

8-30-2008

Ex. 277-US-425

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Stream: Williamson River

Site: 626

Date: 5/11/2004

Habitat: Pool

Flow: High

Date: 8/19/2004

Habitat: Pool

Flow: Low

(1) Level Loop Survey (BM & HP)

BM/HP	BS (ft)	HI (ft)	FS (ft)	Elev (ft)
BM	3.62	103.62		100.00
HP1			6.90	96.72
HP2			7.73	95.89
HP3			5.54	98.08
TP				
HP3	5.30	103.38		
HP2			7.50	95.88
HP1			6.66	96.72
BM			3.39	99.99

Comment:

(1) Level Loop Survey

BM/HP	BS (ft)	HI (ft)	FS (ft)	Elev (ft)
BM	4.31	104.31		100.00
HP1			7.59	96.72
HP2			8.43	95.88
HP3			6.24	98.07
TP				
HP3	6.11	104.18		
HP2			8.32	95.86
HP1			7.48	96.70
BM			4.19	99.99

Comment:

(2) Water Surface Elevation (WSE) Survey

TR	River Station		HI (ft)	FS (ft)	Rod (ft)	WSE (ft)	Ave WSE (ft)	Q (cfs)
	L/R bank (ft)	Ave (ft)						
1-L	0	0	101.12	10.34	0.00	90.78	90.78	1077
1-R	0	0	103.38	12.60	0.00	90.78	90.78	1077
2-L	50	57	101.12	10.34	0.00	90.78	90.78	1161
2-R	63	63	103.38	12.60	0.00	90.78	90.78	1161
3-L	150	125	101.12	10.33	0.00	90.79	90.79	878
3-R	100	100	103.38	12.59	0.00	90.79	90.79	878
Ave Q= 1038.6								

Note: RWSE calc's need to be modified for TR1, TR2, and TR3  
WSE slope = 0.008%

(2) Water Surface Elevation (WSE) Survey

TR	River Station		HI (ft)	FS (ft)	Rod (ft)	WSE (ft)	Ave WSE (ft)	Q (cfs)
	L/R bank (ft)	Ave (ft)						
1-L	0	0	100.66	10.43		90.23	90.23	
1-R	0	0	104.18	13.95		90.23	90.23	
2-L	50	57	100.66	10.36		90.30	90.30	469
2-R	63	63	100.66	10.36		90.30	90.30	469
3-L	150	125	101.22	10.89		90.33	90.30	458
3-R	100	100	101.22	10.95		90.27	90.27	458
Ave Q= 463.4								

Note: WSE slope = 0.056%

(3) Meter and propeller ID for Velocity Correction

Meter ID: 0068  
Propeller ID: na

Meter ID: 3602  
Propeller ID: 3b

(3) Meter and propeller ID for Velocity Correction

Meter ID: 3602  
Propeller ID: 3b







Pool HIGH TRANSECT 1  
 IOC 1100000100001000101000  
 QARD 160.0  
 QARD 200.0  
 QARD 250.0  
 QARD 300.0  
 QARD 350.0  
 QARD 379.7  
 QARD 460.9  
 QARD 500.0  
 QARD 550.0  
 QARD 600.0  
 QARD 650.0  
 QARD 700.0  
 QARD 750.0  
 QARD 800.0  
 QARD 900.0  
 QARD 998.5  
 QARD 1100.  
 QARD 1200.  
 QARD 1300.  
 QARD 1400.  
 QARD 1500.  
 QARD 1600.  
 QARD 1700.  
 QARD 1800.  
 QARD 1900.  
 QARD 2000.  
 QARD 2100.  
 QARD 2200.  
 QARD 2300.  
 QARD 2500.  
 XSEC 0.0 0.00 1.0 71.68 0.00008  
 0.0-23.0 96.2 -4.0 95.3 0.5 93.9 1.0 92.7 5.0 91.7 7.5 90.9  
 0.0 10.0 90.6 12.0 90.5 14.0 90.9 15.5 90.8 19.0 89.8 21.0 89.2  
 0.0 28.0 85.6 35.0 83.2 42.0 80.8 49.0 79.5 56.0 77.6 63.0 77.0  
 0.0 70.0 75.7 77.0 73.9 84.0 72.5 91.0 71.7 98.0 71.7105.0 71.8  
 0.0112.0 72.3119.0 73.2126.0 75.1133.0 77.8140.0 81.4147.0 84.0  
 0.0154.0 86.0161.0 86.9168.0 87.5173.0 89.8177.0 90.4180.0 90.8  
 0.0181.3 93.6182.5 94.6185.0 95.4197.0 95.4  
 NS 0.0 1.3 1.3 1.3 1.2 2.1 2.1  
 NS 0.0 2.1 2.1 2.1 2.1 0.5 2.9 0.5 9.2  
 NS 0.0 0.3 2.3 0.15 2.3 2.3 8.2 8.2 8.3  
 NS 0.0 0.3 8.2 8.2 8.2 8.2 .065 8.2 8.2  
 NS 0.0 8.2 8.2 8.2 2.8 2.3 2.3  
 NS 0.0 2.9 9.2 0.15 2.9 2.9 0.3 9.2 9.3  
 NS 0.0 1.3 1.3 1.3 1.3  
 WSL 0.0 89.87 89.95 90.03 90.11 90.20 90.25  
 WSL 0.0 90.45 90.50 90.55 90.57 90.60 90.62  
 WSL 0.0 90.65 90.67 90.73 90.77 90.83 90.87  
 WSL 0.0 90.91 90.95 90.99 91.02 91.05 91.08  
 WSL 0.0 91.11 91.13 91.16 91.18 91.20 91.25  
 CAL1 0.0 90.78 998.5  
 VEL1 0.0 0.00-0.11-0.09  
 VEL1 0.0 0.01 0.25 0.75 0.53 0.57 0.44 0.18 0.49 0.43 0.74 1.67 0.82  
 VEL1 0.0 0.49 0.43 0.46 0.51 0.58 0.55 0.69 0.31 0.10 0.08 0.01 0.00  
 VEL1 0.0  
 CAL2 0.0 90.42 460.9  
 VEL2 0.0  
 VEL2 0.0  
 VEL2 0.0  
 VEL2 0.0  
 CAL3 0.0 90.23 379.7  
 VEL3 0.0  
 VEL3 0.0  
 VEL3 0.0  
 VEL3 0.0  
 ENDJ

