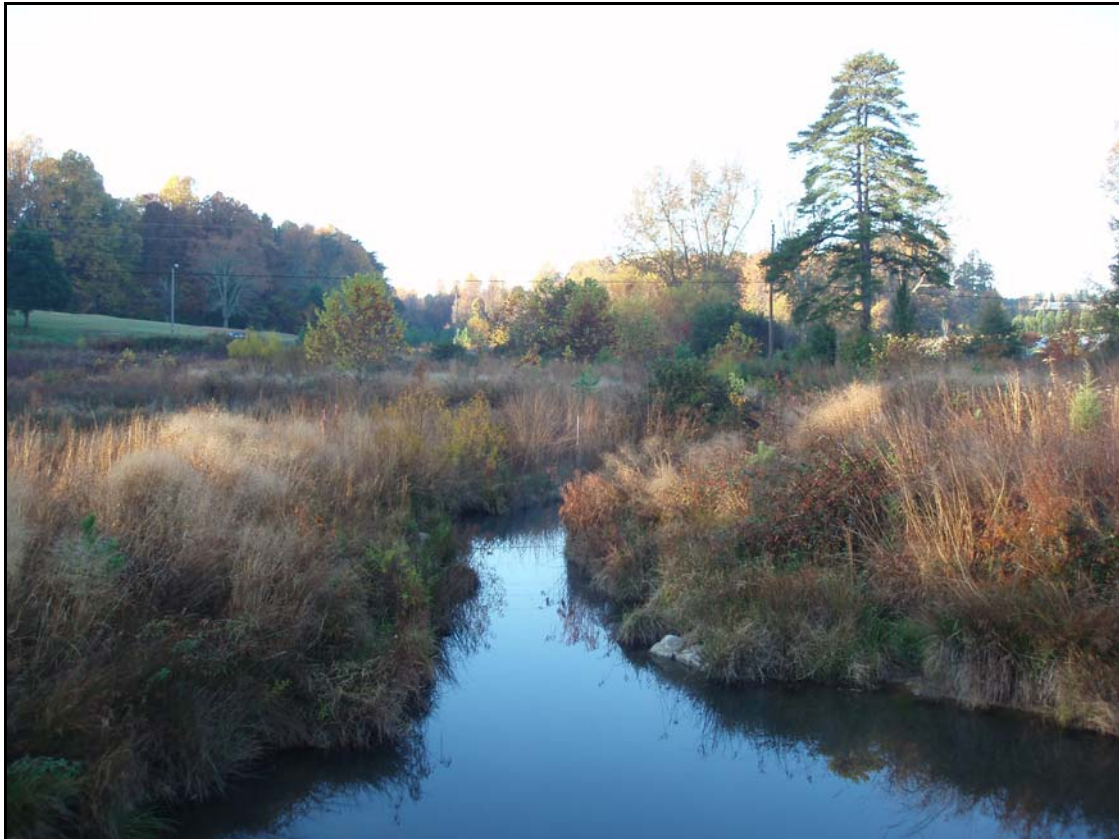


**Price Park  
Stream Restoration Monitoring Report  
EEP Project # 291  
Monitoring Year – 06  
2008**



Submitted to:



NCEEP, 1652 Mail Service Center, Raleigh, NC 27699-1652

**March 2009**



**Monitoring Firm**



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## EXECUTIVE SUMMARY

The North Carolina Wetlands Restoration Program identified UT to Horsepen Creek in Price Park in Greensboro, North Carolina as a restoration project in 2000. In the past, this project has been referred to as UT to Horsepen Creek, Price Park and the Jefferson Pilot stream. Henceforth this project will be referred to as the Price Park project. The approximately 1.0-square mile watershed is located within the USGS 8-digit HUC 03020002 in the Upper Cape Fear River Basin. The project restored 1,436 linear feet of incised, channelized stream to 1,776 feet of sinuous channel. The restoration was designed to correct various problems with the existing stream corridor including unstable channel configuration, minimal bed features, and poor stream and riparian habitat. The restoration plan was completed in October 2000 and called for correcting these problems by stabilizing stream banks, installing in-stream structures, adjusting the stream planform, and replanting the riparian areas with native vegetation. Project construction occurred in 2001 with additional maintenance construction occurring in February 2002 when additional structures were installed. While 2008 is the seventh year since construction was completed, monitoring was not conducted at the site in 2006. In 2007 morphological monitoring was completed, but a formal monitoring report was not prepared. This report describes the findings of the sixth year of monitoring that took place in 2008.

The Price Park vegetation monitoring has utilized three different methods throughout the monitoring period. The vegetation monitoring was originally conducted utilizing transects that ran perpendicular to the stream. These were monitored for the baseline conditions and during the first year of monitoring. The second year of monitoring established five square vegetation plots. These plots were monitored in the second, third, and fourth years of monitoring. In monitoring year 05, eight 10x10 meter vegetation monitoring plots were established. Where feasible, the new plots overlapped the approximate areas of the plots established in monitoring year 02. In monitoring years 05 and 06, the new plots were monitored utilizing the CVS vegetation monitoring protocol. In the years since planting, there have been many volunteer stems that have populated the conservation easement. Differentiating between volunteers and planted trees was difficult, but best efforts were made to do so. From these monitoring plots, a site average of 202 planted stems/acre was calculated in monitoring year 06. Monitoring year 06 also counted volunteer stems as part of the Level 2 vegetation monitoring. While the site has substantial buffer acreage and lateral extent for an urban setting, the planted stem survivorship in year-6 as determined by the vegetation plots is yielding a stem density of 202 stems/acre, approximately 75% of the 260 stems/acre, year-5 criterion. The site also has a substantial volunteer population comprised mainly of green ash (*Fraxinus pennsylvanica*), loblolly pine (*Pinus taeda*), eastern red cedar (*Juniperus virginiana*), and tulip poplar (*Liriodendron tulipifera*) adding to the stem density substantially to just over 2,000 stems/acre. The most prolific exotic invasive species at the site is kudzu (*Pueraria montana*), which already covers a large part of the easement and should be controlled as soon as possible.

Previous monitoring of the project channel revealed some significant areas of bank instability. Observations in monitoring year 6 found many of these same areas of erosion. A total of 7% of bank footage exhibited some state of erosion during the projects history, but most of these demonstrated little advancement after their initial appearance. Most of these are described as moderate, with the exception of a serious instance of outright widening near a failed structure at ~ station 4+00. Many that were previously demonstrating active erosion have begun to stabilize with vegetation or have become stable over time as the banks were reshaped. This reshaping came mainly in the form of bench expansion in most cases, meaning the upper section of bank in some riffle sections scoured, increasing the area of the bench feature. Some of these areas still need to re-vegetate. Although some of the structures placement and construction were not ideal in terms of more recent practice and understanding, 85% within the reach are maintaining full grade control with a single structure exhibiting outright failure. The placement of some of these

structures has limited some of the intended riffle habitat, while adding more discrete functional pool features. There has been evidence of degradational stress in between grade control points on the bed at various times in the projects history, but currently the bed footage exhibiting some form of degradation is estimated at only 3%. The profile has varied vertically over time with the bulk of this appearing to represent movement of bedload through the system, although the section between stations 2+00 and 5+00 appears to have exhibited some downcut after construction. This however does not appear to have advanced over the last 3-4 years since its initial occurrence earlier in the projects history and the water surface and bankfull slopes are nearly identical as measured in 2008 and very close to those measured at the As-built stage. While the site has gone through some adjustments after construction, it appears that the site is exhibiting a stabilizing trend with the continued advancement of the vegetation, although the latter will benefit from the aforementioned planting augmentation and invasive control.



## 1.0 PROJECT BACKGROUND

### 1.1 Project Objectives

The goals and objectives of this project are as follows:

- Provide a stable stream channel that neither aggrades nor degrades, while maintaining its dimension, pattern, and profile with the capacity to transport its watershed's water and sediment load.
- Reconnect the stream with its floodplain.
- Improve aquatic habitat with the use of natural material stabilization structures such as root wads, rock vanes, woody debris and a riparian buffer.
- Provide wildlife habitat and bank stability through the creation of a riparian zone.
- Incorporate the existing greenway plan into the stream restoration plan.

### 1.2 Project Structure, Restoration Type and Approach

A previously incised channel, UT to Horsepen Creek, was restored using channel dimension, pattern, and profile modifications and the establishment of a vegetated riparian zone adjacent to the stream. The Priority I restoration involved converting the 1,436 ft straightened channel into a sinuous channel that meanders for a total of 1,776 ft. Cross vanes and root wads were incorporated for aquatic habitat enhancement and bed and bank stability. A 50-foot riparian buffer on either side of the stream was planted with native vegetation. In addition, an aerial sanitary sewer line was re-aligned to be perpendicular to the stream flow and a gas line was rerouted under the stream channel.

### 1.3 Location and Setting

The Unnamed Tributary to Horsepen Creek is located in Price Park within the city limits of Greensboro, North Carolina. The 1.0-square mile watershed has a park setting with Jefferson Elementary located to the west, Price Park to the east, and Guilford College to the south of the site. There is moderate potential for future development.

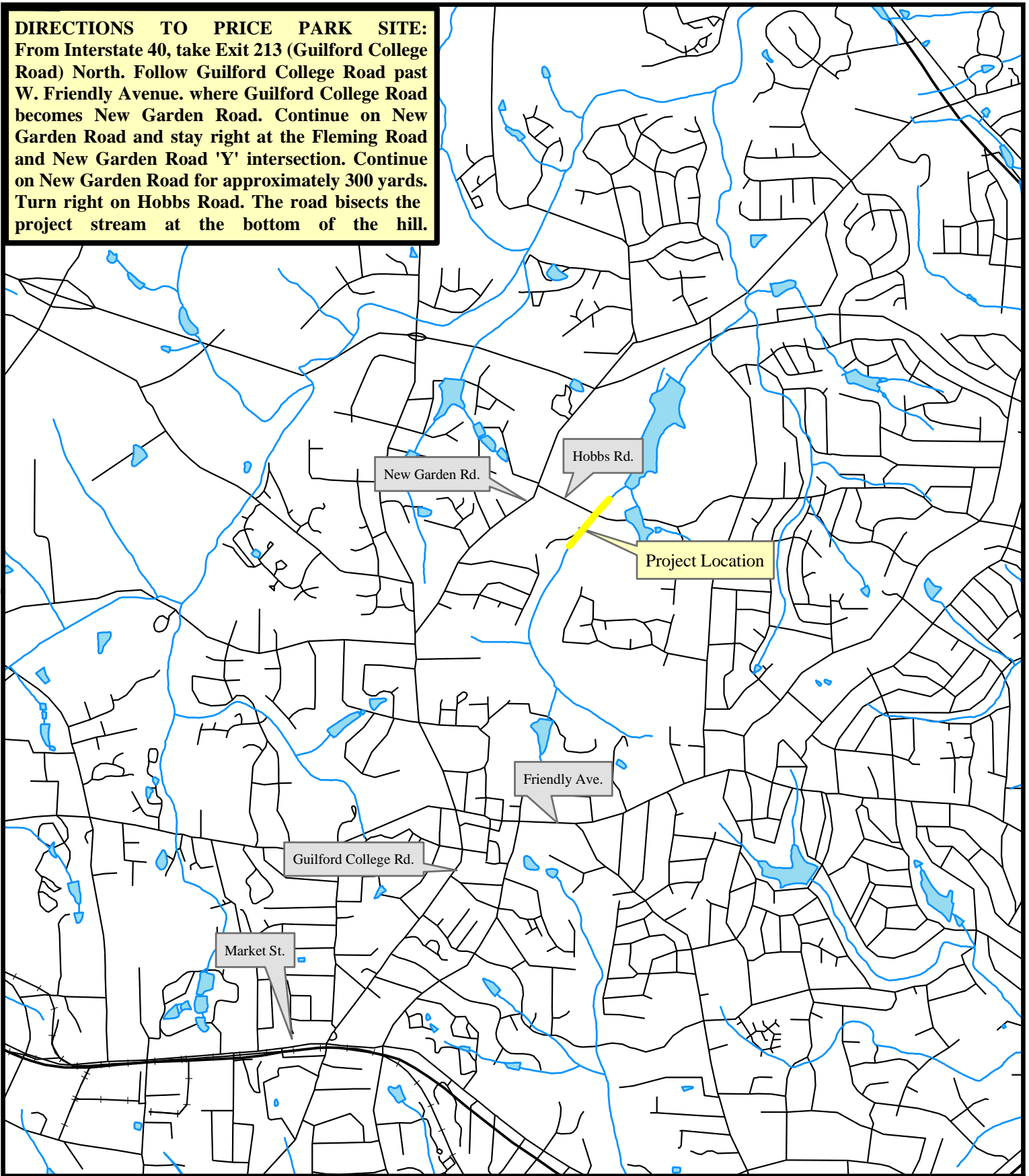
### 1.4 Project History and Background

Table 1. Project Restoration Components						
Project Number and Name: 291 - Price Park						
Segment / Reach ID	Existing Linear Feet	Type	Approach	Linear Feet	Stationing	Comment
UT to Horsepen Creek	N/A	R	P1	1,776	0+00 - 16+46	

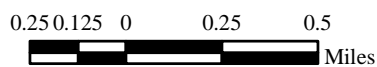
R = Restoration

P1 = Priority 1

**DIRECTIONS TO PRICE PARK SITE:**  
From Interstate 40, take Exit 213 (Guilford College Road) North. Follow Guilford College Road past W. Friendly Avenue, where Guilford College Road becomes New Garden Road. Continue on New Garden Road and stay right at the Fleming Road and New Garden Road 'Y' intersection. Continue on New Garden Road for approximately 300 yards. Turn right on Hobbs Road. The road bisects the project stream at the bottom of the hill.



