

Purlear Creek Phase II Monitoring Report Year 0 of 5 (2006)

Wilkes County, North Carolina

USGS HUC: 0304010110090

Project ID No. 010559701



Designed by: Kimley-Horn and Associates
Year 0 Monitoring by: Kimley-Horn and Associates

Prepared for:



NCDENR-Ecosystem Enhancement Program

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Executive Summary

Phase II of the Purlear Creek Stream and Wetland Restoration project falls within USGS hydrologic unit **0304010110090** in the Yadkin River Basin. The project streams and wetland lie within an agricultural setting comprised predominantly of cattle operations. Prior to restoration work, the project streams had been destabilized through historic straightening, cattle traffic, and a conversion of the watershed to more impervious surfaces. The wetland hydrology had been impacted due to modification of the streams. Cattle grazing and historic planting has mostly limited the wetland and riparian communities to a few species of herbaceous plants and invasive trees.

Riparian and wetland planting was completed on January 24, 2006. Eight vegetation quads were set up for permanent monitoring in March 2006 and these quads were assessed for stem counts at that time. Two species were unidentifiable due to a lack of distinct characteristics visible during the dormant season. For quads 1-7, the stem counts greatly exceeded year 3 success criteria. Quad 8 barely exceeded year 3 success criteria and should be monitored closely for continued adherence to success criteria.

A stream assessment including a visual assessment and geomorphic survey indicated that the project reaches were performing within established success criteria ranges. The initial visual assessment showed two concerns for stability that may become issues in the future. In the section of Reach 1 between stations 67+66 and 68+41, two transverse bars were directing flow into the outer banks of downstream pools. These bars have not caused significant erosion. Two A-Vane structures in Reach 4 at stations 305+91 and 312+32 had piping in the lower cross. The structures continue to maintain function. The geomorphic measurements for both reaches are within the range of the design parameters.

Site wetland hydrology could not be assessed due to malfunctioning wells. These wells will require maintenance to continue wetland hydrology monitoring. The restoration and enhancement wetland areas appear to have become wetter since completion of the restoration work. Vegetation Quads #1 and #6 fall within the wetland and were used to assess wetland vegetation.

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1.0 Project Background

1.1 Location and Setting

Phase II of the Purlear Creek Stream and Wetland Restoration project falls within the Hayes Property in Wilkes County, North Carolina approximately 8 miles northwest of the Town of Wilkesboro. The most direct route to the site from North Wilkesboro is described as follows:

Take US 421 to the intersection with NC 16 and turn right. Travel north – northwest on NC16 to the intersection with Boone Trail (Old US-421) in the town of Miller’s Crossroads. Turn left and travel west to a 3-way intersection with Purlear Road. Turn right and travel north until the intersection with Shingle Gap Road and Old NC-60. Turn left onto New Hope Road and travel west until crossing a one lane bridge. The project ends at the one land bridge.

Figure 1 shows the project vicinity and mitigation features.

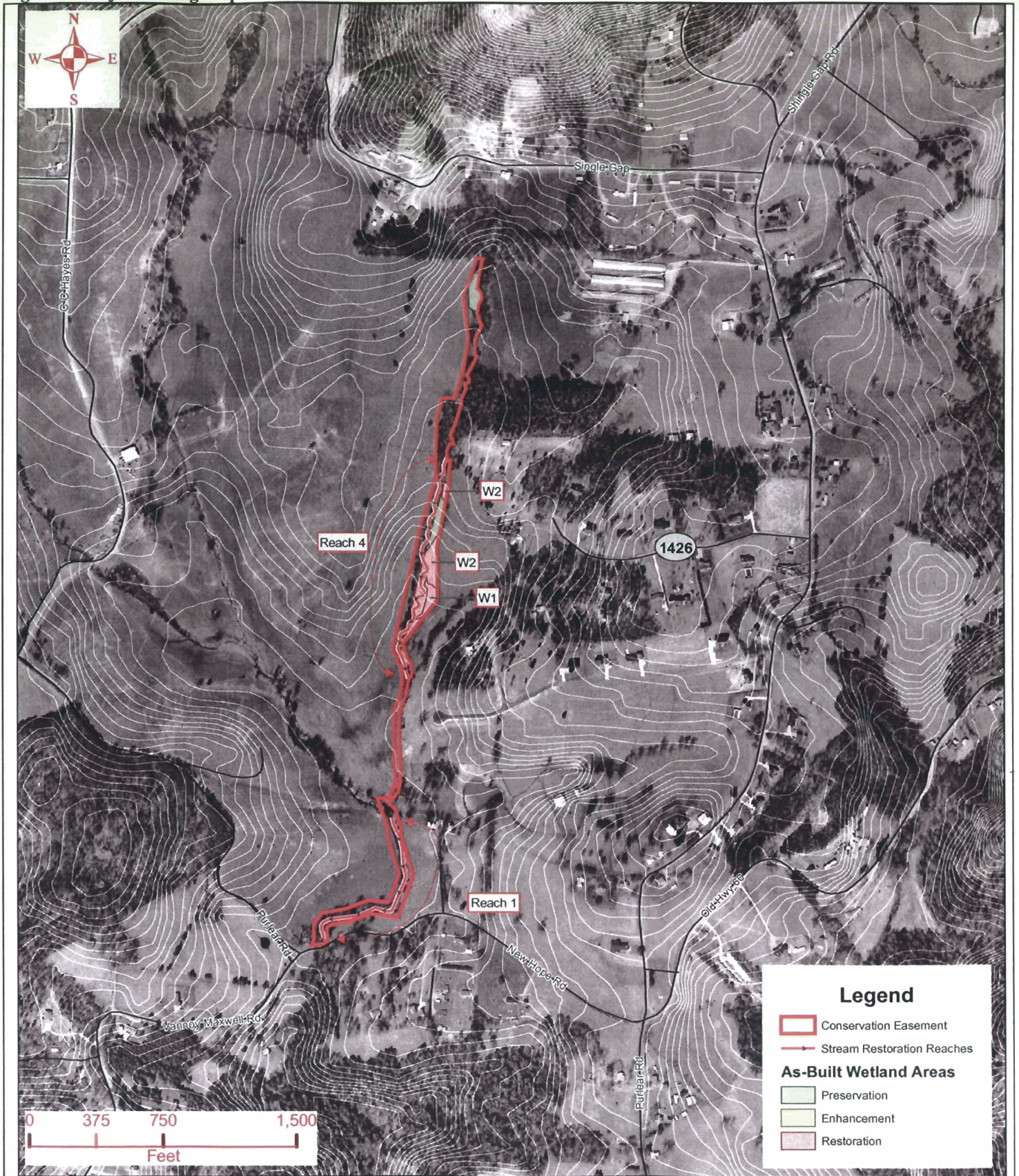
1.2 Project Structure, Mitigation Type, Approach and Objectives

Phase II of the Purlear Creek stream and wetland restoration project strives to restore two (2) stream reaches and restore and enhance adjacent riparian wetlands. Both streams lie within an area that was actively used for cattle grazing. The alignments of the channels also indicate that the channels have been straightened and channelized. The designer used a Priority I approach to restore the upper reach (Reach 4). A new channel was dug into the abandoned floodplain. For the lower reach (Reach 1), the designer used a Priority II approach to restore the reach. The existing channel banks were laid back to create an expanded floodplain and new channel alignment was placed within the expanded floodplain. For both reaches, in-stream structures such as A-Vane, Cross-Vanes, and J-Hooks were installed to provide additional stability to the channel. Root wads were installed to provide additional habitat.

Much of the riparian wetlands had been cleared and cattle grazing severely limited regrowth of woody vegetation. Groundwater and surface water hydrological components were impaired due to channelization of the adjacent stream. Priority I restoration of the adjacent stream should restore the wetland hydrology by increasing the frequency and duration of overbank flows into the wetland and raising the groundwater elevations that are influenced by the base flow elevation of the stream.

Most of the riparian corridor (including the riparian wetland) had been cleared and maintained as pasture. The ecological function of the corridor relative to the streams and wetland had been impaired. The restoration effort planted the area with a mix of woody vegetation to help reestablish a viable riparian forest community. The planting plan assumes that there is adequate seed source for herbaceous species to reestablish in the area. The planted area will be maintained to promote the growth of planted and preferred volunteer species and to limit populations of nuisance and invasive species.

Figure 1: Project Setting Map




Prepared For 	Project Purlear Creek Phase II Stream and Wetland Restoration – Year 0 Monitoring 2006 Wilkes County, North Carolina	Date 6/5/06	Project Number 010559701

Exhibit Table I: Project Mitigation Structure and Objectives Table

Project Segment or Reach ID	Mitigation Type	Approach	Linear Footage (lf) or Acreage (ac)	Stationing	Comment
Reach 1	Restoration	Priority II	1,087 lf	62 + 00 - 72 + 87	--
Reach 4	Restoration	Priority I	1,400 lf	300 + 00 - 314 + 00	--
Tract W1	Restoration	Rehabilitation	0.21 ac.	307 + 50 - 310 + 50	Improvement of vegetation and hydrology of seep wetland
Tract W2	Restoration	Re-establishment	0.84 ac.	301 + 60 - 313 + 90	Restoration of riverine wetland located along left side of Reach 4

1.3 Project History and Background

Exhibit Table II: Project Activity and Reporting History

Activity or Report	Scheduled Completion	Data Collection Complete	Actual Completion or Delivery	Comments
Restoration Plan			April 2004	
Final Design -- 90%	March 2004	--	May 2004	
Construction	Spring 2005	--	Spring 2006	Construction delay due to delay in obtaining easement and multiple bids
Temporary S&E mix applied to entire project area	--	--	--	
Permanent seed mix applied	--	--	--	
Containerized and B&B plantings for reach/segments 1&2	--	--	January 2006	
Mitigation Plan / As-built (Year 0 Monitoring -- baseline)	December 2005	--	May 2006	Delay in planting
Year 1 monitoring	--	--	--	
Year 2 Monitoring	--	--	--	
Year 3 Monitoring	--	--	--	
Year 4 Monitoring	--	--	--	
Year 5 Monitoring	--	--	--	
Year 5+ Monitoring	--	--	--	

