MITIGATION PLAN AND AS-BUILT BASELINE REPORT

Holly Grove Stream Restoration Site

Guilford County, North Carolina
Cataloging Unit: 03030002
EEP Contract #: D06028-B
December 16, 2008

Submitted to:
North Carolina Department of Environment and Natural Resources
North Carolina Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

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EXECUTIVE SUMMARY

Restoration Systems is submitting this Mitigation Plan to the North Carolina Ecosystem Enhancement Program (EEP) for the Holly Grove Stream Restoration Full Delivery Project after having completed construction on degraded reaches of Buckhorn Creek and several of its tributaries located within Guilford County, North Carolina. The project is located within the Cape Fear River Basin, Cataloging Unit 03030002. The primary objectives of the project were to improve local water quality, contribute to the improvement of the water quality of the overall watershed, and restore aquatic and riparian habitat. Specifically, these goals consisted of restoring, enhancing, and preserving approximately 21,000 linear feet of stream, restoring approximately 42 acres of riparian buffers, and preserving approximately 1.11 acres of wetlands.

General Site Conditions

The Holly Grove project site is in a rural setting in the Southern Outer Piedmont ecoregion and currently used to grow row crops with woody vegetation confined to isolated areas. The surrounding area is rural in nature, with some residential development. The drainage area of Buckhorn Creek ranges from 2.7 mi^2 to 4.3 mi^2 with its tributaries ranging from 0.02 mi^2 to 0.20 mi^2. Prior to restoration, the existing channels were highly degraded due to unrestricted livestock access, channelization activities, and lack of riparian vegetation.

Restoration Approach and Implementation

The restoration design was based on a Priority Level 1 and 2 approach to restore proper channel dimension and allow for appropriate sediment transport. Restoration practices on this project were implemented with the intent of minimizing unnecessary disturbance to adjacent land and to protect mature riparian vegetation where it existed. The constructed stream profile has restored stable bed morphology including appropriate riffle-pool sequencing. Cross-vanes, J-Hook vanes, and in-stream log structures have been integrated in to the channel to provide grade control, maintain stable streambanks while the riparian vegetation establishes, and provide in-stream habitat. Biodegradable fiber matting was used to provide temporary stabilization on the newly graded streambanks. Excavated materials from the constructed channel were used to backfill around in-stream structures and to build riffles with a natural substate and function. Restoration activities have resulted in 13,170 linear feet of restored stream channel, 5,284 linear feet of stream enhancement, and 2,694 linear feet of stream preservation for a total of **15,822 SMU**'s.

Native woody and herbaceous species have been used to establish at minimum a fifty-foot wide riparian buffer on each side of the restored reach. The riparian buffer consists of zones in which different woody species were planted. Live stakes of appropriate native species were used along the lower stream banks. Natural stabilization was achieved via establishment of temporary ground cover and planting of native herbs and grass seeding. Project activities have restored 42 acres of riparian buffer and preserved 1.11 acres of wetlands.

The ecological benefits of this restoration include a decrease in sediment entering the watershed via bank erosion; increased aquatic habitat through the construction of a stable channel and appropriate in-stream features; improved terrestrial habitat through the eradication of invasive woody species in the riparian area and planting of a diverse, native riparian buffer, allowing for

better filtration of nutrients entering the stream via groundwater contributions; and improved management of extreme flow events.

Monitoring

Monitoring will consist of the collection and analysis of stream stability and riparian/stream bank vegetation survivability data to assist in the evaluation of the project in meeting established restoration objectives. Specifically, the success of channel modification, erosion control and re-vegetation parameters will be assessed using measurements of stream dimension, pattern, and profile, site photographs, and vegetation sampling. Also included in the data collection is stage data from on-site stream gages to document the frequency and magnitude of high-flow events. Monitoring will be conducted annually for a minimum of five years or until success criteria are met. The first scheduled monitoring event will be conducted at the end of the first full growing season of 2009.

If remedial action is deemed necessary during the monitoring period, the area and/or source of instability will be assessed and appropriate actions will be recommended. This includes, but is not limited to bank erosion, in-stream structure failure, down-cutting of the stream channel, and excessive disease or mortality of the riparian vegetation. No issues have arisen since completion of construction which require consideration or attention.

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1.0 PROJECT GOALS, BACKGROUND, AND ATTRIBUTES

The purpose of the Holly Grove Stream Restoration Project (Site) is to restore degraded sections of Buckhorn Creek and five of its tributaries located in Guilford County, North Carolina. This Plan presents information regarding the existing (pre-restoration) site and watershed conditions, the restoration approach for the project, the resulting linear footage of restored channel and acreage of restored buffer, the monitoring protocol, remedial action plan and detailed as-built drawings of the post-construction site.

1.1 General Project Description

Buckhorn Creek is located approximately 15 miles northeast of the City of Greensboro in rural Guilford County, North Carolina (Figure 1: Vicinity Map). The site consists of approximately 42 acres of floodplain, approximately 21,000 linear feet of stream designated as Buckhorn Creek and its tributaries, and 1.11 acres of existing wetlands (Figure 2: Project Map). The stream reaches consist of perennial, first and second order streams that have historically been impacted by riparian and bank vegetation removal, channel straightening, unrestricted livestock access, and agricultural land-use practices. Existing land use within the site consists of forested areas and row crops. The site is located within moderately sloping colluvial valleys and elevations range from approximately 615 to 720 feet above sea level. Past land management activities have consisted of timber harvesting with subsequent land clearing for agricultural uses including cattle and row crop farming. The land outside of the conservation easement remains in active agricultural production.

1.1.1 USGS and NCDWQ River Basin Designations

The project reach is located in the Haw River watershed of the Cape Fear River Basin (United States Geological Survey (USGS) 14-digit Hydrologic Unit 03030002020070) within North Carolina Division of Water Quality (NCDWQ) sub-basin 03-06-02. This sub-basin is primarily forested, although agriculture accounts for a significant portion of the sub-basin. Buckhorn Creek drains into Reedy Fork Creek approximately ¾ miles downstream of the Site, which in turn flows to the Haw River eight miles downstream.

1.1.2 NCDWQ Surface Water Classification

Reedy Fork Creek in the vicinity of the Site is assigned a best usage classification of C, NSW by the NCDWQ and as such there are no restrictions on watershed development or types of discharge. These waters are suitable for aquatic life propagation and survival, fishing, wildlife, secondary recreation, and agriculture. Secondary recreation includes wading, boating, and other uses not involving human body contact with water on an organized or frequent basis. The supplemental classification, NSW (Nutrient Sensitive Waters) includes areas with water quality problems associated with excessive plant growth resulting from nutrient enrichment.

The portion of Reedy Fork Creek to which Buckhorn Creek drains and the portion of the Haw River that is approximately two miles east of the Site are listed on the DWQ final

2004 and draft 2006 303(d) lists. Streams which are included in the 303(d) list do not meet water quality standards or have impaired uses.

1.2 Project Goals and Objectives

The goals of the Holly Grove Stream Restoration Project focus on improving local water quality, contributing to improvement of the water quality of the overall watershed, and restoring aquatic and riparian habitat. Restoration and enhancement practices proposed for this project were designed with the intent to minimize unnecessary disturbance to adjacent land and to protect mature riparian vegetation where it exists. Specifically, the project objectives consist of the following:

- Restore natural stable channel morphology and proper sediment transport capacity.
- Reduce non-point sources of sedimentation and nutrient inputs.
- Restore 13,170 linear feet of stream through Priority 1 and 2 restoration methodologies.
- Enhance 5,284 linear feet of stream.
- Preserve 2,694 linear feet of stream.
- Preserve 1.11 acres of wetlands.
- Restore 42 acres of riparian buffers.

Note: The activities described above provide **15,822** stream mitigation units (SMUs).

1.3 Project Structure

The project structure is illustrated in Figure 2 which delineates stream restoration, enhancement, preservation reaches for Buckhorn and each of its tributaries. The project structure is tabulated in the corresponding Table 1 (See Appendix A).

1.4 Restoration Type and Approach

Restoration and enhancement practices implemented on this project were designed to minimize unnecessary disturbance to adjacent land and to protect mature riparian vegetation where it exists. Consideration was given to the potential functional lift provided by restoration activities in comparison to the functional lift that could be realized through the natural process of channel evolution. Included in this consideration was an attempt to determine the disturbance and sedimentation that could occur as a result of this natural process. Where restoration was determined to be warranted, consideration was given to which reaches could best be served by maintaining as much of the existing channel pattern as possible.

The proposed channels of Buckhorn Creek and its tributaries are designed as Type B4c streams with the exception of the lower reach of Middle Branch. This channel configuration provides the most stable and natural form in the moderately sloping colluvial valleys that are found throughout the Site. Not only does it effectively convey bankfull discharge and sediment load but also conforms to the natural conveyance of flood flows. Additionally, since broad alluvial valleys are generally not found within the Site, the lower sinuosity of the Type B4c streams will result in minimizing grading and

earthwork activities. The proposed channel dimensions, patterns, and profiles are based on hydraulic relationships and morphologic dimensionless ratios of the reference reaches.

Restoration activities included restoring stable channel morphology supported by natural in-stream habitat and grade/bank stabilization structures, the elimination of accelerated bank erosion, and reestablishment of native riparian buffers greater than 50 feet in width. Exotic riparian vegetation was removed in areas of the project to allow for replanting of native riparian species. In-stream structures were installed to provide for enhanced aquatic habitat, protection of the newly constructed stream banks, and grade control for the newly constructed channel.

1.5 Project History, Contacts and Attribute Data

The summary of the project history, contacts, and attribute data is tabulated in Tables 2, 3, and 4 in Appendix A.

2.0 SUCCESS CRITERIA

2.1 Morphologic Parameters and Channel Stability

Success criteria context provided by NCEEP Mitigation Plan Document Guidance:

> Restored and enhanced streams should demonstrate morphologic stability to be considered successful. Stability does not equate to an absence of change, but rather to sustainable rates of change or stable patterns of variation. Restored streams often demonstrate some level of initial adjustment in the several months that follow construction and some change/variation subsequent to that is also to be expected. However, the observed change should not be unidirectional such that it represents a robust trend. If some trend is evident, it should be very modest or indicate migration to another stable form.

2.1.1 Dimension

Cross-section measurements should indicate little change from the as-built cross-sections. If changes do occur, they will be evaluated to determine whether the adjustments are associated with settling and increased stability or whether they indicate movement towards an unstable condition. The following thresholds will be considered indicators of concern:

- Width/depth ratio increases more than 10 percent,
- Bank height ratio increases more than 25 percent.

2.1.2 Pattern and Profile

Measurements and calculated values should indicate stability with little deviation from as-built conditions and established morphological ranges for the restored stream type. Annual measurements should indicate stable bed-form features with little change from the as-built survey. The pools should maintain their depth with flatter water surface

slopes, while the riffles should remain shallower and steeper. The following thresholds will be considered indicators of concern:

- Riffle slope increases more than 50 percent,
- Profile scarp formation greater than 20 percent of mean depth,
- Pool maximum depth decreases more than 20 percent,
- Pool/riffle feature shifts along the profile of more than the equivalent of one bankfull width.

2.1.3 Substrate

Calculated D_{50} and D_{84} values should indicate coarser size class distribution of bed materials in riffles and finer size class distribution in pools. Generally, it is anticipated that the bed material will coarsen over time. The following thresholds will be considered indicators of concern:

- D_{50} or D_{84} value decreases more than 30 percent,
- Percent sand increases more than 50 percent.

2.1.4 Sediment Transport

Depositional features should be consistent with a stable stream that is effectively managing its sediment load. Point bar and inner berm features, if present, should develop without excessive encroachment of the channel. Lateral and mid-channel bar features should typically not be present and if so only in isolated instances.

2.2 Vegetation

Riparian vegetation monitoring shall be conducted for a minimum of five years to ensure that success criteria are met per USACE guidelines. If monitoring indicates either that the specified survival rate is not being met or the development of detrimental conditions (i.e., invasive species, diseased vegetation), appropriate corrective actions will be developed

2.3 Hydrology

Monitored data and calculated return intervals should indicate the occurrence of a bankfull event during a minimum of two of the five monitored years. It should be noted that Tropical Storm Fay (August 2008) produced a high flow event in which floodwaters crested approximately two feet above bankfull. The project also experienced a bankfull event at the beginning of October 2008.

3.0 MONITORING PLAN

Monitoring protocol will follow that outlined within the EEP Site Specific Mitigation Plan and detailed in the U.S. Army Corps of Engineers (USACE) Stream Mitigation Guidelines for Monitoring Level I. Vegetation monitoring will follow the CVS-EEP Protocol for Recording Vegetation (Lee et al. 2006). Monitoring shall consist of the collection and analysis of stream stability and riparian/stream bank vegetation survivability data to support the evaluation of the project in meeting established

restoration objectives. Specifically, project monitoring will include measurements of stream dimension, profile, pattern, bed materials, photo documentation, vegetation survivability sampling, and stream bankfull return interval.

3.1 Duration

Monitoring shall be conducted annually for a minimum of five years or until success criteria are met, as required in the guidelines and called for in the contract agreements. The first scheduled monitoring event will be conducted in 2009 at the end of the first full growing season following project construction and planting.

3.2 Reporting

A monitoring report will be prepared after all monitoring tasks for each annual monitoring event are completed. Each report will provide the new monitoring data and compare the new data against previous findings. Data tables, cross-sections, profiles, photographs, and other graphics will be included in the report as necessary. Each report will include a discussion of any significant deviations from the as-built survey and previous annual measurements, as well as evaluations as to whether the changes indicate a stable or unstable condition. Each annual monitoring report will be submitted by December 31st of the year during which the monitoring event was conducted. The monitoring reports will be structured and formatted for insertion into this Mitigation Plan, with identification of the monitoring report number/year displayed in the page footer.

3.3 Hydrology

Monitored stream flow data will be used to evaluate the success of restoring the intended bankfull return period. Stream gauges have been installed for monitoring flow stage within the restored reaches. Three crest gauges have been set; one on Buckhorn Creek within the monitored profile reach downstream of the Tickle Rd. bridge, one on Middle Branch within the downstream monitored profile reach, and one on Southwest Creek within the enhancement reach. Each site visit by the monitoring performer will include inspection and documentation of the highest stage for the monitoring interval. Following each inspection the crest gages will be reset and any required maintenance will be performed.

3.4 Stream Channel Stability and Geomorphology

The purpose of monitoring is to evaluate the stability of the restored stream. Following the procedures established in the USDA Forest Service Manual (Harrelson et al 1994) and the methodologies utilized in the Rosgen stream assessment and classification system (Rosgen 1994, 1996), data collected will consist of detailed dimension and pattern measurements, a longitudinal profile(s), and bed materials sampling.

3.4.1 Dimension

Permanent cross-sections (one per 20 bankfull-width lengths, evenly divided based upon riffle and pool percentages), have been established and will be used to evaluate stream dimension. One riffle and one pool cross-section has been located within the reaches also surveyed as part of the longitudinal profile. Permanent monuments, recoverable either

through field identification or use of GPS, have been set at the left and right extents of each cross-section. The cross-section surveys shall provide a detailed measurement of the stream and banks, to include points on the adjacent floodplain, at the top of bank, bankfull, at all breaks in slope, the edge of water, and thalweg. Subsequently, width-to-depth ratios, entrenchment ratios, and bank height ratios will be calculated for each cross-section.

3.4.2 Profile

Eight longitudinal profiles, each covering approximately 20 bankfull-width lengths, have been established and surveyed. Three monitored longitudinal profiles are located along a Buckhorn Creek; one at the upstream end, one between the ford crossing and the confluence with Middle Branch, and one just downstream of the Tickle Rd. bridge. There are two monitored profile reaches located on Middle Branch. One is located at the upstream end and another is located approximately 850 feet upstream of the wetlands. East Branch, Southeast Creek, and Southwest Creek all have one monitored profile located within their restored reaches. The beginning and ending points of each measured section has been permanently monumented. Average, pool, and riffle slopes, as well as pool-to-pool spacing will be calculated.

3.4.3 Pattern

Evaluations of stream pattern, based on valley/stream type, will be developed based upon measurements of sinuosity, meander width ratio, and radius of curvature (on newly constructed meanders only for first year monitoring). Calculations will be made of sinuosity, meander width ratio, radius of curvature/bankfull width ratio, and meander length/bankfull width ratio.

3.4.4 Bed Materials

Pebble counts will be conducted at each cross-section, as well as across the overall study reach (based upon percentage of riffles and pools) for the purpose of classification and evaluation of sediment transport. Pebble count data will be plotted by size distribution in order to assess the D50 and D84 size class.

3.5 Vegetation Monitoring

The survivability of the riparian buffer plantings will be evaluated using eleven (11) randomly placed 10 meter by 10 meter vegetative sampling plots. The corners of each monitoring plot have been marked in the field and their position documented by GPS survey. The monitoring will consist of a physical inventory within each plot in order to determine the composition and number of surviving species and the total number of stems per acre. To the extent possible, differentiation between planted and volunteer stems will be accomplished. The presence of non-native, exotic, and undesirable species will be noted. Additionally, sequential photographs will be taken from the center of each monitoring plot, starting at due north, to create a 360-degree view of the sample site.

3.6 Photograph Reference Points

Photograph reference points (PRPs) have been established to assist in characterizing the site and to allow qualitative evaluation of the site conditions. The location of each photo point has been permanently marked in the field and the bearing/orientation of the photograph is indicated on the As-built plans to allow for consistent repetition. A total of twenty-eight (28) PRP's have been established along the restored stream. Sixteen (16) of these PRP's have been located upstream of the permanent monitoring cross sections. These photographs will be taken facing downstream looking at the section, and will show as much of the banks and channel as possible. The survey tape used for cross-sectional measurements will be centered in each photograph and the water line will be located near the lower edge. An effort will be made to consistently photograph the same area in each subsequent monitoring event.

4.0 MAINTENANCE AND CONTINGENCY PLANS

Recommendations for suggested increased observation; maintenance and/or repair in problem areas will be made within the Results and Discussion sections of the annual monitoring reports, based on the data that is collected. Both the vegetation and morphology sections will include plan views and tables indicating the location of the problems areas, their severity and possible cause(s).

5.0 AS-BUILTS

The Holly Grove site construction was completed in October 2008 and the As-Built survey was completed on November 20, 2008. The survey located the constructed channel boundaries along with the location of in-stream structures. Additionally, all permanent monitoring markers were located during the survey. As-Built plans have been prepared with this information depicting the pre-construction location of the channel, the design alignment, and the post-construction location. A half-size set of the As-Built plans are in Appendix B of this report.

6.0 REFERENCES

Harrelson, C.C., C.L. Rawlins, and J.P. Potyondy. 1994. Stream Channel Reference Sites: An Illustrated Guide to Field Technique. General Technical Report RM-245. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.

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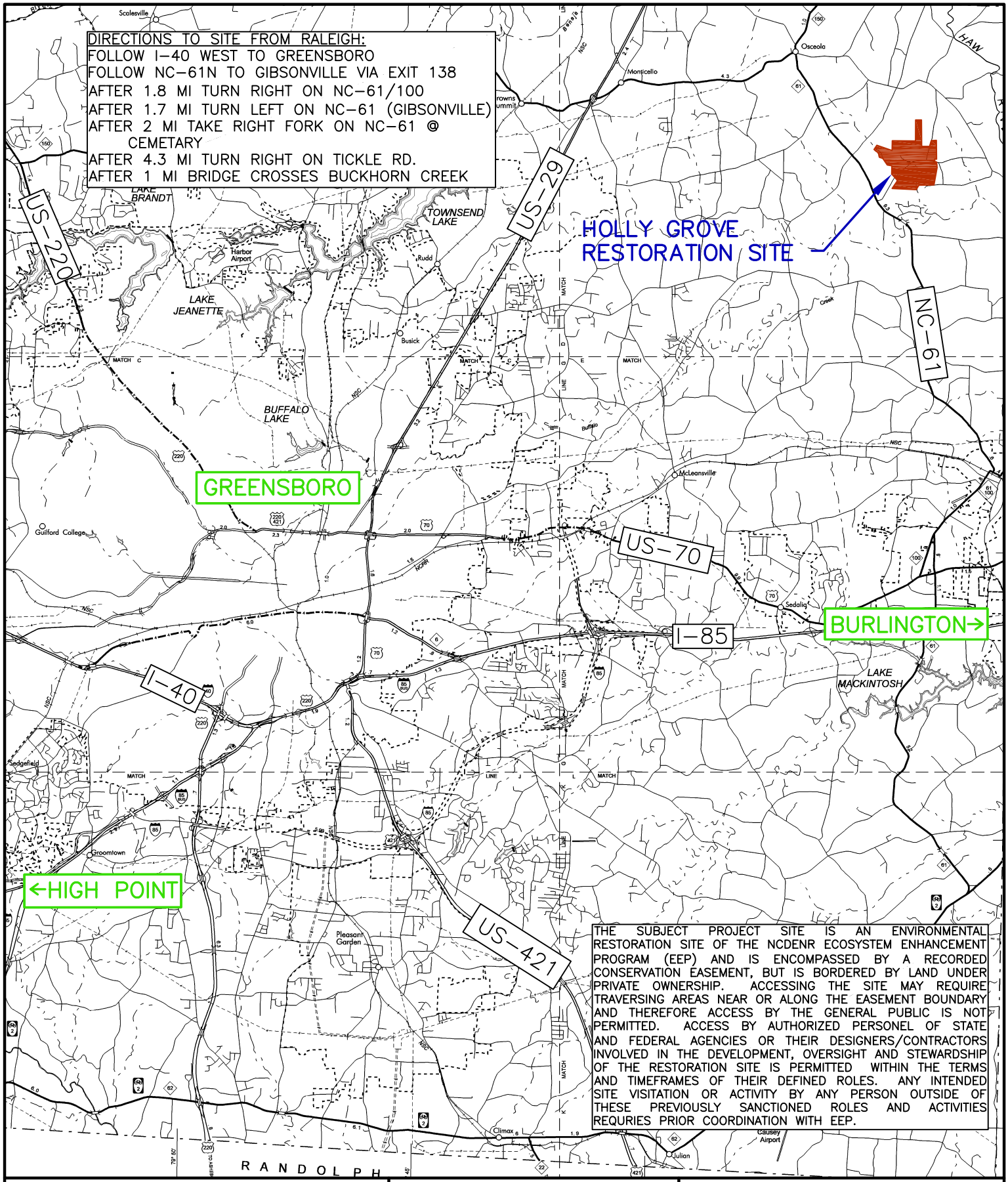
APPENDIX A

FIGURES AND TABLES



PREPARED FOR: Ecosystem Enhancement Program

PREPARED BY: Restoration Systems, LLC

AND BY: Wolf Creek Engineering

SCALE

1/2 0 1 3

MILES

SITE VICINITY MAP

HOLLY GROVE RESTORATION SITE
GUILFORD COUNTY, NORTH CAROLINA
EEP Contract #: D06028-B

FIGURE 1

POND
WEST BRANCH
MIDDLE BRANCH
BUCKHORN CREEK
WETLANDS
LITTLE BRANCH
LAGOON
EAST BRANCH
TICKLE ROAD
GAS PIPELINE
BUCKHORN CREEK
POND
UT TO SW CREEK
SW CREEK
SE CREEK
UT TO SE CREEK

PREPARED FOR:

Ecosystem Enhancement Program

PREPARED BY:

RESTORATION SYSTEMS, LLC

AND BY:

Wolf Creek Engineering

LEGEND

- STREAM RESTORATION
- STREAM PRESERVATION
- STREAM ENHANCEMENT
- WETLANDS
- FORD
- CONSERVATION EASEMENT
- PROPERTY BOUNDARY
- GAS PIPELINE

SCALE

200 0 200 400 600 800

FEET

SITE MAP

HOLLY GROVE RESTORATION SITE
GUILFORD COUNTY, NORTH CAROLINA
EEP Contract #: D06028-B

FIGURE 2

Table 1. Project Components
Holly Grove Stream Restoration Site / EEP Contact #D06028-B

Restoration Reach/Area	Restoration Level	Approach	Pre-Restoration LF or AC	Post-Restoration LF or AC	Station Range/Location	Comments
Buckhorn Creek	R	P2	8,757	8,848	100+00 - 194+50	
West Branch	E2	E2	870	870	300+00 - 308+00	
West Branch	R	P2	390	391	300+00 - 303+91	
Middle Branch	E2	E2	240	240	398+91 - 401+31	
Middle Branch	R	P1	1,549	1,561	401+31 - 417+37	
Middle Branch	E2	E2	472	472	417+37 - 422+09	
Middle Branch	R	P1	90	194	423+00 - 425+40	
East Branch	P	-	960	960	480+00 - 498+80	
East Branch	E2	E2	920	920	480+00 - 498+80	
East Branch	R	P1	300	329	490+00 - 493+29	
East Branch	R	P1	739	761	500+00 - 507+61	
Little Branch	E2	E2	553	553	19+945 - 205+54	
SW Creek	R	P1	723	723	600+00 - 607+34	
SW Creek	E2	E2	2,229	2,229	608+26 - 630+55	
UT to SW Creek	P	-	325	325	650+00 - 653+50	
SE Creek	R	P1	342	363	700+00 - 704+36	
SE Creek	P	-	881	881	706+25 - 715+06	
UT to SE Creek	P	-	528	528	750+00 - 755+28	
Wetland A	E	-	1.11	1.11	Middle Branch	

Component Summation

Restoration Level	Stream (LF)	Riparian Wetland (Ac)		Non-Riparian (Ac	Upland (Ac)	Buffer (Ac)	BMP
		Riverine	Non-Riverine				
Restoration	13,170						
Enhancement		1.11					
Enhancement I							
Enhancement II	5,284						
Creation							
Preservation	2,694						
HQ Preservation							
		1.11					
Totals	**21,148**	**1.11**				**42**	**BMP Count**

= Non-Applicable

Table 2. Project Activity and Reporting History Holly Grove Restoration Project		
Activity or Report	**Data Collection Complete**	**Completion or Delivery**
Restoration Plan	Apr 2007	Jun 2007
Final Design - Construction Plans	N/A	Oct 2007
Construction	N/A	Oct 2008
Temporary S&E mix applied to entire project area	N/A	Sep 2008
Permanent seed mix applied to entire site	N/A	Sep 2008
Bare-root plantings for floodplain and uplands	N/A	Dec 2008
Mitigation Plan / As-Built (Year 0 Monitoring - baseline)	Oct 2008	Dec 2008
Year 1 Monitoring		
Year 2 Monitoring		
Year 3 Monitoring		
Year 4 Monitoring		
Year 5 Monitoring		

Table 3. Project Contact Table Holly Grove Restoration Project		
Designer		
Wolf Creek Engineering, pllc	30 Ben Lippen School Rd., Suite 203 Asheville NC, 28806	
S. Grant Ginn	828-505-2186	
Construction Contractor		
North State Environmental, Inc	2889 Lowery St. Winston-Salem, NC 27101	
Darrell Westmoreland	336-725-2010	
Planting & Seeding Contractor		
North State Environmental, Inc	2889 Lowery St. Winston-Salem, NC 27101	
Stephen Joyce	336-725-2010	
Monitoring Performers		
Stream Monitoring - Wolf Creek Engineering, pllc	S. Grant Ginn	828-505-2186
Vegetation Monitoring - Equinox Environmental, Inc	Sarah Marcinko	828-253-6856

Table 4. Project Attribute Table Holly Grove Restoration Project						
Project County	Guilford					
Physiographic Region	Piedmont					
Ecoregion	Southern Outer Piedmont					
Project River Basin	Cape Fear River Basin					
USGS HUC for Project (14 digit)	03030002020070					
NCDWQ Sub-basin for Project	03-06-02					
Within extent of EEP Watershed Plan?						
WRC Class (Warm, Cool, Cold)						
% of project esaement fenced or demarcated	100% Demarcated Easement Corners					
Beaver activity observed during design phase?	Yes, on Buckhorn Creek upstream of bridge					
Restoration Component Attribute Table						
	Buckhorn	West	Middle	East	Southeast	Southwest
Drainage area (mi^2)	4.27	0.2	0.2	0.2	0.14	0.19
Stream order	Second	First	First	First	First	First
Restored length (feet)	8757	390	1639	1039	342	723
Perennial or Intermittent	Perennial	Perennial	Perennial	Perennial	Perennial	Perennial
Watershed type	Rural	Rural	Rural	Rural	Rural	Rural
Watershed LULC Distribution (e.g.)						
Residential	20%	10%	5%	10%	5%	10%
Ag-Row Crop	40%	60%	50%	10%	90%	10%
Ag-Livestock	10%	5%	10%	0%	0%	0%
Forested	30%	25%	35%	80%	5%	80%
Watershed impervious cover (%)	10	5	5	5	2	2
NCDWQ AU/Index number	16-(1)a					
NCDWQ classification	C, NSW	C, NSW	C, NSW	C, NSW	C, NSW	C, NSW
303d listed?	No					
Upstream of a 303d listed segment?	Yes					
Reasons for 303d listing or stressor	non-point urban and agricultural runoff					
Total acreage of easement	64.87					
Total vegetated acreage within easement	47.06					
Total planted acreage as part of the restoration	45.3					
Rosgen classification of pre-existing	F, G	G	G	G	G	G
Rosgen classification of As-Built	B4c	B4c	B4c	B4c	B4c	B4c
Valley type	II	II	II	II	II	II
Valley slope	0.0051	0.0239	0.0165	0.0119	0.0159	0.0169
Valley side slope range	4% - 40%					
Valley toe slope range	0.4% - 2%					
Cowardin classification	N/A					
Trout waters designation	N/A					
Species of concern, endangered?	Yes, Bald Eagle & Carolina Darter					
Dominant soil series and characteristics	Ch , Co	CcD	Ch	CcD , Ch	CcD	CcD
Series	Congaree	Cecil	Chewacla	Chewacla	Cecil	Cecil
Depth (in)	0-80	0-80	0-70	0-70	0-80	0-80
Clay %	5-35	5-70	5-35	5-35	5-70	5-70
K	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
T	-	-	-	-	-	-

Exhibit Table 5a. - Baseline Stream Data Summary

Holly Grove Restoration Site - Buckhorn Creek (8848 ft)

Parameter	Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			As-Built / Baseline					
Simension and Substrate - Riffle		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Med	Max	Min	Mean	Med	Max	SD	n
Bankfull Width (ft)					24			26					20.1				22	23	25	23.4		23.4	25.4		
Floodprone Width (ft)					32			32					63				30	52.5	75	50		50	70		
Bankfull Mean Depth (ft)					1.6			2.3					1.73				1.69	1.78	1.91	1.3		1.5	1.9		
[1]Bankfull Max Depth (ft)					2.3			3					2				2.3	2.4	2.6	1.9		2.1	2.6		
Bankfull Cross-Sectional Area (ft2)					42			55					34.8				37	40.9	48	30.3		34.3	48.3		
Width/Depth Ratio					10			16					12					13		13.4		16	18.1		
Entrenchment Ratio					1.2			1.3			2.7		2.9	3.1			1.4	2.28	3			2.5			
[1]Bank Height Ratio					2			2.3					1.2					1							
d50 (mm)					14			14					28												
Profile																									
Riffle Length (ft)																	23	40	64	38		58	74		
Riffle Slope (ft/ft)					0.006		0.007	0.008					0.013				0.004	0.005	0.006	0.0053		0.013	0.035		
Pool Length (ft)																	21	25	54	55		67	87		
Pool Max Depth (ft)					2.8		3.35	3.9					2.6				3.4	3.6	3.8	1.08		2.89	3.51		
Pool Spacing (ft)					60		110	160			71		102.5	134			88	119	150	56		119	136		
[2]Pool Volume (ft3)																									
Pattern																									
Channel Beltwidth (ft)					40		80	120			33		36.5	40			33	54	75	183		217	250		
Radius of Curvature (ft)					50		145	240			47		182.5	318			44	59.5	75	41		87	167		
Radius of Curvature Ratio (ft/ft)					1.9		5.95	10			2.3		9.15	16			2	2.5	3	1.7		3.72	7		
Meander Wavelength (ft)					110		225	340			37		104.5	172			44	134.5	225	140		221	380		
Meander Width Ratio (ft/ft)					1.7		3.15	4.6			1.6		1.8	2			1.5	2.25	3	7.82		9.27	10.7		
Substrate, bed and transport parameters																									
[4]Ri% / Ru% / P% / G% / S%																				35	18	29		17	
[4]SC% / Sa% / G% / C% / B% / Be%																									
[4]d16 / d35 / d50 / d84 / d95 / dip / disp (mm)																									
Reach Shear Stress (competency) lb/ft2																		0.66							
Max part size (mm) mobilized at bankfull																		144							
Stream Power (transport capacity) W/m2																									
Additional Reach Parameters																									
Drainage Area (sq mi)					3.76						2.2														
Impervious cover estimate (%)																									
Rosgen Classification					F4 & G4						B4c							B4c				B4c			
Bankfull Velocity (fps)					3.3													4.5							
Bankfull discharge (cfs)					186																				
Valley length (ft)																									
Channel Thalweg length (ft)					8756													8777				8848			
Sinuosity (ft)					1.17						1.05							1.2				1.17			
Water Surface Slope (channel) (ft/ft)					0.0054						0.0079							0.005		0.0042			0.0051		
BF slope (ft/ft)					0.005						0.006							0.006				0.0047			
[5]Bankfull Floodplain Area (acres)																									
[6]Proportion Overwide (%)																									
[7]Entrenchment Class (ER Range)																									
[8]Incision Class (BHR Ranch)																									
BEHI VL% / L% / M% / H% / VH% / E%																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Exhibit Table 5b. - Baseline Stream Data Summary

Holly Grove Restoration Site - West Branch (391 ft)

