.29	0.37
HIGGINS CK	MAINSTEM	5.408	500-YEAR	2270.00	645.30	655.56		655.98	0.001130	5.24	459.71	89.17	0.34
HIGGINS CK	MAINSTEM	5.394	10-YEAR	907.00	645.30	651.42	648.17	651.54	0.000683	2.84	319.12	76.13	0.24
HIGGINS CK	MAINSTEM	5.394	50-YEAR	1394.00	645.30	652.75	648.93	652.92	0.000698	3.26	427.16	85.32	0.26

HEC-RAS Plan: PermtElmSlab0712 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	5.394	100-YEAR	1623.00	645.30	653.85	649.23	654.00	0.000492	3.12	523.93	91.07	0.22
HIGGINS CK	MAINSTEM	5.394	500-YEAR	2270.00	645.30	655.69	650.01	655.86	0.000398	3.34	701.88	102.79	0.21
HIGGINS CK	MAINSTEM	5.364	Bridge										
HIGGINS CK	MAINSTEM	5.335	10-YEAR	907.00	645.30	650.81	647.81	650.94	0.002135	2.92	310.68	74.67	0.25
HIGGINS CK	MAINSTEM	5.335	50-YEAR	1394.00	645.30	652.08	648.51	652.26	0.002262	3.39	411.80	98.26	0.27
HIGGINS CK	MAINSTEM	5.335	100-YEAR	1623.00	645.30	653.35	648.79	653.50	0.001469	3.10	539.91	151.83	0.22
HIGGINS CK	MAINSTEM	5.335	500-YEAR	2270.00	645.30	655.27	649.53	655.42	0.001133	3.20	739.49	1215.31	0.20
HIGGINS CK	MAINSTEM	5.324	10-YEAR	907.00	645.28	650.69		650.86	0.001031	3.32	273.21	90.24	0.30
HIGGINS CK	MAINSTEM	5.324	50-YEAR	1394.00	645.28	651.95		652.18	0.001014	3.79	374.28	119.14	0.30
HIGGINS CK	MAINSTEM	5.324	100-YEAR	1623.00	645.28	653.27		653.45	0.000509	3.37	516.93	229.59	0.24
HIGGINS CK	MAINSTEM	5.324	500-YEAR	2270.00	645.28	655.22		655.39	0.000412	3.35	792.93	608.75	0.21
HIGGINS CK	MAINSTEM	5.289	10-YEAR	907.00	645.20	650.56		650.69	0.000733	2.84	318.83	80.61	0.25
HIGGINS CK	MAINSTEM	5.289	50-YEAR	1394.00	645.20	651.83		652.00	0.000753	3.26	427.09	89.39	0.26
HIGGINS CK	MAINSTEM	5.289	100-YEAR	1623.00	645.20	653.21		653.34	0.000443	2.90	589.12	210.65	0.21
HIGGINS CK	MAINSTEM	5.289	500-YEAR	2270.00	645.20	655.19		655.31	0.000297	2.87	911.13	529.42	0.18
HIGGINS CK	MAINSTEM	5.256	10-YEAR	907.00	645.11	650.35		650.53	0.001051	3.37	268.77	68.53	0.30
HIGGINS CK	MAINSTEM	5.256	50-YEAR	1394.00	645.11	651.60		651.84	0.001140	3.87	360.17	79.34	0.32
HIGGINS CK	MAINSTEM	5.256	100-YEAR	1623.00	645.11	653.07		653.24	0.000719	3.30	492.12	103.54	0.26
HIGGINS CK	MAINSTEM	5.256	500-YEAR	2270.00	645.11	655.08		655.24	0.000446	3.25	745.48	450.24	0.22
HIGGINS CK	MAINSTEM	5.236	10-YEAR	907.00	645.20	650.21		650.40	0.001278	3.58	253.42	68.61	0.33
HIGGINS CK	MAINSTEM	5.236	50-YEAR	1394.00	645.20	651.45		651.70	0.001274	4.06	343.73	76.73	0.34
HIGGINS CK	MAINSTEM	5.236	100-YEAR	1623.00	645.20	652.97		653.16	0.000708	3.47	469.66	92.35	0.26
HIGGINS CK	MAINSTEM	5.236	500-YEAR	2270.00	645.20	655.01		655.19	0.000478	3.46	699.56	136.68	0.22
HIGGINS CK	MAINSTEM	5.184	10-YEAR	907.00	644.50	649.92		650.09	0.000997	3.32	273.46	68.68	0.29
HIGGINS CK	MAINSTEM	5.184	50-YEAR	1394.00	644.50	651.15		651.38	0.001066	3.84	362.97	76.73	0.31
HIGGINS CK	MAINSTEM	5.184	100-YEAR	1623.00	644.50	652.81		652.98	0.000596	3.25	499.56	87.60	0.24
HIGGINS CK	MAINSTEM	5.184	500-YEAR	2270.00	644.50	654.97		655.07	0.000299	2.74	1056.14	372.54	0.18
HIGGINS CK	MAINSTEM	5.166	10-YEAR	907.00	644.48	649.83		650.00	0.000998	3.31	274.13	69.14	0.29
HIGGINS CK	MAINSTEM	5.166	50-YEAR	1394.00	644.48	651.05		651.28	0.001077	3.83	364.27	78.08	0.31
HIGGINS CK	MAINSTEM	5.166	100-YEAR	1623.00	644.48	652.76		652.92	0.000586	3.19	508.55	90.57	0.24
HIGGINS CK	MAINSTEM	5.166	500-YEAR	2270.00	644.48	654.95		655.03	0.000251	2.53	1194.98	443.54	0.16
HIGGINS CK	MAINSTEM	5.144	10-YEAR	907.00	644.40	649.70		649.88	0.001050	3.37	268.79	68.35	0.30
HIGGINS CK	MAINSTEM	5.144	50-YEAR	1394.00	644.40	650.91		651.15	0.001124	3.91	366.48	76.32	0.32
HIGGINS CK	MAINSTEM	5.144	100-YEAR	1623.00	644.40	652.69		652.85	0.000589	3.23	502.47	88.01	0.24
HIGGINS CK	MAINSTEM	5.144	500-YEAR	2270.00	644.40	654.93		655.00	0.000237	2.44	1278.15	505.06	0.16
HIGGINS CK	MAINSTEM	5.094	10-YEAR	907.00	643.10	649.50		649.64	0.000706	2.92	310.21	72.76	0.25

HEC-RAS Plan: PermtElmSlab0712 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froutde # Chl
HIGGINS CK	MAINSTEM	5.094	50-YEAR	1394.00	643.10	650.69		650.88	0.000810	3.47	401.50	80.49	0.27
HIGGINS CK	MAINSTEM	5.094	100-YEAR	1623.00	643.10	652.58		652.71	0.000431	2.87	565.33	94.63	0.21
HIGGINS CK	MAINSTEM	5.094	500-YEAR	2270.00	643.10	654.89		654.95	0.000159	2.13	1575.45	687.92	0.13
HIGGINS CK	MAINSTEM	5.049	10-YEAR	907.00	643.43	649.33		649.47	0.000710	2.96	305.93	70.33	0.25
HIGGINS CK	MAINSTEM	5.049	50-YEAR	1394.00	643.43	650.49		650.68	0.000835	3.56	391.03	76.77	0.28
HIGGINS CK	MAINSTEM	5.049	100-YEAR	1623.00	643.43	652.47		652.61	0.000416	2.93	555.50	98.33	0.20
HIGGINS CK	MAINSTEM	5.049	500-YEAR	2270.00	643.43	654.86		654.91	0.000140	2.10	1742.95	789.28	0.12
HIGGINS CK	MAINSTEM	5.045	10-YEAR	571.00	643.80	649.37		649.43	0.000355	2.03	281.13	67.84	0.18
HIGGINS CK	MAINSTEM	5.045	50-YEAR	750.00	643.80	650.57		650.63	0.000287	2.05	366.17	74.03	0.16
HIGGINS CK	MAINSTEM	5.045	100-YEAR	1000.00	643.80	652.52		652.58	0.000188	1.92	520.36	85.37	0.14
HIGGINS CK	MAINSTEM	5.045	500-YEAR	2000.00	643.80	654.86		654.90	0.000122	1.92	1681.73	789.30	0.12
HIGGINS CK	MAINSTEM	5.020	10-YEAR	571.00	643.80	649.29	645.94	649.38	0.000365	2.35	243.24	67.46	0.19
HIGGINS CK	MAINSTEM	5.020	50-YEAR	750.00	643.80	650.49	646.26	650.59	0.000307	2.49	301.80	73.62	0.18
HIGGINS CK	MAINSTEM	5.020	100-YEAR	1000.00	643.80	652.44	646.67	652.54	0.000218	2.52	397.30	83.68	0.16
HIGGINS CK	MAINSTEM	5.020	500-YEAR	2000.00	643.80	654.85	648.05	654.89	0.000124	1.93	1668.68	789.17	0.12
HIGGINS CK	MAINSTEM	5.012		Culvert									
HIGGINS CK	MAINSTEM	5.005	10-YEAR	571.00	643.80	648.86	645.55	648.95	0.000381	2.40	237.44	91.06	0.19
HIGGINS CK	MAINSTEM	5.005	50-YEAR	750.00	643.80	649.68	645.88	649.80	0.000393	2.71	277.06	95.74	0.20
HIGGINS CK	MAINSTEM	5.005	100-YEAR	1000.00	643.80	650.93	646.30	651.07	0.000364	2.97	336.98	102.83	0.20
HIGGINS CK	MAINSTEM	5.005	500-YEAR	2000.00	643.80	654.85	647.68	654.87	0.000055	1.33	2503.48	1240.48	0.08
HIGGINS CK	MAINSTEM	4.992	10-YEAR	571.00	643.80	648.86		648.90	0.000204	1.53	372.24	91.10	0.13
HIGGINS CK	MAINSTEM	4.992	50-YEAR	750.00	643.80	649.70		649.74	0.000201	1.67	450.19	95.83	0.14
HIGGINS CK	MAINSTEM	4.992	100-YEAR	1000.00	643.80	650.96		651.01	0.000174	1.74	575.46	102.99	0.13
HIGGINS CK	MAINSTEM	4.992	500-YEAR	2000.00	643.80	654.84		654.86	0.000067	1.46	2180.78	1050.50	0.09
HIGGINS CK	MAINSTEM	4.980	10-YEAR	571.00	643.55	648.77		648.87	0.000620	2.53	225.47	59.23	0.23
HIGGINS CK	MAINSTEM	4.980	50-YEAR	750.00	643.55	649.60		649.71	0.000602	2.72	276.22	63.78	0.23
HIGGINS CK	MAINSTEM	4.980	100-YEAR	1000.00	643.55	650.86		650.98	0.000506	2.77	361.12	70.75	0.22
HIGGINS CK	MAINSTEM	4.980	500-YEAR	2000.00	643.55	654.82		654.86	0.000116	1.82	1952.27	1115.56	0.11
HIGGINS CK	MAINSTEM	4.966	10-YEAR	700.00	643.40	648.62		648.80	0.001152	3.42	204.89	54.41	0.31
HIGGINS CK	MAINSTEM	4.966	50-YEAR	920.00	643.40	649.44		649.64	0.001123	3.67	250.81	58.56	0.31
HIGGINS CK	MAINSTEM	4.966	100-YEAR	1260.00	643.40	650.69		650.92	0.000992	3.84	328.22	64.95	0.30
HIGGINS CK	MAINSTEM	4.966	500-YEAR	2140.00	643.40	654.81		654.85	0.000134	1.94	2056.93	1319.41	0.12
HIGGINS CK	MAINSTEM	4.944	10-YEAR	700.00	642.80	648.50		648.68	0.001027	3.36	208.08	51.43	0.29
HIGGINS CK	MAINSTEM	4.944	50-YEAR	920.00	642.80	649.31		649.52	0.001046	3.66	251.31	55.32	0.30
HIGGINS CK	MAINSTEM	4.944	100-YEAR	1260.00	642.80	650.57		650.81	0.000932	3.88	324.42	85.22	0.29
HIGGINS CK	MAINSTEM	4.944	500-YEAR	2140.00	642.80	654.80		654.83	0.000102	1.82	2404.70	1470.15	0.11

HEC-RAS Plan: PermiElmSlab0712 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	4.928	10-YEAR	700.00	642.48	648.43		648.59	0.000897	3.18	220.16	53.89	0.28
HIGGINS CK	MAINSTEM	4.928	50-YEAR	920.00	642.48	649.24		649.43	0.000923	3.47	265.35	57.92	0.29
HIGGINS CK	MAINSTEM	4.928	100-YEAR	1260.00	642.48	650.51		650.72	0.000853	3.67	343.20	64.56	0.28
HIGGINS CK	MAINSTEM	4.928	500-YEAR	2140.00	642.48	654.78		654.82	0.000137	2.00	2043.52	1412.67	0.12
HIGGINS CK	MAINSTEM	4.925	10-YEAR	700.00	643.00	648.38		648.57	0.001220	3.55	197.24	51.43	0.32
HIGGINS CK	MAINSTEM	4.925	50-YEAR	920.00	643.00	649.18		649.41	0.001210	3.83	240.38	55.48	0.32
HIGGINS CK	MAINSTEM	4.925	100-YEAR	1260.00	643.00	650.46		650.71	0.001070	4.00	315.18	61.87	0.31
HIGGINS CK	MAINSTEM	4.925	500-YEAR	2140.00	643.00	654.78		654.81	0.000113	1.81	2206.81	1524.84	0.11
HIGGINS CK	MAINSTEM	4.915	10-YEAR	700.00	643.00	648.38		648.49	0.000773	2.67	283.10	91.30	0.23
HIGGINS CK	MAINSTEM	4.915	50-YEAR	920.00	643.00	649.21		649.33	0.000733	2.85	360.24	96.24	0.23
HIGGINS CK	MAINSTEM	4.915	100-YEAR	1260.00	643.00	650.50		650.62	0.000619	2.95	489.71	104.00	0.21
HIGGINS CK	MAINSTEM	4.915	500-YEAR	2140.00	643.00	654.78		654.81	0.000107	1.75	3036.26	1437.79	0.10
HIGGINS CK	MAINSTEM	4.885	10-YEAR	700.00	642.90	648.25		648.37	0.000807	2.80	270.11	84.80	0.23
HIGGINS CK	MAINSTEM	4.885	50-YEAR	920.00	642.90	649.07		649.21	0.000772	3.01	341.68	89.94	0.23
HIGGINS CK	MAINSTEM	4.885	100-YEAR	1260.00	642.90	650.38		650.52	0.000625	3.15	485.95	154.52	0.22
HIGGINS CK	MAINSTEM	4.885	500-YEAR	2140.00	642.90	654.77		654.79	0.000095	1.73	3124.00	1298.27	0.09
HIGGINS CK	MAINSTEM	4.866	10-YEAR	700.00	642.40	648.15		648.28	0.000862	2.94	257.27	82.33	0.24
HIGGINS CK	MAINSTEM	4.866	50-YEAR	920.00	642.40	648.97		649.12	0.000839	3.17	326.83	86.18	0.24
HIGGINS CK	MAINSTEM	4.866	100-YEAR	1260.00	642.40	650.30		650.46	0.000678	3.31	465.31	137.22	0.23
HIGGINS CK	MAINSTEM	4.866	500-YEAR	2140.00	642.40	654.75		654.78	0.000105	1.84	3022.16	1328.52	0.10
HIGGINS CK	MAINSTEM	4.847	10-YEAR	700.00	642.00	648.07		648.19	0.000829	2.88	260.03	83.50	0.24
HIGGINS CK	MAINSTEM	4.847	50-YEAR	920.00	642.00	648.90		649.04	0.000811	3.11	330.94	87.76	0.24
HIGGINS CK	MAINSTEM	4.847	100-YEAR	1260.00	642.00	650.24		650.38	0.000854	3.07	470.91	135.67	0.24
HIGGINS CK	MAINSTEM	4.847	500-YEAR	2140.00	642.00	654.74		654.77	0.000105	1.66	2891.45	1318.44	0.10
HIGGINS CK	MAINSTEM	4.828	10-YEAR	700.00	641.90	648.01		648.11	0.000657	2.50	297.80	94.80	0.21
HIGGINS CK	MAINSTEM	4.828	50-YEAR	920.00	641.90	648.85		648.96	0.000636	2.68	379.31	100.60	0.21
HIGGINS CK	MAINSTEM	4.828	100-YEAR	1260.00	641.90	650.19		650.30	0.000528	2.76	522.58	131.11	0.20
HIGGINS CK	MAINSTEM	4.828	500-YEAR	2140.00	641.90	654.73		654.76	0.000090	1.66	3006.86	1350.31	0.09
HIGGINS CK	MAINSTEM	4.801	10-YEAR	700.00	642.50	647.86		648.00	0.000992	2.95	251.48	87.91	0.26
HIGGINS CK	MAINSTEM	4.801	50-YEAR	920.00	642.50	648.70		648.85	0.000913	3.12	327.43	92.90	0.25
HIGGINS CK	MAINSTEM	4.801	100-YEAR	1260.00	642.50	650.07		650.21	0.000718	3.15	460.23	107.74	0.23
HIGGINS CK	MAINSTEM	4.801	500-YEAR	2140.00	642.50	654.71		654.74	0.000111	1.83	2816.66	1360.67	0.10
HIGGINS CK	MAINSTEM	4.783	10-YEAR	700.00	642.00	647.78		647.90	0.000852	2.83	260.41	86.96	0.24
HIGGINS CK	MAINSTEM	4.783	50-YEAR	920.00	642.00	648.62		648.76	0.000808	3.02	336.44	92.51	0.24
HIGGINS CK	MAINSTEM	4.783	100-YEAR	1260.00	642.00	650.01		650.14	0.000655	3.07	469.97	101.07	0.22
HIGGINS CK	MAINSTEM	4.783	500-YEAR	2140.00	642.00	654.70		654.73	0.000112	1.87	2680.93	1337.48	0.10
HIGGINS CK	MAINSTEM	4.774	10-YEAR	700.00	642.50	647.72		647.86	0.001098	3.06	242.36	87.34	0.27

HEC-RAS Plan: PermtElmSlab0712 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Mfn Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	4.668	10-YEAR	424.00	640.20	646.20	642.68	646.40	0.000874	3.57	118.67	51.77	0.26
HIGGINS CK	MAINSTEM	4.668	50-YEAR	445.00	640.20	647.21	642.75	647.37	0.000571	3.21	138.79	74.77	0.21
HIGGINS CK	MAINSTEM	4.668	100-YEAR	460.00	640.20	648.65	642.80	648.77	0.000325	2.74	167.69	94.45	0.17
HIGGINS CK	MAINSTEM	4.668	500-YEAR	600.00	640.20	654.64	643.30	654.65	0.000017	0.69	1544.78	819.18	0.04
HIGGINS CK	MAINSTEM	4.664	10-YEAR	444.00	640.20	646.23	642.63	646.35	0.000584	2.76	160.60	51.93	0.21
HIGGINS CK	MAINSTEM	4.664	50-YEAR	485.00	640.20	647.23	642.75	647.33	0.000401	2.56	189.59	75.45	0.18
HIGGINS CK	MAINSTEM	4.664	100-YEAR	700.00	640.20	648.61	643.32	648.75	0.000440	3.05	229.68	94.19	0.19
HIGGINS CK	MAINSTEM	4.664	500-YEAR	1600.00	640.20	654.59	645.24	654.63	0.000126	1.87	1499.99	819.05	0.10
HIGGINS CK	MAINSTEM	4.659	10-YEAR	444.00	638.42	646.26	640.56	646.30	0.000105	1.41	315.20	57.84	0.09
HIGGINS CK	MAINSTEM	4.659	50-YEAR	485.00	638.42	647.26	640.66	647.29	0.000081	1.35	358.94	63.17	0.08
HIGGINS CK	MAINSTEM	4.659	100-YEAR	700.00	638.42	648.65	641.09	648.70	0.000100	1.67	420.34	71.98	0.09
HIGGINS CK	MAINSTEM	4.659	500-YEAR	1600.00	638.42	654.60	642.55	654.62	0.000053	1.38	2126.26	819.07	0.07
HIGGINS CK	MAINSTEM	4.639	10-YEAR	444.00	640.20	646.19	642.65	646.26	0.000568	2.19	202.37	51.69	0.19
HIGGINS CK	MAINSTEM	4.639	50-YEAR	485.00	640.20	647.21	642.77	647.26	0.000320	1.91	253.40	74.79	0.15
HIGGINS CK	MAINSTEM	4.639	100-YEAR	700.00	640.20	648.60	643.36	648.67	0.000297	2.17	323.00	94.13	0.15
HIGGINS CK	MAINSTEM	4.639	500-YEAR	1600.00	640.20	654.56	645.18	654.61	0.000125	1.86	1462.51	668.80	0.10
HIGGINS CK	MAINSTEM	4.638	10-YEAR	444.00	640.80	646.19	643.18	646.26	0.000489	2.10	211.75	62.92	0.18
HIGGINS CK	MAINSTEM	4.638	50-YEAR	485.00	640.80	647.21	643.27	647.26	0.000284	1.85	262.73	67.91	0.14
HIGGINS CK	MAINSTEM	4.638	100-YEAR	700.00	640.80	648.60	643.71	648.67	0.000271	2.11	332.33	80.06	0.14
HIGGINS CK	MAINSTEM	4.638	500-YEAR	1600.00	640.80	654.54	645.13	654.60	0.000113	2.03	1249.66	660.12	0.10
HIGGINS CK	MAINSTEM	4.626		Culvert									
HIGGINS CK	MAINSTEM	4.612	10-YEAR	444.00	641.80	645.49	644.06	645.76	0.002991	4.18	106.10	39.87	0.42
HIGGINS CK	MAINSTEM	4.612	50-YEAR	485.00	641.80	646.82	644.18	646.98	0.001075	3.18	152.73	45.38	0.27
HIGGINS CK	MAINSTEM	4.612	100-YEAR	700.00	641.80	648.14	644.71	648.33	0.000930	3.52	198.80	50.83	0.26
HIGGINS CK	MAINSTEM	4.612	500-YEAR	1600.00	641.80	653.11	646.48	653.24	0.000408	2.88	668.01	153.98	0.18
HIGGINS CK	MAINSTEM	4.611	10-YEAR	444.00	642.03	645.51	643.99	645.68	0.002288	3.34	132.97	50.65	0.36
HIGGINS CK	MAINSTEM	4.611	50-YEAR	485.00	642.03	646.84	644.10	646.93	0.000739	2.98	203.47	58.69	0.22
HIGGINS CK	MAINSTEM	4.611	100-YEAR	700.00	642.03	648.18	644.57	648.27	0.000560	2.52	277.80	66.84	0.20
HIGGINS CK	MAINSTEM	4.611	500-YEAR	1600.00	642.03	653.13	646.05	653.21	0.000227	2.27	820.75	173.79	0.14
HIGGINS CK	MAINSTEM	4.588	10-YEAR	454.00	641.80	645.12	641.80	645.35	0.003110	3.82	118.96	46.50	0.42
HIGGINS CK	MAINSTEM	4.588	50-YEAR	503.00	641.80	646.74	641.80	646.84	0.000838	2.51	200.65	54.69	0.23
HIGGINS CK	MAINSTEM	4.588	100-YEAR	730.00	641.80	648.09	641.80	648.20	0.000691	2.61	279.28	61.56	0.22
HIGGINS CK	MAINSTEM	4.588	500-YEAR	1666.00	641.80	653.07	641.80	653.17	0.000322	2.57	668.01	130.50	0.16
HIGGINS CK	MAINSTEM	4.569	10-YEAR	454.00	638.78	645.16	638.78	645.22	0.000352	2.05	244.81	64.30	0.16
HIGGINS CK	MAINSTEM	4.569	50-YEAR	503.00	638.78	646.75	638.78	646.79	0.000154	1.62	355.65	75.16	0.11
HIGGINS CK	MAINSTEM	4.569	100-YEAR	730.00	638.78	648.11	638.78	648.15	0.000157	1.85	463.63	84.41	0.11
HIGGINS CK	MAINSTEM	4.569	500-YEAR	1666.00	638.78	653.09	638.78	653.14	0.000112	2.14	992.88	143.96	0.10

HEC-RAS Plan: PermtElimSlab0712 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Mfn Ch El (ft)	W.S. Elev (ft)	Critl W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Chi
HIGGINS CK	MAINSTEM	4.542	10-YEAR	454.00	639.10	645.14		645.18	0.000183	1.67	312.35	68.37		0.12
HIGGINS CK	MAINSTEM	4.542	50-YEAR	503.00	639.10	646.74		646.77	0.000091	1.38	428.82	77.20		0.09
HIGGINS CK	MAINSTEM	4.542	100-YEAR	730.00	639.10	648.10		648.13	0.000102	1.62	538.30	84.67		0.10
HIGGINS CK	MAINSTEM	4.542	500-YEAR	1666.00	639.10	653.08		653.12	0.000088	2.02	1090.55	189.89		0.10
HIGGINS CK	MAINSTEM	4.537	10-YEAR	454.00	639.10	645.07	641.02	645.17	0.000430	2.54	179.04	67.95		0.18
HIGGINS CK	MAINSTEM	4.537	50-YEAR	503.00	639.10	646.68	641.17	646.76	0.000238	2.21	227.51	76.87		0.14
HIGGINS CK	MAINSTEM	4.537	100-YEAR	730.00	639.10	648.00	641.74	648.12	0.000294	2.73	287.04	84.19		0.16
HIGGINS CK	MAINSTEM	4.537	500-YEAR	1666.00	639.10	652.95	643.68	653.11	0.000249	3.38	588.71	724.28		0.16
HIGGINS CK	MAINSTEM	4.521		Multi Open										
HIGGINS CK	MAINSTEM	4.505	10-YEAR	454.00	637.50	644.33	639.34	644.40	0.000241	2.08	218.68	75.20		0.14
HIGGINS CK	MAINSTEM	4.505	50-YEAR	503.00	637.50	646.02	639.48	646.07	0.000142	1.85	272.57	85.11		0.11
HIGGINS CK	MAINSTEM	4.505	100-YEAR	730.00	637.50	648.58	640.03	646.68	0.000242	2.51	290.51	88.40		0.15
HIGGINS CK	MAINSTEM	4.505	500-YEAR	1666.00	637.50	649.44	641.88	649.73	0.000490	4.30	409.85	154.20		0.22
HIGGINS CK	MAINSTEM	4.485	10-YEAR	454.00	637.50	644.36	638.36	644.36	0.000020	0.53	855.23	150.34		0.04
HIGGINS CK	MAINSTEM	4.485	50-YEAR	503.00	637.50	646.04	638.42	646.04	0.000011	0.45	1118.36	162.91		0.03
HIGGINS CK	MAINSTEM	4.485	100-YEAR	730.00	637.50	648.62	638.67	646.63	0.000019	0.60	1214.11	167.25		0.04
HIGGINS CK	MAINSTEM	4.485	500-YEAR	1666.00	637.50	649.57	639.50	649.58	0.000035	0.95	1803.30	267.93		0.06

PROPOSED CONDITION
DESIGN MODEL INPUT CHANGES
FROM PERMIT MODEL

DESIGN PROP. COND. ELMHURST ROAD W/ SLAB BRIDGE

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
XXXXXXXX XXXX   X       XXX XXXX XXXXXX XXXX
X   X X       X       X   X   X   X   X
X   X X       X   X   X   X   X   X
X   X XXXXXX   XXXX   X   X   X   X XXXXX
  
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PROJECT DATA

Project Title: Higgins Creek Design & Permit Models
Project File : HigginsCreek-Des.prj
Run Date and Time: 7/10/2012 10:51:56 PM

Project in English units

Project Description:

ECWB Higgins Creek and Higgins Creek Trib. A CBBEL 05/2012
Proposed

Willow-Higgins Creek, Willow Creek, Higgins Creek, Cook County,
Illinois
Existing and Proposed Conditions OMP with As-Built Flood Control
Reservoir Conditions
10-, 50-, 100-, 500-, and 100-Year Floodway Storm
Event Flood Profiles
Christopher B. Burke Engineering, Ltd. 01/06

Updated for Final Willow Creek Relocation Alignment - OMP Project
Competition Phase for proposed conditions (short feeder culverts with open
channels through future western bypass area) - by HNTB/APS Consulting, Inc.
03/2010.

PLAN DATA

Plan Title: Design PR Elm Slab 070912
Plan File : n:\Idot\070404\Drain\Higgins Creek HR & HEC-RAS\Working Models\HEC-RAS for IDOT
071112\HigginsCreek-Des.p10

Geometry Title: Design PR Elm Slab 070912
Geometry File : n:\Idot\070404\Drain\Higgins Creek HR & HEC-RAS\Working Models\HEC-RAS for IDOT
071112\HigginsCreek-Des.g02

Flow Title : Higgins 06 Survey - FINAL WILLOW NAVD88
Flow File : n:\Idot\070404\Drain\Higgins Creek HR & HEC-RAS\Working Models\HEC-RAS for IDOT
071112\HigginsCreek-Des.f06

Plan Description:

Higgins Creek "Proposed Condition" with lower n-values to reflect the concrete
channel and 0.02 over open water. New structures for I-90 over Higgins Creek &
Trib. A, and Elmhurst Road, and Mt. Prospect Road over Higgins Creek.

Plan Summary Information:

Number of:	Cross Sections = 111	Multiple Openings = 1
	Culverts = 7	Inline Structures = 0
	Bridges = 2	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: Higgins 06 Survey - FINAL WILLOW NAVD88
 Flow File : n:\Idot\070404\Drain\Higgins Creek HR & HEC-RAS\Working Models\HEC-RAS for IDOT
 071112\HigginsCreek-Des.f06

Flow Data (cfs)

River	Reach	RS	10-YEAR	50-YEAR	100-YEAR	500-YEAR
HIGGINS CK	2	6.443	275	400	461	548
HIGGINS CK	2	6.404	275	400	461	548
HIGGINS CK	MAINSTEM	6.245	562	810	911	1253
HIGGINS CK	MAINSTEM	6.021	564	810	915	1258
HIGGINS CK	MAINSTEM	5.972	645	1100	1320	1930
HIGGINS CK	MAINSTEM	5.558	907	1394	1623	2270
HIGGINS CK	MAINSTEM	5.045	571	750	1000	2000
HIGGINS CK	MAINSTEM	4.966	700	920	1260	2140
HIGGINS CK	MAINSTEM	4.683	424	445	460	600
HIGGINS CK	MAINSTEM	4.664	444	485	700	1600
HIGGINS CK	MAINSTEM	4.588	454	503	730	1666
HIGGINS TRIB A	CUP	25	222	308	342	414
HIGGINS TRIB A	CUP	12	224	310	344	416
HIGGINS TRIB A	CUP	3.01	294	407	452	574

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
HIGGINS CK	MAINSTEM	10-YEAR		Known WS = 644.36
HIGGINS CK	MAINSTEM	50-YEAR		Known WS = 646.04
HIGGINS CK	MAINSTEM	100-YEAR		Known WS = 646.62
HIGGINS CK	MAINSTEM	500-YEAR		Known WS = 649.57

GEOMETRY DATA

Geometry Title: Design PR Elm Slab 070912
 Geometry File : n:\Idot\070404\Drain\Higgins Creek HR & HEC-RAS\Working Models\HEC-RAS for IDOT
 071112\HigginsCreek-Des.g02

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
HIGGINS CK	2		1
HIGGINS CK	MAINSTEM	1	
HIGGINS TRIB A	CUP		1

JUNCTION INFORMATION

Name: 1
 Description:
 Energy computation Method

Length across Junction	Tributary	Length	Angle
River	River		
HIGGINS CK	to HIGGINS CK	218	
HIGGINS TRIB A	to HIGGINS CK	30	

CROSS SECTION

RIVER: HIGGINS CK
 REACH: 2 RS: 6.443

INPUT

Description: Proposed condition. EOWB surveyed section D33. Shifted 195'
 right for comparison.

Station Elevation Data num= 19									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
209.1	662.93	227.2	662.89	252	662.38	263.7	662.29	288.9	660.74
304.7	657.79	318.9	655.76	323	655.03	330.3	653.3	340.5	652.09
346.1	652.21	352.9	656.28	364.7	656.39	370.2	655.35	376.1	653.32
378.5	652.8	378.5	662	425.9	662.05	434.1	663.58		

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
209.1	.065	304.7	.065	352.9	.075

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	304.7	352.9		204	204		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: 2 RS: 6.404

INPUT

Description: Proposed condition. WH065

Station Elevation Data num= 14									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	662.7	200	663.1	300	663.1	310	663.5	323	655.1
325	654.6	333	652.8	336	652.6	347	654.5	350	655.1
358	656.6	400	657.8	400	662	450	662.7		

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
100	.065	310	.065	358	.075

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	310	358		270	270		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: 2 RS: 6.353

INPUT

Description: Proposed condition. EOWB surveyed section D32. Shifted 135' left for comparison.

