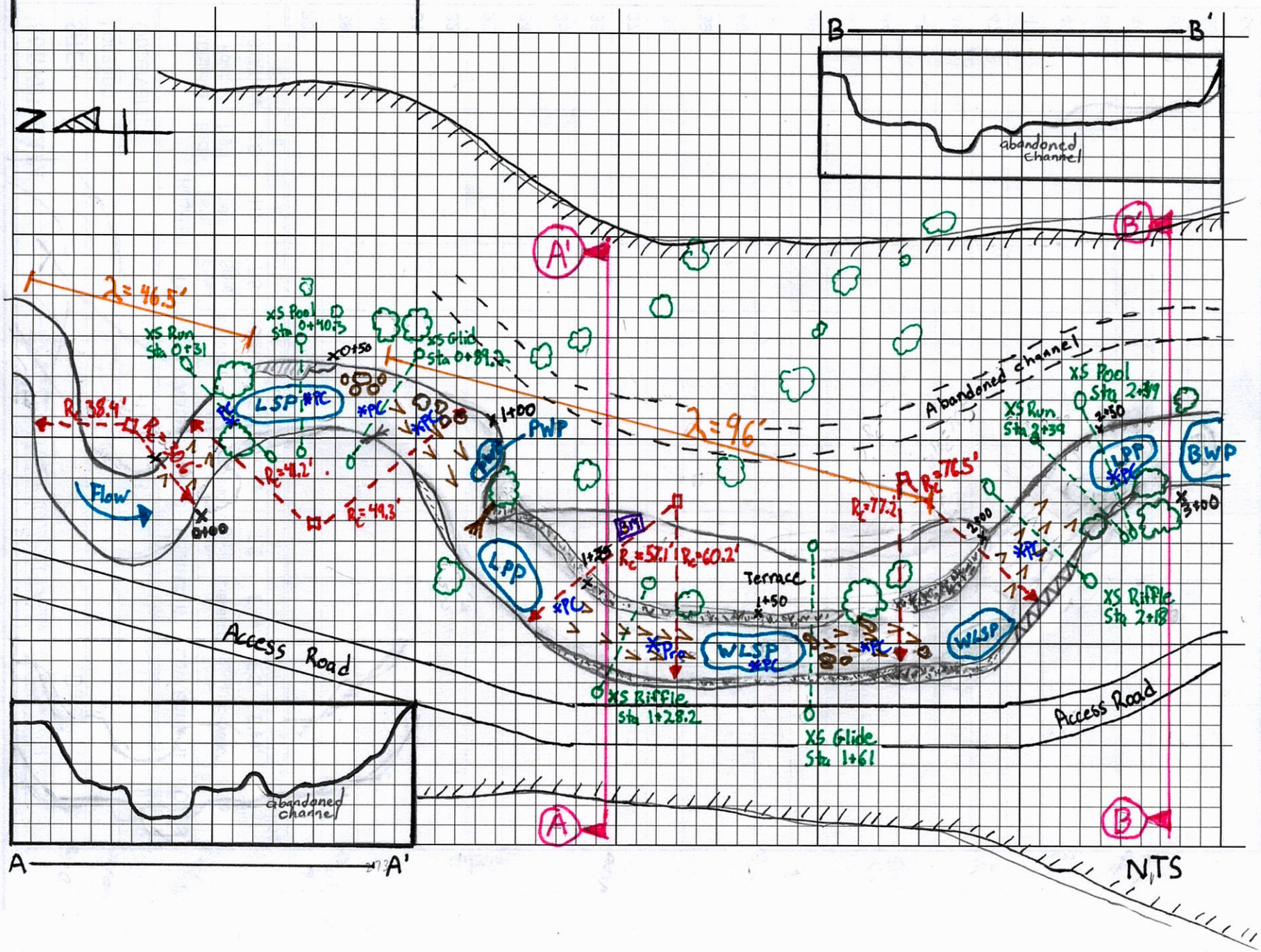
Marsh Run - Reach 3
April 27, 2017
A. Betts, C. Kanuckel



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Solving for Manning's n:

$$\bar{v} = \frac{1.49\,(R)^{2/3}\,(S)^{1/2}}{n}$$

$$n = \frac{1.49\,(R)^{2/3}\,(S)^{1/2}}{\bar{u}}$$

$$u^* = \sqrt{g\,R\,S}$$

$$= \sqrt{(32.2)(1.21)(0.00601)}$$

$$= 0.483$$

$$\frac{\bar{u}}{u^*} = 7.95$$

$$\bar{u} = 7.95 \cdot u^*$$

$$= 7.95\,(0.483)$$

$$= 3.847$$

$$n = \frac{1.49\,(R)^{2/3}\,(S)^{1/2}}{\bar{u}}$$

$$= \frac{1.49\,(1.21)^{2/3}\,(0.00601)^{1/2}}{3.847}$$

$$\boxed{n = 0.034}$$

Worksheet B-4. Dimensionless ratios of the ten pool types (*Second Field Day*).

Stream: Marsh Run Reach 3 Location:

Observers: Team 3 Stream Type: F1/4/6 Landscape Type: U-AL-AD Date: 4/27/17

Pool Type		Dimensional Values: Pool Length (L_p)	Pool Max Depth (d_{maxp})	Pool Slope (S_p)		Dimensionless Ratios: Pool Length to Riffle Width (L_p / W_{bkf})	Pool Max Depth to Riffle Mean Depth (d_{maxp} / d_{bkf})	Pool Slope to Average Slope (S_p / S)
1. Lateral Scour Pool (LSP)	Mean	34.9	2.76	0.002	Mean	1.53	2.46	0.313
	Min.	12.7	1.77	0.000	Min.	0.56	1.58	0.000
	Max.	47.2	3.98	0.005	Max.	2.07	3.55	0.765
2. Contraction Scour Pool (CSP)	Mean				Mean			
	Min.				Min.			
	Max.				Max.			
3. Step/Pool (SP)	Mean				Mean			
	Min.				Min.			
	Max.				Max.			
4. Backwater Pool (BWP)	Mean				Mean			
	Min.				Min.			
	Max.				Max.			
5. Plunge Pool (PP)	Mean				Mean			
	Min.				Min.			
	Max.				Max.			
6. Pocket Water Pool (PWP)	Mean				Mean			
	Min.				Min.			
	Max.				Max.			
7. Lateral Protrusion Pool (LPP)	Mean				Mean			
	Min.				Min.			
	Max.				Max.			
8. Straight Dissipator Pool (SDP)	Mean				Mean			
	Min.				Min.			
	Max.				Max.			
9. Converging Confluence Pool (CCP)	Mean				Mean			
	Min.				Min.			
	Max.				Max.			
10. Compound Pool (CP)	Mean				Mean			
	Min.				Min.			
	Max.				Max.			

