Big Cedar Creek Stream Restoration
Final Year 4 Monitoring Report (2012)
Stanly County, North Carolina

EEP Project ID #92532/EEP Contract #D06054-D

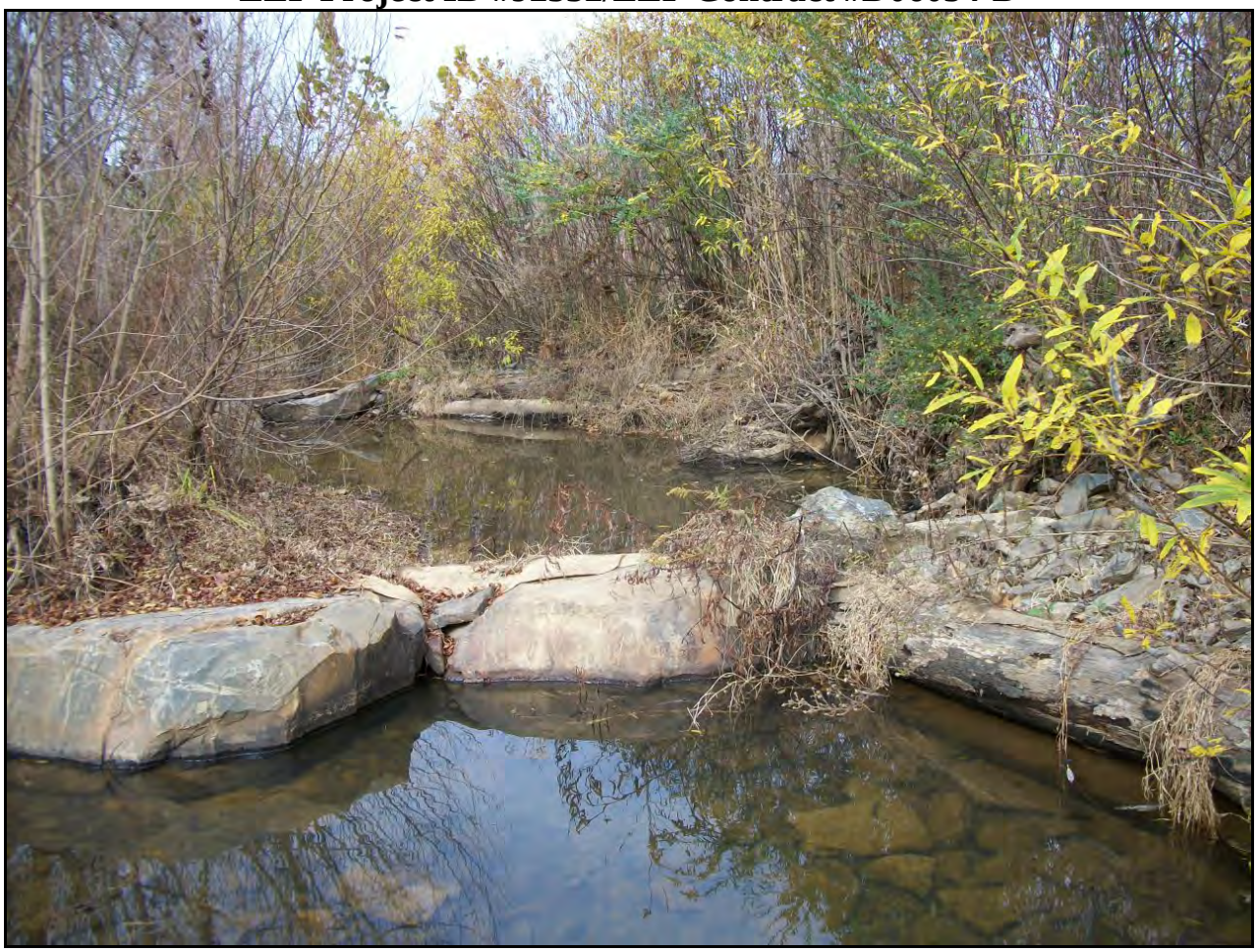

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Table of Contents

Appendices

List of Tables

1.0 EXECUTIVE SUMMARY

This Annual Report details the monitoring activities during the 2012 growing season on the Big Cedar Stream Restoration Site ("Site"). Construction of the Site, including planting of trees, was completed in February 2009. In order to document project success, 23 vegetation monitoring plots, 33 permanent cross-sections, 3,396 linear feet (LF) of longitudinal profiles, and 2 crest gauges were installed and assessed across the Site. The 2012 data represent results from the fourth year of vegetation and hydrologic monitoring.

Prior to restoration, the streams on the Site were channelized and riparian vegetation on the majority of the Site was absent. The riparian vegetation that was present on much of the Site consisted of successional and invasive species such as Chinese privet (*Ligustrum sinense)* and Japanese honeysuckle (*Lonicera japonica*). After construction, it was determined that 11,103 LF of perennial and intermittent channel along Big Cedar Creek (BCC) and six unnamed tributaries (UT1, UT2, UT3, UT1A, UT1B, and UT1C) were restored, 1,171 LF of BCC and UT1 were enhanced, and 539 LF of Big Cedar Creek and the northern most unnamed tributary (UT2) were preserved.

The 23 monitoring plots, 10 meters by 10 meters in size, were used to assess survivability of the woody vegetation planted on Site. They are located to represent the different zones within the project as directed by EEP monitoring guidance. The vegetation monitoring indicated a survivability range of 400 stems per acre to 1,040 stems per acre with an overall average of 694 stems per acre. The Site has met the Year 3 vegetative success criteria and is progressing toward meeting the final year's vegetative success criteria of 260 trees per acre.

In general, the majority of the project's dimension, pattern, profile and in-stream structures have remained stable. Areas of concern documented during Year 3 were addressed through maintenance activities during the spring of 2012 and have remained stable through the current monitoring year. One bankfull event was observed and documented on BCC and UT1 during Year 4.

2.0 PROJECT GOALS, BACKGROUND, & ATTRIBUTES

2.1 Project Location and Description

The Site is located in Stanly County, NC (Figure 1, Appendix A) approximately ten miles south of the City of Albemarle. The Site is part of the Yadkin River Basin within North Carolina Division of Water Quality (NCDWQ) sub-basin 03-07-14 and US Geological Survey (USGS) hydrologic unit 03040105060080.

The Site is part of the Piedmont physiographic province. Medina and others describe the Piedmont as, "… consist(ing) of generally rolling, well-rounded hills and ridges with a few hundred feet of elevation difference between the hills and valleys" (Medina, 2004). The local geology is typical of the Carolina Slate Belt lithotectonic province of central North Carolina, and is comprised of Proterozoic and Cambrian age siltstone, mudstone, and mafic hypabyssal intrusive rocks according to the 1 degree by 2 degree geologic map of the Charlotte Quadrangle prepared by the USGS (Goldsmith et al., 1988). Soil types at the Site were researched using Natural Resources Conservation Service (NRCS) soil survey data for Stanly County, along with on-site evaluations. The predominant soil series within the floodplain area of the Site is mapped as Oakboro silt loam series, a hydric soil.

The Site drains predominately forested and agricultural lands, as well as a portion of the residential and commercial district of the town of Norwood. The Winston-Salem Southbound Railroad line parallels BCC to the east, then turns to cross BCC and UT1 upstream of their confluence.

To reach the Site, take Highway 52 for approximately ten miles south of Albemarle; turn right onto Mount Zion Church Road (1.25 miles south of the Town of Norwood). Follow Mount Zion Church Road for approximately 0.5 mile west to the crossing of BCC on Mount Zion Road Church Road. UT1, UT2, and the upstream reaches of BCC can be accessed from the farm road on the north side of Mount Zion Church Road, approximately 0.25 miles east of the intersection of the railroad and Mount Zion Church Road. Reach 5 and 6 of BCC can be accessed from a farm field approximately 0.1 mile west of the intersection of the railroad and Mount Zion Church Road.

2.2 Restoration Summary

2.2.1 Mitigation Goals and Objectives

The specific goals for the Big Cedar Creek Site Restoration Site were as follows:

- Create geomorphically stable conditions on the Site.
- Improve and restore hydrologic connections between the streams and their floodplains.
- Improve the water quality in the BCC and Rocky River watersheds.
- Improve aquatic and terrestrial habitat along the project corridor.

The primary objective of the Big Cedar Creek Restoration Site was to accelerate the channel evolutionary processes by constructing channels with geomorphically stable cross-sections, increased sinuosity, and access to the floodplain at bankfull stage. Flood attenuation, increased groundwater infiltration, and alleviation of bank stress resulted from providing floodplain access. Water quality improvements were made by excluding cattle from the restored reaches and reducing bank erosion throughout the Site. Aquatic habitat was improved by providing geomorphically stable habitat features and through placement of in-stream habitat structures. Invasive vegetation species removal efforts and reforestation of the riparian buffer with native species complemented the restoration of BCC, UT1, UT2, UT3, UT1A, UT1B, and UT1C. Existing native species were preserved on-site wherever feasible. The vegetative efforts will benefit both aquatic and terrestrial habitat as the Site matures.

2.2.2 Project Description and Restoration Approach

The project involved the restoration, enhancement, and preservation of BCC and six UTs to BCC. A total of 11,103 LF of stream channel were restored along BCC and the UTs (UT1, UT2, UT3, UT1A, UT1B, and UT1C). Additionally, 1,171 LF of Enhancement II were applied along portions of BCC and UT1 and 539 LF of preservation were established along BCC and UT2. The Site has a history of general agricultural usage including cattle, cotton, and corn production. Prior to restoration, the streams on the Site were channelized and riparian vegetation on the majority of the Site had been removed. The riparian vegetation that was present on much of the Site consisted of successional and invasive species such as Chinese privet (*Ligustrum sinense)* and Japanese honeysuckle (*Lonicera japonica*). As a result of channelization, many of the project reaches were incised and lacked bankfull floodplain access.

For analysis and design purposes, BCC, UT1, and UT2 were divided into 11 reaches (As-built Plan Sheets, Appendix D). BCC flows from north to south entering the Site at the northern property line. The reaches on BCC were numbered sequentially from north to south. BCC Reach 1 starts at the northern property line and ends at the confluence with UT2. BCC Reaches 2 through 4 are located between this confluence and the Winston-Salem Southbound Railroad line crossing. BCC Reach 5 begins below the railroad crossing and continues to just upstream of Big Cedar's confluence with UT1. Reach 6 begins where Reach 5 ends and continues to the culvert at Mount Zion Church Road. UT1 flows from west to east entering the Site at the western most property line. The reaches on UT1 (1 through 4) were numbered sequentially from west to east. UT1 ends at its confluence with BCC. UT1 A, B, and C are tributaries to UT1 that flow north to south entering the Site along the northern side of conservation easement along UT1. UT1A, B, and C converge with UT1 in Reaches 4, 3, and 1 respectively. UT2 flows northwest to southeast entering the Site along the northern property line. UT2 ends at its confluence with BCC. UT3 flows east to west under the Winston-Salem Southbound Railroad line. UT3 enters the Site on the eastern side of the conservation easement along BCC and ends at its confluence with BCC Reach 3.

A holistic restoration approach was based on the condition of the overall Site and the potential of each reach for restoration as determined during the on-site assessment. Design criteria for the proposed stream concept were selected based on the range of the reference data and the desired performance of the proposed channel. The developed design criteria were then compared to past projects built with similar conditions. Ultimately, these sites provide the best pattern and dimension ratios because they reflect site conditions after construction. While most reference reaches are in mature forests, restoration sites are in floodplains with little or no mature woody vegetation. This lack of mature woody vegetation severely alters floodplain processes and stream bank conditions. If past ratios did not provide adequate stability or bedform diversity, they were not used. Conversely, if past project ratios created stable channels with optimal bedform diversity, they were incorporated into the design.

Following the initial application of design criteria, detailed refinements were made to accommodate the existing valley morphology and to promote natural channel adjustment following construction. For example, old meander scars in the BCC floodplain were incorporated for a more historical replication of channel alignment. The design philosophy employed at the BCC Site was to use conservative design parameter values based on reference reach data and lessons learned from past projects. This allows the project to evolve in a positive direction (towards more stability) as the permanent vegetation becomes established.

The overall restoration approach for the Site allows stream flows larger than bankfull flows to spread onto the floodplain, dissipating flow energies and reducing stress on streambanks. In-stream structures were used throughout all reaches to control streambed grade, reduce streambank stress, and promote bedform sequences and habitat diversity. The in-stream structures consisted of root wads,

log vanes, log weirs, cross vanes, j-hooks, and constructed riffles. A wide variety of structures were used to promote habitat diversity in the restored channel. Where grade control was a consideration, constructed riffles and grade control j-hooks were installed to provide long-term stability. Streambanks were stabilized using a combination of erosion control matting, temporary and permanent seeding, bare-root planting, and brush mattresses. The Site was planted with native vegetation and is protected through a permanent conservation easement. Table 1 provides a summary of the project approach depicted in Figure 2 in Appendix A.

Table 1. Project Mitigation Approach

BCC Restoration Site: EEP Contract No. D06054-D								
Project Segment or Reach ID	**Existing Footage (LF)**	**Mitigation Type ***	**Approach****	**Linear Footage (LF)**	**Mitigation Ratio**	**Mitigation Units**	**Stationing**	**Comment**
BCC - Reach 1	350	R	P2	603	1:1	603	10+00 to 16+03	Installed in-stream structures to control grade and reduce bank erosion. Priority 2 Restoration was used for this transitional reach to raise the channel to the historic floodplain.
BCC - Reach 2	1,016	R	P1	2,239	1:1	2,239	16+03 to 38+92	Installed in-stream structures to control grade and reduce bank erosion.
BCC - Reach 3	2,046	R	P1	1,827	1:1	1,827	38+92 to 57+19	Installed in-stream structures to control grade and reduce bank erosion.
BCC - Reach 4	976	R	P2	410	1:1	410	57+19 to 61+29	Installed in-stream structures to control grade and reduce bank erosion. Priority 2 was employed to tie the channel into the box culvert at the railroad crossing.
BCC - Reach 5	534	P	P	378	1:5	76	63+79 to 67+57	Preservation.
BCC - Reach 6	904	E	EII	1,046	1:2.5	418	67+57 to 78+03	Regraded banks, installed one grade control cross-vane and one log vane.
Unnamed Tributary 1 - Reach 1	1,998	R	P1, P2	1,248	1:1	1,248	10+46 to 22+94	Installed in-stream structures to control grade and reduce bank erosion. Priority 2 Restoration was used in the upstream, transitional section of the reach to raise the channel to the historic floodplain.
Unnamed Tributary 1 - Reach 2	759	R	P1	1,016	1:1	1,016	22+94 to 33+36	Installed in-stream structures to control grade and reduce bank erosion. The valley narrows and slopes increase to accommodate the decrease in floodplain area.

Table 1. Project Mitigation Approach

BCC Restoration Site: EEP Contract No. D06054-D								
Project Segment or Reach ID	**Existing Footage (LF)**	**Mitigation Type ***	**Approach****	**Linear Footage (LF)**	**Mitigation Ratio**	**Mitigation Units**	**Stationing**	**Comment**
Unnamed Tributary 1 - Reach 3	1,518	R	P1	1,885	1:1	1,885	33+36 to 53+04	Installed in-stream structures to control grade and reduce bank erosion.
Unnamed Tributary 1 - Reach 4	935	R	P1	996	1:1	996	53+04 to 63+52	Installed in-stream structures to control grade and reduce bank erosion.
	125	E	EII	125	1:2.5	50	66+31 to 67+56	Regraded banks and existing riffle.
Unnamed Tributary 2	625	R	P1, P2	609	1:1	609	10+00 to 16+09	Installed in-stream structures to control grade and reduce bank erosion
	162	P	P	161	1:5	32	N/A	Preservation
Unnamed Tributary 3 to BCC	73	R	P1	73	1:1	73	11+08 to 11+82	Installed in-stream structures to control grade. Regraded banks, stabilized with matting, installed stable cattle crossing outside easement to protect reach.
Unnamed Tributary 1A	85	R	P1	85	1:1	85	10+41 to 11+26	Constructed new pattern to connect tributary to UT1. Installed coir matting and plantings.
Unnamed Tributary 1B	33	R	P1	34	1:1	34	10+00 to 10+34	Constructed new pattern to connect tributary to UT1. Installed coir matting and plantings.
Unnamed Tributary 1C	78	R	P1	78	1:1	78	10+54 to 11+32	Constructed new pattern to connect tributary to UT1. Installed coir matting and plantings.
Total linear ft of channel restored or preserved:				12,813				
Mitigation Unit Summation for Streams:				11,679				

* R = Restoration
E = Enhancement
P = Preservation

** P1 = Priority I
P2 = Priority II
P = Preservation
EII = Enhancement II

2.2.3 Project History, Contacts, and Attribute Data

BCC was restored by Baker through a full delivery contract with NCEEP. The chronology of the BCC Restoration Site is presented in Table 2. The contact information for all designers, contractors, and relevant suppliers is presented in Table 3. Relevant project background information is presented in Table 4.

Table 2. Project Activity and Reporting History

BCC Restoration Site: Project No. D06054-D			
Activity or Report	**Scheduled Completion**	**Data Collection Complete**	**Actual Completion or Delivery**
Restoration Plan Prepared	N/A	N/A	Jul-07
Restoration Plan Amended	N/A	N/A	Jul-07
Restoration Plan Approved	Mar-07	N/A	Jul-07
Final Design – (at least 90% complete)	N/A	N/A	Jun-07
Construction Begins	Oct-07	N/A	Nov-07
Temporary S&E mix applied to entire project area	NA	N/A	Dec-08
Permanent seed mix applied to entire project area	Dec-07	N/A	Dec-08
Planting of live stakes	Dec-07	N/A	Feb-09
Planting of bare root trees	Dec-07	N/A	Feb-09
End of Construction	Dec-07	N/A	Feb-09
Survey of As-built conditions (Year 0 Monitoring-baseline)	May-09	Feb-09	May-09
Year 1 Monitoring	Dec-09	Nov-09	Apr-10 (Final)
Year 2 Monitoring	Dec-10	Nov-10	Dec-10 (Final)
Year 3 Monitoring	Dec-11	Feb-12	Mar-12 (Final)
Year 4 Monitoring	Dec-12	Nov-12	Mar-13 (Final)
Year 5 Monitoring	Scheduled Dec-13	Scheduled Nov-13	N/A

Table 3. Project Contact

BCC Restoration Site: Project No. D06054-D	
Designer	
Michael Baker Engineering, Inc.	8000 Regency Parkway, Suite 600 Cary, NC 27518 Contact: Scott Hunt, Tel. 919-481-5703
Construction Contractor	
River Works, Inc.	6105 Chapel Hill Road Raleigh, NC 27607 Contact: Phillip Todd, Tel. 919-582-3575
Planting Contractor	
River Works, Inc.	6105 Chapel Hill Road Raleigh, NC 27607 Contact: Phillip Todd, Tel. 919-582-3575
Seeding Contractor	
River Works, Inc.	6105 Chapel Hill Road Raleigh, NC 27607 Contact: Phillip Todd, Tel. 919-582-3575
Seed Mix Sources	Mellow Marsh Farm, 919-742-1200
Nursery Stock Suppliers	International Paper, 1-888-888-7159
Monitoring Performers	
Michael Baker Engineering, Inc.	5550 Seventy-Seven Center Drive, Suite 320

Table 3. Project Contact

BCC Restoration Site: Project No. D06054-D	
	Charlotte, NC 28217
	Contact:
Stream Monitoring Point of Contact:	Kristi Suggs, Tel. 704-665-2200
Vegetation Monitoring Point of Contact:	Kristi Suggs, Tel. 704-665-2200

Table 4. Project Background

BCC Restoration Site: Project No. D06054-D	
Project County:	Stanly County, NC
Project Reach:	Drainage Area:
BCC Reach 1	2.85 mi^2
BCC Reach 2	2.91 mi^2
BCC Reach 3	3.30 mi^2
BCC Reach 4	3.35 mi^2
BCC Reach 5	4.67 mi^2
BCC Reach 6	4.71 mi^2
UT1 Reach 1	0.93 mi^2
UT1 Reach 2	0.98 mi^2
UT1 Reach 3	1.18 mi^2
UT1 Reach 4	1.21 mi^2
UT1A	0.02 mi^2
UT1B	0.12 mi^2
UT1C	0.10 mi^2
UT2	0.55 mi^2
UT3	0.15 mi^2
Project Reach:	% Impervious Cover:
BCC Reach 1	<1%
BCC Reach 2	<1%
BCC Reach 3	<1%
BCC Reach 4	<1%
BCC Reach 5	<1%
BCC Reach 6	<1%
UT1 Reach 1	<1%
UT1 Reach 2	<1%
UT1 Reach 3	<1%
UT1 Reach 4	<1%
UT1A	0%
UT1B	0%
UT1C	0%
UT2	0%
UT3	0%
Stream Order:	
BCC Reach 1	3rd
BCC Reach 2	3rd
BCC Reach 3	3rd
BCC Reach 4	3rd

Table 4. Project Background

BCC Restoration Site: Project No. D06054-D	
BCC Reach 5	3rd
BCC Reach 6	3rd
UT1 Reach 1	2nd
UT1 Reach 2	2nd
UT1 Reach 3	2nd
UT1 Reach 4	2nd
UT1A	1st
UT1B	1st
UT1C	1st
UT2	1st
UT3	1st
Physiographic Region:	Piedmont
Ecoregion:	Carolina Slate Belt
Rosgen Classification of As-built:	
BCC Reach 1	E/C
BCC Reach 2	E/C
BCC Reach 3	E/C
BCC Reach 4	E/C
BCC Reach 5	B3/1c
BCC Reach 6	F→C
UT1 Reach 1	E/C
UT1 Reach 2	E/C
UT1 Reach 3	E/C
UT1 Reach 4	C
UT1A	E/C
UT1B	E/C
UT1C	E/C
UT2	E
UT3	E/C
Cowardin Classification	Riverine, Upper Perennial, Unconsolidated Bottom, Cobble-Gravel
Dominant Soil Types	
BCC Reach 1	Oa
BCC Reach 2	Oa
BCC Reach 3	Oa
BCC Reach 4	Oa
BCC Reach 5	Co
BCC Reach 6	Co, BaF
UT1 Reach 1	Oa
UT1 Reach 2	Oa, GoF
UT1 Reach 3	Oa, GoF
UT1 Reach 4	Oa, Co
UT1A	Oa
UT1B	Oa
UT1C	Oa
UT2	Oa
UT3	Oa

Table 4. Project Background

BCC Restoration Site: Project No. D06054-D	
Reference site IDs	Unnamed Tributary to Rocky Creek, Richland Creek, Morgan Creek and Spencer Creek
USGS HUC for Project and Reference sites	03010103170030 (Project); 03040101080010 (Reference)
NCDWQ Sub-basin for Project and Reference	03-02-01 (Project); 03-07-02 (Reference)
NCDWQ classification for Project and Reference	C
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	50%

3.0 MONITORING PLAN

Channel stability, vegetation survival, and macroinvertebrate communities will be monitored on the project Site. Post-restoration monitoring will be conducted for five years following the completion of construction to document project success.

3.1 Stream Monitoring

Geomorphic monitoring of restored stream reaches will be conducted for five years to evaluate the effectiveness of the restoration practices. Monitored stream parameters include bankfull flows, stream dimension (cross-sections), pattern and profile (longitudinal profile survey), and photographic documentation. The methods used and any related success criteria are described below for each parameter. For monitoring stream success criteria, 33 permanent cross-sections, 2 crest gauges, and 104 photo identification points were established. The specific locations of these monitoring features are represented on the As-built plan sheets in Appendix D.

3.1.1 Bankfull Events

The occurrence of bankfull events within the monitoring period will be documented by the use of crest gauges and photographs on each project reach. Two crest gauges were installed on the floodplain within 10 feet of the restored channel. The crest gauges will record the highest watermark between site visits, and the gauge will be checked at each site visit to determine if a bankfull event has occurred. Photographs will be used to document the occurrence of debris lines and sediment deposition on the floodplain during monitoring site visits.

Two bankfull flow events must be documented at the crest gauge within the 5-year monitoring period. The two bankfull events must occur in separate years; otherwise, the stream monitoring will continue until two bankfull events have been documented in separate years.

3.1.2 Cross-sections

The 33 permanent cross-sections were installed throughout the entire Site. Within each project reach the distance interval between cross-sections was approximately equal to the combined length of 20 bankfull widths. An emphasis has been placed on riffle data collection because many of the project design parameters are based on riffle dimensions. This is reflected in a higher ratio of riffle to pool cross-sections selected for monitoring. Each cross-section was marked on both banks with permanent pins to establish the exact transect used. A common benchmark will be used for cross-sections and consistently referenced to facilitate comparison of year-to-year data. The annual cross-sectional survey will include points measured at all breaks in slope, including top of bank, bankfull, inner berm, water surface, and thalweg, if the features are present.

There should be little change in As-built cross-sections and those surveyed in subsequent monitoring years. If changes do take place, they will be evaluated to determine if they represent a movement toward a more unstable condition (e.g., down-cutting or erosion) or a movement toward increased stability (e.g., settling, vegetative changes, deposition along the banks, or decrease in width/depth ratio). Riffle cross-sections will be classified using the Rosgen Stream Classification System (1994), and all monitored cross-sections should fall within the quantitative parameters defined for channels of the design stream type.

3.1.3 Pattern

Annual measurements taken for the plan view of the Site will include sinuosity and meander width ratios. Radius of curvature measurements will be taken on newly constructed meanders for the first year of monitoring only. Pattern measurements should show little adjustment over the five-year

monitoring period. If adjustments do occur, they will be evaluated to ensure that the new measurements fall within the quantitative parameters defined for channels of the design stream type.

3.1.4 Longitudinal Profile

A longitudinal profile will be completed annually during each year of the monitoring period. The profile will be conducted for at least 3,331 LF of restored stream reaches where pattern has been adjusted. The exact location of the annual longitudinal profile is marked on the As-built plan sheets in Appendix D. Measurements will include thalweg, water surface, inner berm, bankfull, and top of low bank. Each of these measurements will be taken at the head of each feature (e.g., riffle, run, pool, and glide) and at the maximum pool depth. The survey will be tied to a permanent benchmark.

The longitudinal profiles should show that the bedform features are remaining stable (i.e., they are not aggrading or degrading). The pools should remain deep, with flat water surface slopes, and the riffles should remain steeper and shallower than the pools. Bedforms observed should be consistent with those observed for channels of the design stream type.

3.1.5 Bed Material Analysis

One substrate sample was taken at a constructed riffle on UT1 to show a general particle distribution at the baseline condition. Six post-restoration pebble counts will be performed on BCC, six on UT1, and two on UT2. Pebble counts will be conducted during post-restoration monitoring years 1, 3, and 5 at the time the cross-sectional data is collected. These data will be compared to known distributions from the existing conditions surveys. Results should indicate either maintenance of seeded bed material or a progression towards previous distributions.

3.1.6 Watershed Observations

As part of the post-construction monitoring, any observed activities or changes in the watershed will be noted and connections to on-site observations will be drawn, where appropriate.

3.1.7 Photo Reference Sites

Photographs will be used to document restoration success visually. Reference stations will be photographed after construction and for five years following construction. Reference photos will be taken once a year, from a height of approximately five to six feet. Permanent markers will be established to ensure that the same locations (and view directions) on the Site are monitored during each monitoring period. Photographs taken at cross-sections are provided in Appendix B, while structure photographs are shown in Appendix E.

3.1.7.1 Lateral Reference Photos

Reference photo transects will be taken at each permanent cross-section. Photographs will be taken of both banks at each cross-section. The survey tape will be centered in the photographs of the bank. The water line will be located in the lower edge of the frame, and as much of the bank as possible will be included in each photo. Photographers will make an effort to consistently document the same view in each photo point over time.

3.1.7.2 Structure Photos

Photographs will be taken at grade control structures along the restored streams. Photographers will make every effort to consistently document the same area in each photo point over time. Photographs will be used to evaluate channel aggradation or degradation, bank erosion, success of riparian vegetation, and effectiveness of erosion control measures subjectively. Lateral photos should not indicate excessive erosion or continuing degradation of the banks. A series of photos over time should indicate successive maturation of riparian vegetation. The position of each structure photo point is located on the As-built plan sheets in Appendix D.

3.2 Vegetation Monitoring

Successful restoration of the vegetation on a mitigation site is dependent upon hydrologic restoration, active planting of preferred canopy species, and volunteer regeneration of the native plant community. In order to determine if the criteria are achieved, 23 vegetation monitoring quadrants were installed across the Site as directed by EEP monitoring guidance. The number of quadrants required is based on the plot number spreadsheet (07312006-2) provided by NCEEP that captures approximately five percent of the total conservation easement. The sizes of individual quadrants are 100 square meters for woody tree species. Vegetation monitoring will occur in the fall, prior to the loss of leaves. Individual quadrant data will be provided and will include species composition, density, and survivability. Individual seedlings will be marked to ensure that they can be found in subsequent monitoring years. Mortality will be determined from the difference between the previous year's living, planted seedlings and the current year's living, planted seedlings.

At the end of the first growing season, species composition, density, and survival will be evaluated. For each subsequent year, until the final success criteria are met, the Site will be evaluated between June and November.

The interim measure of vegetative success for the Site will be the survival of at least 320, three-year-old, planted trees per acre at the end of Year 3 of the monitoring period. The final vegetative success criterion will be the survival of 260, five-year old, planted trees per acre at the end of Year 5 of the monitoring period. While measuring species density is the current accepted methodology for evaluating vegetation success on restoration projects, species density alone may be inadequate for assessing plant community health. For this reason, the vegetation monitoring plan will incorporate the evaluation of additional plant community indices to assess overall vegetative success.

Herbaceous vegetation, primarily native grasses, were planted at the Site shall have at least 80 percent coverage of the seeded/planted area. Any herbaceous vegetation not meeting these criteria shall be replanted. At a minimum, ground cover at the project Site shall be in compliance with the North Carolina Erosion and Sedimentation Control Ordinance at all times.

3.3 Biological Monitoring

Benthic macroinvertebrates can be used to assess quantity and quality of life in the creek. In particular, specimens belonging to the insect orders Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies) (EPT) are useful as an index of water quality. These groups are generally the least tolerant to water pollution and therefore are very useful indicators of water quality. Sampling for these three orders is referred to as EPT sampling. Because of the importance of biological success of a stream restoration project, benthic macroinvertebrate sampling will be conducted for post-restoration Years 3, 4 and 5 on the Site.

Pre-construction monitoring was conducted at three sites within the project limits and at one upstream reference site in September 2006 (Figure 3). The results of this sampling event will be used as a baseline for comparison of post restoration monitoring results. Post restoration monitoring sites shall be located in the same general vicinity as the pre restoration monitoring sites. In general, post restoration monitoring results should show trends towards biological distributions similar to that observed at the reference site.

The sampling methodology shall follow the NCDWQ Standard Operating Procedures for Benthic Macroinvertebrates (2006) Qual 4 Method. Identification of collected species will be conducted by a laboratory properly certified by NCDWQ.

3.4 Maintenance and Contingency Plan

Maintenance requirements vary from site to site and are generally driven by the following conditions:

- Projects without established, woody floodplain vegetation are more susceptible to erosion from floods than those with a mature, hardwood forest.
- Projects with sandy, non-cohesive soils are more prone to short-term bank erosion than cohesive soils or soils with high gravel and cobble content.
- Alluvial valley channels with wide floodplains are less vulnerable than confined channels.
- Wet weather during construction can make accurate channel and floodplain excavations difficult.
- Extreme and/or frequent flooding can cause floodplain and channel erosion.
- Extreme hot, cold, wet, or dry weather during and after construction can limit vegetation growth, particularly temporary and permanent seed.
- The presence and aggressiveness of invasive species vegetation can affect the extent to which a native buffer can be established.
- The presence of beaver can affect vegetation survivability and stream function.

Maintenance issues and recommended remediation measures will be detailed and documented in the monitoring reports. Factors that may have caused any maintenance needs, including any of the conditions listed above, shall be discussed. NCEEP approval will be obtained prior to any remedial action.

4.0 MONITORING RESULTS – 2012 YEAR 4 - MONITORING DATA

The five-year monitoring plan for the Site includes criteria to evaluate the success of the vegetation and stream components of the project. The specific locations of vegetation plots, permanent cross-sections, and the crest gauges are shown on the As-built plan sheets. Photo points, located at each of the grade control structures along the restored stream channel, are also located on the As-built plan sheets in Appendix D.

4.1 Stream Data

Fourth year monitoring dimension and profile data were collected from November through December 2012. Results from the fourth year monitoring data were compared with the As-built, Year 1, Year 2 and Year 3 monitoring data. Permanent cross-sections (with photos) and As-built longitudinal data, as well as the quantitative pre-construction, reference reach, and design data used to determine the restoration approach are provided in Appendix B. The locations of the permanent cross-sections are shown on the As-built plan sheets in Appendix D.

4.1.1 Cross-section, Longitudinal Profile, and Bed Material Analysis Monitoring Results

Cross-sections

The 33 permanent cross-sections along the restored channels were re-surveyed to document stream dimension at the end of monitoring Year 4. Channel geometries for Cross-Sections 5, 9, 13, 22, and 32 were impacted by maintenance work completed during 2011 and noted in the Year 3 monitoring report. All completed maintenance items addressed in 2011 were resurveyed in the fall of 2012 and are shown to be functioning as anticipated.

Two indirect effects of the maintenance structures installed in 2011 did result in changes of bed elevations at Cross-Sections 9 and 32. A drop in bed elevations was a result of the installation of cross-vane structures upstream of the cross-sections. The change in bed elevations was noted in the 2011 monitoring report and has remained constant at comparable elevations in the Year 4 survey. The only other notable change in the stream channel was noted within the vicinity of Cross-Section 25 where the channel is shown to have migrated laterally toward the right bank. All of the aforementioned changes in channel geometry will continue to be monitored and any areas that are identified as requiring maintenance will be addressed through appropriate methods.

Additional stream related information is discussed in Section 4.1.2 “Stream Problem Areas Plan View”.

Longitudinal Profile

The Year 4 longitudinal profile was conducted in November 2012. A total of 3,396 LF of channel was resurveyed along representative sections of the restored reaches. Survey on BCC was conducted from As-built Station 12+75 to 18+01 and 47+00 to 57+19. Survey on UT1 started at As-built Station 13+75 to 30+19, while UT2 was resurveyed from As-built Station 11+00 to 13+07. The representative longitudinal profiles were resurveyed to document stream profile at the end of monitoring Year 4. Water surface elevations were recorded along BBC; however, at the time of the survey, no water was observed outside of deep pools in UT1 and UT2.

Pool – to – pool spacing on BCC Reach 1 and Reach 3 has increased from the previous monitoring years, but is within both design and as-built spacing parameters. Riffle slopes on Reaches 1 and 2 of UT1 were also similar to As-built conditions. The pool-to- pool spacing in UT1 Reach 1 remained similar to As-built values. Average pool spacing in Reach 2 of UT1 decreased relative to previous monitoring years; however, the surveyed pool spacing average (70-ft) is approximate to the average

identified in the As-built (74-ft). Pool spacing on UT2 remains above the As-built average but has decreased from the previous monitoring year and is within the upper designed limit of 103 feet. No comparisons were available for Reach 2 as only one pool and one riffle are present in the assessed survey area. The majority of riffle slopes in BCC Reaches 1 and 3 remained similar to As-built values. Sinuosity was not calculated because only portions of each reach were surveyed.

The longitudinal profile and a summary of parameters measured are provided in Appendix B. Note that this summary represents only the portions of the project that were surveyed.

Bed Material Analysis

Prior to construction, riffles were comprised of grain size particles ranging from fine clay to bedrock. The constructed riffles were seeded with on-site alluvium comprised mostly of fine gravel to large cobble size material. Since pebble counts are to be conducted only during Monitoring Years 1, 3, and 5, no pebble count data was performed during Year 4.

4.1.2 Stream Problem Areas

The constructed stream channels are functioning as designed. Maintenance work completed during the spring of 2011 has repaired the major geomorphological issues identified in the previous monitoring reports and the streams continue to function as designed. Minor stream problems observed during the 2012 visual assessment included areas of limited bank erosion along BCC Reach 2 (Station 24+00 and Station 30+50 – 32+50), vegetation in the channel along BCC Reach 2 (Station 37+00) and Reach 3 (Station 49+00), and an abandoned beaver dam (BCC Reach 3, Station 46+90). Additional stream problem areas noted during Year 4 monitoring consisted of minor filling of the channel on UT1 (Station 44+25-44+75) and UT2 (Station 14+25); as well as a minor areas of bank erosion on UT2 (Station 11+25, 12+25, and 13+75 – 14+50). Additional areas of bare banks along BCC Reaches 2 and 3 were noted; however, many of these areas were graded and reseeded in the recent 2011 maintenance tasks and are developing as anticipated. These areas will be monitored to record their development and any areas identified to exhibit continued, deficient growth will be addressed. Table B.1 Appendix B provides a summary of these problem areas. See Figures B1- B3 in Appendix B for an overview of all stream problem areas. Table B.2 in Appendix B has additional data further explaining the visual assessment scores.

Table 5. Visual Morphological Stability Assessment

BCC Restoration Site: Project No. D06054-D						
BCC Reach 1 (603 LF)						
Feature	**Initial**	**MY-01**	**MY-02**	**MY-03**	**MY-04**	**MY-05**
Riffles	100%	100%	100%	100%	100%	
Pools	100%	100%	100%	100%	100%	
Thalweg	100%	84%	83%	100%	100%	
Meanders	100%	100%	100%	100%	100%	
Bed General	100%	98%	99%	100%	100%	
Bank Condition	100%	100%	100%	100%	100%	
Vanes / J Hooks etc.	-----	-----	-----	-----	-----	
Wads and Boulders	100%	100%	100%	100%	100%	
BCC Reach 2 (2,239 LF)						
Feature	**Initial**	**MY-01**	**MY-02**	**MY-03**	**MY-04**	**MY-05**
Riffles	100%	84%	87%	100%	100%	
Pools	100%	100%	91%	100%	100%	
Thalweg	100%	100%	93%	100%	100%	
Meanders	100%	100%	96%	100%	100%	

Table 5. Visual Morphological Stability Assessment

BCC Restoration Site: Project No. D06054-D						
Bed General	100%	96%	95%	100%	100%	
Bank Condition	100%	100%	82%	100%	99%	
Vanes / J Hooks etc.	100%	93%	95%	100%	100%	
Wads and Boulders	100%	94%	88%	100%	100%	
BCC Reach 3 (1,827 LF)						
Feature	**Initial**	**MY-01**	**MY-02**	**MY-03**	**MY-04**	**MY-05**
Riffles	100%	97%	97%	100%	100%	
Pools	100%	100%	100%	100%	100%	
Thalweg	100%	100%	77%	100%	100%	
Meanders	100%	100%	95%	100%	100%	
Bed General	100%	100%	94%	100%	100%	
Bank Condition	100%	94%	93%	100%	100%	
Vanes / J Hooks etc.	100%	96%	92%	100%	100%	
Wads and Boulders	100%	100%	100%	100%	100%	
BCC Reach 4 (410 LF)						
Feature	**Initial**	**MY-01**	**MY-02**	**MY-03**	**MY-04**	**MY-05**
Riffles	100%	100%	100%	100%	100%	
Pools	100%	100%	100%	100%	100%	
Thalweg	100%	100%	67%	100%	100%	
Meanders	100%	92%	92%	100%	100%	
Bed General	100%	98%	88%	100%	100%	
Bank Condition	100%	88%	80%	100%	100%	
Vanes / J Hooks etc.	100%	100%	88%	100%	100%	
Wads and Boulders	100%	100%	100%	100%	100%	
BCC Reach 6 (969 LF)						
Feature	**Initial**	**MY-01**	**MY-02**	**MY-03**	**MY-04**	**MY-05**
Riffles	100%	100%	100%	100%	100%	
Pools	100%	100%	100%	100%	100%	
Thalweg	100%	100%	100%	100%	100%	
Meanders	100%	100%	100%	100%	100%	
Bed General	100%	100%	100%	100%	100%	
Bank Condition	100%	100%	98%	98%	100%	
Vanes / J Hooks etc.	100%	100%	100%	100%	100%	
Wads and Boulders	-----	-----	-----	-----		
UT1 Reach 1 (1,248 LF)						
Feature	**Initial**	**MY-01**	**MY-02**	**MY-03**	**MY-04**	**MY-05**
Riffles	100%	100%	100%	100%	100%	
Pools	100%	100%	100%	100%	100%	
Thalweg	100%	100%	100%	100%	100%	
Meanders	100%	100%	100%	100%	100%	
Bed General	100%	100%	100%	100%	100%	
Bank Condition	100%	100%	100%	100%	100%	
Vanes / J Hooks etc.	-----	-----	-----	-----		
Wads and Boulders	100%	100%	100%	100%	100%	

Table 5. Visual Morphological Stability Assessment

BCC Restoration Site: Project No. D06054-D						
UT1 Reach 2 (1,016 LF)						
Feature	**Initial**	**MY-01**	**MY-02**	**MY-03**	**MY-04**	**MY-05**
Riffles	100%	100%	100%	100%	100%	
Pools	100%	100%	100%	100%	100%	
Thalweg	100%	100%	100%	100%	100%	
Meanders	100%	100%	100%	100%	100%	
Bed General	100%	100%	100%	100%	100%	
Bank Condition	100%	100%	99%	100%	100%	
Vanes / J Hooks etc.	100%	100%	100%	100%	100%	
Wads and Boulders	100%	100%	100%	100%	100%	
UT1 Reach 3 (1,885 LF)						
Feature	**Initial**	**MY-01**	**MY-02**	**MY-03**	**MY-04**	**MY-05**
Riffles	100%	98%	97%	100%	100%	
Pools	100%	100%	96%	100%	100%	
Thalweg	100%	100%	95%	100%	95%	
Meanders	100%	100%	100%	100%	100%	
Bed General	100%	100%	100%	100%	100%	
Bank Condition	100%	97%	82%	100%	100%	
Vanes / J Hooks etc.	100%	100%	100%	98%	100%	
Wads and Boulders	100%	100%	100%	100%	100%	
UT1 Reach 4 (996 LF)						
Feature	**Initial**	**MY-01**	**MY-02**	**MY-03**	**MY-04**	**MY-05**
Riffles	100%	87%	87%	100%	100%	
Pools	100%	90%	90%	100%	100%	
Thalweg	100%	100%	71%	100%	100%	
Meanders	100%	100%	29%	100%	100%	
Bed General	100%	76%	87%	100%	100%	
Bank Condition	100%	90%	50%	100%	100%	
Vanes / J Hooks etc.	100%	100%	100%	100%	100%	
Wads and Boulders	100%	100%	40%	100%	100%	
UT1A (85 LF)						
Feature	**Initial**	**MY-01**	**MY-02**	**MY-03**	**MY-04**	**MY-05**
Riffles	-----	-----	-----	-----	-----	
Pools	-----	-----	-----	-----	-----	
Thalweg	-----	-----	-----	-----	-----	
Meanders	-----	-----	-----	-----	-----	
Bed General	100%	100%	93%	100%	100%	
Bank Condition	100%	100%	100%	100%	100%	
Vanes / J Hooks etc.	-----	-----	-----	-----	-----	
Wads and Boulders	-----	-----	-----	-----	-----	
UT1B (34 LF)						
Feature	**Initial**	**MY-01**	**MY-02**	**MY-03**	**MY-04**	**MY-05**
Riffles	-----	-----	-----	-----	-----	
Pools	-----	-----	-----	-----	-----	
Thalweg	-----	-----	-----	-----	-----	

Table 5. Visual Morphological Stability Assessment

BCC Restoration Site: Project No. D06054-D						
Meanders	-----	-----	-----	-----	-----	
Bed General	100%	100%	100%	100%	100%	
Bank Condition	100%	100%	100%	100%	100%	
Vanes / J Hooks etc.	100%	100%	100%	100%	100%	
Wads and Boulders	-----	-----	-----	-----	-----	
UT1C (78 LF)						
Feature	**Initial**	**MY-01**	**MY-02**	**MY-03**	**MY-04**	**MY-05**
Riffles	-----	-----	-----	-----	-----	
Pools	-----	-----	-----	-----	-----	
Thalweg	-----	-----	-----	-----	-----	
Meanders	-----	-----	-----	-----	-----	
Bed General	100%	100%	100%	100%	100%	
Bank Condition	100%	100%	100%	100%	100%	
Vanes / J Hooks etc.	-----	-----	-----	-----	-----	
Wads and Boulders	-----	-----	-----	-----	-----	
UT2 (609 LF)						
Feature	**Initial**	**MY-01**	**MY-02**	**MY-03**	**MY-04**	**MY-05**
Riffles	100%	100%	94%	100%	100%	
Pools	100%	100%	100%	100%	100%	
Thalweg	100%	100%	100%	100%	96%	
Meanders	100%	100%	86%	100%	100%	
Bed General	100%	100%	97%	100%	100%	
Bank Condition	100%	100%	73%	100%	96%	
Vanes / J Hooks etc.	100%	100%	96%	100%	100%	
Wads and Boulders	100%	100%	75%	100%	100%	
UT3 (73 LF within easement)						
Feature	**Initial**	**MY-01**	**MY-02**	**MY-03**	**MY-04**	**MY-05**
Riffles	-----	-----	-----	-----	-----	
Pools	-----	-----	-----	-----	-----	
Thalweg	-----	-----	-----	-----	-----	
Meanders	-----	-----	-----	-----	-----	
Bed General	100%	100%	100%	100%	100%	
Bank Condition	100%	100%	100%	100%	100%	
Vanes / J Hooks etc.	100%	100%	100%	100%	100%	
Wads and Boulders	-----	-----	-----	-----	-----	

4.2 Hydrology Data

On-site crest gauges documented the occurrence of one bankfull event during the fourth year monitoring period. The highest stage recorded during the fourth year monitoring period was 0.23 feet. Bankfull verification summaries are included in Table 6. Crest gauge locations are included in the As-built plan sheets in Appendix D. Bankfull verification photos are provided in Appendix E.

Table 6. Verification of Bankfull Events

BCC Restoration Site: Project No. D06054-D					
Station Number	**Date of Data Collection**	**Date of Occurrence of Bankfull Event**	**Method of Data Collection**	**Gage Height (feet)**	**Photo # (If available)**
BCC Reach 3	9/24/12	Between 2/22/12 and 9/24/12	Crest Gauge	0.23	BCC Crest Gauge – 9/24/12
UT1 Reach 4	9/26/12	Between 2/22/12 and 9/26/12	Crest Gauge	0.21	UT1 Crest Gauge – 9/26/12

4.3 Vegetation Data

Bare-root trees and shrubs were planted within all areas of the conservation easement. A minimum 50-foot buffer was established along all restored stream reaches. In general, bare-root vegetation was planted at a target density of 680 stems per acre, in an 8-foot by 8-foot grid pattern. Planting of bare-root trees and shrubs was completed in February 2009. The restoration plan for the Site specifies that the number of quadrants required is based on the CVS-NCEEP monitoring guidance (Lee, 2007). The number of quadrants required was determined using the plot number spreadsheet (07312006-2) provided by NCEEP and captures five percent of the total conservation easement. The sizes of individual quadrants are 100 square meters. A total of 23 vegetation plots, each 10 meters by 10 meters in size, were established across the restored Site.

The average Year 4 density of planted bare root stems, based on the data from the 23 monitoring plots, is 694 stems per acre. The vegetation monitoring indicated a survivability range of 400 stems per acre to 1040 stems per acre. During the Year 3 monitoring event, one vegetation plot (15) did not meet the projected success criteria of 320 trees per acre. No volunteer species were noted in any of the Site's vegetation plots during the Year 3 event; however, in Year 4 four additional species were flagged within Vegetation Plot 15 and added to the count for that plot. The inclusion of the woody stem volunteers increased the Year 4 density of the plot to 400 stems per acre. Currently all vegetation plots are on course to meet the Year 5 success criteria of 260 stems per acre. The locations of the vegetation plots are shown on the As-built plan sheets in Appendix D.

Additional vegetation related information is listed below. Monitoring result tables and photos are located in Appendix C.

4.3.1 Vegetative Problem Areas

In April of 2011, banks experiencing erosion issues were re-graded and matted and any additional areas needing immediate ground cover stabilization were reseeded and mulched. Additional stabilization measures (vegetated geo-lifts and brush mattress) were installed in March 2012. These bio-engineered stabilization measures were installed along outer meander bends of UT2 and BCC, as well as, on some meanders along Reaches 3 and 4 of UT1. Additional plantings within the identified bare areas along the stream banks and within the floodplains were also installed in March 2012.

Though the majority of the Site's floodplain and streambanks have established good vegetative cover, Year 4 monitoring did identify some limited areas within the floodplain and along streambanks that exhibited sparse vegetation and minor areas of erosion. These areas with limited vegetative cover were associated with Reach 2 of BCC in areas that were recently repaired in March 2012 and are located at Station 24+00 and 33+00. UT2 (12+30 and 14+00) also displays some areas of bank erosion. Areas of erosion along BCC are minimal and will be monitored and addressed as needed while areas along UT2 will be re-graded, matted and reseeded to stabilize and limit the potential for additional streambank erosion.

A variety of invasive vegetation species are present throughout the Site and consist of *Ligustrum sinese* (Chinese privet), *Lonicera japonica* (Japanese honeysuckle), and *Rosa multiflora* (multi-flora

rose). Vegetation Plots 13 and 23 are located in areas identified as having a higher population of invasive vegetation species (Figure C1). Herbicidal spot treatment of invasive vegetation species near Vegetation Plots 13 and 23 was applied in spring of 2012. The treatment appears to have decreased the invasive vegetation species populations in those areas. Locations adjacent to these treated areas are currently exhibiting increased populations of Chinese privet. In order to continue the maintenance these invasive vegetation species, an herbicidal spot treatment application will be scheduled during 2013. See Table C.6 in Appendix C for problem area categories, locations, descriptions, causes, and photo log.

Restored reaches 2 and 3 on BCC are also beginning to exhibit limited growth of invasive vegetation species along its streambanks and associated floodplain areas. Though present, these species are not currently affecting the establishment of native vegetation species along and adjacent to BCC. These areas will continue to be monitored to promote the establishment of native species and, if necessary, additional efforts to limit further growth of invasive vegetation species will be scheduled.

4.3.2 Vegetative Problem Area Plan View

See Figure C1 in Appendix C for an overview of all vegetative problem areas.

4.4 Benthic Macroinvertebrate Monitoring Data

Field sampling was conducted by Kristi Suggs, Phillip Lynch, and Heath Caldwell of Baker. Laboratory identification of collected species was conducted by Wendell Pennington, lab supervisor with Pennington & Associates, which is certified by NCDWQ.

Benthic macroinvertebrate samples were collected on October 4th, 5th and 8th, 2012. Site 1, the reference site, is located approximately 200 LF upstream of the Site. Site 2 is located above the Winston-Salem Southbound Railroad line crossing at Station 32+00 on BCC while Site 3 is located approximately 300 LF upstream of Mount Zion Church Road at Station 75+00. Site 4 is located along UT1 at Station 51+00. Figure 3 illustrates the sampling site locations.

Habitat assessments using NCDWQ (2001) protocols were also conducted at each site. Physical and chemical measurements including water temperature, percent dissolved oxygen, dissolved oxygen concentration, pH, and specific conductivity were also recorded at each site. The habitat assessment field data sheets are located in Appendix F. Photographs were taken at Sites 1 through 4 to document stream and bank conditions at the time of sampling, and are located in Appendix F.

4.4.1 Benthic Macroinvertebrate Sampling Results and Discussion

A comparison between the pre- and post-construction monitoring results is presented in Table 7 with complete results presented in Appendix F.

At Site 1, the reference site, the 2012 post-construction community structure appears to have improved slightly when compared to that observed during the pre-construction monitoring period. Total taxa richness has decreased in comparison with pre-construction sampling results; however, recent sampling indicates an increase in populations when compared to the previous monitoring year's results. EPT Taxa Richness has increased and the Total Biotic Index and EPT Biotic Index have both decreased over the six year monitoring period. Though these trends seem to reflect a decrease in environmental stressors currently effecting this sampling location, the EPT Taxa Richness for this site meets the population criteria of "poor" for Piedmont sampling locations (NCDWQ, 2012).

Site 2, which underwent restorative maintenance measures in 2011, exhibited improvements in Total Taxa Richness, EPT Taxa Richness, and Total Biotic Index measurements when compared to those sampled in previous years. Though the EPT Biotic Index measurement for Site 2 during the Year 4 monitoring period was less desirable than preconstruction measurements, all measurements show an

improvements in the number of intolerant species and diversity from Year 3 to Year 4. An increase in the EPT Taxa Richness from pre-construction sampling to current populations, in combination with the recent decrease in the EPT Biotic Index, suggests that Site 2 has not fully recovered from the major disturbance to habitat caused by the in-stream construction but water quality and habitat within the restored reach are potentially improving and are on a trajectory toward a restored system.

Site 3 is located on BCC (Reach 6), within the enhanced project area, at the downstream extent of the project. Measurements at this site showed an increase in the overall taxa richness; however, EPT Taxa Richness has decreased from 2011. Additional comparisons from the current year's results to the previous year's results indicate an increase in the Total Biotic Index and the EPT Biotic Index. The increase in both indices associated with the 2012 sampling results reflects a lower abundance of intolerant species than recorded in 2011. Overall results possibly indicate that the existing communities continue to have relatively higher populations of tolerant species but less tolerant species are comparatively more abundant than in the previous years, which may be indicative to upstream maintenance activities conducted on the restored sections of BCC and UT2.

Site 4 Total Taxa Richness and EPT Taxa Richness counts indicate an improvement in taxa diversity from pre-construction samples. Results from Year 4 sampling also show improvements in the number of populations of intolerant species collected from preconstruction measurements and a decrease in those from Year 3 monitoring, while the EPT Biotic Index has improved. Though Site 4 also sustained restorative maintenance measures during Year 3, sample numbers indicate that water quality is improving and that recolonization is occurring.

Year 4 monitoring results show trends toward an increase in the overall biological and EPT richness, and a decrease in biotic indices. These trends indicate the improvement in benthic macroinvertebrate communities within the project Site. It is anticipated that improvements in biotic indices will be seen in future monitoring reports as the project and buffer matures and communities continue to recolonize.