Parameter	Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			As-Built / Baseline					
Simension and Substrate - Riffle		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Med	Max	Min	Mean	Med	Max	SD	n
Bankfull Width (ft)							6.3						20.1					9		9		10.5	12		
Floodprone Width (ft)							7.5						63				12	19.5	27						
Bankfull Mean Depth (ft)							0.9						1.73					0.7							
[1]Bankfull Max Depth (ft)							1.2						2					0.95							
Bankfull Cross-Sectional Area (ft2)							5.5						34.8					6.3							
Width/Depth Ratio							7						12					13							
Entrenchment Ratio							1.2				2.7		2.9	3.1			1.4	1.7	3						
[1]Bank Height Ratio							1.7						1.2					1							
d50 (mm)							28						28												
Profile																									
Riffle Length (ft)																	13	16	19						
Riffle Slope (ft/ft)							0.02						0.013					0.013							
Pool Length (ft)																	7	14	20						
Pool Max Depth (ft)							1.4						2.6					1.4							
Pool Spacing (ft)					30		65	100			33		36.5	40			36	45	54	40		46	52		
[2]Pool Volume (ft3)																									
Pattern																									
Channel Beltwidth (ft)					40		50	60			33		36.5	40			13	20	27			80			
Radius of Curvature (ft)					45		97.5	150			47		182.5	318			18	22.5	27	23		41.5	60		
Radius of Curvature Ratio (ft/ft)					7		15	23			2.3		9.15	16			2	2.5	3	2.3		4.2	6		
Meander Wavelength (ft)					55		77.5	100			37		104.5	172			18	49.5	81			89			
Meander Width Ratio (ft/ft)					6		8	10			1.6		1.8	2			1.5	2.25	3						
Substrate, bed and transport parameters																									
[4]Ri% / Ru% / P% / G% / S%																									
[4]SC% / Sa% / G% / C% / B% / Be%																									
[4]d16 / d35 / d50 / d84 / d95 / dip / disp (mm)																									
Reach Shear Stress (competency) lb/ft2																		0.53							
Max part size (mm) mobilized at bankfull																		96							
Stream Power (transport capacity) W/m2																									
Additional Reach Parameters																									
Drainage Area (sq mi)							0.2						2.2												
Impervious cover estimate (%)																									
Rosgen Classification							G4						B4c					B4c				B4c			
Bankfull Velocity (fps)							3.9											4.5							
Bankfull discharge (cfs)							28																		
Valley length (ft)																									
Channel Thalweg length (ft)							400											386				391			
Sinuosity (ft)							1.06						1.05					1.2				1.17			
Water Surface Slope (channel) (ft/ft)							0.014						0.0079					0.013							
BF slope (ft/ft)							0.015						-					0.015							
[5]Bankfull Floodplain Area (acres)																									
[6]Proportion Overwide (%)																									
[7]Entrenchment Class (ER Range)																									
[8]Incision Class (BHR Ranch)																									
BEHI VL% / L% / M% / H% / VH% / E%																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Exhibit Table 5c. - Baseline Stream Data Summary

Holly Grove Restoration Site - Middle Branch (1796 ft)

Parameter	Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			As-Built / Baseline					
Simension and Substrate - Riffle		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Med	Max	Min	Mean	Med	Max	SD	n
Bankfull Width (ft)							6.3						20.1					9		6.2			7.2		
Floodprone Width (ft)							7.5						63				12	19.5	27	55			80		
Bankfull Mean Depth (ft)							0.9						1.73					0.7		0.6			0.7		
[1]Bankfull Max Depth (ft)							1.2						2					0.95		1			1.1		
Bankfull Cross-Sectional Area (ft2)							5.5						34.8					6.3		3.7			5.2		
Width/Depth Ratio							7						12					13		10			10.4		
Entrenchment Ratio							1.2				2.7		2.9	3.1			1.4	1.7	3	7.6			13		
[1]Bank Height Ratio							1.7						1.2					1							
d50 (mm)							28						28												
Profile																									
Riffle Length (ft)																	10	15	32	17			38		
Riffle Slope (ft/ft)							0.02						0.013					0.013		0.0148			0.0184		
Pool Length (ft)																	6	13	16	17			29		
Pool Max Depth (ft)							1.4						2.6					1.4		0.9			1.32		
Pool Spacing (ft)					30		65	100			33		36.5	40			36	45	54	44			75		
[2]Pool Volume (ft3)																									
Pattern																									
Channel Beltwidth (ft)					40		50	60			33		36.5	40			13	20	27	30			88		
Radius of Curvature (ft)					45		97.5	150			47		182.5	318			18	22.5	27	16			130		
Radius of Curvature Ratio (ft/ft)					7		15	23			2.3		9.15	16			2	2.5	3	2.4			19.4		
Meander Wavelength (ft)					55		77.5	100			37		104.5	172			18	49.5	81	60			105		
Meander Width Ratio (ft/ft)					6		8	10			1.6		1.8	2			1.5	2.25	3	3			8.8		
Substrate, bed and transport parameters																									
[4]Ri% / Ru% / P% / G% / S%																				34	25	29		12	
[4]SC% / Sa% / G% / C% / B% / Be%																									
[4]d16 / d35 / d50 / d84 / d95 / dip / disp (mm)																									
Reach Shear Stress (competency) lb/ft2																		0.58							
Max part size (mm) mobilized at bankfull																		115							
Stream Power (transport capacity) W/m2																									
Additional Reach Parameters																									
Drainage Area (sq mi)							0.2						2.2												
Impervious cover estimate (%)																									
Rosgen Classification							G4						B4c					B4c				B4c			
Bankfull Velocity (fps)							3.9											4.5							
Bankfull discharge (cfs)							28																		
Valley length (ft)																									
Channel Thalweg length (ft)							1778											1790				1796			
Sinuosity (ft)							1.06						1.05					1.2				1.07			
Water Surface Slope (channel) (ft/ft)							0.014						0.0079					0.013		0.0164			0.0187		
BF slope (ft/ft)							0.015						-					0.015		0.016			0.019		
[5]Bankfull Floodplain Area (acres)																									
[6]Proportion Overwide (%)																									
[7]Entrenchment Class (ER Range)																									
[8]Incision Class (BHR Ranch)																									
BEHI VL% / L% / M% / H% / VH% / E%																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Exhibit Table 5d. - Baseline Stream Data Summary

Holly Grove Restoration Site - East Branch (1073 ft)

Parameter	Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			As-Built / Baseline					
Simension and Substrate - Riffle		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Med	Max	Min	Mean	Med	Max	SD	n
Bankfull Width (ft)							6.3						20.1					9				8.6			
Floodprone Width (ft)							7.5						63				12	19.5	27			18			
Bankfull Mean Depth (ft)							0.9						1.73					0.7				0.8			
[1]Bankfull Max Depth (ft)							1.2						2					0.95				1			
Bankfull Cross-Sectional Area (ft2)							5.5						34.8					6.3				6.5			
Width/Depth Ratio							7						12					13				11.4			
Entrenchment Ratio							1.2				2.7		2.9	3.1			1.4	1.7	3			2.1			
[1]Bank Height Ratio							1.7						1.2					1							
d50 (mm)							28						28												
Profile																									
Riffle Length (ft)																	12	17	21	22		23	26		
Riffle Slope (ft/ft)							0.02						0.013					0.013		0.0071		0.0104	0.0132		
Pool Length (ft)																	12	15	18	13		14	17		
Pool Max Depth (ft)							1.4						2.6					1.4		0.5		0.8	0.9		
Pool Spacing (ft)					30		65	100			33		36.5	40			36	45	54	34		35	44		
[2]Pool Volume (ft3)																									
Pattern																									
Channel Beltwidth (ft)					40		50	60			33		36.5	40			13	20	27	28		36	45		
Radius of Curvature (ft)					45		97.5	150			47		182.5	318			18	22.5	27	33		44	60		
Radius of Curvature Ratio (ft/ft)					7		15	23			2.3		9.15	16			2	2.5	3	3.8		5.1	7		
Meander Wavelength (ft)					55		77.5	100			37		104.5	172			18	49.5	81	76		81	91		
Meander Width Ratio (ft/ft)					6		8	10			1.6		1.8	2			1.5	2.25	3	3.25		9.4	5.25		
Substrate, bed and transport parameters																									
[4]Ri% / Ru% / P% / G% / S%																				41	16	24		19	
[4]SC% / Sa% / G% / C% / B% / Be%																									
[4]d16 / d35 / d50 / d84 / d95 / dip / disp (mm)																									
Reach Shear Stress (competency) lb/ft2																		0.54							
Max part size (mm) mobilized at bankfull																		102							
Stream Power (transport capacity) W/m2																									
Additional Reach Parameters																									
Drainage Area (sq mi)							0.2						2.2												
Impervious cover estimate (%)																									
Rosgen Classification							G4						B4c					B4c				B4c			
Bankfull Velocity (fps)							3.9											4.5							
Bankfull discharge (cfs)							28																		
Valley length (ft)																									
Channel Thalweg length (ft)							1039											1058				1073			
Sinuosity (ft)							1.06						1.05					1.2				1.04			
Water Surface Slope (channel) (ft/ft)							0.014						0.0079					0.013				0.011			
BF slope (ft/ft)							0.015						-					0.015				0.011			
[5]Bankfull Floodplain Area (acres)																									
[6]Proportion Overwide (%)																									
[7]Entrenchment Class (ER Range)																									
[8]Incision Class (BHR Ranch)																									
BEHI VL% / L% / M% / H% / VH% / E%																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Exhibit Table 5e. - Baseline Stream Data Summary

Holly Grove Restoration Site - Southwest Creek (363 ft)

Parameter	Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			As-Built / Baseline					
Simension and Substrate - Riffle		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Med	Max	Min	Mean	Med	Max	SD	n
Bankfull Width (ft)							6.3						20.1					7.5				8			
Floodprone Width (ft)							7.5						63				10	16.5	23			25			
Bankfull Mean Depth (ft)							0.9						1.73					0.6				0.5			
[1]Bankfull Max Depth (ft)							1.2						2					0.75				0.8			
Bankfull Cross-Sectional Area (ft2)							5.5						34.8					4.2				4.3			
Width/Depth Ratio							7						12					13				15			
Entrenchment Ratio							1.2				2.7		2.9	3.1			1.4	2.2	3			3.1			
[1]Bank Height Ratio							1.7						1.2					1							
d50 (mm)							28						28												
Profile																									
Riffle Length (ft)																	10	12	19	14		15	18		
Riffle Slope (ft/ft)							0.02						0.013					0.016				0.0067			
Pool Length (ft)																	10	13	20	18		19	21		
Pool Max Depth (ft)							1.4						2.6					1.1		0.49		0.52	1.4		
Pool Spacing (ft)					30		65	100			33		36.5	40			30	37.5	45	20		22	40		
[2]Pool Volume (ft3)																									
Pattern																									
Channel Beltwidth (ft)					40		50	60			33		36.5	40			11	17	23	27		30.5	34		
Radius of Curvature (ft)					45		97.5	150			47		182.5	318			15	19	23	40		64	88		
Radius of Curvature Ratio (ft/ft)					7		15	23			2.3		9.15	16			2	2.5	3	5		8	11		
Meander Wavelength (ft)					55		77.5	100			37		104.5	172			15	41.5	68	81		86	91		
Meander Width Ratio (ft/ft)					6		8	10			1.6		1.8	2			1.5	2.25	3	3.4		38.5	4.3		
Substrate, bed and transport parameters																									
[4]Ri% / Ru% / P% / G% / S%																				40	15	30		15	
[4]SC% / Sa% / G% / C% / B% / Be%																									
[4]d16 / d35 / d50 / d84 / d95 / dip / disp (mm)																									
Reach Shear Stress (competency) lb/ft2																		0.53							
Max part size (mm) mobilized at bankfull																		96							
Stream Power (transport capacity) W/m2																									
Additional Reach Parameters																									
Drainage Area (sq mi)							0.2						2.2												
Impervious cover estimate (%)																									
Rosgen Classification							G4						B4c					B4c				B4c			
Bankfull Velocity (fps)							3.9											4.5							
Bankfull discharge (cfs)							28																		
Valley length (ft)																									
Channel Thalweg length (ft)							342											359				363			
Sinuosity (ft)							1.06						1.05					1.2				1.05			
Water Surface Slope (channel) (ft/ft)							0.014						0.0079					0.016				0.0106			
BF slope (ft/ft)							0.015						-					0.019				0.0106			
[5]Bankfull Floodplain Area (acres)																									
[6]Proportion Overwide (%)																									
[7]Entrenchment Class (ER Range)																									
[8]Incision Class (BHR Ranch)																									
BEHI VL% / L% / M% / H% / VH% / E%																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Exhibit Table 5f. - Baseline Stream Data Summary

Holly Grove Restoration Site - Southeast Creek (723 ft)

Parameter	Gauge	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			As-Built / Baseline					
Simension and Substrate - Riffle		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Med	Max	Min	Mean	Med	Max	SD	n
Bankfull Width (ft)							6.3						20.1					8				8			
Floodprone Width (ft)							7.5						63				11	17.5	24			15.6			
Bankfull Mean Depth (ft)							0.9						1.73					0.6				0.4			
[1]Bankfull Max Depth (ft)							1.2						2					0.85				0.7			
Bankfull Cross-Sectional Area (ft2)							5.5						34.8					4.9				3.4			
Width/Depth Ratio							7						12					13				18.6			
Entrenchment Ratio							1.2				2.7		2.9	3.1			1.4	2.2	3			1.95			
[1]Bank Height Ratio							1.7						1.2					1							
d50 (mm)							28						28												
Profile																									
Riffle Length (ft)																	10	14	19	9		11	18		
Riffle Slope (ft/ft)							0.02						0.013					0.007		0.0044		0.0163	0.0322		
Pool Length (ft)																	6	10	13	5		8	12		
Pool Max Depth (ft)							1.4						2.6					1.3		1.15		1.45	1.65		
Pool Spacing (ft)					30		65	100			33		36.5	40			32	40	48	19		25	32		
[2]Pool Volume (ft3)																									
Pattern																									
Channel Beltwidth (ft)					40		50	60			33		36.5	40			12	18	24	50		55	60		
Radius of Curvature (ft)					45		97.5	150			47		182.5	318			16	20	24	20		28.5	37		
Radius of Curvature Ratio (ft/ft)					7		15	23			2.3		9.15	16			2	2.5	3	2.5		3.55	4.6		
Meander Wavelength (ft)					55		77.5	100			37		104.5	172			16	44	72	60		93	126		
Meander Width Ratio (ft/ft)					6		8	10			1.6		1.8	2			1.5	2.25	3	6.25		6.88	7.5		
Substrate, bed and transport parameters																									
[4]Ri% / Ru% / P% / G% / S%																				33	19	30		18	
[4]SC% / Sa% / G% / C% / B% / Be%																									
[4]d16 / d35 / d50 / d84 / d95 / dip / disp (mm)																									
Reach Shear Stress (competency) lb/ft2																		0.25							
Max part size (mm) mobilized at bankfull																		50							
Stream Power (transport capacity) W/m2																									
Additional Reach Parameters																									
Drainage Area (sq mi)							0.2						2.2												
Impervious cover estimate (%)																									
Rosgen Classification							G4						B4c					B4c				B4c			
Bankfull Velocity (fps)							3.9											4.5							
Bankfull discharge (cfs)							28																		
Valley length (ft)																									
Channel Thalweg length (ft)																						723			
Sinuosity (ft)							1.06						1.05					1.2				1.17			
Water Surface Slope (channel) (ft/ft)							0.014						0.0079					0.007				0.0122			
BF slope (ft/ft)							0.015						-					0.008				0.0122			
[5]Bankfull Floodplain Area (acres)																									
[6]Proportion Overwide (%)																									
[7]Entrenchment Class (ER Range)																									
[8]Incision Class (BHR Ranch)																									
BEHI VL% / L% / M% / H% / VH% / E%																									
Channel Stability or Habitat Metric																									
Biological or Other																									

APPENDIX B

AS-BUILT DRAWINGS

Wolf Creek Engineering
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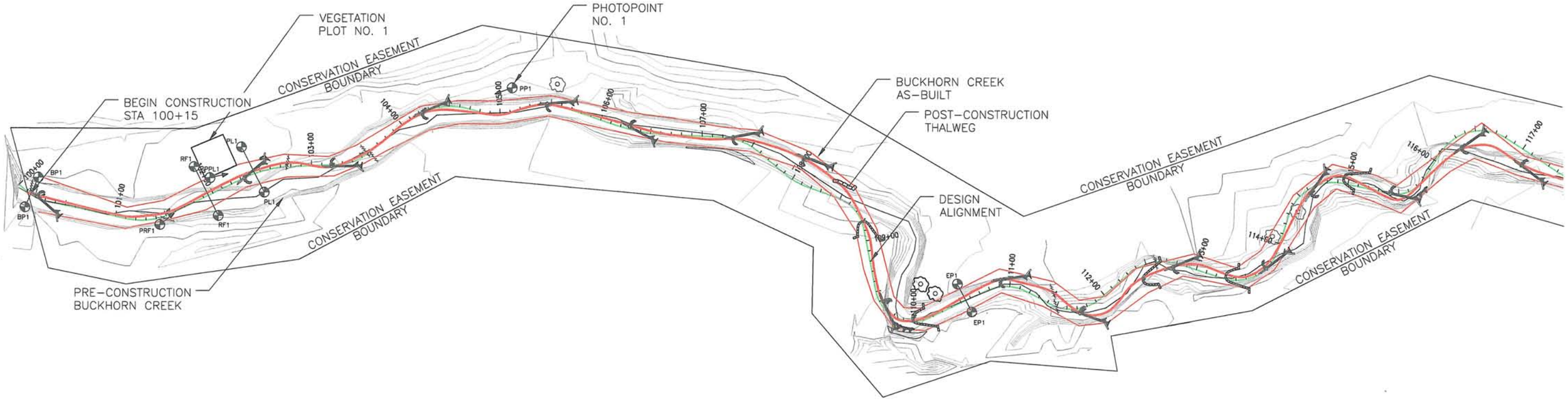
NORTH CAROLINA PE SEAL 027767 ENGINEER S. GRANT GINN 12-10-08

PROJECT	HOLLY GROVE STREAM RESTORATION SITE
OWNER	RESTORATION SYSTEMS, LLC
TITLE	AS-BUILT PLANS
SCALE	AS NOTED
DATE	11/26/2008
DSWN. BY	cme
CHKD. BY	SGG
PROJECT NO.	1024
SHEET NUMBER	1

DATE	BY	REV.	DESCRIPTION



POINT NO.	POINT DESCRIPTION	NORTHING (FT)	EASTING (FT)	ELEVATION (FT)
BP1 RT	BEGIN PROFILE	892186.64	1827088.87	———
BP1 LT	BEGIN PROFILE	892197.58	1827118.27	———
PRF1	PHOTO PT. RIFFLE	892081.9	1827168.92	———
RF1 RT	RIFFLE X.S.	892047.92	1827214.63	———
RF1 LT	RIFFLE X.S.	892097.66	1827231.6	———
PPL1	PHOTO PT. POOL	892079.26	1827234.84	———
PL1 RT	POOL X.S.	892032.47	1827261.68	———
PL1 LT	POOL X.S.	892078.62	1827277.13	———
EP1 RT	END PROFILE	891450.75	1827684.19	———
EP1 LT	END PROFILE	891490.02	1827699.27	———
PP1	PHOTO POINT NO. 1	891932.76	1827501.67	———

LEGEND
- ORIGINAL CHANNEL CENTERLINE
- ORIGINAL CHANNEL
- ORIGINAL CONTOUR
- AS-BUILT THALWEG
- AS-BUILT TOP OF BANK
- DESIGN CHANNEL CENTERLINE
- LOG VANE
- LOG VANE W/ BAFFLE
- CROSS VANE
- BOULDER VANE
- IRON ROD
- GAUGE

50 0 50 150
SCALE IN FEET

BUCKHORN CREEK

Wolf Creek Engineering
ENGINEERING & ENVIRONMENTAL CONSULTING
30 Ben Lippen School Road Asheville, NC 28806
PHONE: (828) 505-2186 WWW.WOLFCREEKENG.COM

NORTH CAROLINA PROFESSIONAL SEAL 021767 ENGINEER S. GRANT GINN 12/19/08

PROJECT	HOLLY GROVE STREAM RESTORATION SITE
OWNER	RESTORATION SYSTEMS, INC
TITLE	AS-BUILT PLANS

SCALE	DRWN. BY	PROJECT NO.	SHEET NUMBER
AS NOTED	cme	1024	2
DATE 11/26/2008	CHKD. BY SGG		

DATE	BY	REV.	DESCRIPTION

VEGETATION PLOT A

GAS LINE EASEMENT

PRE-CONSTRUCTION BUCKHORN CREEK

BUCKHORN CREEK AS-BUILT

DESIGN ALIGNMENT

POST-CONSTRUCTION THALWEG

WEST BRANCH AS-BUILT

PRE-CONSTRUCTION WEST BRANCH

PHOTOPOINT NO. 2

PHOTOPOINT NO. 3

PHOTOPOINT NO. 4

PERMANENT STREAM CROSSING (FORD)

CONSERVATION EASEMENT BOUNDARY

POINT NO.	POINT DESCRIPTION	NORTHING (FT)	EASTING (FT)	ELEVATION (FT)
PP2	PHOTOPOINT NO. 2	890624.38	1828674.01	———
PP3	PHOTOPOINT NO. 3	891109.12	1828874.49	654.85
PP4	PHOTOPOINT NO. 4	891363.46	1829078.7	651.42
BP2 RT	BEGIN PROFILE	891503.87	1829457.43	647.82
BP2 LT	BEGIN PROFILE	891547.31	1829458.52	649.06

LEGEND
- ORIGINAL CHANNEL CENTERLINE
- ORIGINAL CHANNEL
- ORIGINAL CONTOUR
- AS-BUILT THALWEG
- AS-BUILT TOP OF BANK
- DESIGN CHANNEL CENTERLINE
- LOG VANE
- LOG VANE W/ BAFFLE
- CROSS VANE
- BOULDER VANE
- IRON ROD
- GAUGE

50 0 50 150
SCALE IN FEET

LITTLE BRANCH
WEST BRANCH
BUCKHORN CREEK

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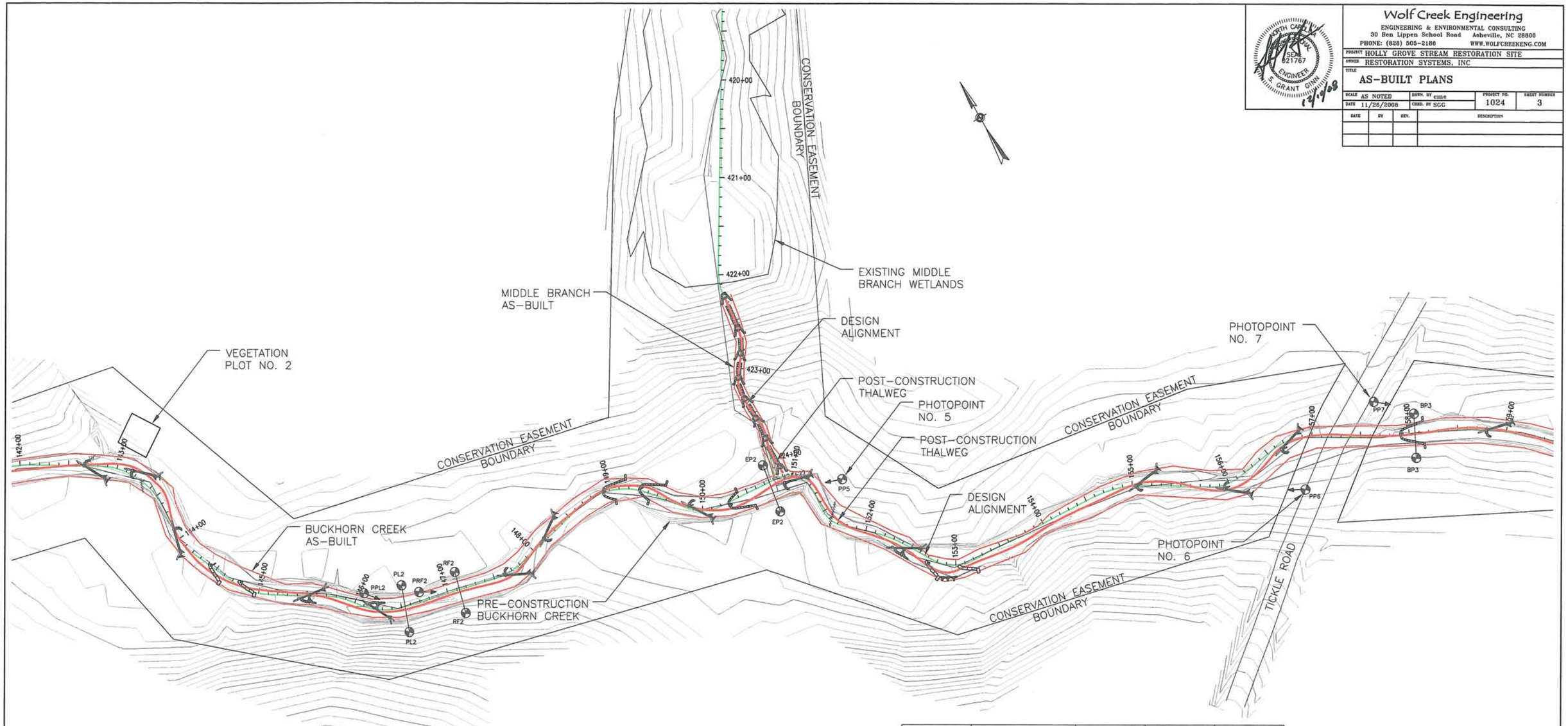
NORTH CAROLINA SEAL 021767 ENGINEER S. GRANT GINN 12/4/08

PROJECT	HOLLY GROVE STREAM RESTORATION SITE
OWNER	RESTORATION SYSTEMS, INC
TITLE	AS-BUILT PLANS
SCALE	AS NOTED
DRWN. BY	cme
PROJECT NO.	1024
SHEET NUMBER	3
DATE	11/26/2008
CHKD. BY	SGG

DATE	BY	REV.	DESCRIPTION

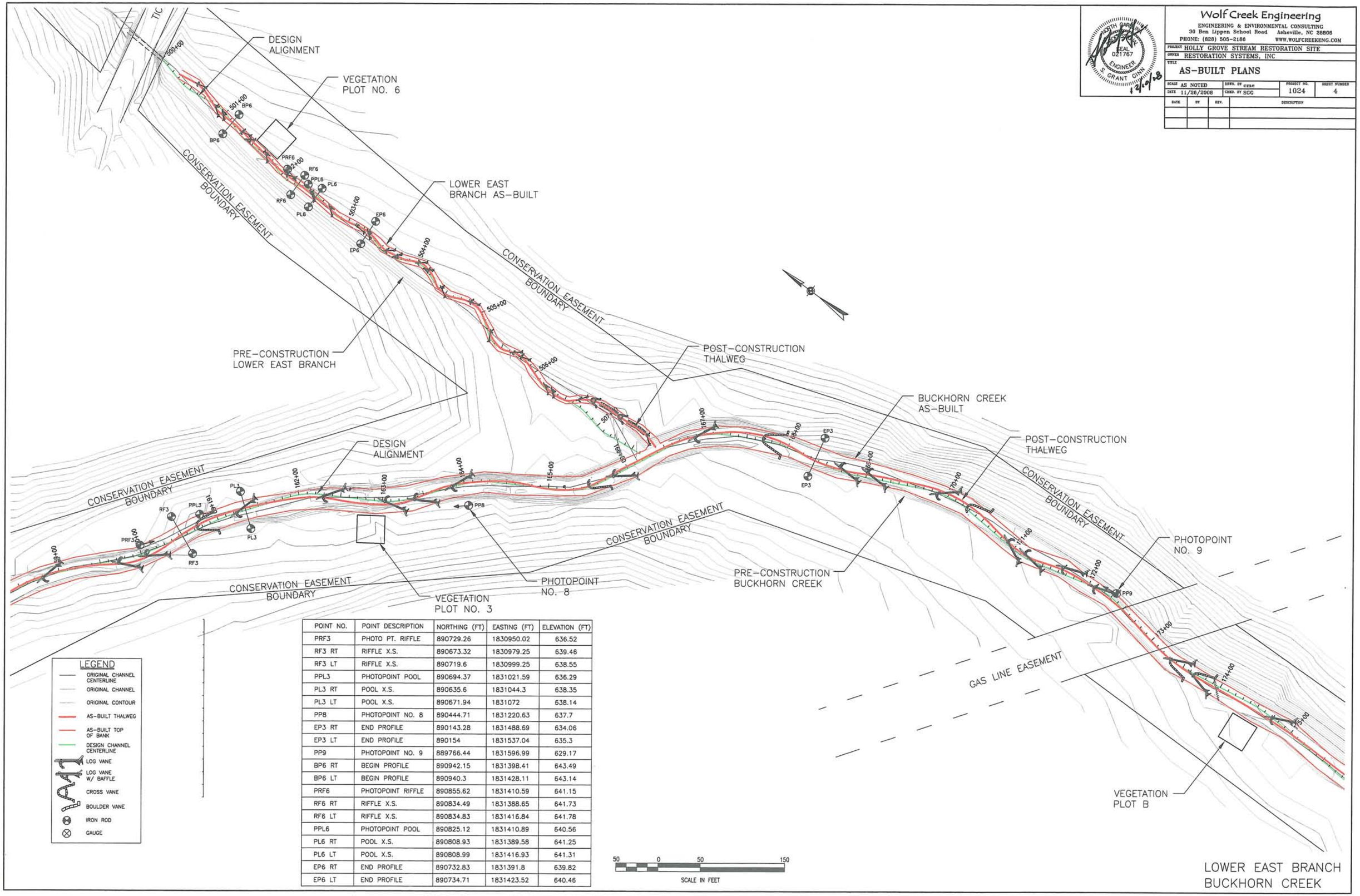


POINT NO.	POINT DESCRIPTION	NORTHING (FT)	EASTING (FT)	ELEVATION (FT)
PP5	PHOTOPOINT NO. 5	891083.47	1830250.37	644.46
PP6	PHOTOPOINT NO. 6			
PP7	PHOTOPOINT NO. 7			
PPL2	PHOTO PT. POOL	891211.78	1829741.13	643.21
PL2 RT	POOL X.S.	891176.39	1829790.64	645.91
PL2 LT	POOL X.S.	891213.65	1829803.79	644.77
PRF2	PHOTO PT. RIFFLE	891198.64	1829816.14	642.57
RF2 RT	RIFFLE X.S.	891156.06	1829847.42	646.48
RF2 LT	RIFFLE X.S.	891198.2	1829858.26	644.39
EP1 RT	END PROFILE	891086.19	1830179.02	642.71
EP2 LT	END PROFILE	891136.07	1830186.79	641.85
BP3 RT	BEGIN PROFILE	890809.79	1830773.35	640.51
BP3 LT	BEGIN PROFILE	890850.39	1830793.57	641.85

LEGEND
- ORIGINAL CHANNEL CENTERLINE
- ORIGINAL CHANNEL
- ORIGINAL CONTOUR
- AS-BUILT THALWEG
- AS-BUILT TOP OF BANK
- DESIGN CHANNEL CENTERLINE
- LOG VANE
- LOG VANE W/ BAFFLE
- CROSS VANE
- BOULDER VANE
- IRON ROD
- GAUGE

50 0 50 150
SCALE IN FEET

MIDDLE BRANCH
BUCKHORN CREEK



POINT NO.	POINT DESCRIPTION	NORTHING (FT)	EASTING (FT)	ELEVATION (FT)
PRF3	PHOTO PT. RIFFLE	890729.26	1830950.02	636.52
RF3 RT	RIFFLE X.S.	890673.32	1830979.25	639.46
RF3 LT	RIFFLE X.S.	890719.6	1830999.25	638.55
PPL3	PHOTOPOINT POOL	890694.37	1831021.59	636.29
PL3 RT	POOL X.S.	890635.6	1831044.3	638.35
PL3 LT	POOL X.S.	890671.94	1831072	638.14
PP8	PHOTOPOINT NO. 8	890444.71	1831220.63	637.7
EP3 RT	END PROFILE	890143.28	1831488.69	634.06
EP3 LT	END PROFILE	890154	1831537.04	635.3
PP9	PHOTOPOINT NO. 9	889766.44	1831596.99	629.17
BP6 RT	BEGIN PROFILE	890942.15	1831398.41	643.49
BP6 LT	BEGIN PROFILE	890940.3	1831428.11	643.14
PRF6	PHOTOPOINT RIFFLE	890855.62	1831410.59	641.15
RF6 RT	RIFFLE X.S.	890834.49	1831388.65	641.73
RF6 LT	RIFFLE X.S.	890834.83	1831416.84	641.78
PPL6	PHOTOPOINT POOL	890825.12	1831410.89	640.56
PL6 RT	POOL X.S.	890808.93	1831389.58	641.25
PL6 LT	POOL X.S.	890808.99	1831416.93	641.31
EP6 RT	END PROFILE	890732.83	1831391.8	639.82
EP6 LT	END PROFILE	890734.71	1831423.52	640.46

NORTH CAROLINA PROFESSIONAL SEAL 021767 ENGINEER S. GRANT GINN
12/9/08

Wolf Creek Engineering
ENGINEERING & ENVIRONMENTAL CONSULTING
30 Ben Lippen School Road Asheville, NC 28806
PHONE: (828) 505-2186 WWW.WOLFCREEKENG.COM

PROJECT HOLLY GROVE STREAM RESTORATION SITE
OWNER RESTORATION SYSTEMS, INC
TITLE **AS-BUILT PLANS**

SCALE	DRWN. BY	PROJECT NO.	SHEET NUMBER
AS NOTED	cme	1024	4
DATE 11/26/2008	CHKD. BY SGG		

DATE	BY	REV.	DESCRIPTION

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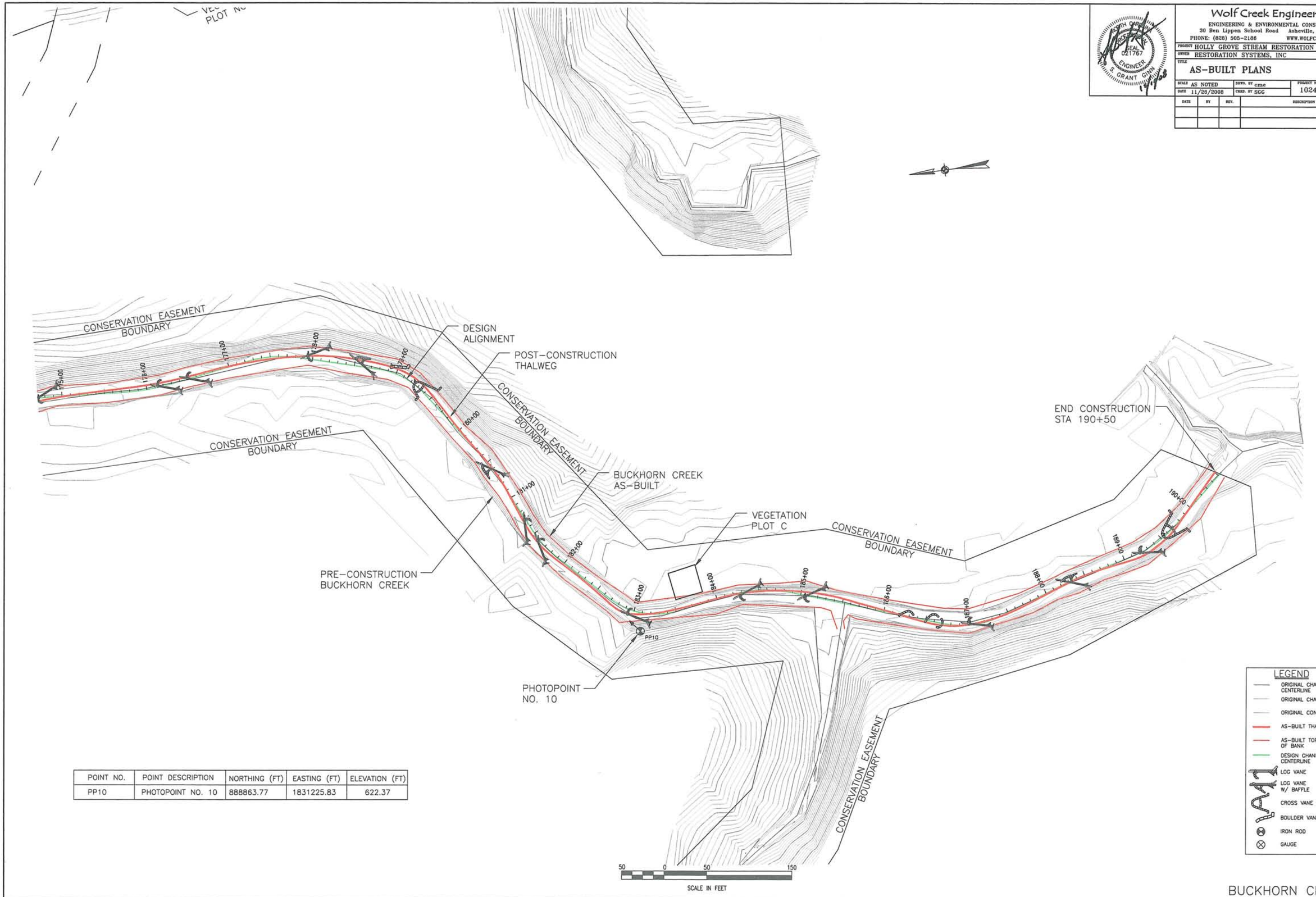
NORTH CAROLINA PROFESSIONAL SEAL 021767 ENGINEER S. GRANT GINN 12/15/08