**Figure 1. Site Vicinity Map**  
**Price Park, Guilford County, EEP Project # 291**



<b>Table 2. Project Activity and Reporting History</b>		
<b>Project Number and Name: 291 - Price Park</b>		
<b>Activity or Report</b>	<b>Data Collection Complete</b>	<b>Actual Completion or Delivery</b>
Restoration Plan	N/A	N/A
Mitigation Plan	2000	Dec-00
Construction	2001	Aug-01
Temporary S&E mix applied to entire project area	2001	Feb-02
As-Built report	2002	June-02
Permanent seed mix applied to reach	2001	Aug-01
Containerized and B&B plantings for reach	Jan-02	Jan-02
<b>Structural maintenance (Bank Grading)</b>	Jan-04	Jan-04
<b>Supplemental planting of containerized material</b>	Jan-04	Jan-04
Year 1 Monitoring	Aug-02	Aug-02
Year 2 Monitoring	Aug-03	Aug-03
Year 3 Monitoring	Aug-04	Aug-04
Year 4 Monitoring	Aug-05	Aug-05
Year 5 Monitoring**	Jul-07*	Nov-07
Year 6 Monitoring	Oct-08	Jan-09

\*No monitoring was conducted in 2006

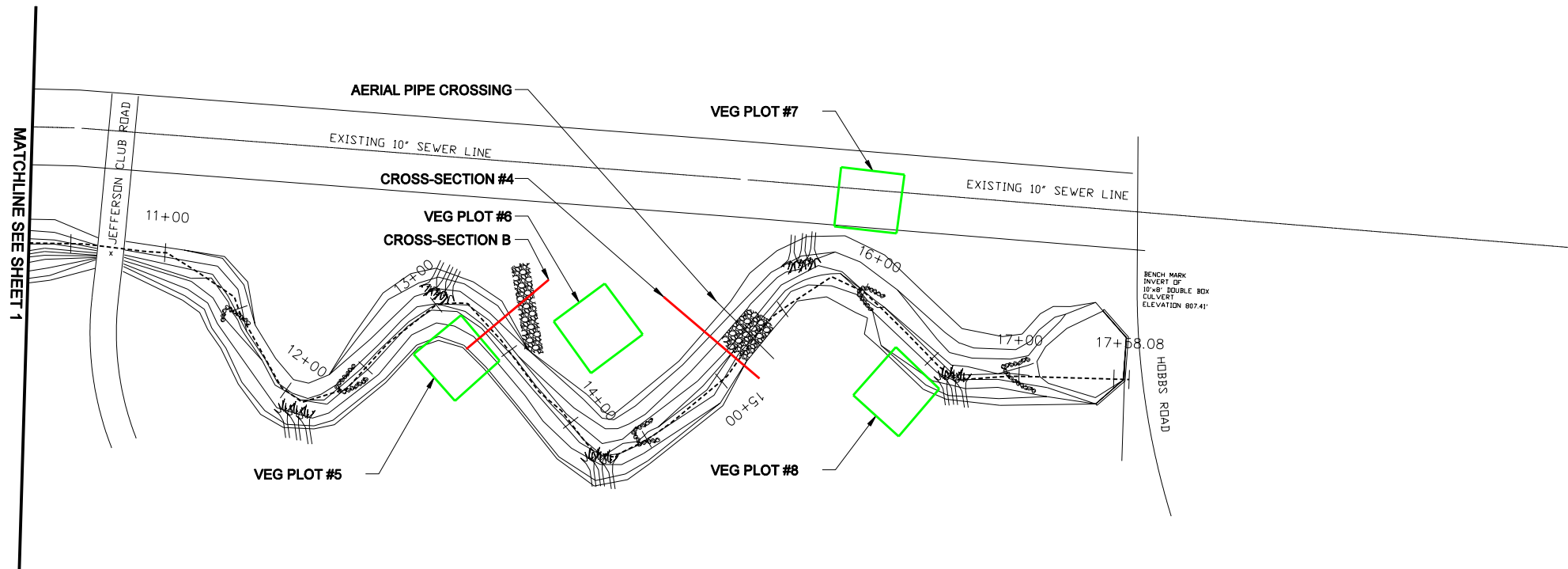
\*\*Data collected but not submitted in an annual monitoring report in 2007

<b>Table 3. Project Contact Table</b>	
<b>Project Number and Name: 291 - Price Park</b>	
<b>Design Firm</b>	Earth Tech of North Carolina, Inc. 701 Corporate Center Drive, Suite 475 Raleigh, North Carolina 27606 Contact: Ron Johnson Phone: (919) 854-6200
<b>Construction Contractor</b>	SEI Environmental, INC. 5100 North I-85, Suite 7 Charlotte, NC 28206 Phone: 1-800-873-1250
<b>Repair Contractor</b>	North State Environmental Inc. 2889 Lowery Street, Suite B Winston-Salem, NC 27101 Contact: Darrell Westmoreland Phone: (336) 725-2010
<b>Monitoring Performer As-Built Report and MY-01</b>	Earth Tech of North Carolina, Inc. 701 Corporate Center Drive, Suite 475 Raleigh, North Carolina 27606
<b>Monitoring Performer MY-02, 03, 04</b>	Biological & Agricultural Engineering North Carolina State University Campus Box 7625 Raleigh, NC 27695 Contact: Dan Clinton Phone: (919) 515-6771
<b>Monitoring Performer MY-06, 07</b>	KCI Associates of North Carolina 4601 Six Forks Rd. Raleigh, NC 27609 Contact: Mr. Adam Spiller Phone: (919) 783-9214 Fax: (919) 783-9266

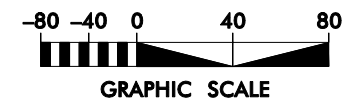
<b>Table 4. Project Background Table</b>	
<b>Project Number and Name: 291 - Price Park</b>	
Project County	Guilford County
Drainage Area	1.0 sq. miles
Drainage Impervious Cover Estimate	Estimated at >10%
Stream Order	1st order
Physiographic Region	Piedmont
Ecoregion	Southern Outer Piedmont (45b)
Rosgen Classification of As-built	E-Stream Type
Dominant Soil Types	N/A*
Reference Site ID	N/A*
USGS HUC for Project and Reference	03030002
NCDWQ Sub-basin for Project and Reference	03-06-02
NCDWQ Classification for Project and Reference	C
Any portion of the project segment 303d listed?	No
Any portion of the project segment upstream of a 303d listed segment?	No
Reasons for 303d Listing or Stressor	N/A
% of Project Easement Fenced	0%

\*Historical project documents necessary to provide these data were unavailable at the time of report submission





LEGEND	
THALWEG .....	
ROOT WAD .....	
ROCK CROSS VANE .....	
STONE FOR BED STABILITY .....	
BOULDERS FOR BANK STABILITY .....	



NO.	REVISIONS



**KCI**  
ASSOCIATES OF NC  
ENGINEERS • PLANNERS • SCIENTISTS  
4601 SIX FORKS ROAD  
RALEIGH, NORTH CAROLINA 27609

**PRICE PARK**  
**UT TO HORSEPEN CREEK**  
GUILFORD COUNTY, NORTH CAROLINA  
EEP PROJECT NUMBER 291 - MY06  
STATION 10+28 TO STATION 17+58

DATE: NOVEMBER 2008  
SCALE: SEE SHEET  
**MONITORING  
PLAN VIEW**  
SHEET 2 OF 2

## 2.0 PROJECT CONDITIONS AND MONITORING RESULTS

### 2.1 Vegetation Assessment

The Price Park vegetation monitoring has utilized three different methods throughout the monitoring period. The vegetation monitoring was originally conducted utilizing transects that ran perpendicular to the stream. These were monitored for the baseline conditions and during the first year monitoring. The second year of monitoring established five square vegetation plots. These plots were monitored in the second, third, and fourth years of monitoring. In monitoring year 05, eight 10x10 meter vegetation monitoring plots were established. Where feasible, the new plots overlapped the approximate areas of the plots established in monitoring year 02. In monitoring years 05 and 06, the new plots were monitored utilizing the CVS vegetation monitoring protocol. In the years since planting, there have been many volunteer stems that have populated the conservation easement. Differentiating between volunteers and planted trees was difficult, but best efforts were made to do so. From these monitoring plots, a site average of 202 planted stems/acre was calculated in monitoring year 06. The four plots representing the upper 60% of the project above the Jefferson Club Road bridge yielded an average planted stem density of 320 stems per acre in monitoring year 6, while the area below this bridge demonstrated planted stem densities of approximately 80 stems/acre. This zone will benefit from planting augmentation and possibly a jurisdictional delineation for a wetland feature of some apparent quality for the lower 200 feet of the project on stream right. The impacts to the vegetation counts were concentrated in this area primarily because of the repeated beaver activity. EEP's wildlife control contractor removed beaver on two occasions and broke the dam at the lower culvert, but remnant material was used by beaver that recolonized the site and re-established the dam. EEP has informed KCI that another removal effort was scheduled for earlier this year. Monitoring year 06 also counted volunteer stems as part of the Level 2 vegetation monitoring. The most numerous volunteer species included green ash (*Fraxinus pennsylvanica*), loblolly pine (*Pinus taeda*), eastern red cedar (*Juniperus virginiana*), and tulip poplar (*Liriodendron tulipifera*). The data from the sixth year of monitoring revealed that only two of the eight monitoring plots contained enough planted trees to be consistent with the 260 planted stems/acre vegetation success criterion. However, including volunteer trees all but two plots had greater than 260 stems/acre and the site average is 2,033 total stems/acre.

The most prolific of the site's exotic invasive species is kudzu (*Pueraria montana*), which already covers a large part of the easement and should be controlled as soon as possible. The other invasive species that are present in the project area include: Japanese honeysuckle (*Lonicera japonica*), Chinese privet (*Ligustrum sinense*), multiflora rose (*Rosa multiflora*), elaeagnus (*Elaeagnus sp.*), mimosa (*Albizia julibrissin*), oriental bittersweet (*Celastrus orbiculatus*), Johnson grass (*Sorghum halepense*), lespedeza (*Lespedeza cuneata*), and microstegium (*Microstegium vimineum*). It is recommended that a site assessment for replanting be conducted and that an aggressive invasive species control program be implemented.

See vegetation data and photos in Appendix A and Current Conditions Plan View in Appendix C. The taxonomic standard being used for vegetation identifications is "Flora of the Carolinas, Virginia, Georgia, and surrounding areas by Alan S. Weakley.

## 2.2. Stream Assessment

Previous monitoring of the project channel revealed some significant areas of bank instability. Observations in monitoring year 6 found many of these same areas of erosion. A total of 7% of bank footage exhibited some state of erosion during the projects history, but most of these demonstrated little advancement after their initial appearance. Most of these are described as moderate, with the exception of a serious instance of outright widening near a failed structure at approximately Station 4+00. Many that were previously demonstrating active erosion have begun to stabilize with vegetation or have become stable over time as the banks were reshaped. In many cases eroded banks can stabilize over time. This can happen as banks become undercut and then the eventual slumping deposits the vegetated tops of the banks on the toe of the bank. The result is a bank with a protected toe and a new, more stable and less steep bank. Raw, eroded banks can also stabilize over time as vegetation grows on them even without slumping. Both of these natural methods of bank stabilization are occurring along many banks at the Price Park site. This is apparent throughout the site where the lower portions of the bank are well vegetated, but the top half of the bank is unvegetated and in some cases still prone to erosion at higher flows. In most places, the banks at Price Park are vertical, because the toe of bank has eroded away. However, in some cases these banks have stabilized. An additional year of monitoring will indicate whether the currently eroding banks are able to stabilize over time. The bank erosion areas of immediate concern are the ones that still, seven years after construction, do not have vegetation established on them. These areas can be seen in the Current Conditions Plan View.

The stream is vertically controlled in some places by the cross vanes that are still functioning and bedrock. There are some apparent areas of stream bed degradation, but most of these areas are no longer worsening. While the bed features are present throughout the stream, they are not in a consistent riffle-pool sequence, but the bed exhibits a more diverse and faceted nature than the as-built profile exhibits. The beaver dam at the downstream limits of the project stream is backwatering the lower portion of the stream, which is described in the Current Conditions Plan View.