Table 7. Pre-restoration vs. Post-restoration Benthic Macroinvertebrate Sampling Data												
BCC Restoration Site: Project No. D06054-D												
Metric	**Site 1 Reference**			**Site 2 U/S BCC**			**Site 3 D/S BCC**			**Site 4 UT1 to BCC**		
	Pre	**Post**	**Post**	**Pre**	**Post**	**Post**	**Pre**	**Post**	**Post**	**Pre**	**Post**	**Post**
	9/13/06	9/28/11	10/5/12	9/13/06	9/28/11	10/5/12	9/13/06	9/26/11	10/8/12	9/14/06	9/26/11	10/4/12
Total Taxa Richness	20	7	13	15	26	29	19	22	25	16	11	19
EPT Taxa Richness	1	0	4	1	3	3	0	5	3	0	3	2
Total Biotic Index	6.76	6.95	5.15	7.85	7.57	7.14	8.39	5.85	7.67	8.18	7.8	8.74
EPT Biotic Index	7.2	N/A	3.9	2.5	7.14	6.8	N/A	6.34	7.3	N/A	7.27	6.55
Dominance in Common (%)	29.4%*	41.2%*	46.4%	53.6%*	21.5%*	29.6%	39.6%*	11.2%*	32.5%	23.2%*	20.0%*	27.8%
Habitat Assessment Rating	82	89	78	62	88	84	72	89	87	63	89	84
Water Temperature (˚C)	19.5	21.8	18.5	18	22.8	18.7	19.1	22.2	15.4	21	21.9	21.9
% Dissolved Oxygen (DO)	46.5	84.8	N/A	N/A	89.2	N/A	28.2	94.1	N/A	72.1	89.5	54.5
DO Concentration (mg/l)	4.16	7.45	7.95	6.06	7.67	6.08	2.60	8.17	6.50	6.42	N/A	4.75
pH	6.99	6.60	7.74	6.78	6.20	7.00	6.87	6.72	7.84	6.78	6.44	6.30
Conductivity (µmhos/cm)	170	120	170	170	120	190	23	150	190	190	150	160

* Data values have been corrected from previous reports.

4.4.2 Habitat Assessment Results and Discussion

Site 1, the reference site, received a 78 on the Habitat Assessment Field Data Sheet. The site exhibited good riffle substrate, and shading and moderate habitat diversity. Riffles were a mix of bedrock, gravel and cobbles, slightly embedded with sand, and the pool bottoms were silty. Severe erosion was evident in a majority of meander bends. Site 1 had a mature hardwood buffer with minimal breaks. Chinese privet was dominant in the floodplain understory. Snags and leaf packs were common within this section of the channel.

Maintenance work was conducted at Site 2, on BCC, during Year 3 monitoring, and included the installation of a cross vane at the head of the riffle, bank grading, and live stake planting. Site conditions during Year 4 monitoring, exhibited excellent riffle pool sequencing, pattern, and stability, as well as good habitat diversity. Riffles were mostly gravel and cobbles, and the pool bottoms were silty. The riparian buffer consisted of immature hardwood seedlings, and woody shrubs, but is currently dominated by herbaceous species and grasses. Numerous types of in-stream habitat including rocks, snags, logs, macrophytes, and leafpacks were present. A habitat assessment score of 84 shows that the Site has continued to remain stable and riparian and streambank vegetation has continued to provide good habitat for aquatic life. It is anticipated that as the project and buffer continue to mature, habitat will continue to improve and diversify.

Site 3 is located in Reach 6 of BCC and did not receive any maintenance work during Year 3. The Site received an 87 on the Habitat Assessment Field Data Sheet. Bedform diversity was good, but somewhat dominated by long riffles. Riffles consisted mostly of gravel and cobbles, with limited embedding by sand, and the pool bottoms were silty. The riparian buffer of Site 3 would be classified as a mature forest, with minimal breaks in the canopy. Aquatic habitat in the form of rocks, macrophytes, and vegetative debris were common while snags, logs, undercut banks, and root mats were rare.

Maintenance work was also conducted in the vicinity of Site 4, on UT1, with the implementation of geo-lifts, bank grading, and live staking. This site received a habitat assessment score of 84 during Year 4 monitoring. Riffles consisted of a mix of gravel, cobble, and boulders and embeddedness was minimal. Pools were frequent with a mix of depths and silty bottoms. Fish were common in the pools throughout the site though the water level and flow rates were low. The riparian buffer of this site consists of scattered immature hardwood seedlings. In-stream habitat included rocks, macrophytes, undercut banks, root mat, and leafpacks. It is anticipated that as the project and buffer continue to mature, habitat will continue to improve and diversify.

Restoration, enhancement, and maintenance measures implemented throughout the project continue to improve the aquatic diversity and in-stream habitat. The physical and chemical measurements of were within water quality norms for Piedmont streams (NCDWQ, 2007) for all sampling sites except for dissolved oxygen at Site 4. However, this is most likely due to low stream flows and high oxygen demands from the multiple schools of minnows.

4.5 Areas of Concern

Overall the restored channels are functioning as designed with limited areas of concern. The identified problems include the localized areas of observed bank erosion, in-channel vegetation and the remnant beaver dam along BCC and the slight filling of the channel along UT1 and UT2. These areas will require minor maintenance activities and are to be scheduled in the spring of 2013. Though invasive species are currently not affecting native vegetation, they will continue to be monitored and an herbicidal spot treatment application will be scheduled during 2013 for dense populations.

5.0 REFERENCES

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Appendix A

Figures

1. Vicinity Map
2. Project Summary Map
3. Macroinvertebrate Monitoring Map

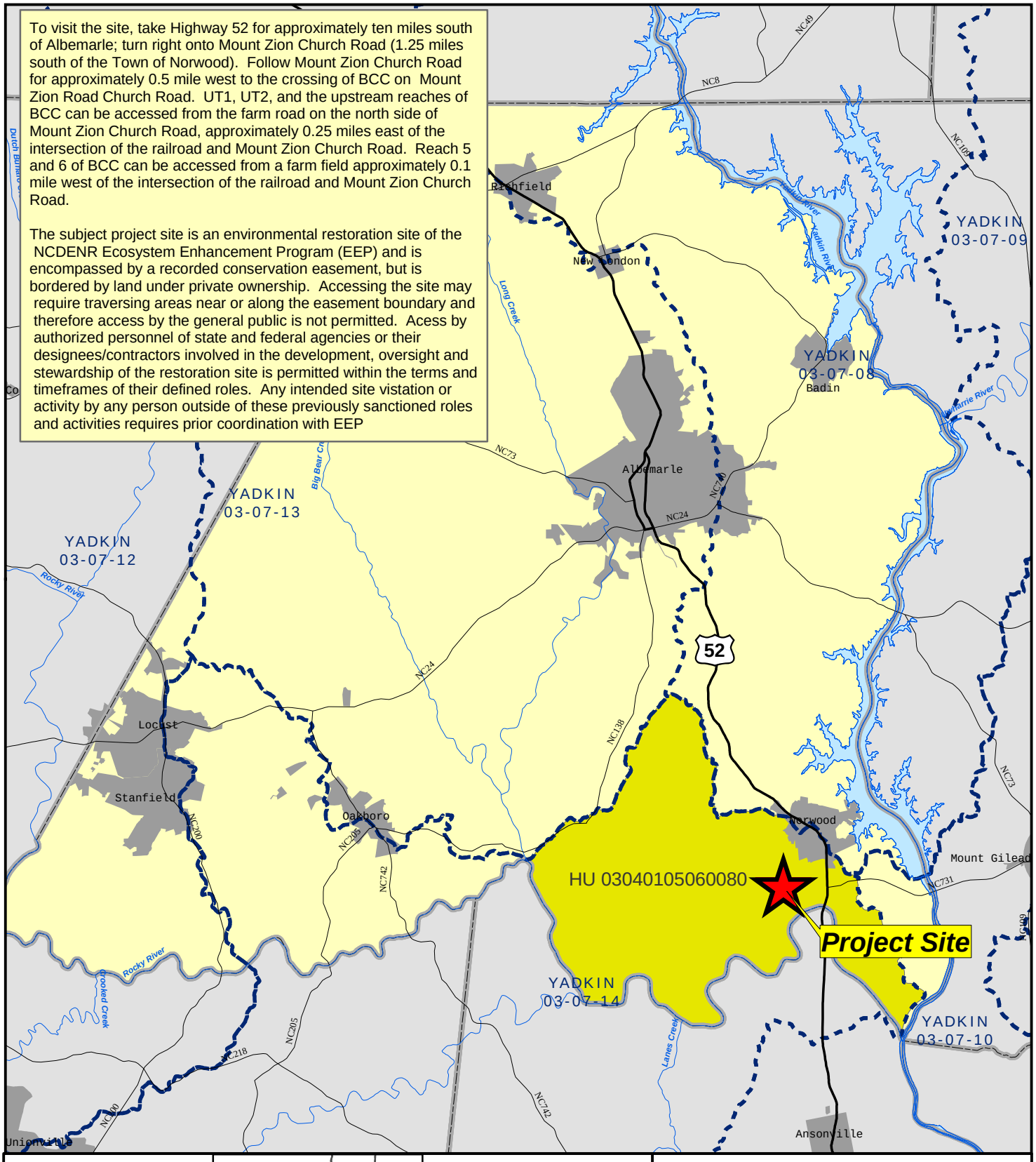


Figure 1: Vicinity Map

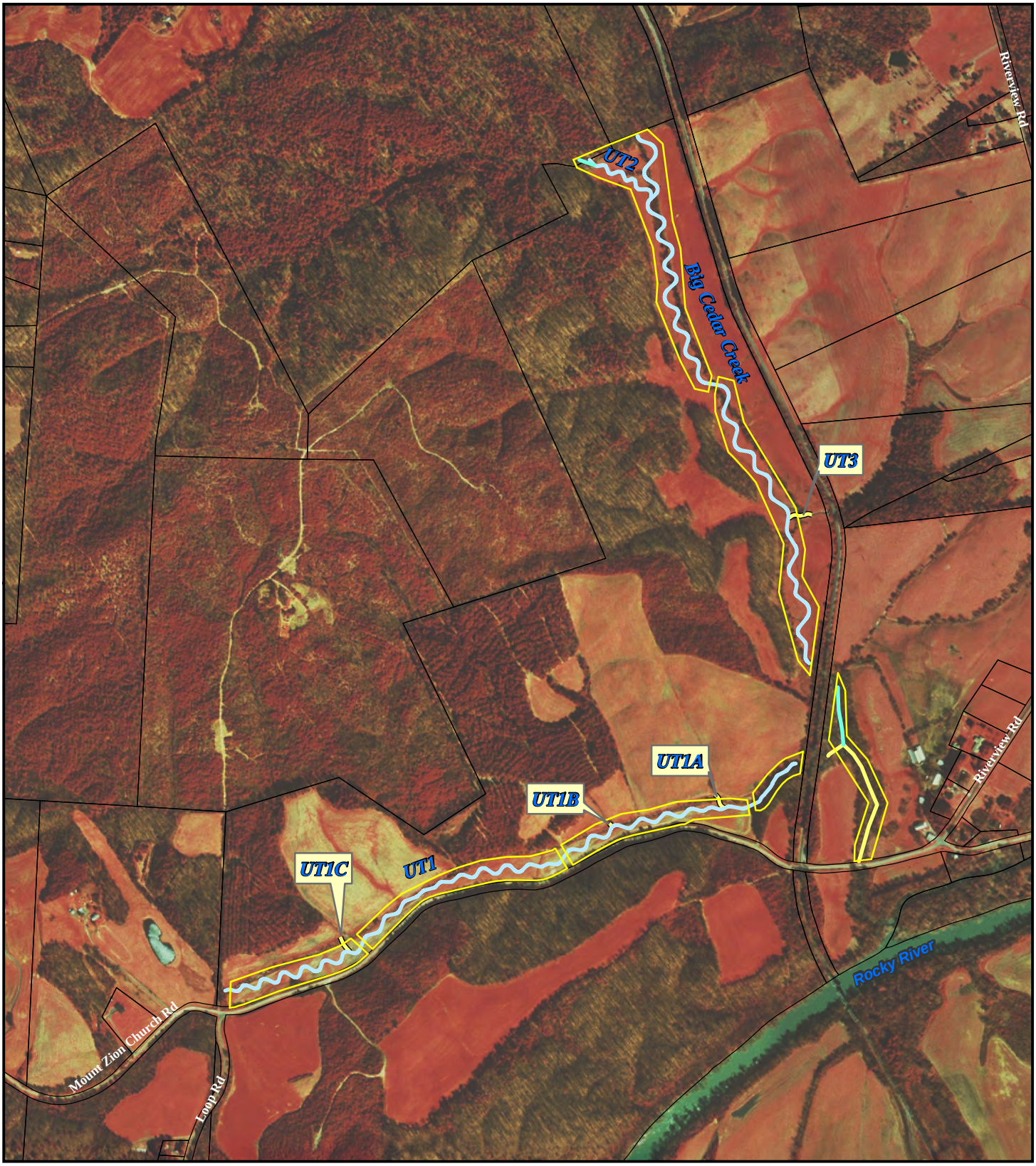
Big Cedar Creek Stream Restoration Project

Annual Monitoring Plan - Year 4

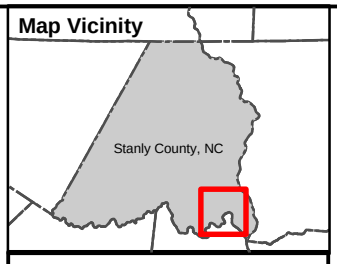
Stanly County, NC

March 2013

Baker



Map Vicinity



EEP Project No. : D06054-D

LEGEND

- Preservation
- Enhancement
- Restoration
- Parcels
- Conservation Easement

0 500 1,000 Feet

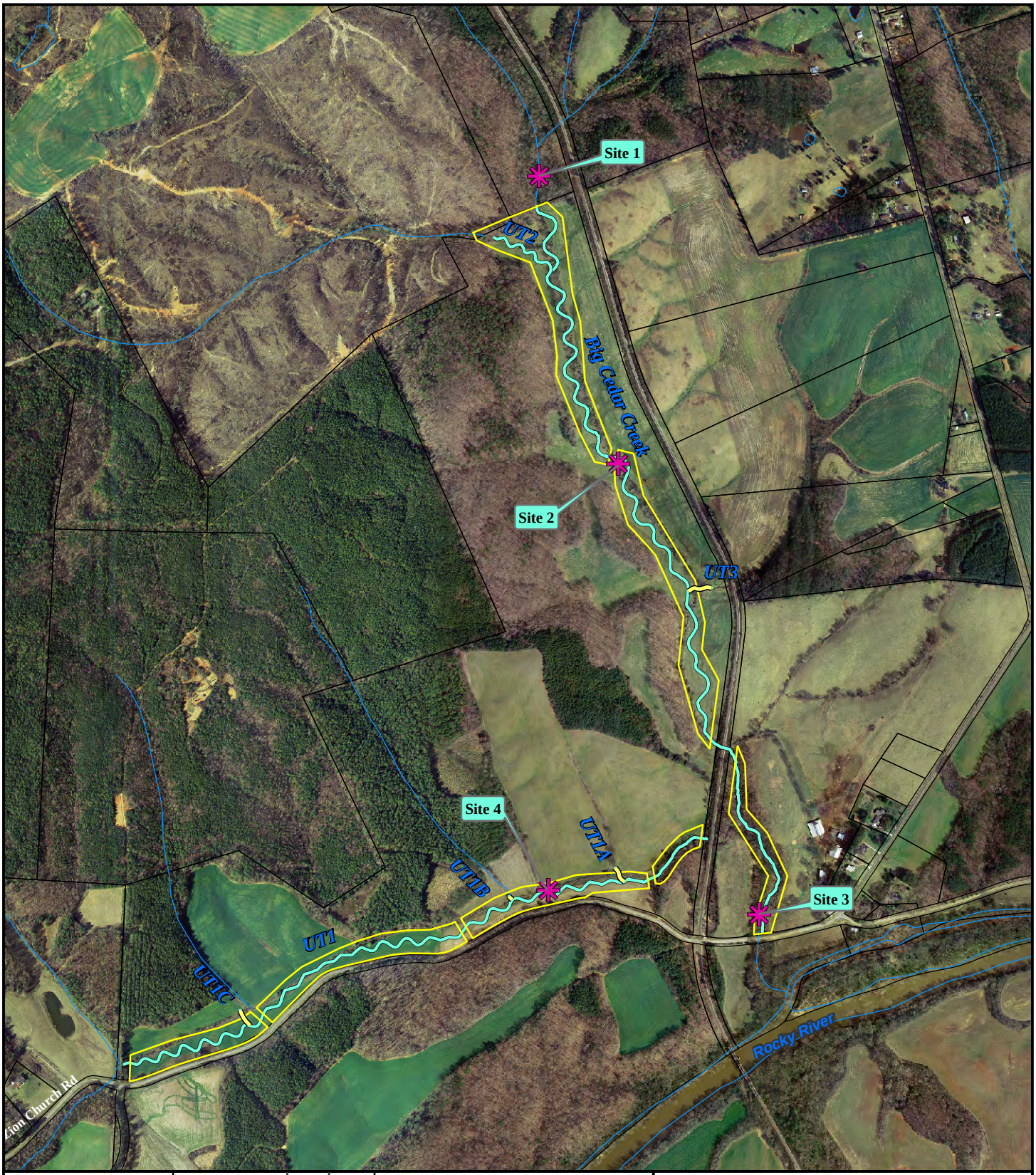
Figure 2: Restoration Summary

Big Cedar Creek Stream Restoration Project

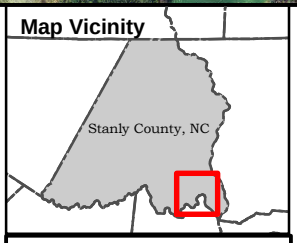
Annual Monitoring Plan - Year 4

Stanly County, NC

March 2013



Map Vicinity



EEP Project No. : D06054-D

LEGEND

- As-Built Streams
- Macroinvertebrate Sampling Sites
- Conservation Easement
- Parcels
- Streams

0 500 1,000 Feet

Figure 3: Benthic Macroinvertebrate Sampling Sites
Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 4
Stanly County, NC

March 2013

Appendix B

Morphological Summary Data

Cross-section Plots

Profile Plots

Morphology Data Table 7 & 8

Tables B.1 & B.2

Representative Stream Problem Area Figures B1- B3

Representative Stream Problem Area Photos

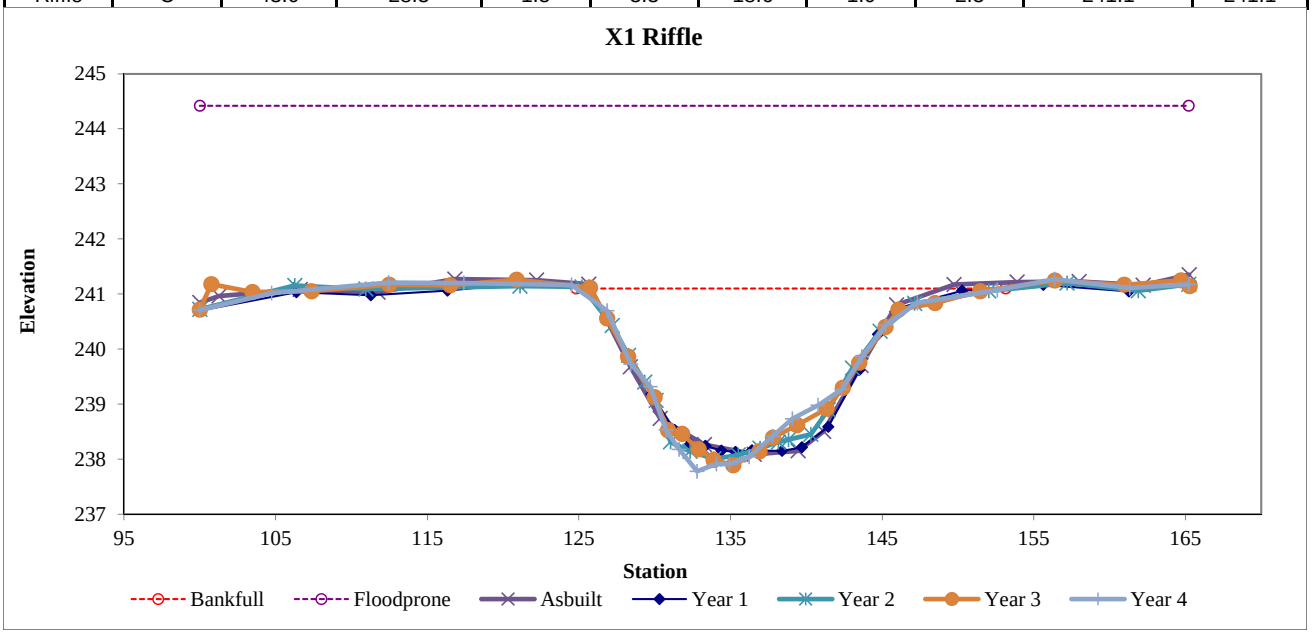
Permanent Cross Section X1

(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	43.0	28.3	1.5	3.3	18.6	1.0	2.3	241.1	241.1

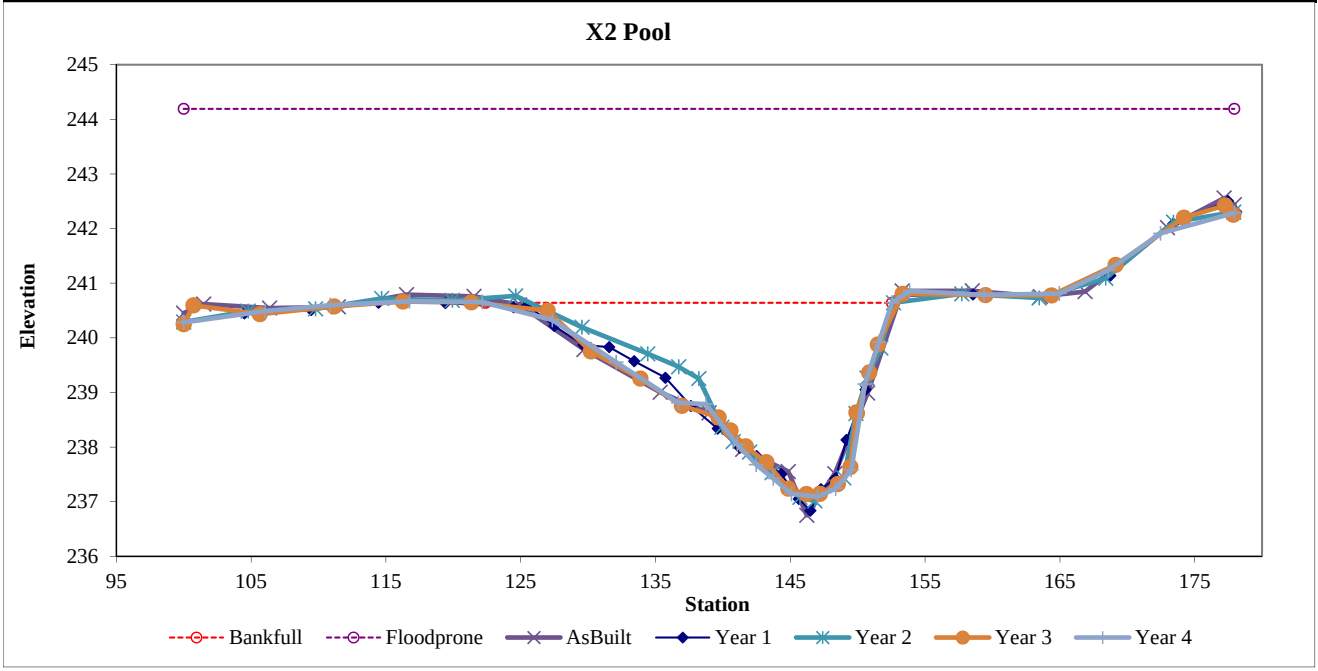


Permanent Cross Section X2
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Pool		51.1	30.2	1.7	3.6	17.8	1.0		240.6	240.6

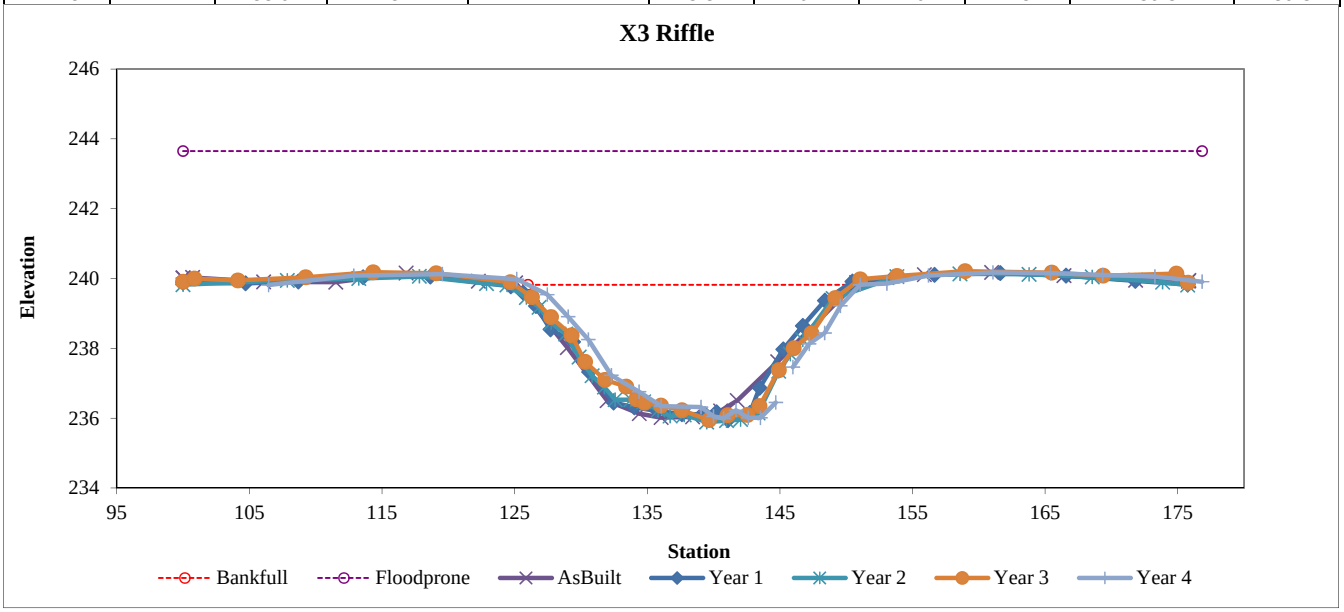


Permanent Cross Section X3
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	E	58.9	25.1	2.4	3.8	10.7	1.0	2.8	239.8	239.8



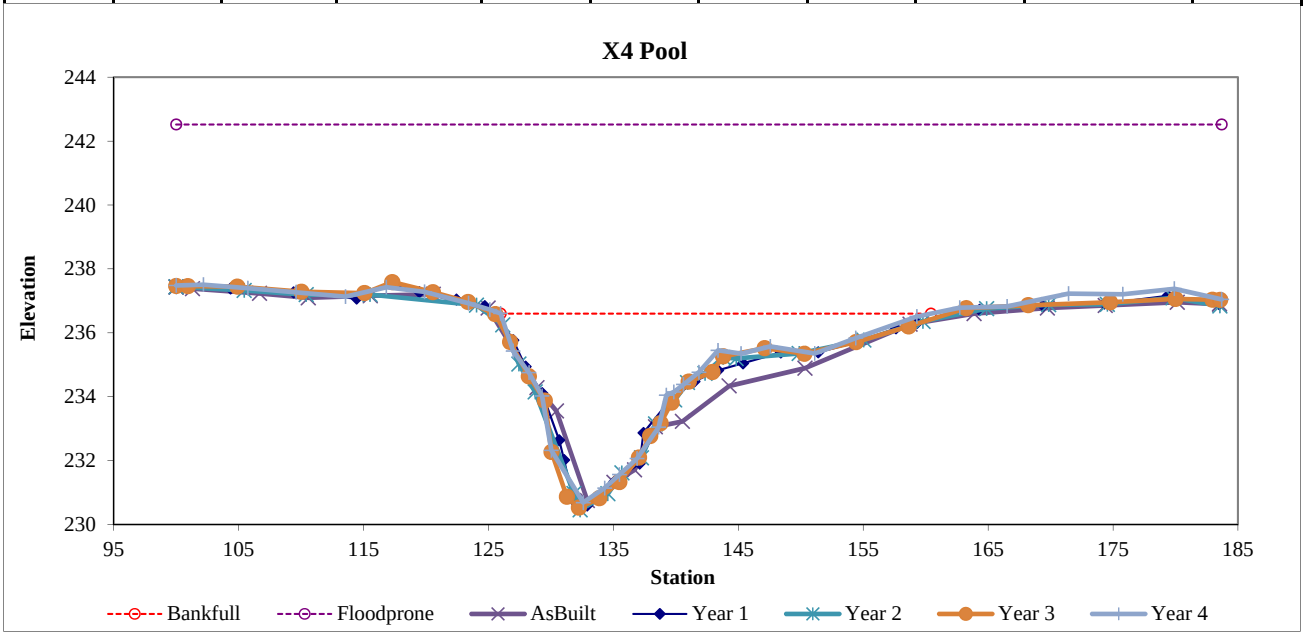
Permanent Cross Section X4

(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Pool		74.4	34.5	2.2	5.9	16.0	1.0		236.6	236.6



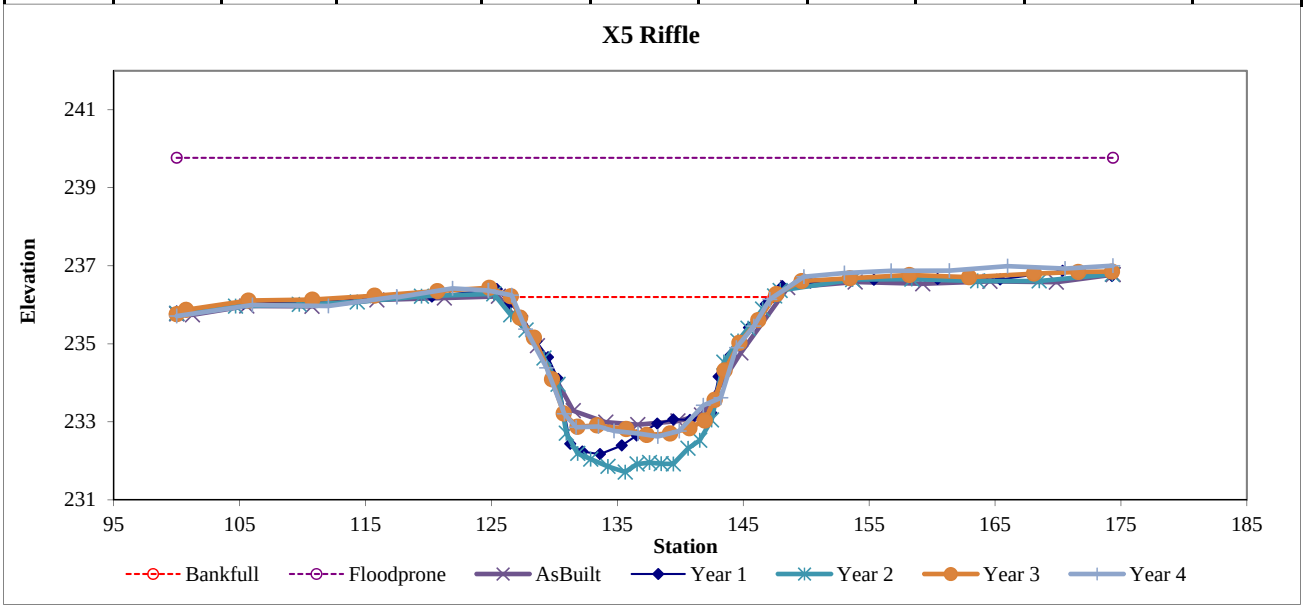
Permanent Cross Section X5

(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	E	51.2	20.7	2.5	3.6	8.4	1.0	3.6	236.2	236.1



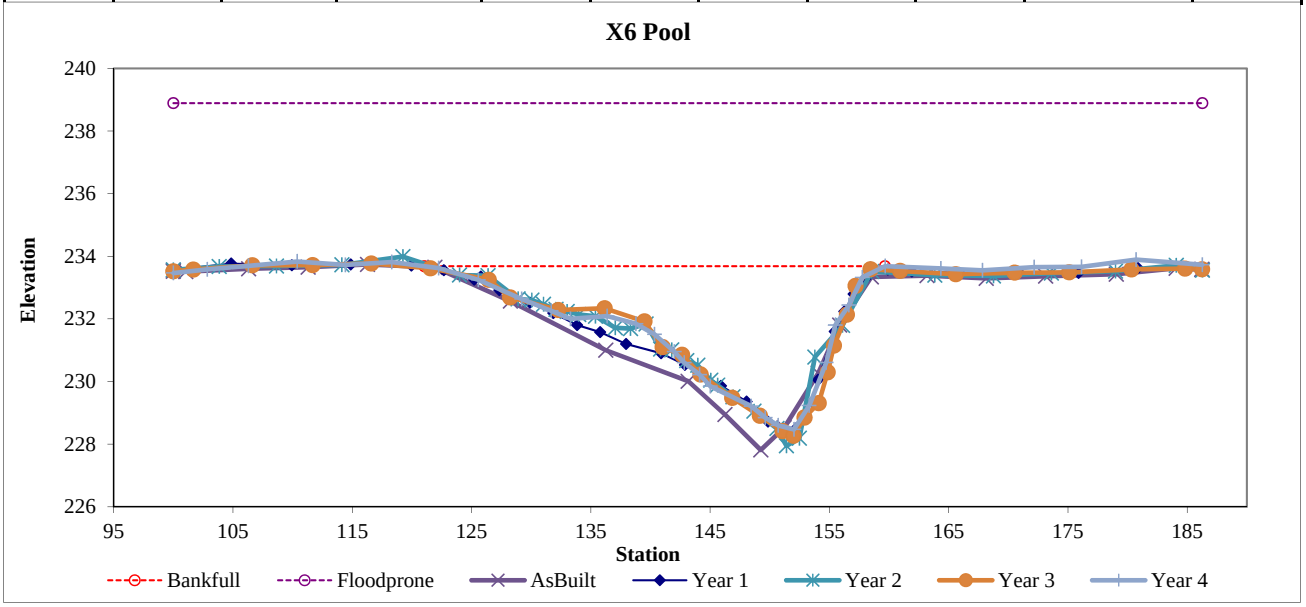
Permanent Cross Section X6

(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Pool		83.7	38.6	2.2	5.2	17.8	1.0		233.7	233.7



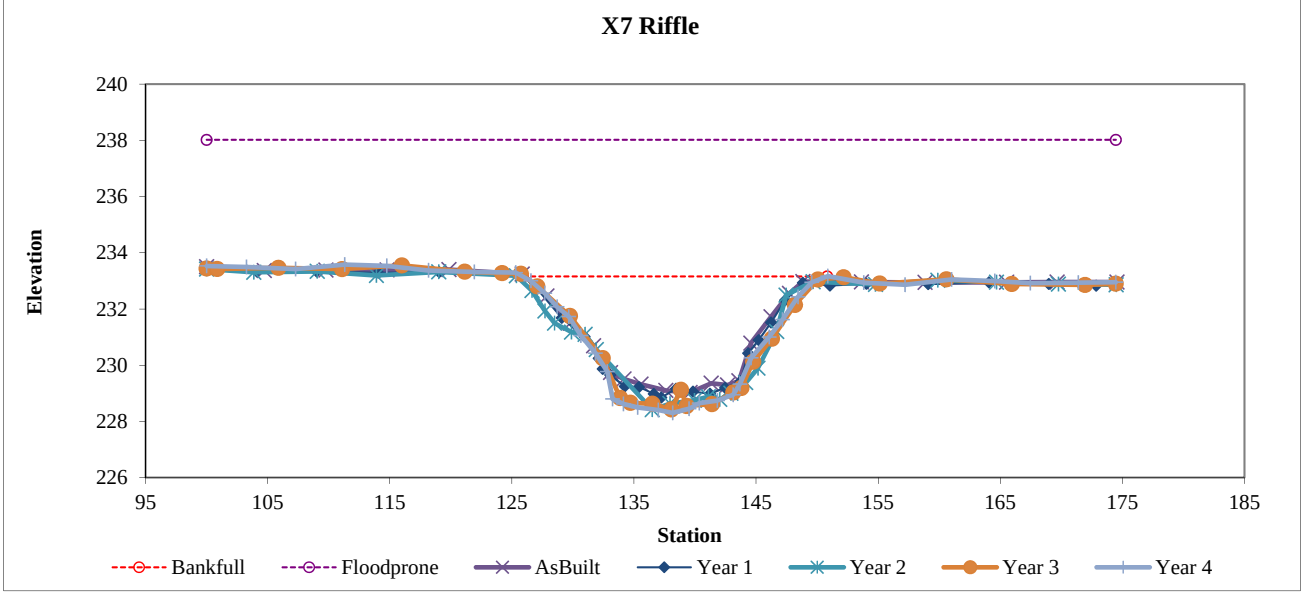
Permanent Cross Section X7

(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	E	70.4	24.9	2.8	4.9	8.8	1.0	3.0	233.2	233.2

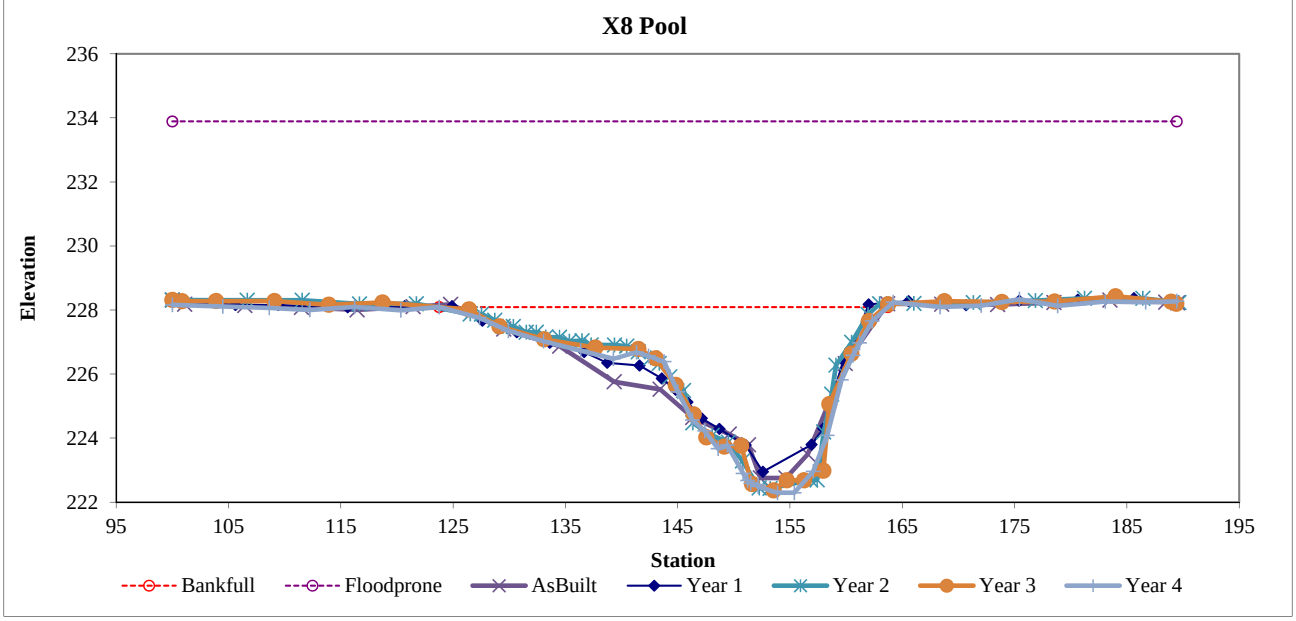


Permanent Cross Section X8
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Pool		94.6	40.0	2.4	5.8	16.9	1.0		228.1	228.1



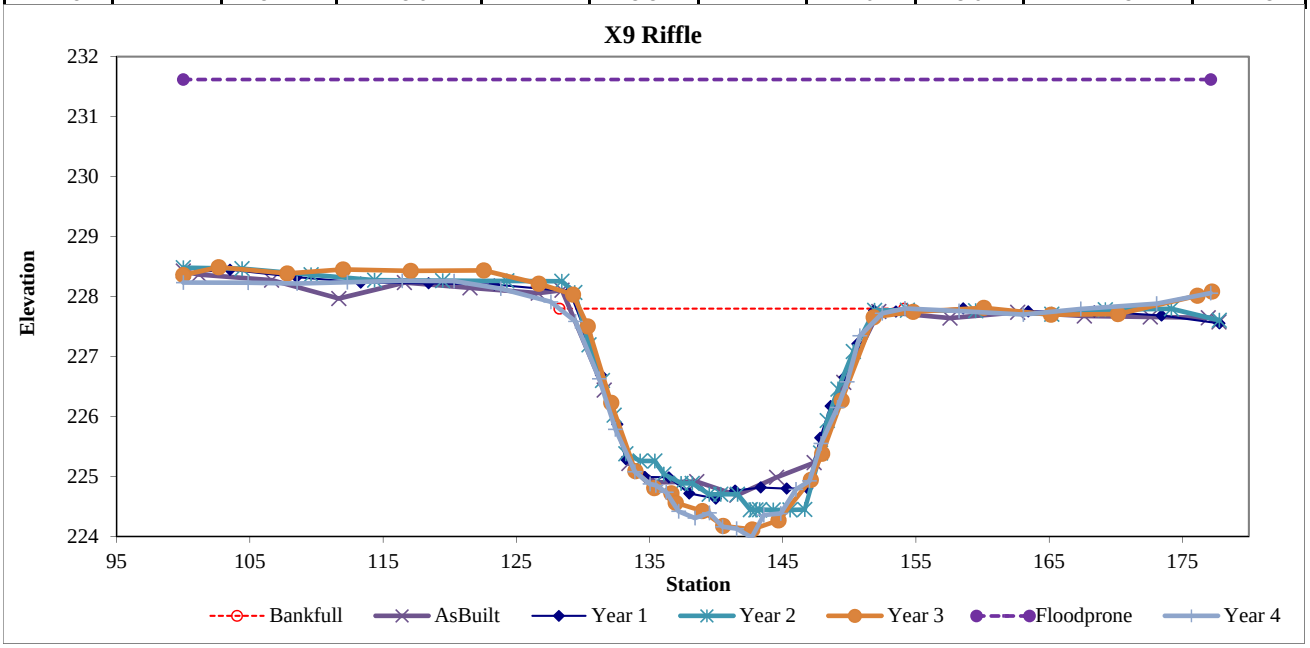
Permanent Cross Section X9

(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	E	57.4	25.9	2.2	3.8	11.7	1.0	3.0	227.8	227.8



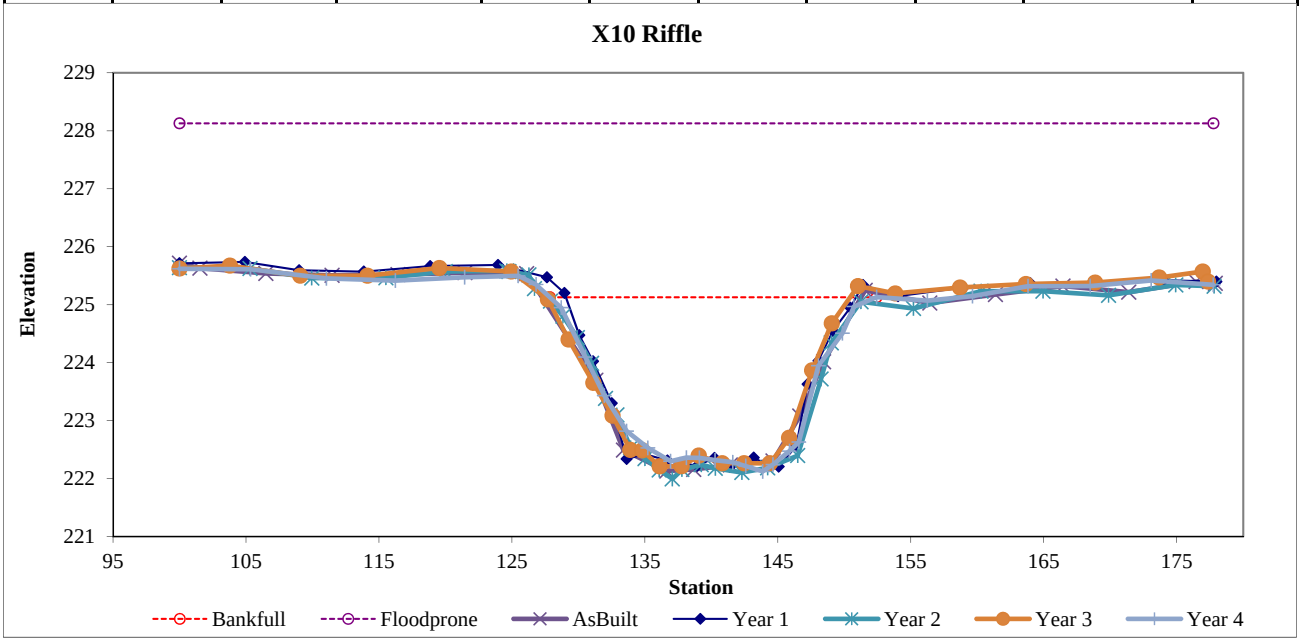
Permanent Cross Section X10

(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	47.1	24.6	1.9	3.0	12.8	1.0	3.2	225.1	225.1

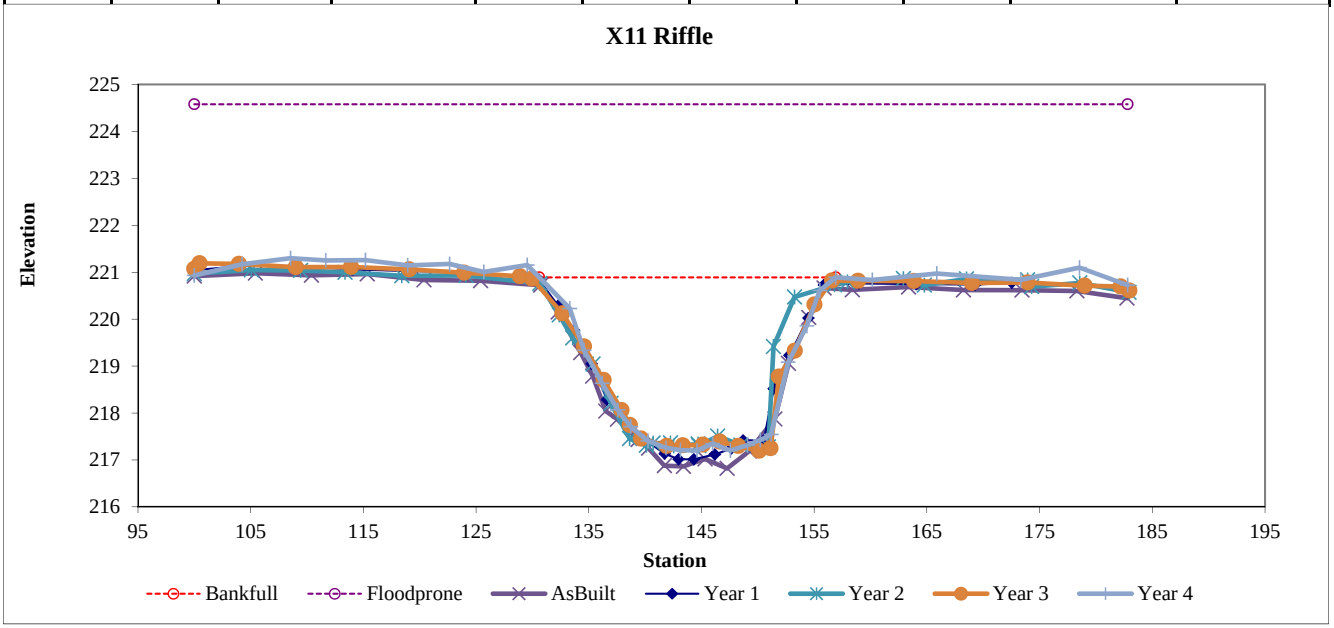


Permanent Cross Section X11
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	E	63.9	26.3	2.4	3.7	10.8	1.0	3.1	220.9	220.9



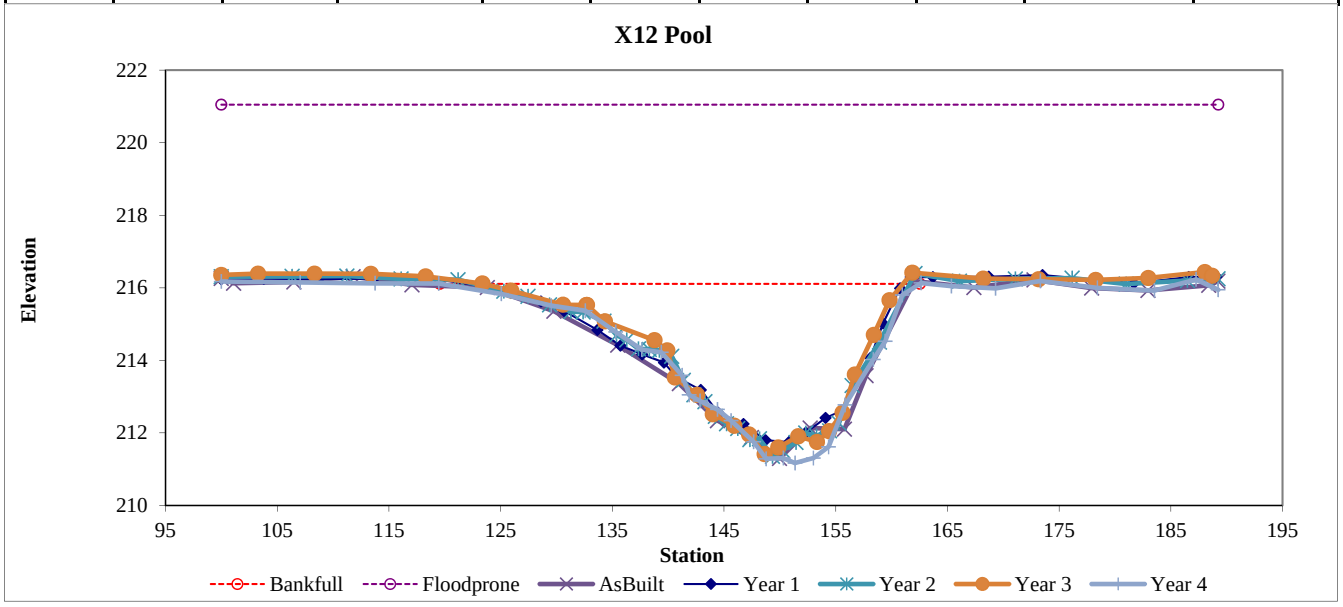
Permanent Cross Section X12

(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Pool		89.6	43.0	2.1	4.9	20.6	1.0		216.1	216.1

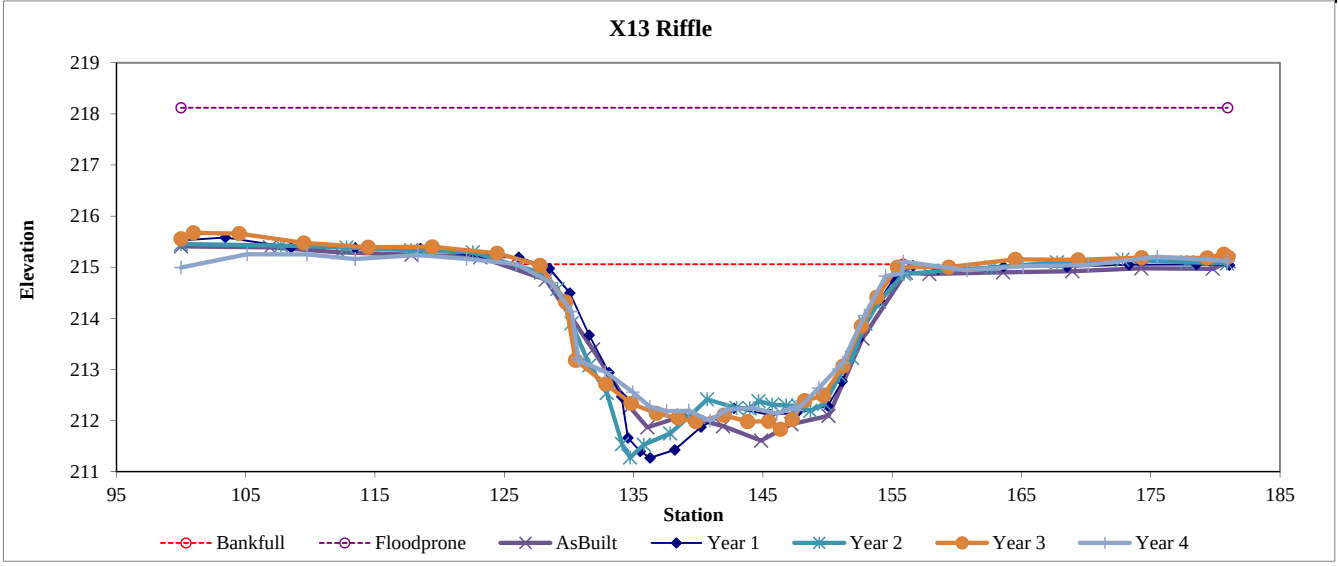


Permanent Cross Section X13
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	59.8	29.9	2.0	3.1	15.0	1.0	2.7	215.1	215.1

