Rocky Branch Stream Restoration

Yadkin County, North Carolina

2010 Year 3 Monitoring Report - Final
EEP Project Number: 308
USGS HUC 03040102
EcoEngineering Project Number: EEP-08020

Prepared for:

NCDENR Ecosystem Enhancement Program
2728 Capital Blvd., Suite 1H 103
Raleigh, NC 27604

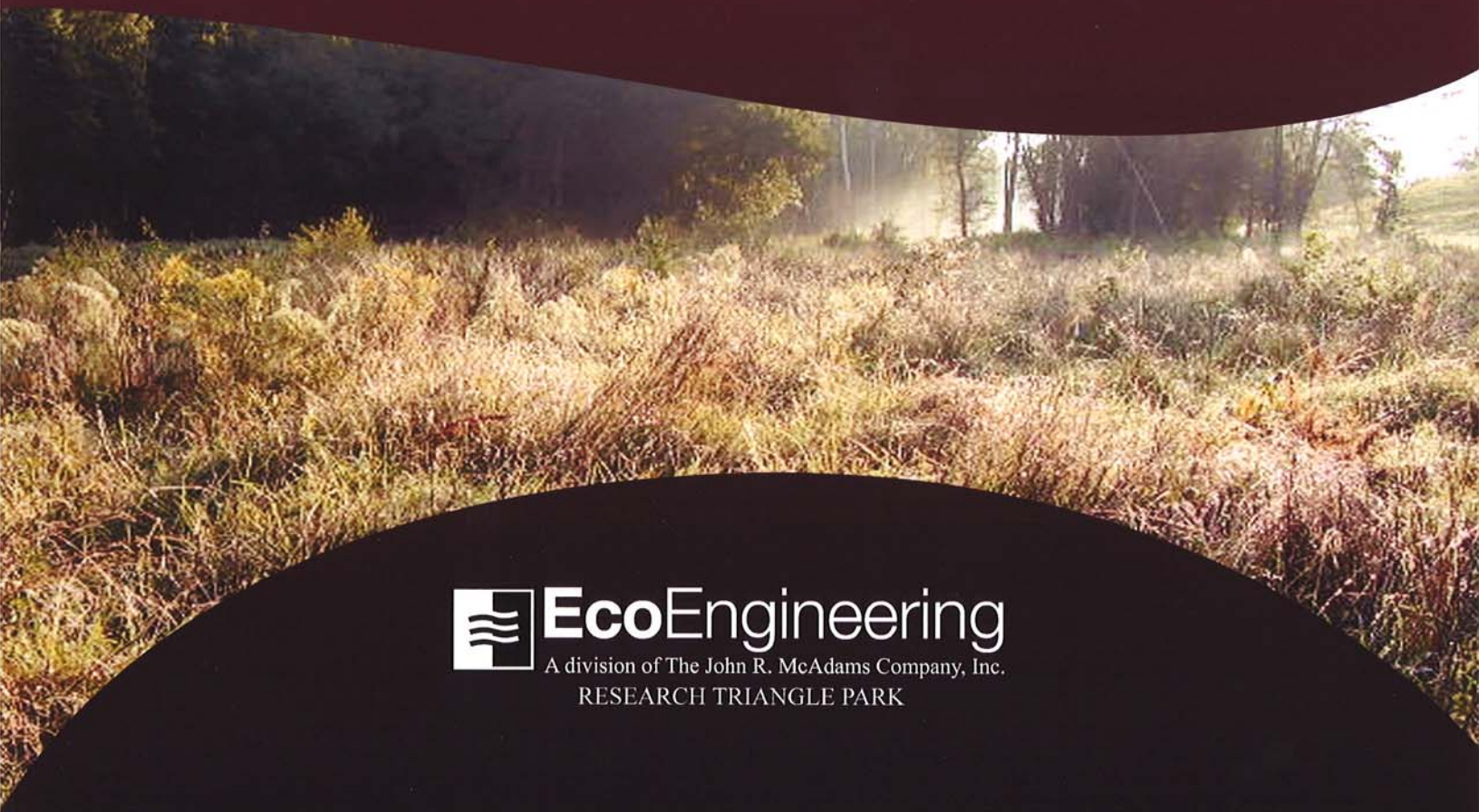

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Table 10. Wetland Criteria Attainment (omitted, not applicable)
– Precipitation and Water Level Plots (omitted, not applicable)

1.0 Executive Summary/Project Abstract

1.1 Project Goals and Objectives

The goals of this stream restoration project were to:

- To improve the overall water quality and aquatic habitat in and around the stream channels by reducing sediment and waste inputs into the stream caused by bank erosion, mass-wasting, and livestock influences.
- To improve the richness and diversity of the plant species within the conservation easement.
- To facilitate on-going livestock operations through farm management improvements.
- To provide perpetual protection for the restored stream channels and associated riparian and upland buffers.

These goals will be met through the following objectives:

- By using natural channel design to restore stable dimension, pattern, and profile for the project stream reaches.
- By establishing a native plant community to match the endemic plant species at the site.
- By reducing the quantities of exotic invasive species at the site through mechanical and chemical methods.
- By decommissioning a dairy waste storage pond to eliminate future risks to the Rocky Branch channel and the watershed.
- By installing watering facilities and a shadehouse to manage livestock previously using the restoration site.
- By establishing a conservation easement and permanent fencing to provide long-term protection for the site. (Mulkey, 2008)

1.2 Vegetation Condition and Comparison

Original baseline vegetation monitoring data was not provided prior to the 2008 Monitoring Year 1 and 2008 is considered a drought year. The 2009 Monitoring Year 2 is considered the baseline datum because after two years of monitoring it is assumed all planted stems within a vegetation monitoring plot have been surveyed and accounted for. Therefore, any additional species observed in proceeding monitoring years are considered volunteer species.

Current stem counts were calculated using vegetation plot monitoring data. Interim density targets (stems/acre) are 320 at year 3 and 288 at year 4. Final stem count criteria are 260 trees per acre at the end of the five (5) year monitoring. As for monitored Year 3, Rocky Branch had 11 plots encompassing 0.27 acres, containing 378 planted and volunteer stems, which yielded a density of 1,391 trees per acre including planted and volunteer species. Planted and volunteer vegetation survival threshold was met for each of the plots.

Various exotic/invasive species were observed at the site. Exotic species observed at the site include Chinese privet (Ligustrum sinense), Chinese lespedeza (Lespedeza cuneata), multiflora rose (Rosa multiflora), and cattail (*Typha lattifolia*). The extent of exotic/invasive species is depicted in the Consolidated Current Conditions Plan View Appendix D.

During the site investigations, encroachments into the conservation easement were observed in the form of cattle entering the easement. The conservation easement encroachment area is noted on Sheet 6 of the Consolidated Current Conditions Plan View located in Appendix D.

The conservation easement encroachment area is near the pond located at the end of the project and within an area that was not previously planted. Field indicators (i.e. cattle hoofs and cattle excrement) were observed indicating that cattle have encroached into the conservation easement. It appeared that cattle entered the conservation easement for short periods of time since there was not an over abundance of field indicators. No damage to planted areas within the conservation easement was noted.

1.3 Stream Stability/Condition and Comparison

The largest problem observed within the stream channel is beaver activity. A beaver den and a new beaver dam were observed this year. Overall the channel morphology appeared stable. However, there is a "J" hook structure (Structure Number 14, Station 12+00, Consolidated Current Conditions Plan View, Appendix D) which has been compromised due to the beaver activity associated with the former beaver dam number 3. Evidence of a bankfull event was observed this monitoring year.

1.4 Wetland Conditions and Performance

No wetlands are being monitored for mitigation credits at this project site.

1.5 Narrative Background

Summary information/data related to the occurrence of items such as beaver or encroachment and statistics related to performance of various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting information formerly found in these reports can be found in the mitigation and restoration plan documents available on the EEP website. All raw data supporting the tables and figures in the appendices is available from EEP upon request.

2.0 Methodology

All monitoring methodologies follow the most current templates and guidelines provided by EEP (EEP, 2006; EEP, 2009). Photographs were taken at high resolution using an Olympus FE-115 5.0 megapixel digital camera. GPS location information was collected using a Trimble Geo XT handheld mapping grade GPS unit. Stream and vegetation problem areas were noted in the field on As-Built Plan Sheets.

The methods used to generate the data in this report are standard fluvial geomorphology techniques as described in *Applied River Morphology* (Rosgen, 1996) and related publications from US Forest Service and the interagency Stream Mitigation Guidelines (USACE, 2003).

Vegetation monitoring methods followed the 2008, Version 4.2 CVS-EEP Protocol for Recording Vegetation (Lee et. al., 2008). Vegetation plot photographs were collected for each vegetation plot. Vegetation monitoring plots were re-marked in the field by replacing all old flagging with new orange flagging. Monitoring taxonomy follows *Flora of the Carolinas, Virginia, Georgia, and Surrounding Areas* (Weakley 2007). Stem height was measured with a folding one-meter rule. Diameter at breast height and decimeter height were measured with calipers.

3.0 References

Ecosystem Enhancement Program (EEP), 2006. Monitoring Report Guidelines, November 16, 2006.

Ecosystem Enhancement Program (EEP), 2009. Monitoring Report Guidelines, June 1, 2009.

Lee, Michael T., R. K. Peet, S. D. Roberts, and T. R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation, Version 4.2 (http://cvs.bio.unc.edu/methods.htm)

Mulkey Engineer and Consultants, 2008. As-Built Mitigation Plan Rocky Branch Stream Mitigation Report. Submitted to NCDENR-EEP, February 2008.

Rosgen, D.L. 1996. Applied Morphology. Wildland Hydrology, Pagosa Springs, CO.

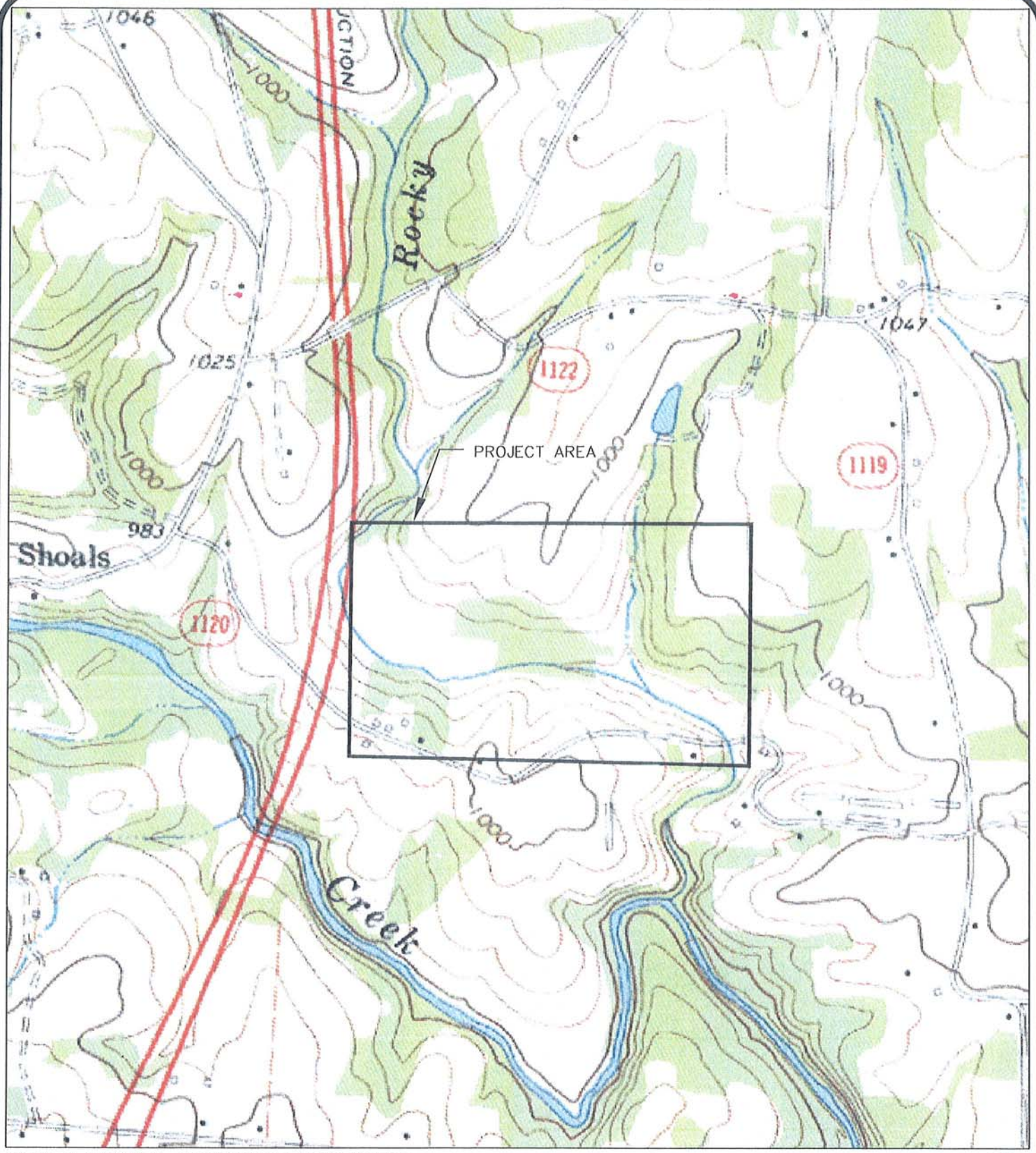
US Army Corps of Engineers (USACE), 2003. April 2003 Stream Mitigation Guidelines.

US Army Corps of Engineers (USACE), 2005. Information Regarding Stream Restoration In The Outer Coastal Plain of North Carolina. US Army Corps of Engineers, Wilmington District, Regulatory Division and North Carolina Department of Environment and Natural Resources, Division of Water Quality, December 1, 2005.

Weakley, A. S., 2008. Flora of the Carolinas, Virginia, Georgia, northern Florida, and surrounding areas. University of North Carolina Herbarium (NCU), North Carolina Botanical Garden, University of North Carolina at Chapel Hill, working Draft as of April 7, 2008.

APPENDIX A

General Figures and Plan View



USGS, 7.5 MINUTE, TOPOGRAPHIC QUADRANGLE;
BROOKS CROSSROADS, N.C.; 1970; LAT: 36.0943785° N
LON: 80.8114769° W

PROJECT NO.	EEP-08020
FILENAME:	EEP-08020
SCALE:	1" = 1,000
DATE:	08-13-10

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ROCKY BRANCH

VICINITY MAP

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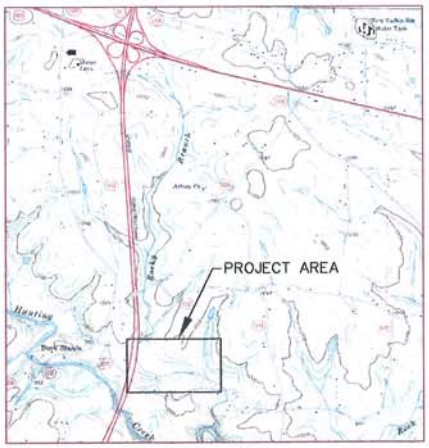
ROCKY BRANCH

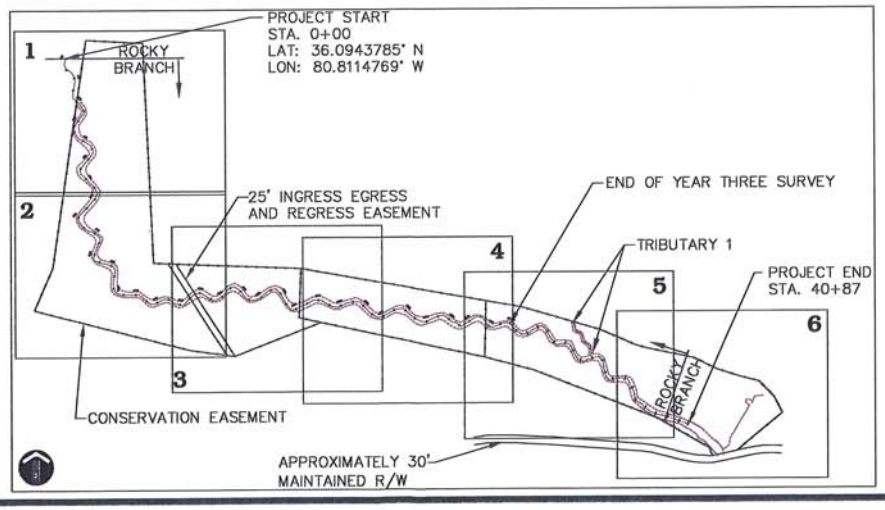
CONSOLIDATED CURRENT CONDITIONS PLAN VIEW - YEAR THREE MONITORING

YADKIN COUNTY, NORTH CAROLINA
EEP PROJECT NUMBER: 308
DATE: AUGUST 23, 2010

NORTH CAROLINA
ECOSYSTEM ENHANCEMENT PROGRAM
NC-EEP CONTACT: HARRY TSOMIDES (828) 545-7057



VICINITY MAP
NTS



POINT TABLE				
POINT NUMBER	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	858613.93	1464824.91	928.25	CONTROL
2	857706.98	1464784.29	923.60	CONTROL
3	857497.74	1465232.84	921.75	CONTROL
4	857374.24	1465869.69	943.35	CONTROL
5	857383.41	1466105.73	924.76	CONTROL
6	857286.17	1466325.15	945.11	CONTROL
7	857204.24	1466508.09	947.75	CONTROL
8	857188.08	1466694.46	939.14	CONTROL
9	856985.38	1467244.76	928.06	CONTROL
10	856996.29	1466467.36	970.98	CONTROL
11	856897.33	1467392.45	917.61	CONTROL
100	857064.87	1467441.85	917.74	CONTROL
101	858419.60	1464837.57	930.60	CONTROL
102	858025.29	1465002.38	927.84	CONTROL
103	858597.92	1464848.09	933.32	CONTROL
104	858530.69	1465077.59	969.73	CONTROL
105	857360.69	1465445.98	923.35	CONTROL
106	858309.21	1464950.27	949.60	NL SET
107	858049.05	1465099.55	941.04	NL SET
108	857672.99	1465257.40	923.10	NL SET
109	857351.66	1465705.60	933.45	NL SET
110	857528.08	1466070.12	918.28	NL SET
111	857483.76	1466334.47	916.79	NL SET
9001	858530.66	1465077.56	969.66	TTPT104
9002	858583.24	1465085.65	964.54	EIP-IN-30MAPLE
9003	858597.24	1464859.07	934.86	R/W MON
9004	858162.53	1464795.63	928.21	BENCHMARK 1
9005	858025.27	1465002.36	927.84	TTPT102
9006	857685.27	1465116.57	924.65	BENCHMARK 3
9007	857560.18	1465779.26	921.38	BENCHMARK 4?
9008	857360.66	1465446.04	923.31	TTPT105
9009	857508.68	1466220.77	919.02	BENCHMARK 5
9010	857439.76	1466843.27	918.41	BENCHMARK 8
9011	857317.78	1466690.43	919.68	BENCHMARK 7

NOTE: SURVEY DATES OF THALWEG AND TOP-OF-BANK - 08/02/10 TO 08/05/10.

SHEET INDEX
1-6 INTEGRATED PLAN VIEW

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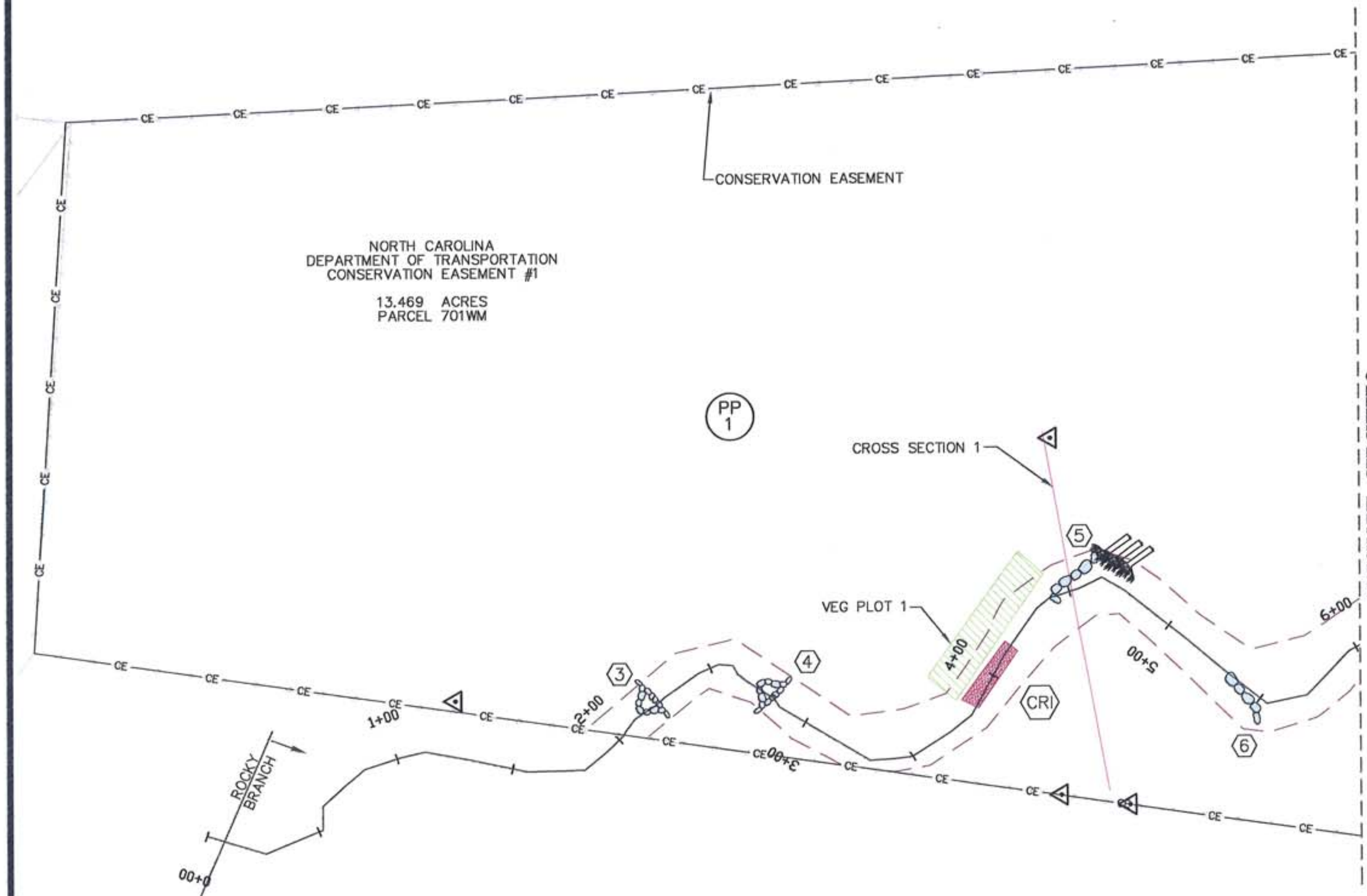

LEGEND

EXISTING FENCE LINE	
THALWEG OF CREEK	
CONSERVATION EASEMENT	
ROCK CROSS VANE	
ROCK A-VANE	
LOG VANE	
ROOT WAD	
ROCK VANE	
STRUCTURE NUMBER	
SURVEY CONTROL	
INVASIVE / EXOTIC POPULATION	
PHOTO POINT	
CREST GAGE	
RIFFLE	
BEAVER DAM	
MID-CHANNEL BAR	
EASEMENT ENCROACHMENT AREA	

NOTES:
CONSERVATION EASEMENT PROVIDED BY EEP FROM PLAT PREPARED BY MULKEY ENGINEERS & CONSULTANTS TITLED "PLAT SHOWING NORTH CAROLINA DEPARTMENT OF TRANSPORTATION CONSERVATION EASEMENTS PROPERTY OF: WILLIAM M. ALLEN, ET. UX., JOE L. ALLEN, ET. UX., TEXIE B. OWNES, ET. AL.", BOOK OF MAPS 9, PAGE 606.