The Monitoring Plan View illustrates how the existing cross vanes are located at the beginning of tangent sections (heads of riffles) on the stream planform. A typical cross vane should concentrate flow in the center of the channel and induce scour to help maintain pools. The arms should also slow water in the near bank region before redirecting it. At Price Park the placement of some of the structures in the lowest extent of meanders combined with short riffles was not ideal in terms of more recent practice and understanding and this has resulted in the conversion of some intended riffle habitat into pools. The cross vanes on the project stream act as grade control structures, but also promote the formation of pools where riffles should be beginning. The installed cross vane arms do not angle out away from the center boulder. Instead of directing water away from the banks, the vane arms act as large stone toe bank protection. Because of their placement, the cross vanes have been evaluated primarily as grade control measures and stone toe stabilization, in which case most are functional. Root wads, which are the other structures at the site, are only marginally functional. While they are still providing stream and terrestrial habitat, many of them are positioned above the streams baseflow and are beginning to rot. Certain degrading root wads then cause the surrounding stabilizing boulders to become displaced in some instances. In some places the root material is rotted away entirely and the root wads are hard to find.

See additional stream assessment and photos in Appendix B and Current Conditions Plan View in Appendix C.



## 2.2.1 Bankfull Event and Stability Assessment

### 2.2.1.a Verification of Bankfull Events Table

<b>Table 5. Verification of Bankfull Events</b>			
<b>Project Number and Name: 291 - Price Park</b>			
<b>Date of Data Collection</b>	<b>Date of Occurrence</b>	<b>Method</b>	<b>Photo Number</b>
7/25/2008	6/30/2008	Crest Gauge	N/A
	8/27/2008	Tropical Storm Fay	N/A

### 2.2.1.b BEHI and Sediment Export Table

<b>Table 6. BEHI and Sediment Export Estimates</b>
<b>Project Number and Name: 291 – Price Park</b>
N/A

## 2.2.2 Stability Assessment Table

<b>Table 7. Categorical Stream Feature Visual Stability Assessment</b>							
<b>Project Number and Name: 291 – Price Park</b>							
<b>Feature</b>	<b>Initial</b>	<b>MY - 01</b>	<b>MY - 02</b>	<b>MY - 03</b>	<b>MY - 04</b>	<b>MY - 05</b>	<b>MY - 06</b>
A. Riffles	100%						59%
B. Pools	100%						117%
C. Thalweg	100%						77%
D. Meanders	100%						66%
E. Bed General	100%						97%
F. Banks	100%						93%
G. Vanes / J Hooks etc.	100%						64%
H. Wads and Boulders	100%						77%

Please note that the pool feature in Table 7 has a rating above 100%. This occurs when there are more pools identified in the longitudinal profile survey for that monitoring year than were originally counted during the as-built survey.

### 2.2.3 Quantitative Measures Summary Tables

**Table 8. Baseline Morphology and Hydraulic Summary  
Project Number and Name: 291 – Price Park**

Parameter	USGS Gage Data			Regional Curve Interval			Pre-Existing Condition			Project Reference Stream			Design			As-built*		
	Min	Max	Mean	Min	Max	Med	Min	Max	Mean	Min	Max	Mean	Riffle	Pool	Min	Max	Mean	
<b>Dimension</b>																		
Bankfull Width (ft)							11.6	20.1	15.9	5.7	7.5	6.6	16.4	18.0	13.3	17.2	14.0	
Floodprone Width (ft)							16.9	>77		20.0	35.0	28.0						
Bankfull Cross Sectional Area (ft <sup>2</sup> )							31.8	32.2	32.0	4.0	6.1	5.1	32.5	36.8	24.1	36.7	31.9	
Bankfull Mean Depth (ft)							1.6	2.8	2.2	0.7	0.8	0.8	2.0	2.0	1.8	2.3	2.1	
Bankfull Maximum Depth (ft)							3.2	4.2	3.7	1.3	1.6	1.5	3.5	4.3	3.2	3.6	3.5	
Width/Depth Ratio							4.2	12.7	8.5	8.2	9.2	8.7	8.3		6.2	8.1	7.3	
Bank Height Ratio									1.5			1.6						
Entrenchment Ratio							1.1	>4.8		3.5	4.6	4.1	>2.2		4.9	7.1	5.8	
Wetted Perimeter (ft)																		
Hydraulic Radius (ft)																		
<b>Pattern</b>																		
Channel Beltwidth (ft)										10.5	22.0	15.8						
Radius of Curvature (ft)										5.7	18.8	11.3						
Meander Wavelength (ft)										22	45	32						
Meander Width Ratio										1.6	3.3	2.4						
<b>Profile</b>																		
Riffle Length (ft)																		
Riffle Slope (ft/ft)										0.01	0.08	0.054						
Pool Length (ft)																		
Pool Spacing (ft)										7.5	48	22.9						
<b>Substrate</b>																		
d50 (mm)									0.71			0.46			0.22	0.45	0.33	
d84 (mm)									bdrk			24.9			8	103	8	
<b>Additional Reach Parameters</b>																		
Valley Length (ft)																		
Channel Length (ft)									1,436									1,776
Sinuosity									1									
Water Surface Slope (ft/ft)									0.0094			0.018						
BF Slope (ft/ft)																		
Rosgen Classification									G5/E5		E5		E5					E5

**Table 9 Morphology and Hydraulic Monitoring Summary**  
**Project Number and Name: 291 – Price Park**

Parameter	Cross-Section 1										Cross-Section 2					
	Riffle										Pool					
	MY-00	MY-01	MY-02	MY-03	MY-04	MY-05*	MY-06	MY-00	MY-01	MY-02	MY-03	MY-04	MY-05*	MY-06		
Bankfull Width (ft)	13.3	14.8	15.0	16.8	14.1	20.1	21.0	22.2	21.0	21.2	21.2	20.6	21.3			
Floodprone Width (ft)				>89	>89	>80	>80				>99	>99				
Bankfull Cross-Sectional Area (ft <sup>2</sup> )	25.2	25.6	37.8	34.9	41.5	61.1	64.0	50.7	47.5	42.9	44.6	48.9	49.7			
Bankfull Mean Depth (ft)	1.9	1.7	2.5	2.1	3.0	3.0	3.0	2.3	2.3	2.0	2.1	2.4	2.3			
Bankfull Maximum Depth (ft)	3.6	3.6	4.4	4.4	4.9	4.4	4.6	5.0	4.7	4.7	4.2	5.0	4.9			
Width/Depth Ratio	7.0	8.7	6.0	8.0	4.7	6.6	6.9	9.7	9.1	10.6	10.1	8.6				
Entrenchment Ratio				>5.3		>4.0	>4.0				>4.7					
Bank Height Ratio						1.0										
Wetted Perimeter (ft)						26.6							26.1			
Hydraulic Radius (ft)						2.4							1.9			
<b>Substrate</b>																
d50 (mm)	0.3		0.1	2.6		13.0	1.2	0.3		1.4	2.3		4.0			
d84 (mm)	87.7		19.6	8.0		28.0	16.0	1.5		14.5	13.7		19.0			
Parameter	Cross Section 3										Cross Section 4***					
Dimension	Riffle										Riffle					
	MY-00	MY-01	MY-02	MY-03	MY-04	MY-05*	MY-06	MY-00	MY-01	MY-02	MY-03	MY-04	MY-05	MY-06		
	Bankfull Width (ft)	14.0	14.0	14.7	14.7	21.4	24.2	24.0	17.2	17.3	17.2	17.1	16.2	***		
Floodprone Width (ft)				>90	>90	>90	>90				>100	>100	***			
Bankfull Cross-Sectional Area (ft <sup>2</sup> )	30.7	28.4	30.8	29.7	36.8	40.8	37.8	37.2	35.5	36.3	35.1	32.1	***			
Bankfull Mean Depth (ft)	2.2	2.0	2.1	2.0	1.7	1.7	1.6	2.1	2.1	2.1	2.0	2.0	***			
Bankfull Maximum Depth (ft)	3.5	3.3	3.6	3.6	3.6	3.7	3.6	3.2	3.6	3.7	3.7	3.5	***			
Width/Depth Ratio	6.4	7.0	7.0	7.4	12.6	14.4	15.2	8.2	8.2	8.2	8.6	8.1	***			
Entrenchment Ratio				>6.1		>4.0	>4.0				>5.9		***			
Bank Height Ratio							1									
Wetted Perimeter (ft)							27.4									
Hydraulic Radius (ft)							1.4									
<b>Substrate</b>																
d50 (mm)	0.2		0.1	0.6		20.0	4.7	0.3		0.3	1.4		***			
d84 (mm)	6.7		12.1	8.5		43.0	29.0	6.9		14.8	16.7		***			

\* No monitoring was performed during 2006; MY-05 was performed during 2007.

\*\* Two additional cross-sections were surveyed per EEP's request.

\*\*\* Cross-Section 4 could not be located during the MY-05 and MY-06 monitoring.

\*\*\*\* No substrate data was recorded for Cross-Section 2.

**Table 9 cont. Morphology and Hydraulic Monitoring Summary  
Project Number and Name: 291 – Price Park**

Parameter	Cross-Section A**						Cross-Section B**						
	MY-00	MY-01	MY-02	MY-03	MY-04	MY-06	MY-00	MY-01	MY-02	MY-03	MY-04	MY-05*	MY-06
<b>Dimension</b>	Rifle						Pool						
Bankfull Width (ft)						29.8						17.5	14.4
Floodprone Width (ft)						>60						>60	>60
Bankfull Cross-Sectional Area (ft <sup>2</sup> )						40.9						36.5	32.1
Bankfull Mean Depth (ft)						1.4						2.1	2.2
Bankfull Maximum Depth (ft)						4.9						3.3	3.2
Width/Depth Ratio						17.4						8.4	6.5
Entrenchment Ratio						>2.0						>3.0	>3.0
Bank Height Ratio						1.0							1.0
Wetted Perimeter (ft)						33.8							16.8
Hydraulic Radius (ft)						1.2							1.9
<b>Substrate</b>													
d50 (mm)						1.9						17	6.6
d84 (mm)						15						29	40

\* No monitoring was performed during 2006; MY-05 was performed during 2007.

\*\* Two additional cross-sections were surveyed per EEP's request.

\*\*\*\* No substrate data was recorded for Cross-Section 2.

**Table 9 cont. Morphology and Hydraulic Monitoring Summary  
Project Number and Name: 291 - Price Park**

Parameter	MY - 01 (2002)			MY - 02 (2003)			MY - 03 (2004)			MY - 04 (2005)			MY - 05 (2007)			MY - 06 (2008)		
	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
<b>Pattern</b>																		
Channel Beltwidth (ft)	49	80		52	95		46	97	69	59	94	76	41	86	65	41	86	65
Radius of Curvature (ft)	49	84	65	48	85	61	27	97	50	29	71	48	28	72	47	28	72	47
Meander Wavelength (ft)	127	183	150	118	197	162	126	211	162	136	202	161	119	201	166	119	201	166
Meander Width Ratio	3.2	5.2		3.4	6.1		2.8	6.0	4.3	3.4	5.3	4.3	1.9	3.9	3.0	1.6	3.4	2.6
<b>Profile</b>																		
Riffle Length (ft)							9	87	47	8.6	38	19.1	7	24	13	5	32	15
Riffle Slope (ft/ft)							0.003	0.030	0.009	0.006	0.084	0.018	0.01	0.131	0.048	0.005	0.042	0.025
Pool Length (ft)							28	73	59	15	71	35	7	48	20	9	45	16
Pool Spacing (ft)	21	153	92	21	153	92	34.5	219	62.5	15	58	35	25	221	61	26	309	53
<b>Additional Reach Parameters</b>																		
Valley Length (ft)		1,384			1,384			1,384			1,384			1,384			1,384	
Channel Length (ft)		1,776			1,776			1,776			1,776			1,776			1,776	
Sinuosity		1.3			1.3			1.3			1.3			1.3			1.3	
Water Surface Slope (ft/ft)		0.0062			0.0078			0.0076			0.0066			0.0067			0.0062	
Number of Bankfull Events		N/A*			N/A*			N/A*			N/A*			N/A*			1	
Rosgen Classification		E5			E5			E5			E5			E5			E5	

\* Historical project documents necessary to provide these data were unavailable at the time of report submission.

### **3.0 METHODOLOGY**

The CVS-EEP protocol (<http://cvs.bio.unc.edu/methods.htm>) was used to collect vegetation data from PricePark this year, the sixth year of monitoring. This methodology was incorporated during the fifth year of monitoring. The method used before that time was the EEP 2004 Stem Counting Protocol.