Station Elevation Data num= 18									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
270	661	275.1	659.42	292	660.3	304.1	659.84	312.5	658.6
321.1	654.67	321.8	654.16	324.1	654.04	327.3	654.04	328.8	652.29
337.4	651.64	349.2	650.86	352.1	653.94	359.5	653.45	384.2	658.59
402	659.13	402	662	445	663.04				

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
270	.065	312.5	.065	384.2	.075

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	312.5	384.2		350	350		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: 2 RS: 6.287

INPUT

Description: Proposed condition. From topo. Replaces copy of WHO65 (6.404) adjusted for slope, modified to match current contours

Station Elevation Data num= 17									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
202	664	202	658.5	234	658	273	658	289	657
304	656	314	655	323	654	332	653	340	651.6
350	650.9	360	653	364	654	373	657	380	658
380	662	441	662						

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
202	.065	289	.065	373	.075

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	289	373		0	0		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.245

INPUT

Description: Proposed condition. 6.246 6.249 WH064 ** HIGGINS CREEK**

Station Elevation Data		num= 10							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	670.82	82	670.72	82	658.62	180	655.72	210	653.72
330	653.72	340	651.02	370	651.02	370	663	500	663.72

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.07	330	.02	370	.07

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	330	370		75	75		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.231

INPUT

Description: Proposed condition. EOWB surveyed section D31. Shifted 200' left. Overbanks extended per topo. Ignore tollway ditch on right side.

Station Elevation Data		num= 14							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-53	661	-53	658.5	-38	658	-22.9	657.52	1.8	657.11
25.8	656.17	42.6	655.35	43.2	654.26	46.1	653.52	52.1	652.86
59.9	652.55	155	652.15	155	662	255.1	662.77		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
-53	.07	42.6	.02	155	.07

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	42.6	155		274	274		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.179

INPUT

Description: Proposed condition with compensatory basin. EOWB surveyed section D30. Shifted 130' left. Overbanks extended per topo.

Station Elevation Data		num= 14							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1	661	1	659	19.9	658.19	43.5	657.86	68.3	657.46
71.8	654.65	81.4	652.73	123.5	651.56	131	657.5	167.6	657.5
175	655	260	655	275	660	278	661		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
1	.07	68.3	.02	131	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	68.3	131		575	575		.1	.3

Ineffective Flow		num= 1			
Sta L	Sta R	Elev	Permanent		
131	278	657.5	T		

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.069

INPUT

Description: EOWB surveyed section D29. Overbanks extended per topo. Proposed retaining wall.

Station Elevation Data		num= 17							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-20	661	-20	659	0	658.73	14.3	658.52	39.6	657.71
62.3	656.55	78.2	652.76	85.6	651.76	122.6	650.55	130.6	652.46

132.1 657.63 138.7 658.04 153.1 657.77 164.2 657.23 168.3 658.17
 175.8 660.46 186.3 664.42

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -20 .07 62.3 .02 132.1 .07

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 62.3 132.1 180 180 180 .1 .3
 Blocked Obstructions num= 1
 Sta L Sta R Elev
 160 186.3 665

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.035

INPUT

Description: XS in pond upstream of dam with proposed Elmhurst Road widening.

Station Elevation Data num= 15
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 656.29 40 656.21 45.7 655.94 56 654.69 62 654.11
 65.5 653.15 69 651.21 75 651.59 89.8 651.45 94.6 651.29
 100.5 652.18 100.6 653.21 109 654.77 130 655.44 150 660.44

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .045 56 .02 109 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 56 109 6 6 6 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 0 40 670 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.034

INPUT

Description: Upstream top of dam with proposed Elmhurst Road widening.

Station Elevation Data num= 17
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 656.29 40 656.21 45.7 655.94 56 654.69 62 654.11
 63 654.1 74.5 653.3 82.8 653.13 89.5 652.95 89.5 651.94
 94.6 651.79 94.6 652.94 99 653.05 100.3 653.21 109 654.74
 130 655.44 150 660.44

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .045 74.5 .013 100.3 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 74.5 100.3 7 7 7 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 0 40 670 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.033

INPUT

Description: downstream top of dam with proposed Elmhurst Road widening.

Station Elevation Data num= 13
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 670 .1 654 47 653.04 62.3 653.26 70 653.51
 89.3 652.78 89.5 651.61 94.6 651.61 94.8 652.62 100.6 652.72
 108 654.18 127 654.6 151 660.6

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .045 70 .013 100.6 .045

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

70 100.6 1 1 1 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 0 47 670 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.032

INPUT

Description: creek downstream of dam with proposed Elmhurst Road widening.

Station Elevation Data num= 13
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 670 .1 654 47 653.04 61.4 652.83 73 649.05
 81.5 648.33 89.4 647.83 94.5 648.16 99 649.11 101.2 649.7
 107 651.46 122 653 150 660

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .045 61.4 .029 107 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 61.4 107 62 62 62 .1 .3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 0 47 670 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.021

INPUT

Description: Proposed condition 040912. 6.022 6.026 ** HIGGINS CREEK**
 WH062, extended per topo.

Approach - Elmhurst Rd in WSP2

Station Elevation Data num= 14
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 670.72 82 670.72 82 658.62 84 658.42 96 652.12
 99 650.12 108 649.42 120 650.12 124 652.12 124 654.12
 128 655.22 132 656 145 656 165 661

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .04 84 .029 128 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 84 128 80 80 80 .1 .3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 145 165 661 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 6.006

INPUT

Description: Proposed condition 040912. EOWB surveyed section D28. Shifted
 80' left for comparison purposes. Overbanks extended per topo.

Station Elevation Data num= 17
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -55 661 -55 660 2.4 659.37 26.7 658.97 37.5 658.56
 45.1 656.79 54.3 652.69 55.5 651.41 59 649.73 59.8 648.55
 69.3 648.72 81.9 649.08 85.7 651.65 92.3 654.81 101.3 655.01
 110 659 267 661

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -55 .06 45.1 .035 92.3 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 45.1 92.3 35 35 35 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -55 26.7 661 T
 102 267 661 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.9994*

INPUT

Description: Interpolated section proposed 040912. Overbanks extended per topo.

Station Elevation Data num= 23									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-28	661	-28	659	22	659	40	658	42.08	656.92
44.24	656.43	53.68	652.23	54.05	652.1	55.33	651.07	57.2	650.37
59.07	649.44	59.92	648.38	69.63	648.53	77.96	648.73	80.81	649.14
82.51	649.21	83.39	649.68	86.39	651.55	93.14	654.68	101.84	654.89
110	659	260	660	290	661				

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
-28	.06	44.24	.035	93.14	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	44.24	93.14		35	23		.3	.5

Ineffective Flow num= 2				
Sta L	Sta R	Elev	Permanent	
-28	22	661	T	
90	290	661	T	

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.9950

INPUT

Description: Interpolated section w/ proposed wall 040912 immediately U/S of Elmhurst Rd. Shifted 80.5' right to align with existing bridge geometry. Overbanks extended per topo.

Station Elevation Data num= 25									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-215	660	-215	659	85	659	106.96	657.79	115.71	657.5
116.89	657.43	121.81	656.52	123.88	656.07	133.91	651.62	134.31	651.51
135.67	650.72	137.65	650.18	139.63	649.16	140.54	648.21	150.46	648.35
158.97	648.52	161.88	649.24	163.62	649.33	164.51	649.71	167.59	651.44
174	654.55	182.88	654.77	190	657	190	661	373	661

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
-215	.06	123.88	.035	174	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	123.88	174		130	125		.3	.5

Ineffective Flow num= 3				
Sta L	Sta R	Elev	Permanent	
-215	-70	660	T	
-70	134	658.61	F	
172	380	660	F	

BRIDGE

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.981

INPUT

Description: 5.982 5.985 Elmhurst Road Proposed option 2; CH2M profile, existing structure LC raised, extended, and widened to the south.

Distance from Upstream XS = 4
 Deck/Roadway Width = 114
 Weir Coefficient = 2.7

Upstream Deck/Roadway Coordinates num= 15														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-224	658.66				-174	658.65				-74	658.61			
26	659.05				123	659.54				136	659.61			
136	662	656.28			170	662	656.46			190	662			
190	659.88				223	660.08				273	660.61			
323	661.44				373	664				473	667.7			

Upstream Bridge Cross Section Data
 Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-215	660	-215	659	85	659	106.96	657.79	115.71	657.5
116.89	657.43	121.81	656.52	123.88	656.07	133.91	651.62	134.31	651.51
135.67	650.72	137.65	650.18	139.63	649.16	140.54	648.21	150.46	648.35
158.97	648.52	161.88	649.24	163.62	649.33	164.51	649.71	167.59	651.44
174	654.55	182.88	654.77	190	657	190	661	373	661

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -215 .06 123.88 .035 174 .06

Bank Sta: Left Right Coeff Contr. Expan.
 123.88 174 .3 .5
 Ineffective Flow num= 3
 Sta L Sta R Elev Permanent
 -215 -70 660 T
 -70 134 658.61 F
 172 380 660 F

Downstream Deck/Roadway Coordinates
 num= 14
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
 -224 658.66 -174 658.65 -74 658.61
 26 659.05 123 659.54 136 659.61
 136 662 656.28 170 662 656.46 170 659.78
 223 660.08 273 660.61 323 661.44
 373 664 473 667.7

Downstream Bridge Cross Section Data
 Station Elevation Data num= 19
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -210 660 -210 659 -182 658 -44 657 72 656
 82 655.7 122 655.2 125 654.7 135 650 143 650
 147 648 152 647.9 157 648 161 650 166 650
 175 654.7 190 655 420 655 443 661

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -210 .06 122 .015 175 .06

Bank Sta: Left Right Coeff Contr. Expan.
 122 175 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -210 134 658 F
 172 443 660 T

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins = 658.61
 Energy head used in spillway design = -.28
 Spillway height used in design = 0
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
 Energy
 Momentum Cd = 1.33
 W.S. Pro Method

W.S.Pro Data
 Left Embankment
 El of the top of the embankment = 658
 El of the toe of the abutment = 656
 Right Embankment
 El of the top of the embankment = 659
 El of the toe of the abutment = 654
 Abutment Type = 4 Vert. abutments and sloping embankments with wingwalls
 Slope of abutments =
 Top width of embankment = 50
 Centroid station of bridge opening =
 Wing Wall Type = Angular wing walls
 Width = 10
 Angle = 45
 Radius =
 Guide Banks Type = No Guide Bank present
 Length =
 Offset =
 Angle =

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
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

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.972

INPUT

Description: 5.969 5.976 ** HIGGINS CREEK** WH061, shifted 82' right for
comparison purposes. Overbanks extended per topo. Approach -
Wille Rd / Exit - Elmhurst Rd in WSP2

Station Elevation Data num= 19
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
-210 660 -210 659 -182 658 -44 657 72 656
82 655.7 122 655.2 125 654.7 135 650 143 650
147 648 152 647.9 157 648 161 650 166 650
175 654.7 190 655 420 655 443 661

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
-210 .06 122 .015 175 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
122 175 66 66 66 .3 .5

Ineffective Flow num= 2
Sta L Sta R Elev Permanent
-210 134 658 F
172 443 660 T

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.959

INPUT

Description: EOWB surveyed section D24, shifted 320' left. Overbanks extended
per topo.

Station Elevation Data num= 22
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
-305 660 -300 659 -45.6 658 -13.4 657 -6.8 656.99
7.7 656.5 30.6 655.6 41.1 654.11 53 649.25 57.4 649.48
61.7 647.65 64.2 647.58 70 647.59 72.8 647.73 76.7 649.53
81.7 649.65 92.9 654.08 100 654.98 114.5 655.62 125 655.8
338 656 360 661

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
-305 .06 41.1 .015 92.9 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
41.1 92.9 50 50 50 .1 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
105 360 660 T

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.950

INPUT

Description: EOWB surveyed section D23. Overbanks extended per topo.

Station Elevation Data num= 20
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

-370	660	-345	659	-313	659	-35	658	0	657.72
32.9	655.48	41	654.27	52.7	649.5	57.5	649.43	61.4	647.43
66.3	647.42	71.3	647.5	75.4	649.4	79.9	649.46	91.5	654.22
107	655.76	124	656.24	308	656.25	325	657	346	661

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -370 .06 41 .015 91.5 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 41 91.5 189 189 189 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 120 346 660 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.914

INPUT

Description: EOWB surveyed section D22, upstream of MRWD entrance. Shifted 6' left. Shape revised per D23 template. Overbanks extended per topo.

Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-435	660	-430	659	-330	659	-262	658	-235	658
-196	659	-158	660	-67	660	-37	658	14.6	657.65
36.4	655.86	40	654.72	53.5	649.68	54	649.5	58.5	649.4
63	647.35	66	647.31	73	647.35	77	649.4	81.5	649.5
82.8	649.66	93.2	654.22	116.5	657.83	203	658	236	661

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -435 .06 40 .015 93.2 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 40 93.2 78 78 78 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -435 42.5 658 F
 94.5 236 660 F

CULVERT

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.911

INPUT

Description: MWRD Kirie Entrance, inverts and road profile per survey, culvert size approximated.

Distance from Upstream XS = 18
 Deck/Roadway Width = 41
 Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates num= 13

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-230	658		-230	658	-200	658								
-100	658		-27	658	0	658.63								
59	659.5		59	661.65	77.8	661.65								
77.9	660		134.1	660.54	183	661								
236	661													

Upstream Bridge Cross Section Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-435	660	-430	659	-330	659	-262	658	-235	658
-196	659	-158	660	-67	660	-37	658	14.6	657.65
36.4	655.86	40	654.72	53.5	649.68	54	649.5	58.5	649.4
63	647.35	66	647.31	73	647.35	77	649.4	81.5	649.5
82.8	649.66	93.2	654.22	116.5	657.83	203	658	236	661

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -435 .06 40 .015 93.2 .06

Bank Sta: Left Right Coeff Contr. Expan.
 40 93.2 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent

-435 42.5 658 F
 94.5 236 660 F

Downstream Deck/Roadway Coordinates

num= 12
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
 -230 660 -230 658 -200 658
 -100 658 -27 658 0 658.63
 59 659.5 59 661.65 77.8 661.65
 77.9 660 134.1 660.54 183 661

Downstream Bridge Cross Section Data

Station Elevation Data num= 19
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -208 660 -208 658 -170 658 -106 658 -49 658
 0 658.24 41.4 654.75 43.2 654.41 54.5 649.5 59 649.4
 63 647.35 66 647.3 73 647.35 77 649.4 81.5 649.5
 93.4 654.22 116.9 659.17 132 660 150 661

Manning's n Values

num= 3
 Sta n Val Sta n Val Sta n Val
 -208 .045 43.2 .015 93.4 .045

Bank Sta: Left Right Coeff Contr. Expan.
 43.2 93.4 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -208 55.5 657.5 F
 81.5 150 660 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 = 658
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name Shape Rise Span
 Culvert #1 Box 9 17
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 18 41 .012 .012 0 .4 1
 Upstream Elevation = 647.3
 Centerline Station = 68.4
 Downstream Elevation = 647.3
 Centerline Station = 68.4

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.899

INPUT

Description: EOWB surveyed section D21, downstream of MRWD entrance. Shape revised per D23 template. Overbanks extended per topo.

Station Elevation Data num= 19
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -208 660 -208 658 -170 658 -106 658 -49 658
 0 658.24 41.4 654.75 43.2 654.41 54.5 649.5 59 649.4
 63 647.35 66 647.3 73 647.35 77 649.4 81.5 649.5
 93.4 654.22 116.9 659.17 132 660 150 661

Manning's n Values

num= 3
 Sta n Val Sta n Val Sta n Val
 -208 .045 43.2 .015 93.4 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 43.2 93.4 186 186 186 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -208 55.5 657.5 F
 81.5 150 660 F

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.86375*

INPUT

Description: Interpolated XS

Station Elevation Data		num=		27					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1.25	658.68	3.13	657.92	18.04	656.86	36.71	655.53	39.43	655.17
42.19	654.82	44.08	654.44	51.8	650.93	55.06	649.49	55.66	649.3
59.25	649.22	60.27	649.06	62.98	647.69	64.37	647.15	67.45	647.1
73.01	647.16	74.3	647.31	77.28	648.83	78.22	649.2	82.09	649.29
82.62	649.36	85.73	650.68	94.28	654.25	95.94	654.45	109.62	655.56
133.8	656.76	173.93	658.83						

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
-1.25	.045	44.08	.015	94.28	.045

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	44.08	94.28		186	186	186		.3	.5

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.8285*

INPUT

Description: Interpolated XS

Station Elevation Data		num=		27					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-2.5	659.12	2.09	657.94	17.69	657.02	37.24	655.86	40.09	655.37
42.97	654.89	44.95	654.47	52.87	650.72	56.21	649.23	56.82	649.09
60.5	649.01	61.55	648.73	64.32	647.32	65.75	646.96	68.9	646.9
74.34	646.97	75.61	647.28	78.52	648.75	79.44	649.01	83.23	649.09
83.75	649.23	86.78	650.61	95.15	654.28	98	654.58	121.31	655.94
162.53	656.84	230.95	658.48						

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
-2.5	.045	44.95	.015	95.15	.045

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	44.95	95.15		186	186	186		.3	.5

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.79325*

INPUT

Description: Interpolated XS

Station Elevation Data		num=		28					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-3.75	659.56	1.04	657.97	17.35	657.19	37.77	656.2	40.74	655.56
43.76	654.96	45.83	654.5	53.93	650.52	57.35	648.96	57.98	648.89
61.75	648.81	62.82	648.39	65.66	646.96	67.12	646.76	70.35	646.7
75.67	646.79	76.91	647.24	79.76	648.68	80.66	648.81	84.36	648.9
84.87	649.09	87.84	650.54	96.03	654.31	100.05	654.7	133.01	656.32
191.26	656.92	287.98	658.14	290	660				

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
-3.75	.045	45.83	.015	96.03	.045

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	45.83	96.03		186	186	186		.3	.5

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.758

INPUT

Description: EOWB surveyed section D20, replaces copy of WHO61 used as U/S
culvert section. Shifted 17' rt. for comparison purposes. Shape
revised per D23 template. Overbanks extended per topo.

Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-5	660	0	658	17	657.35	38.3	656.54	41.4	655.76
46.7	654.53	55	650.31	58.5	648.7	63	648.6	67	646.6
71.8	646.5	77	646.6	81	648.6	85.5	648.7	88.9	650.47
96.9	654.34	102.1	654.83	144.7	656.7	220	657	345	657.8
390	658	390	660						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -5 .045 46.7 .015 96.9 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 46.7 96.9 395 395 395 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -5 41.3 657 F
 102.3 390 657 F

CULVERT

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.721

INPUT

Description: 5.722 5.725 Wille Road culvert per survey, roadway per topo.

Deck data is suspect in WSP-2 model; suspect points deleted.

Distance from Upstream XS = 22
 Deck/Roadway Width = 350
 Weir Coefficient = 2.7

Upstream Deck/Roadway Coordinates num= 10

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	658				25	658	0			25	657	0		
120	657	0			135	657	0			183	658	0		
265	658	0			346	657.23	0			415	657.5	0		
465	658	0												

Upstream Bridge Cross Section Data

Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-5	660	0	658	17	657.35	38.3	656.54	41.4	655.76
46.7	654.53	55	650.31	58.5	648.7	63	648.6	67	646.6
71.8	646.5	77	646.6	81	648.6	85.5	648.7	88.9	650.47
96.9	654.34	102.1	654.83	144.7	656.7	220	657	345	657.8
390	658	390	660						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -5 .045 46.7 .015 96.9 .045

Bank Sta: Left Right Coeff Contr. Expan.
 46.7 96.9 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -5 41.3 657 F
 102.3 390 657 F

Downstream Deck/Roadway Coordinates

num= 11

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-350	658				-245	658	0			-245	657	0		
-150	657	0			-135	657	0			-87	658	0		
-5	658	0			76	657.23	0			145	657.5	0		
151	658	0			275	658								

Downstream Bridge Cross Section Data

Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-340	658	-340	657	-85	656	45	655.56	56.1	654.92
61.8	653.43	70.7	649.72	74	648.4	78.5	648.3	82.5	646.3
89.9	646.23	97.5	646.3	101.5	648.3	106	648.4	109	649.7
117.5	653.6	129.3	655.64	151	657.23	275	658		

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -340 .045 56.1 .015 129.3 .045

Bank Sta: Left Right Coeff Contr. Expan.
 56.1 129.3 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -340 76 656 F
 105 275 656 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 = .95
 Elevation at which weir flow begins = 657
 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
 Culv # 1 Box 9 17
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 22 350 .012 .012 0 .4 1
 Upstream Elevation = 646.5
 Centerline Station = 71.8
 Downstream Elevation = 646.5
 Centerline Station = 90.5

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.683

INPUT

Description: EOWB surveyed section D19, replaces copy of WHO56 used as D/S
 culvert section. Shifted 45' rt. for comparison purposes. Shape
 revised per D18 template. Overbanks extended per topo.

Station Elevation Data num= 19
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -340 658 -340 657 -85 656 45 655.56 56.1 654.92
 61.8 653.43 70.7 649.72 74 648.4 78.5 648.3 82.5 646.3
 89.9 646.23 97.5 646.3 101.5 648.3 106 648.4 109 649.7
 117.5 653.6 129.3 655.64 151 657.23 275 658

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -340 .045 56.1 .015 129.3 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 56.1 129.3 172 172 172 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -340 76 656 F
 105 275 656 F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.650

INPUT

Description: EOWB surveyed section D18, shifted 20' rt. for comparison
 purposes. Overbanks extended per topo.

Station Elevation Data num= 16
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -240 657 -120 656 20 655.63 61.2 653.83 62.4 653.62
 74.3 648.41 78.7 648.17 83.2 646.15 92.3 646.1 97 646.16
 101.7 648.22 105.1 648.26 117.6 653.69 118.2 653.97 134 657.56
 153 657.86

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -240 .045 61.2 .015 118.2 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 61.2 118.2 5 5 5 .1 .3
 Blocked Obstructions num= 1
 Sta L Sta R Elev
 -20 20 657.5

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.649

INPUT

Description: 5.650 5.654 Exit - Wille Rd. WH056 ** HIGGINS CREEK**
 Left

overbank adjusted per current topo.

Station Elevation Data		num= 14							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-240	657	-120	656	20	655.6	60	654.7	72	648.6
79	648.6	83	646.6	90	646.5	98	646.6	102	648.6
109	648.6	120	654.7	127	656.2	130	657.2		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
-240	.045	60	.015	120	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	60	120	294	294	294	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
-20	20	657.5

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.593

INPUT

Description: EOWB surveyed section D17, shifted 984' rt. for comparison purposes. Overbanks extended per topo.

Station Elevation Data		num= 19							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
760	657	917	656	984.1	655.22	997	655.04	1010.4	654.99
1019	654.58	1027.7	653.57	1040	647.96	1043.8	647.98	1048.9	645.88
1053.3	645.87	1058	645.93	1063.8	645.88	1067.2	647.88	1072.4	647.93
1084.1	653.61	1090.5	655.19	1090.5	660	1155	660		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
760	.045	1027.7	.015	1084.1	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1027.7	1084.1	188	188	188	.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.558

INPUT

Description: 5.559 5.563 TAR35 ** HIGGINS CREEK**
 Left overbank revised per current topo.

Station Elevation Data		num= 18							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
756	657	918	656	1000	655.2	1025	653.9	1037	648.3
1041	648.2	1045	646.3	1048	647.7	1052	646.3	1060	646.3
1066	646.3	1070	647.7	1071	648.2	1075	648.3	1087	653.8
1091	655.7	1102	656.4	1142	660.7				

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
756	.045	1025	.015	1087	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1025	1087	308	308	308	.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.500

INPUT

Description: EOWB surveyed section D16, shifted 991' rt. for comparison

purposes. Left overbank extended per topo.

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
872	657	961	656	991	655.52	1009.6	654.78	1021.9	654.05
1026.3	653.4	1030.7	651.44	1038.3	647.67	1042.4	647.62	1046.3	645.68
1049.7	645.55	1054.2	645.58	1058.3	645.56	1061.2	645.54	1065.1	647.55
1069.4	647.68	1081.5	653.65	1091.2	656.18	1102.4	657.91	1115.5	658.12
1125	658.3	1125	660	1190	660				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
872	.045	1026.3	.015	1081.5	.045

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

1026.3	1081.5	21	21	21	.1	.3
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CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.496

INPUT
Description: 5.497 5.500 TAR34 ** HIGGINS CREEK**
Overbanks refined per topo.

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
835	657	953	656	1000	655.3	1026	653.8	1038	647.9
1042	647.9	1043	647.6	1046	645.9	1053	645.9	1061	645.8
1064	647.5	1065	647.8	1070	647.9	1081	653.8	1099	657.9
1106	658.3	1116	658.5	1116	660	1194	660		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
835	.05	1026	.015	1081	.05

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

1026	1081	458	458	458	.1	.3
------	------	-----	-----	-----	----	----

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
835	870	657	T

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.409

INPUT
Description: EOWB surveyed section D15, shifted 947' rt. for comparison
purposes. Extended right per TAR 33.

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
963.4	661.09	982.6	657.33	995	654.68	1008	653.19	1018.8	647.28
1023.7	647.24	1026.8	645.8	1028.6	645.05	1032.4	645.02	1037	645.06
1044.9	646.05	1047.1	647.15	1052.2	647.37	1063	653.58	1072.5	655.41
1088	656.77	1101.9	657.16	1127	657.66	1127	660	1209	660

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
963.4	.06	1008	.015	1063	.06

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

1008	1063	6	6	6	.1	.3
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CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 5.408

INPUT
Description: 5.409 5.413 Approach- NW Tollway TAR33 ** HIGGINS CREEK**

Left side modified to match current topography.

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
960	661	980	657	1000	654.3	1007	653.6	1019	647.5
1024	647.3	1028	645.3	1036	645.3	1043	645.3	1047	647.3
1052	647.5	1064	653.8	1091	656.8	1136	657.7	1136	660
1201	660								

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 960 .06 1007 .015 1064 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1007 1064 72.1 72.1 72.1 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.394

INPUT
 Description: Copy of 5.408, shifted 518' right to match bridge CL.
 5.409

5.413 Approach- NW Tollway TAR33 ** HIGGINS CREEK**
 Left side

modified to match current topography.

Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 1478 661 1498 657 1508 654.3 1512 652.5 1530.2 647.3
 1534.4 645.3 1542.6 645.3 1553 645.5 1573.8 646.6 1596 652.5
 1609 656.8 1782 657.7

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1478 .06 1512 .035 1596 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1512 1596 323 323 323 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 1478 1482 665 F
 1626 1782 665 F

BRIDGE

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.364

INPUT
 Description: I-90 Proposed Bridge including continuous median barrier. Uses
 same internal XS as existing bridge.

5.365 5.369 Northwest
 Tollway per survey, including parapet walls.
 Skew effects ignored

due to low skew angle (<20 degrees)

Distance from Upstream XS = 22
 Deck/Roadway Width = 276
 Weir Coefficient = 2.7
 Bridge Deck/Roadway Skew = 10.1

Upstream Deck/Roadway Coordinates
 num= 15
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
 1354.5 665 1454.5 665 1512.7 665
 1512.7 665 656.87 1596.3 665 656.94 1596.3 665
 1654.5 664.7 1754.5 664.2 1854.5 663.7
 2054.5 662.8 2254.5 663 2454.5 663.6
 2654.5 664.3 2854.5 665 3700 665

Upstream Bridge Cross Section Data

Station Elevation Data num= 17
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 1485.6 660.3 1493 658.73 1499.1 657.95 1505.8 656.48 1512.2 654.84
 1523.9 649.49 1529.8 647.34 1531.3 647.02 1534.9 645.3 1541.2 645.3
 1554.5 645.36 1570.8 646 1577 646.51 1587.8 651.34 1596.3 654.96
 1607 657.47 1618.3 660.02

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1485.6 .06 1512.2 .017 1596.3 .06

Bank Sta: Left Right Coeff Contr. Expan.
 1512.2 1596.3 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 1485.6 1482 665 F
 1626 1618.3 665 F

Downstream Deck/Roadway Coordinates

num= 15														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
1354.5		665			1454.5		665			1512.7		665		
1512.7		665	656.87		1596.3		665	656.94		1596.3		665		
1654.5		664.7			1754.5		664.2			1854.5		663.7		
2054.5		662.8			2254.5		663			2454.5		663.6		
2654.5		664.3			2854.5		665			3700		665		

Downstream Bridge Cross Section Data

Station Elevation Data num= 14											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1497.7	662.06	1505.5	656.1	1513.5	654.38	1523.8	650.43	1535	646		
1544.4	645.3	1556.1	645.65	1567.8	645.91	1576.9	646.12	1579.5	647		
1589	650.81	1596.4	654.06	1608.2	656.82	1622.3	659.35				

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
1497.7	.075	1513.5	.017	1596.4	.075

Bank Sta: Left Right Coeff Contr. Expan.

	1513.5	1596.4		.3	.5
Ineffective Flow num= 2					
Sta L	Sta R	Elev	Permanent		
1497.7	1498.5	659	F		
1614.5	1622.3	659	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 = .95
 Elevation at which weir flow begins = 662.8
 Energy head used in spillway design = -.28
 Spillway height used in design = 0
 Weir crest shape = Broad Crested

Number of Piers = 1

Pier Data

Pier Station Upstream= 1554.5 Downstream= 1554.5					
Upstream num= 2					
Width	Elev	Width	Elev		
2.9	645	2.9	660		
Downstream num= 2					
Width	Elev	Width	Elev		
2.9	645	2.9	660		

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy
 Momentum Cd = 1.2
 Yarnell KVal = .9
 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
 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

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.335

INPUT

Description: Copy of existing condition 5.340.
 5.341 5.345 Exit - NW Tollway

TAR32 ** HIGGINS CREEK**

Station Elevation Data num= 14											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1439	659.7	1510	659.7	1510	654	1528	647.2	1537	645.4		

1554	645.3	1576	645.8	1581	647.1	1597	652	1610	652
1717	654.7	3497	655.7	3530	656.7	3610	657.7		

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1439 .06 1510 .035 1597 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1510 1597 50 50 50 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 1439 1498.5 659 F
 1614.5 3610 659 F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.324

INPUT

Description: EOWB surveyed section D12, shifted 1010' rt. for comparison purposes. Overbanks refined per topo.

Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
944	658	1016.4	658	1016.4	654.5	1038.1	652.88	1050	649.55
1056.4	646.73	1064.6	645.5	1079.3	645.86	1093.2	645.28	1104.6	646.79
1112	649.85	1117.7	650.99	1123.5	651.36	1131.5	651.84	1146.1	652.42
1170	655	1180	656	1230	656	1240	655	1263	647
1265	647	1275	652	1315	653	1455	654	1630	655
1900	656								

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 944 .05 1038.1 .025 1117.7 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1038.1 1117.7 184 184 184 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 1180 1900 657 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.289

INPUT

Description: 5.290 5.293 TAR31 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
900	658.7	969	658.7	969	656.3	1000	655.3	1046	652.4
1069	646.7	1076	645.6	1095	645.2	1115	645.6	1123	646.7
1139	652.3	1335	654	1515	655	1600	656		

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 900 .05 1046 .025 1139 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1046 1139 173 173 173 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 1180 1600 657 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.256

INPUT

Description: EOWB surveyed section D11, shifted 970' rt. for comparison purposes. Overbanks refined per topo.

Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
900	658.7	965	658.7	965	656.3	970	656.21	987.6	655.92
1016.8	655.15	1045.7	652.92	1056.1	651.98	1062.5	651.33	1067.3	650.15
1074.3	647.24	1085	645.34	1097.9	645.11	1109.3	645.39	1118.7	645.59

1127.3	647.53	1136	650.72	1143	652.68	1146.2	653.01	1150	653.21
1153.5	653.52	1160	655	1283	655	1457	655	1590	656

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 900 .05 1045.7 .025 1143 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1045.7 1143 108 108 108 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 1185 1590 657 T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.236

INPUT
 Description: 5.237 5.240 TAR30 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 12									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
920	658.7	1000	655.8	1053	652.5	1078	646.4	1083	645.6
1098	645.2	1118	645.5	1122	646.5	1140	653.9	1149	655
1190	656	1360	656						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 920 .05 1053 .025 1140 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1053 1140 272 272 272 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.184

INPUT
 Description: 5.185 5.189 TAR29 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 15									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
940	658	1000	655	1044	653.1	1068	646.3	1073	644.7
1090	644.5	1107	644.6	1113	646.3	1138	654.6	1153	654.9
1160	653.5	1370	653.5	1375	655.7	1378	656.7	1381	657.7

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 940 .05 1044 .025 1138 .05 1160 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1044 1138 95 95 95 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.166

INPUT
 Description: EOWB surveyed section D10, shifted 1000' rt. for comparison purposes. Overbanks refined per topo.