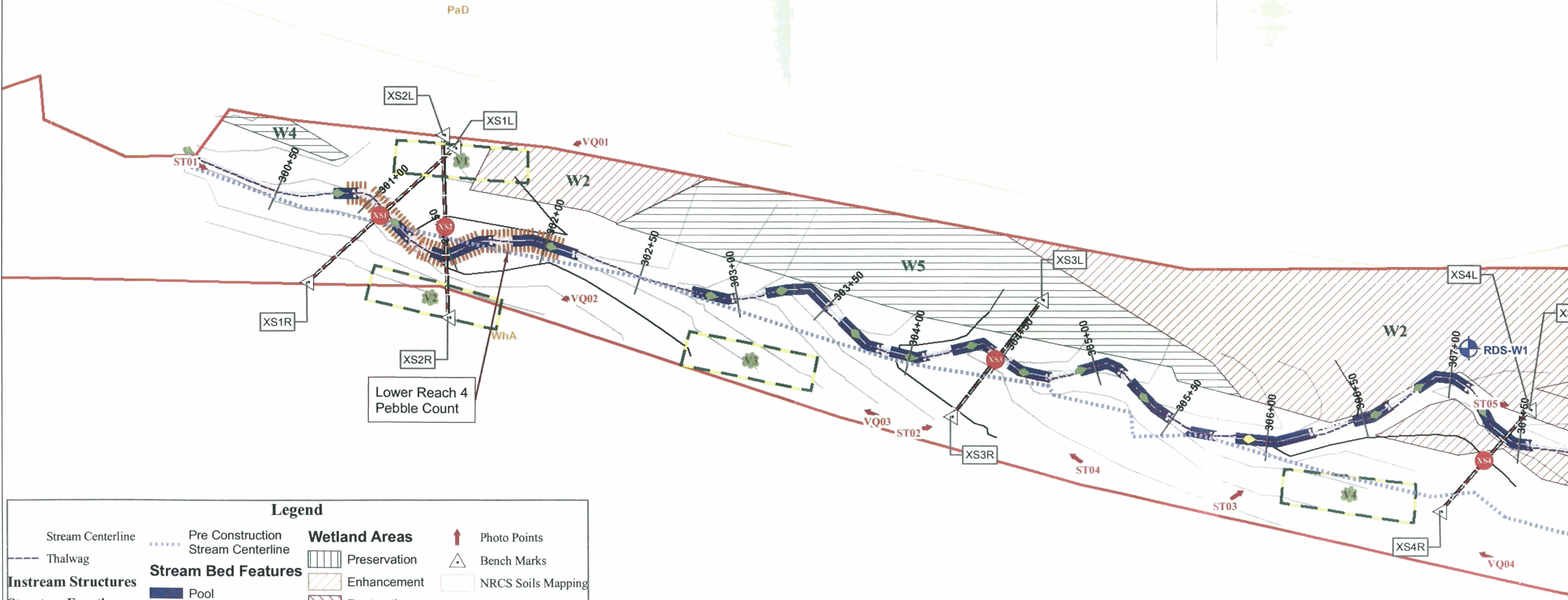
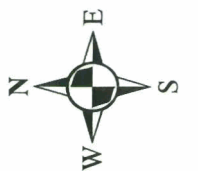
Exhibit Table III: Project Contact Table

Designer	P.O. Box 33068	
Kimley-Horn and Associates	Raleigh, NC 27636-3068	
Primary Designer POC	Will Wilhelm, P.E.	(704) 319-7684
Construction Contractor	220 Stoneridge Drive, Suite 405	
L-J, INC	Columbia, SC 29210	
Primary Contractor POC	Richard Goodwin	(803) 929-1181
Planting Contractor	P.O. Box 655	
HARP	Newell, NC 28126	
Planting contractor POC	Jim Matthews, Ph.D.	(704) 841-2841
Seeding Contractor		
UNKNOWN		
Planting contractor POC	UNKNOWN	
Seed Mix Sources	UNKNOWN	
Nursery Stock Suppliers	UNKNOWN	
Monitoring Performers		
UNKNOWN		
Stream Monitoring POC	UNKNOWN	
Vegetation Monitoring POC	UNKNOWN	
Wetland Monitoring POC	UNKNOWN	

Exhibit Table IV: Project Background Table

Project County	Wilkes	
Drainage Area	Reach 1	3.0 mi ²
	Reach 4	0.4 mi ²
Drainage impervious cover estimate (%)	Reach 1	< 5%
	Reach 4	< 5%
Stream Order	Reach 1	3
	Reach 4	1
Physiographic Region	Piedmont	
Ecoregion	Northern Inner Piedmont	
Rosgen Classification of As-built	Reach 1	C4/1
	Reach 4	C4
Cowardin Classification	PEM01E	
Dominant soil types	Chewacla loam (CkA); Pacolet Sandy clay loam (PcC2); Pacolet sandy loam (PaD); Wehadkee loam (WhA)	
Reference site ID	Upstream 1; Upper Big Warrior Creek; Basin Creek	
USGS HUC for Project and Reference	03040101 (All project and reference reaches)	
NCDWQ Sub-basin for Project and Reference	03-07-01 (All project and reference reaches)	
NCDWQ classification for Project and Reference	Project Reaches & Upstream 1 Reference	12-31-1-8-(2)
	Upper Warrior Creek	12-29-1 (2)
	Basin Creek	12-46-2-2
Any portion of any project segment 303d listed?	No	
Any portion of any project segment upstream of a 303d listed segment?	N/A	
Reasons for 303d listing or stressor	N/A	
% of project easement fenced	100%	

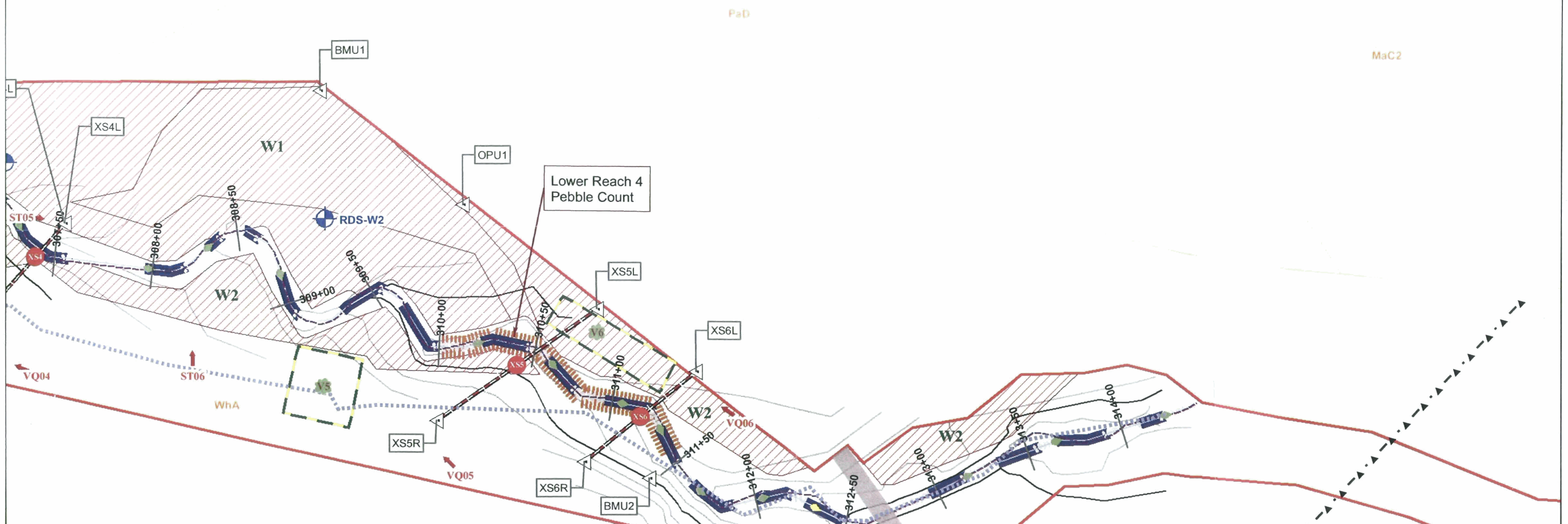
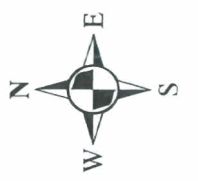
1.4 Monitoring Plan View



Legend			
Stream Centerline	Pre Construction Stream Centerline	Wetland Areas	Photo Points
Thalweg		Preservation	Bench Marks
Instream Structures	Stream Bed Features	Enhancement	NRCS Soils Mapping
Structure Function	Pool	Restoration	Minor Contour
Excellent	Run	Wetland Wells	Major Contour
Good	Riffle	Vegetation Quads	Utility Pole
Pebble Count Areas	Step		Utility Line
Cross Sections			



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	Date 6/5/06		



Legend

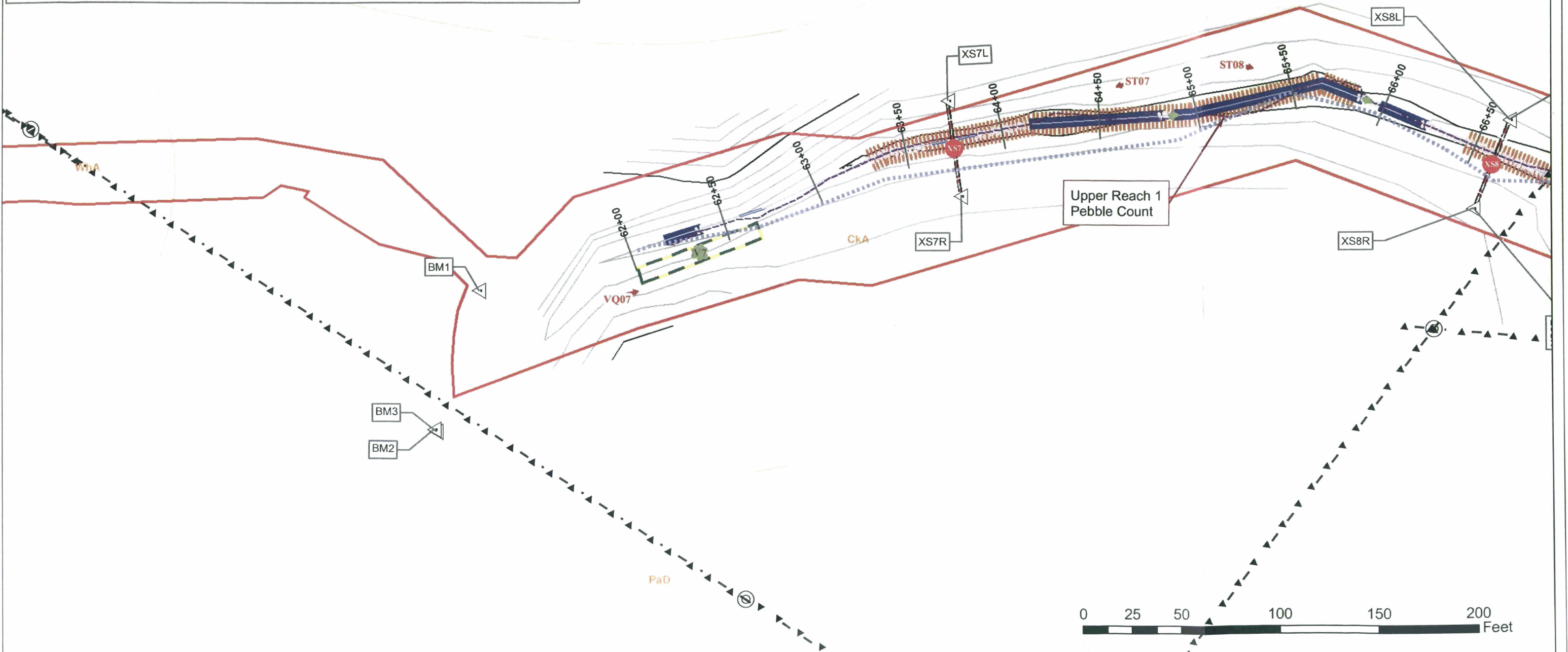
— Stream Centerline Pre Construction Stream Centerline	Wetland Areas	↑ Photo Points
- - - Thalweg	Stream Bed Features	▨ Preservation	△ Bench Marks
Instream Structures	■ Pool	▨ Enhancement	□ NRCS Soils Mapping
Structure Function	— Run	▨ Restoration	— Minor Contour
◆ Excellent	Riffle	⊕ Wetland Wells	— Major Contour
● Good	Step	□ Vegetation Quads	⊙ Utility Pole
▨ Pebble Count Areas		▲▲ Utility Line	
— Cross Sections			




Prepared For: 	Purlear Creek Phase II Stream and Wetland Restoration – Year 0 Monitoring 2006 Wilkes County, North Carolina		
	Date 6/5/06	Project Number 010559701	Sheet 2