SURVEY DATES OF THALWEG AND TOP-OF-BANK – 08/02/10 TO 08/05/10.

NORTH

GRAPHIC SCALE
50 0 25 50 100
1 inch = 50 ft.

SHEET 1 OF 6

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YADKIN COUNTY, NORTH CAROLINA

PROJECT NO. EEP-08020
FILENAME: EEP-08020X
SCALE: 1" = 50'
DATE: 08-13-10

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CONSOLIDATED CURRENT CONDITIONS PLAN VIEW - YEAR THREE MONITORING
YADKIN COUNTY, NORTH CAROLINA

PROJECT NO.	EEP-08020
FILENAME:	EEP-08020X
SCALE:	1" = 60'
DATE:	08-13-10

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GRAPHIC SCALE
1 inch = 60 ft.
120 60 0 30 60

NORTH

MATCH LINE - SEE SHEET 3

MATCH LINE - SEE SHEET 1

VEG PLOT 5
VEG PLOT 4
VEG PLOT 2
VEG PLOT 3
CROSS SECTION 3
CROSS SECTION 2
MID-CHANNEL BAR
COMPRIMISED "J" HOOK STRUCTURE
FORMER BEAVER DAM #3 LOCATION
NEW BEAVER DAM #4 CONSTRUCTED DURING MY03 PERIOD.
TYPHA LATIFOLIA ENCROACHMENT
LESPEDEZA CUNEATA ENCROACHMENT
LIGUSTRUM SINENSE ENCROACHMENT
25' INGRESS, EGRESS AND REGRESS EASEMENT
CONSERVATION EASEMENT
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION CONSERVATION EASEMENT #1
13.469 ACRES PARCEL 701WM

SHEET 2 OF 6

ROCKY BRANCH

CONSOLIDATED CURRENT CONDITIONS PLAN VIEW - YEAR THREE MONITORING
YADKIN COUNTY, NORTH CAROLINA

PROJECT NO.	EEP-08020
FILENAME:	EEP-08020X
SCALE:	1" = 50'
DATE:	08-13-10

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SHEET 3 OF 6

GRAPHIC SCALE
1 inch = 50 ft.
100 50 0 25 50

NORTH

MATCH LINE - SEE SHEET 4

MATCH LINE - SEE SHEET 2

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
CONSERVATION EASEMENT #2
3.641 ACRES
PARCEL 702WM

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
CONSERVATION EASEMENT #1
13.469 ACRES
PARCEL 701WM

CONSERVATION EASEMENT

LIGUSTRUM SINENSE ENCROACHMENT

LESPEDEZA CUNEATA ENCROACHMENT

CROSS SECTION 4

CROSS SECTION 5

VEG PLOT 6

VEG PLOT 7

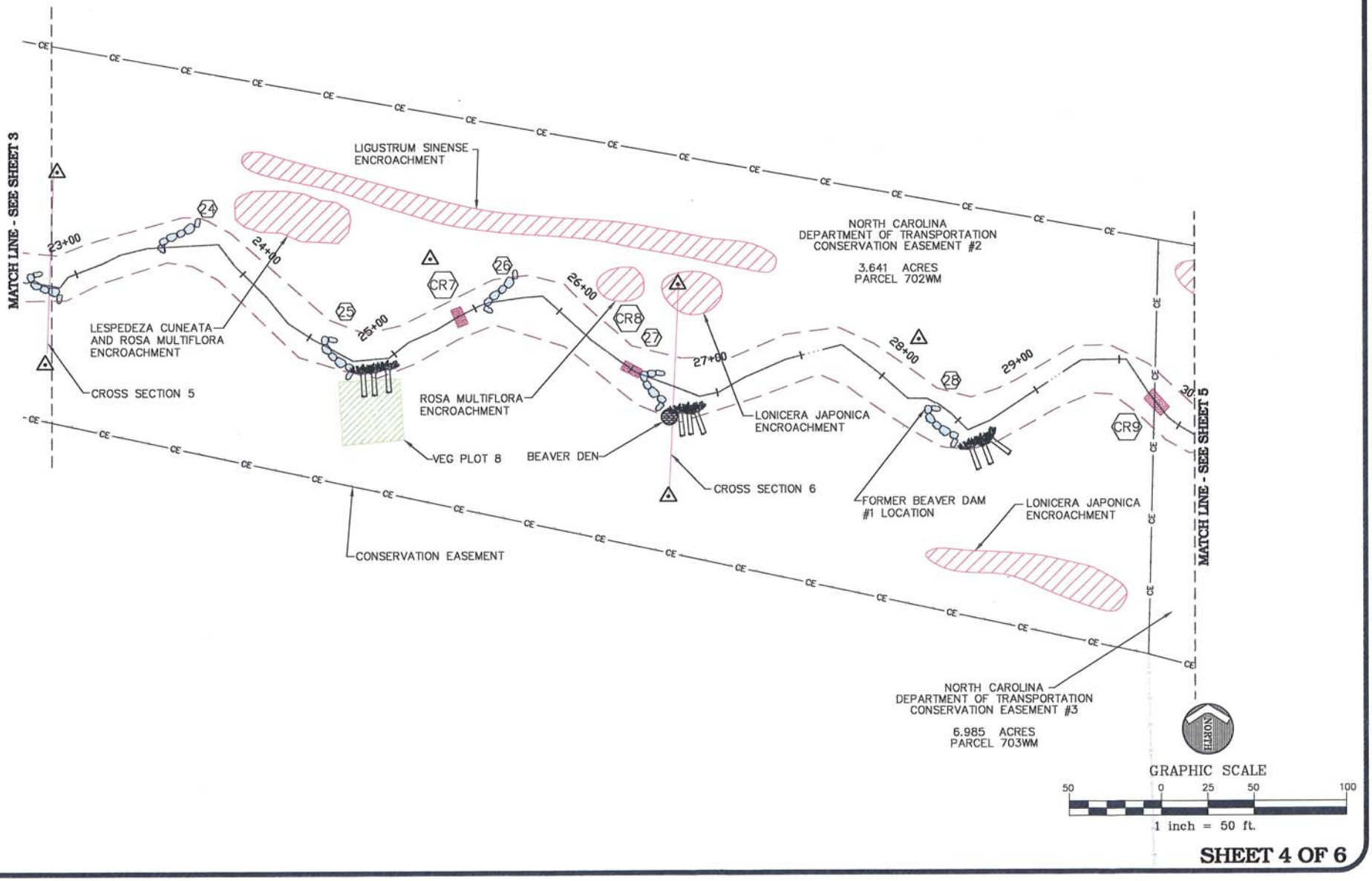
25' INGRESS, EGRESS AND REGRESS EASEMENT

PP 3

CR1

CR6

17+00 18+00 19+00 20+00 21+00 22+00 23+00



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CONSOLIDATED CURRENT CONDITIONS PLAN VIEW - YEAR THREE MONITORING
YADKIN COUNTY, NORTH CAROLINA

PROJECT NO. EEP-08020
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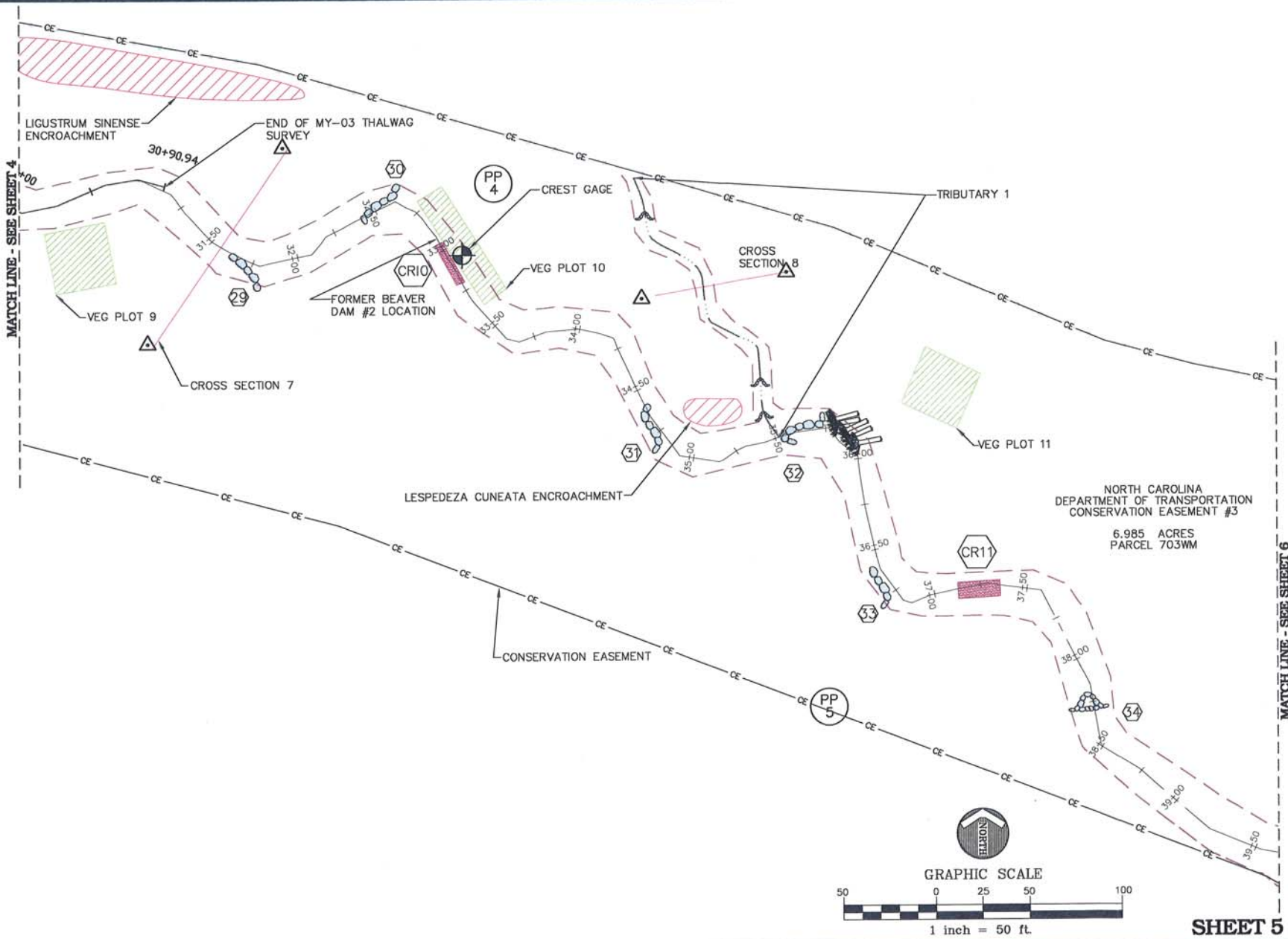

SHEET 5 OF 6

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PROJECT NO.	EEP-08020
FILENAME:	EEP-08020X
SCALE:	1" = 50'
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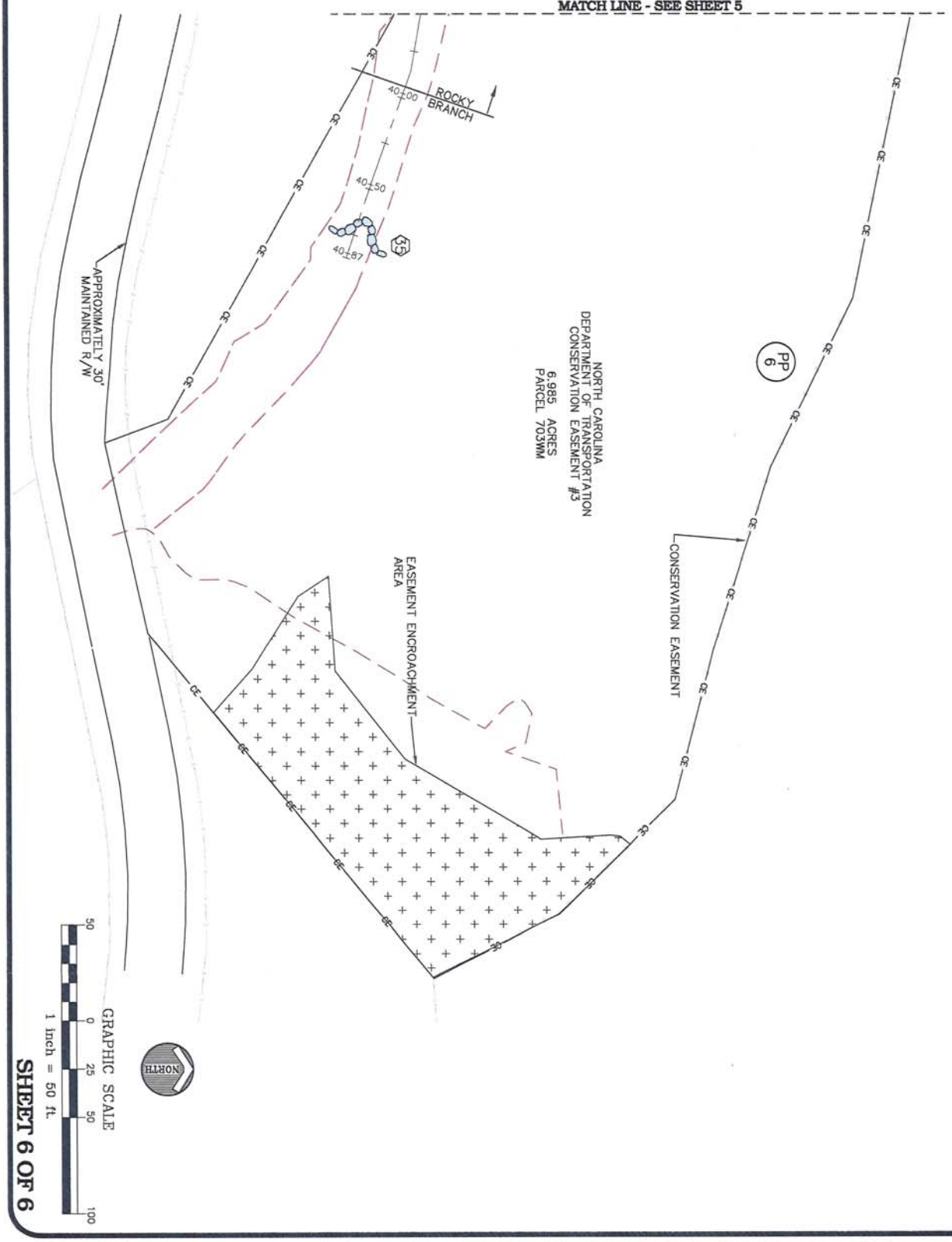

SHEET 6 OF 6

PROJECT NO.	EEP-08020
FILENAME:	EEP-08020X
SCALE:	1" = 50'
DATE:	08-13-10

ROCKY BRANCH

CONSOLIDATED CURRENT CONDITIONS PLAN VIEW - YEAR THREE MONITORING
YADKIN COUNTY, NORTH CAROLINA

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APPENDIX B

General Project Tables

Table 1. Project Restoration Components Rocky Branch Stream Restoration Site/EEP Project Number: 308								
Project Segment or Reach ID	**Existing Feet/Acres**	**Type**	**Approach**	**Footage or Acreage**	**Mitigation Ratio**	**Mitigation Units**	**Stationing**	**Comment**
Rocky Branch	3,090	R	P1 & P2	3,614	1	3,614	0+00 - 30+90.94	
		EI	P4	206	0.66	137		
Tributary 1	593	R	P1	172	1	172	0+00 - 1+72	
Tributary 2	280	NA	NA	Pond	NA	NA	NA	NA = Not Applicable; Portion of original channel contained within proposed conservation easement
Mitigation Unit Summations								
Stream (lf)	Riparian Wetland (Ac)		Nonriparian Wetland (Ac)		Total Wetland (Ac)		Buffer (Ac)	Comment
3,923	0		0		0		0	

R= Restoration
EI= Enhancement
EII= Enhancement II
S= Stabilization
P1= Priority I
P2= Priority II
P3= Priority III
SS=Stream Bank Stabilization

Table 2. Project Activity and Reporting History Rocky Branch Stream Restoration Site/EEP Project Number: 308		
Activity or Report	**Data Collection Complete**	**Actual Completion or Delivery**
Restoration Plan	Winter 04	Mar-05
Final Design – 90%	Summer 05	Winter 05
Construction	May-06	Sep-06
Temporary S&E mix applied to entire project area	May-06	Sep-06
Permanent seed mix applied to reach/segments 1 & 2	Sep-06	Sep-06
Containerized and B&B plantings for reach/segments 1 & 2	Fall 06	Dec-06
Mitigation Plan / As-built (Year 0 Monitoring – baseline)	Winter 07	Feb-08
Year 1 Monitoring	Sep-08	Nov-08
Year 2 Monitoring	Sep-09	Nov-09
Year 3 Monitoring	Aug-10	Oct-10

Note: Timeframe estimated from information provided by EEP.

Table 3. Project Contacts Table Rocky Branch Stream Restoration Site/EEP Project Number: 308	
Designer Primary project design POC	Mulkey Engineers & Consultants 6750 Tryon Road, cary, NC 27518 Wendee Smith, 919-858-1833
Construction Contractor Construction contractor POC	Fluvial Solutions, Inc. PO Box 28749, Raleigh, NC 27611-8749 Peter Jelenevsky, 919-605-6134
Planting Contractor Planting contractor POC	Carolina Silvics 908 Indian Trail Road, Edenton, NC 27932 Mary-Margaret McKinney 252-484-8491
Seeding Contractor Planting contractor POC	Contact: Fluvial Solutions, Inc. PO Box 28749, Raleigh, NC 27611-8749 Peter Jelenevsky, 919-605-6134
Seed Mix Sources	Contact: Fluvial Solutions, Inc. Peter Jelenevsky, 919-605-6134
Nursery Stock Suppliers	ArboGen 843-851-4129
Monitoring Performers	EcoEngineering - A Division of The John R. McAdams Co. 2905 Meridian Parkway, Durham, NC 27713
Stream Monitoring POC Jim Halley	919-287-4262
Vegetation Monitoring POC Jim Halley	919-287-4262
Wetland Monitoring POC NA	NA

Note: Information obtained from EEP documents and bid tabulation results. Use contacts in table for additional information or to verify data.

Table 4. Project Background Table Rocky Branch Stream Restoration Site/EEP Project Number: 308	
Project County	Yadkin County
Drainage Area	3.1 square miles
Drainage impervious cover estimate (%) For example	5%
Stream Order	1
Physiographic Region	Piedmont
Ecoregion	Northern Inner Piedmont
Rosgen Classification of As-built	C4
Cowardin Classification	R3UBH
Dominant soil types	Chewacla, Cecil, Appling, and Wilkes
Reference site ID	Spencer Creek
USGS HUC for Project and Reference	Project 03040102, Reference 03040104
NCDWQ Sub-basin for Project and Reference	Project 03-07-06, Reference 03-07-09
NCDWQ classification for Project and Reference	Project WS-III, Reference WS-IV
Any portion of any project segment 303d listed?	no
Any portion of any project segment upstream of a 303d listed segment?	no
Reasons for 303d listing or stressor	no
% of project easement fenced	100%

APPENDIX C

Vegetation Assessment Data

Table 5. Vegetation Plot Mitigation Success Summary Table			
Rocky Branch Stream Restoration Site/EEP Project ID: 308			
Tract	**Vegetation Plot ID**	**Vegetation Survival Threshold Met?**	**Tract Mean**
Rocky Branch	VP1	Y	100%
	VP2	Y	
	VP3	Y	
	VP4	Y	
	VP5	Y	
	VP6	Y	
	VP7	Y	
	VP8	Y	
	VP9	Y	
	VP10	Y	
	VP11	Y	

Note: Threshold criteria based on planted and volunteer species.