PROJECT	HOLLY GROVE STREAM RESTORATION SITE
OWNER	RESTORATION SYSTEMS, INC
TITLE	AS-BUILT PLANS

SCALE	AS NOTED	DRWN. BY	cme	PROJECT NO.	SHEET NUMBER
DATE	11/26/2008	CHKD. BY	SGG	1024	5

DATE	BY	REV.	DESCRIPTION



POINT NO.	POINT DESCRIPTION	NORTHING (FT)	EASTING (FT)	ELEVATION (FT)
PP10	PHOTOPOINT NO. 10	888863.77	1831225.83	622.37

BUCKHORN CREEK

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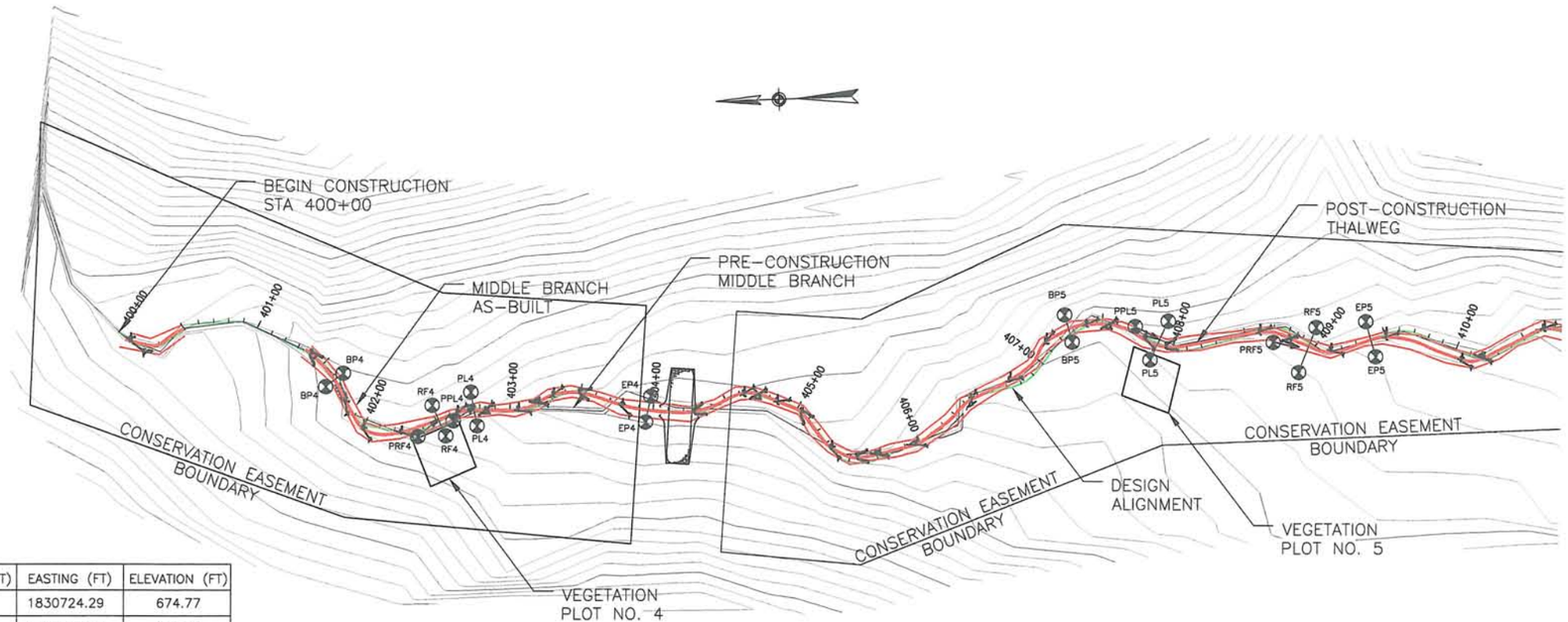
PHONE: (828) 505-2186 WWW.WOLFCREEKENG.COM

NORTH CAROLINA SEAL 021767 ENGINEER S. GRANT GINN 12/9/08

PROJECT	HOLLY GROVE STREAM RESTORATION SITE
OWNER	RESTORATION SYSTEMS, INC
TITLE	AS-BUILT PLANS

SCALE	DRWN. BY	PROJECT NO.	SHEET NUMBER
AS NOTED	cme	1024	6
DATE 11/26/2008	CHKD. BY SGG		

DATE	BY	REV.	DESCRIPTION



POINT NO.	POINT DESCRIPTION	NORTHING (FT)	EASTING (FT)	ELEVATION (FT)
BP4 RT	BEGIN PROFILE	893112.11	1830724.29	674.77
BP4 LT	BEGIN PROFILE	893100.16	1830732.75	674.94
PRF 4	PHOTOPOINT RIFFLE	893052.14	1830688.91	672.84
RF4 RT	RIFFLE X.S.	893033.61	1830688.71	672.97
RF4 RT	RIFFLE X.S.	893041.95	1830709.35	673.1
PPL4	PHOTOPOINT POOL	893028.41	1830698.43	672.27
PL4 RT	POOL X.S.	893012.69	1830694.5	672.34
PL4 RT	POOL X.S.	893016.06	1830717.08	672.37
EP4 RT	END PROFILE	892900.43	1830693.07	670.12
EP4 RT	END PROFILE	892896.35	1830710.01	670.19
BP5 RT	BEGIN PROFILE	892615.37	1830735.78	665.53
BP5 LT	BEGIN PROFILE	892619.77	1830754.12	665.59
PRF 5	PHOTOPOINT RIFFLE	892481.99	1830730.82	662.8
RF5 RT	RIFFLE X.S.	892465.75	1830710.28	663.37
RF5 LT	RIFFLE X.S.	892453.05	1830739.76	662.65
PPL5	PHOTOPOINT POOL	892573.02	1830744.67	663.74
PL5 RT	POOL X.S.	892563.99	1830722.2	664.33
PL5 LT	POOL X.S.	892551	1830747.44	664.4
EP5 RT	END PROFILE	892414.15	1830718.87	661.96
EP5 LT	END PROFILE	892419.91	1830742.4	661.71

LEGEND
- ORIGINAL CHANNEL CENTERLINE
- ORIGINAL CHANNEL
- ORIGINAL CONTOUR
- AS-BUILT THALWEG
- AS-BUILT TOP OF BANK
- DESIGN CHANNEL CENTERLINE
- LOG VANE
- LOG VANE W/ BAFFLE
- CROSS VANE
- BOULDER VANE
- IRON ROD
- GAUGE

50 0 50 150
SCALE IN FEET

MIDDLE BRANCH

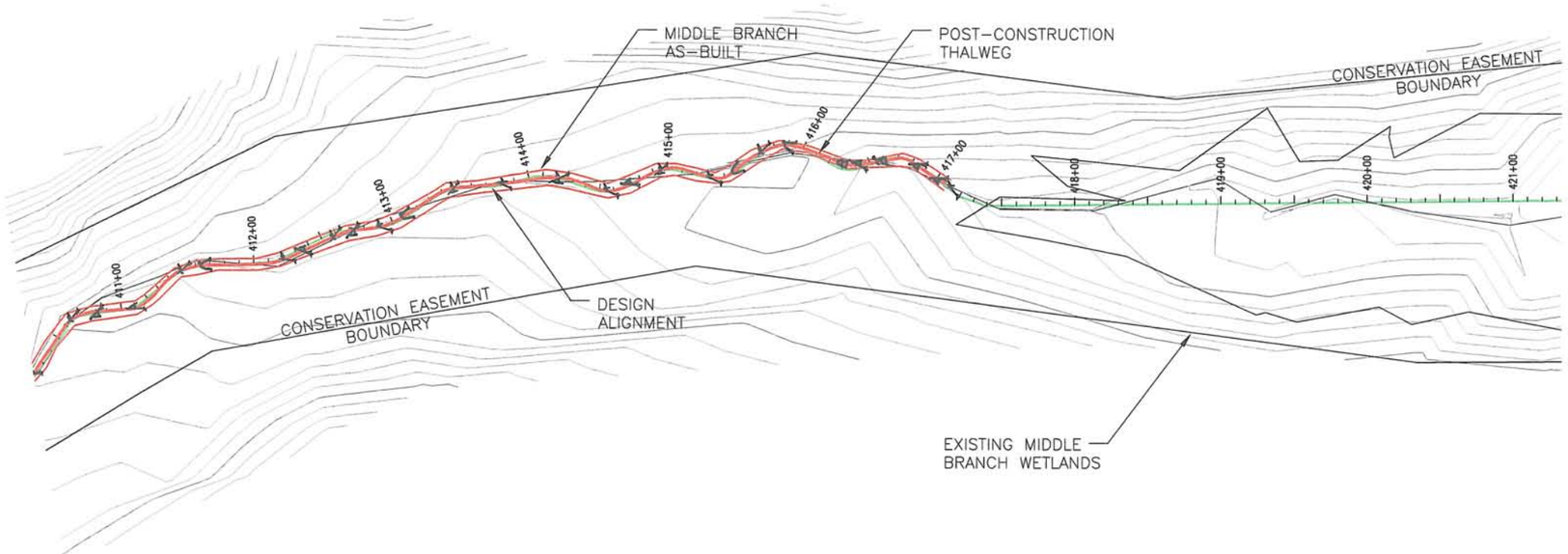
Wolf Creek Engineering
ENGINEERING & ENVIRONMENTAL CONSULTING
30 Ben Lippen School Road Asheville, NC 28806
PHONE: (828) 505-2186 WWW.WOLFCREEKENG.COM

PROJECT: HOLLY GROVE STREAM RESTORATION SITE
OWNER: RESTORATION SYSTEMS, INC
TITLE: **AS-BUILT PLANS**

SCALE	AS NOTED	DRWN. BY	cme	PROJECT NO.	SHEET NUMBER
DATE	11/26/2008	CHKD. BY	SGG	1024	7

DATE	BY	REV.	DESCRIPTION

NORTH CAROLINA SEAL 021767 ENGINEER S. GRANT GINN 12.9.08



LEGEND
- ORIGINAL CHANNEL CENTERLINE
- ORIGINAL CHANNEL
- ORIGINAL CONTOUR
- AS-BUILT THALWEG
- AS-BUILT TOP OF BANK
- DESIGN CHANNEL CENTERLINE
- LOG VANE
- LOG VANE W/ BAFFLE
- CROSS VANE
- BOULDER VANE
- IRON ROD
- GAUGE

50 0 50 150
SCALE IN FEET

MIDDLE BRANCH

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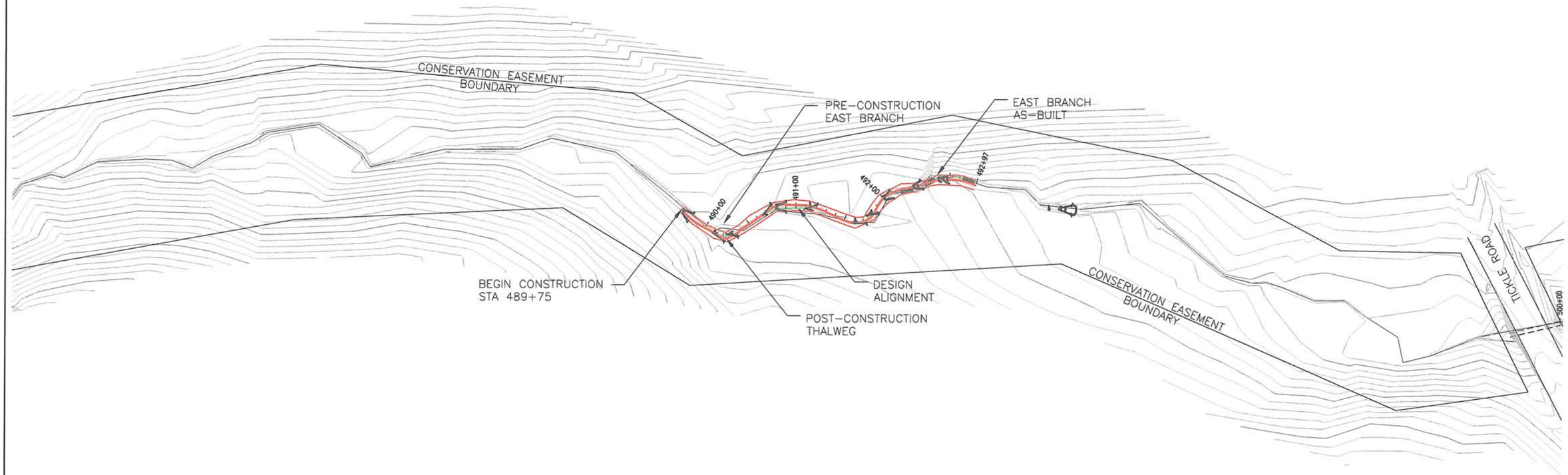
ENGINEERING & ENVIRONMENTAL CONSULTING
30 Ben Lippen School Road Asheville, NC 28806
PHONE: (828) 505-2186 WWW.WOLFCREEKENG.COM

NORTH CAROLINA SEAL 021767 ENGINEER S. GRANT GINN 12-10-08

PROJECT: HOLLY GROVE STREAM RESTORATION SITE
OWNER: RESTORATION SYSTEMS, INC
TITLE: **AS-BUILT PLANS**

SCALE	AS NOTED	DRWN. BY	cme	PROJECT NO.	SHEET NUMBER
DATE	11/26/2008	CHKD. BY	SGG	1024	8

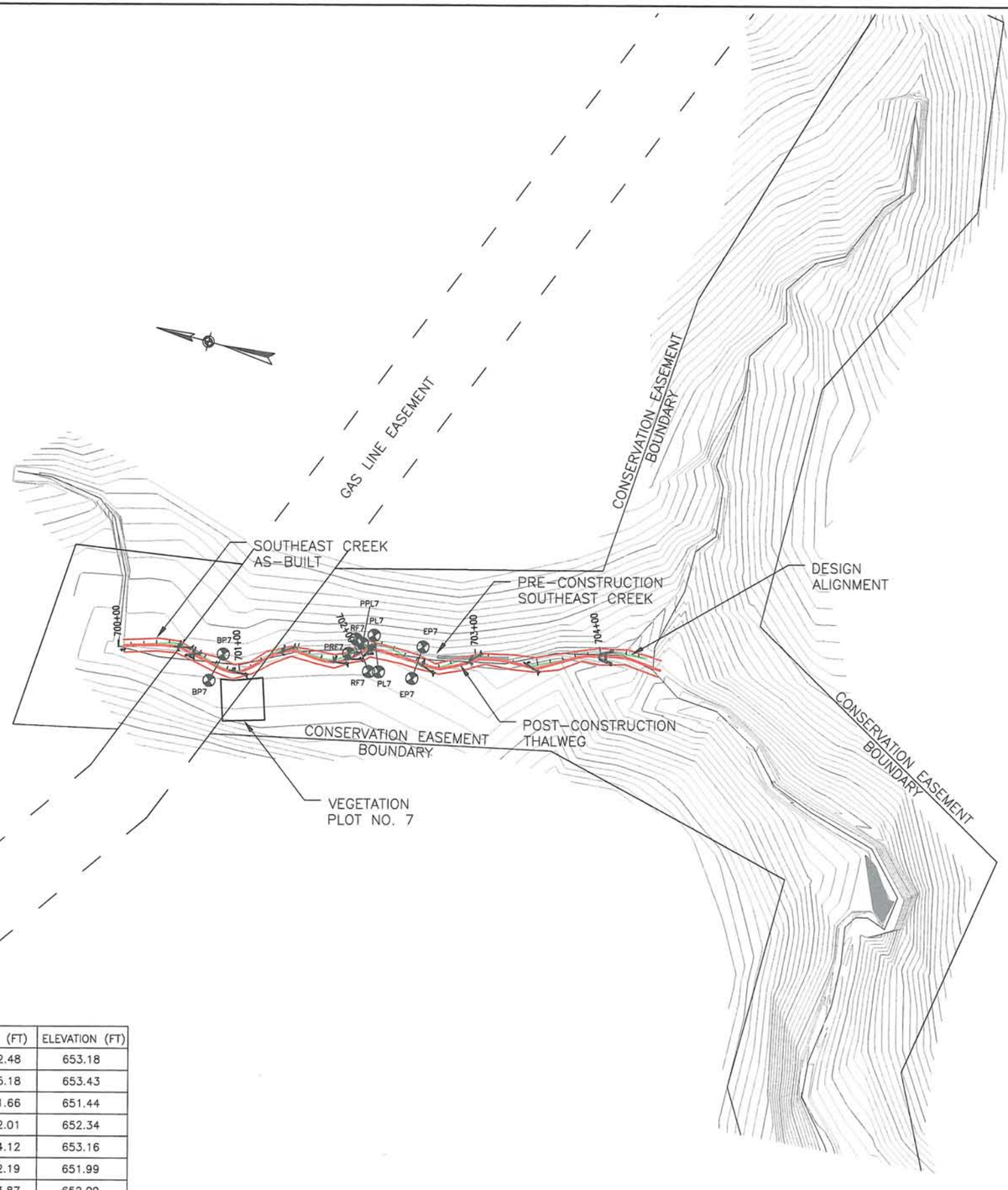
DATE	BY	REV.	DESCRIPTION



LEGEND
- ORIGINAL CHANNEL CENTERLINE
- ORIGINAL CHANNEL
- ORIGINAL CONTOUR
- AS-BUILT THALWEG
- AS-BUILT TOP OF BANK
- DESIGN CHANNEL CENTERLINE
- LOG VANE
- LOG VANE W/ BAFFLE
- CROSS VANE
- BOULDER VANE
- IRON ROD
- GAUGE

50 0 50 150
SCALE IN FEET

EAST BRANCH



POINT NO.	POINT DESCRIPTION	NORTHING (FT)	EASTING (FT)	ELEVATION (FT)
BP7 RT	BEGIN PROFILE	889394.27	1832082.48	653.18
BP7 LT	BEGIN PROFILE	889388.85	1832105.18	653.43
PRF 7	PHOTOPOINT RIFFLE	889294.04	1832131.66	651.44
RF7 RT	RIFFLE X.S.	889275.05	1832122.01	652.34
RF7 LT	RIFFLE X.S.	889291.11	1832144.12	653.16
PPL7	PHOTOPOINT POOL	889285.67	1832142.19	651.99
PL7 RT	POOL X.S.	889267.49	1832123.87	652.09
PL7 LT	POOL X.S.	889278.35	1832150.58	653.53
EP7 RT	END PROFILE	889240.74	1832125.74	651.43
EP7 LT	END PROFILE	889238.74	1832151.82	653.54

LEGEND
- ORIGINAL CHANNEL CENTERLINE
- ORIGINAL CHANNEL
- ORIGINAL CONTOUR
- AS-BUILT THALWEG
- AS-BUILT TOP OF BANK
- DESIGN CHANNEL CENTERLINE
- LOG VANE
- LOG VANE W/ BAFFLE
- CROSS VANE
- BOULDER VANE
- IRON ROD
- GAUGE

50 0 50 150
SCALE IN FEET

SOUTHEAST CREEK

NORTH CAROLINA SEAL 21767 ENGINEER S. GRANT GINN 12-10-08

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PROJECT HOLLY GROVE STREAM RESTORATION SITE
OWNER RESTORATION SYSTEMS, INC
TITLE AS-BUILT PLANS

SCALE	DRWN. BY	PROJECT NO.	SHEET NUMBER
AS NOTED	cme	1024	9
DATE 11/26/2008	CHKD. BY SGG		

DATE	BY	REV.	DESCRIPTION

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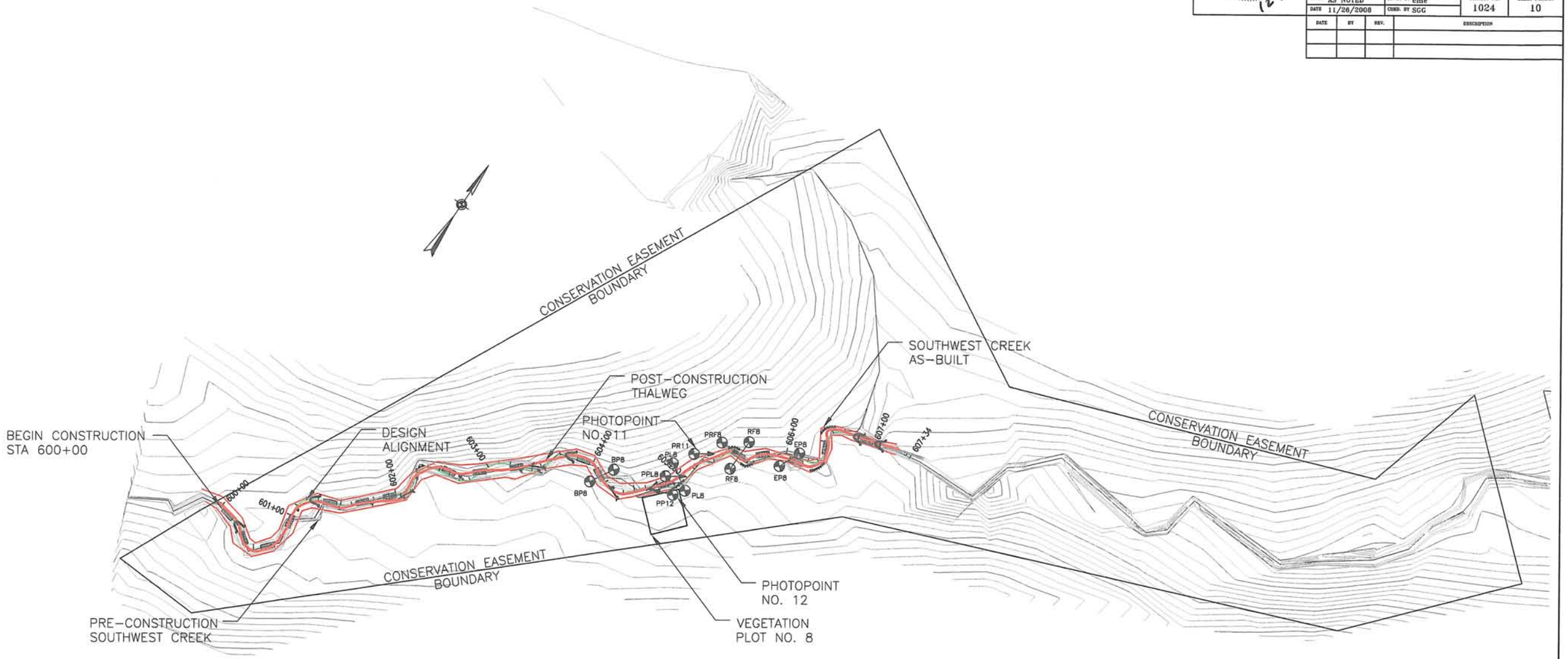
NORTH CAROLINA SEAL 021767 ENGINEER S. GRANT GINN 12-10-08

PROJECT	HOLLY GROVE STREAM RESTORATION SITE
OWNER	RESTORATION SYSTEMS, INC
TITLE	AS-BUILT PLANS

SCALE	DRWN. BY	PROJECT NO.	SHEET NUMBER
AS NOTED	eme	1024	10
DATE 11/26/2008	CHKD. BY SGG		

DATE	BY	REV.	DESCRIPTION



POINT NO.	POINT DESCRIPTION	NORTHING (FT)	EASTING (FT)	ELEVATION (FT)
BP8 RT	BEGIN PROFILE	888530.2	1829244.79	———
BP8 LT	BEGIN PROFILE	888550.58	1829256.28	———
PR8 5	PHOTOPOINT RIFFLE	888624.26	1829321.4	———
RF8 RT	RIFFLE X.S.	888609.33	1829340.21	———
RF8 LT	RIFFLE X.S.	888638.13	1829340.74	———
PPL8	PHOTOPOINT POOL	888571.69	1829296.89	———
PL8 RT	POOL X.S.	888570.92	1829318.35	———
PL8 LT	POOL X.S.	888584.77	1829295.99	———
EP8 RT	END PROFILE	888635.95	1829374.79	———
EP8 LT	END PROFILE	888655.17	1829383.15	———
PP11	PHOTOPOINT NO. 11	888602.23	1829306.57	———
PP12	PHOTOPOINT NO. 12	888562.04	1829311.53	———

50 0 50 150
SCALE IN FEET

LEGEND
- ORIGINAL CHANNEL CENTERLINE
- ORIGINAL CHANNEL
- ORIGINAL CONTOUR
- AS-BUILT THALWEG
- AS-BUILT TOP OF BANK
- DESIGN CHANNEL CENTERLINE
- LOG VANE
- LOG VANE W/ BAFFLE
- CROSS VANE
- BOULDER VANE
- IRON ROD
- GAUGE

SOUTHWEST CREEK

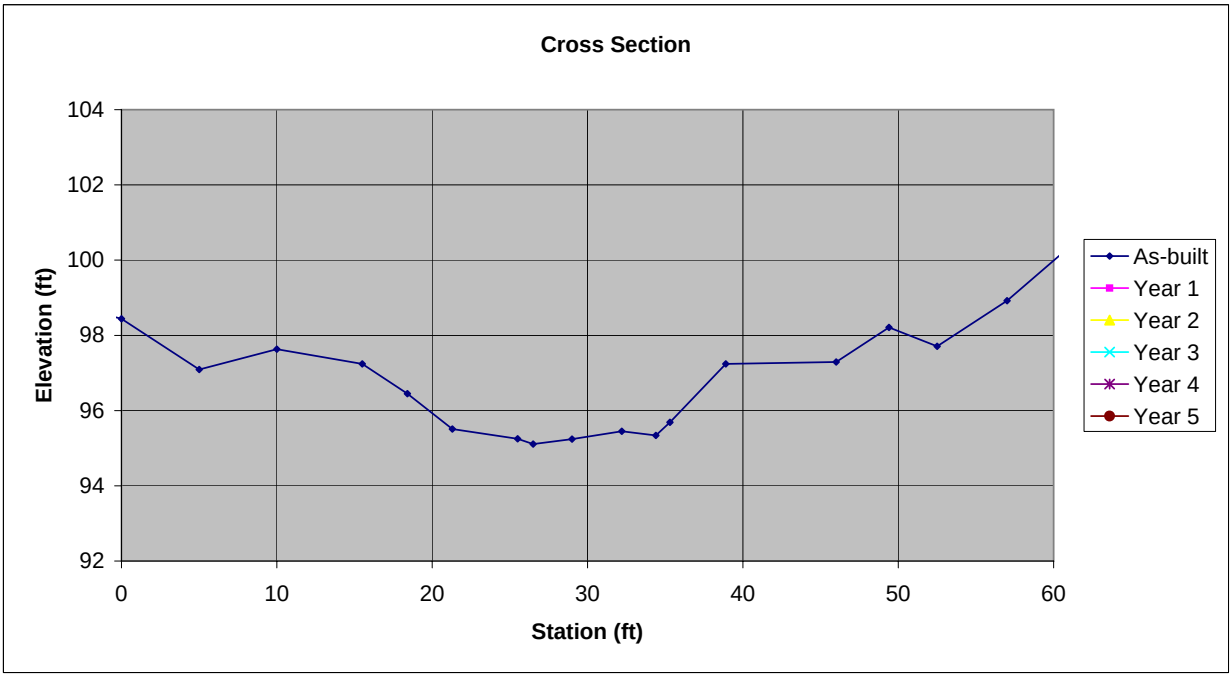
APPENDIX C

BASELINE MONITORING DATA

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section RF1
Reach 1 - Buckhorn Creek - Sta 11+78

Year 0

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	10/22/08	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	34.3	Area	0.0	Area	0.0	Area	0.0	Area	0.0	Area	0.0
Bkf W	23.4	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	1.5	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	2.1	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	16.0	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section RF1
Reach 1 - Buckhorn Creek - Sta 11+78

As-Built

Station	FS/BS	Elev.	Desc.
BM	6.36	97.34	PL IR Rt
HI		103.70	
-20	3.11	100.59	GRND
-10	3.60	100.10	
-5	4.71	98.99	
0	5.26	98.44	GRND
5	6.61	97.09	
10	6.07	97.63	
15.5	6.46	97.24	BKF
18.4	7.25	96.45	
21.3	8.19	95.51	TOE
25.5	8.45	95.25	EOW
26.5	8.59	95.11	THL
29	8.46	95.24	
32.2	8.25	95.45	
34.4	8.36	95.34	EOW
35.3	8.01	95.69	TOE
38.9	6.46	97.24	BKF
46	6.41	97.29	
49.4	5.49	98.21	
52.5	5.99	97.71	GRND
57	4.78	98.92	
62	3.00	100.70	

Year 1

Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 2

Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 3

Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 4

Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

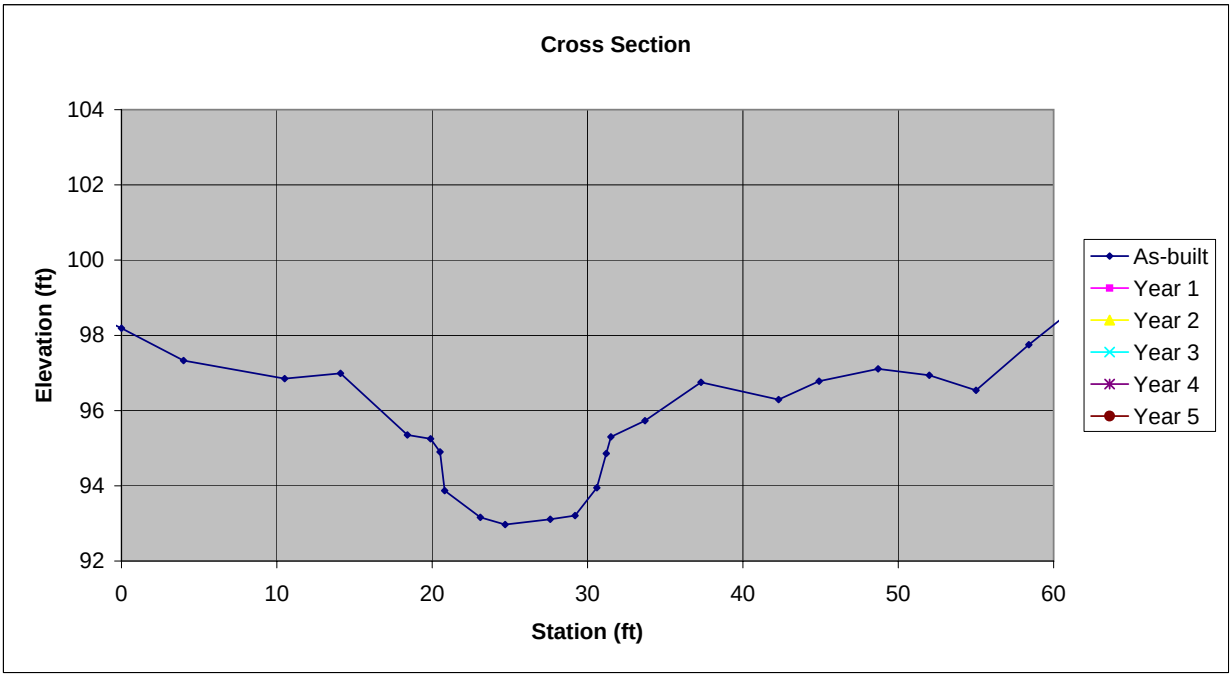
Year 5

Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section PL1
Reach 1 - Buckhorn Creek - Sta 100+00

Year 0

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	10/22/08	Date	11/17/06	Date	11/26/07	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	52.7	Area	0.0	Area	0.0	Area	0.0	Area	0.0	Area	0.0
Bkf W	23.2	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	2.3	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	4.0	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	10.2	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section PL1
Reach 1 - Buckhorn Creek - Sta 100+00

As-Built			
Station	FS/BS	Elev.	Desc.
BM	6.36	97.34	IR Rt
HI		103.70	
-25	3.35	100.35	
-10	4.12	99.58	
-3	4.91	98.79	
0	5.51	98.19	GRND
4	6.37	97.33	
10.5	6.85	96.85	
14.1	6.71	96.99	BKF
18.4	8.35	95.35	
19.9	8.45	95.25	
20.5	8.80	94.90	EOW
20.8	9.83	93.87	
23.1	10.54	93.16	
24.7	10.73	92.97	
27.6	10.59	93.11	
29.2	10.49	93.21	
30.6	9.75	93.95	
31.2	8.84	94.86	EOW
31.5	8.40	95.30	
33.7	7.97	95.73	
37.3	6.95	96.75	BKF
42.3	7.41	96.29	
44.9	6.92	96.78	
48.7	6.59	97.11	
52	6.76	96.94	
55	7.16	96.54	
58.4	5.95	97.75	
62.6	4.57	99.13	
67.5	3.17	100.53	