Legend

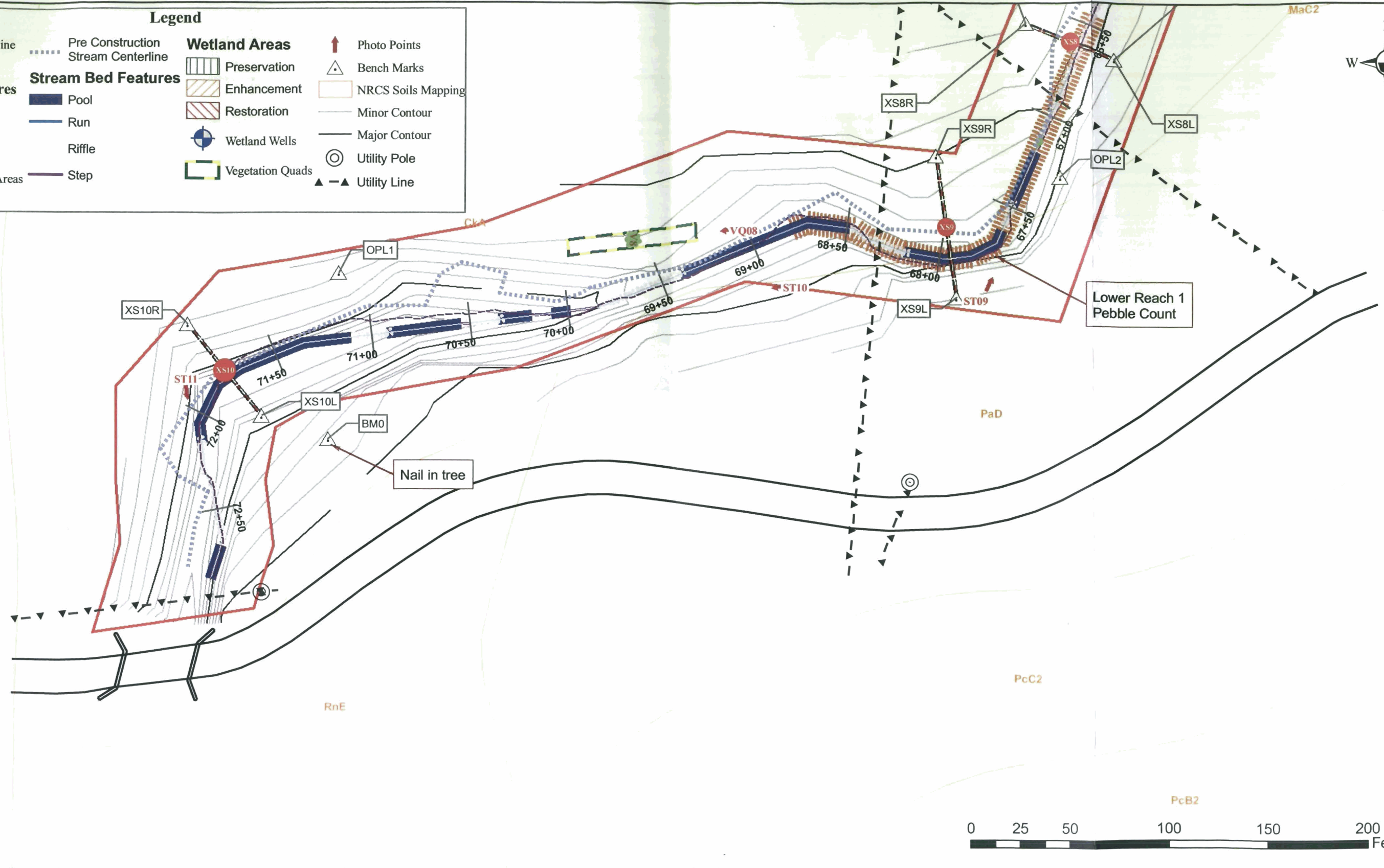
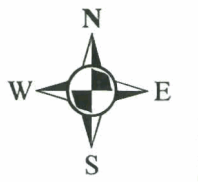
— Stream Centerline Pre Construction Stream Centerline	Wetland Areas	↑ Photo Points
- - - Thalweg		▨ Preservation	△ Bench Marks
Instream Structures	Stream Bed Features	▨ Enhancement	□ NRCS Soils Mapping
Structure Function	■ Pool	▨ Restoration	— Minor Contour
◆ Excellent	— Run	⊕ Wetland Wells	— Major Contour
● Good	▨ Riffle	⊙ Utility Pole	—▲ Utility Line
▨ Pebble Count Areas	— Step	▭ Vegetation Quads	
— Cross Sections			



	Project Purlear Creek Phase II Stream and Wetland Restoration – Year 0 Monitoring 2006 Wilkes County, North Carolina	Project Number 010559701	Sheet 3
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Legend

- Stream Centerline
- Thalweg
- Instream Structures**
- Structure Function**
- Excellent
- Good
- Pebble Count Areas
- Cross Sections
- Pre Construction Stream Centerline
- Stream Bed Features**
- Pool
- Run
- Riffle
- Step
- Wetland Areas**
- Preservation
- Enhancement
- Restoration
- Wetland Wells
- Vegetation Quads
- Photo Points
- Bench Marks
- NRCS Soils Mapping
- Minor Contour
- Major Contour
- Utility Pole
- Utility Line



	Project Purlear Creek Phase II Stream and Wetland Restoration – Year 0 Monitoring 2006 Wilkes County, North Carolina	Project Number 010559701	Sheet 4
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2.0 Project Conditions and Monitoring Results

2.1 Vegetation Assessment

Exhibit Table V: Preliminary Soil Data

Series	Max Depth (in.)	% Clay on Surface	K	T	OM %
Chewacla loam (CkA)	60	10-35	0.28	5	1.0-4.0
Pacolet sandy clay loam (PcC2)	60	20-35	0.24	2	0.5-1.0
Pacolet sandy loam (PaD)	60	15-30	0.2	5	0.5-2.0
Wehadkee loam (WhA)	72	5-27	0.24	5	2.0-5.0

The Year 0 assessment did not find any vegetative problem areas.

Exhibit Table VI: Vegetative Problem Areas

Feature/Issue	Station # / Range	Probable Cause	Photo #
Bare Bank	--	--	--
Bare Bench	--	--	--
Bare Flood Plain	--	--	--
Invasive/Exotic Populations	--	--	--

The Year 0 assessment found that all monitoring quads exhibited stem counts exceeding Year 3 success criteria. Species diversity within each quad ranged from 2 to 7 distinct species.

Exhibit Table VII: Stem counts for each species arranged by plot

Species		Plots								Species Initial Totals	Species Year 1 Totals	Species Survival %
		1	2	3	4	5	6	7	8			
		Area m ²										
		100	100	100	100	100	100	50	50			
Shrubs												
<i>Diospyros</i>	<i>virginiana</i>	4	1	1	5		2			13	--	--
<i>Cornus</i>	<i>spp.</i>	2	12			9		17		40	--	--
<i>Morus</i>	<i>rubra</i>		4	3						7	--	--
<i>Cercis</i>	<i>canadensis</i>		1	2				2		5	--	--
<i>Asimina</i>	<i>triloba</i>			2	16					18	--	--
<i>Cephalanthus</i>	<i>occidentalis</i>					4	1			5	--	--
Trees											--	--
<i>Quercus</i>	<i>spp.</i>	15	5	6	3	13	10	6	3	61	--	--
<i>Platanus</i>	<i>occidentalis</i>		5	6	5			1		17	--	--
<i>Juglans</i>	<i>nigra</i>				2			1		3	--	--
<i>Unknown 1</i>					8	11	3			22	--	--
<i>Unknown 2</i>			2	3	11	8			2	26	--	--
Plot Initial Totals		21	30	23	50	45	16	27	5			
Plot Year 1 Totals		--	--	--	--	--	--	--	--			
Year 3 Count Success Criteria		8	8	8	8	8	8	4	4			
Plot Survival %		--	--	--	--	--	--	--	--			

*Vegetation survey occurred in winter after planting. Two species were unidentifiable.

2.2 Stream Assessment

The Year 0 visual stream assessment found minor problems with the stream. Two structures in Reach 4 had minor piping in the lower cross of the A-Vane. The piping did not seem to impair overall function of the structures and may be self repaired with sediment for upstream. In Reach 1, two transverse bars have formed between stations 67+66 and 68+41. These features have the potential to cause downstream bank erosion.

Exhibit Table VIII: Stream Problem Areas

Feature Issue	Reach	Station numbers	Description	Suspected Cause	Photo number
Aggradation/Bar Formation	--	--	--	--	--
	--	--	--	--	--
Bank scour	1	305+91	Potential for scour from transverse bar	--	SP01
	1	312+32	Potential for scour from transverse bar	--	--
Engineered structures – back or arm scour Etc.	4	67+66	Minor piping in lower cross of A-Vane	Various Possibilities: Temporary loss of backing fabric or fill materials	--
	4	68+41	Minor piping in lower cross of A-Vane		--
	--	--	--	--	--

Exhibit Table IX: Categorical Stream Features Visual Stability Assessment

Reach 1						
Feature	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
A. Riffles	100%	--	--	--	--	--
B. Pools	100%	--	--	--	--	--
C. Thalweg	80%	--	--	--	--	--
D. Meanders	100%	--	--	--	--	--
E. Bed General	100%	--	--	--	--	--
F. Vanes / J Hooks etc.	100%	--	--	--	--	--
G. Wads and Boulders	100%	--	--	--	--	--
Reach 4						
Feature	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
A. Riffles	100%	--	--	--	--	--
B. Pools	100%	--	--	--	--	--
C. Thalweg	100%	--	--	--	--	--
D. Meanders	100%	--	--	--	--	--
E. Bed General	100%	--	--	--	--	--
F. Vanes / J Hooks etc.	98%	--	--	--	--	--
G. Wads and Boulders	--	--	--	--	--	--

Year 0 assessment of channel geometry showed that the as-built geomorphic measurements align closely with the design dimensions.

Exhibit Table X: Baseline Morphology and Hydraulic Summary

		Reach 1																	
Parameter		USGS Gage Data			Regional Curve (3.0 mi ²)			Pre-Existing Condition			Project Reference Stream			Design			As-built		
Dimension	Units	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
BF Width	ft	X	X	X	--	--	28.6	--	--	23.9	--	--	--	--	--	24.2	25.7	26.8	26.3
Floodprone Width	ft	X	X	X	--	--	--	--	--	50	--	--	--	--	--	62	--	--	74.0
BF Cross Sectional Area	ft ²	X	X	X	--	--	45.6	--	--	40.3	--	--	--	--	--	43.5	25.8	48.9	37.3
BF Mean Depth	ft	X	X	X	--	--	1.6	--	--	1.7	--	--	--	--	--	1.8	1.0	1.9	1.4
BF Max Depth	ft	X	X	X	--	--	--	--	--	2.8	--	--	--	--	--	2.7	2.0	3.4	2.7
Width/Depth Ratio		X	X	X	--	--	--	--	--	14.2	11.2	20.8	16	--	--	13.5	--	--	15.9
Entrenchment Ratio		X	X	X	--	--	--	--	--	2.1	1.4	9.9	4	--	--	2.6	--	--	3.1
Wetted Perimeter	ft	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hydraulic radius	ft	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.9	1.8	1.4
Pattern																			
Channel Beltwidth	ft	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	28	61	43
Radius of Curvature	ft	--	--	--	--	--	--	--	--	75	--	--	--	48	83	66	33	57	43
Meander Wavelength	ft	--	--	--	--	--	--	--	--	200	--	--	--	--	--	200	126	220	179
Meander Width ratio		--	--	--	--	--	--	--	--	--	1.7	3.4	2.3	--	--	--	1.1	2.3	1.6
Profile																			
Riffle length	ft	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Riffle slope	ft/ft	--	--	--	--	--	--	--	--	0.015	--	--	--	--	--	0.009	0.001	0.01	0.005
Pool length	ft	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	28	76	53
Pool spacing	ft	--	--	--	--	--	--	61	181	121	--	--	--	121	194	194	127	200	145
Substrate																			
d50	mm	--	--	--	--	--	--	--	--	1	--	--	--	--	--	6	5.3	6.7	6.0
d84	mm	--	--	--	--	--	--	--	--	35	--	--	--	--	--	22	21.8	24.9	23.4
Additional Reach Parameters																			
Valley Length	ft	--	--	--	--	--	--	--	1000	--	--	--	--	1000	--	--	--	1035	--
Channel Length	ft	--	--	--	--	--	--	--	1100	--	--	--	--	1100	--	--	--	1139	--
Sinuosity		--	--	--	--	--	--	--	1.1	1.1	1.4	1.2	--	1.1	--	--	--	1.1	--
Water Surface Slope	ft/ft	--	--	--	--	--	--	--	0.005	0.01	0.016	0.013	--	0.005	--	--	--	0.006	--
BF slope	ft/ft	--	--	--	--	--	--	--	0.005	0.01	0.016	0.013	--	0.005	--	--	--	0.006	--
Rosgen Classification		--	--	--	--	--	--	--	B4c/1	B4c - C4			--	C4/1	--	--	--	C4/1	--
*Habitat Index		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
*Macrobenthos		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Look at USGS Morphology
 CA, w, d
 CA, w, d
 BTR, As-built
 BTR