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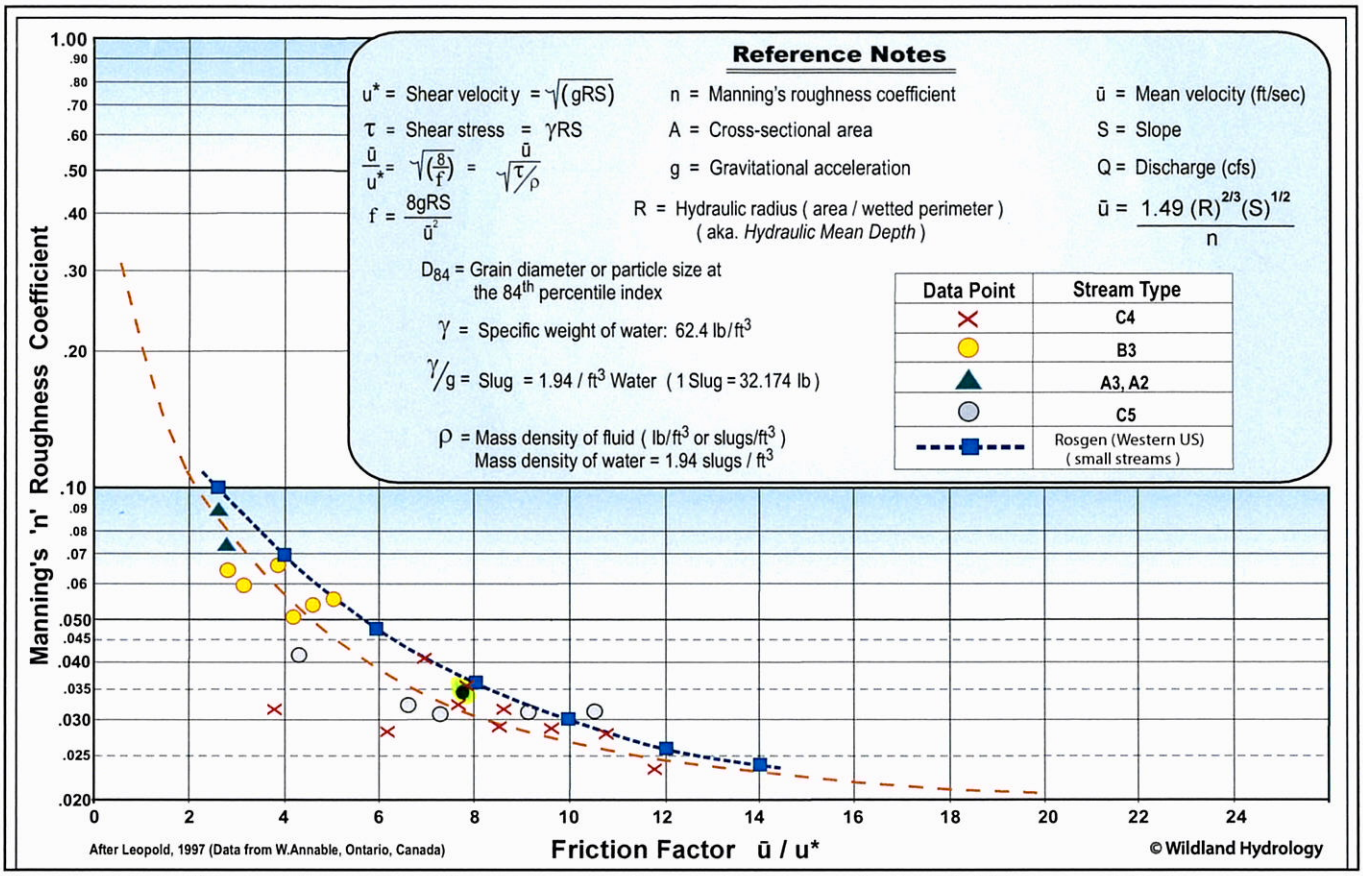

Figure B-35. Friction factor (ū/u*) *vs.* Manning's roughness coefficient 'n' (Rosgen, 2006b).

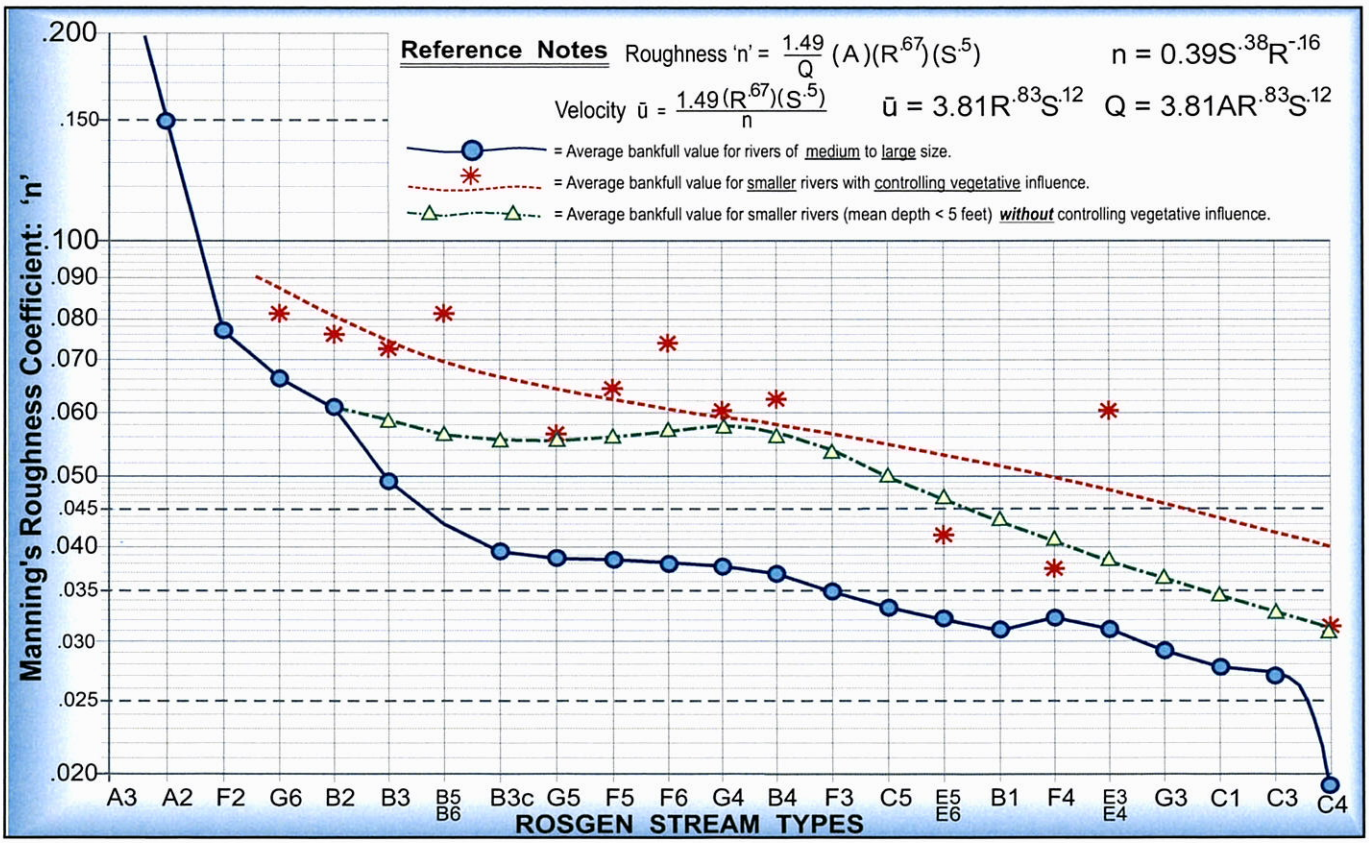

Figure B-36. Manning's 'n' by stream type.

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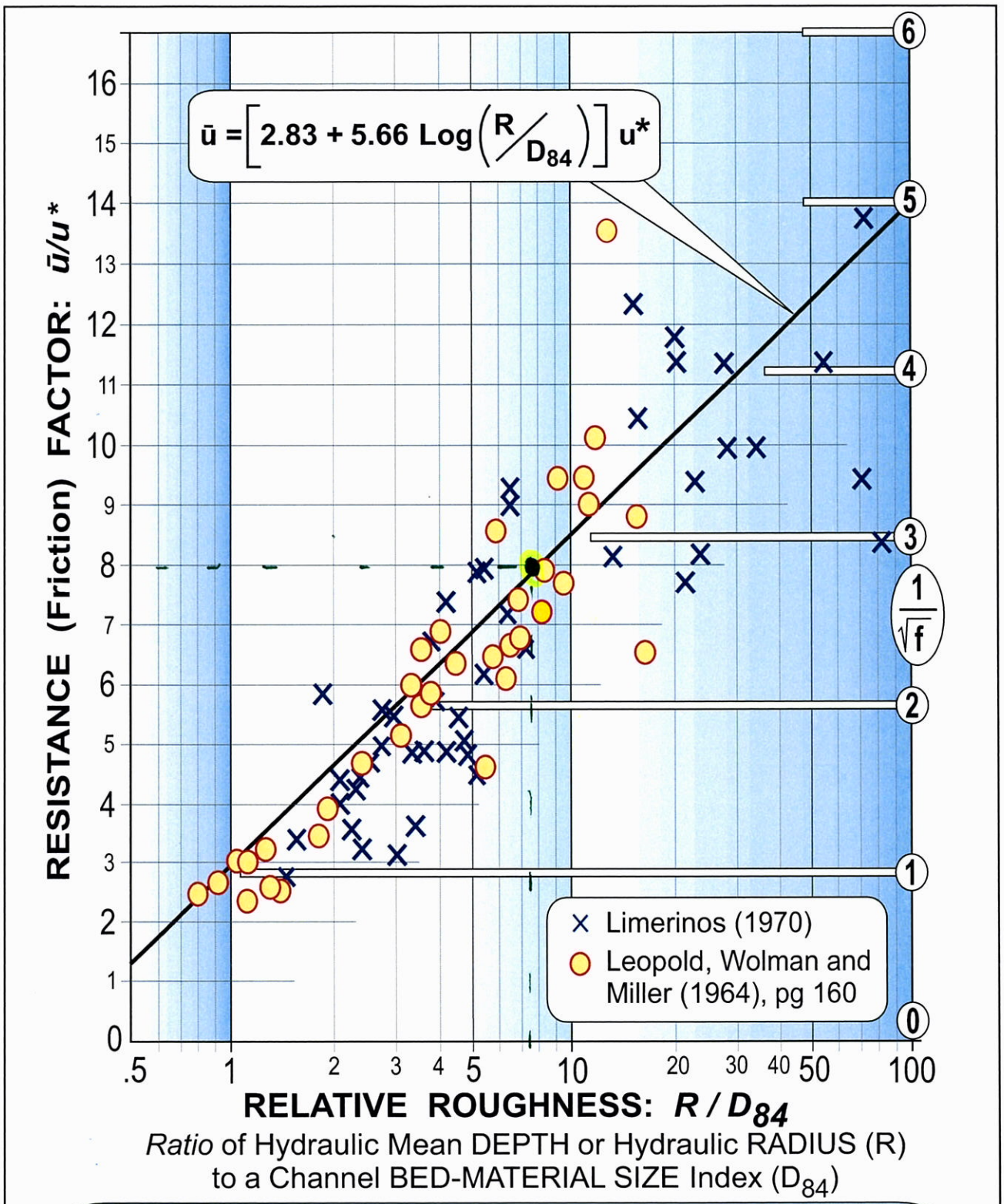