Pool HIGH TRANSECT 2  
 IOC 1100000100001000101000  
 QARD 160.0  
 QARD 200.0  
 QARD 250.0  
 QARD 300.0  
 QARD 350.0  
 QARD 379.7  
 QARD 460.9  
 QARD 500.0  
 QARD 550.0  
 QARD 600.0  
 QARD 650.0  
 QARD 700.0  
 QARD 750.0  
 QARD 800.0  
 QARD 900.0  
 QARD 998.5  
 QARD 1100.  
 QARD 1200.  
 QARD 1300.  
 QARD 1400.  
 QARD 1500.  
 QARD 1600.  
 QARD 1700.  
 QARD 1800.  
 QARD 1900.  
 QARD 2000.  
 QARD 2100.  
 QARD 2200.  
 QARD 2300.  
 QARD 2500.  
 XSEC 0.0 0.00 1.0 71.68 0.00008  
 0.0-23.0 95.6 -7.0 95.4 -3.0 94.3 1.0 93.2 5.0 92.2 8.0 91.5  
 0.0 9.5 90.8 10.5 89.7 16.0 88.9 23.0 87.4 30.0 84.7 37.0 87.7  
 0.0 44.0 85.9 51.0 86.4 58.0 82.0 65.0 74.7 72.0 71.8 79.0 70.6  
 0.0 86.0 68.7 93.0 67.6100.0 67.6107.0 68.3114.0 70.3121.0 72.8  
 0.0128.0 74.6135.0 77.4142.0 80.4149.0 85.2156.0 89.2157.0 90.2  
 0.0162.1 90.8167.3 91.5169.8 91.4171.7 92.6173.8 91.9176.8 92.1  
 0.0180.0 92.5181.5 93.7182.3 94.4183.3 94.3195.3 95.8210.3 96.0  
 NS 0.0 1.3 1.3 1.3 1.3 1.3 1.3  
 NS 0.0 1.2 9.2 9.2 2.9 8.2 7.8  
 NS 0.0 8.2 8.2 8.2 0.25 8.2 8.3 8.3  
 NS 0.0 .083 8.3 8.3 8.3 8.3 8.3 8.3  
 NS 0.0 8.3 3.2 3.2 3.2 2.3 2.9  
 NS 0.0 1.3 1.3 1.3 1.3 1.3 1.3  
 NS 0.0 1.3 1.3 1.3 1.3 1.2 1.2  
 WSL 0.0 89.88 89.95 90.04 90.11 90.20 90.25  
 WSL 0.0 90.46 90.50 90.55 90.58 90.60 90.63  
 WSL 0.0 90.65 90.68 90.73 90.77 90.83 90.88  
 WSL 0.0 90.92 90.95 90.99 91.02 91.05 91.08  
 WSL 0.0 91.11 91.14 91.16 91.19 91.21 91.25  
 CAL1 0.0 90.78 998.5  
 VEL1 0.0 0.00 0.05-0.20-0.11 0.68 0.70  
 VEL1 0.0 0.95 0.82 0.53 0.22 0.54 1.04 1.38 0.90 0.81 0.63 0.31 0.49  
 VEL1 0.0 0.36 0.30 0.19 0.20-0.11-0.03 0.00  
 VEL1 0.0  
 CAL2 0.0 90.43 460.9  
 VEL2 0.0  
 VEL2 0.0  
 VEL2 0.0  
 VEL2 0.0  
 CAL3 0.0 90.30 379.7  
 VEL3 0.0  
 VEL3 0.0  
 VEL3 0.0  
 VEL3 0.0  
 ENDJ

Pool HIGH

TRANSECT 3

IOC 1100000100001000101000

QARD 160.0  
 QARD 200.0  
 QARD 250.0  
 QARD 300.0  
 QARD 350.0  
 QARD 379.7  
 QARD 460.9  
 QARD 500.0  
 QARD 550.0  
 QARD 600.0  
 QARD 650.0  
 QARD 700.0  
 QARD 750.0  
 QARD 800.0  
 QARD 900.0  
 QARD 998.5  
 QARD 1100.  
 QARD 1200.  
 QARD 1300.  
 QARD 1400.  
 QARD 1500.  
 QARD 1600.  
 QARD 1700.  
 QARD 1800.  
 QARD 1900.  
 QARD 2000.  
 QARD 2100.  
 QARD 2200.  
 QARD 2300.  
 QARD 2500.

