Price Park
Stream Restoration Monitoring Report
EEP Project # 291
Monitoring Year – 07
2009

Submitted to:

NCDENR-EEP, 1652 Mail Service Center, Raleigh, NC 27699-1652

December 2009

Monitoring Firm

Landmark Center II, Suite 220
4601 Six Forks Road
Raleigh, NC 27609
Phone: (919) 278-2514
Fax: (919) 783-9266

Project Contact: Adam Spiller
Email: adam.spiller@kci.com
KCI Project No: 12071067B_PP

Design Firm

EARTH TECH | AECOM

701 Corporate Center Drive
Suite 475
Raleigh, NC 27607
Phone: 919-854-6200

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY / PROJECT ABSTRACT

In 2000, the North Carolina Wetlands Restoration Program identified UT to Horsepen Creek in Price Park in Greensboro, North Carolina as a stream restoration project. 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 1.0-mi^2 watershed is located within the USGS 8-digit HUC 03020002 in the Upper Cape Fear River Basin. The project restored approximately 1,776 linear feet of channel. The project was built in 2001 with additional maintenance and structure installation completed in 2002. While 2009 is the eighth 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 seventh year of monitoring that took place in 2009. The project goals and objectives are listed below.

- 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.

The Price Park vegetation monitoring has utilized three different methods throughout the monitoring period. In Monitoring Year 05, the CVS monitoring protocol was used and eight 10 x10 meter vegetation monitoring plots were established. Where feasible, the new plots overlapped the approximate areas of the plots established in monitoring Year 02. 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. While the site has substantial buffer acreage and lateral extent for an urban setting, the planted stem survivorship in Year 07 as determined by the vegetation plots is yielding a stem density of 202 stems/acre, which is below the 260 stems/acre success criterion. The area at the bottom of the project was the primary reason for bringing the planted stems count down to the 202 average. This area neighbors a very wet, marshy wetland feature of some quality on stream right, which in combination with stems taken by beaver and a sewer easement near plot 7 is likely contributing to the reduced planted stems counts in this area. The substantial volunteer population-comprised mainly of green ash (*Fraxinus pennsylvanica*), loblolly pine (*Pinus taeda*), eastern red cedar (*Juniperus virginiana*), and tulip poplar (*Lirodendron tulipifera*)-add to the stem density substantially and put it just over 2,300 stems/acre. The most prolific exotic invasive species at the site is kudzu (*Pueraria montana*), which is present throughout the easement. The site has been included in an EEP contract for invasive plant treatment for summer 2010.

Although the project channel exhibited some adjustments and several areas of instability at some point in its history, observations in measurement years 6 and 7 indicate that the majority of these have stabilized. Two areas of bank erosion rated as severe with one area at cross-section 1, near station 4+00 that included a complete structural failure of a cross-vane. This area covers the 50-foot riffle in this section and represents the one main area of instability. However, the rest are modest instances of prior erosion with 93 and 94% of the total bank footage exhibiting stability for measurement years 6 and 7, respectively.

Most of the structures (85%; 11 of 13) are functional and maintaining grade control. The placement of some of these structures was not in keeping with current practice and understanding, which has limited some of the intended riffle habitat, while adding more discrete functional pool features. There has been variation in bed elevation and localized degradational stress in between some grade control points on the bed at various times in the projects history, but other than a couple of points at the head of riffle features in close proximity to a pool forming structure no appreciable amount of continuous bed footage exhibited degradation. The reach as a whole has maintained grade demonstrating an average difference in elevation at riffles between years 0/1 and 6/7 of 0.02 feet. The water surface and bankfull slopes are nearly identical as measured in 2009 and very close to those measured at the As-built stage. The project has been subject to a long period of observation and while it has gone through some adjustments after construction, it appears that the site continues to exhibit a stabilizing

trend with the continued advancement of the vegetation. The latter will further benefit from the upcoming planting augmentation and invasives control.

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

2.0 METHODOLOGY

The CVS-EEP protocol (http://cvs.bio.unc.edu/methods.htm) was used to collect vegetation data from Price Park this year, the seventh year of monitoring. The vegetation monitoring was originally conducted utilizing transects that ran perpendicular to the stream. These transects 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 through fourth years of monitoring following the EEP 2004 Stem Counting Protocol. The CVS methodology was incorporated during the fifth year of monitoring. Where feasible, the new plots overlapped the approximate areas of the plots established in Monitoring Year 02.

3.0 REFERENCES

Lee, M. 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, A. S. 2006. Flora of the Carolinas, Virginia, Georgia, and Surrounding Areas. (http://www.herbarium.unc.edu/FloraArchives/WeakleyFlora_2006-Jan.pdf)

Appendix A

General Figures and Plan Views

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.

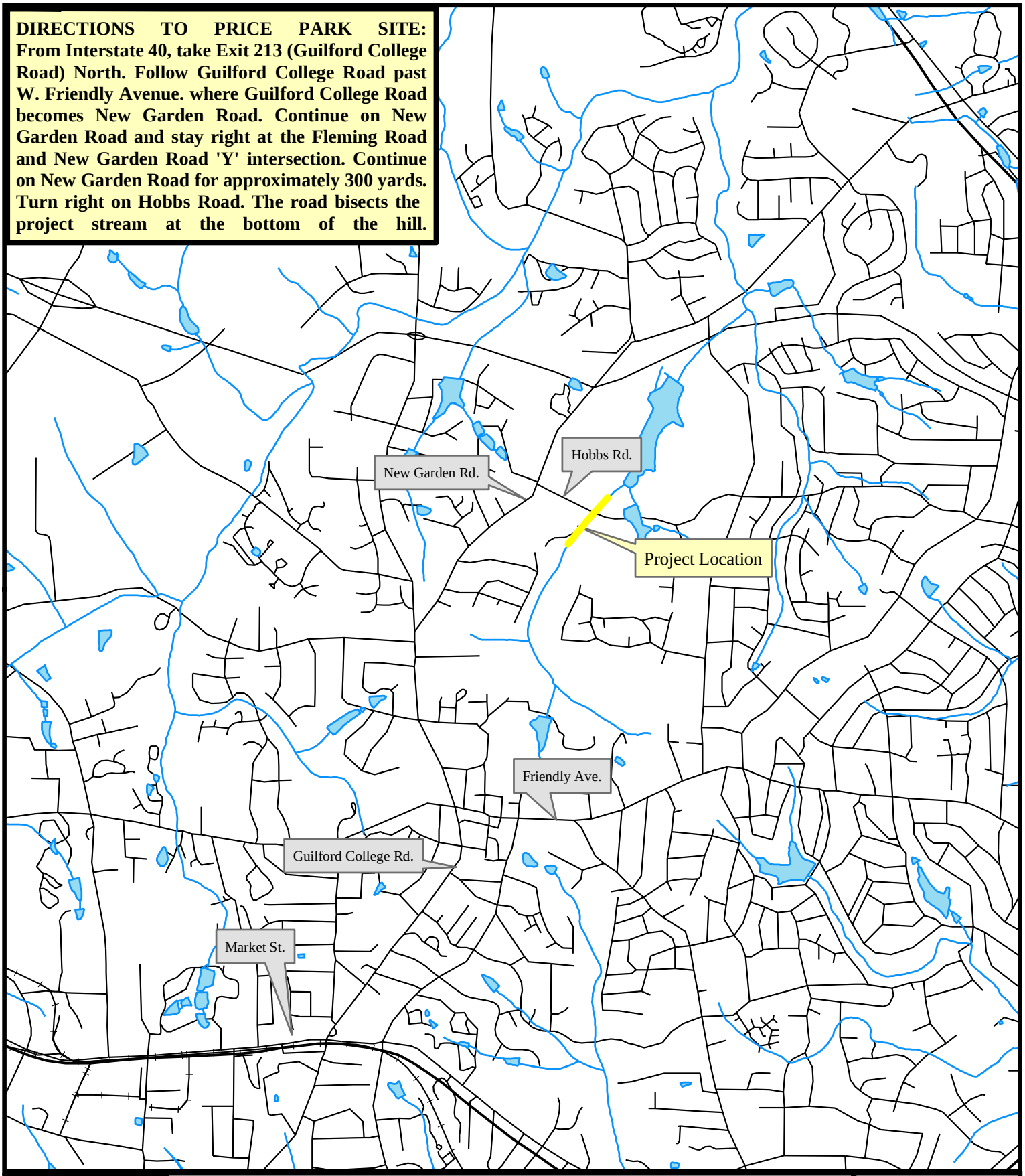
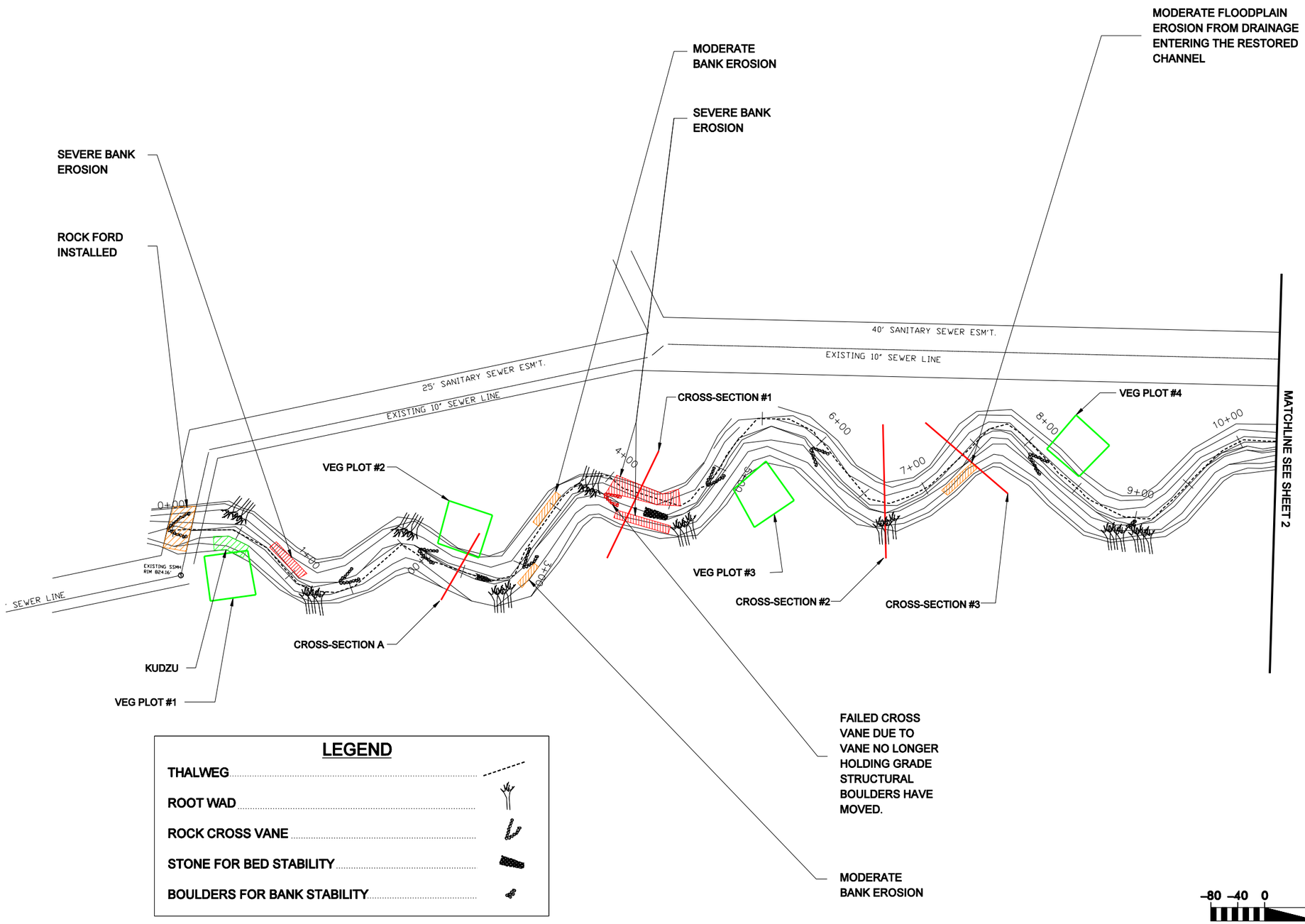