Table 6. Vegetation Metadata	
Rocky Branch Stream Restoration Site/EEP Project ID: 308	
Report Prepared By	George Buchholz
Date Prepared	10/4/2010 16:25
database name	EcoEngineering-2010-B.mdb
database location	X:\Projects\EEP\EEP-08020 (Rocky Branch)\Storm\CVS Vegetation Data\2010 Vegetation Data
computer name	BUCHHOLZGEO
file size	52297728
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----------	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, total stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
PROJECT SUMMARY----------	
Project Code	308
project Name	Rocky Branch
Description	Rocky Branch Stream Restoration Project
River Basin	Yadkin-Pee Dee
length(ft)	3,992
stream-to-edge width (ft)	24
area (sq m)	0.04 sq mile (24.10 acres)
Required Plots (calculated)	11
Sampled Plots	11

Table 6A. Vegetation Condition Assessment
Rocky Branch Stream Restoration Site/EEP Project ID: 308

Planted Acreage **13.29**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acres	----	0	0	0.0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	----	0	0	0.0%
			Total			
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	----	0	0	0.0%
			Cumaltive Total			0.0%

Easement Acreage **24.09**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale).	1000 SF	diagonal, red	17	0.81	3.36%
5. Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	none	cross, black	1	0.35	1.5%

Table 7. Stem Couont Total and Planted by Plot Species
Rocky Branch Stream Restoration Site/EEP Project ID: 308
Page 1

			Current Plot Data (MY3 2010)																									
			E308-01-VP10			E308-01-VP11			E308-01-VP1			E308-01-VP2			E308-01-VP3			E308-01-VP4			E308-01-VP5			E308-01-VP6			E308-01-VP7		
Scientific Name	Common Name	Species Type	P-LS	P-all	T^2	P-LS	P-all	T^2	P-LS	P-all	T^2	P-LS	P-all	T^2	P-LS	P-all	T^2	P-LS	P-all	T^2	P-LS	P-all	T^2	P-LS	P-all	T^2	P-LS	P-all	T^2
Acer negundo	boxelder	Tree									3			1			47								1			1
Acer spicatum	mountain maple	Shrub Tree																									1	1
Alnus serrulata	hazel alder	Shrub Tree					4	4														2	2					
Betula nigra	river birch	Tree		3	3																				1	1		1	2
Cephalanthus occidentalis	common buttonbush	Shrub Tree					3	4					1	1								3	3		6	7		2	3
Cornus amomum	silky dogwood	Shrub																											
Fraxinus pennsylvanica	green ash	Tree		3	4								6	6		3	5		5	5		4	4		5	5		5	5
Itea virginica	Virginia sweetspire	Shrub																											
Juglans nigra	black walnut	Tree															2												
Liriodendron tulipifera	tuliptree	Tree			8			3									1												
Platanus occidentalis	American sycamore	Tree		1	38		2	3		9	11		1	1		11	11		2	2									
Prunus serotina	black cherry	Shrub Tree																											
Prunus virginiana	chokecherry	Shrub Tree												1					1	1									
Quercus nigra	water oak	Tree								3	3		1	1															
Quercus phellos	willow oak	Tree		1	1		5	6											3	3								7	7
Rhus copallinum	flameleaf sumac	Shrub Tree			1																								
Salix nigra	black willow	Tree		3	3					6	6																		
Sambucus canadensis	Common Elderberry	Shrub Tree																							1	1			
		Stem count	0	11	58	0	14	20	0	18	23	0	9	11	0	14	66	0	11	11	0	9	9	0	13	15	0	16	19
		size (ares)	1			1			1			1			1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
		Species count	0	5	7	0	4	5	0	3	4	0	4	6	0	2	5	0	4	4	0	3	3	0	4	5	0	5	6
		Stems per ACRE	0	445	2347	0	567	809	0	728	931	0	364	445	0	567	2671	0	445	445	0	364	364	0	526	607	0	647	769

Notes:
1 = Original baseline vegetation monitoring data was not provided prior to the 2008 Monitoring Year 1 and 2008 is considered a drought year. The 2009 Monitoring Year 2 is considered the baseline datum because after two years of monitoring it is assumed all planted stems within a vegetation monitoring plot have been surveyed and accounted for. Therefore, any additional species observed in proceeding monitoring years are considered volunteer species.
2 = Total of planted stems and volunteer stems.
3 = Total of planted stems only.

Table 7. Stem Couont Total and Planted by Plot Species
Rocky Branch Stream Restoration Site/EEP Project ID: 308
Page 2

			Current Plot Data (MY3 2010)						Annual Means								
			E308-01-VP8			E308-01-VP9			MY3 (2010)			MY2 (2009)[1]			MY1 (2008)		
Scientific Name	Common Name	Species Type	P-LS	P-all	T[2]	P-LS	P-all	T[2]	P-LS	P-all	T[2]	P-LS	P-all	T[3]	P-LS	P-all	T[3]
Acer negundo	boxelder	Tree									53						
Acer spicatum	mountain maple	Shrub Tree								1	1		2	2		2	2
Alnus serrulata	hazel alder	Shrub Tree		2	2		1	1		9	9		9	9		5	5
Betula nigra	river birch	Tree					1	1		6	7		8	8		8	8
Cephalanthus occidentalis	common buttonbush	Shrub Tree		3	3					18	21		19	19		25	25
Cornus amomum	silky dogwood	Shrub											1	1		6	6
Fraxinus pennsylvanica	green ash	Tree		5	5		5	5		41	44		49	49		47	47
Itea virginica	Virginia sweetspire	Shrub											2	2		3	3
Juglans nigra	black walnut	Tree									2						
Liriodendron tulipifera	tuliptree	Tree		1	40		1	24		2	76		2	2		3	3
Platanus occidentalis	American sycamore	Tree		7	55			6		33	127		37	37		37	37
Prunus serotina	black cherry	Shrub Tree						1			1						
Prunus virginiana	chokecherry	Shrub Tree								1	2		1	1		3	3
Quercus nigra	water oak	Tree								4	4		8	8		9	9
Quercus phellos	willow oak	Tree					3	3		19	20		22	22		18	18
Rhus copallinum	flameleaf sumac	Shrub Tree									1						
Salix nigra	black willow	Tree								9	9		14	14		20	20
Sambucus canadensis	Common Elderberry	Shrub Tree								1	1		1	1		3	3
		Stem count	0	18	105	0	11	41	0	144	378	0	175	175	0	189	189
		size (ares)		1			1			11			11			11	
		size (ACRES)		0.02			0.02			0.27			0.27			0.27	
		Species count	0	5	5	0	5	7	0	12	16	0	14	14	0	14	14
		Stems per ACRE	0	728	4249	0	445	1659	0	530	1391	0	644	644	0	695	695

Notes:

1 = Original baseline vegetation monitoring data was not provided prior to the 2008 Monitoring Year 1 and 2008 is considered a drought year. The 2009 Monitoring Year 2 is considered the baseline datum because after two years of monitoring it is assumed all planted stems within a vegetation monitoring plot have been surveyed and accounted for. Therefore, any additional species observed in proceeding monitoring years are considered volunteer species.

2 = Total of planted stems and volunteer stems.

3 = Total of planted stems only.

VEGETATION PLOT 1 - STREAMBANKS (5m X 20m). VIEW FROM SOUTHEAST PLOT CORNER.

VEGETATION PLOT 2 - RIPARIAN BUFFER (10m x 10m). VIEW FROM SOUTHEAST PLOT CORNER.

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SCALE:	NTS
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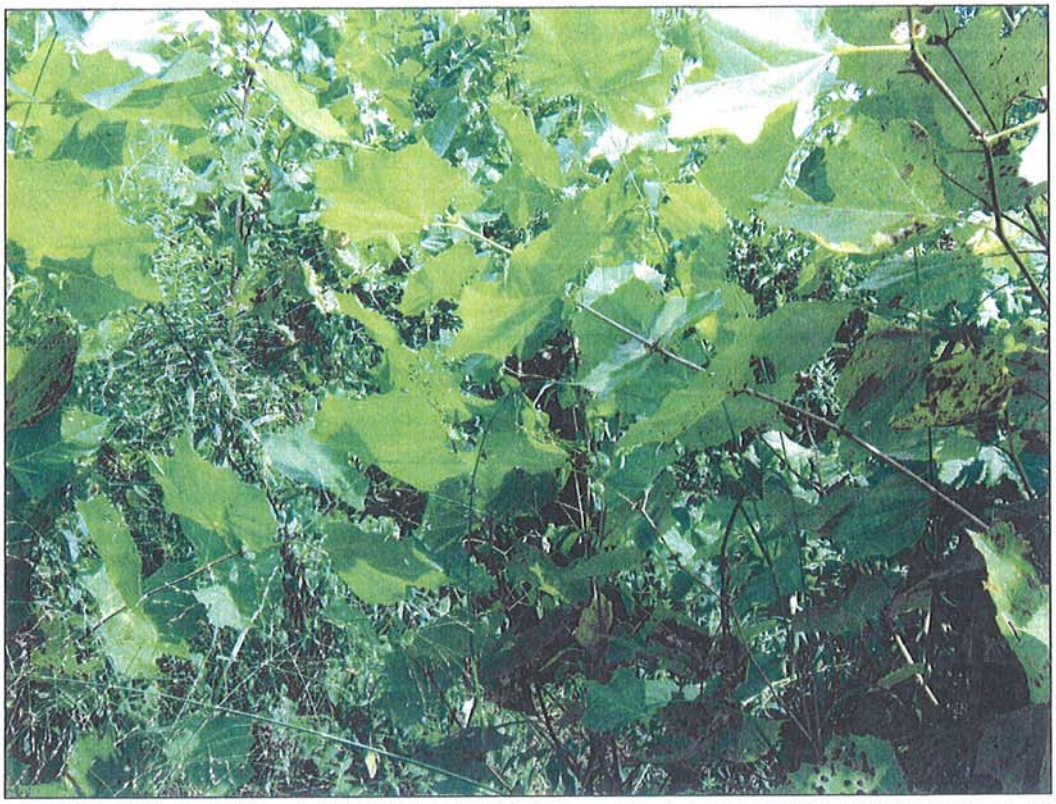
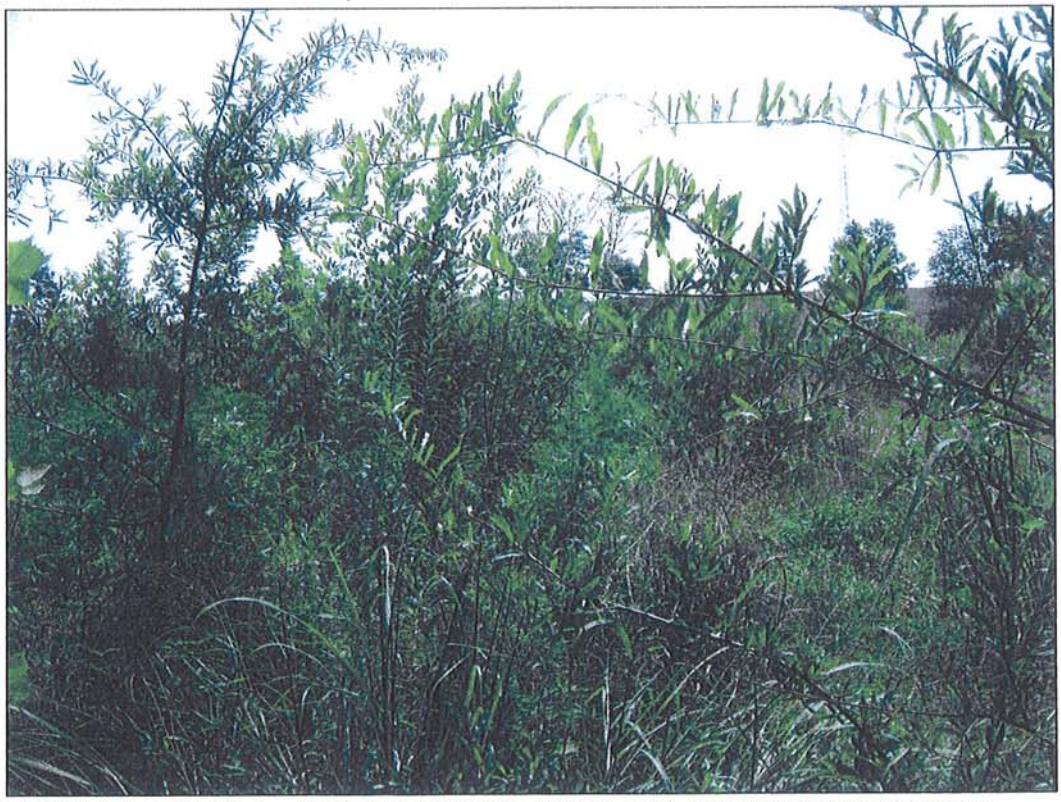


VEGETATION PLOT 3 - RIPARIAN BUFFER (10m x 10m). VIEW FROM NORTHWEST PLOT CORNER.



VEGETATION PLOT 4 - RIPARIAN BUFFER (10m x 10m). VIEW FROM NORTHWEST PLOT CORNER.

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FILENAME:	EEP08020-EX1
SCALE:	NTS
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VEGETATION PLOT 5 - RIPARIAN BUFFER (10m x 10m). VIEW FROM NORTHWEST CORNER.

VEGETATION PLOT 6 - RIPARIAN BUFFER (10m x 10m). VIEW FROM NORTHWEST PLOT CORNER.

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VEGETATION PLOT 7 - RIPARIAN BUFFER (10m x 10m). VIEW FROM NORTHWEST CORNER.

VEGETATION PLOT 8 - RIPARIAN BUFFER (10m x 10m). VIEW FROM NORTHWEST PLOT CORNER.

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VEGETATION PLOT 9 - RIPARIAN BUFFER (10m x 10m). VIEW FROM NORTHWEST CORNER.

VEGETATION PLOT 10 - RIPARIAN BUFFER (5m x 20m). VIEW FROM NORTHWEST PLOT CORNER.

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VEGETATION PLOT II - RIPARIAN BUFFER (10m x 10m). VIEW FROM NORTHWEST CORNER.

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FILENAME:	EEP08020-EX1
SCALE:	NTS
DATE:	08-11-10

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APPENDIX D

Stream Assessment Data

Table 8a. Visual Morphological Stability Assessment
Rocky Branch Stream Restoration Site/EEP Project Number: 308
Rocky Branch: 3,751 Linear Feet

Feature Category	Metric (per As-built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-built	Total Number / feet in unstable state	% Perform in Stable Condition	Feature Perform. Mean or Total
A. Riffles	1. Present ?	28	28	NA	100	
	2. Armor stable (e.g. n o displacement)?	28	28	NA	100	
	3. Facet grade appears stable?	23	28	NA	82	
	4. Minimal evidence of embedding/fining?	28	28	NA	100	
	5. Length appropriate?	NA	NA	NA	NA	**96**
B. Pools	1. Present? (e.g. not subject to severe aggrad. or migrat.?)	25	27	NA	93	
	2. Sufficiently deep (Max Pool D:Mean Bkf>1.6?)	3.5 / 1.5 = 2.3 27	Max Pool / 1.5 > 1.6, 24 of 27	NA	89	
	3. Length appropriate?	23	27	NA	85	**89**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	37	39	NA	95	
	2. Downstream of meander (glide/inflection) centering?	37	39	NA	93	**94**
D. Meander	1. Outer bend in state of limited/controlled erosion?	43	43	NA	100	
	2. Of those eroding, # w/concomitant point bar formation	43	43	NA	100	
	3. Apparent Rc within spec?	42	43	NA	98	
	4. Sufficient floodplain access and relief?	43	43	NA	100	**100**
E. Bed General	1. General channel bed aggradation areas (bar formation)	NA	NA	NA	100	
	2. Channel bed degradation – areas of increasing down-cutting or head cutting?	NA	NA	NA	100	**100**
F. Bank	1. Actively eroding, wasting, or slumping bank	NA	NA	5/90	98	**98**
G. Vanes	1. Free of bank or arm scour?	35	36	30	97	
	2. Height appropriate?	35	36	30	97	
	3. Angle and geometry appear appropriate?	35	36	30	97	
	4. Free of piping or other structural failures?	35	36	30	97	**97**
H. Wads/ Boulders	1. Free of scour?	40	40	NA	100	
	2. Footing stable?	40	40	NA	100	**100**

Table 8b. Visual Morphological Stability Assessment
Rocky Branch Stream Restoration Site/EEP Project Number: 308
Rocky Branch Tributary 1: 172 Linear Feet

Feature Category	Metric (per As-built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-built	Total Number / feet in unstable state	% Perform in Stable Condition	Feature Perform. Mean or Total
A. Riffles	1. Present ?	3	3	NA	100	
	2. Armor stable (e.g. n o displacement)?	3	3	NA	100	
	3. Facet grade appears stable?	3	3	NA	100	
	4. Minimal evidence of embedding/fining?	3	3	NA	100	
	5. Length appropriate?	NA	NA	NA	NA	**100**
B. Pools	1. Present? (e.g. not subject to severe aggrad. or migrat.?)	NA	NA	NA	NA	
	2. Sufficiently deep (Max Pool D:Mean Bkf>1.6?)	NA	NA	NA	NA	
	3. Length appropriate?	NA	NA	NA	NA	**NA**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	4	4	NA	100	
	2. Downstream of meander (glide/inflection) centering?	3	4	NA	100	**100**
D. Meander	1. Outer bend in state of limited/controlled erosion?	5	5	NA	100	
	2. Of those eroding, # w/concomitant point bar formation	0	0	NA	100	
	3. Apparent Rc within spec?	5	5	NA	100	
	4. Sufficient floodplain access and relief?	5	5	NA	100	**100**
E. Bed General	1. General channel bed aggradation areas (bar formation)	NA	NA	NA	100	
	2. Channel bed degradation – areas of increasing down-cutting or head cutting?	NA	NA	NA	100	**100**
F. Bank	1. Actively eroding, wasting, or slumping bank	NA	NA	0/172	100	**100**
G. Vanes	1. Free of bank or arm scour?	3	3	NA	100	
	2. Height appropriate?	3	3	NA	100	
	3. Angle and geometry appear appropriate?	3	3	NA	100	
	4. Free of piping or other structural failures?	3	3	NA	100	**100**
H. Wads/ Boulders	1. Free of scour?	NA	NA	NA	NA	
	2. Footing stable?	NA	NA	NA	NA	**NA**

Table 9. Verification of Bankfull Events Rocky Branch Stream Restoration Site/EEP Project Number: 308			
Date of Data Collection	**Date of Occurrence**	**Method**	**Photo # (if available)**
24-Sep-08	No occurrence	Observation	Not Available
2-Oct-09	Between 09/25/08 and 10/02/09	On-Site Crest Gage located at Station 33+08. Observed eleveation on gage at elevation 918.99	Not Available
5-Aug-10	Between 10/02/09 and 08/05/10	On-Site Crest Gage located at Station 33+08. Observed elevation on gage at elevation 914.25	Not Available

PHOTO POINT 1. VIEW LOOKING SOUTH TOWARD DAIRY FACILITY.

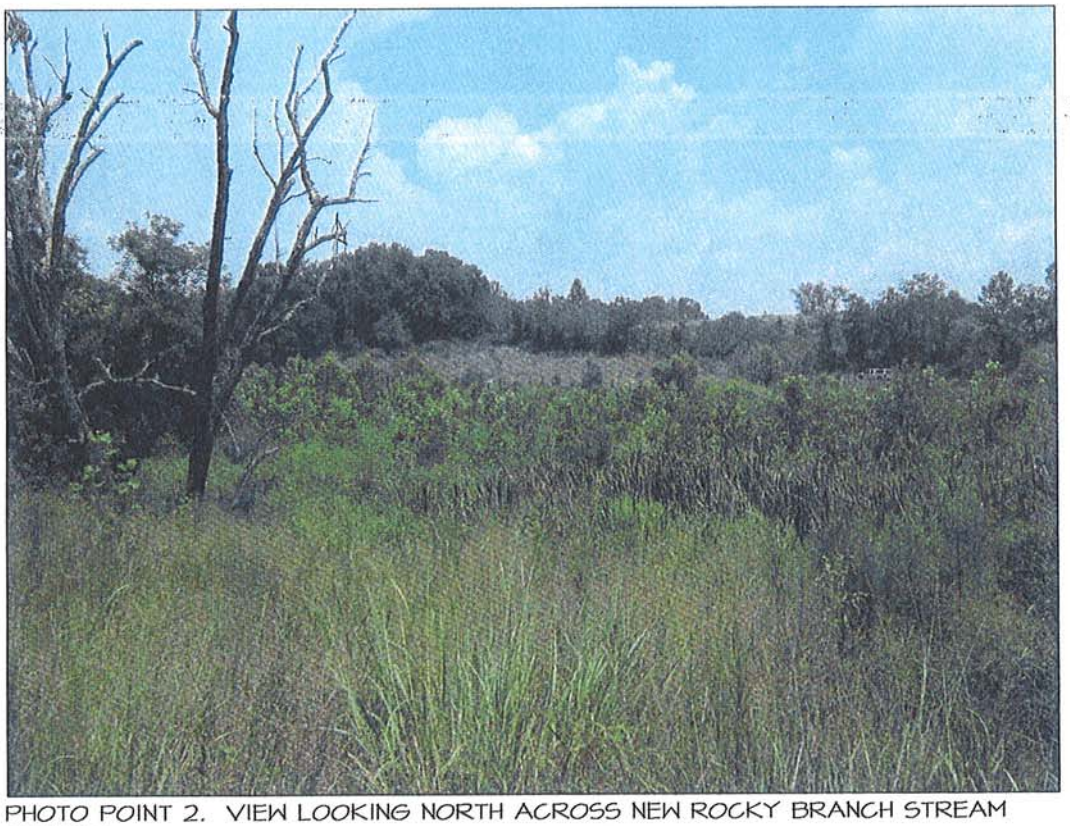

PHOTO POINT 2. VIEW LOOKING NORTH ACROSS NEW ROCKY BRANCH STREAM CHANNEL.

PROJECT NO.	EEP-08020
FILENAME:	EEP08020-EX1
SCALE:	NTS
DATE:	08-11-10

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PHOTO POINT 2. VIEW LOOKING NORTHEAST ACROSS NEW EXISTING ROCKY BRANCH STREAM CHANNEL.

PHOTO POINT 3. VIEW LOOKING WEST TOWARD THE I-77 ROADWAY CORRIDOR.

