UT TO SOUTH FORK
FINAL MONITORING REPORT
YEAR 4 OF 5
2009

EEP Project # 435
Alamance County, North Carolina

Submitted to:

NCDENR-EEP
1652 Mail Service Center
Raleigh, NC 27699

Monitoring Firm:

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TABLE OF CONTENTS

APPENDICES

MONITORING SUMMARY

The North Carolina Ecosystem Enhancement Program (EEP) restored sections of an unnamed tributary to South Fork (UT South Fork) in 2004. This project is located in the southern portion of Alamance County, NC. The different reaches flow through former pasture and wooded areas. Prior to restoration, cattle damage resulted in areas of severe bank erosion and loss of vegetation. Since the restoration has been completed, the livestock have been fenced out of the stream. The overall goal of this project was to help improve water quality in the Cape Fear River basin. Specific objectives to meet this goal were to:

- Reduce bank erosion;
- Reduce nutrient runoff on the site;
- Stabilize stream channel banks by planting vegetation;
- Help the stream reach its equilibrium through the reestablishment of proper dimension, pattern, and profile.

There was strong vegetative cover along the length of the project. Fescue has dominated the herbaceous understory of monitoring reach 1, which appears to be preventing the establishment of the planted bare root trees and other native vegetation. In Monitoring Year 4, several populations of exotic invasive species were noted. Invasive species found include: *Festuca spp.*, *Ligustrum sinense*, *Rosa multiflora*, *Microstegium virmineum*, and *Ailanthus altissima*. Planted stem survival in monitoring reach 1 remains a concern due to fescue dominance. All plots in monitoring reach 1 had planted stem densities below the Year 5 goal of 260 stems per acre. Vegetation Plot 2 is of particular concern because no planted stems were counted in this plot in Monitoring Year 4. The overall planted stem survival from Monitoring Year 1 to Monitoring Year 4 was 65% among all vegetation plots in all reaches. The overall planted stem density across all vegetation plots was 567 stems per acre.

All Monitoring Year 4 profile and pattern parameters were consistent with Monitoring Year 3 values. Aggradation in riffle sections remains a minor problem in monitoring reaches 1 and 2. There is evidence that these areas are stabilizing as the riffles narrow to a stable dimension and reach sediment transport equilibrium. This trend is especially evident in monitoring reach 3, where only one riffle (Station 15+88) was found to be retaining excess fine sediment. The number of aggradation areas and overall length of aggradation identified decreased during Monitoring Year 4 for all monitoring reaches. There are in-stream structures with problems in all monitoring reaches. There were several j-hooks and crossvanes on monitoring reach 1 that had problems of minor concern. In monitoring reach 1, a total of 7 structures were found to have significant problems of concern out of 58 surveyed. Two structures had significant problems of concern out of the 39 structures surveyed at monitoring reach 2, and only 1 structure out of 40 surveyed had significant problems of concern at montoring reach 3. The most severe structural problem along monitoring reach 1 was a rootwad (Station 15+57) where the bank has caved in around the footing, leaving the footing almost completely exposed. In monitoring reach 2, there are two rootwads that have bank failure around the structure and/or structure footing (Station 13+09 and 15+07) where minor piping was observed. At monitoring reach 3 there is a J-hook at Station 13+10 that is missing a center stone. There were small amounts of bank erosion in all monitoring reaches, but none were severe. Only 4% of banks along monitoring reach 1 were impacted by bank erosion, and only 1% of banks along monitoring reaches 2 and 3. It should be noted that evidence of recent beaver activity was noted on October 18th , 2009, at the downstream end of Monitoring Reach 3. No dam was found, but several planted river birch and black willows were chewed. At this time and based on the October 2009 observation, SEPI does not believe the

level of activity represents a threat to the monitoring goals. No bank erosion was noted in the area and the impacted trees are species that have strong root systems that will resprout.

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

METHODOLOGY

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.

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.

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.

Permanent Cross Sections

Four permanent cross sections (two riffles and two pools) were surveyed at Monitoring Reach 1. Two permanent cross sections (one riffle and one pool) were surveyed at Monitoring Reach 2, and six permanent cross sections (3 riffles and 3 pools) were surveyed at Monitoring 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.

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.

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.

REFERENCES

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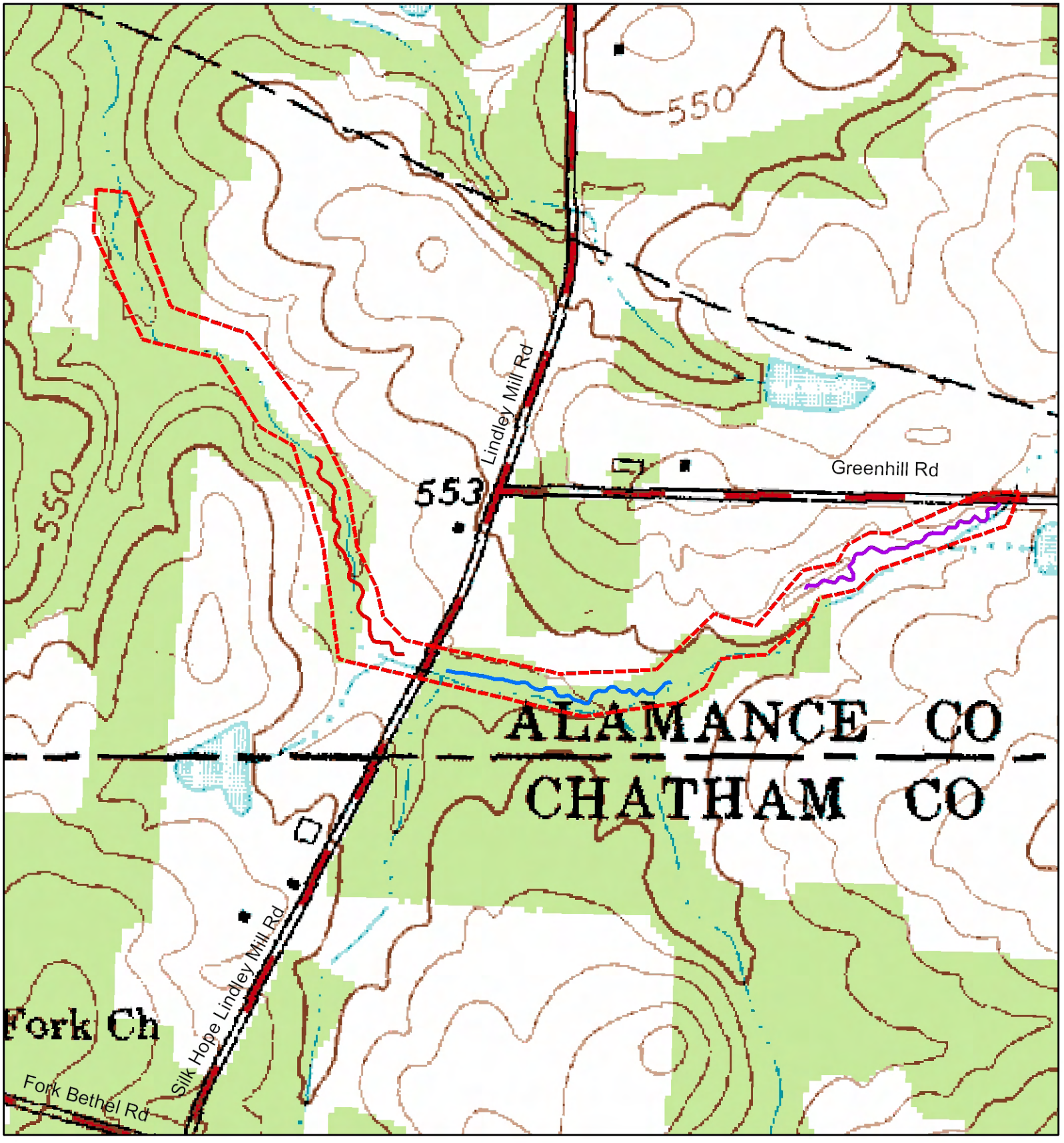
APPENDIX A

GENERAL FIGURES AND PLAN VIEWS



UT SOUTH FORK SITE VICINITY MAP

FIGURE 1
ALAMANCE COUNTY NC

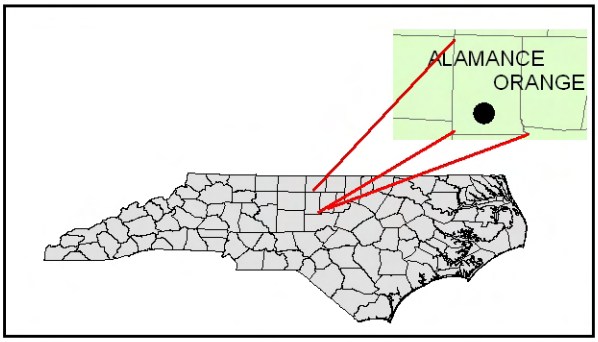
500 250 0 500 Feet

N W E S

Ecosystem Enhancement Program

Legend

- Monitoring Reach 1
- Monitoring Reach 2
- Monitoring Reach 3
- Project Easement



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

CROSS SECTION STAKING			
	NORTHING	EASTING	ELEVATION
XSC 1 LEFT	763207.9909	1898757.6600	559.5123
XSC 1 RIGHT	763307.6006	1898763.3135	561.2426
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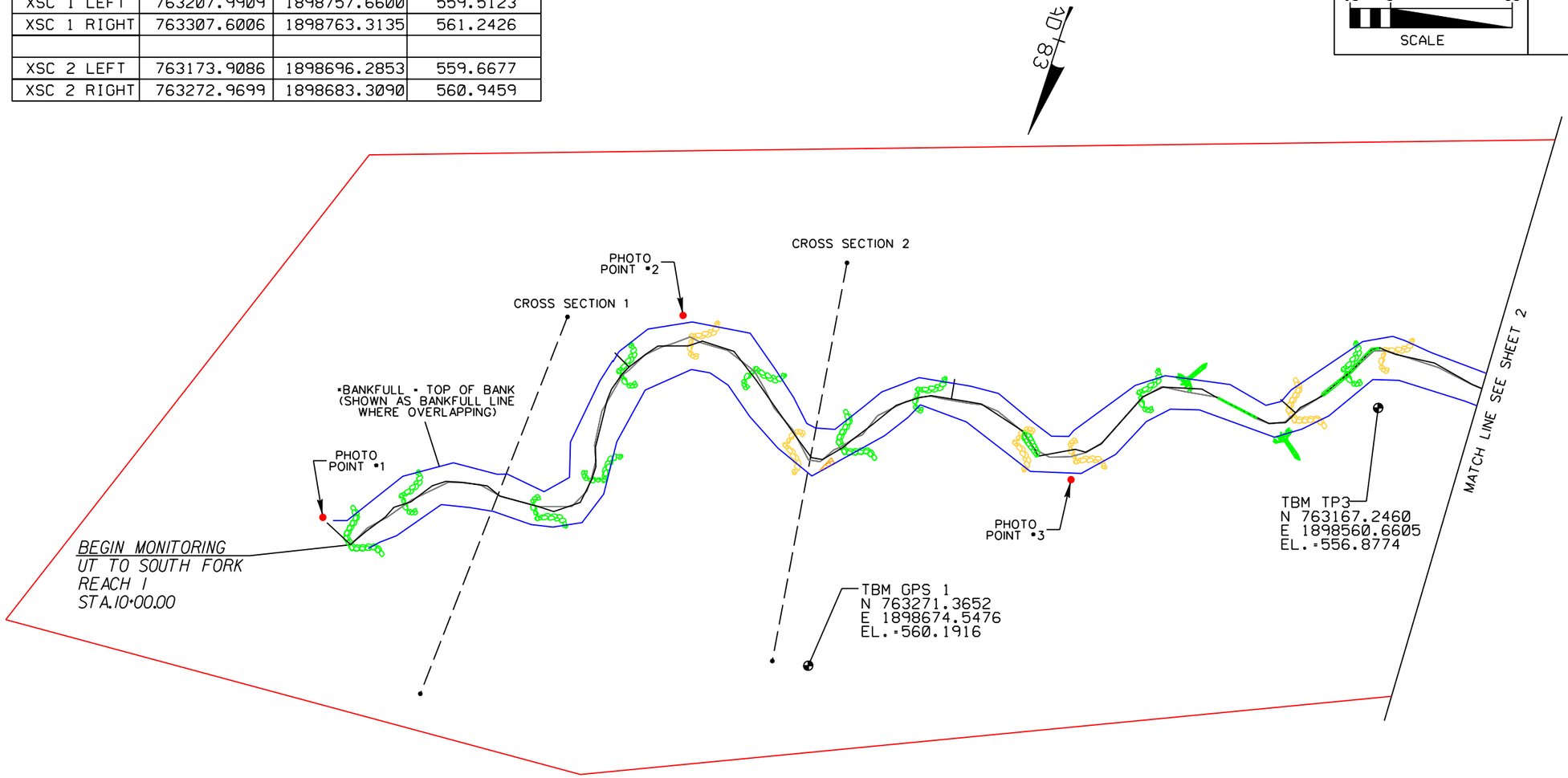

UT TO SOUTH FORK REACH 1

LEGEND

STREAM FEATURES
- THALWEG 2008
- THALWEG 2009
- BANKFULL 2009
- BANK EROSION
- SEVERE BANK EROSION
- AGGRADATION

PROJECT ELEMENTS
- CONTROL POINT/ BENCHMARK (TBM)
- CROSS-SECTIONS
- PHOTO POINT
- EASEMENT BOUNDARY

•SEPI was unable to locate quality aerial photographs for this figure. The old photographs were omitted due to poor quality.

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
CURRENT CONDITIONS PLAN VIEW
FINAL STREAM - YEAR 4

PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY:	
IPJ	
CHECKED BY:	DATE:
PDB	3/9/2009

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PROJECT REFERENCE NO.	SHEET NO.
435	2
PROJECT ENGINEER	

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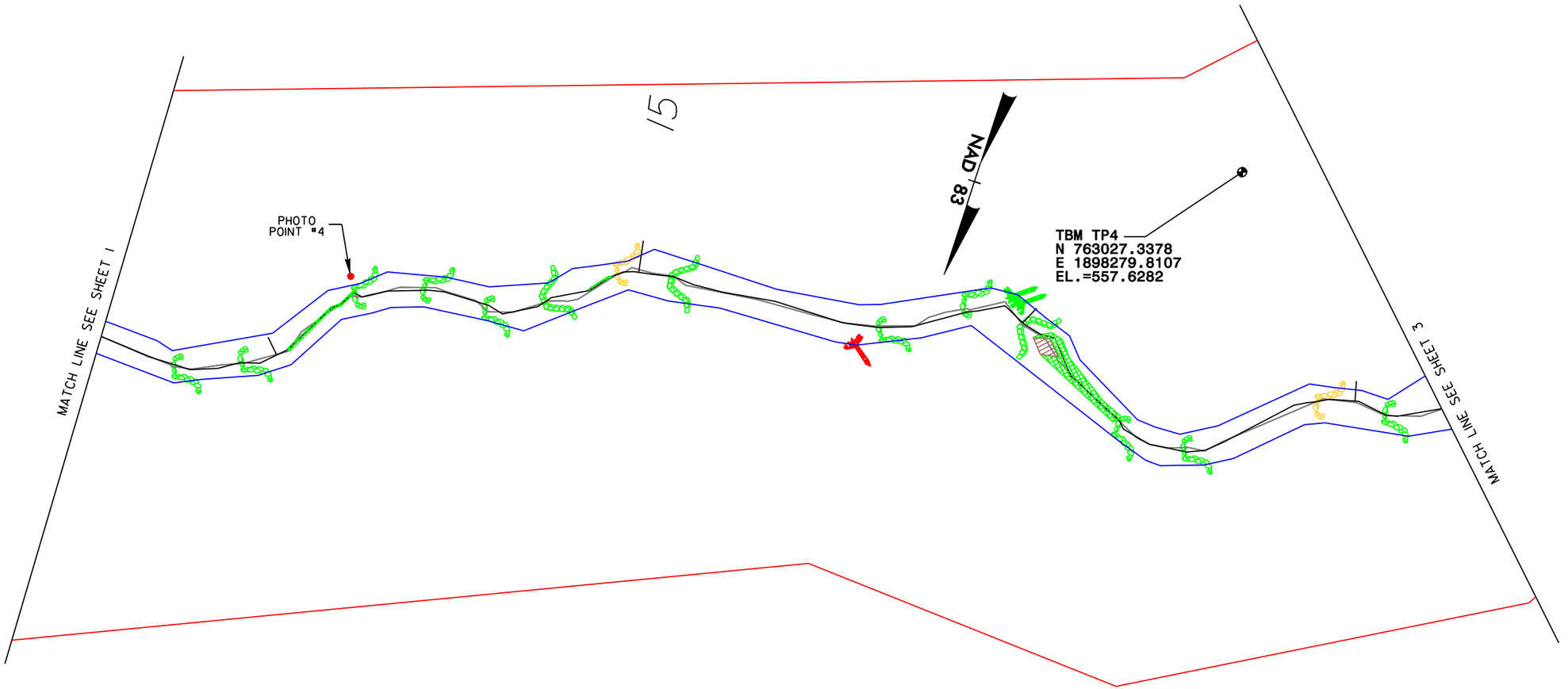
SCALE



UT TO SOUTH FORK
REACH 1

LEGEND

STREAM FEATURES
- THALWEG 2008
- THALWEG 2009
- BANKFULL 2009
- BANK EROSION
- SEVERE BANK EROSION
- AGGRADATION

PROJECT ELEMENTS
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Ecosystem Enhancement PROGRAM

LOCATION:	UT TO SOUTH FORK CREEK CURRENT CONDITIONS PLAN VIEW FINAL STREAM - YEAR 4
PROJ #: 435	COUNTY: ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 3/9/2009

CROSS SECTION STAKING			
	NORTHING	EASTING	ELEVATION
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XSC 4 LEFT	762973.7664	1898215.1833	553.9285
XSC 4 RIGHT	762992.5881	1898174.6097	552.4553

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PROJECT REFERENCE NO.	SHEET NO.
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PROJECT ENGINEER	

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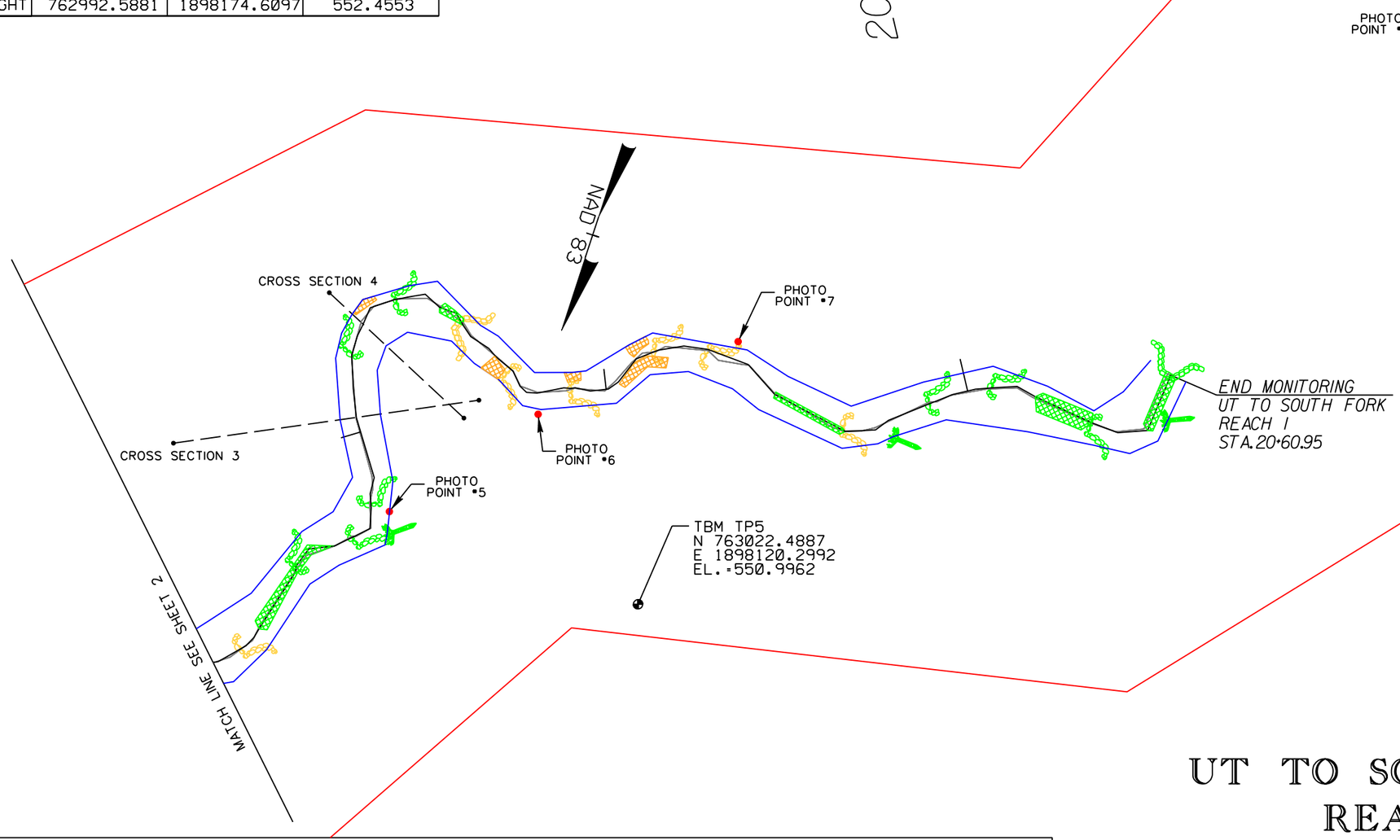

UT TO SOUTH FORK REACH 1

LEGEND

STREAM FEATURES
- THALWEG 2008
- THALWEG 2009
- BANKFULL 2009
- BANK EROSION
- SEVERE BANK EROSION
- AGGRADATION

PROJECT ELEMENTS
- CONTROL POINT/ BENCHMARK (TBM)
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LOCATION: UT TO SOUTH FORK CREEK
CURRENT CONDITIONS PLAN VIEW
FINAL STREAM - YEAR 4

PROJ #:	COUNTY:
435	ALAMANCE
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PROJECT REFERENCE NO.	SHEET NO.
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PROJECT ENGINEER	

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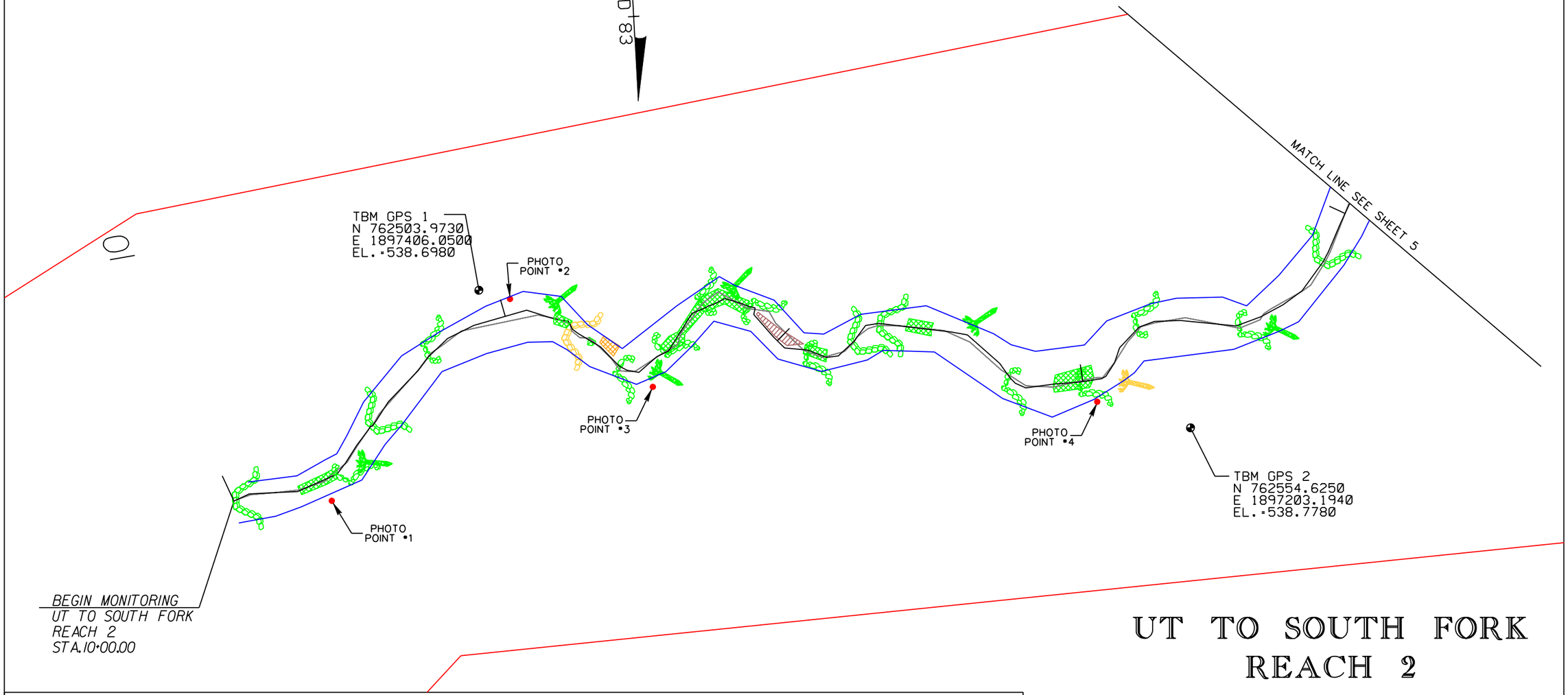
SCALE