XSEC 0.0 0.00 1.0 76.69 0.00008  
 0.0-19.0 96.7 -3.0 96.4 0.0 95.4 1.0 94.1 2.3 92.9 3.5 92.2  
 0.0 4.7 92.4 6.0 91.9 6.4 90.4 6.9 90.4 8.0 90.3 11.0 88.9  
 0.0 18.0 85.7 25.0 84.4 32.0 82.6 39.0 81.4 46.0 80.4 53.0 79.3  
 0.0 60.0 78.5 67.0 77.3 74.0 76.7 81.0 85.3 88.0 86.4 95.0 84.3  
 0.0102.0 85.3109.0 87.2111.0 90.0118.0 88.7125.0 88.3132.0 88.6  
 0.0136.5 89.3137.0 90.0140.0 90.0141.4 90.2142.4 91.5143.8 92.1  
 0.0144.8 92.4152.8 96.7164.8 98.7174.8 99.9  
 NS 0.0 1.3 1.3 3.1 3.1 3.1 1.3  
 NS 0.0 1.3 1.3 2.9 2.9 9.2 9.2  
 NS 0.0 9.2 8.2 8.2 8.7 8.7 8.7  
 NS 0.0 8.7 8.7 8.7 8.7 8.7 8.7  
 NS 0.0 8.7 8.7 8.2 8.2 7.6 8.9  
 NS 0.0 8.2 8.2 8.2 2.8 1.3 1.3  
 NS 0.0 1.3 1.3 1.3 1.3  
 WSL 0.0 89.91 89.98 90.07 90.14 90.23 90.28  
 WSL 0.0 90.48 90.53 90.58 90.60 90.62 90.65  
 WSL 0.0 90.67 90.70 90.75 90.79 90.85 90.89  
 WSL 0.0 90.93 90.96 90.99 91.02 91.05 91.08  
 WSL 0.0 91.11 91.14 91.16 91.19 91.21 91.25  
 CAL1 0.0 90.79 998.5  
 VEL1 0.0 0.00-0.27-0.14  
 VEL1 0.0-0.21 0.02 0.37 0.33 0.70 1.08 1.26 1.93 1.01 2.21 2.31 1.38  
 VEL1 0.0 1.36 1.11 0.61 0.53 0.76-0.09 0.49 0.60 0.60 0.22  
 VEL1 0.0  
 CAL2 0.0 90.44 460.9  
 VEL2 0.0  
 VEL2 0.0  
 VEL2 0.0  
 VEL2 0.0  
 CAL3 0.0 90.31 379.7  
 VEL3 0.0  
 VEL3 0.0  
 VEL3 0.0  
 VEL3 0.0  
 ENDJ



Stream: Williamson River  
 Site: 626  
 Date: 5/11/2004  
 Habitat: Run

Flow: High

BM/HP (ft)	BS (ft)	HI (ft)	FS (ft)	Elev (ft)
BM	4.50	104.50		100.00
HP1			5.26	99.24
HP2			4.84	99.66
HP3			4.62	99.88
TP				
HP3	4.39	104.27		
HP2			4.60	99.67
HP1			5.01	99.26
BM			4.26	100.01

Comment:

Date: 6/29/2004  
 Habitat: Run

Flow: Mid

BM/HP (ft)	BS (ft)	HI (ft)	FS (ft)	Elev (ft)
BM	4.50	104.50		100.00
HP1			5.26	99.24
HP2			4.85	99.65
HP3			4.63	99.87
TP				
HP3	4.74	104.61		
HP2			5.96	98.65
HP1			5.37	99.24
BM			4.61	100.00

Comment: Addit pts surveyed d/s and u/s

Date: 8/19/2004  
 Habitat: Run

Flow: Low

BM/HP (ft)	BS (ft)	HI (ft)	FS (ft)	Elev (ft)
BM	4.68	104.68		100.00
HP1			5.43	99.25
HP2			5.03	99.65
HP3			4.81	99.87
TP				
HP3	4.71	104.58		
HP2			4.93	99.65
HP1			5.33	99.25
BM			4.58	100.00

Comment:

(2) Water Surface Elevation (WSE) Survey

TR	River Station		HI (ft)	FS (ft)	Rod (ft)	WSE (ft)	Ave WSE (ft)	Q (cfs)
	L/R bank (ft)	Ave (ft)						
1-L	0	0	104.27	8.48	0.00	95.79	95.79	983.5
1-R	0	0		8.49	0.00	95.78		
2-L	163	163	104.27	8.42	0.00	95.85	95.86	978.1
2-R				8.40	0.00	95.87		
3-L	276	276	104.27	8.34	0.00	95.93	95.92	1029.4
3-R				8.36	0.00	95.91		

Note: TR2 LWSE surveyed ~20 ft d/s of TR, HI Assumed.  
 WSE slope = 0.049%

Note: Three WSE's measured for TR1, TR2  
 WSE slope = 0.025%

Note: 150' u/s of TR3 FS=9.40 (HI=104.56)  
 WSE slope = 0.024%

(3) Meter and propeller ID for Velocity Correction

Meter ID: 0068  
 Propeller ID: NA

(3) Meter and propeller ID for Velocity Correction

Meter ID: 0068  
 Propeller ID: na

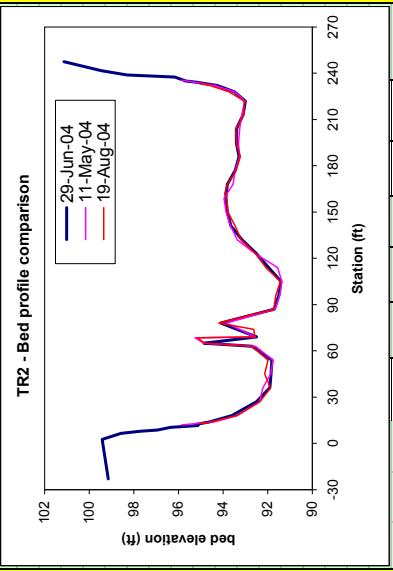
(3) Meter and propeller ID for Velocity Correction