How the Project goes to compare

2d+w
 A/WP

full distribution consider removing

Ade
 BF discharge
 Drainage Area
 capacity
 power

The full distribution that went into how # snags to be available in the App

Reach 4																			
Parameter		USGS Gage Data			Regional Curve (0.4 mi ²)			Pre-Existing Condition			Project Reference Stream			Design			As-built		
Dimension	Units	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
BF Width	ft	--	--	--	--	--	8	--	--	7.4	--	--	--	--	--	8	7.2	9.7	8.5
Floodprone Width	ft	--	--	--	--	--	--	--	--	9.5	--	--	--	--	--	55	--	--	60.1
BF Cross Sectional Area	ft ²	--	--	--	--	--	11.5	--	--	3.5	--	--	--	--	--	4.1	4.1	5.1	4.6
BF Mean Depth	ft	--	--	--	--	--	1.1	--	--	0.5	--	--	--	--	--	0.5	0.5	0.6	0.5
BF Max Depth	ft	--	--	--	--	--	--	--	--	1.4	--	--	--	--	--	1.4	0.9	1.4	1.1
Width/Depth Ratio		--	--	--	--	--	--	--	--	15.5	11.2	20.8	16	--	--	16	--	--	15.4
Entrenchment Ratio		--	--	--	--	--	--	--	--	1.3	1.4	9.9	4	--	--	6.8	--	--	7.1
Wetted Perimeter	ft	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hydraulic radius	ft	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5	0.5	0.5
Pattern																			
Channel Beltwidth	ft	--	--	--	--	--	--	--	--	40	--	--	80	--	--	--	18.5	55.3	34.7
Radius of Curvature	ft	--	--	--	--	--	--	10	40	25	--	--	24	48	83	66	12.8	38.1	20.6
Meander Wavelength	ft	--	--	--	--	--	--	50	60	55	60	80	70	--	--	200	75.4	124.6	93
Meander Width ratio		--	--	--	--	--	--	--	--	5.4	--	--	10	--	--	--	2.2	6.5	4.1
Profile																			
Riffle length	ft	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Riffle slope	ft/ft	--	--	--	--	--	--	0.007	0.02	0.01	--	--	--	--	--	0.009	0.002	0.01	0.03
Pool length	ft	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.7	24.6	15.8
Pool spacing	ft	--	--	--	--	--	--	--	--	70	--	--	--	40	64	64	26.6	63.8	43.5
Substrate																			
d50	mm	--	--	--	--	--	--	--	--	0.5	--	--	--	--	--	6	0.5	2.0	1.3
d84	mm	--	--	--	--	--	--	--	--	5	--	--	--	--	--	22	9.3	26.2	17.8
Additional Reach Parameters																			
Valley Length	ft		--			--				1284		--			1284			1327	
Channel Length	ft		--			--				1412		--			1541			1460	
Sinuosity			--			--				1.1	1.1	1.4	1.2		1.2			1.1	
Water Surface Slope	ft/ft		--			--				0.0165	0.01	0.016	0.013		0.0183			0.013	
BF slope	ft/ft		--			--				0.0165	0.01	0.016	0.013		0.0183			0.013	
Rosgen Classification			--			--				F4		B4c - C4				C4			C5
*Habitat Index			--			--				--		--			--			--	
*Macrobenthos			--			--				--		--			--			--	

2.3 Wetland Assessment

A quantitative assessment of Year 0 wetland hydrology was not possible due to malfunctioning of the sampling wells. The wells will need to be repaired to continue monitoring of wetland hydrology. Vegetation Quads #1 and #6 were used to assess wetland vegetation status. As shown in section 3.1, these quads shows that vegetation growth in the wetland currently exceeds success criteria.

Exhibit Table XI: Wetland Criteria Attainment

Tract	Well ID	Well Hydrology Threshold Met?	Tract Mean	Vegetation Plot ID	Vegetation Survival Threshold Met?	Tract Mean
W1 & W2	RDS-W1	--	--	V1	Y	100%
	RDS-W2	--		V6	Y	

* Wells are malfunctioning and require maintenance to continue wetland hydrology monitoring

3.0 Methodology

Monitoring methods for the Year 0 assessment did not deviate from the procedure described in the mitigation report.

APPENDIX A
VEGETATION MONITORING DATA

Planting Species List				
Common Name	Genus	Species	Live Stakes	Trees
Paw Paw	<i>Asimina</i>	<i>triloba</i>		100
Buttonbush	<i>Cephalanthus</i>	<i>occidentalis</i>		100
Redbud	<i>Cercis</i>	<i>L</i>		50
Silky Dogwood	<i>Cornus</i>	<i>amomum</i>	2,100	200
Flowering Dogwood	<i>Cornus</i>	<i>florida</i>		100
Persimmon	<i>Diospyros</i>	<i>virginiana</i>		100
Green Ash	<i>Fraxinus</i>	<i>pennsylvanica</i>		200
Black Walnut	<i>Juglans</i>	<i>nigra</i>		100
Red Mulberry	<i>Morus</i>	<i>rubra</i>		100
Black Gum	<i>Nyssa</i>	<i>sylvatica</i>		300
Ninebark	<i>Physocarpus</i>	<i>opulifolius</i>	1,200	
Sycamore	<i>Platanus</i>	<i>occidentalis</i>		200
White Oak	<i>Quercus</i>	<i>alba</i>		100
Red Oak	<i>Quercus</i>	<i>falcata</i>		100
Water Oak	<i>Quercus</i>	<i>nigra</i>		100
Willow Oak	<i>Quercus</i>	<i>phellos</i>		100
Shumard Oak	<i>Quercus</i>	<i>shumardii</i>		100
Black Willow	<i>Salix</i>	<i>nigra</i>	800	
Silky Willow	<i>Salix</i>	<i>sericea</i>	2,750	
Elderberry	<i>Sambucus</i>	<i>canadensis</i>	1,150	
Total Planted			8,000	2,050




Photograph VQ1 – Quad 1 (2-2-2006)



Photograph VQ2 – Quad 2 (2-2-2006)

Title | Vegetation Quad Photos


Prepared For: 	Project	Purlear Creek Phase II Stream and Wetland Restoration – Year 0 Monitoring 2006 Wilkes County, North Carolina		
		Date	Project Number	Figure
		5/19/06	010559701	VP-1



Photograph VQ3 – Quad 3 (2-2-2006)




Photograph VQ4 – Quad 4 (2-2-2006)

Title	Vegetation Quad Photos		
Prepared For: 	Project	Purlear Creek Phase II Stream and Wetland Restoration – Year 0 Monitoring 2006 Wilkes County, North Carolina	
		Date 5/19/06	Project Number 010559701



Photograph VQ5 – Quad 5 (2-2-2006)


Photograph VQ6

Title	Vegetation Quad Photos		
Prepared For 	Project	Purlear Creek Phase II Stream and Wetland Restoration – Year 0 Monitoring 2006 Wilkes County, North Carolina	
		Date 5/19/06	Project Number 010559701
			Figure VP-3



Photograph VQ7 – Quad 7 (2-2-2006)

Photograph VQ8

Title		Vegetation Quad Photos		
Prepared For: 	Project	Purlear Creek Phase II Stream and Wetland Restoration – Year 0 Monitoring 2006 Wilkes County, North Carolina		
	Date	Project Number	Figure	
	5/19/06	010559701	VP-4	

APPENDIX B
STREAM MONITORING DATA

Table B1. Visual Morphological Stability Assessment
Purlear Creek Phase II / Project ID 010559701

Reach 1

Feature Category	Metric (per As-built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-built	% Perform in Stable Condition	Feature Perform. Mean or Total
A. Riffles	1 Present?	13	13	100%	100%
	2 Armor stable (e.g. no displacement)?	13	13	100%	
	3 Facet grade appears stable?	13	13	100%	
	4 Minimal evidence of embedding/fining?	13	13	100%	
	5 Length appropriate?	13	13	100%	
B. Pools	1 Present? (e.g not subject to severe aggrad. or migrat.?)	12	12	100%	100%
	2 Sufficiently deep (Max Pool D:Mean Bkf >1.6?)	12	12	100%	
	3 Length appropriate?	12	12	100%	
C. Thalweg	1 Upstream of meander bend (run/inflection) centering?	5	5	100%	80%
	2 Downstream of meander (glide/inflection) centering?	3	5	60%	
D. Meanders	1 Outer bend in state of limited/controlled erosion?	4	4	100%	100%
	2 Of those eroding, # w/concomitant point bar formation?	--	--		
	3 Apparent Rc within spec?	4	4	100%	
	4 Sufficient floodplain access and relief?	4	4	100%	
E. Bed General	1 General channel bed aggradation areas (bar formation)	1068	1068	100%	100%
	2 Channel bed degradation – areas of increasing down-cutting or head cutting?	1068	1068	100%	
F. Vanes	1 Free of back or arm scour?	3	3	100%	100%
	2 Height appropriate?	3	3	100%	
	3 Angle and geometry appear appropriate?	3	3	100%	
	4 Free of piping or other structural failures?	3	3	100%	
G. Wads/ Boulders	1 Free of scour?	1	1	100%	100%
	2 Footing stable?	1	1	100%	

