UT TO SOUTH FORK
FINAL MONITORING REPORT
YEAR 3
2008

EEP Project # 435
Alamance County, North Carolina

Submitted to:

NCDENR-EEP
1652 Mail Service Center
Raleigh, NC 27699

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Original Design Firm:
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Submitted to:

NCDENR-EEP
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Executive Summary

The North Carolina Ecosystem Enhancement Program (EEP) restored the UT to South Fork in 2004. This project is located in the southern portion of Alamance County, NC. The different reaches flow through former pasture areas and wooded sections. Prior to restoration, cattle had unlimited access to the stream channels which created areas of severe bank erosion and loss of vegetation. Since the restoration has been completed, the livestock have been fenced out of the stream with the exception of a few crossings that are used throughout the year to move the cattle from one field to another.

There were several goals for this stream and buffer restoration project. Goals of the stream project included: reducing the bank erosion; reducing nutrient runoff on the site; stabilizing stream channel banks by planting vegetation; and, helping the stream reach its equilibrium though the proper design ratios for dimension, pattern, and profile.

Current monitoring for the site consists of evaluating both stream morphology and riparian vegetation for all three monitoring reaches. The stream monitoring included a longitudinal survey, cross section surveys, pebble counts, problem area identification, and photo documentation. A plan view featuring bankfull, edge of water, and thalweg lines as well as problem area locations was developed from the longitudinal survey. The vegetation assessment included a tally of planted vegetation in permanent vegetation plots, vegetation-specific problem area identification (i.e. bare areas and invasive species), and photo documentation. A vegetation problem area plan view was developed from the problem area identification. All morphological data, vegetation plot and pebble counts, cross section surveys, the longitudinal profile, and the plan view features were compared between monitoring years to assess project performance.

All Monitoring Year 3 profile and pattern parameters were consistent with Monitoring Year 2 values. Aggradation in riffle sections remains a problem in all monitoring subreaches. There is evidence that these areas are stabilizing in general as the riffles narrow to a stable state. The substrate coarsening trend observed at most cross sections is indicative of a clearing of fine sediments that may have been contributed to this aggradation. Several structures are failing in monitoring reaches 1 and 2. Several structures had water piping around stones. Several more structures had loose or displaced stones. In addition, several rootwads have some portion of bank caving in or piping behind the structure or around the footing. The most severe of these problem structures may warrant repair assessment. There were small amounts of bank erosion in all monitoring subreaches, but none were severe.

There was strong vegetative cover along the length of the project. Fescue has dominated the herbaceous understory of monitoring subreach 1, which appears to be preventing the establishment of the planted bare root trees. In Monitoring Year 3, several populations of exotic invasive species were noted. Invasive species found include: *Ligustrum sinense*, *Rosa multiflora*, *Microstegium virmineum*, *Typha latifolia*, and *Ailanthus altissima*. Planted stem survival in monitoring subreach 1 remains a concern. The overall planted stem survival from Monitoring Year 1 to Monitoring Year 3 was 75% among all vegetation plots. The overall planted stem density across all vegetation plots was 650 stems per acre.

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1.0 PROJECT BACKGROUND

1.1 Project Objectives

The goal of this stream restoration project is to improve water quality in the Cape Fear River Basin. The UT to South Fork is typical of other streams in this area, exhibiting instability and degradation in response to current and historical land use practices. The goal of improving water quality will be accomplished by re-establishing a stable dimension, pattern, and profile to the stream. Stabilization of the streambed and banks will reduce the amount of sediment entering the river basin and re-establishment of a permanent vegetated riparian buffer (consisting of native species) will help decrease nutrient input. This buffer will provide shading for wildlife habitat within the stream and along the stream buffer.

1.2 Project Structure, Restoration Type, and Approach

All four restoration subreaches were classified as E4/1 type streams prior to restoration, and exhibited instability that was attributed to excessive cattle access and other current and past land-use practices. The restoration of restoration subreaches 1 and 2 involved channel relocation with adjusted dimension, pattern, and profile resulting in a Priority Level I approach. Restoration for subreach 3 most closely resembled a Priority II and III restoration approach while restoration for subreach 4 most closely resembled a Priority I and II restoration approach. Table I details the specific restoration components employed on each restoration reach.

Table I. Project Restoration Components
UT to South Fork/EEP Project Number 435

Project Segment or Reach ID	Pre-Existing Footage	Type	Approach	As-Built Footage	As-Built Stationing*	Monitoring Year 4 Stationing**	Comments
Subreach 1	***	Restoration	P I	2,503	10+00 to 25+03	Reach 1 - 10+00 – 20+57.63	New channel construction
Subreach 2	***	Restoration	P I, PII	810	25+03 to 33+13	Reach 2 - 10+00 – 20+33.78	Modified pattern, dimension & profile
Subreach 3	***	Enhancement Level I	P II, P III	887	33+13 to 42+00		Modified dimension & profile
Subreach 4	***	Restoration	P I, P II	2,837	42+00-to 70+37	Reach 3 - 10+00 – 20+32.36	Modified pattern, dimension & profile

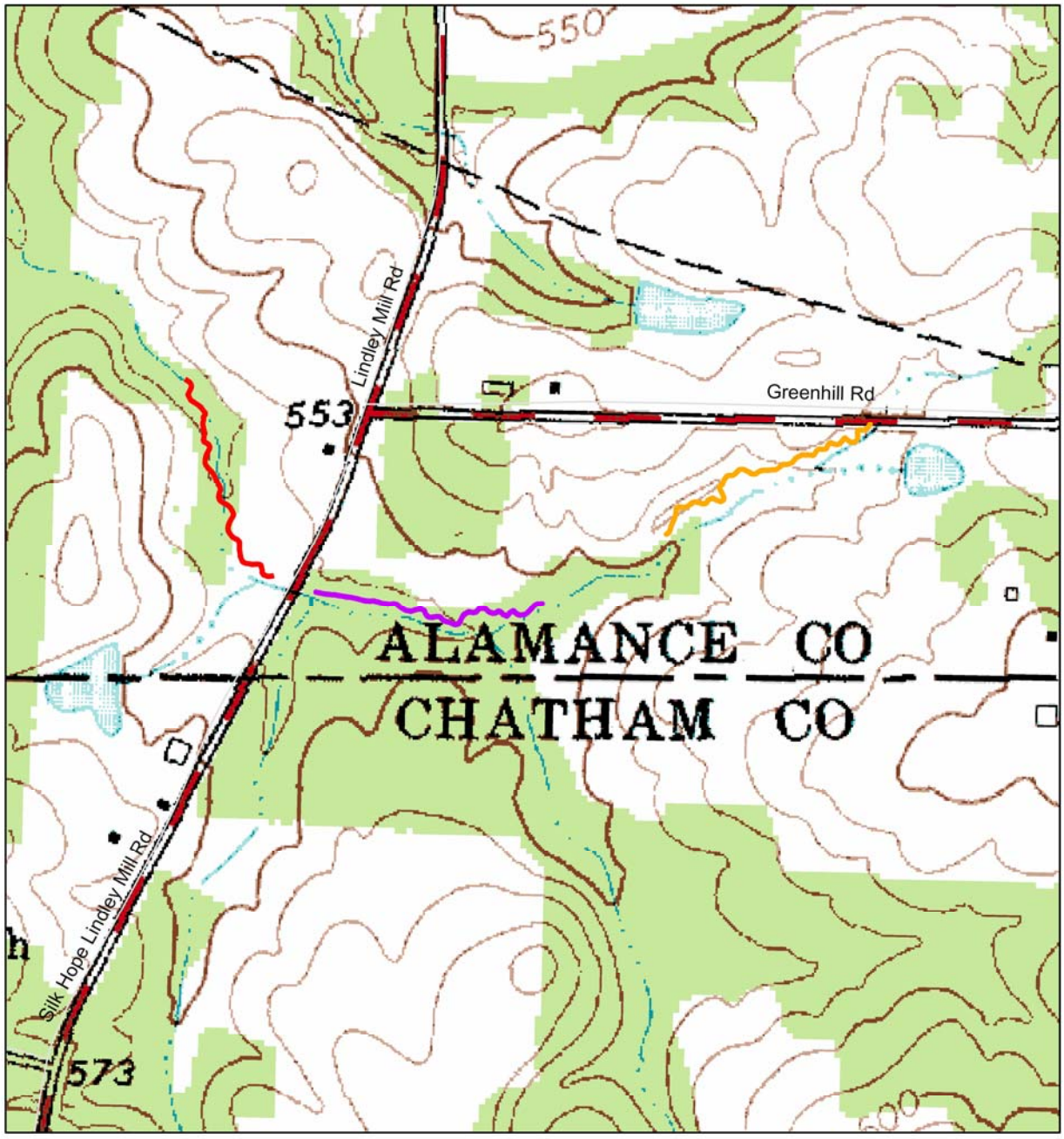
* – Determinations made from the Restoration Design Report for the project.
** – For monitoring purposes Reach 1 is Design Subreach 1, Reach 2 combines portions of both Design Subreach 2 and Design Subreach 3, and Reach 3 is Design Subreach 4.
*** - Information unavailable to SEPI at this time.

1.3 Project Location and Setting

This project is near Snow Camp, North Carolina in south-central Alamance County. To reach the site from Raleigh, go west on US 64 towards Siler City. Take the exit for NC 87 and turn right, heading north. Take a left onto Chapel Hill-Greensboro Road. At the intersection with Lindley Mill Road take a

left towards the community of Sutphin. The site is near the intersection with Green Hill Road before the Chatham County line. To access Reach 1, turn left onto Green Hill Road, you will cross the beginning of that reach. Reaches 2 and 3 can be accessed off of Lindley Mill Road. Figure 1 shows the location of the site and Figure 2 shows the location of each reach surveyed.

The project lies in a mostly open, abandoned agricultural field where cattle once had unlimited access to the stream. Since restoration, the stream has been fenced off, and cattle do not have access to the channel. The surrounding pastures are used for cattle grazing or crop production (hay). Less than 25% of the stream restoration area lies within a sparsely forested buffer area. The surrounding topography is gentle rolling hills.



UT SOUTH FORK
SITE VICINITY MAP

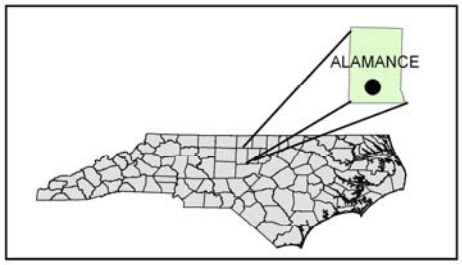
Ecosystem Enhancement Program

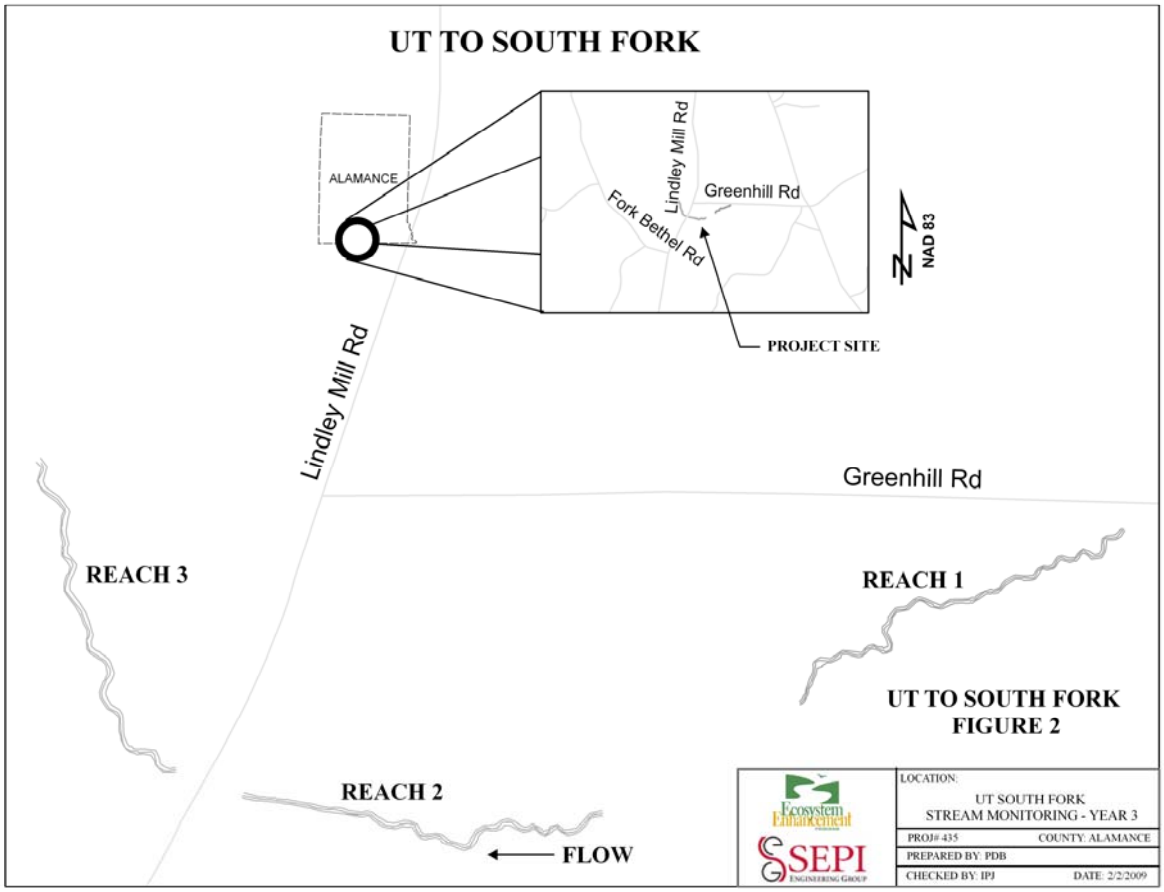
FIGURE 1
ALAMANCE COUNTY NC

500 250 0 500 Feet

N W E S

Monitoring Reach 1
Monitoring Reach 2
Monitoring Reach 3





1.4 History and Background

Tables II, III, and IV provide the project history, contact information for the contractors on the project, and the project background/setting, respectively.

Table II. Project Activity and Reporting History			
UT to South Fork/EEP Project Number 435			
Activity or Report	**Scheduled Completion**	**Data Collection Complete**	**Actual Completion or Delivery**
Restoration Plan			September 2002
Final Design - 90%	Additional raw data being acquired by EEP and will be included in the 2009 monitoring report for the site.		
Construction			
Temporary S&E mix applies to entire project area			
Permanent seed mix applies to reach/segments 1&2			
Containerized and B&B plantings for reach/segments 1&2			
Mitigation Plan/ As-built (Year 0 Monitoring - baseline)			
Year 1 monitoring	December 1, 2006	June 1, 2006	November 2006
Year 2 monitoring	December 1, 2007	October 2007	December 1, 2007
Year 3 monitoring	December 1, 2008	November 2008	November 15, 2008
Year 4 monitoring	December 1, 2009		
Year 5 monitoring	December 1, 2010		
Year 5+ monitoring			

Table III. Project Contact Table	
UT to South Fork/EEP Project Number 445	
Designer	ARCADIS G&M 801 Corporate Center Drive, Suite 300 Raleigh, NC 27607
Construction Contractor	*
Planting Contractor	*
Seeding Contractor	*
2006 – 2008 Monitoring Performers	SEPI Engineering Group 1025 Wade Avenue Raleigh, NC 27607 Phillip Todd (919) 789-9977
Stream Monitoring POC	Ira Poplar-Jeffers (919) 789-9977
Vegetation Monitoring POC	Phil Beach (919) 789-9977
Wetland Monitoring POC	N/A

*Raw data being acquired by EEP and will be included in the 2009 monitoring report.

Table IV. Project Background Table	
UT to South Fork/EEP Project Number 445	
Project County	Alamance County, NC
Drainage impervious cover estimate (%)	5
Stream Order	1
Physiographic Region	Piedmont
Ecoregion	Carolina Slate Belt
Rosgen Classification of As-built	E
Cowardin Classification	N/A
Dominant soil types	Georgeville-Heron-Alamance & Orange-Efland-Herndon
Reference site ID	UT Wells Creek & UT Varnal Creek
USGS HUC for Project and Reference	03030002 Haw River
NCDWQ Sub-basin for Project and Reference	03-04-06
NCDWQ classification for Project and Reference	C, NSW
Any portion of any project segment 303d listed?	no
Any portion of any project segment upstream of a 303d listed segment?	no
Reasons for 303d listing or stressor	N/A
% of project easement fenced	99
% of project easement demarcated with bollards (if fencing absent)	0

2.0 PROJECT MONITORING METHODOLOGY

2.1 Vegetation Methodology

For this monitoring project, a total of twelve (12) plots were studied. Plot sizes measure 10 meters by 10 meters (or equivalent to 100 square meters) depending on buffer width. The vegetation monitoring was not the Carolina Vegetation Survey (CVS) protocol, but was based on the number of stems for the targeted species that were planted for the stream restoration project. The planted material in the plot (previously marked with flagging) was identified by species and a tally of each species was kept and recorded in a field book. Any stems for a given species in a given plot that were not flagged and were counted over and above the baseline total were considered volunteers.

It should be noted that no initial planting documentation has ever been received by SEPI, so all survivability and density calculations are based on using the Monitoring Year 1 stem counts as a baseline. In Monitoring Year 1, SEPI project scientists used their best professional judgement to distinguish planted stems from volunteers.

2.2 Stream Methodology

The project monitoring for the stream channel included a longitudinal survey, cross-sectional surveys, pebble counts, problem area identification, and photo documentation. These measurements were taken at each reach. The stationing was based on thalweg. The methodology for each portion of the stream monitoring is described in detail below.

2.2.1 Longitudinal Profile and Plan View

A longitudinal profile was surveyed for each reach with a Nikon DTM-520 Total Station, prism, and a TDS Recon Pocket PC. The heads of features (i.e., riffles, runs, pools, and glides) were surveyed, as well as the point of maximum depth of each pool, boundaries of problem areas, and any other significant slope-breaks or points of interest. At the head of each feature and at the maximum pool depth, thalweg, water surface, edge of water, left and right bankfull, and left and right top of bank (if different than bankfull) were surveyed. All profile measurements were extracted from this survey, including channel and valley length and length of each feature, water surface slope for each reach and feature, bankfull slope for the reach, and pool spacing. This survey also was used to draw plan view figures with Microstation v8 (Bentley Systems, Inc., Exton, PA) for each reach, and all pattern measurements (i.e. meander length, radius of curvature, belt width, meander width ratio, and sinuosity) were extracted from the plan view. Stationing was calculated along the thalweg.

2.2.2 Permanent Cross Sections

Four permanent cross sections (two riffles and two pools) were surveyed at Reach 1. Two permanent cross sections (one riffle and one pool) were surveyed at Reach 2, and six permanent cross sections (3 riffles and 3 pools) were surveyed at Reach 3. The beginning and end of each permanent cross section were originally marked with a wooden stake and metal conduit. Cross sections were installed perpendicular to the stream flow. Each survey noted all changes in slope, tops of both banks, left and right bankfull, edges of water, thalweg, and water surface. The cross sections were then plotted and overlain on the cross section surveys from all previous monitoring years. All dimension measurements (i.e. bankfull width, floodprone width, bankfull mean depth, cross sectional area, width-to-depth ratio, entrenchment ratio, bank height ratio, wetted perimeter, and hydraulic radius) were extracted from these plots and compared to data from all previous monitoring years.

2.2.3 Pebble Counts

A modified Wolman pebble count (Rosgen 1994), consisting of 50 samples, was conducted at each permanent cross section. The cumulative percentages were graphed, and the D50 and D84 particle sizes were calculated and compared to data from all previous monitoring years.

2.3 Photo Documentation

Permanent photo points were established during Monitoring Year 1. A set of three photographs (facing upstream, facing downstream, and facing the channel) were taken at each photo point with a digital camera. Two photographs were taken at each cross-section (facing upstream and downstream). A representative photograph of each vegetation plot was taken at the designated corner of the vegetation plot and in the same direction as the Monitoring Year 1 photograph. An arrow was placed on the designated corner of each vegetation plot on the plan view sheets to document the corner and direction of each photograph. Photos were also taken of all significant stream and vegetation problem areas.

3.0 PROJECT CONDITION AND MONITORNING RESULTS

3.1 Vegetation Assessment

3.1.1 Soils Data

Preliminary Soil Data					
Series	**Max Depth (in.)**	**% Clay on Surface**	**K**	**T**	**OM %**
Chewacla (Cd)	80	5.0 - 20.0	0.48	*	1.0 - 4.0
Efland (EaB2)	86	<<<<<<< Information unavailable >>>>>>>			
Georgeville (GaB2)	63	5.0 - 27.0	0.48	*	0.5 - 2.0
Georgeville (GbD3)	63	27.0 - 35.0	0.35	*	0.5 - 2.0
Herndon (HdB2)	68	5.0 - 27.0	0.48	*	0.5 - 1.0
Local Alluvial (Lc)		<<<<<<< High variability of data >>>>>>>			
Orange (ObB2)	55	10.0 - 27.0	0.44	*	1.0 - 3.0
Orange (ObC2)	55	10.0 - 27.0	0.44	*	1.0 - 3.0

* The soils information was not available from the Natural Resources Conservation Service (NRCS)

3.1.2 Vegetative Problem Area Plan View

Overall, there was strong vegetative cover along the length of the project. Fescue has dominated the herbaceous understory of Monitoring Reach 1, which may be preventing the establishment of the planted stems. This fescue dominance was particularly noted in Vegetation plot (VP) #2 where no woody stems were noted. Vegetation plot #1 had only 3 green ash (*Fraxinis pennsylvanica*) individuals and VP #4 had only a single green ash and five red maple (*Acer rubrum*) stems. In addition, fewer new volunteers were noted in Monitoring Reach 1 during Monitoring Year 3 than in subreach 2 or 3 plots. The vegetation plots and problem areas are shown on the plan view sheets in Appendix C.

In Monitoring Year 3, several populations of exotic invasive species were noted. Chinese privet (*Ligustrum sinense*) and multiflora rose (*Rosa multiflora*) were found in various areas along all three Monitoring Reaches. Japanese stilt grass (*Microstegium virmineum*) was identified at two locations along Monitoring Reach 1, an area at Station 14+27 and one at Station 19+83. Tree of heaven was identified at one location along Monitoring Reach 2 (Station 15+52) and was found at several locations long Monitoring Reach 3 (see Table VI in Appendix A3). In addition, Japanese honeysuckle (*Lonicera japonica*), *a*lthough not considered to be a major problem, was noted in most of the vegetation plots. Although not considered a 'problem,' it should be noted that cattails, which are sometimes invasive, were noted along all three monitoring reaches, most prominently at Monitoring Reaches 2 and 3.

3.1.3 Stem Counts

Planted stems in Monitoring Reach 1 remain a concern. No stems were located in VP #2, presumably due to *Festuca spp.* dominance. Planted stem densities in all Monitoring Reach 1 vegetation plots (VP #1 through #4) are already below the Monitoring Year 5 goal of 260 stems per acre. In addition, VP# 5 (Monitoring Reach 2) also dropped below the Monitoring Year 5 goal this year. The rest of the vegetation plots are well above the Monitoring Year 5 goal.

The overall planted stem survival from Monitoring Year 1 to Year 3 was 75% among all vegetation plots. The overall planted stem density across all vegetation plots was 650 stems per acre.

It should be noted that there were several species for which additional stems were counted for a given species within a given plot relative to the Monitoring Year 2 count. These additional stems were assumed

to be volunteers and were not included in the survival calculations. The volunteer species were *Cornus ammomum, Acer negundo, Acer rubrum, Betula nigra, Liquidambar styraciflua, Quercus sp., Quercus alba, Diospyros virginiana, Sambucus canandensis, Ulmus americana, Carya sp., Pinus taeda, Cercis canadensis, Ligustrum sinense, and Ailanthus altissima.* In addition, *Liquidambar styraciflua* were too numerous to count where volunteers were noted.

3.2 Stream Assessment

Considering the 5 year timeframe of standard mitigation monitoring, restored streams should demonstrate morphologic stability in order 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 to also be expected. However, the observed change should not indicate a high rate or be unidirectional over time such that a robust trend is evident. If some trend is evident, it should be very modest or indicate migration to another stable form. Examples of the latter include depositional processes resulting in the development of constructive features on the banks and floodplain, such as an inner berm, slight channel narrowing, modest natural levees, and general floodplain deposition. Annual variation is to be expected, but over time this should demonstrate maintenance around some acceptable central tendency while also demonstrating consistency or a reduction in the amplitude of variation. Lastly, all of this must be evaluated in the context of hydrologic events to which the system is exposed over the monitoring period.

For channel dimension, cross-sectional overlays and key parameters such as cross-sectional area and the channel's width to depth ratio should demonstrate modest overall change and patterns of variation that are in keeping with above. For the channels' profile, the reach under assessment should not demonstrate any consistent trends in thalweg aggradation or degradation over any significant continuous portion of its length. Over the monitoring period, the profile should also demonstrate the maintenance or development of bedform (facets) more in keeping with reference level diversity and distributions for the stream type in question. It should also provide a meaningful contrast in terms of bedform diversity against the pre-existing condition. Bedform distributions, riffle/pool lengths and slopes will vary, but should do so with maintenance around design/As-built distributions. This requires that the majority of pools are maintained at greater depths with lower water surface slopes and riffles are shallow with greater water surface slopes. Substrate measurements should indicate the progression towards, or the maintenance of, the known distributions from the design phase.

In addition to these geomorphic criteria, a minimum of two bankfull events must be documented during separate monitoring years within the five year monitoring period for the monitoring to be considered complete. Table VIII documents all bankfull events recorded since the start of Monitoring Year 1.

Table V. Verification of Bankfull Events			
Date of Data Collection	**Likely Date of Occurrence**	**Method**	**Photo # (if available)**
1/9/2007	Unknown	Crest Stage Gauge measurement of approximately 7 inches on stick (bottom of gauge at bkf).	no photo
4/5/2007	Unknown	Crest Stage Gauge measurement of 16" (bottom of gauge 12" below bkf).	no photo
6/4/2007	6/3/2007	Result of an approximate 1.5 inch rain event. Wrack lines observed.	no photo
2/27/2008	1/20/2008	Crest gauge reading of 28 inches over bankfull (located at 15-20 inches on gauge). Also wrack lines observed above bankfull elevation.	no photo
3/17/2008	3/5/2008	Wrack line from bankfull event observed above bankfull.	Photo 4 in SR-3 SPA Photolog
9/1/2008	8/27/2008 - 8/28/2008	According to NCDC Station Coop ID 313555 - Graham ENE, NC , 6.58 inches of precipitation fell on this day. It was assumed, but not verified, that this rainfall produced a bankfull event.	no photo

3.2.1 Longitudinal Profile and Plan View

All Monitoring Year 3 profile and pattern parameters listed in Table XIII (Appendix B3) are consistent with values from Monitoring Year 2.

3.2.2 Permanent Cross Sections

All cross sections overlay nicely and have remained consistent between Monitoring Years 2 and 3. No cross sections have specific problem areas associated with them. However, there is a bank erosion (right) located just downstream of cross section #2 and a bank erosion (right) located just downstream of cross section #4 on Monitoring Reach 1. This erosion has not affected the dimension of these cross sections, but the area should be observed closely during future monitoring years to track any changes. All cross-section graphs are located in Appendix B.

3.2.3 Pebble Counts

Pebble counts for Monitoring Reach 1 generally show a slight coarsening of the substrate (i.e. lower percentage of silt/clay particles), with the exception of the cross section #3 count, which remained consistent with the Monitoring Year 2 count. Pebble counts for Monitoring Reach 2 show the same trend that was observed in Monitoring Reach 1 (i.e., general coarsening of the substrate due to a lower percentage of silt/clay particles). Monitoring Reach 3 pebble counts show the same trend observed in Monitoring Reaches 1 and 2 (i.e., general coarsening of the substrate due to a lower percentage of silt/clay particles), with the exception of cross sections #8 and #10. Cross section #8 was consistent with the Monitoring Year 2 count (i.e., approximately 60% silt/clay), as was cross section #10. However, cross section #10 did not have a fining problem in Monitoring Year 2 and continues to have a good distribution of sediment size classes. The best explanation for this general substrate coarsening trend observed at all three Monitoring Reaches is the increased frequency of high flow events in 2008 that probably flushed some of these fines downstream.

3.2.4 Stream Problem Areas

Aggradation/bar formation in riffle sections remains fairly prominent in all three monitoring reaches, however the trend appears to be that these areas are clearing in the thalweg, creating inner-berm features. Therefore, this aggradation may not be a problem as the stream appears to be narrowing to a stable dimension where it appears the riffle sections were built too wide. Evidence for the notion that riffles along this project were built too wide is found in the observation that the old aggradation (i.e. sediment deposition) that was building in the riffles in many areas is clearing withing the thalweg, but building up along the channel edges and becoming permanent with vegetation taking root, essentially forming inner-berm features along the riffles and leaving the riffles with a more stable low flow dimension that is better able to transport sediment. Further evidence that these aggradational areas may be stabilizing is the general trend (with a few exceptions) across the entire restoration site of a coarsending of the streambed substrate, indicative of the clearing of fine sediment deposition in most areas in Monitoring Year 3. There is some bank erosion in all reaches (e.g., Station 18+26 on Monitoring Reach 1, Station 11+28 on Monitoring Reach 2, and Station 19+30 on Monitoring Reach 3), but there are no areas of severe status, and many areas appear to be healing over. In general the bank conditions of all three reaches was consistent with that of Monitoring Year 2. Many of the stone in-stream structures (i.e. crossvanes and j-hooks) in Monitoring Reaches 1 and 2 have water piping around or under the structure and/or have stones that are loose or have already been displaced (e.g., j-hook at Station 14+92 on Monitoring Reach 1 and a crossvane at Station 20+34 on Monitoring Reach 2). Several of these structures may warrant a repair assessment. In addition, several rootwads on Monitoring Reaches 1 and 2 have problems with the soil caving in behind the structure or around the footing (e.g., Station 15+55 on Monitoring Reach 1 and Station 15+07 on Monitoring Reach 2). In some cases, this instability may just be the result of the ground settling after installation, but in several cases it appears that there is water piping through the structure at certain times, which is a more serious problem. The structures in Reach 3 appear stable overall. Problem areas that were observed in the field are marked on the plan sheets in Appendix B. The stream problem areas table is located in Appendix B and describes the problem areas, station numbers, and respective probable causes.

Table VII a. Categorical Stream Feature Visual Stability Assessment

UT to South Fork

Segment/Reach: 1 (1140 linear feet)

Feature	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
A. Riffles	100%	80%	71%	63%		
B. Pools	100%	80%	90%	87%		
C. Thalweg	100%	85%	88%	100%		
D. Meanders	100%	87%	87%	73%		
E. Bed General	100%	92%	87%	88%		
F. Bank Condition	100%	98%	98%	98%		
G. Vanes / J Hooks etc.	100%	58%	91%	90%		
H. Wads and Boulders	100%	50%	56%	69%		

Table VII b. Categorical Stream Feature Visual Stability Assessment						
UT to South Fork						
Segment/Reach: 2 (1022 linear feet)						
Feature	**Initial**	**MY-01**	**MY-02**	**MY-03**	**MY-04**	**MY-05**
A. Riffles	100%	91%	83%	77%		
B. Pools	100%	90%	100%	88%		
C. Thalweg	100%	94%	93%	94%		
D. Meanders	100%	79%	98%	82%		
E. Bed General	100%	87%	82%	93%		
F. Bank Condition	100%	98%	99%	99%		
G. Vanes / J Hooks etc.	100%	71%	97%	97%		
H. Wads and Boulders	100%	27%	77%	77%		

Table VII c. Categorical Stream Feature Visual Stability Assessment						
UT to South Fork						
Segment/Reach: 3 (1024 linear feet)						
Feature	**Initial**	**MY-01**	**MY-02**	**MY-03**	**MY-04**	**MY-05**
A. Riffles	100%	90%	84%	93%		
B. Pools	100%	91%	88%	82%		
C. Thalweg	100%	88%	100%	100%		
D. Meanders	100%	75%	97%	72%		
E. Bed General	100%	89%	90%	98%		
F. Bank Condition	100%	93%	98%	98%		
G. Vanes / J Hooks etc.	100%	100%	100%	98%		
H. Wads and Boulders	100%	90%	100%	100%		

3.3 Photo Documentation

Photos taken of the vegetation problem areas and photos of the vegetation plots are in Appendix A. Stream problem area photographs are provided in Appendix B. The photographs taken at the marked photo point locations and at the cross-sections are provided in Appendix B.

4.0 RECOMMENDATIONS AND CONCLUSIONS

All Monitoring Year 3 profile and pattern parameters listed in Table XIII (Appendix B3) were consistent with Monitoring Year 2 values. Aggradation in riffle sections remains a problem in all Monitoring Reaches. However, there is evidence that these areas are stabilizing in general as the riffles narrow to a stable state. The substrate coarsening trend observed at most cross sections is indicative of a clearing of fine sediments that may have been contributing to this aggradation. There are several problem areas, especially in Monitoring Reaches 1 and 2, where structures are failing. Several structures had water flowing piping around stones. Several more structures had loose or displaced stones. In addition, several rootwads of Monitoring Reaches 1 and 2 have some portion of bank caving in or piping behind the structure or around the footing. Repair assessment may be warranted on these reaches. There were small amounts of bank erosion in all Monitoring Reaches, but none were severe. In general, bank erosion impacted a low percentage of all reaches and is not a serious concern at this time.

Overall, there was strong vegetative cover along the length of the project. Fescue has dominated the herbaceous understory of Monitoring Reach 1, which may be preventing the establishment of the planted

bare root trees. Various populations of invasive species were discovered in Monitoring Year 3 at all three Monitoring Reaches that were apparently overlooked in previous monitoring years. Species found include: *Ligustrum sinense*, *Rosa multiflora*, *Microstegium virmineum*, *Typha latifolia*, and *Ailanthus altissima*. Planted stem survival in Monitoring Reach 1 remains a concern. No stems were located in VP #2, presumably due to *Festuca spp.* dominance. Planted stem densities in all Monitoring Reach 1 vegetation plots (VP #1 through #4) are already below the Monitoring Year 5 goal of 260 stems per acre. In addition, VP# 5 (Monitoring Reach 2) also dropped below the Monitoring Year 5 goal this year. The rest of the vegetation plots are well above the Monitoring Year 5 goal. The overall 'planted' stem survival from Monitoring Year 1 to Year 3 was 75% among all vegetation plots. The overall 'planted' stem density across all vegetation plots was 650 stems per acre.

REFERENCES

ARCADIS G&M of North Carolina, Inc (ARCADIS). September 2002. *Restoration Design Report, Unnamed Tributary to South Fork.*

DeLorme. 1997. *The North Carolina Atlas and Gazateer*.

Harman, W.H., et al. 1999. *Bankfull Hydraulic Geometry Relationships for North Carolina Streams*. AWRA Wildland Hydrology Symposium Proceedings. Edited by D.S. Olson and J.P. Potyondy. AWRA Summer Synposium. Bozeman, MT.

North Carolina Ecosystem Enhancement Program. November 2006. *Content, Format and Data Requirements for EEP Monitoring Reports*.

Rosgen, D.L. 1994. *A Classification of Natural Rivers*. Catena 22: 166-169.

SEPI Engineering Group. 2006. *UT to South Fork Final Monitoring Report, Year 1 of 5*.

SEPI Engineering Group. 2007. *UT to South Fork Final Monitoring Report, Year 2 of 5*.

U.S. Department of Agriculture, Soil Conversation Service. April 1960. *Soil Survey Alamance County, North Carolina*.

U.S. Department of Army, Corps of Engineers. 2003. *Stream Mitigation Guidelines*. http://www.saw.usace.army.mil/wetlands/Mitigation/stream_mitigation.html

APPENDIX A1

VEGETATION DATA TABLES

Table A1. Stem counts for each species arranged by plot for UT South Fork																
Species	**Plots**												**Year 1 Totals**	**Year 2 Totals**	**Year 3 Totals**	**Survival %**
	1	2	3	4	5	6	7	8	9	10	11	12				
Shrubs																
Cornus ammomum						(LS 15)			(LS 1)	2 (LS 5)	(LS 5)	(LS 5)	3 (LS 31)	3 (LS 31)	2 (LS 31)	97.1%
Salix nigra													1	1	0	0.0%
Trees																
Acer negundo											1		1	1	1	100.0%
Acer rubrum				5			1						7	6	6	85.7%
Betula nigra							2	2	1	11	3	8	31	27	27	87.1%
Carpinus caroliniana													2	0	0	0.0%
Diospyros virginiana						1	5	3	0	3	1	0	18	16	13	72.2%
Fraxinis pennsylvanica	3		3	1	3		8	10	10	16	2	3	70	63	59	84.3%
Symphoricarpos orbiculatus			3							1			4	4	4	100.0%
Juglans nigra									2	1		2	27	8	5	18.5%
Platanus occidentalis						10	13	1	1		2	3	32	30	30	93.8%
Sambucus canandensis					2								5	2	2	40.0%
Quercus michauxii									1	5	2	2	14	10	10	71.4%
Quercus sp.							1						1	1	1	100.0%
Quercus alba								5					10	7	5	50.0%
Ulmus americana							1				1		3	2	2	66.7%
Total including live stake	3	0	6	6	5	26	31	21	16	44	17	23	260	212	195	75.0%
Stems per acre	120	0	240	240	200	1040	1240	840	640	1760	680	920	867	707	650	
Total excluding live stake	3	0	6	6	5	11	31	21	15	39	12	18	229	181	164	71.6%
Stems per acre	120	0	240	240	200	440	1240	840	600	1560	480	720	763	603	547	

**Volunteers of the following species, not initially recorded as planted, were counted: Cornus ammomum, Acer negundo, Acer rubrum, Betula nigra, Fraxinis pennsylvanica, Quercus michauxii, Juglans nigra, Platanus occidentalis, Baccharis halimifolia, Symphoricarpos orbiculatus, Celtis laevigata, Liquidambar styraciflua, Quercus sp., Quercus alba, Diospyros virginiana, Sambucus canandensis, Ulmus americana, Carya sp., Pinus taeda, Cercis canadensis, Ligustrum sinense, and Ailanthus altissima.*

**Liquidambar styraciflua were too numerous to count where new volunteers were noted.*

Table A2. Vegetative Problem Areas			
Feature/Issue	**Station # / Range**	**Probable Cause**	**Photo #**
Stream Reach 1			
Ligustrum sinense (Left Bank)	SR1 - 10+00	Invasive vegetative opportunism	
Rosa multiflora (Right Bank)	SR1 - 11+25	Invasive vegetative opportunism	
Rosa multiflora (Left Bank)	SR1 - 13+54	Invasive vegetative opportunism	
Ligustrum sinense (Right Bank)	SR1 - 13+56	Invasive vegetative opportunism	
Ligustrum sinense (Right Bank)	SR1 - 14+17 to 14+58	Invasive vegetative opportunism	
Microstegium virmineum (Both Banks)	SR1 - 14+27 to 14+39	Invasive vegetative opportunism	Photo 1
Rosa multiflora (Left Bank)	SR1 - 14+36	Invasive vegetative opportunism	
Rosa multiflora (Left Bank)	SR1 - 16+71	Invasive vegetative opportunism	
Ligustrum sinense (Left Bank)	SR1 - 18+40	Invasive vegetative opportunism	
Bare Bench/Bank	SR1 - 18+61 to 18+66	Lack of vegetation/erodible soil texture	Photo 2
Microstegium virmineum (Left Bank)	SR1 - 19+83 to 20+09	Invasive vegetative opportunism	
Ligustrum sinense (Left Bank)	SR1 - 19+80	Invasive vegetative opportunism	
Ligustrum sinense (Left Bank)	SR1 - 20+09 to 20+24	Invasive vegetative opportunism	
Ligustrum sinense (Left Bank)	SR1 - 20+46	Invasive vegetative opportunism	
Festuca spp.	SR1 - entire reach	Invasive vegetative opportunism - Fescue has dominated most of the herbaceous understory.	Photo 1
Stream Reach 2			
Rosa multiflora (Left Bank)	SR2 - 10+04 to 14+29	Invasive vegetative opportunism	
Rosa multiflora and Ligustrum sinense (Left Bank)	SR2 - 10+51 to 14+08	Invasive vegetative opportunism	
Ligustrum sinense (Right Bank)	SR2 - 10+68 10+94	Invasive vegetative opportunism	Photo 1
Rosa multiflora (Right Bank)	SR2 - 11+30 to 11+41	Invasive vegetative opportunism	
Rosa multiflora (Left Bank)	SR2 - 11+17 to 11+71	Invasive vegetative opportunism	Photo 3
Ligustrum sinense (Right Bank)	SR2 - 12+10	Invasive vegetative opportunism	
Ligustrum sinense (Right Bank)	SR2 - 13+03	Invasive vegetative opportunism	
Bare Bench/Bank (Right)	SR2 -13+09 13+43	Lack of vegetation/erodible soil texture	
Rosa multiflora and Ligustrum sinense (Right Bank)	SR2 - 13+51 15+03	Invasive vegetative opportunism	
Bare Bench/Bank (Right)	SR2 - 13+65 to 15+83	Lack of vegetation/erodible soil texture	
Rosa multiflora (Left Bank)	SR2 - 14+29	Invasive vegetative opportunism	
Ligustrum sinense (Left Bank)	SR2 - 14+29 14+80	Invasive vegetative opportunism	
Rosa multiflora (Left Bank)	SR2 - 14+70	Invasive vegetative opportunism	
Ailanthus altissima (Left Bank)	SR2 - 15+52	Invasive vegetative opportunism	
Rosa multiflora and Ligustrum sinense (Right Bank)	SR2 - 15+86 to 17+16	Invasive vegetative opportunism	
Ligustrum sinense (Left Bank)	SR2 - 15+63 to 16+39	Invasive vegetative opportunism	
Rosa multiflora and Ligustrum sinense (Left Bank)	SR2 - 16+73 to 17+42	Invasive vegetative opportunism	
Ligustrum sinense (Left Bank)	SR2 - 17+11 to 17+18	Invasive vegetative opportunism	
Rosa multiflora (Right Bank)	SR2 - 18+00 to 18+05	Invasive vegetative opportunism	
Ligustrum sinense (Right Bank)	SR2 - 18+13 to 19+08	Invasive vegetative opportunism	
Ligustrum sinense (Left Bank)	SR2 - 18+33	Invasive vegetative opportunism	
Ligustrum sinense (Right Bank)	SR2 - 18+39 to 18+47	Invasive vegetative opportunism	
Rosa multiflora and Ligustrum sinense (Right Bank)	SR2 - 18+83 to 19+19	Invasive vegetative opportunism	
Ligustrum sinense (Right Bank)	SR2 - 19+76	Invasive vegetative opportunism	
Ligustrum sinense (Right Bank)	SR2 - 19+84	Invasive vegetative opportunism	
Ligustrum sinense (Left Bank)	SR2 - 19+84 to 20+33	Invasive vegetative opportunism	
Stream Reach 3			
Ligustrum sinense (Right Bank)	SR3 - 10+17 to 10+33	Invasive vegetative opportunism	
Ligustrum sinense (Left Bank)	SR3 - 11+22 to 11+48	Invasive vegetative opportunism	
Ligustrum sinense (Left Bank)	SR3 - 11+61 to 11+74	Invasive vegetative opportunism	
Rosa multiflora (Left Bank)	SR3 - 12+00 to 12+08	Invasive vegetative opportunism	
Ligustrum sinense (Left Bank)	SR3 - 11+84 to 14+79	Invasive vegetative opportunism	
Rosa multiflora (Left Bank)	SR3 - 12+78 to 12+80	Invasive vegetative opportunism	
Rosa multiflora (Left Bank)	SR3 - 12+80	Invasive vegetative opportunism	
Rosa multiflora (Right Bank)	SR3 - 13+88 to 14+01	Invasive vegetative opportunism	
Ligustrum sinense (Right Bank)	SR3 - 14+21 to 14+27	Invasive vegetative opportunism	Photo 2
Ligustrum sinense (Right Bank)	SR3 - 14+8 to8 14+98	Invasive vegetative opportunism	
Rosa multiflora (Right Bank)	SR3 - 15+00	Invasive vegetative opportunism	
Ligustrum sinense (Right Bank)	SR3 - 15+02 to 15+10	Invasive vegetative opportunism	
Ailanthus altissima and Ligustrum sinense (Left Bank)	SR3 - 14+78 to 17+37	Invasive vegetative opportunism	
Ligustrum sinense (Right Bank)	SR3 - 15+59	Invasive vegetative opportunism	
Ligustrum sinense (Right Bank)	SR3 - 15+69	Invasive vegetative opportunism	
Rosa multiflora (Right Bank)	SR3 - 15+94	Invasive vegetative opportunism	
Ligustrum sinense (Left Bank)	SR3 - 16+21	Invasive vegetative opportunism	
Typha latifolia	SR3 - 15+96 to 16+36	Aggradation/Invasive vegetative opportunism	
Ailanthus altissima (Right Bank)	SR3 - 15+72 to 16+47	Invasive vegetative opportunism	
Ailanthus altissima (Left Bank)	SR3 - 16+34 to 16+45	Invasive vegetative opportunism	
Bare Bench/Bank (Left)	SR3 - 16+40	Lack of vegetation/erodible soil texture	Photo 3
Ailanthus altissima and *Ligustrum sinense* (Left Bank)	SR3 - 17+50 to 19+55	Invasive vegetative opportunism	
Ailanthus altissima (Right Bank)	SR3 - 17+33	Invasive vegetative opportunism	
Rosa multiflora (Right Bank)	SR3 - 17+86 to 17+92	Invasive vegetative opportunism	
Rosa multiflora (Right Bank)	SR3 - 18+00	Invasive vegetative opportunism	
Ligustrum sinense (Right Bank)	SR3 - 18+20 to 18+53	Invasive vegetative opportunism	
Rosa multiflora (Right Bank)	SR3 - 18+26 to 18+47	Invasive vegetative opportunism	
Ligustrum sinense (Right Bank)	SR3 - 18+58 to 18+64	Invasive vegetative opportunism	
Rosa multiflora (Left Bank)	SR3 - 18+79 to 18+94	Invasive vegetative opportunism	
Ligustrum sinense (Right Bank)	SR3 - 18+88	Invasive vegetative opportunism	
Ailanthus altissima (Right Bank)	SR3 - 19+14 to 20+05	Invasive vegetative opportunism	Photo 4
Rosa multiflora (Right Bank)	SR3 - 19+87	Invasive vegetative opportunism	
Rosa multiflora (Left Bank)	SR3 - 19+68 to 20+22	Invasive vegetative opportunism	

APPENDIX A2

PHOTOLOG VEGETATION PROBLEM AREAS

APPENDIX A2
PHOTOLOG – UT SOUTH FORK (REACH 1)

PROBLEM AREAS (Vegetation)

Photo 1: Representative *Microstegium virmineum* and *Festuca spp.*-dominated problem areas. *Microstegium virmineum* is the dry brown grass dominating the channel in foreground of the photo, and *Festuca spp.* is the green grass on floodplain (Station No. 14+35; view downstream on 3-03-2008).