### **4.0 REFERENCES**

Lee, Michael T., R. K. Peet, S. D. Roberts, and T. R. Wentworth. 2006. CVS-EEP Protocol for Recording Vegetation, Version 4.0 (<http://cvs.bio.unc.edu/methods.htm>)

Weakley, Alan S. 2006. Flora of the Carolinas, Virginia, Georgia, and Surrounding Areas. ([http://www.herbarium.unc.edu/FloraArchives/WeakleyFlora\\_2006-Jan.pdf](http://www.herbarium.unc.edu/FloraArchives/WeakleyFlora_2006-Jan.pdf))

# **Appendix A**

## **Vegetation Data**





## A1 - Vegetation Data Tables

**Table A1. Vegetation Metadata**

**Project Number and Name: 291 - Price Park**

Report Prepared By	Brian Roberts
Date Prepared	8/15/2008 14:21
Database Name	kci-problem-II-fixed.mdb
Database Location	M:\2007\12071067_2007 EEP OPEN END\Veg_database

**PROJECT SUMMARY-----**

Project Code	Project Name	Description	Length (ft)	Stream-to-Edge Width (ft)	Area (sq m)	Required Plots (calculated)	Sampled Plots
291	Price Park	Stream Restoration site in Greensboro, NC	1,776	80	26,397	8	8

**Table A2. Vegetation Vigor by Species**

**Project Number and Name: 291 - Price Park**

Species	4	3	2	1	0	Missing
<i>Alnus serrulata</i>	2					
<i>Cornus amomum</i>	1	3				
<i>Diospyros virginiana</i>	5					
<i>Fraxinus pennsylvanica</i>	4	6				
<i>Quercus falcata</i>	1	1				
<i>Quercus michauxii</i>	5	3				
<i>Quercus phellos</i>	3	1				
<i>Carpinus caroliniana</i>	5					
<b>TOT:</b>	<b>8</b>	<b>26</b>	<b>14</b>			

**Table A3. Vegetation Damage by Species**

**Project Number and Name: 291 - Price Park**

Species	All Damage Categories	No Damage	Deer	Insects	Vine Strangulation
<i>Alnus serrulata</i>	2	2			
<i>Carpinus caroliniana</i>	5	5			
<i>Cornus amomum</i>	4	2	1	1	
<i>Diospyros virginiana</i>	5	5			
<i>Fraxinus pennsylvanica</i>	10	6	1		3
<i>Quercus falcata</i>	2	2			
<i>Quercus michauxii</i>	8	8			
<i>Quercus phellos</i>	4	3		1	
<b>TOT:</b>	<b>8</b>	<b>40</b>	<b>33</b>	<b>2</b>	<b>2</b>

Table A4. Vegetation Damage by Plot						
Project Number and Name: 291 - Price Park						
	Plot	All Damage Categories	No Damage	Deer	Insects	Vine Strangulation
	PP-A-0001-year:6	13	10			3
	PP-A-0002-year:6	6	4	1	1	
	PP-A-0003-year:6	4	4			
	PP-A-0004-year:6	9	7	1	1	
	PP-A-0005-year:6	3	3			
	PP-A-0006-year:6	1	1			
	PP-A-0007-year:6	1	1			
	PP-A-0008-year:6	3	3			
<b>TOT:</b>	<b>8</b>	<b>40</b>	<b>33</b>	<b>2</b>	<b>2</b>	<b>3</b>

Table A5. Stem Count by Plot and Species												
Project Number and Name: 291 - Price Park												
	Species	Total Planted Stems	# plots	avg# stems	plot PP-A-0001-year:6	plot PP-A-0002-year:6	plot PP-A-0003-year:6	plot PP-A-0004-year:6	plot PP-A-0005-year:6	plot PP-A-0006-year:6	plot PP-A-0007-year:6	plot PP-A-0008-year:6
	<i>Alnus serrulata</i>	2	1	2				2				
	<i>Carpinus caroliniana</i>	5	3	1.67		1		3				1
	<i>Cornus amomum</i>	4	2	2		1		3				
	<i>Diospyros virginiana</i>	5	4	1.25	1		1			1		2
	<i>Fraxinus pennsylvanica</i>	10	3	3.33	7	2	1					
	<i>Quercus falcata</i>	2	1	2	2							
	<i>Quercus michauxii</i>	8	4	2	2	1	2		3			
	<i>Quercus phellos</i>	4	4	1	1	1		1			1	
<b>TOT:</b>	<b>8</b>				<b>13</b>	<b>6</b>	<b>4</b>	<b>9</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>3</b>

Table A6. Vegetative Problem Areas			
Project Number and Name: 291 – Price Park (UT to Horsepen Creek)			
Segment/Reach: Ut to Horsepen Creek (1,758 ft.)			
Feature/Issue	Station # / Range	Probable Cause	Photo #
Invasive Vegetation	00+30 – 00+60	Kudzu	VP1
	11+00 – 11+60	Kudzu	

## A2 – Representative Vegetation Problem Area Photos



VP1 – Mimosa (*Albizia julibrissin*) and kudzu (*Pueraria montana*). Photo taken near Station 3+50. 10/29/08 - MY 06



VP2 – Thorny olive (*Elaeagnus pungens*) along stream bank. Photo taken near Station 5+50. 10/29/08 - MY 06



### A3 - Vegetation Monitoring Plot Photos



Vegetation Plot 1 – Taken looking southeast toward the center of the plot from the origin. 8/14/08 - MY 06



Vegetation Plot 2 – Taken looking northeast toward the center of the plot from the origin. 8/14/08 - MY 06





Vegetation Plot 3 – Taken looking east toward the center of the plot from the origin. 8/14/08 - MY 06



Vegetation Plot 4 – Taken looking east toward the center of the plot from the origin. 8/14/08 - MY 06





Vegetation Plot 5 – Taken looking south toward the center of the plot from the origin. 8/14/08 - MY 06



Vegetation Plot 6 – Taken looking east toward the center of the plot from the origin. 8/14/08 - MY 06





Vegetation Plot 7 – Taken looking northeast toward the center of the plot from the origin. 8/14/08 - MY 06



Vegetation Plot 8 – Taken looking south toward the center of the plot from the origin. 8/14/08 - MY 06





# **Appendix B**

## **Geomorphologic Data**



## **B1 – Representative Stream Problem Area Photos**



SP1 – Severe bank erosion. Photo taken near Station 4+00 (XS1). 10/29/08 - MY 06



SP2 – Upper bank erosion. Photo taken near Station 5+00. 10/29/08 - MY 06





SP3 – Root wads completely above baseflow, rotting, and with scour behind. Photo taken near Station 9+00. 10/29/08 - MY 06



SP4 – Failed cross vane. Photo taken near Station 4+00. 11/5/08 - MY 06



SP5 – Beaver dam causing backwater conditions to Station 13+60. Photo taken near Station 17+50. 10/29/08 - MY 06



## Appendix B2 – Stream Photo Stations



M1-US – MY06 – 11/5/08



M1-DS – MY06 – 11/5/08



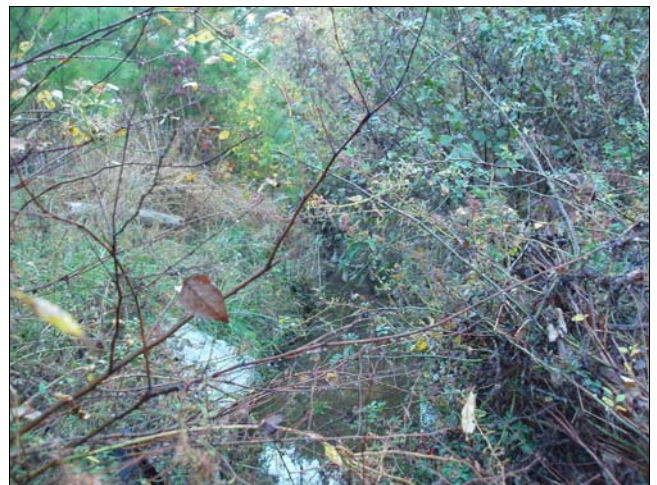
M2-US – MY06 – 11/5/08



M2-DS – MY06 – 11/5/08



M3-US – MY06 – 11/5/08



M3-DS – MY06 – 11/5/08





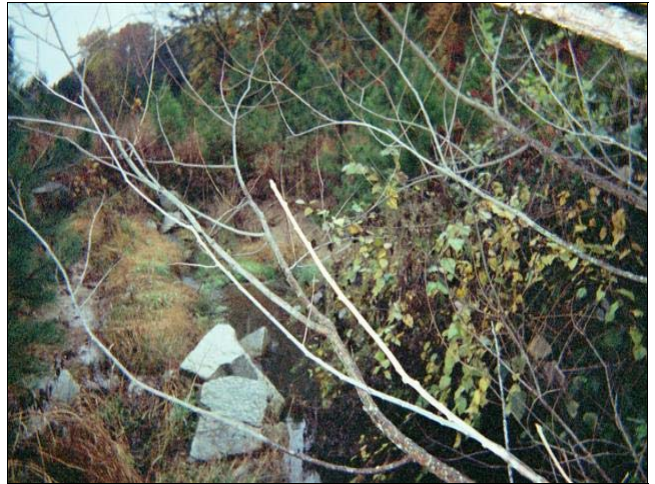
M4-US – MY06 – 11/5/08



M4-DS – MY06 – 11/5/08



M5-US – MY06 – 11/5/08



M5-DS – MY06 – 11/5/08



M6-US – MY06 – 11/5/08



M6-DS – MY06 – 11/5/08





M7-US – MY06 – 11/5/08



M7-DS – MY06 – 11/5/08



M8-US – MY06 – 11/5/08



M8-DS – MY06 – 11/5/08



M9-US – MY06 – 11/5/08



M9-DS – MY06 – 11/5/08

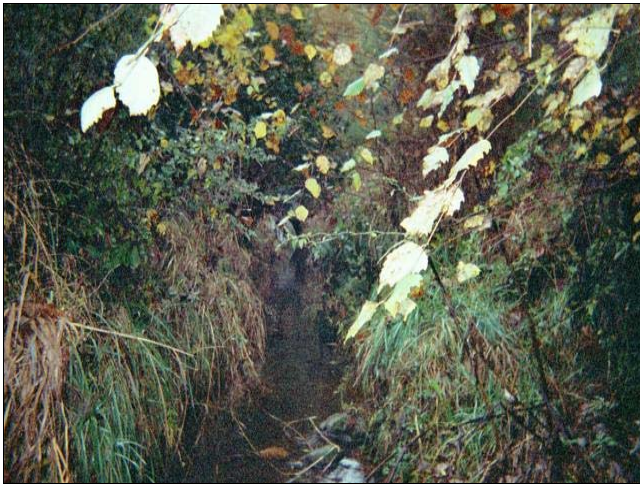




M10-US – MY06 – 11/5/08



M10-DS – MY06 – 11/5/08



M11-US – MY06 – 11/5/08



M11-DS – MY06 – 11/5/08



M12-US – MY06 – 11/5/08



M12-DS – MY06 – 11/5/08





M13-US – MY06 – 11/5/08



M13-DS – MY06 – 11/5/08



M14-US – MY06 – 11/5/08



M14-DS – MY06 – 11/5/08



M15-US – MY06 – 11/5/08



M15-DS – MY06 – 11/5/08





M16-US – MY06 – 11/5/08



M16-DS – MY06 – 11/5/08



M17-US – MY06 – 11/5/08



M17-DS – MY06 – 11/5/08

## B3 –Qualitative Visual Stability Assessment Table

Table B1. Qualitative Visual Stability Assessment						
Project Number and Name: 291 – Price Park						
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?	10	17	N/A	59%	<b>59%</b>
	2. Armor stable (e.g. no displacement)?	10	17	N/A	59%	
	3. Facet grade appears stable?	10	17	N/A	59%	
	4. Minimal evidence of embedding/fining?	10	17	N/A	59%	
	5. Length appropriate?	10	17	N/A	59%	
B. Pools	1. Present? (e.g. no severe aggradation)	21	18	N/A	117%	<b>117%</b>
	2. Sufficiently deep (Dmax pool:Mean Bkf > 1.6?)	21	18	N/A	117%	
	3. Length appropriate?	21	18	N/A	117%	
C. Thalweg	1. Upstream of meander bend centering?	12	17	N/A	71%	<b>77%</b>
	2. Downstream of meander centering?	14	17	N/A	82%	
D. Meanders	1. Outer bend in state of limited/controlled erosion?	11	17	N/A	65%	<b>66%</b>
	2. Of those eroding, # w/ concomitant point bar formation?	0	6	N/A	0%	
	3. Apparent Rc within spec?	17	17	N/A	100%	
	4. Sufficient floodplain access and relief?	17	17	N/A	100%	
E. Bed General	1. General channel bed aggradation areas (bar formation)	N/A	N/A	1/15	99%	<b>97%</b>
	2. Channel bed degradation - areas of increasing down cutting or head cutting?	N/A	N/A	3/90	95%	
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	18/240	93%	<b>93%</b>
G. Vanes	1. Free of back or arm scour?	11	13	N/A	85%	<b>64%</b>
	2. Height appropriate?	11	13	N/A	85%	
	3. Angle and geometry appear appropriate?	0	13	N/A	0%	
	4. Free of piping or other structural failures?	11	13	N/A	85%	
H. Wads / Boulders	1. Free of scour?	10	13	N/A	77%	<b>77%</b>
	2. Footing stable?	10	13	N/A	77%	

\* Total number of features per as-built estimated from planview sheets.