Station Elevation Data num= 23									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
969	657.7	979	656.7	990	656.5	1011.7	654.64	1022.8	654.25
1029.1	653.45	1044.8	649.51	1054.7	646.45	1060	644.6	1070.5	644.48
1077.7	644.6	1087.1	644.58	1095.1	644.49	1097.7	645.11	1106.7	648.02
1124.9	653.51	1126.7	653.67	1130.9	653.8	1135.7	653.86	1145	653.5
1445	653.5	1455	655.7	1460	657.7				

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 969 .05 1029.1 .025 1124.9 .05 1145 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1029.1 1124.9 117 117 117 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.144

INPUT
 Description: 5.145 5.149 TAR28 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data		num= 14		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
965	659	985	657	1000	656.5	1031	654	1057	646.3
1062	644.6	1079	644.4	1098	644.5	1103	646.3	1127	653.8
1137	653.5	1515	653.5	1525	655	1530	656		

Manning's n Values		num= 4		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
965	.05	1031	.025	1127	.05	1137	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1031	1127		266	266		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.094

INPUT
 Description: 5.095 5.098 TAR27 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data		num= 20		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
974	657.7	976	656.7	979	655.7	986	654.7	998	653.7
1000	653.6	1012	652.5	1016	651.7	1034	646.3	1040	644.5
1061	643.1	1079	644.4	1086	646.3	1109	653.6	1120	653.5
1650	653.5	1652	654.7	1655	655.7	1658	656.7	1680	657.7

Manning's n Values		num= 4		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
974	.05	1012	.025	1109	.05	1120	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1012	1109		237	237		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.049

INPUT
 Description: EOWB surveyed section D9, shifted 985' rt. for comparison
 purposes. Overbanks refined per topo.

Station Elevation Data		num= 20		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
955	657.7	958	656.7	961	655.7	964	654.7	976	653.7
993.2	653.2	1001	652.15	1021.7	645.18	1027.6	643.91	1046.3	643.43
1062.4	643.8	1068.5	645.01	1087.3	652.26	1128.7	653.17	1133.5	653.5
1746	653.5	1752	654.7	1757	655.7	1762	656.7	1787	657.7

Manning's n Values		num= 4		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
955	.05	1001	.025	1087.3	.05	1133.5	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1001	1087.3		22	22		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.045

INPUT
 Description: 5.046 5.049 Approach - MWRD TAR26 ** HIGGINS CREEK** Overbanks
 refined per topo.

Station Elevation Data		num= 22		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
950	659.7	952	658.7	955	657.7	958	656.7	961	655.7
964	654.7	976	653.7	1000	653.4	1004	652.5	1021	646.3

1028	644.5	1044	643.8	1066	644.3	1073	646.3	1088	652.5
1102	652.7	1110	653.5	1746	653.5	1752	654.7	1757	655.7
1762	656.7	1787	657.7						

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val
 950 .05 1004 .025 1088 .05 1110 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1004 1088 130 130 130 .3 .5

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.020

INPUT
 Description: 5.021 5.024 Immediately Upstream - MWRD ** HIGGINS CREEK**
 Cross Section copied from Approach section.
 Overbanks refined per topo.

Station Elevation Data		num= 22							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
950	659.7	952	658.7	955	657.7	958	656.7	961	655.7
964	654.7	976	653.7	1000	653.4	1004	652.5	1021	646.3
1028	644.5	1044	643.8	1066	644.3	1073	646.3	1088	652.5
1102	652.7	1110	653.5	1746	653.5	1752	654.7	1757	655.7
1762	656.7	1787	657.7						

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val
 950 .05 1004 .025 1088 .05 1110 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1004 1088 80 80 80 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 950 1022 653.3 F
 1071 1787 652.7 F

CULVERT

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.012

INPUT
 Description: 5.013 5.017 MWRD1 Cell 1 Crossing
 Deck realigned to match section stationing.
 Distance from Upstream XS = 10
 Deck/Roadway Width = 60
 Weir Coefficient = 2.7
 Upstream Deck/Roadway Coordinates

num= 25														
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
944	660.72				947	659.72				950	658.72			
953	657.72				956	656.72				959	654.72			
1000	653.82				1018	653.46				1046	652.64			
1062	652.61				1105.5	653.15				1130	654.42			
1325	652.72				1336	651.72				1348	650.72			
1355	650.22				1444	649.92				1454	650.72			
1465	651.72				1477	652.72				2120	653.72			
2140	654.72				2145	655.72				2220	656.72			
2370	657.72													

Upstream Bridge Cross Section Data
 Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
950	659.7	952	658.7	955	657.7	958	656.7	961	655.7
964	654.7	976	653.7	1000	653.4	1004	652.5	1021	646.3
1028	644.5	1044	643.8	1066	644.3	1073	646.3	1088	652.5
1102	652.7	1110	653.5	1746	653.5	1752	654.7	1757	655.7
1762	656.7	1787	657.7						

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val
 950 .05 1004 .025 1088 .05 1110 .03

Bank Sta: Left Right Coeff Contr. Expan.

1004 1088 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 950 1022 653.3 F
 1071 1787 652.7 F

Downstream Deck/Roadway Coordinates
 num= 26
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
 663 660.72 944 660.72 947 659.72
 950 658.72 953 657.72 956 656.72
 959 654.72 1000 653.82 1038 653.46
 1066 652.64 1082 652.61 1125.5 653.15
 1130 654.42 1325 652.72 1336 651.72
 1348 650.72 1355 650.22 1444 649.92
 1454 650.72 1465 651.72 1477 652.72
 2120 653.72 2140 654.72 2145 655.72
 2220 656.72 2370 657.72

Downstream Bridge Cross Section Data
 Station Elevation Data num= 17
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 666 656.7 669 655.7 672 654.7 678 653.7 1000 653.4
 1003 652.8 1024 645.5 1030 644.5 1065 643.8 1090 643.8
 1096 645.5 1117 653 1126 653.5 1949 653.5 1956 654.7
 1963 655.7 1970 656.7

Manning's n Values num= 5
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 666 .03 1000 .05 1003 .025 1117 .05 1126 .03

Bank Sta: Left Right Coeff Contr. Expan.
 1003 1117 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 666 1042 652 F
 1090 1970 652 F

Blocked Obstructions num= 1
 Sta L Sta R Elev
 1145 1190 657

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins = 652.61
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Culverts = 2

Culvert Name Shape Rise Span
 Culv # 1 Box 5 7
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 10 60 .015 .015 0 .4 1
 Upstream Elevation = 643.77
 Centerline Station = 1036
 Downstream Elevation = 643.84
 Centerline Station = 1056

Culvert Name Shape Rise Span
 Culv # 2 Box 5 9
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 10 60 .015 .015 0 .4 1
 Number of Barrels = 2
 Upstream Elevation = 643.77
 Centerline Stations
 Sta. Sta.
 1045 1055
 Downstream Elevation = 643.84
 Centerline Stations
 Sta. Sta.
 1065 1075

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 5.005

INPUT

Description: 5.006 5.009 Immediately Downstream - MWRD ** HIGGINS CREEK**
 Cross Section copied from Exit section. Overbanks refined per topo.

Station Elevation Data		num=		17	
Sta	Elev	Sta	Elev	Sta	Elev
666	656.7	669	655.7	672	654.7
1003	652.8	1024	645.5	1030	644.5
1096	645.5	1117	653	1126	653.5
1963	655.7	1970	656.7	1949	653.5

Manning's n Values		num=		5	
Sta	n Val	Sta	n Val	Sta	n Val
666	.03	1000	.05	1003	.025
				1117	.05
				1126	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1003	1117		69	69		.3	.5

Ineffective Flow		num=		2	
Sta L	Sta R	Elev	Permanent		
666	1042	652	F		
1090	1970	652	F		

Blocked Obstructions		num=		1	
Sta L	Sta R	Elev			
1145	1190	657			

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.992

INPUT

Description: 4.993 4.996 Exit - MWRD TAR25 ** HIGGINS CREEK**
 Overbanks

Station Elevation Data		num=		19	
Sta	Elev	Sta	Elev	Sta	Elev
844	657	850	655	920	654
1024	645.5	1030	644.5	1065	643.8
1117	653	1126	653.5	1130	653.9
1949	653.5	1956	654.7	1963	655.7
				1970	656.7

Manning's n Values		num=		4	
Sta	n Val	Sta	n Val	Sta	n Val
844	.05	1003	.025	1117	.05
				1190	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1003	1117		62	62		.1	.3

Blocked Obstructions		num=		1	
Sta L	Sta R	Elev			
1135	1180	657			

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.980

INPUT

Description: EOWB surveyed section D8, shifted 975' rt. for comparison purposes. Overbanks refined per topo.

Station Elevation Data		num=		18	
Sta	Elev	Sta	Elev	Sta	Elev
780	656	785	655	790	654
1019.2	644.49	1027.1	643.75	1037.7	643.55
1079.7	652.45	1089.1	653.47	1110.2	653.9
1920	653.5	1933	655	1940	656
				988.1	653.72
				997.8	653.45
				1047.2	643.76
				1055	644.56
				1150	653.9
				1155	653.5

Manning's n Values		num=		5	
Sta	n Val	Sta	n Val	Sta	n Val
780	.03	988.1	.05	997.8	.025
				1079.7	.05
				1155	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	997.8	1079.7		73	73		.1	.3

Blocked Obstructions		num=		1	
Sta L	Sta R	Elev			

1113 1143 656

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.966

INPUT

Description: 4.967 4.971 TAR24 ** HIGGINS CREEK**
Overbanks refined per topo.

Station Elevation Data		num= 17							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
537	656.7	601	655.7	617	654.7	630	654	1000	654
1002	653.6	1018	645.6	1024	643.8	1038	643.4	1050	643.8
1057	645.6	1079	652.7	1087	653.5	1927	653.5	1934	654.7
1940	655.7	1945	656.7						

Manning's n Values		num= 5							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
537	.02	1000	.05	1002	.025	1079	.05	1087	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1002	1079		115	115		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.944

INPUT

Description: 4.945 4.949 TAR23 ** HIGGINS CREEK**
Overbanks refined per topo.

Station Elevation Data		num= 21							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
385	656.7	400	655.7	423	654.7	433	653.7	1000	653.3
1003	652.8	1017	645.5	1023	643.2	1035	642.8	1048	643.3
1054	645.5	1067	650	1084	650	1839	649.7	1843	650.7
1847	651.7	1851	652.7	1882	653.7	1890	654.7	1898	655.7
1925	656.7								

Manning's n Values		num= 5							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
385	.02	1000	.05	1003	.025	1067	.05	1084	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1003	1067		86	86		.1	.3

Ineffective Flow	num= 1	
Sta L	Sta R	Elev
1067	1925	653.5
		T

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.928

INPUT

Description: EOWB surveyed section D7, shifted 980' rt. for comparison purposes. Overbanks refined per topo.

Station Elevation Data		num= 16							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
455	656	460	655	465	654	983.5	653.78	996.5	652.72
1001.2	652.61	1018	644.44	1023.5	642.73	1033.3	642.48	1043.6	642.77
1050.7	644.4	1078.9	653.3	1098.7	653.31	1866	654	1876	655
1886	656								

Manning's n Values		num= 5							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
455	.05	460	.02	1001.2	.035	1078.9	.05	1098.7	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1001.2	1078.9		14	14		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.925

INPUT

Description: 4.926 4.930 TAR22 ** HIGGINS CREEK**

Overbanks refined per topo.

Station Elevation Data		num=		19					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
320	656.7	330	655.7	350	654.7	827	654.3	960	653.7
1000	652.7	1002	652.7	1017	645.5	1024	643.1	1036	643
1046	643.3	1054	645.5	1076	653	1082	653.1	1839	653.2
1856	653.7	1872	654.7	1886	655.7	1916	656.7		

Manning's n Values		num=		5					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
320	.05	330	.02	1002	.035	1076	.05	1082	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1002	1076		55	55		.1	.3

CROSS SECTION

RIVER: HIGGINS CK

REACH: MAINSTEM RS: 4.915

INPUT

Description: 4.916 4.920 TAR21 ** HIGGINS CREEK**

Overbanks refined per topo.

Station Elevation Data		num=		12					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
415	655.5	420	654	954	654	972	648	1002	647
1014	643	1046	643	1070	651	1102	652	1690	653
1850	654	1860	655.5						

Manning's n Values		num=		4			
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
415	.02	954	.065	1002	.04	1070	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1002	1070		159	159		.1	.3

CROSS SECTION

RIVER: HIGGINS CK

REACH: MAINSTEM RS: 4.885

INPUT

Description: 4.886 4.889 TAR20 ** HIGGINS CREEK**

Overbanks refined per topo.

Station Elevation Data		num=		13					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
420	655	425	654	987	653.9	1005	647.9	1034	646.9
1046	642.9	1080	642.9	1090	649	1110	650	1220	651
1395	652	1640	653	1730	655				

Manning's n Values		num=		4			
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
420	.02	987	.065	1034	.04	1090	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1034	1090		101	101		.1	.3

CROSS SECTION

RIVER: HIGGINS CK

REACH: MAINSTEM RS: 4.866

INPUT

Description: 4.867 4.870 TAR19 ** HIGGINS CREEK**

Overbanks refined per topo.

Station Elevation Data		num=		13					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
395	655	400	654	1009	653.9	1027	647.9	1058	646.9
1071	642.4	1099	642.4	1110	649	1132	650	1215	651
1405	652	1617	653	1740	655				

Manning's n Values		num=		4			
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
395	.02	1009	.065	1058	.04	1110	.065

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

1058 1110 100 100 100 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.847

INPUT

Description: 4.848 4.851 TAR18 ** HIGGINS CREEK**
Overbanks refined per topo.

Station Elevation Data		num= 14							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
260	655	265	654	985	653.9	1003	647.9	1034	646.9
1049	642	1073	642	1088	649	1110	650	1200	651
1370	652	1510	653	1550	654	1590	655		

Manning's n Values		num= 4					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
260	.02	985	.065	1034	.04	1110	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1034	1110		101	101		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.828

INPUT

Description: 4.829 4.832 TAR17 ** HIGGINS CREEK**
Overbanks refined per topo.

Station Elevation Data		num= 13							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
235	655	240	654	980	653.8	998	647.8	1029	646.8
1044	641.9	1068	641.9	1100	650	1215	651	1365	652
1495	653	1550	654	1600	655				

Manning's n Values		num= 4					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
235	.02	980	.065	1029	.04	1100	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1029	1100		139	139		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.801

INPUT

Description: 4.802 4.806 TAR16 ** HIGGINS CREEK**
Overbanks refined per topo.

Station Elevation Data		num= 13							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
240	655	245	654	998	653.8	1016	647.8	1047	646.8
1060	642.5	1088	642.5	1110	650	1210	651	1360	652
1440	653	1565	654	1617	655				

Manning's n Values		num= 4					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
240	.02	998	.065	1047	.04	1110	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1047	1110		99	99		.1	.3

Ineffective Flow		num= 1		
Sta L	Sta R	Elev	Permanent	T
1588	1617	655		

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.783

INPUT

Description: 4.784 4.787 TAR15 ** HIGGINS CREEK**
Overbanks refined per topo.

Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
260	655	265	654	1038	653.8	1056	647.8	1087	646.8
1101	642	1127	642	1150	650	1225	651	1480	653
1620	655								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
260	.02	1038	.065	1087	.04	1150	.065

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
1087	1150	43	43	43	.1	.3	

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1550	1620	655	T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.774

INPUT

Description: 4.775 4.779 TAR14 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
270	655	275	654	1058	653.7	1076	647.7	1107	646.7
1120	642.5	1148	642.5	1170	650	1230	651	1472	653
1595	655								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
270	.02	1058	.065	1107	.04	1170	.065

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
1107	1170	18	18	18	.1	.3	

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1522	1595	655	T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.771

INPUT

Description: EOWB surveyed section D6, shifted 1100' rt. for comparison purposes. Overbanks refined per topo.

Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
310	655	315	654	1099.1	653.91	1117.7	648.31	1124.3	647.86
1146.1	647.02	1150.1	645.94	1152.4	642.96	1157	642.05	1186.9	642.52
1191.5	642.96	1193.9	643.89	1203.3	648.97	1207.4	649.66	1217.5	649.9
1227.5	650.03	1235	650.14	1270	651	1510	653	1620	655

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
310	.02	1099.1	.065	1146.1	.04	1203.3	.065

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
1146.1	1203.3	57	57	57	.1	.3	

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1540	1620	655	T

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.760

INPUT

Description: 4.761 4.765 TAR13 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
320	655	325	654	1117	653.7	1135	647.7	1166	646.7
1182	641.5	1204	641.5	1222	650	1270	651	1440	652
1455	655								

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 320 .02 1117 .065 1166 .04 1222 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1166 1222 95 95 95 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.742

INPUT
 Description: 4.743 4.747 TAR12 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 340 655 344 654 1124 653.72 1142 647.72 1173 646.72
 1186 642.22 1214 642.22 1237 650 1270 651 1365 652
 1485 652 1500 655

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 340 .02 1124 .065 1173 .04 1237 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1173 1237 156 156 156 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.713

INPUT
 Description: 4.714 4.717 TAR11 ** HIGGINS CREEK**
 Overbanks refined per topo.

Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 325 655 330 654 1087 653.7 1105 647.7 1136 646.7
 1149 642.4 1177 642.4 1200 650 1240 651 1400 652
 1595 654 1600 655

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 325 .02 1087 .065 1136 .04 1200 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1136 1200 80 80 80 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.698

INPUT
 Description: 4.699 4.702 TAR10 ** HIGGINS CREEK**
 Extended left and right
 per D5.

Station Elevation Data num= 11
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 295 655 300 654 1063 653.6 1081 647.6 1112 646.6
 1125 642.2 1153 642.2 1188 651 1378 652 1613 654
 1618 655

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 295 .02 1063 .065 1112 .04 1188 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1081 1188 20 20 20 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.694

INPUT

Description: EOWB surveyed section D5, shifted 1060' rt. for comparison purposes. Overbanks refined per topo.

Station Elevation Data num= 21									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
295	655	300	654	1060	654	1064.2	653.1	1083.3	647.56
1108.1	646.93	1116.8	645.63	1119.3	643.81	1126	641.6	1139.8	641.46
1152.2	641.72	1157.8	645.74	1160.6	643.84	1167.7	648.16	1175.5	650.04
1186.5	650.48	1186.8	650.56	1207.9	651	1390	652	1625	654
1630	655								

Manning's n Values num= 4							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
295	.02	1060	.065	1116.8	.04	1157.8	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1116.8	1157.8		57	57		.1	.3

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.683

INPUT
Description: 4.684 4.688 TAR9 ** HIGGINS CREEK**
Overbanks refined per topo.

Station Elevation Data num= 10									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
295	655	300	654	1046	653.6	1064	647.6	1095	646.6
1115	639.9	1129	639.9	1171	651	1200	652	1582	655

Manning's n Values num= 4							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
295	.02	1046	.065	1095	.04	1171	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1095	1171		26	26		.3	.5

Ineffective Flow num= 2			
Sta L	Sta R	Elev	Permanent
295	1079	651.72	F
1150	1582	651.87	F

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.678

INPUT
Description: 4.679 4.683 Immediately Upstream - Touhy Ave Reservoir Control.
Overbanks refined per topo.

Cross Section copied from Approach section. ** HIGGINS CREEK**

Station Elevation Data num= 10									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
265	655	266	654	1046	653.6	1064	647.6	1095	646.6
1115	639.9	1129	639.9	1171	653.9	1192	653.9	1582	655

Manning's n Values num= 4							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
265	.02	1046	.065	1095	.04	1171	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1095	1171		55	55		.3	.5

Ineffective Flow num= 2			
Sta L	Sta R	Elev	Permanent
265	1111	652.62	F
1133	1582	652.62	F

CULVERT

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.673

INPUT
Description: 4.674 4.677 MWRD TARCONT Cell 2 crossing per survey.
Deck

realigned to match section stationing.
Distance from Upstream XS = 1
Deck/Roadway Width = 53

Weir Coefficient = 2.7
 Upstream Deck/Roadway Coordinates
 num= 7

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
1000	651.72				1070	651.72				1096	652.18			
1122	652.38				1142	652.26				1160	651.93			
1176	651.87													

Upstream Bridge Cross Section Data
 Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
265	655	266	654	1046	653.6	1064	647.6	1095	646.6
1115	639.9	1129	639.9	1171	653.9	1192	653.9	1582	655

Manning's n Values num= 4

Sta	n	Val	Sta	n	Val	Sta	n	Val	Sta	n	Val
265	.02		1046	.065		1095	.04		1171	.065	

Bank Sta: Left Right Coeff Contr. Expan.
 1095 1171 .3 .5
 Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
265	1111	652.62	F
1133	1582	652.62	F

Downstream Deck/Roadway Coordinates
 num= 7

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
1025	651.72				1095	651.72				1120	652.18			
1147	652.38				1167	652.26				1185	651.93			
1201	651.87													

Downstream Bridge Cross Section Data
 Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
455	655	455	654	855	654	1071	653.6	1089	647.6
1120	646.6	1139	640.2	1155	640.2	1196	653.9	1217	653.9
1273.6	654.39	1275	655						

Manning's n Values num= 3

Sta	n	Val	Sta	n	Val	Sta	n	Val
455	.065		1120	.04		1196	.065	

Bank Sta: Left Right Coeff Contr. Expan.
 1120 1196 .3 .5
 Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
455	1137	651.22	F
1157	1275	651.22	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 = .95
 Elevation at which weir flow begins = 651.72
 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
Culv # 1	Box	4	9

FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG

Culvert Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
1	53	.015	.015	0	.4	1

Number of Barrels = 2
 Upstream Elevation = 642.71
 Centerline Stations

Sta.	Sta.
1117	1127

 Downstream Elevation = 642.72
 Centerline Stations

Sta.	Sta.
1142	1152

CROSS SECTION

RIVER: HIGGINS CK

REACH: MAINSTEM RS: 4.668

INPUT

Description: 4.669 4.672 Immediately Downstream - (TARCONT)Touhy Ave Reservoir Control

Cross Section copied from Exit section. ** HIGGINS CREEK** Overbanks refined per topo.

Station Elevation Data		num= 12							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
455	655	455	654	855	654	1071	653.6	1089	647.6
1120	646.6	1139	640.2	1155	640.2	1196	653.9	1217	653.9
1273.6	654.39	1275	655						

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
455	.065	1120	.04	1196	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1120	1196		19	19		.3	.5

Ineffective Flow		num= 2			
Sta L	Sta R	Elev	Permanent		
455	1137	651.22	F		
1157	1275	651.22	F		

CROSS SECTION

RIVER: HIGGINS CK REACH: MAINSTEM RS: 4.664

INPUT

Description: 4.665 4.669 TAR8 ** HIGGINS CREEK** Original WSP2 Approach - Touhy Ave / Exit - TARCONT

Station Elevation Data		num= 12							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
455	655	455	654	855	654	1071	653.6	1089	647.6
1120	646.6	1139	640.2	1155	640.2	1196	653.9	1217	653.9
1273.6	654.39	1275	655						

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
455	.065	1120	.04	1196	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1120	1196		27	27		.3	.5

Ineffective Flow		num= 2			
Sta L	Sta R	Elev	Permanent		
455	1132.5	651	F		
1161.5	1275	651	F		

CROSS SECTION

RIVER: HIGGINS CK REACH: MAINSTEM RS: 4.659

INPUT

Description: EOWB surveyed section D4, shifted 1075' rt. for comparison purposes. Overbanks refined per topo.

Station Elevation Data		num= 21							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
455	655	455	654	855	654	905	653	965	652
1075	650.9	1090.2	650.55	1106.3	649.74	1113.4	648.29	1119.5	646.26
1120.8	643.56	1124.8	639.8	1168.3	638.42	1173.6	643.5	1176.4	645.87
1181.7	648.12	1190	650.46	1211.9	650.77	1219	650.79	1273.6	654.39
1275	655								

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
455	.065	1113.4	.04	1190	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1113.4	1190		103	103		.3	.5

Ineffective Flow		num= 2			
Sta L	Sta R	Elev	Permanent		
455	1125	651	F		
1169	1275	651	F		

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.639

INPUT

Description: 4.640 4.644 Immediately Upstream - Touhy Ave ** HIGGINS CREEK**
 Cross Section copied from Approach section. Extended left and
 right to match suveyed section D3.

Station Elevation Data		num=		10					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
550	656	550	654	1071	653.6	1089	647.6	1120	646.6
1139	640.2	1155	640.2	1196	653.9	1217	653.9	1220	655

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
550	.065	1120	.04	1196	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1120	1196		1	1		.3	.5

Ineffective Flow		num=		2	
Sta L	Sta R	Elev	Permanent		
550	1122	652.52	F		
1172	1220	652.52	F		

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.638

INPUT

Description: EOWB surveyed section D3, shifted 1057' rt. for comparison
 purposes. Extended left along RR, which controls OT.

Station Elevation Data		num=		18					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
550	656	550	654	1070.9	653.78	1087	651.23	1100.1	648.26
1111.4	645.77	1121.5	644.69	1124.8	643.64	1129.8	642.35	1138.8	641.45
1152.9	640.8	1156.2	641.52	1160.7	641.61	1171.3	643.04	1172.8	647.27
1200.6	653.59	1206.8	654.39	1220	655				

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
550	.065	1111.4	.04	1172.8	.065

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1111.4	1172.8		143.4	143.4		.3	.5

Ineffective Flow		num=		2	
Sta L	Sta R	Elev	Permanent		
550	1122	654.5	F		
1172	1220	656	F		

CULVERT

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.626

INPUT

Description: 4.627 4.630 TOUHY AVE (RR controls) per survey, topo, and plan
 set.

Deck realigned to match section stationing.

Distance from Upstream XS = 10

Deck/Roadway Width = 124.4

Weir Coefficient = 2.7

Upstream Deck/Roadway Coordinates

num=		6												
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
530	656				542	655				580	654.5			
815	655				1050	656				1250	656			

Upstream Bridge Cross Section Data

Station Elevation Data		num=		18					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
550	656	550	654	1070.9	653.78	1087	651.23	1100.1	648.26
1111.4	645.77	1121.5	644.69	1124.8	643.64	1129.8	642.35	1138.8	641.45
1152.9	640.8	1156.2	641.52	1160.7	641.61	1171.3	643.04	1172.8	647.27
1200.6	653.59	1206.8	654.39	1220	655				

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
550	.065	1111.4	.04	1172.8	.065

550 .065 1111.4 .04 1172.8 .065

Bank Sta: Left Right Coeff Contr. Expan.
 1111.4 1172.8 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 550 1122 654.5 F
 1172 1220 656 F

Downstream Deck/Roadway Coordinates
 num= 6
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
 580 656 592 655 630 654.5
 865 655 1100 656 1300 656

Downstream Bridge Cross Section Data
 Station Elevation Data num= 15
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 585 656 710 655 920 654 925 653 950 653
 955 654 1000 655 1050 655 1104 651.3 1165 650.8
 1185 643.1 1200 641.8 1213 641.8 1231 653.5 1240 655

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 585 .4 1165 .033 1231 .04

Bank Sta: Left Right Coeff Contr. Expan.
 1165 1231 .3 .5

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 585 1184 652 F
 1219 1240 652 F

Blocked Obstructions num= 1
 Sta L Sta R Elev
 945 1097 656

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins = 654.5
 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
 Culv # 1 Box 8 13.5
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 2 - Wingwall flared 90 or 15 deg.
 Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
10	124.4	.015	.015	0	.5	1	

Number of Barrels = 2
 Upstream Elevation = 642.28
 Centerline Stations
 Sta. Sta.
 1140 1155
 Downstream Elevation = 642.52
 Centerline Stations
 Sta. Sta.
 1194 1209

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.612

INPUT
 Description: 4.613 4.617 Immediately Downstream - Touhy Ave ** HIGGINS CREEK** Cross Section copied from Exit section. Blocked obstruction for proposed Touhy overpass. Extended left for RR, which controls OT.

Station Elevation Data num= 15
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 585 656 710 655 920 654 925 653 950 653
 955 654 1000 655 1050 655 1104 651.3 1165 650.8
 1185 643.1 1200 641.8 1213 641.8 1231 653.5 1240 655

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val						
585	.4	1165	.033	1231	.04						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1165 1231 10 10 10 .3 .5

Ineffective Flow num= 2
Sta L Sta R Elev Permanent
585 1184 652 F
1219 1240 652 F

Blocked Obstructions num= 1
Sta L Sta R Elev
945 1097 656

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.611

INPUT

Description: EOWB surveyed section D2. Blocked obstruction for proposed Touhy overpass. Shifted 25' left for comparison purposes. Then shifted 1100' right. Extended left for RR, which controls OT.

Station	Elevation	Data	num=	18							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
585	656	710	655	920	654	925	653	950	653		
955	654	1000	655	1100	655	1118.2	651.33	1168	650.03		
1176.3	648.04	1192.5	642.93	1197.9	642.42	1204.4	642.03	1218.5	642.24		
1226	642.36	1248	650.08	1261	654.64						

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
585 .04 1168 .033 1248 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1168 1248 119 119 119 .3 .5

Ineffective Flow num= 2
Sta L Sta R Elev Permanent
585 1179 651 F
1235 1261 651 F

Blocked Obstructions num= 1
Sta L Sta R Elev
961 1100 656

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.588

INPUT

Description: 4.589 4.592 Exit - Touhy Ave TAR7 ** HIGGINS CREEK** Extended left to allow roadway OT for 500-year flow. Shifted 1095' left for comparison purposes.

Station	Elevation	Data	num=	13							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-156	655	-116	654	-106	652	-98	652	-78	654		
-50	655	0	655	34	654	70	650.8	90	643.1		
105	641.8	123	641.8	152	653.5						

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
-156 .04 70 .033 152 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
70 152 98 98 98 .1 .3

Blocked Obstructions num= 1
Sta L Sta R Elev
-156 -114 656

CROSS SECTION

RIVER: HIGGINS CK
REACH: MAINSTEM RS: 4.569

INPUT

Description: EOWB surveyed section D1. Extended left to allow roadway OT for 500-year flow.

Station	Elevation	Data	num=	17							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

-275	654.5	-217	653	-214	652	-206	651.8	-198	652
-180	655	31.4	654.86	45.3	653.08	84.5	642.23	93	641.26
95	640	99.8	639.09	106.3	639.34	117.5	638.78	122.8	641.42
135.3	644.26	169.9	655.01						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -275 .04 84.5 .033 122.8 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 84.5 122.8 144 144 144 .1 .3
 Blocked Obstructions num= 1
 Sta L Sta R Elev
 -275 -217 656

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.542

INPUT
 Description: 4.543 4.543 Approach - Mt Prospect Rd TAR6
 Extended left to

allow roadway OT for 500-year flow.
 Station Elevation Data num= 10
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -425 655 -425 653 -382 652 -366 652 -358 651.4
 -335 655 0 655.4 45 639.1 80 639.1 125 655.4

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -425 .04 45 .033 80 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 45 80 23 23 23 .1 .3

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.537

INPUT
 Description: 4.538 4.539 Immediately Upstream - Mt Prospect Rd
 Cross Section

copied from Approach section. Extended left to allow roadway OT
 for 500-year flow.
 Station Elevation Data num= 21
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -1200 652 -1040 652 -775 653 -502 655 -415 655
 -400 653 -359 652 -313 651 -299 649 -286 648
 -270 649 -248 654 -142 655 -120 655 -86 652
 -53 652 -30 654 0 655.4 45 639.1 80 639.1
 125 655.4

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -1200 .04 45 .033 80 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 45 80 174 174 174 .3 .5
 Ineffective Flow num= 3
 Sta L Sta R Elev Permanent
 -1200 -307 656 F
 -265 46.5 656 F
 76.5 125 656 F

MULTIPLE OPENING

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.521

INPUT
 Description: 4.522 4.522 Mt. Prospect Road - PROPOSED 12/11
 Distance from Upstream XS = 10
 Deck/Roadway Width = 154
 Weir Coefficient = 2.7
 Upstream Deck/Roadway Coordinates
 num= 8

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-1200	656.03				-1100	656.61				-722	653.98			
-422	655.97				-222	657.64				-22	659.31			
78	660.15				200	660								

Upstream Bridge Cross Section Data

Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1200	652	-1040	652	-775	653	-502	655	-415	655
-400	653	-359	652	-313	651	-299	649	-286	648
-270	649	-248	654	-142	655	-120	655	-86	652
-53	652	-30	654	0	655.4	45	639.1	80	639.1
125	655.4								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-1200	.04	45	.033	80	.04

Bank Sta: Left Right Coeff Contr. Expan.

45	80	.3	.5
----	----	----	----

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
-1200	-307	656	F
-265	46.5	656	F
76.5	125	656	F

Downstream Deck/Roadway Coordinates

num= 8

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
-1200	656.03				-1100	656.61				-722	653.98			
-422	655.97				-222	657.64				-22	659.31			
78	660.15				200	660								

Downstream Bridge Cross Section Data

Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1100	650	-800	650	-735	651	-674	654	-633	655
-582	655	-475	654	-375	652	-288	650	-269	649
-252	648	-235	649	-162	654	-125	654	-100	653
0	652.8	45	637.5	80	637.5	125	652.8		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-1100	.04	45	.033	80	.04

Bank Sta: Left Right Coeff Contr. Expan.