NAD 83



UT TO SOUTH FORK REACH 2

LEGEND

STREAM FEATURES
- THALWEG 2008
- THALWEG 2009
- BANKFULL 2009
- BANK EROSION
- SEVERE BANK EROSION
- AGGRADATION

PROJECT ELEMENTS
- CONTROL POINT/ BENCHMARK (TBM)
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Ecosystem Enhancement PROGRAM

LOCATION: UT TO SOUTH FORK CREEK
CURRENT CONDITIONS PLAN VIEW
FINAL STREAM - YEAR 4

PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY:	
IPJ	
CHECKED BY:	DATE:
PDB	3/9/2009

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

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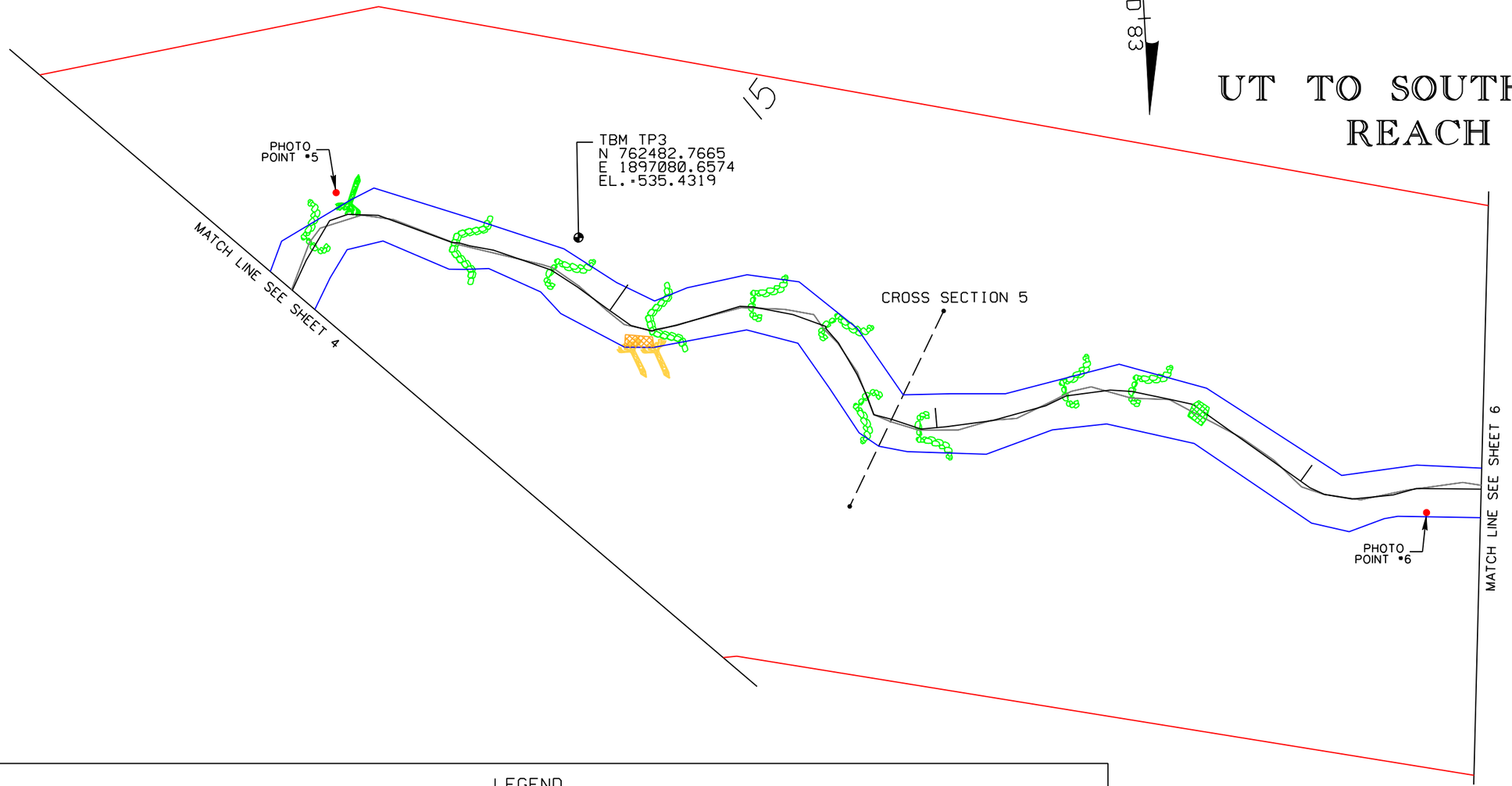
PROJECT REFERENCE NO.	SHEET NO.
435	5
PROJECT ENGINEER	

10 0 30
SCALE

NAD 83

UT TO SOUTH FORK REACH 2



LEGEND

STREAM FEATURES
- THALWEG 2008
- THALWEG 2009
- BANKFULL 2009
- BANK EROSION
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CURRENT CONDITIONS PLAN VIEW
FINAL STREAM - YEAR 4

PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 3/9/2009

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

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PROJECT REFERENCE NO.	SHEET NO.
435	6
PROJECT ENGINEER	

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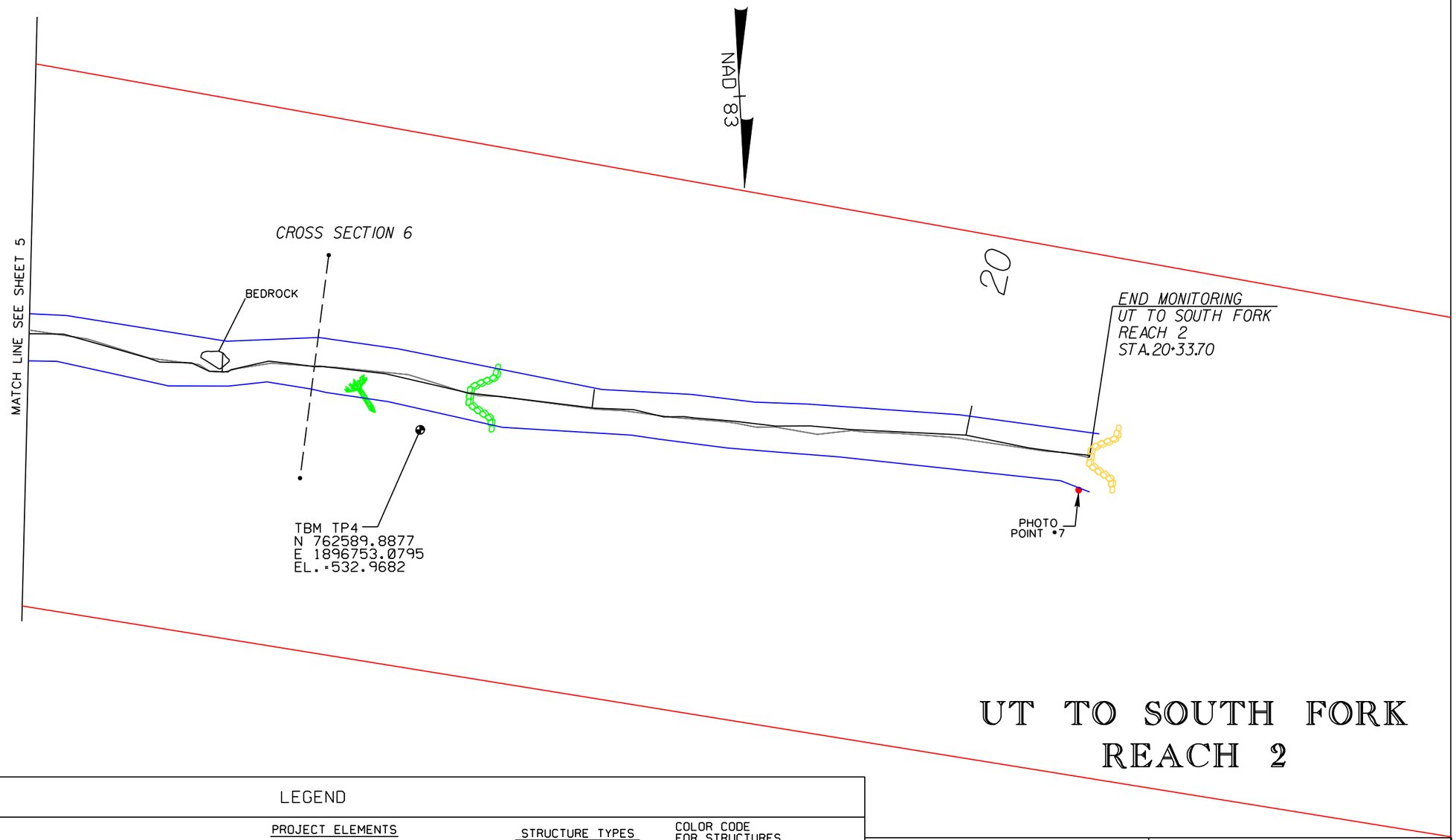

UT TO SOUTH FORK REACH 2

LEGEND

STREAM FEATURES
- THALWEG 2008
- THALWEG 2009
- BANKFULL 2009
- BANK EROSION
- SEVERE BANK EROSION
- AGGRADATION

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Ecosystem Enhancement PROGRAM

LOCATION: UT TO SOUTH FORK CREEK
CURRENT CONDITIONS PLAN VIEW
FINAL STREAM - YEAR 4

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435	ALAMANCE
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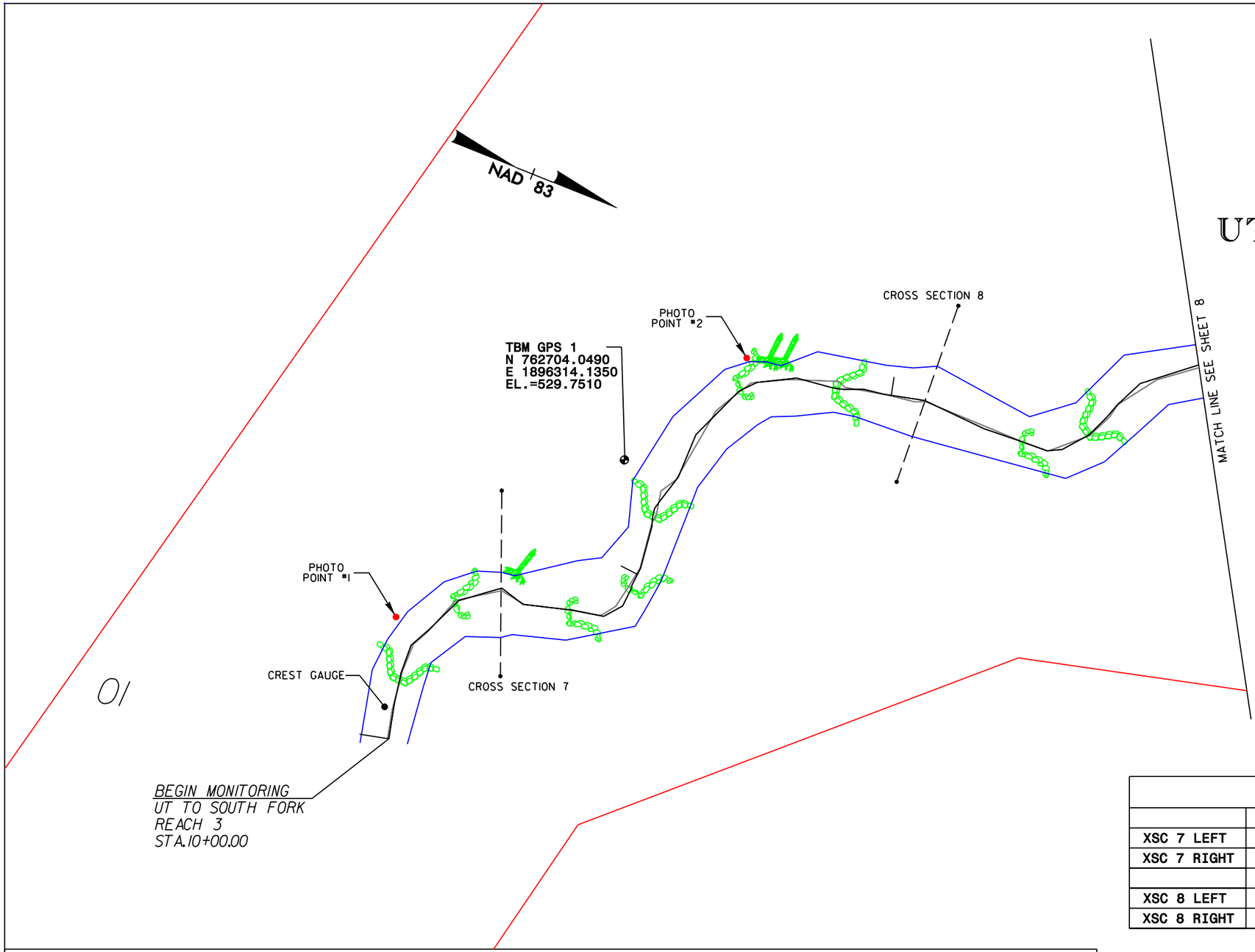
PROJECT REFERENCE NO.	SHEET NO.
435	7
PROJECT ENGINEER	

10 0 30
SCALE

UT TO SOUTH FORK REACH 3



CROSS SECTION STAKING			
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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

LEGEND

STREAM FEATURES
- THALWEG 2008
- THALWEG 2009
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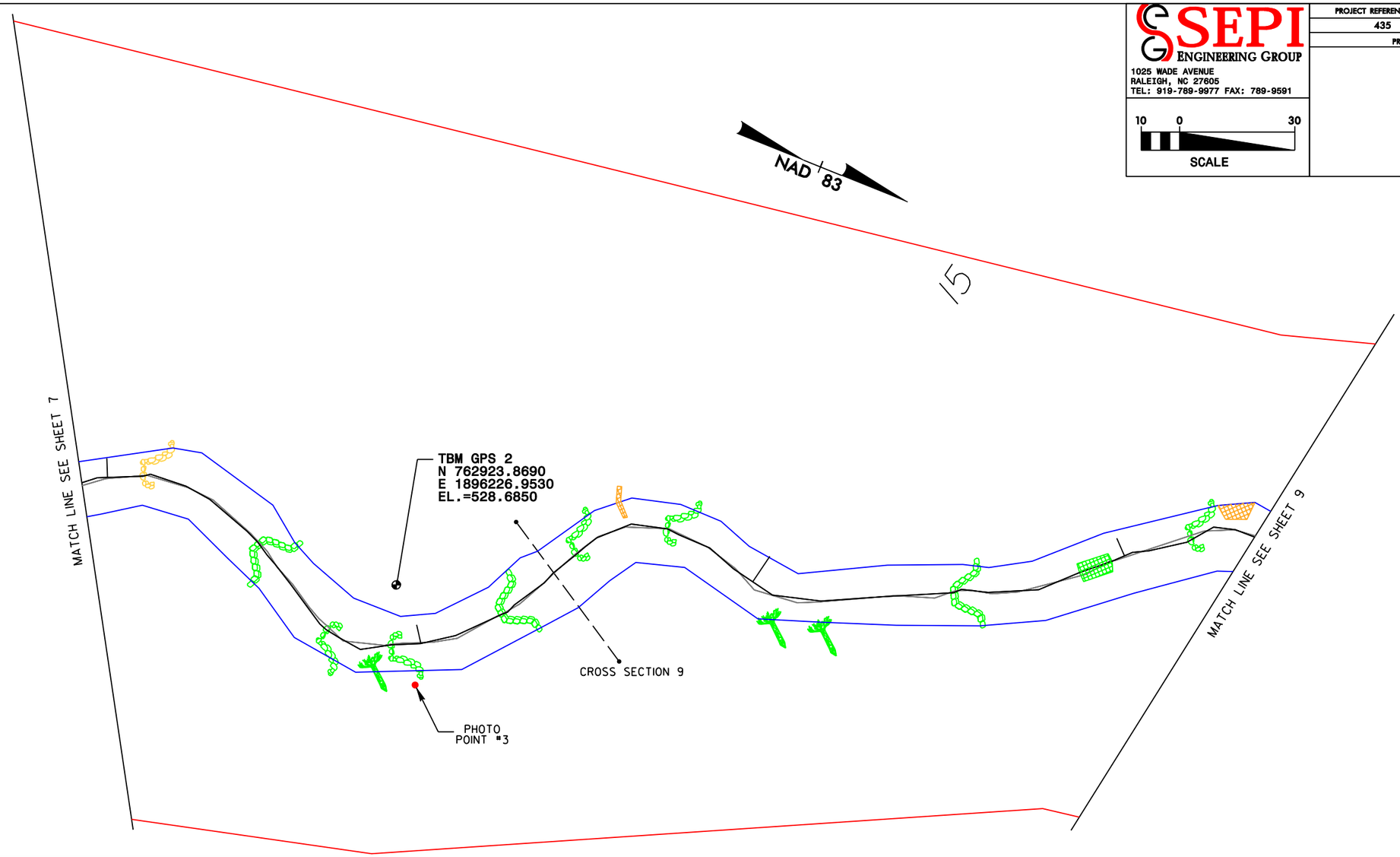
PROJECT REFERENCE NO.	SHEET NO.
435	8
PROJECT ENGINEER	

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

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Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
CURRENT CONDITIONS PLAN VIEW
FINAL STREAM - YEAR 4

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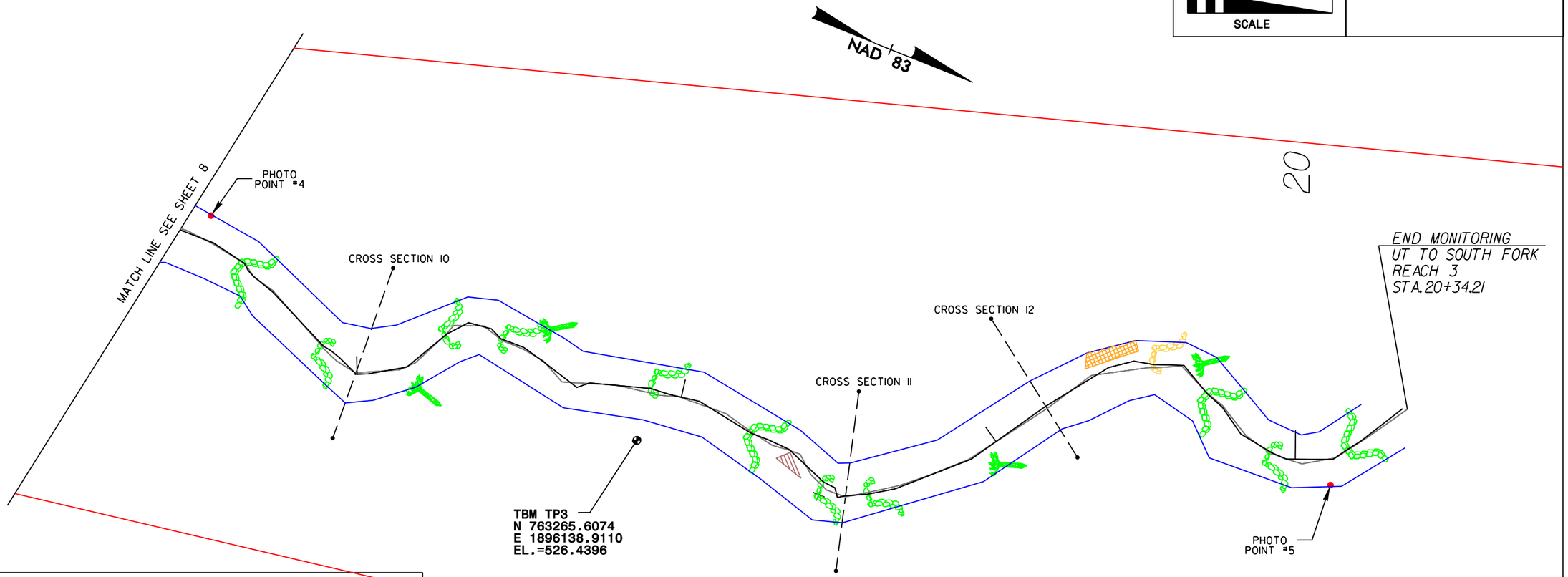
PROJECT REFERENCE NO.	SHEET NO.
435	9
PROJECT ENGINEER	

10 0 30
SCALE



CROSS SECTION STAKING			
	NORTHING	EASTING	ELEVATION
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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

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- AGGRADATION
- BAR FORMATION

PROJECT ELEMENTS
- CONTROL POINT/ BENCHMARK (TBM)
- CROSS-SECTIONS
- PHOTO POINT
- EASEMENT BOUNDARY

•SEPI was unable to locate quality aerial photographs for this figure. The old photographs were omitted due to poor quality.

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
CURRENT CONDITIONS PLAN VIEW
FINAL STREAM - YEAR 4

PROJ #:	COUNTY:
435	ALAMANCE
PREPARED BY: IPJ	
CHECKED BY: PDB	DATE: 3/9/2009

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.

*INVASIVE *LONICERA JAPONICA* IS COMMONLY FOUND ALONG PROJECT CORRIDOR.