Meter ID: 3602  
 Propeller ID: 3b

1



Stream: Williamson Riv	11-May-04										29-Jun-04										19-Aug-04									
	Sta (ft)	FS (ft)	Ground (ft)	Depth (ft)	V <sub>0.2064</sub> (ft/s)	V <sub>0.8</sub> (ft/s)	q (cfs)	substrate	Sta (ft)	FS (ft)	Ground (ft)	Depth (ft)	V <sub>0.2064</sub> (ft/s)	V <sub>0.8</sub> (ft/s)	q (cfs)	substrate	Sta (ft)	FS (ft)	Ground (ft)	Depth (ft)	V <sub>0.2064</sub> (ft/s)	V <sub>0.8</sub> (ft/s)	q (cfs)	substrate						
	RWP 1.0	12.0	95.86	0.00	0.00	0.00	0.00	-23.0	5.46	99.15	0.00	0.00	0.00	0.00	0.00	1.3														
	RWE	14.0	94.41	1.45	0.63	0.75	3.26	1.0	5.20	99.41	0.60	0.54	0.65	1.07	8.2	1.3														
		18.0	93.36	2.50	0.81	0.95	15.44	6.6	5.19	99.42	1.60	0.30	0.38	3.99	2.9	1.3														
		27.0	92.36	3.50	1.04	1.13	1.26	8.0	6.89	97.72	3.30	1.16	1.04	1.26	38.03	6.7														
		36.0	92.21	3.65	1.13	1.45	1.50	8.6	7.66	96.95	3.40	0.95	0.96	1.11	34.02	5.6														
		45.0	91.86	4.00	1.45	1.54	1.73	10.4	8.26	96.35	3.50	1.13	1.04	1.26	38.03	6.5														
		54.0	91.76	4.10	1.18	1.09	1.32	11.7	9.49	95.12	3.30	0.87	0.87	0.53	9.64	8.4														
		63.0	92.56	3.30	0.03	0.03	48.66	12.5	95.21	95.21	0.00	0.00	0.00	0.00	0.00	8.2														
		65.0	94.86	1.00	0.42	0.52	1.43	14.0	94.61	94.61	0.60	0.60	0.54	0.65	1.07	8.2														
		68.5	95.26	0.60	1.93	2.22	2.67	18.0	93.61	93.61	1.60	0.30	0.38	3.99	2.9	8.2														
		69.0	92.56	3.30	0.15	2.25	1.40	27.0	92.51	92.51	2.70	0.90	0.71	0.94	22.93	5.4														
		78.0	93.86	2.00	1.51	1.75	31.46	36.0	91.91	91.91	3.30	1.16	1.04	1.26	38.03	6.7														
		87.0	91.66	4.20	1.49	2.24	2.15	45.0	91.86	91.86	3.35	1.13	1.04	1.26	38.03	6.5														
		96.0	91.46	4.40	1.79	2.33	2.37	54.0	91.81	91.81	3.40	0.95	0.96	1.11	34.02	5.6														
		105.0	91.36	4.50	1.53	2.17	2.13	63.0	92.71	92.71	2.50	0.22	-0.10	0.07	0.99	8.4														
		114.0	91.56	4.30	1.00	1.78	1.61	65.0	94.86	94.86	0.35	0.12	0.18	0.19	8.3	8.3														
		123.0	92.56	3.30	1.13	1.45	1.50	69.0	92.51	92.51	2.70	0.93	0.45	0.82	14.33	8.3														
		132.0	93.36	2.50	1.68	1.94	43.67	78.0	94.11	94.11	1.10	0.71	0.84	8.31	8.7	8.3														
		141.0	93.66	2.20	1.24	1.44	28.50	87.0	91.71	91.71	3.30	1.87	1.52	1.96	61.66	5.4														
		150.0	93.86	2.00	1.49	1.72	31.05	96.0	91.51	91.51	3.70	1.83	1.55	1.95	65.00	5.4														
		159.0	93.96	1.90	1.49	1.72	29.49	105.0	91.41	91.41	3.80	1.58	1.29	1.66	56.83	6.5														
		168.0	93.56	2.30	1.05	1.22	25.28	114.0	91.96	91.96	3.25	1.39	0.61	1.17	34.18	7.6														
		177.0	93.46	2.40	1.02	1.19	25.63	123.0	92.51	92.51	2.70	0.85	0.45	0.77	18.77	6.7														
		186.0	93.26	2.60	0.54	1.19	1.01	132.0	93.16	93.16	2.05	0.79	0.61	0.93	17.11	7.6														
		195.0	93.31	2.55	1.10	1.58	1.55	141.0	93.66	93.66	1.55	0.61	0.73	10.13	7.6	7.6														
		204.0	93.26	2.60	1.00	1.49	1.44	150.0	93.81	93.81	1.40	0.93	1.08	13.65	7.6	7.6														
		213.0	93.16	2.70	0.34	1.52	1.09	159.0	93.89	93.89	1.32	0.14	0.21	2.46	7.6	7.6														
		222.0	93.01	2.85	1.49	0.05	0.90	168.0	93.81	93.81	1.40	0.53	0.64	8.00	7.6	7.6														
		228.0	93.46	2.40	0.11	0.17	2.03	177.0	93.46	93.46	1.75	0.15	0.22	3.45	7.6	7.6														
		232.0	94.36	1.50	-0.07	-0.11	-0.62	186.0	93.29	93.29	1.92	0.34	0.43	7.43	7.6	7.6														
		LWE 235.6	95.86	0.00	0.00	0.00	0.00	195.0	93.41	93.41	1.80	0.15	0.22	3.55	6.7	6.7														
		LWP 241.6						204.0	93.41	93.41	1.80	0.43	0.53	8.57	6.7	6.7														
								213.0	93.11	93.11	2.10	0.29	0.37	7.07	6.7	6.7														
								222.0	93.01	93.01	2.20	0.28	0.36	6.01	6.2	6.2														
								228.0	93.49	93.49	1.72	-0.04	-0.06	-0.54	2.7	2.7														
								232.0	94.26	94.26	0.95	0.00	0.01	0.00	2.1	2.1														
								LWE 234.2	95.21	95.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
								235.0	8.94	95.67																				
								237.5	8.45	96.16																				
								239.0	6.30	98.31																				
								LWP 241.6	5.17	99.44																				
								247.6	3.47	101.14																				





RIFFLE

HIGH

TRANSECT 1

IOC 110110000001000101000

QARD 160.0  
 QARD 200.0  
 QARD 250.0  
 QARD 300.0  
 QARD 350.0  
 QARD 379.7  
 QARD 460.9  
 QARD 500.0  
 QARD 550.0  
 QARD 600.0  
 QARD 650.0  
 QARD 700.0  
 QARD 750.0  
 QARD 800.0  
 QARD 900.0  
 QARD 998.5  
 QARD 1100.  
 QARD 1200.  
 QARD 1300.  
 QARD 1400.  
 QARD 1500.  
 QARD 1600.  
 QARD 1700.  
 QARD 1800.  
 QARD 1900.  
 QARD 2000.  
 QARD 2100.  
 QARD 2200.  
 QARD 2300.  
 QARD 2500.