45	80	.3	.5
----	----	----	----

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
-1100	-265	653	F
-239	46.5	653	F
78.5	125	653	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 = .95
 Elevation at which weir flow begins = 654
 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

Number of Culverts = 2

Culvert Name Shape Rise Span
 MtProsp 36" Box 3.5 10
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 10 154 .012 .012 0 .4 1
 Number of Barrels = 2
 Upstream Elevation = 648.1
 Centerline Stations
 Sta. Sta.
 -292 -280
 Downstream Elevation = 648
 Centerline Stations
 Sta. Sta.
 -258 -246

Culvert Name Shape Rise Span
 MtProsp Higg Box 8 12
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 10 154 .015 .015 0 .4 1
 Upstream Elevation = 638.6
 Centerline Station = 62.5
 Downstream Elevation = 637.09
 Centerline Station = 62.5

Multiple Opening Stagnation Limits

Opening Type	Upstream		Downstream	
	Sta. Left	Sta. Right	Sta. Left	Sta. Right
Culvert Group	-1200	-120	-1100	-125
Culvert Group	-248	125	-235	125

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.505

INPUT

Description: 4.506 4.506 Immediately Downstream - RELOCATED Mt Prospect Rd

Cross Section copied from Exit section. Extended left to allow roadway OT for 500-year flow.

Station Elevation Data		num= 19							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1100	650	-800	650	-735	651	-674	654	-633	655
-582	655	-475	654	-375	652	-288	650	-269	649
-252	648	-235	649	-162	654	-125	654	-100	653
0	652.8	45	637.5	80	637.5	125	652.8		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
-1100	.04	45	.033	80	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	45	80		103	103		.3	.5

Ineffective Flow		num= 3	
Sta L	Sta R	Elev	Permanent
-1100	-265	653	F
-239	46.5	653	F
78.5	125	653	F

CROSS SECTION

RIVER: HIGGINS CK
 REACH: MAINSTEM RS: 4.485

INPUT

Description: 4.486 4.486 Exit - Mt Prospect Rd TAR4 revised per current topo reflecting relocated Willow Creek.

Station Elevation Data		num= 11							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	652	92	649	118	648	144	649	160	650
190	652	217	653	237	653	295	637.5	394	637.5
452	653								

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .04 237 .033 452 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 237 452 0 0 0 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 25

INPUT

Description: River Mile or Station US5
 Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.22	11.547	671.72	80.829	670.72	84.293	669.72	92.376	667.72
103.923	667.72	113.161	669.72	121.244	670.72	132.791	671.72	138.564	672.22

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .055 84.293 .035 113.161 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 84.293 113.161 100 100 100 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 24

INPUT

Description: River Mile or Station US4
 Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	674.72	12	671.72	45	671.72	55	666.72	65	666.72
75	670.72	78	671.72	83	672.22				

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .055 45 .035 75 .055

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 45 75 200 200 200 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 23

INPUT

Description: River Mile or Station US3
 Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	674.72	9	671.72	19	671.72	30	672.72	39	671.72
50	667.72	65	667.72	75	670.72	78	671.72		

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .055 39 .035 75 .055

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 39 75 200 200 200 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 22

INPUT

Description: River Mile or Station US2
 Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	674.72	60	673.72	75	669.72	80	664.72	105	664.72
116	670.72	120	671.72						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .055 75 .035 116 .055

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 75 116 300 300 300 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 21

INPUT

Description: River Mile or Station US1
 Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	673.72	10	671.72	70	670.72	80	669.72	95	664.72
105	664.72	126	670.72	130	671.72				

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .055 80 .035 126 .055

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 80 126 100 100 100 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 20

INPUT

Description: River Mile or Station EGV8
 Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.72	8	671.72	40	670.72	72	669.72	87	664.72
95	664.72	117	668.72	120	669.72	134	670.72		

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .055 72 .035 117 .055

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 72 117 100 100 100 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 19

INPUT

Description: River Mile or Station EGV7
 Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.72	8	671.72	38	670.72	61	669.72	77	667.72
89	665.72	92	664.42	94	664.72	107	667.72	160	668.72
180	669.72	245	670.72						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .055 61 .035 107 .055

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 61 107 100 100 100 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 18

INPUT

Description: River Mile or Station EGV6
 Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-----	------	-----	------	-----	------	-----	------	-----	------

40	670.72	75	669.72	87	664.72	92	664.22	97	664.72
135	667.72	175	668.72	192	669.72	219	670.72		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
40	.04	75	.04	135	.055

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

	75	135	100	100	100	.1	.3
--	----	-----	-----	-----	-----	----	----

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 17

INPUT
Description: River Mile or Station EGV5
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	673.72	12	670.72	81	669.72	92	664.12	100	664.12
104	664.72	119	666.72	135	667.72	159	668.72	215	669.72
235	670.72								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	81	.035	104	.035

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

	81	104	100	100	100	.1	.3
--	----	-----	-----	-----	-----	----	----

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 16

INPUT
Description: River Mile or Station EGV4
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.72	15	669.72	50	668.72	84	667.72	92	664.02
101	664.02	120	665.72	130	666.72	136	667.72	145	668.72
190	669.72	265	670.72						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	84	.035	130	.035

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

	84	130	100	100	100	.1	.3
--	----	-----	-----	-----	-----	----	----

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 15

INPUT
Description: River Mile or Station EGV3
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.22	12	669.72	15	668.72	90	667.72	101	663.72
107	663.72	118	667.72	124	668.72	139	669.72	169	670.72

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.055	90	.035	118	.055

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

	90	118	100	100	100	.1	.3
--	----	-----	-----	-----	-----	----	----

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 14

INPUT
Description: River Mile or Station EGV2
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.22	15	669.72	18	668.72	78	667.72	90	663.72
102	663.72	112	667.72	129	672.72				

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .055 15 .035 112 .055

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 15 112 100 100 100 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 13

INPUT

Description: River Mile or Station EGV1
 Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	671.72	12	669.72	25	663.72	39	663.72	47	666.72
55	667.72	75	668.22						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .04 12 .035 55 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 12 55 280 280 280 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 12

INPUT

Description: River Mile or Station 281C
 Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	669.72	8	668.72	16	667.72	23	666.72	37	665.72
39	664.72	40	663.72	41	662.72	56	662.72	58	663.72
60	664.72	62	665.72	64	666.72	66	667.72	68	668.72

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .04 16 .035 66 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 16 66 140 140 140 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 11

INPUT

Description: River Mile or Station 281CC
 Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
955	672.72	975	671.72	980	670.72	983	669.72	992	664.72
994	663.72	1000	663.02	1005	663.72	1008	664.72	1018	669.72
1022	670.72	1028	671.72						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 955 .04 983 .035 1018 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 983 1018 140 140 140 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 10

INPUT

Description: River Mile or Station 281B

Station Elevation Data				num=	12					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
779	671.72	840	670.72	845	669.72	852	664.72	857	663.72	
862	662.72	869	663.72	873	664.72	882	669.72	890	670.72	
1015	670.72	1100	670.92							

Manning's n Values				num=	3					
Sta	n Val	Sta	n Val	Sta	n Val					
779	.04	845	.035	882	.04					

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	845	882		138	138		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 9

INPUT
Description: River Mile or Station 281BB

Station Elevation Data				num=	11					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
960	670.72	976	669.72	992	664.72	995	663.72	997	662.72	
1000	662.22	1008	662.72	1010	663.72	1015	664.72	1030	669.72	
1040	670.72									

Manning's n Values				num=	3					
Sta	n Val	Sta	n Val	Sta	n Val					
960	.04	976	.035	1030	.04					

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	976	1030		140	140		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 8

INPUT
Description: River Mile or Station 281

Station Elevation Data				num=	13					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
700	672.42	800	671.72	878	670.42	886	667.92	896	662.12	
899	661.32	900	661.02	901	661.32	915	662.42	943	669.92	
1000	669.52	1100	669.22	1200	669.22					

Manning's n Values				num=	3					
Sta	n Val	Sta	n Val	Sta	n Val					
700	.035	878	.042	943	.04					

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	878	943		68	68		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 7

INPUT
Description: River Mile or Station 281X

Station Elevation Data				num=	14					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
990	668.72	1026	667.72	1033	666.72	1042	665.72	1055	664.72	
1058	663.72	1060	662.72	1070	661.02	1075	662.72	1080	663.72	
1082	664.72	1085	665.72	1095	667.72	1102	668.72			

Manning's n Values				num=	3					
Sta	n Val	Sta	n Val	Sta	n Val					
990	.04	1033	.04	1095	.04					

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1033	1095		91	91		.1	.3

CROSS SECTION

RIVER: HIGGINS TRIB A
REACH: CUP RS: 6.001

INPUT

Description: River Mile or Station 281X used just upstream of crossing.

Station Elevation Data num= 14
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 990 668.72 1026 667.72 1033 666.72 1042 665.72 1055 664.72
 1058 663.72 1060 662.72 1070 661.02 1075 662.72 1080 663.72
 1082 664.72 1085 665.72 1095 667.72 1102 668.72

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 990 .04 1033 .04 1095 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1033 1095 72.5 72.5 72.5 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 990 1058 666.72 F
 1082 1102 666.72 F

CULVERT

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 6

INPUT

Description: Culvert(s) @ 281A

Distance from Upstream XS = 1
 Deck/Roadway Width = 70.5
 Weir Coefficient = 2.7

Upstream Deck/Roadway Coordinates
 num= 4
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
 990 667.02 -.28 1090 666.72 -.28 1190 666.72 -.28
 1290 666.92 -.28

Upstream Bridge Cross Section Data
 Station Elevation Data num= 14
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 990 668.72 1026 667.72 1033 666.72 1042 665.72 1055 664.72
 1058 663.72 1060 662.72 1070 661.02 1075 662.72 1080 663.72
 1082 664.72 1085 665.72 1095 667.72 1102 668.72

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 990 .04 1033 .04 1095 .04

Bank Sta: Left Right Coeff Contr. Expan.
 1033 1095 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 990 1058 666.72 F
 1082 1102 666.72 F

Downstream Deck/Roadway Coordinates
 num= 4
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
 799 667.02 -.28 900 666.72 -.28 1000 666.72 -.28
 1100 666.92 -.28

Downstream Bridge Cross Section Data
 Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 799 675.72 800 670.42 878 669.12 886 666.62 896 660.82
 899 660.02 900 659.72 901 660.02 915 661.12 943 669.62
 1000 668.22 1001 675.72

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 799 .04 878 .045 943 .04

Bank Sta: Left Right Coeff Contr. Expan.
 878 943 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 799 896 666.72 F
 919 1001 666.72 F

Upstream Embankment side slope = 3.362 horiz. to 1.0 vertical
 Downstream Embankment side slope = 3.362 horiz. to 1.0 vertical

Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins = 666.72
 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
 Culv # 1 Box 4.85 15.8
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 1 70.5 .012 .012 0 .4 1
 Upstream Elevation = 660.72
 Centerline Station = 1070
 Downstream Elevation = 660.4
 Centerline Station = 907.9

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 5.999

INPUT

Description: River Mile or Station 281AA used just downstream of crossing.

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
799	675.72	800	670.42	878	669.12	886	666.62	896	660.82
899	660.02	900	659.72	901	660.02	915	661.12	943	669.62
1000	668.22	1001	675.72						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
799	.04	878	.045	943	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 878 943 149 149 149 .3 .5
 Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
799	896	666.72	F
919	1001	666.72	F

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 5

INPUT

Description: River Mile or Station 281AA. Reach lengths adjusted by -350' to match 2008 FIS profile length.

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
799	675.72	800	670.42	878	669.12	886	666.62	896	660.82
899	660.02	900	659.72	901	660.02	915	661.12	943	669.62
1000	668.22	1001	675.72						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
799	.04	878	.045	943	.04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 878 943 1505 1505 1505 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 4.1

INPUT

Description: EOWB surveyed section C7. Shifted 73' left for comparison. Uses n-values to match FIS XS 4.

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
61	671.59	95.5	659.27	161.9	656.84	245.5	655.81	253.3	652.52
259.1	651.98	263.5	652.16	265.9	654.01	273.7	655.63	292.5	655.71
322.2	656.23	340.5	661.74						

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 61 .045 245.5 .035 273.7 .045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 245.5 273.7 335 260 175 .1 .3

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 3.8

INPUT

Description: Proposed condition. EOWB surveyed section C6. Extended left using 1' topo.

Station Elevation Data num= 18
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -80 662 -54 657 -48 657 -36 660 -10 657
 0 656.18 27.6 656.11 51.9 656.07 75.8 655.37 106.8 654.87
 143.3 655.08 146.2 652.54 149.8 651.03 176 652.81 182.5 654.73
 192.7 658.58 202 662.51 210.2 662.67

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -80 .04 143.3 .035 182.5 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 143.3 182.5 460 380 340 .1 .3
 Left Levee Station= -36 Elevation= 660

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 3.5

INPUT

Description: Proposed condition. EOWB surveyed section C5. Extended left using 1' topo.

Station Elevation Data num= 17
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 -12 662 12 654 16 654 20 655.2 27.6 655
 63.4 653.91 93.2 654.36 96.1 652.27 101.3 651.09 115.2 651.3
 117.5 652.15 120.6 653.53 123.5 654.43 130.5 656.59 143.5 661.63
 146.3 662.05 148.8 662.11

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 -12 .04 93.2 .035 123.5 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 93.2 123.5 490 490 490 .1 .3
 Left Levee Station= 20 Elevation= 655.2

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 3.1

INPUT

Description: Proposed condition. EOWB surveyed section C4. Extended left using 1' topo, skewed 30 deg. Shifted right 1730' for comparison to d/s.

Station Elevation Data num= 12
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 1740 661 1765.5 652.5 1769.5 652.5 1773.56 653.95 1777.03 652.53
 1786.12 651.27 1796.25 650.91 1801.53 652.61 1805.34 653.79 1812.53 656.68
 1821.71 660.42 1824.92 661.02

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 1740 .04 1773.56 .035 1805.34 .04

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1773.56 1805.34 55 55 55 .1 .3
 Skew Angle = 30

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 3.01

INPUT

Description: Cross Section interpolated upstream of proposed culvert extension.
 Overbanks corrected using 1' topo.

Station Elevation Data num= 12									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1673	661	1707	656	1721	655	1775	654	1779	653
1784	650.5	1792	650.5	1797	653	1800	654	1808	655
1825	660	1837	662						

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
1673	.04	1775	.04	1800	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1775	1800	330	330	330	.3	.5
Ineffective Flow num= 2							
Sta L	Sta R	Elev	Permanent				
1673	1770	664	F				
1806	1837	664	F				

CULVERT

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 2

INPUT

Description: Culvert(s) @ 280A
 Distance from Upstream XS = 30
 Deck/Roadway Width = 295
 Weir Coefficient = 2.7

Upstream Deck/Roadway Coordinates num= 5									
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	664.7		1694	663.5	1794	663.6			
1894	663.7		2410	665.2					

Upstream Bridge Cross Section Data num= 12									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1673	661	1707	656	1721	655	1775	654	1779	653
1784	650.5	1792	650.5	1797	653	1800	654	1808	655
1825	660	1837	662						

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
1673	.04	1775	.04	1800	.04

Bank Sta:	Left	Right	Coeff Contr.	Expan.
	1775	1800	.3	.5
Ineffective Flow num= 2				
Sta L	Sta R	Elev	Permanent	
1673	1770	664	F	
1806	1837	664	F	

Downstream Deck/Roadway Coordinates num= 5									
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	664.7		1694	663.5	1794	663.6			
1894	663.7		2410	665.2					

Downstream Bridge Cross Section Data num= 13									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1499	665.72	1500	655.02	1600	654.82	1700	654.32	1777	655.02
1784	651.22	1787	650.62	1794	650.22	1797	651.22	1802	653.42
1900	653.32	2000	654.42	2001	665.72				

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
1499	.05	1777	.05	1802	.05

Bank Sta:	Left	Right	Coeff Contr.	Expan.
	1777	1802	.3	.5
Ineffective Flow num= 2				
Sta L	Sta R	Elev	Permanent	

1499 1776 662.5 F
 1804 2001 662.5 F

Upstream Embankment side slope = 2 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins = 663.52
 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
 Culv # 1 Box 9 12
 FHWA Chart # 8 - flared wingwalls
 FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 5 320 .013 .03 1 .4 1
 Number of Barrels = 2
 Upstream Elevation = 649.5
 Centerline Stations
 Sta. Sta.
 1781 1795
 Downstream Elevation = 649
 Centerline Stations
 Sta. Sta.
 1783 1797

CROSS SECTION

RIVER: HIGGINS TRIB A
 REACH: CUP RS: 1

INPUT

Description: Cross Section 1 from Tributary A LOMR '07 = WSP2 XS 280AA
 Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1499	665.72	1500	655.02	1600	654.82	1700	654.32	1777	655.02
1784	651.22	1787	650.62	1794	650.22	1797	651.22	1802	653.42
1900	653.32	2000	654.42	2001	665.72				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1499	.05	1777	.05	1802	.05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 1777 1802 0 0 0 .3 .5
 Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1499	1776	662.5	F
1804	2001	662.5	F

SUMMARY OF MANNING'S N VALUES

River:HIGGINS CK

Reach	River Sta.	n1	n2	n3	n4	n5
2	6.443	.065	.065	.075		
2	6.404	.065	.065	.075		
2	6.353	.065	.065	.075		
2	6.287	.065	.065	.075		
MAINSTEM	6.245	.07	.02	.07		
MAINSTEM	6.231	.07	.02	.07		
MAINSTEM	6.179	.07	.02	.045		
MAINSTEM	6.069	.07	.02	.07		
MAINSTEM	6.035	.045	.02	.045		
MAINSTEM	6.034	.045	.013	.045		
MAINSTEM	6.033	.045	.013	.045		
MAINSTEM	6.032	.045	.029	.045		
MAINSTEM	6.021	.04	.029	.04		
MAINSTEM	6.006	.06	.035	.06		
MAINSTEM	5.9994*	.06	.035	.06		
MAINSTEM	5.9950	.06	.035	.06		
MAINSTEM	5.981	Bridge				
MAINSTEM	5.972	.06	.015	.06		

MAINSTEM	5.959	.06	.015	.06		
MAINSTEM	5.950	.06	.015	.06		
MAINSTEM	5.914	.06	.015	.06		
MAINSTEM	5.911	Culvert				
MAINSTEM	5.899	.045	.015	.045		
MAINSTEM	5.86375*	.045	.015	.045		
MAINSTEM	5.8285*	.045	.015	.045		
MAINSTEM	5.79325*	.045	.015	.045		
MAINSTEM	5.758	.045	.015	.045		
MAINSTEM	5.721	Culvert				
MAINSTEM	5.683	.045	.015	.045		
MAINSTEM	5.650	.045	.015	.045		
MAINSTEM	5.649	.045	.015	.045		
MAINSTEM	5.593	.045	.015	.045		
MAINSTEM	5.558	.045	.015	.045		
MAINSTEM	5.500	.045	.015	.045		
MAINSTEM	5.496	.05	.015	.05		
MAINSTEM	5.409	.06	.015	.06		
MAINSTEM	5.408	.06	.015	.06		
MAINSTEM	5.394	.06	.035	.06		
MAINSTEM	5.364	Bridge				
MAINSTEM	5.335	.06	.035	.06		
MAINSTEM	5.324	.05	.025	.05		
MAINSTEM	5.289	.05	.025	.05		
MAINSTEM	5.256	.05	.025	.05		
MAINSTEM	5.236	.05	.025	.05		
MAINSTEM	5.184	.05	.025	.05	.03	
MAINSTEM	5.166	.05	.025	.05	.03	
MAINSTEM	5.144	.05	.025	.05	.03	
MAINSTEM	5.094	.05	.025	.05	.03	
MAINSTEM	5.049	.05	.025	.05	.03	
MAINSTEM	5.045	.05	.025	.05	.03	
MAINSTEM	5.020	.05	.025	.05	.03	
MAINSTEM	5.012	Culvert				
MAINSTEM	5.005	.03	.05	.025	.05	.03
MAINSTEM	4.992	.05	.025	.05	.02	
MAINSTEM	4.980	.03	.05	.025	.05	.02
MAINSTEM	4.966	.02	.05	.025	.05	.02
MAINSTEM	4.944	.02	.05	.025	.05	.02
MAINSTEM	4.928	.05	.02	.035	.05	.02
MAINSTEM	4.925	.05	.02	.035	.05	.02
MAINSTEM	4.915	.02	.065	.04	.065	
MAINSTEM	4.885	.02	.065	.04	.065	
MAINSTEM	4.866	.02	.065	.04	.065	
MAINSTEM	4.847	.02	.065	.04	.065	
MAINSTEM	4.828	.02	.065	.04	.065	
MAINSTEM	4.801	.02	.065	.04	.065	
MAINSTEM	4.783	.02	.065	.04	.065	
MAINSTEM	4.774	.02	.065	.04	.065	
MAINSTEM	4.771	.02	.065	.04	.065	
MAINSTEM	4.760	.02	.065	.04	.065	
MAINSTEM	4.742	.02	.065	.04	.065	
MAINSTEM	4.713	.02	.065	.04	.065	
MAINSTEM	4.698	.02	.065	.04	.065	
MAINSTEM	4.694	.02	.065	.04	.065	
MAINSTEM	4.683	.02	.065	.04	.065	
MAINSTEM	4.678	.02	.065	.04	.065	
MAINSTEM	4.673	Culvert				
MAINSTEM	4.668	.065	.04	.065		
MAINSTEM	4.664	.065	.04	.065		
MAINSTEM	4.659	.065	.04	.065		
MAINSTEM	4.639	.065	.04	.065		
MAINSTEM	4.638	.065	.04	.065		
MAINSTEM	4.626	Culvert				
MAINSTEM	4.612	.4	.033	.04		
MAINSTEM	4.611	.04	.033	.04		
MAINSTEM	4.588	.04	.033	.04		
MAINSTEM	4.569	.04	.033	.04		
MAINSTEM	4.542	.04	.033	.04		
MAINSTEM	4.537	.04	.033	.04		
MAINSTEM	4.521	Mult Open				
MAINSTEM	4.505	.04	.033	.04		
MAINSTEM	4.485	.04	.033	.04		

River:HIGGINS TRIB A

Reach	River Sta.	n1	n2	n3
CUP	25	.055	.035	.035
CUP	24	.055	.035	.055

CUP	23	.055	.035	.055
CUP	22	.055	.035	.055
CUP	21	.055	.035	.055
CUP	20	.055	.035	.055
CUP	19	.055	.035	.055
CUP	18	.04	.04	.055
CUP	17	.055	.035	.035
CUP	16	.055	.035	.035
CUP	15	.055	.035	.055
CUP	14	.055	.035	.055
CUP	13	.04	.035	.035
CUP	12	.04	.035	.04
CUP	11	.04	.035	.04
CUP	10	.04	.035	.04
CUP	9	.04	.035	.04
CUP	8	.035	.042	.04
CUP	7	.04	.04	.04
CUP	6.001	.04	.04	.04
CUP	6	Culvert		
CUP	5.999	.04	.045	.04
CUP	5	.04	.045	.04
CUP	4.1	.045	.035	.045
CUP	3.8	.04	.035	.04
CUP	3.5	.04	.035	.04
CUP	3.1	.04	.035	.04
CUP	3.01	.04	.04	.04
CUP	2	Culvert		
CUP	1	.05	.05	.05

SUMMARY OF REACH LENGTHS

River: HIGGINS CK

Reach	River Sta.	Left	Channel	Right
2	6.443	204	204	204
2	6.404	270	270	270
2	6.353	350	350	350
2	6.287	0	0	0
MAINSTEM	6.245	75	75	75
MAINSTEM	6.231	274	274	274
MAINSTEM	6.179	575	575	575
MAINSTEM	6.069	180	180	180
MAINSTEM	6.035	6	6	6
MAINSTEM	6.034	7	7	7
MAINSTEM	6.033	1	1	1
MAINSTEM	6.032	62	62	62
MAINSTEM	6.021	80	80	80
MAINSTEM	6.006	35	35	35
MAINSTEM	5.9994*	35	23	20
MAINSTEM	5.9950	130	125	120
MAINSTEM	5.981	Bridge		
MAINSTEM	5.972	66	66	66
MAINSTEM	5.959	50	50	50
MAINSTEM	5.950	189	189	189
MAINSTEM	5.914	78	78	78
MAINSTEM	5.911	Culvert		
MAINSTEM	5.899	186	186	186
MAINSTEM	5.86375*	186	186	186
MAINSTEM	5.8285*	186	186	186
MAINSTEM	5.79325*	186	186	186
MAINSTEM	5.758	395	395	395
MAINSTEM	5.721	Culvert		
MAINSTEM	5.683	172	172	172
MAINSTEM	5.650	5	5	5
MAINSTEM	5.649	294	294	294
MAINSTEM	5.593	188	188	188
MAINSTEM	5.558	308	308	308
MAINSTEM	5.500	21	21	21
MAINSTEM	5.496	458	458	458
MAINSTEM	5.409	6	6	6
MAINSTEM	5.408	72.1	72.1	72.1
MAINSTEM	5.394	323	323	323
MAINSTEM	5.364	Bridge		
MAINSTEM	5.335	50	50	50
MAINSTEM	5.324	184	184	184
MAINSTEM	5.289	173	173	173
MAINSTEM	5.256	108	108	108

MAINSTEM	5.236	272	272	272
MAINSTEM	5.184	95	95	95
MAINSTEM	5.166	117	117	117
MAINSTEM	5.144	266	266	266
MAINSTEM	5.094	237	237	237
MAINSTEM	5.049	22	22	22
MAINSTEM	5.045	130	130	130
MAINSTEM	5.020	80	80	80
MAINSTEM	5.012	Culvert		
MAINSTEM	5.005	69	69	69
MAINSTEM	4.992	62	62	62
MAINSTEM	4.980	73	73	73
MAINSTEM	4.966	115	115	115
MAINSTEM	4.944	86	86	86
MAINSTEM	4.928	14	14	14
MAINSTEM	4.925	55	55	55
MAINSTEM	4.915	159	159	159
MAINSTEM	4.885	101	101	101
MAINSTEM	4.866	100	100	100
MAINSTEM	4.847	101	101	101
MAINSTEM	4.828	139	139	139
MAINSTEM	4.801	99	99	99
MAINSTEM	4.783	43	43	43
MAINSTEM	4.774	18	18	18
MAINSTEM	4.771	57	57	57
MAINSTEM	4.760	95	95	95
MAINSTEM	4.742	156	156	156
MAINSTEM	4.713	80	80	80
MAINSTEM	4.698	20	20	20
MAINSTEM	4.694	57	57	57
MAINSTEM	4.683	26	26	26
MAINSTEM	4.678	55	55	55
MAINSTEM	4.673	Culvert		
MAINSTEM	4.668	19	19	19
MAINSTEM	4.664	27	27	27
MAINSTEM	4.659	103	103	103
MAINSTEM	4.639	1	1	1
MAINSTEM	4.638	143.4	143.4	143.4
MAINSTEM	4.626	Culvert		
MAINSTEM	4.612	10	10	10
MAINSTEM	4.611	119	119	119
MAINSTEM	4.588	98	98	98
MAINSTEM	4.569	144	144	144
MAINSTEM	4.542	23	23	23
MAINSTEM	4.537	174	174	174
MAINSTEM	4.521	Mult Open		
MAINSTEM	4.505	103	103	103
MAINSTEM	4.485	0	0	0

River: HIGGINS TRIB A

Reach	River Sta.	Left	Channel	Right
CUP	25	100	100	100
CUP	24	200	200	200
CUP	23	200	200	200
CUP	22	300	300	300
CUP	21	100	100	100
CUP	20	100	100	100
CUP	19	100	100	100
CUP	18	100	100	100
CUP	17	100	100	100
CUP	16	100	100	100
CUP	15	100	100	100
CUP	14	100	100	100
CUP	13	280	280	280
CUP	12	140	140	140
CUP	11	140	140	140
CUP	10	138	138	138
CUP	9	140	140	140
CUP	8	68	68	68
CUP	7	91	91	91
CUP	6.001	72.5	72.5	72.5
CUP	6	Culvert		
CUP	5.999	149	149	149
CUP	5	1505	1505	1505
CUP	4.1	335	260	175
CUP	3.8	460	380	340
CUP	3.5	490	490	490
CUP	3.1	55	55	55

CUP	3.01	330	330	330
CUP	2	Culvert		
CUP	1	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: HIGGINS CK

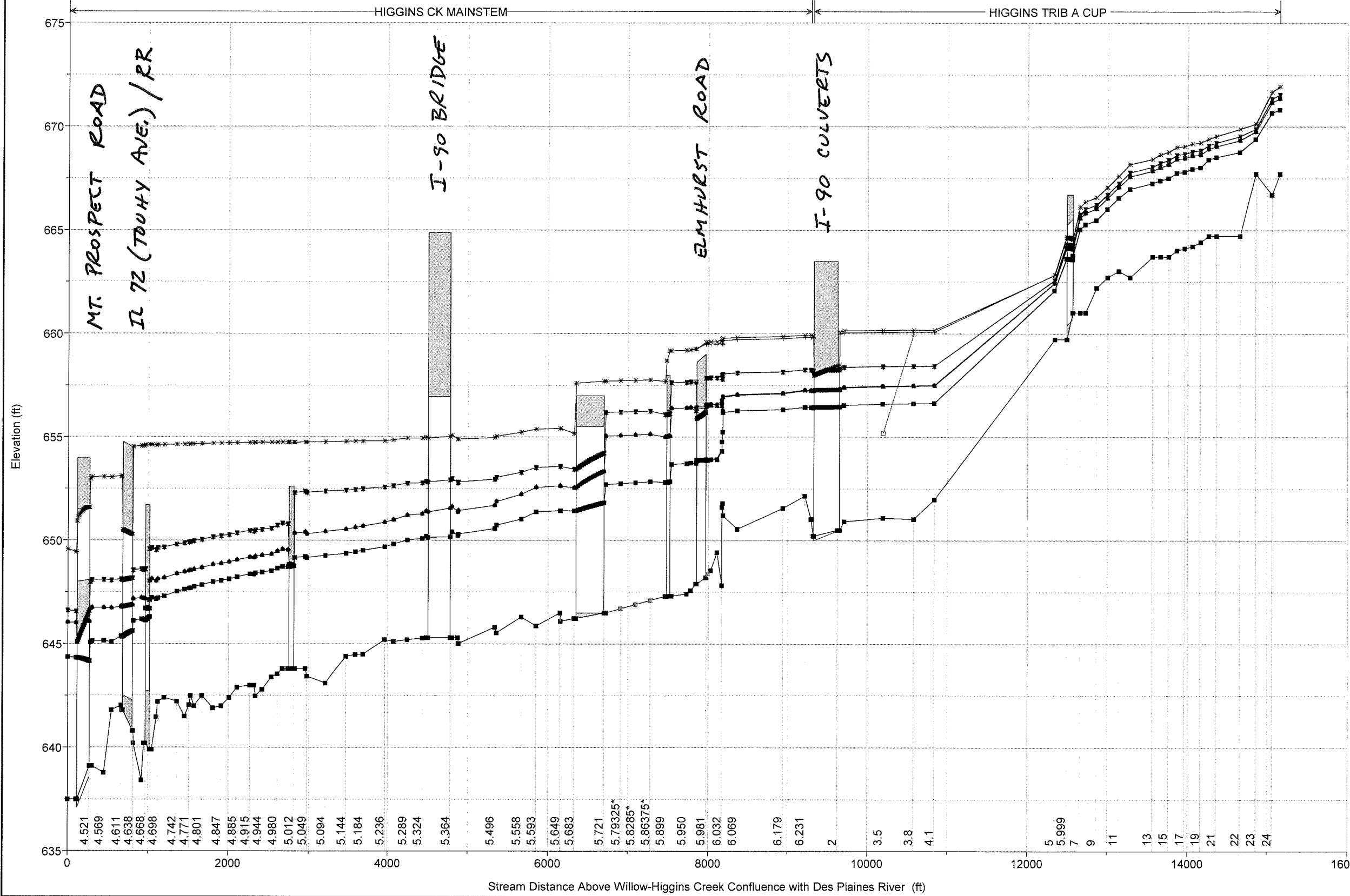
Reach	River Sta.	Contr.	Expan.
2	6.443	.1	.3
2	6.404	.1	.3
2	6.353	.1	.3
2	6.287	.1	.3
MAINSTEM	6.245	.1	.3
MAINSTEM	6.231	.1	.3
MAINSTEM	6.179	.1	.3
MAINSTEM	6.069	.1	.3
MAINSTEM	6.035	.1	.3
MAINSTEM	6.034	.1	.3
MAINSTEM	6.033	.1	.3
MAINSTEM	6.032	.1	.3
MAINSTEM	6.021	.1	.3
MAINSTEM	6.006	.3	.5
MAINSTEM	5.9994*	.3	.5
MAINSTEM	5.9950	.3	.5
MAINSTEM	5.981	Bridge	
MAINSTEM	5.972	.3	.5
MAINSTEM	5.959	.1	.3
MAINSTEM	5.950	.1	.3
MAINSTEM	5.914	.3	.5
MAINSTEM	5.911	Culvert	
MAINSTEM	5.899	.3	.5
MAINSTEM	5.86375*	.3	.5
MAINSTEM	5.8285*	.3	.5
MAINSTEM	5.79325*	.3	.5
MAINSTEM	5.758	.3	.5
MAINSTEM	5.721	Culvert	
MAINSTEM	5.683	.3	.5
MAINSTEM	5.650	.1	.3
MAINSTEM	5.649	.1	.3
MAINSTEM	5.593	.1	.3
MAINSTEM	5.558	.1	.3
MAINSTEM	5.500	.1	.3
MAINSTEM	5.496	.1	.3
MAINSTEM	5.409	.1	.3
MAINSTEM	5.408	.1	.3
MAINSTEM	5.394	.3	.5
MAINSTEM	5.364	Bridge	
MAINSTEM	5.335	.3	.5
MAINSTEM	5.324	.1	.3
MAINSTEM	5.289	.1	.3
MAINSTEM	5.256	.1	.3
MAINSTEM	5.236	.1	.3
MAINSTEM	5.184	.1	.3
MAINSTEM	5.166	.1	.3
MAINSTEM	5.144	.1	.3
MAINSTEM	5.094	.1	.3
MAINSTEM	5.049	.1	.3
MAINSTEM	5.045	.3	.5
MAINSTEM	5.020	.3	.5
MAINSTEM	5.012	Culvert	
MAINSTEM	5.005	.3	.5
MAINSTEM	4.992	.1	.3
MAINSTEM	4.980	.1	.3
MAINSTEM	4.966	.1	.3
MAINSTEM	4.944	.1	.3
MAINSTEM	4.928	.1	.3
MAINSTEM	4.925	.1	.3
MAINSTEM	4.915	.1	.3
MAINSTEM	4.885	.1	.3
MAINSTEM	4.866	.1	.3
MAINSTEM	4.847	.1	.3
MAINSTEM	4.828	.1	.3
MAINSTEM	4.801	.1	.3
MAINSTEM	4.783	.1	.3
MAINSTEM	4.774	.1	.3
MAINSTEM	4.771	.1	.3