Figure 1. Site Vicinity Map
Price Park, Guilford County, EEP Project # 291

0.25 0.125 0 0.25 0.5
Miles

Ecosystem Enhancement Program

KCI ASSOCIATES OF NC



LEGEND

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

–80 –40 0 40 80

GRAPHIC SCALE

REVISIONS

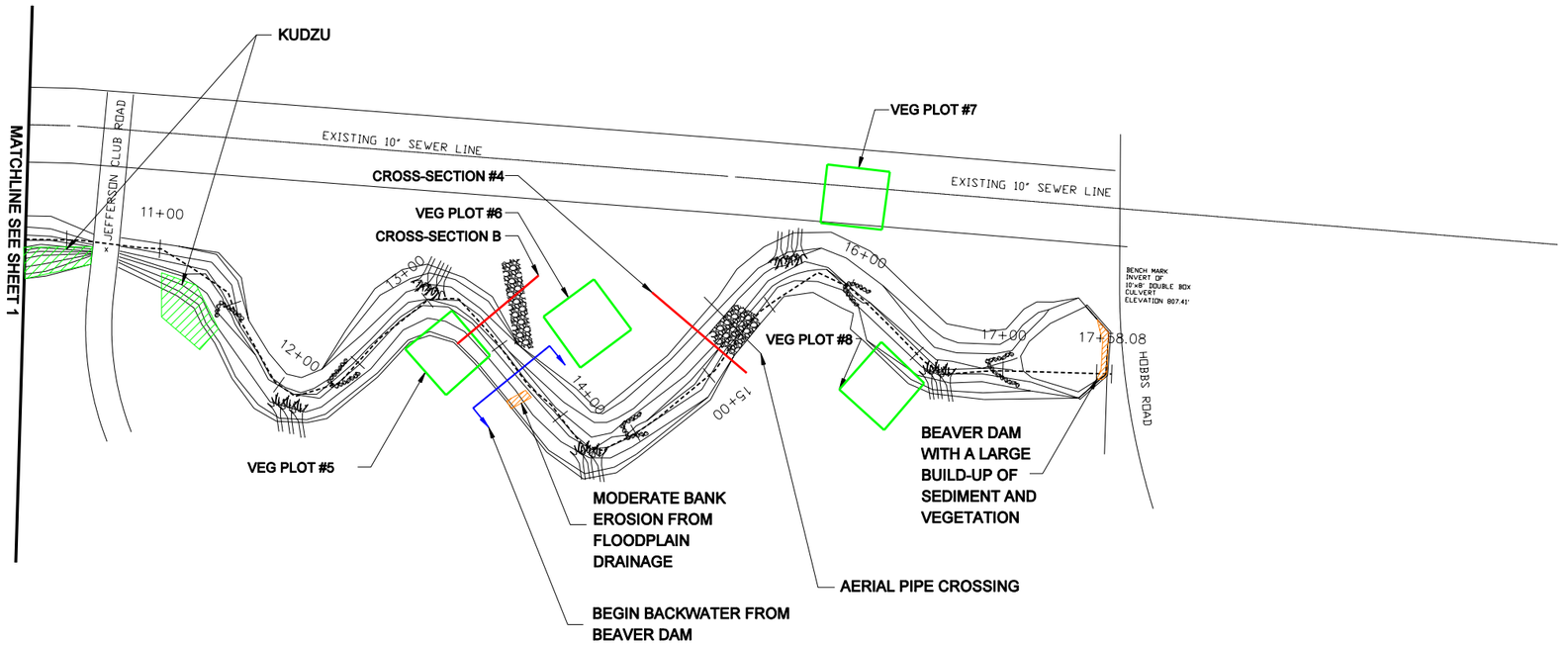
Ecosystem Enhancement Program

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 - MY07
STATION 00+00 TO STATION 10+28

DATE: DECEMBER 2009
SCALE: SEE SHEET

CURRENT CONDITION PLAN VIEW



LEGEND

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

–80 –40 0 40 80

GRAPHIC SCALE

REVISIONS

Ecosystem Enhancement Program

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

PRICE PARK
UT TO HORSEPEN CREEK
GUILFORD COUNTY, NORTH CAROLINA
EEP PROJECT NUMBER 291 - MY07
STATION 10+28 TO STATION 17+58

DATE: DECEMBER 2009
SCALE: SEE SHEET

CURRENT CONDITION PLAN VIEW

Appendix B

General Project Tables

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 - 17+76	

R = Restoration P1 = Priority 1

Table 2. Project Activity and Reporting History Project Number and Name: 291 - Price Park		
Activity or Report	**Data Collection Complete**	**Actual Completion or Delivery**
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
Structural maintenance (Bank Grading)	Jan-04	Jan-04
Supplemental planting of containerized material	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
Year 7 Monitoring	Nov-09	Dec-09

*No monitoring was conducted in 2006

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

Table 3. Project Contacts Table Project Number and Name: 291 - Price Park	
Design Firm	Earth Tech of North Carolina, Inc. 701 Corporate Center Drive, Suite 475 Raleigh, North Carolina 27607 Contact: Ron Johnson Phone: (919) 854-6200
Construction Contractor	SEI Environmental, INC. 5100 North I-85, Suite 7 Charlotte, NC 28206 Phone: 1-800-873-1250
Repair Contractor	North State Environmental Inc. 2889 Lowery Street, Suite B Winston-Salem, NC 27101 Contact: Darrell Westmoreland Phone: (336) 725-2010
Monitoring Performer **As-Built Report and MY-01**	Earth Tech of North Carolina, Inc. 701 Corporate Center Drive, Suite 475 Raleigh, North Carolina 27607
Monitoring Performer **MY-02, 03, 04**	Biological & Agricultural Engineering North Carolina State University Campus Box 7625 Raleigh, NC 27695 Contact: Dan Clinton Phone: (919) 515-6771
Monitoring Performer **MY-05, 06, 07**	KCI Associates of North Carolina 4601 Six Forks Rd. Raleigh, NC 27609 Contact: Mr. Adam Spiller Phone: (919) 278-2514 Fax: (919) 783-9266

Table 4. Project Attribute Table Project Number and Name: 291 - Price Park	
Project County	Guilford County
Drainage Area	1.0 sq. mile
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

Appendix C

Vegetation Assessment Data

Table 5. Vegetation Plot Mitigation Success Summary Table Project Number and Name: 291 - Price Park		
Vegetation Plot ID	**Monitoring Year 07 Planted Stem Density (stems/acre)**	**Vegetation Survival Threshold Met?**
1	526	Yes
2	243	No
3	162	No
4	364	Yes
5	121	No
6	40	No
7	40	No
8	121	No

Table 6. Vegetation Metadata Table
Project Number and Name: 291 - Price Park

Report Prepared By	Brian Roberts
Date Prepared	8/19/2009 13:37
Database Name	KCI-2008-cvs-eep-entrytool-v2.2.7-MTL.mdb
Database Location	C:\Users\broberts\Desktop\KCI_2008-entrytool-v2.2.7