Photo 2: Representative bare bank problem area (Station No. 18+61 – 19+67; view upstream; 3-05-2008).

APPENDIX A2
PHOTOLOG – UT SOUTH FORK (REACH 2)

PROBLEM AREAS (Vegetation)

Photo 1: Invasive Chinese privet (*Ligustrum sinense*) problem area. Privet trees in this photo are those with green leaves (2-28-2008).

Photo 2: Although not considered a 'problem,' it should be noted that cattails, which are sometimes invasive, were noted along all three reaches. This is a representative cattail (*Typha latifolia)* growth area on Monitoring Reach 2 (Station No. 11+00; view downstream on 3-06-2008). Also there is a large multiflora rose (*Rosa multiflora*) located on the left bank in the upper left-hand corner of the photo.

Photo 3: Representative multiflora rose (*Rosa multiflora*) problem area (Station No. 11+60; view downstream on 3-06-2008). Rose is located on left bank in upper left corner of photo.

APPENDIX A2
PHOTOLOG – UT SOUTH FORK (REACH 3)

PROBLEM AREAS (Vegetation)

Photo 1: Although not considered a 'problem,' it should be noted that cattails, which are sometimes invasive, were noted along all three reaches. This is a representative cattail (*Typha latifolia)* growth area on Monitoring Reach 3 (Station No. 11+10; view upstream on 10-22-2008). Cattails are growing in channel at center of photo

Photo 2. Representative Chinese privet (*Ligustrum sinense*) problem area (Approximate Station No. 13+10 – 13+50; view upstream on 3-17-2008). Privet are the green shrubs located on the floodplain along the Western side of the project (i.e., along the top of the photo in the background).

Photo 3. Representative bare bank problem area (Station No. 16+40; view across channel from left bank on 3-18-2008). Bare bank is on left bank (i.e., nearest in photo).

Photo 4: Invasive tree of heaven (*Ailanthus altissima*) problem area (located within vegetation plot 11; photo taken on 10-22-2008).

APPENDIX A3

PHOTOLOG VEGETATION PLOTS

APPENDIX A3
PHOTOLOG UT to SOUTH FORK

VEGETATION PLOTS


Photo 1: Vegetation Plot 1 (10-21-2008).


Photo 2: Vegetation Plot 2 (10-21-2008).


Photo 3: Vegetation Plot 3 (10-21-2008).


Photo 4: Vegetation Plot 4 (10-21-2008).


Photo 5: Vegetation Plot 5 (10-21-2008).


Photo 6: Vegetation Plot 6 (10-21-2008).


Photo 7: Vegetation Plot 7 (10-21-2008).


Photo 8: Vegetation Plot 8 (10-21-2008).


Photo 9: Vegetation Plot 9 (10-21-2008).


Photo 10: Vegetation Plot 10 (10-21-2008).


Photo 11: Vegetation Plot 11 (10-21-2008).


Photo 12: Vegetation Plot 12 (10-21-2008).

APPENDIX B1

PHOTOLOG STREAM PROBLEM AREAS

APPENDIX B1
PHOTOLOG – UT SOUTH FORK (REACH 1)

PROBLEM AREAS

Photo 1: Representative aggradation problem area (Station No. 14+07 – 14+22; view upstream on 3-03-2008).

Photo 2: Representative bank erosion problem area (Station No. 18+26 – 18+31.5; view of left bank; 2-28-2008).

Photo 3: Representative problem J-hook (Station No. 14+92; view upstream; 2-28-2008).

Photo 4: Representative problem Root Wad (Station No. 15+55; view of erosion around footing on right bank; 2-28-2008).

APPENDIX B1
PHOTOLOG – UT SOUTH FORK (REACH 2)

PROBLEM AREAS (Stream)

Photo 1: Representative aggradation problem area (Station No. 13+96 – 14+15; view upstream on 3-11-2008).

Photo 2: Representative problem cross vane (Station No. 20+34; view of left bank on 3-11-2008). Note current coming out of bank on downstream of left arm (in view), an indication of water piping around the arm.

Photo 3: Representative bank erosion problem area (Station No. 10+78; facing left bank on 3-06-2008).

APPENDIX B1
PHOTOLOG – UT to SOUTH FORK (REACH 3)

PROBLEM AREAS (Stream)

Photo 1: Representative jhook problem area (Station No. 19+45; view of right bank, downstream, 11-6-2008).

Photo 2: Representative bank erosion problem area (Station No. 19+30; view upstream, right bank; 11-6-2008).

Photo 3: Representative sidebar/aggradation problem area (Station No. 18+29; view upstream;11-6-2008).

Photo 4: Bankfull flow event evidence (wrack line) at Station No. 10+00; Note foot of pole is resting at bankfull level; 3-16-2008.

APPENDIX B2

PHOTOLOG OF CROSS-SECTIONS AND PHOTO POINTS

APPENDIX B2
PHOTOLOG – UT SOUTH FORK (REACH 1)

CROSS-SECTIONS & PHOTOPOINTS

Cross-Section 1: View Downstream (3-03-2008).

Cross-Section 1: View Upstream (3-03-2008).

Cross-Section 2: View Downstream (3-03-2008).

Cross-Section 2: View Upstream (3-03-2008).

Cross-Section 3: View Downstream (3-05-2008).

Cross-Section 3: View Upstream (3-05-2008).

Cross-Section 4: View Downstream (3-05-2008).

Cross-Section 4: View Upstream (3-05-2008).

Photo point 1: View Upstream (3-03-2008).

Photo point 2: View Upstream (3-03-2008).

Photo point 1: View Downstream (3-03-2008).

Photo point 2: View Downstream (3-03-2008).

Photo point 1: Facing Channel (3-03-2008).

Photo point 2: Facing Channel (3-03-2008).

Photo point 3: View Upstream (3-03-2008).

Photo point 4: View Upstream (3-03-2008).

Photo point 3: View Downstream (3-03-2008).

Photo point 4: View Downstream (3-03-2008).

Photo point 3: Facing Channel (3-03-2008).

Photo point 4: Facing Channel (3-03-2008).

Photo point 5: View Upstream (3-05-2008).

Photo point 6: View Upstream (3-05-2008).

Photo point 5: View Downstream (3-05-2008).

Photo point 6: View Downstream (3-05-2008).

Photo point 5: Facing Channel (3-05-2008).

Photo point 6: Facing Channel (3-05-2008).

Photo point 7: View Upstream (3-05-2008).

Photo point 8: View Upstream (3-05-2008).

Photo point 7: View Downstream (3-05-2008).

Photo point 8: View Downstream (3-05-2008).

Photo point 7: Facing Channel (3-05-2008).

Photo point 8: Facing Channel (3-05-2008).

APPENDIX B2
PHOTOLOG – UT SOUTH FORK (REACH 2)

CROSS-SECTIONS & PHOTOPOINTS

Cross-Section 5: View Downstream (3-11-2008).

Cross-Section 5: View Upstream (3-11-2008).

Cross-Section 6: View Downstream (3-11-2008).

Cross-Section 6: View Upstream (3-11-2008).

Photo point 1: View Upstream (3-06-2008).

Photo point 2: View Upstream (3-06-2008).

Photo point 1: View Downstream (3-06-2008).

Photo point 2: View Downstream (3-06-2008).

Photo point 1: Facing Channel (3-06-2008).

Photo point 2: Facing Channel (3-06-2008).

Photo point 3: View Upstream (3-06-2008).

Photo point 4: View Upstream (3-06-2008).

Photo point 3: View Downstream (3-06-2008).

Photo point 4: View Downstream (3-06-2008).

Photo point 3: Facing Channel (3-06-2008).

Photo point 4: Facing Channel (3-06-2008).

Photo point 5: View Upstream (3-11-2008).

Photo point 6: View Upstream (3-11-2008).

Photo point 5: View Downstream (3-11-2008).

Photo point 6: View Downstream (3-11-2008).

Photo point 5: Facing Channel (3-11-2008).

Photo point 6: Facing Channel (3-11-2008).

Photo point 7: View Upstream (3-11-2008).

Photo point 7: View Downstream (3-11-2008).

Photo point 7: Facing Channel (3-11-2008).

APPENDIX B2
PHOTOLOG – UT SOUTH FORK (REACH 3)

CROSS-SECTION & PHOTOPOINTS


Cross-Section 7: View Downstream (3-17-2008).


Cross-Section 7: View Upstream (3-17-2008).


Cross-Section 8: View Downstream (3-17-2008).


Cross-Section 8: View Upstream (3-17-2008).


Cross-Section 9: View Downstream (3-17-2008).


Cross-Section 9: View Upstream (3-17-2008).

Cross-Section 10: View Downstream (3-18-2008).

Cross-Section 10: View Upstream (3-18-2008).

Cross-Section 11: View Downstream (3-18-2008).

Cross-Section 11: View Upstream (3-18-2008).

Cross-Section 12: View Downstream (3-18-2008).

Cross-Section 12: View Upstream (3-18-2008).

Photo point 1: View Upstream (3-17-2008).

Photo point 2: View Upstream (3-17-2008).

Photo point 1: View Downstream (3-17-2008).

Photo point 2: View Downstream (3-17-2008).

Photo point 1: Facing Channel (3-17-2008).

Photo point 2: Facing Channel (3-17-2008).


Photo point 3: View Upstream (3-17-2008).


Photo point 4: View Upstream (3-18-2008).


Photo point 3: View Downstream (3-17-2008).


Photo point 4: View Downstream (3-18-2008).


Photo point 3: Facing Channel (3-17-2008).


Photo point 4: Facing Channel (3-18-2008).

Photo point 5: View Upstream (3-18-2008).

Photo point 5: View Downstream (3-18-2008).

Photo point 5: Facing Channel (3-18-2008).

APPENDIX B3

STREAM DATA TABLES

Appendix B3
UT to South Fork

Table VIII a. Baseline Morphology and Hydraulic Summary

UT to South Fork (Restoration Subreach 1)

Project Number 435

Parameter	USGS Gage Data			Regional Curve Interval			Pre-Existing Condition			Project Reference Stream			Design			As-built*		
	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Dimension																		
BF Width (ft)	**28.00**	**30.00**	**29.00**				**3.00**	**3.40**	**3.20**	**6.50**	**10.00**	**8.00**	**N/A**	**N/A**	**9.40**			
Floodprone Width (ft)	**40.00**	**100.00**	**70.00**				**N/A**	**N/A**	**10.00**	**16.00**	**22.00**	**18.80**	**N/A**	**N/A**	**>33**			
BFCross Sectional Area (ft)	**58.60**	**58.90**	**58.80**				**2.90**	**3.60**	**3.20**	**3.90**	**6.30**	**5.30**	**N/A**	**N/A**	**5.90**			
BF Mean Depth (ft)	**2.00**	**2.10**	**2.00**				**1.00**	**1.10**	**1.00**	**0.40**	**1.00**	**0.70**	**N/A**	**N/A**	**0.60**			
Max Depth (ft)	**2.70**	**3.00**	**2.90**				**1.00**	**1.80**	**1.40**	**0.90**	**1.40**	**1.10**	**0.80**	**1.30**	**1.00**			
Width/Depth Ratio	**13.00**	**15.00**	**14.00**				**N/A**	**N/A**	**3.00**	**7.00**	**26.00**	**13.50**	**N/A**	**N/A**	**15.00**			
Entrenchment Ratio	**1.30**	**3.60**	**2.40**				**2.90**	**3.30**	**3.10**	**2.00**	**3.40**	**2.40**	**N/A**	**N/A**	**>2.2**			
Bank Height Ratio	**N/A**	**N/A**	**N/A**				**0.60**	**3.10**	**1.80**	**1.40**	**2.50**	**1.80**	**N/A**	**N/A**	**1.00**			
Wetted Perimeter (ft)	**32.00**	**34.20**	**33.00**				**5.00**	**5.60**	**5.20**	**7.30**	**12.00**	**9.40**	**N/A**	**N/A**	**10.60**			
Hydraulic radius (ft)	**1.83**	**1.72**	**1.78**				**0.58**	**0.64**	**0.62**	**0.53**	**0.53**	**0.56**	**N/A**	**N/A**	**0.56**			
Pattern																		
Channel Beltwidth (ft)	**N/A**	**N/A**	**N/A**				**22.00**	**122.00**	**48.90**	**10.00**	**35.00**	**20.90**	**12.20**	**41.40**	**24.50**			
Radius of Curvature (ft)	**N/A**	**N/A**	**N/A**				**7.00**	**100.00**	**26.10**	**2.30**	**31.80**	**13.50**	**2.80**	**37.60**	**15.10**			
Meander Wavelenght (ft)	**N/A**	**N/A**	**N/A**				**21.00**	**282.00**	**136.70**	**35.00**	**70.00**	**50.00**	**41.40**	**82.80**	**59.30**			
Meander Width Ratio	**N/A**	**N/A**	**N/A**				**6.90**	**38.10**	**15.30**	**1.30**	**4.40**	**2.60**	**1.30**	**4.40**	**2.60**			
Profile																		
Riffle length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Riffle slope (ft/ft)	**N/A**	**N/A**	**N/A**				**0.01**	**0.03**	**0.02**	**0.02**	**0.08**	**0.04**	**0.01**	**0.04**	**0.02**			
Pool length (ft)	**N/A**	**N/A**	**N/A**				**3.80**	**27.60**	**11.70**	**7.00**	**27.00**	**14.50**	**8.50**	**32.00**	**16.90**			
Pool spacing (ft)	**N/A**	**N/A**	**N/A**				**23.20**	**165.60**	**75.40**	**17.00**	**63.00**	**36.50**	**19.80**	**74.30**	**43.30**			
Substrate																		
d50 (mm)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**13.00**	**N/A**	**N/A**	**4.50**	**N/A**	**N/A**	**N/A**			
d84 (mm)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**44.00**	**N/A**	**N/A**	**33.00**	**N/A**	**N/A**	**N/A**			
Additional Reach Parameters																		
Valley Length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Channel Length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Sinuosity	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**1.22**	**N/A**	**N/A**	**1.40**	**N/A**	**N/A**	**1.26**			
Water Surface Slope (ft/ft)	**N/A**	**N/A**	**0.00**				**N/A**	**N/A**	**0.01**	**N/A**	**N/A**	**0.02**	**N/A**	**N/A**	**0.01**			
BF slope (ft/ft)	**N/A**	**N/A**	**0.00**				**N/A**	**N/A**	**0.01**	**N/A**	**N/A**	**0.02**	**N/A**	**N/A**	**0.01**			
Rosgen Classification	**N/A**	**N/A**	**B/C**				**N/A**	**N/A**	**E 4/1**	**N/A**	**N/A**	**C/E 4/1**	**N/A**	**N/A**	**C/E 4/1**			
*Habitat Index																		
*Macrobenthos																		

*As-built information is unavailable to SEPI at this time.

Table VIII b. Baseline Morphology and Hydraulic Summary

UT to South Fork (Restoration Subreach 2)

Project Number 435

Parameter	USGS Gage Data			Regional Curve Interval			Pre-Existing Condition			Project Reference Stream			Design			As-built*		
	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Dimension																		
BF Width (ft)	**28.00**	**30.00**	**29.00**				**N/A**	**N/A**	**9.00**	**6.50**	**10.00**	**8.00**	**N/A**	**N/A**	**12.20**			
Floodprone Width (ft)	**40.00**	**100.00**	**70.00**				**N/A**	**N/A**	**68.00**	**16.00**	**22.00**	**18.80**	**N/A**	**N/A**	**>26.8**			
BFCross Sectional Area (ft)	**58.60**	**58.90**	**58.80**				**N/A**	**N/A**	**10.20**	**3.90**	**6.30**	**5.30**	**N/A**	**N/A**	**10.00**			
BF Mean Depth (ft)	**2.00**	**2.10**	**2.00**				**N/A**	**N/A**	**1.10**	**0.40**	**1.00**	**0.70**	**N/A**	**N/A**	**0.80**			
Max Depth (ft)	**2.70**	**3.00**	**2.90**				**1.00**	**2.10**	**1.50**	**0.90**	**1.40**	**1.10**	**1.00**	**1.60**	**1.30**			
Width/Depth Ratio	**13.00**	**15.00**	**14.00**				**N/A**	**N/A**	**8.00**	**7.00**	**26.00**	**13.50**	**N/A**	**N/A**	**15.00**			
Entrenchment Ratio	**1.30**	**3.60**	**2.40**				**N/A**	**N/A**	**7.60**	**2.00**	**3.40**	**2.40**	**N/A**	**N/A**	**>2.2**			
Bank Height Ratio	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**1.70**	**1.40**	**2.50**	**1.80**	**N/A**	**N/A**	**1.00**			
Wetted Perimeter (ft)	**32.00**	**34.20**	**33.00**				**N/A**	**N/A**	**11.20**	**7.30**	**12.00**	**9.40**	**N/A**	**N/A**	**13.80**			
Hydraulic radius (ft)	**1.83**	**1.72**	**1.78**				**N/A**	**N/A**	**0.91**	**0.53**	**0.53**	**0.56**	**N/A**	**N/A**	**0.72**			
Pattern																		
Channel Beltwidth (ft)	**N/A**	**N/A**	**N/A**				**12.00**	**114.00**	**45.70**	**10.00**	**35.00**	**20.90**	**15.90**	**53.90**	**31.80**			
Radius of Curvature (ft)	**N/A**	**N/A**	**N/A**				**5.00**	**140.00**	**28.00**	**2.30**	**31.80**	**13.50**	**3.70**	**49.00**	**19.60**			
Meander Wavelenght (ft)	**N/A**	**N/A**	**N/A**				**40.00**	**172.00**	**87.90**	**35.00**	**70.00**	**50.00**	**53.90**	**107.80**	**77.20**			
Meander Width Ratio	**N/A**	**N/A**	**N/A**				**1.30**	**12.70**	**5.10**	**1.30**	**4.40**	**2.60**	**1.30**	**4.40**	**2.60**			
Profile																		
Riffle length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Riffle slope (ft/ft)	**N/A**	**N/A**	**N/A**				**0.00**	**0.08**	**0.03**	**0.02**	**0.08**	**0.04**	**0.01**	**0.05**	**0.03**			
Pool length (ft)	**N/A**	**N/A**	**N/A**				**3.80**	**27.60**	**12.40**	**7.00**	**27.00**	**14.50**	**11.00**	**41.60**	**22.00**			
Pool spacing (ft)	**N/A**	**N/A**	**N/A**				**12.90**	**75.90**	**35.40**	**17.00**	**63.00**	**36.50**	**25.70**	**96.80**	**56.30**			
Substrate																		
d50 (mm)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**13.00**	**N/A**	**N/A**	**4.50**	**N/A**	**N/A**	**N/A**			
d84 (mm)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**44.00**	**N/A**	**N/A**	**53.00**	**N/A**	**N/A**	**N/A**			
Additional Reach Parameters																		
Valley Length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Channel Length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Sinuosity	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**1.27**	**N/A**	**N/A**	**1.40**	**N/A**	**N/A**	**1.58**			
Water Surface Slope (ft/ft)	**N/A**	**N/A**	**0.00**				**N/A**	**N/A**	**0.02**	**N/A**	**N/A**	**0.02**	**N/A**	**N/A**	**0.01**			
BF slope (ft/ft)	**N/A**	**N/A**	**0.00**				**N/A**	**N/A**	**0.02**	**N/A**	**N/A**	**0.02**	**N/A**	**N/A**	**0.01**			
Rosgen Classification	**N/A**	**N/A**	**B/C**				**N/A**	**N/A**	**E 4/1**	**N/A**	**N/A**	**C/E 4/1**	**N/A**	**N/A**	**C/E 4/1**			
*Habitat Index																		
*Macrobenthos																		

*As-built information is unavailable to SEPI at this time.

Table VIII c. Baseline Morphology and Hydraulic Summary

UT to South Fork (Restoration Subreach 3)

Project Number 435

Parameter	USGS Gage Data			Regional Curve Interval			Pre-Existing Condition			Project Reference Stream			Design			As-built*		
	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Dimension																		
BF Width (ft)	**28.00**	**30.00**	**29.00**				**N/A**	**N/A**	**12.00**	**6.50**	**10.00**	**8.00**	**N/A**	**N/A**	**14.00**			
Floodprone Width (ft)	**40.00**	**100.00**	**70.00**				**N/A**	**N/A**	**25.00**	**16.00**	**22.00**	**18.80**	**N/A**	**N/A**	**>30.8**			
BFCross Sectional Area (ft)	**58.60**	**58.90**	**58.80**				**N/A**	**N/A**	**12.10**	**3.90**	**6.30**	**5.30**	**N/A**	**N/A**	**15.00**			
BF Mean Depth (ft)	**2.00**	**2.10**	**2.00**				**N/A**	**N/A**	**1.00**	**0.40**	**1.00**	**0.70**	**N/A**	**N/A**	**1.10**			
Max Depth (ft)	**2.70**	**3.00**	**2.90**				**1.20**	**3.20**	**1.80**	**0.90**	**1.40**	**1.10**	**1.40**	**2.20**	**1.80**			
Width/Depth Ratio	**13.00**	**15.00**	**14.00**				**N/A**	**N/A**	**12.00**	**7.00**	**26.00**	**13.50**	**N/A**	**N/A**	**13.00**			
Entrenchment Ratio	**1.30**	**3.60**	**2.40**				**N/A**	**N/A**	**2.10**	**2.00**	**3.40**	**2.40**	**N/A**	**N/A**	**>2.2**			
Bank Height Ratio	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**2.40**	**1.40**	**2.50**	**1.80**	**N/A**	**N/A**	**1.00**			
Wetted Perimeter (ft)	**32.00**	**34.20**	**33.00**				**N/A**	**N/A**	**14.00**	**7.30**	**12.00**	**9.40**	**N/A**	**N/A**	**16.20**			
Hydraulic radius (ft)	**1.83**	**1.72**	**1.78**				**N/A**	**N/A**	**0.86**	**0.53**	**0.53**	**0.56**	**N/A**	**N/A**	**0.93**			
Pattern																		
Channel Beltwidth (ft)	**N/A**	**N/A**	**N/A**				**19.00**	**77.00**	**39.70**	**10.00**	**35.00**	**20.90**	**4.00**	**56.00**	**22.00**			
Radius of Curvature (ft)	**N/A**	**N/A**	**N/A**				**11.00**	**46.00**	**22.20**	**2.30**	**31.80**	**13.50**	**4.00**	**56.00**	**22.00**			
Meander Wavelenght (ft)	**N/A**	**N/A**	**N/A**				**60.00**	**109.00**	**80.40**	**35.00**	**70.00**	**50.00**	**62.00**	**123.00**	**88.00**			
Meander Width Ratio	**N/A**	**N/A**	**N/A**				**1.60**	**6.40**	**3.30**	**1.30**	**4.40**	**2.60**	**1.30**	**4.40**	**2.60**			
Profile																		
Riffle length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Riffle slope (ft/ft)	**N/A**	**N/A**	**N/A**				**0.00**	**0.05**	**0.02**	**0.02**	**0.08**	**0.04**	**0.00**	**0.02**	**0.01**			
Pool length (ft)	**N/A**	**N/A**	**N/A**				**9.40**	**59.20**	**35.30**	**7.00**	**27.00**	**14.50**	**13.00**	**48.00**	**25.00**			
Pool spacing (ft)	**N/A**	**N/A**	**N/A**				**37.80**	**103.90**	**73.20**	**17.00**	**63.00**	**36.50**	**29.00**	**111.00**	**64.00**			
Substrate																		
d50 (mm)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**13.00**	**N/A**	**N/A**	**4.50**	**N/A**	**N/A**	**N/A**			
d84 (mm)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**45.00**	**N/A**	**N/A**	**53.00**	**N/A**	**N/A**	**N/A**			
Additional Reach Parameters																		
Valley Length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Channel Length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Sinuosity	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**1.16**	**N/A**	**N/A**	**1.40**	**N/A**	**N/A**	**1.16**			
Water Surface Slope (ft/ft)	**N/A**	**N/A**	**0.00**				**N/A**	**N/A**	**0.01**	**N/A**	**N/A**	**0.02**	**N/A**	**N/A**	**0.01**			
BF slope (ft/ft)	**N/A**	**N/A**	**0.00**				**N/A**	**N/A**	**0.01**	**N/A**	**N/A**	**0.02**	**N/A**	**N/A**	**0.01**			
Rosgen Classification	**N/A**	**N/A**	**B/C**				**N/A**	**N/A**	**E 4/1**	**N/A**	**N/A**	**C/E 4/1**	**N/A**	**N/A**	**C/E 4/1**			
*Habitat Index																		
*Macrobenthos																		

*As-built information is unavailable to SEPI at this time.

Table VIII d. Baseline Morphology and Hydraulic Summary

UT to South Fork (Restoration Subreach 4)

Project Number 435

Parameter	USGS Gage Data			Regional Curve Interval			Pre-Existing Condition			Project Reference Stream			Design			As-built*		
	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Dimension																		
BF Width (ft)	**28.00**	**30.00**	**29.00**				**13.00**	**18.00**	**15.70**	**6.50**	**10.00**	**8.00**			**14.10**			
Floodprone Width (ft)	**40.00**	**100.00**	**70.00**				**21.00**	**200.00**	**82.00**	**16.00**	**22.00**	**18.80**			**>31.00**			
BFCross Sectional Area (ft)	**58.60**	**58.90**	**58.80**				**19.40**	**33.00**	**25.10**	**3.90**	**6.30**	**5.30**			**25.00**			
BF Mean Depth (ft)	**2.00**	**2.10**	**2.00**				**1.50**	**1.80**	**1.60**	**0.40**	**1.00**	**0.70**			**1.80**			
Max Depth (ft)	**2.70**	**3.00**	**2.90**				**1.60**	**2.90**	**1.90**	**0.90**	**1.40**	**1.10**	**2.30**	**3.50**	**2.80**			
Width/Depth Ratio	**13.00**	**15.00**	**14.00**				**9.00**	**11.00**	**10.00**	**7.00**	**26.00**	**13.50**			**8.00**			
Entrenchment Ratio	**1.30**	**3.60**	**2.40**				**1.60**	**11.10**	**4.40**	**2.00**	**3.40**	**2.40**	**N/A**	**N/A**	**>2.20**			
Bank Height Ratio	**N/A**	**N/A**	**N/A**				**0.60**	**2.10**	**1.90**	**1.40**	**2.50**	**1.80**	**N/A**	**N/A**	**1.00**			
Wetted Perimeter (ft)	**32.00**	**34.20**	**33.00**				**16.00**	**21.60**	**18.90**	**7.30**	**12.00**	**9.40**	**N/A**	**N/A**	**17.70**			
Hydraulic radius (ft)	**1.83**	**1.72**	**1.78**				**1.21**	**1.53**	**1.33**	**0.53**	**0.53**	**0.56**	**N/A**	**N/A**	**1.41**			
Pattern																		
Channel Beltwidth (ft)	**N/A**	**N/A**	**N/A**				**27.00**	**151.00**	**56.10**	**10.00**	**35.00**	**20.90**	**18.40**	**62.20**	**36.80**			
Radius of Curvature (ft)	**N/A**	**N/A**	**N/A**				**5.00**	**138.00**	**29.30**	**2.30**	**31.80**	**13.50**	**4.20**	**56.60**	**22.60**			
Meander Wavelenght (ft)	**N/A**	**N/A**	**N/A**				**45.00**	**340.00**	**127.30**	**35.00**	**70.00**	**50.00**	**62.20**	**124.40**	**89.10**			
Meander Width Ratio	**N/A**	**N/A**	**N/A**				**1.70**	**9.60**	**3.60**	**1.30**	**4.40**	**2.60**	**1.30**	**4.40**	**2.60**			
Profile																		
Riffle length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Riffle slope (ft/ft)	**N/A**	**N/A**	**N/A**				**0.00**	**0.06**	**0.02**	**0.02**	**0.08**	**0.04**	**0.00**	**0.02**	**0.01**			
Pool length (ft)	**N/A**	**N/A**	**N/A**				**15.90**	**197.30**	**67.80**	**7.00**	**27.00**	**14.50**	**12.70**	**48.10**	**25.40**			
Pool spacing (ft)	**N/A**	**N/A**	**N/A**				**34.60**	**280.60**	**121.60**	**17.00**	**63.00**	**36.50**	**29.70**	**111.70**	**65.00**			
Substrate																		
d50 (mm)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**2.00**	**N/A**	**N/A**	**4.50**	**N/A**	**N/A**	**N/A**			
d84 (mm)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**30.00**	**N/A**	**N/A**	**53.00**	**N/A**	**N/A**	**N/A**			
Additional Reach Parameters																		
Valley Length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Channel Length (ft)	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**			
Sinuosity	**N/A**	**N/A**	**N/A**				**N/A**	**N/A**	**1.23**	**N/A**	**N/A**	**1.4**	**N/A**	**N/A**	**1.23**			
Water Surface Slope (ft/ft)	**N/A**	**N/A**	**0.00**				**N/A**	**N/A**	**0.01**	**N/A**	**N/A**	**0.02**	**N/A**	**N/A**	**0.01**			
BF slope (ft/ft)	**N/A**	**N/A**	**0.00**				**N/A**	**N/A**	**1.01**	**N/A**	**N/A**	**1.02**	**N/A**	**N/A**	**1.01**			
Rosgen Classification	**N/A**	**N/A**	**B/C**				**N/A**	**N/A**	**E 4/1**	**N/A**	**N/A**	**C/E 4/1**	**N/A**	**N/A**	**C/E 4/1**			
*Habitat Index																		
*Macrobenthos																		

*As-built information is unavailable to SEPI at this time.

Appendix B3
UT to South Fork

Table IX a. Morphology and Hydraulic Monitoring Summary

UT to South Fork Creek

Segment/Reach: 1 (1140 linear feet)

Parameter	Cross Section 1 Riffle						Cross Section 2 Pool						Cross Section 3 Riffle						Cross Section 4 Pool					
Dimension	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+
BF Width (ft)	12.1	13.4	11.0				12.6	12.6	12.6				13.8	10.9	9.0				11.8	12.0	11.3			
Floodporne Width (ft)	99	100+	100+				NA	NA	NA				40+	35+	24+				NA	NA	NA			
BFCross Sectional Area (ft)	8.2	8.7	7.8				12.3	11.9	11.9				8.1	6.1	5.7				13.7	11.1	13.6			
BF Mean Depth (ft)	0.7	0.6	0.7				1.0	0.9	0.9				0.6	0.6	0.6				1.2	0.9	1.2			
Width/Depth Ratio	17.9	20.7	15.4				NA	NA	NA				23.6	18.1	14.3				NA	NA	NA			
Entrenchment Ratio	8.5	7.5+	9.1+				NA	NA	NA				3.0+	3.2+	2.7+				NA	NA	NA			
Bank Height Ratio	1.0	1.0	1.0				NA	NA	NA				1.0	1.0	1.4				NA	NA	NA			
Wetted Perimeter (ft)	50.5	15.6	11.6				13.6	14.1	14.1				14.9	14.2	9.8				12.3	14	13.6			
Hydraulic radius (ft)	0.4	0.5	0.9				0.9	0.8	0.8				0.5	0.4	0.6				1.1	0.8	1.1			
Substrate																								
d50 (mm)	sand	<0.062	0.1				sand	<0.062	0.63				sand	<0.062	<0.062				sand	<0.062	<0.062			
d84 (mm)	sand	15	21				sand	<0.062	4.8				sand	<0.062	<0.062				sand	<0.062	11			

Parameter	MY-01 (2006)			MY-02 (2007)			MY-03 (2008)			MY-04 (2009)			MY-05 (2010)			MY+ (2011)		
Pattern	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Channel Beltwidth (ft)	8.9	51.8	20.7	17.7	63.6	24.8	15.1	48.2	24.2									
Radius of Curvature (ft)	9.1	39.1	14.4	8.5	41.7	20.1	10.5	44.6	21.1									
Meander Wavelenght (ft)	46.4	95.8	62.9	38.6	120	68.4	46.4	101.0	67.3									
Meander Width Ratio	0.69	4.02	1.61	1.32	4.73	1.90	1.38	4.38	2.20									
Profile																		
Riffle length (ft)	2.6	61.1	8.9	2.7	43.7	11.1	3.71	30.03	11.3									
Riffle slope (ft/ft)	0.000	0.082	0.014	0.002	0.113	0.023	0.005	0.1451	0.03									
Pool length (ft)	4.4	71.0	12.10	5.6	46.6	13.8	7.31	44.37	15.6									
Pool spacing (ft)	8.5	126.5	34.4	6.4	72.2	25.7	12.83	64.32	31.7									
Additional Reach Parameters																		
Valley Length (ft)	926			925			850											
Channel Length (ft)	1166			1140			1058											
Sinuosity	1.26			1.23			1.24											
Water Surface Slope (ft/ft)	0.0098			0.0096			0.0096											
BF slope (ft/ft)	0.0094			0.0099			0.0102											
Rosgen Classification	C5			C6			C5/6											
*Habitat Index	NA			NA			NA											
*Macrobenthos	NA			NA			NA											

Appendix B3
UT to South Fork

Table IX b. Morphology and Hydraulic Monitoring Summary

UT to South Fork Creek

Segment/Reach: 2 (1022 linear feet)

Parameter	Cross Section 5 Pool						Cross Section 6 Riffle					
Dimension	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+
BF Width (ft)	10.5	12.2	12.3				10.4	11.3	11.5			
Floodporne Width (ft)	NA	NA	NA				50+	60+	60+			
BFCross Sectional Area (ft)	11.4	13.7	14.1				12.1	11.0	12.1			
BF Mean Depth (ft)	1.1	1.1	1.1				1.2	1.0	1.1			
Width/Depth Ratio	NA	NA	NA				9.0	11.5	10.9			
Entrenchment Ratio	NA	NA	NA				4.8+	5.3+	5.2+			
Bank Height Ratio	NA	NA	NA				1.0	1.0	1.5			
Wetted Perimeter (ft)	39.0	13.8	13.9				12.3	11.9	12.2			
Hydraulic radius (ft)	0.6	1.0	1.0				1.0	0.9	1.0			
Substrate												
d50 (mm)	sand	<0.062	2.9				sand	<0.062	15			
d84 (mm)	sand	51	51				sand	30	28			

Parameter	MY-01 (2006)			MY-02 (2007)			MY-03 (2008)			MY-04 (2009)			MY-05 (2010)			MY+ (2011)		
Pattern	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Channel Beltwidth (ft)	14.3	64.2	27.5	21.2	54.0	30.9	18.3	50.5	28.1									
Radius of Curvature (ft)	7.9	45.5	24.8	5.2	45.5	26.7	13.2	71.8	30.0									
Meander Wavelenght (ft)	56.6	116.7	73.4	54.4	115.6	74.1	51.9	122.3	78.7									
Meander Width Ratio	1.38	6.17	2.65	1.88	4.78	2.74	1.5878	4.38957	2.45									
Profile																		
Riffle length (ft)	1.3	30.1	9.1	1.9	46.7	11.6	6.16	46.2	11.155									
Riffle slope (ft/ft)	0.000	0.383	0.020	0.000	0.133	0.015	0.002	0.093	0.022									
Pool length (ft)	7.0	53.0	20.6	5.2	52.2	16.0	7.01	68.33	17.45									
Pool spacing (ft)	22.0	188.0	56.7	7.2	77.6	26.2	8.38	88.76	36.35									
Additional Reach Parameters																		
Valley Length (ft)	907			906			905											
Channel Length (ft)	1029			1022			1034											
Sinuosity	1.1			1.1			1.1											
Water Surface Slope (ft/ft)	0.0081			0.0077			0.0075											
BF slope (ft/ft)	0.0073			0.0074			0.0071											
Rosgen Classification	C5			C6			C4											
*Habitat Index	NA			NA			NA											
*Macrobenthos	NA			NA			NA											

Table IX c. Morphology and Hydraulic Monitoring Summary
UT to South Fork Creek
Segment/Reach: 3 (1024 linear feet)

Parameter	Cross Section 7 Pool						Cross Section 8 Riffle						Cross Section 9 Riffle						Cross Section 10 Pool						Cross Section 11 Pool						Cross Section 12 Riffle					
Dimension	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+
BF Width (ft)	12.4	11.9	12.6				12.2	14.4	15.2				15.3	14.2	16.7				15	17.4	18.2				11.2	11.2	11.4				15.9	14.4	14.4			
Floodporne Width (ft)	NA	NA	NA				50+	50+	50+				45+	45+	45+				NA	NA	NA				NA	NA	NA				45+	45+	45+			
BFCross Sectional Area (ft)	20.4	20.6	19.9				14	18.8	19.0				21.4	20.4	22.0				26.6	30.5	30.4				21	22.0	21.6				21.6	19.7	20.0			
BF Mean Depth (ft)	1.6	1.7	1.6				1.2	1.3	1.3				1.4	1.4	1.3				1.8	1.7	1.7				1.9	2.0	1.9				1.4	1.4	1.4			
Width/Depth Ratio	NA	NA	NA				10.6	11.1	12.1				11.0	9.9	12.7				NA	NA	NA				NA	NA	NA				11.7	10.3	10.4			
Entrenchment Ratio	NA	NA	NA				3.2+	3.5+	3.3+				3.2+	3.2+	2.7+				NA	NA	NA				NA	NA	NA				3.2+	3.1+	2.9+			
Bank Height Ratio	NA	NA	NA				1.0	1.0	1.2				1.0	1.0	1.0				NA	NA	NA				NA	NA	NA				1.0	1.0	1.0			
Wetted Perimeter (ft)	14.4	13.9	15.0				13.4	15.8	16.6				16.5	15.5	18				16.3	19.5	20.5				14.2	14.0	14.3				17.6	15.6	15.8			
Hydraulic radius (ft)	1.4	1.5	1.3				1.0	1.2	1.2				1.3	1.3	1.2				1.4	1.6	1.5				1.6	1.6	1.5				1.3	1.3	1.3			
Substrate																																				
d50 (mm)	sand	<0.062	1.8				sand	<0.062	<0.062				sand	1.6	1.7				sand	15	9.2				sand	1.5	11				sand	0.35	2			
d84 (mm)	sand	11.3	20				sand	26	22				sand	13.7	10.9				sand	59	30				sand	18	70				sand	8	55			

Parameter	MY-01 (2006)			MY-02 (2007)			MY-03 (2008)			MY-04 (2009)			MY-05 (2010)			MY+ (2011)		
Pattern	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Channel Beltwidth (ft)	13.8	68.7	37.1	31.1	53.3	42.2	22.0	56.6	41.0									
Radius of Curvature (ft)	16.8	107.9	30.9	19.5	51.5	33.6	19.8	114.9	37.0									
Meander Wavelenght (ft)	79.3	151.6	125.3	87.9	197.5	94.2	60.7	155.7	117.7									
Meander Width Ratio	0.91	4.55	2.46	2.18	3.74	2.71	1.43	3.67	2.66									
Profile																		
Riffle length (ft)	2.1	40.9	12.0	2.2	43.1	11.3	2.7	58.0	14.9									
Riffle slope (ft/ft)	0.000	0.140	0.012	0.000	0.162	0.015	0.000	0.044	0.010									
Pool length (ft)	7.0	84.0	28.8	11.0	83.0	23.9	9.7	102.4	21.4									
Pool spacing (ft)	21.0	101.0	45.8	20.8	86.9	42.3	18.1	89.8	36.9									
Additional Reach Parameters																		
Valley Length (ft)	862			863			864											
Channel Length (ft)	1020			1024			1032											
Sinuosity	1.2			1.2			1.2											
Water Surface Slope (ft/ft)	0.0046			0.0049			0.0045											
BF slope (ft/ft)	0.0036			0.0039			0.0039											
Rosgen Classification	C5			C5/6			C5/6											
*Habitat Index	NA			NA			NA											
*Macrobenthos	NA			NA			NA											

Table B1 a. Stream Problem Areas

UT to South Fork, Reach 1

Feature Issue	Station numbers	Suspected Cause	Photo number
Aggradation	10+10 10+18	Channel possibly built too wide, naturally narrowing.	
Aggradation	10+31.5 10+36	Channel possibly built too wide, naturally narrowing.	
J-hook	10+50	Piping around structure.	
J-hook	10+95	Center stone positioned wrong, loose rock.	
J-hook	11+15	Loose center stone, structure may need extra stone and repositioning of center rock	
Aggradation	11+44 11+51	Channel possibly built too wide, naturally narrowing.	
J-hook	11+52	Angle of structure directing flow into outside of meander (right bank).	
Bank Erosion (right bank)	11+61 11+64.5	Angle of upstream j-hook is directing flow into unprotected bank and causing erosion.	
J-hook	12+35	Small amount of water piping around left arm.	
Aggradation	12+38 12+43	Channel possibly built too wide, naturally narrowing.	
Aggradation	12+77.5 12+88	Channel possibly built too wide, naturally narrowing.	
Root Wad	12+88	Bank failure/caving on downsream end of wad around footing.	
Cross Vane	12+98	Matting exposed within active channel.	
Aggradation	13+05 13+26.5	Area is "washing" out and aggradation now located downstream of j-hook.	
J-hook	13+26	Center stone loose; stones on either side of center appear to be missing.	
Aggradation	14+07 14+22	Channel possibly built too wide, naturally narrowing.	1
Aggradation	14+81 14+92	Channel possibly built too wide, naturally narrowing.	
J-hook	14+92	Piping/undermining of center stone & center stone loose.	3
Aggradation	15+02 15+07	Channel possibly built too wide, naturally narrowing.	
Aggradation	15+29.5 15+49.5	Channel possibly built too wide, naturally narrowing.	
Rootwad	15+55	Earth failing/caving all around footing; footing almost completely exposed.	4
Aggradation	15+73.5 15+78	Channel possibly built too wide, naturally narrowing.	
Aggradation	16+00 16+36	Channel possibly built too wide, naturally narrowing.	
Aggradation	16+64 16+89	Channel possibly built too wide, naturally narrowing.	
J-hook	16+89	Gap in structure (i.e. missing center rock).	
J-hook	17+29	Missing center rock.	
Aggradation	17+37 17+54	Channel possibly built too wide, naturally narrowing.	
Bank Erosion (right bank)	17+74 17+77	Healing over, cause of old erosion was angle of upstream j-hook.	
Bank Erosion (left bank)	18+26 18+31.5	Lack of bank protection on outside of meander.	2
Side Bar (left)	18+51	Small sedment bar on outside of meander.	
Crossvane	18+53	Piping/undermining around center stone.	
Bank Erosion (right bank)	18+66.5 18+70	Ponding at high flows due to j-hook placement as well as piping causing scour of bank upstream of structure.	
J-hook	18+70	Installed too high, ponding during high flows, piping b/t center stone bank.	
Bank Erosion (left bank)	18+87.5 18+89	Piping around j-hook causing bank scour directly upstream.	
J-hook	18+88	Installed too high, undermining/piping under structure causing scour.	
Bank Erosion (right bank)	19+00 19+16	Section appears to be downcutting (i.e. incising), leaving weakened banks. The incision is possibly due to channel scour downstream (i.e. directly upstream of downstream j-hook) that created a headcut.	
Bank Erosion (left bank)	19+04 19+11	Section appears to be downcutting (i.e. incising), leaving weakened banks. The incision is possibly due to channel scour downstream (i.e. directly upstream of downstream j-hook) that created a headcut. This has resulted in piping/undermining around left arm of J-hook.	
J-hook	19+10	Installed too high, scour/piping under structure and around structure arm.	
Bank Erosion (left bank)	19+20.5 19+26	Piping around j-hook causing bank scour/undercutting directly upstream.	
J-hook	19+26	Installed too high, undermining/piping under structure causing scour.	
J-hook	19+65	Loose center stone, piping around structure.	
Rootwad	19+75	Bank failing behind structure, possibly installed too high.	
Aggradation	20+14 20+57	Channel possibly built too wide, naturally narrowing.	