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RALEIGH, NC 27605
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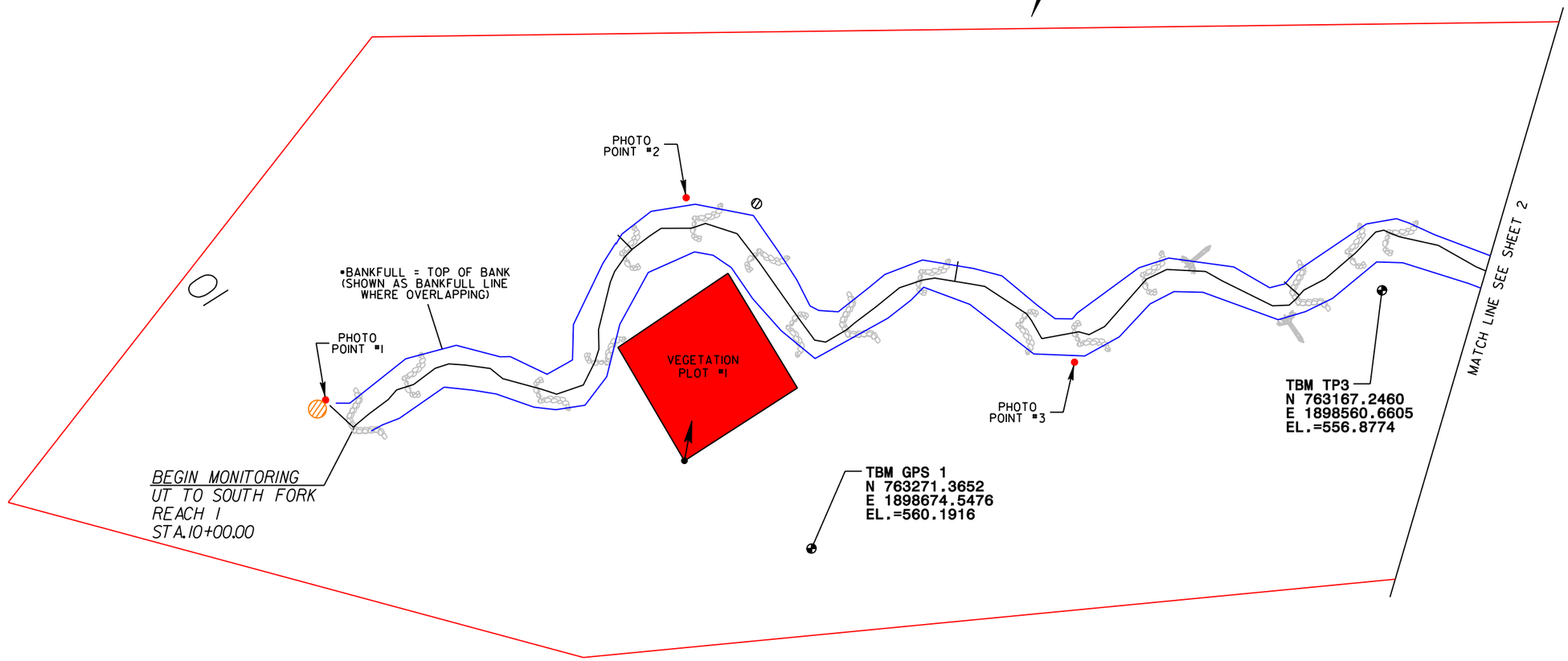
PROJECT REFERENCE NO.	SHEET NO.
435	1
PROJECT ENGINEER	

10 0 30
SCALE

NAD 83



UT TO SOUTH FORK REACH 1

LEGEND

- THALWEG 2009
- BANKFULL 2009
- EASEMENT BOUNDARY
- 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
- *LIGUSTRUM SINENSE* PRESENT
- *AILANTHUS ALTISSIMA* PRESENT

Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
CURRENT CONDITIONS PLAN VIEW
FINAL VEGETATION - YEAR 4

PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 3/9/2009

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

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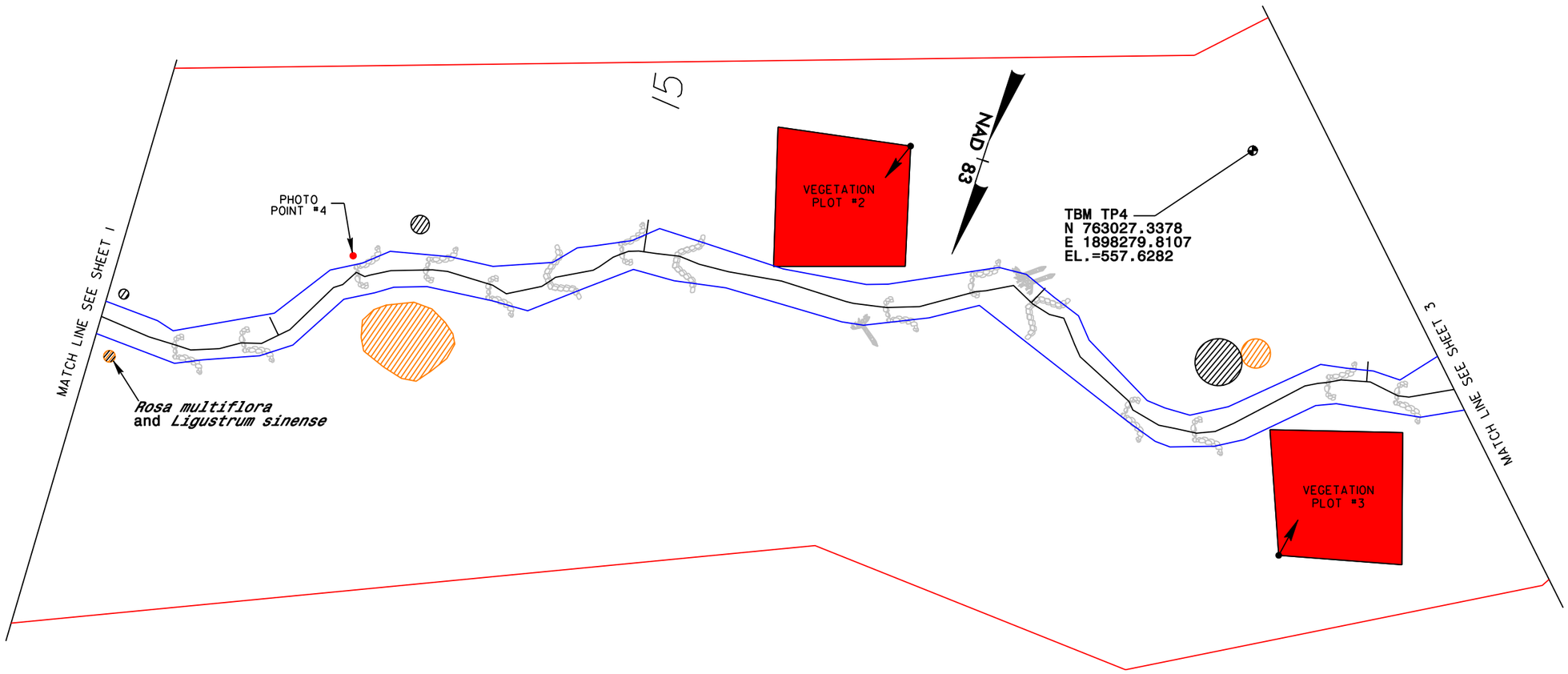
*INVASIVE *LONICERA JAPONICA* IS COMMONLY FOUND ALONG PROJECT CORRIDOR.



UT TO SOUTH FORK REACH 1

LEGEND

- THALWEG 2009
- BANKFULL 2009
- EASEMENT BOUNDARY
- 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
- *LIGUSTRUM SINENSE* PRESENT
- *AILANTHUS ALTISSIMA* PRESENT

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PROJECT REFERENCE NO.	SHEET NO.
435	2

PROJECT ENGINEER

10 0 30
SCALE

Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
CURRENT CONDITIONS PLAN VIEW
FINAL VEGETATION - YEAR 4

PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 3/9/2009

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

*INVASIVE *LONICERA JAPONICA* IS COMMONLY FOUND ALONG PROJECT CORRIDOR.

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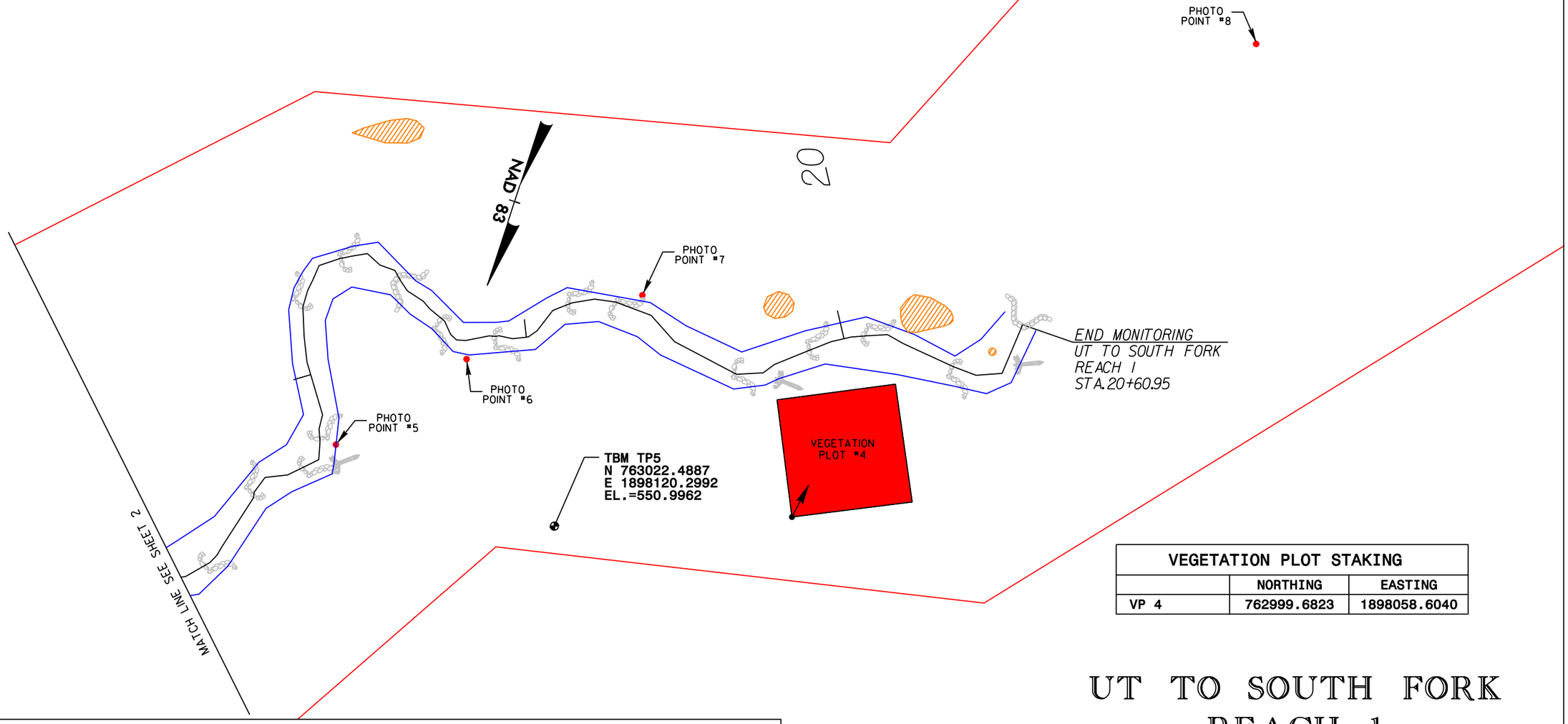
PROJECT REFERENCE NO.	SHEET NO.
435	3
PROJECT ENGINEER	

10 0 30
SCALE



VEGETATION PLOT STAKING		
	NORTHING	EASTING
VP 4	762999.6823	1898058.6040

UT TO SOUTH FORK REACH 1

LEGEND

- THALWEG 2009
- BANKFULL 2009
- EASEMENT BOUNDARY
- 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
- *LIGUSTRUM SINENSE* PRESENT
- *AILANTHUS ALTISSIMA* PRESENT

Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
CURRENT CONDITIONS PLAN VIEW
FINAL VEGETATION - YEAR 4

PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 3/9/2009

*INVASIVE *LONICERA JAPONICA* IS COMMONLY FOUND ALONG PROJECT CORRIDOR.

NAD 83

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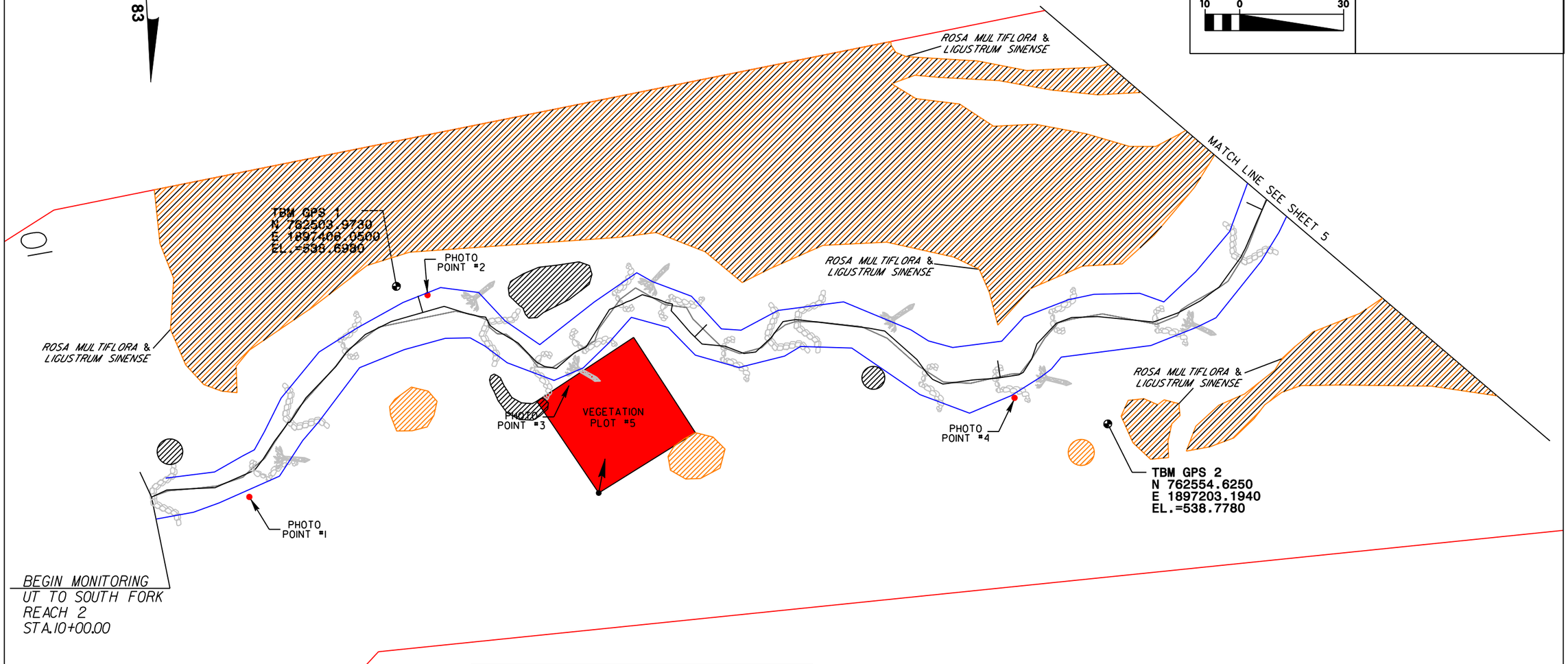
SCALE
10 0 30

PROJECT REFERENCE NO.	SHEET NO.
435	4
PROJECT ENGINEER	



VEGETATION PLOT STAKING		
	NORTHING	EASTING
VP 5	762567.3856	1897350.9904

LEGEND

- THALWEG 2009
- BANKFULL 2009
- EASEMENT BOUNDARY
- 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
- *LIGUSTRUM SINENSE* PRESENT
- *AILANTHUS ALTISSIMA* PRESENT

UT TO SOUTH FORK REACH 2

Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
CURRENT CONDITIONS PLAN VIEW
FINAL VEGETATION - YEAR 4

PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 3/9/2009

SEPI ENGINEERING GROUP
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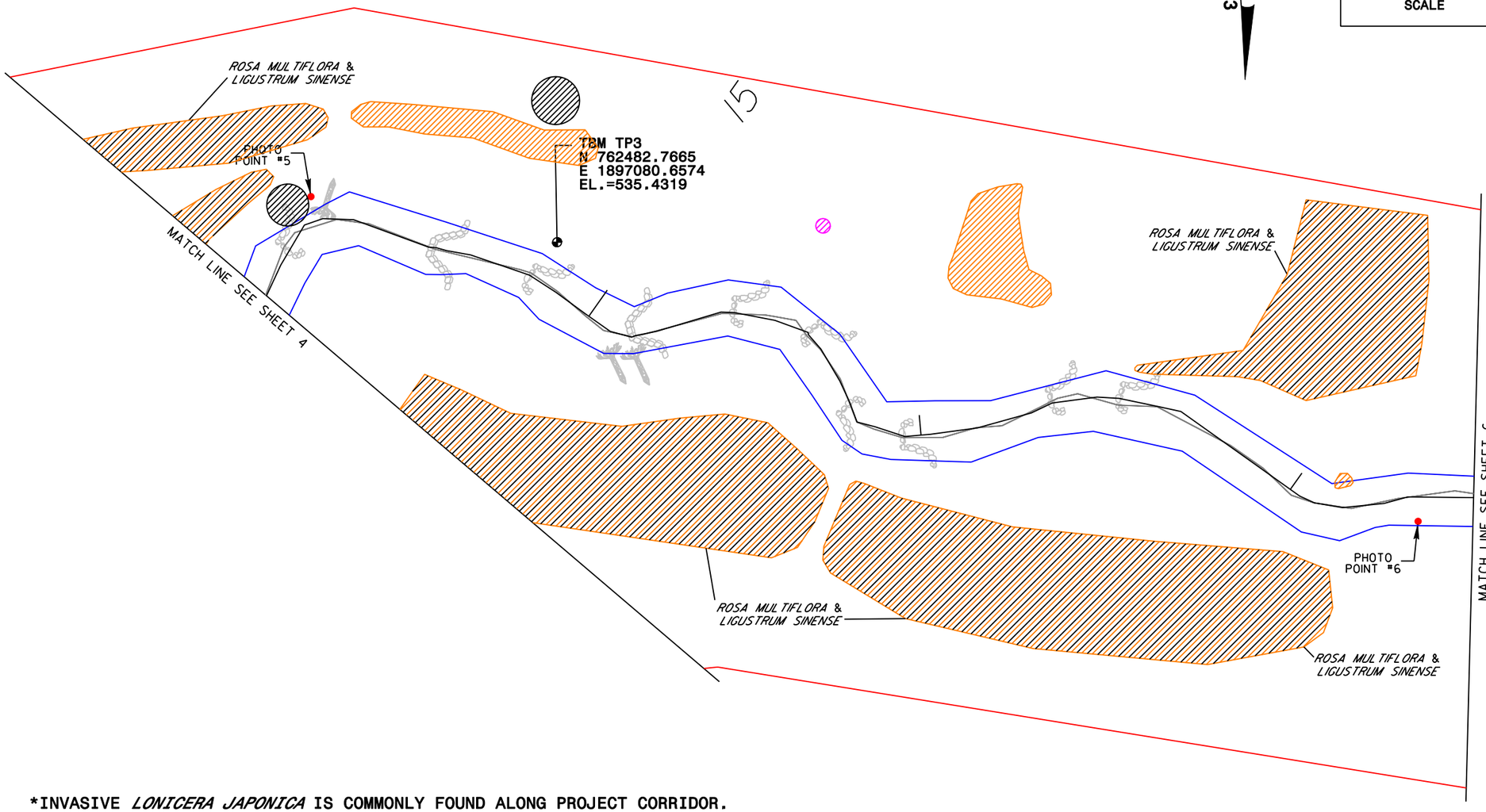
TEL: 919-789-9977 FAX: 789-9591

PROJECT REFERENCE NO.	SHEET NO.
435	5
PROJECT ENGINEER	

10 0 30
SCALE

NAD 83



*INVASIVE *LONICERA JAPONICA* IS COMMONLY FOUND ALONG PROJECT CORRIDOR.

LEGEND

- THALWEG 2009
- BANKFULL 2009
- EASEMENT BOUNDARY
- 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
- *LIGUSTRUM SINENSE* PRESENT
- *AILANTHUS ALTISSIMA* PRESENT

UT TO SOUTH FORK REACH 2

Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
CURRENT CONDITIONS PLAN VIEW
FINAL VEGETATION - YEAR 4

PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 3/9/2009

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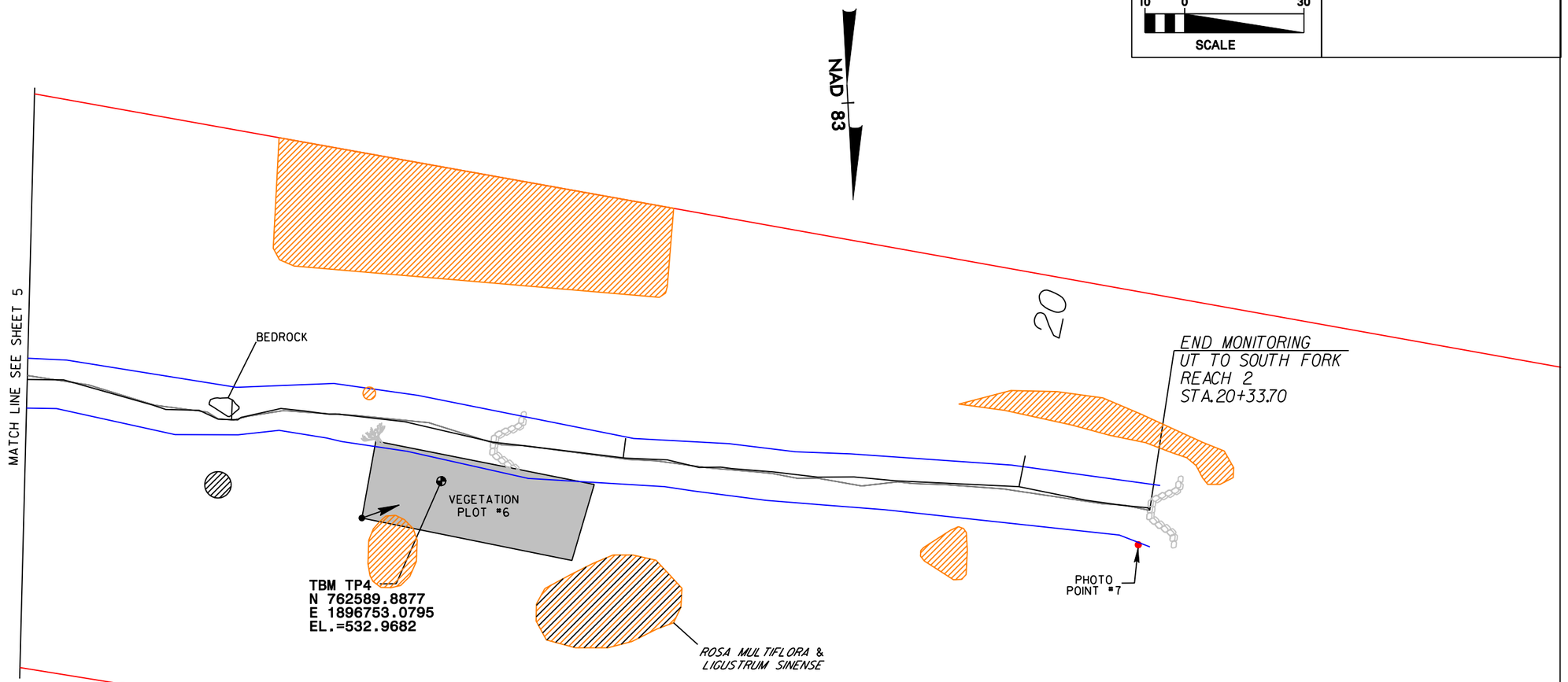
PROJECT REFERENCE NO.	SHEET NO.
435	6
PROJECT ENGINEER	

10 0 30
SCALE



VEGETATION PLOT STAKING		
	NORTHING	EASTING
VP 6	762598.0885	1896773.5260

*INVASIVE *LONICERA JAPONICA* IS COMMONLY FOUND ALONG PROJECT CORRIDOR.