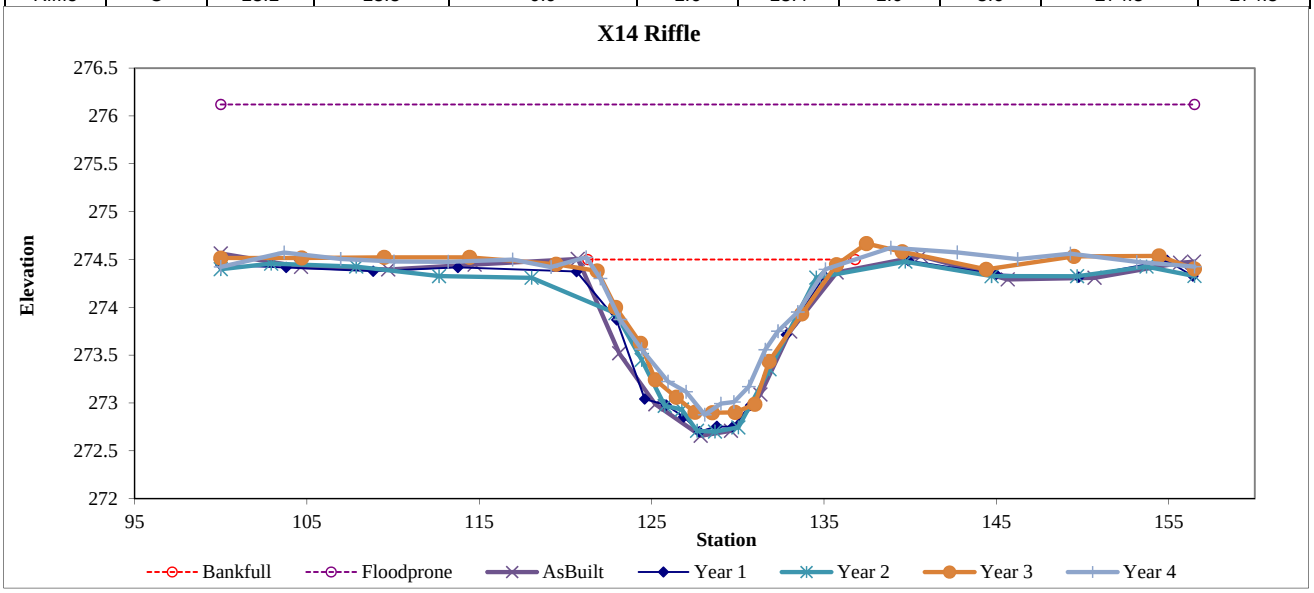


Permanent Cross Section X14
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	13.1	15.5	0.9	1.6	18.4	1.0	3.6	274.5	274.5



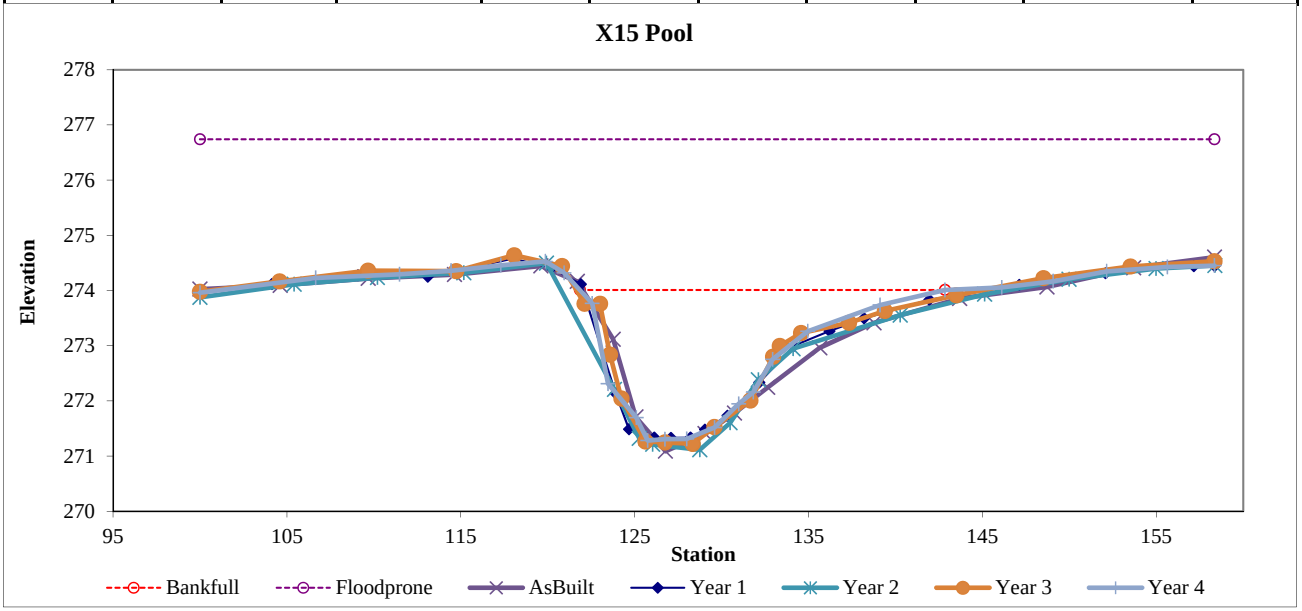
Permanent Cross Section X15

(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Pool		27.3	21.0	1.3	2.7	16.2	1.0		274.0	274.0

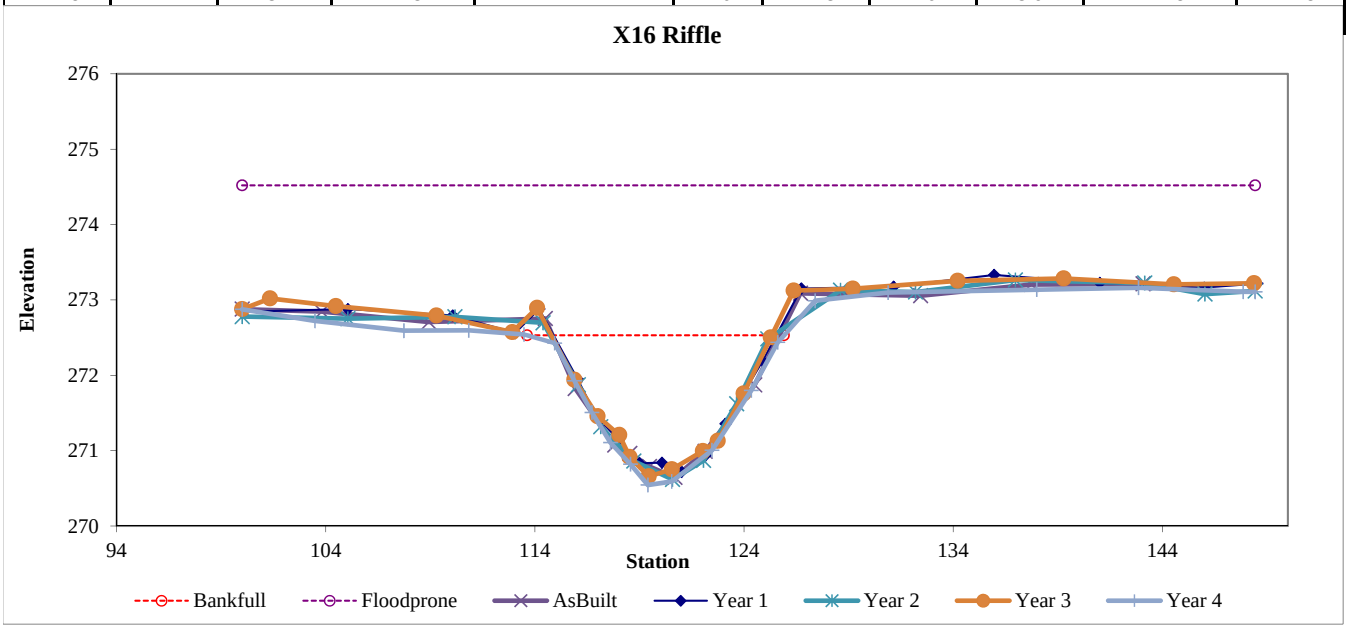


Permanent Cross Section X16
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	E	13.4	12.3	1.1	2.0	11.3	1.0	3.9	272.5	272.5

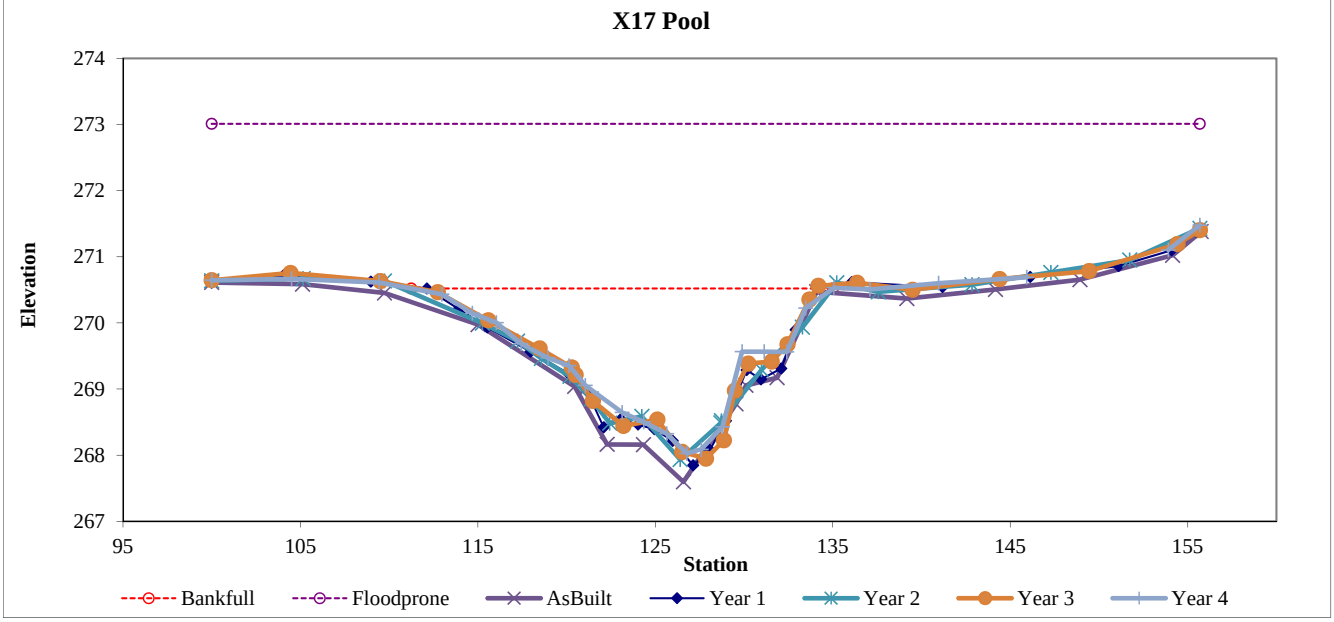


Permanent Cross Section X17
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Pool		26.9	23.8	1.1	2.5	21.0	1.0		270.3	270.3

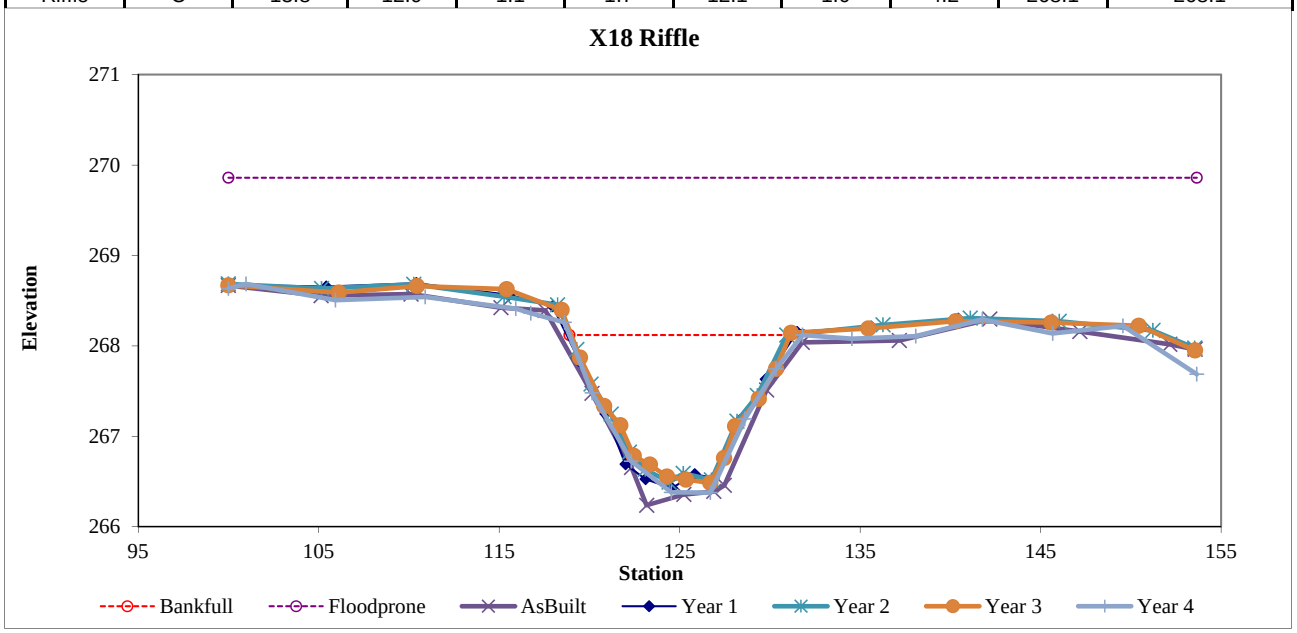


Permanent Cross Section X18
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	13.8	12.9	1.1	1.7	12.1	1.0	4.2	268.1	268.1

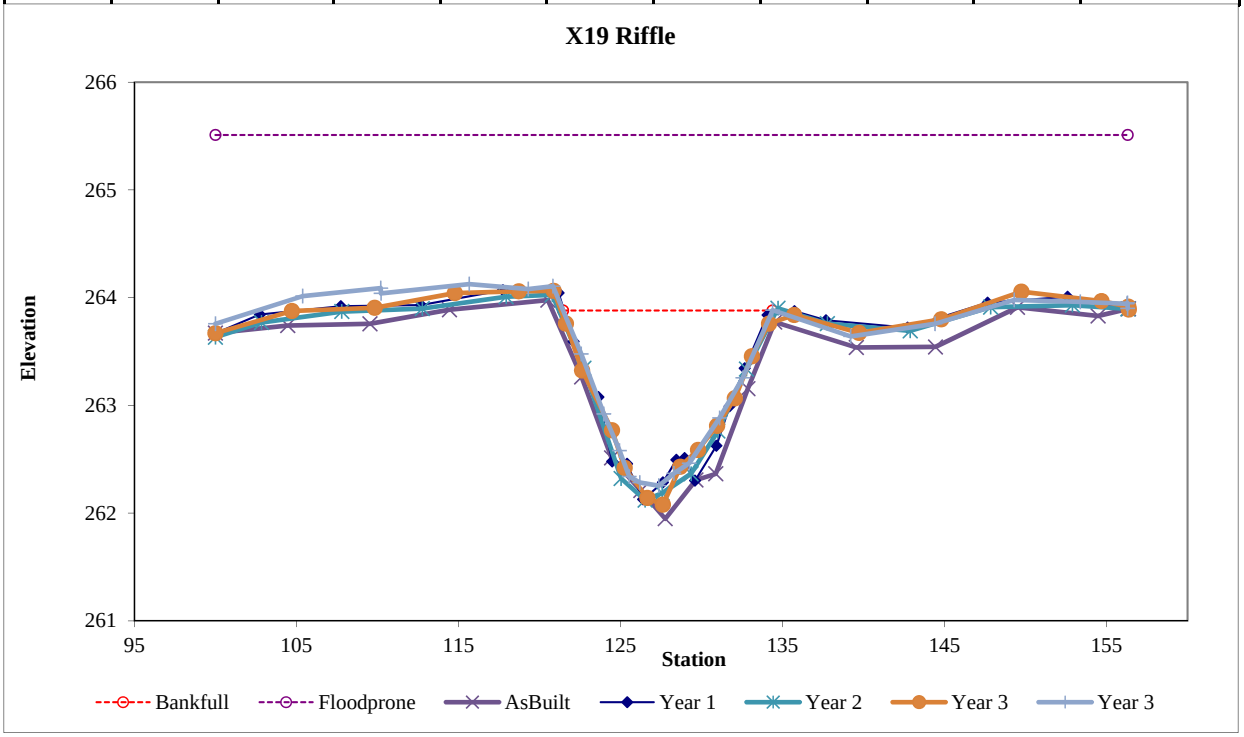


Permanent Cross Section X19
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	12.9	12.9	1.0	1.6	13.0	1.0	4.4	263.9	263.9

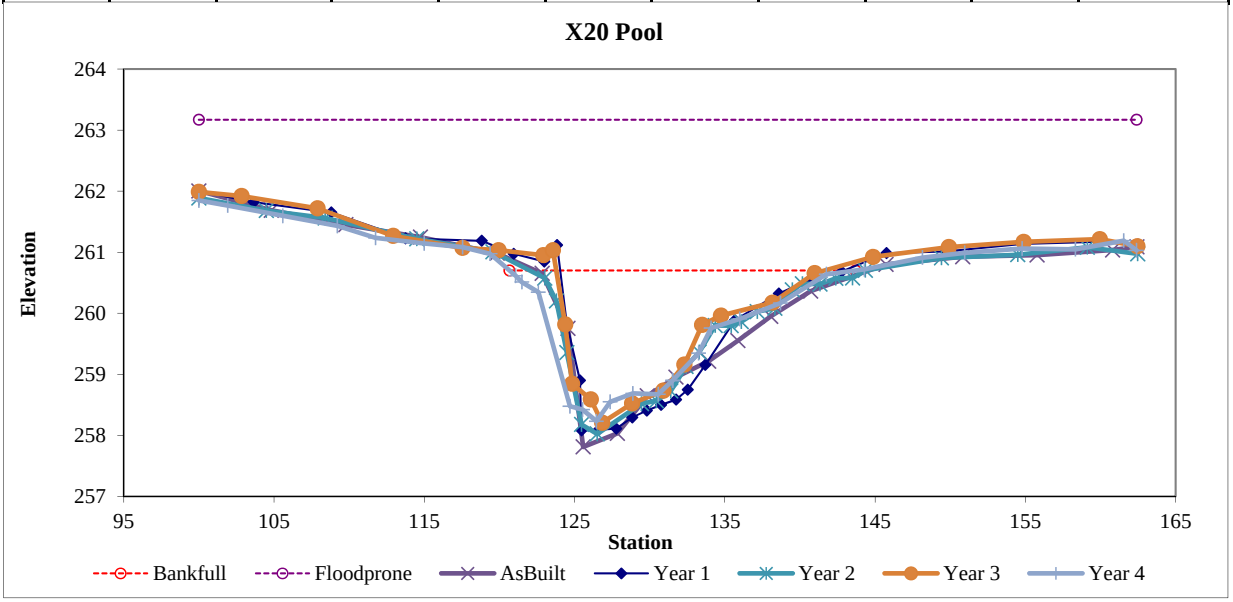


Permanent Cross Section X20
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Pool		25.8	23.0	1.1	2.5	20.6	1.0		260.7	260.7

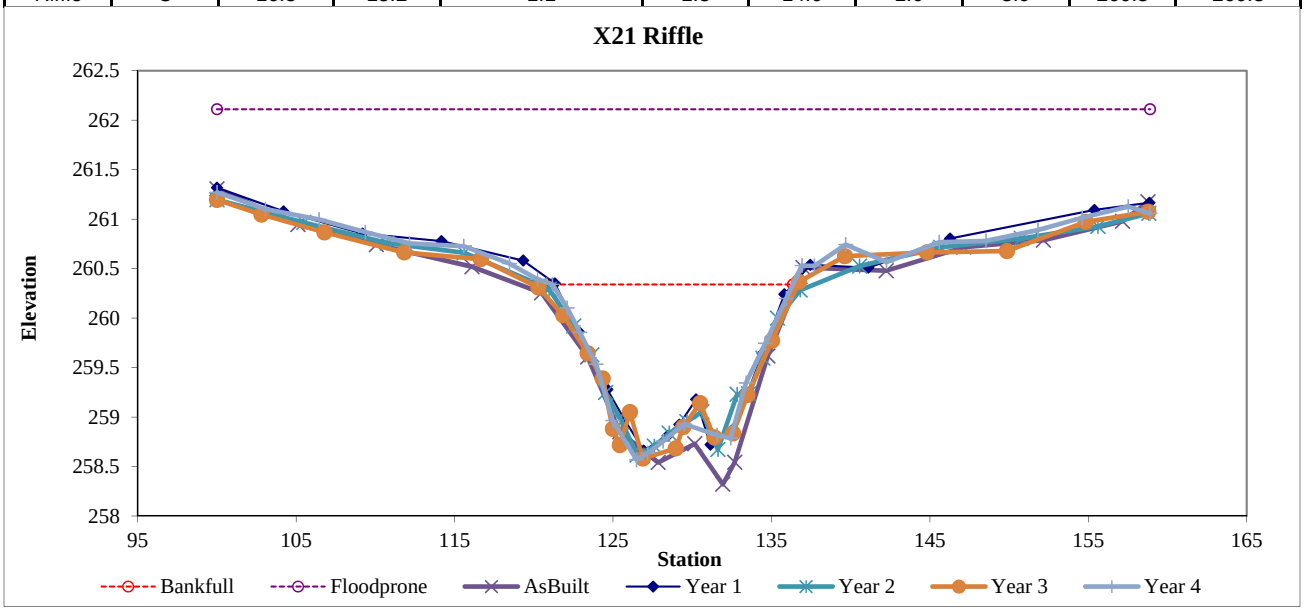


Permanent Cross Section X21
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	16.5	15.2	1.1	1.8	14.0	1.0	3.9	260.3	260.3

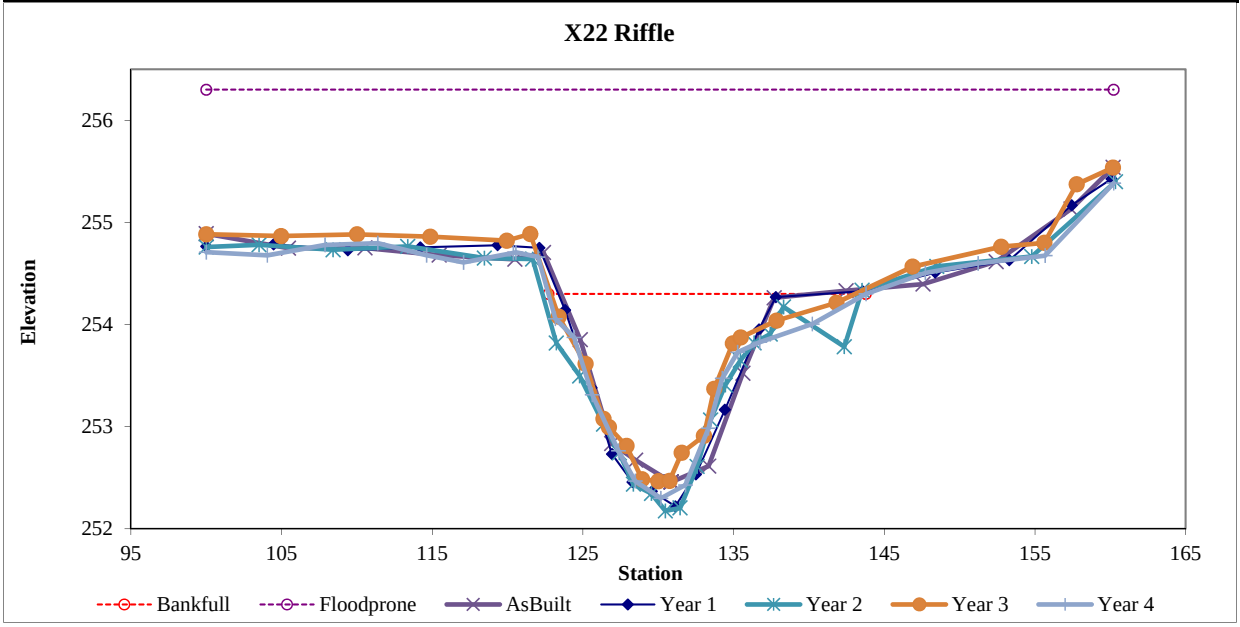


Permanent Cross Section X22
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	10.2	11.9	0.9	1.5	14.0	0.9	5.0	253.8	253.7

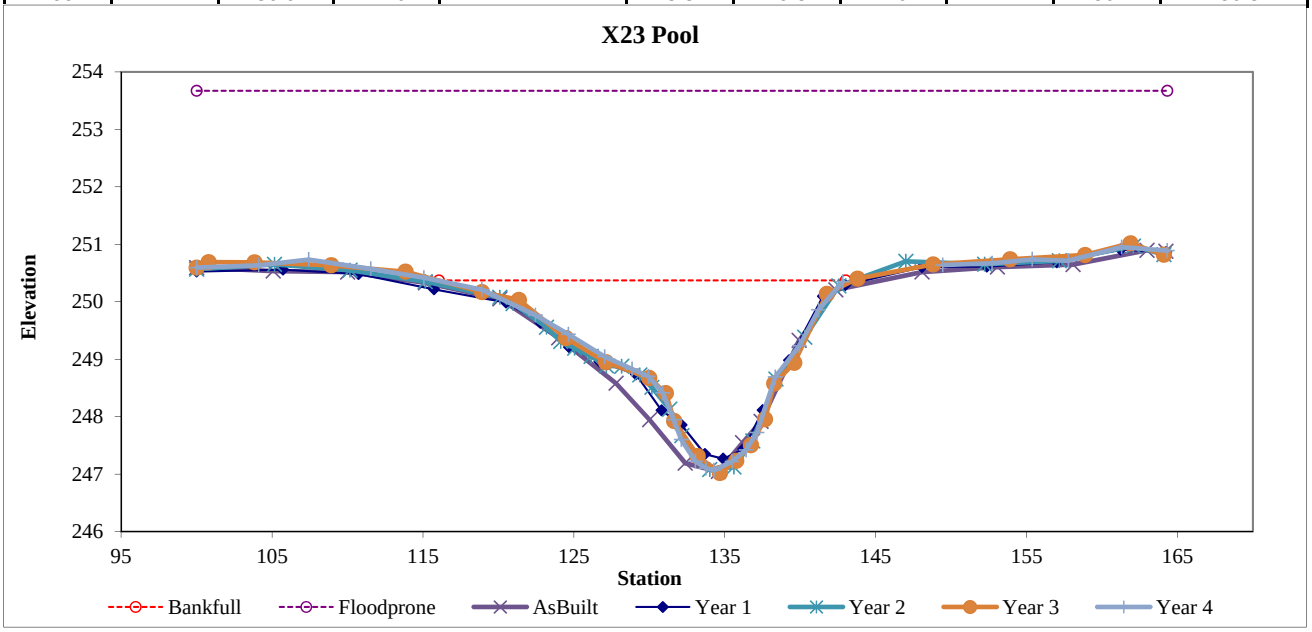


Permanent Cross Section X23
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Pool		36.6	27.0	1.4	3.3	19.8	1.0		250.4	250.3

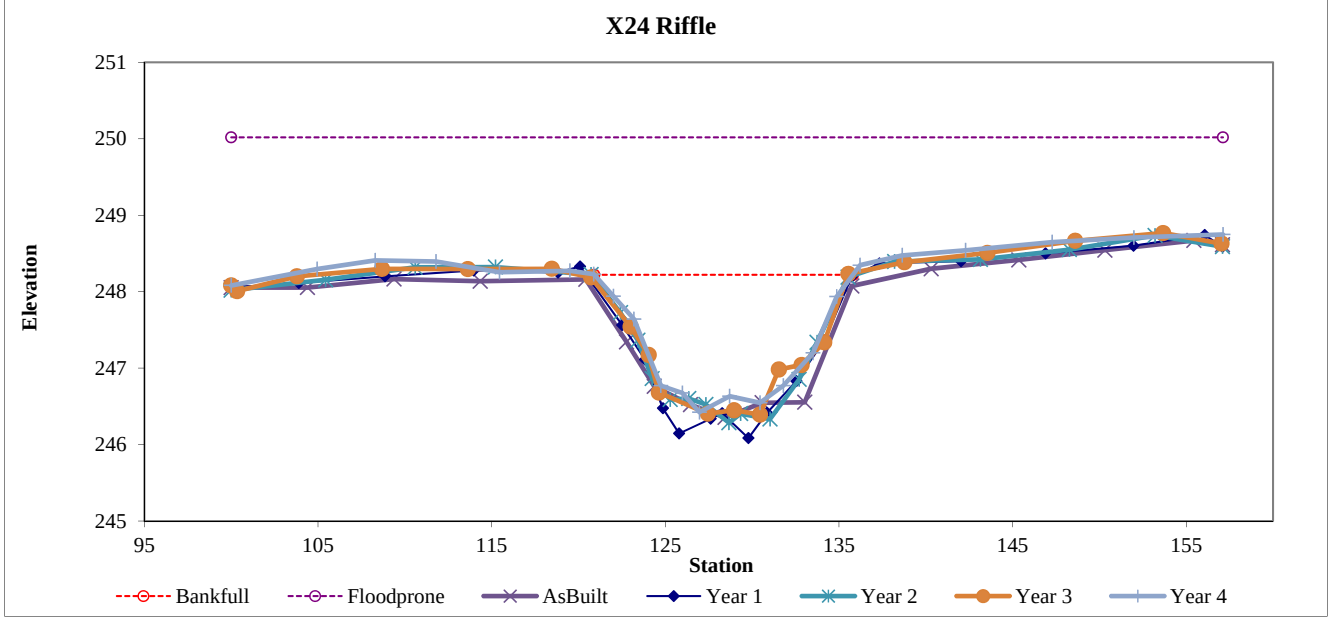


Permanent Cross Section X24
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	16.8	14.9	1.1	1.8	13.2	1.0	3.8	247.8	247.8

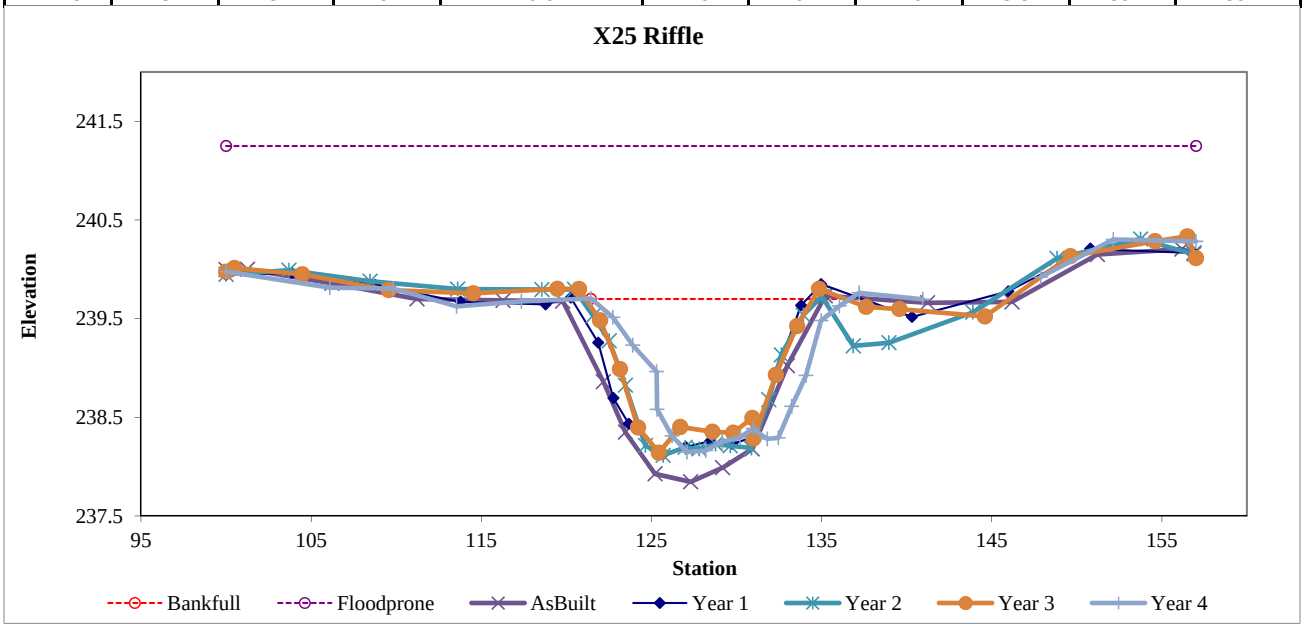


Permanent Cross Section X25
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	13.7	15.1	0.9	1.6	16.7	1.0	3.8	239.7	239.7

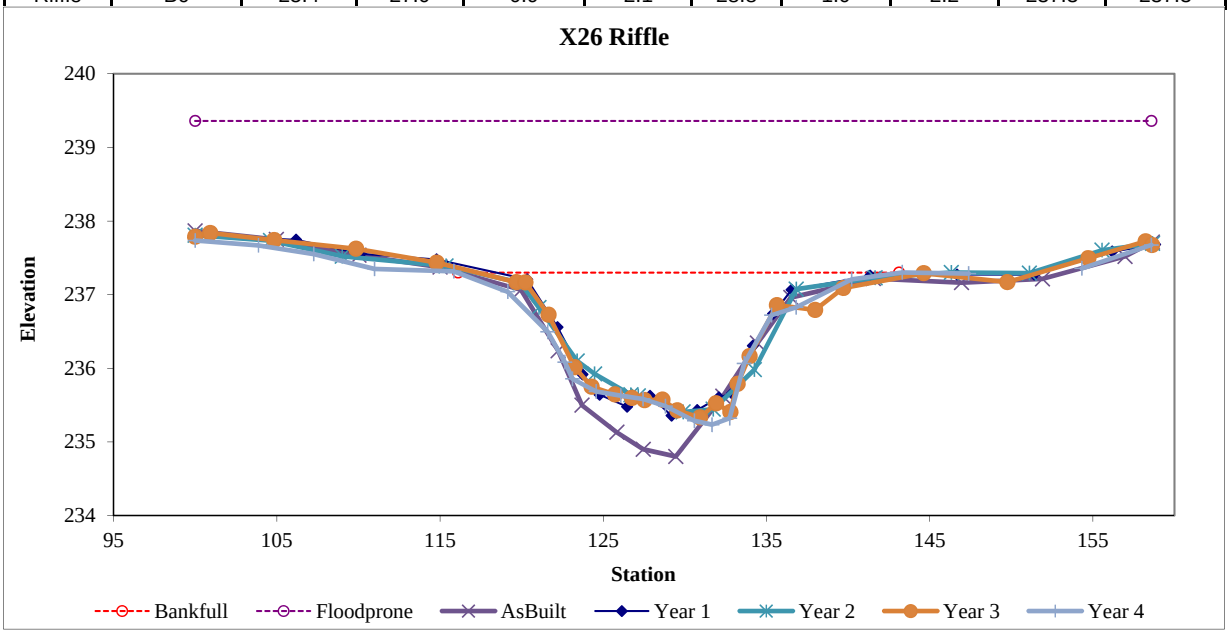


Permanent Cross Section X26
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	Bc	25.4	27.0	0.9	2.1	28.8	1.0	2.2	237.3	237.3

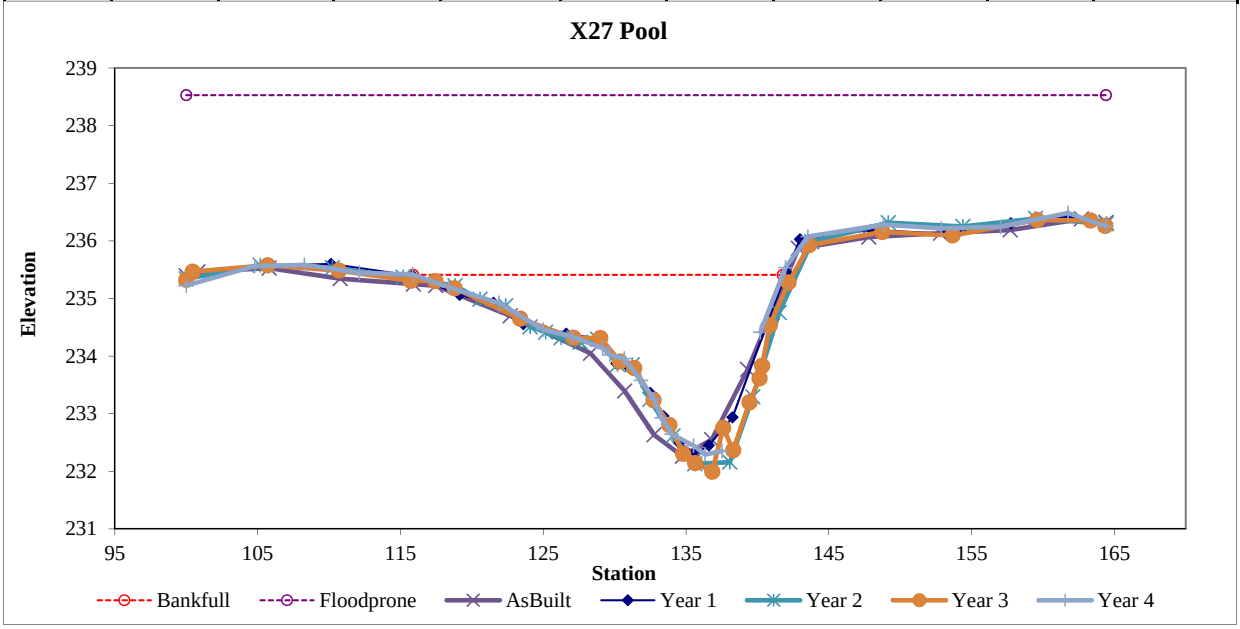


Permanent Cross Section X27
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Pool		34.0	25.9	1.3	3.1	19.7	1.0		235.4	235.4

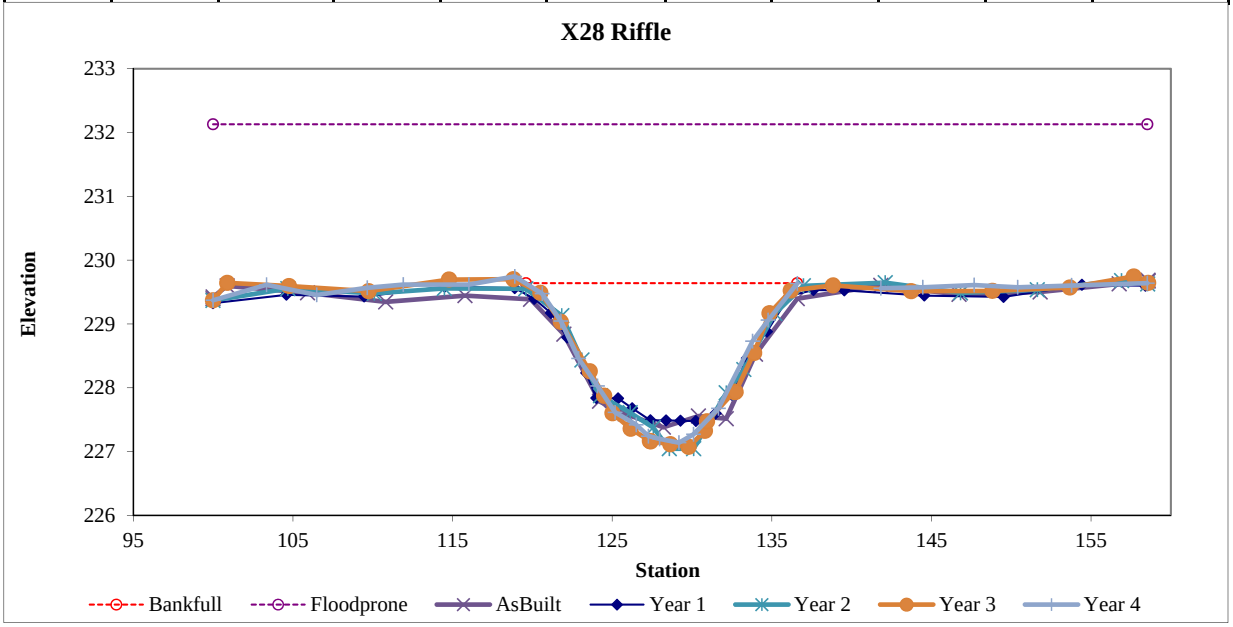


Permanent Cross Section X28
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	E	24.3	17.0	1.4	2.5	11.9	1.0	3.4	229.2	229.6



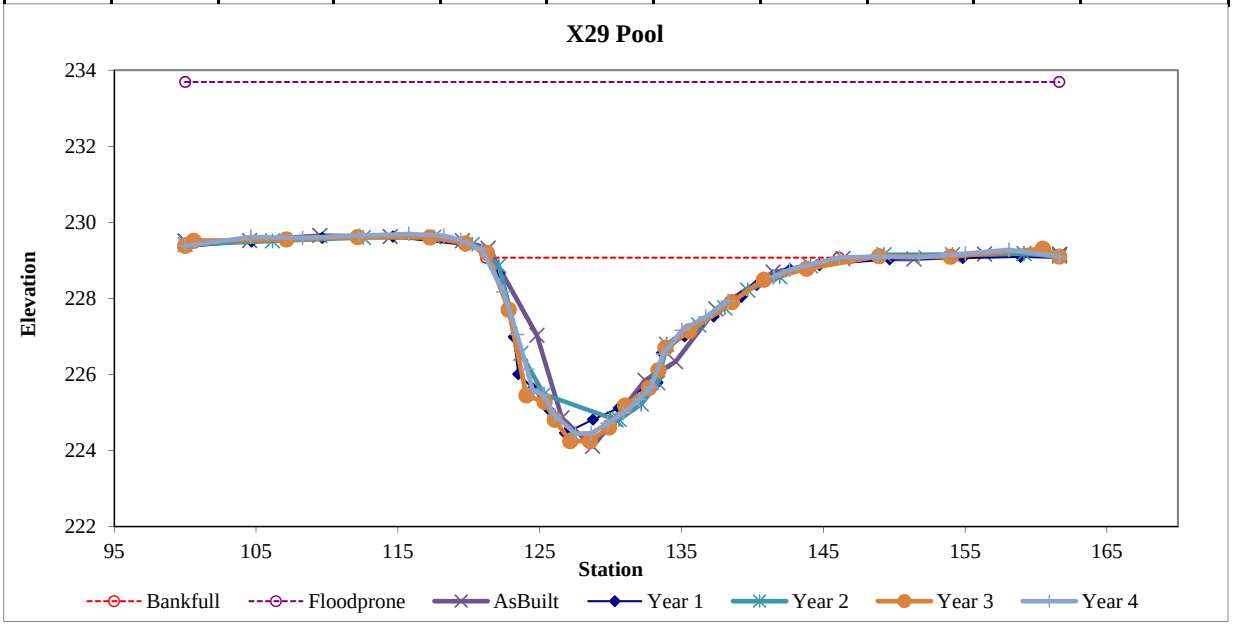
Permanent Cross Section X29

(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Pool		49.2	22.5	2.2	4.4	10.3	1.0		228.5	228.4

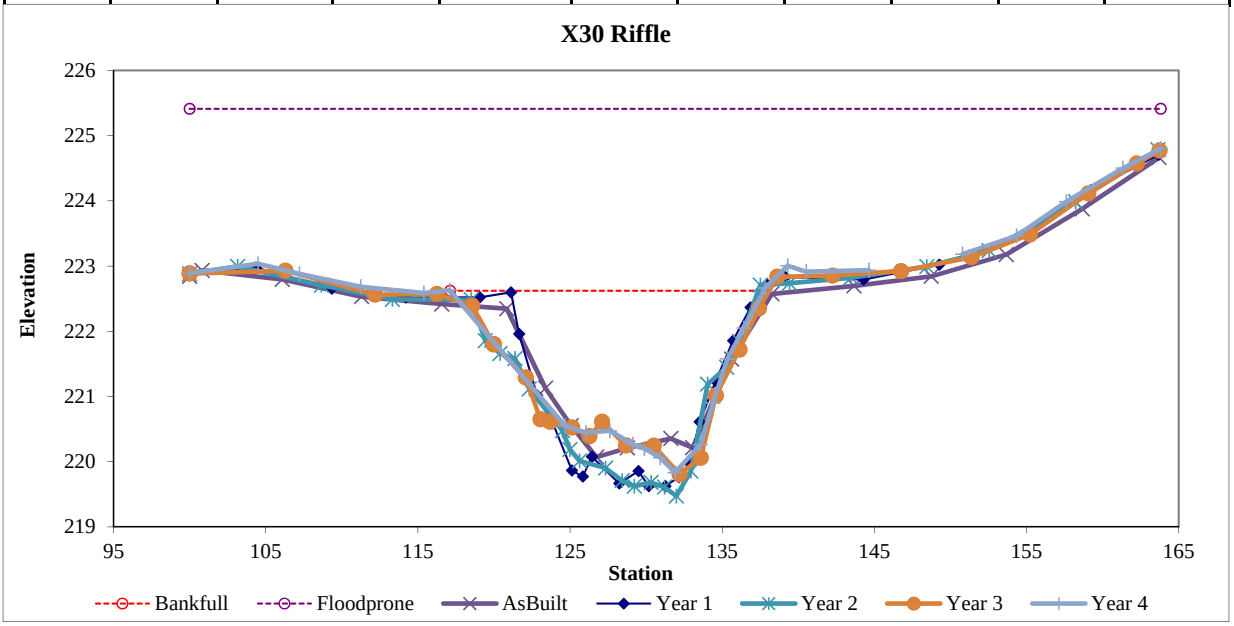


Permanent Cross Section X30
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	33.1	20.6	1.6	2.8	12.8	1.0	3.1	222.6	222.6

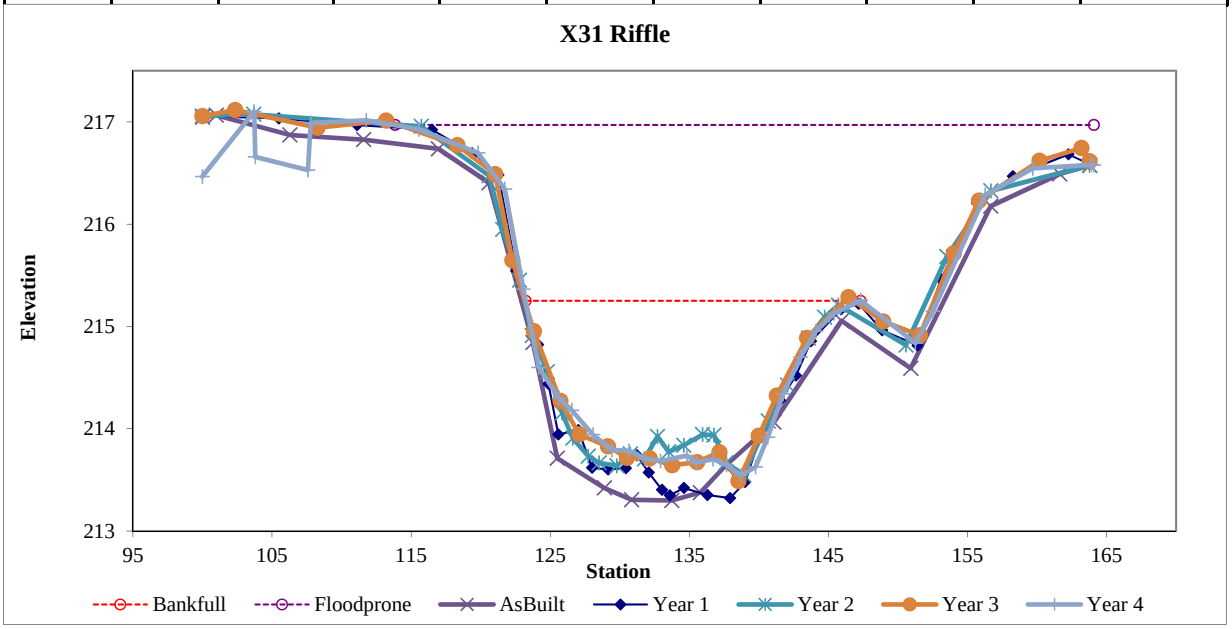


Permanent Cross Section X31
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	26.6	24.1	1.1	1.7	21.8	1.0	2.1	215.3	215.3

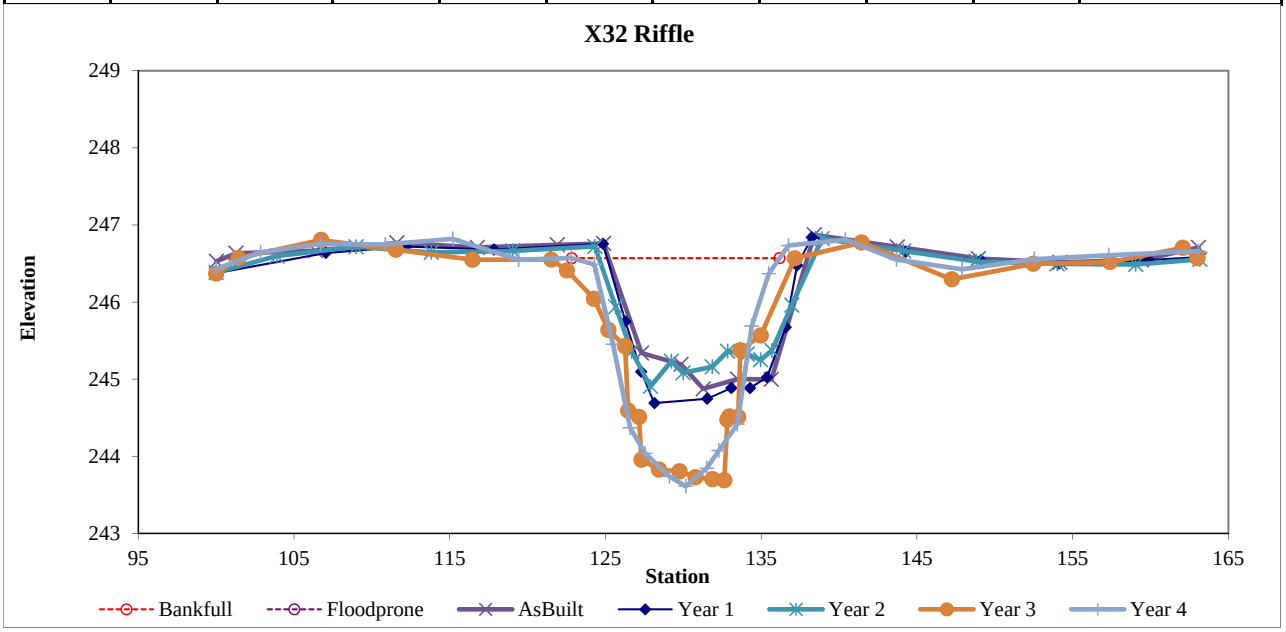


Permanent Cross Section X32
(Year 4 Monitoring Data - collected November 2012)

Looking at the Left Bank

Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	E	22.8	13.3	1.7	3.0	7.8	1.0	4.7	246.6	246.6

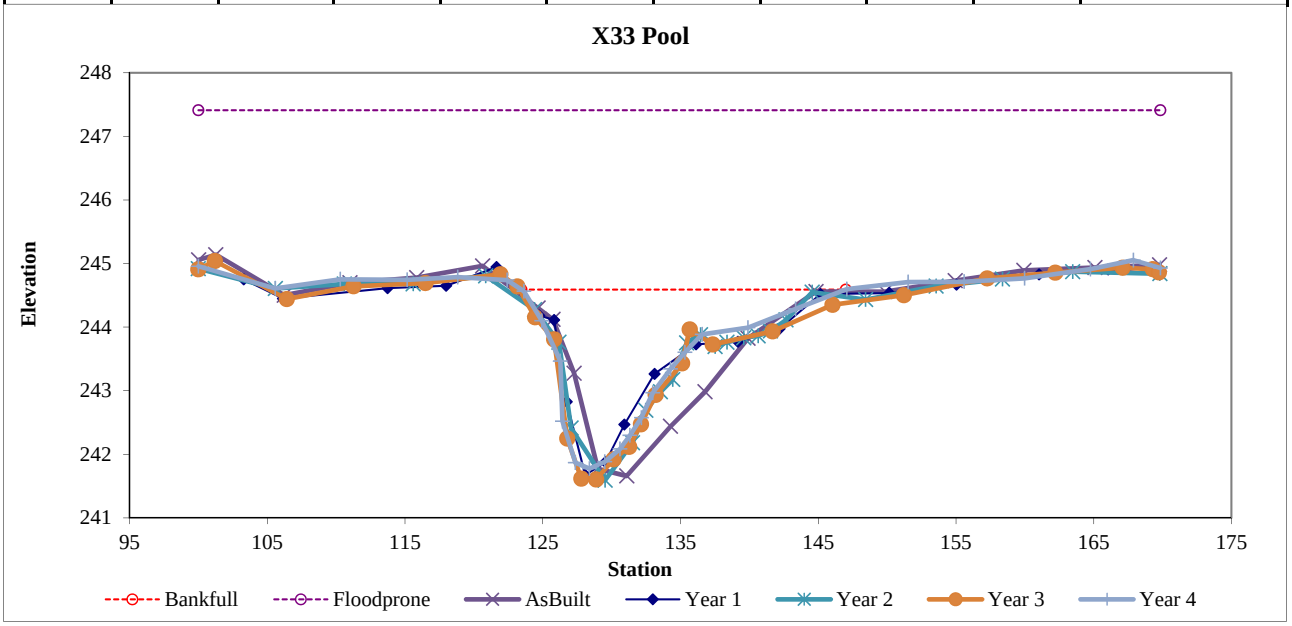


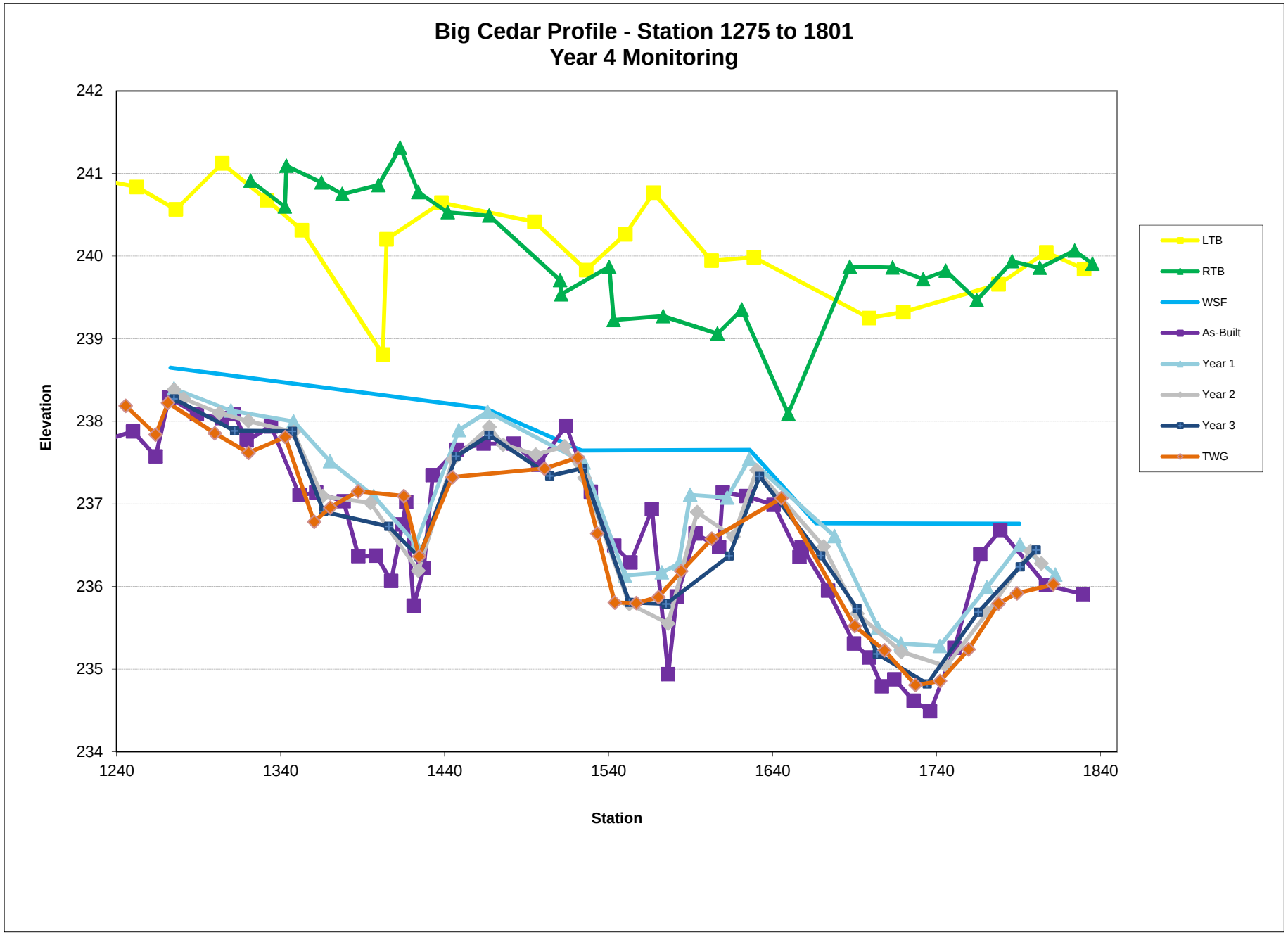
Permanent Cross Section X33
(Year 4 Monitoring Data - collected November 2012)