PROJECT NO.	EEP-08020
FILENAME:	EEP08020-EX1
SCALE:	NTS
DATE:	08-11-10

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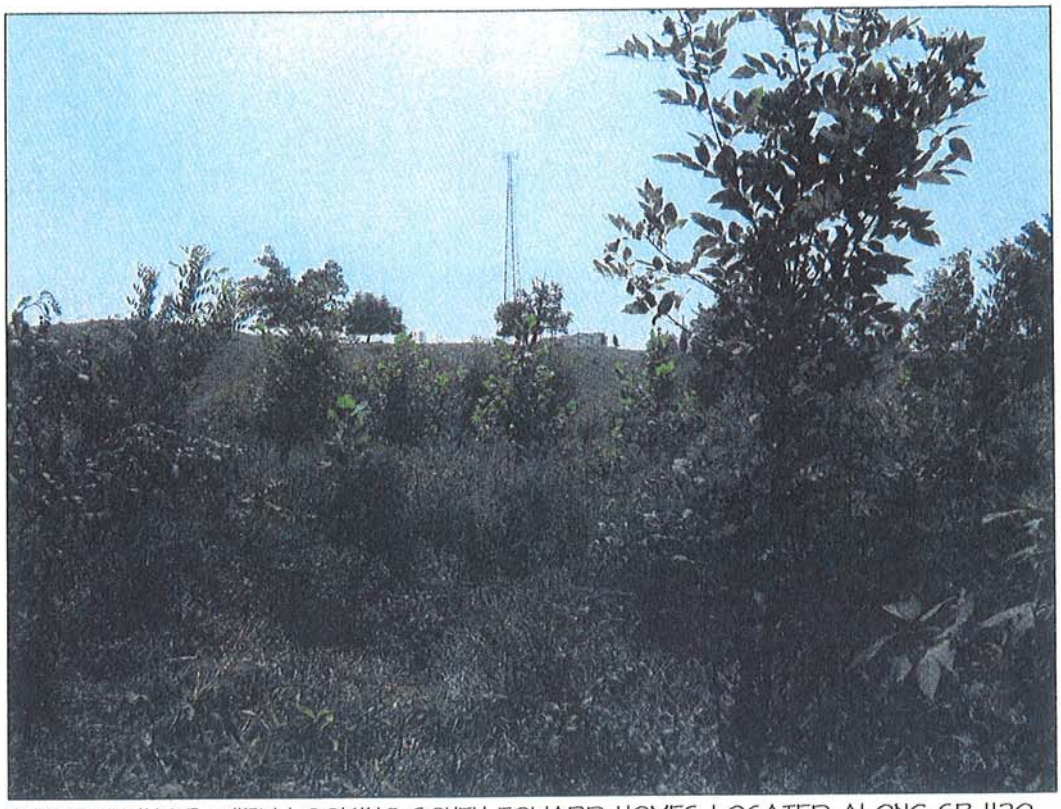

PHOTO POINT 3. VIEW LOOKING SOUTH TOWARD HOMES LOCATED ALONG SR 1120.

PHOTO POINT 3. VIEW LOOKING EAST TOWARD WOODED AREA.

PROJECT NO.	EEP-08020
FILENAME:	EEP08020-EX1
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PHOTO POINT 4. VIEW LOOKING WEST THROUGH WOODED SECTION.

PHOTO POINT 4. VIEW LOOKING SOUTH TOWARD SR 1120.

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FILENAME:	EEP08020-EX1
SCALE:	NTS
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PHOTO POINT 4. VIEW LOOKING EAST TOWARD NEWLY CONSTRUCTED TRIBUTARY 1 AND MAIN CHANNEL.

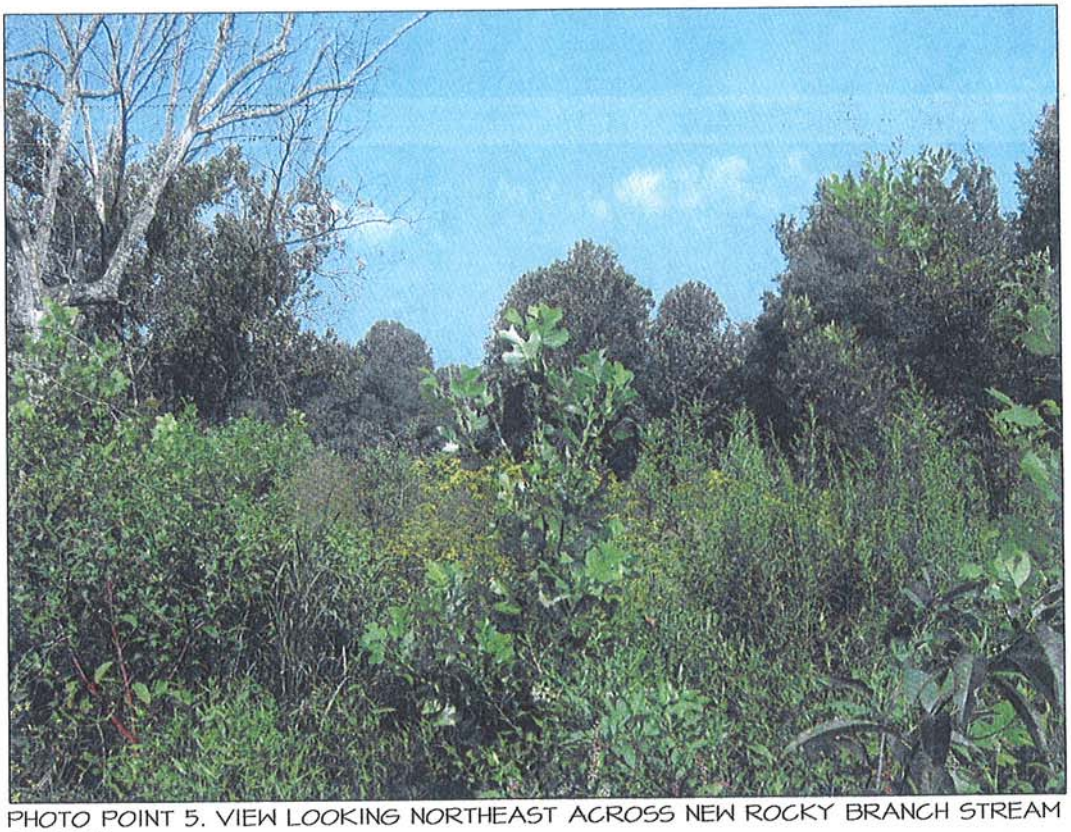

PHOTO POINT 5. VIEW LOOKING NORTHEAST ACROSS NEW ROCKY BRANCH STREAM CHANNEL.

PROJECT NO.	EEP-08020
FILENAME:	EEP08020-EX1
SCALE:	NTS
DATE:	08-11-10

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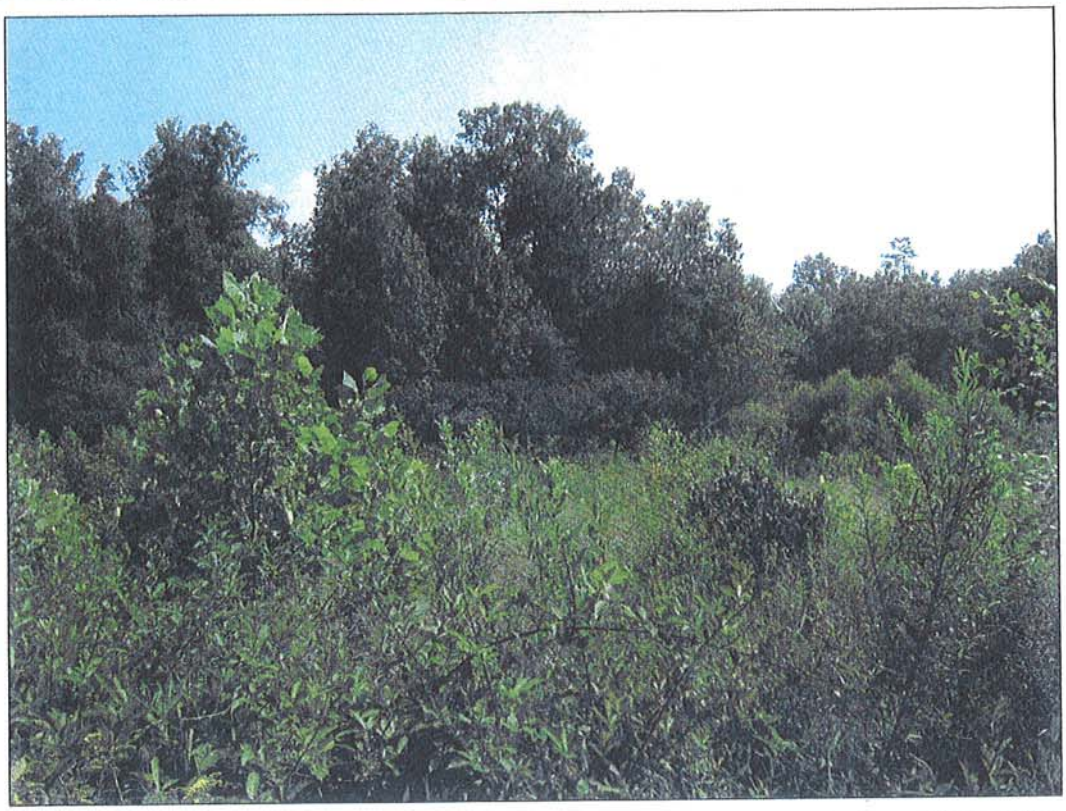

PHOTO POINT 5. VIEW LOOKING NORTH TOWARD NEWLY CONSTRUCTED TRIBUTARY 1.

PHOTO POINT 5. VIEW LOOKING NORTHEAST TOWARD NEW POND.

PROJECT NO.	EEP-08020
FILENAME:	EEP08020-EX1
SCALE:	NTS
DATE:	08-11-10

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PHOTO POINT 6. VIEW LOOKING WEST TOWARD SR 1120.

PHOTO POINT 6. VIEW LOOKING SOUTH TOWARD SR 1120 AND JOE ALLEN RESIDENCE.

PROJECT NO.	EEP-08020
FILENAME:	EEP08020-EX1
SCALE:	NTS
DATE:	08-11-10

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PHOTO POINT 6. VIEW LOOKING EAST TOWARD NEW POND.

PROJECT NO.	EEP-08020
FILENAME:	EEP08020-EX1
SCALE:	NTS
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CROSS SECTION 1 - POOL. (ROCKY BRANCH, STA 4 + 25) VIEW LOOKING DOWNSTREAM.

CROSS SECTION 2 - RIFFLE. (ROCKY BRANCH, STA 9 + 22) VIEW LOOKING DOWNSTREAM.

PROJECT NO.	EEP-08020
FILENAME:	EEP08020-EX1
SCALE:	NTS
DATE:	08-11-10

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CROSS SECTION 3 - POOL. (ROCKY BRANCH, STA 13 + 25) VIEW LOOKING DOWNSTREAM.

CROSS SECTION 4 - RIFFLE. (ROCKY BRANCH, STA 17 + 49) VIEW LOOKING DOWNSTREAM.

PROJECT NO.	EEP-08020
FILENAME:	EEP08020-EX1
SCALE:	NTS
DATE:	08-11-10

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CROSS SECTION 5 - POOL. (ROCKY BRANCH, STA 22 + 32) VIEW LOOKING DOWNSTREAM.

CROSS SECTION 6 - RIFFLE. (ROCKY BRANCH, STA 26 + 22) VIEW LOOKING DOWNSTREAM.

PROJECT NO.	EEP-08020
FILENAME:	EEP08020-EX1
SCALE:	NTS
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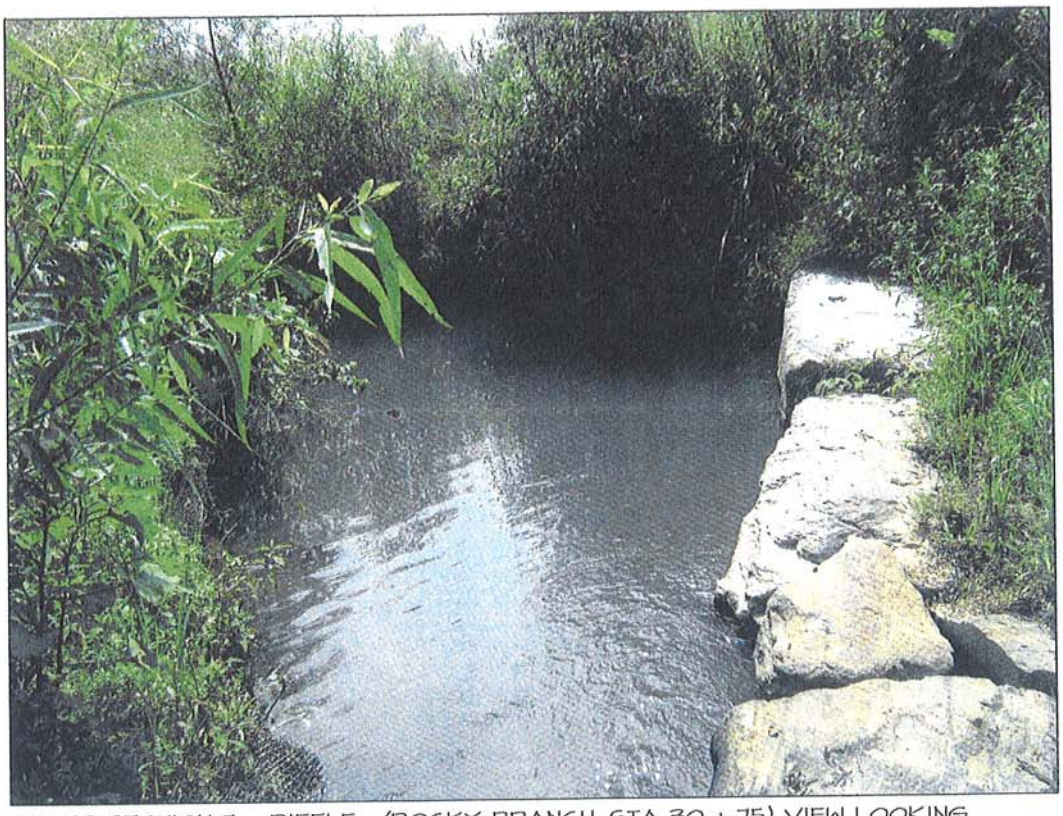
P.O. BOX 14005 ZIP 27709-4005
(919) 361-5000



CROSS SECTION 7 - RIFFLE. (ROCKY BRANCH, STA 30 + 75) VIEW LOOKING DOWNSTREAM.

CROSS SECTION 8 - RIFFLE. (TRIBUTARY 1, STA 0 + 75) VIEW LOOKING DOWNSTREAM.

PROJECT NO.	EEP-08020
FILENAME:	EEP08020-EX1
SCALE:	NTS
DATE:	10-13-09

McADAMS

Ecosystem Enhancement Program

ROCKY BRANCH

MONITORING PHOTOS

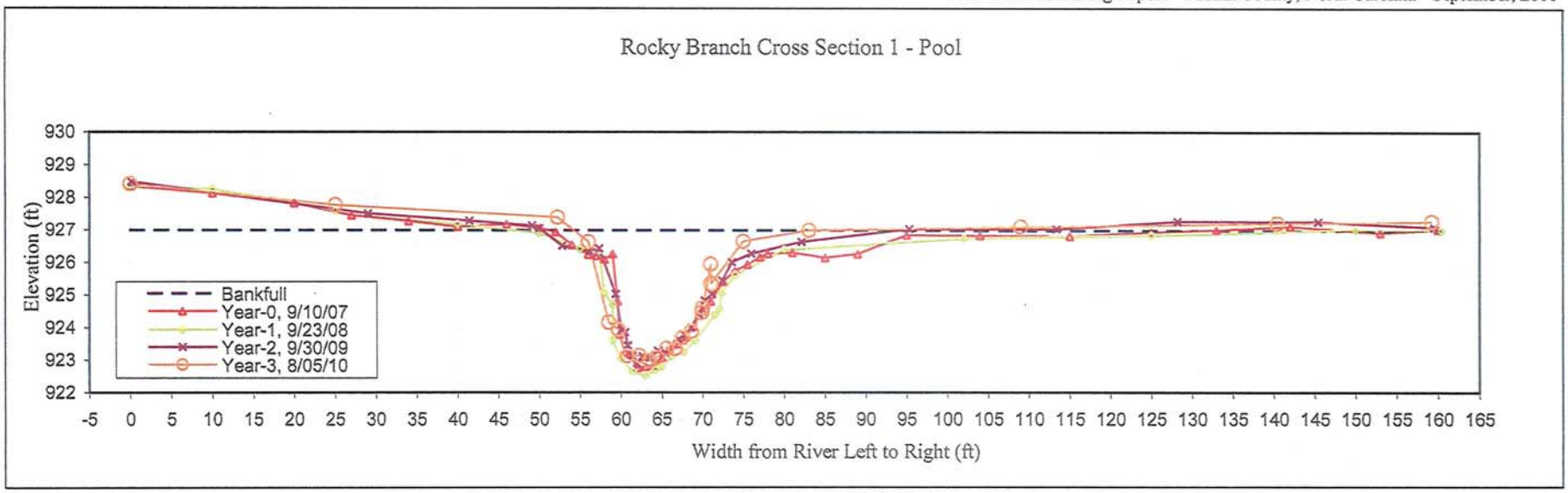
YADKIN COUNTY, NORTH CAROLINA

EcoEngineering
A division of The John R. McAdams Company, Inc.

RESEARCH TRIANGLE PARK, NC
P.O. BOX 14005 ZIP 27709-4005
(919) 361-5000

ROCKY BRANCH **EEP PROJECT # 308** CROSS-SECTION: 1

Year-0		Year-1		Year-2		Year-3		Year-4		Year-5		Year-6	
Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)
0.00	928.33	0.00	928.33	-0.87	928.46	0.00	928.41						
10.00	928.12	10.00	928.26	28.76	927.50	25.04	927.76						
20.00	927.82	25.00	927.58	41.50	927.27	52.24	927.38						
27.00	927.44	40.00	927.18	49.38	927.13	56.04	926.62						
34.00	927.26	50.00	926.90	50.28	927.04	58.54	924.15						
40.00	927.08	55.00	926.41	53.16	926.49	59.69	923.93						
46.00	927.17	57.30	926.34	56.54	926.34	60.77	923.12						
50.00	927.05	58.00	925.08	57.83	926.41	62.26	923.13						
52.00	926.92	59.00	924.71	59.88	925.02	63.46	922.97						
54.00	926.52	59.00	923.62	60.60	923.92	64.36	923.07						
56.00	926.22	60.00	923.05	61.05	923.84	65.61	923.36						
57.00	926.19	61.40	922.64	61.39	923.44	66.63	923.33						
58.00	926.08	63.00	922.52	61.96	923.12	67.55	923.69						
59.00	926.25	64.20	922.68	62.54	922.90	68.67	923.88						
59.60	924.80	65.00	922.80	63.27	923.10	69.93	924.46						
59.80	923.79	66.20	923.12	64.16	923.07	70.00	924.60						
60.50	923.25	67.70	923.26	65.20	923.28	71.00	925.94						
61.00	923.19	69.10	923.61	66.11	923.20	71.03	925.34						
62.00	922.75	71.50	924.40	66.81	923.47	74.99	926.64						
63.00	922.78	72.10	924.58	67.78	923.63	83.04	926.98						
64.00	922.83	72.30	925.06	68.58	923.75	109.00	927.09						
65.00	923.07	74.00	925.62	69.35	923.99	140.48	927.20						
66.00	923.29	80.00	926.38	70.31	924.40	159.25	927.26						
67.00	923.49	102.00	926.74	71.07	924.82								
68.00	923.71	125.00	926.84	71.99	925.02								
69.00	924.04	150.00	927.02	73.27	925.43								
70.00	924.50	160.40	926.99	74.49	925.99								
71.00	924.80			76.91	926.26								
72.50	925.40			83.25	926.62								
74.00	925.73			96.79	927.03								
75.50	925.92			115.30	927.03								
77.00	926.15			130.50	927.26								
78.00	926.26			148.17	927.26								
81.00	926.29			162.68	927.08								
85.00	926.13												
89.00	926.25												
95.00	926.83												
104.00	926.81												
115.00	926.80												
125.00	926.92												
133.00	927.00												
142.00	927.11												
153.00	926.91												
160.00	927.02												



CROSS SECTION PLOT - LOOKING DOWNSTREAM

YEAR-3, 2010 SURVEY DATA **CROSS-SECTION:** 1

PROJECT ROCKY BRANCH **FEATURE:** Pool

TASK CROSS SECTION

REACH ROCKY BRANCH

DATE 8/02/10 to 8/05/10

CREW BUCHHOLZ/PARRISH/PICKENS

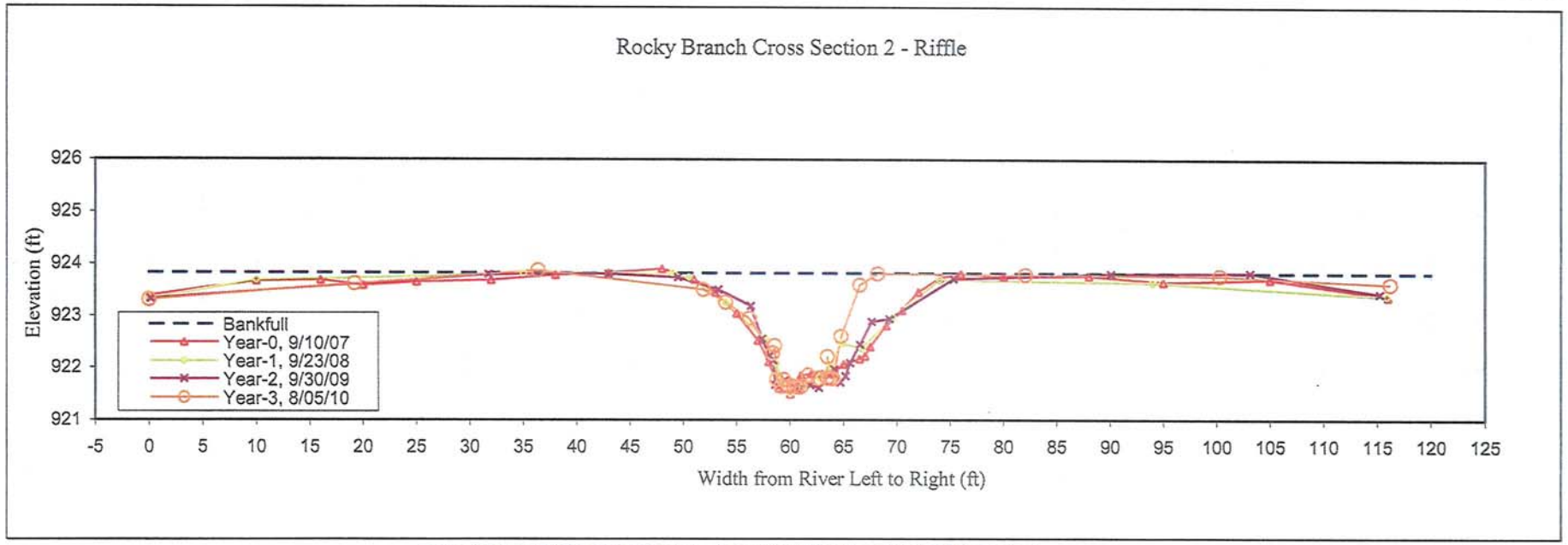
Summary Data
All dimensions in feet.