Ratio of Hydraulic Mean DEPTH or Hydraulic RADIUS (R) to a Channel BED-MATERIAL SIZE Index (D_{84})

R/D84 = 8.07
ū/u* = 7.95

The relation of channel *bed-particle size* to *hydraulic resistance*, developed with river data collected from a variety of Eastern and Western streams.

Resistance factors, **ū/u*** and **$1/\sqrt{f}$**, are shown as a function of **Relative Roughness**; i.e., a *Ratio* of Hydraulic Mean Depth (**d**), or Hydraulic Radius (**R**), to a bed-material size index (**D_{84}**), as taken from field measurements (Leopold, Wolman and Miller, 1964).

Figure B-34. Relative roughness (R/D_{84}) *vs.* friction factor (ū/u*) (Rosgen, 2006b).

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Worksheet B-5. Procedure to validate hydraulic relations using gage station data.

Validation of Hydraulic Relationships Using Gaging Station Data

1. Obtain the drainage area associated with the gaging station.
2. Obtain the field-determined bankfull discharge at the gaging station (**Figure B-43**).
3. Obtain the bankfull channel dimensions from the gaging station hydraulic geometry relationships (discharge *vs.* width, depth, area, and velocity).
4. Measure the average water surface slope.
5. Perform an active bed pebble count on the riffle to obtain D_{84}.
6. Determine the stream type.
7. Solve for Manning's 'n' at the bankfull stage: $n = (1.49R^{2/3}S^{1/2})/\bar{u}$ (use the bankfull mean velocity from Step 3).
8. Calculate relative roughness: R/D_{84}. Make sure that D_{84} is converted from millimeters to feet. Hydraulic radius (R) and mean depth (d_{bkf}) are often used interchangeably when width/depth ratios are greater than 12.
9. Calculate shear velocity: $u^* = (gRS)^{1/2}$.
10. Calculate friction factor: $\bar{u}/u^*$.
11. Plot bankfull discharge as a function of drainage area on the appropriate regional curve.
12. Plot bankfull channel dimensions as a function of drainage area on the appropriate regional curve (note stream type of plotted values using unique symbols).
13. Plot relative roughness by friction factor (**Figure B-34**) (Example in **Figure B-39**).
14. Plot Manning's 'n' by friction factor (**Figure B-35**) (Example in **Figure B-40**).
15. Plot Manning's 'n' by stream type (**Figure B-36**) (Example in **Figure B-41**).

Gaging Station Name: Marsh Run **Gaging Station Number:**

1	2	3a	3b	3c	3d	4	5a	5b	6	7	8	9	10
Drainage Area (mi^2)	Bankfull Discharge Q_{bkf} (cfs)	Bankfull Width W_{bkf}	Bankfull Mean Depth d_{bkf} (ft)	Bankfull Area A_{bkf} (ft^2)	Bankfull Velocity $\bar{u}_{bkf}$ (ft/s)	Ave. Water Surface Slope S (ft/ft)	D_{84} (mm)	D_{84} (ft)	Stream Type	Manning's 'n'	Relative Roughness R/D_{84} (ft/ft)	Shear Velocity u^* (ft/s)	Friction Factor $\bar{u}/u^*$
19.05	109	20.0	1.9	38	3	0.00601	45.75	0.15	F1/4/6	0.034	8.07	0.483	7.95

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Summary....*USGS GAGE STATION* Data / Records for STREAM CHANNEL CLASSIFICATION

Station NAME:	Marsh Run	Station Number:	01617800
LOCATION:	Reach 3		
Period of Record:	52 yrs	Mean Annual DISCHARGE:	cfs
Drainage AREA:	acres 19.05 mi²	Drainage Area Mn Elev:	ft
Reference REACH SLOPE:	ft/ft	Valley Type:	U-AL-AD
Stream Type:	F1/4/6	HUC:	

"BANKFULL" CHARACTERISTICS

Determined from FIELD MEASUREMENT			Determined from GAGE DATA Analysis		
Bankfull WIDTH (W_{bkf})	22.61	ft	Bankfull WIDTH (W_{bkf})	20.0	ft
Bankfull Mean DEPTH (d_{bkf})	1.24	ft	Bankfull MEAN DEPTH (d_{bkf})	1.9	ft
Bankfull Xsec AREA (A_{bkf})	27.99	ft²	Bankfull Xsec AREA (A_{bkf})	38	ft²
Wetted PERIMETER (W_P)	23.13	ft	Wetted PERIMETER (W_P)	23.8	ft
Bankfull STAGE (Gage Ht)	N/A	ft	Bankfull STAGE (Gage Ht)	2.12	ft
Est. Mean VELOCITY (u)	3.9	ft/sec	Mean VELOCITY (u)	3.9	ft/sec
Est. Bkf. DISCHARGE (Q_{bkf})	109	cfs	Bankfull DISCHARGE (Q_{bkf})	109	cfs

Bankfull DISCHARGE associated with **"field-determined"** Bankfull STAGE (From Gage Height reading at Staff Plate and tabular Stage-Discharge curve data): N/A cfs

Recurrence Interval (Log-Pearson) associated with **"field-determined"** Bankfull Discharge: 1.9 yrs

From the *Annual Peak Flow Frequency Analysis* data for the Gage Station, determine:

1.5 Year **R.I.** Discharge =	71	cfs	**10** Year **R.I.** Discharge =	274	cfs
2.0 Year **R.I.** Discharge =	105	cfs	**25** Year **R.I.** Discharge =	435	cfs
5.0 Year **R.I.** Discharge =	194	cfs	**50** Year **R.I.** Discharge =	458	cfs

MEANDER GEOMETRY

Meander Wavelength (L_m)	78.8	ft	Radius of Curvature (R_C)	53.8	ft
Belt Width (W_{blt})	66.2	ft	Meander Width Ratio (W_{blt}/W_{bkf})	2.9	ft/ft

