

Big Cedar Creek Stream Restoration FINAL Year 5 Monitoring Report (2013) Stanly County, North Carolina

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Big Cedar Creek Stream Restoration

FINAL Year 5 Monitoring Report (2013)

Stanly County, North Carolina

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Table of Contents

1.0	Executive Summary	1
2.0	Project Goals, Background, & Attributes	2
2.1	<i>Project Location and Description</i>	2
2.2	<i>Restoration Summary</i>	2
2.2.1	Mitigation Goals and Objectives.....	2
2.2.2	Project Description and Restoration Approach.....	3
2.2.3	Project History, Contacts, and Attribute Data.....	5
3.0	Monitoring Plan	10
3.1	<i>Stream Monitoring</i>	10
3.1.1	Bankfull Events.....	10
3.1.2	Cross-sections	10
3.1.3	Pattern	10
3.1.4	Longitudinal Profile.....	11
3.1.5	Bed Material Analysis.....	11
3.1.6	Watershed Observations	11
3.1.7	Photo Reference Sites	11
3.2	<i>Vegetation Monitoring</i>	12
3.3	<i>Biological Monitoring</i>	12
3.4	<i>Maintenance and Contingency Plan</i>	12
4.0	Monitoring Results – 2013 year 5 - monitoring data	14
4.1	<i>Stream Data</i>	14
4.1.1	Cross-section, Longitudinal Profile, and Bed Material Analysis Monitoring Results	14
4.1.2	Stream Problem Areas	15
4.2	<i>Hydrology Data</i>	19
4.3	<i>Vegetation Data</i>	20
4.3.1	Vegetative Problem Areas	20
4.3.2	Vegetative Problem Area Plan View	20
4.4	<i>Benthic Macroinvertebrate Monitoring Data</i>	20
4.4.1	Benthic Macroinvertebrate Sampling Results and Discussion	21
4.4.2	Habitat Assessment Results and Discussion.....	23
4.5	<i>Areas of Concern</i>	23
5.0	References	25

Appendices

- Appendix A** Figures 1 - 4
- Appendix B** Cross-section Plots, Profile Plots, Morphological Summary Data (Tables 8 & 9), Pebble Count Data, Pebble Count Data Sheets, Stream Problem Area Photos, Figures B1 – B3 & Data (Tables B.1 – B.2)
- Appendix C** Vegetation Data (Tables C.1 thru C.7), Vegetation Monitoring Plot Photos, Vegetation Plot Data Sheets, Vegetation Problem Area Photos, and Figures C1 – C5
- Appendix D** As-built Plan Sheets
- Appendix E** Photo Log
- Appendix F** Habitat Assessment Field Sheets, Habitat Assessment Data (Table F.1), Photo Log

List of Tables

- Table 1.** Project Mitigation Approach
- Table 2.** Project Activity and Reporting History
- Table 3.** Project Contact
- Table 4.** Project Background
- Table 5.** Visual Morphological Stability Assessment
- Table 6.** Verification of Bankfull Events
- Table 7.** Pre-restoration vs. Post-restoration Benthic Macroinvertebrate Sampling Data

1.0 EXECUTIVE SUMMARY

This Annual Report details the monitoring activities during the 2013 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 2013 data represent results from the fifth 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 the Site. They are located to represent the different zones within the project as directed by EEP monitoring guidance. The Year 5 vegetation monitoring indicated a survivability range of 400 stems per acre to 880 stems per acre with an overall average of 680 stems per acre. Therefore, the Site has met the Year 5 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. Geomorphic problem areas consist of a few localized areas of observed bank erosion throughout the Site and some isolated areas of in-channel vegetation due to extended periods of drought-like conditions. Beaver activity was documented in monitoring Years 3 through 5. Currently all beavers and their habitats have been removed. Evidence of beaver activity is limited and is not causing any significant impacts to the channel or the Site.

One bankfull event was observed and documented on BCC and UT1 during Year 5 monitoring. Throughout the five-year monitoring period, at least five bank full events have been documented, four of which were in separate years; therefore the Site has met the final year’s hydrologic success criteria of at least two bankfull flow events in separate years and within the five-year monitoring period.

Vegetative areas of concern consist primarily of invasive species infestations that have taken hold in the Year 5 growing season. To sufficiently treat the multiple areas of invasive species, a combination of treatment applications will be used throughout the project site and will include herbicidal spray, basal application, and physical removal, when needed. All cuttings will be removed from the easement and disposed of properly.

Fencing concerns include a cattle barrier that has shifted and is not fully restricting potential cattle access into the restored sections of Big Cedar. Also of concern is a cattle access area located below Reach 4 of Big Cedar, outside the easement, but upstream of Reaches 5 & 6. Fencing concerns will be addressed and maintenance will be implemented prior to closeout.

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 et al, 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 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, and
- 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	Dec-13	Dec-13	May-14 (Final)

Table 3. Project Contact

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

Table 3. Project Contact

BCC Restoration Site: Project No. D06054-D	
Monitoring Performers	
Michael Baker Engineering, Inc.	5550 Seventy-Seven Center Drive, Suite 320 Charlotte, NC 28217
	<u>Contact:</u>
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

Table 4. Project Background

BCC Restoration Site: Project No. D06054-D	
BCC Reach 4	3rd
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 (Rosgen, 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, and
- 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 – 2013 YEAR 5 - 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

Fifth year monitoring dimension and profile data were collected from October through December 2013. Results from the fifth year monitoring data were compared with the As-built, Year 1, Year 2, Year 3, and Year 4 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 5. 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. Drop in bed elevations were a result of the installation of cross-vane structures upstream of these cross-sections. The change in bed elevations were noted in the 2011 monitoring report and have remained constant at comparable elevations in Year 4 and Year 5 surveys. In Year 4, Cross-Section 25 is shown to have migrated laterally toward the right bank; however, Year 5 shows this cross section to be in line with the as-built condition.

Taking into account all of the aforementioned changes in channel geometry as a result of the maintenance work, all cross-sections are currently stable and functioning as designed. Only minor fluctuations have occurred throughout the five-year monitoring period in respect to as-built conditions.

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

Longitudinal Profile

The Year 5 longitudinal profile was conducted in December 2013. A total of 3,532 LF of channel was resurveyed along representative sections of the restored reaches. Survey on BCC was conducted from As-built Station 12+07 to 18+02, and 47+00 to 57+20. Survey on UT1 started at As-built Station 13+76 to 30+82, while UT2 was resurveyed from As-built Station 10+18 to 12+29. The representative longitudinal profiles were resurveyed to document stream profile at the end of monitoring Year 5. Water surface elevations were also recorded along BBC, UT1, and UT2 at the time of the survey.

Pool-to-pool spacing and riffle slopes have predominantly remained consistent and are within the design parameters on the surveyed reaches throughout the five-year monitoring period. All riffles appear to be stable except for one on BCC Reach 3 at Station 51+60 – 52+02. Instability of this riffle

was not apparent during the field assessment; however, the profile reveals degradation of the riffle. The implementation of cross vanes at the tail of riffles during Year 3, have continued to hold grade and have provided additional scouring of some pools creating deeper pools and better habitat. 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. During Year 5, six pebble counts were conducted on Big Cedar, six on UT1, and two on UT2.

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 that were observed during the 2013 visual assessment included isolated areas of limited bank erosion along BCC Reach 3 (Station 46+90 – 47+30) and Reach 4 (Station 59+60 – 60+00) and UT1 Reach 4 (Station 56+60), minor filling and vegetation in the channel on UT1 (Station 43+25 – 43+75), and two abandoned beaver dams (BCC Reach 2, Stations 21+25 and 33+00). Any additional areas of concern previously noted, have since stabilized or are no longer active areas of concern. Table B.1 in Appendix B provides a summary of these problem areas. See Figures B1- B3 in Appendix B for an overview of all stream problem areas from the visual assessment. Table 5, below, quantitatively summarizes each of the observed reaches morphological stability while Table B.2 in Appendix B provides additional quantitative data to explain the visual assessment scores in more detail.

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%	100%
Pools	100%	100%	100%	100%	100%	100%
Thalweg	100%	84%	83%	100%	100%	100%
Meanders	100%	100%	100%	100%	100%	100%
Bed General	100%	98%	99%	100%	100%	100%
Bank Condition	100%	100%	100%	100%	100%	100%
Vanes / J Hooks etc.	-----	-----	-----	-----	-----	-----
Wads and Boulders	100%	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%	100%
Pools	100%	100%	91%	100%	100%	100%
Thalweg	100%	100%	93%	100%	100%	100%
Meanders	100%	100%	96%	100%	100%	100%
Bed General	100%	96%	95%	100%	100%	100%
Bank Condition	100%	100%	82%	100%	99%	100%
Vanes / J Hooks etc.	100%	93%	95%	100%	100%	100%
Wads and Boulders	100%	94%	88%	100%	100%	100%

Table 5. Visual Morphological Stability Assessment

BCC Restoration Site: Project No. D06054-D						
BCC Reach 3 (1,827 LF)						
Feature	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
Riffles	100%	97%	97%	100%	100%	100%
Pools	100%	100%	100%	100%	100%	100%
Thalweg	100%	100%	77%	100%	100%	100%
Meanders	100%	100%	95%	100%	100%	100%
Bed General	100%	100%	94%	100%	100%	100%
Bank Condition	100%	94%	93%	100%	100%	99%
Vanes / J Hooks etc.	100%	96%	92%	100%	100%	100%
Wads and Boulders	100%	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%	100%
Pools	100%	100%	100%	100%	100%	100%
Thalweg	100%	100%	67%	100%	100%	100%
Meanders	100%	92%	92%	100%	100%	100%
Bed General	100%	98%	88%	100%	100%	100%
Bank Condition	100%	88%	80%	100%	100%	99%
Vanes / J Hooks etc.	100%	100%	88%	100%	100%	100%
Wads and Boulders	100%	100%	100%	100%	100%	100%
BCC Reach 6 (1,046LF)						
Feature	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
Riffles	100%	100%	100%	100%	100%	100%
Pools	100%	100%	100%	100%	100%	100%
Thalweg	100%	100%	100%	100%	100%	100%
Meanders	100%	100%	100%	100%	100%	100%
Bed General	100%	100%	100%	100%	100%	100%
Bank Condition	100%	100%	98%	98%	100%	100%
Vanes / J Hooks etc.	100%	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%	100%
Pools	100%	100%	100%	100%	100%	100%
Thalweg	100%	100%	100%	100%	100%	100%
Meanders	100%	100%	100%	100%	100%	100%
Bed General	100%	100%	100%	100%	100%	100%
Bank Condition	100%	100%	100%	100%	100%	100%
Vanes / J Hooks etc.	-----	-----	-----	-----	-----	-----
Wads and Boulders	100%	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%	100%
Pools	100%	100%	100%	100%	100%	100%
Thalweg	100%	100%	100%	100%	100%	100%
Meanders	100%	100%	100%	100%	100%	100%
Bed General	100%	100%	100%	100%	100%	100%
Bank Condition	100%	100%	99%	100%	100%	100%
Vanes / J Hooks etc.	100%	100%	100%	100%	100%	100%
Wads and Boulders	100%	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%	100%
Pools	100%	100%	96%	100%	100%	100%
Thalweg	100%	100%	95%	100%	95%	100%
Meanders	100%	100%	100%	100%	100%	100%
Bed General	100%	100%	100%	100%	100%	99%
Bank Condition	100%	97%	82%	100%	100%	100%
Vanes / J Hooks etc.	100%	100%	100%	98%	100%	100%
Wads and Boulders	100%	100%	100%	100%	100%	100%
UT1 Reach 4 (1,121 LF)						
Feature	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
Riffles	100%	87%	87%	100%	100%	100%
Pools	100%	90%	90%	100%	100%	100%
Thalweg	100%	100%	71%	100%	100%	100%
Meanders	100%	100%	29%	100%	100%	100%
Bed General	100%	76%	87%	100%	100%	100%
Bank Condition	100%	90%	50%	100%	100%	99%
Vanes / J Hooks etc.	100%	100%	100%	100%	100%	100%
Wads and Boulders	100%	100%	40%	100%	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%	100%
Bank Condition	100%	100%	100%	100%	100%	100%
Vanes / J Hooks etc.	-----	-----	-----	-----	-----	-----
Wads and Boulders	-----	-----	-----	-----	-----	-----

Table 5. Visual Morphological Stability Assessment

BCC Restoration Site: Project No. D06054-D						
UT1B (34 LF)						
Feature	Initial	MY-01	MY-02	MY-03	MY-04	MY-05
Riffles	----	----	----	----	----	----
Pools	----	----	----	----	----	----
Thalweg	----	----	----	----	----	----
Meanders	----	----	----	----	----	----
Bed General	100%	100%	100%	100%	100%	100%
Bank Condition	100%	100%	100%	100%	100%	100%
Vanes / J Hooks etc.	100%	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%	100%
Bank Condition	100%	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%	100%
Pools	100%	100%	100%	100%	100%	100%
Thalweg	100%	100%	100%	100%	96%	96%
Meanders	100%	100%	86%	100%	100%	100%
Bed General	100%	100%	97%	100%	100%	100%
Bank Condition	100%	100%	73%	100%	96%	100%
Vanes / J Hooks etc.	100%	100%	96%	100%	100%	100%
Wads and Boulders	100%	100%	75%	100%	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%	100%
Bank Condition	100%	100%	100%	100%	100%	100%
Vanes / J Hooks etc.	100%	100%	100%	100%	100%	100%
Wads and Boulders	----	----	----	----	----	----

4.2 Hydrology Data

On-site crest gauges documented the occurrence of at least one bank full event during the fifth year monitoring period. Throughout the five-year monitoring period, at least five bank full events have been documented, four of which were in separate years. The highest stages recorded on Site throughout the five year monitoring period were 0.41 feet on Big Cedar and 0.33 feet on UT1. The Site has met the final year's hydrologic success criteria of at least two bank full flow events in separate years and within the 5-year monitoring period. All bank full events documented throughout the five-year monitoring period are summarized in Table 6. The Site's crest gauge locations are included in the As-built plan sheets in Appendix D. Crest gauge verification photos for Year 5 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	3/4/2009	Unknown	Crest Gauge	0.2	See Yr. 1 Monitoring Report (BCC CG)
	12/8/2010	Between 3/4/2009 and 12/8/2010	Crest Gauge	0.14	See Yr. 2 Monitoring Report (BCC Crest Gauge – 12/8/10)
	2/22/2012	Between 12/8/2010 and 2/22/12	Crest Gauge	0.41	See Yr.3 Monitoring Report (BCC Crest Gauge – 2/22/12)
	9/24/2012	Between 2/22/12 and 9/24/12	Crest Gauge	0.23	See Yr.4 Monitoring Report (BCC Crest Gauge – 9/24/12)
	12/3/2013	Between 9/24/12 and 12/3/2013	Crest Gauge	0.41	BCC Crest Gauge - 12/3/2013
UT1 - Reach 4	3/4/2009	Unknown	Crest Gauge	0.25	See Yr. 1 Monitoring Report (UT1 CG)
	10/10/2010	Between 3/4/2009 and 12/10/2010	Crest Gauge	0.21	See Yr.2 Monitoring Report (UT1 Crest Gauge – 10/10/10)
	2/22/2012	Between 12/10/2010 and 2/22/12	Crest Gauge	0.26	See Yr.3 Monitoring Report (UT1 Crest Gauge – 2/22/12)
	9/26/2012	Between 2/22/12 and 9/26/12	Crest Gauge	0.21	See Yr.4 Monitoring Report (UT1 Crest Gauge – 9/26/12)
	12/3/2013	Between 10/22/2013 and 12/3/2013	Crest Gauge	0.33	UT1 Crest Gauge - 12/3/2013

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 et al, 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 5 density of planted bare root stems, based on the data from the 23 monitoring plots, is 680 stems per acre. The vegetation monitoring indicated a survivability range of 400 stems per acre to 880 stems per acre. Woody stem volunteers were flagged in Year 4 and Year 5 and were included as part of the vegetation counts. The Site has met the Year 5 vegetative success criteria of 260 trees 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

The majority of the Site's floodplain and streambanks have established good vegetative cover. As discussed previously in Section 4.1.2, Year 5 monitoring did identify some isolated areas where bank vegetation was minimal and erosion has occurred. In addition, there are limited areas within the floodplain where herbaceous vegetation is sparse due to poor and rocky soil conditions. Though herbaceous vegetation is sparse in these areas, erosion is minimal and planted woody vegetation has become established; therefore, no additional planting is needed.

Though a variety of invasive vegetation species are present throughout the Site, the establishment of *Ligustrum sinense* (Chinese privet) infestations are the most dominant. Vegetation Plots 11, 13, 15, 19, and 23 were identified as having a high population density of invasive vegetation species (Figure C1). In order to control invasive species populations throughout the Site, an herbicidal treatment and/or the physical removal of invasive vegetation species will be conducted prior to closeout. See Table C.6 in Appendix C for problem area categories, locations, descriptions, causes, and photo log.

4.3.2 Vegetative Problem Area Plan View

See Figures C1 – C5 in Appendix C for an overview of all vegetative problem areas.

4.4 Benthic Macroinvertebrate Monitoring Data

Field sampling was conducted by Kristi Suggs and Renee Flinchum-Bowles 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 between October 15th and 17th of 2013. 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, and pH were also recorded at each site. Specific conductivity had been recorded in previous monitoring years; however, it was not recorded during Year 5 collection period because the monitoring device was not

functioning properly at this time. 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

In a riparian ecosystem, benthic macroinvertebrates make up the fundamental foundation of the system's food chain. Because health and sustainability of the system is so interdependent upon its interaction with the benthic community, the health of the biological community is often assessed based on the health of its benthic community. The health of a benthic community is measured by the abundance and diversity of benthic taxa present, as well as, the pollution tolerance of the taxa present. Therefore, a benthic community with a higher ratio of diverse pollutant intolerant taxa may be healthier than a higher density community with a diverse ratio of pollutant tolerant taxa.

Year 5 post-construction sampling results in comparison to pre-construction sampling results, at all sampling sites, show an increase in diversity and abundance of less pollution tolerant benthic taxa, as well as, all taxa. In addition, post restoration monitoring results at Sites 2, 3, and 4 show a general trend in biological distributions similar to that observed at Site 1, the reference site.

Year 5 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. Since the health of the biological community in a riparian ecosystem is dependent on the health of its benthic community, it is anticipated that the health of the benthic community's ecosystem will continue to improve as the project and buffer matures and more communities continue to recolonize. Therefore, it is anticipated that the quantity and quality of the entire biological community will continue to successfully improve.

A comparison between the pre- and post-construction monitoring results is presented in Table 7 with complete results presented in Table F.1 in Appendix F.

Table 7. Summary of Pre-Restoration vs. Post-Restoration Benthic Macroinvertebrate Sampling Data

Big Cedar Creek 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	Post	Pre	Post	Post	Post	Pre	Post	Post	Post	Pre	Post	Post	Post
	9/13/06	9/28/11	10/5/12	10/17/13	9/13/06	9/28/11	10/5/12	10/17/13	9/13/06	9/26/11	10/8/12	10/15/13	9/14/06	9/26/11	10/4/12	10/16/13
Total Taxa Richness	20	7	13	42	15	26	29	38	19	22	25	37	16	11	19	22
EPT Taxa Richness	1	0	4	10	1	3	3	11	0	5	3	8	0	3	2	4
Total Biotic Index	6.76	6.95	5.15	6.61	7.85	7.57	7.14	7.07	8.39	5.85	7.67	6.55	8.18	7.8	8.74	7.79
EPT Biotic Index	7.2	n/a	3.9	5.4	2.5	7.14	6.8	5.2	0	6.34	7.3	5.5	0	7.27	6.55	7
Dominance in Common (%)	29.4%	41.2%	46.4%	18.8%	53.6%	21.5%	29.6%	13.2%	39.6%	11.2%	32.5%	14.2%	23.2%	20.0%	27.8%	11.2%
Habitat Assessment Rating	82	89	78	107	62	88	84	132	72	89	87	95	63	89	84	122
Water Temperature (°C)	19.5	21.8	18.5	18	18	22.8	18.7	18.9	19.1	22.2	15.4	18	21	21.9	21.9	18
% Dissolved Oxygen (DO)	46.5	84.8	N/A	72.6	N/A	89.2	N/A	79.3	28.2	94.1	N/A	52.8	72.1	89.5	54.5	42
DO Concentration (mg/l)	4.16	7.45	7.95	7.01	6.06	7.67	6.08	7.35	2.6	8.17	6.5	5	6.42	N/A	4.75	3.97
pH	6.99	6.6	7.74	7.9	6.78	6.2	7	7.68	6.87	6.72	7.84	7.04	6.78	6.44	6.3	7.32
Conductivity (µmhos/cm)	170	120	170	N/A*	170	120	190	N/A*	23	150	190	N/A*	190	150	160	N/A*

* Conductivity meter was not working during sampling period so no measurement was recorded.

4.4.2 Habitat Assessment Results and Discussion

Site 1, the reference site, received a 107 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 and were slightly embedded with sands. Pools were frequent but predominantly shallow and filling with silts. Severe erosion was evident in a majority of the outer meander bends. Site 1 had a mature hardwood buffer with minimal canopy breaks and a riparian zone of greater than fifty feet from each top of bank; however, the floodplain understory was infested with Chinese privet. Snags, leaf packs, and root mats were present but not common. A majority of the root mats were not submerged within the water column.

Site 2 is located on Reach 2 within a Priority I Restoration section of Big Cedar Creek. The site is downstream of a cattle crossing and maintenance work was conducted within this section of the channel prior to Year 4 monitoring. Post-maintenance work, the site continues to exhibit 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 a variety of herbaceous species, grasses, young hardwood trees and woody shrubs; therefore, providing only partial stream shading. Numerous types of in-stream habitat including rocks, snags, logs, macrophytes, and leafpacks were present. A habitat assessment score of 132 shows that the site continues to improve in respect to stability and habitat diversity.

Site 3 is located in Reach 6 within an Enhancement II section of Big Cedar Creek. No maintenance work was conducted within this section. The Site received a 95 on the Habitat Assessment Field Data Sheet. Bedform diversity is good, but somewhat dominated by long runs. 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, and Chinese privet is common in the understory. Aquatic habitat in the form of rocks, sticks, and leaf packs were common while snags, logs, undercut banks, and root mats were rare.

Site 4 is located on Reach 3 within a Priority I Restoration section of UT1. Maintenance work was also conducted within the vicinity of the sampling location prior to Year 4 monitoring. This site received a habitat assessment score of 122. Water levels and flow velocities were below normal at the time of sampling. Riffles consisted of a mix of gravel, cobble, and boulders and embeddedness was minimal. Pools were frequent and bottoms consisted of a mix of silts and sand. Small 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 young hardwoods and woody shrubs; however, the stream receives a moderate amount of shade due to quickly maturing woody vegetation along the top of the stream banks. 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 at all sampling sites were within water quality norms for Piedmont streams (NCDWQ, 2007), except for dissolved oxygen at Site 4. 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 a few localized areas of observed bank erosion along Big Cedar and UT1 and some isolated areas of in-channel vegetation, predominantly on UT1, because of frequent and extended periods of low flow

conditions throughout the monitoring period. Areas of active bank erosion may need to be repaired prior to project closeout. Beaver activity was documented in monitoring Years 3 through 5. Currently all beavers and their habitats have been removed; however, past beaver presence can still be noted in areas where their activities occurred. Currently these areas are not causing any significant impacts to the channel or the Site.

Vegetative areas of concern consist primarily of invasive species infestations that have taken hold in the Year 5 growing season. These areas have multiplied quickly and occur throughout the entire project site; however, they are predominantly located along fence/easement lines where infestations outside of the easement can easily migrate into the easement and/or in areas where construction equipment accessed the Site between Year 3 and Year 4 monitoring to conduct maintenance work. To sufficiently treat the multiple areas of invasive species, a combination of treatment applications will be used throughout the project site and will include herbicidal spray, basal application, and physical removal, when needed. All cuttings will be removed from the easement and disposed of properly.

Fencing maintenance areas of concern are located downstream of Big Cedar Reach 4. One concern is a cattle barrier that has shifted; therefore, leaving an access area for cattle to enter the restored section of Big Cedar. To better exclude cattle from the restored section of the project, the cattle barrier will be readjusted and re-tied to the easement fence. Another concern consists of cattle access to Big Cedar outside the easement but upstream of Reach 5 & 6. Because this location serves as a conduit for pasture rotation among the three adjoining pastures and as the only source of drinking water for the livestock, the cattle access area was reevaluated. Upon review, it was determined that the crossings upstream of the railroad culvert are excessively wide. Because repair options are limited, Baker proposes to reduce the width of each crossing and add additional stone to the crossings. These measures will help limit cattle access outside of the hardened surface, improve the stability at the crossings, and minimize water quality concerns. See Figure 4 in Appendix A for a depiction of the proposed crossing revisions.

5.0 REFERENCES

- Goldsmith, R., D. J. Milton, and J. W. Horton, Jr. 1988. Geologic map of the Charlotte 1 degree by 2 degree quadrangle, North Carolina and South Carolina. Scale 1:250,000. Miscellaneous Investigations Series I-1251-E. Reston, VA: U.S. Geological Survey.
- Lee, M., Peet R., Roberts, S., Wentworth, T. 2007. CVS-NCEEP Protocol for Recording Vegetation, Version 4.1.
- Medina, M.A., Reid, J.C., Carpenter, R.H. 2004. Physiography of North Carolina Map. North Carolina Geologic Survey. Raleigh, NC.
- North Carolina Division of Water Quality (NCDWQ). 2012. Standard Operating Procedures for Benthic Macroinvertebrates.
- NCDWQ. 2007. North Carolina Administrative Code 15A NCAC 2B: Redbook.
- NCDWQ. 2006. Standard Operating Procedures for Benthic Macroinvertebrates.
- NCDWQ. 2001. Interim, Internal Technical Guide: Benthic Macroinvertebrate Monitoring Protocols for Compensatory Stream Restoration Projects.
- Rosgen, D. L. 1994. A Classification of Natural Rivers. *Catena* 22:169-199.

Appendix A

Figure 1. Vicinity Map

Figure 2. Project Summary Map

Figure 3. Macroinvertebrate Monitoring Map

Figure 4. Proposed Steam Crossing Revisions

To visit 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 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.

The subject project site is an environmental restoration site of the NCDENR Ecosystem Enhancement Program (EEP) and is encompassed by a recorded conservation easement, but is bordered by land under private ownership. Accessing the site may require traversing areas near or along the easement boundary and therefore access by the general public is not permitted. Access by authorized personnel of state and federal agencies or their designees/contractors involved in the development, oversight and stewardship of the restoration site is permitted within the terms and timeframes of their defined roles. Any intended site visitation or activity by any person outside of these previously sanctioned roles and activities requires prior coordination with EEP.

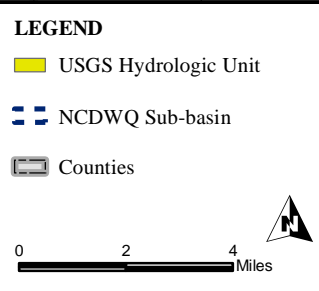
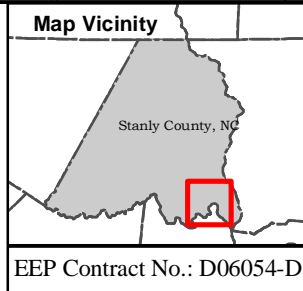
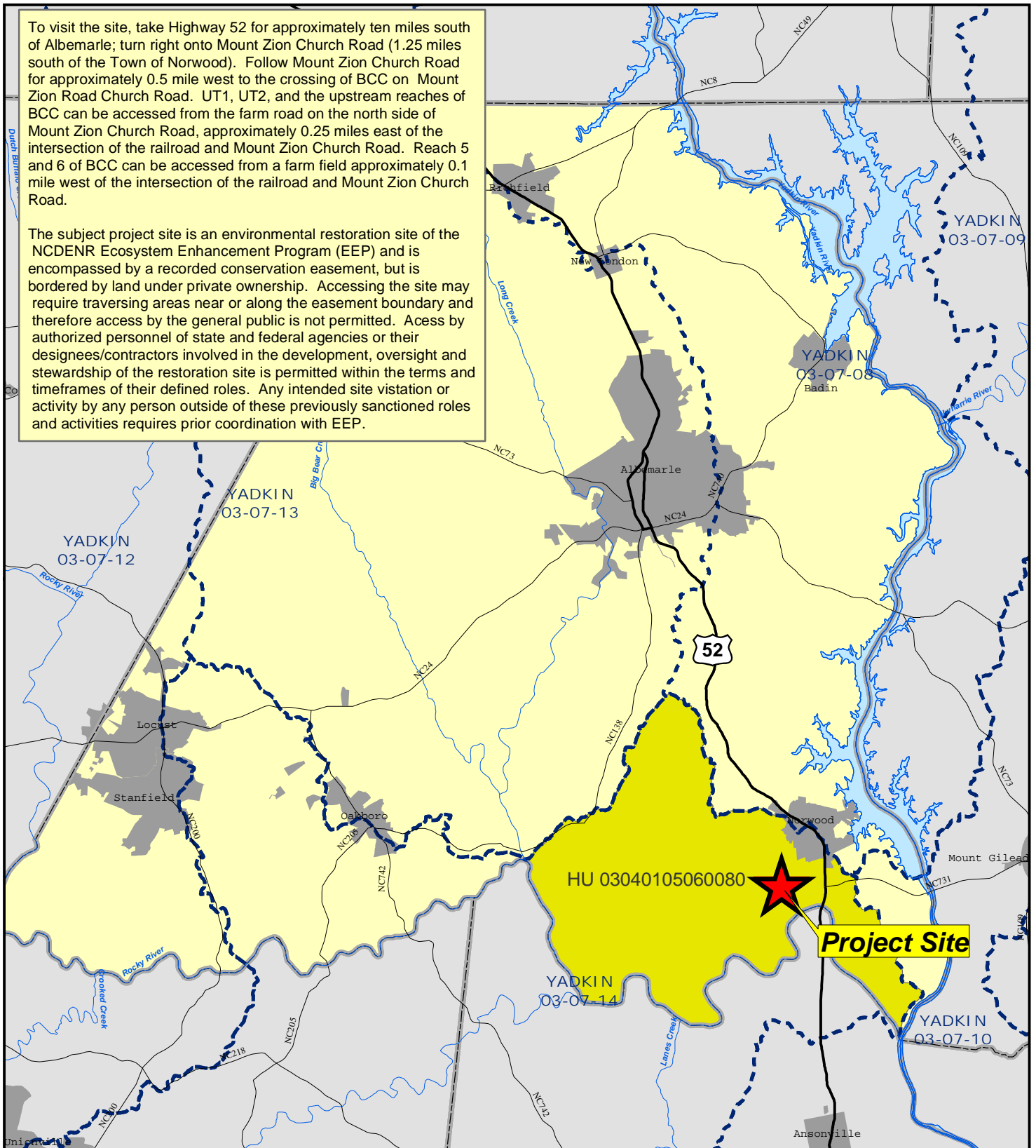

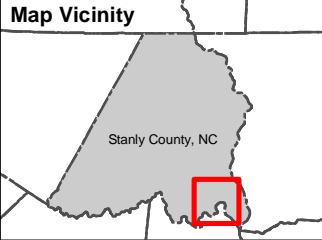









Figure 1: Vicinity Map
Big Cedar Creek Stream Restoration Project
 Annual Monitoring Plan - Year 5
 Stanly County, NC

May 2014



	Map Vicinity 	LEGEND <ul style="list-style-type: none">  Parcels  Conservation Easement  Enhancement  Preservation  Restoration 	Figure 2: Restoration Summary Big Cedar Creek Stream Restoration Project Annual Monitoring Plan - Year 5 Stanly County, NC
	EEP Contract No.: D06054-D		



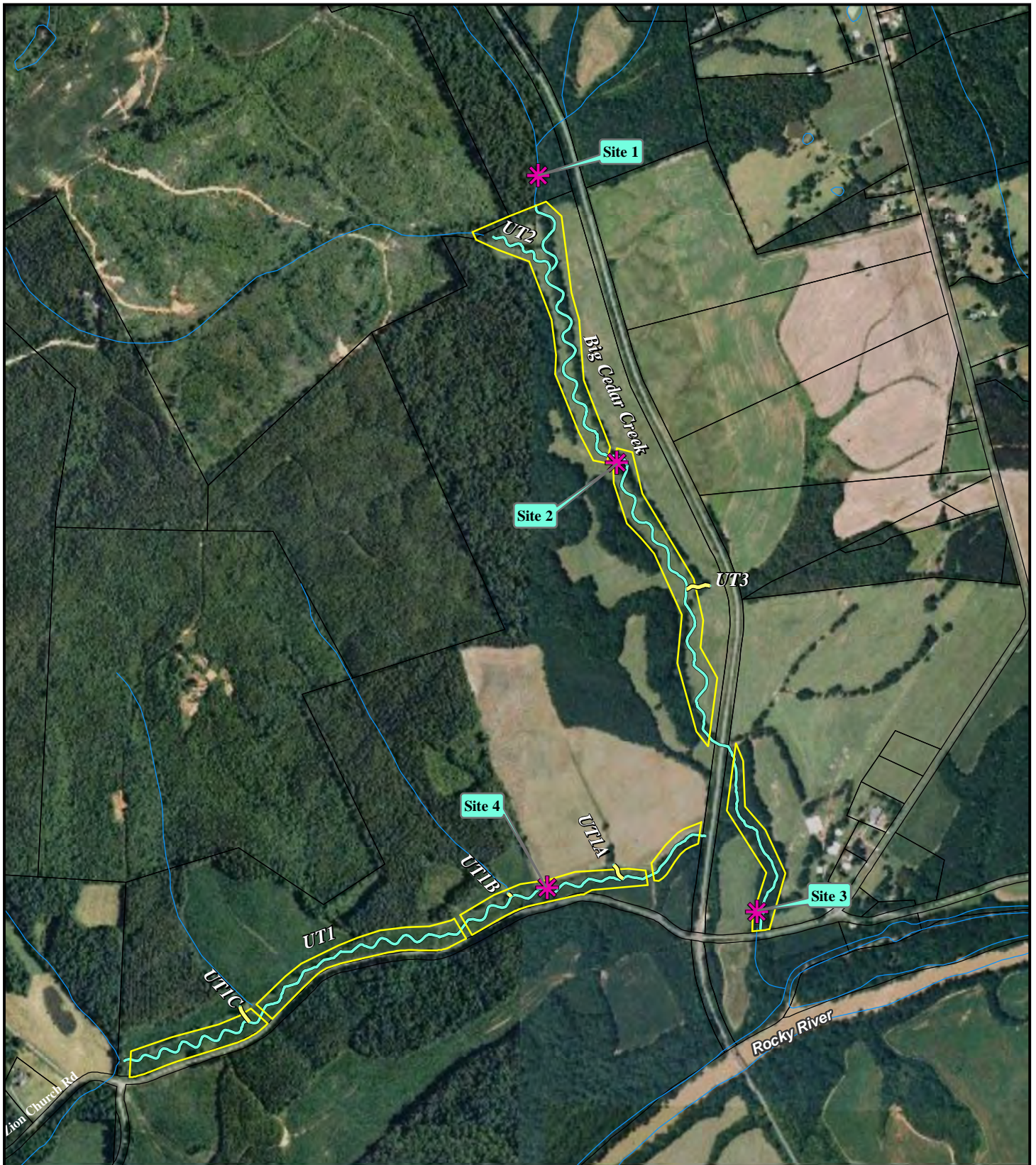


Figure 3: Benthic Macroinvertebrate Sampling Sites
Big Cedar Creek Stream Restoration Project
 Annual Monitoring Plan - Year 5
 Stanly County, NC



Map Vicinity

Stanly County, NC

EEP Contract No.: D06054-D

LEGEND

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

0 500 1,000 Feet

May 2014



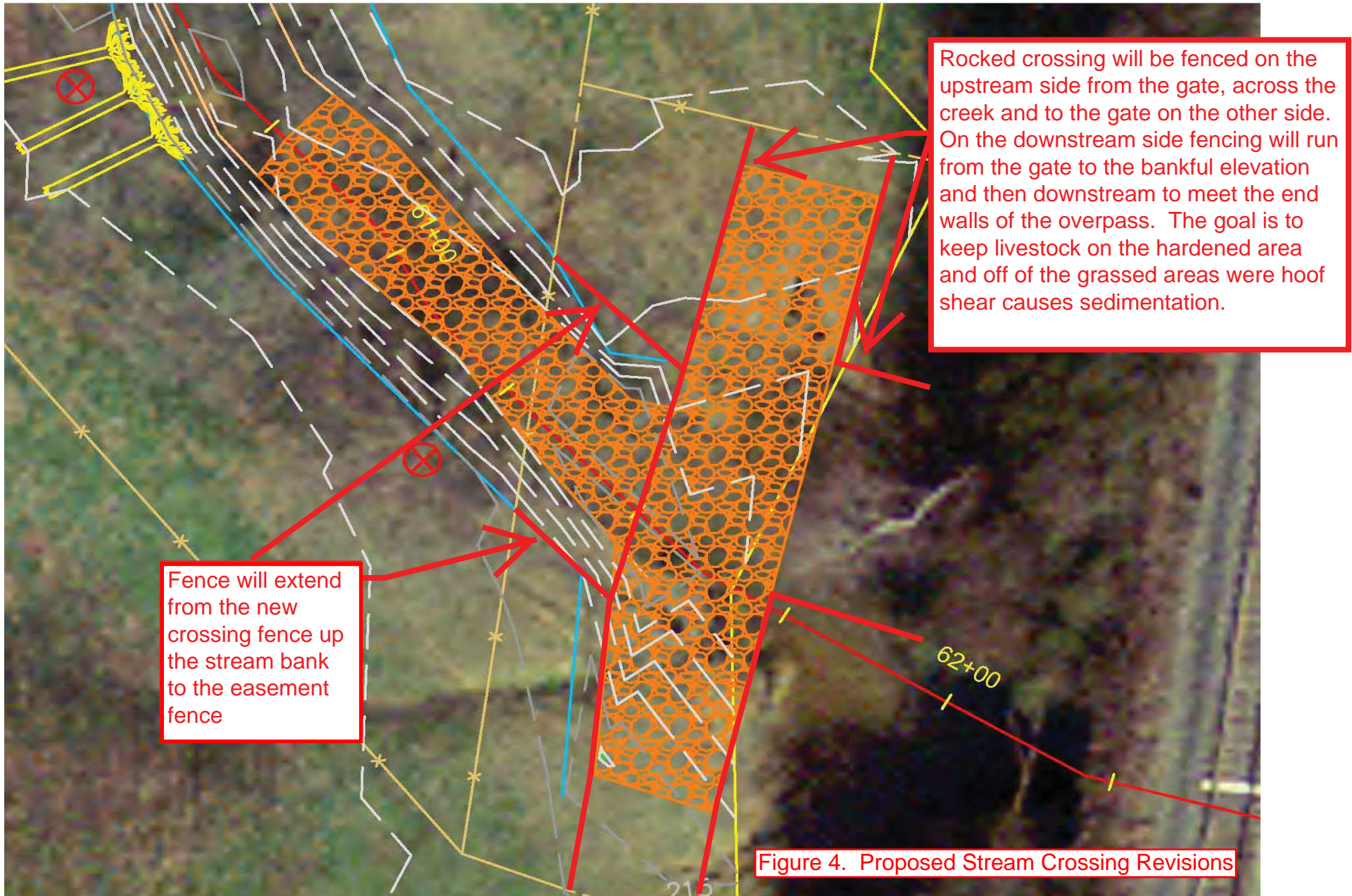


Figure 4. Proposed Stream Crossing Revisions

Appendix B

Morphological Summary Data

Cross-section Plots

Profile Plots

Morphology Data Table 8 & 9

Pebble Count Analysis and Data Sheets

Tables B.1 & B.2

Representative Stream Problem Area Figures B1- B3

Representative Stream Problem Area Photos

Permanent Cross Section X1
 (Year 5 Monitoring Data - collected November 2013)

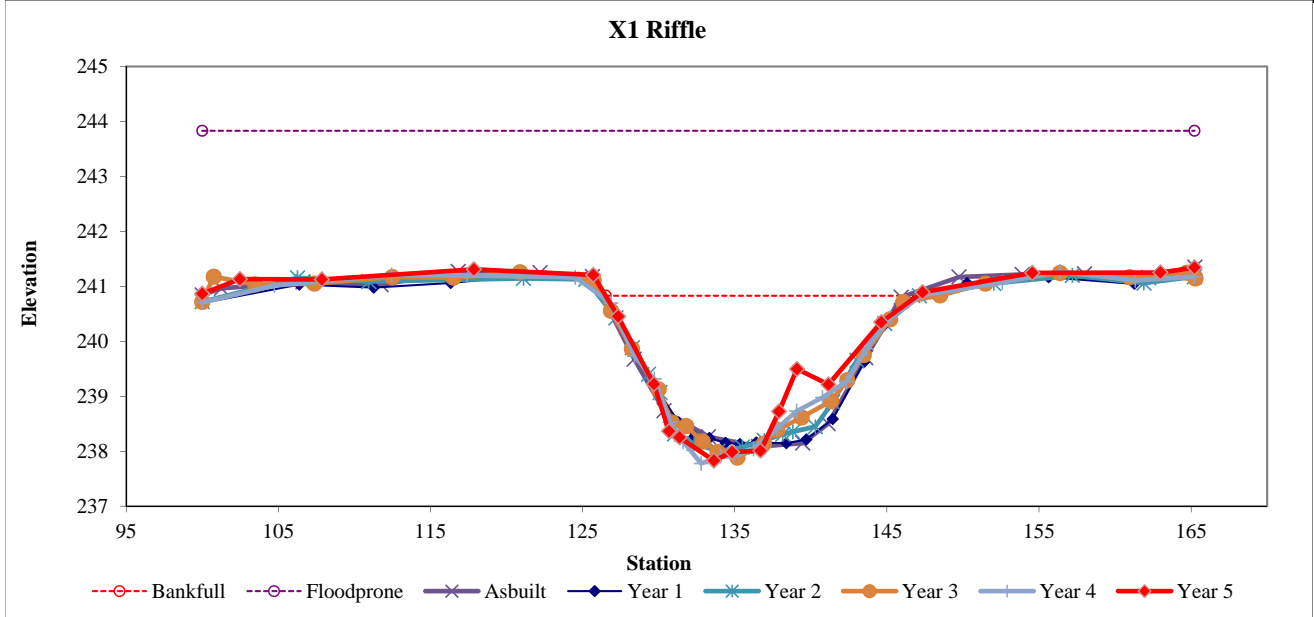


Looking at the Left Bank



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	33.7	20.5	1.6	3.0	12.5	1.0	3.2	240.8	240.9



Permanent Cross Section X2
(Year 5 Monitoring Data - collected November 2013)

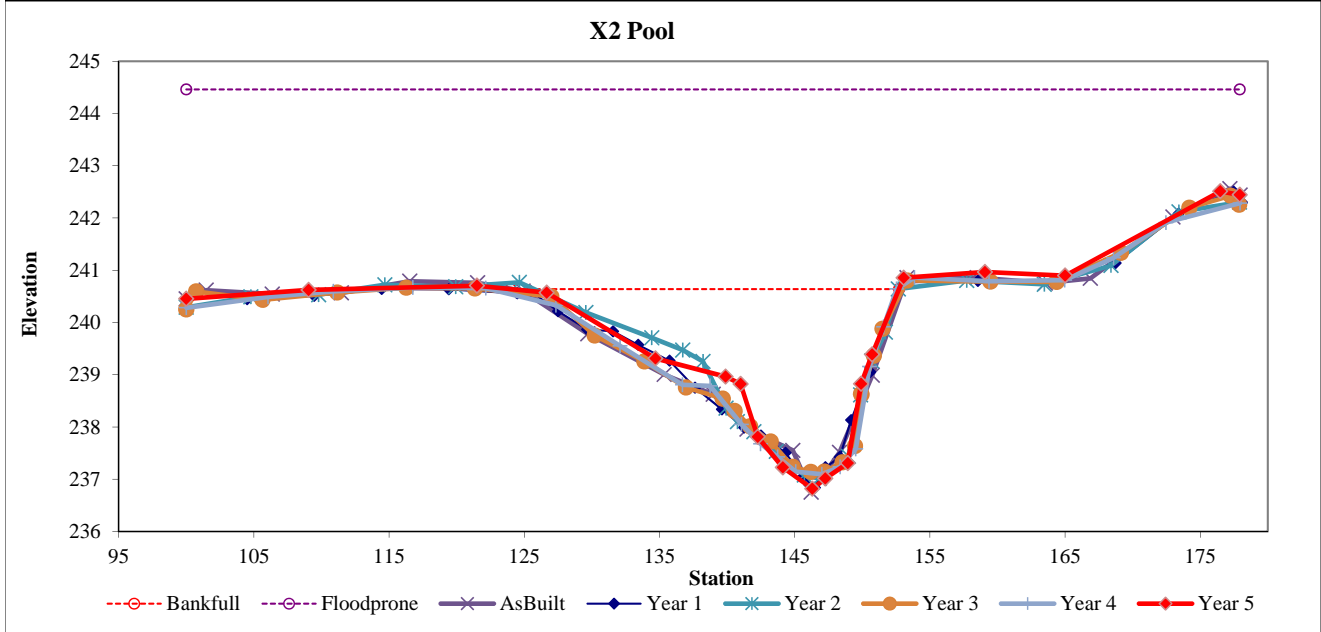


Looking at the Left Bank



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		46.5	28.7	1.6	3.8	17.8	1.0	2.7	240.6	240.6



Permanent Cross Section X3
(Year 5 Monitoring Data - collected November 2013)



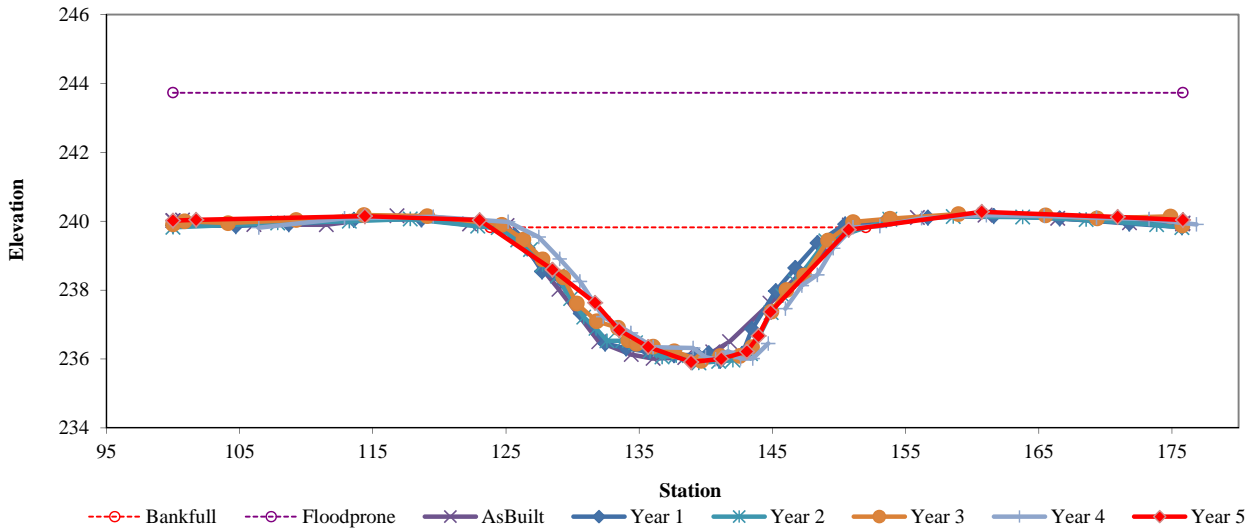
Looking at the Left Bank



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	60.7	28.2	2.2	3.9	13.1	1.0	2.7	239.8	239.8

X3 Riffle



Permanent Cross Section X4
 (Year 5 Monitoring Data - collected November 2013)

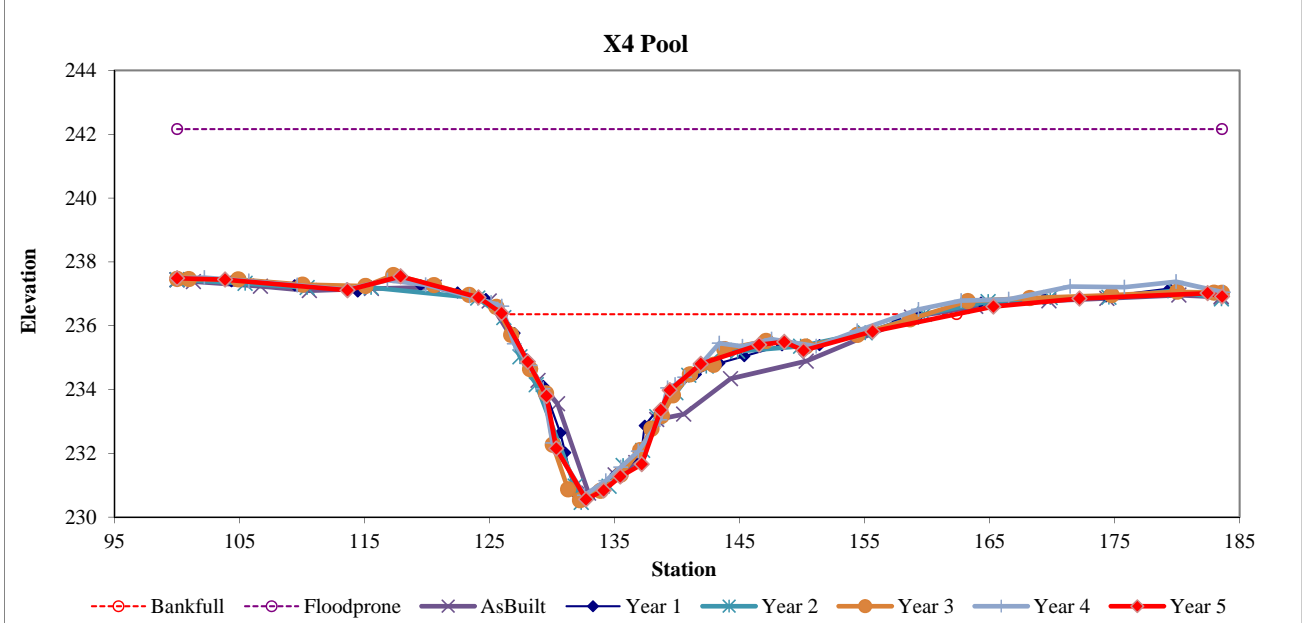


Looking at the Left Bank



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		71.0	36.4	2.0	5.8	18.6	1.0	2.3	236.4	236.6



Permanent Cross Section X5
(Year 5 Monitoring Data - collected November 2013)

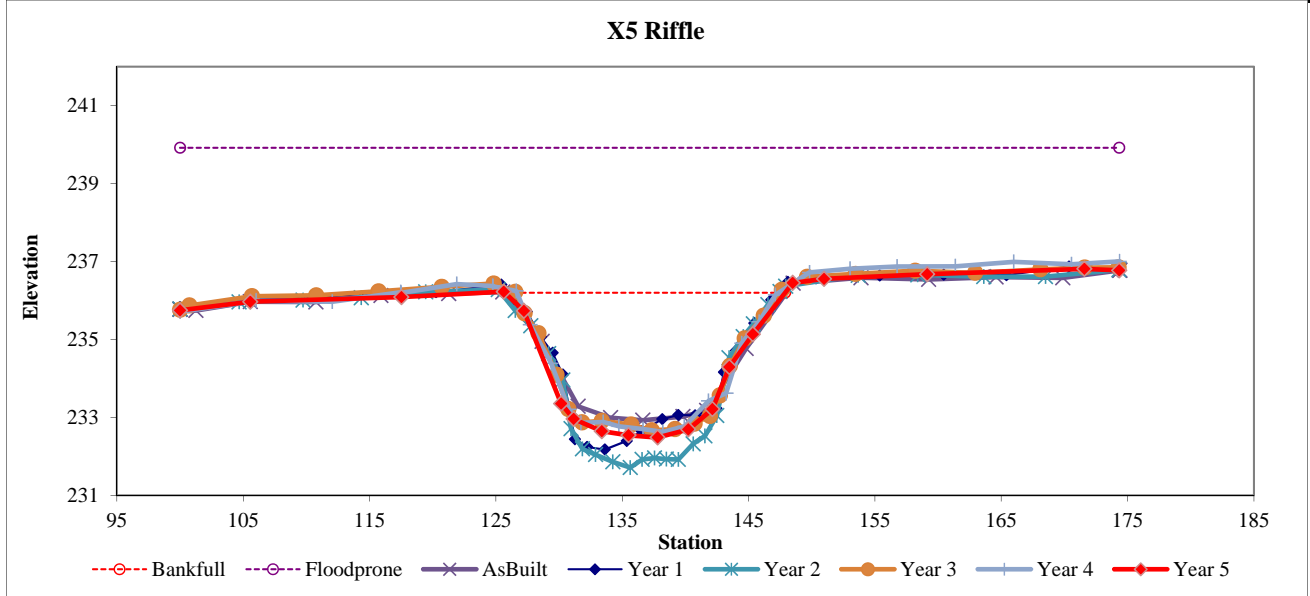


Looking at the Left Bank



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	54.3	22.2	2.5	3.7	9.1	1.0	3.3	236.2	236.2



Permanent Cross Section X6
 (Year 5 Monitoring Data - collected November 2013)

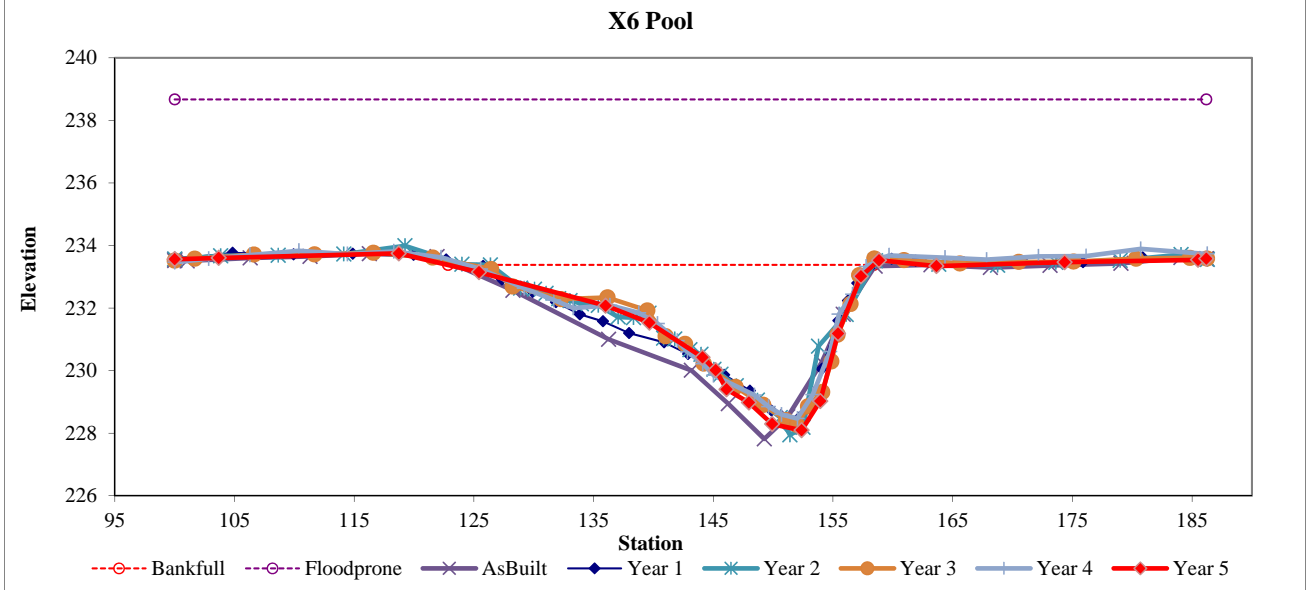


Looking at the Left Bank



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		76.5	35.6	2.2	5.3	16.5	1.0	2.4	233.4	233.2



Permanent Cross Section X7
 (Year 5 Monitoring Data - collected November 2013)

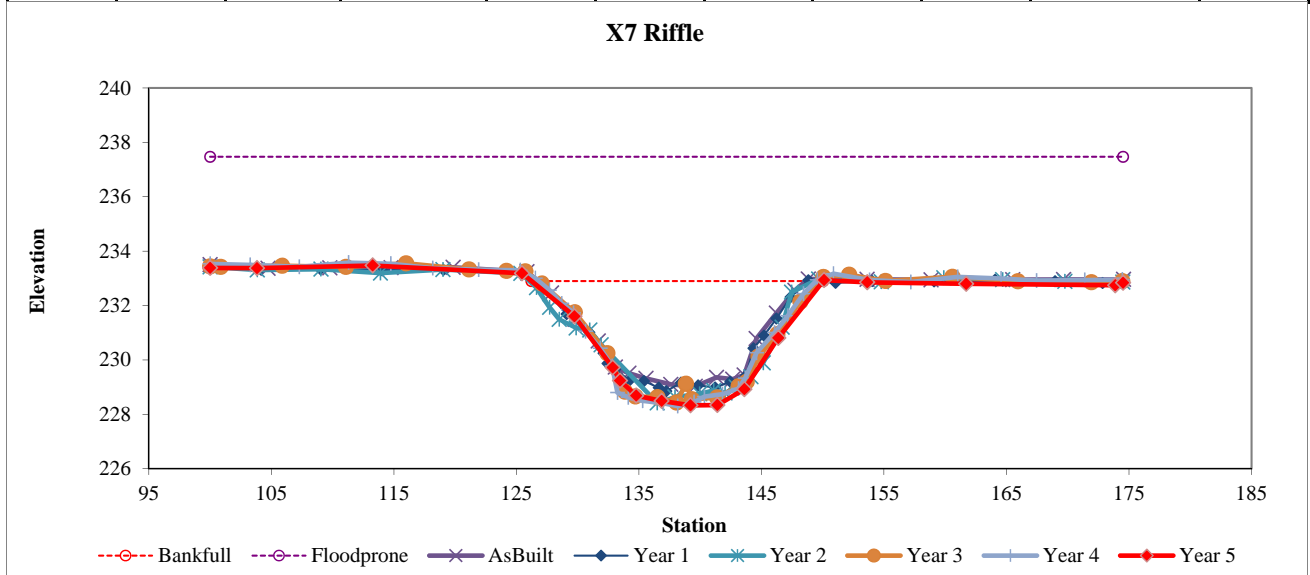


Looking at the Left Bank



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	67.7	23.8	2.8	4.6	8.4	1.0	3.1	232.9	232.9



Permanent Cross Section X8
 (Year 5 Monitoring Data - collected November 2013)



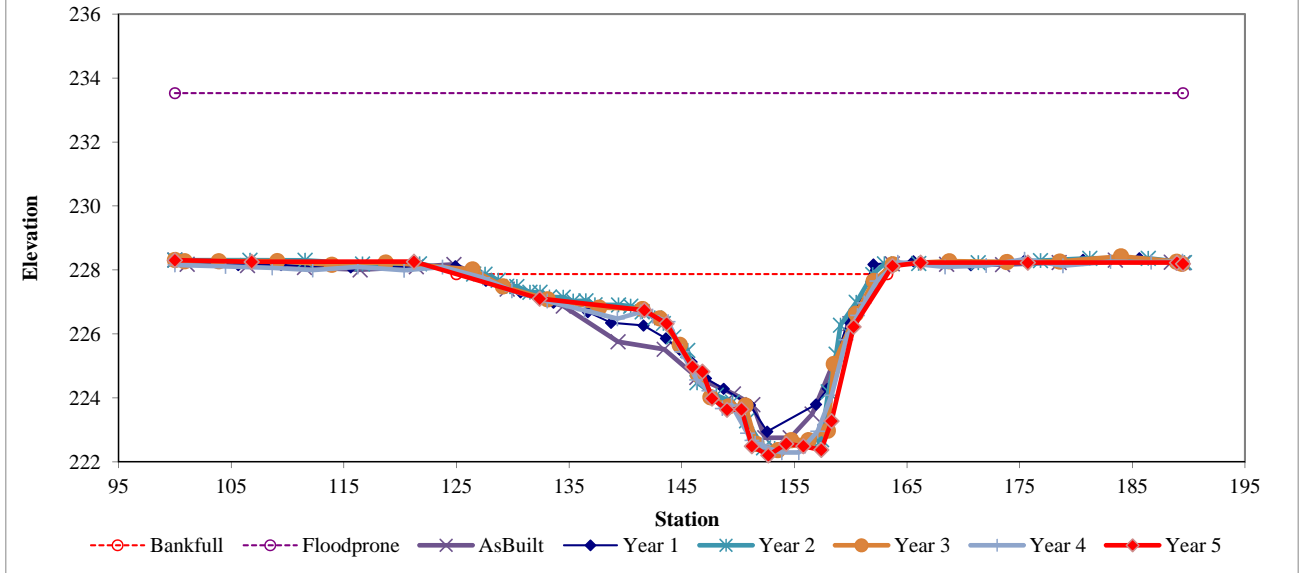
Looking at the Left Bank



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		87.0	38.3	2.3	5.7	16.8	1.0	2.3	227.9	228.1

X8 Pool



Permanent Cross Section X9
 (Year 5 Monitoring Data - collected November 2013)

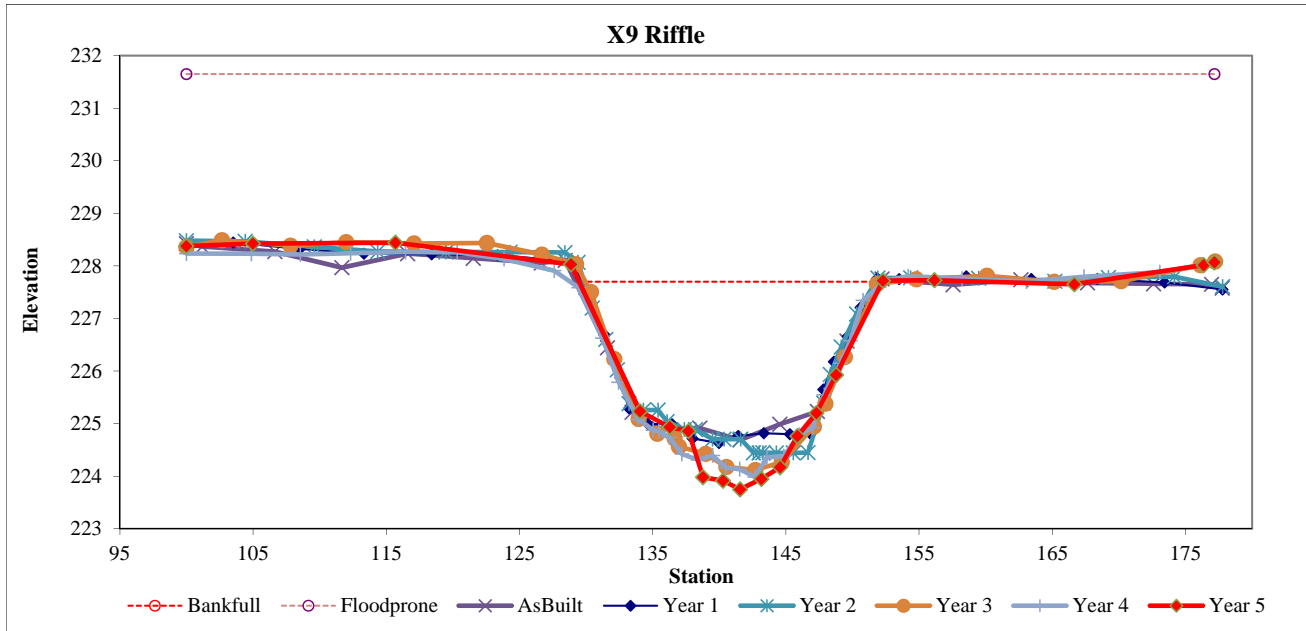


Looking at the Left Bank



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	55.2	22.8	2.4	4.0	9.4	1.0	3.4	227.7	227.7



Permanent Cross Section X10
 (Year 5 Monitoring Data - collected November 2013)

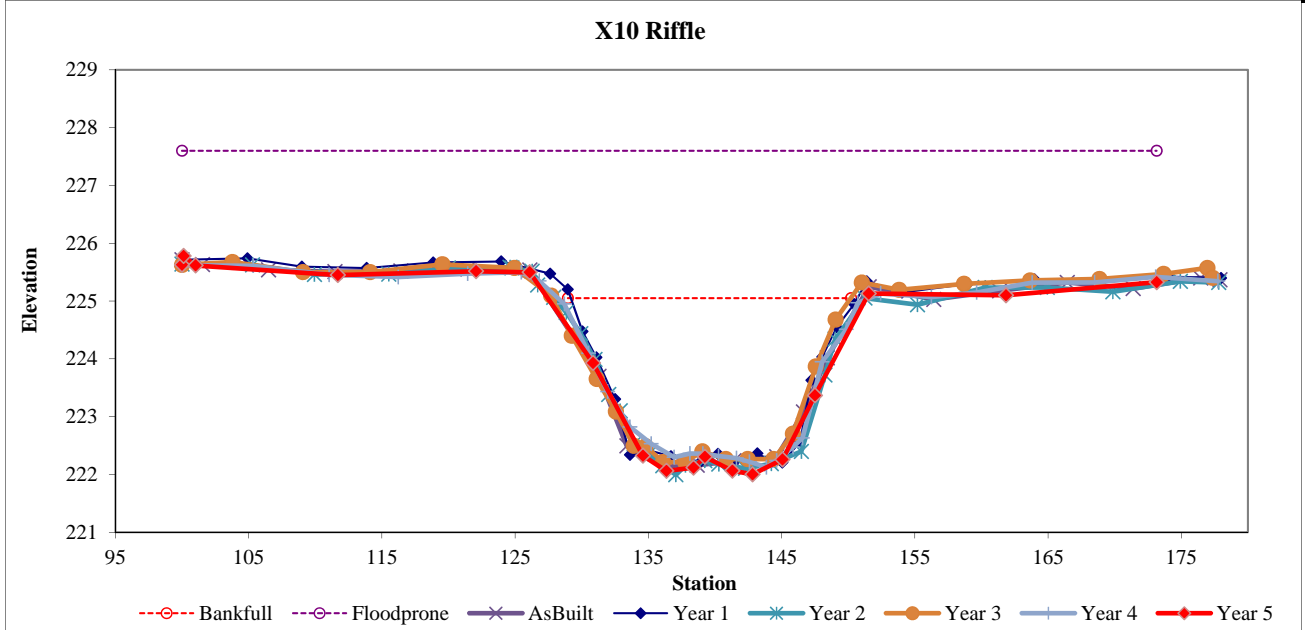


Looking at the Left Bank



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	37.0	21.2	1.7	2.6	12.2	1.2	3.4	225.1	225.6



Permanent Cross Section X11
(Year 5 Monitoring Data - collected November 2013)



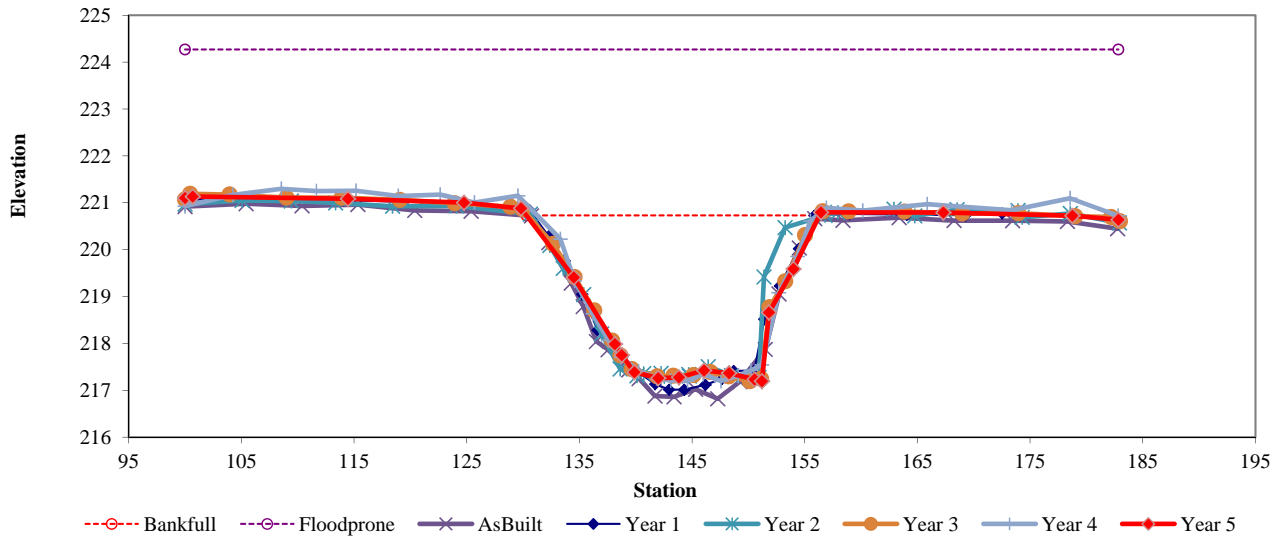
Looking at the Left Bank



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	60.6	26.0	2.3	3.5	11.2	1.0	3.2	220.7	220.8

X11 Riffle



Permanent Cross Section X12
(Year 5 Monitoring Data - collected November 2013)

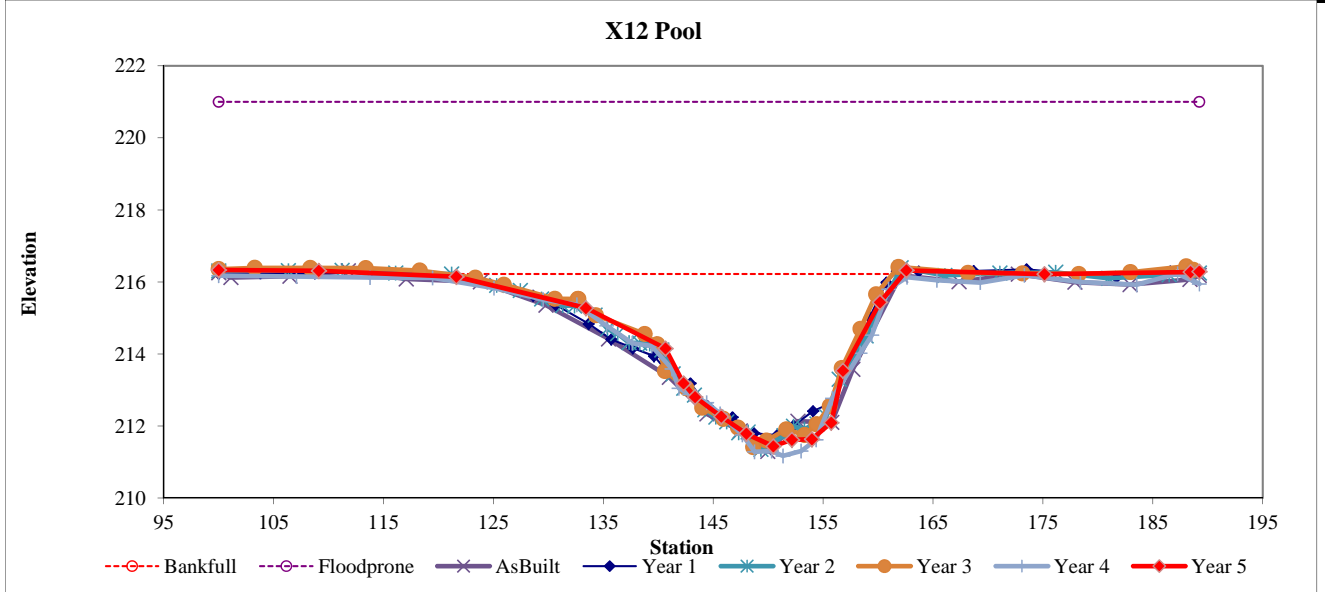


Looking at the Left Bank



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		88.6	46.4	1.9	4.8	24.3	1.0	1.9	216.2	216.1



Permanent Cross Section X13
(Year 5 Monitoring Data - collected November 2013)

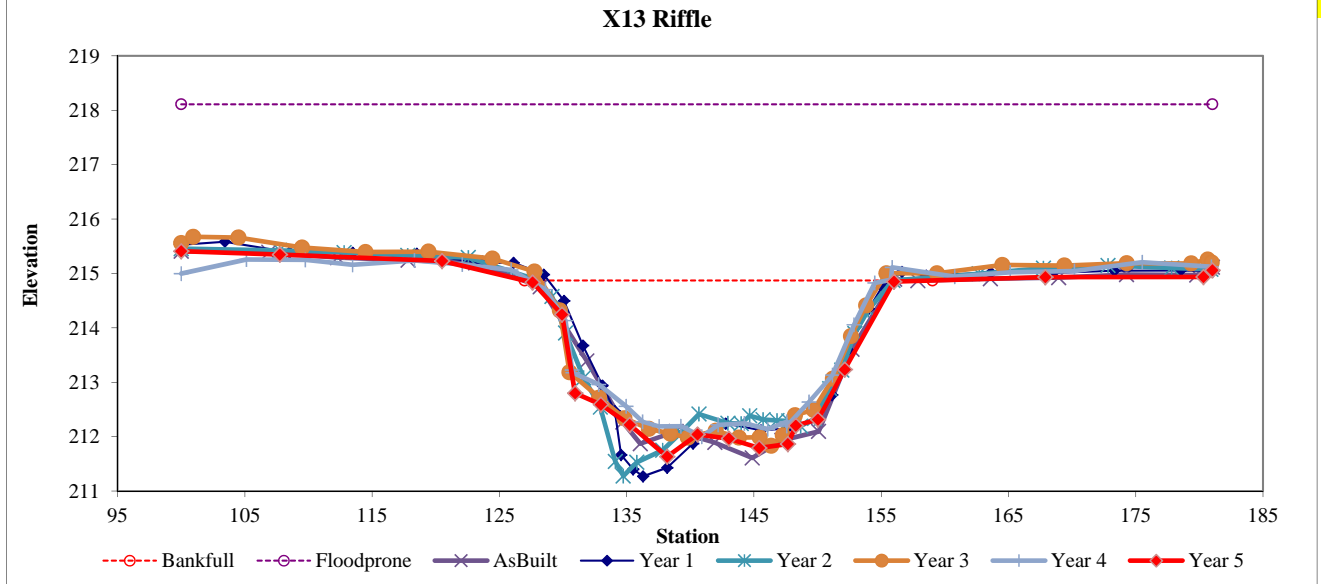


Looking at the Left Bank



Looking at the Right Bank

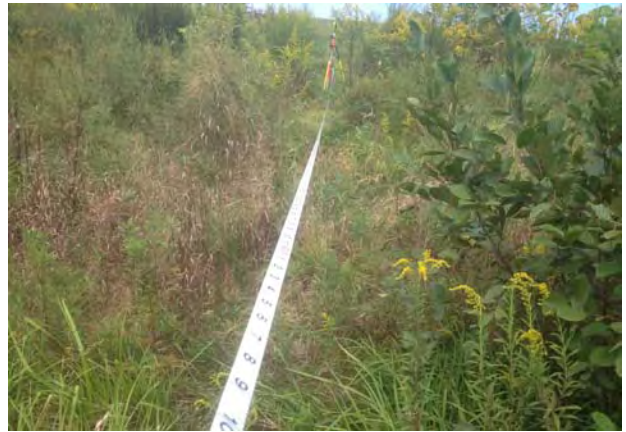
Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	63.1	32.1	2.0	3.2	16.3	1.0	2.5	214.9	214.8



Permanent Cross Section X14
(Year 5 Monitoring Data - collected November 2013)

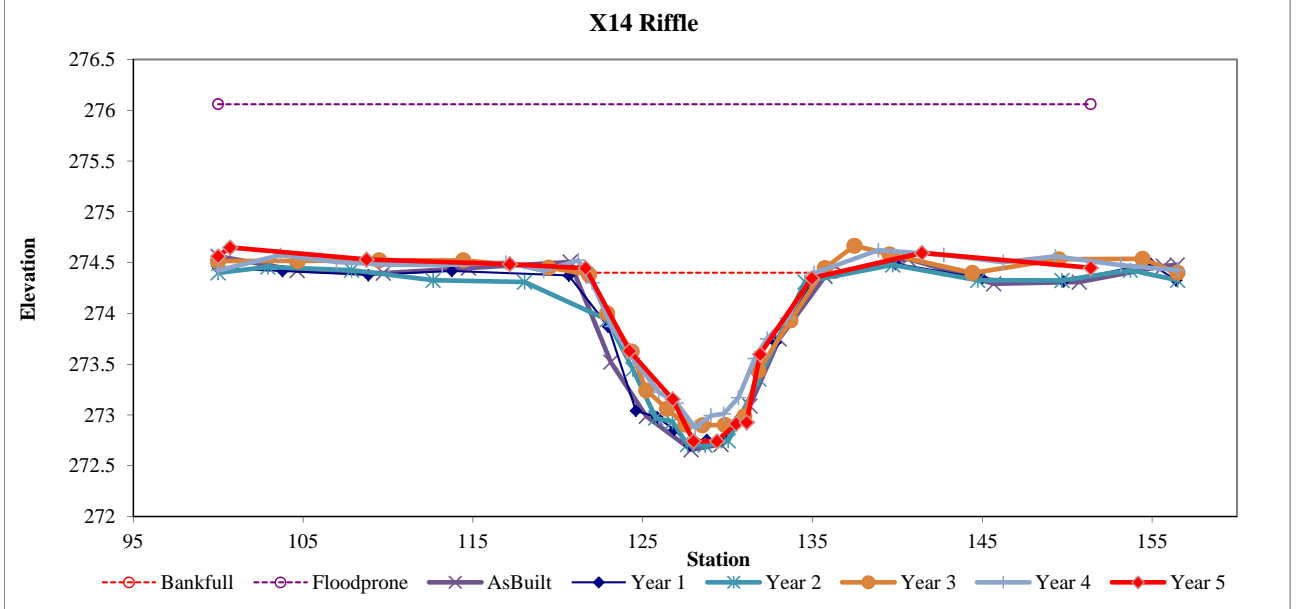


Looking at the Left Bank



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	12.5	14.6	0.9	1.7	17.0	1.0	3.5	274.4	274.4



Permanent Cross Section X15
(Year 5 Monitoring Data - collected November 2013)

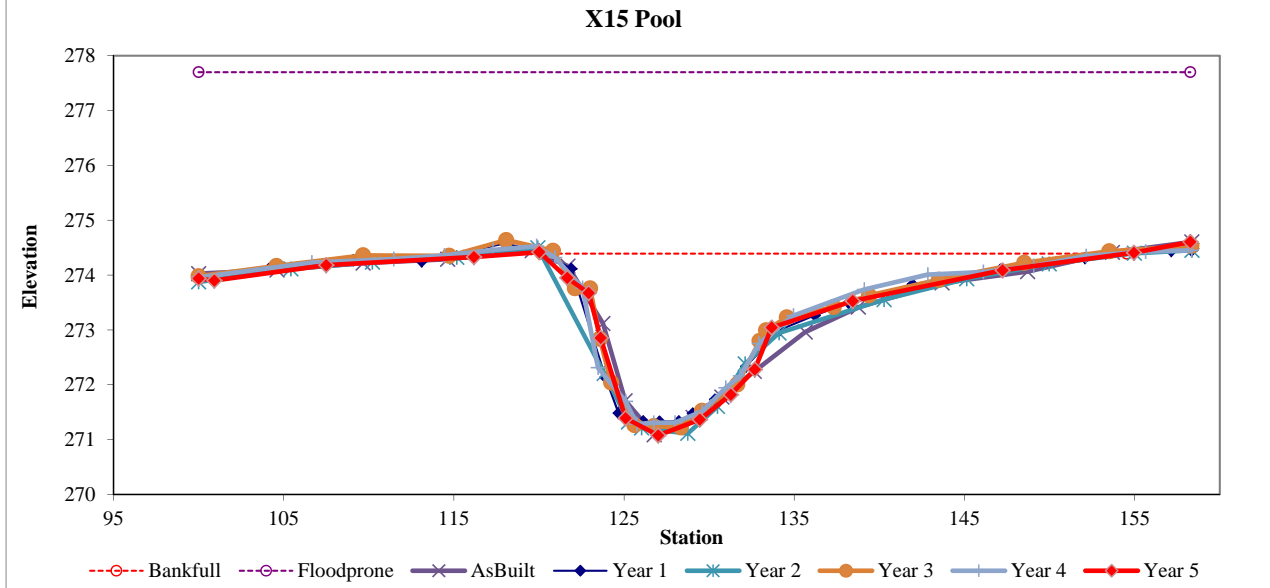


Looking at the Left Bank



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		40.6	34.4	1.2	3.3	29.2	1.0	1.7	274.4	274.4



Permanent Cross Section X16
(Year 5 Monitoring Data - collected November 2013)