Year 1			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

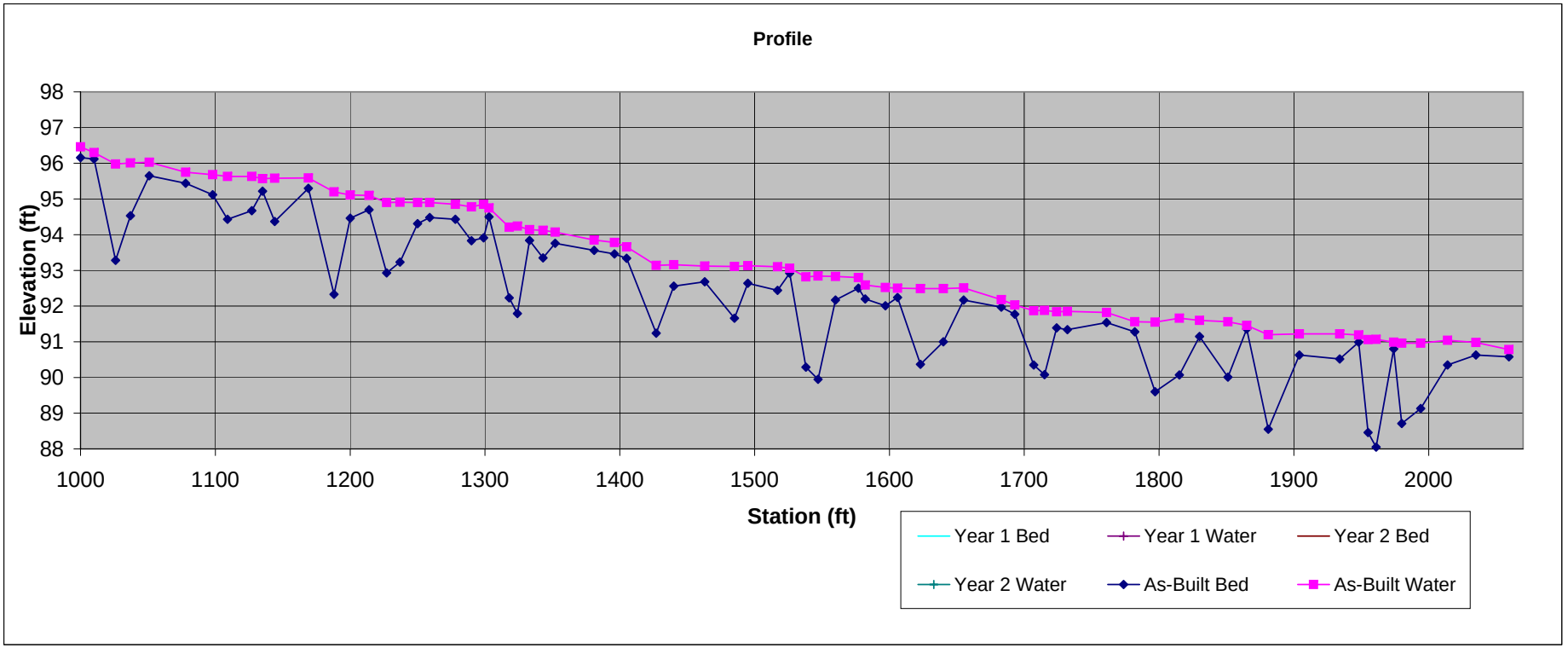
Year 2			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 3			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 4			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 5			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Holly Grove Stream Restoration Site
Guilford County, NC
Profile Reach 1 - Buckhorn Creek



Holly Grove Stream Restoration Site
Guilford County, NC
Profile Reach 1 - Buckhorn Creek

As-Built

HI	Station	Bed FS	Bed Elev.	Water Depth	Water Elev.	Bankfull FS	Bankfull Elev.	Description
106.24	1000	10.08	96.16	0.30	96.46			
106.24	1010	10.12	96.12	0.18	96.30			
106.24	1026	12.96	93.28	2.70	95.98			
106.24	1037	11.71	94.53	1.48	96.01			
106.24	1051	10.59	95.65	0.38	96.03			
106.24	1078	10.8	95.44	0.31	95.75			
106.24	1098	11.12	95.12	0.56	95.68			
106.24	1109	11.81	94.43	1.20	95.63			
106.24	1127	11.57	94.67	0.96	95.63			
106.24	1135	11.02	95.22	0.35	95.57			
106.24	1144	11.87	94.37	1.21	95.58			
106.24	1169	10.94	95.30	0.29	95.59			
106.24	1188	13.91	92.33	2.87	95.20			
106.24	1200	11.78	94.46	0.65	95.11			
106.24	1214	11.54	94.70	0.40	95.10			
106.24	1227	13.31	92.93	1.97	94.90			
106.24	1237	13.01	93.23	1.68	94.91			
106.24	1250	11.93	94.31	0.59	94.90			
106.24	1259	11.76	94.48	0.42	94.90			
106.24	1278	11.81	94.43	0.42	94.85			
106.24	1290	12.41	93.83	0.95	94.78			
106.24	1299	12.33	93.91	0.94	94.85			
106.24	1303	11.74	94.50	0.25	94.75			
103.94	1318	11.71	92.23	1.98	94.21			
103.94	1324	12.15	91.79	2.45	94.24			
103.94	1333	10.1	93.84	0.30	94.14			
103.94	1343	10.59	93.35	0.77	94.12			
103.94	1352	10.18	93.76	0.31	94.07			
103.94	1381	10.38	93.56	0.29	93.85			
103.94	1396	10.48	93.46	0.32	93.78			
103.94	1405	10.6	93.34	0.32	93.66			
103.94	1427	12.7	91.24	1.90	93.14			
103.94	1440	11.38	92.56	0.60	93.16			
103.94	1463	11.26	92.68	0.44	93.12			
103.94	1485	12.28	91.66	1.45	93.11			
103.94	1495	11.3	92.64	0.49	93.13			
103.94	1517	11.5	92.44	0.66	93.10			
103.94	1526	11.02	92.92	0.14	93.06			
103.94	1538	13.65	90.29	2.53	92.82			
103.94	1547	13.99	89.95	2.89	92.84			
103.94	1560	11.77	92.17	0.66	92.83			
103.94	1577	11.44	92.50	0.30	92.80			
103.94	1582	11.74	92.20	0.39	92.59			
103.94	1597	11.93	92.01	0.51	92.52			
103.94	1606	11.7	92.24	0.26	92.50			
103.94	1623	13.57	90.37	2.12	92.49			
103.94	1640	12.94	91.00	1.49	92.49			
103.94	1655	11.77	92.17	0.34	92.51			
103.94	1683	11.97	91.97	0.21	92.18			
103.94	1693	12.17	91.77	0.26	92.03			
103.94	1707	13.59	90.35	1.52	91.87			
103.94	1715	13.86	90.08	1.80	91.88			
103.94	1724	12.55	91.39	0.45	91.84			
103.94	1732	12.6	91.34	0.51	91.85			
100.64	1761	9.1	91.54	0.28	91.82			
100.64	1782	9.36	91.28	0.28	91.56			
100.64	1797	11.04	89.60	1.95	91.55			
100.64	1815	10.57	90.07	1.59	91.66			
100.64	1830	9.49	91.15	0.45	91.60			
100.64	1851	10.63	90.01	1.55	91.56			
100.64	1865	9.28	91.36	0.10	91.46			
100.64	1881	12.09	88.55	2.65	91.20			
100.64	1904	10.01	90.63	0.59	91.22			
100.64	1934	10.12	90.52	0.70	91.22			
100.64	1948	9.65	90.99	0.20	91.19			
100.64	1955	12.18	88.46	2.60	91.06			
100.64	1961	12.59	88.05	3.02	91.07			

Holly Grove Stream Restoration Site
Guilford County, NC
Profile Reach 1 - Buckhorn Creek

As-Built

HI	Station	Bed FS	Bed Elev.	Water Depth	Water Elev.	Bankfull FS	Bankfull Elev.	Description
100.64	1974	9.84	90.80	0.19	90.99			
100.64	1980	11.93	88.71		90.96			
100.64	1994	11.51	89.13	1.83	90.96			
100.64	2014	10.29	90.35	0.69	91.04			
100.64	2035	10.01	90.63	0.35	90.98			
100.64	2059.5	10.06	90.58	0.20	90.78			

Pebble Count Weighted by Channel Feature

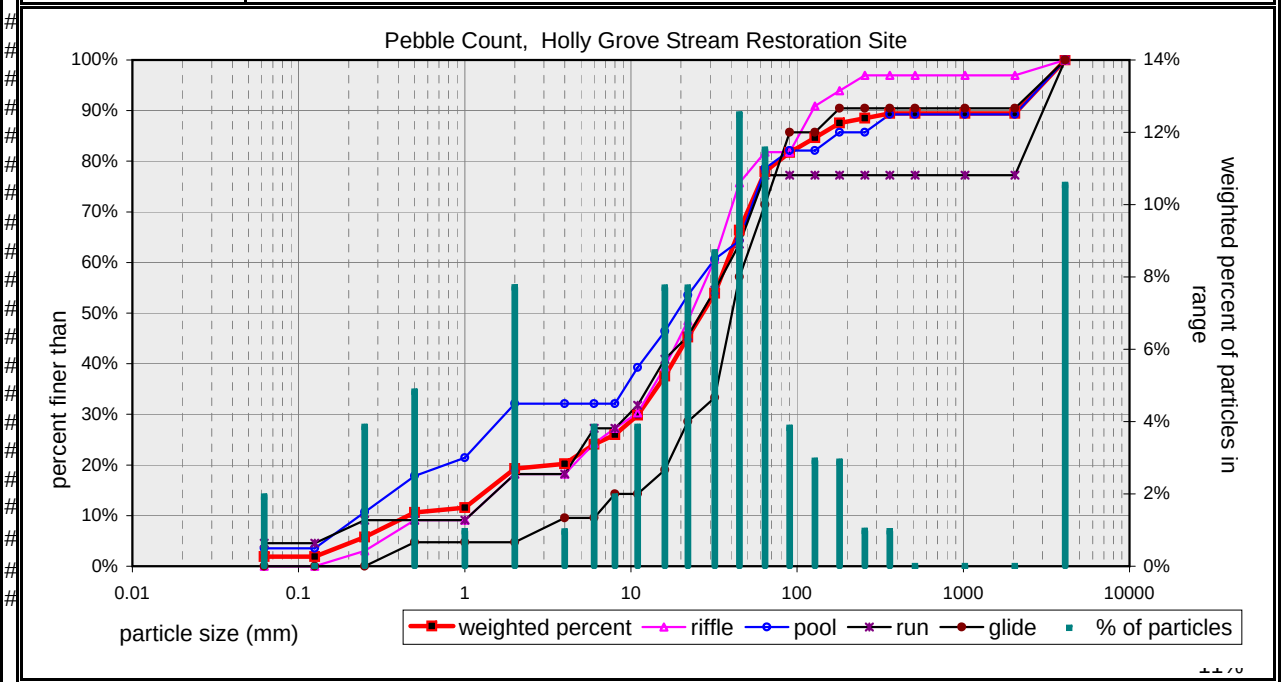
Percent Riffle:	32	Percent Run:	21
Percent Pool:	27	Percent Glide:	20

Pebble Count,

Holly Grove Stream Restoration Site
Guilford County, NC
As-Built Reach 1
Note: 2%

Material	Size Range (mm)		weighted	
silt/clay	0	0.062	1.9	#
very fine sand	0.062	0.13	0.0	#
fine sand	0.13	0.25	3.9	#
medium sand	0.25	0.5	4.8	#
coarse sand	0.5	1	1.0	#
very coarse sand	1	2	7.7	#
very fine gravel	2	4	1.0	#
fine gravel	4	6	3.8	#
fine gravel	6	8	1.9	#
medium gravel	8	11	3.9	#
medium gravel	11	16	7.7	#
coarse gravel	16	22	7.7	#
coarse gravel	22	32	8.7	#
very coarse gravel	32	45	12.5	#
very coarse gravel	45	64	11.5	#
small cobble	64	90	3.8	#
medium cobble	90	128	2.9	#
large cobble	128	180	2.9	#
very large cobble	180	256	1.0	#
small boulder	256	362	1.0	#
small boulder	362	512	0.0	#
medium boulder	512	1024	0.0	#
large boulder	1024	2048	0.0	#
very large boulder	2048	4096	10.5	#
weighted particle count:			100.0	

bedrock		0.0
clay hardpan		0.0
detritus/wood		0.0
artificial		0.0
weighted total count:		100



based on sediment particles only	size percent less than (mm)						particle size distribution		
	D16	D35	D50	D65	D84	D95	gradation	geo mean	std dev
	1.491	14.14	27.0	43	118	2948	11.3	13.3	8.9

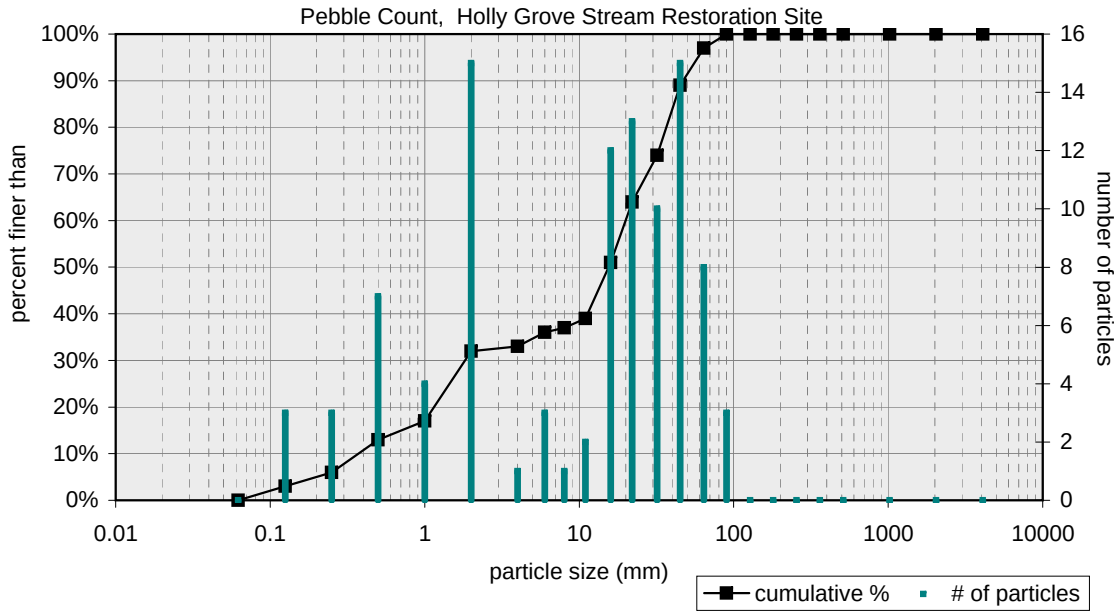
based on total count	percent by substrate type								
	silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	2%	17%	59%	11%	12%	0%	0%	0%	0%

Pebble Count of Channel Reach

Material	Size Range (mm)		Count	
silt/clay	0	0.062	**0**	##
very fine sand	0.062	0.13	**3**	##
fine sand	0.13	0.25	**3**	##
medium sand	0.25	0.5	**7**	##
coarse sand	0.5	1	**4**	##
very coarse sand	1	2	**15**	##
very fine gravel	2	4	**1**	##
fine gravel	4	6	**3**	##
fine gravel	6	8	**1**	##
medium gravel	8	11	**2**	##
medium gravel	11	16	**12**	##
coarse gravel	16	22	**13**	##
coarse gravel	22	32	**10**	##
very coarse gravel	32	45	**15**	##
very coarse gravel	45	64	**8**	##
small cobble	64	90	**3**	##
medium cobble	90	128	**0**	##
large cobble	128	180	**0**	##
very large cobble	180	256	**0**	##
small boulder	256	362	**0**	##
small boulder	362	512	**0**	##
medium boulder	512	1024	**0**	##
large boulder	1024	2048	**0**	##
very large boulder	2048	4096	**0**	##
	total particle count:		100	

bedrock			**2**
clay hardpan			
detritus/wood			
artificial			
	total count:		102

Pebble Count,
Holly Grove Stream Restoration Site
Guilford County, NC
As-Built Reach 1
Note: **Riffle**



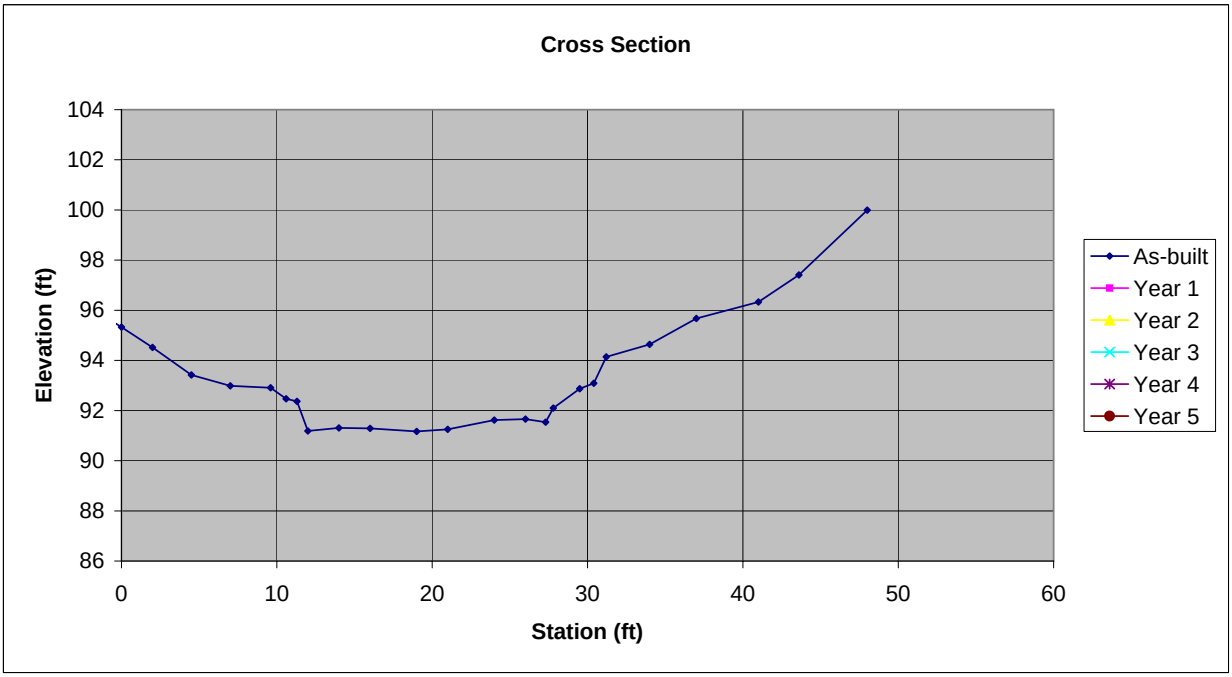
based on sediment particles only	size percent less than (mm)						particle size distribution		
	D16	D35	D50	D65	D84	D95	gradation	geo mean	std dev
	0.841	5.24	15.5	23	40	59	10.5	5.8	6.9

based on total count	percent by substrate type								
	silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	0%	31%	64%	3%	0%	2%	0%	0%	0%

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section RF2
Reach 2 - Buckhorn Creek - Sta 15+86

Year 0

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	10/22/08	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	30.3	Area	0.0	Area	0.0	Area	0.0	Area	0.0	Area	0.0
Bkf W	23.4	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	1.3	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	1.9	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	18.1	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section RF2
Reach 2 - Buckhorn Creek - Sta 15+86

As-Built			
Station	FS/BS	Elev.	Desc.
BM	6.90	95.47	IR Lt
HI		102.37	
-20	5.33	97.04	
-10	5.45	96.92	
-5	5.66	96.71	
-2	6.27	96.10	
0	7.04	95.33	GRND
2	7.85	94.52	
4.5	8.95	93.42	
7	9.38	92.99	
9.6	9.46	92.91	BKF
10.6	9.90	92.47	
11.3	10.00	92.37	EOW
12	11.18	91.19	
14	11.06	91.31	
16	11.08	91.29	
19	11.20	91.17	
21	11.12	91.25	
24	10.75	91.62	
26	10.71	91.66	
27.3	10.83	91.54	EOW
27.8	10.27	92.10	
29.5	9.50	92.87	
30.4	9.28	93.09	
31.2	8.23	94.14	BKF
34	7.73	94.64	
37	6.70	95.67	
41	6.04	96.33	
43.6	4.96	97.41	GRND
48	2.38	99.99	

Year 1			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 2			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 3			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

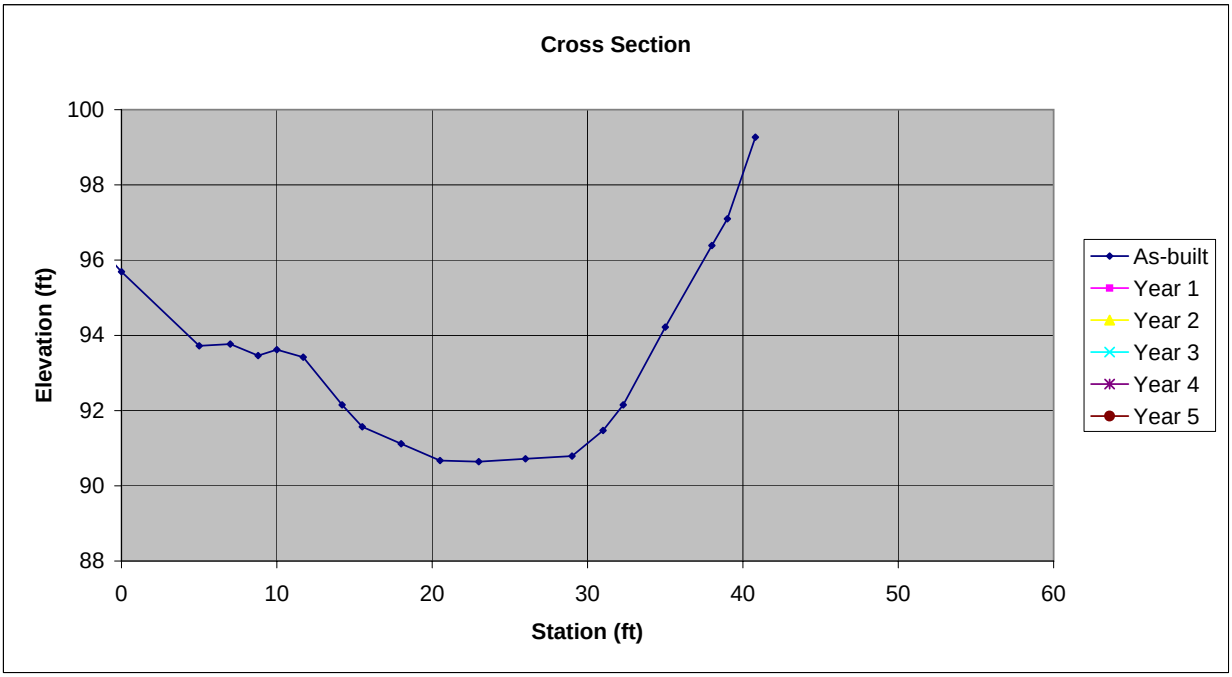
Year 4			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 5			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section PL2
Reach 2 - Buckhorn Creek - Sta 15+27

Year 0

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	10/2/08	Date	11/17/06	Date	11/26/07	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	45.6	Area	0.0	Area	0.0	Area	0.0	Area	0.0	Area	0.0
Bkf W	23.3	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	2.0	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	2.8	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	11.9	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section PL2
Reach 2 - Buckhorn Creek - Sta 15+27

As-Built			
Station	FS/BS	Elev.	Desc.
BM	6.90	95.47	IR Lt
HI		102.37	
-20	5.09	97.28	
-10	5.13	97.24	
-3	5.30	97.07	
0	6.68	95.69	GRND
5	8.65	93.72	
7	8.60	93.77	
8.8	8.91	93.46	
10	8.75	93.62	
11.7	8.95	93.42	BKF
14.2	10.22	92.15	
15.5	10.80	91.57	
18	11.25	91.12	
20.5	11.70	90.67	
23	11.73	90.64	BR
26	11.65	90.72	BR
29	11.58	90.79	
31	10.90	91.47	
32.3	10.22	92.15	EOW
35	8.15	94.22	
38	5.98	96.39	
39	5.27	97.10	
40.8	3.10	99.27	

Year 1			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

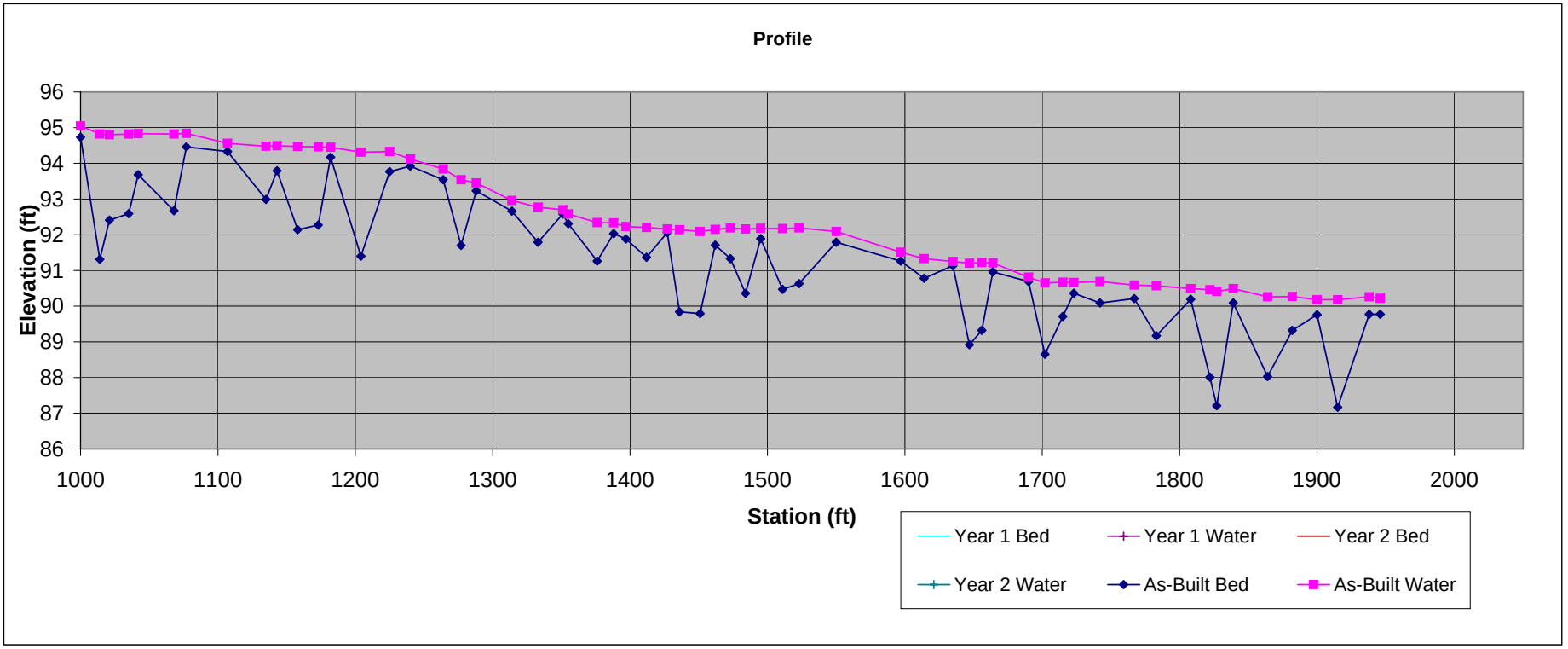
Year 2			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 3			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 4			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 5			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Holly Grove Stream Restoration Site
Guilford County, NC
Profile Reach 2 - Buckhorn Creek



Holly Grove Stream Restoration Site
Guilford County, NC
Profile Reach 2 - Buckhorn Creek

As-Built

HI	Station	Bed FS	Bed Elev.	Water Depth	Water Elev.	Bankfull FS	Bankfull Elev.	Description
102.30	1000	7.57	94.73	0.32	95.05			
102.30	1014	10.99	91.31	3.51	94.82			
102.30	1021	9.89	92.41	2.39	94.80			
102.30	1035	9.71	92.59	2.23	94.82			
102.30	1042	8.62	93.68	1.15	94.83			
102.30	1068	9.63	92.67	2.15	94.82			
102.30	1077	7.84	94.46	0.38	94.84			
102.30	1107	7.97	94.33	0.23	94.56			
102.30	1135	9.31	92.99	1.49	94.48			
102.30	1143	8.51	93.79	0.70	94.49			
102.30	1158	10.16	92.14	2.33	94.47			
102.30	1173	10.03	92.27	2.19	94.46			
102.30	1182	8.13	94.17	0.28	94.45			
102.30	1204	10.9	91.40	2.91	94.31			
102.30	1225	8.53	93.77	0.56	94.33			
102.30	1240	8.38	93.92	0.20	94.12			
102.30	1264	8.76	93.54	0.30	93.84			
102.30	1277	10.6	91.70	1.84	93.54			
102.30	1288	9.07	93.23	0.22	93.45			
102.30	1314	9.64	92.66	0.30	92.96			
102.30	1333	10.51	91.79	0.98	92.77			
102.30	1351	9.72	92.58	0.12	92.70			
102.30	1355	9.99	92.31	0.27	92.58			
100.27	1376	9.01	91.26	1.08	92.34			
100.27	1388	8.24	92.03	0.30	92.33			
100.27	1397	8.39	91.88	0.35	92.23			
100.27	1412	8.9	91.37	0.83	92.20			
100.27	1427	8.21	92.06	0.10	92.16			
100.27	1436	10.43	89.84	2.30	92.14			
100.27	1451	10.48	89.79	2.30	92.09			
100.27	1462	8.56	91.71	0.44	92.15			
100.27	1473	8.94	91.33	0.86	92.19			
100.27	1484	9.91	90.36	1.80	92.16			
100.27	1495	8.38	91.89	0.29	92.18			
100.27	1511	9.8	90.47	1.70	92.17			
100.27	1523	9.64	90.63	1.56	92.19			
100.27	1550	8.48	91.79	0.30	92.09			
100.27	1597	9.01	91.26	0.25	91.51			
100.27	1614	9.49	90.78	0.55	91.33			
100.27	1635	9.14	91.13	0.12	91.25			
100.27	1647	11.35	88.92	2.28	91.20			
100.27	1656	10.95	89.32	1.90	91.22			
100.27	1664	9.31	90.96	0.25	91.21			
100.27	1690	9.58	90.69	0.12	90.81			
100.27	1702	11.62	88.65	2.00	90.65			
100.27	1715	10.56	89.71	0.96	90.67			
100.27	1723	9.91	90.36	0.30	90.66			
100.27	1742	10.18	90.09	0.60	90.69			
100.27	1767	10.06	90.21	0.38	90.59			
100.27	1783	11.1	89.17	1.40	90.57			
100.27	1808	10.08	90.19	0.30	90.49			
100.27	1822	12.26	88.01	2.45	90.46			
100.27	1827	13.06	87.21	3.20	90.41			
100.27	1839	10.18	90.09	0.40	90.49			
97.51	1864	9.48	88.03	2.23	90.26			
97.51	1882	8.19	89.32	0.95	90.27			
97.51	1900	7.75	89.76		90.18			
97.51	1915	10.34	87.17	3.01	90.18			
97.51	1938	7.74	89.77	0.49	90.26			
97.51	1946	7.74	89.77	0.45	90.22			

Pebble Count Weighted by Channel Feature

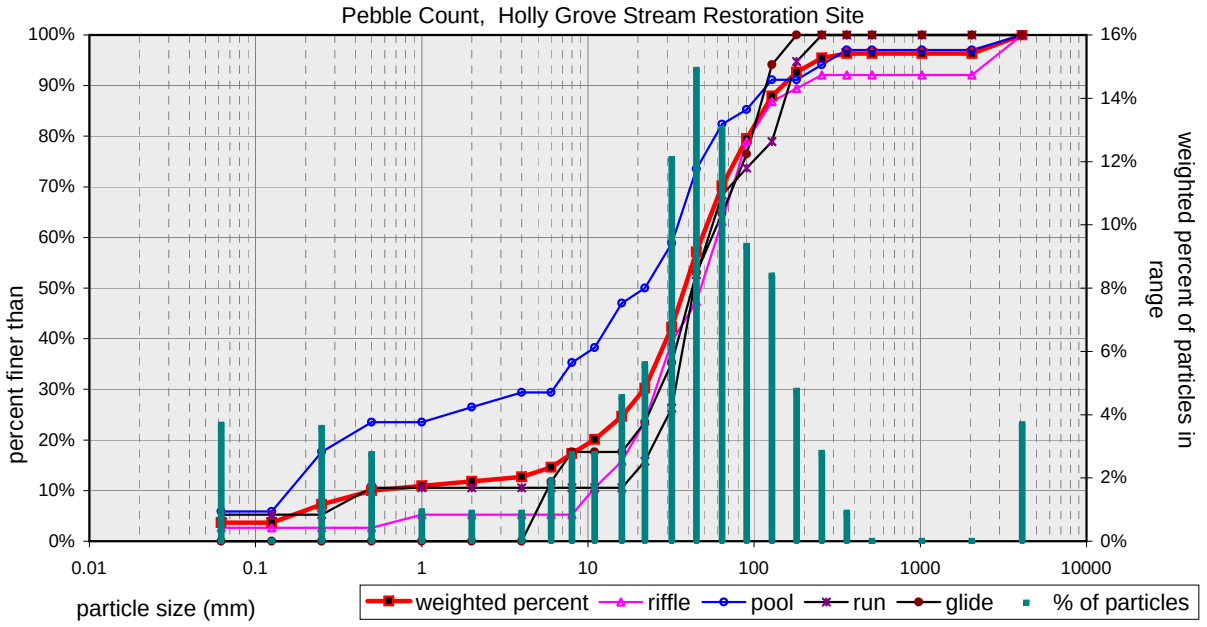
Percent Riffle:	35	Percent Run:	18
Percent Pool:	31	Percent Glide:	16

Pebble Count,

Material	Size Range (mm)		weighted	
silt/clay	0	0.062	3.6	#
very fine sand	0.062	0.13	0.0	#
fine sand	0.13	0.25	3.5	#
medium sand	0.25	0.5	2.7	#
coarse sand	0.5	1	0.9	#
very coarse sand	1	2	0.9	#
very fine gravel	2	4	0.9	#
fine gravel	4	6	1.9	#
fine gravel	6	8	2.7	#
medium gravel	8	11	2.7	#
medium gravel	11	16	4.5	#
coarse gravel	16	22	5.5	#
coarse gravel	22	32	12.0	#
very coarse gravel	32	45	14.8	#
very coarse gravel	45	64	12.9	#
small cobble	64	90	9.2	#
medium cobble	90	128	8.3	#
large cobble	128	180	4.7	#
very large cobble	180	256	2.8	#
small boulder	256	362	0.9	#
small boulder	362	512	0.0	#
medium boulder	512	1024	0.0	#
large boulder	1024	2048	0.0	#
very large boulder	2048	4096	3.6	#
weighted particle count:			99.1	

bedrock		0.9
clay hardpan		0.0
detritus/wood		0.0
artificial		0.0
weighted total count:		100

Holly Grove Stream Restoration Site
Guilford County, NC
As-Built Reach 2
Note: 4%



based on sediment particles only	size percent less than (mm)						particle size distribution		
	D16	D35	D50	D65	D84	D95	gradation	geo mean	std dev
	6.947	25.52	38.2	56	109	243	4.2	27.5	4.0

based on total count	percent by substrate type								
	silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	4%	8%	58%	25%	5%	1%	0%	0%	0%