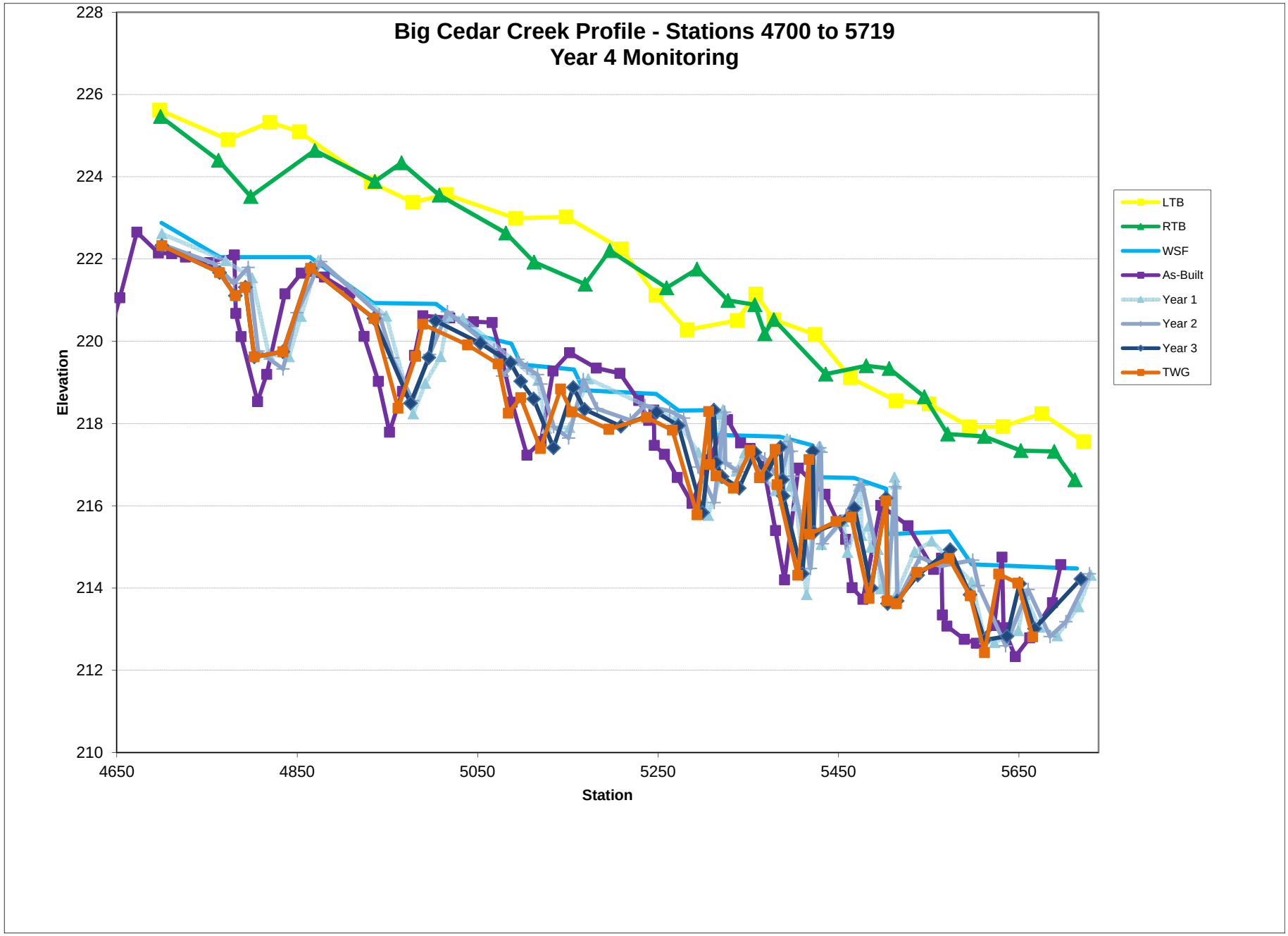
Looking at the Left Bank

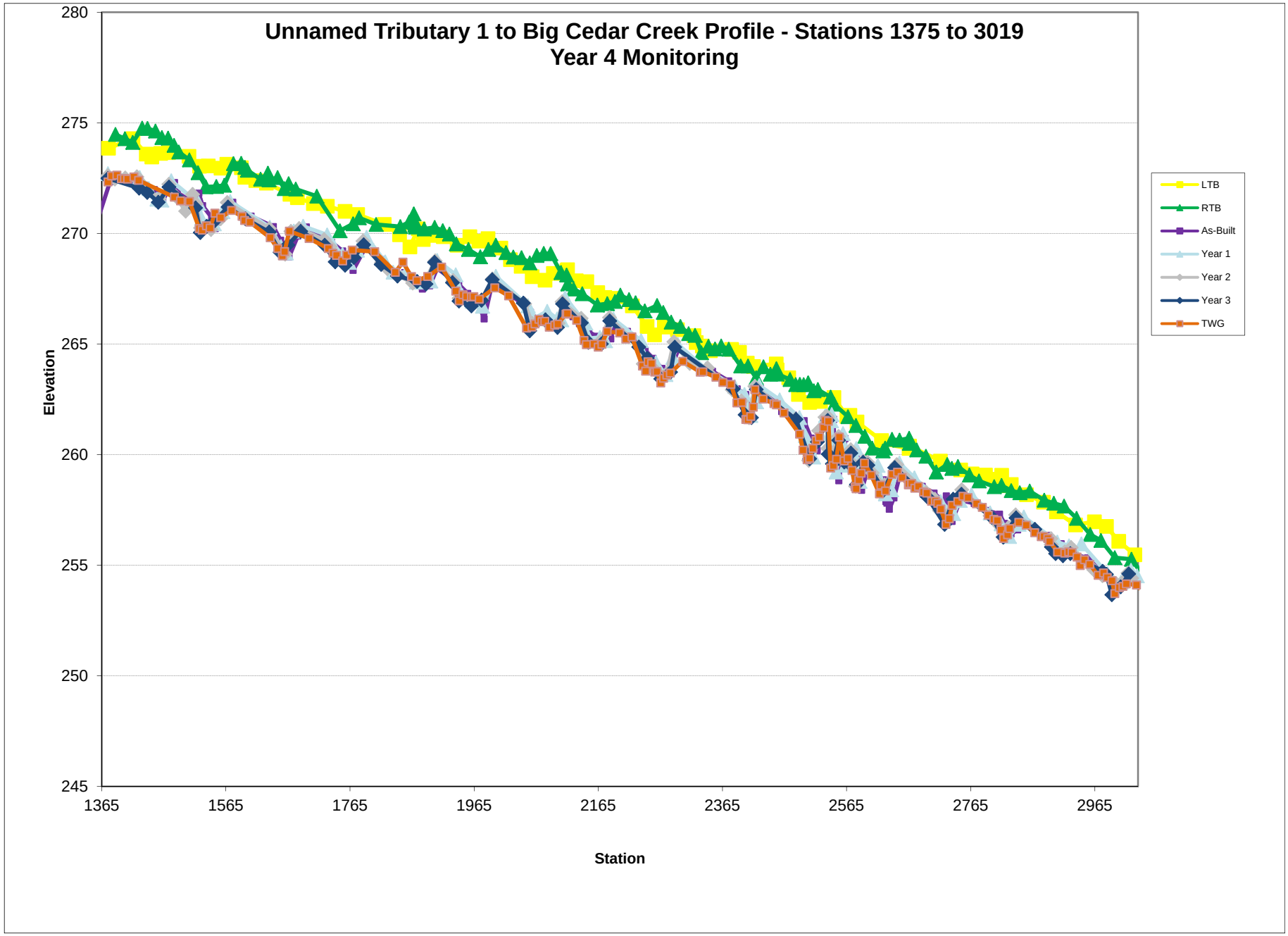
Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Pool		26.1	23.6	1.1	2.8	21.3	1.0		244.6	244.6




Big Cedar Profile - Station 1275 to 1801
Year 4 Monitoring
Elevation
242
241
240
239
238
237
236
235
234
1240
1340
1440
1540
1640
1740
1840
Station
LTB
RTB
WSF
As-Built
Year 1
Year 2
Year 3
TWG


Big Cedar Creek Profile - Stations 4700 to 5719
Year 4 Monitoring
Elevation
228
226
224
222
220
218
216
214
212
210
4650
4850
5050
5250
5450
5650
Station
LTB
RTB
WSF
As-Built
Year 1
Year 2
Year 3
TWG


Unnamed Tributary 1 to Big Cedar Creek Profile - Stations 1375 to 3019
Year 4 Monitoring
Elevation
Station
280
275
270
265
260
255
250
245
1365
1565
1765
1965
2165
2365
2565
2765
2965
LTB
RTB
As-Built
Year 1
Year 2
Year 3
TWG

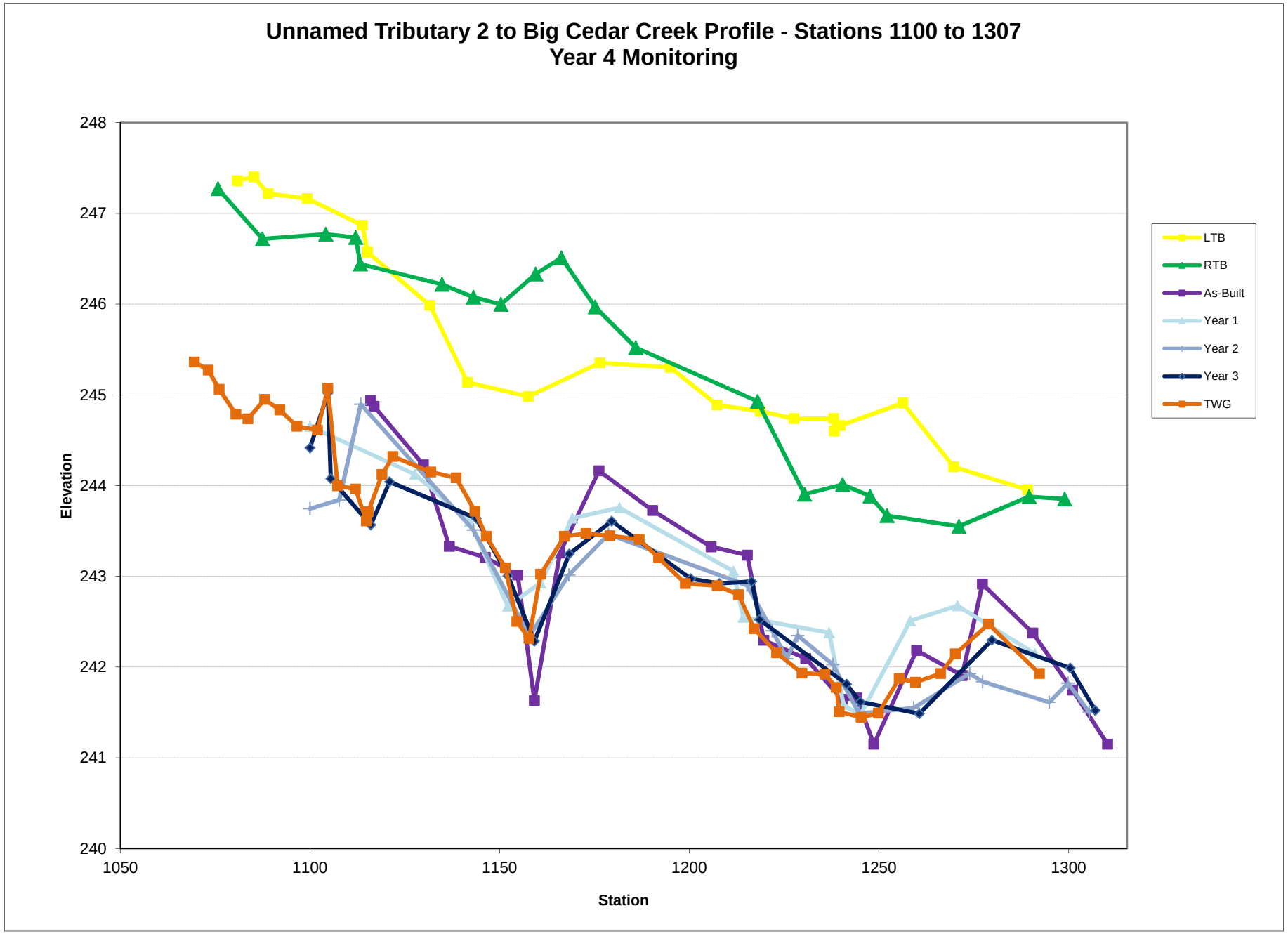

Unnamed Tributary 2 to Big Cedar Creek Profile - Stations 1100 to 1307
Year 4 Monitoring
248
247
246
245
244
243
242
241
240
Elevation
1050
1100
1150
1200
1250
1300
Station
LTB
RTB
As-Built
Year 1
Year 2
Year 3
TWG

Table 7. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
BCC Reach 1 (603 LF)

Parameter	USGS Gauge	Regional Curve Interval			Pre-Existing Condition						Reference Reach(es) Data Morgan Creek					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																
BF Width (ft)	-----	10.0	35.0	18.7	-----	16.3	-----	-----	-----	1	-----	33.2	-----	-----	-----	2
Floodprone Width (ft)	-----	-----	-----	-----	-----	>126.6	-----	-----	-----	1	-----	77.5	-----	-----	-----	2
BF Mean Depth (ft)	-----	1.3	3.1	2.1	-----	2.3	-----	-----	-----	1	-----	2.3	-----	-----	-----	2
BF Max Depth (ft)	-----	-----	-----	-----	-----	2.8	-----	-----	-----	1	-----	2.8	-----	-----	-----	2
BF Cross-sectional Area (ft²)	-----	18.0	68.0	43.7	-----	36.7	-----	-----	-----	1	-----	75.1	-----	-----	-----	2
Width/Depth Ratio	-----	-----	-----	-----	-----	7.1	-----	-----	-----	1	-----	14.1	-----	-----	-----	2
Entrenchment Ratio	-----	-----	-----	-----	-----	>7.8	-----	-----	-----	1	-----	2.3	-----	-----	-----	2
Bank Height Ratio	-----	-----	-----	-----	-----	1.8	-----	-----	-----	1	-----	1.0	-----	-----	-----	2
d50 (mm)	-----	-----	-----	-----	-----	14.0	-----	-----	-----	-----	-----	3.0	-----	-----	-----	1
Pattern																
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	0.01	-----	-----	0.04	-----	-----	0.01	-----	-----	0.02	-----	2
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	46.0	-----	-----	98.0	-----	-----	146.0	-----	-----	-----	-----	2
Pool Max Depth (ft)	-----	-----	-----	-----	-----	3.8	-----	-----	-----	-----	4.1	-----	-----	-----	-----	1
Pool Volume (ft³)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----			<0.063 / 6 / 14 / 100 / 300						N/A / 1.2 / 3 / 77 / 800			
Reach Shear Stress (competency) lb/ft²	-----	-----	-----	-----	-----	0.88	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	-----	-----	-----	-----	250.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																
Drainage Area (SM)	-----	-----	-----	-----	2.3	-----	-----	2.9	-----	-----	-----	-----	-----	8.4	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classificatior	-----	-----	-----	-----	-----	E4/1	-----	-----	-----	-----	-----	C4	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	6.6	-----	-----	-----	-----
BF Discharge (cfs)	-----	58.0	450.0	189.7	-----	-----	-----	-----	-----	-----	-----	524.0	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----		350.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	350.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	1.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----		0.0080	-----	-----	-----	-----	-----	0.0070	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
BCC Reach 1 (603 LF)

Parameter	Design						As-built						Year 1						Year 2						Year 3					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	20.0	-----	-----	-----	1	-----	19.6	-----	-----	-----	1	-----	19.5	-----	-----	-----	1	-----	21.1	-----	-----	-----	1	-----	19.5	-----	-----	-----	1
Floodprone Width (ft)	-----	87.0	-----	-----	-----	1	-----	65.3	-----	-----	-----	1	-----	65.2	-----	-----	-----	1	-----	65.2	-----	-----	-----	1	-----	65.3	-----	-----	-----	1
BF Mean Depth (ft)	-----	2.0	-----	-----	-----	1	-----	1.9	-----	-----	-----	1	-----	1.8	-----	-----	-----	1	-----	1.8	-----	-----	-----	1	-----	1.7	-----	-----	-----	1
BF Max Depth (ft)	-----	2.8	-----	-----	-----	1	-----	2.7	-----	-----	-----	1	-----	2.6	-----	-----	-----	1	-----	2.8	-----	-----	-----	1	-----	2.8	-----	-----	-----	1
BF Cross-sectional Area (ft^2)	-----	39.0	-----	-----	-----	1	-----	37.0	-----	-----	-----	1	-----	35.6	-----	-----	-----	1	-----	36.9	-----	-----	-----	1	-----	33.9	-----	-----	-----	1
Width/Depth Ratio	-----	10.0	-----	-----	-----	1	-----	10.4	-----	-----	-----	1	-----	10.7	-----	-----	-----	1	-----	12.1	-----	-----	-----	1	-----	11.3	-----	-----	-----	1
Entrenchment Ratio	-----	4.4	-----	-----	-----	1	-----	3.3	-----	-----	-----	1	-----	3.3	-----	-----	-----	1	-----	3.1	-----	-----	-----	1	-----	3.3	-----	-----	-----	1
Bank Height Ratio	-----	1.0	-----	-----	-----	1	-----	1.0	-----	-----	-----	1	-----	1.0	-----	-----	-----	1	-----	1.0	-----	-----	-----	1	-----	1.0	-----	-----	-----	1
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	26.0	-----	-----	-----	1.0	-----	-----	-----	-----	-----	-----	-----	49.2	-----	-----	-----	-----
Pattern																														
Channel Beltwidth (ft)	103.0	-----	-----	132.0	-----	3	106.6	116.1	109.8	132.0	13.8	3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	50.0	-----	-----	70.0	-----	3	48.0	59.7	61.0	70.0	11.1	3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	2.5	-----	-----	3.5	-----	3	2.5	3.0	-----	3.6	-----	3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	281.0	-----	-----	285.0	-----	2	251.7	272.8	257.2	309.4	31.8	3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	5.2	-----	-----	6.6	-----	3	5.4	-----	-----	6.7	-----	3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																														
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	52.0	69.0	73.0	83.0	12.9	3	58	66	66	72	-----	2	58	66	66	73	-----	2	57	64	64	71	-----	2
Riffle Slope (ft/ft)	0.0073	-----	-----	0.0079	-----	4	0.003	0.005	0.006	0.007	0.002	3	0.005	0.007	0.007	0.008	-----	2	0.004	0.007	0.007	0.009	-----	2	0.005	0.007	0.007	0.009	-----	2
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	150.0	-----	-----	205.0	-----	4	128.0	172.0	155.0	232.0	44.0	3	-----	127.0	-----	-----	-----	1	-----	152.0	-----	-----	-----	1	-----	151.0	-----	-----	-----	1
Pool Max Depth (ft)	-----	6.5	-----	-----	-----	1	-----	3.9	-----	-----	-----	-----	-----	3.8	-----	-----	-----	1	-----	3.6	-----	-----	-----	1	-----	3.4	-----	-----	-----	1
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																														
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----				6 / 18 / 26 / 63 / 120			-----	-----	-----	-----	-----	----				<0.063 / 16 / 49 / 98 / 163		
Reach Shear Stress (competency) lb/f²	-----	0.31	-----	-----	-----	-----	-----	0.2	-----	-----	-----	1	-----	0.2	-----	-----	-----	1	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	80.0	-----	-----	-----	-----	-----	53.0	-----	-----	-----	1	-----	53.0	-----	-----	-----	1	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	11.6	-----	-----	-----	1	-----	11.8	-----	-----	-----	1	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	----
Additional Reach Parameters																														
Drainage Area (SM)	2.3	-----	-----	2.3	-----	-----	2.3	-----	-----	2.3	-----	-----	2.3	-----	-----	2.3	-----	-----	2.3	-----	-----	2.3	-----	-----	2.3	-----	-----	2.3	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classificatior	-----	E/C4	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----
BF Velocity (fps)	-----	3.8	-----	-----	-----	-----	-----	4.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	150.0	-----	-----	-----	-----	-----	150.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	460.0	-----	-----	-----	-----	-----		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	573.0	-----	-----	-----	-----	-----	603.0	-----	-----	-----	-----	-----	337.0	-----	-----	-----	-----	-----	354.0	-----	-----	-----	-----	-----	354.0	-----	-----	-----	-----
Sinuosity	-----	1.30	-----	-----	-----	-----	-----	1.31	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	0.0030	-----	-----	-----	-----	-----	0.002	-----	-----	-----	-----	-----	0.002	-----	-----	-----	-----	-----	0.002	-----	-----	-----	-----	-----	0.002	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
BCC Reach 1 (603 LF)

Parameter	Year 4					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	28.3	-----	-----	-----	1
Floodprone Width (ft)	-----	65.2	-----	-----	-----	1
BF Mean Depth (ft)	-----	1.5	-----	-----	-----	1
BF Max Depth (ft)	-----	3.3	-----	-----	-----	1
BF Cross-sectional Area (ft²)	-----	43.0	-----	-----	-----	1
Width/Depth Ratio	-----	18.6	-----	-----	-----	1
Entrenchment Ratio	-----	2.3	-----	-----	-----	1
Bank Height Ratio	-----	1.0	-----	-----	-----	1
d50 (mm)	-----	-----	-----	-----	-----	-----
Pattern						
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----
Profile						
Riffle Length (ft)	60	66	66	72	-----	2
Riffle Slope (ft/ft)	0.003	0.007	0.007	0.008	-----	2
Pool Length (ft)	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	155.1	-----	-----	-----	1
Pool Max Depth (ft)	3.4	3.8	-----	4.1	-----	2
Pool Volume (ft³)	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters						
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	-----	-----
Reach Shear Stress (competency) lb/f²	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----
Additional Reach Parameters						
Drainage Area (SM)	2.3	-----	-----	2.3	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----
Rosgen Classificatior	-----	E/C	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	250.7	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	0.004	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
BCC Reach 2 (2239 LF)

Parameter	USGS Gauge	Regional Curve Interval			Pre-Existing Condition						Reference Reach(es) Data Morgan Creek					
Dimension and Substrate - Riffle		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	12.0	39.0	18.8	-----	22.0	-----	-----	-----	1.0	-----	33.2	-----	-----	-----	2
Floodprone Width (ft)		-----	-----	-----	-----	33.0	-----	-----	-----	1.0	-----	77.5	-----	-----	-----	2
BF Mean Depth (ft)	-----	1.4	3.3	2.1	-----	1.8	-----	-----	-----	1.0	-----	2.3	-----	-----	-----	2
BF Max Depth (ft)	-----	-----	-----	-----	-----	2.6	-----	-----	-----	1.0	-----	2.8	-----	-----	-----	2
BF Cross-sectional Area (ft^2)	-----	23.0	85.0	44.3	-----	39.7	-----	-----	-----	1.0	-----	75.1	-----	-----	-----	2
Width/Depth Ratio	-----	-----	-----	-----	-----	12.2	-----	-----	-----	1.0	-----	14.1	-----	-----	-----	2
Entrenchment Ratio	-----	-----	-----	-----	-----	1.5	-----	-----	-----	1.0	-----	2.3	-----	-----	-----	2
Bank Height Ratio	-----	-----	-----	-----	-----	1.9	-----	-----	-----	1.0	-----	1.0	-----	-----	-----	2
d50 (mm)	-----	-----	-----	-----	-----	17.0	-----	-----	-----	1.0	-----	3.0	-----	-----	-----	1
Pattern																
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	0.0	-----	-----	0.0	-----	-----	0.01	-----	-----	0.02	-----	2
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	40.0	-----	-----	242.0	-----	-----	146.0	-----	-----	-----	-----	2
Pool Max Depth (ft)	-----	-----	-----	-----	-----	4.2	-----	-----	-----	-----	4.1	-----	-----	-----	-----	1
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----			<0.063 / 8 / 17 /85 / 350						N/A / 1.2 / 3 / 77 / 800			
Reach Shear Stress (competency) lb/f²	-----	-----	-----	-----	-----	0.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	-----	-----	-----	-----	190.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																
Drainage Area (SM)	-----	-----	-----	-----	2.9	-----	-----	2.9	-----	-----	-----	-----	-----	8.4	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	B4/1c	-----	-----	-----	-----	-----	C4	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	6.6	-----	-----	-----	-----
BF Discharge (cfs)	-----	72.0	530.0	192.6	-----	-----	-----	-----	-----	-----	-----	524.0	-----	-----	-----	-----
Valley Length (ft)	-----	-----	-----	-----	-----	1016.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	1016.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	1.00	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	0.0077	-----	-----	-----	-----	-----	0.0070	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
BCC Reach 2 (2239 LF)

Parameter	Design						As-built						Year 1						Year 2						Year 3					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	23	-----	-----	-----	1	22.5	23.9	23.4	25.7	1.3	3	22.3	23.3	22.5	25.2	1.6	3	22.5	24.6	23.8	27.6	2.6	3	21.0	23.6	23.7	26.1	2.6	3
Floodprone Width (ft)	-----	100.0	-----	-----	-----	1	74.4	74.9	74.5	75.8	0.7	3	74.3	74.8	74.5	75.7	0.8	3	74.3	74.9	74.5	75.8	0.8	3	74.3	75.0	75.0	75.8	1.1	3
BF Mean Depth (ft)	-----	2.3	-----	-----	-----	1	2.2	2.4	2.4	2.5	0.1	3	2.3	2.5	2.5	2.6	0.2	3	2.3	2.6	2.7	2.7	0.3	3	2.4	2.5	2.5	2.8	0.2	3
BF Max Depth (ft)	-----	3.3	-----	-----	-----	1	3.3	3.6	3.5	3.9	0.2	3	3.8	4.0	4.1	4.2	0.2	3	3.9	4.4	4.6	4.6	0.4	3	3.6	4.0	4.0	4.6	0.5	3
BF Cross-sectional Area (ft^2)	-----	52.7	-----	-----	-----	1	49.7	56.6	56.9	63.1	5.5	3	56.2	57.6	57.6	59.0	1.4	3	61.4	62.9	62.8	64.5	1.5	3	51.4	59.9	61.8	66.6	7.8	3
Width/Depth Ratio	-----	10.0	-----	-----	-----	1	9.6	10.1	10.2	10.4	0.3	3	8.7	9.5	9.0	10.8	1.1	3	8.2	9.7	8.8	12.1	2.1	3	8.4	9.3	8.6	11.0	1.5	3
Entrenchment Ratio	-----	4.3	-----	-----	-----	1	3.0	3.2	3.2	3.3	0.1	3	3.0	3.2	3.3	3.3	0.2	3	2.8	3.1	3.1	3.3	0.3	3	2.9	3.2	3.1	3.5	0.3	3
Bank Height Ratio	-----	1.0	-----	-----	-----	1	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	22.6	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	97.0	-----	-----	-----	1
Pattern																														
Channel Beltwidth (ft)	73.0	-----	-----	144.0	-----	14	72.4	99.2	99.7	144.0	18.9	14	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	44.0	-----	-----	77.0	-----	15	37.0	52.7	47.0	89.0	14.2	15	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	1.9	-----	-----	3.3	-----	15	1.6	2.2	-----	3.8	-----	15	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	197.0	-----	-----	312.0	-----	13	184.9	229.4	216.6	297.5	33.1	14	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	3.2	-----	-----	6.3	-----	14	3.0	-----	-----	6.0	-----	14	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																														
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	41.0	62.0	59.0	102.0	18.5	15	-----	-----	-----	38	-----	1	-----	-----	-----	41	-----	1	-----	-----	-----	37	-----	1
Riffle Slope (ft/ft)	0.0092	-----	-----	0.0144	-----	15	0.0070	0.0110	0.0110	0.0170	0.0030	15	0.020	0.020	0.020	0.020	-----	1	-----	0.024	-----	-----	-----	1	-----	0.017	-----	-----	-----	1
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	110.0	-----	-----	223.0	-----	15	101.0	135.0	150.0	225.0	39.2	15	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	5.2	-----	-----	-----	1	5.5	-----	-----	5.5	-----	2	5.2	-----	-----	5.7	-----	2	5.4	-----	-----	5.9	-----	2	5.0	-----	-----	6.1	-----	2
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																														
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			<0.063 / 10 / 22.6 / 80 / 150				-----	-----	-----	-----	-----	-----			53 / 79 / 97 / 155 / 180					
Reach Shear Stress (competency) lb/f²	-----	0.6	-----	-----	-----	-----	-----	0.62	-----	-----	-----	1	-----	1	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	150.0	-----	-----	-----	-----	-----	170.0	-----	-----	-----	1	-----	200.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	29.3	-----	-----	-----	1	-----	38.6	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																														
Drainage Area (SM)	2.3	-----	-----	3.1	-----	-----	2.3	-----	-----	3.1	-----	-----	2.3	-----	-----	3.1	-----	-----	2.3	-----	-----	3.1	-----	-----	2.3	-----	-----	3.1	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classificatior	-----	E/C4	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----
BF Velocity (fps)	-----	3.5	-----	-----	-----	-----	-----	3.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	185.0	-----	-----	-----	-----	-----	185.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	1723.0	-----	-----	-----	-----	-----	1694.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	2240.0	-----	-----	-----	-----	-----	2220.0	-----	-----	-----	-----	-----	200.0	-----	-----	-----	-----	-----	174.0	-----	-----	-----	-----	-----	174.0	-----	-----	-----	-----
Sinuosity	-----	1.30	-----	-----	-----	-----	-----	1.31	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	0.0050	-----	-----	-----	-----	-----	0.0050	-----	-----	-----	-----	-----	0.0070	-----	-----	-----	-----	-----	0.0070	-----	-----	-----	-----	-----	0.0070	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary

Big Cedar Creek Restoration Site Contract No. D06054-D

BCC Reach 2 (2239 LF)

Parameter	Year 4					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n
BF Width (ft)	20.7	23.6	24.9	25.1	2.5	3
Floodprone Width (ft)	74.4	74.9	74.5	75.8	0.6	3
BF Mean Depth (ft)	2.4	2.5	2.5	2.8	0.2	3
BF Max Depth (ft)	3.6	4.1	3.8	4.9	0.7	3
BF Cross-sectional Area (ft^2)	51.2	60.2	58.9	70.4	9.7	3
Width/Depth Ratio	8.4	9.3	8.8	10.7	1.2	3
Entrenchment Ratio	2.8	3.1	3.0	3.6	0.4	3
Bank Height Ratio	1.0	1.0	1.0	1.0	0.0	3
d50 (mm)	-----	-----	-----	-----	-----	-----
Pattern						
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----
Profile						
Riffle Length (ft)	-----	75	-----	-----	-----	1
Riffle Slope (ft/ft)		0.01	-----	-----	-----	1
Pool Length (ft)	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	4.5	-----	-----	-----	1
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters						
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	-----	-----
Reach Shear Stress (competency) lb/f²	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----
Additional Reach Parameters						
Drainage Area (SM)	2.3	-----	-----	3.1	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----
Rosgen Classificatior	-----	E/C	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	266.8	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	0.003	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
BCC Reach 3 (1827 LF)

Parameter	USGS Gauge	Regional Curve Interval			Pre-Existing Condition						Reference Reach(es) Data Morgan Creek					
Dimension - Riffle		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	13.0	40.0	19.9	-----	19.5	-----	-----	-----	1	-----	33.2	-----	-----	-----	2
Floodprone Width (ft)	-----	-----	-----	-----	-----	>111.4	-----	-----	-----	1	-----	77.5	-----	-----	-----	2
BF Mean Depth (ft)	-----	1.4	3.5	2.2	-----	1.7	-----	-----	-----	1	-----	2.3	-----	-----	-----	2
BF Max Depth (ft)	-----	-----	-----	-----	-----	2.7	-----	-----	-----	1	-----	2.8	-----	-----	-----	2
BF Cross-sectional Area (ft^2)	-----	25.0	90.0	48.3	-----	32.8	-----	-----	-----	1	-----	75.1	-----	-----	-----	2
Width/Depth Ratio	-----	-----	-----	-----	-----	11.5	-----	-----	-----	1	-----	14.1	-----	-----	-----	2
Entrenchment Ratio	-----	-----	-----	-----	-----	>5.7	-----	-----	-----	1	-----	2.3	-----	-----	-----	2
Bank Height Ratio	-----	-----	-----	-----	-----	1.6	-----	-----	-----	1	-----	1.0	-----	-----	-----	2
d50 (mm)	-----	-----	-----	-----	-----	17.0	-----	-----	-----	1	-----	3.0	-----	-----	-----	1
Pattern																
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull Width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	0.010	-----	-----	0.049	-----	-----	0.014	-----	-----	0.024	-----	2.000
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	59.0	-----	-----	242.0	-----	-----	146.0	-----	-----	-----	-----	2
Pool Max Depth (ft)	-----	-----	-----	-----	-----	3.3	-----	-----	-----	-----	4.1	-----	-----	-----	-----	1
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----			<0.063 / 8 / 17 / 85 / 350						N/A / 1.2 / 3 / 77 / 800			
Reach Shear Stress (competency) lb/f²	-----	-----	-----	-----	-----	0.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	-----	-----	-----	-----	100.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																
Drainage Area (SM)	-----	-----	-----	-----	2.9	-----	-----	3.3	-----	-----	-----	-----	-----	8.4	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	C4/1	-----	-----	-----	-----	-----	C4	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	6.6	-----	-----	-----	-----
BF Discharge (cfs)	-----	68.0	590.0	210.9	-----	-----	-----	-----	-----	-----	-----	524.0	-----	-----	-----	-----
Valley Length (ft)	-----	-----	-----	-----	-----	1860.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	2046.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	1.10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	0.0045	-----	-----	-----	-----	-----	0.0070	-----	-----	-----	-----
BF Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Banfull Floodplain Area (Acres	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
BCC Reach 3 (1827 LF)

Parameter	Design						As-built						Year 1						Year 2						Year 3					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	24.4	-----	-----	-----	1	23.1	24.5	24.6	25.7	1.1	3	22.3	23.4	23.1	24.9	1.3	3	22.2	23.9	23.3	26.1	2.0	3	21.8	24.3	24.6	26.5	2.4	3
Floodprone Width (ft)	-----	100+	-----	-----	-----	1	77.8	79.5	77.9	82.9	2.4	3	77.8	79.6	78.0	82.9	2.9	3	77.8	79.5	77.8	83.0	3.0	3	77.2	79.2	77.4	83.0	3.3	3
BF Mean Depth (ft)	-----	2.1	-----	-----	-----	1	2.1	2.2	2.2	2.2	0.0	3	2.2	2.3	2.3	2.4	0.1	3	2.0	2.2	2.2	2.3	0.2	3	21.8	24.3	24.6	26.5	2.4	3
BF Max Depth (ft)	-----	3.0	-----	-----	-----	1	3.1	3.2	3.1	3.3	0.1	3	3.1	3.3	3.1	3.7	0.3	3	3.1	3.3	3.3	3.5	0.2	3	3.1	3.4	3.5	3.6	0.3	3
BF Cross-sectional Area (ft^2)	-----	52.1	-----	-----	-----	1	50.1	52.7	51.8	56.2	2.6	3	50.5	53.9	50.8	60.4	5.6	3	47.6	52.1	51.8	56.9	4.6	3	51.1	55.6	53.5	62.2	5.8	3
Width/Depth Ratio	-----	11.6	-----	-----	-----	1	10.7	11.4	11.7	11.8	0.5	3	9.8	10.2	10.3	10.5	0.4	3	9.5	11.0	11.4	12.0	1.3	3	8.9	10.7	11.3	11.9	1.6	3
Entrenchment Ratio	-----	4.1+	-----	-----	-----	1	3.2	3.3	3.2	3.4	0.1	3	3.3	3.4	3.4	3.5	0.1	3	3.2	3.3	3.3	3.5	0.2	3	3.1	3.2	3.1	3.5	0.2	3
Bank Height Ratio	-----	1.0	-----	-----	-----	1	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	59.0	-----	-----	-----	1.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																														
Channel Beltwidth (ft)	52.0	-----	-----	114.0	-----	12	50.0	76.8	79.5	103.0	14.3	12	45.0	65.3	63.0	88.0	16.6	5	52.0	74.0	78.0	84.0	12.0	5	44.0	72.0	77.0	92.0	18.9	6
Radius of Curvature (ft)	44.0	-----	-----	83.0	-----	13	40.0	57.2	50.0	103.0	17.6	13	51.0	66.0	71.0	79.0	11.3	7	63.0	74.9	75.0	83.0	6.1	7	58.0	71.7	73.0	85.0	8.6	7
Rc:Bankfull width (ft/ft)	1.8	-----	-----	3.4	-----	13	1.6	-----	-----	4.2	-----	13	2.2	-----	-----	3.4	-----	7	2.6	-----	-----	3.5	------	7	2.4	3.0	3.0	3.5	0.4	7
Meander Wavelength (ft)	187.0	-----	-----	313.0	-----	11	176.5	240.0	247.6	285.0	35.6	13	176.0	236.0	236.0	291.0	53.5	5	156.0	231.4	230.0	292.0	61.2	5	176.0	237.2	230.0	301.0	59.2	5
Meander Width Ratio	2.1	-----	-----	4.7	-----	12	2.0	-----	-----	4.2	-----	12	1.9	-----	-----	3.8	-----	5	2.2	-----	-----	3.5	-----	5	1.8	3.0	3.2	3.8	0.8	6
Profile																														
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	37	70	66	127	25	12	35	68	72	97	21	6	20	69	71	111	33	6	25	66	67	116	36	6
Riffle Slope (ft/ft)	0.008	-----	-----	0.017	-----	13.000	0.002	0.013	0.011	0.031	0.008	13.000	0.009	0.016	0.017	0.025	0.010	6.000	0.001	0.011	0.015	0.036	0.010	6.000	0.002	0.015	0.014	0.032	0.010	6.000
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	83.0	-----	-----	185.0	-----	13	87.0	140.0	141.0	183.0	26.4	13	90.0	130.0	128.0	130.0	32.0	6	84.0	138.0	134.0	173.0	33.4	6	76.0	135.0	142.0	174.0	37.7	6
Pool Max Depth (ft)	-----	5.2	-----	-----	-----	1	-----	5.4	-----	-----	-----	1	-----	5.2	-----	-----	-----	1	-----	5.4	-----	-----	-----	1	-----	5.65	-----	-----	-----	1
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																														
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----				33 / 47 / 59 / 102 / 130			-----	-----	-----	-----	-----	-----				<0.063 / 20 /36 / 84 / 128		
Reach Shear Stress (competency) lb/f²	-----	0.8	-----	-----	-----	-----	-----	0.68	-----	-----	-----	1	-----	1.1	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	190.0	-----	-----	-----	-----	-----	180	-----	-----	-----	1	-----	225	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	36.8	-----	-----	-----	1	-----	51.2	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																														
Drainage Area (SM)	3.1	-----	-----	3.3	-----	-----	3.1	-----	-----	3.32	-----	-----	3.1	-----	-----	3.32	-----	-----	3.1	-----	-----	3.32	-----	-----	3.1	-----	-----	3.32	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classificatior	-----	E/C4	-----	-----	-----	N/A	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----
BF Velocity (fps)	-----	3.7	-----	-----	-----	-----	-----	3.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	195.0	-----	-----	-----	N/A	-----	195.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	1558.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	1809.0	-----	-----	-----	-----	-----	1823.0	-----	-----	-----	-----	-----	1030.0	-----	-----	-----	-----	-----	1027.0	-----	-----	-----	-----	-----	1027.0	-----	-----	-----	-----
Sinuosity	-----	1.10	-----	-----	-----	-----	-----	1.17	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	0.0077	-----	-----	-----	-----	-----	0.0060	-----	-----	-----	-----	-----	0.0080	-----	-----	-----	-----	-----	0.0080	-----	-----	-----	-----	-----	0.0080	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary

Big Cedar Creek Restoration Site Contract No. D06054-D

BCC Reach 3 (1827 LF)

Parameter	Year 4					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n
BF Width (ft)	24.6	25.6	25.9	26.3	0.9	3
Floodprone Width (ft)	77.1	79.2	77.8	82.8	3.1	3
BF Mean Depth (ft)	1.9	2.2	2.2	2.4	0.3	3
BF Max Depth (ft)	3.0	3.5	3.7	3.8	0.4	3
BF Cross-sectional Area (ft^2)	47.1	56.1	57.4	63.9	8.5	3
Width/Depth Ratio	10.8	11.8	11.7	12.8	1.0	3
Entrenchment Ratio	3.0	3.1	3.1	3.2	0.1	3
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0	3
d50 (mm)	-----	-----	-----	-----	-----	-----
Pattern						
Channel Beltwidth (ft)	62.0	72.2	75.0	84.0	8.8	
Radius of Curvature (ft)	53.6	76.4	79.5	89.3	13.8	7
Rc:Bankfull width (ft/ft)	2.1	3.0	3.1	3.5	0.5	7
Meander Wavelength (ft)	182.0	235.0	240.0	285.0	51.0	5
Meander Width Ratio	2.5	2.8	2.9	3.3	0.3	5
Profile						
Riffle Length (ft)	25	67	70	116	40	6
Riffle Slope (ft/ft)	0.002	0.015	0.016	0.032	0.011	6
Pool Length (ft)	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	80.0	134.8	142.5	174.0	35.5	6
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters						
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	-----	-----
Reach Shear Stress (competency) lb/f²	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----
Additional Reach Parameters						
Drainage Area (SM)	3.1	-----	-----	3.3	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----
Rosgen Classificatior	-----	E/C	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	1027	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	0.008	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
BCC Reach 4 (410 LF)

Parameter	USGS Gauge	Regional Curve Interval			Pre-Existing Condition						Reference Reach(es) Data Morgan Creek					
Dimension - Riffle		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	13.0	40.0	20.0	-----	29.6	-----	-----	-----	-----	-----	33.2	-----	-----	-----	2
Floodprone Width (ft)	-----	-----	-----	-----	-----	>109.7	-----	-----	-----	-----	-----	77.5	-----	-----	-----	2
BF Mean Depth (ft)	-----	1.4	3.5	2.2	-----	1.6	-----	-----	-----	-----	-----	2.3	-----	-----	-----	2
BF Max Depth (ft)	-----	-----	-----	-----	-----	2.3	-----	-----	-----	-----	-----	2.8	-----	-----	-----	2
BF Cross-sectional Area (ft^2)	-----	25.0	90.0	48.8	-----	47.1	-----	-----	-----	-----	-----	75.1	-----	-----	-----	2
Width/Depth Ratio	-----	-----	-----	-----	-----	18.5	-----	-----	-----	-----	-----	14.1	-----	-----	-----	2
Entrenchment Ratio	-----	-----	-----	-----	-----	>3.7	-----	-----	-----	-----	-----	2.3	-----	-----	-----	2
Bank Height Ratio	-----	-----	-----	-----	-----	1.6	-----	-----	-----	-----	-----	1.0	-----	-----	-----	2
d50 (mm)	-----	-----	-----	-----	-----	17	-----	-----	-----	-----	-----	3.0	-----	-----	-----	1
Pattern																
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull Width (ft/ft)	-----	-----	-----	-----			-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	0.0138	-----	-----	0.0498	-----	-----	0.0140	-----	-----	0.0240	-----	2
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	20.0	-----	-----	236.0	-----	-----	146.0	-----	-----	-----	-----	2
Pool Max Depth (ft)	-----	-----	-----	-----	-----	3.4	-----	-----	-----	-----	4.1	-----	-----	-----	-----	1
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----			<0.063 / 5 / 17 / 120 / >2048						N/A / 1.2 / 3 / 77 / 800			
Reach Shear Stress (competency) lb/f²	-----	-----	-----	-----	-----	0.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max Part Size (mm) mobilized at bankfull (Rosgen Curve	-----	-----	-----	-----	-----	200.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																
Drainage Area (SM)	-----	-----	-----	-----	3.3	-----	-----	3.4	-----	-----	-----	-----	-----	8.4	-----	-----
Impervious cover estimate (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classificatior	-----	-----	-----	-----	-----	C4/1	-----	-----	-----	-----	-----	C4	-----	-----	-----	-----
Bankfull Velocity (fps)	-----	-----	-----	-----	-----	1.6	-----	-----	-----	-----	-----	6.6	-----	-----	-----	-----
BF Discharge (cfs)	-----	68.0	590.0	213.2	-----		-----	-----	-----	-----	-----	524.0	-----	-----	-----	-----
Valley Length (ft)	-----	-----	-----	-----	-----	887.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	976.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	1.10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	0.0090	-----	-----	-----	-----	-----	0.0070	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stablibity or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
BCC Reach 4 (410 LF)

Parameter	Design						As-built						Year 1						Year 2						Year 3					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	26.0	-----	-----	-----	1	-----	27.5	-----	-----	-----	1	-----	27.8	-----	-----	-----	1	-----	28.0	-----	-----	-----	1	-----	27.6	-----	-----	-----	1
Floodprone Width (ft)	-----	94.0	-----	-----	-----	1	-----	81.0	-----	-----	-----	1	-----	81.1	-----	-----	-----	1	-----	80.9	-----	-----	-----	1	-----	81.0	-----	-----	-----	1
BF Mean Depth (ft)	-----	2.2	-----	-----	-----	1	-----	2.1	-----	-----	-----	1	-----	2.3	-----	-----	-----	1	-----	2.1	-----	-----	-----	1	-----	2.2	-----	-----	-----	1
BF Max Depth (ft)	-----	3.0	-----	-----	-----	1	-----	3.2	-----	-----	-----	1	-----	3.7	-----	-----	-----	1	-----	3.6	-----	-----	-----	1	-----	3.2	-----	-----	-----	1
BF Cross-sectional Area (ft^2)	-----	57.2	-----	-----	-----	1	-----	58.3	-----	-----	-----	1	-----	62.6	-----	-----	-----	1	-----	59.7	-----	-----	-----	1	-----	61.5	-----	-----	-----	1
Width/Depth Ratio	-----	11.8	-----	-----	-----	1	-----	13.0	-----	-----	-----	1	-----	12.4	-----	-----	-----	1	-----	13.1	-----	-----	-----	1	-----	12.4	-----	-----	-----	1
Entrenchment Ratio	-----	3.6	-----	-----	-----	1	-----	3.0	-----	-----	-----	1	-----	2.9	-----	-----	-----	1	-----	2.9	-----	-----	-----	1	-----	2.9	-----	-----	-----	1
Bank Height Ratio	-----	1.0	-----	-----	-----	1	-----	1.0	-----	-----	-----	1	-----	1.0	-----	-----	-----	1	-----	1.0	-----	-----	-----	1	-----	1.0	-----	-----	-----	1
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																														
Channel Beltwidth (ft)	58.0	-----	-----	91.0	-----	3	57.0	89.3	97.0	114.0	29.3	3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	52.0	-----	-----	53.0	-----	3	27.0	46.0	51.0	60.0	17.1	3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	2.0	-----	-----	2.0	-----	3	1.0	-----	-----	2.2	-----	3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	207.0	-----	-----	247.0	-----	2	224.3	236.6	236.6	248.9	17.4	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	2.2	-----	-----	3.5	-----	3	2.1	-----	-----	4.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																														
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	43.0	66.5	67.0	89.0	18.0	4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	0.0119	-----	-----	0.0237	-----	4	0.0120	0.0140	0.0140	0.0160	0.0020	4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	105.0	-----	-----	112.0	-----	2	118.0	122.0	122.0	126.0	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	5.0	-----	-----	-----	1	-----	4.7	-----	-----	-----	1	-----	4.3	-----	-----	-----	1	-----	4.9	-----	-----	-----	1	-----	4.9	-----	-----	-----	1
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																														
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Reach Shear Stress (competency) lb/f²	-----	1.2	-----	-----	-----	-----	-----	1.1	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	275.0	-----	-----	-----	-----	-----	260.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	53.6	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																														
Drainage Area (SM)	3.3	-----	-----	3.4	-----	-----	3.3	-----	-----	3.4	-----	-----	3.3	-----	-----	3.4	-----	-----	3.3	-----	-----	3.4	-----	-----	3.3	-----	-----	3.4	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classificatior	-----	E/C4	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----
BF Velocity (fps)	-----	3.5	-----	-----	-----	-----	-----	3.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	199.0	-----	-----	-----	-----	-----	199.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	350.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	400.0	-----	-----	-----	-----	-----	410.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity	-----	1.10	-----	-----	-----	-----	-----	1.17	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	0.0098	-----	-----	-----	-----	-----	0.0094	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary

Big Cedar Creek Restoration Site Contract No. D06054-D

BCC Reach 4 (410 LF)

Parameter	Year 4					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	29.9	-----	-----	-----	1
Floodprone Width (ft)	-----	81.0	-----	-----	-----	1
BF Mean Depth (ft)	-----	2.0	-----	-----	-----	1
BF Max Depth (ft)	-----	3.1	-----	-----	-----	1
BF Cross-sectional Area (ft^2)	-----	59.8	-----	-----	-----	1
Width/Depth Ratio	-----	15.0	-----	-----	-----	1
Entrenchment Ratio	-----	2.7	-----	-----	-----	1
Bank Height Ratio	-----	1.0	-----	-----	-----	1
d50 (mm)	-----	-----	-----	-----	-----	-----
Pattern						
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----
Profile						
Riffle Length (ft)	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters						
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	-----	-----
Reach Shear Stress (competency) lb/f²	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----
Additional Reach Parameters						
Drainage Area (SM)	3.3	-----	-----	3.4	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	E/C4	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT1 Reach 1 (1248 LF)

Parameter	USGS Gauge	Regional Curve Interval			Pre-Existing Condition						Reference Reach(es) Data Spencer Creek					
Dimension and Substrate - Riffle		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	7.0	26.0	11.5	-----	18.9	-----	-----	-----	1	-----	8.7	-----	-----	-----	1
Floodprone Width (ft)	-----	-----	-----	-----	-----	>135.3	-----	-----	-----	1	-----	228.5	-----	-----	-----	1
BF Mean Depth (ft)	-----	0.9	2.4	1.5	-----	0.8	-----	-----	-----	1	-----	1.2	-----	-----	-----	1
BF Max Depth (ft)	-----	-----	-----	-----	-----	1.8	-----	-----	-----	1	-----	1.9	-----	-----	-----	1
BF Cross-sectional Area (ft^2)	-----	10.0	38.0	20.4	-----	14.4	-----	-----	-----	1	-----	10.6	-----	-----	-----	1
Width/Depth Ratio	-----	-----	-----	-----	-----	23.6	-----	-----	-----	1	-----	7.3	-----	-----	-----	1
Entrenchment Ratio	-----	-----	-----	-----	-----	>7.2	-----	-----	-----	1	-----	26.3	-----	-----	-----	1
Bank Height Ratio	-----	-----	-----	-----	-----	1.6	-----	-----	-----	1	-----	1.0	-----	-----	-----	1
d50 (mm)	-----	-----	-----	-----	-----	18.0	-----	-----	-----	1	-----	8.6	-----	-----	-----	-----
Pattern																
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	24.0	-----	-----	52.0	-----	2
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	5.4	-----	-----	22.1	-----	5
Rc:Bankfull Width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.6	-----	-----	2.5	-----	5
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	54.0	-----	-----	196.0	-----	2
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.8	-----	-----	6.0	-----	2
Profile																
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	0.0180	-----	-----	0.1530	-----	2	0.010	-----	-----	0.067	-----	2
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
Pool Spacing (ft)	-----	-----	-----	-----	9.9	-----	-----	182	-----	-----	13.0	-----	-----	46.5	-----	5
Pool Max Depth (ft)	-----	-----	-----	-----	-----	2.2	-----	-----	-----	-----	-----	2.5	-----	-----	-----	1
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----			<0.063 / 7 / 18 / 149 / >2048						0.06 / 3 / 8.6 / 77 / 180			
Reach Shear Stress (competency) lb/f²	-----	-----	-----	-----	-----	0.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	-----	-----	-----	-----	125.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																
Drainage Area (SM)	-----	-----	-----	-----	0.7	-----	-----	0.9	-----	-----	-----	-----	-----	0.5	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	C4/1	-----	-----	-----	-----	-----	E4/C4	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	30.0	235.0	84.5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length (ft)	-----	-----	-----	-----	-----	1,816.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	1,998.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	1.10	-----	-----	-----	-----	-----	1.10	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	0.0116	-----	-----	-----	-----	-----	0.0132	-----	-----	-----	-----
BF Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT1 Reach 1 (1248 LF)