Table B1 b. Stream Problem Areas

UT to South Fork, Reach 2

Feature Issue	Station numbers	Suspected Cause	Photo number
Aggradation	10+18	Channel possibly built too wide, naturally narrowing.	
	10+30		
Aggradation	11+13.5	Channel possibly built too wide, naturally narrowing.	
	11+19		
Crossvane	11+19	Piping around structure, pool behind structure filling in with sediment deposit on right side.	
Aggradation	11+25.5	Channel possibly built too wide, naturally narrowing.	
	11+28		
Bank Erosion (left bank)	11+28.5	Inadequate protection on outside of meander.	3
	11+34		
Aggradation	11+53	Channel possibly built too wide, naturally narrowing.	
	11+87		
Aggradation	12+41.5	Channel possibly built too wide, naturally narrowing.	
	12+48.5		
Aggradation	12+89	Channel possibly built too wide, naturally narrowing.	
	13+01		
Bank Erosion (right bank)	13+03.5		
	13+06	Flow directed into bank from structure directly upstream and rootwad inadequate to protect bank.	
Rootwad (severe)	13+05	Exposed, installed too high, bank failures caving in and around structure footing.	
Aggradation	13+96	Riffle narrowing, channel possibly built too wide, naturally narrowing.	1
	14+14.5		
Rootwad	14+27	Some evidence of undercutting, possibly installed too high.	
Aggradation	14+38	Channel possibly built too wide, naturally narrowing.	
	14+53		
Rootwad	15+07	Bank failure around structure.	
Bank Erosion (right bank)	15+07	Possible improper installation of rootwads causing bank to cave in around structures, however area is healing over with new vegetation.	
	15+11		
Rootwad	15+11	Bank failure around structure.	
Central Bar	15+24	Sediment bar in pool.	
Aggradation	16+13.5	Channel possibly built too wide, naturally narrowing.	
	16+20		
Aggradation	16+66	Channel possibly built too wide, naturally narrowing.	
	16+81.5		
Side bar (left)	16+92	Sediment bar along riffle on straight section.	
Crossvane	18+67	Missing center rock.	
Crossvane	20+33.78	Piping around structure.	2

Table B1 c. Stream Problem Areas

UT to South Fork, Reach 3

Feature Issue	Station numbers	Suspected Cause	Photo number
Bank Erosion (Right Bank)	11+35	Soil type or lack of vegetation. Perhaps built too wide and is narrowing.	
	11+39.5		
Aggradation	13+58	Channel possibly built too wide, naturally narrowing.	
	13+65		
Aggradation	15+37	Channel possibly built too wide, naturally narrowing.	
	15+53		
Aggradation	15+88	Channel possibly built too wide, naturally narrowing.	
	15+94.5		
Bank Erosion (Left Bank)	16+15		
	16+28	Lack of protective vegetation and/or soil stability around structure on outside of meander.	
Side Bar (right)	18+29	Sediment bar constricting channel below crossvane.	3
	18+42		
Bank Erosion (Left Bank)	19+30	Lack of protection on outside of meander in area of highest shear stress. J-hook placed too far downstream along meander. Area currently healing but needs additional protective measures t	2
	19+50	prevent future erosional events.	
J-hook	19+45	Orginal structure placement should have been upstream near start of adjacent bank erosion. The result may have prevented adjacent bank erosion (left).	1

Table B2 a. Visual Morphological Stability Assessment						
UT to South Fork						
Segment/Reach: 1 (1152 feet)						
Feature Category	**Metric (per As-built and reference baselines)**	**(#Stable) Number Performing as Intended**	**Total Number per As-built**	**Total Number / feet in unstable state**	**% Performing in Stable Condition**	**Feature Performance Mean or Total**
A. Riffles	1. Present	21	28	NA	75%	
	2. Armor stable	19	28	NA	68%	
	3. Facet grade appears stable	19	28	NA	68%	
	4. Minimal evidence of embedding/fining	12	28	NA	43%	
	5. Length appropriate	17	28	NA	61%	**63%**
B. Pools	1. Present	24	25	NA	96%	
	2. Sufficiently deep	24	25	NA	96%	
	3. Length appropriate	17	25	NA	68%	**87%**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering	13	13	NA	100%	
	2. Downstream of meander (glide/inflection) centering	13	13	NA	100%	**100%**
D. Meanders	1. Outer bend in state of limited/controlled erosion	21	26	NA	81%	
	2. Of those eroding, # w/concomitant point bar formation	1	5	NA	20%	
	3. Apparent Rc within specifications	24	26	NA	92%	
	4. Sufficient floodplain access and relief	26	26	NA	100%	**73%**
E. Bed General	1. General channel bed aggradation areas (bar formation)	NA	NA	16/236	78%	
	2. Channel bed degradation - areas of increasing down cutting or head cutting	NA	NA	1/16	98%	**88%**
F. Bank Condition	1. Actively eroding, wasting, or slumping bank	NA	NA	8/45.5	98%	**98%**
G. Vanes / J Hooks etc.	1. Free of back or arm scour	49	50	NA	98%	
	2. Height appropriate	46	50	NA	92%	
	3. Angle and geometry appear appropriate	49	50	NA	98%	
	4. Free of piping or other structural failures	36	50	NA	72%	**90%**
H. Wads and Boulders	1. Free of scour	6	8	NA	75%	
	2. Footing stable	5	8	NA	63%	**69%**

Table B2 b. Visual Morphological Stability Assessment						
UT to South Fork						
Segment/Reach: 2 (1030 feet)						
Feature Category	**Metric (per As-built and reference baselines)**	**(#Stable) Number Performing as Intended**	**Total Number per As-built**	**Total Number / feet in unstable state**	**% Performing in Stable Condition**	**Feature Performance Mean or Total**
A. Riffles	1. Present	12	13	NA	92%	
	2. Armor stable	10	13	NA	77%	
	3. Facet grade appears stable	10	13	NA	77%	
	4. Minimal evidence of embedding/fining	7	13	NA	54%	
	5. Length appropriate	11	13	NA	85%	**77%**
B. Pools	1. Present	13	14	NA	93%	
	2. Sufficiently deep	13	14	NA	93%	
	3. Length appropriate	11	14	NA	79%	**88%**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering	7	8	NA	88%	
	2. Downstream of meander (glide/inflection) centering	7	7	NA	100%	**94%**
D. Meanders	1. Outer bend in state of limited/controlled erosion	12	14	NA	86%	
	2. Of those eroding, # w/concomitant point bar formation	1	2	NA	50%	
	3. Apparent Rc within specifications	13	14	NA	93%	
	4. Sufficient floodplain access and relief	14	14	NA	100%	**82%**
E. Bed General	1. General channel bed aggradation areas (bar formation)	NA	NA	12/136	87%	
	2. Channel bed degradation - areas of increasing down cutting or head cutting	NA	NA	0/0	100%	**93%**
F. Bank Condition	1. Actively eroding, wasting, or slumping bank	NA	NA	3/12	99%	**99%**
G. Vanes / J Hooks etc.	1. Free of back or arm scour	28	28	NA	100%	
	2. Height appropriate	28	28	NA	100%	
	3. Angle and geometry appear appropriate	28	28	NA	100%	
	4. Free of piping or other structural failures	25	28	NA	89%	**97%**
H. Wads and Boulders	1. Free of scour	7	11	NA	64%	
	2. Footing stable	10	11	NA	91%	**77%**

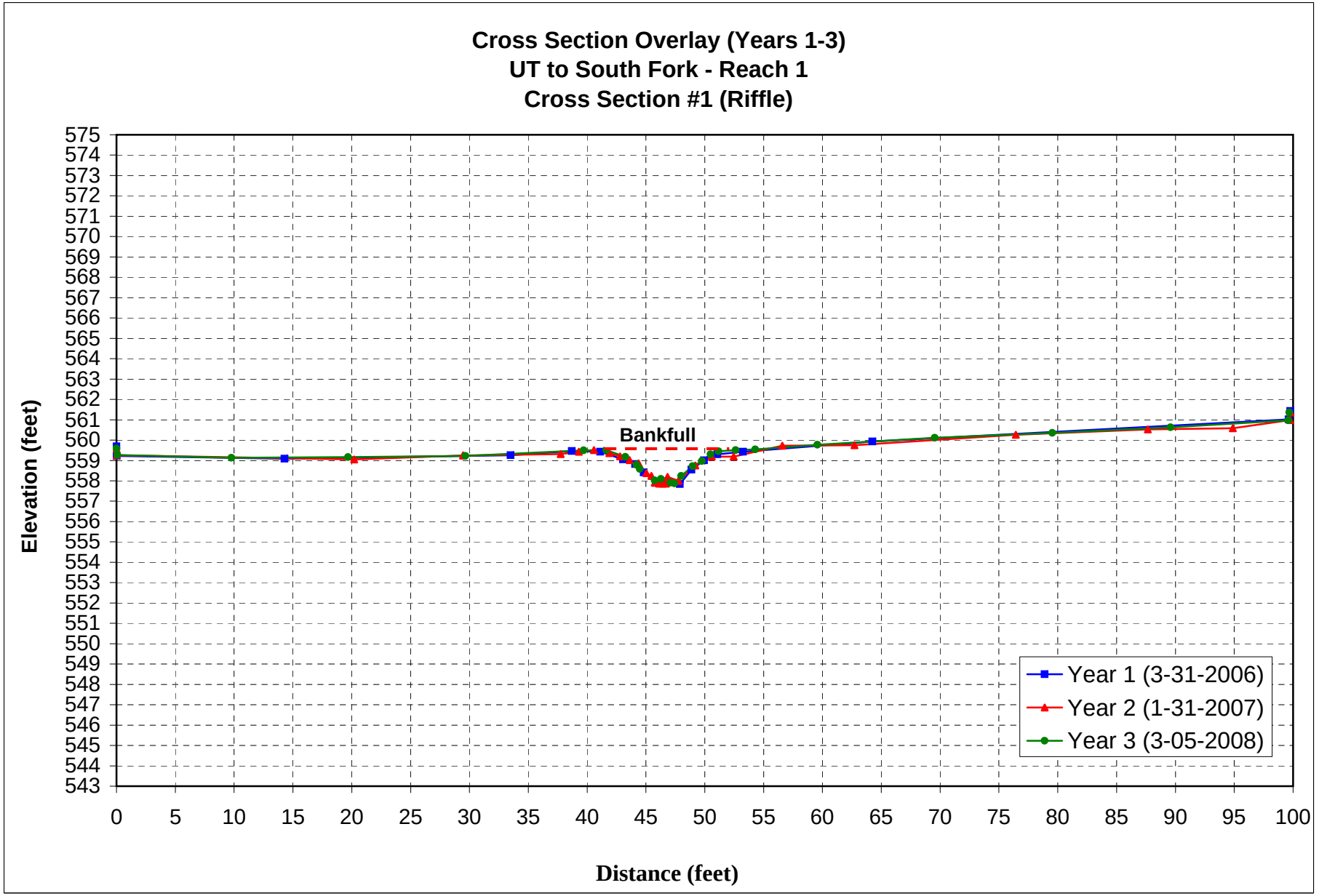
Table B2 c. Visual Morphological Stability Assessment						
UT to South Fork						
Segment/Reach: 3 (1028 feet)						
Feature Category	**Metric (per As-built and reference baselines)**	**(#Stable) Number Performing as Intended**	**Total Number per As-built**	**Total Number / feet in unstable state**	**% Performing in Stable Condition**	**Feature Performance Mean or Total**
A. Riffles	1. Present	16	16	NA	100%	
	2. Armor stable	15	16	NA	94%	
	3. Facet grade appears stable	15	16	NA	94%	
	4. Minimal evidence of embedding/fining	12	16	NA	75%	
	5. Length appropriate	16	16	NA	100%	**93%**
B. Pools	1. Present	17	19	NA	89%	
	2. Sufficiently deep	17	19	NA	89%	
	3. Length appropriate	13	19	NA	68%	**82%**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering	6	6	NA	100%	
	2. Downstream of meander (glide/inflection) centering	7	7	NA	100%	**100%**
D. Meanders	1. Outer bend in state of limited/controlled erosion	12	14	NA	86%	
	2. Of those eroding, # w/concomitant point bar formation	0	2	NA	0%	
	3. Apparent Rc within specifications	12	14	NA	100%	
	4. Sufficient floodplain access and relief	14	14	NA	100%	**72%**
E. Bed General	1. General channel bed aggradation areas (bar formation)	NA	NA	4/42.5	96%	
	2. Channel bed degradation - areas of increasing down cutting or head cutting	NA	NA	0/0	100%	**98%**
F. Bank Condition	1. Actively eroding, wasting, or slumping bank	NA	NA	3/37.5	98%	**98%**
G. Vanes / J Hooks etc.	1. Free of back or arm scour	29	30	NA	97%	
	2. Height appropriate	30	30	NA	100%	
	3. Angle and geometry appear appropriate	29	30	NA	97%	
	4. Free of piping or other structural failures	30	30	NA	100%	**98%**
H. Wads and Boulders	1. Free of scour	10	10	NA	100%	
	2. Footing stable	10	10	NA	100%	**100%**

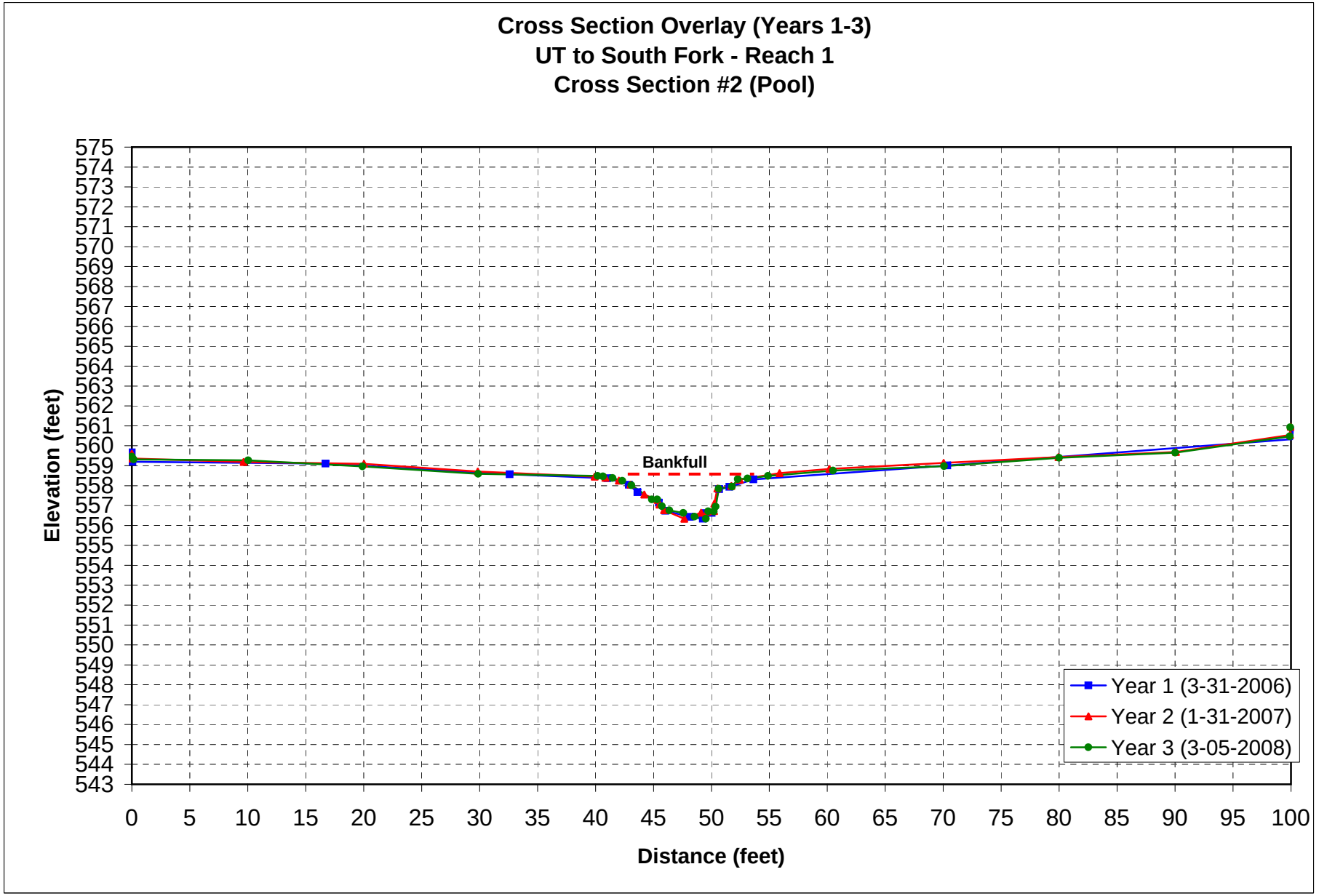
APPENDIX B4

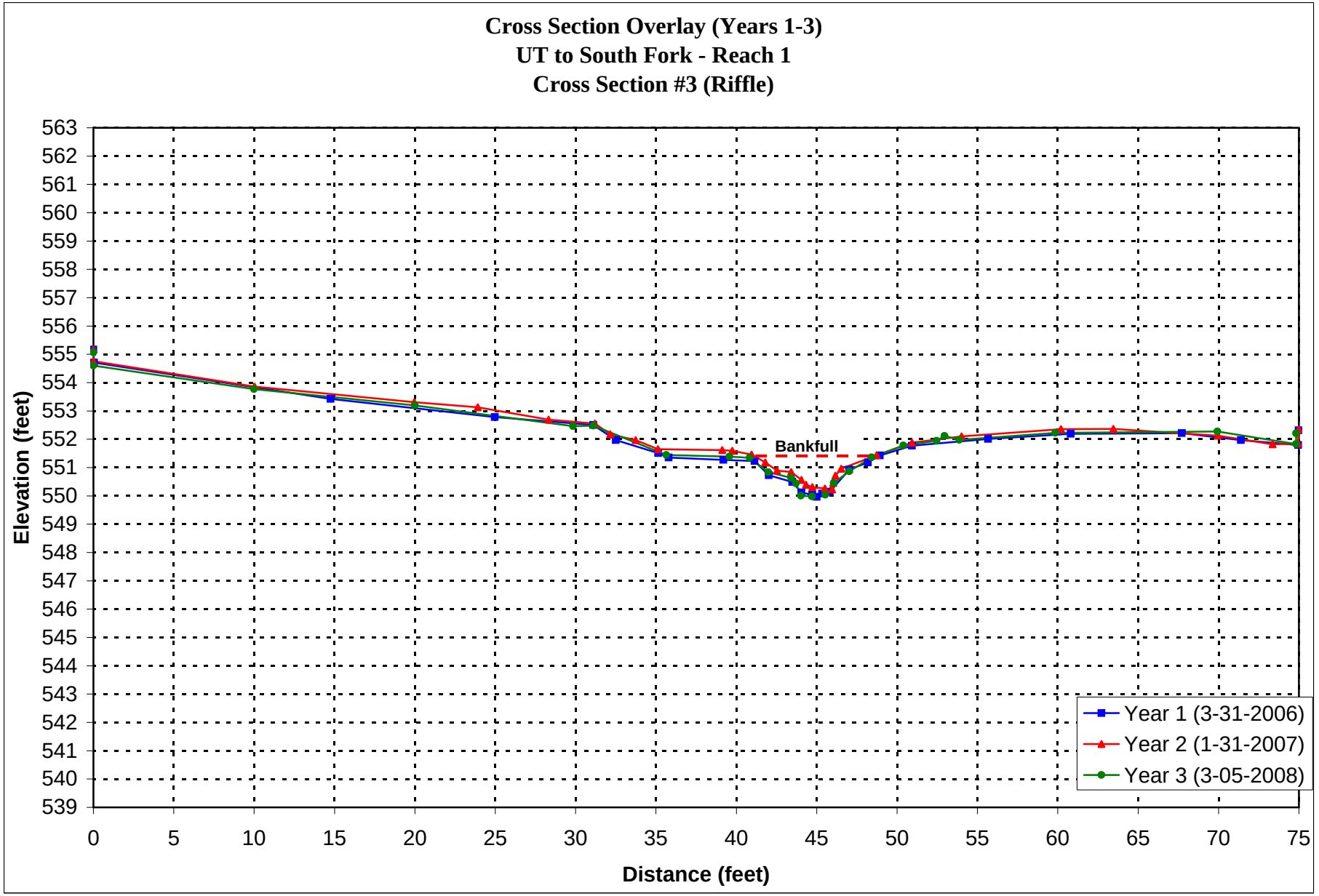
STREAM CROSS-SECTIONS

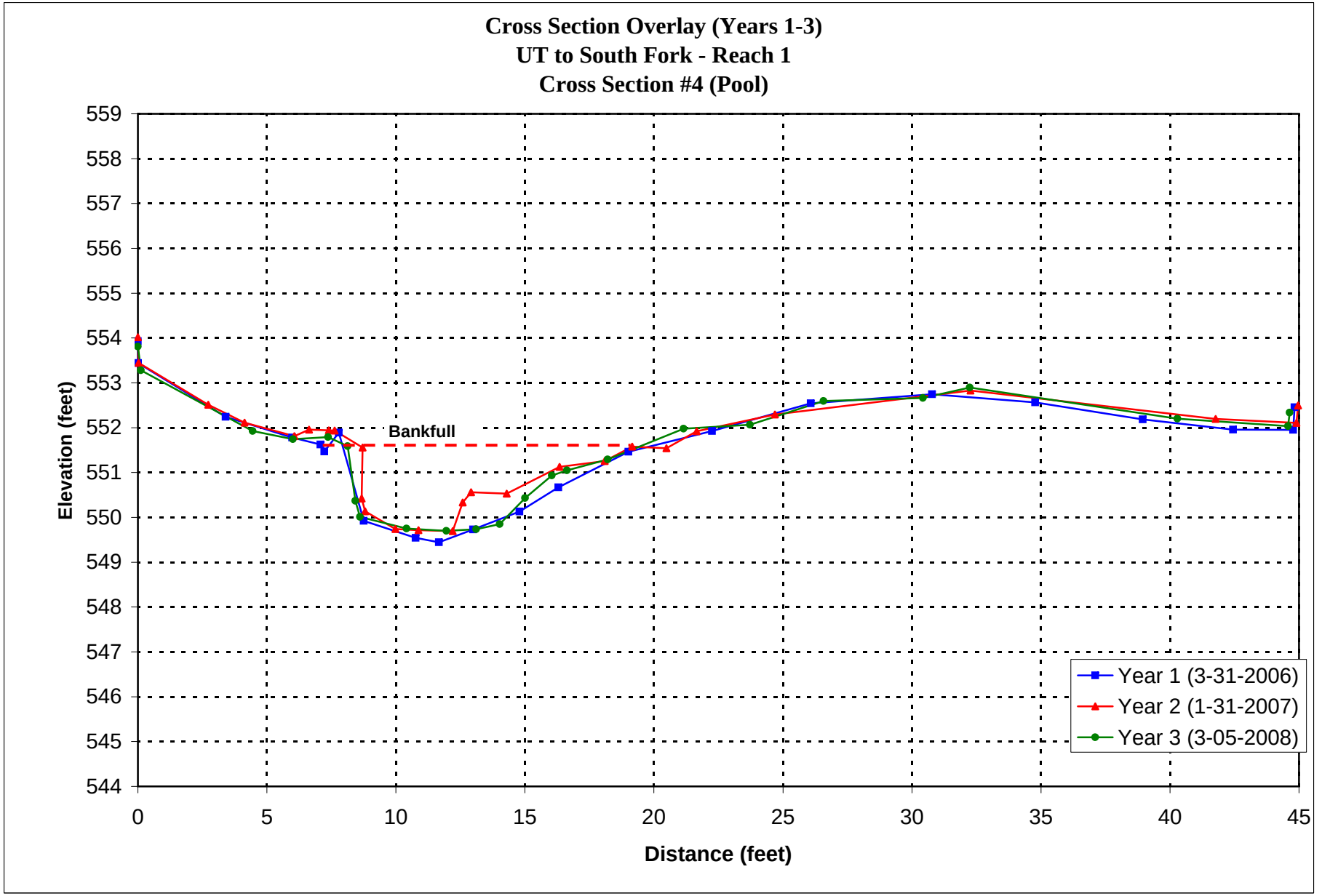
APPENDIX B6

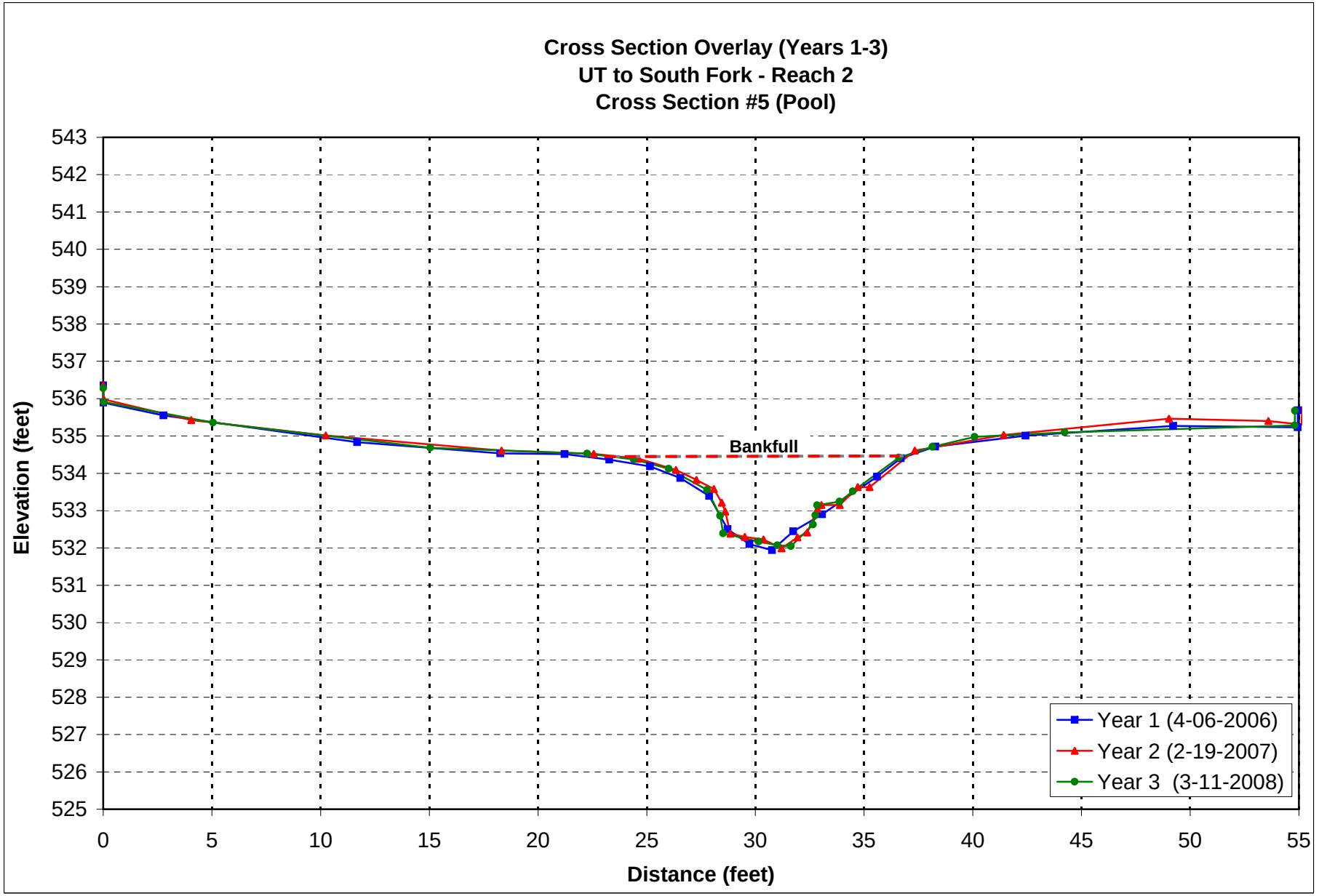
STREAM PEBBLE COUNTS

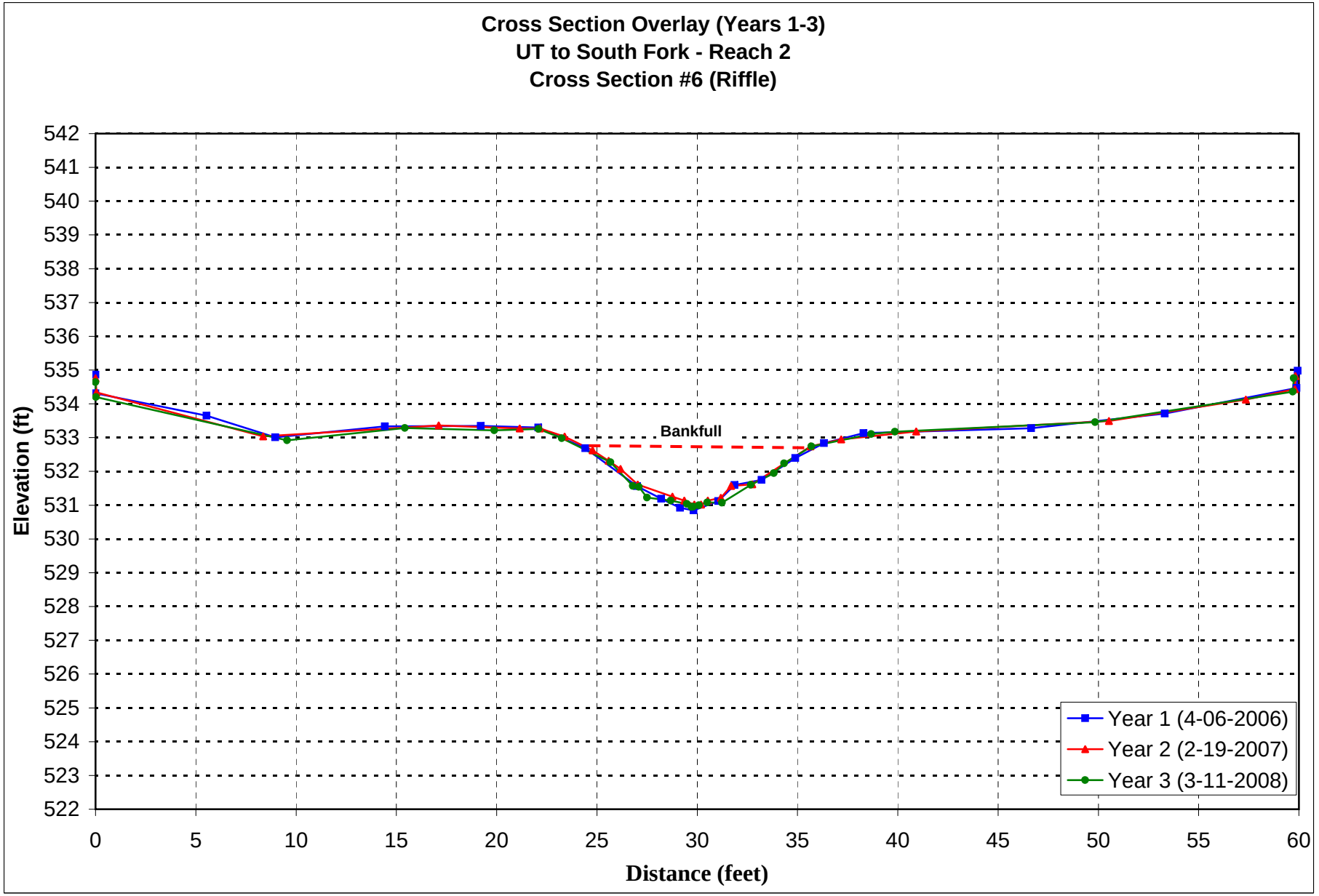

Cross Section Overlay (Years 1-3)
UT to South Fork - Reach 1
Cross Section #1 (Riffle)
Elevation (feet)
575
574
573
572
571
570
569
568
567
566
565
564
563
562
561
560
559
558
557
556
555
554
553
552
551
550
549
548
547
546
545
544
543
Bankfull
Year 1 (3-31-2006)
Year 2 (1-31-2007)
Year 3 (3-05-2008)
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
Distance (feet)

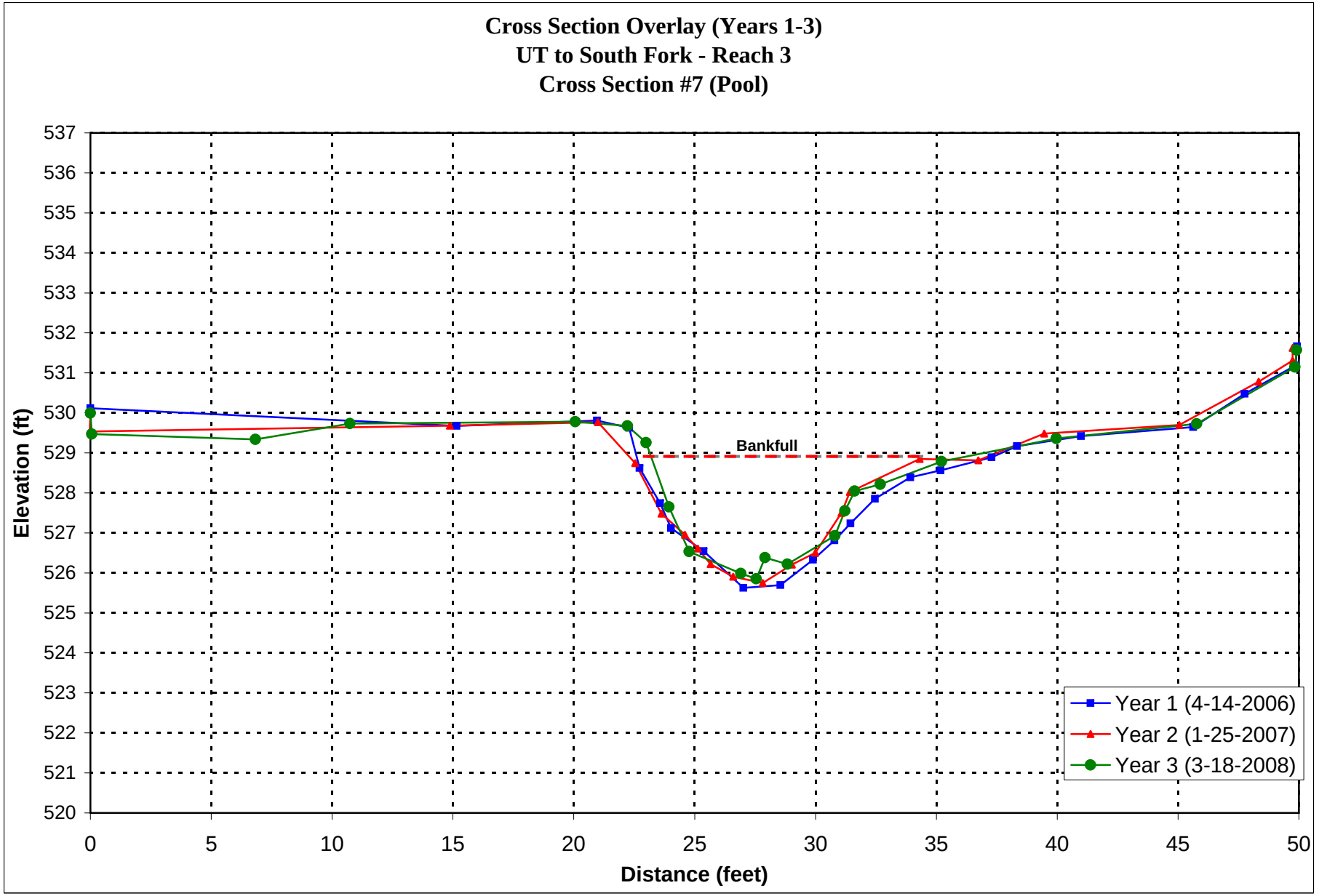

Cross Section Overlay (Years 1-3)
UT to South Fork - Reach 1
Cross Section #2 (Pool)
Elevation (feet)
575
574
573
572
571
570
569
568
567
566
565
564
563
562
561
560
559
558
557
556
555
554
553
552
551
550
549
548
547
546
545
544
543
Bankfull
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
Distance (feet)
Year 1 (3-31-2006)
Year 2 (1-31-2007)
Year 3 (3-05-2008)

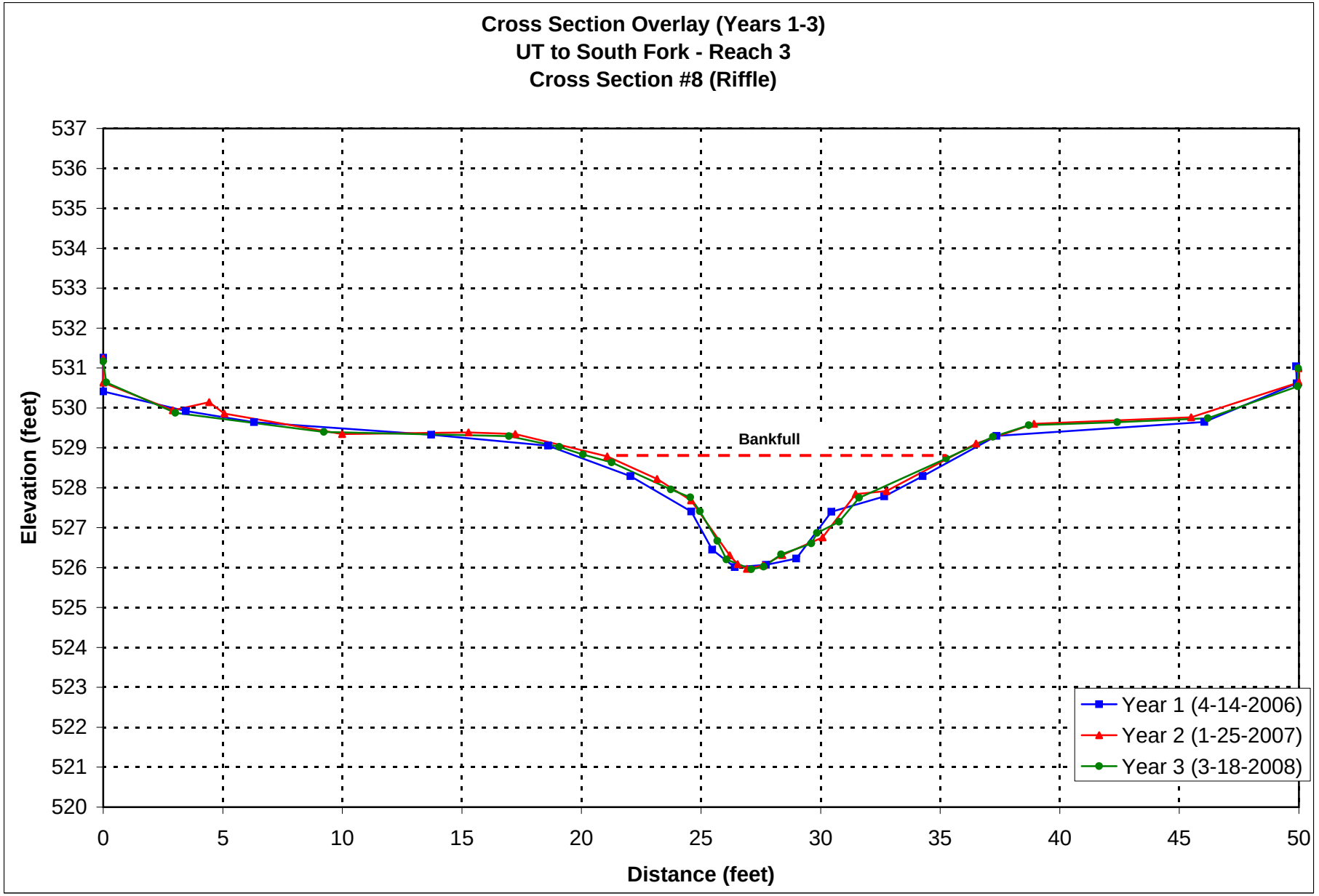

Cross Section Overlay (Years 1-3)
UT to South Fork - Reach 1
Cross Section #3 (Riffle)
Elevation (feet)
563
562
561
560
559
558
557
556
555
554
553
552
551
550
549
548
547
546
545
544
543
542
541
540
539
Bankfull
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
Distance (feet)
Year 1 (3-31-2006)
Year 2 (1-31-2007)
Year 3 (3-05-2008)