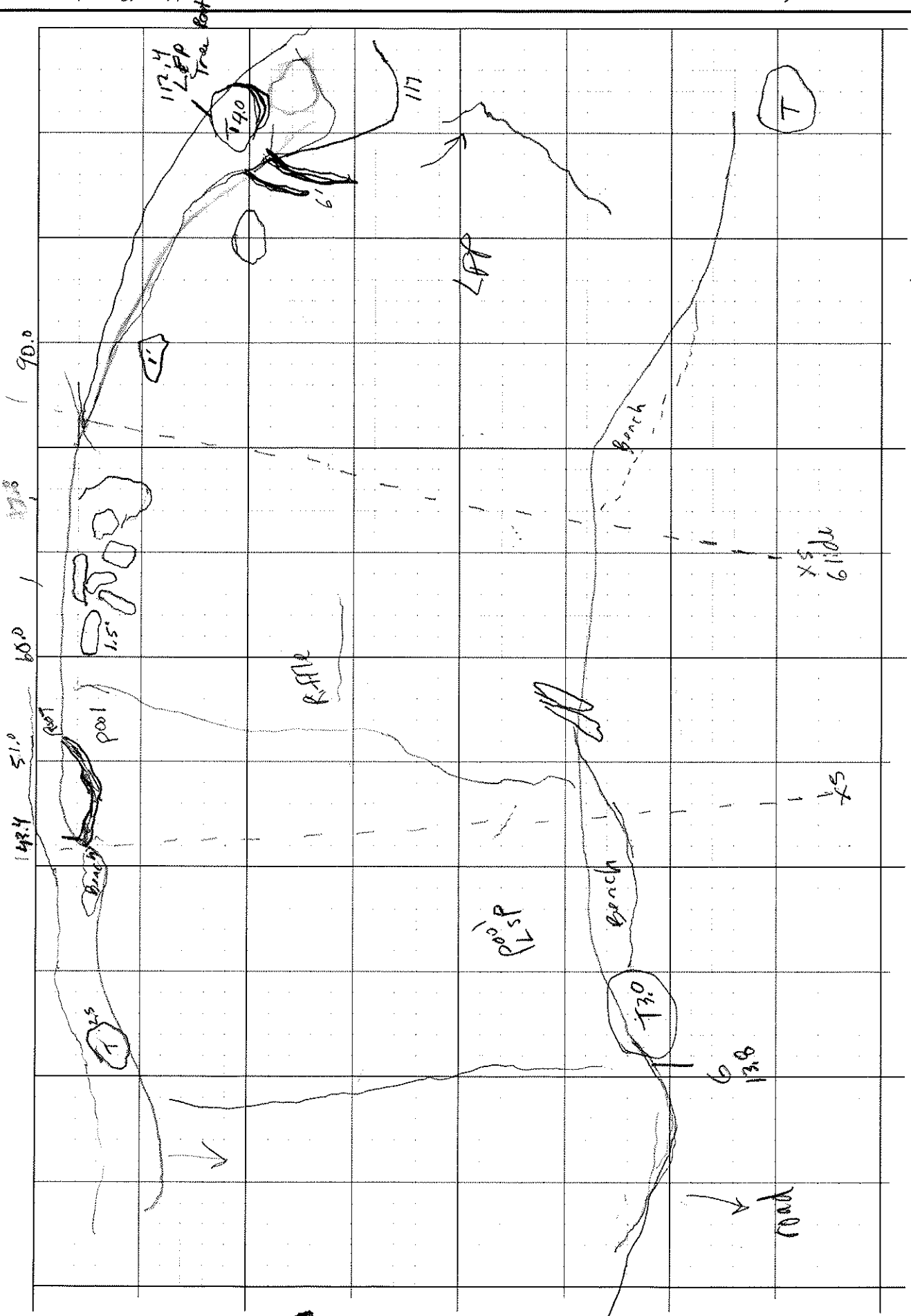
HYDRAULIC GEOMETRY

Based on *USGS Discharge Summary Notes* data (Form 9-207) and regression analyses of measured discharge (**Q**) with the hydraulic parameters of Width (**W**), Area (**A**), Mean Depth (**d**) & Mean Velocity (**u**), determine the *intercept coefficient* (**a**) and the *slope exponent* (**b**) values for a power function of the form $Y = aX^b$, when **Y** is one of the selected hydraulic parameters and **X** is a given discharge value (**Q**).

	Width (**W**)	Depth (**d**)	Area (**A**)	Velocity(**u**)
Intercept Coefficient **a**)	9.354	0.379	3.549	0.280
Slope Exponent **b**)	0.186	0.333	0.519	0.483

Hydraulic Radius R = A / W_P	1.21	ft	**Manning's "n"** at Bankfull Stage	0.034	Coeff.

$$\text{"n"} = 1.4895\,[(\text{Area})\,(\text{Hydraulic Radius}^{2/3})\,(\text{Slope})^{1/2}]\,/\,Q_{bkf}$$



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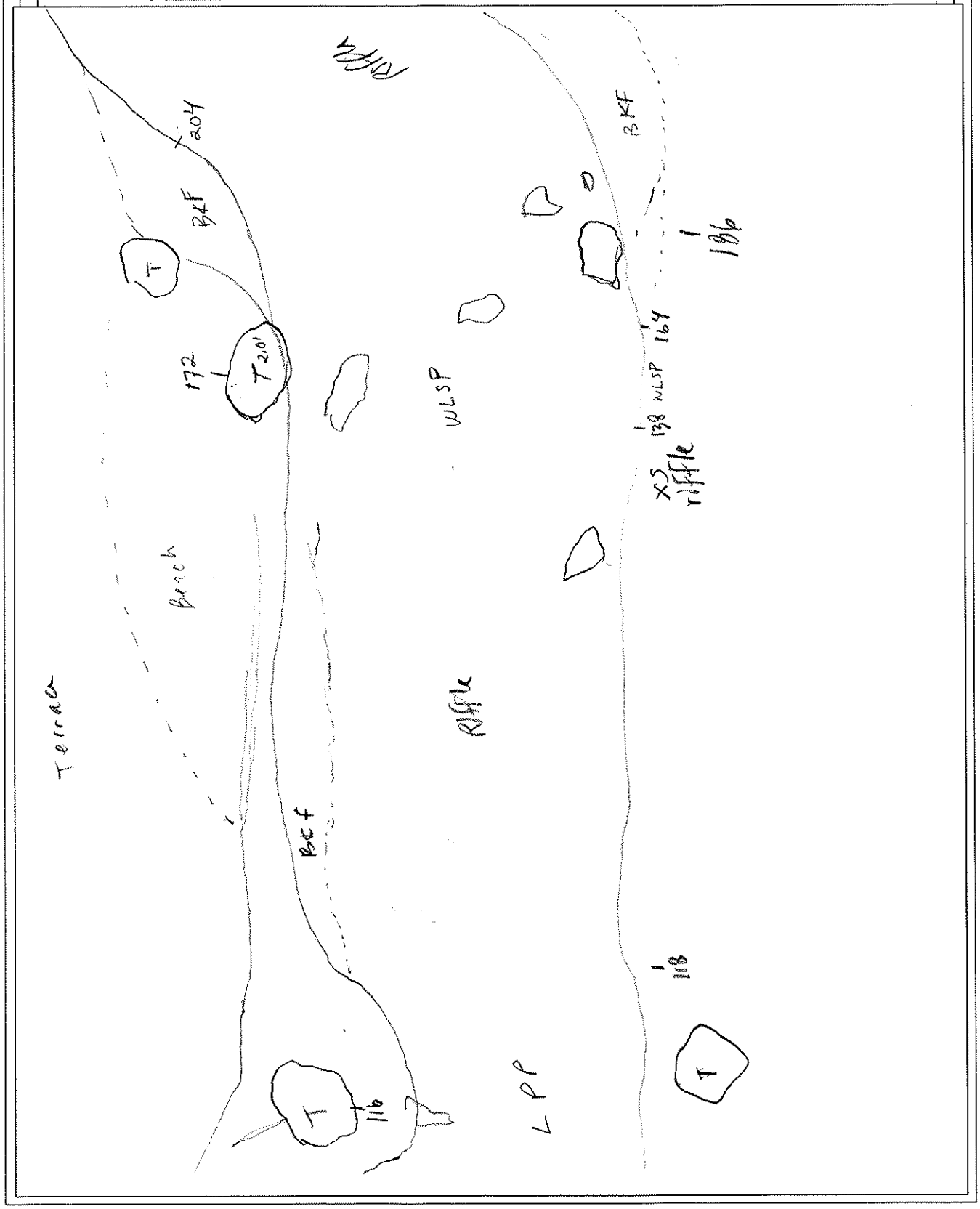
AREA-SITE LOCATION....REACH MAP