Pebble Count of Channel Reach

Pebble Count,

Holly Grove Stream Restoration Site

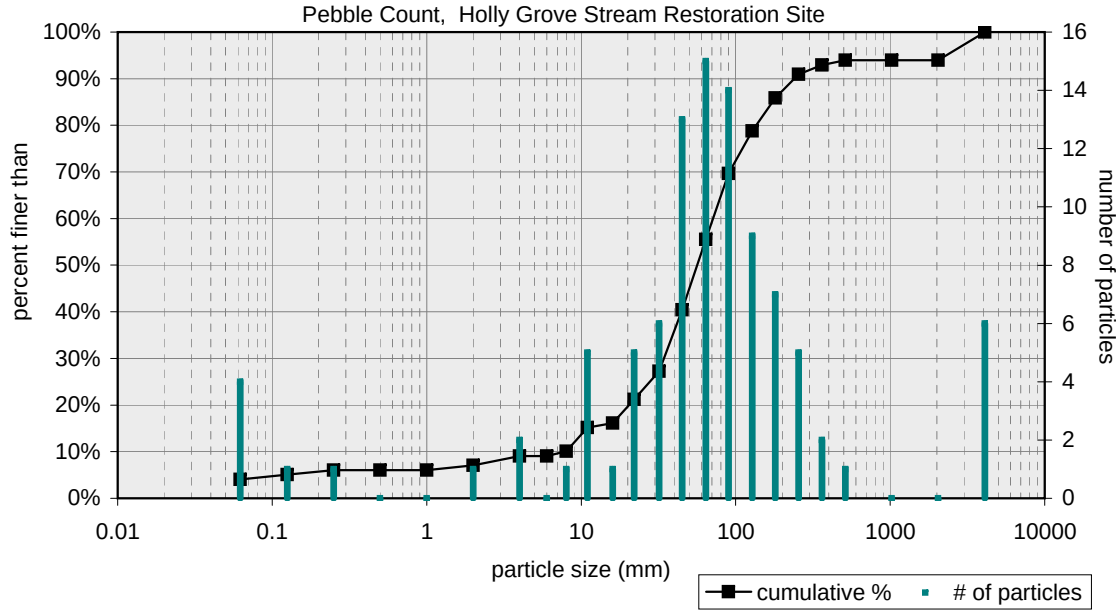
Guilford County, NC

As-Built Reach 2

Note: **Riffle**

Material	Size Range (mm)		Count	
silt/clay	0	0.062	**4**	##
very fine sand	0.062	0.13	**1**	##
fine sand	0.13	0.25	**1**	##
medium sand	0.25	0.5	**0**	##
coarse sand	0.5	1	**0**	##
very coarse sand	1	2	**1**	##
very fine gravel	2	4	**2**	##
fine gravel	4	6	**0**	##
fine gravel	6	8	**1**	##
medium gravel	8	11	**5**	##
medium gravel	11	16	**1**	##
coarse gravel	16	22	**5**	##
coarse gravel	22	32	**6**	##
very coarse gravel	32	45	**13**	##
very coarse gravel	45	64	**15**	##
small cobble	64	90	**14**	##
medium cobble	90	128	**9**	##
large cobble	128	180	**7**	##
very large cobble	180	256	**5**	##
small boulder	256	362	**2**	##
small boulder	362	512	**1**	##
medium boulder	512	1024	**0**	##
large boulder	1024	2048	**0**	##
very large boulder	2048	4096	**6**	##
		total particle count:	99	

bedrock		
clay hardpan		
detritus/wood		
artificial		
	total count:	99



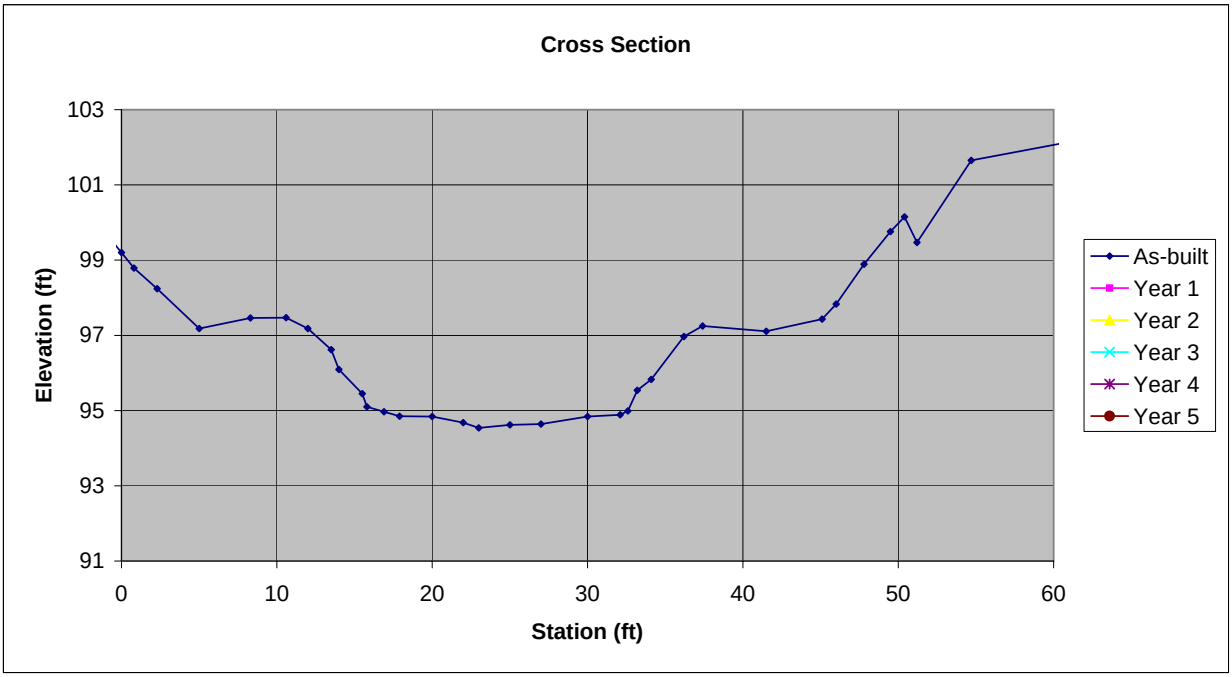
based on sediment particles only	size percent less than (mm)						particle size distribution		
	D16	D35	D50	D65	D84	D95	gradation	geo mean	std dev
	15.069	39.11	56.2	80	165	2312	3.3	49.8	3.3

based on total count	percent by substrate type								
	silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	4%	3%	48%	35%	9%	0%	0%	0%	0%

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section RF3
Reach 3 - Buckhorn Creek - Sta 12+49

Year 0

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	10/22/08	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	48.3	Area	0.0	Area	0.0	Area	0.0	Area	0.0	Area	0.0
Bkf W	25.4	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	1.9	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	2.6	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	13.4	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section RF3
Reach 3 - Buckhorn Creek - Sta 12+49

As-Built			
Station	FS/BS	Elev.	Desc.
BM	5.88	99.44	IR Lt
HI		105.32	
-20	4.71	100.61	
-10	5.33	99.99	
-1	5.61	99.71	
0	6.12	99.20	GRND
0.8	6.53	98.79	
2.3	7.08	98.24	
5	8.14	97.18	
8.3	7.86	97.46	
10.6	7.85	97.47	
12	8.14	97.18	BKF
13.5	8.70	96.62	
14	9.23	96.09	
15.5	9.87	95.45	
15.8	10.22	95.10	
16.9	10.35	94.97	
17.9	10.47	94.85	EOW
20	10.48	94.84	
22	10.64	94.68	
23	10.78	94.54	
25	10.70	94.62	
27	10.68	94.64	
30	10.48	94.84	
32.1	10.43	94.89	EOW
32.6	10.33	94.99	
33.2	9.78	95.54	
34.1	9.49	95.83	
36.2	8.35	96.97	
37.4	8.07	97.25	BKF
41.5	8.21	97.11	
45.1	7.89	97.43	
46	7.49	97.83	
47.8	6.43	98.89	
49.5	5.56	99.76	
50.4	5.17	100.15	GRND
51.2	5.85	99.47	
54.7	3.67	101.65	
61	3.18	102.14	
68	2.85	102.47	

Year 1			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 2			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 3			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

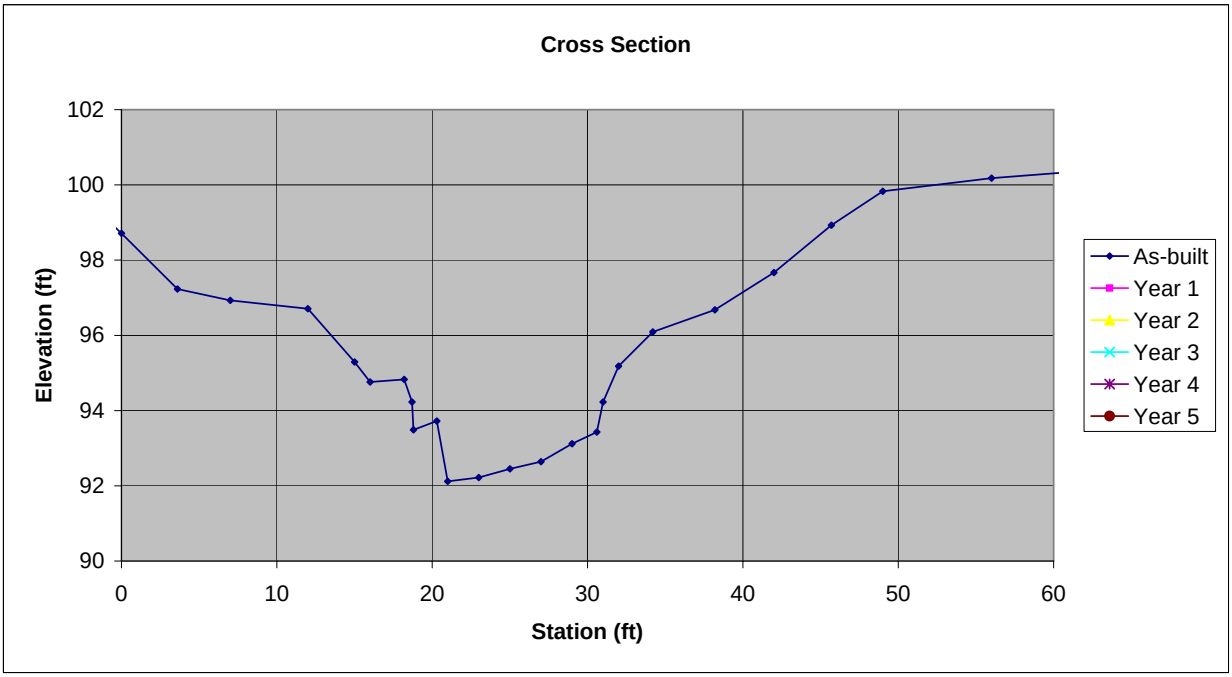
Year 4			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 5			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section PL3
Reach 3 - Buckhorn Creek - Sta 13+31

Year 0

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	10/22/08	Date	11/17/06	Date	11/26/07	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	61.6	Area	0.0	Area	0.0	Area	0.0	Area	0.0	Area	0.0
Bkf W	22.2	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	2.8	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	4.6	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	8.0	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section PL3
Reach 3 - Buckhorn Creek - Sta 13+31

As-Built			
Station	FS/BS	Elev.	Desc.
BM	5.88	99.44	IR Lt
HI		105.32	
-20	4.23	101.09	
-14.5	4.60	100.72	
-12	5.23	100.09	
-2.5	5.62	99.70	
0	6.61	98.71	
3.6	8.09	97.23	
7	8.39	96.93	BKF
12	8.61	96.71	
15	10.03	95.29	
16	10.56	94.76	
18.2	10.49	94.83	LOG
18.7	11.09	94.23	EOW
18.8	11.83	93.49	
20.3	11.60	93.72	
21	13.20	92.12	
23	13.10	92.22	
25	12.87	92.45	
27	12.68	92.64	
29	12.20	93.12	
30.6	11.89	93.43	
31	11.09	94.23	EOW
32	10.14	95.18	
34.2	9.23	96.09	BKF
38.2	8.64	96.68	
42	7.65	97.67	
45.7	6.39	98.93	GRND
49	5.49	99.83	
56	5.14	100.18	
66	4.82	100.50	

Year 1			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

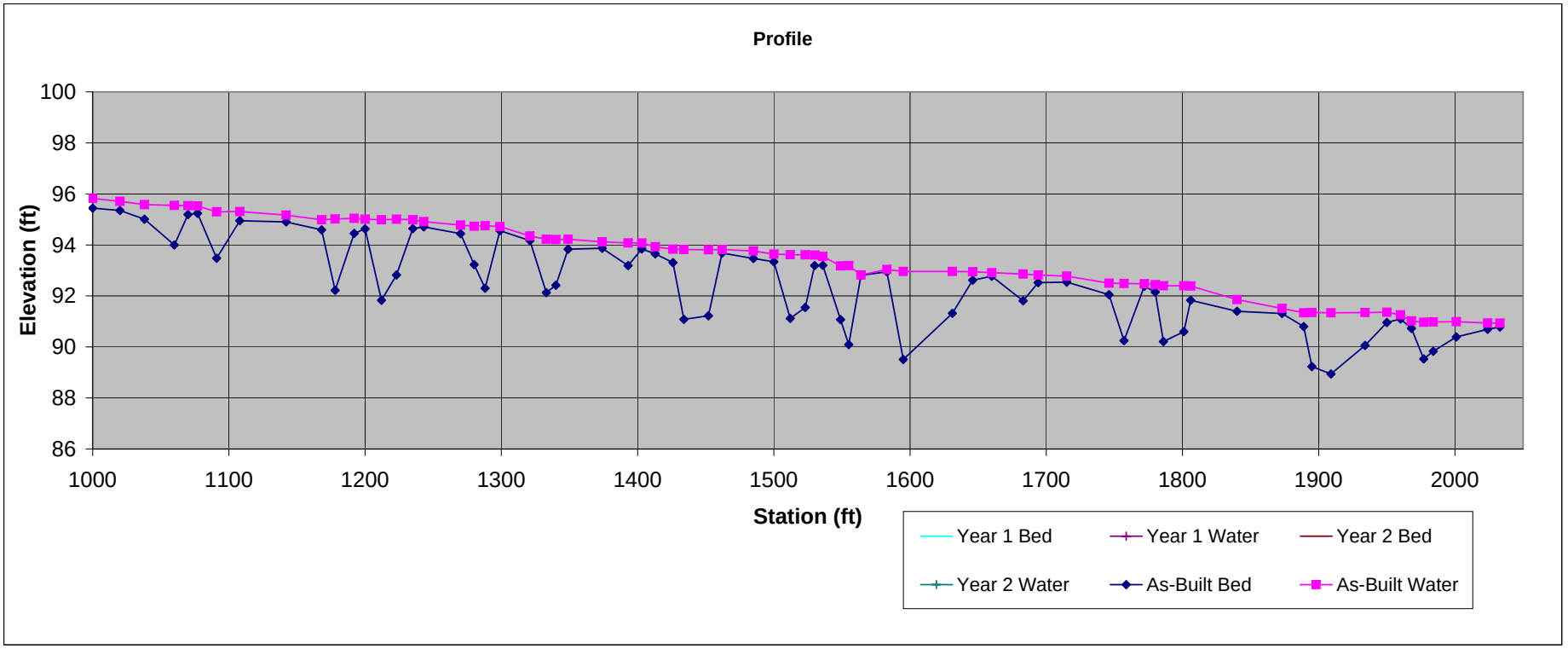
Year 2			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 3			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 4			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 5			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Holly Grove Stream Restoration Site
Guilford County, NC
Profile Reach 3 - Buckhorn Creek



Holly Grove Stream Restoration Site
Guilford County, NC
Profile Reach 3 - Buckhorn Creek

As-Built

HI	Station	Bed FS	Bed Elev.	Water Depth	Water Elev.	Bankfull FS	Bankfull Elev.	Description
104.96	1000	9.52	95.44	0.38	95.82			
104.96	1020	9.61	95.35	0.36	95.71			
104.96	1038	9.95	95.01	0.57	95.58			
104.96	1060	10.96	94.00	1.55	95.55			
104.96	1070	9.77	95.19	0.35	95.54			
104.96	1077	9.72	95.24	0.29	95.53			
104.96	1091	11.48	93.48	1.82	95.30			
104.96	1108	10.01	94.95	0.36	95.31			
104.96	1142	10.06	94.90	0.27	95.17			
104.96	1168	10.37	94.59	0.40	94.99			
104.96	1178	12.74	92.22	2.80	95.02			
104.96	1192	10.51	94.45	0.59	95.04			
104.96	1200	10.33	94.63	0.38	95.01			
104.96	1212	13.13	91.83	3.16	94.99			
104.96	1223	12.14	92.82	2.19	95.01			
104.96	1235	10.32	94.64	0.35	94.99			
104.96	1243	10.25	94.71	0.20	94.91			
104.96	1270	10.52	94.44	0.34	94.78			
104.96	1280	11.73	93.23	1.50	94.73			
104.96	1288	12.66	92.30	2.45	94.75			
104.96	1299	10.40	94.56	0.16	94.72			
104.96	1321	10.79	94.17	0.18	94.35			
104.96	1333	12.83	92.13	2.09	94.22			
104.96	1340	12.54	92.42	1.79	94.21			
104.96	1349	11.13	93.83	0.39	94.22			
104.96	1374	11.09	93.87	0.25	94.12			
104.96	1393	11.77	93.19	0.89	94.08			
104.96	1403	11.12	93.84	0.23	94.07			
104.96	1413	11.31	93.65	0.28	93.93			
104.96	1426	11.65	93.31	0.52	93.83			
104.96	1434	13.88	91.08	2.74	93.82			
104.96	1452	13.74	91.22	2.59	93.81			
104.96	1462	11.28	93.68	0.14	93.82			
104.96	1485	11.49	93.47	0.29	93.76			
104.96	1500	11.62	93.34	0.30	93.64			
104.96	1512	13.84	91.12	2.50	93.62			
104.96	1523	13.41	91.55	2.06	93.61			
104.96	1530	11.77	93.19	0.41	93.60			
104.96	1536	11.76	93.20	0.35	93.55			
102.14	1549	11.07	91.07	2.11	93.18			
102.14	1555	12.05	90.09	3.10	93.19			
102.14	1564	9.33	92.81	0.01	92.82			
102.14	1583	9.19	92.95	0.09	93.04			
102.14	1595	12.63	89.51	3.45	92.96			
102.14	1631	10.82	91.32	1.64	92.96			
102.14	1646	9.52	92.62	0.33	92.95			
102.14	1660	9.37	92.77	0.14	92.91			
102.14	1683	10.33	91.81	1.05	92.86			
102.14	1694	9.62	92.52	0.30	92.82			
102.14	1715	9.60	92.54	0.24	92.78			
102.14	1746	10.09	92.05	0.45	92.50			
102.14	1757	11.89	90.25	2.24	92.49			
102.14	1772	9.76	92.38	0.10	92.48			
102.14	1780	9.99	92.15	0.29	92.44			
102.14	1786	11.93	90.21	2.19	92.40			
102.14	1801	11.54	90.60	1.80	92.40			
102.14	1806	10.31	91.83	0.56	92.39			
102.14	1840	10.74	91.40	0.46	91.86			
102.14	1873	10.83	91.31	0.20	91.51			
102.14	1889	11.34	90.80	0.54	91.34			
102.14	1895	12.91	89.23	2.12	91.35			
102.14	1909	13.20	88.94	2.40	91.34			
102.14	1934	12.08	90.06	1.29	91.35			
102.14	1950	11.18	90.96	0.40	91.36			
102.14	1960	11.04	91.10	0.16	91.26			
102.14	1968	11.41	90.73	0.29	91.02			
102.14	1977	12.61	89.53	1.44	90.97			

Holly Grove Stream Restoration Site
Guilford County, NC
Profile Reach 3 - Buckhorn Creek

As-Built

HI	Station	Bed FS	Bed Elev.	Water Depth	Water Elev.	Bankfull FS	Bankfull Elev.	Description
102.14	1984	12.31	89.83	1.15	90.98			
102.14	2001	11.75	90.39	0.60	90.99			
102.14	2024	11.45	90.69	0.25	90.94			
102.14	2033	11.36	90.78	0.15	90.93			

Pebble Count Weighted by Channel Feature

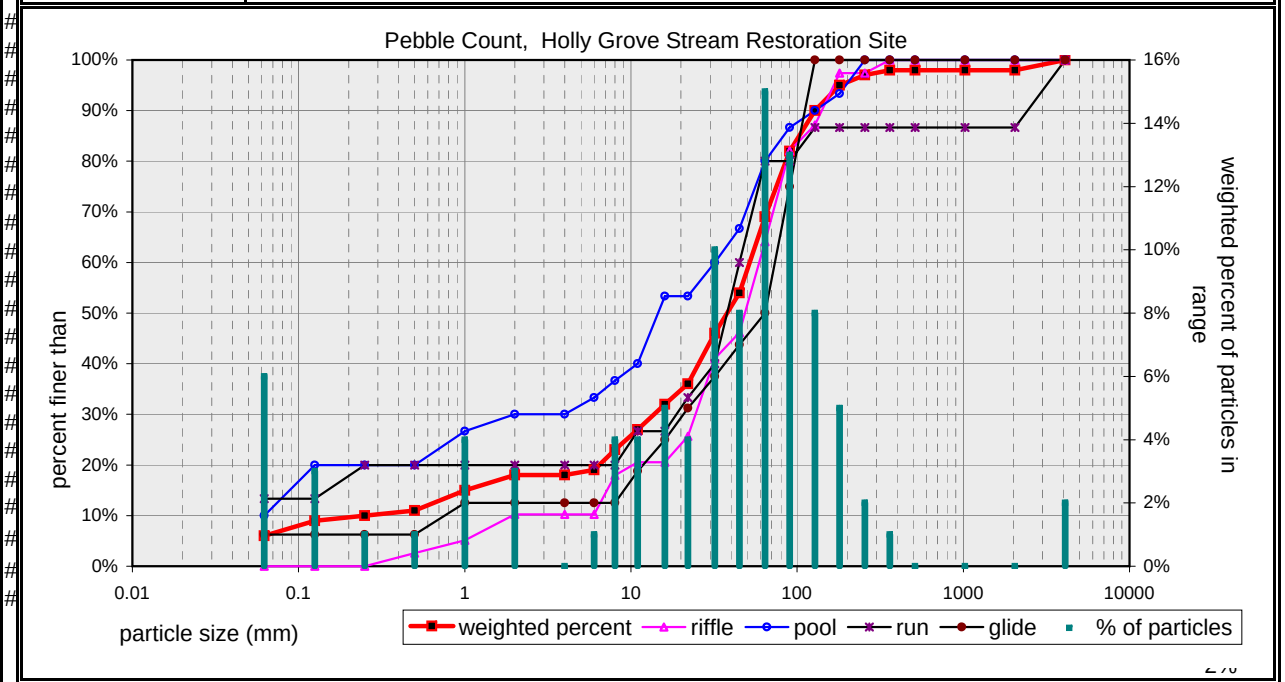
Percent Riffle:	39	Percent Run:	15
Percent Pool:	30	Percent Glide:	16

Pebble Count,

	Holly Grove Stream Restoration Site
	Guilford County, NC
	As-Built Reach 3
Note:	6%

Material	Size Range (mm)		weighted	
silt/clay	0	0.062	6.0	#
very fine sand	0.062	0.13	3.0	#
fine sand	0.13	0.25	1.0	#
medium sand	0.25	0.5	1.0	#
coarse sand	0.5	1	4.0	#
very coarse sand	1	2	3.0	#
very fine gravel	2	4	0.0	#
fine gravel	4	6	1.0	#
fine gravel	6	8	4.0	#
medium gravel	8	11	4.0	#
medium gravel	11	16	5.0	#
coarse gravel	16	22	4.0	#
coarse gravel	22	32	10.0	#
very coarse gravel	32	45	8.0	#
very coarse gravel	45	64	15.0	#
small cobble	64	90	13.0	#
medium cobble	90	128	8.0	#
large cobble	128	180	5.0	#
very large cobble	180	256	2.0	#
small boulder	256	362	1.0	#
small boulder	362	512	0.0	#
medium boulder	512	1024	0.0	#
large boulder	1024	2048	0.0	#
very large boulder	2048	4096	2.0	#
weighted particle count:			100.0	

bedrock		0.0
clay hardpan		0.0
detritus/wood		0.0
artificial		0.0
weighted total count:		100



based on sediment particles only	size percent less than (mm)						particle size distribution		
	D16	D35	D50	D65	D84	D95	gradation	geo mean	std dev
	1.260	20.32	37.9	58	98	180	16.4	11.1	8.8

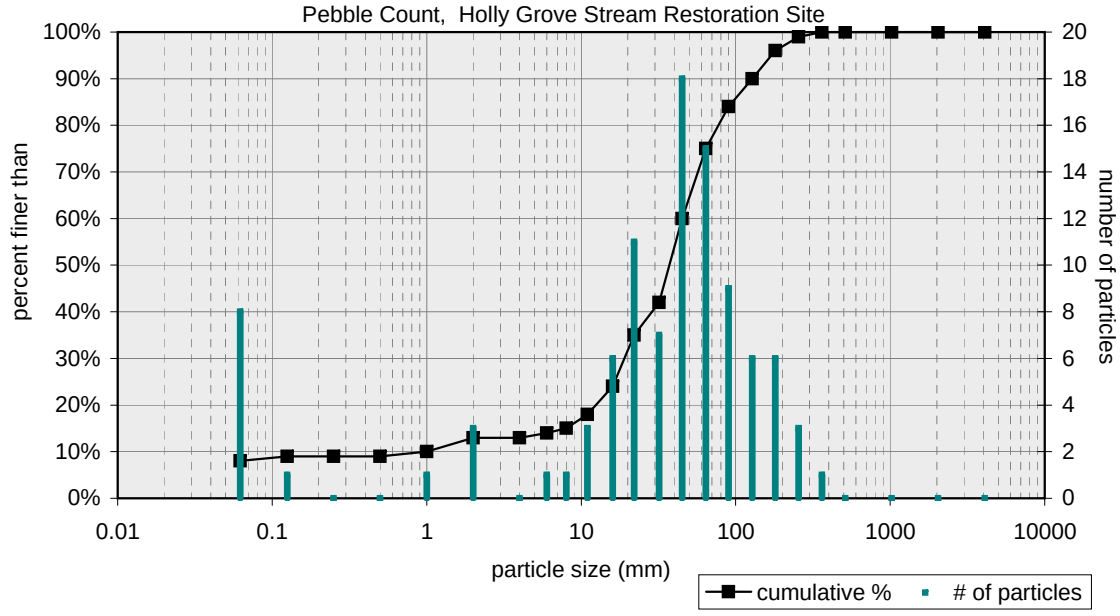
based on total count	percent by substrate type								
	silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	6%	12%	51%	28%	3%	0%	0%	0%	0%

Pebble Count of Channel Reach

Pebble Count,
Holly Grove Stream Restoration Site
Guilford County, NC
As-Built Reach 3
Note: **Riffle**

Material	Size Range (mm)		Count	
silt/clay	0	0.062	**8**	##
very fine sand	0.062	0.13	**1**	##
fine sand	0.13	0.25	**0**	##
medium sand	0.25	0.5	**0**	##
coarse sand	0.5	1	**1**	##
very coarse sand	1	2	**3**	##
very fine gravel	2	4	**0**	##
fine gravel	4	6	**1**	##
fine gravel	6	8	**1**	##
medium gravel	8	11	**3**	##
medium gravel	11	16	**6**	##
coarse gravel	16	22	**11**	##
coarse gravel	22	32	**7**	##
very coarse gravel	32	45	**18**	##
very coarse gravel	45	64	**15**	##
small cobble	64	90	**9**	##
medium cobble	90	128	**6**	##
large cobble	128	180	**6**	##
very large cobble	180	256	**3**	##
small boulder	256	362	**1**	##
small boulder	362	512	**0**	##
medium boulder	512	1024	**0**	##
large boulder	1024	2048	**0**	##
very large boulder	2048	4096	**0**	##
	total particle count:		100	

bedrock		
clay hardpan		
detritus/wood		
artificial		
	total count:	100



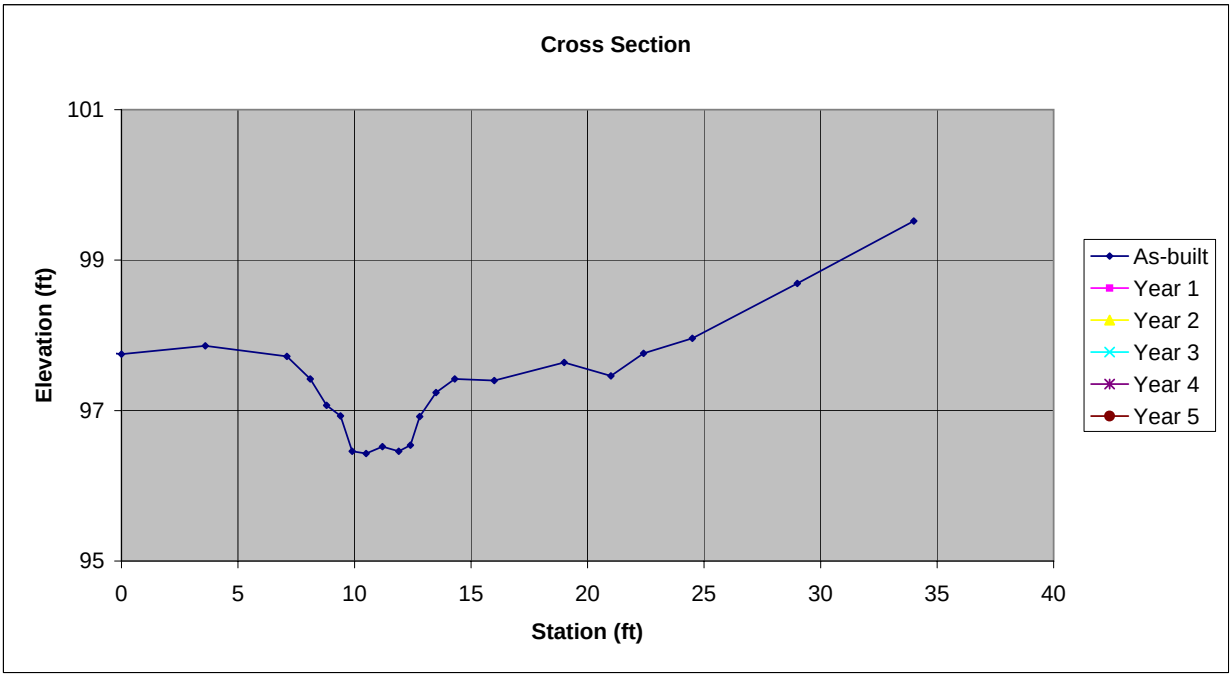
based on sediment particles only	size percent less than (mm)						particle size distribution		
	D16	D35	D50	D65	D84	D95	gradation	geo mean	std dev
	8.896	22.00	37.2	51	90	170	3.3	28.3	3.2

based on total count	percent by substrate type								
	silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	8%	5%	62%	24%	1%	0%	0%	0%	0%

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section RF4
Reach 4 - Middle Branch - Sta 10+88

Year 0

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	10/22/08	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	3.7	Area	0.0	Area	0.0	Area	0.0	Area	0.0	Area	0.0
Bkf W	6.2	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	0.6	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	1.0	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	10.4	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section RF4
Reach 4 - Middle Branch - Sta 10+88

As-Built			
Station	FS/BS	Elev.	Desc.
BM	3.96	100.00	IR Lt
HI		103.96	
-15	5.26	98.70	
-6	6.00	97.96	
0	6.21	97.75	
3.6	6.10	97.86	
7.1	6.24	97.72	
8.1	6.54	97.42	
8.8	6.89	97.07	
9.4	7.03	96.93	
9.9	7.50	96.46	
10.5	7.53	96.43	
11.2	7.44	96.52	
11.9	7.50	96.46	
12.4	7.42	96.54	
12.8	7.04	96.92	
13.5	6.72	97.24	
14.3	6.54	97.42	
16	6.56	97.40	
19	6.32	97.64	
21	6.50	97.46	
22.4	6.20	97.76	
24.5	6.00	97.96	
29	5.27	98.69	
34	4.44	99.52	

Year 1			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 2			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 3			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

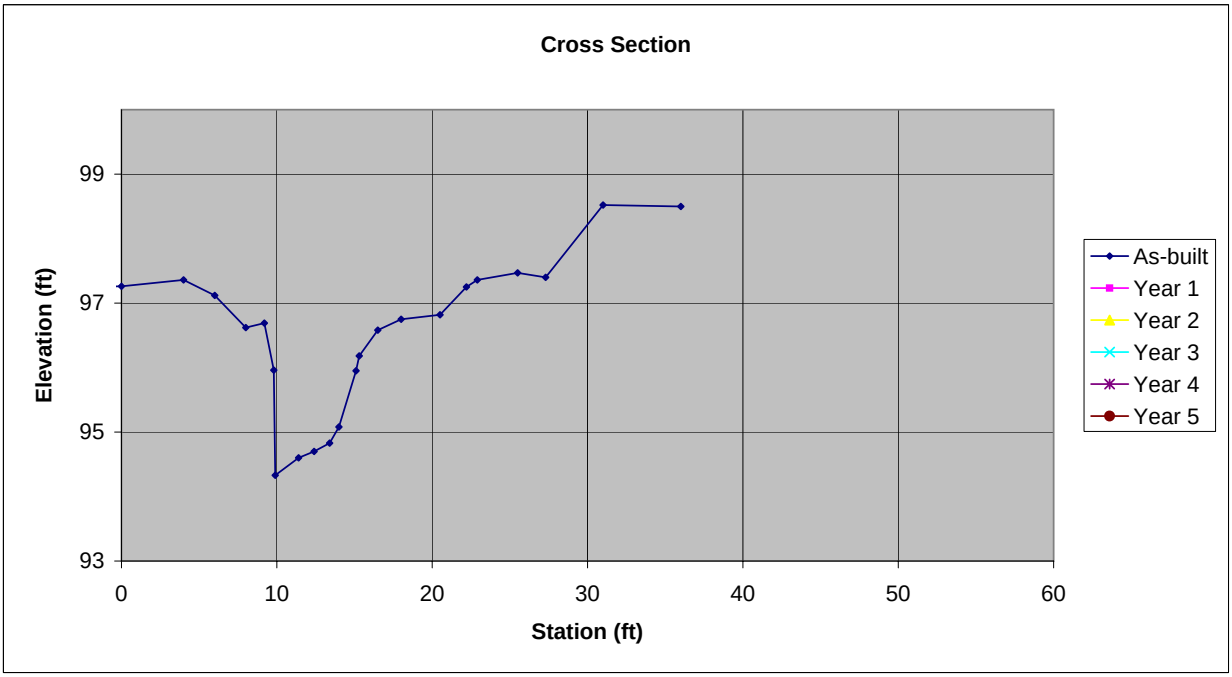
Year 4			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 5			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section PL4
Reach 4 - Middle Branch - Sta 11+14