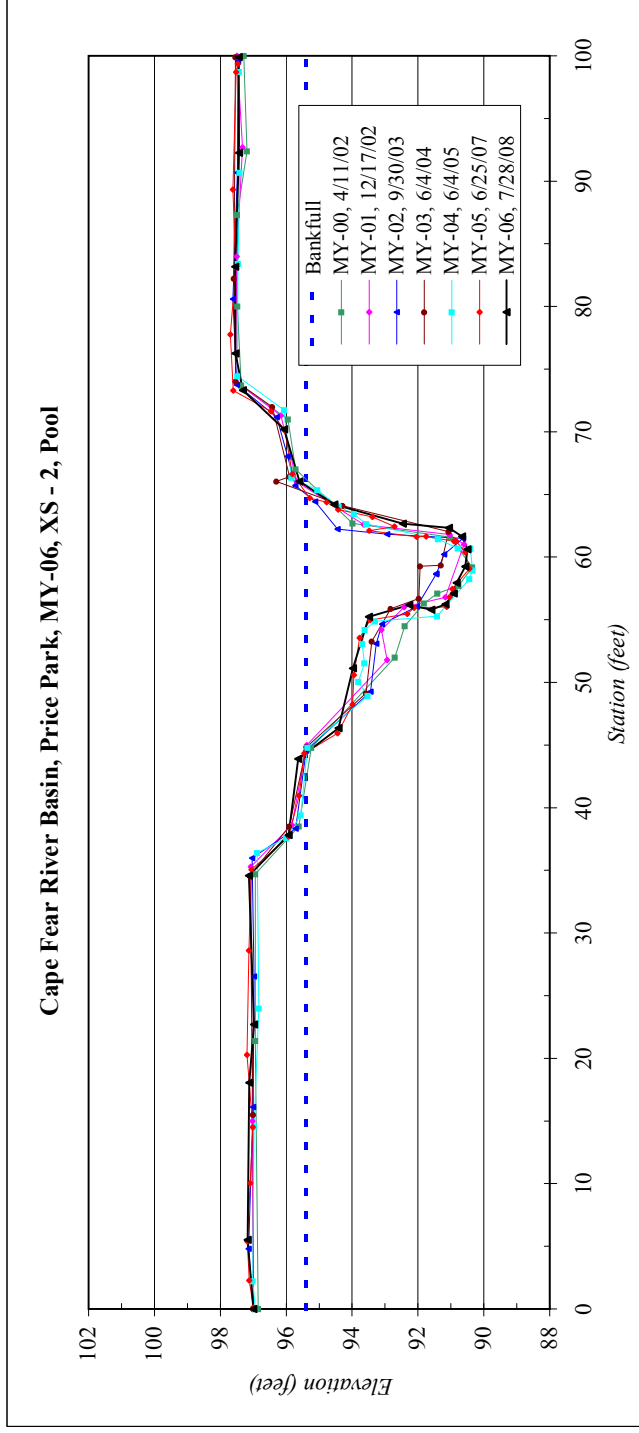


<b>River Basin:</b>	Cape Fear
<b>Watershed:</b>	Price Park, MY-06
<b>XS ID</b>	XS - 2, Pool
<b>Drainage Area (sq mi):</b>	1.0
<b>Date:</b>	7/28/2008
<b>Field Crew:</b>	B. Roberts, K. Vaughan



Station	Elevation
0.0	97.00
5.5	97.17
18.1	97.12
22.7	96.97
34.6	97.14
37.8	95.92
43.9	95.63
46.4	94.41
51.1	93.97
55.2	93.49
56.2	92.26
55.8	91.59
56.2	91.16
57.1	90.92
57.9	90.83
59.2	90.56
60.6	90.49
61.6	90.66
62.3	91.06
62.7	92.46
64.2	94.54
66.0	95.60
70.2	96.06
73.3	97.32
76.3	97.54
83.2	97.55
92.3	97.43
99.9	97.44

SUMMARY DATA	
Bankfull Elevation:	95.4
Bankfull Cross-Sectional Area:	49.7
Bankfull Width:	21.3
Flood Prone Area Elevation:	-
Flood Prone Area Width:	-
Max Depth at Bankfull:	4.9
Mean Depth at Bankfull:	2.3
W / D Ratio:	-
Entrenchment Ratio:	-
Bank Height Ratio:	-

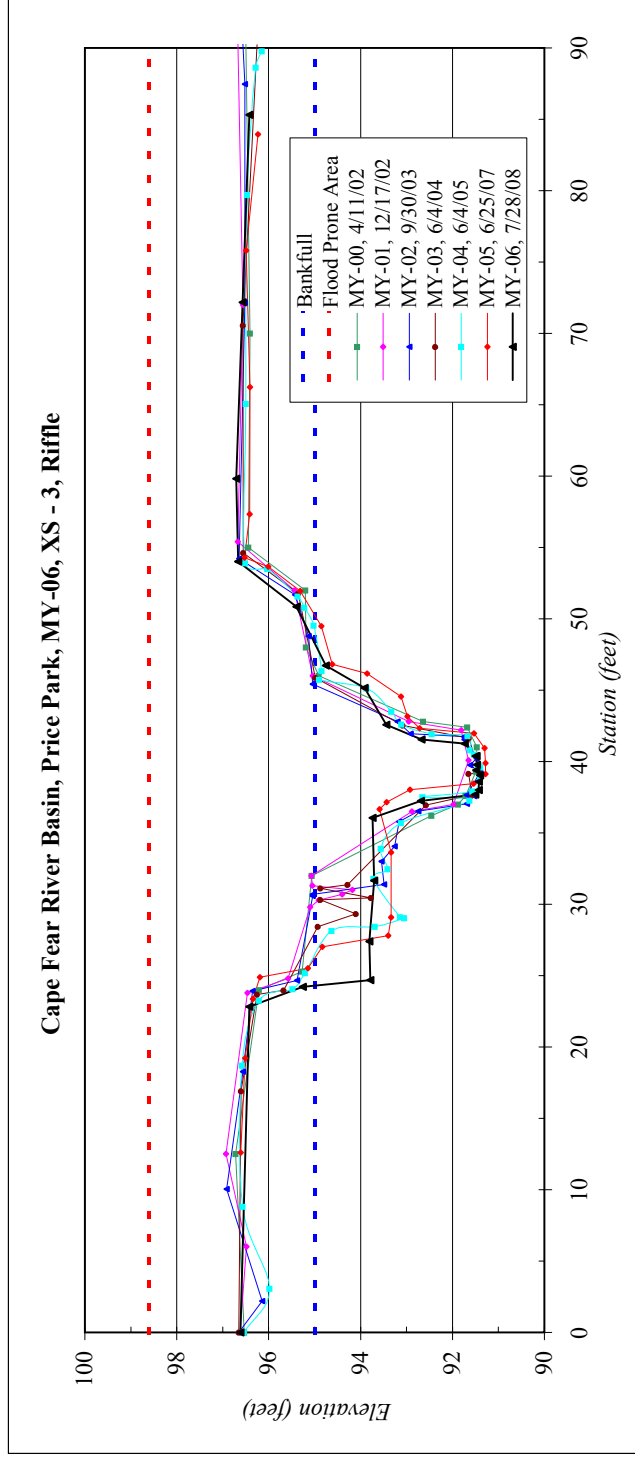


<b>River Basin:</b>	Cape Fear
<b>Watershed:</b>	Price Park, MY-06
<b>XS ID</b>	XS - 3, Riffle
<b>Drainage Area (sq mi):</b>	1.0
<b>Date:</b>	7/28/2008
<b>Field Crew:</b>	B. Roberts, K. Vaughan



Station	Elevation
0.0	96.61
22.8	96.42
24.2	95.26
24.7	93.79
27.4	93.81
31.7	93.71
36.1	93.74
37.2	92.69
37.7	91.50
38.0	91.42
38.6	91.42
39.0	91.40
39.4	91.48
39.8	91.47
40.4	91.48
40.4	91.50
41.3	91.73
41.5	92.68
42.6	93.44
45.2	93.91
46.7	94.76
50.8	95.40
54.0	96.66
59.8	96.71
72.2	96.57
85.3	96.42

SUMMARY DATA	
<b>Bankfull Elevation:</b>	95.0
<b>Bankfull Cross-Sectional Area:</b>	37.8
<b>Bankfull Width:</b>	24.0
<b>Flood Prone Area Elevation:</b>	98.6
<b>Flood Prone Width:</b>	>90
<b>Max Depth at Bankfull:</b>	3.6
<b>Mean Depth at Bankfull:</b>	1.6
<b>W / D Ratio:</b>	15.2
<b>Entrenchment Ratio:</b>	>4
<b>Bank Height Ratio:</b>	1.0

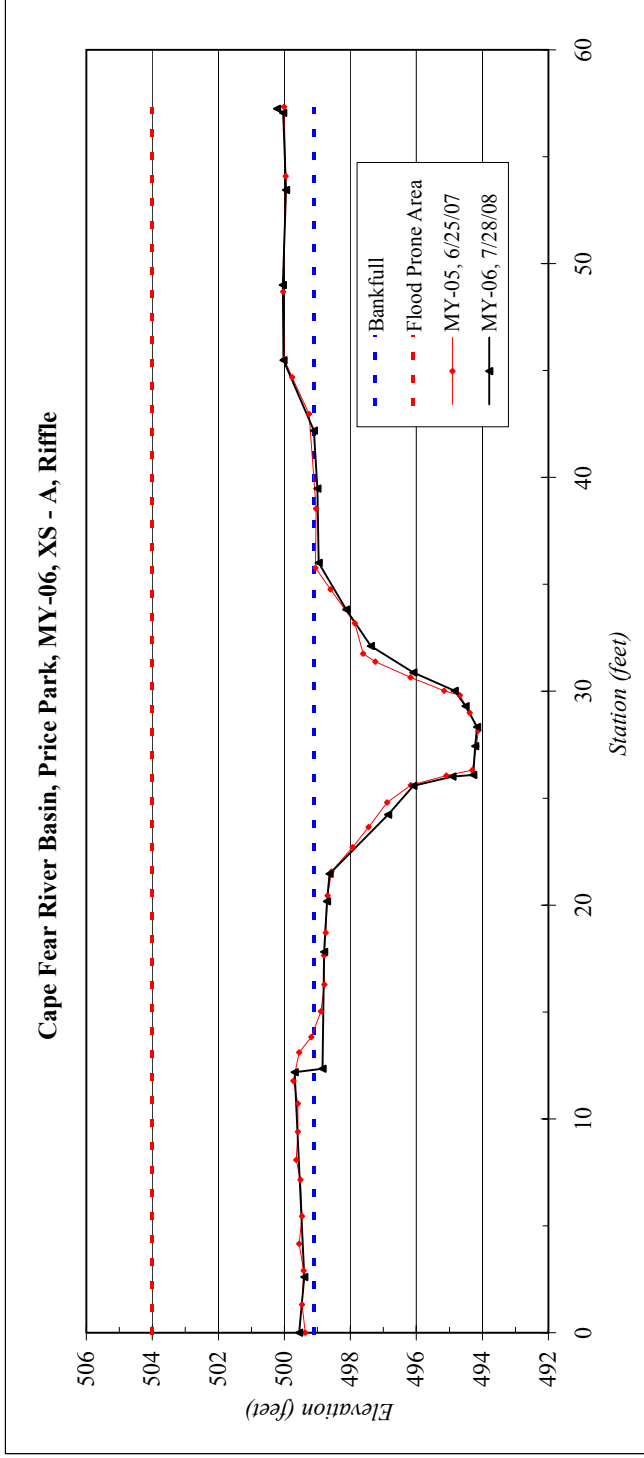


<b>River Basin:</b>	Cape Fear
<b>Watershed:</b>	Price Park, MY-06
<b>XS ID</b>	XS - A, Riffle
<b>Drainage Area (sq mi):</b>	1.0
<b>Date:</b>	7/25/2008
<b>Field Crew:</b>	B. Roberts, K. Vaughan, A. Spiller



Station	Elevation
0.0	499.55
2.6	499.40
12.2	499.69
12.3	498.84
17.8	498.79
20.2	498.71
21.5	498.63
24.2	496.86
25.6	496.09
26.0	494.91
26.1	494.28
27.4	494.22
28.3	494.16
29.3	494.51
30.0	494.84
30.9	496.09
32.1	497.38
33.8	498.13
36.0	498.97
39.5	499.00
42.2	499.10
45.5	500.03
49.0	500.05
53.4	499.95
57.1	500.04
57.2	500.23

SUMMARY DATA	
<b>Bankfull Elevation:</b>	499.1
<b>Bankfull Cross-Sectional Area:</b>	40.9
<b>Bankfull Width:</b>	29.8
<b>Flood Prone Area Elevation:</b>	504.0
<b>Flood Prone Width:</b>	>60
<b>Max Depth at Bankfull:</b>	4.9
<b>Mean Depth at Bankfull:</b>	1.4
<b>W / D Ratio:</b>	21.7
<b>Entrenchment Ratio:</b>	>2
<b>Bank Height Ratio:</b>	1.0