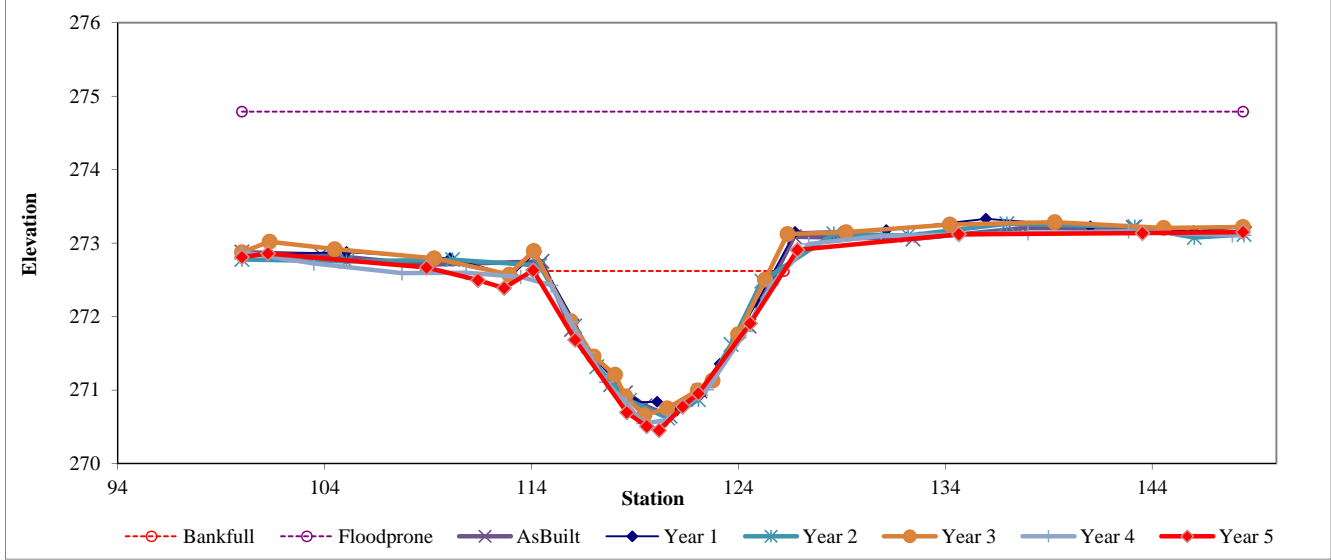
Looking at the Left Bank



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	14.9	12.1	1.2	2.2	9.8	1.0	4.0	272.6	272.6

X16 Riffle



Permanent Cross Section X17
(Year 5 Monitoring Data - collected November 2013)

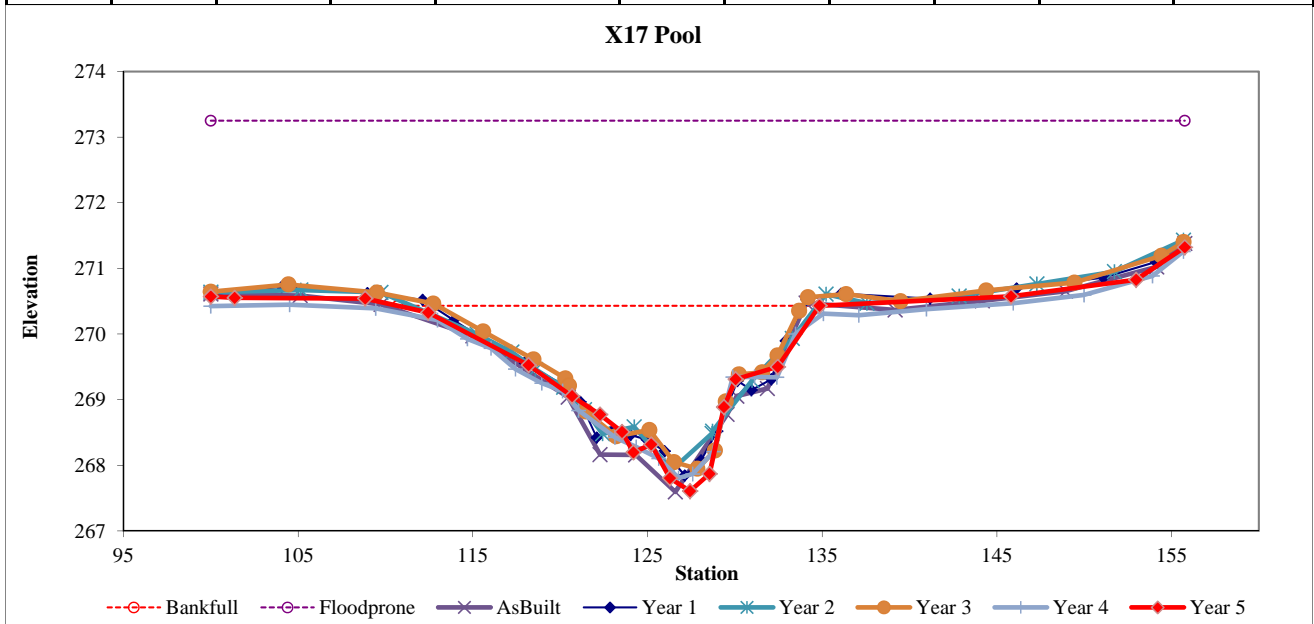


Looking at the Left Bank



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		28.9	24.1	1.2	2.8	20.2	1.0	2.3	270.4	270.4



Permanent Cross Section X18
(Year 5 Monitoring Data - collected November 2013)

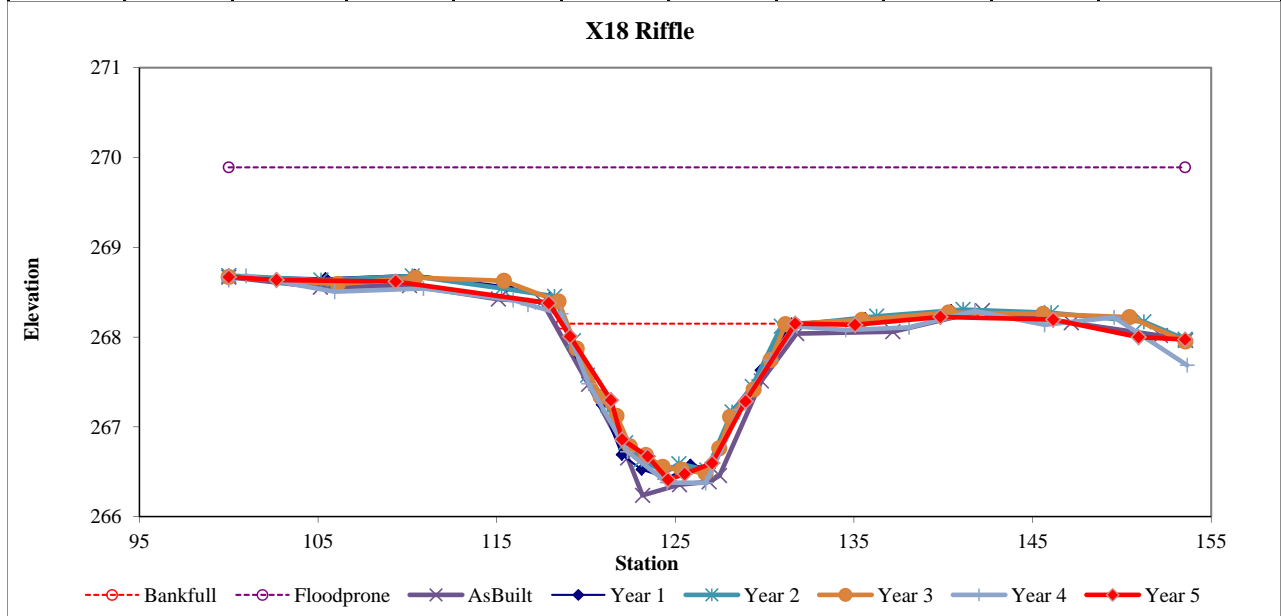


Looking at the Left Bank

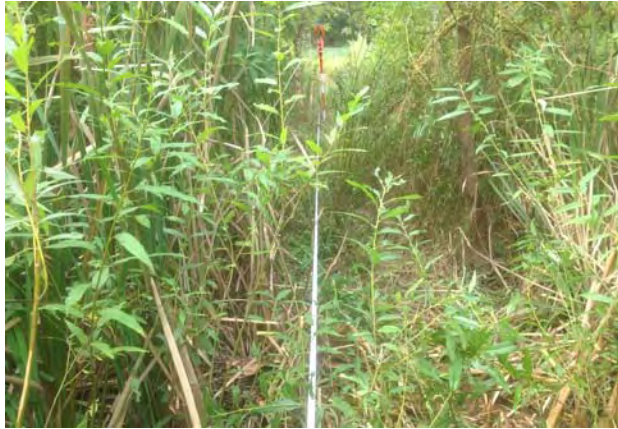


Looking at the Right Bank

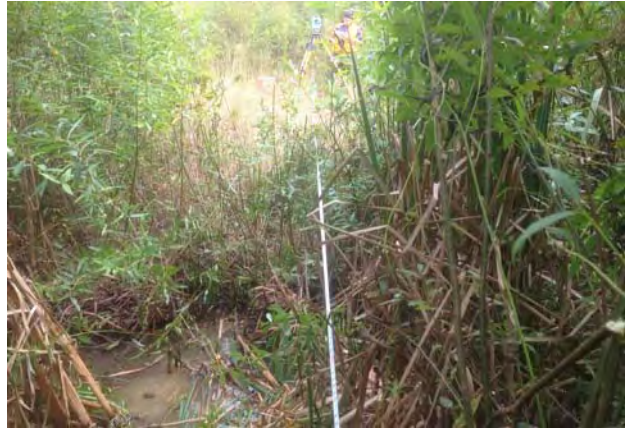
Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	13.2	13.1	1.0	1.7	12.9	1.0	4.1	268.2	268.2



Permanent Cross Section X19
(Year 5 Monitoring Data - collected November 2013)



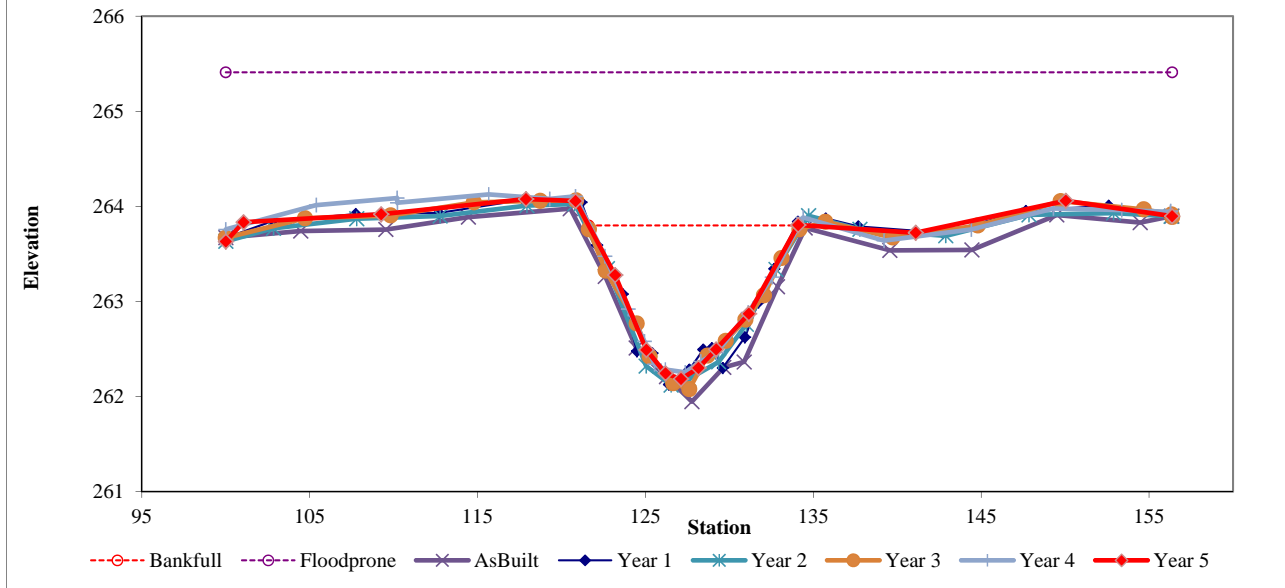
Looking at the Left Bank



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	11.8	12.5	1.0	1.6	13.1	1.0	4.5	263.8	263.8

X19 Riffle



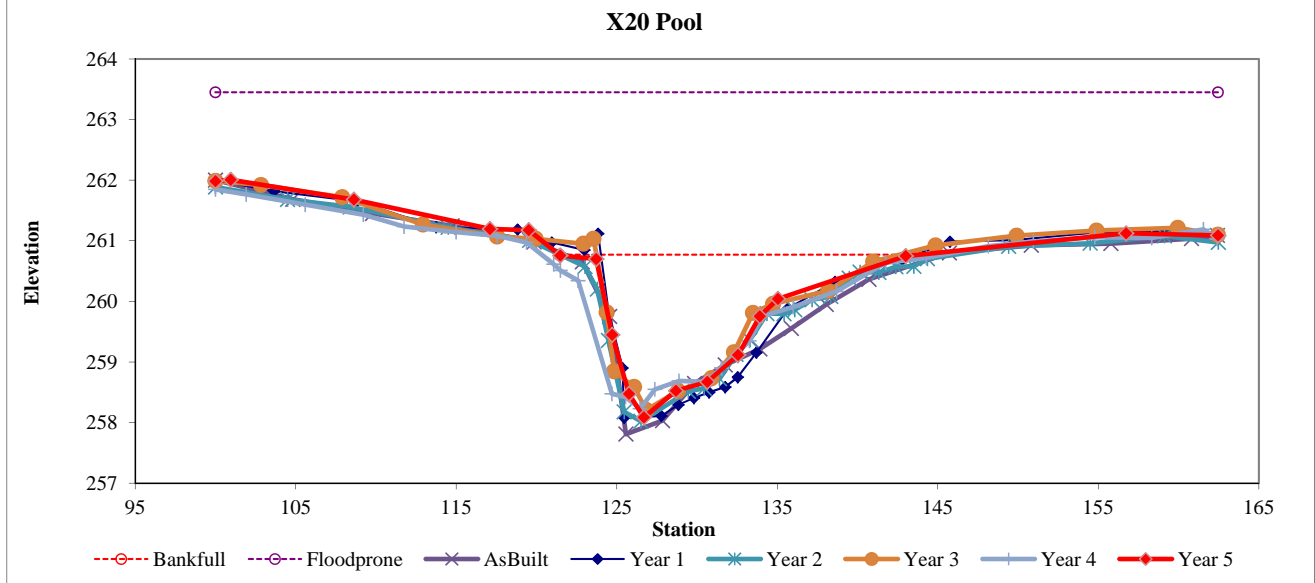
Permanent Cross Section X20
(Year 5 Monitoring Data - collected November 2013)



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		23.5	22.4	1.1	2.7	21.3	1.0	2.8	260.8	260.7



Permanent Cross Section X21
(Year 5 Monitoring Data - collected November 2013)

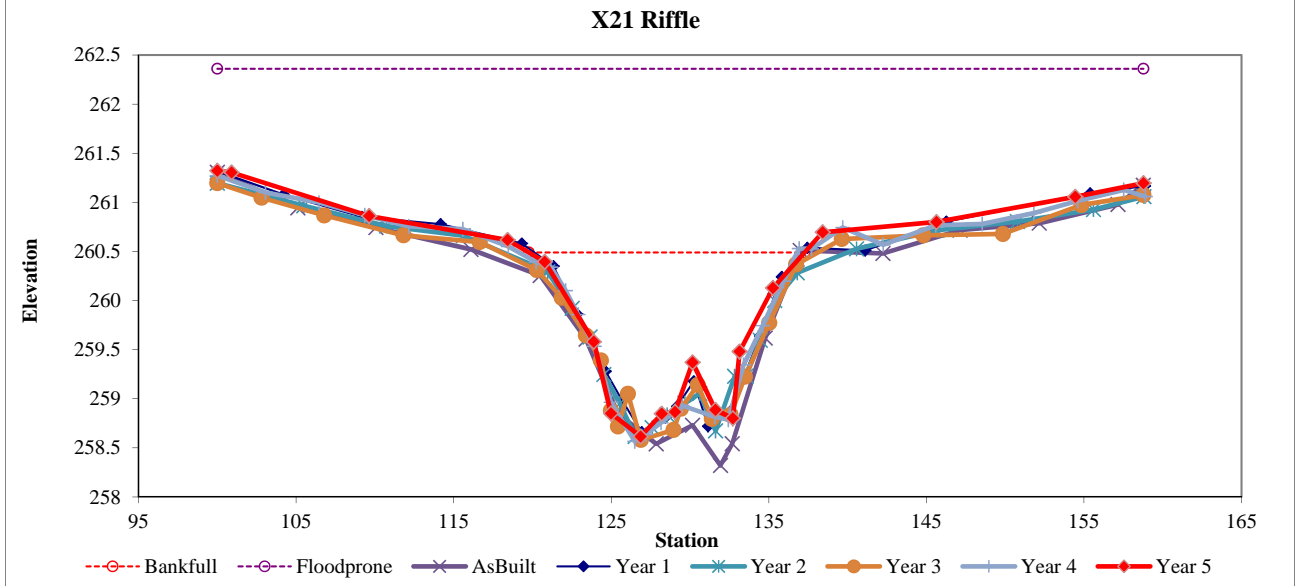


Looking at the Left Bank



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	17.7	17.5	1.0	1.9	17.3	1.1	3.4	260.5	260.6



Permanent Cross Section X22
(Year 5 Monitoring Data - collected November 2013)

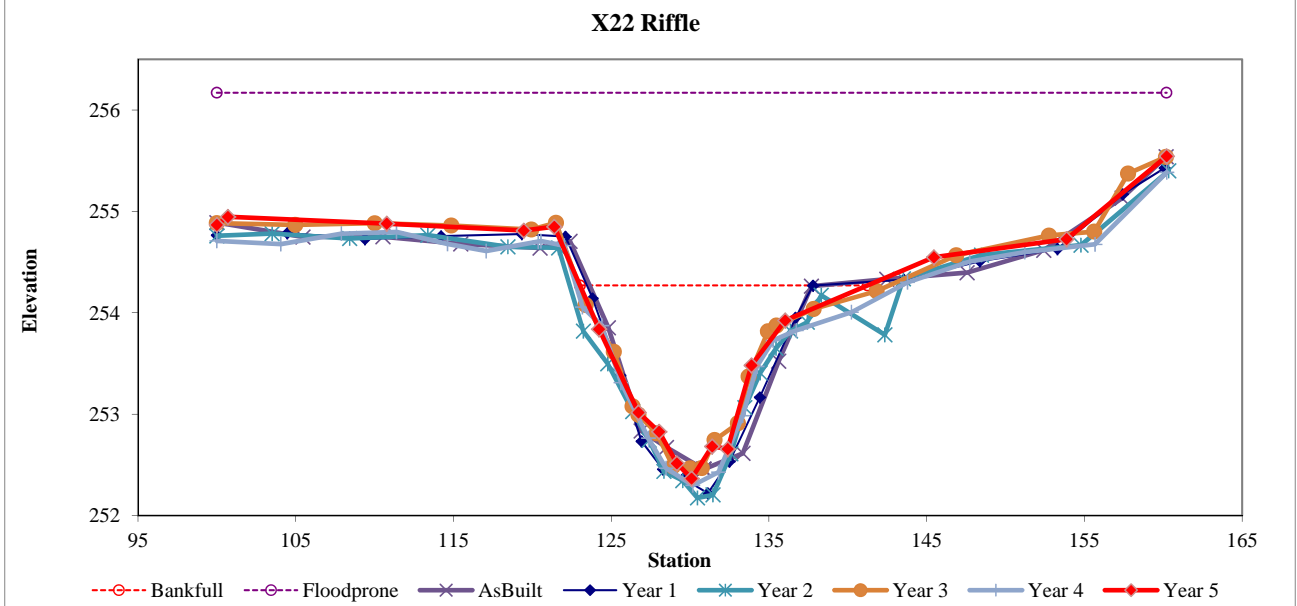


Looking at the Left Bank

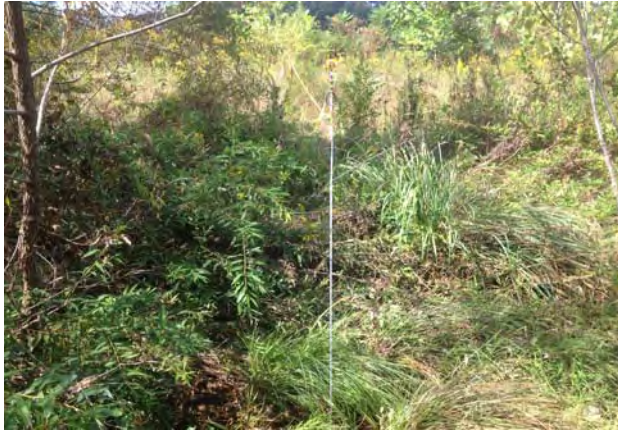


Looking at the Right Bank

Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Riffle	C	15.4	18.2	0.8	1.9	21.6	1.1	3.3	254.3	254.6



Permanent Cross Section X23
(Year 5 Monitoring Data - collected November 2013)

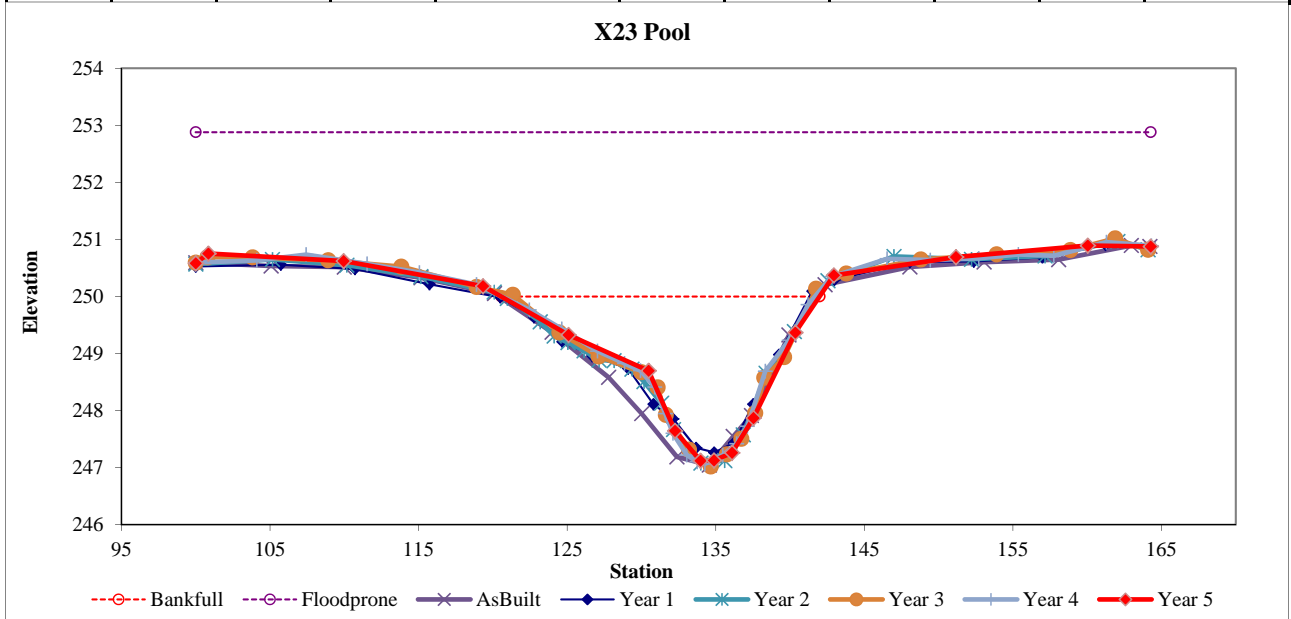


Looking at the Left Bank



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		28.5	21.4	1.3	2.9	16.1	1.1	3.0	250.0	250.2



Permanent Cross Section X24
(Year 5 Monitoring Data - collected November 2013)

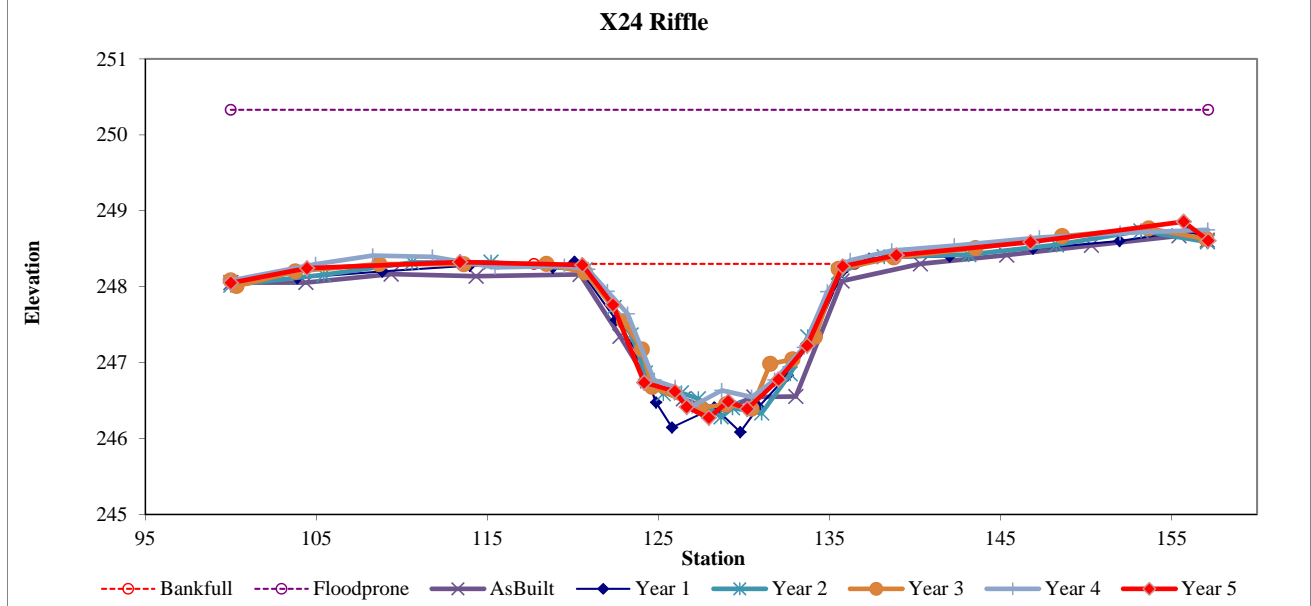


Looking at the Left Bank



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	19.8	18.7	1.1	2.0	17.7	1.0	3.0	248.3	248.3



Permanent Cross Section X25
(Year 5 Monitoring Data - collected November 2013)



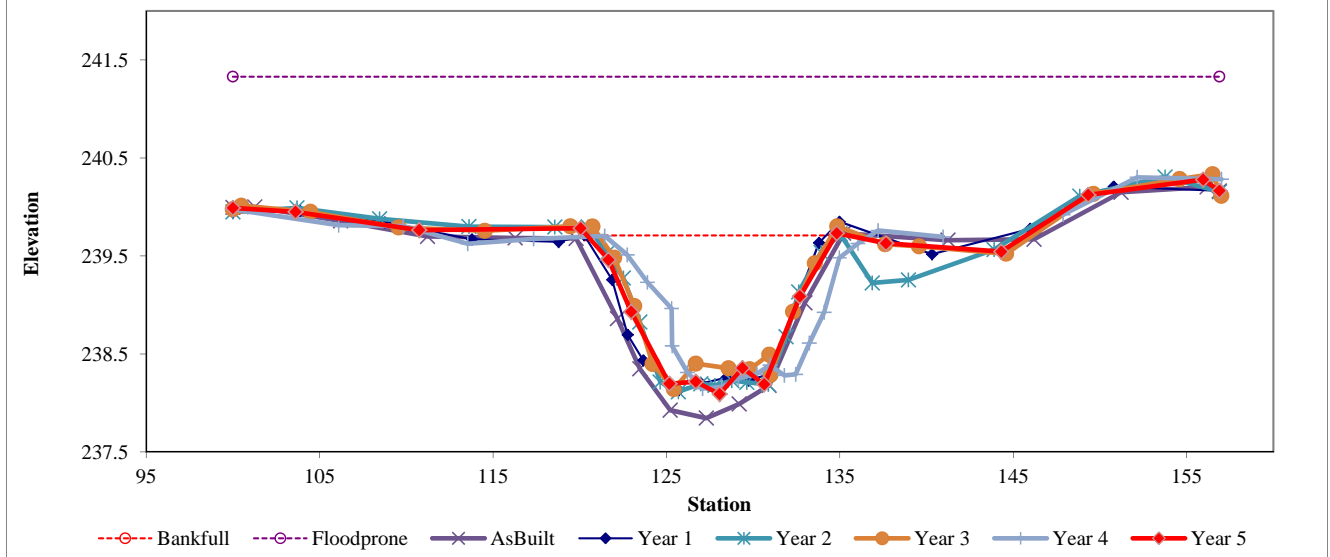
Looking at the Left Bank



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	14.4	14.3	1.0	1.6	14.3	1.0	4.0	239.7	239.7

X25 Riffle



Permanent Cross Section X26
(Year 5 Monitoring Data - collected November 2013)

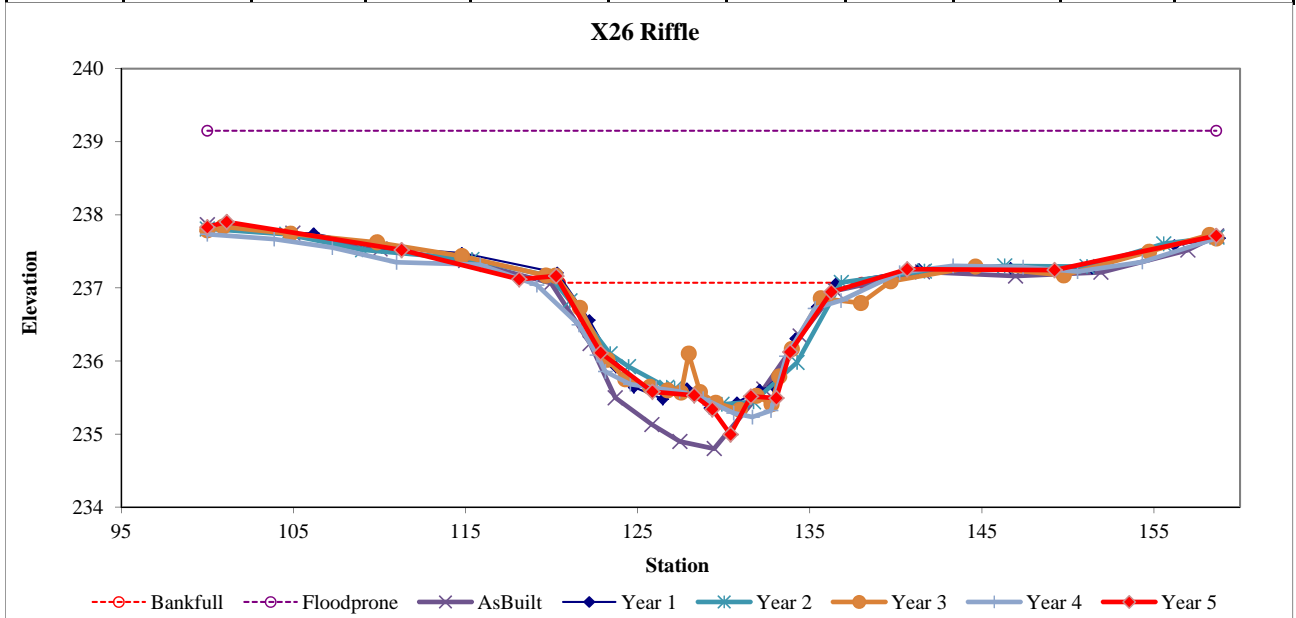


Looking at the Left Bank



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	19.1	17.5	1.1	2.1	16.1	0.9	3.3	237.1	236.9



Permanent Cross Section X27
(Year 5 Monitoring Data - collected November 2013)

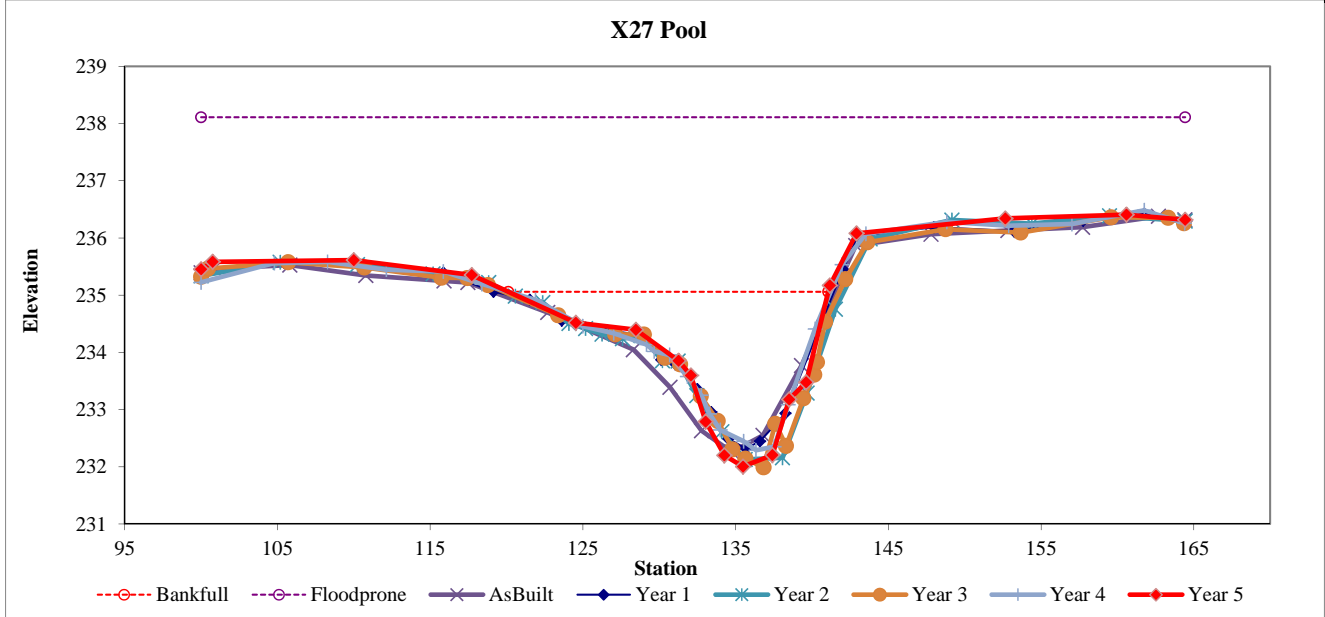


Looking at the Left Bank



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		27.2	20.9	1.3	3.1	16.1	1.1	3.1	235.1	235.4



Permanent Cross Section X28
(Year 5 Monitoring Data - collected November 2013)

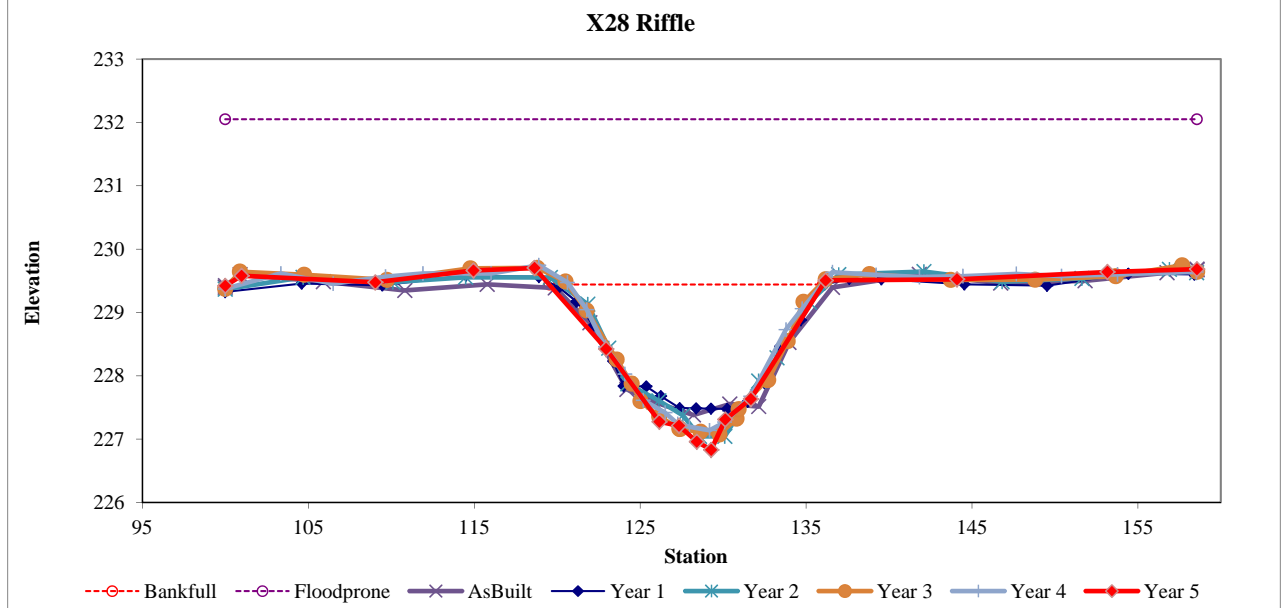


Looking at the Left Bank



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	23.1	16.5	1.4	2.6	11.8	1.0	3.6	229.4	229.5



Permanent Cross Section X29
 (Year 5 Monitoring Data - collected November 2013)

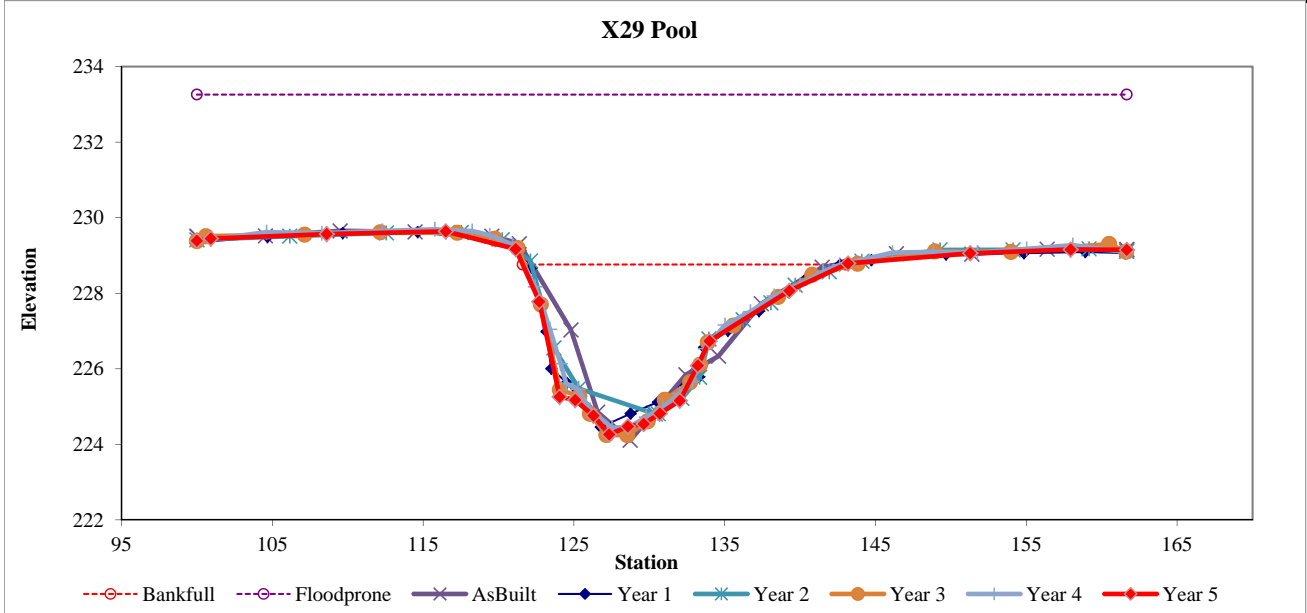


Looking at the Left Bank



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		49.6	21.4	2.3	4.5	9.3	1.0	2.9	228.8	228.8



Permanent Cross Section X30
(Year 5 Monitoring Data - collected November 2013)

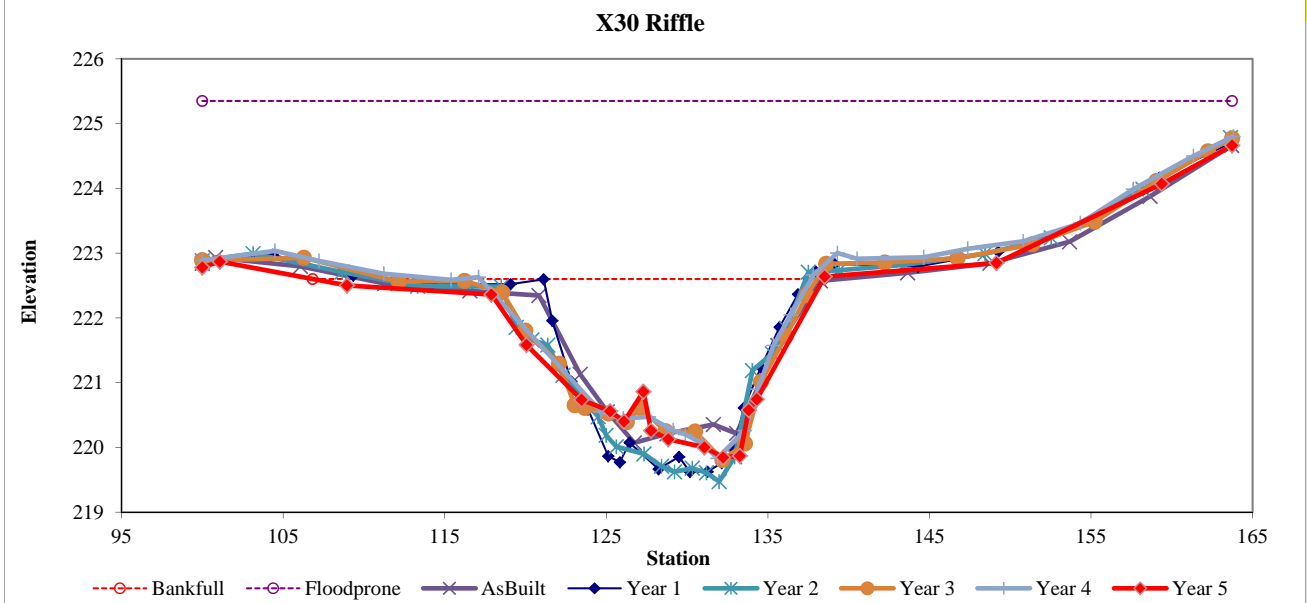


Looking at the Left Bank



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	36.8	31.6	1.2	2.8	27.2	0.9	2.0	222.6	222.4



Permanent Cross Section X31
(Year 5 Monitoring Data - collected November 2013)

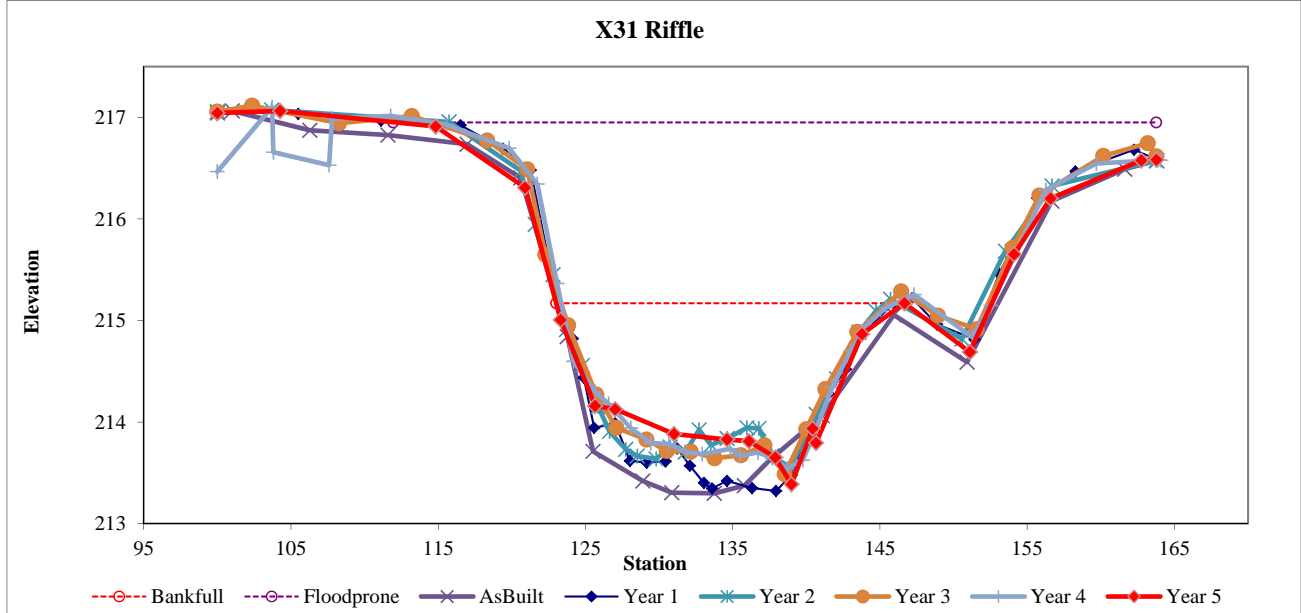


Looking at the Left Bank



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	24.1	23.7	1.0	1.8	23.2	1.0	2.2	215.2	215.2



Permanent Cross Section X32
 (Year 5 Monitoring Data - collected November 2013)

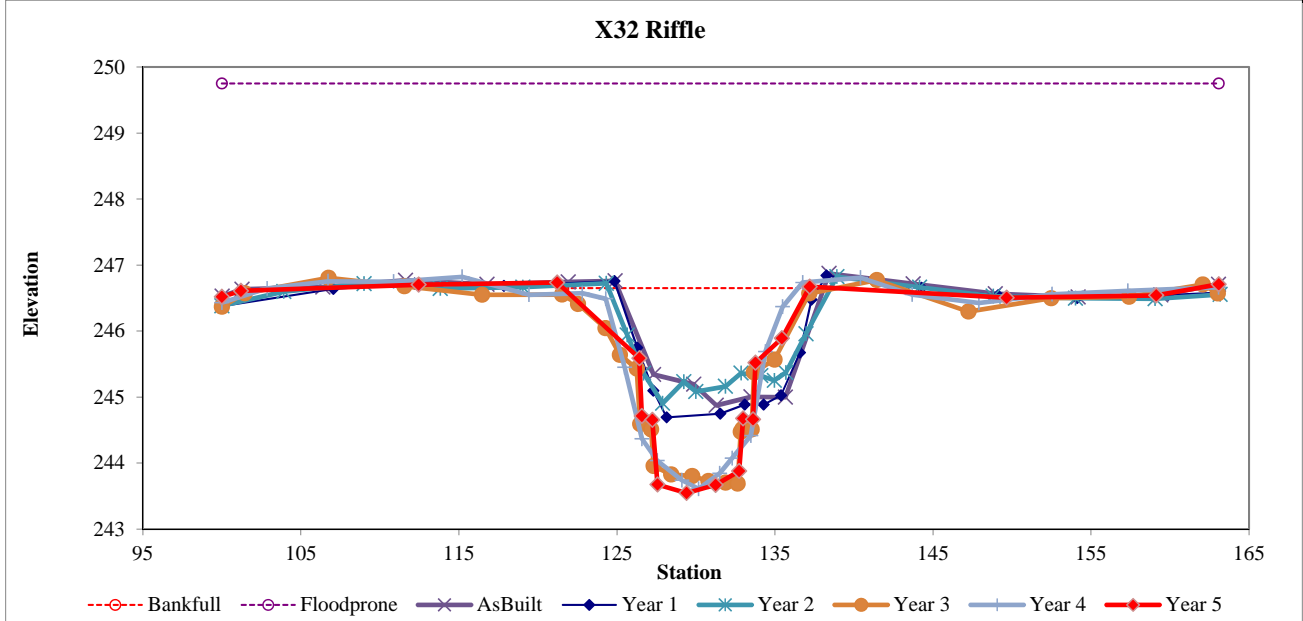


Looking at the Left Bank



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	24.7	15.6	1.6	3.1	9.8	1.0	4.1	246.7	246.7



Permanent Cross Section X33
(Year 5 Monitoring Data - collected November 2013)

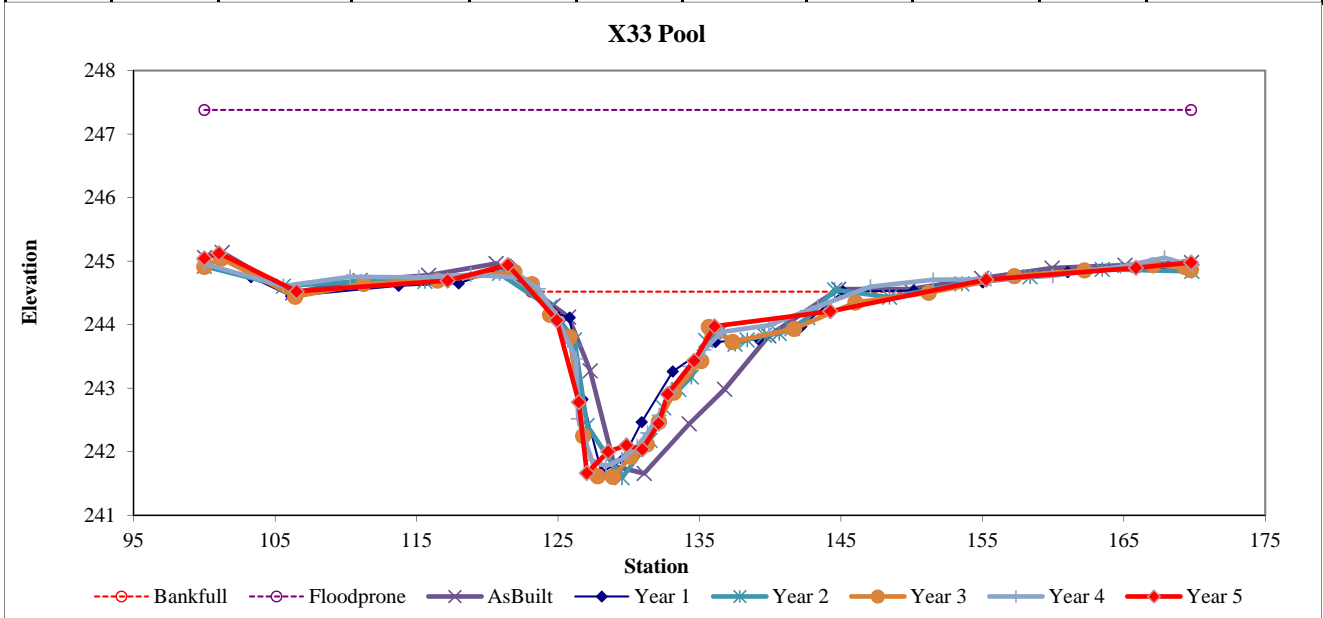


Looking at the Left Bank

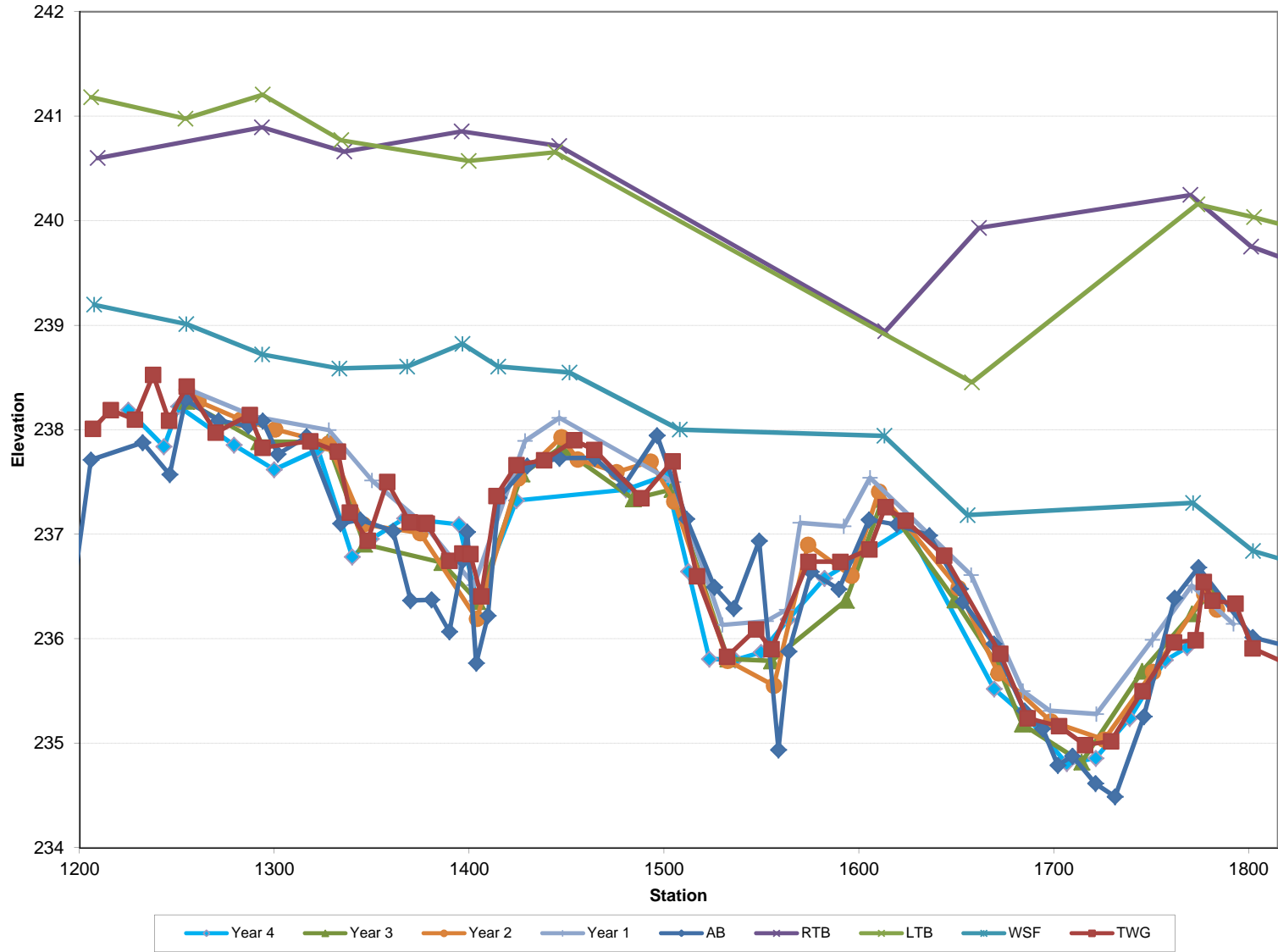


Looking at the Right Bank

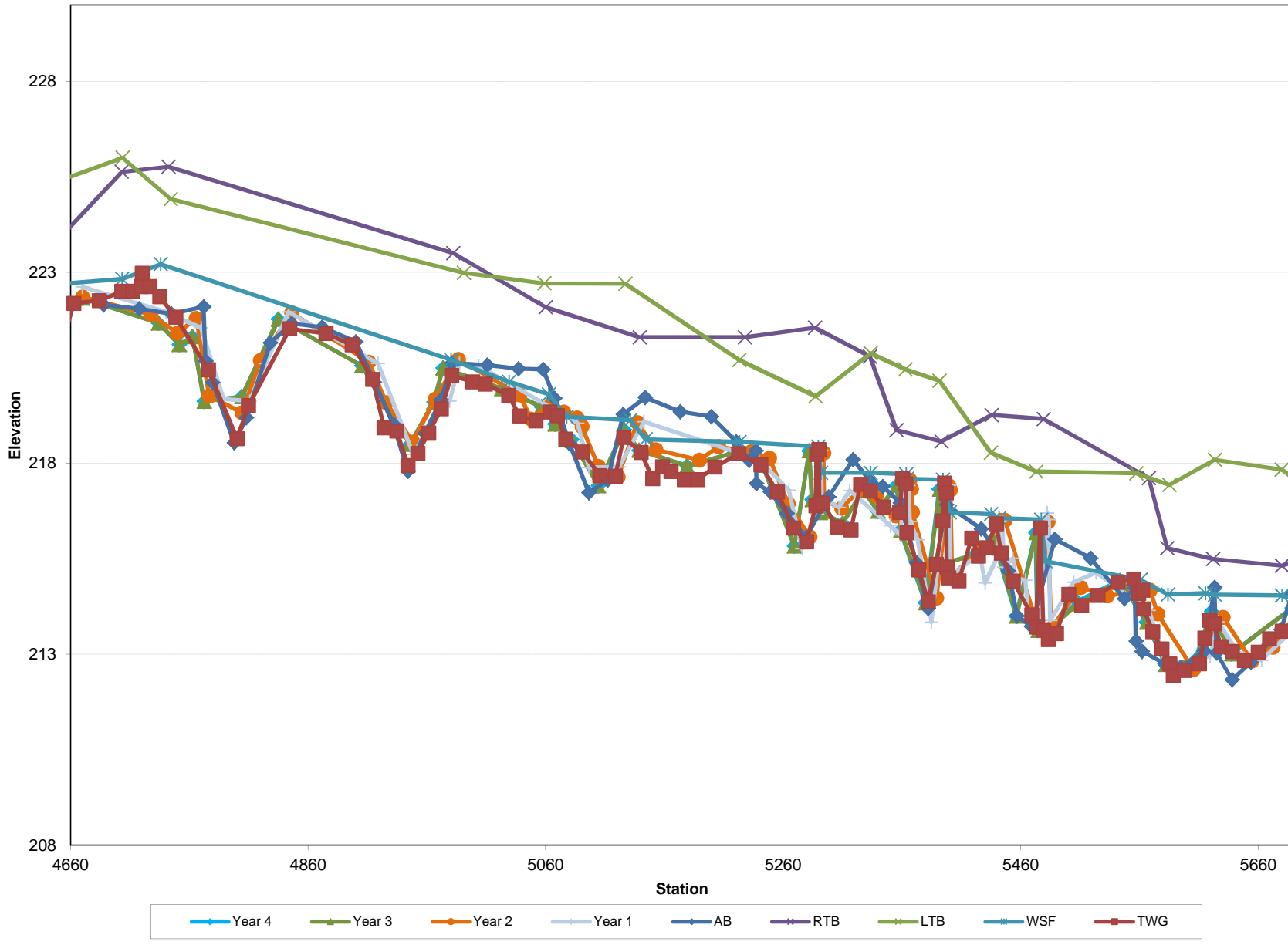
Feature	Stream Type	BKF Area	BKF Width	BKF Depth	Max BKF Depth	W/D	BH Ratio	ER	BKF Elev	TOB Elev
Pool		25.5	28.0	0.9	2.9	30.7	1.1	2.5	244.5	244.7



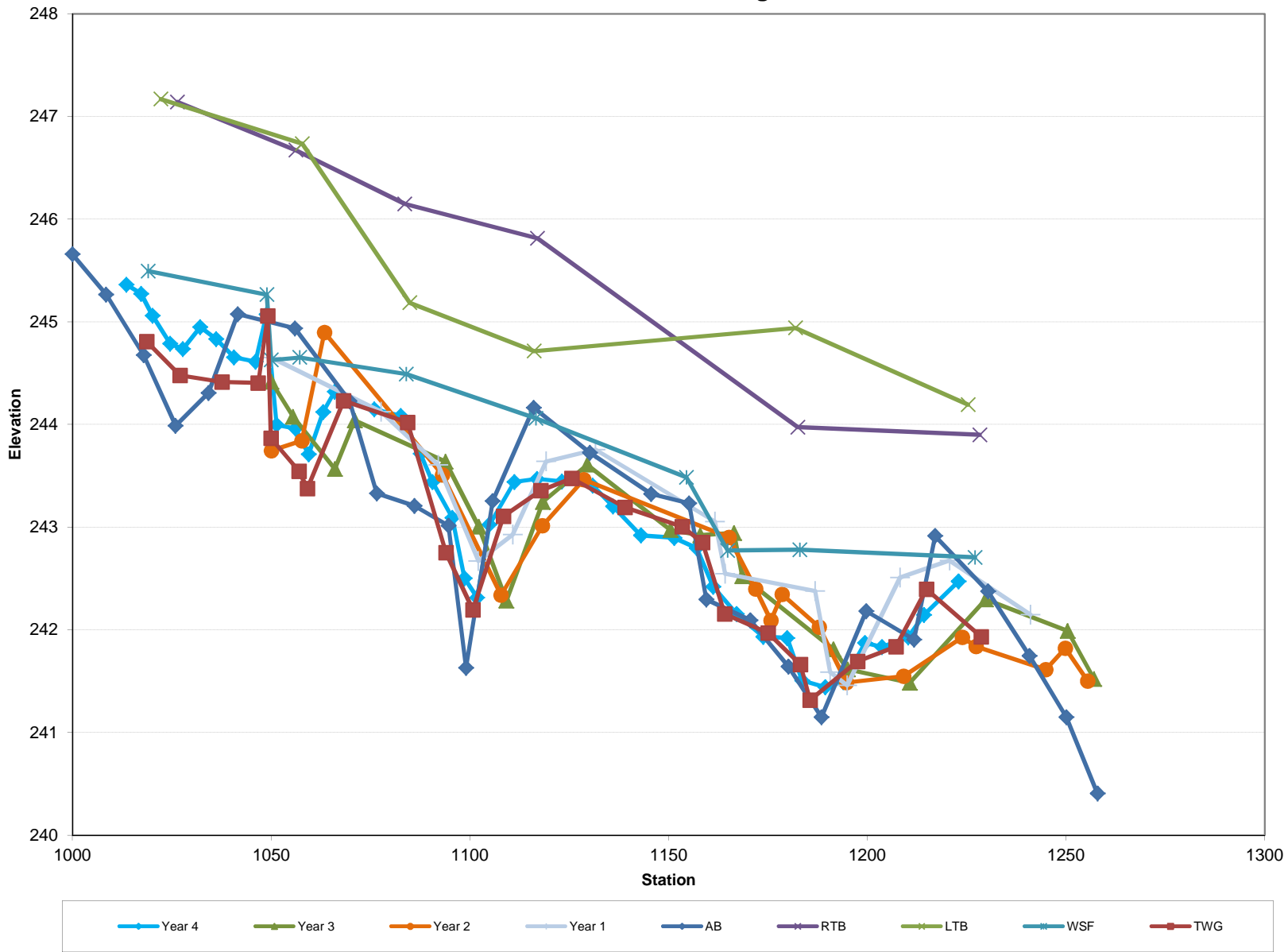
Big Cedar Profile - Station 1207 to 1802 Year 5 Monitoring



Big Cedar Profile - Station 4660 - 5680 Year 5 Monitoring



UT2 Profile - Station 1018 - 1229 Year 5 Monitoring



UT1 Profile - Station 1376 - 3082 Year 5 Monitoring

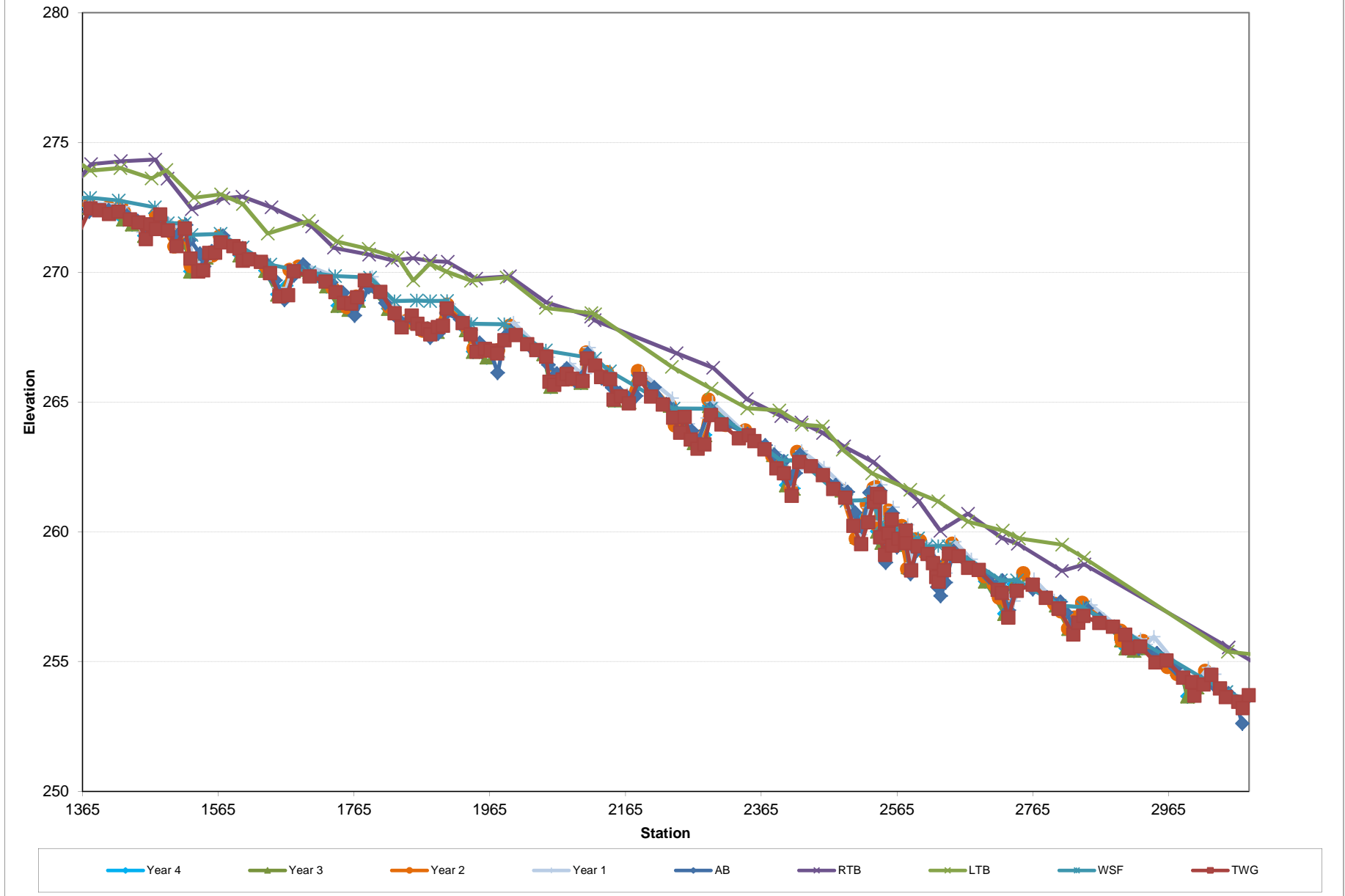


Table 8. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
BCC Reach 1 (603 LF)

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 (ft ²)	----	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)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Re: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 (ft ³)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
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/ft ²	----	----	----	----	----	0.88	----	----	----	----	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	250.0	----	----	----	----	----	----	----	----	----	----
Stream Power (transport capacity) W/m ²	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Additional Reach Parameters																
Drainage Area (SM)	----	----	----	----	2.3	----	----	2.9	----	----	----	----	----	8.4	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	----	----	----	----	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 8. 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					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																
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/ft ²	----	----	----	----	----	0.7	----	----	----	----	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	190.0	----	----	----	----	----	----	----	----	----	----
Stream Power (transport capacity) W/m ²	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
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 8. 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					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension - Riffle																
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/ft ²	----	----	----	----	----	0.4	----	----	----	----	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	100.0	----	----	----	----	----	----	----	----	----	----
Stream Power (transport capacity) W/m ²	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
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 8. 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					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension - Riffle																
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/ft ²	----	----	----	----	----	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)	----	----	----	----	3.3	----	----	3.4	----	----	----	----	----	8.4	----	----
Impervious cover estimate (acres)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	----	----	----	----	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 Stability or Habitat Metric	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Biological or Other	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Table 8. 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					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																
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/ft ²	----	----	----	----	----	0.5	----	----	----	----	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	125.0	----	----	----	----	----	----	----	----	----	----
Stream Power (transport capacity) W/m ²	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
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 8. 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					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate- Riffle																
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/ft ²	----	----	----	----	----	1.0	----	----	----	----	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	250.0	----	----	----	----	----	----	----	----	----	----
Stream Power (transport capacity) W/m ²	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
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 8. 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/ft ²	----	----	----	----	----	0.9	----	----	----	----	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	225.0	----	----	----	----	----	----	----	----	----	----
Stream Power (transport capacity) W/m ²	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
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 8. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT1 Reach 4 (1,121 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/ft ²	----	----	----	----	----	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 Classification	----	----	----	----	----	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 8. 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					
		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																
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/ft ²	----	----	----	----	----	1.3	----	----	----	----	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	300.0	----	----	----	----	----	----	----	----	----	----
Stream Power (transport capacity) W/m ²	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
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 8. Baseline Stream Summary																			
Big Cedar Creek Restoration Site Contract No. D06054-D																			
BCC Reach 1 (603 LF)																			
Parameter	Design						As-built						Year 1						
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	
Dimension and Substrate - Riffle																			
BF Width (ft)	----	20.0	----	----	----	1	----	19.6	----	----	----	1	----	19.5	----	----	----	----	1
Floodprone Width (ft)	----	87.0	----	----	----	1	----	65.3	----	----	----	1	----	65.2	----	----	----	----	1
BF Mean Depth (ft)	----	2.0	----	----	----	1	----	1.9	----	----	----	1	----	1.8	----	----	----	----	1
BF Max Depth (ft)	----	2.8	----	----	----	1	----	2.7	----	----	----	1	----	2.6	----	----	----	----	1
BF Cross-sectional Area (ft ²)	----	39.0	----	----	----	1	----	37.0	----	----	----	1	----	35.6	----	----	----	----	1
Width/Depth Ratio	----	10.0	----	----	----	1	----	10.4	----	----	----	1	----	10.7	----	----	----	----	1
Entrenchment Ratio	----	4.4	----	----	----	1	----	3.3	----	----	----	1	----	3.3	----	----	----	----	1
Bank Height Ratio	----	1.0	----	----	----	1	----	1.0	----	----	----	1	----	1.0	----	----	----	----	1
d50 (mm)	----	----	----	----	----	----	----	----	----	----	----	----	----	26.0	----	----	----	----	1.0
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	----	----	----	----	----	----	----
Re: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
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
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
Pool Max Depth (ft)	----	6.5	----	----	----	1	----	3.9	----	----	----	----	----	3.8	----	----	----	----	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 / 18 / 26 / 63 / 120	----	----	----	----
Reach Shear Stress (competency) lb/ft ²	----	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/m ²	----	----	----	----	----	----	----	11.6	----	----	----	1	----	11.8	----	----	----	----	1
Additional Reach Parameters																			
Drainage Area (SM)	2.3	----	----	2.3	----	----	2.3	----	----	2.3	----	----	2.3	----	----	2.3	----	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C4	----	----	----	----	----	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	----	----	----	----	----
Sinuosity	----	1.30	----	----	----	----	----	1.31	----	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	0.0030	----	----	----	----	----	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 8. Baseline Stream Summary

Big Cedar Creek Restoration Site Contract No. D06054-D

BCC Reach 2 (2239 LF)

Parameter	Design						As-built						Year 1					
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																		
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
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
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
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
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
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
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
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
d50 (mm)	----	----	----	----	----	----	----	----	----	----	----	----	----	22.6	----	----	----	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
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
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
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/ft ²	----	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/m ²	----	----	----	----	----	----	----	29.3	----	----	----	1	----	38.6	----	----	----	1
Additional Reach Parameters																		
Drainage Area (SM)	2.3	----	----	3.1	----	----	2.3	----	----	3.1	----	----	2.3	----	----	3.1	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C4	----	----	----	----	----	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	----	----	----	----
Sinuosity	----	1.30	----	----	----	----	----	1.31	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	0.0050	----	----	----	----	----	0.0050	----	----	----	----	----	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 8. Baseline Stream Summary

Big Cedar Creek Restoration Site Contract No. D06054-D

BCC Reach 3 (1827 LF)

Parameter	Design						As-built						Year 1					
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																		
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
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
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
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
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
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
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
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
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
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
Rc:Bankfull width (ft/ft)	1.8	----	----	3.4	----	13	1.6	----	----	4.2	----	13	2.2	----	----	3.4	----	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
Meander Width Ratio	2.1	----	----	4.7	----	12	2.0	----	----	4.2	----	12	1.9	----	----	3.8	----	5
Profile																		
Riffle Length (ft)	----	----	----	----	----	----	37	70	66	127	25	12	35	68	72	97	21	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
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
Pool Max Depth (ft)	----	5.2	----	----	----	1	----	5.4	----	----	----	1	----	5.2	----	----	----	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	----	----	----
Reach Shear Stress (competency) lb/ft ²	----	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/m ²	----	----	----	----	----	----	----	36.8	----	----	----	1	----	51.2	----	----	----	1
Additional Reach Parameters																		
Drainage Area (SM)	3.1	----	----	3.3	----	----	3.1	----	----	3.32	----	----	3.1	----	----	3.32	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C4	----	----	----	N/A	----	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	----	----	----	----
Sinuosity	----	1.10	----	----	----	----	----	1.17	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	0.0077	----	----	----	----	----	0.0060	----	----	----	----	----	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 8. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
BCC Reach 4 (410 LF)

Parameter	Design						As-built						Year 1					
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																		
BF Width (ft)	----	26.0	----	----	----	1	----	27.5	----	----	----	1	----	27.8	----	----	----	1
Floodprone Width (ft)	----	94.0	----	----	----	1	----	81.0	----	----	----	1	----	81.1	----	----	----	1
BF Mean Depth (ft)	----	2.2	----	----	----	1	----	2.1	----	----	----	1	----	2.3	----	----	----	1
BF Max Depth (ft)	----	3.0	----	----	----	1	----	3.2	----	----	----	1	----	3.7	----	----	----	1
BF Cross-sectional Area (ft ²)	----	57.2	----	----	----	1	----	58.3	----	----	----	1	----	62.6	----	----	----	1
Width/Depth Ratio	----	11.8	----	----	----	1	----	13.0	----	----	----	1	----	12.4	----	----	----	1
Entrenchment Ratio	----	3.6	----	----	----	1	----	3.0	----	----	----	1	----	2.9	----	----	----	1
Bank Height Ratio	----	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
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/ft ²	----	1.2	----	----	----	----	----	1.1	----	----	----	1	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	275.0	----	----	----	----	----	260.0	----	----	----	1	----	----	----	----	----	----
Stream Power (transport capacity) W/m ²	----	----	----	----	----	----	----	53.6	----	----	----	1	----	----	----	----	----	----
Additional Reach Parameters																		
Drainage Area (SM)	3.3	----	----	3.4	----	----	3.3	----	----	3.4	----	----	3.3	----	----	3.4	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C4	----	----	----	----	----	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 8. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT1 Reach 1 (1248 LF)

Parameter	Design						As-built						Year 1					
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																		
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
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
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
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
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
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
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
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
d50 (mm)	----	----	----	----	----	----	----	39.0	----	----	----	1	----	62.0	----	----	----	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
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
Rc:Bankfull width (ft/ft)	----	----	----	----	----	----	1.7	----	----	3.1	----	1	2.3	----	----	3.1	----	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
Meander Width Ratio	2.2	----	----	4.9	----	13	3.2	----	----	5.7	----	13	3.8	----	----	6.1	----	8
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
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
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
Pool Max Depth (ft)	----	----	----	----	----	----	2.3	----	----	2.9	----	2	2.2	----	----	2.7	----	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	----	----	----
Reach Shear Stress (competency) lb/ft ²	----	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/m ²	----	----	----	----	----	----	----	24.4	----	----	----	1	----	33.4	----	----	----	1
Additional Reach Parameters																		
Drainage Area (SM)	0.7	----	----	0.8	----	----	0.7	----	----	0.8	----	----	0.7	----	----	0.8	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C4	----	----	----	----	----	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	----	----	----	----
Sinuosity	----	1.30	----	----	----	----	----	1.30	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	0.0080	----	----	----	----	----	0.0060	----	----	----	----	----	----	----	----	----	----
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 8. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT1 Reach 2 (1016)

Parameter	Design						As-built						Year 1					
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																		
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
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
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
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
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
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
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
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
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
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
Rc:Bankfull width (ft/ft)	2.0	----	----	3.2	----	11	1.4	----	----	3.3	----	1	1.8	----	----	2.1	----	2
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
Meander Width Ratio	2.0	----	----	3.0	----	10	2.0	----	----	4.0	----	1	2.1	----	----	4.1	----	2
Profile																		
Riffle Length (ft)	----	----	----	----	----	----	48.0	67.0	64.0	94.0	14.0	10	42	62	60	92	16	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
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
Pool Max Depth (ft)	----	3.5	----	----	----	1	----	2.6	----	----	----	1	----	2.9	----	----	----	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/ft ²	----	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/m ²	----	----	----	----	----	----	----	54.1	----	----	----	1	----	59.7	----	----	----	1
Additional Reach Parameters																		
Drainage Area (SM)	0.8	----	----	0.9	----	----	0.8	----	----	0.9	----	----	0.8	----	----	0.9	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	B4c	----	----	----	----	----	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	----	----	----	----
Sinuosity	----	1.00	----	----	----	----	----	1.10	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	0.0128	----	----	----	----	----	0.0130	----	----	----	----	----	----	----	----	----	----
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 8. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT1 Reach 3 (1885 LF)

Parameter	Design						As-built						Year 1					
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																		
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
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
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
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
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
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
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
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
d50 (mm)	----	----	----	----	----	----	----	----	----	----	----	----	----	37.0	----	----	----	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
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	----	----	----
Reach Shear Stress (competency) lb/F	----	0.7	----	----	----	----	----	0.8	----	----	----	1	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	190.0	----	----	----	----	----	200.0	----	----	----	1	----	----	----	----	----	----
Stream Power (transport capacity) W/m ²	----	----	----	----	----	----	----	57.9	----	----	----	1	----	----	----	----	----	----
Additional Reach Parameters																		
Drainage Area (SM)	0.9	----	----	1.1	----	----	0.9	----	----	1.1	----	----	0.9	----	----	1.1	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	C4	----	----	----	----	----	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 8. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT1 Reach 4 (996 LF)

Parameter	Design						As-built						Year 1					
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																		
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
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
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
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
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
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
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
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
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
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	----	----	----
Reach Shear Stress (competency) lb/ft ²	----	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	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	B4c	----	----	----	----	----	C	----	----	----	----	----	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 8. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT2 (609 LF)

Parameter	Design						As-built						Year 1					
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle																		
BF Width (ft)	----	13	----	----	----	1	----	13.4	----	----	----	1	----	13.2	----	----	----	1
Floodprone Width (ft)	----	74.0+	----	----	----	1	----	63.1	----	----	----	1	----	63.1	----	----	----	1
BF Mean Depth (ft)	----	1.1	----	----	----	1	----	1.4	----	----	----	1	----	1.5	----	----	----	1
BF Max Depth (ft)	----	1.4	----	----	----	1	----	1.9	----	----	----	1	----	2.1	----	----	----	1
BF Cross-sectional Area (ft ²)	----	14.3	----	----	----	1	----	18.1	----	----	----	1	----	20.1	----	----	----	1
Width/Depth Ratio	----	11.8	----	----	----	1	----	9.9	----	----	----	1	----	8.7	----	----	----	1
Entrenchment Ratio	----	5.7+	----	----	----	1	----	4.7	----	----	----	1	----	4.8	----	----	----	1
Bank Height Ratio	----	1.0	----	----	----	1	----	1.0	----	----	----	1	----	1.0	----	----	----	1
d50 (mm)	----	----	----	----	----	----	----	----	----	----	----	----	----	22.6	----	----	----	1
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
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
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
Pool Max Depth (ft)	----	3.6	----	----	----	1	----	2.5	----	----	----	1	----	2.6	----	----	----	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	----	----	----	----
Reach Shear Stress (competency) lb/ft ²	----	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/m ²	----	----	----	----	----	----	----	44.0	----	----	----	1	----	34.5	----	----	----	1
Additional Reach Parameters																		
Drainage Area (SM)	0.5	----	----	0.6	----	----	0.5	----	----	0.6	----	----	0.5	----	----	0.6	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C4	----	----	----	----	----	E	----	----	----	----	----	E	----	----	----	----
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	----	----	----	----
Sinuosity	----	1.20	----	----	----	----	----	1.28	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	0.0150	----	----	----	----	----	0.0140	----	----	----	----	----	0.011	----	----	----	----
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. Baseline Stream Summary													
Big Cedar Creek Restoration Site Contract No. D06054-D													
BCC Reach 1 (603 LF)													
Parameter	Year 2						Year 3						
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	
Dimension and Substrate - Riffle													
BF Width (ft)	----	21.1	----	----	----	1	----	19.5	----	----	----	1	
Floodprone Width (ft)	----	65.2	----	----	----	1	----	65.3	----	----	----	1	
BF Mean Depth (ft)	----	1.8	----	----	----	1	----	1.7	----	----	----	1	
BF Max Depth (ft)	----	2.8	----	----	----	1	----	2.8	----	----	----	1	
BF Cross-sectional Area (ft ²)	----	36.9	----	----	----	1	----	33.9	----	----	----	1	
Width/Depth Ratio	----	12.1	----	----	----	1	----	11.3	----	----	----	1	
Entrenchment Ratio	----	3.1	----	----	----	1	----	3.3	----	----	----	1	
Bank Height Ratio	----	1.0	----	----	----	1	----	1.0	----	----	----	1	
d50 (mm)	----	----	----	----	----	----	----	49.2	----	----	----	----	
Pattern													
Channel Beltwidth (ft)	----	----	----	----	----	----	----	----	----	----	----	----	
Radius of Curvature (ft)	----	----	----	----	----	----	----	----	----	----	----	----	
Rc:Bankfull width (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----	
Meander Wavelength (ft)	----	----	----	----	----	----	----	----	----	----	----	----	
Meander Width Ratio	----	----	----	----	----	----	----	----	----	----	----	----	
Profile													
Riffle Length (ft)	58	66	66	73	----	2	57	64	64	71	----	2	
Riffle Slope (ft/ft)	0.004	0.007	0.007	0.009	----	2	0.005	0.007	0.007	0.009	----	2	
Pool Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----	
Pool Spacing (ft)	----	152.0	----	----	----	1	----	151.0	----	----	----	1	
Pool Max Depth (ft)	----	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	----	----	----	----	----	----	----	<0.063 / 16 / 49 / 98 / 163					----
Reach Shear Stress (competency) lb/ft ²	----	----	----	----	----	----	----	----	----	----	----	----	
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	----	----	----	----	----	----	----	
Stream Power (transport capacity) W/m ²	----	----	----	----	----	----	----	----	----	----	----	----	
Additional Reach Parameters													
Drainage Area (SM)	2.3	----	----	2.3	----	----	2.3	----	----	2.3	----	----	
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	
Rosgen Classifier	----	E/C	----	----	----	----	----	E/C	----	----	----	----	
BF Velocity (fps)	----	----	----	----	----	----	----	----	----	----	----	----	
BF Discharge (cfs)	----	----	----	----	----	----	----	----	----	----	----	----	
Valley Length	----	----	----	----	----	----	----	----	----	----	----	----	
Channel length (ft)	----	354.0	----	----	----	----	----	354.0	----	----	----	----	
Sinuosity	----	----	----	----	----	----	----	----	----	----	----	----	
Water Surface Slope (Channel) (ft/ft)	----	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 8. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
BCC Reach 2 (2239 LF)