Year 0

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	5/4/06	Date	11/17/06	Date	11/26/07	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	11.1	Area	0.0	Area	0.0	Area	0.0	Area	0.0	Area	0.0
Bkf W	8.8	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	1.3	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	2.4	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	7.0	W/d	#DIV/0!	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section PL4
Reach 4 - Middle Branch - Sta 11+14

As-Built			
Station	FS/BS	Elev.	Desc.
BM	3.20	100.00	IR Lt
HI		103.20	
-20	5.17	98.03	
-10	5.55	97.65	
-3	5.95	97.25	
0	5.94	97.26	
4	5.84	97.36	
6	6.08	97.12	
8	6.58	96.62	
9.2	6.51	96.69	
9.8	7.24	95.96	EOW
9.9	8.87	94.33	
11.4	8.60	94.60	
12.4	8.50	94.70	
13.4	8.37	94.83	
14	8.12	95.08	
15.1	7.25	95.95	EOW
15.3	7.02	96.18	
16.5	6.62	96.58	
18	6.45	96.75	
20.5	6.38	96.82	
22.2	5.95	97.25	
22.9	5.84	97.36	
25.5	5.73	97.47	
27.3	5.80	97.40	
31	4.68	98.52	
36	4.70	98.50	

Year 1			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

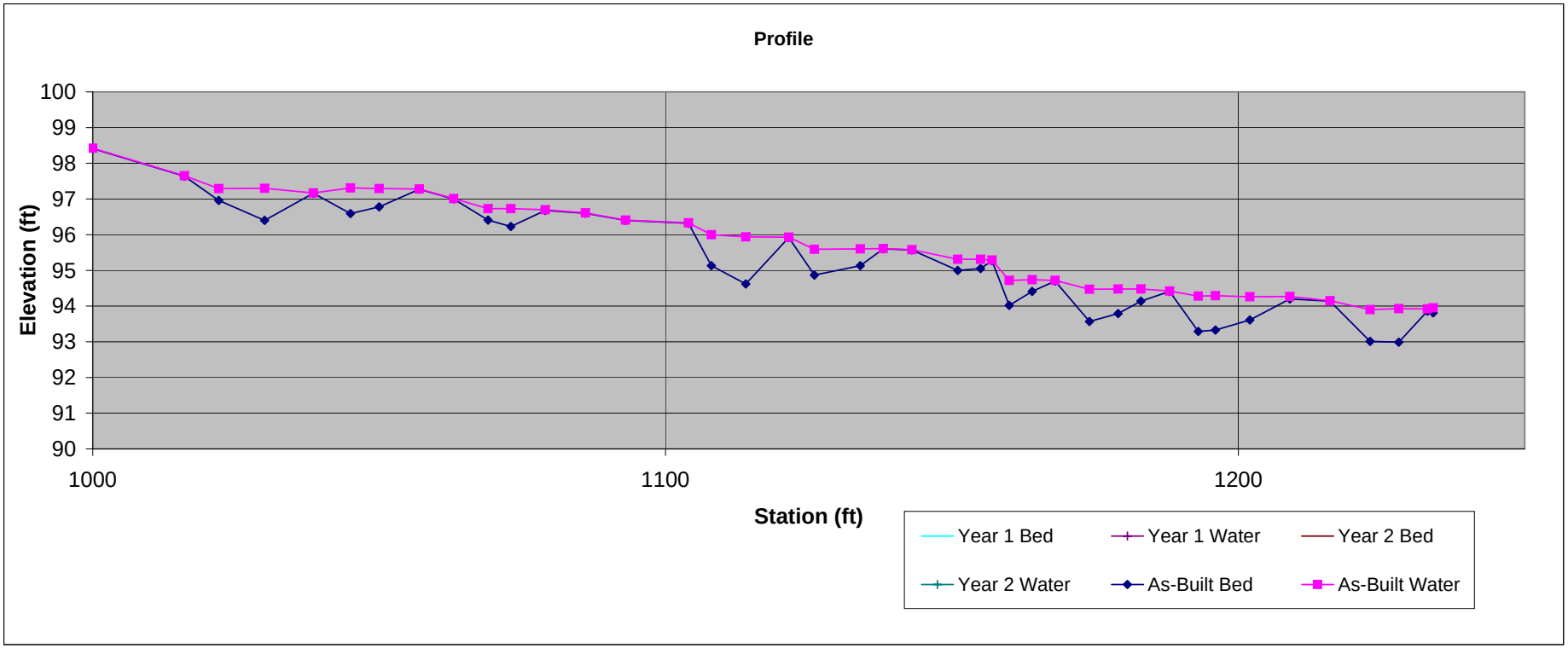
Year 2			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 3			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 4			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 5			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Holly Grove Stream Restoration Site
Guilford County, NC
Profile Reach 4 - Middle Branch



Holly Grove Stream Restoration Site
Guilford County, NC
Profile Reach 4 - Middle Branch

As-Built

HI	Station	Bed FS	Bed Elev.	Water Depth	Water Elev.	Bankfull FS	Bankfull Elev.	Description
103.96	1000	5.55	98.41	0.01	98.42			
103.96	1016	6.32	97.64	0.01	97.65			
103.96	1022	7.00	96.96	0.33	97.29			
103.96	1030	7.56	96.40	0.90	97.30			
103.96	1038.5	6.80	97.16	0.01	97.17			
103.96	1045	7.37	96.59	0.72	97.31			
103.96	1050	7.18	96.78	0.51	97.29			
103.96	1057	6.69	97.27	0.01	97.28			
103.96	1063	6.96	97.00	0.01	97.01			
103.96	1069	7.55	96.41	0.32	96.73			
103.96	1073	7.73	96.23	0.50	96.73			
103.96	1079	7.28	96.68	0.02	96.70			
103.96	1086	7.36	96.60	0.01	96.61			
103.96	1093	7.56	96.40	0.01	96.41			
103.96	1104	7.64	96.32	0.01	96.33			
103.96	1108	8.83	95.13	0.87	96.00			
103.96	1114	9.34	94.62	1.32	95.94			
103.96	1121.5	8.04	95.92	0.01	95.93			
103.96	1126	9.09	94.87	0.72	95.59			
103.96	1134	8.83	95.13	0.47	95.60			
103.96	1138	8.36	95.60	0.01	95.61			
103.96	1143	8.39	95.57	0.01	95.58			
103.96	1151	8.96	95.00	0.31	95.31			
103.96	1155	8.91	95.05	0.26	95.31			
103.96	1157	8.69	95.27	0.02	95.29			
103.96	1160	9.94	94.02	0.70	94.72			
103.96	1164	9.55	94.41	0.33	94.74			
103.96	1168	9.26	94.70	0.02	94.72			
103.96	1174	10.39	93.57	0.90	94.47			
103.96	1179	10.17	93.79	0.69	94.48			
103.96	1183	9.82	94.14	0.34	94.48			
103.96	1188	9.55	94.41	0.01	94.42			
103.96	1193	10.67	93.29	0.99	94.28			
103.96	1196	10.63	93.33	0.96	94.29			
103.96	1202	10.35	93.61	0.65	94.26			
103.96	1209	9.76	94.20	0.07	94.27			
103.96	1216	9.82	94.14	0.01	94.15			
103.96	1223	10.95	93.01	0.89	93.90			
103.96	1228	10.97	92.99	0.94	93.93			
103.96	1233	10.10	93.86	0.06	93.92			
103.96	1234	10.15	93.81	0.14	93.95			

Pebble Count Weighted by Channel Feature

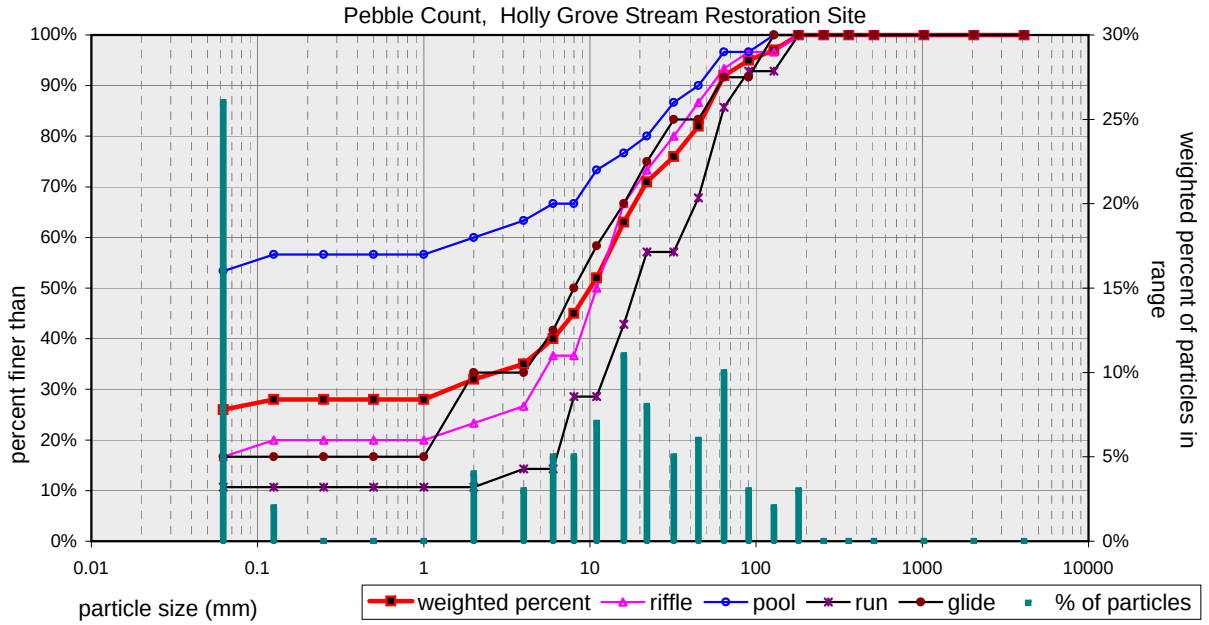
Percent Riffle:	30	Percent Run:	28
Percent Pool:	30	Percent Glide:	12

Pebble Count,

Holly Grove Stream Restoration Site
Guilford County, NC
As-Built Reach 4
Note: 26%

Material	Size Range (mm)		weighted	
silt/clay	0	0.062	26.0	#
very fine sand	0.062	0.13	2.0	#
fine sand	0.13	0.25	0.0	#
medium sand	0.25	0.5	0.0	#
coarse sand	0.5	1	0.0	#
very coarse sand	1	2	4.0	#
very fine gravel	2	4	3.0	#
fine gravel	4	6	5.0	#
fine gravel	6	8	5.0	#
medium gravel	8	11	7.0	#
medium gravel	11	16	11.0	#
coarse gravel	16	22	8.0	#
coarse gravel	22	32	5.0	#
very coarse gravel	32	45	6.0	#
very coarse gravel	45	64	10.0	#
small cobble	64	90	3.0	#
medium cobble	90	128	2.0	#
large cobble	128	180	3.0	#
very large cobble	180	256	0.0	#
small boulder	256	362	0.0	#
small boulder	362	512	0.0	#
medium boulder	512	1024	0.0	#
large boulder	1024	2048	0.0	#
very large boulder	2048	4096	0.0	#
weighted particle count:			100.0	

bedrock		0.0
clay hardpan		0.0
detritus/wood		0.0
artificial		0.0
weighted total count:		100



based on sediment particles only	size percent less than (mm)						particle size distribution		
	D16	D35	D50	D65	D84	D95	gradation	geo mean	std dev
	0.062	4.00	10.0	17	48	90	83.4	1.7	27.9

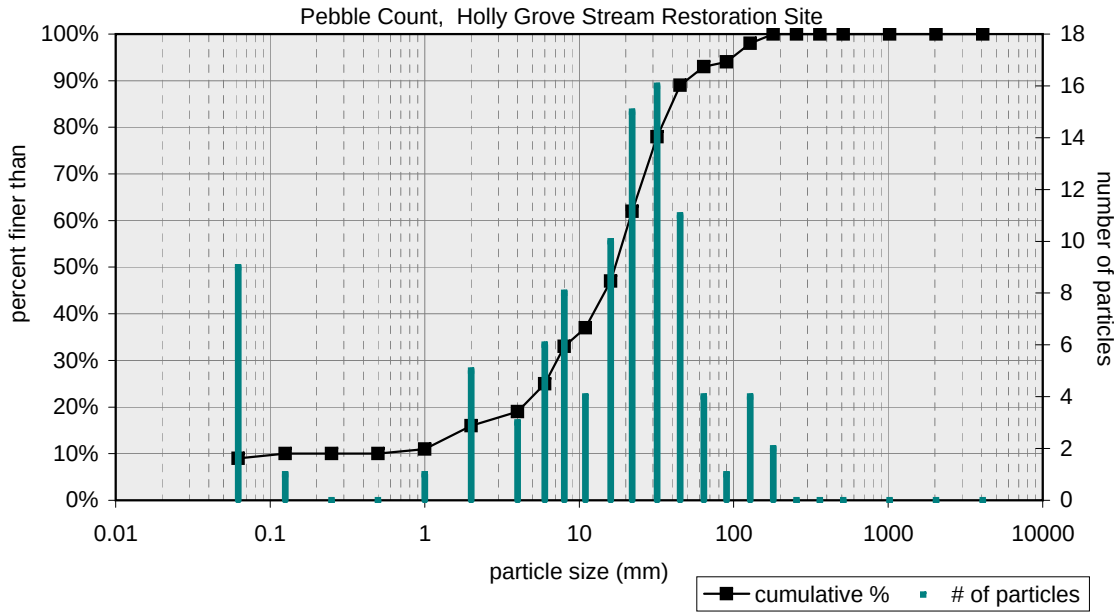
based on total count	percent by substrate type								
	silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	26%	6%	60%	8%	0%	0%	0%	0%	0%

Pebble Count of Channel Reach

Material	Size Range (mm)		Count	
silt/clay	0	0.062	**9**	##
very fine sand	0.062	0.13	**1**	##
fine sand	0.13	0.25	**0**	##
medium sand	0.25	0.5	**0**	##
coarse sand	0.5	1	**1**	##
very coarse sand	1	2	**5**	##
very fine gravel	2	4	**3**	##
fine gravel	4	6	**6**	##
fine gravel	6	8	**8**	##
medium gravel	8	11	**4**	##
medium gravel	11	16	**10**	##
coarse gravel	16	22	**15**	##
coarse gravel	22	32	**16**	##
very coarse gravel	32	45	**11**	##
very coarse gravel	45	64	**4**	##
small cobble	64	90	**1**	##
medium cobble	90	128	**4**	##
large cobble	128	180	**2**	##
very large cobble	180	256	**0**	##
small boulder	256	362	**0**	##
small boulder	362	512	**0**	##
medium boulder	512	1024	**0**	##
large boulder	1024	2048	**0**	##
very large boulder	2048	4096	**0**	##
		total particle count:	100	

bedrock		
clay hardpan		
detritus/wood		
artificial		
	total count:	100

Pebble Count,
Holly Grove Stream Restoration Site
Guilford County, NC
As-Built Reach 4
Note: **Riffle**



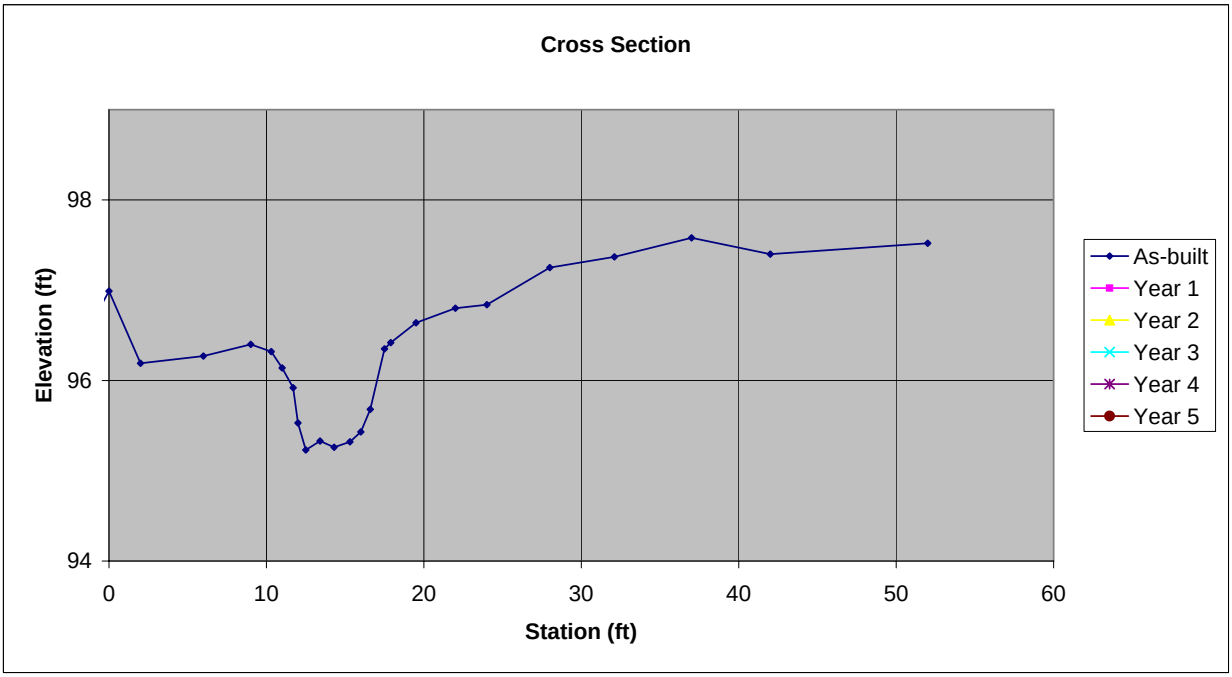
based on sediment particles only	size percent less than (mm)						particle size distribution		
	D16	D35	D50	D65	D84	D95	gradation	geo mean	std dev
	2.000	9.38	17.1	24	39	98	5.4	8.8	4.4

based on total count	percent by substrate type								
	silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	9%	7%	77%	7%	0%	0%	0%	0%	0%

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section RF5
Reach 5 - Middle Branch - Sta 100+00

Year 0

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	10/22/08	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	5.2	Area	0.0	Area	0.0	Area	0.0	Area	0.0	Area	0.0
Bkf W	7.2	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	0.7	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	1.1	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	10.0	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section RF5
Reach 5 - Middle Branch - Sta 100+00

As-Built			
Station	FS/BS	Elev.	Desc.
BM	2.82	100.00	IR Lt
HI		102.82	
-18	5.60	97.22	
-9	5.80	97.02	
-5	5.05	97.77	
-1	6.15	96.67	
0	5.83	96.99	
2	6.63	96.19	
6	6.55	96.27	
9	6.42	96.40	
10.3	6.50	96.32	
11	6.68	96.14	
11.7	6.90	95.92	
12	7.29	95.53	
12.5	7.59	95.23	
13.4	7.49	95.33	
14.3	7.56	95.26	
15.3	7.50	95.32	
16	7.39	95.43	
16.6	7.14	95.68	
17.5	6.47	96.35	
17.9	6.40	96.42	
19.5	6.18	96.64	
22	6.02	96.80	
24	5.98	96.84	
28	5.57	97.25	
32.1	5.45	97.37	
37	5.24	97.58	
42	5.42	97.40	
52	5.3	97.52	

Year 1			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 2			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 3			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 4			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

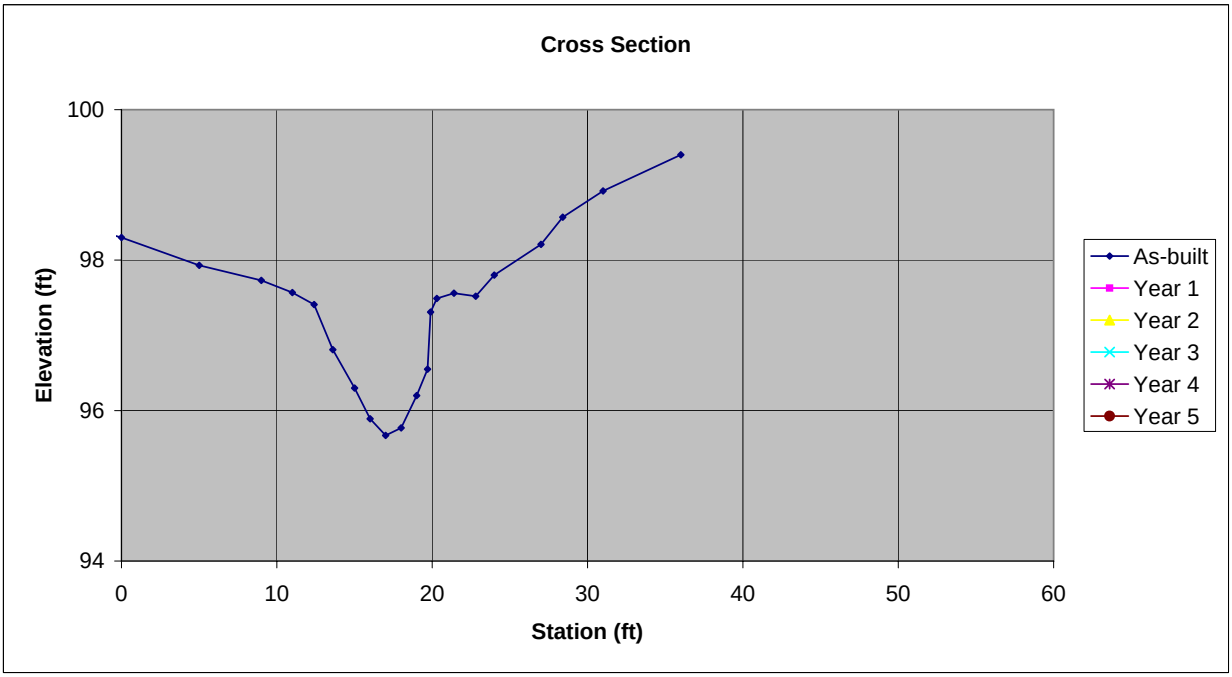
Year 5			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section PL5
Reach 5 - Middle Branch - Sta 100+00

NO CURRENT PICTURE

Year 0

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	10/22/08	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	9.1	Area	0.0	Area	0.0	Area	0.0	Area	0.0	Area	0.0
Bkf W	9.3	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	1.0	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	1.8	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	9.5	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section PL5
Reach 5 - Middle Branch - Sta 100+00

As-Built			
Station	FS/BS	Elev.	Desc.
BM	2.82	100.00	IR Lt
HI		102.82	
-20	4.65	98.17	
-10	4.35	98.47	
-7	4.12	98.70	
0	4.52	98.30	
5	4.89	97.93	
9	5.09	97.73	
11	5.25	97.57	
12.4	5.41	97.41	
13.6	6.01	96.81	
15	6.52	96.30	
16	6.93	95.89	
17	7.15	95.67	
18	7.05	95.77	
19	6.62	96.20	
19.7	6.27	96.55	
19.9	5.51	97.31	
20.3	5.33	97.49	
21.4	5.26	97.56	
22.8	5.30	97.52	
24	5.02	97.80	
27	4.61	98.21	
28.4	4.25	98.57	
31	3.90	98.92	
36	3.42	99.40	

Year 1			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

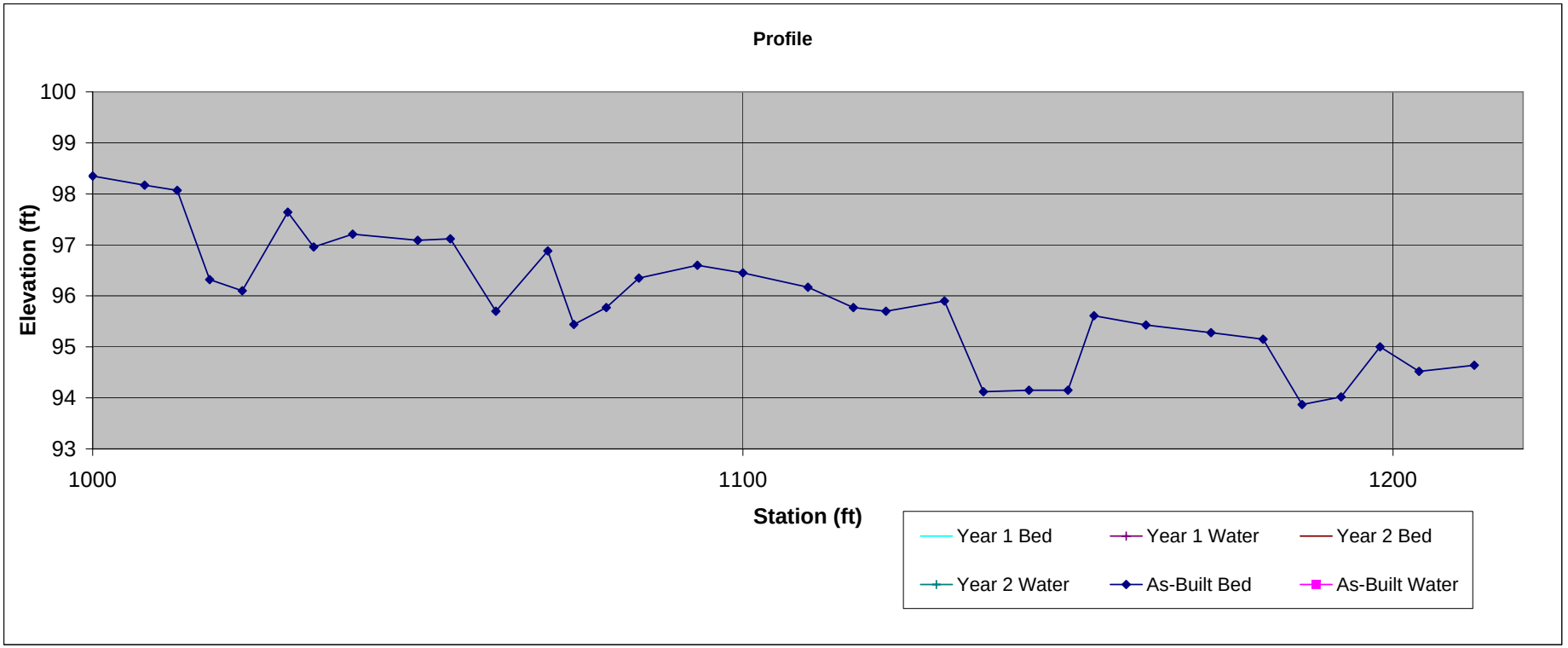
Year 2			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 3			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 4			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 5			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Holly Grove Stream Restoration Site
Guilford County, NC
Profile Reach 5 - Middle Branch



Holly Grove Stream Restoration Site
Guilford County, NC
Profile Reach 5 - Middle Branch

As-Built

HI	Station	Bed FS	Bed Elev.	Water Depth	Water Elev.	Bankfull FS	Bankfull Elev.	Description
102.82	1000	4.47	98.35					
102.82	1008	4.65	98.17					
102.82	1013	4.75	98.07					
102.82	1018	6.50	96.32					
102.82	1023	6.72	96.10					
102.82	1030	5.18	97.64					
102.82	1034	5.86	96.96					
102.82	1040	5.61	97.21					
102.82	1050	5.73	97.09					
102.82	1055	5.70	97.12					
102.82	1062	7.12	95.70					
102.82	1070	5.94	96.88					
102.82	1074	7.38	95.44					
102.82	1079	7.05	95.77					
102.82	1084	6.47	96.35					
102.82	1093	6.22	96.60					
102.82	1100	6.37	96.45					
102.82	1110	6.65	96.17					
102.82	1117	7.05	95.77					
102.82	1122	7.12	95.70					
102.82	1131	6.92	95.90					
102.82	1137	8.70	94.12					
102.82	1144	8.67	94.15					
102.82	1150	8.67	94.15					
102.82	1154	7.21	95.61					
102.82	1162	7.39	95.43					
102.82	1172	7.54	95.28					
102.82	1180	7.67	95.15					
102.82	1186	8.95	93.87					
102.82	1192	8.80	94.02					
102.82	1198	7.82	95.00					
102.82	1204	8.30	94.52					
102.82	1212.5	8.18	94.64					

Pebble Count Weighted by Channel Feature

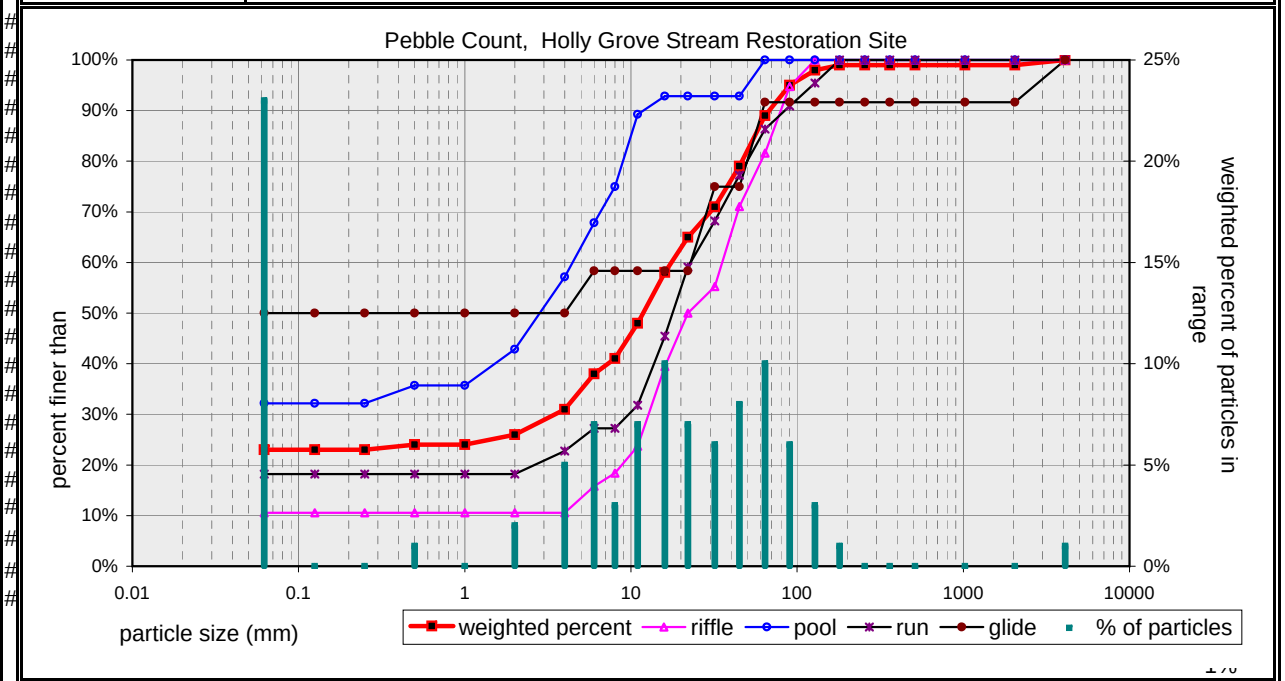
Percent Riffle:	38	Percent Run:	22
Percent Pool:	28	Percent Glide:	12

Pebble Count,

Holly Grove Stream Restoration Site
Guilford County, NC
As-Built Reach 5
Note: 23%

Material	Size Range (mm)		weighted	
silt/clay	0	0.062	23.0	#
very fine sand	0.062	0.13	0.0	#
fine sand	0.13	0.25	0.0	#
medium sand	0.25	0.5	1.0	#
coarse sand	0.5	1	0.0	#
very coarse sand	1	2	2.0	#
very fine gravel	2	4	5.0	#
fine gravel	4	6	7.0	#
fine gravel	6	8	3.0	#
medium gravel	8	11	7.0	#
medium gravel	11	16	10.0	#
coarse gravel	16	22	7.0	#
coarse gravel	22	32	6.0	#
very coarse gravel	32	45	8.0	#
very coarse gravel	45	64	10.0	#
small cobble	64	90	6.0	#
medium cobble	90	128	3.0	#
large cobble	128	180	1.0	#
very large cobble	180	256	0.0	#
small boulder	256	362	0.0	#
small boulder	362	512	0.0	#
medium boulder	512	1024	0.0	#
large boulder	1024	2048	0.0	#
very large boulder	2048	4096	1.0	#
weighted particle count:			100.0	

bedrock		0.0
clay hardpan		0.0
detritus/wood		0.0
artificial		0.0
weighted total count:		100



based on sediment particles only	size percent less than (mm)						particle size distribution		
	D16	D35	D50	D65	D84	D95	gradation	geo mean	std dev
	0.062	5.04	11.9	22	54	90	97.9	1.8	29.4

based on total count	percent by substrate type								
	silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	23%	3%	63%	10%	1%	0%	0%	0%	0%