XSEC 0.0 0.00 1.0 88.59 0.00049  
 0.0-27.0 99.4 1.0 99.1 4.4 98.6 6.9 97.7 9.1 96.3 9.5 95.4  
 0.0 10.7 95.2 11.3 95.8 13.5 94.6 15.0 93.4 19.0 92.6 23.0 91.2  
 0.0 31.0 90.8 39.0 89.5 47.0 88.8 55.0 88.6 63.0 88.8 71.0 89.2  
 0.0 79.0 89.7 87.0 91.2 95.0 93.4 96.5 94.5 99.0 94.4 99.5 93.3  
 0.0103.0 92.3111.0 92.9119.0 93.4127.0 93.9135.0 94.2143.0 93.7  
 0.0151.0 93.7159.0 93.8167.0 94.2174.0 94.4175.0 95.1181.5 94.9  
 0.0182.0 94.4187.5 94.1190.5 95.7192.0 95.8192.1 96.2193.8 96.0  
 0.0196.3 95.8197.3 97.5198.3 98.2202.3 98.3230.3100.2  
 NS 0.0 1.3 1.3 1.3 1.3 1.3 3.1  
 NS 0.0 3.1 1.2 0.5 8.2 8.2 0.2 2.9 5.6  
 NS 0.0 7.6 6.2 .12 8.7 6.7 6.7 6.7  
 NS 0.0 7.6 8.7 8.7 8.9 .09 8.9 .095 8.9  
 NS 0.0 7.9 7.6 7.6 6.7 6.7 6.7  
 NS 0.0 7.6 7.6 7.6 7.6 8.7 8.7  
 NS 0.0 7.8 7.6 2.7 1.2 1.2 1.2  
 NS 0.0 1.2 1.2 1.3 1.3 1.3  
 CAL1 0.0 95.79 998.5  
 VEL1 0.0 0.00 0.01 0.11 0.24 0.97  
 VEL1 0.0 1.62 1.93 0.67 3.01 2.78 2.59 2.35 0.71 0.67 0.81 0.23 0.39  
 VEL1 0.0 0.68 0.63 0.54 0.49 1.26 1.31 1.16 0.45 0.55 1.29 1.06 0.76  
 VEL1 0.0 0.53 0.30 0.14 0.00  
 CAL2 0.0 95.16 460.9  
 VEL2 0.0  
 VEL2 0.0  
 VEL2 0.0  
 VEL2 0.0  
 CAL3 0.0 94.99 379.7  
 VEL3 0.0  
 VEL3 0.0  
 VEL3 0.0  
 VEL3 0.0  
 ENDJ

RIFFLE

HIGH

TRANSECT 2

IOC 110110000001000101000

QARD 160.0  
 QARD 200.0  
 QARD 250.0  
 QARD 300.0  
 QARD 350.0  
 QARD 379.7  
 QARD 460.9  
 QARD 500.0  
 QARD 550.0  
 QARD 600.0  
 QARD 650.0  
 QARD 700.0  
 QARD 750.0  
 QARD 800.0  
 QARD 900.0  
 QARD 998.5  
 QARD 1100.  
 QARD 1200.  
 QARD 1300.  
 QARD 1400.  
 QARD 1500.  
 QARD 1600.  
 QARD 1700.  
 QARD 1800.  
 QARD 1900.  
 QARD 2000.  
 QARD 2100.  
 QARD 2200.  
 QARD 2300.  
 QARD 2500.

XSEC 0.0 0.00 1.0 91.36 0.00049  
 0.0-23.0 99.2 1.0 99.4 2.6 99.4 6.6 98.6 8.0 97.7 8.6 96.9  
 0.0 10.4 96.3 11.7 95.1 12.0 95.9 14.0 94.4 18.0 93.4 27.0 92.4  
 0.0 36.0 92.2 45.0 91.9 54.0 91.8 63.0 92.6 65.0 94.9 68.5 95.3  
 0.0 69.0 92.6 78.0 93.9 87.0 91.7 96.0 91.5105.0 91.4114.0 91.6  
 0.0123.0 92.6132.0 93.4141.0 93.7150.0 93.9159.0 94.0168.0 93.6  
 0.0177.0 93.5186.0 93.3195.0 93.3204.0 93.3213.0 93.2222.0 93.0  
 0.0228.0 93.5232.0 94.4235.6 95.9237.5 96.2239.0 98.3241.6 99.4  
 0.0247.6101.1  
 NS 0.0 1.3 1.3 1.3 1.3 1.3 1.3  
 NS 0.0 1.2 8.2 8.2 8.2 2.9 5.4  
 NS 0.0 6.7 6.5 5.6 8.4 8.3 .022 8.3  
 NS 0.0 8.3 8.7 5.4 5.4 6.5 7.6  
 NS 0.0 6.7 7.6 7.6 7.6 7.6 7.6  
 NS 0.0 7.6 7.6 6.7 6.7 6.7 6.2  
 NS 0.0 2.7 2.1 1.2 1.2 1.3 1.3  
 NS 0.0 1.3  
 CAL1 0.0 95.86 998.5  
 VEL1 0.0 0.00 0.75 0.95 1.26  
 VEL1 0.0 1.50 1.73 1.32 0.53 0.52 2.22 1.40 1.75 2.15 2.37 2.13 1.61  
 VEL1 0.0 1.50 1.94 1.44 1.72 1.72 1.22 1.19 1.01 1.55 1.44 1.09 0.90  
 VEL1 0.0 0.17-0.11 0.00  
 CAL2 0.0 95.21 460.9  
 VEL2 0.0  
 VEL2 0.0  
 VEL2 0.0  
 VEL2 0.0  
 CAL3 0.0 95.04 379.7  
 VEL3 0.0  
 VEL3 0.0  
 VEL3 0.0  
 VEL3 0.0  
 ENDJ