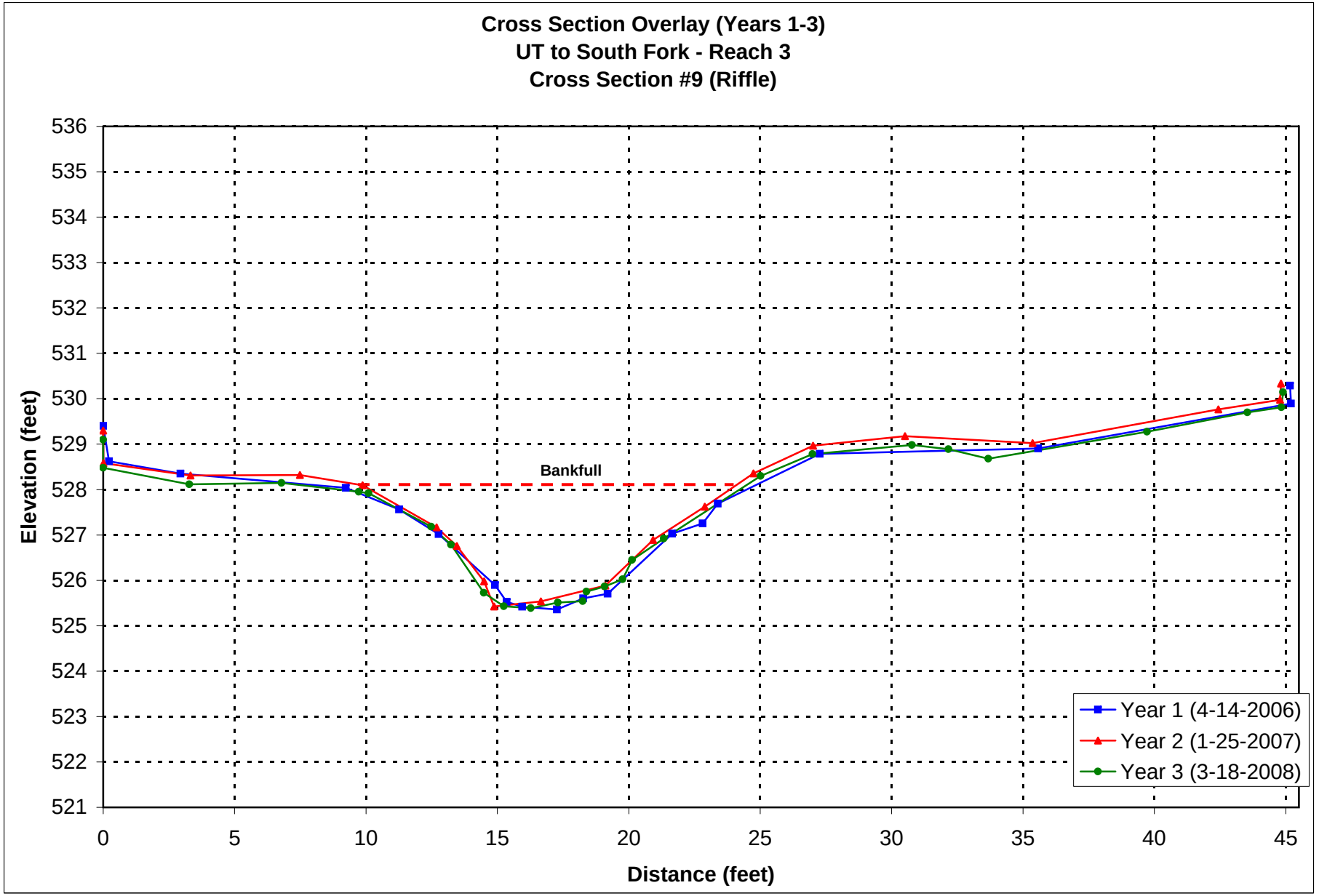

Cross Section Overlay (Years 1-3)
UT to South Fork - Reach 1
Cross Section #4 (Pool)
Elevation (feet)
559
558
557
556
555
554
553
552
551
550
549
548
547
546
545
544
Bankfull
0
5
10
15
20
25
30
35
40
45
Distance (feet)
Year 1 (3-31-2006)
Year 2 (1-31-2007)
Year 3 (3-05-2008)

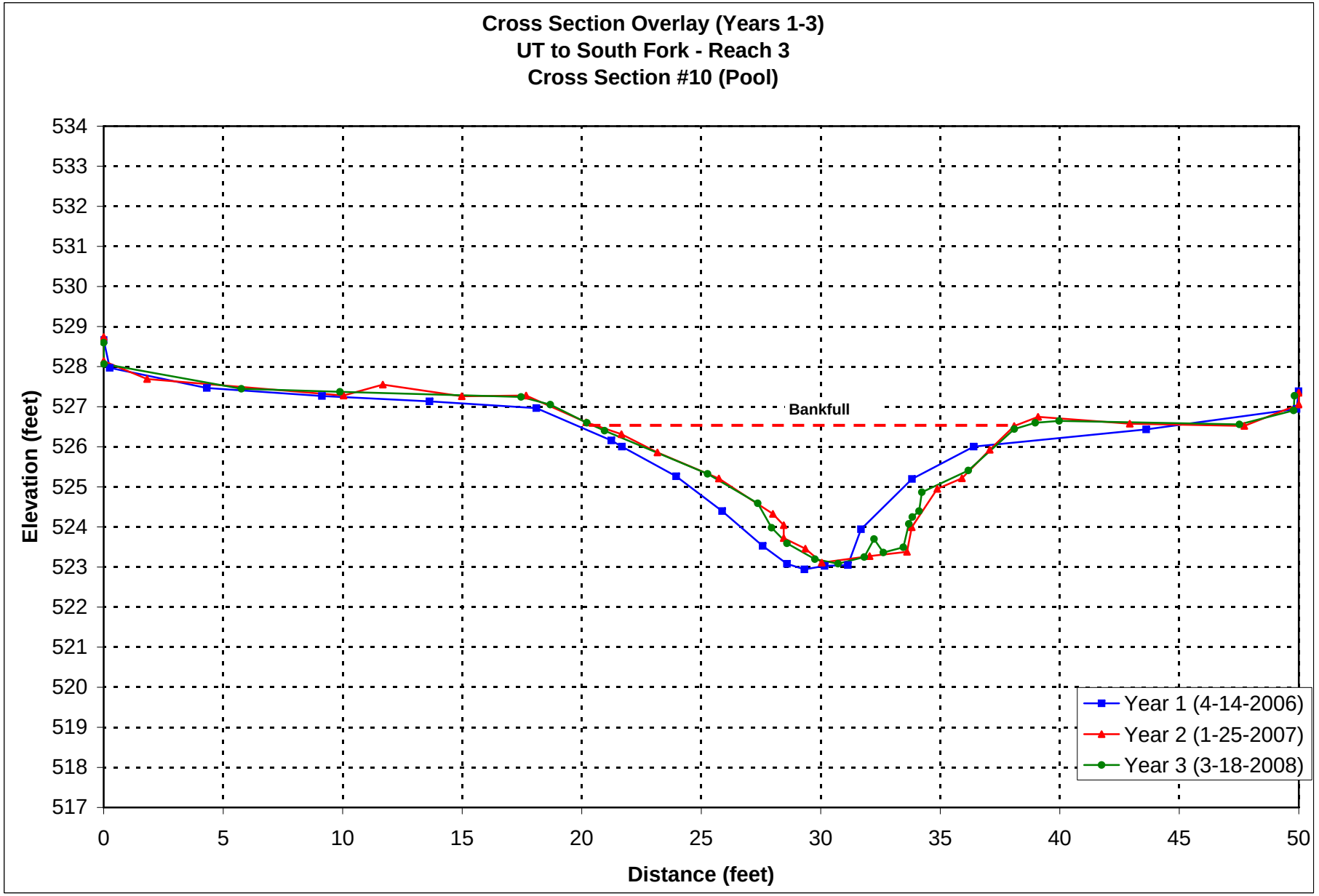

Cross Section Overlay (Years 1-3)
UT to South Fork - Reach 2
Cross Section #5 (Pool)
Elevation (feet)
543
542
541
540
539
538
537
536
535
534
533
532
531
530
529
528
527
526
525
Bankfull
0
5
10
15
20
25
30
35
40
45
50
55
Distance (feet)
Year 1 (4-06-2006)
Year 2 (2-19-2007)
Year 3 (3-11-2008)

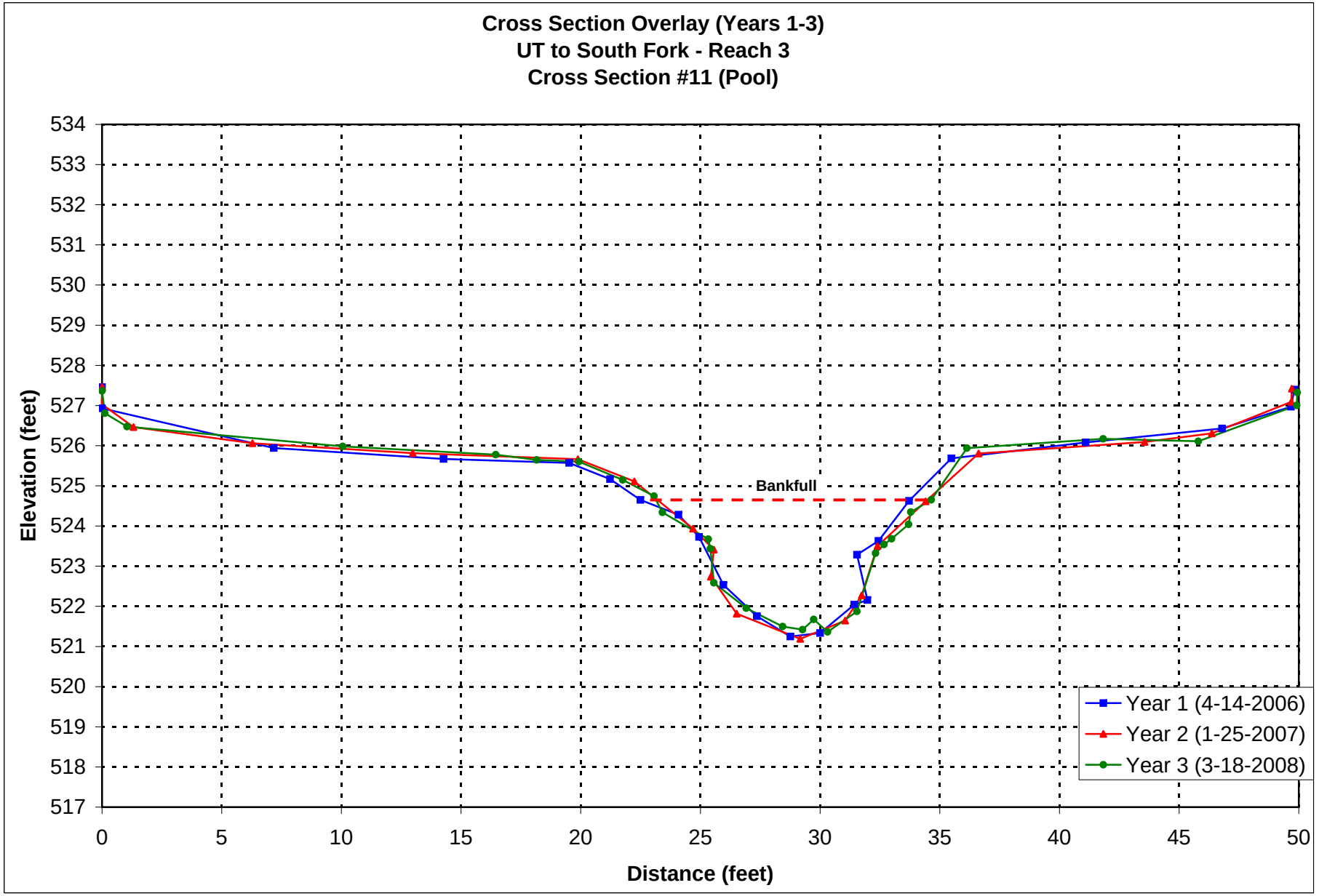

Cross Section Overlay (Years 1-3)
UT to South Fork - Reach 2
Cross Section #6 (Riffle)
Elevation (ft)
542
541
540
539
538
537
536
535
534
533
532
531
530
529
528
527
526
525
524
523
522
Bankfull
0
5
10
15
20
25
30
35
40
45
50
55
60
Distance (feet)
Year 1 (4-06-2006)
Year 2 (2-19-2007)
Year 3 (3-11-2008)

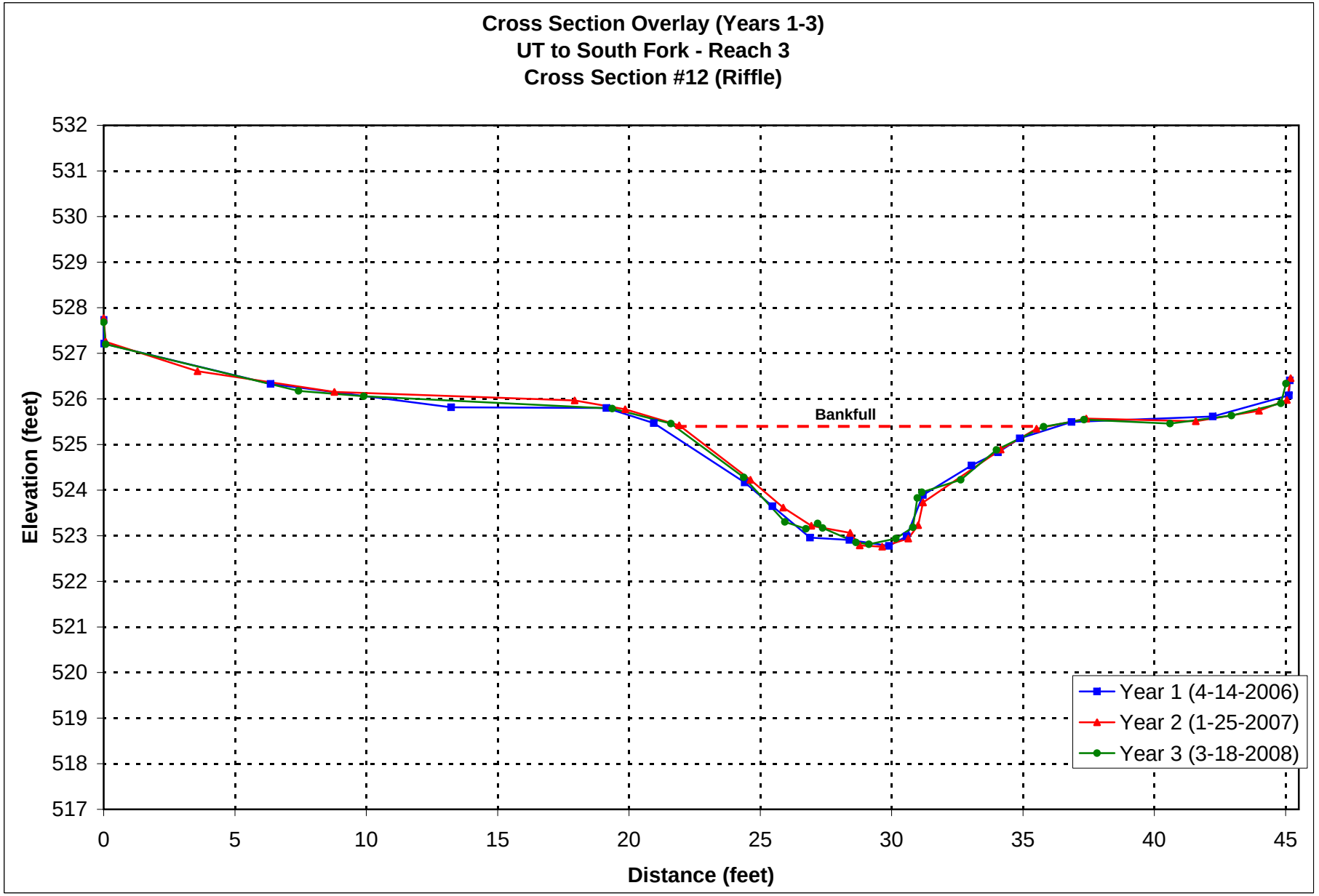

Cross Section Overlay (Years 1-3)
UT to South Fork - Reach 3
Cross Section #7 (Pool)
Elevation (ft)
537
536
535
534
533
532
531
530
529
528
527
526
525
524
523
522
521
520
Bankfull
0
5
10
15
20
25
30
35
40
45
50
Distance (feet)
Year 1 (4-14-2006)
Year 2 (1-25-2007)
Year 3 (3-18-2008)


Cross Section Overlay (Years 1-3)
UT to South Fork - Reach 3
Cross Section #8 (Riffle)
Elevation (feet)
537
536
535
534
533
532
531
530
529
528
527
526
525
524
523
522
521
520
Bankfull
0
5
10
15
20
25
30
35
40
45
50
Distance (feet)
Year 1 (4-14-2006)
Year 2 (1-25-2007)
Year 3 (3-18-2008)


Cross Section Overlay (Years 1-3)
UT to South Fork - Reach 3
Cross Section #9 (Riffle)
Elevation (feet)
536
535
534
533
532
531
530
529
528
527
526
525
524
523
522
521
Bankfull
0
5
10
15
20
25
30
35
40
45
Distance (feet)
Year 1 (4-14-2006)
Year 2 (1-25-2007)
Year 3 (3-18-2008)


Cross Section Overlay (Years 1-3)
UT to South Fork - Reach 3
Cross Section #10 (Pool)
Elevation (feet)
534
533
532
531
530
529
528
527
526
525
524
523
522
521
520
519
518
517
Bankfull
0
5
10
15
20
25
30
35
40
45
50
Distance (feet)
Year 1 (4-14-2006)
Year 2 (1-25-2007)
Year 3 (3-18-2008)


Cross Section Overlay (Years 1-3)
UT to South Fork - Reach 3
Cross Section #11 (Pool)
Elevation (feet)
534
533
532
531
530
529
528
527
526
525
524
523
522
521
520
519
518
517
0
5
10
15
20
25
30
35
40
45
50
Distance (feet)
Bankfull
Year 1 (4-14-2006)
Year 2 (1-25-2007)
Year 3 (3-18-2008)


Cross Section Overlay (Years 1-3)
UT to South Fork - Reach 3
Cross Section #12 (Riffle)
Elevation (feet)
532
531
530
529
528
527
526
525
524
523
522
521
520
519
518
517
0
5
10
15
20
25
30
35
40
45
Distance (feet)
Bankfull
Year 1 (4-14-2006)
Year 2 (1-25-2007)
Year 3 (3-18-2008)

Field Crew:	IPJ and PDB
Stream Reach:	1
Drainage Area:	0.15
Date:	Mar-08
Monitoring Year	3

STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	559.59	
0.07	559.27	
9.78	559.13	
19.68	559.16	
29.65	559.22	
39.72	559.50	
41.63	559.51	
43.24	559.18	
44.21	558.79	
44.48	558.58	
45.74	558.02	
46.29	558.09	
47.09	557.91	Thalweg
47.43	557.87	
48.01	558.24	
48.98	558.72	
49.76	558.97	
50.50	559.30	
51.18	559.45	
52.62	559.51	Top of Bank
54.30	559.54	
59.57	559.78	
69.55	560.12	
79.55	560.36	
89.60	560.63	
99.61	560.97	
99.68	561.36	

Bankfull Hydraulic Geometry

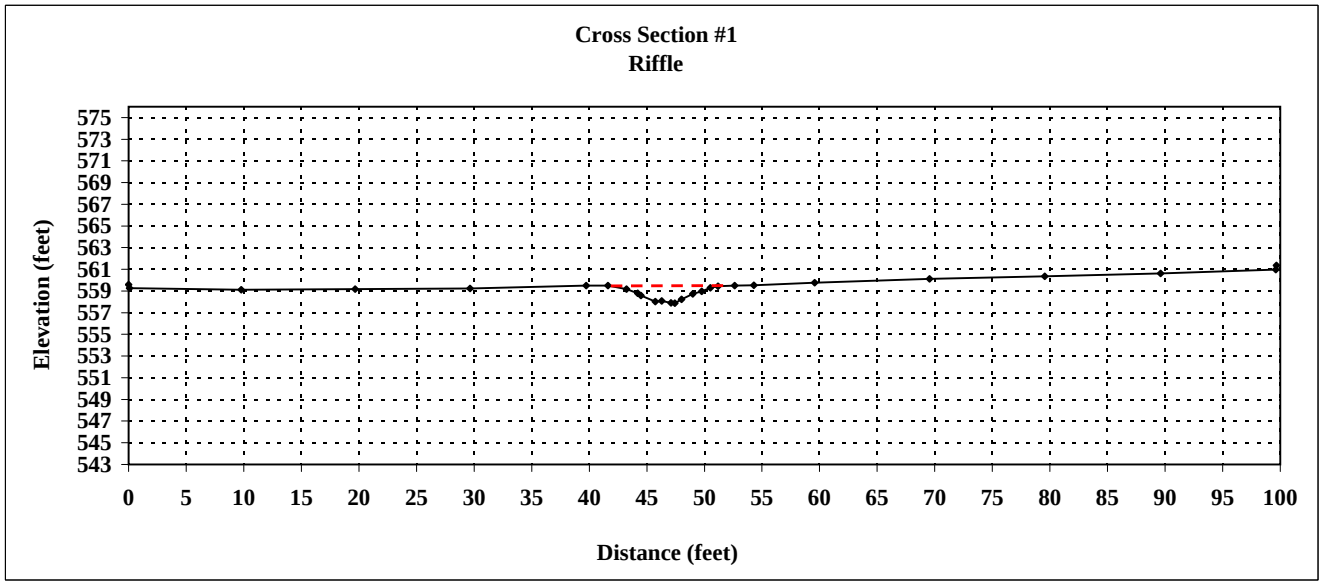
	Width (Feet)	Depth (Feet)	Perimeter (Feet)	Area (Sq. Ft.)
	0.00	0.00	0.00	0.00
	1.60	0.33	1.64	0.26
	0.96	0.72	1.04	0.50
	0.27	0.93	0.34	0.22
	1.26	1.48	1.38	1.52
	0.55	1.42	0.55	0.80
	0.80	1.60	0.82	1.20
	0.34	1.64	0.34	0.55
	0.58	1.27	0.69	0.85
	0.97	0.78	1.08	0.99
	0.78	0.53	0.82	0.51
	0.75	0.20	0.82	0.28
	0.67	0.05	0.69	0.09
	1.42	0.00	1.42	0.04
TOTALS	10.96		11.63	7.81

SUMMARY DATA (BANKFULL)

A(BKF)	7.81	W(FPA)	100+
W(BKF)	10.96	WP	11.63
Max d	1.64	Hydraulic Radius	0.94
Mean d	0.71	Wetted Perimeter=	WP
W/D	15.38	Area=	A
Bank Height	1.60	Width=	W
Entrenchment	9.1+	Depth=	D
Stream Type	C	Bankfull=	BKF
Area from Rural Regional Curve			6.2

Bankfull datum* = 559.51

*Datum reset during Monitoring Year 2.



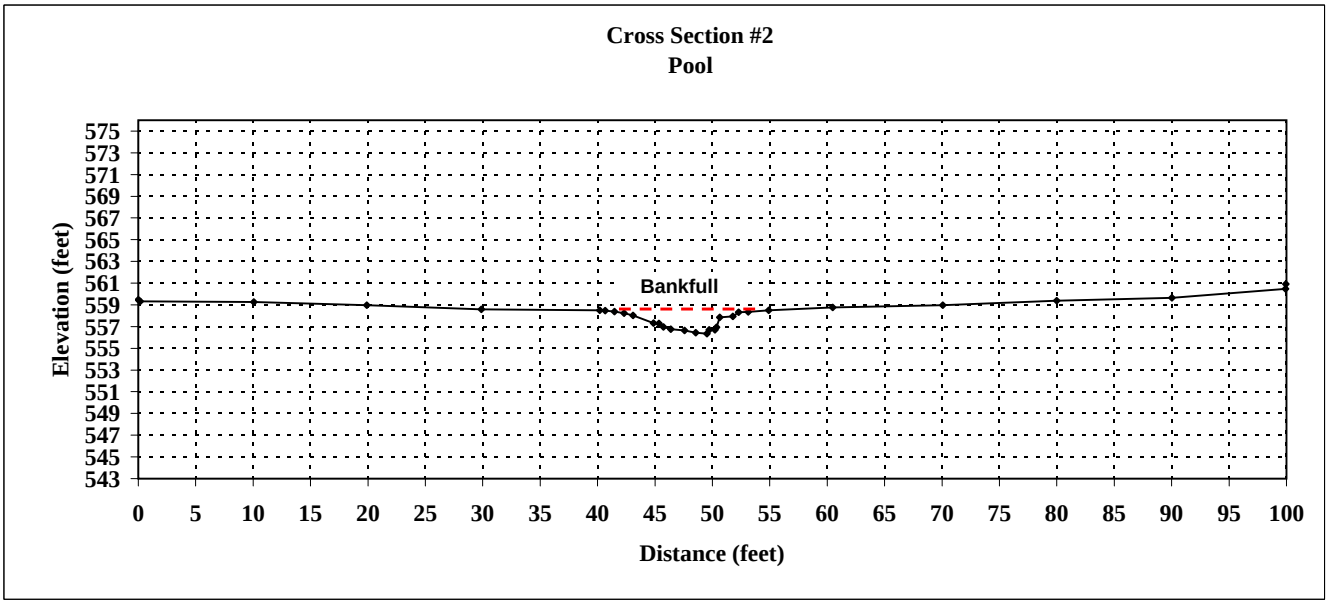
Field Crew:	IPJ and PDB
Stream Reach:	1
Drainage Area:	0.15
Date:	Mar-08
Monitoring Year	3

STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	559.46	
0.16	559.31	
10.05	559.27	
19.90	558.97	
29.89	558.59	
40.20	558.49	
40.65	558.46	4007
41.47	558.38	4005
42.31	558.25	
43.09	558.02	
44.87	557.31	
45.33	557.30	
45.74	556.97	4003
46.37	556.75	
47.58	556.63	
48.55	556.44	
49.53	556.34	4002
49.74	556.70	
50.21	556.70	
50.36	556.94	4003
50.64	557.85	
51.78	557.95	
52.28	558.32	
53.13	558.36	4006
54.89	558.49	4008
60.49	558.75	
70.07	558.98	
80.00	559.40	
90.02	559.65	
99.91	560.47	
99.95	560.93	

	Bankfull Hydraulic Geometry			
	Width (Feet)	Depth (Feet)	Perimeter (Feet)	Area (Sq. Ft.)
	0.00	0.00	0.00	0.00
	0.27	0.02	0.27	0.00
	0.84	0.15	0.85	0.07
	0.79	0.38	0.82	0.21
	1.77	1.09	1.91	1.30
	0.46	1.09	0.46	0.50
	0.41	1.43	0.53	0.52
	0.63	1.65	0.66	0.96
	1.21	1.77	1.22	2.07
	0.97	1.96	0.99	1.80
	0.98	2.06	0.99	1.97
	0.20	1.69	0.42	0.38
	0.48	1.69	0.48	0.81
	0.15	1.45	0.28	0.24
	0.28	0.55	0.95	0.28
	1.13	0.45	1.14	0.57
	0.50	0.07	0.63	0.13
	0.85	0.04	0.85	0.05
	0.67	0.00	0.67	0.01
TOTALS	12.60		14.12	11.86

SUMMARY DATA	
A(BKF)	11.86
W(BKF)	12.60
Max d	2.06
Mean d	0.94
Wet. P	14.12
Hyd. R	0.84

Bankfull datum* = 558.40
*Datum reset during Monitoring Year 2.



Field Crew:	IPJ and PDB
Stream Reach:	1
Drainage Area:	0.15
Date:	Mar-08
Monitoring Year	3

STATION (Feet)	HI (Feet)	NOTES
0.00	555.07	
0.00	554.60	
9.99	553.77	
20.00	553.19	
29.85	552.46	
31.12	552.48	
35.65	551.44	
39.57	551.39	BKF/TOB
40.83	551.34	
41.99	550.84	
43.41	550.64	
43.71	550.44	LEW
44.01	550.00	
44.72	549.98	Thalweg
45.55	550.04	
46.07	550.46	REW
47.03	550.87	
48.42	551.36	
50.39	551.78	
52.47	551.95	
52.96	552.11	
53.88	551.98	
59.86	552.22	
69.93	552.28	
74.82	551.83	
74.82	552.21	

Bankfull Hydraulic Geometry

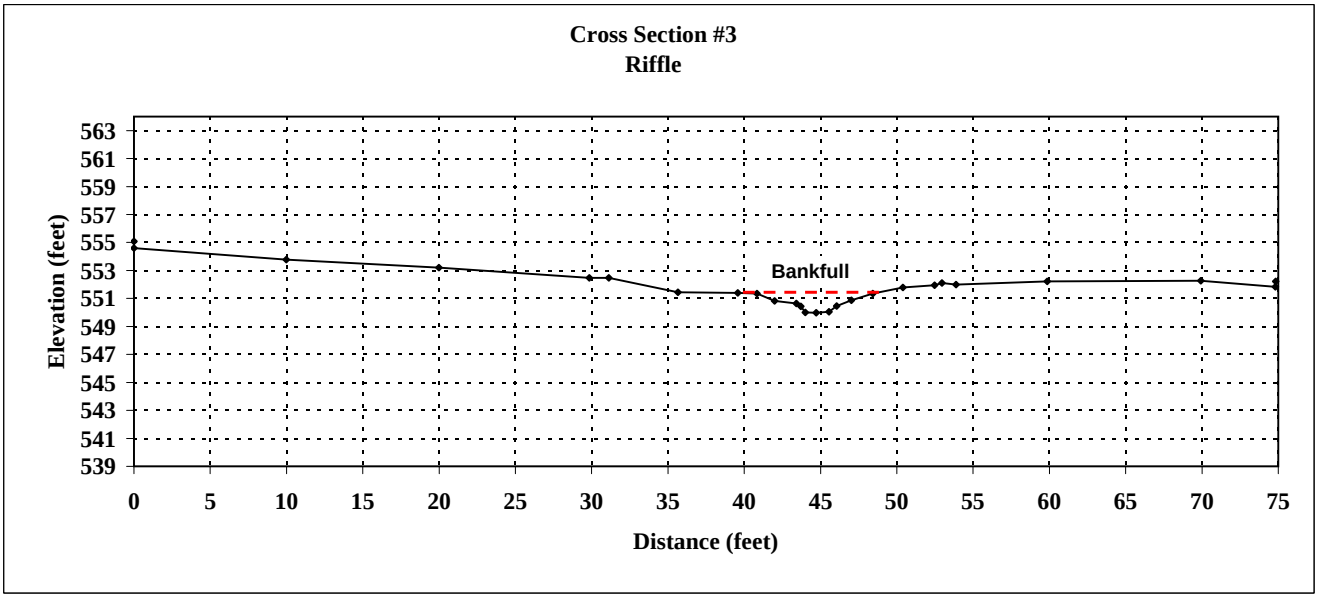
	Width (Feet)	Depth (Feet)	Perimeter (Feet)	Area (Sq. Ft.)
	0.00	0.00	0.00	0.00
	1.26	0.04	1.26	0.03
	1.16	0.55	1.26	0.35
	1.42	0.75	1.43	0.93
	0.30	0.95	0.36	0.25
	0.30	1.38	0.53	0.35
	0.71	1.41	0.71	0.99
	0.83	1.35	0.83	1.14
	0.52	0.93	0.67	0.59
	0.96	0.52	1.05	0.70
	1.39	0.03	1.48	0.38
	0.18	0.00	0.18	0.00
TOTALS	9.03		9.75	5.72

SUMMARY DATA (BANKFULL)

A(BKF)	5.72	W(FPA)	24+
W(BKF)	9.03	WP	9.75
Max d	1.41	Hydraulic Radius	0.59
Mean d	0.63	Wetted Perimeter=	WP
W/D	14.26	Area=	A
Bank Height	1.41	Width=	W
Entrenchment	2.7+	Depth=	D
Stream Type	C	Bankfull=	BKF
Area from Rural Regional Curve			6.2

Bankfull datum* = 551.39

*Datum reset during Monitoring Year 3.



Field Crew:	IPJ and PDB
Stream Reach:	1
Drainage Area:	0.15
Date:	Mar-08
Monitoring Year	3

STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	553.81	
0.12	553.28	
4.45	551.93	
6.01	551.74	
7.37	551.79	TOB
8.13	551.59	BKF
8.43	550.37	LEW
8.61	550.01	
10.41	549.75	Thalweg
11.96	549.70	
13.11	549.74	
14.02	549.85	
15.00	550.43	REW
16.05	550.93	
16.63	551.05	
18.21	551.29	
21.16	551.98	
23.72	552.07	
26.57	552.60	
30.43	552.66	
32.24	552.90	
40.29	552.20	
44.57	552.04	
44.64	552.34	

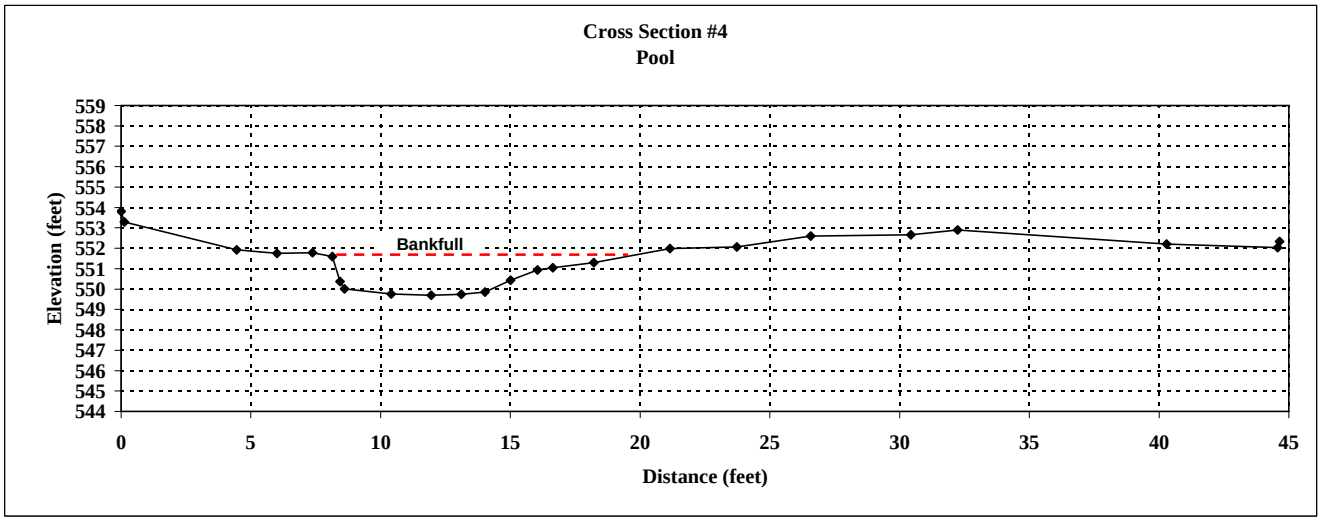
Bankfull/Top of Bank Hydraulic Geometry

	Width (Feet)	Depth (Feet)	Perimeter (Feet)	Area (Sq. Ft.)
	0.00	0.00	0.00	0.00
	0.29	1.21	1.24	0.17
	0.18	1.57	0.40	0.25
	1.80	1.83	1.82	3.06
	1.54	1.88	1.54	2.86
	1.16	1.84	1.16	2.16
	0.91	1.73	0.92	1.62
	0.98	1.15	1.14	1.41
	1.04	0.65	1.16	0.94
	0.58	0.53	0.60	0.34
	1.58	0.29	1.60	0.65
	1.19	0.00	1.22	0.17
TOTALS	11.26		12.80	13.64

SUMMARY DATA

A(BKF)	13.64
W(BKF)	11.26
Max d	12.80
Mean d	1.21
Wet. P	12.80
Hyd. R	1.07

Bankfull datum* = 551.58
*Datum reset during Monitoring Year 2.



Field Crew:	IPJ and PDB
Stream Reach:	2
Drainage Area:	0.38
Date:	Mar-08
Monitoring Year	3

STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	536.28	
0.02	535.91	
5.06	535.35	
15.04	534.68	
22.26	534.53	TOB
24.41	534.37	BKF
26.01	534.12	
27.78	533.55	
28.38	532.86	LEW
28.52	532.39	
30.15	532.17	
31.02	532.07	Thalweg
31.63	532.05	
32.65	532.63	
32.76	532.88	REW
32.85	533.14	
33.88	533.24	
34.49	533.52	
36.60	534.42	
38.14	534.70	
40.08	534.98	
44.23	535.09	
54.80	535.28	
54.82	535.68	

Bankfull/Top of Bank Hydraulic Geometry

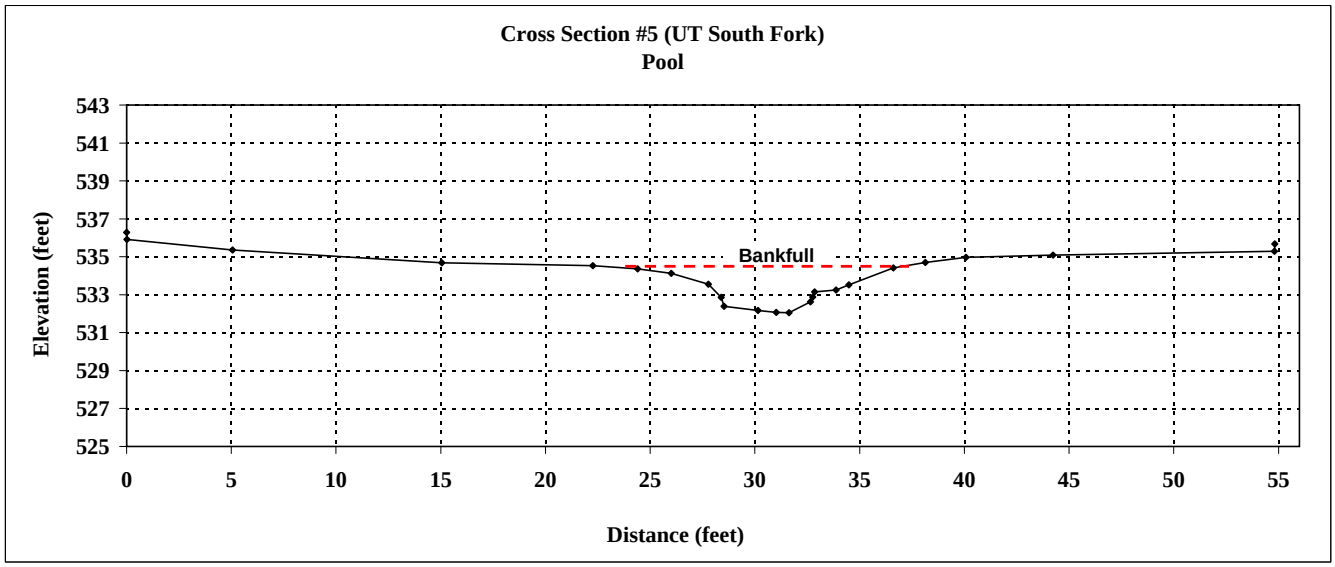
	Width (Feet)	Depth (Feet)	Perimeter (Feet)	Area (Sq. Ft.)
	0.00	0.00	0.00	0.00
	0.21	0.02	0.21	0.00
	1.60	0.26	1.62	0.23
	1.77	0.83	1.86	0.97
	0.60	1.52	0.92	0.71
	0.14	2.00	0.50	0.25
	1.63	2.22	1.64	3.44
	0.86	2.32	0.87	1.96
	0.62	2.34	0.62	1.44
	1.02	1.76	1.17	2.09
	0.11	1.51	0.27	0.17
	0.09	1.25	0.28	0.12
	1.03	1.14	1.04	1.23
	0.61	0.87	0.67	0.61
	2.03	0.00	2.21	0.89
TOTALS	12.32		13.87	14.10

SUMMARY DATA

A(BKF)	14.10
W(BKF)	12.32
Max d	2.34
Mean d	1.14
Wet. P	13.87
Hyd. R	1.02

Bankfull datum* = 534.39

*Datum reset during Monitoring Year 2.



Field Crew:	IPJ and PDB
Stream Reach:	2
Drainage Area:	0.38
Date:	Mar-08
Monitoring Year	3

STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	534.64	
0.02	534.20	
9.56	532.92	
15.43	533.28	
19.89	533.21	
22.09	533.26	
23.25	532.98	
25.67	532.27	
26.80	531.57	
27.10	531.54	
27.49	531.23	
28.68	531.14	LEW
29.48	531.04	
29.72	530.95	
29.81	530.96	Thalweg
30.09	531.00	
30.51	531.08	
31.24	531.07	REW
32.68	531.61	
33.83	531.95	
34.34	532.24	
35.70	532.74	BKF
38.68	533.11	TOB
39.86	533.18	
49.84	533.46	
59.70	534.36	
59.75	534.76	

Bankfull/Top of Bank Hydraulic Geometry

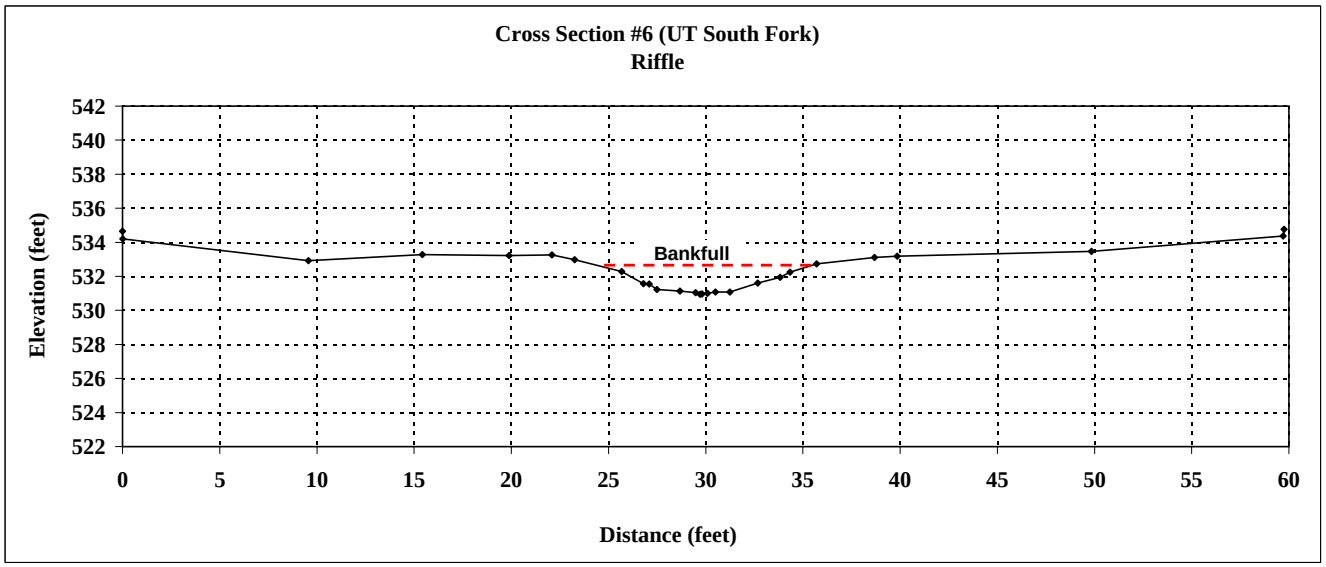
	Width (Feet)	Depth (Feet)	Perimeter (Feet)	Area (Sq. Ft.)
	0.00	0.00	0.00	0.00
	1.47	0.47	1.55	0.34
	1.12	1.17	1.32	0.92
	0.30	1.20	0.30	0.35
	0.40	1.52	0.51	0.54
	1.19	1.60	1.19	1.85
	0.80	1.70	0.81	1.32
	0.24	1.79	0.26	0.42
	0.09	1.78	0.09	0.17
	0.27	1.74	0.28	0.48
	0.42	1.66	0.43	0.72
	0.73	1.67	0.73	1.21
	1.44	1.14	1.53	2.02
	1.15	0.79	1.20	1.11
	0.51	0.50	0.59	0.33
	1.36	0.00	1.45	0.34
TOTALS	11.50		12.23	12.12

SUMMARY DATA (BANKFULL)

A(BKF)	12.12	W(FPA)	60+
W(BKF)	11.50	WP	12.23
Max d	1.79	Hydraulic Radius	0.99
Mean d	1.05	Wetted Perimeter=	WP
W/D	10.90	Area=	A
Bank Height	2.16	Width=	W
Entrenchment	5.2+	Depth=	D
Stream Type	C	Bankfull=	BKF
Area from Rural Regional Curve			11.5

Bankfull datum* = 532.74

*Datum reset during Monitoring Year 2.