Bankfull X-sec area	51.4	sq. ft.
Bankfull Width	28.8	ft.
Bankfull Mean Depth	1.8	ft.
Bankfull Max Depth	4.0	ft.
Width/Depth Ratio	>12	
Entrenchment Ratio	>2.2	
Classification	n/a	
Bank Height Ratio	1.0	
Bankfull Elevation:	926.98	ft.

CROSS SECTION PHOTO - LOOKING DOWNSTREAM

EcoEngineering
A division of The John R. McAdams Company, Inc.

ROCKY BRANCH		EEP PROJECT # 308		CROSS-SECTION: 2							
Year-0		Year-1		Year-2		Year-3		Year-4		Year-5		Year-6	
Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)
0.00	923.38	0.00	923.32	0.15	923.32	0.00	923.30						
10.00	923.66	10.00	923.68	31.73	923.79	19.21	923.61						
16.00	923.68	35.00	923.81	42.99	923.80	36.40	923.87						
20.00	923.58	49.00	923.82	49.52	923.74	51.90	923.50						
25.00	923.64	50.50	923.74	53.28	923.50	53.97	923.26						
32.00	923.68	54.00	923.26	56.32	923.19	56.20	922.95						
38.00	923.78	57.70	922.56	57.37	922.55	58.38	922.28						
43.00	923.82	58.70	922.08	58.06	922.22	58.54	922.42						
48.00	923.90	59.30	921.70	58.46	922.14	58.73	921.77						
51.00	923.70	60.00	921.51	58.60	921.68	59.18	921.64						
53.00	923.45	61.30	921.66	59.54	921.77	59.43	921.77						
55.00	923.05	62.70	921.82	60.76	921.58	59.93	921.64						
57.00	922.52	63.80	922.04	61.91	921.67	60.31	921.64						
58.00	922.11	64.80	922.48	62.71	921.62	60.67	921.63						
59.00	921.61	66.70	922.38	64.14	921.97	61.02	921.63						
60.00	921.50	69.60	922.98	64.70	921.72	61.72	921.86						
60.50	921.58	74.00	923.70	65.19	921.84	62.68	921.80						
61.00	921.85	94.00	923.65	65.63	922.09	63.48	921.80						
62.00	921.89	115.90	923.38	66.55	922.44	63.50	922.21						
63.00	921.88			67.65	922.89	63.78	921.80						
64.00	921.90			69.31	922.94	64.02	921.79						
65.00	922.07			75.32	923.71	64.78	922.60						
66.50	922.17			90.09	923.81	66.55	923.59						
67.00	922.22			103.15	923.83	68.21	923.81						
67.50	922.40			115.26	923.43	82.06	923.79						
69.00	922.81					100.31	923.77						
70.50	923.11					116.25	923.61						
72.00	923.46												
74.00	923.73												
76.00	923.81												
80.00	923.76												
88.00	923.77												
95.00	923.65												
105.00	923.70												
116.00	923.37												



CROSS SECTION PLOT - LOOKING DOWNSTREAM

YEAR-3, 2010 SURVEY DATA **CROSS-SECTION:** 2
PROJECT ROCKY BRANCH **FEATURE:** Riffle
TASK CROSS SECTION
REACH ROCKY BRANCH
DATE 8/02/10 to 8/05/10
CREW BUCHHOLZ/PARRISH/PICKENS

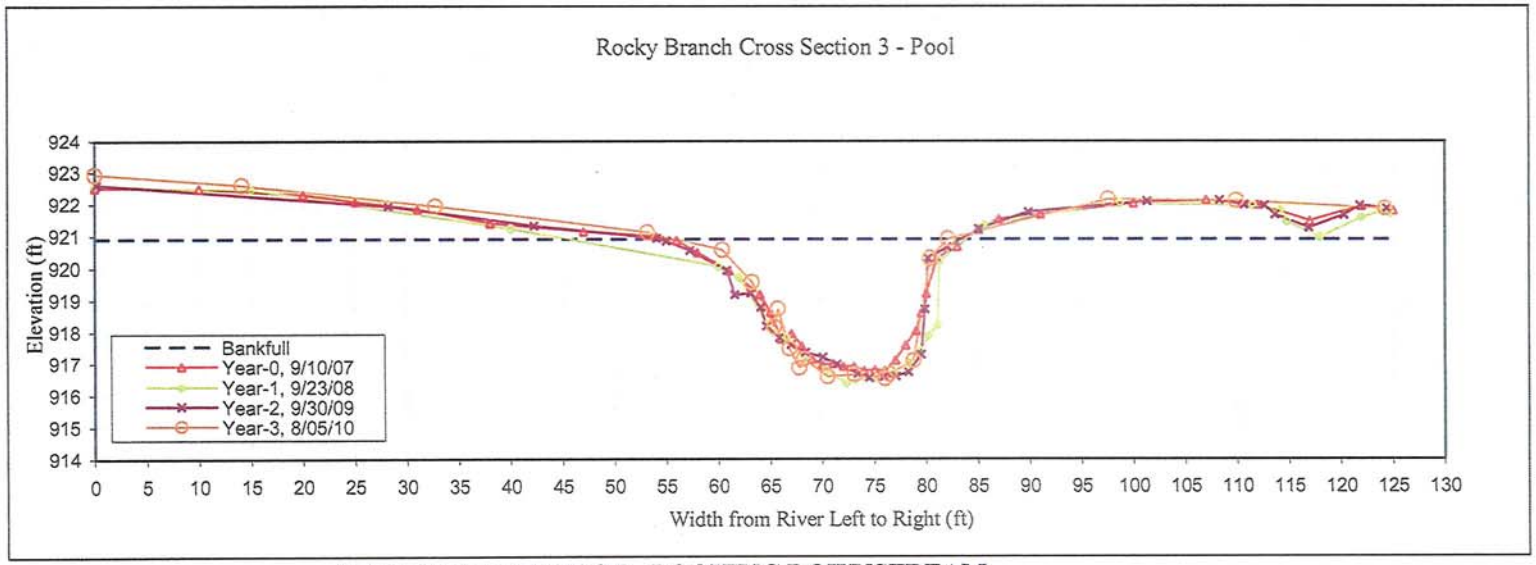
Summary Data
All dimensions in feet.

Bankfull X-sec area	18.5	sq. ft.
Bankfull Width	36.4	ft.
Bankfull Mean Depth	0.5	ft.
Bankfull Max Depth	2.0	ft.
Width/Depth Ratio	>12	
Entrenchment Ratio	>2.2	
Classification	C	
Bank Height Ratio	1.0	
Bankfull Elevation:	923.82	ft.

CROSS SECTION PHOTO - LOOKING DOWNSTREAM

EcoEngineering
A division of The John R. McAdams Company, Inc.

ROCKY BRANCH		EEP PROJECT # 308				CROSS-SECTION: 3							
Year-0		Year-1		Year-2		Year-3		Year-4		Year-5		Year-6	
Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)
0.00	922.51	0.00	922.56	0.18	922.60	0.00	922.92						
10.00	922.49	15.00	922.46	28.22	921.93	14.12	922.59						
20.00	922.29	40.00	921.25	42.24	921.31	32.74	921.94						
25.00	922.08	60.00	920.08	54.05	920.93	53.17	921.11						
31.00	921.84	62.00	919.73	54.98	920.84	60.38	920.57						
38.00	921.40	64.70	918.25	57.25	920.55	63.24	919.57						
47.00	921.14	66.50	917.81	60.83	919.94	65.39	918.16						
54.00	920.99	68.20	917.24	61.58	919.18	65.71	918.73						
56.00	920.86	70.30	916.79	63.10	919.23	66.84	917.47						
58.00	920.49	72.30	916.39	64.06	918.77	67.75	916.86						
61.00	919.93	73.20	916.49	64.63	918.17	68.21	917.14						
64.00	919.19	75.10	916.55	65.86	917.80	70.48	916.58						
65.00	918.62	76.90	916.71	67.00	917.59	73.07	916.64						
66.00	917.77	78.30	917.03	68.37	917.35	76.03	916.52						
67.00	917.96	79.40	917.41	70.02	917.20	76.46	916.66						
68.00	917.56	80.20	917.89	71.38	916.97	78.77	917.09						
69.00	917.15	81.10	918.24	73.39	916.68	80.37	920.31						
70.00	916.96	81.30	920.24	74.49	916.55	82.12	920.91						
71.00	917.00	85.60	921.37	75.91	916.57	97.56	922.15						
72.00	916.92	98.70	922.04	77.07	916.59	109.91	922.11						
73.00	916.92	111.50	921.97	78.28	916.73	124.27	921.86						
74.00	916.78	114.20	921.83	79.50	917.28								
75.00	916.81	114.80	921.47	79.87	918.71								
76.00	916.77	118.00	920.99	80.18	920.30								
77.00	917.11	122.00	921.59	82.06	920.65								
78.00	917.58	124.00	921.79	85.06	921.21								
79.00	918.04	124.70	921.72	89.88	921.75								
79.50	918.60			101.33	922.10								
80.00	919.22			108.30	922.13								
81.00	920.29			110.69	921.98								
83.00	920.67			112.65	921.96								
85.00	921.20			113.67	921.65								
87.00	921.53			116.93	921.25								
91.00	921.68			120.30	921.65								
100.00	922.03			121.83	921.96								
107.00	922.13			124.42	921.86								
112.00	921.99												
117.00	921.47												
122.00	921.94												
125.00	921.80												



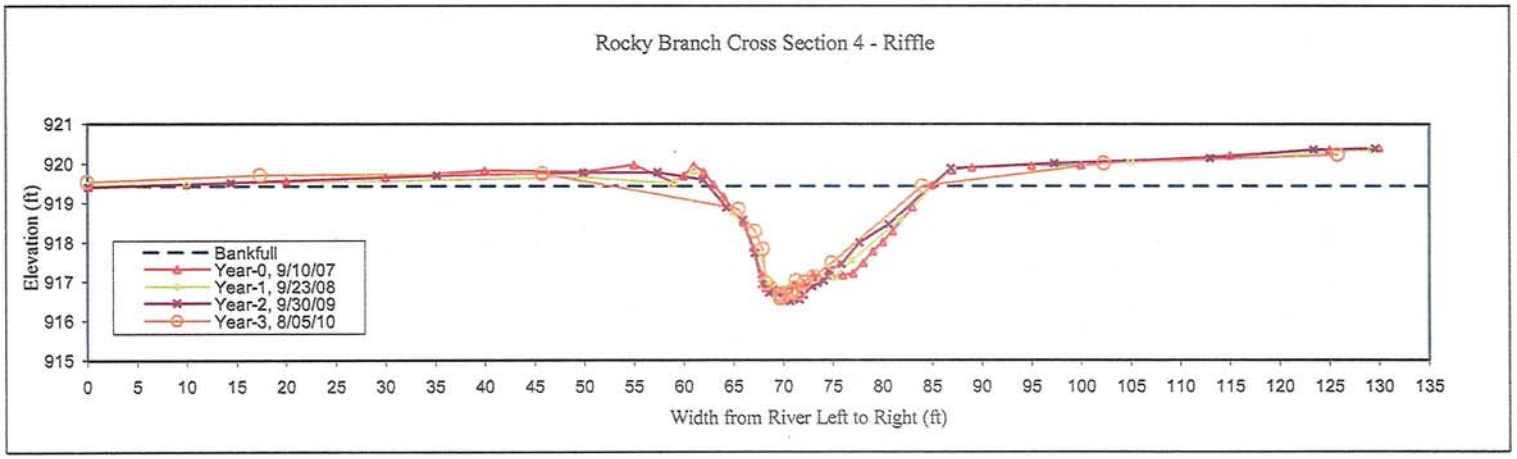
CROSS SECTION PLOT - LOOKING DOWNSTREAM

	CROSS-SECTION:	3
ROCKY BRANCH	**FEATURE:**	Pool
CROSS SECTION		
ROCKY BRANCH		
8/02/10 to 8/05/10		
BUCHHOLZ/PARRISH/PICKENS		

65.1	sq. ft.
26.3	ft.
2.5	ft.
4.4	ft.
10.6	
>2.2	
n/a	
1.0	
920.91	ft.

CROSS SECTION PHOTO - LOOKING DOWNSTREAM

ROCKY BRANCH		EEP PROJECT # 308		CROSS-SECTION: 4							
Year-0		Year-1		Year-2		Year-3		Year-4		Year-5		Year-6	
Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)
0.00	919.45	0.00	919.46	0.08	919.40	0.00	919.54						
10.00	919.48	10.00	919.48	14.42	919.51	17.36	919.71						
20.00	919.57	50.00	919.67	35.15	919.70	45.79	919.75						
30.00	919.66	59.00	919.51	49.90	919.78	65.51	918.84						
40.00	919.83	61.00	919.82	57.38	919.78	67.15	918.28						
50.00	919.80	65.00	918.77	61.95	919.60	67.91	917.83						
55.00	919.97	67.60	917.73	64.28	918.88	68.27	916.95						
59.00	919.52	68.50	917.06	65.96	918.56	69.65	916.66						
60.00	919.69	69.00	916.96	67.13	917.73	69.69	916.56						
61.00	919.95	70.00	916.80	67.85	916.92	69.93	916.59						
62.00	919.80	70.90	916.58	68.55	916.70	70.76	916.73						
63.00	919.47	71.80	916.77	69.40	916.70	70.90	916.71						
64.00	919.16	72.80	916.99	70.18	916.74	71.29	917.02						
65.00	918.80	74.00	917.08	70.68	916.48	71.54	916.69						
66.00	918.51	75.10	917.12	71.60	916.52	72.16	916.98						
67.00	917.87	76.90	917.55	72.03	916.65	73.05	917.12						
67.80	917.18	81.70	918.58	72.86	916.87	74.87	917.48						
68.20	916.83	87.00	919.87	73.44	916.95	84.02	919.43						
69.00	916.92	105.00	920.05	74.05	917.02	102.32	920.01						
70.00	916.77	129.20	920.36	74.55	917.28	125.87	920.23						
70.50	916.55			75.81	917.44								
71.00	916.92			77.67	917.99								
72.00	916.96			80.62	918.46								
73.00	917.16			86.88	919.88								
75.00	917.16			97.29	920.01								
76.00	917.16			113.02	920.14								
77.00	917.21			123.42	920.36								
78.00	917.48			129.63	920.39								
79.00	917.78												
80.00	918.01												
81.00	918.28												
83.00	918.90												
85.00	919.46												
87.00	919.84												
89.00	919.91												
95.00	919.95												
100.00	919.97												
115.00	920.21												
125.00	920.36												
130.00	920.41												



CROSS SECTION PLOT - LOOKING DOWNSTREAM

YEAR-3, 2010 SURVEY DATA **CROSS-SECTION:** 4

PROJECT ROCKY BRANCH **FEATURE:** Riffle

TASK CROSS SECTION

REACH ROCKY BRANCH

DATE 8/02/10 to 8/05/10

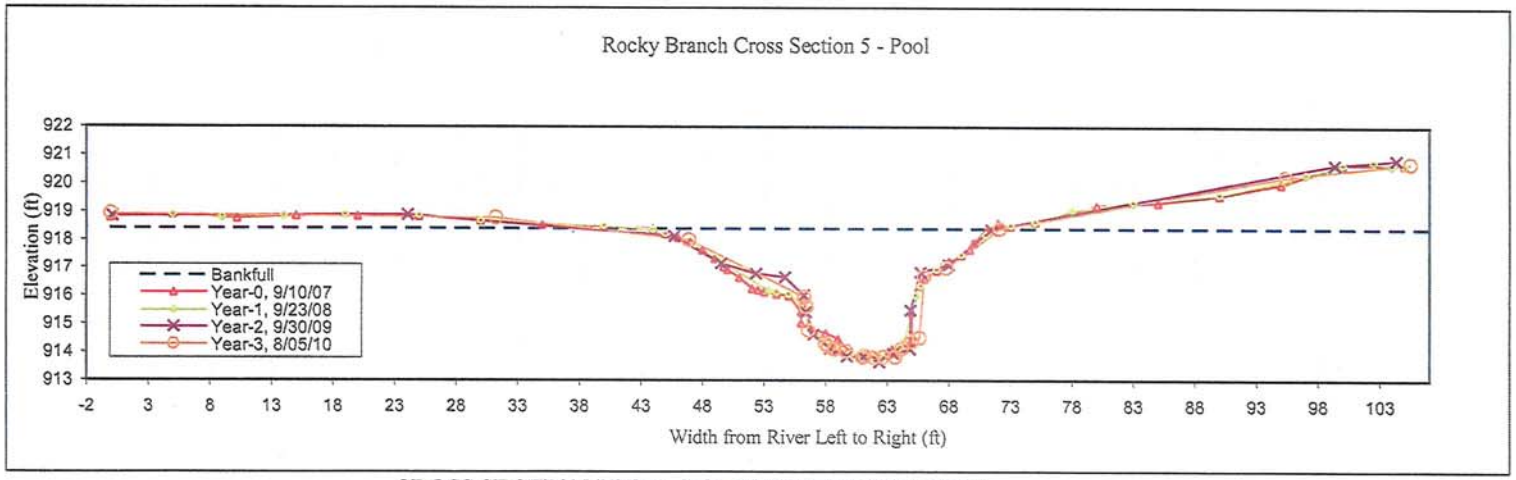
CREW BUCHHOLZ/PARRISH/PICKENS

Summary Data
All dimensions in feet.

Bankfull X-sec area	32.2	sq. ft.
Bankfull Width	31.3	ft.
Bankfull Mean Depth	1.0	ft.
Bankfull Max Depth	2.9	ft.
Width/Depth Ratio	>12	
Entrenchment Ratio	>2.2	
Classification	C	
Bank Height Ratio	1.0	
Bankfull Elevation:	919.43	ft.

CROSS SECTION PHOTO - LOOKING DOWNSTREAM

ROCKY BRANCH		EEP PROJECT # 308		CROSS-SECTION: 5							
Year-0		Year-1		Year-2		Year-3		Year-4		Year-5		Year-6	
Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)
0.00	918.78	0.00	918.78	0.13	918.83	0.00	918.91						
5.00	918.89	5.00	918.87	24.09	918.87	31.24	918.77						
10.20	918.75	9.00	918.79	45.71	918.12	46.90	918.00						
15.00	918.84	14.00	918.84	49.52	917.16	56.27	915.96						
20.00	918.83	19.00	918.89	52.33	916.78	56.45	915.62						
25.00	918.82	25.00	918.85	54.69	916.65	56.60	914.76						
30.00	918.67	30.00	918.66	56.24	916.01	57.94	914.32						
35.00	918.54	40.00	918.49	56.38	915.42	58.23	914.20						
40.00	918.47	44.00	918.36	57.01	914.62	58.69	914.10						
44.00	918.39	45.00	918.21	58.34	914.13	59.68	914.03						
45.00	918.20	47.40	917.83	59.73	913.84	61.00	913.81						
46.00	918.08	49.50	917.23	61.07	913.84	61.15	913.89						
47.00	917.91	53.40	916.19	62.34	913.64	61.94	913.81						
48.00	917.63	54.00	916.14	63.50	913.95	62.71	913.83						
49.00	917.32	55.00	916.05	64.85	914.11	63.66	913.82						
49.70	917.03	56.00	915.74	64.89	915.49	64.17	914.10						
50.00	916.91	56.40	915.43	65.71	916.83	65.03	914.38						
51.00	916.64	57.30	914.62	67.98	917.11	65.62	914.50						
52.00	916.25	60.00	913.93	71.44	918.37	65.98	916.67						
52.50	916.21	61.10	913.82	99.35	920.66	67.81	916.99						
53.00	916.14	61.80	913.83	104.36	920.82	72.16	918.41						
54.00	916.06	62.60	913.81			95.42	920.22						
55.00	916.00	64.00	914.17			105.50	920.70						
56.00	915.43	64.40	914.41										
56.00	915.02	65.30	916.02										
57.00	914.78	65.70	916.36										
58.00	914.67	67.00	916.93										
59.00	914.47	69.00	917.47										
60.00	913.99	71.00	918.17										
60.80	913.85	73.00	918.51										
61.00	913.85	75.00	918.63										
62.00	913.90	78.00	919.06										
63.00	913.89	83.00	919.33										
63.40	914.12	90.00	919.60										
64.00	914.14	97.00	920.30										
64.80	914.35	100.00	920.65										
65.00	914.59	102.50	920.77										
65.00	915.43	104.00	920.65										
65.60	916.37	105.00	920.64										
66.00	916.61												
67.00	916.89												
68.00	917.24												
69.00	917.47												
69.70	917.67												
70.00	917.92												
71.00	918.32												
72.00	918.61												
73.00	918.50												
75.00	918.64												
80.00	919.21												
85.00	919.31												
90.00	919.57												
95.00	919.98												
100.00	920.66												
105.00	920.67												



CROSS SECTION PLOT - LOOKING DOWNSTREAM

YEAR-3, 2010 SURVEY DATA **CROSS-SECTION:** 5

PROJECT ROCKY BRANCH **FEATURE:** Pool

TASK CROSS SECTION

REACH ROCKY BRANCH

DATE 8/02/10 to 8/05/10

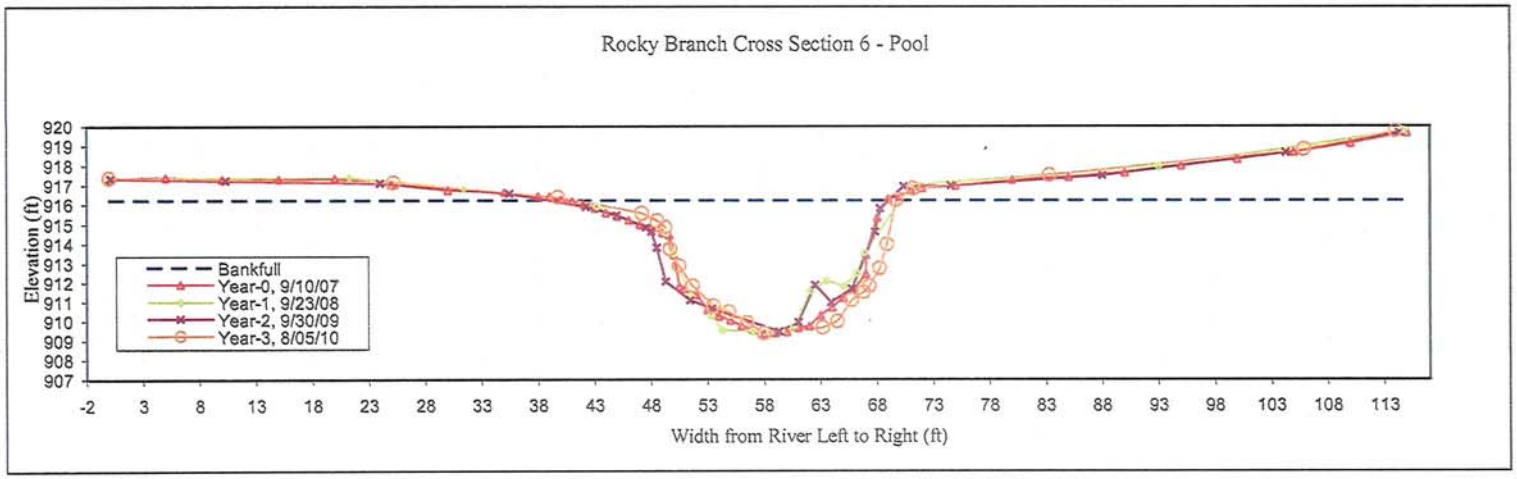
CREW BUCHHOLZ/PARRISH/PICKENS

Summary Data
All dimensions in feet.