IOC 1101100000001000101000

QARD 160.0  
 QARD 200.0  
 QARD 250.0  
 QARD 300.0  
 QARD 350.0  
 QARD 379.7  
 QARD 460.9  
 QARD 500.0  
 QARD 550.0  
 QARD 600.0  
 QARD 650.0  
 QARD 700.0  
 QARD 750.0  
 QARD 800.0  
 QARD 900.0  
 QARD 998.5  
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 QARD 1700.  
 QARD 1800.  
 QARD 1900.  
 QARD 2000.  
 QARD 2100.  
 QARD 2200.  
 QARD 2300.  
 QARD 2500.

XSEC 0.0 0.00 1.0 92.00 0.00049  
 0.0-45.0 99.4 1.0 99.6 8.4 99.4 9.0 98.0 10.5 95.7 12.8 95.9  
 0.0 15.5 95.6 17.3 95.6 18.0 96.1 18.5 95.1 25.0 92.7 33.0 91.1  
 0.0 41.0 91.0 49.0 90.7 57.0 90.7 65.0 91.1 73.0 91.2 81.0 91.7  
 0.0 89.0 92.5 97.0 92.4105.0 91.8113.0 91.5121.0 90.6129.0 90.7  
 0.0137.0 90.9145.0 90.8153.0 90.5161.0 90.2169.0 90.6177.0 90.9  
 0.0185.0 91.9193.0 93.0201.4 94.5202.9 95.9203.7 96.6206.9 96.9  
 0.0211.9 98.6216.9 99.5231.9101.2237.4105.1  
 NS 0.0 1.3 1.3 1.3 3.1 8.3 8.8  
 NS 0.0 8.1 .05 1.8 .05 1.3 .05 8.2 8.2 8.2  
 NS 0.0 8.2 2.1 8.9 8.9 8.2 3.2  
 NS 0.0 4.5 5.4 5.4 5.4 7.6 7.6  
 NS 0.0 6.7 6.7 6.7 7.6 6.7 6.7  
 NS 0.0 6.7 9.2 2.9 1.3 1.3 1.3  
 NS 0.0 1.3 1.3 5.1 5.1  
 CAL1 0.0 95.92 998.5  
 VEL1 0.0 0.00 0.37 0.08 0.35 0.66 0.62  
 VEL1 0.0 0.65 0.56 0.72 0.59 0.70 0.91 1.13 1.38 1.33 1.47 1.41 1.62  
 VEL1 0.0 1.78 1.90 2.23 2.09 2.57 1.76 0.50-0.08-0.02 0.00  
 VEL1 0.0  
 CAL2 0.0 95.23 460.9  
 VEL2 0.0  
 VEL2 0.0  
 VEL2 0.0  
 VEL2 0.0  
 CAL3 0.0 95.06 379.7  
 VEL3 0.0  
 VEL3 0.0  
 VEL3 0.0  
 VEL3 0.0  
 ENDJ

Stream: Williamson River  
 Site: 626  
 Date: 5/11/2004  
 Habitat: Riffle

Flow: High

(1) Level Loop Survey (BM & HP)

BM/HP (ft)	BS (ft)	HI (ft)	FS (ft)	Elev (ft)
BM	7.82	107.82		100.00
HP1			5.09	102.73
HP2			6.15	101.67
HP3			4.96	102.86
TP				
HP3	5.23	108.09		
HP2			6.40	101.69
HP1			5.34	102.75
BM			8.08	100.01

Comment: Addit survey pt d/s of TR1

Date: 6/29/2004  
 Habitat: Riffle

Flow: Mid

(1) Level Loop Survey

BM/HP (ft)	BS (ft)	HI (ft)	FS (ft)	Elev (ft)
BM	9.21	109.21		100.00
HP1			6.47	102.74
HP2			7.52	101.69
HP3			6.36	102.85
TP				
HP3	6.48	109.33		
HP2			7.64	101.69
HP1			6.60	102.73
BM			9.33	100.00

Comment: Addit survey pt d/s of TR1

Date: 8/19/2004  
 Habitat: Riffle

Flow: Low

(1) Level Loop Survey

BM/HP (ft)	BS (ft)	HI (ft)	FS (ft)	Elev (ft)
BM	7.95	107.95		100.00
HP1			5.21	102.74
HP2			6.26	101.69
HP3			5.11	102.84
TP				
HP3	5.33	108.17		
HP2			6.50	101.67
HP1			5.45	102.72
BM			8.19	99.98

Comment:

(2) Water Surface Elevation (WSE) Survey

TR	River Station		HI (ft)	FS (ft)	Rod (ft)	WSE (ft)	Ave	
	L/R bank (ft)	Ave (ft)					WSE (ft)	Q (cfs)
1-L	0	0	108.09	14.21	0.00	93.88	93.87	1019.1
1-R	0	0	108.09	14.24	0.00	93.85	93.85	
2-L	80	132	108.09	14.07	0.00	94.02	94.01	993.2
2-R	183	145	108.09	14.10	0.00	93.99	93.99	
3-L	145	200	108.09	14.01	0.00	94.08	94.11	867.3
3-R	254	254	108.09	13.96	0.00	94.13	94.13	