Field Crew:	IPJ and PDB
Stream Reach:	3
Drainage Area:	1.05
Date:	Mar-08
Monitoring Year	3

STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	529.99	
0.06	529.47	
6.83	529.34	
10.74	529.73	
20.06	529.78	
22.22	529.68	TOB
22.99	529.26	
23.94	527.65	LEW
24.78	526.53	
26.92	525.99	Thalweg
27.55	525.85	
27.91	526.38	
28.83	526.22	
30.80	526.93	
31.22	527.55	REW
31.62	528.05	
32.68	528.22	
35.21	528.79	BKF
39.96	529.36	
45.77	529.73	
49.84	531.15	
49.90	531.57	

Bankfull/Top of Bank Hydraulic Geometry

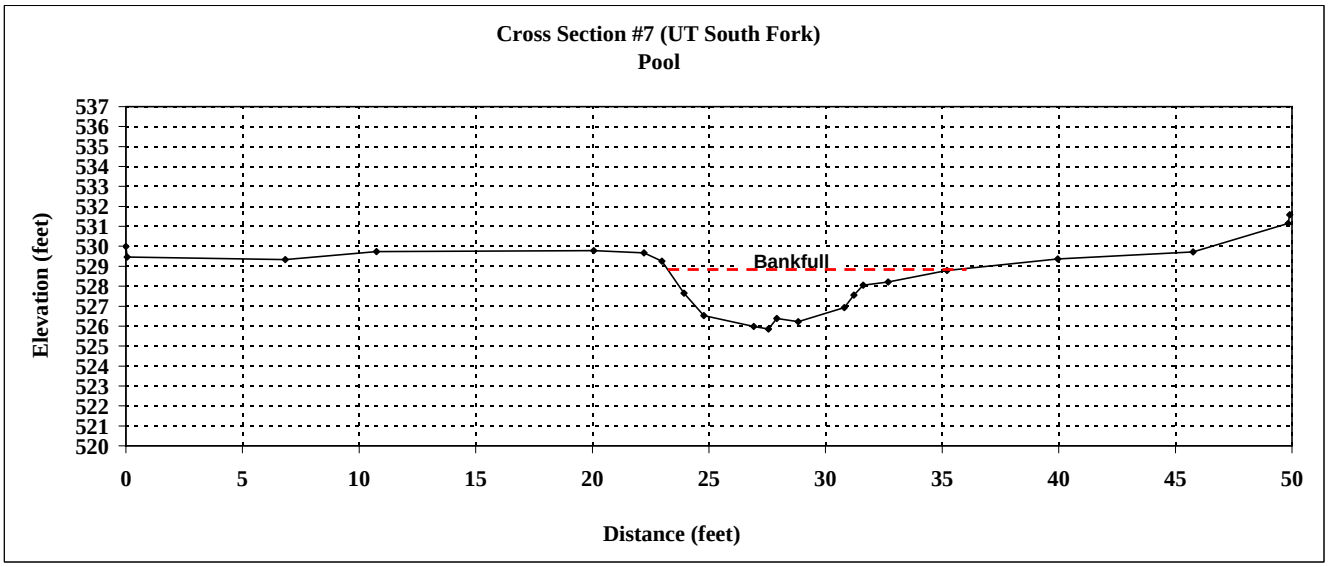
	Width (Feet)	Depth (Feet)	Perimeter (Feet)	Area (Sq. Ft.)
	0.00	0.00	0.00	0.00
	0.74	1.20	1.41	0.44
	0.84	2.32	1.40	1.48
	2.14	2.86	2.21	5.53
	0.63	3.00	0.65	1.86
	0.36	2.47	0.64	0.99
	0.92	2.63	0.94	2.36
	1.97	1.92	2.09	4.48
	0.41	1.30	0.75	0.66
	0.40	0.81	0.63	0.42
	1.06	0.64	1.08	0.77
	2.53	0.06	2.59	0.88
	0.59	0.00	0.59	0.02
TOTALS	12.60		14.98	19.89

SUMMARY DATA

A(BKF)	19.89
W(BKF)	12.60
Max d	3.00
Mean d	1.58
Wet P.	14.98
Hyd. R	1.33

Bankfull datum* = 528.85

*Datum reset during Monitoring Year 2.



Field Crew:	IPJ and PDB
Stream Reach:	3
Drainage Area:	1.05
Date:	Mar-07
Monitoring Year	3

STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	531.17	
0.13	530.64	
3.02	529.88	
9.23	529.40	
16.97	529.29	TOB
19.07	529.03	
20.06	528.83	BKF
21.26	528.63	
23.73	527.96	
24.55	527.76	
24.95	527.41	
25.68	526.67	LEW
26.06	526.20	
27.10	525.96	Thalweg
27.62	526.02	
28.35	526.33	
29.61	526.61	REW
29.85	526.87	
30.78	527.15	
31.61	527.75	
35.25	528.73	
37.21	529.27	
38.71	529.57	
42.41	529.64	
46.20	529.74	
49.95	530.54	
49.97	530.99	

Bankfull/Top of Bank Hydraulic Geometry

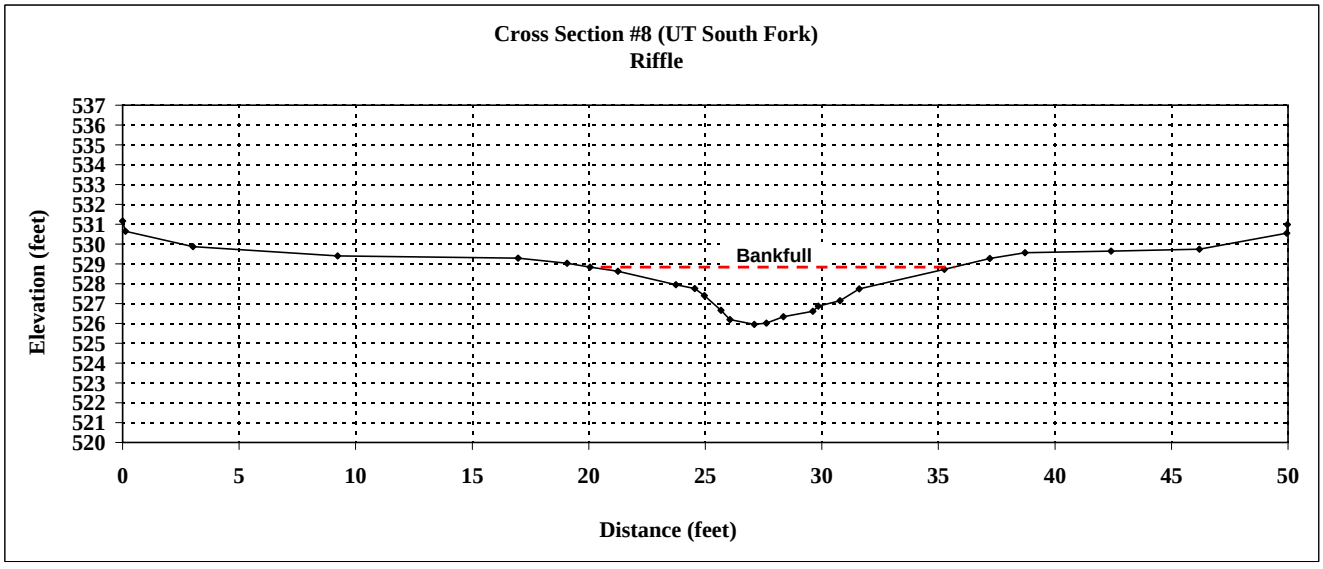
	Width (Feet)	Depth (Feet)	Perimeter (Feet)	Area (Sq. Ft.)
	0.00	0.00	0.00	0.00
	0.96	0.15	0.97	0.07
	2.48	0.83	2.57	1.22
	0.82	1.02	0.84	0.76
	0.40	1.38	0.53	0.48
	0.73	2.12	1.04	1.27
	0.38	2.59	0.60	0.89
	1.05	2.83	1.07	2.83
	0.51	2.77	0.52	1.43
	0.73	2.45	0.79	1.91
	1.26	2.18	1.29	2.93
	0.24	1.92	0.35	0.48
	0.93	1.64	0.97	1.65
	0.83	1.04	1.03	1.11
	3.65	0.05	3.78	1.99
	0.20	0.00	0.20	0.01
TOTALS	15.15		16.56	19.03

SUMMARY DATA (BANKFULL)

A(BKF)	19.03	W(FPA)	50+
W(BKF)	15.15	WP	16.56
Max d	2.83	Hydraulic Radius	1.15
Mean d	1.26	Wetted Perimeter=	WP
W/D	12.06	Area=	A
Bank Height	3.34	Width=	W
Entrenchment	3.3+	Depth=	D
Stream Type	C	Bankfull=	BKF
Area from Rural Regional Curve			22.7

Bankfull datum* = 528.79

*Datum reset during Monitoring Year 2.



Field Crew:	IPJ and PDB
Stream Reach:	3
Drainage Area:	1.05
Date:	Mar-07
Monitoring Year	3

STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	529.10	
0.00	528.48	
3.28	528.11	
6.79	528.15	TOB
9.73	527.95	
10.10	527.92	
12.48	527.18	
13.23	526.79	
14.48	525.73	LEW
15.24	525.43	
16.28	525.39	Thalweg
17.30	525.51	
18.25	525.54	
18.39	525.75	REW
19.08	525.86	
19.76	526.03	
20.13	526.45	
21.33	526.92	
25.02	528.30	
26.99	528.78	
30.77	528.98	
32.17	528.89	
33.68	528.68	
39.72	529.27	
43.54	529.70	
44.84	529.81	
44.90	530.14	

Bankfull/Top of Bank Hydraulic Geometry

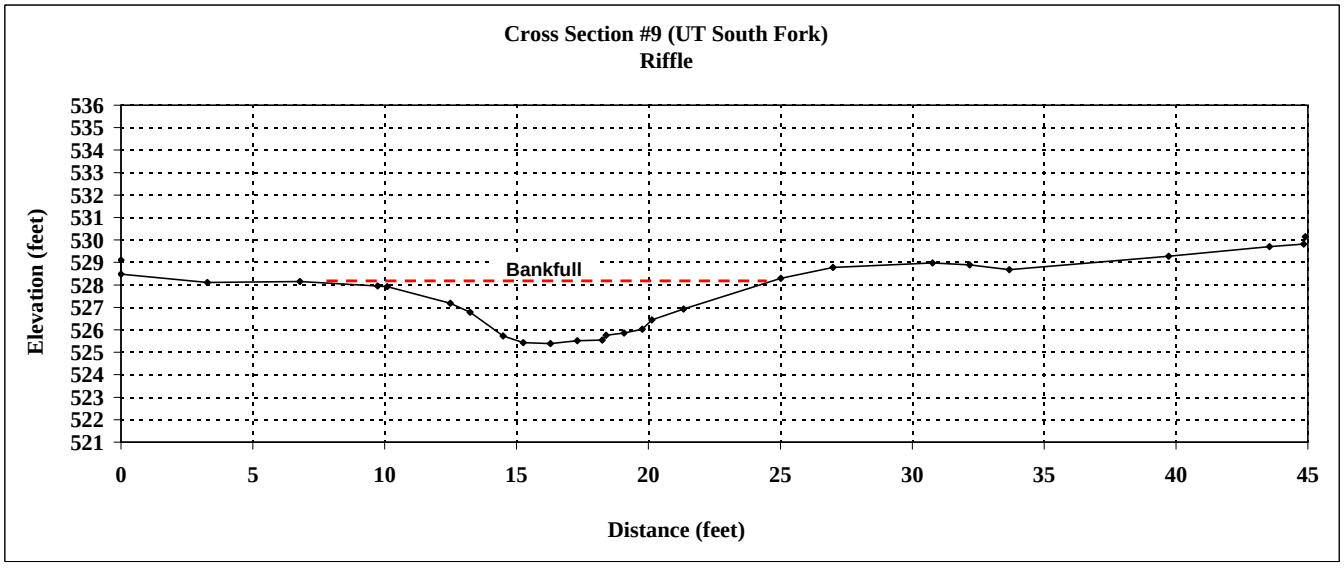
	Width (Feet)	Depth (Feet)	Perimeter (Feet)	Area (Sq. Ft.)
	0.00	0.00	0.00	0.00
	2.03	0.14	2.03	0.14
	0.37	0.17	0.37	0.06
	2.38	0.91	2.49	1.29
	0.75	1.31	0.85	0.83
	1.25	2.37	1.64	2.30
	0.76	2.66	0.82	1.92
	1.03	2.70	1.03	2.78
	1.03	2.58	1.03	2.71
	0.94	2.55	0.95	2.43
	0.14	2.34	0.25	0.35
	0.69	2.23	0.70	1.57
	0.69	2.07	0.70	1.47
	0.37	1.65	0.56	0.68
	1.20	1.17	1.29	1.69
	3.07	0.00	3.29	1.80
TOTALS	16.70		18.00	22.01

SUMMARY DATA (BANKFULL)

A(BKF)	22.01	W(FPA)	45+
W(BKF)	16.70	WP	18.00
Max d	2.70	Hydraulic Radius	1.22
Mean d	1.32	Wetted Perimeter=	WP
W/D	12.67	Area=	A
Bank Height	2.76	Width=	W
Entrenchment	2.7+	Depth=	D
Stream Type	C	Bankfull=	BKF
Area from Rural Regional Curve			22.7

Bankfull datum* = 528.09

*Datum reset during Monitoring Year 2.



Field Crew:	IPJ and PDB
Stream Reach:	3
Drainage Area:	1.05
Date:	Mar-07
Monitoring Year	3

STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	528.60	
0.01	528.07	
5.76	527.45	
9.89	527.37	
17.47	527.24	
18.69	527.05	
20.21	526.60	
20.96	526.40	
25.27	525.33	
27.37	524.59	
27.94	523.98	LEW
28.59	523.59	
29.76	523.20	
30.73	523.08	Thalweg
31.82	523.25	
32.23	523.70	
32.62	523.36	
33.46	523.49	
33.69	524.08	REW
33.83	524.25	
34.11	524.39	
34.23	524.87	
36.17	525.41	
38.10	526.44	
38.97	526.60	TOB
39.97	526.64	
47.51	526.56	
49.79	526.91	
49.82	527.27	

Bankfull Hydraulic Geometry

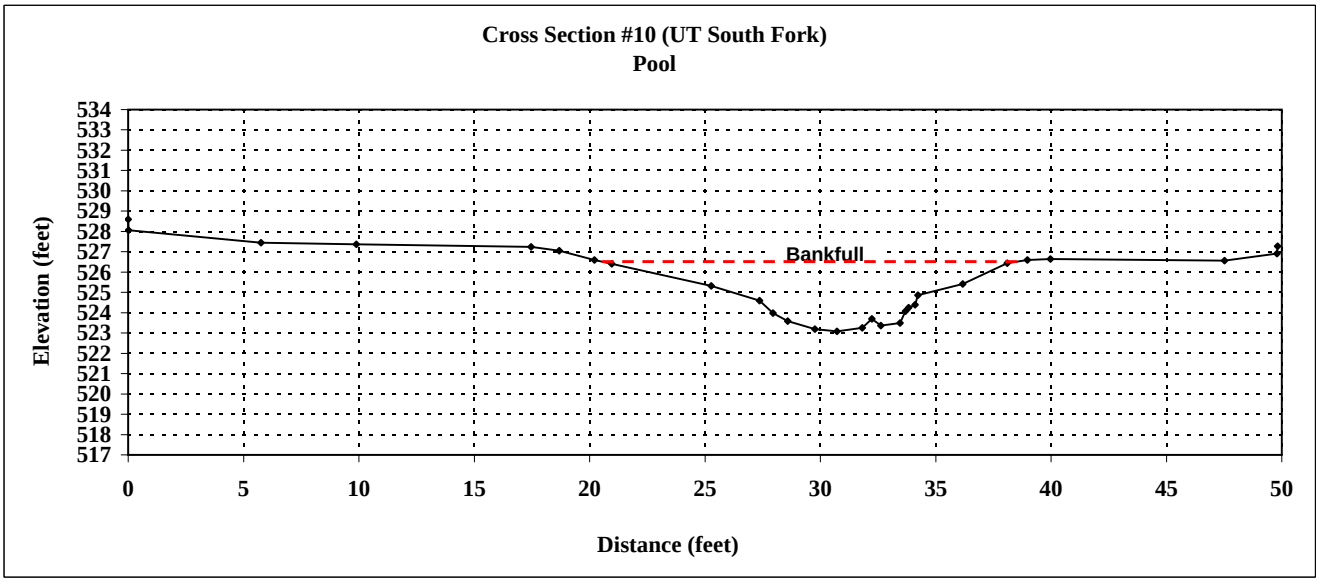
	Width (Feet)	Depth (Feet)	Perimeter (Feet)	Area (Sq. Ft.)
	0.00	0.00	0.00	0.00
	0.55	0.12	0.56	0.03
	4.31	1.19	4.44	2.82
	2.10	1.93	2.22	3.28
	0.58	2.54	0.84	1.29
	0.64	2.93	0.75	1.75
	1.17	3.32	1.24	3.66
	0.97	3.43	0.97	3.27
	1.09	3.27	1.11	3.67
	0.41	2.82	0.61	1.25
	0.39	3.16	0.52	1.17
	0.84	3.03	0.85	2.59
	0.23	2.44	0.63	0.62
	0.14	2.27	0.22	0.34
	0.28	2.12	0.32	0.62
	0.12	1.65	0.49	0.23
	1.94	1.11	2.02	2.68
	1.92	0.08	2.18	1.14
	0.50	0.00	0.51	0.02
TOTALS	18.19		20.47	30.44

SUMMARY DATA

A(BKF)	30.44
W(BKF)	18.19
Max d	3.43
Mean d	1.67
Wet. P	20.47
Hyd. R	1.49

Bankfull datum* = 526.52

*Datum reset during Monitoring Year 2.



Field Crew:	IPJ and PDB
Stream Reach:	3
Drainage Area:	1.05
Date:	Mar-07
Monitoring Year	3

STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	527.37	
0.12	526.81	
1.04	526.47	
10.06	525.98	
16.45	525.78	
18.16	525.65	
19.92	525.60	TOB
21.75	525.15	
23.06	524.74	
23.41	524.34	
25.33	523.67	
25.42	523.44	LEW
25.56	522.59	
26.91	521.96	
28.43	521.50	
29.27	521.42	Thalweg
29.73	521.67	
30.31	521.36	
31.54	521.87	
32.32	523.32	REW
32.67	523.54	
32.99	523.68	
33.70	524.04	
33.79	524.35	
34.65	524.65	BKF
36.13	525.94	
41.83	526.17	
45.80	526.11	
49.91	527.00	
49.94	527.32	

Bankfull/Top of Bank Hydraulic Geometry

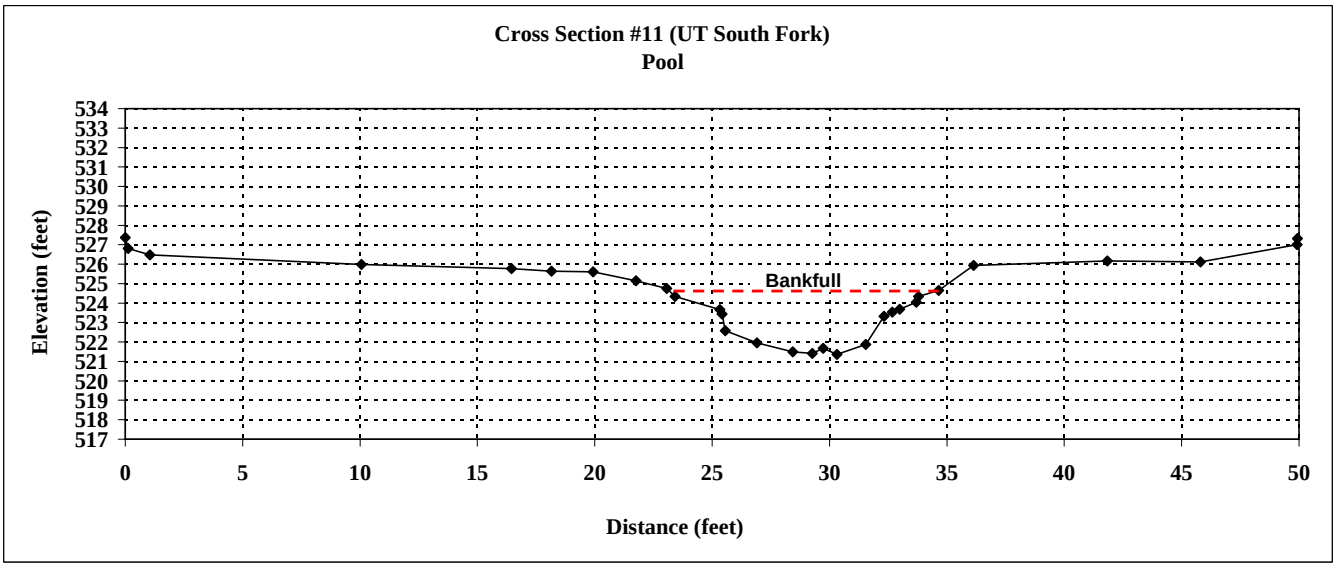
	Width (Feet)	Depth (Feet)	Perimeter (Feet)	Area (Sq. Ft.)
	0.00	0.00	0.00	0.00
	0.21	0.28	0.35	0.03
	1.91	0.94	2.03	1.16
	0.09	1.18	0.25	0.10
	0.14	2.03	0.86	0.23
	1.35	2.66	1.49	3.17
	1.52	3.12	1.59	4.39
	0.84	3.20	0.84	2.64
	0.46	2.94	0.53	1.43
	0.58	3.25	0.65	1.79
	1.23	2.74	1.33	3.68
	0.78	1.29	1.64	1.56
	0.35	1.07	0.42	0.42
	0.32	0.93	0.35	0.32
	0.71	0.57	0.80	0.54
	0.09	0.27	0.32	0.04
	0.81	0.00	0.85	0.11
TOTALS	11.40		14.30	21.61

SUMMARY DATA

A(BKF)	21.61
W(BKF)	11.40
Max d	3.25
Mean d	1.90
Wet. P	14.30
Hyd. R	1.51

Bankfull datum* = 524.62

*Datum reset during Monitoring Year 2.



Field Crew:	IPJ and PDB
Stream Reach:	3
Drainage Area:	1.05
Date:	Mar-07
Monitoring Year	3

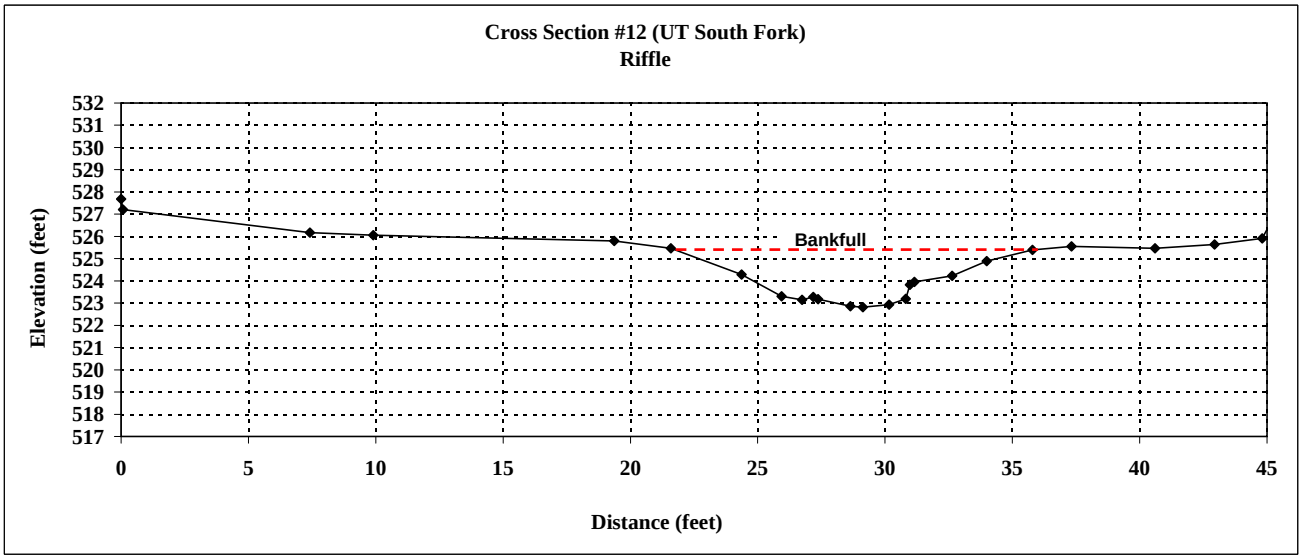
STATION (Feet)	ELEVATION (Feet)	NOTES
0.00	527.68	
0.08	527.20	
7.42	526.18	
9.90	526.06	
19.36	525.79	
21.59	525.46	
24.37	524.28	
25.93	523.30	
26.74	523.15	EW
27.19	523.27	Dry
27.37	523.17	EW
28.64	522.85	
29.13	522.81	Thalweg
30.16	522.94	
30.81	523.19	REW
30.98	523.83	
31.15	523.95	
32.63	524.23	
33.99	524.88	
35.78	525.39	BKF
37.32	525.55	TOB
40.60	525.46	
42.94	525.63	
44.82	525.90	
45.01	526.34	

	Bankfull Hydraulic Geometry			
	Width (Feet)	Depth (Feet)	Perimeter (Feet)	Area (Sq. Ft.)
	0.00	0.00	0.00	0.00
	2.72	1.14	2.95	1.55
	1.56	2.12	1.84	2.54
	0.80	2.27	0.82	1.76
	0.45	2.15	0.46	0.99
	0.18	2.25	0.21	0.41
	1.27	2.57	1.31	3.06
	0.49	2.61	0.50	1.28
	1.02	2.48	1.03	2.60
	0.65	2.23	0.70	1.54
	0.17	1.59	0.66	0.32
	0.17	1.47	0.21	0.26
	1.48	1.19	1.51	1.97
	1.36	0.54	1.51	1.18
	1.79	0.03	1.86	0.51
	0.27	0.00	0.27	0.00
TOTALS	14.40		15.84	19.98

SUMMARY DATA (BANKFULL)			
A(BKF)	19.98	W(FPA)	45+
W(BKF)	14.40	WP	15.84
Max d	2.61	Hydraulic Radius	1.26
Mean d	1.39	Wetted Perimeter=	WP
W/D	10.38	Area=	A
Bank Height	2.73	Width=	W
Entrenchment	2.9+	Depth=	D
Stream Type	C	Bankfull=	BKF
Area from Rural Regional Curve			22.7

Bankfull datum* = 525.42

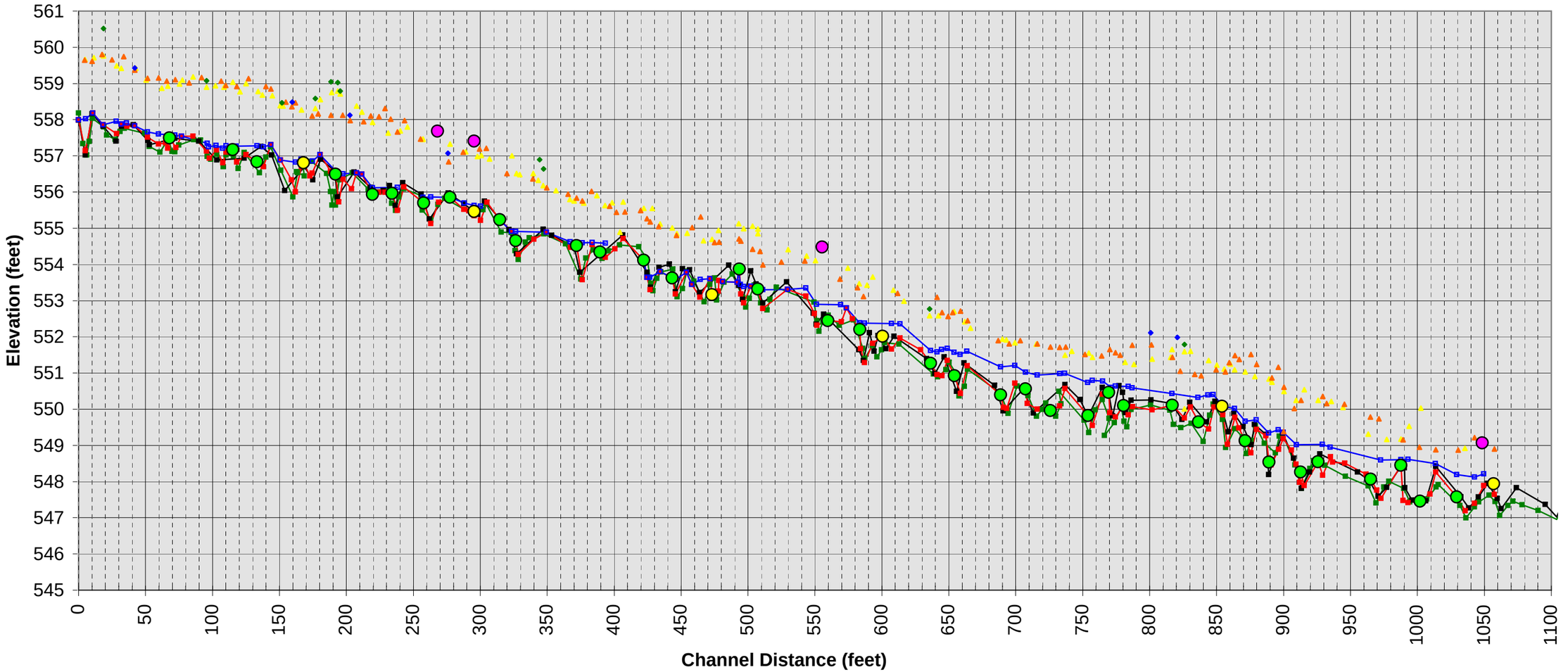
*Datum reset during Monitoring Year 2.



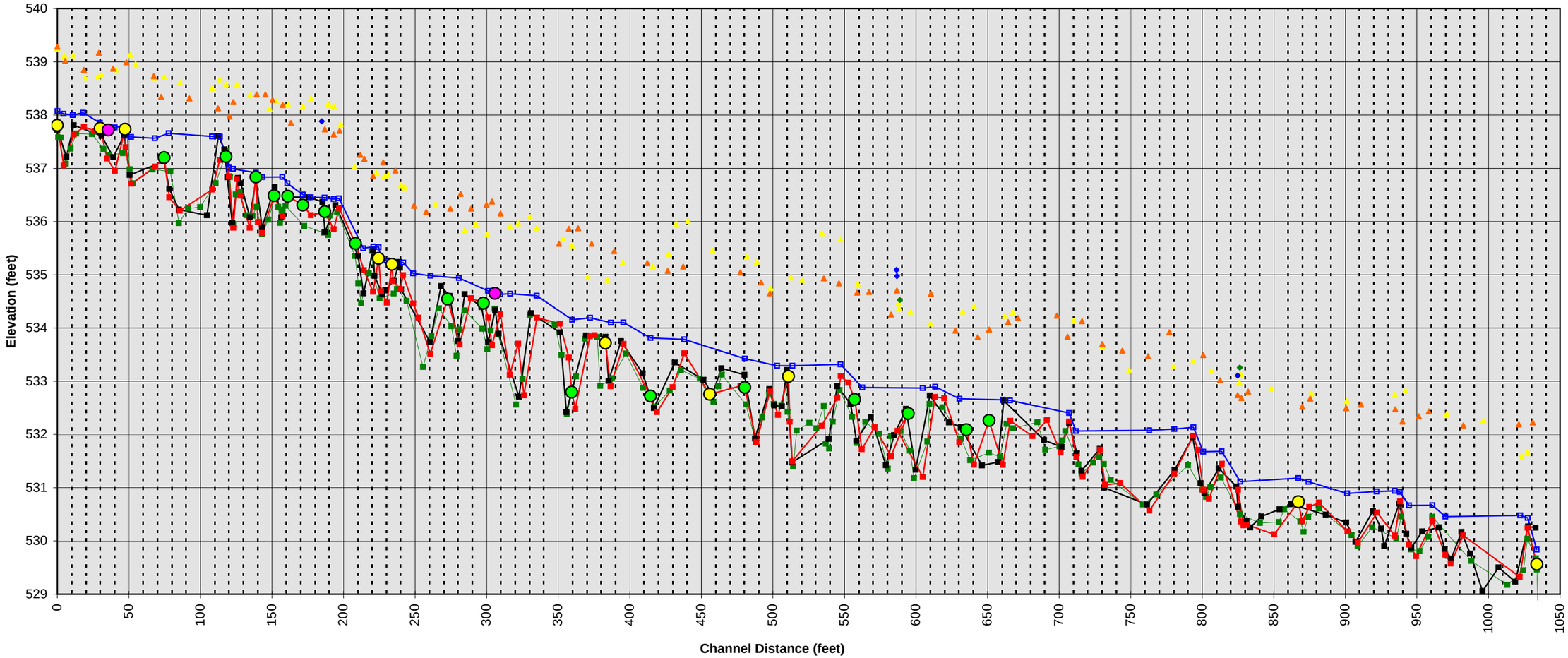
APPENDIX B5

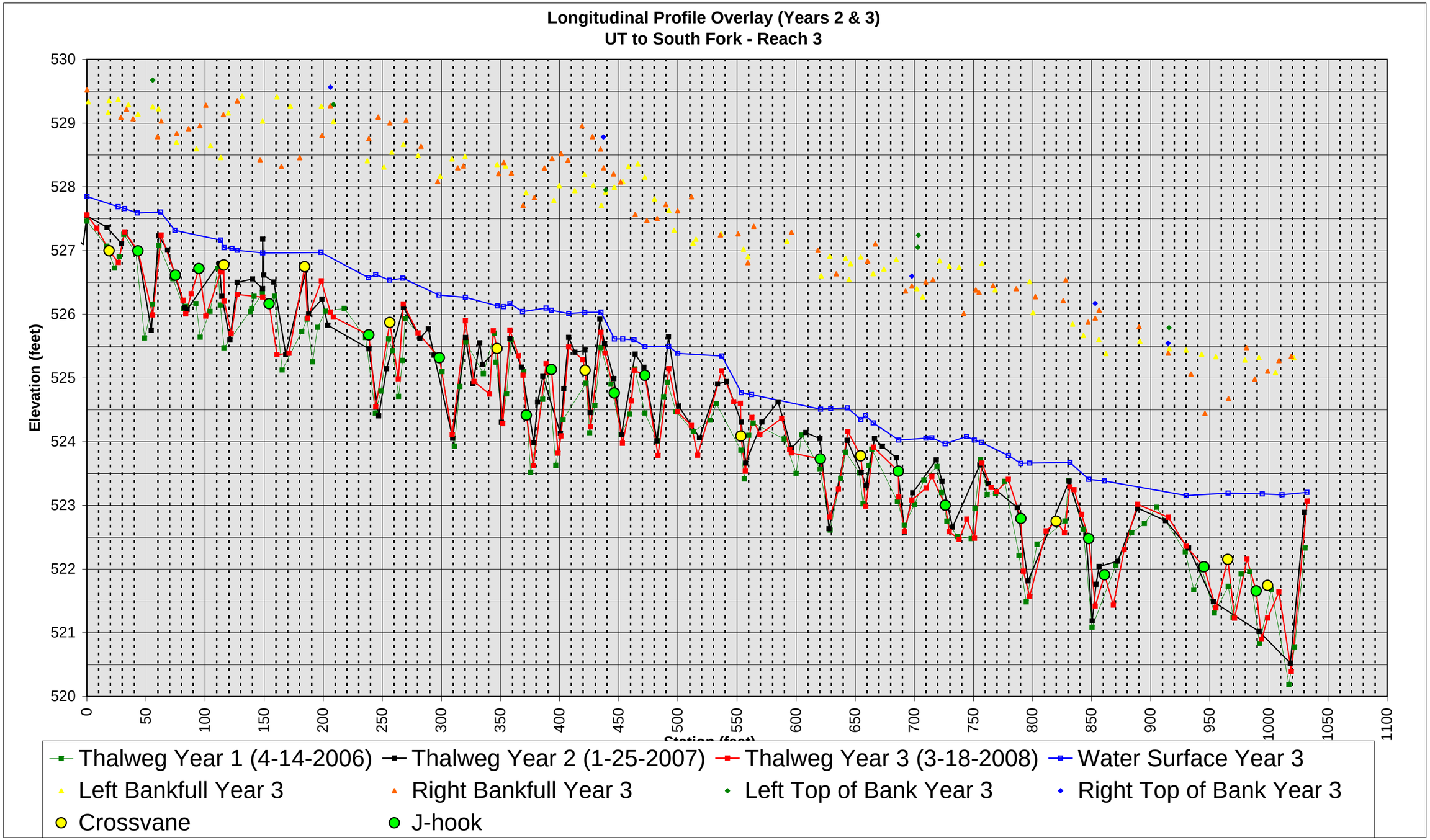
STREAM LONGITUDINAL PROFILE

Longitudinal Profile Overlay (Years 2 & 3)
UT to South Fork - Reach 1



Longitudinal Profile Overlay (Years 2 & 3)
UT to South Fork - Reach 2




Longitudinal Profile Overlay (Years 2 & 3)
UT to South Fork - Reach 3
Elevation (feet)
530
529
528
527
526
525
524
523
522
521
520
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
1050
1100
Thalweg Year 1 (4-14-2006)
Thalweg Year 2 (1-25-2007)
Thalweg Year 3 (3-18-2008)
Water Surface Year 3
Left Bankfull Year 3
Right Bankfull Year 3
Left Top of Bank Year 3
Right Top of Bank Year 3
Crossvane
J-hook

PEBBLE COUNT

Site: UT South Fork

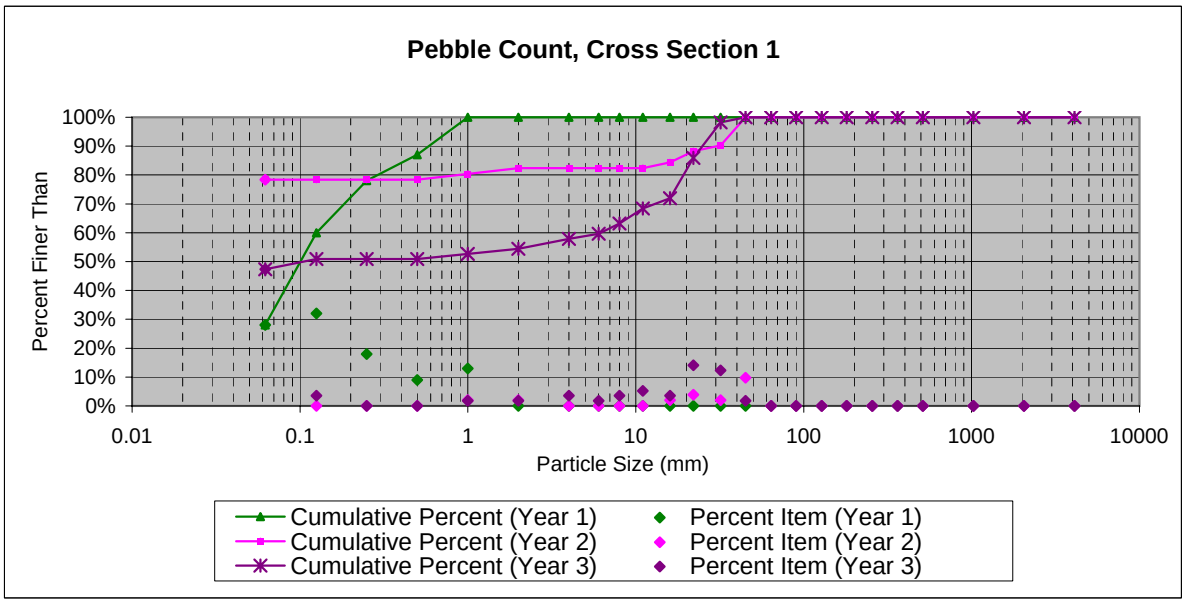
Party: IPJ & PDB

Date: 10/22/08

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 1	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	27	27	47%	47%
	Very Fine	.062-.125	SAND	2	2	4%	51%
	Fine	.125-.25			0	0%	51%
	Medium	.25-.50			0	0%	51%
	Coarse	.50-1.0		1	1	2%	53%
.04-.08	Very Coarse	1.0-2		1	1	2%	54%
.08-.16	Very Fine	2.0-4.0	GRAVEL	2	2	4%	58%
.16-.22	Fine	4-5.7		1	1	2%	60%
.22-.31	Fine	5.7-8		2	2	4%	63%
.31-.44	Medium	8-11.3		3	3	5%	68%
.44-.63	Medium	11.3-16		2	2	4%	72%
.63-.89	Coarse	16-22.6		8	8	14%	86%
.89-1.26	Coarse	22.6-32		7	7	12%	98%
1.26-1.77	Very Coarse	32-45		1	1	2%	100%
1.77-2.5	Very Coarse	45-64			0	0%	100%
2.5-3.5	Small	64-90	COBBLE		0	0%	100%
3.5-5.0	Small	90-128			0	0%	100%
5.0-7.1	Large	128-180			0	0%	100%
7.1-10.1	Large	180-256			0	0%	100%
10.1-14.3	Small	256-362	BOULDER		0	0%	100%
14.3-20	Small	362-512			0	0%	100%
20-40	Medium	512-1024			0	0%	100%
40-80	Large	1024-2048			0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	57	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

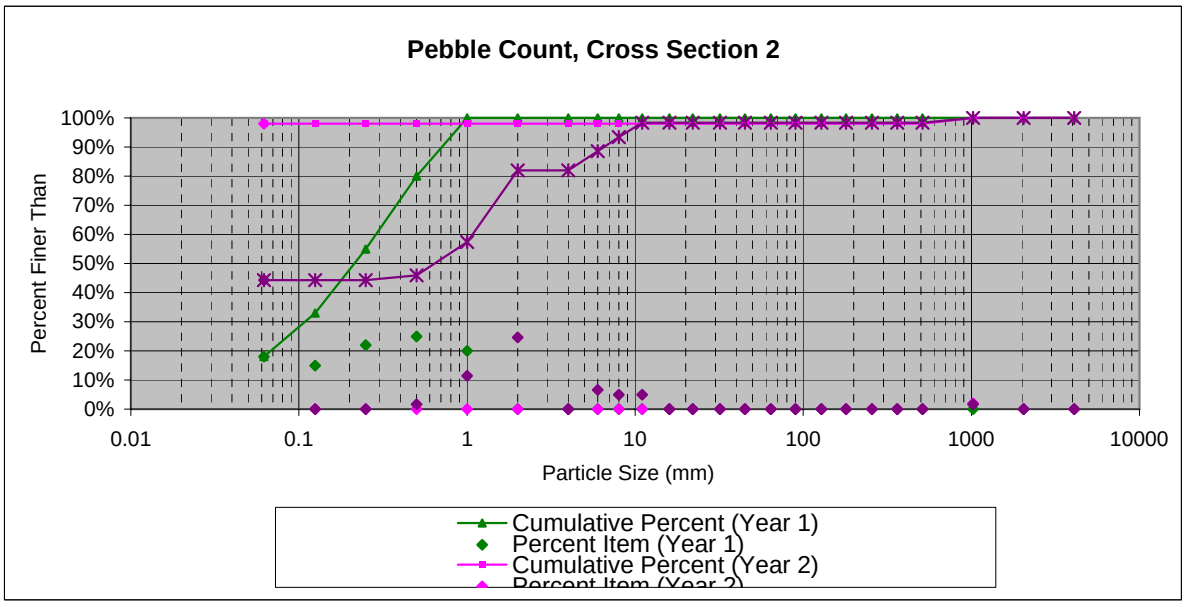
Party: IPJ & PDB

Date: 10/22/08

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 2	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	27	27	44%	44%
	Very Fine	.062-.125	SAND		0	0%	44%
	Fine	.125-.25	SAND		0	0%	44%
	Medium	.25-.50	SAND	1	1	2%	46%
	Coarse	.50-1.0	SAND	7	7	11%	57%
.04-.08	Very Coarse	1.0-2	SAND	15	15	25%	82%
.08-.16	Very Fine	2.0-4.0	GRAVEL		0	0%	82%
.16-.22	Fine	4-5.7	GRAVEL	4	4	7%	89%
.22-.31	Fine	5.7-8	GRAVEL	3	3	5%	93%
.31-.44	Medium	8-11.3	GRAVEL	3	3	5%	98%
.44-.63	Medium	11.3-16	GRAVEL		0	0%	98%
.63-.89	Coarse	16-22.6	GRAVEL		0	0%	98%
.89-1.26	Coarse	22.6-32	GRAVEL		0	0%	98%
1.26-1.77	Very Coarse	32-45	GRAVEL		0	0%	98%
1.77-2.5	Very Coarse	45-64	GRAVEL		0	0%	98%
2.5-3.5	Small	64-90	COBBLE		0	0%	98%
3.5-5.0	Small	90-128	COBBLE		0	0%	98%
5.0-7.1	Large	128-180	COBBLE		0	0%	98%
7.1-10.1	Large	180-256	COBBLE		0	0%	98%
10.1-14.3	Small	256-362	BOULDER		0	0%	98%
14.3-20	Small	362-512	BOULDER		0	0%	98%
20-40	Medium	512-1024	BOULDER	1	1	2%	100%
40-80	Large	1024-2048	BOULDER		0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	61	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