Bankfull X-sec area	62.0	sq. ft.
Bankfull Width	33.6	ft.
Bankfull Mean Depth	1.8	ft.
Bankfull Max Depth	4.6	ft.
Width/Depth Ratio	>12	
Entrenchment Ratio	>2.2	
Classification	n/a	
Bank Height Ratio	1.0	
Bankfull Elevation:	918.41	ft.

CROSS SECTION PHOTO - LOOKING DOWNSTREAM

ROCKY BRANCH		EEP PROJECT # 308				CROSS-SECTION: 6							
Year-0		Year-1		Year-2		Year-3		Year-4		Year-5		Year-6	
Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)
0.00	917.33	0.00	917.32	0.13	917.32	0.00	917.36						
5.00	917.39	21.30	917.41	10.28	917.22	25.21	917.13						
10.00	917.30	31.40	916.85	23.98	917.10	39.75	916.39						
15.00	917.30	43.20	915.88	35.45	916.57	47.19	915.56						
20.00	917.34	49.30	914.54	42.22	915.86	48.56	915.17						
25.00	917.05	50.00	913.46	44.96	915.44	49.27	914.84						
30.00	916.73	51.50	911.26	47.53	914.83	49.69	913.73						
35.00	916.65	53.30	910.28	48.03	914.62	50.48	912.87						
38.00	916.44	54.30	909.55	48.50	913.79	51.67	911.82						
39.00	916.41	57.00	909.46	49.28	912.03	53.51	910.77						
40.00	916.27	58.50	909.36	51.43	911.04	54.90	910.47						
41.00	916.16	59.50	909.47	53.37	910.64	56.47	909.91						
42.00	916.04	60.60	909.72	59.31	909.45	58.02	909.35						
43.00	915.80	62.10	911.56	61.03	909.93	63.20	909.64						
44.00	915.58	63.50	912.12	62.50	911.85	64.50	909.97						
45.00	915.40	65.10	911.80	63.94	910.95	65.77	911.07						
46.00	915.21	66.20	912.49	65.75	911.65	66.83	911.47						
47.00	914.98	66.90	913.53	67.82	914.59	67.36	911.81						
48.00	914.80	71.10	917.04	68.27	915.78	68.25	912.73						
49.00	914.57	93.00	917.93	70.38	916.93	68.88	913.95						
49.60	914.45	114.70	919.76	74.57	916.96	69.71	916.22						
50.00	913.45			88.02	917.49	71.27	916.82						
50.50	911.79			104.28	918.65	83.31	917.51						
51.00	911.68			114.30	919.66	105.89	918.81						
52.00	911.35					114.00	919.74						
53.00	910.55												
54.00	910.23												
55.00	910.03												
56.00	909.73												
57.00	909.55												
58.00	909.35												
59.00	909.38												
60.00	909.43												
61.00	909.63												
62.00	909.73												
63.00	910.28												
64.00	910.69												
65.00	911.20												
66.00	911.64												
67.00	912.44												
67.00	913.43												
68.00	915.32												
69.00	916.28												
70.00	916.41												
71.00	916.74												
72.00	916.84												
75.00	916.96												
80.00	917.28												
85.00	917.4												
90.00	917.63												
95.00	917.98												
100.00	918.32												
105.00	918.68												
110.00	919.11												
115.00	919.66												



CROSS SECTION PLOT - LOOKING DOWNSTREAM

YEAR-3, 2010 SURVEY DATA **CROSS-SECTION:** 6

PROJECT ROCKY BRANCH **FEATURE:** Pool

TASK CROSS SECTION

REACH ROCKY BRANCH

DATE 8/02/10 to 8/05/10

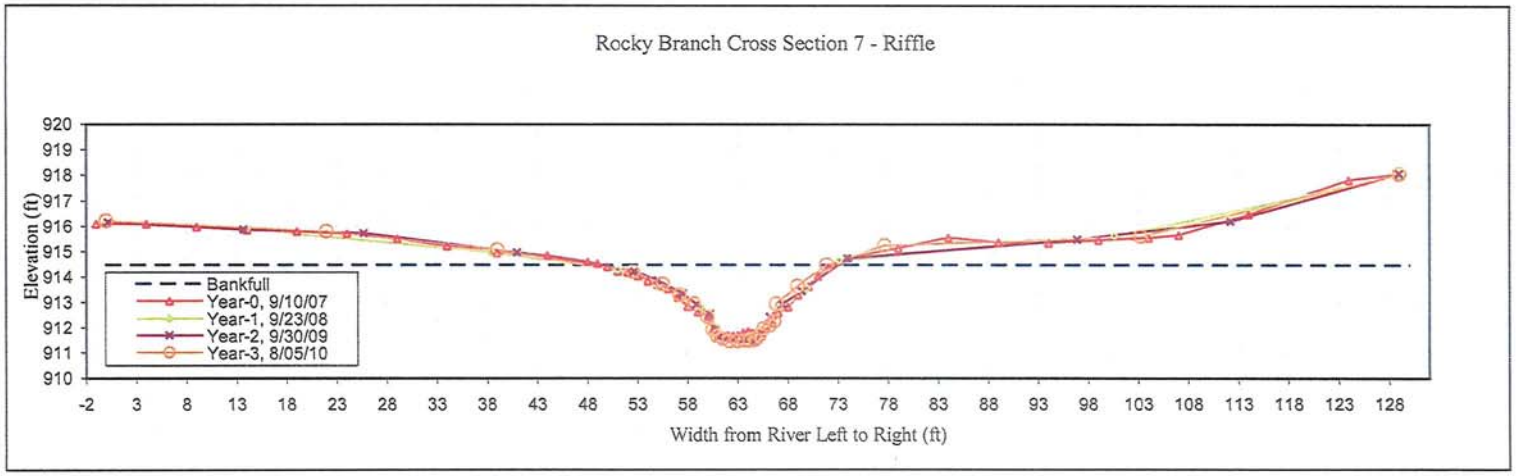
CREW BUCHHOLZ/PARRISH/PICKENS

Summary Data
All dimensions in feet.

Bankfull X-sec area	112.6	sq. ft.
Bankfull Width	28.4	ft.
Bankfull Mean Depth	4.0	ft.
Bankfull Max Depth	6.9	ft.
Width/Depth Ratio	7.2	
Entrenchment Ratio	>2.2	
Classification	n/a	
Bank Height Ratio	1.0	
Bankfull Elevation:	916.22	ft.

CROSS SECTION PHOTO - LOOKING DOWNSTREAM

ROCKY BRANCH		EEP PROJECT # 308		CROSS-SECTION: 7							
Year-0		Year-1		Year-2		Year-3		Year-4		Year-5		Year-6	
Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)
-1.00	916.10	0.00	916.17	0.16	916.17	0.00	916.23						
4.00	916.10	14.00	915.91	13.66	915.89	21.98	915.81						
9.00	915.99	38.40	915.01	25.66	915.74	39.02	915.08						
14.00	915.87	51.00	914.29	40.96	914.98	52.54	914.21						
19.00	915.82	55.00	913.65	52.67	914.22	55.51	913.72						
24.00	915.73	59.30	912.83	55.00	913.86	57.18	913.30						
29.00	915.52	60.70	911.77	57.47	913.35	58.62	912.95						
34.00	915.23	61.50	911.52	58.84	912.92	59.97	912.44						
39.00	914.97	63.10	911.47	60.20	912.55	60.47	911.91						
44.00	914.87	64.30	911.64	60.68	911.95	60.96	911.66						
48.00	914.61	65.20	911.87	61.09	911.60	61.49	911.55						
49.00	914.54	65.80	912.15	61.90	911.61	62.14	911.45						
50.00	914.40	69.80	913.55	62.69	911.58	62.96	911.46						
51.00	914.22	73.10	914.65	63.56	911.52	63.62	911.48						
52.00	914.18	100.60	915.62	64.63	911.41	64.19	911.48						
53.00	914.04	129.00	918.03	65.32	911.75	64.72	911.50						
54.00	913.83			66.17	912.42	65.16	911.70						
55.00	913.71			67.42	912.92	65.53	911.96						
56.00	913.54			69.36	913.44	66.18	912.09						
57.00	913.20			73.93	914.75	66.58	912.25						
58.00	912.84			96.87	915.50	66.83	912.95						
59.00	912.63			112.20	916.22	68.95	913.64						
60.00	912.47			129.00	918.08	71.85	914.49						
60.50	911.93					77.62	915.26						
61.00	911.72					103.21	915.62						
61.50	911.62					129.05	918.07						
62.00	911.69												
62.50	911.67												
63.00	911.71												
63.50	911.81												
64.00	911.86												
65.00	911.93												
65.70	912.07												
66.50	912.19												
67.00	912.60												
68.00	912.82												
69.00	913.29												
70.00	913.63												
71.00	914.03												
72.00	914.39												
73.00	914.63												
74.00	914.77												
79.00	915.16												
84.00	915.58												
89.00	915.39												
94.00	915.36												
99.00	915.48												
104.00	915.56												
107.00	915.68												
114.00	916.5												
124.00	917.84												
129.00	918.06												



CROSS SECTION PLOT - LOOKING DOWNSTREAM

YEAR-3, 2010 SURVEY DATA **CROSS-SECTION:** 7

PROJECT ROCKY BRANCH **FEATURE:** Riffle

TASK CROSS SECTION

REACH ROCKY BRANCH

DATE 8/02/10 to 8/05/10

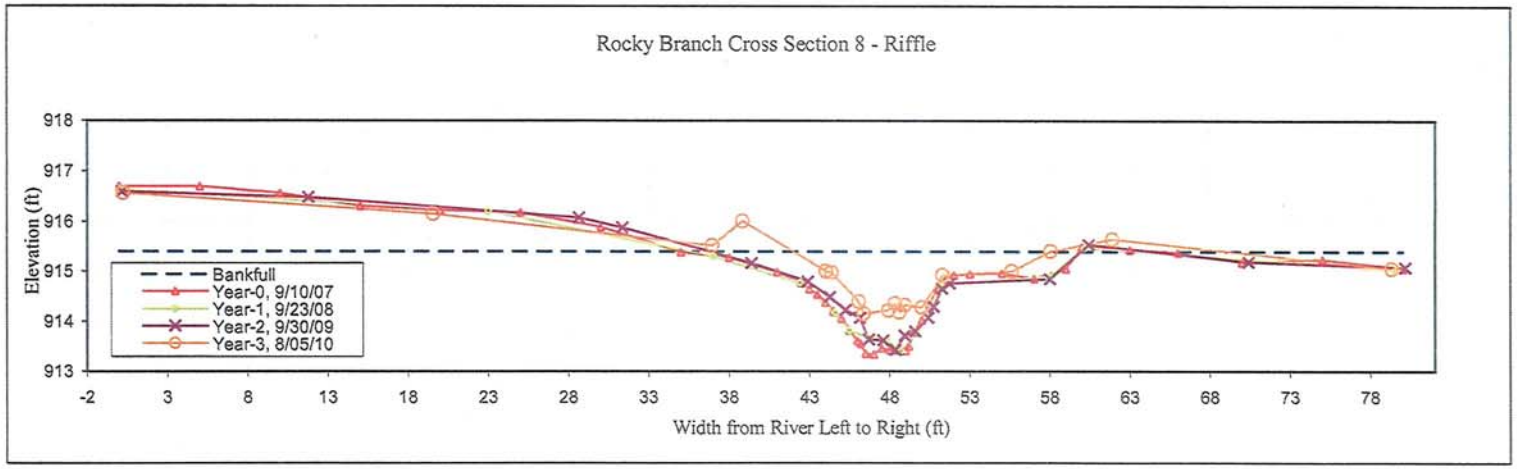
CREW BUCHHOLZ/PARRISH/PICKENS

Summary Data
All dimensions in feet.

Bankfull X-sec area	31.0	sq. ft.
Bankfull Width	23.7	ft.
Bankfull Mean Depth	1.3	ft.
Bankfull Max Depth	3.0	ft.
Width/Depth Ratio	>12	
Entrenchment Ratio	>2.2	
Classification	C	
Bank Height Ratio	1.0	
Bankfull Elevation:	914.49	ft.

CROSS SECTION PHOTO - LOOKING DOWNSTREAM

ROCKY BRANCH		EEP PROJECT # 308				CROSS-SECTION:	8						
Year-0		Year-1		Year-2		Year-3		Year-4		Year-5		Year-6	
Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)	Station (ft)	Elev. (ft)
0.00	916.69	0.00	916.63	0.17	916.58	0.25	916.56						
5.00	916.69	23.00	916.21	11.78	916.47	19.55	916.15						
10.00	916.56	37.00	915.30	28.65	916.08	36.95	915.51						
15.00	916.30	42.40	914.77	31.35	915.88	38.84	916.01						
20.00	916.22	44.60	914.16	39.41	915.16	44.04	915.00						
25.00	916.18	45.50	913.81	42.90	914.80	44.39	914.98						
30.00	915.89	46.70	913.68	44.28	914.48	46.07	914.39						
35.00	915.38	47.80	913.62	45.27	914.22	46.40	914.15						
38.00	915.27	48.70	913.40	46.15	914.07	47.93	914.21						
41.00	914.99	49.70	913.78	46.71	913.63	48.33	914.35						
42.50	914.77	51.20	914.72	47.61	913.61	48.62	914.17						
43.00	914.64	57.90	914.89	48.37	913.43	48.94	914.32						
43.50	914.53	60.20	915.47	48.94	913.71	50.01	914.27						
44.00	914.37	79.60	915.03	49.61	913.79	51.31	914.92						
44.50	914.19			50.42	914.07	55.61	915.00						
45.00	914.05			50.74	914.28	58.06	915.40						
45.50	913.82			51.27	914.65	61.91	915.64						
46.00	913.61			51.76	914.76	79.31	915.05						
46.20	913.55			58.01	914.85								
46.50	913.35			60.44	915.53								
47.00	913.34			70.41	915.19								
47.50	913.46			80.18	915.08								
48.00	913.42												
48.50	913.42												
49.00	913.41												
49.20	913.50												
49.50	913.78												
50.00	914.02												
50.50	914.33												
51.00	914.65												
51.50	914.84												
52.00	914.92												
53.00	914.95												
55.00	914.96												
57.00	914.85												
59.00	915.05												
60.00	915.48												
63.00	915.43												
66.00	915.37												
70.00	915.18												
75.00	915.24												
80.00	915.06												



CROSS SECTION PLOT - LOOKING DOWNSTREAM

YEAR-3, 2010 SURVEY DATA **CROSS-SECTION:** 8

PROJECT ROCKY BRANCH **FEATURE:** Riffle

TASK CROSS SECTION

REACH ROCKY BRANCH

DATE 8/02/10 to 8/05/10

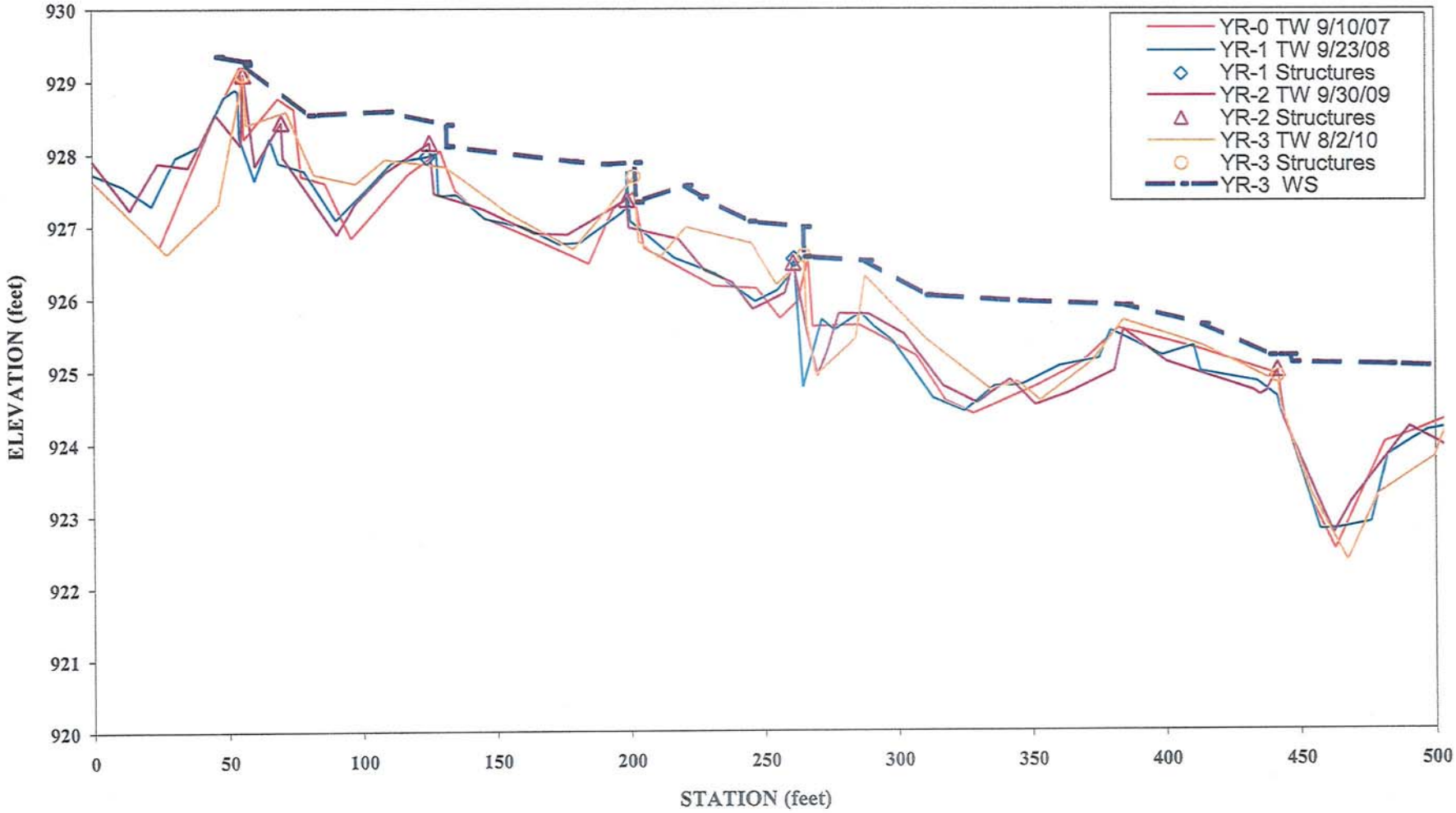
CREW BUCHHOLZ/PARRISH/PICKENS

Summary Data
All dimensions in feet.

Bankfull X-sec area	11.60	sq. ft.
Bankfull Width	26.40	ft.
Bankfull Mean Depth	0.40	ft.
Bankfull Max Depth	1.30	ft.
Width/Depth Ratio	>12	
Entrenchment Ratio	>2.2	
Classification	C	
Bank Height Ratio	1.0	
Bankfull Elevation:	915.40	ft.