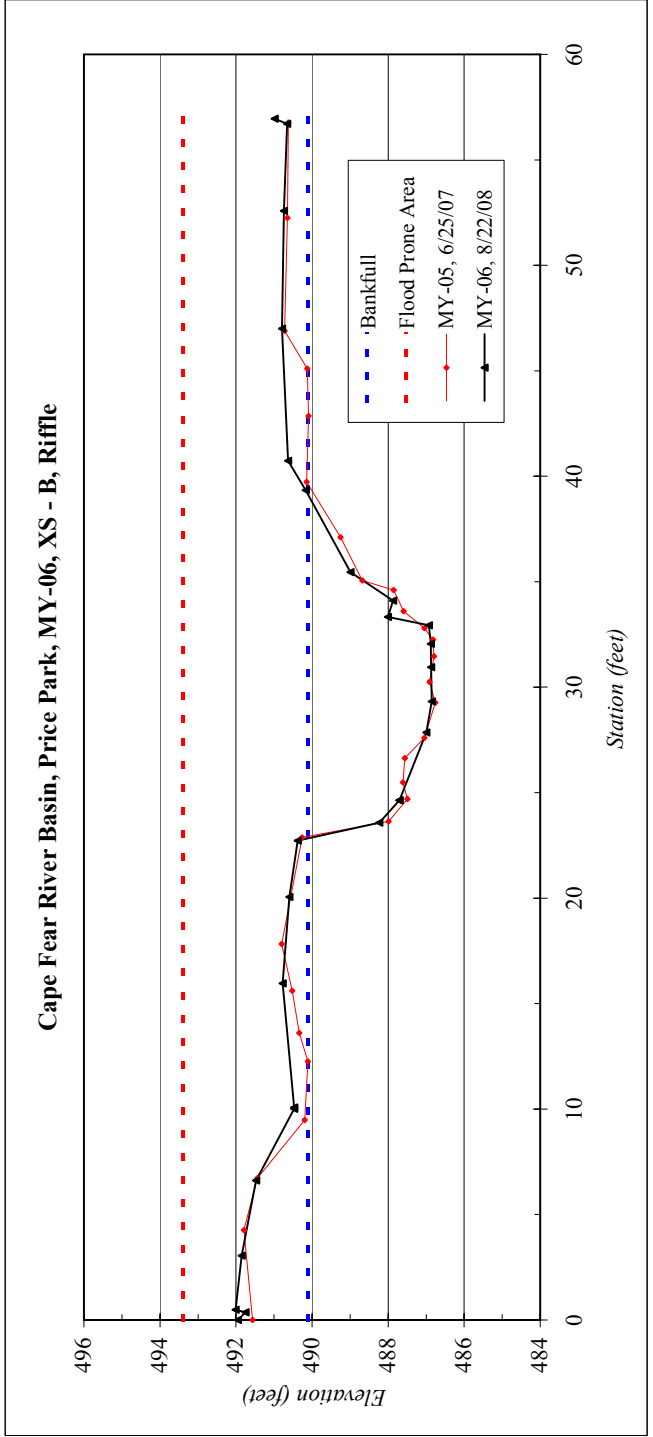




<b>River Basin:</b>	Cape Fear
<b>Watershed:</b>	Price Park, MY-06
<b>XS ID</b>	XS - B, Riffle
<b>Drainage Area (sq mi):</b>	1.0
<b>Date:</b>	8/22/2008
<b>Field Crew:</b>	B. Roberts, B. Hayes

SUMMARY DATA	
<b>Bankfull Elevation:</b>	490.1
<b>Bankfull Cross-Sectional Area:</b>	32.1
<b>Bankfull Width:</b>	14.4
<b>Flood Prone Area Elevation:</b>	493.4
<b>Flood Prone Width:</b>	>60
<b>Max Depth at Bankfull:</b>	3.2
<b>Mean Depth at Bankfull:</b>	2.2
<b>W / D Ratio:</b>	6.5
<b>Entrenchment Ratio:</b>	>3
<b>Bank Height Ratio:</b>	1.0

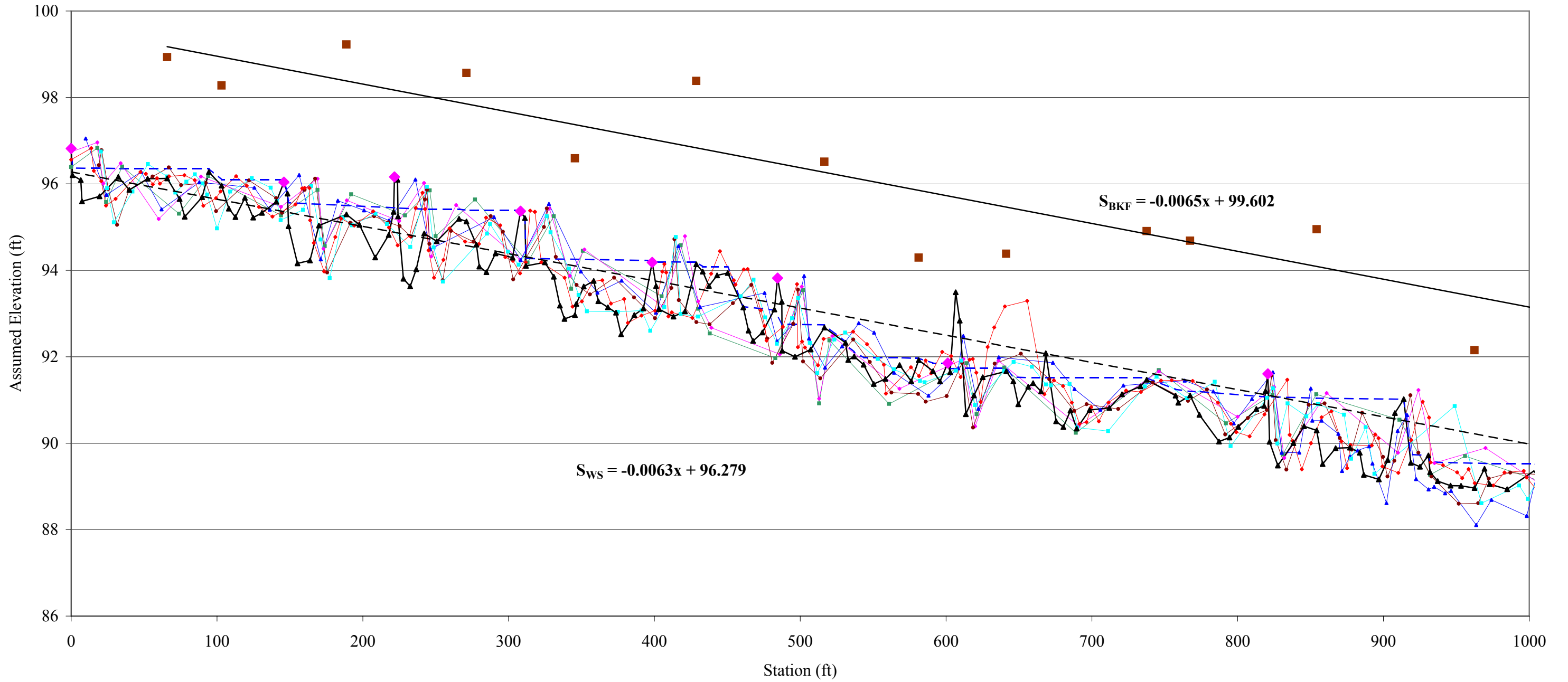
Station	Elevation
0.0	491.95
0.4	491.75
0.5	492.01
3.1	491.85
6.6	491.47
10.0	490.47
10.1	490.47
16.0	490.77
20.1	490.60
22.7	490.38
23.6	488.23
24.6	487.70
27.8	487.00
29.3	486.85
31.0	486.87
32.1	486.88
32.9	486.93
33.3	488.00
34.1	487.87
35.5	488.99
39.3	490.16
40.7	490.63
47.0	490.79
52.6	490.74
56.7	490.66
57.0	490.98



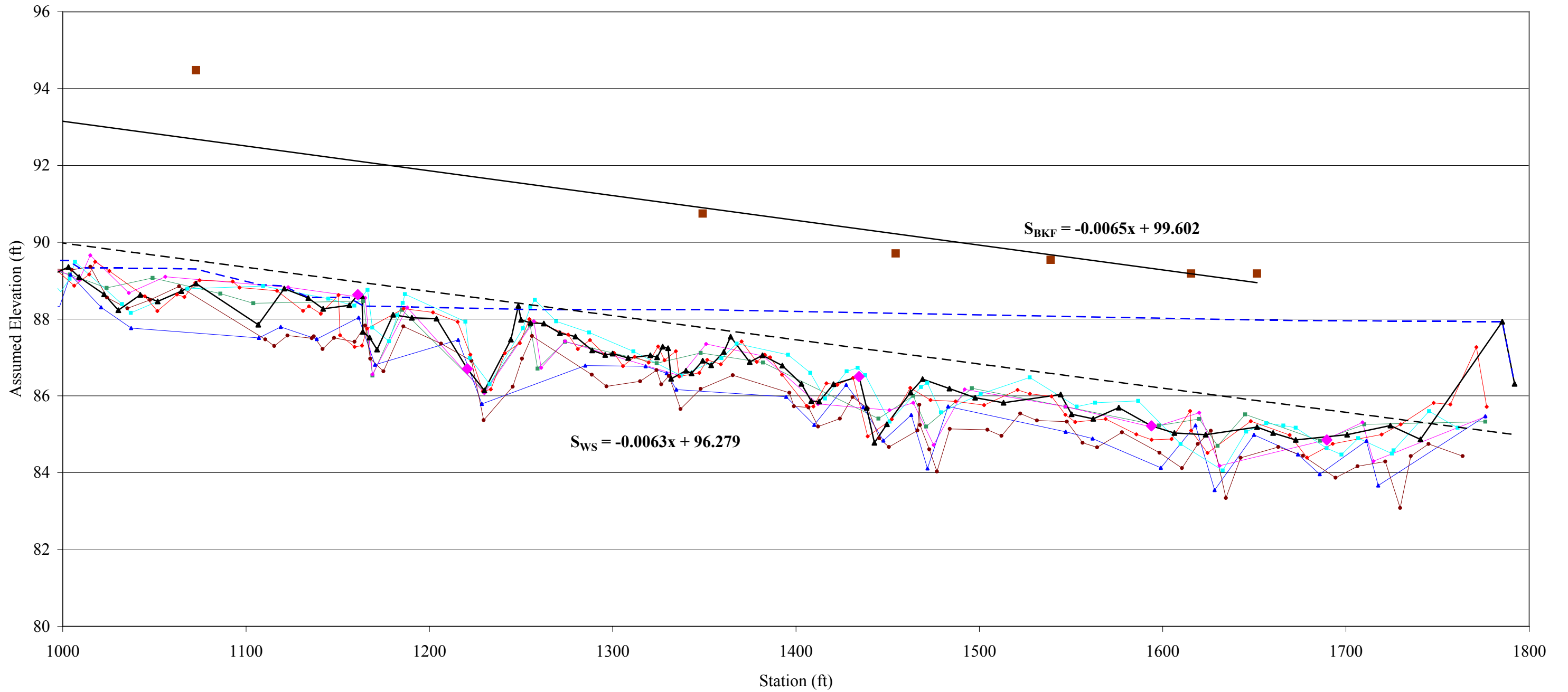


# B5 - Longitudinal Plots

Longitudinal Profile  
Price Park  
EEP Project Number 291- MY06  
Stations 00+00 to 10+00



**Longitudinal Profile**  
**Price Park**  
**EEP Project Number 291- MY06**  
**Stations 10+00 to 18+00**

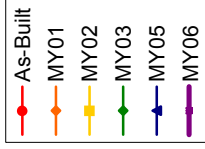
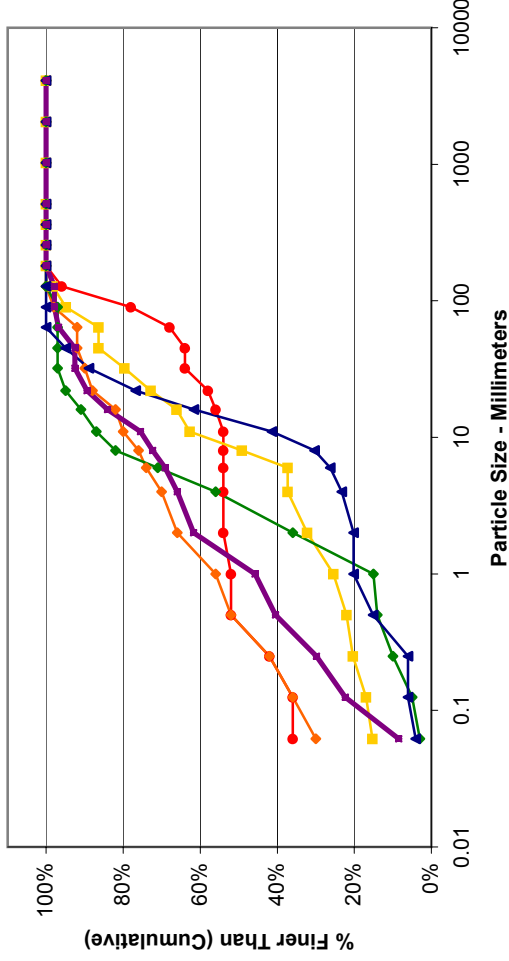