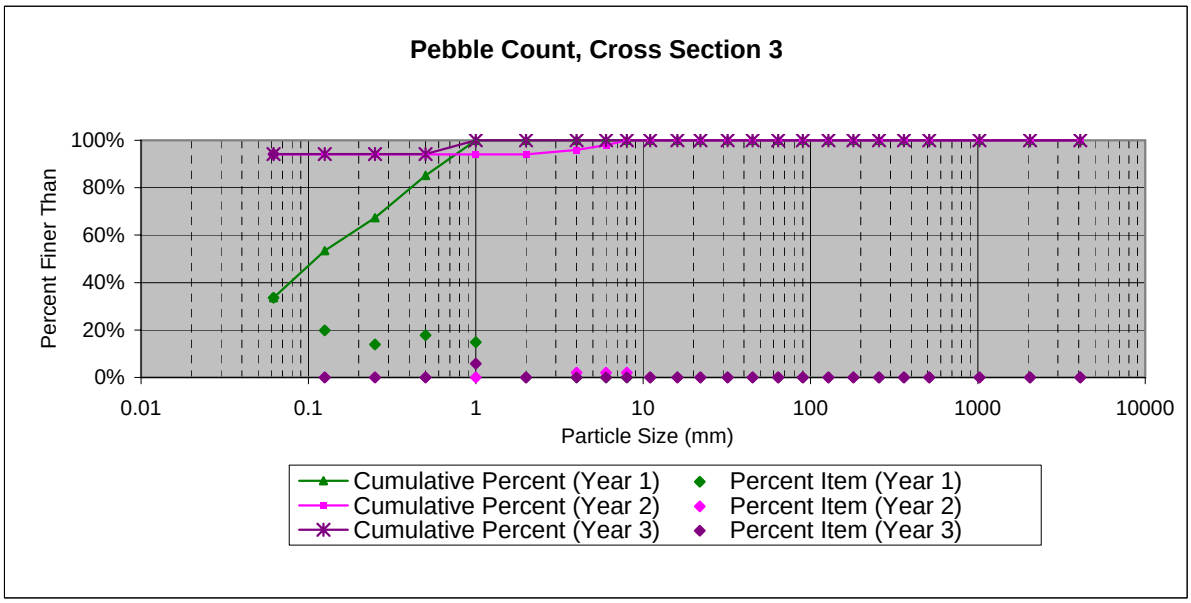
Party: IPJ & PDB

Date: 10/22/08

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 3	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	49	49	94%	94%
	Very Fine	.062-.125	SAND		0	0%	94%
	Fine	.125-.25	SAND		0	0%	94%
	Medium	.25-.50	SAND		0	0%	94%
	Coarse	.50-1.0	SAND	3	3	6%	100%
.04-.08	Very Coarse	1.0-2	SAND		0	0%	100%
.08-.16	Very Fine	2.0-4.0	GRAVEL		0	0%	100%
.16-.22	Fine	4-5.7	GRAVEL		0	0%	100%
.22-.31	Fine	5.7-8	GRAVEL		0	0%	100%
.31-.44	Medium	8-11.3	GRAVEL		0	0%	100%
.44-.63	Medium	11.3-16	GRAVEL		0	0%	100%
.63-.89	Coarse	16-22.6	GRAVEL		0	0%	100%
.89-1.26	Coarse	22.6-32	GRAVEL		0	0%	100%
1.26-1.77	Very Coarse	32-45	GRAVEL		0	0%	100%
1.77-2.5	Very Coarse	45-64	GRAVEL		0	0%	100%
2.5-3.5	Small	64-90	COBBLE		0	0%	100%
3.5-5.0	Small	90-128	COBBLE		0	0%	100%
5.0-7.1	Large	128-180	COBBLE		0	0%	100%
7.1-10.1	Large	180-256	COBBLE		0	0%	100%
10.1-14.3	Small	256-362	BOULDER		0	0%	100%
14.3-20	Small	362-512	BOULDER		0	0%	100%
20-40	Medium	512-1024	BOULDER		0	0%	100%
40-80	Large	1024-2048	BOULDER		0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	52	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

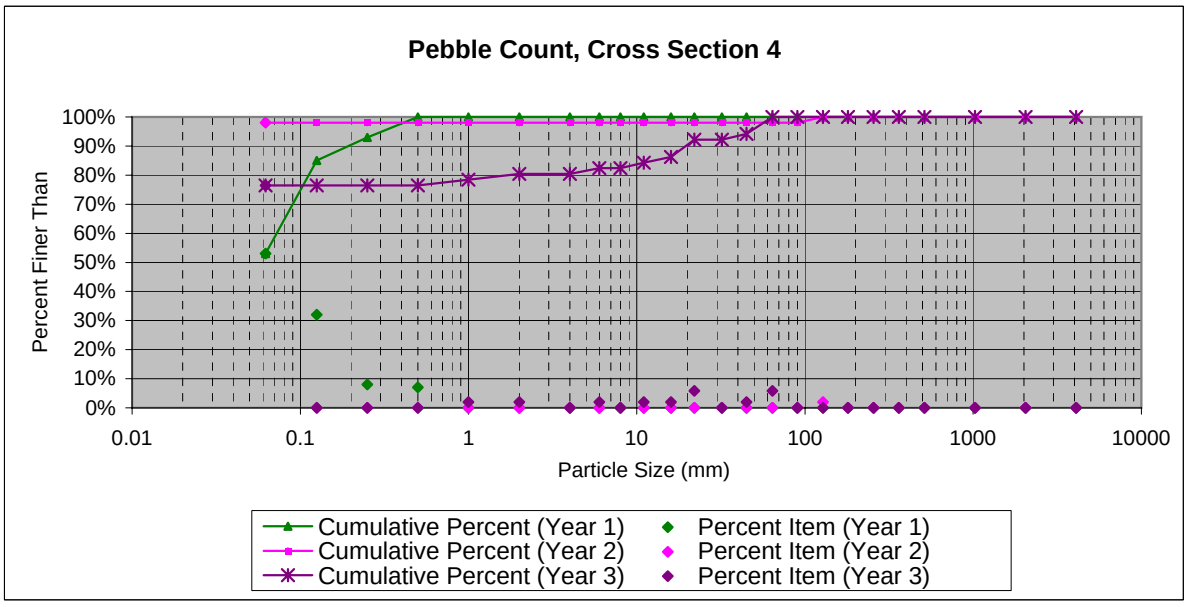
Party: IPJ & PDB

Date: 10/22/08

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 4	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	39	39	76%	76%
	Very Fine	.062-.125	SAND		0	0%	76%
	Fine	.125-.25			0	0%	76%
	Medium	.25-.50			0	0%	76%
	Coarse	.50-1.0		1	1	2%	78%
.04-.08	Very Coarse	1.0-2		1	1	2%	80%
.08-.16	Very Fine	2.0-4.0	GRAVEL		0	0%	80%
.16-.22	Fine	4-5.7		1	1	2%	82%
.22-.31	Fine	5.7-8			0	0%	82%
.31-.44	Medium	8-11.3		1	1	2%	84%
.44-.63	Medium	11.3-16		1	1	2%	86%
.63-.89	Coarse	16-22.6		3	3	6%	92%
.89-1.26	Coarse	22.6-32			0	0%	92%
1.26-1.77	Very Coarse	32-45		1	1	2%	94%
1.77-2.5	Very Coarse	45-64		3	3	6%	100%
2.5-3.5	Small	64-90	COBBLE		0	0%	100%
3.5-5.0	Small	90-128			0	0%	100%
5.0-7.1	Large	128-180			0	0%	100%
7.1-10.1	Large	180-256			0	0%	100%
10.1-14.3	Small	256-362	BOULDER		0	0%	100%
14.3-20	Small	362-512			0	0%	100%
20-40	Medium	512-1024			0	0%	100%
40-80	Large	1024-2048			0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	51	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

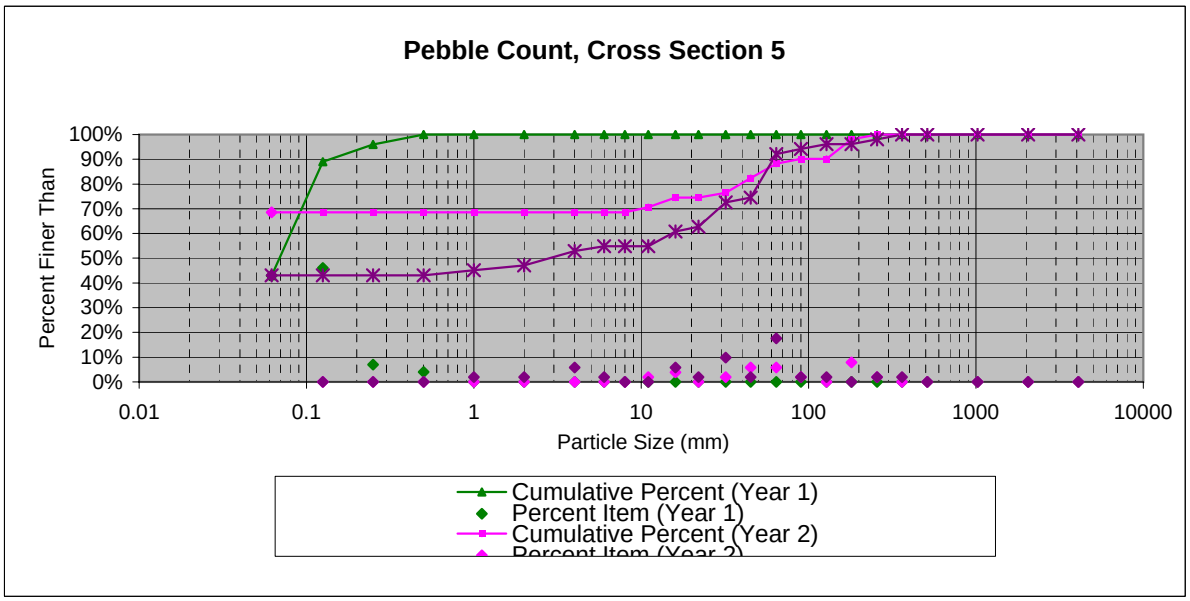
Party: IPJ & PDB

Date: 10/22/08

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 5	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	22	22	43%	43%
	Very Fine	.062-.125	SAND		0	0%	43%
	Fine	.125-.25	SAND		0	0%	43%
	Medium	.25-.50	SAND		0	0%	43%
	Coarse	.50-1.0	SAND	1	1	2%	45%
.04-.08	Very Coarse	1.0-2	SAND	1	1	2%	47%
.08-.16	Very Fine	2.0-4.0	GRAVEL	3	3	6%	53%
.16-.22	Fine	4-5.7	GRAVEL	1	1	2%	55%
.22-.31	Fine	5.7-8	GRAVEL		0	0%	55%
.31-.44	Medium	8-11.3	GRAVEL		0	0%	55%
.44-.63	Medium	11.3-16	GRAVEL	3	3	6%	61%
.63-.89	Coarse	16-22.6	GRAVEL	1	1	2%	63%
.89-1.26	Coarse	22.6-32	GRAVEL	5	5	10%	73%
1.26-1.77	Very Coarse	32-45	GRAVEL	1	1	2%	75%
1.77-2.5	Very Coarse	45-64	GRAVEL	9	9	18%	92%
2.5-3.5	Small	64-90	COBBLE	1	1	2%	94%
3.5-5.0	Small	90-128	COBBLE	1	1	2%	96%
5.0-7.1	Large	128-180	COBBLE		0	0%	96%
7.1-10.1	Large	180-256	COBBLE	1	1	2%	98%
10.1-14.3	Small	256-362	BOULDER	1	1	2%	100%
14.3-20	Small	362-512	BOULDER		0	0%	100%
20-40	Medium	512-1024	BOULDER		0	0%	100%
40-80	Large	1024-2048	BOULDER		0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	51	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

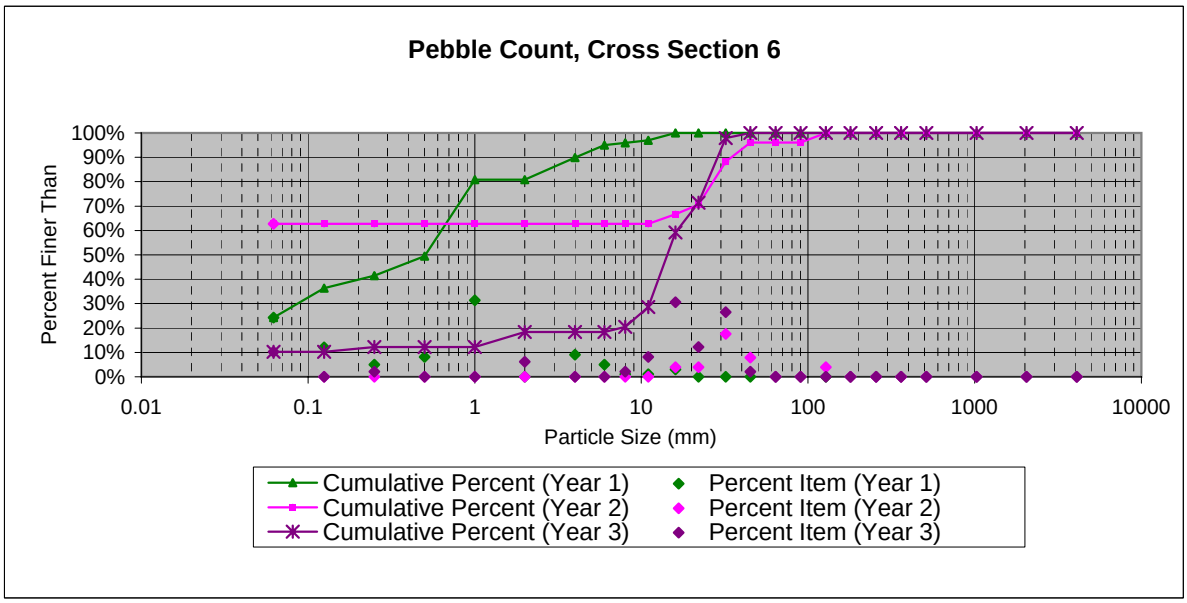
Party: IPJ & PDB

Date: 10/22/08

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 6	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	5	5	10%	10%
	Very Fine	.062-.125	SAND		0	0%	10%
	Fine	.125-.25	SAND	1	1	2%	12%
	Medium	.25-.50	SAND		0	0%	12%
	Coarse	.50-1.0	SAND		0	0%	12%
.04-.08	Very Coarse	1.0-2	SAND	3	3	6%	18%
.08-.16	Very Fine	2.0-4.0	GRAVEL		0	0%	18%
.16-.22	Fine	4-5.7	GRAVEL		0	0%	18%
.22-.31	Fine	5.7-8	GRAVEL	1	1	2%	20%
.31-.44	Medium	8-11.3	GRAVEL	4	4	8%	29%
.44-.63	Medium	11.3-16	GRAVEL	15	15	31%	59%
.63-.89	Coarse	16-22.6	GRAVEL	6	6	12%	71%
.89-1.26	Coarse	22.6-32	GRAVEL	13	13	27%	98%
1.26-1.77	Very Coarse	32-45	GRAVEL	1	1	2%	100%
1.77-2.5	Very Coarse	45-64	GRAVEL		0	0%	100%
2.5-3.5	Small	64-90	COBBLE		0	0%	100%
3.5-5.0	Small	90-128	COBBLE		0	0%	100%
5.0-7.1	Large	128-180	COBBLE		0	0%	100%
7.1-10.1	Large	180-256	COBBLE		0	0%	100%
10.1-14.3	Small	256-362	BOULDER		0	0%	100%
14.3-20	Small	362-512	BOULDER		0	0%	100%
20-40	Medium	512-1024	BOULDER		0	0%	100%
40-80	Large	1024-2048	BOULDER		0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	49	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

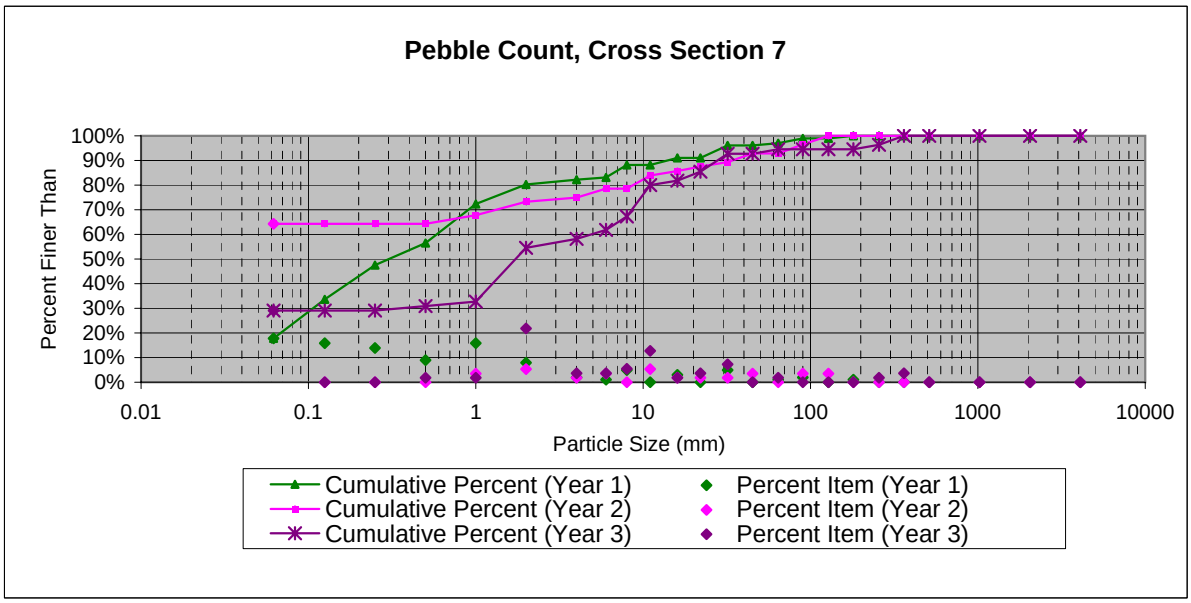
Party: IPJ & PDB

Date: 10/22/08

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 7	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	16	16	29%	29%
	Very Fine	.062-.125	SAND		0	0%	29%
	Fine	.125-.25	SAND		0	0%	29%
	Medium	.25-.50	SAND	1	1	2%	31%
	Coarse	.50-1.0	SAND	1	1	2%	33%
.04-.08	Very Coarse	1.0-2	SAND	12	12	22%	55%
.08-.16	Very Fine	2.0-4.0	GRAVEL	2	2	4%	58%
.16-.22	Fine	4-5.7	GRAVEL	2	2	4%	62%
.22-.31	Fine	5.7-8	GRAVEL	3	3	5%	67%
.31-.44	Medium	8-11.3	GRAVEL	7	7	13%	80%
.44-.63	Medium	11.3-16	GRAVEL	1	1	2%	82%
.63-.89	Coarse	16-22.6	GRAVEL	2	2	4%	85%
.89-1.26	Coarse	22.6-32	GRAVEL	4	4	7%	93%
1.26-1.77	Very Coarse	32-45	GRAVEL		0	0%	93%
1.77-2.5	Very Coarse	45-64	GRAVEL	1	1	2%	95%
2.5-3.5	Small	64-90	COBBLE		0	0%	95%
3.5-5.0	Small	90-128	COBBLE		0	0%	95%
5.0-7.1	Large	128-180	COBBLE		0	0%	95%
7.1-10.1	Large	180-256	COBBLE	1	1	2%	96%
10.1-14.3	Small	256-362	BOULDER	2	2	4%	100%
14.3-20	Small	362-512	BOULDER		0	0%	100%
20-40	Medium	512-1024	BOULDER		0	0%	100%
40-80	Large	1024-2048	BOULDER		0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	55	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

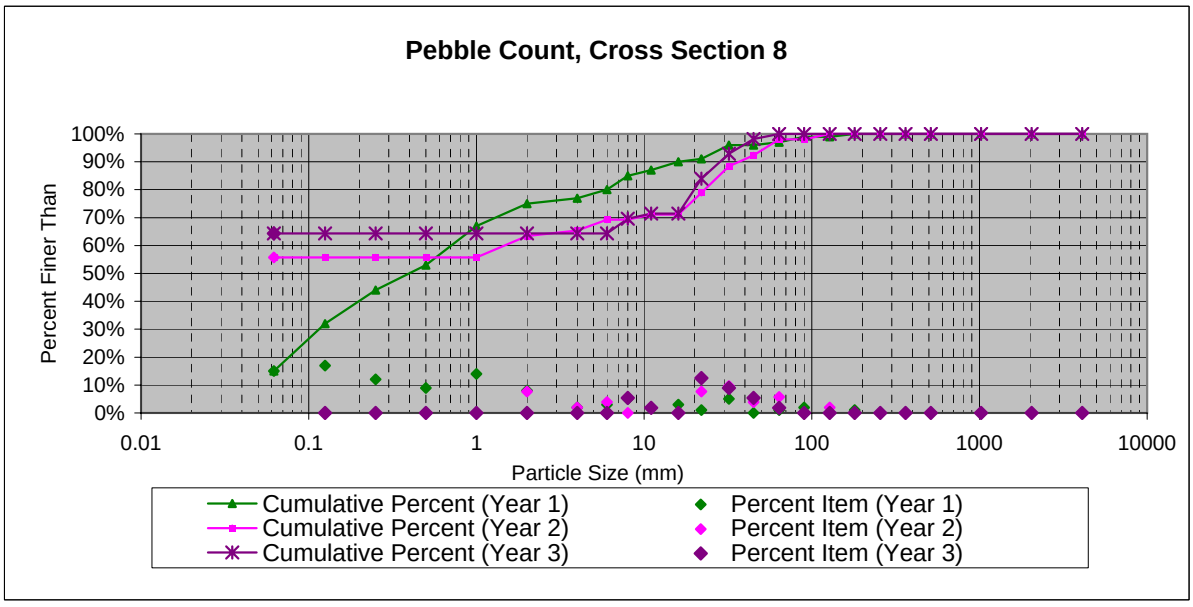
Party: IPJ & PDB

Date: 10/22/08

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 8	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	36	36	64%	64%
	Very Fine	.062-.125	SAND		0	0%	64%
	Fine	.125-.25			0	0%	64%
	Medium	.25-.50			0	0%	64%
	Coarse	.50-1.0			0	0%	64%
.04-.08	Very Coarse	1.0-2			0	0%	64%
.08-.16	Very Fine	2.0-4.0			0	0%	64%
.16-.22	Fine	4-5.7			0	0%	64%
.22-.31	Fine	5.7-8	GRAVEL	3	3	5%	70%
.31-.44	Medium	8-11.3		1	1	2%	71%
.44-.63	Medium	11.3-16			0	0%	71%
.63-.89	Coarse	16-22.6		7	7	13%	84%
.89-1.26	Coarse	22.6-32		5	5	9%	93%
1.26-1.77	Very Coarse	32-45		3	3	5%	98%
1.77-2.5	Very Coarse	45-64		1	1	2%	100%
2.5-3.5	Small	64-90	COBBLE		0	0%	100%
3.5-5.0	Small	90-128			0	0%	100%
5.0-7.1	Large	128-180			0	0%	100%
7.1-10.1	Large	180-256			0	0%	100%
10.1-14.3	Small	256-362	BOULDER		0	0%	100%
14.3-20	Small	362-512			0	0%	100%
20-40	Medium	512-1024			0	0%	100%
40-80	Large	1024-2048			0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	56	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

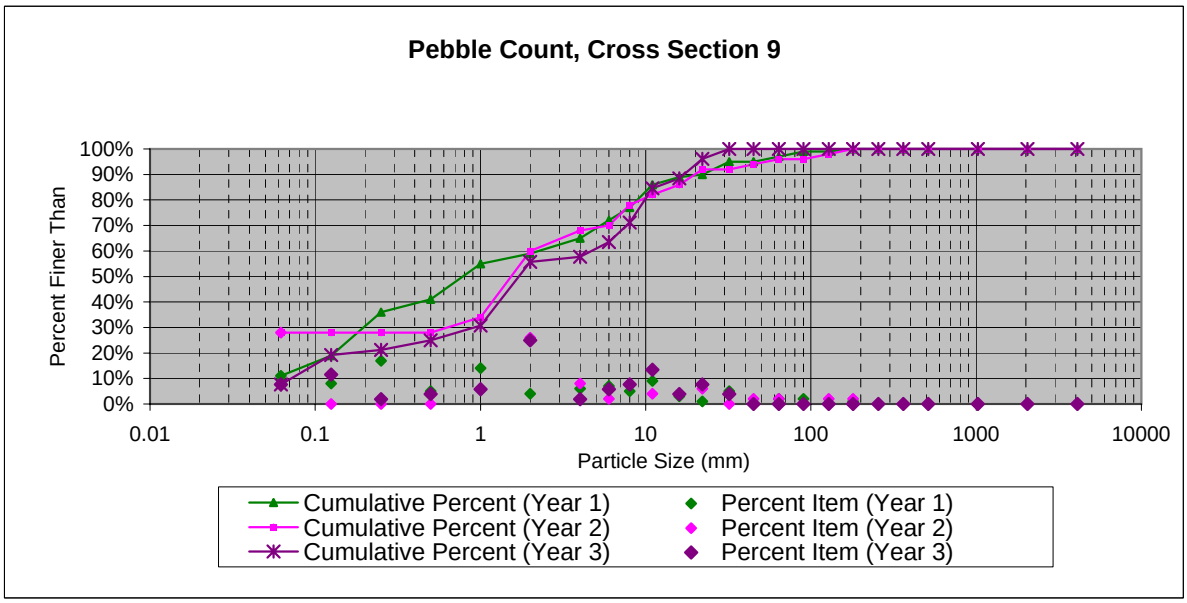
Party: IPJ & PDB

Date: 10/22/08

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 9	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	4	4	8%	8%
	Very Fine	.062-.125	SAND	6	6	12%	19%
	Fine	.125-.25		1	1	2%	21%
	Medium	.25-.50		2	2	4%	25%
	Coarse	.50-1.0		3	3	6%	31%
.04-.08	Very Coarse	1.0-2		13	13	25%	56%
.08-.16	Very Fine	2.0-4.0	GRAVEL	1	1	2%	58%
.16-.22	Fine	4-5.7		3	3	6%	63%
.22-.31	Fine	5.7-8		4	4	8%	71%
.31-.44	Medium	8-11.3		7	7	13%	85%
.44-.63	Medium	11.3-16		2	2	4%	88%
.63-.89	Coarse	16-22.6		4	4	8%	96%
.89-1.26	Coarse	22.6-32		2	2	4%	100%
1.26-1.77	Very Coarse	32-45			0	0%	100%
1.77-2.5	Very Coarse	45-64			0	0%	100%
2.5-3.5	Small	64-90	COBBLE		0	0%	100%
3.5-5.0	Small	90-128			0	0%	100%
5.0-7.1	Large	128-180			0	0%	100%
7.1-10.1	Large	180-256			0	0%	100%
10.1-14.3	Small	256-362	BOULDER		0	0%	100%
14.3-20	Small	362-512			0	0%	100%
20-40	Medium	512-1024			0	0%	100%
40-80	Large	1024-2048			0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	52	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

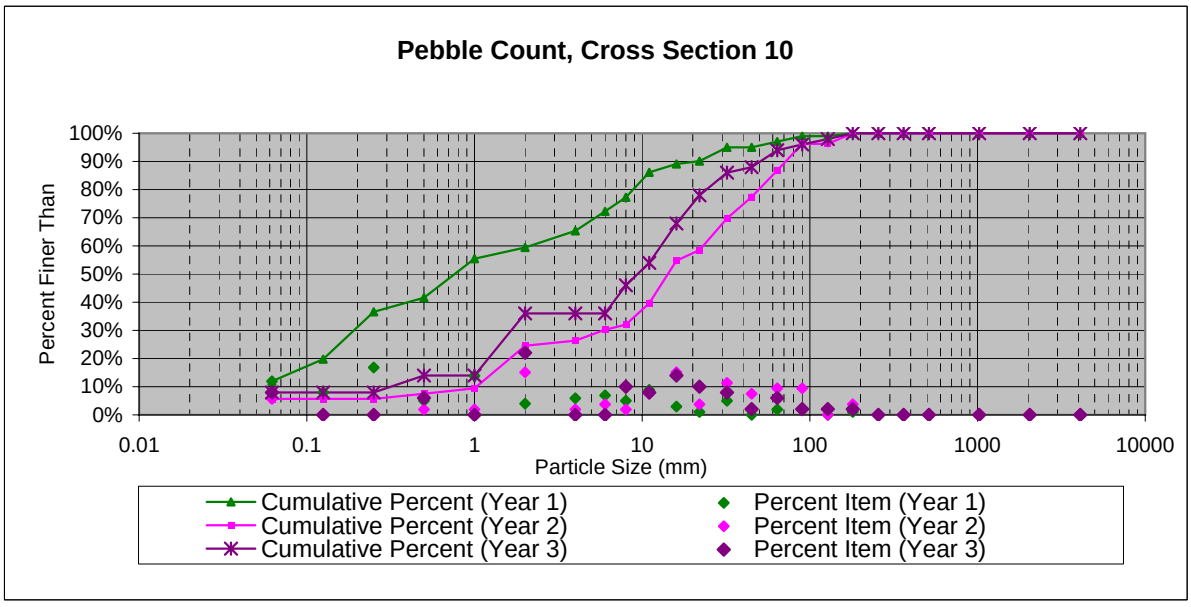
Party: IPJ & PDB

Date: 10/22/08

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 10	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	4	4	8%	8%
	Very Fine	.062-.125	SAND		0	0%	8%
	Fine	.125-.25	SAND		0	0%	8%
	Medium	.25-.50	SAND	3	3	6%	14%
	Coarse	.50-1.0	SAND		0	0%	14%
.04-.08	Very Coarse	1.0-2	SAND	11	11	22%	36%
.08-.16	Very Fine	2.0-4.0	GRAVEL		0	0%	36%
.16-.22	Fine	4-5.7	GRAVEL		0	0%	36%
.22-.31	Fine	5.7-8	GRAVEL	5	5	10%	46%
.31-.44	Medium	8-11.3	GRAVEL	4	4	8%	54%
.44-.63	Medium	11.3-16	GRAVEL	7	7	14%	68%
.63-.89	Coarse	16-22.6	GRAVEL	5	5	10%	78%
.89-1.26	Coarse	22.6-32	GRAVEL	4	4	8%	86%
1.26-1.77	Very Coarse	32-45	GRAVEL	1	1	2%	88%
1.77-2.5	Very Coarse	45-64	GRAVEL	3	3	6%	94%
2.5-3.5	Small	64-90	COBBLE	1	1	2%	96%
3.5-5.0	Small	90-128	COBBLE	1	1	2%	98%
5.0-7.1	Large	128-180	COBBLE	1	1	2%	100%
7.1-10.1	Large	180-256	COBBLE		0	0%	100%
10.1-14.3	Small	256-362	BOULDER		0	0%	100%
14.3-20	Small	362-512	BOULDER		0	0%	100%
20-40	Medium	512-1024	BOULDER		0	0%	100%
40-80	Large	1024-2048	BOULDER		0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	50	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

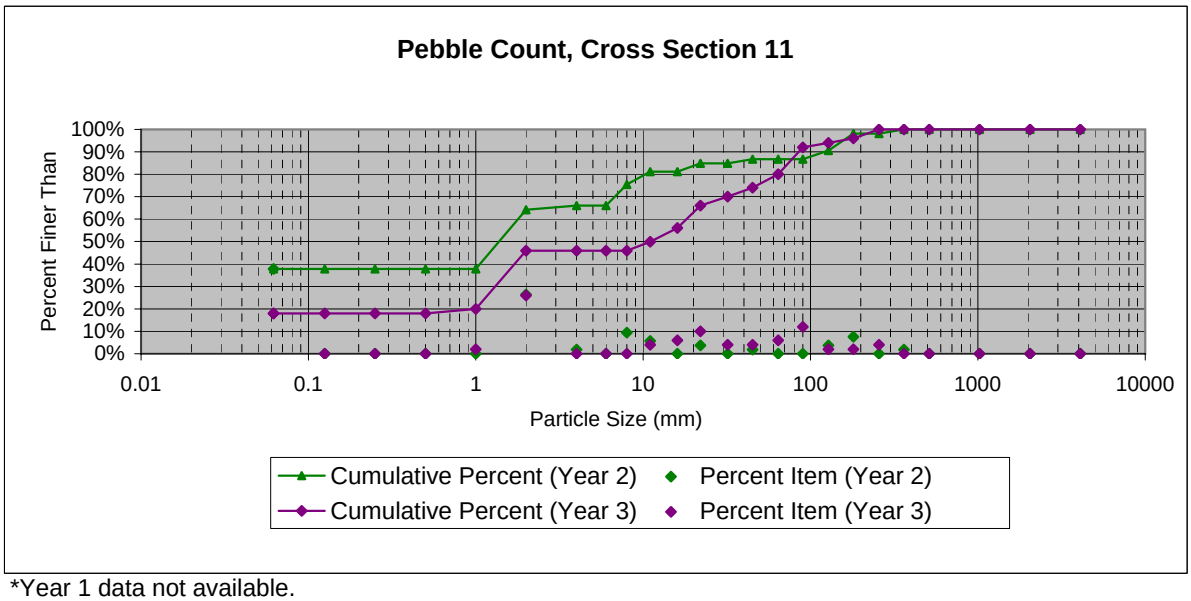
Party: IPJ & PDB

Date: 10/22/08

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 11	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	9	9	18%	18%
	Very Fine	.062-.125	SAND		0	0%	18%
	Fine	.125-.25	SAND		0	0%	18%
	Medium	.25-.50	SAND		0	0%	18%
	Coarse	.50-1.0	SAND	1	1	2%	20%
.04-.08	Very Coarse	1.0-2	SAND	13	13	26%	46%
.08-.16	Very Fine	2.0-4.0	GRAVEL		0	0%	46%
.16-.22	Fine	4-5.7	GRAVEL		0	0%	46%
.22-.31	Fine	5.7-8	GRAVEL		0	0%	46%
.31-.44	Medium	8-11.3	GRAVEL	2	2	4%	50%
.44-.63	Medium	11.3-16	GRAVEL	3	3	6%	56%
.63-.89	Coarse	16-22.6	GRAVEL	5	5	10%	66%
.89-1.26	Coarse	22.6-32	GRAVEL	2	2	4%	70%
1.26-1.77	Very Coarse	32-45	GRAVEL	2	2	4%	74%
1.77-2.5	Very Coarse	45-64	GRAVEL	3	3	6%	80%
2.5-3.5	Small	64-90	COBBLE	6	6	12%	92%
3.5-5.0	Small	90-128	COBBLE	1	1	2%	94%
5.0-7.1	Large	128-180	COBBLE	1	1	2%	96%
7.1-10.1	Large	180-256	COBBLE	2	2	4%	100%
10.1-14.3	Small	256-362	BOULDER		0	0%	100%
14.3-20	Small	362-512	BOULDER		0	0%	100%
20-40	Medium	512-1024	BOULDER		0	0%	100%
40-80	Large	1024-2048	BOULDER		0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	50	**100%**	**100%**



*Year 1 data not available.

PEBBLE COUNT

Site: UT South Fork

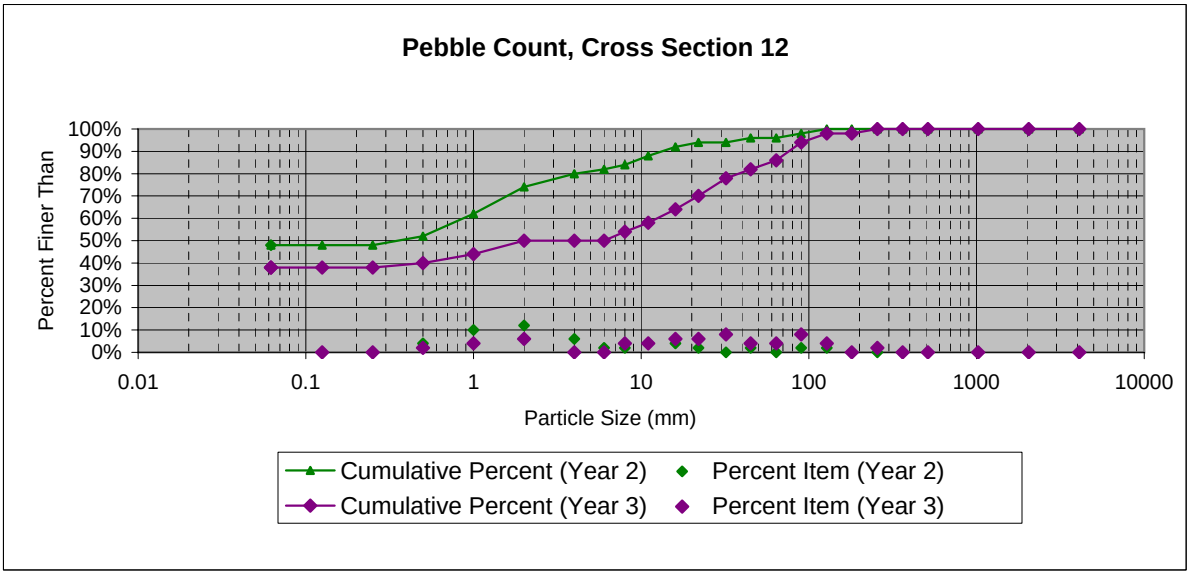
Party: IPJ & PDB

Date: 10/22/08

SEPI ENGINEERING GROUP

PARTICLE COUNT

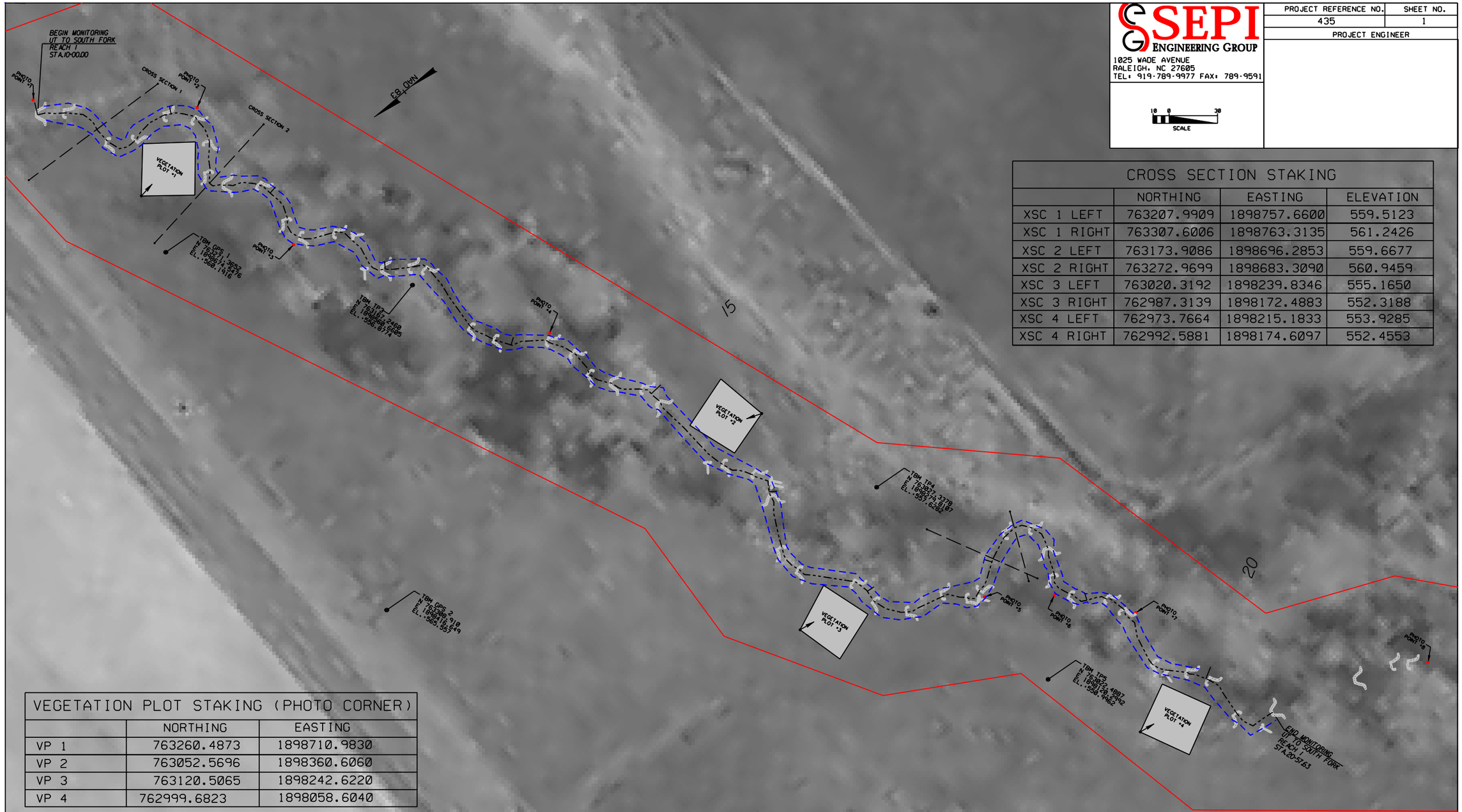
Inches	Particle	Millimeters		CS 12	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	19	19	38%	38%
	Very Fine	.062-.125	SAND		0	0%	38%
	Fine	.125-.25	SAND		0	0%	38%
	Medium	.25-.50	SAND	1	1	2%	40%
	Coarse	.50-1.0	SAND	2	2	4%	44%
.04-.08	Very Coarse	1.0-2	SAND	3	3	6%	50%
.08-.16	Very Fine	2.0-4.0	GRAVEL		0	0%	50%
.16-.22	Fine	4-5.7	GRAVEL		0	0%	50%
.22-.31	Fine	5.7-8	GRAVEL	2	2	4%	54%
.31-.44	Medium	8-11.3	GRAVEL	2	2	4%	58%
.44-.63	Medium	11.3-16	GRAVEL	3	3	6%	64%
.63-.89	Coarse	16-22.6	GRAVEL	3	3	6%	70%
.89-1.26	Coarse	22.6-32	GRAVEL	4	4	8%	78%
1.26-1.77	Very Coarse	32-45	GRAVEL	2	2	4%	82%
1.77-2.5	Very Coarse	45-64	GRAVEL	2	2	4%	86%
2.5-3.5	Small	64-90	COBBLE	4	4	8%	94%
3.5-5.0	Small	90-128	COBBLE	2	2	4%	98%
5.0-7.1	Large	128-180	COBBLE		0	0%	98%
7.1-10.1	Large	180-256	COBBLE	1	1	2%	100%
10.1-14.3	Small	256-362	BOULDER		0	0%	100%
14.3-20	Small	362-512	BOULDER		0	0%	100%
20-40	Medium	512-1024	BOULDER		0	0%	100%
40-80	Large	1024-2048	BOULDER		0	0%	100%
	Bedrock		**BDRK**		0	0%	100%
				TOTALS →	50	**100%**	**100%**



*Year 1 data not available.