CROSS SECTION PHOTO - LOOKING DOWNSTREAM

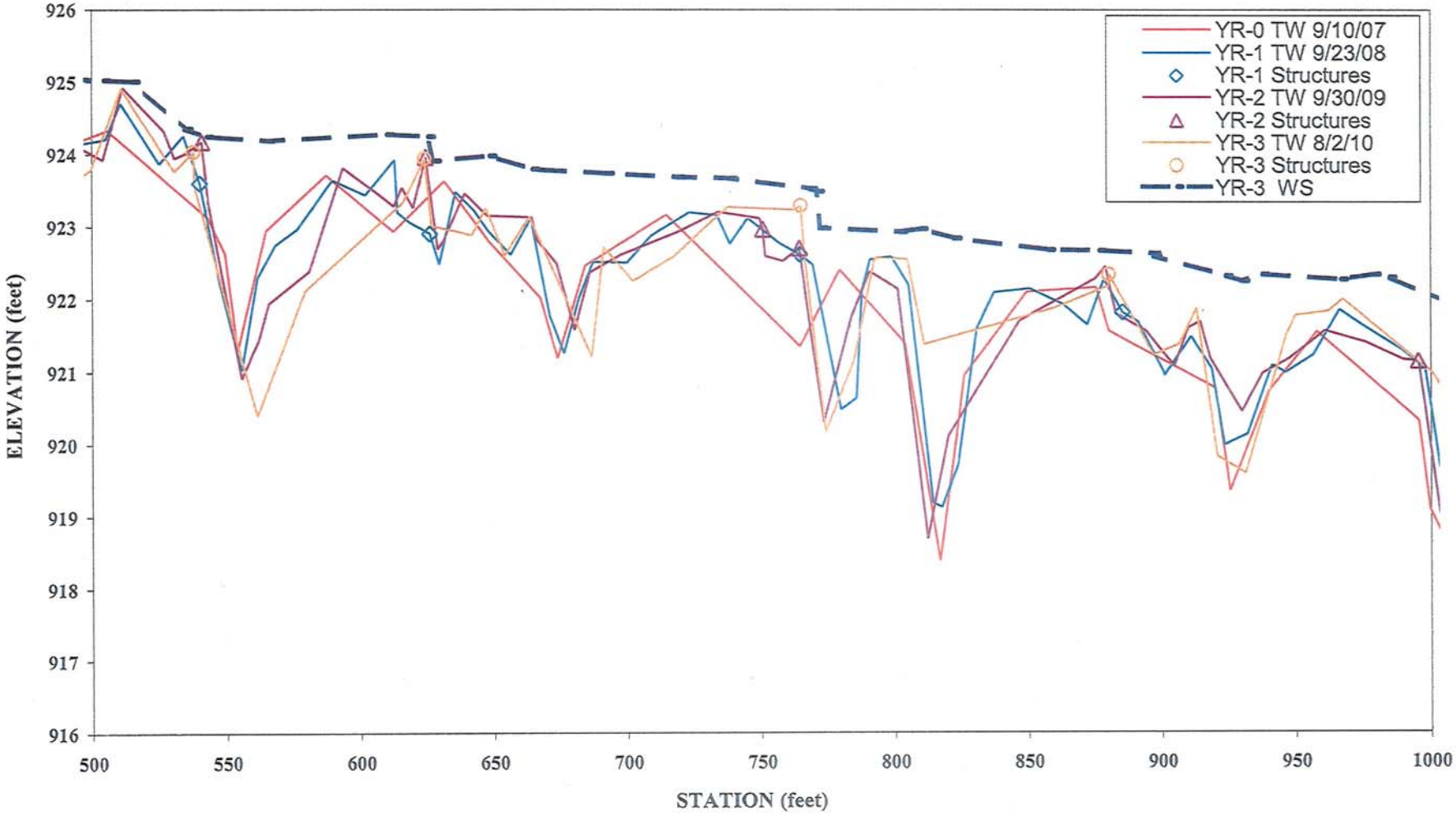
Rocky Branch
Longitudinal Profile
2010 (Year-3) Monitoring



Note: Due to slight differences in thalweg length, longitudinal profile was adjusted horizontally. Structures were used as a guide.

EcoEngineering
A division of The John R. McAdams Company, Inc.

Rocky Branch
Longitudinal Profile
2010 (Year-3) Monitoring



Note: Due to slight differences in thalweg length, longitudinal profile was adjusted horizontally. Structures were used as a guide.

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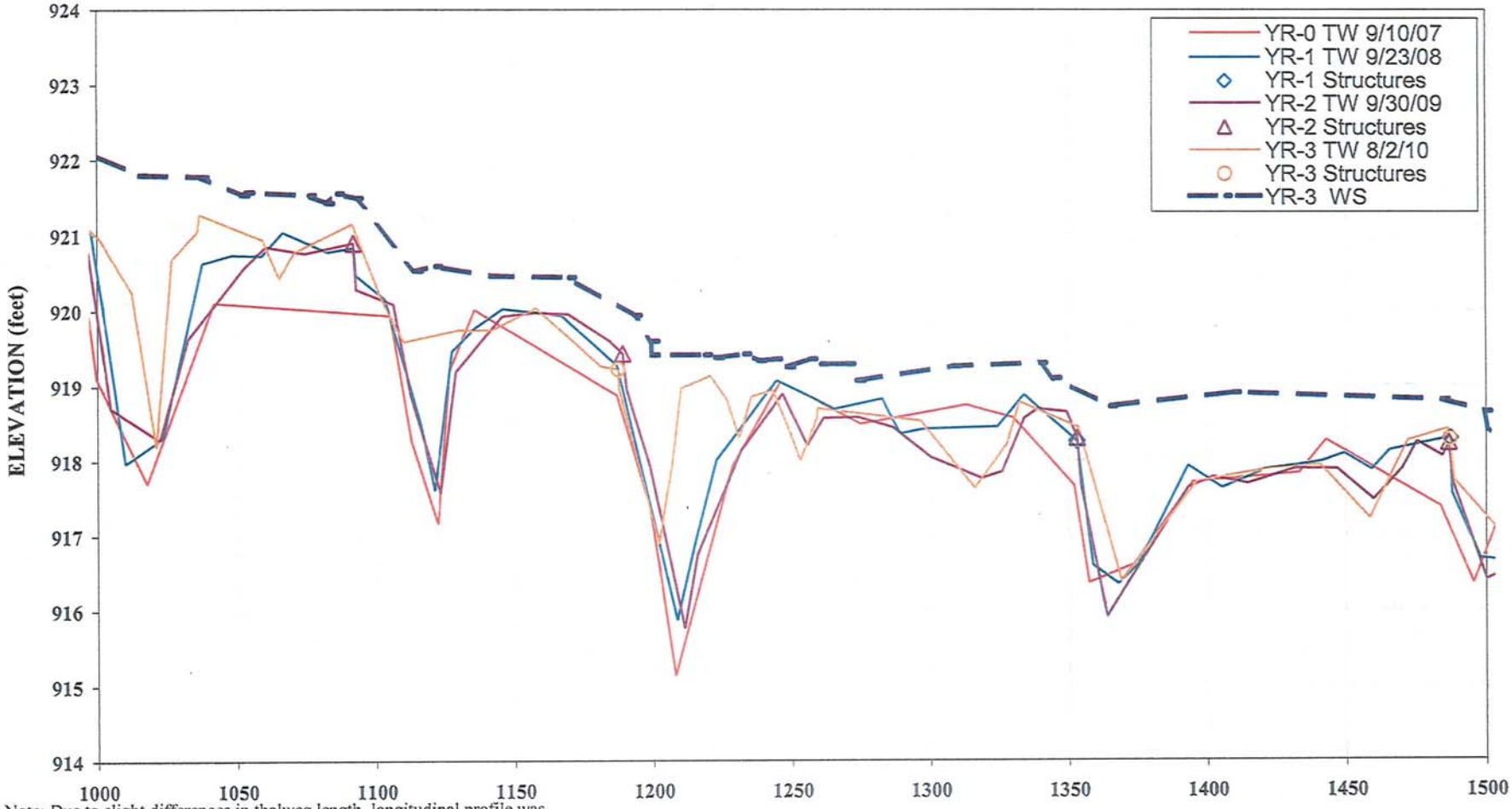
Rocky Branch
Longitudinal Profile
2010 (Year-3) Monitoring



Note: Due to slight differences in thalweg length, longitudinal profile was adjusted horizontally. Structures were used as a guide.

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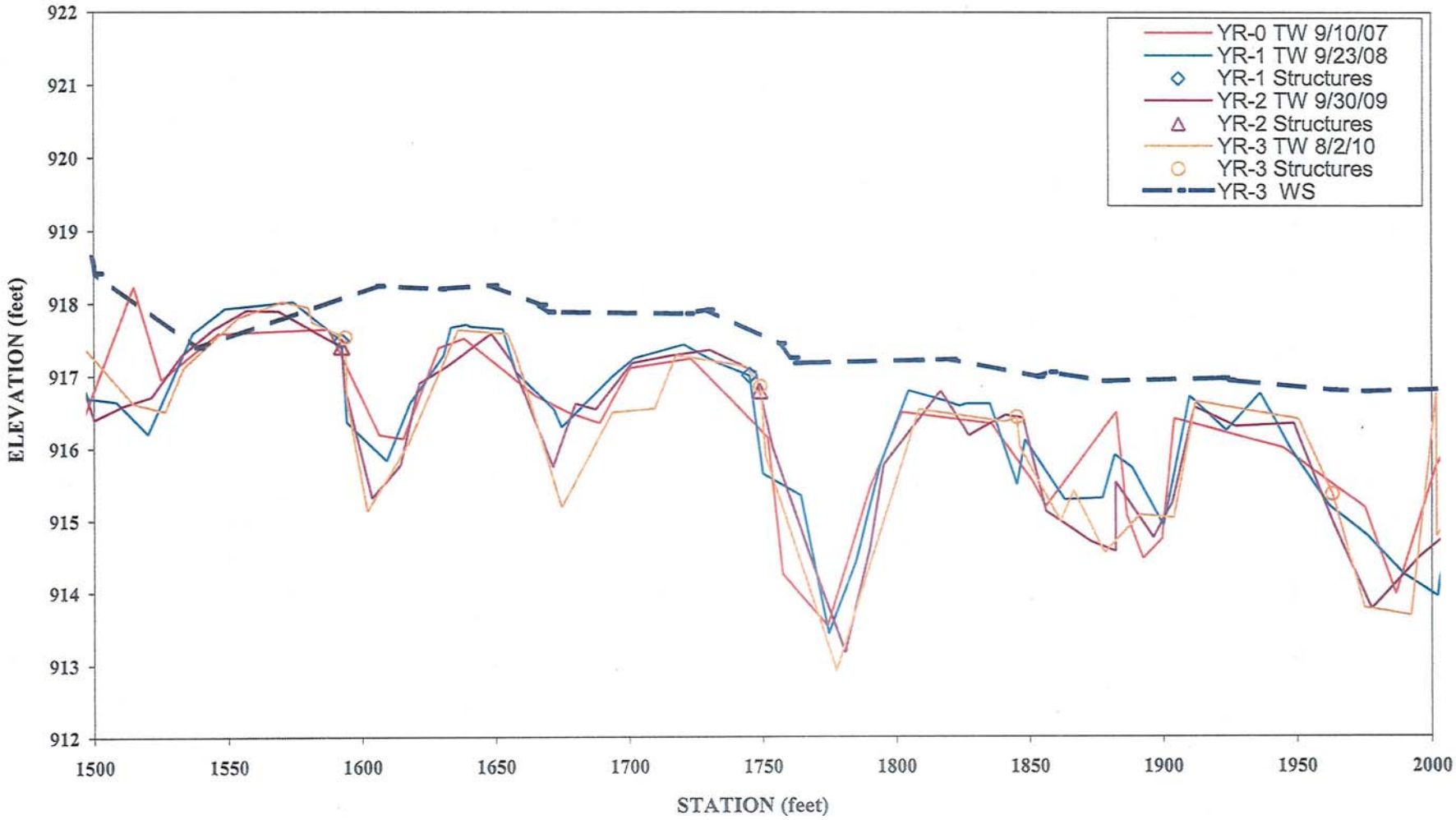
Rocky Branch
Longitudinal Profile
2010 (Year-3) Monitoring



Note: Due to slight differences in thalweg length, longitudinal profile was adjusted horizontally. Structures were used as a guide.

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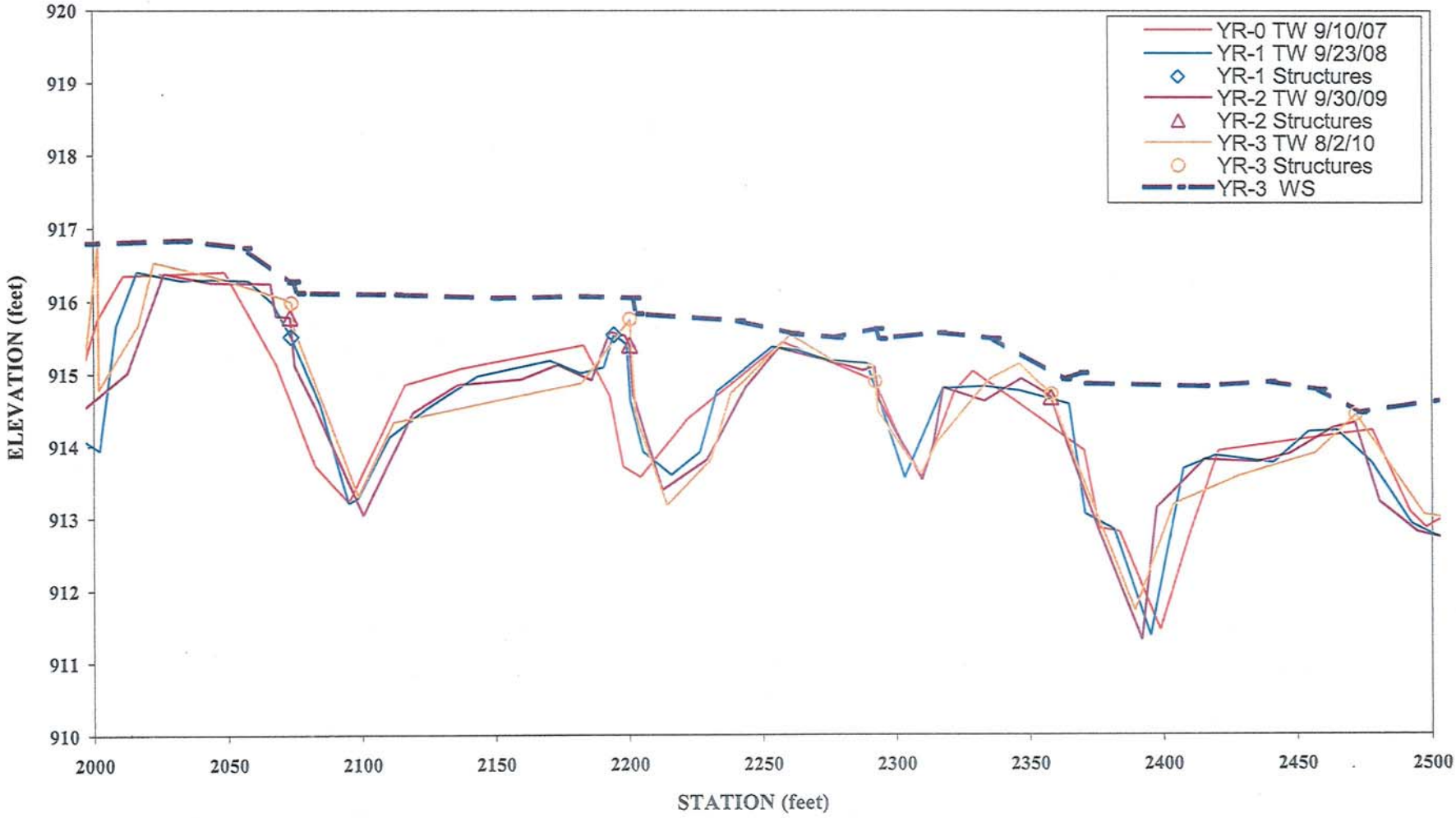
Rocky Branch
Longitudinal Profile
2010 (Year-3) Monitoring



Note: Due to slight differences in thalweg length, longitudinal profile was adjusted horizontally. Structures were used as a guide.

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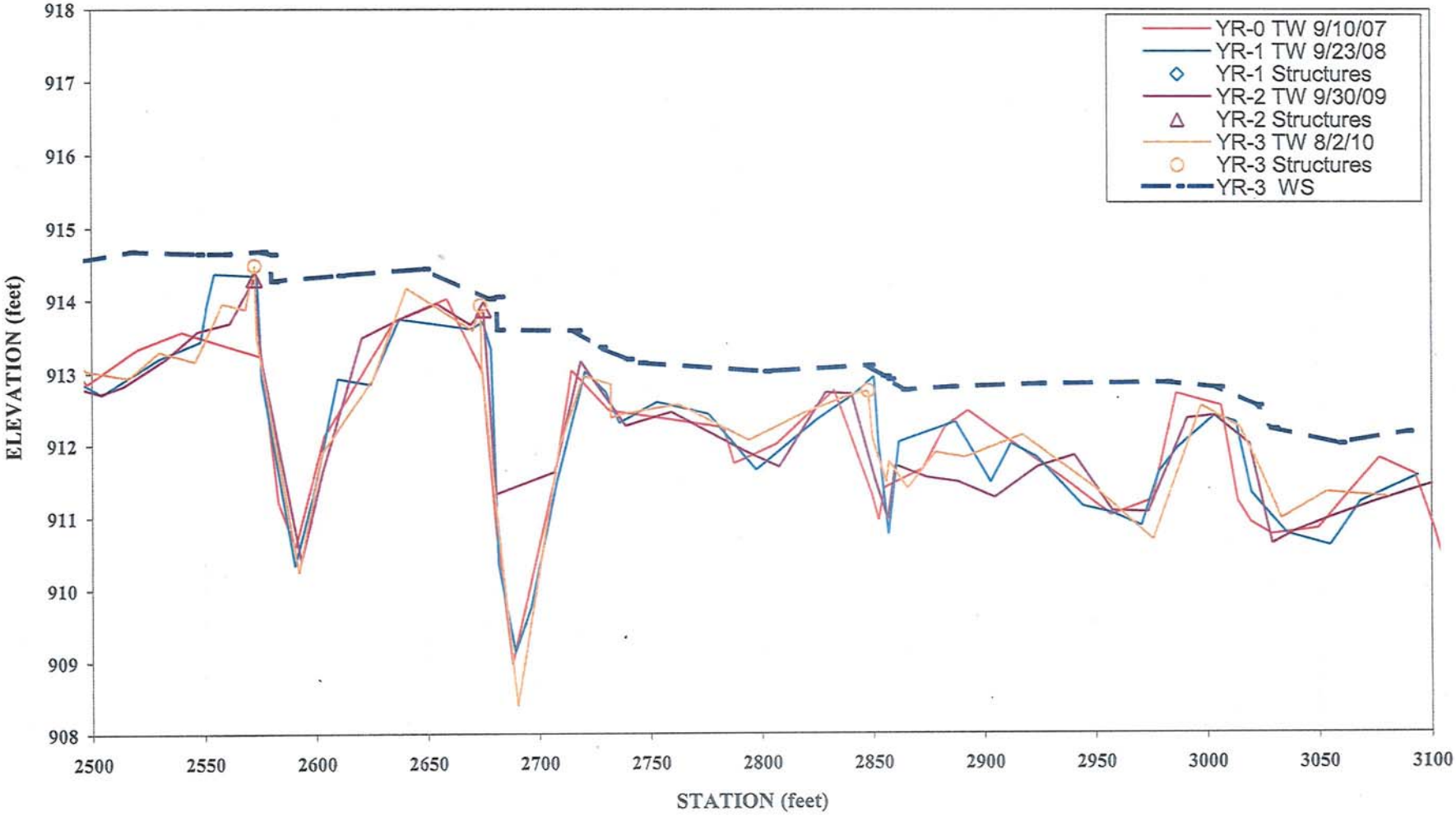
Rocky Branch
Longitudinal Profile
2010 (Year-3) Monitoring



Note: Due to slight differences in thalweg length, longitudinal profile was adjusted horizontally. Structures were used as a guide.

EcoEngineering
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3-YEAR, 2010 SURVEY DATA

PROJECT NAME ROCKY BRANCH

TASK LONGITUDINAL PROFILE
REACH ROCKY BRANCH
DATE 8/2/2010 to 8/5/2010
CREW BUCHHOLZ/PARRISH/PICKENS

FEATURE/FACET SLOPE LENGTH, AND SPACING AND LONGITUDINAL PROFILE DATA

Overall water surface slope =	0.6%
WS sta. start =	52.38 ft
WS sta. end =	3107.48 ft
ELEV. Start =	929.35 ft msl
ELEV. End =	912.16 ft msl

DESIGN	MIN.	MAX.
Riffle	1.1%	3.3%
Run	---	---
p-p spacing	115	161

Results

	n =	MIN.	MEDIAN.	AVG.	MAX.
Riffle slopes measured =	29	0.13%	1.21%	2.10%	18.59%
Run slopes measured =	18	0.28%	6.64%	6.40%	18.78%
Pools measured =	36	15	85	84	175

All data reported in units of **feet** unless otherwise specified.