Note: Additional WSE's surveyed  
 WSE slope = 0.120%

Ave Q= 959.9

(3) Meter and propeller ID for Velocity Correction

Meter ID: 4099  
 Propeller ID: 1a

(2) Water Surface Elevation (WSE) Survey

TR	River Station		HI (ft)	FS (ft)	Rod (ft)	WSE (ft)	Ave	
	L/R bank (ft)	Ave (ft)					WSE (ft)	Q (cfs)
1-L	0	0	109.33	15.66	0.00	93.67	93.54	
1-R	0	0	109.33	15.93	0.00	93.40	93.40	
2-L	80	132	109.33	15.58	0.00	93.75	93.72	440.6
2-R	183	145	109.33	15.64	0.00	93.69	93.69	
3-L	145	200	109.33	15.53	0.00	93.80	93.79	
3-R	254	254	109.33	15.55	0.00	93.78	93.78	

Note: Additional WSE's surveyed  
 WSE slope = 0.128%

Ave Q= 440.6

(3) Meter and propeller ID for Velocity Correction

Meter ID: 3602  
 Propeller ID: 3a

(2) Water Surface Elevation (WSE) Survey

TR	River Station		HI (ft)	FS (ft)	Rod (ft)	WSE (ft)	Ave	
	L/R bank (ft)	Ave (ft)					WSE (ft)	Q (cfs)
1-L	0	0	108.20	14.69	0.00	93.51	93.38	446
1-R	0	0	108.17	14.92	0.00	93.25	93.25	
2-L	80	132	108.20	14.53	0.00	93.67	93.63	401.5
2-R	183	145	108.20	14.62	0.00	93.58	93.58	
3-L	145	200	108.20	14.53	0.00	93.67	93.67	374.7
3-R	254	254	108.20	14.54	0.00	93.66	93.66	

Note: WSE slope = 0.143%

Ave Q= 407.3

(3) Meter and propeller ID for Velocity Correction

Meter ID: 4099  
 Propeller ID: 1a









RIFFLE HIGH TRANSECT 1  
 IOC 1101100000001000101000  
 QARD 160.0  
 QARD 200.0  
 QARD 250.0  
 QARD 300.0  
 QARD 350.0  
 QARD 379.7  
 QARD 460.9  
 QARD 500.0  
 QARD 550.0  
 QARD 600.0  
 QARD 650.0  
 QARD 700.0  
 QARD 750.0  
 QARD 800.0  
 QARD 900.0  
 QARD 998.5  
 QARD 1100.  
 QARD 1200.  
 QARD 1300.  
 QARD 1400.  
 QARD 1500.  
 QARD 1600.  
 QARD 1700.  
 QARD 1800.  
 QARD 1900.  
 QARD 2000.  
 QARD 2100.  
 QARD 2200.  
 QARD 2300.  
 QARD 2500.  
 XSEC 0.0 0.00 1.0 91.52 0.00120  
 0.0-11.0103.1 -4.0 99.1 1.0 95.9 3.0 94.9 4.4 94.4 6.3 94.0  
 0.0 6.9 93.9 8.0 93.0 15.0 92.2 30.0 91.6 45.0 91.5 60.0 91.5  
 0.0 75.0 91.6 82.0 92.1 90.0 92.5105.0 92.5120.0 92.5135.0 92.3  
 0.0150.0 92.2165.0 92.0180.0 92.1195.0 92.1210.0 92.4217.0 92.5  
 0.0225.0 92.5233.0 92.5240.0 92.5250.0 92.8260.0 92.8270.0 93.2  
 0.0272.5 93.4273.5 93.7274.5 93.3275.5 93.2280.0 93.2295.0 92.9  
 0.0310.0 92.4320.0 92.1330.0 92.7333.5 92.8334.5 93.6336.5 93.9  
 0.0337.0 93.9339.0 93.9339.5 93.5339.6 93.9341.7 94.2344.7 95.1  
 0.0347.2 97.0350.2 98.1358.2100.9374.2101.3  
 NS 0.0 1.3 1.3 1.3 1.3 1.3 1.3  
 NS 0.0 1.2 4.8 4.5 5.9 5.9 5.9  
 NS 0.0 5.9 9.5 5.9 5.9 5.9 5.9  
 NS 0.0 5.9 5.9 5.4 5.6 5.6 5.4  
 NS 0.0 .05 5.9 5.4 5.9 5.4 5.9 5.4  
 NS 0.0 1.1 .05 1.1 .05 1.1 5.4 5.4 5.4  
 NS 0.0 5.6 6.9 6.9 9.5 9.2 2.1  
 NS 0.0 2.1 2.1 1.2 1.2 1.2 1.3  
 NS 0.0 1.3 1.3 1.3 1.3  
 CAL1 0.0 93.87 998.5  
 VEL1 0.0 0.00 0.52 1.82 1.65 1.71 1.67  
 VEL1 0.0 1.78 1.67 1.81 2.49 2.41 2.30 2.70 2.83 2.52 2.40 2.19 2.05  
 VEL1 0.0 0.85 2.18 2.14 2.22 1.20 2.21 2.34 0.01 0.01 1.41 1.50 1.78  
 VEL1 0.0 1.89 2.08 2.32 0.68 0.00 0.01 0.00 0.00 0.11 0.00  
 VEL1 0.0  
 CAL2 0.0 93.54 460.9  
 VEL2 0.0  
 VEL2 0.0  
 VEL2 0.0  
 VEL2 0.0  
 VEL2 0.0  
 CAL3 0.0 93.38 379.7  
 VEL3 0.0  
 VEL3 0.0  
 VEL3 0.0  
 VEL3 0.0  
 ENDJ