Table B1. Visual Morphological Stability Assessment

Purlear Creek Phase II / Project ID 010559701

Reach 4

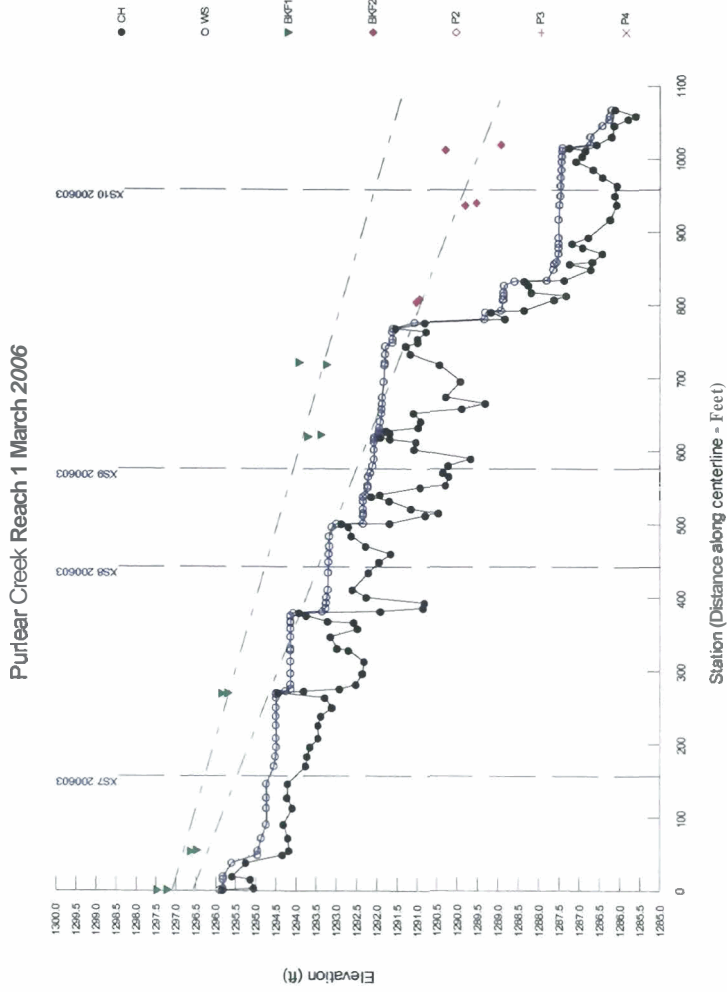
Feature Category	Metric (per As-built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-built	Total Number / feet in unstable state	Feature Perform. Mean or Total
A. Riffles	1 Present?	35	35	100%	100%
	2 Armor stable (e.g. no displacement)?	35	35	100%	
	3 Facet grade appears stable?	35	35	100%	
	4 Minimal evidence of embedding/fining?	35	35	100%	
	5 Length appropriate?	35	35	100%	
B. Pools	1 Present? (e.g not subject to severe aggrad. or migrat.?)	34	34	100%	100%
	2 Sufficiently deep (Max Pool D:Mean Bkf > 1.6?)	34	34	100%	
	3 Length appropriate?	34	34	100%	
C. Thalweg	1 Upstream of meander bend (run/inflection) centering?	27	27	100%	100%
	2 Downstream of meander (glide/inflection) centering?	27	27	100%	
D. Meanders	1 Outer bend in state of limited/controlled erosion?	27	27	100%	100%
	2 Of those eroding, # w/concomitant point bar formation?	--	--		
	3 Apparent Re within spec?	27	27	100%	
	4 Sufficient floodplain access and relief?	27	27	100%	
E. Bed General	1 General channel bed aggradation areas (bar formation)	1436	1436	100%	100%
	2 Channel bed degradation – areas of increasing down-cutting or head cutting?	1436	1436	100%	
F. Vanes	1 Free of back or arm scour?	29	29	100%	98%
	2 Height appropriate?	29	29	100%	
	3 Angle and geometry appear appropriate?	29	29	100%	
	4 Free of piping or other structural failures?	27	29	93%	
G. Wads/ Boulders	1 Free of scour?	--	--		--
	2 Footing stable?	--	--		

Reach 1 Profile Data - March 2006															
Station	Channel Elevation	Water Surface	Bankfull Elevation	Station	Channel Elevation	Water Surface	Bankfull Elevation	Station	Channel Elevation	Water Surface	Bankfull Elevation	Station	Channel Elevation	Water Surface	Bankfull Elevation
0.00			1,297.47	381.70	1,291.91	1,293.34	718.10	1,015.76	1,287.23	1,291.81	1,293.23	1,015.76	1,287.23	1,287.41	1,288.93
0.37	1,295.83	1,295.90	1,297.21	386.27	1,290.85	1,293.26	718.45	1,290.41	1,286.56	1,291.80	1,286.56	1,290.41	1,286.56	1,286.73	
0.88	1,295.05	1,295.82		393.51	1,290.81	1,293.25	720.97	1,291.16	1,286.18	1,291.79	1,286.18	1,291.16	1,286.18	1,286.72	
3.39	1,295.13	1,295.82		400.89	1,292.26	1,293.24	733.32	1,291.28	1,286.13	1,291.79	1,286.13	1,291.28	1,286.13	1,286.43	
15.66	1,295.59	1,295.82		411.21	1,292.60	1,293.21	744.08	1,291.98	1,286.54	1,291.52	1,286.54	1,291.98	1,286.54	1,286.26	
19.25	1,295.25	1,295.61		434.60	1,292.20	1,293.20	749.07	1,290.98	1,285.78	1,291.61	1,285.78	1,290.98	1,285.78	1,286.24	
37.83	1,294.33	1,294.96		449.28	1,291.94	1,293.19	753.69	1,290.77	1,285.59	1,291.62	1,285.59	1,290.77	1,285.59	1,286.20	
49.01			1,296.63	460.23	1,291.65	1,293.18	764.08	1,290.77	1,286.10	1,291.62	1,286.10	1,290.77	1,286.10		
52.88			1,296.48	470.67	1,292.27	1,293.17	768.43	1,291.53	1,288.86	1,291.60	1,288.86	1,291.53	1,288.86		
54.47	1,294.18	1,294.96	1,296.48	484.48	1,292.62	1,293.17	776.33	1,290.80	1,289.32	1,291.06	1,289.32	1,290.80	1,289.32		
54.48	1,294.20	1,294.87		497.19	1,292.69	1,293.10	781.16	1,288.81	1,289.30	1,291.06	1,289.30	1,288.81	1,289.30		
71.54	1,294.31	1,294.74		501.15	1,292.87	1,293.00	790.44	1,289.15	1,288.86	1,291.06	1,288.86	1,289.15	1,288.86		
90.21	1,294.09	1,294.74		501.81	1,291.68	1,292.34	792.96	1,288.34	1,288.92	1,291.03	1,288.92	1,288.34	1,288.92		
112.60	1,294.22	1,294.74		512.77	1,290.79	1,292.34	803.74								
126.76	1,293.72	1,294.51		515.73	1,290.44	1,292.33	807.69	1,287.61	1,288.88	1,291.03	1,288.88	1,287.61	1,288.88		
145.91	1,293.76	1,294.55		521.52	1,291.15	1,292.34	807.89	1,287.31	1,288.86	1,291.03	1,288.86	1,287.31	1,288.86		
170.09	1,293.45	1,294.50		532.52	1,291.69	1,292.34	813.12	1,287.31	1,288.86	1,291.03	1,288.86	1,287.31	1,288.86		
183.18	1,293.45	1,294.50		538.41	1,292.13	1,292.34	817.48	1,288.17	1,288.86	1,291.03	1,288.86	1,288.17	1,288.86		
196.13	1,293.65	1,294.49		541.17	1,291.91	1,292.28	827.31	1,288.23	1,288.84	1,291.03	1,288.84	1,288.23	1,288.84		
208.13	1,293.45	1,294.50		551.00	1,290.27	1,292.23	832.86	1,288.34	1,288.59	1,291.03	1,288.59	1,288.34	1,288.59		
225.68	1,293.45	1,294.50		553.80	1,290.27	1,292.23	834.18	1,287.36	1,287.80	1,291.03	1,287.80	1,287.36	1,287.80		
238.37	1,293.37	1,294.50		565.96	1,290.19	1,292.21	849.33	1,286.70	1,287.64	1,291.03	1,287.64	1,286.70	1,287.64		
250.09	1,293.11	1,294.50		570.73	1,290.34	1,292.16	856.60	1,287.23	1,287.62	1,291.03	1,287.62	1,287.23	1,287.62		
263.67	1,293.27	1,294.50		580.74	1,290.21	1,292.11	859.63	1,286.66	1,287.51	1,291.03	1,287.51	1,286.66	1,287.51		
268.41		1,294.50	1,295.85	589.91	1,289.65	1,292.07	871.17	1,286.41	1,287.51	1,291.03	1,287.51	1,286.41	1,287.51		
288.91	1,294.43	1,294.50	1,295.69	602.95	1,291.07	1,292.07	879.10	1,286.90	1,287.51	1,291.03	1,287.51	1,286.90	1,287.51		
270.22	1,294.43	1,294.50		613.04	1,291.02	1,292.07	884.80	1,287.17	1,287.51	1,291.03	1,287.51	1,287.17	1,287.51		
272.50	1,293.80	1,294.26		616.87	1,291.67	1,292.07	893.08	1,286.76	1,287.51	1,291.03	1,287.51	1,286.76	1,287.51		
275.61	1,292.92	1,294.14		619.49	1,291.90	1,292.07	917.95	1,286.23	1,287.51	1,291.03	1,287.51	1,286.23	1,287.51		
281.69	1,292.51	1,294.14		619.50	1,291.98	1,291.98	936.03			1,291.03	1,289.80				
296.75	1,292.35	1,294.14		622.12	1,291.96	1,291.96	1,293.36	1,286.07	1,287.49	1,291.03	1,287.49	1,286.07	1,287.49		
313.16	1,292.31	1,294.14		625.37	1,291.67	1,291.96	939.53			1,291.03	1,289.53				
328.20	1,292.69	1,294.14		628.14	1,291.76	1,291.95	950.30	1,286.11	1,287.46	1,291.03	1,287.46	1,286.11	1,287.46		
330.83	1,292.98	1,294.14		632.71	1,290.96	1,291.94	964.19	1,286.06	1,287.46	1,291.03	1,287.46	1,286.06	1,287.46		
347.12	1,293.14	1,294.14		641.23	1,290.90	1,291.91	975.59	1,286.41	1,287.45	1,291.03	1,287.45	1,286.41	1,287.45		
357.80	1,292.47	1,294.14		652.65	1,291.08	1,291.88	986.13	1,286.64	1,287.44	1,291.03	1,287.44	1,286.64	1,287.44		
366.37	1,292.56	1,294.14		658.20	1,289.87	1,291.88	997.15	1,287.06	1,287.44	1,291.03	1,287.44	1,287.06	1,287.44		
367.97	1,293.21	1,294.14		665.54	1,289.30	1,291.87	1,004.47	1,286.91	1,287.43	1,291.03	1,287.43	1,286.91	1,287.43		
375.56	1,293.74	1,294.14		674.32	1,290.26	1,291.87	1,012.13			1,291.03	1,290.28				
379.42	1,293.92	1,294.06		695.72	1,289.90	1,291.83	1,012.13	1,286.83	1,287.42	1,291.03	1,287.42	1,286.83	1,287.42		

Reach 1 Profile and Pattern Summary

Variable	Pattern Summary		
	Min	Avg	Max
Sinuosity	1.05	178.77	219.61
Meander Wavelength (ft)	125.51	178.77	219.61
Radius of Curvature (ft)	32.78	42.9	58.64
Belt Width (ft)	28.11	42.97	60.94

Variable	Profile Summary		
	Min	Avg	Max
S riffle (ft/ft)	0.00124	0.00532	0.01033
S pool (ft/ft)	0	0.00094	0.00251
S run (ft/ft)	0.01107	0.02706	0.05166
S glide (ft/ft)	0	0.00123	0.0047
P - P (ft)	35.39	83.51	129.41
P length (ft)	27.65	53.21	76.32
Dmax riffle (ft)	1.83	2.6	3.37
Dmax pool (ft)	2.86	3.59	4.17
Dmax run (ft)	1.58	2.69	3.39
Dmax glide (ft)	1.4	2.4	3.28
Low Bank Ht (ft)	0	1.5	0
Bankfull Slope (ft/ft)		0.006	





Looking Upstream



Looking Downstream



Looking at Left Bank



Looking at Right Bank

Title Cross Section Photos – Cross Section XS7

Prepared For:



Project Purlear Creek Phase II Stream and Wetland Restoration – Year 0 Monitoring 2006
Wilkes County, North Carolina

Date 5/19/06

Project ID 010559701

Figure CSP-1



Looking Upstream



Looking Downstream



Looking at Left Bank



Looking at Right Bank

Title Cross Section Photos – Cross Section XS8

Project Purlear Creek Phase II Stream and Wetland Restoration – Year 0 Monitoring 2006
Wilkes County, North Carolina