APPENDIX C

PLAN VIEW SHEETS



SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

SCALE 10 0 30

PROJECT REFERENCE NO.	SHEET NO.
435	1
PROJECT ENGINEER	

CROSS SECTION STAKING

	NORTHING	EASTING	ELEVATION
XSC 1 LEFT	763207.9909	1898757.6600	559.5123
XSC 1 RIGHT	763307.6006	1898763.3135	561.2426
XSC 2 LEFT	763173.9086	1898696.2853	559.6677
XSC 2 RIGHT	763272.9699	1898683.3090	560.9459
XSC 3 LEFT	763020.3192	1898239.8346	555.1650
XSC 3 RIGHT	762987.3139	1898172.4883	552.3188
XSC 4 LEFT	762973.7664	1898215.1833	553.9285
XSC 4 RIGHT	762992.5881	1898174.6097	552.4553

VEGETATION PLOT STAKING (PHOTO CORNER)

	NORTHING	EASTING
VP 1	763260.4873	1898710.9830
VP 2	763052.5696	1898360.6060
VP 3	763120.5065	1898242.6220
VP 4	762999.6823	1898058.6040

LEGEND

STREAM FEATURES
- THALWEG 2008
- BANKFULL 2008

PROJECT ELEMENTS
- CONTROL POINT/BENCHMARK (TBM)
- VEGETATION PLOT WITH PHOTO CORNER (ARROW)
- CROSS-SECTIONS
- PHOTO POINT
- EASEMENT BOUNDARY

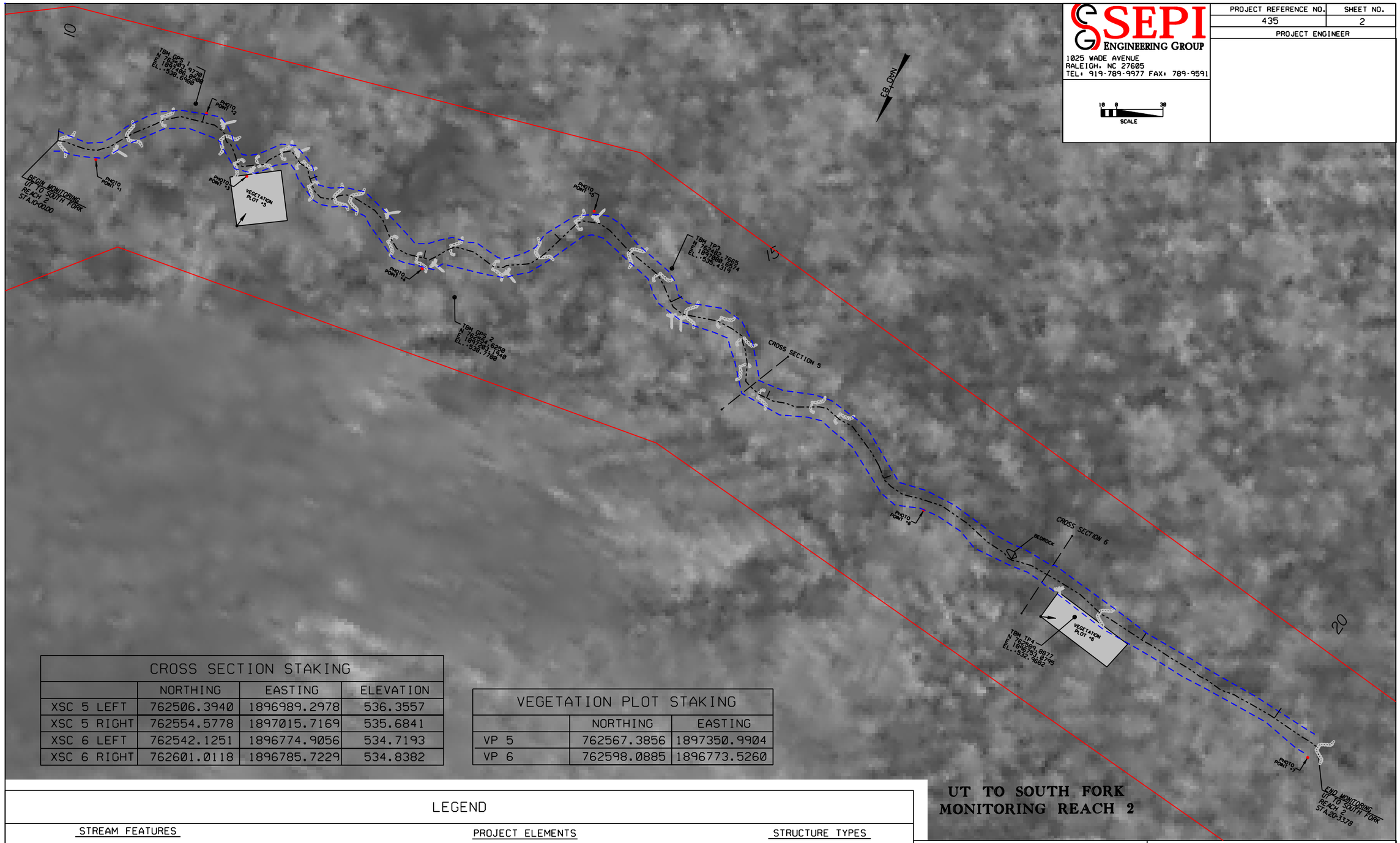
STRUCTURE TYPES
- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

UT TO SOUTH FORK MONITORING REACH 1

Ecosystem Enhancement PROGRAM

LOCATION: UT TO SOUTH FORK CREEK MONITORING PLAN VIEW MONITORING YEAR 3

PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 2/03/09



SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	2
PROJECT ENGINEER	

CROSS SECTION STAKING

	NORTHING	EASTING	ELEVATION
XSC 5 LEFT	762506.3940	1896989.2978	536.3557
XSC 5 RIGHT	762554.5778	1897015.7169	535.6841
XSC 6 LEFT	762542.1251	1896774.9056	534.7193
XSC 6 RIGHT	762601.0118	1896785.7229	534.8382

VEGETATION PLOT STAKING

	NORTHING	EASTING
VP 5	762567.3856	1897350.9904
VP 6	762598.0885	1896773.5260

LEGEND

STREAM FEATURES
- THALWEG 2008
- BANKFULL 2008

PROJECT ELEMENTS
- CONTROL POINT/BENCHMARK (TBM)
- VEGETATION PLOT WITH PHOTO CORNER (ARROW)
- CROSS-SECTIONS
- PHOTO POINT
- EASEMENT BOUNDARY

STRUCTURE TYPES
- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

UT TO SOUTH FORK MONITORING REACH 2

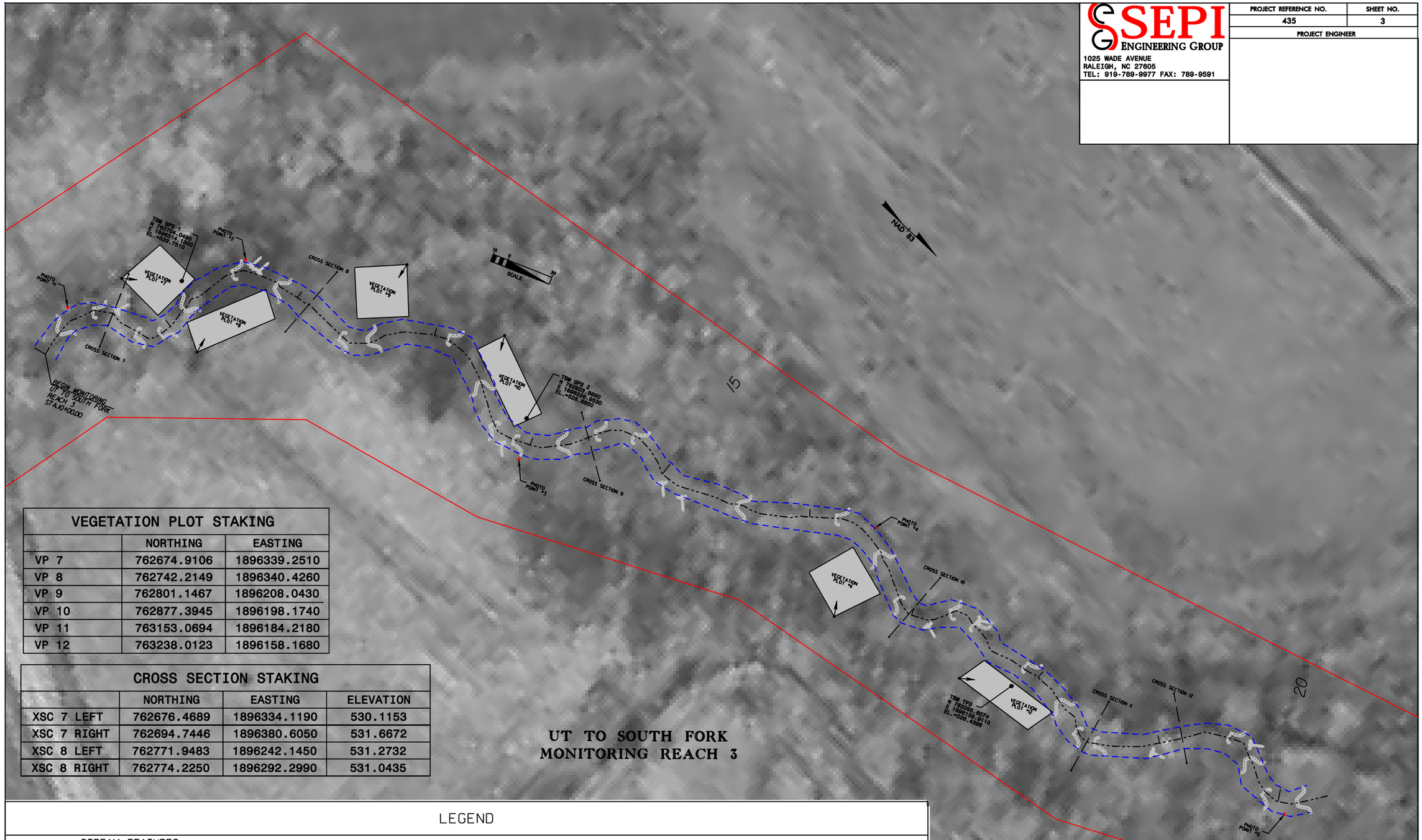
Ecosystem Enhancement Program

LOCATION: UT TO SOUTH FORK CREEK MONITORING PLAN VIEW MONITORING YEAR 3

PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 2/03/09

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	3
PROJECT ENGINEER	



VEGETATION PLOT STAKING

	NORTHING	EASTING
VP 7	762674.9106	1896339.2510
VP 8	762742.2149	1896340.4260
VP 9	762801.1467	1896208.0430
VP 10	762877.3945	1896198.1740
VP 11	763153.0694	1896184.2180
VP 12	763238.0123	1896158.1680

CROSS SECTION STAKING

	NORTHING	EASTING	ELEVATION
XSC 7 LEFT	762676.4689	1896334.1190	530.1153
XSC 7 RIGHT	762694.7446	1896380.6050	531.6672
XSC 8 LEFT	762771.9483	1896242.1450	531.2732
XSC 8 RIGHT	762774.2250	1896292.2990	531.0435

UT TO SOUTH FORK MONITORING REACH 3

LEGEND

STREAM FEATURES
- THALWEG 2008
- BANKFULL 2008

PROJECT ELEMENTS
- CONTROL POINT/BENCHMARK (TBM)
- VEGETATION PLOT WITH PHOTO CORNER (ARROW)
- CROSS-SECTIONS
- PHOTO POINT
- EASEMENT BOUNDARY

STRUCTURE TYPES
- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

Ecosystem Enhancement PROGRAM

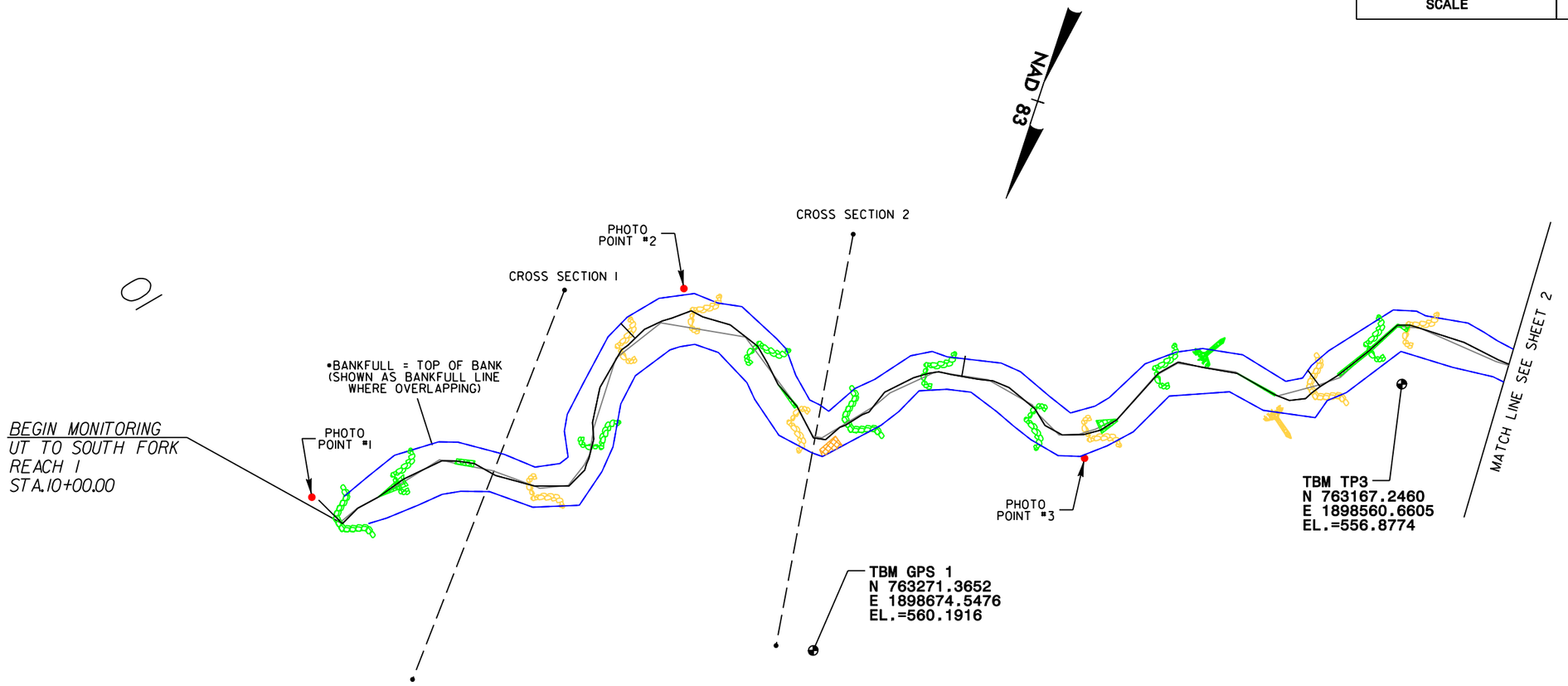
LOCATION: UT TO SOUTH FORK CREEK MONITORING PLAN VIEW MONITORING YEAR 3

PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 2/03/09

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	1
PROJECT ENGINEER	

10 0 30
SCALE



CROSS SECTION STAKING			
	NORTHING	EASTING	ELEVATION
XSC 1 LEFT	763207.9909	1898757.6600	559.5123
XSC 1 RIGHT	763307.6006	1898763.3135	561.2426
XSC 2 LEFT	763173.9086	1898696.2853	559.6677
XSC 2 RIGHT	763272.9699	1898683.3090	560.9459

UT TO SOUTH FORK REACH 1

LEGEND

- THALWEG 2007
- THALWEG 2008
- BANKFULL 2008
- CROSS-SECTIONS
- BANK EROSION
- SEVERE BANK EROSION
- AGGRADATION

STRUCTURE TYPES
- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

COLOR CODE FOR STRUCTURES
- GOOD STRUCTURE (ACTUAL LOCATION)
- STRUCTURE WITH POTENTIAL PROBLEM (ACTUAL LOCATION)
- FAILING STRUCTURE (ACTUAL LOCATION)

Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
STREAM MONITORING - YEAR 3

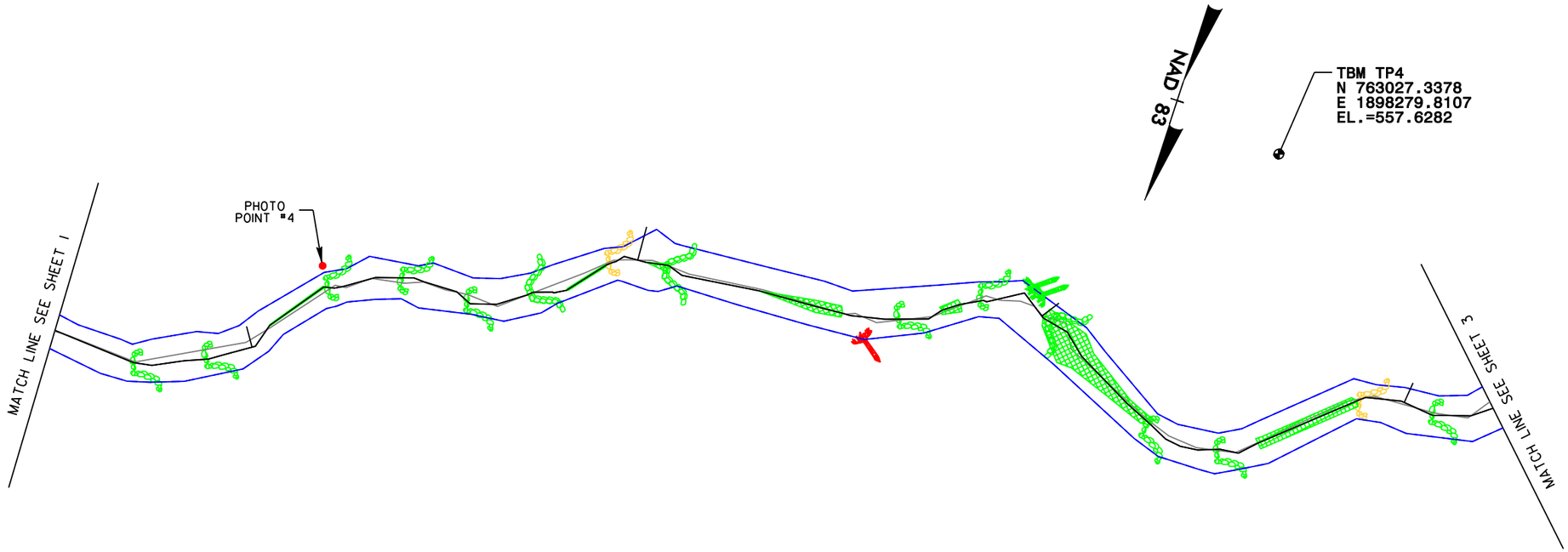
PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 2/10/09

SEPI ENGINEERING GROUP	PROJECT REFERENCE NO.	SHEET NO.
1025 WADE AVENUE RALEIGH, NC 27605 TEL: 919-789-9977 FAX: 789-9591	435	2
	PROJECT ENGINEER	

10 0 30

SCALE

15



UT TO SOUTH FORK REACH 1

LEGEND

- THALWEG 2007
- THALWEG 2008
- BANKFULL 2008
- CROSS-SECTIONS
- BANK EROSION
- SEVERE BANK EROSION
- AGGRADATION

STRUCTURE TYPES

- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

COLOR CODE FOR STRUCTURES

- GOOD STRUCTURE (ACTUAL LOCATION)
- STRUCTURE WITH POTENTIAL PROBLEM (ACTUAL LOCATION)
- FAILING STRUCTURE (ACTUAL LOCATION)

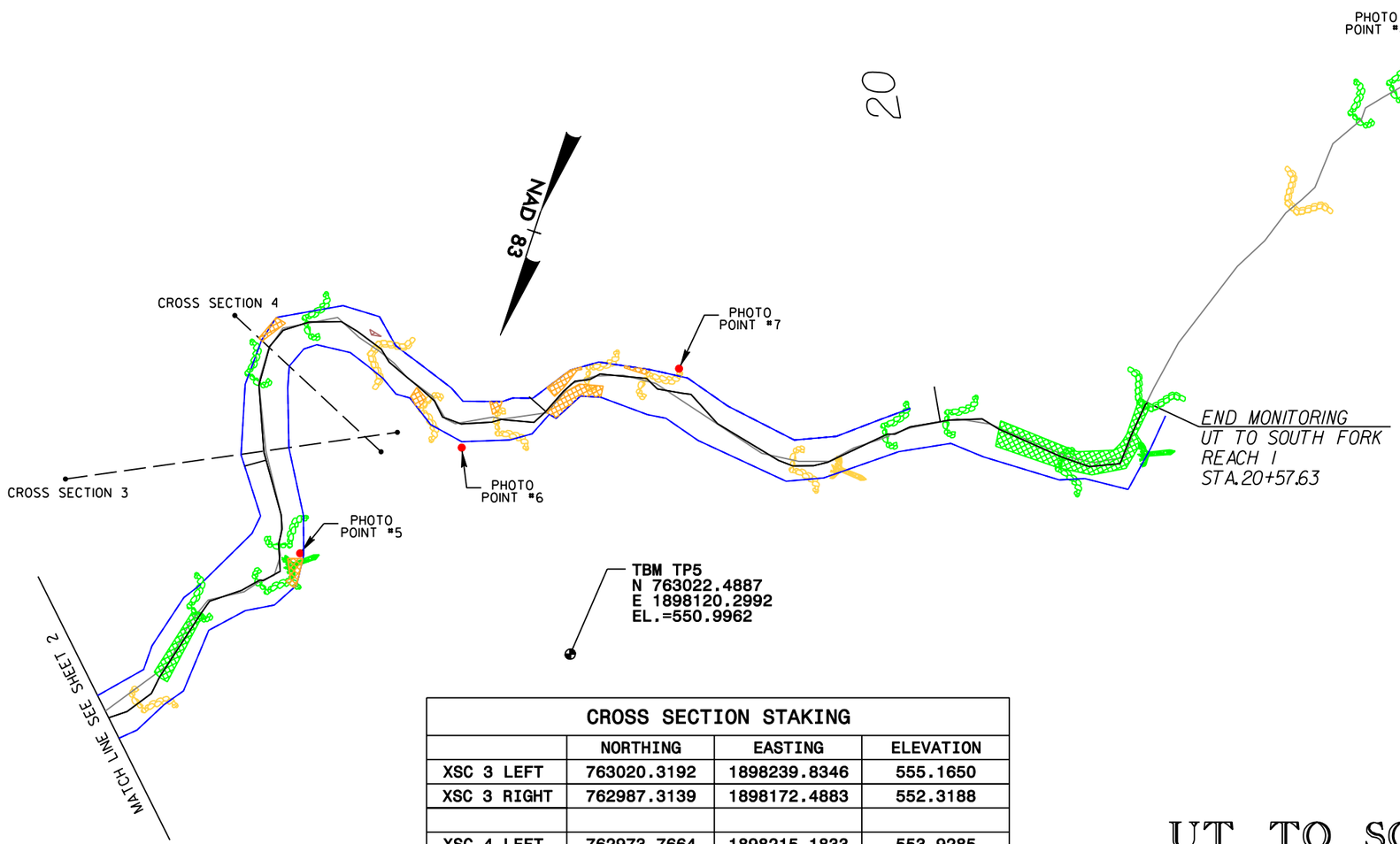
Ecosystem Enhancement PROGRAM

LOCATION:	UT TO SOUTH FORK CREEK STREAM MONITORING - YEAR 3
PROJ #: 435	COUNTY: ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 2/10/09

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	3
PROJECT ENGINEER	

10 0 30
SCALE



CROSS SECTION STAKING			
	NORTHING	EASTING	ELEVATION
XSC 3 LEFT	763020.3192	1898239.8346	555.1650
XSC 3 RIGHT	762987.3139	1898172.4883	552.3188
XSC 4 LEFT	762973.7664	1898215.1833	553.9285
XSC 4 RIGHT	762992.5881	1898174.6097	552.4553

UT TO SOUTH FORK REACH 1

LEGEND

- THALWEG 2007
- THALWEG 2008
- BANKFULL 2008
- CROSS-SECTIONS
- BANK EROSION
- SEVERE BANK EROSION
- AGGRADATION

STRUCTURE TYPES
- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

COLOR CODE FOR STRUCTURES
- GOOD STRUCTURE (ACTUAL LOCATION)
- STRUCTURE WITH POTENTIAL PROBLEM (ACTUAL LOCATION)
- FAILING STRUCTURE (ACTUAL LOCATION)

Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
STREAM MONITORING - YEAR 3

PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 2/10/09

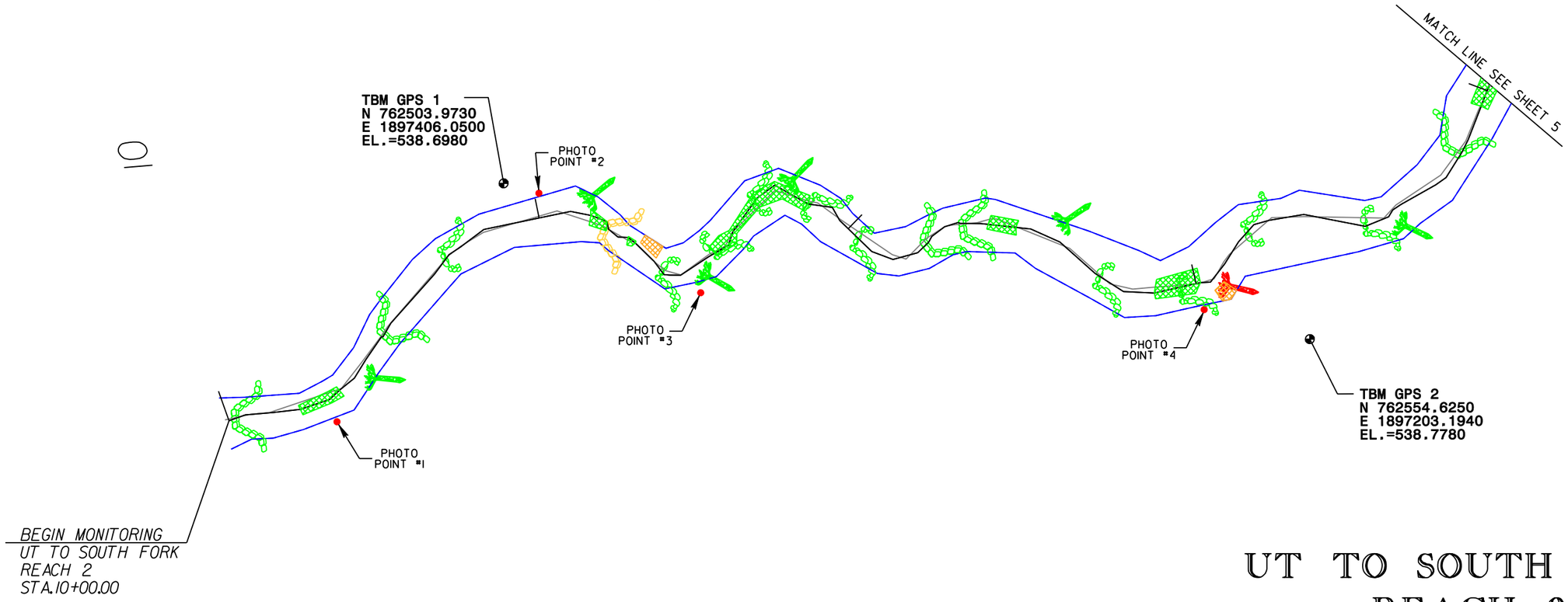
SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	4
PROJECT ENGINEER	

10 0 30
SCALE

NAD 83

10



UT TO SOUTH FORK REACH 2

LEGEND

- THALWEG 2007
- THALWEG 2008
- BANKFULL 2008
- CROSS-SECTIONS
- BANK EROSION
- SEVERE BANK EROSION
- AGGRADATION

STRUCTURE TYPES
- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

COLOR CODE FOR STRUCTURES
- GOOD STRUCTURE (ACTUAL LOCATION)
- STRUCTURE WITH POTENTIAL PROBLEM (ACTUAL LOCATION)
- FAILING STRUCTURE (ACTUAL LOCATION)

Ecosystem Enhancement PROGRAM

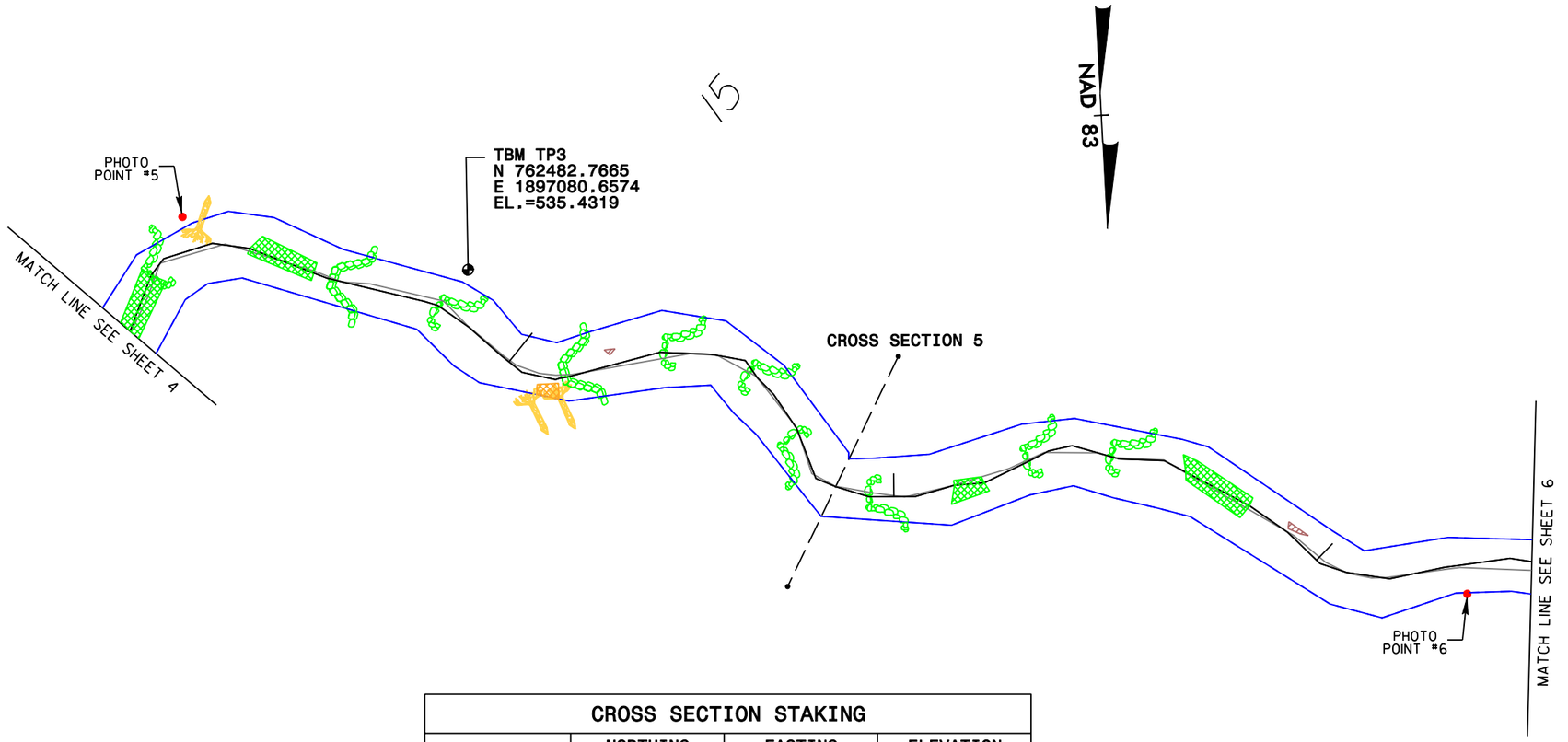
LOCATION:
UT TO SOUTH FORK CREEK
STREAM MONITORING - YEAR 3

PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 2/10/09

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	5
PROJECT ENGINEER	

10 0 30
SCALE



CROSS SECTION STAKING			
	NORTHING	EASTING	ELEVATION
XSC 5 LEFT	762506.3940	1896989.2978	536.3557
XSC 5 RIGHT	762554.5778	1897015.7169	535.6841

UT TO SOUTH FORK REACH 2

LEGEND

THALWEG 2007
THALWEG 2008
BANKFULL 2008
CROSS-SECTIONS

BANK EROSION
SEVERE BANK EROSION
AGGRADATION

STRUCTURE TYPES
ROCK CROSS VANE
J-HOOK VANE
ROOTWAD
ROCK VANE

COLOR CODE FOR STRUCTURES
GOOD STRUCTURE (ACTUAL LOCATION)
STRUCTURE WITH POTENTIAL PROBLEM (ACTUAL LOCATION)
FAILING STRUCTURE (ACTUAL LOCATION)

Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
STREAM MONITORING - YEAR 3

PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 2/10/09

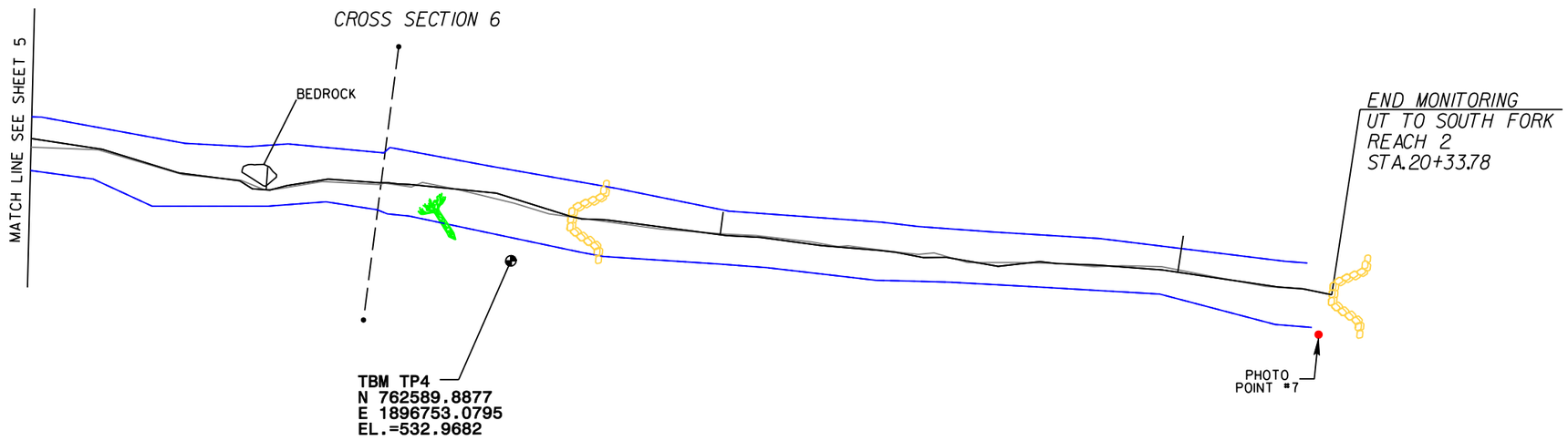
SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	6
PROJECT ENGINEER	

10 0 30
SCALE

NAD 83

20



CROSS SECTION STAKING			
	NORTHING	EASTING	ELEVATION
XSC 6 LEFT	762542.1251	1896774.9056	534.7193
XSC 6 RIGHT	762601.0118	1896785.7229	534.8382

UT TO SOUTH FORK REACH 2

LEGEND

THALWEG 2007
THALWEG 2008
BANKFULL 2008
CROSS-SECTIONS

BANK EROSION
SEVERE BANK EROSION
AGGRADATION

STRUCTURE TYPES
ROCK CROSS VANE
J-HOOK VANE
ROOTWAD
ROCK VANE

COLOR CODE FOR STRUCTURES
GOOD STRUCTURE (ACTUAL LOCATION)
STRUCTURE WITH POTENTIAL PROBLEM (ACTUAL LOCATION)
FAILING STRUCTURE (ACTUAL LOCATION)

Ecosystem Enhancement PROGRAM

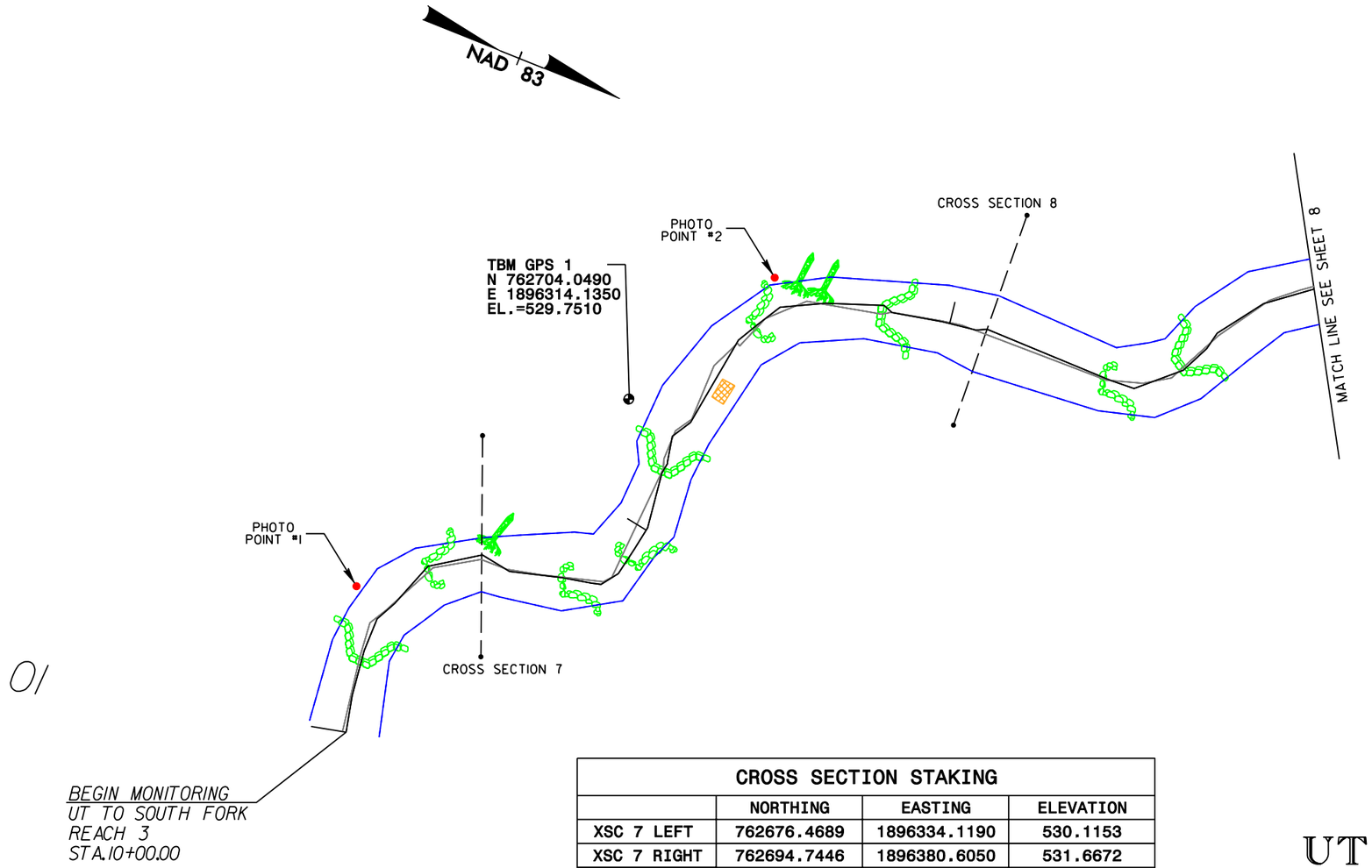
LOCATION:
UT TO SOUTH FORK CREEK
STREAM MONITORING - YEAR 3

PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 2/10/09

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	7
PROJECT ENGINEER	

10 0 30
SCALE



CROSS SECTION STAKING			
	NORTHING	EASTING	ELEVATION
XSC 7 LEFT	762676.4689	1896334.1190	530.1153
XSC 7 RIGHT	762694.7446	1896380.6050	531.6672
XSC 8 LEFT	762771.9483	1896242.1450	531.2732
XSC 8 RIGHT	762774.2250	1896292.2990	531.0435

UT TO SOUTH FORK REACH 3

LEGEND

- THALWEG 2007
- THALWEG 2008
- BANKFULL 2008
- CROSS-SECTIONS
- BANK EROSION
- SEVERE BANK EROSION
- AGGRADATION

STRUCTURE TYPES
- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

COLOR CODE FOR STRUCTURES
- GOOD STRUCTURE (ACTUAL LOCATION)
- STRUCTURE WITH POTENTIAL PROBLEM (ACTUAL LOCATION)
- FAILING STRUCTURE (ACTUAL LOCATION)

Ecosystem Enhancement PROGRAM

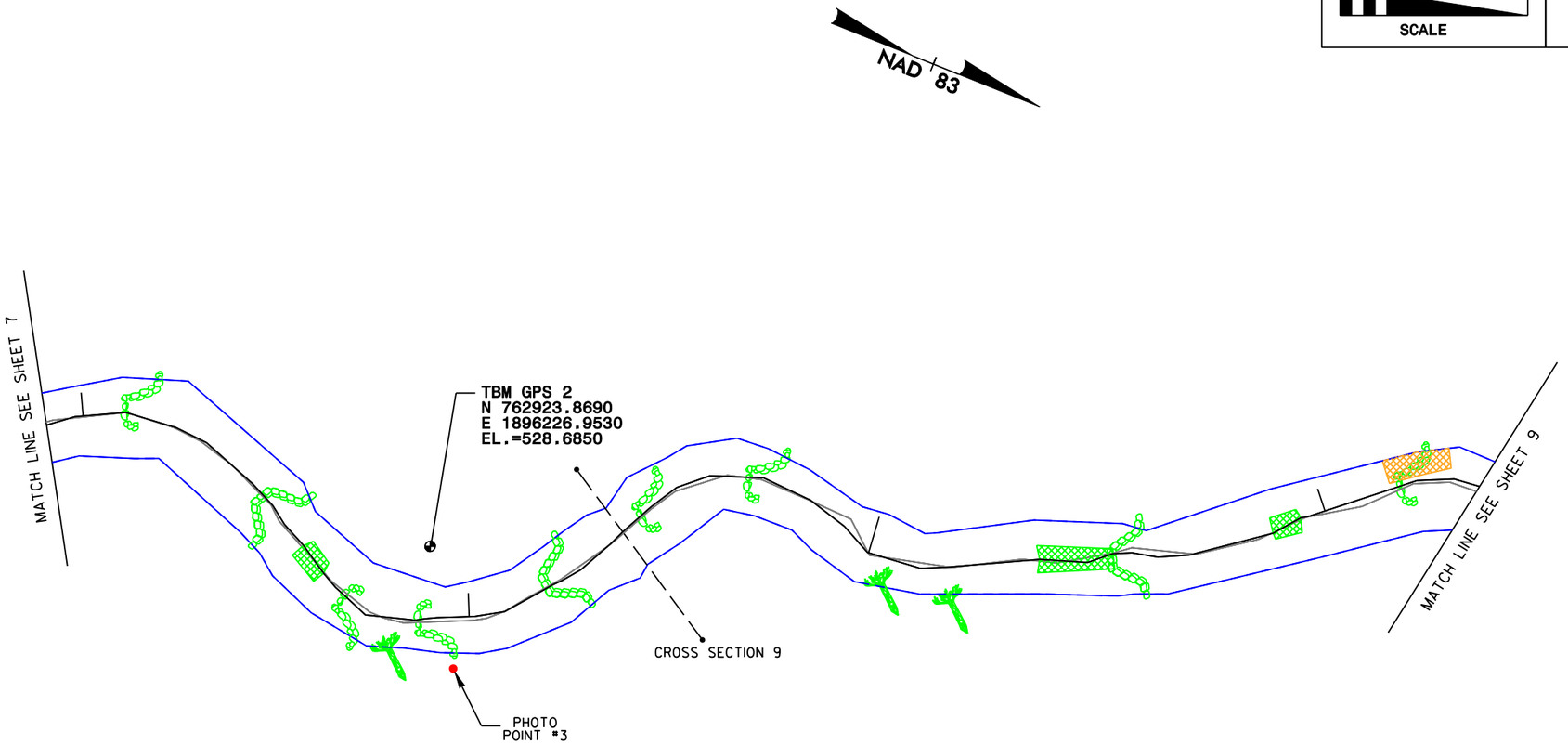
LOCATION:
UT TO SOUTH FORK CREEK
STREAM MONITORING - YEAR 3

PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 2/10/09

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	8
PROJECT ENGINEER	

10 0 30
SCALE



CROSS SECTION STAKING			
	NORTHING	EASTING	ELEVATION
XSC 9 LEFT	762946.7210	1896200.1180	529.2745
XSC 9 RIGHT	762985.1716	1896223.8140	530.1599

UT TO SOUTH FORK REACH 3

LEGEND

THALWEG 2007
THALWEG 2008
BANKFULL 2008
CROSS-SECTIONS

BANK EROSION
SEVERE BANK EROSION
AGGRADATION

STRUCTURE TYPES
ROCK CROSS VANE
J-HOOK VANE
ROOTWAD
ROCK VANE

COLOR CODE FOR STRUCTURES
GOOD STRUCTURE (ACTUAL LOCATION)
STRUCTURE WITH POTENTIAL PROBLEM (ACTUAL LOCATION)
FAILING STRUCTURE (ACTUAL LOCATION)