MY-00, 4/11/02	MY-01, 12/17/02	MY-02, 9/30/03	MY-03, 6/4/04	MY-04, 6/4/05	MY-05, 6/25/07
MY-06, 7/28/08	Water Surface	Bankfull	In-stream Structures	BKF Slope	

# B6 - Pebble Count Plots

Cross Section 1 Riffle - MY06			
Particle	Millimeter	S/C	Count
Silt/Clay	< 0.062	S/C	8
Very Fine	.062 - .125	S	13
Fine	.125 - .25	A	7
Medium	.25 - .50	N	10
Coarse	.50 - 1	D	5
Very Coarse	1 - 2	S	15
Very Fine	2 - 4		4
Fine	4 - 5.7	G	3
Fine	5.7 - 8	R	3
Medium	8 - 11.3	A	3
Medium	11.3 - 16	V	8
Coarse	16 - 22.6	E	5
Coarse	22.6 - 32	L	3
Very Coarse	32 - 45	S	4
Very Coarse	45 - 64		
Small	64 - 90	C	1
Small	90 - 128	O	
Large	128 - 180	B	2
Large	180 - 256	L	
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	6
<b>Total</b>			<b>100</b>

Particle Size Distribution  
Price Park  
XS 1 Riffle



Size (mm)	Count
D16	0.091
D35	0.35
D50	1.2
D65	3.4
D84	16
D95	55

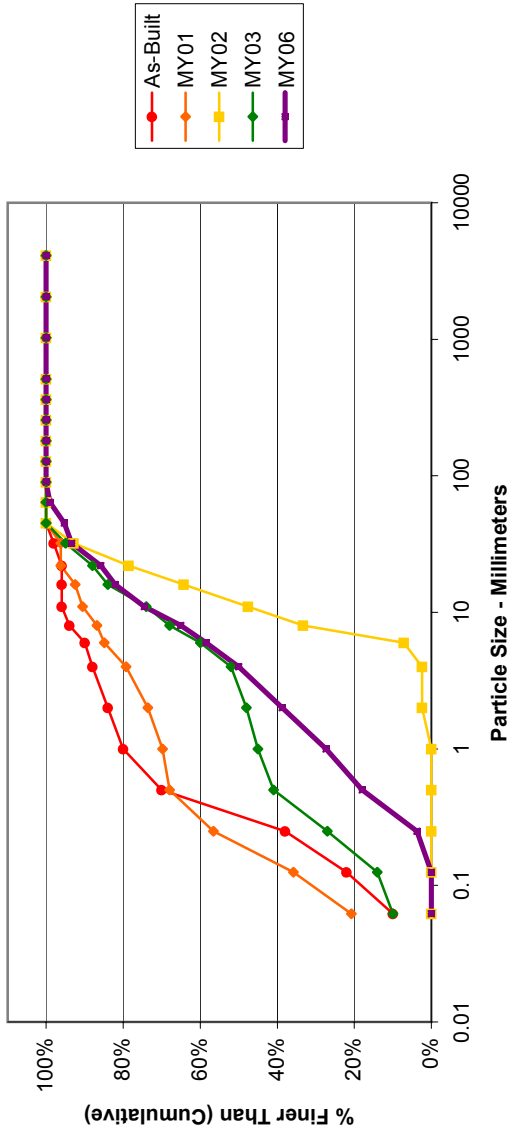
Size Distribution	
mean	1.2
dispersion	13.3
skewness	0.00

Type	Percentage
silt/clay	8%
sand	50%
gravel	33%
cobble	3%
boulder	0%
bedrock	6%
hardpan	
wood/det	
artificial	

Note:

Cross Section 2 Pool - MY06			
Particle	Millimeter	S/C	Count
Silt/Clay	< 0.062	S/C	
Very Fine	.062 - .125	S	
Fine	.125 - .25	A	4
Medium	.25 - .50	N	15
Coarse	.50 - 1	D	10
Very Coarse	1 - 2	S	12
Very Fine	2 - 4		12
Fine	4 - 5.7	G	9
Fine	5.7 - 8	R	7
Medium	8 - 11.3	A	10
Medium	11.3 - 16	V	8
Coarse	16 - 22.6	E	4
Coarse	22.6 - 32	L	8
Very Coarse	32 - 45	S	2
Very Coarse	45 - 64		4
Small	64 - 90	C	1
Small	90 - 128	O	
Large	128 - 180	B	
Large	180 - 256	L	
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
<b>Total</b>			<b>106</b>

Particle Size Distribution  
Price Park  
XS 2 Pool



Size (mm)	Count
D16	0.46
D35	1.6
D50	4
D65	8
D84	19
D95	43

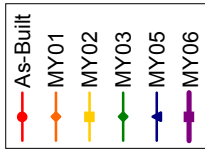
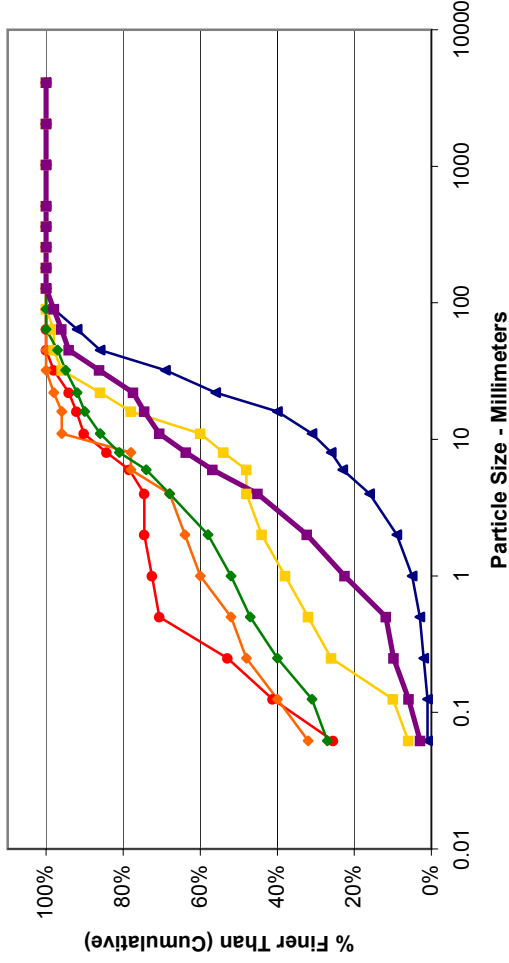
Size Distribution	
mean	3.0
dispersion	6.7
skewness	-0.10

Type	Percentage
silt/clay	39%
sand	60%
gravel	1%
cobble	
boulder	
bedrock	
hardpan	
wood/det	
artificial	

Note: Due to hazardous conditions, no data were collected for MY05.

Cross Section 3 Riffle - MY06			
Particle	Millimeter	S/C	Count
Silt/Clay	< 0.062		3
Very Fine	.062 - .125	S	3
Fine	.125 - .25	A	4
Medium	.25 - .50	N	2
Coarse	.50 - 1	D	11
Very Coarse	1 - 2	S	10
Very Fine	2 - 4		13
Fine	4 - 5.7	G	12
Fine	5.7 - 8	R	7
Medium	8 - 11.3	A	7
Medium	11.3 - 16	V	4
Coarse	16 - 22.6	E	3
Coarse	22.6 - 32	L	9
Very Coarse	32 - 45	S	8
Very Coarse	45 - 64		2
Small	64 - 90	C	2
Small	90 - 128	O	2
Large	128 - 180	B	
Large	180 - 256	L	
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
<b>Total</b>			<b>102</b>

Particle Size Distribution  
Price Park  
XS 3 Riffle



Size (mm)	Count
D16	0.66
D35	2.3
D50	4.7
D65	8.5
D84	29
D95	53

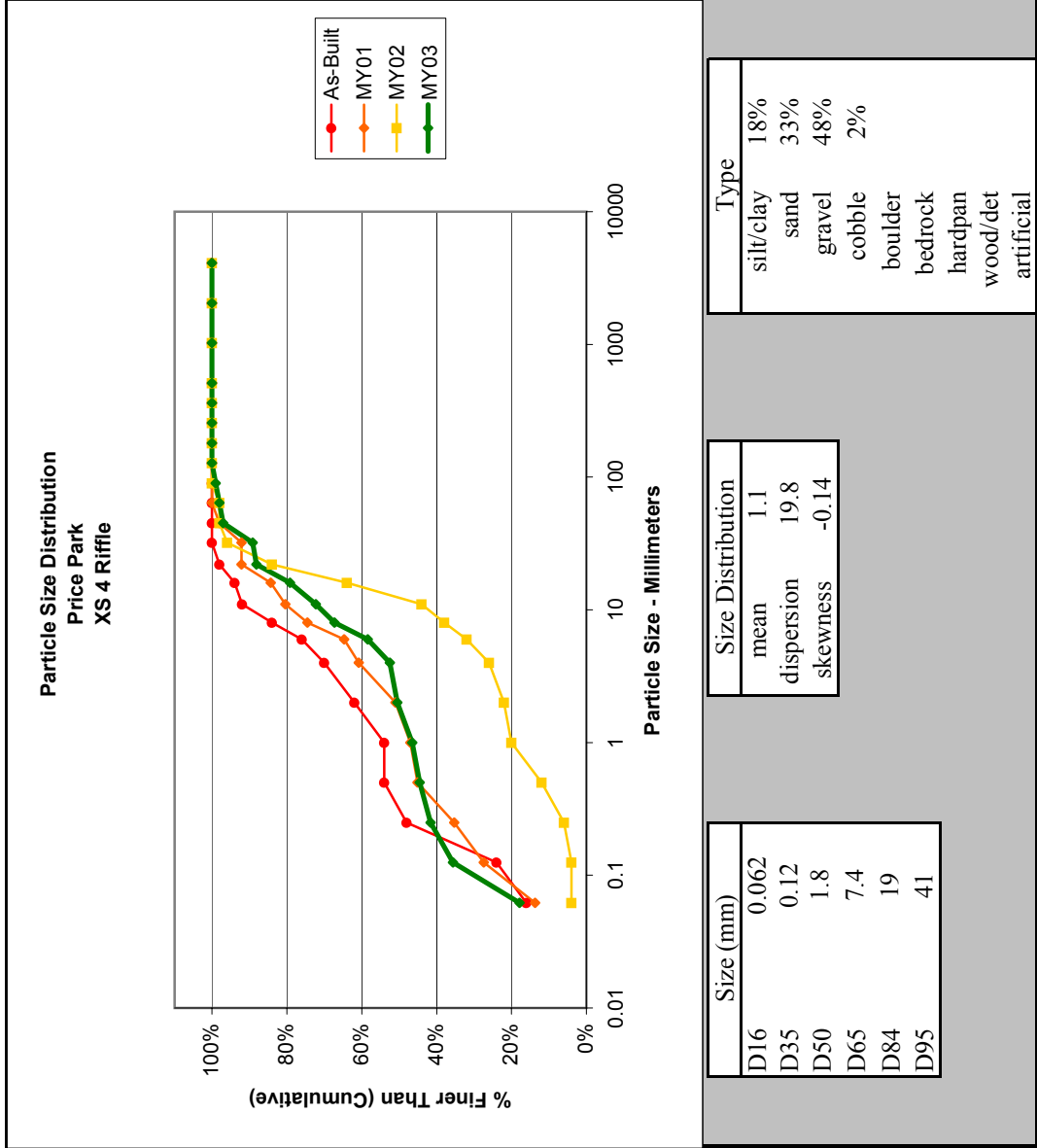
Size Distribution	
mean	4.4
dispersion	6.6
skewness	-0.02

Type	Percentage
silt/clay	3%
sand	29%
gravel	64%
cobble	4%
boulder	0%
bedrock	
hardpan	
wood/det	
artificial	

Note:

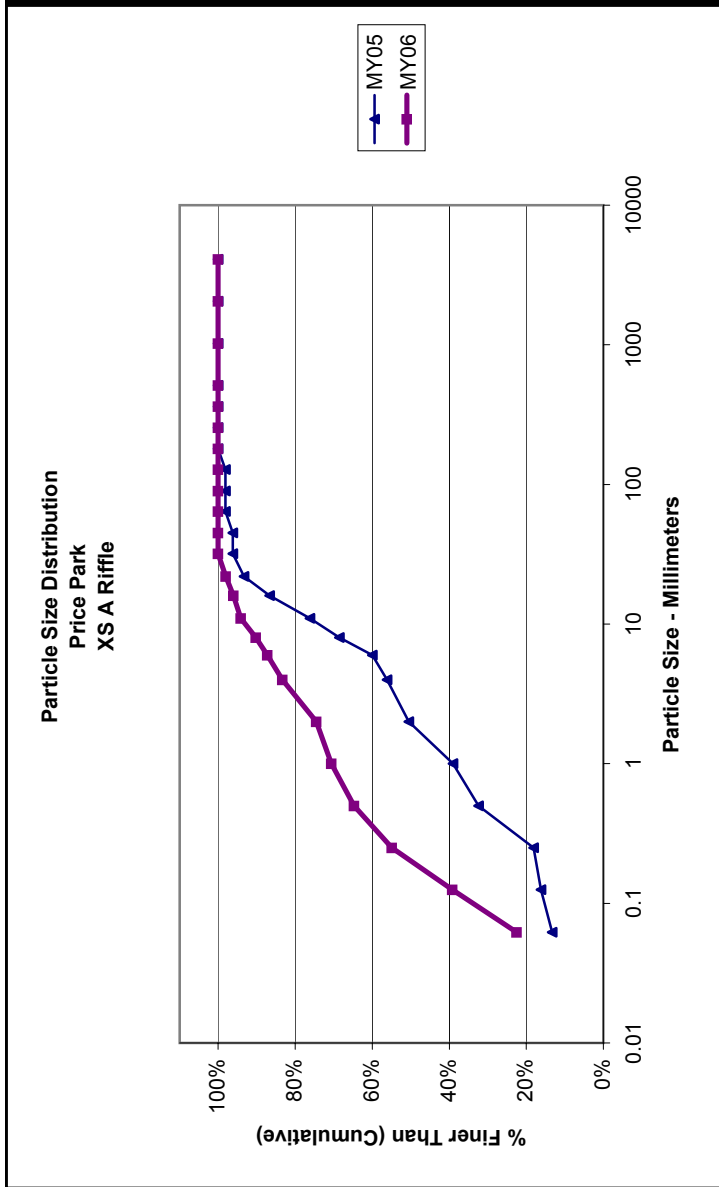
Cross Section 4 Riffle - MY03			
Particle	Millimeter	S/C	Count
Silt/Clay	< 0.062		18
Very Fine	.062 - .125	S	18
Fine	.125 - .25	A	6
Medium	.25 - .50	N	3
Coarse	.50 - 1	D	2
Very Coarse	1 - 2	S	4
Very Fine	2 - 4		2
Fine	4 - 5.7	G	6
Fine	5.7 - 8	R	9
Medium	8 - 11.3	A	5
Medium	11.3 - 16	V	7
Coarse	16 - 22.6	E	9
Coarse	22.6 - 32	L	1
Very Coarse	32 - 45	S	8
Very Coarse	45 - 64		1
Small	64 - 90	C	1
Small	90 - 128	O	1
Large	128 - 180	B	
Large	180 - 256	L	
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
<b>Total</b>			<b>101</b>

Note: Due to missing monumentation, no data were collected for MY05 or MY06.





Cross Section A Riffle - MY06				Count
Particle	Millimeter	S/C		
Silt/Clay	< 0.062			23
Very Fine	.062 - .125	S		17
Fine	.125 - .25	A		16
Medium	.25 - .50	N		10
Coarse	.50 - 1	D		6
Very Coarse	1 - 2	S		4
Very Fine	2 - 4			9
Fine	4 - 5.7	G		4
Fine	5.7 - 8	R		3
Medium	8 - 11.3	A		4
Medium	11.3 - 16	V		2
Coarse	16 - 22.6	E		2
Coarse	22.6 - 32	L		2
Very Coarse	32 - 45	S		
Very Coarse	45 - 64			
Small	64 - 90	C		
Small	90 - 128	O		
Large	128 - 180	B		
Large	180 - 256	L		
Small	256 - 362	B		
Small	362 - 512	L		
Medium	512 - 1024	D		
Lrg- Very Lrg	1024 - 2048	R		
Bedrock	>2048	BDRK		
<b>Total</b>				<b>102</b>



Size (mm)	
D16	0.062
D35	0.1
D50	0.2
D65	0.52
D84	4.3
D95	13

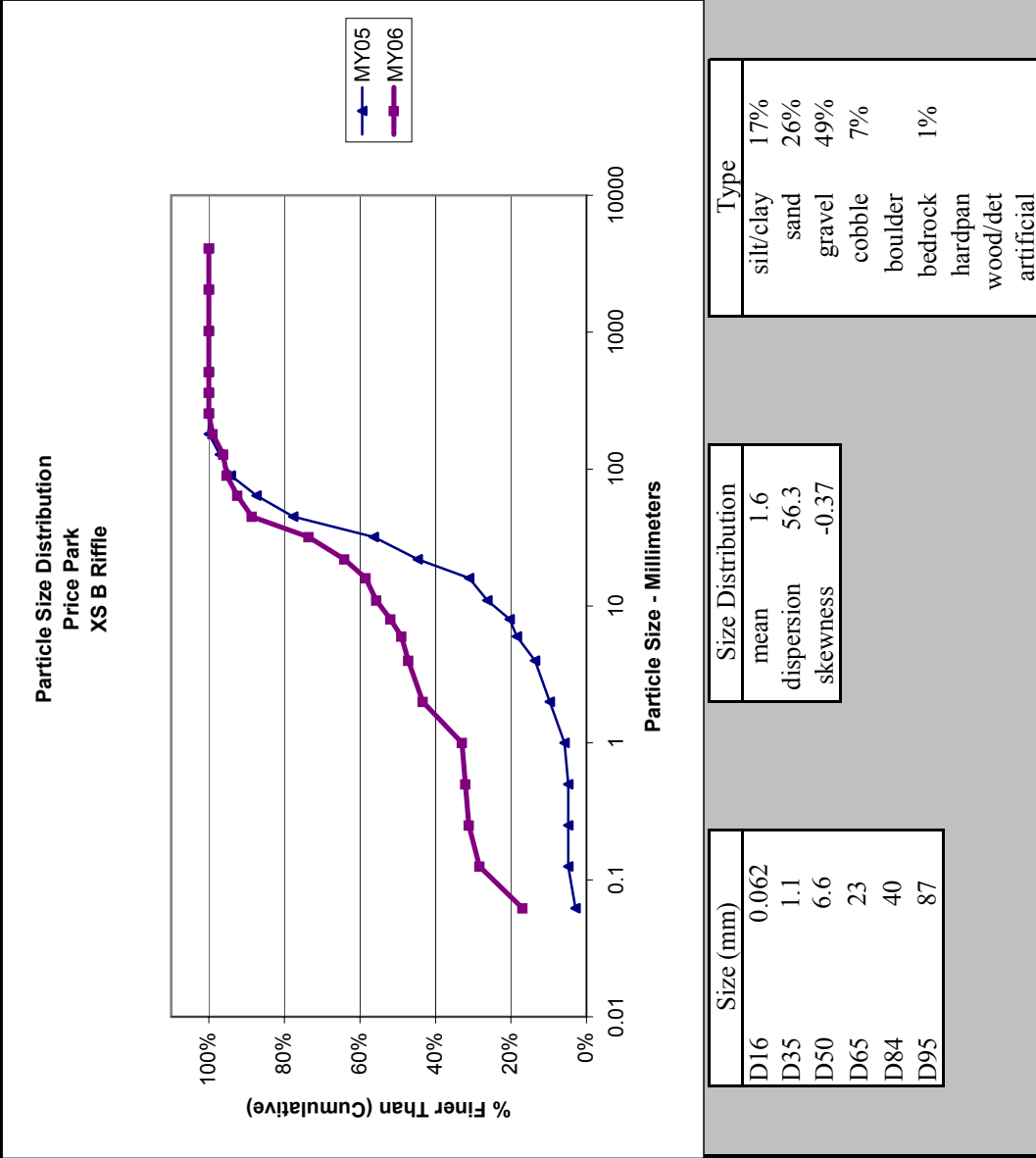
Size Distribution	
mean	0.5
dispersion	12.4
skewness	0.30

Type	
silt/clay	23%
sand	52%
gravel	25%
cobble	
boulder	
bedrock	
hardpan	
wood/det	
artificial	

Note: Cross Section A was established in MY05.

Cross Section B Riffle - MY06			
Particle	Millimeter	S/C	Count
Silt/Clay	< 0.062	S/C	18
Very Fine	.062 - .125	S	12
Fine	.125 - .25	A	3
Medium	.25 - .50	N	1
Coarse	.50 - 1	D	1
Very Coarse	1 - 2	S	11
Very Fine	2 - 4		4
Fine	4 - 5.7	G	2
Fine	5.7 - 8	R	3
Medium	8 - 11.3	A	4
Medium	11.3 - 16	V	3
Coarse	16 - 22.6	E	6
Coarse	22.6 - 32	L	10
Very Coarse	32 - 45	S	16
Very Coarse	45 - 64		4
Small	64 - 90	C	3
Small	90 - 128	O	1
Large	128 - 180	B	3
Large	180 - 256	L	1
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	1
<b>Total</b>			<b>107</b>

Note: Cross Section B was established in MY05.



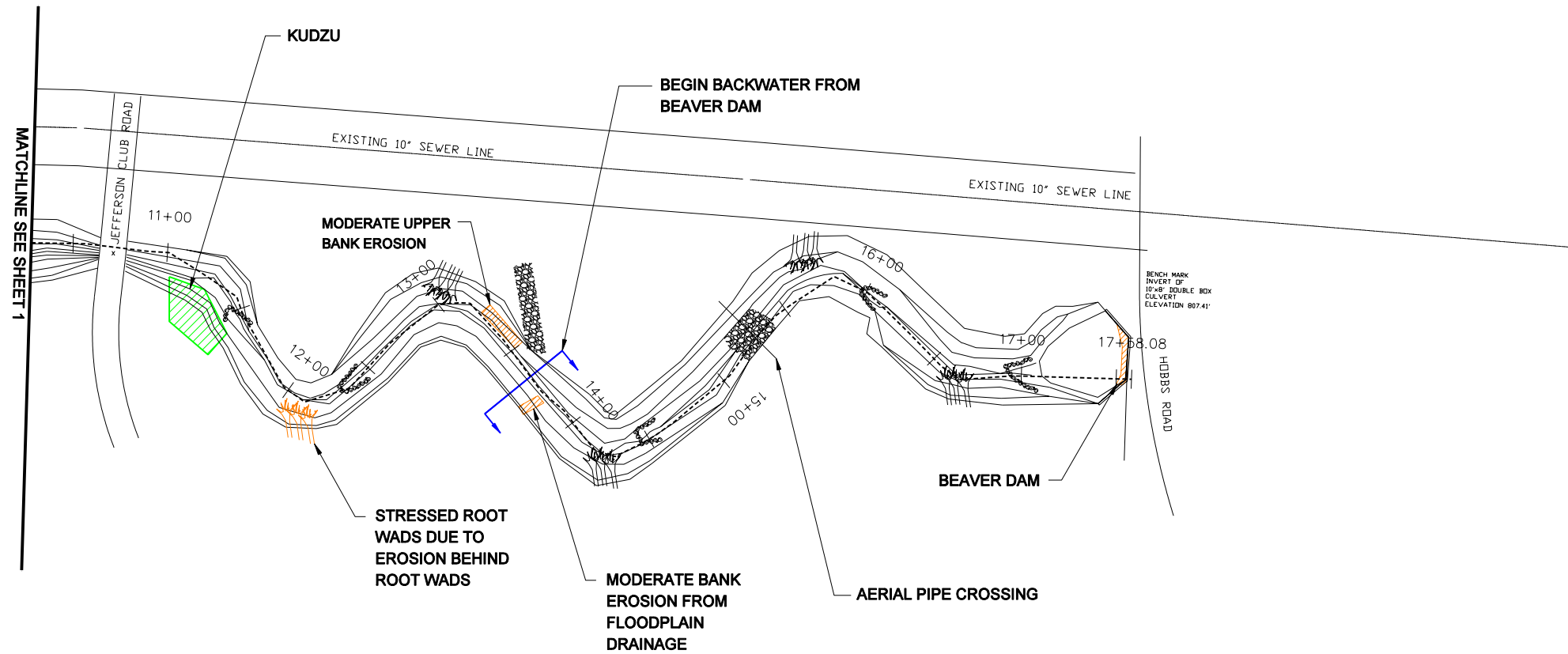
# **Appendix C**

## **Current Conditions Plan View**



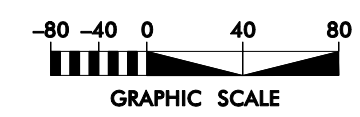






**LEGEND**

THALWEG	---
ROOT WAD	~
ROCK CROSS VANE	~
STONE FOR BED STABILITY	~
BOULDERS FOR BANK STABILITY	~



NO.	DESCRIPTION	DATE



**KCI**  
ASSOCIATES OF NC  
ENGINEERS • PLANNERS • SCIENTISTS  
4601 SIX FORKS ROAD  
RALEIGH, NORTH CAROLINA 27609

PRICE PARK  
UT TO HORSEPEN CREEK  
GUILFORD COUNTY, NORTH CAROLINA  
EEP PROJECT NUMBER 291 - MY06  
STATION 10+28 TO STATION 17+58

DATE: NOVEMBER 2008  
SCALE: SEE SHEET

CURRENT  
CONDITIONS  
PLAN VIEW