MAINSTEM	4.760	.1	.3
MAINSTEM	4.742	.1	.3
MAINSTEM	4.713	.1	.3
MAINSTEM	4.698	.1	.3
MAINSTEM	4.694	.1	.3
MAINSTEM	4.683	.3	.5
MAINSTEM	4.678	.3	.5
MAINSTEM	4.673	Culvert	
MAINSTEM	4.668	.3	.5
MAINSTEM	4.664	.3	.5
MAINSTEM	4.659	.3	.5
MAINSTEM	4.639	.3	.5
MAINSTEM	4.638	.3	.5
MAINSTEM	4.626	Culvert	
MAINSTEM	4.612	.3	.5
MAINSTEM	4.611	.3	.5
MAINSTEM	4.588	.1	.3
MAINSTEM	4.569	.1	.3
MAINSTEM	4.542	.1	.3
MAINSTEM	4.537	.3	.5
MAINSTEM	4.521	Mult Open	
MAINSTEM	4.505	.3	.5
MAINSTEM	4.485	.1	.3

River: HIGGINS TRIB A

Reach	River Sta.	Contr.	Expan.
CUP	25	.1	.3
CUP	24	.1	.3
CUP	23	.1	.3
CUP	22	.1	.3
CUP	21	.1	.3
CUP	20	.1	.3
CUP	19	.1	.3
CUP	18	.1	.3
CUP	17	.1	.3
CUP	16	.1	.3
CUP	15	.1	.3
CUP	14	.1	.3
CUP	13	.1	.3
CUP	12	.1	.3
CUP	11	.1	.3
CUP	10	.1	.3
CUP	9	.1	.3
CUP	8	.1	.3
CUP	7	.1	.3
CUP	6.001	.3	.5
CUP	6	Culvert	
CUP	5.999	.3	.5
CUP	5	.1	.3
CUP	4.1	.1	.3
CUP	3.8	.1	.3
CUP	3.5	.1	.3
CUP	3.1	.1	.3
CUP	3.01	.3	.5
CUP	2	Culvert	
CUP	1	.3	.5

**PROPOSED CONDITION
DESIGN MODEL RESULTS**



Legend	
WS 500-YEAR - DesElmSlab041112	✕
WS 500-YEAR - DesElmBxs050112	▽
WS 100-YEAR - DesElmSlab041112	✕
WS 100-YEAR - DesElmBxs050112	▽
WS 50-YEAR - DesElmBxs050112	●
WS 50-YEAR - DesElmSlab041112	▲
WS 10-YEAR - DesElmSlab041112	✕
WS 10-YEAR - DesElmBxs050112	▽
Ground	□
Left Levee	○

DESIGN
 PROP. PROFILES

DESIGN PROP. COND. ELMHURST ROAD W/ SLAB BRIDGE

HFC-RAS Plan: DesElmSlab070912

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	25	10-YEAR	222.00	667.72	670.82		670.95	0.001495	2.99	79.46	48.42	0.33
HIGGINS TRIB A	CUP	25	50-YEAR	308.00	667.72	671.36		671.51	0.001354	3.24	117.06	91.78	0.33
HIGGINS TRIB A	CUP	25	100-YEAR	342.00	667.72	671.55		671.70	0.001280	3.28	136.23	107.35	0.32
HIGGINS TRIB A	CUP	25	500-YEAR	414.00	667.72	671.93		672.07	0.001102	3.28	182.40	128.60	0.30
HIGGINS TRIB A	CUP	24	10-YEAR	222.00	666.72	670.67		670.81	0.001422	2.97	74.63	27.78	0.32
HIGGINS TRIB A	CUP	24	50-YEAR	308.00	666.72	671.17		671.36	0.001622	3.47	89.06	30.24	0.35
HIGGINS TRIB A	CUP	24	100-YEAR	342.00	666.72	671.34		671.55	0.001691	3.64	94.35	31.11	0.36
HIGGINS TRIB A	CUP	24	500-YEAR	414.00	666.72	671.68		671.92	0.001823	3.98	105.10	32.79	0.38
HIGGINS TRIB A	CUP	23	10-YEAR	222.00	667.72	669.39	669.39	670.07	0.016922	6.60	33.62	25.18	1.01
HIGGINS TRIB A	CUP	23	50-YEAR	308.00	667.72	669.75	669.75	670.55	0.016036	7.16	43.03	27.36	1.01
HIGGINS TRIB A	CUP	23	100-YEAR	342.00	667.72	669.88	669.88	670.72	0.015736	7.34	46.62	28.15	1.00
HIGGINS TRIB A	CUP	23	500-YEAR	414.00	667.72	670.13	670.13	671.05	0.015365	7.69	53.81	29.66	1.01
HIGGINS TRIB A	CUP	22	10-YEAR	222.00	664.72	668.77		668.82	0.000377	1.78	124.59	36.48	0.17
HIGGINS TRIB A	CUP	22	50-YEAR	308.00	664.72	669.34		669.41	0.000460	2.11	145.72	38.09	0.19
HIGGINS TRIB A	CUP	22	100-YEAR	342.00	664.72	669.53		669.61	0.000492	2.24	152.96	38.62	0.20
HIGGINS TRIB A	CUP	22	500-YEAR	414.00	664.72	669.88		669.98	0.000558	2.48	166.89	40.08	0.21
HIGGINS TRIB A	CUP	21	10-YEAR	222.00	664.72	668.53		668.63	0.001193	2.61	85.12	34.74	0.29
HIGGINS TRIB A	CUP	21	50-YEAR	308.00	664.72	669.05		669.18	0.001329	2.96	104.15	38.13	0.32
HIGGINS TRIB A	CUP	21	100-YEAR	342.00	664.72	669.22		669.37	0.001388	3.09	110.77	39.24	0.32
HIGGINS TRIB A	CUP	21	500-YEAR	414.00	664.72	669.54		669.71	0.001512	3.35	123.62	41.32	0.34
HIGGINS TRIB A	CUP	20	10-YEAR	222.00	664.72	668.41		668.51	0.001283	2.55	87.20	39.33	0.30
HIGGINS TRIB A	CUP	20	50-YEAR	308.00	664.72	668.92		669.05	0.001325	2.84	108.64	43.22	0.31
HIGGINS TRIB A	CUP	20	100-YEAR	342.00	664.72	669.09		669.23	0.001338	2.95	116.02	44.23	0.32
HIGGINS TRIB A	CUP	20	500-YEAR	414.00	664.72	669.40		669.56	0.001393	3.20	130.12	46.10	0.33
HIGGINS TRIB A	CUP	19	10-YEAR	222.00	664.42	668.03		668.27	0.004462	3.98	57.94	48.86	0.54
HIGGINS TRIB A	CUP	19	50-YEAR	308.00	664.42	668.64		668.85	0.003073	3.75	99.36	86.26	0.46
HIGGINS TRIB A	CUP	19	100-YEAR	342.00	664.42	668.85		669.04	0.002886	3.64	118.42	94.67	0.43
HIGGINS TRIB A	CUP	19	500-YEAR	414.00	664.42	669.23		669.39	0.002184	3.49	156.02	105.21	0.40
HIGGINS TRIB A	CUP	18	10-YEAR	222.00	664.22	667.97		668.02	0.001081	1.95	115.11	65.60	0.24
HIGGINS TRIB A	CUP	18	50-YEAR	308.00	664.22	668.60		668.66	0.000832	2.01	165.14	92.44	0.22
HIGGINS TRIB A	CUP	18	100-YEAR	342.00	664.22	668.81		668.87	0.000783	2.04	185.13	99.26	0.22
HIGGINS TRIB A	CUP	18	500-YEAR	414.00	664.22	669.18		669.24	0.000728	2.12	223.42	106.48	0.21
HIGGINS TRIB A	CUP	17	10-YEAR	222.00	664.12	667.82		667.91	0.001073	2.76	97.73	52.60	0.28
HIGGINS TRIB A	CUP	17	50-YEAR	308.00	664.12	668.47		668.57	0.000941	2.84	137.80	69.62	0.27
HIGGINS TRIB A	CUP	17	100-YEAR	342.00	664.12	668.69		668.78	0.000907	2.86	153.22	75.15	0.27
HIGGINS TRIB A	CUP	17	500-YEAR	414.00	664.12	669.06		669.16	0.000933	3.03	184.61	95.52	0.27
HIGGINS TRIB A	CUP	16	10-YEAR	222.00	664.02	667.77		667.83	0.000637	1.84	123.12	54.33	0.20

HEC-RAS Plan: DesInSlab070912 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Chl
HIGGINS TRIB A	CUP	16	50-YEAR	308.00	664.02	668.43		668.49	0.000465	1.99	168.31	82.69	0.19	
HIGGINS TRIB A	CUP	16	100-YEAR	342.00	664.02	668.65		668.71	0.000453	2.04	186.89	91.84	0.19	
HIGGINS TRIB A	CUP	16	500-YEAR	414.00	664.02	669.02		669.09	0.000455	2.19	225.27	118.61	0.20	
HIGGINS TRIB A	CUP	15	10-YEAR	222.00	663.72	667.52		667.71	0.002438	3.56	62.39	26.88	0.41	
HIGGINS TRIB A	CUP	15	50-YEAR	308.00	663.72	668.17		668.39	0.002051	3.77	89.07	64.78	0.39	
HIGGINS TRIB A	CUP	15	100-YEAR	342.00	663.72	668.39		668.61	0.001912	3.82	105.06	82.39	0.38	
HIGGINS TRIB A	CUP	15	500-YEAR	414.00	663.72	668.77		668.99	0.001710	3.90	142.32	109.96	0.37	
HIGGINS TRIB A	CUP	14	10-YEAR	222.00	663.72	667.40		667.52	0.001264	2.73	81.44	32.25	0.30	
HIGGINS TRIB A	CUP	14	50-YEAR	308.00	663.72	668.03		668.17	0.001939	2.91	105.85	53.96	0.36	
HIGGINS TRIB A	CUP	14	100-YEAR	342.00	663.72	668.25		668.38	0.002168	2.88	119.03	67.70	0.38	
HIGGINS TRIB A	CUP	14	500-YEAR	414.00	663.72	668.65		668.77	0.002186	2.76	151.10	93.00	0.38	
HIGGINS TRIB A	CUP	13	10-YEAR	222.00	663.72	667.27		667.38	0.001391	2.75	80.86	34.06	0.31	
HIGGINS TRIB A	CUP	13	50-YEAR	308.00	663.72	667.86		668.00	0.001437	3.00	103.19	44.60	0.33	
HIGGINS TRIB A	CUP	13	100-YEAR	342.00	663.72	668.06		668.21	0.001403	3.08	112.87	52.97	0.32	
HIGGINS TRIB A	CUP	13	500-YEAR	414.00	663.72	668.44		668.60	0.001333	3.23	135.01	60.22	0.32	
HIGGINS TRIB A	CUP	12	10-YEAR	224.00	662.72	667.00		667.07	0.000668	2.16	103.62	43.48	0.25	
HIGGINS TRIB A	CUP	12	50-YEAR	310.00	662.72	667.59		667.67	0.000889	2.37	130.84	48.79	0.25	
HIGGINS TRIB A	CUP	12	100-YEAR	344.00	662.72	667.79		667.88	0.000681	2.44	141.05	50.70	0.26	
HIGGINS TRIB A	CUP	12	500-YEAR	416.00	662.72	668.19		668.29	0.000630	2.58	161.89	54.66	0.25	
HIGGINS TRIB A	CUP	11	10-YEAR	224.00	663.02	666.55		666.63	0.003496	4.22	53.10	22.97	0.49	
HIGGINS TRIB A	CUP	11	50-YEAR	310.00	663.02	667.08		667.42	0.003725	4.73	65.57	24.95	0.51	
HIGGINS TRIB A	CUP	11	100-YEAR	344.00	663.02	667.26		667.63	0.003798	4.90	70.20	25.65	0.52	
HIGGINS TRIB A	CUP	11	500-YEAR	416.00	663.02	667.61		668.04	0.003931	5.23	79.59	27.00	0.54	
HIGGINS TRIB A	CUP	10	10-YEAR	224.00	662.72	666.03		666.31	0.003963	4.25	52.75	25.19	0.52	
HIGGINS TRIB A	CUP	10	50-YEAR	310.00	662.72	666.54		666.89	0.003931	4.69	66.12	26.84	0.53	
HIGGINS TRIB A	CUP	10	100-YEAR	344.00	662.72	666.72		667.09	0.003948	4.85	70.96	27.41	0.53	
HIGGINS TRIB A	CUP	10	500-YEAR	416.00	662.72	667.07		667.48	0.004005	5.16	80.59	28.51	0.54	
HIGGINS TRIB A	CUP	9	10-YEAR	224.00	662.22	665.48		665.75	0.004112	4.15	54.02	27.71	0.52	
HIGGINS TRIB A	CUP	9	50-YEAR	310.00	662.22	666.04		666.34	0.003818	4.40	70.40	31.16	0.52	
HIGGINS TRIB A	CUP	9	100-YEAR	344.00	662.22	666.23		666.54	0.003758	4.50	76.42	32.34	0.52	
HIGGINS TRIB A	CUP	9	500-YEAR	416.00	662.22	666.59		666.93	0.003696	4.70	88.44	34.56	0.52	
HIGGINS TRIB A	CUP	8	10-YEAR	224.00	661.02	665.28		665.37	0.001464	2.48	90.47	35.12	0.27	
HIGGINS TRIB A	CUP	8	50-YEAR	310.00	661.02	665.83		665.95	0.001602	2.80	110.71	36.13	0.29	
HIGGINS TRIB A	CUP	8	100-YEAR	344.00	661.02	666.02		666.15	0.001656	2.92	117.95	39.16	0.30	
HIGGINS TRIB A	CUP	8	500-YEAR	416.00	661.02	666.37		666.53	0.001774	3.15	132.09	41.08	0.31	
HIGGINS TRIB A	CUP	7	10-YEAR	224.00	661.02	665.03		665.22	0.003520	3.45	64.99	32.01	0.43	
HIGGINS TRIB A	CUP	7	50-YEAR	310.00	661.02	665.58		665.78	0.003808	3.66	84.74	40.70	0.45	

HEC-RAS Plan: DesElmSlab070912 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRBA	CUP	1	10-YEAR	294.00	650.22	656.42	653.02	656.50	0.000859	2.36	126.56	500.31	0.19
HIGGINS TRBA	CUP	1	50-YEAR	407.00	650.22	657.21	653.54	657.33	0.000970	2.78	148.73	500.45	0.21
HIGGINS TRBA	CUP	1	100-YEAR	452.00	650.22	658.23	653.70	658.33	0.000670	2.59	177.26	500.64	0.18
HIGGINS TRBA	CUP	1	500-YEAR	574.00	650.22	659.90	654.12	660.00	0.000499	2.80	223.92	500.94	0.16
HIGGINS CK	2	6.443	10-YEAR	275.00	652.09	657.56		657.59	0.001014	1.53	200.96	72.18	0.15
HIGGINS CK	2	6.443	50-YEAR	400.00	652.09	658.35		658.39	0.000985	1.72	259.89	76.79	0.15
HIGGINS CK	2	6.443	100-YEAR	461.00	652.09	658.99		659.03	0.000758	1.87	310.04	80.21	0.14
HIGGINS CK	2	6.443	500-YEAR	548.00	652.09	660.28		660.31	0.000435	1.50	418.21	87.14	0.11
HIGGINS CK	2	6.404	10-YEAR	275.00	652.60	657.13		657.24	0.003469	2.59	110.12	56.77	0.28
HIGGINS CK	2	6.404	50-YEAR	400.00	652.60	657.96		658.07	0.002804	2.71	169.08	81.42	0.26
HIGGINS CK	2	6.404	100-YEAR	461.00	652.60	658.73		658.80	0.001670	2.34	232.02	82.61	0.20
HIGGINS CK	2	6.404	500-YEAR	548.00	652.60	660.15		660.20	0.000736	1.83	351.37	84.82	0.14
HIGGINS CK	2	6.353	10-YEAR	275.00	650.86	656.78		656.81	0.000817	1.40	195.89	59.04	0.14
HIGGINS CK	2	6.353	50-YEAR	400.00	650.86	657.61		657.65	0.000904	1.62	246.96	64.81	0.15
HIGGINS CK	2	6.353	100-YEAR	461.00	650.86	658.49		658.52	0.000658	1.50	306.54	70.95	0.13
HIGGINS CK	2	6.353	500-YEAR	548.00	650.86	660.04		660.06	0.000323	1.29	450.50	116.99	0.09
HIGGINS CK	2	6.287	10-YEAR	275.00	650.90	656.49		656.52	0.000854	1.31	209.33	74.88	0.14
HIGGINS CK	2	6.287	50-YEAR	400.00	650.90	657.31		657.34	0.000843	1.45	276.55	91.08	0.14
HIGGINS CK	2	6.287	100-YEAR	461.00	650.90	658.31		658.33	0.000445	1.26	392.71	165.56	0.11
HIGGINS CK	2	6.287	500-YEAR	548.00	650.90	659.97		659.98	0.000157	0.93	687.99	178.00	0.07
HIGGINS CK	MAINSTEM	6.245	10-YEAR	562.00	651.02	656.43		656.48	0.000106	2.07	586.00	214.01	0.16
HIGGINS CK	MAINSTEM	6.245	50-YEAR	810.00	651.02	657.23		657.30	0.000123	2.42	770.01	241.04	0.18
HIGGINS CK	MAINSTEM	6.245	100-YEAR	911.00	651.02	658.25		658.30	0.000081	2.16	1033.90	275.56	0.14
HIGGINS CK	MAINSTEM	6.245	500-YEAR	1253.00	651.02	659.92		659.96	0.000060	2.09	1513.06	288.00	0.13
HIGGINS CK	MAINSTEM	6.231	10-YEAR	562.00	652.15	656.44		656.47	0.000048	1.26	458.71	136.17	0.11
HIGGINS CK	MAINSTEM	6.231	50-YEAR	810.00	652.15	657.25		657.28	0.000054	1.50	576.53	161.35	0.12
HIGGINS CK	MAINSTEM	6.231	100-YEAR	911.00	652.15	658.26		658.29	0.000036	1.37	763.64	200.85	0.10
HIGGINS CK	MAINSTEM	6.231	500-YEAR	1253.00	652.15	659.93		659.96	0.000028	1.42	1109.35	208.00	0.09
HIGGINS CK	MAINSTEM	6.179	10-YEAR	562.00	651.56	656.33		656.43	0.000227	2.58	217.73	152.75	0.24
HIGGINS CK	MAINSTEM	6.179	50-YEAR	810.00	651.56	657.09		657.24	0.000261	3.07	264.14	159.22	0.26
HIGGINS CK	MAINSTEM	6.179	100-YEAR	911.00	651.56	658.16		658.27	0.000150	2.67	436.62	247.29	0.20
HIGGINS CK	MAINSTEM	6.179	500-YEAR	1253.00	651.56	659.87		659.94	0.000083	2.39	891.39	273.60	0.16
HIGGINS CK	MAINSTEM	6.069	10-YEAR	562.00	650.55	656.27		656.33	0.000112	1.97	285.17	68.24	0.17
HIGGINS CK	MAINSTEM	6.069	50-YEAR	810.00	650.55	657.03		657.12	0.000137	2.40	339.79	78.99	0.19
HIGGINS CK	MAINSTEM	6.069	100-YEAR	911.00	650.55	658.12		658.19	0.000089	2.19	446.77	133.07	0.16
HIGGINS CK	MAINSTEM	6.069	500-YEAR	1253.00	650.55	659.82		659.90	0.000067	2.26	729.04	180.00	0.14

HEC-RAS Plan: DesElmSlab070912 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	6.035	10-YEAR	562.00	651.21	656.19		656.30	0.000242	2.74	233.02	92.47	0.25
HIGGINS CK	MAINSTEM	6.035	50-YEAR	810.00	651.21	656.93		657.08	0.000281	3.20	303.09	135.95	0.27
HIGGINS CK	MAINSTEM	6.035	100-YEAR	911.00	651.21	658.06		658.17	0.000145	2.77	414.05	140.47	0.21
HIGGINS CK	MAINSTEM	6.035	500-YEAR	1253.00	651.21	659.77		659.88	0.000104	2.80	592.35	147.33	0.18
HIGGINS CK	MAINSTEM	6.034	10-YEAR	562.00	651.79	655.24	655.24	656.21	0.001835	8.28	101.58	72.70	0.94
HIGGINS CK	MAINSTEM	6.034	50-YEAR	810.00	651.79	656.17	655.83	657.01	0.001107	7.99	178.37	91.99	0.77
HIGGINS CK	MAINSTEM	6.034	100-YEAR	911.00	651.79	657.81		658.14	0.000284	5.31	336.71	139.49	0.42
HIGGINS CK	MAINSTEM	6.034	500-YEAR	1253.00	651.79	659.59		659.86	0.000166	4.97	520.10	146.61	0.34
HIGGINS CK	MAINSTEM	6.033	10-YEAR	562.00	651.61	654.76	654.76	655.57	0.002054	7.84	112.42	127.55	0.98
HIGGINS CK	MAINSTEM	6.033	50-YEAR	810.00	651.61	656.50		656.86	0.000430	5.46	258.47	134.50	0.50
HIGGINS CK	MAINSTEM	6.033	100-YEAR	911.00	651.61	657.89		658.11	0.000174	4.29	384.53	140.09	0.33
HIGGINS CK	MAINSTEM	6.033	500-YEAR	1253.00	651.61	659.64		659.84	0.000115	4.26	553.22	147.08	0.29
HIGGINS CK	MAINSTEM	6.032	10-YEAR	562.00	647.83	654.37		654.45	0.000237	2.28	285.87	127.40	0.18
HIGGINS CK	MAINSTEM	6.032	50-YEAR	810.00	647.83	656.71		656.77	0.000116	2.06	484.70	136.75	0.13
HIGGINS CK	MAINSTEM	6.032	100-YEAR	911.00	647.83	658.01		658.06	0.000079	1.90	604.84	141.96	0.11
HIGGINS CK	MAINSTEM	6.032	500-YEAR	1253.00	647.83	659.74		659.80	0.000075	2.08	775.54	148.90	0.11
HIGGINS CK	MAINSTEM	6.021	10-YEAR	564.00	649.42	653.99		654.39	0.002043	5.03	112.12	31.57	0.47
HIGGINS CK	MAINSTEM	6.021	50-YEAR	810.00	649.42	656.50		656.73	0.000773	3.93	214.43	59.32	0.31
HIGGINS CK	MAINSTEM	6.021	100-YEAR	915.00	649.42	657.87		658.03	0.000440	3.34	294.86	67.42	0.24
HIGGINS CK	MAINSTEM	6.021	500-YEAR	1258.00	649.42	659.61		659.78	0.000337	3.42	402.89	77.43	0.22
HIGGINS CK	MAINSTEM	6.006	10-YEAR	564.00	648.55	653.99		654.20	0.001313	3.65	154.69	39.22	0.32
HIGGINS CK	MAINSTEM	6.006	50-YEAR	810.00	648.55	656.51		656.65	0.000566	3.02	279.58	58.85	0.22
HIGGINS CK	MAINSTEM	6.006	100-YEAR	915.00	648.55	657.88		657.99	0.000339	2.70	359.65	67.12	0.18
HIGGINS CK	MAINSTEM	6.006	500-YEAR	1258.00	648.55	659.61		659.74	0.000291	2.90	479.88	178.03	0.17
HIGGINS CK	MAINSTEM	5.9994*	10-YEAR	564.00	648.38	653.96	651.21	654.15	0.001072	3.41	165.16	41.81	0.30
HIGGINS CK	MAINSTEM	5.9994*	50-YEAR	810.00	648.38	656.50	651.85	656.63	0.000487	2.95	274.21	61.08	0.21
HIGGINS CK	MAINSTEM	5.9994*	100-YEAR	915.00	648.38	657.86	652.09	657.97	0.000312	2.71	340.03	67.47	0.18
HIGGINS CK	MAINSTEM	5.9994*	500-YEAR	1258.00	648.38	659.59		659.73	0.000286	2.99	446.01	226.27	0.17
HIGGINS CK	MAINSTEM	5.9950	10-YEAR	564.00	648.21	653.95	651.05	654.12	0.000864	3.29	171.48	44.10	0.27
HIGGINS CK	MAINSTEM	5.9950	50-YEAR	810.00	648.21	656.44	651.66	656.59	0.000411	3.04	266.25	66.05	0.20
HIGGINS CK	MAINSTEM	5.9950	100-YEAR	915.00	648.21	657.84	651.90	657.96	0.000286	2.87	319.20	83.88	0.17
HIGGINS CK	MAINSTEM	5.9950	500-YEAR	1258.00	648.21	659.60	652.59	659.70	0.000229	2.71	602.60	405.00	0.16
HIGGINS CK	MAINSTEM	5.981		Bridge									
HIGGINS CK	MAINSTEM	5.972	10-YEAR	645.00	647.90	653.72	651.45	653.97	0.000259	4.03	160.12	46.03	0.35
HIGGINS CK	MAINSTEM	5.972	50-YEAR	1100.00	647.90	656.25	651.83	656.65	0.000157	3.16	256.21	381.31	0.21
HIGGINS CK	MAINSTEM	5.972	100-YEAR	1320.00	647.90	657.61	652.82	657.90	0.000122	4.28	308.22	558.85	0.26
HIGGINS CK	MAINSTEM	5.972	500-YEAR	1930.00	647.90	659.25	653.82	659.43	0.000081	3.68	1212.38	646.31	0.22

HEC-RAS Plan: DesElmSlab070912 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	5.959	10-YEAR	645.00	647.58	653.74		653.91	0.000190	3.29	196.29	50.06	0.29
HIGGINS CK	MAINSTEM	5.959	50-YEAR	1100.00	647.58	656.42		656.59	0.000095	3.25	379.90	330.20	0.23
HIGGINS CK	MAINSTEM	5.959	100-YEAR	1320.00	647.58	657.67		657.83	0.000074	3.21	526.68	380.44	0.20
HIGGINS CK	MAINSTEM	5.959	500-YEAR	1930.00	647.58	659.22		659.42	0.000079	3.75	939.27	653.22	0.22
HIGGINS CK	MAINSTEM	5.950	10-YEAR	645.00	647.42	653.72		653.90	0.000208	3.43	187.99	47.92	0.31
HIGGINS CK	MAINSTEM	5.950	50-YEAR	1100.00	647.42	656.40		656.58	0.000105	3.37	369.53	292.18	0.23
HIGGINS CK	MAINSTEM	5.950	100-YEAR	1320.00	647.42	657.66		657.82	0.000080	3.31	507.35	327.56	0.21
HIGGINS CK	MAINSTEM	5.950	500-YEAR	1930.00	647.42	659.20		659.41	0.000085	3.86	940.38	686.53	0.22
HIGGINS CK	MAINSTEM	5.914	10-YEAR	645.00	647.31	653.69	650.92	653.86	0.000192	3.32	194.32	49.23	0.29
HIGGINS CK	MAINSTEM	5.914	50-YEAR	1100.00	647.31	656.39	651.92	656.56	0.000099	3.32	333.52	77.22	0.23
HIGGINS CK	MAINSTEM	5.914	100-YEAR	1320.00	647.31	657.63	652.32	657.81	0.000079	3.34	398.36	100.45	0.21
HIGGINS CK	MAINSTEM	5.914	500-YEAR	1930.00	647.31	659.18	653.32	659.40	0.000085	3.85	759.67	512.08	0.22
HIGGINS CK	MAINSTEM	5.911		Culvert									
HIGGINS CK	MAINSTEM	5.899	10-YEAR	645.00	647.30	652.81	650.97	653.28	0.000434	5.50	117.34	42.98	0.46
HIGGINS CK	MAINSTEM	5.899	50-YEAR	1100.00	647.30	655.00	652.12	655.62	0.000338	6.31	174.27	58.72	0.43
HIGGINS CK	MAINSTEM	5.899	100-YEAR	1320.00	647.30	656.09	652.62	656.75	0.000295	6.52	202.48	76.74	0.41
HIGGINS CK	MAINSTEM	5.899	500-YEAR	1930.00	647.30	657.68	653.85	658.23	0.000232	5.97	373.59	103.26	0.37
HIGGINS CK	MAINSTEM	5.86375*	10-YEAR	645.00	647.10	652.84		653.11	0.000342	4.15	155.57	43.32	0.39
HIGGINS CK	MAINSTEM	5.86375*	50-YEAR	1100.00	647.10	655.13		655.40	0.000205	4.14	270.74	64.60	0.32
HIGGINS CK	MAINSTEM	5.86375*	100-YEAR	1320.00	647.10	656.25		656.51	0.000153	4.06	359.27	97.01	0.28
HIGGINS CK	MAINSTEM	5.86375*	500-YEAR	1930.00	647.10	657.76		658.08	0.000152	4.66	543.86	147.78	0.29
HIGGINS CK	MAINSTEM	5.8285*	10-YEAR	645.00	646.90	652.79		653.04	0.000308	4.02	160.52	43.26	0.37
HIGGINS CK	MAINSTEM	5.8285*	50-YEAR	1100.00	646.90	655.10		655.36	0.000192	4.06	276.10	65.20	0.31
HIGGINS CK	MAINSTEM	5.8285*	100-YEAR	1320.00	646.90	656.23		656.47	0.000144	3.99	366.41	103.56	0.28
HIGGINS CK	MAINSTEM	5.8285*	500-YEAR	1930.00	646.90	657.74		658.05	0.000143	4.56	592.62	194.58	0.28
HIGGINS CK	MAINSTEM	5.79325*	10-YEAR	645.00	646.70	652.74		652.98	0.000278	3.89	165.80	43.23	0.35
HIGGINS CK	MAINSTEM	5.79325*	50-YEAR	1100.00	646.70	655.07		655.32	0.000180	3.97	281.17	64.39	0.30
HIGGINS CK	MAINSTEM	5.79325*	100-YEAR	1320.00	646.70	656.21		656.44	0.000136	3.92	370.76	93.14	0.27
HIGGINS CK	MAINSTEM	5.79325*	500-YEAR	1930.00	646.70	657.72		658.02	0.000136	4.49	627.61	248.29	0.28
HIGGINS CK	MAINSTEM	5.758	10-YEAR	645.00	646.50	652.70	650.19	652.92	0.000250	3.76	171.43	43.22	0.33
HIGGINS CK	MAINSTEM	5.758	50-YEAR	1100.00	646.50	655.04	651.21	655.28	0.000169	3.89	285.85	62.48	0.29
HIGGINS CK	MAINSTEM	5.758	100-YEAR	1320.00	646.50	656.19	651.64	656.42	0.000130	3.86	354.38	93.29	0.26
HIGGINS CK	MAINSTEM	5.758	500-YEAR	1930.00	646.50	657.70	652.70	657.99	0.000132	4.44	652.10	320.93	0.27
HIGGINS CK	MAINSTEM	5.721		Culvert									
HIGGINS CK	MAINSTEM	5.683	10-YEAR	645.00	646.23	651.43	649.46	651.82	0.000361	4.99	129.22	46.19	0.42