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 7. Stem Count Total and Planted by Plot and Species
Project Number and Name: 291 - Price Park

			Current Plot Data (MY7 2009)																								Annual Means								
			PP-A-0001			PP-A-0002			PP-A-0003			PP-A-0004			PP-A-0005			PP-A-0006			PP-A-0007			PP-A-0008			MY7 (2009)			MY6 (2008)			MY5 (2007)		
Scientific Name	**Common Name**	**Species Type**	**P-LS**	**P-all**	**T**	**P-LS**	**P-all**	**T**	**P-LS**	**P-all**	**T**	**P-LS**	**P-all**	**T**	**P-LS**	**P-all**	**T**	**P-LS**	**P-all**	**T**	**P-LS**	**P-all**	**T**	**P-LS**	**P-all**	**T**	**P-LS**	**P-all**	**T**	**P-LS**	**P-all**	**T**	**P-LS**	**P-all**	**T**
Acer negundo	boxelder	Tree																													1			2
Acer rubrum	red maple	Tree						1																											2
Alnus serrulata	hazel alder	Shrub Tree											2	2														2	2		2	2		2	2
Carpinus caroliniana	American hornbeam	Shrub Tree					1	1					3	3											1	1		5	5		5	6		5	6
Cornus amomum	silky dogwood	Shrub					1	2					3	3			2											4	7		4	4		4	4
Diospyros virginiana	common persimmon	Tree		1	1					1	2						1		1	1					2	2		5	7		5	8		5	9
Fagus grandifolia	American beech	Tree																																	1
Fraxinus	green ash	Tree		7	89		2	10		1	2			1			2											10	104		10	98		10	130
Juglans nigra	black walnut	Tree												4			1												5			3			3
Juniperus	eastern redcedar	Tree			3						8			28			10			12			1						62			24			21
Lindera benzoin	northern spicebush	Shrub Tree																																	1
Liquidambar	sweetgum	Tree			36			54			65						1												156			143			187
Liriodendron tulipifera	tuliptree	Tree			10			3			5																		18			11			16
Morella cerifera	wax myrtle	Shrub Tree																		1									1						2
Pinus echinata	shortleaf pine	Tree																														1			2
Pinus taeda	loblolly pine	Tree			8			16			14			8			1												47			41			40
Pinus virginiana	Virginia pine	Tree																														1			2
Platanus	American sycamore	Tree																		3									3			3			3
Prunus serotina	black cherry	Shrub Tree																																	1
Quercus falcata	southern red oak	Tree		2	2																							2	2		2	2		2	3
Quercus michauxii	swamp chestnut	Tree		2	2		1	1		2	2					3	3											8	8		8	8		8	8
Quercus phellos	willow oak	Tree		1	1		1	1					1	1								1	1					4	4		4	4		4	4
Rhus glabra	smooth sumac	Shrub Tree																																	1
Rosa palustris	swamp rose	Shrub																														1			1
Ulmus americana	American elm	Tree									1																		1						
Unknown		unknown															1												1			5			1
		Stem count	0	13	154	0	6	92	0	4	101	0	9	64	0	3	23	0	1	17	0	1	4	0	3	3	0	40	458	0	40	402	0	40	484
		size (ares)	1			1			1			1			1			1			1			1			8			8			8		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.20			0.20			0.20		
		Species count	0	5	10	0	5	11	0	3	10	0	4	11	0	1	10	0	1	4	0	1	4	0	2	2	0	8	21	0	8	22	0	8	29
		Stems per ACRE	0	526.1	6232	0	242.8	3723	0	161.9	4087	0	364.2	2590	0	121.4	930.8	0	40.47	688	0	40.47	161.9	0	121.4	121.4	0	202.3	2317	0	202.3	2034	0	202.3	2448

P-LS - Planted Live Stakes P-all - Planted Stems Total (with Live Stakes) T - Total (Planted Including Live Stakes and Volunteers)

Vegetation Monitoring Plot Photos

Vegetation Plot 1 – Taken looking southeast toward the center of the plot from the origin. 7/16/09 - MY 07

Vegetation Plot 2 – Taken looking northeast toward the center of the plot from the origin. 7/16/09 - MY 07

Vegetation Plot 3 – Taken looking east toward the center of the plot from the origin. 7/16/09 - MY 07

Vegetation Plot 4 – Taken looking east toward the center of the plot from the origin. 7/16/09 - MY 07

Vegetation Plot 5 – Taken looking south toward the center of the plot from the origin. 7/16/09 - MY 07

Vegetation Plot 6 – Taken looking east toward the center of the plot from the origin. 7/16/09 - MY 07

Vegetation Plot 7 – Taken looking northeast toward the center of the plot from the origin. 7/16/09 - MY 07

Vegetation Plot 8 – Taken looking south toward the center of the plot from the origin. 7/16/09 - MY 07

Appendix D

Stream Assessment Data

Stream Station Photos

M1-US – MY07 – 11/3/09

M1-DS – MY07 – 11/3/09

M2-US – MY07 – 11/3/09

M2-DS – MY07 – 11/3/09

M3-US – MY07 – 11/3/09

M3-DS – MY07 – 11/3/09

M4-US – MY07 – 11/3/09

M4-DS – MY07 – 11/3/09

M5-US – MY07 – 11/3/09

M5-DS – MY07 – 11/3/09

M6-US – MY07 – 11/3/09

M6-DS – MY07 – 11/3/09

M7-US – MY07 – 11/3/09

M7-DS – MY07 – 11/3/09

M8-US – MY07 – 11/3/09

M8-DS – MY07 – 11/3/09

M9-US – MY07 – 11/3/09

M9-DS – MY07 – 11/3/09

M10-US – MY07 – 11/3/09

M10-DS – MY07 – 11/3/09

M11-US – MY07 – 11/3/09

M11-DS – MY07 – 11/3/09

M12-US – MY07 – 11/3/09

M12-DS – MY07 – 11/3/09

M13-US – MY07 – 11/3/09

M13-DS – MY07 – 11/3/09

M14-US – MY07 – 11/3/09

M14-DS – MY07 – 11/3/09

M15-US – MY07 – 11/3/09

M15-DS – MY07 – 11/3/09

M16-US – MY07 – 11/3/09

M16-DS – MY07 – 11/3/09

M17-US – MY07 – 11/3/09

M17-DS – MY07 – 11/3/09

Table B1. Visual Morphological 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?	13	17	N/A	76%	**73%**
	2. Armor stable (e.g. no displacement)?	13	17	N/A	76%	
	3. Facet grade appears stable?	12	17	N/A	71%	
	4. Minimal evidence of embedding/fining?	13	17	N/A	76%	
	5. Length appropriate?	11	17	N/A	65%	
B. Pools	1. Present? (e.g. no severe aggradation)	27	18	N/A	150%	**148%**
	2. Sufficiently deep (Dmax pool:Mean Bkf > 1.6?)	27	18	N/A	150%	
	3. Length appropriate?	26	18	N/A	144%	
C. Thalweg	1. Upstream of meander bend centering?	12	17	N/A	71%	**77%**
	2. Downstream of meander centering?	14	17	N/A	82%	
D. Meanders	1. Outer bend in state of limited/controlled erosion?	15	17	N/A	88%	**69%**
	2. Of those eroding, # w/ concomitant point bar formation?	0	2	N/A	0%	
	3. Apparent Rc within spec?	17	17	N/A	100%	
	4. Sufficient floodplain access and relief?	15	17	N/A	88%	
E. Bed General	1.General channel bed aggradation areas (bar formation)	N/A	N/A	0/0	100%	**100%**
	2. Channel bed degradation - areas of increasing down cutting or head cutting?	N/A	N/A	0/0	100%	
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	8/220	94%	**94%**
G. Vanes	1. Free of back or arm scour?	11	13	N/A	85%	**64%**
	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%	**77%**
	2. Footing stable?	10	13	N/A	77%	