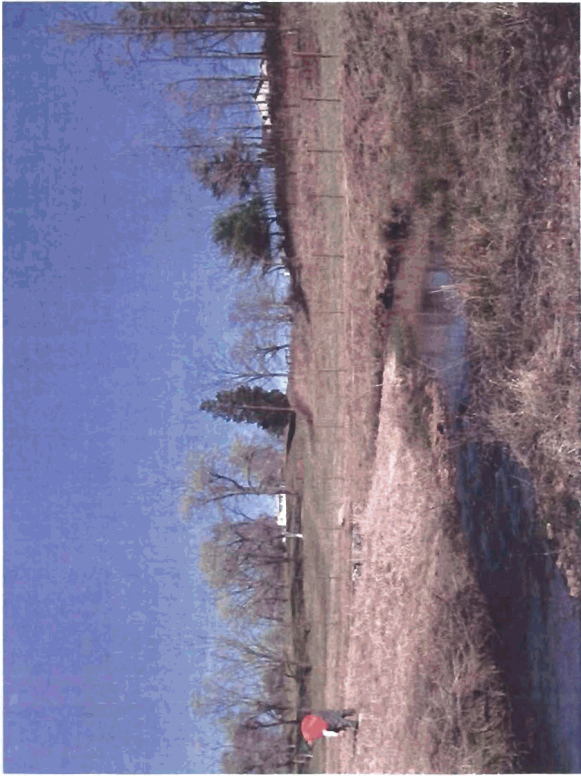
Date 5/19/06

Project ID 010559701

Figure CSP-1



Prepared For:



Looking Upstream



Looking Downstream



Looking at Left Bank



Looking at Right Bank

Title Cross Section Photos – Cross Section XS9

Prepared For: Purlear Creek Phase II Stream and Wetland Restoration – Year 0 Monitoring 2006
Wilkes County, North Carolina



Date
5/19/06

Project ID
010559701

Figure
CSP-1



Looking Upstream



Looking Downstream



Looking at Left Bank



Looking at Right Bank

Title Cross Section Photos – Cross XS10



Project

Purlear Creek Phase II Stream and Wetland Restoration – Year 0 Monitoring 2006
Wilkes County, North Carolina

Date

5/19/06

Project ID

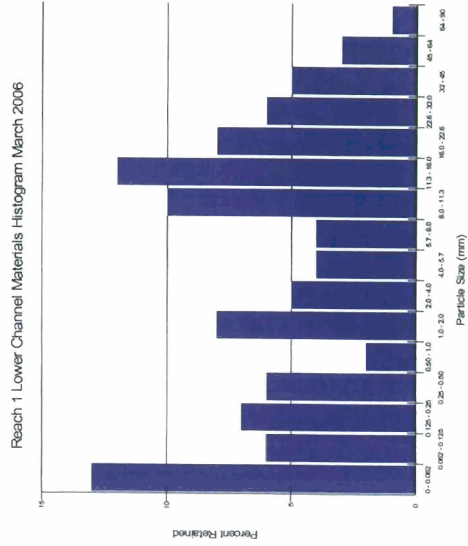
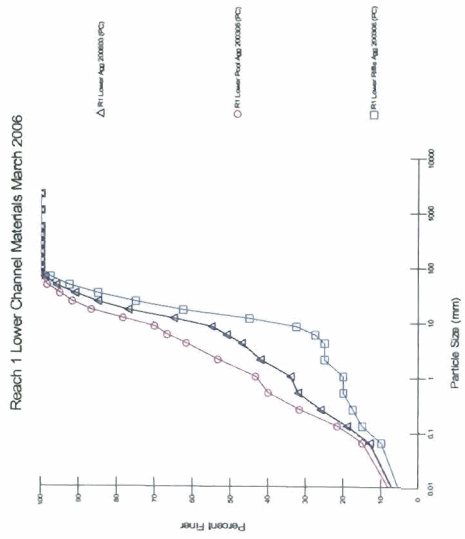
OIOSSWOI

Figure

CSP-I

Reach 1 Lower Section Channel Materials 2006					
Particle Name	Size (mm)	Count	Particle %	Cumulative %	
silt/clay	0	13	13	13	13
very fine sand	0.062	6	6	6	19
fine sand	0.125	7	7	7	26
medium sand	0.25	6	6	6	32
coarse sand	0.5	2	2	2	34
very coarse sand	1	2	2	2	42
very fine gravel	2	4	4	4	47
fine gravel	4	6	6	6	51
medium gravel	6	4	4	4	55
coarse gravel	8	11	11	11	65
very coarse gravel	11	16	16	16	77
small cobble	16	22	22	22	85
medium cobble	22	32	32	32	91
large cobble	32	45	45	45	96
very large cobble	45	64	64	64	99
small boulder	64	90	90	90	100
medium boulder	90	128	128	128	100
large boulder	128	180	180	180	100
very large boulder	180	256	256	256	100
small boulder	256	362	362	362	100
medium boulder	362	512	512	512	100
large boulder	512	1024	1024	1024	100
very large boulder	1024	2048	2048	2048	100
	2048	4096	4096	4096	100

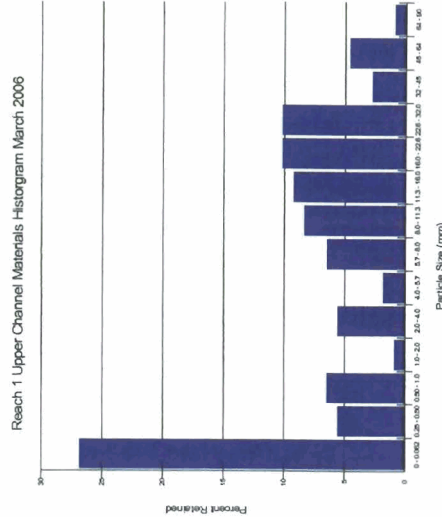
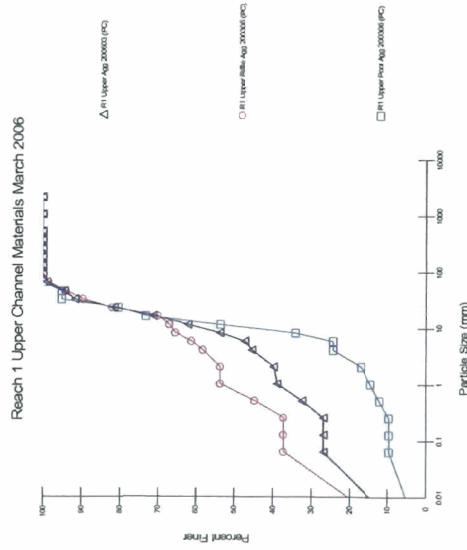
Particle Size Analysis	
D16 (mm)	0.09
D35 (mm)	1.13
D50 (mm)	5.27
D84 (mm)	21.78
D95 (mm)	42.4
D100 (mm)	90
Silt/Clay (%)	13
Sand (%)	29
Gravel (%)	57
Cobble (%)	1
Boulder (%)	0
Bedrock (%)	0



Reach 1 Upper Section Channel Materials

Particle Name	Size (mm)	Count	Particle %	Cumulative %
silt/clay	0	0	26.85	26.85
very fine sand	0.062	0	0	26.85
fine sand	0.13	0	0	26.85
medium sand	0.25	6	5.56	32.41
coarse sand	0.5	7	6.48	38.89
very coarse sand	1	2	0.93	39.81
very fine gravel	2	4	3.44	43.25
fine gravel	4	6	5.16	48.41
medium gravel	8	11	9.52	57.93
coarse gravel	16	22	18.98	76.91
very coarse gravel	32	45	38.44	115.35
small cobble	64	90	76.88	192.23
medium cobble	128	180	153.76	346.00
large cobble	256	362	305.52	651.52
very large cobble	512	1024	863.04	1514.56
small boulder	1024	2048	1726.08	3240.64
medium boulder	2048	4096	3452.16	6692.80
very large boulder	4096	0	0	6692.80

Particle Size Analysis	
D16 (mm)	0.04
D35 (mm)	0.7
D50 (mm)	6.69
D64 (mm)	24.92
D95 (mm)	47.3
D100 (mm)	90
Silt/Clay (%)	26.85
Sand (%)	12.96
Gravel (%)	59.26
Cobble (%)	0.93
Boulder (%)	0
Bedrock (%)	0