Pebble Count of Channel Reach

Pebble Count,

Holly Grove Stream Restoration Site

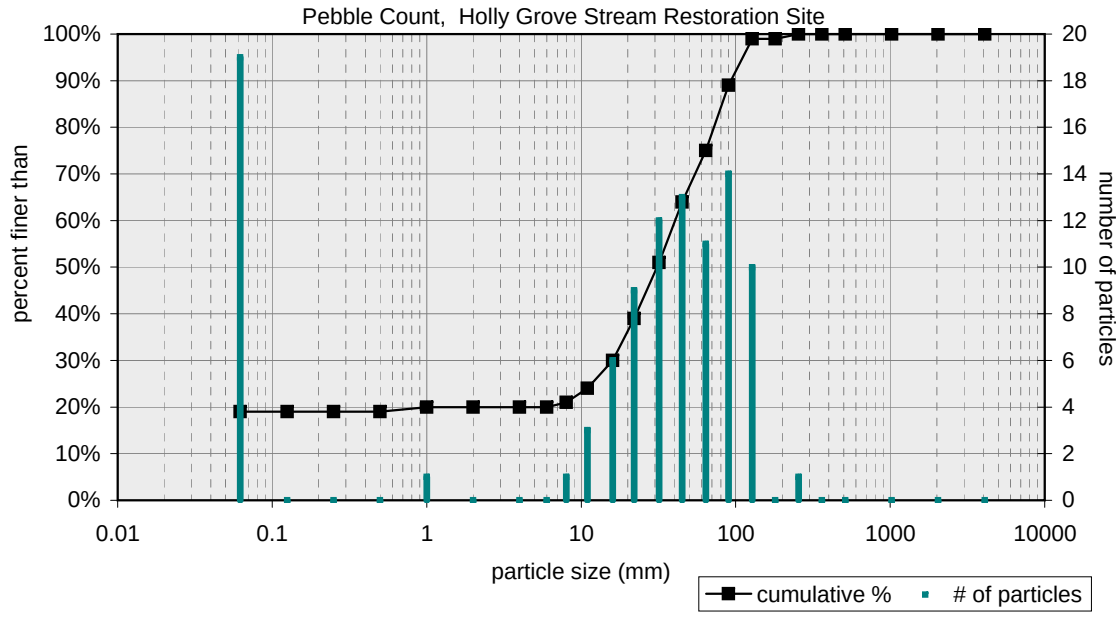
Guilford County, NC

As-Built Reach 5

Note: **Riffle**

Material	Size Range (mm)		Count	
silt/clay	0	0.062	**19**	##
very fine sand	0.062	0.13	**0**	##
fine sand	0.13	0.25	**0**	##
medium sand	0.25	0.5	**0**	##
coarse sand	0.5	1	**1**	##
very coarse sand	1	2	**0**	##
very fine gravel	2	4	**0**	##
fine gravel	4	6	**0**	##
fine gravel	6	8	**1**	##
medium gravel	8	11	**3**	##
medium gravel	11	16	**6**	##
coarse gravel	16	22	**9**	##
coarse gravel	22	32	**12**	##
very coarse gravel	32	45	**13**	##
very coarse gravel	45	64	**11**	##
small cobble	64	90	**14**	##
medium cobble	90	128	**10**	##
large cobble	128	180	**0**	##
very large cobble	180	256	**1**	##
small boulder	256	362	**0**	##
small boulder	362	512	**0**	##
medium boulder	512	1024	**0**	##
large boulder	1024	2048	**0**	##
very large boulder	2048	4096	**0**	##
	total particle count:		100	

bedrock		
clay hardpan		
detritus/wood		
artificial		
	total count:	100



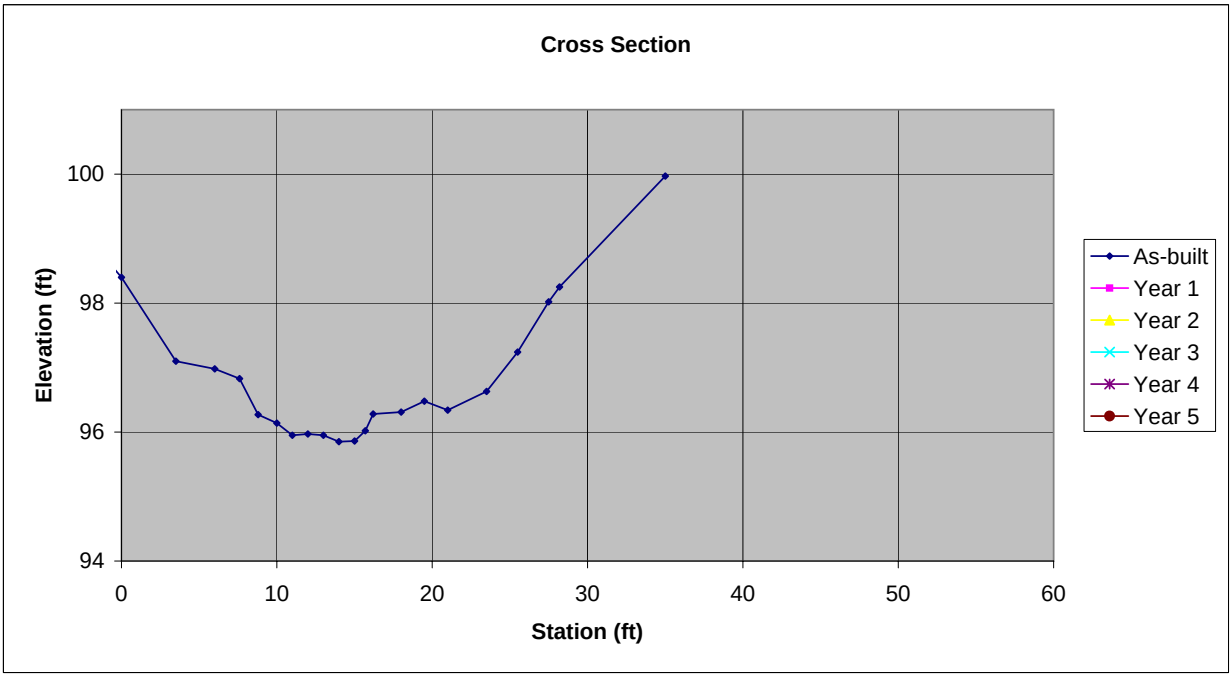
based on sediment particles only	size percent less than (mm)						particle size distribution		
	D16	D35	D50	D65	D84	D95	gradation	geo mean	std dev
	0.062	19.10	31.0	46	80	111	251.4	2.2	35.8

based on total count	percent by substrate type								
	silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	19%	1%	55%	25%	0%	0%	0%	0%	0%

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section RF6
Reach 6 - Lower East Branch - Sta 100+00

Year 0

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	10/2/08	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	6.5	Area	0.0	Area	0.0	Area	0.0	Area	0.0	Area	0.0
Bkf W	8.6	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	0.8	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	1.0	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	11.4	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section RF6
Reach 6 - Lower East Branch - Sta 100+00

As-Built

Station	FS/BS	Elev.	Desc.
BM	5.02	100.00	IR Lt
HI		105.02	
-10	5.28	99.74	
-5	5.76	99.26	
-2	6.05	98.97	
0	6.62	98.40	
3.5	7.92	97.10	
6	8.04	96.98	
7.6	8.19	96.83	
8.8	8.75	96.27	
10	8.88	96.14	
11	9.07	95.95	
12	9.05	95.97	
13	9.07	95.95	
14	9.17	95.85	
15	9.16	95.86	
15.7	9.00	96.02	
16.2	8.74	96.28	
18	8.71	96.31	
19.5	8.54	96.48	
21	8.68	96.34	
23.5	8.39	96.63	
25.5	7.78	97.24	
27.5	7.00	98.02	
28.2	6.77	98.25	
35	5.05	99.97	

Year 1

Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 2

Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 3

Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 4

Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

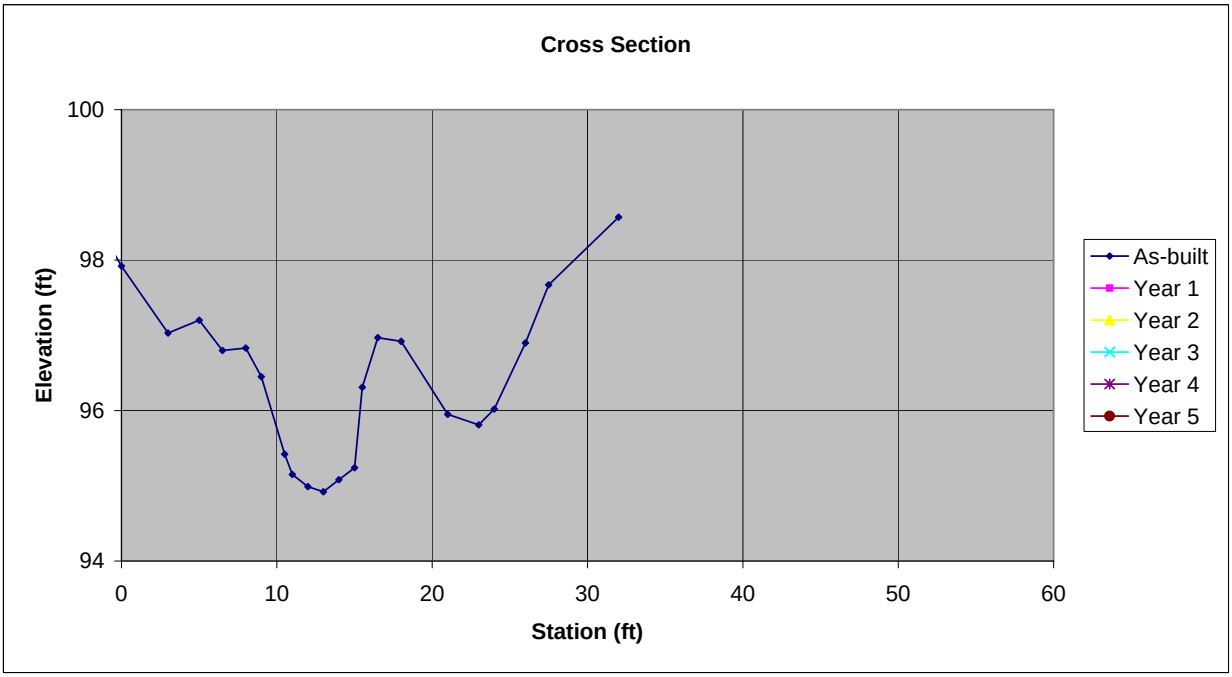
Year 5

Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section PL6
Reach 6 - Lower East Branch - Sta 100+00

Year 0

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	10/22/08	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	10.8	Area	0.0	Area	0.0	Area	0.0	Area	0.0	Area	0.0
Bkf W	8.5	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	1.3	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	2.0	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	6.7	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section PL6
Reach 6 - Lower East Branch - Sta 100+00

As-Built			
Station	FS/BS	Elev.	Desc.
BM	5.02	100.00	IR Lt
HI		105.02	
-10	5.68	99.34	
-8.5	5.57	99.45	
-2	6.38	98.64	
0	7.10	97.92	
3	7.99	97.03	
5	7.82	97.20	
6.5	8.22	96.80	
8	8.19	96.83	
9	8.57	96.45	
10.5	9.60	95.42	
11	9.87	95.15	
12	10.03	94.99	
13	10.10	94.92	
14	9.94	95.08	
15	9.78	95.24	
15.5	8.71	96.31	
16.5	8.05	96.97	
18	8.10	96.92	
21	9.07	95.95	
23	9.21	95.81	
24	9.00	96.02	
26	8.12	96.90	
27.5	7.35	97.67	
32	6.45	98.57	

Year 1			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

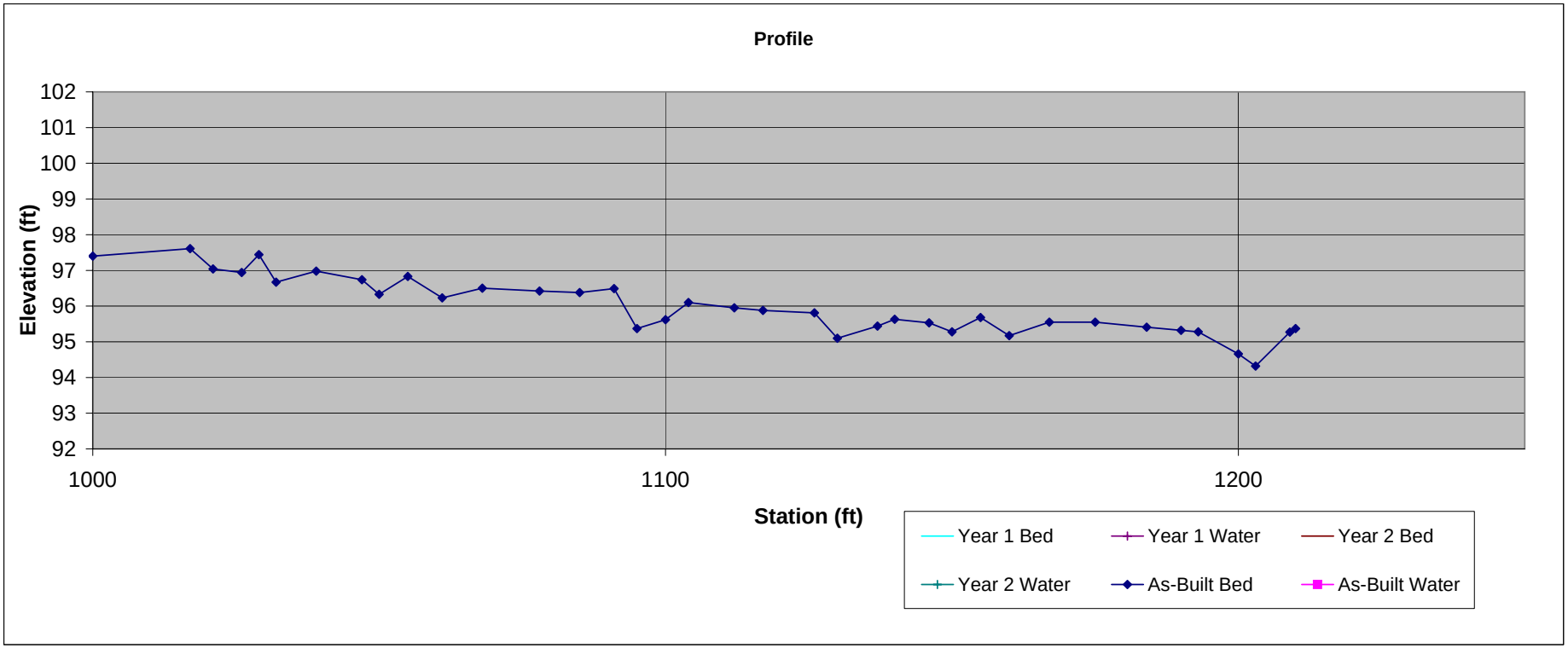
Year 2			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 3			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 4			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 5			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Holly Grove Stream Restoration Site
Guilford County, NC
Profile Reach 6 - Lower East Branch



Holly Grove Stream Restoration Site
Guilford County, NC
Profile Reach 6 - Lower East Branch

As-Built

HI	Station	Bed FS	Bed Elev.	Water Depth	Water Elev.	Bankfull FS	Bankfull Elev.	Description
105.20	1000	7.80	97.40					
105.20	1017	7.59	97.61					
105.20	1021	8.16	97.04					
105.20	1026	8.26	96.94					
105.20	1029	7.76	97.44					
105.20	1032	8.53	96.67					
105.20	1039	8.22	96.98					
105.20	1047	8.46	96.74					
105.20	1050	8.87	96.33					
105.20	1055	8.37	96.83					
105.20	1061	8.97	96.23					
105.20	1068	8.70	96.50			7.70	97.50	
105.20	1078	8.78	96.42					
105.20	1085	8.82	96.38					
105.20	1091	8.71	96.49					
105.20	1095	9.83	95.37					
105.20	1100	9.58	95.62					
105.20	1104	9.10	96.10					
105.20	1112	9.25	95.95					
105.20	1117	9.32	95.88					
105.20	1126	9.39	95.81					
105.20	1130	10.10	95.10					
105.20	1137	9.76	95.44					
105.20	1140	9.57	95.63			8.43	96.77	
105.20	1146	9.67	95.53					
105.20	1150	9.92	95.28					
105.20	1155	9.52	95.68					
105.20	1160	10.03	95.17					
105.20	1167	9.65	95.55					
105.20	1175	9.65	95.55			8.55	96.65	
105.20	1184	9.79	95.41					
105.20	1190	9.88	95.32					
105.20	1193	9.92	95.28					
105.20	1200	10.54	94.66					
105.20	1203	10.88	94.32					
105.20	1209	9.93	95.27					
105.20	1210	9.83	95.37					

Pebble Count Weighted by Channel Feature

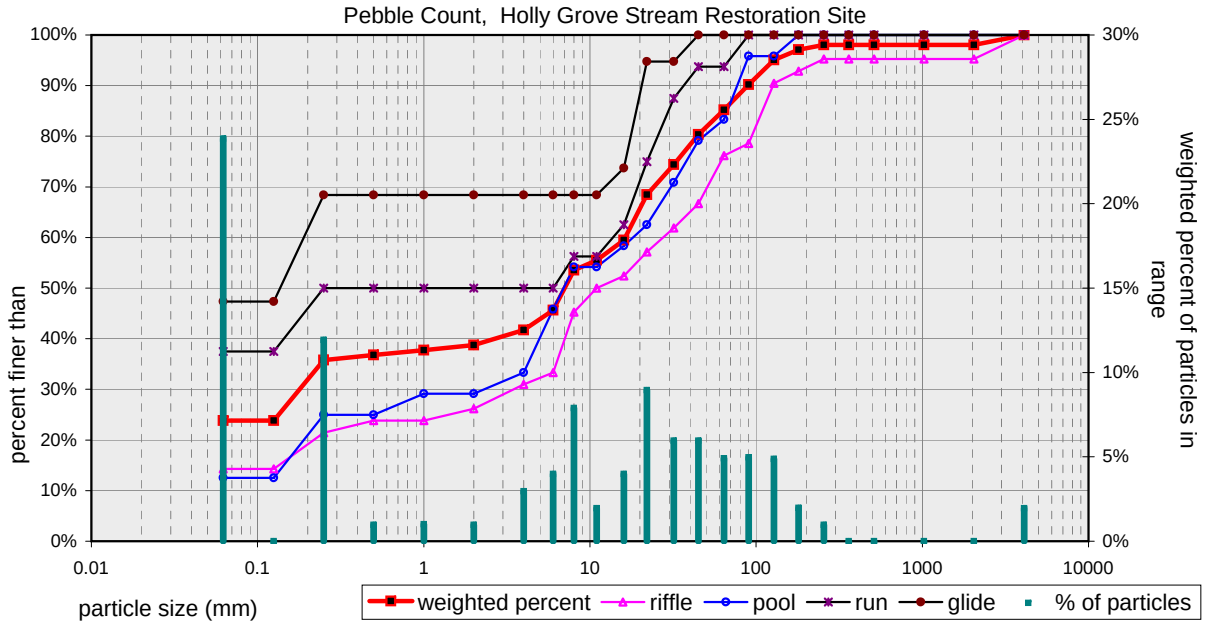
Percent Riffle:	41	Percent Run:	16
Percent Pool:	24	Percent Glide:	19

Pebble Count,

Material	Size Range (mm)		weighted	
silt/clay	0	0.062	23.9	#
very fine sand	0.062	0.13	0.0	#
fine sand	0.13	0.25	11.9	#
medium sand	0.25	0.5	1.0	#
coarse sand	0.5	1	1.0	#
very coarse sand	1	2	1.0	#
very fine gravel	2	4	3.0	#
fine gravel	4	6	4.0	#
fine gravel	6	8	7.9	#
medium gravel	8	11	2.0	#
medium gravel	11	16	4.0	#
coarse gravel	16	22	9.0	#
coarse gravel	22	32	6.0	#
very coarse gravel	32	45	6.0	#
very coarse gravel	45	64	4.9	#
small cobble	64	90	5.0	#
medium cobble	90	128	4.9	#
large cobble	128	180	2.0	#
very large cobble	180	256	1.0	#
small boulder	256	362	0.0	#
small boulder	362	512	0.0	#
medium boulder	512	1024	0.0	#
large boulder	1024	2048	0.0	#
very large boulder	2048	4096	2.0	#
weighted particle count:			100.0	

bedrock		0.0
clay hardpan		0.0
detritus/wood		0.0
artificial		0.0
weighted total count:		100

Holly Grove Stream Restoration Site
Guilford County, NC
As-Built Reach 6
Note: 24%



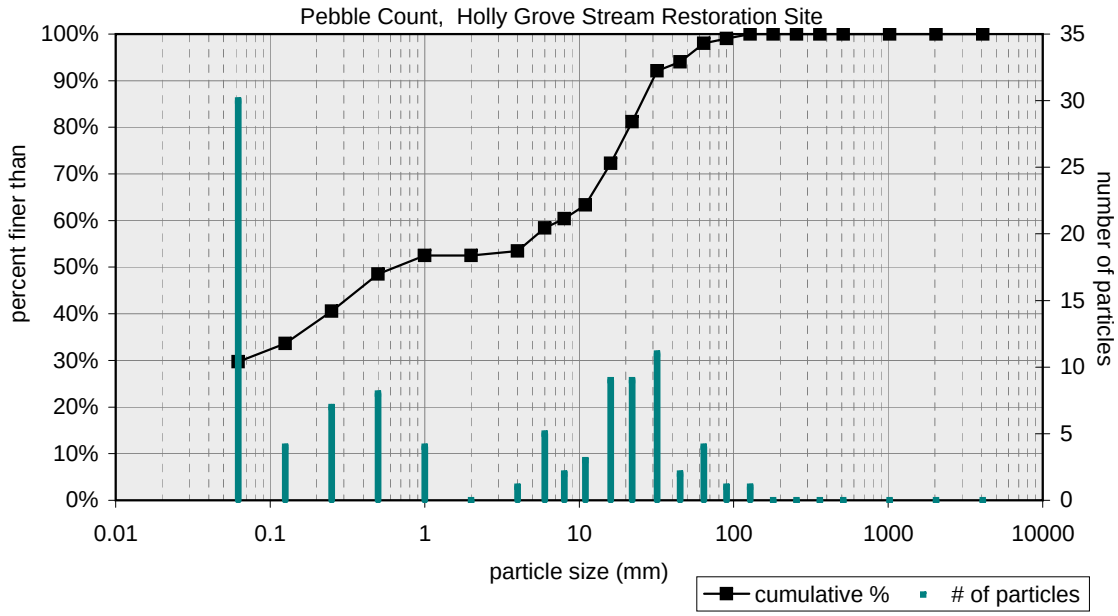
based on sediment particles only	size percent less than (mm) D16	D35	D50	D65	D84	D95	particle size distribution gradation	geo mean	std dev
	0.062	0.24	7.0	19	59	127	60.8	1.9	30.7

based on total count	percent by substrate type silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	24%	15%	47%	13%	2%	0%	0%	0%	0%

Pebble Count of Channel Reach

Pebble Count,
Holly Grove Stream Restoration Site
Guilford County, NC
As-Built Reach 6
Note: **Riffle**

Material	Size Range (mm)		Count	
silt/clay	0	0.062	**30**	##
very fine sand	0.062	0.13	**4**	##
fine sand	0.13	0.25	**7**	##
medium sand	0.25	0.5	**8**	##
coarse sand	0.5	1	**4**	##
very coarse sand	1	2	**0**	##
very fine gravel	2	4	**1**	##
fine gravel	4	6	**5**	##
fine gravel	6	8	**2**	##
medium gravel	8	11	**3**	##
medium gravel	11	16	**9**	##
coarse gravel	16	22	**9**	##
coarse gravel	22	32	**11**	##
very coarse gravel	32	45	**2**	##
very coarse gravel	45	64	**4**	##
small cobble	64	90	**1**	##
medium cobble	90	128	**1**	##
large cobble	128	180	**0**	##
very large cobble	180	256	**0**	##
small boulder	256	362	**0**	##
small boulder	362	512	**0**	##
medium boulder	512	1024	**0**	##
large boulder	1024	2048	**0**	##
very large boulder	2048	4096	**0**	##
		total particle count:	101	



bedrock			
clay hardpan			
detritus/wood			
artificial			
	total count:	101	

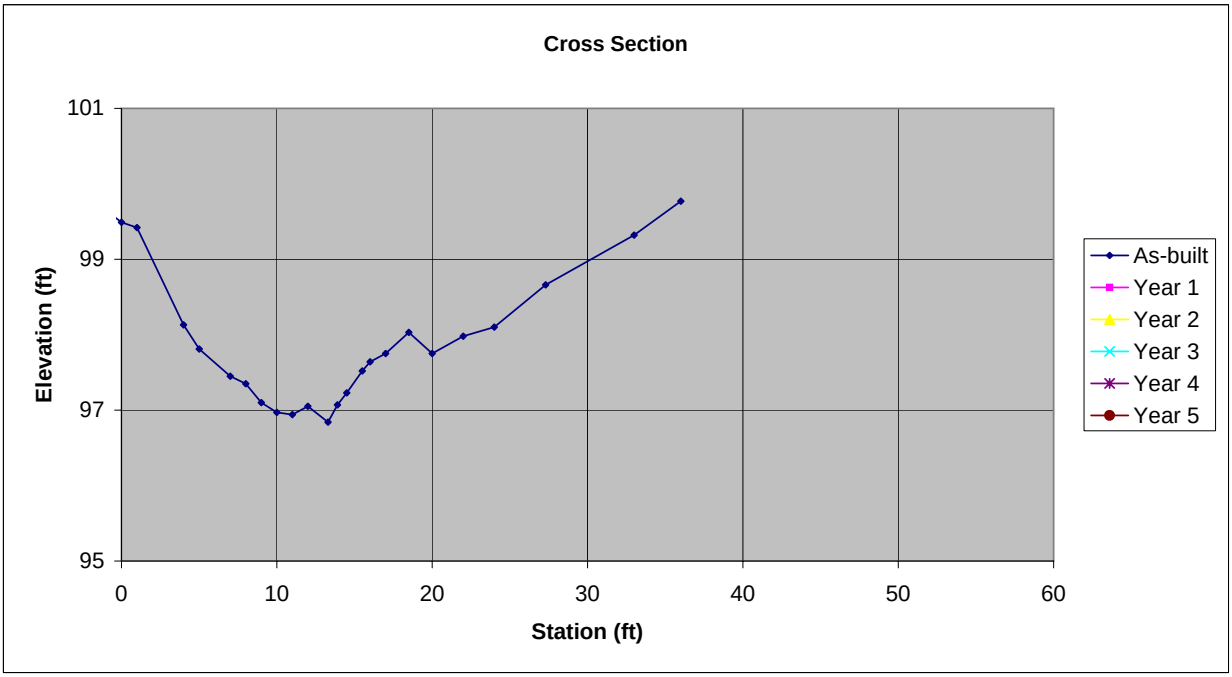
based on sediment particles only	size percent less than (mm)						particle size distribution		
	D16	D35	D50	D65	D84	D95	gradation	geo mean	std dev
	0.062	0.14	0.6	12	24	49	23.9	1.2	19.8

based on total count	percent by substrate type								
	silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	30%	23%	46%	2%	0%	0%	0%	0%	0%

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section RF7
Reach 7 - Southeast Creek - Sta 100+00

Year 0

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	10/22/08	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	4.3	Area	0.0	Area	0.0	Area	0.0	Area	0.0	Area	0.0
Bkf W	8	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	0.5	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	0.8	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	15.0	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section RF7
Reach 7 - Southeast Creek - Sta 100+00

As-Built			
Station	FS/BS	Elev.	Desc.
BM	7.17	100.00	IR Lt
HI		107.17	
-8	6.40	100.77	
0	7.68	99.49	
1	7.75	99.42	
4	9.04	98.13	
5	9.36	97.81	
7	9.72	97.45	
8	9.82	97.35	
9	10.07	97.10	
10	10.20	96.97	
11	10.23	96.94	
12	10.12	97.05	
13.3	10.33	96.84	
13.9	10.10	97.07	
14.5	9.94	97.23	
15.5	9.65	97.52	
16	9.53	97.64	
17	9.42	97.75	
18.5	9.14	98.03	
20	9.42	97.75	
22	9.19	97.98	
24	9.07	98.10	
27.3	8.51	98.66	
33	7.85	99.32	
36	7.40	99.77	

Year 1			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 2			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 3			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

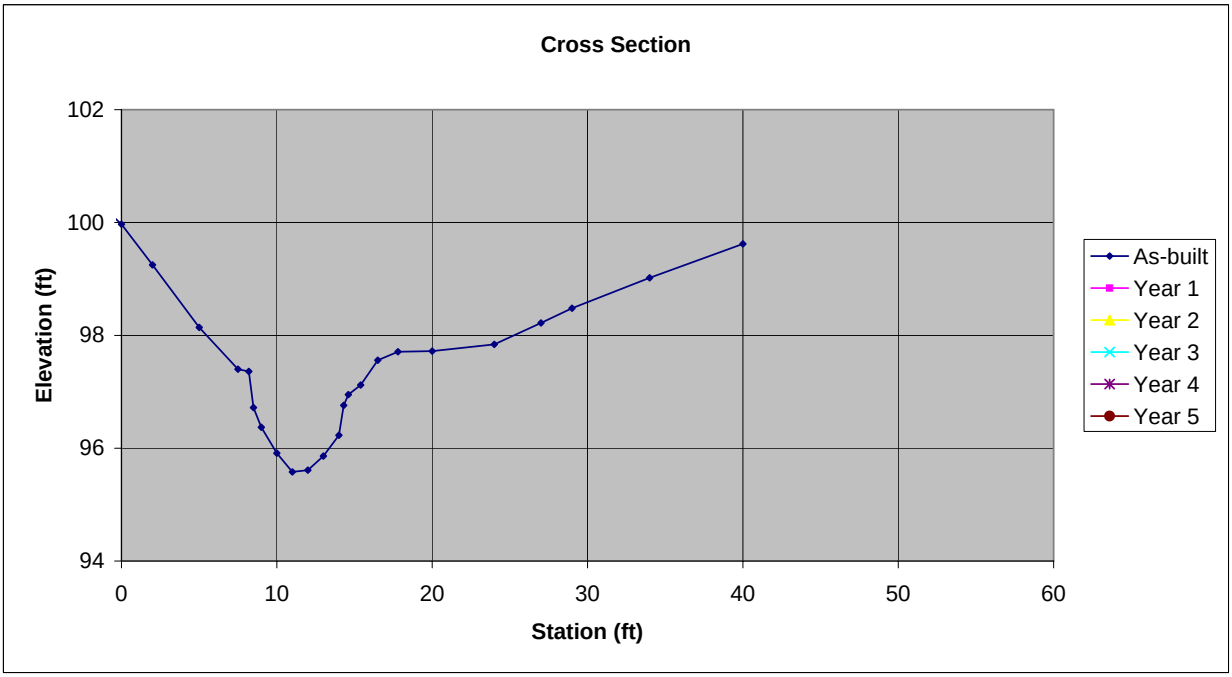
Year 4			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 5			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section PL7
Reach 7 - Southeast Creek - Sta 100+00

Year 0

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	10/22/08	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	8.7	Area	0.0	Area	0.0	Area	0.0	Area	0.0	Area	0.0
Bkf W	8.3	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	1.1	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	1.8	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	7.9	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section PL7
Reach 7 - Southeast Creek - Sta 100+00

As-Built			
Station	FS/BS	Elev.	Desc.
BM	7.17	100.00	IR Lt
HI		107.17	
-4	6.17	101.00	
0	7.20	99.97	
2	7.92	99.25	
5	9.03	98.14	
7.5	9.77	97.40	
8.2	9.81	97.36	
8.5	10.45	96.72	
9	10.80	96.37	
10	11.26	95.91	
11	11.59	95.58	
12	11.56	95.61	
13	11.31	95.86	
14	10.94	96.23	
14.3	10.41	96.76	
14.6	10.22	96.95	
15.4	10.05	97.12	
16.5	9.61	97.56	
17.8	9.46	97.71	
20	9.45	97.72	
24	9.33	97.84	
27	8.95	98.22	
29	8.69	98.48	
34	8.15	99.02	
40	7.55	99.62	

Year 1			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

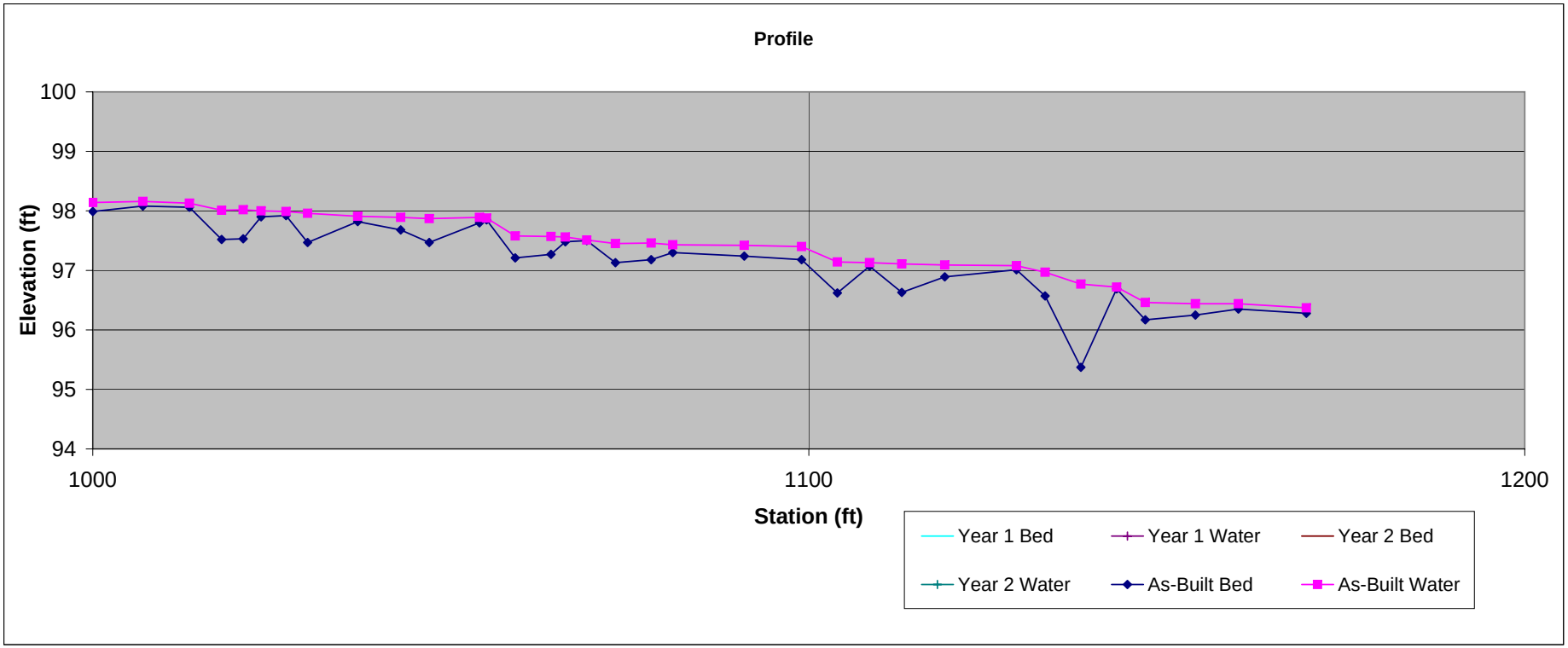
Year 2			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 3			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 4			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 5			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Holly Grove Stream Restoration Site
Guilford County, NC
Profile Reach 7 - Southeast Creek



Holly Grove Stream Restoration Site
Guilford County, NC
Profile Reach 7 - Southeast Creek

As-Built

HI	Station	Bed FS	Bed Elev.	Water Depth	Water Elev.	Bankfull FS	Bankfull Elev.	Description
107.17	1000	9.18	97.99	0.15	98.14			
107.17	1007	9.09	98.08	0.08	98.16	8.15	99.02	
107.17	1013.5	9.11	98.06	0.07	98.13			
107.17	1018	9.65	97.52	0.49	98.01			
107.17	1021	9.64	97.53	0.49	98.02			
107.17	1023.5	9.27	97.90	0.10	98.00			
107.17	1027	9.25	97.92	0.07	97.99			
107.17	1030	9.70	97.47	0.49	97.96			
107.17	1037	9.35	97.82	0.09	97.91			
107.17	1043	9.49	97.68	0.21	97.89			
107.17	1047	9.70	97.47	0.40	97.87			
107.17	1054	9.37	97.80	0.09	97.89			
107.17	1055	9.32	97.85	0.03	97.88			
107.17	1059	9.96	97.21	0.37	97.58			
107.17	1064	9.90	97.27	0.30	97.57			
107.17	1066	9.69	97.48	0.08	97.56	8.87	98.30	
107.17	1069	9.67	97.50	0.01	97.51			
107.17	1073	10.04	97.13	0.32	97.45			
107.17	1078	9.99	97.18	0.28	97.46			
107.17	1081	9.87	97.30	0.13	97.43			
107.17	1091	9.93	97.24	0.18	97.42			
107.17	1099	9.99	97.18	0.22	97.40			
107.17	1104	10.55	96.62	0.52	97.14			
107.17	1108.5	10.10	97.07	0.06	97.13			
107.17	1113	10.54	96.63	0.48	97.11			
107.17	1119	10.28	96.89	0.20	97.09	9.57	97.60	
107.17	1129	10.16	97.01	0.07	97.08			
107.17	1133	10.60	96.57	0.40	96.97			
107.17	1138	11.80	95.37	1.40	96.77			
107.17	1143	10.48	96.69	0.03	96.72			
107.17	1147	11.00	96.17	0.29	96.46			
107.17	1154	10.92	96.25	0.19	96.44			
107.17	1160	10.82	96.35	0.09	96.44			
107.17	1169.5	10.89	96.28	0.09	96.37			