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

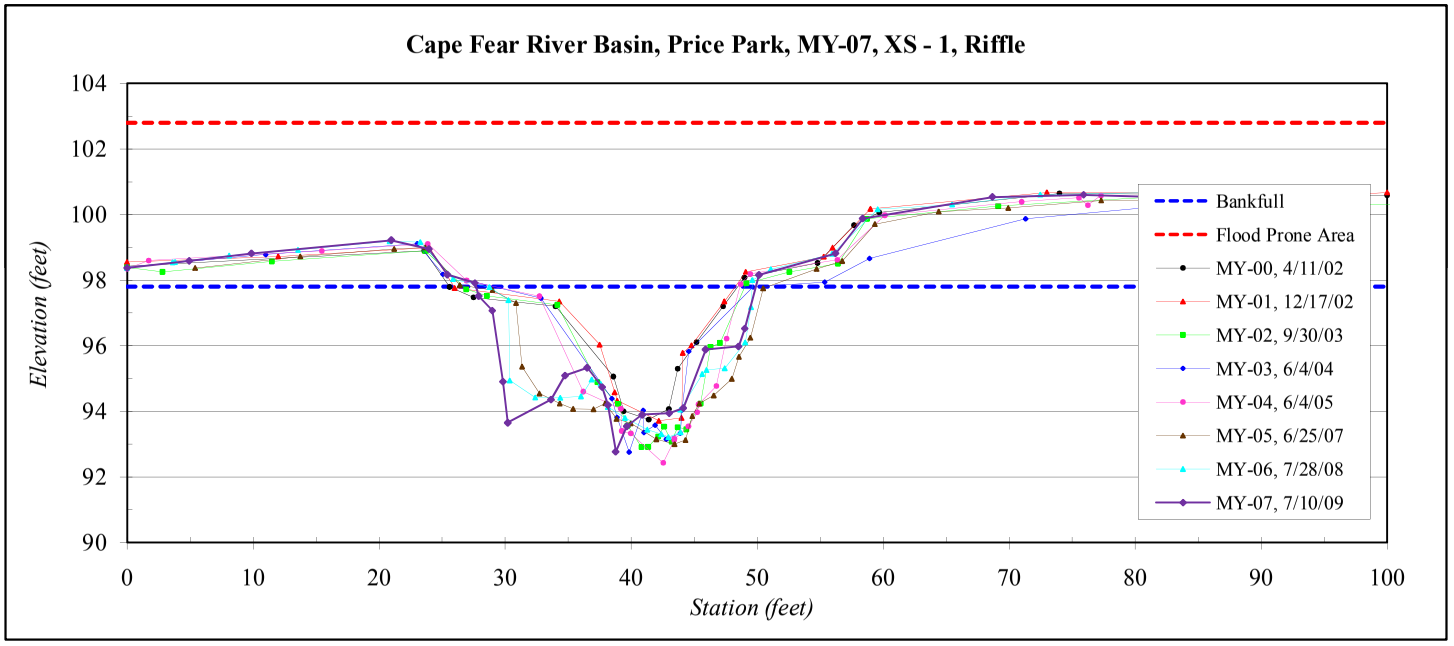
Table 9. Verification of Bankfull Events Project Number and Name: 291 - Price Park			
Date of Data Collection	**Date of Occurrence**	**Method**	**Photo Number**
7/25/2008	6/30/2008	Crest Gauge	N/A
N/A	8/27/2008	Tropical Storm Fay	N/A
11/9/2009	6/5/2009	Evaluation of Rainfall Data	N/A

Cross-Section Plots

River Basin:	Cape Fear
Watershed:	Price Park, MY-07
XS ID	XS - 1, Riffle
Drainage Area (sq mi):	1.0
Date:	7/10/2009
Field Crew:	B. Roberts, C. Carter

Station	Elevation
0.0	98.37
4.9	98.59
9.9	98.82
21.0	99.22
24.0	98.95
25.4	98.17
27.6	97.91
27.9	97.52
29.0	97.07
29.8	94.90
30.2	93.65
33.6	94.36
34.8	95.09
36.5	95.33
37.7	94.74
38.2	94.19
38.8	92.77
39.7	93.54
40.9	93.90
43.0	93.94
44.1	94.10
45.9	95.89
48.5	95.98
49.0	96.53
50.1	98.16
56.2	98.82
58.4	99.88
68.7	100.54
75.9	100.60
88.5	100.46

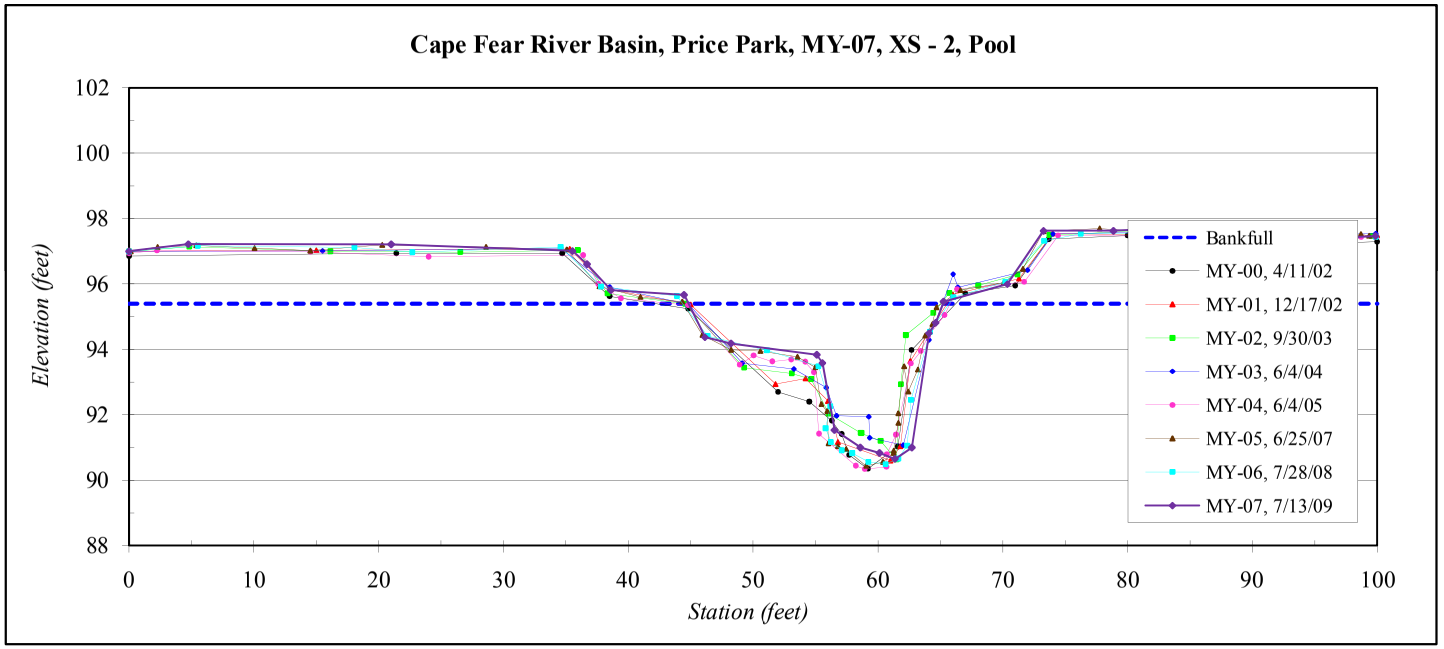
SUMMARY DATA	
Bankfull Elevation:	97.8
Bankfull Cross-Sectional Area:	65.4
Bankfull Width:	22.2
Flood Prone Area Elevation:	102.8
Flood Prone Width:	>80
Max Depth at Bankfull:	5.0
Mean Depth at Bankfull:	2.9
W / D Ratio:	7.5
Entrenchment Ratio:	>4
Bank Height Ratio:	1.0



River Basin:	Cape Fear
Watershed:	Price Park, MY-07
XS ID	XS - 2, Pool
Drainage Area (sq mi):	1.0
Date:	7/13/2009
Field Crew:	B. Roberts, C. Carter

Station	Elevation
0.0	97.00
4.8	97.22
21.0	97.21
35.5	97.01
36.7	96.60
38.6	95.81
44.5	95.67
46.1	94.37
48.2	94.18
55.1	93.84
55.6	93.58
56.5	91.53
58.6	90.99
60.1	90.83
61.4	90.65
62.7	90.99
64.1	94.49
64.6	94.81
65.3	95.46
70.4	96.00
73.3	97.63
78.9	97.63
89.6	97.80
98.3	97.43
99.9	97.47

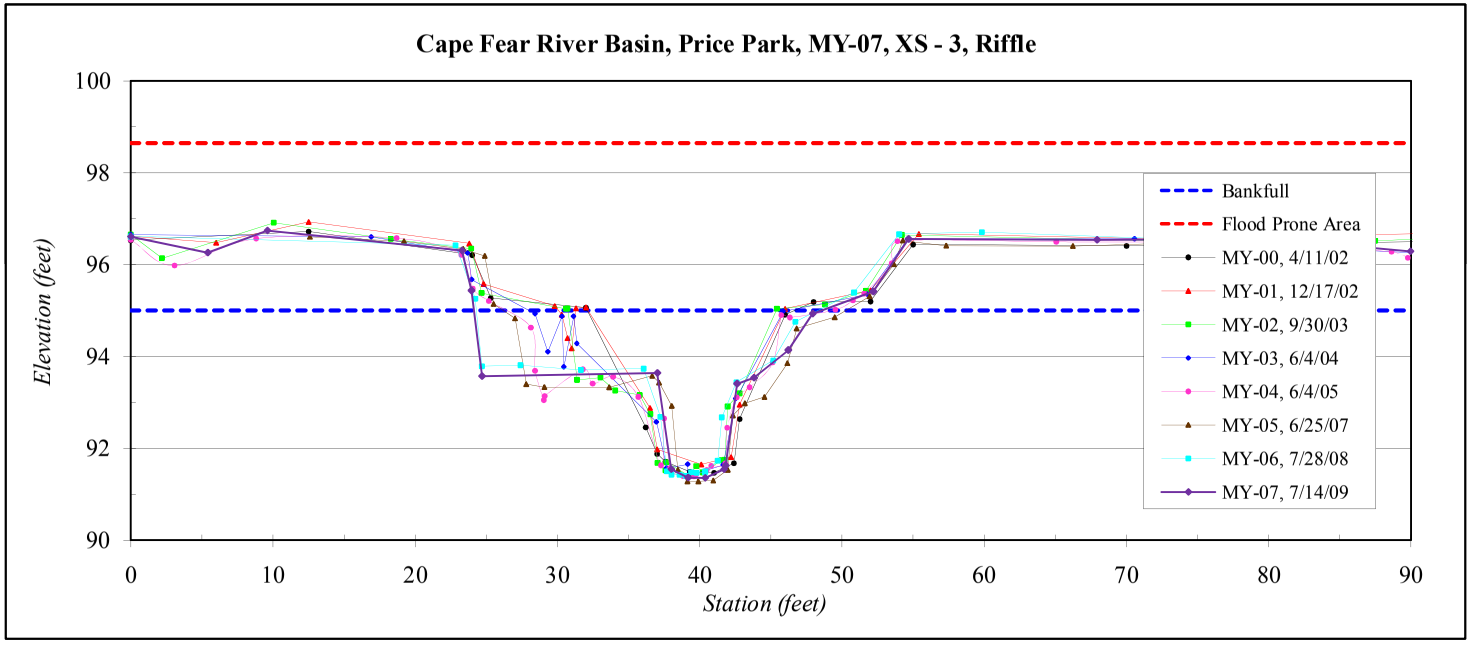
SUMMARY DATA	
Bankfull Elevation:	95.4
Bankfull Cross-Sectional Area:	47.8
Bankfull Width:	20.4
Flood Prone Area Elevation:	-
Flood Prone Width:	-
Max Depth at Bankfull:	4.8
Mean Depth at Bankfull:	2.3
W / D Ratio:	-
Entrenchment Ratio:	-
Bank Height Ratio:	-