UT TO SOUTH FORK REACH 2

LEGEND

- THALWEG 2009
- BANKFULL 2009
- EASEMENT BOUNDARY
- 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
- *LIGUSTRUM SINENSE* PRESENT
- *AILANTHUS ALTISSIMA* PRESENT

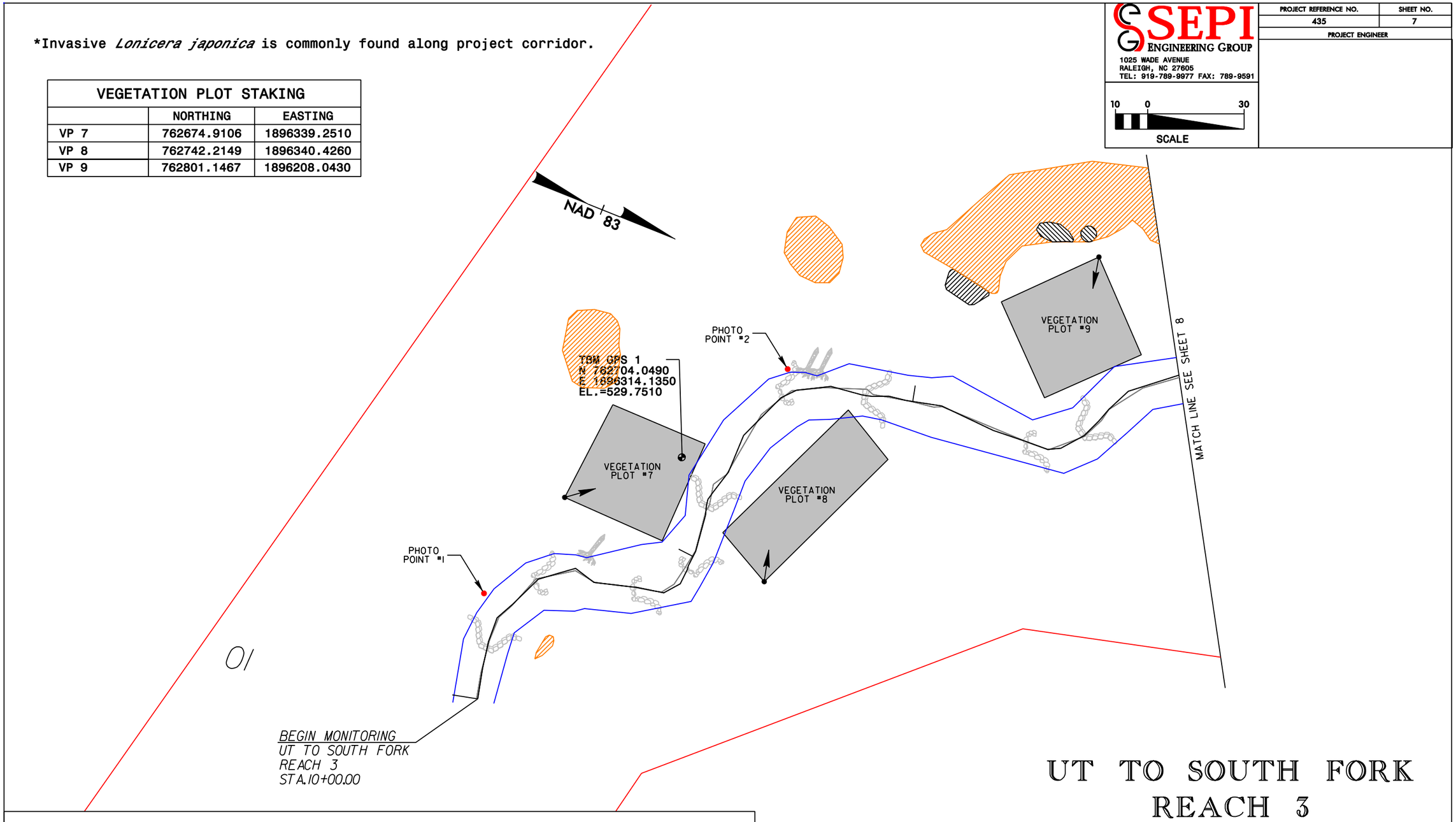
Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
CURRENT CONDITIONS PLAN VIEW
FINAL VEGETATION - YEAR 4

PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 3/9/2009

*Invasive *Lonicera japonica* is commonly found along project corridor.

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



LEGEND

- THALWEG 2009
- BANKFULL 2009
- EASEMENT BOUNDARY
- 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
- *LIGUSTRUM SINENSE* PRESENT
- *AILANTHUS ALTISSIMA* PRESENT

UT TO SOUTH FORK REACH 3

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10 0 30
SCALE

PROJECT REFERENCE NO.	SHEET NO.
435	7
PROJECT ENGINEER	

Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
CURRENT CONDITIONS PLAN VIEW
FINAL VEGETATION - YEAR 4

PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 3/9/2009

SEPI ENGINEERING GROUP
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RALEIGH, NC 27605
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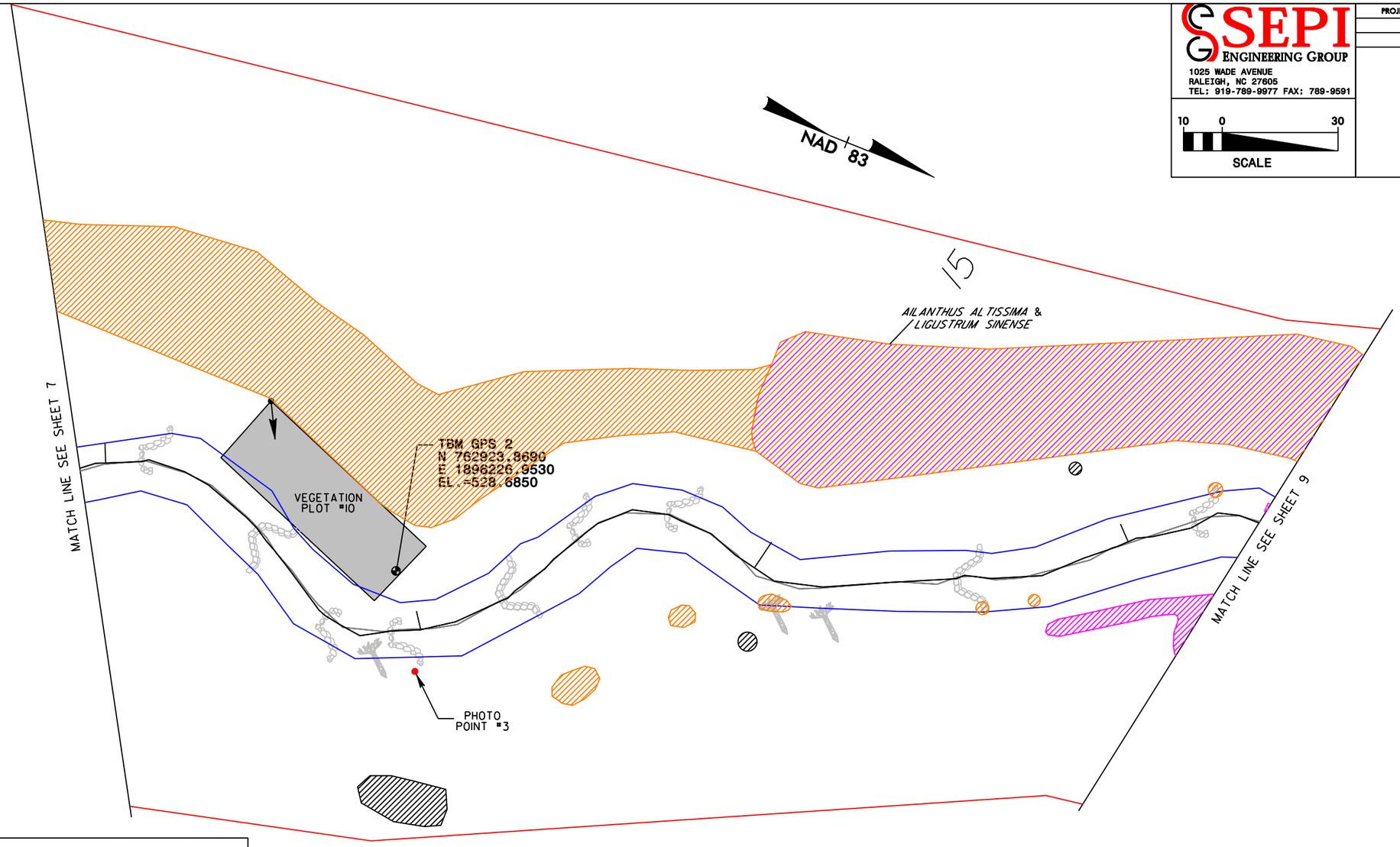
PROJECT REFERENCE NO.	SHEET NO.
435	8
PROJECT ENGINEER	

10 0 30
SCALE



VEGETATION PLOT STAKING		
	NORTHING	EASTING
VP 10	762877.3945	1896198.1740

*Invasive *Lonicera japonica* is commonly found along project corridor.

LEGEND

- THALWEG 2009
- BANKFULL 2009
- EASEMENT BOUNDARY
- 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
- *LIGUSTRUM SINENSE* PRESENT
- *AILANTHUS ALTISSIMA* PRESENT

UT TO SOUTH FORK REACH 3

Ecosystem Enhancement PROGRAM

LOCATION:
UT TO SOUTH FORK CREEK
CURRENT CONDITIONS PLAN VIEW
FINAL VEGETATION - YEAR 4

PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 3/9/2009

*Invasive *Lonicera japonica* is commonly found along project corridor.

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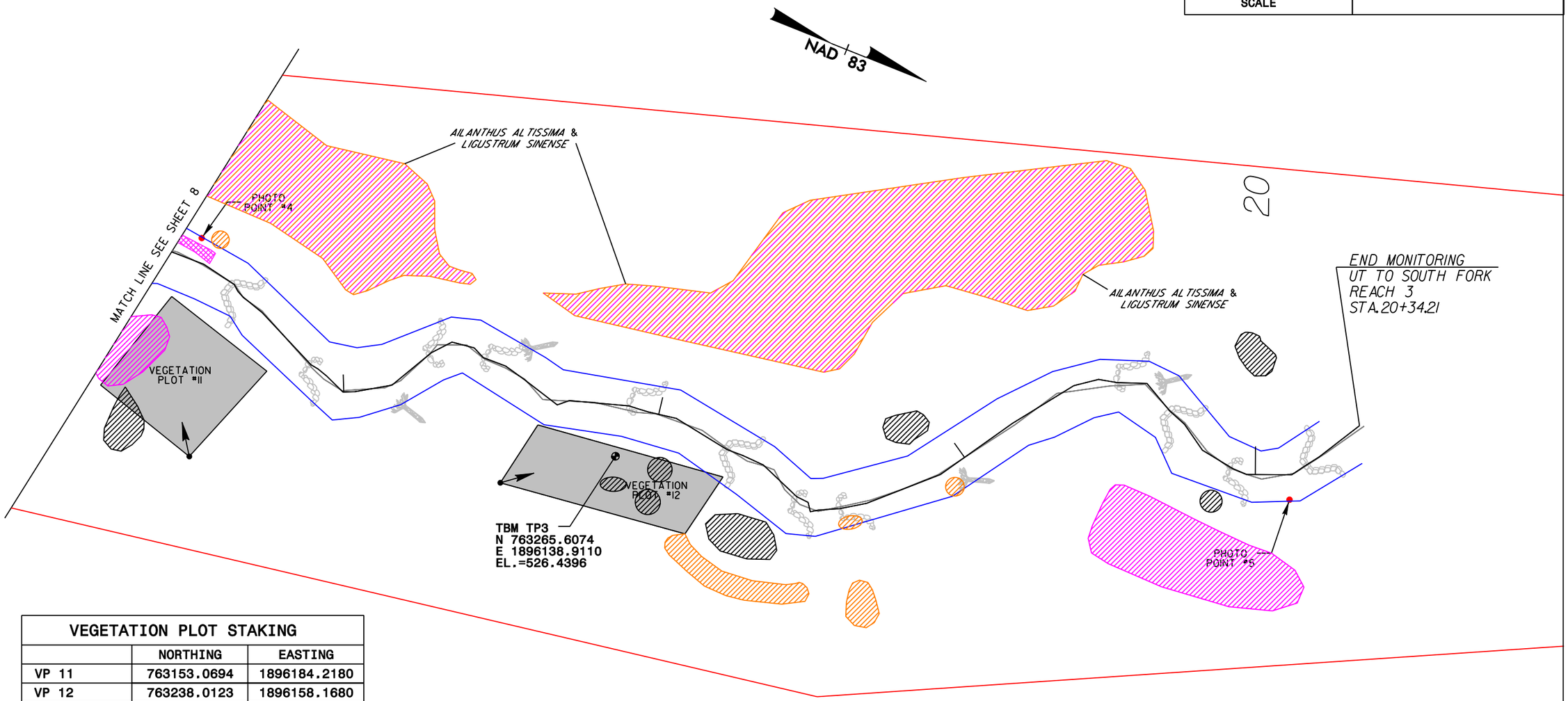
PROJECT REFERENCE NO.	SHEET NO.
435	9
PROJECT ENGINEER	

10 0 30
SCALE



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

LEGEND

- THALWEG 2009
- BANKFULL 2009
- EASEMENT BOUNDARY
- 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
- *LIGUSTRUM SINENSE* PRESENT
- *AILANTHUS ALTISSIMA* PRESENT

UT TO SOUTH FORK REACH 3

Ecosystem Enhancement PROGRAM

LOCATION: UT TO SOUTH FORK CREEK
CURRENT CONDITIONS PLAN VIEW
FINAL VEGETATION - YEAR 4

PROJ #:	COUNTY:
435	ALAMANCE
MONITORED BY: IPJ	
CHECKED BY: PDB	DATE: 3/9/2009

APPENDIX B

GENERAL PROJECT TABLES

Table 1. 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	1,525	Restoration	P I	1,503	10+00 to 26+03	Reach 1 - 10+00 – 20+57.63	New channel construction
Subreach 2	600	Restoration	P I, PII	710	26+03 to 33+13	Reach 2 - 10+00 – 20+33.78	Modified pattern, dimension & profile
Subreach 3	887	Enhancement Level I	P II, P III	887	33+13 to 42+00		Modified dimension & profile
Subreach 4	2,795	Restoration	P I, P II	2,837	42+00 to 70+37	Reach 3 - 10+00 – 20+32.36	Modified pattern, dimension & profile

* – Estimations based upon the design length from the Restoration Design Report for the project. SEPI does not currently posses as-built documentation.

** – 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.

Table 2. 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 2010 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	October 2009	November 15, 2009
Year 5 monitoring	December 1, 2010		

Table 3. 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 2010 monitoring report.

Table 4. 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

APPENDIX C

VEGETATION ASSESSMENT DATA

APPENDIX C
PHOTOLOG UT to SOUTH FORK

VEGETATION PLOTS


Photo 1: Vegetation Plot 1 (10-18-2009).


Photo 2: Vegetation Plot 2 (10-18-2009).


Photo 3: Vegetation Plot 3 (10-18-2009).


Photo 4: Vegetation Plot 4 (10-18-2009).


Photo 5: Vegetation Plot 5 (10-18-2009).


Photo 6: Vegetation Plot 6 (10-18-2009).


Photo 7: Vegetation Plot 7 (10-18-2009).


Photo 8: Vegetation Plot 8 (10-18-2009).


Photo 9: Vegetation Plot 9 (10-18-2009).


Photo 10: Vegetation Plot 10 (10-18-2009).


Photo 11: Vegetation Plot 11 (10-18-2009).


Photo 12: Vegetation Plot 12 (10-18-2009).

APPENDIX D

STREAM ASSESSMENT DATA

APPENDIX D
PHOTOLOG – UT SOUTH FORK (REACH 1)

CROSS-SECTIONS & PHOTOPOINTS

Cross-Section 1: View Upstream (2-11-2009).

Cross-Section 1: View Downstream (2-11-2009).

Cross-Section 2: View Upstream (2-11-2009).

Cross-Section 2: View Downstream (2-11-2009).

Cross-Section 3: View Upstream (2-12-2009).

Cross-Section 3: View Downstream (2-12-2009).

Cross-Section 4: View Upstream (2-12-2009).

Cross-Section 4: View Downstream (2-12-2009).

Photo point 1: View Upstream (2-11-2009).

Photo point 1: View Downstream (2-11-2009).

Photo point 2: View Upstream (2-11-2009).

Photo point 2: View Downstream (2-11-2009).

Photo point 3: View Upstream (2-11-2009).

Photo point 3: View Downstream (2-11-2009).

Photo point 4: View Upstream (2-11-2009).

Photo point 4: View Downstream (2-11-2009).

Photo point 5: View Upstream (2-12-2009).

Photo point 5: View Downstream (2-12-2009).

Photo point 6: View Upstream (2-12-2009).

Photo point 6: View Downstream (2-12-2009).

Photo point 7: View Upstream (2-12-2009).

Photo point 7: View Downstream (2-12-2009).

Photo point 8: View Upstream (3-12-2009).

Photo point 8: View Downstream (3-12-2009).

Photo point 8: Facing Channel (3-12-2009).

APPENDIX D
PHOTOLOG – UT SOUTH FORK (REACH 2)

CROSS-SECTIONS & PHOTOPOINTS


Cross-Section 5: View Upstream (2-17-2009).


Cross-Section 5: View Downstream (2-17-2009).


Cross-Section 6: View Upstream (2-17-2009).


Cross-Section 6: View Downstream (2-17-2009).

Photo point 1: View Upstream (2-17-2009).

Photo point 1: View Downstream (2-17-2009).

Photo point 2: View Upstream (2-17-2009).

Photo point 2: View Downstream (2-17-2009).

Photo point 3: View Upstream (2-17-2009).

Photo point 3: View Downstream (2-17-2009).

Photo point 4: View Upstream (2-17-2009).

Photo point 4: View Downstream (2-17-2009).

Photo point 5: View Upstream (2-17-2009).

Photo point 5: View Downstream (2-17-2009).

Photo point 6: View Upstream (2-17-2009).

Photo point 6: View Downstream (2-17-2009).

Photo point 7: View Upstream (2-17-2009).

Photo point 7: View Downstream (2-17-2009).

APPENDIX D
PHOTOLOG – UT SOUTH FORK (REACH 3)

CROSS-SECTION & PHOTOPOINTS


Cross-Section 7: View Upstream (2-26-2009).


Cross-Section 7: View Downstream (2-26-2009).


Cross-Section 8: View Upstream (2-26-2009).


Cross-Section 8: View Downstream (2-26-2009).


Cross-Section 9: View Upstream (2-26-2009).


Cross-Section 9: View Downstream (2-26-2009).

Cross-Section 10: View Upstream (3-4-2009).

Cross-Section 10: View Downstream (3-4-2009).

Cross-Section 11: View Upstream (3-4-2009).

Cross-Section 11: View Downstream (3-4-2009).

Cross-Section 12: View Upstream (3-4-2009).

Cross-Section 12: View Downstream (3-4-2009).

Photo point 1: View Upstream (2-26-2009).

Photo point 2: View Upstream (2-26-2009).

Photo point 1: View Downstream (2-26-2009).

Photo point 2: View Downstream (2-26-2009).

Photo point 1: Facing Channel (2-26-2009).

Photo point 2: Facing Channel (2-26-2009).

Photo point 3: View Upstream (2-26-2009).

Photo point 4: View Upstream (3-4-2009).

Photo point 3: View Downstream (2-26-2009).

Photo point 4: View Downstream (3-4-2009).

Photo point 3: Facing Channel (2-26-2009).

Photo point 4: Facing Channel (3-4-2009).


Photo point 5: View Upstream (3-4-2009).


Photo point 5: View Downstream (3-4-2009).


Photo point 5: Facing Channel (3-4-2009).

Table 5. Vegetation Plot Mitigation Success Summary Table			
Tract	**Vegetation Plot ID**	**Vegetation Survival Threshold Met?**	**Tract Mean (Stems per Acre)**
UT South Fork Monitoring Reach 1	1	No	140
	2	No	
	3	No	
	4	No	
UT South Fork Monitoring Reach 2	5	No	620
	6	Yes	
UT South Fork Monitoring Reach 3	7	Yes	833
	8	Yes	
	9	Yes	
	10	Yes	
	11	Yes	
	12	Yes	

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**	**Year 4 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 1)	3 (LS 31)	3 (LS 31)	2 (LS 31)	2 (LS 27)	85.3%
Salix nigra													1	1	0	0	0.0%
Trees																	
Acer negundo											1		1	1	1	1	100.0%
Acer rubrum				5			1						7	6	6	6	85.7%
Betula nigra							1	2	1	10	3	7	31	27	27	24	77.4%
Carpinus caroliniana													2	0	0	0	0.0%
Diospyros virginiana						1	2	3	0	3	1	0	18	16	13	10	55.6%
Fraxinis pennsylvanica	3		3	1	3		8	4	10	15	1	3	70	63	59	51	72.9%
Symphoricarpos orbiculatus			2							1			4	4	4	3	75.0%
Juglans nigra									2	0		0	27	8	5	2	7.4%
Platanus occidentalis						10	13	1	1		1	2	32	30	30	28	87.5%
Sambucus canandensis					2								5	2	2	2	40.0%
Quercus michauxii									1	5	2	2	14	10	10	10	71.4%
Quercus sp.							1						1	1	1	1	100.0%
Quercus alba								1					10	7	5	1	10.0%
Ulmus americana							1				1		3	2	2	2	66.7%
Total including live stake	3	0	5	6	5	26	27	11	16	41	15	15	260	212	195	170	65.4%
Stems per acre	120	0	200	240	200	1040	1080	440	640	1640	600	600	867	707	650	567	
Total excluding live stake	3	0	5	6	5	11	27	11	15	39	10	14	229	181	164	146	63.8%
Stems per acre	120	0	200	240	200	440	1080	440	600	1560	400	560	763	603	547	487	

**Volunteers of the following species, not initially recorded as planted, were counted: Cornus ammomum (VP 6, 7, 9, 10, 11), Acer negundo (VP 7, 10, 12), Acer rubrum (VP Betula nigra (VP 9, 11), Fraxinis pennsylvanica (VP 1, 4, 7, 12), Quercus michauxii (VP 10, 11), Juglans nigra (VP 3), Platanus occidentalis (VP 6, 7, 9), Baccharis halimifoli Symphoricarpos orbiculatus (VP 4, 5, 10, 11), Celtis laevigata (VP 10, 12), Liquidambar styraciflua (VP 1, 7, 8, 9, 10), Quercus sp. (VP 7, 8, 10, 12), Quercus alba (VP 6), Diospyros virginiana (VP 9, 10, 11, 12), Sambucus canandensis (VP 6), Ulmus americana (VP 7, 8, 12), Pinus taeda (VP 3, 8, 9, 10, 12), Cercis canadensis (VP 5), Juniperus virginiana (VP 8), Salix nigra (VP 11) and Ailanthus altissima (VP 11).*