Parameter	Design						As-built						Year 1						Year 2						Year 3					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	13.0	-----	-----	-----	1	11.6	13.2	13.2	14.7	1.3	3	12.0	12.8	12.8	13.7	0.9	3	11.9	13.5	12.0	16.5	2.6	3	11.9	12.6	12.2	13.6	0.9	3
Floodprone Width (ft)	-----	73.8	-----	-----	-----	1	48.4	52.8	53.6	56.5	3.3	3	48.5	52.8	53.5	56.4	4.0	3	48.4	52.8	53.5	56.4	4.0	3	48.4	52.8	53.6	56.5	4.1	3
BF Mean Depth (ft)	-----	1.2	-----	-----	-----	1	1.0	1.1	1.1	1.3	0.1	3	1.0	1.1	1.1	1.3	0.2	3	0.8	1.0	1.0	1.2	0.2	3	0.9	5.1	1.4	12.9	0.9	3
BF Max Depth (ft)	-----	1.7	-----	-----	-----	1	1.7	1.9	1.8	2.1	0.2	3	1.6	1.8	1.7	2.2	0.3	3	1.6	1.8	1.6	2.1	0.3	3	1.5	1.8	1.7	2.2	0.4	3
BF Cross-sectional Area (ft^2)	-----	15.3	-----	-----	-----	1	14.2	14.9	15.2	15.2	0.5	3	13.6	14.5	13.7	16.1	1.4	3	12.4	13.4	13.4	14.3	0.9	3	12.6	13.9	12.9	16.3	2.1	3
Width/Depth Ratio	-----	10.8	-----	-----	-----	1	8.8	11.8	12.3	14.2	2.2	3	9.0	11.6	12.1	13.7	2.4	3	9.9	14.0	11.6	20.4	5.7	3	8.7	11.7	11.6	14.7	3.0	3
Entrenchment Ratio	-----	5.7	-----	-----	-----	1	3.9	4.0	4.0	4.2	0.1	3	4.0	4.1	4.0	4.2	0.1	3	3.3	14.0	4.1	4.3	0.5	3	4.1	4.2	4.1	4.4	0.2	3
Bank Height Ratio	-----	1.0	-----	-----	-----	1	1.0	1.0	1.0	1.0	1.0	3	1.0	1.0	1.0	1.0	1.0	3	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	39.0	-----	-----	-----	1	-----	62.0	-----	-----	-----	1	-----	-----	-----	-----	-----	1	-----	-----	-----	-----	-----	1
Pattern																														
Channel Beltwidth (ft)	29.0	-----	-----	64.0	-----	13	42.0	65.6	67.0	75.0	10.2	13	48.0	68.0	69.5	78.0	9.3	8	54.0	69.0	72.5	75.0	8.2	8	59.0	65.9	66.0	78.0	6.5	7
Radius of Curvature (ft)	28.0	-----	-----	40.0	-----	14	22.0	32.4	33.0	41.0	5.2	14	29.0	32.5	32.5	39.0	3.2	8	24.0	31.3	31.0	39.0	4.9	8	29.0	35.6	35.5	43.0	4.8	8
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----	1.7	-----	-----	3.1	-----	1	2.3	-----	-----	3.1	-----	8	1.8	-----	-----	2.9	-----	8	2.3	2.8	2.8	3.4	0.4	8
Meander Wavelength (ft)	140.0	-----	-----	157.0	-----	12	111.3	151.9	150.7	174.0	15.9	12	150.0	156.6	157.0	166.0	5.4	7	146.0	155.3	154.0	166.0	6.3	7	153.0	158.1	158.0	168.0	5.3	7
Meander Width Ratio	2.2	-----	-----	4.9	-----	13	3.2	-----	-----	5.7	-----	13	3.8	-----	-----	6.1	-----	8	4.0	-----	-----	5.6	-----	8	4.7	5.2	5.2	6.2	0.5	7
Profile																														
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	29.0	47.0	46.0	78.0	15.0	14	30.0	43.0	44.0	64.0	11.0	9	29.0	43.0	43.0	69.0	13.2	9	29.0	43.0	42.0	66.0	12.3	9
Riffle Slope (ft/ft)	0.0115	-----	-----	0.0230	-----	14	0.0000	0.0110	0.0120	0.0270	0.0081	14	0.0030	0.0220	0.0220	0.0370	0.0110	9	0.0070	0.0230	0.0210	0.0360	0.0090	9	0.008	0.020	0.019	0.029	0.010	9
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	63.0	-----	-----	115.0	-----	13	61.0	95.0	102.0	113.0	17.0	13	70.0	102.0	104.0	128.0	22.0	9	63.0	104.0	102.0	137.0	27.9	8	63.0	101.0	101.0	130.0	22.9	8
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----	2.3	-----	-----	2.9	-----	2	2.2	-----	-----	2.7	-----	2	2.6	-----	-----	2.8	-----	2	2.6	-----	-----	3.0	-----	2
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																														
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	-----	-----			12 / 24 / 39 / 110 / 160						20 / 40 / 62 / 110 / 150				-----	-----	-----	-----	-----	-----			<0.063 / <0.063 / 37 / 95 / 125					
Reach Shear Stress (competency) lb/f²	-----	0.5	-----	-----	-----	-----	-----	0.4	-----	-----	-----	1	-----	0.5	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	125.0	-----	-----	-----	-----	-----	95.0	-----	-----	-----	1	-----	130.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	24.4	-----	-----	-----	1	-----	33.4	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																														
Drainage Area (SM)	0.7	-----	-----	0.8	-----	-----	0.7	-----	-----	0.8	-----	-----	0.7	-----	-----	0.8	-----	-----	0.7	-----	-----	0.8	-----	-----	0.7	-----	-----	0.8	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classificatior	-----	E/C4	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----
BF Velocity (fps)	-----	4.5	-----	-----	-----	-----	-----	4.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	69.0	-----	-----	-----	-----	-----	69.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	959.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	1276.0	-----	-----	-----	-----	-----	1247.0	-----	-----	-----	-----	-----	918.0	-----	-----	-----	-----	-----	910.0	-----	-----	-----	-----	-----	910.0	-----	-----	-----	-----
Sinuosity	-----	1.30	-----	-----	-----	-----	-----	1.30	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	0.0080	-----	-----	-----	-----	-----	0.0060	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.014	-----	-----	-----	-----	-----	0.0080	-----	-----	-----	-----	-----	0.0080	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary

Big Cedar Creek Restoration Site Contract No. D06054-D

UT1 Reach 1 (1248 LF)

Parameter	Year 4					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n
BF Width (ft)	12.3	12.3	12.9	15.5	1.7	3
Floodprone Width (ft)	48.4	52.8	53.7	56.5	4.1	3
BF Mean Depth (ft)	0.9	1.0	1.1	1.1	0.1	3
BF Max Depth (ft)	1.6	1.8	1.7	2.0	0.2	3
BF Cross-sectional Area (ft^2)	13.1	13.4	13.4	13.8	0.4	3
Width/Depth Ratio	11.3	13.9	12.1	18.4	3.9	3
Entrenchment Ratio	3.6	3.9	3.9	4.2	0.3	3
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0	3
d50 (mm)	-----	-----	-----	-----	-----	-----
Pattern						
Channel Beltwidth (ft)	45.0	67.0	69.0	81.0	11.5	7
Radius of Curvature (ft)	24.0	35.0	37.0	42.0	6.1	8
Rc:Bankfull width (ft/ft)	1.9	2.8	2.9	3.3	0.5	8
Meander Wavelength (ft)	152.0	156.0	155.0	161.0	3.1	7
Meander Width Ratio	3.6	5.3	5.5	6.4	0.9	7
Profile						
Riffle Length (ft)	6	61	64	78	30	8
Riffle Slope (ft/ft)	0.012	0.024	0.018	0.510	0.014	8
Pool Length (ft)	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	39.0	69.0	70.0	100.0	30.0	8
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters						
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	-----	-----
Reach Shear Stress (competency) lb/f²	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----
Additional Reach Parameters						
Drainage Area (SM)	0.7	-----	-----	0.8	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----
Rosgen Classificatior	-----	E/C	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	905.0	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	0.010	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT1 Reach 2 (1016)

Parameter	USGS Gauge	Regional Curve Interval			Pre-Existing Condition						Reference Reach(es) Data Spencer Creek					
Dimension and Substrate- Riffle		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	7.0	27.0	11.8	-----	13.1	-----	-----	-----	1	-----	8.7	-----	-----	-----	1
Floodprone Width (ft)	-----	-----	-----	-----	-----	48.8	-----	-----	-----	1	-----	228.5	-----	-----	-----	1
BF Mean Depth (ft)	-----	0.9	1.5	1.5	-----	1.4	-----	-----	-----	1	-----	1.2	-----	-----	-----	1
BF Max Depth (ft)	-----	-----	-----	-----	-----	2.2	-----	-----	-----	1	-----	1.9	-----	-----	-----	1
BF Cross-sectional Area (ft^2)	-----	11.0	40.0	21.1	-----	18.5	-----	-----	-----	1	-----	10.6	-----	-----	-----	1
Width/Depth Ratio	-----	-----	-----	-----	-----	9.4	-----	-----	-----	1	-----	7.3	-----	-----	-----	1
Entrenchment Ratio	-----	-----	-----	-----	-----	3.7	-----	-----	-----	1	-----	26.3	-----	-----	-----	1
Bank Height Ratio	-----	-----	-----	-----	-----	2.1	-----	-----	-----	1	-----	1.0	-----	-----	-----	1
d50 (mm)	-----	-----	-----	-----	-----	40.0	-----	-----	-----	1	-----	8.6	-----	-----	-----	1
Pattern																
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	24.0	-----	-----	52.0	-----	2
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	5.4	-----	-----	22.1	-----	5
Rc:Bankfull Width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.6	-----	-----	2.5	-----	5
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	54.0	-----	-----	196.0	-----	2
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.8	-----	-----	6.0	-----	2
Profile																
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	0.024	-----	-----	0.178	-----	2.000	0.010	-----	-----	0.067	-----	2.000
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
Pool Spacing (ft)	-----	-----	-----	-----	9.8	-----	-----	118.2	-----	-----	13.0	-----	-----	46.5	-----	5
Pool Max Depth (ft)	-----	-----	-----	-----	-----	2.1	-----	-----	-----	-----	-----	2.5	-----	-----	-----	1
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	<0.063 / 11 / 40 / >2048 / >2048						0.06 / 3 / 8.6 / 77 / 180					
Reach Shear Stress (competency) lb/f²	-----	-----	-----	-----	-----	1.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	-----	-----	-----	-----	250.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																
Drainage Area (SM)	-----	-----	-----	-----	0.9	-----	-----	1.0	-----	-----	-----	-----	-----	0.5	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	E4/1	-----	-----	-----	-----	-----	E4/C4	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	30.0	260.0	87.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length (ft)	-----	-----	-----	-----	-----	759.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	759.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	1.00	-----	-----	-----	-----	-----	1.10	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	0.0140	-----	-----	-----	-----	-----	0.0132	-----	-----	-----	-----
BF Slope (ft/ft)	-----	-----	-----	-----	-----	0.0139	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Banfull Floodplain Area (Acres	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT1 Reach 2 (1016)

Parameter	Design						As-built						Year 1						Year 2						Year 3					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	15.0	-----	-----	-----	1	13.4	14.4	14.1	15.9	1.1	3	12.5	14.0	14.3	15.1	1.3	3	13.6	15.0	15.8	15.8	1.3	3	11.3	14.0	14.3	16.3	2.5	3
Floodprone Width (ft)	-----	85.5	-----	-----	-----	1	56.4	58.4	58.8	60.2	1.6	3	56.3	58.4	58.9	60.1	1.9	3	56.3	58.5	58.8	60.4	2.0	3	56.4	58.4	58.8	60.2	1.9	3
BF Mean Depth (ft)	-----	4.5	-----	-----	-----	1	1.1	1.1	1.1	1.2	0.0	3	1.0	1.1	1.1	1.2	0.1	3	1.0	1.0	1.1	1.1	0.1	3	0.8	0.9	0.9	1.1	0.1	3
BF Max Depth (ft)	-----	1.5	-----	-----	-----	1	1.8	1.9	1.8	1.9	0.1	3	1.7	1.8	1.7	2.1	0.2	3	1.7	1.8	1.8	2.0	0.2	3	1.4	1.6	1.7	1.8	0.2	3
BF Cross-sectional Area (ft^2)	-----	16.8	-----	-----	-----	1	14.5	16.3	16.3	17.9	1.4	3	13.0	15.5	16.0	17.4	2.2	3	14.4	15.5	15.4	16.6	1.1	3	9.4	13.0	13.0	16.6	3.6	3
Width/Depth Ratio	-----	13.6	-----	-----	-----	1	12.1	12.8	12.4	14.0	0.9	3	11.8	12.7	12.0	14.2	1.3	3	12.8	14.6	14.9	16.2	1.7	3	13.5	15.1	15.7	16.0	1.3	3
Entrenchment Ratio	-----	5.7	-----	-----	-----	1	3.7	4.1	4.2	4.3	0.3	3	3.9	4.2	4.2	4.5	0.3	3	3.7	3.8	3.8	3.9	0.1	3	3.6	4.2	3.9	5.1	0.8	3
Bank Height Ratio	-----	1.0	-----	-----	-----	1	1.0	1.0	1.0	1.0	1.0	3	1.0	1.0	1.0	1.0	1.0	3	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pattern																														
Channel Beltwidth (ft)	30.0	-----	-----	45.0	-----	10	29.0	45.3	48.0	58.0	11.7	10	30.0	46.5	49.5	57.0	10.6	6	41.0	49.0	49.5	59.0	6.5	5	41.0	49.0	49.5	59.0	6.5	6
Radius of Curvature (ft)	30.0	-----	-----	48.0	-----	11	20.0	35.3	36.0	47.0	6.2	11	25.0	28.0	29.0	30.0	2.0	5	28.0	39.0	40.0	46.0	7.1	4	32.0	44.8	46.5	52.0	7.0	6
Rc:Bankfull width (ft/ft)	2.0	-----	-----	3.2	-----	11	1.4	-----	-----	3.3	-----	1	1.8	-----	-----	2.1	-----	2	1.9	-----	-----	3.1	-----	2	2.3	3.2	3.3	3.7	0.5	6
Meander Wavelength (ft)	134.0	-----	-----	199.0	-----	9	68.6	145.1	146.3	222.4	44.6	11	166.0	184.8	186.0	199.0	13.6	5	173.0	185.4	183.0	201.0	10.6	5	166.0	184.6	179.0	200.0	14.6	5
Meander Width Ratio	2.0	-----	-----	3.0	-----	10	2.0	-----	-----	4.0	-----	1	2.1	-----	-----	4.1	-----	2	2.7	-----	-----	3.9	-----	2	2.9	3.5	3.5	4.2	0.5	6
Profile																														
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	48.0	67.0	64.0	94.0	14.0	10	42	62	60	92	16	6	37	53	58	96	21	6	48	62	56	94	17	6
Riffle Slope (ft/ft)	0.019	-----	-----	0.028	-----	11.000	0.008	0.016	0.017	0.022	0.005	10.000	0.021	0.024	0.025	0.032	0.004	6.000	0.020	0.020	0.020	0.030	0.000	6.000	0.016	0.020	0.020	0.024	0.000	6.000
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	62.0	-----	-----	140.0	-----	11	17.0	74.0	77.0	116.0	28.0	11	41	85	90	110	24	7	47	90	84	101	19	7	78	97	96	119	13	6
Pool Max Depth (ft)	-----	3.5	-----	-----	-----	1	-----	2.6	-----	-----	-----	1	-----	2.9	-----	-----	-----	1	-----	2.7	-----	-----	-----	1	-----	2.7	-----	-----	-----	1
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																														
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Reach Shear Stress (competency) lb/f²	-----	0.8	-----	-----	-----	-----	-----	0.8	-----	-----	-----	1	-----	1.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	200.0	-----	-----	-----	-----	-----	200.0	-----	-----	-----	1	-----	215.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	54.1	-----	-----	-----	1	-----	59.7	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																														
Drainage Area (SM)	0.8	-----	-----	0.9	-----	-----	0.8	-----	-----	0.9	-----	-----	0.8	-----	-----	0.9	-----	-----	0.8	-----	-----	0.9	-----	-----	0.8	-----	-----	0.9	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classificatior	-----	B4c	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----
BF Velocity (fps)	-----	4.5	-----	-----	-----	-----	-----	4.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	76.0	-----	-----	-----	-----	-----	76.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	----	924.0	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----
Channel length (ft)	-----	1025.0	-----	-----	-----	-----	----	1016.0	-----	-----	-----	-----	----	740.0	-----	-----	-----	-----	----	734.0	-----	-----	-----	-----	----	734.0	-----	-----	-----	-----
Sinuosity	-----	1.00	-----	-----	-----	-----	----	1.10	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	0.0128	-----	-----	-----	-----	----	0.0130	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	----	0.014	-----	-----	-----	-----	----	0.014	-----	-----	-----	-----	----	0.014	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary

Big Cedar Creek Restoration Site Contract No. D06054-D

UT1 Reach 2 (1016)

Parameter	Year 4					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n
BF Width (ft)	11.9	13.3	12.9	15.2	1.7	3
Floodprone Width (ft)	56.3	58.5	58.9	60.2	2.0	3
BF Mean Depth (ft)	0.9	1.0	1.0	1.1	0.1	3
BF Max Depth (ft)	1.5	1.6	1.6	1.8	0.1	3
BF Cross-sectional Area (ft^2)	10.2	13.2	12.9	16.5	3.2	3
Width/Depth Ratio	13.0	13.6	14.0	14.0	0.6	3
Entrenchment Ratio	3.9	4.4	4.4	5.0	0.6	3
Bank Height Ratio	1.0	1.0	1.0	1.0	0.0	3
d50 (mm)	-----	-----	-----	-----	-----	-----
Pattern						
Channel Beltwidth (ft)	41.0	49.0	49.0	57.0	7.07	6
Radius of Curvature (ft)	31.0	38.0	36.0	48.0	6.4	5
Rc:Bankfull width (ft/ft)	2.2	2.7	2.6	3.4	0.46	5
Meander Wavelength (ft)	171.0	184.0	180.0	201.0	14.1	5
Meander Width Ratio	2.9	3.5	3.5	4.1	0.51	6
Profile						
Riffle Length (ft)	5.9	44	47	78	27	8
Riffle Slope (ft/ft)	0.012	0.024	0.018	0.051	0.014	8
Pool Length (ft)	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	39	69	70	100	30	6
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters						
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	-----	-----
Reach Shear Stress (competency) lb/f²	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----
Additional Reach Parameters						
Drainage Area (SM)	0.8	-----	-----	0.9	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	E/C	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----
Valley Length	----	-----	-----	-----	-----	-----
Channel length (ft)	----	734.0	-----	-----	-----	-----
Sinuosity	----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	----	-----	-----	-----	-----	-----
BF slope (ft/ft)	----	0.014	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT1 Reach 3 (1885 LF)

Parameter	USGS Gauge	Regional Curve Interval			Pre-Existing Condition						Reference Reach(es) Data Spencer Creek					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																
BF Width (ft)	-----	7.5	27.0	12.8	-----	17.6	-----	-----	-----	1	-----	8.7	-----	-----	-----	1
Floodprone Width (ft)	-----	-----	-----	-----	-----	>115.2	-----	-----	-----	1	-----	228.5	-----	-----	-----	1
BF Mean Depth (ft)	-----	1.0	2.5	1.6	-----	1.2	-----	-----	-----	1	-----	1.2	-----	-----	-----	1
BF Max Depth (ft)	-----	-----	-----	-----	-----	2.4	-----	-----	-----	1	-----	1.9	-----	-----	-----	1
BF Cross-sectional Area (ft^2)	-----	12.0	43.0	24.0	-----	20.9	-----	-----	-----	1	-----	10.6	-----	-----	-----	1
Width/Depth Ratio	-----	-----	-----	-----	-----	14.7	-----	-----	-----	1	-----	7.3	-----	-----	-----	1
Entrenchment Ratio	-----	-----	-----	-----	-----	>6.5	-----	-----	-----	1	-----	26.3	-----	-----	-----	1
Bank Height Ratio	-----	-----	-----	-----	-----	1.4	-----	-----	-----	1	-----	1.0	-----	-----	-----	1
d50 (mm)	-----	-----	-----	-----	-----	16.0	-----	-----	-----	1	-----	8.6	-----	-----	-----	-----
Pattern																
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	24.0	-----	-----	52.0	-----	2
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	5.4	-----	-----	22.1	-----	5
Rc:Bankfull Width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.6	-----	-----	2.5	-----	5
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	54.0	-----	-----	196.0	-----	2
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.8	-----	-----	6.0	-----	2
Profile																
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	0.0274	-----	-----	0.0628	-----	2	0.0100	-----	-----	0.0670	-----	2
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	27.2	-----	-----	539.5	-----	-----	13	-----	-----	46.5	-----	5
Pool Max Depth (ft)	-----	-----	-----	-----	-----	2.1	-----	-----	-----	-----	-----	2.5	-----	-----	-----	1
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----			<0.063 / 8 / 16 / 110 / 1024						0.06 / 3 / 8.6 / 77 / 180			
Reach Shear Stress (competency) lb/f²	-----	-----	-----	-----	-----	0.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	-----	-----	-----	-----	225.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																
Drainage Area (SM)	-----	-----	-----	-----	1.0	-----	-----	1.2	-----	-----	-----	-----	-----	0.5	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	C4/1	-----	-----	-----	-----	-----	E4/C4	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	35.0	290.0	100.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length (ft)	-----	-----	-----	-----	-----	1518.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	1518.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	1.00	-----	-----	-----	-----	-----	1.10	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	0.0134	-----	-----	-----	-----	-----	0.013	-----	-----	-----	-----
BF Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Banfull Floodplain Area (Acres	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT1 Reach 3 (1885 LF)

Parameter	Design						As-built						Year 1						Year 2						Year 3					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	15.0	-----	-----	-----	1	15.1	15.5	15.3	16.2	0.5	3	14.0	15.6	15.8	16.9	1.5	3	14.2	15.2	14.7	16.6	1.0	3	14.1	14.4	14.4	14.8	0.3	3
Floodprone Width (ft)	-----	85.2	-----	-----	-----	1	56.9	57.5	57.1	58.6	0.8	3	56.9	57.6	57.1	58.8	1.0	3	56.9	57.6	57.1	58.7	0.8	3	57.0	57.6	57.0	58.6	0.9	3
BF Mean Depth (ft)	-----	1.2	-----	-----	-----	1	1.2	1.2	1.2	1.3	0.1	3	1.1	1.2	1.1	1.3	0.1	3	1.0	1.1	1.1	1.2	0.1	3	1.0	1.1	1.0	1.2	0.1	3
BF Max Depth (ft)	-----	1.5	-----	-----	-----	1	1.7	1.9	1.8	2.2	0.2	3	1.6	1.9	1.7	2.3	0.4	3	1.6	1.7	1.7	1.9	0.1	3	1.5	1.7	1.7	1.8	0.1	3
BF Cross-sectional Area (ft^2)	-----	17.3	-----	-----	-----	1	17.8	18.9	17.9	21.0	1.5	3	15.0	18.3	17.8	22.0	3.5	3	14.6	17.0	18.0	18.4	0.7	3	14.5	15.5	14.6	17.3	1.6	3
Width/Depth Ratio	-----	12.5	-----	-----	-----	1	12.6	12.8	12.7	13.1	0.2	3	12.9	13.3	13.1	14.0	0.6	3	12.0	13.6	13.9	15.0	0.7	3	12.6	13.5	13.7	14.3	0.9	3
Entrenchment Ratio	-----	5.7	-----	-----	-----	1	3.6	3.7	3.7	3.8	0.1	3	3.4	3.6	3.6	3.7	0.2	3	3.5	3.7	3.6	4.0	0.2	3	3.9	4.0	4.0	4.1	0.1	3
Bank Height Ratio	-----	1.0	-----	-----	-----	1	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	37.0	-----	-----	-----	1	-----	-----	-----	-----	-----	1	-----	-----	-----	-----	-----	1
Pattern																														
Channel Beltwidth (ft)	22.0	-----	-----	65.0	-----	18	29.0	63.7	68.0	76.0	12.9	18	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	30.0	-----	-----	50.0	-----	19	29.0	38.4	37.0	52.0	6.8	19	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	2.0	-----	-----	3.3	-----	19	1.9	-----	-----	3.4	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	127.0	-----	-----	198.0	-----	17	129.7	177.7	181.2	220.1	22.0	18	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	1.5	-----	-----	4.3	-----	18	1.9	-----	-----	4.9	-----	18	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																														
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	31.0	55.0	59.0	85.0	15.0	18	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	0.0175	-----	-----	0.0354	-----	19	0.0100	0.0220	0.0200	0.0390	0.008	18	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	61.0	-----	-----	137.0	-----	19	23.0	94.0	106.5	134.0	30.0	20	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	3.3	-----	-----	-----	1	3.0	-----	-----	3.0	-----	2	2.7	-----	-----	2.7	-----	2	2.9	-----	-----	3.1	-----	2	3.0	-----	-----	3.3	-----	2
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																														
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----				11.3 / 21 / 37 / 120 / 180												10 / 25 /37 / 95 / 170		
Reach Shear Stress (competency) lb/f²	-----	0.7	-----	-----	-----	-----	-----	0.8	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	190.0	-----	-----	-----	-----	-----	200.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	57.9	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																														
Drainage Area (SM)	0.9	-----	-----	1.1	-----	-----	0.9	-----	-----	1.1	-----	-----	0.9	-----	-----	1.1	-----	-----	0.9	-----	-----	1.1	-----	-----	0.9	-----	-----	1.1	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	C4	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----
BF Velocity (fps)	-----	5.5	-----	-----	-----	-----	-----	5.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	95.0	-----	-----	-----	-----	-----	95.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	1571.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	1954.0	-----	-----	-----	-----	-----	1885.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity	-----	1.20	-----	-----	-----	-----	-----	1.20	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	0.0118	-----	-----	-----	-----	-----	0.0120	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary

Big Cedar Creek Restoration Site Contract No. D06054-D

UT1 Reach 3 (1885 LF)

Parameter	Year 4					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n
BF Width (ft)	14.9	19.0	15.1	27.0	6.95	3
Floodprone Width (ft)	57.0	57.6	57.1	58.6	0.9	3
BF Mean Depth (ft)	0.9	1.0	0.9	1.1	0.1	3
BF Max Depth (ft)	1.6	1.8	1.8	2.1	0.3	3
BF Cross-sectional Area (ft^2)	13.7	18.6	16.8	25.4	6.1	3
Width/Depth Ratio	13.2	19.6	16.7	28.8	8.2	3
Entrenchment Ratio	2.2	3.3	3.8	3.8	0.1	3
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0	3
d50 (mm)	-----	-----	-----	-----	-----	-----
Pattern						
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----
Profile						
Riffle Length (ft)	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters						
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	-----	-----
Reach Shear Stress (competency) lb/f²	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----
Additional Reach Parameters						
Drainage Area (SM)	0.9	-----	-----	1.1	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	E/C	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT1 Reach 4 (996 LF)

Parameter	USGS Gauge	Regional Curve Interval			Pre-Existing Condition						Reference Reach(es) Data Spencer Creek					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																
BF Width (ft)	-----	7.5	27.0	12.9	-----	23.1	-----	-----	-----	1	-----	8.7	-----	-----	-----	1
Floodprone Width (ft)	-----	-----	-----	-----	-----	69.2	-----	-----	-----	1	-----	228.5	-----	-----	-----	1
BF Mean Depth (ft)	-----	1.0	2.5	1.6	-----	1.0	-----	-----	-----	1	-----	1.2	-----	-----	-----	1
BF Max Depth (ft)	-----	-----	-----	-----	-----	1.8	-----	-----	-----	1	-----	1.9	-----	-----	-----	1
BF Cross-sectional Area (ft^2)	-----	12.0	43.0	24.4	-----	22.6	-----	-----	-----	1	-----	10.6	-----	-----	-----	1
Width/Depth Ratio	-----	-----	-----	-----	-----	23.1	-----	-----	-----	1	-----	7.3	-----	-----	-----	1
Entrenchment Ratio	-----	-----	-----	-----	-----	3.0	-----	-----	-----	1	-----	26.3	-----	-----	-----	1
Bank Height Ratio	-----	-----	-----	-----	-----	1.8	-----	-----	-----	1	-----	1.0	-----	-----	-----	1
d50 (mm)	-----	-----	-----	-----	-----	32.0	-----	-----	-----	1	-----	8.6	-----	-----	-----	1
Pattern																
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	24.0	-----	-----	52.0	-----	2
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	5.4	-----	-----	22.1	-----	5
Rc:Bankfull Width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.6	-----	-----	2.5	-----	5
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	54.0	-----	-----	196.0	-----	2
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.8	-----	-----	6.0	-----	2
Profile																
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	0.0264	-----	-----	0.2521	-----	-----	0.0100	-----	-----	0.0670	-----	2
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
Pool Spacing (ft)	-----	-----	-----	-----	34.4	-----	-----	156.4	-----	-----	13.0	-----	-----	46.5	-----	5
Pool Max Depth (ft)	-----	-----	-----	-----	-----	3.0	-----	-----	-----	-----	-----	2.5	-----	-----	-----	1
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----			<0.063 / 11 / 32 / 100 / 180						0.06 / 3 / 8.6 / 77 / 180			
Reach Shear Stress (competency) lb/f	-----	-----	-----	-----	-----	0.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	-----	-----	-----	-----	200.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																
Drainage Area (SM)	-----	-----	-----	-----	1.2	-----	-----	1.2	-----	-----	-----	-----	-----	0.5	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classificatior	-----	-----	-----	-----	-----	C4/1	-----	-----	-----	-----	-----	E4/C4	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	35.0	290.0	102.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length (ft)	-----	-----	-----	-----	-----	850.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	935.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	1.10	-----	-----	-----	-----	-----	1.10	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	0.0145	-----	-----	-----	-----	-----	0.0132	-----	-----	-----	-----
BF Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Banfull Floodplain Area (Acres	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT1 Reach 4 (996 LF)

Parameter	Design						As-built						Year 1						Year 2						Year 3					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	16.0	-----	-----	-----	1	16.7	18.7	16.8	22.6	2.8	3	16.3	18.4	16.5	22.5	3.5	3	17.20	19.5	18.66	22.52	2.75	3	15.6	19.3	19.0	23.4	3.9	3
Floodprone Width (ft)	-----	87.0	-----	-----	-----	1	51.3	57.8	58.6	63.5	5.0	3	56.4	59.5	58.4	63.7	3.8	3	52.80	58.3	58.54	63.63	5.42	3	58.6	60.9	60.4	63.8	2.6	3
BF Mean Depth (ft)	-----	1.3	-----	-----	-----	1	1.2	1.3	1.3	1.5	0.1	3	1.2	1.5	1.3	2.0	0.4	3	1.11	1.4	1.36	1.82	0.36	3	1.1	1.4	1.5	1.6	0.2	3
BF Max Depth (ft)	-----	1.7	-----	-----	-----	1	1.8	2.0	2.0	2.3	0.2	3	1.9	2.3	2.0	3.0	0.6	3	1.66	2.4	2.51	3.01	0.68	3	1.8	2.3	2.4	2.6	0.4	3
BF Cross-sectional Area (ft^2)	-----	20.0	-----	-----	-----	1	21.3	24.8	25.3	27.8	2.7	3	20.6	27.2	27.7	33.2	6.3	3	23.35	27.4	25.05	33.93	5.68	3	22.8	26.3	26.7	29.4	3.3	3
Width/Depth Ratio	-----	12.3	-----	-----	-----	1	11.2	14.2	13.1	18.4	3.1	3	8.2	13.1	12.9	18.3	5.1	3	10.26	14.4	12.67	20.25	5.21	3	10.6	14.4	12.2	20.4	5.3	3
Entrenchment Ratio	-----	5.4	-----	-----	-----	1	2.3	3.2	3.5	3.8	0.7	3	2.5	3.3	3.6	3.9	0.7	3	2.09	3.0	3.40	3.41	0.76	3	2.6	3.1	2.9	3.8	0.6	3
Bank Height Ratio	-----	1.0	-----	-----	-----	1	1.0	1.0	1.0	1.0	1.0	3	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	40.0	-----	-----	-----	1	-----	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	----
Pattern																														
Channel Beltwidth (ft)	31.0	-----	-----	47.0	-----	7	38.0	55.3	41.0	112.0	26.4	7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	32.0	-----	-----	50.0	-----	9	14.0	36.3	36.0	55.0	1.1	9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	2.0	-----	-----	3.1	-----	9	0.9	-----	-----	3.6	-----	9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	133.0	-----	-----	168.0	-----	5	136.3	156.1	159.8	181.0	62.9	6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	1.9	-----	-----	2.9	-----	7	2.0	-----	-----	3.6	-----	7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																														
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	37.0	55.0	54.0	79.0	13.0	10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	0.0222	-----	-----	0.0301	-----	12	0.0050	0.0220	0.0230	0.0310	0.0070	10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	64.0	-----	-----	105.0	-----	9	66.0	81.0	75.0	106.0	13.0	9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	4.0	-----	-----	-----	1	-----	4.6	-----	-----	-----	1	-----	4.3	-----	-----	-----	1	-----	4.0	-----	-----	-----	1	-----	4.5	-----	-----	-----	1
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																														
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			11.3 / 26 / 40 / 83 / 180				-----	-----	-----	-----	-----	-----		18 / 37 / 51 / 100 / 163		
Reach Shear Stress (competency) lb/f	-----	1.1	-----	-----	-----	-----	-----	1.2	-----	-----	-----	1	-----	-----	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	250.0	-----	-----	-----	-----	-----	290.0	-----	-----	-----	1	-----	-----	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----	-----	68.2	-----	-----	-----	1	-----	-----	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																														
Drainage Area (SM)	1.1	-----	-----	1.2	-----	-----	1.1	-----	-----	1.2	-----	-----	1.1	-----	-----	1.2	-----	-----	1.1	-----	-----	1.2	-----	-----	1.1	-----	-----	1.2	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classificatior	-----	B4c	-----	-----	-----	-----	-----	C	-----	-----	-----	-----	-----	C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----
BF Velocity (fps)	-----	5.0	-----	-----	-----	-----	-----	4.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	100.0	-----	-----	-----	-----	-----	100.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	915.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	1501.0	-----	-----	-----	-----	-----	997.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity	-----	1.00	-----	-----	-----	-----	-----	1.09	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	0.0161	-----	-----	-----	-----	-----	0.0160	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary

Big Cedar Creek Restoration Site Contract No. D06054-D

UT1 Reach 4 (996 LF)

Parameter	Year 4					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n
BF Width (ft)	17.0	20.6	20.6	24.1	3.5	3
Floodprone Width (ft)	50.2	57.5	58.5	63.8	6.9	3
BF Mean Depth (ft)	1.1	1.4	1.4	1.6	0.3	3
BF Max Depth (ft)	1.7	2.3	2.5	2.8	0.6	3
BF Cross-sectional Area (ft^2)	24.3	28.0	26.6	33.1	4.6	3
Width/Depth Ratio	11.9	15.5	12.8	21.8	5.5	3
Entrenchment Ratio	2.1	2.9	3.1	3.4	0.6	3
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0	3
d50 (mm)	-----	-----	-----	-----	-----	-----
Pattern						
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----
Profile						
Riffle Length (ft)	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----
Pool Length (ft)	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	-----	-----	-----	-----	-----	-----
Pool Max Depth (ft)	-----	-----	-----	-----	-----	-----
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters						
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	-----	-----
Reach Shear Stress (competency) lb/f	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m^2	-----	-----	-----	-----	-----	-----
Additional Reach Parameters						
Drainage Area (SM)	1.1	-----	-----	1.2	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----
Rosgen Classificatior	-----	E/C	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT2 (609 LF)

Parameter	USGS Gauge	Regional Curve Interval			Pre-Existing Condition						Reference Reach(es) Data Spencer Creek					
Dimension and Substrate - Riffle		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	5.5	21.0	9.2	-----	9.2	-----	-----	-----	1	-----	8.7	-----	-----	-----	1
Floodprone Width (ft)	-----	-----	-----	-----	-----	>142.2	-----	-----	-----	1	-----	228.5	-----	-----	-----	1
BF Mean Depth (ft)	-----	0.8	2.1	1.2	-----	1.2	-----	-----	-----	1	-----	1.2	-----	-----	-----	1
BF Max Depth (ft)	-----	-----	-----	-----	-----	1.6	-----	-----	-----	1	-----	1.9	-----	-----	-----	1
BF Cross-sectional Area (ft^2)	-----	7.0	27.0	14.3	-----	10.8	-----	-----	-----	1	-----	10.6	-----	-----	-----	1
Width/Depth Ratio	-----	-----	-----	-----	-----	7.7	-----	-----	-----	1	-----	7.3	-----	-----	-----	1
Entrenchment Ratio	-----	-----	-----	-----	-----	>15.5	-----	-----	-----	1	-----	26.3	-----	-----	-----	1
Bank Height Ratio	-----	-----	-----	-----	-----	1.3	-----	-----	-----	1	-----	1.0	-----	-----	-----	1
d50 (mm)	-----	-----	-----	-----	-----	15.0	-----	-----	-----	1	-----	8.6	-----	-----	-----	-----
Pattern		-----	-----													
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	24.0	-----	-----	52.0	-----	2
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	5.4	-----	-----	22.1	-----	5
Rc:Bankfull Width (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.6	-----	-----	2.5	-----	5
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	54.0	-----	-----	196.0	-----	2
Meander Width Ratio	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.8	-----	-----	6.0	-----	2
Profile																
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Riffle Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.01	-----	-----	0.07	-----	2.00
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
Pool Spacing (ft)	-----	-----	-----	-----	61.0	-----	-----	114.0	-----	-----	13.0	-----	-----	46.5	-----	5
Pool Max Depth (ft)	-----	-----	-----	-----	-----	2.2	-----	-----	-----	-----	-----	2.5	-----	-----	-----	1
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----			<0.063 / 8 / 15 / 64 / 90						0.06 / 3 / 8.6 / 77 / 180			
Reach Shear Stress (competency) lb/f²	-----	-----	-----	-----	-----	1.3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	-----	-----	-----	-----	300.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																
Drainage Area (SM)	-----	-----	-----	-----	0.5	-----	-----	0.6	-----	-----	-----	-----	-----	0.5	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	-----	-----	-----	-----	G4	-----	-----	-----	-----	-----	E4/C4	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	20.0	175.0	57.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length (ft)	-----	-----	-----	-----	-----	568.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	-----	-----	-----	-----	625.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	1.10	-----	-----	-----	-----	-----	1.10	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	-----	-----	-----	-----	0.0215	-----	-----	-----	-----	-----	0.0130	-----	-----	-----	-----
BF Slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Banfull Floodplain Area (Acres	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT2 (609 LF)

Parameter	Design						As-built						Year 1						Year 2						Year 3					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	13	-----	-----	-----	1	-----	13.4	-----	-----	-----	1	-----	13.2	-----	-----	-----	1	-----	14.4	-----	-----	-----	1	-----	15.6	-----	-----	-----	1
Floodprone Width (ft)	-----	74.0+	-----	-----	-----	1	-----	63.1	-----	-----	-----	1	-----	63.1	-----	-----	-----	1	-----	63.2	-----	-----	-----	1	-----	63.0	-----	-----	-----	1
BF Mean Depth (ft)	-----	1.1	-----	-----	-----	1	-----	1.4	-----	-----	-----	1	-----	1.5	-----	-----	-----	1	-----	1.2	-----	-----	-----	1	-----	1.5	-----	-----	-----	1
BF Max Depth (ft)	-----	1.4	-----	-----	-----	1	-----	1.9	-----	-----	-----	1	-----	2.1	-----	-----	-----	1	-----	1.8	-----	-----	-----	1	-----	2.9	-----	-----	-----	1
BF Cross-sectional Area (ft^2)	-----	14.3	-----	-----	-----	1	-----	18.1	-----	-----	-----	1	-----	20.1	-----	-----	-----	1	-----	17.4	-----	-----	-----	1	-----	23.8	-----	-----	-----	1
Width/Depth Ratio	-----	11.8	-----	-----	-----	1	-----	9.9	-----	-----	-----	1	-----	8.7	-----	-----	-----	1	-----	11.9	-----	-----	-----	1	-----	10.3	-----	-----	-----	1
Entrenchment Ratio	-----	5.7+	-----	-----	-----	1	-----	4.7	-----	-----	-----	1	-----	4.8	-----	-----	-----	1	-----	4.4	-----	-----	-----	1	-----	4.0	-----	-----	-----	1
Bank Height Ratio	-----	1.0	-----	-----	-----	1	-----	1.0	-----	-----	-----	1	-----	1.0	-----	-----	-----	1	-----	1.0	-----	-----	-----	1	-----	1.0	-----	-----	-----	1
d50 (mm)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	22.6	-----	-----	-----	1	-----	-----	-----	-----	-----	----	-----	34	-----	-----	-----	----
Pattern																														
Channel Beltwidth (ft)	46.0	-----	-----	55.0	-----	7	44.0	52.6	53.0	61.0	5.6	7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	23.0	-----	-----	37.0	-----	7	25.0	31.6	30.0	43.0	6.4	7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	1.8	-----	-----	2.8	-----	7	2.5	-----	-----	3.6	-----	7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	98.0	-----	-----	142.0	-----	6	99.0	122.4	120.5	147.8	17.0	6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Meander Width Ratio	3.5	-----	-----	4.2	-----	7	5.4	-----	-----	6.7	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Profile																														
Riffle Length (ft)	-----	-----	-----	-----	-----	-----	20.0	40.8	43.0	56.0	12.5	8	20.0	26.0	28.0	30.0	5.3	3	29.0	31.0	39.0	58.0	16.2	3	23	31	28	41	9	9
Riffle Slope (ft/ft)	0.02	-----	-----	0.05	-----	8.00	0.01	0.03	0.03	0.05	0.01	8.00	0.02	0.02	0.02	0.03	0.00	3.00	0.02	0.03	0.03	0.05	0.02	3.00	0.020	0.026	0.026	0.030	0.030	3
Pool Length (ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	62.0	-----	-----	99.0	-----	7	55.0	76.0	73.0	103.0	15.7	7	-----	93.0	-----	93.0	-----	1	-----	87.0	-----		-----	1	-----	102.0	-----		-----	1
Pool Max Depth (ft)	-----	3.6	-----	-----	-----	1	-----	2.5	-----	-----	-----	1	-----	2.6	-----	-----	-----	1	-----	3.0	-----	-----	-----	1	-----	2.8	-----	-----	-----	1
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters																														
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----			6.5 / 16 / 22.6 / 60 / 100				-----	-----	-----	-----	-----	-----			12 / 25 / 34 / 60 / 141			
Reach Shear Stress (competency) lb/f²	-----	0.9	-----	-----	-----	-----	-----	1.0	-----	-----	-----	1	-----	0.9	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	220.0	-----	-----	-----	-----	-----	250.0	-----	-----	-----	1	-----	205.0	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----	-----	44.0	-----	-----	-----	1	-----	34.5	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Additional Reach Parameters																														
Drainage Area (SM)	0.5	-----	-----	0.6	-----	-----	0.5	-----	-----	0.6	-----	-----	0.5	-----	-----	0.6	-----	-----	0.5	-----	-----	0.6	-----	-----	0.5	-----	-----	0.6	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	E/C4	-----	-----	-----	-----	-----	E	-----	-----	-----	-----	-----	E	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----	-----	E/C	-----	-----	-----	-----
BF Velocity (fps)	-----	3.9	-----	-----	-----	-----	-----	3.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	56.0	-----	-----	-----	-----	-----	56.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----	-----	476.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	605.0	-----	-----	-----	-----	-----	609.0	-----	-----	-----	-----	-----	191.0	-----	-----	-----	-----	-----	206.0	-----	-----	-----	-----	-----	206.0	-----	-----	-----	-----
Sinuosity	-----	1.20	-----	-----	-----	-----	-----	1.28	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	0.0150	-----	-----	-----	-----	-----	0.0140	-----	-----	-----	-----	-----	0.011	-----	-----	-----	-----	-----	0.014	-----	-----	-----	-----	-----	0.014	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table 7. Baseline Stream Summary

Big Cedar Creek Restoration Site Contract No. D06054-D

UT2 (609 LF)

Parameter	Year 4					
Dimension and Substrate - Riffle	Min	Mean	Med	Max	SD	n
BF Width (ft)	-----	13.3	-----	-----	-----	1
Floodprone Width (ft)	-----	63.1	-----	-----	-----	1
BF Mean Depth (ft)	-----	1.7	-----	-----	-----	1
BF Max Depth (ft)	-----	3.0	-----	-----	-----	1
BF Cross-sectional Area (ft^2)	-----	22.8	-----	-----	-----	1
Width/Depth Ratio	-----	7.8	-----	-----	-----	1
Entrenchment Ratio	-----	4.7	-----	-----	-----	1
Bank Height Ratio	-----	1.0	-----	-----	-----	1
d50 (mm)	-----	-----	-----	-----	-----	-----
Pattern						
Channel Beltwidth (ft)	-----	-----	-----	-----	-----	-----
Radius of Curvature (ft)	-----	-----	-----	-----	-----	-----
Rc:Bankfull width (ft/ft)	-----	-----	-----	-----	-----	-----
Meander Wavelength (ft)	-----	-----	-----	-----	-----	-----
Meander Width Ratio	-----	-----	-----	-----	-----	-----
Profile						
Riffle Length (ft)	14.0	24.0	16.7	40.2	14.4	3
Riffle Slope (ft/ft)	0.012	0.019	0.017	0.029	0.008	3
Pool Length (ft)	-----	-----	-----	-----	-----	-----
Pool Spacing (ft)	42.8	65.2	65.2	87.6	31.678384	2
Pool Max Depth (ft)	2.5	2.7	2.7	2.8	0.2	3
Pool Volume (ft^3)	-----	-----	-----	-----	-----	-----
Substrate and Transport Parameters						
Ri% / Ru% / P% / G% / S%	-----	-----	-----	-----	-----	-----
SC% / Sa% / G% / B% / Be%	-----	-----	-----	-----	-----	-----
d16 / d35 / d50 / d84 / d95	-----	-----	-----	-----	-----	-----
Reach Shear Stress (competency) lb/f²	-----	-----	-----	-----	-----	-----
Max part size (mm) mobilized at bankfull (Rosgen Curve	-----	-----	-----	-----	-----	-----
Stream Power (transport capacity) W/m²	-----	-----	-----	-----	-----	-----
Additional Reach Parameters						
Drainage Area (SM)	0.5	-----	-----	0.6	-----	-----
Impervious cover estimate (%)	-----	-----	-----	-----	-----	-----
Rosgen Classification	-----	E/C	-----	-----	-----	-----
BF Velocity (fps)	-----	-----	-----	-----	-----	-----
BF Discharge (cfs)	-----	-----	-----	-----	-----	-----
Valley Length	-----	-----	-----	-----	-----	-----
Channel length (ft)	-----	222.8	-----	-----	-----	-----
Sinuosity	-----	-----	-----	-----	-----	-----
Water Surface Slope (Channel) (ft/ft)	-----	0.016	-----	-----	-----	-----
BF slope (ft/ft)	-----	-----	-----	-----	-----	-----
Bankfull Floodplain Area (acres)	-----	-----	-----	-----	-----	-----
BEHI VL% / L% / M% / H% / VH% / E%	-----	-----	-----	-----	-----	-----
Channel Stability or Habitat Metric	-----	-----	-----	-----	-----	-----
Biological or Other	-----	-----	-----	-----	-----	-----

Table 8. Morphology and Hydraulic Monitoring Summary																							
Big Cedar Creek Restoration Site: Project No. D06054-D																							
Big Cedar Creek Reach 1 (603 LF)																							
	Cross-section 1 (Riffle)						Cross-section 2 (Pool)																
Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																							
BF Width (ft)	19.6	19.5	21.1	19.5	28.3		28.0	27.3	27.0	25.7	30.2												
BF Mean Depth (ft)	1.9	1.8	1.8	1.7	1.5		1.8	1.7	1.7	1.8	1.7												
Width/Depth Ratio	10.4	10.7	12.1	11.3	18.6		15.7	15.7	16.0	14.3	17.8												
BF Cross-sectional Area (ft^2)	37.1	35.6	36.9	33.9	43.0		50.1	47.5	45.3	46.3	51.1												
BF Max Depth (ft)	2.7	2.6	2.8	2.8	3.3		3.9	3.8	3.6	3.4	3.6												
Width of Floodprone Area (ft)	>64.7	>65.2	>65.2	>65.3	>65.2		>78.0	>78.0	>77.9	>77.9	>77.9												
Entrenchment Ratio	>3.3	3.3	3.1	3.3	2.3		N/A	N/A	N/A	N/A	N/A												
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0												
Wetted Perimeter (ft)	23.4	23.1	24.6	23.0	31.4		31.6	30.7	30.3	29.3	33.6												
Hydraulic Radius (ft)	1.6	1.5	1.5	1.5	1.4		1.6	1.5	1.5	1.6	1.5												
Based on current/developing bankfull feature																							
BF Width (ft)																							
BF Mean Depth (ft)																							
Width/Depth Ratio																							
BF Cross-sectional Area (ft^2)																							
BF Max Depth (ft)																							
Width of Floodprone Area (ft)																							
Entrenchment Ratio																							
Bank Height Ratio																							
Wetted Perimeter (ft)																							
Hydraulic Radius (ft)																							
Cross Sectional Area between end pins (ft^2)	-						-																
d50 (mm)	-			49.22			-			<0.063													
Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																							
BF Width (ft)																							
BF Mean Depth (ft)																							
Width/Depth Ratio																							
BF Cross-sectional Area (ft^2)																							
BF Max Depth (ft)																							
Width of Floodprone Area (ft)																							
Entrenchment Ratio																							
Bank Height Ratio																							
Wetted Perimeter (ft)																							
Hydraulic Radius (ft)																							
Based on current/developing bankfull feature																							
BF Width (ft)																							
BF Mean Depth (ft)																							
Width/Depth Ratio																							
BF Cross-sectional Area (ft^2)																							
BF Max Depth (ft)																							
Width of Floodprone Area (ft)																							
Entrenchment Ratio																							
Bank Height Ratio																							
Wetted Perimeter (ft)																							
Hydraulic Radius (ft)																							
Cross Sectional Area between end pins (ft^2)																							
d50 (mm)																							

Table 8. Morphology and Hydraulic Monitoring Summary

Big Cedar Creek Restoration Site: Project No. D06054-D

Big Cedar Creek Reach 2 (2239 LF)

	Cross-section 3 (Riffle)						Cross-section 4 (Pool)						Cross-section 5 (Riffle)						Cross-section 6 (Pool)					
Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																								
BF Width (ft)	25.7	25.2	27.6	26.1	25.1		33.0	33.1	34.0	36.2	34.5		22.5	22.5	22.5	21.0	20.7		34.8	35.7	32.0	31.2	38.6	
BF Mean Depth (ft)	2.5	2.3	2.3	2.4	2.4		2.3	2.0	2.1	2.2	2.2		2.2	2.5	2.7	2.5	2.5		2.5	2.34	2.3	2.2	2.2	
Width/Depth Ratio	10.4	10.8	12.1	11.0	10.7		14.6	16.3	16.4	16.7	16.0		10.2	9.0	8.2	8.6	8.4		13.7	15.25	14.1	14.2	17.8	
BF Cross-sectional Area (ft²)	63.1	59.0	62.8	61.8	58.9		74.3	67.2	70.5	78.7	74.4		49.7	56.2	61.4	51.4	51.2		88.2	83.4	72.5	68.6	83.7	
BF Max Depth (ft)	3.9	3.8	3.9	4.0	3.8		5.5	5.7	5.9	6.1	5.9		3.3	4.2	4.6	3.6	3.6		5.5	5.21	5.4	5.0	5.2	
Width of Floodprone Area (ft)	>75.8	>75.7	>75.8	>75.8	>75.8		>83.5	>83.5	>83.6	>83.6	>83.7		>74.4	>74.3	>74.3	>74.3	>74.4		>86.2	>86.2	>86.3	>86.2	>86.3	
Entrenchment Ratio	>3.0	3.0	2.8	2.9	2.8		N/A	N/A	N/A	N/A	N/A		>3.3	3.3	3.3	3.5	3.6		N/A	N/A	N/A	N/A	N/A	
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Wetted Perimeter (ft)	30.6	29.9	32.1	30.8	29.8		37.5	37.1	38.1	40.6	38.8		26.9	27.5	27.9	25.9	25.7		39.9	40.4	36.5	35.6	43.0	
Hydraulic Radius (ft)	2.1	2.0	2.0	2.0	2.0		2.0	1.8	1.8	1.9	1.9		1.8	2.0	2.2	2.0	2.0		2.2	2.1	2.0	1.9	1.9	
Based on current/developing bankfull feature																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft²)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Cross Sectional Area between end pins (ft^2)	-						-						-						-					
d50 (mm)	-						-			<0.063			-			97.037			-					

	Cross-section 7 (Riffle)																							
Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																								
BF Width (ft)	22.3	22.3	23.8	23.7	24.9																			
BF Mean Depth (ft)	2.5	2.58	2.7	2.8	2.8																			
Width/Depth Ratio	8.9	8.65	8.8	8.4	8.8																			
BF Cross-sectional Area (ft²)	55.6	57.6	64.5	66.6	70.4																			
BF Max Depth (ft)	3.9	4.1	4.6	4.6	4.9																			
Width of Floodprone Area (ft)	>75.8	>74.5	>74.5	>74.5	>74.5																			
Entrenchment Ratio	>3.4	3.3	3.1	3.1	3.0																			
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0																			
Wetted Perimeter (ft)	27.3	27.5	29.2	29.3	30.6																			
Hydraulic Radius (ft)	2.0	2.1	2.2	2.3	2.3																			
Based on current/developing bankfull feature																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft²)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Cross Sectional Area between end pins (ft^2)	-																							
d50 (mm)	-																							