River Basin:	Cape Fear
Watershed:	Price Park, MY-07
XS ID	XS - 3, Riffle
Drainage Area (sq mi):	1.0
Date:	7/14/2009
Field Crew:	B. Roberts, C. Carter

Station	Elevation
0.0	96.61
5.4	96.26
9.6	96.74
23.3	96.31
23.9	95.44
24.7	93.57
37.0	93.64
38.0	91.54
39.2	91.36
40.4	91.36
41.7	91.54
41.8	91.62
42.6	93.41
43.8	93.54
46.2	94.14
47.9	94.93
52.2	95.42
54.7	96.56
67.9	96.54
80.4	96.56
90.0	96.29

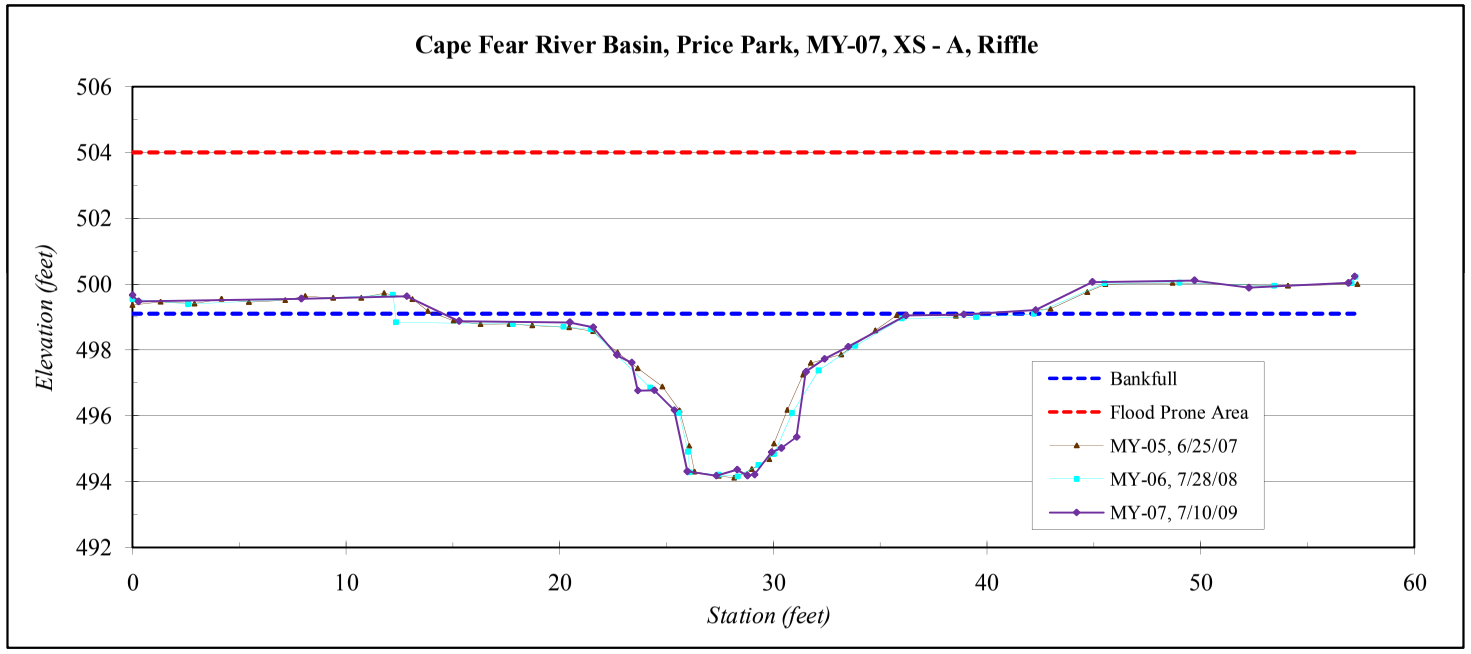
SUMMARY DATA	
Bankfull Elevation:	95.0
Bankfull Cross-Sectional Area:	41.0
Bankfull Width:	24.4
Flood Prone Area Elevation:	98.6
Flood Prone Width:	>90
Max Depth at Bankfull:	3.6
Mean Depth at Bankfull:	1.7
W / D Ratio:	14.5
Entrenchment Ratio:	>4
Bank Height Ratio:	1.0



River Basin:	Cape Fear
Watershed:	Price Park, MY-07
XS ID	XS - A, Riffle
Drainage Area (sq mi):	1.0
Date:	7/10/2009
Field Crew:	B. Roberts, C. Carter

Station	Elevation
0.0	499.67
0.3	499.48
7.9	499.56
12.8	499.63
15.3	498.88
20.5	498.84
21.6	498.69
22.7	497.85
23.4	497.62
23.7	496.77
24.4	496.78
25.4	496.17
26.0	494.32
27.3	494.18
28.3	494.37
28.8	494.19
29.1	494.22
29.9	494.90
30.4	495.02
31.1	495.36
31.5	497.34
32.4	497.73
33.5	498.10
36.2	499.05
38.9	499.08
42.3	499.21
44.9	500.07
49.7	500.12
52.3	499.89
56.9	500.04
57.2	500.24

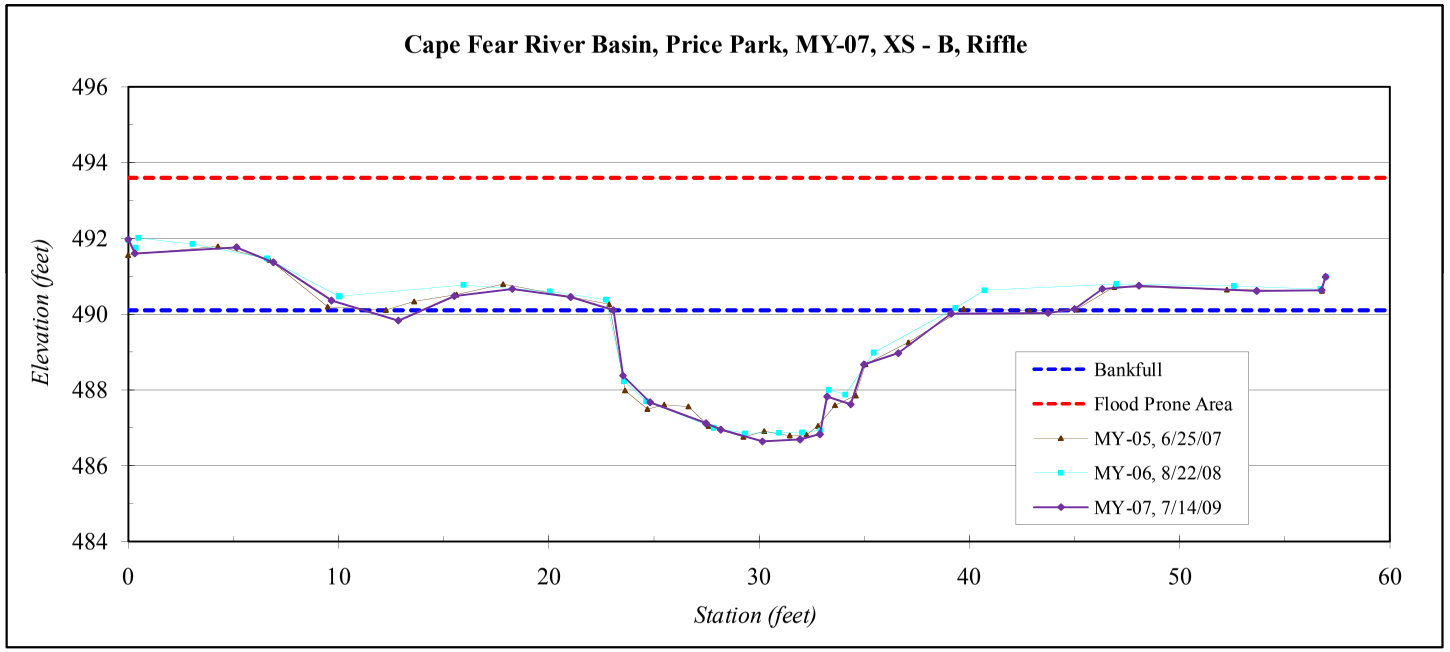
SUMMARY DATA	
Bankfull Elevation:	499.1
Bankfull Cross-Sectional Area:	39.6
Bankfull Width:	24.8
Flood Prone Area Elevation:	504.0
Flood Prone Width:	>60
Max Depth at Bankfull:	4.9
Mean Depth at Bankfull:	1.6
W / D Ratio:	15.5
Entrenchment Ratio:	>2
Bank Height Ratio:	1.0