**Liquidambar styraciflua were too numerous to count in vegetation plots 8, 9, and 10.*

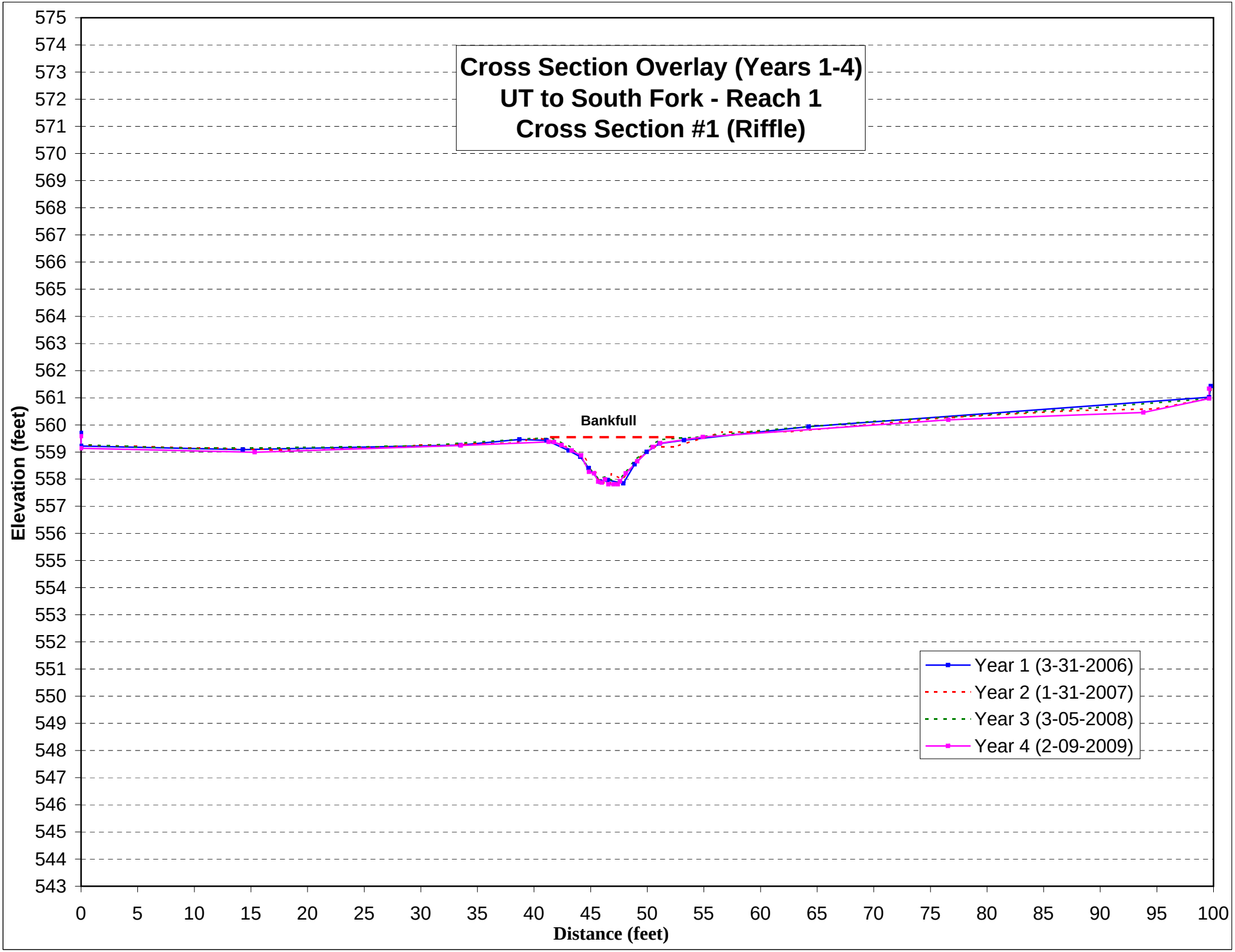
Table B2 a. Visual Morphological Stability Assessment						
UT to South Fork						
Segment/Reach: 1 (1152 feet)						
Feature Category	**Metric (per As-built and reference baselines)**	**(#Stable) Number Performing as Intended**	**Total Number per As-built**	**Total Number / feet in unstable state**	**% Performing in Stable Condition**	**Feature Performance Mean or Total**
A. Riffles	1. Present	22	28	NA	79%	
	2. Armor stable	18	28	NA	64%	
	3. Facet grade appears stable	22	28	NA	79%	
	4. Minimal evidence of embedding/fining	12	28	NA	43%	
	5. Length appropriate	21	28	NA	75%	**68%**
B. Pools	1. Present	23	25	NA	92%	
	2. Sufficiently deep	23	25	NA	92%	
	3. Length appropriate	18	25	NA	72%	**85%**
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	22	26	NA	85%	
	2. Of those eroding, # w/concomitant point bar formation	2	4	NA	50%	
	3. Apparent Rc within specifications	23	26	NA	88%	
	4. Sufficient floodplain access and relief	26	26	NA	100%	**81%**
E. Bed General	1. General channel bed aggradation areas (bar formation)	NA	NA	11/182.5	83%	
	2. Channel bed degradation - areas of increasing down cutting or head cutting	NA	NA	0/0	100%	**91%**
F. Bank Condition	1. Actively eroding, wasting, or slumping bank	NA	NA	9/84	96%	**96%**
G. Vanes / J Hooks etc.	1. Free of back or arm scour	48	50	NA	96%	
	2. Height appropriate	45	50	NA	90%	
	3. Angle and geometry appear appropriate	49	50	NA	98%	
	4. Free of piping or other structural failures	37	50	NA	74%	**90%**
H. Wads and Boulders	1. Free of scour	7	8	NA	88%	
	2. Footing stable	7	8	NA	88%	**88%**

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	8	13	NA	62%	
	5. Length appropriate	12	13	NA	92%	**80%**
B. Pools	1. Present	13	14	NA	93%	
	2. Sufficiently deep	13	14	NA	93%	
	3. Length appropriate	12	14	NA	86%	**90%**
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	13	14	NA	93%	
	2. Of those eroding, # w/concomitant point bar formation	1	1	NA	100%	
	3. Apparent Rc within specifications	13	14	NA	93%	
	4. Sufficient floodplain access and relief	14	14	NA	100%	**96%**
E. Bed General	1. General channel bed aggradation areas (bar formation)	NA	NA	7/103.5	90%	
	2. Channel bed degradation - areas of increasing down cutting or head cutting	NA	NA	0/0	100%	**95%**
F. Bank Condition	1. Actively eroding, wasting, or slumping bank	NA	NA	2/11	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	26	28	NA	93%	**98%**
H. Wads and Boulders	1. Free of scour	9	11	NA	82%	
	2. Footing stable	10	11	NA	91%	**86%**

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	15	16	NA	94%	
	5. Length appropriate	16	16	NA	100%	**96%**
B. Pools	1. Present	19	19	NA	100%	
	2. Sufficiently deep	19	19	NA	100%	
	3. Length appropriate	16	19	NA	84%	**95%**
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	11	14	NA	86%	
	2. Of those eroding, # w/concomitant point bar formation	2	3	NA	67%	
	3. Apparent Rc within specifications	12	14	NA	100%	
	4. Sufficient floodplain access and relief	14	14	NA	100%	**88%**
E. Bed General	1. General channel bed aggradation areas (bar formation)	NA	NA	2/19	98%	
	2. Channel bed degradation - areas of increasing down cutting or head cutting	NA	NA	0/0	100%	**99%**
F. Bank Condition	1. Actively eroding, wasting, or slumping bank	NA	NA	3/21	99%	**99%**
G. Vanes / J Hooks etc.	1. Free of back or arm scour	30	30	NA	100%	
	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	29	30	NA	97%	**98%**
H. Wads and Boulders	1. Free of scour	10	10	NA	100%	
	2. Footing stable	10	10	NA	100%	**100%**

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 bankfull).	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
3/8/2009	3/7/2009	Crest gauge reading of 16.5 inches (bankfull level set at 15 inches).	Photos 5 and 6 in SR-3 SPA Photolog.


Cross Section Overlay (Years 1-4)
UT to South Fork - Reach 1
Cross Section #1 (Riffle)
Bankfull
Year 1 (3-31-2006)
Year 2 (1-31-2007)
Year 3 (3-05-2008)
Year 4 (2-09-2009)
Elevation (feet)
Distance (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
0
5
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15
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25
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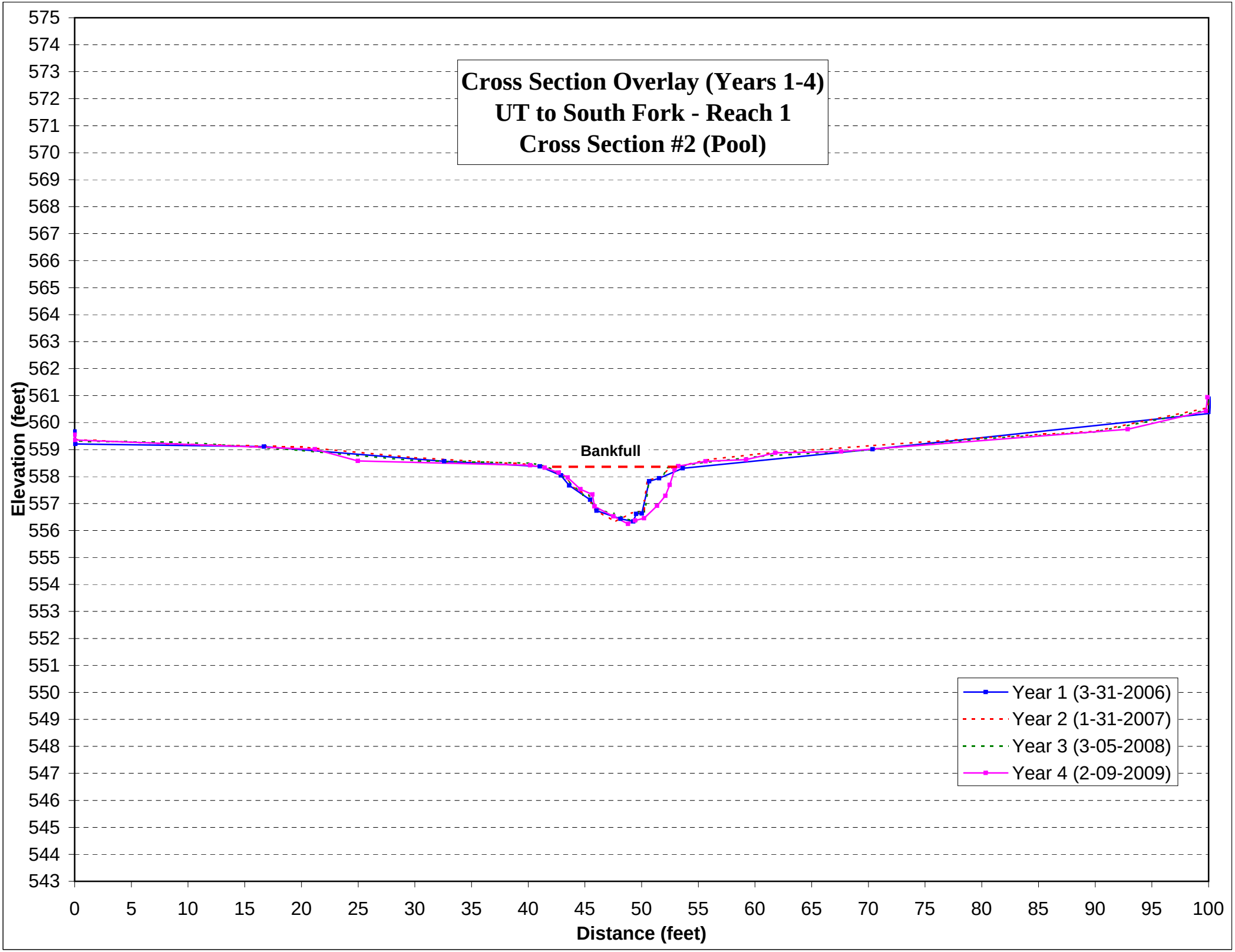
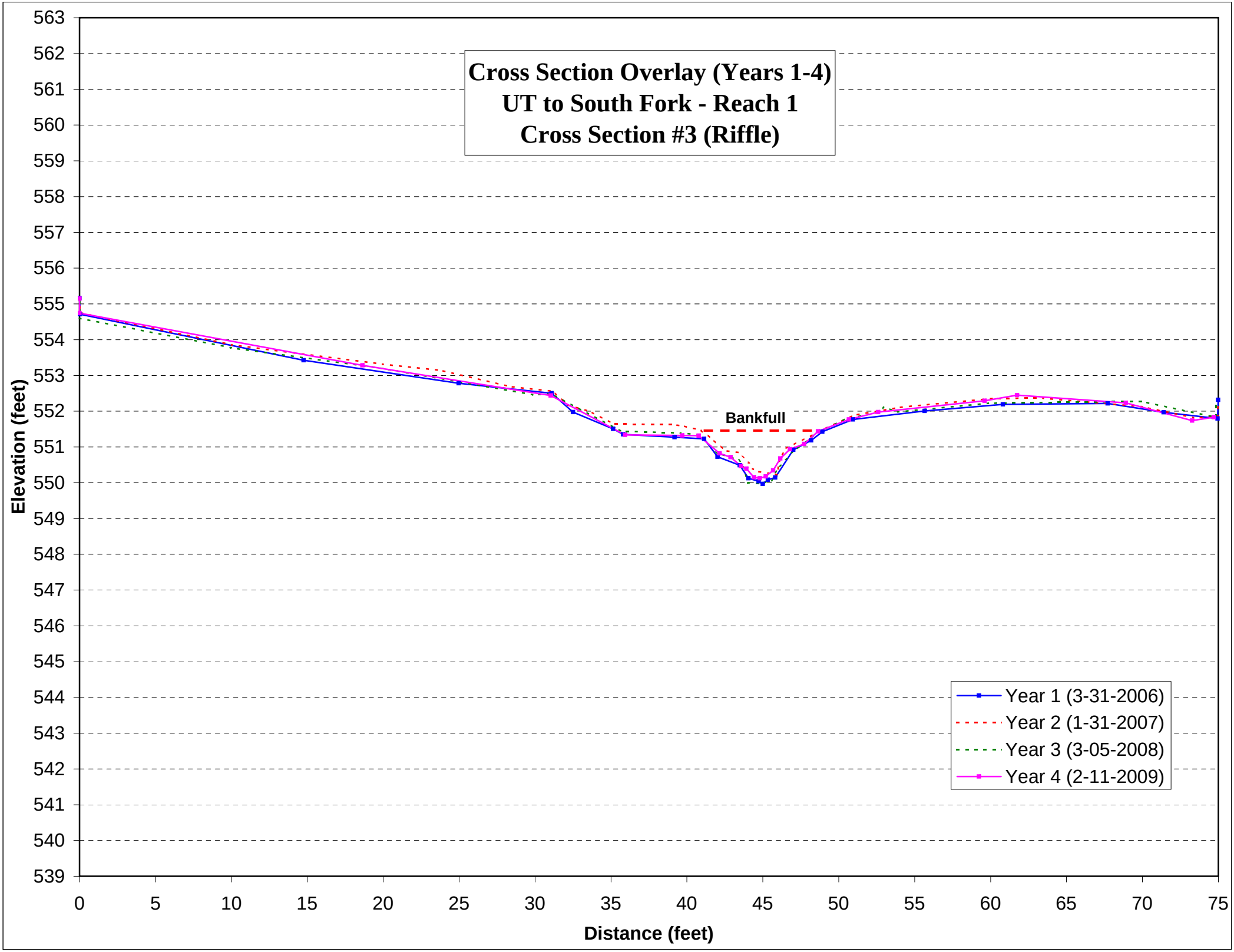
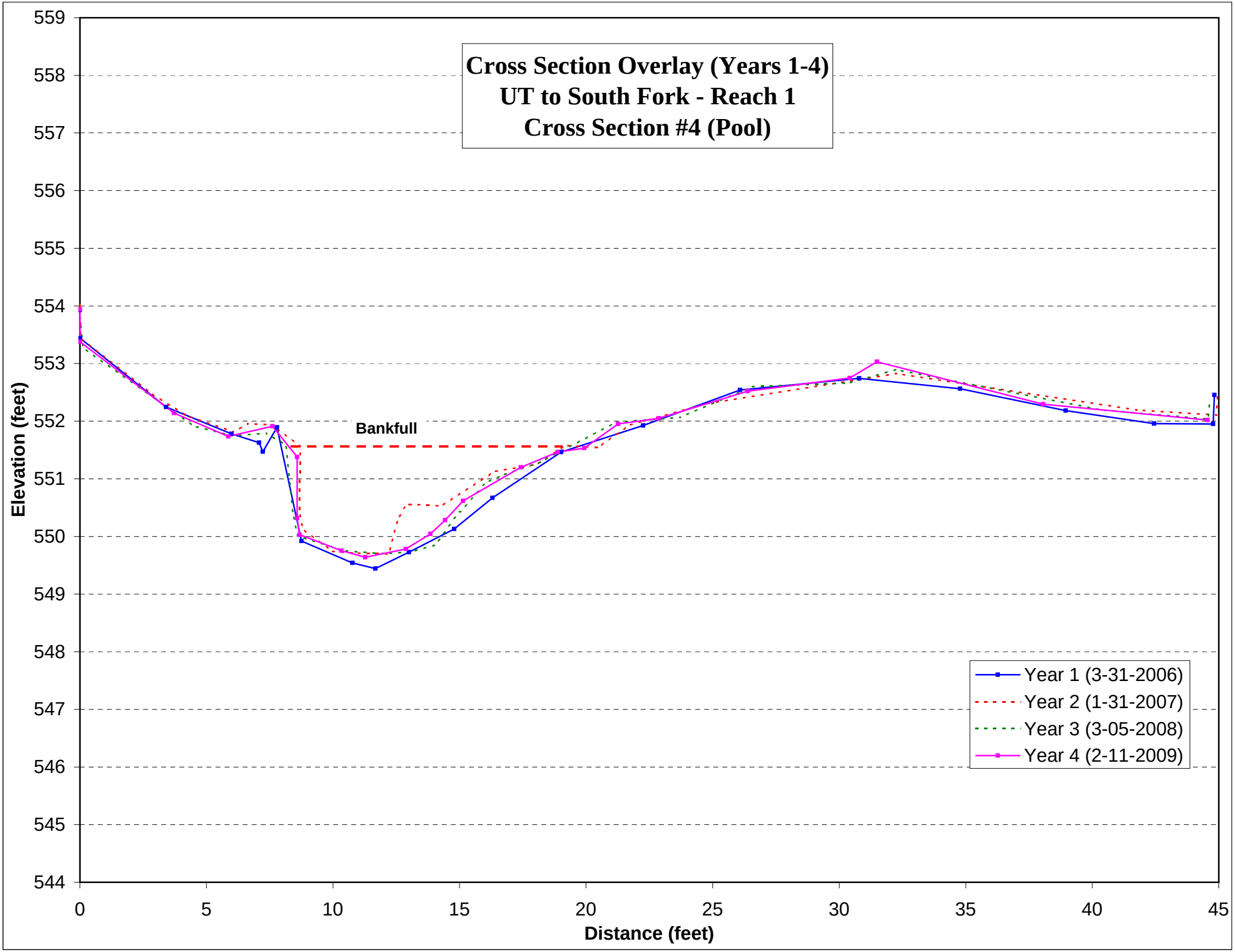
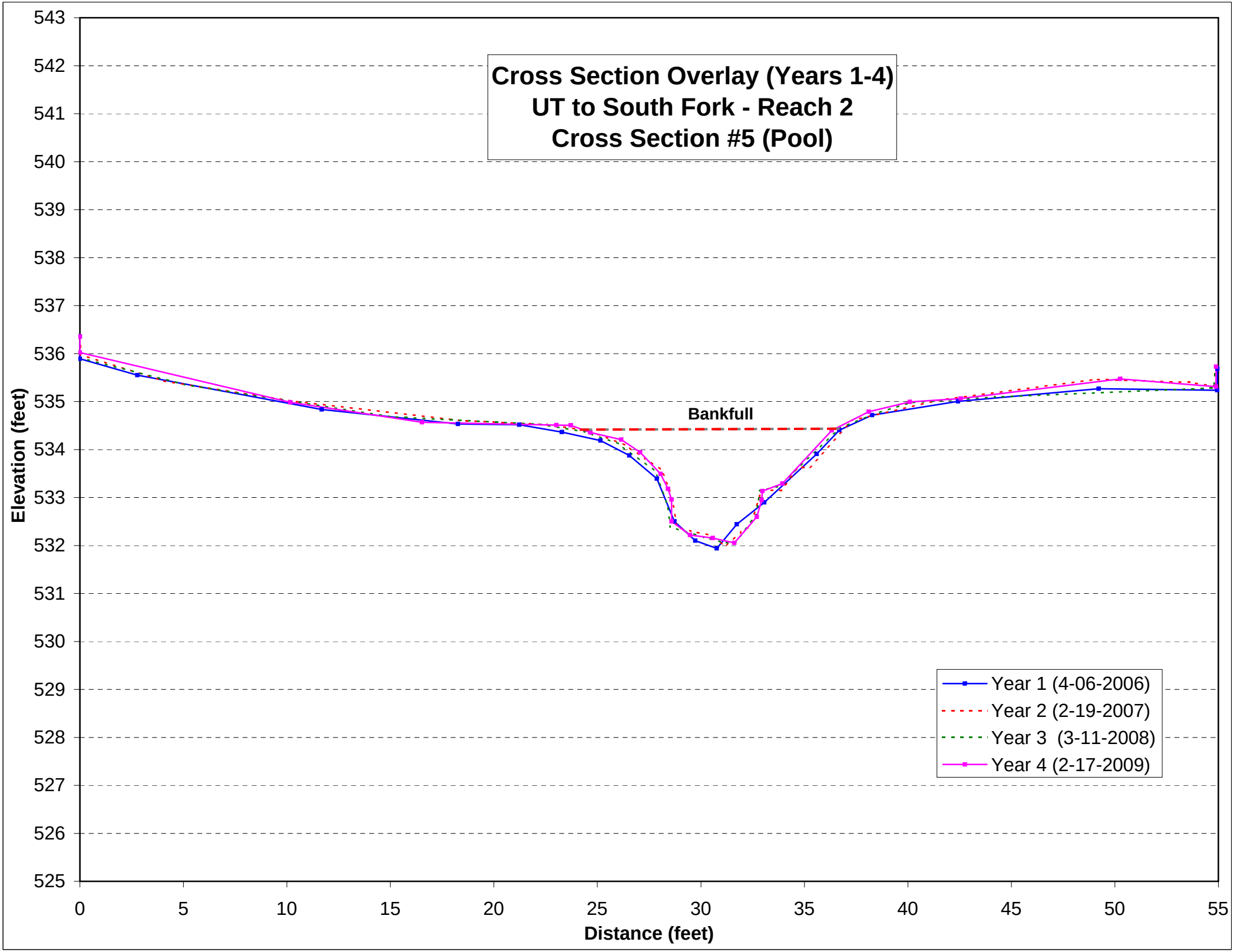
45
50
55
60
65
70
75
80
85
90
95
100


Cross Section Overlay (Years 1-4)
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)
Year 4 (2-09-2009)


Cross Section Overlay (Years 1-4)
UT to South Fork - Reach 1
Cross Section #3 (Riffle)
Bankfull
Year 1 (3-31-2006)
Year 2 (1-31-2007)
Year 3 (3-05-2008)
Year 4 (2-11-2009)
Elevation (feet)
Distance (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
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75


Cross Section Overlay (Years 1-4)
UT to South Fork - Reach 1
Cross Section #4 (Pool)
Bankfull
Year 1 (3-31-2006)
Year 2 (1-31-2007)
Year 3 (3-05-2008)
Year 4 (2-11-2009)
Elevation (feet)
Distance (feet)
559
558
557
556
555
554
553
552
551
550
549
548
547
546
545
544
0
5
10
15
20
25
30
35
40
45