Table 8. Morphology and Hydraulic Monitoring Summary

Big Cedar Creek Restoration Site: Project No. D06054-D

Big Cedar Creek Reach 3 (1827 LF)

	Cross-section 8 (Pool)						Cross-section 9 (Riffle)						Cross-section 10 (Riffle)						Cross-section 11 (Riffle)					
Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																								
BF Width (ft)	38.8	37.0	34.5	36.8	40.0		23.1	22.3	22.2	21.8	25.9		24.6	23.1	23.3	24.6	24.6		25.0	24.9	26.1	26.5	26.3	
BF Mean Depth (ft)	2.5	2.3	2.3	2.4	2.4		2.2	2.3	2.3	2.5	2.2		2.1	2.2	2.0	2.1	1.9		2.5	2.4	2.2	2.4	2.4	
Width/Depth Ratio	15.6	15.8	15.0	15.5	16.9		10.7	9.8	9.5	8.9	11.7		11.7	10.5	11.4	11.9	12.8		9.9	10.3	12.0	11.3	10.8	
BF Cross-sectional Area (ft²)	96.4	86.6	78.9	87.2	94.6		50.1	50.5	51.8	53.5	57.4		51.8	50.8	47.6	51.1	47.1		63.2	60.4	56.9	62.2	63.9	
BF Max Depth (ft)	5.4	5.2	5.4	5.7	5.8		3.1	3.1	3.3	3.5	3.8		3.1	3.1	3.1	3.1	3.0		3.8	3.7	3.5	3.6	3.7	
Width of Floodprone Area (ft)	>89.5	>89.5	>89.6	>89.4	>89.5		>77.8	>77.8	>77.8	>77.22	>77.1		>77.9	>78	>77.8	>77.36	>77.8		>82.5	>82.9	>82.9	>83.0	>82.8	
Entrenchment Ratio	N/A	N/A	N/A	N/A	N/A		>3.4	3.5	3.5	3.5	3.0		>3.2	3.4	3.3	3.1	3.2		>3.3	3.3	3.2	3.1	3.1	
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Wetted Perimeter (ft)	43.8	41.6	39.0	41.5	44.7		27.5	26.9	26.8	26.7	30.3		28.8	27.5	27.4	28.8	28.4		30.0	29.7	30.5	31.2	31.2	
Hydraulic Radius (ft)	2.2	2.1	2.0	2.1	2.1		1.8	1.9	1.9	2.0	1.9		1.8	1.8	1.7	1.8	1.7		2.1	2.0	1.9	2.0	2.1	
Based on current/developing bankfull feature																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft²)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Cross Sectional Area between end pins (ft^2)	-						-						-						-					
d50 (mm)	-			<0.063			-						-			35.9			-					
Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft²)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Based on current/developing bankfull feature																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft²)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Cross Sectional Area between end pins (ft^2)																								
d50 (mm)																								

Table 8. Morphology and Hydraulic Monitoring Summary

Big Cedar Creek Restoration Site: Project No. D06054-D

Big Cedar Creek Reach 4 (410 LF)

	Cross-section 12 (Pool)						Cross-section 13 (Riffle)																	
Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																								
BF Width (ft)	38.0	37.2	40.6	43.3	43.0		27.5	27.8	28.0	27.56	29.9													
BF Mean Depth (ft)	2.3	2.2	2.2	2.1	2.1		2.1	2.3	2.1	2.23	2.0													
Width/Depth Ratio	16.3	17.1	18.4	21.1	20.6		13.0	12.4	13.1	12.35	15.0													
BF Cross-sectional Area (ft²)	88.5	80.7	89.5	89.1	89.6		58.3	62.6	59.7	61.5	59.8													
BF Max Depth (ft)	4.7	4.3	4.9	4.9	4.9		3.2	3.7	3.6	3.17	3.1													
Width of Floodprone Area (ft)	>89.2	>89.1	>89.2	>88.7	>89.2		>81.0	>81.1	>80.9	>81.0	>81.0													
Entrenchment Ratio	N/A	N/A	N/A	N/A	N/A		>2.9	2.9	2.9	2.9	2.7													
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0													
Wetted Perimeter (ft)	42.6	41.6	45.0	47.4	47.1		31.7	32.4	32.2	32.0	33.9													
Hydraulic Radius (ft)	2.1	1.9	2.0	1.9	1.9		1.8	1.9	1.9	1.9	1.8													
Based on current/developing bankfull feature																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft²)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Cross Sectional Area between end pins (ft^2)	-						-																	
d50 (mm)	-						-																	
Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft²)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Based on current/developing bankfull feature																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft²)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Cross Sectional Area between end pins (ft^2)																								
d50 (mm)																								

Table 8. Morphology and Hydraulic Monitoring Summary

Big Cedar Creek Restoration Site: Project No. D06054-D

UT1 Reach 1 (1248 LF)

	Cross-section 14 (Riffle)						Cross-section 15 (Pool)						Cross-section 16 (Riffle)						Cross-section 17 (Pool)					
Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																								
BF Width (ft)	14.7	13.7	16.5	13.6	15.5		33.3	34.8	24.2	27.3	21.0		11.6	12.0	11.9	11.9	12.3		24.3	22	25.3	23.3	23.8	
BF Mean Depth (ft)	1.0	1.0	0.8	0.9	0.9		1.3	1.1	1.3	1.2	1.3		1.3	1.3	1.2	1.4	1.1		1.3	1.3	1.3	1.23	1.1	
Width/Depth Ratio	14.2	14.2	20.4	14.7	18.4		26.8	30.5	19.3	22.3	16.2		8.8	9.0	9.9	8.7	11.3		18.7	16.4	20.2	18.94	21.0	
BF Cross-sectional Area (ft²)	15.2	13.7	13.4	12.6	13.1		41.6	39.8	30.5	33.4	27.3		15.2	16.1	14.3	16.3	13.4		31.6	29.5	31.6	28.7	26.9	
BF Max Depth (ft)	1.7	1.6	1.6	1.5	1.6		3.3	3.1	2.8	3.0	2.7		2.1	2.2	2.1	2.2	2.0		2.9	2.7	2.7	2.61	2.5	
Width of Floodprone Area (ft)	>56.5	>56.4	>56.5	>56.5	>56.5		>57.2	>57.2	>58.4	>58.3	>58.3		>48.4	>48.5	>48.4	>48.4	>48.4		>55.8	>55.5	>55.7	>55.7	>55.7	
Entrenchment Ratio	>3.8	4.0	3.3	4.1	3.6		N/A	N/A	N/A	N/A	N/A		>4.2	4.0	4.1	4.1	3.9		N/A	N/A	N/A	N/A	N/A	
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Wetted Perimeter (ft)	16.7	15.7	18.1	15.5	17.2		35.9	37.0	26.8	29.7	23.6		14.2	14.6	14.3	14.6	14.5		26.9	24.6	27.8	25.8	26.0	
Hydraulic Radius (ft)	0.9	0.9	0.7	0.8	0.8		1.2	1.1	1.1	1.1	1.2		1.1	1.1	1.0	1.1	0.9		1.2	1.2	1.1	1.1	1.0	
Based on current/developing bankfull feature																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft²)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Cross Sectional Area between end pins (ft^2)	-						-						-						-					
d50 (mm)	-			36.88			-			<0.063			-						-					

	Cross-section 18 (Riffle)																							
Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																								
BF Width (ft)	13.2	12.8	12.0	12.2	12.9																			
BF Mean Depth (ft)	1.1	1.1	1.0	1.1	1.1																			
Width/Depth Ratio	12.3	12.1	11.6	11.6	12.1																			
BF Cross-sectional Area (ft²)	14.2	13.6	12.4	12.9	13.8																			
BF Max Depth (ft)	1.8	1.7	1.6	1.7	1.7																			
Width of Floodprone Area (ft)	>56.6	>53.5	>53.5	>53.6	>53.7																			
Entrenchment Ratio	>4.0	4.2	4.3	4.4	4.2																			
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0																			
Wetted Perimeter (ft)	15.4	15.0	14.1	14.3	15.1																			
Hydraulic Radius (ft)	0.9	0.9	0.9	0.9	0.9																			
Based on current/developing bankfull feature																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft²)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Cross Sectional Area between end pins (ft^2)	-																							
d50 (mm)	39																							

Table 8. Morphology and Hydraulic Monitoring Summary

Big Cedar Creek Restoration Site: Project No. D06054-D

UT1 Reach 2 (1016 LF)

	Cross-section 19 (Riffle)						Cross-section 20 (Pool)						Cross-section 21 (Riffle)						Cross-section 22 (Riffle)					
Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																								
BF Width (ft)	13.4	12.5	13.6	14.3	12.9		21.2	22.0	22.3	21.2	23.0		15.9	15.1	15.8	16.3	15.2		14.1	14.3	15.8	11.3	11.9	
BF Mean Depth (ft)	1.1	1.0	1.1	0.9	1.0		1.3	1.4	1.1	1.2	1.1		1.1	1.1	1.0	1.0	1.1		1.2	1.2	1.1	0.8	0.9	
Width/Depth Ratio	12.4	12.0	12.8	15.7	13.0		16.8	15.6	19.5	17.2	20.6		14.0	14.2	16.2	16.0	14.0		12.1	11.8	14.9	13.5	14.0	
BF Cross-sectional Area (ft²)	14.5	13.0	14.4	13.0	12.9		26.7	31.1	25.5	26.3	25.8		17.9	16.0	15.4	16.6	16.5		16.3	17.4	16.6	9.4	10.2	
BF Max Depth (ft)	1.8	1.7	1.8	1.8	1.6		2.8	2.9	2.7	2.7	2.5		1.9	1.7	1.7	1.7	1.8		1.8	2.1	2.0	1.4	1.5	
Width of Floodprone Area (ft)	>56.4	>56.3	>56.3	>56.4	>56.3		>62.4	>62.5	>62.5	>62.5	>62.4		>58.8	>58.9	>58.8	>58.8	>58.9		>60.1	>60.1	>60.4	>57.4	>60.2	
Entrenchment Ratio	>4.2	4.5	3.9	3.9	4.4		N/A	N/A	N/A	N/A	N/A		>3.7	3.9	3.7	3.6	3.9		>4.3	4.2	3.8	5.1	5.0	
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	0.9	
Wetted Perimeter (ft)	15.6	14.5	15.7	16.1	14.9		23.8	24.8	24.6	23.7	25.3		18.1	17.3	17.8	18.3	17.3		16.4	16.7	17.9	13.0	13.7	
Hydraulic Radius (ft)	0.9	0.9	0.9	0.8	0.9		1.1	1.3	1.0	1.1	1.0		1.0	0.9	0.9	0.9	1.0		1.0	1.0	0.9	0.7	0.7	
Based on current/developing bankfull feature																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft²)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Cross Sectional Area between end pins (ft²)	-						-						-						-					
d50 (mm)	-						-						-						-					
Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft²)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Based on current/developing bankfull feature																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft²)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Cross Sectional Area between end pins (ft²)																								
d50 (mm)																								

Table 8. Morphology and Hydraulic Monitoring Summary

Big Cedar Creek Restoration Site: Project No. D06054-D

UT1 Reach 3 (1885 LF)

	Cross-section 23 (Pool)						Cross-section 24 (Riffle)						Cross-section 25 (Riffle)						Cross-section 26 (Riffle)					
Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																								
BF Width (ft)	21.8	20.8	20.8	20.2	27.0		15.1	16.9	14.7	14.8	14.9		15.3	14.0	14.2	14.1	15.1		16.2	15.8	16.6	14.41	27.0	
BF Mean Depth (ft)	1.5	1.4	1.4	1.4	1.4		1.2	1.3	1.2	1.2	1.1		1.2	1.1	1.0	1.0	0.9		1.3	1.1	1.1	1.01	0.9	
Width/Depth Ratio	14.3	15.3	15.2	14.0	19.8		12.7	12.9	12.0	12.6	13.2		13.1	13.1	13.9	13.7	16.7		12.6	14	15.0	14.26	28.8	
BF Cross-sectional Area (ft²)	33.3	28.2	28.5	29.2	36.6		17.9	22.0	18.0	17.3	16.8		17.8	15.0	14.6	14.5	13.7		20.9	17.8	18.4	14.6	25.4	
BF Max Depth (ft)	3.0	2.7	2.9	3.0	3.3		1.7	2.3	1.9	1.8	1.8		1.8	1.6	1.6	1.7	1.6		2.2	1.7	1.7	1.53	2.1	
Width of Floodprone Area (ft)	>64.2	>64.3	>64.1	>64.2	>64.3		>57.1	>57.1	>57.1	>57.2	>57.1		>56.9	>56.9	>56.9	>57.0	>57.0		>58.6	>58.8	>58.7	>58.8	>58.6	
Entrenchment Ratio	N/A	N/A	N/A	N/A	N/A		>3.8	3.4	3.6	3.9	3.8		>3.7	3.6	4.0	4.0	3.8		>3.6	3.7	3.5	4.1	2.2	
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1	1.0	
Wetted Perimeter (ft)	24.9	23.6	23.5	23.1	29.7		17.5	19.5	17.1	17.1	17.2		17.6	16.2	16.3	16.2	16.9		18.8	18.0	18.8	16.4	28.9	
Hydraulic Radius (ft)	1.3	1.2	1.2	1.3	1.2		1.0	1.1	1.1	1.0	1.0		1.0	0.9	0.9	0.9	0.8		1.1	1.0	1.0	0.9	0.9	
Based on current/developing bankfull feature																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft²)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Cross Sectional Area between end pins (ft^2)	-						-						-						-					
d50 (mm)	-			6.6			-			37.06			-						-					

	Cross-section 27 (Pool)																							
Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																								
BF Width (ft)	24.3	25.9	23.6	24.8	25.9																			
BF Mean Depth (ft)	1.3	1.2	1.4	1.4	1.3																			
Width/Depth Ratio	18.1	19.2	16.8	18.3	19.7																			
BF Cross-sectional Area (ft²)	32.5	25.9	33.0	33.7	34.0																			
BF Max Depth (ft)	3.0	2.7	3.1	3.3	3.1																			
Width of Floodprone Area (ft)	>64.4	>64.5	>64.4	>64.5	>64.4																			
Entrenchment Ratio	N/A	N/A	N/A	N/A	N/A																			
Bank Height Ratio	1.0	1	1.0	1.0	1.0																			
Wetted Perimeter (ft)	27.0	28.3	26.4	27.5	28.5																			
Hydraulic Radius (ft)	1.2	0.9	1.3	1.2	1.2																			
Based on current/developing bankfull feature																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft²)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Cross Sectional Area between end pins (ft^2)	-																							
d50 (mm)	-																							

Table 8. Morphology and Hydraulic Monitoring Summary

Big Cedar Creek Restoration Site: Project No. D06054-D

UT1 Reach 4 (996 LF)

	Cross-section 28 (Riffle)						Cross-section 29 (Pool)						Cross-section 30 (Riffle)						Cross-section 31 (Riffle)					
Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																								
BF Width (ft)	16.7	16.3	17.2	15.6	17.0		19.2	20.6	22.0	22.1	22.5		16.8	16.5	18.7	19.0	33.1		22.6	22.5	22.5	23.36	24.09	
BF Mean Depth (ft)	1.3	1.3	1.4	1.5	1.4		2.2	2.3	2.1	2.2	2.2		1.5	2.0	1.8	1.6	20.6		1.2	1.2	1.1	1.14	1.1	
Width/Depth Ratio	13.1	12.9	12.7	10.6	11.9		8.7	9.0	10.3	10.0	10.3		11.2	8.2	10.3	12.2	2.8		18.4	18.3	20.3	20.42	21.81	
BF Cross-sectional Area (ft²)	21.3	20.6	23.4	22.8	24.3		42.0	47.1	46.8	49.1	49.2		25.3	33.2	33.9	29.4	C		27.8	27.7	25.1	26.7	26.6	
BF Max Depth (ft)	2.0	2.0	2.5	2.4	2.5		4.6	4.3	4.0	4.5	4.4		2.3	3.0	3.0	2.6	1.6		1.8	1.9	1.7	1.8	1.7	
Width of Floodprone Area (ft)	>58.6	>58.4	>58.5	>58.6	>58.5		>61.7	>61.6	>61.6	>61.7	>61.6		>63.5	>63.7	>63.7	>63.8	>63.8		51.3	>56.4	>56.5	>56.6	>50.2	
Entrenchment Ratio	>3.5	3.6	3.4	3.8	3.4		N/A	N/A	N/A	N/A	N/A		>3.8	3.9	3.4	2.9	3.1		2.3	2.5	2.1	2.6	2.1	
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Wetted Perimeter (ft)	19.2	18.9	19.9	18.5	19.9		23.5	25.2	26.2	26.6	26.9		19.8	20.5	22.3	22.1	74.3		25.1	24.9	24.7	25.6	26.3	
Hydraulic Radius (ft)	1.1	1.1	1.2	1.2	1.2		1.8	1.9	1.8	1.8	1.8		1.3	1.6	1.5	1.3	#####		1.1	1.1	1.0	1.0	1.0	
Based on current/developing bankfull feature																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft²)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Cross Sectional Area between end pins (ft²)	-						-						-						-					
d50 (mm)	-			50.94			-			14.83			-						-					

	Cross-section 28 (Riffle)						Cross-section 29 (Pool)						Cross-section 30 (Riffle)						Cross-section 31 (Riffle)					
Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft²)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Based on current/developing bankfull feature																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft²)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Cross Sectional Area between end pins (ft²)																								
d50 (mm)																								

Table 8. Morphology and Hydraulic Monitoring Summary

Big Cedar Creek Restoration Site: Project No. D06054-D

UT2 (609 LF)

	Cross-section 32 (Riffle)						Cross-section 33 (Pool)																	
Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																								
BF Width (ft)	13.4	13.2	14.4	15.6	13.3		26.8	21.8	22.0	22.1	23.6													
BF Mean Depth (ft)	1.4	1.5	1.2	1.5	1.7		1.1	1.1	1.2	1.1	1.1													
Width/Depth Ratio	9.9	8.7	11.9	10.3	7.8		24.4	20.0	18.7	21.0	21.3													
BF Cross-sectional Area (ft^2)	18.1	20.1	17.4	23.8	22.8		29.4	23.7	25.8	23.3	26.1													
BF Max Depth (ft)	1.9	2.1	1.8	2.9	3.0		2.9	2.9	3.0	2.8	2.8													
Width of Floodprone Area (ft)	>63.1	>63.1	>63.2	>63.3	>63.1		>69.8	>69.8	>69.8	>69.9	>69.8													
Entrenchment Ratio	>4.7	4.8	4.4	4.0	4.7		N/A	N/A	N/A	N/A	N/A													
Bank Height Ratio	1.0	1	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0													
Wetted Perimeter (ft)	16.1	16.2	16.8	18.7	16.8		29.0	24.0	24.3	24.2	25.8													
Hydraulic Radius (ft)	1.1	1.2	1.0	1.3	1.4		1.0	1.0	1.1	1.0	1.0													
Based on current/developing bankfull feature																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft^2)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Cross Sectional Area between end pins (ft^2)	-						-																	
d50 (mm)	-			34.17			-			42.4														

Dimension and substrate	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5	Base	MY1	MY2	MY3	MY4	MY5
Based on fixed baseline bankfull elevation																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft^2)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Based on current/developing bankfull feature																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
BF Cross-sectional Area (ft^2)																								
BF Max Depth (ft)																								
Width of Floodprone Area (ft)																								
Entrenchment Ratio																								
Bank Height Ratio																								
Wetted Perimeter (ft)																								
Hydraulic Radius (ft)																								
Cross Sectional Area between end pins (ft^2)																								
d50 (mm)																								

Table B.1. Stream Problem Areas Big Cedar Creek Restoration Site: Project No. D06054-D			
BCC Reach 2			
Feature Issue	**Station No.**	**Suspected Cause**	**Photo Number**
Minor bank erosion	24+00, Left Bank	Loose matting/sparse vegetation	SPA 1
Minor bank erosion	30+50 - 32+75, Left Bank	Loose matting/sparse vegetation	SPA 2
Vegetation in channel	Station 37+00	Sedimentation from ford crossing	SPA 3
BCC Reach 3			
Feature Issue	**Station No.**	**Suspected Cause**	**Photo Number**
Other	46+90	Abandoned beaver dam	SPA 4
Vegetation in channel	Station 49+00	Sediment from tributary	SPA 5
UT1 Reach 3			
Feature Issue	**Station No.**	**Suspected Cause**	**Photo Number**
Filled Channel/Shift Thalweg	44+25 - 44+75	Sediment from roadway outfall.	SPA 6
UT2			
Feature Issue	**Station No.**	**Suspected Cause**	**Photo Number**
Minor bank erosion	11+30, Right Bank	Loose matting/sparse vegetation	SPA 7
Minor bank erosion	12+30, Left Bank	Loose matting/sparse vegetation/rocky substrate	SPA 8
Minor bank erosion	13+75 - 14+30, Left Bank	Loose matting/sparse vegetation	SPA 9
Minor bank erosion	14+00, Right Bank	Loose matting/sparse vegetation	SPA 10
Filled Channel/Shift Thalweg	14+25	Upstream bank erosion	SPA 11

Table B2. Visual Morphological Stability Assessment
Big Cedar Creek Restoration Site: Project No. D06054-D

BCC Reach 1 (603 LF)

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 Perfomance Mean or Total
A. Riffles	1. Present?	3	3	N/A	100	
	2. Armor stable (e.g. no displacement)?	3	3	N/A	100	
	3. Facet grades appears stable?	3	3	N/A	100	
	4. Minimal evidence of embedding/fining?	3	3	N/A	100	
	5. Length appropriate?	3	3	N/A	100	**100%**
B. Pools	1. Present? (e.g. not subject to severe aggradation or migration?)	4	4	N/A	100	
	2. Sufficiently deep (Max Pool D:Mean Bkf >1.6?)	4	4	N/A	100	
	3. Length appropriate?	4	4	N/A	100	**100%**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	3	3	N/A	100	
	2. Downstream of meander (glide/inflection) centering?	3	3	N/A	100	**100%**
D. Meanders	1. Outer bend in state of limited/controlled erosion?	3	3	N/A	100	
	2. Of those eroding, # w/concomitant point bar formation?	N/A	N/A	N/A	N/A	
	3. Apparent Rc within spec?	3	3	N/A	100	
	4. Sufficient floodplain access and relief?	3	3	N/A	100	**100%**
E. Bed General	1. General channel bed aggradation areas (bar formation)	N/A	N/A	0/0	100	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	N/A	N/A	0/0	100	**100%**
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	0/0	100	**100%**
G. Vanes	1. Free of back or arm scour?	N/A	N/A	N/A	N/A	
	2. Height appropriate?	N/A	N/A	N/A	N/A	
	3. Angle and geometry appear appropriate?	N/A	N/A	N/A	N/A	
	4. Free of piping or other structural failures?	N/A	N/A	N/A	N/A	**N/A**
H. Wads/ Boulders	1. Free of scour?	4	4	N/A	100	
	2. Footing stable?	4	4	N/A	100	**100%**

BCC Reach 2 (2220 LF)

Feature Category	Metric (per As-Built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-Built[1]	Total Number / feet in unstable state	% Performing in Stable Condition	Feature Perfomance Mean or Total
A. Riffles	1. Present?	12	12	N/A	100	
	2. Armor stable (e.g. no displacement)?	12	12	N/A	100	
	3. Facet grades appears stable?	12	12	N/A	100	
	4. Minimal evidence of embedding/fining?	12	12	N/A	100	
	5. Length appropriate?	12	12	N/A	100	**100%**
B. Pools	1. Present? (e.g. not subject to severe aggradation or migration?)	15	15	N/A	100	
	2. Sufficiently deep (Max Pool D:Mean Bkf >1.6?)	15	15	N/A	100	
	3. Length appropriate?	15	15	N/A	100	**100%**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	15	15	N/A	100	
	2. Downstream of meander (glide/inflection) centering?	15	15	N/A	100	**100%**
D. Meanders	1. Outer bend in state of limited/controlled erosion?	15	15	N/A	100	
	2. Of those eroding, # w/concomitant point bar formation?	N/A	N/A	N/A	N/A	
	3. Apparent Rc within spec?	15	15	N/A	100	
	4. Sufficient floodplain access and relief?	15	15	N/A	100	**100%**
E. Bed General	1. General channel bed aggradation areas (bar formation)	N/A	N/A	0/0	100	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	N/A	N/A	0/0	100	**100%**
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	2 / 60	99	**99%**
G. Vanes	1. Free of back or arm scour?	13	13	N/A	100	
	2. Height appropriate?	13	13	N/A	100	
	3. Angle and geometry appear appropriate?	13	13	N/A	100	
	4. Free of piping or other structural failures?	13	13	N/A	100	**100%**
H. Wads/ Boulders	1. Free of scour?	16	16	N/A	100	
	2. Footing stable?	16	16	N/A	100	**100%**

[1] 3 riffles were converted to cross vanes during Year 3 repair work. Initally there were 15 riffles and 10 vanes.

Table B2. Visual Morphological Stability Assessment
Big Cedar Creek Restoration Site: Project No. D06054-D

BCC Reach 3 (1823 LF)

Feature Category	Metric (per As-Built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-Built[1]	Total Number / feet in unstable state	% Performing in Stable Condition	Feature Perfomance Mean or Total
A. Riffles	1. Present?	12	12	N/A	100	
	2. Armor stable (e.g. no displacement)?	12	12	N/A	100	
	3. Facet grades appears stable?	12	12	N/A	100	
	4. Minimal evidence of embedding/fining?	12	12	N/A	100	
	5. Length appropriate?	12	12	N/A	100	**100%**
B. Pools	1. Present? (e.g. not subject to severe aggradation or migration?)	13	13	N/A	100	
	2. Sufficiently deep (Max Pool D:Mean Bkf >1.6?)	13	13	N/A	100	
	3. Length appropriate?	13	13	N/A	100	**100%**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	13	13	N/A	100	
	2. Downstream of meander (glide/inflection) centering?	13	13	N/A	100	**100%**
D. Meanders	1. Outer bend in state of limited/controlled erosion?	13	13	N/A	100	
	2. Of those eroding, # w/concomitant point bar formation?	N/A	N/A	N/A	N/A	
	3. Apparent Rc within spec?	13	13	N/A	100	
	4. Sufficient floodplain access and relief?	13	13	N/A	100	**100%**
E. Bed General	1. General channel bed aggradation areas (bar formation)	N/A	N/A	0/0	100	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	N/A	N/A	0/0	100	**100%**
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	0/0	100	**100%**
G. Vanes	1. Free of back or arm scour?	16	16	N/A	100	
	2. Height appropriate?	16	16	N/A	100	
	3. Angle and geometry appear appropriate?	16	16	N/A	100	
	4. Free of piping or other structural failures?	16	16	N/A	100	**100%**
H. Wads/ Boulders	1. Free of scour?	10	11	N/A	100	
	2. Footing stable?	11	11	N/A	100	**100%**

[1] 1 riffle was converted to a cross vane during Year 3 repair work. Initally there were 13 riffles and 12 vanes. Old total of 12 vanes was incorrect.

BCC Reach 4 (410 LF)

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 Perfomance Mean or Total
A. Riffles	1. Present?	4	4	N/A	100	
	2. Armor stable (e.g. no displacement)?	4	4	N/A	100	
	3. Facet grades appears stable?	4	4	N/A	100	
	4. Minimal evidence of embedding/fining?	4	4	N/A	100	
	5. Length appropriate?	4	4	N/A	100	**100%**
B. Pools	1. Present? (e.g. not subject to severe aggradation or migration?)	3	3	N/A	100	
	2. Sufficiently deep (Max Pool D:Mean Bkf >1.6?)	3	3	N/A	100	
	3. Length appropriate?	3	3	N/A	100	**100%**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	3	3	N/A	100	
	2. Downstream of meander (glide/inflection) centering?	3	3	N/A	100	**100%**
D. Meanders	1. Outer bend in state of limited/controlled erosion?	3	3	N/A	100	
	2. Of those eroding, # w/concomitant point bar formation?	N/A	N/A	N/A	N/A	
	3. Apparent Rc within spec?	3	3	N/A	100	
	4. Sufficient floodplain access and relief?	3	3	N/A	100	**100%**
E. Bed General	1. General channel bed aggradation areas (bar formation)	N/A	N/A	0/0	100	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	N/A	N/A	0/0	100	**100%**
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	0/0	100	**100%**
G. Vanes	1. Free of back or arm scour?	2	2	N/A	100	
	2. Height appropriate?	2	2	N/A	100	
	3. Angle and geometry appear appropriate?	2	2	N/A	100	
	4. Free of piping or other structural failures?	2	2	N/A	100	**100%**
H. Wads/ Boulders	1. Free of scour?	3	3	N/A	100	
	2. Footing stable?	3	3	N/A	100	**100%**

Table B2. Visual Morphological Stability Assessment
Big Cedar Creek Restoration Site: Project No. D06054-D

BCC Reach 6 (969 LF)

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 Perfomance Mean or Total
A. Riffles	1. Present?	4	4	N/A	100	
	2. Armor stable (e.g. no displacement)?	4	4	N/A	100	
	3. Facet grades appears stable?	4	4	N/A	100	
	4. Minimal evidence of embedding/fining?	4	4	N/A	100	
	5. Length appropriate?	4	4	N/A	100	**100%**
B. Pools	1. Present? (e.g. not subject to severe aggradation or migration?)	4	4	N/A	100	
	2. Sufficiently deep (Max Pool D:Mean Bkf >1.6?)	4	4	N/A	100	
	3. Length appropriate?	4	4	N/A	100	**100%**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	3	3	N/A	100	
	2. Downstream of meander (glide/inflection) centering?	3	3	N/A	100	**100%**
D. Meanders	1. Outer bend in state of limited/controlled erosion?	3	3	N/A	100	
	2. Of those eroding, # w/concomitant point bar formation?	N/A	N/A	N/A	N/A	
	3. Apparent Rc within spec?	N/A	N/A	N/A	N/A	
	4. Sufficient floodplain access and relief?	3	3	N/A	100	**100%**
E. Bed General	1. General channel bed aggradation areas (bar formation)	N/A	N/A	0/0	100	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	N/A	N/A	0/0	100	**100%**
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	0/0	100	**100%**
G. Vanes	1. Free of back or arm scour?	2	2	N/A	100	
	2. Height appropriate?	2	2	N/A	100	
	3. Angle and geometry appear appropriate?	2	2	N/A	100	
	4. Free of piping or other structural failures?	2	2	N/A	100	**100%**
H. Wads/ Boulders	1. Free of scour?	N/A	N/A	N/A	N/A	**N/A**
	2. Footing stable?	N/A	N/A	N/A	N/A	**N/A**

UT1 Reach 1 (1247 LF)

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 Perfomance Mean or Total
A. Riffles	1. Present?	13	13	N/A	100	
	2. Armor stable (e.g. no displacement)?	13	13	N/A	100	
	3. Facet grades appears stable?	13	13	N/A	100	
	4. Minimal evidence of embedding/fining?	13	13	N/A	100	
	5. Length appropriate?	13	13	N/A	100	**100%**
B. Pools	1. Present? (e.g. not subject to severe aggradation or migration?)	13	13	N/A	100	
	2. Sufficiently deep (Max Pool D:Mean Bkf >1.6?)	13	13	N/A	100	
	3. Length appropriate?	13	13	N/A	100	**100%**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	13	13	N/A	100	
	2. Downstream of meander (glide/inflection) centering?	13	13	N/A	100	**100%**
D. Meanders	1. Outer bend in state of limited/controlled erosion?	13	13	N/A	100	
	2. Of those eroding, # w/concomitant point bar formation?	N/A	N/A	N/A	N/A	
	3. Apparent Rc within spec?	13	13	N/A	100	
	4. Sufficient floodplain access and relief?	13	13	N/A	100	**100%**
E. Bed General	1. General channel bed aggradation areas (bar formation)	N/A	N/A	0/0	100	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	N/A	N/A	0/0	100	**100%**
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	0/0	100	**100%**
G. Vanes	1. Free of back or arm scour?	N/A	N/A	N/A	N/A	
	2. Height appropriate?	N/A	N/A	N/A	N/A	
	3. Angle and geometry appear appropriate?	N/A	N/A	N/A	N/A	
	4. Free of piping or other structural failures?	N/A	N/A	N/A	N/A	**N/A**
H. Wads/ Boulders	1. Free of scour?	3	3	N/A	100	
	2. Footing stable?	3	3	N/A	100	**100%**

Table B2. Visual Morphological Stability Assessment
Big Cedar Creek Restoration Site: Project No. D06054-D

UT1 Reach 2 (1016 LF)

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 Perfomance Mean or Total
A. Riffles	1. Present?	9	9	N/A	100	
	2. Armor stable (e.g. no displacement)?	9	9	N/A	100	
	3. Facet grades appears stable?	9	9	N/A	100	
	4. Minimal evidence of embedding/fining?	9	9	N/A	100	
	5. Length appropriate?	9	9	N/A	100	**100%**
B. Pools	1. Present? (e.g. not subject to severe aggradation or migration?)	11	11	N/A	100	
	2. Sufficiently deep (Max Pool D:Mean Bkf >1.6?)	11	11	N/A	100	
	3. Length appropriate?	11	11	N/A	100	**100%**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	11	11	N/A	100	
	2. Downstream of meander (glide/inflection) centering?	11	11	N/A	100	**100%**
D. Meanders	1. Outer bend in state of limited/controlled erosion?	11	11	N/A	100	
	2. Of those eroding, # w/concomitant point bar formation?	N/A	N/A	N/A	N/A	
	3. Apparent Rc within spec?	11	11	N/A	100	
	4. Sufficient floodplain access and relief?	11	11	N/A	100	**100%**
E. Bed General	1. General channel bed aggradation areas (bar formation)	N/A	N/A	0/0	100	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	N/A	N/A	0/0	100	**100%**
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	0/0	100	**100%**
G. Vanes	1. Free of back or arm scour?	2	2	N/A	100	
	2. Height appropriate?	2	2	N/A	100	
	3. Angle and geometry appear appropriate?	2	2	N/A	100	
	4. Free of piping or other structural failures?	2	2	N/A	100	**100%**
H. Wads/ Boulders	1. Free of scour?	5	5	N/A	100	
	2. Footing stable?	5	5	N/A	100	**100%**

UT1 Reach 3 (1885 LF)

Feature Category	Metric (per As-Built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-Built[1]	Total Number / feet in unstable state	% Performing in Stable Condition	Feature Perfomance Mean or Total
A. Riffles	1. Present?	17	17	N/A	100	
	2. Armor stable (e.g. no displacement)?	17	17	N/A	100	
	3. Facet grades appears stable?	17	17	N/A	100	
	4. Minimal evidence of embedding/fining?	17	17	N/A	100	
	5. Length appropriate?	17	17	N/A	100	**100%**
B. Pools	1. Present? (e.g. not subject to severe aggradation or migration?)	19	19	N/A	100	
	2. Sufficiently deep (Max Pool D:Mean Bkf >1.6?)	19	19	N/A	100	
	3. Length appropriate?	19	19	N/A	100	**100%**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	19	19	N/A	100	
	2. Downstream of meander (glide/inflection) centering?	18	19	N/A	95	**97%**
D. Meanders	1. Outer bend in state of limited/controlled erosion?	19	19	N/A	100	
	2. Of those eroding, # w/concomitant point bar formation?	N/A	N/A	N/A	N/A	
	3. Apparent Rc within spec?	19	19	N/A	100	
	4. Sufficient floodplain access and relief?	19	19	N/A	100	**100%**
E. Bed General	1. General channel bed aggradation areas (bar formation)	N/A	N/A	0/0	100	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	N/A	N/A	0/0	100	**100%**
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	0/0	100	**100%**
G. Vanes	1. Free of back or arm scour?	14	14	N/A	100	
	2. Height appropriate?	14	14	N/A	100	
	3. Angle and geometry appear appropriate?	14	14	N/A	100	
	4. Free of piping or other structural failures?	14	14	N/A	100	**100%**
H. Wads/ Boulders	1. Free of scour?	11	11	N/A	100	
	2. Footing stable?	11	11	N/A	100	**100%**

[1] 1 riffle was converted to into two cross vane during Year 3 repair work. Initally there were 18 riffles and 12 vanes.

Table B2. Visual Morphological Stability Assessment
Big Cedar Creek Restoration Site: Project No. D06054-D

UT1 Reach 4 (997 LF)

Feature Category	Metric (per As-Built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-Built[1]	Total Number / feet in unstable state	% Performing in Stable Condition	Feature Perfomance Mean or Total
A. Riffles	1. Present?	7	7	N/A	100	
	2. Armor stable (e.g. no displacement)?	7	7	N/A	100	
	3. Facet grades appears stable?	7	7	N/A	100	
	4. Minimal evidence of embedding/fining?	7	7	N/A	100	
	5. Length appropriate?	7	7	N/A	100	**100%**
B. Pools	1. Present? (e.g. not subject to severe aggradation or migration?)	7	7	N/A	100	
	2. Sufficiently deep (Max Pool D:Mean Bkf >1.6?)	7	7	N/A	100	
	3. Length appropriate?	7	7	N/A	100	**100%**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	7	7	N/A	100	
	2. Downstream of meander (glide/inflection) centering?	7	7	N/A	100	**100%**
D. Meanders	1. Outer bend in state of limited/controlled erosion?	7	7	N/A	100	
	2. Of those eroding, # w/concomitant point bar formation?	N/A	N/A	N/A	N/A	
	3. Apparent Rc within spec?	7	7	N/A	100	
	4. Sufficient floodplain access and relief?	7	7	N/A	100	**100%**
E. Bed General	1. General channel bed aggradation areas (bar formation)	N/A	N/A	0/0	100	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	N/A	N/A	0/0	100	**100%**
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	0/0	100	**100%**
G. Vanes	1. Free of back or arm scour?	4	4	N/A	100	
	2. Height appropriate?	4	4	N/A	100	
	3. Angle and geometry appear appropriate?	4	4	N/A	100	
	4. Free of piping or other structural failures?	4	4	N/A	100	**100%**
H. Wads/ Boulders	1. Free of scour?	5	5	N/A	100	
	2. Footing stable?	5	5	N/A	100	**100%**

[1] A total of 3 cross vanes were added during Year 3 repair work. 2 existing riffles were converted into cross vanes. Initally there were 9 riffles and 1 vane.

UT1A (85 LF)

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 Perfomance Mean or Total
A. Riffles	1. Present?	N/A	N/A	N/A	N/A	
	2. Armor stable (e.g. no displacement)?	N/A	N/A	N/A	N/A	
	3. Facet grades appears stable?	N/A	N/A	N/A	N/A	
	4. Minimal evidence of embedding/fining?	N/A	N/A	N/A	N/A	
	5. Length appropriate?	N/A	N/A	N/A	N/A	**N/A**
B. Pools	1. Present? (e.g. not subject to severe aggradation or migration?)	N/A	N/A	N/A	N/A	
	2. Sufficiently deep (Max Pool D:Mean Bkf >1.6?)	N/A	N/A	N/A	N/A	
	3. Length appropriate?	N/A	N/A	N/A	N/A	**N/A**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	N/A	N/A	N/A	N/A	
	2. Downstream of meander (glide/inflection) centering?	N/A	N/A	N/A	N/A	**N/A**
D. Meanders	1. Outer bend in state of limited/controlled erosion?	N/A	N/A	N/A	N/A	
	2. Of those eroding, # w/concomitant point bar formation?	N/A	N/A	N/A	N/A	
	3. Apparent Rc within spec?	N/A	N/A	N/A	N/A	
	4. Sufficient floodplain access and relief?	N/A	N/A	N/A	N/A	**N/A**
E. Bed General	1. General channel bed aggradation areas (bar formation)	N/A	N/A	0/0	100	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	N/A	N/A	0/0	100	**100%**
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	0/0	100	**100%**
G. Vanes	1. Free of back or arm scour?	N/A	N/A	N/A	N/A	
	2. Height appropriate?	N/A	N/A	N/A	N/A	
	3. Angle and geometry appear appropriate?	N/A	N/A	N/A	N/A	
	4. Free of piping or other structural failures?	N/A	N/A	N/A	N/A	**N/A**
H. Wads/ Boulders	1. Free of scour?	N/A	N/A	N/A	N/A	
	2. Footing stable?	N/A	N/A	N/A	N/A	**N/A**

Table B2. Visual Morphological Stability Assessment
Big Cedar Creek Restoration Site: Project No. D06054-D

UT1B (34 LF)

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 Perfomance Mean or Total
A. Riffles	1. Present?	N/A	N/A	N/A	N/A	
	2. Armor stable (e.g. no displacement)?	N/A	N/A	N/A	N/A	
	3. Facet grades appears stable?	N/A	N/A	N/A	N/A	
	4. Minimal evidence of embedding/fining?	N/A	N/A	N/A	N/A	
	5. Length appropriate?	N/A	N/A	N/A	N/A	**N/A**
B. Pools	1. Present? (e.g. not subject to severe aggradation or migration?)	N/A	N/A	N/A	N/A	
	2. Sufficiently deep (Max Pool D:Mean Bkf >1.6?)	N/A	N/A	N/A	N/A	
	3. Length appropriate?	N/A	N/A	N/A	N/A	**N/A**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	N/A	N/A	N/A	N/A	
	2. Downstream of meander (glide/inflection) centering?	N/A	N/A	N/A	N/A	**N/A**
D. Meanders	1. Outer bend in state of limited/controlled erosion?	N/A	N/A	N/A	N/A	
	2. Of those eroding, # w/concomitant point bar formation?	N/A	N/A	N/A	N/A	
	3. Apparent Rc within spec?	N/A	N/A	N/A	N/A	
	4. Sufficient floodplain access and relief?	N/A	N/A	N/A	N/A	**N/A**
E. Bed General	1. General channel bed aggradation areas (bar formation)	N/A	N/A	0/0	100	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	N/A	N/A	0/0	100	**100%**
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	0/0	100	**100%**
G. Vanes	1. Free of back or arm scour?	1	1	N/A	100	
	2. Height appropriate?	1	1	N/A	100	
	3. Angle and geometry appear appropriate?	1	1	N/A	100	
	4. Free of piping or other structural failures?	1	1	N/A	100	**100%**
H. Wads/ Boulders	1. Free of scour?	N/A	N/A	N/A	N/A	
	2. Footing stable?	N/A	N/A	N/A	N/A	**N/A**

UT1C (78 LF)

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 Perfomance Mean or Total
A. Riffles	1. Present?	N/A	N/A	N/A	N/A	
	2. Armor stable (e.g. no displacement)?	N/A	N/A	N/A	N/A	
	3. Facet grades appears stable?	N/A	N/A	N/A	N/A	
	4. Minimal evidence of embedding/fining?	N/A	N/A	N/A	N/A	
	5. Length appropriate?	N/A	N/A	N/A	N/A	**N/A**
B. Pools	1. Present? (e.g. not subject to severe aggradation or migration?)	N/A	N/A	N/A	N/A	
	2. Sufficiently deep (Max Pool D:Mean Bkf >1.6?)	N/A	N/A	N/A	N/A	
	3. Length appropriate?	N/A	N/A	N/A	N/A	**N/A**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	N/A	N/A	N/A	N/A	
	2. Downstream of meander (glide/inflection) centering?	N/A	N/A	N/A	N/A	**N/A**
D. Meanders	1. Outer bend in state of limited/controlled erosion?	N/A	N/A	N/A	N/A	
	2. Of those eroding, # w/concomitant point bar formation?	N/A	N/A	N/A	N/A	
	3. Apparent Rc within spec?	N/A	N/A	N/A	N/A	
	4. Sufficient floodplain access and relief?	N/A	N/A	N/A	N/A	**N/A**
E. Bed General	1. General channel bed aggradation areas (bar formation)	N/A	N/A	0/0	100	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	N/A	N/A	0/0	100	**100%**
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	0/0	100	**100%**
G. Vanes	1. Free of back or arm scour?	N/A	N/A	N/A	N/A	
	2. Height appropriate?	N/A	N/A	N/A	N/A	
	3. Angle and geometry appear appropriate?	N/A	N/A	N/A	N/A	
	4. Free of piping or other structural failures?	N/A	N/A	N/A	N/A	**N/A**
H. Wads/ Boulders	1. Free of scour?	N/A	N/A	N/A	N/A	
	2. Footing stable?	N/A	N/A	N/A	N/A	**N/A**

Table B2. Visual Morphological Stability Assessment
Big Cedar Creek Restoration Site: Project No. D06054-D

UT2 (609 LF)

Feature Category	Metric (per As-Built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-Built[1]	Total Number / feet in unstable state	% Performing in Stable Condition	Feature Perfomance Mean or Total
A. Riffles	1. Present?	8	8	N/A	100	
	2. Armor stable (e.g. no displacement)?	8	8	N/A	100	
	3. Facet grades appears stable?	8	8	N/A	100	
	4. Minimal evidence of embedding/fining?	8	8	N/A	100	
	5. Length appropriate?	8	8	N/A	100	**100%**
B. Pools	1. Present? (e.g. not subject to severe aggradation or migration?)	8	8	N/A	100	
	2. Sufficiently deep (Max Pool D:Mean Bkf >1.6?)	8	8	N/A	100	
	3. Length appropriate?	8	8	N/A	100	**100%**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	7	7	N/A	100	
	2. Downstream of meander (glide/inflection) centering?	7	7	N/A	100	**100%**
D. Meanders	1. Outer bend in state of limited/controlled erosion?	7	7	N/A	100	
	2. Of those eroding, # w/concomitant point bar formation?	N/A	N/A	N/A	N/A	
	3. Apparent Rc within spec?	7	7	N/A	100	
	4. Sufficient floodplain access and relief?	7	7	N/A	100	**100%**
E. Bed General	1. General channel bed aggradation areas (bar formation)	N/A	N/A	0/0	100	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	N/A	N/A	0/0	100	**100%**
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	2 / 50	96	**96%**
G. Vanes	1. Free of back or arm scour?	8	8	N/A	100	
	2. Height appropriate?	8	8	N/A	100	
	3. Angle and geometry appear appropriate?	8	8	N/A	100	
	4. Free of piping or other structural failures?	8	8	N/A	100	**100%**
H. Wads/ Boulders	1. Free of scour?	4	4	N/A	100	
	2. Footing stable?	4	4	N/A	100	**100%**

[1] 1 cross vane was added during Year 3 repairs. Initally there were 7 vanes.