RIFFLE HIGH TRANSECT 2  
 IOC 1101100000001000101000  
 QARD 160.0  
 QARD 200.0  
 QARD 250.0  
 QARD 300.0  
 QARD 350.0  
 QARD 379.7  
 QARD 460.9  
 QARD 500.0  
 QARD 550.0  
 QARD 600.0  
 QARD 650.0  
 QARD 700.0  
 QARD 750.0  
 QARD 800.0  
 QARD 900.0  
 QARD 998.5  
 QARD 1100.  
 QARD 1200.  
 QARD 1300.  
 QARD 1400.  
 QARD 1500.  
 QARD 1600.  
 QARD 1700.  
 QARD 1800.  
 QARD 1900.  
 QARD 2000.  
 QARD 2100.  
 QARD 2200.  
 QARD 2300.  
 QARD 2500.  
 XSEC 0.0 0.00 1.0 91.52 0.00120  
 0.0-25.0100.2-10.0 99.4 -1.0 98.1 1.0 96.8 2.4 96.2 5.0 95.6  
 0.0 10.0 95.5 13.0 95.2 16.0 94.8 18.6 94.0 19.6 93.6 20.6 93.4  
 0.0 21.6 93.2 22.6 93.1 23.6 93.1 24.6 93.1 30.0 92.9 42.0 92.4  
 0.0 54.0 92.1 66.0 92.0 78.0 91.8 90.0 92.0102.0 91.7114.0 91.4  
 0.0126.0 91.6138.0 91.7150.0 91.8162.0 91.9174.0 92.0186.0 92.4  
 0.0198.0 92.5210.0 92.5222.0 92.5234.0 92.5246.0 92.6258.0 92.4  
 0.0270.0 92.1282.0 92.1294.0 92.4297.0 92.8298.5 92.9301.2 94.0  
 0.0302.9 94.7303.7 94.1305.6 94.7307.4 95.4309.9 96.8312.4 97.5  
 0.0324.4101.3338.4101.9  
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 NS 0.0 1.2 1.2 1.2 1.2 1.2 2.9  
 NS 0.0 2.9 2.9 2.9 2.9 4.5 5.9  
 NS 0.0 5.4 5.9 5.9 5.4 5.4 5.9  
 NS 0.0 5.4 6.5 6.5 6.5 5.6 5.6  
 NS 0.0 5.6 5.4 5.4 5.4 5.4 5.9  
 NS 0.0 5.9 5.9 5.9 2.9 2.9 1.1  
 NS 0.0 1.2 2.1 2.1 1.2 1.2 1.2  
 NS 0.0 1.3 1.3  
 CAL1 0.0 94.01 998.5  
 VEL1 0.0 0.00 0.01 0.01  
 VEL1 0.0 0.01 0.01 0.21 0.97 2.13 2.05 1.95 2.21 1.77 2.05 2.19 1.96  
 VEL1 0.0 2.20 2.19 2.00 2.24 2.05 2.51 2.13 1.77 1.61 1.80 1.66 1.73  
 VEL1 0.0 1.43 1.35 1.43 0.85 0.11 0.00  
 VEL1 0.0  
 CAL2 0.0 93.72 460.9  
 VEL2 0.0  
 VEL2 0.0  
 VEL2 0.0  
 VEL2 0.0  
 VEL2 0.0  
 CAL3 0.0 93.63 379.7  
 VEL3 0.0  
 VEL3 0.0  
 VEL3 0.0  
 VEL3 0.0  
 VEL3 0.0  
 ENDJ

IOC 1101100000001000101000

QARD 160.0  
 QARD 200.0  
 QARD 250.0  
 QARD 300.0  
 QARD 350.0  
 QARD 379.7  
 QARD 460.9  
 QARD 500.0  
 QARD 550.0  
 QARD 600.0  
 QARD 650.0  
 QARD 700.0  
 QARD 750.0  
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 QARD 900.0  
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 QARD 1700.  
 QARD 1800.  
 QARD 1900.  
 QARD 2000.  
 QARD 2100.  
 QARD 2200.  
 QARD 2300.  
 QARD 2500.

XSEC 0.0 0.00 1.0 91.52 0.00120  
 0.0-45.0102.5-20.0102.3 1.0 95.5 3.5 94.6 4.5 94.7 6.5 94.6  
 0.0 6.9 94.1 8.3 93.8 9.0 93.1 11.0 92.8 19.0 92.3 29.0 92.0  
 0.0 39.0 91.8 49.0 91.4 59.0 91.3 69.0 91.4 79.0 91.2 89.0 91.0  
 0.0 99.0 90.9109.0 90.8119.0 90.6129.0 90.1139.0 89.7149.0 89.9  
 0.0159.0 90.0169.0 90.4179.0 90.9189.0 91.4199.0 91.8209.0 92.1  
 0.0219.0 91.8229.0 92.0239.0 92.1243.0 92.9245.0 93.5246.8 94.1  
 0.0247.1 94.5248.2 94.7249.3 95.2251.8 96.8254.3 97.9263.3101.1  
 0.0269.3101.6

NS 0.0 1.3 1.3 1.3 1.3 1.3 1.3  
 NS 0.0 1.2 9.2 .05 2.9 9.2 9.2 9.6  
 NS 0.0 6.5 5.6 5.4 5.4 5.4 5.6  
 NS 0.0 6.5 6.5 6.5 6.5 6.5 6.5  
 NS 0.0 6.5 5.3 5.4 5.4 4.5 4.5  
 NS 0.0 9.4 9.2 9.2 9.2 0.2 2.1 1.2  
 NS 0.0 1.2 1.2 1.3 1.3 1.3 1.3  
 NS 0.0 1.3

CAL1 0.0 94.11 998.5

VEL1 0.0 0.00 0.27 0.04 1.35 1.22 1.45  
 VEL1 0.0 1.70 1.21 1.23 1.29 1.40 1.41 1.48 1.34 1.46 1.28 1.35 1.23  
 VEL1 0.0 1.27 1.17 1.22 1.25 1.34 1.29 1.00 0.74 0.54 0.34 0.02 0.00

VEL1 0.0  
 CAL2 0.0 93.79 460.9

VEL2 0.0  
 VEL2 0.0  
 VEL2 0.0  
 VEL2 0.0

CAL3 0.0 93.67 379.7

VEL3 0.0  
 VEL3 0.0  
 VEL3 0.0  
 VEL3 0.0  
 ENDJ