Cross Section Overlay (Years 1-4)
UT to South Fork - Reach 2
Cross Section #5 (Pool)
Bankfull
Year 1 (4-06-2006)
Year 2 (2-19-2007)
Year 3 (3-11-2008)
Year 4 (2-17-2009)
Elevation (feet)
Distance (feet)
543
542
541
540
539
538
537
536
535
534
533
532
531
530
529
528
527
526
525
0
5
10
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20
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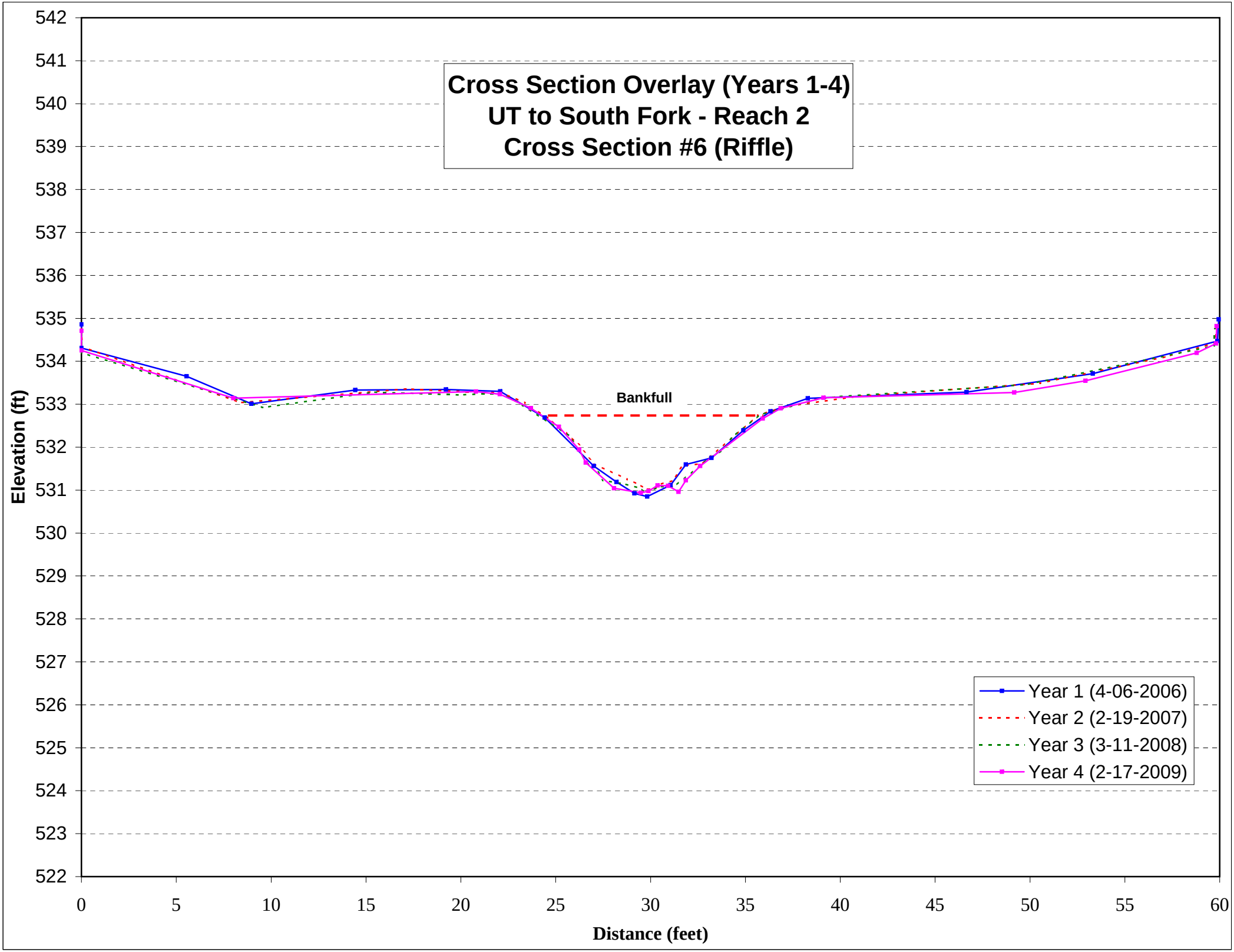
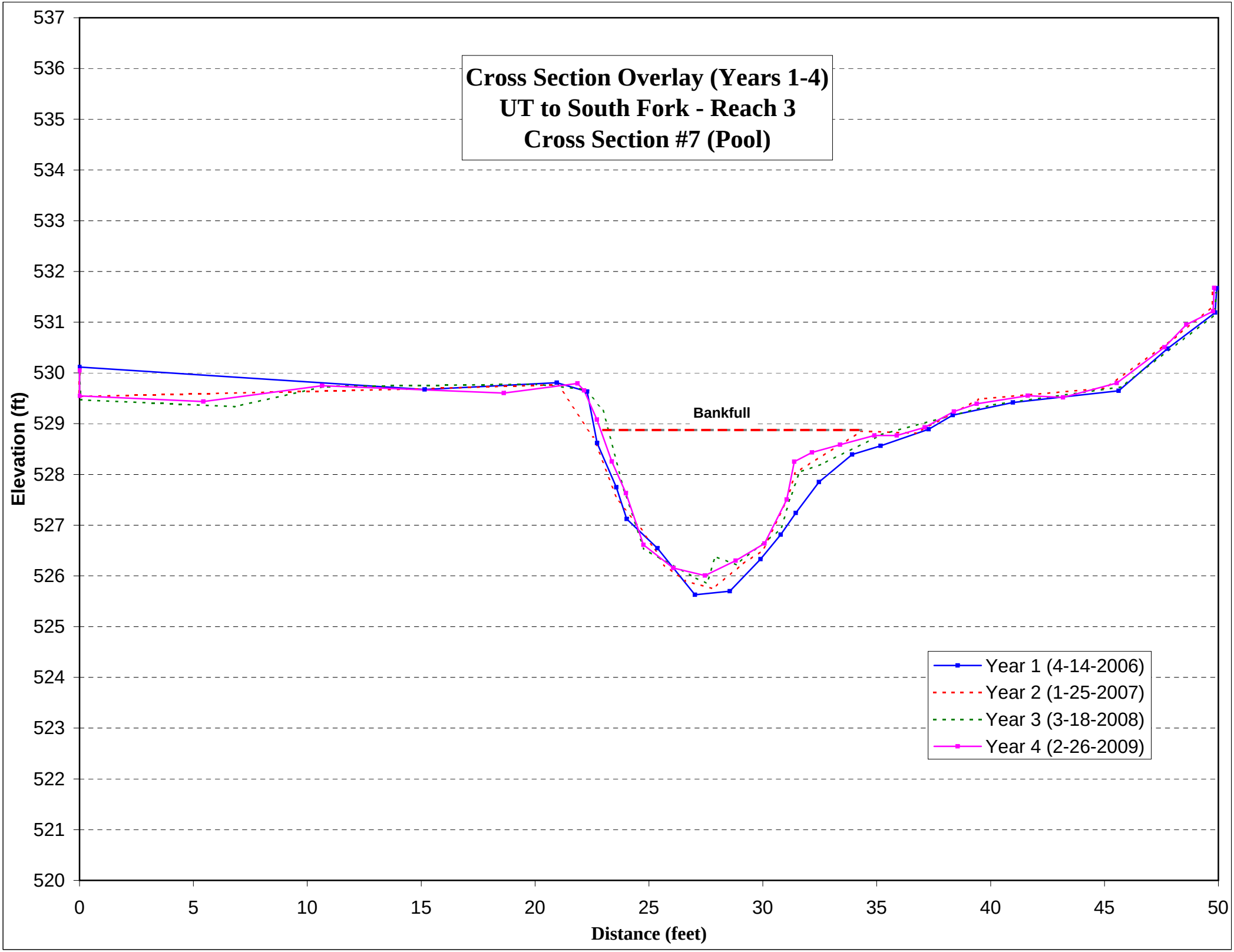
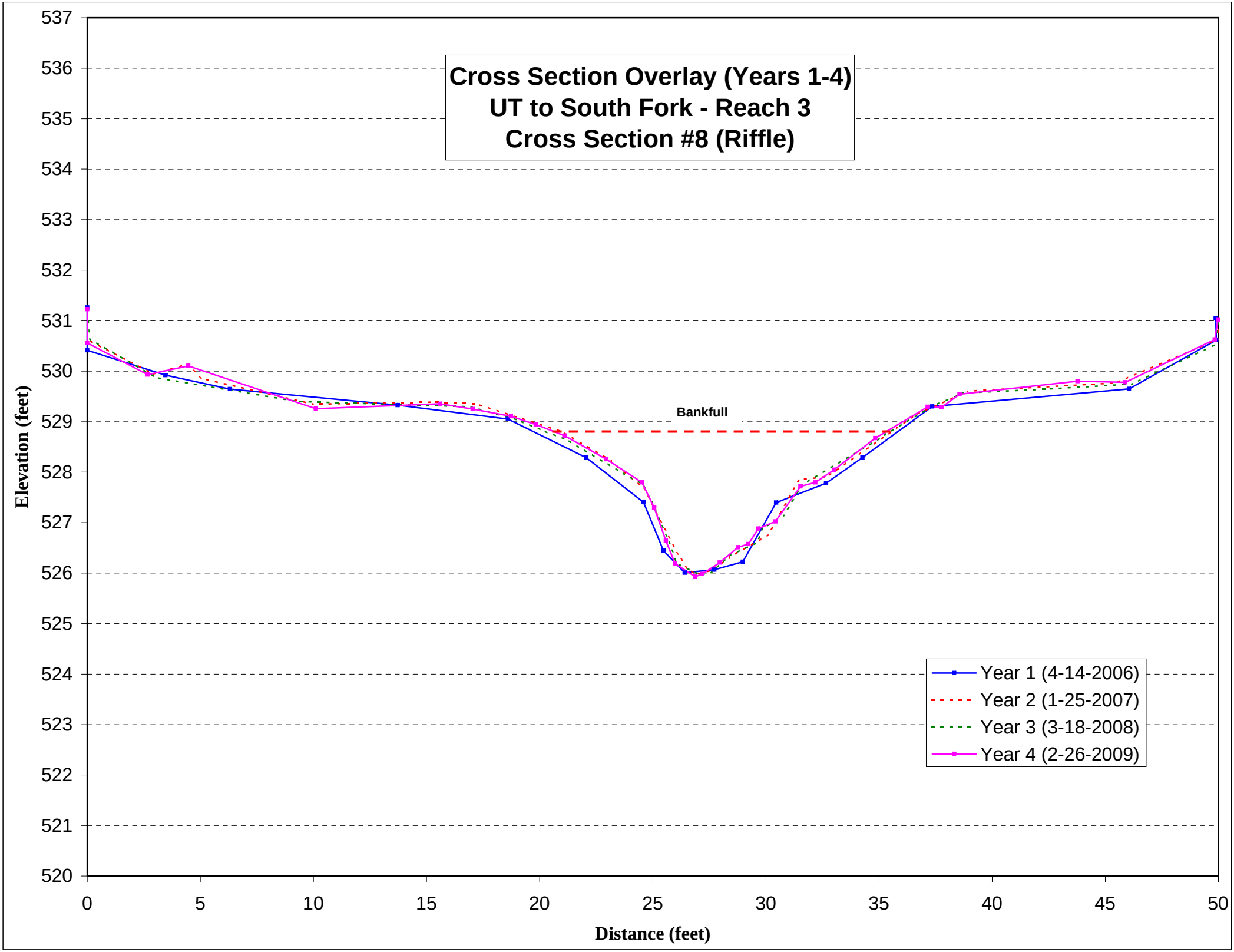
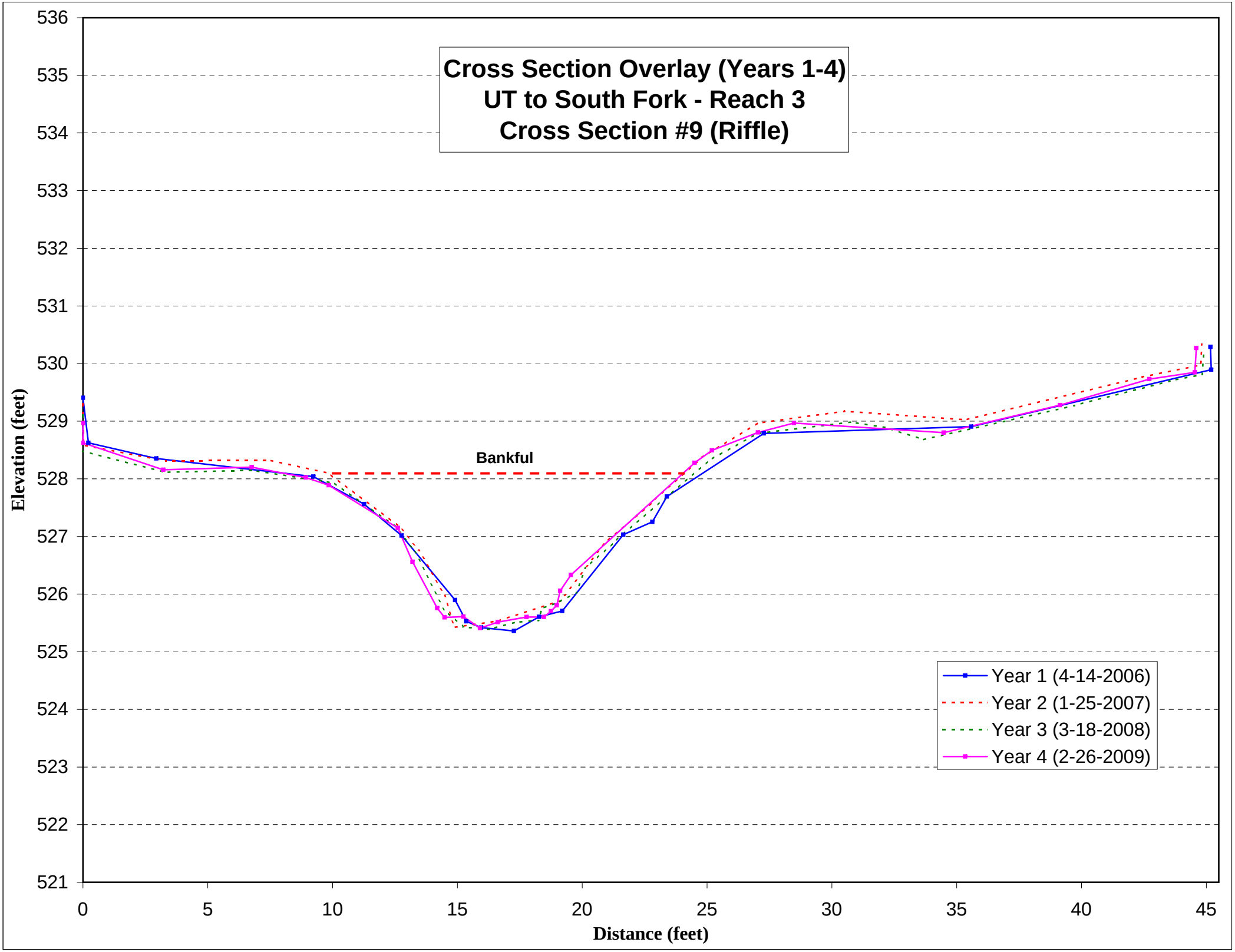
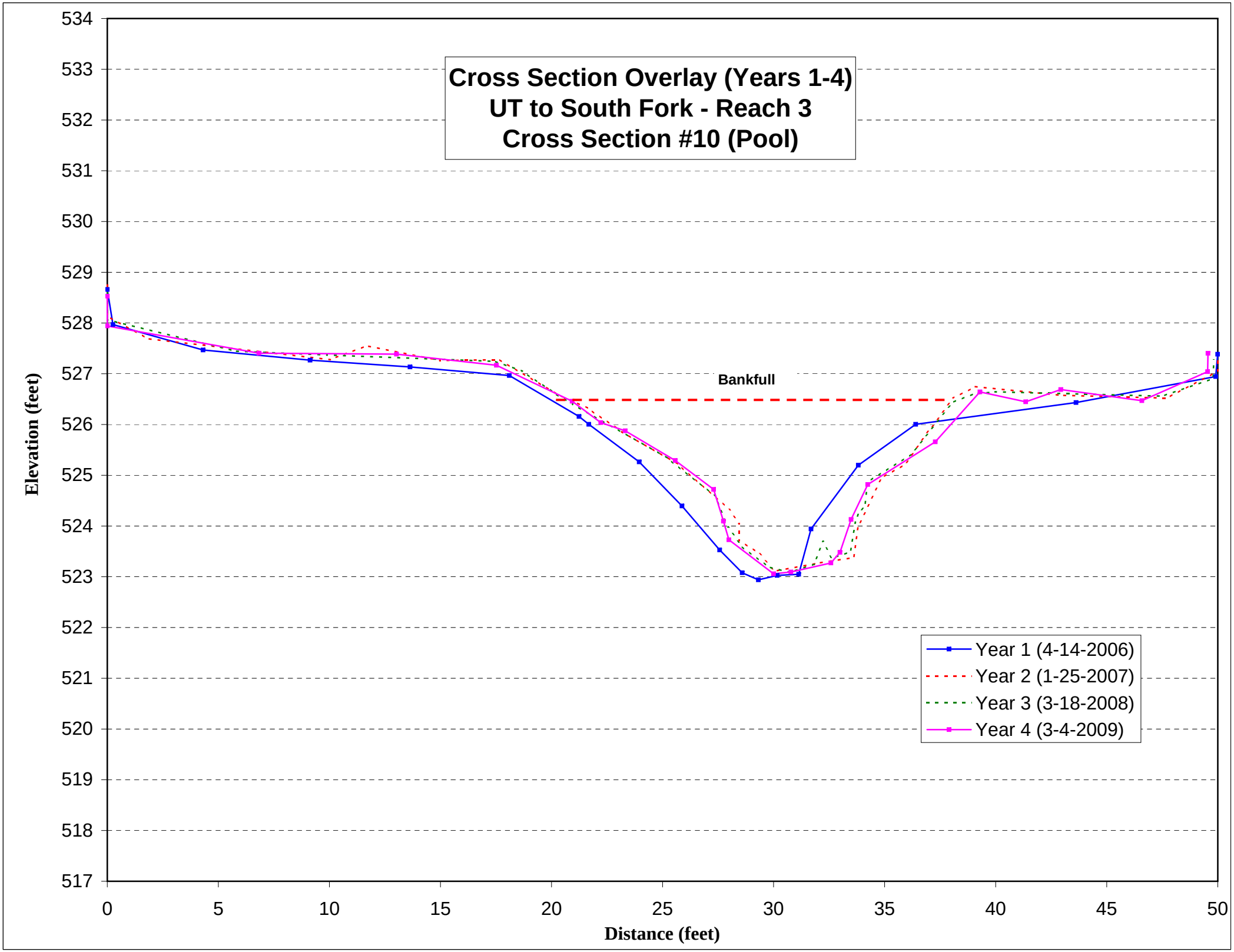
40
45
50
55


Cross Section Overlay (Years 1-4)
UT to South Fork - Reach 2
Cross Section #6 (Riffle)
Bankfull
Elevation (ft)
Distance (feet)
542
541
540
539
538
537
536
535
534
533
532
531
530
529
528
527
526
525
524
523
522
0
5
10
15
20
25
30
35
40
45
50
55
60
Year 1 (4-06-2006)
Year 2 (2-19-2007)
Year 3 (3-11-2008)
Year 4 (2-17-2009)


Cross Section Overlay (Years 1-4)
UT to South Fork - Reach 3
Cross Section #7 (Pool)
Elevation (ft)
Distance (feet)
Bankfull
Year 1 (4-14-2006)
Year 2 (1-25-2007)
Year 3 (3-18-2008)
Year 4 (2-26-2009)
537
536
535
534
533
532
531
530
529
528
527
526
525
524
523
522
521
520
0
5
10
15
20
25
30
35
40
45
50


Cross Section Overlay (Years 1-4)
UT to South Fork - Reach 3
Cross Section #8 (Riffle)
Bankfull
Year 1 (4-14-2006)
Year 2 (1-25-2007)
Year 3 (3-18-2008)
Year 4 (2-26-2009)
Elevation (feet)
Distance (feet)
537
536
535
534
533
532
531
530
529
528
527
526
525
524
523
522
521
520
0
5
10
15
20
25
30
35
40
45
50


Cross Section Overlay (Years 1-4)
UT to South Fork - Reach 3
Cross Section #9 (Riffle)
Bankful
Elevation (feet)
Distance (feet)
536
535
534
533
532
531
530
529
528
527
526
525
524
523
522
521
0
5
10
15
20
25
30
35
40
45
Year 1 (4-14-2006)
Year 2 (1-25-2007)
Year 3 (3-18-2008)
Year 4 (2-26-2009)


Cross Section Overlay (Years 1-4)
UT to South Fork - Reach 3
Cross Section #10 (Pool)
Bankfull
Year 1 (4-14-2006)
Year 2 (1-25-2007)
Year 3 (3-18-2008)
Year 4 (3-4-2009)
Elevation (feet)
Distance (feet)
534
533
532
531
530
529
528
527
526
525
524
523
522
521
520
519
518
517
0
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10
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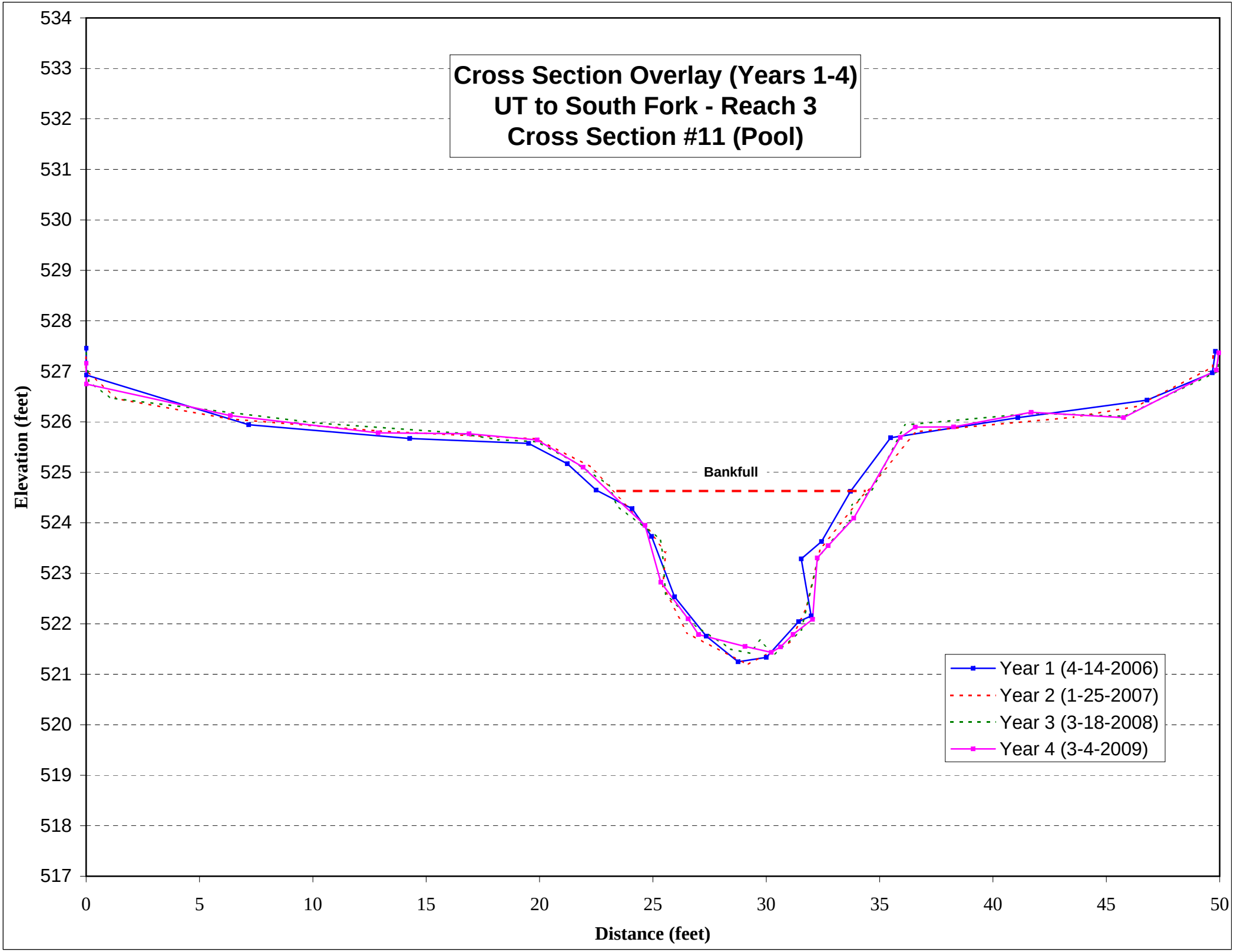
45
50