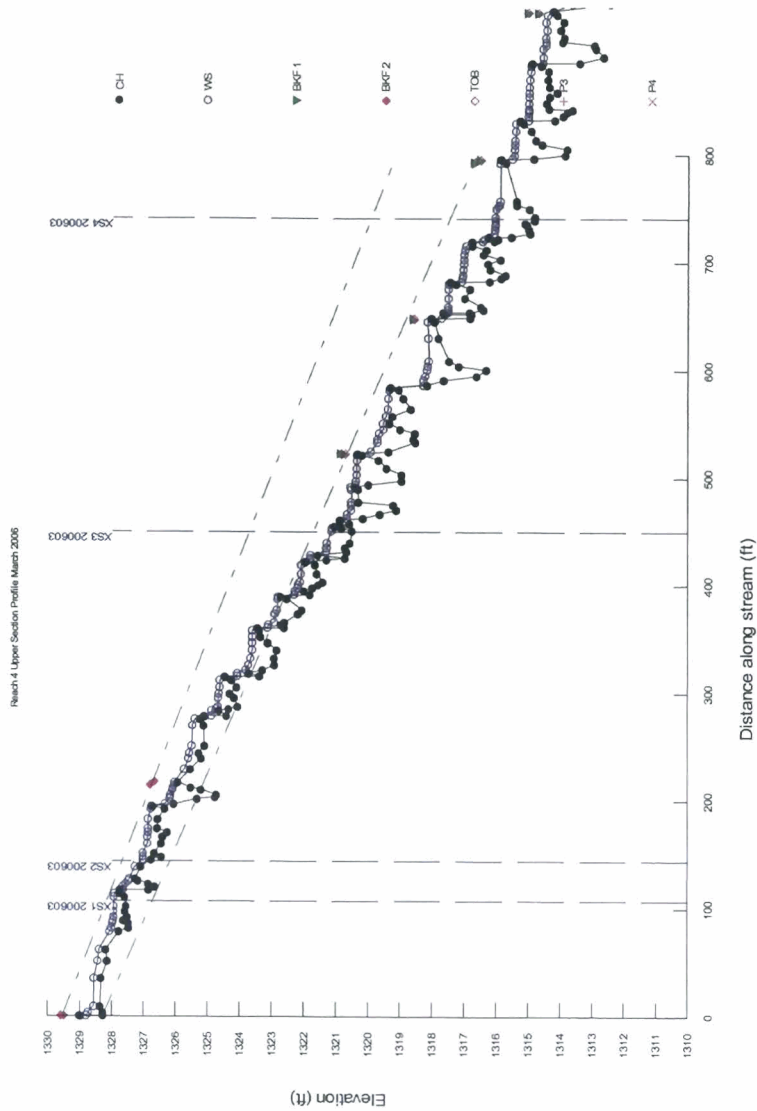


Station	Channel Elevation	Water Surface	Bankfull Elevation	Station	Channel Elevation	Water Surface	Bankfull Elevation	Station	Channel Elevation	Water Surface	Bankfull Elevation	Station	Channel Elevation	Water Surface	Bankfull Elevation
0.00			1,329.49	212.48	1,325.51	1,326.08	1,326.80	400.94	1,321.54	1,322.18	557.86	1,319.23	1,319.44		
0.20	1,328.98	1,329.00	1,329.58	214.53	1,326.03	1,326.04	1,326.80	403.53	1,321.39	1,322.11	564.35	1,318.65	1,319.36		
0.40	1,328.27	1,328.79		217.30	1,325.92	1,326.03	1,326.80	411.27	1,321.58	1,322.08	574.35	1,318.88	1,319.36		
0.60	1,328.27	1,328.74		229.57	1,325.92	1,326.03	1,326.80	419.66	1,321.64	1,322.07	582.30	1,319.03	1,319.32		
0.80	1,328.36	1,328.56		239.45	1,325.18	1,325.59		422.29	1,321.93	1,321.95	584.15	1,319.27	1,319.29		
1.00	1,328.33	1,328.55		244.53	1,325.26	1,325.56		424.32	1,321.27	1,321.79	586.56	1,318.14	1,318.26		
1.20	1,328.13	1,328.43		251.33	1,325.08	1,325.49		428.59	1,321.54	1,321.78	591.28	1,317.62	1,318.26		
1.40	1,328.18	1,328.39		270.15	1,325.11	1,325.46		431.68	1,320.65	1,321.30	600.91	1,316.30	1,318.15		
1.60	1,327.78	1,328.05		276.16	1,325.22	1,325.59		435.47	1,320.70	1,321.28	604.40	1,317.15	1,318.13		
1.80	1,327.46	1,328.00		278.66	1,325.07	1,325.09		440.14	1,320.55	1,321.28	609.02	1,317.45	1,318.10		
2.00	1,327.46	1,327.96		279.09	1,324.39	1,324.87		451.00	1,320.49	1,321.13	630.37	1,317.78	1,318.11		
2.20	1,327.62	1,327.95		283.94	1,324.62	1,324.86		454.00	1,320.81	1,321.12	645.65	1,317.91	1,318.14		
2.40	1,327.51	1,327.93		285.63	1,324.32	1,324.72		455.24	1,321.03	1,321.05	647.37				
2.60	1,327.57	1,327.93		287.69	1,324.05	1,324.87		457.70	1,320.56	1,320.87	647.37				
2.80	1,327.54	1,327.93		289.95	1,324.15	1,324.85		461.14	1,320.84	1,320.86	647.74				
3.00	1,327.58	1,327.92		289.91	1,324.29	1,324.84		462.89	1,320.14	1,320.86	647.74				
3.20	1,327.73	1,327.91		305.72	1,324.07	1,324.61		466.76	1,319.62	1,320.85	648.47	1,318.00	1,318.02		
3.40	1,327.71	1,327.73		312.29	1,324.23	1,324.61		470.63	1,319.10	1,320.51	649.02	1,318.80	1,317.70		
3.60	1,326.83	1,327.63		315.28	1,324.44	1,324.46		475.19	1,319.19	1,320.51	652.33	1,316.76	1,317.61		
3.80	1,326.64	1,327.64		315.99	1,323.37	1,324.07		477.97	1,320.28	1,320.51	652.64	1,317.60	1,317.62		
4.00	1,326.84	1,327.56		318.65	1,323.70	1,324.06		489.89	1,320.29	1,320.51	654.01	1,317.62	1,317.84		
4.20	1,327.16	1,327.46		321.84	1,323.26	1,323.78		492.06	1,320.39	1,320.53	654.19	1,316.82	1,317.51		
4.40	1,327.25	1,327.43		326.53	1,322.90	1,323.72		494.08	1,319.97	1,320.38	656.61	1,316.39	1,317.49		
4.60	1,327.07	1,327.26		332.73	1,322.91	1,323.65		497.54	1,318.63	1,320.37	659.41	1,316.46	1,317.49		
4.80	1,326.75	1,327.01		340.39	1,322.83	1,323.60		503.46	1,318.94	1,320.34	667.46	1,316.97	1,317.49		
5.00	1,326.43	1,327.01		346.92	1,323.10	1,323.60		509.41	1,319.41	1,320.34	676.08	1,316.81	1,317.48		
5.20	1,326.65	1,327.01		352.58	1,323.32	1,323.60		516.96	1,319.65	1,320.33	680.61	1,317.24	1,317.47		
5.40	1,326.44	1,326.87		358.53	1,323.37	1,323.60		521.74	1,320.17	1,320.33	682.34	1,317.41	1,317.43		
5.60	1,326.39	1,326.87		360.32	1,323.42	1,323.44		522.24			683.06	1,316.20	1,317.08		
5.80	1,326.24	1,326.85		361.12	1,322.56	1,323.11		522.24			686.02	1,315.83	1,317.05		
6.00	1,326.56	1,326.85		363.77	1,322.70	1,323.10		522.58	1,320.30	1,320.32	688.87	1,315.70	1,317.03		
6.20	1,326.55	1,326.85		365.97	1,322.59	1,322.91		522.60			694.03	1,316.17	1,317.02		
6.40	1,326.33	1,326.76		374.07	1,322.17	1,322.88		522.60			699.41	1,316.25	1,317.01		
6.60	1,326.70	1,326.75		377.63	1,322.04	1,322.83		524.69	1,319.35	1,319.91	703.34	1,315.66	1,317.00		
6.80	1,326.04	1,326.33		388.10	1,322.51	1,322.81		533.57	1,318.50	1,319.70	708.00	1,316.39	1,317.00		
7.00	1,325.31	1,326.18		389.98	1,322.70	1,322.79		536.38	1,318.57	1,319.70	712.24	1,316.90	1,316.97		
7.20	1,324.74	1,326.16		391.88	1,321.79	1,322.29		541.97	1,318.52	1,319.65	716.17	1,316.74	1,316.94		
7.40	1,324.71	1,326.15		395.41	1,321.96	1,322.26		545.63	1,318.98	1,319.52	719.40	1,316.74	1,316.76		
7.60	1,325.18	1,326.08		396.21	1,321.71	1,322.18		551.09	1,319.31	1,319.53	720.50	1,316.05	1,316.42		

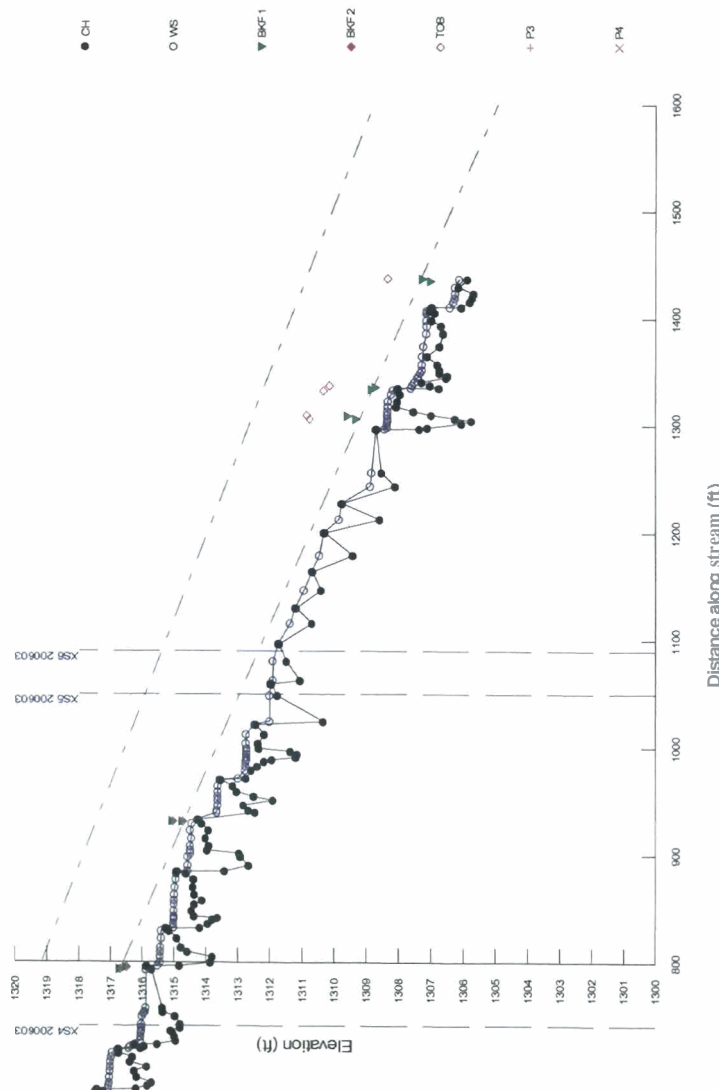
Reach 4 Profile Data - March 2006

Reach 4 Profile Data - March 2006

Station	Channel Elevation	Water Surface	Bankfull Elevation	Station	Channel Elevation	Water Surface	Bankfull Elevation	Station	Channel Elevation	Water Surface	Bankfull Elevation	Station	Channel Elevation	Water Surface	Bankfull Elevation
722.27	1,315.94	1,316.37		885.19	1,313.41	1,314.57		1,048.70	1,311.76	1,312.01		1,346.86	1,306.47	1,307.36	
723.74	1,316.23	1,316.25		890.50	1,312.66	1,314.56		1,059.63	1,311.94	1,311.98		1,349.47	1,306.71	1,307.31	
724.26	1,315.82	1,316.22		898.66	1,312.91	1,314.57		1,062.93	1,311.95	1,311.90		1,352.19	1,306.71	1,307.26	
727.46	1,314.93	1,316.06		901.60	1,312.95	1,314.48		1,080.80	1,311.47	1,311.89		1,357.35	1,306.78	1,307.26	
731.19	1,314.98	1,316.04		904.68	1,313.95	1,314.48		1,096.91	1,311.70	1,311.74		1,365.11	1,307.09	1,307.25	
734.95	1,315.03	1,316.03		906.69	1,313.90	1,314.49		1,116.09	1,311.68	1,311.36		1,374.40	1,306.71	1,307.21	
736.69	1,315.09	1,316.02		915.73	1,314.01	1,314.45		1,130.28	1,311.17	1,311.21		1,386.34	1,306.60	1,307.12	
739.41	1,314.80	1,316.02		923.11	1,313.91	1,314.48		1,146.84	1,310.39	1,310.94		1,393.37	1,306.66	1,307.11	
742.45	1,314.79	1,316.02		929.51	1,314.13	1,314.44		1,164.20	1,310.65	1,310.69		1,398.52	1,306.95	1,307.11	
750.09	1,314.96	1,316.00		931.02			1,314.72	1,179.23	1,309.40	1,310.45		1,405.67	1,306.86	1,307.11	
752.53		1,315.95		931.02				1,200.54	1,310.27	1,310.31		1,407.67	1,307.02	1,307.10	
753.79	1,315.35	1,315.91		931.18			1,315.04	1,212.74	1,308.57	1,309.65		1,410.46	1,306.94	1,306.96	
757.36	1,315.36	1,315.88		931.18				1,227.57	1,309.73	1,309.76		1,410.61	1,306.94	1,306.40	
762.88	1,315.70	1,315.88		933.08	1,314.23	1,314.25		1,243.69	1,308.09	1,308.67		1,415.79	1,305.77	1,306.29	
793.07			1,316.69	939.79	1,312.45	1,313.65		1,256.37	1,308.51	1,308.83		1,419.12	1,305.72	1,306.25	
794.91			1,316.49	941.82	1,312.65	1,313.65		1,296.79	1,308.67	1,308.69		1,423.42	1,305.66	1,306.24	
796.66	1,314.83	1,315.51		946.56	1,312.82	1,313.62		1,297.29	1,307.33	1,308.43		1,429.36	1,306.12	1,306.24	
799.91	1,313.85	1,315.43		951.17	1,311.90	1,313.62		1,298.33	1,307.09	1,308.35		1,434.68			1,306.97
803.78	1,314.57	1,315.42		954.82	1,312.49	1,313.62		1,302.23	1,306.03	1,308.35		1,436.72			1,307.22
813.73	1,314.77	1,315.42		958.12	1,313.03	1,313.62		1,304.77	1,305.73	1,308.33					
822.36	1,314.91	1,315.40		964.46	1,313.15	1,313.62		1,305.67				1,436.72	1,305.85	1,306.11	
829.23	1,315.15	1,315.40		970.29	1,313.52	1,313.62		1,305.90			1,309.30				
831.66	1,315.24	1,315.26		971.43	1,312.74	1,312.99		1,306.78	1,306.23	1,308.33					
832.24	1,314.18	1,315.01		979.13	1,312.57	1,312.77		1,308.78			1,309.56				
835.68	1,313.93	1,315.01		982.86	1,312.38	1,312.74		1,308.16							
839.89	1,313.79	1,315.00		987.28	1,312.17	1,312.74		1,309.16							
841.69	1,313.63	1,315.00		989.03	1,311.93	1,312.71		1,310.22	1,306.97	1,308.34					
842.93	1,314.36	1,315.00		991.36	1,311.18	1,312.71		1,313.51	1,307.52	1,308.33					
847.86	1,314.44	1,314.99		994.13	1,311.15	1,312.71		1,318.05	1,308.05	1,308.32					
854.04	1,314.35	1,314.98		996.84	1,311.36	1,312.71		1,322.93	1,308.02	1,308.32					
857.79	1,314.11	1,314.98		999.57	1,312.33	1,312.71		1,329.50	1,307.94	1,308.22					
863.06	1,314.35	1,314.98		1,003.94	1,312.36	1,312.74		1,332.09							
869.88	1,314.40	1,314.97		1,009.49				1,333.51	1,308.00	1,308.16					
877.43	1,314.38	1,314.94		1,012.11				1,335.51			1,308.81				
882.64	1,314.62	1,314.93		1,012.59	1,312.17	1,312.74		1,334.88	1,308.00	1,308.02					
884.73	1,314.89	1,314.91		1,012.59	1,312.17	1,312.74		1,335.37	1,306.73	1,307.60					
				1,019.00				1,335.51			1,308.69				
				1,021.74	1,312.42	1,312.47		1,336.99							
				1,024.61	1,310.33	1,312.01		1,337.80	1,307.00	1,307.56					
				1,035.19				1,340.87	1,307.27	1,307.50					
				1,038.16				1,345.11	1,306.51	1,307.41					