Stream/Drainage:_____ Site/Reach:_____

Drawn By:_____ Date:_____



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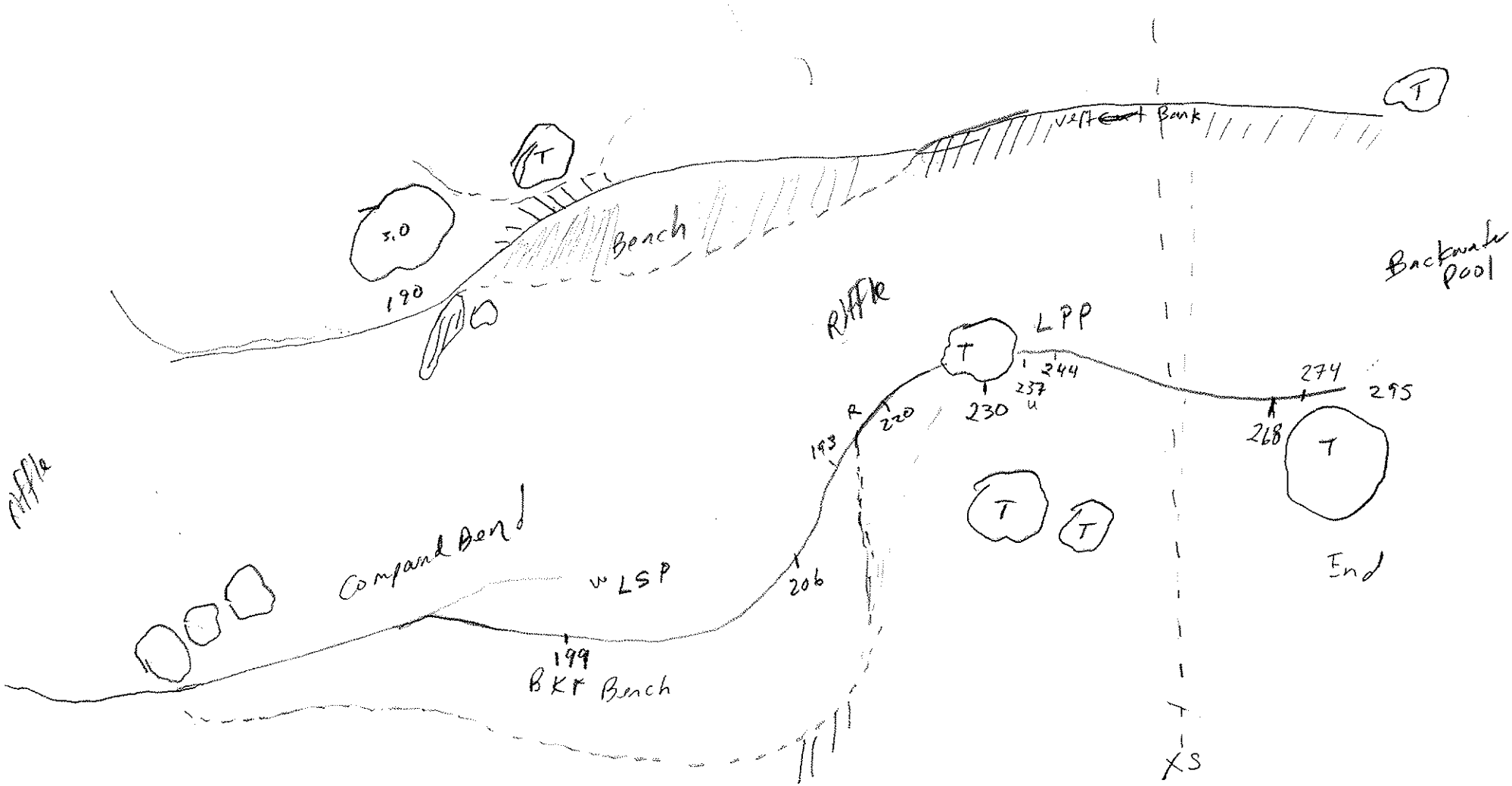
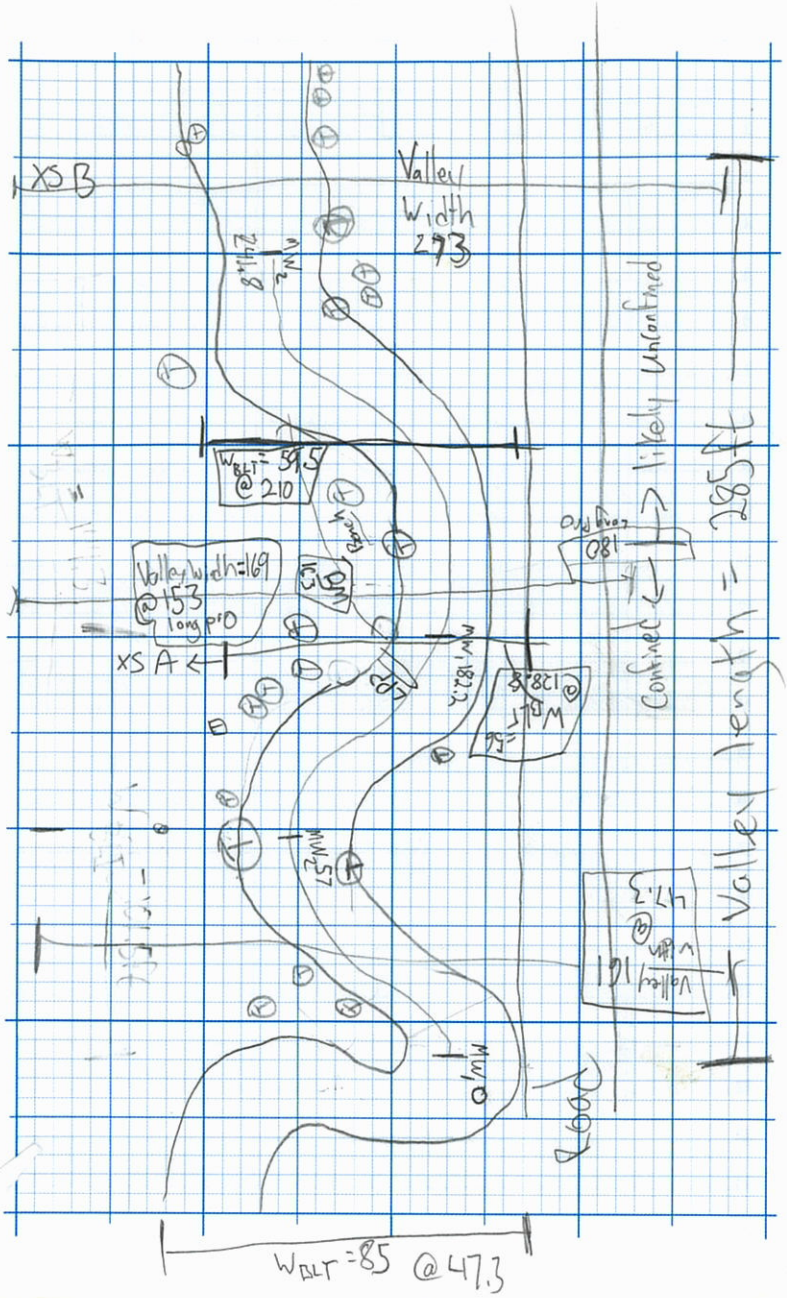
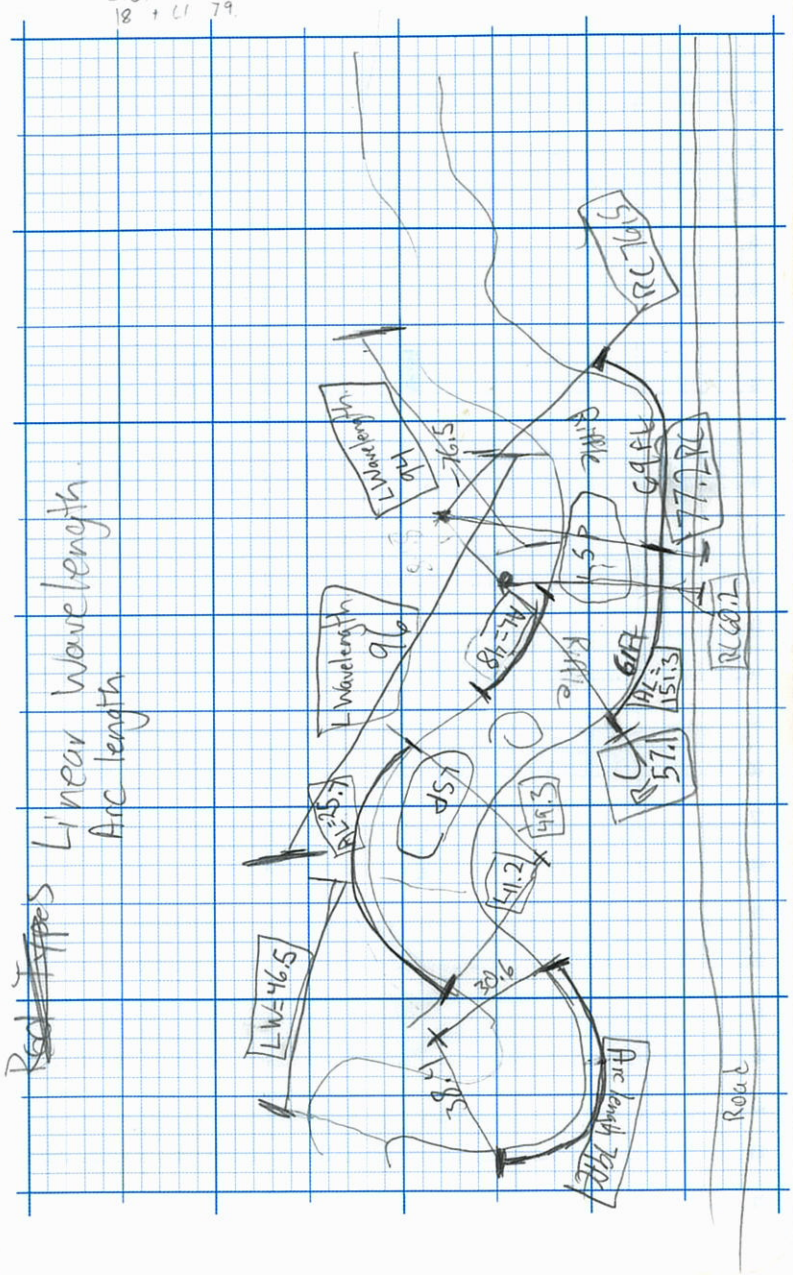
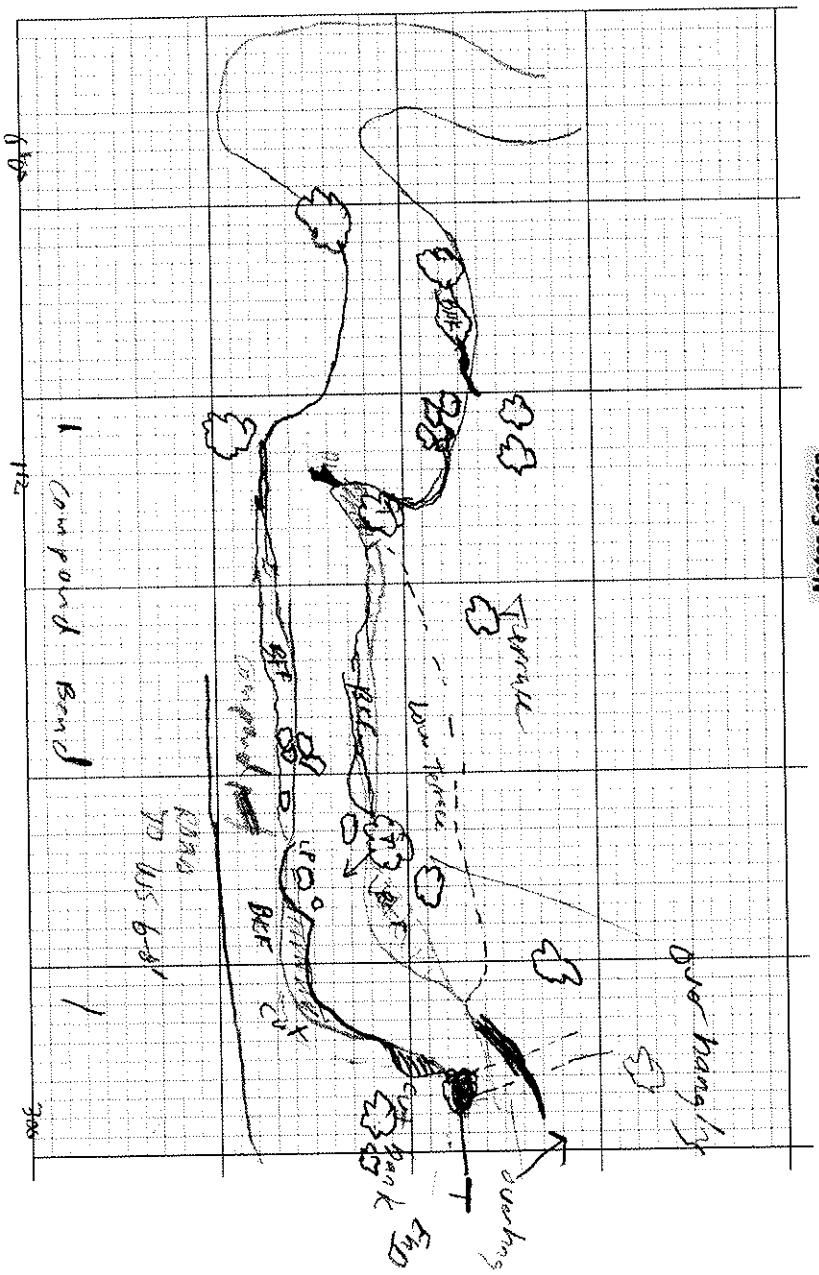
2