Cross Section Overlay (Years 1-4)
UT to South Fork - Reach 3
Cross Section #11 (Pool)
Elevation (feet)
Distance (feet)
Bankfull
Year 1 (4-14-2006)
Year 2 (1-25-2007)
Year 3 (3-18-2008)
Year 4 (3-4-2009)
534
533
532
531
530
529
528
527
526
525
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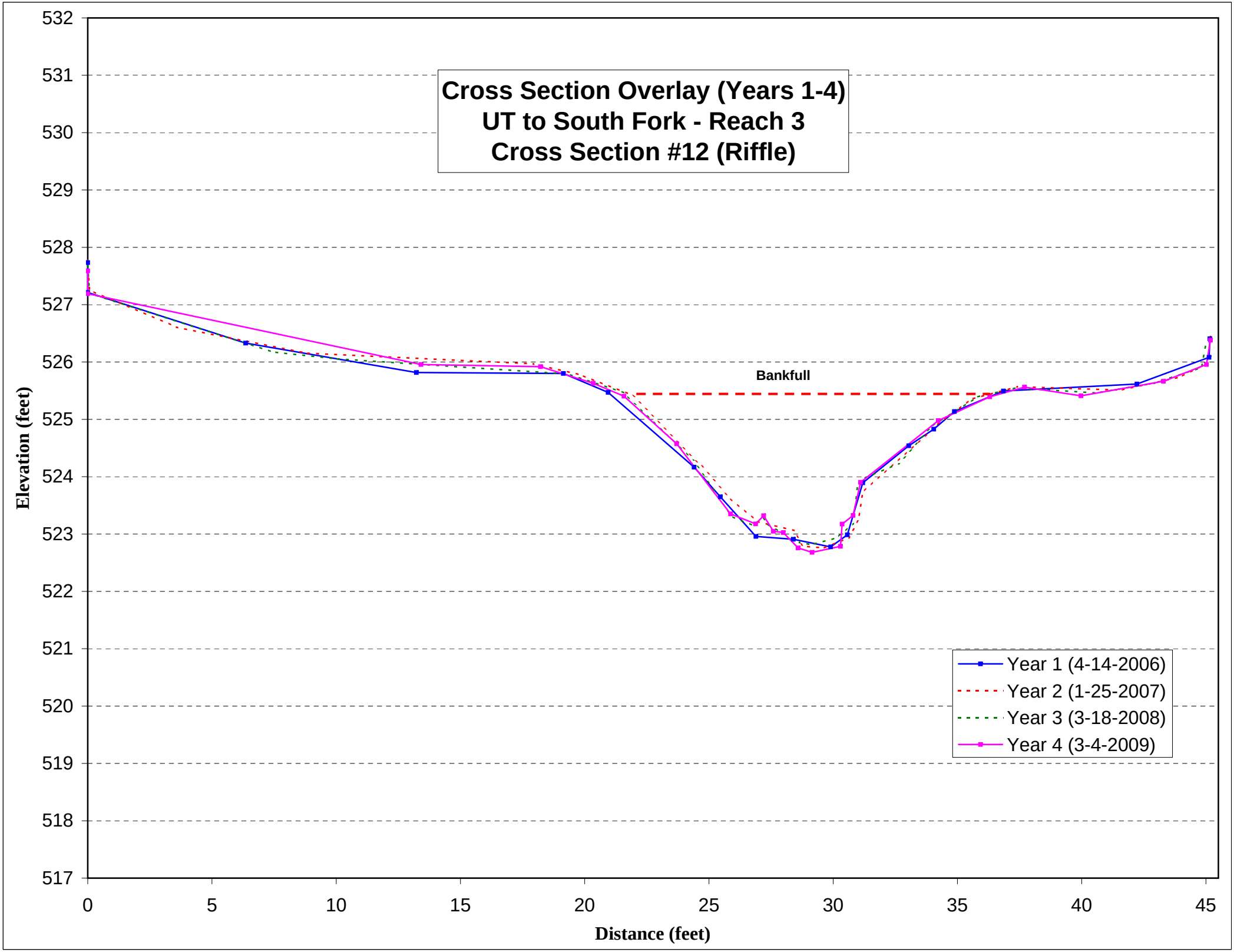

Cross Section Overlay (Years 1-4)
UT to South Fork - Reach 3
Cross Section #12 (Riffle)
Bankfull
Year 1 (4-14-2006)
Year 2 (1-25-2007)
Year 3 (3-18-2008)
Year 4 (3-4-2009)
Elevation (feet)
Distance (feet)
532
531
530
529
528
527
526
525
524
523
522
521
520
519
518
517
0
5
10
15
20
25
30
35
40
45

Longitudinal Profile Overlay (Years 1 - 4)
UT to South Fork - Reach 1

Elevation (feet)

561
560
559
558
557
556
555
554
553
552
551
550
549
548
547
546
545

0 50 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000 1050 1100

Channel Distance (feet)

Thalweg Year 1 (3-31-2006)
Thalweg Year 2 (1-31-2007)
Thalweg Year 3 (3-05-2008)
Thalweg Year 4 (2-11-2009)
Water Surface Year 4
Left Bankfull Year 4
Right Bankfull Year 4
Crossvane
J-Hook
Rootwad

Longitudinal Profile Overlay (Years 1 - 4)
UT to South Fork - Reach 3

Elevation (feet)

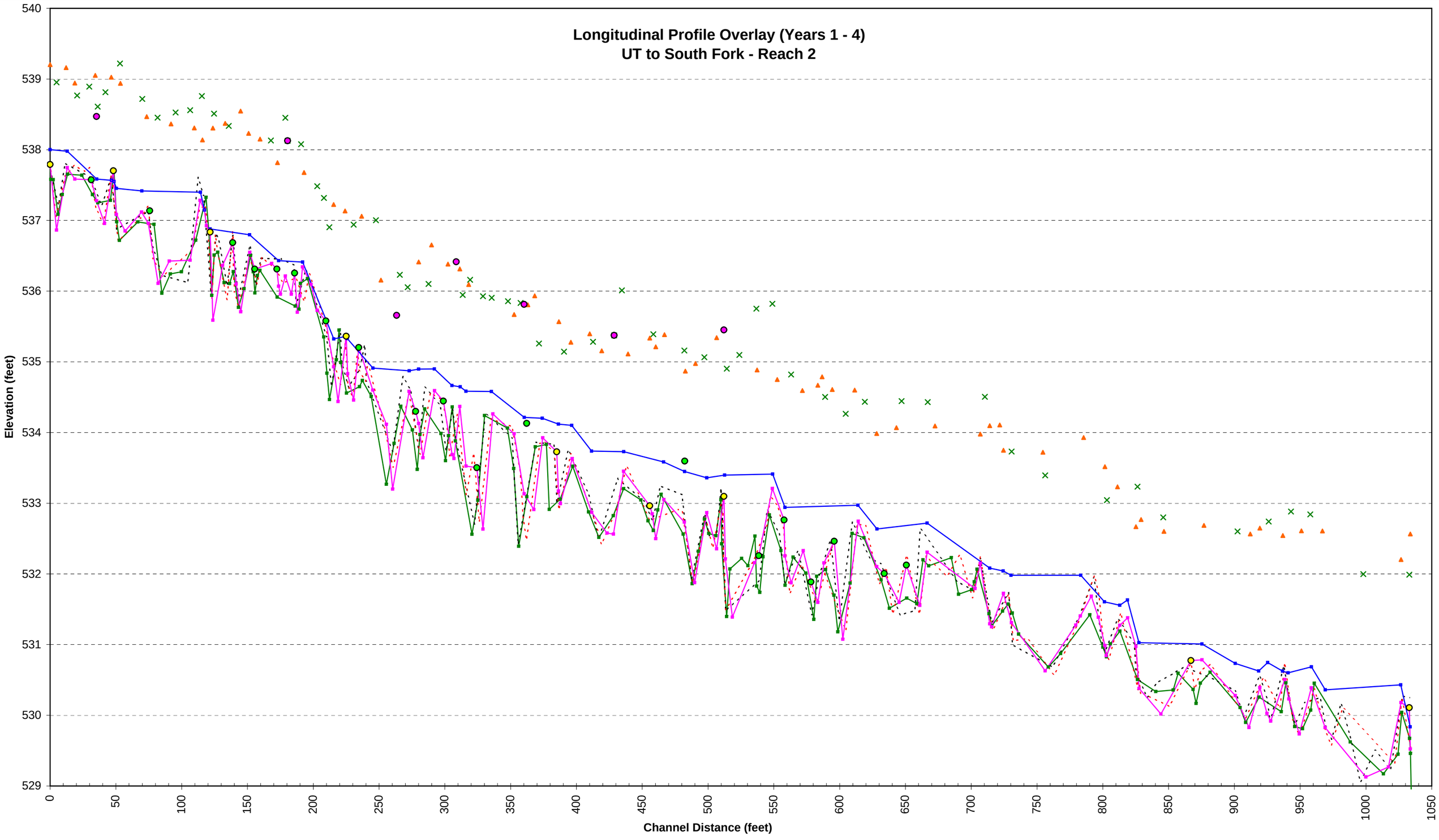
530
529
528
527
526
525
524
523
522
521
520

0 50 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000 1050 1100

Station (feet)

Thalweg Year 1 (4-14-2006)
Thalweg Year 2 (1-25-2007)
Thalweg Year 3 (3-18-2008)
Thalweg Year 4 (3-4-2009)
Water Surface Year 4
Left Bankfull Year 4
Right Bankfull Year 4
Crossvane
J-hook
Rootwad

Longitudinal Profile Overlay (Years 1 - 4)
UT to South Fork - Reach 2



PEBBLE COUNT

Site: UT South Fork

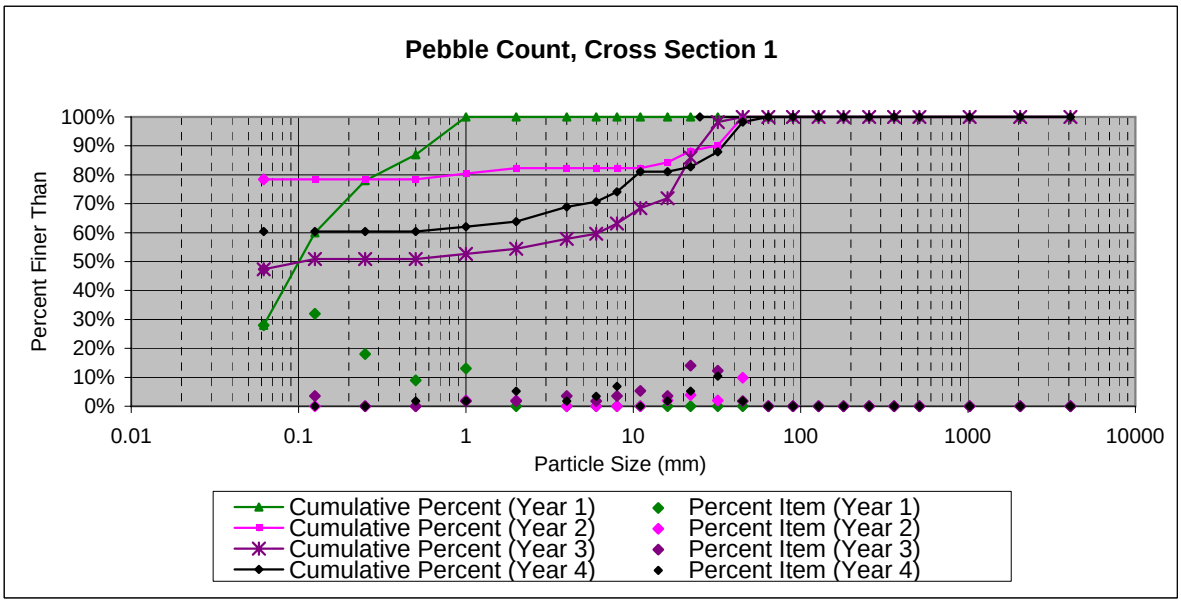
Party: IPJ & PDB

Date: 10/08/09

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 1	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	35	35	60%	60%
	Very Fine	.062-.125	SAND		0	0%	60%
	Fine	.125-.25	SAND		0	0%	60%
	Medium	.25-.50	SAND	1	1	2%	62%
	Coarse	.50-1.0	SAND	1	1	2%	64%
.04-.08	Very Coarse	1.0-2	SAND	3	3	5%	69%
.08-.16	Very Fine	2.0-4.0	GRAVEL	1	1	2%	71%
.16-.22	Fine	4-5.7	GRAVEL	2	2	3%	74%
.22-.31	Fine	5.7-8	GRAVEL	4	4	7%	81%
.31-.44	Medium	8-11.3	GRAVEL		0	0%	81%
.44-.63	Medium	11.3-16	GRAVEL	1	1	2%	83%
.63-.89	Coarse	16-22.6	GRAVEL	3	3	5%	88%
.89-1.26	Coarse	22.6-32	GRAVEL	6	6	10%	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 →	58	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

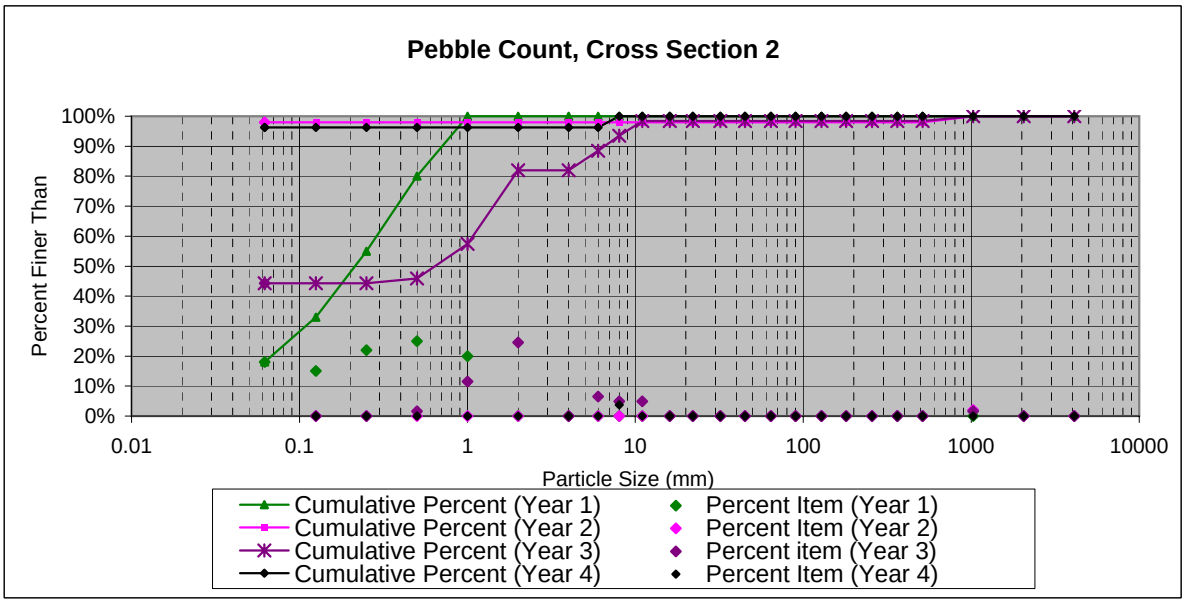
Party: IPJ & PDB

Date: 10/08/09

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 2	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	52	52	96%	96%
	Very Fine	.062-.125	SAND		0	0%	96%
	Fine	.125-.25			0	0%	96%
	Medium	.25-.50			0	0%	96%
	Coarse	.50-1.0			0	0%	96%
.04-.08	Very Coarse	1.0-2			0	0%	96%
.08-.16	Very Fine	2.0-4.0			0	0%	96%
.16-.22	Fine	4-5.7	GRAVEL		0	0%	96%
.22-.31	Fine	5.7-8		2	2	4%	100%
.31-.44	Medium	8-11.3			0	0%	100%
.44-.63	Medium	11.3-16			0	0%	100%
.63-.89	Coarse	16-22.6			0	0%	100%
.89-1.26	Coarse	22.6-32			0	0%	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 →	54	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

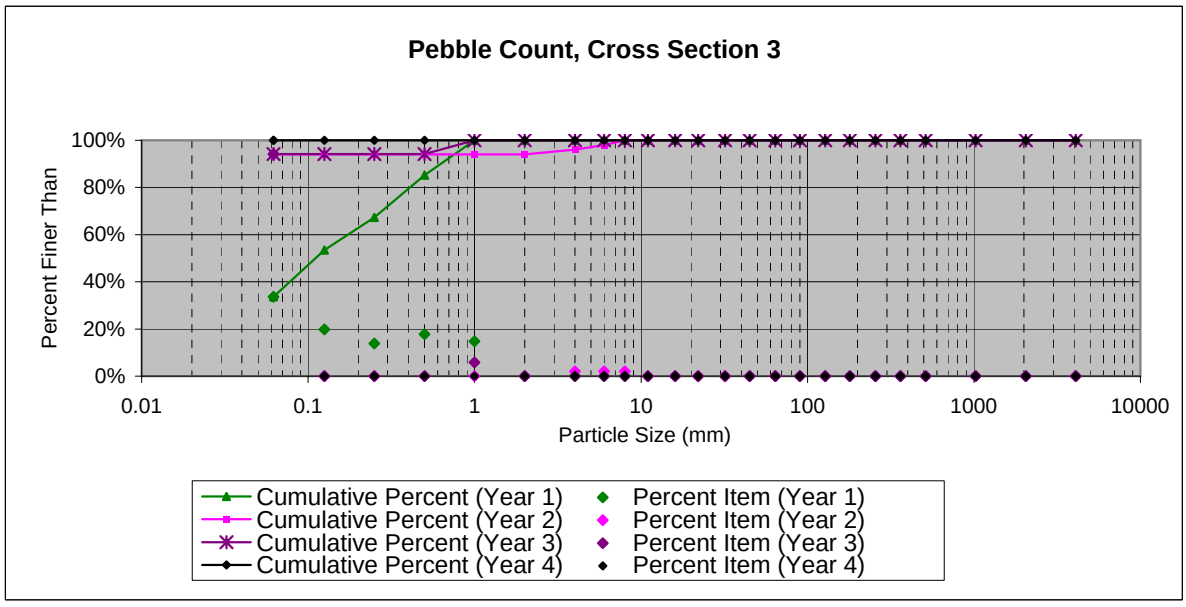
Party: IPJ & PDB

Date: 10/08/09

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 3	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	50	50	100%	100%
	Very Fine	.062-.125	SAND		0	0%	100%
	Fine	.125-.25			0	0%	100%
	Medium	.25-.50			0	0%	100%
	Coarse	.50-1.0			0	0%	100%
.04-.08	Very Coarse	1.0-2			0	0%	100%
.08-.16	Very Fine	2.0-4.0	GRAVEL		0	0%	100%
.16-.22	Fine	4-5.7			0	0%	100%
.22-.31	Fine	5.7-8			0	0%	100%
.31-.44	Medium	8-11.3			0	0%	100%
.44-.63	Medium	11.3-16			0	0%	100%
.63-.89	Coarse	16-22.6			0	0%	100%
.89-1.26	Coarse	22.6-32			0	0%	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 →	50	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

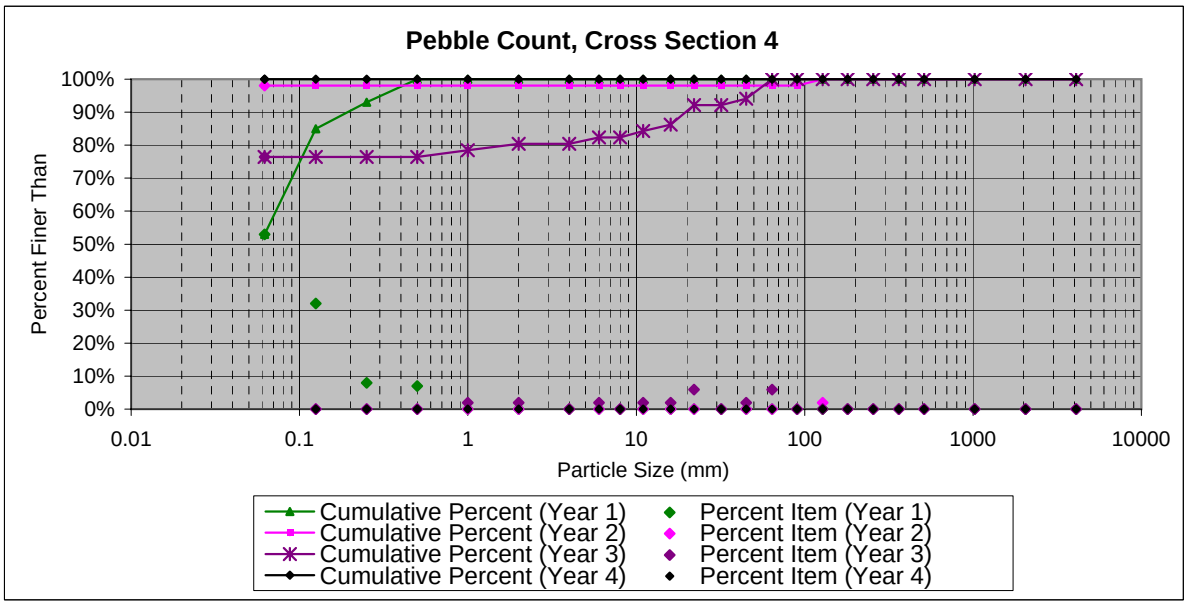
Party: IPJ & PDB

Date: 10/08/09

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 4	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	50	50	100%	100%
	Very Fine	.062-.125	SAND		0	0%	100%
	Fine	.125-.25			0	0%	100%
	Medium	.25-.50			0	0%	100%
	Coarse	.50-1.0			0	0%	100%
.04-.08	Very Coarse	1.0-2			0	0%	100%
.08-.16	Very Fine	2.0-4.0	GRAVEL		0	0%	100%
.16-.22	Fine	4-5.7			0	0%	100%
.22-.31	Fine	5.7-8			0	0%	100%
.31-.44	Medium	8-11.3			0	0%	100%
.44-.63	Medium	11.3-16			0	0%	100%
.63-.89	Coarse	16-22.6			0	0%	100%
.89-1.26	Coarse	22.6-32			0	0%	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 →	50	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

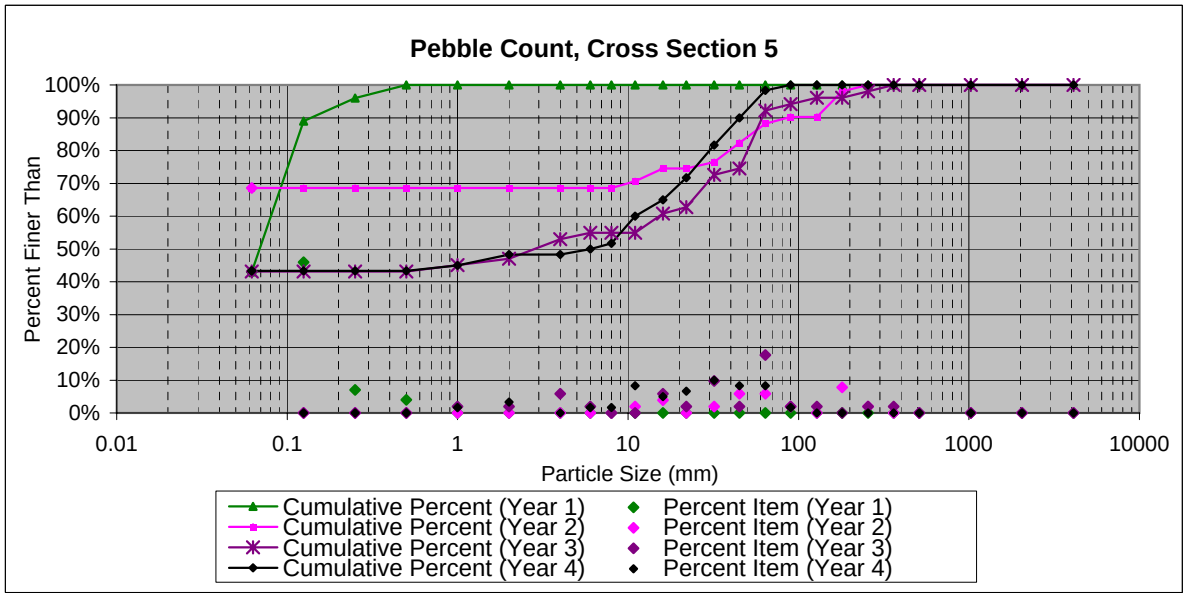
Party: IPJ & PDB

Date: 10/08/09

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 5	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	26	26	43%	43%
	Very Fine	.062-.125	SAND		0	0%	43%
	Fine	.125-.25			0	0%	43%
	Medium	.25-.50			0	0%	43%
	Coarse	.50-1.0		1	1	2%	45%
.04-.08	Very Coarse	1.0-2		2	2	3%	48%
.08-.16	Very Fine	2.0-4.0			0	0%	48%
.16-.22	Fine	4-5.7	GRAVEL	1	1	2%	50%
.22-.31	Fine	5.7-8		1	1	2%	52%
.31-.44	Medium	8-11.3		5	5	8%	60%
.44-.63	Medium	11.3-16		3	3	5%	65%
.63-.89	Coarse	16-22.6		4	4	7%	72%
.89-1.26	Coarse	22.6-32		6	6	10%	82%
1.26-1.77	Very Coarse	32-45		5	5	8%	90%
1.77-2.5	Very Coarse	45-64		5	5	8%	98%
2.5-3.5	Small	64-90	COBBLE	1	1	2%	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 →	60	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