HCC-RAS Plan: DesElmSlab070912 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Chl
HIGGINS CK	MAINSTEM	5.683	50-YEAR	1100.00	646.23	652.55	650.51	653.27	0.000499	6.81	161.54	51.30	0.51	0.51
HIGGINS CK	MAINSTEM	5.683	100-YEAR	1320.00	646.23	653.45	650.99	654.22	0.000437	7.04	187.58	55.43	0.49	0.49
HIGGINS CK	MAINSTEM	5.683	500-YEAR	1930.00	646.23	655.16	652.15	656.19	0.000426	8.13	237.38	74.69	0.50	0.50
HIGGINS CK	MAINSTEM	5.650	10-YEAR	645.00	646.10	651.44		651.70	0.000329	4.04	159.50	45.05	0.38	0.38
HIGGINS CK	MAINSTEM	5.650	50-YEAR	1100.00	646.10	652.63		653.03	0.000406	5.09	216.31	50.50	0.43	0.43
HIGGINS CK	MAINSTEM	5.650	100-YEAR	1320.00	646.10	653.58		653.96	0.000328	4.96	266.06	54.83	0.40	0.40
HIGGINS CK	MAINSTEM	5.650	500-YEAR	1930.00	646.10	655.42		655.83	0.000241	5.17	404.18	95.71	0.36	0.36
HIGGINS CK	MAINSTEM	5.649	10-YEAR	645.00	646.50	651.44		651.69	0.000360	4.06	158.94	47.70	0.39	0.39
HIGGINS CK	MAINSTEM	5.649	50-YEAR	1100.00	646.50	652.63		653.03	0.000411	5.03	218.73	52.21	0.43	0.43
HIGGINS CK	MAINSTEM	5.649	100-YEAR	1320.00	646.50	653.58		653.95	0.000323	4.89	269.82	55.78	0.39	0.39
HIGGINS CK	MAINSTEM	5.649	500-YEAR	1930.00	646.50	655.42		655.83	0.000248	5.10	390.75	95.47	0.36	0.36
HIGGINS CK	MAINSTEM	5.593	10-YEAR	645.00	645.87	651.38		651.59	0.000252	3.66	175.99	47.02	0.33	0.33
HIGGINS CK	MAINSTEM	5.593	50-YEAR	1100.00	645.87	652.56		652.91	0.000325	4.69	234.47	52.04	0.39	0.39
HIGGINS CK	MAINSTEM	5.593	100-YEAR	1320.00	645.87	653.52		653.85	0.000267	4.61	286.42	56.12	0.36	0.36
HIGGINS CK	MAINSTEM	5.593	500-YEAR	1930.00	645.87	655.38		655.75	0.000201	4.91	422.84	120.04	0.33	0.33
HIGGINS CK	MAINSTEM	5.558	10-YEAR	907.00	646.30	651.03		651.49	0.000637	5.42	167.26	49.82	0.52	0.52
HIGGINS CK	MAINSTEM	5.558	50-YEAR	1394.00	646.30	652.23		652.80	0.000598	6.06	229.86	54.99	0.52	0.52
HIGGINS CK	MAINSTEM	5.558	100-YEAR	1623.00	646.30	653.29		653.78	0.000414	5.58	290.85	59.59	0.45	0.45
HIGGINS CK	MAINSTEM	5.558	500-YEAR	2270.00	646.30	655.23		655.70	0.000270	5.52	429.14	92.67	0.38	0.38
HIGGINS CK	MAINSTEM	5.500	10-YEAR	907.00	645.54	650.74		651.28	0.000698	5.88	154.34	43.49	0.55	0.55
HIGGINS CK	MAINSTEM	5.500	50-YEAR	1394.00	645.54	651.87		652.58	0.000724	6.76	206.24	48.17	0.58	0.58
HIGGINS CK	MAINSTEM	5.500	100-YEAR	1623.00	645.54	653.05		653.63	0.000483	6.10	265.91	53.20	0.48	0.48
HIGGINS CK	MAINSTEM	5.500	500-YEAR	2270.00	645.54	655.03		655.60	0.000314	6.03	392.88	83.61	0.41	0.41
HIGGINS CK	MAINSTEM	5.496	10-YEAR	907.00	645.80	650.57		651.24	0.000991	6.80	137.47	42.40	0.65	0.65
HIGGINS CK	MAINSTEM	5.496	50-YEAR	1394.00	645.80	651.69		652.55	0.000955	7.43	187.59	46.78	0.65	0.65
HIGGINS CK	MAINSTEM	5.496	100-YEAR	1623.00	645.80	652.95		653.61	0.000574	6.50	249.74	51.70	0.52	0.52
HIGGINS CK	MAINSTEM	5.496	500-YEAR	2270.00	645.80	654.97		655.59	0.000363	6.30	374.19	80.44	0.43	0.43
HIGGINS CK	MAINSTEM	5.409	10-YEAR	907.00	645.02	650.31		650.83	0.000672	5.78	156.79	44.04	0.54	0.54
HIGGINS CK	MAINSTEM	5.409	50-YEAR	1394.00	645.02	651.44		652.13	0.000693	6.67	208.88	48.07	0.56	0.56
HIGGINS CK	MAINSTEM	5.409	100-YEAR	1623.00	645.02	652.82		653.35	0.000412	5.82	278.92	53.01	0.45	0.45
HIGGINS CK	MAINSTEM	5.409	500-YEAR	2270.00	645.02	654.90		655.41	0.000271	5.77	409.56	75.86	0.38	0.38
HIGGINS CK	MAINSTEM	5.408	10-YEAR	907.00	645.30	650.23		650.82	0.000797	6.12	148.31	43.59	0.58	0.58
HIGGINS CK	MAINSTEM	5.408	50-YEAR	1394.00	645.30	651.36		652.12	0.000796	6.97	200.00	47.96	0.60	0.60
HIGGINS CK	MAINSTEM	5.408	100-YEAR	1623.00	645.30	652.79		653.34	0.000449	5.96	272.50	53.49	0.47	0.47
HIGGINS CK	MAINSTEM	5.408	500-YEAR	2270.00	645.30	654.89		655.41	0.000289	5.80	403.56	78.16	0.39	0.39
HIGGINS CK	MAINSTEM	5.394	10-YEAR	907.00	645.30	650.42	648.17	650.63	0.001404	3.67	246.81	68.89	0.34	0.34
HIGGINS CK	MAINSTEM	5.394	50-YEAR	1394.00	645.30	651.63	648.93	651.90	0.001403	4.16	335.45	77.67	0.35	0.35

HEC-RAS Plan: DesElmSlab070912 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E. G. Elev (ft)	E. G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froutde # Chl
HIGGINS CK	MAINSTEM	5.394	100-YEAR	1623.00	645.30	652.99	649.23	653.20	0.000810	3.63	447.92	86.58	0.28
HIGGINS CK	MAINSTEM	5.394	500-YEAR	2270.00	645.30	655.08	650.01	655.29	0.000520	3.63	641.00	98.72	0.23
HIGGINS CK	MAINSTEM	5.364	Bridge										
HIGGINS CK	MAINSTEM	5.335	10-YEAR	907.00	645.30	650.21	647.81	650.39	0.001125	3.40	267.05	71.13	0.31
HIGGINS CK	MAINSTEM	5.335	50-YEAR	1394.00	645.30	651.41	648.51	651.65	0.001156	3.91	356.51	78.22	0.32
HIGGINS CK	MAINSTEM	5.335	100-YEAR	1623.00	645.30	652.86	648.78	653.03	0.000660	3.40	489.23	130.85	0.25
HIGGINS CK	MAINSTEM	5.335	500-YEAR	2270.00	645.30	654.98	649.53	655.15	0.000445	3.37	709.77	709.04	0.22
HIGGINS CK	MAINSTEM	5.324	10-YEAR	907.00	645.28	650.09		650.33	0.000811	3.90	232.77	82.20	0.36
HIGGINS CK	MAINSTEM	5.324	50-YEAR	1394.00	645.28	651.28		651.58	0.000819	4.41	316.53	101.23	0.38
HIGGINS CK	MAINSTEM	5.324	100-YEAR	1623.00	645.28	652.78		653.00	0.000424	3.72	460.24	171.03	0.28
HIGGINS CK	MAINSTEM	5.324	500-YEAR	2270.00	645.28	654.94		655.13	0.000252	3.58	749.49	533.01	0.23
HIGGINS CK	MAINSTEM	5.289	10-YEAR	907.00	645.20	650.01		650.18	0.000568	3.29	275.78	76.84	0.31
HIGGINS CK	MAINSTEM	5.289	50-YEAR	1394.00	645.20	651.21		651.43	0.000565	3.74	372.81	85.10	0.31
HIGGINS CK	MAINSTEM	5.289	100-YEAR	1623.00	645.20	652.76		652.92	0.000299	3.16	524.76	151.73	0.24
HIGGINS CK	MAINSTEM	5.289	500-YEAR	2270.00	645.20	654.94		655.08	0.000177	3.04	867.23	498.71	0.19
HIGGINS CK	MAINSTEM	5.256	10-YEAR	907.00	645.11	649.82		650.06	0.000807	3.89	233.36	65.48	0.36
HIGGINS CK	MAINSTEM	5.256	50-YEAR	1394.00	645.11	651.00		651.30	0.000821	4.43	314.40	73.15	0.38
HIGGINS CK	MAINSTEM	5.256	100-YEAR	1623.00	645.11	652.65		652.85	0.000469	3.60	450.44	94.14	0.29
HIGGINS CK	MAINSTEM	5.256	500-YEAR	2270.00	645.11	654.86		655.04	0.000255	3.37	712.71	138.89	0.23
HIGGINS CK	MAINSTEM	5.236	10-YEAR	907.00	645.20	649.69		649.96	0.000988	4.14	219.20	65.27	0.40
HIGGINS CK	MAINSTEM	5.236	50-YEAR	1394.00	645.20	650.87		651.21	0.000949	4.64	300.61	72.96	0.40
HIGGINS CK	MAINSTEM	5.236	100-YEAR	1623.00	645.20	652.58		652.80	0.000454	3.73	434.75	85.07	0.29
HIGGINS CK	MAINSTEM	5.236	500-YEAR	2270.00	645.20	654.81		655.01	0.000271	3.58	672.99	131.57	0.24
HIGGINS CK	MAINSTEM	5.184	10-YEAR	907.00	644.50	649.51		649.72	0.000666	3.69	245.94	66.00	0.34
HIGGINS CK	MAINSTEM	5.184	50-YEAR	1394.00	644.50	650.69		650.97	0.000721	4.25	328.03	73.69	0.35
HIGGINS CK	MAINSTEM	5.184	100-YEAR	1623.00	644.50	652.49		652.68	0.000356	3.44	471.93	85.52	0.26
HIGGINS CK	MAINSTEM	5.184	500-YEAR	2270.00	644.50	654.80		654.93	0.000187	2.99	995.32	362.89	0.20
HIGGINS CK	MAINSTEM	5.166	10-YEAR	907.00	644.48	649.45		649.66	0.000668	3.65	248.67	66.44	0.33
HIGGINS CK	MAINSTEM	5.166	50-YEAR	1394.00	644.48	650.62		650.90	0.000712	4.20	331.53	74.95	0.35
HIGGINS CK	MAINSTEM	5.166	100-YEAR	1623.00	644.48	652.47		652.64	0.000346	3.37	482.14	88.41	0.25
HIGGINS CK	MAINSTEM	5.166	500-YEAR	2270.00	644.48	654.80		654.90	0.000162	2.80	1126.39	441.03	0.18
HIGGINS CK	MAINSTEM	5.144	10-YEAR	907.00	644.40	649.37		649.58	0.000694	3.66	246.48	66.17	0.34
HIGGINS CK	MAINSTEM	5.144	50-YEAR	1394.00	644.40	650.53		650.81	0.000723	4.25	328.10	73.84	0.36
HIGGINS CK	MAINSTEM	5.144	100-YEAR	1623.00	644.40	652.42		652.60	0.000342	3.39	479.44	86.27	0.25
HIGGINS CK	MAINSTEM	5.144	500-YEAR	2270.00	644.40	654.78		654.86	0.000156	2.73	1204.89	502.28	0.18
HIGGINS CK	MAINSTEM	5.094	10-YEAR	907.00	643.10	649.27		649.42	0.000421	3.09	293.42	71.25	0.27

HEC-RAS Plan: DesElmSlab070912 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	5.094	50-YEAR	1394.00	643.10	650.43		650.64	0.000481	3.67	380.31	78.76	0.29
HIGGINS CK	MAINSTEM	5.094	100-YEAR	1623.00	643.10	652.38		652.51	0.000242	2.97	546.46	92.52	0.22
HIGGINS CK	MAINSTEM	5.094	500-YEAR	2270.00	643.10	654.77		654.84	0.000105	2.39	1492.53	666.68	0.15
HIGGINS CK	MAINSTEM	5.049	10-YEAR	907.00	643.43	649.17		649.32	0.000402	3.08	294.91	69.45	0.26
HIGGINS CK	MAINSTEM	5.049	50-YEAR	1394.00	643.43	650.31		650.52	0.000470	3.69	377.61	75.79	0.29
HIGGINS CK	MAINSTEM	5.049	100-YEAR	1623.00	643.43	652.32		652.46	0.000230	3.00	540.91	90.13	0.21
HIGGINS CK	MAINSTEM	5.049	500-YEAR	2270.00	643.43	654.75		654.82	0.000094	2.38	1653.73	788.37	0.14
HIGGINS CK	MAINSTEM	5.045	10-YEAR	571.00	643.80	649.22		649.29	0.000201	2.11	271.09	67.07	0.18
HIGGINS CK	MAINSTEM	5.045	50-YEAR	750.00	643.80	650.40		650.47	0.000161	2.12	354.09	73.18	0.17
HIGGINS CK	MAINSTEM	5.045	100-YEAR	1000.00	643.80	652.37		652.43	0.000103	1.97	507.86	83.32	0.14
HIGGINS CK	MAINSTEM	5.045	500-YEAR	2000.00	643.80	654.75		654.81	0.000083	2.19	1594.78	788.42	0.13
HIGGINS CK	MAINSTEM	5.020	10-YEAR	571.00	643.80	649.17	645.94	649.26	0.000203	2.41	236.97	66.80	0.19
HIGGINS CK	MAINSTEM	5.020	50-YEAR	750.00	643.80	650.34	646.28	650.44	0.000170	2.55	294.58	72.86	0.18
HIGGINS CK	MAINSTEM	5.020	100-YEAR	1000.00	643.80	652.30	646.67	652.40	0.000118	2.56	390.54	82.97	0.16
HIGGINS CK	MAINSTEM	5.020	500-YEAR	2000.00	643.80	654.74	648.05	654.80	0.000084	2.20	1585.97	788.33	0.13
HIGGINS CK	MAINSTEM	5.012		Culvert									
HIGGINS CK	MAINSTEM	5.005	10-YEAR	571.00	643.80	648.72	645.55	648.82	0.000213	2.47	230.92	90.28	0.20
HIGGINS CK	MAINSTEM	5.005	50-YEAR	750.00	643.80	649.54	645.88	649.66	0.000218	2.78	270.22	94.93	0.21
HIGGINS CK	MAINSTEM	5.005	100-YEAR	1000.00	643.80	650.80	646.30	650.94	0.000198	3.03	330.52	102.06	0.20
HIGGINS CK	MAINSTEM	5.005	500-YEAR	2000.00	643.80	654.76	647.68	654.79	0.000037	1.52	2395.02	1239.60	0.09
HIGGINS CK	MAINSTEM	4.992	10-YEAR	571.00	643.80	648.74	648.74	648.78	0.000114	1.58	360.78	90.38	0.14
HIGGINS CK	MAINSTEM	4.992	50-YEAR	750.00	643.80	649.57	649.57	649.61	0.000111	1.71	437.57	95.08	0.14
HIGGINS CK	MAINSTEM	4.992	100-YEAR	1000.00	643.80	650.83	650.83	650.88	0.000095	1.78	562.59	102.28	0.13
HIGGINS CK	MAINSTEM	4.992	500-YEAR	2000.00	643.80	654.76	654.76	654.78	0.000036	1.48	2099.14	1044.50	0.09
HIGGINS CK	MAINSTEM	4.980	10-YEAR	571.00	643.55	648.65	648.65	648.76	0.000347	2.62	218.27	58.55	0.24
HIGGINS CK	MAINSTEM	4.980	50-YEAR	750.00	643.55	649.47	649.47	649.59	0.000334	2.80	268.08	63.08	0.24
HIGGINS CK	MAINSTEM	4.980	100-YEAR	1000.00	643.55	650.74	650.74	650.87	0.000276	2.84	352.56	70.08	0.22
HIGGINS CK	MAINSTEM	4.980	500-YEAR	2000.00	643.55	654.74	654.74	654.78	0.000065	1.89	1865.22	1114.49	0.12
HIGGINS CK	MAINSTEM	4.966	10-YEAR	700.00	643.40	648.52	648.52	648.72	0.000633	3.51	199.57	53.91	0.32
HIGGINS CK	MAINSTEM	4.966	50-YEAR	920.00	643.40	649.33	649.33	649.55	0.000614	3.76	244.65	58.02	0.32
HIGGINS CK	MAINSTEM	4.966	100-YEAR	1260.00	643.40	650.59	650.59	650.83	0.000535	3.92	321.64	64.43	0.31
HIGGINS CK	MAINSTEM	4.966	500-YEAR	2140.00	643.40	654.74	654.74	654.78	0.000072	1.98	1961.88	1317.82	0.12
HIGGINS CK	MAINSTEM	4.944	10-YEAR	700.00	642.80	648.47	648.47	648.65	0.000537	3.39	206.25	51.26	0.30
HIGGINS CK	MAINSTEM	4.944	50-YEAR	920.00	642.80	649.27	649.27	649.48	0.000548	3.70	248.93	55.12	0.31
HIGGINS CK	MAINSTEM	4.944	100-YEAR	1260.00	642.80	650.53	650.53	650.77	0.000488	3.92	321.80	834.96	0.30
HIGGINS CK	MAINSTEM	4.944	500-YEAR	2140.00	642.80	654.74	654.74	654.77	0.000053	1.84	2309.02	1468.13	0.11

HEC-RAS Plan: DesElmSlab070912 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	4.928	10-YEAR	700.00	642.48	648.42		648.58	0.000903	3.19	219.61	53.63	0.28
HIGGINS CK	MAINSTEM	4.928	50-YEAR	920.00	642.48	649.23		649.41	0.000933	3.48	264.35	57.83	0.29
HIGGINS CK	MAINSTEM	4.928	100-YEAR	1260.00	642.48	650.49		650.70	0.000862	3.69	341.90	64.45	0.28
HIGGINS CK	MAINSTEM	4.928	500-YEAR	2140.00	642.48	654.73		654.76	0.000106	1.75	1975.25	1411.95	0.11
HIGGINS CK	MAINSTEM	4.925	10-YEAR	700.00	643.00	648.36		648.56	0.001229	3.56	196.68	51.37	0.32
HIGGINS CK	MAINSTEM	4.925	50-YEAR	920.00	643.00	649.16		649.39	0.001224	3.84	239.39	55.39	0.33
HIGGINS CK	MAINSTEM	4.925	100-YEAR	1260.00	643.00	650.44		650.69	0.001082	4.01	313.89	61.77	0.31
HIGGINS CK	MAINSTEM	4.925	500-YEAR	2140.00	643.00	654.73		654.76	0.000080	1.52	2130.81	1523.15	0.09
HIGGINS CK	MAINSTEM	4.915	10-YEAR	700.00	643.00	648.37		648.48	0.000780	2.68	282.10	91.24	0.23
HIGGINS CK	MAINSTEM	4.915	50-YEAR	920.00	643.00	649.19		649.31	0.000742	2.86	356.51	96.13	0.23
HIGGINS CK	MAINSTEM	4.915	100-YEAR	1260.00	643.00	650.48		650.61	0.000626	2.96	487.56	103.87	0.22
HIGGINS CK	MAINSTEM	4.915	500-YEAR	2140.00	643.00	654.73		654.75	0.000096	1.66	2960.62	1437.27	0.09
HIGGINS CK	MAINSTEM	4.885	10-YEAR	700.00	642.90	648.23		648.35	0.000815	2.80	269.08	84.75	0.23
HIGGINS CK	MAINSTEM	4.885	50-YEAR	920.00	642.90	649.05		649.19	0.000783	3.03	339.89	89.48	0.23
HIGGINS CK	MAINSTEM	4.885	100-YEAR	1260.00	642.90	650.36		650.50	0.000634	3.16	482.54	152.01	0.22
HIGGINS CK	MAINSTEM	4.885	500-YEAR	2140.00	642.90	654.71		654.74	0.000084	1.62	3056.13	1295.73	0.09
HIGGINS CK	MAINSTEM	4.866	10-YEAR	700.00	642.40	648.14		648.27	0.000870	2.95	256.20	82.27	0.24
HIGGINS CK	MAINSTEM	4.866	50-YEAR	920.00	642.40	648.95		649.10	0.000850	3.19	324.99	86.08	0.24
HIGGINS CK	MAINSTEM	4.866	100-YEAR	1260.00	642.40	650.28		650.44	0.000688	3.32	462.13	135.21	0.23
HIGGINS CK	MAINSTEM	4.866	500-YEAR	2140.00	642.40	654.70		654.73	0.000091	1.70	2957.85	1325.29	0.09
HIGGINS CK	MAINSTEM	4.847	10-YEAR	700.00	642.00	648.05		648.18	0.000838	2.89	258.87	83.43	0.24
HIGGINS CK	MAINSTEM	4.847	50-YEAR	920.00	642.00	648.87		649.02	0.000822	3.13	328.96	87.64	0.24
HIGGINS CK	MAINSTEM	4.847	100-YEAR	1260.00	642.00	650.22		650.35	0.000870	3.08	467.59	133.98	0.25
HIGGINS CK	MAINSTEM	4.847	500-YEAR	2140.00	642.00	654.70		654.72	0.000089	1.52	2830.02	1316.34	0.09
HIGGINS CK	MAINSTEM	4.828	10-YEAR	700.00	641.90	648.00		648.10	0.000665	2.51	296.42	94.70	0.21
HIGGINS CK	MAINSTEM	4.828	50-YEAR	920.00	641.90	648.83		648.93	0.000645	2.69	376.95	100.44	0.21
HIGGINS CK	MAINSTEM	4.828	100-YEAR	1260.00	641.90	650.17		650.28	0.000536	2.77	519.29	128.12	0.20
HIGGINS CK	MAINSTEM	4.828	500-YEAR	2140.00	641.90	654.69		654.71	0.000074	1.51	2946.83	1347.86	0.08
HIGGINS CK	MAINSTEM	4.801	10-YEAR	700.00	642.50	647.85		647.98	0.001005	2.97	250.02	87.82	0.26
HIGGINS CK	MAINSTEM	4.801	50-YEAR	920.00	642.50	648.68		648.82	0.000929	3.14	325.01	92.74	0.25
HIGGINS CK	MAINSTEM	4.801	100-YEAR	1260.00	642.50	650.04		650.19	0.000730	3.17	457.33	104.93	0.23
HIGGINS CK	MAINSTEM	4.801	500-YEAR	2140.00	642.50	654.67		654.70	0.000090	1.65	2762.42	1358.38	0.09
HIGGINS CK	MAINSTEM	4.783	10-YEAR	700.00	642.00	647.76		647.89	0.000864	2.84	258.87	86.36	0.24
HIGGINS CK	MAINSTEM	4.783	50-YEAR	920.00	642.00	648.60		648.73	0.000823	3.04	333.89	92.35	0.24
HIGGINS CK	MAINSTEM	4.783	100-YEAR	1260.00	642.00	649.98		650.12	0.000666	3.09	467.11	100.47	0.22
HIGGINS CK	MAINSTEM	4.783	500-YEAR	2140.00	642.00	654.66		654.69	0.000091	1.68	2632.96	1334.69	0.09
HIGGINS CK	MAINSTEM	4.774	10-YEAR	700.00	642.50	647.70		647.84	0.001115	3.07	240.73	87.13	0.27

HEC-RAS Plan: DesElmStab070912 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Mfn Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	4.668	10-YEAR	424.00	640.20	646.13	642.88	646.33	0.000909	3.62	117.29	51.36	0.26
HIGGINS CK	MAINSTEM	4.668	50-YEAR	445.00	640.20	647.17	642.75	647.33	0.000582	3.22	138.00	73.44	0.22
HIGGINS CK	MAINSTEM	4.668	100-YEAR	460.00	640.20	648.62	642.80	648.73	0.000329	2.75	167.00	94.24	0.17
HIGGINS CK	MAINSTEM	4.668	500-YEAR	600.00	640.20	654.61	643.30	654.62	0.000017	0.70	1522.68	819.12	0.04
HIGGINS CK	MAINSTEM	4.664	10-YEAR	444.00	640.20	648.16	642.63	646.28	0.000609	2.80	158.60	51.52	0.21
HIGGINS CK	MAINSTEM	4.664	50-YEAR	485.00	640.20	647.19	642.75	647.29	0.000409	2.57	188.46	74.12	0.18
HIGGINS CK	MAINSTEM	4.664	100-YEAR	700.00	640.20	648.57	643.32	648.72	0.000447	3.06	228.66	93.98	0.19
HIGGINS CK	MAINSTEM	4.664	500-YEAR	1600.00	640.20	654.56	645.24	654.61	0.000128	1.88	1476.99	818.99	0.11
HIGGINS CK	MAINSTEM	4.659	10-YEAR	444.00	638.42	646.20	640.56	646.23	0.000108	1.42	312.22	57.64	0.09
HIGGINS CK	MAINSTEM	4.659	50-YEAR	485.00	638.42	647.22	640.66	647.25	0.000083	1.36	357.23	62.97	0.08
HIGGINS CK	MAINSTEM	4.659	100-YEAR	700.00	638.42	648.62	641.09	648.66	0.000101	1.67	418.80	71.69	0.10
HIGGINS CK	MAINSTEM	4.659	500-YEAR	1600.00	638.42	654.57	642.55	654.59	0.000054	1.39	2103.46	819.01	0.07
HIGGINS CK	MAINSTEM	4.639	10-YEAR	444.00	640.20	646.12	642.65	646.19	0.000603	2.23	198.80	51.26	0.20
HIGGINS CK	MAINSTEM	4.639	50-YEAR	485.00	640.20	647.17	642.77	647.23	0.000329	1.93	251.40	73.43	0.15
HIGGINS CK	MAINSTEM	4.639	100-YEAR	700.00	640.20	648.56	643.36	648.64	0.000303	2.18	321.21	93.92	0.15
HIGGINS CK	MAINSTEM	4.639	500-YEAR	1600.00	640.20	654.53	645.18	654.58	0.000127	1.87	1443.40	668.72	0.11
HIGGINS CK	MAINSTEM	4.638	10-YEAR	444.00	640.80	646.12	643.18	646.19	0.000518	2.13	208.19	62.97	0.18
HIGGINS CK	MAINSTEM	4.638	50-YEAR	485.00	640.80	647.17	643.27	647.22	0.000292	1.86	260.74	67.71	0.14
HIGGINS CK	MAINSTEM	4.638	100-YEAR	700.00	640.80	648.57	643.71	648.63	0.000276	2.12	330.54	79.74	0.15
HIGGINS CK	MAINSTEM	4.638	500-YEAR	1600.00	640.80	654.51	645.13	654.58	0.000115	2.04	1231.86	659.50	0.10
HIGGINS CK	MAINSTEM	4.626	Culvert										
HIGGINS CK	MAINSTEM	4.612	10-YEAR	444.00	641.80	645.34	644.06	645.64	0.002365	4.39	101.14	39.27	0.45
HIGGINS CK	MAINSTEM	4.612	50-YEAR	485.00	641.80	646.77	644.18	646.93	0.000760	3.21	151.00	45.18	0.27
HIGGINS CK	MAINSTEM	4.612	100-YEAR	700.00	641.80	648.09	644.71	648.29	0.000650	3.55	197.28	50.65	0.26
HIGGINS CK	MAINSTEM	4.612	500-YEAR	1600.00	641.80	653.09	646.48	653.23	0.000304	3.01	663.67	153.79	0.19
HIGGINS CK	MAINSTEM	4.611	10-YEAR	444.00	642.03	645.38	643.99	645.57	0.001811	3.52	126.25	48.85	0.39
HIGGINS CK	MAINSTEM	4.611	50-YEAR	485.00	642.03	646.80	644.10	646.89	0.000522	2.41	200.93	58.41	0.22
HIGGINS CK	MAINSTEM	4.611	100-YEAR	700.00	642.03	648.13	644.57	648.23	0.000392	2.54	275.53	66.55	0.20
HIGGINS CK	MAINSTEM	4.611	500-YEAR	1600.00	642.03	653.12	646.05	653.19	0.000148	2.22	817.90	173.50	0.13
HIGGINS CK	MAINSTEM	4.588	10-YEAR	454.00	641.80	645.08	645.32	645.32	0.002219	3.88	117.06	46.29	0.43
HIGGINS CK	MAINSTEM	4.588	50-YEAR	503.00	641.80	646.72	646.82	646.82	0.000578	2.52	199.76	54.61	0.23
HIGGINS CK	MAINSTEM	4.588	100-YEAR	730.00	641.80	648.07	648.18	648.18	0.000475	2.82	278.25	61.47	0.22
HIGGINS CK	MAINSTEM	4.588	500-YEAR	1666.00	641.80	653.06	653.16	653.16	0.000217	2.56	686.70	130.21	0.16
HIGGINS CK	MAINSTEM	4.569	10-YEAR	454.00	638.78	645.15	645.21	645.21	0.000251	2.09	243.78	64.19	0.16
HIGGINS CK	MAINSTEM	4.569	50-YEAR	503.00	638.78	646.74	646.78	646.78	0.000112	1.67	354.98	75.10	0.11
HIGGINS CK	MAINSTEM	4.569	100-YEAR	730.00	638.78	648.09	648.14	648.14	0.000116	1.92	462.70	84.33	0.12
HIGGINS CK	MAINSTEM	4.569	500-YEAR	1666.00	638.78	653.07	653.14	653.14	0.000087	2.29	991.21	143.79	0.11

HEC-RAS Plan: DesElmStab070912 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	4.542	10-YEAR	454.00	639.10	645.14		645.18	0.000135	1.74	311.92	68.33	0.12
HIGGINS CK	MAINSTEM	4.542	50-YEAR	503.00	639.10	646.74		646.77	0.000069	1.45	428.47	77.18	0.09
HIGGINS CK	MAINSTEM	4.542	100-YEAR	730.00	639.10	648.09		648.13	0.000078	1.71	537.76	84.64	0.10
HIGGINS CK	MAINSTEM	4.542	500-YEAR	1666.00	639.10	653.07		653.12	0.000070	2.18	1088.96	189.79	0.10
HIGGINS CK	MAINSTEM	4.537	10-YEAR	454.00	639.10	645.07	641.02	645.17	0.000293	2.54	179.01	67.95	0.18
HIGGINS CK	MAINSTEM	4.537	50-YEAR	503.00	639.10	646.68	641.17	646.76	0.000162	2.21	227.48	76.87	0.14
HIGGINS CK	MAINSTEM	4.537	100-YEAR	730.00	639.10	648.00	641.74	648.12	0.000200	2.73	267.00	84.14	0.16
HIGGINS CK	MAINSTEM	4.537	500-YEAR	1666.00	639.10	652.94	643.68	653.11	0.000180	3.48	587.81	720.06	0.16
HIGGINS CK	MAINSTEM	4.521		Multi Open									
HIGGINS CK	MAINSTEM	4.505	10-YEAR	454.00	637.50	644.33	639.34	644.40	0.000164	2.08	218.63	75.19	0.14
HIGGINS CK	MAINSTEM	4.505	50-YEAR	503.00	637.50	646.02	639.48	646.07	0.000097	1.85	272.54	85.10	0.11
HIGGINS CK	MAINSTEM	4.505	100-YEAR	730.00	637.50	646.58	640.03	646.68	0.000165	2.51	290.46	88.39	0.15
HIGGINS CK	MAINSTEM	4.505	500-YEAR	1666.00	637.50	649.44	641.88	649.73	0.000336	4.31	409.61	154.04	0.22
HIGGINS CK	MAINSTEM	4.485	10-YEAR	454.00	637.50	644.36	638.36	644.36	0.000014	0.53	855.23	150.34	0.04
HIGGINS CK	MAINSTEM	4.485	50-YEAR	503.00	637.50	646.04	638.42	646.04	0.000008	0.45	1118.36	162.91	0.03
HIGGINS CK	MAINSTEM	4.485	100-YEAR	730.00	637.50	646.62	638.67	646.63	0.000013	0.60	1214.11	167.25	0.04
HIGGINS CK	MAINSTEM	4.485	500-YEAR	1666.00	637.50	649.57	639.50	649.58	0.000024	0.95	1803.30	267.93	0.06