Feature	Station	Length	Slope
RIFFLE	232.94	18.58	0.91%
RIFFLE	293.81	22.81	3.86%
RIFFLE	390.36	29.71	1.21%
RIFFLE	443.9	7.91	0.25%
RIFFLE	520.92	26.88	3.27%
RIFFLE	653.73	9.63	18.59%
RIFFLE	737.57	29.79	0.13%
RIFFLE	808.53	12.19	0.16%
RIFFLE	928.92	7.65	0.52%
RIFFLE	978.12	38.61	2.23%
RIFFLE	1052.74	22.75	1.45%
RIFFLE	1097.72	20.69	4.88%
RIFFLE	1173.86	23.45	0.94%
RIFFLE	1226.15	16.38	0.92%
RIFFLE	1251.41	7.73	1.16%
RIFFLE	1275.1	37.43	1.63%
RIFFLE	1348.14	21.33	1.59%
RIFFLE	1488.04	14.37	1.74%
RIFFLE	1652.1	21.63	1.57%
RIFFLE	1733.71	26.22	0.61%
RIFFLE	1824.4	32.43	0.52%
RIFFLE	1928.19	38.52	0.65%
RIFFLE	2038.54	52.92	0.94%

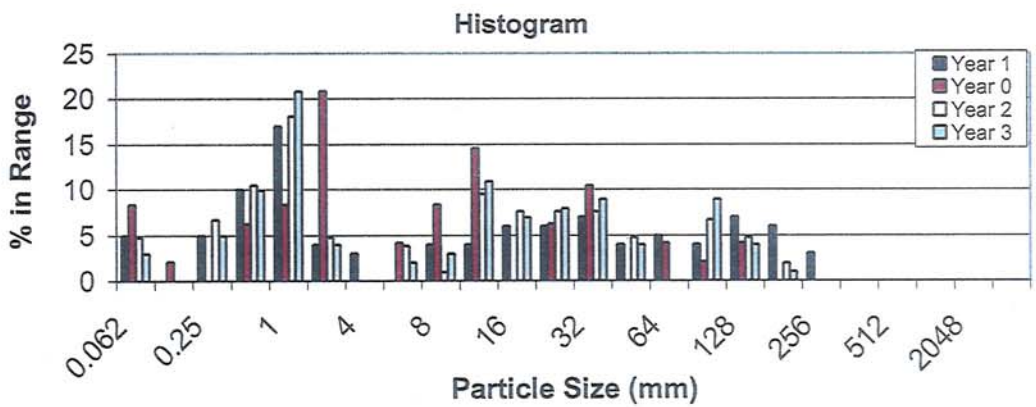
n =	29
MIN =	0.13%
MEDIAN =	1.21%
AVG. =	2.10%
MAX =	18.59%

RIFFLE	2280.54	16.78	2.21%
RIFFLE	2355.3	33	0.67%
RIFFLE	2578.34	16.24	0.49%
RIFFLE	2666.83	29.89	1.97%
RIFFLE	2746.37	18.38	2.83%
RIFFLE	3023.43	24.25	3.05%

Feature	Station	Length	Slope		
RUN	88.28	15.6	0.83%	n =	18
RUN	160.73	24.37	2.09%	MIN =	0.28%
RUN	251.52	9.33	6.11%	MEDIAN =	6.64%
RUN	316.62	23.74	2.91%	AVG. =	6.40%
RUN	663.36	23.2	9.40%	MAX =	18.78%
RUN	820.72	6.23	18.78%		
RUN	936.57	10.58	2.27%		
RUN	1016.73	11.54	6.24%		
RUN	1075.49	5.81	8.78%		
RUN	1118.41	7.75	7.23%		
RUN	1242.53	4.46	11.43%		
RUN	1369.47	25.42	8.06%		
RUN	1673.73	17.06	12.37%		
RUN	1856.83	4.42	1.36%		
RUN	1966.71	12.55	8.21%		
RUN	2297.32	14.96	1.80%		
RUN	2764.75	109.05	0.28%		
RUN	3047.68	11.63	7.05%		

Feature	Station	Length	p-p spacing			
POOL	103.88	27		n =	36	
POOL	185.1	37	81	MIN =	15	(p-p spacing)
POOL	217.29	18	32	MEDIAN =	85	
POOL	260.85	15	44	AVG. =	84	
POOL	275.38	18	15	MAX =	175	
POOL	340.36	34	65			
POOL	477.45	36	137			
POOL	571.4	41	94			
POOL	641.89	20	70			
POOL	686.56	28	45			
POOL	789.99	29	103			
POOL	826.95	35	37			
POOL	912.96	26	86			
POOL	947.15	29	34			
POOL	1028.27	20	81			
POOL	1081.3	11	53			
POOL	1126.16	28	45			
POOL	1217.98	19	92			
POOL	1246.99	5	29			
POOL	1331.95	31	85			
POOL	1394.89	43	63			
POOL	1542.45	45	148			
POOL	1617.99	23	76			
POOL	1690.79	36	73			
POOL	1793.54	57	103			
POOL	1877.61	20	84			
POOL	2008.27	51	131			

POOL	2118.64	37	110
POOL	2234.21	36	116
POOL	2328.99	22	95
POOL	2419.44	44	90
POOL	2517.17	58	98
POOL	2618.32	29	101
POOL	2716.24	35	98
POOL	2891.58	28	175
POOL	3059.31	32	168



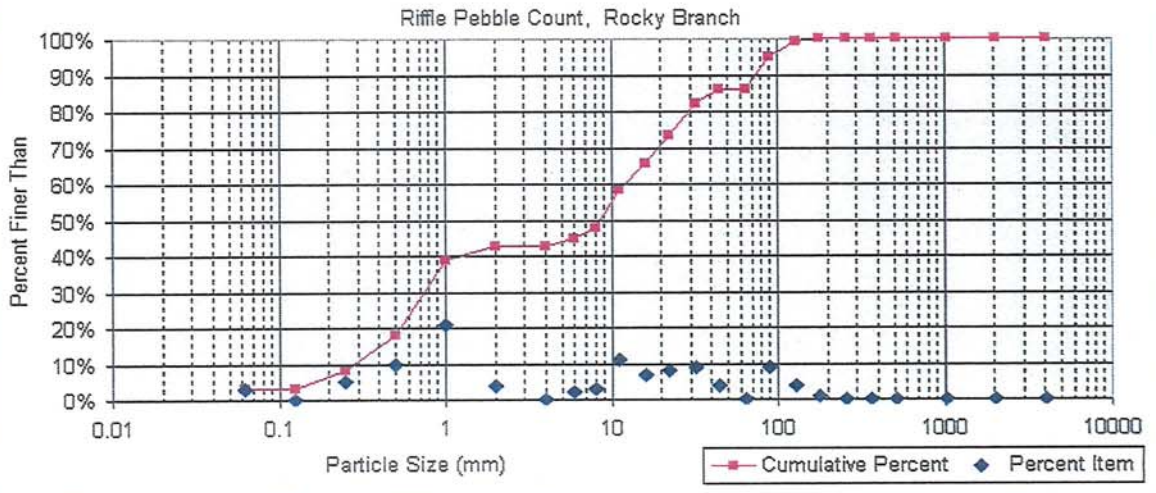
EEP PROJECT ID: 308
CROSS-SECTION: 2 FEATURE: RIFFLE

PROJECT ROCKY BRANCH
TASK PEBBLE COUNT
REACH ROCKY BRANCH
DATE 8/02/2010 to 8/05/2010
CREW BUCHHOLZ/PARRISH/PICKENS

Material	Size Range (mm)		Count
silt/clay	0	0.062	3
very fine sand	0.062	0.13	
fine sand	0.13	0.25	5
medium sand	0.25	0.5	10
coarse sand	0.5	1	21
very coarse sand	1	2	4
very fine gravel	2	4	
fine gravel	4	6	2
fine gravel	6	8	3
medium gravel	8	11	11
medium gravel	11	16	7
coarse gravel	16	22	8
coarse gravel	22	32	9
very coarse gravel	32	45	4
very coarse gravel	45	64	
small cobble	64	90	9
medium cobble	90	128	4
large cobble	128	180	1
very large cobble	180	256	
small boulder	256	362	
small boulder	362	512	
medium boulder	512	1024	
large boulder	1024	2048	
very large boulder	2048	4096	
bedrock			
	Total Particle Count:		101

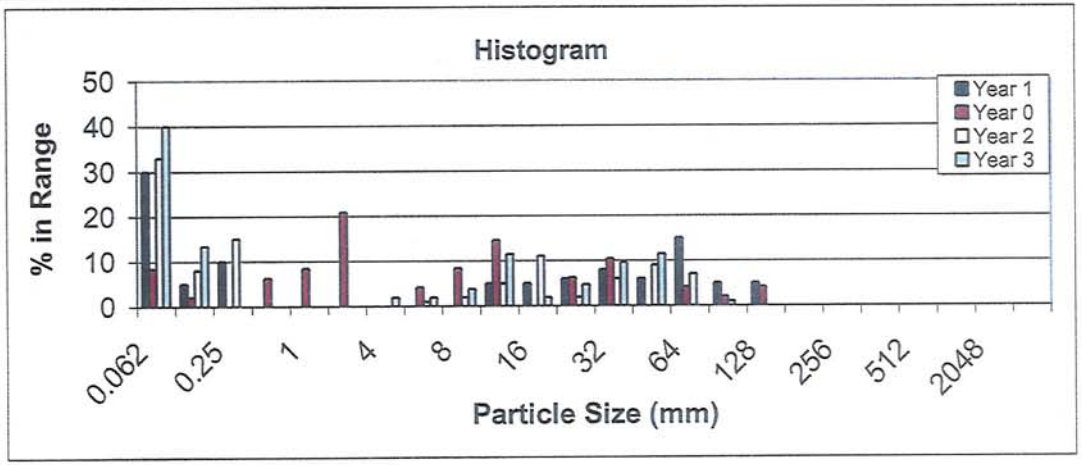
Rocky Branch
8/2/2010

Note:



Size percent less than (mm)				
D16	D35	D50	D84	D95
0.440	0.89	8.6	37	90

Percent by substrate type					
silt/clay	sand	gravel	cobble	boulder	bedrock
3%	40%	44%	14%	0%	0%



EEP PROJECT ID: 308
CROSS-SECTION: 4 FEATURE: RIFFLE

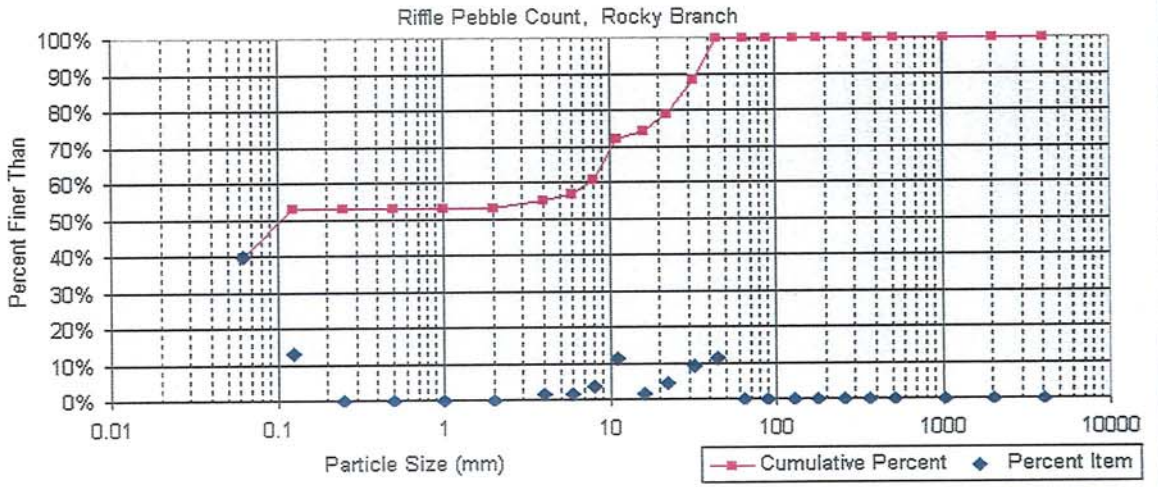
Ecosystem Enhancement PROGRAM

PROJECT ROCKY BRANCH
TASK PEBBLE COUNT
REACH ROCKY BRANCH
DATE 8/02/2010 to 8/05/2010
CREW BUCHHOLZ/PARRISH/PICKENS

Material	Size Range (mm)		Count
silt/clay	0	0.062	42
very fine sand	0.062	0.13	14
fine sand	0.13	0.25	
medium sand	0.25	0.5	
coarse sand	0.5	1	
very coarse sand	1	2	
very fine gravel	2	4	2
fine gravel	4	6	2
fine gravel	6	8	4
medium gravel	8	11	12
medium gravel	11	16	2
coarse gravel	16	22	5
coarse gravel	22	32	10
very coarse gravel	32	45	12
very coarse gravel	45	64	
small cobble	64	90	
medium cobble	90	128	
large cobble	128	180	
very large cobble	180	256	
small boulder	256	362	
small boulder	362	512	
medium boulder	512	1024	
large boulder	1024	2048	
very large boulder	2048	4096	
bedrock			
Total Particle Count:			105

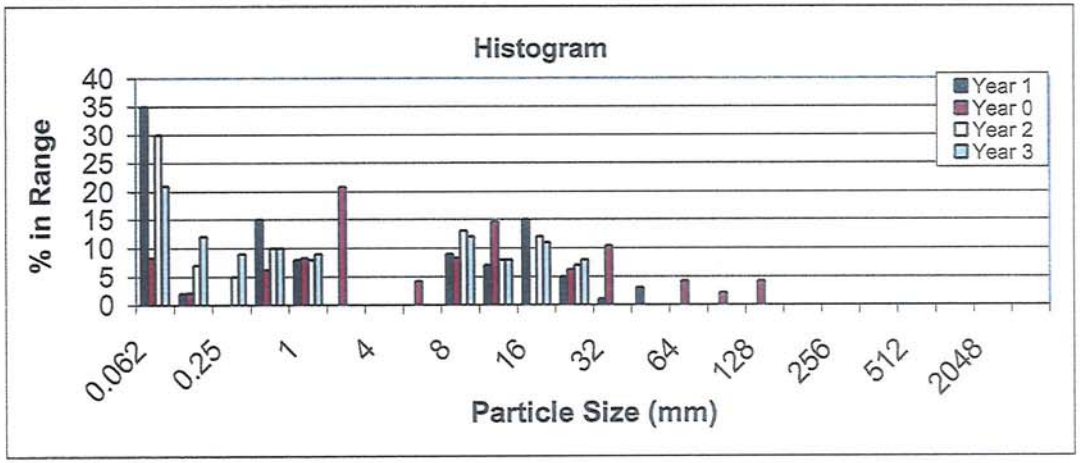
	Rocky Branch
	8/3/2010

Note:	



Size percent less than (mm)				
D16	D35	D50	D84	D95
#N/A	#N/A	0.1	27	39

Percent by substrate type					
silt/clay	sand	gravel	cobble	boulder	bedrock
40%	13%	47%	0%	0%	0%



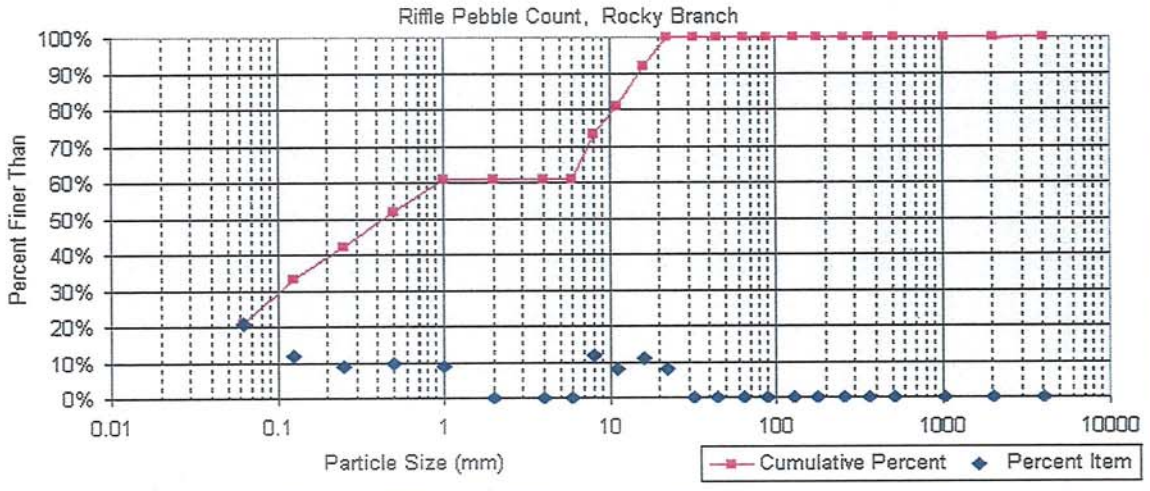
EEP PROJECT ID: 308
CROSS-SECTION: 7 FEATURE: RIFFLE

PROJECT ROCKY BRANCH
TASK PEBBLE COUNT
REACH ROCKY BRANCH
DATE 8/02/2010 to 8/05/2010
CREW BUCHHOLZ/PARRISH/PICKENS

Material	Size Range (mm)		Count
silt/clay	0	0.062	21
very fine sand	0.062	0.13	12
fine sand	0.13	0.25	9
medium sand	0.25	0.5	10
coarse sand	0.5	1	9
very coarse sand	1	2	
very fine gravel	2	4	
fine gravel	4	6	
fine gravel	6	8	12
medium gravel	8	11	8
medium gravel	11	16	11
coarse gravel	16	22	8
coarse gravel	22	32	
very coarse gravel	32	45	
very coarse gravel	45	64	
small cobble	64	90	
medium cobble	90	128	
large cobble	128	180	
very large cobble	180	256	
small boulder	256	362	
small boulder	362	512	
medium boulder	512	1024	
large boulder	1024	2048	
very large boulder	2048	4096	
bedrock			
	Total Particle Count:		100

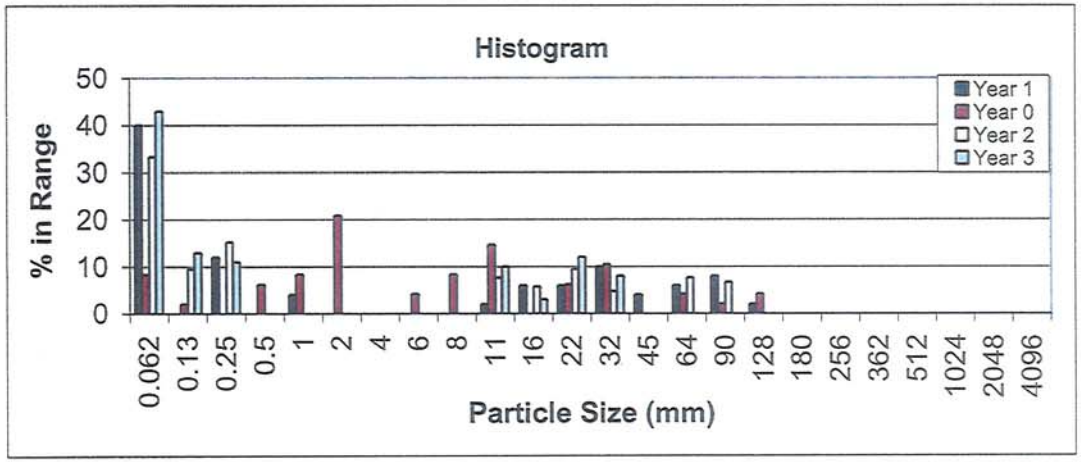
	Rocky Branch
	8/4/2010

Note:	



Size percent less than (mm)				
D16	D35	D50	D84	D95
#N/A	0.15	0.4	12	18

Percent by substrate type					
silt/clay	sand	gravel	cobble	boulder	bedrock
21%	40%	39%	0%	0%	0%



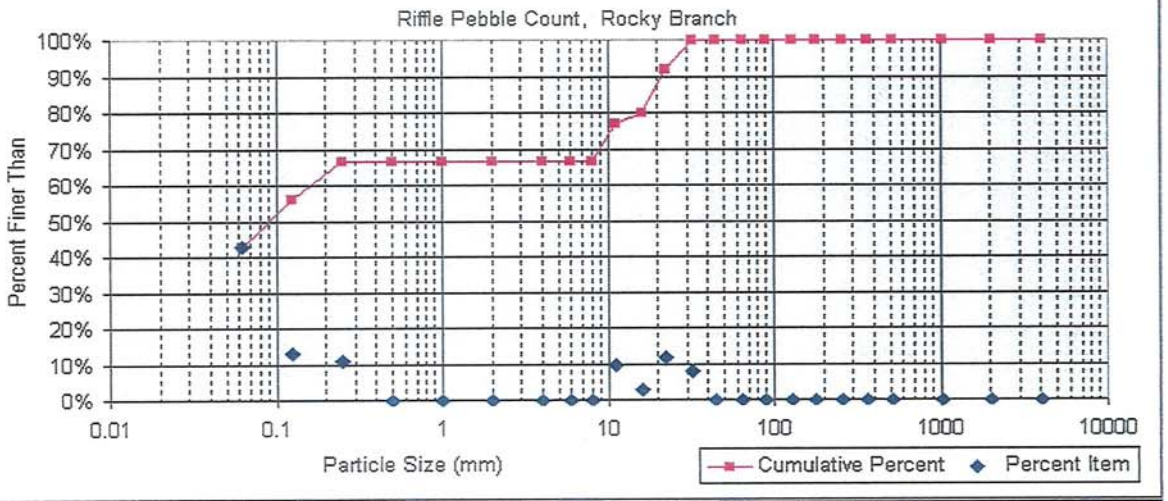
EEP PROJECT ID: 308
CROSS-SECTION: 8 FEATURE: RIFFLE

PROJECT ROCKY BRANCH
TASK PEBBLE COUNT
REACH ROCKY BRANCH
DATE 8/02/2010 to 8/05/2010
CREW BUCHHOLZ/PARRISH/PICKENS

Material	Size Range (mm)		Count
silt/clay	0	0.062	43
very fine sand	0.062	0.13	13
fine sand	0.13	0.25	11
medium sand	0.25	0.5	
coarse sand	0.5	1	
very coarse sand	1	2	
very fine gravel	2	4	
fine gravel	4	6	
fine gravel	6	8	
medium gravel	8	11	10
medium gravel	11	16	3
coarse gravel	16	22	12
coarse gravel	22	32	8
very coarse gravel	32	45	
very coarse gravel	45	64	
small cobble	64	90	
medium cobble	90	128	
large cobble	128	180	
very large cobble	180	256	
small boulder	256	362	
small boulder	362	512	
medium boulder	512	1024	
large boulder	1024	2048	
very large boulder	2048	4096	
bedrock			
	Total Particle Count:		100

Rocky Branch
8/4/2010

Note:



Size percent less than (mm)					Percent by substrate type					
D16	D35	D50	D84	D95	silt/clay	sand	gravel	cobble	boulder	bedrock
#N/A	#N/A	0.1	18	25	43%	24%	33%	0%	0%	0%

APPENDIX E

Wetland Assessment

(omitted – not applicable)