Reach 4 Lower Section Profile March 2006



Param Summary			
Variable	Min	Avg	Max
Sinuosity	1.1	1.1	
Meander Wavelength (ft)	75.35	93.02	124.58
Radius of Curvature (ft)	12.81	20.61	38.13
Belt Width (ft)	18.53	34.74	55.27
Profile Summary			
Variable	Min	Avg	Max
S riffle (ft/ft)	0.00154	0.01084	0.02744
S pool (ft/ft)	0.00064	0.003	0.00812
S run (ft/ft)	0.02095	0.05563	0.15277
S glide (ft/ft)	0	0.00061	0.00281
P - P (ft)	26.59	43.51	63.76
P length (ft)	2.68	15.79	24.62
Dmax riffle (ft)	0.87	1.13	1.39
Dmax pool (ft)	1.11	1.22	1.32
Dmax run (ft)	0.88	1.66	2.37
Dmax glide (ft)	0.43	1.01	1.45
Low Bank Ht (ft)	0.53	0.85	1.4
Bankfull Slope (ft/ft)		0.013	

- CH
- WS
- ▼ BKF1
- ◆ BKF2
- ◇ TOB
- + P3
- × P4

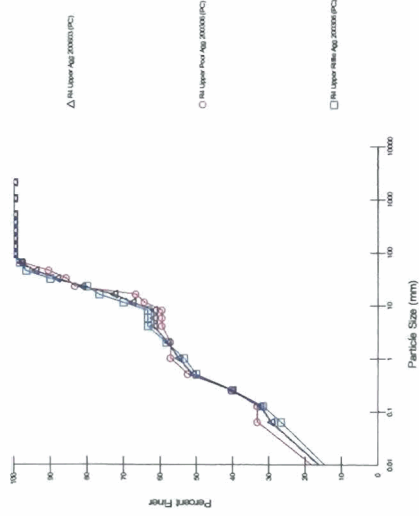
Reach 4 Upper Section Channel Materials

Particle Name	Size (mm)	Count	Particle %	Cumulative %
silt/clay	0	30	29.41	29.41
very fine sand	0.062	3	2.94	32.35
fine sand	0.13	8	7.84	40.2
medium sand	0.25	11	10.78	50.98
coarse sand	0.5	4	3.92	54.9
very coarse sand	1	2	2.94	57.84
very fine gravel	2	4	3.92	61.76
fine gravel	4	6	0	61.76
medium gravel	8	11	5.88	67.65
medium gravel	11	16	4.9	72.55
coarse gravel	16	22	8.82	81.37
coarse gravel	22	32	6.86	88.24
very coarse gravel	32	45	5.88	94.12
very coarse gravel	45	64	3.92	98.04
small cobble	64	90	1.96	100
medium cobble	90	128	0	100
large cobble	128	180	0	100
very large cobble	180	256	0	100
small boulder	256	362	0	100
small boulder	362	512	0	100
medium boulder	512	1024	0	100
large boulder	1024	2048	0	100
very large boulder	2048	4096	0	100

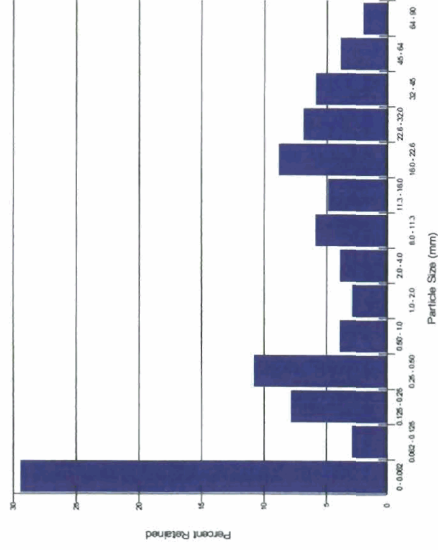
Particle Size Analysis

D16 (mm)	0.03
D35 (mm)	0.17
D50 (mm)	0.48
D84 (mm)	26.2
D95 (mm)	49.27
D100 (mm)	90
Silt/Clay (%)	29.41
Sand (%)	28.43
Gravel (%)	40.2
Cobble (%)	1.96
Boulder (%)	0
Bedrock (%)	0

Reach 4 Upper Channel Materials March 2006



Reach 4 Upper Channel Materials Histogram March 2006

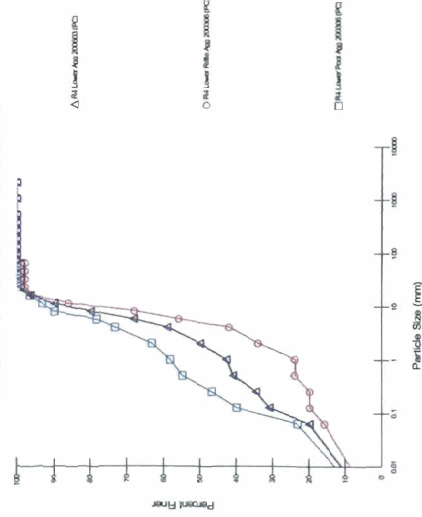


Reach 4 Lower Section Channel Materials

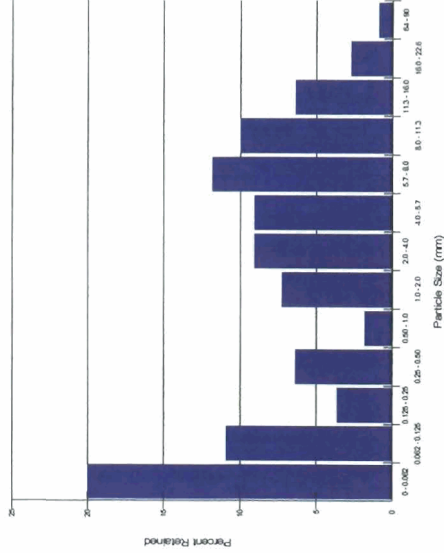
Particle Name	Size (mm)	Count	Particle %	Cumulative %
silt/clay	0	22	20	20
very fine sand	0.062	12	10.91	30.91
fine sand	0.125	4	3.64	34.55
medium sand	0.25	7	6.36	40.91
coarse sand	0.5	2	1.82	42.73
very coarse sand	1	8	7.27	50
very fine gravel	2	4	9.09	59.09
fine gravel	4	6	9.09	68.18
medium gravel	6	13	11.82	80
medium gravel	8	11	10	90
medium gravel	11	7	6.36	96.36
coarse gravel	16	3	2.73	99.09
coarse gravel	22	0	0	99.09
very coarse gravel	32	45	0	99.09
very coarse gravel	45	64	0	99.09
small cobble	64	90	0.91	100
medium cobble	90	128	0	100
large cobble	128	180	0	100
very large cobble	180	256	0	100
small boulder	256	362	0	100
small boulder	362	512	0	100
medium boulder	512	1024	0	100
large boulder	1024	2048	0	100
very large boulder	2048	4096	0	100

Particle Size Analysis	
D16 (mm)	0.05
D35 (mm)	0.27
D50 (mm)	2
D84 (mm)	9.32
D95 (mm)	14.99
D100 (mm)	90
Silt/Clay (%)	20
Sand (%)	30
Gravel (%)	49.09
Cobble (%)	0.91
Boulder (%)	0
Bedrock (%)	0

Reach 4 Lower Channel Materials March 2006



Reach 4 Lower Channel Materials Histogram March 2006






Photograph ST1.



Photograph ST2


Title	Permanent Stream Monitoring Photos		
	Project	Purlear Creek Phase II Stream and Wetland Restoration – Year 0 Monitoring 2006 Wilkes County, North Carolina	
		Date 5/19/06	Project Number 010559701
Figure SMP-1			



Photograph ST3



Photograph ST4


Title	Permanent Stream Monitoring Photos		
Prepared For: 	Project	Purlear Creek Phase II Stream and Wetland Restoration – Year 0 Monitoring 2006 Wilkes County, North Carolina	
	Date	Project Number	Figure
	5/19/06	010559701	SMP-2



Photograph ST5



Photograph ST6

Title		Permanent Stream Monitoring Photos		
Prepared For: 	Project	Purlear Creek Phase II Stream and Wetland Restoration – Year 0 Monitoring 2006 Wilkes County, North Carolina		
	Date	Project Number	Figure	
	5/19/06	010559701	SMP-3	



Photograph ST7



Photograph ST8

Title Permanent Stream Monitoring Photos

Prepared For:



Project

Purlear Creek Phase II Stream and Wetland Restoration – Year 0 Monitoring 2006
Wilkes County, North Carolina

Date

5/19/06

Project Number

010559701

Figure

SMP-4



Photograph ST9



Photograph ST10

Title Permanent Stream Monitoring Photos

Prepared For



Project

Purlear Creek Phase II Stream and Wetland Restoration – Year 0 Monitoring 2006
Wilkes County, North Carolina

Date

5/19/06

Project Number


010559701

Figure

SMP-5



Photograph ST11

Title		Permanent Stream Monitoring Photos		
Prepared For: 	Project	Purlear Creek Phase II Stream and Wetland Restoration - Year 0 Monitoring 2006 Wilkes County, North Carolina		
	Date	Project Number	Figure	
	5/19/06	010559701	SMP-6	



Photograph SP1 – Transverse bar directing flow into outside pool bank downstream..

Title | Stream Problem Area Photos



Project

Purlear Creek Phase II Stream and Wetland Restoration – Year 0 Monitoring 2006
Wilkes County, North Carolina

Date
5/19/06

Project Number
010559701

Figure
SP-1



APPENDIX C
WETLAND MONITORING DATA