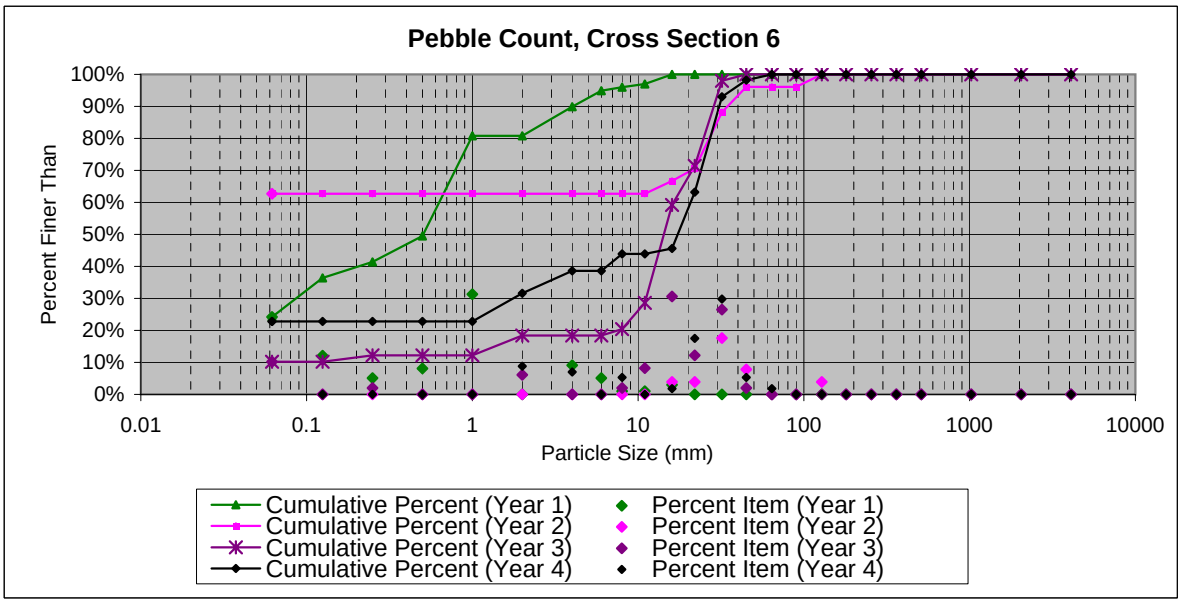
Party: IPJ & PDB

Date: 10/08/09

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 6	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	13	13	23%	23%
	Very Fine	.062-.125	SAND		0	0%	23%
	Fine	.125-.25			0	0%	23%
	Medium	.25-.50			0	0%	23%
	Coarse	.50-1.0			0	0%	23%
.04-.08	Very Coarse	1.0-2		5	5	9%	32%
.08-.16	Very Fine	2.0-4.0	GRAVEL	4	4	7%	39%
.16-.22	Fine	4-5.7			0	0%	39%
.22-.31	Fine	5.7-8		3	3	5%	44%
.31-.44	Medium	8-11.3			0	0%	44%
.44-.63	Medium	11.3-16		1	1	2%	46%
.63-.89	Coarse	16-22.6		10	10	18%	63%
.89-1.26	Coarse	22.6-32		17	17	30%	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 →	57	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

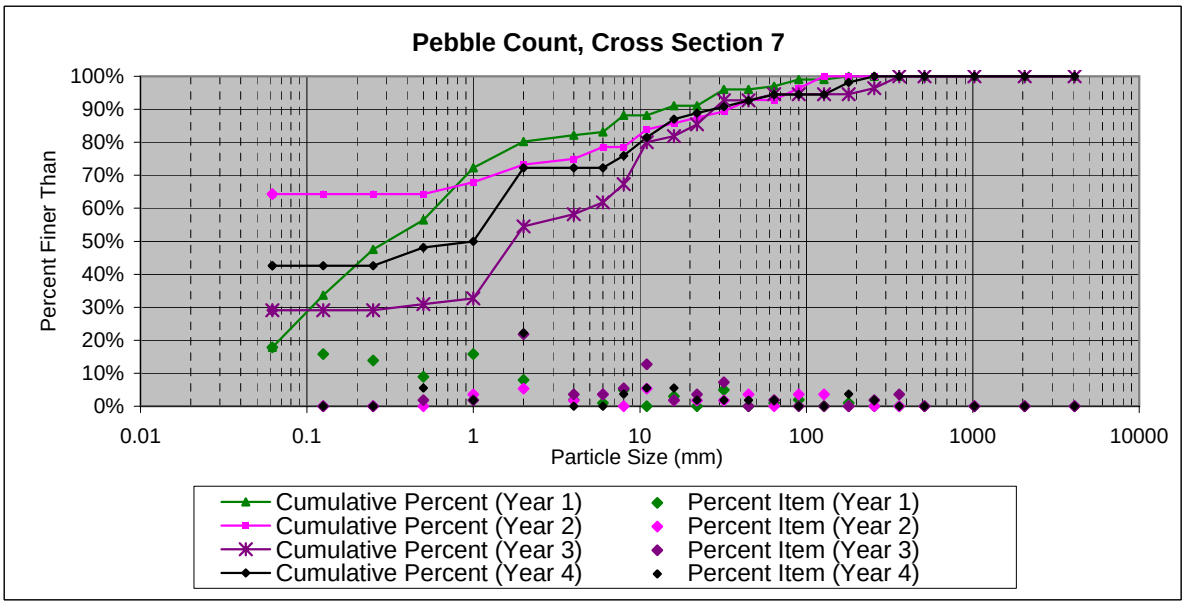
Party: IPJ & PDB

Date: 10/08/09

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 7	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	23	23	43%	43%
	Very Fine	.062-.125	SAND		0	0%	43%
	Fine	.125-.25	SAND		0	0%	43%
	Medium	.25-.50	SAND	3	3	6%	48%
	Coarse	.50-1.0	SAND	1	1	2%	50%
.04-.08	Very Coarse	1.0-2	SAND	12	12	22%	72%
.08-.16	Very Fine	2.0-4.0	GRAVEL		0	0%	72%
.16-.22	Fine	4-5.7	GRAVEL		0	0%	72%
.22-.31	Fine	5.7-8	GRAVEL	2	2	4%	76%
.31-.44	Medium	8-11.3	GRAVEL	3	3	6%	81%
.44-.63	Medium	11.3-16	GRAVEL	3	3	6%	87%
.63-.89	Coarse	16-22.6	GRAVEL	1	1	2%	89%
.89-1.26	Coarse	22.6-32	GRAVEL	1	1	2%	91%
1.26-1.77	Very Coarse	32-45	GRAVEL	1	1	2%	93%
1.77-2.5	Very Coarse	45-64	GRAVEL	1	1	2%	94%
2.5-3.5	Small	64-90			0	0%	94%
3.5-5.0	Small	90-128	COBBLE		0	0%	94%
5.0-7.1	Large	128-180	COBBLE	2	2	4%	98%
7.1-10.1	Large	180-256	COBBLE	1	1	2%	100%
10.1-14.3	Small	256-362			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 →	54	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

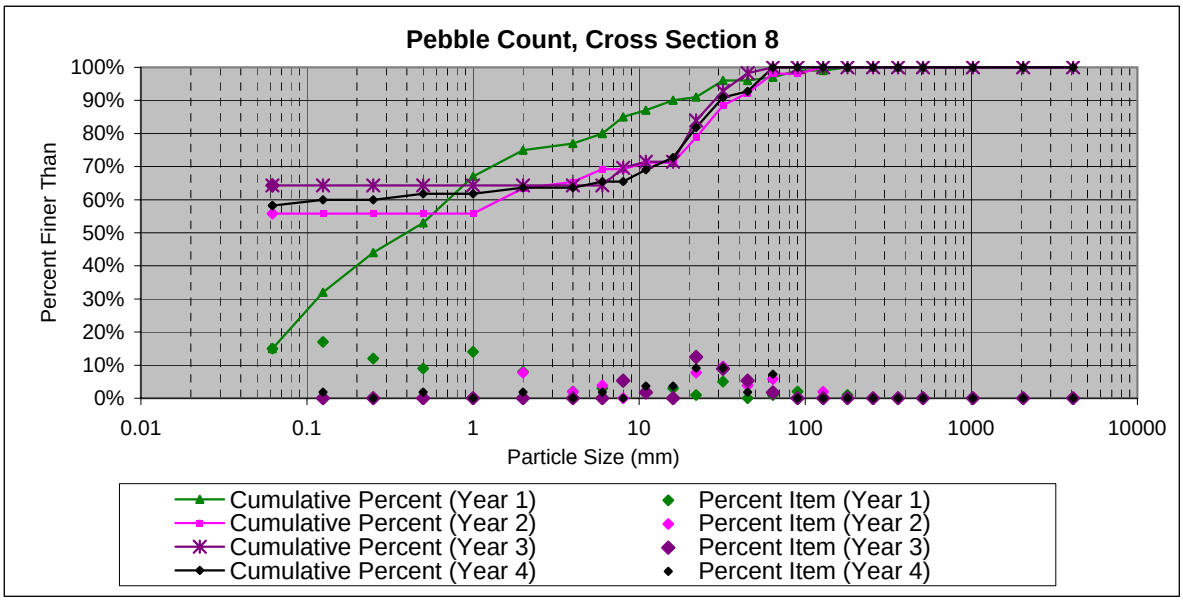
Party: IPJ & PDB

Date: 10/08/09

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 8	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	32	32	58%	58%
	Very Fine	.062-.125	SAND	1	1	2%	60%
	Fine	.125-.25	SAND		0	0%	60%
	Medium	.25-.50	SAND	1	1	2%	62%
	Coarse	.50-1.0	SAND		0	0%	62%
.04-.08	Very Coarse	1.0-2	SAND	1	1	2%	64%
.08-.16	Very Fine	2.0-4.0	GRAVEL		0	0%	64%
.16-.22	Fine	4-5.7	GRAVEL	1	1	2%	65%
.22-.31	Fine	5.7-8	GRAVEL		0	0%	65%
.31-.44	Medium	8-11.3	GRAVEL	2	2	4%	69%
.44-.63	Medium	11.3-16	GRAVEL	2	2	4%	73%
.63-.89	Coarse	16-22.6	GRAVEL	5	5	9%	82%
.89-1.26	Coarse	22.6-32	GRAVEL	5	5	9%	91%
1.26-1.77	Very Coarse	32-45	GRAVEL	1	1	2%	93%
1.77-2.5	Very Coarse	45-64	GRAVEL	4	4	7%	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 →	55	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

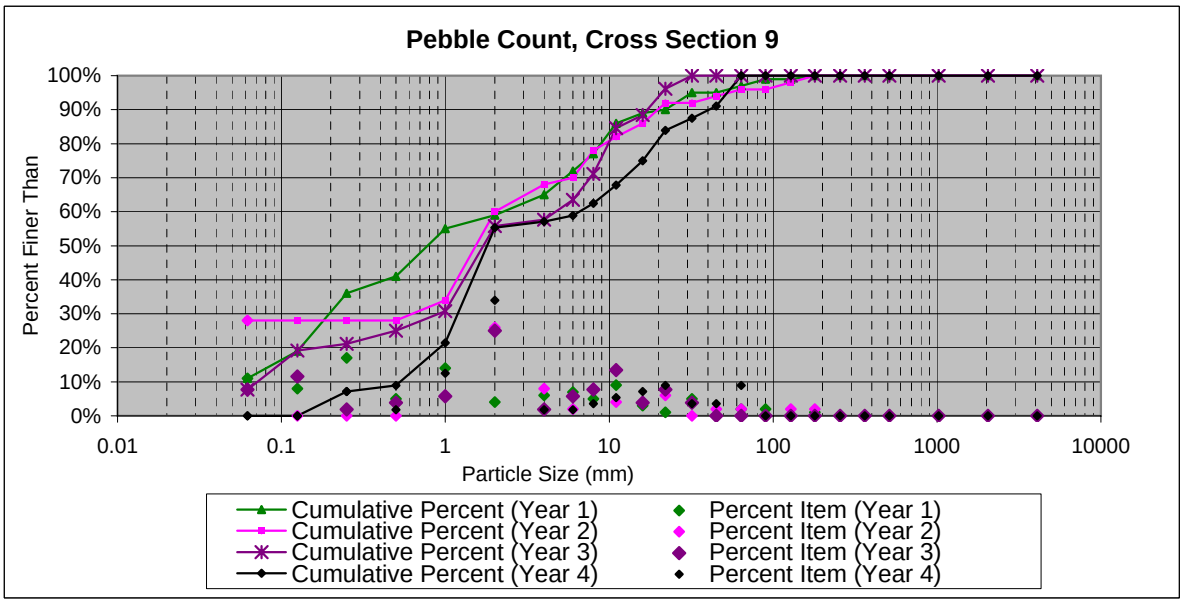
Party: IPJ & PDB

Date: 10/08/09

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 9	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**		0	0%	0%
	Very Fine	.062-.125	SAND		0	0%	0%
	Fine	.125-.25	SAND	4	4	7%	7%
	Medium	.25-.50	SAND	1	1	2%	9%
	Coarse	.50-1.0	SAND	7	7	13%	21%
.04-.08	Very Coarse	1.0-2	SAND	19	19	34%	55%
.08-.16	Very Fine	2.0-4.0	GRAVEL	1	1	2%	57%
.16-.22	Fine	4-5.7	GRAVEL	1	1	2%	59%
.22-.31	Fine	5.7-8	GRAVEL	2	2	4%	63%
.31-.44	Medium	8-11.3	GRAVEL	3	3	5%	68%
.44-.63	Medium	11.3-16	GRAVEL	4	4	7%	75%
.63-.89	Coarse	16-22.6	GRAVEL	5	5	9%	84%
.89-1.26	Coarse	22.6-32	GRAVEL	2	2	4%	88%
1.26-1.77	Very Coarse	32-45	GRAVEL	2	2	4%	91%
1.77-2.5	Very Coarse	45-64	GRAVEL	5	5	9%	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 →	56	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

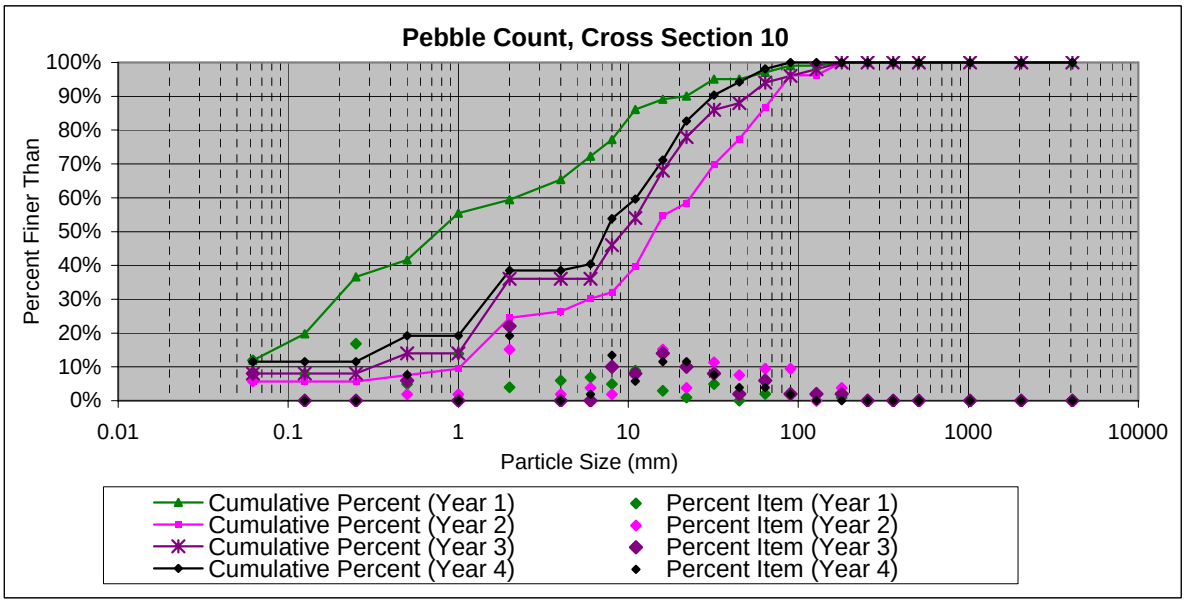
Party: IPJ & PDB

Date: 10/08/09

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 10	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	6	6	12%	12%
	Very Fine	.062-.125	SAND		0	0%	12%
	Fine	.125-.25	SAND		0	0%	12%
	Medium	.25-.50	SAND	4	4	8%	19%
	Coarse	.50-1.0	SAND		0	0%	19%
.04-.08	Very Coarse	1.0-2	SAND	10	10	19%	38%
.08-.16	Very Fine	2.0-4.0	GRAVEL		0	0%	38%
.16-.22	Fine	4-5.7	GRAVEL	1	1	2%	40%
.22-.31	Fine	5.7-8	GRAVEL	7	7	13%	54%
.31-.44	Medium	8-11.3	GRAVEL	3	3	6%	60%
.44-.63	Medium	11.3-16	GRAVEL	6	6	12%	71%
.63-.89	Coarse	16-22.6	GRAVEL	6	6	12%	83%
.89-1.26	Coarse	22.6-32	GRAVEL	4	4	8%	90%
1.26-1.77	Very Coarse	32-45	GRAVEL	2	2	4%	94%
1.77-2.5	Very Coarse	45-64	GRAVEL	2	2	4%	98%
2.5-3.5	Small	64-90	COBBLE	1	1	2%	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

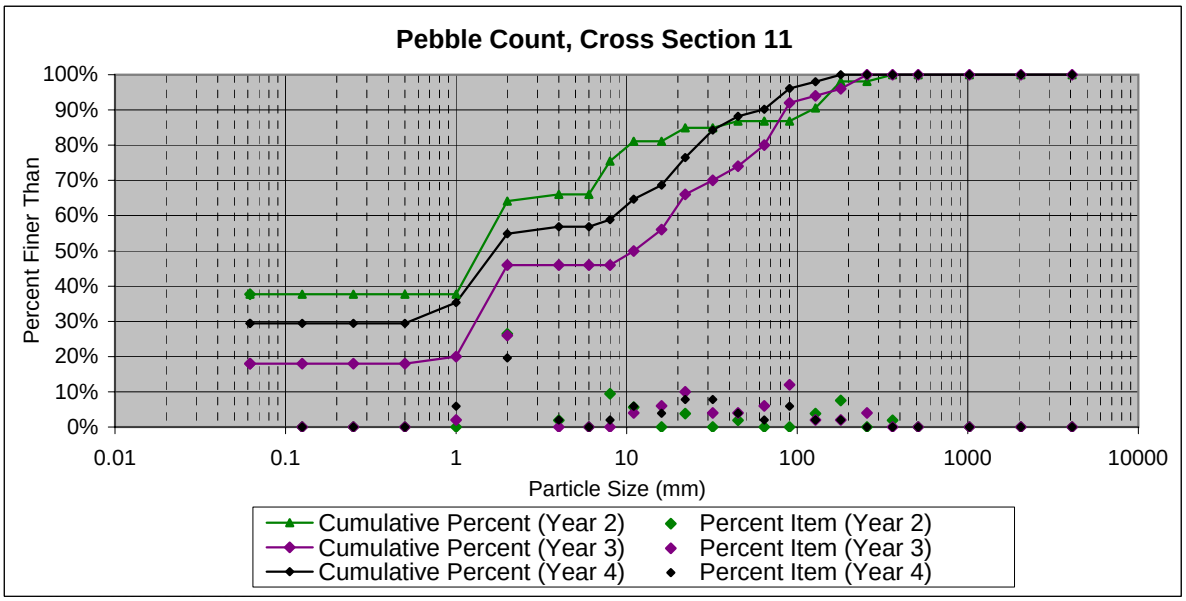
Party: IPJ & PDB

Date: 10/08/09

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 11	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	15	15	29%	29%
	Very Fine	.062-.125	SAND		0	0%	29%
	Fine	.125-.25	SAND		0	0%	29%
	Medium	.25-.50	SAND		0	0%	29%
	Coarse	.50-1.0	SAND	3	3	6%	35%
.04-.08	Very Coarse	1.0-2	SAND	10	10	20%	55%
.08-.16	Very Fine	2.0-4.0	GRAVEL	1	1	2%	57%
.16-.22	Fine	4-5.7	GRAVEL		0	0%	57%
.22-.31	Fine	5.7-8	GRAVEL	1	1	2%	59%
.31-.44	Medium	8-11.3	GRAVEL	3	3	6%	65%
.44-.63	Medium	11.3-16	GRAVEL	2	2	4%	69%
.63-.89	Coarse	16-22.6	GRAVEL	4	4	8%	76%
.89-1.26	Coarse	22.6-32	GRAVEL	4	4	8%	84%
1.26-1.77	Very Coarse	32-45	GRAVEL	2	2	4%	88%
1.77-2.5	Very Coarse	45-64	GRAVEL	1	1	2%	90%
2.5-3.5	Small	64-90	COBBLE	3	3	6%	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 →	51	**100%**	**100%**



PEBBLE COUNT

Site: UT South Fork

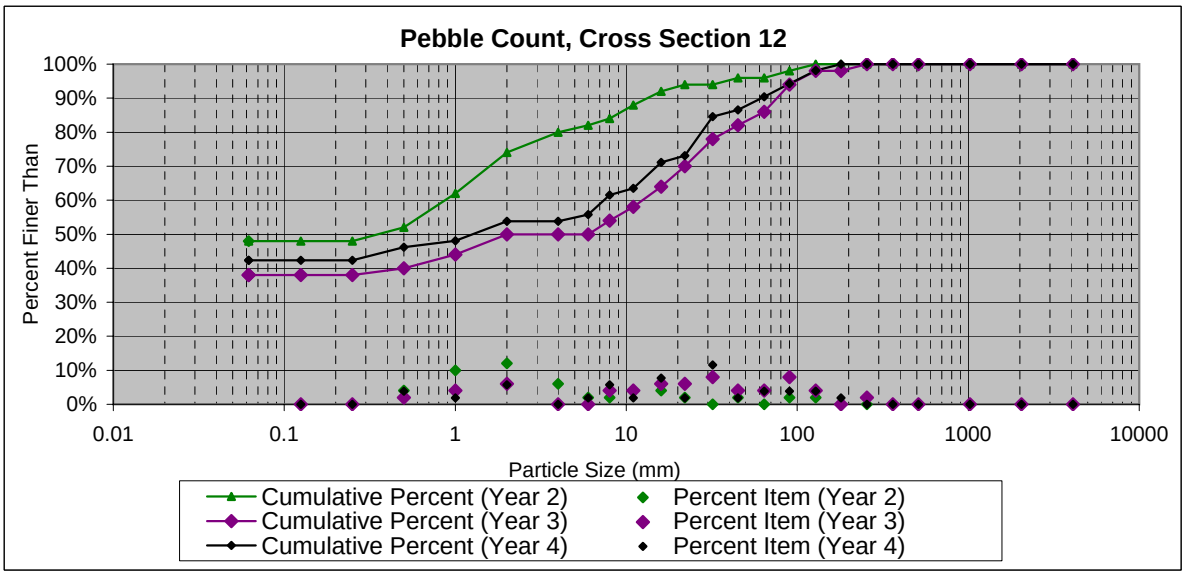
Party: IPJ & PDB

Date: 10/08/09

SEPI ENGINEERING GROUP

PARTICLE COUNT

Inches	Particle	Millimeters		CS 12	TOT#	ITEM %	% CUM
	Silt/Clay	< 0.062	**S/C**	22	22	42%	42%
	Very Fine	.062-.125	SAND		0	0%	42%
	Fine	.125-.25	SAND		0	0%	42%
	Medium	.25-.50	SAND	2	2	4%	46%
	Coarse	.50-1.0	SAND	1	1	2%	48%
.04-.08	Very Coarse	1.0-2	SAND	3	3	6%	54%
.08-.16	Very Fine	2.0-4.0	GRAVEL		0	0%	54%
.16-.22	Fine	4-5.7	GRAVEL	1	1	2%	56%
.22-.31	Fine	5.7-8	GRAVEL	3	3	6%	62%
.31-.44	Medium	8-11.3	GRAVEL	1	1	2%	63%
.44-.63	Medium	11.3-16	GRAVEL	4	4	8%	71%
.63-.89	Coarse	16-22.6	GRAVEL	1	1	2%	73%
.89-1.26	Coarse	22.6-32	GRAVEL	6	6	12%	85%
1.26-1.77	Very Coarse	32-45	GRAVEL	1	1	2%	87%
1.77-2.5	Very Coarse	45-64	GRAVEL	2	2	4%	90%
2.5-3.5	Small	64-90	COBBLE	2	2	4%	94%
3.5-5.0	Small	90-128	COBBLE	2	2	4%	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 →	52	**100%**	**100%**



*Year 1 data not available.