UT3 (73 LF within easement)

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 Perfomance Mean or Total
A. Riffles	1. Present?	N/A	N/A	N/A	N/A	
	2. Armor stable (e.g. no displacement)?	N/A	N/A	N/A	N/A	
	3. Facet grades appears stable?	N/A	N/A	N/A	N/A	
	4. Minimal evidence of embedding/fining?	N/A	N/A	N/A	N/A	
	5. Length appropriate?	N/A	N/A	N/A	N/A	**N/A**
B. Pools	1. Present? (e.g. not subject to severe aggradation or migration?)	N/A	N/A	N/A	N/A	
	2. Sufficiently deep (Max Pool D:Mean Bkf >1.6?)	N/A	N/A	N/A	N/A	
	3. Length appropriate?	N/A	N/A	N/A	N/A	**N/A**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	N/A	N/A	N/A	N/A	
	2. Downstream of meander (glide/inflection) centering?	N/A	N/A	N/A	N/A	**N/A**
D. Meanders	1. Outer bend in state of limited/controlled erosion?	N/A	N/A	N/A	N/A	
	2. Of those eroding, # w/concomitant point bar formation?	N/A	N/A	N/A	N/A	
	3. Apparent Rc within spec?	N/A	N/A	N/A	N/A	
	4. Sufficient floodplain access and relief?	N/A	N/A	N/A	N/A	**N/A**
E. Bed General	1. General channel bed aggradation areas (bar formation)	N/A	N/A	0/0	100	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	N/A	N/A	0/0	100	**100%**
F. Bank	1. Actively eroding, wasting, or slumping bank	N/A	N/A	100	100	**100%**
G. Vanes	1. Free of back or arm scour?	2	2	N/A	100	
	2. Height appropriate?	2	2	N/A	100	
	3. Angle and geometry appear appropriate?	2	2	N/A	100	
	4. Free of piping or other structural failures?	2	2	N/A	100	**100%**
H. Wads/ Boulders	1. Free of scour?	N/A	N/A	N/A	N/A	
	2. Footing stable?	N/A	N/A	N/A	N/A	**N/A**

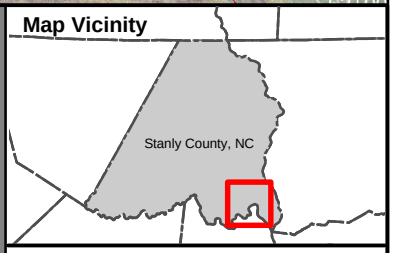
Figure B1: Stream Problem Areas
BCC (Station 24+00 to 47+00)

Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 4
Stanly County, NC

0 100 200 400 Feet
1" = 200'

LEGEND

- Minor Bank Erosion
- Vegetation in Channel
- Beaver Dam Remnant
- Conservation Easement
- As-built Alignment



EEP Project No. : D06054-D
March 2013

Ecosystem Enhancement PROGRAM

Figure B2: Stream Problem Areas
UT1 (Station 38+00 to 51+00)

Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 4
Stanly County, NC

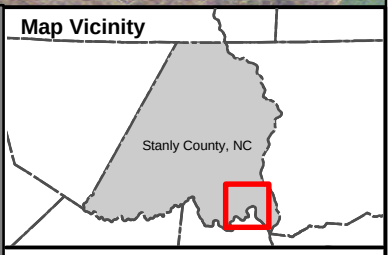
0 50 100 200 Feet

1" = 100'

LEGEND

- Filled Channel
- Conservation Easement
- Asbuilt Alignment

Map Vicinity



EEP Project No. : D06054-D
March 2013

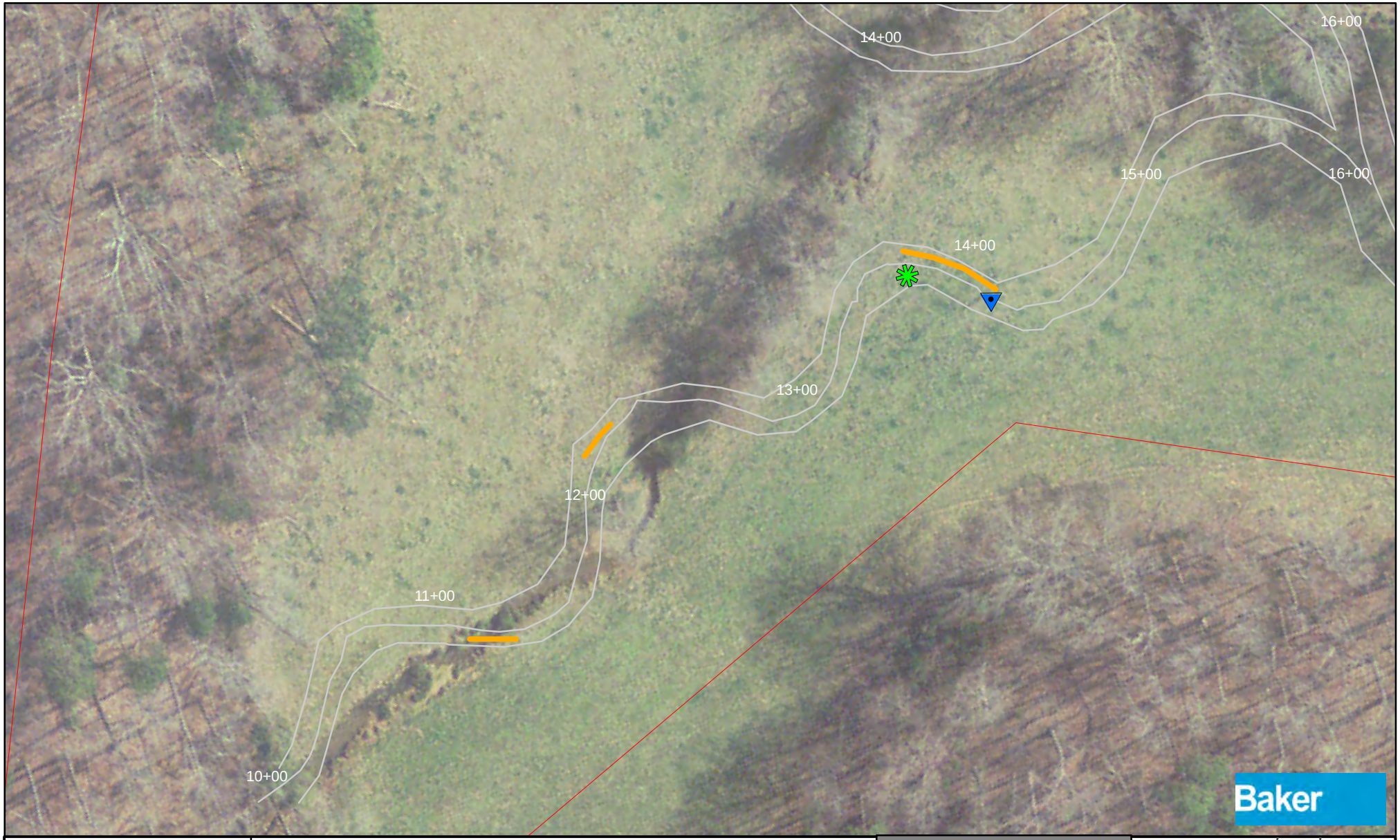


Figure B3: Stream Problem Areas
UT2 (Station 10+00 to 16+00)

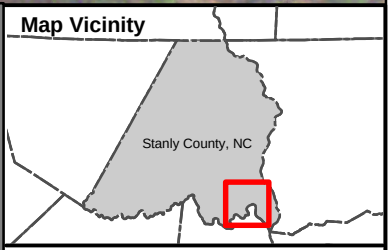
Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 4
Stanly County, NC

0 25 50 100 Feet
1" = 50'

LEGEND

- Filled Channel
- Bank Scour
- Minor Bank Erosion
- Conservation Easement
- Asbuilt Alignment

Map Vicinity



EEP Project No. : D06054-D
March 2013

Representative Stream Problem Area Photos

SPA 1 – Minor bank erosion along BCC at Station 24+00, left bank

SPA 2 – Minor bank erosion along BCC at Station 30+50 to 32+75, left bank

SPA 3 – Vegetation in BCC channel near Station 37+00

SPA 4 – Abandoned beaver dam remnant at Station 46+90, BCC

SPA 5 – Vegetation in BCC channel near Station 49+00

SPA 6 – Shifted thalweg along UT1 Station 44+25-44+75

SPA 7 – Minor bank erosion along UT2 at Station 11+30, right bank

SPA 8 – Minor bank erosion along UT2 at Station 12+30, left bank

SPA 9 – Minor bank erosion along UT2 at Station 13+75 to 14+30, left bank

SPA 10 – Bank scour at Station 14+00 on right bank, UT2

SPA 11 – Filled channel near Station 14+25, UT2

Appendix C

Vegetation Data

Vegetation Data

Tables C.1 through C.7

Vegetation Monitoring Plot Photos

Vegetation Problem Areas Figure C1 & C2

Vegetation Problem Area Photos

Table C.1. Vegetation Metadata

Big Cedar Creek Restoration Site: Project No. D06054-D	
Report Prepared By	Heath Caldwell
Date Prepared	11/27/2012 14:37
Revised/Edited	
database name	cvs-eep-entrytool-v2.2.7.mdb
database location	C:\Documents and Settings\Heath.Caldwell\Desktop
computer name	CHABWHCALDWELL
file size	39059456
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----------	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, total stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
PROJECT SUMMARY----------	
Project Code	92532
project Name	Big Cedar Creek
Description	Restoration Project
River Basin	Yadkin-Pee Dee
length(ft)	11661
stream-to-edge width (ft)	70
area (sq m)	151652.58
Required Plots (calculated)	23
Sampled Plots	23

Table C.2. Vegetation Vigor by Species

Big Cedar Creek Restoration Site: Project No. D06054-D									
	Species	**CommonName**	**4**	**3**	**2**	**1**	**0**	**Missing**	**Unknown**
	Betula nigra	river birch	50	5	5	2	1		
	Cornus amomum	silky dogwood	37	11	8	9	2	2	
	Corylus americana	American hazelnut	2	2	3				
	Fraxinus pennsylvanica	green ash	17	2	5	3			
	Ilex verticillata	common winterberry	1	4	5	2	1		
	Quercus michauxii	swamp chestnut oak	7	4			1		
	Quercus nigra	water oak	3	4	1		2		
	Quercus phellos	willow oak	19	11	6				
	Symphoricarpos orbiculatus	coralberry	1		2				
	Ulmus alata	winged elm	2						
	Viburnum dentatum	southern arrowwood	19	9				1	
	Carpinus caroliniana	American hornbeam	14	12	2				
	Calycanthus floridus	eastern sweetshrub		1		2			
	Quercus rubra	northern red oak	3	1	1				
	Lindera benzoin	northern spicebush	2	2	2	2	3	2	
	Platanus occidentalis	American sycamore	59	17	13	4	2		
	Acer rubrum	red maple	1						
TOT:	**17**	**17**	**237**	**85**	**53**	**24**	**12**	**5**	**0**

Table C.3. Vegetation Damage by Species

Big Cedar Creek Restoration Site: Project No. D06054-D							
	Species	CommonName	Count of Damage Categories	No damage	Deer	Unknown	
	Acer rubrum	red maple	0	1			
	Betula nigra	river birch	0	63			
	Calycanthus floridus	eastern sweetshrub	0	3			
	Carpinus caroliniana	American hornbeam	0	28			
	Cornus amomum	silky dogwood	3	66	3		
	Corylus americana	American hazelnut	0	7			
	Fraxinus pennsylvanica	green ash	0	27			
	Ilex verticillata	common winterberry	1	12	1		
	Lindera benzoin	northern spicebush	1	12	1		
	Platanus occidentalis	American sycamore	0	95			
	Quercus michauxii	swamp chestnut oak	0	12			
	Quercus nigra	water oak	0	10			
	Quercus phellos	willow oak	0	36			
	Quercus rubra	northern red oak	0	5			
	Symphoricarpos orbiculatus	coralberry	0	3			
	Ulmus alata	winged elm	0	2			
	Viburnum dentatum	southern arrowwood	0	29			
TOT:	**17**	**17**	**5**	**411**	**5**	**0**	

Table C.4. Vegetation Damage by Plot

Big Cedar Creek Restoration Site: Project No. D06054-D						
	Plot	Count of Damage Categories	No damage	Deer	Unknown	
	92532-01-0001-year:3	0	16			
	92532-01-0002-year:3	0	24			
	92532-01-0003-year:3	1	20	1		
	92532-01-0004-year:3	2	15	2		
	92532-01-0005-year:3	1	18	1		
	92532-01-0006-year:3	0	20			
	92532-01-0007-year:3	0	17			
	92532-01-0008-year:3	0	18			
	92532-01-0009-year:3	0	26			
	92532-01-0010-year:3	0	21			
	92532-01-0011-year:3	1	17	1		
	92532-01-0012-year:3	0	19			
	92532-01-0013-year:3	0	19			
	92532-01-0014-year:3	0	16			
	92532-01-0015-year:3	0	11			
	92532-01-0016-year:3	0	17			
	92532-01-0017-year:3	0	20			
	92532-01-0018-year:3	0	13			
	92532-01-0019-year:3	0	18			
	92532-01-0020-year:3	0	13			
	92532-01-0021-year:3	0	18			
	92532-01-0022-year:3	0	16			
	92532-01-0023-year:3	0	19			
TOT:	**23**	**5**	**411**	**5**	**0**	

Table C.5. Planted Stems by Plot and Species

Big Cedar Creek Restoration Site: Project No. D06054-D

Comment	Species	CommonName	Total Planted Stems	# plots	avg# stems	plot 92532-01-0001-year:4	plot 92532-01-0002-year:4	plot 92532-01-0003-year:4	plot 92532-01-0004-year:4	plot 92532-01-0005-year:4	plot 92532-01-0006-year:4	plot 92532-01-0007-year:4	plot 92532-01-0008-year:4	plot 92532-01-0009-year:4	plot 92532-01-0010-year:4	plot 92532-01-0011-year:4	plot 92532-01-0012-year:4	plot 92532-01-0013-year:4	plot 92532-01-0014-year:4	plot 92532-01-0015-year:4	plot 92532-01-0016-year:4	plot 92532-01-0017-year:4	plot 92532-01-0018-year:4	plot 92532-01-0019-year:4	plot 92532-01-0020-year:4	plot 92532-01-0021-year:4	plot 92532-01-0022-year:4	plot 92532-01-0023-year:4
	Acer rubrum	red maple	1	1	1						1																	
	Betula nigra	river birch	62	18	3.44	1	5	4	4	4		2		5	2		1	5	7	1	3		3	4	3		3	5	
	Calycanthus floridus	eastern sweetshrub	3	3	1								1				1					1						
	Carpinus caroliniana	American hornbeam	28	12	2.33	2	3		1			1		2				6	3		1	3		3	2			1	
	Cornus amomum	silky dogwood	65	22	2.95	3	4	1	1	6	4	4	4	1	3	7	3	4	3	1	4	1	2	1		4	2	2	
	Corylus americana	American hazelnut	7	3	2.33								4			2	1												
	Fraxinus pennsylvanica	green ash	27	15	1.8		1	1			4	1	2	1	4	1	2			2	1			2		3	1	1	
	Ilex verticillata	common winterberry	12	7	1.71											2	1				1	1		1		2	4		
	Lindera benzoin	northern spicebush	8	6	1.33	2	1						1	1												1		2	
	Platanus occidentalis	American sycamore	93	18	5.17	6	6	9	7	2	4	5	4	6	9	5	7			1	4	9		6	2		1		
	Quercus michauxii	swamp chestnut oak	11	7	1.57				1		3	1		2	1												1	2	
	Quercus nigra	water oak	8	5	1.6																2	3	1			1		1	
	Quercus phellos	willow oak	36	13	2.77			2	2	5	1	1		4						3			6	1	6	2	2	1	
	Quercus rubra	northern red oak	5	5	1		1	1		1	1											1							
	Symphoricarpos orbiculatu	coralberry	3	3	1									1	1	1													
	Ulmus alata	winged elm	2	1	2															2									
	Viburnum dentatum	southern arrowwood	28	14	2	2	2	2		1	2		2	3			3	2	2		1					3	1	2	
TOT:	**17**	**17**	**399**	**17**		**16**	**23**	**20**	**16**	**19**	**19**	**16**	**18**	**26**	**20**	**18**	**19**	**17**	**15**	**10**	**17**	**19**	**12**	**18**	**13**	**16**	**15**	**17**	

Table C.6. Vegetative Problem Areas

Big Cedar Creek Restoration Site: Project No. D06054-D			
BCC			
Feature/Issue	Station # / Range	Probable Cause	Photo #
Bare Bank	24+80, Left Bank	Sparse Vegetation Growth	VPA 1
Bare Bank	26+00 - 26+60, Right Bank	Sparse Vegetation Growth	VPA 2
Bare Bank	29+00, Left Bank	Sparse Vegetation Growth	VPA 3
Bare Bank	29+00 - 29+75, Right Bank	Sparse Vegetation Growth	VPA 4
Bare Bank	33+00, Left Bank	Sparse Vegetation Growth	VPA 5
Bare Bank	33+50 - 34+25, Left Bank	Sparse Vegetation Growth	VPA 6
Invasive/Exotic Populations	65+00 - 67+00, Right Bank	*Ligustrum sinese* persisting after construction.	VPA 7
UT1			
Feature/Issue	Station # / Range	Probable Cause	Photo #
Invasive/Exotic Populations	62+50 - 63+50, Right Bank	*Ligustrum sinese* persisting after construction.	VPA 8

Table C.7. Plot Species and Densities

Big Cedar Creek Restoration Site Contract No. D06054-D																											
Tree Species	**Plots**																							**Year 1 Totals**	**Year 2 Totals**	**Year 3 Totals**	**Year 4 Totals**	**Average**
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23					
Acer rubrum							1																	1	1	1	1	
Betula nigra	1	5	4	4	4		2		5	2		1	5	7	1	3		3	4	3		3	5	64	65	63	62	
Calycanthus floridus								1				1					1							3	3	3	3	
Carpinus caroliniana	2	*3*		1			1		2				6	3		1	3		3	2			1	32	30	28	28	
Cornus amomum	3	4	1	1	6	4	4	4	1	3	7	3	4	3	1	4	1	2	1		4	2	2	69	69	69	65	
Corylus americana								4			2	1												7	7	7	7	
Fraxinus pennsylvanica		1	1			4	1	2	1	4	1	2			2	1			2		3	1	1	25	25	25	27	
Ilex verticillata											2	1				1	1		1		2	4		20	13	13	12	
Lindera benzoin	2	1						1	1												1		2	27	17	12	8	
Platanus occidentalis	6	6	9	7	2	4	5	4	6	9	5	7			1	4	9		6	2		1		108	99	95	93	
Quercus michauxii				1		3	1		2	1												1	2	17	15	12	11	
Quercus nigra																2	3	1			1		1	13	11	10	8	
Quercus phellos			2	2	5	1	1		4						3			6	1	6	2	2	1	40	35	36	36	
Quercus rubra		1	1		1	1											1							5	5	5	5	
Symphoricarpos obiculatus									1	1	1													4	4	3	3	
Ulmus alata															2									0	0	0	2	
Viburnum dentatum	2	2	2		1	2		2	3			3	2	2		1					3	1	2	32	28	29	28	
Stems/plot	16	23	20	16	19	19	16	18	26	20	18	19	17	15	10	17	19	12	18	13	16	15	17	467	427	411	399	
Stems/acre Year 4	640	920	800	640	760	760	640	720	1040	800	720	760	680	600	400	680	760	480	720	520	640	600	680	N/A	N/A	N/A	N/A	694
Stems/acre Initial	1000	960	960	760	880	1000	1040	1040	1080	1080	840	880	840	800	640	840	880	800	840	680	880	840	960					892

Vegetation Monitoring Plot Photos

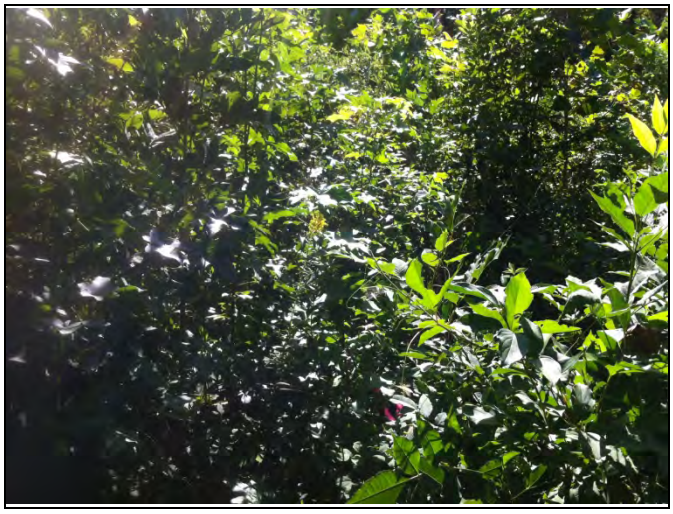
Veg Plot 1

Veg Plot 2

Veg Plot 3

Veg Plot 4

Veg Plot 5



Veg Plot 6

Veg Plot 7

Veg Plot 8

Veg Plot 9

Veg Plot 10

Veg Plot 11

Veg Plot 12

Veg Plot 13

Veg Plot 14

Veg Plot 15

Veg Plot 16

Veg Plot 17

Veg Plot 18

Veg Plot 19

Veg Plot 20

Veg Plot 21

Veg Plot 22

Veg Plot 23

Ecosystem Enhancement PROGRAM

Figure C1: Vegetation Problem Areas
BCC (Station 24+00 to 38+00)

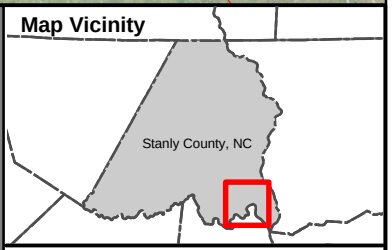
Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 4
Stanly County, NC

0 50 100 200 Feet
1" = 100'

LEGEND

- Bare Bank
- Conservation Easement
- As-built Alignment

Map Vicinity



EEP Project No. : D06054-D
March 2013

Figure C2: Vegetation Problem Areas
BCC (Station 65+00 to 67+00) and
UT1 (Station 62+50 to 63+50)

Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 4
Stanly County, NC

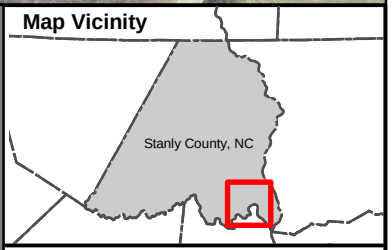
0 75 150 300 Feet

1" = 150'

LEGEND

- Invasives
- Vegetation Plots
- Conservation Easement
- Asbuilt Alignment

Map Vicinity



EEP Project No. : D06054-D
March 2013

Representative Vegetation Problem Area Photos

VPA 1 – Bare bank along BCC at Station 24+80, left bank

VPA 2 – Bare bank along BCC at Station 26+00 to 26+60, right bank

VPA 3 – Bare bank along BCC at Station 29+00, left bank

VPA 4 – Bare bank along BCC at Station 29+00 to 29+75, right bank

VPA 5 – Bare bank along BCC at Station 33+00, left bank

VPA 6 – Bare bank along BCC at Station 33+50 to34+25, left bank

VPA 7 – Invasive species on BCC Station 65+00 to 67+00, right bank

VPA 8 – Invasive species on UT1 Station 62+50 to 63+50 right bank

Appendix D

As-Built Plan Sheets

BIG CEDAR CREEK

SCO # D06054-D

STATE	BAKER PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
NC	109261	1	63
SCO PROJECT NO. D06054-D			

NC ECOSYSTEM ENHANCEMENT PROGRAM

STANLY COUNTY

LOCATION:
SOUTH APPROX. 12 MILES FROM THE INTERSECTION OF HWY 24/27 & HWY 52 THEN APPROX. 1 MILE FROM INTERSECTION OF HWY 52 & MT. ZION CHURCH RD.

TYPE OF WORK:
STREAM AND WETLAND RESTORATION

VICINITY MAP - NTS

INDEX OF SHEETS

GRAPHIC SCALES

20 0 20 40
PLANS

20 0 20 40
PROFILE (HORIZONTAL)

2 0 2 4
PROFILE (VERTICAL)

STREAM COORDINATE SUMMARY

STREAM NAME	STATION	LATITUDE & LONGITUDE
BIG CEDAR CREEK	10+00	LAT: 35° 12' 31.80" LONG: 80° 07' 43.62"
UNNAMED TRIBUTARY 1	10+00	LAT: 35° 11' 29.40" LONG: 80° 05' 19.14"
UNNAMED TRIBUTARY 2	10+00	LAT: 35° 12' 29.49" LONG: 80° 07' 47.34"

PREPARED FOR THE OFFICE OF:

Ecosystem Enhancement Program

NCDENR-ECOSYSTEM ENHANCEMENT PROGRAM
2728 CAPITAL BLVD, SUITE 1H 103
RALEIGH, NC 27604

NCEEP CONTACT: GUY PEARCE
REVIEW COORDINATOR

NCEEP CONTACT: TIM BAUMGARTNER
PROJECT MANAGER

PREPARED IN THE OFFICE OF:

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KEVIN TWEEDY, P.E.
PROJECT ENGINEER

CHRISTINE D. MILLER
PROJECT DESIGNER

PROJECT ENGINEER

SIGNATURE *P.E.*

BAKER PROJECT REFERENCE NO.	SHEET NO.
109261	2

PROJECT ENGINEER

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SYMBOLOGY

- E — RECORDED CONSERVATION EASEMENT
- 725 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- X — EXISTING FENCE
- CENTERLINE RAILROAD
- ROW
- PARCEL BOUNDARY
- EXISTING ROAD/PAVEMENT
- 10+00 — EXISTING STREAM ALIGNMENT
- 10+00 — PROPOSED STREAM ALIGNMENT
- EXISTING EDGE OF WOODS
- EXISTING TREE
- PERMANENT STREAM CROSSING
- FLOW DIRECTION
- GEOLIFT
- BANK STABILIZATION
- TRANSPLANT
- ROCK CROSS VANE
- LOG SILL
- ROOT WAD
- LOG J-HOOK VANE
- BRUSH MATTRESS
- LOG VANE
- LOG STEP-POOL
- CONSTRUCTED RIFFLE (NATIVE MATERIAL)
- FLOODPLAIN POOL
- COVER LOG

BIG CEDAR CREEK

SYMBOLOGY

BAKER PROJECT REFERENCE NO.	SHEET NO.
109261	5A

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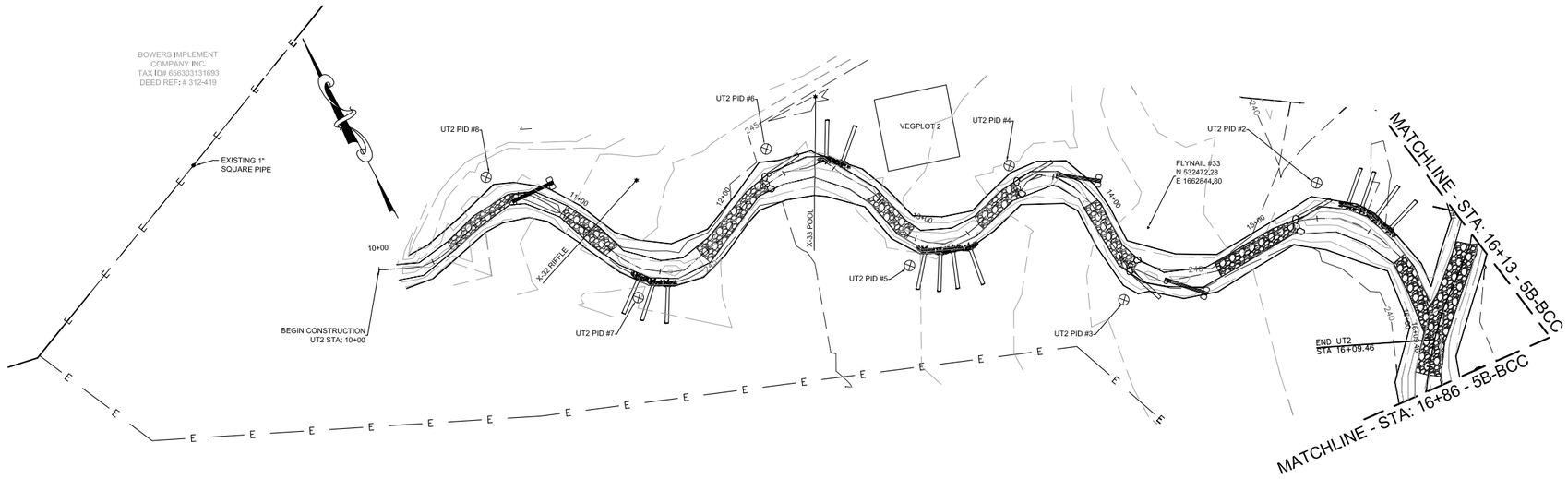

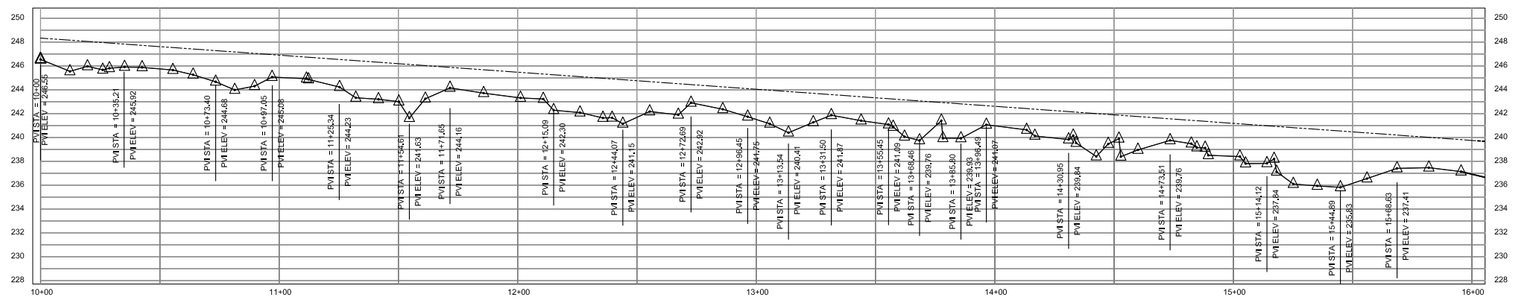

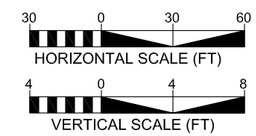

BIG CEDAR CREEK

UT2 AS-BUILT

BAKER PROJECT REFERENCE NO.	SHEET NO.
109261	5B

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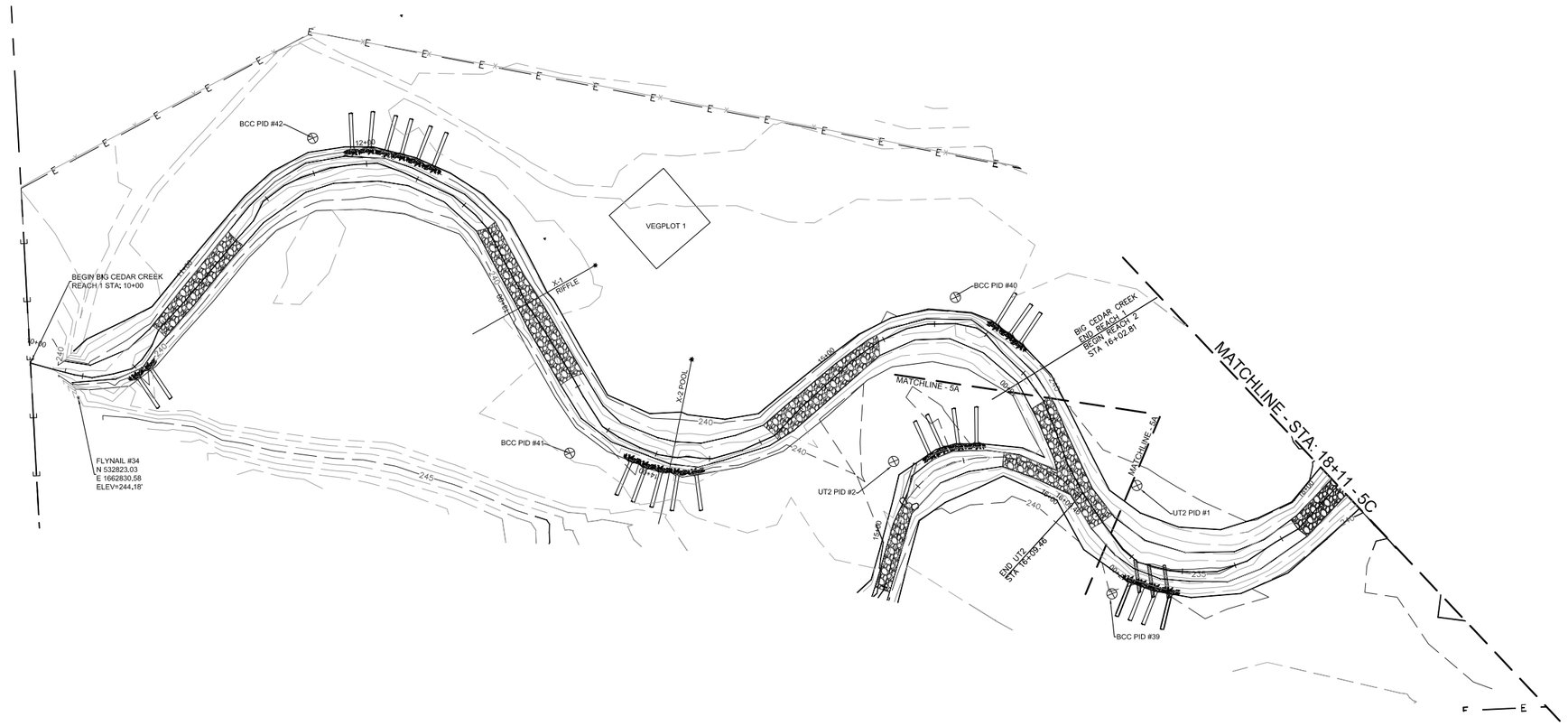

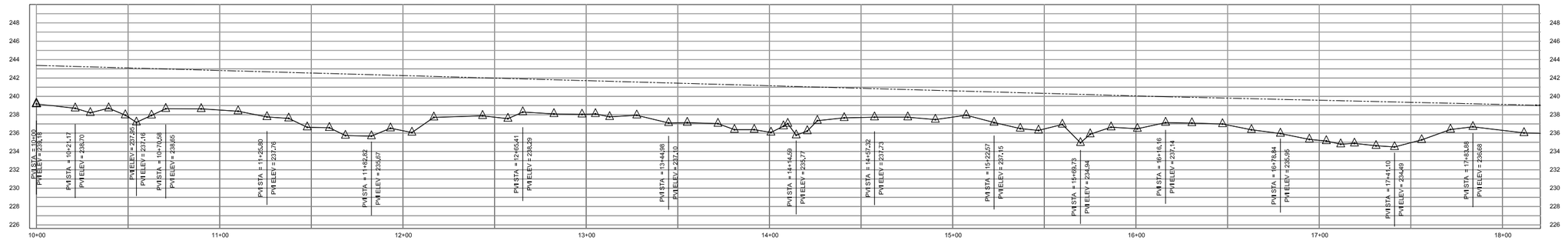

30 0 30 60
HORIZONTAL SCALE (FT)

4 0 4 8
VERTICAL SCALE (FT)

BIG CEDAR CREEK

BIG CEDAR CREEK
AS-BUILT

BAKER PROJECT REFERENCE NO.	SHEET NO.
109261	5C

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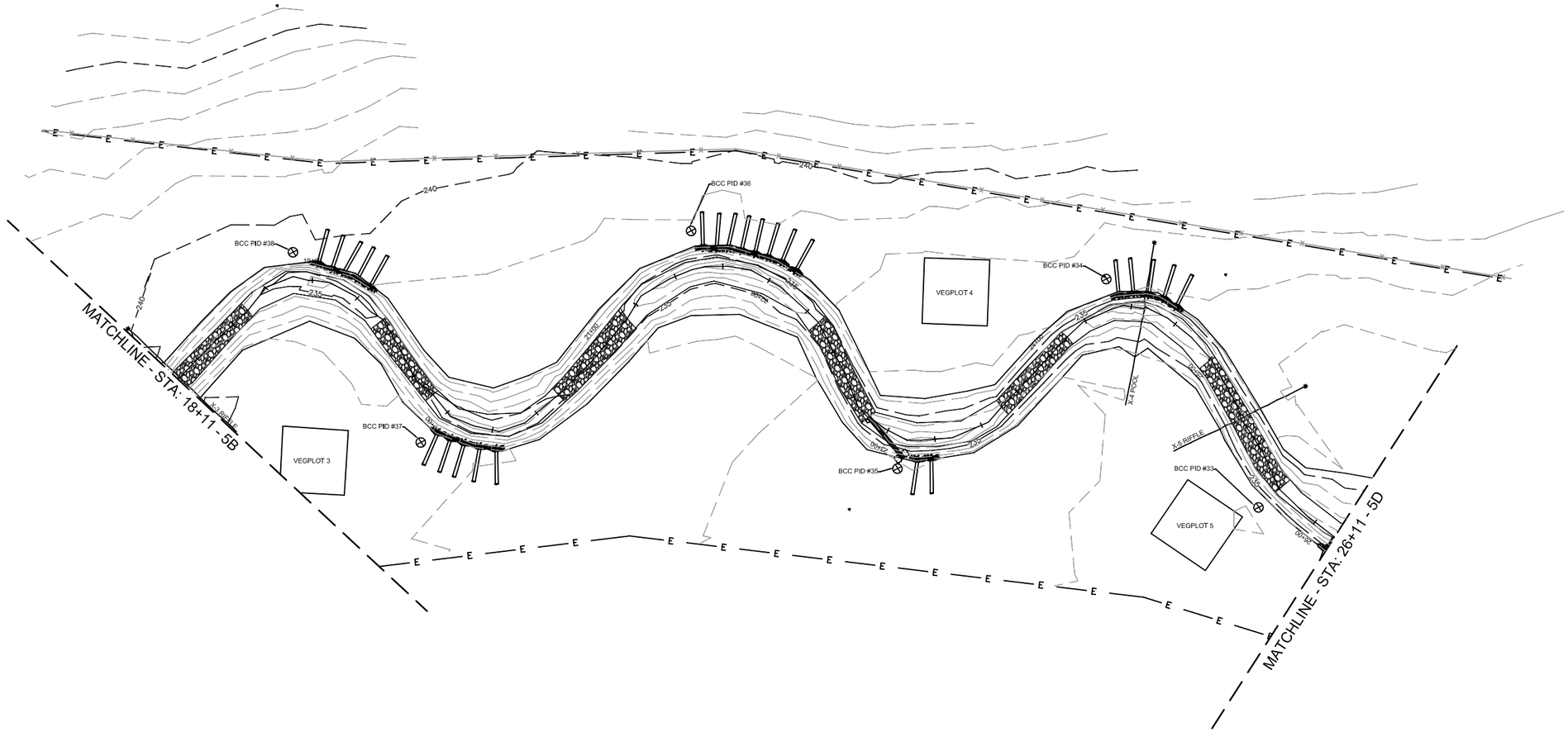

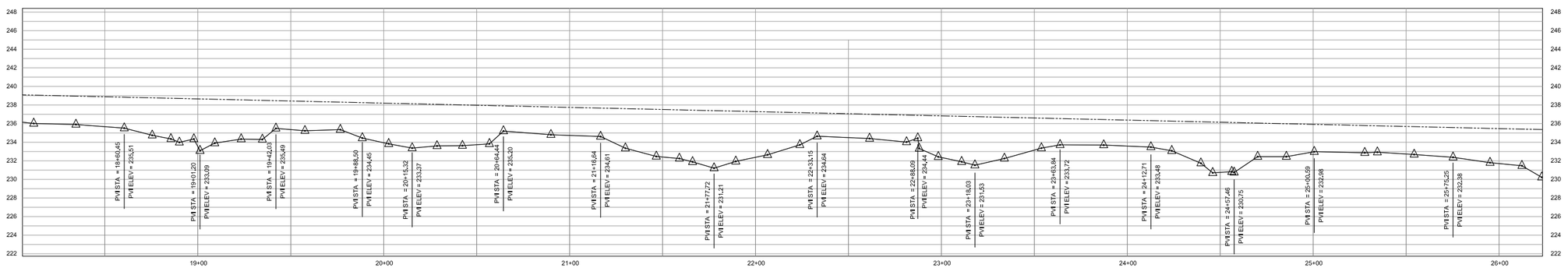

30 0 30 60
HORIZONTAL SCALE (FT)

4 0 4 8
VERTICAL SCALE (FT)

BIG CEDAR CREEK

BIG CEDAR CREEK
AS-BUILT

BAKER PROJECT REFERENCE NO.	SHEET NO.
109261	5D

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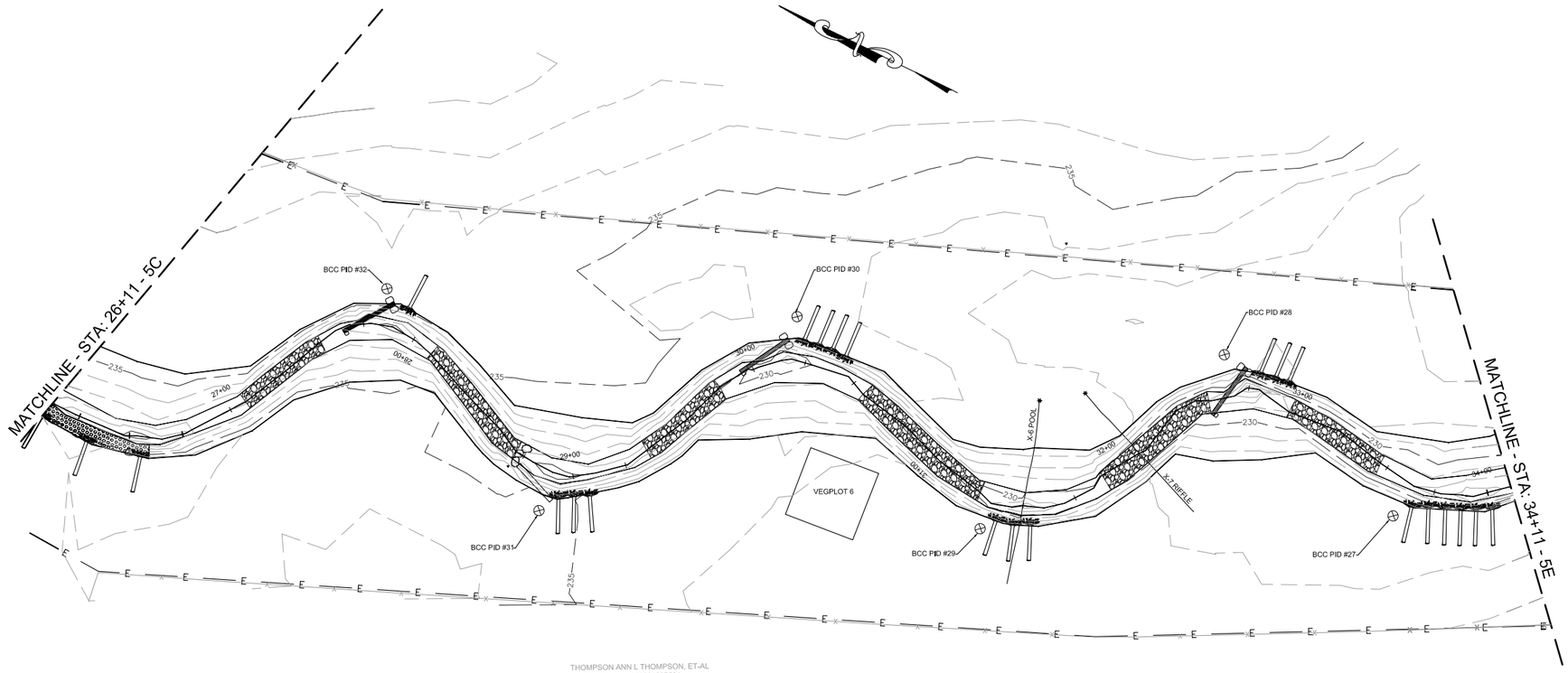

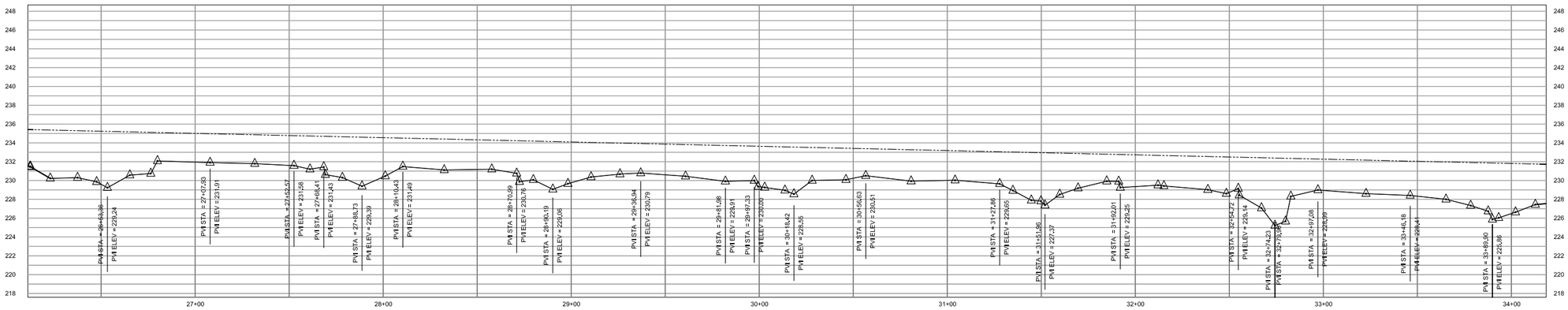

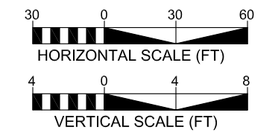

BIG CEDAR CREEK

BIG CEDAR CREEK
AS-BUILT

BAKER PROJECT REFERENCE NO.	SHEET NO.
109261	5E

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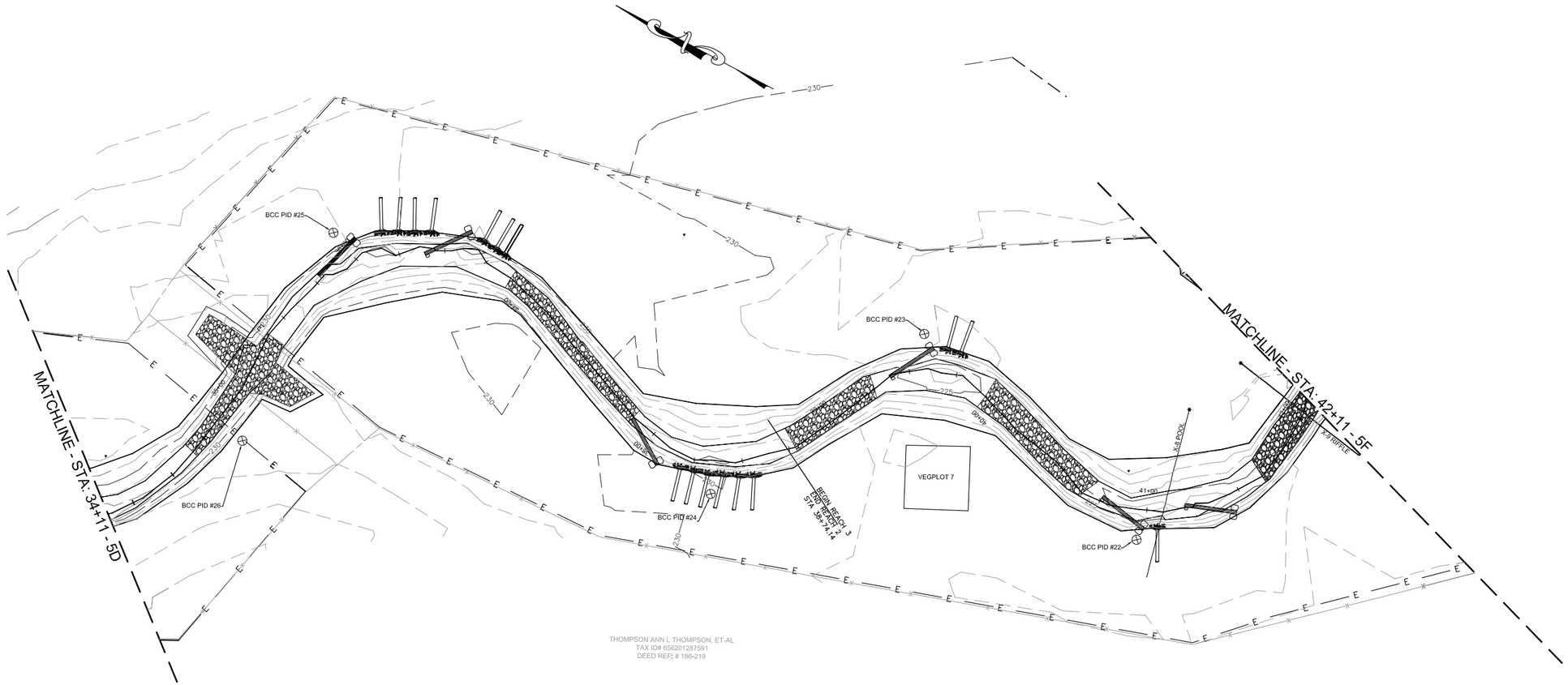

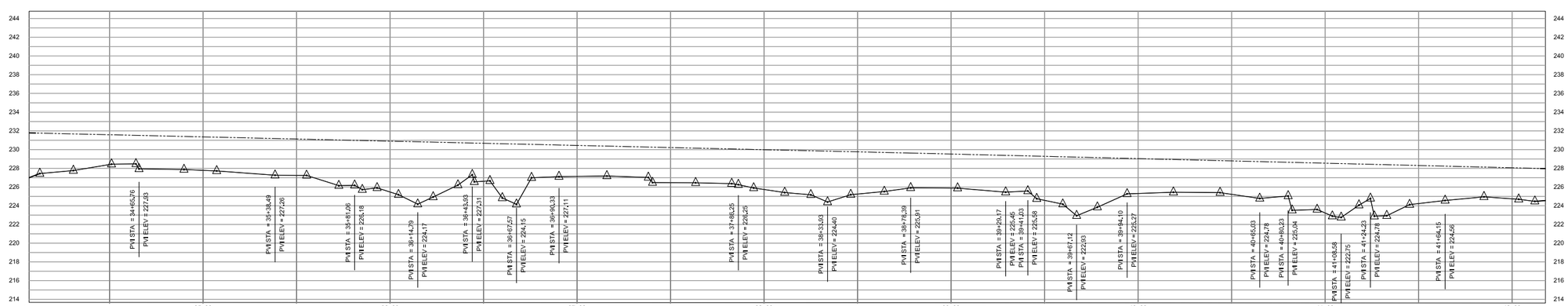

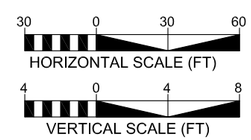

BIG CEDAR CREEK

BIG CEDAR CREEK AS-BUILT

BAKER PROJECT REFERENCE NO.	SHEET NO.
109261	5F

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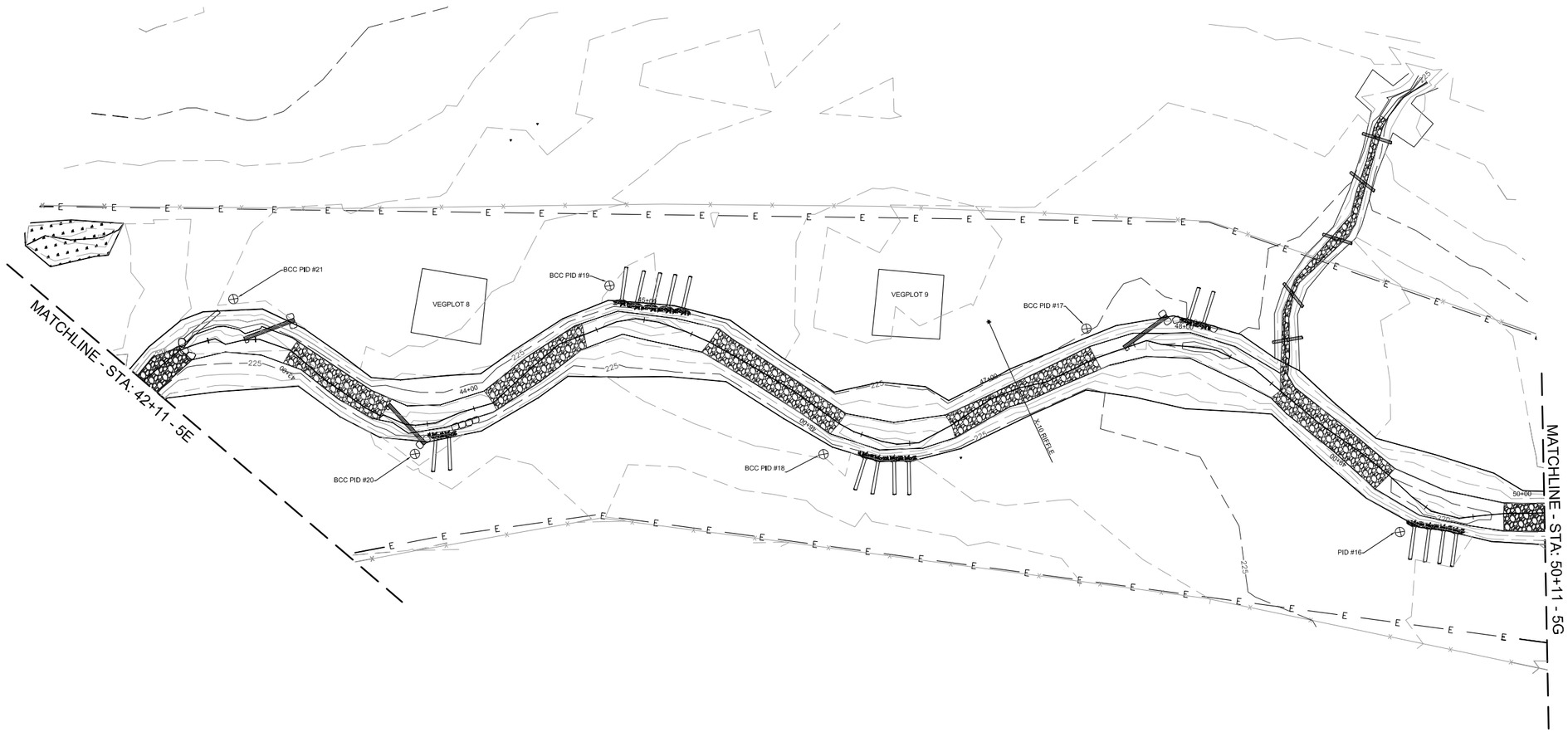

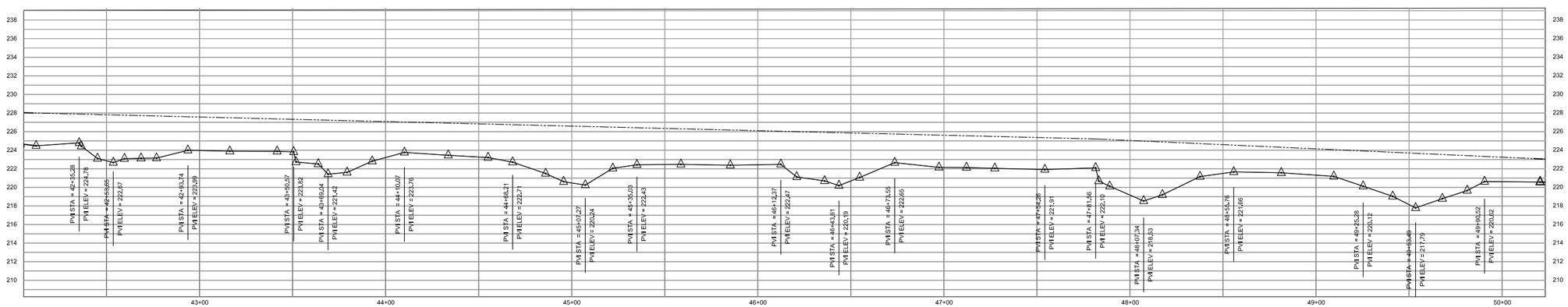

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HORIZONTAL SCALE (FT)

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VERTICAL SCALE (FT)

BIG CEDAR CREEK

BIG CEDAR CREEK
AS-BUILT

BAKER PROJECT REFERENCE NO.	SHEET NO.
109261	5G

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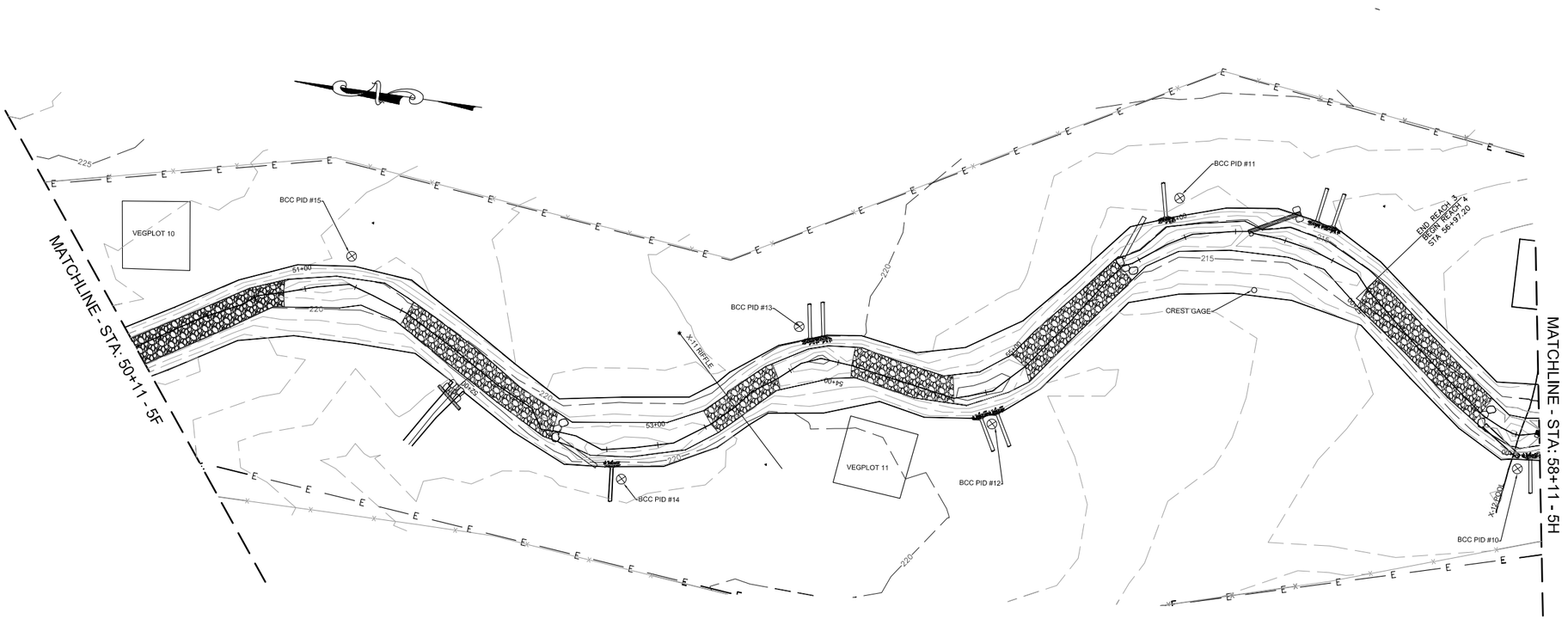

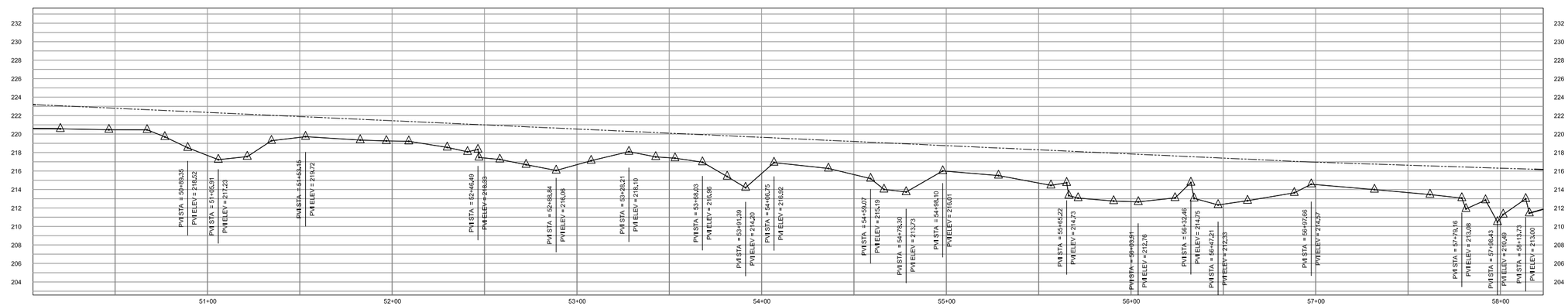

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VERTICAL SCALE (FT)