River Basin:	Cape Fear
Watershed:	Price Park, MY-07
XS ID	XS - B, Riffle
Drainage Area (sq mi):	1.0
Date:	7/14/2009
Field Crew:	B. Roberts, C.Carter

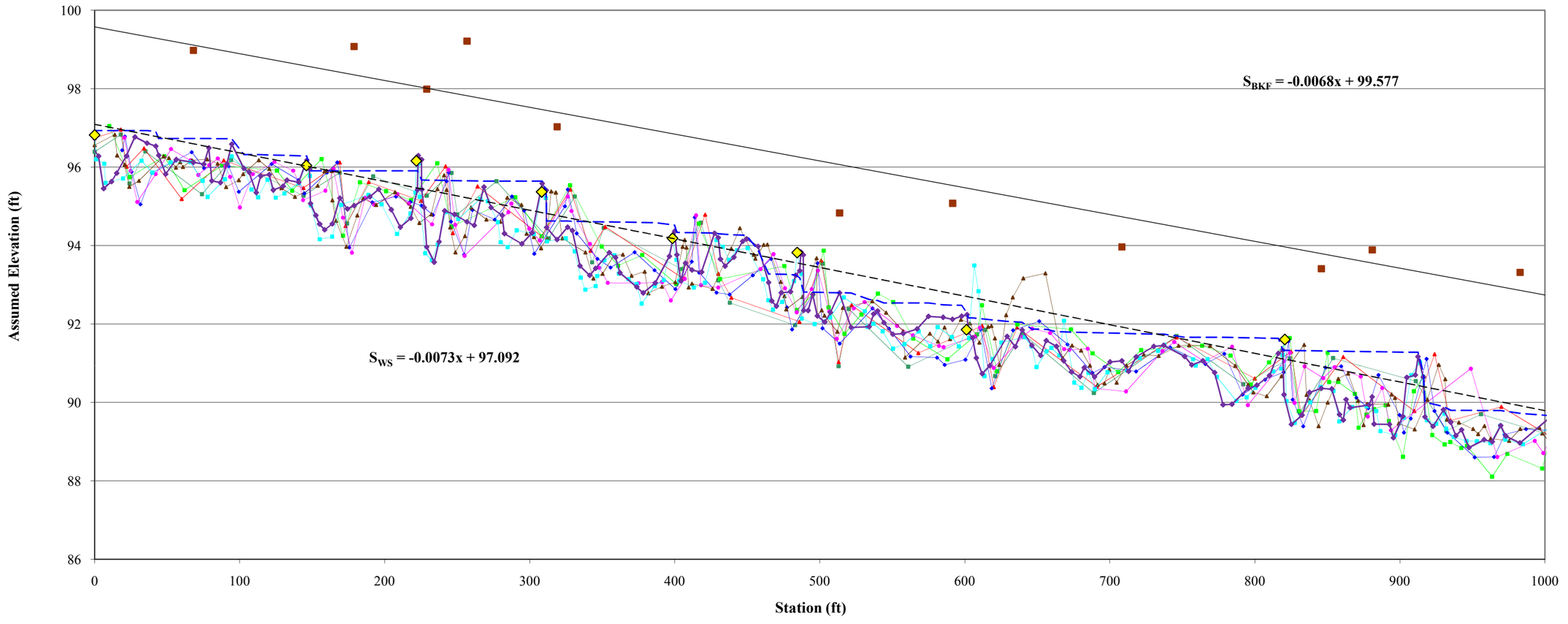
Station	Elevation
0.0	491.97
0.3	491.60
5.2	491.77
6.9	491.37
9.7	490.36
12.8	489.83
15.5	490.48
18.3	490.67
21.0	490.45
23.1	490.10
23.5	488.38
24.8	487.68
27.5	487.12
28.2	486.95
30.2	486.64
31.9	486.70
32.9	486.83
33.2	487.83
34.4	487.62
35.0	488.67
36.6	488.97
39.1	490.01
43.7	490.03
45.0	490.14
46.3	490.67
48.1	490.75
53.7	490.61
56.8	490.63
56.9	490.98

SUMMARY DATA	
Bankfull Elevation:	490.1
Bankfull Cross-Sectional Area:	36.7
Bankfull Width:	16.1
Flood Prone Area Elevation:	493.6
Flood Prone Width:	>60
Max Depth at Bankfull:	3.5
Mean Depth at Bankfull:	2.3
W / D Ratio:	7.1
Entrenchment Ratio:	>3
Bank Height Ratio:	1.0

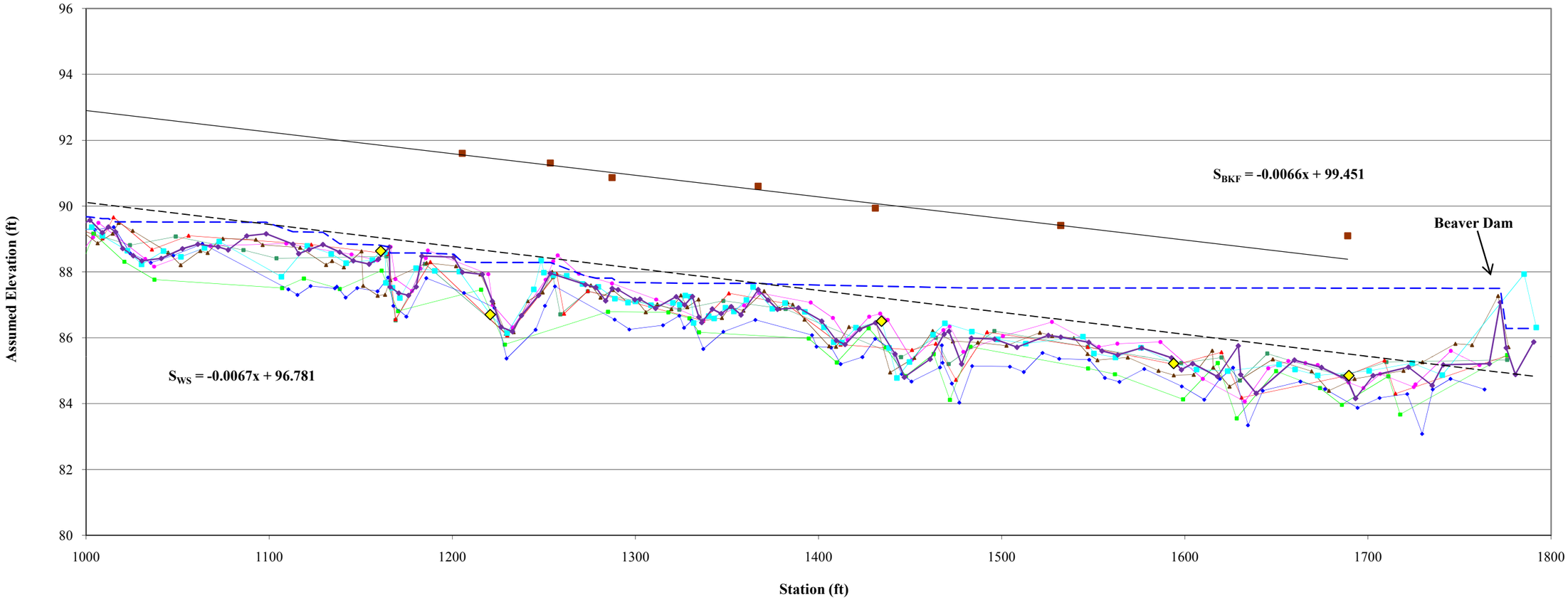


Longitudinal Plots

Longitudinal Profile
Price Park
EEP Project Number 291- MY07
Stations 00+00 to 10+00



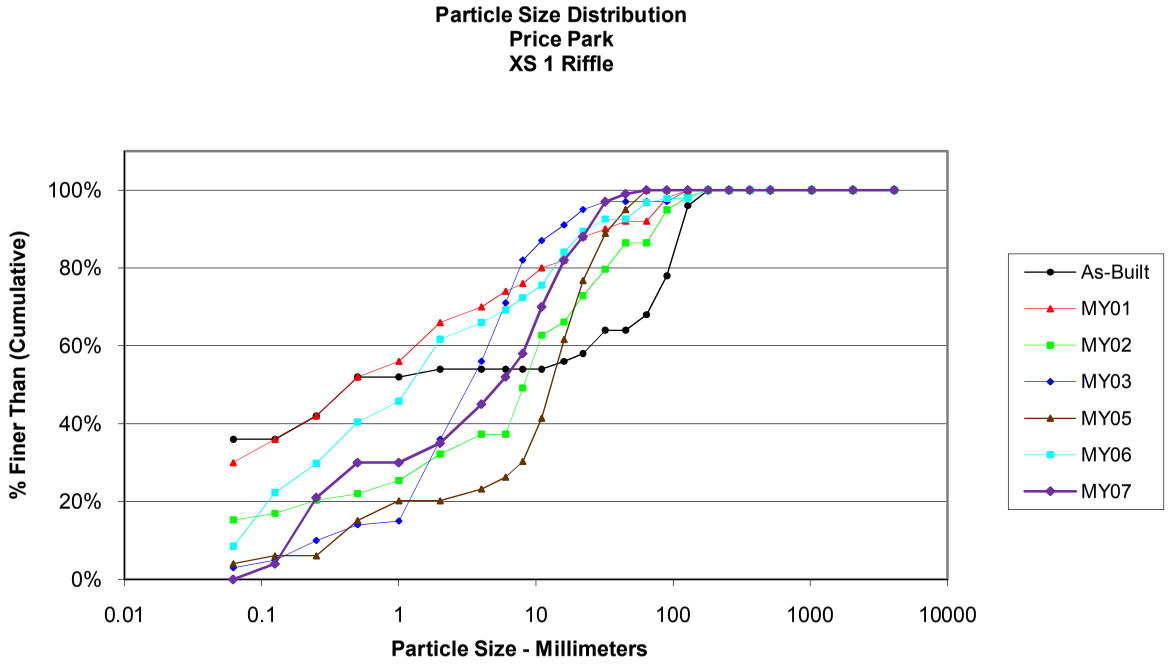
Longitudinal Profile
Price Park
EEP Project Number 291- MY07
Stations 10+00 to 18+00