Parameter	Year 2						Year 3					
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle												
BF Width (ft)	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)	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	2.6	2.7	2.7	0.3	3	2.4	2.5	2.5	2.8	0.2	3
BF Max Depth (ft)	3.9	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)	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	8.2	9.7	8.8	12.1	2.1	3	8.4	9.3	8.6	11.0	1.5	3
Entrenchment Ratio	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	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3
d50 (mm)	----	----	----	----	----	----	----	97.0	----	----	----	1
Pattern												
Channel Beltwidth (ft)	----	----	----	----	----	----	----	----	----	----	----	----
Radius of Curvature (ft)	----	----	----	----	----	----	----	----	----	----	----	----
Rc:Bankfull width (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----
Meander Wavelength (ft)	----	----	----	----	----	----	----	----	----	----	----	----
Meander Width Ratio	----	----	----	----	----	----	----	----	----	----	----	----
Profile												
Riffle Length (ft)	----	----	----	41	----	1	----	----	----	37	----	1
Riffle Slope (ft/ft)	----	0.024	----	----	----	1	----	0.017	----	----	----	1
Pool Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----
Pool Spacing (ft)	----	----	----	----	----	----	----	----	----	----	----	----
Pool Max Depth (ft)	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	----	----	----	----	----	----	----	53 / 79 / 97 / 155 / 180	----	----	----	----
Reach Shear Stress (competency) lb/ft ²	----	----	----	----	----	----	----	----	----	----	----	----
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	----	----	2.3	----	----	3.1	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C	----	----	----	----	----	E/C	----	----	----	----
BF Velocity (fps)	----	----	----	----	----	----	----	----	----	----	----	----
BF Discharge (cfs)	----	----	----	----	----	----	----	----	----	----	----	----
Valley Length	----	----	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	174.0	----	----	----	----	----	174.0	----	----	----	----
Sinuosity	----	----	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	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 8. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
BCC Reach 3 (1827 LF)

Parameter	Year 2						Year 3					
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle												
BF Width (ft)	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)	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)	2.0	2.2	2.2	2.3	0.2	3	21.8	24.3	24.6	26.5	2.4	3
BF Max Depth (ft)	3.1	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)	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	9.5	11.0	11.4	12.0	1.3	3	8.9	10.7	11.3	11.9	1.6	3
Entrenchment Ratio	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	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3
d50 (mm)	----	----	----	----	----	----	----	----	----	----	----	----
Pattern												
Channel Beltwidth (ft)	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)	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)	2.6	----	----	3.5	----	7	2.4	3.0	3.0	3.5	0.4	7
Meander Wavelength (ft)	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	2.2	----	----	3.5	----	5	1.8	3.0	3.2	3.8	0.8	6
Profile												
Riffle Length (ft)	20	69	71	111	33	6	25	66	67	116	36	6
Riffle Slope (ft/ft)	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)	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)	----	5.4	----	----	----	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	----	----	----	----	----	----	----	----	<0.063 / 20 / 36 / 84 / 128	----	----	----
Reach Shear Stress (competency) lb/ft ²	----	----	----	----	----	----	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	----	----	----	----	----	----	----
Stream Power (transport capacity) W/m ²	----	----	----	----	----	----	----	----	----	----	----	----
Additional Reach Parameters												
Drainage Area (SM)	3.1	----	----	3.32	----	----	3.1	----	----	3.32	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C	----	----	----	----	----	E/C	----	----	----	----
BF Velocity (fps)	----	----	----	----	----	----	----	----	----	----	----	----
BF Discharge (cfs)	----	----	----	----	----	----	----	----	----	----	----	----
Valley Length	----	----	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	1027.0	----	----	----	----	----	1027.0	----	----	----	----
Sinuosity	----	----	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	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 8. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
BCC Reach 4 (410 LF)

Parameter	Year 2							Year 3						
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n		
Dimension and Substrate - Riffle														
BF Width (ft)	----	28.0	----	----	----	1	----	27.6	----	----	----	1		
Floodprone Width (ft)	----	80.9	----	----	----	1	----	81.0	----	----	----	1		
BF Mean Depth (ft)	----	2.1	----	----	----	1	----	2.2	----	----	----	1		
BF Max Depth (ft)	----	3.6	----	----	----	1	----	3.2	----	----	----	1		
BF Cross-sectional Area (ft ²)	----	59.7	----	----	----	1	----	61.5	----	----	----	1		
Width/Depth Ratio	----	13.1	----	----	----	1	----	12.4	----	----	----	1		
Entrenchment Ratio	----	2.9	----	----	----	1	----	2.9	----	----	----	1		
Bank Height Ratio	----	1.0	----	----	----	1	----	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)	----	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/ft ²	----	----	----	----	----	----	----	----	----	----	----	----		
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	----	----	3.3	----	----	3.4	----	----		
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----		
Rosgen Classification	----	E/C	----	----	----	----	----	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 8. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT1 Reach 1 (1248 LF)

Parameter	Year 2						Year 3					
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle												
BF Width (ft)	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)	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)	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)	1.6	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)	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	9.9	14.0	11.6	20.4	5.7	3	8.7	11.7	11.6	14.7	3.0	3
Entrenchment Ratio	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	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3
d50 (mm)	----	----	----	----	----	1	----	----	----	----	----	1
Pattern												
Channel Beltwidth (ft)	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)	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)	1.8	----	----	2.9	----	8	2.3	2.8	2.8	3.4	0.4	8
Meander Wavelength (ft)	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	4.0	----	----	5.6	----	8	4.7	5.2	5.2	6.2	0.5	7
Profile												
Riffle Length (ft)	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)	0.0070	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	104.0	102.0	137.0	27.9	8	63.0	101.0	101.0	130.0	22.9	8
Pool Max Depth (ft)	2.6	----	----	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	----	----	----	----	----	----	----	----	----	----	----	----
Reach Shear Stress (competency) lb/ft ²	----	----	----	----	----	----	----	----	<0.063 / <0.063 / 37 / 95 / 125	----	----	----
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	----	----	0.7	----	----	0.8	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C	----	----	----	----	----	E/C	----	----	----	----
BF Velocity (fps)	----	----	----	----	----	----	----	----	----	----	----	----
BF Discharge (cfs)	----	----	----	----	----	----	----	----	----	----	----	----
Valley Length	----	----	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	910.0	----	----	----	----	----	910.0	----	----	----	----
Sinuosity	----	----	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----
BF slope (ft/ft)	----	0.0080	----	----	----	----	----	0.0080	----	----	----	----
Bankfull Floodplain Area (acres)	----	----	----	----	----	----	----	----	----	----	----	----
BEHI VL% / L% / M% / H% / VH% / E%	----	----	----	----	----	----	----	----	----	----	----	----
Channel Stability or Habitat Metric	----	----	----	----	----	----	----	----	----	----	----	----
Biological or Other	----	----	----	----	----	----	----	----	----	----	----	----

Table 8. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT1 Reach 2 (1016)

Parameter	Year 2						Year 3					
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle												
BF Width (ft)	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)	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)	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)	1.7	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)	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	12.8	14.6	14.9	16.2	1.7	3	13.5	15.1	15.7	16.0	1.3	3
Entrenchment Ratio	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	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3
d50 (mm)	----	----	----	----	----	----	----	----	----	----	----	----
Pattern												
Channel Beltwidth (ft)	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)	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)	1.9	----	----	3.1	----	2	2.3	3.2	3.3	3.7	0.5	6
Meander Wavelength (ft)	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	2.7	----	----	3.9	----	2	2.9	3.5	3.5	4.2	0.5	6
Profile												
Riffle Length (ft)	37	53	58	96	21	6	48	62	56	94	17	6
Riffle Slope (ft/ft)	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)	47	90	84	101	19	7	78	97	96	119	13	6
Pool Max Depth (ft)	----	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/ft ²	----	----	----	----	----	----	----	----	----	----	----	----
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	----	----	0.8	----	----	0.9	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C	----	----	----	----	----	E/C	----	----	----	----
BF Velocity (fps)	----	----	----	----	----	----	----	----	----	----	----	----
BF Discharge (cfs)	----	----	----	----	----	----	----	----	----	----	----	----
Valley Length	----	----	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	734.0	----	----	----	----	----	734.0	----	----	----	----
Sinuosity	----	----	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----
BF slope (ft/ft)	----	0.014	----	----	----	----	----	0.014	----	----	----	----
Bankfull Floodplain Area (acres)	----	----	----	----	----	----	----	----	----	----	----	----
BEHI VL% / L% / M% / H% / VH% / E%	----	----	----	----	----	----	----	----	----	----	----	----
Channel Stability or Habitat Metric	----	----	----	----	----	----	----	----	----	----	----	----
Biological or Other	----	----	----	----	----	----	----	----	----	----	----	----

Table 8. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT1 Reach 3 (1885 LF)

Parameter	Year 2						Year 3					
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle												
BF Width (ft)	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)	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)	1.0	1.1	1.1	1.2	0.1	3	1.0	1.1	1.0	1.2	0.1	3
BF Max Depth (ft)	1.6	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)	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	12.0	13.6	13.9	15.0	0.7	3	12.6	13.5	13.7	14.3	0.9	3
Entrenchment Ratio	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	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3
d50 (mm)	----	----	----	----	----	1	----	----	----	----	----	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)	----	----	----	----	----	----	----	----	----	----	----	----
Pool Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----
Pool Spacing (ft)	----	----	----	----	----	----	----	----	----	----	----	----
Pool Max Depth (ft)	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	----	----	----	----	----	----	----	----	10 / 25 / 37 / 95 / 170	----	----	----
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)	0.9	----	----	1.1	----	----	0.9	----	----	1.1	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C	----	----	----	----	----	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 8. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT1 Reach 4 (996 LF)

Parameter	Year 2						Year 3					
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle												
BF Width (ft)	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)	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)	1.11	1.4	1.36	1.82	0.36	3	1.1	1.4	1.5	1.6	0.2	3
BF Max Depth (ft)	1.66	2.4	2.51	3.01	0.68	3	1.8	2.3	2.4	2.6	0.4	3
BF Cross-sectional Area (ft²)	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	10.26	14.4	12.67	20.25	5.21	3	10.6	14.4	12.2	20.4	5.3	3
Entrenchment Ratio	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	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3
d50 (mm)	----	----	----	----	----	----	----	----	----	----	----	----
Pattern												
Channel Beltwidth (ft)	----	----	----	----	----	----	----	----	----	----	----	----
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)	----	4.0	----	----	----	1	----	4.5	----	----	----	1
Pool Volume (ft³)	----	----	----	----	----	----	----	----	----	----	----	----
Substrate and Transport Parameters												
Ri% / Ru% / P% / G% / S%	----	----	----	----	----	----	----	----	----	----	----	----
SC% / Sa% / G% / B% / Be%	----	----	----	----	----	----	----	----	----	----	----	----
d16 / d35 / d50 / d84 / d95	----	----	----	----	----	----	----	----	18 / 37 / 51 / 100 / 163	----	----	----
Reach Shear Stress (competency) lb/ft²	----	----	----	----	----	----	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	----	----	----	----	----	----	----
Stream Power (transport capacity) W/m²	----	----	----	----	----	----	----	----	----	----	----	----
Additional Reach Parameters												
Drainage Area (SM)	1.1	----	----	1.2	----	----	1.1	----	----	1.2	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C	----	----	----	----	----	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 8. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT2 (609 LF)

Parameter	Year 2						Year 3					
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle												
BF Width (ft)	----	14.4	----	----	----	1	----	15.6	----	----	----	1
Floodprone Width (ft)	----	63.2	----	----	----	1	----	63.0	----	----	----	1
BF Mean Depth (ft)	----	1.2	----	----	----	1	----	1.5	----	----	----	1
BF Max Depth (ft)	----	1.8	----	----	----	1	----	2.9	----	----	----	1
BF Cross-sectional Area (ft ²)	----	17.4	----	----	----	1	----	23.8	----	----	----	1
Width/Depth Ratio	----	11.9	----	----	----	1	----	10.3	----	----	----	1
Entrenchment Ratio	----	4.4	----	----	----	1	----	4.0	----	----	----	1
Bank Height Ratio	----	1.0	----	----	----	1	----	1.0	----	----	----	1
d50 (mm)	----	----	----	----	----	----	----	34	----	----	----	----
Pattern												
Channel Beltwidth (ft)	----	----	----	----	----	----	----	----	----	----	----	----
Radius of Curvature (ft)	----	----	----	----	----	----	----	----	----	----	----	----
Rc:Bankfull width (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----
Meander Wavelength (ft)	----	----	----	----	----	----	----	----	----	----	----	----
Meander Width Ratio	----	----	----	----	----	----	----	----	----	----	----	----
Profile												
Riffle Length (ft)	29.0	31.0	39.0	58.0	16.2	3	23	31	28	41	9	9
Riffle Slope (ft/ft)	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)	----	87.0	----	----	----	1	----	102.0	----	----	----	1
Pool Max Depth (ft)	----	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	----	----	----	----	----	----	----	----	12 / 25 / 34 / 60 / 141	----	----	----
Reach Shear Stress (competency) lb/ft ²	----	----	----	----	----	----	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	----	----	----	----	----	----	----
Stream Power (transport capacity) W/m ²	----	----	----	----	----	----	----	----	----	----	----	----
Additional Reach Parameters												
Drainage Area (SM)	0.5	----	----	0.6	----	----	0.5	----	----	0.6	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C	----	----	----	----	----	E/C	----	----	----	----
BF Velocity (fps)	----	----	----	----	----	----	----	----	----	----	----	----
BF Discharge (cfs)	----	----	----	----	----	----	----	----	----	----	----	----
Valley Length	----	----	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	206.0	----	----	----	----	----	206.0	----	----	----	----
Sinuosity	----	----	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	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 8. Baseline Stream Summary													
Big Cedar Creek Restoration Site Contract No. D06054-D													
BCC Reach 1 (603 LF)													
Parameter	Year 4						Year 5						
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	
Dimension and Substrate - Riffle													
BF Width (ft)	----	28.3	----	----	----	1	----	20.5	----	----	----	1	
Floodprone Width (ft)	----	65.2	----	----	----	1	----	65.2	----	----	----	1	
BF Mean Depth (ft)	----	1.5	----	----	----	1	----	1.6	----	----	----	1	
BF Max Depth (ft)	----	3.3	----	----	----	1	----	3.0	----	----	----	1	
BF Cross-sectional Area (ft ²)	----	43.0	----	----	----	1	----	33.7	----	----	----	1	
Width/Depth Ratio	----	18.6	----	----	----	1	----	12.5	----	----	----	1	
Entrenchment Ratio	----	2.3	----	----	----	1	----	3.2	----	----	----	1	
Bank Height Ratio	----	1.0	----	----	----	1	----	1.0	----	----	----	1	
d50 (mm)	----	----	----	----	----	----	----	----	----	----	----	----	
Pattern													
Channel Beltwidth (ft)	----	----	----	----	----	----	----	----	----	----	----	----	
Radius of Curvature (ft)	----	----	----	----	----	----	----	----	----	----	----	----	
Re:Bankfull width (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----	
Meander Wavelength (ft)	----	----	----	----	----	----	----	----	----	----	----	----	
Meander Width Ratio	----	----	----	----	----	----	----	----	----	----	----	----	
Profile													
Riffle Length (ft)	60	66	66	72	----	2	35	56	56	78	----	2	
Riffle Slope (ft/ft)	0.003	0.007	0.007	0.008	----	2	0.008	0.013	0.013	0.017	----	2	
Pool Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----	
Pool Spacing (ft)	----	155.1	----	----	----	1	----	155.0	----	----	----	2	
Pool Max Depth (ft)	3.4	3.8	----	4.1	----	2	4.0	4.1	----	4.2	----	2	
Pool Volume (ft ³)	----	----	----	----	----	----	----	----	----	----	----	----	
Substrate and Transport Parameters													
Ri% / Ru% / P% / G% / S%	----	----	----	----	----	----	----	----	----	----	----	----	
SC% / Sa% / G% / B% / Be%	----	----	----	----	----	----	----	----	----	----	----	----	
d16 / d35 / d50 / d84 / d95	----	----	----	----	----	----	----	9 / 19 / 42 / 113 / 158	----	----	----	----	
Reach Shear Stress (competency) lb/ft ²	----	----	----	----	----	----	----	----	----	----	----	----	
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	----	----	----	----	----	----	----	
Stream Power (transport capacity) W/m ²	----	----	----	----	----	----	----	----	----	----	----	----	
Additional Reach Parameters													
Drainage Area (SM)	2.3	----	----	2.3	----	----	2.3	----	----	2.3	----	----	
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	
Rosgen Classification	----	E/C	----	----	----	----	----	C	----	----	----	----	
BF Velocity (fps)	----	----	----	----	----	----	----	----	----	----	----	----	
BF Discharge (cfs)	----	----	----	----	----	----	----	----	----	----	----	----	
Valley Length	----	----	----	----	----	----	----	----	----	----	----	----	
Channel length (ft)	----	250.7	----	----	----	----	----	395.0	----	----	----	----	
Sinuosity	----	----	----	----	----	----	----	----	----	----	----	----	
Water Surface Slope (Channel) (ft/ft)	----	0.004	----	----	----	----	----	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 8. Baseline Stream Summary													
Big Cedar Creek Restoration Site Contract No. D06054-D													
BCC Reach 2 (2239 LF)													
Parameter	Year 4						Year 5						
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	
Dimension and Substrate - Riffle													
BF Width (ft)	20.7	23.6	24.9	25.1	2.5	3	22.2	24.7	23.8	28.2	3.1	3	
Floodprone Width (ft)	74.4	74.9	74.5	75.8	0.6	3	74.3	74.9	74.5	75.8	0.8	3	
BF Mean Depth (ft)	2.4	2.5	2.5	2.8	0.2	3	2.2	2.5	2.5	2.8	0.3	3	
BF Max Depth (ft)	3.6	4.1	3.8	4.9	0.7	3	3.7	4.1	3.9	4.6	0.5	3	
BF Cross-sectional Area (ft ²)	51.2	60.2	58.9	70.4	9.7	3	54.3	60.9	60.7	67.7	6.7	3	
Width/Depth Ratio	8.4	9.3	8.8	10.7	1.2	3	8.4	10.2	9.1	13.1	2.5	3	
Entrenchment Ratio	2.8	3.1	3.0	3.6	0.4	3	2.7	3.0	3.1	3.3	0.3	3	
Bank Height Ratio	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)	----	----	----	----	----	----	----	----	----	----	----	----	
Radius of Curvature (ft)	----	----	----	----	----	----	----	----	----	----	----	----	
Rc:Bankfull width (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----	
Meander Wavelength (ft)	----	----	----	----	----	----	----	----	----	----	----	----	
Meander Width Ratio	----	----	----	----	----	----	----	----	----	----	----	----	
Profile													
Riffle Length (ft)	----	75	----	----	----	1	25	28	28	30	3.6	2	
Riffle Slope (ft/ft)	----	0.01	----	----	----	1	0.02	0.02	0.02	0.02	0.01	2	
Pool Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----	
Pool Spacing (ft)	----	----	----	----	----	----	----	----	----	----	----	----	
Pool Max Depth (ft)	----	4.5	----	----	----	1	----	4.2	----	----	----	1	
Pool Volume (ft ³)	----	----	----	----	----	----	----	----	----	----	----	----	
Substrate and Transport Parameters													
Ri% / Ru% / P% / G% / S%	----	----	----	----	----	----	----	----	----	----	----	----	
SC% / Sa% / G% / B% / Be%	----	----	----	----	----	----	----	----	----	----	----	----	
d16 / d35 / d50 / d84 / d95	----	----	----	----	----	----	----	16 / 47 / 71 / 152 / 226	----	----	----	----	
Reach Shear Stress (competency) lb/ft ²	----	----	----	----	----	----	----	----	----	----	----	----	
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	----	----	2.3	----	----	3.1	----	----	
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	
Rosgen Classification	----	E/C	----	----	----	----	----	E/C	----	----	----	----	
BF Velocity (fps)	----	----	----	----	----	----	----	----	----	----	----	----	
BF Discharge (cfs)	----	----	----	----	----	----	----	----	----	----	----	----	
Valley Length	----	----	----	----	----	----	----	----	----	----	----	----	
Channel length (ft)	----	266.8	----	----	----	----	----	200.3	----	----	----	----	
Sinuosity	----	----	----	----	----	----	----	----	----	----	----	----	
Water Surface Slope (Channel) (ft/ft)	----	0.003	----	----	----	----	----	0.006	----	----	----	----	
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. Baseline Stream Summary												
Big Cedar Creek Restoration Site Contract No. D06054-D												
BCC Reach 3 (1827 LF)												
Parameter	Year 4						Year 5					
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle												
BF Width (ft)	24.6	25.6	25.9	26.3	0.9	3	21.2	23.3	22.8	26.0	2.4	3
Floodprone Width (ft)	77.1	79.2	77.8	82.8	3.1	3	73.2	77.7	77.2	82.8	4.8	3
BF Mean Depth (ft)	1.9	2.2	2.2	2.4	0.3	3	1.7	2.1	2.3	2.4	0.4	3
BF Max Depth (ft)	3.0	3.5	3.7	3.8	0.4	3	2.6	3.4	3.5	4.0	0.7	3
BF Cross-sectional Area (ft ²)	47.1	56.1	57.4	63.9	8.5	3	37.0	50.9	55.2	60.6	12.4	3
Width/Depth Ratio	10.8	11.8	11.7	12.8	1.0	3	9.4	10.9	11.2	12.2	1.4	3
Entrenchment Ratio	3.0	3.1	3.1	3.2	0.1	3	3.2	3.3	3.4	3.4	0.1	3
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0	3	1.0	1.1	1.0	1.2	0.1	3
d50 (mm)	----	----	----	----	----	----	----	----	----	----	----	----
Pattern												
Channel Beltwidth (ft)	62.0	72.2	75.0	84.0	8.8		26.3	52.5	42.1	95.5	25.7	6
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	175.9	236.8	232.5	293.6	53.9	5
Meander Width Ratio	2.5	2.8	2.9	3.3	0.3	5	1.2	2.3	1.8	3.7	1.0	4
Profile												
Riffle Length (ft)	25	67	70	116	40	6	19	62	69	89	33.0	4
Riffle Slope (ft/ft)	0.002	0.015	0.016	0.032	0.011	6	0.005	0.010	0.009	0.016	0.00	4
Pool Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----
Pool Spacing (ft)	80.0	134.8	142.5	174.0	35.5	6	59.8	121.0	105.0	174.5	40.0	7
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	----	----	----	----	----	----	----	----	<0.063 / 11 / 17 / 87 / 128			
Reach Shear Stress (competency) lb/ft ²	----	----	----	----	----	----	----	----	----	----	----	----
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	----	----	3.1	----	----	3.3	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C	----	----	----	----	----	E/C	----	----	----	----
BF Velocity (fps)	----	----	----	----	----	----	----	----	----	----	----	----
BF Discharge (cfs)	----	----	----	----	----	----	----	----	----	----	----	----
Valley Length	----	----	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	1027	----	----	----	----	----	1020	----	----	----	----
Sinuosity	----	----	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	0.008	----	----	----	----	----	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 8. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
BCC Reach 4 (410 LF)

Parameter	Year 4						Year 5					
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle												
BF Width (ft)	----	29.9	----	----	----	1	----	32.1	----	----	----	1
Floodprone Width (ft)	----	81.0	----	----	----	1	----	81.0	----	----	----	1
BF Mean Depth (ft)	----	2.0	----	----	----	1	----	2.0	----	----	----	1
BF Max Depth (ft)	----	3.1	----	----	----	1	----	3.2	----	----	----	1
BF Cross-sectional Area (ft ²)	----	59.8	----	----	----	1	----	63.1	----	----	----	1
Width/Depth Ratio	----	15.0	----	----	----	1	----	16.3	----	----	----	1
Entrenchment Ratio	----	2.7	----	----	----	1	----	2.5	----	----	----	1
Bank Height Ratio	----	1.0	----	----	----	1	----	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/ft ²	----	----	----	----	----	----	----	----	----	----	----	----
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	----	----	3.3	----	----	3.4	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C4	----	----	----	----	----	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 8. Baseline Stream Summary												
Big Cedar Creek Restoration Site Contract No. D06054-D												
UT1 Reach 1 (1248 LF)												
Parameter	Year 4						Year 5					
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle												
BF Width (ft)	12.3	12.3	12.9	15.5	1.7	3	12.1	13.3	13.1	14.6	1.3	3
Floodprone Width (ft)	48.4	52.8	53.7	56.5	4.1	3	48.4	51.1	51.4	53.5	2.6	3
BF Mean Depth (ft)	0.9	1.0	1.1	1.1	0.1	3	0.9	1.0	1.0	1.2	0.2	3
BF Max Depth (ft)	1.6	1.8	1.7	2.0	0.2	3	1.7	1.9	1.7	2.2	0.3	3
BF Cross-sectional Area (ft ²)	13.1	13.4	13.4	13.8	0.4	3	12.5	13.5	13.2	14.9	1.2	3
Width/Depth Ratio	11.3	13.9	12.1	18.4	3.9	3	9.8	13.2	12.9	17.0	3.6	3
Entrenchment Ratio	3.6	3.9	3.9	4.2	0.3	3	3.5	3.9	4.0	4.1	0.3	3
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0	3	1.0	1.0	1.0	1.0	0.0	3
d50 (mm)	----	----	----	----	----	----	----	----	----	----	----	----
Pattern												
Channel Beltwidth (ft)	45.0	67.0	69.0	81.0	11.5	7	29.4	56.8	62.1	67.7	13.8	8.0
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	142.8	158.0	158.3	173.0	11.8	7.0
Meander Width Ratio	3.6	5.3	5.5	6.4	0.9	7	2.4	4.3	4.7	4.6	1.1	4
Profile												
Riffle Length (ft)	6	61	64	78	30	8	34	55	47	97	21.3	8
Riffle Slope (ft/ft)	0.012	0.024	0.018	0.510	0.014	8	0.008	0.021	0.021	0.031	0.01	8
Pool Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----
Pool Spacing (ft)	39.0	69.0	70.0	100.0	30.0	8	31.7	96.0	104.0	119.7	28.3	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	----	----	----	----	----	----	----	----	6 / 44 / 59 / 107 / 138	----	----	----
Reach Shear Stress (competency) lb/ft ²	----	----	----	----	----	----	----	----	----	----	----	----
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	----	----	0.7	----	----	0.8	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C	----	----	----	----	----	C/Bc	----	----	----	----
BF Velocity (fps)	----	----	----	----	----	----	----	----	----	----	----	----
BF Discharge (cfs)	----	----	----	----	----	----	----	----	----	----	----	----
Valley Length	----	----	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	905.0	----	----	----	----	----	914.0	----	----	----	----
Sinuosity	----	----	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	0.010	----	----	----	----	----	0.009	----	----	----	----
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. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT1 Reach 2 (1016)

Parameter	Year 4						Year 5					
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle												
BF Width (ft)	11.9	13.3	12.9	15.2	1.7	3	12.5	16.1	17.5	18.2	3.1	3
Floodprone Width (ft)	56.3	58.5	58.9	60.2	2.0	3	56.4	58.5	58.8	60.2	1.9	3
BF Mean Depth (ft)	0.9	1.0	1.0	1.1	0.1	3	0.8	0.9	1.0	1.0	0.1	3
BF Max Depth (ft)	1.5	1.6	1.6	1.8	0.1	3	1.6	1.8	1.9	1.9	0.2	3
BF Cross-sectional Area (ft ²)	10.2	13.2	12.9	16.5	3.2	3	11.8	15.0	15.4	17.7	3.0	3
Width/Depth Ratio	13.0	13.6	14.0	14.0	0.6	3	13.1	17.3	17.3	21.6	4.3	3
Entrenchment Ratio	3.9	4.4	4.4	5.0	0.6	3	3.3	3.7	3.4	4.5	0.7	3
Bank Height Ratio	1.0	1.0	1.0	1.0	0.0	3	1.0	1.1	1.1	1.1	0.1	3
d50 (mm)	----	----	----	----	----	----	----	----	----	----	----	----
Pattern												
Channel Beltwidth (ft)	41.0	49.0	49.0	57.0	7.07	6	16.0	32.4	35.9	49.8	12.3	7
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	129.7	178.6	189.7	204.7	27.8	6
Meander Width Ratio	2.9	3.5	3.5	4.1	0.51	6	1.3	2.0	2.1	2.7	0.6	4
Profile												
Riffle Length (ft)	5.9	44	47	78	27	8	39.0	67	66	96	18.5	6
Riffle Slope (ft/ft)	0.012	0.024	0.018	0.051	0.014	8	0.013	0.020	0.020	0.026	0.004	6
Pool Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----
Pool Spacing (ft)	39	69	70	100	30	6	35	83	83	178	48	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/ft ²	----	----	----	----	----	----	----	----	----	----	----	----
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	----	----	0.8	----	----	0.9	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C	----	----	----	----	----	C	----	----	----	----
BF Velocity (fps)	----	----	----	----	----	----	----	----	----	----	----	----
BF Discharge (cfs)	----	----	----	----	----	----	----	----	----	----	----	----
Valley Length	----	----	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	734.0	----	----	----	----	----	791.6	----	----	----	----
Sinuosity	----	----	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----
BF slope (ft/ft)	----	0.014	----	----	----	----	----	0.014	----	----	----	----
Bankfull Floodplain Area (acres)	----	----	----	----	----	----	----	----	----	----	----	----
BEHI VL% / L% / M% / H% / VH% / E%	----	----	----	----	----	----	----	----	----	----	----	----
Channel Stability or Habitat Metric	----	----	----	----	----	----	----	----	----	----	----	----
Biological or Other	----	----	----	----	----	----	----	----	----	----	----	----

Table 8. Baseline Stream Summary													
Big Cedar Creek Restoration Site Contract No. D06054-D													
UT1 Reach 3 (1885 LF)													
Parameter	Year 4						Year 5						
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	
Dimension and Substrate - Riffle													
BF Width (ft)	14.9	19.0	15.1	27.0	6.95	3	14.3	16.8	17.5	18.7	2.3	3	
Floodprone Width (ft)	57.0	57.6	57.1	58.6	0.9	3	56.9	57.5	57.1	58.6	0.9	3	
BF Mean Depth (ft)	0.9	1.0	0.9	1.1	0.1	3	1.0	1.1	1.1	1.1	0.1	3	
BF Max Depth (ft)	1.6	1.8	1.8	2.1	0.3	3	1.6	1.9	2.0	2.1	0.3	3	
BF Cross-sectional Area (ft ²)	13.7	18.6	16.8	25.4	6.1	3	14.4	17.8	19.1	19.8	2.9	3	
Width/Depth Ratio	13.2	19.6	16.7	28.8	8.2	3	14.3	16.0	16.1	17.7	1.7	3	
Entrenchment Ratio	2.2	3.3	3.8	3.8	0.1	3	3.0	3.4	3.3	4.0	0.5	3	
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0	3	0.9	1.0	1.0	1.0	0.1	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	----	----	----	----	----	----	----	18 / 30 / 43 / 188 / 286	----	----	----	----	
Reach Shear Stress (competency) lb/ft ²	----	----	----	----	----	----	----	----	----	----	----	----	
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	----	----	0.9	----	----	1.1	----	----	
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----	
Rosgen Classification	----	E/C	----	----	----	----	----	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 8. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT1 Reach 4 (996 LF)

Parameter	Year 4						Year 5					
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle												
BF Width (ft)	17.0	20.6	20.6	24.1	3.5	3	16.5	23.9	23.7	31.6	7.6	3
Floodprone Width (ft)	50.2	57.5	58.5	63.8	6.9	3	49.0	57.1	58.6	63.7	7.5	3
BF Mean Depth (ft)	1.1	1.4	1.4	1.6	0.3	3	1.0	1.2	1.2	1.4	0.2	3
BF Max Depth (ft)	1.7	2.3	2.5	2.8	0.6	3	1.8	2.4	2.6	2.8	0.5	3
BF Cross-sectional Area (ft ²)	24.3	28.0	26.6	33.1	4.6	3	23.1	28.0	24.1	36.8	7.6	3
Width/Depth Ratio	11.9	15.5	12.8	21.8	5.5	3	11.8	20.7	23.2	27.2	8.0	3
Entrenchment Ratio	2.1	2.9	3.1	3.4	0.6	3	2.0	2.6	2.2	3.6	0.9	3
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0	3	0.9	1.0	1.0	1.0	0.1	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	----	----	----	----	----	----	----	9 / 34 / 57 / 149 / 228	----	----	----	----
Reach Shear Stress (competency) lb/ft ²	----	----	----	----	----	----	----	----	----	----	----	----
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	----	----	1.1	----	----	1.2	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C	----	----	----	----	----	E/C/Bc	----	----	----	----
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 8. Baseline Stream Summary
Big Cedar Creek Restoration Site Contract No. D06054-D
UT2 (609 LF)

Parameter	Year 4						Year 5					
	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n
Dimension and Substrate - Riffle												
BF Width (ft)	----	13.3	----	----	----	1	----	15.6	----	----	----	1
Floodprone Width (ft)	----	63.1	----	----	----	1	----	63.1	----	----	----	1
BF Mean Depth (ft)	----	1.7	----	----	----	1	----	1.6	----	----	----	1
BF Max Depth (ft)	----	3.0	----	----	----	1	----	3.1	----	----	----	1
BF Cross-sectional Area (ft ²)	----	22.8	----	----	----	1	----	24.7	----	----	----	1
Width/Depth Ratio	----	7.8	----	----	----	1	----	9.8	----	----	----	1
Entrenchment Ratio	----	4.7	----	----	----	1	----	4.1	----	----	----	1
Bank Height Ratio	----	1.0	----	----	----	1	----	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	24	17	40	14.4	3	14	23	22	33	9.3	4
Riffle Slope (ft/ft)	0.012	0.019	0.017	0.029	0.008	3	0.012	0.020	0.016	0.036	0.011	4
Pool Length (ft)	----	----	----	----	----	----	----	----	----	----	----	----
Pool Spacing (ft)	42.8	65.2	65.2	87.6	31.678384	2	41.7	63.0	63.3	84.8	30.5	2
Pool Max Depth (ft)	2.5	2.7	2.7	2.8	0.2	3	2.4	2.7	2.7	3.1	0.4	3
Pool Volume (ft ³)	----	----	----	----	----	----	----	----	----	----	----	----
Substrate and Transport Parameters												
Ri% / Ru% / P% / G% / S%	----	----	----	----	----	----	----	----	----	----	----	----
SC% / Sa% / G% / B% / Be%	----	----	----	----	----	----	----	----	----	----	----	----
d16 / d35 / d50 / d84 / d95	----	----	----	----	----	----	----	19 / 30 / 39 / 76 / 128	----	----	----	----
Reach Shear Stress (competency) lb/ft ²	----	----	----	----	----	----	----	----	----	----	----	----
Max part size (mm) mobilized at bankfull (Rosgen Curve)	----	----	----	----	----	----	----	----	----	----	----	----
Stream Power (transport capacity) W/m ²	----	----	----	----	----	----	----	----	----	----	----	----
Additional Reach Parameters												
Drainage Area (SM)	0.5	----	----	0.6	----	----	0.5	----	----	0.6	----	----
Impervious cover estimate (%)	----	----	----	----	----	----	----	----	----	----	----	----
Rosgen Classification	----	E/C	----	----	----	----	----	E	----	----	----	----
BF Velocity (fps)	----	----	----	----	----	----	----	----	----	----	----	----
BF Discharge (cfs)	----	----	----	----	----	----	----	----	----	----	----	----
Valley Length	----	----	----	----	----	----	----	----	----	----	----	----
Channel length (ft)	----	222.8	----	----	----	----	----	211.0	----	----	----	----
Sinuosity	----	----	----	----	----	----	----	----	----	----	----	----
Water Surface Slope (Channel) (ft/ft)	----	0.016	----	----	----	----	----	0.013	----	----	----	----
BF slope (ft/ft)	----	----	----	----	----	----	----	----	----	----	----	----
Bankfull Floodplain Area (acres)	----	----	----	----	----	----	----	----	----	----	----	----
BEHI VL% / L% / M% / H% / VH% / E%	----	----	----	----	----	----	----	----	----	----	----	----
Channel Stability or Habitat Metric	----	----	----	----	----	----	----	----	----	----	----	----
Biological or Other	----	----	----	----	----	----	----	----	----	----	----	----

Table 9. Morphology and Hydraulic Monitoring Summary

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

Big Cedar Creek Reach 1 (603 LF)

Dimension and substrate	Cross-section 1 (Riffle)						Cross-section 2 (Pool)											
	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	20.5	28.0	27.3	27.0	25.7	30.2	28.7						
BF Mean Depth (ft)	1.9	1.8	1.8	1.7	1.5	1.6	1.8	1.7	1.7	1.8	1.7	1.6						
Width/Depth Ratio	10.4	10.7	12.1	11.3	18.6	12.5	15.7	15.7	16.0	14.3	17.8	17.8						
BF Cross-sectional Area (ft ²)	37.1	35.6	36.9	33.9	43.0	33.7	50.1	47.5	45.3	46.3	51.1	46.5						
BF Max Depth (ft)	2.7	2.6	2.8	2.8	3.3	3.0	3.9	3.8	3.6	3.4	3.6	3.8						
Width of Floodprone Area (ft)	>64.7	>65.2	>65.2	>65.3	>65.2	>65.2	>78.0	>78.0	>77.9	>77.9	>77.9	>77.9						
Entrenchment Ratio	>3.3	3.3	3.1	3.3	2.3	3.2	N/A	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						
Wetted Perimeter (ft)	23.4	23.1	24.6	23.0	31.4	23.7	31.6	30.7	30.3	29.3	33.6	31.9						
Hydraulic Radius (ft)	1.6	1.5	1.5	1.5	1.4	1.4	1.6	1.5	1.5	1.6	1.5	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	-	41.8	-	-	-	<0.063	-	28.24						
Dimension and substrate																		
	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 9. Morphology and Hydraulic Monitoring Summary

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

Big Cedar Creek Reach 2 (2239 LF)

Dimension and substrate	Cross-section 3 (Riffle)						Cross-section 4 (Pool)						Cross-section 5 (Riffle)						Cross-section 6 (Pool)					
	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	28.2	33.0	33.1	34.0	36.2	34.5	36.4	22.5	22.5	22.5	21.0	20.7	22.2	34.8	35.7	32.0	31.2	38.6	35.6
BF Mean Depth (ft)	2.5	2.3	2.3	2.4	2.4	2.2	2.3	2.0	2.1	2.2	2.2	2.0	2.2	2.5	2.7	2.5	2.5	2.5	2.5	2.34	2.3	2.2	2.2	2.2
Width/Depth Ratio	10.4	10.8	12.1	11.0	10.7	13.1	14.6	16.3	16.4	16.7	16.0	18.6	10.2	9.0	8.2	8.6	8.4	9.1	13.7	15.25	14.1	14.2	17.8	16.5
BF Cross-sectional Area (ft ²)	63.1	59.0	62.8	61.8	58.9	60.7	74.3	67.2	70.5	78.7	74.4	71.0	49.7	56.2	61.4	51.4	51.2	54.3	88.2	83.4	72.5	68.6	83.7	76.5
BF Max Depth (ft)	3.9	3.8	3.9	4.0	3.8	3.9	5.5	5.7	5.9	6.1	5.9	5.8	3.3	4.2	4.6	3.6	3.6	3.7	5.5	5.21	5.4	5.0	5.2	5.3
Width of Floodprone Area (ft)	>75.8	>75.7	>75.8	>75.8	>75.8	>75.8	>83.5	>83.5	>83.6	>83.6	>83.7	>83.6	>74.4	>74.3	>74.3	>74.3	>74.4	>74.3	>86.2	>86.2	>86.3	>86.2	>86.3	>86.2
Entrenchment Ratio	>3.0	3.0	2.8	2.9	2.8	2.7	N/A	N/A	N/A	N/A	N/A	N/A	>3.3	3.3	3.3	3.5	3.6	3.3	N/A	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	1.0	1.0	1.0	1
Wetted Perimeter (ft)	30.6	29.9	32.1	30.8	29.8	32.6	37.5	37.1	38.1	40.6	38.8	40.4	26.9	27.5	27.9	25.9	25.7	27.2	39.9	40.4	36.5	35.6	43.0	40.0
Hydraulic Radius (ft)	2.1	2.0	2.0	2.0	2.0	1.9	2.0	1.8	1.8	1.9	1.9	1.8	1.8	2.0	2.2	2.0	2.0	2.0	2.2	2.1	2.0	1.9	1.9	1.9
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)	-	-	-	-	-	-	-	-	-	<0.063	-	24.6	-	-	-	97.0	-	70.5	-	-	-	-	-	-
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	23.8																		
BF Mean Depth (ft)	2.5	2.58	2.7	2.8	2.8	2.8																		
Width/Depth Ratio	8.9	8.65	8.8	8.4	8.8	8.4																		
BF Cross-sectional Area (ft ²)	55.6	57.6	64.5	66.6	70.4	67.7																		
BF Max Depth (ft)	3.9	4.1	4.6	4.6	4.9	4.6																		
Width of Floodprone Area (ft)	>75.8	>74.5	>74.5	>74.5	>74.5	>74.5																		
Entrenchment Ratio	>3.4	3.3	3.1	3.1	3.0	3.1																		
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0	1.0																		
Wetted Perimeter (ft)	27.3	27.5	29.2	29.3	30.6	29.4																		
Hydraulic Radius (ft)	2.0	2.1	2.2	2.3	2.3	2.3																		
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 9. Morphology and Hydraulic Monitoring Summary

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

Big Cedar Creek Reach 3 (1827 LF)

Dimension and substrate	Cross-section 8 (Pool)						Cross-section 9 (Riffle)						Cross-section 10 (Riffle)						Cross-section 11 (Riffle)					
	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	38.3	23.1	22.3	22.2	21.8	25.9	22.8	24.6	23.1	23.3	24.6	24.6	21.2	25.0	24.9	26.1	26.5	26.3	26.0
BF Mean Depth (ft)	2.5	2.3	2.3	2.4	2.4	2.3	2.2	2.3	2.3	2.5	2.2	2.4	2.1	2.2	2.0	2.1	1.9	1.7	2.5	2.4	2.2	2.4	2.4	2.3
Width/Depth Ratio	15.6	15.8	15.0	15.5	16.9	16.8	10.7	9.8	9.5	8.9	11.7	9.4	11.7	10.5	11.4	11.9	12.8	12.2	9.9	10.3	12.0	11.3	10.8	11.2
BF Cross-sectional Area (ft ²)	96.4	86.6	78.9	87.2	94.6	87.0	50.1	50.5	51.8	53.5	57.4	55.2	51.8	50.8	47.6	51.1	47.1	37.0	63.2	60.4	56.9	62.2	63.9	60.6
BF Max Depth (ft)	5.4	5.2	5.4	5.7	5.8	5.7	3.1	3.1	3.3	3.5	3.8	4.0	3.1	3.1	3.1	3.1	3.0	2.6	3.8	3.7	3.5	3.6	3.7	3.5
Width of Floodprone Area (ft)	>89.5	>89.5	>89.6	>89.4	>89.5	>89.5	>77.8	>77.8	>77.8	>77.22	>77.1	>77.2	>77.9	>78	>77.8	>77.36	>77.8	>73.2	>82.5	>82.9	>82.9	>83.0	>82.8	>82.8
Entrenchment Ratio	N/A	N/A	N/A	N/A	N/A	N/A	>3.4	3.5	3.5	3.5	3.0	3.4	>3.2	3.4	3.3	3.1	3.2	3.4	>3.3	3.3	3.2	3.1	3.1	3.2
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	1.2	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	42.9	27.5	26.9	26.8	26.7	30.3	27.6	28.8	27.5	27.4	28.8	28.4	24.6	30.0	29.7	30.5	31.2	31.2	30.6
Hydraulic Radius (ft)	2.2	2.1	2.0	2.1	2.1	2.0	1.8	1.9	1.9	2.0	1.9	2.0	1.8	1.8	1.7	1.8	1.7	1.5	2.1	2.0	1.9	2.0	2.1	2.0
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)	-	-	-	<0.063	-	18.8	-	-	-	-	-	-	-	-	-	35.9	-	17.2	-	-	-	-	-	-
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 9. Morphology and Hydraulic Monitoring Summary

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

Big Cedar Creek Reach 4 (410 LF)

Dimension and substrate	Cross-section 12 (Pool)						Cross-section 13 (Riffle)																		
	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	46.4	27.5	27.8	28.0	27.56	29.9	32.1													
BF Mean Depth (ft)	2.3	2.2	2.2	2.1	2.1	1.9	2.1	2.3	2.1	2.23	2.0	2.0													
Width/Depth Ratio	16.3	17.1	18.4	21.1	20.6	24.3	13.0	12.4	13.1	12.35	15.0	16.3													
BF Cross-sectional Area (ft ²)	88.5	80.7	89.5	89.1	89.6	88.6	58.3	62.6	59.7	61.5	59.8	63.1													
BF Max Depth (ft)	4.7	4.3	4.9	4.9	4.9	4.8	3.2	3.7	3.6	3.17	3.1	3.2													
Width of Floodprone Area (ft)	>89.2	>89.1	>89.2	>88.7	>89.2	>89.2	>81.0	>81.1	>80.9	>81.0	>81.0	>81.0													
Entrenchment Ratio	N/A	N/A	N/A	N/A	N/A	N/A	>2.9	2.9	2.9	2.9	2.7	2.5													
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													
Wetted Perimeter (ft)	42.6	41.6	45.0	47.4	47.1	50.2	31.7	32.4	32.2	32.0	33.9	36.1													
Hydraulic Radius (ft)	2.1	1.9	2.0	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.8	1.7													
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)	-	-	-	-	-	-	-	-	-	-	-	-													
Dimension and substrate																									
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 9. Morphology and Hydraulic Monitoring Summary

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

UT1 Reach 1 (1248 LF)

Dimension and substrate	Cross-section 14 (Riffle)						Cross-section 15 (Pool)						Cross-section 16 (Riffle)						Cross-section 17 (Pool)					
	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	14.6	33.3	34.8	24.2	27.3	21.0	34.4	11.6	12.0	11.9	11.9	12.3	12.1	24.3	22	25.3	23.3	23.8	24.1
BF Mean Depth (ft)	1.0	1.0	0.8	0.9	0.9	0.9	1.3	1.1	1.3	1.2	1.3	1.2	1.3	1.3	1.2	1.4	1.1	1.2	1.3	1.3	1.3	1.23	1.1	1.2
Width/Depth Ratio	14.2	14.2	20.4	14.7	18.4	17.0	26.8	30.5	19.3	22.3	16.2	29.2	8.8	9.0	9.9	8.7	11.3	9.8	18.7	16.4	20.2	18.94	21.0	20.2
BF Cross-sectional Area (ft ²)	15.2	13.7	13.4	12.6	13.1	12.5	41.6	39.8	30.5	33.4	27.3	40.6	15.2	16.1	14.3	16.3	13.4	14.9	31.6	29.5	31.6	28.7	26.9	28.9
BF Max Depth (ft)	1.7	1.6	1.6	1.5	1.6	1.7	3.3	3.1	2.8	3.0	2.7	3.3	2.1	2.2	2.1	2.2	2.0	2.2	2.9	2.7	2.7	2.61	2.5	2.8
Width of Floodprone Area (ft)	>56.5	>56.4	>56.5	>56.5	>56.5	>51.4	>57.2	>57.2	>58.4	>58.3	>58.3	>58.3	>48.4	>48.5	>48.4	>48.4	>48.4	>48.4	>55.8	>55.5	>55.7	>55.7	>55.7	>55.8
Entrenchment Ratio	>3.8	4.0	3.3	4.1	3.6	3.5	N/A	N/A	N/A	N/A	N/A	N/A	>4.2	4.0	4.1	4.1	3.9	4.0	N/A	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	1.0	1.0	1.0	1
Wetted Perimeter (ft)	16.7	15.7	18.1	15.5	17.2	16.4	35.9	37.0	26.8	29.7	23.6	36.8	14.2	14.6	14.3	14.6	14.5	14.5	26.9	24.6	27.8	25.8	26.0	26.5
Hydraulic Radius (ft)	0.9	0.9	0.7	0.8	0.8	0.8	1.2	1.1	1.1	1.1	1.2	1.1	1.1	1.1	1.0	1.1	0.9	1.0	1.2	1.2	1.1	1.1	1.0	1.1
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)	-	-	-	36.88	-	59.3	-	-	-	<0.063	-	<0.063	-	-	-	-	-	-	-	-	-	-	-	-
Dimension and substrate																								
	Cross-section 18 (Riffle)																							
	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	13.1																		
BF Mean Depth (ft)	1.1	1.1	1.0	1.1	1.1	1.0																		
Width/Depth Ratio	12.3	12.1	11.6	11.6	12.1	12.9																		
BF Cross-sectional Area (ft ²)	14.2	13.6	12.4	12.9	13.8	13.2																		
BF Max Depth (ft)	1.8	1.7	1.6	1.7	1.7	1.7																		
Width of Floodprone Area (ft)	>56.6	>53.5	>53.5	>53.6	>53.7	>53.5																		
Entrenchment Ratio	>4.0	4.2	4.3	4.4	4.2	4.1																		
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0	1.0																		
Wetted Perimeter (ft)	15.4	15.0	14.1	14.3	15.1	15.1																		
Hydraulic Radius (ft)	0.9	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 (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)	39	-	-	-	-	-																		

Table 9. Morphology and Hydraulic Monitoring Summary

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

UT1 Reach 2 (1016 LF)

Dimension and substrate	Cross-section 19 (Riffle)						Cross-section 20 (Pool)						Cross-section 21 (Riffle)						Cross-section 22 (Riffle)					
	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	12.5	21.2	22.0	22.3	21.2	23.0	22.4	15.9	15.1	15.8	16.3	15.2	17.5	14.1	14.3	15.8	11.3	11.9	18.2
BF Mean Depth (ft)	1.1	1.0	1.1	0.9	1.0	1.0	1.3	1.4	1.1	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.1	1.0	1.2	1.2	1.1	0.8	0.9	0.8
Width/Depth Ratio	12.4	12.0	12.8	15.7	13.0	13.1	16.8	15.6	19.5	17.2	20.6	21.3	14.0	14.2	16.2	16.0	14.0	17.3	12.1	11.8	14.9	13.5	14.0	21.6
BF Cross-sectional Area (ft²)	14.5	13.0	14.4	13.0	12.9	11.8	26.7	31.1	25.5	26.3	25.8	23.5	17.9	16.0	15.4	16.6	16.5	17.7	16.3	17.4	16.6	9.4	10.2	15.4
BF Max Depth (ft)	1.8	1.7	1.8	1.8	1.6	1.6	2.8	2.9	2.7	2.7	2.5	2.7	1.9	1.7	1.7	1.7	1.8	1.9	1.8	2.1	2.0	1.4	1.5	1.9
Width of Floodprone Area (ft)	>56.4	>56.3	>56.3	>56.4	>56.3	>56.4	>62.4	>62.5	>62.5	>62.5	>62.4	>62.5	>58.8	>58.9	>58.8	>58.8	>58.9	>58.8	>60.1	>60.1	>60.4	>57.4	>60.2	>60.2
Entrenchment Ratio	>4.2	4.5	3.9	3.9	4.4	4.5	N/A	N/A	N/A	N/A	N/A	N/A	>3.7	3.9	3.7	3.6	3.9	3.4	>4.3	4.2	3.8	5.1	5.0	3.3
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	1.1	1.0	1.0	1.0	1.0	0.9	1.1
Wetted Perimeter (ft)	15.6	14.5	15.7	16.1	14.9	14.5	23.8	24.8	24.6	23.7	25.3	24.6	18.1	17.3	17.8	18.3	17.3	19.5	16.4	16.7	17.9	13.0	13.7	19.8
Hydraulic Radius (ft)	0.9	0.9	0.9	0.8	0.9	0.8	1.1	1.3	1.0	1.1	1.0	1.0	1.0	0.9	0.9	0.9	1.0	0.9	1.0	1.0	0.9	0.7	0.7	0.8
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 (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 9. Morphology and Hydraulic Monitoring Summary

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

UT1 Reach 3 (1885 LF)

Dimension and substrate	Cross-section 23 (Pool)						Cross-section 24 (Riffle)						Cross-section 25 (Riffle)						Cross-section 26 (Riffle)					
	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	21.4	15.1	16.9	14.7	14.8	14.9	18.7	15.3	14.0	14.2	14.1	15.1	14.3	16.2	15.8	16.6	14.41	27.0	17.5
BF Mean Depth (ft)	1.5	1.4	1.4	1.4	1.4	1.3	1.2	1.3	1.2	1.2	1.1	1.1	1.2	1.1	1.0	1.0	0.9	1.0	1.3	1.1	1.1	1.01	0.9	1.1
Width/Depth Ratio	14.3	15.3	15.2	14.0	19.8	16.1	12.7	12.9	12.0	12.6	13.2	17.7	13.1	13.1	13.9	13.7	16.7	14.3	12.6	14	15.0	14.26	28.8	16.1
BF Cross-sectional Area (ft²)	33.3	28.2	28.5	29.2	36.6	28.5	17.9	22.0	18.0	17.3	16.8	19.8	17.8	15.0	14.6	14.5	13.7	14.4	20.9	17.8	18.4	14.6	25.4	19.1
BF Max Depth (ft)	3.0	2.7	2.9	3.0	3.3	2.9	1.7	2.3	1.9	1.8	1.8	2.0	1.8	1.6	1.6	1.7	1.6	1.6	2.2	1.7	1.7	1.53	2.1	2.1
Width of Floodprone Area (ft)	>64.2	>64.3	>64.1	>64.2	>64.3	>64.3	>57.1	>57.1	>57.1	>57.2	>57.1	>57.1	>56.9	>56.9	>56.9	>57.0	>57.0	>56.9	>58.6	>58.8	>58.7	>58.8	>58.6	>58.6
Entrenchment Ratio	N/A	N/A	N/A	N/A	N/A	N/A	>3.8	3.4	3.6	3.9	3.8	3.0	>3.7	3.6	4.0	4.0	3.8	4.0	>3.6	3.7	3.5	4.1	2.2	3.3
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0	1.1	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	0.9
Wetted Perimeter (ft)	24.9	23.6	23.5	23.1	29.7	24.0	17.5	19.5	17.1	17.1	17.2	20.9	17.6	16.2	16.3	16.2	16.9	16.3	18.8	18.0	18.8	16.4	28.9	19.7
Hydraulic Radius (ft)	1.3	1.2	1.2	1.3	1.2	1.2	1.0	1.1	1.1	1.0	1.0	0.9	1.0	0.9	0.9	0.9	0.8	0.9	1.1	1.0	1.0	0.9	0.9	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)	-	-	-	6.6	-	14.4	-	-	-	37.056	-	43.3	-	-	-	-	-	-	-	-	-	-	-	-
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	20.9																		
BF Mean Depth (ft)	1.3	1.2	1.4	1.4	1.3	1.3																		
Width/Depth Ratio	18.1	19.2	16.8	18.3	19.7	16.1																		
BF Cross-sectional Area (ft²)	32.5	25.9	33.0	33.7	34.0	27.2																		
BF Max Depth (ft)	3.0	2.7	3.1	3.3	3.1	3.1																		
Width of Floodprone Area (ft)	>64.4	>64.5	>64.4	>64.5	>64.4	>64.4																		
Entrenchment Ratio	N/A	N/A	N/A	N/A	N/A	N/A																		
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0	1.1																		
Wetted Perimeter (ft)	27.0	28.3	26.4	27.5	28.5	23.5																		
Hydraulic Radius (ft)	1.2	0.9	1.3	1.2	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 (ft²)	-																							
d50 (mm)	-	-	-	-	-	-																		

Table 9. Morphology and Hydraulic Monitoring Summary

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

UT1 Reach 4 (1121 LF)

Dimension and substrate	Cross-section 28 (Riffle)						Cross-section 29 (Pool)						Cross-section 30 (Riffle)						Cross-section 31 (Riffle)					
	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	16.5	19.2	20.6	22.0	22.1	22.5	21.4	16.8	16.5	18.7	19.0	20.6	31.6	22.6	22.5	22.5	23.36	24.09	23.7
BF Mean Depth (ft)	1.3	1.3	1.4	1.5	1.4	1.4	2.2	2.3	2.1	2.2	2.2	2.3	1.5	2.0	1.8	1.6	2.8	1.2	1.2	1.2	1.1	1.14	1.1	1.0
Width/Depth Ratio	13.1	12.9	12.7	10.6	11.9	11.8	8.7	9.0	10.3	10.0	10.3	9.3	11.2	8.2	10.3	12.2	12.8	27.2	18.4	18.3	20.3	20.42	21.81	23.2
BF Cross-sectional Area (ft²)	21.3	20.6	23.4	22.8	24.3	23.1	42.0	47.1	46.8	49.1	49.2	49.6	25.3	33.2	33.9	29.4	33.1	36.8	27.8	27.7	25.1	26.7	26.6	24.1
BF Max Depth (ft)	2.0	2.0	2.5	2.4	2.5	2.6	4.6	4.3	4.0	4.5	4.4	4.5	2.3	3.0	3.0	2.6	2.8	2.8	1.8	1.9	1.7	1.8	1.7	1.8
Width of Floodprone Area (ft)	>58.6	>58.4	>58.5	>58.6	>58.5	>58.6	>61.7	>61.6	>61.6	>61.7	>61.6	>61.7	>63.5	>63.7	>63.7	>63.8	>63.8	>63.7	51.3	>56.4	>56.5	>56.6	>50.2	>49.0
Entrenchment Ratio	>3.5	3.6	3.4	3.8	3.4	3.6	N/A	N/A	N/A	N/A	N/A	N/A	>3.8	3.9	3.4	2.9	3.1	2.0	2.3	2.5	2.1	2.6	2.1	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	0.9	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	19.3	23.5	25.2	26.2	26.6	26.9	26.0	19.8	20.5	22.3	22.1	26.2	34.0	25.1	24.9	24.7	25.6	26.3	25.7
Hydraulic Radius (ft)	1.1	1.1	1.2	1.2	1.2	1.2	1.8	1.9	1.8	1.8	1.8	1.9	1.3	1.6	1.5	1.3	1.3	1.1	1.1	1.1	1.0	1.0	1.0	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 (ft²)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
d50 (mm)	-	-	-	50.94	-	56.7	-	-	-	14.825	-	20.2	-	-	-	-	-	-	-	-	-	-	-	-
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)																								
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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 9. Morphology and Hydraulic Monitoring Summary


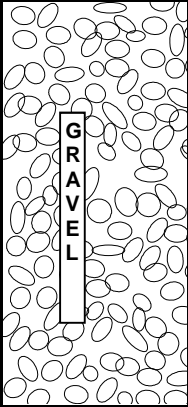
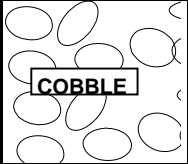
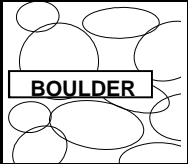
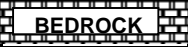
Big Cedar Creek Restoration Site: Contract No. D06054-D

UT2 (609 LF)

Dimension and substrate	Cross-section 32 (Riffle)						Cross-section 33 (Pool)																	
	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	15.6	26.8	21.8	22.0	22.1	23.6	28.0												
BF Mean Depth (ft)	1.4	1.5	1.2	1.5	1.7	1.6	1.1	1.1	1.2	1.1	1.1	0.9												
Width/Depth Ratio	9.9	8.7	11.9	10.3	7.8	9.8	24.4	20.0	18.7	21.0	21.3	30.7												
BF Cross-sectional Area (ft²)	18.1	20.1	17.4	23.8	22.8	24.7	29.4	23.7	25.8	23.3	26.1	25.5												
BF Max Depth (ft)	1.9	2.1	1.8	2.9	3.0	3.1	2.9	2.9	3.0	2.8	2.8	2.9												
Width of Floodprone Area (ft)	>63.1	>63.1	>63.2	>63.3	>63.1	>63.1	>69.8	>69.8	>69.8	>69.9	>69.8	>69.8												
Entrenchment Ratio	>4.7	4.8	4.4	4.0	4.7	4.1	N/A	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	1.0	1.1												
Wetted Perimeter (ft)	16.1	16.2	16.8	18.7	16.8	18.8	29.0	24.0	24.3	24.2	25.8	29.8												
Hydraulic Radius (ft)	1.1	1.2	1.0	1.3	1.4	1.3	1.0	1.0	1.1	1.0	1.0	0.9												
Based on current/developing bankfull feature																								
BF Width (ft)																								
BF Mean Depth (ft)																								
Width/Depth Ratio																								
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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																								
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Wetted Perimeter (ft)																								
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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)																								

PEBBLE COUNT DATA SHEET: RIFFLE 100-COUNT

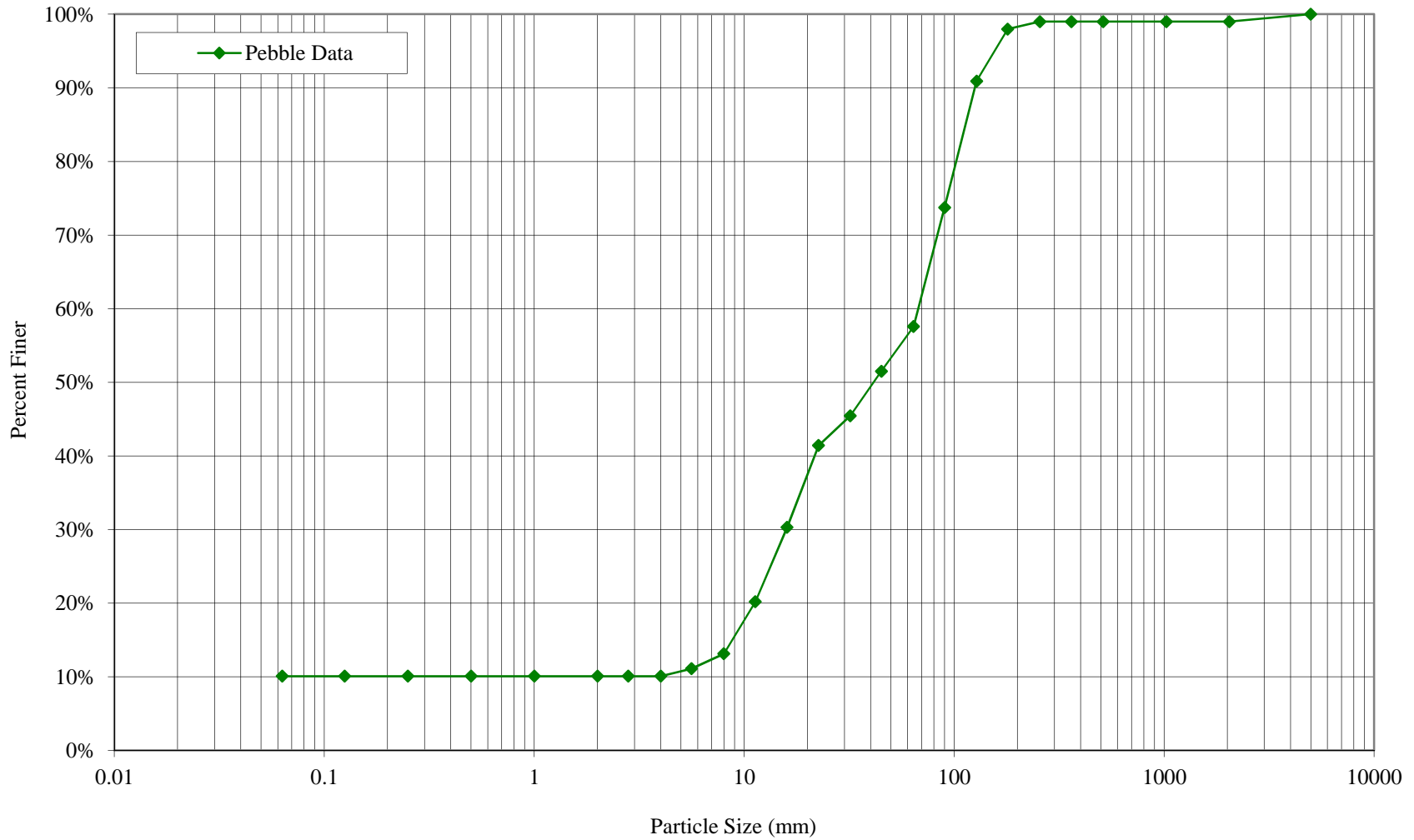
BAKER PROJECT NO.		109261
SITE OR PROJECT:	Big Cedar Creek Restoration - Year 5 Monitoring	
REACH/LOCATION:	BCC X1 Riffle	
DATE COLLECTED:	12/19/2013	
FIELD COLLECTION BY:	MW & DH	
DATA ENTRY BY:	KS	

MATERIAL	PARTICLE	SIZE (mm)	PARTICLE CLASS COUNT		Summary	
			Riffle	Class %	% Cum	
SILT/CLAY	Silt / Clay	< .063	10	10%	10%	
 SAND	Very Fine	.063 - .125			10%	
	Fine	.125 - .25			10%	
	Medium	.25 - .50			10%	
	Coarse	.50 - 1.0			10%	
	Very Coarse	1.0 - 2.0			10%	
 GRAVEL	Very Fine	2.0 - 2.8			10%	
	Very Fine	2.8 - 4.0			10%	
	Fine	4.0 - 5.6	1	1%	11%	
	Fine	5.6 - 8.0	2	2%	13%	
	Medium	8.0 - 11.0	7	7%	20%	
	Medium	11.0 - 16.0	10	10%	30%	
	Coarse	16.0 - 22.6	11	11%	41%	
	Coarse	22.6 - 32	4	4%	45%	
	Very Coarse	32 - 45	6	6%	52%	
	Very Coarse	45 - 64	6	6%	58%	
 COBBLE	Small	64 - 90	16	16%	74%	
	Small	90 - 128	17	17%	91%	
	Large	128 - 180	7	7%	98%	
	Large	180 - 256	1	1%	99%	
 BOULDER	Small	256 - 362			99%	
	Small	362 - 512			99%	
	Medium	512 - 1024			99%	
	Large-Very Large	1024 - 2048			99%	
 BEDROCK	Bedrock	> 2048	1	1%	100%	
Total			99	100%		

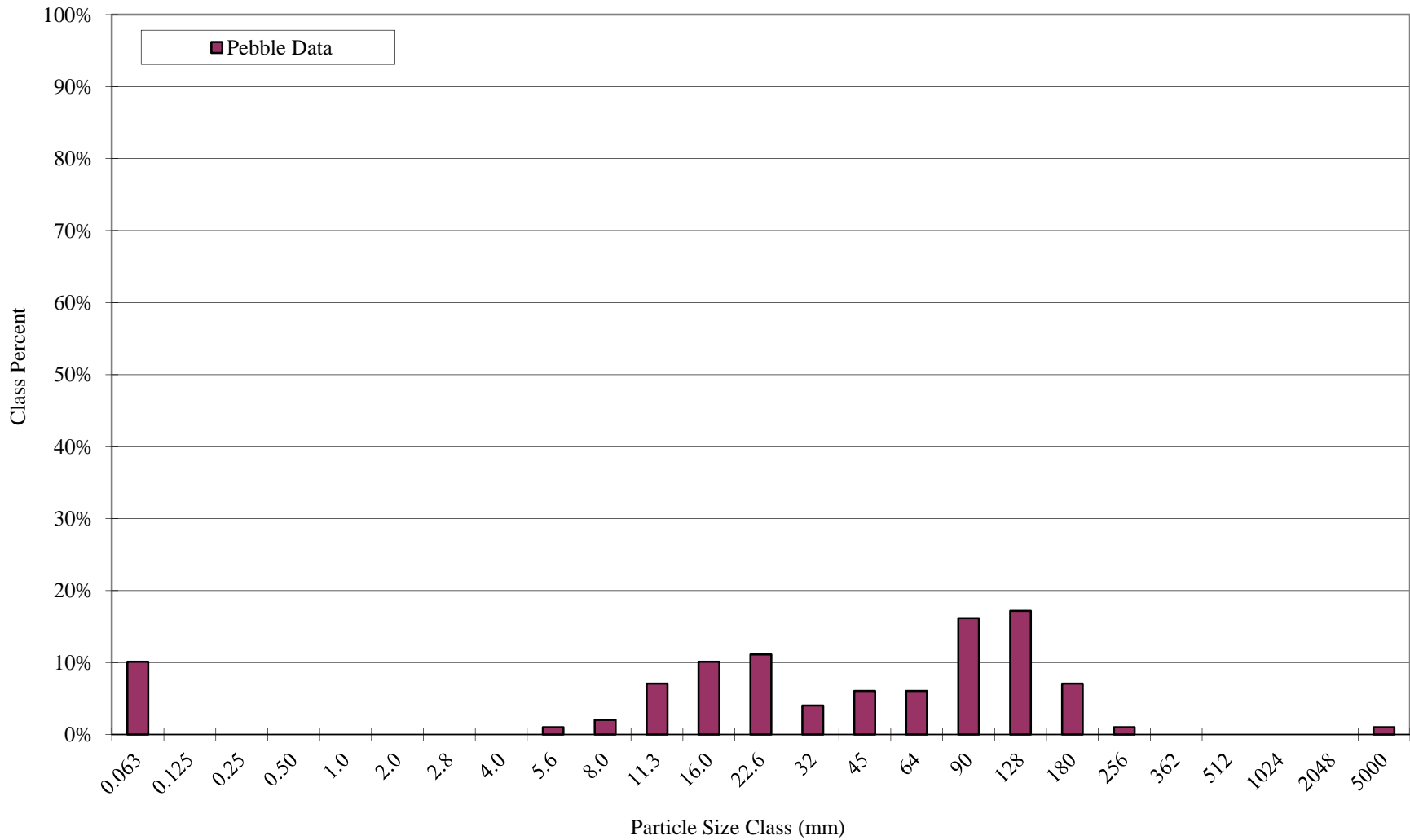
Largest particles:

(riffle)

**Big Cedar Creek
BCC X1 - Riffle
Pebble Count Particle Size Distribution**

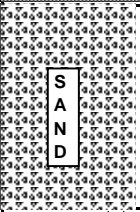
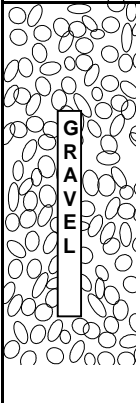
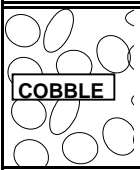
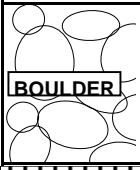



Big Cedar Creek
BCC X1 - Riffle
Riffle Pebble Count Size Class Distribution



PEBBLE COUNT DATA SHEET: POOL 100-COUNT

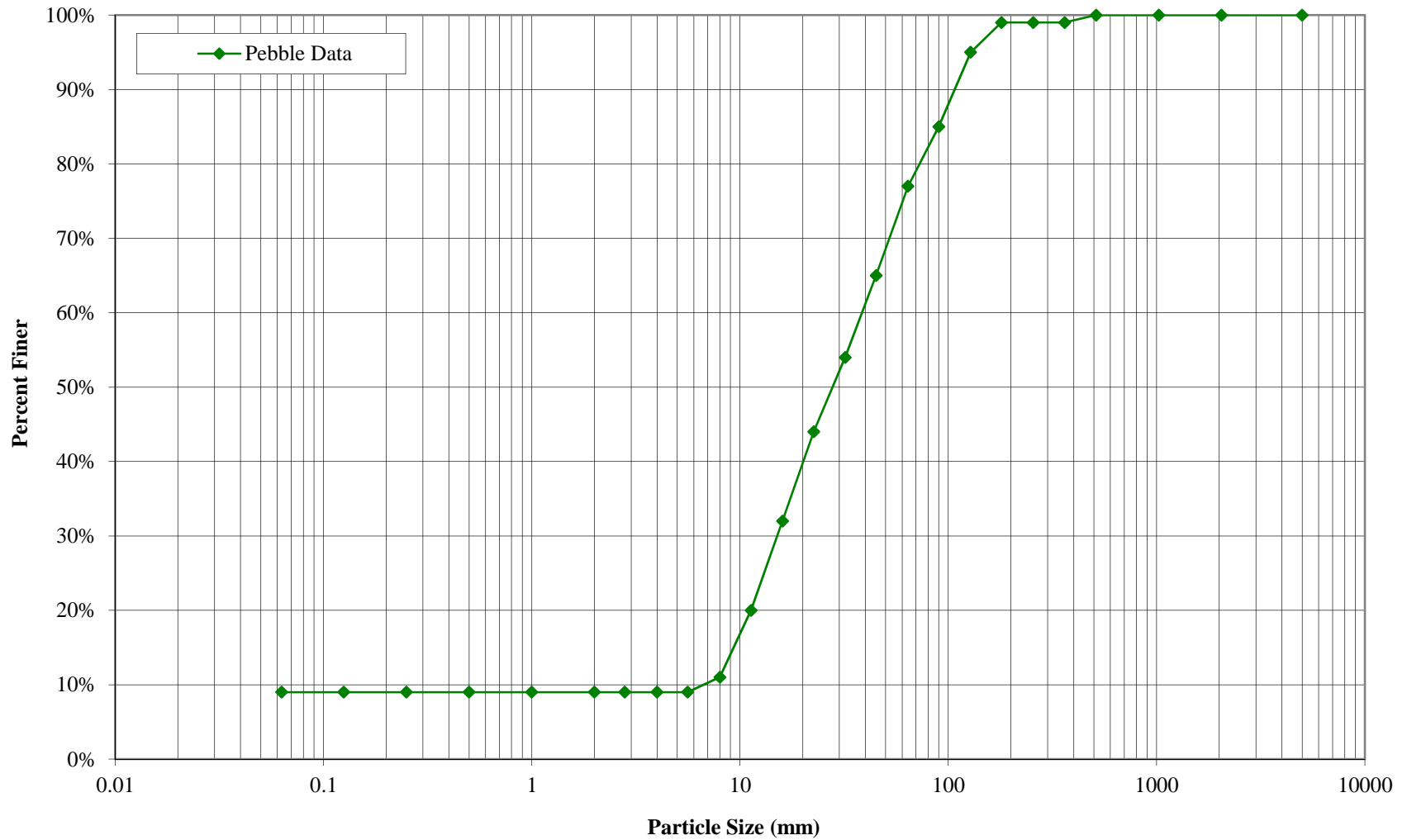
BAKER PROJECT NO. 109261	
SITE OR PROJECT:	Big Cedar Creek Restoration - Year 5 Monitoring
REACH/LOCATION:	BCC X2 Pool
DATE COLLECTED:	12/19/2013
FIELD COLLECTION BY:	MW & DH
DATA ENTRY BY:	KS

MATERIAL	PARTICLE	SIZE (mm)	PARTICLE CLASS COUNT		Summary	
			Pool	Class %	% Cum	
 SILT/CLAY	Silt / Clay	< .063	9	9%	9%	
	Very Fine	.063 - .125			9%	
	Fine	.125 - .25			9%	
	Medium	.25 - .50			9%	
	Coarse	.50 - 1.0			9%	
	Very Coarse	1.0 - 2.0			9%	
 GRAVEL	Very Fine	2.0 - 2.8			9%	
	Very Fine	2.8 - 4.0			9%	
	Fine	4.0 - 5.6			9%	
	Fine	5.6 - 8.0	2	2%	11%	
	Medium	8.0 - 11.0	9	9%	20%	
	Medium	11.0 - 16.0	12	12%	32%	
	Coarse	16.0 - 22.6	12	12%	44%	
	Coarse	22.6 - 32	10	10%	54%	
	Very Coarse	32 - 45	11	11%	65%	
	Very Coarse	45 - 64	12	12%	77%	
 COBBLE	Small	64 - 90	8	8%	85%	
	Small	90 - 128	10	10%	95%	
	Large	128 - 180	4	4%	99%	
	Large	180 - 256			99%	
 BOULDER	Small	256 - 362			99%	
	Small	362 - 512	1	1%	100%	
	Medium	512 - 1024			100%	
	Large-Very Large	1024 - 2048			100%	
 BEDROCK	Bedrock	> 2048			100%	
Total			100	100%		

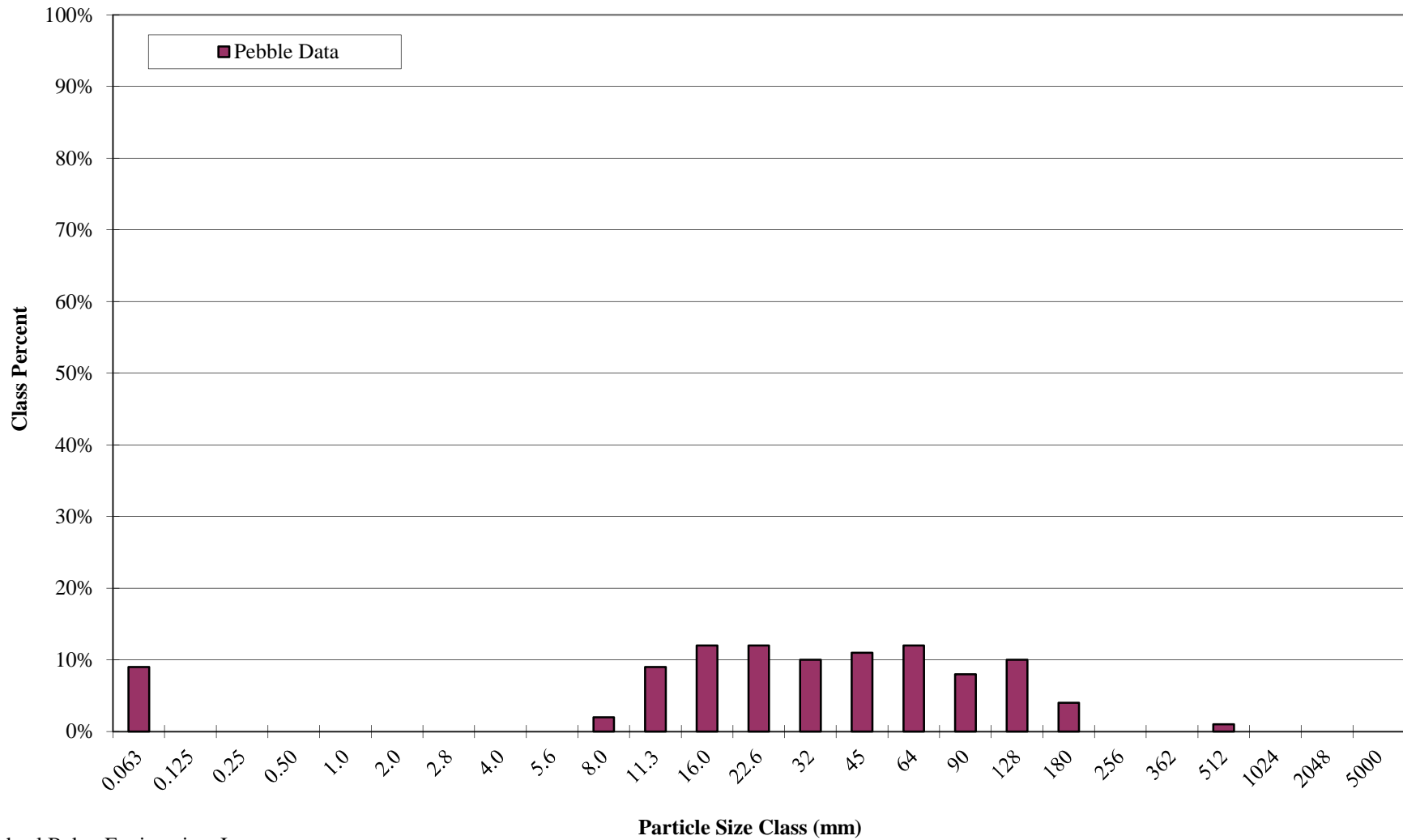
Largest particles:

(pool)

**Big Cedar Creek
BCC X2 - Pool
Pebble Count Particle Size Distribution**



**Big Cedar Creek
BCC X2 - Pool
Pebble Count Size Class Distribution**



PEBBLE COUNT DATA SHEET: POOL 100-COUNT

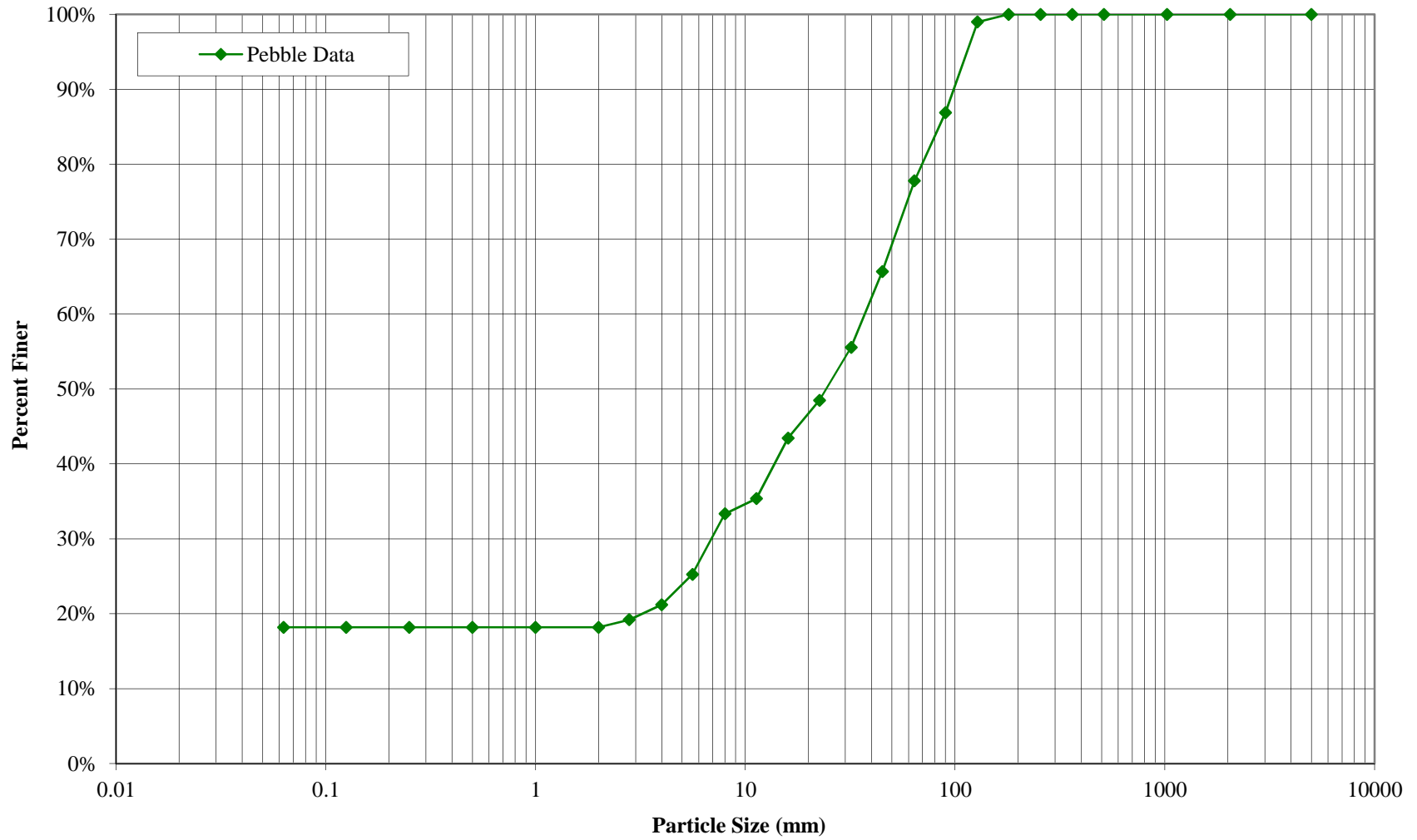
	BAKER PROJECT NO. 109261
SITE OR PROJECT:	Big Cedar Creek Restoration - Year 5 Monitoring
REACH/LOCATION:	BCC X4 Pool
DATE COLLECTED:	12/19/2013
FIELD COLLECTION BY:	MW & DH
DATA ENTRY BY:	KS

MATERIAL	PARTICLE	SIZE (mm)	PARTICLE CLASS COUNT		Summary	
			Pool	Class %	% Cum	
SILT/CLAY	Silt / Clay	< .063	18	18%	18%	
SAND	Very Fine	.063 - .125			18%	
	Fine	.125 - .25			18%	
	Medium	.25 - .50			18%	
	Coarse	.50 - 1.0			18%	
	Very Coarse	1.0 - 2.0			18%	
GRAVEL	Very Fine	2.0 - 2.8	1	1%	19%	
	Very Fine	2.8 - 4.0	2	2%	21%	
	Fine	4.0 - 5.6	4	4%	25%	
	Fine	5.6 - 8.0	8	8%	33%	
	Medium	8.0 - 11.0	2	2%	35%	
	Medium	11.0 - 16.0	8	8%	43%	
	Coarse	16.0 - 22.6	5	5%	48%	
	Coarse	22.6 - 32	7	7%	56%	
	Very Coarse	32 - 45	10	10%	66%	
	Very Coarse	45 - 64	12	12%	78%	
COBBLE	Small	64 - 90	9	9%	87%	
	Small	90 - 128	12	12%	99%	
	Large	128 - 180	1	1%	100%	
	Large	180 - 256			100%	
BOULDER	Small	256 - 362			100%	
	Small	362 - 512			100%	
	Medium	512 - 1024			100%	
	Large-Very Large	1024 - 2048			100%	
BEDROCK	Bedrock	> 2048			100%	
	Total		99	100%		

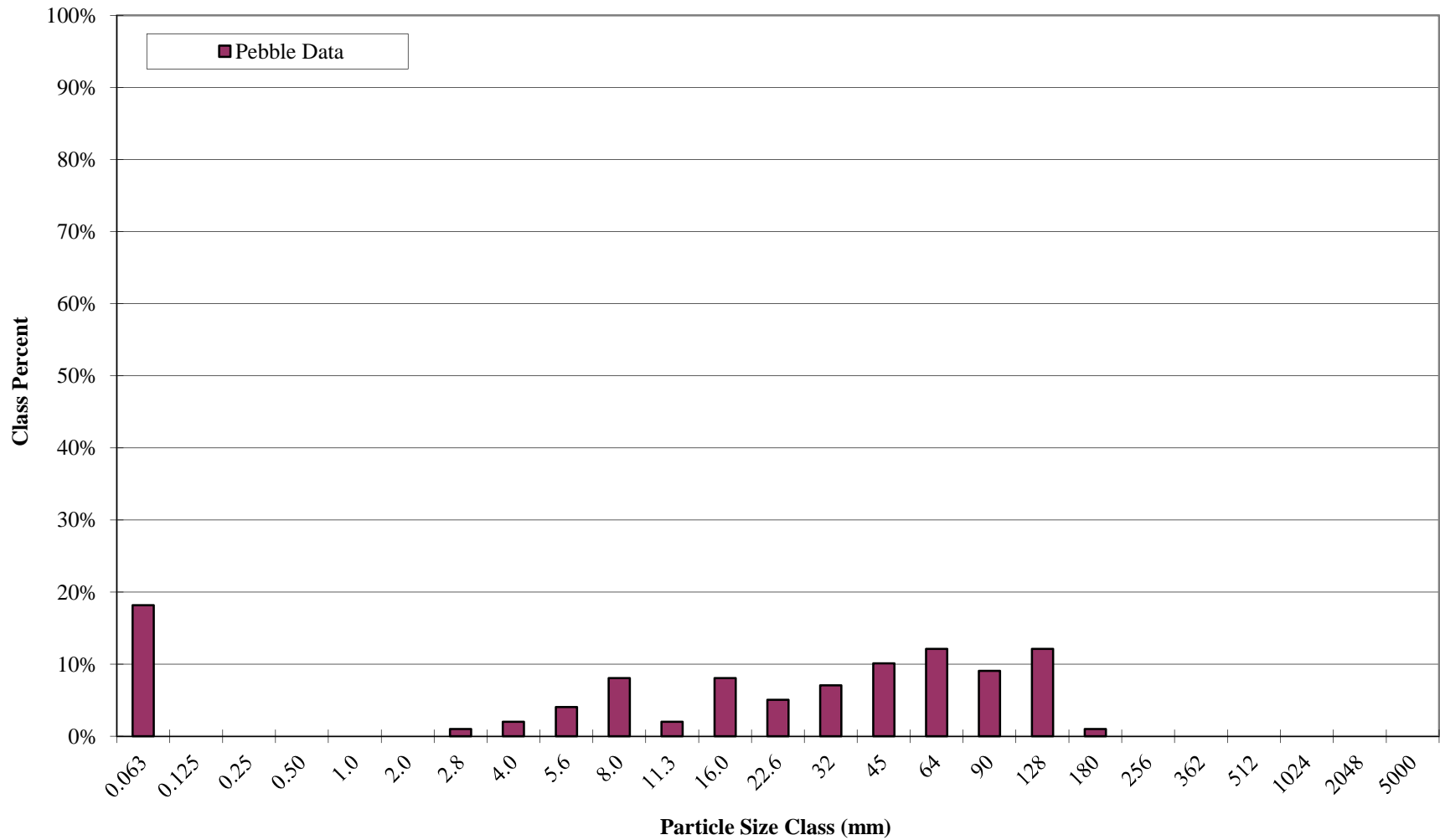
Largest particles:

(pool)

**Big Cedar Creek
BCC X4 - Pool
Pebble Count Particle Size Distribution**



**Big Cedar Creek
BCC X4 - Pool
Pebble Count Size Class Distribution**



PEBBLE COUNT DATA SHEET: RIFFLE 100-COUNT

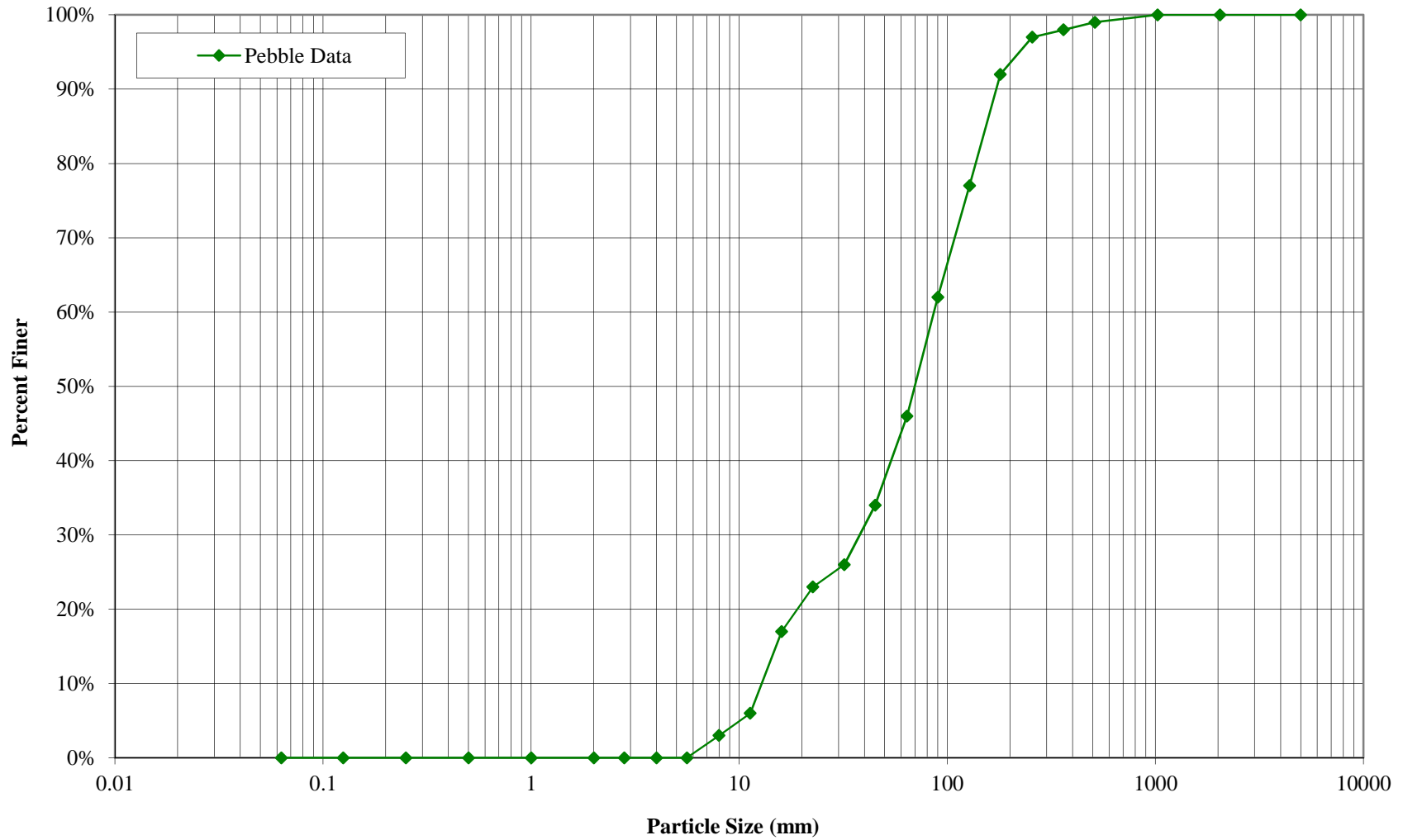
BAKER PROJECT NO. 109261	
SITE OR PROJECT:	Big Cedar Creek Restoration - Year 5 Monitoring
REACH/LOCATION:	BCC X5 Riffle
DATE COLLECTED:	12/19/2013
FIELD COLLECTION BY:	MW & DH
DATA ENTRY BY:	KS

MATERIAL	PARTICLE	SIZE (mm)	PARTICLE CLASS COUNT		Summary		
			Riffle		Class %	% Cum	
SILT/CLAY	Silt / Clay	< .063				0%	
	SAND	Very Fine	.063 - .125				0%
		Fine	.125 - .25				0%
		Medium	.25 - .50				0%
		Coarse	.50 - 1.0				0%
		Very Coarse	1.0 - 2.0				0%
GRAVEL	Very Fine	2.0 - 2.8				0%	
	Very Fine	2.8 - 4.0				0%	
	Fine	4.0 - 5.6				0%	
	Fine	5.6 - 8.0	3		3%	3%	
	Medium	8.0 - 11.0	3		3%	6%	
	Medium	11.0 - 16.0	11		11%	17%	
	Coarse	16.0 - 22.6	6		6%	23%	
	Coarse	22.6 - 32	3		3%	26%	
	Very Coarse	32 - 45	8		8%	34%	
	Very Coarse	45 - 64	12		12%	46%	
COBBLE	Small	64 - 90	16		16%	62%	
	Small	90 - 128	15		15%	77%	
	Large	128 - 180	15		15%	92%	
	Large	180 - 256	5		5%	97%	
BOULDER	Small	256 - 362	1		1%	98%	
	Small	362 - 512	1		1%	99%	
	Medium	512 - 1024	1		1%	100%	
	Large-Very Large	1024 - 2048				100%	
BEDROCK	Bedrock	> 2048				100%	
Total			100		100%		

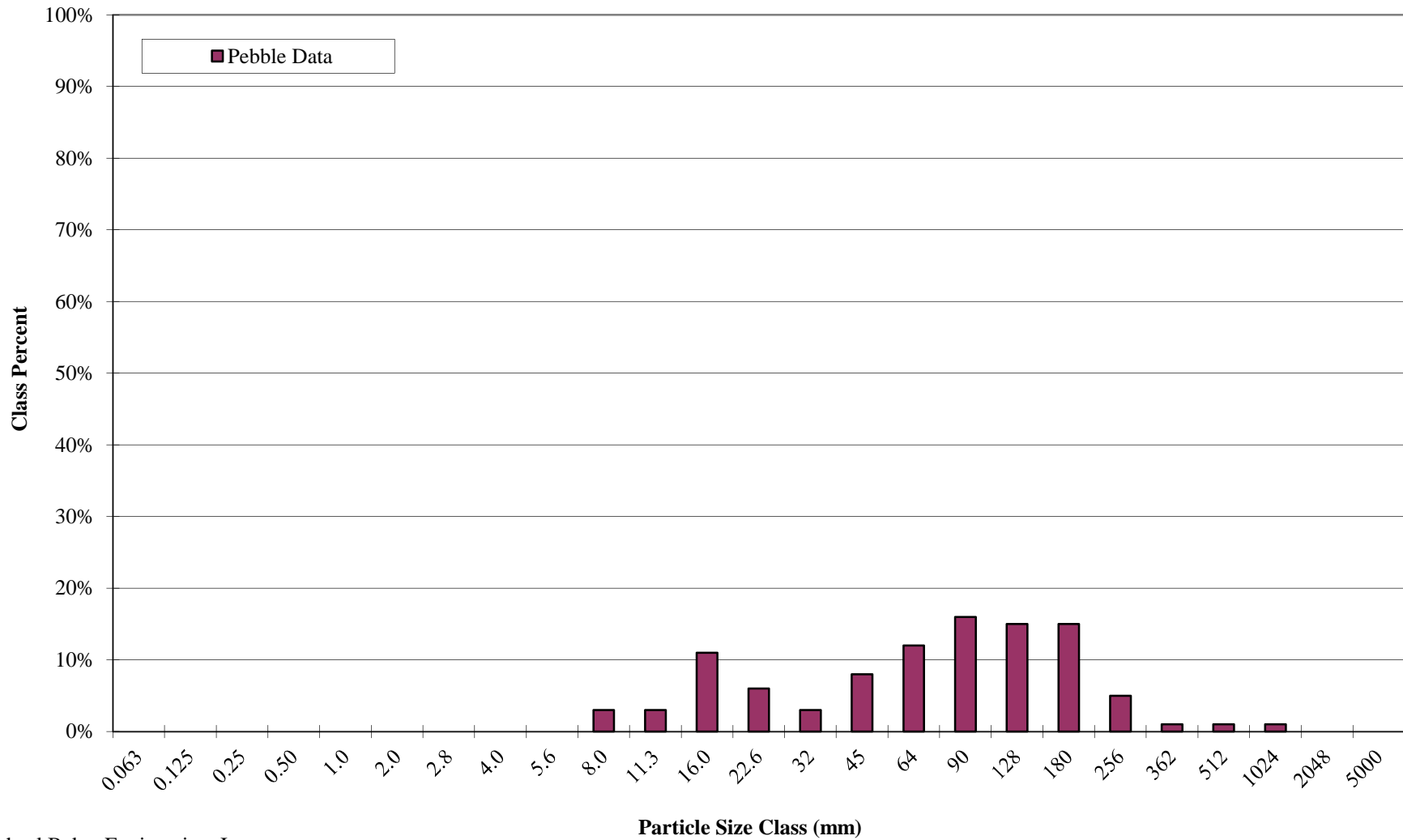
Largest particles:

(riffle)

**Big Cedar Creek
BCC X5 - Riffle
Pebble Count Particle Size Distribution**

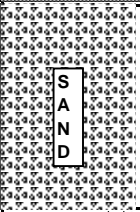
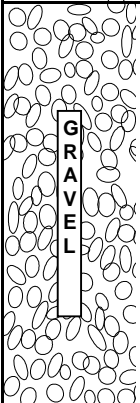
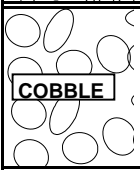
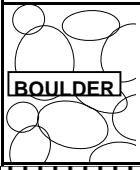


**Big Cedar Creek
BCC X5 - Riffle
Pebble Count Size Class Distribution**



PEBBLE COUNT DATA SHEET: POOL 100-COUNT

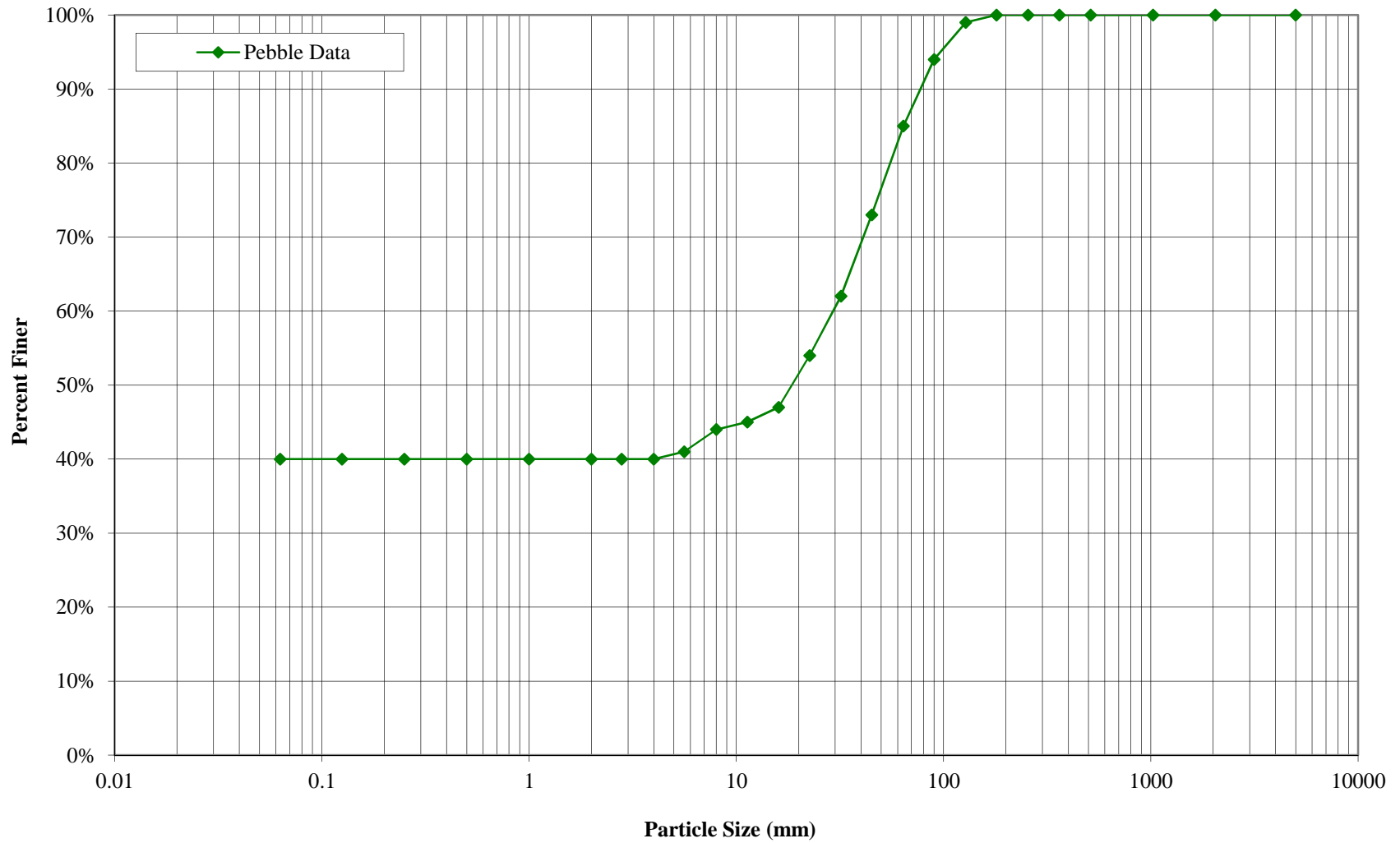
BAKER PROJECT NO.		109261
SITE OR PROJECT:	Big Cedar Creek Restoration - Year 5 Monitoring	
REACH/LOCATION:	BCC X8 Pool	
DATE COLLECTED:	12/19/2013	
FIELD COLLECTION BY:	MW & DH	
DATA ENTRY BY:	KS	

MATERIAL	PARTICLE	SIZE (mm)	PARTICLE CLASS COUNT		Summary	
			Pool		Class %	% Cum
SILT/CLAY	Silt / Clay	< .063	40		40%	40%
 SAND	Very Fine	.063 - .125				40%
	Fine	.125 - .25				40%
	Medium	.25 - .50				40%
	Coarse	.50 - 1.0				40%
	Very Coarse	1.0 - 2.0				40%
 GRAVEL	Very Fine	2.0 - 2.8				40%
	Very Fine	2.8 - 4.0				40%
	Fine	4.0 - 5.6	1		1%	41%
	Fine	5.6 - 8.0	3		3%	44%
	Medium	8.0 - 11.0	1		1%	45%
	Medium	11.0 - 16.0	2		2%	47%
	Coarse	16.0 - 22.6	7		7%	54%
	Coarse	22.6 - 32	8		8%	62%
	Very Coarse	32 - 45	11		11%	73%
	Very Coarse	45 - 64	12		12%	85%
 COBBLE	Small	64 - 90	9		9%	94%
	Small	90 - 128	5		5%	99%
	Large	128 - 180	1		1%	100%
	Large	180 - 256				100%
 BOULDER	Small	256 - 362				100%
	Small	362 - 512				100%
	Medium	512 - 1024				100%
	Large-Very Large	1024 - 2048				100%
BEDROCK	Bedrock	> 2048				100%
Total			100		100%	

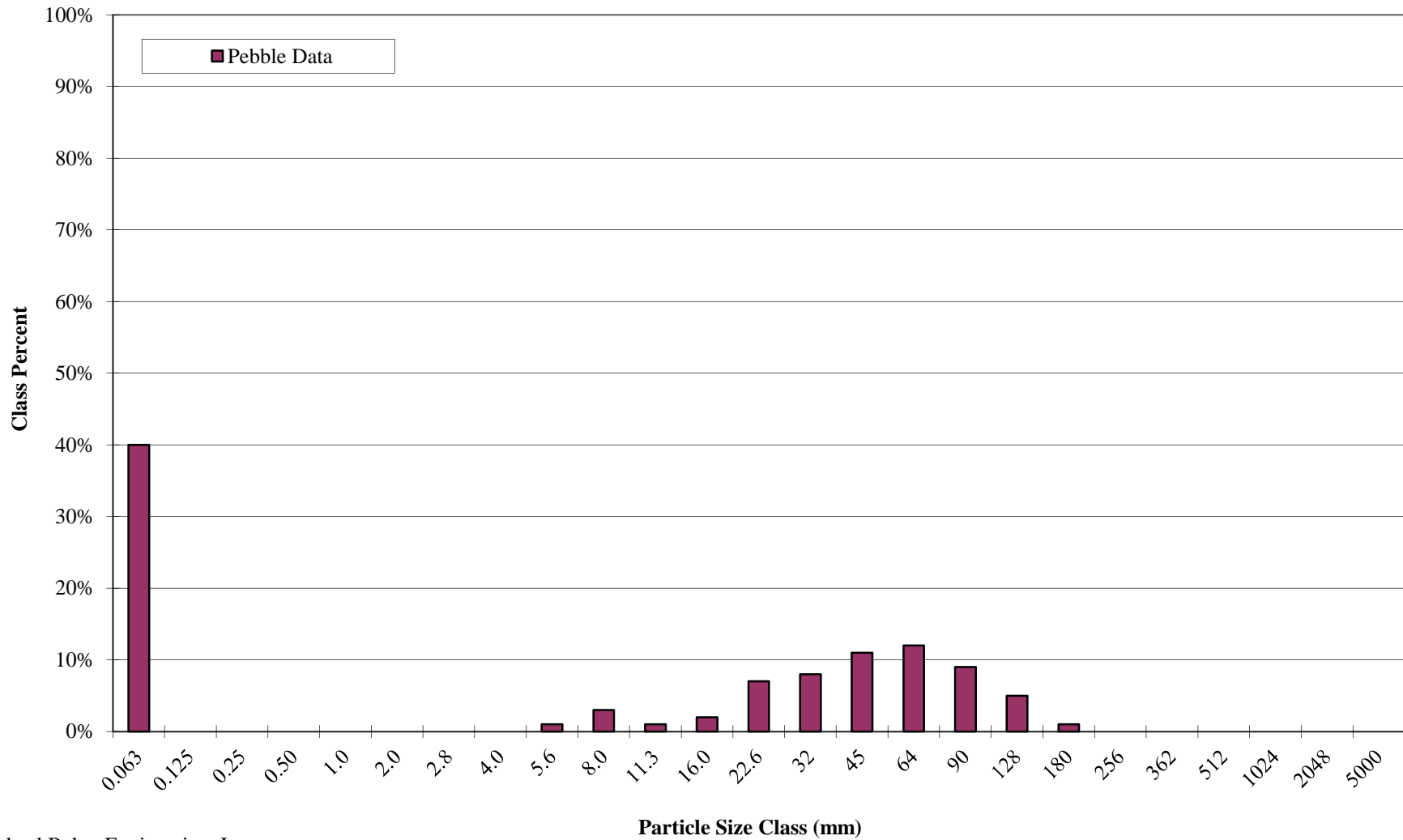
Largest particles:

(pool)

**Big Cedar Creek
BCC X8 - Pool
Pebble Count Particle Size Distribution**



**Big Cedar Creek
BCC X8 - Pool
Pebble Count Size Class Distribution**



PEBBLE COUNT DATA SHEET: RIFFLE 100-COUNT

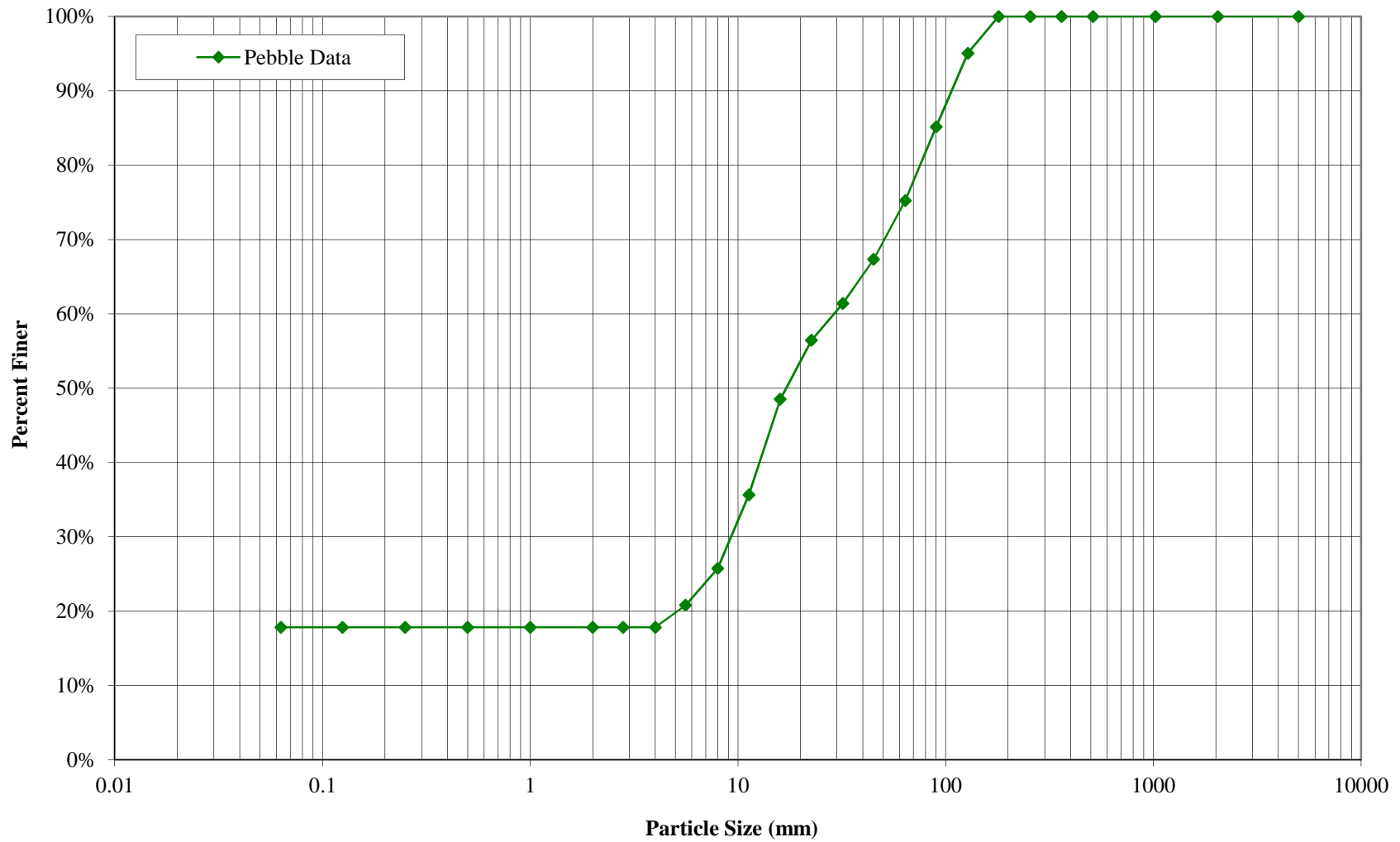
BAKER PROJECT NO.		109261
SITE OR PROJECT:	Big Cedar Creek Restoration - Year 5 Monitoring	
REACH/LOCATION:	BCC X10 Riffle	
DATE COLLECTED:	12/19/2013	
FIELD COLLECTION BY:	MW & DH	
DATA ENTRY BY:	KS	

MATERIAL	PARTICLE	SIZE (mm)	PARTICLE CLASS COUNT		Summary		
			Riffle		Class %	% Cum	
SILT/CLAY	Silt / Clay	< .063	18		18%	18%	
	SAND	Very Fine	.063 - .125				18%
		Fine	.125 - .25				18%
		Medium	.25 - .50				18%
		Coarse	.50 - 1.0				18%
		Very Coarse	1.0 - 2.0				18%
GRAVEL	Very Fine	2.0 - 2.8				18%	
	Very Fine	2.8 - 4.0				18%	
	Fine	4.0 - 5.6	3		3%	21%	
	Fine	5.6 - 8.0	5		5%	26%	
	Medium	8.0 - 11.0	10		10%	36%	
	Medium	11.0 - 16.0	13		13%	49%	
	Coarse	16.0 - 22.6	8		8%	56%	
	Coarse	22.6 - 32	5		5%	61%	
	Very Coarse	32 - 45	6		6%	67%	
	Very Coarse	45 - 64	8		8%	75%	
COBBLE	Small	64 - 90	10		10%	85%	
	Small	90 - 128	10		10%	95%	
	Large	128 - 180	5		5%	100%	
	Large	180 - 256				100%	
BOULDER	Small	256 - 362				100%	
	Small	362 - 512				100%	
	Medium	512 - 1024				100%	
	Large-Very Large	1024 - 2048				100%	
BEDROCK	Bedrock	> 2048				100%	
Total			101		100%		

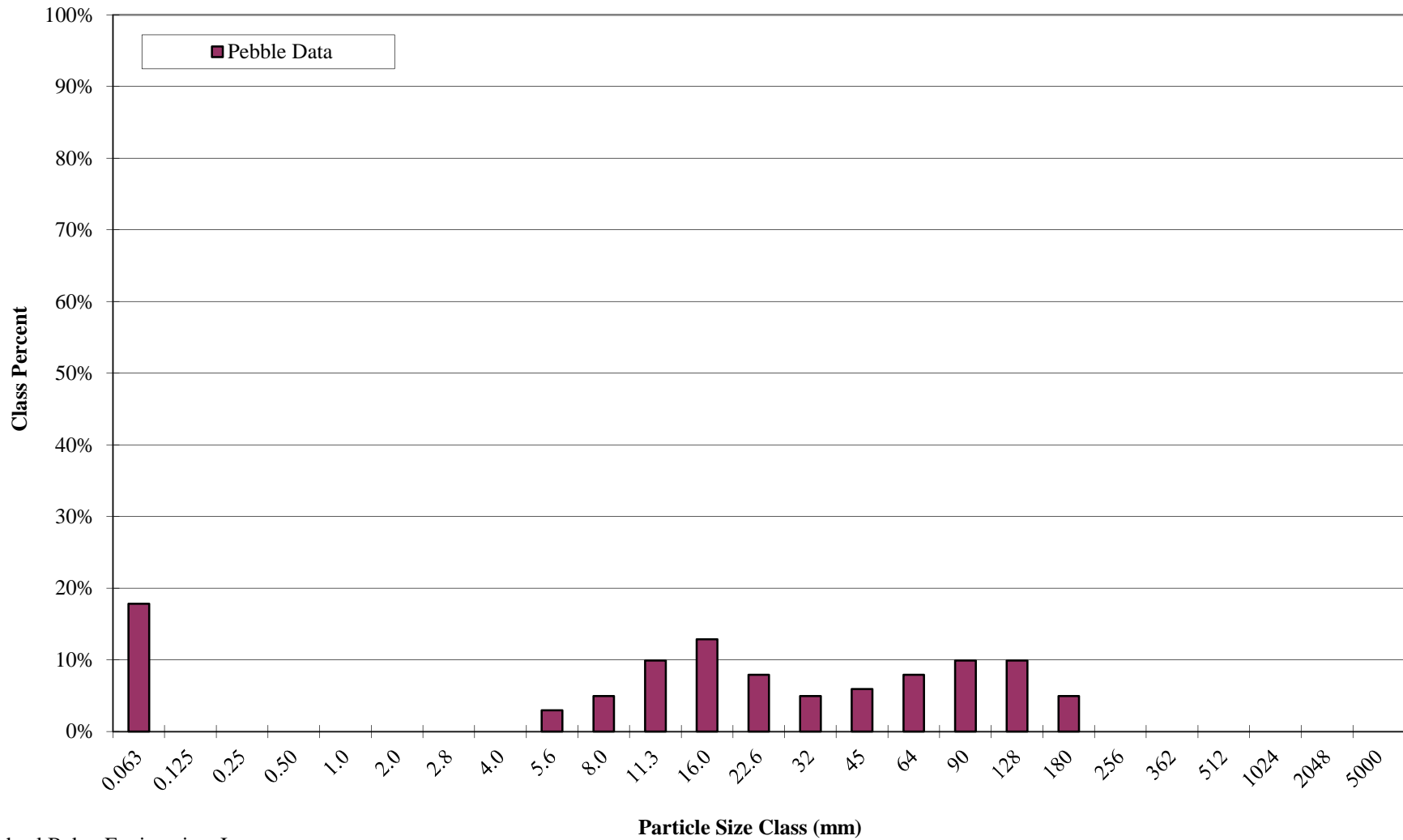
Largest particles:

(riffle)

**Big Cedar Creek
BCC X10 - Riffle
Pebble Count Particle Size Distribution**

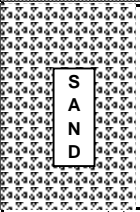
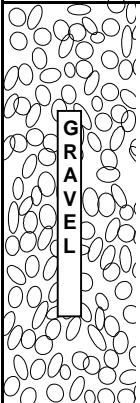
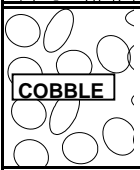
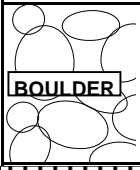


**Big Cedar Creek
BCC X10 - Riffle
Pebble Count Size Class Distribution**



PEBBLE COUNT DATA SHEET: RIFFLE 100-COUNT

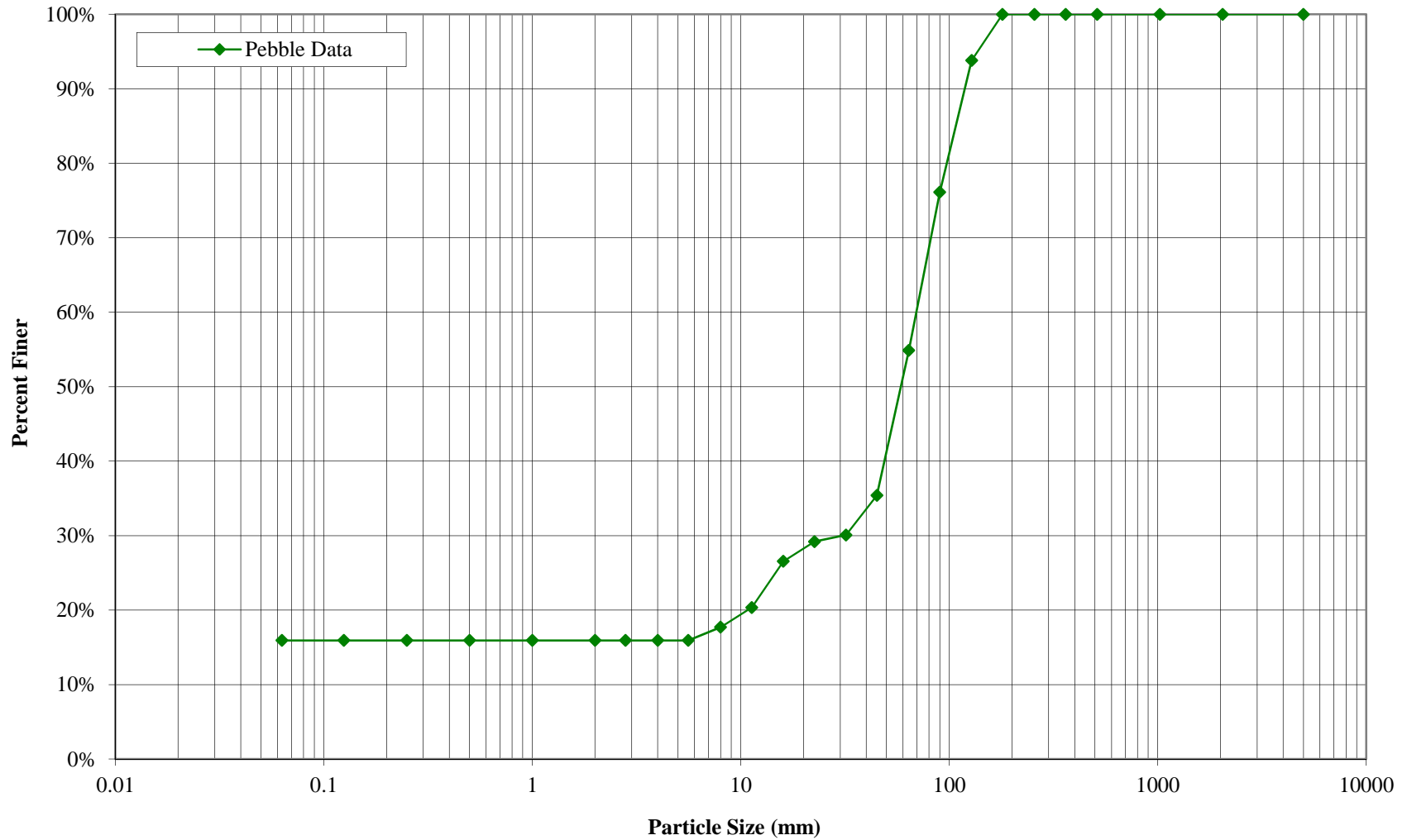
	BAKER PROJECT NO. 109261
SITE OR PROJECT:	Big Cedar Creek Restoration - Year 5 Monitoring
REACH/LOCATION:	UT1 X14 Riffle
DATE COLLECTED:	12/19/2013
FIELD COLLECTION BY:	MW & DH
DATA ENTRY BY:	KS

MATERIAL	PARTICLE	SIZE (mm)	PARTICLE CLASS COUNT		Summary	
			Riffle		Class %	% Cum
SILT/CLAY	Silt / Clay	< .063	18		16%	16%
 SAND	Very Fine	.063 - .125				16%
	Fine	.125 - .25				16%
	Medium	.25 - .50				16%
	Coarse	.50 - 1.0				16%
	Very Coarse	1.0 - 2.0				16%
 GRAVEL	Very Fine	2.0 - 2.8				16%
	Very Fine	2.8 - 4.0				16%
	Fine	4.0 - 5.6				16%
	Fine	5.6 - 8.0	2		2%	18%
	Medium	8.0 - 11.0	3		3%	20%
	Medium	11.0 - 16.0	7		6%	27%
	Coarse	16.0 - 22.6	3		3%	29%
	Coarse	22.6 - 32	1		1%	30%
	Very Coarse	32 - 45	6		5%	35%
	Very Coarse	45 - 64	22		19%	55%
 COBBLE	Small	64 - 90	24		21%	76%
	Small	90 - 128	20		18%	94%
	Large	128 - 180	7		6%	100%
	Large	180 - 256				100%
 BOULDER	Small	256 - 362				100%
	Small	362 - 512				100%
	Medium	512 - 1024				100%
	Large-Very Large	1024 - 2048				100%
BEDROCK	Bedrock	> 2048				100%
	Total		113		100%	

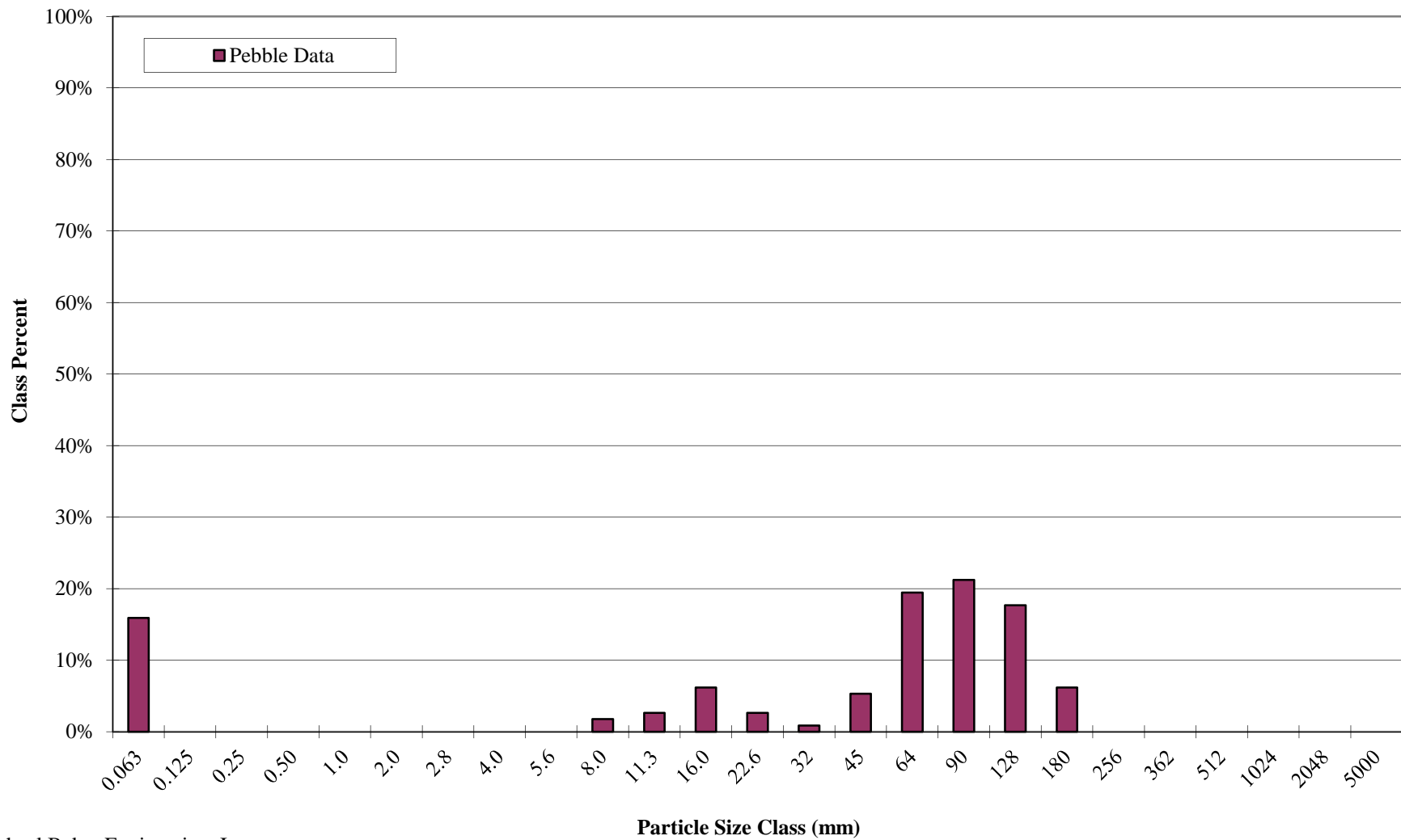
Largest particles:

(riffle)

**Big Cedar Creek
UT1 X14 - Riffle
Pebble Count Particle Size Distribution**

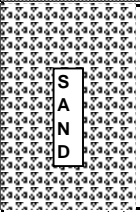
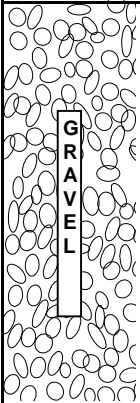
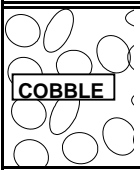
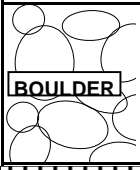


**Big Cedar Creek
UT1 X14 - Riffle
Pebble Count Size Class Distribution**



PEBBLE COUNT DATA SHEET: POOL 100-COUNT

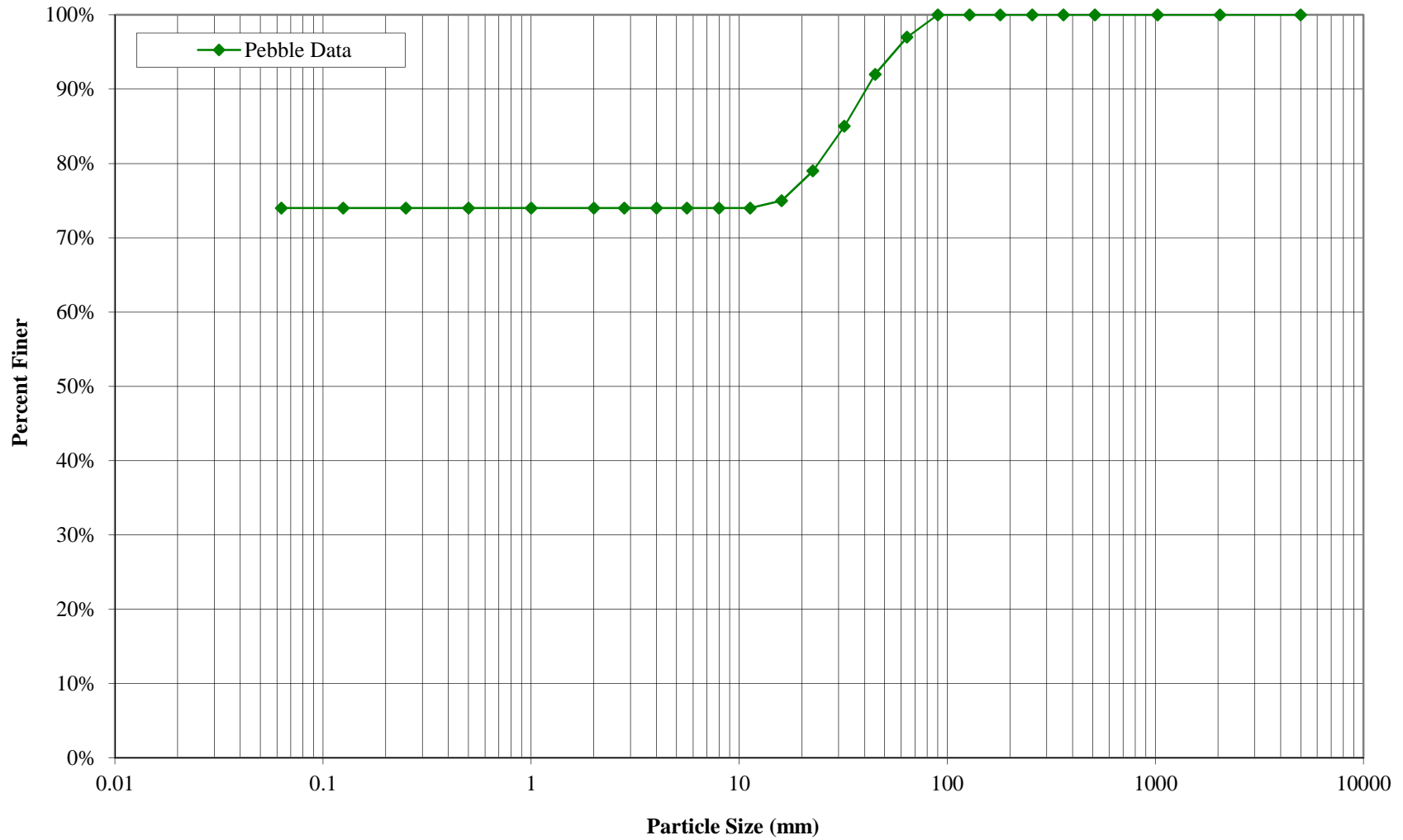
		BAKER PROJECT NO.	109261
SITE OR PROJECT:	Big Cedar Creek Restoration - Year 5 Monitoring		
REACH/LOCATION:	UT1 X15 Pool		
DATE COLLECTED:	12/19/2013		
FIELD COLLECTION BY:	MW & DH		
DATA ENTRY BY:	KS		

MATERIAL	PARTICLE	SIZE (mm)	PARTICLE CLASS COUNT		Summary	
			Pool	Class %	% Cum	
SILT/CLAY	Silt / Clay	< .063	74	74%	74%	
 SAND	Very Fine	.063 - .125			74%	
	Fine	.125 - .25			74%	
	Medium	.25 - .50			74%	
	Coarse	.50 - 1.0			74%	
	Very Coarse	1.0 - 2.0			74%	
 GRAVEL	Very Fine	2.0 - 2.8			74%	
	Very Fine	2.8 - 4.0			74%	
	Fine	4.0 - 5.6			74%	
	Fine	5.6 - 8.0			74%	
	Medium	8.0 - 11.0			74%	
	Medium	11.0 - 16.0	1	1%	75%	
	Coarse	16.0 - 22.6	4	4%	79%	
	Coarse	22.6 - 32	6	6%	85%	
	Very Coarse	32 - 45	7	7%	92%	
	Very Coarse	45 - 64	5	5%	97%	
 COBBLE	Small	64 - 90	3	3%	100%	
	Small	90 - 128			100%	
	Large	128 - 180			100%	
	Large	180 - 256			100%	
 BOULDER	Small	256 - 362			100%	
	Small	362 - 512			100%	
	Medium	512 - 1024			100%	
	Large-Very Large	1024 - 2048			100%	
BEDROCK	Bedrock	> 2048			100%	
Total			100	100%		

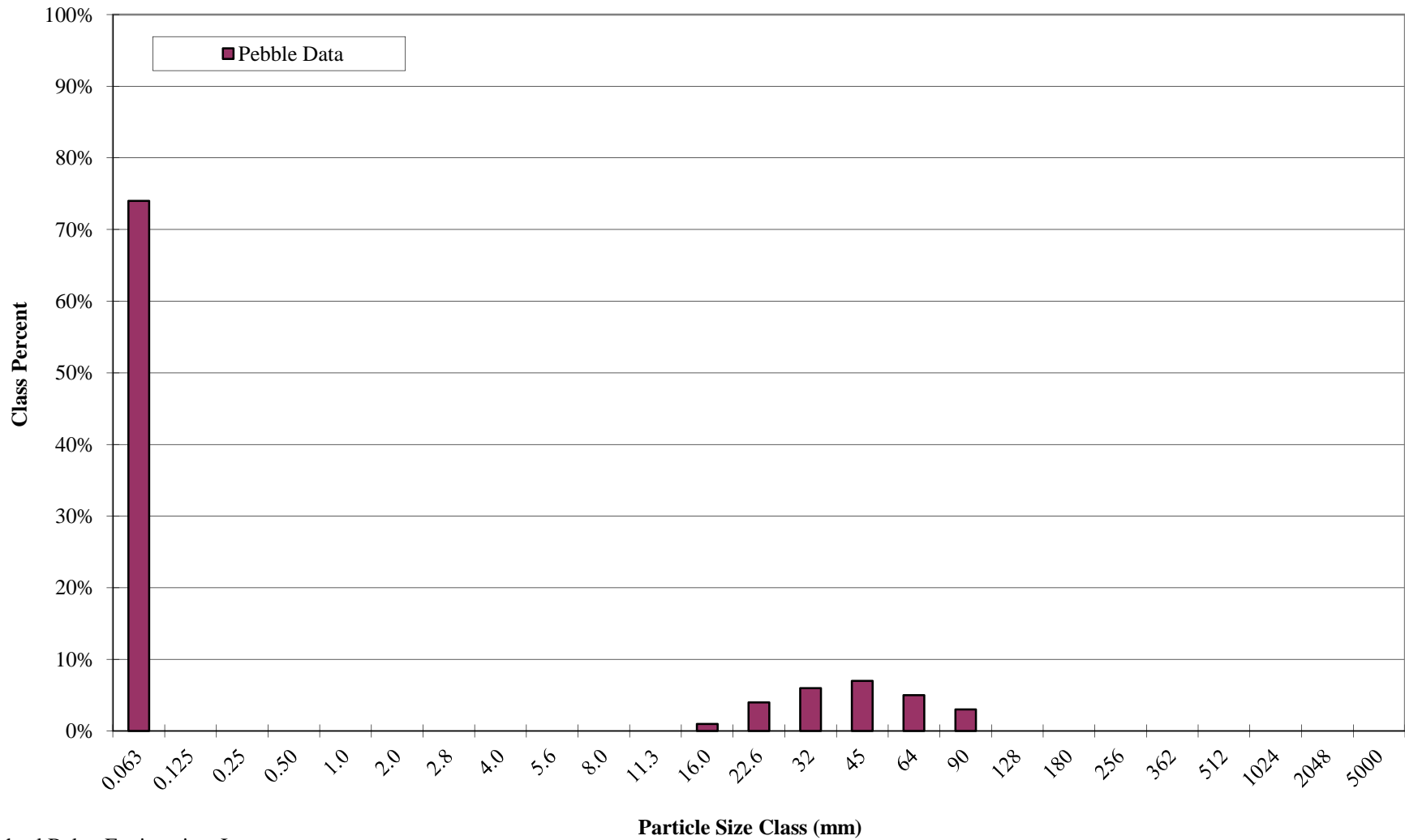
Largest particles:

(pool)

**Big Cedar Creek
UT1 X15 - Pool
Pebble Count Particle Size Distribution**

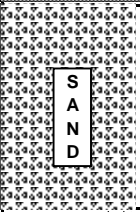
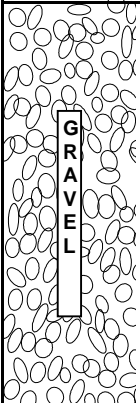
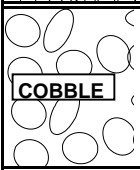
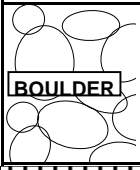


**Big Cedar Creek
UT1 X15 - Pool
Riffle Pebble Count Size Class Distribution**



PEBBLE COUNT DATA SHEET: POOL 100-COUNT

BAKER PROJECT NO.		109261
SITE OR PROJECT:	Big Cedar Creek Restoration - Year 5 Monitoring	
REACH/LOCATION:	UT1 X23 Pool	
DATE COLLECTED:	12/3/2013	
FIELD COLLECTION BY:	MC / KS	
DATA ENTRY BY:	KS	

MATERIAL	PARTICLE	SIZE (mm)	PARTICLE CLASS COUNT		Summary	
			Pool	Class %	% Cum	
SILT/CLAY	Silt / Clay	< .063	29	29%	29%	
 SAND	Very Fine	.063 - .125			29%	
	Fine	.125 - .25			29%	
	Medium	.25 - .50			29%	
	Coarse	.50 - 1.0			29%	
	Very Coarse	1.0 - 2.0			29%	
 GRAVEL	Very Fine	2.0 - 2.8			29%	
	Very Fine	2.8 - 4.0	1	1%	30%	
	Fine	4.0 - 5.6	2	2%	32%	
	Fine	5.6 - 8.0	6	6%	38%	
	Medium	8.0 - 11.0	6	6%	44%	
	Medium	11.0 - 16.0	9	9%	53%	
	Coarse	16.0 - 22.6	4	4%	57%	
	Coarse	22.6 - 32	9	9%	66%	
	Very Coarse	32 - 45	12	12%	78%	
	Very Coarse	45 - 64	2	2%	80%	
 COBBLE	Small	64 - 90	7	7%	87%	
	Small	90 - 128	5	5%	92%	
	Large	128 - 180	1	1%	93%	
	Large	180 - 256	6	6%	99%	
 BOULDER	Small	256 - 362	1	1%	100%	
	Small	362 - 512			100%	
	Medium	512 - 1024			100%	
	Large-Very Large	1024 - 2048			100%	
BEDROCK	Bedrock	> 2048			100%	
Total			100	100%		

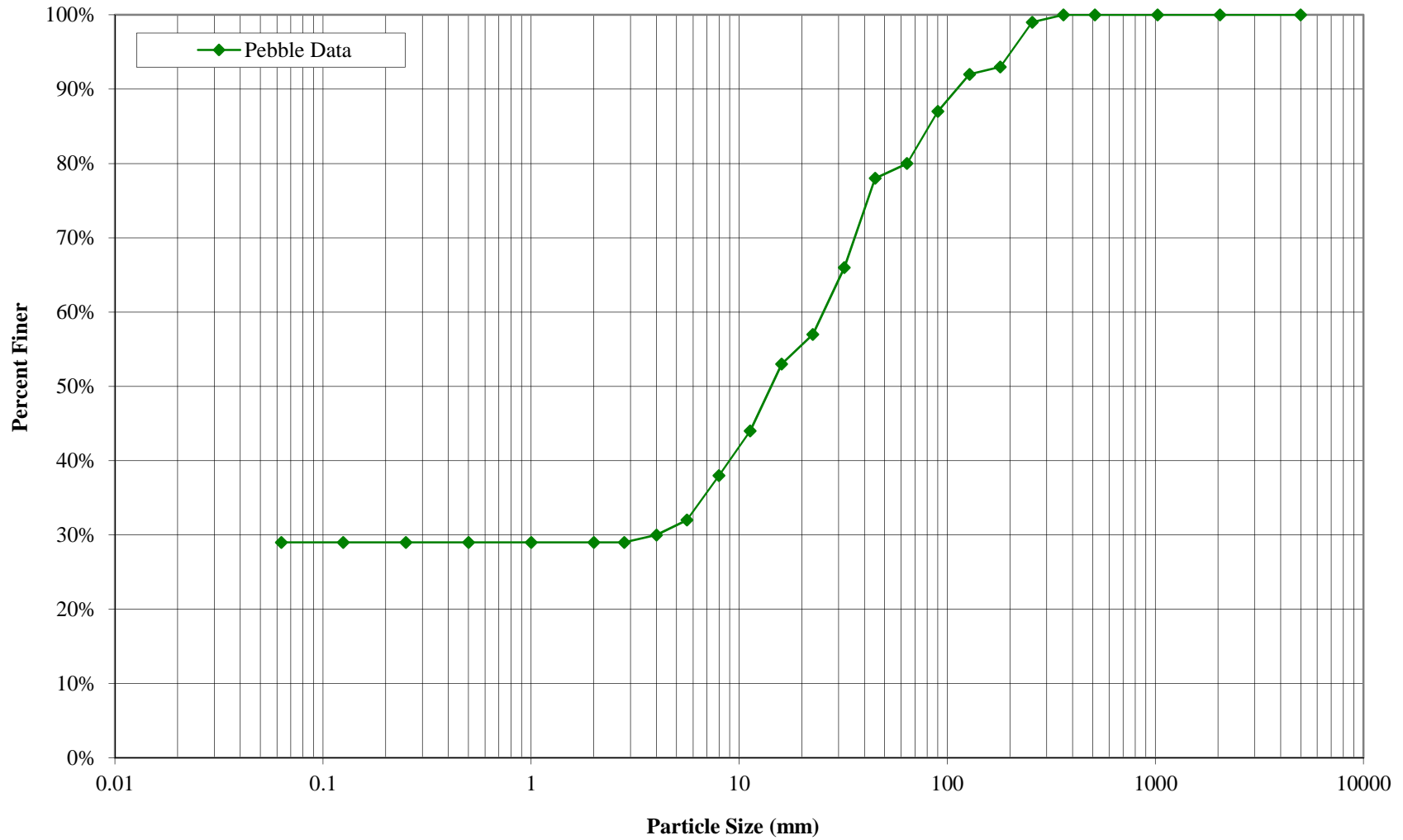
Largest particles:

(pool)

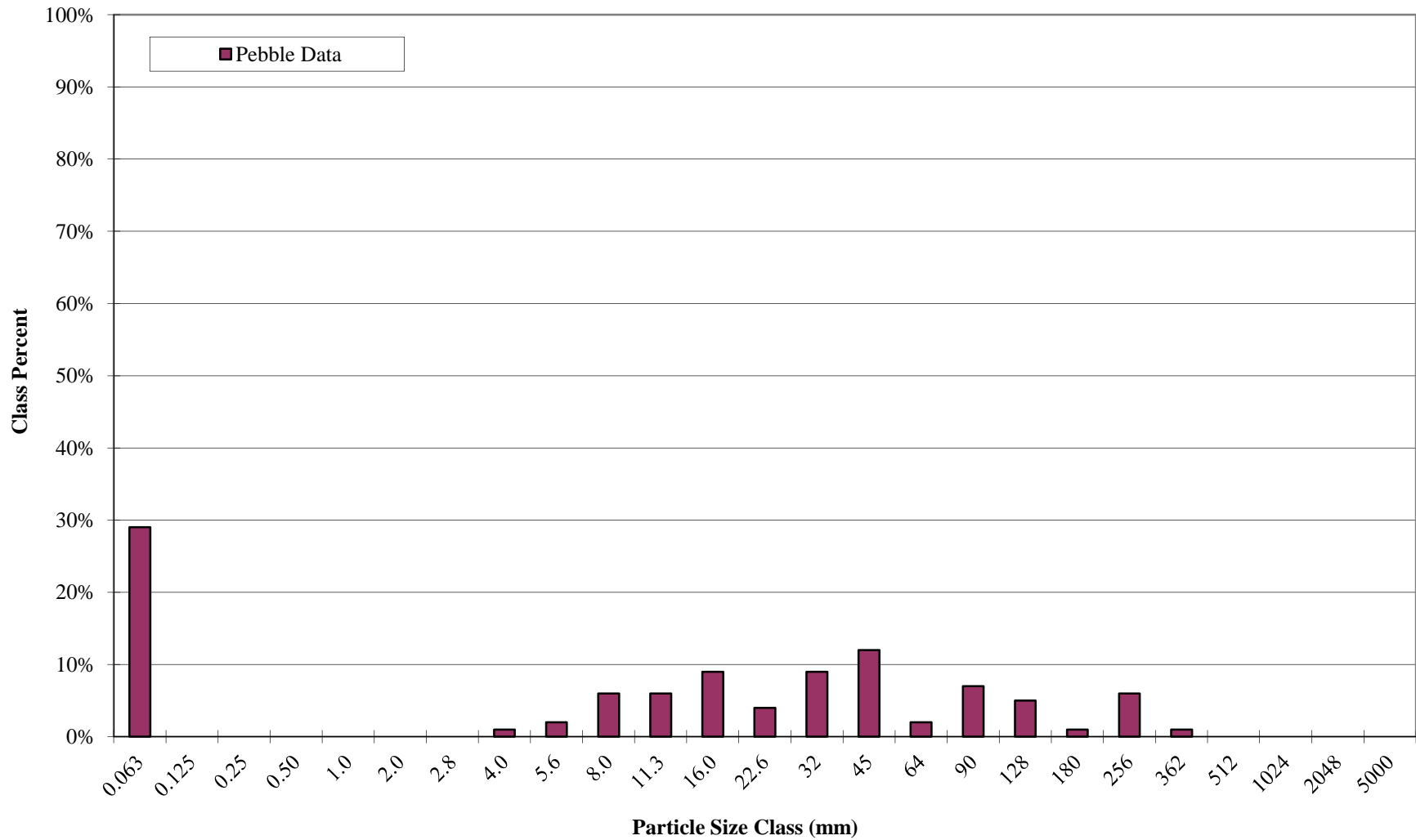
d16

#N/A

**Big Cedar Creek
UT1 X23 - Pool
Pebble Count Particle Size Distribution**



**Big Cedar Creek
UT1 X23 - Pool
Pebble Count Size Class Distribution**



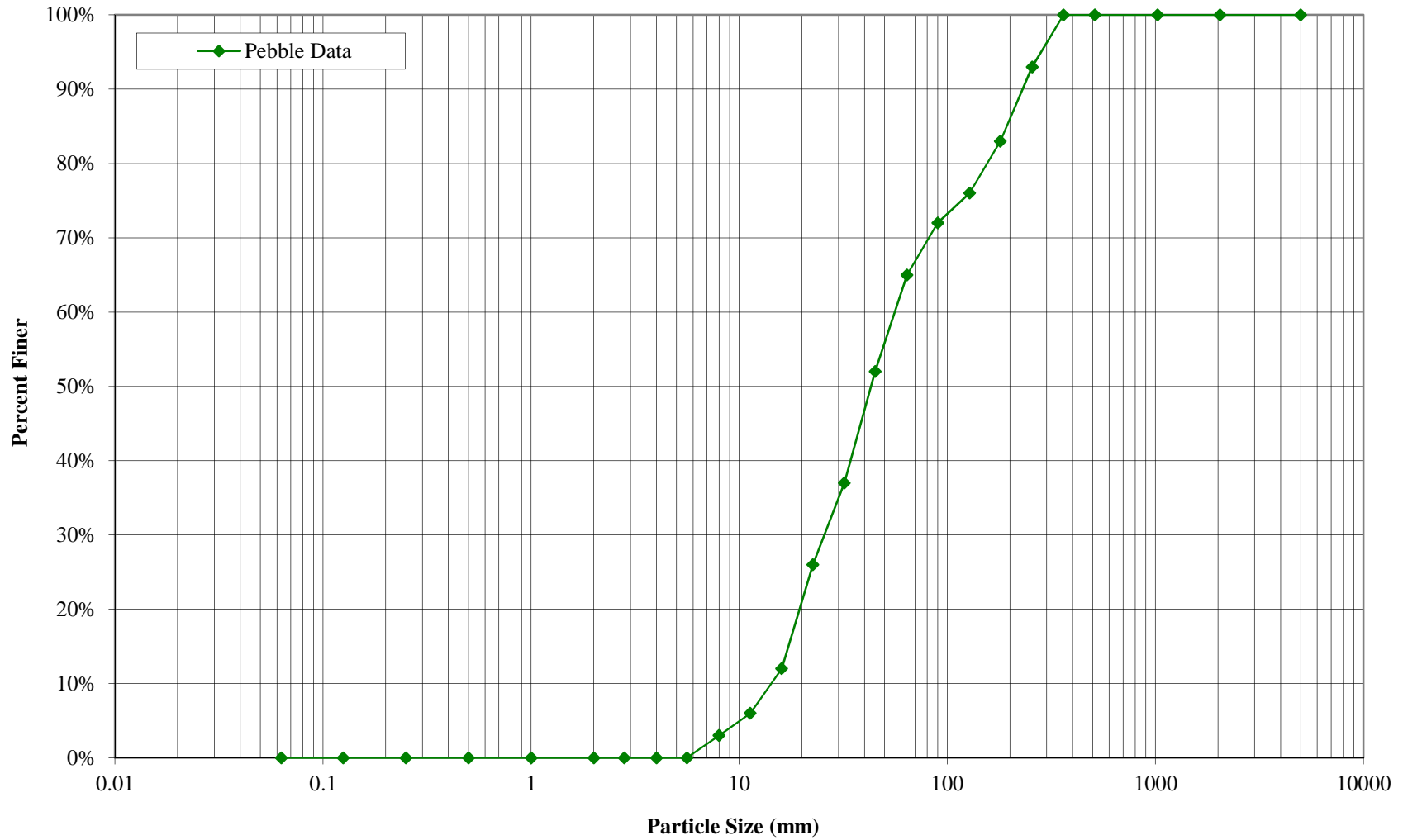
PEBBLE COUNT DATA SHEET: RIFFLE 100-COUNT

BAKER PROJECT NO.		109261
SITE OR PROJECT:	Big Cedar Creek Restoration - Year 5 Monitoring	
REACH/LOCATION:	UT1 X24 Riffle	
DATE COLLECTED:	12/3/2013	
FIELD COLLECTION BY:	KS / MC	
DATA ENTRY BY:	KS	

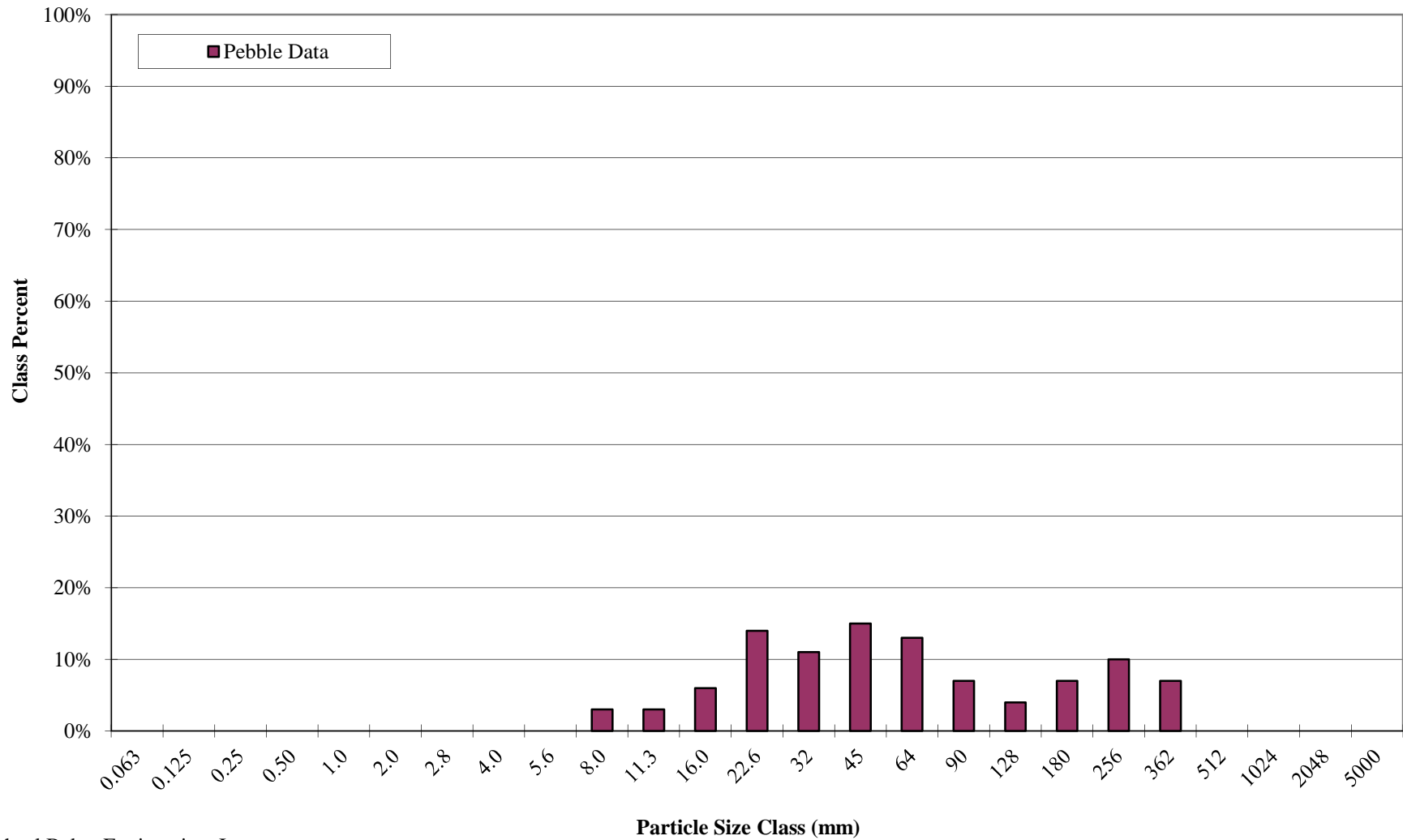
MATERIAL	PARTICLE	SIZE (mm)	PARTICLE CLASS COUNT		Summary	
			Riffle	Class %	% Cum	
SILT/CLAY	Silt / Clay	< .063			0%	
	SAND	Very Fine	.063 - .125			0%
		Fine	.125 - .25			0%
		Medium	.25 - .50			0%
		Coarse	.50 - 1.0			0%
		Very Coarse	1.0 - 2.0			0%
GRAVEL	Very Fine	2.0 - 2.8			0%	
	Very Fine	2.8 - 4.0			0%	
	Fine	4.0 - 5.6			0%	
	Fine	5.6 - 8.0	3	3%	3%	
	Medium	8.0 - 11.0	3	3%	6%	
	Medium	11.0 - 16.0	6	6%	12%	
	Coarse	16.0 - 22.6	14	14%	26%	
	Coarse	22.6 - 32	11	11%	37%	
	Very Coarse	32 - 45	15	15%	52%	
	Very Coarse	45 - 64	13	13%	65%	
COBBLE	Small	64 - 90	7	7%	72%	
	Small	90 - 128	4	4%	76%	
	Large	128 - 180	7	7%	83%	
	Large	180 - 256	10	10%	93%	
BOULDER	Small	256 - 362	7	7%	100%	
	Small	362 - 512			100%	
	Medium	512 - 1024			100%	
	Large-Very Large	1024 - 2048			100%	
BEDROCK	Bedrock	> 2048			100%	
Total			100	100%		

Largest particles: 350.00
(riffle)

**Big Cedar Creek
UT1 X24 - Riffle
Pebble Count Particle Size Distribution**

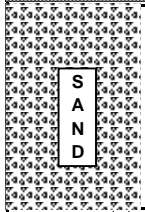
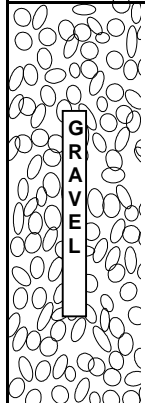
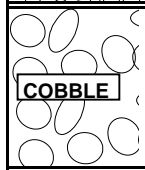
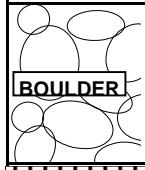


**Big Cedar Creek
UT1 X24 - Riffle
Pebble Count Size Class Distribution**



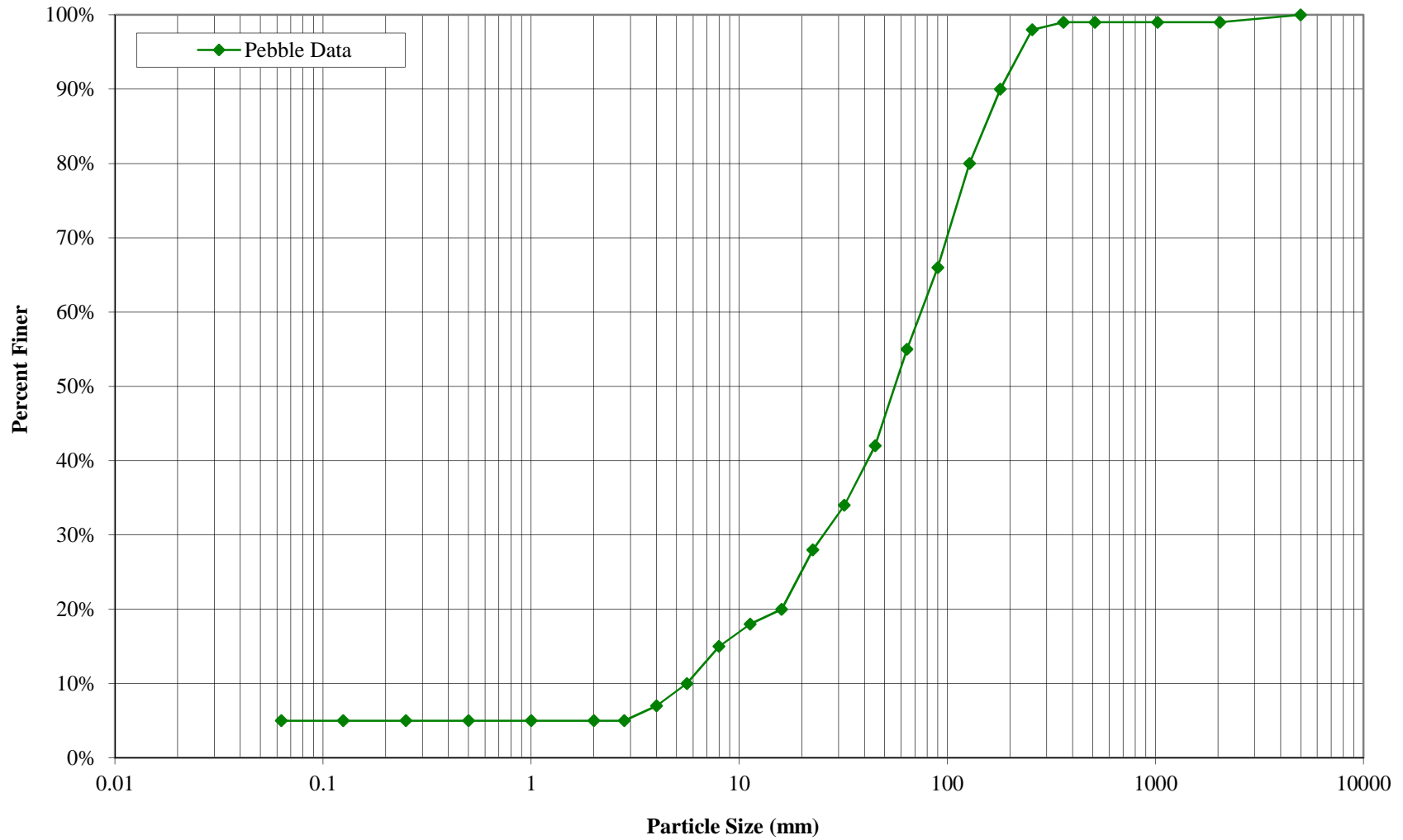
PEBBLE COUNT DATA SHEET: RIFFLE 100-COUNT