BIG CEDAR CREEK

BIG CEDAR CREEK
AS-BUILT

BAKER PROJECT REFERENCE NO.	SHEET NO.
109261	5H

PROJECT ENGINEER

Baker

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Suite 200
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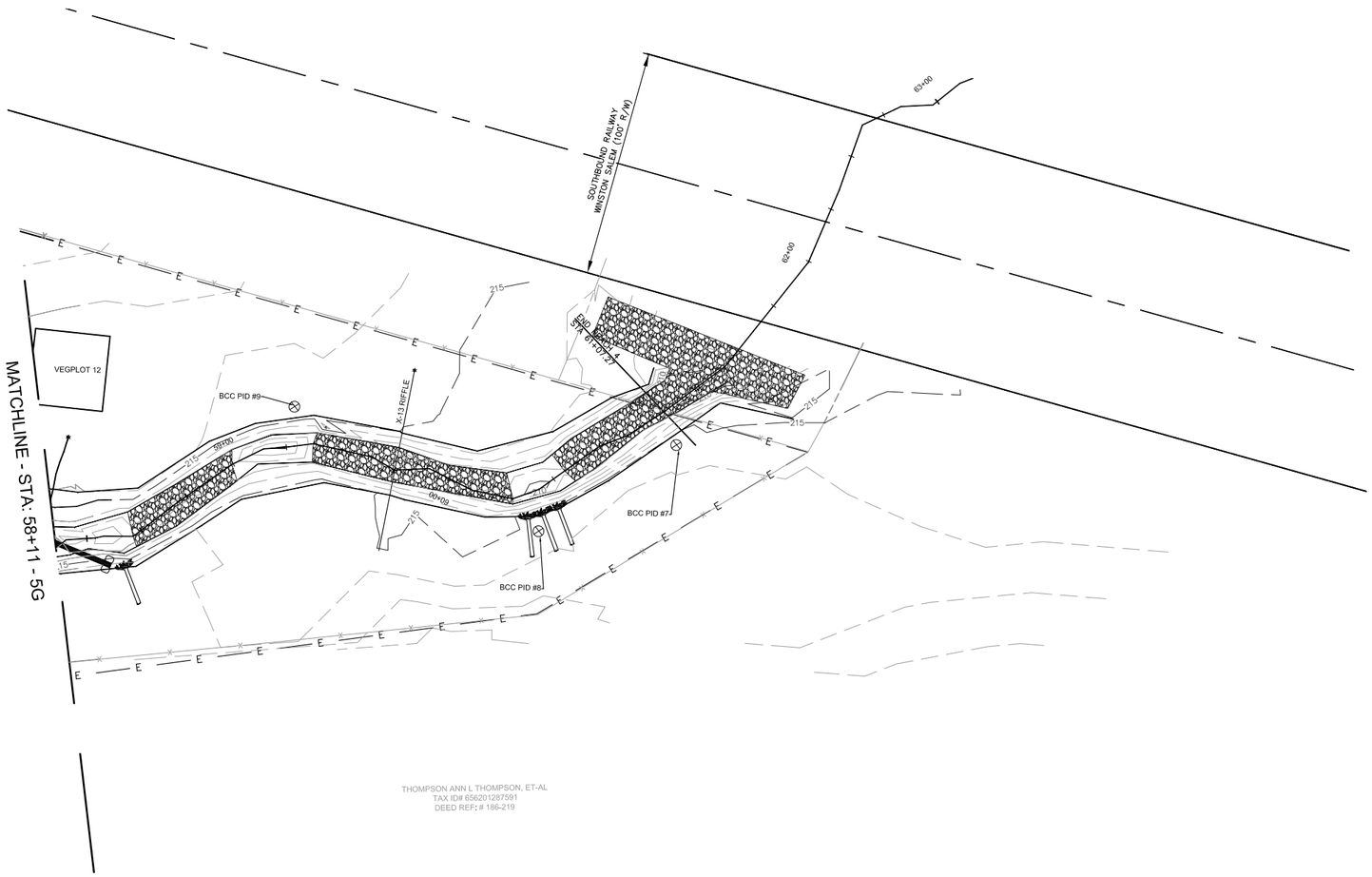
Phone: 704.334.4454
Fax: 704.334.4492



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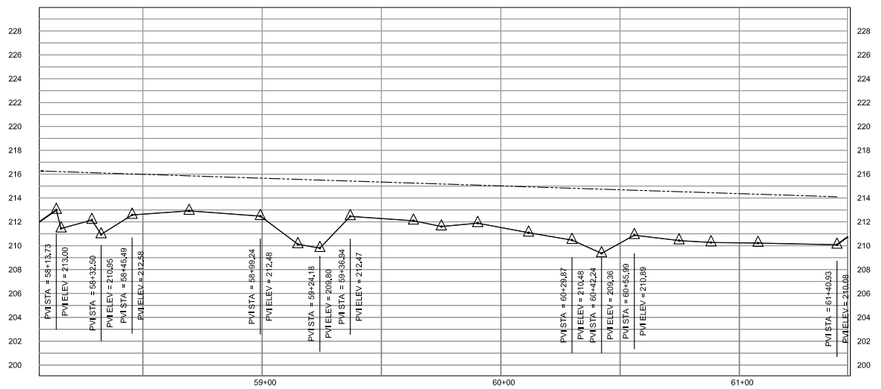
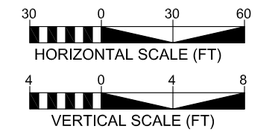
TAX ID# 6562012875 91
DEED REF: # 186-219





BIG CEDAR CREEK

BIG CEDAR CREEK
AS-BUILT

BAKER PROJECT REFERENCE NO.	SHEET NO.
109261	51

PROJECT ENGINEER

Baker

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Suite 200
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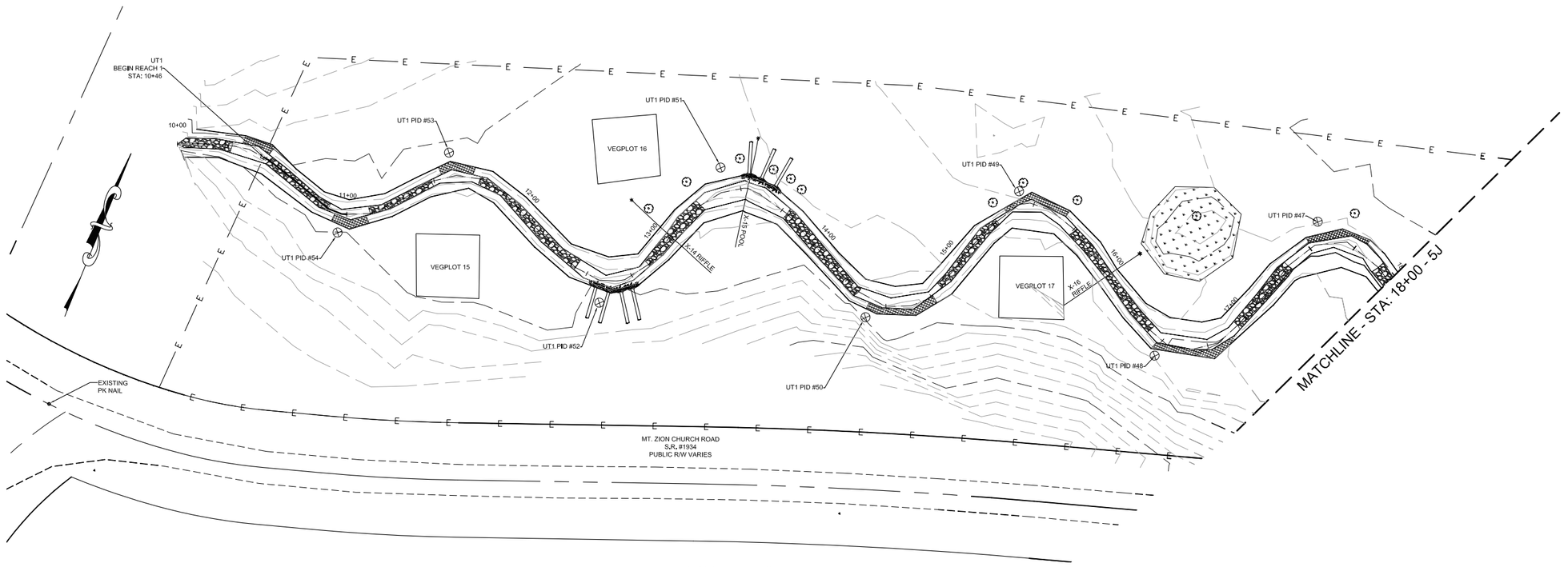
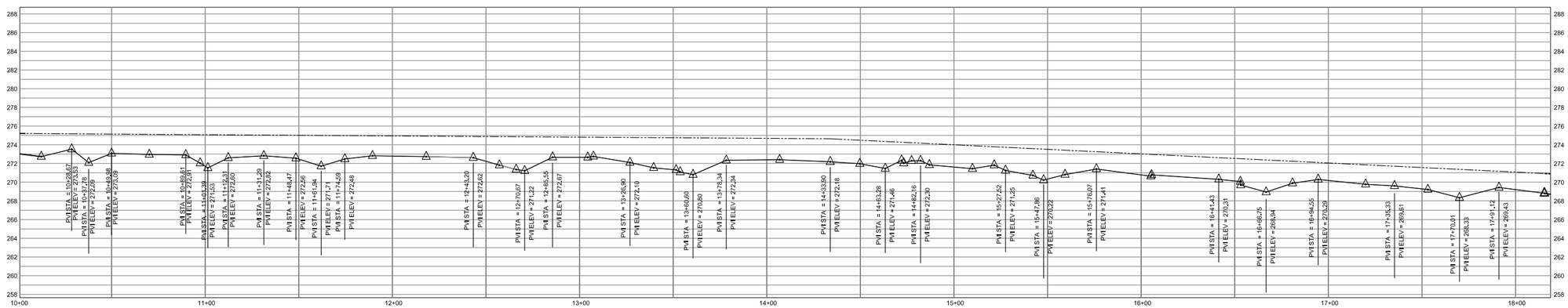
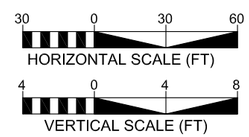
Phone: 704.334.4454
Fax: 704.334.4492







BIG CEDAR CREEK

UT1 AS-BUILT

BAKER PROJECT REFERENCE NO.	SHEET NO.
109261	5J

PROJECT ENGINEER

Baker

Michael Baker Engineering, Inc.
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Suite 200
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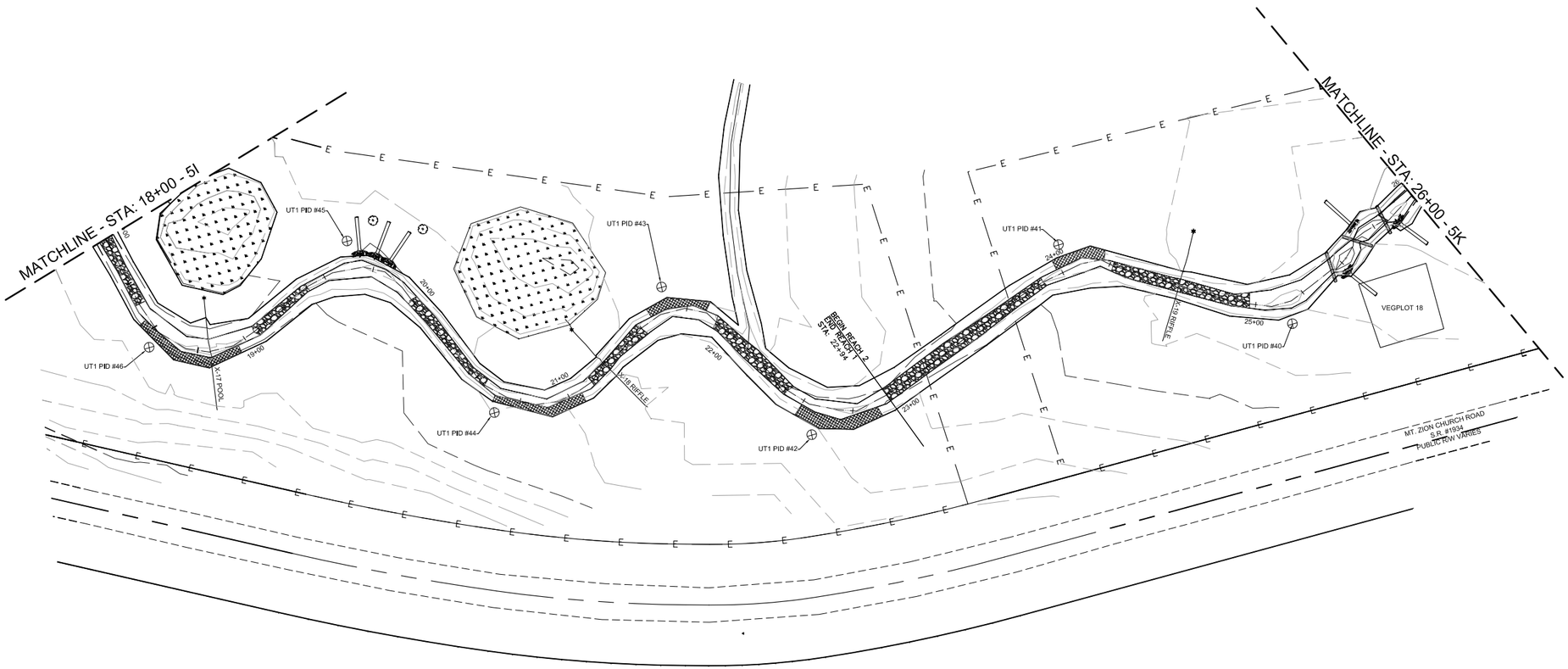
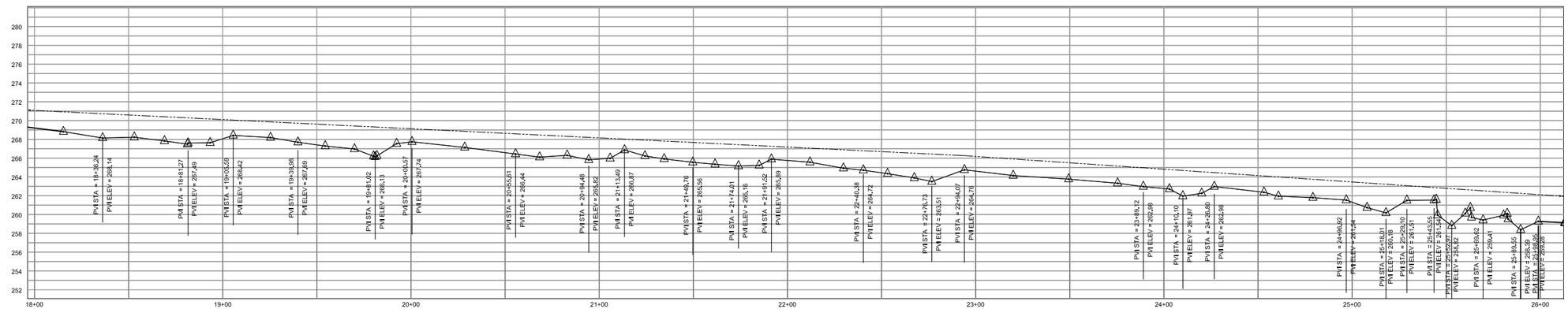
Fax: 704.334.4492





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HORIZONTAL SCALE (FT)

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VERTICAL SCALE (FT)

BIG CEDAR CREEK

UT1 AS-BUILT

BAKER PROJECT REFERENCE NO.	SHEET NO.
109261	5K

PROJECT ENGINEER

Baker

Michael Baker Engineering, Inc.
1447 South Tryon Street
Suite 200
Charlotte, NC 28203
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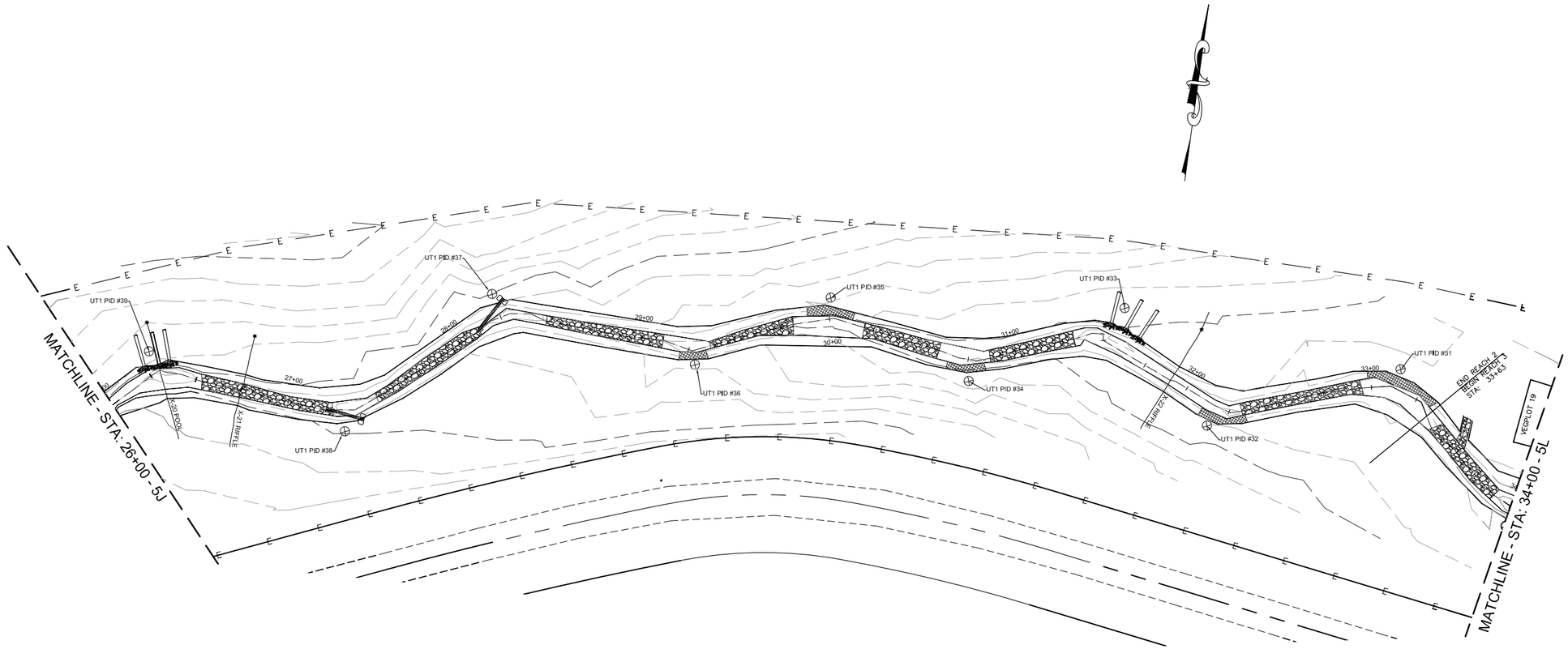
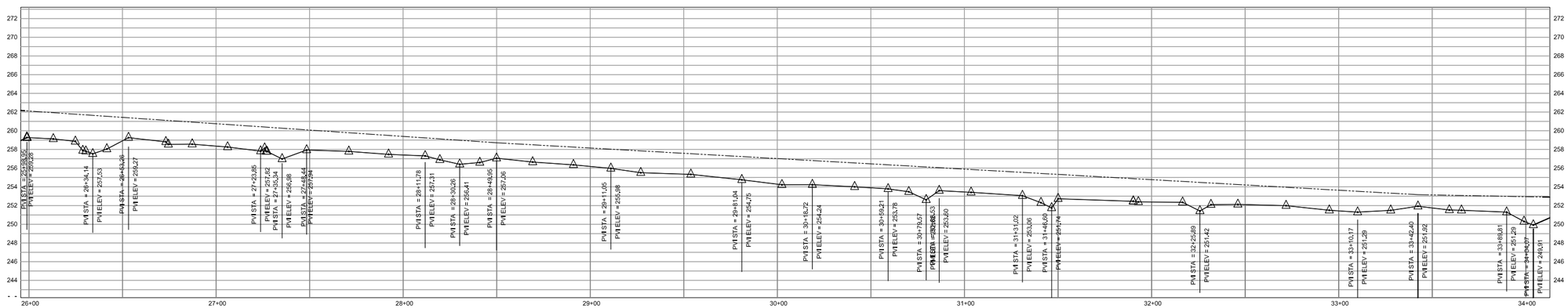
Fax: 704.334.4492





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VERTICAL SCALE (FT)

BIG CEDAR CREEK

UT1 AS-BUILT

BAKER PROJECT REFERENCE NO.	SHEET NO.
109261	5L

PROJECT ENGINEER

Baker

Michael Baker Engineering, Inc.
1447 South Tryon Street
Suite 200
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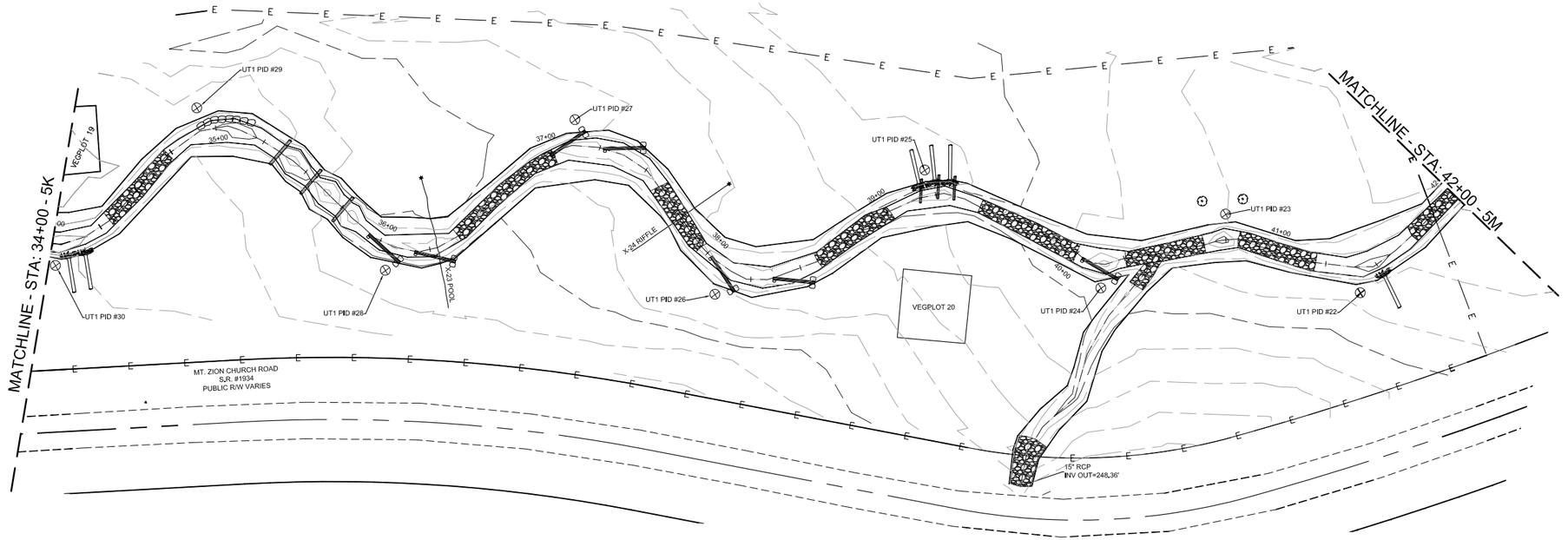
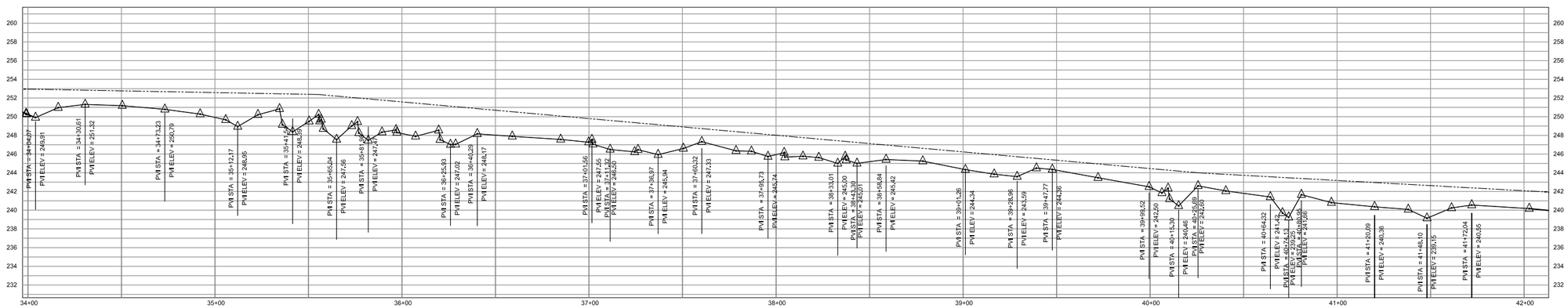
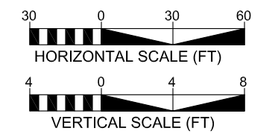
Phone: 704.334.4454
Fax: 704.334.4492







BIG CEDAR CREEK

UT1 AS-BUILT

BAKER PROJECT REFERENCE NO.	SHEET NO.
109261	5M

PROJECT ENGINEER

Baker
Michael Baker Engineering, Inc.
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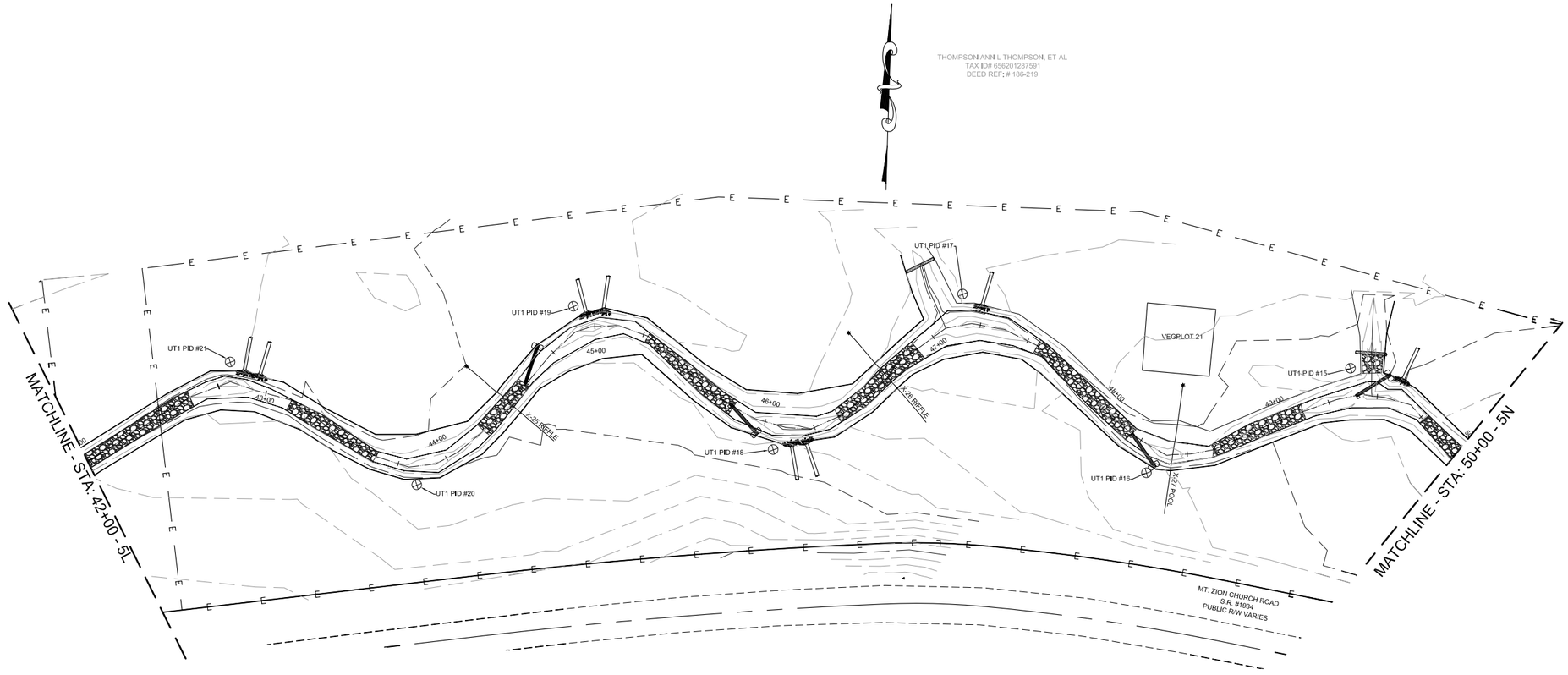
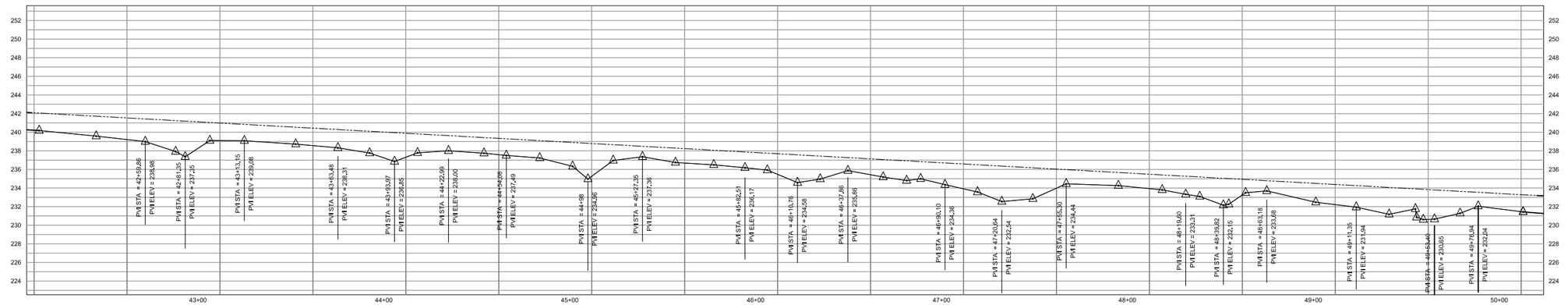
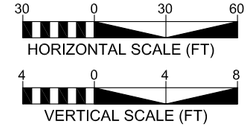






BIG CEDAR CREEK

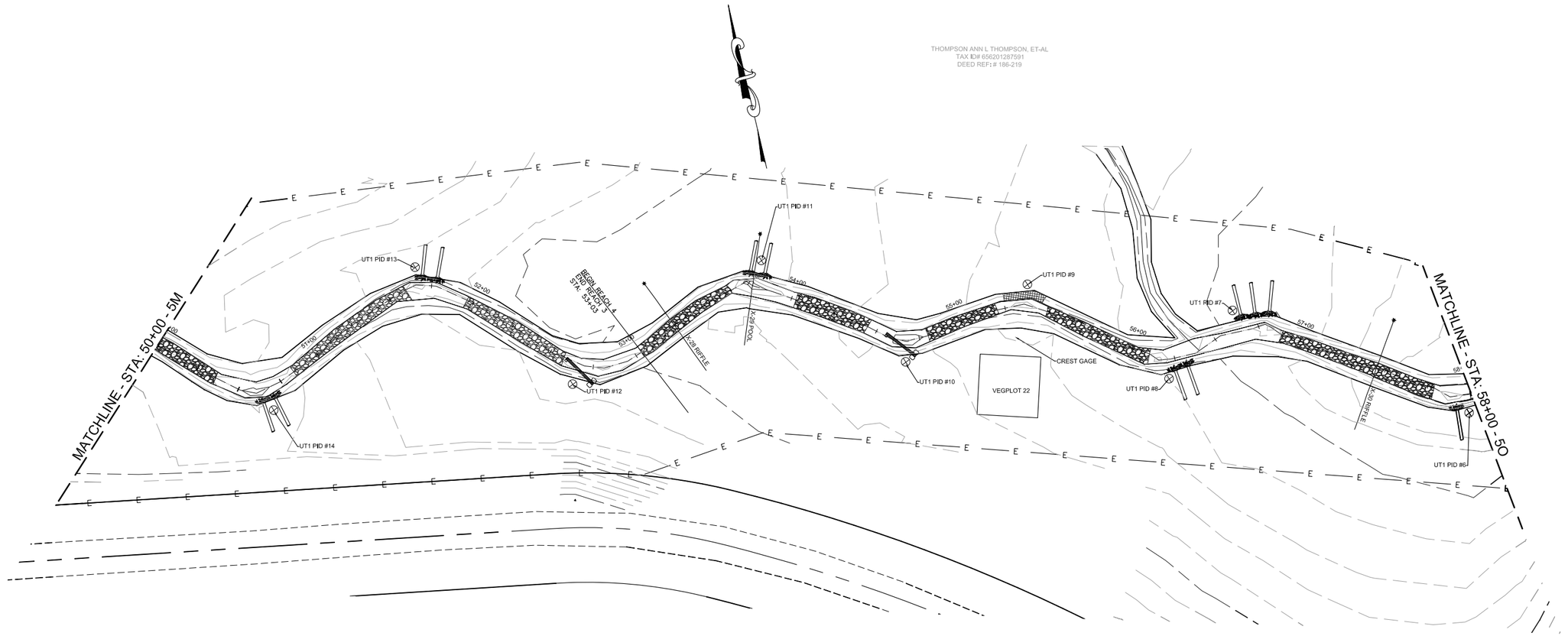
UT1 AS-BUILT

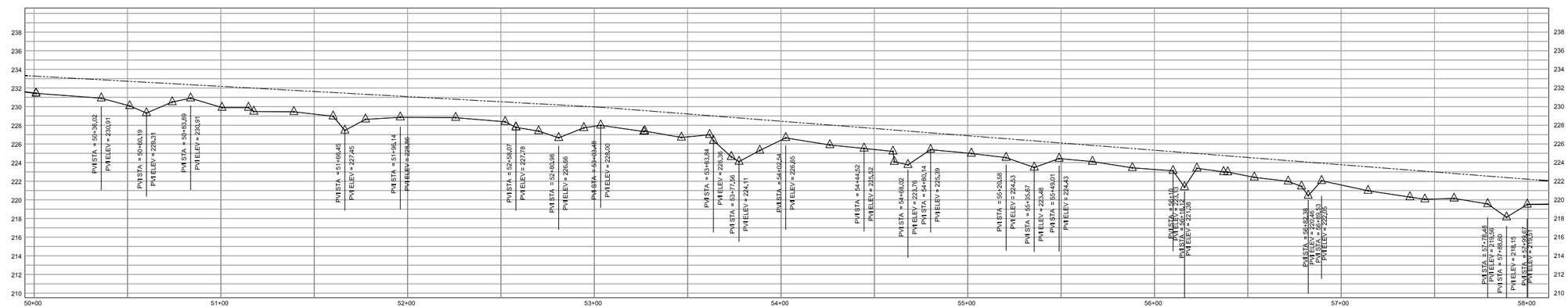
BAKER PROJECT REFERENCE NO.	SHEET NO.
109261	5N

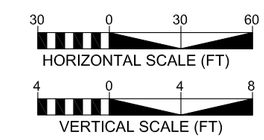
PROJECT ENGINEER

Baker

Michael Baker Engineering, Inc.
1447 South Tryon Street
Suite 200
Charlotte, NC 28203
Phone: 704.334.4454
Fax: 704.334.4492







BIG CEDAR CREEK

UT1 AS-BUILT

BAKER PROJECT REFERENCE NO.	SHEET NO.
109261	50

PROJECT ENGINEER

Baker

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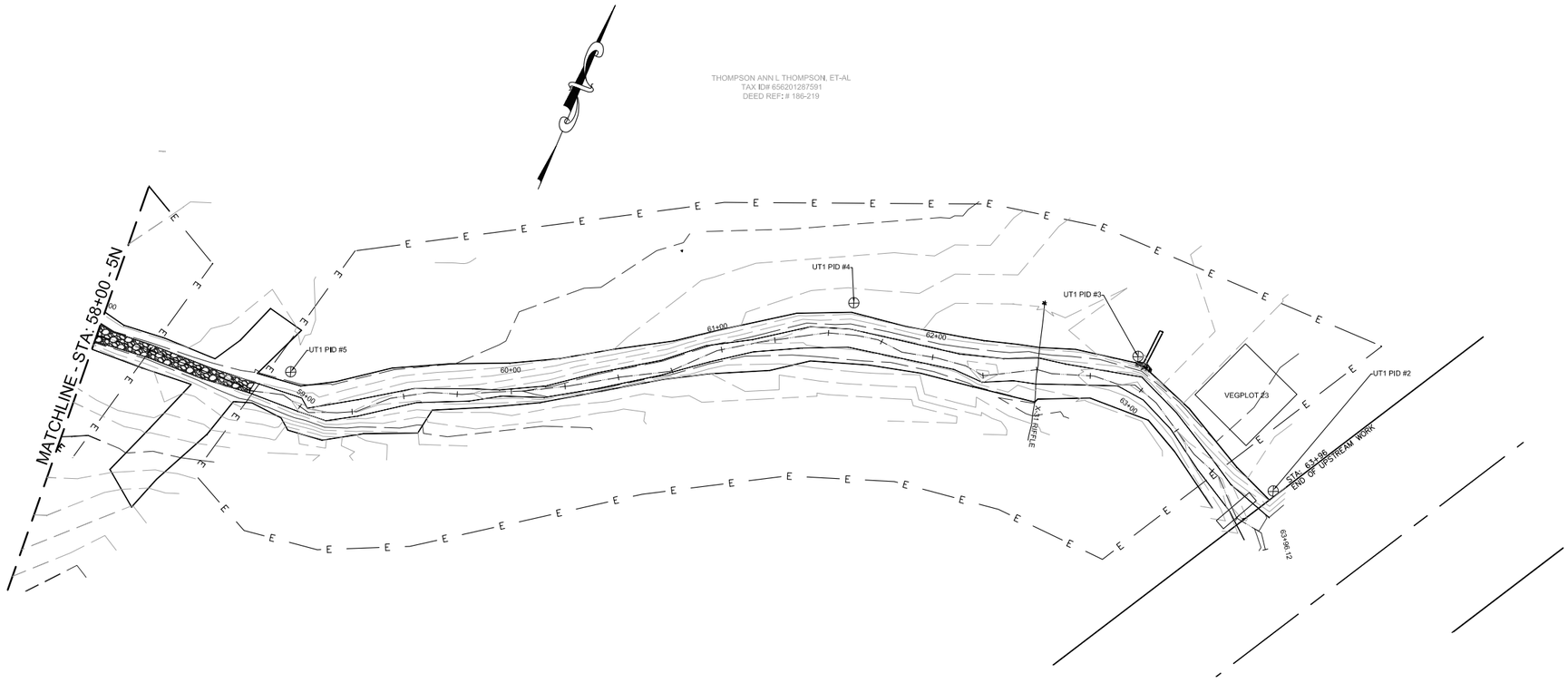
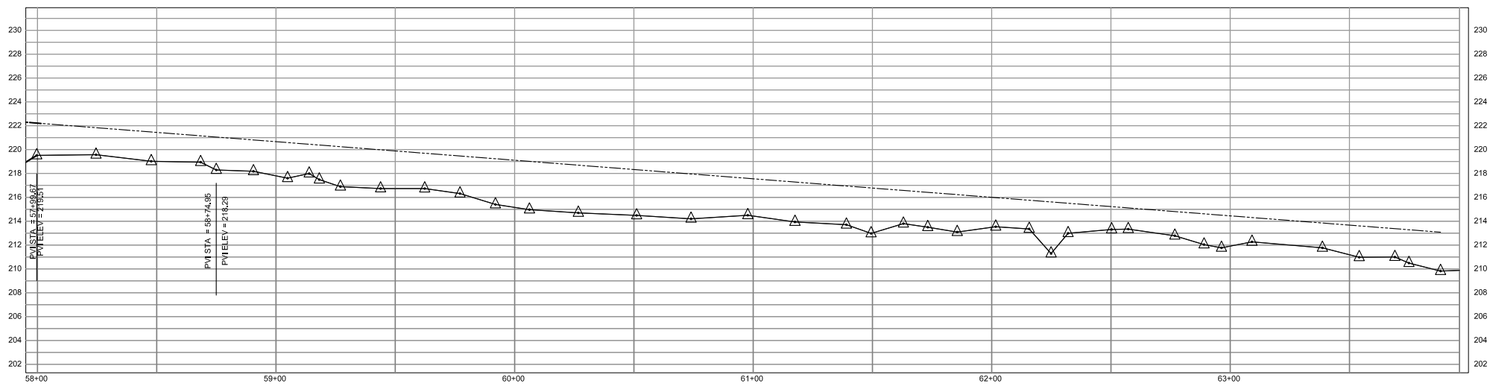
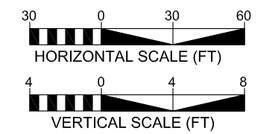
Fax: 704.334.4492







BIG CEDAR CREEK

UT1 AS-BUILT

Appendix E

Photo ID Log

1. Big Cedar Creek (BCC)
2. Unnamed Tributary 1 (UT1)
3. Unnamed Tributary 2 (UT2)
4. Crest Gauge Photos

APPENDIX E:
PHOTO ID LOG

Big Cedar Creek Photos

BCC PID 1– Cross Vane, BCC Reach 6 End

BCC PID 2 – Re-graded Riffle, BCC Reach 6

BCC PID 3 –Existing Riffle, BCC Reach 6

BCC PID 4 – Re-graded Riffle, BCC Reach 6

BCC PID 5 – Re-graded Riffle, BCC Reach 6

BCC PID 6 – Log Vane in distance, BCC Reach 6 Start

BCC PID 7 – Constructed Riffle, BCC Reach 4 End

BCC PID 8 – Constructed Riffle, BCC Reach 4

BCC PID 9 – Constructed Riffle, BCC Reach 4

BCC PID 10 – Constructed Riffle, BCC Reach 4 Start

BCC PID 11 – Log J-Hook & Constructed Riffle, BCC Reach 3 End

BCC PID 12 – Log J-Hook Step Pool, BCC Reach 3

BCC PID 13 – Log J-Hook &
Constructed Riffle, BCC Reach 3

BCC PID 14 – Constructed Riffle, BCC Reach 3

BCC PID 15 – Constructed Riffle, BCC Reach 3

BCC PID 16 – Constructed Riffle, BCC Reach 3

BCC PID 17 – Constructed Riffle, UT1 Reach 3

BCC PID 18 – Constructed Riffle, BCC Reach 3

BCC PID 19 – Constructed Riffle, BCC Reach 3

BCC PID 20 – Constructed Riffle, BCC Reach 3

BCC PID 21 – Constructed Riffle, BCC Reach 3

BCC PID 22 – Constructed Riffle, BCC Reach 3

BCC PID 23 – Constructed Riffle, BCC Reach 3 Start

BCC PID 24 – Constructed Riffle, BCC Reach 2 End

BCC PID 25 – Riffle Crossing, BCC Reach 2

BCC PID 26 – Constructed Riffle, BCC Reach 2

BCC PID 27 – Constructed Riffle, BCC Reach 2

BCC PID 28 – Log J-Hook & Constructed Riffle, BCC Reach 2

BCC PID 29 – Log J-Hook & Constructed Riffle, BCC Reach 2

BCC PID 30 – Constructed Riffle, BCC Reach 2

BCC PID 31 – Constructed Riffle, BCC Reach 2

BCC PID 32 – Constructed Riffle, BCC Reach 2

BCC PID 33 – Constructed Riffle, BCC Reach 2

BCC PID 34 – Constructed Riffle, BCC Reach 2

BCC PID 35 – Constructed Riffle, BCC Reach 2

BCC PID 36 – Constructed Riffle, BCC Reach 2

BCC PID 37 – Constructed Riffle, BCC Reach 2

BCC PID 38 – Constructed Riffle, BCC Reach 2

BCC PID 39 – Constructed Riffle, BCC Reach 2 Start

BCC PID 40 – Constructed Riffle, BCC Reach 1 End

BCC PID 41 – Constructed Riffle, BCC Reach 1

BCC PID 42 – Constructed Riffle, BCC Reach 1 Start

UT1 Photos

UT1 PID 1 – Constructed Riffle, UT1 Reach 4 End

UT1 PID 2 –Constructed Riffle, UT1 Reach 4

UT1 PID 3 – Constructed Riffle, UT1 Reach 4

UT1 PID 4 – Constructed Riffle, UT1 Reach 4

UT1 PID 5 – Riffle Crossing, UT1 Reach 4

UT1 PID 6 – Constructed Riffle, UT1 Reach 4

UT1 PID 7 – Constructed Riffle, UT1 Reach 4

UT1 PID 8 – Constructed Riffle, UT1 Reach 4

UT1 PID 9 – Constructed Riffle, UT1 Reach 4

UT1 PID 10 – Constructed Riffle, UT1 Reach 4

UT1 PID 11 – Constructed Riffle, UT1 Reach 4 Start

UT1 PID 12 – Constructed Riffle, UT1 Reach 3 End

UT1 PID 13 – Constructed Riffle, UT1 Reach 3

UT1 PID 14 – Constructed Riffle, UT1 Reach 3

UT1 PID 15 – Constructed Riffle, UT1 Reach 3

UT1 PID 16 – Constructed Riffle, UT1 Reach 3

UT1 PID 17 – Constructed Riffle, UT1 Reach 3

UT1 PID 18 – Constructed Riffle, UT1 Reach 3

UT1 PID 19 – Constructed Riffle, UT1 Reach 3

UT1 PID 20 – Constructed Riffle, UT1 Reach 3

UT1 PID 21 – Constructed Riffle, UT1 Reach 3

UT1 PID 22 – Constructed Riffle, UT1 Reach 3

UT1 PID 23 – Constructed Riffle, UT1 Reach 3

UT1 PID 24 – Constructed Riffle, UT1 Reach 3

UT1 PID 25 – Constructed Riffle, UT1 Reach 3

UT1 PID 26 – Constructed Riffle, UT1 Reach 3

UT1 PID 27 – Constructed Riffle, UT1 Reach 3

UT1 PID 28 – Log sill step pools (3), UT1 Reach 3

UT1 PID 29 – Constructed Riffle, UT1 Reach 3

UT1 PID 30– Constructed Riffle, UT1 Reach 3 Start

UT1 PID 31 – Constructed Riffle, UT1 Reach 2 End

UT1 PID 32 – Constructed Riffle, UT1 Reach 2

UT1 PID 33 – Constructed Riffle, UT1 Reach 2

UT1 PID 34– Constructed Riffle, UT1 Reach 2

UT1 PID 35 – Constructed Riffle, UT1 Reach 2

UT1 PID 36 – Constructed Riffle, UT1 Reach 2

UT1 PID 37 – Constructed Riffle, UT1 Reach 2

UT1 PID 38 – Constructed Riffle, UT1 Reach 2

UT1 PID 39 – Rock and roll structures (3), UT1 Reach 3

UT1 PID 40 – Constructed Riffle, UT1 Reach 2

UT1 PID 41 – Riffle crossing, UT1 Reach 2 Start

UT1 PID 42 – Constructed Riffle, UT1 Reach 1 End

UT1 PID 43 – Constructed Riffle, UT1 Reach 1

UT1 PID 44 – Constructed Riffle, UT1 Reach 1

UT1 PID 45 – Constructed Riffle, UT1 Reach 1

UT1 PID 46 – Constructed Riffle, UT1 Reach 1

UT1 PID 47 – Constructed Riffle, UT1 Reach 1

UT1 PID 48 – Constructed Riffle, UT1 Reach 1

UT1 PID 49 – Constructed Riffle, UT1 Reach 1

UT1 PID 50 – Constructed Riffle, UT1 Reach 1

UT1 PID 51 – Constructed Riffle, UT1 Reach 1

UT1 PID 52 – Constructed Riffle, UT1 Reach 1

UT1 PID 53 – Constructed Riffle, UT1 Reach 1

UT1 PID 54 – Constructed Riffle, UT1 Reach 1 Start

UT2 Photos

UT2 PID 1 – Constructed Riffle, UT2 End

UT2 PID 2 – Constructed Riffle

UT2 PID 3 – Constructed Riffle

UT2 PID 4 – Constructed Riffle

UT2 PID 5 – Constructed Riffle

UT2 PID 6 – Constructed Riffle

UT2 PID 7 – Constructed Riffle

UT2 PID 8 – Constructed Riffle, UT2 Start

Crest Gauge Photos

BCC Crest Gauge – 9/24/2012

UT1 Crest Gauge – 9/26/2012

Appendix F

Benthic Macroinvertebrate Monitoring Data

Habitat Assessment Field Sheets

Habitat Assessment Data (Table F.1)

Photo Log

TABLE F.1. BENTHOS DATA

Big Cedar Creek Stream Restoration Project Collected on October 4, 5 & 8, 2012						
SPECIES	**Tolerance Values**	**Functional Feeding Group**	**Site 1 Reference 10/5/2012**	**Site 2 U/S Big Cedar 10/5/2012**	**Site 3 D/S Big Cedar 10/8/2012**	**Site 4 UT Big Cedar 10/4/2012**
PLATYHELMINTHES						
Turbellaria						
Tricladida						
Dugesiidae						
Cura foremanii						1
MOLLUSCA						
Gastropoda						
Basommatophora						
Ancylidae		**SC**				
Ferrissia rivularis	***6**	**SC**		1		
Lymnaeidae		**SC**				
Pseudosuccinea columella	**7.7**	**SC**				1
Physidae						
Physella sp.	**8.8**	**CG**		1	2	8
ANNELIDA						
Oligochaeta	***10**	**CG**				
Tubificida						
Lumbricidae		**SC**	1			
Naididae	***8**	**CG**		1		
Nais sp.	**8.9**	**CG**				1
Tubificidae w.o.h.c.	**7.1**	**CG**		2		
ARTHROPODA						
Arachnoidea						
Acariformes	**5.5**		1	8	9	
Crustacea						
Copepoda						
Cyclopoida						
Cyclopidae						
Macrocyclops albidus				2	3	3
Ostracoda				2		1
Cladocera						
Daphnidae						
Ceriodaphnia sp.				1	2	1
Isopoda						
Asellidae		**SH**				
Caecidotea sp.	**9.1**	**CG**	3		1	
Amphipoda		**CG**				
Crangonyctidae						
Crangonyx sp.	**7.9**	**CG**	1			
Hyalellidae						
Hyalella azteca	**7.8**	**CG**			1	
Insecta						
Collembola						
Isotomidae					2	

TABLE F.1. BENTHOS DATA

Big Cedar Creek Stream Restoration Project Collected on October 4, 5 & 8, 2012						
SPECIES	**Tolerance Values**	**Functional Feeding Group**	**Site 1 Reference 10/5/2012**	**Site 2 U/S Big Cedar 10/5/2012**	**Site 3 D/S Big Cedar 10/8/2012**	**Site 4 UT Big Cedar 10/4/2012**
Ephemeroptera						
Baetidae	**4**	**CG**	1	2		
Baetis flavistriga	**7**	**CG**	3			
Callibaetis sp.	***4**	**CG**		1		1
Centroptilum sp.	**6.6**	**CG**		2	2	
Procloeon sp.	**5**		1			
Caenidae		**CG**				
Caenis sp.	**7.4**	**CG**		31	14	7
Heptageniidae	**4**	**SC**	6			
Leucrocuta sp.	**2.4**	**SC**	5			
Stenonema femoratum	**7.2**	**SC**			3	
Odonata						
Aeshnidae		**P**				
Anax junius	**3**	**P**				1
Coenagrionidae		**P**				
Ischnura sp.	**9.5**			13	2	16
Libellulidae		**P**				
Libellula sp.	**9.6**	**P**		2	1	16
Plecoptera						
Perlodidae	**2**	**P**	3			
Coleoptera						
Dryopidae						
Helichus sp.	**4.6**	**SC**		1		
Dytiscidae		**P**				
Neoporus sp.	**8.6**				1	
Elmidae		**CG**				
Dubiraphia vittata	**4.1**	**SC**		1		
Stenelmis sp.	**5.1**	**SC**	1			
Haliplidae						
Peltodytes sp.	**8.7**	**SH**		3		3
Peltodytes duodecimpunctatus	**8.7**	**SH**		5		2
Peltodytes sexmaculatus	**8.7**	**SH**		1		4
Hydrophilidae		**P**				
Berosus sp.	**8.4**	**CG**		1		2
Tropisternus sp.	**9.7**	**P**				1
Psephenidae		**SC**				
Psephenus herricki	**2.4**	**SC**			1	
Scirtidae		**SC**			1	
Diptera						
Chironomidae						
Chironominae					1	
Ablabesmyia mallochi	**7.2**	**P**		3		
Clinotanypus sp.	**6**	**P**			2	
Cryptochironomus sp.	**6.4**	**P**		1		
Dicrotendipes neomodestus	**8.1**	**CG**		4		1
Goeldichironomus sp.				2	1	
Labrundinia sp.	**5.9**	**P**		2		
Nanocladius crassicornus/rectinervis complex				1		
Polypedilum aviceps	**3.7**		1			
Polypedilum flavum (convictum)	**4.9**	**SH**			1	
Big Cedar Creek Stream Restoration Project Collected on October 4, 5 & 8, 2012						

TABLE F.1. BENTHOS DATA

SPECIES	Tolerance Values	Functional Feeding Group	Site 1 Reference 10/5/2012	Site 2 U/S Big Cedar 10/5/2012	Site 3 D/S Big Cedar 10/8/2012	Site 4 UT Big Cedar 10/4/2012
Polypedilum halterale gp.	**7.3**	**SH**			3	
Polypedilum illinoense	**9**	**SH**		1	16	1
Polypedilum sp.					1	
Tanypodinae					1	
Tanytarsus sp.	**6.8**	**FC**		2	1	1
Culicidae		**FC**				
Anopheles sp.	**8.6**	**FC**	1		5	
Sciomyzidae				1		
Total Number of Organisms			**28**	**98**	**77**	**71**
Total Taxa Richness			**13**	**29**	**25**	**19**
EPT Taxa Richness			**4**	**3**	**3**	**3**
Total Biotic Index			**5.15**	**7.68**	**7.67**	**8.72**

Notes: Tolerance Values: ranges from 0 (least tolerant to pollution) to 10 (most tolerant to pollution).

Functional Feeding Group: CG = Collector-Gatherer, FC = Filterer-Collector, OM = Omnivore, PR = Predator, SC = Scraper, SH = Shredder.

Abundance: R = Rare (1-2 individuals); C = Common (3-9 individuals); A = Abundant (10 or more individuals).

Big Cedar Creek Macroinvertebrate Sampling Photos

BCC Site 1 – looking upstream

BCC Site 1 – looking downstream

BCC Site 2 – looking upstream

BCC Site 2 – looking downstream

BCC Site 3 – looking upstream

BCC Site 3 – looking downstream

BCC Site 4 (UT1) – looking upstream

BCC Site 4 (UT1) – looking downstream