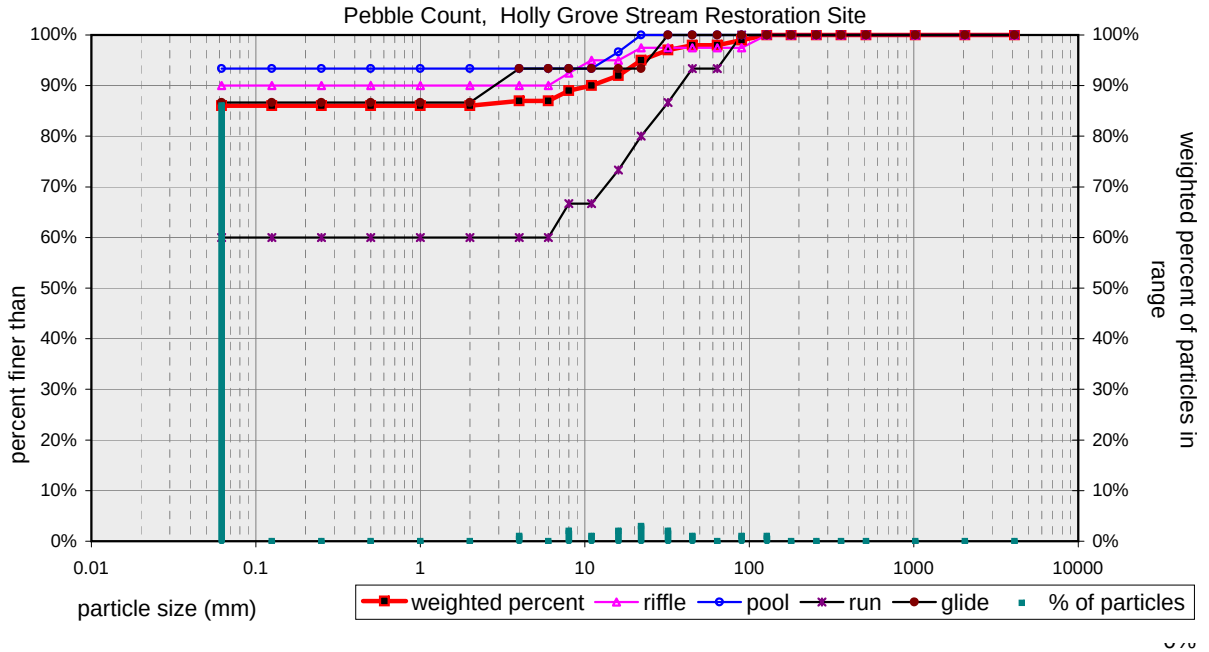
Pebble Count Weighted by Channel Feature

Percent Riffle:	40	Percent Run:	15	
Percent Pool:	30	Percent Glide:	15	Pebble Count,

Material	Size Range (mm)		weighted	
silt/clay	0	0.062	86.0	#
very fine sand	0.062	0.13	0.0	#
fine sand	0.13	0.25	0.0	#
medium sand	0.25	0.5	0.0	#
coarse sand	0.5	1	0.0	#
very coarse sand	1	2	0.0	#
very fine gravel	2	4	1.0	#
fine gravel	4	6	0.0	#
fine gravel	6	8	2.0	#
medium gravel	8	11	1.0	#
medium gravel	11	16	2.0	#
coarse gravel	16	22	3.0	#
coarse gravel	22	32	2.0	#
very coarse gravel	32	45	1.0	#
very coarse gravel	45	64	0.0	#
small cobble	64	90	1.0	#
medium cobble	90	128	1.0	#
large cobble	128	180	0.0	#
very large cobble	180	256	0.0	#
small boulder	256	362	0.0	#
small boulder	362	512	0.0	#
medium boulder	512	1024	0.0	#
large boulder	1024	2048	0.0	#
very large boulder	2048	4096	0.0	#
weighted particle count:			100.0	

bedrock		0.0
clay hardpan		0.0
detritus/wood		0.0
artificial		0.0
weighted total count:		100

Holly Grove Stream Restoration Site
Guilford County, NC
As-Built Reach 7
Note: 86%



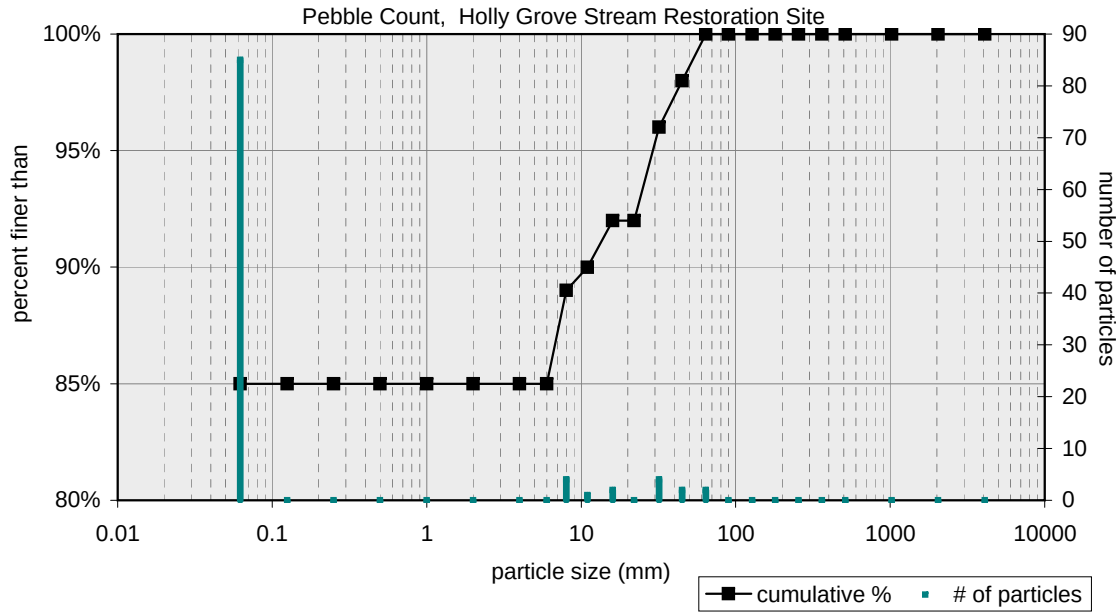
based on sediment particles only	size percent less than (mm) D16	D35	D50	D65	D84	D95	particle size distribution gradation	geo mean	std dev
	0.062	0.06	0.1	0	0	0	1.0	0.1	1.0

based on total count	percent by substrate type silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	86%	0%	12%	2%	0%	0%	0%	0%	0%

Pebble Count of Channel Reach

Pebble Count,
Holly Grove Stream Restoration Site
Guilford County, NC
As-Built Reach 7
Note: **Riffle**

Material	Size Range (mm)		Count	
silt/clay	0	0.062	**85**	##
very fine sand	0.062	0.13	**0**	##
fine sand	0.13	0.25	**0**	##
medium sand	0.25	0.5	**0**	##
coarse sand	0.5	1	**0**	##
very coarse sand	1	2	**0**	##
very fine gravel	2	4	**0**	##
fine gravel	4	6	**0**	##
fine gravel	6	8	**4**	##
medium gravel	8	11	**1**	##
medium gravel	11	16	**2**	##
coarse gravel	16	22	**0**	##
coarse gravel	22	32	**4**	##
very coarse gravel	32	45	**2**	##
very coarse gravel	45	64	**2**	##
small cobble	64	90	**0**	##
medium cobble	90	128	**0**	##
large cobble	128	180	**0**	##
very large cobble	180	256	**0**	##
small boulder	256	362	**0**	##
small boulder	362	512	**0**	##
medium boulder	512	1024	**0**	##
large boulder	1024	2048	**0**	##
very large boulder	2048	4096	**0**	##
		total particle count:	100	



bedrock				
clay hardpan				
detritus/wood				
artificial				
		total count:	100	

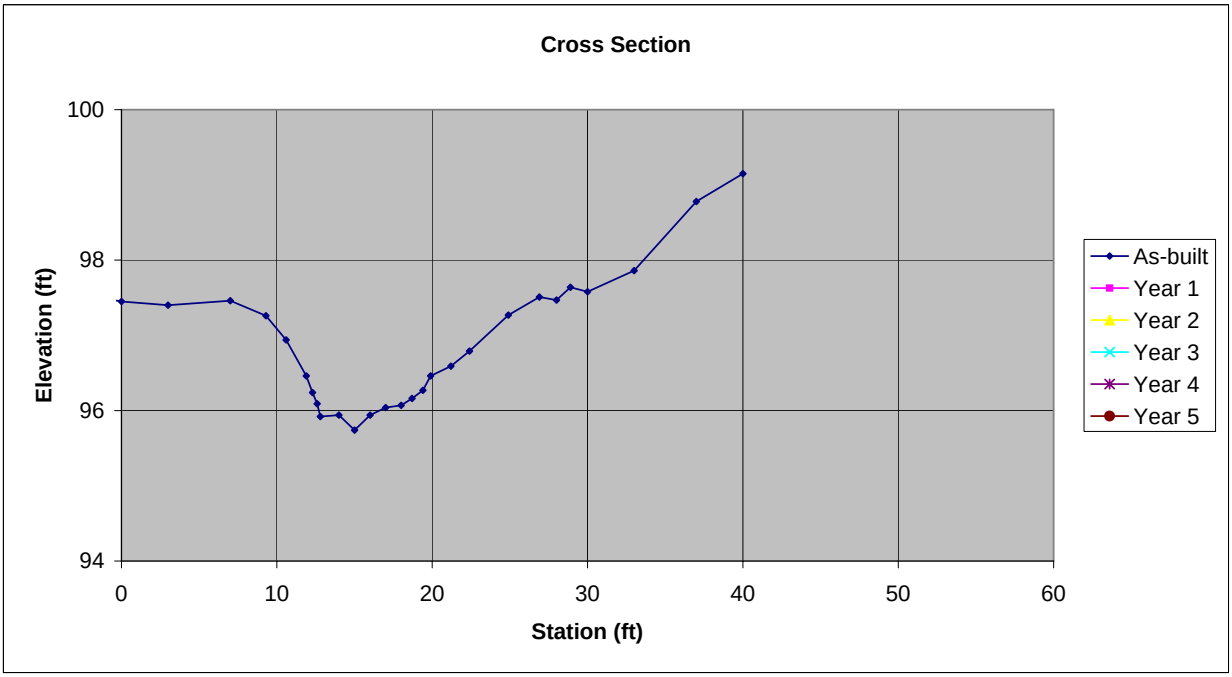
based on sediment particles only	size percent less than (mm)						particle size distribution		
	D16	D35	D50	D65	D84	D95	gradation	geo mean	std dev
	0.062	0.06	0.1	0	0	0	1.0	0.1	1.0

based on total count	percent by substrate type								
	silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	85%	0%	15%	0%	0%	0%	0%	0%	0%

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section RF8
Reach 8 - Southwest Creek - Sta 100+00

Year 0

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	10/22/08	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	3.4	Area	0.0	Area	0.0	Area	0.0	Area	0.0	Area	0.0
Bkf W	8	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	0.4	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	0.7	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	18.6	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section RF8
Reach 8 - Southwest Creek - Sta 100+00

As-Built			
Station	FS/BS	Elev.	Desc.
BM	2.51	98.99	IR Lt
HI		101.50	
-15	3.36	98.14	
-8	3.67	97.83	
-3	3.94	97.56	
0	4.05	97.45	
3	4.10	97.40	
7	4.04	97.46	
9.3	4.24	97.26	
10.6	4.56	96.94	
11.9	5.04	96.46	
12.3	5.26	96.24	
12.6	5.41	96.09	
12.8	5.58	95.92	
14	5.56	95.94	
15	5.76	95.74	
16	5.56	95.94	
17	5.46	96.04	
18	5.43	96.07	
18.7	5.34	96.16	
19.4	5.23	96.27	
19.9	5.04	96.46	
21.2	4.91	96.59	
22.4	4.71	96.79	
24.9	4.23	97.27	
26.9	3.99	97.51	
28	4.03	97.47	
28.9	3.86	97.64	
30	3.92	97.58	
33	3.64	97.86	
37	2.72	98.78	
40	2.35	99.15	

Year 1			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 2			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 3			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

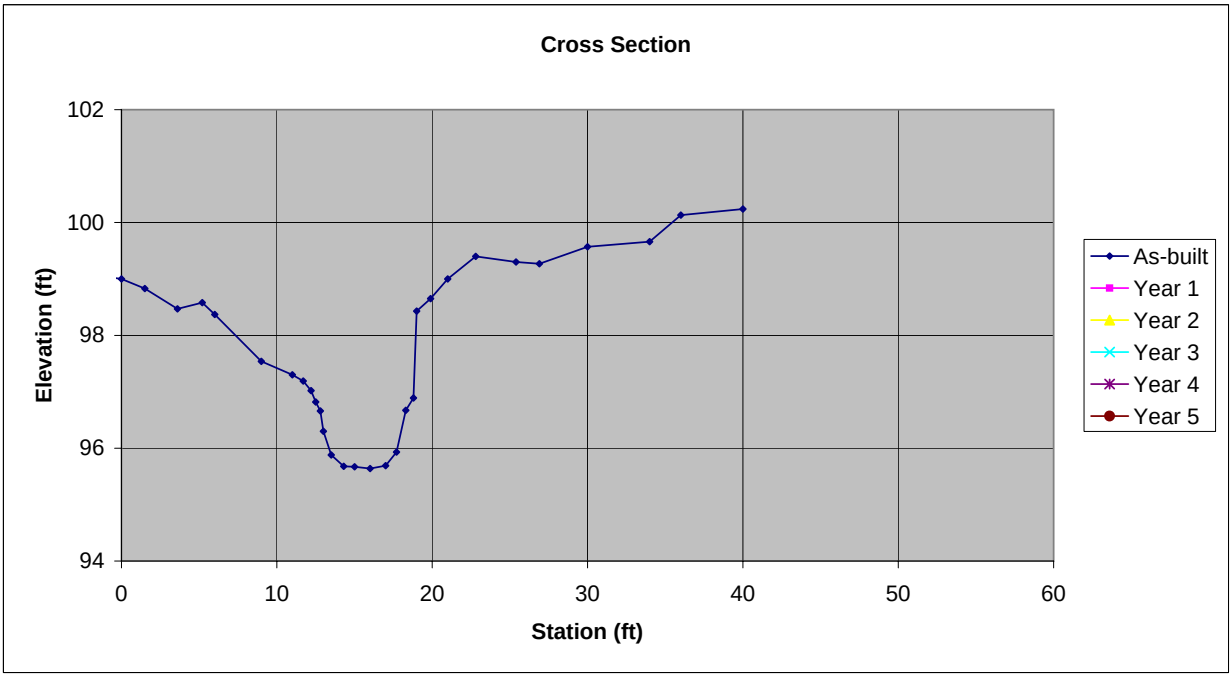
Year 4			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 5			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section PL8
Reach 8 - Southwest Creek - Sta 100+00

Year 0

Facing Downstream



As-Built		Year 1		Year 2		Year 3		Year 4		Year 5	
Date	10/22/08	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0	Date	0/0/0
Area	7.9	Area	0.0	Area	0.0	Area	0.0	Area	0.0	Area	0.0
Bkf W	7.1	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10	Bkf W	10
Dmean	1.1	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0	Dmean	0.0
Dmax	1.6	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0	Dmax	0.0
W/d	6.4	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0	W/d	0.0

Holly Grove Stream Restoration Site
Guilford County, NC
Cross Section PL8
Reach 8 - Southwest Creek - Sta 100+00

As-Built			
Station	FS/BS	Elev.	Desc.
BM	5.31	98.99	IR Lt
HI		104.30	
-17	3.29	101.01	
-10.5	4.42	99.88	
-4	5.09	99.21	
-1	5.26	99.04	
0	5.30	99.00	
1.5	5.47	98.83	
3.6	5.83	98.47	
5.2	5.72	98.58	
6	5.93	98.37	
9	6.76	97.54	
11	7.00	97.30	
11.7	7.11	97.19	
12.2	7.28	97.02	
12.5	7.48	96.82	
12.8	7.64	96.66	
13	8.00	96.30	
13.5	8.42	95.88	
14.3	8.62	95.68	
15	8.63	95.67	
16	8.66	95.64	
17	8.61	95.69	
17.7	8.37	95.93	
18.3	7.63	96.67	
18.8	7.41	96.89	
19	5.87	98.43	
19.9	5.65	98.65	
21	5.30	99.00	
22.8	4.9	99.40	
25.4	5	99.30	
26.9	5.03	99.27	
30	4.73	99.57	
34	4.64	99.66	
36	4.17	100.13	
40	4.06	100.24	

Year 1			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

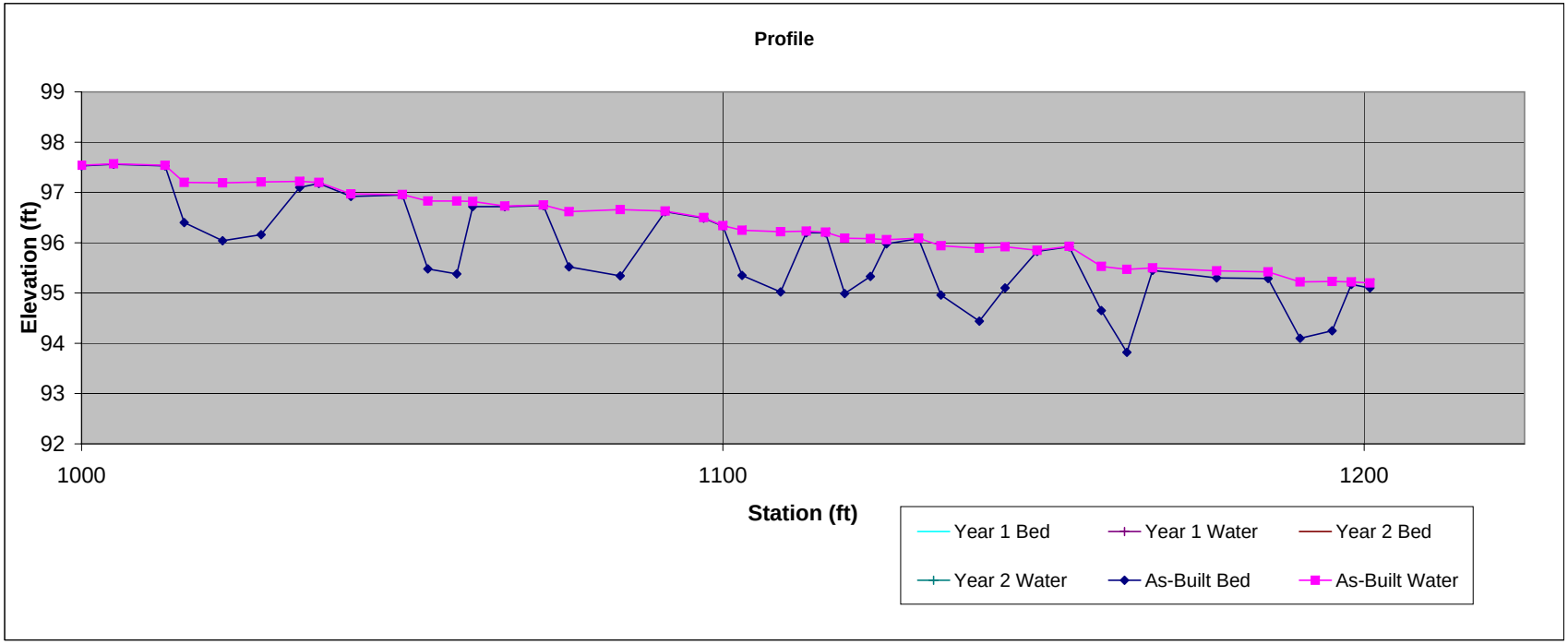
Year 2			
Station	FS/BS	Elev.	Desc.
BM			IR Lt
HI		0.00	

Year 3			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 4			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Year 5			
Station	FS/BS	Elev.	Desc.
BM	0.00	100.00	IR Lt
HI		100.00	

Holly Grove Stream Restoration Site
Guilford County, NC
Profile Reach 8 - Southwest Creek



Holly Grove Stream Restoration Site
Guilford County, NC
Profile Reach 8 - Southwest Creek

As-Built

HI	Station	Bed FS	Bed Elev.	Water Depth	Water Elev.	Bankfull FS	Bankfull Elev.	Description
104.04	1000	6.51	97.53	0.01	97.54			
104.04	1005	6.48	97.56	0.01	97.57	5.90	98.14	
104.04	1013	6.51	97.53	0.01	97.54			
104.04	1016	7.64	96.40	0.80	97.20			
104.04	1022	8.00	96.04	1.15	97.19			
104.04	1028	7.88	96.16	1.05	97.21			
104.04	1034	6.94	97.10	0.12	97.22			
104.04	1037	6.86	97.18	0.02	97.20	6.41	97.63	
104.04	1042	7.12	96.92	0.05	96.97			
104.04	1050	7.09	96.95	0.01	96.96	6.39	97.65	
104.04	1054	8.56	95.48	1.35	96.83			
104.04	1058.5	8.66	95.38	1.45	96.83			
104.04	1061	7.32	96.72	0.10	96.82			
104.04	1066	7.32	96.72	0.01	96.73			
104.04	1072	7.30	96.74	0.01	96.75			
104.04	1076	8.52	95.52	1.10	96.62			
104.04	1084	8.70	95.34	1.32	96.66			
104.04	1091	7.42	96.62	0.01	96.63	6.73	97.31	
104.04	1097	7.55	96.49	0.01	96.50			
104.04	1100	7.71	96.33	0.01	96.34			
104.04	1103	8.69	95.35	0.90	96.25			
104.04	1109	9.02	95.02	1.20	96.22			
104.04	1113	7.84	96.20	0.03	96.23			
104.04	1116	7.84	96.20	0.01	96.21	7.25	96.79	
104.04	1119	9.05	94.99	1.10	96.09			
104.04	1123	8.71	95.33	0.75	96.08			
104.04	1125.5	8.06	95.98	0.08	96.06	7.18	96.86	
104.04	1130.5	7.96	96.08	0.01	96.09			
104.04	1134	9.08	94.96	0.98	95.94			
104.04	1140	9.60	94.44	1.45	95.89			
104.04	1144	8.94	95.10	0.82	95.92			
104.04	1149	8.21	95.83	0.02	95.85	7.45	96.59	
101.50	1154	5.58	95.92	0.01	95.93			
101.50	1159	6.85	94.65	0.88	95.53			
101.50	1163	7.68	93.82	1.65	95.47			
101.50	1167	6.05	95.45	0.05	95.50			
101.50	1177	6.20	95.30	0.14	95.44	5.43	96.07	
101.50	1185	6.21	95.29	0.13	95.42			
101.50	1190	7.40	94.10	1.12	95.22			
101.50	1195	7.25	94.25	0.98	95.23			
101.50	1198	6.33	95.17	0.05	95.22			
101.50	1200.9	6.40	95.10	0.10	95.20			

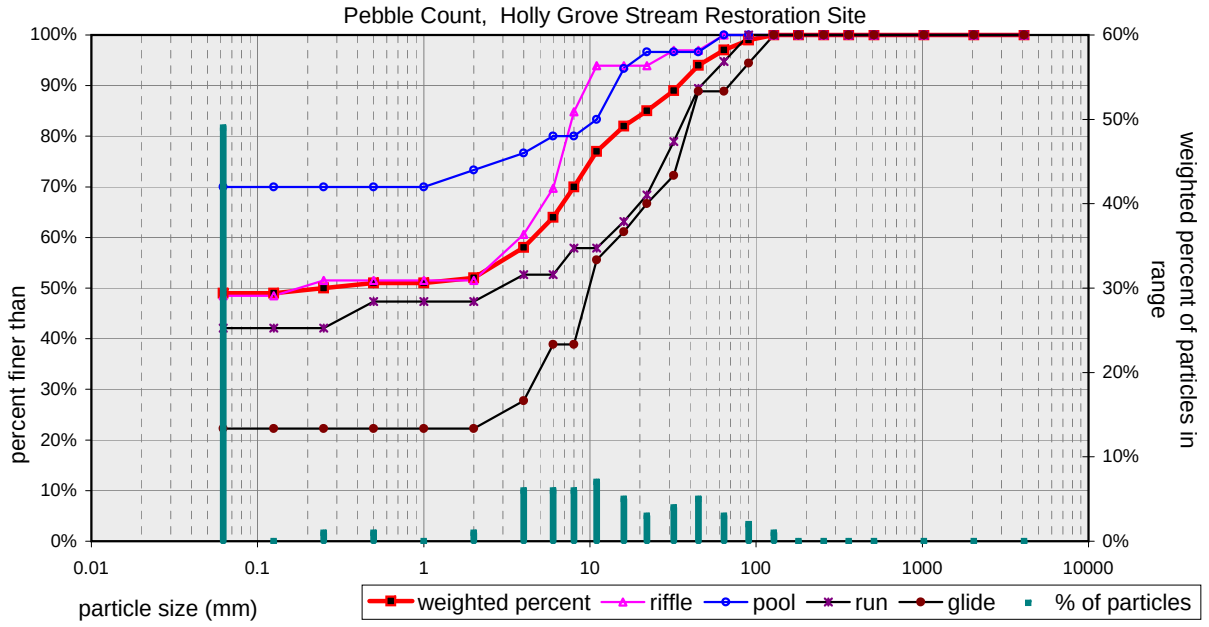
Pebble Count Weighted by Channel Feature

Percent Riffle:	**33**	Percent Run:	**19**	
Percent Pool:	**30**	Percent Glide:	**18**	Pebble Count,

Material	Size Range (mm)		weighted	
silt/clay	0	0.062	49.0	#
very fine sand	0.062	0.13	0.0	#
fine sand	0.13	0.25	1.0	#
medium sand	0.25	0.5	1.0	#
coarse sand	0.5	1	0.0	#
very coarse sand	1	2	1.0	#
very fine gravel	2	4	6.0	#
fine gravel	4	6	6.0	#
fine gravel	6	8	6.0	#
medium gravel	8	11	7.0	#
medium gravel	11	16	5.0	#
coarse gravel	16	22	3.0	#
coarse gravel	22	32	4.0	#
very coarse gravel	32	45	5.0	#
very coarse gravel	45	64	3.0	#
small cobble	64	90	2.0	#
medium cobble	90	128	1.0	#
large cobble	128	180	0.0	#
very large cobble	180	256	0.0	#
small boulder	256	362	0.0	#
small boulder	362	512	0.0	#
medium boulder	512	1024	0.0	#
large boulder	1024	2048	0.0	#
very large boulder	2048	4096	0.0	#
weighted particle count:			100.0	

bedrock		0.0
clay hardpan		0.0
detritus/wood		0.0
artificial		0.0
weighted total count:		100

Holly Grove Stream Restoration Site
Guilford County, NC
As-Built Reach 8
Note: 49%



based on sediment particles only	size percent less than (mm) D16	D35	D50	D65	D84	D95	particle size distribution gradation	geo mean	std dev
	0.062	0.06	0.3	6	20	51	41.6	1.1	17.9

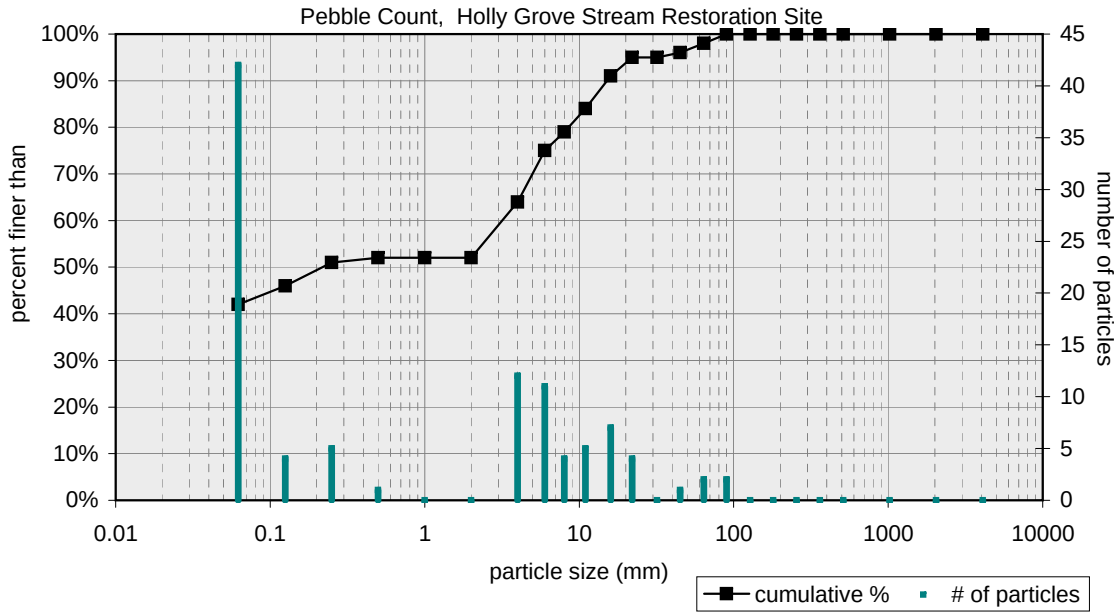
based on total count	percent by substrate type silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	49%	3%	45%	3%	0%	0%	0%	0%	0%

Pebble Count of Channel Reach

Material	Size Range (mm)		Count	
silt/clay	0	0.062	**42**	##
very fine sand	0.062	0.13	**4**	##
fine sand	0.13	0.25	**5**	##
medium sand	0.25	0.5	**1**	##
coarse sand	0.5	1	**0**	##
very coarse sand	1	2	**0**	##
very fine gravel	2	4	**12**	##
fine gravel	4	6	**11**	##
fine gravel	6	8	**4**	##
medium gravel	8	11	**5**	##
medium gravel	11	16	**7**	##
coarse gravel	16	22	**4**	##
coarse gravel	22	32	**0**	##
very coarse gravel	32	45	**1**	##
very coarse gravel	45	64	**2**	##
small cobble	64	90	**2**	##
medium cobble	90	128	**0**	##
large cobble	128	180	**0**	##
very large cobble	180	256	**0**	##
small boulder	256	362	**0**	##
small boulder	362	512	**0**	##
medium boulder	512	1024	**0**	##
large boulder	1024	2048	**0**	##
very large boulder	2048	4096	**0**	##
		total particle count:	100	

bedrock		
clay hardpan		
detritus/wood		
artificial		
	total count:	100

Pebble Count,
Holly Grove Stream Restoration Site
Guilford County, NC
As-Built Reach 8
Note: **Riffle**



based on sediment particles only	size percent less than (mm)						particle size distribution		
	D16	D35	D50	D65	D84	D95	gradation	geo mean	std dev
	0.062	0.06	0.2	4	11	22	27.0	0.8	13.3

based on total count	percent by substrate type								
	silt/clay	sand	gravel	cobble	boulder	bedrock	hardpan	wood/det	artificial
	42%	10%	46%	2%	0%	0%	0%	0%	0%

PHOTO POINTS

Photo Point 1

Buckhorn Creek facing upstream Photo No. 1

Photo Point 2

Buckhorn Creek facing upstream Photo No. 2

Photo Point 3

Buckhorn Creek facing upstream Photo No. 3

Photo Point 4

West Branch facing downstream Photo No. 4

Photo Point 5

Buckhorn Creek facing upstream Photo No. 5

Photo Point 6

Buckhorn Creek at bridge, facing upstream Photo No. 6

Photo Point 7

Buckhorn Creek at bridge, facing downstream Photo No. 7

Photo Point 8

Buckhorn Creek facing upstream Photo No. 8

Photo Point 9

Buckhorn Creek facing upstream Photo No. 9

Photo Point 10

Buckhorn Creek facing upstream Photo No. 10

Photo Point 11

Southwest Creek facing downstream Photo No. 11

Photo Point 12

Southwest Creek facing upstream Photo No. 12

VEGETATION SURVEY

Baseline Vegetation Data

Baseline vegetation data was collected on December 2nd and 3rd of 2008. Due to the size of the Site and ongoing construction activities in the fall, plantings were installed in several phases. Many of the stems from the earlier planting phases were heavily browsed, which provided difficulty in species identification. Baseline data was therefore collected on stem density and grid location without differentiation of species. The monitoring that will be conducted at the end of year-one will allow for assignment of individual species by correlation with grid position. Vegetation sampling across the site was above the required average density with an overall average of 599 planted stems per acre. The bare root plantings and live-stakes were installed according to the following distribution:

Floodplains

13.3% American sycamore(*Platanus occidentalis*)
13.3% Green ash (*Fraxinus pennsylvanica*)
6.67% River birch (*Betula nigra*)
6.67% Black walnut (*Juglans nigra*)
6.67% Swamp chestnut oak (*Quercus michauxii*)
6.67% Bitternut hickory (*Carya cordiformis*)
6.67% Tulip poplar (*Liriodendron tulipifera*)
6.67% Water oak (*Quercus nigra*)
6.67% Willow oak (*Quercus phellos*)
6.67% Spicebush (*Lindera benzoin*)
6.67% Witch hazel (*Hamamelis virginiana*)
6.67% Tag alder (*Alnus serrulata*)
6.67% Buttonbush (*Cephalanthus occidentalis*)

Uplands

8.70% American beech (*Fagus grandifolia*)
8.70% White ash (*Fraxinus americana*)
9.78% Black gum (*Nyssa sylvatica*)
9.78% Northern red oak (*Quercus rubra*)
9.78% White oak (*Quercus alba*)
9.78% Persimmon (*Diospyros virginiana*)
8.70% Redbud (*Cercis canadensis*)
8.70% Flowering dogwood (*Cornus florida*)
8.70% Hazelnut (*Corylus americana*)
8.70% Deciduous holly (*Ilex decidua*)
8.70% Southern arrow-wood (*Viburnum dentatum*)

Streamside

30% Silky dogwood (*Cornus amomum*)
30% Silky willow (*Salix sericea*)
20% Elderberry (*Sambucus canadensis*)
20% Ninebark (*Physocarpus opulafolius*)