BAKER PROJECT NO. 109261	
SITE OR PROJECT:	Big Cedar Creek Restoration - Year 5 Monitoring
REACH/LOCATION:	UT1 X28 Riffle
DATE COLLECTED:	12/3/2013
FIELD COLLECTION BY:	KS / MC
DATA ENTRY BY:	KS

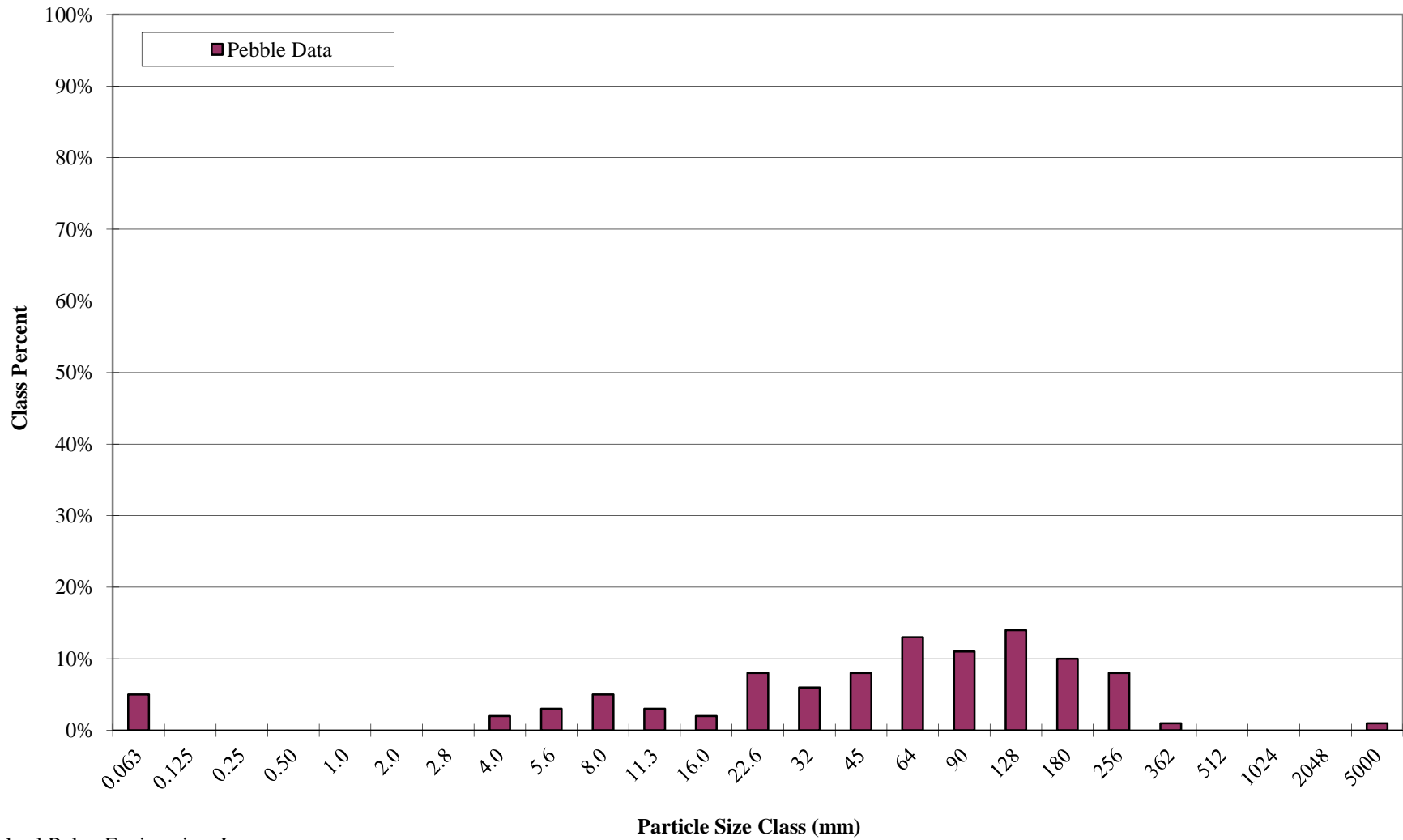
MATERIAL	PARTICLE	SIZE (mm)	PARTICLE CLASS COUNT		Summary	
			Riffle		Class %	% Cum
SILT/CLAY	Silt / Clay	< .063	5		5%	5%
 SAND	Very Fine	.063 - .125				5%
	Fine	.125 - .25				5%
	Medium	.25 - .50				5%
	Coarse	.50 - 1.0				5%
	Very Coarse	1.0 - 2.0				5%
 GRAVEL	Very Fine	2.0 - 2.8				5%
	Very Fine	2.8 - 4.0	2		2%	7%
	Fine	4.0 - 5.6	3		3%	10%
	Fine	5.6 - 8.0	5		5%	15%
	Medium	8.0 - 11.0	3		3%	18%
	Medium	11.0 - 16.0	2		2%	20%
	Coarse	16.0 - 22.6	8		8%	28%
	Coarse	22.6 - 32	6		6%	34%
	Very Coarse	32 - 45	8		8%	42%
	Very Coarse	45 - 64	13		13%	55%
 COBBLE	Small	64 - 90	11		11%	66%
	Small	90 - 128	14		14%	80%
	Large	128 - 180	10		10%	90%
	Large	180 - 256	8		8%	98%
 BOULDER	Small	256 - 362	1		1%	99%
	Small	362 - 512				99%
	Medium	512 - 1024				99%
	Large-Very Large	1024 - 2048				99%
BEDROCK	Bedrock	> 2048	1		1%	100%
Total			100		100%	

Largest particles: Bedrock (riffle)

**Big Cedar Creek
UT1 X28 - Riffle
Pebble Count Particle Size Distribution**

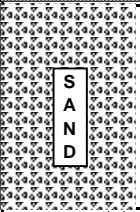
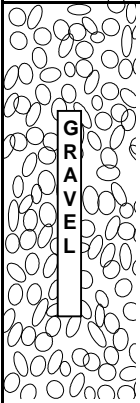
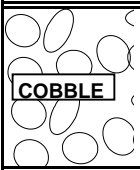
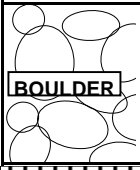


**Big Cedar Creek
UT1 X28 - Riffle
Pebble Count Size Class Distribution**



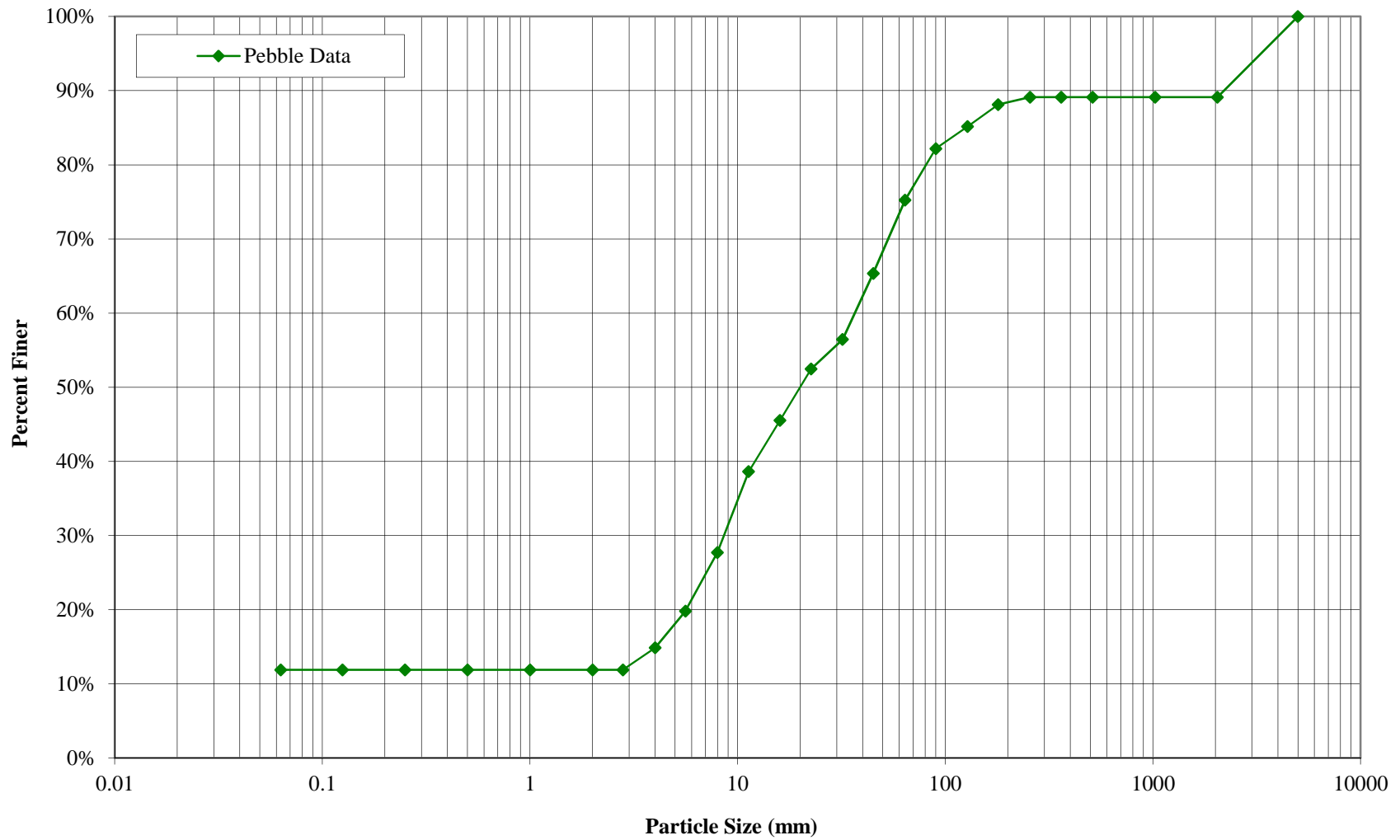
PEBBLE COUNT DATA SHEET: POOL 100-COUNT

BAKER PROJECT NO.		109261
SITE OR PROJECT:	Big Cedar Creek Restoration - Year 5 Monitoring	
REACH/LOCATION:	UT1 X29 Pool	
DATE COLLECTED:	12/3/2013	
FIELD COLLECTION BY:	KS / MC	
DATA ENTRY BY:	KS	

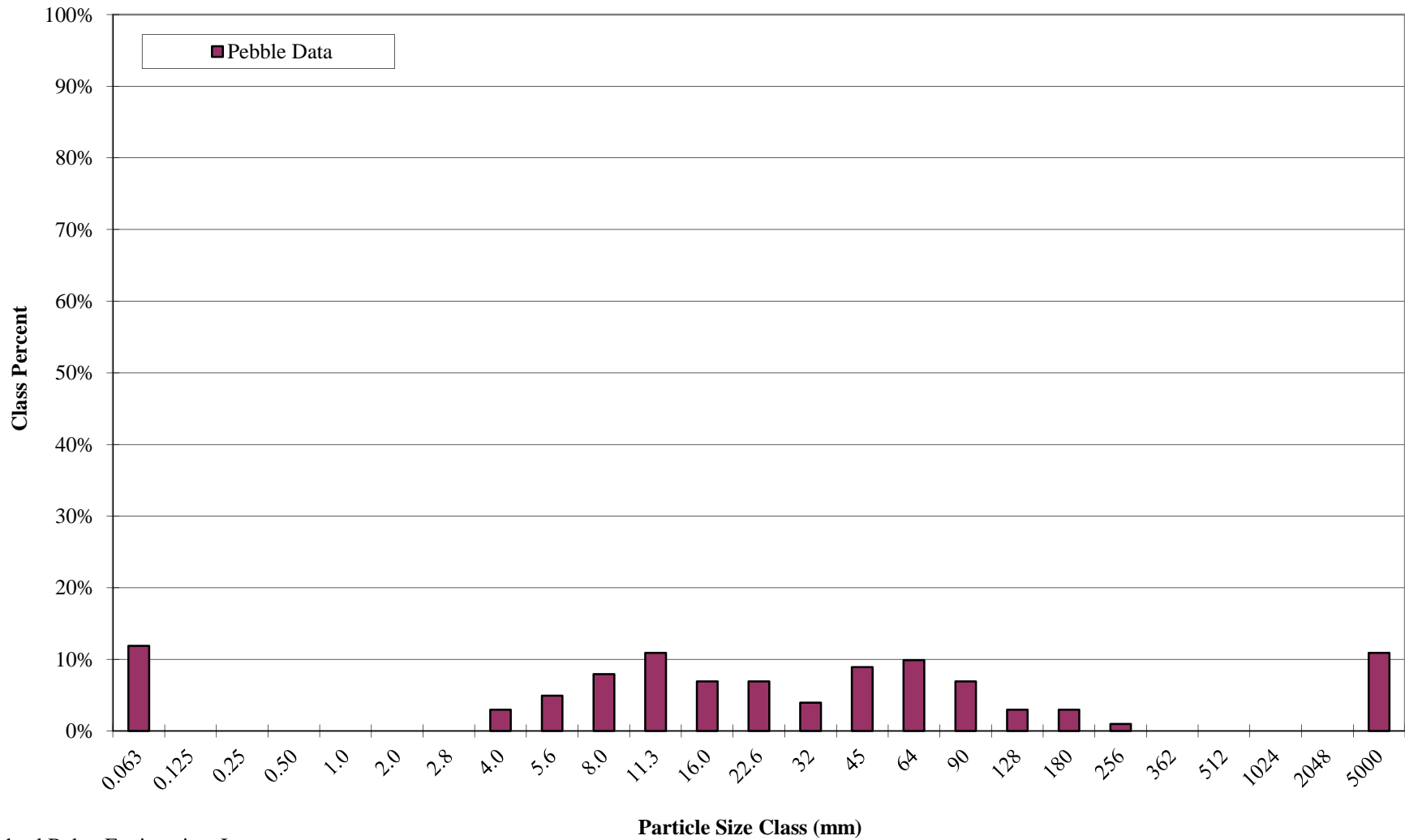
MATERIAL	PARTICLE	SIZE (mm)	PARTICLE CLASS COUNT		Summary	
			Pool	Class %	% Cum	
SILT/CLAY	Silt / Clay	< .063	12	12%	12%	
 SAND	Very Fine	.063 - .125			12%	
	Fine	.125 - .25			12%	
	Medium	.25 - .50			12%	
	Coarse	.50 - 1.0			12%	
	Very Coarse	1.0 - 2.0			12%	
 GRAVEL	Very Fine	2.0 - 2.8			12%	
	Very Fine	2.8 - 4.0	3	3%	15%	
	Fine	4.0 - 5.6	5	5%	20%	
	Fine	5.6 - 8.0	8	8%	28%	
	Medium	8.0 - 11.0	11	11%	39%	
	Medium	11.0 - 16.0	7	7%	46%	
	Coarse	16.0 - 22.6	7	7%	52%	
	Coarse	22.6 - 32	4	4%	56%	
	Very Coarse	32 - 45	9	9%	65%	
	Very Coarse	45 - 64	10	10%	75%	
 COBBLE	Small	64 - 90	7	7%	82%	
	Small	90 - 128	3	3%	85%	
	Large	128 - 180	3	3%	88%	
	Large	180 - 256	1	1%	89%	
 BOULDER	Small	256 - 362			89%	
	Small	362 - 512			89%	
	Medium	512 - 1024			89%	
	Large-Very Large	1024 - 2048			89%	
BEDROCK	Bedrock	> 2048	11	11%	100%	
	Total		101	100%		

Largest particles: -
(pool)

**Big Cedar Creek
UT1 X29 - Pool
Pebble Count Particle Size Distribution**

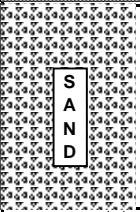
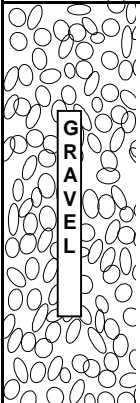
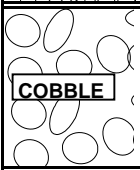
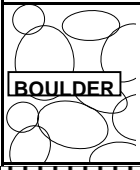


**Big Cedar Creek
UT1 X29 - Pool
Pebble Count Size Class Distribution**



PEBBLE COUNT DATA SHEET: RIFFLE 100-COUNT

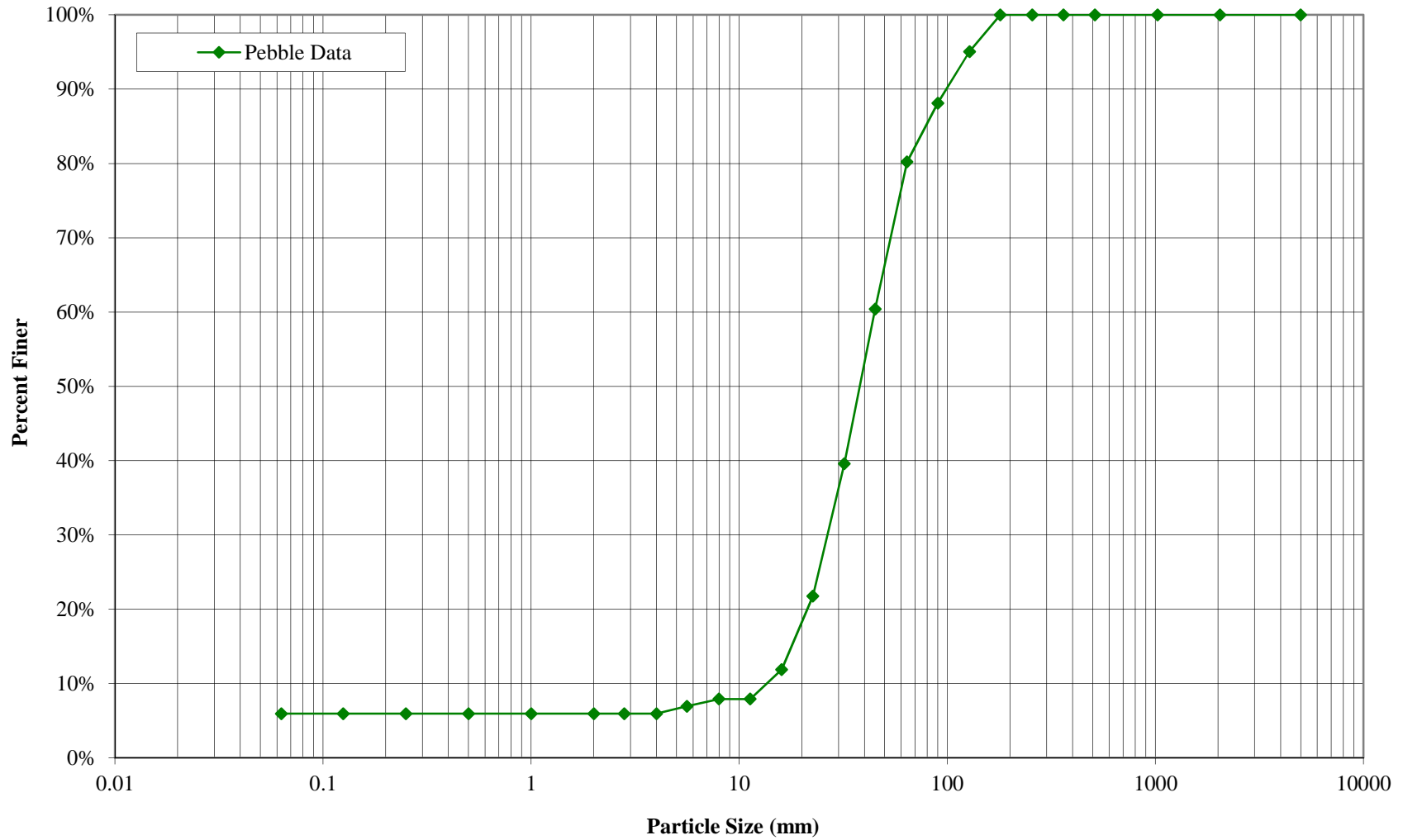
BAKER PROJECT NO.		109261
SITE OR PROJECT:	Big Cedar Creek Restoration - Year 5 Monitoring	
REACH/LOCATION:	UT2 X32 Riffle	
DATE COLLECTED:	12/19/2013	
FIELD COLLECTION BY:	MW & DH	
DATA ENTRY BY:	KS	

MATERIAL	PARTICLE	SIZE (mm)	PARTICLE CLASS COUNT		Summary	
			Riffle		Class %	% Cum
SILT/CLAY	Silt / Clay	< .063	6		6%	6%
 SAND	Very Fine	.063 - .125				6%
	Fine	.125 - .25				6%
	Medium	.25 - .50				6%
	Coarse	.50 - 1.0				6%
	Very Coarse	1.0 - 2.0				6%
 GRAVEL	Very Fine	2.0 - 2.8				6%
	Very Fine	2.8 - 4.0				6%
	Fine	4.0 - 5.6	1		1%	7%
	Fine	5.6 - 8.0	1		1%	8%
	Medium	8.0 - 11.0				8%
	Medium	11.0 - 16.0	4		4%	12%
	Coarse	16.0 - 22.6	10		10%	22%
	Coarse	22.6 - 32	18		18%	40%
	Very Coarse	32 - 45	21		21%	60%
	Very Coarse	45 - 64	20		20%	80%
 COBBLE	Small	64 - 90	8		8%	88%
	Small	90 - 128	7		7%	95%
	Large	128 - 180	5		5%	100%
	Large	180 - 256				100%
 BOULDER	Small	256 - 362				100%
	Small	362 - 512				100%
	Medium	512 - 1024				100%
	Large-Very Large	1024 - 2048				100%
BEDROCK	Bedrock	> 2048				100%
Total			101		100%	

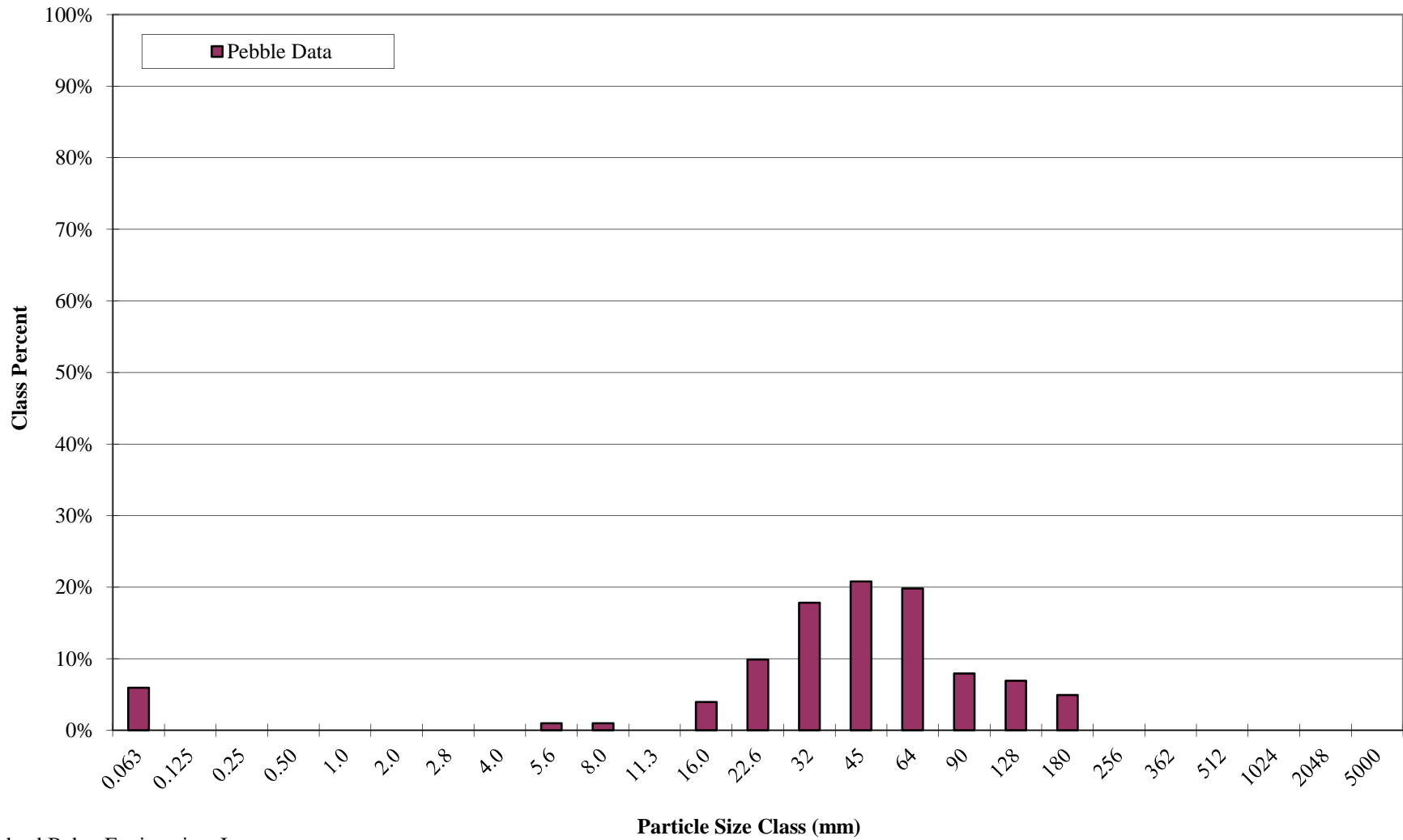
Largest particles:

(riffle)

**Big Cedar Creek
UT2 X32 - Riffle
Pebble Count Particle Size Distribution**



**Big Cedar Creek
UT2 X32 - Riffle
Pebble Count Size Class Distribution**



PEBBLE COUNT DATA SHEET: POOL 100-COUNT

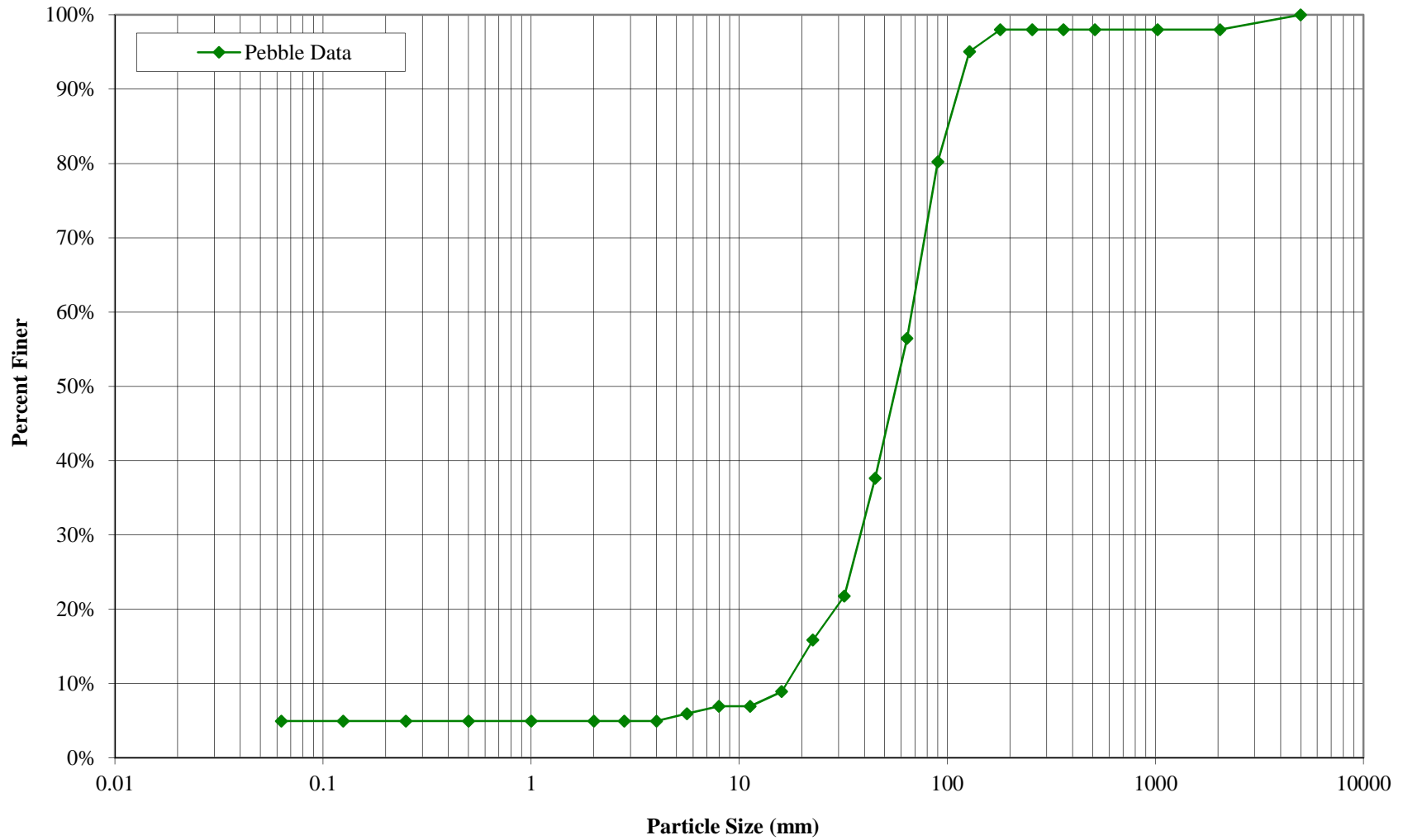
BAKER PROJECT NO. 109261	
SITE OR PROJECT:	Big Cedar Creek Restoration - Year 5 Monitoring
REACH/LOCATION:	UT2 X33 Pool
DATE COLLECTED:	12/19/2013
FIELD COLLECTION BY:	MW & DH
DATA ENTRY BY:	KS

MATERIAL	PARTICLE	SIZE (mm)	PARTICLE CLASS COUNT		Summary	
			Pool	Class %	% Cum	
SILT/CLAY	Silt / Clay	< .063	5	5%	5%	
	Very Fine	.063 - .125			5%	
SAND	Fine	.125 - .25			5%	
	Medium	.25 - .50			5%	
	Coarse	.50 - 1.0			5%	
	Very Coarse	1.0 - 2.0			5%	
	Very Fine	2.0 - 2.8			5%	
GRAVEL	Very Fine	2.8 - 4.0			5%	
	Fine	4.0 - 5.6	1	1%	6%	
	Fine	5.6 - 8.0	1	1%	7%	
	Medium	8.0 - 11.0			7%	
	Medium	11.0 - 16.0	2	2%	9%	
	Coarse	16.0 - 22.6	7	7%	16%	
	Coarse	22.6 - 32	6	6%	22%	
	Very Coarse	32 - 45	16	16%	38%	
	Very Coarse	45 - 64	19	19%	56%	
	COBBLE	Small	64 - 90	24	24%	80%
Small		90 - 128	15	15%	95%	
Large		128 - 180	3	3%	98%	
Large		180 - 256			98%	
BOULDER	Small	256 - 362			98%	
	Small	362 - 512			98%	
	Medium	512 - 1024			98%	
	Large-Very Large	1024 - 2048			98%	
BEDROCK	Bedrock	> 2048	2	2%	100%	
Total			101	100%		

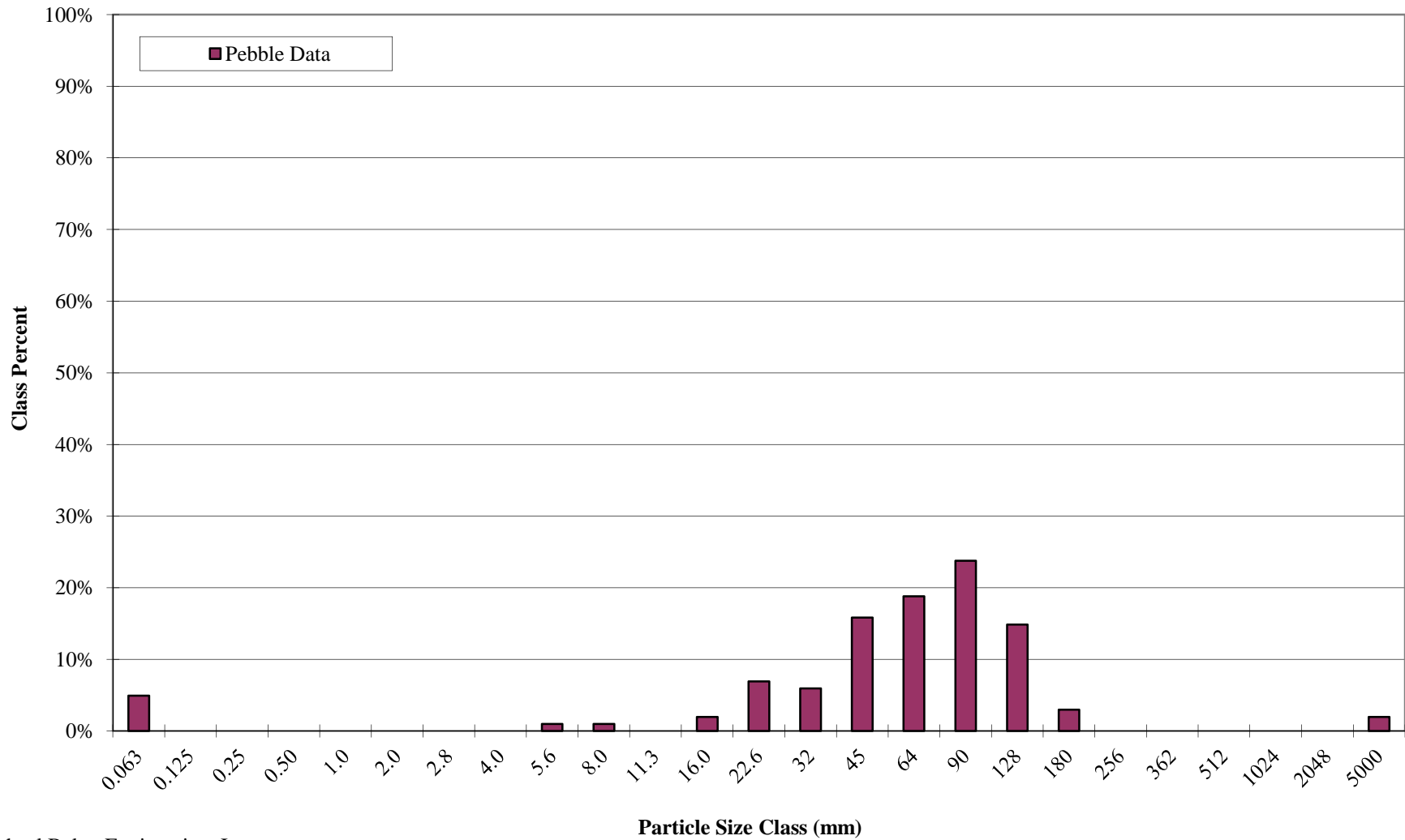
Largest particles:

(pool)

**Big Cedar Creek
UT2 X33 - Pool
Pebble Count Particle Size Distribution**



**Big Cedar Creek
UT2 X33 - Pool
Pebble Count Size Class Distribution**



Pavement/Subpavement Analysis

SITE OR PROJECT:	Big Cedar
REACH/LOCATION:	BCC Reach 1, X-1 R.A.
DATE COLLECTED:	12-19-2013
FIELD COLLECTION BY:	DH, MW
DATA ENTERED BY:	
LARGEST SUBPAVEMENT PARTICLE (mm):	

SEDIMENT ANALYSIS DATA SHEET

100 ct

MATERIAL	PARTICLE	SIZE (mm)	Pavement	Subpavement	
			100 ct	Bucket (g)	
	Silt / Clay	< .063			10
SAND	Very Fine	.063 - .125			
	Fine	.125 - .25			
	Medium	.25 - .50			
	Coarse	.50 - 1.0			
	Very Coarse	1.0 - 2.0			
GRAVEL	Very Fine	2.0 - 2.8			
	Very Fine	2.8 - 4.0			
	Fine	4.0 - 5.6			1
	Fine	5.6 - 8.0			2
	Medium	8.0 - 11.0			7
	Medium	11.0 - 16.0			10
	Coarse	16 - 22.6			11
	Coarse	22.6 - 32			4
	Very Coarse	32 - 45			6
BOULDER	Very Coarse	45 - 64			6
	Small	64 - 90			16
	Small	90 - 128			17
	Large	128 - 180			7
BOULDER	Large	180 - 256			1
	Small	256 - 362			
	Small	362 - 512			
BOULDER	Medium	512 - 1024			
	Large-Very Large	1024 - 2048			
BEDROCK	Bedrock	> 2048			1
			0	0	

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Pavement/Subpavement Analysis

SITE OR PROJECT:	Big Cedar
REACH/LOCATION:	BCC Reach 1 X-2 Pool
DATE COLLECTED:	12-19-2013
FIELD COLLECTION BY:	MW, DH
DATA ENTERED BY:	
LARGEST SUBPAVEMENT PARTICLE (mm):	

SEDIMENT ANALYSIS DATA SHEET

100ct

MATERIAL	PARTICLE	SIZE (mm)	Pavement	Subpavement
			100 ct	Bucket (g)
	Silt / Clay	< .063		
SAND	Very Fine	.063 - .125		
	Fine	.125 - .25		
	Medium	.25 - .50		
	Coarse	.50 - 1.0		
	Very Coarse	1.0 - 2.0		
GRAVEL	Very Fine	2.0 - 2.8		
	Very Fine	2.8 - 4.0		
	Fine	4.0 - 5.6		
	Fine	5.6 - 8.0		
	Medium	8.0 - 11.0		
	Medium	11.0 - 16.0		
	Coarse	16 - 22.6		
	Coarse	22.6 - 32		
	Very Coarse	32 - 45		
Very Coarse	45 - 64			
COBBLE	Small	64 - 90		
	Small	90 - 128		
	Large	128 - 180		
	Large	180 - 256		
BOULDER	Small	256 - 362		
	Small	362 - 512		
	Medium	512 - 1024		
	Large-Very Large	1024 - 2048		
BEDROCK	Bedrock	> 2048		
			0	0

Pavement/Subpavement Analysis

SITE OR PROJECT:	Big Cedar
REACH/LOCATION:	BCC Road 2, X-4 post
DATE COLLECTED:	12-19-2013
FIELD COLLECTION BY:	DH, MW
DATA ENTERED BY:	
LARGEST SUBPAVEMENT PARTICLE (mm):	

SEDIMENT ANALYSIS DATA SHEET

100 of

MATERIAL	PARTICLE	SIZE (mm)	Pavement	Subpavement
			100 ct	Bucket (g)
	Silt / Clay	< .063		
SAND	Very Fine	.063 - .125		
	Fine	.125 - .25		
	Medium	.25 - .50		
	Coarse	.50 - 1.0		
	Very Coarse	1.0 - 2.0		
GRAVEL	Very Fine	2.0 - 2.8		
	Very Fine	2.8 - 4.0		
	Fine	4.0 - 5.6		
	Fine	5.6 - 8.0		
	Medium	8.0 - 11.0		
	Medium	11.0 - 16.0		
	Coarse	16 - 22.6		
	Coarse	22.6 - 32		
	Very Coarse	32 - 45		
COBBLE	Very Coarse	45 - 64		
	Small	64 - 90		
	Small	90 - 128		
	Large	128 - 180		
BOULDER	Large	180 - 256		
	Small	256 - 362		
	Small	362 - 512		
	Medium	512 - 1024		
BEDROCK	Large-Very Large	1024 - 2048		
	Bedrock	> 2048		
			0	0

Pavement/Subpavement Analysis

SITE OR PROJECT:	BIG CEDAR
REACH/LOCATION:	BCC Road 2, X-SR A12
DATE COLLECTED:	12-19-2013
FIELD COLLECTION BY:	DH, MV
DATA ENTERED BY:	
LARGEST SUBPAVEMENT PARTICLE (mm):	

SEDIMENT ANALYSIS DATA SHEET

100 ct

MATERIAL	PARTICLE	SIZE (mm)	Pavement	Subpavement
			100 ct	Bucket (g)
	Silt / Clay	< .063		
S A N D	Very Fine	.063 - .125		
	Fine	.125 - .25		
	Medium	.25 - .50		
	Coarse	.50 - 1.0		
	Very Coarse	1.0 - 2.0		
GRAVEL	Very Fine	2.0 - 2.8		
	Very Fine	2.8 - 4.0		
	Fine	4.0 - 5.6		
	Fine	5.6 - 8.0		
	Medium	8.0 - 11.0		
	Medium	11.0 - 16.0		
	Coarse	16 - 22.6		
	Coarse	22.6 - 32		
	Very Coarse	32 - 45		
COBBLE	Very Coarse	45 - 64		
	Small	64 - 90		
	Small	90 - 128		
	Large	128 - 180		
BOULDER	Large	180 - 256		
	Small	256 - 362		
	Small	362 - 512		
	Medium	512 - 1024		
BEDROCK	Large-Very Large	1024 - 2048		
	Bedrock	> 2048		
			0	0

Pavement/Subpavement Analysis

SITE OR PROJECT:	<i>Big Cedar</i>
REACH/LOCATION:	<i>BCC Road 3 X-8 Road</i>
DATE COLLECTED:	<i>12-19-13</i>
FIELD COLLECTION BY:	<i>MW DH</i>
DATA ENTERED BY:	
LARGEST SUBPAVEMENT PARTICLE (mm):	

SEDIMENT ANALYSIS DATA SHEET

100ct

MATERIAL	PARTICLE	SIZE (mm)	Pavement	Subpavement
			100 ct	Bucket (g)
	Silt / Clay	< .063	 	
S A N D	Very Fine	.063 - .125		
	Fine	.125 - .25		
	Medium	.25 - .50		
	Coarse	.50 - 1.0		
	Very Coarse	1.0 - 2.0		
GRAVEL	Very Fine	2.0 - 2.8		
	Very Fine	2.8 - 4.0		
	Fine	4.0 - 5.6		
	Fine	5.6 - 8.0	 	
	Medium	8.0 - 11.0		
	Medium	11.0 - 16.0	 	
	Coarse	16 - 22.6	 	
	Coarse	22.6 - 32	 	
	Very Coarse	32 - 45	 	
	Very Coarse	45 - 64	 	
COBBLE	Small	64 - 90	 	
	Small	90 - 128	 	
	Large	128 - 180	 	
	Large	180 - 256		
BOULDER	Small	256 - 362		
	Small	362 - 512		
	Medium	512 - 1024		
	Large-Very Large	1024 - 2048		
BEDROCK	Bedrock	> 2048		
			0	0

46
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50

** lots of clay*

Pavement/Subpavement Analysis

SITE OR PROJECT:	Big Cedar
REACH/LOCATION:	BCC Reach 3 X-10
DATE COLLECTED:	12-19-2013
FIELD COLLECTION BY:	MW DM
DATA ENTERED BY:	
LARGEST SUBPAVEMENT PARTICLE (mm):	

SEDIMENT ANALYSIS DATA SHEET

100 ct.

MATERIAL	PARTICLE	SIZE (mm)	Pavement	Subpavement
			100 ct	Bucket (g)
	Silt / Clay	< .063		
SAND	Very Fine	.063 - .125		
	Fine	.125 - .25		
	Medium	.25 - .50		
	Coarse	.50 - 1.0		
	Very Coarse	1.0 - 2.0		
GRAVEL	Very Fine	2.0 - 2.8		
	Very Fine	2.8 - 4.0		
	Fine	4.0 - 5.6		
	Fine	5.6 - 8.0		
	Medium	8.0 - 11.0		
	Medium	11.0 - 16.0		
	Coarse	16 - 22.6		
	Coarse	22.6 - 32		
	Very Coarse	32 - 45		
COBBLE	Very Coarse	45 - 64		
	Small	64 - 90		
	Small	90 - 128		
	Large	128 - 180		
BOULDER	Large	180 - 256		
	Small	256 - 362		
	Small	362 - 512		
	Medium	512 - 1024		
BEDROCK	Large-Very Large	1024 - 2048		
	Bedrock	> 2048		
			0	0

100 count Pebble Count
Pavement/Subpavement Analysis

SITE OR PROJECT:	<i>Big Codan</i>
REACH/LOCATION:	<i>UTI Road 1 X-14 Rd</i>
DATE COLLECTED:	<i>12/19/2013</i>
FIELD COLLECTION BY:	<i>DA, MLW</i>
DATA ENTERED BY:	
LARGEST SUBPAVEMENT PARTICLE (mm):	

SEDIMENT ANALYSIS DATA SHEET

100 ct

MATERIAL	PARTICLE	SIZE (mm)	Pavement	Subpavement
			100 ct	Bucket (g)
	Silt / Clay	< .063	<i> </i>	<i> </i>
SAND	Very Fine	.063 - .125		
	Fine	.125 - .25		
	Medium	.25 - .50		
	Coarse	.50 - 1.0		
	Very Coarse	1.0 - 2.0		
GRAVEL	Very Fine	2.0 - 2.8		
	Very Fine	2.8 - 4.0		
	Fine	4.0 - 5.6		
	Fine	5.6 - 8.0	<i> </i>	
	Medium	8.0 - 11.0	<i> </i>	
	Medium	11.0 - 16.0	<i> </i>	
	Coarse	16 - 22.6	<i> </i>	
	Coarse	22.6 - 32	<i> </i>	
	Very Coarse	32 - 45	<i> </i>	
COBBLE	Very Coarse	45 - 64	<i> </i>	<i> </i>
	Small	64 - 90	<i> </i>	<i> </i>
	Small	90 - 128	<i> </i>	<i> </i>
	Large	128 - 180	<i> </i>	<i> </i>
BOULDER	Large	180 - 256	<i> </i>	<i> </i>
	Small	256 - 362		
	Small	362 - 512		
	Medium	512 - 1024		
BEDROCK	Large-Very Large	1024 - 2048		
	Bedrock	> 2048		
			0	0

Pavement/Subpavement Analysis

Pool

SITE OR PROJECT: <i>Big Cedar</i>
REACH/LOCATION: <i>Reach 1 X-15</i>
DATE COLLECTED: <i>12/19/2013</i>
FIELD COLLECTION BY: <i>DH, MW</i>
DATA ENTERED BY:
LARGEST SUBPAVEMENT PARTICLE (mm):

SEDIMENT ANALYSIS DATA SHEET

			Pavement	Subpavement
MATERIAL	PARTICLE	SIZE (mm)	100 ct	Bucket (g)
	Silt / Clay	< .063	###	###
SAND	Very Fine	.063 - .125		
	Fine	.125 - .25		
	Medium	.25 - .50		
	Coarse	.50 - 1.0		
	Very Coarse	1.0 - 2.0		
GRAVEL	Very Fine	2.0 - 2.8		
	Very Fine	2.8 - 4.0		
	Fine	4.0 - 5.6		
	Fine	5.6 - 8.0		
	Medium	8.0 - 11.0		
	Medium	11.0 - 16.0		
	Coarse	16 - 22.6		
	Coarse	22.6 - 32		
	Very Coarse	32 - 45		
COBBLE	Small	64 - 90		
	Small	90 - 128		
	Large	128 - 180		
	Large	180 - 256		
BOULDER	Small	256 - 362		
	Small	362 - 512		
	Medium	512 - 1024		
	Large-Very Large	1024 - 2048		
BEDROCK	Bedrock	> 2048		
			0	0

###

** leaf packs / silt
in pool*

PEBBLE COUNT DATA SHEET: POOL 100-COUNT



BAKER PROJECT NO. 109361

SITE OR PROJECT:	BIG CEDAR YR 5 MONITORING
REACH/LOCATION:	IT 1 X-23 Pool
DATE COLLECTED:	12-3-13
FIELD COLLECTION BY:	KJ & MC
DATA ENTRY BY:	KS

MATERIAL	PARTICLE	SIZE (mm)	PARTICLE CLASS WEIGHT (g)
SILT/CLAY	Silt / Clay	< .063	
SAND	Very Fine	.063 - .125	
	Fine	.125 - .25	
	Medium	.25 - .50	
	Coarse	.50 - 1.0	
	Very Coarse	1.0 - 2.0	
GRAVEL	Very Fine	2.0 - 2.8	
	Very Fine	2.8 - 4.0	
	Fine	4.0 - 5.6	
	Fine	5.6 - 8.0	
	Medium	8.0 - 11.0	
	Medium	11.0 - 16.0	
	Coarse	16.0 - 22.6	
	Coarse	22.6 - 32	
	Very Coarse	32 - 45	
	Very Coarse	45 - 64	
COBBLE	Small	64 - 90	
	Small	90 - 128	
	Large	128 - 180	
	Large	180 - 256	
BOULDER	Small	256 - 362	
	Small	362 - 512	
	Medium	512 - 1024	
	Large-Very Large	1024 - 2048	
BEDROCK	Bedrock	> 2048	
Total			

Largest particle: _____ mm

PEBBLE COUNT DATA SHEET: RIFFLE 100-COUNT

BAKER PROJECT NO. 109261

SITE OR PROJECT:	BIG CEDAR VRS MONITORING
REACH/LOCATION:	UT 1 X-24 RIFFLE
DATE COLLECTED:	12/3/13
FIELD COLLECTION BY:	RS4 MC
DATA ENTRY BY:	

MATERIAL	PARTICLE	SIZE (mm)	PARTICLE CLASS COUNT		Summary	
			Riffle	Class %	% Cum	
SILT/CLAY	Silt / Clay	< .063				#DIV/0!
	Very Fine	.063 - .125				#DIV/0!
	Fine	.125 - .25				#DIV/0!
	Medium	.25 - .50				#DIV/0!
	Coarse	.50 - 1.0				#DIV/0!
	Very Coarse	1.0 - 2.0				#DIV/0!
GRAVEL	Very Fine	2.0 - 2.8				#DIV/0!
	Very Fine	2.8 - 4.0				#DIV/0!
	Fine	4.0 - 5.6				#DIV/0!
	Fine	5.6 - 8.0				#DIV/0!
	Medium	8.0 - 11.0				#DIV/0!
	Medium	11.0 - 16.0				#DIV/0!
	Coarse	16.0 - 22.6				#DIV/0!
	Coarse	22.6 - 32				#DIV/0!
	Very Coarse	32 - 45				#DIV/0!
	Very Coarse	45 - 64				#DIV/0!
COBBLE	Small	64 - 90				#DIV/0!
	Small	90 - 128				#DIV/0!
	Large	128 - 180				#DIV/0!
	Large	180 - 256				#DIV/0!
BOULDER	Small	256 - 362				#DIV/0!
	Small	362 - 512				#DIV/0!
	Medium	512 - 1024				#DIV/0!
	Large-Very Large	1024 - 2048				#DIV/0!
BEDROCK	Bedrock	> 2048				#DIV/0!
Total			0	0%		

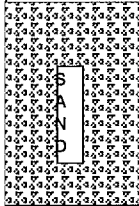
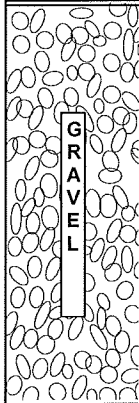
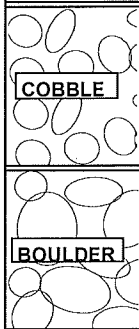
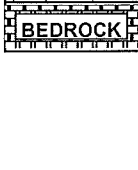

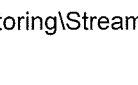
Largest particles: 350
(riffle)



PEBBLE COUNT DATA SHEET: RIFFLE 100-COUNT

BAKER PROJECT NO. 109261

SITE OR PROJECT:	<u>BIG CEDAR VR 5 MONITORING</u>
REACH/LOCATION:	<u>UT 1 X-28 RIFFLE</u>
DATE COLLECTED:	<u>12/3/13</u>
FIELD COLLECTION BY:	<u>MC & KS</u>
DATA ENTRY BY:	<u>KS</u>

MATERIAL	PARTICLE	SIZE (mm)	PARTICLE CLASS WEIGHT (g)	
 SILT/CLAY	Silt / Clay	< .063	<u> </u>	
	 SAND	Very Fine	.063 - .125	
		Fine	.125 - .25	
		Medium	.25 - .50	
		Coarse	.50 - 1.0	
 GRAVEL	Very Coarse	1.0 - 2.0		
	Very Fine	2.0 - 2.8		
	Very Fine	2.8 - 4.0	<u> </u>	
	Fine	4.0 - 5.6	<u> </u>	
	Fine	5.6 - 8.0	<u> </u>	
	Medium	8.0 - 11.0	<u> </u>	
	Medium	11.0 - 16.0	<u> </u>	
	Coarse	16.0 - 22.6	<u> </u>	
	Coarse	22.6 - 32	<u> </u>	
	Very Coarse	32 - 45	<u> </u>	
 COBBLE	Very Coarse	45 - 64	<u> </u>	
	Small	64 - 90	<u> </u>	
	Small	90 - 128	<u> </u>	
	Large	128 - 180	<u> </u>	
 BOULDER	Large	180 - 256	<u> </u>	
	Small	256 - 362	<u> </u>	
	Small	362 - 512		
	Medium	512 - 1024		
 BEDROCK	Large-Very Large	1024 - 2048		
	Bedrock	> 2048	<u> </u>	
		Total		

Largest particle: Bedrock mm

PEBBLE COUNT DATA SHEET: POOL 100-COUNT

BAKER PROJECT NO. 1092601

SITE OR PROJECT: <u>BIG CEDAR YR 5 MONITORING</u>
REACH/LOCATION: <u>UT1 X-29 POOL</u>
DATE COLLECTED: <u>12/3/13</u>
FIELD COLLECTION BY: <u>MC + KS</u>
DATA ENTRY BY:

MATERIAL	PARTICLE	SIZE (mm)	PARTICLE CLASS COUNT		Summary		Distribution Plot Size (mm)
			Riffle		Class %	% Cum	
SILT/CLAY	Silt / Clay	< .063				#DIV/0!	0.063
	Very Fine	.063 - .125				#DIV/0!	0.125
	Fine	.125 - .25				#DIV/0!	0.25
	Medium	.25 - .50				#DIV/0!	0.50
	Coarse	.50 - 1.0				#DIV/0!	1.0
	Very Coarse	1.0 - 2.0				#DIV/0!	2.0
GRAVEL	Very Fine	2.0 - 2.8				#DIV/0!	2.8
	Very Fine	2.8 - 4.0				#DIV/0!	4.0
	Fine	4.0 - 5.6				#DIV/0!	5.6
	Fine	5.6 - 8.0				#DIV/0!	8.0
	Medium	8.0 - 11.0				#DIV/0!	11.3
	Medium	11.0 - 16.0				#DIV/0!	16.0
	Coarse	16.0 - 22.6				#DIV/0!	22.6
	Coarse	22.6 - 32				#DIV/0!	32
	Very Coarse	32 - 45				#DIV/0!	45
	Very Coarse	45 - 64				#DIV/0!	64
COBBLE	Small	64 - 90				#DIV/0!	90
	Small	90 - 128				#DIV/0!	128
	Large	128 - 180				#DIV/0!	180
	Large	180 - 256				#DIV/0!	256
BOULDER	Small	256 - 362				#DIV/0!	362
	Small	362 - 512				#DIV/0!	512
	Medium	512 - 1024				#DIV/0!	1024
	Large-Very Large	1024 - 2048				#DIV/0!	2048
BEDROCK	Bedrock	> 2048				#DIV/0!	5000
Total			0		0%		

Largest particles: _____
(pool)

Pavement/Subpavement Analysis

SITE OR PROJECT:	Big Cedar
REACH/LOCATION:	UT2, X-32 RIFFLE
DATE COLLECTED:	12-19-2013
FIELD COLLECTION BY:	DH, MW
DATA ENTERED BY:	
LARGEST SUBPAVEMENT PARTICLE (mm):	

SEDIMENT ANALYSIS DATA SHEET

100 ct

MATERIAL	PARTICLE	SIZE (mm)	Pavement	Subpavement	
			100 ct	Bucket (g)	
	Silt / Clay	< .063	100		6
S A N D	Very Fine	.063 - .125			
	Fine	.125 - .25			
	Medium	.25 - .50			
	Coarse	.50 - 1.0			
	Very Coarse	1.0 - 2.0			
GRAVEL	Very Fine	2.0 - 2.8			
	Very Fine	2.8 - 4.0			
	Fine	4.0 - 5.6	1		1
	Fine	5.6 - 8.0	1		1
	Medium	8.0 - 11.0			
	Medium	11.0 - 16.0	4		4
	Coarse	16 - 22.6	10		10
	Coarse	22.6 - 32	18		18
	Very Coarse	32 - 45	21		21
	Very Coarse	45 - 64	20		20
COBBLE	Small	64 - 90	8		8
	Small	90 - 128	7		7
	Large	128 - 180	5		5
	Large	180 - 256			
BOULDER	Small	256 - 362			
	Small	362 - 512			
	Medium	512 - 1024			
	Large-Very Large	1024 - 2048			
BEDROCK	Bedrock	> 2048			
			0	0	

Pavement/Subpavement Analysis

SITE OR PROJECT:	Big Cedar
REACH/LOCATION:	UT2, X-33 Pool
DATE COLLECTED:	12-19-2013
FIELD COLLECTION BY:	DH, MW
DATA ENTERED BY:	
LARGEST SUBPAVEMENT PARTICLE (mm):	

SEDIMENT ANALYSIS DATA SHEET

100 ct

MATERIAL	PARTICLE	SIZE (mm)	Pavement	Subpavement
			100 ct	Bucket (g)
	Silt / Clay	< .063		
SAND	Very Fine	.063 - .125		
	Fine	.125 - .25		
	Medium	.25 - .50		
	Coarse	.50 - 1.0		
	Very Coarse	1.0 - 2.0		
GRAVEL	Very Fine	2.0 - 2.8		
	Very Fine	2.8 - 4.0		
	Fine	4.0 - 5.6		
	Fine	5.6 - 8.0		
	Medium	8.0 - 11.0		
	Medium	11.0 - 16.0		
	Coarse	16 - 22.6		
	Coarse	22.6 - 32		
	Very Coarse	32 - 45		
	Very Coarse	45 - 64		
COBBLE	Small	64 - 90		
	Small	90 - 128		
	Large	128 - 180		
	Large	180 - 256		
BOULDER	Small	256 - 362		
	Small	362 - 512		
	Medium	512 - 1024		
	Large-Very Large	1024 - 2048		
BEDROCK	Bedrock	> 2048		
			0	0

**Table B.1. Stream Problem Areas
Big Cedar Creek Restoration Site: Contract No. D06054-D**

UT1 Reach 4			
Feature Issue	Station No.	Suspected Cause	Photo Number
Minor bank erosion	56+60, Left Bank	Loose matting/sparse vegetation	SPA 1
Mid-channel bar	43+25 - 43+75	Large willow & vegetation in channel backing up sediment	SPA 2
BCC Reach 4			
Feature Issue	Station No.	Suspected Cause	Photo Number
Minor bank erosion	59+60 - 60+00, Left Bank	Sparse woody vegetation	SPA 3
BCC Reach 3			
Feature Issue	Station No.	Suspected Cause	Photo Number
Minor bank erosion	46+90 - 47+30, Left Bank	Loose matting/sparse vegetation	SPA 4
Riffle degradation	51+60 - 52+02	Unknown (Degradation not apparent during field walk. Noted from profile survey.)	N/A
BCC Reach 2			
Feature Issue	Station No.	Suspected Cause	Photo Number
Debris across channel	21+25; 33+00	Remnant Beaver Dam	SPA 5

**Table B2. Visual Morphological Stability Assessment
Big Cedar Creek Restoration Site: Contract 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 Performance 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%

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

BCC Reach 2 (2239LF)

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 Performance 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	0/0	100	100%
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. Initially there were 15 riffles and 10 vanes.

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

BCC Reach 3 (1827 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 Performance 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	100.0	
	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	1/40	99.98	99.98%
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. Initially there were 13 riffles and 12 vanes. Old total of 12 vanes was incorrect.

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

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 Performance 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	1/40	99.9	99.9%
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: Contract No. D06054-D**

BCC Reach 6 (1046LF)

Feature Category	Metric (per As-Built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-Built	Total Number / feet in unstable state	% Performing in Stable Condition	Feature Performance Mean or Total
A. Riffles	1. Present?	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

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

UT1 Reach 1 (1248 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 Performance 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: Contract 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 Performance 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%

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

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 Performance 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	100	100%
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	1/50	99.97	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	N/A	N/A	0/0	100	99.99%
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. Initially there were 18 riffles and 12 vanes.

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

UT1 Reach 4 (1121 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 Performance 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	100.0	
	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	1/40	99.96	99.96%
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. Initially there were 9 riffles and 1 vane.

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

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 Performance 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: Contract 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 Performance 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

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

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 Performance 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: Contract No. D06054-D**

UT2 (609 LF)

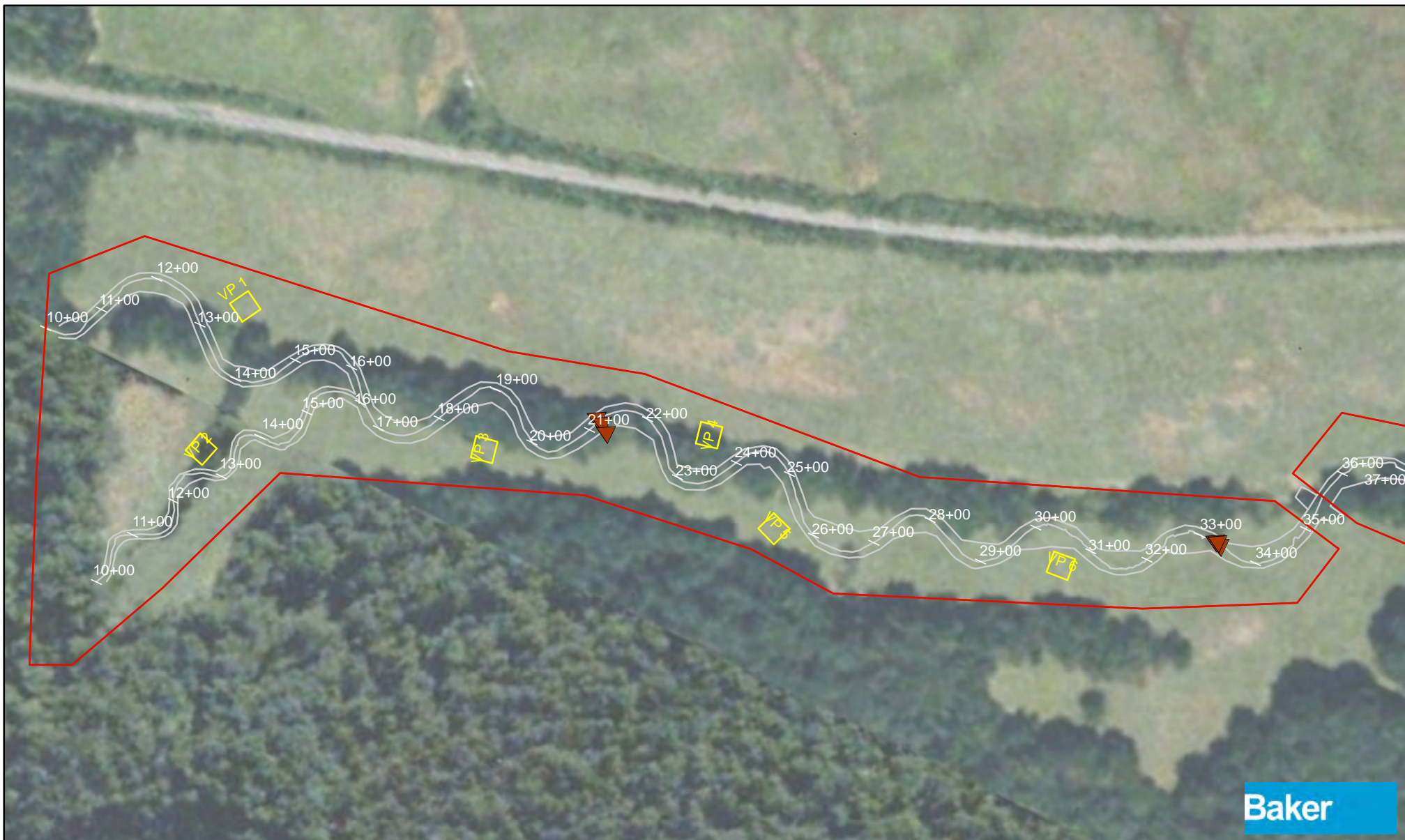
Feature Category	Metric (per As-Built and reference baselines)	(# Stable) Number Performing as Intended	Total number per As-Built ¹	Total Number / feet in unstable state	% Performing in Stable Condition	Feature Performance Mean or Total
A. Riffles	1. Present?	8	8	N/A	100	
	2. Armor stable (e.g. no displacement)?	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	0/0	100	100%
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. Initially there were 7 vanes.

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

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 Performance 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 10+00 to 37+00) and
UT 2 (Station 10+00 to 16+00)**

Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 5
Stanly County, NC

LEGEND

-  Beaver Dam Remnant
-  Conservation Easement
-  Asbuilt Alignment

Map Vicinity



EEP Contract No. : D06054-D
May 2014



0 50 100 200 Feet 1" = 200'



**Figure B2: Stream Problem Areas
BCC (Station 44+00 to 63+00)**




Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 5
Stanly County, NC



0 37.5 75 150
Feet

1" = 150'

LEGEND

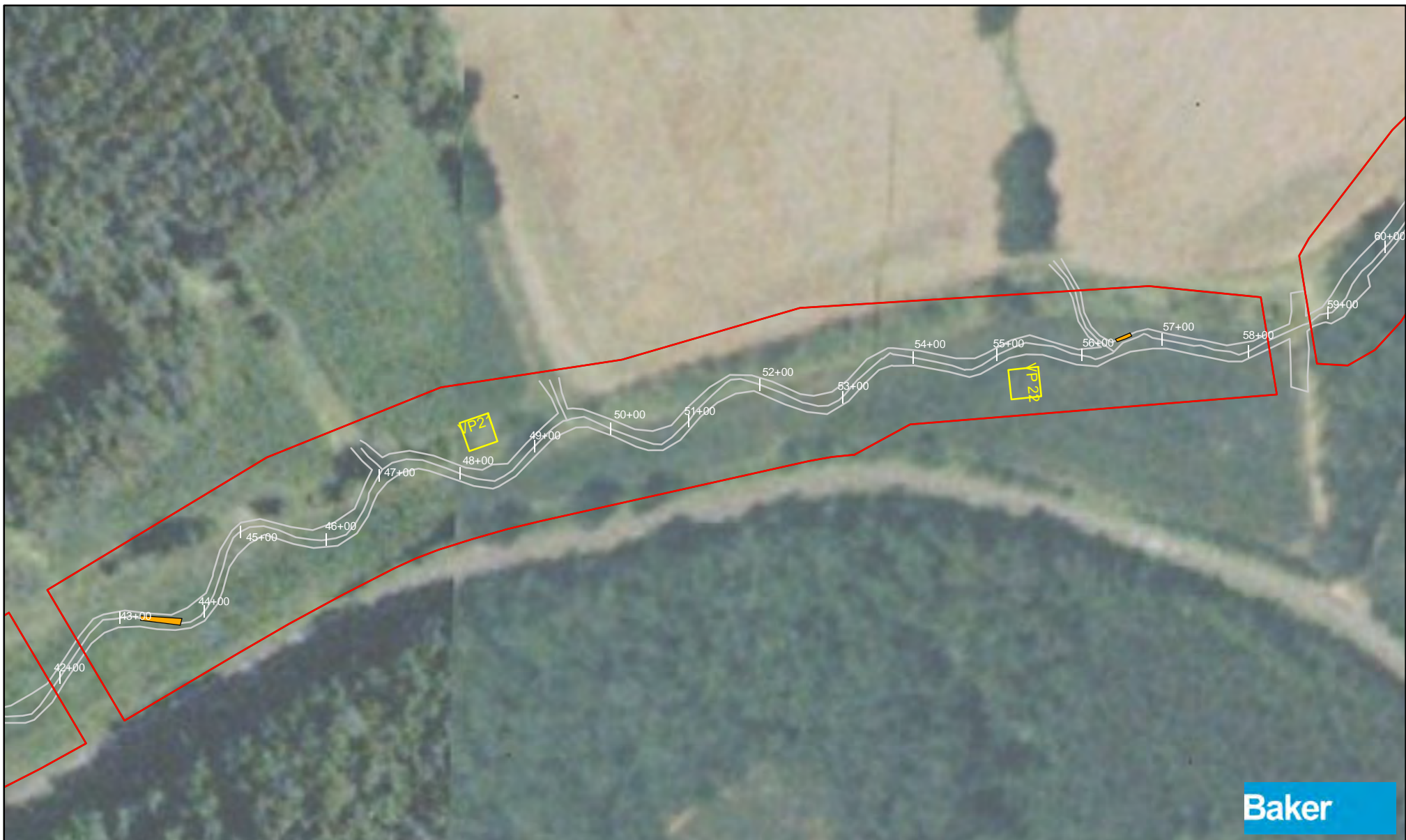
-  Minor Bank Erosion
-  Conservation Easement
-  Asbuilt Alignment

Map Vicinity



EEP Contract No. : D06054-D
May 2014





**Figure B3: Stream Problem Areas
UT1 (Station 41+50 to 60+25)**

Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 5
Stanly County, NC

LEGEND

- Conservation Easement
- Minor Bank Erosion
- Asbuilt Alignment

Map Vicinity



EEP Contract No. : D06054-D
May 2014



0 37.5 75 150
Feet

1" = 150'

Representative Stream Problem Area Photos



SPA 1 – Minor bank erosion on UT1 at Station 56+60, left bank



SPA 2 – Mid-channel bar on UT1 at Station 43+25 to 43+75



SPA 3 – Minor bank erosion on left bank of BCC from Station 60+00 to 59+60



SPA 4 – Bank erosion on left of BCC from Station 46+90 to 47+30



SPA 5 – Remnant beaver dam on BCC at Station 21+25 and Station 33+00

Appendix C

Vegetation Data

Vegetation Data Tables C.1 through C.7

Vegetation Monitoring Plot Photos

Vegetation Plot Data Sheets

Vegetation Problem Area Photos

Vegetation Problem Areas Figure C1 – C5

Table C.1. Vegetation Metadata
Big Cedar Creek Restoration Site: Contract No. D06054-D

Report Prepared By	Kristi Suggs
Date Prepared	1/5/2014 10:25
Revised/Edited	
database name	cvs-eeep-entrytool-v2.2.7.mdb
database location	C:
computer name	CHABLKUSUGGS
file size	42012672
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: Contract No. D06054-D

	Species	Common Name	4	3	2	1	0	Missing	Unknown
	Betula nigra	river birch	45	6	4				
	Carya ovata	shagbark hickory		1					
	Cephalanthus occidentalis	common buttonbush	5	2	5				
	Cornus amomum	silky dogwood	34	17	11		1	3	
	Corylus americana	American hazelnut	4	3					
	Fraxinus pennsylvanica	green ash	19	3	3	1			
	Ilex verticillata	common winterberry						1	
	Quercus falcata	southern red oak		1					
	Quercus michauxii	swamp chestnut oak	6	2		1	1		
	Quercus nigra	water oak	6	1	1				
	Quercus phellos	willow oak	27	5	3		2		
	Symphoricarpos orbiculatus	coralberry	2			1			
	Ulmus alata	winged elm	1	1					
	Viburnum dentatum	southern arrowwood	22	5	1		1	1	
	Carpinus caroliniana	American hornbeam	27	4	1		2		
	Calycanthus floridus	eastern sweetshrub				1		1	
	Quercus rubra	northern red oak	2	2	1				
	Lindera benzoin	northern spicebush	7	1	3				
	Platanus occidentalis	American sycamore	72	11	8		1		
	Acer negundo	boxelder	1						
	Acer rubrum	red maple	1						
TOT:	21	21	281	65	41	4	8	6	0

Table C.3. Vegetation Damage by Species
Big Cedar Creek Restoration Site: Contract No. D06054-D

Species	Common Name	Count of Damage Categories						
		No Damage	Other	Insects	Storm	Unknown		
Acer negundo	boxelder	0	1					
Acer rubrum	red maple	0	1					
Betula nigra	river birch	0	55					
Calycanthus floridus	eastern sweetshrub	1	1				1	
Carpinus caroliniana	American hornbeam	0	34					
Carya ovata	shagbark hickory	0	1					
Cephalanthus occidentalis	common buttonbush	1	11		1			
Cornus amomum	silky dogwood	5	61	1	1	1	2	
Corylus americana	American hazelnut	1	6		1			
Fraxinus pennsylvanica	green ash	1	25	1				
Ilex verticillata	common winterberry	0	1					
Lindera benzoin	northern spicebush	0	11					
Platanus occidentalis	American sycamore	1	91				1	
Quercus falcata	southern red oak	0	1					
Quercus michauxii	swamp chestnut oak	0	10					
Quercus nigra	water oak	0	8					
Quercus phellos	willow oak	0	37					
Quercus rubra	northern red oak	0	5					
Symphoricarpos orbiculatus	coralberry	0	3					
Ulmus alata	winged elm	0	2					
Viburnum dentatum	southern arrowwood	0	30					
TOT:	21	21	10	395	2	3	1	4

Table C.4. Vegetation Damage by Plot
Big Cedar Creek Restoration Site: Contract No. D06054-D

Plot	Count of Damage Categories		No Damage	Other	Insects	Storm	Unknown
92532-01-0001-year:5	2	14					2
92532-01-0002-year:5	0	23					
92532-01-0003-year:5	0	20					
92532-01-0004-year:5	0	16					
92532-01-0005-year:5	0	19					
92532-01-0006-year:5	0	20					
92532-01-0007-year:5	0	16					
92532-01-0008-year:5	1	18		1			
92532-01-0009-year:5	1	25	1				
92532-01-0010-year:5	0	20					
92532-01-0011-year:5	2	16	1	1			
92532-01-0012-year:5	1	18					1
92532-01-0013-year:5	1	16			1		
92532-01-0014-year:5	0	16					
92532-01-0015-year:5	0	10					
92532-01-0016-year:5	1	16		1			
92532-01-0017-year:5	1	18					1
92532-01-0018-year:5	0	13					
92532-01-0019-year:5	0	18					
92532-01-0020-year:5	0	13					
92532-01-0021-year:5	0	17					
92532-01-0022-year:5	0	15					
92532-01-0023-year:5	0	18					
TOT:	23	10 395	2	3	1	4	

Table C.6. Vegetative Problem Areas

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

BCC			
Feature/Issue	Station # / Range	Probable Cause	Photo #
Invasive/Exotic Populations	Reaches 1 - 6	<i>Ligustrum sinense</i> persisting after construction.	VPA 1
UT1			
Feature/Issue	Station # / Range	Probable Cause	Photo #
Invasive/Exotic Populations	Reaches 1 - 4	<i>Ligustrum sinense</i> persisting after construction.	VPA 2
UT2			
Feature/Issue	Station # / Range	Probable Cause	Photo #
Invasive/Exotic Populations	Reach 1	<i>Ligustrum sinense</i> persisting after construction.	VPA 1

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	Year 5 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							
<i>Acer negundo</i>									1															0	0	0	0	1		
<i>Acer rubrum</i>							1																	1	1	1	1	1		
<i>Betula nigra</i>	1	5	4	4	4		2		3	2		1	5	6		2		3	2	3		3	5	64	65	63	62	55		
<i>Calycanthus floridus</i>												1												3	3	3	3	1		
<i>Carpinus caroliniana</i>	2	2		1			1		3				5	4	1	2	3		5	2			1	32	30	28	28	32		
<i>Carya ovata</i>																1								0	0	0	0	1		
<i>Cephalanthus occidentalis</i>											2	1				1	2		1		1	4		0	0	0	0	12		
<i>Cornus amomum</i>	2	3	1	1	5	4	4	4	1	3	7	3	4	4	1	4	1	2	1		4	2	1	69	69	69	65	62		
<i>Corylus americana</i>								4			2	1												7	7	7	7	7		
<i>Fraxinus pennsylvanica</i>		1	1			4	1	1	1	4	1	2			2	1			2		3	1	1	25	25	25	27	26		
<i>Ilex verticillata</i>																								20	13	13	12	0		
<i>Lindera benzoin</i>	2	1						2	1												1		4	27	17	12	8	11		
<i>Platanus occidentalis</i>	6	6	9	7	2	4	5	4	6	8	5	7			1	4	8		6	2		1		108	99	95	93	91		
<i>Quercus falcata</i>																						1		0	0	0	0	1		
<i>Quercus michauxii</i>				1		3	1		1	1													2	17	15	12	11	9		
<i>Quercus nigra</i>															2	3	1				1		1	13	11	10	8	8		
<i>Quercus phellos</i>			2	2	6	1	1		2						3			6	1	6	2	2	1	40	35	36	36	35		
<i>Quercus rubra</i>		1	1		1	1											1							5	5	5	5	5		
<i>Symphoricarpos obiculatus</i>									1	1	1													4	4	3	3	3		
<i>Ulmus alata</i>															2									0	0	0	2	2		
<i>Viburnum dentatum</i>	2	2	2		1	2		3	2			3	2	2		1						4	1	1	32	28	29	28	28	
Stems/plot	15	21	20	16	19	19	16	18	22	19	18	19	16	16	10	17	19	12	18	13	16	15	17	467	427	411	399	391		
Stems/acre Year 5	600	840	800	640	760	760	640	720	880	760	720	760	640	640	400	680	760	480	720	520	640	600	680	N/A	N/A	N/A	N/A	N/A	680	
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						694	
Stems/acre Year 3	640	960	840	680	760	800	680	720	1040	840	720	760	760	640	280	680	800	520	720	520	680	640	760						715	
Stems/acre Year 2	809	971	931	688	769	809	850	769	971	890	728	809	769	647	283	728	890	566	688	526	769	688	769						753	
Stems/acre Year 1	769	931	931	688	769	850	931	890	1092	971	809	850	809	728	607	769	890	769	769	647	850	728	850						822	
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



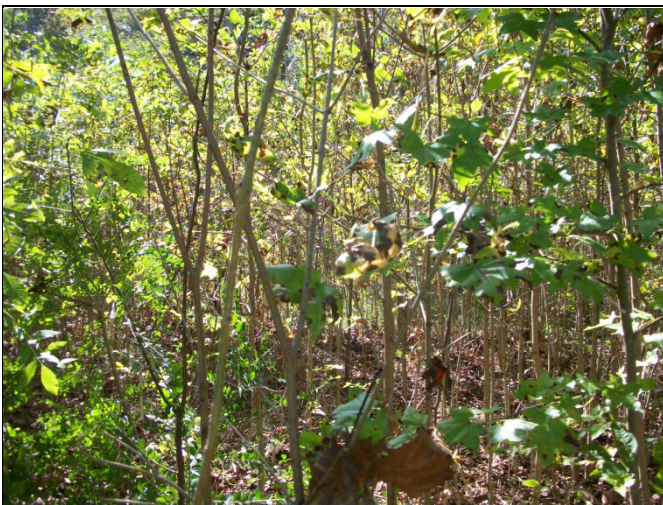
Veg Plot 8



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

Plot 92532-01-0001

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): **5** Date: **11/1/13** - **1/1**

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: **1662971.957**
(dec.deg. or m)

Longitude or UTM-E: **532586.8988**

Coordinate Accuracy (m):

Plot Dimensions: X: **10** Y: **10**

Datum: **NAD83/W**
UTM Zone: **18Q**
X-Axis bearing (deg): **35.208**

Party: **D. Hungenbrett** Role: **L**

R. Ellison Role: **A**

J. Schragel Role: **A**

Notes on plot:

Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Last Year's Data			THIS YEAR'S DATA						
						ddh 1 mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re- sprout	Vigor*	Damage*	Notes
1	Viburnum dentatum	(E)	R			9	119.0	4.0	15	180	7	<input type="checkbox"/>	3		
yr1: 1-1 yr2: 1-1															
2	Platanus occidentalis	(E)	R			28	270.0	15.0	43	200+	26	<input type="checkbox"/>	4		
yr1: 1-2 yr2: 1-2 yr4: >270															
7	Platanus occidentalis	(E)	R			13	101.0	DBH?	12	110	-	<input type="checkbox"/>	3		
yr1: 1-7 yr2: 1-7															
9	Cornus amomum	(E)	R			12	62.0		8	60	-	<input type="checkbox"/>	2	unk	
yr1: 1-9 yr2: 1-9															
10	Carpinus caroliniana	(E)	R			20	251.0	9.0	38	200+	25	<input type="checkbox"/>	4		
yr1: 1-10 yr2: 1-10															
14	Platanus occidentalis	(E)	R			10	62.0		63	200+	32	<input type="checkbox"/>	3		
yr1: 1-14 yr2: 1-14															
15	Betula nigra	(E)	R			24	60.0		10	72	-	<input type="checkbox"/>	2		
yr1: 1-15 yr2: 1-15															
16	Platanus occidentalis	(E)	R			30	270.0	41.0	109	200+	27	<input type="checkbox"/>	4		
yr1: 1-16 yr2: 1-16 yr3: <270 yr4: >270															
17	Lindera benzoin	(E)	R			7	50.0		7	53	-	<input type="checkbox"/>	2		
yr1: 1-17 yr2: 1-17															
18	Cornus amomum	(E)	R			12	44.0		-	-	-	<input type="checkbox"/>	M	unk	
yr1: 1-18 yr2: 1-18															
20	-Lindera benzoin -	(E)	R			4	27.0		7	59	-	<input type="checkbox"/>	2		
yr1: 1-20 yr2: 1-20															
21	Viburnum dentatum	(E)	R			16	136.0	5.0	21	200+	11	<input type="checkbox"/>	4		
yr1: 1-21 yr2: 1-21															
22	Platanus occidentalis	(E)	R			32	270.0	20.0	43	200+	25	<input type="checkbox"/>	4		
yr1: 1-22 yr2: 1-22 yr4: >270															
23	Carpinus caroliniana	(E)	R			4	38.0		8	62	-	<input type="checkbox"/>	2		
yr1: 1-23 yr2: 1-23															
24	Platanus occidentalis	(E)	R			13	175.0	6.0	19	193	8	<input type="checkbox"/>	3		
yr1: 1-24 yr2: 1-24															
25	Cornus amomum	(E)	R			7	48.0		7	48	-	<input type="checkbox"/>	2		
yr1: 1-25 yr2: 1-25															

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Plot (continued): 92532-01-0001

Plot (continued): 92532-01-0001		Last Year's Data			THIS YEAR'S DATA										
ID	Species	map char	source	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes

stems: 16 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMOval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Plot 92532-01-0002

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): Date: - / /

Party: Role:

Notes on plot:

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m)

Datum:

Longitude or UTM-E:

UTM Zone:

Coordinate Accuracy (m):

X-Axis bearing (deg):

Plot Dimensions: X: Y:

Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

ID	Species Name	Map char	Source*	Last Year's Data			THIS YEAR'S DATA								
				X 0.1m	Y 0.1m	ddh 1 mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
26	Platanus occidentalis	(E)	R			26	270.0	14.0	23	200+	35	<input type="checkbox"/>	4		
yr1: 2-1 yr2: 2-1 yr4: <270															
27	Cornus amomum	(E)	R			4	43.0		6	40	-	<input type="checkbox"/>	2		
yr1: 2-2 yr2: 2-2															
28	Viburnum dentatum	(E)	R			12	147.0	6.0	15	173	5	<input type="checkbox"/>	3		
yr1: 2-3 yr2: 2-3															
29	Betula nigra	(E)	R			15	166.0	2.0	21	200+	8	<input type="checkbox"/>	4		
yr1: 2-4 yr2: 2-4															
30	Carpinus caroliniana	(E)	R			15	38.0	2.0	-	-	-	<input type="checkbox"/>	0	-	dead
yr1: 2-5 yr2: 2-5															
31	Platanus occidentalis	(E)	R			20	193.0	5.0	25	200+	8	<input type="checkbox"/>	4		
yr1: 2-6 yr2: 2-6															
32	Carpinus caroliniana	(E)	R			10	159.0	2.0	15	200+	25	<input type="checkbox"/>	4		
yr1: 2-7 yr2: 2-7															
33	Betula nigra	(E)	R			11	117.0	DBH?	11	117	-	<input type="checkbox"/>	2		
yr1: 2-8 yr2: 2-8 (New Growth)															
34	Betula nigra	(E)	R			6	34.0		6	48	-	<input type="checkbox"/>	2		
yr1: 2-9 yr2: 2-9															
35	Platanus occidentalis	(E)	R			31	270.0	23.0	44	200+	26	<input type="checkbox"/>	4		
yr1: 2-10 yr2: 2-10 yr4: <270															
36	Platanus occidentalis	(E)	R			27	233.0	12.0	34	200+	20	<input type="checkbox"/>	4		
yr1: 2-11 yr2: 2-11															
37	Cornus amomum	(E)	R			10	91.0		10	93	-	<input type="checkbox"/>	2		
yr1: 2-12 yr2: 2-12 (New Growth)															
38	Quercus rubra	(E)	R			12	151.0	4.0	17	162	5	<input type="checkbox"/>	3		
yr1: 2-13 yr2: 2-13															
39	Betula nigra	(E)	R			6	71.0		7	122	-	<input type="checkbox"/>	2		
yr1: 2-14 yr2: 2-14															
40	Platanus occidentalis	(E)	R			26	270.0	16.0	40	200+	21	<input type="checkbox"/>	4		
yr1: 2-15 yr2: 2-15 yr4: <270															
41	Fraxinus pennsylvanica	(E)	R			31	270.0	19.0	35	200+	22	<input type="checkbox"/>	4		
yr1: 2-16 yr2: 2-16 yr3: <270 yr4: <270															
42	Lindera benzoin	(E)	R			6	103.0	DBH?	8	132	-	<input type="checkbox"/>	2		
yr1: 2-17 yr2: 2-17															
44	Carpinus caroliniana	(E)	R			12	154.0	4.0	21	200+	10	<input type="checkbox"/>	4		
yr1: 2-19 yr2: 2-19															

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRricane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Plot (continued): 92532-01-0002

ID	Species	map char	source	X (m)	Y (m)	Last Year's Data			THIS YEAR'S DATA						
						ddh (mm)	Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes
45	Cornus amomum	(E)	R			10	97.0		10	100	-		2		
yr1: 2-20 yr2: 2-20															
46	Platanus occidentalis	(E)	R			10	270.0	83.0	140	200+	92		4		
yr1: 2-21 yr2: 2-21 yr3: <270 yr4: <270															
47	Betula nigra	(E)	R			19	270.0	12.0	23	200+	14		3		
yr1: 2-22 yr2: 2-22 yr4: <270															
48	Viburnum dentatum	(E)	R			20	230.0	12.0	20	200+	12		4		
yr1: 2-23 yr2: 2-23															
49	Cornus amomum	(E)	R			6	42.0						0		dead
yr1: 2-24 yr2: 2-24 yr4: Stem broken															

stems: 23

New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMOval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Plot 92532-01-0003

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): **5** Date: **11/1/13** - **1/1/13**

Party: **D. Hunyecz** Role: **K**

Notes on plot:

Taxonomic Standard:

R. Ellison Role: **A**

Taxonomic Standard DATE:

D. Schragel Role: **A**

Latitude or UTM-N: **1662939.109**

Datum: **NAD83/W**

Longitude or UTM-E: **532159.1657**

UTM Zone: **18Q**

Coordinate Accuracy (m): **10**

X-Axis bearing (deg): **35.207**

Plot Dimensions: X: **10** Y: **10** Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

ID	Species Name	Map char	Source*	Last Year's Data			THIS YEAR'S DATA								
				X 0.1m	Y 0.1m	ddh 1 mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
50	Platanus occidentalis	(E)	R			18	143.0	6.0	30	200+	19	<input type="checkbox"/>	4		
yr1: 3-1 yr2: 3-1															
51	Viburnum dentatum	(E)	R			19	185.0	6.0	16	200+	12	<input type="checkbox"/>	4		
yr1: 3-2 yr2: 3-2															
53	Betula nigra	(E)	R			44	270.0	21.0	95	200+	37	<input type="checkbox"/>	4		
yr1: 3-4 yr2: 3-4 yr4: >270															
54	Cornus amomum	(E)	R			11	50.0		10	83	-	<input type="checkbox"/>	2		
yr1: 3-5 yr2: 3-5															
55	Platanus occidentalis	(E)	R			21	225.0	13.0	32	200+	17	<input type="checkbox"/>	4		
yr1: 3-6 yr2: 3-6															
56	Platanus occidentalis	(E)	R			51	270.0	32.0	70	200+	45	<input type="checkbox"/>	4		
yr1: 3-7 yr2: 3-7 yr3: <270 yr4: >270															
57	Quercus rubra	(E)	R			9	65.0		13	80	-	<input type="checkbox"/>	2		
yr1: 3-8 yr2: 3-8															
58	Betula nigra	(E)	R			15	141.0	3.0	15	123	-	<input type="checkbox"/>	3		
yr1: 3-9 yr2: 3-9															
59	Platanus occidentalis	(E)	R			42	270.0	24.5	55	200+	40	<input type="checkbox"/>	4		
yr1: 3-10 yr2: 3-10 yr3: <270 yr4: >270															
60	Viburnum dentatum	(E)	R			27	198.0	8.0	20	200+	12	<input type="checkbox"/>	4		
yr1: 3-11 yr2: 3-11															
61	Platanus occidentalis	(E)	R			21	209.0	11.0	30	200+	17	<input type="checkbox"/>	4		
yr1: 3-12 yr2: 3-12															
62	Platanus occidentalis	(E)	R			21	245.0	13.0	30	200+	18	<input type="checkbox"/>	4		
yr1: 3-13 yr2: 3-13															
63	Quercus phellos	(E)	R			7	75.0		9	108	-	<input type="checkbox"/>	2		
yr1: 3-14 yr2: 3-14															
65	Platanus occidentalis	(E)	R			9	87.0		10	107	-	<input type="checkbox"/>	3		
yr1: 3-16 yr2: 3-16															
66	Betula nigra	(E)	R			17	160.0	7.0	21	200+	6	<input type="checkbox"/>	3		
yr1: 3-17 yr2: 3-17															
67	Platanus occidentalis	(E)	R			42	270.0	25.0	55	200	37	<input type="checkbox"/>	4		
yr1: 3-18 yr2: 3-18 yr3: <270 yr4: >270															
68	Platanus occidentalis	(E)	R			29	257.0	14.0	40	200+	20	<input type="checkbox"/>	4		
yr1: 3-19 yr2: 3-19															
69	Betula nigra	(E)	R			33	270.0	13.0	35	200+	20	<input type="checkbox"/>	4		
yr1: 3-20 yr2: 3-20 yr4: >270															

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

p. 5

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMOVAL, CUT, MOWING, BEAVER, DEER, RODENTS, INSECTS, GAME, LIVESTOCK, Other/Unknown ANIMAL, Human TRAMPLED, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICANE, DISEASED, VINE Strangulation, UNKNOW, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Plot (continued): 92532-01-0003

ID	Species	map char	source	X (m)	Y (m)	Last Year's Data			THIS YEAR'S DATA						
						ddh (mm)	Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes
72	Fraxinus pennsylvanica	(B)	R			19	220.0	8.0	22	200+	10	<input type="checkbox"/>	3		
yr1: 3-23 yr2: 3-23															
73	Quercus phellos	(B)	R			9	131.0	5.0	10	152	3	<input type="checkbox"/>	3		
yr1: 3-24 yr2: 3-24															

stems: 20 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	Vigor*	Damage*	Notes

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 6
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.
 *DAMAGE: REMOval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRricane, DISeased, VINE Strangulation, UNKNown, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.
 Printed in the CYS-EEP Entry Tool ver. 2.2.7

Plot 92532-01-0004

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): Date: - / /

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: Datum:

Longitude or UTM-E: UTM Zone:

Coordinate Accuracy (m): X-Axis bearing (deg):

Party: Role:
 Role:
 Role:

Notes on plot:

Plot Dimensions: X: Y: Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

ID	Species Name	Map char	Source*	Last Year's Data			THIS YEAR'S DATA									
				X 0.1m	Y 0.1m	dbh 1 mm	Height 1cm*	DBH 1 cm	dbh 1mm	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes	
74	Quercus phellos	(E)	R			24	260.0	12.0	30	200+	20	<input type="checkbox"/>	4			
yr1: 4-1 yr2: 4-1																
75	Quercus phellos	(E)	R			37	270.0	28.0	42	200+	40	<input type="checkbox"/>	3			
yr1: 4-2 yr2: 4-2 yr3: <270 yr4: >270																
76	Quercus michauxii	(E)	R			35	270.0	18.0	41	200+	27	<input type="checkbox"/>	3			
yr1: 4-3 yr2: 4-3 yr4: >270																
77	Platanus occidentalis	(E)	R			25	218.0	14.0	37	200+	32	<input type="checkbox"/>	4			
yr1: 4-4 yr2: 4-4																
78	Betula nigra	(E)	R			39	270.0	34.0	41	200+	45	<input type="checkbox"/>	4			
yr1: 4-5 yr2: 4-5 yr3: <270 yr4: >270																
79	Platanus occidentalis	(E)	R			94	270.0	68.0	111	200+	88	<input type="checkbox"/>	4			
yr1: 4-6 yr2: 4-6 yr3: <270 yr4: >270																
80	Platanus occidentalis	(E)	R			23	263.0	13.5	37	200+	30	<input type="checkbox"/>	4			
yr1: 4-7 yr2: 4-7																
81	Platanus occidentalis	(E)	R			52	270.0	30.0	75	200+	42	<input type="checkbox"/>	3			
yr1: 4-8 yr2: 4-8 yr3: <270 yr4: >270																
82	Betula nigra	(E)	R			39	270.0	21.0	45	200+	21	<input type="checkbox"/>	4			
yr1: 4-10 yr2: 4-10 yr4: >270																
83	Carpinus caroliniana	(E)	R			12	175.0	6.0	20	200+	14	<input type="checkbox"/>	4			
yr1: 4-11 yr2: 4-11																
85	Cornus amomum	(E)	R			15	150.0	4.0	27	187	10	<input type="checkbox"/>	3			
yr1: 4-13 yr2: 4-13																
87	Platanus occidentalis	(E)	R			92	270.0	62.0	115	200+	90	<input type="checkbox"/>	4			
yr1: 4-15 yr2: 4-15 yr3: <270 yr4: >270																
88	Platanus occidentalis	(E)	R			16	228.0	8.0	32	200+	16	<input type="checkbox"/>	3			
yr1: 4-16 yr2: 4-16																
89	Betula nigra	(E)	R			45	270.0	28.0	61	200+	41	<input type="checkbox"/>	3			
yr1: 4-17 yr2: 4-17 yr3: <270 yr4: >270																
90	Platanus occidentalis	(E)	R			29	270.0	17.0	35	200+	30	<input type="checkbox"/>	4			
yr1: 4-18 yr2: 4-18 yr4: >270																
91	Betula nigra	(E)	R			26	247.0	16.0	38	200+	28	<input type="checkbox"/>	3			
yr1: 4-19 yr2: 4-19																

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 7
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing. *DAMAGE: REMOVAL, CUT, MOWING, BEAVER, DEER, RODENTS, INSECTS, GAME, LIVESTOCK, Other/Unknown
 ANIMAL, Human TRAMPLED, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICANE, DISSEASD, VINE Strangulation, UNKNOWn, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m. Printed in the CVS-EEP Entry Tool ver. 2.2.7

Plot (continued): 92532-01-0004

Plot (continued): 92532-01-0004				Last Year's Data			THIS YEAR'S DATA								
ID	Species	map char	source	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes

stems: 16 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair,

*DAMAGE: REMOval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown

1=unlikely to survive year, 0=dead,

ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRricane, DISeased, VINE Strangulation, UNKNown, specify other.

M=missing.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

109261 - Big Cedar

Plot 92532-01-0005

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): Date: - /

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: Datum: (dec.deg. or m)

Longitude or UTM-E: UTM Zone:

Coordinate Accuracy (m): X-Axis bearing (deg):

Party: Role:

Notes on plot:

Plot Dimensions: X: Y: Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Last Year's Data			THIS YEAR'S DATA						
						ddh 1 mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
93	Cornus amomum	(E)	R			26	270.0	13.0	✓	250	1.7+		4		
yr1: 5-1 yr2: 5-1 yr4: >270															
94	Quercus phellos	(E)	R			10	117.0	DBH?	✓	13+	176.8	.6+		2.5	
yr1: 5-2 yr2: 5-2 (Broken Stem)															
96	Platanus occidentalis	(E)	R			52	270.0	36.0	✓	7400	6.2+		4		
yr1: 5-4 yr2: 5-4 yr3: <270 yr4: >270															
97	Cornus amomum	(E)	R			11	115.0	DBH?	✓	9.4	118.9	.4+		2.5	
yr1: 5-5 yr2: 5-5															
98	Betula nigra	(E)	R			9	118.0	DBH?	✓	13+	158.5	1.6+		4	
yr1: 5-6 yr2: 5-6 (Broken Stem & New Growth)															
99	Quercus phellos	(E)	R			55	270.0	31.5	✓	7400	4.7+		4		
yr1: 5-7 yr2: 5-7 yr4: >270															
100	Viburnum dentatum	(E)	R			19	173.0	7.5	✓	2250	1.3+		4		
yr1: 5-8 yr2: 5-8															
101	Cornus amomum	(E)	R			15	118.0	DBH?	✓	17+	135.9	.2+		4	
yr1: 5-9 yr2: 5-9															
102	Cornus amomum Quercus phellos	(E)	R			32	270.0	22.0	✓	7400	2.6+		4		mislabeled
yr1: 5-10 yr2: 5-10 yr4: >270															
104	Quercus rubra	(E)	R			12	262.0	17.0	✓	2250	1.7		4		
yr1: 5-11 yr2: 5-11															
105	Betula nigra	(E)	R			48	270.0	31.0	✓	7250	4.7+		4		
yr1: 5-12 yr2: 5-12 yr3: <270 yr4: >270															
107	Quercus phellos	(E)	R			22	249.0	11.0	✓	7250	1.7+		4		
yr1: 5-14 yr2: 5-14 (New Growth)															
108	Platanus occidentalis	(E)	R			49	270.0	29.0	✓	7400	4.4+		4		
yr1: 5-15 yr2: 5-15 (New Growth) yr3: <270 yr4: >270															
109	Betula nigra	(E)	R			61	270.0	41.0	✓	7400	6.2+		4		
yr1: 5-16 yr2: 5-16 yr3: <270 yr4: >270															
110	Quercus phellos	(E)	R			30	270.0	18.0	✓	7250	2.8+		4		
yr1: 5-17 yr2: 5-17 (Renamed from Quercus nigra to Quercus phellos) yr4: >270															
111	Cornus amomum	(E)	R			12	132.0	DBH?	✓	9+	106.7	.4+		2.5	present yr 1 with at collar
yr1: 5-18 yr2: 5-18															
112	Cornus amomum	(E)	R			10	80.0		✓	8+	105.4			3	some dead stems
yr1: 5-19 yr2: 5-19 (Broken Stem & New Growth)															
113	Betula nigra	(E)	R			67	270.0	44.0	✓	7400	6.3+		4		
yr1: 5-20 yr2: 5-20 yr3: <270 yr4: >270															

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 9

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing

*DAMAGE: REMOval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMPled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.

Plot (continued): 92532-01-0005

Last Year's Data

THIS YEAR'S DATA

ID	Species	map char	source	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	THIS YEAR'S DATA				
									ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*
114	Quercus phellos	(E)	R			25	270.0	15.0	750	26		4	

yr1: 5-21 | yr2: 5-21 | yr4: >270

stems: 19

New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

Fraxinus pennsylvanica

Height
 750 250
 750 50-100
 750 > 100

Liquidambar styraciflua

750 250
 750 50-100
 750 > 100

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

109261 - Big Cedar

Plot 92532-01-0006

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): Date: - /

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: Datum:

(dec.deg. or m)

Longitude or UTM-E: UTM Zone:

Coordinate Accuracy (m): X-Axis bearing (deg):

Plot Dimensions: X: Y: Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

Party:

Role:

Notes on plot:

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Last Year's Data			THIS YEAR'S DATA						
						ddh 1 mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
116	Cornus amomum	Ⓔ	R			20	225.0	8.0	✓	2250	14+	□	3.5		
yr1: 6-1 yr2: 6-1															
117	Viburnum dentatum	Ⓔ	R			12	230.0	8.0	✓	>250	9+	□	4		
yr1: 6-2 yr2: 6-2															
118	Cornus amomum	Ⓔ	R			10	17.0		✓	12+	121.9	✓	4		
yr1: 6-3 yr2: 6-3															
119	Viburnum dentatum	Ⓔ	R			14	181.0	7.0	✓	>250	1.1	□	4		
yr1: 6-4 yr2: 6-4															
120	Platanus occidentalis	Ⓔ	R			46	270.0	29.5	✓	7400	54+	□	4		
yr1: 6-5 yr2: 6-5 yr3: <270 yr4: >270															
121	Quercus phellos	Ⓔ	R			33	270.0	20.0	✓	7250	24+	□	4		
yr1: 6-6 yr2: 6-6 yr3: <270 yr4: >270															
123	Platanus occidentalis	Ⓔ	R			71	270.0	55.0	✓	>400	10.2	□	4		
yr1: 6-8 yr2: 6-8 yr3: <270 yr4: >270															
124	Fraxinus pennsylvanica	Ⓔ	R			32	270.0	23.5	✓	7400	29+	□	4		
yr1: 6-9 yr2: 6-9 yr4: >270															
125	Quercus michauxii	Ⓔ	R			20	262.0	12.5	✓	7250	13+	□	4		
yr1: 6-10 yr2: 6-10															
126	Platanus occidentalis	Ⓔ	R			35	270.0	25.0	✓	7250	39+	□	4		
yr1: 6-11 yr2: 6-11 yr3: <270 yr4: >270															
127	Cornus amomum	Ⓔ	R			15	260.0	7.0	✓	7250	9+	□	3.5		
yr1: 6-12 yr2: 6-12															
129	Fraxinus pennsylvanica	Ⓔ	R			37	270.0	24.0	✓	>400	3.3+	□	4		
yr1: 6-14 yr2: 6-14 yr4: >270															
130	Quercus michauxii	Ⓔ	R			18	270.0	15.0	✓	7250	1.7+	□	4		
yr1: 6-15 yr2: 6-15 yr4: >270															
131	Quercus rubra	Ⓔ	R			26	261.0	12.5	✓	7250	21+	□	4		
yr1: 6-16 yr2: 6-16															
133	Platanus occidentalis	Ⓔ	R			71	270.0	51.0	✓	>400	8.7+	□	4		
yr1: 6-18 yr2: 6-18 yr3: <270 yr4: >270															
134	Cornus amomum	Ⓔ	R			Missing			✓			□			Missing
yr1: 6-19 yr2: 6-19															
136	Cornus amomum	Ⓔ	R			20	219.0	10.0	✓	7250	13+	□	4		
yr1: 6-21 yr2: 6-21															
137	Fraxinus pennsylvanica	Ⓔ	R			42	270.0	19.0	✓	7250	3.8	□	4		
yr1: 6-22 yr2: 6-22 yr3: <270 yr4: >270															

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMOval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Plot (continued): 92532-01-0006				Last Year's Data			THIS YEAR'S DATA								
ID	Species	map char	source	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes
138	Quercus michauxii	(E)	R			19	150.0	8.0	/	7250	.91	<input type="checkbox"/>	4		
yr1: 6-23 yr2: 6-23															
139	Fraxinus pennsylvanica	(E)	R			19	195.0	11.0	/	7250	1.17	<input type="checkbox"/>	4		
yr1: 6-24 yr2: 6-24															

stems: 20 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

~~Fraxinus pennsylvanica~~ H Height >50 >100

~~Liquidambar styraciflua~~ >50 >100

~~Kindera benzoin~~ 1 >100

~~Cottonwood~~ 1 >100
1 50-100

~~Prunus serotina~~ 1 >100

~~Xelmus alata~~ 10 >100

Multiflora rose

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 12
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing. *DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRricane, DISeased, VINE Strangulation, UNKNown, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m. Printed in the CVS-EEP Entry Tool ver. 2.2.7

109261 - Big Cedar

Plot 92532-01-0007

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): Date: - /

Party:

Role:

Notes on plot:

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: Datum:

Longitude or UTM-E: UTM Zone:

Coordinate Accuracy (m):

X-Axis bearing (deg):

Plot Dimensions: X: Y:

Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Last Year's Data			THIS YEAR'S DATA						
						ddh 1 mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re- sprout	Vigor*	Damage*	Notes
141	Betula nigra	(E)	R			41	270.0	27.5	/	>400	4.5+	<input type="checkbox"/>	4		
yr1: 7-1 yr2: 7-1 yr3: <270 yr4: >270															
142	Fraxinus pennsylvanica	(E)	R			85	270.0	40.5	/	>400	5.8+	<input type="checkbox"/>	4		
yr1: 7-2 yr2: 7-2 yr3: <270 yr4: >270															
143	Carpinus caroliniana	(E)	R			39	270.0	30.0	/	>400	4.1+	<input type="checkbox"/>	4		
yr1: 7-3 yr2: 7-3 yr3: <270 yr4: >270															
145	Platanus occidentalis	(E)	R			45	270.0	29.5	/	>400	6.1+	<input type="checkbox"/>	4		
yr1: 7-5 yr2: 7-5 yr3: <270 yr4: >270															
146	Cornus amomum	(E)	R			27	270.0	18.0	/	7250	1.8	<input type="checkbox"/>	4		
yr1: 7-6 yr2: 7-6 yr3: <270 yr4: >270															
148	Cornus amomum	(E)	R			25	270.0	19.0	/	>250	2.3+	<input type="checkbox"/>	4		
yr1: 7-8 yr2: 7-8 yr3: <270 yr4: >270															
149	Acer rubrum	(E)	R			51	270.0	37.0	/	>400	4.8+	<input type="checkbox"/>	4		
yr1: 7-9 yr2: 7-9 yr3: <270 yr4: >270															
150	Quercus phellos	(E)	R			21	270.0	12.0	/	>250	1.2+	<input type="checkbox"/>	4		
yr1: 7-10 yr2: 7-10 yr4: >270															
151	Quercus michauxii	(E)	R			18	270.0	15.0	/	>400	1.7+	<input type="checkbox"/>	4		
yr1: 7-11 yr2: 7-11 yr3: <270 yr4: >270															
153	Cornus amomum	(E)	R			26	270.0	18.0	/	>250	2.3+	<input type="checkbox"/>	4		
yr1: 7-13 yr2: 7-13 yr3: <270 yr4: >270															
155	Platanus occidentalis	(E)	R			115	270.0	78.0	/	>400	8.4	<input type="checkbox"/>	4		
yr1: 7-15 yr2: 7-15 yr3: <270 yr4: >270															
156	Platanus occidentalis	(E)	R			120	270.0	90.0	/	>400	12.7	<input type="checkbox"/>	4		
yr1: 7-16 yr2: 7-16 yr3: <270 yr4: >270															
160	Platanus occidentalis	(E)	R			95	270.0	64.0	/	>400	6.4	<input type="checkbox"/>	4		
yr1: 7-20 yr2: 7-20 yr3: <270 yr4: >270															
161	Betula nigra	(E)	R			84	270.0	64.0	/	>400	10.4	<input type="checkbox"/>	4		
yr1: 7-21 yr2: 7-21 yr3: <270 yr4: >270															
164	Platanus occidentalis	(E)	R			105	270.0	65.0	/	>400	8.6	<input type="checkbox"/>	4		
yr1: 7-24 yr2: 7-24 yr3: <270 yr4: >270															
166	Cornus amomum	(E)	R			23	270.0	15.0	/	7250	1.9+	<input type="checkbox"/>	4		
yr1: 7-26 yr2: 7-26 yr4: >270															

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRricane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Plot (continued): 92532-01-0007

Last Year's Data

THIS YEAR'S DATA

ID	Species	map source char	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes
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stems: 16 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

Fraxinus pennsylvanica # Height
 > 25 72.5m
 > 20 7100
 > 50 50-100

Liquidambar styraciflua
 5 74m
 10 72.5m
 5 50-100

Acer rubra
 2 74m
 2 7100

Ulmus alata
 1 50-100
 1 750

Carpinus caroliniana 1 7100

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 14

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMOval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMPled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

109261 - Big Cedar

Plot 92532-01-0008

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): Date: - / Party: Role: Notes on plot:

Taxonomic Standard: Taxonomic Standard DATE:

Latitude or UTM-N: Datum: Longitude or UTM-E: UTM Zone: Coordinate Accuracy (m): X-Axis bearing (deg):

Plot Dimensions: X: Y: Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Last Year's Data			THIS YEAR'S DATA							
						ddh 1 mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re- sprout	Vigor*	Damage*	Notes	
167	Corylus americana	Ⓔ	R			11	80.0		✓	9+	100.6	2		3	bug	
yr1: 8-1 yr2: 8-1																
169	Fraxinus pennsylvanica	Ⓔ	R			27	220.0	9.0	✓	>250	11+			4		mislabeled
yr1: 8-3 yr2: 8-3 (Misnamed as Viburnum dentatum)																
170	Platanus occidentalis	Ⓔ	R			75	270.0	50.0	✓	>400	8.8+			4		
yr1: 8-4 yr2: 8-4 yr3: <270 yr4: >270																
172	Cornus amomum	Ⓔ	R			21	270.0	15.0	✓	7250	2			4		
yr1: 8-6 yr2: 8-6 yr4: >270																
173	Lindera benzoin	Ⓔ	R			9	70.0		✓	10+	138.4	2+		4		
yr1: 8-7 yr2: 8-7																
175	Platanus occidentalis	Ⓔ	R				270.0	DBH!!	✓	7400	7.3			4		
yr1: 8-9 yr2: 8-9 yr3: <270 yr4: >270																
176	Viburnum dentatum	Ⓔ	R			18	270.0	12.0	✓	7250	1.7			4		
yr1: 8-10 yr2: 8-10 yr4: >270																
177	Platanus occidentalis	Ⓔ	R			57	270.0	41.0	✓	>400	6.5			4		
yr1: 8-11 yr2: 8-11 yr3: <270 yr4: >270																
179	Corylus americana	Ⓔ	R			17	80.0	6.0	✓	7250	1.3			4		
yr1: 8-13 yr2: 8-13																
181	Corylus americana	Ⓔ	R		?	65	95.0		✓	7+	154.9	5+		3.5		mis-measured ddh last yr
yr1: 8-15 yr2: 8-15																
182	Viburnum dentatum	Ⓔ	R			17	225.0	11.0	✓	7250	1.1+			4		
yr1: 8-16 yr2: 8-16																
183	Cornus amomum	Ⓔ	R			25	270.0	14.0	✓	7250	1.6+			3.5		
yr1: 8-17 yr2: 8-17 yr4: >270																
184	Fraxinus pennsylvanica	Ⓔ	R			8	138.0	4.0	✓	7250	1.9+			4		
yr1: 8-18 yr2: 8-18																
186	Corylus americana	Ⓔ	R			16	225.0	9.5	✓	7250	1.0+			4		
yr1: 8-20 yr2: 8-20																
187	Calycanthus floridus	Ⓔ	R			4	45.0		✓							Missing
yr1: 8-21 yr2: 8-21																
188	Cornus amomum	Ⓔ	R			30	270.0	15.0	✓	>250	20+			4		
yr1: 8-22 yr2: 8-22 yr3: <270 yr4: >270																
189	Cornus amomum	Ⓔ	R			25	250.0	11.0	✓	7250	1.5			4		
yr1: 8-23 yr2: 8-23																
190	Platanus occidentalis	Ⓔ	R			56	270.0	38.0	✓	7400	6.6			4		
yr1: 8-24 yr2: 8-24 yr3: <270 yr4: >270																

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 15
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing
 *DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.
 Printed in the CVS-EBP Entry Tool ver. 2.2.7

Plot (continued): 92532-01-0008

Plot (continued): 92532-01-0008				Last Year's Data			THIS YEAR'S DATA							
ID	Species	map source char	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes

stems: 18 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes
19 LB				/	>250	14+	4		missed in yr 21?

Fraxinus pennsylvanica

#	Height
> 50	> 100
> 25	50-100

Alnus alata

3	> 100
1	50-100
2	< 50

Liquidambar styraciflua

4	> 100
2	< 50
1	50-100

~~*Lindera benzoin*~~

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 16
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.
 *DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m. Printed in the CVS-EEP Entry Tool ver. 2.2.7

109261 - Big Cedar

Plot 92532-01-0009

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): Date: - / Party: Role: Notes on plot:

Taxonomic Standard: Taxonomic Standard DATE:

Latitude or UTM-N: Datum: Longitude or UTM-E: UTM Zone: Coordinate Accuracy (m): X-Axis bearing (deg):

Plot Dimensions: X: Y: Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Last Year's Data			THIS YEAR'S DATA						
						ddh 1 mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
193	Betula nigra	(E)	R			65	270.0	51.0	✓	>400	5.4+		4		
yr1: 9-1 yr2: 9-1 yr3: <270 yr4: >270															
194	Platanus occidentalis	(E)	R			91	270.0	70.0	✓	>400	8.4		4		
yr1: 9-2 yr2: 9-2 yr3: <270 yr4: >270															
195	Quercus phellos	(E)	R			20	270.0	12.0	✓	>250	1.3+		4		
yr1: 9-3 yr2: 9-3 yr3: <270 yr4: >270															
196	Betula nigra	(E)	R			99	270.0	72.0	✓	>400	8.6		4		
yr1: 9-4 yr2: 9-4 yr3: <270 yr4: >270															
197	Betula nigra	(E)	R			78	270.0	65.0	✓	>400	8.5+		4		
yr1: 9-5 yr2: 9-5 yr3: <270 yr4: >270															
198	Platanus occidentalis	(E)	R			114	270.0	89.0	✓	>400	11.7		4+		
yr1: 9-6 yr2: 9-6 yr3: <270 yr4: >270															
199	Platanus occidentalis	(E)	R			99	270.0	81.0	✓	>400	10.9		4		
yr1: 9-7 yr2: 9-7 yr3: <270 yr4: >270															
200	Cornus amomum	(E)	R			17	270.0	10.0	✓	>250	1.0+		2		Some dead stems
yr1: 9-8 yr2: 9-8 yr3: <270 yr4: >270															
201	Platanus occidentalis	(E)	R			100	270.0	71.0	✓	>400	7.6		4		
yr1: 9-9 yr2: 9-9 yr3: <270 yr4: >270															
202	Carpinus caroliniana	(E)	R			28	270.0	22.0	✓	>250	2.6+		4		
yr1: 9-10 yr2: 9-10 yr3: <270 yr4: >270															
203	Quercus phellos	(E)	R			19	270.0	13.0	✓				0		Dead
yr1: 9-11 yr2: 9-11 yr3: <270 yr4: >270															
204	Quercus phellos	(E)	R			26	270.0	20.0	✓	>400	1.9+		4		
yr1: 9-12 yr2: 9-12 yr3: <270 yr4: >270															
205	Platanus occidentalis	(E)	R			132	270.0	89.0	✓	>400	12.7		4		
yr1: 9-13 yr2: 9-13 yr3: <270 yr4: >270															
206	Symphoricarpos orbiculatus	(E)	R			16	150.0	1.5	✓	7+	99.1		✓	1	resprout
yr1: 9-14 yr2: 9-14															
207	Viburnum dentatum	(E)	R			13	270.0	7.0	✓				0		dead
yr1: 9-15 yr2: 9-15 yr4: >270															
208	Viburnum dentatum	(E)	R			17	198.0	6.0	✓	1.6+	201.2	1.0		2.5	
yr1: 9-16 yr2: 9-16															
209	Betula nigra <i>Carpinus caroliniana</i>	(E)	R			36	270.0	26.0	✓	>400	2.9		4		mislabel
yr1: 9-17 yr2: 9-17 yr3: <270 yr4: >270															
210	Fraxinus pennsylvanica	(E)	R			51	270.0	35.0	✓	>400	3.2+		4		
yr1: 9-18 yr2: 9-18 yr3: <270 yr4: >270															

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 17
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing
 *DAMAGE: REMOval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNOwn, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m. Printed in the CVS-EEP Entry Tool ver. 2.2.7

Plot (continued): 92532-01-0009						Last Year's Data			THIS YEAR'S DATA						
ID	Species	map char	source	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes
211	Carpinus caroliniana	(E)	R			35	270.0	32.0	✓	>400	3.1+	<input type="checkbox"/>	4		
yr1: 9-19 yr2: 9-19 yr3: <270 yr4: >270															
212	Quercus michauxii	(E)	R			34	270.0	21.0	✓			<input type="checkbox"/>	0		Dead
yr1: 9-20 yr2: 9-20 (New Growth) yr4: >270															
213	Quercus michauxii	(E)	R			21	270.0	12.0	✓	>250	1.4+	<input type="checkbox"/>	3.5		
yr1: 9-21 yr2: 9-21 yr4: >270															
214	Lindera benzoin	(E)	R			13	100.0		✓	9.1	109.7	<input checked="" type="checkbox"/>	4		
yr1: 9-22 yr2: 9-22															
215	Betula nigra Box Elder Acer negundo	(E)	R			48	270.0	36.0	✓	>400	4.0+	<input type="checkbox"/>	4		
yr1: 9-23 yr2: 9-23 yr3: <270 yr4: >270															
216	Platanus occidentalis	(E)	R			110	270.0	81.0	✓	>400	10.9	<input type="checkbox"/>	4		
yr1: 9-24 yr2: 9-24 yr3: <270 yr4: >270															
218	Viburnum dentatum	(E)	R			26	270.0	12.0	✓	>250	2.0+	<input type="checkbox"/>	4		
yr1: 9-26 yr2: 9-26 yr3: <270 yr4: >270															
219	Quercus phellos	(E)	R			10	150.0	4.0	✓			<input type="checkbox"/>	0		Dead
yr1: 9-27 yr2: 9-27															

stems: 26 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

✓ Fraxinus pennsylvanica # 750 Height >200
3 150

✓ Acer negundo 15 # 200

✓ Alnus alata 1 150
1 50-100

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 18

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMPled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

109261 - Big Cedar

Plot 92532-01-0010

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): Date: - /

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: Datum:

Longitude or UTM-E: UTM Zone:

Coordinate Accuracy (m):

Plot Dimensions: X: Y: Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

Party:

Role:

Notes on plot:

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Last Year's Data			THIS YEAR'S DATA						
						dbh 1 mm	Height 1 cm*	DBH 1 cm	dbh 1mm	Height 1 cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
220	Cornus amomum yr1: 10-1 yr2: 10-1	Ⓔ	R			11	103.0	DBH?	11	134.6	5+	<input type="checkbox"/>	4		
221	Betula nigra yr1: 10-2 yr2: 10-2 yr3: <270 yr4: >270	Ⓔ	R			109	270.0	87.0	/	>400	12.7	<input type="checkbox"/>	4		
222	Cornus amomum yr1: 10-3 yr2: 10-3	Ⓔ	R			10	85.0		10+	109	/	<input type="checkbox"/>	3.5		
223	Platanus occidentalis yr1: 10-4 yr2: 10-4 yr3: <270 yr4: >270	Ⓔ	R			70	270.0	46.0	/	>400	7.7+	<input type="checkbox"/>	4		
224	Platanus occidentalis yr1: 10-5 yr2: 10-5	Ⓔ	R			20	218.0	10.0	/			<input type="checkbox"/>			Dead Missing?
225	Betula nigra yr1: 10-6 yr2: 10-6 yr3: <270 yr4: >270	Ⓔ	R			95	270.0	62.0	/	>400	8.4+	<input type="checkbox"/>	4		
226	Fraxinus pennsylvanica yr1: 10-7 yr2: 10-7 yr3: <270 yr4: >270	Ⓔ	R			73	270.0	39.0	/	7250	4.3+	<input type="checkbox"/>	4		
228	Quercus michauxii yr1: 10-9 yr2: 10-9 (New Growth)	Ⓔ	R			6	110.0	DBH?	6	121.9	2+	<input type="checkbox"/>	4		
229	Platanus occidentalis yr1: 10-10 yr2: 10-10 yr3: <270 yr4: >270	Ⓔ	R			96	270.0	83.0	/	>400	.5	<input type="checkbox"/>	4		
230	Cornus amomum yr1: 10-11 yr2: 10-11 yr4: >270	Ⓔ	R			21	270.0	15.0	/	7250	2.4	<input type="checkbox"/>	4		
232	Fraxinus pennsylvanica yr1: 10-13 yr2: 10-13	Ⓔ	R			18	205.0	DBH!!	9+	135.9	.3	<input checked="" type="checkbox"/>	3.5		new growth
233	Platanus occidentalis yr1: 10-14 yr2: 10-14 yr3: <270 yr4: >270	Ⓔ	R			110	270.0	80.0	/	>400	4.2	<input type="checkbox"/>	4		
235	Platanus occidentalis yr1: 10-16 yr2: 10-16	Ⓔ	R			8	113.0	DBH?	8+	118.9	/	<input type="checkbox"/>	3		
236	Fraxinus pennsylvanica yr1: 10-17 yr2: 10-17 (New Growth) yr3: New growth broke off	Ⓔ	R			5	52.0		6+	80.0	/	<input checked="" type="checkbox"/>	2		regrowth
237	Platanus occidentalis yr1: 10-18 yr2: 10-18 yr3: <270 yr4: >270	Ⓔ	R			94	270.0	94.0	/	>400	1.3	<input type="checkbox"/>	4		
238	Symphoricarpos orbiculatus yr1: 10-19 yr2: 10-19	Ⓔ	R			15	137.0	DBH?	15	144.8	.2	<input type="checkbox"/>	4		
239	Platanus occidentalis yr1: 10-20 yr2: 10-20	Ⓔ	R			20	225.0	10.0	/	7250	2.0	<input type="checkbox"/>	4		
240	Platanus occidentalis yr1: 10-21 yr2: 10-21 yr4: >270	Ⓔ	R			35	270.0	20.0	/	>250	3.5	<input type="checkbox"/>	4		

*SOURCE: T=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 19
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.
 *DAMAGE: REMOVAL, CUT, MOWING, BEAVER, DEER, RODENTS, INSECTS, GAME, LIVESTOCK, Other/Unknown ANIMAL, Human TRAMPLED, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICANE, DISEASED, VINE Strangulation, UNKNOWN, specify other.

Plot (continued): 92532-01-0010				Last Year's Data			THIS YEAR'S DATA								
ID	Species	map char	source	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes
243	Platanus occidentalis	(E)	R			120	270.0	100.0	✓	>400	15.2	<input type="checkbox"/>	4		
yr1: 10-24 yr2: 10-24 yr3: <270 yr4: >270															
246	Fraxinus pennsylvanica	(E)	R			52	270.0	25.0	✓	>250	28	<input type="checkbox"/>	4		
yr1: 10-27 yr2: 10-27 yr3: <270 yr4: >270															

stems: 20 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

~~FP~~ # >100 Height >100
~~FP~~ >25 50-100
~~LS~~ 4 @ >100

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 20
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.
 *DAMAGE: REMOval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMPled, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

109261 - Big Cedar

Plot 92532-01-0011

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): Date: - / Party: _____ Role: _____ Notes on plot:

Taxonomic Standard: _____

Taxonomic Standard DATE: _____

Latitude or UTM-N: Datum:

Longitude or UTM-E: UTM Zone:

Coordinate Accuracy (m): X-Axis bearing (deg):

Plot Dimensions: X: Y: Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Last Year's Data			THIS YEAR'S DATA						
						ddh 1 mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re- sprout	Vigor*	Damage*	Notes
247	Cornus amomum	(E)	R			10	195.0	6.0	11+	207	7+		4		
yr1: 11-1 yr2: 11-1															
248	Platanus occidentalis	(E)	R			77	270.0	50.0	✓	7400	9.4		4		
yr1: 11-2 yr2: 11-2 yr3: <270 yr4: >270															
249	Platanus occidentalis	(E)	R			72	270.0	50.0	✓	>400	7.9		4		
yr1: 11-3 yr2: 11-3 yr3: <270 yr4: >270															
250	Cornus amomum	(E)	R			19	270.0	9.0	✓	7250	1.5+		4		
yr1: 11-4 yr2: 11-4 yr4: >270															
251	Cornus amomum	(E)	R			25	270.0	14.0	✓	>250	1.4+		4		
yr1: 11-5 yr2: 11-5 yr4: >270															
254	Symphoricarpos orbiculatus	(E)	R			11	123.0	DBH?	✓	8+	205.1	.2		4	previous yr ddb @ collar
yr1: 11-8 yr2: 11-8 coral berry															
255	Platanus occidentalis	(E)	R			57	270.0	45.0	✓	>400	7.6+		4		
yr1: 11-9 yr2: 11-9 yr3: <270 yr4: >270															
256	Fraxinus pennsylvanica	(E)	R			15	154.0	5.0	✓	12+	125	.2+		1.5	top dead previous yr ddb @ collar
yr1: 11-10 yr2: 11-10															
257	Ilex verticillata	(E)	R			12	100.0		✓	11+	97.5	/		4	
yr1: 11-11 yr2: 11-11 Button bush															
258	Ilex verticillata	(E)	R			5	55.0		✓	5+	55.9	/		3	
yr1: 11-12 yr2: 11-12 Button bush															
259	Corylus americana	(E)	R			18	254.0	10.0	✓	>250	1.3		4		
yr1: 11-13 yr2: 11-13															
260	Cornus amomum	(E)	R			22	222.0	9.0	✓	7050	1.3		4		
yr1: 11-14 yr2: 11-14															
261	Cornus amomum	(E)	R			12	77.0		✓	12	91.4	/		3.5	bug
yr1: 11-15 yr2: 11-15															
263	Cornus amomum	(E)	R			16	226.0	9.0	✓	>250	1.1+		4		
yr1: 11-17 yr2: 11-17															
264	Corylus americana	(E)	R			20	231.0	12.0	✓	>250	1.7		4		
yr1: 11-18 yr2: 11-18															
265	Cornus amomum	(E)	R			15	142.0	DBH!!	✓	14.4	179.8	.5+		3.5	previous yr ddb @ collar
yr1: 11-19 yr2: 11-19															
266	Platanus occidentalis	(E)	R			34	270.0	18.0	✓	>250	2.7+		4		
yr1: 11-20 yr2: 11-20 yr3: <270 yr4: >270															
267	Platanus occidentalis	(E)	R			42	270.0	25.0	✓	>400	3.3+		4		
yr1: 11-21 yr2: 11-21 yr3: <270															

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 21

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing. *DAMAGE: REMOval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNOwn, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m. Printed in the CVS-EEP Entry Tool ver. 2.2.7

Plot (continued): 92532-01-0011

		Last Year's Data			THIS YEAR'S DATA									
ID	Species	map source char	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes

stems: 18 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

Liquidambar styraciflua > 50 various heights > 100

Fraxinus pennsylvanica > 20 Various heights > 100

Alnus alata 7 > 100

Unknown Willow? 1 50-100

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 22
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing. *DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMPled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m. Printed in the CVS-EEP Entry Tool ver. 2.2.7

109261 - Big Cedar

92532-01-0012

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): Date: - /

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m) Datum:

Longitude or UTM-E: UTM Zone:

Coordinate Accuracy (m): X-Axis bearing (deg):

Plot Dimensions: X: Y: Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

Party: Role:

Notes on plot:

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Last Year's Data			THIS YEAR'S DATA							
						dbh 1 mm	Height 1cm*	DBH 1 cm	dbh 1mm	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes	
268	Viburnum dentatum	(E)	R			15	177.0	8.0	✓	12+	182.9	8+	<input type="checkbox"/>	4		previous yr dbh at collar
	yr1: 12-1 yr2: 12-1															
270	Viburnum dentatum	(E)	R			8	80.0		✓	9+	86.4	/	<input type="checkbox"/>	3.5		
	yr1: 12-3 yr2: 12-3															
271	Viburnum dentatum	(E)	R			11	82.0		✓	10+	80	/	<input type="checkbox"/>	3		previous yr dbh at collar
	yr1: 12-4 yr2: 12-4															
272	Fraxinus pennsylvanica	(E)	R			15	63.0		✓	5+	52.1	/	<input checked="" type="checkbox"/>	2		resprout
	yr1: 12-5 yr2: 12-5															
273	Platanus occidentalis	(E)	R			21	225.0	10.0	✓	/	250	12+	<input type="checkbox"/>	4		
	yr1: 12-6 yr2: 12-6															
274	Fraxinus pennsylvanica	(E)	R			11	58.0		✓	4	27.9	/	<input checked="" type="checkbox"/>	2.5		resprout
	yr1: 12-7 yr2: 12-7															
275	Corylus americana	(E)	R			18	70.0		✓	10+	67.1	/	<input type="checkbox"/>	3		previous yr dbh at collar
	yr1: 12-8 yr2: 12-8															
276	Platanus occidentalis	(E)	R			12	80.0		✓	8+	75.3	/	<input checked="" type="checkbox"/>	3		regrowth
	yr1: 12-9 yr2: 12-9															
278	Platanus occidentalis	(E)	R			9	91.0		✓	5+	80	/	<input checked="" type="checkbox"/>	2		regrowth
	yr1: 12-11 yr2: 12-11															
279	Cornus amomum	(E)	R			12	53.0		✓	7	64	/	<input type="checkbox"/>	3.5		previous yr dbh at collar
	yr1: 12-12 yr2: 12-12															
281	Platanus occidentalis	(E)	R			8	64.0		✓	8+	67.3	/	<input checked="" type="checkbox"/>	2 2		regrowth
	yr1: 12-14 yr2: 12-14															
282	Platanus occidentalis	(E)	R			14	91.0		✓	7+	88.4	/	<input checked="" type="checkbox"/>	2.5		resprout
	yr1: 12-15 yr2: 12-15															
283	Cornus amomum	(E)	R			7	31.0		✓	5+	39.6	/	<input type="checkbox"/>	3		previous yr dbh at collar
	yr1: 12-16 yr2: 12-16															
284	Platanus occidentalis	(E)	R			7	80.0		✓	5+	81.3	/	<input type="checkbox"/>	2		
	yr1: 12-17 yr2: 12-17															
285	Betula nigra	(E)	R			37	180.0	8.0	✓	/	250	1.5	<input type="checkbox"/>	4		
	yr1: 12-18 yr2: 12-18															
286	Platanus occidentalis	(E)	R			7	81.0		✓	7+	100.6	/	<input type="checkbox"/>	2.5		
	yr1: 12-19 yr2: 12-19															
287	Calycanthus floridus	(E)	R			2	8.0		✓	1	10.2	/	<input type="checkbox"/>	1		no leaves
	yr1: 12-20 yr2: 12-20															
288	Ilex verticillata	(E)	R			8	66.0		✓	7+	61	/	<input type="checkbox"/>	2.5		
	yr1: 12-21 yr2: 12-21															

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 23
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing. *DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m. Printed in the CVS-EEP Entry Tool ver. 2.2.7

Plot (continued): 92532-01-0012				Last Year's Data			THIS YEAR'S DATA						
ID	Species	map char	source X (m) Y (m)	ddh (mm)	Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes
289	Cornus amomum	Ⓟ	R	5	40.0		4.2	30.5		<input type="checkbox"/>	2		previous yr ddh at collar

yr1: 12-22 | yr2: 12-22

stems: 19 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

Fraxinus pennsylvanica 3 7100
 " " 10 50-100
 " " 16 750

Ulmus alata 1 50-100
 6 750
Quercus mich. 1 50-100
Quercus sp. 2 750
 cherry bark oak?
Platanus occ. 1 7100
 2 50-100
Pinus taeda 1 750

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 24
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.
 *DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Plot 92532-01-0013

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): Date: / /

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m) Datum:

Longitude or UTM-E: UTM Zone:

Coordinate Accuracy (m): X-Axis bearing (deg):

Plot Dimensions: X: Y: Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

Party: Role:
 Role:
 Role:

Notes on plot:

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Last Year's Data			THIS YEAR'S DATA						
						ddh 1mm	Height 1cm*	DBH 1cm	ddh 1mm	Height 1cm*	DBH 1cm	Re-sprout	Vigor*	Damage*	Notes
290	Betula nigra	(E)	R			9	117.0	DBH?	18	200+	9	<input type="checkbox"/>	4		
yr1: 13-1 yr2: 13-1															
291	Cornus amomum	(E)	R			28	192.0	10.0	35	200+	12	<input type="checkbox"/>	4		
yr1: 13-2 yr2: 13-2															
293	Carpinus caroliniana	(E)	R			21	270.0	13.0				<input type="checkbox"/>	0		
yr1: 13-4 yr2: 13-4 yr3: <270 yr4: <270															
294	Carpinus caroliniana	(E)	R			15	205.0	5.0	20	183	3	<input type="checkbox"/>	4		
yr1: 13-5 yr2: 13-5															
295	Cornus amomum	(E)	R			30	270.0	20.0	39	200+	28	<input type="checkbox"/>	4		
yr1: 13-6 yr2: 13-6 yr3: <270 yr4: <270															
296	Carpinus caroliniana	(E)	R			27	270.0	15.0	40	200+	21	<input type="checkbox"/>	4		
yr1: 13-7 yr2: 13-7 yr4: <270															
297	Betula nigra	(E)	R			30	270.0	18.0	41	200+	35	<input type="checkbox"/>	4		
yr1: 13-8 yr2: 13-8 yr4: <270															
298	Betula nigra	(E)	R			62	270.0	36.0	77	200+	51	<input type="checkbox"/>	4		
yr1: 13-9 yr2: 13-9 yr3: <270 yr4: <270															
299	Cornus amomum	(E)	R			25	270.0	17.0	34	200+	27	<input type="checkbox"/>	4		
yr1: 13-10 yr2: 13-10 yr3: <270 yr4: <270															
300	Betula nigra	(E)	R			47	270.0	18.0	51	200+	30	<input type="checkbox"/>	4		
yr1: 13-11 yr2: 13-11 yr3: <270 yr4: <270															
301	Cornus amomum	(E)	R			16	242.0	8.0	15	191	9	<input type="checkbox"/>	3	5	STORM tree damage
yr1: 13-12 yr2: 13-12															
302	Carpinus caroliniana	(E)	R			41	270.0	25.0	61	200+	44	<input type="checkbox"/>	4		
yr1: 13-13 yr2: 13-13 yr4: <270															
303	Viburnum dentatum	(E)	R			27	270.0	13.0	27	200+	21	<input type="checkbox"/>	4		
yr1: 13-14 yr2: 13-14 yr4: <270															
304	Betula nigra	(E)	R			19	150.0	4.0	23	200+	12	<input type="checkbox"/>	4		
yr1: 13-15 yr2: 13-15 yr3: Renamed from carpinus caroliniana															
305	Carpinus caroliniana	(E)	R			28	230.0	13.0	19	200+	24	<input type="checkbox"/>	4		
yr1: 13-16 yr2: 13-16															
307	Carpinus caroliniana	(E)	R			35	270.0	21.0	51	200+	41	<input type="checkbox"/>	4		
yr1: 13-18 yr2: 13-18 yr3: <270 yr4: <270															
309	Viburnum dentatum	(E)	R			15	212.0	7.0	25	200+	13	<input type="checkbox"/>	4		
yr1: 13-20 yr2: 13-20															

*SOURCE: T=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 9

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing. *DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNOwn, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m. Printed in the CVS-EEP Entry Tool ver. 2.2.7

Plot (continued): 92532-01-0013				Last Year's Data			THIS YEAR'S DATA								
ID	Species	map char	source	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes

#stems: 17 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 10
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing
 *DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m. Printed in the CVS-EPP Entry Tool ver. 2.2.7

Plot 92532-01-0014

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): Date: - / /

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: Datum:

Longitude or UTM-E: UTM Zone:

Coordinate Accuracy (m): X-Axis bearing (deg):

Party: Role:
 Role:
 Role:

Notes on plot:

Plot Dimensions: X: Y: Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Last Year's Data			THIS YEAR'S DATA						
						ddh 1 mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
312	Betula nigra	(E)	R			31	230.0	9.0	39	200+	18	<input type="checkbox"/>	4		
yr1: 14-2 yr2: 14-2 (Misabeled as Ilex verticillata)															
313	Cornus amomum	(E)	R			29	270.0	10.0	29	200+	12	<input type="checkbox"/>	3		
yr1: 14-3 yr2: 14-3															
314	Carpinus caroliniana	(E)	R			11	101.0	DBH?	15	177	4	<input type="checkbox"/>	3		
yr1: 14-4 yr2: 14-4															
315	Viburnum dentatum	(E)	R			12	197.0	8.0	14	200+	8	<input type="checkbox"/>	3		
yr1: 14-5 yr2: 14-5															
316	Betula nigra	(E)	R			26	270.0	13.0	41	200+	29	<input type="checkbox"/>	4		
yr1: 14-6 yr2: 14-6															
317	Cornus amomum	(E)	R			15	230.0	11.0	26	200+	11	<input type="checkbox"/>	4		
yr1: 14-7 yr2: 14-7															
319	Carpinus caroliniana	(E)	R			33	270.0	14.0	45	200+	25	<input type="checkbox"/>	4		
yr1: 14-9 yr2: 14-9															
320	Viburnum dentatum	(E)	R			15	202.0	10.0	17	200+	14	<input type="checkbox"/>	4		
yr1: 14-10 yr2: 14-10															
321	Carpinus caroliniana	(E)	R			12	211.0	10.0	25	200+	15	<input type="checkbox"/>	4		
yr1: 14-11 yr2: 14-11															
322	Betula nigra	(E)	R			25	270.0	12.0	32	200+	22	<input type="checkbox"/>	4		
yr1: 14-12 yr2: 14-12															
323	Betula nigra	(E)	R			38	270.0	23.0	60	200+	46	<input type="checkbox"/>	4		
yr1: 14-13 yr2: 14-13 (Misabeled as Betula nigra) yr3: Renamed from Ilex verticillata															
325	Betula nigra	(E)	R			71	270.0	32.0	90	200+	55	<input type="checkbox"/>	4		
yr1: 14-15 yr2: 14-15 (Misabeled as Betula nigra) yr3: Renamed from Platanus occidentalis (<270)															
326	Cornus amomum	(E)	R			18	254.0	11.0	18	200+	14	<input type="checkbox"/>	3		
yr1: 14-16 yr2: 14-16															
328	Betula nigra CC	(E)	R			19	270.0	11.0	23	200+	16	<input type="checkbox"/>	4		
yr1: 14-18 yr2: 14-18															
330	Betula nigra	(E)	R			56	270.0	37.0	68	200+	55	<input type="checkbox"/>	4		
yr1: 14-20 yr2: 14-20 (Misabeled as Betula nigra) yr3: Renamed from Platanus occidentalis (<270)															

stems: 15 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 11
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing
 *DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

14-17 Cornus amomum

ddh | Height | DBH
26 | 200+ | 11

109261 - Big Cedar

Plot 92532-01-0015

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): Date: -

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: Datum:

Longitude or UTM-E: UTM Zone:

Coordinate Accuracy (m):

X-Axis bearing (deg):

Plot Dimensions: X: Y: Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

Party:

Role:

Notes on plot:

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Last Year's Data			THIS YEAR'S DATA						
						ddh 1 mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
333	Platanus occidentalis	(E)	R			29	209.0	13.0	/	2250	29+	<input type="checkbox"/>	4		
yr1: 15-3 yr2: 15-3															
334	Betula nigra <i>Carpinus</i>	(E)	R			15	101.0	DBH?	/	>250	.8+	<input type="checkbox"/>	4		mis labeled
yr1: 15-4 yr2: 15-4 <i>Caroliniana</i>															
335	Cornus amomum	(E)	R			9	93.0		/	11+	113	<input type="checkbox"/>	3		
yr1: 15-5 yr2: 15-5															
342	Quercus phellos	(E)	R			30	175.0	10.0	/	>250	20+	<input type="checkbox"/>	4		
yr1: 15-12 yr2: 15-12															
344	Quercus phellos	(E)	R			9	60.0		/	12+	94.5	<input type="checkbox"/>	4		
yr1: 15-14 yr2: 15-14															
346	Quercus phellos	(E)	R			9	119.0	DBH?	/	15+	140.2	.3	<input type="checkbox"/>	2.5	
yr1: 15-16 yr2: 15-16															
2989	Fraxinus pennsylvanica	(E)	U			14	147.0	DBH!!	/	>250	16+	<input type="checkbox"/>	4		
2990	Fraxinus pennsylvanica	(E)	U			15	121.0	DBH?	/	27+	185.4	11+	<input type="checkbox"/>	4	
2991	Ulmus alata	(E)	U			18	141.0	DBH!!	/	>250	16+	<input type="checkbox"/>	4		
2992-20	Ulmus alata	(E)	U			16	158.0	DBH!!	/	20.5	167.6	16+	<input type="checkbox"/>	3.5	

stems: 10 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

Fraxinus pennsylvanica # 11 Height >100
 " " # 5 50-100
 Ulmus alata # 3 50-100

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 28
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing. *DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m. Printed in the CVS-EEP Entry Tool ver. 2.2.7

109261 - Big Cedar

Plot 92532-01-0016

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): Date: - /

Taxonomic Standard: _____ Party: _____ Role: _____ Notes on plot: _____

Taxonomic Standard DATE: _____

Latitude or UTM-N: Datum:

Longitude or UTM-E: UTM Zone:

Coordinate Accuracy (m): X-Axis bearing (deg):

Plot Dimensions: X: Y: Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Last Year's Data			THIS YEAR'S DATA							
						dbh 1 mm	Height 1cm*	DBH 1 cm	dbh 1mm	Height 1cm*	DBH 1 cm	Re- sprout	Vigor*	Damage*	Notes	
347	Cornus amomum	(E)	R			7	66.0		✓	7+	96.5	/	<input type="checkbox"/>	3.5		
yr1: 16-1 yr2: 16-1																
348	Platanus occidentalis	(E)	R			51	270.0	29.0	✓	/	>400	42+	<input type="checkbox"/>	4		
yr1: 16-2 yr2: 16-2 yr3: <270 yr4: >270																
350	Carpinus caroliniana	(E)	R			31	270.0	11.0	✓	/	>400	20+	<input type="checkbox"/>	4		
yr1: 16-4 yr2: 16-4 yr4: >270																
351	Betula nigra	(E)	R			59	270.0	28.0	✓	/	>400	5.8+	<input type="checkbox"/>	4		
yr1: 16-5 yr2: 16-5 yr4: >270																
352	Ilex verticillata	(E)	R			5	52.0		✓	4+	53.3	/	<input type="checkbox"/>	2	bug	previous yr dbh at collar
yr1: 16-6 yr2: 16-6																
355	Quercus nigra	(E)	R			41	270.0	23.0	✓	/	>400	29+	<input type="checkbox"/>	4		
yr1: 16-9 yr2: 16-9 yr4: >270																
356	Quercus nigra	(E)	R			31	270.0	20.0	✓	/	>400	29+	<input type="checkbox"/>	4		
yr1: 16-10 yr2: 16-10 yr4: >270																
357	Platanus occidentalis	(E)	R			64	270.0	40.0	✓	/	>400	7.2+	<input type="checkbox"/>	4		
yr1: 16-11 yr2: 16-11 yr3: <270 yr4: >270																
359	Cornus amomum	(E)	R			13	81.0		✓	11+	137.2	44	<input type="checkbox"/>	4		previous year dbh at collar
yr1: 16-13 yr2: 16-13																
360	Betula nigra	(E)	R			42	270.0	30.0	✓	/	>400	5.3+	<input type="checkbox"/>	4		
yr1: 16-14 yr2: 16-14 yr3: <270 yr4: >270																
361	Betula nigra	(E)	R			22	140.0	14.0	✓	/	>250	2.5	<input type="checkbox"/>	4		
yr1: 16-15 yr2: 16-15																
362	Cornus amomum	(E)	R			20	106.0	DBH?	✓	14+	78.8	4+	<input type="checkbox"/>	4		previous year dbh at collar
yr1: 16-16 yr2: 16-16																
363	Fraxinus pennsylvanica	(E)	R			15	86.0		✓	19+	161.5	8+	<input type="checkbox"/>	3.5		
yr1: 16-17 yr2: 16-17																
364	Platanus occidentalis	(E)	R			47	270.0	30.0	✓	/	>400	5.5+	<input type="checkbox"/>	4		
yr1: 16-18 yr2: 16-18 yr4: >270																
365	Viburnum dentatum	(E)	R			21	141.0	DBH!!	✓	/	>250	10+	<input type="checkbox"/>	4		
yr1: 16-19 yr2: 16-19																
366	Platanus occidentalis	(E)	R			68	270.0	38.0	✓	/	>400	6.9+	<input type="checkbox"/>	4		
yr1: 16-20 yr2: 16-20 yr3: <270 yr4: >270																
367	Cornus amomum	(E)	R			21	182.0	10.0	✓	/	>250	1.5+	<input type="checkbox"/>	4		
yr1: 16-21 yr2: 16-21																

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 29

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSeCts, GAME, LIVESTock, Other/Unknown ANIMAl, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRricane, DISeased, VINE Strangulation, UNKNOwn, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Printed in the CVS-EEP Entry Tool ver. 2.2.7

Plot (continued): 92532-01-0016				Last Year's Data			THIS YEAR'S DATA								
ID	Species	map char	source	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re- sprout	Vigor*	Damage*	Notes

stems: 17 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

/ Fraxinus 3 7100
pennsylvanica

/ Alnus 5 >100
alata

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 30

*VIGOR: 4=excellent, 3=good, 2=fair,
1=unlikely to survive year, 0=dead,
M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INsects, GAME, LIVESTock, Other/Unknown
ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICane, DISeased, VINE
Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

109261- Big Cedar

Plot 92532-01-0017

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): 5 Date: 10/23/2013 - 1/1 Party: _____ Role: _____ Notes on plot: _____

Taxonomic Standard: _____

Taxonomic Standard DATE: _____

Latitude or UTM-N: 1660252.663 Datum: NAD83/W

Longitude or UTM-E: 526651.9064 UTM Zone: _____

Coordinate Accuracy (m): _____ X-Axis bearing (deg): 35.192

Plot Dimensions: X: 10 Y: 10 Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Last Year's Data			THIS YEAR'S DATA							
						ddh 1 mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re- sprout	Vigor*	Damage*	Notes	
368	Platanus occidentalis	(E)	R			10	118.0	DBH?	✓	12+	144.8	.3+	<input type="checkbox"/>	3		
yr1: 17-1 yr2: 17-1																
369	Ilex verticillata ^{Butternut}	(E)	R			5	44.0		✓	1	27.9	/	<input type="checkbox"/>	2.5		mislabeled
yr1: 17-2 yr2: 17-2																
371	Cornus amomum	(E)	R			9	91.0		✓	8	96.5	/	<input type="checkbox"/>	3		
yr1: 17-4 yr2: 17-4																
372	Platanus occidentalis	(E)	R			10	85.0		✓	8+	96.5	/	<input type="checkbox"/>	3		previous year ddh at collar
yr1: 17-5 yr2: 17-5																
373	Quercus nigra	(E)	R			7	59.0		✓	5+	54.6	/	<input type="checkbox"/>	3		
yr1: 17-6 yr2: 17-6																
374	Platanus occidentalis	(E)	R			3	25.0		✓	5+	57.2	/	<input type="checkbox"/>	2.5		
yr1: 17-7 yr2: 17-7																
375	Quercus nigra	(E)	R			14	120.0	DBH?	✓	17+	143.3	.4	<input type="checkbox"/>	4		
yr1: 17-8 yr2: 17-8																
376	Carpinus caroliniana	(E)	R			18	94.0		✓	/	72.50	.7+	<input type="checkbox"/>	4		
yr1: 17-9 yr2: 17-9																
377	Carpinus caroliniana	(E)	R			24	162.0	3.0	✓	18+	112.7	.3	<input type="checkbox"/>	3.5		previous year ddh at collar
yr1: 17-10 yr2: 17-10																
378	Platanus occidentalis ^{CU Butternut}	(E)	R			6	27.0		✓	6.3	42.7	/	<input type="checkbox"/>	2.5		mislabeled
yr1: 17-11 yr2: 17-11																
379	Platanus occidentalis	(E)	R			4	23.0		✓	4+	64	/	<input type="checkbox"/>	2		
yr1: 17-12 yr2: 17-12																
380	Platanus occidentalis	(E)	R			13	142.0	DBH!!	✓	16+	118.9	.7+	<input type="checkbox"/>	4		
yr1: 17-13 yr2: 17-13																
381	Carpinus caroliniana	(E)	R			18	84.0		✓	15+	92.7		<input type="checkbox"/>	3		previous year ddh at
yr1: 17-14 yr2: 17-14																
382	Platanus occidentalis	(E)	R			3	19.0		✓	13+	177.8	.6+	<input type="checkbox"/>	3.5		
yr1: 17-15 yr2: 17-15																
383	Platanus occidentalis	(E)	R			2	26.0		✓	5+	24.4	/	<input type="checkbox"/>	2		
yr1: 17-16 yr2: 17-16																
384	Quercus nigra	(E)	R			18	128.0	DBH?	✓	17.2	104.6	.5	<input type="checkbox"/>	4		
yr1: 17-17 yr2: 17-17																
386	Calyeanthus floridus ^{Hickory nut}	(E)	R			19	132.0	DBH?	✓	22+	170.7	.9+	<input type="checkbox"/>	3.5		mislabeled
yr1: 17-19 yr2: 17-19 ^{Carya sp.}																
388	Quercus rubra	(E)	R			12	71.0		✓	12.5	73.2	/	<input type="checkbox"/>	3.5		
yr1: 17-21 yr2: 17-21																

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 31

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing. *DAMAGE: REMOVAL, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROught, STORM, HURRricane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m. Printed in the CVS-EPP Entry Tool ver. 2.2.7

Plot (continued): 92532-01-0017

Last Year's Data

THIS YEAR'S DATA

ID	Species	map char	source	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes
389	Platanus occidentalis			Ⓜ	R	16	214.0	DBH!!	16+	164.6	5+		3		

yr1: 17-22 | yr2: 17-22

stems: 19

New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

~~P. mustaeda~~ 4 >100
 " " 7 50-100

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 32
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing. *DAMAGE: REMOval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

109261 - Big Cedar

Plot 92532-01-0018

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): Date: - /

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: Datum:

Longitude or UTM-E: UTM Zone:

Coordinate Accuracy (m): X-Axis bearing (deg):

Plot Dimensions: X: Y: Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

Party:

Role:

Notes on plot:

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Last Year's Data			THIS YEAR'S DATA							
						ddh 1 mm	Height 1 cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re- sprout	Vigor*	Damage*	Notes	
390	Quercus phellos	(E)	R			11	115.0	3.0	✓	14+	179.1	7+	<input type="checkbox"/>	3		
yr1: 18-1 yr2: 18-1																
392	Quercus nigra	(E)	R			17	144.0	4.0	✓	27+	201.9	9+	<input type="checkbox"/>	4		
yr1: 18-3 yr2: 18-3																
393	Betula nigra	(E)	R			12	70.0		✓	13.4	131.1	.2	<input type="checkbox"/>	4		
yr1: 18-4 yr2: 18-4																
394	Cornus amomum	(E)	R			3	22.0		✓	11	25.4	✓	<input checked="" type="checkbox"/>	2		
yr1: 18-5 yr2: 18-5																
395	Cornus amomum	(E)	R			Missing			✓				<input type="checkbox"/>			Still missing
yr1: 18-6 yr2: 18-6																
397	Cornus amomum	(E)	R			10	101.0	DBH?	✓	8+	115.8	✓	<input type="checkbox"/>	3		
yr1: 18-8 yr2: 18-8																
399	Quercus phellos	(E)	R			12	62.0		✓	15+	141"		<input type="checkbox"/>	3		
yr1: 18-10 yr2: 18-10																
400	Quercus phellos	(E)	R			10	68.0		✓	11+	80"		<input type="checkbox"/>	3		
yr1: 18-11 yr2: 18-11																
402	Quercus phellos	(E)	R			13	74.0		✓	21+	166.4	7+	<input type="checkbox"/>	4		
yr1: 18-13 yr2: 18-13																
403	Betula nigra	(E)	R			5	46.0		✓	8+	95.3	✓	<input type="checkbox"/>	3		
yr1: 18-14 yr2: 18-14																
404	Betula nigra	(E)	R			17	155.0	3.0	✓	✓	>250	1.3	<input type="checkbox"/>	4		
yr1: 18-15 yr2: 18-15																
405	Quercus phellos	(E)	R			27	173.0	9.0	✓	✓	>250	1.5	<input type="checkbox"/>	4		
yr1: 18-16 yr2: 18-16																
406	Quercus phellos	(E)	R			23	226.0	13.0	✓	✓	>250	1.9+	<input type="checkbox"/>	4		
yr1: 18-17 yr2: 18-17 yr3: Renamed from Platanus occidentalis																

stems: 13 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

✓ Pinus taeda 1 >100
Pinus taeda 1 >50
Quercus mich. 1 >50

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 33
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing
 *DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INsects, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m. Printed in the CVS-EPP Entry Tool ver. 2.2.7

109261 - Big Cedar

Plot 92532-01-0019

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): Date: - /

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: Datum:

Longitude or UTM-E: UTM Zone:

Coordinate Accuracy (m): X-Axis bearing (deg):

Plot Dimensions: X: Y: Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

Party:

Role:

Notes on plot:

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Last Year's Data			THIS YEAR'S DATA						
						ddh 1 mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re- sprout	Vigor*	Damage*	Notes
410	Platanus occidentalis	(E)	R			97	270.0	78.0	✓	>400	12.7		4		
yr1: 19-1 yr2: 19-1 yr3: <270 yr4: >270															
412	Betula nigra	(E)	R			49	270.0	34.0	✓	>400	48+		4		
yr1: 19-3 yr2: 19-3 yr3: <270 yr4: >270															
414	Platanus occidentalis	(E)	R			100	270.0	57.0	✓	>400	9.7		4		
yr1: 19-5 yr2: 19-5 yr3: <270 yr4: >270															
415	Cornus amomum	(E)	R			14	197.0	6.0	✓	>250	15+		4		
yr1: 19-6 yr2: 19-6															
416	Carpinus caroliniana	(E)	R			28	270.0	15.0	✓	>250	2.0+		4		
yr1: 19-7 yr2: 19-7 yr4: >270															
417	Fraxinus pennsylvanica	(E)	R			33	270.0	18.0	✓	>400	28+		4		
yr1: 19-8 yr2: 19-8 yr4: >270															
418	Platanus occidentalis	(E)	R			113	270.0	88.0	✓	>400	14.2		4		
yr1: 19-9 yr2: 19-9 yr3: <270 yr4: >270															
419	Betula nigra	(E)	R			85	270.0	46.0	✓	>400	7.6+		4		
yr1: 19-10 yr2: 19-10 yr3: <270 yr4: >270															
421	Platanus occidentalis	(E)	R			94	270.0	DBH!!!	✓	>400	11.9		4		
yr1: 19-12 yr2: 19-12 yr3: <270 yr4: >270															
422	Carpinus caroliniana	(E)	R			24	230.0	10.0	✓	>400	4.9+		4		
yr1: 19-13 yr2: 19-13															
423	Fraxinus pennsylvanica	(E)	R			30	241.0	16.0	✓	>250	3.2+		4		
yr1: 19-14 yr2: 19-14															
424	Platanus occidentalis	(E)	R			47	270.0	29.0	✓	>400	5.0+		4		
yr1: 19-15 yr2: 19-15 yr3: <270 yr4: >270															
425	Betula nigra <i>Carpinus caroliniana</i>	(E)	R			22	260.0	13.0	✓	>250	2.4		4		mis labeled
yr1: 19-16 yr2: 19-16 (Mislabeled as Platanus occidentalis)															
427	Carpinus caroliniana	(E)	R			18	185.0	7.0	✓	>250	2.0		4		
yr1: 19-18 yr2: 19-18															
428	Platanus occidentalis	(E)	R			46	270.0	25.0	✓	>250	4.1+		4		
yr1: 19-19 yr2: 19-19 yr3: <270 yr4: >270															
429	Betula nigra <i>Carpinus caroliniana</i>	(E)	R			62	270.0	34.0	✓	>250	4.2+		4		mis labeled
yr1: 19-20 yr2: 19-20 yr3: <270 yr4: >270															
430	Quercus phellos	(E)	R			40	270.0	22.0	✓	>250	3.1+		4		
yr1: 19-21 yr2: 19-21 yr4: >270															
2355	Ilex verticillata <i>Buttonbush</i>	(E)	R			9	115.0	DBH?	✓	10+	144.8	2	4		

Found 19-11 (Stem ID 420)

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubing, R=bare Root, M=Mechanically, U=Unknown p. 34

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Printed in the CVS-EEP Entry Tool ver. 2.2.7

Plot (continued): 92532-01-0019				Last Year's Data			THIS YEAR'S DATA							
ID	Species	map source char	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes

stems: 18 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

	#	Height
<i>Liquidambar</i>	8	> 100
<i>styraciflua</i>	1	50-100
<hr/>		
<i>Ulmus alata</i>	6	> 100
/ " "	4	50-100
<hr/>		
<i>Pinus taeda</i>	1	> 100

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 35
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing. *DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMPled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m. Printed in the CVS-EEP Entry Tool ver. 2.2.7

109261 - Big Cedar

Plot 92532-01-0020

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): 5

Date: 10/22/2013 - 1/1

Party:

Role:

Notes on plot:

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N:

(dec.deg. or m)

1662045.131

Datum: NAD83/W

Longitude or UTM-E:

527430.2246

UTM Zone:

Coordinate Accuracy (m):

X-Axis bearing (deg): 35.194

Plot Dimensions: X: 10

Y: 10

Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

KS
RFM
a9

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Last Year's Data			THIS YEAR'S DATA						
						ddh 1 mm	Height 1 cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re- sprout	Vigor*	Damage*	Notes
431	Platanus occidentalis	(E)	R			40	270.0	21.0	✓	>400	55+		4		
yr1: 20-1 yr2: 20-1 yr4: >270															
432	Quercus phellos	(E)	R			35	270.0	17.0	✓	>400	36+		4		
yr1: 20-2 yr2: 20-2 yr4: >270															
433	Quercus phellos	(E)	R			36	270.0	25.0	✓	>250	38+		4		
yr1: 20-3 yr2: 20-3 yr4: >270															
434	Quercus phellos	(E)	R			24	225.0	12.0	✓	>250	25+		4		
yr1: 20-4 yr2: 20-4															
436	Carpinus caroliniana	(E)	R			31	270.0	15.0	✓	>250	27+		4		
yr1: 20-6 yr2: 20-6 yr4: >270															
437	Betula nigra	(E)	R			37	270.0	14.0	✓	>250	37+		4		
yr1: 20-7 yr2: 20-7 yr4: >270															
438	Quercus phellos	(E)	R			26	254.0	13.0	✓	>250	28+		4		
yr1: 20-8 yr2: 20-8															
439	Betula nigra	(E)	R			28	229.0	10.0	✓	>250	26+		4		
yr1: 20-9 yr2: 20-9															
440	Betula nigra	(E)	R			65	270.0	44.0	✓	>400	67+		4		
yr1: 20-10 yr2: 20-10 yr3: <270 yr4: >270															
441	Carpinus caroliniana	(E)	R			27	270.0	18.0	✓	>250	33+		4		
yr1: 20-11 yr2: 20-11 yr4: >270															
442	Platanus occidentalis	(E)	R			38	270.0	18.0	✓	>400	61+		4		
yr1: 20-12 yr2: 20-12 yr4: >270															
443	Quercus phellos	(E)	R			68	270.0	43.0	✓	>400	63+		4		
yr1: 20-13 yr2: 20-13 yr3: <270 yr4: >270															
447	Quercus phellos	(E)	R			54	270.0	31.0	✓	>400	39+		4		
yr1: 20-17 yr2: 20-17 yr4: >270															

stems: 13

New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

Rhus copalina 3 >1m

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

109261-Big Cedar

Plot 92532-01-0021

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): Date: - Party: Role: Notes on plot:

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: Datum:

Longitude or UTM-E: UTM Zone:

Coordinate Accuracy (m): X-Axis bearing (deg):

Plot Dimensions: X: Y: Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Last Year's Data			THIS YEAR'S DATA							
						ddh 1 mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1-cm	Re-sprout	Vigor*	Damage*	Notes	
448	Lindera benzoin	Ⓔ	R			5	86.0		✓	5+	120.7	✓		3		
yr1: 21-1 yr2: 21-1																
449	Viburnum dentatum	Ⓔ	R			20	178.0	5.0	✓	26.1	213.4	8+		4		
yr1: 21-2 yr2: 21-2																
450	Quercus nigra	Ⓔ	R			25	186.0	DBH!!!	✓	>250	1.6+			2.5		
yr1: 21-3 yr2: 21-3																
452	Fraxinus pennsylvanica	Ⓔ	R			63	270.0	25.0	✓	>400	3.6			4		
yr1: 21-5 yr2: 21-5 (Misabeled as Platanus occidentalis) yr3: <270 yr4: >270																
453	Cornus amomum	Ⓔ	R			23	200.0	12.0	✓	>250	1.5+			4		
yr1: 21-6 yr2: 21-6																
455	Quercus phellos	Ⓔ	R			33	237.0	8.0	✓	>250	1.8+			4		
yr1: 21-8 yr2: 21-8																
456	Cornus amomum	Ⓔ	R			10	91.0		✓	13+	149.4	3		4		
yr1: 21-9 yr2: 21-9																
457	Ilex verticillata	Ⓔ	R			11	137.0	4.0	✓							missing
yr1: 21-10 yr2: 21-10																
458	Quercus phellos	Ⓔ	R			52	270.0	33.0	✓	>250	50+			4		
yr1: 21-11 yr2: 21-11 yr3: <270 yr4: >270																
459	Viburnum dentatum	Ⓔ	R			14	207.0	DBH!!!	✓	14+	182.9	1.5+		4		
yr1: 21-12 yr2: 21-12																
461	Fraxinus pennsylvanica	Ⓔ	R			65	270.0	40.0	✓	>400	60+			4		
yr1: 21-14 yr2: 21-14 yr3: <270 yr4: >270																
463	Ilex verticillata <i>Buttonbush</i>	Ⓔ	R			9	68.0		✓	10	160	1.5+		4		
yr1: 21-16 yr2: 21-16																
464	Viburnum dentatum	Ⓔ	R			Missing			✓	>250	12+			4		
yr1: 21-17 yr2: 21-17																
465	Viburnum dentatum	Ⓔ	R			34	197.0	8.0	✓	>250	20+			4		
yr1: 21-18 yr2: 21-18																
466	Cornus amomum	Ⓔ	R			20	259.0	10.0	✓	>250	17+			4		
yr1: 21-19 yr2: 21-19																
467	Fraxinus pennsylvanica	Ⓔ	R			55	270.0	26.0	✓	>250	41+			4		
yr1: 21-20 yr2: 21-20 yr3: <270 yr4: >270																
468	Cornus amomum	Ⓔ	R			30	270.0	19.0	✓	>250	20+			4		
yr1: 21-21 yr2: 21-21 yr3: <270 yr4: >270																