Pebble Count Plots

Cross-Section 1 Riffle - MY07			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	
Very Fine	.062 - .125	S	4
Fine	.125 - .25	A	17
Medium	.25 - .50	N	9
Coarse	.50 - 1	D	
Very Coarse	1 - 2	S	5
Very Fine	2 - 4		10
Fine	4 - 5.7	G	7
Fine	5.7 - 8	R	6
Medium	8 - 11.3	A	12
Medium	11.3 - 16	V	12
Coarse	16 - 22.6	E	6
Coarse	22.6 - 32	L	9
Very Coarse	32 - 45	S	2
Very Coarse	45 - 64		1
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	
		Total	100

Note:

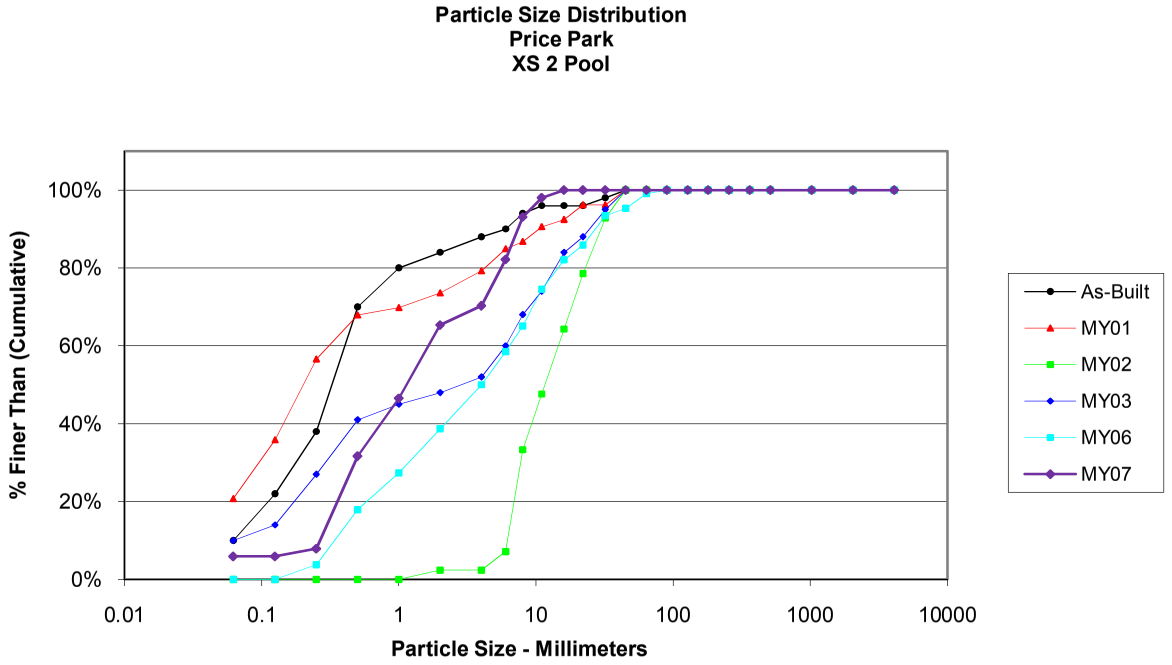


Size (mm)	
D16	0.2
D35	2
D50	5.3
D65	9.6
D84	18
D95	29

Size Distribution	
mean	1.9
dispersion	14.9
skewness	-0.32

Type	
silt/clay	0%
sand	35%
gravel	65%
cobble	0%
boulder	0%
bedrock	0%
hardpan	0%
wood/det	0%
artificial	0%

Cross-Section 2 Pool - MY07			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	6
Very Fine	.062 - .125	S	
Fine	.125 - .25	A	2
Medium	.25 - .50	N	24
Coarse	.50 - 1	D	15
Very Coarse	1 - 2	S	19
Very Fine	2 - 4		5
Fine	4 - 5.7	G	12
Fine	5.7 - 8	R	11
Medium	8 - 11.3	A	5
Medium	11.3 - 16	V	2
Coarse	16 - 22.6	E	
Coarse	22.6 - 32	L	
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	
		Total	101



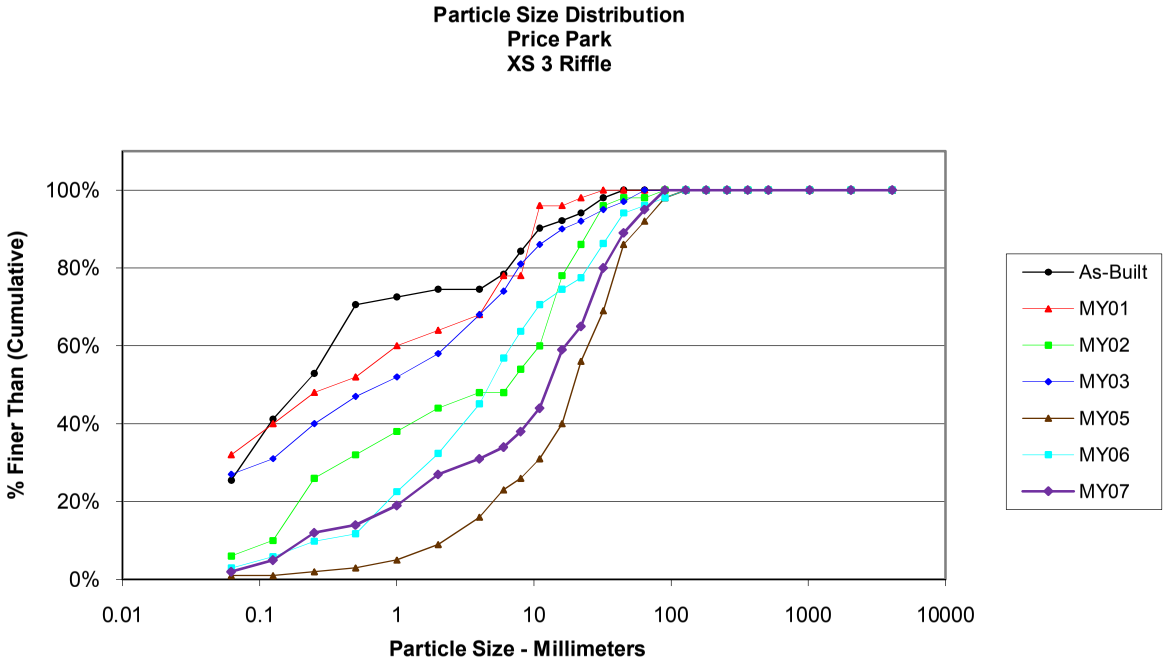
Size (mm)	
D16	0.32
D35	0.58
D50	1.1
D65	2
D84	6.3
D95	9.1

Size Distribution	
mean	1.4
dispersion	4.6
skewness	0.10

Type	
silt/clay	6%
sand	59%
gravel	35%
cobble	0%
boulder	0%
bedrock	0%
hardpan	0%
wood/det	0%
artificial	0%

Cross-Section 3 Riffle - MY07			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	2
Very Fine	.062 - .125	S	3
Fine	.125 - .25	A	7
Medium	.25 - .50	N	2
Coarse	.50 - 1	D	5
Very Coarse	1 - 2	S	8
Very Fine	2 - 4		4
Fine	4 - 5.7	G	3
Fine	5.7 - 8	R	4
Medium	8 - 11.3	A	6
Medium	11.3 - 16	V	15
Coarse	16 - 22.6	E	6
Coarse	22.6 - 32	L	15
Very Coarse	32 - 45	S	9
Very Coarse	45 - 64		6
Small	64 - 90	C	5
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	
		Total	100

Note:



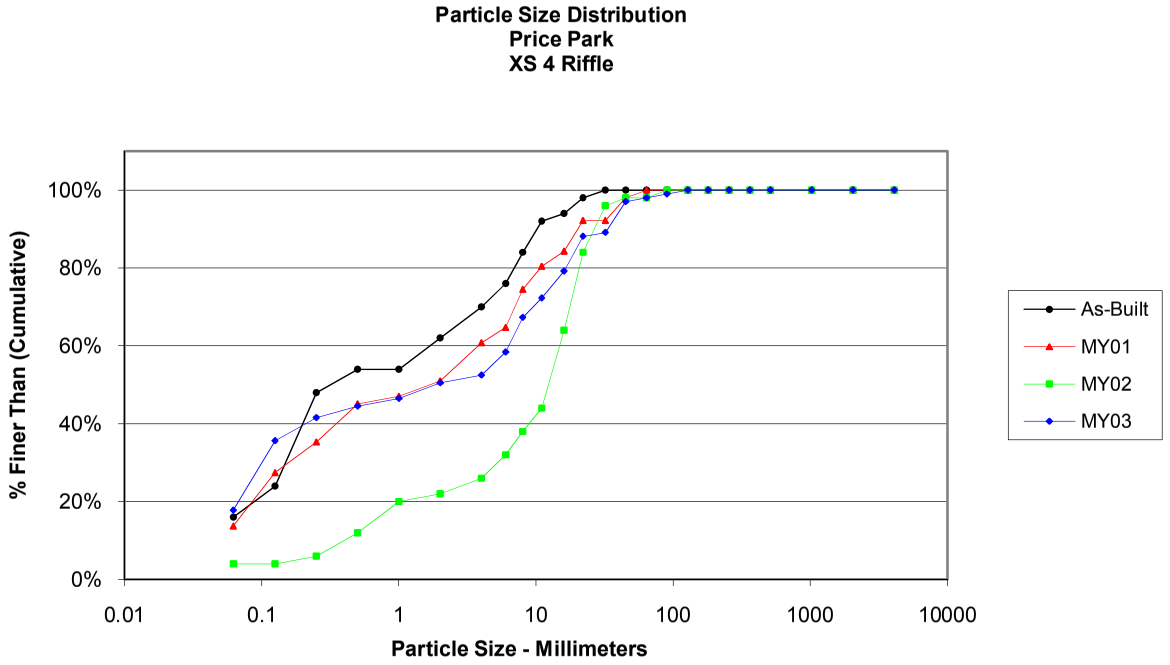
Size (mm)	
D16	0.66
D35	6.4
D50	13
D65	22
D84	37
D95	64