3
T
3.0
190
Bench
vert Bank
T
Backwater Pool
Riffle
LPP
T
244
237
230
274
295
268
T
R
220
193
T
T
End
Riffle
Compound Bend
w LSP
206
199
BKF Bench
XS


XS B
Valley Width 273
W_{BLT} = 59.5 @ 210
Valley width = 169 @ 153 long pro
XS A
Confined
likely Unconfined
Valley length = 285 ft
Road
W_{BLT} = 85 @ 47.3

282F61F
3001
18 + 61 79




Compound Bend
Terrace
Low Terrace
Overhanging
Overhanging
Cut Bank
Cut
Road to US 6-8'
BFF
BFF
BFF
BFF
BFF
BFF
BFF
BFF
Compound

SURVEY DATA ⟹ **CROSS - SECTION 1**

SITE: March Run - Reach 3 Date: 4/27/17

Location: Glide XS#2 Sta. 161+00

Observers: PVC + MR HUC:

Item	Distance, Point, or STATION ft	Back-Sight BS ft	Height of Instrument HI ft	Fore-Sight FS ft	Elevation ft	NOTES / COMMENTS / REMARKS
1		7.33				BENCH MARK
2	0.0	5.75	5.75			Left Pin, Low Terrace
3	5.0	5.46				
4	11.0	6.20				
5	17.0	7.54				TERRACE BREAK
6	26.5	6.85				
7	31.5	7.03				
8	33.8	7.37				
9	35.5	7.99				~~BKF~~
10	37.2	8.63				~~BKF~~
11	38.1	8.75				BKF
12	39.1	8.95				
13	40.6	9.29				
14	41.8	9.87			97.46	~~WATER~~ L. EDGE OF WATER
15	43.6	~~9.84~~ 10.15				
16	44.7	~~10.10~~ 10.45				
17	46.6 47.6	10.39 ~~9.86~~ 10.37				
18	49.2	~~10.04~~ 10.40				
19	51.0	~~9.98~~ 10.41				
20	51.9	~~10.04~~ 10.38				
21	53.8	~~9.81~~ 10.17				
22	55.6	10.32				~~R. EDGE OF WATER~~
23	56.5	9.89				R. EDGE OF WATER
24	57.4	9.40				
25	60.4	9.45				
26	61.6	9.22				
27	63.8	8.03				
28	67.4	6.56				~~EDGE OF DRIVE~~
	69.0	6.44				EDGE OF DRIVE
	80.0	5.89				EDGE OF DRIVE

OTHER ~~5.54~~ ~~5.75~~ ~~5.55~~

ours 5.55
Theirs 5.15
.40
Diff.

*Check pool XS is at max depth

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SURVEY DATA → **CROSS - SECTION 2**

SITE: Marsh Run - Reach 3 Riffle #2 Sta. 218 Date: 4/27/17

Item	STATION ft	B S ft	H I ft	F S ft	Elevation ft	NOTES COMMENTS REMARKS
1	0	7.35			100	Bench Mark
2	0	5.65				Left Pin
3	5.0	6.36				
4	10.0	7.10				
5	16.5	7.80				
6	18.5	7.89				
7	22.5	8.16				
8	24.5	8.29				
9	26.9	8.53				
10	28.2	8.98				
11	29.8	9.66				Bench, BKF?
12	31.0	9.81				
13	32.0	10.21				
14	32.5	10.50				L.E. Water
15	32.5	10.83				
16	34.0	10.86				
17	36.0	10.84				
18	38.0	10.88				
19	40.1	10.85				
20	42.5	10.99				TW
21	43.5	10.71				
22	44.5	10.58				
23	45.8	10.71				
24	47.1	10.98				
25	48.4	11.08				
26	49.9	10.55				R.E. Water
27	52.8	9.71				
28	54.6	8.53				
29	55.7	6.95				
30	62.0	5.95				
31	75.0	6.24				
	90.0	6.35				

W_{BKF} = 23

10.99
9.66
1.33

9.66
1.33
8.33

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SURVEY DATA → CROSS - SECTION 4

SITE: Marsh Run Run 2 Reach 3 Sta. 239+00 Date: 4/27/17

Item	STATION ft	B S ft	H I ft	F S ft	Elevation ft	NOTES COMMENTS REMARKS
1		5.69				Bench Mark
2	0	3.88				Left Pin
3	4	3.96				
4	9	4.37				
5	11.9	5.10				
6	13.1	6.08				
7	15.1	7.90				
8	16.4	8.58				
9	17.1	8.91			96.78	LEW
10	19.7	9.59				
11	22.1	9.67				
12	23.0	9.71				
13	25.8	10.23				
14	28.6	10.57				
15	30.6	10.79				
16	31.4	10.59				
17	32.3	10.28				
18	35.9	9.46				
19	37.4	8.91				REW
20	38.9	7.77				
21	39.1	7.76				
22	40.7	6.40				
23	47	5.57				
24	52	4.68				
25	65	4.66				Right Pin
26						
27						
28						
29						
30						
31						