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 37

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRricane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

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Plot (continued): 92532-01-0021

Last Year's Data

THIS YEAR'S DATA

ID	Species	map char	source	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes
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stems: 17 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

✓ Salix nigra 4 >4m
 ✓ Liquidambar styraciflua 1 >2.5
 ✓ Cottonwood 1 >4m
 ✓ Rhus copalina 1 >2.5

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 38
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.
 *DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMPled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

109261-13ig Cedar

Plot 92532-01-0022

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): Date: - /

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: Datum: (dec.deg. or m)

Longitude or UTM-E: UTM Zone:

Coordinate Accuracy (m): X-Axis bearing (deg):

Plot Dimensions: X: Y: Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

Party:

Role:

Notes on plot:

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Last Year's Data			THIS YEAR'S DATA						
						ddh 1 mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re- sprout	Vigor*	Damage*	Notes
470	Betula nigra	(E)	R			49	254.0	18.0	✓	>250	5.0+		4		
yr1: 22-1 yr2: 22-1															
472	Betula nigra	(E)	R			25	214.0	10.0	✓	>250	2.0+		4		
yr1: 22-3 yr2: 22-3 (New Growth)															
473	Platanus occidentalis	(E)	R			44	270.0	19.0	✓	>250	3.7+		4		
yr1: 22-4 yr2: 22-4 yr4: >270															
474	Ilex-verticillata <i>Buttonbush</i>	(E)	R			8	69.0		✓	6+	82.3	/		3	
yr1: 22-5 yr2: 22-5															
476	Ilex-verticillata <i>Buttonbush</i>	(E)	R			7	68.0		✓	6.0	73.7	/		2.5	
yr1: 22-7 yr2: 22-7															
477	Quercus phellos	(E)	R			29	226.0	11.0	✓	>250	2.1+		4		
yr1: 22-8 yr2: 22-8															
481	Ilex-verticillata <i>Buttonbush</i>	(E)	R			8	89.0		✓	13+	109.2	/		4	
yr1: 22-12 yr2: 22-12															
482	Fraxinus pennsylvanica	(E)	R			36	270.0	19.0	✓	>250	2.9+		4		
yr1: 22-13 yr2: 22-13 yr4: >270															
483	Cornus amomum	(E)	R			20	169.0	5.0	✓	23+	182.9	1.4+		4	
yr1: 22-14 yr2: 22-14															
484	Betula nigra	(E)	R			43	270.0	27.0	✓	>250	4.6+		4		
yr1: 22-15 yr2: 22-15 yr4: >270															
485	Ilex-verticillata <i>Buttonbush</i>	(E)	R			7	81.0		✓	8.4	94.5	/		4	
yr1: 22-16 yr2: 22-16															
486	Quercus michauxii- <i>phellos</i>	(E)	R			46	267.0	25.0	✓	>250	3.8+		4		
yr1: 22-17 yr2: 22-17															
487	Quercus phellos- <i>falcata</i>	(E)	R			6	60.0		✓	7+	85.4	/		3	
yr1: 22-18 yr2: 22-18															
488	Cornus amomum	(E)	R			18	164.0	8.0	✓	16+	192	.7		4	
yr1: 22-19 yr2: 22-19															
489	Viburnum dentatum	(E)	R			12	205.0	6.0	✓	>250	.8+		4		
yr1: 22-20 yr2: 22-20															

stems: 15 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 39

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing

*DAMAGE: REMOval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Printed in the CVS-EEP Entry Tool ver. 2.2.7

Rhus copalina	1	> 2.5
Prunus serotina	1	> 2.5
Fraxinus pensyl.		
Pinus taeda	1	> 1
Platanus occid.	1	> 2.5
Betula		
Carpinus Carol.	1	> 1
Ulmus alata		

109261 - Big Cedar

Plot 92532-01-0023

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): Date: - /

Taxonomic Standard: Party: Role:

Taxonomic Standard DATE:

Latitude or UTM-N: Datum: Notes on plot:

Longitude or UTM-E: UTM Zone:

Coordinate Accuracy (m): X-Axis bearing (deg):

Plot Dimensions: X: Y: Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Last Year's Data			THIS YEAR'S DATA				Notes		
						ddh l mm	Height 1cm*	DBH l cm	ddh lmm	Height 1cm*	DBH l cm	Re-sprout		Vigor*	Damage*
491	Lindera benzoin	(E)	R			11	209.0	8.0	/	72.5	7+		4		
yr1: 23-1 yr2: 23-1															
492	Cornus amomum LB	(E)	R			17	270.0	9.0	/	72.5	1.0+		4		Mislabelled LB Spice bush
yr1: 23-2 yr2: 23-2 (Mislabelled as Ilex verticillata) yr4: >270															
493	Lindera benzoin	(E)	R			16	222.0	8.0	/	72.5	8+		4		
yr1: 23-3 yr2: 23-3															
494	Betula nigra	(E)	R			45	270.0	28.0	/	74	3.8+		4		
yr1: 23-4 yr2: 23-4 yr4: >270															
495	Betula nigra	(E)	R			40	270.0	22.0	/	74	3.4+		4		
yr1: 23-5 yr2: 23-5 yr4: >270															
496	Betula nigra	(E)	R			54	270.0	42.0	/	74	6.1+		4		
yr1: 23-6 yr2: 23-6 yr4: >270															
497	Viburnum dentatum	(E)	R			22	270.0	15.0	/						Missing
yr1: 23-7 yr2: 23-7 yr4: >270															
499	Viburnum dentatum	(E)	R			19	218.0	8.0	/	74	1.0+		4		
yr1: 23-9 yr2: 23-9															
500	Quercus phellos	(E)	R			32	270.0	24.0	/	74	2.7+		4		
yr1: 23-10 yr2: 23-10 yr4: >270															
502	Betula nigra	(E)	R			71	270.0	67.0	/	74	7.4+		4		
yr1: 23-12 yr2: 23-12 yr4: >270															
503	Quercus nigra	(E)	R			40	270.0	30.0	/	74	3.5+		4		
yr1: 23-13 yr2: 23-13 yr4: >270															
504	Quercus michauxii	(E)	R			7	111.0	DBH?	/	6+	52" 1.1		4		regrowth from stump
yr1: 23-14 yr2: 23-14															
505	Carpinus caroliniana	(E)	R			52	270.0	40.0	/	74	2.8		5+		regrowth
yr1: 23-15 yr2: 23-15 yr4: >270															
506	Quercus michauxii	(E)	R			11	150.0	DBH!!	/	9+	154.9cm		2+		regrowth
yr1: 23-16 yr2: 23-16															
507	Betula nigra	(E)	R			83	270.0	56.0	/	74	5.6+		4		
yr1: 23-17 yr2: 23-17 yr4: >270															
508	Cornus amomum	(E)	R			26	270.0	21.0	/	72.5	2.0+		4		
yr1: 23-18 yr2: 23-18 yr4: >270															
509	Fraxinus pennsylvanica	(E)	R			61	270.0	45.0	/	74	5.8+		4		
yr1: 23-19 yr2: 23-19 yr4: >270															
514	Lindera benzoin	(E)	R			Missing			/	72.5	.5+		4		
yr1: 23-24 yr2: 23-24 (Broken Stem)															

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 40

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMOval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMPled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRricane, DISeased, VINE Strangulation, UNKNOwn, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Printed in the CVS-EEP Entry Tool ver. 2.2.7

Plot (continued): 92532-01-0023

Last Year's Data

THIS YEAR'S DATA

ID	Species	map char	source	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes
----	---------	----------	--------	-------	-------	----------	-------------	----------	----------	-------------	----------	-----------	--------	---------	-------

stems: 18 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes
	#								

Volunteers (sp) # Height
 Elderberry (Sambucus canadensis) 28 > 2.5m
 Betula nigra 3 > 4m
 Sycamore (Platanus occidentalis) 13 > 4m
 Fraxinus pennsylv 20 > 4m
 Investigation of privet

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 41
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing. *DAMAGE: REMOval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMPled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DiSeased, VINE Strangulation, UNKNown, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m. Printed in the CVS-EEP Entry Tool ver. 2.2.7

Representative Vegetation Problem Area Photos



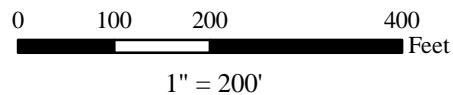
VPA 1 – Privet on Big Cedar



VPA 2 – Privet on UT1



**Figure C1: Vegetation Problem Areas
BCC (Station 10+00 to 37+00) and
UT2 (Station 10+00 to 16+00)**
Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 5
Stanly County, NC



LEGEND

- Invasive Species - Individuals
- ▨ Invasive Species - Clusters
- Conservation Easement
- Vegetation Plots

Map Vicinity

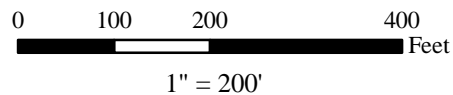


EEP Contract No. : D06054-D
May 2014



**Figure C2: Vegetation Problem Areas
BCC (Station 37+00 to 59+00)**

Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 5
Stanly County, NC



LEGEND

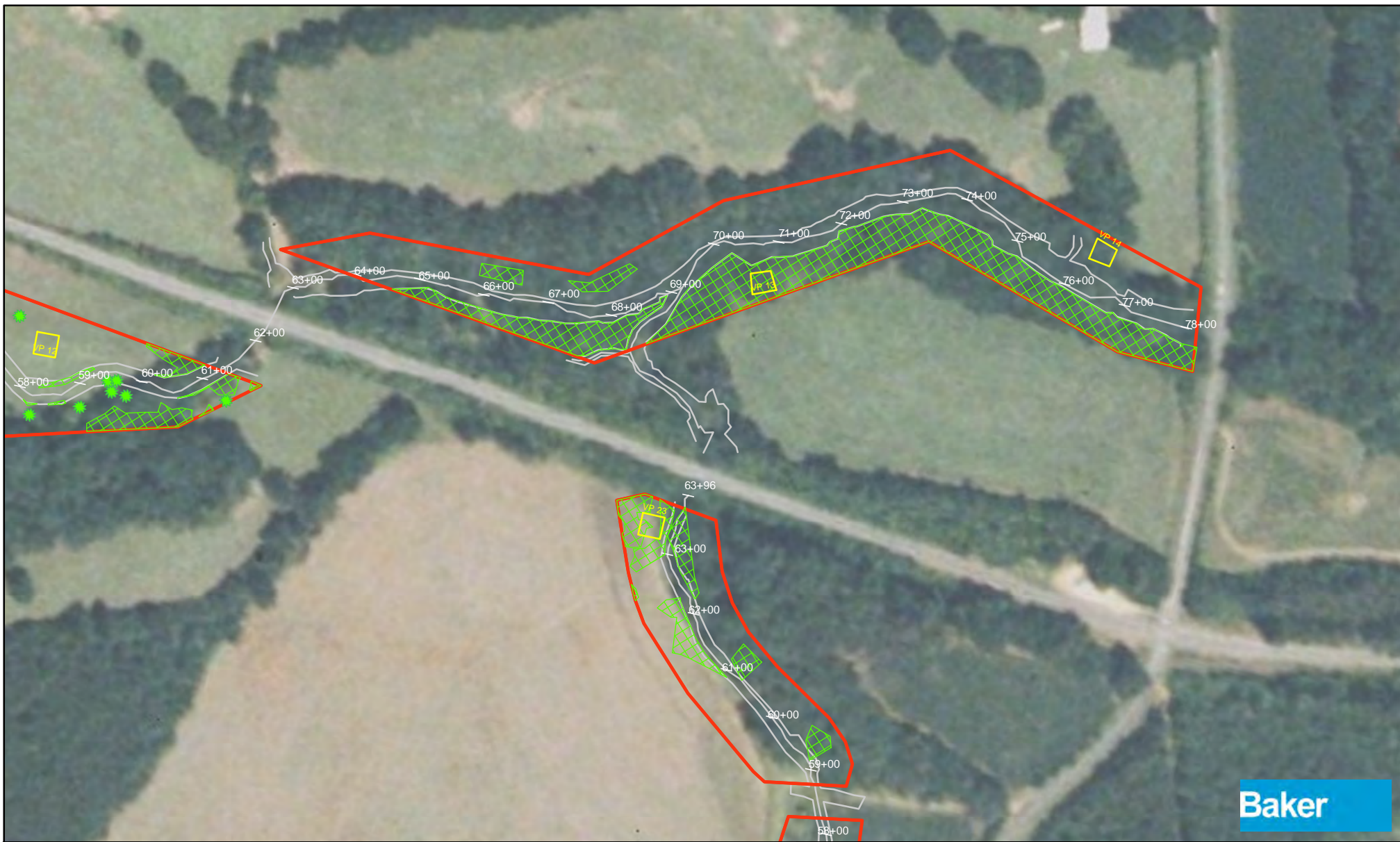
- Invasive Species - Individuals
- Invasive Species - Clusters
- Conservation Easement
- Vegetation Plots

Map Vicinity



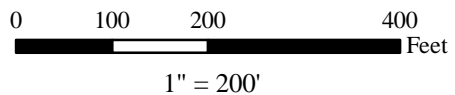
EEP Contract No. : D06054-D
May 2014





**Figure C3: Vegetation Problem Areas
BCC (Station 59+00 to 78+00) and
UT1 (Station 59+00 to 63+96)**

Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 5
Stanly County, NC



LEGEND

-  Vegetation Plots
-  Invasive Species - Individuals
-  Invasive Species - Clusters
-  Conservation Easement

Map Vicinity



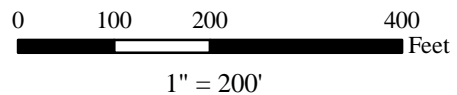
EEP Contract No. : D06054-D
May 2014









**Figure C4: Vegetation Problem Areas
UT1 (Station 35+00 to 59+00)**

Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 5
Stanly County, NC



LEGEND

-  Vegetation Plots
-  Invasive Species - Individuals
-  Invasive Species - Clusters
-  Conservation Easement

Map Vicinity

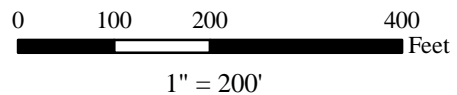


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May 2014



**Figure C5: Vegetation Problem Areas
UT1 (Station 10+00 to 35+00)**

Big Cedar Creek Stream Restoration Project
Annual Monitoring Plan - Year 5
Stanly County, NC



LEGEND

- Vegetation Plots
- Invasive Species - Individuals
- ▨ Invasive Species - Clusters
- Conservation Easement

Map Vicinity



EEP Contract No. : D06054-D
May 2014

Appendix D

As-Built Plan Sheets

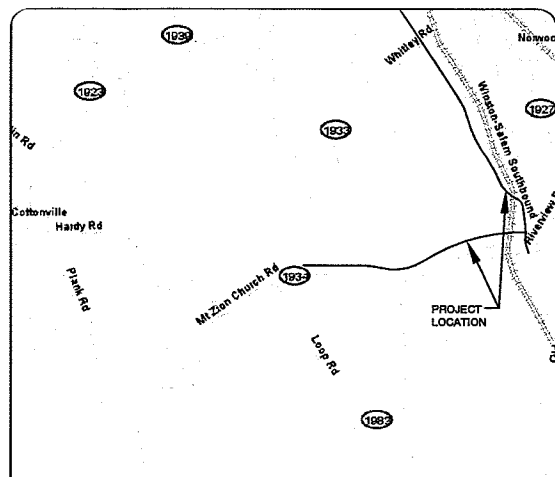
BIG CEDAR CREEK

SCO # D06054-D

NC ECOSYSTEM ENHANCEMENT PROGRAM

STANLY COUNTY

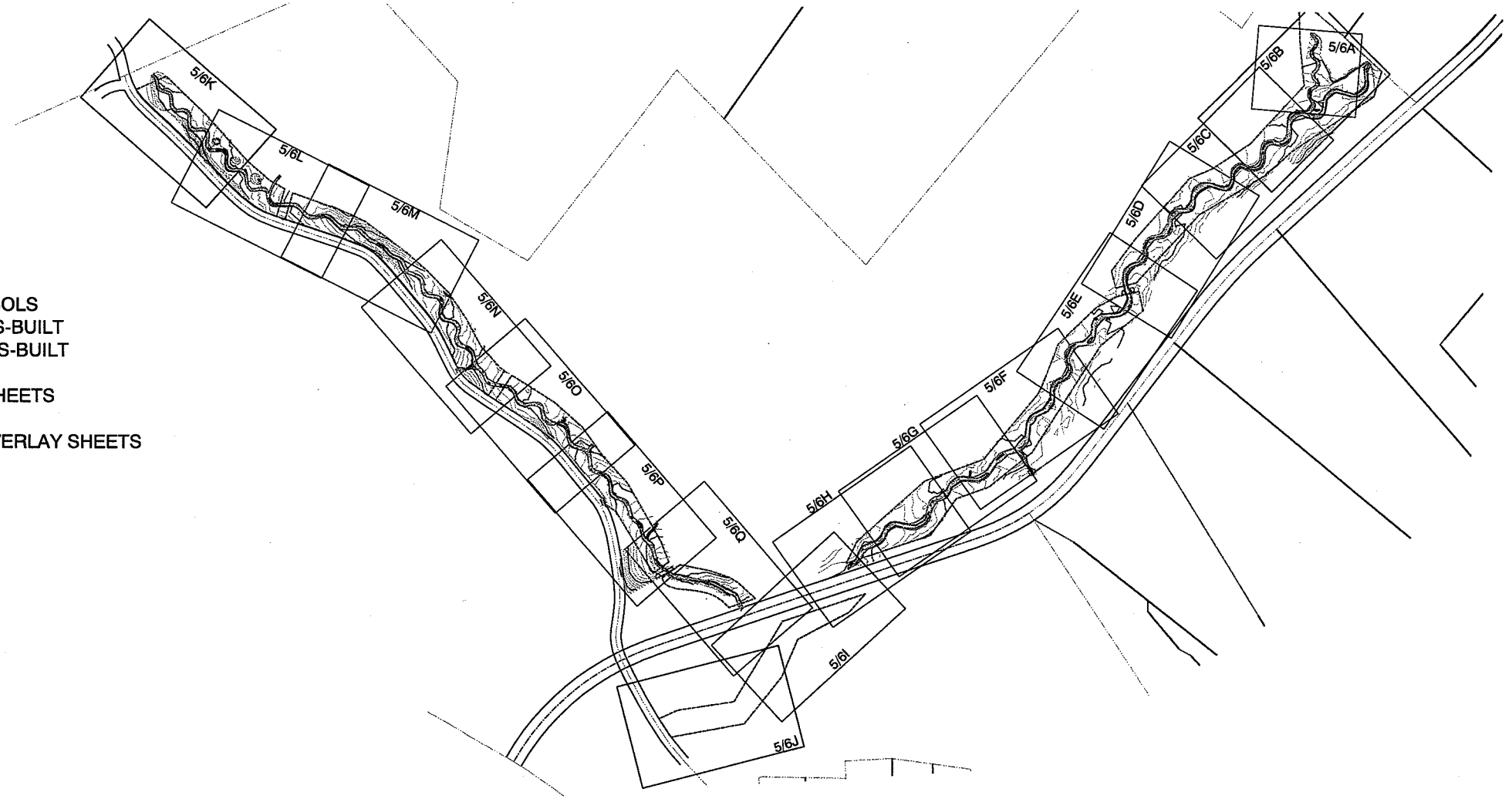
STATE	BAKER PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
NC	109261	1	67
SCO PROJECT NO. D06054-D			



VICINITY MAP - NTS

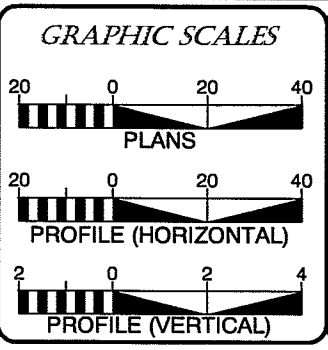
LOCATION:
 SOUTH APPROX. 12 MILES FROM THE INTERSECTION OF
 HWY 24/27 & HWY 52 THEN APPROX. 1 MILE FROM
 INTERSECTION OF HWY 52 & MT. ZION CHURCH RD.

TYPE OF WORK:
 STREAM AND WETLAND RESTORATION




INDEX OF SHEETS

- 1.....TITLE PAGE
- 2.....CONVENTIONAL SYMBOLS
- 3-3B.....DESIGN KEY SHEET/AS-BUILT
 REFERENCE SHEET/AS-BUILT
 OVERLAY SHEET
- 4A-4AB.....PROPOSED DESIGN SHEETS
- 5A-5Q.....AS-BUILT SHEETS
- 6A-6Q.....DESIGN / AS-BUILT OVERLAY SHEETS



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"
UNNAMED TRIBUTARY 3	10+00	LAT: 35° 12' 04.35" LONG: 80° 07' 27.84"
UNNAMED TRIBUTARY 1A	10+00	LAT: 35° 11' 44.02" LONG: 80° 07' 36.06"
UNNAMED TRIBUTARY 1B	10+00	LAT: 35° 11' 41.86" LONG: 80° 07' 45.39"
UNNAMED TRIBUTARY 1C	10+00	LAT: 35° 11' 33.41" LONG: 80° 08' 08.97"

PREPARED FOR THE OFFICE OF:




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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 Phone: 704.334.4454
 Fax: 704.334.4492

KEVIN TWEEDY, P.E.
 PROJECT ENGINEER

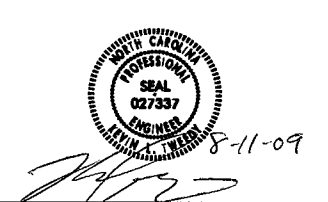
CHRISTINE D. MILLER
 PROJECT DESIGNER

PROJECT ENGINEER



8-11-09

[Signature] P.E.



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SYMBOLOLOGY

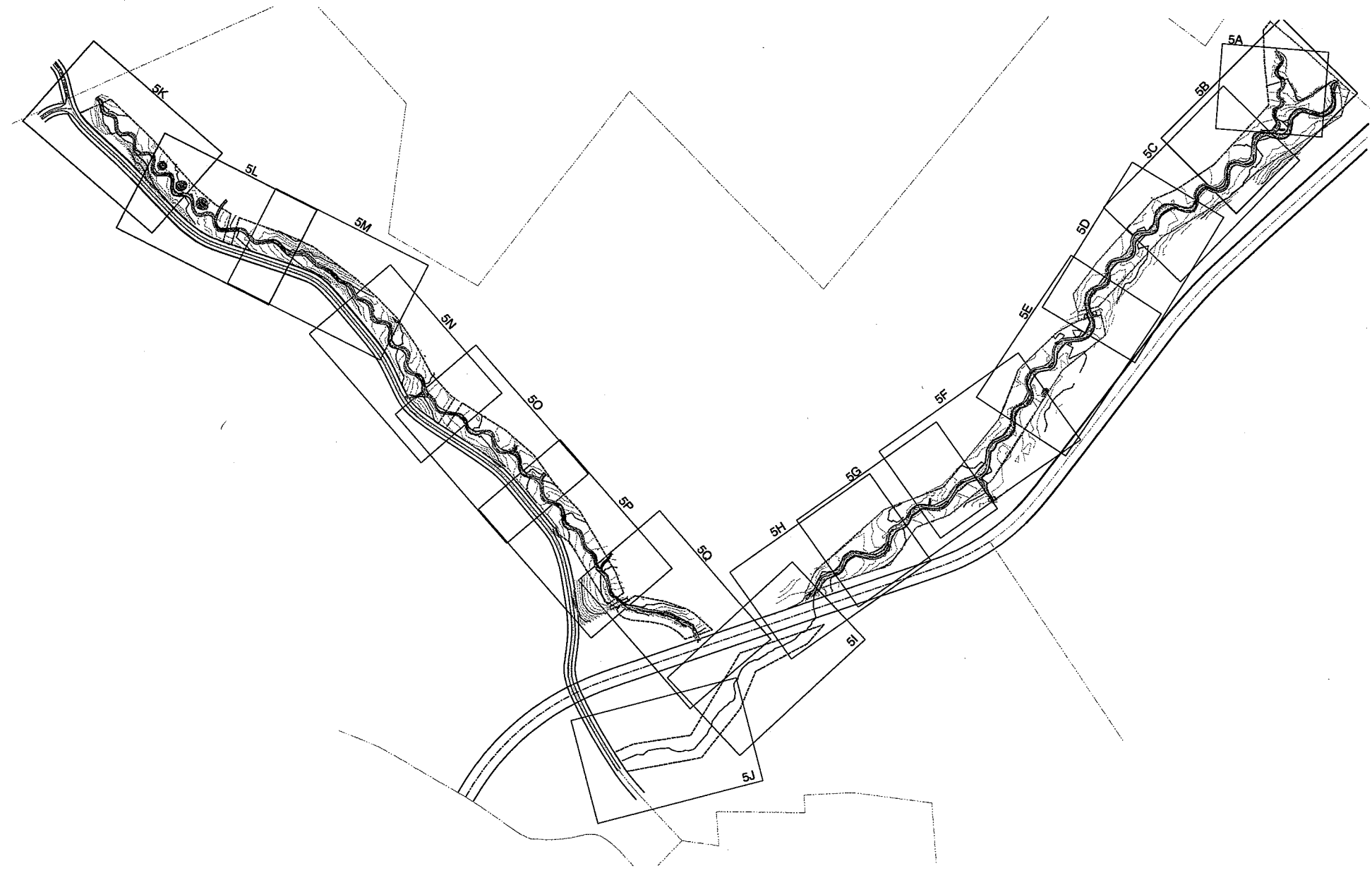
	RECORDED CONSERVATION EASEMENT		ROCK CROSS VANE
	EXISTING MAJOR CONTOUR		LOG SILL
	EXISTING MINOR CONTOUR		ROOT WAD
	EXISTING FENCE		LOG J-HOOK VANE
	CENTERLINE RAILROAD		BRUSH MATTRESS
	ROW		LOG VANE
	PARCEL BOUNDARY		LOG STEP-POOL
	EXISTING ROAD/PAVEMENT		CONSTRUCTED RIFFLE (NATIVE MATERIAL)
	EXISTING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



Kevin L. Thayer 8-16-09

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AS-BUILT KEY SHEET

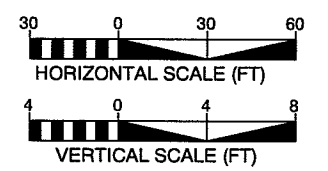
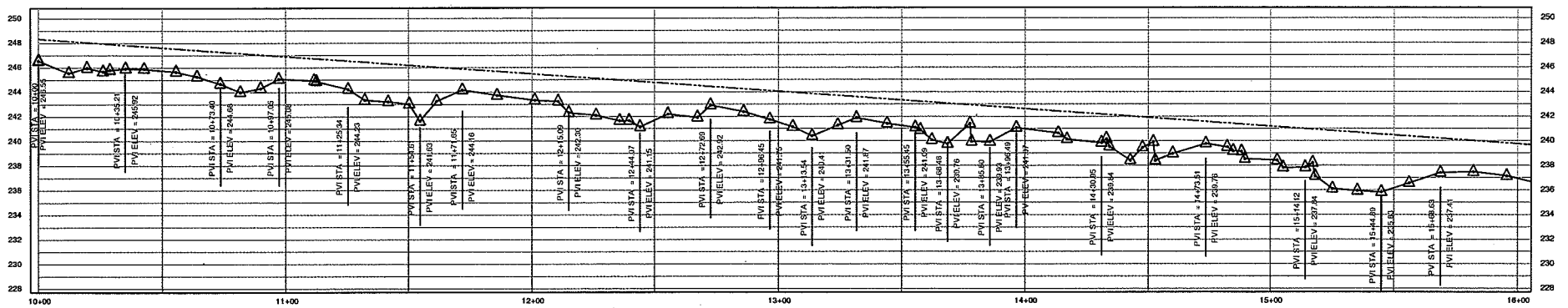
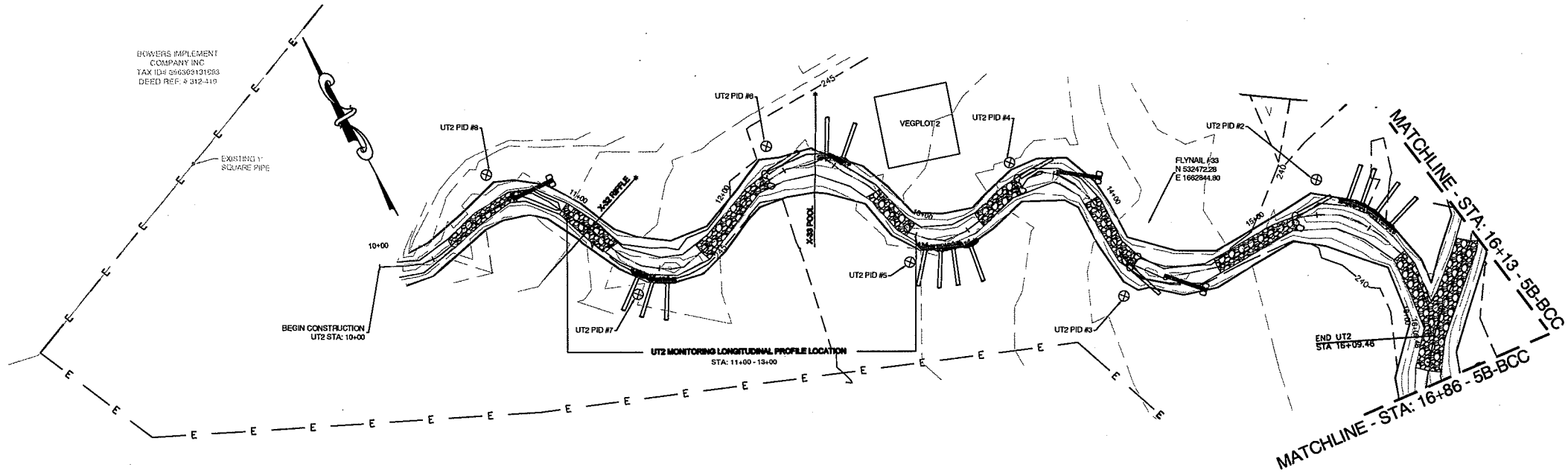


BIG CEDAR CREEK
AS-BUILT KEY SHEET





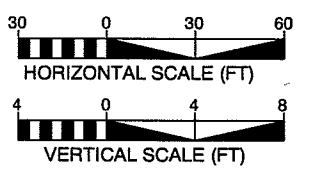
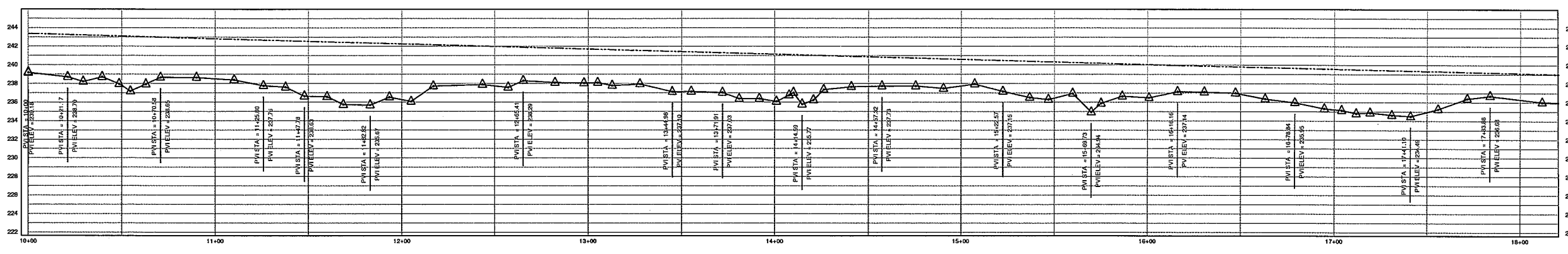
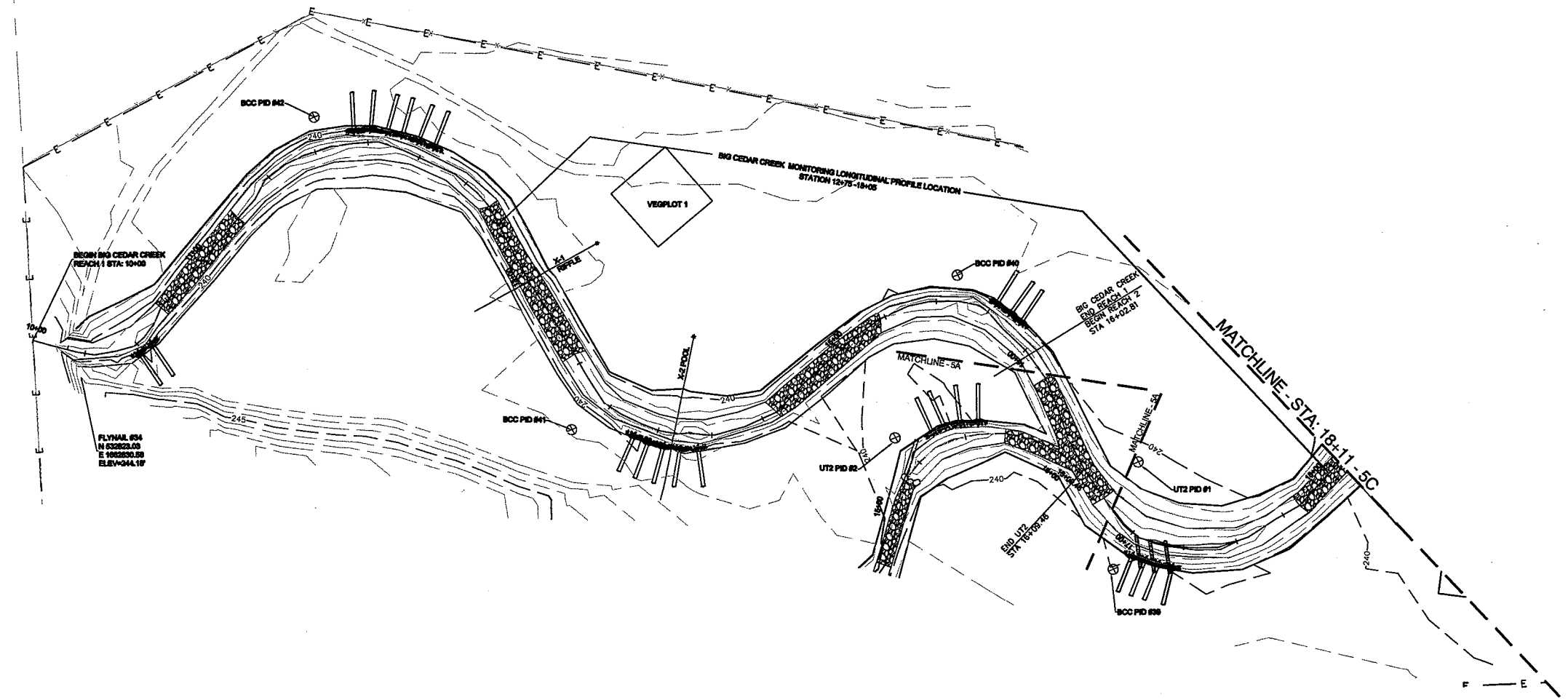
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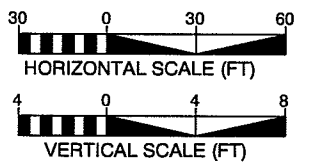
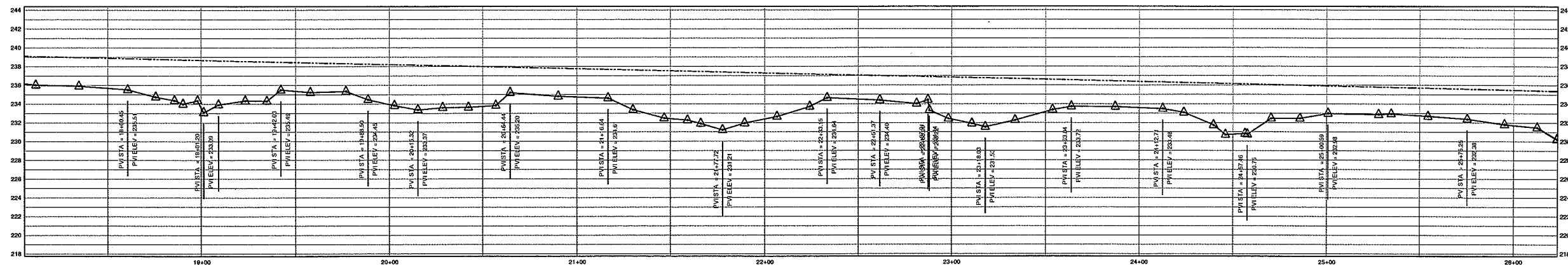
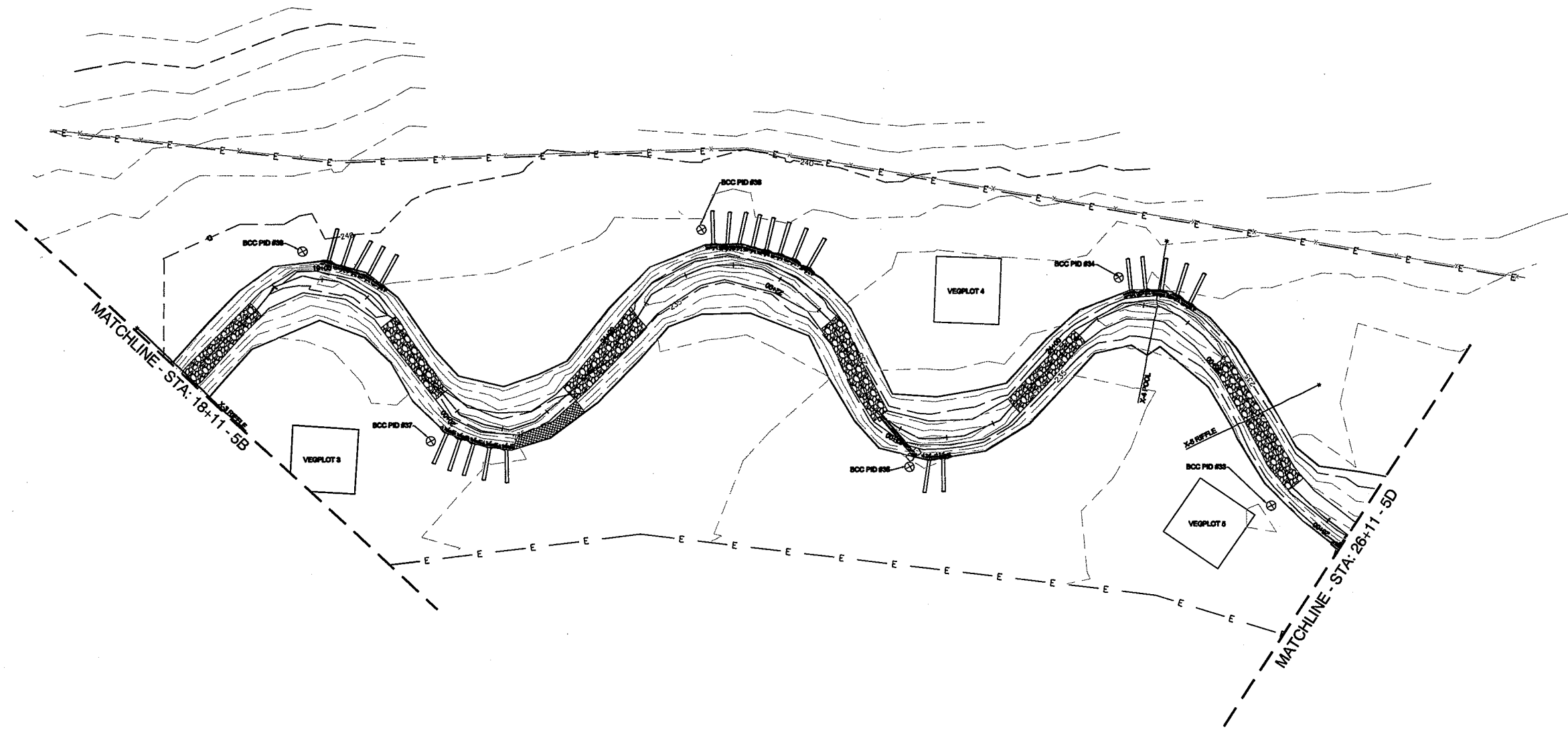


BIG CEDAR CREEK
 UT2 AS-BUILT



BAKER PROJECT REFERENCE NO. 109261	SHEET NO. 5B
PROJECT ENGINEER	
	
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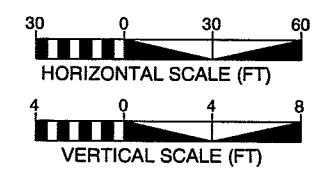
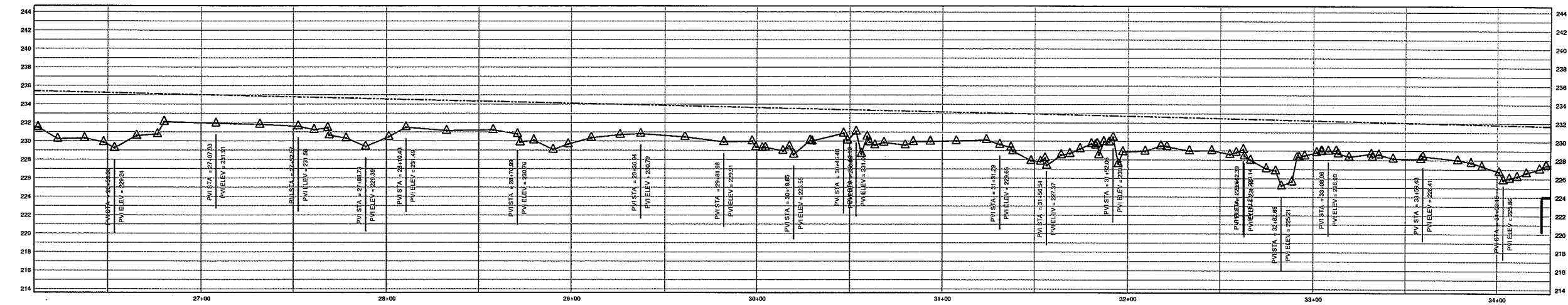
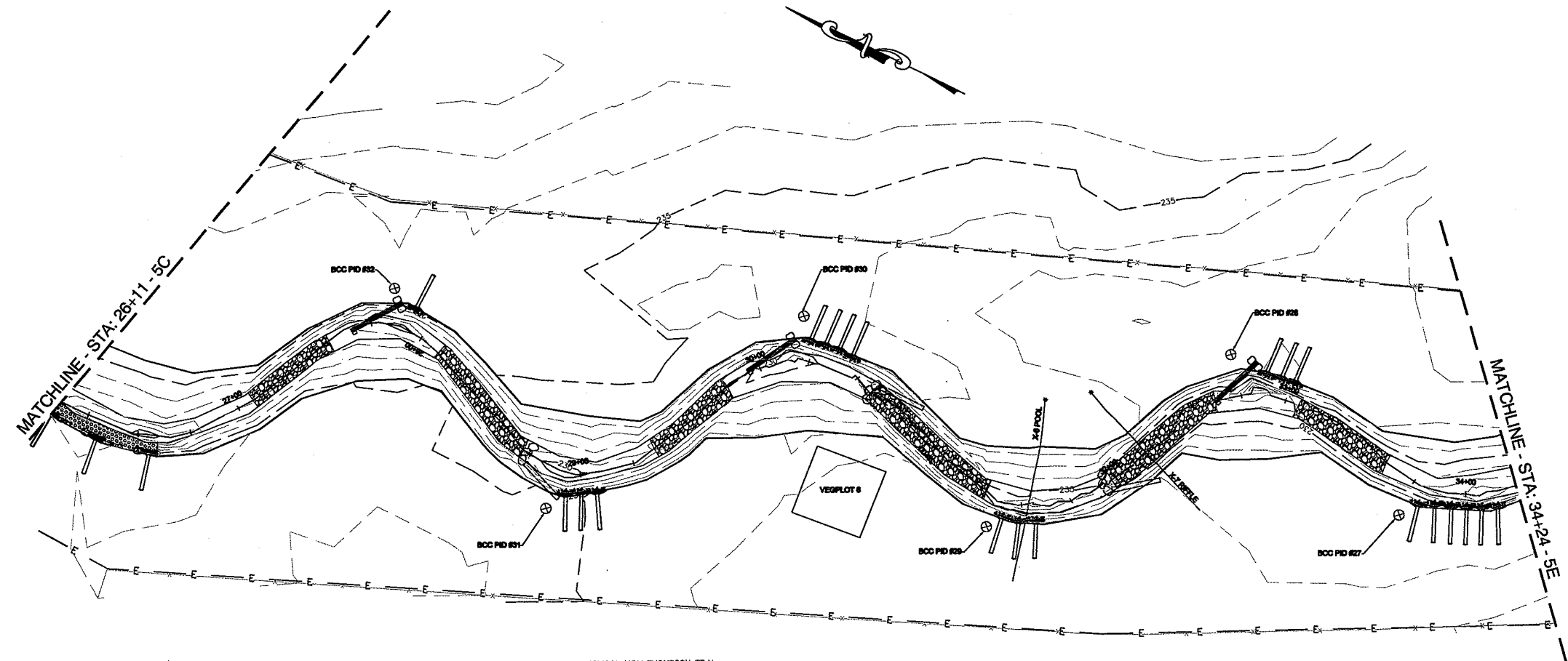


BIG CEDAR CREEK
BIG CEDAR CREEK AS-BUILT



BIG CEDAR CREEK
BIG CEDAR CREEK AS-BUILT

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PROJECT ENGINEER	
	
	
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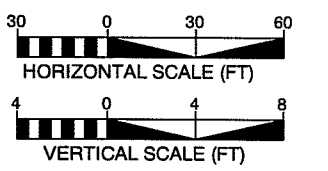
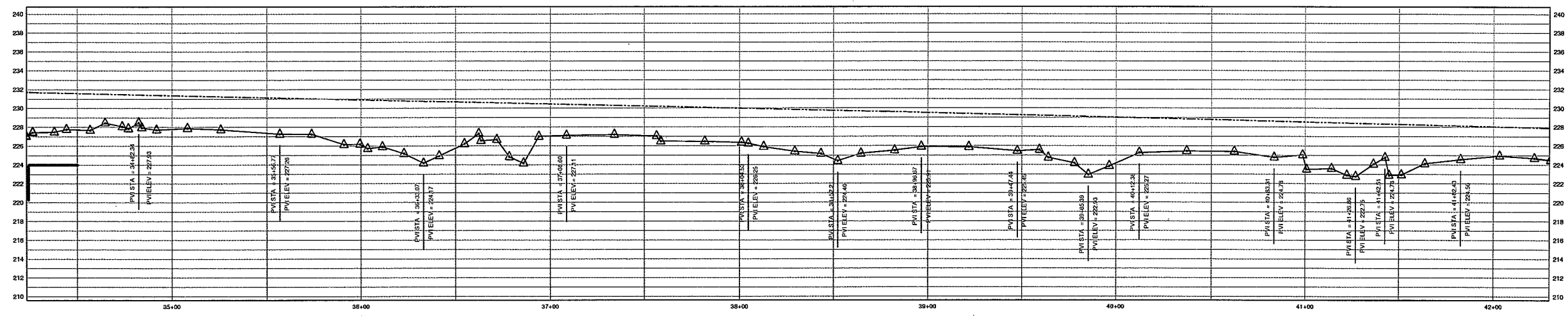
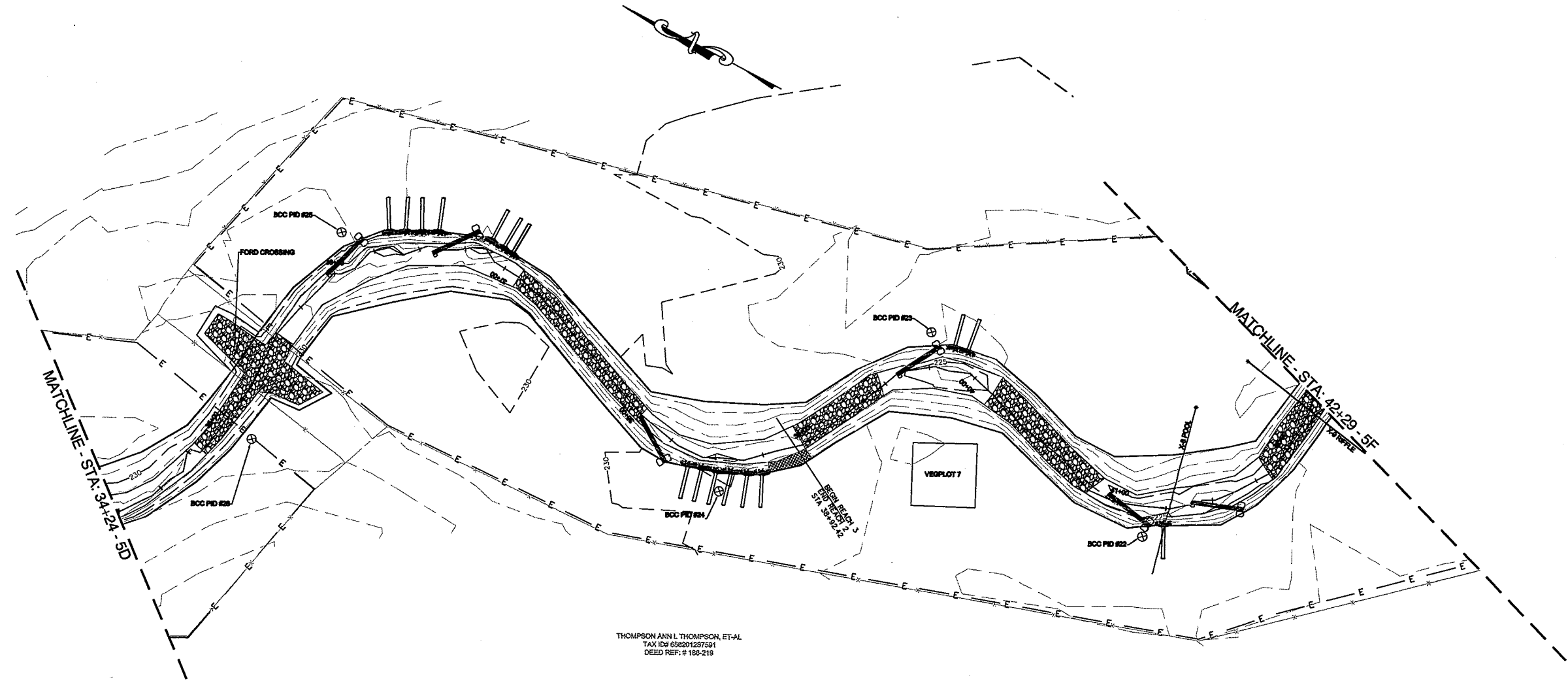


BIG CEDAR CREEK
BIG CEDAR CREEK
AS-BUILT





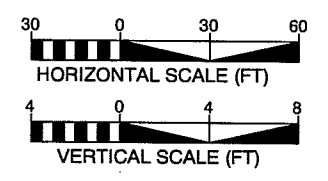
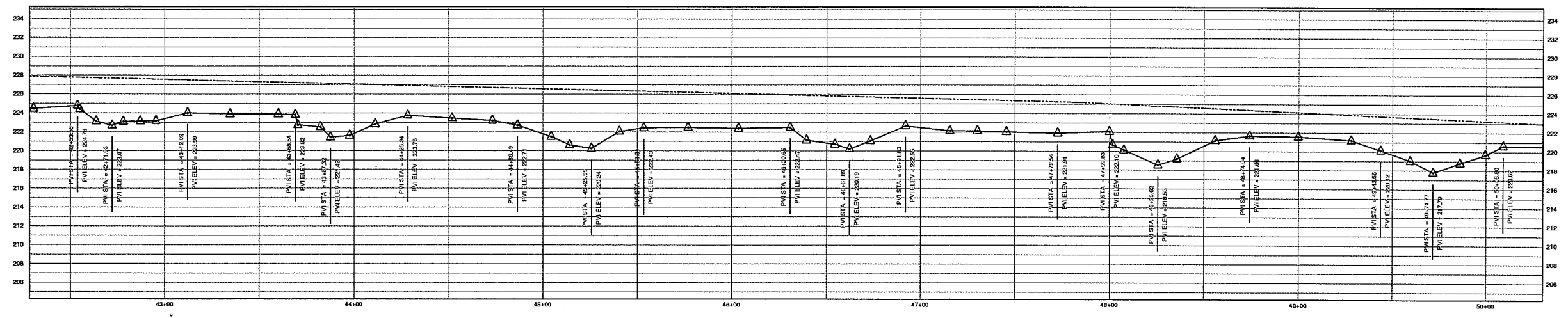
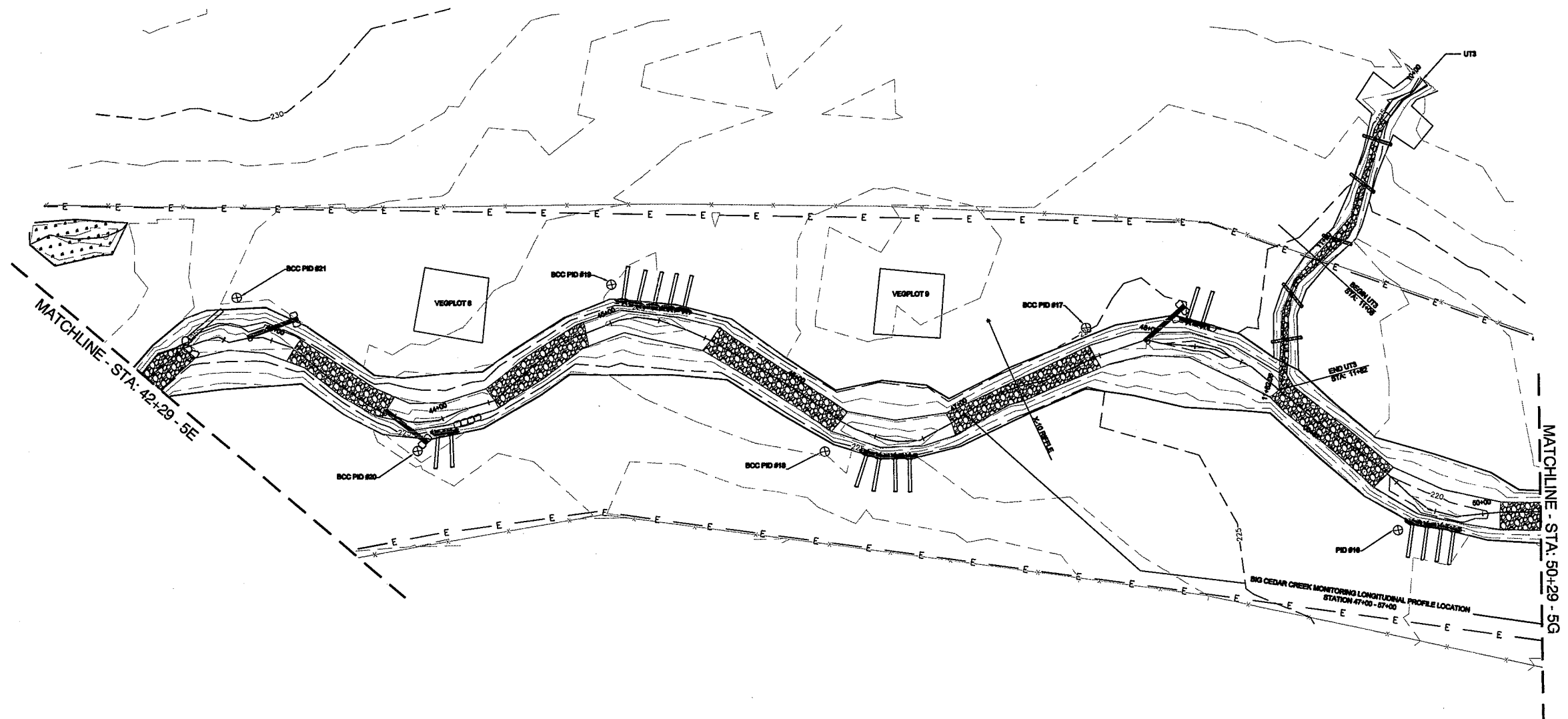
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BIG CEDAR CREEK

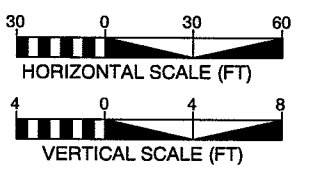
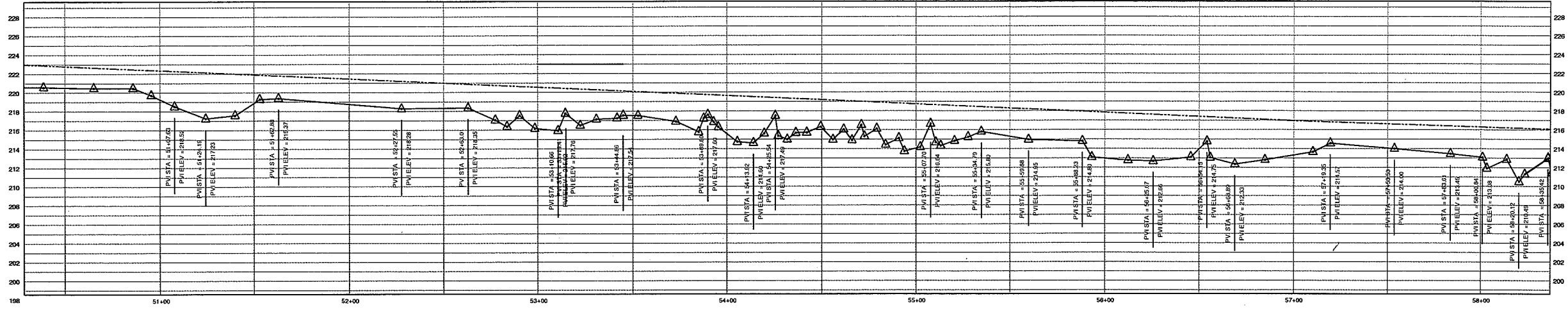
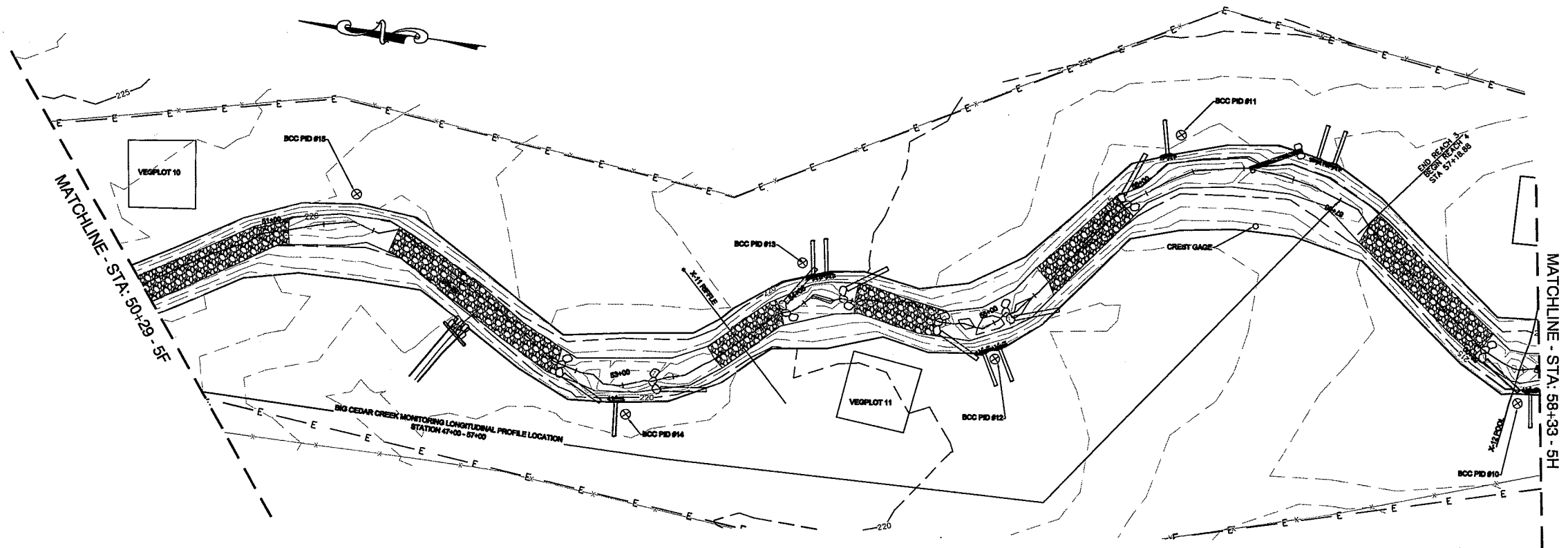
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Michael Baker

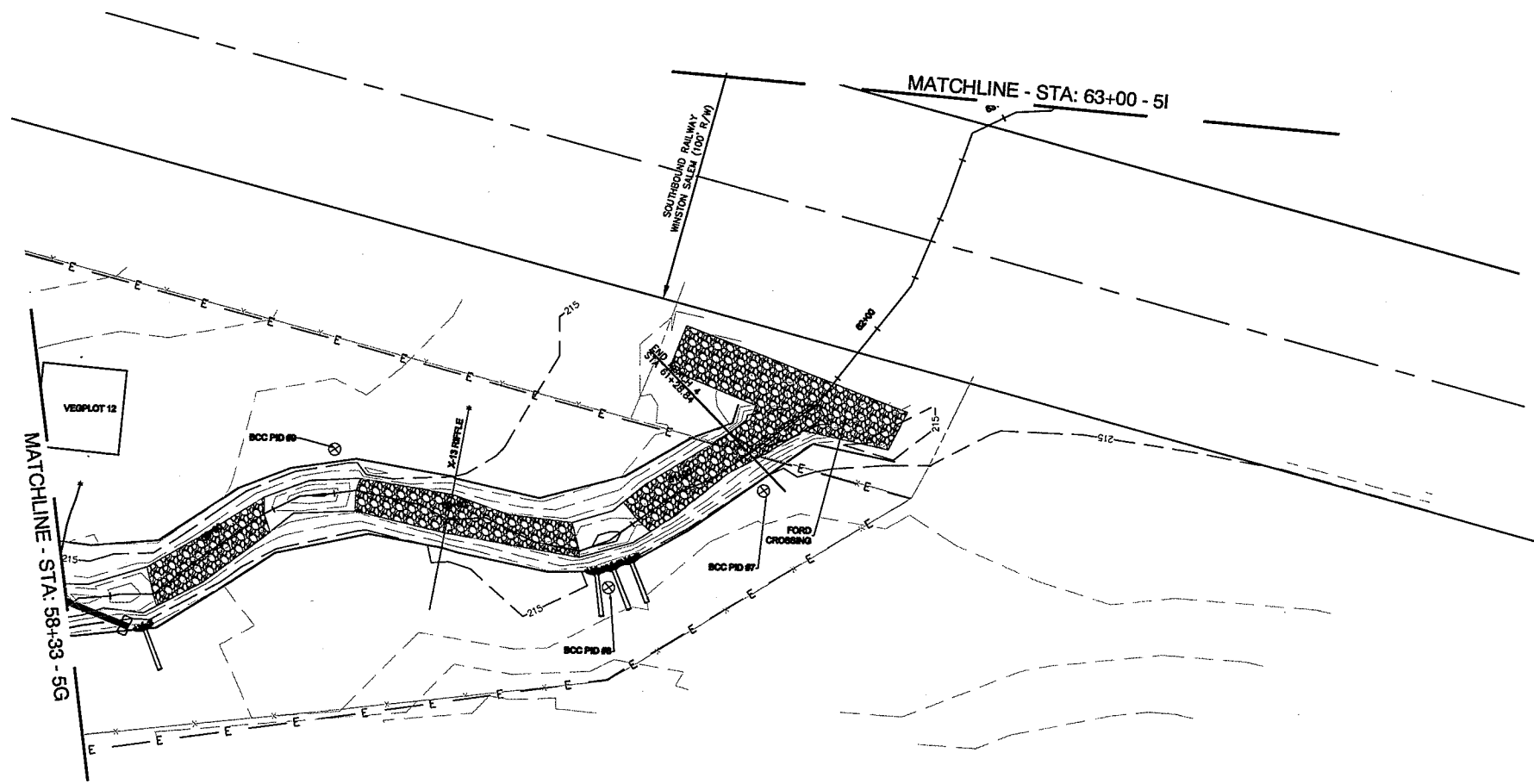
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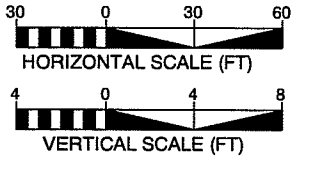
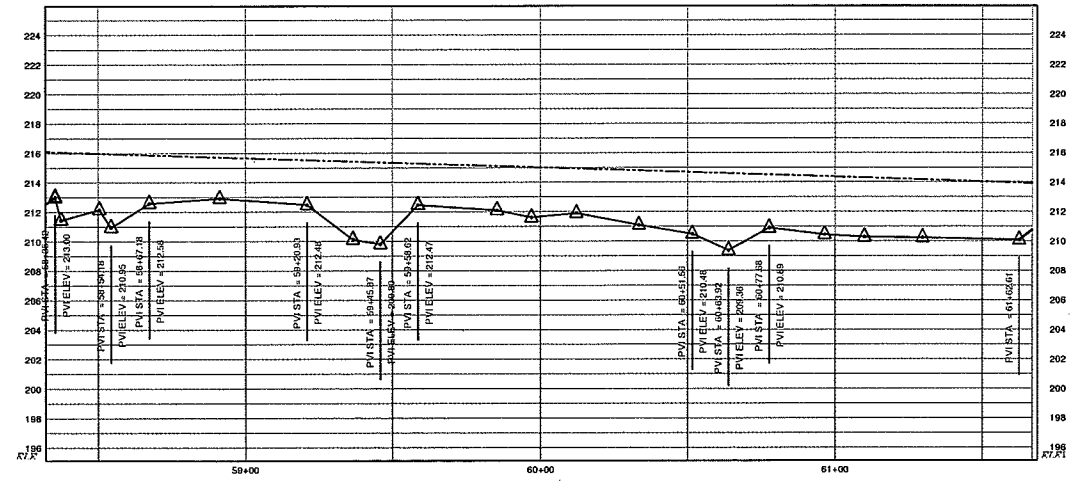
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BIG CEDAR CREEK AS-BUILT



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 Fax: 704.334.4452

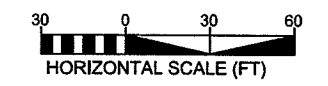
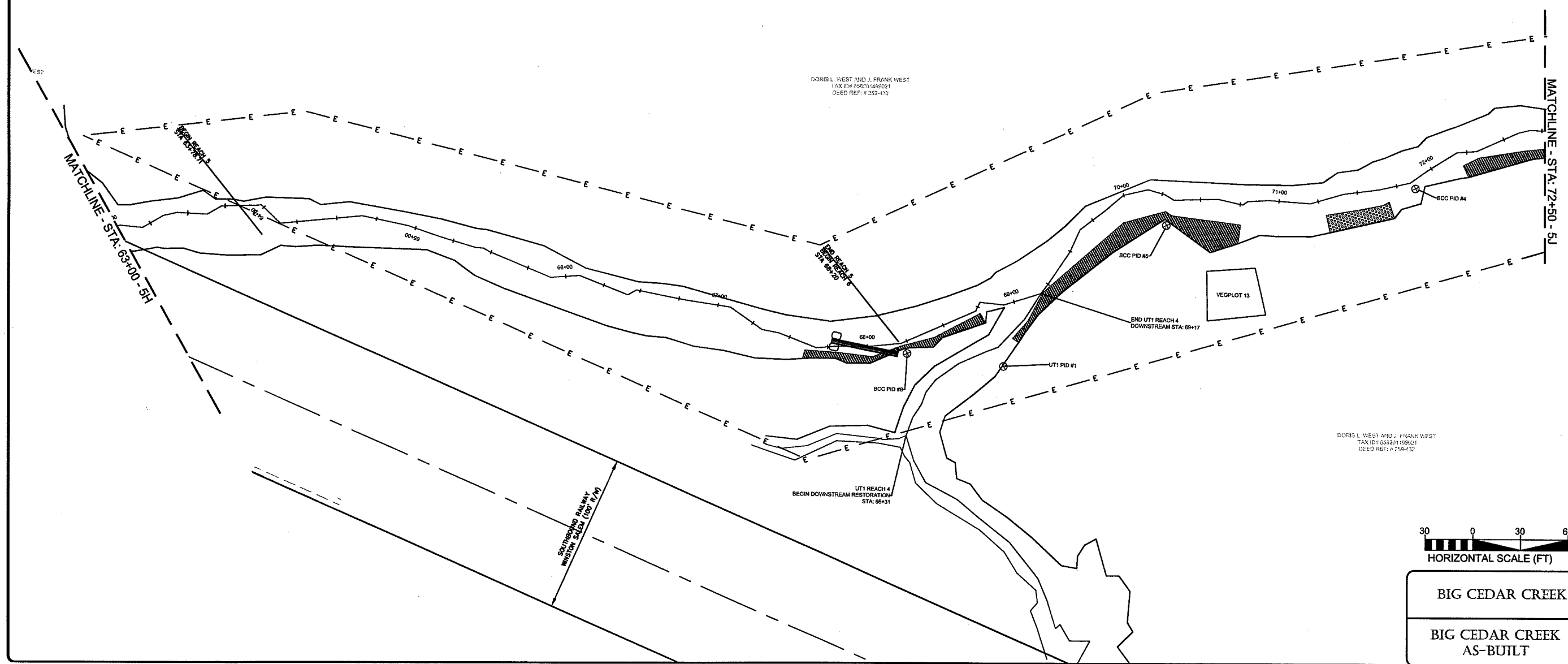


THOMPSON ANN L THOMPSON, ET-AL
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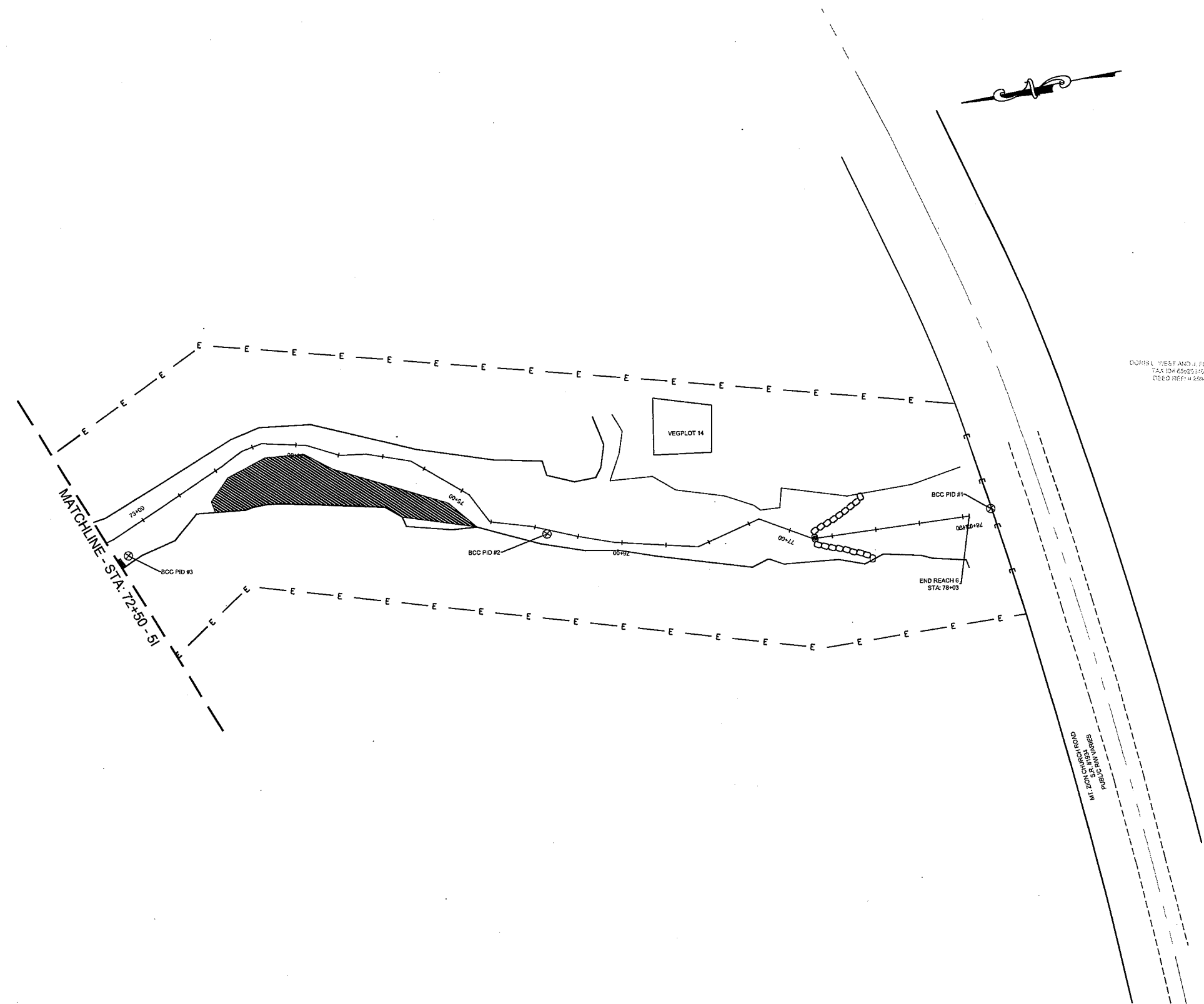
BIG CEDAR CREEK
BIG CEDAR CREEK
AS-BUILT

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109261	51
PROJECT ENGINEER	
8-11-09	
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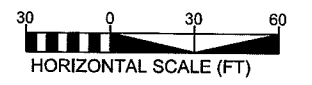


BIG CEDAR CREEK
 BIG CEDAR CREEK
 AS-BUILT



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PROJECT ENGINEER	
	
5-11-09	
	
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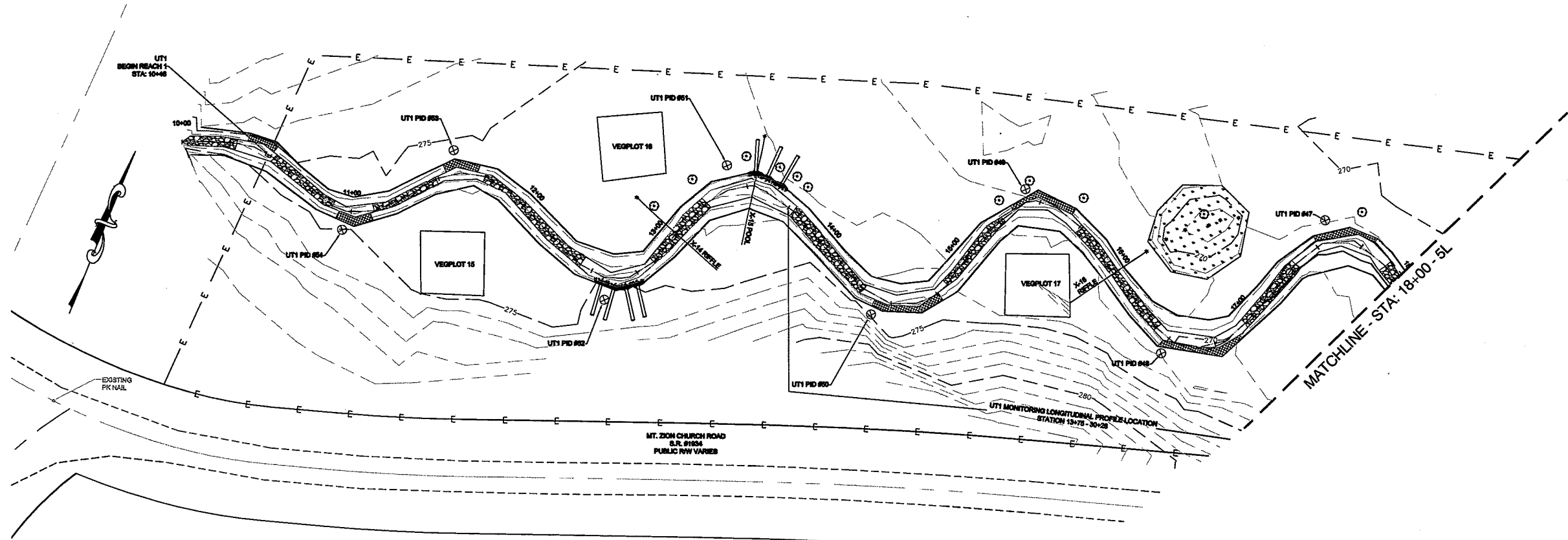


DORRIS L. WEST AND J. FRANK WEST
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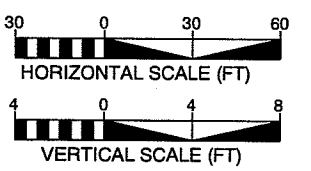
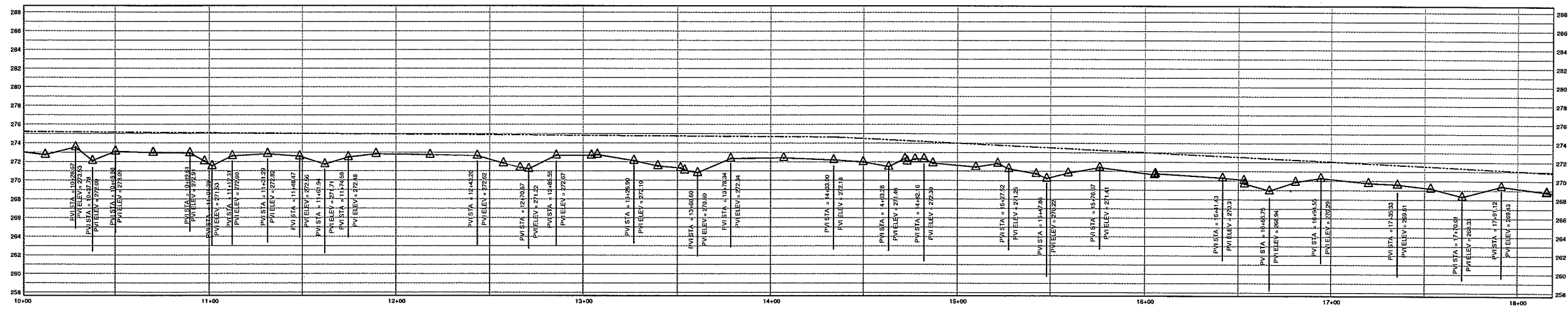