DESIGN PROP. COND. ELMHURST ROAD W/ BOX CULVERTS

HEC-RAS Plan: DesElmBxs070912

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.C. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Cht
HIGGINS TRIB A	CUP	25	10-YEAR	222.00	667.72	670.82		670.95	0.001495	2.99	79.46	48.42	0.33
HIGGINS TRIB A	CUP	25	50-YEAR	308.00	667.72	671.35		671.51	0.001356	3.24	116.96	91.69	0.33
HIGGINS TRIB A	CUP	25	100-YEAR	342.00	667.72	671.55		671.70	0.001280	3.28	136.23	107.35	0.32
HIGGINS TRIB A	CUP	25	500-YEAR	414.00	667.72	671.93		672.07	0.001102	3.28	182.40	128.60	0.30
HIGGINS TRIB A	CUP	24	10-YEAR	222.00	666.72	670.67		670.81	0.001422	2.97	74.63	27.78	0.32
HIGGINS TRIB A	CUP	24	50-YEAR	308.00	666.72	671.17		671.35	0.001624	3.47	89.02	30.24	0.35
HIGGINS TRIB A	CUP	24	100-YEAR	342.00	666.72	671.34		671.55	0.001691	3.64	94.35	31.11	0.36
HIGGINS TRIB A	CUP	24	500-YEAR	414.00	666.72	671.68		671.92	0.001823	3.98	105.10	32.79	0.38
HIGGINS TRIB A	CUP	23	10-YEAR	222.00	667.72	669.39	669.39	670.07	0.016922	6.60	33.62	25.18	1.01
HIGGINS TRIB A	CUP	23	50-YEAR	308.00	667.72	669.76	669.76	670.55	0.015916	7.14	43.15	27.39	1.00
HIGGINS TRIB A	CUP	23	100-YEAR	342.00	667.72	669.88	669.88	670.72	0.015736	7.34	46.62	28.15	1.00
HIGGINS TRIB A	CUP	23	500-YEAR	414.00	667.72	670.13	670.13	671.05	0.015385	7.69	53.81	29.66	1.01
HIGGINS TRIB A	CUP	22	10-YEAR	222.00	664.72	668.77		668.82	0.000377	1.78	124.59	36.48	0.17
HIGGINS TRIB A	CUP	22	50-YEAR	308.00	664.72	669.34		669.41	0.000460	2.11	145.72	38.09	0.19
HIGGINS TRIB A	CUP	22	100-YEAR	342.00	664.72	669.53		669.61	0.000492	2.24	152.96	38.62	0.20
HIGGINS TRIB A	CUP	22	500-YEAR	414.00	664.72	669.88		669.98	0.000588	2.48	166.89	40.08	0.21
HIGGINS TRIB A	CUP	21	10-YEAR	222.00	664.72	668.53		668.63	0.001193	2.61	85.12	34.74	0.29
HIGGINS TRIB A	CUP	21	50-YEAR	308.00	664.72	669.05		669.18	0.001329	2.96	104.15	38.13	0.32
HIGGINS TRIB A	CUP	21	100-YEAR	342.00	664.72	669.22		669.37	0.001368	3.09	110.77	39.24	0.32
HIGGINS TRIB A	CUP	21	500-YEAR	414.00	664.72	669.54		669.71	0.001512	3.35	123.62	41.32	0.34
HIGGINS TRIB A	CUP	20	10-YEAR	222.00	664.72	668.41		668.51	0.001283	2.55	87.20	39.33	0.30
HIGGINS TRIB A	CUP	20	50-YEAR	308.00	664.72	668.92		669.05	0.001325	2.84	108.64	43.22	0.31
HIGGINS TRIB A	CUP	20	100-YEAR	342.00	664.72	669.09		669.23	0.001338	2.95	116.02	44.23	0.32
HIGGINS TRIB A	CUP	20	500-YEAR	414.00	664.72	669.40		669.56	0.001393	3.20	130.12	46.10	0.33
HIGGINS TRIB A	CUP	19	10-YEAR	222.00	664.42	668.03		668.27	0.004462	3.98	57.94	48.86	0.54
HIGGINS TRIB A	CUP	19	50-YEAR	308.00	664.42	668.64		668.85	0.003073	3.75	99.36	86.26	0.46
HIGGINS TRIB A	CUP	19	100-YEAR	342.00	664.42	668.85		669.04	0.002686	3.64	118.42	94.67	0.43
HIGGINS TRIB A	CUP	19	500-YEAR	414.00	664.42	669.23		669.39	0.002184	3.49	156.02	105.21	0.40
HIGGINS TRIB A	CUP	18	10-YEAR	222.00	664.22	667.97		668.02	0.001081	1.95	115.11	65.60	0.24
HIGGINS TRIB A	CUP	18	50-YEAR	308.00	664.22	668.60		668.66	0.000832	2.01	165.14	92.44	0.22
HIGGINS TRIB A	CUP	18	100-YEAR	342.00	664.22	668.81		668.87	0.000783	2.04	185.13	99.26	0.22
HIGGINS TRIB A	CUP	18	500-YEAR	414.00	664.22	669.18		669.24	0.000728	2.12	223.42	106.48	0.21
HIGGINS TRIB A	CUP	17	10-YEAR	222.00	664.12	667.82		667.91	0.001073	2.76	97.73	52.60	0.28
HIGGINS TRIB A	CUP	17	50-YEAR	308.00	664.12	668.47		668.57	0.000941	2.84	137.80	69.62	0.27
HIGGINS TRIB A	CUP	17	100-YEAR	342.00	664.12	668.69		668.78	0.000907	2.86	153.22	75.15	0.27
HIGGINS TRIB A	CUP	17	500-YEAR	414.00	664.12	669.06		669.16	0.000933	3.03	184.61	95.52	0.27
HIGGINS TRIB A	CUP	16	10-YEAR	222.00	664.02	667.77		667.83	0.000637	1.84	123.12	54.33	0.20

HEC-RAS Plan: DesEmBxs070912 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	16	50-YEAR	308.00	664.02	668.43		668.49	0.000465	1.99	168.31	82.69	0.19
HIGGINS TRIB A	CUP	16	100-YEAR	342.00	664.02	668.65		668.71	0.000453	2.04	186.89	91.84	0.19
HIGGINS TRIB A	CUP	16	500-YEAR	414.00	664.02	669.02		669.09	0.000455	2.19	225.27	118.61	0.20
HIGGINS TRIB A	CUP	15	10-YEAR	222.00	663.72	667.52		667.71	0.002438	3.56	62.39	26.88	0.41
HIGGINS TRIB A	CUP	15	50-YEAR	308.00	663.72	668.17		668.39	0.002051	3.77	89.07	64.78	0.39
HIGGINS TRIB A	CUP	15	100-YEAR	342.00	663.72	668.39		668.61	0.001912	3.82	105.06	82.39	0.38
HIGGINS TRIB A	CUP	15	500-YEAR	414.00	663.72	668.77		668.99	0.001710	3.90	142.32	109.96	0.37
HIGGINS TRIB A	CUP	14	10-YEAR	222.00	663.72	667.40		667.52	0.001264	2.73	81.44	32.25	0.30
HIGGINS TRIB A	CUP	14	50-YEAR	308.00	663.72	668.03		668.17	0.001939	2.91	105.85	53.96	0.36
HIGGINS TRIB A	CUP	14	100-YEAR	342.00	663.72	668.25		668.38	0.002168	2.88	119.03	67.70	0.38
HIGGINS TRIB A	CUP	14	500-YEAR	414.00	663.72	668.65		668.77	0.002186	2.76	151.10	93.00	0.38
HIGGINS TRIB A	CUP	13	10-YEAR	222.00	663.72	667.27		667.38	0.001391	2.75	80.86	34.06	0.31
HIGGINS TRIB A	CUP	13	50-YEAR	308.00	663.72	667.86		668.00	0.001437	3.00	103.19	44.60	0.33
HIGGINS TRIB A	CUP	13	100-YEAR	342.00	663.72	668.06		668.21	0.001403	3.08	112.87	52.97	0.32
HIGGINS TRIB A	CUP	13	500-YEAR	414.00	663.72	668.44		668.60	0.001333	3.23	135.01	60.22	0.32
HIGGINS TRIB A	CUP	12	10-YEAR	224.00	662.72	667.00		667.07	0.000868	2.16	103.62	43.48	0.25
HIGGINS TRIB A	CUP	12	50-YEAR	310.00	662.72	667.59		667.67	0.000889	2.37	130.84	48.79	0.25
HIGGINS TRIB A	CUP	12	100-YEAR	344.00	662.72	667.79		667.88	0.000881	2.44	141.05	50.70	0.26
HIGGINS TRIB A	CUP	12	500-YEAR	416.00	662.72	668.19		668.29	0.000830	2.58	161.89	54.66	0.25
HIGGINS TRIB A	CUP	11	10-YEAR	224.00	663.02	666.55		666.83	0.003496	4.22	53.10	22.97	0.49
HIGGINS TRIB A	CUP	11	50-YEAR	310.00	663.02	667.08		667.42	0.003725	4.73	65.57	24.95	0.51
HIGGINS TRIB A	CUP	11	100-YEAR	344.00	663.02	667.26		667.63	0.003788	4.90	70.20	25.65	0.52
HIGGINS TRIB A	CUP	11	500-YEAR	416.00	663.02	667.61		668.04	0.003931	5.23	79.59	27.00	0.54
HIGGINS TRIB A	CUP	10	10-YEAR	224.00	662.72	666.03		666.31	0.003963	4.25	52.75	25.19	0.52
HIGGINS TRIB A	CUP	10	50-YEAR	310.00	662.72	666.54		666.89	0.003931	4.69	66.12	26.84	0.53
HIGGINS TRIB A	CUP	10	100-YEAR	344.00	662.72	666.72		667.09	0.003948	4.85	70.96	27.41	0.53
HIGGINS TRIB A	CUP	10	500-YEAR	416.00	662.72	667.07		667.48	0.004005	5.16	80.59	28.51	0.54
HIGGINS TRIB A	CUP	9	10-YEAR	224.00	662.22	665.48		665.75	0.004112	4.15	54.02	27.71	0.52
HIGGINS TRIB A	CUP	9	50-YEAR	310.00	662.22	666.04		666.34	0.003818	4.40	70.40	31.16	0.52
HIGGINS TRIB A	CUP	9	100-YEAR	344.00	662.22	666.23		666.54	0.003758	4.50	76.42	32.34	0.52
HIGGINS TRIB A	CUP	9	500-YEAR	416.00	662.22	666.59		666.93	0.003696	4.70	88.44	34.56	0.52
HIGGINS TRIB A	CUP	8	10-YEAR	224.00	661.02	665.28		665.37	0.001464	2.48	90.47	35.12	0.27
HIGGINS TRIB A	CUP	8	50-YEAR	310.00	661.02	665.83		665.95	0.001602	2.80	110.71	38.13	0.29
HIGGINS TRIB A	CUP	8	100-YEAR	344.00	661.02	666.02		666.15	0.001696	2.92	117.95	39.16	0.30
HIGGINS TRIB A	CUP	8	500-YEAR	416.00	661.02	666.37		666.53	0.001774	3.15	132.09	41.08	0.31
HIGGINS TRIB A	CUP	7	10-YEAR	224.00	661.02	665.03		665.22	0.003520	3.45	64.99	32.01	0.43
HIGGINS TRIB A	CUP	7	50-YEAR	310.00	661.02	665.58		665.78	0.003808	3.66	84.74	40.70	0.45

HEC-RAS Plan: DesElmBxs070912 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS TRIB A	CUP	1	10-YEAR	294.00	650.22	656.42	653.02	656.50	0.000659	2.36	126.56	500.31	0.19
HIGGINS TRIB A	CUP	1	50-YEAR	407.00	650.22	657.24	653.54	657.36	0.000951	2.77	149.60	500.46	0.21
HIGGINS TRIB A	CUP	1	100-YEAR	452.00	650.22	658.22	653.70	658.33	0.000673	2.59	177.09	500.64	0.18
HIGGINS TRIB A	CUP	1	500-YEAR	574.00	650.22	659.80	654.12	659.90	0.000520	2.63	221.12	500.92	0.16
HIGGINS CK	2	6.443	10-YEAR	275.00	652.09	657.56		657.59	0.001014	1.53	200.96	72.18	0.15
HIGGINS CK	2	6.443	50-YEAR	400.00	652.09	658.36		658.40	0.000975	1.72	260.73	76.85	0.15
HIGGINS CK	2	6.443	100-YEAR	461.00	652.09	658.98		659.02	0.000760	1.68	309.77	80.20	0.14
HIGGINS CK	2	6.443	500-YEAR	548.00	652.09	660.20		660.23	0.000456	1.52	411.40	86.72	0.11
HIGGINS CK	2	6.404	10-YEAR	275.00	652.60	657.13		657.24	0.003469	2.59	110.12	56.77	0.28
HIGGINS CK	2	6.404	50-YEAR	400.00	652.60	657.98		658.08	0.002752	2.69	170.43	81.45	0.25
HIGGINS CK	2	6.404	100-YEAR	461.00	652.60	658.72		658.80	0.001677	2.35	231.67	82.60	0.20
HIGGINS CK	2	6.404	500-YEAR	548.00	652.60	660.07		660.11	0.000782	1.87	344.13	84.69	0.14
HIGGINS CK	2	6.353	10-YEAR	275.00	650.86	656.78		656.81	0.000817	1.40	195.89	59.04	0.14
HIGGINS CK	2	6.353	50-YEAR	400.00	650.86	657.63		657.67	0.000889	1.61	248.42	64.96	0.15
HIGGINS CK	2	6.353	100-YEAR	461.00	650.86	658.48		658.52	0.000680	1.51	306.18	70.91	0.13
HIGGINS CK	2	6.353	500-YEAR	548.00	650.86	659.95		659.97	0.000342	1.31	439.88	112.48	0.10
HIGGINS CK	2	6.287	10-YEAR	275.00	650.90	656.49		656.52	0.000854	1.31	209.33	74.88	0.14
HIGGINS CK	2	6.287	50-YEAR	400.00	650.90	657.34		657.37	0.000818	1.44	279.27	91.76	0.14
HIGGINS CK	2	6.287	100-YEAR	461.00	650.90	658.30		658.32	0.000447	1.26	391.72	165.18	0.11
HIGGINS CK	2	6.287	500-YEAR	548.00	650.90	659.87		659.89	0.000169	0.95	670.64	178.00	0.07
HIGGINS CK	MAINSTEM	6.245	10-YEAR	562.00	651.02	656.43		656.48	0.000106	2.07	588.00	214.01	0.16
HIGGINS CK	MAINSTEM	6.245	50-YEAR	810.00	651.02	657.26		657.33	0.000120	2.40	777.56	242.10	0.17
HIGGINS CK	MAINSTEM	6.245	100-YEAR	911.00	651.02	658.25		658.29	0.000081	2.16	1032.23	275.36	0.15
HIGGINS CK	MAINSTEM	6.245	500-YEAR	1253.00	651.02	659.82		659.87	0.000063	2.13	1484.35	288.00	0.13
HIGGINS CK	MAINSTEM	6.231	10-YEAR	562.00	652.15	656.44		656.47	0.000048	1.26	458.71	136.17	0.11
HIGGINS CK	MAINSTEM	6.231	50-YEAR	810.00	652.15	657.28		657.31	0.000053	1.49	581.55	163.22	0.12
HIGGINS CK	MAINSTEM	6.231	100-YEAR	911.00	652.15	658.26		658.28	0.000036	1.38	762.43	200.67	0.10
HIGGINS CK	MAINSTEM	6.231	500-YEAR	1253.00	652.15	659.83		659.86	0.000029	1.45	1088.72	208.00	0.09
HIGGINS CK	MAINSTEM	6.179	10-YEAR	562.00	651.56	656.33		656.43	0.000227	2.58	217.73	152.75	0.24
HIGGINS CK	MAINSTEM	6.179	50-YEAR	810.00	651.56	657.13		657.27	0.000255	3.04	266.21	159.50	0.26
HIGGINS CK	MAINSTEM	6.179	100-YEAR	911.00	651.56	658.15		658.26	0.000151	2.67	435.01	246.80	0.21
HIGGINS CK	MAINSTEM	6.179	500-YEAR	1253.00	651.56	659.76		659.84	0.000089	2.44	863.12	273.29	0.16
HIGGINS CK	MAINSTEM	6.069	10-YEAR	562.00	650.55	656.27		656.33	0.000112	1.97	285.17	68.24	0.17
HIGGINS CK	MAINSTEM	6.069	50-YEAR	810.00	650.55	657.06		657.15	0.000134	2.38	342.60	79.69	0.19
HIGGINS CK	MAINSTEM	6.069	100-YEAR	911.00	650.55	658.11		658.18	0.000089	2.19	445.89	132.86	0.16
HIGGINS CK	MAINSTEM	6.069	500-YEAR	1253.00	650.55	659.72		659.80	0.000071	2.30	710.24	180.00	0.15

HEC-RAS Plan: DesEmBxs070912 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Chl
HIGGINS CK	MAINSTEM	6.035	10-YEAR	562.00	651.21	656.19		656.30	0.000242	2.74	233.02	92.47	0.25	
HIGGINS CK	MAINSTEM	6.035	50-YEAR	810.00	651.21	656.97		657.11	0.000253	3.17	306.78	136.10	0.26	
HIGGINS CK	MAINSTEM	6.035	100-YEAR	911.00	651.21	658.05		658.16	0.000146	2.78	413.35	140.44	0.21	
HIGGINS CK	MAINSTEM	6.035	500-YEAR	1253.00	651.21	659.67		659.78	0.000109	2.84	580.95	146.91	0.19	
HIGGINS CK	MAINSTEM	6.034	10-YEAR	562.00	651.79	655.24	655.24	656.21	0.001835	8.28	101.58	72.70	0.94	
HIGGINS CK	MAINSTEM	6.034	50-YEAR	810.00	651.79	656.30	655.85	657.05	0.000946	7.59	190.92	133.45	0.72	
HIGGINS CK	MAINSTEM	6.034	100-YEAR	911.00	651.79	657.80		658.14	0.000286	5.32	335.88	139.46	0.42	
HIGGINS CK	MAINSTEM	6.034	500-YEAR	1253.00	651.79	659.48		659.76	0.000177	5.08	507.71	146.14	0.35	
HIGGINS CK	MAINSTEM	6.033	10-YEAR	562.00	651.61	654.78	654.78	655.57	0.001994	7.77	113.71	127.61	0.97	
HIGGINS CK	MAINSTEM	6.033	50-YEAR	810.00	651.61	656.58		656.92	0.000396	5.33	265.87	134.84	0.48	
HIGGINS CK	MAINSTEM	6.033	100-YEAR	911.00	651.61	657.88		658.10	0.000174	4.30	383.81	140.06	0.34	
HIGGINS CK	MAINSTEM	6.033	500-YEAR	1253.00	651.61	659.52		659.74	0.000122	4.34	541.91	146.63	0.29	
HIGGINS CK	MAINSTEM	6.032	10-YEAR	562.00	647.83	654.31		654.39	0.000248	2.31	280.88	127.15	0.18	
HIGGINS CK	MAINSTEM	6.032	50-YEAR	810.00	647.83	656.78		656.84	0.000112	2.03	491.06	137.04	0.13	
HIGGINS CK	MAINSTEM	6.032	100-YEAR	911.00	647.83	658.00		658.05	0.000080	1.90	604.15	141.93	0.11	
HIGGINS CK	MAINSTEM	6.032	500-YEAR	1253.00	647.83	659.63		659.69	0.000078	2.11	764.49	148.47	0.12	
HIGGINS CK	MAINSTEM	6.021	10-YEAR	564.00	649.42	653.91		654.32	0.002185	5.15	109.55	31.41	0.49	
HIGGINS CK	MAINSTEM	6.021	50-YEAR	810.00	649.42	656.58		656.80	0.000735	3.86	218.98	59.79	0.30	
HIGGINS CK	MAINSTEM	6.021	100-YEAR	915.00	649.42	657.86		658.03	0.000441	3.35	294.40	67.37	0.24	
HIGGINS CK	MAINSTEM	6.021	500-YEAR	1258.00	649.42	659.49		659.67	0.000356	3.48	395.69	76.97	0.22	
HIGGINS CK	MAINSTEM	6.006	10-YEAR	564.00	648.55	653.91		654.13	0.001391	3.72	151.44	38.86	0.33	
HIGGINS CK	MAINSTEM	6.006	50-YEAR	810.00	648.55	656.59		656.73	0.000533	2.98	284.01	59.20	0.22	
HIGGINS CK	MAINSTEM	6.006	100-YEAR	915.00	648.55	657.87		657.98	0.000340	2.70	359.19	67.07	0.18	
HIGGINS CK	MAINSTEM	6.006	500-YEAR	1258.00	648.55	659.50		659.63	0.000306	2.95	471.30	158.71	0.18	
HIGGINS CK	MAINSTEM	5.9994*	10-YEAR	564.00	648.38	653.88		654.07	0.001141	3.49	161.75	41.44	0.31	
HIGGINS CK	MAINSTEM	5.9994*	50-YEAR	810.00	648.38	656.58		656.71	0.000466	2.92	277.86	61.59	0.21	
HIGGINS CK	MAINSTEM	5.9994*	100-YEAR	915.00	648.38	657.85		657.97	0.000314	2.72	339.64	67.44	0.18	
HIGGINS CK	MAINSTEM	5.9994*	500-YEAR	1258.00	648.38	659.47		659.62	0.000299	3.03	438.22	209.09	0.18	
HIGGINS CK	MAINSTEM	5.9950	10-YEAR	564.00	648.21	653.87	651.05	654.03	0.000992	3.23	174.39	43.75	0.29	
HIGGINS CK	MAINSTEM	5.9950	50-YEAR	810.00	648.21	656.58	651.67	656.68	0.000376	2.63	318.27	67.16	0.19	
HIGGINS CK	MAINSTEM	5.9950	100-YEAR	915.00	648.21	657.86	651.92	657.95	0.000249	2.43	392.50	84.28	0.16	
HIGGINS CK	MAINSTEM	5.9950	500-YEAR	1258.00	648.21	659.49	652.63	659.59	0.000223	2.63	621.23	405.00	0.15	
HIGGINS CK	MAINSTEM	5.981	Culvert											
HIGGINS CK	MAINSTEM	5.972	10-YEAR	645.00	647.90	653.73	651.46	653.95	0.000265	3.74	172.47	46.10	0.34	
HIGGINS CK	MAINSTEM	5.972	50-YEAR	1100.00	647.90	656.41	652.41	656.61	0.000131	3.56	317.53	401.36	0.26	
HIGGINS CK	MAINSTEM	5.972	100-YEAR	1320.00	647.90	657.66	652.82	657.85	0.000099	3.52	389.89	565.41	0.23	
HIGGINS CK	MAINSTEM	5.972	500-YEAR	1930.00	647.90	659.28	653.76	659.44	0.000076	3.51	1283.67	646.39	0.21	

HCC-RAS Plan: DesElmBxs070912 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Chl
HIGGINS CK	MAINSTEM	5.959	10-YEAR	645.00	647.58	653.74		653.91	0.000190	3.29	196.29	50.06	0.29	
HIGGINS CK	MAINSTEM	5.959	50-YEAR	1100.00	647.58	656.42		656.59	0.000095	3.25	379.90	330.20	0.23	
HIGGINS CK	MAINSTEM	5.959	100-YEAR	1320.00	647.58	657.67		657.83	0.000074	3.21	526.68	380.44	0.20	
HIGGINS CK	MAINSTEM	5.959	500-YEAR	1930.00	647.58	659.22		659.42	0.000079	3.75	939.27	653.22	0.22	
HIGGINS CK	MAINSTEM	5.950	10-YEAR	645.00	647.42	653.72		653.90	0.000208	3.43	187.99	47.92	0.31	
HIGGINS CK	MAINSTEM	5.950	50-YEAR	1100.00	647.42	656.40		656.58	0.000105	3.37	369.53	292.18	0.23	
HIGGINS CK	MAINSTEM	5.950	100-YEAR	1320.00	647.42	657.66		657.82	0.000080	3.31	507.35	327.56	0.21	
HIGGINS CK	MAINSTEM	5.950	500-YEAR	1930.00	647.42	659.20		659.41	0.000085	3.86	940.38	686.53	0.22	
HIGGINS CK	MAINSTEM	5.914	10-YEAR	645.00	647.31	653.69	650.92	653.86	0.000192	3.32	194.32	49.23	0.29	
HIGGINS CK	MAINSTEM	5.914	50-YEAR	1100.00	647.31	656.39	651.92	656.56	0.000099	3.32	333.52	77.22	0.23	
HIGGINS CK	MAINSTEM	5.914	100-YEAR	1320.00	647.31	657.63	652.32	657.81	0.000079	3.34	398.36	100.45	0.21	
HIGGINS CK	MAINSTEM	5.914	500-YEAR	1930.00	647.31	659.18	653.32	659.40	0.000085	3.85	759.67	512.08	0.22	
HIGGINS CK	MAINSTEM	5.911		Culvert										
HIGGINS CK	MAINSTEM	5.899	10-YEAR	645.00	647.30	652.81	650.97	653.28	0.000434	5.50	117.34	42.98	0.46	
HIGGINS CK	MAINSTEM	5.899	50-YEAR	1100.00	647.30	655.00	652.12	655.62	0.000338	6.31	174.27	58.72	0.43	
HIGGINS CK	MAINSTEM	5.899	100-YEAR	1320.00	647.30	656.09	652.62	656.75	0.000295	6.52	202.48	76.74	0.41	
HIGGINS CK	MAINSTEM	5.899	500-YEAR	1930.00	647.30	657.68	653.85	658.23	0.000232	5.97	373.59	103.26	0.37	
HIGGINS CK	MAINSTEM	5.86375*	10-YEAR	645.00	647.10	652.84		653.11	0.000342	4.15	155.57	43.32	0.39	
HIGGINS CK	MAINSTEM	5.86375*	50-YEAR	1100.00	647.10	655.13		655.40	0.000205	4.14	270.74	64.60	0.32	
HIGGINS CK	MAINSTEM	5.86375*	100-YEAR	1320.00	647.10	656.25		656.51	0.000153	4.06	359.27	97.01	0.28	
HIGGINS CK	MAINSTEM	5.86375*	500-YEAR	1930.00	647.10	657.76		658.08	0.000152	4.66	543.86	147.78	0.29	
HIGGINS CK	MAINSTEM	5.8285*	10-YEAR	645.00	646.90	652.79		653.04	0.000308	4.02	160.52	43.26	0.37	
HIGGINS CK	MAINSTEM	5.8285*	50-YEAR	1100.00	646.90	655.10		655.36	0.000192	4.06	276.10	65.20	0.31	
HIGGINS CK	MAINSTEM	5.8285*	100-YEAR	1320.00	646.90	656.23		656.47	0.000144	3.99	366.41	103.56	0.28	
HIGGINS CK	MAINSTEM	5.8285*	500-YEAR	1930.00	646.90	657.74		658.05	0.000143	4.56	592.62	194.58	0.28	
HIGGINS CK	MAINSTEM	5.79325*	10-YEAR	645.00	646.70	652.74		652.98	0.000278	3.89	165.80	43.23	0.35	
HIGGINS CK	MAINSTEM	5.79325*	50-YEAR	1100.00	646.70	655.07		655.32	0.000180	3.97	281.17	64.39	0.30	
HIGGINS CK	MAINSTEM	5.79325*	100-YEAR	1320.00	646.70	656.21		656.44	0.000136	3.92	370.76	93.14	0.27	
HIGGINS CK	MAINSTEM	5.79325*	500-YEAR	1930.00	646.70	657.72		658.02	0.000136	4.49	627.61	248.29	0.28	
HIGGINS CK	MAINSTEM	5.758	10-YEAR	645.00	646.50	652.70	650.19	652.92	0.000250	3.76	171.43	43.22	0.33	
HIGGINS CK	MAINSTEM	5.758	50-YEAR	1100.00	646.50	655.04	651.21	655.28	0.000169	3.89	285.85	62.48	0.29	
HIGGINS CK	MAINSTEM	5.758	100-YEAR	1320.00	646.50	656.19	651.64	656.42	0.000130	3.86	354.38	93.29	0.26	
HIGGINS CK	MAINSTEM	5.758	500-YEAR	1930.00	646.50	657.70	652.70	657.99	0.000132	4.44	652.10	320.93	0.27	
HIGGINS CK	MAINSTEM	5.721		Culvert										
HIGGINS CK	MAINSTEM	5.683	10-YEAR	645.00	646.23	651.43	649.46	651.82	0.000361	4.99	129.22	46.19	0.42	

HEC-RAS Plan: DesElmBxs070912 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	5.683	50-YEAR	1100.00	646.23	652.55	650.51	653.27	0.000499	6.81	161.54	51.30	0.51
HIGGINS CK	MAINSTEM	5.683	100-YEAR	1320.00	646.23	653.45	650.99	654.22	0.000437	7.04	187.58	55.43	0.49
HIGGINS CK	MAINSTEM	5.683	500-YEAR	1930.00	646.23	655.16	652.15	656.19	0.000426	8.13	237.38	74.89	0.50
HIGGINS CK	MAINSTEM	5.650	10-YEAR	645.00	646.10	651.44		651.70	0.000329	4.04	159.50	45.05	0.38
HIGGINS CK	MAINSTEM	5.650	50-YEAR	1100.00	646.10	652.63		653.03	0.000406	5.09	216.31	50.50	0.43
HIGGINS CK	MAINSTEM	5.650	100-YEAR	1320.00	646.10	653.58		653.96	0.000328	4.96	266.06	54.83	0.40
HIGGINS CK	MAINSTEM	5.650	500-YEAR	1930.00	646.10	655.42		655.83	0.000241	5.17	404.18	99.71	0.36
HIGGINS CK	MAINSTEM	5.649	10-YEAR	645.00	646.50	651.44		651.69	0.000360	4.06	158.94	47.70	0.39
HIGGINS CK	MAINSTEM	5.649	50-YEAR	1100.00	646.50	652.63		653.03	0.000411	5.03	218.73	52.21	0.43
HIGGINS CK	MAINSTEM	5.649	100-YEAR	1320.00	646.50	653.58		653.95	0.000323	4.99	269.82	55.78	0.39
HIGGINS CK	MAINSTEM	5.649	500-YEAR	1930.00	646.50	655.42		655.83	0.000248	5.10	390.75	95.47	0.36
HIGGINS CK	MAINSTEM	5.593	10-YEAR	645.00	645.87	651.38		651.59	0.000252	3.66	175.99	47.02	0.33
HIGGINS CK	MAINSTEM	5.593	50-YEAR	1100.00	645.87	652.56		652.91	0.000325	4.89	234.47	52.04	0.39
HIGGINS CK	MAINSTEM	5.593	100-YEAR	1320.00	645.87	653.52		653.85	0.000267	4.61	286.42	56.12	0.36
HIGGINS CK	MAINSTEM	5.593	500-YEAR	1930.00	645.87	655.38		655.75	0.000201	4.91	422.84	120.04	0.33
HIGGINS CK	MAINSTEM	5.558	10-YEAR	907.00	646.30	651.03		651.49	0.000637	5.42	167.26	49.82	0.52
HIGGINS CK	MAINSTEM	5.558	50-YEAR	1394.00	646.30	652.23		652.80	0.000598	6.06	229.86	54.99	0.52
HIGGINS CK	MAINSTEM	5.558	100-YEAR	1623.00	646.30	653.29		653.78	0.000414	5.58	290.85	59.59	0.45
HIGGINS CK	MAINSTEM	5.558	500-YEAR	2270.00	646.30	655.23		655.70	0.000270	5.52	429.14	92.67	0.38
HIGGINS CK	MAINSTEM	5.500	10-YEAR	907.00	645.54	650.74		651.28	0.000698	5.88	154.34	43.49	0.55
HIGGINS CK	MAINSTEM	5.500	50-YEAR	1394.00	645.54	651.87		652.58	0.000724	6.76	206.24	48.17	0.58
HIGGINS CK	MAINSTEM	5.500	100-YEAR	1623.00	645.54	653.05		653.63	0.000483	6.10	265.91	53.20	0.48
HIGGINS CK	MAINSTEM	5.500	500-YEAR	2270.00	645.54	655.03		655.60	0.000314	6.03	392.88	83.61	0.41
HIGGINS CK	MAINSTEM	5.496	10-YEAR	907.00	645.80	650.57		651.24	0.000991	6.60	137.47	42.40	0.65
HIGGINS CK	MAINSTEM	5.496	50-YEAR	1394.00	645.80	651.69		652.55	0.000955	7.43	187.59	46.78	0.65
HIGGINS CK	MAINSTEM	5.496	100-YEAR	1623.00	645.80	652.95		653.61	0.000574	6.50	249.74	51.70	0.52
HIGGINS CK	MAINSTEM	5.496	500-YEAR	2270.00	645.80	654.97		655.59	0.000363	6.30	374.19	80.44	0.43
HIGGINS CK	MAINSTEM	5.409	10-YEAR	907.00	645.02	650.31		650.83	0.000672	5.78	156.79	44.04	0.54
HIGGINS CK	MAINSTEM	5.409	50-YEAR	1394.00	645.02	651.44		652.13	0.000693	6.67	208.88	48.07	0.56
HIGGINS CK	MAINSTEM	5.409	100-YEAR	1623.00	645.02	652.82		653.36	0.000412	5.82	278.92	53.01	0.45
HIGGINS CK	MAINSTEM	5.409	500-YEAR	2270.00	645.02	654.90		655.41	0.000271	5.77	409.56	75.86	0.38
HIGGINS CK	MAINSTEM	5.408	10-YEAR	907.00	645.30	650.23		650.82	0.000797	6.12	148.31	43.59	0.58
HIGGINS CK	MAINSTEM	5.408	50-YEAR	1394.00	645.30	651.36		652.12	0.000796	6.97	200.00	47.96	0.60
HIGGINS CK	MAINSTEM	5.408	100-YEAR	1623.00	645.30	652.79		653.34	0.000449	5.96	272.50	53.49	0.47
HIGGINS CK	MAINSTEM	5.408	500-YEAR	2270.00	645.30	654.89		655.41	0.000289	5.80	403.56	78.16	0.39
HIGGINS CK	MAINSTEM	5.394	10-YEAR	907.00	645.30	650.42	648.17	650.63	0.001404	3.67	246.81	68.89	0.34
HIGGINS CK	MAINSTEM	5.394	50-YEAR	1394.00	645.30	651.63	648.93	651.90	0.001403	4.16	335.45	77.67	0.35