Ecosystem Enhancement PROGRAM

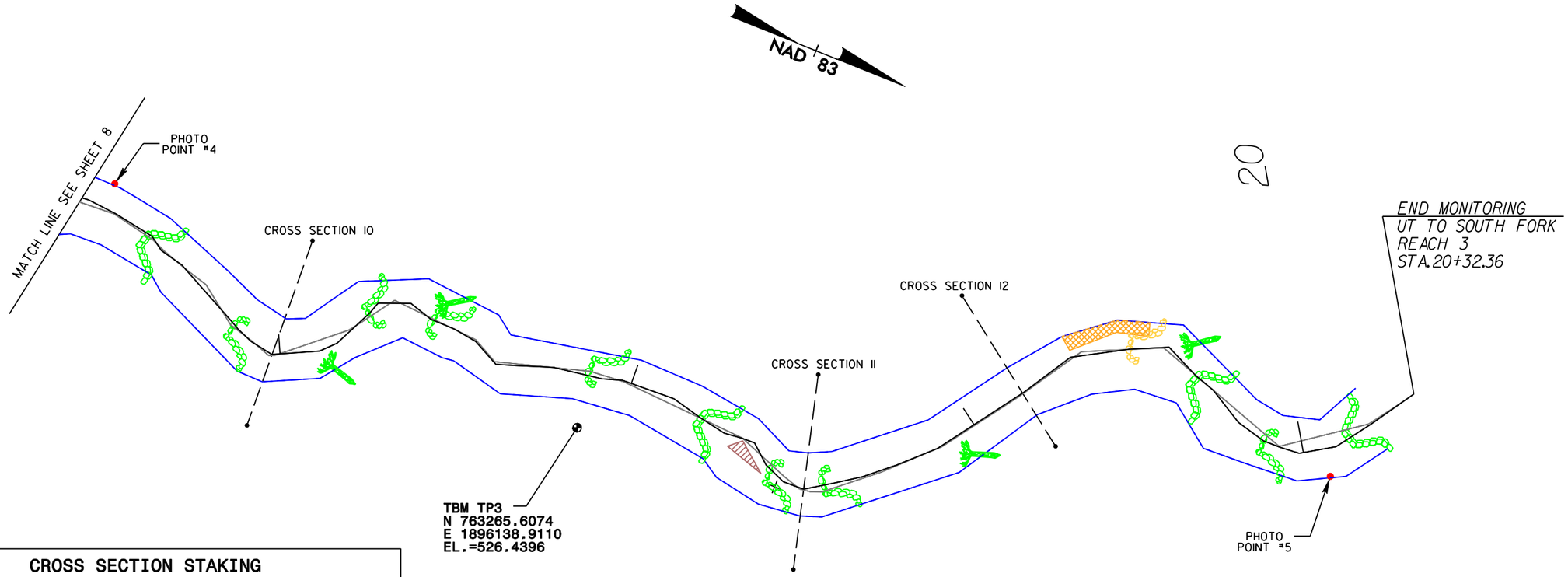
LOCATION:
UT TO SOUTH FORK CREEK
STREAM MONITORING - YEAR 3

PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 2/10/09

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	9
PROJECT ENGINEER	

10 0 30
SCALE



CROSS SECTION STAKING			
	NORTHING	EASTING	ELEVATION
XSC 10 LEFT	763185.3049	1896119.8830	528.6611
XSC 10 RIGHT	763187.3395	1896169.7620	527.3895
XSC 11 LEFT	763317.5403	1896103.5160	527.4576
XSC 11 RIGHT	763330.1768	1896151.9130	527.3963
XSC 12 LEFT	763344.0200	1896071.2010	527.7327
XSC 12 RIGHT	763380.4412	1896097.9050	526.4052

UT TO SOUTH FORK REACH 3

LEGEND

THALWEG 2007
THALWEG 2008
BANKFULL 2008
CROSS-SECTIONS

BANK EROSION
SEVERE BANK EROSION
AGGRADATION

STRUCTURE TYPES
ROCK CROSS VANE
J-HOOK VANE
ROOTWAD
ROCK VANE

COLOR CODE FOR STRUCTURES
GOOD STRUCTURE (ACTUAL LOCATION)
STRUCTURE WITH POTENTIAL PROBLEM (ACTUAL LOCATION)
FAILING STRUCTURE (ACTUAL LOCATION)

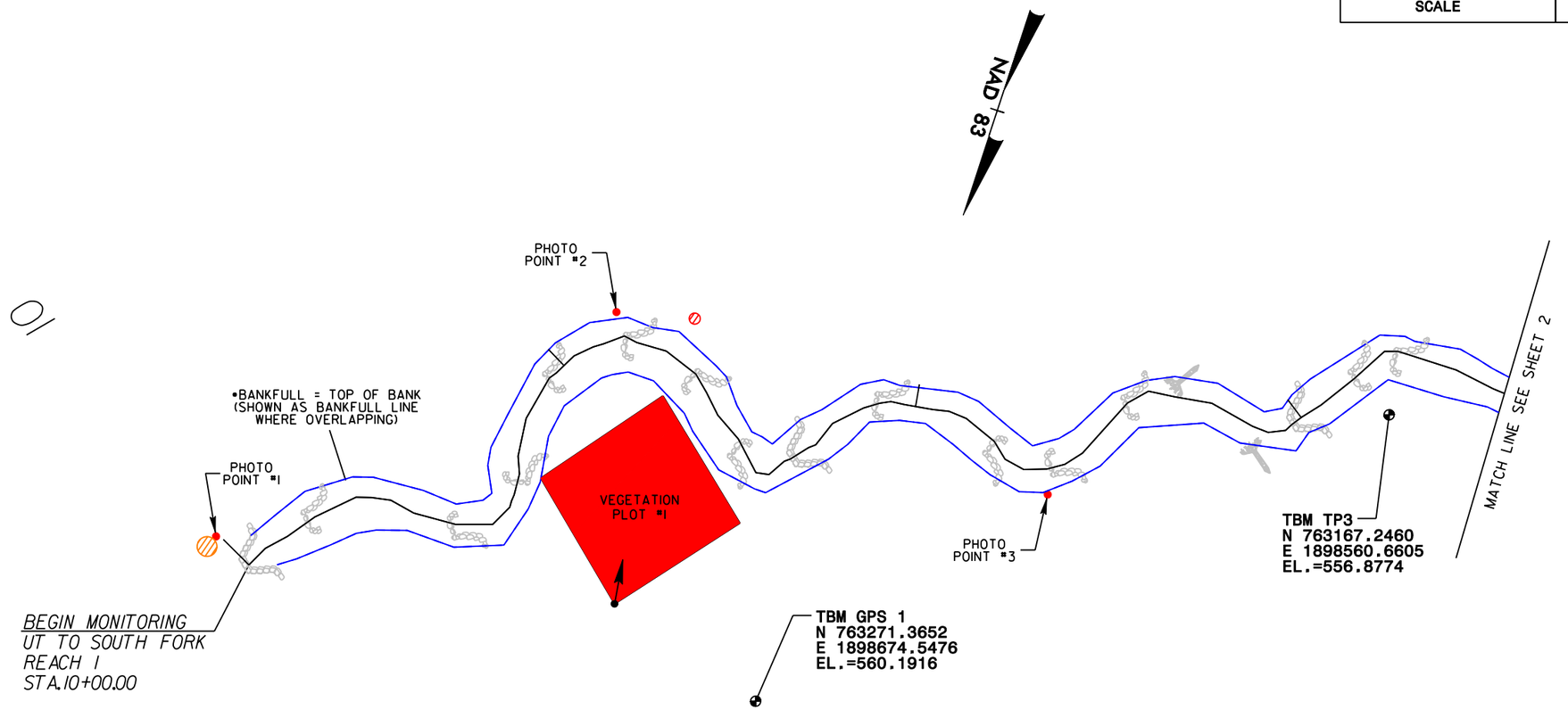
Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
STREAM MONITORING - YEAR 3

PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 2/10/09

SEPI ENGINEERING GROUP	PROJECT REFERENCE NO.	SHEET NO.
1025 WADE AVENUE RALEIGH, NC 27605 TEL: 919-789-9977 FAX: 789-9591	435	1
	PROJECT ENGINEER	

10 0 30
SCALE



VEGETATION PLOT STAKING (PHOTO CORNER)		
	NORTHING	EASTING
VP 1	763260.4873	1898710.9830

*THE HERBACEOUS UNDERSTORY COMPONENT OF THE VEGETATIVE COMMUNITY IS DOMINATED BY *FESTUCA SPP.* ALONG THE LENGTH OF SR1.

LEGEND

- THALWEG 2008
- BANKFULL 2008
- PHOTO POINT
- VEGETATION PLOT WITH PHOTO CORNER
- VEGETATION PLOT NOT MEETING SUCCESS REQUIREMENTS

STRUCTURE TYPES

- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

- BARE BENCH/BANK
- BARE FLOODPLAIN
- *ROSA MULTIFLORA* PRESENT
- *MICROSTEGIUM VIRMINEUM* PRESENT
- *LIGUSTRUM SINENSE* PRESENT
- *AILANTHUS ALTISSIMA* PRESENT

UT TO SOUTH FORK REACH 1

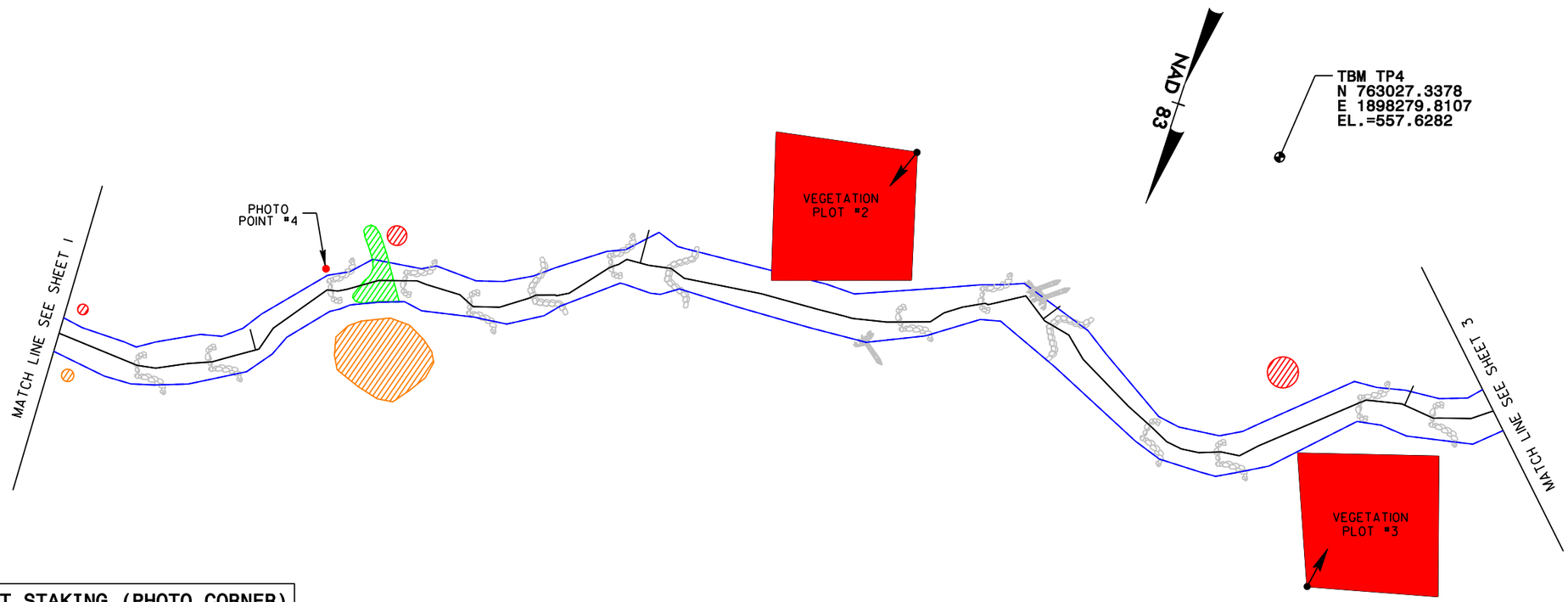
Ecosystem Enhancement PROGRAM

LOCATION:	UT TO SOUTH FORK CREEK VEGETATION ASSESSMENT - YEAR 3
PROJ #: 435	COUNTY: ALAMANCE
MONITORED BY:	IPJ
CHECKED BY: PDB	DATE: 6/02/08

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	2
PROJECT ENGINEER	

10 0 30
SCALE



VEGETATION PLOT STAKING (PHOTO CORNER)		
	NORTHING	EASTING
VP 2	763052.5696	1898360.6060
VP 3	763120.5065	1898242.6220

*THE HERBACEOUS UNDERSTORY COMPONENT OF THE VEGETATIVE COMMUNITY IS DOMINATED BY *FESTUCA SPP.* ALONG THE LENGTH OF SR1.

LEGEND

THALWEG 2008
BANKFULL 2008
PHOTO POINT
VEGETATION PLOT WITH PHOTO CORNER
VEGETATION PLOT NOT MEETING SUCCESS REQUIREMENTS

STRUCTURE TYPES

ROCK CROSS VANE
J-HOOK VANE
ROOTWAD
ROCK VANE

BARE BENCH/BANK
BARE FLOODPLAIN
ROSA MULTIFLORA PRESENT
MICROSTEGIUM VIRMINEUM PRESENT
LIGUSTRUM SINENSE PRESENT
AILANTHUS ALTISSIMA PRESENT

UT TO SOUTH FORK REACH 1

Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
VEGETATION ASSESSMENT - YEAR 3

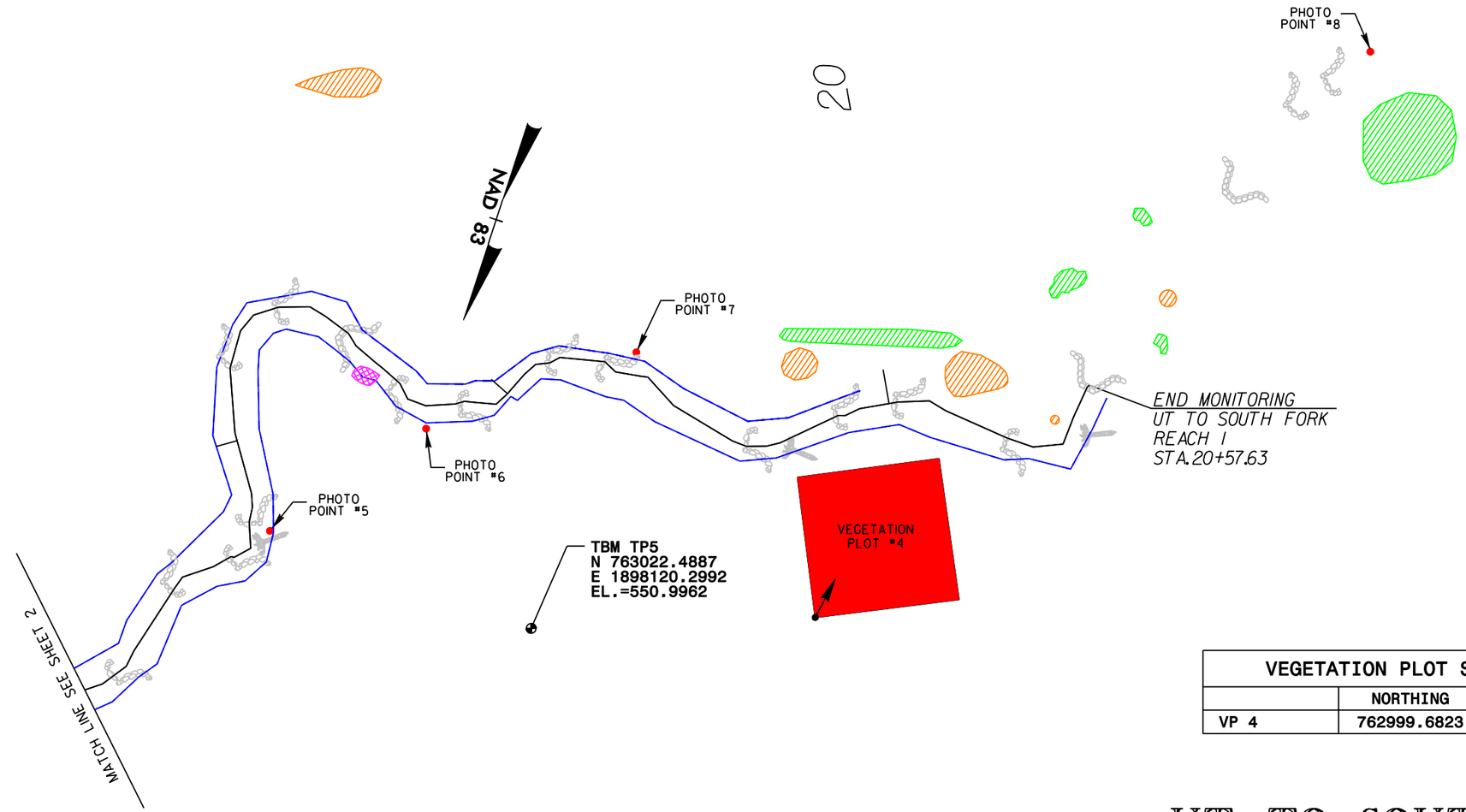
PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 6/02/08

*THE HERBACEOUS UNDERSTORY COMPONENT OF THE VEGETATIVE COMMUNITY IS DOMINATED BY *FESTUCA SPP.* ALONG THE LENGTH OF SR1.

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	3
PROJECT ENGINEER	

10 0 30
SCALE



VEGETATION PLOT STAKING		
	NORTHING	EASTING
VP 4	762999.6823	1898058.6040

UT TO SOUTH FORK REACH 1

LEGEND

THALWEG 2008
BANKFULL 2008
PHOTO POINT
VEGETATION PLOT WITH PHOTO CORNER
VEGETATION PLOT NOT MEETING SUCCESS REQUIREMENTS

STRUCTURE TYPES

ROCK CROSS VANE
J-HOOK VANE
ROOTWAD
ROCK VANE

BARE BENCH/BANK
BARE FLOODPLAIN
ROSA MULTIFLORA PRESENT
MICROSTEGIUM VIRMINEUM PRESENT
LIGUSTRUM SINENSE PRESENT
AILANTHUS ALTISSIMA PRESENT

Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
VEGETATION ASSESSMENT - YEAR 3

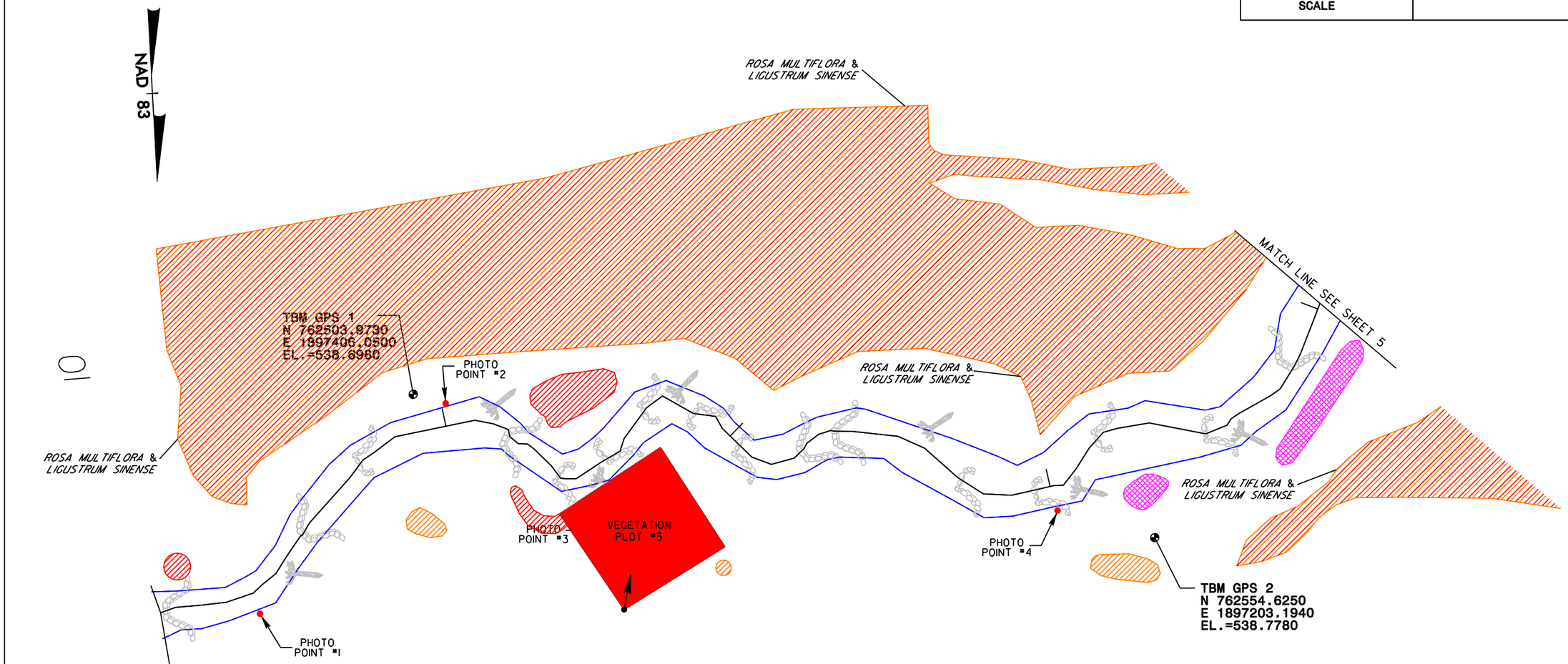
PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 6/02/08

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	4
PROJECT ENGINEER	

10 0 30
SCALE

NAD 83



VEGETATION PLOT STAKING		
	NORTHING	EASTING
VP 5	762567.3856	1897350.9904

LEGEND

THALWEG 2008
BANKFULL 2008
PHOTO POINT
VEGETATION PLOT WITH PHOTO CORNER
VEGETATION PLOT NOT MEETING SUCCESS REQUIREMENTS

STRUCTURE TYPES

ROCK CROSS VANE
J-HOOK VANE
ROOTWAD
ROCK VANE

BARE BENCH/BANK
BARE FLOODPLAIN
ROSA MULTIFLORA PRESENT
MICROSTEGIUM VIRMINEUM PRESENT
LIGUSTRUM SINENSE PRESENT
AILANTHUS ALTISSIMA PRESENT

UT TO SOUTH FORK REACH 2

Ecosystem Enhancement PROGRAM

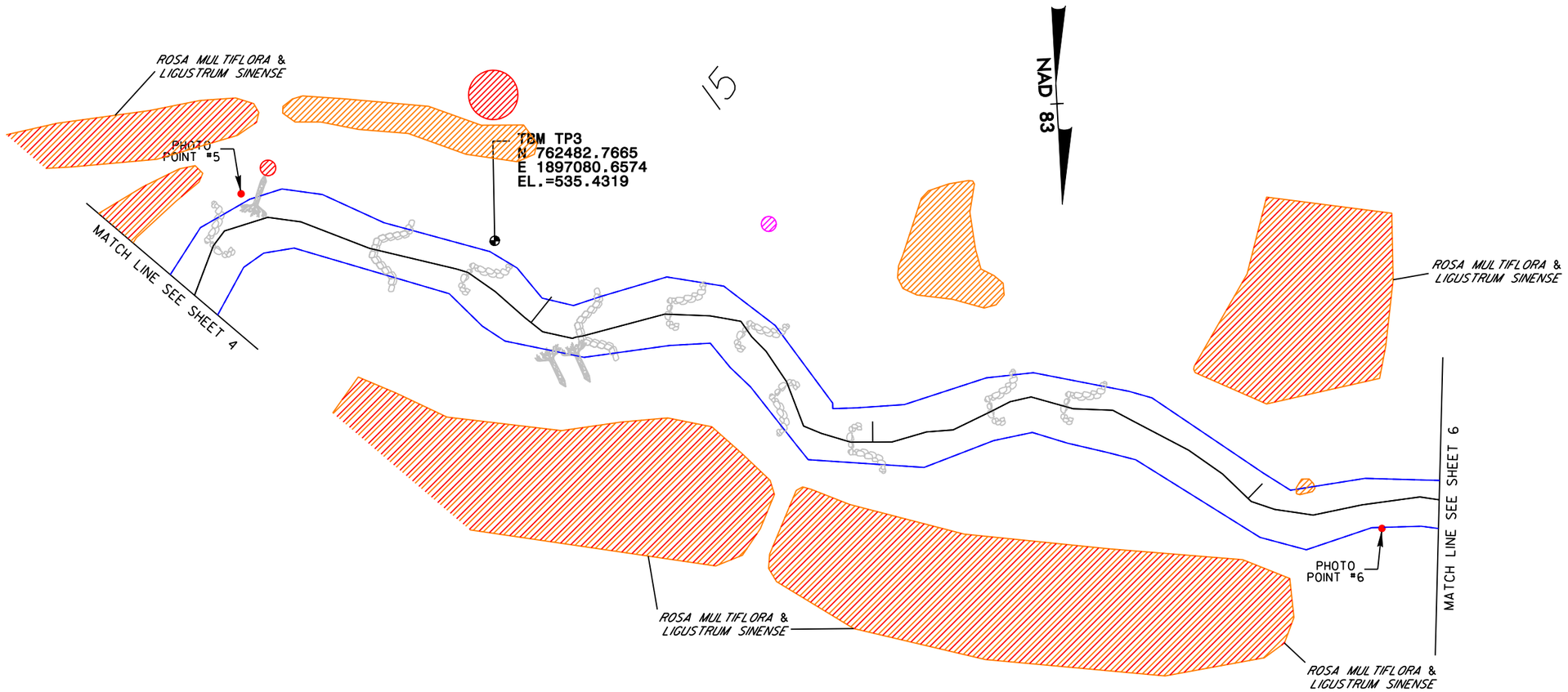
LOCATION:
UT TO SOUTH FORK CREEK
VEGETATION ASSESSMENT - YEAR 3

PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 6/02/08

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	5
PROJECT ENGINEER	

10 0 30
SCALE



LEGEND

- THALWEG 2008
- BANKFULL 2008
- PHOTO POINT
- VEGETATION PLOT WITH PHOTO CORNER
- VEGETATION PLOT NOT MEETING SUCCESS REQUIREMENTS

STRUCTURE TYPES

- ROCK CROSS VANE
- J-HOOK VANE
- ROOTWAD
- ROCK VANE

- BARE BENCH/BANK
- BARE FLOODPLAIN
- *ROSA MULTIFLORA* PRESENT
- *MICROSTEGIUM VIRMINEUM* PRESENT
- *LIGUSTRUM SINENSE* PRESENT
- *AILANTHUS ALTISSIMA* PRESENT

UT TO SOUTH FORK REACH 2

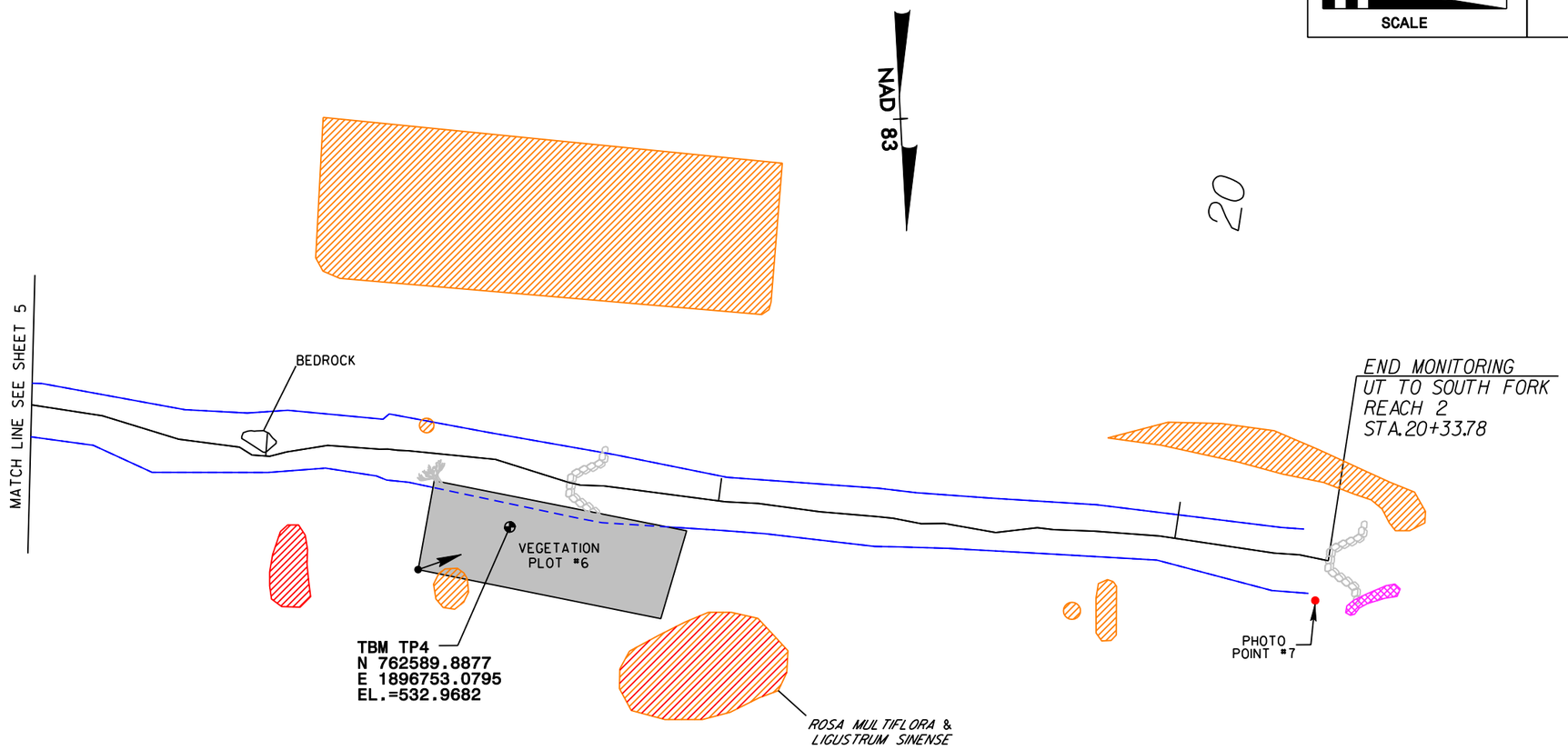
Ecosystem Enhancement PROGRAM

LOCATION:	UT TO SOUTH FORK CREEK VEGETATION ASSESSMENT - YEAR 3
PROJ #: 435	COUNTY: ALAMANCE
MONITORED BY:	IPJ
CHECKED BY: PDB	DATE: 6/02/08

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	6
PROJECT ENGINEER	

10 0 30
SCALE



VEGETATION PLOT STAKING		
	NORTHING	EASTING
VP 6	762598.0885	1896773.5260

UT TO SOUTH FORK REACH 2

LEGEND

THALWEG 2008
BANKFULL 2008
PHOTO POINT
VEGETATION PLOT WITH PHOTO CORNER
VEGETATION PLOT NOT MEETING SUCCESS REQUIREMENTS

STRUCTURE TYPES

ROCK CROSS VANE
J-HOOK VANE
ROOTWAD
ROCK VANE

BARE BENCH/BANK
BARE FLOODPLAIN
ROSA MULTIFLORA PRESENT
MICROSTEGIUM VIRMINEUM PRESENT
LIGUSTRUM SINENSE PRESENT
AILANTHUS ALTISSIMA PRESENT

Ecosystem Enhancement PROGRAM

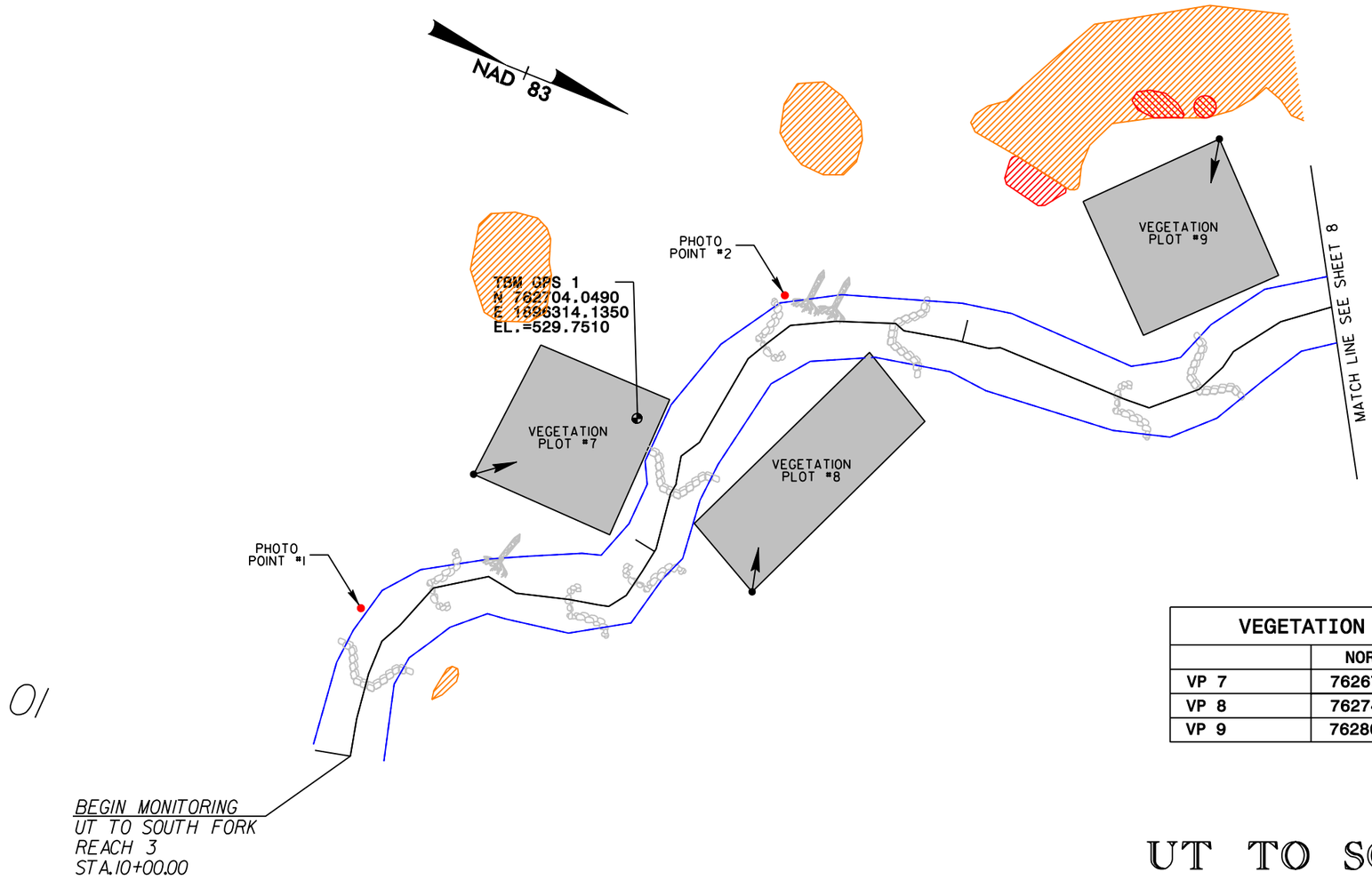
LOCATION:
UT TO SOUTH FORK CREEK
VEGETATION ASSESSMENT - YEAR 3

PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 6/02/08

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	7
PROJECT ENGINEER	

10 0 30
SCALE



VEGETATION PLOT STAKING		
	NORTHING	EASTING
VP 7	762674.9106	1896339.2510
VP 8	762742.2149	1896340.4260
VP 9	762801.1467	1896208.0430

UT TO SOUTH FORK REACH 3

LEGEND

THALWEG 2008
BANKFULL 2008
PHOTO POINT
VEGETATION PLOT WITH PHOTO CORNER
VEGETATION PLOT NOT MEETING SUCCESS REQUIREMENTS

STRUCTURE TYPES

ROCK CROSS VANE
J-HOOK VANE
ROOTWAD
ROCK VANE

BARE BENCH/BANK
BARE FLOODPLAIN
ROSA MULTIFLORA PRESENT
MICROSTEGIUM VIRMINEUM PRESENT
LIGUSTRUM SINENSE PRESENT
AILANTHUS ALTISSIMA PRESENT

Ecosystem Enhancement PROGRAM

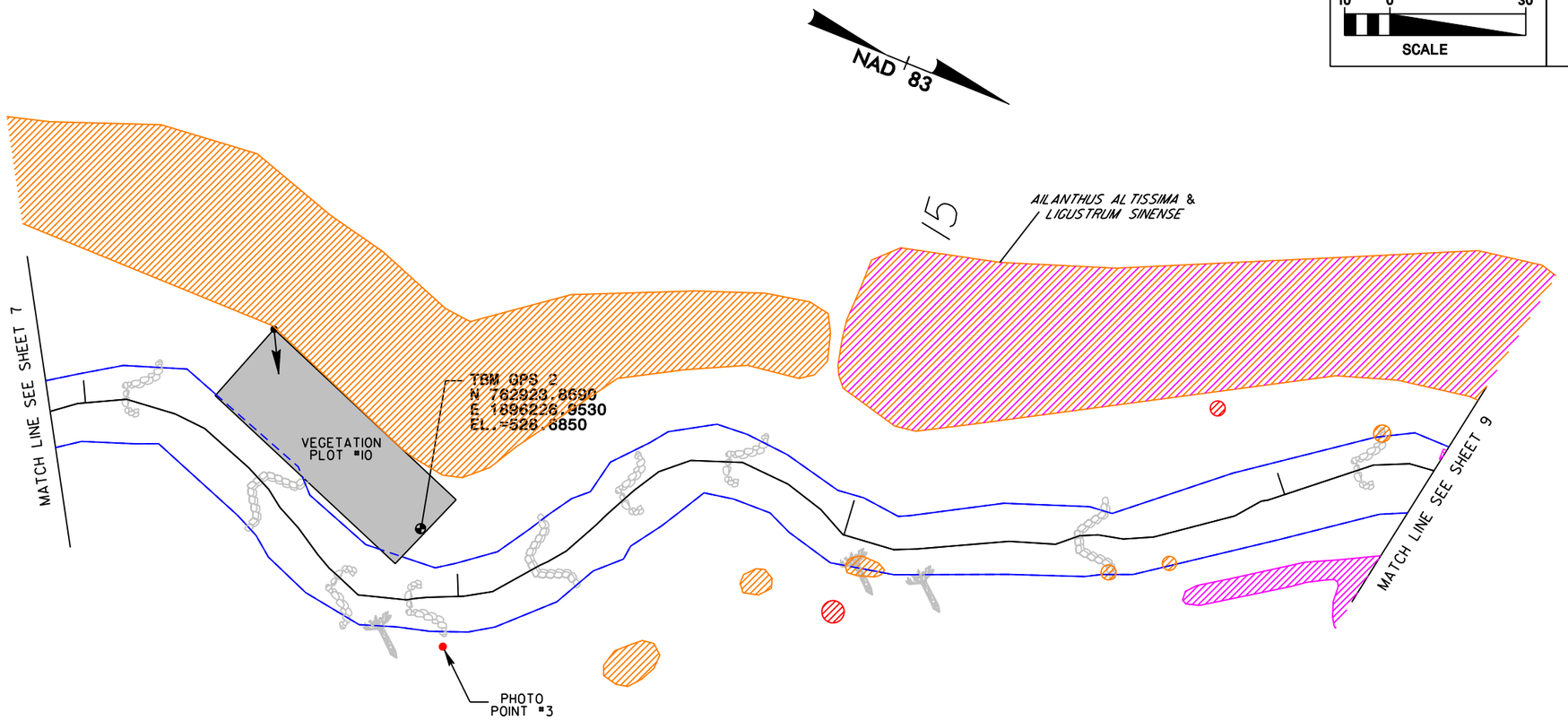
LOCATION:
UT TO SOUTH FORK CREEK
VEGETATION ASSESSMENT - YEAR 3

PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 6/02/08

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	8
PROJECT ENGINEER	

10 0 30
SCALE



VEGETATION PLOT STAKING		
	NORTHING	EASTING
VP 10	762877.3945	1896198.1740

LEGEND

THALWEG 2008
BANKFULL 2008
PHOTO POINT
VEGETATION PLOT WITH PHOTO CORNER
VEGETATION PLOT NOT MEETING SUCCESS REQUIREMENTS

STRUCTURE TYPES

ROCK CROSS VANE
J-HOOK VANE
ROOTWAD
ROCK VANE

BARE BENCH/BANK
BARE FLOODPLAIN
ROSA MULTIFLORA PRESENT
MICROSTEGIUM VIRMINEUM PRESENT
LIGUSTRUM SINENSE PRESENT
AILANTHUS ALTISSIMA PRESENT

UT TO SOUTH FORK REACH 3

Ecosystem Enhancement PROGRAM

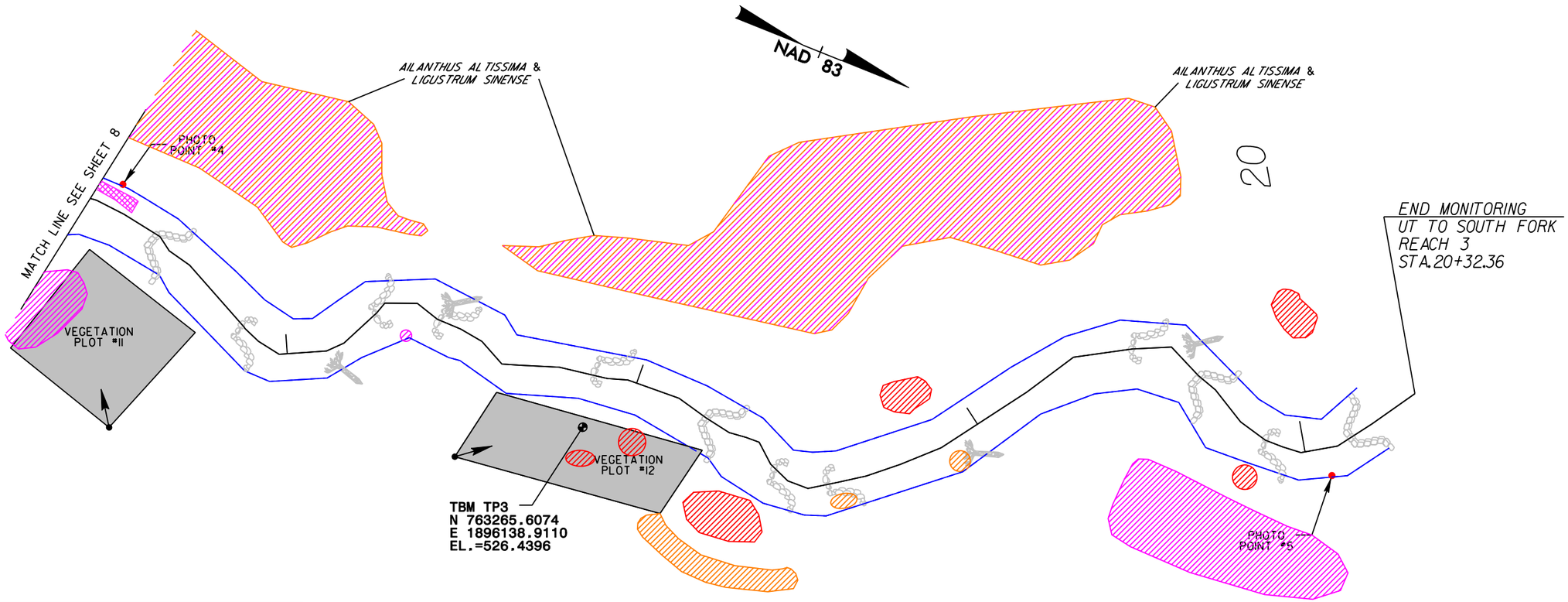
LOCATION:
UT TO SOUTH FORK CREEK
VEGETATION ASSESSMENT - YEAR 3

PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 6/02/08

SEPI ENGINEERING GROUP
1025 WADE AVENUE
RALEIGH, NC 27605
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	9
PROJECT ENGINEER	

10 0 30
SCALE



VEGETATION PLOT STAKING		
	NORTHING	EASTING
VP 11	763153.0694	1896184.2180
VP 12	763238.0123	1896158.1680

LEGEND

THALWEG 2008
BANKFULL 2008
PHOTO POINT
VEGETATION PLOT WITH PHOTO CORNER
VEGETATION PLOT NOT MEETING SUCCESS REQUIREMENTS

STRUCTURE TYPES

ROCK CROSS VANE
J-HOOK VANE
ROOTWAD
ROCK VANE

BARE BENCH/BANK
BARE FLOODPLAIN
ROSA MULTIFLORA PRESENT
MICROSTEGIUM VIRMINEUM PRESENT
LIGUSTRUM SINENSE PRESENT
AILANTHUS ALTISSIMA PRESENT

UT TO SOUTH FORK REACH 3

Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
VEGETATION ASSESSMENT - YEAR 3

PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 6/02/08