BIG CEDAR CREEK
 BIG CEDAR CREEK
 AS-BUILT

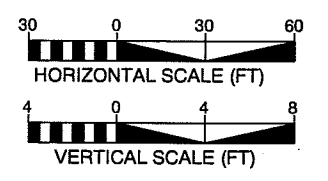
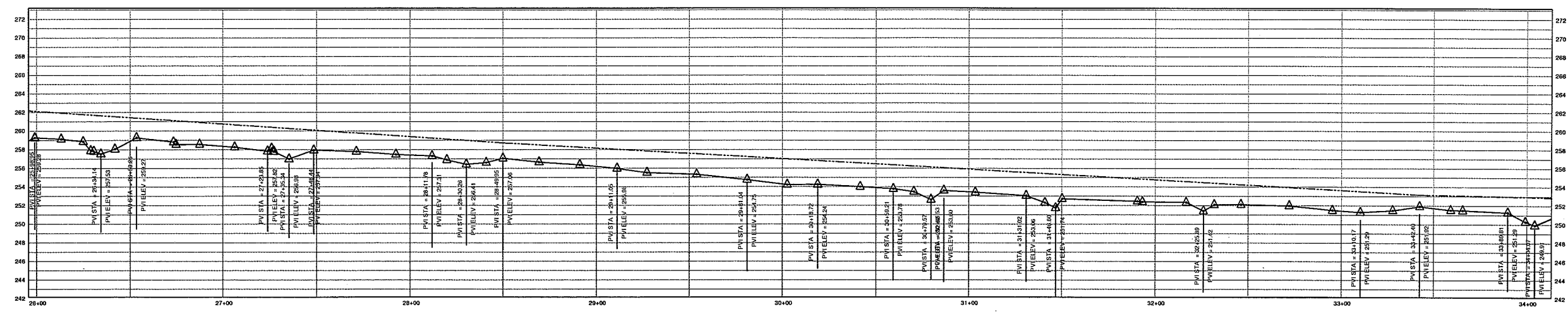
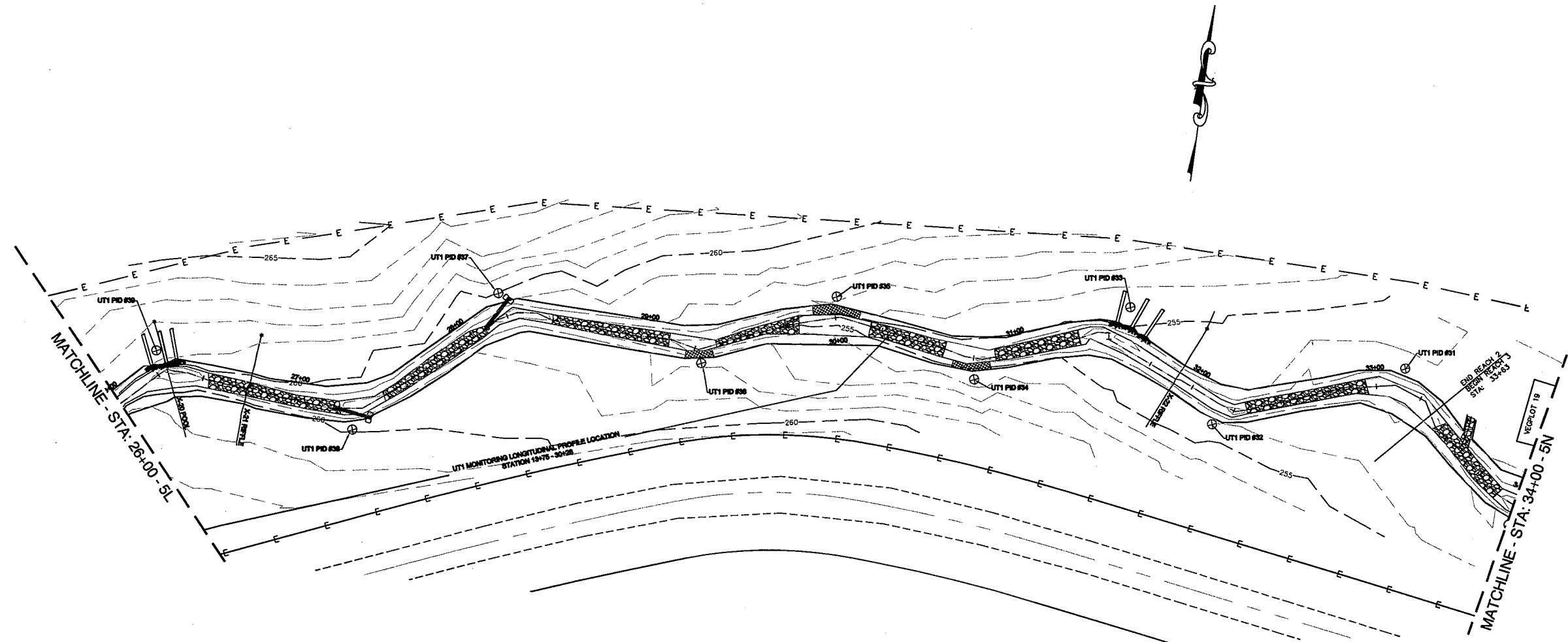
BAKER PROJECT REFERENCE NO. 109261 SHEET NO. 5K
 PROJECT ENGINEER


Baker
 David L. Baker Engineering, Inc.
 1417 South Tryon Street
 Suite 202
 Charlotte, NC 28203
 Phone: 704.234.4454
 Fax: 704.234.4492



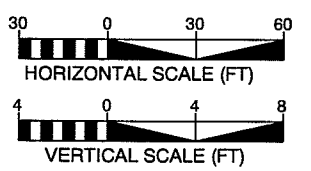
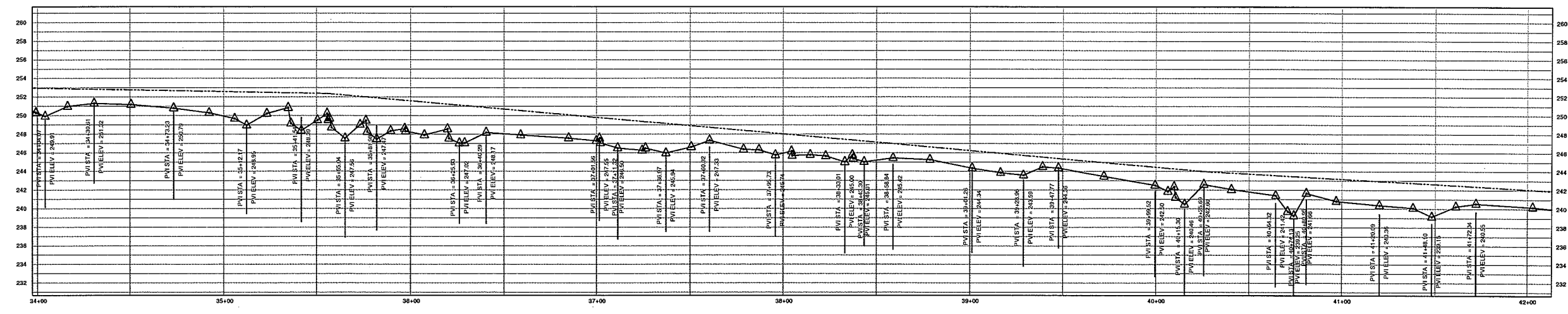
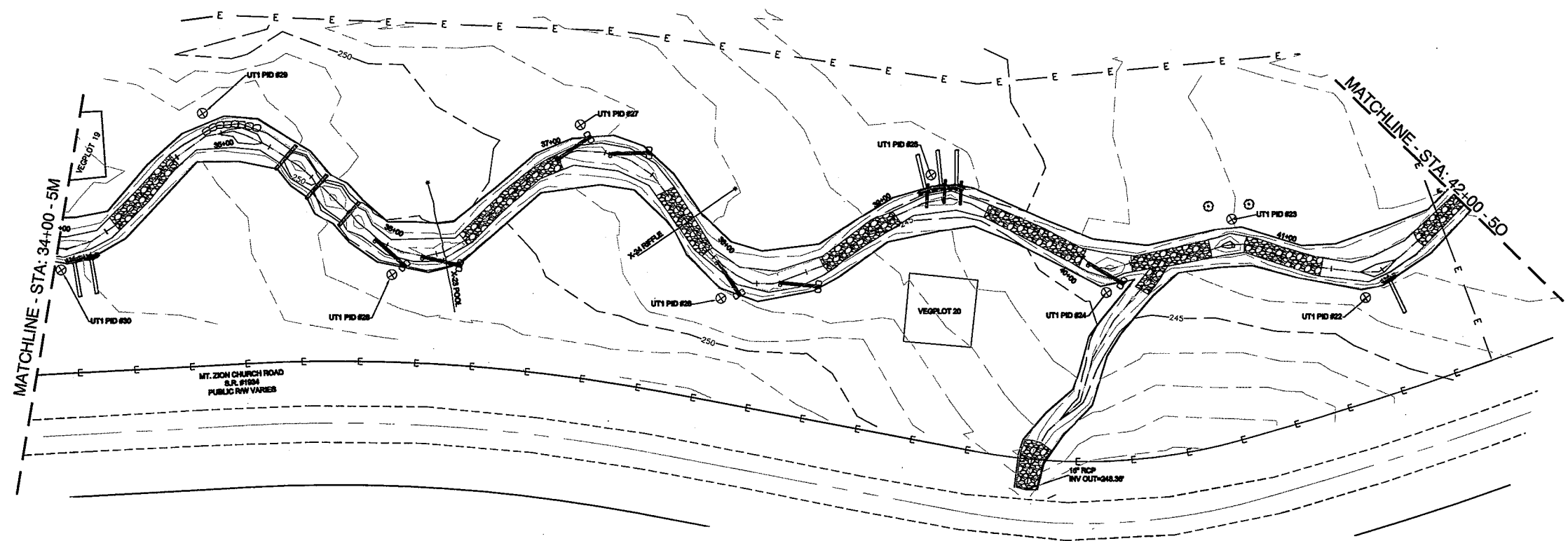
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BIG CEDAR CREEK
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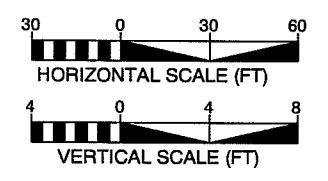
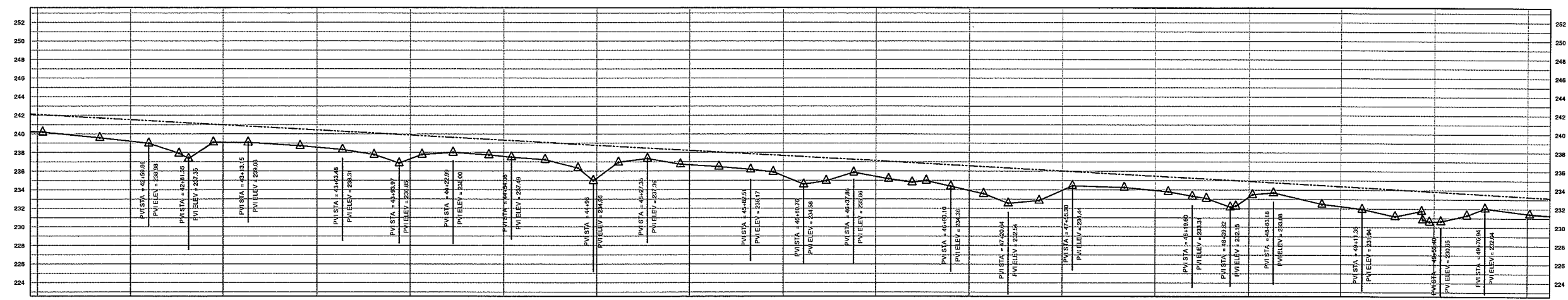
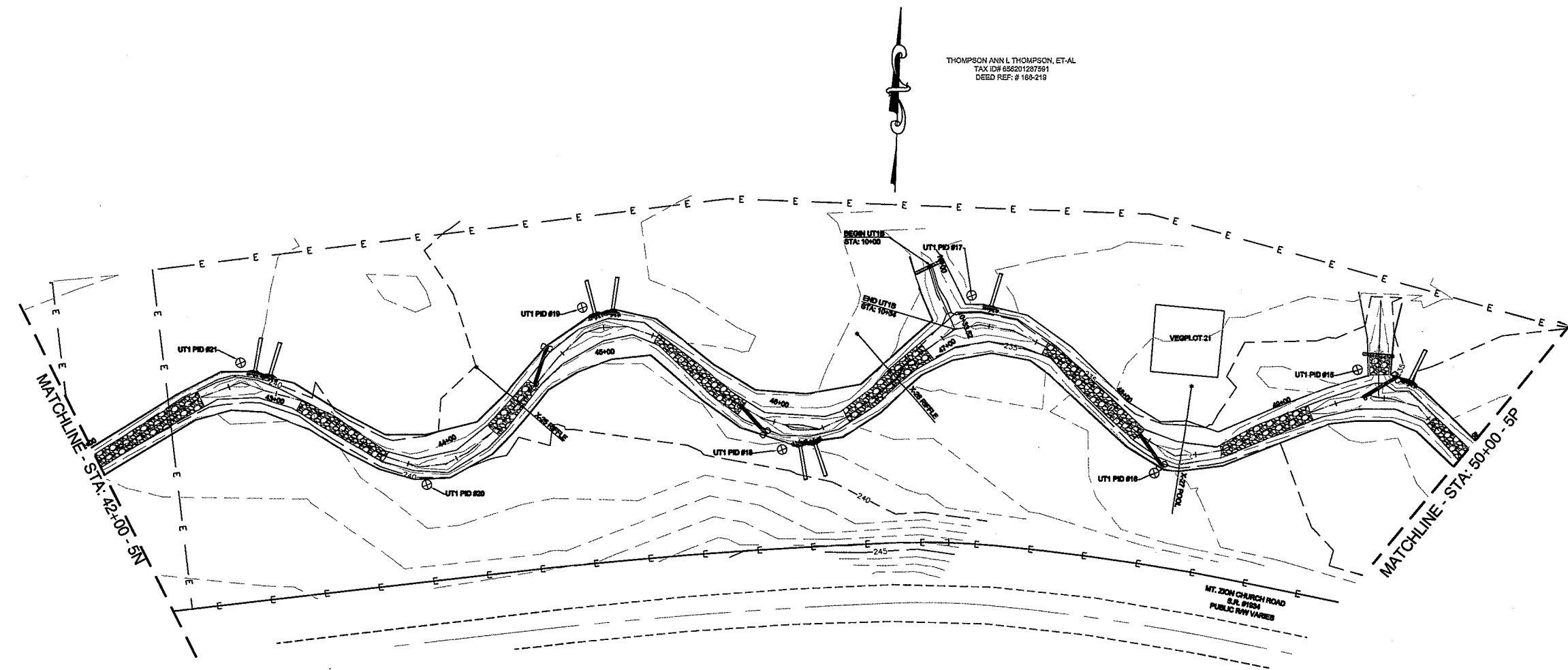


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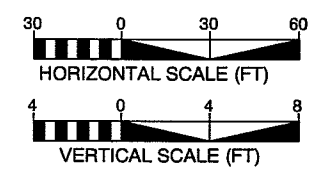
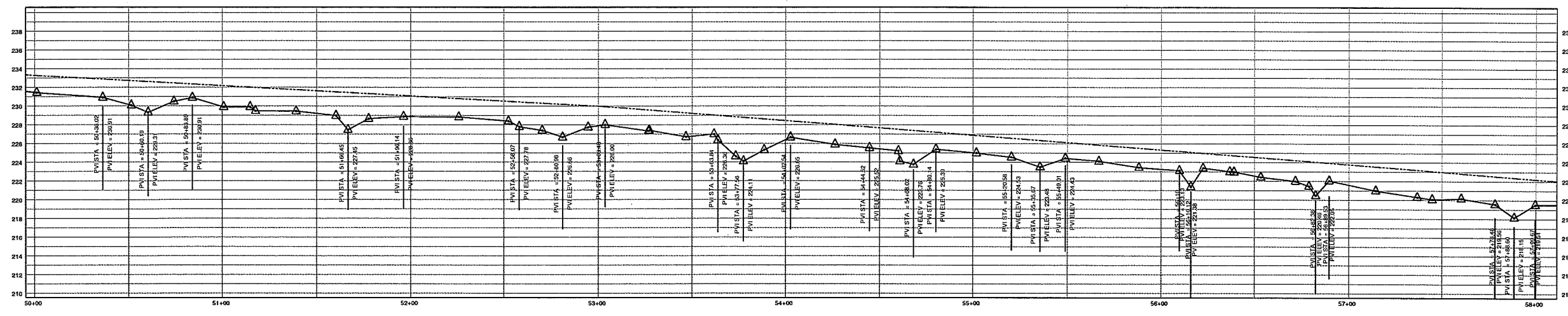
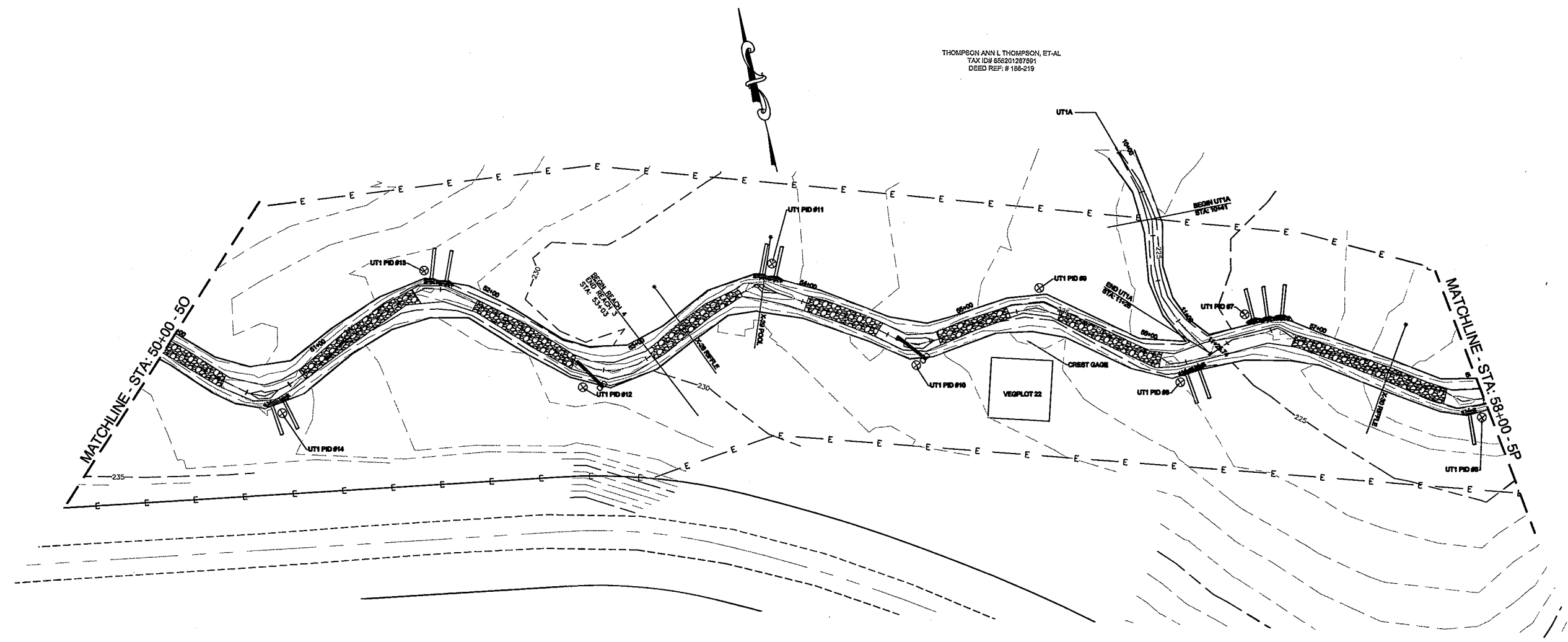
BIG CEDAR CREEK
 UTI AS-BUILT

BAKER PROJECT REFERENCE NO. 109261	SHEET NO. 50
PROJECT ENGINEER	
	
	
Baker Michael Baker Engineering, Inc. 1447 South Tryon Street Suite 200 Charlotte, NC 28203 Phone: 704.334.4454 Fax: 704.334.4422	

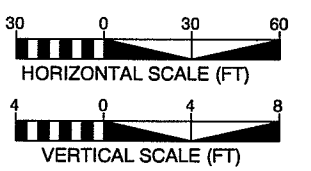
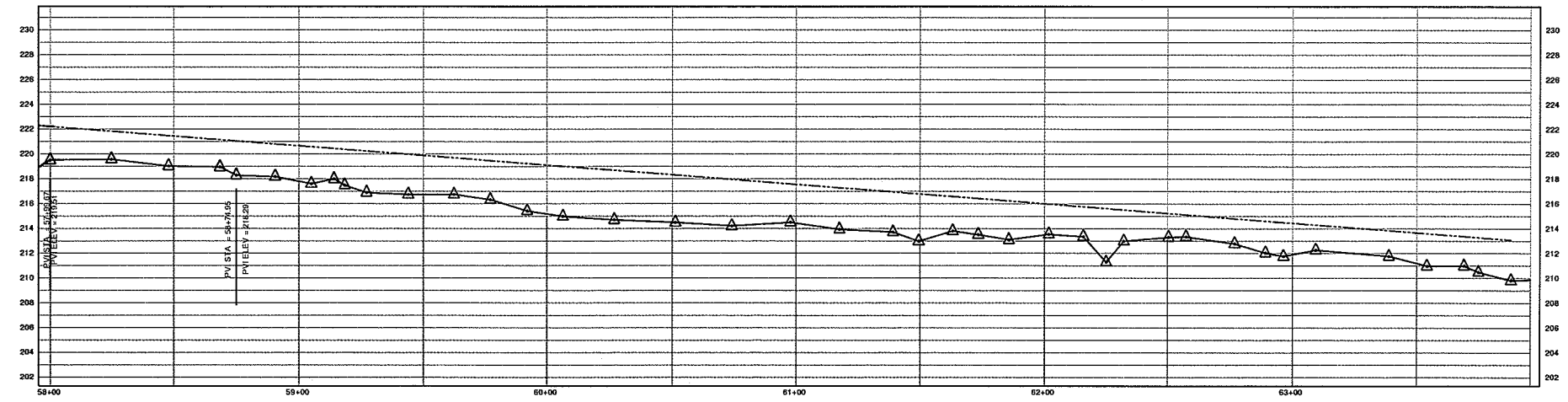
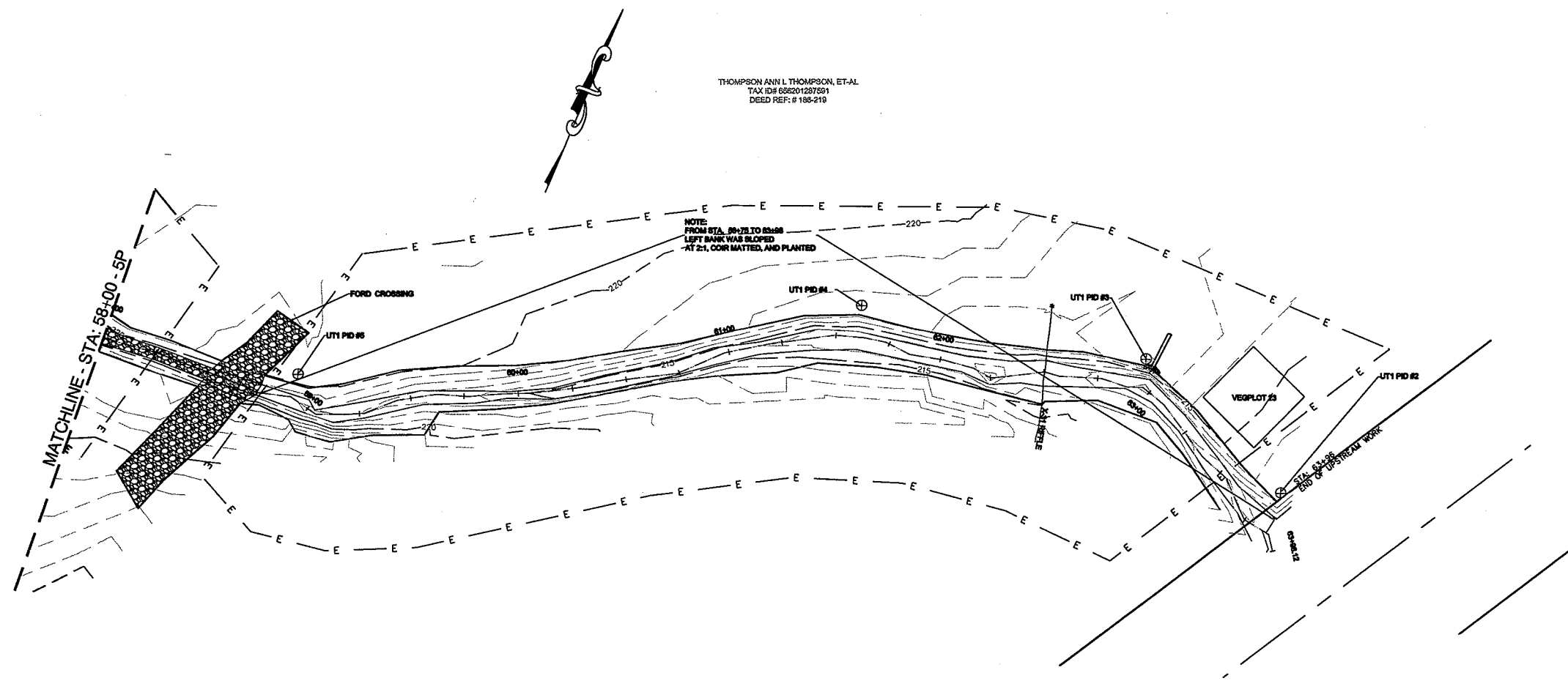


BIG CEDAR CREEK

UTI AS-BUILT



BIG CEDAR CREEK
 UTI AS-BUILT



BIG CEDAR CREEK

UTI 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

Big Cedar Creek Photos



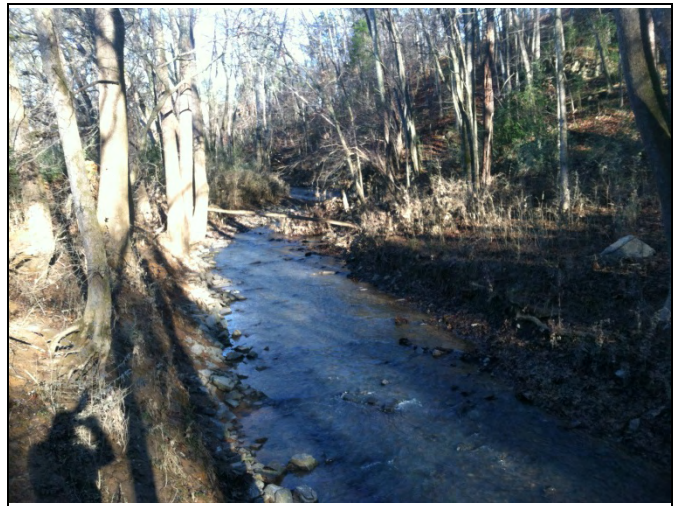
BCC PID 1– Cross Vane, BCC Reach 6 End



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



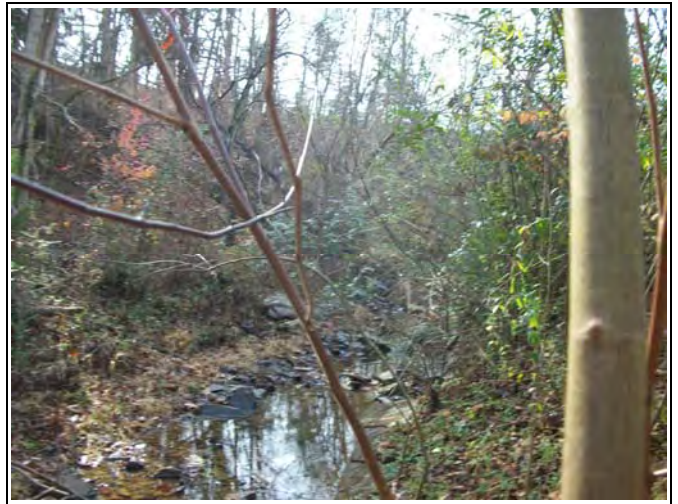
UT1 PID 1 – Constructed Riffle, UT1 Reach 4 End



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 – 0.41-ft (12/3/2013)



UT1 Crest Gauge – 0.33-ft (12/3/2013)

Appendix F

Benthic Macroinvertebrate Monitoring Data

Habitat Assessment Field Sheets

Habitat Assessment Data (Table F.1)

Photo Log

Habitat Assessment Field Data Sheet
Mountain/ Piedmont Streams

Biological Assessment Unit, DWQ

TOTAL SCORE 107

Directions for use: The observer is to survey a minimum of 100 meters with 200 meters preferred of stream, preferably in an upstream direction starting above the bridge pool and the road right-of-way. The segment which is assessed should represent average stream conditions. To perform a proper habitat evaluation the observer needs to get into the stream. To complete the form, select the description which best fits the observed habitats and then circle the score. If the observed habitat falls in between two descriptions, select an intermediate score. A final habitat score is determined by adding the results from the different metrics.

Stream Big Cedar Creek Location/road: Site 1 (Road Name _____) County _____

Date 10/17/2013 CC# _____ Basin _____ Subbasin _____

Observer(s) KS & RFB Type of Study: Fish Benthos Basinwide Special Study (Describe) _____

Latitude _____ Longitude _____ Ecoregion: MT P Slate Belt Triassic Basin

Water Quality: Temperature 18.0 °C DO 72.6% 7.61 mg/l Conductivity (corr.) N/A µS/cm pH 7.9

Physical Characterization: Visible land use refers to immediate area that you can see from sampling location - include what you estimate driving thru the watershed in watershed land use.

Visible Land Use: _____ %Forest _____ %Residential _____ %Active Pasture _____ % Active Crops
_____ %Fallow Fields _____ % Commercial _____ %Industrial _____ %Other - Describe: _____

Watershed land use : Forest Agriculture Urban Animal operations upstream

Width: (meters) Stream 10 ft Channel (at top of bank) 17.5 ft Stream Depth: (m) Avg 1.5 ft Max 3 ft
 Width variable Large river >25m wide

Bank Height (from deepest part of riffle to top of bank-first flat surface you stand on): (m) 6 ft

Bank Angle: 70 ° or NA (Vertical is 90°, horizontal is 0°. Angles > 90° indicate slope is towards mid-channel, < 90° indicate slope is away from channel. NA if bank is too low for bank angle to matter.)

- Channelized Ditch
- Deeply incised-steep, straight banks Both banks undercut at bend Channel filled in with sediment
- Recent overbank deposits Bar development Buried structures Exposed bedrock
- Excessive periphyton growth Heavy filamentous algae growth Green tinge Sewage smell

Manmade Stabilization: N Y: Rip-rap, cement, gabions Sediment/grade-control structure Berm/levee

Flow conditions : High Normal Low

Turbidity: Clear Slightly Turbid Turbid Tannic Milky Colored (from dyes)

Good potential for Wetlands Restoration Project?? YES NO Details _____

Channel Flow Status

Useful especially under abnormal or low flow conditions.

- A. Water reaches base of both lower banks, minimal channel substrate exposed
- B. Water fills >75% of available channel, or <25% of channel substrate is exposed.....
- C. Water fills 25-75% of available channel, many logs/snags exposed.....
- D. Root mats out of water.....
- E. Very little water in channel, mostly present as standing pools.....

Weather Conditions: Overcast 77° Photos: N Y Digital 35mm

Remarks: Deeply incised heavy erosion, outer meanders are unstable

I. Channel Modification

- A: channel natural, frequent bends..... 5 Score
- B. channel natural, infrequent bends (channelization could be old)..... 4
- C. some channelization present..... 3
- D. more extensive channelization, >40% of stream disrupted..... 2
- E. no bends, completely channelized or rip rapped or gabioned, etc..... 0

Evidence of dredging Evidence of desnagging=no large woody debris in stream Banks of uniform shape/height
 Remarks _____ Subtotal 5

II. Instream Habitat: Consider the percentage of the reach that is favorable for benthos colonization or fish cover. If >70% of the reach is rocks, 1 type is present, circle the score of 17. Definition: leafpacks consist of older leaves that are packed together and have begun to decay (not piles of leaves in pool areas). Mark as Rare, Common, or Abundant.

19 Rocks 0 Macrophytes 10 Sticks and leafpacks 5 Snags and logs 6 Undercut banks or root mats

AMOUNT OF REACH FAVORABLE FOR COLONIZATION OR COVER

	>70%	40-70%	20-40%	<20%
	Score	Score	Score	Score
4 or 5 types present.....	20	16	12	8
3 types present.....	<u>19</u>	15	11	<u>7</u>
2 types present.....	18	14	10	<u>6</u>
1 type present.....	17	13	9	5
No types present.....	0			

No woody vegetation in riparian zone Remarks _____ Subtotal 40

III. Bottom Substrate (silt, sand, detritus, gravel, cobble, boulder) Look at entire reach for substrate scoring, but only look at riffle for embeddedness, and use rocks from all parts of riffle-look for "mud line" or difficulty extracting rocks.

- A. substrate with good mix of gravel, cobble and boulders** Score
 - 1. embeddedness <20% (very little sand, usually only behind large boulders)..... 15
 - 2. embeddedness 20-40%..... 12
 - 3. embeddedness 40-80%..... 8
 - 4. embeddedness >80%..... 3
- B. substrate gravel and cobble**
 - 1. embeddedness <20%..... 14
 - 2. embeddedness 20-40%..... 11
 - 3. embeddedness 40-80% 6
 - 4. embeddedness >80%..... 2
- C. substrate mostly gravel**
 - 1. embeddedness <50%..... 8
 - 2. embeddedness >50%..... 4
- D. substrate homogeneous**
 - 1. substrate nearly all bedrock..... 3
 - 2. substrate nearly all sand 3
 - 3. substrate nearly all detritus..... 2
 - 4. substrate nearly all silt/ clay..... 1

Remarks _____ Subtotal 12

IV. Pool Variety Pools are areas of deeper than average maximum depths with little or no surface turbulence. Water velocities associated with pools are always slow. Pools may take the form of "pocket water", small pools behind boulders or obstructions, in large high gradient streams, or side eddies.

- A. Pools present** Score
 - 1. Pools Frequent (>30% of 200m area surveyed)
 - a. variety of pool sizes..... 10
 - b. pools about the same size (indicates pools filling in)..... 8
 - 2. Pools Infrequent (<30% of the 200m area surveyed)
 - a. variety of pool sizes..... 6
 - b. pools about the same size..... 4
- B. Pools absent**..... 0

Subtotal 8

Pool bottom boulder-cobble=hard Bottom sandy-sink as you walk Silt bottom Some pools over wader depth
 Remarks _____

Page Total 65

V. Riffle Habitats

Definition: Riffle is area of reeration-can be debris dam, or narrow channel area. Riffles **Frequent** Riffles **Infrequent**

	<u>Score</u>	<u>Score</u>
A. well defined riffle and run, riffle as wide as stream and extends 2X width of stream....	16	12
B. riffle as wide as stream but riffle length is not 2X stream width	(14)	7
C. riffle not as wide as stream and riffle length is not 2X stream width	10	3
D. riffles absent.....	0	

Channel Slope: Typical for area Steep=fast flow Low=like a coastal stream

Subtotal 14

VI. Bank Stability and Vegetation

FACE UPSTREAM

Left Bank Score Rt. Bank Score

A. Banks stable

1. little evidence of erosion or bank failure(except outside of bends), little potential for erosion.. 7 7

B. Erosion areas present

- 1. diverse **trees**, shrubs, grass; plants healthy with good root systems..... 6 6
- 2. few trees or small trees and **shrubs**; vegetation appears generally healthy..... (5) (5)
- 3. sparse **mixed** vegetation; plant types and conditions suggest poorer soil binding..... 3 3
- 4. mostly **grasses**, few if any trees and shrubs, high erosion and failure potential at high flow.. 2 2
- 5. little or no bank vegetation, mass erosion and bank failure evident..... 0 0

Total 10

Remarks High infestation of privet

VII. Light Penetration Canopy is defined as tree or vegetative cover directly above the stream's surface. Canopy would block out sunlight when the sun is directly overhead. Note shading from mountains, but not use to score this metric.

	<u>Score</u>
A. Stream with good canopy with some breaks for light penetration	10
B. Stream with full canopy - breaks for light penetration absent.....	(8)
C. Stream with partial canopy - sunlight and shading are essentially equal.....	7
D. Stream with minimal canopy - full sun in all but a few areas.....	2
E. No canopy and no shading.....	0

24
18
42

Remarks _____ Subtotal 8

VIII. Riparian Vegetative Zone Width

Definition: Riparian zone for this form is area of natural vegetation adjacent to stream (can go beyond floodplain). Definition: A break in the riparian zone is any place on the stream banks which allows sediment or pollutants to directly enter the stream, such as paths down to stream, storm drains, uprooted trees, otter slides, etc.

FACE UPSTREAM

Lft. Bank Score Rt. Bank Score

Dominant vegetation: Trees Shrubs Grasses Weeds/old field Exotics (kudzu, etc)

A. Riparian zone intact (no breaks)

- 1. width > 18 meters..... (5) (5)
- 2. width 12-18 meters..... 4 4
- 3. width 6-12 meters..... 3 3
- 4. width < 6 meters..... 2 2

B. Riparian zone not intact (breaks)

- 1. breaks rare
 - a. width > 18 meters..... 4 4
 - b. width 12-18 meters..... 3 3
 - c. width 6-12 meters..... 2 2
 - d. width < 6 meters..... 1 1
- 2. breaks common
 - a. width > 18 meters..... 3 3
 - b. width 12-18 meters..... 2 2
 - c. width 6-12 meters..... 1 1
 - d. width < 6 meters..... 0 0

42
65
107

Remarks _____ Total 10

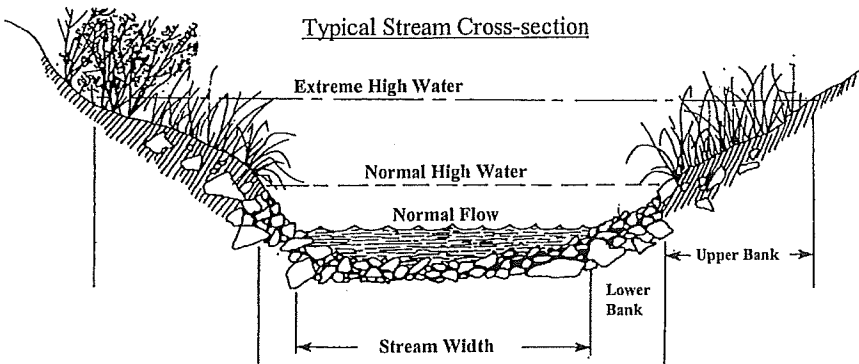
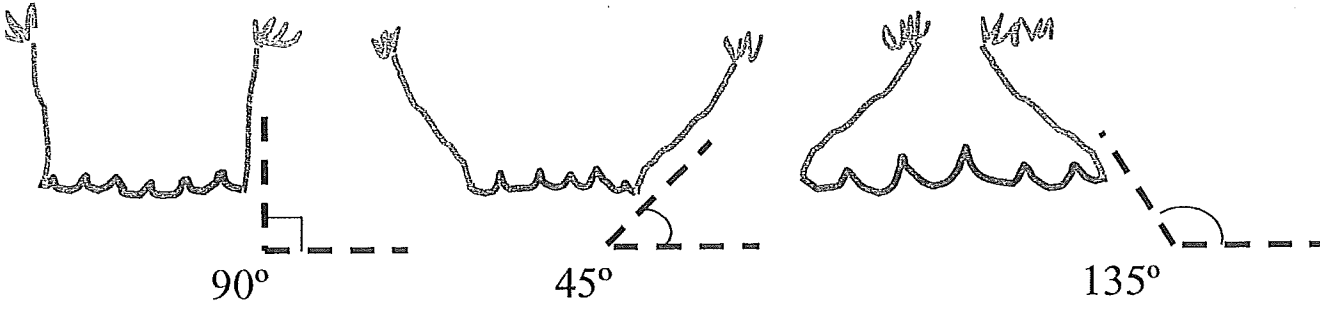
Page Total 42

Disclaimer-form filled out, but score doesn't match subjective opinion-atypical stream.

TOTAL SCORE 107

Supplement for Habitat Assessment Field Data Sheet

Diagram to determine bank angle:



This side is 45° bank angle.

Site Sketch:

Other comments:

Small Fish present

Water striders

Salamanders

crayfish

Habitat Assessment Field Data Sheet
Mountain/ Piedmont Streams

TOTAL SCORE /32

Biological Assessment Unit, DWQ

Directions for use: The observer is to survey a minimum of 100 meters with 200 meters preferred of stream, preferably in an upstream direction starting above the bridge pool and the road right-of-way. The segment which is assessed should represent average stream conditions. To perform a proper habitat evaluation the observer needs to get into the stream. To complete the form, select the description which best fits the observed habitats and then circle the score. If the observed habitat falls in between two descriptions, select an intermediate score. A final habitat score is determined by adding the results from the different metrics.

Stream Big Cedar Creek Location/road: Site 2 (Road Name _____) County _____

Date 10/17/2013 CC# _____ Basin _____ Subbasin _____

Observer(s) KS + RB Type of Study: Fish Benthos Basinwide Special Study (Describe) _____

Latitude _____ Longitude _____ Ecoregion: MT P Slate Belt Triassic Basin

Water Quality: Temperature 18.9 °C DO ^{79.3%} 7.35 mg/l Conductivity (corr.) N/A µS/cm pH 7.68

Physical Characterization: Visible land use refers to immediate area that you can see from sampling location - include what you estimate driving thru the watershed in watershed land use.

Visible Land Use: _____ %Forest _____ %Residential _____ %Active Pasture _____ % Active Crops
_____ %Fallow Fields _____ % Commercial _____ %Industrial _____ %Other - Describe: _____

Watershed land use : Forest Agriculture Urban Animal operations upstream

Width: (meters) Stream 5ft Channel (at top of bank) 15 Stream Depth: (m) Avg 2.5ft Max 4.5ft
 Width variable Large river >25m wide

Bank Height (from deepest part of riffle to top of bank-first flat surface you stand on): (m) 1.5ft

Bank Angle: 45 ° or NA (Vertical is 90°, horizontal is 0°. Angles > 90° indicate slope is towards mid-channel, < 90° indicate slope is away from channel. NA if bank is too low for bank angle to matter.)

- Channelized Ditch
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Flow conditions : High Normal Low

Turbidity: Clear Slightly Turbid Turbid Tannic Milky Colored (from dyes)

Good potential for Wetlands Restoration Project?? YES NO Details _____

Channel Flow Status

Useful especially under abnormal or low flow conditions.

- A. Water reaches base of both lower banks, minimal channel substrate exposed
- B. Water fills >75% of available channel, or <25% of channel substrate is exposed.....
- C. Water fills 25-75% of available channel, many logs/snags exposed.....
- D. Root mats out of water.....
- E. Very little water in channel, mostly present as standing pools.....

Weather Conditions: Overcast 67° Photos: N Y Digital 35mm

Remarks: Restoration Priority 1

constructed riffles + crossings

I. Channel Modification

- A: channel natural, frequent bends..... 5 **Score**
- B. channel natural, infrequent bends (channelization could be old)..... 4
- C. some channelization present..... 3
- D. more extensive channelization, >40% of stream disrupted..... 2
- E. no bends, completely channelized or rip rapped or gabioned, etc..... 0

Evidence of dredging Evidence of desnagging=no large woody debris in stream Banks of uniform shape/height

Remarks Restoration Priority 1 Subtotal 5

II. Instream Habitat: Consider the percentage of the reach that is favorable for benthos colonization or fish cover. If >70% of the reach is rocks, 1 type is present, circle the score of 17. Definition: leafpacks consist of older leaves that are packed together and have begun to decay (not piles of leaves in pool areas). Mark as Rare, Common, or Abundant.

15 Rocks 10 Macrophytes 6 Sticks and leafpacks 5 Snags and logs 15 Undercut banks or root mats

AMOUNT OF REACH FAVORABLE FOR COLONIZATION OR COVER

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	Score	Score	Score	Score
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3 types present.....	19	<u>15</u>	11	7
2 types present.....	18	14	<u>10</u>	<u>6</u>
1 type present.....	17	13	9	5
No types present.....	0			

No woody vegetation in riparian zone

Remarks Site below farm crossing

Subtotal 51

III. Bottom Substrate (silt, sand, detritus, gravel, cobble, boulder) Look at entire reach for substrate scoring, but only look at riffle for embeddedness, and use rocks from all parts of riffle-look for "mud line" or difficulty extracting rocks.

A. substrate with good mix of gravel, cobble and boulders

- 1. embeddedness <20% (very little sand, usually only behind large boulders)..... 15 **Score**
- 2. embeddedness 20-40%..... 12
- 3. embeddedness 40-80%..... 8
- 4. embeddedness >80%..... 3

B. substrate gravel and cobble

- 1. embeddedness <20%..... 14
- 2. embeddedness 20-40%..... 11
- 3. embeddedness 40-80% 6
- 4. embeddedness >80%..... 2

C. substrate mostly gravel

- 1. embeddedness <50%..... 8
- 2. embeddedness >50%..... 4

D. substrate homogeneous

- 1. substrate nearly all bedrock..... 3
- 2. substrate nearly all sand 3
- 3. substrate nearly all detritus..... 2
- 4. substrate nearly all silt/ clay..... 1

Remarks _____

Subtotal 12

IV. Pool Variety Pools are areas of deeper than average maximum depths with little or no surface turbulence. Water velocities associated with pools are always slow. Pools may take the form of "pocket water", small pools behind boulders or obstructions, in large high gradient streams, or side eddies.

A. Pools present

- 1. Pools Frequent (>30% of 200m area surveyed)
 - a. variety of pool sizes..... 10 **Score**
 - b. pools about the same size (indicates pools filling in)..... 8
- 2. Pools Infrequent (<30% of the 200m area surveyed)
 - a. variety of pool sizes..... 6
 - b. pools about the same size..... 4

B. Pools absent..... 0

Subtotal 10

Pool bottom boulder-cobble=hard Bottom sandy-sink as you walk Silt bottom Some pools over wader depth

Remarks majority hard - sandy-silty in large pools

Page Total 78

V. Riffle Habitats

Definition: Riffle is area of reeration-can be debris dam, or narrow channel area. Riffles **Frequent** Riffles **Infrequent**

	<u>Score</u>	<u>Score</u>
A. well defined riffle and run, riffle as wide as stream and extends 2X width of stream....	(16)	12
B. riffle as wide as stream but riffle length is not 2X stream width	14	7
C. riffle not as wide as stream and riffle length is not 2X stream width	10	3
D. riffles absent.....	0	

Channel Slope: Typical for area Steep=fast flow Low=like a coastal stream

Subtotal 16

VI. Bank Stability and Vegetation

FACE UPSTREAM

Left Bank Score Rt. Bank Score

A. Banks stable		
1. little evidence of erosion or bank failure(except outside of bends), little potential for erosion.	(7)	(7)
B. Erosion areas present		
1. diverse trees , shrubs, grass; plants healthy with good root systems.....	6	6
2. few trees or small trees and shrubs ; vegetation appears generally healthy.....	5	5
3. sparse mixed vegetation; plant types and conditions suggest poorer soil binding.....	3	3
4. mostly grasses , few if any trees and shrubs, high erosion and failure potential at high flow..	2	2
5. little or no bank vegetation, mass erosion and bank failure evident.....	0	0

Total 14

Remarks Restoration Priority

VII. Light Penetration Canopy is defined as tree or vegetative cover directly above the stream's surface. Canopy would block out sunlight when the sun is directly overhead. Note shading from mountains, but not use to score this metric.

	<u>Score</u>
A. Stream with good canopy with some breaks for light penetration	10
B. Stream with full canopy - breaks for light penetration absent.....	8
C. Stream with partial canopy - sunlight and shading are essentially equal.....	7
D. Stream with minimal canopy - full sun in all but a few areas.....	2
E. No canopy and no shading.....	0

Remarks Year 5 post construction restoration Subtotal 4

VIII. Riparian Vegetative Zone Width

Definition: Riparian zone for this form is area of natural vegetation adjacent to stream (can go beyond floodplain). Definition: A break in the riparian zone is any place on the stream banks which allows sediment or pollutants to directly enter the stream, such as paths down to stream, storm drains, uprooted trees, otter slides, etc.

FACE UPSTREAM

Lft. Bank Score Rt. Bank Score

Dominant vegetation: Trees Shrubs Grasses Weeds/old field Exotics (kudzu, etc)

A. Riparian zone intact (no breaks)		
1. width > 18 meters.....	(5)	(5)
2. width 12-18 meters.....	4	4
3. width 6-12 meters.....	3	3
4. width < 6 meters.....	2	2
B. Riparian zone not intact (breaks)		
1. breaks rare		
a. width > 18 meters.....	4	4
b. width 12-18 meters.....	3	3
c. width 6-12 meters.....	2	2
d. width < 6 meters.....	1	1
2. breaks common		
a. width > 18 meters.....	3	3
b. width 12-18 meters.....	2	2
c. width 6-12 meters.....	1	1
d. width < 6 meters.....	0	0

Total 10

Remarks _____

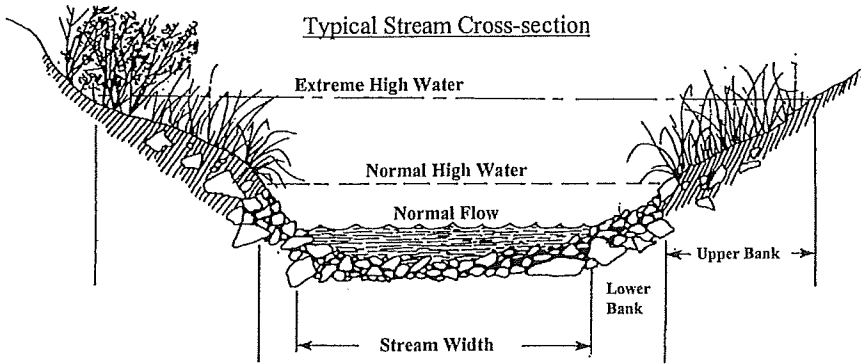
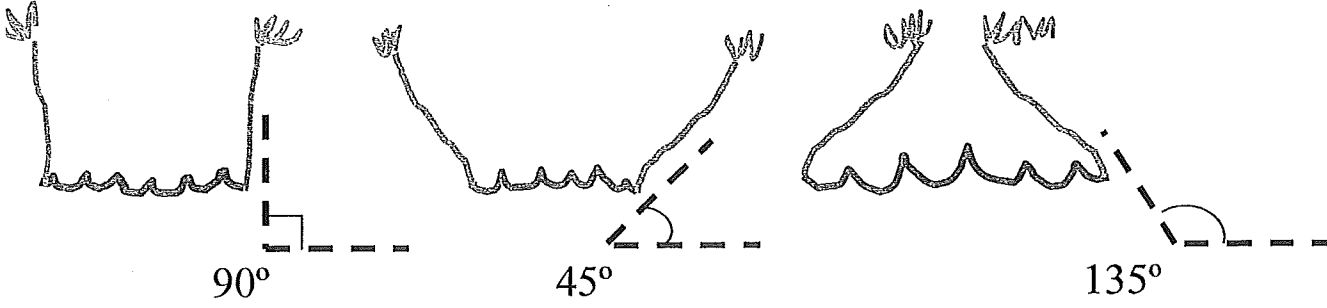
Page Total 54

Disclaimer-form filled out, but score doesn't match subjective opinion-atypical stream.

TOTAL SCORE 132

Supplement for Habitat Assessment Field Data Sheet

Diagram to determine bank angle:



This side is 45° bank angle.

Site Sketch:

Other comments:

Small fish present

Habitat Assessment Field Data Sheet
Mountain/ Piedmont Streams

Biological Assessment Unit, DWQ

TOTAL SCORE 96

Directions for use: The observer is to survey a minimum of 100 meters with 200 meters preferred of stream, preferably in an upstream direction starting above the bridge pool and the road right-of-way. The segment which is assessed should represent average stream conditions. To perform a proper habitat evaluation the observer needs to get into the stream. To complete the form, select the description which best fits the observed habitats and then circle the score. If the observed habitat falls in between two descriptions, select an intermediate score. A final habitat score is determined by adding the results from the different metrics.

Stream Big Cedar Creek Location/road: Site 3 (Road Name _____) County Stanley

Date 10/15/2013 CC# _____ Basin _____ Subbasin _____

Observer(s) KS+RB Type of Study: Fish Benthos Basinwide Special Study (Describe) _____

Latitude _____ Longitude _____ Ecoregion: MT P Slate Belt Triassic Basin

Water Quality: Temperature 18 °C DO 5.0 mg/l Conductivity (corr.) N/A μS/cm pH 7.04

Physical Characterization: Visible land use refers to immediate area that you can see from sampling location - include what you estimate driving thru the watershed in watershed land use.

Visible Land Use: _____ %Forest _____ %Residential _____ %Active Pasture _____ % Active Crops
_____ %Fallow Fields _____ % Commercial _____ %Industrial _____ %Other - Describe: _____

Watershed land use : Forest Agriculture Urban Animal operations upstream

Width: (meters) Stream 15 ft Channel (at top of bank) 25 ft Stream Depth: (m) Avg 1.5 ft Max 4 ft
 Width variable Large river >25m wide

Bank Height (from deepest part of riffle to top of bank-first flat surface you stand on): (m) 4 ft

Bank Angle: R 90° L 45° ° or NA (Vertical is 90°, horizontal is 0°. Angles > 90° indicate slope is towards mid-channel, < 90° indicate slope is away from channel. NA if bank is too low for bank angle to matter.)

- Channelized Ditch
- Deeply incised-steep, straight banks Both banks undercut at bend Channel filled in with sediment
- Recent overbank deposits Bar development Buried structures Exposed bedrock
- Excessive periphyton growth Heavy filamentous algae growth Green tinge Sewage smell
- Manmade Stabilization: N Y: Rip-rap, cement, gabions Sediment/grade-control structure Berm/levee

Flow conditions : High Normal Low
Turbidity: Clear Slightly Turbid Turbid Tannic Milky Colored (from dyes)

Good potential for Wetlands Restoration Project?? YES NO Details _____

Channel Flow Status

- Useful especially under abnormal or low flow conditions.
- A. Water reaches base of both lower banks, minimal channel substrate exposed
- B. Water fills >75% of available channel, or <25% of channel substrate is exposed.....
- C. Water fills 25-75% of available channel, many logs/snags exposed.....
- D. Root mats out of water.....
- E. Very little water in channel, mostly present as standing pools.....

Weather Conditions: 70° Sunny Photos: N Y Digital 35mm

Remarks: _____

I. Channel Modification

- A: channel natural, frequent bends..... 5
- B. channel natural, infrequent bends (channelization could be old)..... (4)
- C. some channelization present..... 3
- D. more extensive channelization, >40% of stream disrupted..... 2
- E. no bends, completely channelized or rip rapped or gabioned, etc..... 0

Evidence of dredging Evidence of desnagging=no large woody debris in stream Banks of uniform shape/height

Remarks _____ Subtotal 4

II. Instream Habitat: Consider the percentage of the reach that is favorable for benthos colonization or fish cover. If >70% of the reach is rocks, 1 type is present, circle the score of 17. Definition: leafpacks consist of older leaves that are packed together and have begun to decay (not piles of leaves in pool areas). Mark as Rare, Common, or Abundant.

7 Rocks 0 Macrophytes 11 Sticks and leafpacks 5 Snags and logs 5 Undercut banks or root mats

AMOUNT OF REACH FAVORABLE FOR COLONIZATION OR COVER

	>70%	40-70%	20-40%	<20%
	Score	Score	Score	Score
4 or 5 types present.....	20	16	12	8
3 types present.....	19	15	11	7
2 types present.....	18	14	10	6
1 type present.....	17	13	9	5
No types present.....	0			

No woody vegetation in riparian zone

Remarks _____

Subtotal 38

III. Bottom Substrate (silt, sand, detritus, gravel, cobble, boulder) Look at entire reach for substrate scoring, but only look at riffle for embeddedness, and use rocks from all parts of riffle-look for "mud line" or difficulty extracting rocks.

A. substrate with good mix of gravel, cobble and boulders

- 1. embeddedness <20% (very little sand, usually only behind large boulders)..... 15
- 2. embeddedness 20-40%..... 12
- 3. embeddedness 40-80%..... 8
- 4. embeddedness >80%..... 3

B. substrate gravel and cobble

- 1. embeddedness <20%..... (14) 12
- 2. embeddedness 20-40%..... (11)
- 3. embeddedness 40-80% 6
- 4. embeddedness >80%..... 2

C. substrate mostly gravel

- 1. embeddedness <50%..... 8
- 2. embeddedness >50%..... 4

D. substrate homogeneous

- 1. substrate nearly all bedrock..... 3
- 2. substrate nearly all sand 3
- 3. substrate nearly all detritus..... 2
- 4. substrate nearly all silt/ clay..... 1

Remarks _____

Subtotal 12

IV. Pool Variety Pools are areas of deeper than average maximum depths with little or no surface turbulence. Water velocities associated with pools are always slow. Pools may take the form of "pocket water", small pools behind boulders or obstructions, in large high gradient streams, or side eddies.

A. Pools present

- 1. Pools Frequent (>30% of 200m area surveyed)
 - a. variety of pool sizes..... 10
 - b. pools about the same size (indicates pools filling in)..... 8
- 2. Pools Infrequent (<30% of the 200m area surveyed)
 - a. variety of pool sizes..... (6)
 - b. pools about the same size..... 4

B. Pools absent

0

Subtotal 6

Pool bottom boulder-cobble-hard Bottom sandy-sink as you walk Silt bottom Some pools over wader depth

Remarks _____

Page Total 60

V. Riffle Habitats

Definition: Riffle is area of reaceration-can be debris dam, or narrow channel area.

	Riffles Frequent	Riffles Infrequent
	<u>Score</u>	<u>Score</u>
A. well defined riffle and run, riffle as wide as stream and extends 2X width of stream....	16	12
B. riffle as wide as stream but riffle length is not 2X stream width	14	7
C. riffle not as wide as stream and riffle length is not 2X stream width	10	(3)
D. riffles absent.....	0	

Channel Slope: Typical for area Steep=fast flow Low=like a coastal stream

Subtotal 3

VI. Bank Stability and Vegetation

FACE UPSTREAM

Left Bank
Score Rt. Bank
Score

A. Banks stable		
1. little evidence of erosion or bank failure(except outside of bends), little potential for erosion..	(7)	7
B. Erosion areas present		
1. diverse trees , shrubs, grass; plants healthy with good root systems.....	6	6
2. few trees or small trees and shrubs ; vegetation appears generally healthy.....	5	(5)
3. sparse mixed vegetation; plant types and conditions suggest poorer soil binding.....	3	3
4. mostly grasses , few if any trees and shrubs, high erosion and failure potential at high flow..	2	2
5. little or no bank vegetation, mass erosion and bank failure evident.....	0	0

Total 12

Remarks _____

VII. Light Penetration Canopy is defined as tree or vegetative cover directly above the stream's surface. Canopy would block out sunlight when the sun is directly overhead. Note shading from mountains, but not use to score this metric.

	<u>Score</u>
A. Stream with good canopy with some breaks for light penetration	(10)
B. Stream with full canopy - breaks for light penetration absent.....	8
C. Stream with partial canopy - sunlight and shading are essentially equal.....	7
D. Stream with minimal canopy - full sun in all but a few areas.....	2
E. No canopy and no shading.....	0

Remarks _____ Subtotal 10

VIII. Riparian Vegetative Zone Width

Definition: Riparian zone for this form is area of natural vegetation adjacent to stream (can go beyond floodplain). Definition: A break in the riparian zone is any place on the stream banks which allows sediment or pollutants to directly enter the stream, such as paths down to stream, storm drains, uprooted trees, otter slides, etc.

FACE UPSTREAM

Lft. Bank
Score Rt. Bank
Score

Dominant vegetation: Trees Shrubs Grasses Weeds/old field Exotics (kudzu, etc) ^{Priv}

A. Riparian zone intact (no breaks)		
1. width > 18 meters.....	(5)	(5)
2. width 12-18 meters.....	4	4
3. width 6-12 meters.....	3	3
4. width < 6 meters.....	2	2
B. Riparian zone not intact (breaks)		
1. breaks rare		
a. width > 18 meters.....	4	4
b. width 12-18 meters.....	3	3
c. width 6-12 meters.....	2	2
d. width < 6 meters.....	1	1
2. breaks common		
a. width > 18 meters.....	3	3
b. width 12-18 meters.....	2	2
c. width 6-12 meters.....	1	1
d. width < 6 meters.....	0	0

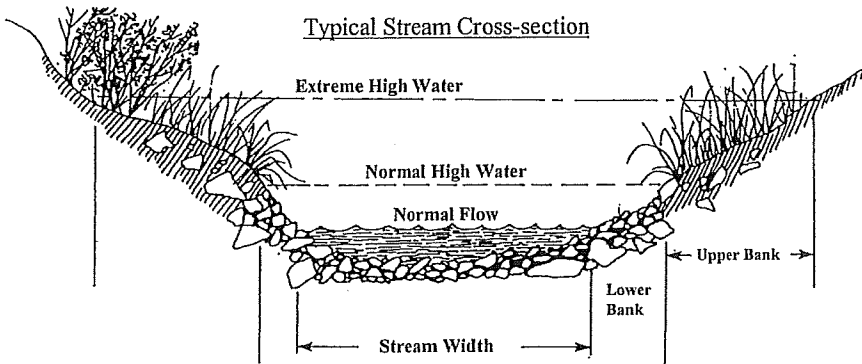
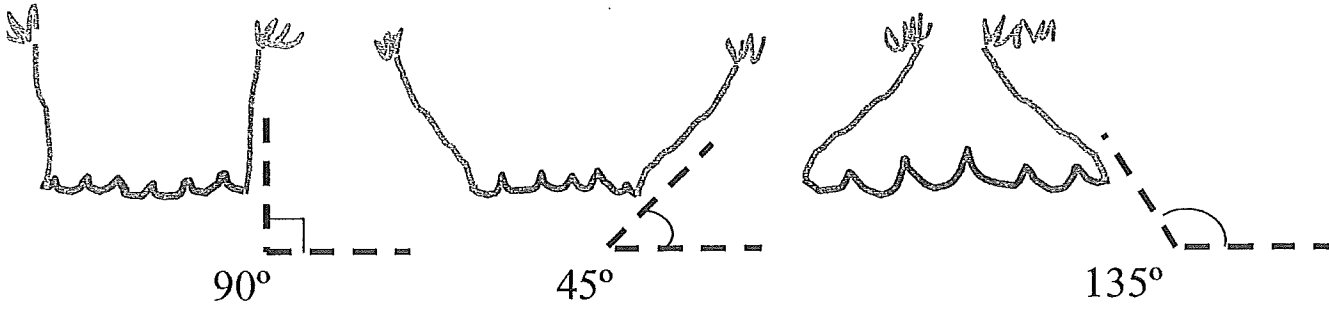
Remarks Priv in understory Total 10

Page Total 35

Disclaimer-form filled out, but score doesn't match subjective opinion-atypical stream. **TOTAL SCORE** 95

Supplement for Habitat Assessment Field Data Sheet

Diagram to determine bank angle:



This side is 45° bank angle.

Site Sketch:

Other comments:

One crayfish

One small fish

vials
pH buffer solution
batteries for conductivity meter

Habitat Assessment Field Data Sheet
Mountain/ Piedmont Streams

Biological Assessment Unit, DWQ

TOTAL SCORE 122

Directions for use: The observer is to survey a minimum of 100 meters with 200 meters preferred of stream, preferably in an upstream direction starting above the bridge pool and the road right-of-way. The segment which is assessed should represent average stream conditions. To perform a proper habitat evaluation the observer needs to get into the stream. To complete the form, select the description which best fits the observed habitats and then circle the score. If the observed habitat falls in between two descriptions, select an intermediate score. A final habitat score is determined by adding the results from the different metrics.

Stream Big Cedar Creek Location/road: Slite 4 (Road Name _____) County Stanley

Date 10/16/2013 CC# _____ Basin _____ Subbasin _____

Observer(s) KS & RB Type of Study: Fish Benthos Basinwide Special Study (Describe) _____

Latitude _____ Longitude _____ Ecoregion: MT P Slate Belt Triassic Basin

Water Quality: Temperature 18 °C DO ^{42%} 3.97 mg/l Conductivity (corr.) N/A μS/cm pH 7.32

Physical Characterization: Visible land use refers to immediate area that you can see from sampling location - include what you estimate driving thru the watershed in watershed land use.

Visible Land Use: _____ %Forest _____ %Residential _____ %Active Pasture _____ % Active Crops
_____ %Fallow Fields _____ % Commercial _____ %Industrial _____ %Other - Describe: _____

Watershed land use : Forest Agriculture Urban Animal operations upstream

Width: (meters) Stream 6 ft Channel (at top of bank) 15 ft Stream Depth: (m) Avg 1.5 ft Max 3 ft
 Width variable Large river >25m wide

Bank Height (from deepest part of riffle to top of bank-first flat surface you stand on): (m) 3.5 ft

Bank Angle: <45 ° or NA (Vertical is 90°, horizontal is 0°. Angles > 90° indicate slope is towards mid-channel, < 90° indicate slope is away from channel. NA if bank is too low for bank angle to matter.)

- Channelized Ditch Restored priority 1
- Deeply incised-steep, straight banks Both banks undercut at bend Channel filled in with sediment
- Recent overbank deposits Bar development Buried structures Exposed bedrock
- Excessive periphyton growth Heavy filamentous algae growth Green tinge Sewage smell

Manmade Stabilization: N Y: Rip-rap, cement, gabions Sediment/grade-control structure Berm/levee

Flow conditions : High Normal Low

Turbidity: Clear Slightly Turbid Turbid Tannic Milky Colored (from dyes)

Good potential for Wetlands Restoration Project?? YES NO Details _____

Channel Flow Status

Useful especially under abnormal or low flow conditions.

- A. Water reaches base of both lower banks, minimal channel substrate exposed
- B. Water fills >75% of available channel, or <25% of channel substrate is exposed.....
- C. Water fills 25-75% of available channel, many logs/snags exposed.....
- D. Root mats out of water.....
- E. Very little water in channel, mostly present as standing pools.....

Weather Conditions: cloudy 70°C Photos: N Y Digital 35mm

Remarks: Riffles with in-stream vegetation more than normal

I. Channel Modification

- A. channel natural, frequent bends..... 5
- B. channel natural, infrequent bends (channelization could be old)..... 4
- C. some channelization present..... 3
- D. more extensive channelization, >40% of stream disrupted..... 2
- E. no bends, completely channelized or rip rapped or gabioned, etc..... 0

Evidence of dredging Evidence of desnagging=no large woody debris in stream Banks of uniform shape/height

Remarks Priority 1 Restoration Subtotal 5

II. Instream Habitat: Consider the percentage of the reach that is favorable for benthos colonization or fish cover. If >70% of the reach is rocks, 1 type is present, circle the score of 17. Definition: leafpacks consist of older leaves that are packed together and have begun to decay (not piles of leaves in pool areas). Mark as Rare, Common, or Abundant.

15 Rocks 14 Macrophytes 9 Sticks and leafpacks Snags and logs 14 Undercut banks or root mats

AMOUNT OF REACH FAVORABLE FOR COLONIZATION OR COVER

	>70%	40-70%	20-40%	<20%
	Score	Score	Score	Score
4 or 5 types present.....	20	16	12	8
3 types present.....	19	15	11	7
2 types present.....	18	14	10	6
1 type present.....	17	13	9	5
No types present.....	0			

No woody vegetation in riparian zone Remarks _____ Subtotal 52

III. Bottom Substrate (silt, sand, detritus, gravel, cobble, boulder) Look at entire reach for substrate scoring, but only look at riffle for embeddedness, and use rocks from all parts of riffle-look for "mud line" or difficulty extracting rocks.

A. substrate with good mix of gravel, cobble and boulders Score

- 1. embeddedness <20% (very little sand, usually only behind large boulders)..... 15
- 2. embeddedness 20-40%..... 12
- 3. embeddedness 40-80%..... 8
- 4. embeddedness >80%..... 3

B. substrate gravel and cobble

- 1. embeddedness <20%..... 14
- 2. embeddedness 20-40%..... 11
- 3. embeddedness 40-80% 6
- 4. embeddedness >80%..... 2

C. substrate mostly gravel

- 1. embeddedness <50%..... 8
- 2. embeddedness >50%..... 4

D. substrate homogeneous

- 1. substrate nearly all bedrock..... 3
- 2. substrate nearly all sand 3
- 3. substrate nearly all detritus..... 2
- 4. substrate nearly all silt/ clay..... 1

Remarks _____ Subtotal 15

IV. Pool Variety Pools are areas of deeper than average maximum depths with little or no surface turbulence. Water velocities associated with pools are always slow. Pools may take the form of "pocket water", small pools behind boulders or obstructions, in large high gradient streams, or side eddies.

A. Pools present Score

- 1. Pools Frequent (>30% of 200m area surveyed)
 - a. variety of pool sizes..... 10
 - b. pools about the same size (indicates pools filling in)..... 8
- 2. Pools Infrequent (<30% of the 200m area surveyed)
 - a. variety of pool sizes..... 6
 - b. pools about the same size..... 4

B. Pools absent..... 0 Subtotal 8

Pool bottom boulder-cobble=hard Bottom sandy-sink as you walk Silt bottom Some pools over wader depth

Remarks Sandy-silty but not sinking

V. Riffle Habitats

Definition: Riffle is area of reaeration-can be debris dam, or narrow channel area. Riffles **Frequent** Riffles **Infrequent**

	<u>Score</u>	<u>Score</u>
A. well defined riffle and run, riffle as wide as stream and extends 2X width of stream....	16	12
B. riffle as wide as stream but riffle length is not 2X stream width	14	7
C. riffle not as wide as stream and riffle length is not 2X stream width	10	3
D. riffles absent.....	0	

Channel Slope: Typical for area Steep=fast flow Low=like a coastal stream Subtotal 16

VI. Bank Stability and Vegetation

FACE UPSTREAM

Left Bank Score Rt. Bank Score

A. Banks stable

1. little evidence of erosion or bank failure(except outside of bends), little potential for erosion. (7) (7)

B. Erosion areas present

1. diverse trees , shrubs, grass; plants healthy with good root systems.....	6	6
2. few trees or small trees and shrubs ; vegetation appears generally healthy.....	5	5
3. sparse mixed vegetation; plant types and conditions suggest poorer soil binding.....	3	3
4. mostly grasses , few if any trees and shrubs, high erosion and failure potential at high flow..	2	2
5. little or no bank vegetation, mass erosion and bank failure evident.....	0	0

Total 14

Remarks Restoration Priority 1

VII. Light Penetration Canopy is defined as tree or vegetative cover directly above the stream's surface. Canopy would block out sunlight when the sun is directly overhead. Note shading from mountains, but not use to score this metric.

	<u>Score</u>
A. Stream with good canopy with some breaks for light penetration	10
B. Stream with full canopy - breaks for light penetration absent.....	8
C. Stream with partial canopy - sunlight and shading are essentially equal.....	7
D. Stream with minimal canopy - full sun in all but a few areas.....	(2)
E. No canopy and no shading.....	0

Remarks Year 5 post construction Subtotal 2

VIII. Riparian Vegetative Zone Width

Definition: Riparian zone for this form is area of natural vegetation adjacent to stream (can go beyond floodplain). Definition: A break in the riparian zone is any place on the stream banks which allows sediment or pollutants to directly enter the stream, such as paths down to stream, storm drains, uprooted trees, otter slides, etc.

FACE UPSTREAM

Lft. Bank Score Rt. Bank Score

Dominant vegetation: Trees Shrubs Grasses Weeds/old field Exotics (kudzu, etc)

A. Riparian zone intact (no breaks)

1. width > 18 meters.....	(5)	(5)
2. width 12-18 meters.....	4	4
3. width 6-12 meters.....	3	3
4. width < 6 meters.....	2	2

B. Riparian zone not intact (breaks)

1. breaks rare		
a. width > 18 meters.....	4	4
b. width 12-18 meters.....	3	3
c. width 6-12 meters.....	2	2
d. width < 6 meters.....	1	1
2. breaks common		
a. width > 18 meters.....	3	3
b. width 12-18 meters.....	2	2
c. width 6-12 meters.....	1	1
d. width < 6 meters.....	0	0

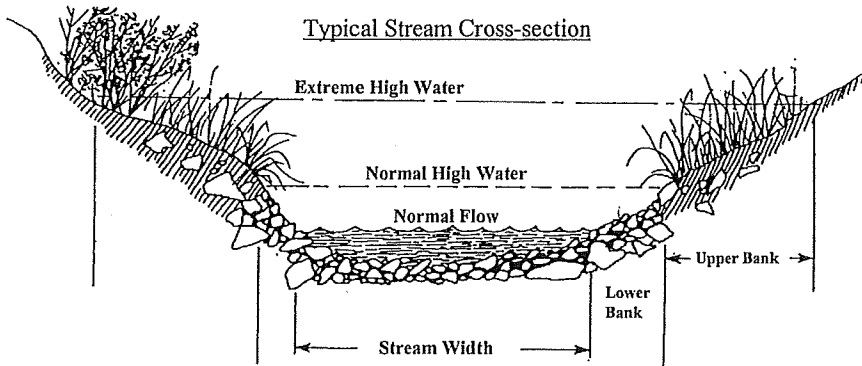
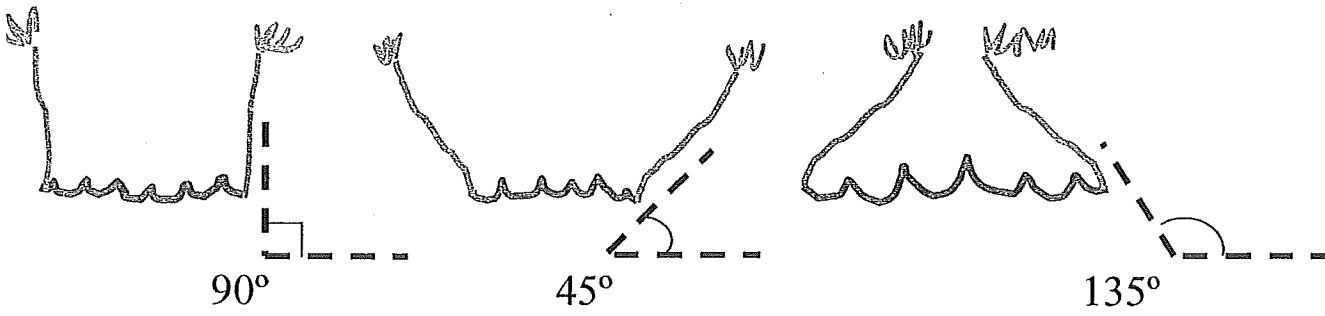
Remarks _____ Total 10

Page Total 42

Disclaimer-form filled out, but score doesn't match subjective opinion-atypical stream: **TOTAL SCORE** 122

Supplement for Habitat Assessment Field Data Sheet

Diagram to determine bank angle:



This side is 45° bank angle.

Site Sketch:

Other comments:

School of small fish

lots of crawfish + tadpoles

TABLE F.1. BENTHOS DATA

Big Cedar Creek Stream Restoration Project Collected on October 15, 16, & 17, 2013						
SPECIES	Tolerance Value	Functional Feeding Group	Site 1 Reference 10/17/2013	Site 2 U/S Big Cedar 10/17/2013	Site 3 D/S Big Cedar 10/15/2013	Site 4 UT1 to Big Cedar 10/16/2013
PLATYHELMINTHES - Phylum						
Turbellaria - Class						
Tricladida - Order						
Dugesiidae -Family						
<i>Girardia (Dugesia) tigrina- Genus Species</i>	7.1				6	
<i>Phagocata sp.</i>						8
MOLLUSCA						
Gastropoda						
Basommatophora (Limnophila NC)						
Lymnaeidae		SC				
<i>Pseudosuccinea columella</i>	7.7	SC		1		5
Physidae						
<i>Physella sp.</i>	8.7	CG	11	3	5	8
Planorbidae		SC				
<i>Helisoma anceps</i>	6.6	SC		14	1	
<i>Menetus dilatatus</i>	7.6	SC	2			
ANNELIDA						
Clitellata						
Oligochaeta						
Tubificida						
Lumbricidae		SC		1		2
Naididae		CG				
<i>Branchiodrilus hortensis</i>					1	
<i>Nais communis</i>	8.7	CG			1	
<i>Stylaria lacustris</i>	8.4	CG		4		
Tubificinae w.h.c.		CG			1	
Lumbriculida						
Lumbriculidae		CG				
<i>Lumbriculus sp.</i>		CG			6	
ARTHROPODA						
Arachnoidea						
Acariformes						
Hygrobatidae						
<i>Atractides sp.</i>		-	1		1	3
Crustacea						
Cladocera						
Daphnidae						
<i>Ceriodaphnia sp.</i>			4		2	1
Copepoda						
Cyclopoida						
<i>Macrocyclus albidus</i>			1	1	1	2
Isopoda						
Asellidae						
<i>Caecidotea sp.</i>	8.4	CG	13		51	1
Amphipoda						
Crangonyctidae						
<i>Crangonyx sp.</i>	7.2	CG	3			41
Insecta						
Ephemeroptera						
Baetidae						
<i>Baetis flavistriga</i>	6.8	CG	12	7	22	
<i>Baetis intercalaris</i>	5	CG		1	2	
<i>Callibaetis sp.</i>	9.2	CG				4
<i>Centroptilum sp.</i>	3.8	CG	2	10		
<i>Dipheter hagani</i>	1.1			1		

TABLE F.1. BENTHOS DATA

Big Cedar Creek Stream Restoration Project Collected on October 15, 16, & 17, 2013						
SPECIES	Tolerance Value	Functional Feeding Group	Site 1 Reference 10/17/2013	Site 2 U/S Big Cedar 10/17/2013	Site 3 D/S Big Cedar 10/15/2013	Site 4 UT1 to Big Cedar 10/16/2013
Caenidae		CG				
<i>Caenis sp.</i>	6.8	CG	15	41	52	78
Heptageniidae		SC				
<i>Leucrocuta sp.</i>	2	SC	5	1	6	
<i>Maccaffertium modestum</i>	5.7	SC	46	4	7	
<i>Stenonema femoratum</i>	6.9	SC	8	3	2	4
Odonata						
Aeshnidae		P				
<i>Basiaeschna janata</i>	7.1					3
<i>Boyeria vinosa</i>	5.8	P	1	2	1	
Calopterygidae		P				
<i>Calopteryx maculata</i>	7.5	P	20			
<i>Calopteryx sp.</i>	7.5	P		1		1
Coenagrionidae		P				
<i>Argia sp.</i>	8.3	P	2	32		4
<i>Argia sedula</i>	8.3	P			11	
<i>Enallagma sp.</i>	8.5	P		43	13	7
<i>Ischnura sp.</i>	9.5		1	51		7
Gomphidae		P				
<i>Gomphus exilis</i>	5.9				1	
<i>Gomphus sp.</i>	5.9	P		1		
Libellulidae		P		7		1
<i>Epicordulia princeps</i>	7.3	P			1	
<i>Libellula sp.</i>	9.4	P	1			
<i>Pachydiplax longipennis</i>	9.6			1		
<i>Perithemis sp.</i>	9.4	P	1			
<i>Somatochlora tenebrosa</i>	8.9			1		2
Plecoptera						
Perlodidae		P	2			
Hemiptera						
Gerridae		P				
<i>Aquarius sp.</i>		P	1			
Nepidae						
<i>Ranatra sp.</i>	6.3			1		
Notonectidae						
<i>Notonecta sp.</i>		P	2			
Veliidae		P				
<i>Microvelia sp.</i>		P	2			
Megaloptera						
Sialidae		P				
<i>Sialis sp.</i>	7	P	1			
Trichoptera						
Hydropsychidae		FC				
<i>Cheumatopsyche sp.</i>	6.6	FC	2	2	4	
<i>Diplectrona modesta</i>	2.3	FC	1			
<i>Hydropsyche sp.</i>		FC		1		
Philopotamidae		FC				
<i>Chimarra sp.</i>	3.3	FC	18	3	11	1
Coleoptera						
Curculionidae			2			
<i>Helichus fastigiatus</i>	4.1	SC	4	1		
Dytiscidae		P	4		1	
<i>Neoporos sp.</i>	5		1		1	
Elmidae		CG				
<i>Stenelmis sp.</i>	5.6	SC		5	2	
Haliplidae						

TABLE F.1. BENTHOS DATA

Big Cedar Creek Stream Restoration Project Collected on October 15, 16, & 17, 2013						
SPECIES	Tolerance Value	Functional Feeding Group	Site 1 Reference 10/17/2013	Site 2 U/S Big Cedar 10/17/2013	Site 3 D/S Big Cedar 10/15/2013	Site 4 UT1 to Big Cedar 10/16/2013
<i>Haliphus triopsis</i>		SH		1		
<i>Peltodytes sp.</i>	8.4	SH				13
Psephenidae		SC				
<i>Psephenus herricki</i>	2.3	SC	2		16	
Diptera						
Chironomidae						
<i>Ablabesmyia mallochi</i>	7.4	P	2	1		
<i>Chironomus sp.</i>	9.3	CG	2			
<i>Conchapelopia sp.</i>	8.4	P		4	2	
<i>Corynoneura sp.</i>	5.7	CG			1	
<i>Dicrotendipes neomodestus</i>	7.9	CG	1			
<i>Paramerina sp.</i>	4.1	P		1		
<i>Parametriocnemus sp.</i>	3.9	CG			1	
<i>Paratanytarsus sp.</i>	8	CG			1	
<i>Paratendipes albimanus/duplicatus</i>	5.6			1		
<i>Phaenopsectra punctipes gp.</i>	7.1		1			
<i>Polypedilum aviceps</i>	3.6		1			
<i>Polypedilum flavum</i>	5.7	SH	1			
<i>Polypedilum illinoense gp.</i>	8.7	SH		1	5	
<i>Rheotanytarsus exiguus gp.</i>	6.5	FC			1	
<i>Tanytarsus sp.</i>	6.6	FC	1	2		
<i>Tribelos jucundum</i>	5.7		10			
Culicidae		FC				
<i>Anopheles sp.</i>	8.6	FC	12	28	11	1
Dixidae		CG				
<i>Dixella sp.</i>		CG	1			
Simuliidae		FC				
<i>Simulium verecundum complex</i>	4.9			5	5	
Tipulidae		SH				
<i>Tipula sp.</i>	7.5	SH			4	
Total Number of Organisms			223	288	260	197
Total Taxa Richness			42	38	37	22
EPT Taxa Richness			10	11	8	4
Total Biotic Index			6.61	7.07	6.55	7.79

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