HEC-RAS Plan: DesElmBxs070912 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	5.394	100-YEAR	1623.00	645.30	652.99	649.23	653.20	0.000810	3.63	447.92	86.58	0.28
HIGGINS CK	MAINSTEM	5.394	500-YEAR	2270.00	645.30	655.08	650.01	655.29	0.000520	3.63	641.00	98.72	0.23
HIGGINS CK	MAINSTEM	5.364	Bridge										
HIGGINS CK	MAINSTEM	5.335	10-YEAR	907.00	645.30	650.21	647.81	650.39	0.001125	3.40	287.05	71.13	0.31
HIGGINS CK	MAINSTEM	5.335	50-YEAR	1394.00	645.30	651.41	648.51	651.66	0.001156	3.91	356.51	78.22	0.32
HIGGINS CK	MAINSTEM	5.335	100-YEAR	1623.00	645.30	652.86	648.79	653.03	0.000660	3.40	489.23	130.85	0.25
HIGGINS CK	MAINSTEM	5.335	500-YEAR	2270.00	645.30	654.98	649.53	655.15	0.000445	3.37	709.77	709.04	0.22
HIGGINS CK	MAINSTEM	5.324	10-YEAR	907.00	645.28	650.09		650.33	0.000811	3.90	232.77	82.20	0.36
HIGGINS CK	MAINSTEM	5.324	50-YEAR	1394.00	645.28	651.28		651.58	0.000819	4.41	316.53	101.23	0.38
HIGGINS CK	MAINSTEM	5.324	100-YEAR	1623.00	645.28	652.78		653.00	0.000424	3.72	460.24	171.03	0.28
HIGGINS CK	MAINSTEM	5.324	500-YEAR	2270.00	645.28	654.94		655.13	0.000252	3.58	749.49	533.01	0.23
HIGGINS CK	MAINSTEM	5.289	10-YEAR	907.00	645.20	650.01		650.18	0.000568	3.29	275.78	76.84	0.31
HIGGINS CK	MAINSTEM	5.289	50-YEAR	1394.00	645.20	651.21		651.43	0.000565	3.74	372.81	85.10	0.31
HIGGINS CK	MAINSTEM	5.289	100-YEAR	1623.00	645.20	652.76		652.92	0.000299	3.16	524.76	151.73	0.24
HIGGINS CK	MAINSTEM	5.289	500-YEAR	2270.00	645.20	654.94		655.08	0.000177	3.04	867.23	498.71	0.19
HIGGINS CK	MAINSTEM	5.256	10-YEAR	907.00	645.11	649.82		650.06	0.000807	3.89	233.36	65.48	0.36
HIGGINS CK	MAINSTEM	5.256	50-YEAR	1394.00	645.11	651.00		651.30	0.000821	4.43	314.40	73.15	0.38
HIGGINS CK	MAINSTEM	5.256	100-YEAR	1623.00	645.11	652.65		652.85	0.000469	3.60	450.44	94.14	0.29
HIGGINS CK	MAINSTEM	5.256	500-YEAR	2270.00	645.11	654.86		655.04	0.000255	3.37	712.71	138.89	0.23
HIGGINS CK	MAINSTEM	5.236	10-YEAR	907.00	645.20	649.69		649.96	0.000988	4.14	219.20	65.27	0.40
HIGGINS CK	MAINSTEM	5.236	50-YEAR	1394.00	645.20	650.87		651.21	0.000949	4.64	300.61	72.96	0.40
HIGGINS CK	MAINSTEM	5.236	100-YEAR	1623.00	645.20	652.58		652.80	0.000454	3.73	434.75	85.07	0.29
HIGGINS CK	MAINSTEM	5.236	500-YEAR	2270.00	645.20	654.81		655.01	0.000271	3.58	672.99	131.57	0.24
HIGGINS CK	MAINSTEM	5.184	10-YEAR	907.00	644.50	649.51		649.72	0.000686	3.69	245.94	66.00	0.34
HIGGINS CK	MAINSTEM	5.184	50-YEAR	1394.00	644.50	650.69		650.97	0.000721	4.25	328.03	73.69	0.35
HIGGINS CK	MAINSTEM	5.184	100-YEAR	1623.00	644.50	652.49		652.68	0.000356	3.44	471.93	85.52	0.26
HIGGINS CK	MAINSTEM	5.184	500-YEAR	2270.00	644.50	654.80		654.93	0.000187	2.99	995.32	362.89	0.20
HIGGINS CK	MAINSTEM	5.166	10-YEAR	907.00	644.48	649.45		649.66	0.000668	3.65	248.67	66.44	0.33
HIGGINS CK	MAINSTEM	5.166	50-YEAR	1394.00	644.48	650.62		650.90	0.000712	4.20	331.53	74.95	0.35
HIGGINS CK	MAINSTEM	5.166	100-YEAR	1623.00	644.48	652.47		652.64	0.000346	3.37	482.14	88.41	0.25
HIGGINS CK	MAINSTEM	5.166	500-YEAR	2270.00	644.48	654.80		654.90	0.000162	2.80	1126.39	441.03	0.18
HIGGINS CK	MAINSTEM	5.144	10-YEAR	907.00	644.40	649.37		649.58	0.000684	3.68	246.48	66.17	0.34
HIGGINS CK	MAINSTEM	5.144	50-YEAR	1394.00	644.40	650.53		650.81	0.000723	4.25	328.10	73.84	0.36
HIGGINS CK	MAINSTEM	5.144	100-YEAR	1623.00	644.40	652.42		652.60	0.000342	3.39	479.44	86.27	0.25
HIGGINS CK	MAINSTEM	5.144	500-YEAR	2270.00	644.40	654.78		654.88	0.000156	2.73	1204.89	502.28	0.18
HIGGINS CK	MAINSTEM	5.094	10-YEAR	907.00	643.10	649.27		649.42	0.000421	3.09	293.42	71.25	0.27

HEC-RAS Plan: DesEmBxs070912 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E. G. Elev (ft)	E. G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	5.084	50-YEAR	1394.00	643.10	650.43		650.64	0.000481	3.67	380.31	78.76	0.29
HIGGINS CK	MAINSTEM	5.084	100-YEAR	1623.00	643.10	652.38		652.51	0.000242	2.97	546.46	92.52	0.22
HIGGINS CK	MAINSTEM	5.084	500-YEAR	2270.00	643.10	654.77		654.84	0.000105	2.39	1492.53	666.68	0.15
HIGGINS CK	MAINSTEM	5.049	10-YEAR	907.00	643.43	649.17		649.32	0.000402	3.08	294.91	69.45	0.26
HIGGINS CK	MAINSTEM	5.049	50-YEAR	1394.00	643.43	650.31		650.52	0.000470	3.69	377.61	75.79	0.29
HIGGINS CK	MAINSTEM	5.049	100-YEAR	1623.00	643.43	652.32		652.46	0.000230	3.00	540.91	90.13	0.21
HIGGINS CK	MAINSTEM	5.049	500-YEAR	2270.00	643.43	654.75		654.82	0.000094	2.38	1653.73	788.37	0.14
HIGGINS CK	MAINSTEM	5.045	10-YEAR	571.00	643.80	649.22		649.29	0.000201	2.11	271.09	67.07	0.18
HIGGINS CK	MAINSTEM	5.045	50-YEAR	750.00	643.80	650.40		650.47	0.000161	2.12	354.09	73.18	0.17
HIGGINS CK	MAINSTEM	5.045	100-YEAR	1000.00	643.80	652.37		652.43	0.000103	1.97	507.86	83.32	0.14
HIGGINS CK	MAINSTEM	5.045	500-YEAR	2000.00	643.80	654.75		654.81	0.000083	2.19	1594.78	788.42	0.13
HIGGINS CK	MAINSTEM	5.020	10-YEAR	571.00	643.80	649.17	645.94	649.26	0.000203	2.41	236.97	66.80	0.19
HIGGINS CK	MAINSTEM	5.020	50-YEAR	750.00	643.80	650.34	646.26	650.44	0.000170	2.55	294.58	72.86	0.18
HIGGINS CK	MAINSTEM	5.020	100-YEAR	1000.00	643.80	652.30	646.67	652.40	0.000118	2.56	390.54	82.97	0.16
HIGGINS CK	MAINSTEM	5.020	500-YEAR	2000.00	643.80	654.74	648.05	654.80	0.000084	2.20	1585.97	788.33	0.13
HIGGINS CK	MAINSTEM	5.012	Culvert										
HIGGINS CK	MAINSTEM	5.005	10-YEAR	571.00	643.80	648.72	645.55	648.82	0.000213	2.47	230.92	90.28	0.20
HIGGINS CK	MAINSTEM	5.005	50-YEAR	750.00	643.80	649.54	645.88	649.66	0.000218	2.78	270.22	94.93	0.21
HIGGINS CK	MAINSTEM	5.005	100-YEAR	1000.00	643.80	650.80	646.30	650.94	0.000198	3.03	330.52	102.06	0.20
HIGGINS CK	MAINSTEM	5.005	500-YEAR	2000.00	643.80	654.76	647.68	654.79	0.000037	1.52	2395.02	1239.60	0.09
HIGGINS CK	MAINSTEM	4.992	10-YEAR	571.00	643.80	648.74		648.78	0.000114	1.58	360.78	90.38	0.14
HIGGINS CK	MAINSTEM	4.992	50-YEAR	750.00	643.80	649.57		649.61	0.000111	1.71	437.57	95.08	0.14
HIGGINS CK	MAINSTEM	4.992	100-YEAR	1000.00	643.80	650.83		650.88	0.000095	1.78	562.59	102.28	0.13
HIGGINS CK	MAINSTEM	4.992	500-YEAR	2000.00	643.80	654.76		654.78	0.000036	1.48	2099.14	1044.50	0.09
HIGGINS CK	MAINSTEM	4.980	10-YEAR	571.00	643.55	648.65		648.76	0.000347	2.62	218.27	58.55	0.24
HIGGINS CK	MAINSTEM	4.980	50-YEAR	750.00	643.55	649.47		649.59	0.000334	2.80	268.08	63.08	0.24
HIGGINS CK	MAINSTEM	4.980	100-YEAR	1000.00	643.55	650.74		650.87	0.000276	2.84	352.56	70.08	0.22
HIGGINS CK	MAINSTEM	4.980	500-YEAR	2000.00	643.55	654.74		654.78	0.000065	1.89	1865.22	1114.49	0.12
HIGGINS CK	MAINSTEM	4.966	10-YEAR	700.00	643.40	648.52		648.72	0.000633	3.51	199.57	53.91	0.32
HIGGINS CK	MAINSTEM	4.966	50-YEAR	920.00	643.40	649.33		649.55	0.000614	3.76	244.65	58.02	0.32
HIGGINS CK	MAINSTEM	4.966	100-YEAR	1260.00	643.40	650.59		650.83	0.000535	3.92	321.64	64.43	0.31
HIGGINS CK	MAINSTEM	4.966	500-YEAR	2140.00	643.40	654.74		654.78	0.000072	1.98	1961.88	1317.82	0.12
HIGGINS CK	MAINSTEM	4.944	10-YEAR	700.00	642.80	648.47		648.65	0.000637	3.39	206.25	51.26	0.30
HIGGINS CK	MAINSTEM	4.944	50-YEAR	920.00	642.80	649.27		649.48	0.000548	3.70	248.93	55.12	0.31
HIGGINS CK	MAINSTEM	4.944	100-YEAR	1260.00	642.80	650.53		650.77	0.000488	3.92	321.80	834.96	0.30
HIGGINS CK	MAINSTEM	4.944	500-YEAR	2140.00	642.80	654.74		654.77	0.000053	1.84	2309.02	1468.13	0.11

HEC-RAS Plan: DesElimBxs070912 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	4.928	10-YEAR	700.00	642.48	648.42		648.58	0.000903	3.19	219.61	53.63	0.28
HIGGINS CK	MAINSTEM	4.928	50-YEAR	920.00	642.48	649.23		649.41	0.000933	3.48	284.35	57.83	0.29
HIGGINS CK	MAINSTEM	4.928	100-YEAR	1260.00	642.48	650.49		650.70	0.000862	3.69	341.90	64.45	0.28
HIGGINS CK	MAINSTEM	4.928	500-YEAR	2140.00	642.48	654.73		654.76	0.000106	1.75	1975.25	1411.95	0.11
HIGGINS CK	MAINSTEM	4.925	10-YEAR	700.00	643.00	648.36		648.56	0.001229	3.56	196.68	51.37	0.32
HIGGINS CK	MAINSTEM	4.925	50-YEAR	920.00	643.00	649.16		649.39	0.001224	3.84	239.39	55.39	0.33
HIGGINS CK	MAINSTEM	4.925	100-YEAR	1260.00	643.00	650.44		650.69	0.001082	4.01	313.89	61.77	0.31
HIGGINS CK	MAINSTEM	4.925	500-YEAR	2140.00	643.00	654.73		654.76	0.000080	1.52	2130.81	1523.15	0.09
HIGGINS CK	MAINSTEM	4.915	10-YEAR	700.00	643.00	648.37		648.48	0.000780	2.68	282.10	91.24	0.23
HIGGINS CK	MAINSTEM	4.915	50-YEAR	920.00	643.00	649.19		649.31	0.000742	2.86	358.51	96.13	0.23
HIGGINS CK	MAINSTEM	4.915	100-YEAR	1260.00	643.00	650.48		650.61	0.000626	2.96	487.56	103.87	0.22
HIGGINS CK	MAINSTEM	4.915	500-YEAR	2140.00	643.00	654.73		654.75	0.000086	1.66	2960.62	1437.27	0.09
HIGGINS CK	MAINSTEM	4.885	10-YEAR	700.00	642.90	648.23		648.35	0.000815	2.80	289.08	84.75	0.23
HIGGINS CK	MAINSTEM	4.885	50-YEAR	920.00	642.90	649.05		649.19	0.000783	3.03	339.89	89.48	0.23
HIGGINS CK	MAINSTEM	4.885	100-YEAR	1260.00	642.90	650.36		650.50	0.000694	3.16	482.54	152.01	0.22
HIGGINS CK	MAINSTEM	4.885	500-YEAR	2140.00	642.90	654.71		654.74	0.000084	1.62	3058.13	1295.73	0.09
HIGGINS CK	MAINSTEM	4.866	10-YEAR	700.00	642.40	648.14		648.27	0.000870	2.95	256.20	82.27	0.24
HIGGINS CK	MAINSTEM	4.866	50-YEAR	920.00	642.40	648.95		649.10	0.000850	3.19	324.99	86.08	0.24
HIGGINS CK	MAINSTEM	4.866	100-YEAR	1260.00	642.40	650.28		650.44	0.000698	3.32	462.13	135.21	0.23
HIGGINS CK	MAINSTEM	4.866	500-YEAR	2140.00	642.40	654.70		654.73	0.000091	1.70	2957.85	1325.29	0.09
HIGGINS CK	MAINSTEM	4.847	10-YEAR	700.00	642.00	648.05		648.18	0.000838	2.89	258.87	83.43	0.24
HIGGINS CK	MAINSTEM	4.847	50-YEAR	920.00	642.00	648.87		649.02	0.000822	3.13	328.96	87.64	0.24
HIGGINS CK	MAINSTEM	4.847	100-YEAR	1260.00	642.00	650.22		650.35	0.000870	3.08	467.59	133.38	0.25
HIGGINS CK	MAINSTEM	4.847	500-YEAR	2140.00	642.00	654.70		654.72	0.000089	1.52	2830.02	1316.34	0.09
HIGGINS CK	MAINSTEM	4.828	10-YEAR	700.00	641.90	648.00		648.10	0.000685	2.51	296.42	94.70	0.21
HIGGINS CK	MAINSTEM	4.828	50-YEAR	920.00	641.90	648.83		648.93	0.000645	2.69	376.95	100.44	0.21
HIGGINS CK	MAINSTEM	4.828	100-YEAR	1260.00	641.90	650.17		650.28	0.000536	2.77	519.29	128.12	0.20
HIGGINS CK	MAINSTEM	4.828	500-YEAR	2140.00	641.90	654.69		654.71	0.000074	1.51	2946.83	1347.86	0.08
HIGGINS CK	MAINSTEM	4.801	10-YEAR	700.00	642.50	647.85		647.98	0.001005	2.97	250.02	87.82	0.26
HIGGINS CK	MAINSTEM	4.801	50-YEAR	920.00	642.50	648.68		648.82	0.000929	3.14	325.01	92.74	0.25
HIGGINS CK	MAINSTEM	4.801	100-YEAR	1260.00	642.50	650.04		650.19	0.000730	3.17	457.33	104.93	0.23
HIGGINS CK	MAINSTEM	4.801	500-YEAR	2140.00	642.50	654.67		654.70	0.000090	1.65	2762.42	1358.38	0.09
HIGGINS CK	MAINSTEM	4.783	10-YEAR	700.00	642.00	647.76		647.89	0.000864	2.84	258.87	86.36	0.24
HIGGINS CK	MAINSTEM	4.783	50-YEAR	920.00	642.00	648.60		648.73	0.000823	3.04	333.89	92.35	0.24
HIGGINS CK	MAINSTEM	4.783	100-YEAR	1260.00	642.00	649.98		650.12	0.000666	3.09	467.11	100.47	0.22
HIGGINS CK	MAINSTEM	4.783	500-YEAR	2140.00	642.00	654.66		654.69	0.000091	1.68	2632.96	1334.69	0.09
HIGGINS CK	MAINSTEM	4.774	10-YEAR	700.00	642.50	647.70		647.84	0.001115	3.07	240.73	87.13	0.27

HEC-RAS Plan: DesElmBxs070912 (Continued)

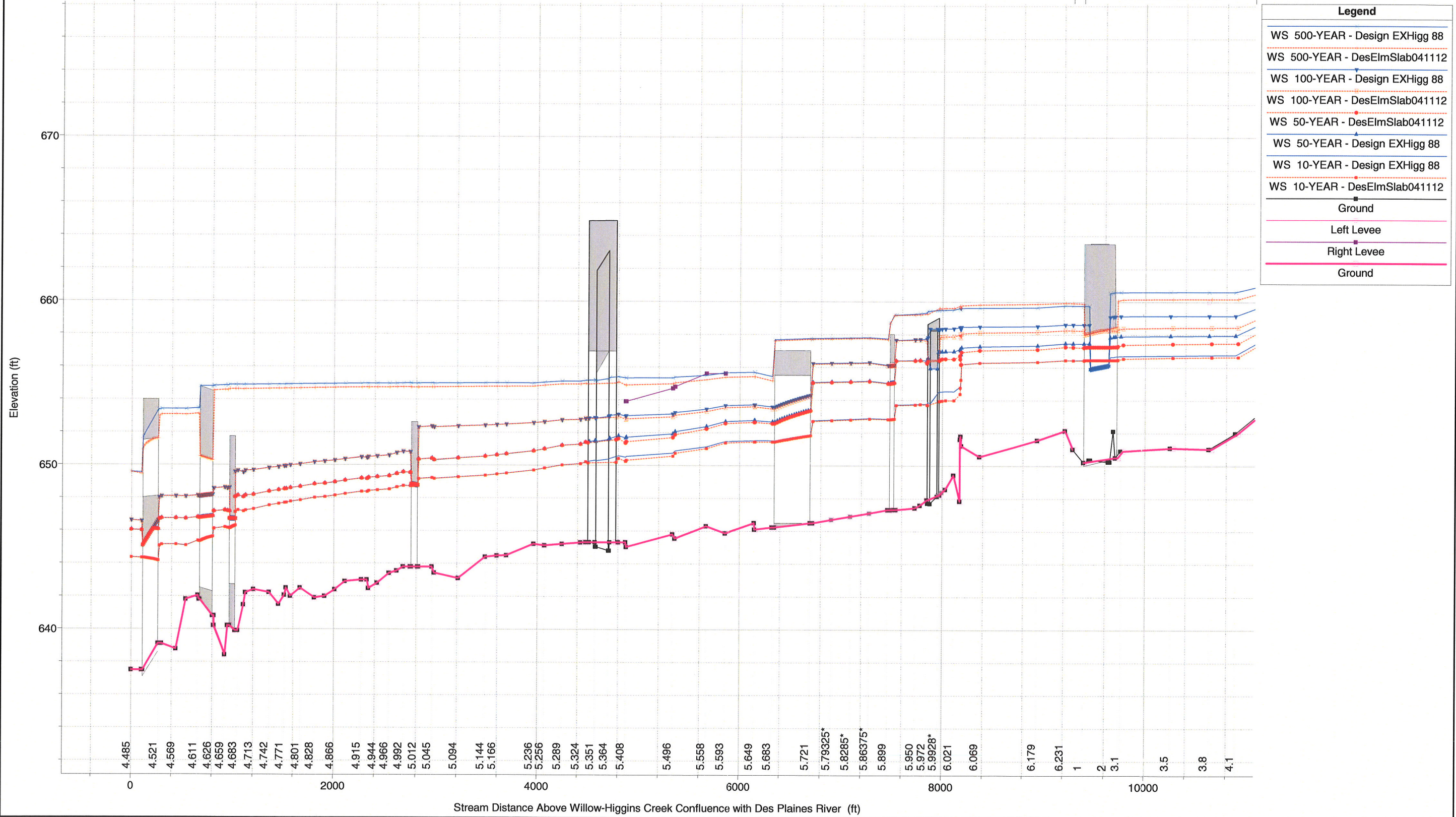
River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Critl W.S. (ft)	E. G. Elev (ft)	E. G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	4.668	10-YEAR	424.00	640.20	648.13	642.68	646.33	0.000909	3.62	117.29	51.36	0.26
HIGGINS CK	MAINSTEM	4.668	50-YEAR	445.00	640.20	647.17	642.75	647.33	0.000582	3.22	138.00	73.44	0.22
HIGGINS CK	MAINSTEM	4.668	100-YEAR	460.00	640.20	648.62	642.80	648.73	0.000329	2.75	167.00	94.24	0.17
HIGGINS CK	MAINSTEM	4.668	500-YEAR	600.00	640.20	654.61	643.30	654.62	0.000017	0.70	1522.68	819.12	0.04
HIGGINS CK	MAINSTEM	4.664	10-YEAR	444.00	640.20	646.16	642.63	646.28	0.000609	2.80	158.60	51.52	0.21
HIGGINS CK	MAINSTEM	4.664	50-YEAR	485.00	640.20	647.19	642.75	647.29	0.000409	2.57	188.46	74.12	0.18
HIGGINS CK	MAINSTEM	4.664	100-YEAR	700.00	640.20	648.57	643.32	648.72	0.000447	3.06	228.66	93.98	0.19
HIGGINS CK	MAINSTEM	4.664	500-YEAR	1600.00	640.20	654.56	645.24	654.61	0.000128	1.88	1476.99	818.99	0.11
HIGGINS CK	MAINSTEM	4.659	10-YEAR	444.00	638.42	646.20	640.56	646.23	0.000108	1.42	312.22	57.64	0.09
HIGGINS CK	MAINSTEM	4.659	50-YEAR	485.00	638.42	647.22	640.66	647.25	0.000083	1.36	357.23	62.97	0.08
HIGGINS CK	MAINSTEM	4.659	100-YEAR	700.00	638.42	648.62	641.09	648.66	0.000101	1.67	418.80	71.69	0.10
HIGGINS CK	MAINSTEM	4.659	500-YEAR	1600.00	638.42	654.57	642.55	654.59	0.000054	1.39	2103.46	819.01	0.07
HIGGINS CK	MAINSTEM	4.639	10-YEAR	444.00	640.20	646.12	642.65	646.19	0.000603	2.23	198.80	51.28	0.20
HIGGINS CK	MAINSTEM	4.639	50-YEAR	485.00	640.20	647.17	642.77	647.23	0.000329	1.93	251.40	73.43	0.15
HIGGINS CK	MAINSTEM	4.639	100-YEAR	700.00	640.20	648.56	643.36	648.64	0.000303	2.18	321.21	93.92	0.15
HIGGINS CK	MAINSTEM	4.639	500-YEAR	1600.00	640.20	654.53	645.18	654.58	0.000127	1.87	1443.40	668.72	0.11
HIGGINS CK	MAINSTEM	4.638	10-YEAR	444.00	640.80	646.12	643.18	646.19	0.000518	2.13	208.19	62.57	0.18
HIGGINS CK	MAINSTEM	4.638	50-YEAR	485.00	640.80	647.17	643.27	647.22	0.000292	1.86	260.74	67.71	0.14
HIGGINS CK	MAINSTEM	4.638	100-YEAR	700.00	640.80	648.57	643.71	648.63	0.000276	2.12	330.54	79.74	0.15
HIGGINS CK	MAINSTEM	4.638	500-YEAR	1600.00	640.80	654.51	645.13	654.58	0.000115	2.04	1231.86	659.50	0.10
HIGGINS CK	MAINSTEM	4.626		Culvert									
HIGGINS CK	MAINSTEM	4.612	10-YEAR	444.00	641.80	645.34	644.06	645.64	0.002385	4.39	101.14	39.27	0.45
HIGGINS CK	MAINSTEM	4.612	50-YEAR	485.00	641.80	646.77	644.18	646.93	0.000780	3.21	151.00	45.18	0.27
HIGGINS CK	MAINSTEM	4.612	100-YEAR	700.00	641.80	648.09	644.71	648.29	0.000650	3.55	197.28	50.65	0.26
HIGGINS CK	MAINSTEM	4.612	500-YEAR	1600.00	641.80	653.09	646.48	653.23	0.000304	3.01	663.67	153.79	0.19
HIGGINS CK	MAINSTEM	4.611	10-YEAR	444.00	642.03	645.38	643.99	645.57	0.001811	3.52	126.25	49.85	0.39
HIGGINS CK	MAINSTEM	4.611	50-YEAR	485.00	642.03	646.80	644.10	646.89	0.000522	2.41	200.93	58.41	0.22
HIGGINS CK	MAINSTEM	4.611	100-YEAR	700.00	642.03	648.13	644.57	648.23	0.000392	2.54	275.53	66.55	0.20
HIGGINS CK	MAINSTEM	4.611	500-YEAR	1600.00	642.03	653.12	646.05	653.19	0.000148	2.22	817.90	173.50	0.13
HIGGINS CK	MAINSTEM	4.588	10-YEAR	454.00	641.80	645.08	645.08	645.32	0.002219	3.88	117.06	46.29	0.43
HIGGINS CK	MAINSTEM	4.588	50-YEAR	503.00	641.80	646.72	646.82	646.82	0.000578	2.52	199.76	54.61	0.23
HIGGINS CK	MAINSTEM	4.588	100-YEAR	730.00	641.80	648.07	648.18	648.25	0.000475	2.62	278.25	61.47	0.22
HIGGINS CK	MAINSTEM	4.588	500-YEAR	1666.00	641.80	653.06	653.06	653.16	0.000217	2.56	686.70	130.21	0.16
HIGGINS CK	MAINSTEM	4.569	10-YEAR	454.00	638.78	645.15	645.21	645.21	0.000251	2.09	243.78	64.19	0.16
HIGGINS CK	MAINSTEM	4.569	50-YEAR	503.00	638.78	646.74	646.78	646.78	0.000112	1.67	354.98	75.10	0.11
HIGGINS CK	MAINSTEM	4.569	100-YEAR	730.00	638.78	648.09	648.14	648.14	0.000116	1.92	462.70	84.33	0.12
HIGGINS CK	MAINSTEM	4.569	500-YEAR	1666.00	638.78	653.07	653.14	653.14	0.000087	2.29	991.21	143.79	0.11

HEC-RAS Plan: DesEmBxs070912 (Continued)

River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
HIGGINS CK	MAINSTEM	4.542	10-YEAR	454.00	639.10	645.14		645.18	0.000135	1.74	311.92	68.33	0.12
HIGGINS CK	MAINSTEM	4.542	50-YEAR	503.00	639.10	646.74		646.77	0.000069	1.45	428.47	77.18	0.09
HIGGINS CK	MAINSTEM	4.542	100-YEAR	730.00	639.10	648.09		648.13	0.000078	1.71	537.76	84.64	0.10
HIGGINS CK	MAINSTEM	4.542	500-YEAR	1666.00	639.10	653.07		653.12	0.000070	2.18	1088.96	189.79	0.10
HIGGINS CK	MAINSTEM	4.537	10-YEAR	454.00	639.10	645.07	641.02	645.17	0.000293	2.54	179.01	67.95	0.18
HIGGINS CK	MAINSTEM	4.537	50-YEAR	503.00	639.10	646.88	641.17	646.76	0.000162	2.21	227.48	76.87	0.14
HIGGINS CK	MAINSTEM	4.537	100-YEAR	730.00	639.10	648.00	641.74	648.12	0.000200	2.73	267.00	84.14	0.16
HIGGINS CK	MAINSTEM	4.537	500-YEAR	1666.00	639.10	652.94	643.68	653.11	0.000180	3.48	587.81	720.06	0.16
HIGGINS CK	MAINSTEM	4.521		Mult Open									
HIGGINS CK	MAINSTEM	4.505	10-YEAR	454.00	637.50	644.33	639.34	644.40	0.000164	2.08	218.63	75.19	0.14
HIGGINS CK	MAINSTEM	4.505	50-YEAR	503.00	637.50	646.02	639.48	646.07	0.000097	1.85	272.54	85.10	0.11
HIGGINS CK	MAINSTEM	4.505	100-YEAR	730.00	637.50	646.58	640.03	646.68	0.000165	2.51	290.46	88.39	0.15
HIGGINS CK	MAINSTEM	4.505	500-YEAR	1666.00	637.50	649.44	641.88	649.73	0.000336	4.31	409.61	154.04	0.22
HIGGINS CK	MAINSTEM	4.485	10-YEAR	454.00	637.50	644.36	638.36	644.36	0.000014	0.53	855.23	150.34	0.04
HIGGINS CK	MAINSTEM	4.485	50-YEAR	503.00	637.50	646.04	638.42	646.04	0.000008	0.45	1118.36	162.91	0.03
HIGGINS CK	MAINSTEM	4.485	100-YEAR	730.00	637.50	646.62	638.67	646.63	0.000013	0.60	1214.11	167.25	0.04
HIGGINS CK	MAINSTEM	4.485	500-YEAR	1666.00	637.50	649.87	639.50	649.58	0.000024	0.95	1803.30	267.93	0.06

HIGGINS CK MAINSTEM

HIGGINS TRIB A CUP



Legend	
WS 500-YEAR - Design EXHigg 88	(Blue line with downward triangles)
WS 500-YEAR - DesElmSlab041112	(Red line with downward triangles)
WS 100-YEAR - Design EXHigg 88	(Orange line with downward triangles)
WS 100-YEAR - DesElmSlab041112	(Purple line with downward triangles)
WS 50-YEAR - DesElmSlab041112	(Blue line with upward triangles)
WS 50-YEAR - Design EXHigg 88	(Red line with upward triangles)
WS 10-YEAR - Design EXHigg 88	(Orange line with upward triangles)
WS 10-YEAR - DesElmSlab041112	(Purple line with upward triangles)
Ground	(Black line with square markers)
Left Levee	(Pink line)
Right Levee	(Purple line)
Ground	(Black line)

4.485 4.521 4.569 4.611 4.626 4.659 4.683 4.713 4.742 4.771 4.801 4.828 4.866 4.915 4.944 4.966 4.992 5.012 5.045 5.094 5.144 5.166 5.236 5.256 5.289 5.324 5.351 5.364 5.408 5.496 5.558 5.593 5.649 5.683 5.721 5.79325* 5.8285* 5.86375* 5.899 5.950 5.972 5.9928* 6.021 6.069 6.179 6.231 1 2 3.1 3.5 3.8 4.1

Stream Distance Above Willow-Higgins Creek Confluence with Des Plaines River (ft)

DESIGN PROP. VS.
 MOD. EX, PROFILES