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SURVEY DATA → CROSS - SECTION 4

SITE: Marsh Run - Pool 2 Reach 3 Sta. 249 Date: 4/27/17

Item	STATION ft	B S ft	H I ft	F S ft	Elevation ft	NOTES / COMMENTS / REMARKS
1		5.69				Bench Mark
2	0	4.33				Left Pin
3	8	3.73				High Point.
4	11.3	4.45				Top of Slope
5	13.9	5.98				
6	14.8	7.18				
7	16.2	8.92			96.77	LEWater
8	20.0	9.63				
9	23.0	10.07				
10	25.0	10.34				
11	26.7	10.76				
12	28.0	10.85				
13	30.1	10.68				
14	32.0	10.31				
15	34.0	9.53				
16	36.0	8.89			96.74	REWater
17	37.5	8.64				Sand Stops/Muck
18	39.1	7.82				
19	40.4	6.85				
20	42.6	6.10				Top of Slope
21	47.7	5.55				
22	53.0	4.64				
23	66.0	4.60				Right Pin
24						
25						
26						
27						
28						
29						
30						
31						

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Reach 3 Team 3

SURVEY DATA ⟹ **CROSS - SECTION 8**

SITE: Run XS 0+31 Date: 4/27/17

BM 6.90
Fnd 1600
BM 6.87
BM 98.11
11.C7 98.98

Item	STATION ft	B S ft	H I ft	F S ft	Elevation ft	NOTES / COMMENTS / REMARKS
1	0.0	5.20				
2	2.0	4.96				
3	5.0	5.70				
4	7.0	5.47				LB
5	8.20	5.77				
6	9.65	6.60				
7	10.10	6.93				
8	10.70	6.66				
9	11.20	8.38				
10	11.50	8.41				
11	12.00	8.63				LEW
12	12.7	9.25				
13	13.3	9.04				
14	14.0	9.03				Tree Root
15	14.8	9.27				
16	15.2	9.59				
17	16.2	9.71				
18	16.9	10.03				
19	17.6	10.22				~~THL~~ TW
20	18.4	10.00				
21	19.3	10.05				
22	20.1	10.02				
23	20.9	10.11				
24	22.0	10.00				
25	22.8	9.75				
26	23.6	9.47				
27	24.8	9.21				
28	25.9	8.87				
29	27.00	8.84				
30	27.8	8.69				REW
31	28.4	7.22				Tree Root

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Stn	BS		
28.9	8.08		
29.55	7.25		
30.4	6.76		
31.5	6.26		
32.5	5.86		
33.7	5.53		
36.0	5.15		
38.55	4.50		RB
40.00	5.06		

7.69
7.84
0.15

7.69
7.78
9

BKF Shot off cross X

7.69

~~7.84~~

~~7.78~~ 7.69

6 ft down stream from the X station

SURVEY DATA → **CROSS - SECTION 7**

SITE: Pool XS 40.3 Date: 4/27/17

BM 6.86
BM 6.89
Photo 1599
BKF=98.99
PB Slope = 20%

Item	STATION ft	B S ft	H I ft	F S ft	Elevation ft	NOTES / COMMENTS / REMARKS
1	0.00	5.25				
2	1.60	4.94				
3	3.30	4.99				LTOB
4	4.30	5.14				
5	5.10	5.82				Vertical Bank
6	6.40	6.28				Vertical Bank
7	7.10	8.68				
8	7.40	8.69				LEW
9	7.50	8.94				Weird Hole
10	7.85	9.93				
11	8.20	9.84				~~Veggy Tuft Bank~~
12	8.40	8.29				Veggy Tuft Bank
13	9.55	8.22				Veggy Tuft Bank
14	9.85	9.25				~~rock~~
15	10.50	9.14				rock in channel
16	11.50	9.10				
17	12.55	9.31				
18	13.00	11.37				
19	13.90	11.07				rock
20	15.15	11.49				11.57 slightly US tape TW
21	15.60	11.47				
22	16.75	11.26				
23	17.25	10.91				
24	18.20	10.64				
25	19.00	10.30				
26	19.65	10.43				
27	20.30	10.34				
28	21.05	9.98				
29	21.55	9.83				
30	22.20	9.37				
31	23.05	9.12				

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23.75	8.89	
24.30	8.73	— REW
24.80	8.54	
25.25	8.09	
25.95	7.89	
26.75	7.71	
27.40	7.57	
28.45	7.28	
29.50	6.70	
30.65	6.16	
31.60	5.71	
32.40	5.32	
33.10	5.11	
34.05	4.92	— ToB
36.50	4.79	

Marsh Run Team 5 Reach 3

Photo 1597

BM 6.86
BM 6.85

Photo 1598

.982
-.836
1.66

SURVEY DATA ⟹ **CROSS - SECTION 6**

SITE: Glide X sec 0+89.2

Date: 4/27/17

Item	STATION ft	B S ft	H I ft	F S ft	Elevation ft	NOTES / COMMENTS / REMARKS
1	0.0	5.33				
2	2.0	5.39				
3	3.9	5.48				
4	5.00	5.69				TBank
5	5.80	6.05				
6	7.00	7.55				
7	8.10	8.36				BK?
8	8.90	8.64				
9	9.20	8.96				
10	9.80	9.02				LEW
11	10.9	9.16				
12	12.0	9.32				
13	13.4	9.47				
14	14.6	9.49				
15	15.5	8.69				In channel Rock
16	16.00	9.02				
17	16.5	9.58				
18	17.5	9.53				
19	18.3	9.61				TW
20	19.3	9.41				
21	20.15	9.23				
22	21.1	9.26				
23	22.15	9.43				
24	23.00	9.29				
25	24.20	9.25				
26	25.6	9.24				Bank
27	26.4	9.39				
28	27.5	9.36				
29	28.55	9.26				
30	29.6	9.29				
31	30.7	9.40				

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31.65	9.45	
32.4	9.00	REW
32.95	8.69	Fast hold
33.55	8.30	
34.1	8.14	RKF
34.7	7.95	
35.4	7.76	
36.1	7.38	
37.0	6.94	
37.8	6.55	
38.65	6.05	
39.4	5.76	RTOB
41.0	5.61	
44.0	5.59	
46.6	5.72	

Marsh Run Reach #10

BM 6.85
6.86

Pool
40.3
69.2
Glide (E.)

SURVEY DATA → **CROSS - SECTION** 5

SITE: Riffle XS 1+28.2 Date: 4/27/17

Item	STATION ft	BS ft	HI ft	FS ft	Elevation ft	NOTES / COMMENTS / REMARKS
1	0.00	4.86				
2	6.00	4.87				
3	13.00	5.31				
4	14.65	5.59				
5	16.70	6.07				
6	18.40	6.43				
7	19.30	7.04				
8	20.10	7.75				
9	21.75	8.73				FP?
10	23.50	9.01				~~BKF~~
11	25.45	9.35				LEW
* 12	22.65	8.93				
13	25.90	9.77				
14	27.70	10.00				
15	29.65	10.00				+
16	31.30	10.00				
17	32.85	9.90				
18	33.95	9.89				
19	34.80	9.95				
20	37.10	9.85				
21	39.10	9.66				
22	40.70	9.38				REW
23	42.20	8.78				
24	43.30	8.43				
25	43.65	8.31				BKF [Long Pro 107]
26	44.45	~~8.92~~ 7.92				
27	45.60	7.31				
28	46.90	6.67				
29	47.70	6.51				TOB
30	56.00	6.14				Center of Road
31	61.20	5.60				Edge of Road
	64.10	5.49				Edge of Valley

Photo 1597

89.2
141

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~~64.11 5.47 Edge of Valley~~

8.00	5.36
18.00	5.68
26.00	6.20
41.00	7.31
52.00	6.40
58.00	6.12
65.00	6.00

XS
40.3
89.2
128.2
161 - glide
218 - riffle
239

SURVEY DATA ⟹ LONGITUDINAL PROFILE 1

SITE: MARSH RUN - Long Pro Date: 4/27/2017

Location: REACH 3 BM = 100

Observers: EMILY, SARAH HUC:

	Distance, Point, or STATION (ft)	Back-Sight BS (ft)	Height of Instrument HI (ft)	Thalweg Fore-Sight FS (ft)	Thalweg Elevation Elev. (ft)	Water Surface Fore-Sight FS (ft)	Water Surface Elevation Elev. (ft)	Bankfull Fore-Sight FS (ft)	Bankfull Elevation Elev. (ft)	Low Bank HI Fore-Sight FS (ft)	Low Bank HI Elevation Elev. (ft)	NOTES e.g. Riffle Run Pool Glide
1	BM	7.35										
2	2.8			10.20		9.11		8.06*		BKF = 1.05' -WSE		glide
3	6.2			9.77		9.19						glide
4	11.5			9.52		9.19						start of riffle / end glide
5	10.1							8.21*		BKF = 1.18' -WSE		
6	14.4			9.97		9.37						Riffle
7	23.0			10.81		9.33						start run
8	26.5			11.04		9.38						
9	~~22~~ 31			11.10		9.37		8.37		BKF = 1.0' -WSE		mid run
10	39			13.04		10.32	x 9.38			BKF = 9.99' WSE		start pool - LCP
11	40.3			12.27		9.35	(-2.92)	8.36		→ WSE at REOW = 9.40		MAX DEPTH
12	43.7		12.12	~~11.94~~	9.36	~~9.18~~	(-2.76)			→ WSE at REOW = 9.39		
13	55.5		11.63	~~11.64~~	9.33	~~9.54~~	~~(-2.10)~~ (-2.3)			9.37		
14	61.6			10.33		9.32	(-0.99)		WSE	9.42		glide start
15	67.3			10.28		~~9.23~~	(-0.95) 9.33			9.35 →		behind log LEOW: 9.35
16	73			10.24		~~9.13~~	(-0.89) 9.35	8.64		→ WSE at R, EOW = 9.43		
17	81.5			10.08		9.42		8.39*				
18	89.2			9.67		9.43		~~8.71~~		BKF = 1.04'		end glide / start riffle
19	99.3			9.88		9.45						
20	110			9.95		9.56		8.41*		BKF = 1.15'		
21	113			10.15		9.89		8.55*		BKF = 1.34'		log protrusion left bank @ BKF measurement
22	122.2			10.28		9.81						lots of bedrock
23	128.2			10.46		9.86		8.84*		BKF = 1.02'		
24	139.8			10.47		9.86						
25	~~150.7~~			~~11.09~~		~~9.87~~		8.84* ~~8.98~~		BKF = 1.03'		on BORK
26												
27												

Mostly Lateral scour pools

12.12 - 2.76 = 9.36

XS

XS

rocks along left bank; XS channel constricted

XS

Remove? ???

* = flagged in toothpick

BKF bench?

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SURVEY DATA → **LONGITUDINAL PROFILE 2**

SITE: Marsh Run Date: 4/27/17

Location: Reach 3

Observers: Sarah, Emily HUC:

	Distance, Point, or STATION ft	Back-Sight BS ft	Height of Instrument HI ft	Thalweg Fore-Sight FS ft	Thalweg Elevation Elev. ft	Water Surface Fore-Sight FS ft	Water Surface Elevation Elev. ft	Bankfull Fore-Sight FS ft	Bankfull Elevation Elev. ft	Low Bank HI Fore-Sight FS ft	Low Bank HI Elevation Elev. ft	NOTES e.g. Riffle Run Pool Glide
28	141			10.46		9.85						RUN start
29	147.1			10.55		9.84						TOP OF MINI POOL
30	150.6			11.13		9.86		8.84*				DMAX MINI BABY POOL
31	159.8			~~10.14~~	10.54	~~9.54~~	9.90					GLIDE START
glide XS ~~XS~~ 32	161			~~9.88~~	~~10.26~~ 10.33	~~9.96~~	9.94	8.86				GLIDE DMIN
33	172			~~10.94~~	10.42	~~10.60~~	10.0'					@ TREE (BOX ELDER) IN CASE OF WEIRD SHIT
XS 34	~~185.6~~	~~188~~										TREE IN WAY
35	191.4			10.90		10.31		~~9.38~~*	9.23*			↑
36	198.6			10.92		10.36		9.33			~~Dmax~~	wants to be a pool? WTBP
37	202.5			11.04		10.31					Dmax	↓ in meander
38	205.2			10.93		10.35						G
39	208.0			10.87		10.37						R
riffle XS 40	218			11.09		10.51		9.57*				in R @ XS-Riffle
41	227.4			11.29		10.54						mid R start cause by of lateral
42	236.2			11.32		10.58					start RUN	protrusion pool
run XS 43	239.0			12.08		~~10.67~~	10.60	9.57* RB				mid run at run X-S
44	243.1			12.57		10.60						top Pool end of run
pool XS 45	249			12.73		10.61		9.58				Dmax on sediment
46	258.2			12.44		10.59					G	← Start Backwate
47	280.9			11.56		10.58					R	high point area channel widening
48	286			11.86		10.58						
49	295			11.95		10.59						← scour along tree roots LB
50	300			11.97		10.60		8.98, 11.57 1.38				sloping down, water flat
51												
52												
53												
54												

along LB

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7 non pool — ~~TTTT~~ ~~TTTT~~ ~~TTTT~~

Protrusion

Site: Marsh Run 4/27/17

Location: Riffle 2+02 HUC:

Observers: Dianne Kim

				Dot Count for RIFFLE (1) Bedrock	POOL (2) Cobble	COMP. 3	RIFFLE (1) Reach: / Date: TOT # ITEM % % CUM	POOL (2) Reach: / Date: TOT # ITEM % % CUM	COMPOSITE (3) Reach: / Date: TOT # ITEM % % CUM
Inches	PARTICLE	Millimeters							
	Silt / Clay	< .062	S/C						
	Very Fine	.062 - .125	SAND						
	Fine	.125 - .25							
	Medium	.25 - .50							
	Coarse	.50 - 1.0							
.04 - .08	Very Coarse	1.0 - 2							
.08 - .16	Very Fine	2 - 4	GRAVEL						
.16 - .22	Fine	4 - 5.7							
.22 - .31	Fine	5.7 - 8							
.31 - .44	Medium	8 - 11.3					1		
.44 - .63	Medium	11.3 - 16					2		
.63 - .89	Coarse	16 - 22.6					4		
.89 - 1.3	Coarse	22.6 - 32					10		
1.3 - 1.8	Very Coarse	32 - 45					13		
1.8 - 2.5	Very Coarse	45 - 64					19		
2.5 - 3.5	Small	64 - 90	COBBLE				35		
3.5 - 5.0	Small	90 - 128					13		
5.0 - 7.1	Large	128 - 180					4		
7.1 - 10.1	Large	180 - 256							
10.1 - 14.3	Small	256 - 362	BOULDER						
14.3 - 20	Small	362 - 512							
20 - 40	Medium	512 - 1024							
40 - 80	Large-Vry Large	1024 - 2048							
	Bedrock		BDRK						
						TOTAL→			

Stream Type: Landscape Type:

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End 297

Active Protrusion

39-61.6
22.6
214.4 non 72%

147-139
8
82.6 Pool 28%

295-297
Pool
52

Site: Marsh Run
Location: Riffle 1+13.5 - Hvt. 27
Observers: Dianne Kim

Inches	PARTICLE	Millimeters		Dot Count for RIFFLE 1	POOL 2	COMP. 3	RIFFLE (1) TOT #	ITEM %	% CUM	POOL (2) TOT #	ITEM %	% CUM	COMPOSITE (3) TOT #	ITEM %	% CUM
	Silt / Clay	< .062	S/C												
	Very Fine	.062 - .125	SAND												
	Fine	.125 - .25													
	Medium	.25 - .50													
	Coarse	.50 - 1.0													
.04 - .08	Very Coarse	1.0 - 2													
.08 - .16	Very Fine	2 - 4	GRAVEL												
.16 - .22	Fine	4 - 5.7													
.22 - .31	Fine	5.7 - 8		;			2								
.31 - .44	Medium	8 - 11.3		1:			5								
.44 - .63	Medium	11.3 - 16		⊠⊠			20								
.63 - .89	Coarse	16 - 22.6		⊠⊠			20								
.89 - 1.3	Coarse	22.6 - 32		⊠⊠⊠			30								
1.3 - 1.8	Very Coarse	32 - 45		⊠1:			15								
1.8 - 2.5	Very Coarse	45 - 64		⊠			10								
2.5 - 3.5	Small	64 - 90	COBBLE	1:			5								
3.5 - 5.0	Small	90 - 128		;			1								
5.0 - 7.1	Large	128 - 180		:			2								
7.1 - 10.1	Large	180 - 256													
10.1 - 14.3	Small	256 - 362	BOULDER												
14.3 - 20	Small	362 - 512													
20 - 40	Medium	512 - 1024													
40 - 80	Large-Vry Large	1024 - 2048													
	Bedrock		BDRK												
						TOTAL→									

Stream Type: Landscape Type:

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