Size Distribution	
mean	4.9
dispersion	11.3
skewness	-0.32

Type	
silt/clay	2%
sand	25%
gravel	68%
cobble	5%
boulder	0%
bedrock	0%
hardpan	0%
wood/det	0%
artificial	0%

Cross-Section 4 Riffle - MY07			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	
Very Fine	.062 - .125	S	
Fine	.125 - .25	A	
Medium	.25 - .50	N	
Coarse	.50 - 1	D	
Very Coarse	1 - 2	S	
Very Fine	2 - 4		
Fine	4 - 5.7	G	
Fine	5.7 - 8	R	
Medium	8 - 11.3	A	
Medium	11.3 - 16	V	
Coarse	16 - 22.6	E	
Coarse	22.6 - 32	L	
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	
		Total	0

Note: Due to missing monumentation, no data were collected for MY05-MY07.



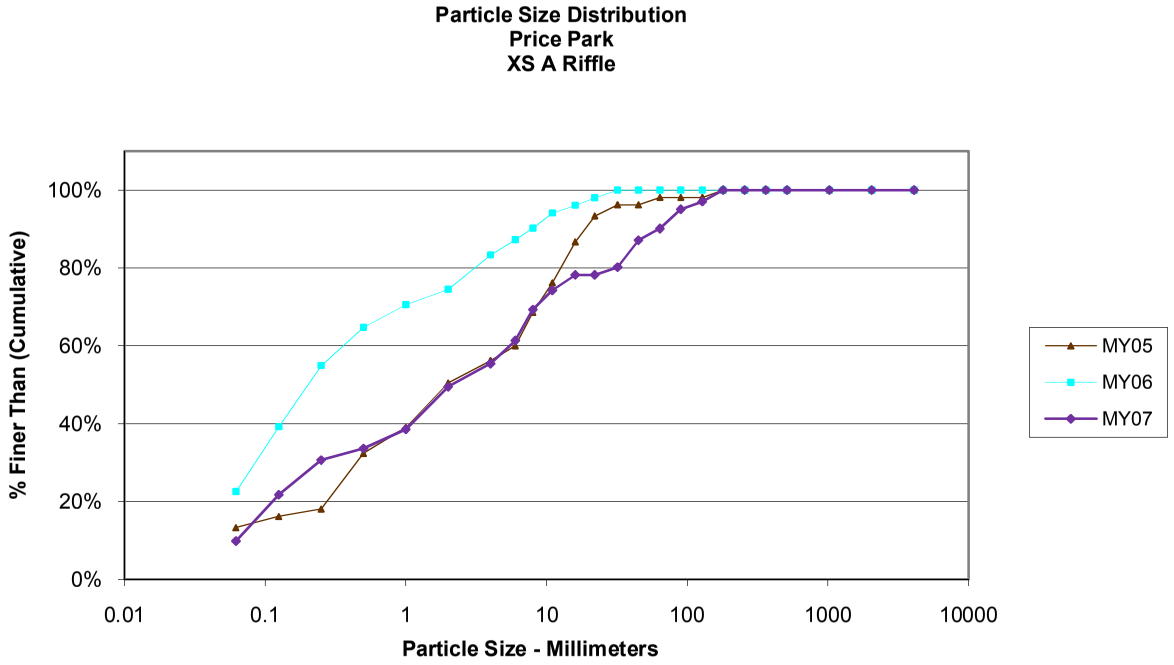
Size (mm)
D16
D35
D50
D65
D84
D95

Size Distribution
mean
dispersion
skewness

Type
silt/clay
sand
gravel
cobble
boulder
bedrock
hardpan
wood/det
artificial

Cross-Section A Riffle - MY07			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	10
Very Fine	.062 - .125	S	12
Fine	.125 - .25	A	9
Medium	.25 - .50	N	3
Coarse	.50 - 1	D	5
Very Coarse	1 - 2	S	11
Very Fine	2 - 4		6
Fine	4 - 5.7	G	6
Fine	5.7 - 8	R	8
Medium	8 - 11.3	A	5
Medium	11.3 - 16	V	4
Coarse	16 - 22.6	E	
Coarse	22.6 - 32	L	2
Very Coarse	32 - 45	S	7
Very Coarse	45 - 64		3
Small	64 - 90	C	5
Small	90 - 128	O	2
Large	128 - 180	B	3
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	
		Total	101

Note: Cross-Section A was established in MY05.



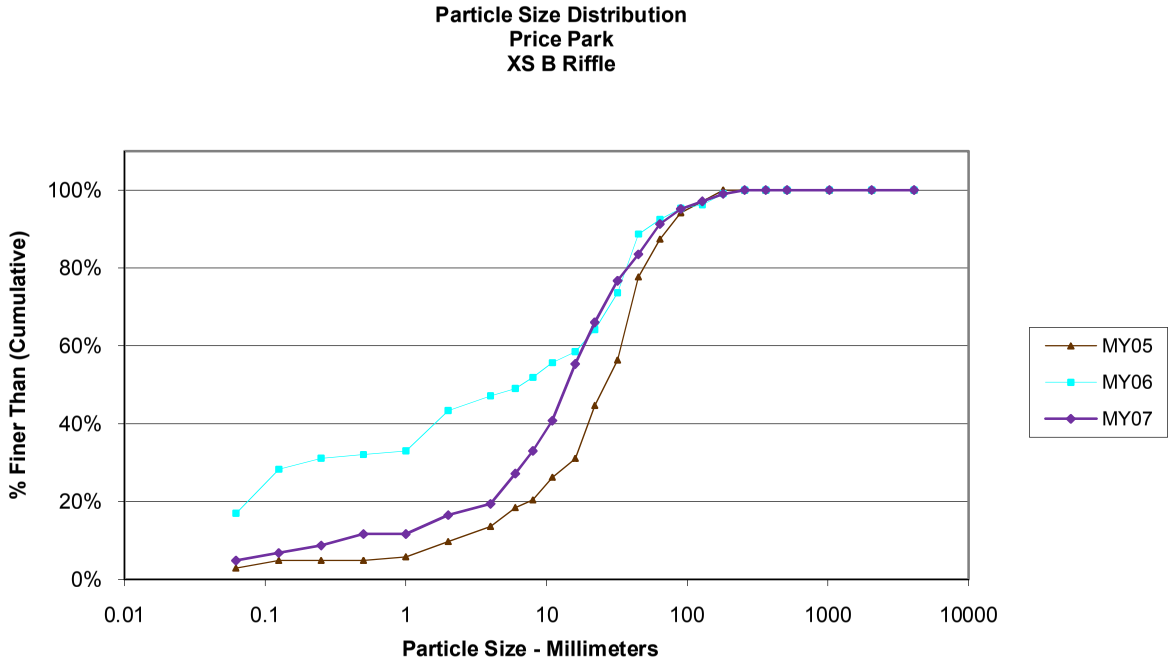
Size (mm)	
D16	0.089
D35	0.6
D50	2.1
D65	6.8
D84	39
D95	90

Size Distribution	
mean	1.9
dispersion	21.1
skewness	-0.03

Type	
silt/clay	10%
sand	40%
gravel	41%
cobble	10%
boulder	0%
bedrock	0%
hardpan	0%
wood/det	0%
artificial	0%

Cross-Section B Riffle - MY07			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	5
Very Fine	.062 - .125	S	2
Fine	.125 - .25	A	2
Medium	.25 - .50	N	3
Coarse	.50 - 1	D	
Very Coarse	1 - 2	S	5
Very Fine	2 - 4		3
Fine	4 - 5.7	G	8
Fine	5.7 - 8	R	6
Medium	8 - 11.3	A	8
Medium	11.3 - 16	V	15
Coarse	16 - 22.6	E	11
Coarse	22.6 - 32	L	11
Very Coarse	32 - 45	S	7
Very Coarse	45 - 64		8
Small	64 - 90	C	4
Small	90 - 128	O	2
Large	128 - 180	B	2
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	
		Total	103

Note: Cross-Section B was established in MY05.



Size (mm)	
D16	1.9
D35	8.7
D50	14
D65	21
D84	46
D95	89

Size Distribution	
mean	9.3
dispersion	5.3
skewness	-0.15

Type	
silt/clay	5%
sand	12%
gravel	75%
cobble	9%
boulder	0%
bedrock	0%
hardpan	0%
wood/det	0%
artificial	0%